volume 1

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eem PRODUCT SECTIONS
1100-2100

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- eem Product Sections 2200-6000

20th edition

eem 77 78

electronic engineers master catalog

see companion
volume 2
(PAGES 2381-4722/SECTIONS 2200-6000)

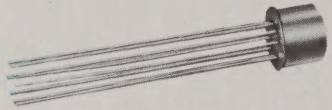
INCORPORATED

INDUSTRIAL PRODUCTS SELECTION GUIDE

MINIATURE SEALED INDUSTRIAL RELAYS

Reduces Maintenance and Service Cost

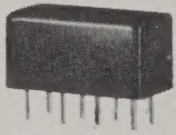
The smallest physical size industrial relays available, providing the ultimate in reliable switching capability. Hermetic sealing prevents contamination — assures long life, trouble-free operation — sharply reduces maintenance and service cost. Ideal for data processing, communications, machine control, remote station, and power and low-level switching. . . in any environment containing dust, moisture, corrosive or explosive materials.



See Page 3545

TO-5 SERIES

Hermetically sealed DPDT relays with switching capabilities from Dry Circuit to 1 ampere at coil sensitivities from 60 MW. available with and without internal diode coil suppression.



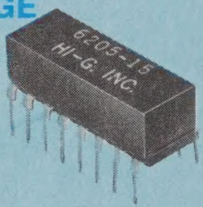
See Page 3545

½ SIZE CRYSTAL CAN RELAYS

High speed hermetically sealed DPDT relays with switching capabilities from Dry Circuit to 5 amperes, at coil sensitivity of 350 MW.

SOLID STATE TIMERS

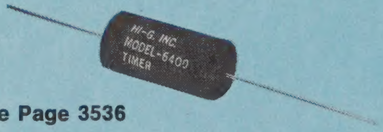
DIP PACKAGE TIMER



See Page 3536

No external components required for these 6200/6300 Timers. Model 6200 for Delay-On-Make, 6300 for Interval (one shot) applications. Choose from Sink or Source Models in 5, 12, 24 or 48 VDC inputs. Use Model MCG-5 for 5 VDC Master Clear Generator function.

IN-LINE TIMER



See Page 3536

Eliminate relay race with Delay-On-Make Model 6400. Stocked fixed delays of 1, 5, 10, 30 and 60 sec. for 6, 12, 24 and 48 VDC input power. Adjustable models and delays to 120 sec. available. Solid state output for inductive loads to 2 amps. Reverse polarity protected.

CMOS DIGITAL TIME DELAY RELAYS

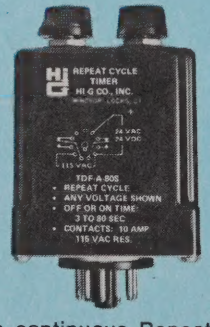
TIME DELAY RELAY
EXT SWITCH
24 VAC
24 VDC
MODEL
TDP-1
FIELD PROGRAM OPTIONS

MODELS
TDP
TDR
TDO
TDN

See
Pages 3528, 3529

Programmable Models TDP permit user selection of two modes: DELAY-ON-OPERATE, or DELAY-ON-RELEASE. Depending on the specific model selected, the input voltage ranges possible are: 12/24 VDC or 24/120 VAC plus 24 VDC, or 120/240 VAC. Two delay ranges are available, depending on model chosen: 0.3 seconds to 300 seconds, or 1 to 120 minutes. Within these basic ranges jumper selectable ranges are possible. Non-programmable conventional models TDO, TDR, TDN are shown on Page 3528.

MODELS
TDF
TDI

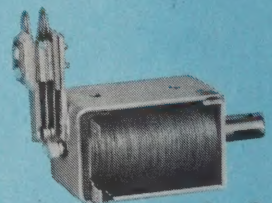


See Page 3531

Model TDF provides continuous Repeat Cycling (Flasher) action. Model TDI — Delayed Interval Timer delivers a single OFF-ON-OFF cycle. Initiation always starts the OFF period first. Individual non-interacting controls adjust OFF/ON ratio. Both models operate from 24 VAC, 24 VDC or 120 VAC. Three timing ranges available.

SOLENOIDS

THE INTERCHANGEABLES



See Page 3524

Low cost D-frame solenoids completely interchangeable with industry recognized standard sizes. Standard options include choice of clevis, push or pull, and plunger operated switch.

THE PROBLEM SOLVERS

See Page 3526

More than 2300 standard "off the shelf" solenoid combinations available in (8) basic sizes. A unique Design Engineers Solenoid Kit is offered as well.

TUBULARS

See Page 3525

Both regular duty and extra duty types are offered in a choice of push or pull operation. Four coil voltages and four duty cycles are standard.

CUSTOM SOLENOIDS

See Page 3525

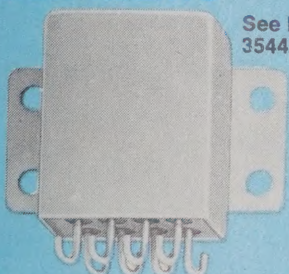
Magnetic has custom designed numerous solenoids requiring special performance characteristics. Pictured is a print head solenoid for high speed dot matrix impact printing.

Hi-G, INCORPORATED
580 Spring Street
Windsor Locks, Connecticut 06096
Tel: (203) 623-2481

MILITARY PRODUCTS SELECTION GUIDE

INCORPORATED

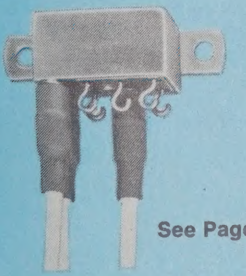
POWER RELAYS



See Pages 3544, 3546

Power switching up to 10 Amperes in accordance with Mil-R-5757/23-/28. Available in a full range of coil resistances and mounting configurations to provide versatility of this Qualified product.

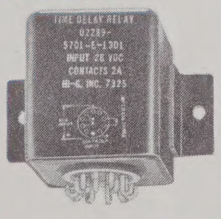
RADIO FREQUENCY RELAYS



See Page 3542

A complete line of RF switching devices with 200 watt handling capabilities at coil sensitivities of 250 MW VSWR characteristics of 1.1:1 to 500 MHz in cable impedances of 50 - 75 - 95 ohms.

DELAY ON RELEASE TIMERS



See Page 3533

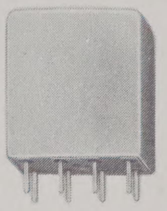
Series 5600/5700 offers 2, 5 and 10 amp contacts, one or two pole, delays to 2 hours, temperature ranges −55°C to +85°C or +125°C and are hermetically sealed.

SENSORS

See Page 3537

Series 1300 for voltage, 1400 for phase and 7000 for frequency. Available with solid state or relay output; military or commercial applications/packaging.

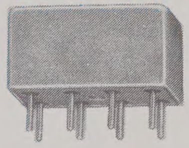
CRYSTAL CAN RELAYS



See Pages 3544, 3547

Reliable switching in a full size crystal can relay qualified to Mil-R-5757/10. Coil sensitivity of 250 MW. and contact ratings from low level to 2.0 ampere.

1/2 SIZE CRYSTAL CAN RELAY



See Pages 3543, 3546

A long established relay design providing reliability and switch performance to the qualified standards of MIL-R-39016/6 — Dry Circuit to 2 Amperes at switching sensitivities of 250 MW. Level "L" and "M" Qualification available.

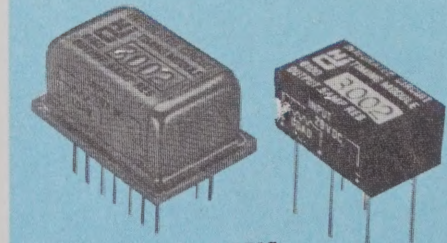
INTERVAL TIMER

4622-A-5001
TIME DELAY RELAY
INPUT 28 VDC
CONTACTS 4A
HI-G, INC.
7145

See Page 3533

Series 4600/4700/4800 offer one shot function for 10 milliseconds to 2 hours in relay or solid state output. Factory fixed or field adjustable. Hermetically sealed, AC or DC inputs and temperatures to 125°C.

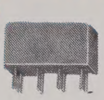
MIL-R-83726/13 THICK FILM TIMERS



See Page 3535

Delay on operate solid state output in 5, 12 and 24 VDC inputs 0.3″ wide x 0.1″ grid pin spacing. Model 6100 is epoxy and 6150 hermetically sealed. Model 6001 qualified to MIL-R-83726/13.

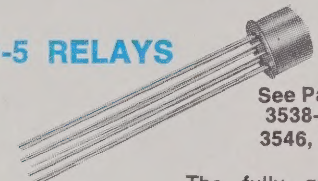
1/5 SIZE CRYSTAL CAN RELAYS



See Pages 3543, 3546

The ultimate in relay design, size and capability — Dry Circuit to 2 Amperes in a package capable of withstanding today's environmental stresses — Qualified to Mil-R-39016/13. Level "L" and "M" Qualification available.

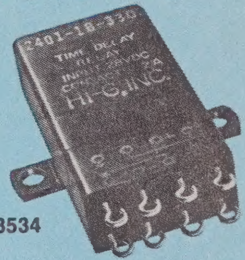
TO-5 RELAYS



See Pages 3538-3541, 3546, 3547

The fully qualified TO-5 series with switching capabilities from Dry Circuit to 1 Ampere at coil sensitivities from 60 MW. Qualified to Mil-R-39016/7-/9-/10-/11. Diode and Suppression Steering version qualified to MIL-R-39016/15 . Level "L" and "M" Qualification available. Transistor driven hybrid relays qualified to MIL-R-28776.

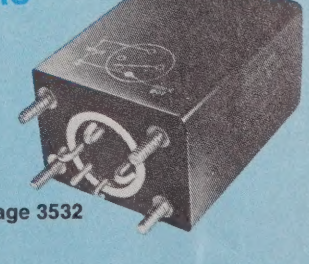
DELAY ON OPERATE TIMERS



See Page 3534

Series 2400-Crystal can (1.5″ max.) factory fixed to 120 seconds, DPDT, 2 amp contacts and temperatures −55°C to +125°C.

VERSATILE DELAY ON OPERATE TIMERS



See Page 3532

For loads to 10 amps delays to 2 hours, AC or DC input, up to 4 PDT output. Series 1600 factory set; 1700 resistor adjustable with temperatures to 125°C.

HOW TO USE eem

eem/Electronic Engineers Master is the world's largest single collection of catalog pages from the manufacturers of electronic and electro-mechanical components, systems and equipment.

The catalog pages are divided into 43 product sections for rapid comparison and evaluation of similar products.

1. ALPHABETICAL INDEX OF MANUFACTURERS' CATALOG PAGES

To locate a particular manufacturers' catalog page by manufacturers' name, look them up in the complete alphabetical index which appears at the beginning of **Volumes 1 & 2.**

2. MANUFACTURERS' INDEX TO CATALOG PAGES BY eem PRODUCT SECTION NUMBER

To locate a particular manufacturers' catalog pages by one of the 43 product sections, look them up by section number in the complete index which appears at the beginning of **Volumes 1 & 2.**

3. PRODUCT INDEX AND DIRECTORY

The Product Index begins on **Page 1 of Volume 1.**

To locate a specific product, look in the alphabetical Product Index and Directory. Under each product heading, manufacturers are listed alphabetically. Those manufacturers with product information in the catalog are shown in **bold face** type with page numbers. For catalog information on this product, refer to the page numbers shown. Where a **bold face** listing appears with an asterisk, the product is not cataloged in this edition. Those manufacturers who have submitted data to verify that they do manufacture this product but have no further data in this edition, are shown in light face type.

NOTE:
The letter "**d**" preceding the listing indicates the product is available from distributors.

The letter "**m**" preceding the listing indicates the product is available to military specifications.

4. eem FILE SYSTEM

The **eem** File System is a method of conveniently filing manufacturers' catalogs, technical bulletins or magazine articles. It is divided into 43 product sections to coincide with the **eem** product section numbers as used in this edition. Use this index to file and locate information on specific products. In addition, in the sub-classification of **eem** products all similar products are grouped together by **eem** product section numbers. The **eem** File System begins on the green edged pages at the back of the Product Index and Directory.

5. MANUFACTURERS, SALES OFFICES AND TRADE MARKS DIRECTORY

To locate a manufacturer by name, refer to the alphabetical Manufacturers, Sales Offices and Trade Marks Directory. Each listing contains complete address and phone numbers of main offices, branch offices, local representatives and local distributors.

Bold face listings indicate manufacturers who have catalog pages in this edition. Their page numbers are included. Trade marks with descriptions of the products and names of their manufacturers are combined alphabetically with manufacturers' names and are identified by (TM).

Plus . . . This important additional information:
Federal Supply Code (FSC) Number
Corporate Logos

The Manufacturers' Directory begins on the yellow pages immediately following the green edged pages of the Product Index and Directory.

6. MANUFACTURERS' CATALOG PAGES

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- Manufacturers' Catalog Pages — **eem** Product Section Number 2200-6000

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43 PRODUCT SECTIONS

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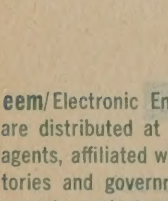

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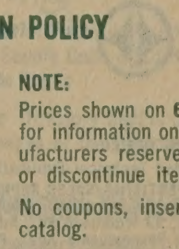
A bound catalog file for the complete product data of hundreds of manufacturers. This Catalog is divided into 43 product sections, to simplify and speed the comparison and evaluation of similar products. An industry-wide Product Directory plus a Directory of Manufacturers and Trade Marks place the products and sales offices of 3,000 manufacturers at the fingertips of the user.



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This index provides an alphabetical listing of manufacturers' pages and where to find them.

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  Microelectronics
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Raytheon Co.
  Distributor Products Oper.
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Bell, Inc., F. W.
Berkeley Instruments, Inc.
Bird Electronics Corp.
Boonton Electronics Corp.
California Instrument Co.
Chatsworth Data Corp.
Clarke-Hess Comm.
Comstrom/Seg
Continental Leasing
Continental Specialties Corp.
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EMICO Sheller Globe Corp.
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Exact Electronics
Faria Meter Corp.
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Freed Transformer Co., Inc.
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Gralex Industries
  Div. General Microwave
Hipotronics, Inc.
Hoyt Electrical Instrument
  Works, Inc.
Hughes Aircraft Ind'l. Prods. Div.
Instruments for Industry, Inc.
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ITT Jennings
International Crystal Mfg.
Jewell Electrical
Kay Elementrics Corp.
Krohn-Hite Corp.
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London Co., The
McGraw Edison Co.
Marconi Instrument Div. Marconi
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Moxon, Inc.
Nationwide Electronic
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Norland Instruments
North Atlantic
Philips Test and Measuring
Polarad Electronic Instruments
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Anaren Microwave, Inc.
Daico Industries, Inc.
Gralex Industries
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Hope Electronics
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Anaheim
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Bodine Electric Co.
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Computer Devices Corp. of Calif.
Delevan
  Div. American Precision
Eastern Air Devices
Electro-Craft Corp.
Fabricast, Inc.
Gemcor (Gen. Electro Mech.)
General Electric Co.
Graphite Metallizing Corp.
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Ledex, Inc.
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Micro-Mo Electronics, Inc.
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Pittman Corp., The
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Advanced High Voltage, Inc.
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Bertan Associates, Inc.
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Mid-Eastern Industries
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North Hills Electronics, Inc.
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Elgar Corp.
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ITT Jennings
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Kurman Relay
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Midtex, Inc.
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Sanford Miller Corp.
Sarkes Tarzian, Inc.
Semtech Corp.
Solid State Devices, Inc.
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Chicago Lock
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Chicago Lock Co.
Clare-Pendar
Control Switch
Crouse-Hinds
CW Industries
Digitran Co.
Durakool
Electro Mechanical
  Components, Inc.
Electroswitch Corp.
Fifth Dimension, Inc.
Grayhill, Inc.
Hamlin
Heinemann Electric Co.
IEE/Schadow, Inc.
Illuminated Products, Inc.
Info-lite Corp.
Interswitch
ITT Jennings
Janco Corp.
Ledex, Inc.
Licon
LVC Industries
Littelfuse, Inc.
Master Specialties
Maxi Switch, Inc.
MCG Electronics, Inc.
McGill Mfg. Co.
McGraw Edison
Mechanical Enterprises, Inc.
Micro Switch
Minelco Div. General Time
Oak Industries, Inc.
Ohmite Mfg. Co.
Oslo Controls
Otto Controls Div.
RCL Electronics Div. AMP
Raytheon Co.
  Distributor Products Operations
Refac
Shallco, Inc.
Shigoto Industries, Ltd.
Stackpole Comps.
Standard Grigsby, Inc.
Standex Electronics
Stanford Applied Eng.
Switchcraft
T-Bar, Inc.
Tapeswitch Corp. of America
Tech Labs
UID Electronics Div. AMF
Unimax Switch Corp.
Veetronix, Inc.

eem PRODUCT SECTION 5300

Thermocouple, Elements & Accessories 4312-4334

Carborundum Co.
Elmwood Sensors, Inc.
Fenwal Electronics
Keystone Carbon Co.
Midwest Components, Inc.
Murata Corp. of America
No. American Philips Controls
Omega Engineering, Inc.
RFL Industries, Inc.

eem PRODUCT SECTION 5400

Tools (Hand & Power)/ Soldering Supplies 4327-4333

Channellock, Inc.
Edsyn, Inc.
Hexacon Electric Co.
Technitool

eem PRODUCT SECTION 5500

Transducers 4336-4348

American Aerospace Controls, Inc.
Bell, Inc., F. W.
Bolt Beranek & Newman, Inc.
Entran Devices, Inc.
Linden Laboratories
Ohio Semitronics, Inc.

eem PRODUCT SECTION 5600

Transformers 4349-4517

Abbott Transistor Labs, Inc.
Coil Co. of America
Essex Controls
  Div. Essex International, Inc.
EWC, Inc.
Freed Transformer Co., Inc.
GenRad
Hisonic, Inc.
Inductive Components, Inc.
KGS Electronics
Magnetico, Inc.
Microtran Co., Inc.
Neshaminy Transformer Co.
North Hills Electronics, Inc.
NWL Transformers
Ohmite Mfg. Co.
Perkin Elmer Corp.
Pico Electronics, Inc.
Signal Transformer Co., Inc.
Sprague Products Co.
Staco, Inc.
Sterling Transformer Corp.
Superior Electric Co.
Technitrol, Inc.
Thordarson Meissner
TRW/UTC Transformers
Todd Systems
Torotel, Inc.
Torwico Electronics, Inc.
Triad-Utrad Distributor Services

eem PRODUCT SECTION 5700

Tubes & Tube Parts .. 4518-4521

Amperex Electronic Corp.
Inter-Tech Group, Inc.
Victoreen Instrument
  Div. Sheller Globe

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Wire/Cable/Harnesses & Accessories 4522-4722

Alpha Wire Corp.
Belden Corp. Electronic Div.
Breeze-Illinois, Inc.
Columbia Electronic Cables
Consolidated Wire & Assoc. Corp.
Daburn Electronics & Cable Corp.
Dearborn Wire & Cable Co.
Electroweave, Inc.
Essex Controls
  Div. Essex International, Inc.
Grayhill, Inc.
Heyman Mfg. Co., Inc.
Markel & Sons, Frank L.
National Wire & Cable Corp.
Panduit Corp.
Philadelphia Insul. Wire Co., Inc.
Rowe Industries, Inc.
Shigoto Industries, Ltd.
Standard Wire & Cable Co.
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Whitmor Wire & Cable Corp.
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NOTE: The letter "d" preceding the listing indicates the product is available from distributors.
The letter "m" preceding the listing indicates the product is available to military specifications.

Abrasive Belts, Compounds, Cords, Powders, etc.

Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
D Cratex Rubberized Abrasives, Dept. EM, 1600 Rollins Rd., Burlingame, Cal. 94010
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
M Hoffman Co., P. R., Div. of Aiken Inds., Inc., Dept. EM, 321 Cherry St., Carlisle, Pa. 17013
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Norton Co., Public Relations Dept., Dept. EM, One New Bond St., Worcester, Mass. 01606
SGL Abrasives, Dept. EM, North Pitt St. Ext., Carlisle, Pa. 17013
Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123

Absorbers, Microwave

Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Electronautics, Dept. Dielectric Comm., Dept. EM, Newtown Rd., Littleton, Mass. 01460
General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Accelerometers

BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... p. 4339
Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 p. 4341
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
M Bendix-Guidance Systems, Dept. EM, Teterboro, N.J. 07608
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Engdahl Enterprises, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626
M Genisco Tech. Corp., Transducers, Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
D IMPACT-O-GRAPH Div., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Media Recovery Inc., Dept. EM, Box 867, Graham, Tex. 76046
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Setra Systems Inc., Dept. EM, 12 Huron Dr., Natick, Mass. 01760
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Actuators, Servo, Linear

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .. p. 3949
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401** *
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** *
M **Regdon Corp., Dept. EM, 3715 Grand Blvd., Brookfield, Ill 60513** *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** *
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Icon Division, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142
Jordan Controls, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Lisk, G.W. Co., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432
M Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
M Servotronics, Inc., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749

Actuators, Servo, Rotary

M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** *
Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 *
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401** p. 3571,3572
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** *
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
D Hills-McCanna Co., Dept. EM, 400 Maple Ave., Carpentersville, Ill. 60110
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Icon Division, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
Jamesbury Corp., Dept. EM, 640 Lincoln St., Worcester, Mass. 01605
Jordan Controls, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Lisk, G.W. Co., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432
M Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749

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Adapters, Panoramic—See Receivers, Panoramic

Adapters, Waveguide

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix Corp., The, Electrical Comp. Div., Dept. EM, Sidney, N.Y. 13838
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Adhesives, Conducting

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 *
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** *
D **Techni-Tool, Inc., Total Spectrum Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** *
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234** *
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 *
Ablestik Laboratories, Dept. EM, 833 W. 182nd St., Gardena, Cal. 90248
Acme Chemical & Insulation Co., Dept. EM, 166 Chapel St., New Haven, Conn. 06513
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ambroid Co., Dept. EM, P.O. Box 1089, Taunton, MA 02780
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
M Armstrong Cork Co., Dept. EM, W. Liberty St., Lancaster, Pa. 17604
M Armstrong Prods. Co., Dept. EM, Box 657, Warsaw, Ind. 46580
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
DM Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936

Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
Leepoxy Plastics, Dept. EM, 3324 Ferguson Rd., Ft. Wayne, Ind. 46809
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif, 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
DM Oneida Electronics Mfg., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
M Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Tra-Con, Inc., Dept. EM, 55 North St., Medford, Mass. 02155
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Adhesives, General Purpose

Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... p. 4325
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
M Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
Metron Optics, Dept. EM, P.O. Box 690, Solana Beach, Cal. 92075
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221

Adhesives, Insulating

D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
M Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
D Techcon Systems Inc., Dept. EM, 16016 So. Figueroa St., Gardena, Cal 90248

Air Cleaners & Filters (Shielded & Unshielded)

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 .. *
Evans, George Corp., Dept. EM, 121 37th St., Moline, Ill. 61265 .... p. 2696
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... ***
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 .... ***
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
Air-Maze Div., Dept. EM, 25000 Miles Rd., Cleveland, Ohio 44128
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
M Aluminum Filter Co., Dept. EM, PO Box 1311, Santa Barbara, Cal. 91302
AMF Inc., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450
Atmosphere Controls Prdts., Dept. EM, 295 Polaris, Mt. View, Cal. 94043
Baker Co., Inc., Dept. EM, Drawer E - Sanford Airport, Sanford, Me. 04073
M Balston, Inc., Dept. EM, Box C, 703 Massachusetts Ave., Lexington, Mass 02173
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Carey Elctrn. Engrg. Co., Dept. EM, 1880 Clifton Ave., Springfield, Ohio 45505
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
D Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
D Johnson Corp., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Midget Louver Co., Dept. EM, 800 Main Ave., Norwalk, Conn. 06852
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
Pall Corp., Dept. EM, 30 Sea Cliff Ave., Glen Cove, N.Y. 11542
Pall Trinity Micro Corp., Dept. EM, Rte. 281, Cortland, N.Y. 13045
M Research Prods. Corp., Dept. EM, 1015 E Washington Ave., Madison, Wisc 53701
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Weber Tech Products, Dept. EM, 1340 Monroe Ave. N.W., Grand Rapids, Mich. 49505
M Wire Cloth Enterprises, Inc., Dept. EM, 130-132 Gamma Dr., R.I.D.C., Pittsburgh, Pa. 15238

Air Conditioners (For Equipment)

M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... p. 2700
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
M Kooltronic Inc., Dept. EM, Hamilton Ave., Hopewell, N.J. 08525
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Lear Siegler, Inc., Transportation Support Div., Dept. EM, 11135 Condor Ave., Fountain Valley, Cal. 92708
Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512

Alarms & Alarm Systems

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... *
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466**
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 .... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
D **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 p. 1121**
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 p. 1469
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... ***
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acron Corp., Dept. EM, 1095 Towbin Ave., Lakewood, N.J. 08701
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D Adapter/Charger Prdts., Dept. EM, P.O. Box 3218 8727 N. Pioneer Rd., Peoria, Ill. 61614
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
AMF Electical Prods. Dev. Div., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
D Bacharach Instrument Co., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Bell PA Products Corp., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Brooks Instr. Div., Emerson Elec. Co., Dept. EM, 407 W. Vine St., Hatfield, Pa. 19440
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Cognitronics Corp., Dept. EM, 25 Crescent St., Stamford, Conn. 06906
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Cybersonic Div., C. A. Briggs Co., Dept. EM, Box 151, Glenside, Pa. 19038
M Datacom, Inc., Dept. EM, Box 278, Ft. Walton Beach, Fla. 32548
D Delta Products, Dept. EM, Box 1147, Grand Junction, Colo. 81501
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
D Eastcraft Security Systems Corp., Dept. EM, Box 876, Melbourne, Fla. 32901
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554

Engdahl Enterprises, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
M GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Kidde, Walter & Co., Belleville Div., Dept. EM, 675 Main St., Belleville, N.J. 07109
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
L-Tronics, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
MRC Alarm Systems & Devices Co., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
D Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
D Protectowire Co., Dept. EM, Hanover, Mass. 02339
D PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Puleo Electronics, Inc., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563
Risk Inds, Inc., George, Dept. EM, GRI Plaza, Kimball, Neb. 69145
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Signatron, Inc., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Alarms, Controls, Photoelectric

Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 p. 1121
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007

M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
Laser Systems Corp., Dept. EM, 117 N. First St., Ann Arbor, Mich. 48108
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tri-Tronics Co. Inc., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417

Alloys, Brazing

D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
DM Anaconda Company Brass Division, Dept. EM, 414 Meadow St., Waterbury, Conn. 06720
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Chemetron Corp., Welding Prods., Dept. EM, 111 E. Wacker Dr., Chicago, Ill. 60601
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Glidden Metals, Chem/Met Div. SCM Corp., Dept. EM, 900 Union Commerce Bldg., Cleveland, Ohio 44115
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784
Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361

Alloys, Metal - Ceramic

Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 p. 2661
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... p. 2677
Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Carpenter Technology, Dept. EM, Box 662, Reading, Pa. 19603
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Phelps Dodge Sales Co., Inc., Dept. EM, 300 Park Ave., New York, N.Y. 10022
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
United Refining & Smelting Co., Dept. EM, 3700 N. Runge Ave., Franklin Park, Ill. 60131

Alphanumeric Readouts—Tubes, Readout

Alternators

Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 .... *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3261,3385**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M Aircraft Appliances Eqpt, Dept. EM, 152 E Dr., Brmalea, Ont, Can.
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Columbia Electric Mfg. Co., Dept. EM, 4519 Hamilton Ave. N.W., Cleveland, Ohio 44114
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604

DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
D Leece Neville Div., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140

Altimeters

M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Aluminizers, Vacuum—See Deposition Equip.; Evaporation Equip.

Amplifiers, A-F

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... p. 1101
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... p. 1104
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1106,1107
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055** .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... p. 1109
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. p. 2987
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** .... *
MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 p. 2989,2990,2993
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... p. 1120
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *
M **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414** ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
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All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Allison Labs., Inc., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Amplifier Corp. of America, Dept. EM, 75 Frost St., Westbury, N.Y. 11590
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
Audio Equip., Div. W. Kidde & Co., Inc., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
D Bell PA Products Corp., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Communications Equipment Co., Dept. EM, Box 700, Glen Arbor, Mich. 49636
D Communications Equipment Co., Inc., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
D Davis & Co., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Dynaco Inc., Div Tyco Corp., Dept. EM, Box 88 Coles Rd., Blackwood, N.J. 08012
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
D Encom Prods. Co., Inc., Dept. EM, Lower Hopewell Rd., Box 300, Oxford, Pa. 19363
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
HGA Elctrns., Inc., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
M Instruments, Inc., Dept. EM, 3432 Midway Dr., San Diego, Cal. 92110
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
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M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Newcomb Audio Products Co., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
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D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Southwest Tech Prods Corp., Dept. EM, 219 W. Rhapsody, San Antonio, Tex. 78216
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D Tape-Athon Corp., Dept. EM, 502 S. Isis Ave., Inglewood, Cal 90301
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D TOA Electronics, Inc., Dept. EM, 1023 Grandview Dr., So. San Francisco, Cal. 94080
D Trutone Elctrns., Inc., Dept. EM, 7315 Fulton Ave., No. Hollywood, Cal. 91605
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284

Amplifiers, Antenna

C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 p. 2986

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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601

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M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361

Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050

M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051

BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075

D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857

Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010

D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428

M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241

Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915

Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1

D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404

Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020

D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014

Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050

Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876

D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791

D Kay-Townes Antenna Co., Dept. EM, Turner Chapel RD., P.O. Box 593, Rome, Ga 30161

M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631

Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631

Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910

Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234

RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096

Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006

M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729

Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801

D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220

D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105

Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Amplifiers, Charge

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *

Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... p. 1104

ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107

Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *

Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *

Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686

Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313

American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377

Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094

Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675

M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627

D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615

Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043

D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705

Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734

PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043

M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146

M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730

Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052

Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Amplifiers, Compressor

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M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... ***

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D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038 .... ***

D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803

BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075

Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915

Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704

D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015

D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014

D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641

M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716

M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716

Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734

D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725

Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404

D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403

Amplifiers, Current

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 3947

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***

ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107

Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *

Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *

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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090

M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704

Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702

D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139

M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716

D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705

Norton Assocs., Inc., Dept. EM, 10 Di Tomas Ct., Copiague, N.Y. 11726

Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734

M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146

Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540

DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876

DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876

M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

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Amplifiers, D-C

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***

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M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... ***

M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***

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Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... p. 2834

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D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... ***

Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *

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ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *

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Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *

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PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *

Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 *

Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *

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Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
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M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
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M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
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M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
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D General Computers, Inc., Dept. EM, 5990 W. Pico Blvd., Los Angeles, Calif. 90035
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
M Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
M Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
M Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Amplifiers, Data—See Amplifiers, Instrumentation

Amplifiers, Decade

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Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 p. 1107
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 *
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
MVP Electronics, Dept. EM, 1161 N. Tustin, Orange, Cal. 92667
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Amplifiers, Deflection

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CPS Inc., Dept. EM, 722 E. Evelyn Ave., Sunnyvale, Cal. 94086 p. 3218
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 p. 1107
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Digital Graphics, Dept. EM, 5000 Tuna Canyon, Malibu, Cal. 90265
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801

Amplifiers, Delay Line

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 p. 1107
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Amplifiers, Differential

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M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 p. 1104
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 p. 2834
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 p. 1107
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005** *
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Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** *
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DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Data, Inc., Dept. EM, 210 S. Mason, Box 2071, Ft. Collins, Colo. 80521
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806

D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
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Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
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D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
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DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
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C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
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D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801

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ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** p. 2734
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... p. 1109
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 p. 1469
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
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D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
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Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Amplifiers, I-F

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 1108
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... p. 2484
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
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M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
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- M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
- M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
- M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
- Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
- Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
- M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
- DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
- Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
- Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
- DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
- M Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
- M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
- DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
- Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
- DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
- DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
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- M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
- D Rodelco, Dept. EM, 356A Commack Rd., Deer Park, N.Y. 11729
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- Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
- Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
- Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
- Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
- Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
- Waller Corp., Dept. EM, PO Box 340, Crystal Lake, Ill. 60014
- M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
- Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
- Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Amplifiers, Instrumentation

- **Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ..... p. 3131**
- M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ..... p. 2981**
- **C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .. p. 1103**
- **Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ..... ***
- **Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 ..... ***
- **Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498**
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- **ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 ..... p. 1105,1107**
- **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ..... ***
- **Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 ***
- **Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 1108**
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- **Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 ***
- **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 ..... p. 1272**
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- **Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 ***
- M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 ***
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- **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ..... ***
- D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038 ..... ***
- **PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 ..... ***
- **Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ..... ***
- **Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 p. 1112,1113**
- **Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 p. 1469**
- DM **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 ..... ***
- M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
- D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ..... ***
- **Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 ***
- **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ..... ***
- M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
- M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
- M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
- M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
- B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
- M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
- M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
- M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
- M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
- M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
- M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
- Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
- Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
- Data, Inc., Dept. EM, 210 S. Mason, Box 2071, Ft. Collins, Colo. 80521
- Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
- Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
- Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
- Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
- M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
- Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
- Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
- M Genisco Tech. Corp., Transducers, Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
- M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
- D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
- D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
- Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
- Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
- HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
- Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
- M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
- Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
- Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
- DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
- M Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
- Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
- D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
- Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
- DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
- Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
- M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
- Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
- DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
- Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
- Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
- DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
- DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
- San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
- Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
- Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
- Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
- Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
- M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
- Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
- Standard Controls, Dept. EM, 2401 S. Bayview St., Seattle, Wash. 98144
- Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
- Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
- Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
- DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
- Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
- Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
- United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
- Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
- Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

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- **ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 ..... p. 1107**
- EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
- Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

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- **Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ..... ***
- **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ..... ***
- M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 ..... ***
- **ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 ..... p. 1107**
- **Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 ***
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- **North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 ..... ***
- **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
- **Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 ***
- M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
- M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090

Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830

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Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
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D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

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CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905

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Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
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M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... **p. 2990**
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
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D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

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Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... **p. 1101**
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M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
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D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404

D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852

Amplifiers, Lock-In

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540

Amplifiers, Logarithmic

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
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Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
American Astrionics, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
MVP Electronics, Dept. EM, 1161 N. Tustin, Orange, Cal. 92667
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Amplifiers, Magnetic

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** **p. 4357**
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... **p. 1107**
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... **p. 4413**
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855** .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... **p. 3290**
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
HGA Elctrns., Inc., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Amplifiers, Master Antenna—See Amplifiers, Distribution

Amplifiers, Microphone—See Amplifiers, A-F

Amplifiers, Microwave

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 **p. 2986**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... **p. 1106,1107**
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** **p. 2988-2990,2993**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 **p. 3057**
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... **p. 3059**
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... **p. 2485**
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548

Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304 •
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Amplifiers, Mixing

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
D Communications Equipment Co., Dept. EM, Box 700, Glen Arbor, Mich. 49636
D Communications Equipment Co., Inc., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
HGA Elctrns., Inc., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Pulse Techniques, Inc., Dept. EM, 1411 Palisade Ave., Teaneck, N.J. 07666
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Amplifiers, Multichannel

Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... p. 1109
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 p. 2745
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 p. 1113,1680
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way. Palo Alto, Cal. 94303

Amplifiers, Narrow-Band

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... p. 1104
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... p. 1109
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Amplifiers, Null

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401

D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Amplifiers, Operational

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... p. 3366
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** ...... p. 2981
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 p. 1489
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1106,1107
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... p. 1120
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
D General Computers, Inc., Dept. EM, 5990 W. Pico Blvd., Los Angeles, Calif. 90035
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

Amplifiers, Parametric

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Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 p. 3058
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Amplifiers, Peak-Limiting

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D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Pacific Electronic Enterprises, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770 .... *
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Amplifiers, Phase-Lock Loop

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... p. 2484
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Amplifiers, Photocell—See Amplifiers, Transducer

Amplifiers, Power

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Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... p. 1101
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... p. 2979
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... *
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1105-1107
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** p. 2886,2887
LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. p. 2987
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** p. 2988,2989
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... p. 1120
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Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
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AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
Amplifier Corp. of America, Dept. EM, 75 Frost St., Westbury, N.Y. 11590
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
D Bell PA Products Corp., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201
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Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Communitron Corp., Dept. EM, 1429 N. Halstead, Hutchinson, Kans 67501
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
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Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
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Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
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M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
M GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Instruments, Inc., Dept. EM, 3432 Midway Dr., San Diego, Cal. 92110
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
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M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
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D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
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M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Newcomb Audio Products Co., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
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Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
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Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D TOA Electronics, Inc., Dept. EM, 1023 Grandview Dr., So. San Francisco, Cal. 94080
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
D Trutone Elctrns., Inc., Dept. EM, 7315 Fulton Ave., No. Hollywood, Cal. 91605
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Amplifiers, Public Address—See Amplifiers, A-F

Amplifiers, Pulse

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Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
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M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
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Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623

Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
M Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404

Amplifiers, Pulse-Limiting

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... **p. 1107**
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Pacific Electronic Enterprises, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

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Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... **p. 1101**
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... **p. 2996**
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
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General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... **p. 1109**
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... **p. 3006**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 **p. 3057,3058**
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
American Astrionics, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
D Arvee Engrg. Co., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
D Cerro Communication Products, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal, 94043
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Kay-Townes Antenna Co., Dept. EM, Turner Chapel RD., P.O. Box 593, Rome, Ga 30161
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915

D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Rodelco, Dept. EM, 356A Commack Rd., Deer Park, N.Y. 11729
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
D TPL Communications Co., Dept. EM, P.O. Box 1415, Gardena, Cal. 90247
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

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Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** .... *
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 .... *
M **Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446** .... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1661
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
DM **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017** .... *
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 *

M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

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DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .. p. 3949
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343** .. *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1106,1107
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... p. 3950
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120** *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
Pacific Electronic Enterprises, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770 .... *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... p. 3126
Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
Advance Instr. Corp., Dept. EM, 1707 F. St., Belmar, N, J. 07719
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
M Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Jordan Controls, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
M Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

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D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
D TPL Communications Co., Dept. EM, P.O. Box 1415, Gardena, Cal. 90247
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902

Amplifiers, Standing Wave

ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... **p. 1107**
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. **p. 2987**
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Amplifiers, Strain Gauge—See Amplifiers, Transducer

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ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... **p. 1105-1107**
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Amplifiers, Synchro

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
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ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... **p. 3950**
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
M Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
M Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Amplifiers, Telemetering

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Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Amplica Inc., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
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Amplifiers, Thermocouple—See Amplifiers/Transducer

Amplifiers, Thyratron

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Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

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Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
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M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
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Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
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Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
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Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Kelk, George Ltd., Dept. EM, 48 Lesmill Rd., Don Mills, Ont., Can. M3B 2T5
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Norton Assocs., Inc., Dept. EM, 10 Di Tomas Ct., Copiague, N.Y. 11726
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Standard Controls, Dept. EM, 2401 S. Bayview St., Seattle, Wash. 98144
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
Telmar, Inc., Dept. EM, 1150 W. Third Ave., Columbus, Ohio 43212
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Amplifiers, Traveling-Wave Tube

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Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
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M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 .... ***
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787

Amplifiers, Ultrasonic

M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
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Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Instruments, Inc., Dept. EM, 3432 Midway Dr., San Diego, Cal. 92110
MetroTek, Inc., Dept. EM, Box 101, Richland, Wash. 99352
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
D Sonobond Corp., Sub. Christiana Metals Corp., Dept. EM, 200 E. Rosedale Ave., West Chester, Pa. 19380
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Amplifiers, Video

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *

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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
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M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
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D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
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Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
M Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
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MVP Electronics, Dept. EM, 1161 N. Tustin, Orange, Cal. 92667
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Perry Amplifier, Dept. EM, 138 Fuller St., Brookline, Mass. 02146
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
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Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Amplifiers, Voltage Reference

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1107
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... p. 1109
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Amplifiers, Wideband

Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... p. 1101
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 3947
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
C-COR Elctrns., Dept. EM, 60 Decibel Rd., State College, Pa. 16801 .. p. 1102
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... p. 1105-1107
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 1108
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... ***
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... ***
LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. p. 2987
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... p. 3388,3390**
MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 .... p. 2989
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 p. 2745
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 *
DM **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 ***
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... p. 3126
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
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M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
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D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
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Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
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Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540

General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
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M Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
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D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
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Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
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M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Analyzers, A-F

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... p. 1474
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2885
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... p. 2895
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M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
M Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
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Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
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Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876
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Analyzers, Antenna Pattern

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D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
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Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Analyzers, Coincidence

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830

Analyzers, Differential—See Analyzers, Phase & Voltage

Analyzers, Digital

Balco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Vector Assocs., Dept. EM, 685 Station Rd., Bellport, N.Y. 11713

Analyzers, Distortion—See Analyzers, A-F

Analyzers, Engine (Gas & Diesel)

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D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
D Owatonna Tool Co., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060
M Process Analyzer Inc., Dept. EM, 1101 State Rd., Princeton, N.J. 08540
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Trans-Sonics, Inc., Dept. EM, P.O. Box 326, Lexington, Mass. 02173
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West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Analyzers, Frequency—See Analyzers, Spectrum

Analyzers, Frequency Stability—See Meters, Frequency Deviation

Analyzers, Gas

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Airco Industrial Gases, Dept. EM, 575 Mountain Ave., Murray Hill, N.J. 07974
D Bacharach Instrument Co., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
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Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
M Fisher Scientific Co., Dept. EM, 711 Forbes Ave., Pittsburgh, Pa. 15219
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D High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
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D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121
M Process Analyzer Inc., Dept. EM, 1101 State Rd., Princeton, N.J. 08540
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Sensors, Inc., Dept. EM, 3908 Varsity Dr., Ann Arbor, Mich. 48104
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

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Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
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EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
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Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Analyzers, Impedance

Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
Chatsworth Data Corp., Dept. EM, 20710 Lassen St., Chatsworth, Cal. 91311 p. 2816
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Analyzers, Interference

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... p. 1474
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2827
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
M Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Analyzers, Intermodulation

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Analyzers, Logic

D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
D **E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Digital Broadcast Sys., Dept. EM, 4306 Gov. Dr., Ste O, Huntsville, Ala. 35805
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Vector Assocs., Dept. EM, 685 Station Rd., Bellport, N.Y. 11713

Analyzers, Magnetic

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Analyzers, Microwave

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Analyzers, Network

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 *
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904
O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Analyzers, Noise

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 *
A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 *
BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 *
Elgenco, Inc., Dept. EM, Box 460, Huricane, Utah 84737 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Bearing Inspection, Dept. EM, 10041 Shoemaker Ave., Santa Fe Springs, Cal. 90670
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
DM Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Analyzers, Phase & Voltage

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 p. 2804
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 p. 1474
M **Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080** p. 2827
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 p. 3390
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Analyzers, Probability Density, Distribution

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701

Analyzers, Pulse

Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Analyzers, Radar

Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 *
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
M Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Analyzers, SCR

Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112

Analyzers, Servo

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 *
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** p. 3950
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Analyzers, Sonic & Subsonic

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 *
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 p. 1474
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** *

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876

Analyzers, Spectrum (Including Oscilloscopes With Plug-Ins)

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 p. 2721
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1461
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2883,2885
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2898
Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 p. 2913
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 p. 2920**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bausch & Lomb, A.S. Div., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Electro-Metrics, Div. Penril Gorp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sanders Associates, Products Div. - Spectrum Analyzer, Dept. EM, 95 Canal St., Nashua, NH 03060
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876

Analyzers, Telemetric Data

Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... p. 1474
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 p. 1471
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
M Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Analyzers, Transfer Function

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236
Zoomar, Inc., Dept. EM, 55 Sea Cliff Ave., Glen Cove, N.Y. 11542

Analyzers, Ultrasonic

Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... p. 1474
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... ***
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
MetroTek, Inc., Dept. EM, Box 101, Richland, Wash. 99352
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Techsonics, Dept. EM, Box 251, El Prado, N.M. 87529
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Analyzers, Vibration

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Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Bearing Inspection, Dept. EM, 10041 Shoemaker Ave., Santa Fe Springs, Cal. 90670
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Nicolet Scientific Corp., Dept. EM, 245 Livingston St., Northvale, N.J. 07647
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112

Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Analyzers, Video—See Analyzers, Spectrum

Analyzers, Waveform—See Analyzers, Harmonic

Annunciators

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M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405** *
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LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
AMF Electical Prods. Dev. Div., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Cognitronics Corp., Dept. EM, 25 Crescent St., Stamford, Conn. 06906
D Communications Equipment Co., Dept. EM, Box 700, Glen Arbor, Mich. 49636
D Communications Equipment Co., Inc., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Engdahl Enterprises, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626
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Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
KMC Systems Inc., Dept. EM, 200 State Highway 17, Mahwah, N.J. 07430
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
Major Data Concepts, Inc., Dept. EM, 1796 Monrovia Ave., Costa Mesa, Cal. 92627
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M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
D Onan Div-Onan Corp., Dept. EM, 1400 73rd Ave. N.E., Minneapolis, Minn. 55432
Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
D Protectowire Co., Dept. EM, Hanover, Mass. 02339
Puleo Electronics, Inc., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563
DM Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
M Stacoswitch, Inc., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705

Antenna Dummy Loads—See Dummy Loads

Antenna Feed Systems

DM **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
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Ainslie Corp., Dept. EM, 531 Pond St.; S. Braintree, Mass. 02185
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
D Budwig Mfg. Co., Dept. EM, P.O. Box 97, Ramona, Calif. 92065
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,. Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801

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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
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Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Cunningham, Sub. Gleason Works, Dept. EM, 10 Carriage St., Honeoye Falls, N.Y. 14472
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
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D Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119

Antenna Switching Matrices

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Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103 .... *
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Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
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M A''en Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
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D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
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M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
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Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Microflect Co., Dept. EM, 3575 25th S.E., Salem, Ore. 97302
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
D South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
Stainless, Inc., Dept. EM, 3rd St., N. Wales, Pa. 19454
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
D Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601
D Universal Products Engrg., Dept. EM, 1230 Racine St., Racine, Wisc. 53403
Up-Right Scaffolds, Div. Up-Right, Inc., Dept. EM, 1013 Pardee St., Berkeley, Calif. 94710
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Antennas, Airborne

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
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Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
Antenna Specialists Co., Dept. EM, 12435 Euclid Ave., Cleveland, Ohio 44106
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
DM Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801

Antennas, Citizens Band—See Antennas, Whip & Accessories (Including Marine & Mobile Types)

Antennas, Direction Finding

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ...... p. 2995
M Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
L-Tronics, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801

Antennas, Ground Plane

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
D Antenna Specialists Co., Dept. EM, 12435 Euclid Ave., Cleveland, Ohio 44106
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D Kreckman, Herb Co., Dept. EM, Cresco, Pa. 18326
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Premax Prods. Div., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D Robyn International Inc., Dept. EM, Box 478 10901 Northland Dr., Rockford, Mich 49341
D Shakespeare, Dept. EM, Box 246, Columbia, S.C. 29202
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119

Antennas, Helical

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ...... p. 2995
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311

M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Shakespeare, Dept. EM, Box 246, Columbia, S.C. 29202
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Antennas, Log-Periodic

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
D Antenna Specialists Co., Dept. EM, 12435 Euclid Ave., Cleveland, Ohio 44106
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Kay-Townes Antenna Co., Dept. EM, Turner Chapel RD., P.O. Box 593, Rome, Ga 30161
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761

Antennas, Loop

Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 p. 1825
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Antennas, Microwave

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
M Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
Antennas for Communications, Inc., Dept. EM, Cordage Park, Plymouth, Mass. 02360
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
CGTI, Dept. EM, 2 Windward Ave., White Plains, N.Y. 10605
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M ITT Gilfillan Div. of ITT, Dept. EM, 7821 Orion Ave., Van Nuys, Calif. 91409
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
M Radatron Corp., Dept. EM, 2424 Niagara Falls Blvd., N. Tonawanda, NY 14120
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
DM Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Antennas, Phased Array

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950

DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
D Antenna Specialists Co., Dept. EM, 12435 Euclid Ave., Cleveland, Ohio 44106
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
M Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Antennas, Rhombic

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Stainless, Inc., Dept. EM, 3rd St., N. Wales, Pa. 19454
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543

Antennas, Spiral

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291

Antennas, Telemetry, Tracking

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
CGTI, Dept. EM, 2 Windward Ave., White Plains, N.Y. 10605
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Antennas, Telescopic

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M Astro Research Corp., Dept. EM, Box 4128, Santa Barbara, Cal. 93103
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
CGTI, Dept. EM, 2 Windward Ave., White Plains, N.Y. 10605
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Peerless Sls. Co., Dept. EM, 4200 W. Chicago Ave., Chicago, Ill 60651
D Premax Prods. Div., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
D Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Antennas, Whip & Accessories (Including Marine & Mobile Types)

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** .... *
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
D Antenna Specialists Co., Dept. EM, 12435 Euclid Ave., Cleveland, Ohio 44106
Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
ASC Systems Corp., Dept. EM, 155 W. Main St., Rockville, Conn. 06066
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
D Budwig Mfg. Co., Dept. EM, P.O. Box 97, Ramona, Calif. 92065
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
DM Francis Inds., Inc., Dept. EM, 431 W. Broad St., Pataskala, Ohio 43062
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D New-Tronics Corp., Dept. EM, 15800 Commerce Park Dr., Brookpark, Ohio 44142

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Premax Prods. Div., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
D Robyn International Inc., Dept. EM, Box 478 10901 Northland Dr., Rockford, Mich 49341
D Royce Electronics Corp., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
DM Shakespeare, Dept. EM, Box 246, Columbia, S.C. 29202
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Armatures—See Motor & Generator Armatures, Rotors, Stators

Arms, Phono, Transcription—See Phonographs, Parts & Accessories

Arresters, Electrical Surge-Also See Suppressors, Arc; Protectors, Surge

Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 4015
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... ***
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... ***
M **McG Electronics Inc., Dept. EM, 160 Brook Ave., Deer Park, N.Y. 11729 .... ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Standard Power, Inc., Dept. EM, 1400 S. Village Way, Santa Ana, Cal. 92705 *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... ***
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Arresters, Lightning

D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
D South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754

Attenuators, Audio

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 .... ***
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
D **Duncan Electronics, Inc., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626 .... ***
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... ***
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... p. 4231
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... ***
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 .... ***
D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .... ***
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
D Davis & Co., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Knol Enterprise, Dept. EM, 200 Suburban Rd., San Luis Obispo, Cal. 93401
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Attenuators, Coaxial

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220** .... *
Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... p. 2835
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
D **Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742** .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880-2882
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... p. 3716
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Cerro Communication Products, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Attenuators, Decade

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470** .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Attenuators, Fixed

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3637
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... p. 2999
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Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 3005
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 p. 4307
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Cerro Communication Products, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electronautics, Dept. Dielectric Comm., Dept. EM, Newtown Rd., Littleton, Mass. 01460
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573

Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
TRG, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Attenuators, I-F

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
D **Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2898
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Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Attenuators, Impedance Matching

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D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3637**
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Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... ***
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 p. 2947
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Attenuators, Logarithmic

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

Attenuators, Microwave

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
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M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 .... ***
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
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Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electronautics, Dept. Dielectric Comm., Dept. EM, Newtown Rd., Littleton, Mass. 01460
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
D Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Attenuators, Programmable

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
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M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880-2882
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 p. 3585
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Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2931**
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Attenuators, R-F

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 ..... *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
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M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881**
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Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3716
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... ***
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2930**
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
D Alaun Engrg., Dept. EM, 515 South Palm, Alhambra, Cal 91803
DM Anaren Microwaye, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Attenuators, Ratio

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *

Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Attenuators, Turret

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880,2881
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 ***
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Attenuators, Variable

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 .... ***
Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... ***
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 3005
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2880-2882
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... ***
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 p. 4307
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2931**
D **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733 .... ***
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 p. 2947**
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Audible Signal Devices, Electronic

Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 .... *
Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 p. 1121
Cybersonic Div., C. A. Briggs Co., Dept. EM, Box 151, Glenside, Pa. 19038
Gulton Inds., Piezo Prods. Div., Dept. EM, Box 4300, Fullerton, Cal. 92634
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021

Audio Equipment—See Amplifiers; Microphones; Speakers; etc.

Awls—See Scribers

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Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... p. 1797,1798**
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
DM **Dynatech Corp., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702 p. 1833**
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
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D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... ***
D **3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... ***
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Texas Instruments, Connector Systems, Dept. EM, 34 Forest St., Attleboro, Mass. 02703 .... *
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M Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
M Advanced Circuitry, Litton Systems Inc., Dept. EM, 4811 W. Kearney St., Springfield, Mo. 65803
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Bussco Engrg., Dept. EM, 119 Standard St., El Segundo, Cal. 90245
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
M Teradyne Comps., Dept. EM, 900 Lawrence St., Lowell, Mass. 01852

Baffles, Speaker

Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Argos Products Co., Inc., Dept. EM, 600 S. Sycamore St., Genoa, Ill. 60135
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Fourjay Industries, Dept. EM, Box 1465 Northridge Br., Dayton, Ohio 45414
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
M Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284

Ballasts—See Resistors, Ballast

Baluns—See Transformers, Matching

Barrier Blocks & Strips—See Terminal Blocks; Terminal Strips

Bars, Shorting

D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ...... p. 2064**
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Rogers Corp., Dept. EM, Rogers, Conn. 06263

Baths, Controlled Temperature (Air & Liquid)

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 ***
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Marlow Industries, Inc., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041 *
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 ...... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Brinkmann Instrs., Inc., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
M Fisher Scientific Co., Dept. EM, 711 Forbes Ave., Pittsburgh, Pa. 15219
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Zeva Elec. Corp., Dept. EM, 3 Greatmeadow La., Hanover, N.J. 07936

Baths, Ultrasonic—See Cleaners, Ultrasonic

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Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ...... p, 3291,3292
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... ***
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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 ...... ***
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D Acme Battery Corp., Dept. EM, 700 Canal St., Stamford, Conn. 06904
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703

Batteries, Dry, Flashlight, Transistor, etc.

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ...... p. 3291-3293
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 ...... ***
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D Acme Battery Corp., Dept. EM, 700 Canal St., Stamford, Conn. 06904
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
DM Mallory Battery, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

Batteries, Gelled-Electrolyte

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ...... p. 3242**
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... ***
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Elpower Corp., Dept. EM, 2117 S. Anne St., Santa Ana, Cal. 92704
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
D Globe Union, Inc., Globe Battery Div., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Gould, Inc., Portable Battery Div., Dept. EM, 931 Vandalia, St. Paul, Minn. 55114
D Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
D Power-Sonic Corp., Dept. EM, Box 5242, 3106 Spring St., Redwood City, Cal. 94063
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014

Batteries, Lead-Acid

DM **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ...... p. 3242**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ...... p. 3291,3293
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... p. 3297
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Elpower Corp., Dept. EM, 2117 S. Anne St., Santa Ana, Cal. 92704
Exide Power Sys. Div., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
D Globe Union, Inc., Globe Battery Div., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Gould Inc., Ind'l. Battery Div., Dept. EM, 2050 Cabot Blvd. W., Langhorne, PA. 19047
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power-Sonic Corp., Dept. EM, Box 5242, 3106 Spring St., Redwood City, Cal. 94063
Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
M UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Wisco Div., ESB Inc., Dept. EM, 1222 18th St., Racine, Wisc. 53403

Batteries, Lead-Dioxide

DM **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ...... p. 3242**
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... *
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
D Globe Union, Inc., Globe Battery Div., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212

Batteries, Lithium

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ...... p. 3242**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ...... p. 3291,3292
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ...... *
Tauber Electronics, Dept. EM, 3650 Clairemont Dr., Ste. 8, San Diego, Cal. 92117 ...... p. 3340
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007

Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
DM Mallory Battery, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power Conversion Inc., Dept. EM, 70 MacQuesten Pkwy. S., Mt. Vernon, N.Y. 10550
Sanyo Electric Inc., Dept. EM, 51 Joseph St., Moonachie, N.J. 07074

Batteries, Magnesium

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002

Batteries, Manganese Alkaline

ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
DM Mallory Battery, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591
Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703

Batteries, Mercury

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ..... p. 3291,3292
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... ***
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 ..... p. 3349
DM Mallory Battery, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
Telecommunications Devices, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515

Batteries, Nickel-Alkaline

M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Batteries, Nickel-Cadmium

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ..... p. 3291,3293
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... p. 3296**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ..... *
Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 ..... p. 2939
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 ..... p. 3349
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
General Electric Co., Battery Business Dept., Dept. EM, Box 861, Gainesville, Fla. 32602
D Gould, Inc., Portable Battery Div., Dept. EM, 931 Vandalia, St. Paul, Minn. 55114
D Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
DM Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
D Royce Electronics Corp., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116
Saft America Inc., Dept. EM, Box 1886, Valdosta, Ga. 31601
Sanyo Electric Inc., Dept. EM, 51 Joseph St., Moonachie, N.J. 07074
Telecommunications Devices, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Batteries, Nickel-Zinc

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Batteries, Photoflash

Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... p. 3297
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703

Batteries, Silver-Cadmium

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Batteries, Silver Oxide

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ..... p. 3291,3292
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 ..... p. 3349
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Mallory Battery, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703

Batteries, Silver-Zinc

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... *
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
D Gould, Inc., Portable Battery Div., Dept. EM, 931 Vandalia, St. Paul, Minn. 55114
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Batteries, Solar—See Cells, Photovoltaic

Batteries, Standard Cell

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ..... *
Tauber Electronics, Dept. EM, 3650 Clairemont Dr., Ste. 8, San Diego, Cal. 92117 ..... p. 3340
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 ..... p. 3349
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D Gould, Inc., Portable Battery Div., Dept. EM, 931 Vandalia, St. Paul, Minn. 55114
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212

Batteries, Storage

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ..... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ..... *
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Exide Power Sys. Div., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
Gould Inc., Ind'l. Battery Div., Dept. EM, 2050 Cabot Blvd. W., Langhorne, PA. 19047
D Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power-Sonic Corp., Dept. EM, Box 5242, 3106 Spring St., Redwood City, Cal. 94063
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212
Telecommunications Devices, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014

Batteries, Transistor—See Batteries, Dry, Flashlight, Transistor, etc.

Batteries, Water Activated

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865 ..... p. 3242**
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Exide Power Sys. Div., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
SGL Batteries Manufacturing Co., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212

Batteries, Zinc-Air

D **Eagle-Picher Inds., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865** ... p. 3242
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 ... *
Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 ... p. 3349
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Sanyo Electric Inc., Dept. EM, 51 Joseph St., Moonachie, N.J. 07074

Battery Holders—See Retainers, Battery

Battery Plugs—See Connectors, Battery

Bearings

M **Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702** ... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ... *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 ... p. 4321
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** p. 2181
M **Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523** ... *
Barden Corp., Dept. EM, 200 Park Ave., Danbury, Conn. 06810
D Bearing Inspection, Dept. EM, 10041 Shoemaker Ave., Santa Fe Springs, Cal. 90670
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Bird, Richard H. & Co., Inc., Dept. EM, 1 Spruce St., Waltham, Mass. 02154
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
General Elec., Carboloy Systems Dept., Dept. EM, Box 237, Detroit, Mich. 48232
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
MPB Corp., Dept. EM, Precision Park, Keene, N.H. 03431
DM New Hampshire Ball Bearings, Inc., Dept. EM, Peterborough, N.H. 03458
M N.L. Inds., Inc., Bearings Div., Dept. EM, 5461 Southwyck Blvd., Toledo, Ohio 43614
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
Pageant/M.A. Miller Industries, Dept. EM, 605 Northern Blvd., Chinchilla, Pa. 18501
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
D Pure Carbon Co., Inc., Dept. EM, 441 Hall Ave., St. Marys, Pa. 15857
DM Raway Bearing Corp., Dept. EM, 8 Melnick Rd., Monsey, N.Y. 10952
Rogers Corp., Dept. EM, Rogers, Conn. 06263
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482

Bells, Buzzers, Gongs, Sirens & Aural Warning Devices

D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** ... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 p. 1427
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 ... p. 2391
Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 ... p. 1118,1119
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** ... p. 3596
D **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414** ... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** ... *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Protectowire Co., Dept. EM, Hanover, Mass. 02339
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Southwood Electronic Co., Dept. EM, 7624 Lindenwood Dr., Indianapolis, Ind. 46227
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Wheelock Signals, Dept. EM, 273 Branchport Ave., Long Branch, N.J. 07740

Belts, Dial Drive—See Cords & Cable, Dial Drive

Benches, Consoles, Stools, Tables (Lab & Shop) -Also See Cabinets & Accessories, Metal

Cabtron Sys., Inc., Dept. EM, 200 Anets Dr., Northbrook, Ill. 60062 ... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ... p. 1538
M **Formica Metal Prods. Co., Inc., Dept. EM, Corporation Way, Dept. M, Medford, Mass. 02155** ... p. 1131
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ... *
M **General Devices Co., Inc., Dept. EM, Box 19188, Indianapolis, Ind. 46219** .. *
Optima Enclosures, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084 ... *
D **Par-Metal Prods. Inc., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216** .. *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** ... *
M **Vent-Rak, Div., General Devices Co., Inc., Dept. EM, P.O. Box 19188, Indianapolis, Ind. 46219** ... *
D **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** ... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Advance Engrg. Systems, Div. Sonnell, Inc., Dept. EM, 18255 S. Hoover St., Gardena, Cal. 90248
M Alden Sys. Co., Inc., Dept. EM, Box A, Dept. 262, Westboro, Mass. 01581
M Amco Engineering Co., Dept. EM, 7333 W. Ainslie St., Chicago, Ill. 60656
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Atmosphere Controls Prdts., Dept. EM, 295 Polaris, Mt. View, Cal. 94043
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
Baker Co., Inc., Dept. EM, Drawer E - Sanford Airport, Sanford, Me. 04073
DM Bay Prods., Div. American Metal Works, Dept. EM, 8701 Torresdale Ave., Phila., Pa. 19136
Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
DM Easy-Up Inc., Dept. EM, Racine, Wisc. 53401
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
D Equipto, Aurora Equipment Co., Dept. EM, 225 So. Highland Ave., Aurora, Ill. 60507
M Fisher Scientific Co., Dept. EM, 711 Forbes Ave., Pittsburgh, Pa. 15219
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Kewaunee Scien. Equip. Corp., Dept. EM, 4012 Logan St., Adrian, Mich. 49221
Labconco Corp., Dept. EM, 8811 Prospect, Kansas City, Mo 64132
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Lyon Metal products, Inc., Dept. EM, 47 Railroad Ave., Aurora, Ill. 60507
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Stackbin Corp., Dept. EM, Box 434, Pawtucket, R.I. 02862
D Sturdilite Angle Steel Div., Kewanee Scientific Equip. Corp., Dept. EM, Plainwell, Mich. 49080
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601

Bends & Twists, Microwave

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** ... *
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
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M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
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Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

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SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
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D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016

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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

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G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
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Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
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M D & L Sales Co. Inc., Dept. EM, 296 Preakness Ave., Paterson, N.J. 07502
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
D Mark Specialties, Dept. EM, 1780 Monrovia, Costa Mesa, Cal. 92627
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
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Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Resdel Corp., Dept. EM, Bldg. 22–County Airport, Rio Grande, N.J. 08242
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M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
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M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Mikron Instr. Co., Dept. EM, Box 211, Ridgewood, N.J. 07451
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
Raytek, Inc., Dept. EM, 1277 Terra Bella Ave., Mountain View, Cal. 94043
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Bolometers, Microwave

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
MSI Electronics, Inc., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Bolts—See Fasteners

Books—See Technical Books

Boosters, Low Line Voltage, Automatic—See Regulators & Stabilizers, Voltage

Boxes, Decade—See Decade Boxes

Boxes, Junction, Outlets & Wall Plates

ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1862,1912,1951,1954, Inside Back Cover,
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2080-2092
D **Par-Metal Prods. Inc., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216 .. ***
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2190
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Todd Systems, Dept. EM, 4 Radford Pl., Yonkers, N.Y. 10701 .... p. 4489
D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .... ***
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
D Adalet Mfg. Co., Div. Scott & Fetzer Co., Dept. EM, 4801 W. 150th St., Cleveland, Ohio 44135
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Brooks Mfg. Co., Dept. EM, Box 17602, Philadelphia, Pa 19135
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Hoffman Engineering Co., Div. Federal Cartridge Corp., Dept. EM, 9th & Tyler Sts., Anoka, Minn. 55303
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
Kole Enterprises, Inc., Dept. EM, 3553 N.W. 50th St., Miami, Fla. 33142
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011
Wiremold Co., Dept. EM, West Hartford, Conn. 06110

Boxes, Metal & Plastic—See Cabinets; Cans; Cases; Containers

Boxes, Plug-In—See Enclosures, Module, Plug-In

Boxes, Power Outlet—See Boxes, Junction, Outlet & Wall Plates

Boxes, Shipping (Reusable)—See Cases, Transit

Brackets, Antenna—See Mounts, Antenna

Braid, Cable - Also see Wire Shielding

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
DM **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
M **Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 p. 4578**
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... *
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 .. *
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4614**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... ***
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... *
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 .... ***
M Aircraft & Elex Spcltys, Dept. EM, Box 126, Plainfield, Ind 46168
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
M Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
M Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Brakes, Magnetic

M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320 ***
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... *
M **Delevan Div., American Prec. Inds., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052 .... p. 3074**
M **General-Electro Mechanical, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207 p. 3084**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... ***
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 .... ***
D Altair Resch. & Mfg. Co., Dept. EM, 1241 E. State St., Ontario, Calif. 91761
Ambi-Tech Inds. Inc., Dept. EM, 861 Washington Ave., Westwood, N.J. 07675
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Brakes, Mechanical

Delevan Div., American Prec. Inds., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052 .... p. 3074
M **General-Electro Mechanical, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207 p. 3084**
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 3129**
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
DM Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040

DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040

Breadboard Assemblies

Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 ... p. 1394,1395
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ... p. 1538
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 ... p. 1400-1402
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** ... p. 1412
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Eastern Electronics Mfg. Corp, Dept. EM, 180 Roberts St., East Hartford, Conn. 06108

Breadboards & Breadboard Kits—See Kits, Breadboarding

Bridges, Admittance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Bridges, Antenna—See Bridges, R-F

Bridges, Audio

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Bridges, Calorimeter

M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** ... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791

Bridges, Capacitance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** ... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 p. 2866
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 ... *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
Dielectric Instr. Corp., Dept. EM, 761 Franklin Ave., Pittsburgh, Pa. 15221
D ECD Corp., Dept. EM, 196 Broadway, Cambridge, MA 02139
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Bridges, Deviation

General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 p. 2866
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** ... p. 2929
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Bridges, Impedance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 ... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 ... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 ... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040 p. 3931
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Bridges, Inductance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
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Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ... p. 2899
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 ... *
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Bridges, Kelvin

D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** ... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** ... *
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462

Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966

Bridges, Limit—See Bridges (Specific Types)

Bridges, Megohm—See Bridges, Resistance

Bridges, Power, R-F

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Bridges, Programmable—See Bridges (Specific Types)

Bridges, Q

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2899**
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Bridges, Ratio—See Testers, Ratio Voltage; Meters Ratio

Bridges, Resistance

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 **p. 2866**
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
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D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** .... **p. 2929**
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Associated Testing Laboratories, Dept. EM, 23 Vincent St., Wayne, N.J. 07470
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Bridges, R-F

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
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North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Bridges, Schering

Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
Dielectric Instr. Corp., Dept. EM, 761 Franklin Ave., Pittsburgh, Pa. 15221
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070

Bridges, Silicon Cell

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **Elctrn. Devices, Dept. EM, 21 Gray Oaks Ave., Yonkers, N.Y. 10710** .. **p. 3862**
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245** .... *
D **Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563** .... *
DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040** **p. 3944**
D **Westinghouse Elec. Corp., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697** .... *
D Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
D General Instrument Corp., Discrete Semiconductor Div., Dept. EM, 600 West John St., Hicksville, N.Y. 11802
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
Rectifier Components Corp., Dept. EM, 1112 Lousons Rd., Union, N.J. 07083
D RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729

Bridges, Strain Gauge

Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850** .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Bridges, Synchro & Resolver

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1483
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** *
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Bridges, Temperature

Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 *
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
DM Burns Engrg., Inc., Dept. EM, 10201 Bren Rd. East, Minnetonka, Minn. 55343
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Bridges, Wheatstone

Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** *
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
M Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Brushes & Brush Assemblies

D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002** *
M **Fabricast, Inc., Dept. EM, 2517 Seaman Ave., So. El Monte, Cal. 91733** p. 3079,3080
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 p. 4414
Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702 p. 3082
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** *
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017** *
Braun-Brush Co., Dept. EM, 43 Albertson Ave., Albertson, N.Y. 11507
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
D Pure Carbon Co., Inc., Dept. EM, 441 Hall Ave., St. Marys, Pa. 15857
Stackpole Carbon Co., Carbon Div., Dept. EM, St. Marys, Pa. 15857
D Superior Carbon Prods., Inc., Dept. EM, 9115 George Ave., Cleveland, Ohio 44105
M Unit Industries, Inc., Dept. EM, 529 S. Raymond Ave., Fullerton, Cal. 92631

Bulbs—See Lamps

Bumpers

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** p. 2774
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** p. 2538
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** p. 2170
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** p. 2785
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
DM Budwig Mfg. Co., Dept. EM, P.O. Box 97, Ramona, Calif. 92065
M Caplugs Div., Protective Closures Co., Dept. EM, 2150 Elmwood Ave., Buffalo, N.Y. 14207
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020

Burnishers, Contact

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** *
D Adre Co., Dept. EM, Box 09415, Milwaukee, Wisc. 53209
Elctrn. Chemical Corp., Dept. EM, 813 Communipaw Ave., Jersey City, N.J. 07304
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008

Bus Bars & Systems

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 p. 1705
DM **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** *
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 *
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 p. 1394,1395
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** *
Elfab Corp., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001 p. 1838
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** p. 4138
DM **Lear Siegler, Elctrn. Instr. Div., Dept. EM, 714 N. Brookhurst St., Anaheim, Cal. 92803** p. 2121
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** *
D Air Quip-Robleyco, Dept. EM, Box 1118, Richardson, Tex. 75080
DM Anaconda Company Brass Division, Dept. EM, 414 Meadow St., Waterbury, Conn. 06720
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
BH Electronics, Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
Burdette Buss Bars, Inc., Dept. EM, 16 W. Kings Hwy., Box 14, Mt. Ephraim, N.J. 08059
M Bussco Engrg., Dept. EM, 119 Standard St., El Segundo, Cal. 90245
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
M Rogers Corp., Dept. EM, Rogers, Conn. 06263
Seastrom Mfg. Co. Inc., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
M Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720

Bushings, Glass, Plastic, Metal, Rubber, Etc.

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** p. 2774

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ..... **p. 1705**
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** ..... *
D **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** ..... **p. 1822**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ..... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 ..... *
Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702 ..... *
D **Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033** **p. 4669**
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 **p. 1912, Inside Back Cover,**
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** ..... **p. 2537,2538,2540**
D **Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605** ..... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 **p. 3283**
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... **p. 2143**
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 **p. 2170,2178,2179,2181,2182,2187**
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234** ..... *
Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 ..... **p. 2783**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** **p. 2786**
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
D Adalet Mfg. Co., Div. Scott & Fetzer Co., Dept. EM, 4801 W. 150th St., Cleveland, Ohio 44135
DM Aimsco Inc., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
M Atlantic Optical Moulding Co., Dept. EM, Ellis St., Dudley, Mass. 01570
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
M Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Cherry Fasteners, Townsend Div. Textron Inc., Dept. EM, Box 2157, Santa Ana, Cal. 92707
M Cleveland Mica Co., Dept. EM, 1360 Hird Ave., Lakewood, Ohio 44107
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
D Deutsch Fastener Corp., Dept. EM, 7001 W. Imperial Hwy., Los Angeles, Cal. 90045
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4644-4648,4664-4667**
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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
DM Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
DM Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
M Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
M Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
Caltron Industries, Dept. EM, 2015 Second St., Berkeley, Cal. 94710
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
D Cerro Communication Products, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Essex Int'l., Inc., Telecommunications Prods. Div., Dept. EM, 800 E. Garfield Ave., Decatur, Ill. 62526
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
D Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D New-Tronics Corp., Dept. EM, 15800 Commerce Park Dr., Brookpark, Ohio 44142
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
Phelps Dodge Puerto Rico Corp., Dept. EM, P.O. Box 188, Carolina, Puerto Rico 00630
M Precision Tube, Dept. EM, Church Rd. & Wissahickon, No. Wales, Pa. 19454
M Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Superior Cable Div., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
M Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cable, Dial—See Cords & Cable, Dial Drive

Cable Fault Locators

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Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
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Addison Div. Muirhead, Inc., Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007

Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
D Protectowire Co., Dept. EM, Hanover, Mass. 02339
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Cable, Flame Retardant

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522,4529**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4538-4552,4555,4556,4558-4564,4574-4576**
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4581,4582,4584**
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4612,4619**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
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M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
DM Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
DM General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
DM Phelps Dodge Cable & Wire Co., Dept. EM, Foot of Point St., Yonkers, N.Y. 10702
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
M Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Cable, Flat

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522,4530,4531**
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4566**
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M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 p. 4643**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Hughes Aircraft Co., Connecting Devices Div., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714 .... *
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DM Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
M Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
D Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
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D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
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M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
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M Rogers Corp., Dept. EM, Rogers, Conn. 06263
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D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
DM Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
DM Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
Telecommunications Devices, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

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D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131

- D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
- DM Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
- D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
- D Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
- D General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
- D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
- Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
- Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
- D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
- M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
- M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
- D Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
- Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
- Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Cable, High Temperature (Over 125Í C)

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- M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
- DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
- D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
- Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
- DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
- Caltron Industries, Dept. EM, 2015 Second St., Berkeley, Cal. 94710
- Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
- DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
- D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
- M General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
- M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
- Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
- Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
- Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
- M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
- D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
- D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
- Masterite Corporation, Dept. EM, 2841 Lomita Blvd., Torrance, Cal. 90505
- M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
- Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
- Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
- M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
- Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
- M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
- M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
- DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
- DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
- Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
- Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

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- **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... p. 4522**
- **Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... ***
- M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
- D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .... p. 4539,4540,4542-4548,4553,4574,4575**
- **Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... ***
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- DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4607,4612,4619**
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- M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
- DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... ***
- **Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. ***
- **National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... p. 4672,4675,4678,4679,4685,4686**
- M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 .... p. 4713**
- D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
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- **Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... ***
- **TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... ***
- **Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... ***
- DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 .... p. 4722**
- M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
- M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
- D Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
- D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
- D Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
- Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
- D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Dielectric Sciences, Dept. EM, 5 South Ave., Burlington, Mass 01803
- Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
- Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
- D General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
- M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
- Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
- D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
- M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
- Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
- Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
- D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
- M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
- Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
- M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
- DM Phelps Dodge Cable & Wire Co., Dept. EM, Foot of Point St., Yonkers, N.Y. 10702
- Phelps Dodge Puerto Rico Corp., Dept. EM, P.O. Box 188, Carolina, Puerto Rico 00630
- Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
- Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
- M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
- DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
- Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
- Teledyne Western Wire & Cable, Dept. EM, 2425 E. 30th St., Los Angeles, Cal. 90051
- Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
- D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
- TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
- Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
- Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210

Cable, Intercommunication & Sound System—See Cable, Audio

Cable, Irradiated

- D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... p. 4522**
- M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
- D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
- **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4612,4619**

DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4626**
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
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D **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
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M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
D Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Cable, Low-Capacitance

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4593,4598,4619**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
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M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Hughes Aircraft Co., Connecting Devices Div., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714 .... *
D **3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... ***
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M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
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DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 .... ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
D Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Essex Int'l., Inc., Telecommunications Prods. Div., Dept. EM, 800 E. Garfield Ave., Decatur, Ill. 62526
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
Phelps Dodge Puerto Rico Corp., Dept. EM, P.O. Box 188, Carolina, Puerto Rico 00630
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Superior Cable Div., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

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D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4572-4575**
Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4582,4583
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D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
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D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
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DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 .... ***
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
D Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522,4524,4525,4527-4529,4531**
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4538-4553,4555-4566,4569-4576**
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *

Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 p. 4578
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D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4579,4580,4582-4586**
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588-4590,4592-4606,4613,4618,4619**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... p. 4622,4624**
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4626,4627,4630-4632,4635,4637**
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M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 p. 4643**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Hughes Aircraft Co., Connecting Devices Div., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714 .... *
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DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... ***
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M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
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D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4651-4660,4664-4667**
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M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
M Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
Caltron Industries, Dept. EM, 2015 Second St., Berkeley, Cal. 94710
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
D Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
DM General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
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Telecommunications Devices, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cable, TFE Insulated

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ... p. 4588,4619**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 ... ***
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 ... p. 4626**
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 ... ***
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ... *
Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057 ... p. 4693,4702,4709
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ... ***
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ... p. 4715
DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 ... ***
D Addington Laboratories, Inc., Maser Hitemp Wire Div., Dept. EM, 800 N. Grand, Covina, Cal. 91724
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Caltron Industries, Dept. EM, 2015 Second St., Berkeley, Cal. 94710
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Microtech, Dept. EM, 1420 Conchester Hwy, Boothwyn, Pa. 19061
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
M Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016

Cable, Transmission Line

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 ... p. 4544,4545,4553-4556,4558,4565**
Cable Concepts Corp., Dept. EM, 1610A Manning Blvd., Levittown, Pa. 19057 *
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ... p. 4580,4581,4584**
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ... p. 4588,4597,4617,4619**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 ... ***
Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 ... p. 4626
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
Hughes Aircraft Co., Connecting Devices Div., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714 ... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 ... ***
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ... p. 4684,4685
DM **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ... ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ... p. 4654,4664-4667**
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ... p. 4715
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 ... *
DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 ... ***
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
DM Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016

Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Essex Int'l., Inc., Telecommunications Prods. Div., Dept. EM, 800 E. Garfield Ave., Decatur, Ill. 62526
Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
Phelps Dodge Cable & Wire Co., Dept. EM, Foot of Point St., Yonkers, N.Y. 10702
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
Phelps Dodge Overseas Mktg. Corp., Dept. EM, 437 Madison Ave., New York, N.Y. 10022
Phelps Dodge Puerto Rico Corp., Dept. EM, P.O. Box 188, Carolina, Puerto Rico 00630
Precision Tube, Dept. EM, Church Rd. & Wissahickon, No. Wales, Pa. 19454
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
DM Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
DM T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Cable, Triaxial

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ...... p. 4588,4601,4619**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 ...... ***
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 ...... p. 4626**
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 ...... ***
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ...... *
DM **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ...... p. 4646**
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ...... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 ...... *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 ...... ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 ...... ***
D Addington Laboratories, Inc., Maser Hitemp Wire Div., Dept. EM, 800 N. Grand, Covina, Cal. 91724
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
Caltron Industries, Dept. EM, 2015 Second St., Berkeley, Cal. 94710
D Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Essex Int'l., Inc., Telecommunications Prods. Div., Dept. EM, 800 E. Garfield Ave., Decatur, Ill. 62526
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
Precision Tube, Dept. EM, Church Rd. & Wissahickon, No. Wales, Pa. 19454
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Cable, TV (Including Camera)

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 ...... *
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ...... p. 4588,4604,4605,4607,4612,4619**
Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 ...... p. 4626
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ...... *
DM **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ...... p. 4647,4664-4667**
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ...... p. 4715
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 ...... *
DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 ...... ***
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D Cerro Communication Products, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
D Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016

Cable, Twisted Pair

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522,4524,4526,4528,4530,4531**
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 ...... ***
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4538,4539,4543-4545,4548-4552,4555-4558,4565**
Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 ...... *
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4579,4581,4582**
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ...... p. 4588,4591,4595,4597,4598,4619**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 ...... ***
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 ...... p. 4626,4630,4632**
• **Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ...... p. 1538**
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 p. 4643**
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 ...... ***
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ...... p. 4676,4677,4685
Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057 ...... p. 4699,4709,4712
DM **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ...... p. 4652,4654,4664-4667**
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ...... p. 4715
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ...... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 ...... *
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 ...... ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 ...... ***

D Addington Laboratories, Inc., Maser Hitemp Wire Div., Dept. EM, 800 N. Grand, Covina, Cal. 91724
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
D Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
Interdyne, Intercette Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91401
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Microtech, Dept. EM, 1420 Conchester Hwy, Boothwyn, Pa. 19061
Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Rockland Insulated Wire & Cable, Dept. EM, 87 Broadway, Haverstraw, N.Y. 10927
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Cable, Woven Conductor

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4619
Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4626
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 p. 4643**
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... p. 2679**
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4644-4647,4664-4667
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... p. 4715
Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... p. 4716,4717
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903

Cages, Circuit Board—See Racks, Circuit Board

Calculators, Electrical & Electronic-Also See Computers, Desk Top

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 p. 1672
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Addmaster Corp., Dept. EM, 416 Junipero Serra Dr., San Gabriel, Cal. 91776
Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
Diversified Electronics Co., Dept. EM, 260 Wolfe Rd., Sunnyvale, Cal. 94086
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
D Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Sharp Electronics Corp., Dept. EM, 2 Sharp Plaza P.O. Box 389, Paramus, N.J. 07652
Sinclair Radionics, Inc., Dept. EM, 375 Park Ave., New York, N.Y. 10022
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, Accelerometer

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
M Genisco Tech. Corp., Rotating Test Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Calibrators, Attenuation

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Calibrators, Crystal

Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
M RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, Current

Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 p. 2840
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2861,2863**
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Calibrators, Frequency

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... p. 2407
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985

D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, LVDT

Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110

Calibrators, Magnetic Field

Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206

Calibrators, Meter—See Testers, Meter

Calibrators, Oscilloscope

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, Radar Range

Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548

Calibrators, Sound Level

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Becton, Dickinson & Co., Edmont-Wilson Div., Dept. EM, 3157 Walnut St., Coshocton, Ohio 43812
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, Sweep—See Generators, Sweep

Calibrators, Synchro

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... ***
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Calibrators, Time-Base

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
California Avionics Labs., Inc., Dept. EM, Box 701, Palo Alto, Calif. 94302
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Calibrators, Voltage

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Datel Systems Inc,, Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... p. 2834
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 p. 2840
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2861,2863**
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2905
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Designs Pacific, Inc., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Pioneer Instrumentation, Dept. EM, 4800 E. 131st St., Cleveland, Ohio 44105
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Stoelting Co., Dept. EM, 1350 S. Kostner Ave., Chicago, Ill. 60623
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Calibrators, VSWR

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Calling Systems—See Intercom Systems

Calorimeters, Microwave

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Cameras, Data Recording

International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
DM CAI, Div. Bourns Inc., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
D Reticon Corp., Dept. EM, 910 Benicia Ave., Sunnyvale, Cal. 94086
D Teledyne Camera Sys., Dept. EM, 131 N. Fifth Ave., Arcadia, Cal. 91006

Cameras, Image Converter

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Benthos, Inc., Dept. EM, Edgerton Dr., N. Falmouth, Mass. 02556
DM CAI, Div. Bourns Inc., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
D Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
D Reticon Corp., Dept. EM, 910 Benicia Ave., Sunnyvale, Cal. 94086
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Cameras, Infrared

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
M Teltron, Inc., Dept. EM, 940 Willow St., Pottstown, Pa. 19464

Cameras, Oscilloscope

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
DM CAI, Div. Bourns Inc., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Stoelting Co., Dept. EM, 1350 S. Kostner Ave., Chicago, Ill. 60623
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne Camera Sys., Dept. EM, 131 N. Fifth Ave., Arcadia, Cal. 91006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Cameras, Television

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1461
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Cameras, Video

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1461
DM CAI, Div. Bourns Inc., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576

Cams

A. M. W. Corp., Dept. EM, 78 Bow, Arlington, Mass. 02174
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Kwikset Powdered Metal Prods., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040

Cans & Flat Packs, Integrated Circuit—See Packages, Integrated Circuit

Cans, Capacitor, Relay, Semiconductor, Transformer, etc

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... p. 3604
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2183
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
D South Shore Metal Prods., Inc., Dept. EM, 88 E Allen Blvd., Farmingdale, N.Y. 11735
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011

Capacitance Comparators—See Bridges, Capacitance

Capacitor Hardware

D **AAVID Engrg, Inc., Dept. EM, 30 Cook Ct., Laconia, N.H. 03246 .... ***
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 .... ***
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247

Capacitor Leakage Indicators—See Testers, Capacitor

Capacitors, Air Cooled

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Chip (For Microcircuits)

M **American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... p. 1164,1166,1167**
DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... p. 1174,1175**
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
D **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... p. 1357,1364,1366-1370**
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 .... *
Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *

D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... ***
M **Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510 .. p. 1267**
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
M **Republic Elctrns. Corp., Dept. EM, 176 E. 7th St., Paterson, NJ 07524 p. 1297**
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 p. 1298,1299
D **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan .. ***
Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1304
DM **Union Carbide Corp., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606 .... ***
DM **Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... p. 1381**
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Emcon Div., Illinois Tool Works Inc., Dept. EM, 11620 Sorrento Valley :Rd., Box 81542, San Diego, Cal. 92138
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Matsuo Elctrns. of America, Dept. EM, 831 S. Douglas St., El Segundo, Cal. 90245
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M.I.A.L. U.S.A., Inc., Dept. EM, 173 Franklin Ave., Nutley, N.J. 07110
M Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D NCI, Inc., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138

Capacitors, Fixed, Air

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... p. 1266
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Capacitors, Fixed, Bathtub

Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 *
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1218,1220, Back Cover, Vol. 2
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1301**
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... ***
PFC, Dept. EM, Community Dr., Great Neck; NY 11022 .... p. 1291,1292
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... ***
Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 p. 1301
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
M **Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 ***
M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
DM Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
D Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
M S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, Ceramic

DM **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... ***
M **American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... p. 1166,1167**
Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1169
DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 p. 1171,1174-1179**
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... p. 1358,1360
DM **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... p. 1359,1364-1370,1372-1375,1377-1380,2771**
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 p. 1180,1181
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... p. 1234**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053 p. 1253
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254,1255**
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 1256
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... ***
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .. p. 1262,1263
DM **Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... p. 1266**
M **Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510 .. p. 1267**
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D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 1296**
M **Republic Elctrns. Corp., Dept. EM, 176 E. 7th St., Paterson, NJ 07524 p. 1297**
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 p. 2752,2757,2758**
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1303,1344-1350**
DM **Union Carbide Corp., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606 .... p. 1356**
DM **Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... p. 1381-1383**
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
D Emcon Div., Illinois Tool Works Inc., Dept. EM, 11620 Sorrento Valley :Rd., Box 81542, San Diego, Cal. 92138
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
International Importers, Dept. EM; 2244 S. Western Ave., Chicago, Ill. 60608
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
DM KD Components, Inc., Dept. EM, 3016 S. Orange Ave., Santa Ana, Cal. 92707
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
D Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138

Capacitors, Fixed, Ceramic Disc—See Capacitor, Fixed, Ceramic

Capacitors, Fixed, Decade

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 .... *
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105** *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1301**
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... **p. 2865**
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Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
PFC, Dept. EM, Community Dr., Great Neck, NY 11022 .... *
Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 p. 1301
DM **Union Carbide Corp., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606** .... *
Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 *
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
D San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Capacitors, Fixed, Electrolytic (All Types)

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1169**
DM **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 p. 1235-1244**
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... **p. 1234**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 p. 1250
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
D **Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053 p. 1253**
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254,1255**
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845** .... **p. 1258-1260**
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D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... **p. 1295,1296**
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Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1304-1337**
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D Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
Alissa Mfg. Co., Dept. EM, 735 E. Hyde Park Blvd., Inglewood, Cal. 90302
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
D Callins Industries, Dept. EM, Box C, Greenfield, Tenn. 38230
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Capar, Dept. EM, 303 Crossways Park Dr., Woodbury, N.Y. 11797
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Hilton Industries Inc., Dept. EM, 190 Maple St., Glen Falls, N.Y. 12801
M Hunter Stanley Elec., Dept. EM, 208 Russell St., Nashville, Tenn. 37213
D Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
DM Kahgan Electronics Corp., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
NCI, Inc., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
DM Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Tran Spectra Inc., Dept. EM, Box 9, Airport Rd., Greenfield, Tenn. 38230
United Chemicon Inc., Dept. EM, 731 James St., Ste. 306, Syracuse, N.Y. 13203
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

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DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577** .... *
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... **p. 1361**
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D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105** *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
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ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 1256
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... *
M **Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510** .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... *
M **Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076** .... *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
D **Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 p. 2752,2757,2758**
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 *
M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
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Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076; Longwood, Fla. 32750
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Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
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Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D NCI, Inc., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
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Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138

Capacitors, Fixed, Film/Metalized

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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
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M **Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1184,1186,1228,1229, Back Cover, Vol. 2**
DM **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 p. 1235**
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D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093** .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
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M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248,1249**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 p. 1251
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
D **Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053** *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254,1255**
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 1258,1261**
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 1278**
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M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
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DM **TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153** .... *
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D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
D Callins Industries, Dept. EM, Box C, Greenfield, Tenn. 38230
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
D Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
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D Matsuo Elec. Co., Ltd., Dept. EM, 3-5, 3-chome, Sennari-chu, Toyonaka-shi, Osaka, Japan
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D Paktron Div., Illinois Tool Works, Inc., Dept. EM, 900 Follin Lane, S.E., Vienna, Va. 22180
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
D Plessey Capacitors, Dept. EM, 5334 Sterling Center Dr., Westlake Village, Cal. 91361
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191
M S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed for A-C Applications (Including Motor Start)

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M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039** .... *
M **Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1183, 1186-1200, 1204-1206, 1208-1217, 1219-1225, 1228, 1229, 1233, Back Cover, Vol. 2**
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 p. 1235**
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
D **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 .... p. 1275**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
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M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
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D **Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404** .... *
M **Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301** *
Aerovox Inds., Inc., Dept. EM, 740 Belleville Ave., New Bedford, Mass. 02741
Alissa Mfg. Co., Dept. EM, 735 E. Hyde Park Blvd., Inglewood, Cal. 90302
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
D Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
D Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
DM Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Tran Spectra Inc., Dept. EM, Box 9, Airport Rd., Greenfield, Tenn. 38230
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
United Chemicon Inc., Dept. EM, 731 James St., Ste. 306, Syracuse, N.Y. 13203
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, Glass

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... *
Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... p. 1376-1379
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 p. 1180
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... p. 1234**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .. p. 1262,1263
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D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040

Capacitors, Fixed, High Capacitance-Low Voltage (50 Volts & Under)

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... **p. 1164,1166,1167**
DM **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1169**
AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... **p. 1171-1175**
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M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039** .... **p. 1357,1364-1380,2771**
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 p. 1180,1181
M **Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1187-1206,1208-1219,1222-1230,1232,1233, Back Cover,**
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 p. 1238-1244**
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... *
Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820 .... **p. 1245**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248**
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 p. 1250
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
D **Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053** *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1255**
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845** .... *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... **p. 1266**
M **Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510** .... *
D **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201** .... **p. 1275**
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
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D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
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M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... *
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan** .. *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
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M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
D Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
D Callins Industries, Dept. EM, Box C, Greenfield, Tenn. 38230
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
D Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
D Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Hilton Industries Inc., Dept. EM, 190 Maple St., Glen Falls, N.Y. 12801
M Hunter Stanley Elec., Dept. EM, 208 Russell St., Nashville, Tenn. 37213
D Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Midwec Div., Independent Cable, Dept. EM, Box 417 G, Scottsbluff, Neb. 69361
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
NCI, Inc., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
M S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
DM Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
D Tansitor Elctrns., Div. Aerotron, Dept. EM, West Rd., Bennington, Vt. 05201
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tran Spectra Inc., Dept. EM, Box 9, Airport Rd., Greenfield, Tenn. 38230
United Chemicon Inc., Dept. EM, 731 James St., Ste. 306, Syracuse, N.Y. 13203
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, High-Temperature (Over 125 C)

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DM **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... *
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Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039** .... *
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1222,1223,1231, Back Cover,
Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 p. 1235,1241-1244
D **Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820** .... **p. 1245**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
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M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248**
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DM **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201** .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
M **Republic Elctrns. Corp., Dept. EM, 176 E. 7th St., Paterson, NJ 07524** .... *
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... *
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... *
DM **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan** .. *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 .... *
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... *
Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 *
Alissa Mfg. Co., Dept. EM, 735 E. Hyde Park Blvd., Inglewood, Cal. 90302
D Callins Industries, Dept. EM, Box C, Greenfield, Tenn. 38230
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
D Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
DM KD Components, Inc., Dept. EM, 3016 S. Orange Ave., Santa Ana, Cal. 92707
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Midwec Div., Independent Cable, Dept. EM, Box 417 G, Scottsbluff, Neb. 69361
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
NCI, Inc., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407
M Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
M Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021

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D **Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820 .... ***
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248,1301**
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M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... ***
D **Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053 ***
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 1264
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Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
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D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1343**
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 .... *
Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 *
D Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
Aerovox Inds., Inc., Dept. EM, 740 Belleville Ave., New Bedford, Mass. 02741
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
D Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
D Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM KD Components, Inc., Dept. EM, 3016 S. Orange Ave., Santa Ana, Cal. 92707
M Lapp Insulator Div., Interpace Corp., Radio Specialties, Dept. EM, 350 Sumner St., LeRoy, N.Y. 14482
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
M.I.A.L. U.S.A., Inc., Dept. EM, 173 Franklin Ave., Nutley, N.J. 07110
Midwec Div., Independent Cable, Dept. EM, Box 417 G, Scottsbluff, Neb. 69361
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191
D Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, Laboratory Standard

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... *
D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 ***
M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... ***
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
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PFC, Dept. EM, Community Dr., Great Neck, NY 11022 .... p. 1293
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Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 *
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

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DM **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1168**
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... p. 1170**
DM **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 ***
D **Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820 .... ***
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan p. 1300**
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
DM Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
M Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
DM Kahgan Electronics Corp., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, Molded Composition

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1168**
AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... p. 1176-1179

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Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... *
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Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 p. 1181
Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 *
F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1249
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 1257
D **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201 .... ***
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1303,1350,1351
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 .... *
D **Union Carbide Corp., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606 .... ***
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
D Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Gudeman Corp., Dept. EM, 340 W. Huron St,, Chicago, Ill. 60610
Midwec Div., Independent Cable, Dept. EM, Box 417 G, Scottsbluff, Neb. 69361
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324
DM Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648

Capacitors, Fixed, Monolithic

DM **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... ***
M **American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... p. 1163,1167**
D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1169**
DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... p. 1172,1173**
DM **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... p. 1362-1371,1377-1380**
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 .... *
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... ***
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... *
Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510 .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
M **Republic Elctrns. Corp., Dept. EM, 176 E. 7th St., Paterson, NJ 07524 p. 1297**
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 .... *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 p. 1303,1348,1349**
DM **Union Carbide Corp., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606 .... p. 1356**
DM **Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... p. 1381-1383**
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
D Emcon Div., Illinois Tool Works Inc., Dept. EM, 11620 Sorrento Valley :Rd., Box 81542, San Diego, Cal. 92138
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
GTI/Tensor Electronics, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
DM KD Components, Inc., Dept. EM, 3016 S. Orange Ave., Santa Ana, Cal. 92707
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M.I.A.L. U.S.A., Inc., Dept. EM, 173 Franklin Ave., Nutley, N.J. 07110
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138

Capacitors, Fixed, Mylar, Metallized & Non-Metallized

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 ***
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1203
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 ***
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
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D **Illinois Capacitor Inc., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053 p. 1253**
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D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254,1255**
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 1257
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 1258,1261**
D **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 1278,1280,1281,1283**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 1294**
PFC, Dept. EM, Community Dr., Great Neck, NY 11022 .... *
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan .. ***
Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
DM **TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 Inside Back Cover,**
M **Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301 p. 1384,1385**
M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
DM Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745
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D Capar, Dept. EM, 303 Crossways Park Dr., Woodbury, N.Y. 11797
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M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... *
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
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D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
D **ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845** .... *
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D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
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DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
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Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
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Capacitors, Fixed, Photoflash

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Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
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D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
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Capacitors, Fixed Plastic

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Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 p. 1248,1301
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M **Wesco Electrical Co., Dept. EM, 201 Munson St., Greenfield, Mass. 01301** p. 1386,1387
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D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
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National Capacitor Supply, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641

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D Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
S & El Mfg., Dept. EM, Box 832, Northridge, Cal. 91324

Capacitors, Fixed, Polycarbonate, Metallized & Non-Metallized—See Capacitors, Fixed, Plastic

Capacitors, Fixed, Polyester, Metallized & Non-Metallized—See Capacitors, Fixed, Mylar, Metallized & Non-Metallized

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Capacitors, Fixed, Polystyrene—See Capacitors, Fixed, Plastic

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Capacitors, Fixed, Porcelain, Enamel

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M **Johanson Dielectrics Inc., Dept. EM, Box 6456, Burbank, Cal. 91510 .... ***
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Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219

Capacitors, Fixed, Power Factor Correction

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Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
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Sangamo Capacitor Div., Dept. EM, Box 128, Pickens, S.C. 29671
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
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Capacitors, Fixed, Pulse-Forming Network

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EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
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Matsuo Elec. Co., Ltd., Dept. EM, 3-5, 3-chome, Sennari-chu, Toyonaka-shi, Osaka, Japan
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D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
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Capacitors, Fixed, TFE, & TFE, Metallized

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M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
PFC, Dept. EM, Community Dr., Great Neck, NY 11022 .... *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 ***
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 .... *
M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
M Dearborn Elctrns. Div., Sprague Elec. Co., Dept. EM, Box 1076, Longwood, Fla. 32750
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021

Capacitors, Fixed, TFE, Metallized—Capacitors, Fixed, TFE, & TFE, Metallized

Capacitors, Fixed, Temperature Compensating

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 ***
DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577 .... ***
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
DM **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... p. 1359**
Centre Engrg., Dept. EM, 2820 E. College Ave., State College, Pa. 16801 .... *
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 .... *
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 ***
D **Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820 .... ***
Elpac Components, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 .... ***
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *

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D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 p. 1276
PFC, Dept. EM, Community Dr., Great Neck, NY 11022 *
M **Republic Elctrns. Corp., Dept. EM, 176 E. 7th St., Paterson, NJ 07524** p. 1297
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
DM **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan** *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** p. 1347-1349
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 *
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 *
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
Elctrn. Concepts, Inc., Dept. EM, Box 627, Eatontown, N.J. 07724
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Nichicon America Corp., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Fixed, Vacuum

High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 p. 1262-1264
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016

Capacitors, Overvoltage Protected

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 *
Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 *
Component Resch., Dept. EM, 1655-26 St., Santa Monica, Cal. 90404 p. 1232, Back Cover, Vol. 2
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 p. 1252
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 *
Dilectron, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
D Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646

Capacitors, Variable, Air

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 p. 1265
DM **Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005** p. 1266
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** p. 1270
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Hopt Co., K., Dept. EM, 118 First Ave., Atlantic Highlands, N.J. 07716
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Ceramic

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 *
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 1256
DM **Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005** *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** p. 1268,1269
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** p. 1296
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
DM Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
D JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
D Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Capacitors, Variable, Film

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
Alissa Mfg. Co., Dept. EM, 735 E. Hyde Park Blvd., Inglewood, Cal. 90302
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
D Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Gas

ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 *
M Lapp Insulator Div., Interpace Corp., Radio Specialties, Dept. EM, 350 Sumner St., LeRoy, N.Y. 14482

Capacitors, Variable, Glass

D **Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005** *
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, H-V (Lab Type) Also see Decade Boxes, Capacitance

Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 p. 1168
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 p. 1265
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 *
PFC, Dept. EM, Community Dr., Great Neck, NY 11022 *

M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040

Capacitors, Variable, High-Temperature (Over 125 C)

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** **p. 1301**
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... **p. 1266**
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** **p. 1301**
D Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Motor Driven

ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... **p. 4137**

Capacitors, Variable, Mica

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** **p. 1168**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Capacitors, Variable, Neutralizing

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
D Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Padder

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** **p. 1168**
D Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Piston—See Capacitors, Variable, Trimmer (All Types)

Capacitors, Variable, Quartz

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... **p. 1266**
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, TFE

M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 **p. 1265**
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** .... *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
Film Capacitors, Inc., Dept. EM, 100 8th St., Passaic, N.J. 07055
M Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
D Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Temperature Compensating

Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605** .... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502** *
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
D Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Trimmer (All Types)

American Technical Ceramics, Dept. EM, 1 Norden La., Huntington Sta., N.Y. 11746 .... *
D **Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915** .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 **p. 1265**
M **Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005** .... **p. 1266**
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
DM Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Hopt Co., K., Dept. EM, 118 First Ave., Atlantic Highlands, N.J. 07716
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Sprague-Goodman Electronics, Inc., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
DM Voltronics Corp., Dept. EM, West St., E. Hanover, N.J. 07936

Capacitors, Variable, Vacuum

ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016

Capacitors, Water Cooled

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
High Energy Corp., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365 **p. 1252**
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Caps, Connector

DM **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... **p. 1705**
DM **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
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Card Readers—See Punched Card Equipment

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Mobil-Tronics, Dept. EM, Box 1022, Tustin, Cal. 92680
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Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
D Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Kalart Victor Corp., Dept. EM, Hultenius St., Plainville, Conn. 06062
D Kay-Townes Antenna Co., Dept. EM, Turner Chapel RD., P.O. Box 593, Rome, Ga 30161
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
Stainless, Inc., Dept. EM, 3rd St., N. Wales, Pa. 19454
D Tape-Athon Corp., Dept. EM, 502 S. Isis Ave., Inglewood, Cal 90301
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Teknekron/Trax, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM; 9045 Balboa Ave., San Diego, Cal 92123
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cavities, Microwave

Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 p. 2992,2993**
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ...... p. 2995
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324

Cavities, Power Device

Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985

Cells, Electrolytic (Timing)—See Timers, Electrolytic Cell

Cells, Load

Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
Automatic Timing & Controls Co., Dept. EM; King of Prussia, Pa. 19406
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
D Interface, Inc., Dept. EM, 7401 Butherus Dr., Scottsdale, Ariz. 85260
Kelk, George Ltd., Dept. EM, 48 Lesmill Rd., Don Mills, Ont., Can. M3B 2T5
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
D Ormond Inc., Dept. EM, 11969 E. Rivera Rd., Santa Fe Springs, Cal. 90670
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Toledo Scale, Div. Reliance Elect. Co., Dept. EM, 350 W. Wilson Bridge Rd., Worthington, Ohio 43085
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Cells, Photoconductive

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... ***
D **Clairex Elctrns. Inc., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550 p. 3132,3134**
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 1667
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... p. 3138
D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 3139-3146**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 p. 3152,3153**
M Artech Corp., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
Quantrol Elect. Inc., Dept. EM, 1820 Mills Ave., El Paso, Tex. 79901
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Cells, Photoemissive
A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 1667
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Artech Corp., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054

Cells, Photovoltaic
D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859
Clairex Elctrns. Inc., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550 ...... *
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... *
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... p. 3138
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 3291,3293
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 p. 3152,3153
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Spectrolab, Inc., Dept. EM, 12500 Gladstone Ave., Sylmar, Cal. 91342
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Cells, Solar—See Cells, Photovoltaic

Cements—See Adhesives, (All Types)

Ceramic Resonators
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... p. 4343
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
D Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 p. 2773
Gulton Inds., Piezo Prods. Div., Dept. EM, Box 4300, Fullerton, Cal. 92634
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646

Chambers, Altitude
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 p. 2683
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
D Associated Environmental Systems, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Environmental
M Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 p. 2683
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
D Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684
D American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
D Associated Environmental Systems, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Atlas Electric Devices, Dept. EM, 4114 N. Ravenswood Ave., Chicago, Ill. 60613
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
GCA/Burlington Div., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Labconco Corp., Dept. EM, 8811 Prospect, Kansas City, Mo 64132
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Explosion
M Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 *
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... *
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Fluid Conditioner
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... *
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Humidity
Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 p. 2683
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684
M Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Magnetic Environment
M Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
M Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... p. 2679
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
D Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302

Chambers, Pressure
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
Benthos, Inc., Dept. EM, Edgerton Dr., N. Falmouth, Mass. 02556
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D Red Point Corp., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503
Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512

Chambers, Radiation
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966

NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302

Chambers, Shock

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682**
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 p. 2683
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Space Simulation

M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
M Spectrolab, Inc., Dept. EM, 12500 Gladstone Ave., Sylmar, Cal. 91342
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Chambers, Temperature

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 p. 2683
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
Sigma Sys. Corp., Dept. EM, 3163 Adams Ave., San Diego, Calif. 92116 p. 2685
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
Associated Environmental Systems, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
D Despatch Oven Co., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
Products for Research, Inc., Dept. EM, 78 Holten St., Danvers, Mass. 01923
Reliability Inc., Dept. EM, 8000 Harwin, Houston, Tex. 77036
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Vacuum

Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 .... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
M Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
D Brew Richard D. & Co., Inc., Dept. EM, 90 Airport Rd., Concord, N.H. 03301
DM Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
D Red Point Corp., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Chambers, Vibration

Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 .... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684**
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
M Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
M Webber Manufacturing Co., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206

Character Recognition Systems

M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Chargers, Battery

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 .... p. 3358
D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 p. 3362**
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 .... p. 3213
Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 p. 3219
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... ***
D **Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 p. 3236**
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974 .... ***
Gates Elctrn. Co., Dept. EM, 526 Van Nest Ave., Bronx, N.Y. 10460 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466
Jerome Industries Corp., Dept. EM, 391 Lakeside Ave., Orange, N.J. 07050 p. 3272
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... p. 3390**
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
M **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 .... ***
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 .... *
Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... *
Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... *
Accurate Electronics Co., Dept. EM, 2635 So. Wabash Ave., Chicago, Ill. 60616
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Adapter/Charger Prdts., Dept. EM, P.O. Box 3218 8727 N. Pioneer Rd., Peoria, Ill. 61614
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
Altair Resch. & Mfg. Co., Dept. EM, 1241 E. State St., Ontario, Calif. 91761
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
M Barnes & Reinecke, Inc., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
DM Collins Elecs, Inc., Dept. EM, Old Love Pt. Rd., Stevensville, Md. 21666
Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410

M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
D Elpower Corp., Dept. EM, 2117 S. Anne St., Santa Ana, Cal. 92704
General Electric Co., Battery Business Dept., Dept. EM, Box 861, Gainesville, Fla. 32602
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Globe Union, Inc., Globe Battery Div., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Gould Inc., Ind'l. Battery Div., Dept. EM, 2050 Cabot Blvd. W., Langhorne, PA. 19047
HGA Elctrns., Inc., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550
D Hollingsworth Co., John R., Dept. EM, Nutt & French Creek Rds., Phoenixville, Pa. 19460
D Ionics, Inc., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172
D Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
DM Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Onan Div-Onan Corp., Dept. EM, 1400 73rd Ave. N.E., Minneapolis, Minn. 55432
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
Power Conversion Products Inc., Dept. EM, 42 East St., Crystal Lake, Ill. 60014
Power-Sonic Corp., Dept. EM, Box 5242, 3106 Spring St., Redwood City, Cal. 94063
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
Sanyo Electric Inc., Dept. EM, 51 Joseph St., Moonachie, N.J. 07074
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Solidstate Controls, Inc., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
D Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Chargers, Magnet—See Magnetizers

Chassis, Circuit Board Mounting

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** .... *
D **Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207** *
Compac, Dept. EM, 222 Middle Country Rd., Smithown, N.Y. 11787 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
D **Interlok, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Par-Metal Prods. Inc., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216** .. *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
D **Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050** .... *
Techmar Corp., Dept. EM, 2232 S. Cotner Ave., Los Angeles, Cal. 90064 .... *
UNITRACK Div., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
M Calmark Corp., Dept. EM, 4947 Walnut Grove, 4947 Walnut Grove, Cal. 91776
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Circuit Structures Lab., Div. D-Cemco Inc Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
DM E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
D Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
Overly-Hautz Co., Dept. EM, 8617 Clinton Rd., Cleveland, Ohio 44144
M Riester & Thesmacher Co., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Chassis Marking Kits—See Kits, Marking (Dial, Instrument, Equipment, etc.)

Chassis, Metal

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** .... *
D **Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207** *
Compac, Dept. EM, 222 Middle Country Rd., Smithown, N.Y. 11787 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
M **General Devices Co., Inc., Dept. EM, Box 19188, Indianapolis, Ind. 46219** .. *
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
Optima Enclosures, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084 .... *
D **Premier Metal Prods. Co., Div. Sunshine Mining Co., Dept. EM, 381 Canal Place, Bronx, N.Y. 10451** .... *
Techmar Corp., Dept. EM, 2232 S. Cotner Ave., Los Angeles, Cal. 90064 .... *
UNITRACK Div., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Vent-Rak, Div., General Devices Co., Inc., Dept. EM, P.O. Box 19188, Indianapolis, Ind. 46219 .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
Zero-East Div., Dept. EM, 288 Main St., Monson, Mass. 01057 .... *
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
M Beechwood Mfg. Corp., Dept. EM, 360 S. Downey Ave., Indianapolis, Ind. 46219
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
M Calmark Corp., Dept. EM, 4947 Walnut Grove, 4947 Walnut Grove, Cal. 91776
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
MarkHon Industries Inc., Dept. EM, 200 Bond St., Wabash, Ind. 46992
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
Overly-Hautz Co., Dept. EM, 8617 Clinton Rd., Cleveland, Ohio 44144
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
M Riester & Thesmacher Co., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
M Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

Chassis Slides—See Slides, Cabinet, Chassis

Checkers—See Analyzers; Testers

Chemicals, Anti-Static—See Coatings, Anti-Static

Chemicals, Electroplating

Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
M Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803

Baker, J.T. Chemical Co., Dept. EM, Phillipsburg, N.J. 08865
D Barco Chem. Prods. Inc., Dept. EM, 701-703 S. LaSalle, Chicago, Ill. 60605
Bariod Div., N L Inds., Inc., Dept. EM, Box 1675, Houston, Tex. 77001
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
M M & T Chemicals Inc., Sub. American Can Co., Dept. EM, Rahway, N.J. 07065
M Mallinckrodt, Inc., Dept. EM, 2nd & Mallinckrodt Sts., St. Louis, Mo. 63147
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
D Sifco Metachemical, Div. Steel Improv. & Forging, Dept. EM, 5708 Schaaf Rd., Independence, Ohio 44131
M Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Chemicals, Epoxy Stripping

M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Bariod Div., N L Inds., Inc., Dept. EM, Box 1675, Houston, Tex. 77001
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
DM Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
M Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
D Pennwalt Corp., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102
Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248

Chemicals, Etching

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Adre Co., Dept. EM, Box 09415, Milwaukee, Wisc. 53209
Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
M Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Auric Corp., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114
Baker, J.T. Chemical Co., Dept. EM, Phillipsburg, N.J. 08865
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114
M Film Microelectronics, Inc., Dept. EM, 17 A St., Burlington, Mass 01803
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
M Mallinckrodt, Inc., Dept. EM, 2nd & Mallinckrodt Sts., St. Louis, Mo. 63147
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
D Pennwalt Corp., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102
Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Sifco Metachemical, Div. Steel Improv. & Forging, Dept. EM, 5708 Schaaf Rd., Independence, Ohio 44131
Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017

Chemicals, Fungicidal—See Coatings, Fungicidal

Chemicals, Wire Stripping

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *

Acme Chemical & Insulation Co., Dept. EM, 166 Chapel St., New Haven, Conn. 06513
M Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877

Chestsets—See Handsets, Chestsets

Chips, IC—See Circuits, Integrated, Silicon Monolithic, Unpackaged Chips

Chokes, A-F—See Coils, A-F

Chokes, R-F—See Coils, R-F

Chokes, Swinging

M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *
D **Todd Systems, Dept. EM, 4 Radford Pl., Yonkers, N.Y. 10701** .... p. 4488
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Chokes, Waveguide

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025

DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Choppers - Also see Light Choppers

M **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 3131
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... ***
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
M **Philamon, Inc., Dept. EM, 33 Dubon Ct., Farmingdale, N.Y. 11735 .... p. 2467**
Stevens-Arnold, Inc., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
DM Collins Elecs, Inc., Dept. EM, Old Love Pt. Rd., Stevensville, Md. 21666
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Chronometers

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... ***
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761

Circuit Analyzers—See Testers, Signal Tracing

Circuit Board Holders, Jig Type—See Holders, Circuit Board

Circuit Breakers

M **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... p. 3954,3955**
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM **Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 p. 4094**
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 4149**
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... ***
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
DM Aiken Industries, Inc., Mechanical Prod. Div., Dept. EM, 1824 River St. Box 729, Jackson, Mich. 49204
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
M E-T-A Prods. Co. America, Dept. EM, 7400 N. Croname Rd., Chicago, Ill. 60648
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
D Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Underwriters Safety Device, An Eltra Co., Dept. EM, 7300 W. Wilson Ave., Chicago, Ill. 60656
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011
Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Circuit Testers—See Testers, Signal Tracing

Circuits, Hybrid, Thick Film

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... ***
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2979,3642,3643**
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... p. 2982**
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... ***
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
M **North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... p. 2984**
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
DM Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
AMF Electical Prods. Dev. Div., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Boeing Microelectronics, Dept. EM, Box 24666, Seattle, Wash. 98124
D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
M Custom Devices, Div. CTL, Inc., Dept. EM, 763 U.S. Hwy. 17-92, Fern Park, Fla. 32730
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M General Elec., Valley Forge Space Tech. Ctr., Dept. EM, Box 8555, Phila., Pa. 19101
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Hybrid Microelectronic Circuits Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave., (E 4/5), Newport Bch., Cal. 92663
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
M Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
Mepco/Electra, Dept. EM, Box 760, Mineral Wells, Tex. 76067
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Mica Corporation, Dept. EM, 10900 Washington Blvd., P.O. Box 2578, Culver City, Calif. 90230
M Micropac Industries, Inc., Dept. EM, 905 E. Walnut St., Garland, Tex. 75040
Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
Tri-Sage Inc., Dept. EM, 1212 Pittsford-Victor Rd., Pittsford, NY 14534

Circuits, Hybrid, Thin-Film

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... ***
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2979,3642,3643**
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... p. 2984

Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... p. 2484,2485
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Boeing Microelectronics, Dept. EM, Box 24666, Seattle, Wash. 98124
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M Film Microelectronics, Inc., Dept. EM, 17 A St., Burlington, Mass 01803
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Hybrid Microelectronic Circuits Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave., (E 4/5), Newport Bch., Cal. 92663
M HyComp Inc., Dept. EM, Box 250, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
Micropac Industries, Inc., Dept. EM, 905 E. Walnut St., Garland, Tex. 75040
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Western Microsystems, Inc., Dept. EM, Box 23192, San Diego, Cal. 92123

Circuits, Integrated, Monolithic—See IC's (Specific Types)

Circuits, Integrated, Silicon Monolithic, Unpackaged Chips

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
M Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

Circuits, Printed Flexible

Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
Defiance Circuit Corp., Sub. of Hi-G Inc., Dept. EM, 12 Shepherd St., Lawrence, Mass. 01843 .... *
Hughes Aircraft Co., Connecting Devices Div., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714 .... *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
M Bureau Engraving, Inc., Ind'l. Div., Dept. EM, 219 N. Second St., Minneapolis, Minn. 55401
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
Dytronics Div., GTI Corp., Dept. EM, Box 217, Leesburg, Ind. 46538
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
Flexprint Div, Sanders Assocs., Inc., Dept. EM, Grenier Field, Manchester, N H 03060
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
M Minco Products Inc., Dept. EM, 7300 Commerce Lane, Minneapolis, Minn. 55432
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
M Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
M Rogers Corp., Dept. EM, Rogers, Conn. 06263
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M SGL Printed Circuits, Div. SGL Inds., Inc., Dept. EM, 827 Black Oak Ridge Rd., Wayne, N.J. 07470
Sheldahl, Inc., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057
Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
M T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360

Circuits, Printed, Multilayer

Defiance Circuit Corp., Sub. of Hi-G Inc., Dept. EM, 12 Shepherd St., Lawrence, Mass. 01843 .... *
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M Advanced Circuitry, Litton Systems Inc., Dept. EM, 4811 W. Kearney St., Springfield, Mo. 65803
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Astro Circuit Corp., Dept. EM, 540 Main St., Tewksbury, Mass. 01876
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
M Bureau Engraving, Inc., Ind'l. Div., Dept. EM, 219 N. Second St., Minneapolis, Minn. 55401
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Circuits, Inc., Dept. EM, 59 Deming Rd., Berlin, Conn. 06037
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dattilo Enterprises, Inc., Dept. EM, 2302 Taylorsville Rd., Louisville, Ky. 40205
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
DM Diva, Inc., Dept. EM, 607 Industrial Way West, Eatontown, N.J. 07724
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
Flexprint Div, Sanders Assocs., Inc., Dept. EM, Grenier Field, Manchester, N H 03060
GTE Sylvania, Circuit Module Oper., Elctrn. Comps. Grp., Dept. EM, Box 360, Muncy, Pa. 17756
GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Knol Enterprise, Dept. EM, 200 Suburban Rd., San Luis Obispo, Cal. 93401
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
MBC Engineering Inc., Dept. EM, 2501 Walsh Ave., Santa Clara, Cal. 95050
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
D Metropolitan Circuits Inc., Dept. EM, 1261 Logan, Costa Mesa, Cal 92626
Metropolitan Circuits Inc., Dept. EM, 2706 Edgington St., Franklin Park, Ill. 60121
M Mica Corporation, Dept. EM, 10900 Washington Blvd., P.O. Box 2578, Culver City, Calif. 90230
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420

Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
North American Printed Circuit Div., Tyco Labs., Inc., Dept. EM, Box 145, Stafford, Conn. 06075
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
M Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
Rogers Corp., Dept. EM, Rogers, Conn. 06263
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
M SGL Printed Circuits, Div. SGL Inds., Inc., Dept. EM, 827 Black Oak Ridge Rd., Wayne, N.J. 07470
T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D Thiokol Chemical Div., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607
TRW/Cinch-Graphik, Elctrn. Comps., Div. TRW INC., Dept. EM, 200 S. Turnbull Canyon Rd., City of Industry, Cal. 91744

Circuits, Printed, Rigid One & Two Sided

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Applied Circuits, Inc., Dept. EM, 36-06 43rd. Ave., Long Island City, N.Y. 11101 .... *
Defiance Circuit Corp., Sub. of Hi-G Inc., Dept. EM, 12 Shepherd St., Lawrence, Mass. 01843 .... *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137** *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... *
DM **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
M Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
M Advanced Circuitry, Litton Systems Inc., Dept. EM, 4811 W. Kearney St., Springfield, Mo. 65803
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Artech Corp., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Astrocom Corp., Dept. EM, 15012 Minnetonka Rd., Minnetonka, Minn 55343
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
M Avionics Ltd., Dept. EM, Box 200, Niagara-On-Lake, Ont., Can.
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
M Bureau Engraving, Inc., Ind'l. Div., Dept. EM, 219 N. Second St., Minneapolis, Minn. 55401
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
D Circuit-Stik, Inc., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
M Circuits, Inc., Dept. EM, 59 Deming Rd., Berlin, Conn. 06037
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Dattilo Enterprises, Inc., Dept. EM, 2302 Taylorsville Rd., Louisville, Ky. 40205
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Dytronics Div., GTI Corp., Dept. EM, Box 217, Leesburg, Ind. 46538
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Eastern Electronics Mfg. Corp, Dept. EM, 180 Roberts St., East Hartford, Conn. 06108
E.D.I. Inc., Dept. EM, Box 66, Cairo, Ill. 62914
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
M Electro Packaging, Inc., Dept. EM, 176 Walker St., Lowell, Mass. 01854
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
M Electronic Support Systems, Dept. EM, 122 W. St. Charles Rd., Villa Park, Ill. 60181
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
Flexprint Div, Sanders Assocs., Inc., Dept. EM, Grenier Field, Manchester, N H 03060
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
General Electrodynamics Corp., Dept. EM, 4430 Forest La., Garland, Tex. 75040
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gridcraft, Inc., Dept. EM, 14520 Lima Rd., Fort Wayne, Ind 46808
GTE Sylvania, Circuit Module Oper., Elctrn. Comps. Grp., Dept. EM, Box 360, Muncy, Pa. 17756
GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
D Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Interdyne, Intercette Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91401
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Kalmus & Assoc., Dept. EM, 2424 S. 25th Ave., Broadview, ILL. 60153
Kantz Electronic Ind., Dept. EM, 229 W. 4th St., Clifton, N.J. 07011
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Lika, Dept. EM, 405 Aldo Ave., Santa Clara, Cal. 95050
Masterite Corporation, Dept. EM, 2841 Lomita Blvd., Torrance, Cal. 90505
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D Metropolitan Circuits Inc., Dept. EM, 1261 Logan, Costa Mesa, Cal 92626
Metropolitan Circuits Inc., Dept. EM, 2706 Edgington St., Franklin Park, Ill. 60121
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
National Metal Crafters Inc., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125
North American Printed Circuit Div., Tyco Labs., Inc., Dept. EM, Box 145, Stafford, Conn. 06075
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Parlex Corp, Dept. EM, 145 Milk St., Methuen, Mass. 01844
M Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
M Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Rogers Corp., Dept. EM, Rogers, Conn. 06263
Rosemont-Nashville, Inc., Dept. EM, 100 Heil Quacker Blvd., Lavergne, Tenn.
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
DM Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
M SGL Printed Circuits, Div. SGL Inds., Inc., Dept. EM, 827 Black Oak Ridge Rd., Wayne, N.J. 07470
M Solid State Circuits, Dept. EM, 616 Boonville, Springfield, Mo. 65806
M T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
DM Techniques, Inc., Dept. EM, 235 Jackson St., Englewood, N.J. 07631
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
TRW/Cinch-Graphik, Elctrn. Comps., Div. TRW INC., Dept. EM, 200 S. Turnbull Canyon Rd., City of Industry, Cal. 91744
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103

Circuits, Printed (With Components)—See Cards, Linear Function (With Discrete Components)

Circuits, Thick Film, Thin Film—See Circuits, Hybrid

Circulators, Ferrite

M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... **p. 2484**
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M UTE Microwave,, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Citizens Band, Business Band, Marine Band Comm. Systems—See Comm. Systems, Radiotelephone

Clamps & Clips, Cable-Also See Wire & Cable Ties

M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... p. 1705**
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 4668**
DM **Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033 p. 4669**
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1912,1914,1952,1953,1979, Inside Back Cover,
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
D **3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... ***
Mueller Electric Co., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114 .... p. 2129
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4688,4689**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169,2186,2187**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... Inside Back Cover,**
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2785**
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
Alinabal, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460
All States Plastic Mfg. Co., Inc., Dept. EM, 1801 W. Foster Ave., Chicago, Ill. 60640
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
DM Budwig Mfg. Co., Dept. EM, P.O. Box 97, Ramona, Calif. 92065
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
M Dennison Mfg. Co., Fastener Division, Dept. EM, Framingham, Mass. 01701
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Price & Rutzebeck, Dept. EM, Box 30, Hayward, Calif. 94543
D Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
D Tyton Corp., Dept. EM, 2300 W. Florist Ave., Milwaukee, Wisc. 53209
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
M Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720
DM Weckesser Co. Inc., Dept. EM, 4444 W. Irving Park Rd., Chicago, Ill. 60641
D Zeus Ind'l. Prods., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869

Clamps & Clips, Component

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515 .... ***
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 p. 3461
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... ***
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1952,1953,1979, Inside Back Cover,
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2535
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169**
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... ***
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
D Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
Seastrom Mfg. Co. Inc., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201
M Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Timber-Top, Inc., Dept. EM, Hopkins Rd., Box 517E, Watertown, Conn. 06795
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
D Viking Inds., Inc., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311
DM Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clamps & Clips, Ground

ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1951, Inside Back Cover,
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
DM **Mueller Electric Co., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114 .... p. 2129**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
DM Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clamps, Rim Clenching

Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2536

Timber-Top, Inc., Dept. EM, Hopkins Rd., Box 517E, Watertown, Conn. 06795

Clamps, Synchro

Timber-Top, Inc., Dept. EM, Hopkins Rd., Box 517E, Watertown, Conn. 06795

Clean Room Equipment & Supplies

Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Alconox Inc., Dept. EM, 217 Park Ave. S., New York, N.Y. 10003
Static Inc., Dept. EM, Box 414, Lee, Mass. 01238
Weber Tech Products, Dept. EM, 1340 Monroe Ave. N.W., Grand Rapids, Mich. 49505
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Cleaners & Solvents

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... p. 1388**
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109 .... ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Alconox Inc., Dept. EM, 217 Park Ave. S., New York, N.Y. 10003
M Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Ambroid Co., Dept. EM, P.O. Box 1089, Taunton, MA 02780
American Gas & Chemical Co., Ltd., Dept. EM, 5 Tenakill Pk., Cresskill, N.J. 07626
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
D Audio-Technica U.S., Inc., Dept. EM, 33 Shiawassee Ave., Fairlawn, Ohio 44313
Baker, J.T. Chemical Co., Dept. EM, Phillipsburg, N.J. 08865
D Barco Chem. Prods. Inc., Dept. EM, 701-703 S. LaSalle, Chicago, Ill. 60605
Bariod Div., N L Inds., Inc., Dept. EM, Box 1675, Houston, Tex. 77001
Baron-Blakeslee, Inc., Dept. EM, 1620 S. Laramie Ave., Chicago, Ill. 60650
D Bendix Corp., Instr. & Life Support Div., Dept. EM, 2734 Hickory Grove Rd., Davenport, Iowa 52808
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
DM Cobehn, Inc., Dept. EM, 226 Passaic Ave., Fairfield, N.J. 07006
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
D Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Elctrn. Chemical Corp., Dept. EM, 813 Communipaw Ave., Jersey City, N.J. 07304
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D Friend's Mfg., Dept. EM, Rd. 5, Box 74, Williamstown, N.J. 08094
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
D Gardiner Solder Co., Div. of Gardiner Metal Co., Dept. EM, 5207 Walnut St, Downers Grove, Ill 60515
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
M Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
DM Kester Solder Div., Litton Systems Inc., Dept. EM, 4201 Wrightwood Ave., Chicago, Ill. 60639
D Krylon, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404
L & R Mfg., Dept. EM, 577 Elm St., Kearny, N.J. 07032
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
DM LPS Research Labs, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M M & T Chemicals Inc., Sub. American Can Co., Dept. EM, Rahway, N.J. 07065
M Mallinckrodt, Inc., Dept. EM, 2nd & Mallinckrodt Sts., St. Louis, Mo. 63147
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Odell Co., M. P., Dept. EM, 26612 Center Ridge Rd., Cleveland, Ohio 44145
D Pennwalt Corp., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102
Philadelphia Quartz Co., Dept. EM, Box 840, Valley Forge, Pa. 19482
Phillips Mfg. Co., National Ultrasonic Div., Dept. EM, 7334 N. Clark St., Chicago, Ill. 60626
PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
D Quietrole Co., Dept. EM, 395 St. John, Spartenburg, S.C. 29302
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
D Udel Manufacturing, Dept. EM, Box 2028, Covina, Cal. 91722
Ultrasonic Corp., Dept. EM, Box 672, Pipestone, Minn. 56164
Ultrasonic Instrs. Int'l., Inc., Dept. EM, 165 EM Marine St., Farmingdale, N.Y. 11735
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cleaners, Ultrasonic

Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
D American Elec. Heater, Dept. EM, 6110 Cass Ave., Detroit, Mich. 48202
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
D Barco Chem. Prods. Inc., Dept. EM, 701-703 S. LaSalle, Chicago, Ill. 60605
Baron-Blakeslee, Inc., Dept. EM, 1620 S. Laramie Ave., Chicago, Ill. 60650
D Bendix Corp., Instr. & Life Support Div., Dept. EM, 2734 Hickory Grove Rd., Davenport, Iowa 52808
Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
M Keuffel & Esser Co., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960
Koh-I-Noor Rapidograph, Dept. EM, 100 North St., Bloomsbury, N.J. 08804
L & R Mfg., Dept. EM, 577 Elm St., Kearny, N.J. 07032
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
DM LPS Research Labs, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
Phillips Mfg. Co., National Ultrasonic Div., Dept. EM, 7334 N. Clark St., Chicago, Ill. 60626
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
Static Inc., Dept. EM, Box 414, Lee, Mass. 01238
D Tronic Corp., Dept. EM, Box 247-E, Belmont, Cal. 94002
D Udel Manufacturing, Dept. EM, Box 2028, Covina, Cal. 91722
D Ultrasonic Corp., Dept. EM, Box 672; Pipestone, Minn. 56164
DM Ultrasonic Instrs. Int'l., Inc., Dept. EM, 165 EM Marine St., Farmingdale, N.Y. 11735
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Clips, Alligator

Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020 .... ***
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2063,2067**
DM **Mueller Electric Co., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114 .... p. 2128,2129**
D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... p. 2130**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2165**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543

DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips & Caps, Grid & Plate

D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips & Holders, Fuse-Also See Panels, Fuse

Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045** .... **p. 3978,3980-3983**
Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 p. 4094
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 p. 2119**
DM **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 4148,4149**
D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335** .... **p. 2131**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2186**
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
D Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Components Corp., Dept. EM, 106 Main St., Denville, N.J. 07834
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
D Marathon Special Prods. Corp., Dept. EM, 13300 Van Camp Rd., Bowling Green, Ohio 43402
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
Oneida Electronics Mfg., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Panel Components Corp., Dept. EM, 2015 Second St., Berkeley, Cal. 94710
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Seastrom Mfg. Co. Inc., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Taylor Electric, Inc., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
D Underwriters Safety Device, An Eltra Co., Dept. EM, 7300 W. Wilson Ave., Chicago, Ill. 60656
DM Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips, Battery

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 p. 2119**
DM **Mueller Electric Co., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114** .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2165,2175,2186**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
M Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips, Board, Harness

Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006** .... *
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... *
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... **p. 2076**
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510

Clips, Fahnestock, Spring Wire

D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips, Logic Test

D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006** .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... **p. 2076**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040

Clips, Test

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006** .... *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** .... **p. 1841**
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020** .... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766** .... **p. 2076,2079**
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
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D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2165**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *

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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Clips, Transistor & Diode—See Retainers, Transistor & Diode

Clocks (All Types)

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
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M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... p. 1487
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ..... p. 2437
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M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** ..... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 ..... *
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D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** ..... *
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Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 p. 1681
Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 ..... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614** ..... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ..... *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** ..... *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Baumker Mfg. Co., Dept. EM, 5144 Enterprise, Toledo, Ohio 43612
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
D Gibson Instruments W.C., Dept. EM, Box 352, 1304 Myer Rd., Seabrook, Tex. 77586
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
HGA Elctrns., Inc., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518

Clutches, Friction

M **Delevan Div., American Prec. Inds., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052** ..... *
M **General-Electro Mechanical, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207** p. 3084
Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702 ..... p. 3082
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 ..... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** ..... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ..... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ..... p. 3129
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Kwikset Powdered Metal Prods., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803
DM Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
DM Northfield Precision Instr. Corp., Dept. EM, 4400 Austin Blvd., Island Park, N.Y. 11558
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Clutches, Magnetic

M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** .... *
M **Delevan Div., American Prec. Inds., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052** ..... p. 3074
M **General-Electro Mechanical, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207** p. 3084
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ..... *
D Altair Resch. & Mfg. Co., Dept. EM, 1241 E. State St., Ontario, Calif. 91761
Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
D WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Clutches, Positive

Delevan Div., American Prec. Inds., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052 ..... *
M **General-Electro Mechanical, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207** *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ..... *
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
DM Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094

Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Coatings, Anti-Static

Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... **p. 1388**
Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... **p. 1390,1391**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Barco Chem. Prods. Inc., Dept. EM, 701-703 S. LaSalle, Chicago, Ill. 60605
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
Libbey Owens-Ford Co., Liberty Mirror Div., Dept. EM, 811 Madison Ave., Toledo, Ohio 43695
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Coatings, Compounds, Lubricants, etc., Heat Conductive

Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... **p. 1390,1391**
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Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Astrodyne, Inc., Sub. Roanwell Corp., Dept. EM, 353 Middlesex Ave., Wilmington, Mass. 01887
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
D Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
D Krylon, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404
DM LPS Research Labs, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040

SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Coatings, Conductive, Electric

Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... **p. 1390,1391**
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
DM Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
D Krylon, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404
Libbey Owens-Ford Co., Liberty Mirror Div., Dept. EM, 811 Madison Ave., Toledo, Ohio 43695
D 3M Co., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
Vari-Light Corp., Sub. Polacoat Inc., Dept. EM, 9770 Conklin Rd., Cincinnati, Ohio 45242
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Coatings, Corrosion Resistant

Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... **p. 1390,1391**
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Electrofilm, Inc., Dept. EM, 7116 Laurel Canyon Blvd., No. Hollywood, Cal. 91605
M Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Coatings, Electromagnetic Wave-Absorbing

Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... **p. 1390,1391**
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006

D Krylon, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525

Coatings, Fungicidal

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1391
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
M Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
D Sterling, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143

Coatings, High-Temperature, Ceramic, Plasma Spray —See Services, Coating

Coatings, Insulating

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109 .... ***
DM **Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1390,1391**
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
D Acme Chemical & Insulation Co., Dept. EM, 166 Chapel St., New Haven, Conn. 06513
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Ambroid Co., Dept. EM, P.O. Box 1089, Taunton, MA 02780
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
M Armstrong Prods. Co., Dept. EM, Box 657, Warsaw, Ind. 46580
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Coors Porcelain Co., Dept. EM, 600 Ninth St., Golden, Colo. 80401
D CPL Corp., Chemical Prods. Corp. Div., Dept. EM, King Philip Rd., E. Providence, R.I. 02914
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
M Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
D Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
M M & T Chemicals Inc., Sub. American Can Co., Dept. EM, Rahway, N.J. 07065
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
Mobay Chem. Corporation, Dept. EM, Pittsburgh, Pa. 15205
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
M Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
M Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
DM Sterling, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Union Carbide, Parylene, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Coatings, Moisture Repellant & Waterproofing

Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .. p. 2528
Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1390,1391
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
M Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123

Coatings, Protective

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .. p. 2528
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109 .... ***
DM **Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1390,1391**
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Ambroid Co., Dept. EM, P.O. Box 1089, Taunton, MA 02780
AMF Tuboscope, Inc., AMF Inc., Dept. EM, P.O. Box 808, Houston, Texas 77001
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
M Armstrong Prods. Co., Dept. EM, Box 657, Warsaw, Ind. 46580
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
D CPL Corp., Chemical Prods. Corp. Div., Dept. EM, King Philip Rd., E. Providence, R.I. 02914
Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Fidelity Chem. Prods. Corp., Dept. EM, 472 Frelinghuysen Ave., Newark, N.J. 07114
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
D Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
D Krylon, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
M LPS Research Labs, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M M & T Chemicals Inc., Sub. American Can Co., Dept. EM, Rahway, N.J. 07065
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Markal Co., Dept. EM, 250 N. Washtenaw Ave., Chicago, Ill. 60612
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
M Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670

Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
D Pennwalt Corp., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
M Seal-Peel, Inc., Dept. EM, Box 250, Troy, Mich. 48084
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
D Solder Removal Co., Dept. EM, 1077 E. Edna Pl., Covina, Cal. 91724
D Sterling, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
M Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
M Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Union Carbide, Parylene, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
DM Western Coating Co., Dept. EM, Box 598, Royal Oak, Mich. 48073
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Coatings, Radioactive

Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1390,1391
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101

Coatings, Transducer Forming

Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377 .... p. 1390,1391
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060

Code & Tab Markers—See Wire Markers (All Types)

Coded Discs, Optical—See Encoders, Shaft Angle, Optical

Coders, A-F

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
M Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Coders, Beacon

Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 .... p. 2504
M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209

Coders, Transponder

M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115

Coil Assemblies & Forms-Also See Bobbins, Winding, Coil & Transformer

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Harbison Ind'l. Prods., Inc., Dept. EM, 7205 Hibbs La., Levittown, Pa. 19057 p. 1428
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... p. 2671
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .. p. 2673
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
M **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Cincinnati Dev. & Mfg. Co., Dept. EM, 5614 Wooster Pike, Cincinnati, Ohio 45227
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Cortec, Inc., Dept. EM, 711 W. 17th St. (Bldg. H.I.), Costa Mesa, Cal. 92627
Cosmo Plastics Co., Dept. EM, 3239 W. 14th St., Cleveland, Ohio 44109
M D & L Sales Co. Inc., Dept. EM, 296 Preakness Ave., Paterson, N.J. 07502
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
D Mark Specialties, Dept. EM, 1780 Monrovia, Costa Mesa, Cal. 92627
Micrometals, Dept. EM, 228 N. Sunset, City of Industry, Cal. 91744
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
M Ogallala Elctrns., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Resdel Corp., Dept. EM, Bldg. 22–County Airport, Rio Grande, N.J. 08242
M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
D Spec Plastics Inc., Dept. EM, 7224 Atoll Ave., No. Hollywood, Cal. 91605
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coil Standards—See Standards, Inductance

Coil-Winding Equipment—See Machines, Coil-Winding

Coils, A-F

Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4427**
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *

M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 p. 4474
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** *
Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** *
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
M JB Elctrn. Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Coils, Antenna (Including Loading Type)

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
M **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** *
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** *
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
D Lattin Radio Labs., Dept. EM, 1431 Sweeney, Box 44, Owensboro, Ky. 42301
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coils, Broadcast

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879

Coils, Chip

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
DM **Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052** p. 1424,1425
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** *
Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040

Coils, Degaussing

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** *
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Coils, Field

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Ogallala Elctrns., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153
Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Coils, Focusing

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Syntronic Instruments Inc., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101 *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Display Components Inc., Dept. EM, 550 Newton Rd, Box 488, Littleton, Mass. 01460
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515

M Ogallala Elctrns., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coils, Foil-Wound

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Ogallala Elctrns., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Coils, High-Q, Low-Frequency

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... p. 1414,1418
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420,1422
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 1426
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... p. 4417
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 1429
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532** .... *
OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... p. 3290
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 p. 4455,4459
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358,4359,4379,4397-4407
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** p. 4464
Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 p. 4478
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** p. 1452-1456
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** Inside Back Cover,
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
M Lenox-Fugle Elctrns., Inc., Dept. EM, 100 Sylvania Pl., S. Plainfield, N.J. 07080
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Coils, Hybrid & Repeater

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 1444
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740

Coils, I-F

Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... *
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coils, Metallized Glass

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040

Coils, Molded

DM **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... p. 1414,1415**
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 .... p. 1423**
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 1426
DM **Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... p. 4412**
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 1431-1433,1437-1443,1445**
M **Rowe Industries, Inc., Dept. EM, 6225 Benóre Rd., Toledo, Ohio 43612** .... *
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 p. 1455,1457**
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
DM Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Plasticraft Co., Dept. EM, 814 N. Sacramento Blvd., Chicago, Ill. 60622
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Cosmo Plastics Co., Dept. EM, 3239 W. 14th St., Cleveland, Ohio 44109
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60C41
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
DM Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Cón, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
M Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740

Coils, Oscillator

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coils, R-F

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 .... p. 1413**
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... p. 1415,1416,1418**
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420-1422
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 .... p. 1423**

D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 1426**
DM **Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... p. 1424,1425**
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 p. 1429,4429
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 1431,1432,1437,1438,1444**
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 p. 4454,4459
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358,4377,4378,4397-4407
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 p. 1453-1455**
TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover, Vol. 2
DM Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
DM Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
M J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
M Lenox-Fugle Elctrns., Inc., Dept. EM, 100 Sylvania Pl., S. Plainfield, N.J. 07080
Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Superex Electronics Corp., Dept. EM, 151 Ludlow St., Yonkers, N.Y. 10705
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Coils, Relay

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... ***
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... ***
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103 .... *
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 p. 3582
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
M **Regdon Corp., Dept. EM, 3715 Grand Blvd., Brookfield, Ill 60513 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740

Coils, Saturable Reactor

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 .... *
Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 .... *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
M Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018

- Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
- Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
- Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
- Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
- M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
- Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
- Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
- Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
- M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
- Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
- Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
- Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
- G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
- M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
- Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
- Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
- Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
- M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
- Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
- M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
- Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
- M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
- M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
- TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
- D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
- Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
- M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Coils, Shielded

- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ...... ***
- **DM Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 ...... p. 1415,1417,1418**
- **M Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 ...... ***
- **Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420-1422**
- **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
- **DM Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 ...... p. 1423**
- **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ...... p. 1426**
- **DM Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 ...... p. 1424,1425**
- **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 ...... ***
- **M Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 ...... ***
- **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 ...... ***
- **Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 ...... ***
- **North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 1429**
- **NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... ***
- **DM Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 ...... p. 1430-1436**
- **DM Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 ...... ***
- **M Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 ...... ***
- DM Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
- M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
- Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
- Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
- M Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
- M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
- Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
- Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
- Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
- Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
- D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
- M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
- M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
- Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
- D Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
- M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
- M J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
- M Lenox-Fugle Elctrns., Inc., Dept. EM, 100 Sylvania Pl., S. Plainfield, N.J. 07080
- Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
- M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
- Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
- M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
- QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
- M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
- M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
- TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
- Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639

Coils, Solenoid

- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ...... ***
- **D Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 ...... ***
- **M Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
- **Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 ...... ***
- **DM Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 ...... p. 1423**
- **D Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ...... ***
- **Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ...... ***
- **Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 ...... ***
- **M ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
- **M Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 ...... ***
- **M Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 ...... ***
- **Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 p. 3582**
- **Magnetec Corp., Sub of Hi-G Inc, Dept. EM, 96 Granby St., Bloomfield, Conn. 06002 ...... ***
- **Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 ...... ***
- **NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... ***
- **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 ...... ***
- **M Regdon Corp., Dept. EM, 3715 Grand Blvd., Brookfield, Ill 60513 ...... ***
- **Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... ***
- **M Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 ...... ***
- Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
- DM Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
- American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
- American Magnetics, Dept. EM, Box R, Oak Ridge, Tenn. 37830
- M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
- Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
- A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
- Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
- Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
- D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
- Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
- Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
- M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
- Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
- Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
- Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
- De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
- Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
- M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
- D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
- Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
- Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
- D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
- M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
- Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
- M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
- Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
- J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
- D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
- LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
- M Lisk, G.W. Co., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432
- Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
- D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
- M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
- Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
- D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
- M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
- Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
- D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
- Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
- M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
- QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
- Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
- M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
- M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
- Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
- Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
- U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
- Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
- Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
- Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
- Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Coils, Telephone

- **M Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
- **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 ...... ***
- **Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 ...... ***

DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
M **Regdon Corp., Dept. EM, 3715 Grand Blvd., Brookfield, Ill 60513** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** *
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740

Coils, Telephone Pickup (For Recording)—See Pickups, Telephone

Coils, Toroidal

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 *
DM **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** p. 1414
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
Corcom, Inc., Dept. EM, 2635 No. Kildare Ave., Chicago, Ill. 60639 *
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** *
DM **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** p. 1426
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** *
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** p. 4412
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** p. 4417
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** *
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 *
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532** *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** *
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 *
Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** *
DM **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** p. 1456,1457
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** Inside Back Cover, *
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
Allen Elctrns. Div., Allen Organ Co., Dept. EM, Macungie, Pa. 18062
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
D De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
DynaMagnetic Engrg, Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
M El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
M Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Coils, Transducer

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Coils, Transformer

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 *

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 1426
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... p. 1424,1425
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
D **Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787** *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
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NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... p. 4435,4437,4439
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Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 p. 4454,4459
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... p. 4358,4359,4377-4379,4397-4407
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
A. P. W. Co., Inc., Dept. EM, 72 W. Main, Rockaway, N. J. 07866
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dia-Netics Inc., Dept. EM, 18823 Napa St., Northridge, Cal. 91324
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Vari-L Co., Dept. EM, 3863 Monaco Pkwy., Denver, Colo. 80207
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 .... p. 1413
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** .... *
D **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Syntronic Instruments Inc., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101 *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... p. 1417,1418
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420-1422
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024** .... p. 1423
DM **Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052** .... p. 1424,1425
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 1429
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532** .... p. 1430,1445,1446
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 4469

TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover, √c
Airco Speer Electrns., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
D Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M J.D.N. Electronics Inc., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933
DM JFD Electronics Components Corp., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
D San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

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D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Syntronic Instruments Inc., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101 *
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515

Cold-Cathode Readout Tubes—See Tubes, Readout

Color Filters, Panel Light Assembly

Schott Optical Glass Inc., Dept. EM, York Ave., Duryea, Pa. 18642

Combiners, Microwave—See Couplers, Microwave

Comm. Systems, Carrier Current

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005

Comm. Systems, Data

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006** .... *
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Astrocom Corp., Dept. EM, 15012 Minnetonka Rd., Minnetonka, Minn 55343
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Digital Communications Assoc., Inc., Dept. EM, 135 Technology Park, Atlanta, Ga 30092
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Honeywell Information Sys Inc, Dept. EM, 200 Smith St, Waltham, Mass. 02154
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
International Communications, A Milgo Co., Dept. EM, 8600 NW 41st St., Miami, Fla. 33166
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
M Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Microdata Corp., Dept. EM, 17481 Red Hill Ave., Irvine, Cal. 92705
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
D Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
M Teletype Corp., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076
Terminal Systems Inc., Dept. EM, 11300 Hartland St., N. Hollywood, Cal. 91605

Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663
Western Telematic, Inc., Dept. EM, 3001 Red Hill Ave., Costa Mesa, Cal. 92626
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.

Comm. Systems, Facsimile

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Datalog Div., Litton Sys., Dept. EM, 1770 Walt Whitman Rd., Melville, N. Y. 11746
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Telautograph Corp., Dept. EM, 8700 Bellanca Ave., Los Angeles, Cal. 90045

Comm. Systems, F-M

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D Royce Electronics Corp., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
Waller Corp., Dept. EM, PO Box 340, Crystal Lake, Ill. 60014
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119

Comm. Systems, Frequency Shift

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041

Comm. Systems, Land Mobile Networks

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466
Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
SYT Corporation, Dept. EM, 1220 Barranca, El Paso, Tex. 79935

Comm. Systems, Laser

Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... p. 1795
Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... p. 1468
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D International Laser Sys., Inc., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404

Comm. Systems, Message Switching Centers

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
D Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050

Comm. Systems, Microwave

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... p. 2986
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
CGTI, Dept. EM, 2 Windward Ave., White Plains, N.Y. 10605
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Comm. Systems, Multiplex

Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 p. 1471**
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810.
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Digital Communications Assoc., Inc., Dept. EM, 135 Technology Park, Atlanta, Ga 30092
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713

Comm. Systems, Radiotelephone

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... *
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
D A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
Livermore Data Systems, Inc., Dept. EM, 2050 Research Dr., Livermore, Cal. 94550
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
D Royce Electronics Corp., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
SYT Corporation, Dept. EM, 1220 Barranca, El Paso, Tex. 79935
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
D Tram Corp., Dept. EM, Box 187, Winnisquam, N.H. 03289
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Comm. Systems, Selective Paging

Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Aiphone USA, Dept. EM, 2116 N. Pacific Ave., Seattle, Wash. 98103
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Baumker Mfg. Co., Dept. EM, 5144 Enterprise, Toledo, Ohio 43612
Bell PA Products Corp., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Iwata Electric Co., Ltd., Dept. EM, 1-16 Chome Soto-Kanda, Chiyoda-ku Tokyo, Japan
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
D Talk-A-Phone Co., Dept. EM, 5013 No. Kedzie Ave., Chicago, Ill. 60625
D University Sound, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803

Comm. Systems, Single-Sideband

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
D Era Acoustics, Dept. EM, 311 E. Park St., Moonachie, N.J. 07074
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D Magitran Co., Dept. EM, 311 E. Park St., Moonachie, N.J. 07074
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Royce Electronics Corp., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076

Comm. Systems, Single-Sideband (Cont'd)

D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Telautograph Corp., Dept. EM, 8700 Bellanca Ave., Los Angeles, Cal. 90045
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119

Comm. Systems, Telemetering

M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101 .... ***
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... ***
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
D **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017 .... ***
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 p. 1471**
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
D Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
M EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
D F & M Systems Co., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Comm. Systems, Telephone

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... *
D Aiphone USA, Dept. EM, 2116 N. Pacific Ave., Seattle, Wash. 98103
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Amtron Div., Sippican Corp., Dept. EM, 14820 S.-Kedzie Ave., Midlothian, Ill. 60445
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
D Communications Equipment Co., Dept. EM, Box 700, Glen Arbor, Mich. 49636
D Communications Equipment Co., Inc., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220
D Communitron Corp., Dept. EM, 1429 N. Halstead, Hutchinson, Kans 67501
Conklin Instr. Corp., Dept. EM, Main St., Pleasant Valley, N.Y. 12569
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Dataproducts Corp., Dept. EM, 6219 DeSoto Ave., Woodland Hills, Cal. 91365
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132
M Electronic Counters, Inc., Dept. EM, 240 Humphrey St., Englewood, N.J. 07631
D Encom Prods. Co., Inc., Dept. EM, Lower Hopewell Rd., Box 300, Oxford, Pa. 19363
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D ITT Telecommunications, Apparatus Dept., Dept. EM, Fulton Dr., Corinth, Miss. 38834
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Milgo Electronic Corp., Dept. EM, 8600 N.W. 41st Street, Miami, Fla. 33166
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Mylee Digital Sciences, Dept. EM, 155 Weldon Pkwy., Maryland Heights, Mo. 63043
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
Rapidprint Inc., Dept. EM, 2055 S. Main St., Middletown, Conn. 06457
Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
SYT Corporation, Dept. EM, 1220 Barranca, El Paso, Tex. 79935
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
Viking Electronics, Dept. EM, 406 2nd St., Hudson, Wisc. 54016
D Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Comm. Systems, Teletype

Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Telautograph Corp., Dept. EM, 8700 Bellanca Ave., Los Angeles, Cal. 90045
M Teletype Corp., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076
Terminal Systems Inc., Dept. EM, 11300 Hartland St., N. Hollywood, Cal. 91605
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404

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Commutators

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
D **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017 .... ***
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... ***
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D Nippert Co., Dept. EM, 825 Pittsburgh Dr., Delaware, Ohio 43015
D Possis Corp., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426

Comparators, Analog—See Comparators, Voltage

Comparators, Attenuation

DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Comparators, Capacitance—See Bridges, Capacitance

Comparators, Density—See Densitometers, Electronic

Comparators, Digital

Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ...... p. 1538
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 ...... ***
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 ...... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2909**
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Metron Optics, Dept. EM, P.O. Box 690, Solana Beach, Cal. 92075
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM,,2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Comparators, Frequency

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ...... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ...... ***
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Comparators, Impedance—See Bridges, Impedance

Comparators, Inductance—See Bridges, Inductance

Comparators, Logic Test

Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 ...... *
D **Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... ***
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ...... p. 2895
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040

Comparators, Phase

Corcom, Inc., Dept. EM, 2635 No. Kildare Ave., Chicago, Ill. 60639 ...... *
M **Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ...... ***
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 ...... ***
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
D American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Comparators, Reluctance

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *

Comparators, Resistance—See Bridges, Resistance

Comparators, Voltage

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... p. 2981
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 ...... ***

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D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** ..... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 p. 2866
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** ..... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** ..... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Pioneer Instrumentation, Dept. EM, 4800 E. 131st St., Cleveland, Ohio 44105
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Compounds, Encapsulating, Molding, Potting-Also See Plastic Raw Materials

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ..... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** ..... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** ..... p. 1389
D Acme Chemical & Insulation Co., Dept. EM, 166 Chapel St., New Haven, Conn. 06513
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Amicon Corp., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173
Armstrong Cork Co., Dept. EM, W. Liberty St., Lancaster, Pa. 17604
M Armstrong Prods. Co., Dept. EM, Box 657, Warsaw, Ind. 46580
Astrodyne, Inc., Sub. Roanwell Corp., Dept. EM, 353 Middlesex Ave., Wilmington, Mass. 01887
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
M Castall, Inc., Dept. EM, Weymouth Ind. Park, E. Weymouth, Mass. 02188
DM Celanese Plastics, Dept. EM, 26 Main St., Chatham, N.J. 07928
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
D CPL Corp., Chemical Prods. Corp. Div., Dept. EM, King Philip Rd., E. Providence, R.I. 02914
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
Epoxylite Corp., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Glastic Corp., Dept. EM, 4321 Glenridge Rd., Cleveland, Ohio 44121
M Goodrich Co. Chemical Div. BF, Dept. EM, 6100 Oak Tree Blvd., Cleveland, Ohio 44131
M Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
Leepoxy Plastics, Dept. EM, 3324 Ferguson Rd., Ft. Wayne, Ind. 46809
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Mobay Chem. Corporation, Dept. EM, Pittsburgh, Pa. 15205
Morton Chemical Co., Div. Morton Norwich Prods., Dept. EM, 110 N. Wacker Dr., Chicago, Ill. 60606
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Plastics Engrg. Co., Dept. EM, 3518 Lakeshore Rd., Sheboygan, Wisc. 53081
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
Seal-Peel, Inc., Dept. EM, Box 250, Troy, Mich. 48084
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
D Sterling, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
D Techcon Systems Inc., Dept. EM, 16016 So. Figueroa St., Gardena, Cal 90248
Thiokol Chemical Div., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607
Tra-Con, Inc., Dept. EM, 55 North St., Medford, Mass. 02155
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Union Carbide, Parylene, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
D Western Coating Co., Dept. EM, Box 598, Royal Oak, Mich. 48073

Compounds, Insulating

Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 ..... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ..... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** ..... *
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234** ..... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
M Castall, Inc., Dept. EM, Weymouth Ind. Park, E. Weymouth, Mass. 02188
D Celanese Plastics, Dept. EM, 26 Main St., Chatham, N.J. 07928
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172
M Goodrich Co. Chemical Div. BF, Dept. EM, 6100 Oak Tree Blvd., Cleveland, Ohio 44131
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
D Sterling, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020

Compressors, Data

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 p. 1458-1465
Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109 ..... p. 1389
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313

Computer Logic Circuits—See Cards, Logic; Circuits, Hybrid; Circuits, Integrated; Modules, Logic

Computer Tape Recorders—See Recorders, Computer Data

Computer Type Indicators—See Lights; Dials

Computers, Analog

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** ..... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .. p. 1497

D **E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 ..... ***
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 ..... ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 ..... ***
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 ..... p. 1659
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
AMF Electical Prods. Dev. Div., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
M Aviation Elec., Ltd.; Sub. Bendix Corp., Dept. EM, Box 2140, St. Laurent, Que, Can. H4L 4X8
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
D General Computers, Inc., Dept. EM, 5990 W. Pico Blvd., Los Angeles, Calif. 90035
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368

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Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 ..... p. 1475-1477
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ..... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 ..... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ..... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 ..... p. 2391
Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 ..... p. 1663
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 p. 1672
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 p. 1469
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Adams-Smith Inc., Dept. EM, Summer Rd., Boxboro, Mass. 01719
Applied Data Commun., Dept. EM, 1509 E. McFadden Ave., Santa Ana, Cal. 92705
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Diversified Electronics Co., Dept. EM, 260 Wolfe Rd., Sunnyvale, Cal. 94086
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell Information Sys Inc, Dept. EM, 200 Smith St, Waltham, Mass. 02154
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Microdata Corp., Dept. EM, 17481 Red Hill Ave., Irvine, Cal. 92705
D Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 4817C
Sharp Electronics Corp., Dept. EM, 2 Sharp Plaza P.O. Box 389, Paramus, N.J. 07652
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713

Computers, Digital

M **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 ..... ***
D **E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 ..... ***
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 ..... p. 2839
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M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 ..... p. 1663**
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Adams-Smith Inc., Dept. EM, Summer Rd., Boxboro, Mass. 01719
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
Applied Data Commun., Dept. EM, 1509 E. McFadden Ave., Santa Ana, Cal. 92705
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
M Bendix-Guidance Systems, Dept. EM, Teterboro, N.J. 07608
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
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California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
D Cipher Data Products, Dept. EM, 5630 Kearny Mesa Rd., San Diego, Cal. 92111
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computer Talk Inc., Dept. EM, Box 145, Idledale, Colo. 80453
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Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
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D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
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Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
Fabri-Tek, Inc., Dept. EM, 5901 S County Rd. #18, Minneapolis, Minn. 55436
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Goodyear Aerospace Corp., Dept. EM, 1210 Massillon Road, Akron, Ohio 44315
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Harris Corp., Computer Systems Div., Dept. EM, PO Box 23550, Fort Lauderdale, Fla. 33307
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell Information Sys Inc, Dept. EM, 200 Smith St, Waltham, Mass. 02154
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
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D Martin Research, Dept. EM, 3336 Commercial Ave., Northbrook, Ill. 60062
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D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
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Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050

Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
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Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
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Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
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Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
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DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409

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Honeywell Information Sys Inc, Dept. EM, 200 Smith St, Waltham, Mass. 02154
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Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
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Condensers—See Capacitors

Conditioners, Power Line—See Regulators & Stablizers, Voltage

Conductive Fabrics, Films & Tapes—See Fabrics, Conductive

Conductive Plastic Materials

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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
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M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
D Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
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Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
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D 3M Co., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

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DM Anaconda Company Brass Division, Dept. EM, 414 Meadow St., Waterbury, Conn. 06720
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

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Compac, Dept. EM, 222 Middle Country Rd., Smithtown, N.Y. 11787 ...... *
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Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
DM Bendix Corp., The, Electrical Comp. Div., Dept. EM, Sidney, N.Y. 13838
DM Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
D Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
Hypertronics Corp., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Industrial Electronic Hardware, Dept. EM, 109 Prince St., New York, N.Y. 10012
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Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
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Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Eastern Electronics Mfg. Corp, Dept. EM, 180 Roberts St., East Hartford, Conn. 06108
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
M Hypertronics Corp., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775
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Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
U.S. Components Inc., Dept. EM, 1320 Zerega Ave., Bronx, N.Y. 10462

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D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
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D Revox Corp., Dept. EM, 155 Michael Dr., Syosset, NY 11791
D SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011
Wiremold Co., Dept. EM, West Hartford, Conn. 06110

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M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
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D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
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Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
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D – Product sold through distributors M – Product meets MIL specs
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D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
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DM **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... ***
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
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D Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
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M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Jolo Industries, Inc., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
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D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
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D U.S. Components Inc., Dept. EM, 1320 Zerega Ave., Bronx, N.Y. 10462

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M Connector Inds. of America, Dept. EM, 639 N. Wayne, Cincinnati, Ohio 45215
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
D GIC Thermodynamics Div., Dept. EM, 4949 Delemere, Royal Oak, Mich. 48073
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071

- Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
- M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
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- D **Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... ***
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- D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
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- Burdette Buss Bars, Inc., Dept. EM, 16 W. Kings Hwy., Box 14, Mt. Ephraim, N.J. 08059
- D Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
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- GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
- M Hypertronics Corp., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775
- Industrial Electronic Hardware, Dept. EM, 109 Prince St., New York, N.Y. 10012
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- D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
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- M Star Tron Corp., Dept. EM, 58 Curtis St., Providence, R.I. 02909
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- Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
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- M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
- Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
- Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070

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- **AirBorn, Inc., Dept. EM, 4321 Airborn Dr., Addison, Tex. 75001 .... ***
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D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
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D Superior Carbon Prods., Inc., Dept. EM, 9115 George Ave., Cleveland, Ohio 44105
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D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
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D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409

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D Akro-Mils, Inc., Dept. EM, 1293 S. Main St., Akron, Ohio 44301
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M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
M Applied Design Co., Dept. EM, 2465 Sheridan Dr., Tonawanda, N.Y. 14150
DM Bay Prods., Div. American Metal Works, Dept. EM, 8701 Torresdale Ave., Phila., Pa. 19136
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
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D LEWISystems, Menasha Corp., Dept. EM, 426 Montgomery St., Watertown, Wisc. 53094
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Metropolitan Wire Corp., Industrial Div., Dept. EM, Washington & George, Wilkes-Barre, Pa. 18705
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M M Elctrn. Enclosures, Dept. EM, 111 Bloomingdale Rd., Hicksville, N.Y. 11801
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DM Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
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M TA Instrument Case Co., Dept. EM, 4625 Alger St., Los Angeles, Cal 90039
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DM Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D Vichek Plastics Co., Dept. EM, Middlefield, Ohio 44062
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... p. 2391
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... ***
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... p. 2929
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... p. 2403
D Allen Bradley, Sys. Div., Dept. EM, 747 Alpha Dr., Highland Heights, Ohio 44143
D Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
D Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynage, Inc. Control Prods Grp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
D Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Industrial Solid State Controls Ind., Dept. EM, 435 W. Philadelphia St., York, Pa. 17405
Iveron Corp., Dept. EM, 1152 Morena Blvd., San Diego, Cal. 92110
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
Martin Research, Dept. EM, 3336 Commercial Ave., Northbrook, Ill. 60062
Midwest Controls Co., Dept. EM, Box 4435, Lincoln, Neb. 68504
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
OAS Inc., Dept. EM, 145 Palasades St., Dobbs Ferry, N.Y. 10522

D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Possis Corp., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Control Panels & Systems, Computer—See Boards, Programming

Control Systems, Air Traffic

M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466,1467**
Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041

Controls, Audio System Consoles

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... p. 1466,1467
Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038 .... p. 1120
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612

Controls, Camera

Cunningham, Sub. Gleason Works, Dept. EM, 10 Carriage St., Honeoye Falls, N.Y. 14472

Controls, Capacitance Operated

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
Electron-Machine Corp., Dept. EM, Box M, Umatilla, Fla. 32784
D Gordon Engineering Corp., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029

Controls, Carbon—See Potentiometers; Rheostats

Controls, Constant Impedance—See Attenuators

Controls, Counting and Sorting

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
D Ferranti-Packard, Ltd. Elec. Div., Dept. EM, 121 Industry St., Toronto, Can.M6M 4M3
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
M Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Bivd., Hauppauge, N.Y. 11787
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
D Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Tri-Tronics Co. Inc., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080

Controls, Density

Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Electron-Machine Corp., Dept. EM, Box M, Umatilla, Fla. 32784
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Controls, Dimension

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Electron-Machine Corp., Dept. EM, Box M, Umatilla, Fla. 32784
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Controls, Door Opening & Closing (Industrial)

D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Advanced Devices Lab, Dept. EM, P.O. Box 11455, Reno, Nev. 89510
A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
D Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010

D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234

Controls, Environmental Test Equipment

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406** *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... **p. 2391**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 **p. 2686**
D American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
Analytical Measurements, Dept. EM, 31 Willow St., Chatham, N.J. 07928
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Chadwick-Helmuth Co., Inc., Dept. EM, 111 E. Railroad Ave., Monrovia, Calif. 91016
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
D Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
L.A.B. Div., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
Oven Industries, Inc., Dept. EM, 800 New Holland Ave., Mechanicsburg, Pa. 17055
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Controls, Fader

Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
D **Duncan Electronics, Inc., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626** .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750

Controls, Fluid Conductivity

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
DM De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Controls, Fluid Flow

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Aitken Communications Inc., Dept. EM, 701 S 10th St., Taft, Cal 93268
Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
M Brooks Instr. Div., Emerson Elec. Co., Dept. EM, 407 W. Vine St., Hatfield, Pa. 19440
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Controlotron Corp., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
General Valve Corp., Dept. EM, 110 Rte. 10 Box 342, E. Hanover, N.J. 07936
Harwil Co., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404
D Hills-McCanna Co., Dept. EM, 400 Maple Ave., Carpentersville, Ill. 60110
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
D Johnson Corp., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
M Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
M Pressure Controls, Inc., Dept. EM, 681 Main St., Belleville, N.J. 07109
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Trans-Sonics, Inc., Dept. EM, P.O. Box 326, Lexington, Mass. 02173
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Controls, Frequency

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... **p. 2381**
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena. Cal 91107** **p. 2385**
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** .... *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061

M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Standard Crystal Corp., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803

Controls, Gas

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... p. 4321
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
Airco Industrial Gases, Dept. EM, 575 Mountain Ave., Murray Hill, N.J. 07974
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
Lektra Labs., Inc., Dept. EM, 129-07 18th Ave., College Point, N.Y. 11356
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172

Controls, Hardware, Shafts & Accessories—See Shafts; Dials;etc.

Controls, Humidity

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406** *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Controls, Ignitron Firing

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Delta Products, Dept. EM, Box 1147, Grand Junction, Colo. 81501
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Controls, Joystick

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 p. 2397
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715

Controls, Lamp Dimming, Flashing

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** p. 2385
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... *
M **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010** .... *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
D Hughey & Phillips, Inc., Dept. EM, 3050 N. California St., Burbank, Cal. 91505
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Loyola Industries, A Div. of Astrophysics Research Corp., Dept. EM, 1526 West 240th. St., Harbor City, Cal. 90710
D Lutron Electronics Co., Dept. EM, Coopersburg, Pa. 18036
Omicron Instruments, Dept. EM, 1710 - 19th St., Santa Monica, Cal. 90404
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417

Controls, Level, Dry Material

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
D Fairchild Industrial Prods. Div., Dept. EM, 75 Mall Dr., Commack, N.Y. 11725
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Controls, Level, Liquid

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... p. 4321
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047

Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Brooks Instr. Div., Emerson Elec. Co., Dept. EM, 407 W. Vine St., Hatfield, Pa. 19440
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Controlotron Corp., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704
D Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Electric Machinery Mfg. Co., Dept. EM, 800 Central Ave., Minneapolis, Minn. 55413
D Fairchild Industrial Prods. Div., Dept. EM, 75 Mall Dr., Commack, N.Y. 11725
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
D Johnson Corp., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Temposonics Inc., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803
Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
Trans-Sonics, Inc., Dept. EM, P.O. Box 326, Lexington, Mass. 02173
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960
D Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Controls, Machine Tool

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 p. 2397
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735** .... *
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
Allen Bradley, Sys. Div., Dept. EM, 747 Alpha Dr., Highland Heights, Ohio 44143
Ambi-Tech Inds. Inc., Dept. EM, 861 Washington Ave., Westwood, N.J. 07675
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Conrac Corp., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Dynage, Inc. Control Prods Grp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
East Controls Co., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
D Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
Fincor Div., North American Rockwell, Dept. EM, 3750 E. Market St., York, Pa. 17405
D Flight Sys., Inc., Dept. EM, Box 25, Mechanicsburg, Pa. 17055
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
D Gordon Engineering Corp., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Icon Division, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
DM Nippon Pulse Motor Co., Ltd., Dept. EM, 13-16, 2-chome, Hongo, Bunkyo-ku, Tokyo 113 Japan
Nolatron Inc., Dept. EM, 3809 Paxton St., Harrisburg, Pa. 17111
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071

Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404

Controls, Moisture—See Controls, Humidity

Controls, Motor Speed

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Anaheim Automation, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801 p. 3062
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** p. 2385
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D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** p. 3069
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D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** ...... *
Computer Devices of Calif., Dept. EM, 11901 Burke St., Santa Fe Springs, Cal. 90670 ...... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** ...... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ...... *
Duncan Electronics, Inc., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626 ...... *
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343** p. 3077
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 ...... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** ...... p. 3951
Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 ...... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 ...... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 ...... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 ...... *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 p. 2397
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120** *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... p. 4206
Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 ...... *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 p. 3107
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 ...... *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010** p. 3108,3109
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 ...... *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** ...... *
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
AcroSys, Dept. EM, Box 687, Philomath, Ore. 97370
Advance Instr. Corp., Dept. EM, 1707 F. St., Belmar, N. J. 07719
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
M American Plasticraft Co., Dept. EM, 814 N. Sacramento Blvd., Chicago, Ill. 60622
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Carson Mfg. Co., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Electro-Devices, Inc., Dept. EM, 4-6 Godwin Ave., Paterson, N.J. 07509
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025
D Emerson, Industrial Controls Div., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702
Fincor Div., North American Rockwell, Dept. EM, 3750 E. Market St., York, Pa. 17405
Firing Circuits Inc., Dept. EM, Muller Ave., Box 2007, Norwalk, Conn. 06852
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Icon Division, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Instruments Components Co., Dept. EM, 7239 Industrial Park Blvd., Mentor, Ohio 44060
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Loyola Industries, A Div. of Astrophysics Research Corp., Dept. EM, 1526 West 240th. St., Harbor City, Cal. 90710
D Lutron Electronics Co., Dept. EM, Coopersburg, Pa. 18036
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
Mercer Controls Corp., Dept. EM, 96 Mercer St., New York, N.Y. 10012
Minnesota Electric Tech. Inc., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Torq Engineered Products, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
DM Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236
D WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404

Controls, Oscillator

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** ...... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ...... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** ...... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185

Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151

Controls, Photoelectric

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4198**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 *
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Automation Devices, Inc., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
D Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
D Hughey & Phillips, Inc., Dept. EM, 3050 N. California St., Burbank, Cal. 91505
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
D Intermatic, Inc., Dept. EM, Intermatic Plaza, Spring Grove, Ill. 60081
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
D Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
DM Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tri-Tronics Co. Inc., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080

Controls, Positioning

Anaheim Automation, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801 .. *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385**
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... *
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 ...... ***
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Computer Devices of Calif., Dept. EM, 11901 Burke St., Santa Fe Springs, Cal. 90670 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... *
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 p. 2397
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... ***
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 .... ***
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Candy Mfg. Co., Dept. EM, 626 Grove St., Evanston, Ill 60201
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
D Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
Fincor Div., North American Rockwell, Dept. EM, 3750 E. Market St., York, Pa. 17405
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
General Atomic Co., Dept. EM, P.O. Box 81608, San Diego, Cal. 92138
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Icon Division, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Jordan Controls, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Robinson-Halpern Co., Dept. EM, One Apollo Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Temposonics Inc., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126

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D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
D WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Controls, Pressure

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385**
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 ...... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** ...... *
M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855** ...... **p. 2391**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 ...... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Cook Elec. Co., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
D Dynisco, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
M Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
MKS Instrs., Inc., Dept. EM, 22 Third Ave., Burlington, Mass. 01803
D Owatonna Tool Co., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060
M Pressure Controls, Inc., Dept. EM, 681 Main St., Belleville, N.J. 07109
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Robinson-Halpern Co., Dept. EM, One Apollo Rd., Plymouth Meeting, Pa. 19462
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
M Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Controls, Proportional

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** ...... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** ...... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ...... **p. 3469**
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 ...... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 ...... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** ...... *
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 ...... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 ...... *
M **Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850** .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** ...... **p. 4326**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** ...... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D Hills-McCanna Co., Dept. EM, 400 Maple Ave., Carpentersville, Ill. 60110
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
M Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
M Oven Industries, Inc., Dept. EM, 800 New Holland Ave., Mechanicsburg, Pa. 17055
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
D Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Controls, Proximity-Also See Controls, Capacitance Operated

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** ...... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** ...... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ...... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 ...... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4196-4198**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 ...... *
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Automation Devices, Inc., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901

D Gordon Engineering Corp., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Controls, Remote

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** ...... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 p. 2397
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Carson Mfg. Co., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data Link Corp., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
M Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Southwood Electronic Co., Dept. EM, 7624 Lindenwood Dr., Indianapolis, Ind. 46227
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Controls, Run, Shutdown Command, Start

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
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M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855** .... **p. 2391**
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D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... **p. 2879**
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
M **Marlow Industries, Inc., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041** *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550** .... **p. 2702**
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
PCI Sub. North American Philips Controls Corp, Dept. EM, Husky Pk., Frederick, Md. 21701 .... *
D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** .... **p. 4326**
Sigma Sys. Corp., Dept. EM, 3163 Adams Ave., San Diego, Calif. 92116 **p. 2685**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
D Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
D American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Analytical Measurements, Dept. EM, 31 Willow St., Chatham, N.J. 07928
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Burling Instr. Co., Dept. EM, 16 River Rd., Box 298, Chatham, N.J. 07928
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Mohtvale, N.J. 07645
M Chatham Controls Corp., Dept. EM, 33 River Rd., Chatham, N.J. 07928
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
DM Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
D Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025

Controls, Temperature (Cont'd)

Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
King-Seeley Thermos Co., King-Seeley Div. Thermos Co., Dept. EM, Box 423, Kendallville, Ind. 46755
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
D Lutron Electronics Co., Dept. EM, Coopersburg, Pa. 18036
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Mikron Instr. Co., Dept. EM, Box 211, Ridgewood, N.J. 07451
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
M Oven Industries, Inc., Dept. EM, 800 New Holland Ave., Mechanicsburg, Pa. 17055
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
M PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Rosemont-Nashville, Inc., Dept. EM, 100 Heil Quacker Blvd., Lavergne, Tenn.
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sierracin/Thermal Sys., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
Tempkey Inc., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Trans-Met Engrg., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Watlow Elec. Mfg. Co., Dept. EM, 12001 Lackland Rd., St. Louis, Mo. 63141
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Controls, Thyratron Grid

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905

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Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** ...... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... *
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
Ambi-Tech Inds. Inc., Dept. EM, 861 Washington Ave., Westwood, N.J. 07675
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
East Controls Co., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641
Electrol Co., Inc., Dept. EM, 321 Dewey St., York, Pa. 17404
Fincor Div., North American Rockwell, Dept. EM, 3750 E. Market St., York, Pa. 17405
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
Mercer Controls Corp., Dept. EM, 96 Mercer St., New York, N.Y. 10012
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Controls, Vibrator

Staco, Inc., Dept. EM, 2240 E. 3rd St., Dayton, Ohio 45403 .... *

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Convection Cooling Packages, Semiconductor—See Transistor, Diode, Thyristor Heat Dissipators

Converters, A-C to D-C (Non-Rotary)—See Power Supplies, A-C to D-C

Converters, Analog To Digital

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 p. 2789
M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101** .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... p. 2978
M **BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203** .... *
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** ...... p. 2981
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 p. 1489
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M **Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446** .... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .. p. 1497
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... *
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1661
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005** .... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 .. *
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Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
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M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
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M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
American Astrionics, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626
Anadex Instrs., Inc., Dept, EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
M Micro Power Systems Inc., Dept. EM, 3100 Alfred St., Santa Clara, Cal. 95050
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Superior Mfg. & Instrument Corp., Dept: EM, 19-36 38th St., Long Island City, N.Y. 11105
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
DM Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Converters, Analog To Pulse

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M **Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850** .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
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Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
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Converters, Binary To Decimal

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M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... p. 1494
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Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614** .... *

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Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
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G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
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D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
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Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
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Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
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Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Spellman High Voltage Elctrns. Corp., Dept. EM, 7 Fairchild Ave., Plainview, N.Y. 11803 .... ***
D **Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... ***
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digital Graphics, Dept. EM, 5000 Tuna Canyon, Malibu, Cal. 90265
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.

Converters, D-C to D-C, Less Than 30 VDC Output

M **Abbott Transistor Labs, Power Supply Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016 .... p. 3163,3166,3167**
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Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402 .... p. 3200
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M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230 .... ***
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 p. 3210,3211
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 3369
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 .... p. 3213-3215
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
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Crestronics Inc., Dept. EM, 23539 Crest Forest Dr., Box "S", Crestline, Cal. 92325 .... p. 3221
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... ***
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .... *
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DM **Dressen-Barnes Electronics, Div. American Elctrns., Dept. EM, 1600 E. Valencia Dr., Fullerton, Cal. 92631 .... p. 3238**
D **Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 ***
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974 .... ***
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D **Flite-Tronics Co., Inc., Dept. EM, 3314 Burton Ave., Burbank, Cal. 91504 p. 3382**
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... p. 3267
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... p. 2982,3271**
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Sorensen Co., Dept. EM, 676 Island Pond Rd., Manchester, N.H. 03103 .... *
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Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 .... p. 3623
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M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... p. 3350,3351**
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Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
M Anadyne, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003

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* – Company has information in this edition but not on this product.

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M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
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MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
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M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
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Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
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M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Reliability Inc., Dept. EM, 8000 Harwin, Houston, Tex. 77036
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
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Power Systems, Inc., Dept. EM, 12 Tobey Rd., Bloomfield, Conn. 06002 ...... *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 ...... ***
M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 ...... ***
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 ...... ***
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 ...... p. 3357
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Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
M Anadyne, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
D B. H. Industries, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
M Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
M Etatech, Inc., Dept. EM, 187M W. Orangethorpe Ave., Placentia, Cal. 92670
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Converters, D-C to D-C, 300 to 1,000 VDC Output

M **Abbott Transistor Labs, Power Supply Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016 ...... ***
Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402 ...... p. 3200
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 ...... ***

M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230 .... ***
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 p. 3211
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
D **Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 p. 3249**
Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... *
Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... p. 3270
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4424
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Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Designs Pacific, Inc., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304 .... *
Power Systems, Inc., Dept. EM, 12 Tobey Rd., Bloomfield, Conn. 06002 .... *
Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... *
M **Spellman High Voltage Elctrns. Corp., Dept. EM; 7 Fairchild Ave., Plainview, N.Y. 11803 .... ***
M **Stevens-Arnold, Inc., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127 .... ***
M **Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 .... ***
Tecnetics, Inc., Dept. EM, 1624 Range St. Box 910, Boulder Industrial Park, Boulder, Colo. 80302 .... *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... ***
D **Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... ***
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
M Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Galileo Electro-Optics Corp., Dept. EM; Galileo Pk., Sturbridge, Mass. 01518
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

Converters, D-C to D-C, Greater Than 1,000 VDC Output

Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402 .... *
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230 .... ***
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M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... *
M **Spellman High Voltage Elctrns. Corp., Dept. EM, 7 Fairchild Ave., Plainview, N.Y. 11803 .... ***
M **Stevens-Arnold, Inc., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127 .... ***
Tecnetics, Inc., Dept. EM, 1624 Range St. Box 910, Boulder Industrial Park, Boulder, Colo. 80302 .... *
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... ***
D **Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... ***
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
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D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210

Converters, D-C to Frequency (Power)—See Inverters, D-C to A-C

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
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EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... ***
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685**
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 p. 3402-3404
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... ***
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236

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Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 .... *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2978**
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... p. 2981**
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***

Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 p. 1489
M Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... *
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M Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .. p. 1497
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
M Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
D Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1661
M Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... *
M Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... p. 1662
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Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 .... *
DM Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017 p. 1676
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Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... *
M Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
D Diego, Systems, Dept. EM, 7152 Convoy Court, San Diego, CA 92111
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M HyComp Inc., Dept. EM, Box 250, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
M Micro Power Systems Inc., Dept. EM, 3100 Alfred St., Santa Clara, Cal. 95050
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
DM Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

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A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 p. 1665
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
D Chalco Engrg. Corp., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248
Cipher Data Products, Dept. EM, 5630 Kearny Mesa Rd., San Diego, Cal. 92111
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Converters, Digital To Resolver

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... *
M Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
M Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 .... *
M Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
M Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
M Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... *
M Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
M Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 .... *
M Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685
M Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 1690
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Converters, Digital To Synchro

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1483
M Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... *
M Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
M Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 .... p. 1494
M Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... *
M Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *

ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1660
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 p. 1662**
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 p. 1671**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 p. 1673,2915**
M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685**
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 p. 1690**
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Converters, Frequency, Logarithmic

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 p. 1494
Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 p. 3402-3404
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112

Converters, Frequency Shift Keying

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3260,3384
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Converters, Frequency, Test

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806** *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 *
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 *
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 *
Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 p. 2734
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3260,3384**
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** *
Nova Electric Mfg. Co., Dept. EM, 263 Hillside Ave., Nutley, N.J. 07110 *
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Converters, Frequency to D-C - Also see Power Supplies A-C Input, D-C Output

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 *
Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 *
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 *
Almond Instrs. Co., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724 *
A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806 p. 3360,3361
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022** *
M **Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105** *
D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101** *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 p. 2981
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** *
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 *
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974** *
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3260,3384**
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 p. 2400
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
D Diego, Systems, Dept. EM, 7152 Convoy Court, San Diego, CA 92111
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Price & Rutzebeck, Dept. EM, Box 30, Hayward, Calif. 94543
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026

Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Converters, Graphic To Digital

Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685
Altek Corp., Dept. EM, 2150 Industrial Pkwy, Silver Spring, MD 20904
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545

Converters, High-Frequency

A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806 p. 3360,3361
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** p. 2996
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** p. 3363
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** p. 2734
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** p. 3261,3385
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 *
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 p. 3399
M **Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041** *
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236

Converters, Low-Frequency

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806** p. 3360,3361
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** *
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** p. 3363
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** p. 3261,3385
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 *
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 p. 3399
M **Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041** *
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Converters, Microwave Frequency

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 p. 3058
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 p. 3059
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Converters, Multiplying, Analog to Digital and Digital to Analog

CPS Inc., Dept. EM, 722 E. Evelyn Ave., Sunnyvale, Cal. 94086 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Micro Power Systems Inc., Dept. EM, 3100 Alfred St., Santa Clara, Cal. 95050
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050

Converters, Paper Tape To Magnetic Tape

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D Chalco Engrg. Corp., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246

Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Converters, Paper Tape To Paper Tape

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Chalco Engrg. Corp., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Converters, Phase

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 p. 3236
D **Flite-Tronics Co., Inc., Dept. EM, 3314 Burton Ave., Burbank, Cal. 91504 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 .... ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... ***
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 p. 3399
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Converters, Polar To Rectangular Coordinates

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1490**
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... p. 1663**
Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685**
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Converters, Power Frequency, Electronic

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 p. 3154
M **A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806 p. 3360,3361**
M **Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... ***
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974 .... ***
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... ***
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
Nova Electric Mfg. Co., Dept. EM, 263 Hillside Ave., Nutley, N.J. 07110 ...... *
M **Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 .... ***
M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... ***
M **Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 ***
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
D B. H. Industries, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
Telmar, Inc., Dept. EM, 1150 W. Third Ave., Columbus, Ohio 43212
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Converters, Power Frequency, Rotary

A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806 p. 3360,3361
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3260,3384**
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Anadyne, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
D Diego, Systems, Dept. EM, 7152 Convoy Court, San Diego, CA 92111
Electric Machinery Mfg. Co., Dept. EM, 800 Central Ave., Minneapolis, Minn. 55413
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247

Converters, Pressure To D-C, Pressure To Frequency—See Transducers, Pressure

Converters, Pulse To Analog

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377

Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Converters, Pulse To Digital

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
M **Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850** .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Converters, Resolver To Digital

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... p. 1490
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... p. 1494
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1660
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** p. 1685
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... p. 1690
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Converters, Rotary—See Motor Electric Generator Sets

Converters, Scan

D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
General Electrodynamics Corp., Dept. EM, 4430 Forest La., Garland, Tex. 75040
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Vidco, Inc., Dept. EM, P.O. Box 25452, Portland, Ore. 97225

Converters, Single Sideband Receiver

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543

Converters, Synchro To Digital

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
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M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
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Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

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Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

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M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
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Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 .... *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
M **Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 ***
Aerospace Avionics, Inc., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Teledyne Philbrick, Dept. EM, 17 Allied Dr Rte 128, Dedham, Mass. 02026
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043
D Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236

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GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... p. 1388
Lytron, Inc., Dept. EM, 3 Dragon Ct., Woburn, Mass. 01801 .... *
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Elctrn. Chemical Corp., Dept. EM, 813 Communipaw Ave., Jersey City, N.J. 07304
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221

Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cooling Equipment—See Air Conditioners; Blowers & Fans; Heat Exchangers & Systems

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

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M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... ***
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159

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DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Carolina Steel & Wire Corp., Dept. EM, I-20 and S.C. 6, Lexington, S.C. 29072
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696

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DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... ***
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
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D **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440 .... ***
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Gudebrod Bros. Silk Co., Inc., Electronics Div., Dept. EM, 12 S. 12th St., Philadelphia, Pa. 19107
DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220

Cords, Communication, Control, Microphone, etc.—See Cable, Specific Type

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Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... ***
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... p. 1701
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4577**
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DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
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Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cable Systems & Assembly Co., Inc., Dept. EM, 210 Broadway, Everett, Mass. 02149
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
Excel Specialty Corp., Dept. EM, 6335 N. Broadway, Chicago, Ill. 60660
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
Teledyne Western Wire & Cable, Dept. EM, 2425 E. 30th St., Los Angeles, Cal. 90051
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... ***
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Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Dynatech Corp., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702 *
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... ***
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2039,2068,2069,2094-2096,2098,2104-2111**
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Mac Panel Co., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .. p. 4282,4283**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281**
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... *
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... ***
DM ADC Prods., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

D Brooks Mfg. Co., Dept. EM, Box 17602, Philadelphia, Pa 19135
DM Cable Systems & Assembly Co., Inc., Dept. EM, 210 Broadway, Everett, Mass. 02149
California Avionics Labs., Inc., Dept. EM, Box 701, Palo Alto, Calif. 94302
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
Excel Specialty Corp., Dept. EM, 6335 N. Broadway, Chicago, Ill. 60660
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cords, Power—See Cable, Power

Cords, Retractile

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... p. 1701
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4571-4573**
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4618**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... p. 4623**
D **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... ***
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2096,2104**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... *
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D Superior Cable Div., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601
M Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816

Cords, Speaker Extension—See Cable, Audio

Cords, Twin Lead—See Cable, Multiconductor

Cores, Ceramic

Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Diamonite Products Div., Dept. EM, Box 567, Shreve, Ohio 44676
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Magnetic Dielectrics, Dept. EM, Industrial Dr., W. Milford, N.J. 07480
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Quartzite Processing, Inc., Dept. EM, 6 Holyoke St., Malden, Mass. 02148
M Star Porcelain Co., Dept. EM, 71 Muirhead Ave., Box 1267, Trenton, N.J. 08638
D Trans-Tech, Dept. EM, 12 Meem Ave., Gaithersburg, Md. 20760
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Cores, Magnetic, Ferrite, EL & E

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... p. 2665
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .. p. 2673
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Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Cores, Magnetic, Ferrite, Pot/Cup

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
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Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Cores, Magnetic, Ferrite, Slug

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
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Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832

M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permacor, Div. Radio Cores, Inc., Dept. EM, 9540 S. Tulley Ave., Oak Lawn, Ill 60454
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
Stackpole Carbon Co., Electronic Comps. Div./Soft Ferrites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Cores, Magnetic, Ferrite, Toroid

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... p. 2665
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .. p. 2673
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Dataram Corp., Dept. EM, Princeton-Highstown Rd., Cranbury, N.J. 08512
M Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
M Fabri-Tek, Inc., Computer Systems Div., Dept. EM, 5901 S. County Rd. 18, Minneapolis, Minn. 55436
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832
M Magnetic Dielectrics, Dept. EM, Industrial Dr., W. Milford, N.J. 07480
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Stackpole Carbon Co., Electronic Comps. Div./Soft Ferrites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
D Trans-Tech, Dept. EM, 12 Meem Ave., Gaithersburg, Md. 20760
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Cores, Magnetic, Ferrite, Yoke Section

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .. p. 2673
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832
Magneco Electronics, Inc., Dept. EM, 135 S. La Salle St., Chicago, Ill. 60603
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Cores, Magnetic, Metal Alloy (Other Than Silicon & Nickel-Iron)

Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093

Cores, Magnetic, Nickel-Iron, EL, EE, F & Ring Laminations

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Barker Elec. Sls., Dept. EM, Box 405, Ship Bottom, NJ 08008
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan

Cores, Magnetic, Nickel-Iron, Toroid

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .... *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Barker Elec. Sls., Dept. EM, Box 405, Ship Bottom, NJ 08008
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093

Cores, Magnetic, Powdered Iron, Pot/Cup

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Cortec, Inc., Dept. EM, 711 W. 17th St. (Bldg. H.I.), Costa Mesa, Cal. 92627
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Micrometals, Dept. EM, 228 N. Sunset, City of Industry, Cal. 91744
Permacor, Div. Radio Cores, Inc., Dept. EM, 9540 S. Tulley Ave., Oak Lawn, Ill 60454
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan

Cores, Magnetic, Powdered Iron, Slug

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 2680,2681
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Cortec, Inc., Dept. EM, 711 W. 17th St. (Bldg. H.I.), Costa Mesa, Cal. 92627
Micrometals, Dept. EM, 228 N. Sunset, City of Industry, Cal. 91744
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permacor, Div. Radio Cores, Inc., Dept. EM, 9540 S. Tulley Ave., Oak Lawn, Ill 60454
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Cores, Magnetic, Powdered Iron, Toroid

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
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Cortec, Inc., Dept. EM, 711 W. 17th St. (Bldg. H.I.), Costa Mesa, Cal. 92627
Micrometals, Dept. EM, 228 N. Sunset, City of Industry, Cal. 91744
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permacor, Div. Radio Cores, Inc., Dept. EM, 9540 S. Tulley Ave., Oak Lawn, Ill 60454
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan

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M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001

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Barker Elec. Sls., Dept. EM, Box 405, Ship Bottom, NJ 08008
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093

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Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
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D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206

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D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
M **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 2402**
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
D Eldorado Instrument Co., Dept. EM; 2151 Arnold Industrial Hwy., Concord, Cal. 94520
D Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
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Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
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Nu-Metrics, Dept. EM, P.O. Box 800, Connellsville, Pa. 15425
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
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M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
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Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
D Vorne Inds., Inc., Dept. EM, 5023 W. Belmont Ave., Chicago, Ill. 60641

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Luff Research, Dept. EM, Box 449, Jackson Hgts., N.Y. 11372
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B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
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Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
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D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
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D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
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Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
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Counters, Electro-Magnetic

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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
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DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
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DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

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M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
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HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
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Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
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Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
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Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
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Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
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Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008
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DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
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United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002

Counters, Frequency (Cont'd)

AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
EIP, Incorporated, Dept. EM, 3230 Scott Blvd., Santa Clara, Cal. 95051
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
D Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Luff Research, Dept. EM, Box 449, Jackson Hgts., N.Y. 11372
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Counters, Mechanical

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** **p. 2393**
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... **p. 2402**
Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Counters, Particle

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... **p. 2402**
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Bausch & Lomb, A.S. Div., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625
Bausch & Lomb, S.O.P.D. Div, Dept. EM, 1400 N. Goodman St., Rochester, N.Y. 14602
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
Nuclear Meas. Corp., Dept. EM, 2460 N. Arlington Ave., Indianapolis, Ind. 46218
M Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Counters, Photoelectric

Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368** .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... **p. 2402**
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
D Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
M Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Tri-Tronics Co. Inc., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
D Vorne Inds., Inc., Dept. EM, 5023 W. Belmont Ave., Chicago, Ill. 60641
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

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D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... **p. 1538**
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** **p. 2393**
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** **p. 2912**
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Pláza, Elmsford, N.Y. 10523** .... **p. 2402**
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
D Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nu-Metrics, Dept. EM, P.O. Box 800, Connellsville, Pa. 15425
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
D Vorne Inds., Inc., Dept. EM, 5023 W. Belmont Ave., Chicago, Ill. 60641
D Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Counters, Printing

D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

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Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
Curtis Instrs., Inc., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
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D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Practical Automation, Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484 *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
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Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
EIP, Incorporated, Dept. EM, 3230 Scott Blvd., Santa Clara, Cal. 95051
Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
D Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161

Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Nu-Metrics, Dept. EM, P.O. Box 800, Connellsville, Pa. 15425
M Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
D Vorne Inds., Inc., Dept. EM, 5023 W. Belmont Ave., Chicago, Ill. 60641
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368** .... *
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D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
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United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Redington Counters, Inc., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

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Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
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LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
D Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
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Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
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Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
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Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
B. H. Industries, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019
M ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Livermore Data Systems, Inc., Dept. EM, 2050 Research Dr., Livermore, Cal. 94550
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034

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M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
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M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Antenna Research Associates, Inc., Dept. EM, 11317 Frederick (Box 196), Beltsville, Md. 20705
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074

GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... ***
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Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
M Connecticut Microwave Corp., Dept. EM, Route 44, New Hartford, Conn. 06057
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Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
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D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
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Antennas for Communications, Inc., Dept. EM, Cordage Park, Plymouth, Mass. 02360
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Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
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Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Connecticut Microwave Corp., Dept. EM, Route 44, New Hartford, Conn. 06057
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
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M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
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GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
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Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
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M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
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M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009

DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Couplers, Multi-Set—See Couplers, Antenna

Couplers, Power

Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... *
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441

Couplers, Rotary

M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Couplings, Quick-Disconnect, Liquid or Gas

D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
Owatonna Tool Co., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731

Couplings, Shaft, Rigid & Flexible

Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2537**
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... ***
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2181
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Helical Prods. Co., Inc., Dept. EM, Box 2296, Santa Maria, Cal. 93454
M Instru-Lec Corp., Dept. EM, 520 Homestead Ave., Mt. Vernon, N.Y. 10550
Lord Kinematics, Lord Corp., Dept. EM, 1635 W. 12th St., Erie, Pa. 16512
M Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Naugler Engrg., Inc., Dept. EM, Off Dunham Rd., Beverly, Mass. 01915
M Northfield Precision Instr. Corp., Dept. EM, 4400 Austin Blvd., Island Park, N.Y. 11558
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Renbrandt, Inc., Dept. EM, 6 Parmelee St., Boston, Mass. 02118
M Servometer Corp., Dept. EM, 501 Little Falls Rd., Cedar Grove, N.J. 07009
Skyo Industries Inc., Dept. EM, 171 Brook Ave., Deer Park, N.Y. 11729
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Covers, Protective (Including Dust)

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
Aries Electronics, Dept. EM, Box 231, Frenchtown, N.J. 08825 .... *
Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 p. 3458,3461
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 4075
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ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2051,2055,2080,2082,2083,2088,2091
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D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... ***
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D **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
Zero-East Div., Dept. EM, 288 Main St., Monson, Mass. 01057 .... *
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
M Caplugs Div., Protective Closures Co., Dept. EM, 2150 Elmwood Ave., Buffalo, N.Y. 14207
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
M GTI/Clover Div., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
D Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Sunbank Elctrns., Inc., Dept. EM, 3110 Winona, Box 6669, Burbank, Cal. 91505
Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

Crayons, Coatings, Pellets, etc., Temperature Indicating

Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
M Artech Corp., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
3M Company, Technical Ceramic Prods. Div., Dept. EM; 3M Center 223-4S, St. Paul, MN. 55101
Markal Co., Dept. EM, 250 N. Washtenaw Ave., Chicago, Ill. 60612
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Crossbars—See Scanners, Crossbar; Switches, Crossbar

Crystal Blanks

Croven, Ltd., Dept. EM, 500 Beech St., Whitby, Ont., Can. .... *
D **Crystek Crystals Corp., Dept. EM, 1000 Crystal Dr., Ft. Myers, Fla. 33901 .. ***
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2416
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... p. 2448
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 ***
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2472**
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
M Hoffman Co., P. R., Div. of Aiken Inds., Inc., Dept. EM, 321 Cherry St., Carlisle, Pa. 17013
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Savoy Electronics, Dept. EM, P.O. Box 5727, Ft. Lauderdale, Fla. 33310
M Standard Crystal Corp., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913

Crystals, Frequency Control

M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508 .... p. 2410**
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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DM **Crystek Crystals Corp., Dept. EM, 1000 Crystal Dr., Ft. Myers, Fla. 33901 p. 2435**
M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2416**
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... p. 2444-2446,2448
DM **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 ***
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2450,2451,2453**
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... p. 2462**
Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 p. 1121
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2473,2475**
M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Crystal Network Prods. Corp., Dept. EM. 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
R/T Labs., Inc., Dept. EM, 4126 Colerain Ave., Cincinnati, Ohio 45223
M Savoy Electronics, Dept. EM, P.O. Box 5727, Ft. Lauderdale, Fla. 33310
M Standard Crystal Corp., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754
Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
DM United States Crystal Corp., Dept. EM, 3605 McCart St., Ft. Worth, Tex. 76110

Crystals, Piezoelectric

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M **Croven, Ltd., Dept. EM, 500 Beech St., Whitby, Ont., Can. .... p. 2434**
DM **Crystek Crystals Corp., Dept. EM, 1000 Crystal Dr., Ft. Myers, Fla. 33901 .. ***
DM **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 .... ***
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... p. 4343
DM **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 ***
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... ***
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Cleveland Crystals, Inc., Dept. EM, Box 17157, Euclid, Ohio 44117
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
M Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Gulton Inds., Piezo Prods. Div., Dept. EM, Box 4300, Fullerton, Cal. 92634
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
R/T Labs., Inc., Dept. EM, 4126 Colerain Ave., Cincinnati, Ohio 45223
M Savoy Electronics, Dept. EM, P.O. Box 5727, Ft. Lauderdale, Fla. 33310
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Standard Crystal Corp., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123
DM United States Crystal Corp., Dept. EM, 3605 McCart St., Ft. Worth, Tex. 76110
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Crystals, Quartz

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... p. 1473
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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DM **Crystek Crystals Corp., Dept. EM, 1000 Crystal Dr., Ft. Myers, Fla. 33901 p. 2435**
DM **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2414,2415**
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. ***
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
DM **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 p. 2460,2461**
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2450-2453**
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
Piezo Technology Inc., Dept. EM, 2525 Shader Rd., Orlando, Fla. 32804 .... *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2472,2473,2475**
M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 ...... p. 2478,2479**
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... p. 2483**
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
M Hoffman Co., P. R., Div. of Aiken Inds., Inc., Dept. EM, 321 Cherry St., Carlisle, Pa. 17013
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Quaker Elctrns., Dept. EM, Box 215, Hunlock Creek, Pa. 18621
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
R/T Labs., Inc., Dept. EM, 4126 Colerain Ave., Cincinnati, Ohio 45223
M Savoy Electronics, Dept. EM, P.O. Box 5727, Ft. Lauderdale, Fla. 33310
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can.
M Standard Crystal Corp., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754
D Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
DM United States Crystal Corp., Dept. EM, 3605 McCart St., Ft. Worth, Tex. 76110
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913

Crystals, Quartz, for Watches

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 2412
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2414,2415,2417
Motorola, Inc. Component Prods., Quartz Time Piece, Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 .... *
Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2473
Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... p. 2479
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Crystals, Semiconductor(Ingots & Wafers)

Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4347
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2472**
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 .... ***
Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Monsanto, Dept. EM, Box 8, St. Peters, Mo. 63376
Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
Phelps Dodge Sales Co., Inc., Dept. EM, 300 Park Ave., New York, N.Y. 10022
Semiconductor Processing Co., Dept. EM, 10 Industrial Park Rd, Hingham, Mass. 02043
Siltec Corp., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025
M Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Crystals, Yig

M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050

Cups, Encapsulation

ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
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Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
EpoxyCast Electronic Case Co., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
Resdel Corp., Dept. EM, Bldg. 22–County Airport, Rio Grande, N.J. 08242
M Robison Elctrns., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
D Spec Plastics Inc., Dept. EM, 7224 Atoll Ave., No. Hollywood, Cal. 91605
Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613

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Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735 .... p. 4336,4337**
M **Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... ***
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
D **Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... ***
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Kabo Electronics, Dept. EM, 123 Bacon St., Natick, Mass. 01760
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Micro Technical Industries, Dept. EM, 1999 S. Coast Hwy., Laguna Beach, Cal. 92651
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Pearson Elctrns. Inc., Dept. EM, 4007 Transport St., Palo Alto, Cal. 94303
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

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Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2452
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Designs Pacific, Inc., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304 .... *
M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... ***
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... ***
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushing, N.Y. 11354
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111
D Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Cutters, Diagonal—See Cutters, Wire, Hand Operated

Cutters, Wire, Automatic—See Machines, Wire Measuring & Cutting

Cutters, Wire, Hand Operated

D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
D **Channellock, Inc., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335 .... ***
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D **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... ***
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2174
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
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Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Safety Razor, Dept. EM, P.O. Box 500, Staunton, Va. 24401
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
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Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141

Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
D Plato Products, Inc., Dept. EM, El Monte, Cal. 91731
D Porter, H.K., Inc., Dept. EM, 74 Foley St., Somerville, Mass. 02143
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Dampers, Servo

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... ***
Airpot Corp., Dept. EM, 27 Lois St., Norwalk, Conn. 06851
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Dampers, Structural, Chassis, Panel, etc.—See Mounts, Shock & Vibration

Data Acquisition & Reduction Systems

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 p. 2789
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... p. 2981
Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 p. 1458-1465
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
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Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
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Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
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M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... ***
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Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
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M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 ***
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M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
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All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
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D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
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M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
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M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
M Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
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D Cipher Data Products, Dept. EM, 5630 Kearny Mesa Rd., San Diego, Cal. 92111
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Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Datacom, Inc., Dept. EM, Box 278, Ft. Walton Beach, Fla. 32548
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
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Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Electronic Solutions Inc., Dept. EM, 8070 Engineer Rd., San Diego, Cal. 92111
EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Engdahl Enterprises, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626
D F & M Systems Co., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
GCA/Burlington Div., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
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M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
LFE Control System Industries, Dept. EM, 2920 Sand Ysidro Way, Santa Clara, Cal. 95051
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
M Monarch Marking Sys., Dept. EM, Box 608, Dayton, Ohio 45401
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121

Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Petty Geophysical Engrg., Dept. EM, Box 36306, Houston, Tex. 77036
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
QuantaLog, Inc., Dept. EM, 42 Enterprise Drive, Ann Arbor, Mich 48103
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
D Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Data Compressors, Digital

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518

Data Display Indicators—See Lights; Dials; Display Devices & Displays; Tubes, Readout

Data Display Systems—See Displays; Terminals, Data Display

Data Loggers

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 p. 2789
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... *
Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2859**
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 p. 2888,2889
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... p. 2907
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
D **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017 .... ***
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... p. 2921
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2945
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa 19020
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Computer Terminal Sys., Dept. EM, 52 Newtown Plaza, Plainview, N.Y. 11803
Computer Transceiver Systems, Dept. EM, 66 E. Midland Ave., Paramus, N.J. 07652
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electronic Solutions Inc., Dept. EM, 8070 Engineer Rd., San Diego, Cal. 92111
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
GCA/Burlington Div., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Memodyne Corp., Dept. EM, 369 Elliot St., Newton Upper Falls, Mass 02164
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
Micro Communications Corp., Dept. EM, 80 Bacon St., Waltham, Mass. 02154
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
QuantaLog, Inc., Dept. EM, 42 Enterprise Drive, Ann Arbor, Mich 48103
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043

Decade Boxes, Capacitance

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wide Range Electronics Corp., Dept. EM, 2119 Schultz Rd., St. Louis, Mo. 63141

Decade Boxes, Delay Line

M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081

M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.

Decade Boxes, Inductance

M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wide Range Electronics Corp., Dept. EM, 2119 Schultz Rd., St. Louis, Mo. 63141

Decade Boxes, Resistance

D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** p. 3680,3681
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
DM **Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wide Range Electronics Corp., Dept. EM, 2119 Schultz Rd., St. Louis, Mo. 63141
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Decade Boxes, Transformer

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
D Phipps & Bird, Dept. EM, P.O. Box 27324, Richmond, Va. 23261
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Decalcomania-Also See Labels, Pressure Sensitive

D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093** .... *
D Decalcraft Corp., Dept. EM, Rte. 309, Hatfield, Pa. 19440
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Meyercord Co., Dept. EM, 365 E. North Ave., Carol Stream, Wheaton, Ill. 60187
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Stanpat Products Inc., Dept. EM, 366 Main St., Port Washington, N.Y. 11050
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
Topflight Corp., Dept. EM, 160 East 9th Ave., York, Pa. 17404

Decoders, Binary To Decimal—See Converters, Binary To Decimal

Decoders, Digital To Analog—See Converters, Digital To Analog

Decoders, Pulse

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876

Decoders, Readout—See Drivers & Decoders For Readouts

Decoders, Telemetry—See Decoders, Tone

Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536

Decoders, Tone

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902

Decoders, Video

M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Decommutators, Telemetering

M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101** .... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006** .... *
Astrodata Inc., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730

Decontaminants—See Cleaners & Solvents

Degaussers—See Demagnetizers; Coils, Degaussing

Degreasing Chemicals—See Cleaners & Solvents

Dehumidifiers (For Equipment)

M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083** .... *
Atmosphere Controls Prdts., Dept. EM, 295 Polaris, Mt. View, Cal. 94043
Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406

- DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
- Lectrodryer Div., Dept. EM, Box 4599, Pittsburgh, Pa. 15205
- Pall Corp., Dept. EM, 30 Sea Cliff Ave., Glen Cove, N.Y. 11542
- Pall Trinity Micro Corp., Dept. EM, Rte. 281, Cortland, N.Y. 13045

Dehydrators

- Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
- Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
- D Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
- M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
- Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
- D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
- Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
- DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
- Lectrodryer Div., Dept. EM, Box 4599, Pittsburgh, Pa. 15205
- Pall Trinity Micro Corp., Dept. EM, Rte. 281, Cortland, N.Y. 13045

Delay Lines, All Types

- **Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... p. 2490-2492,2718**
- **Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 ... p. 2494,2495**
- **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2496-2498**
- **Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421**
- **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 ... p. 2504**
- **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 p. 2506**
- **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 ... p. 2438**
- **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 p. 2507-2512**
- **Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ... p. 1538**
- **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 p. 2516,2517**
- **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 p. 3580,3581**
- **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... p. 2518,2520-2523**
- Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
- Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754

Delay Lines, Cable

- **Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... ***
- **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2497**
- M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 ... ***
- M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
- M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
- M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 ... ***
- M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 ... ***
- D **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... ***
- DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
- Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
- Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
- Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
- Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
- M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
- Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
- Precision Tube, Dept. EM, Church Rd. & Wissahickon, No. Wales, Pa. 19454
- Standard Engineering, Dept. EM, 44800 Industrial Dr., Fremont, Cal. 94538
- M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
- Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
- Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Distributed, Constant (Fixed)

- **Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... p. 2491**
- **Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 ... p. 2494,2495**
- M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2497**
- M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 ... ***
- M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
- M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
- M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 ... ***
- M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
- M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 p. 2516,2517**
- D **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 ... ***
- **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... p. 2519**
- **Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ... ***
- Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
- El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
- Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
- PCA Elctrns., Inc., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343
- M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
- Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
- Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Distributed, Constant (Variable)

- **Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... ***
- **Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 ... p. 2494,2495**
- M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 p. 2497,2499,2500**
- M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 ... ***
- M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
- M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
- M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 p. 2510-2512**
- M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 p. 2514**
- M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 p. 2516,2517**
- **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... p. 2519**
- **Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ... ***
- Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
- Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
- Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
- Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
- D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Delay Lines, Glass & Quartz

- **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 ... ***
- **Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 ... p. 2494**
- **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2497**
- M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
- **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 ... ***
- **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 ... ***
- M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 ... ***
- M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
- Corning Glass Works, Memory Prods Dept., Dept. EM, 3900 Electronic Dr., Raleigh, N.C. 27602
- Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
- M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
- M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
- D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002

Delay Lines, Liquid

- **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2497**
- M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 ... ***

Delay Lines, Lumped-Constant (Electrically Variable)

- **Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... p. 2490**
- **Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 ... p. 2494,2495**
- M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489**
- **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 ... p. 2497,2500**
- **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 ... ***
- M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 ... p. 2504**
- M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
- M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 p. 2506**
- M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 p. 2510-2512**
- M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 p. 2514**
- M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 p. 2516,2517**

RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** p. 2524,2525
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rhombus Inds., Inc., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002

Delay Lines, Lumped-Constant (Fixed)

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2490,2492
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... p. 2494
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** .... p. 2504
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** p. 2505
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** p. 2506
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** p. 2514
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008** p. 2516,2517
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 2519
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** p. 2524,2525
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
M El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
M Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
PCA Elctrns., Inc., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Rhombus Inds., Inc., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Lumped-Constant (Mechanically Variable)

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2490
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497,2499
Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** .... p. 2504
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** p. 2505
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** p. 2506
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .. p. 2510
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** p. 2514
M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008** p. 2516,2517
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 2519
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 2524,2525
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Rhombus Inds., Inc., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Magnetostrictive

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** p. 2506
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380

Delay Lines, Miniature & Subminiature-Also See Specific Types Of Delay Lines

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2492
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... p. 2494
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 p. 2497,2501,2502
Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** .... p. 2504
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** p. 2505
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** p. 2506
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** p. 2507-2510,2512
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** p. 2514,2515
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008** p. 2517
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .. p. 3580
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 2518-2523
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** p. 2524
M **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426** *
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
PCA Elctrns., Inc., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Rhombus Inds., Inc., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304

Delay Lines, Solid Blank

Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** *
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746

Delay Lines, Strip

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** .... *
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *

RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590

Delay Lines, Trimmer

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2490
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 .... ***
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 p. 2509,2511**
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
M **Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... ***
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 .... ***
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Ultrasonic

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2490
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 p. 2489
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508 .... ***
Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 .... p. 2504
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 p. 2506**
Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 p. 2517
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 .... ***
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Corning Glass Works, Memory Prods Dept., Dept. EM, 3900 Electronic Dr., Raleigh, N.C. 27602
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304

Delay Lines, Video—See Delay Lines, Ultrasonic

Delay Lines, Waveguide

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Delay Lines, Wire

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 .... ***
RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan

Delays, Time (Excluding Delay Lines, Time Delay Relays)

M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 ***
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... p. 2497
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1464
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... p. 3535**
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
Airpot Corp., Dept. EM, 27 Lois St., Norwalk, Conn. 06851
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
M Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
East Controls Co., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Jay-El Prods., Dept. EM, 1859 W. 169th St., Gardena, Calif. 90247
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Demagnetizers

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
D **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Amplifier Corp. of America, Dept. EM, 75 Frost St., Westbury, N.Y. 11590
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D Fidelitone, Inc., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067
Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
L & R Mfg., Dept. EM, 577 Elm St., Kearny, N.J. 07032
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Recoton Corp., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Schonstedt Instr. Co., Dept. EM, 1775 Wiehle Ave., Reston, Va. 22090
D Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
DM Stearns Magnetics Inc., Sub. Magnetics Int'l., Dept. EM, 6001 S. General Ave., Cudahy, Wisc. 53110

Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
Wide Range Electronics Corp., Dept. EM, 2119 Schultz Rd., St. Louis, Mo. 63141

Demodulators

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** p. 2390
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** p. 1685

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D SC Electronics, Dept. EM, 530 5th Ave. N.W., New Brighton, Minn. 55112
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Demodulators, Magnetic

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 p. 2390
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634

Densitometers, Electronic

Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
D Spatial Data Systems, Inc., Dept. EM, P.O. Box 249 508 S. Fairview, Goleta, Cal. 93017
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Deposition Equipment, Vacuum & Accessories-Also See Evaporation Equipment, Electron Beam

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
Inficon Inc., Inficon Leybold-Heraeus Inc., Dept. EM, 5 Adler Dr., E. Syracuse, N.Y. 13057
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Desiccators—See Dehumidifiers

Desoldering Tools & Equipment—See Soldering Accessories; Soldering Equip.; Soldering Guns; etc.

Detectors, A-F—See Detectors, Frequency

Detectors, Coaxial

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Detectors, Corona—See Testers, Corona

Detectors, Crystal

M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890

Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D 3M Co., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Detectors, F-M—See Detectors, Frequency

Detectors, Flaw & Defect-Also See Locators, Open-Short

Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
M **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410** .... *
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 **p. 2181**
Applied Fluidics Inc., Dept. EM, 770 Main St., Westbury, N.Y. 11590
Automation Inds., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Dunegan/Endevco, Dept. EM, Rancho Viejo Rd., San Juan Capistrano, Cal. 92675
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D ITT Industrial & Automation Systems, Dept. EM, 41225 Plymouth Rd., Plymouth, Mich. 48170
Media Recovery Inc., Dept. EM, Box 867, Graham, Tex. 76046
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Siltec Corp., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Sotcher Measurement, Inc., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778

Detectors, Frequency

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** **p. 2385**
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... **p. 2981**
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 **p. 2733**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... **p. 3537**
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
Acron Corp., Dept. EM, 1095 Towbin Ave., Lakewood, N.J. 08701
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio, 45241
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Techsonics, Dept. EM, Box 251, El Prado, N.M. 87529
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Detectors, Gas Leak

Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
DM American Gas & Chemical Co., Ltd., Dept. EM, 5 Tenakill Pk., Cresskill, N.J. 07626
Applied Fluidics Inc., Dept. EM, 770 Main St., Westbury, N.Y. 11590
D Bacharach Instrument Co., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Dunegan/Endevco, Dept. EM, Rancho Viejo Rd., San Juan Capistrano, Cal. 92675
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
M Figaro Engrg. Inc., Dept. EM, 3-7-3 Higashitoyonaka, Toyonaka City, Osaka, Japan
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Monitors, Inc., Dept. EM, 3019 Enterprise St., Costa Mesa, Cal. 92626
Gow-Mac Instr. Co., Dept. EM, 100 Kings Rd., Madison, N.J. 07940
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Inficon Inc., Inficon Leybold-Heraeus Inc., Dept. EM, 5 Adler Dr., E. Syracuse, N.Y. 13057
ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
MKS Instrs., Inc., Dept. EM, 22 Third Ave., Burlington, Mass. 01803
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Techsonics, Dept. EM, Box 251, El Prado, N.M. 87529
M Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Detectors, Impedance—See Meters, Impedance

Detectors, Infrared

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 1667
Melcor/Materials Elctrn. Prods., Dept. EM, 990 Spruce St., Trenton, N.J. 08648 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4347
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Advanced Devices Lab, Dept. EM, P.O. Box 11455, Reno, Nev. 89510
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
FJW Industries, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
M Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
D International Laser Sys., Inc., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
Mikron Instr. Co., Dept. EM, Box 211, Ridgewood, N.J. 07451
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Sensors, Inc., Dept. EM, 3908 Varsity Dr., Ann Arbor, Mich. 48104
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081

Detectors, Light Intensity—See Meters, Light, Nonphotographic

Detectors, Magnetic—See Meters, Gauss

Detectors, Microwave

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 p. 2733
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Advanced Devices Lab, Dept. EM, P.O. Box 11455, Reno, Nev. 89510
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Detectors, Null—See Indicators, Null

Detectors, Phase-Sensitive

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** p. 2385
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... p. 3537
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
D Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Detectors, Photovoltaic —See Cells, Photovoltaic

Detectors, R-F—See Detectors, Frequency

Detectors, Radiation

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... *
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Nuclear Meas. Corp., Dept. EM, 2460 N. Arlington Ave., Indianapolis, Ind. 46218
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Sensors, Inc., Dept. EM, 3908 Varsity Dr., Ann Arbor, Mich. 48104
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830

Detectors, Smoke

Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Detectors, Standing Wave

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Detectors, Ultraviolet

D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 **p. 2385**
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
M Artech Corp., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
D Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Detectors, Vacuum

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
American Gas & Chemical Co., Ltd., Dept. EM, 5 Tenakill Pk., Cresskill, N.J. 07626
Applied Fluidics Inc., Dept. EM, 770 Main St., Westbury, N.Y. 11590
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Detectors,Vibration—See Transducers, Vibration

Detectors, Video

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 **p. 1460,1464**
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Detectors, Voltage

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** **p. 2385**
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... **p. 3537**
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Industrial Solid State Controls Ind., Dept. EM, 435 W. Philadelphia St., York, Pa. 17405
Kabo Electronics, Dept. EM, 123 Bacon St., Natick, Mass. 01760
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806

Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Dials, Instrument, Metal, Plastic, etc.

D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207 *
Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3824,3831
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .... ***
Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 p. 3838
Electronic Hardware Corp., Dept. EM, 320 Broad Hollow Rd., Farmingdale, N.Y. 11735 .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2536**
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... ***
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... p. 2551-2554
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745 .... ***
Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2941
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Davies Molding Co., Harry, Dept. EM, 4920 Bloomingdale Ave., , Chicago, Ill. 60639
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Main Electrns., Inc., Dept. EM, 225 Ida, Wichita, Kan. 67211
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D NOBEX Div., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Rogan Corp., Dept. EM, 3455 Woodhead Dr., Northbrook, Ill. 60062
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Dials, Telephone-Type

Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D ITT Telecommunications, Apparatus Dept., Dept. EM, Fulton Dr., Corinth, Miss. 38834
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Dials, Turns-Counting

DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 3780**
D **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 ....p. 3794,3811,3812,3814, Back Cover,**
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3824,3831**
D **Duncan Electronics, Inc., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626 .... p. 3836**
D **Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 p. 3838**
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745 .... ***
D **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733 .... ***
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D TRW/Cinch-Monadnock, An Elctrn. Comps., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749

Dielectric Heating Equipment

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606

Dielectrics—See Films; Insulation Materials

Differentials, Mechanical—See Gears & Gear Mechanisms

Digital Tape Recorders—See Recorders, Computer Data

Digitizers, Pencil Follower (Inc. Coordinate & Graphic)

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 p. 1459,1464
Altek Corp., Dept. EM, 2150 Industrial Pkwy, Silver Spring, MD 20904
D Auto Trol Corp., Dept. EM, 5650 N. Pecos St., Denver, Colo. 80221
Broomall Industries, Inc., Dept. EM, 682 Parkway, Broomall, Pa. 19008
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Computer Talk Inc., Dept. EM, Box 145, Idledale, Colo. 80453
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Dimmers, Light—See Controls, Lamp Dimming, Flashing

Diode Arrays (Including Photo)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... ***
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... ***
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... *
D **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
D **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 ***
Westinghouse Elec. Corp., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304

Diode Arrays (Including Photo) (Cont'd)

D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
Rectifier Components Corp., Dept. EM, 1112 Lousons Rd., Union, N.J. 07083
D Reticon Corp., Dept. EM, 910 Benicia Ave., Sunnyvale, Cal. 94086
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054

Diodes, Avalanche

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 .... p. 3859**
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
DM **Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401 .... p. 3878,3879,3881-3883**
DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... ***
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 .... Inside Back Cover,
TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 .... Inside Back Cover,
D **Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040 ***
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
M EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M High Voltage Devices, Inc., Dept. EM, 7435 Ave., Visalia, Cal. 93277
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
DM RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729
D Semicon Inc., Dept. EM, 10 North Ave., Burlington, Mass. 01803
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Thyrotek Corp., Dept. EM, 611 109th St. P.O. Box 5407, Arlington, Tx 76011
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054

Diodes, Backward

D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
D RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Diodes, Breakdown—See Diodes Avalanche

Diodes, Electroluminescent (Radiating)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
DM **Leecraft Mfg. Co., Inc., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503

Diodes, Frequency Multiplier

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... *
M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
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M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Diodes, Matched Quads

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901** .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401 .... *
M **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320** .... *
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D International Diode Corp., Dept. EM, 229 Cleveland Ave., Harrison, NJ 07029
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Kemtron Electron Prods., Inc., Dept. EM, 14 Prince Pl., Newburyport, Mass. 01950
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
D Semicon Inc., Dept. EM, 10 North Ave., Burlington, Mass. 01803
D Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Diodes, Microwave Detector

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 **p. 3004**

M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
Kemtron Electron Prods., Inc., Dept. EM, 14 Prince Pl., Newburyport, Mass. 01950
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Diodes, Microwave Mixer

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
M Kemtron Electron Prods., Inc., Dept. EM, 14 Prince Pl., Newburyport, Mass. 01950
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Diodes, Noise

TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

Diodes, Photoelectric

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... p. 3136
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 p. 3004
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... p. 3138
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ....** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
D **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 p. 3152,3153**

DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
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Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Diodes, PIN

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AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Diode Corp., Dept. EM, 13 Pleasant St. Box 47, Colebrook, N.H. 03576
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Diodes, Schottky

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TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
D **Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040** *

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M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
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DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281

Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915

Diodes, Selenium—See Rectifiers, Selenium

Diodes, Silicon

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
D **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901** .... *
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D **Elctrn. Devices, Dept. EM, 21 Gray Oaks Ave., Yonkers, N.Y. 10710** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245** .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 3869
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... p. 3138
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Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
DM **Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401 .... p. 3878-3880,3884**
DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 .... *
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M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
CSR Industries Inc., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
D Electronic Transistors, Dept. EM, 112-15 Northern Blvd., Flushing, N.Y. 11368
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
DM General Instrument Corp., Discrete Semiconductor Div., Dept. EM, 600 West John St., Hicksville, N.Y. 11802
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M High Voltage Devices, Inc., Dept. EM, 7435 Ave., Visalia, Cal. 93277
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D International Diode Corp., Dept. EM, 229 Cleveland Ave., Harrison, NJ 07029
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
M Kemtron Electron Prods., Inc., Dept. EM, 14 Prince Pl., Newburyport, Mass. 01950
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Diode Corp., Dept. EM, 13 Pleasant St. Box 47, Colebrook, N.H. 03576
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
Optoelectronics, Inc., Dept. EM, 1309 Dynamic St., Petaluma, Cal. 94952
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Thyristors & Rectifiers, Dept. EM, Rte. 202, Somerville, N.J. 08876
Rectifier Components Corp., Dept. EM, 1112 Lousons Rd., Union, N.J. 07083
RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
D Semicon Inc., Dept. EM, 10 North Ave., Burlington, Mass. 01803
D Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Diodes, Step Recovery

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **Westinghouse Elec. Corp., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697** .... *
M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Diodes, Switching

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 p. 3000,3002
Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... p. 3860,3861
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254**
International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... *

DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... ***
Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... *
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
D **Westinghouse Elec. Corp., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
CSR Industries Inc., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
D Electronic Transistors, Dept. EM, 112-15 Northern Blvd., Flushing, N.Y. 11368
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M High Voltage Devices, Inc., Dept. EM, 7435 Ave., Visalia, Cal. 93277
Hutson Industries, Dept. EM, 2019 W. Valley View, Dallas, Tex. 75234
D International Diode Corp., Dept. EM, 229 Cleveland Ave., Harrison, NJ 07029
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Diode Corp., Dept. EM, 13 Pleasant St. Box 47, Colebrook, N.H. 03576
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
DM RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Diodes, Temperature Compensating

International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... p. 3867
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... p. 4322
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Thermosen, Inc., Dept. EM, 375 Fairfield Ave., Stamford, Conn. 06904

Diodes, Trigger—See Diodes, Avalanche

Diodes, Tunnel

D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503

Diodes, Varactor

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
M Addington Labs, Inc., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
DM Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
MSI Electronics, Inc., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
M United Microtronics, Inc., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Diodes, Video Detector—See Diodes, Microwave Detector

Diodes, Zener & Stabistors (Forward Reference Diodes)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... ***
Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254**
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... p. 3867**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 3874**
DM **Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401 .... p. 3878,3884,3885**
DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 Inside Back Cover,
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
CSR Industries Inc., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735
D Electronic Transistors, Dept. EM, 112-15 Northern Blvd., Flushing, N.Y. 11368
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518

DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D International Diode Corp., Dept. EM, 229 Cleveland Ave., Harrison, NJ 07029
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
D Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
Microwave Diode Corp., Dept. EM, 13 Pleasant St. Box 47, Colebrook, N.H. 03576
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
D Semicon Inc., Dept. EM, 10 North Ave., Burlington, Mass. 01803
D Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Siemens Corp., Comps Div., Dept. EM, Box 1390, Scottsdale, Ariz. 85252
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Diplexers, Antenna

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Direction Finders

M Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
L-Tronics, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Disc Packs, Magnetic

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
DM Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
Wabash Tape, Dept. EM, 2700 Des Plaines Ave., #112, Des Plaines, Ill 60018

Discharge Systems, Energy

Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

Discriminators

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... ***
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2427
Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 p. 2735**
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 p. 2443**
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M **Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050

Discs, Computer Memory—See Memory Systems, Disc

Discs, Memory, Flexible

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Information Terminals, Dept. EM, 323 Soquel Way, Sunnyvale, Cal. 94086
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Teknekron/Trax, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704

Discs, Optical Encoder—See Encoders, Shaft Angle

Displays, Dot Matrix

DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... ***
Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
DM **Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915

Bail Bros. Research Corp., Electronic Display Div., Dept. EM, Box 3376, St Paul, Minn. 55165
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Ferranti Elec., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803
D Ferranti-Packard, Ltd. Elec. Div., Dept. EM, 121 Industry St., Toronto, Can.M6M 4M3
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Luminator Div., Gulton Industries, Dept. EM, 1200 E. Dallas N. Pkwy., Plano, Tex 75074
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Displays, Edge-Lit & Back-Lit

Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2587
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 ...... p. 2639,4129
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
Data Panel, Inc, Dept. EM, 7313 S. Washington, Edina, Minn. 55435
Holex Corp, Dept. EM, 2544 W. Main St., Norristown, Pa. 19401
KMC Systems Inc., Dept. EM, 200 State Highway 17, Mahwah, N.J. 07430
Marlin Manufacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111

Displays, Electroluminescent

Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... p. 2567
Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... p. 2584
Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2586,2587
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Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 ...... p. 2639,4129
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... p. 2652
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Futaba Corp., Dept. EM, Super Bldg. 1-11-5, Sotokanda Chiyoda-ku, Japan
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Displays, Electromechanical

Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... p. 2567
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... ***
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 ***
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... p. 2647,2648
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 p. 2660
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... ***
M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Ferranti Elec., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
KMC Systems Inc., Dept. EM, 200 State Highway 17, Mahwah, N.J. 07430
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Major Data Concepts, Inc., Dept. EM, 1796 Monrovia Ave., Costa Mesa, Cal. 92627
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
M Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218

Displays, Fiberoptcis

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 ***
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008

Displays, Light-Emitting Diode (LED)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... p. 2567
Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 .... p. 1475-1477,1479
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1482,1483
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
D **Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257 .... p. 2570-2575**
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2810
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... p. 2815
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... ***
Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... p. 1487
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1490
Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 .... p. 1494
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 p. 2824,2825
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... p. 2585**
Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 p. 4064
Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2586,2587
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2828-2831
Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 p. 2832
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 p. 4098
DM **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638**
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... p. 2639
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 p. 2875
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .. p. 2876,2877
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 1666,2394-2396
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 p. 2888,2889
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... p. 1668
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *

Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 p. 1673,2915
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Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... p. 3595
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 p. 2926,2927
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 p. 3150
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... p. 1686-1689
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 p. 2943
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2944
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2957
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Bowmar Canada Ltd., Dept. EM, 1257 Algoma Rd., Ottawa, Ont., Canada K1B 3W7
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Puleo Electronics, Inc., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Displays, Lighted Segment

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 ....** *
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 ....** *
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 ....** *
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405** *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aerospace Optics Inc., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
M Day-light Display Corp., Dept. EM, 11 Fairfield Pl., Box 1231, W. Caldwell, N.J. 07006
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
Futaba Corp., Dept. EM, Super Bldg. 1-11-5, Sotokanda Chiyoda-ku, Japan
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D National Electronics, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134
National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes; N.J. 07417
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Displays, Liquid Crystal

Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2570
D **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551 .... p. 2594**
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638
American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optel Corp., Dept. EM, Box 2215, Princeton, N.J. 08540
D Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Transparent Conductors Inc., Dept. EM, 26 Coromar Dr., Box 549, Goleta, Cal. 93017
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Vari-Light Corp., Sub. Polacoat Inc., Dept. EM, 9770 Conklin Rd., Cincinnati, Ohio 45242
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284

Displays, Planar Gas Discharge

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 ....** *
Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 ....** *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
D Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
Transparent Conductors Inc., Dept. EM, 26 Coromar Dr., Box 549, Goleta, Cal. 93017

Displays, Projection Type (CRT; Electromechanical; Film; Light Valve)

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 ....** *
Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... *
Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 .... p. 1479
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Conrac Corp., Datex Div., Dept. EM, 1600 S. Mountain Ave., Duarte, Cal. 91010
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Holex Corp, Dept. EM, 2544 W. Main St., Norristown, Pa. 19401
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Major Data Concepts, Inc., Dept. EM, 1796 Monrovia Ave., Costa Mesa, Cal. 92627
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
DM Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Terminal Data Corp. of Md, Dept. EM, 11878 Coakley Circle, Rockville, Md. 20852
Vidco, Inc., Dept. EM, P.O. Box 25452, Portland, Ore. 97225
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Displays, Status

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... **p. 1538**
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343** *
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405** *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368** .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 .... *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aerospace Optics Inc., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
D Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
Data Panel, Inc, Dept. EM, 7313 S. Washington, Edina, Minn. 55435
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
M Day-light Display Corp., Dept. EM, 11 Fairfield Pl., Box 1231, W. Caldwell, N.J. 07006
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
D Ferranti-Packard, Ltd. Elec. Div., Dept. EM, 121 Industry St., Toronto, Can.M6M 4M3
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
K.C.C. Shokai Ltd., Dept. EM, No. 31 Ouchi-dori 4-chome, Nada-ku, Kobe, Japan
Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
DM Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054

Displays, Tube—See Tubes, Readout

Dissipators, Heat—See Transistors, Diode, Thyristor Heat Dissipators; Heat Sinks, Soldering

Distortion Analyzers, Indicators—See Analyzers, A-F

Dividers, Analog

M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** ...... **p. 2981**
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026

Dividers, Frequency

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
DM **Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Kelk, George Ltd., Dept. EM, 48 Lesmill Rd., Don Mills, Ont., Can. M3B 2T5
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Luff Research, Dept. EM, Box 449, Jackson Hgts., N.Y. 11372
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111

Dividers, Magnetic Analog

D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *

Dividers, Power (LF, HF, VHF, UHF)

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... **p. 2999**
Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... **p. 1795**
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... **p. 3006**
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. **p. 3056**
Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ...... **p. 2995**
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201

Dividers, Power (LF, HF, VHF, UHF) (Cont'd)

Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Dividers, Power, Microwave

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 ... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 ... p. 3006
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 3056
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
D Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,. Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Dividers, Voltage - Also see Networks, Resistance; Transformers, Voltage Dividing

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3638**
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ... *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 ... ***
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 ... p. 3668,3671
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 ... *
DM **Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 ... ***
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ... ***
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 ... p. 2877
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 ... p. 3281
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 ... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 p. 3283
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ... ***
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 3056
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 ... ***
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 ... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 ... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 ... p. 3611**
TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 Inside Back Cover,
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 ... p. 3353
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 ... p. 3767**
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... p. 3771
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Pearson Elctrns. Inc., Dept. EM, 4007 Transport St., Palo Alto, Cal. 94303
M Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Doors, Cabinet, Metal—See Cabinets & Accessories, Metal

Doublers, Frequency—See Multipliers, Frequency

Drafting Machines

D Auto Trol Corp., Dept. EM, 5650 N. Pecos St., Denver, Colo. 80221
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Dietzgen Corp., Dept. EM, 250 Wille Rd., Des Plaines, Ill 60018
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523

M Keuffel & Esser Co., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Drafting Symbols, Dry Transfer, Pressure Sensitive, etc. (Including Lettering)

Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2575
DM **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
M Centron Engrg., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
D Chartpak, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
M Keuffel & Esser Co., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
Stanpat Products Inc., Dept. EM, 366 Main St., Port Washington, N.Y. 11050
Webtek Corp., Dept. EM, 4326 W. Pico Blvd., Los Angeles, Cal. 90019

Drawers, Cash

Sharp Electronics Corp., Dept. EM, 2 Sharp Plaza P.O. Box 389, Paramus, N.J. 07652
Sweda Int'l., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058

Drawers, Sliding

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
Chassis-Trak, Div., General Devices Co., Inc., Dept. EM, 525 S. Webster Ave., Indianapolis, Ind. 46219 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
M **General Devices Co., Inc., Dept. EM, Box 19188, Indianapolis, Ind. 46219 .. ***
Optima Enclosures, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084 .... *
Premier Metal Prods. Co., Div. Sunshine Mining Co., Dept. EM, 381 Canal Place, Bronx, N.Y. 10451 .... *
Vent-Rak, Div., General Devices Co., Inc., Dept. EM, P.O. Box 19188, Indianapolis, Ind. 46219 .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
Zero-East Div., Dept. EM, 288 Main St., Monson, Mass. 01057 .... *
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
Equipto, Aurora Equipment Co., Dept. EM, 225 So. Highland Ave., Aurora, Ill. 60507
G. F. Business Equipment, Inc., Emcor Prods., Dept. EM, 1600 Fourth Ave. N.W., Rochester, Minn. 55901
MarkHon Industries Inc., Dept. EM, 200 Bond St., Wabash, Ind. 46992
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
DM Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

Drills & Accessories, Hand & Power

GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... p. 1388
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2170
Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302
DM High Speed Hammer Co., Inc., Dept. EM, 313 Norton St., Rochester, N.Y. 14621
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
D Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Petty Geophysical Engrg., Dept. EM, Box 36306, Houston, Tex. 77036
Price & Rutzebeck, Dept. EM, Box 30, Hayward, Calif. 94543
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Tool Group Marketing Division, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131
D Wahl Clipper Corp., Dept. EM, 2902 Locust St., Sterling, Ill. 61081
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Drivers & Decoders For Readouts

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
Anaheim Automation, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801 p. 3062
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... p. 2495
M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2575**
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... ***
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... ***
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
General Systems International Inc., Dept. EM, 1440 Allec, Anaheim, Cal. 92805
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
National Electronics, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Drivers, Chopper

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Drivers, Nut

D **Channellock, Inc., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335 .... p. 4327**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
D Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905
D Porter, H.K., Inc., Dept. EM, 74 Foley St., Somerville, Mass. 02143
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Standard Pneumatic Motor Co., Dept. EM, Box 10030, Reno, Nev. 89510
Tool Group Marketing Division, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Drivers, Solenoid

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... ***
Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1490
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503

DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735

Drivers, Speaker

D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021

Drivers, Switch

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103

Drivers, Tube—See Drivers & Decoders for Readouts

Drives & Drive Mechanisms (Dial)

Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2534,2535**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... ***
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
M Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Drums, Computer Memory-Also See Memory Systems, Drum

California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
M Ferra Flux Corp., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Dry Transfer Letters & Numbers—See Kits, Marking-Drafting Symbols

Ducts, Wiring

D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Hoffman Engineering Co., Div. Federal Cartridge Corp., Dept. EM, 9th & Tyler Sts., Anoka, Minn. 55303
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
Taylor Electric, Inc., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011
Wiremold Co., Dept. EM, West Hartford, Conn. 06110

Dummy Loads

D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... p. 1795
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 ...... p. 1413**
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... ***
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... p. 2835**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... ***
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D CES Elctrns., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Connecticut Microwave Corp., Dept. EM, Route 44, New Hartford, Conn. 06057
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electronautics, Dept. Dielectric Comm., Dept. EM, Newtown Rd., Littleton, Mass. 01460
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Duplexers, Microwave

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518'
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Theta-Com CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Duplicators, Magnetic Tape

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
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D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
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M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877

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M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
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D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
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D Sifco Metachemical, Div. Steel Improv. & Forging, Dept. EM, 5708 Schaaf Rd., Independence, Ohio 44131
M Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
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M Amco Engineering Co., Dept. EM, 7333 W. Ainslie St., Chicago, Ill. 60656
M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
Hoffman Engineering Co., Div. Federal Cartridge Corp., Dept. EM, 9th & Tyler Sts., Anoka, Minn. 55303
Miller, W. A. Co., Inc., Dept. EM, Mingo Loop, Oquossoc, Me. 04964
M Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771

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M **Environmental Container Sys., Inc., Dept. EM, 3560 Rogue River Hwy., Box 188, Grants Pass, Ore. 97526 .... p. 1127**
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M Adam Co., Inc., W. D., Dept. EM, 630 W. 17th St., Costa Mesa, Cal. 92627
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Kole Enterprises, Inc., Dept. EM, 3553 N.W. 50th St., Miami, Fla. 33142
Parsons Mfg. Corp., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025
Princeton Case Co., Dept. EM, 667 Lehigh Ave., Union, N.J. 07083
M Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Warwick Prods Co., Dept. EM, 7909 Rockside Rd., Independence, Ohio 44131

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D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 p. 3066,3067**
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 .... *
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M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Encoders, Keyboard

Applied Dynamics International, Inc., Dept. EM, 3800 Stone School Rd., Ann Arbor., Mich. 48014 .... *
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360

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Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... p. 3071
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132

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Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 p. 3066,3067
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 p. 1486
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Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
Renco Corp., Dept. EM, 26 Coromar Dr., Box 246, Goleta, Cal. 93017 p. 1682

M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 1691,2405**
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

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Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1482,1483
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Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 ***
Renco Corp., Dept. EM, 26 Coromar Dr., Box 246, Goleta, Cal. 93017 p. 1682
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

Encoders, Shaft Angle, Optical

BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 p. 1484-1486
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... p. 3071**
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Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 .... p. 1494
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D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
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M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ....p. 1690,1691,2404,2405**
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
DATA TECHnology, Inc., Dept. EM, 4 Gill St., Woburn, Mass. 01801
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
GCA/Burlington-Div., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Gould/Trump-Ross, Dept. EM, 340 Fordham Road, Wilmington, Mass. 01887
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
M H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

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Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
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GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
Interface Technology Inc., Dept. EM, 10500 Kahlmeyer Dr., St. Louis, Mo. 63132
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051

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Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2490
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas. Tex. 75234
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
D Pulse Techniques, Inc., Dept. EM, 1411 Palisade Ave., Teaneck, N.J. 07666
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

Equalizers, Delay

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .... ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304

TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324

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Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
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M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
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M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324

Erasers, Magnetic Tape (Bulk)

DM **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725

Escutcheons

D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
D South Shore Metal Prods., Inc., Dept. EM, 88 E Allen Blvd., Farmingdale, N.Y. 11735
Topflight Corp., Dept. EM, 160 East 9th Ave., York, Pa. 17404

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D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
Allied Chemical Corp., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960
Conversion Chem. Corp., Dept. EM, 210 E. Main St., Rockville, Conn. 06066
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
D Techniques, Inc., Dept. EM, 235 Jackson St., Englewood, N.J. 07631
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017

Evaporation Equipment, Electron Beam

Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716

Expanders, Meter—See Multipliers, Meter

Explosive Gas Indicators—See Detectors, Gas Leak

Extractors, Circuit Board, Tube—See Pullers, Circuit Board

Eyelets

Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
DM Aimsco Inc., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
Atlas Eyelets, Dept. EM, Pinkham St., Fairhaven, Mass. 02719
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
M Braxton Mfg. Co., Dept. EM, Echo Lake Rd. N., Watertown, Conn. 06795
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
M GTI/Clover Div., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
DM Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
D USM Corp., "POP" Rivet & Eyelet Divs., Dept. EM, 510 River Rd., Shelton, Conn. 06484
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Fabrics, Conductive

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017** .... *
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Facsimile Equipment—See Comm. Systems, Facsimile

Fans—See Blowers & Fans & Accessories

Fasteners, Metal

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515 .... p. 2774**
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M **APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631** .... *
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D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... p. 3516
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DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3716
DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 2778**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2167,2169-2171,2174,2181**
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ....Inside Back Cover,

Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 .... p. 2781,2782
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2785**
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Abbott Screw & Mfg. Co., Dept. EM, 6525 N. Clark St., Chicago, Ill. 60626
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
Adams Rite Prods., Inc., Dept. EM, 540 W. Chevy Chase Dr., Glendale, Cal. 91209
DM Aimsco Inc., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199
Alinabal, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460
DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
Anchor Bolt & Screw, Dept. EM, 2950 W. Grand, Chicago, Ill. 60622
Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
D Arrow Fastener Co., Inc., Dept. EM, 271 Mayhill St., Saddlebrook, N.J. 07662
Associated Spring-Barnes Group Inc., Dept. EM, 18 Main St., Bristol, Conn. 06010
Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
DM Aurich F W & Co, Dept. EM, 4000 22nd Av. W., Seattle, Wash. 98199
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
DM Avibank Mfg. Inc., Dept. EM, 210 S. Victory Blvd., Burbank, Calif. 91503
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Bostitch, Div. of Textron, Inc., Dept. EM, Briggs Dr., E. Greenwich, R.I. 02818
Camcar, Div. Textron Inc., Dept. EM, 600 18th Ave., Rockford, Ill. 61101
M Cherry Fasteners, Townsend Div. Textron Inc., Dept. EM, Box 2157, Santa Ana, Cal. 92707
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
D Deutsch Fastener Corp., Dept. EM, 7001 W. Imperial Hwy., Los Angeles, Cal. 90045
D Dimco-Gray Company, Dept. EM, 8200 S. Suburban Rd., Dayton, Ohio 45459
Dupree, Inc., Dept. EM, 9835 Dupree St., So. El Monte, Cal. 91733
DM Dzus Fastener Co., Inc., Dept. EM, 425 Union Blvd., West Islip, N.Y. 11795
DM ESNA Division, Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
DM Esna Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
DM ITT Harper, Dept. EM, 8200 Lehigh Ave., Morton Grove, ILL. 60053
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
M Long-Lok Fasteners Corp., Dept. EM, 10630 Chester Rd., Cincinnati, Ohio 45215
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
M Milford Rivet & Mach., Dept. EM, 857 Bridgeport Ave., Milford, Conn. 06460
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
M Morris, J.I. Co., Dept. EM, 372 Elm St., Southbridge, Mass. 01550
D Nelson Stud Welding TRW Inc., Dept. EM, 28th & Toledo Ave., Lorain, Ohio 44035
N.K.R. Precision Mfg. Corp., Dept. EM, Rte. 17M, Box 333, Harriman, N.Y. 10926
Pan-L-Fast, Dept. EM, 13205 Sherman Way, N. Hollywood, Cal. 91605
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Penn Engrg. & Mfg. Corp., Dept. EM, Doylestown, Pa. 18901
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Seastrom Mfg. Co. Inc., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Skyo Industries Inc., Dept. EM, 171 Brook Ave., Deer Park, N.Y. 11729
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Tridair Inds., Rexnord Co., Dept. EM, 3000 W. Lomita Blvd., Torrance, Calif. 90505
M TRW/Cinch-Monadnock, An Elctrn. Comps., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
D USM Corp., "POP" Rivet & Eyelet Divs., Dept. EM, 510 River Rd., Shelton, Conn. 06484
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
M Waldes Kohinoor, Inc., Dept. EM, 47-16 Austel Pl., Long Island City, N.Y. 11101
M Waldman Corp., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024
D Wrought Washer Mfg., Inc., Dept. EM, 2252 S. Bay St., Milwaukee, Wisc. 53207
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Fasteners, Non-Metallic

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515 .... p. 2774**
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... *
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 .... ***
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... ***
Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033 *
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 2778
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2167,2169,2170**
Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
DM Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
DM Aimsco Inc., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199
All States Plastic Mfg. Co., Inc., Dept. EM, 1801 W. Foster Ave., Chicago, Ill. 60640
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Anchor Bolt & Screw, Dept. EM, 2950 W. Grand, Chicago, Ill. 60622
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Cincinnati Dev. & Mfg. Co., Dept. EM, 5614 Wooster Pike, Cincinnati, Ohio 45227
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Dennison Mfg. Co., Fastener Division, Dept. EM, Framingham, Mass. 01701
D Dzus Fastener Co., Inc., Dept. EM, 425 Union Blvd., West Islip, N.Y. 11795
D Eaton Corp.; Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Esna Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
D Fibre Materials Corp., Dept. EM, 34 Dupont St., Plainview, N.Y. 11803
Fischer Special Mfg. Co., Dept. EM, 446 Morgan St., Cincinnati, Ohio 45206
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
Hanscom, H.F. Co., Inc., Dept. EM, 225 Chapman St., Providence, R.I. 02905
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D ITT Harper, Dept. EM, 8200 Lehigh Ave., Morton Grove, ILL. 60053
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Taylor Electric, Inc., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654
Tridair Inds., Rexnord Co., Dept. EM, 3000 W. Lomita Blvd., Torrance, Calif. 90505
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
DM Weckesser Co. Inc., Dept. EM, 4444 W. Irving Park Rd., Chicago, Ill. 60641

Fault Locators—See Detectors, Flaw & Defect

Feedthrus & Seals, Environmental

M **Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662**
M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
M **APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... ***
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2182**
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Fusite Div./Emerson Elec., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067

Minnesota Rubber Co., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416
D Parker Hannifin Corp., O-Seal Div., Dept. EM, 10567 Jefferson Blvd., Culver City, Calif. 90230
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
M Servometer Corp., Dept. EM, 501 Little Falls Rd., Cedar Grove, N.J. 07009
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Teledyne Mecca, Dept. EM, Box 36393, Houston, Tex. 77036
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Vacuum Resch. Mfg., Dept. EM, 3100 Crow Canyon Rd., San Ramon, Cal. 94583
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vernay Laboratories, Inc., Dept. EM, S. College St., Yellow Springs, Ohio 45387

Ferrite Material & Parts

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1420
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... p. 2665
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
D Countis Inds., Dept. EM, Box 1444, San Luis Obispo, Cal. 93406
Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Indiana General, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
M Magnetic Dielectrics, Dept. EM, Industrial Dr., W. Milford, N.J. 07480
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Quartzite Processing, Inc., Dept. EM, 6 Holyoke St., Malden, Mass. 02148
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Trans-Tech, Dept. EM, 12 Meem Ave., Gaithersburg, Md. 20760
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Fiber Optic Bundles

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
M Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
D Lenox Instr. Co., Dept. EM, 121 E. Luray St., Philadelphia, Pa. 19120
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
Optics Technology, Dept. EM, 1902 McGaw Ave., Irvine, Cal. 92714
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D Rank Precision Inds., Dept. EM, 411 Jarvis Ave., Des Plaines, Ill. 60018
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153

Fiber Optic Cables & Components

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... *
M Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Schott Optical Glass Inc., Dept. EM, York Ave., Duryea, Pa. 18642
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153

Films, Capacitor

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Schweitzer, Div., Kimberly Clark Corp., Dept. EM, Lee, Mass. 01238
DM Texas Capacitor, Dept. EM, 7830 Westglen Dr., Houston, Tex. 77042
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Films, Masking (Incl. Photographic)

D AGFA-Gevaert, Inc., Dept. EM, 275 North St., Teterboro, N.J. 07608
Conforming Matrix Corp., Dept. EM, Box 5126, Pt. Pl. Sta., Toledo, Ohio 43611
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Keuffel & Esser Co., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
Seal-Peel, Inc., Dept. EM, Box 250, Troy, Mich. 48084
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
D Western Coating Co., Dept. EM, Box 598, Royal Oak, Mich. 48073

Films, Resistance

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .. p. 1397
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M HyComp Inc., Dept. EM, Box 250, Maynard, Mass. 01754
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746

Filter Synthesizers

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2818
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *

Filters, Active (All Types)

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... p. 2722**
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... p. 2981**
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2724**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .... ***
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... ***
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M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... p. 2724**
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... p. 2466
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... p. 2746

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Control Concepts Corp., Dept. EM, 333 Front St., Binghamton, N.Y. 13905
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
M Iwata Electric Co., Ltd., Dept. EM, 1-16 Chome Soto-Kanda, Chiyoda-ku Tokyo, Japan
Linear Networks Co., Dept. EM, Box 775, Westminster, Cal. 92683
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Micropac Industries, Inc., Dept. EM, 905 E. Walnut St., Garland, Tex. 75040
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Pall Corp., Dept. EM, 30 Sea Cliff Ave., Glen Cove, N.Y. 11542
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

Filters, A-F

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** **p. 2730**
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
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Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... **p. 2982**
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M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** .... *
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... **p. 2746**
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
D Pulse Techniques, Inc., Dept. EM, 1411 Palisade Ave., Teaneck, N.J. 07666
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

Filters, Air—See Air Cleaners & Filters

Filters, Analog—See Filters, Continuously Variable

Filters, Antenna

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
Piezo Technology Inc., Dept. EM, 2525 Shader Rd., Orlando, Fla. 32804 .... *
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... **p. 2746**
Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan **p. 1300**
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
D Finney Co., Dept. EM, 34 W. Interstate St.; Bedford, Ohio 44014
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Norsal Industries, Inc., Dept. EM, 34 Grand Blyd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Band Elimination

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... p. 2718
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M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... p. 2996,2997**
M **Arra.Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... p. 2722**
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 .... ***
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... ***
Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... *
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M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2725**
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... p. 2438**
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .. p. 2728**
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 p. 2730**
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 p. 2732,2733
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... p. 2736
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 p. 2443**
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
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M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
D Audio-Vidio Engrg. Co., Dept. EM, 65 Nancy Blvd., Merrick, N.Y. 11566
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
D De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910

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M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
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White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050

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M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... ***
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... ***
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M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
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AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
Allison Labs., Inc., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Audio-Vidio Engrg. Co., Dept. EM, 65 Nancy Blvd., Merrick, N.Y. 11566
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
M Blackhawk Networks Corp., Dept. EM, 14 N. Parker Dr., Janesville, Wisc. 53545
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810

D De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
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Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
Linear Networks Co., Dept. EM, Box 775, Westminster, Cal. 92683
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
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M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
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Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
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M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Band Reject, Band Stop—See Filters, Band, Elimination

Filters, Ceramic

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022** .... *
DM **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577** .... *
M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039** .... **p. 2770**
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067** .... **p. 2743**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... **p. 2744**
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DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M **Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146** **p. 2772,2773**
All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
DM San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
M Star Porcelain Co., Dept. EM, 71 Muirhead Ave., Box 1267, Trenton, N.J. 08638
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138

Filters, Coaxial

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... **p. 1795**
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** **p. 2811**
M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039** .... *
Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... **p. 2992**
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... **p. 2746**
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631

Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Color, Panel Light

RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... p. 2746

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Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... p. 2495
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 ***
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 p. 2730**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. ***
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 .... ***
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... ***
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... ***
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Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 *

M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M Blackhawk Networks Corp., Dept. EM, 14 N. Parker Dr., Janesville, Wisc. 53545
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727

M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Continuously Variable

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... p. 2996**
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... p. 2722**
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2724
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 p. 2732
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
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M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... p. 2724**
Precision Filters, Inc., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850 ...... *
Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2474
RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706 .... p. 2746
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2931**
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
Allison Labs., Inc., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
AMF Inc., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
M Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
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DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Crystal (Incl. Monolithic Devices)

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** ... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ... *
Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 ... **p. 2770**
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 p. 2431,2725**
M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2423-2425**
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** ... **p. 2438**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 p. 2735**
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 p. 2443**
M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 p. 2461
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** ... **p. 2450,2453-2455**
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** ... **p. 2449**
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** ... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** ... **p. 2725**
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** ... **p. 2466**
Piezo Technology Inc., Dept. EM, 2525 Shader Rd., Orlando, Fla. 32804 p. 2468,2469
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** ... **p. 2472,2474,2475**
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Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan .. *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** ... **p. 2483**
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M Blackhawk Networks Corp., Dept. EM, 14 N. Parker Dr., Janesville, Wisc. 53545
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Heath Dynamics, Rengency Elect. (Shepard Inds.), Dept. EM, 6050 N. 52 Ave., Glendale, Ariz. 85301
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can.
D Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019

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Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

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M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022** ... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 ... *
D **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577** ... *
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M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
AMF Inc., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450
M Amphenol Canada Ltd. Oper., Bunker Ramo Corp., Dept. EM, 44 Metropolitan Rd., Scarborough, (Ont.), Can.
D Audio-Vidio Engrg. Co., Dept. EM, 65 Nancy Blvd., Merrick, N.Y. 11566
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M DynaMagnetic Engrg, Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191
M Research Prods. Corp., Dept. EM, 1015 E Washington Ave., Madison, Wisc 53701
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
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M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
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M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** .... *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
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M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel; N.J. 07001
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
D Pulse Techniques, Inc., Dept. EM, 1411 Palisade Ave., Teaneck, N.J. 07666
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
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M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
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UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
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DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
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Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
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M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005** .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
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M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *

M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
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AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
Allison Labs., Inc., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
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M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
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D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
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D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
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D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
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M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
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D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
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DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
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M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
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Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767
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M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
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CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
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M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
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M DynaMagnetic Engrg, Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
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North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 ... *
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M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
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Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
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Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
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Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
Linear Networks Co., Dept. EM, Box 775, Westminster, Cal. 92683
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Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
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DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

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M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... ***
M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... ***
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M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
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M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... ***
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
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M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
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NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
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Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 .... *
D **Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 .... ***
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 p. 2760**
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TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 p. 2766-2768
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Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 p. 2773
M Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Burwen Lab. Inc., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Captor Corp., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Control Concepts Corp., Dept. EM, 333 Front St., Binghamton, N.Y. 13905
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342

Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M DynaMagnetic Engrg. Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
D Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
Linear Networks Co., Dept. EM, Box 775, Westminster, Cal. 92683
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd.; Portland, Ore. 97214
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

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A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *

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AMF Inc., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Pall Trinity Micro Corp., Dept. EM, Rte. 281, Cortland, N.Y. 13045
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan

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M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
M **Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
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D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Filters, Notch—See Filters, Band Elimination

Filters, Optical

Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
3M Co., Visual Prods./Indus. Optics, Dept. EM, 3M Center, Bldg. 220-10W, St. Paul, MN. 55101
Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
Schott Optical Glass Inc., Dept. EM, York Ave., Duryea, Pa. 18642
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

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Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 *
Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 p. 2495
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** *
D **AVX Ceramics, Dept. EM, Box 867, Myrtle Beach, S.C. 29577** *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** *
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** *
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** p. 2810
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Centralab/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Compac, Dept. EM, 222 Middle Country Rd., Smithown, N.Y. 11787 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** *
D **Corcom, Inc., Dept. EM, 2635 No. Kildare Ave., Chicago, Ill. 60639** *
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105** *
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M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 p. 2737
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663** *
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M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** *
Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 *
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M **Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076** *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** *
D **Soshin Elec. Co., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan** p. 1300
D **Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415** *
DM **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 *
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D **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 *
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
D **Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146** *
Active & Passive Components, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M DynaMagnetic Engrg, Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Elmag Corp., Dept. EM, 54 Clark St., Newark, N.J. 07104
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Gudeman Corp., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Industrial Condenser Corp., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
DM Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
M San Fernando Elec. Mfg., Dept. EM, 1501 1st St., San Fernando, Cal. 91341
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
DM Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
M Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086

DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
D TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Viclan Inc., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... **p. 2436**
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Hertz Filter, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
M **Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663** .. *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** .... **p. 2454**
Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
Piezo Technology Inc., Dept. EM, 2525 Shader Rd., Orlando, Fla. 32804 .... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** .... **p. 2474**
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... **p. 2746**
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Automatic Coil Corp., Sub. Designatronics Inc,, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Blackhawk Networks Corp., Dept. EM, 14 N. Parker Dr., Janesville, Wisc. 53545
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Heath Dynamics, Rengency Elect. (Shepard Inds.), Dept. EM, 6050 N. 52 Ave., Glendale, Ariz. 85301
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
D Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

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M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
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TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
M Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324

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Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .. **p. 2819**
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
D **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033** .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 **p. 2733**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
M **Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580** .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
M **RF Interonics, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706** .... **p. 2746**
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 *
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AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M Alpha Components, Inc., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
D De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
M Filtech Corp., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
Linear Networks Co., Dept. EM, Box 775, Westminster, Cal. 92683
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631

M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Piezo Crystal Co., Dept. EM, 100 "K" St., Carlisle, Pa. 17013
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
M Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
M Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

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D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2980**
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2819**
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .. p. 2728**
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
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Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
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M K R Electronics, Inc., Dept. EM, 91 Avenel St., Avenel, N.J. 07001
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M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
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Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan

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M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
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M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
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Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
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D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
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Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
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Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
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Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
Texscan Microwave, Dept. EM, 2446 N. Shadeland, Indianapolis, Ind. 46219
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Wavecom, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
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M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y, 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385**
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... ***
Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 p. 2735
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... p. 3534**
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... ***
D **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Amglo Corp., Dept. EM, 5301 Wesley Terr., Rosemont, Ill. 60018
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Betamite Electronic Dev., Dept. EM, 6321 W. Slauson Ave., Culver City, Cal. 90230
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
ECP Corp., Dept. EM, 4726 Superior Ave., Cleveland, Ohio 44103
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
D Hughey & Phillips, Inc., Dept. EM, 3050 N. California St., Burbank, Cal. 91505
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134
Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Flashlights & Lanterns

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power Conversion Inc., Dept. EM, 70 MacQuesten Pkwy. S., Mt. Vernon, N.Y. 10550
D Ray-O-Vac Div., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Flat Packages, Integrated Circuit—See Packages, Integrated Circuit

Fluid Flow Indicators—See Meters, Fluid Flow

Flux, Brazing & Soldering Materials

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
D Bow Solder Products, Dept. EM, P.O. Box 488, 900 Hobson St., Union, N.J. 07083
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
Chemetron Corp., Welding Prods., Dept. EM, 111 E. Wacker Dr., Chicago, Ill. 60601
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Federated Metals Corp., Dept. EM, 120 Broadway, New York, N.Y. 10005
D Gardiner Solder Co., Div. of Gardiner Metal Co., Dept. EM, 5207 Walnut St, Downers Grove, Ill 60515
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
DM Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
DM Kester Solder Div., Litton Systems Inc., Dept. EM, 4201 Wrightwood Ave., Chicago, Ill. 60639
Lake Chemical Co., Dept. EM, 250 N. Washtenaw Ave., Chicago, Ill. 60612
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590
NL Industries, Inc., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020
D Ruby Chemical Co., Dept. EM, Box 1108, Columbus, Ohio 43216
D Superior Flux & Mfg. Co., Dept. EM, 95 Alpha Park, Cleveland, Ohio 44143
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501

Foil, Capacitor

Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
Schweitzer, Div., Kimberly Clark Corp., Dept. EM, Lee, Mass. 01238
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Foil, Magnetic

M **Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 .... ***
M **Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124 .... ***
M **Eagle Magnetic Co., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224 .... p. 2664**
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 2672
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
D Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

Foil, Magnetic Shielding—See Shields, Magnetic

Forks, Tuning—See Tuning Forks

Forms, Coil—See Coil Assemblies & Forms

Forms, Wire

Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Associated Spring-Barnes Group Inc., Dept. EM, 18 Main St., Bristol, Conn. 06010
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
DM Helix Spring Corp., Dept. EM, 35-10 10th St., Long Island City, N.Y. 11106
ITT Jennings, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
M Templeman, D.R. Co., Dept. EM, 8 Park St., Plainville, Conn. 06062
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361

Frames, Cabinet & Rack

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... p. 1798**
Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207 *
Cabtron Sys., Inc., Dept. EM, 200 Anets Dr., Northbrook, Ill. 60062 .... *

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. *
Optima Enclosures, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084 .... *
D **Par-Metal Prods. Inc., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216 .. ***
Premier Metal Prods. Co., Div. Sunshine Mining Co., Dept. EM, 381 Canal Place, Bronx, N.Y. 10451 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
M Amco Engineering Co., Dept. EM, 7333 W. Ainslie St., Chicago, Ill. 60656
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
G. F. Business Equipment, Inc., Emcor Prods., Dept. EM, 1600 Fourth Ave. N.W., Rochester, Minn. 55901
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
MarkHon Industries Inc., Dept. EM, 200 Bond St., Wabash, Ind. 46992
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Overly-Hautz Co., Dept. EM, 8617 Clinton Rd., Cleveland, Ohio 44144
M Riester & Thesmacher Co., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130
D Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Standard Engineering, Dept. EM, 44800 Industrial Dr., Fremont, Cal. 94538
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Zero-East Div., Dept. EM, 288 Main St., Monson, Mass. 01057
Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

Freeze Spray—See Refrigerants, Spray; Coolants, Circuit & Component

Freezer Cabinets—See Refrigerators, Environmental Test

Frequency Analyzers—See Analyzers, Spectrum

Frequency Extenders—See Dividers, Frequency

Frequency Sources—See Oscillators

Function, Modules—See Modules, Logic

Furnaces, Electric

Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Acme Elec. Heating Corp., Dept. EM, 4685 E. 11th, Hialeah, Fla. 33013
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Casso-Solar Corp., Dept. EM, 125-10 Queens Blvd., Kew Gardens, N.Y. 11415
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Despatch Oven Co., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
DM L & L Special Furnace Co., Dept. EM, 166 Conchester Rd., Twin Oaks, Pa. 19016
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076

Furnaces, Gas (Production)

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Despatch Oven Co., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Watkins-Johnson Co., Production Equip., Dept. EM, 440 Mount Hermon Rd., Scotts Valley, Cal. 95060

Furnaces, Vacuum

M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
D Brew Richard D. & Co., Inc., Dept. EM, 90 Airport Rd., Concord, N.H. 03301
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
D Systems Furniture, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Furniture, Electronic Lab.—See Benches, Consoles, Stools, Tables (Lab & Shop)

Fuse Clips—See Clips & Holders, Fuse

Fuses

D **Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 .... ***
DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045 .... p. 3978-3980,3983**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... ***
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 4149**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
M Economy Fuse Div., Federal Pacific Elec. Co., Dept. EM, 2070 Maple St., Des Plaines, Ill. 60016
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Mepco/Electra Inc., Dept. EM, 11468 Sorrento Valley Rd., San Diego, Cal. 92121
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Panel Components Corp., Dept. EM, 2015 Second St., Berkeley, Cal. 94710
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Fuses, Failure Indicating

DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045 .... p. 3978-3980,3983**
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... p. 3868**
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Economy Fuse Div., Federal Pacific Elec. Co., Dept. EM, 2070 Maple St., Des Plaines, Ill. 60016
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Puleo Electronics, Inc., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Fuses, Thermal

DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045 .... ***
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 .... ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Fuses, Time Delay

DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045 .... p. 3979**
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
M Economy Fuse Div., Federal Pacific Elec. Co., Dept. EM, 2070 Maple St., Des Plaines, Ill. 60016
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Panel Components Corp., Dept. EM, 2015 Second St., Berkeley, Cal. 94710

M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Gages, Displacement, Linear

Marlow Industries, Inc., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041 *
M **Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
M Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Gages, Ionization

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Fredericks Co., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Gages, Pressure-Also See Transducers, Pressure

BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... **p. 2391**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... **p. 2890**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... **p. 2404**
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Airco Industrial Gases, Dept. EM, 575 Mountain Ave., Murray Hill, N.J. 07974
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
D Dynisco, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
MKS Instrs., Inc., Dept. EM, 22 Third Ave., Burlington, Mass. 01803
Owatonna Tool Co., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Setra Systems Inc., Dept. EM, 12 Huron Dr., Natick, Mass. 01760
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Gages, Strain

Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Micro-Measurements Div., Vishay Intertechnology, Inc., Dept. EM, Box 306, Romulus, Mich. 48174
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Gages, Tension

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
M Ametek, Inc, Hunter Spring Division, Dept. EM, 1 Spring Ave., Hatfield, Pa. 19440
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Gages, Vacuum

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D Fredericks Co., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
MKS Instrs., Inc., Dept. EM, 22 Third Ave., Burlington, Mass. 01803
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
D Setra Systems Inc., Dept. EM, 12 Huron Dr., Natick, Mass. 01760
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Vacuum Resch. Mfg., Dept. EM, 3100 Crow Canyon Rd., San Ramon, Cal. 94583
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Galvanometers—See Meters, Galvanometer

Gaskets—See Seals

Gaskets, Shielding, R-F-Also See Shields, R-F

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 **p. 2675**
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
Compac, Dept. EM, 222 Middle Country Rd., Smithown, N.Y. 11787 .... **p. 1821**
Instrument Specialties, Dept. EM, 276 Bergen Blvd., Little Falls, N.J. 07424 **p. 2666-2669**
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550** .... *
Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ...... **p. 2675**
Portescap US, Dept. EM, 730 Fifth Ave., New York, N.Y. 10019 .... **p. 3105**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106

M Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
Connecticut Hard Rubber Co., Dept. EM, 407 East St., New Haven, Conn. 06509
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
D Parker Hannifin Corp., O-Seal Div., Dept. EM, 10567 Jefferson Blvd., Culver City, Calif. 90230
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
DM Press-On Prods., Dept. EM, 1020 S. Westgate Dr., Addison, Ill. 60101
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016

Gates, Computer Circuit (AND, OR, NOR, ETC.)—See Cards, Logic; IC's, Logic Circuits

Gearheads & Speed Reducers

Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 ...... *
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** ...... *
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 ...... *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** ...... *
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120** *
Portescap US, Dept. EM, 730 Fifth Ave., New York, N.Y. 10019 ...... p. 3105
Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 ...... p. 3953
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ...... *
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424

Gears & Gear Mechanisms (Precision)

Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702 ...... p. 3082
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 ...... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** ...... *
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120** *
Portescap US, Dept. EM, 730 Fifth Ave., New York, N.Y. 10019 ...... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** ...... p. 3953
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M Instru-Lec Corp., Dept. EM, 520 Homestead Ave., Mt. Vernon, N.Y. 10550
Invincible Gear Co., Dept. EM, 14938 Telegraph Rd., Detroit, Mich. 48239
Kwikset Powdered Metal Prods., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749

Generators, A-M

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** ...... *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2812
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ...... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 ...... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ...... *
Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 ...... p. 1494
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 ...... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ...... *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .. p. 2894
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ...... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ...... p. 2897
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 ...... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** ...... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Clemens Mfg. Co., Dept. EM, 630 So. Berry Rd., St. Louis, Mo. 63122
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Generators, A-M/F-M

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ...... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 ...... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ...... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 ...... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .. p. 2894
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ...... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 ...... p. 2897,2898
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 ...... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 ...... *
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Generators, Audio

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** ...... *
Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** ...... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 ...... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** ...... *

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
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Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
D **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414** ...... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... p. 2946
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Generators, Bar, Dot & Crosshatch

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 p. 1458,1463
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Visual Information Institute Inc., Dept. EM, Box 33, Xenia, Ohio 45385

Generators, Character

Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Generators, Citizens Band

D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2897,2898
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107

Generators, Color Bar

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Generators, Digital Delay—See Generators Pulse

Generators, Electrical Power

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** p. 3260,3384
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... p. 3390
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
M Aircraft Appliances Eqpt, Dept. EM, 152 E Dr., Brmalea, Ont, Can.
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Columbia Electric Mfg. Co., Dept. EM, 4519 Hamilton Ave. N.W., Cleveland, Ohio 44114
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Onan Div-Onan Corp., Dept. EM, 1400 73rd Ave. N.E., Minneapolis, Minn. 55432
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247

Generators, F-M

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2812
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *

Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 **p. 2948**
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
M EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Generators, FM/Stereo

M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Generators, Function

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... **p. 2801**
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... **p. 2817**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... **p. 2848**
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... **p. 2860,2863**
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 **p. 2874,2875**
M **Kepco, Inc., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352** .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** **p. 2887**
M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... **p. 2946**
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** **p. 2948**
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D General Computers, Inc., Dept. EM, 5990 W. Pico Blvd., Los Angeles, Calif. 90035
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Shapiro Scientific Inst., Dept. EM, 3500 E. Coast Hwy., Corona del Mar, Cal. 92625
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Generators, Gating/Timing

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... **p. 3951**
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614** .... **p. 1689**
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
California Avionics Labs., Inc., Dept. EM, Box 701, Palo Alto, Calif. 94302
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Generators, Hall

M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735** .... *
M **Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229** .... *
M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Generators, Harmonic

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *

M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Generators, Infrared—See Lamps, Infrared

Generators, Low-Frequency

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 **p. 2790,2791**
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** **p. 3260,3384**
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 .... **p. 2988**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** .... *
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Taylor-Winfield Corp., Dept. EM, 1052 Mahoning Ave. NW, Warren, Ohio 44482
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

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Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

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Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... **p. 2997**
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 **p. 2986**
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Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058** .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
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Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803

Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

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Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 p. 2809
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Elgenco, Inc., Dept. EM, Box 460, Huricane, Utah 84737 .... p. 2842,2844-2846
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 p. 2734**
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M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sadelco, Inc. , Dept. EM, 299 Park Ave., Weehawken, NJ 07087
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

Generators, Phase

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 p. 2832**
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... p. 2849
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Generators, Pulse

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 p. 2986
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... p. 2822**
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 p. 2874,2875
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M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 .... p. 2991**
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2904
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 p. 2922
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 .... p. 2995**
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... p. 2946
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A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Chronetics, Inc., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
M Electronic Counters, Inc., Dept. EM, 240 Humphrey St., Englewood, N.J. 07631
Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
Kappa Scientific Corp., Dept. EM, Box 30585, Santa Barbara, Cal. 93105
DM Kurz-Kasch, Inc., Electronics Div., Dept. EM, 711 Hunter Rd, Wilmington, Ohio 45177
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
MetroTek, Inc., Dept. EM, Box 101, Richland, Wash. 99352
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM Nippon Pulse Motor Co., Ltd., Dept. EM, 13-16, 2-chome, Hongo, Bunkyo-ku, Tokyo 113 Japan
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181

Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

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M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134 .... ***
Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2801**
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... ***
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. p. 2894**
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Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850 .... ***
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M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Clemens Mfg. Co., Dept. EM, 630 So. Berry Rd., St. Louis, Mo. 63122
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Taylor-Winfield Corp., Dept. EM, 1052 Mahoning Ave. NW, Warren, Ohio 44482
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

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B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2801
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Interstate Electronics, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803 p. 2874
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Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Generators, Single-Sideband

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803 .. p. 2894**
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American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

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Generators, Square-Wave—See Generators, Function

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Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... p. 2872
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M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2884**
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2897,2899
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2930**
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
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M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 p. 2947,2948**
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Brookhaven Instrs. Corp., Dept. EM, Box 3136, Austin, Tex. 78764
Cal-Tek Engrg, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Generators, Time Code

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... p. 1487**
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2904
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... p. 1686-1689**
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AcroSys, Dept. EM, Box 687, Philomath, Ore. 97370
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Generators, Timing, Digital

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... ***
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... p. 1686-1689**
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
California Avionics Labs., Inc., Dept. EM, Box 701, Palo Alto, Calif. 94302
D CBS Laboratories, Dept. EM, High Ridge Rd., Stamford, Conn. 06905
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
M Jaesic Industries Co., Dept. EM, 29830 Beck, Wixom, Mich. 48096
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Terminal Data Corp. of Md, Dept. EM, 11878 Coakley Circle, Rockville, Md. 20852
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
D Biddle, James.G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
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Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716

DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051

D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725

Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066

Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797

M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518

T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759

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M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803

Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Generators, Tone-Burst

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *

Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *

Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 **p. 2948**

A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194

D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680

American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377

Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356

Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086

Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922

Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025

Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550

Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066

Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

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Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *

Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... **p. 2997**

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *

Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *

Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *

M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *

Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2897,2899**

M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... **p. 2988**

Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 **p. 2904**

Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *

Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... **p. 3059**

D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *

M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** .... *

M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107** *

M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086

D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735

Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748

M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303

M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354

D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857

Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207

Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086

D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791

Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304

Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044

Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803

D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659

Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan

M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055

Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306

Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006

Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862

Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Generators, Ultrasonic

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Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... *

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *

Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *

Rockland Sys. Corp., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994 .. *

Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002

Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130

D Bendix Corp., Instr. & Life Support Div., Dept. EM, 2734 Hickory Grove Rd., Davenport, Iowa 52808

Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484

Brinkmann Instrs., Inc., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590

Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174

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Fibra-Sonics ,Inc., Dept. EM, 4626 N. Lamon Ave., Chicago, Ill. 60630

Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103

MetroTek, Inc., Dept. EM, Box 101, Richland, Wash. 99352

Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154

Phillips Mfg. Co., National Ultrasonic Div., Dept. EM, 7334 N. Clark St., Chicago, Ill. 60626

Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101

Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

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Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Generators, Word

M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *

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M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701

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Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324

D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904

DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518

D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862

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Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

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Governors, Centrifugal

Synchro-Start Products, Inc., Dept. EM, Box 147, 8109 N. Lawndale Ave., Skokie, Ill. 60076

Torq Engineered Products, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146

Graphalloy Products

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D Pure Carbon Co., Inc., Dept. EM, 441 Hall Ave., St. Marys, Pa. 15857

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Stackpole Carbon Co., Carbon Div., Dept. EM, St. Marys, Pa. 15857

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D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Fourjay Industries, Dept. EM, Box 1465 Northridge Br., Dayton, Ohio 45414
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
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D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750

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Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
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M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243

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Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
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Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
National Metal Crafters Inc., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125
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M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
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Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
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D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
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Davies Molding Co., Harry, Dept. EM, 4920 Bloomingdale Ave., , Chicago, Ill. 60639
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
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Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
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Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
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M Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

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D Audio-Technica U.S., Inc., Dept. EM, 33 Shiawassee Ave., Fairlawn, Ohio 44313
DM Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
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GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
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M Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
D Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Aries Electronics, Dept. EM, Box 231, Frenchtown, N.J. 08825 .. p. 1790,1791
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Jolo Industries, Inc., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

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M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Nippert Co., Dept. EM, 825 Pittsburgh Dr., Delaware, Ohio 43015
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Headphones

Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281
Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420

Heads, Audio & Stereo (Recording, Playback & Erase)

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
M **International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115**
M **Lipps, Inc., Dept. EM, 1630 Euclid St., Santa Monica, Cal. 90404 p. 1116,1117**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Computer Products Int'l. Inc., Dept. EM, Box 1316, Sunnyvale, Cal. 94086
M Ferra Flux Corp., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Kwikset Powdered Metal Prods., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803
M Magnusonic Devices, Inc., Dept. EM, 290 Duffy Ave., Hicksville, N.Y. 11801
Michigan Magnetics, Dept. EM, 203 W. Third St., Vermontville, Mich 49096
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Norton Assocs., Inc., Dept. EM, 10 Di Tomas Ct., Copiague, N.Y. 11726
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Saki Magnetics Inc., Dept. EM, 1649 12th St., Santa Monica, Cal. 90404
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Heads, Data (Recording, Playback & Erase)

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
M **International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 ***
M **Lipps, Inc., Dept. EM, 1630 Euclid St., Santa Monica, Cal. 90404 p. 1116,1117**
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
American Magnetics Corp., Dept. EM, 2424 Carson St., Torrance, Cal. 90501
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Applied Magnetics Corp., Magnetic Head Div., Dept. EM, 75 Robin Hill Rd., Goleta, Calif. 93017
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Computer Products Int'l. Inc., Dept. EM, Box 1316, Sunnyvale, Cal. 94086
M Ferra Flux Corp., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
M Magnusonic Devices, Inc., Dept. EM, 290 Duffy Ave., Hicksville, N.Y. 11801
Michigan Magnetics, Dept. EM, 203 W. Third St., Vermontville, Mich 49096
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Norton Assocs., Inc., Dept. EM, 10 Di Tomas Ct., Copiague, N.Y. 11726
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
D Saki Magnetics Inc., Dept. EM, 1649 12th St., Santa Monica, Cal. 90404
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Western Magnetics, Inc., Dept. EM, 1733 Flower St., Glendale, Cal. 91201

Heads, Reflective

Lipps, Inc., Dept. EM, 1630 Euclid St., Santa Monica, Cal. 90404 p. 1116,1117
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683

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D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *
M **Lipps, Inc., Dept. EM, 1630 Euclid St., Santa Monica, Cal. 90404 p. 1116,1117**
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Applied Magnetics Corp., Magnetic Head Div., Dept. EM, 75 Robin Hill Rd., Goleta, Calif. 93017
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Computer Products Int'l. Inc., Dept. EM, Box 1316, Sunnyvale, Cal. 94086
M Ferra Flux Corp., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M Magnusonic Devices, Inc., Dept. EM, 290 Duffy Ave., Hicksville, N.Y. 11801
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Norton Assocs., Inc., Dept. EM, 10 Di Tomas Ct., Copiague, N.Y. 11726
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Saki Magnetics Inc., Dept. EM, 1649 12th St., Santa Monica, Cal. 90404
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Heat Dissipators—See Transistor, Diode, Thyristor, Heat Dissipators; Heat Sinks, Soldering

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Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Borg-Warner Thermoelectrics, Dept. Borg-Warner, Dept. EM, Wolf & Algonquin Rds., Des Plaines, Ill. 60018 .... p. 2688,2689,2691
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 p. 2986
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... p. 2695**
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... ***
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
M **Lytron, Inc., Dept. EM, 3 Dragon Ct., Woburn, Mass. 01801 .... p. 2697**
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... p. 2700,2702**
Rotron, Inc., Dept. EM, Hasbrouck La., Woodstock, N.Y. 12498 .... *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 .... *
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... ***
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 .... ***
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
AMF Inc., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450
D Astrodyne, Inc., Sub. Roanwell Corp., Dept. EM, 353 Middlesex Ave., Wilmington, Mass. 01887
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Corning Science Products, Corning Glass Works, Dept. EM, Corning, N.Y. 14830
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
M Kooltronic Inc., Dept. EM, Hamilton Ave., Hopewell, N.J. 08525
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
D Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
WEI Corp., Dept. EM, 1405 S. Village Way, Santa Ana, Cal. 92705

Heat Guns, Production

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Sigma Sys. Corp., Dept. EM, 3163 Adams Ave., San Diego, Calif. 92116 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D American Elec. Heater, Dept. EM, 6110 Cass Ave., Detroit, Mich. 48202
Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
M Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Clements National Co., Dept. EM, 6656 S. Narragansett Ave., Chicago, Ill. 60638
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
DM Commercial Elec. Heating Devices & Mfg., Inc., Dept. EM, 1008 E. Garvey Blvd., Monterey Park, Cal. 91754
Henes Products Corp., Dept. EM, 4301 E. Madison St., Phoenix, Ariz. 85034
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Master Appliance Corp., Dept. EM, 2420 18th St., Box 545, Racine, Wisc. 53403
Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
Penntube Plastics, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D UNGAR, Div., Eldon Inds., Inc., Dept. EM, 233 E. Manville St., Compton, Cal. 90220
D Wahl Clipper Corp., Dept. EM, 2902 Locust St., Sterling, Ill. 61081
Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501
WEI Corp., Dept. EM, 1405 S. Village Way, Santa Ana, Cal. 92705

Heat Shrinkable Elastomers, Plastics—See Caps, Forms & Tapes, Heat Shrinkable; Tubing, Heat Shrinkable

Heat Sinks—See Heat Sinks, Soldering; Transistor, Diode, Thyristor, Heat Dissipators

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D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
D **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... ***
Dressen-Barnes Electronics, Div. American Elctrns., Dept. EM, 1600 E. Valencia Dr., Fullerton, Cal. 92631 .... p. 3237,3239
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 .... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 p. 3919
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .. p. 3930
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 .... ***
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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
Fab-Tek Inc., Dept. EM, 17 Sugar Hollow Rd., Danbury, Conn. 06810
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
DM Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006

D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D South Shore Metal Prods., Inc., Dept. EM, 88 E Allen Blvd., Farmingdale, N.Y. 11735
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
D X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Heaters & Accessories, Induction

Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
Miller, Co. L.C., Dept. EM, 717 Monterey Pass Rd., Monterey Park, Cal. 91754
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
M Sierracin/Thermal Sys., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061
Taylor-Winfield Corp., Dept. EM, 1052 Mahoning Ave. NW, Warren, Ohio 44482
M Therm-O-Lab Corp., Dept. EM, 6940 Farmdale Ave., N. Hollywood, Cal. 91605
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Heaters & Heating Elements (For Components & Equipment) Also see Ovens

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406** *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... p. 2702
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400** .... *
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067** .... *
Acme Elec. Heating Corp., Dept. EM, 4685 E. 11th, Hialeah, Fla. 33013
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
M Armstrong Cork Co., Dept. EM, W. Liberty St., Lancaster, Pa. 17604
Casso-Solar Corp., Dept. EM, 125-10 Queens Blvd., Kew Gardens, N.Y. 11415
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Electrofilm, Inc., Dept. EM, 7116 Laurel Canyon Blvd., No. Hollywood, Cal. 91605
D General Electric, Ind'l Heating Business Dept, Dept. EM, 1 Progress Rd, Shelbyville, Ind. 46176
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
Micro Technical Industries, Dept. EM, 1999 S. Coast Hwy., Laguna Beach, Cal. 92651
M Minco Products Inc., Dept. EM, 7300 Commerce Lane, Minneapolis, Minn. 55432
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
DM Safeway Products, Dept. EM, 440 Middlefield St., Middletown, Conn. 06457
M Sierracin/Thermal Sys., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Sta-Warm Elec. Co., Dept. EM, 116 N. Chestnut St., Ravenna, Ohio 44266
M Therm-O-Lab Corp., Dept. EM, 6940 Farmdale Ave., N. Hollywood, Cal. 91605
Ultra Carbon Corp., Dept. EM, Box 747, Bay City, Mich. 48706
D Watlow Elec. Mfg. Co., Dept. EM, 12001 Lackland Rd., St. Louis, Mo. 63141
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Heaters, Immersion

D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Hermetic Sealing—See Machines, Hermetic Sealing; Seals, Hermetic; Services, Hermetic Sealing

Hinges—See Fasteners

Holders & Carriers, Chip (Capacitor, IC, LSI)

DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
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D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613

Holders & Carriers, IC, LSI (Packaged)

D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** .... *
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... *
Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 p. 2119
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
M GTI/Clover Div., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150
GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Metropolitan Wire Corp., Industrial Div., Dept. EM, Washington & George, Wilkes-Barre, Pa. 18705
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613

Holders, Battery—See Retainers, Battery; Connectors, Battery

Holders, Brush—See Brushes & Brush Assemblies

Holders, Circuit Board (Production Type)

D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
UNITRACK Div., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082 .... *
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Colbert Inds., PanaVise Div., Dept. EM, 10107 Adella Ave., South Gate, Cal 90280
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
D Metropolitan Wire Corp., Industrial Div., Dept. EM, Washington & George, Wilkes-Barre, Pa. 18705
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Parsons Mfg. Corp., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025
D Tech. Devices Co., Dept. EM, 11250 Playa Ct., Culver City, Calif. 90230
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Zeva Elec. Corp., Dept. EM, 3 Greatmeadow La., Hanover, N.J. 07936

Holders, Crystal

Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** p. 2119

M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078 p. 2460**
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2451,2452
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2472,2475**
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

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D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2059**
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***

Holders, Tube—See Retainers, Tube

Honeycomb Sheets, Panels, etc.

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 .. *
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... ***
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 .... ***
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
DM Met-L-Wood Corp., Dept. EM, 6755 65th St., Chicago, Ill. 60638
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Horns, Microwave-Also See Antennas, Microwave

AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Antennas for Communications, Inc., Dept. EM, Cordage Park, Plymouth, Mass. 02360
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Housings, Circuit Module—See Enclosures, Circuit Board, Module & Relay Mounting

Housings, Photomultiplier Tube—See Photomultiplier Tube Housings

Hybrid Voltage Regulators

DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
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M **Integrated Circuits, Inc., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005 .... p. 2982**
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 3056
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
M American Plasticraft Co., Dept. EM, 814 N. Sacramento Blvd., Chicago, Ill. 60622
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Custom Devices, Div. CTL, Inc., Dept. EM, 763 U.S. Hwy. 17-92, Fern Park, Fla. 32730
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
Micropac Industries, Inc., Dept. EM, 905 E. Walnut St., Garland, Tex. 75040
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Power Monolithics Inc., Dept. EM, 121 International Dr., Corpus Christi, Tex. 78410
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404

Hydrophones & Accessories

BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... p. 4343
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
M Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Hysteresisgraphs

D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Igniters, Arc Lamp—See Power Supplies For Arc Lamp

Image Expanders, Oscilloscope

M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Impedance Comparators—See Bridges, Impedance

Impedance Converters, Microwave

Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Incremental Magnetic Recorders—Recorders, Computer Data

Index Assemblies, Switch

Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Stacoswitch, Inc., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626

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Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1483
M **BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... ***
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1490**
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M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949**

Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 ..... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ..... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1660
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** ..... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** ..... *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4163
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** p. 1671
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** p. 1673,2915
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** p. 1685
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ..... *
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
M H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
M Pickering & Co., Meas. & Controls Div., Dept. EM, 101 Sunnyside Blvd., Plainview, N.Y. 11803
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Indicators, Antenna Position

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ..... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** ..... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** ..... *
Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304 ..... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** ..... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** ..... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** ..... *
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ..... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ..... *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** ..... *
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
D Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Indicators, Azimuth

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** ..... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ..... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** ..... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** ..... *
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M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** ..... *
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ..... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ..... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** ..... *
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Indicators, Capacitor Leakage—See Testers, Capacitor

Indicators, Circuit Condition, On, Off etc. (Electro-Mechanical)-Also see Indicators, Instrument, Flag, Pointer, etc.

Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 ..... p. 2567
Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 ..... *
DM **Bussmann Manufacturing, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045** ..... p. 3979,3980,3982,3983
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640** ..... *
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 ..... *
D **Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733** ..... *
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 ..... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343** *
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020** ..... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
M **Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787** ..... p. 2647-2649
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854** ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 ..... *
Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 ..... *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 ..... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** ..... *
DM **Unimax Switch Corp., Sub. Unimax Group, Inc., Dept. EM, Ives Rd., Wallingford, Conn. 06492** ..... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** ..... *
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Compu-Lite Corp., Dept. EM, 711 W. 17th St. #F12, Costa Mesa, Cal. 92627
M Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
Jay-El Prods., Dept. EM, 1859 W. 169th St., Gardena, Calif. 90247
Korry Mfg. Co., Dept. EM, 223 8th Ave. N., Seattle, Wash. 98109
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040

Media Recovery Inc., Dept. EM, Box 867, Graham, Tex. 76046
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
M Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
DM SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
D Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

Indicators, Computer Type & Data Display—See Lights, Dial, Panel pilot & Accessories, Display Devices; Displays

Indicators, Distortion—See Analyzers, A-F

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M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101 .... ***
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... p. 2407
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... p. 1487**
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Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753 .... ***
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 2395**
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D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... p. 2902**
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... ***
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... p. 2399**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Aero Instrument Facility, Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
D J-B-T Instrs., Inc., Dept. EM, Box 1818, New Haven, Conn. 06508
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
DM Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Indicators, Electromechanical—See Indicators, Circuit Condition, On / Off

Indicators, Frequency—See Meters, Frequency

Indicators, Humidity & Moisture (Electronic)

MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D American Instr. Co., Div. Travenol Labs. Inc., Dept. EM, 8030 Georgia Ave. - Dept. D16-2, Silver Spring, Md. 20910
D Bacharach Instrument Co., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
DM H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Inficon Inc., Inficon Leybold-Heraeus Inc., Dept. EM, 5 Adler Dr., E. Syracuse, N.Y. 13057
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Indicators, Illumination—See Meters, Light (Non Photographic)

Indicators, Instrument, Flag, Pointer, etc.

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... p. 2567
Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... p. 2839
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878,2879
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... p. 2647,2648**
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... p. 2399
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
Analytical Measurements, Dept. EM, 31 Willow St., Chatham, N.J. 07928
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Daco Instr. Co., Dept. EM, 30 Stran Rd., Milford, Conn. 06460
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Indicators, Linear Displacement

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***

D – Product sold through distributors M – Product meets MIL specs
* – Company has information in this edition but not on this product.

Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
D Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
D IMPACT-O-GRAPH Div., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Pickering & Co., Meas. & Controls Div., Dept. EM, 101 Sunnyside Blvd., Plainview, N.Y. 11803
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Indicators, Liquid Level

Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... **p. 4321**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Autocon.Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
Controlotron Corp., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704
D Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Johnson Corp., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
M Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Sonics, Inc., Dept. EM, P.O. Box 326, Lexington, Mass. 02173
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106
D Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Indicators, Magnetic Field

Allard Instr., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590 .... *
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Automation Inds., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal, 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Indicators, Noise-Figure—See Meters, Noise-Figure

Indicators, Null

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Dranetz Engrg. Labs,, Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... **p. 2865**
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... **p. 2878**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... *
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M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Indicators, Numeric Readout—See Display Devices & Displays; Tubes, Readout

Indicators, Positioning

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735** .... **p. 3951**

M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** .... *
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
M C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Dupree, Inc., Dept. EM, 9835 Dupree St., So. El Monte, Cal. 91733
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
M Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
D Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
Itek Corp. Meas. Sys. Div., Dept. EM, Christina St., Newton, Mass. 02161
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Indicators, Power Level—See Monitors, Power

Indicators, Pressure—See Gages, Pressure

Indicators, Proximity

D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735** .... *
Advance Instr. Corp., Dept. EM, 1707 F. St., Belmar, N. J. 07719
Automation Devices, Inc., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Controlotron Corp., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Fiber Photics, Inc., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D Gordon Engineering Corp., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Indicators, R-F—See Meters, Frequency

Indicators, Rotary Shaft Position—See Encoders, Shaft Angle

Indicators, Servo

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949**
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... p. 3951**
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
M Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
M Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Indicators, Shorted Turn—See Testers, Coil

Indicators, Sound Level—See Meters, Audio Level

Indicators, Speed

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... p. 2383
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** .... *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *

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Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
M Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
Electro-Devices, Inc., Dept. EM, 4-6 Godwin Ave., Paterson, N.J. 07509
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Indicators, Strain (For Use With Strain Gauges)

Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Indicators, Telemetering—See Analyzers, Telemetric Data

Indicators, Temperature—See Meters, Temperature

Indicators, Temperature (Non-Meter Type)

Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... ***
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
DM H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
M Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
D Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080

Indicators, Torque

Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
Tool Group Marketing Division, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Indicators, Transducer Output, Analog

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110

Indicators, Transducer Output, Digital

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676

Indicators, Transient Voltage

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
DM Ferranti-Packard, Ltd. Elec. Div., Dept. EM, 121 Industry St., Toronto, Can.M6M 4M3
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754

Indicators, Vacuum—See Gages, Vacuum

Indicators, VSWR—See Meters, Standing Wave Ratio

Inductance Comparators—See Bridges, Inductance

Inductance Standards—See Standards, Inductance

Induction Potentiometers—See Resolvers, Synchro

Inductors—See Coils

Inks For Thick Film Microcircuits

Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Epoxy Technology, Dept. EM, 65 Grove St., Watertown, Mass. 02172

Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746

Insertion Loss Measurement Systems

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Inserts—See Bushings, etc.

Instrument Parts, Precision—See Bearings; Gears & Gear Mechanisms, Springs; etc.

Insulation Materials

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4615
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4641
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
DM **Humiseal Div., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377** .... *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
D **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440** .... p. 2977
DM **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Armstrong Cork Co., Dept. EM, W. Liberty St., Lancaster, Pa. 17604
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
M Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
Bird, Richard H. & Co., Inc., Dept. EM, 1 Spruce St., Waltham, Mass. 02154
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
M Cleveland Mica Co., Dept. EM, 1360 Hird Ave., Lakewood, Ohio 44107
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
DM Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Diamonite Products Div., Dept. EM, Box 567, Shreve, Ohio 44676
Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
M Fibre Materials Corp., Dept. EM, 34 Dupont St., Plainview, N.Y. 11803
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
Glastic Corp., Dept. EM, 4321 Glenridge Rd., Cleveland, Ohio 44121
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM. 555 Harbor Blvd., Belmont, Cal. 94002
DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
Industrial Mica Div., Columbia Chase Corp., Dept. EM, 223 S. Van Brunt St., Englewood, N.J. 07631
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mobay Chem. Corporation, Dept. EM, Pittsburgh, Pa. 15205
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Nat'l Ceramic Co., Dept. EM, 500 Southard St., Trenton, N.J. 08602
Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Rogers Corp., Dept. EM, Rogers, Conn. 06263
Rostone Corp., Dept. EM, 2781 S. Concord Rd., Lafayette, Ind. 47902
Schweitzer, Div., Kimberly Clark Corp., Dept. EM, Lee, Mass. 01238
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
Tellite Corp., Dept. EM, 17 Lenox Rd., Summit, N.J. 07901
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Insulation Parts, Fabricated

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** .... p. 2774
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** .... *
DM **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** .... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .. p. 1836
D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033 p. 4669
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... *
D **Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605** .... *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... p. 2679
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2168,2182
Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... *
Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 .... *
D **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440** .... p. 2977
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Akron Porcelain Co., Dept. EM, 2719 Cory Ave., Akron, Ohio 44314
M Atlantic Optical Moulding Co., Dept. EM, Ellis St., Dudley, Mass. 01570
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
M Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
D Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
M Cleveland Mica Co., Dept. EM, 1360 Hird Ave., Lakewood, Ohio 44107
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
M Comco Plastics, Inc., Dept. EM, 98-36 C. Jamaica Ave., Richmond Hill, N.Y. 11418
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Diamonite Products Div., Dept. EM, Box 567, Shreve, Ohio 44676
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Fibre Materials Corp., Dept. EM, 34 Dupont St., Plainview, N.Y. 11803
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
Garner Glass Co., Dept. EM, 177 S. Indian Hill Blvd., Claremont, Calif. 91711
Industrial Mica Div., Columbia Chase Corp., Dept. EM, 223 S. Van Brunt St., Englewood, N.J. 07631
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Nat'l Ceramic Co., Dept. EM, 500 Southard St., Trenton, N.J. 08602
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Quartzite Processing, Inc., Dept. EM, 6 Holyoke St., Malden, Mass. 02148
Rostone Corp., Dept. EM, 2781 S. Concord Rd., Lafayette, Ind. 47902
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
M Star Porcelain Co., Dept. EM, 71 Muirhead Ave., Box 1267, Trenton, N.J. 08638
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
TOR Corporation, Dept. EM, 14715 Arminta St., Van Nuys, Cal. 91402
Tran-Tec Corporation, Dept. EM, Box 1022, Columbus, Neb. 68601
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243

D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Insulators, Antenna

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Lapp Insulator Div., Interpace Corp., Radio Specialties, Dept. EM, 350 Sumner St., LeRoy, N.Y. 14482
DM Nat'l Ceramic Co., Dept. EM, 500 Southard St., Trenton, N.J. 08602
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
M Star Porcelain Co., Dept. EM, 71 Muirhead Ave., Box 1267, Trenton, N.J. 08638
Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601

Insulators, Bushing (Metallized)—See Bushings, etc.

Insulators, Clip, Test & Battery

D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
DM **Mueller Electric Co., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan

Integrated Circuit Packaging Systems

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... *
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** ...... **p. 1123**
D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852** ...... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... **p. 1538**
Dynatech Corp., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702 **p. 1833**
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... *
M Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
DM Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

IC's, Active Filters

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Non Linear Filters, Dept. EM, Box 338, Trumbull, Conn. 06611
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Adders, Full, Half, Modulo-2 Also see IC's, Arithmetric Logic Units

D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Amplifiers, Audio

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038** .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Modular Devices, Inc., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Amplifiers, Current

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

IC's, Amplifiers, Instrumentation

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
M Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Amplifiers, Logarithmic

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729

DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

IC's, Amplifiers, Operational

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
DM Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D Opamp Labs, Inc., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
EEP Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Amplifiers, Operational, Micropower

DM Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123

DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Amplifiers, Opto-Electronic

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Integrated Photomatrix, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Amplifiers, R-F

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

IC's, Amplifiers, Sample-And-Hold—See IC's, Sample And-Hold Circuits

IC's, Amplifiers, Sense Also see IC's, Comparators, Analog

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260** .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon Systems Inc., Dept. EM, 2913 Daimler St., Santa Ana, Cal. 92705
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's AND, AND-OR-Invert Gates—See IC's Logic Circuits

IC's, Arithmetic Logic Units (ALU) Also see IC's, Adders, Full, Half, Module

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *

DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
M Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Breadboard Circuits

D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... *
Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
M Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Buffers—See IC's, Logic Circuits

IC's, Bus Drivers—See IC's, Data Bus Drivers

IC's, Calculator Kits

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
M Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803

D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

IC's, Central Processing Units (CPU)

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Character Generators, Dot-Matrix

D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Chroma Amplifiers Demodulators, Signal Processors

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Clock Drivers

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2427
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
Electronic Laboratory Supply, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Code Converters—See IC's, Encoders & Decoders

IC's, Communications Circuits

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

IC's, Comparators, Analog Also see IC's, Amplifiers, Sense

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014

D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Comparators, Digital

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Converters, Analog-To-Digital

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *

M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981

D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Converters, Binary To Binary Code Decimal— See IC's, Encoders & Decoders

IC's, Converters, Digital-To-Analog

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *

M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
M RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Converters, Voltage-To-Frequency

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Counters and Adapters

E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086

D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Current Regulators

DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Data Bus Drivers

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
M Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, D-C Amplifiers

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Decoders, Decoder/Drivers (All Types)—See IC's, Encoders & Decoders

IC's, Demultiplexers—See IC's, Multiplexers

IC's, Differential Amplifiers—See IC's, Amplifiers, Operational

IC's, Diode Matrices

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... p. 1122
M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Discriminators, F-M—See IC's, Television, A-M/F-M Sound Circuits

IC's, Display Drivers, 7-Segment, 9-Segment NIXIE, Etc

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746

McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Encoders & Decoders

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Exclusive OR Gates—See IC's, Logic Circuits

IC's, Expanders—See IC's, Logic Circuits

IC's, Flip-Flops J-K, R-S, R-S-T, Type D, Pulse Triggered, Etc—See IC's, Logic Circuits

IC's, Four-Quadrant Multipliers—See IC's, Multipliers, Analog

IC's, Frequency Dividers—See IC's, Counters & Adapters

IC's, Frequency-Shift Keyers

Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086

IC's, Frequency Synthesizers

DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Function Generators

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Energy Elctrn. Products Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Gates—See IC's, Logic Circuits

IC's, Hexidecimal Counters—See IC's, Counters & Adapters

IC's, High-Voltage (200 V & Over)

M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042

IC's, Intermediate-Frequency Amplifiers—See IC's, Amplifiers, Radio-Frequency

IC's, Inverters—See IC's, Logic Circuits

IC's, Keyboard Encoders—See IC's, Encoders & Decoders

IC's, Lamp Drivers—See IC's, Logic Circuits; IC's, Display Drivers

IC's, Latch—See IC's, Logic Circuits

IC's, Level Shifters, Translators—See IC's, Logic Circuits

IC's, Line Drivers/Receivers & Line Drivers/Transmitters

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... p. 2984
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Energy Elctrn. Products Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Linear Multipliers—See IC's, Multipliers, Analog

IC's, Logic Circuits

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 2413
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... p. 2432,2433
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802 .... *
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... p. 2462
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017 .... p. 2476
D Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
D Beckman Instrs., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electronic Laboratory Supply, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Memories

D General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802 .... *
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Advanced Memory Sys., Inc., Dept. EM, 1275 Hammerwood Ave., Sunnyvale, Cal. 94086
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
Electronic Laboratory Supply, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119
DM Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

IC's, Memory & Logic Array, Programmable

Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086

IC's, Microprocessors

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
Energy Elctrn. Products Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
RCA Solid State Div., Micro Processors, Dept. EM, Route 202, Somerville, N.J. 08876
M Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
M Scientific Micro Sys., Dept. EM, 520 Clyde St., Mountain View, Cal. 94043
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

IC's, Mixers—See IC's, Communications, Circuits

IC's, Modulator/Demodulators, Balanced

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Integrated Microsystems Inc., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Multiplexers, Analog

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Multiplexers, Digital

D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Multipliers, Analog

M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Multivibrators

D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *

DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
M RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, NAND, NOR & OR/NOR gates—See IC's, Logic Circuits

IC's, Oscillators

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
D **Motorola, Inc., Compt. Prods. Clock Oscillator Dept., Dept. EM, 2553 N. Edgington, Franklin Park, Ill. 60131** .... *
Motorola, Inc. Component Prods., Piezo-Ceramic Speaker Dept., Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 .... *
Motorola, Inc. Component Prods., Quartz Time Piece, Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** .... *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Parity Generator/Checkers

DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Phase Lock Loop Circuits

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Power Amplifiers (1 W Minimum)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... **p. 2984**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Energy Elctrn. Products Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Power Gates—See IC's, Logic Circuits

IC's, Pulse Shapers—See IC's, Multivibrators

IC's, Receiver/Transmitter, Asynchronous

D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... **p. 2984**
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

IC's, Receivers, A-M, F-M

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... p. 2984
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ....** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Receivers, Teletype

Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051

IC's, Relay Drivers—See IC's, Logic Circuits

IC's, Sample-And-Hold Circuits

M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ....** *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Schmitt Triggers—See IC's Logic Circuits

IC's, Shift Registers, Static or Dynamic

D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802 ....** *
DM Advanced Micro Devices, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
Electronic Arrays, Dept. EM, 550 Middlefield Rd., Mountain View, Cal. 94043
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
McGuirk Electronics Co. Inc., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
M Ragen Semiconductor, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Subtractors—See IC's, Logic Circuits

IC's, Switches, Analog

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 .... p. 3001
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 p. 3149
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 ....** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
M Collins Radio Group, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Instrument Corp., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876
D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Television, A-M/F-M Sound Circuits

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2427
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... p. 2984
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ....** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

IC's, Three-State Logic (TSL)

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042

DM Harris Semiconductor, Dept. EM, Box 883, Melbourne, Fla. 32901
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222

IC's, Timers

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D **General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802** .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... p. 3535,3536
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
Interdesign Inc., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Mostek Corp., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
DM Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

IC's, Transducer, Pressure

D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051

IC's, Transistor Arrays

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802 .... p. 3864,3865
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
DM American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222

IC's, Translators, ECL to TTL, ECL to MOS, etc.

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
DM ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222

IC's, Transmitters, Teletype

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042

IC's, Video Amplifiers—See IC's, Amplifiers, Radio-Frequency

IC's, Voltage Regulators

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Energy Elctrn. Products Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
M Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave.; Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Micro Networks, Dept. EM, 324 Clark St., Worcester, Mass. 01606
Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Power Monolithics Inc., Dept. EM, 121 International Dr., Corpus Christi, Tex. 78410
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
D SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Signetics Corp., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

IC's, Wareform Generators—See IC's, Function Generators

IC's, Wideband Amplifiers—See IC's, Amplifiers, Radio Frequency

IC's, Zero-Voltage Switches

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D Exar Integrated Systems, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
DM RCA Solid State Div., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

Integrators, Electronic

Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1460
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Curtis Instrs., Inc., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549 .. p. 2821
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *

M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... ***
Plessey Electro-Products, Dept. EM, 3860 Centinela Ave., Los Angeles, Cal. 90066 .... p. 2401
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 3128
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Brookhaven Instrs. Corp., Dept. EM, Box 3136, Austin, Tex. 78764
D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
East Controls Co., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
Fogg System Co., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
Laboratory Data Control, Div. M. Roy Corp., Dept. EM, Box 10235, Riviera Beach, Fla. 33404
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Integrators, Mechanical & Electro-Mechanical

M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 3128**
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Intensifiers, Image

A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Varo Electron Devices, Inc., Dept. EM, 2203 W. Walnut St., Garland, Tex. 75040
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Intercom Systems - Also see Comm. Systems, Selective Paging

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
D Aiphone USA, Dept. EM, 2116 N. Pacific Ave., Seattle, Wash. 98103
Alaun Engrg., Dept. EM, 515 South Palm, Alhambra, Cal 91803
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Communications Equipment Co., Dept. EM, Box 700, Glen Arbor, Mich. 49636
D Communications Equipment Co., Inc., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Encom Prods. Co., Inc., Dept. EM, Lower Hopewell Rd., Box 300, Oxford, Pa. 19363
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
D Talk-A-Phone Co., Dept. EM, 5013 No. Kedzie Ave., Chicago, Ill. 60625
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Interferometer Systems

Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Intervalometers—See Timers

Inverters, A-C to D-C—See Power Supplies, A-C to D-C

Inverters, D-C to A-C—See Power Supplies, A-C Output

Isolators, D-C/D-C Signal

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 p. 3148
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

Isolators, Ferrite

Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... *
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Isolators, Line

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 ... ***
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 ... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 ... *
Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 ... *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 p. 3260,3384**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ... ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ... ***
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 ... *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705

Isolators, Microwave (All Types)

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ... p. 2057,2058
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 p. 3148
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 ... p. 2484**
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
M Cir-Q-Tel, Inc., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Isolators, Opto

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
D **Clairex Elctrns. Inc., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550 p. 3134**
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ... p. 1538
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 ... p. 3138
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ... ***
DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 ... p. 3139-3146**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 p. 3148
D **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 p. 3152,3153**
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optics Technology, Dept. EM, 1902 McGaw Ave., Irvine, Cal. 92714
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Quantrol Elect. Inc., Dept. EM, 1820 Mills Ave., El Paso, Tex. 79901
D Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008

Isolators, Source—See Isolators, Line

Jack Adapters (All Types)

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ... ***
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ... p. 2047,2057,2061-2064,2067**
D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 ... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ... ***
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 ... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2144,2162**
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 ... ***
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
DM Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Jack Covers

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 ... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ... *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 ... ***
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 ... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 ... ***
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247

Jack Panel Assemblies & Accessories—See Panels, Jack

Jacks (All Types)

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 ... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ... p. 1705
DM **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 ... ***
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 ... *
D **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012 ... p. 1822**
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 ... ***
D **Eby Company, Dept. EM, 4701 Germantown, Philadelphia, Pa. 19144 ... ***
DM **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .. p. 1836**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1962-1964, Inside Back Cover,
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 p. 2041, 2042, 2046-2049, 2051-2053, 2057, 2058, 2061-2064, 2066, 2067-2069**

Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093 p. 2114,2776,2777**
D **Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 .... p. 1844,1845**
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... p. 2130,2131
DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 2134,2135**
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D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 ....: ***
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DM Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
DM ADC Prods., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
DM Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
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D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Jolo Industries, Inc., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
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S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
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Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
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M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
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Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
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M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Ultra Carbon Corp., Dept. EM, Box 747, Bay City, Mich. 48706
D Western Coil & Elec. Co., Dept. EM, 215 State St., Racine, Wisc. 53403

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Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
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M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... ***
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DM T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031

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M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
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DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D CES Elctrns., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
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Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
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San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
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D British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
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Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
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Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081

Kits, Cable-End Sealing

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*** – Company has information in this edition but not on this product.**

LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
M Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
Tra-Con, Inc., Dept. EM, 55 North St., Medford, Mass. 02155

Kits, Connector

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 **p. 4533**
D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
Elfab Corp., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001 ...... p. 1838
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1979, Inside Back Cover,
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630** .... *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2377**
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Kits, Marking (Dial, Instrument, Equipment, etc.)

D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 p. 1397,2528**
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
M Ackerman Gould Co., Inc., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
Chartpak, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053
Eastern Marking Machine Corp., Dept. EM, 30 Alabama Ave., Island Park, N.Y. 11558
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
Lectroetch, Dept. EM, 14925 Elderwood Ave., E. Cleveland, Ohio 44112
Matthews & Co., Jas. H., Marking Systems Div., Dept. EM, 6515 Penn. Ave., Pittsburgh, Pa. 15206
Metron Optics, Dept. EM, P.O. Box 690, Solana Beach, Cal. 92075
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Kits, Potentiometer, Rheostat

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... *
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078

Kits, Power Supply

E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Semiconductor Circuits, Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830 *
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902

Kits, Printed Circuit

Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... p. 1394-1396
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... p. 1399
Elfab Corp., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001 ...... p. 1838
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... p. 2480
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
D Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
D Circuit-Stik, Inc., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
DM Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
M SGL Printed Circuits, Div. SGL Inds., Inc., Dept. EM, 827 Black Oak Ridge Rd., Wayne, N.J. 07470
D Techniques, Inc., Dept. EM, 235 Jackson St., Englewood, N.J. 07631

Kits, Programming Board

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
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Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .. p. 1397
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... p. 1399
Elfab Corp., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001 ...... p. 1838
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368** .... *
M **LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354** .... *

Kits, Shielding

Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 .... *
Instrument Specialties, Dept. EM, 276 Bergen Blvd., Little Falls, N.J. 07424 *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... p. 2679**
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** .... *
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... p. 1401
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
DM Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Kits, Switch Assembling

Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... p. 3999
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630** .... *
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648

Kits, Terminal

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412

D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610

Kits, Test Equipment

D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... ***
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... ***
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... p. 4335**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
A E Corp., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194
Analytical Measurements, Dept. EM, 31 Willow St., Chatham, N.J. 07928
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Bacharach Instrument Co., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Warwick Prods Co., Dept. EM, 7909 Rockside Rd., Independence, Ohio 44131

Kits, Training Aid

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... p. 1396**
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Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Chartpak, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053
Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Scientific Measurements, Dept. EM, 1319 Dobson, Evanston, Ill. 60202
D Tab Books, Dept. EM, Monterey & Pinola Aves., Blue Ridge Summit, Pa. 17214
Worner Elctrn. Devices, Dept. EM, 121 N. Main St., Rankin, Ill. 60960

Knives & Knife Sets

D **Channellock, Inc., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335 .... p. 4327**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
American Safety Razor, Dept. EM, P.O. Box 500, Staunton, Va. 24401
Chartpak, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Uber Grafic Instrs., Dept. EM, Box 4, Palo Alto, Cal. 94302
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Knobs, All Types

ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... p. 2526
Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207 p. 2527
Electronic Hardware Corp., Dept. EM, 320 Broad Hollow Rd., Farmingdale, N.Y. 11735 .... p. 2529
IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 p. 4096
Interlok, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... p. 2530-2532
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2534,2545-2547,2549
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DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 2557-2565**
D **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... p. 2551-2554
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DM Davies Molding Co., Harry, Dept. EM, 4920 Bloomingdale Ave., , Chicago, Ill. 60639
D Douglas-Workman Elctrns Corp., Dept. EM, Box 15577, Ft. Lauderdale, Fla. 33318
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Radial Controls, Dept. EM, 2555 E. 55th Place, Indianapolis, Ind. 46220
Spec Plastics Inc., Dept. EM, 7224 Atoll Ave., No. Hollywood, Cal. 91605

Knobs, Limit Stop

Electronic Hardware Corp., Dept. EM, 320 Broad Hollow Rd., Farmingdale, N.Y. 11735 .... p. 2529
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2548**
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... p. 2550
D **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***
M Radial Controls, Dept. EM, 2555 E. 55th Place, Indianapolis, Ind. 46220
DM Rogan Corp., Dept. EM, 3455 Woodhead Dr., Northbrook, Ill. 60062

Knobs, Locking, Control Shaft

Electronic Hardware Corp., Dept. EM, 320 Broad Hollow Rd., Farmingdale, N.Y. 11735 .... p. 2529
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... p. 2550
DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 2557,2560-2566**
D **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
M Dupree, Inc., Dept. EM, 9835 Dupree St., So. El Monte, Cal. 91733
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
M Radial Controls, Dept. EM, 2555 E. 55th Place, Indianapolis, Ind. 46220
D Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791

Knobs, Slip Clutch

Electronic Hardware Corp., Dept. EM, 320 Broad Hollow Rd., Farmingdale, N.Y. 11735 .... p. 2529
DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... p. 2550
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***
M Radial Controls, Dept. EM, 2555 E. 55th Place, Indianapolis, Ind. 46220

Knobs, Torque, Incremental, Ratio Drive

DM **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... p. 2550
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***
DM Rogan Corp., Dept. EM, 3455 Woodhead Dr., Northbrook, Ill. 60062

Labels, Pressure-Sensitive, Adhesive

D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 .... ***
Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2587
Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
M Althor Prods., Dept. EM, 202 Bay 46th St., Brooklyn, N.Y. 11214
M Anodyne Inc., Dept. EM, 1270 N.W. 165th St., N. Miami Beach, Fla. 33169
D Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
D Decalcraft Corp., Dept. EM, Rte. 309, Hatfield, Pa. 19440
D Labelon Corp., Dept. EM, 10 Chapin St., Canandaigua, N.Y. 14424
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
M Markem Corp., Dept. EM, 1000 Congress St., Keene, NH 03431
DM Metalphoto Corp., Dept. EM, 18531 South Miles Rd., Cleveland, Ohio 44128

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M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Stanpat Products Inc., Dept. EM, 366 Main St., Port Washington, N.Y. 11050
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
Topflight Corp., Dept. EM, 160 East 9th Ave., York, Pa. 17404
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020

Labels, Temperature Indicating

Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
Ashley-Butler, Inc., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876
Camwil Inc., Dept. EM, 835 Keeaumoku, Honolulu, Haw. 96814
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
Vari-Light Corp., Sub. Polacoat Inc., Dept. EM, 9770 Conklin Rd., Cincinnati, Ohio 45242

Laboratories, Testing—See Services, Electrical Measurement & Test

Lacing, Cable—See Cords & Tapes, Lacing

Laminates, Metal Clad (Including Copper)

DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
Alinabal, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460
Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
M Atlantic Laminates, Dept. EM, 174 N. Main St., Franklin, N.H. 03235
Cincinnati Dev. & Mfg. Co., Dept. EM, 5614 Wooster Pike, Cincinnati, Ohio 45227
Cincinnati Milacron, Molded Plastics Division, Dept. EM, P.O. Box 246, Blanchester, Ohio 45107
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
DM General Elec. Co., Laminated & Insulating Matls. Bus. Dep., Dept. EM, Coshocton, Ohio 43812
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
D Injectorall Elctrns. Corp., Dept. EM, 98-100 Glen St., Glen Cove, N.Y. 11542
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
DM Met-L-Wood Corp., Dept. EM, 6755 65th St., Chicago, Ill. 60638
M Mica Corporation, Dept. EM, 10900 Washington Blvd., P.O. Box 2578, Culver City, Calif. 90230
D New England Laminates Co., Inc., Dept. EM, 25 Crescent St., Glenbrook, Conn. 06906
DM Norplex Div., Universal Oil Products, Dept. EM, Norplex Dr., LaCrosse, Wisc. 54601
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Rogers Corp., Dept. EM, Rogers, Conn. 06263
Sheldahl, Inc., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
M Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
Tech Materials Inc., Dept. EM, 5 Wellington Rd., Lincoln, R.I. 02865
M Tellite Corp., Dept. EM, 17 Lenox Rd., Summit, N.J. 07901
D Thiokol Chemical Div., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607

Laminates, Plastic Impregnated (Unclad)

Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2587
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 .... ***
M Atlantic Laminates, Dept. EM, 174 N. Main St., Franklin, N.H. 03235
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Cincinnati Dev. & Mfg. Co., Dept. EM, 5614 Wooster Pike, Cincinnati, Ohio 45227
Cincinnati Milacron, Molded Plastics Division, Dept. EM, P.O. Box 246, Blanchester, Ohio 45107
D Comco Plastics, Inc., Dept. EM, 98-36 C. Jamaica Ave., Richmond Hill, N.Y. 11418
Fibre Materials Corp., Dept. EM, 34 Dupont St., Plainview, N.Y. 11803
M General Elec. Co., Laminated & Insulating Matls. Bus. Dep., Dept. EM, Coshocton, Ohio 43812
D Glastic Corp., Dept. EM, 4321 Glenridge Rd., Cleveland, Ohio 44121
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
M Mica Corporation, Dept. EM, 10900 Washington Blvd., P.O. Box 2578, Culver City, Calif. 90230
Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
D New England Laminates Co., Inc., Dept. EM, 25 Crescent St., Glenbrook, Conn. 06906
DM Norplex Div., Universal Oil Products, Dept. EM, Norplex Dr., LaCrosse, Wisc. 54601
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Rogers Corp., Dept. EM, Rogers, Conn. 06263
Sheldahl, Inc., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
M Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
D Thiokol Chemical Div., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Laminates, Plastic (With Integral Heating Elements)

M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Sheldahl, Inc., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Laminations, Magnetic Recording Head

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
American Chemical Etching, Inc., Dept. EM, 13730 Desmond St., Pacoima, , Cal. 91331
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901

Laminations, Transformer & Inductor

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Alinabal, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460
M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206

Lamp Adapters

D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... ***
Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2586
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... p. 4292
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Int'l. Prods. Inc., Dept. EM, Box 405, Atchison, Kans. 66002
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Lamp Assembly Color Filters, Lens Mountable

APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... *
Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... *
Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 2623
Leecraft Mfg. Co., Inc., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101 .... p. 2641
Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 .... *
Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014

Lamp Drivers

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
D **Hamai Electric Lamp Co., Ltd., Dept. EM, 9-26, Kasuga 1-chome, Bunkyo-Ku, Tokyo, Japan 112 .... ***
Industrial Devices, Dept. EM, Edgewater, N.J. 07020 .... *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
Data Display Products, Dept. EM, Box 91072, Los Angeles, Cal. 90009
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134

Lamp Holders—See Sockets, Lamp & Lamp Assemblies

Lamps, Arc

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003

Lamps, Dial, Panel, Pilot Incandescent & Accessories

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603** .... p. 2568,2569,3977
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640** .... p. 2576,2579,2580,2582
Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .. p. 4003
Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 4012
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237** .... p. 2584,2585
Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2586
D **Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM **GTE Sylvania Inc., Miniature Lighting Prods., Dept. EM, W. Main St., Hillsboro, N.H. 03244** .... p. 2589-2591
DM **Hamai Electric Lamp Co., Ltd., Dept. EM, 9-26, Kasuga 1-chome, Bunkyo-Ku, Tokyo, Japan 112** .... *
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343** *
DM **Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711** ...... p. 2595-2613,2618-2635,4100,4110-4113,4118,4127
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020** .... p. 2636,2637
DM **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405** p. 2638
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
DM **Leecraft Mfg. Co., Inc., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101** .... p. 2641
Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 .... *
Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 2644,2645
M **LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354** .... p. 4151
DM **Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627** p. 4152
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4164,4165
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 p. 4204
D **Oshino Electric Lamp Works, Ltd, Dept. EM, 2-5-2, Minami-Shinagawa, Shinagawa-Ku, Tokyo, Japan** .... p. 2651
D **Oslo Controls, Dept. EM, 417 Washington St., New Haven, Conn. 06473** .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... p. 2653
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Sloan Company, Dept. EM, 7704 San Fernando Rd., Sun Valley, Cal. 91352** p. 2654-2657
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2184,2185,2190
Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 .... p. 2658,2659
Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 p. 4278,4287,4291,4293
Wilbrecht Electronics, Inc., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107 p. 2642,2643
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Cogenel, Inc., Entrelec Div., Dept. EM, 101 Executive Blvd., Elmsford, N.Y. 10523
DM Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Data Display Products, Dept. EM, Box 91072, Los Angeles, Cal. 90009
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
DM Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
D Int'l. Prods. Inc., Dept. EM, Box 405, Atchison, Kans. 66002
D JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
DM Ledco Div., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Penn Keystone Corp., Dept. EM, Division St., Ansonia, Conn. 06401
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
M Precision Lamp, Inc., Dept. EM, 950 N. Rengstorff Ave., Mountain View, Cal. 94043
DM Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Lamps, Edge Lighting, Panel

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... p. 3137
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 2629-2634
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2184,2185
Wilbrecht Electronics, Inc., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107 p. 2642,2643
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042

Lamps, Electroluminescent—See Panels

Lamps, Exciter, Photographic

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Gilway Technical Lamp, Dept. EM, 272 New Boston Park, Woburn, Mass. 01801
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003
Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Lamps, Flashtube

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M Amglo Corp., Dept. EM, 5301 Wesley Terr., Rosemont, Ill. 60018
DM Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
General Electric Co., Miniature Lamp Dept., Dept. EM, Nela Park, Clevland, Ohio 44112
DM Kemlite Labs., Inc., Dept. EM, 1819 W. Grand Ave., Chicago, Ill. 60622
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Voltarc Tubes, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430
Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Lamps, Indicator—See Lamps, Dial, Panel, Pilot, Incandescent, & Accessories

Lamps, Glow—See Lamps, Neon

Lamps, Infrared

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
Canrad-Hanovia, Inc., Dept. EM, 100 Chestnut St., Newark, N.J. 07105
D Casso-Solar Corp., Dept. EM, 125-10 Queens Blvd., Kew Gardens, N.Y. 11415
Fusion Systems Corp., Dept. EM, 11810 Parklawn Dr., Rockville, Md. 20852
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304

D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
OAL Assocs., Inc., Dept. EM, P.O. Box 64, Escondido, Cal. 92025
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Western Coil & Elec. Co., Dept. EM, 215 State St., Racine, Wisc. 53403
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003

Lamps, Magnifying, Inspection

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Luxo Lamp Corp., Dept. EM, Monument Park, Port Chester, N.Y. 10573
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153

Lamps, Mercury Vapor

Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Canrad-Hanovia, Inc., Dept. EM, 100 Chestnut St., Newark, N.J. 07105
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Fusion Systems Corp., Dept. EM, 11810 Parklawn Dr., Rockville, Md. 20852
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
D Illumination Industries, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086
D Ionics, Inc., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
D Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Voltarc Tubes, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003

Lamps, Miniature & Subminiature

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... ***
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D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... ***
D **Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM **GTE Sylvania Inc., Miniature Lighting Prods., Dept. EM, W. Main St., Hillsboro, N.H. 03244 .... ***
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D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 ***
DM **Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 ...... p. 2601,2605-2607,2609,2610,2614-2616,2628-2634**
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020 .... ***
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D **Sloan Company, Dept. EM, 7704 San Fernando Rd., Sun Valley, Cal. 91352 ***
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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Data Display Products, Dept. EM, Box 91072, Los Angeles, Cal. 90009
Dupree, Inc., Dept. EM, 9835 Dupree St., So. El Monte, Cal. 91733
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D General Electric Co., Miniature Lamp Dept., Dept. EM, Nela Park, Clevland, Ohio 44112
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
DM Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gilway Technical Lamp, Dept. EM, 272 New Boston Park, Woburn, Mass. 01801
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
D Int'l. Prods. Inc., Dept. EM, Box 405, Atchison, Kans. 66002
DM JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D Ledco Div., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107
M Lenox Instr. Co., Dept. EM, 121 E. Luray St., Philadelphia, Pa. 19120
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Panel Components Corp., Dept. EM, 2015 Second St., Berkeley, Cal. 94710
M Precision Lamp, Inc., Dept. EM, 950 N. Rengstorff Ave., Mountain View, Cal. 94043
M Radatron Corp., Dept. EM, 2424 Niagara Falls Blvd., N. Tonawanda, NY 14120
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
DM Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Tensor Corp., Dept. EM, 333 Stanley Ave., Brooklyn, NY 11207
D Titan Tool Supply Co., Inc., Dept. EM, 68 Comet, Buffalo, N.Y. 14216
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Lamps, Neon

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... p. 2569**
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D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 ***
D **Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 2595,2597,2599,2613-2617,2628,4127**
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M **LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... ***
Oshino Electric Lamp Works, Ltd, Dept. EM, 2-5-2, Minami-Shinagawa, Shinagawa-Ku, Tokyo, Japan .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2184,2185
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D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Data Display Products, Dept. EM, Box 91072, Los Angeles, Cal. 90009
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
DM Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Glowlite Corp., Sub. ELT, Inc., Dept. EM, Pauls Valley, Okla. 73075
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
D Int'l. Prods. Inc., Dept. EM, Box 405, Atchison, Kans. 66002
DM JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
DM Kemlite Labs., Inc., Dept. EM, 1819 W. Grand Ave., Chicago, Ill. 60622
D Ledco Div., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Oneida Electronics Mfg., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Panel Components Corp., Dept. EM, 2015 Second St., Berkeley, Cal. 94710
Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714

SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Signalite Div., Gen. Instr., Dept. EM, 1933 Heck Ave., Neptune, N.J. 07753
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
Voltarc Tubes, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Lamps, Oil Tight

DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 2607
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216

Lamps, Placard—See Lamps, Dial, Panel, Pilot, Incandescent, & Accessories

Lamps, Press-to-Test

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 p. 2603-2606, 2608-2612, 2618, 2619, 2621, 4100, 4101, 4110-4113, 4118
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216

Lamps, Projection

D **Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 .... ***
Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 2644
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
Canrad-Hanovia, Inc., Dept. EM, 100 Chestnut St., Newark, N.J. 07105
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D General Electric Co., Miniature Lamp Dept., Dept. EM, Nela Park, Clevland, Ohio 44112
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gilway Technical Lamp, Dept. EM, 272 New Boston Park, Woburn, Mass. 01801
D Illumination Industries, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Precision Lamp, Inc., Dept. EM, 950 N. Rengstorff Ave., Mountain View, Cal. 94043
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003

Lamps, Solid State-Also see Diodes, Light-Emitting

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... ***
DM **Chicago Miniature/Drake, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640 .... ***
D **Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... ***
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
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D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020 .... p. 2637**
DM **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 ***
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D **Sloan Company, Dept. EM, 7704 San Fernando Rd., Sun Valley, Cal. 91352 p. 2656,2657**
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... p. 4281
Data Display Products, Dept. EM, Box 91072, Los Angeles, Cal. 90009
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
DM Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
D Ledco Div., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D OPCOA, Div. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

D Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705

Lamps, Stroboscopic Source

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... p. 2928
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Lamps, Tungsten Halogen

Leecraft Mfg. Co., Inc., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
D General Electric Co., Miniature Lamp Dept., Dept. EM, Nela Park, Clevland, Ohio 44112
Gilway Technical Lamp, Dept. EM, 272 New Boston Park, Woburn, Mass. 01801
JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Lamps, Ultraviolet

Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 .... *
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
Canrad-Hanovia, Inc., Dept. EM, 100 Chestnut St., Newark, N.J. 07105
Fusion Systems Corp., Dept. EM, 11810 Parklawn Dr., Rockville, Md. 20852
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D Illumination Industries, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086
DM Kemlite Labs., Inc., Dept. EM, 1819 W. Grand Ave., Chicago, Ill. 60622
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Voltarc Tubes, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430
D Western Coil & Elec. Co., Dept. EM, 215 State St., Racine, Wisc. 53403
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003
Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Lamps, Xenon

D **Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 .... ***
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Atlas Electric Devices, Dept. EM, 4114 N. Ravenswood Ave., Chicago, Ill. 60613
M Canrad-Hanovia, Inc., Dept. EM, 100 Chestnut St., Newark, N.J. 07105
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
D Illumination Industries, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086
D Ionics, Inc., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172
JKL Components Corp., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064
DM Kemlite Labs., Inc., Dept. EM, 1819 W. Grand Ave., Chicago, Ill. 60622
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D North American Philips Lighting Corp., Dept. EM, Bank St., Hightstown, N.J. 08520
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Spectrolab, Inc., Dept. EM, 12500 Gladstone Ave., Sylmar, Cal. 91342
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Voltarc Tubes, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Laser Crystal & Rods

Cleveland Crystals, Inc., Dept. EM, Box 17157, Euclid, Ohio 44117

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666

Lasers & Laser Systems

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Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
D Apollo Lasers Inc., Dept. EM, 6357 Arizona Cir., Los Angeles, Cal. 90045
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Holex Corp, Dept. EM, 2544 W. Main St., Norristown, Pa. 19401
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM International Laser Sys., Inc., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Laser Systems Corp., Dept. EM, 117 N. First St., Ann Arbor, Mich. 48108
Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
D Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
D Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
D Raytheon Co., Spec. Microwave & Device Oper., Dept. EM, 130 Second Ave., Waltham, Mass. 02154
RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Systems Instrs. Resch., Inc., Dept. EM, 331 Luckie St., N.W., Atlanta, Ga. 30313
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Thermal Amer. Fused Quartz, Dept. EM; Change Bridge Rd., Montville, N.J. 07045
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123

Lasers, Instrumentation

Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043

Lead Assemblies & Receptacles, High Voltage-Also See Connectors; Cable Assemblies & Harnesses

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... ***
Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2039
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2155-2159
Accurate Electronics Corp.; Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
M Aircraft & Elex Spcltys, Dept. EM, Box 126, Plainfield, Ind 46168
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
Dielectric Sciences, Dept. EM, 5 South Ave., Burlington, Mass 01803
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Excel Specialty Corp., Dept. EM, 6335 N. Broadway, Chicago, Ill. 60660
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York; N.Y. 10016
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Reynolds Inds., Inc., Dept. EM, Box 1170, Marina Del Rey, Cal. 90291
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021

Leads, Test & Adaptors

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4618**
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... ***
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ....p. 2059,2065,2079,2094,2095,2097,2098,2100,2103**
D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2155-2159**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 p. 2932,2939
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
California Avionics Labs., Inc., Dept. EM, Box 701, Palo Alto, Calif. 94302
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Desco Mfg. Co., Dept. EM, 1530 Flower St., Glendale, Cal. 91201
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Excel Specialty Corp., Dept. EM, 6335 N. Broadway; Chicago, Ill. 60660
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

LED's—See Diodes, Light-Emitting (LED's)

Lenses, Filters, Windows, Infrared

Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Cleveland Crystals, Inc., Dept. EM, Box 17157, Euclid, Ohio 44117
FJW Industries, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056
Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
Schott Optical Glass Inc., Dept. EM, York Ave., Duryea, Pa. 18642
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Lenses, Optical & Camera

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
AGFA-Gevaert, Inc., Dept. EM, 275 North St., Teterboro, N.J. 07608
D Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
DM CAI, Div. Bourns Inc., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
M Cosmicar Lens Div., Asahi Precision Co., Ltd., Dept. EM, 424 Higashi Oizumi, Nerima-Ku, Tokyo, Japan
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
FJW Industries, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
General Electrodynamics Corp., Dept. EM, 4430 Forest La., Garland, Tex. 75040
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022

- D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
- Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
- Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
- Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
- M Lenox Instr. Co., Dept. EM, 121 E. Luray St., Philadelphia, Pa. 19120
- 3M Co., Visual Prods./Indus. Optics, Dept. EM, 3M Center, Bldg. 220-10W, St. Paul, MN. 55101
- Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
- Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
- D Nikon, Inc., Instr. Div. Ehrenreich Photo-Optical Ind., Dept. EM, 623 Stewart Ave., Garden City, N.Y. 11530
- D Olympus Corp. America, Dept. EM, Two Nevada Dr., New Hyde Park, N.Y. 11040
- M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
- D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
- D Rank Precision Inds., Dept. EM, 411 Jarvis Ave., Des Plaines, Ill. 60018
- M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
- Schott Optical Glass Inc., Dept. EM, York Ave., Duryea, Pa. 18642
- Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
- Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
- Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018
- Zoomar, Inc., Dept. EM, 55 Sea Cliff Ave., Glen Cove, N.Y. 11542

Lenses, R-F

- Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006

Lenses, Readout & Display

- **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 4005,4014**
- **Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... ***
- **Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733 .... p. 4069**
- **Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 4108,4109**
- D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020 .... ***
- M **Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 ***
- **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4173**
- **Sloan Company, Dept. EM, 7704 San Fernando Rd., Sun Valley, Cal. 91352 p. 2654-2657**
- **Sorenson Lighted Controls, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110 .... ***
- Atlantic Optical Moulding Co., Dept. EM, Ellis St., Dudley, Mass. 01570
- Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
- Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
- M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
- Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
- 3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
- Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
- Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
- M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
- D NOBEX Div., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010
- Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
- Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
- Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
- SGL Graphics, Div. of SGL Inds., Inc., Dept. EM, John Fitch Industrial Park, Warminster, Pa. 18974
- D Shelly Assocs., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714

Light Choppers

- **Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... ***
- **Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... ***
- M **Philamon, Inc., Dept. EM, 33 Dubon Ct., Farmingdale, N.Y. 11735 .... p. 2467**
- American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
- Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
- D General Scanning, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172
- Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
- Infrared Industries, Inc., Dept. EM, 62 Fourth Ave., Waltham, Mass. 02154
- M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901

Light Sources, Photoelectric

- D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
- **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 ***
- D Autotron, Inc., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832
- D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
- Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
- Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
- D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
- FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
- Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
- Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
- D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
- Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
- D Photo Research Corp., Division Kollmorgen Corp., Dept. EM, 3000 N. Hollywood Way, Burbank, Cal. 91505
- Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
- M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
- Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
- Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
- Tri-Tronics Co. Inc., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521
- Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Light Sources, Stroboscopic—See Lights, Stroboscopic, Source

Lighting Equipment, Emergency

- **Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... ***
- **Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 .... ***
- D Bodine Co., Dept. EM, 236 Mt. Pleasant Rd., Collierville, Tenn. 38017
- D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
- D Hollingsworth Co., John R., Dept. EM, Nutt & French Creek Rds., Phoenixville, Pa. 19460
- D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
- D New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
- Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
- TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
- D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
- Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
- D Tripp-Lite, Dept. EM, 133 N. Jefferson, Chicago, Ill. 60606
- Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Limit Stops—See Knobs, Limit Stop

Limit Stops, Mechanical

- D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2535**
- M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... ***
- **Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... ***
- D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... ***
- Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
- Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
- M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
- Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
- M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
- Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
- D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105

Limiters, Current

- **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... ***
- M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
- D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... ***
- M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... ***
- **Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... ***
- **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... p. 4320**
- D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
- Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
- Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
- Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
- Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
- Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
- D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Limiters, Microwave

- M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
- M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
- **Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006**
- M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
- AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
- M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
- M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
- Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
- Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
- M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
- Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
- Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
- Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Limiters, Surge

Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754

Line Strechers, Microwave

M Arra Inc., Antenna & Radome Resch/ Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Liners, Tube Shield—See Shields, Tube

Loads, Electronic, Variable-Also See Dummy Loads

ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Electronautics, Dept. Dielectric Comm., Dept. EM, Newtown Rd., Littleton, Mass. 01460
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
D Sotcher Measurement, Inc., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Locators, Open-Short

M Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2181
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803

Locks, Dial & Shaft

Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
D Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2538
DM Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. *
D Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... *
D Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2181
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
DM Aimsco Inc., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
Kwikset Powdered Metal Prods., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Logic Cards (without Components)—See Boards, Plug-In

Logic Circuits—See Cards, Logic; IC's, Logic Circuits; Modules, Logic

Loudspeakers—See Speakers

Louvers, Vents, & Windows (For Equipment)—See Cabinets & Accessories, Metal

Lubricants

D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... p. 1388
M General Devices Co., Inc., Dept. EM, Box 19188, Indianapolis, Ind. 46219 .. *
Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Chemtronics, Inc., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electrofilm, Inc., Dept. EM, 7116 Laurel Canyon Blvd., No. Hollywood, Cal. 91605
Elctrn. Chemical Corp., Dept. EM, 813 Communipaw Ave., Jersey City, N.J. 07304
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
DM LPS Research Labs, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Metron Optics, Dept. EM, P.O. Box 690, Solana Beach, Cal. 92075
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
M Nye, William F., Inc., Dept. EM, P.O. Box G-927, New Bedford, Mass. 02742
D Pennwalt Corp., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102
D Quietrole Co., Dept. EM, 395 St. John, Spartenburg, S.C. 29302
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
DM Tech Spray, Inc., Dept. EM, Box 949, Amarillo, Tex. 79105
Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Lugs, Terminal—See Terminals, Lug

LVDT's—See Transducers, Displacement

Machines & Accessories, Semiconductor Manufacturing

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *

M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
M Amersil, Inc., Dept. EM, 650 Jernees Mill Rd., Sayreville, NJ 08872
Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Dix Engrg. Div., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626
Ewald Instrs. Corp., Dept. EM, Rte. 7R, Kent, Conn. 06757
Excellon Micronetics, Dept. EM, 2675 Skypark Dr. #204, Torrance, Cal. 90505
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
M Hoffman Co., P. R., Div. of Aiken Inds., Inc., Dept. EM, 321 Cherry St., Carlisle, Pa. 17013
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
J & S Tool Co., Inc., Dept. EM, 70 Okner Pkwy., Livingston, N.J. 07039
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif 91604
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
Red Point Corp., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922
Siltec Corp., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
DM Systonics, Inc., Dept. EM, Box 121, Winchester, Mass. 01890
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159

Machines & Tools, Crimping—See Tools, Crimping & Swaging

Machines, Cleaning & Degreasing - Also see Cleaners, Ultrasonic

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484
D Chemcut Corp., Dept. EM, 500 Science Pk., State College, Pa. 16801
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
DM Cobehn, Inc., Dept. EM, 226 Passaic Ave., Fairfield, N.J. 07006
M Cyclo-Tronics, Inc., Dept. EM, 3858 N. Cicero Ave., Chicago, Ill. 60641
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Headway Research, Inc., Dept. EM, 3713 Forest La., Garland, Tex. 75042
D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
Inland Mfg. Co., Dept. EM, 1108 Jackson St., Omaha, Neb. 68102
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
L & R Mfg., Dept. EM, 577 Elm St., Kearny, N.J. 07032
D London Chemical Co., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Odell Co., M. P., Dept. EM, 26612 Center Ridge Rd., Cleveland, Ohio 44145
Phillips Mfg. Co., National Ultrasonic Div., Dept. EM, 7334 N. Clark St., Chicago, Ill. 60626
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Static Inc., Dept. EM, Box 414, Lee, Mass. 01238
Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
D Tronic Corp., Dept. EM, Box 247-E, Belmont, Cal. 94002
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103

Machines, Coil-Winding

M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230** .... *
D Coil Winding Equip. Co., Dept. EM, Railroad Plaza, Oyster Bay, N.Y. 11771
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Eubanks Engrg., Dept. EM, 1307 So. Myrtle Ave., Monrovia, Calif. 91016
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
D Possis Corp., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Stevens, Geo. Mfg. Co., Dept. EM, 6001 N. Keystone Ave., Lincolnwood, Ill. 60646
D Universal Mfg. Co., Inc., Dept. EM, 1168 Grove St., Irvington, N.J. 07111

Machines, Component Handling, Feeding, Insertion & Sorting

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... **p. 1802,1806**
Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... *
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
A. M. W. Corp., Dept. EM, 78 Bow, Arlington, Mass. 02174
Automation Devices, Inc., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Conforming Matrix Corp., Dept. EM, Box 5126, Pt. Pl. Sta., Toledo, Ohio 43611
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Dix Engrg. Div., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Excellon Micronetics, Dept. EM, 2675 Skypark Dr. #204, Torrance, Cal. 90505
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
DM Gluco, Inc., Dept. EM, Box 336, Monroeville, Pa. 15146
Goodrich Div., Conrac Corp., Dept. EM, 3560 Chicago Dr., Hudsonville, Mich. 49426
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
M IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
M Penn Engrg. & Mfg. Corp., Dept. EM, Doylestown, Pa. 18901
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
D Ramsey Engineering, Dept. EM, 1853 W. County Rd. C, St. Paul, Minn. 55113
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Synergistic Products, Sub. Cavitron Corp., Dept. EM, 1902 McGraw Ave., Irvine, Cal. 92705
Tridak, Inc., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
Universal Instruments Corp., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902

Machines, Hermetic Sealing

Associate General Labs., Inc., Dept. EM, 8934 W. Ogden Ave., Brookfield, Ill. 60513
Dix Engrg. Div., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034

Machines, Induction Heating (Electronic)

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Machines, Lead Cutting & Forming

Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
Harwil Co., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404
Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Pentronix Div., Dept. EM, 1737 Cicotte, Lincoln Park, Mich. 48146
Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
Tech. Devices Co., Dept. EM, 11250 Playa Ct., Culver City, Calif. 90230
Universal Instruments Corp., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902

Machines, Marking & Numbering

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... *

M Ackerman Gould Co., Inc., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572
Acromark Co., Dept. EM, 60 Locust/Dept. 397, Berkeley Hts., N.J. 07922
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
Conrac Corp., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
Dix Engrg. Div., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626
Eastern Marking Machine Corp., Dept. EM, 30 Alabama Ave., Island Park, N.Y. 11558
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
M Kingsley Mach. Co., Aero-Space Div., Dept. EM, 850 Cahuenga Blvd., Hollywood, Calif. 90038
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Lectroetch, Dept. EM, 14925 Elderwood Ave., E. Cleveland, Ohio 44112
M Markem Corp., Dept. EM, l000 Congress St., Keene, NH 03431
Matthews & Co., Jas. H., Marking Systems Div., Dept. EM, 6515 Penn. Ave., Pittsburgh, Pa. 15206
DM Metalphoto Corp., Dept. EM, 18531 South Miles Rd., Cleveland, Ohio 44128
M Monarch Marking Sys., Dept. EM, Box 608, Dayton, Ohio 45401
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Universal Instruments Corp., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902

Machines, Mask Alignment & Exposure

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
M E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Grover Photo Prods., Dept. EM, 341 Arden Ave., Glendale, Cal. 91203
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922
Webtek Corp., Dept. EM, 4326 W. Pico Blvd., Los Angeles, Cal. 90019

Machines, Metallizing, Vacuum—See Deposition Equipment, Vacuum & Accessories

Machines, Plastic Molding

Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109 .... *
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
D Di-Acro, Div. Houdaille Inds., Inc., Dept. EM, 316 8th Ave., Lake City, Minn. 55041
DM Gluco, Inc., Dept. EM, Box 336, Monroeville, Pa. 15146
H.P.M. Div., Koehring Co., Dept. EM, Marion Rd., Mt. Gilead, Ohio 43338
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
Wabash Metal Prods., Dept. EM, 1569 Morris St., Wabash, Ind. 46992

Machines, Plating

D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
Auric Corp., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
HBS Equipment Div., Dept. EM, 3000 Supply Ave., Los Angeles, Calif. 90040
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Metal Fabricators, Inc., Dept. EM, Box 1946, Greenville, S.C. 29602
D Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
M Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901

Machines, Printed Circuit Drilling, Etching & Punching

Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... **p. 1802**
Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 **p. 1840**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Chemcut Corp., Dept. EM, 500 Science Pk., State College, Pa. 16801
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
M Cyclo-Tronics, Inc., Dept. EM, 3858 N. Cicero Ave., Chicago, Ill. 60641
D Di-Acro, Div. Houdaille Inds., Inc., Dept. EM, 316 8th Ave., Lake City, Minn. 55041
DM High Speed Hammer Co., Inc., Dept. EM, 313 Norton St., Rochester, N.Y. 14621
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Metal Fabricators, Inc., Dept. EM, Box 1946, Greenville, S.C. 29602
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D Synergistic Products, Sub. Cavitron Corp., Dept. EM, 1902 McGraw Ave., Irvine, Cal. 92705
Universal Instruments Corp., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902

Machines, Spinner, Photo-Resist

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Headway Research, Inc., Dept. EM, 3713 Forest La., Garland, Tex. 75042
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
Macronetics, Dept. EM, 570 Maude Ct., Sunnyvale, Cal. 94086
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034

Machines, Terminal Installing

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... *
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 **p. 1817**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
M AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
Artos Engrg. Co., Dept. EM, 15600 W. Lincoln Ave., New Berlin, Wisc. 53151
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
DM Gluco, Inc., Dept. EM, Box 336, Monroeville, Pa. 15146
Goodrich Div., Conrac Corp., Dept. EM, 3560 Chicago Dr., Hudsonville, Mich. 49426
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Machines, Transistor Assembling

M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Dix Engrg. Div., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626
Excellon Micronetics, Dept. EM, 2675 Skypark Dr. #204, Torrance, Cal. 90505
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034

Machines, Ultrasonic Bonding

GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D Sonobond Corp., Sub. Christiana Metals Corp., Dept. EM, 200 E. Rosedale Ave., West Chester, Pa. 19380
Ultrasonic Instrs. Int'l., Inc., Dept. EM, 165 EM Marine St., Farmingdale, N.Y. 11735
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Machines, Vibration Fatigue Testing—See Testers, Vibration

Machines, Wafer Alignment—See Machines, Mask Alignment & Exposure

Machines, Wire Marking, Hand & Automatic

Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 **p. 1817**
Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 **p. 1840**
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... *
M Ackerman Gould Co., Inc., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572
Acromark Co., Dept. EM, 60 Locust/Dept. 397, Berkeley Hts., N.J. 07922
Artos Engrg. Co., Dept. EM, 15600 W. Lincoln Ave., New Berlin, Wisc. 53151
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
Conrac Corp., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
M Markem Corp., Dept. EM, l000 Congress St., Keene, NH 03431
Nat'l. Band & Tag, Dept. EM, 721 York St., Newport, Ky. 41072
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Machines, Wire Measuring & Cutting

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... p. 1705
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 p. 1817
Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... p. 1839
Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 p. 1840
ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2029
Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
M Ackerman Gould Co., Inc., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572
Artos Engrg. Co., Dept. EM, 15600 W. Lincoln Ave., New Berlin, Wisc. 53151
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
Conrac Corp., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Eubanks Engrg., Dept. EM, 1307 So. Myrtle Ave., Monrovia, Calif. 91016
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
D Hykon Mfg. Co., Dept. EM, 163 E. State St., Box 923, Alliance, Ohio 44601
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Universal Instruments Corp., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902
Western Electronic Prods. Co., Dept. EM, 107 Los Molinos, San Clemente, Cal. 92672

Machines, Wire Wrapping-See Tools, Wire Wrapping

Magnetizers

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 p. 4338
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
Indiana General/Div. Emm Corp., Magnet Prods., Dept. EM, 405 Elm St., Valparaiso, Ind. 46383
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
DM Stearns Magnetics Inc., Sub. Magnetics Int'l., Dept. EM, 6001 S. General Ave., Cudahy, Wisc. 53110
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Magnetodiodes—See Magnetoresistors, Hall

Magnetometers

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Automation Inds., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
M Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Schonstedt Instr. Co., Dept. EM, 1775 Wiehle Ave., Reston, Va. 22090
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Magnetoresistors, Hall

M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Superior Mfg. & Instrument Corp.; Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105

Magnetrons—See Tubes, Magnetron

Magnets, Focusing—See Magnets, Permanent

Magnets (Lab. Type)

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... ***
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Colt Industries, Crucible Magnetics Div., Dept. EM, Box 100, Elizabethtown, Ky. 42701
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Magnets, Permanent

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Arnold Engineering Co., Dept. EM, Box "G", Marengo, Ill. 60152
M Barker Elec. Sls., Dept. EM, Box 405, Ship Bottom, NJ 08008
Bunting Magnetics Co., Dept. EM, 2100 Estes Ave., Elk Grove Village, Ill. 60007
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
D Colt Industries, Crucible Magnetics Div., Dept. EM, Box 100, Elizabethtown, Ky. 42701
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y, 14445
Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
General Magnetic Co., Dept. EM, 10001 Erwin Ave., Detroit, Mich. 48234
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Hudson Magnetic Corp., Dept. EM, 62 Water St., Ossining, N.Y. 10562
D Indiana General/Div. Emm Corp., Magnet Prods., Dept. EM, 405 Elm St., Valparaiso, Ind. 46383
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
D Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
Ogallala Elctrns., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
M Permanent Magnet Co., Dept. EM, 4437 Bragdon St., Indianapolis, Ind. 46226
R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
Rol-a-chart Div., Wm. A. Steward Co., Dept. EM, Box 367, Diamond Springs, Cal. 95619
Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Stackpole Carbon Company/Permanent Ceramic Magnets & Magnetizable Powder, Magnet Div., Dept. EM, Kane, Pa. 16735
DM Stearns Magnetics Inc., Sub. Magnetics Int'l., Dept. EM, 6001 S. General Ave., Cudahy, Wisc. 53110
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Magnets, Superconducting

Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 .... p. 4357
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
American Magnetics, Dept. EM, Box R, Oak Ridge, Tenn. 37830
D Colt Industries, Crucible Magnetics Div., Dept. EM, Box 100, Elizabethtown, Ky. 42701
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
Permag Corp., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Magnifying Glasses, Inspection

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Bausch & Lomb, S.O.P.D. Div, Dept. EM, 1400 N. Goodman St., Rochester, N.Y. 14602
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Markers, Dry Transfer—See Kits, Marking

Markers, Identification—See Labels; Nameplates

Markers, R-F—See Generators, Marker

Markers, Terminal—See Kits, Marking, etc.

Markers, Wire, Tab & Sleeve—See Wire Markers

Masers

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634

Mask Alignment & Exposure Systems—See Machines, Mask Alignment & Exposure

Masts, Antenna—See Antenna Towers & Supports

Materials, Graphite

Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
Stackpole Carbon Co., Carbon Div., Dept. EM, St. Marys, Pa. 15857
Ultra Carbon Corp., Dept. EM, Box 747, Bay City, Mich. 48706

Materials, Magnetic—See Shields, Magnetic

Materials, Self-Lubricating

Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D Pure Carbon Co., Inc., Dept. EM, 441 Hall Ave., St. Marys, Pa. 15857
Rogers Corp., Dept. EM, Rogers, Conn. 06263
D Thiokol Chemical Div., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607

Matrices, Computer-Also See Boards, Programming

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... p. 2789
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... ***
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... p. 4129
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... p. 1659
Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... p. 4132
M **LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... p. 4150**
Mac Panel Co., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 .... p. 3585
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... p. 2363**
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311

Memories, Buffer

M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
American Astrionics, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626
M Fabri-Tek, Inc., Computer Systems Div., Dept. EM, 5901 S. County Rd. 18, Minneapolis, Minn. 55436
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
D Western Digital Corp., Dept. EM, 3128 Red Hill Ave., Newport Beach, Cal. 92663

Memory Systems, Core

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Control Data Corp., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Dataproducts Corp., Dept. EM, 6219 DeSoto Ave., Woodland Hills, Cal. 91365
Dataram Corp., Dept. EM, Princeton-Highstown Rd., Cranbury, N.J. 08512
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
Fabri-Tek, Inc., Dept. EM, 5901 S County Rd. #18, Minneapolis, Minn. 55436
M Fabri-Tek, Inc., Computer Systems Div., Dept. EM, 5901 S. County Rd. 18, Minneapolis, Minn. 55436
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Harris Corp., Computer Systems Div., Dept. EM, PO Box 23550, Fort Lauderdale, Fla. 33307
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D Standard Memories, Dept. EM, 3400 Segerstrom Ave., Santa Ana, Cal. 92704
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Memory Systems, Delay Line

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 p. 2505**
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ***
Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... *
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 .... ***
Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Memory Systems, Disc

Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Alpha Data Incorporated, Dept. EM, 20750 Marilla St., Chatsworth, Cal 91311
Amcomp, Inc., Dept. EM, 686 W. Maude Ave., Sunnyvale, Cal. 94086
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109

California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Computer Talk Inc., Dept. EM, Box 145, Idledale, Colo. 80453
Control Data Corp., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
M Digital Dev. Corp., Dept. EM, 8615 Balboa, San Diego, Cal. 92123
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Diva, Inc., Dept. EM, 607 Industrial Way West, Eatontown, N.J. 07724
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
General Instr. Corp., Systematics Div., Dept. EM, 13040 S. Cerise Ave., Hawthorne, Cal. 90250
General Systems International Inc., Dept. EM, 1440 Allec, Anaheim, Cal. 92805
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
ICOM Div., Dept. EM, 6741 Variel Ave., Canoga Park, Cal. 91303
Kemper Engineering Co., Dept. EM, 9337 Shoshone Ave., Northridge, Cal. 91324
M Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Microdata Corp., Dept. EM, 17481 Red Hill Ave., Irvine, Cal. 92705
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Pertec., Peripheral Equip. Div., Dept. EM, 9600 Irondale Ave., Chatsworth, Cal. 91311
DM Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
Remex, Ex-Cell-O Corp., Dept. EM, 1733 East Alton St., Irvine, Cal. 92714
M Scientific Micro Sys., Dept. EM, 520 Clyde St., Mountain View, Cal. 94043
Shaffstall Corp., Dept. EM, 5149 E. 65th St., Indianapolis, Ind. 46220
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Teknekron/Trax, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Memory Systems, Drum

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
M Fabri-Tek, Inc., Computer Systems Div., Dept. EM, 5901 S. County Rd. 18, Minneapolis, Minn. 55436
M Ferra Flux Corp., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705
General Instr. Corp., Systematics Div., Dept. EM, 13040 S. Cerise Ave., Hawthorne, Cal. 90250
M Kenton Engrg. Corp., Dept. EM, 8232 Christiana Ave., Skokie, Ill. 60076
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Memory Systems, Tape

Almond Instrs. Co., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724 .... *
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
Amcomp, Inc., Dept. EM, 686 W. Maude Ave., Sunnyvale, Cal. 94086
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computer Operations, Dept. EM, 9700B G. Palmer Hwy, Lanham, Md. 20801
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Data Recording Sys., Sub. American Videonetics Corp., Dept. EM, 432 Toyama Dr., Sunnyvale, Cal. 94086
Datacom, Inc., Dept. EM, Box 278, Ft. Walton Beach, Fla. 32548
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Diva, Inc., Dept. EM, 607 Industrial Way West, Eatontown, N.J. 07724
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Microdata Corp., Dept. EM, 17481 Red Hill Ave., Irvine, Cal. 92705
Mohawk Data Sciences Corp., Administrative Hdqts., Dept. EM, Palisade St., Herkimer, N.Y. 13350
DM Pertec., Peripheral Equip. Div., Dept. EM, 9600 Irondale Ave., Chatsworth, Cal. 91311
DM Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
DM Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
Teknekron/Trax, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043

Memory Systems, Thin-Film, Planar

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Memory Systems, Thin-Film, Plated Wire

M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan

Memory Systems, Semiconductor

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
M Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Advanced Memory Sys., Inc., Dept. EM, 1275 Hammerwood Ave., Sunnyvale, Cal. 94086
American Astrionics, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Control Data Corp., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Harris Corp., Computer Systems Div., Dept. EM, PO Box 23550, Fort Lauderdale, Fla. 33307
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
D Intel Memory Systems, Dept. EM, 1302 N. Mathilda, Sunnyvale, Cal. 94086
M Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Pacific Technology, Dept. EM, 235 Airport Way, Renton, Wash. 98055
Ragen Precision Inds., Inc., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032
M Scientific Micro Sys., Dept. EM, 520 Clyde St., Mountain View, Cal. 94043
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Vidco, Inc., Dept. EM, P.O. Box 25452, Portland, Ore. 97225
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Metal Compounds, Foils, Powders, Sheet, Stock

M Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 p. 2661
Adre Co., Dept. EM, Box 09415, Milwaukee, Wisc. 53209
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
M Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
Glidden Metals, Chem/Met Div. SCM Corp., Dept. EM, 900 Union Commerce Bldg., Cleveland, Ohio 44115
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
M Kawecki Berylco Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
M Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
NL Industries, Inc., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020
Philips Elmet Corp., Dept. EM, 1560 Lisbon Rd., Lewiston, Me. 04240
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Metal Oxides

Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Baker, J.T. Chemical Co., Dept. EM, Phillipsburg, N.J. 08865
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
M Glidden Metals, Chem/Met Div. SCM Corp., Dept. EM, 900 Union Commerce Bldg., Cleveland, Ohio 44115
Grace, W.R. & Co., Davison Chemical Div., Dept. EM, 4000 N. Hawthorne St., Chattanooga, Tenn. 37406
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
Int'l. Electrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
M Kawecki Berylco Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019

M Mallinckrodt, Inc., Dept. EM, 2nd & Mallinckrodt Sts., St. Louis, Mo. 63147
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Michigan Chemical Corp., Dept. EM, 351 E. Ohio St., Chicago, Ill. 60611
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Phelps Dodge Refining Corp., Dept. EM, 300 Park Ave., N.Y.C., N.Y. 10022
Philadelphia Quartz Co., Dept. EM, Box 840, Valley Forge, Pa. 19482
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Metal Parts—See Services, Metal Parts Fabrication

Metal-To-Glass Alloys—See Seals, Glass-To-Metal

Metals, Clad

M Advanced Materials Systems, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
GTE Sylvania, Inc., W.M. Chace Co., Dept. EM, 1600 Beard Ave., Detroit, Mich. 48209
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
M Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
Tech Materials Inc., Dept. EM, 5 Wellington Rd., Lincoln, R.I. 02865
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
Williams Precious Metal Div., Williams Gold Refining, Dept. EM, 2978 Main St., Buffalo, N.Y. 14214

Metals, High Purity

Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
M Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Glidden Metals, Chem/Met Div. SCM Corp., Dept. EM, 900 Union Commerce Bldg., Cleveland, Ohio 44115
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
NL Industries, Inc., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020
Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Phelps Dodge Sales Co., Inc., Dept. EM, 300 Park Ave., New York, N.Y. 10022
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361

Metals, Precious

M Advanced Materials Systems, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Auric Corp., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Handy & Harman, Dept. EM, 850 Third Ave., New York, N.Y. 10022
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
Phelps Dodge Corp., Dept. EM, 300 Park Ave., New York, N.Y. 10022
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
Tech Materials Inc., Dept. EM, 5 Wellington Rd., Lincoln, R.I. 02865
D Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
United Refining & Smelting Co., Dept. EM, 3700 N. Runge Ave., Franklin Park, Ill. 60131
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361
Williams Precious Metal Div., Williams Gold Refining, Dept. EM, 2978 Main St., Buffalo, N.Y. 14214

Metals, Rare

Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Michigan Chemical Corp., Dept. EM, 351 E. Ohio St., Chicago, Ill. 60611
Sel-Rex Div. Oxy Metal Industries Corp., Dept. EM, 75 River Rd., Nutley, N.J. 07110
M Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Metals, Refractory

D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
M Mallory Metallurgical, Div. P.R. Mallory, Dept. EM, 3029 E. Washington St., Indianapolis, Ind. 46206
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Philips Elmet Corp., Dept. EM, 1560 Lisbon Rd., Lewiston, Me. 04240
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
United Refining & Smelting Co., Dept. EM, 3700 N. Runge Ave., Franklin Park, Ill. 60131

Metals, Semiconductor—See Crystals, Semiconductor

Meter Cases—See Cases, Equipment

Meter Controllers—See Relays, Meter

Meter Expanders—See Multipliers, Meter

Meters, A-C Leakage Including Adapters

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
D Sotcher Measurement, Inc., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086

Meters, Acceleration

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
D IMPACT-O-GRAPH Div., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Media Recovery Inc., Dept. EM, Box 867, Graham, Tex. 76046
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Meters, Admittance

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Meters, Air Velocity

Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Meters, Ampere, A-C

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 p. 2793
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 p. 2807
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
D **Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... p. 2838**
D **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... ***
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
D **Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... ***
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2892,2893
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 p. 2902,2903**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... p. 2907
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912**
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... p. 2927**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2932**
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2955,2959**
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
M Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
M Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Ampere, R-F

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... ***
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Ampere, True RMS

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *

D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Ampere-Hour

Curtis Instrs., Inc., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549 .... *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2891
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212** .... p. 4344,4345
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
HBS Equipment Div., Dept. EM, 3000 Supply Ave., Los Angeles, Calif. 90040
D Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901

Meters, Attenuation

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Audio Level

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Becton, Dickinson & Co., Edmont-Wilson Div., Dept. EM, 3157 Walnut St., Coshocton, Ohio 43812
DM Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Capacitance, Inductance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 p. 2866
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D ECD Corp., Dept. EM, 196 Broadway, Cambridge, MA 02139
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
MSI Electronics, Inc., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Clamp-On

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
D **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224** ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212** .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... p. 2959
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
M Columbia Electric Mfg. Co., Dept. EM, 4519 Hamilton Ave. N.W., Cleveland, Ohio 44114
Ferranti Elec., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707

Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Conductance

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Schneider Instr. Co., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Meters, Counting Rate, Nuclear

Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Nuclear Meas. Corp., Dept. EM, 2460 N. Arlington Ave., Indianapolis, Ind. 46218
M Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018

Meters, DC

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... p. 2815
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... p. 2838,2839
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... p. 2868,2869
Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... p. 2870
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 2877
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... p. 2878
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 p. 2902,2903
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344,4345
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... p. 2940
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2950,2954-2956
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Decibel Indicating

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Meters, Deviation

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Meters, Differential

Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 p. 2840
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550

Meters, Distortion & Noise

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2898
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Becton, Dickinson & Co., Edmont-Wilson Div., Dept. EM, 3157 Walnut St., Coshocton, Ohio 43812
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Meters, Edge-Wise

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *

D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** *
D **Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917** *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
D **Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179** *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Elapsed Time—See Indicators, Elapsed Time

Meters, Electrometer

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** *
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Corning Science Products, Corning Glass Works, Dept. EM, Corning, N.Y. 14830
Electron-Machine Corp., Dept. EM, Box M, Umatilla, Fla. 32784
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Meters, F-M Deviation

London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 p. 2896
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Meters, Field Strength

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 p. 2872
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 p. 2896
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
Arvin Systems, Dept. EM, 1771 Springfield St., Dayton, Ohio 45403
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
M Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sadelco, Inc. , Dept. EM, 299 Park Ave., Weehawken, NJ 07087
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Meters, Fluid Flow

Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 p. 2839
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Carolina Medical Elctrns., Inc., Dept. EM, U.S. 52 Expwy., Box 307, King, N.C. 27021
Controlotron Corp., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704
Erdco Engrg. Corp., Dept. EM, 136 Official Rd., Addison, Ill. 60101
Ocean Research Equipment, Inc., Dept. EM, Box 709, Falmouth, Mass. 02541
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tridak, Inc., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Meters, Flutter & Wow

Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
Amplifier Corp. of America, Dept. EM, 75 Frost St., Westbury, N.Y. 11590
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
M Kenton Engrg. Corp., Dept. EM, 8232 Christiana Ave., Skokie, Ill. 60076
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Meters, Flux

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Meters, Frequency

M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101** .. p. 2792
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2828-2830
Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... p. 2835
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** p. 3004
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... p. 2872
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... p. 2873
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2909
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
M Aero Instrument Facility, Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electronic Service Co., Dept. EM, 10 Robert Court, Verona, N.J. 07044
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
J-B-T Instrs., Inc., Dept. EM, Box 1818, New Haven, Conn. 06508
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Power Waves Inc., Dept. EM, Box 1353, Asbury Park, N.J. 07712
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Frequency Deviation

Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101 .. p. 2792
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 p. 3004
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... p. 2872
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Electronic Service Co., Dept. EM, 10 Robert Court, Verona, N.J. 07044
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Meters, Frequency (Digital)

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2828-2830
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... p. 2907
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *

D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2944
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Meters, Galvanometer

Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... p. 3131
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Coleman Instr. Div., Dept. EM, 2000 York Road, Oak Brook, Ill. 60521
Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
M Photron Instrument Co., Dept. EM, 6516 Detroit Ave., Cleveland, Ohio 44102
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115

Meters, Gauss

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 p. 2807
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005

Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Meters, Grid Dip

Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021

Meters, Illuminated Scale

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 p. 2793
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 p. 2807
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2810
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 p. 2824,2825
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2828-2830
Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 p. 2832
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 .... p. 2867
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... p. 2868
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... p. 2901**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 p. 1673,2915
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2955,2956**
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Production Process, Div. Ind'l. Marine Elctrns. Inc., Dept. EM, Grenier Ind'l. Park, Londonderry, N.H. 03053
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115

Meters, Impedance

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
M **Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142

Meters, Impedance (Cont'd)

Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Electronic Service Co., Dept. EM, 10 Robert Court, Verona, N.J. 07044
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Inductance

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Kilovolt

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D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... p. 2869**
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D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... ***
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Meters, Kilowatt

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

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Meters, Light (Non Photographic)

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... p. 3135
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 ***
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D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
D Apollo Lasers Inc., Dept. EM, 6357 Arizona Cir., Los Angeles, Cal. 90045
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Photo Research Corp., Division Kollmorgen Corp., Dept. EM, 3000 N. Hollywood Way, Burbank, Cal. 91505
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Meters, Megohm

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Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 ... *
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M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ... p. 2868,2869**
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 ... *
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DM **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ... ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 ... ***
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 ... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ... ***
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American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
DM Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Meters, Micro-Microampere—See Meters, Nanoampere

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Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 ... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 ... ***
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 ... ***
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 ... *
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Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ... *
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 ... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 ... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ... ***
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 ... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ... *
D **Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 ... ***
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D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 ... p. 2940**
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D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ... ***
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
DM Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
DM Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Microhm

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 ... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 ... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ... ***
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ... ***
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009

D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016.
Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518

Meters, Microvolt

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** ...... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** ...... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
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D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** ...... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** ...... *
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Meters, Microwave

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 ...... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** p. 3004
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Meters, Milliampere

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 ...... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** ...... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** p. 2806
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 ...... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
D **Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917** ...... p. 2838,2839
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 p. 2851
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** ...... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 ...... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
D **Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179** ...... p. 2870
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** ...... p. 2878
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 ...... p. 2891,2892
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854** p. 2900,2902,2903
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ...... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** ...... p. 2940
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2944
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** ...... p. 2949-2953,2955-2957
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** ...... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
M Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
DM Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
M Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
DM Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114

Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Milliohm

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Millivolt

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... p. 2383
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** .... *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... *
D **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224** ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... p. 2878
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2891-2893
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854** p. 2902,2903
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** ...... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... p. 2940
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... p. 2957
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Modulation

D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... p. 2895
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2897,2898
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Zoomar, Inc., Dept. EM, 55 Sea Cliff Ave., Glen Cove, N.Y. 11542

Meters, Moving Scale

Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... p. 2870

Meters, Moving Scale (Cont'd)

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 p. 3107
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184

Meters, Multitester

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2800
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 p. 2824,2825
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2852,2863**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... p. 2926
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Meters, Multitester (Digital)

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2799**
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... p. 2815**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 p. 2824,2825
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2831
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2853,2854,2863**
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
DM **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... p. 2926**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2957**
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
NOBEX Div., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Multitester (Potentiometric)

D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Nanoampere

D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... p. 2902
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030

Meters, Nanovolt

D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139

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D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030

Meters, Noise-Figure

BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2898**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Noise & Sound Level

BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 .... *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2898**
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Becton, Dickinson & Co., Edmont-Wilson Div., Dept. EM, 3157 Walnut St., Coshocton, Ohio 43812
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Mine Safety Appliances Co., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Null

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... **p. 2828-2830**
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... **p. 2878**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154** .... *
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854** .... **p. 2902**
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** .... *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... **p. 2940**
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Meters, Ohm

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... **p. 2907**
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... **p. 2929**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... **p. 2940**
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111
Wolff Electronics, Box 121, Dept. EM, 43-07 Fox Run Dr., Plainsboro, N.J. 08536

Meters, Output

Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Meters, Panel (Analog)

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 p. 2926,2927**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Meters, Panel (D'Arsonval Movement)

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101 .. p. 2792
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 p. 2806**
D **Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... p. 2838**
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 p. 2851
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
D **Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... p. 2870**
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
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D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 p. 2900-2903**
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 p. 2940,2941**
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2949,2952-2956**
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Panel (Digital)

Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
D **California Instrs., Div. Aiken Inds. Inc., Dept: EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
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M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 .... p. 2867
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908,2909**
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 p. 2912**
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 p. 1673
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
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Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 p. 2926,2927
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2957**
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Meterex Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

Meters, Peak Power

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Meters, Period

Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 ..... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ..... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ..... ***
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ..... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... *
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111

Meters, Permeameter

Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... *
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Meters, Phase-Angle

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 ..... p. 2804
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 ..... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 ..... ***
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 ..... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ..... *
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735 ..... ***
M **Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ..... p. 2828-2831**
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 ..... p. 2832**
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ..... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ..... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322 ***
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 ..... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ..... p. 1673,2915**
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 ..... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 ..... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... ***
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Evans Assocs., Dept. EM, Box 5055, Berkeley, Cal. 94705
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Phase Vector Volt

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ..... p. 2828-2830
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ..... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ..... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

Meters, Picoampere

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ..... p. 3004**
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ..... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ..... p. 2895
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 ..... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... *
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Power, AC

Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 ..... p. 2805
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 ..... p. 2837
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 ..... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ..... ***
Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 ..... p. 2940
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ..... ***
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Meters, Power DC

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 ..... *
Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 ..... p. 2940
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ..... ***
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Meters, Power Factor

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 ..... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ..... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ..... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 ..... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ..... ***
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Power, R-F

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... ***
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... p. 2835**
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Pyrometer

D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
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D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... ***
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2940**
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Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
DM Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
Trans-Met Engrg., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631

Meters, Q

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2899
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, R-F

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2810**
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... p. 2902**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Meters, Ratio

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... p. 2804
California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... p. 2815
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908**
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... ***
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2919
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electro Sci, Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
MSI Electronics, Inc., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Meters, Recording

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720

D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Meters, Reflectometer

M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Meters, RFI

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

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D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... p. 2878
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508

Meters, Snap-around—See Meters, Clamp-on

Meters, Standing Wave Ratio

M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... p. 2878
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Meters, Temperature (Contacting)

D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** p. 2806
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... p. 2834
D **Edsyn, Inc., Dept. EM, 15958 Arminta St., Van Nuys, Cal. 91406** .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... p. 2856,2859,2863
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... p. 2391
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2890
Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 .... p. 2901
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... p. 2907
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** p. 2909
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** .... p. 4326
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Digilin Inc., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
J-B-T Instrs., Inc., Dept. EM, Box 1818, New Haven, Conn. 06508
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
D Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
D Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempkey Inc., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306
Trans-Met Engrg., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
D Wahl, Wm. Corp., Dept. EM, 12908 Panama St., Los Angeles, Cal. 90066
Wolff Electronics, Box 121, Dept. EM, 43-07 Fox Run Dr., Plainsboro, N.J. 08536
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Meters, Temperature, Dial-Type (Non-Contacting)—See Pyrometers

Meters, Thermal Transfer

D Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
D Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165

Meters, Time Interval—See Timers, Interval

Meters, Vacuum Tube Volt (VTVM)

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2800
D Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, VAR

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
TransData Inc., Dept. EM, P.O. Box 518, Dublin, Ohio 43017

Meters, Vibration

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686
D Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
L.A.B. Div., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Meters, Volt

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... p. 2383
D ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... *
American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735 .... p. 4337
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 p. 2793
D Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
D Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2827
Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... p. 2837
D Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... p. 2838,2839
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
D Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 .... *
D Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 .... *
D Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2855,2861,2863
D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
D General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 *
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
D Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Instruments for Industry, Inc., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735 .... p. 2872
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .. p. 2876,2877
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2102
D Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... p. 2891-2893
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
D Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 p. 2902,2903
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 p. 2908
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 p. 1673,2915
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344
D Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
M Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 4469
D Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2940
D Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2950,2954-2957,2959
D Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *

A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
M Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Key Instruments, Inc., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
M Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donher Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
D Velonex, Display Prods., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Volt, Deviation

Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... **p. 2827**
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... **p. 2102**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 **p. 2943**
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
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D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735

Meters, Volt, Differential—See Meters, Volt

Meters, Volt, Digital (DVM) & Accessories

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
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D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229** *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... **p. 2858,2863**
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
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LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... **p. 2890**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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DM **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
DM **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017** .... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... **p. 2944**
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... **p. 2957**
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Datascan Div., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043

Meters, Volt, Frequency Selective

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
Electric Field Measurements, Dept. EM, Box 326, W. Stockbridge, Mass. 01266
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Volt, Log-Conversion

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 p. 2959
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017

Meters, Volt, Peak

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Volt, Potentiometric

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Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550

Meters, Volt, R-F

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** *
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Meters, Volt, Sampling

Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 *
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250

Meters, Volt, True RMS

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2814
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** p. 2954
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electrical Standards Div., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017

Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Valhalla Scientific, Inc., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111

Meters, Volt-Ohm-Milliampere (VOM)

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2800**
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 p. 2926,2927**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... 2932-2936**
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2959**
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Meters, Volt-Ohm-Milliamperes (Vom) Digital

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... ***
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2958
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IET Labs Inc., Dept. EM, 419 W. 119th St., New York, N.Y. 10027
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, VU

D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301 .... ***
Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Hoyt Electrical Instr. Works, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179 .... p. 2870
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 .... p. 2878**
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 2896
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854 p. 2901-2903**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2940**
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... p. 2951,2953**
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Ammon Instrs., Inc., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
M Ideal Precision Meter Co., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Phaostron Instrument, Dept. EM, 151 Pasadena Ave., So. Pasadena, Cal. 91030
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Shurite Meters, Dept. EM, 428 Chapel St., New Haven, Conn. 06508
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601

Meters, Watt

D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007 .... ***
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2810,2811
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 p. 2813
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... p. 2817
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J, 07701 .... p. 2835**
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... p. 2907
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... p. 2926
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Barnes & Reinecke, Inc., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dixson, Inc., Dept. EM, Box 1449, Grand Junction, Colo. 81501
Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550

M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
D Scientific Educational Prods., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
TransData Inc., Dept. EM, P.O. Box 518, Dublin, Ohio 43017
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Meters, Watt-Hour

D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344,4345
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212

Meters, Watt, RF Directional

M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2810**
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... p. 4344
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
M Dielectric Comms. Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107

Meters, Wave

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... ***
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Meters, Waveguide—See Meters, Microwave

Microcircuit Production Equip.

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
GCA/Burlington Div., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Headway Research, Inc., Dept. EM, 3713 Forest La., Garland, Tex. 75042
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
Isotronics, Inc., Dept. EM, 12 Coffin Ave., New Bedford, Mass. 02746
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
D Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

Microcircuits—See IC's; Circuits, Hybrid

Microcomputers

Anaheim Automation, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801 .. *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... p. 1659
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
Control Logic, Inc., Dept. EM, 9 Tech Circle, Natick, Mass. 01760
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
ECD Corp., Dept. EM, 196 Broadway, Cambridge, MA 02139
Electronic Memories & Magnetics Corp., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
DM Intel Corp., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051
MilerTronics, Dept. EM, 303 Airport Rd, Greenville, S.C. 29607
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Micrometers—See Testers, Thickness (All Types)

Microphone Accessories (Including Stands, Holders, Booms)

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
M Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
DM Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D University Sound, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803

Microphones, Carbon

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
M Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
DM Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402

Microphones, Cardioid

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *

D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Recoton Corp., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101
D Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520

Microphones, Ceramic

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
D Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
M Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Superex Electronics Corp., Dept. EM, 151 Ludlow St., Yonkers, N.Y. 10705
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402

Microphones, Condenser

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
DM Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Microphones, Crystal

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Fidelitone, Inc., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520

Microphones, Dynamic

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
M Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Fidelitone, Inc., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
DM Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Recoton Corp., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101
D Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Superex Electronics Corp., Dept. EM, 151 Ludlow St., Yonkers, N.Y. 10705
DM Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
D TOA Electronics, Inc., Dept. EM, 1023 Grandview Dr., So. San Francisco, Cal. 94080
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Microphones, Lavalier

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan

Microphones, Lavalier (Cont'd)

D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Microphones, Magnetic

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Audiosears Corp., Dept. EM, South St., Stamford, N.Y. 12167
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Microphones, Omnidirectional

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Astatic Corp., Dept. EM, Box 120, Conneaut, Ohio 44030
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
DM Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
D R-Columbia Products, Inc., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Microphones, Velocity

Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Microphones, Wireless

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN 55101
D Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
DM Primo Company Ltd., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590

Microscopes

Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
American Optical Corp., Sci. Instr. Div., Dept. EM, Eggert & Sugar Rds., Buffalo, N.Y. 14215
D Bausch & Lomb, S.O.P.D. Div, Dept. EM, 1400 N. Goodman St., Rochester, N.Y. 14602
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
D Hacker Instrs., Inc., Dept. EM, Box 657, Fairfield, N.J. 07006
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
D Nikon, Inc., Instr. Div. Ehrenreich Photo-Optical Ind., Dept. EM, 623 Stewart Ave., Garden City, N.Y. 11530
D Olympus Corp. America, Dept. EM, Two Nevada Dr., New Hyde Park, N.Y. 11040
Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
Skia Corp., Dept. EM, 460 Division St., Campbell, Cal. 95008
D Titan Tool Supply Co., Inc., Dept. EM, 68 Comet, Buffalo, N.Y. 14216
M Unitron Scientific, Inc., Dept. EM, 66 Needham St., Newton Highlands, Mass. 02161
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Microscopes, Infrared

M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922

Microscopes, Measuring

American Optical Corp., Sci. Instr. Div., Dept. EM, Eggert & Sugar Rds., Buffalo, N.Y. 14215
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
M Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
M Hacker Instrs., Inc., Dept. EM, Box 657, Fairfield, N.J. 07006
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
M Lenox Instr. Co., Dept. EM, 121 E. Luray St., Philadelphia, Pa. 19120
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Nikon, Inc., Instr. Div. Ehrenreich Photo-Optical Ind., Dept. EM, 623 Stewart Ave., Garden City, N.Y. 11530
D Olympus Corp. America, Dept. EM, Two Nevada Dr., New Hyde Park, N.Y. 11040
D Titan Tool Supply Co., Inc., Dept. EM, 68 Comet, Buffalo, N.Y. 14216
M Unitron Scientific, Inc., Dept. EM, 66 Needham St., Newton Highlands, Mass. 02161
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Microwave Comb Generator—See Generators, Microwave

Microwave Integrated Circuits (MIC's)

M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Microwave Prod. Equip. (including modules)

Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
Isotronics, Inc., Dept. EM, 12 Coffin Ave., New Bedford, Mass. 02746

Microwave, Mismatches, Precision

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

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Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Mixer-Preamplifiers, Microwave

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Micropnase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Mixers, Audio

D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... ***
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Davis & Co., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
Revox Corp. , Dept. EM, 155 Michael Dr., Syosset, NY 11791
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520

Mixers, Microwave

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Mixers, R-F

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Optimax, Inc., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Modems—See Modulator/Demodulators, Data

Modulation Transfer Analyzers—See Analyzers, Transfer Function

Modulator/Demodulators, Data

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1491**
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***

Modulator/Demodulators, Data (Cont'd)

Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 p. 2733
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Anderson Jacobson, Dept. EM, 521 Charcot Ave., San Jose, Cal. 95131
Astrocom Corp., Dept. EM, 15012 Minnetonka Rd., Minnetonka, Minn 55343
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
B. H. Industries, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
M GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
International Communications, A Milgo Co., Dept. EM, 8600 NW 41st St., Miami, Fla. 33166
Livermore Data Systems, Inc., Dept. EM, 2050 Research Dr., Livermore, Cal. 94550
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Milgo Electronic Corp., Dept. EM, 8600 N.W. 41st Street, Miami, Fla. 33166
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034
Penril Corp., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Rockwell Int'l., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803
Signatron, Inc., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Terminal Systems Inc., Dept. EM, 11300 Hartland St., N. Hollywood, Cal. 91605
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Modulator/Demodulators, Laser

Andersen Labs., Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002 .... p. 2495
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D International Laser Sys., Inc., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804
Kappa Scientific Corp., Dept. EM, Box 30585, Santa Barbara, Cal. 93105
M Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234

Modulators, A-M

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1491
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... ***
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... p. 2895
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Feedback, Inc., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Modulators, F-M

Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... p. 2895
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Modulators, Light

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Lasermetrics, Inc., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801

Modulators, Magnetic

Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 p. 2388
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311

Modulators, Microwave

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 p. 2986
Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949

Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 .... ***
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Modulators, Phase

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... p. 1491**
Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 .... p. 3002
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801

Modulators, Pulse

M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525 p. 2988,2991**
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***

Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Instrument Research Co., Dept. EM, Box 40207, Santa Barbara, Cal. 93103
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Modulators, R-F

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017 .... ***
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Modulators, Telemetering

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203

D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852

Modules, Amplifier

M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021** p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M CELCO, Constantine Engrg. Labs. Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Modules, Analog Multiplier

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Analog-to-Digital Conversion

M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021** p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... p. 1663
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Control & Switching

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 p. 3585
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Decoding

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 p. 3585
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Digital-to-Analog Conversion

M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021** p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
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Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynamic Measurements Corp., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Encoding

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 *
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Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021** p. 1498
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M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 p. 2737
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Logic (Encapsulated)-Also See Cards; Circuits; Networks

Anaheim Automation, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801 .. *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 .... *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** .... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .... *

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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 3108,3109
Automatic Test Systems, Dept. EM, 23 Poplar St., Malden, Mass. 02148
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GTE Sylvania, Circuit Module Oper., Elctrn. Comps. Grp., Dept. EM, Box 360, Muncy, Pa. 17756
M GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
DM Intech/Function Modules, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Standard Engineering, Dept. EM, 44800 Industrial Dr., Fremont, Cal. 94538
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chjyoda-ku, Tokyo 101, Japan
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Modules, Oscillator

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... ***
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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Monitors, Current

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M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735 .... p. 4336,4337**
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 ***
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 .... ***
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 .... *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasadena, Cal. 91105
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Sotcher Measurement, Inc., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086
D Tekelec Inc., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

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M **Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... p. 2407**
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
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Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 *
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MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040 ***
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2944
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American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasadena, Cal. 91105
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Monitors, Humidity—See Indicators, Humidity & Moisture

Monitors, Laser Energy

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Apollo Lasers Inc., Dept. EM, 6357 Arizona Cir., Los Angeles, Cal. 90045
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
D Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
D Quantrad Corporation, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
United Detector Tech., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405

Monitors, Line & Program

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
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Gralex Inds., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735 .... **p. 2867**
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735

Monitors, Modulation

London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tucker Electrónics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Monitors, Phase & Phase-Angle

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Chesterfield Prods. Inc., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662 *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
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Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

Monitors, Phase Sequence & Loss

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Dranetz Engrg. Labs , Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
General Atomic Co., Dept. EM, P.O. Box 81608, San Diego, Cal. 92138
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

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Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Itoh Electronics, Inc. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017 .... *
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
D LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Pacific Technology, Dept. EM, 235 Airport Way, Renton, Wash. 98055
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Sotcher Measurement, Inc., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Monitors, Power, A-F

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725

Monitors, Power Failure

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... **p. 2827**
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Monitors, Power, R-F

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 **p. 2811**
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *

M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710

Monitors, Pulse Code Modulation

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
OAS Inc., Dept. EM, 145 Palasades St., Dobbs Ferry, N.Y. 10522
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071

Monitors, Temperature-Also See Controls, Temperature

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... p. 2944
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Burling Instr. Co., Dept. EM, 16 River Rd., Box 298, Chatham, N.J. 07928
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Chatham Controls Corp., Dept. EM, 33 River Rd., Chatham, N.J. 07928
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
East Controls Co., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
Electronic Solutions Inc., Dept. EM, 8070 Engineer Rd., San Diego, Cal. 92111
EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
M Sierracin/Thermal Sys., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
D Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
Tempkey Inc., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
Trans-Met Engrg., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Monitors, Thermocouple

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electronic Solutions Inc., Dept. EM, 8070 Engineer Rd., San Diego, Cal. 92111
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043

Monitors, Video

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 .... p. 1479,1480
Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 .... p. 1463
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2898
Aydin Controls, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
Ball Bros. Research Corp., Electronic Display Div., Dept. EM, Box 3376, St Paul, Minn. 55165
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
D Redactron Corp., Dept. EM, 100 Parkway Dr. S., Hauppauge, N.Y. 11787
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Monitors, Voltage—See Meters, Volt

Monitors, Waveform—See Oscilloscopes

Motor & Generator Armatures, Rotors, Stators

M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** *
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 *
M **Fabricast, Inc., Dept. EM, 2517 Seaman Ave., So. El Monte, Cal. 91733** *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** *
Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** *
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
Calvert Elctrns,, Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
D Leece Neville Div., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
Minnesota Electric Tech. Inc., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Motor Electric Generator Sets

D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** p. 3260,3261,3384,3385
Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303 *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** *
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
Applied Motors Inc., Dept. EM, Box 106, 4801 Boeing Dr., Rockford, Ill. 61105
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
Electric Machinery Mfg. Co., Dept. EM, 800 Central Ave., Minneapolis, Minn. 55413
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Leece Neville Div., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103
Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
Power Systems & Controls, Inc., Dept. EM, 3206 Lanvale Ave., Richmond, Va. 23230
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072

Motor Speed Drives—See Controls, Motor Speed

Motors, Brushless, D-C

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** p. 3063,3064
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** p. 3065
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 p. 3068
Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 p. 3069
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** p. 3070
Computer Devices of Calif., Dept. EM, 11901 Burke St., Santa Fe Springs, Cal. 90670 p. 3072,3073
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 p. 3075
Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343 p. 3077
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 p. 3061
D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523** p. 3085
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** p. 3091
Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120 p. 3092-3097
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 p. 3102
Pittman Corp., Dept. EM, 343 Godshall Drive, Harleysville, Pa. 19438 p. 3104
Portescap US, Dept. EM, 730 Fifth Ave., New York, N.Y. 10019 p. 3105
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 p. 3126
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 Inside Back Cover,
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** p. 2406,3127
Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 p. 3130
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
Brailsford & Co., Dept. EM, 670 Milton Rd., Rye, N.Y. 10580
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749

Motors, Clock & Timing

D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** *
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 *
Acrodyne Controls, Dept. EM, Box 1044, Janesville, Wisc. 53545
Bowman Electrical Prods. Corp., Dept. EM, 108 N. Jefferson St., Chicago, Ill. 60606
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
D Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
DM Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
IMC Magnetics Corp., Hansen Mfg. Co., Inc., Dept. EM, Dept. EM, Box 23, Princeton, Ind. 47670
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM Nippon Pulse Motor Co., Ltd., Dept. EM, 13-16, 2-chome, Hongo, Bunkyo-ku, Tokyo 113 Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176

Motors, Control

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** ... *
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** ... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** ... *
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 ... *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** .... *
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** ...... *
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** ...... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** ... *
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343** .. *
Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 ... *
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** ... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 ... *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4198
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410** ... *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010** p. 3108,3109
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 ... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ... *
Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 ... *
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
Fasco Industries, Inc., Dept. EM, 601 N. Federal Ave., Boca Ratan, Fla. 33432
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Horizons International, Inc., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
DM Inertial Motors Corp., Dept. EM, 280 N. Broad St., Doylestown, Pa. 18901
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
Link Communications Inc., Dept. EM, 260 W. Broadway, New York, N.Y. 10013
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
M Servotronics, Inc., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744

Motors, Drag Cup

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** ... *
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** ... p. 3065
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** ... *
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Motors, Fractional Horsepower

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** ... *
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803** ... *
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 ... *
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** p. 3069
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** p. 3070
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 ... *
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343** .. *
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D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523** ... p. 3085
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** ... *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410** ... *
Pittman Corp., Dept. EM, 343 Godshall Drive, Harleysville, Pa. 19438 ... *
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Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 ... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** p. 3130
D Airtrol Corp., Dept. EM, 203 W. Hawick St., Rockton, Ill. 61072
Alliance Mfg. Co., North American Phillips Co., Dept. EM, Alliance, Ohio 44601
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
Ametek/Lamb Electric, Dept. EM, 627 Lake St., Kent, Ohio 44240
Applied Motors Inc., Dept. EM, Box 106, 4801 Boeing Dr., Rockford, Ill. 61105
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowman Electrical Prods. Corp., Dept. EM, 108 N. Jefferson St., Chicago, Ill. 60606
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
M Doerr Electric Corp., Dept. EM, Box 67, Cedarburg, Wisc. 53012
D ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
Fasco Industries, Inc., Dept. EM, 601 N. Federal Ave., Boca Ratan, Fla. 33432
General Industries Co., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
D Hankscraft Motors, Div. of Gerber Prods. Co., Dept. EM, PO Box 120, Reedsburg, Wisc. 53959
M Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Horizons International, Inc., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
Indiana Gen'l. Div., Electro-Mechanical Prods., Dept. EM, Oglesby, Ill. 61348
Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Leece Neville Div., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103
Minnesota Electric Tech. Inc., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
Molon Motors & Coil Corp., Dept. EM, 3737 Industrial Ave., Rolling Meadows, Ill. 60008

M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
DM Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749
Yaskawa Electric America, Inc., Dept. EM, 4001 Westerly Pl., Newport Beach, Cal. 92660

Motors, Gearhead

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... ***
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803 .... p. 3065**
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D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 p. 3069**
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 p. 3070**
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***
Computer Devices of Calif., Dept. EM, 11901 Burke St., Santa Fe Springs, Cal. 90670 .... *
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 .... p. 3075
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343 .. ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 3085-3087**
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120 p. 3092-3097,3100,3101**
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... ***
Pittman Corp., Dept. EM, 343 Godshall Drive, Harleysville, Pa. 19438 p. 3104
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Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 Inside Back Cover,
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 3128**
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 p. 3130**
Alliance Mfg. Co., North American Phillips Co., Dept. EM, Alliance, Ohio 44601
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
Ametek/Lamb Electric, Dept. EM, 627 Lake St., Kent, Ohio 44240
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Doerr Electric Corp., Dept. EM, Box 67, Cedarburg, Wisc. 53012
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
D ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
General Industries Co., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035
D Hankscraft Motors, Div. of Gerber Prods. Co., Dept. EM, PO Box 120, Reedsburg, Wisc. 53959
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
M Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Horizons International, Inc., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
Indiana Gen'l. Div., Electro-Mechanical Prods., Dept. EM, Oglesby, Ill. 61348
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
Minnesota Electric Tech. Inc., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
Molon Motors & Coil Corp., Dept. EM, 3737 Industrial Ave., Rolling Meadows, Ill. 60008
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Motoresearch Mfg. Co., Dept. EM, 1600 Junction Ave., Racine, Wisc. 53403
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749
Yamashina Seiki Co., Ltd., Dept. EM, 20 Kitsone Yaba-cho, Yamashina Higashino, Higashiyama-ku, Kyoto, Japan

Motors, Gyro

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... ***
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M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424

Motors, Hysteresis

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... ***
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803 .... ***
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 .... ***
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 .... *
D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 .... ***
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... ***
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M Aircraft Appliances Eqpt, Dept. EM, 152 E Dr., Brmalea, Ont, Can.
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
General Industries Co., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498

M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Warner Elec. Brake & Clutch Co., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080

Motors, Synchronous

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... p. 3063**
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803 .... p. 3065**
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 .... p. 3068
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 ...... ***
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***
D **Computer Devices of Calif., Dept. EM, 11901 Burke St., Santa Fe Springs, Cal. 90670 .... p. 3072,3073**
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 .... p. 3075
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D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 3085,3087**
M **McLean Engrg. Labs., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550 .... ***
DM **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... p. 3102**
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 .... ***
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 Inside Back Cover,
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 3128**
Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501 .... p. 2406
Acrodyne Controls, Dept. EM, Box 1044, Janesville, Wisc. 53545
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
Bowman Electrical Prods. Corp., Dept. EM, 108 N. Jefferson St., Chicago, Ill. 60606
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Doerr Electric Corp., Dept. EM, Box 67, Cedarburg, Wisc. 53012
ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
Electric Machinery Mfg. Co., Dept. EM, 800 Central Ave., Minneapolis, Minn. 55413
General Industries Co., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
DM Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Molon Motors & Coil Corp., Dept. EM, 3737 Industrial Ave., Rolling Meadows, Ill. 60008
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
M Western Gear Corp., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749
Yamashina Seiki Co., Ltd., Dept. EM, 20 Kitsone Yaba-cho, Yamashina Higashino, Higashiyama-ku, Kyoto, Japan

Motors, Synchronous, Polarized—See Motors, Snychronous

Motors, Timing—See Motors, Clock & Timing

Motors, Torque (Including Torquers)

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... p. 3063,3064**
M **Aeroflex Labs., Inc., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803 .... ***
D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618 p. 3069**
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... p. 3071**
Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Japanese Prods. Corp., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 3085**
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... p. 3089
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303 .... p. 3090**
M **MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... p. 2971**
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120 ***
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... p. 3103
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 Inside Back Cover,
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501 .... p. 2406,3127**
Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 p. 3130
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
M Ashland Elec. Prods., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475

Motors, Torque (Including Torquers) (Cont'd)

D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
M Doerr Electric Corp., Dept. EM, Box 67, Cedarburg, Wisc. 53012
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
D ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
D General Scanning, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172
Hertner Div., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
D Hurst Mfg. Corp., Dept. EM, Box 326, Princeton, Ind. 47670
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
Indiana Gen'l. Div., Electro-Mechanical Prods., Dept. EM, Oglesby, Ill. 61348
M Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
M Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
Marathon Battery Co., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
M Servotronics, Inc., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
DM Welco Inds. Inc., Dept. EM, 9027 Shell Ave., Cincinnati, Ohio 45236
Western Gear Corp., Electro Prods. Oper., Dept. EM, 14724 East Proctor, City of Industry, Cal 91749
Yaskawa Electric America, Inc., Dept. EM, 4001 Westerly Pl., Newport Beach, Cal. 92660

Motors, Universal, A-C Or D-C Operation

D **Bodine Electric Co., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618** ...... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
TRW/Globe Motors, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404 ...... *
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
Ametek/Lamb Electric, Dept. EM, 627 Lake St., Kent, Ohio 44240
M Applied Technology Div., Western Gear Corp., Dept. EM, 14724 E. Proctor Ave., Box 1040, City of Industry, Cal. 91744
B & B Motor & Control, Dept. EM, 96 Spring St., New York, N.Y. 10012
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Eaton Corp., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111
ECM Motor Co., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196
Elden Mfg. Co., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
Howard Industries, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
D Leece Neville Div., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Nidec America Corp., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Servo-Instruments Corp., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824

Mounts, Antenna

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Ametek, Inc, Hunter Spring Division, Dept. EM, 1 Spring Ave., Hatfield, Pa. 19440
D Antenna Incorporated, Dept. EM, 23850 Commerce Park Rd., Cleveland, Ohio 44122
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
DM Easy-Up Inc., Dept. EM, Racine, Wisc. 53401
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
Gavin Electronics Div., Dept. EM, P.O. Box #520, Somerville, N.J. 08876
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Lord Kinematics, Lord Corp., Dept. EM, 1635 W. 12th St., Erie, Pa. 16512
Microflect Co., Dept. EM, 3575 25th S.E., Salem, Ore. 97302
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Premax Prods. Div., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
D South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
Tri-Ex Tower Corp., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277
Turner Div., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Mounts, CRT & Accessories

D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
Syntronic Instruments Inc., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101 **p. 1450**
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720

Mounts, Crystal

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** .... *
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
D Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Quaker Elctrns., Dept. EM, Box 215, Hunlock Creek, Pa. 18621
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Mounts, Integrated Circuit—See Sockets, Integrated Circuit; Boards, Plug-In

Mounts, Klystron

Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801

Mounts, Microwave

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Microflect Co., Dept. EM, 3575 25th S.E., Salem, Ore. 97302
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Mounts, Mobile Antenna—See Mounts, Antenna

Mounts, Shock & Vibration

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4690
UNITRACK Div., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082 .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
Airpot Corp., Dept. EM, 27 Lois St., Norwalk, Conn. 06851
Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
M Grant Hardware Co., Div. Buildex Inc., Dept. EM, 525 High St., W. Nyack, N.Y. 10994
Lord Kinematics, Lord Corp., Dept. EM, 1635 W. 12th St., Erie, Pa. 16512
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Nikon, Inc., Instr. Div. Ehrenreich Photo-Optical Ind., Dept. EM, 623 Stewart Ave., Garden City, N.Y. 11530
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020

Mounts, Tape Head

International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *

Mounts, Thermistor

Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... *
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Mounts, Transistor (Including Kits)—See Pads, Transistor Mounting

Multiplexers, Analog

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
M **Arnoux Corp., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... p. 2981
Computer Labs, Dept. EM, 505 Edwardia Dr., Greensboro, N.C. 27409 p. 1489
M **Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446** .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
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M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
DM **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017** .... *
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 p. 1680
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
Coastcom, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D F & M Systems Co., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229
M Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
M Micro Power Systems Inc., Dept. EM, 3100 Alfred St., Santa Clara, Cal. 95050
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040

Multiplexers, Digital

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
M **Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446** .... *
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... p. 1659
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Neff Instrument Corp., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Phoenix Data Inc., Dept. EM, 3384 W. Osborn Rd., Phoenix, Ariz. 85017** .... *
Preston Scientific Inc., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805 p. 1680
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digital Communications Assoc., Inc., Dept. EM, 135 Technology Park, Atlanta, Ga 30092
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Dynamic System Elctrns., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LFE Control System Industries, Dept. EM, 2920 Sand Ysidro Way, Santa Clara, Cal. 95051
Livermore Data Systems, Inc., Dept. EM, 2050 Research Dr., Livermore, Cal. 94550
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D PCS., Inc., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086

Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Multiplexers, Radio

Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910

Multiplexers, Transmission

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 p. 2789
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
D ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Computrol Corp., Dept. EM, Berkshire Industrial Pk., Bethel, Conn. 06801
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D F & M Systems Co., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228

Multiplexers, Video

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730

Multipliers, Analog

M **Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734** ...... **p. 2981**
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 p. 2386**
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040 p. 3945
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
Signatron, Inc., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518

Multipliers, Crystal

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055

Multipliers, Diode

D **Elctrn. Devices, Dept. EM, 21 Gray Oaks Ave., Yonkers, N.Y. 10710** .... *
M **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320** .... *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040 *
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
M Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
Rectifier Components Corp., Dept. EM, 1112 Lousons Rd., Union, N.J. 07083
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Multipliers, Frequency

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... **p. 2996**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... **p. 3006**
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
Varo Semiconductor, Inc., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040 p. 3945
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
DM Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Ajax Magnethermic Corp., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482
M Anzac Electronics, Dept. EM, 39 Green St., Waltham, Mass. 02154
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
TDL Electronics, Dept. EM, Route 7, Fayetteville, Ark. 72701
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801

M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Multipliers, Hall

Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Multipliers, Magnetic Analog

M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735** .... *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *

Multipliers, Meter

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2799
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115

Multipliers, Servo

M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003** .... *
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Nameplates

D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Acromark Co., Dept. EM, 60 Locust/Dept. 397, Berkeley Hts., N.J. 07922
M Anodyne Inc., Dept. EM, 1270 N.W. 165th St., N. Miami Beach, Fla. 33169
M Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
M Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
M Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Electro Stylus, Dept. EM, 31 Cheyenne Blvd., Colorado Springs, Colo. 80906
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Markem Corp., Dept. EM, 1000 Congress St., Keene, NH 03431
Matthews & Co., Jas. H., Marking Systems Div., Dept. EM, 6515 Penn. Ave., Pittsburgh, Pa. 15206
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
DM Metalphoto Corp., Dept. EM, 18531 South Miles Rd., Cleveland, Ohio 44128
M Meyercord Co., Dept. EM, 365 E. North Ave., Carol Stream, Wheaton, Ill. 60187
Nat'l. Band & Tag, Dept. EM, 721 York St., Newport, Ky. 41072
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
SGL Graphics, Div. of SGL Inds., Inc., Dept. EM, John Fitch Industrial Park, Warminster, Pa. 18974
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Topflight Corp., Dept. EM, 160 East 9th Ave., York, Pa. 17404

Navigation Equipment & Instruments etc.

M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 ...... p. 2995
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424

Networks, Crossover, Attenuator (Audio)

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
D University Sound, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Networks, Directional Antenna Phasing

M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2829,2830
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 3563
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Networks, Hybrid

A. P. Circuit Corp., Dept. EM, 865 West End Ave., New York, N.Y. 10025 .... *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2428
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 ...... p. 4423
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3716
Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Networks, Ladder

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... *
Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... p. 2743
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... *

RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... p. 3726
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 ... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Stackpole Components Co., Dept. EM, Box 14466, Raleigh, N.C. 27610 p. 3735
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 ... *
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 ...Inside Back Cover,
D **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** ... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 ... *
Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 p. 2772,2773
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... p. 3771
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Film Microelectronics, Inc., Dept. EM, 17 A St., Burlington, Mass 01803
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
M HyComp Inc., Dept. EM, Box 250, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247

Networks, LC

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 ... *
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** ... *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** ... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** ... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 ... *
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** ... *
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111** ... *
Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 ... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** ... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 ... *
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040

Networks, Matching

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428** ... *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** ... *
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 ... *
Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011 ... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 ... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** ... *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** ... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 ... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 ... *
D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111** ... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** ... *
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 ... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 ... *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Networks, Phase

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M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** *
M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550** ... *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** ... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 ... p. 2829,2830
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** ... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** ... *
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 ... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** ... *
TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 ... *
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012

Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406

Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550

Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401

Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221

D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050

M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006

Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247

Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Networks, Pulse Forming

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *

M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***

M **Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... ***

M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902 ***

M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *

M **Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 .... ***

M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***

M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***

M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***

ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 3563

M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***

M **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... ***

RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *

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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***

TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *

M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419

D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138

Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201

Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207

Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530

M El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618

Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550

Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634

Kappa Scientific Corp., Dept. EM, Box 30585, Santa Barbara, Cal. 93105

Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123

Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

M Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639

M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405

Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247

D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002

Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021

Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

Networks, Rejection—See Filters

Networks, RC

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***

American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... *

Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 *

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***

Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *

CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *

D **Custom Elctrns., Dept. EM, Browne St., Oneonta, N.Y. 13820 .... ***

Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *

M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***

M **F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 .... ***

General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *

M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***

M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... ***

Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *

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RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... *

D **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***

Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 .... *

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *

M **Southern Electronics Co., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502 ***

Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *

Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *

TT Elctrns., Inc., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064 .... *

D Acushnet Capacitor Co., Dept. EM, 720 Belleville, New Bedford, Mass. 02745

All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590

D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803

M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090

D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201

CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514

M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906

M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012

Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406

Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776

Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550

Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401

Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075

M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221

D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818

M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051

D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050

Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123

D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960

D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825

Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484

D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247

Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035

TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan

M Thinco Div. Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040

Tri-Sage Inc., Dept. EM, 1212 Pittsford-Victor Rd., Pittsford, NY 14534

M Western Microsystems, Inc., Dept. EM, Box 23192, San Diego, Cal. 92123

White Instrs., Inc., Dept. EM, Box 698, Austin, Tex. 78767

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D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3636-3639**

American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3633

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D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2978,3642,3643**

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General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *

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Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *

M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... ***

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Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *

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D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
M Circuit Technology, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
M Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tri-Sage Inc., Dept. EM, 1212 Pittsford-Victor Rd., Pittsford, NY 14534
DM Ultronix, Inc., Dept. EM, P.O. Box 1090, Grand Junction, Col. 81501

Null Detectors—See Indicators, Null

Nuts, Metal—See Fasteners, Metal

Nuts, Plastic—See Fasteners, Non-Metallic

Oceanographic Equip. (Electronic)

Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
AMF Electical Prods. Dev. Div., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Benthos, Inc., Dept. EM, Edgerton Dr., N. Falmouth, Mass. 02556
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
M Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
EPC Labs, Inc., Dept. EM, 123 Brimbal Ave., Beverly, Mass. 01915
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co. Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co. Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Preformed Line Products Co., Dept. EM, Box 91129, Cleveland, Ohio 44101
Products for Research, Inc., Dept. EM, 78 Holten St., Danvers, Mass. 01923
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721

Oils—See Lubricants

Optical Component Mounts & Accessories

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... **p. 2544**
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
FJW Industries, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060

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M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540** **p. 2439**
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M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** .... *
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Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** .... *
Allen Elctrns. Div., Allen Organ Co., Dept. EM, Macungie, Pa. 18062
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Oscillators, Audio (Test)—See Generators, Audio

Oscillators, Beat Frequency (BFO)

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005

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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086

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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377

Oscillators, Cavity

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985
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M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

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M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... *
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M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2417-2421,2427,2428**
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Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 p. 3379
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Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 2441
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D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2450,2456,2457**
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M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850 p. 2486-2488**
Vernitron Piezoelectric Div., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146 p. 2773
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Chronomite Labs, Dept. EM, 21011 S. Figueroa St., Carson, Cal. 90745
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
DM Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607

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M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can.
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019
Tyco Filters Div., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillators, Decade (Test)

Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 p. 3379
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Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

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Oscillators, LC

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
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American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282

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M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... p. 2408,2409
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
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Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 p. 2443
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M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
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M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
D **Motorola, Inc., Compt. Prods. Clock Oscillator Dept., Dept. EM, 2553 N. Edgington, Franklin Park, Ill. 60131** .... *
Motorola, Inc. Component Prods., Piezo-Ceramic Speaker Dept., Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 .... *
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Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... *
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American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Tyco Crystal Products Div., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019

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Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
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M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... p. 2485
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
DM Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086

M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
M Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
M Deltronic Crystal Inds., Inc., Dept. EM, Box 323, Denville, N.J. 07834
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Parametric Inds., Inc., Dept. EM, 742 Main St., Winchester, Mass. 01890
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
M Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillators, Power (Module)

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 p. 3154
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... p. 3366
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D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
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Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
Pacific Electronic Enterprises, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770 .... *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 p. 2470,2471
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
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D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Oscillators, Pulse (Module)

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
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M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** .... *
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M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** .... *
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Oscillators, Pulse (Test)—See Generators, Pulse

Oscillators, RC (Module)

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... p. 2729
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540** p. 2439
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** p. 2887
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086

Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Oscillators, Reed

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172

Oscillators, R-F (Module)

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** *
M **Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758** *
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** *
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 *
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 *
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 *
M **Krohn-Hite Corp., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322** *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** *
MF Electronics Corp., Dept. EM, 118 E. 25th St., New York, N.Y. 10010 p. 2459
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** *
D **Motorola, Inc., Compt. Prods. Clock Oscillator Dept., Dept. EM, 2553 N. Edgington, Franklin Park, Ill. 60131** *
Motorola, Inc. Component Prods., Piezo-Ceramic Speaker Dept., Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 *
Motorola, Inc. Component Prods., Quartz Time Piece, Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** *
Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017 *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2930,2931**
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** *
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
DM Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Oscillators, R-F (Test)—See Generators, R-F

Oscillators, Sinusoidal (Module)

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M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 p. 2433
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 *
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439**
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 p. 2732
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 p. 2470
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850 p. 2487**
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
DM Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Optical Electronics, Inc., Dept. EM, Box 11140, Tucson, Ariz. 85734
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Southwood Electronic Co., Dept. EM, 7624 Lindenwood Dr., Indianapolis, Ind. 46227
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282

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Oscillators, Square-Wave (Module)

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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... p. 3371
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725 ***
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M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
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M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055 .... ***
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
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D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... ***
MF Electronics Corp., Dept. EM, 118 E. 25th St., New York, N.Y. 10010 ...... *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... ***
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Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... ***
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017 .... ***
M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... ***
Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2931
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850 .... ***
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Engineered Components Co., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

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Oscillators, Telemetry

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055 .... ***
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
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Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 p. 1471
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillators, Temperature Compensated

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
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M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2417-2422**
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090 .... ***
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439**
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055 .... p. 2440**
Hughés Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2450,2456**
MF Electronics Corp., Dept. EM, 118 E. 25th St., New York, N.Y. 10010 p. 2458
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188 .... p. 2449**
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... p. 2462**
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2475
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017 .... p. 2477**
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614 .... ***
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850 p. 2487**
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
DM Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal: 94086
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282

Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Dón Mills 404 Ont., Ont. Can.
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Tedford Crystal Labs., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillators, Test Equipment—See Generators (Specific Types)

Oscillators, Tuning-Fork Controlled

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
M **Philamon, Inc., Dept. EM, 33 Dubon Ct., Farmingdale, N.Y. 11735** .... p. 2467
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Oscillators, UHF/VHF (Module)

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 .... *
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 p. 2439
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... p. 3386
International Crystal Mfg., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102 .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... *
MF Electronics Corp., Dept. EM, 118 E. 25th St., New York, N.Y. 10010 p. 2459
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Q-Tech Corp., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064 ...... *
M **Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013** .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
M **Trak Microwave Corporation, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614** .... *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** p. 2488
M Addington Labs., Inc., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
Communication Technique Ino, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
Gorman-Redlich Mfg. Co., Dept. EM, 6 Curtis St., Athens, Ohio 45701
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
M Scientific Research Corp., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TRW Auto-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillators, UHF/VHF (Test)—See Generators, UHF/VHF

Oscillators, Ultrasonic (Module)

Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540** p. 2439
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
M T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304

Oscillators, Ultrasonic (Test)—See Generators, Ultrasonic

Oscillators, Voltage Controlled (Module)

M **Accutronics-A Hammond Corp., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134** .... *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Bliley Electric Co., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508** .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548** p. 2417
M **Damon Corp., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090** .... *
M **Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540** p. 2439
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** p. 2735
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... p. 2440
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 p. 2441
Hughes Aircraft Co., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663 .. *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... p. 3388,3389
D **McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065** .... p. 2450
M **Microsonics, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188** .... *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... *
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... p. 2475
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 p. 1471
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** p. 2487
M Addington Labs., Inc., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086

Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
M Crystal Network Prods. Corp., Dept. EM, 818 Parade St., Erie, Pa. 16503
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Luff Research, Dept. EM, Box 449, Jackson Hgts., N.Y. 11372
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
M Microwave Technology, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055
DM Miteg Inc., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Nihon Dempa Kogyo Co., Ltd., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan
M Omni-Spectra, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
DM Systron-Donner, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
TMC Systems (Ariz.), Inc., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
DM Yig-Tek Corp., Dept. EM, 1725 De La Cruz Blvd., Santa Clara, Cal. 95050
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Oscillographs, Direct Writing

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 2973
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
M Photron Instrument Co., Dept. EM, 6516 Detroit Ave., Cleveland, Ohio 44102
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Oscilloscope Plug-Ins

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 p. 2911
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Oscilloscopes, Digital Readout

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2795
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 ***
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Oscilloscopes, General Purpose

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794-2796**
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 p. 2910,2911**
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2916-2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... p. 3059
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2930**
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... p. 2946
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 p. 2947
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
M Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vu-data Corp., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Oscilloscopes, High-Frequency (Above 75 MHZ)

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2916-2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 p. 2947
M Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Oscilloscopes, Low-Frequency (D-C to 3 MHZ)

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805**
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 ***
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2916-2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 ***

Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vu-data Corp., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111

Oscilloscopes, Mid-Frequency (D-C to 75 MHZ)

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794-2796**
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2916-2918
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
D Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
Meguro Electronic Instr. Co., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vu-data Corp., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111

Oscilloscopes, Multi-Beam

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Oscilloscopes, Multiple Channel

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... ***
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... ***
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 ***
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2917,2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... ***
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 p. 2930**
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
M **Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 ***
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
M Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735

Oscilloscopes, Portable, Battery Operated

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2796
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... p. 2805
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2916-2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vu-data Corp., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111

Oscilloscopes, Processing

D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Oscilloscopes, Programmable

Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 *
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Oscilloscopes, Sampling

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Oscilloscopes, Storage

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
D **Nicolet Instruments Corp., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711 ***
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... p. 2918**
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Oscilloscopes, Three-Dimensional

Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Outlets, Electrical—See Boxes, Junction, Outlets & Wall Plates

Ovens, Aging, Burn-In, Life Test

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682**
Ransco Industries, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030 ...... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 .... ***
M Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Associated Environmental Systems, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
M Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
D Despatch Oven Co., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235

Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Reliability Inc., Dept. EM, 8000 Harwin, Houston, Tex. 77036
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Ovens, Crystal & Component

M **CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 p. 2422**
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
McCoy Electronics, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065 .... p. 2457
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054 .... p. 2462**
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... p. 2464,2465
Acme Elec. Heating Corp., Dept. EM, 4685 E. 11th, Hialeah, Fla. 33013
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Erie Frequency Control, Div. Erie Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Micro Technical Industries, Dept. EM, 1999 S. Coast Hwy., Laguna Beach, Cal. 92651
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Northern Engineering Labs., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105
Odell Co., M. P., Dept. EM, 26612 Center Ridge Rd., Cleveland, Ohio 44145
M Oven Industries, Inc., Dept. EM, 800 New Holland Ave., Mechanicsburg, Pa. 17055
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Siltec Corp., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can.
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703

Ovens, Electric—See Furnaces, Electric

Ovens, Vacuum

Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 *
Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120 *
Baker Co., Inc., Dept. EM, Drawer E - Sanford Airport, Sanford, Me. 04073
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
Forma Scientific, Inc., Dept. EM, Box 649, Marietta, Ohio 45750
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
High Vacuum Equip. Corp., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043
Hotpack Corp., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
D Red Point Corp., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Standard Environmental Systems, Inc., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Packages, Integrated Circuit

Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... p. 1122
Ann Arbor Terminals, Inc., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103 .... p. 1475,1478
Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092 p. 3418-3421
M **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 ...... p. 1123
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... *
Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 .... p. 3001
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 3690
Dialight, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237 .... p. 2585
Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180 p. 3487
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 .. ***
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 p. 2983
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Coors Porcelain Co., Dept. EM, 600 Ninth St., Golden, Colo. 80401
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
M Diacon, Dept. EM, 4812 G Kearny Mesa Rd., San Diego, Cal. 92111
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Information Control Corp., Abacus Div. Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
Isotronics, Inc., Dept. EM, 12 Coffin Ave., New Bedford, Mass. 02746
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Metalized Ceramics, Dept. EM, Huntington Industrial Pk., Providence, R.I. 02907
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
DM Plessey Chatsworth, Dept. EM, 20245 Sunburst St., Chatsworth, Cal. 91311
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Packaging Panels, IC—See Boards, Plug-In

Pads, L, T, & H—See Attenuators, Audio

Pads, Transistor Mounting

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515 .... ***
DM **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 .... ***
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 .... ***
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
DM Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
D Air Quip-Robleyco, Dept. EM, Box 1118, Richardson, Tex. 75080
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
D Circuit Structures Lab., Div. D-Cemco Inc Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
D D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
D Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
D Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
D Gudebrod Bros. Silk Co., Inc., Electronics Div., Dept. EM, 12 S. 12th St., Philadelphia, Pa. 19107
Industrial Mica Div., Columbia Chase Corp., Dept. EM, 223 S. Van Brunt St., Englewood, N.J. 07631
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
M Robison Elctrns., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
D Spec Plastics Inc., Dept. EM, 7224 Atoll Ave., No. Hollywood, Cal. 91605
M TOR Corporation, Dept. EM, 14715 Arminta St., Van Nuys, Cal. 91402
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
M TRW/Cinch-Monadnock, An Elctrn. Comps., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749

Paging Systems—See Comm. Systems, Selective Paging

Paints, Conductive, Electric—See Coatings, Conductive, Electric

Paints, Metallic

GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *

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D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016

Paints, Radioactive—See Coatings, Radioactive

Paints, Reflective

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006

Paints, Resistive-Also see Inks for Thick-Film Microcircuits

GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... p. 1388
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Isochem Resins Co., Dept. EM, 99 Cook St., Lincoln, R.I. 02865
DM Kepro Circuit Systems, Inc., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122
Mereco Products Div., Metachem Resins Corp., Dept. EM, 538 Wellington Ave., Cranston, R.I. 02910
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
N L Inds., Inc., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080

Panel Equipment—See Dials; Connectors; Jacks; Lights; etc.

Panel Marking Kits—See Kits, Marking (Dial, Instrument, Equipment, etc.)

Panels, Edge-lit

Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2587
M Aerospace Optics Inc., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118

Panels, Electroluminescent

Display Devices, Dept. EM, Box 667, Encinitas, Cal. 92024 .... p. 2587
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854

Panels, Fuse

GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
D **Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 .... ***
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .... ***
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Taylor Electric, Inc., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654
D Underwriters Safety Device, An Eltra Co., Dept. EM, 7300 W. Wilson Ave., Chicago, Ill. 60656
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011

Panels, IC Packaging—See Boards, Plug-In

Panels, Jack

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Dynatech Corp., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702 *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***
Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... p. 1839
M **GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... ***
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Mac Panel Co., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262 .... *
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
DM **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... p. 4275,4279-4281**
D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281**
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... ***
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
DM ADC Prods., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
D LMB Heeger, Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
Marlin Manufacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Puleo Electronics, Inc., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311

Panels, Metal—See Enclosures, Circuit Board, Module & Relay Mounting

Panels, Meter—See Enclosures, Circuit Board, Module, & Relay Mounting

Panels, Patch—See Panels, Jack

Panels, Power Bus For IC's

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
DM **Dynatech Corp., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702 ***
Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... p. 1839
Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 .. *
Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 .... p. 3622
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
Spectro Equipment, Inc., Dept. EM, 6021 Royalton Rd., N. Royalton, Ohio 44133

Panels, Relay Rack—See Enclosures, Circuit Board, Module, & Relay Mounting

Panoramic Adapters—See Receivers, Panoramic

Paper Tape Preparation Systems

Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 p. 1495
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
D Chalco Engrg. Corp., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248
Computer Transceiver Systems, Dept. EM, 66 E. Midland Ave., Paramus, N.J. 07652
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Sweda Int'l., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teleterminal Corp., Dept. EM, 12 Cambridge St., Burlington, Mass. 01803
Time Share Peripherals Corp., Dept. EM, Route 6, Bethel, Conn. 06801
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Paper, Graphic Recording

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ...... p. 1538
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 ...... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
AGFA-Gevaert, Inc., Dept. EM, 275 North St., Teterboro, N.J. 07608
M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
D Astro-Med, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
M Fitchburg Coated Products, Div. Litton Inds., Dept. EM, P. O. Box 1106, Scranton, Pa. 18501
Graphic Controls Corp., Recording Chart Div., Dept. EM, 189 Van Rensselaer St., Buffalo, N.Y. 14210
Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Keuffel & Esser Co., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960
DM Laboratory Data Control, Div. M. Roy Corp., Dept. EM, Box 10235, Riviera Beach, Fla. 33404
D Linear Instrs. Corp., Dept. EM, 17282 Eastman Ave., Irvine, Cal. 92714
Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Telautograph Corp., Dept. EM, 8700 Bellanca Ave., Los Angeles, Cal. 90045
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Patch Boards—See Boards, Programming

Pedestals, Radar

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 ...... ***
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
M Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120

Perforators, Paper Tape (Electrically Powered)

Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 p. 1495
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 ...... p. 1679**
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 ...... *
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
D Chalco Engrg. Corp., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
D Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Remex, Ex-Cell-O Corp., Dept. EM, 1733 East Alton St., Irvine, Cal. 92714
Sweda Int'l., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teleterminal Corp., Dept. EM, 12 Cambridge St., Burlington, Mass. 01803
Time Share Peripherals Corp., Dept. EM, Route 6, Bethel, Conn. 06801
Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Peripheral Interface Elements

Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 ...... *
Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 p. 1495
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 ...... p. 1538
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
Kemper Engineering Co., Dept. EM, 9337 Shoshone Ave., Northridge, Cal. 91324
MDB Systems Inc., Dept. EM, 1995 N. Batavia St., Orange, Cal. 92665
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Time Share Peripherals Corp., Dept. EM, Route 6, Bethel, Conn. 06801

Phones—See Handsets, Chestsets, Headphones, Headsets, etc.

Phonographs, Parts & Accessories

Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 p. 1825
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ...... ***
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 ...... p. 2130
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2145
Aldshir Mfg., Dept. EM, 111 Lake, Tuckahoe, N.Y. 10707
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Audio-Technica U.S., Inc., Dept. EM, 33 Shiawassee Ave., Fairlawn, Ohio 44313
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
Fidelitone, Inc., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
D Merix Chem. Co., Dept. EM, 2234 East 75th St., Chicago, Ill. 60649
Newcomb Audio Products Co., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
D Pageant/M.A. Miller Industries, Dept. EM, 605 Northern Blvd., Chinchilla, Pa. 18501
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Recoton Corp., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Stanton Magnetics, Inc., Dept. EM, Terminal Dr., Plainview, N.Y. 11803
DM V-M Corporation, Dept. EM, Box 1247, Benton Harbor, Mich 49022
Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520

Photocells & Phototubes—See Cells, Photoconductive, etc.

Photoelectric Equipment—See Alarms, Controls, Photoelectric

Photoelectric Tubes—See Cells, Photoconductive

Photoemissive Detectors—See Cells, Photoemissive

Photometers—See Meters, Light

Photomultiplier Tube Housings

Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 p. 2661
Marlow Industries, Inc., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041 *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Bunting Magnetics Co., Dept. EM, 2100 Estes Ave., Elk Grove Village, Ill. 60007
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Products for Research, Inc., Dept. EM, 78 Holten St., Danvers, Mass. 01923
D Stanton Magnetics, Inc., Dept. EM, Terminal Dr., Plainview, N.Y. 11803

Pickups, Magnetic, Proximity, Torque, Vibration, etc.—See Transducers, Specific Type

Pickups, Telephone (For Recording)

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 ...... p. 2383
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ...... ***
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *

Pickups, Telephone (For Recording) (Cont'd)

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Fidelitone, Inc., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Pilot Lamps—See Lamps, Dial & Pilot

Pin Straighteners, Tube

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *

Pins, Cotter, Dowel, Taper, etc.—See Pins, Mechanical

Pins, Electrically Conductive

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
Appleton Electronic Div., Appleton Electric Co., Dept. EM, 1701 W. Wellington Ave., Chicago, Ill. 60657 .... p. 1783
D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
D **Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** .... *
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... p. 1802,1804
D **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 .... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2057
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
DM **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... p. 2365
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
D Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626
Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
D Ledco Div., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
M Waldman Corp., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054

Pins, Mechanical

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... p. 1705
D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
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DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
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DM Avibank Mfg. Inc., Dept. EM, 210 S. Victory Blvd., Burbank, Calif. 91503
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
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Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Bird, Richard H. & Co., Inc., Dept. EM, 1 Spruce St., Waltham, Mass. 02154
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
D Deutsch Fastener Corp., Dept. EM, 7001 W. Imperial Hwy., Los Angeles, Cal. 90045
DM ESNA Division, Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
DM Esna Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
D Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
Tridair Inds., Rexnord Co., Dept. EM, 3000 W. Lomita Blvd., Torrance, Calif. 90505
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243

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M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
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D CPL Corp., Chemical Prods. Corp. Div., Dept. EM, King Philip Rd., E. Providence, R.I. 02914
D Dolph, John C. Co., Dept. EM, New Rd., Monmouth Junction, N.J. 08852
Dow Chemical Co., Dept. EM, Box 2020, Midland, Mich. 48640
DM Dynaloy, Inc., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936
Eastman Chem. Prods., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662
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M Fiberfil Div. Dart Ind., Dept. EM, P.O. Box 3333, Evansville, Ind. 47732
FMC Corp., Ind'l. Chemical Div., Dept. EM, 2000 Market St., Philadelphia, Pa 19103
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DM General Elec., Plastics, Dept. EM, 1 Plastic Ave., Pittsfield, Mass. 01201
M Goodrich Co. Chemical Div. BF, Dept. EM, 6100 Oak Tree Blvd., Cleveland, Ohio 44131
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M Packaged Resins Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
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D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
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Union Carbide, Chemicals & Plastics, Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

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Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350

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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
D Erikson Specialized Tool Co., Dept. EM, Box 424, Pico-Rivera, Cal. 90660
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
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D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
D Plato Products, Inc., Dept. EM, El Monte, Cal. 91731
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D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
M Waldes Kohinoor, Inc., Dept. EM, 47-16 Austel Pl., Long Island City, N.Y. 11101
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Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D GIC Thermodynamics Div., Dept. EM, 4949 Delemere, Royal Oak, Mich. 48073
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hypertronics Corp., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
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D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
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Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
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M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
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D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
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D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
D Jolo Industries, Inc., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603
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D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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M Caplugs Div., Protective Closures Co., Dept. EM, 2150 Elmwood Ave., Buffalo, N.Y. 14207

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D Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626

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D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223

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D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247

D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543

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DM **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***

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Vernitron Elec. Comps., Beau Prods., Dept. EM, Box 10, Laconia, N.H. 03246 *

D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***

DM ADC Prods., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435

D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857

Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078

D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245

D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904

Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627

Hypertronics Corp., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775

Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086

D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223

Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362

Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047

Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656

D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150

Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543

S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647

DM SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093

SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021

D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan

D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007

D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207

D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Plugs, Fused

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *

Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

D Potter Co., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191

Pointers, Dial

D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***

DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... ***

RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... p. 2551-2554

D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***

D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138

Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877

M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901

Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***

D **Eby Company, Dept. EM, 4701 Germantown, Philadelphia, Pa. 19144 p. 1835**

M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *

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D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 1841**

D **Interlok, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... ***

D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2041,2043-2046,2048,2049,2060,2064,2066,2068,2069**

D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093 p. 2777**

DM **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... p. 2130**

D **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... ***

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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *

DM **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2150-2153,2159,2160,2163,2164**

Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... p. 2249

D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 2251**

W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013 .... p. 2379

D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***

Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484

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D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138

Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245

Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618

D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

D NOBEX Div., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010

D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453

D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696

D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543

S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647

D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan

Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908

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Potentiometer, Elements

M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
Carter Mfg. Corp., Dept. EM, Sugar Rd., Bolton, Mass. 01740 .... *
Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Astro Elctrns., Inc., Dept. EM, 2478 Fender Ave., Unit "D", Fullerton, Calif. 92631
M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787
M Electronic Controls, Inc., Dept. EM, 1900 Tyler Ave., S. Elmonte, Cal. 91733
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
M Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
M New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
M Unimetrics Corp., Mektron Div., Dept. EM, 1853 Raymond Ave., Anaheim, Cal. 92801
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

Potentiometers, Carbon Ceramic

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
DM **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507** .... **p. 3794, Back Cover,**
Centralab Elctrns. Div., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
M CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Potentiometers, Carbon Film

D **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507** .... **p. 3782,3793,3820,3821, Back Cover,**
Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3827
Electro-Techniqués, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 p. 3838,3839
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Potentiometers, Ceramic-Metal (Cermet)

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3773-3775
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... **p. 3778**
DM **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 p. 3782-3788, 3790, 3793-3797, 3800-3804, 3810, 3815, 3820, 3821, Back Cover,**
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D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3825**
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D **Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054** *
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... *
Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... **p. 3841**
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D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745** .... **p. 3846**
DM **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733** .... **Inside Back Cover,**
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DM **Weston Components & Controls, Div. Sangamo Weston Inc., Dept. EM, Archbald, Pa. 18403** .... **p. 3856,3857**
M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
D Diplohmatic Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
DM Mepco/Electra Inc., Dept. EM, 11468 Sorrento Valley Rd., San Diego, Cal. 92121
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
DM Techno-Comps. Corp., Dept. EM, 7803 Lemona, Van Nuys, Cal. 91405
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Potentiometers, Composition, Carbon

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3774**
DM **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507** .... *
DM **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745** .... *
Stackpole Components Co., Dept. EM, Box 14466, Raleigh, N.C. 27610 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Potentiometers, Conductive Plastic

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3774**
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
DM **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507** .... **p. 3794-3804,3807,3815-3817,3820,3821, Back Cover,**
M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
M **Carter Mfg. Corp., Dept. EM, Sugar Rd., Bolton, Mass. 01740** .... **p. 3823**
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3824,3826-3829**
Duncan Electronics, Inc., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626 .... **p. 3836,3837**
D **Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054** *
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745** .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787
Electronic Controls, Inc., Dept. EM, 1900 Tyler Ave., S. Elmonte, Cal. 91733
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
M Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
M New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
M Unimetrics Corp., Mektron Div., Dept. EM, 1853 Raymond Ave., Anaheim, Cal. 92801
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

Potentiometers, Hot Molded

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3773,3775
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... **p. 3844**
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550

Potentiometers, Lab Type

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
D **Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507** .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745** .... *
DM **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733** .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brinkmann Instrs., Inc., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076

Potentiometers, Linear

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 .... *
DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
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M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
M **Carter Mfg. Corp., Dept. EM, Sugar Rd., Bolton, Mass. 01740** .... *
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
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D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
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M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Spectrol Electronics Corp., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745** .... *
DM **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733** .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 2404
D **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... *
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
DM Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
M New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
M Unimetrics Corp., Mektron Div., Dept. EM, 1853 Raymond Ave., Anaheim, Cal. 92801
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778

Potentiometers, Metal Film

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733** .... *
D **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... *
D **Weston Components & Controls, Div. Sangamo Weston Inc., Dept. EM, Archbald, Pa. 18403** .... *
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International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418

Potentiometers, Metal, Glazed—See Potentiometers, Ceramic-Metal

Potentiometers, Motorized

Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 p. 3838,3839
Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078

Potentiometers, Multiturn

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Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
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M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
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Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
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D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
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TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
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M Xentek, Inc., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069

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Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
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Chen Industries, Inc., Dept. EM, 2740 S. LaCienega Blvd., Los Angeles, Ca. 90034
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
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Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
DM Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
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Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
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EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
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Keltron Corp., Walden Div., Dept. EM, 225 Crescent St., Waltham, Mass. 02154
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
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Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
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Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
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M Condenser Products Corp., Dept. EM, Box 997, Brooksville, Fla. 33512
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
DM Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
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EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
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D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
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M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
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Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
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M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
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Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
Voltex Co., Inc., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

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Power/Mate Corp., Dept. EM, 514 S. River St., Hackensack, N.J. 07601 ...... *
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M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
Keltron Corp., Walden Div., Dept. EM, 225 Crescent St., Waltham, Mass. 02154
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
D Plastic Capacitors, Inc., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639
Power Pac, Inc., Dept. EM, 18 Marshall St., South Norwalk, Conn. 06854
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735

Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
M Xentek, Inc., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

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Gates Elctrn. Co., Dept. EM, 526 Van Nest Ave., Bronx, N.Y. 10460 .... *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 .... ***
Gould, Inc. Instr. Sys. Div. Power Supply Dept., Dept. EM, 3631 Perkins Ave., Cleveland, Ohio 44114 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 .... *
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LH Research, Inc., Dept. EM, 1821 Langley, Irvine, Cal. 92714 .... *
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Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
Pacific Electronic Enterprises, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770 .... *
Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
D **Power/Mate Corp., Dept. EM, 514 S. River St., Hackensack, N.J. 07601 ...... ***
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D **Tele-Dynamics, Div. of AMBAC, Dept. EM, 525 Virginia Dr., Ft. Washington, Pa. 19034 .... ***
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... ***
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... ***
D **Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... ***
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *
Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
D Adtech Power Inc., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806
D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
American Power Systems Corp., Dept. EM, 51 Jackson St., Worcester, Mass. 01608
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307
Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Dynage, Inc., Power Supply Corp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
D Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
D Emerson, Industrial Controls Div., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702
M Etatech, Inc., Dept. EM, 187M W. Orangethorpe Ave., Placentia, Cal. 92670
Firing Circuits Inc., Dept. EM, Muller Ave., Box 2007, Norwalk, Conn. 06852
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
M Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
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M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Viking Electronics, Dept. EM, 406 2nd St., Hudson, Wisc. 54016
Viking Modules, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154
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D **Alpha Power, Inc., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311 .... ***
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
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D **Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787** *
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974** .... *
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Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
Gates Elctrn. Co., Dept. EM, 526 Van Nest Ave., Bronx, N.Y. 10460 .... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
M **Kepco, Inc., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352** .... *
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North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
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Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... *
Reacor, Inc., Dept. EM, 718 Lingco Dr., Richardson, Tex. 75081 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 .... *
DM **Sorensen Co., Dept. EM, 676 Island Pond Rd., Manchester, N.H. 03103** ...... *
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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
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Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Instruments Components Co., Dept. EM, 7239 Industrial Park Blvd., Mentor, Ohio 44060
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Northeast Scientific Corp., Dept. EM, 30 Wetherbee St., Acton, Mass. 01720
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Omicron Instruments, Dept. EM, 1710 - 19th St., Santa Monica, Cal. 90404
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
M Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Viking Modules, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
D WER Industrial, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072
Xentek, Inc., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069

Power Supplies, Constant Voltage

Abbott Transistor Labs., Industrial Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016 .... *
M **Abbott Transistor Labs, Power Supply Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016** .... *
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042** .... *
Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 .... *
Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402 .... *
M **Almond Instrs. Co., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724** .... *
D **Alpha Power, Inc., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311** .... *
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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
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M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803** .... *
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D Adapter/Charger Prdts., Dept. EM, P.O. Box 3218 8727 N. Pioneer Rd., Peoria, Ill. 61614
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
American Power Systems Corp., Dept. EM, 51 Jackson St., Worcester, Mass. 01608
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
M Anadyne, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Arenberg Ultrasonic Inc., Dept. EM, 94 Green, Jamaica Plain, Mass. 02130
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
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Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518

Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
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Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
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Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
D Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Northeast Scientific Corp., Dept. EM, 30 Wetherbee St., Acton, Mass. 01720
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Polytran Devices, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524
Power Conversion Products Inc., Dept. EM, 42 East St., Crystal Lake, Ill. 60014
Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viking Electronics, Dept. EM, 406 2nd St., Hudson, Wisc. 54016
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606
Xentek, Inc., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069

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M AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... *
M Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 .... *
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Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
NCR Power Systems Div., Dept. EM, 584 S. Lake Emma Rd., Box 898, Lake Mary, Fla. 32746 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
M OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... *
Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Technology, Inc., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204 .... *
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M Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... *
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *
Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Amglo Corp., Dept. EM, 5301 Wesley Terr., Rosemont, Ill. 60018
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Exide Power Sys. Div., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
M Ionics, Inc., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172
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Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
Maxwell Labs., Inc., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
Spectrolab, Inc., Dept. EM, 12500 Gladstone Ave., Sylmar, Cal. 91342
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
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Tecnetics, Inc., Dept. EM, 1624 Range St. Box 910, Boulder Industrial Park, Boulder, Colo. 80302 .... *

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Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *

Accurate Electronics Co., Dept. EM, 2635 So. Wabash Ave., Chicago, Ill. 60616

Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727

D Adtech Power Inc., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806

D Advanced Control Systems Corp., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830

Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102

American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810

M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.

Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003

Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040

Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307

Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123

Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435

Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086

Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060

Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454

D Dynage, Inc., Power Supply Corp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002

E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343

DM Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002

M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036

M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767

Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303

D Epsco, Inc., Dept. EM, 920 Westwood Dr., Addison, Ill. 60101

M Etatech, Inc., Dept. EM, 187M W. Orangethorpe Ave., Placentia, Cal. 92670

D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan

Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223

HBS Equipment Div., Dept. EM, 3000 Supply Ave., Los Angeles, Calif. 90040

Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304

M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149

M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548

D Lutron Electronics Co., Dept. EM, Coopersburg, Pa. 18036

Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113

Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172

D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705

NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810

North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833

D Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005

Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403

Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560

M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904

Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867

Power Pac, Inc., Dept. EM, 18 Marshall St., South Norwalk, Conn. 06854

Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302

Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109

Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242

D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862

Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735

M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927

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M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
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D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
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Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
Dial Prods. Co., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002
Dynage, Inc., Power Supply Corp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002
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M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
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Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
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- DM Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
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- Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
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- Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
- M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
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M Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
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M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
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D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
M Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
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D **Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470** .... *
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M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
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NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214

Omicron Instruments, Dept. EM, 1710 - 19th St., Santa Monica, Cal. 90404
Oxford Instr. Inc., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403
Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
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Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
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Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
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Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927

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M **Abbott Transistor Labs, Power Supply Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016 .... ***
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D **Alpha Power, Inc., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311 .... ***
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 .... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 .... *
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M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974 .... ***
Electronic Measurements, Dept. EM, 405 Essex Rd., Neptune, N.J. 07753 .. *
Electrostatics Inc., Dept. EM, 7718 Clairemont Mesa Blvd., San Diego, Cal. 92111 .... *
D **Elexon Power Sys., Div. Elpac Inc., Dept. EM, 3131 S. Standard Ave., Santa Ana, Cal. 92705 .... ***
D **Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... ***
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
Ferrotran Elctrn., Dept. EM, 683 Broadway, New York, N.Y. 10012 .... *
Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... ***
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M **Kepco, Inc., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352 .... ***
Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Designs Pacific, Inc., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304 .... *
D **Power/Mate Corp., Dept. EM, 514 S. River St., Hackensack, N.J. 07601 ...... ***
D **Power One, Dept. EM, 531 Dawson Dr., Camarillo, Cal. 93010 .... ***
Power Systems, Inc., Dept. EM, 12 Tobey Rd., Bloomfield, Conn. 06002 .... *
DM **Powertec, Inc., Dept. EM, 9168 DeSoto Ave., Chatsworth, Cal. 91311 .... ***
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137 ***
Reacor, Inc., Dept. EM, 718 Lingco Dr., Richardson, Tex. 75081 .... *
Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Semiconductor Circuits, Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830 *
DM **Sorensen Co., Dept. EM, 676 Island Pond Rd., Manchester, N.H. 03103 ...... ***
M **Spellman High Voltage Elctrns. Corp., Dept. EM, 7 Fairchild Ave., Plainview, N.Y. 11803 .... ***
Standard Power, Inc., Dept. EM, 1400 S. Village Way, Santa Ana, Cal. 92705 *
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D **Tele-Dynamics, Div. of AMBAC, Dept. EM, 525 Virginia Dr., Ft. Washington, Pa. 19034 .... ***
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 .... *
M **Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... ***
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... ***
Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... *
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... *
D Adtech Power Inc., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806
American Power Systems Corp., Dept. EM, 51 Jackson St., Worcester, Mass. 01608
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Erie Technological Products, Dept. EM, PO Box 961, Erie, Pa. 16512
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Intronics Inc., Dept. EM, 57 Chapel St., Newton, Mass. 02158
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
Power-Pack, Inc., Dept. EM, 1 St. John St., Dover, NH 03820
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154

D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Viking Electronics, Dept. EM, 406 2nd St., Hudson, Wisc. 54016
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International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... *
M Kepco, Inc., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352 p. 3274,3275
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D Power One, Dept. EM, 531 Dawson Dr., Camarillo, Cal. 93010 .... *
Power Systems, Inc., Dept. EM, 12 Tobey Rd., Bloomfield, Conn. 06002 .... *
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Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
D Adtech Power Inc., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Anadyne, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D B. H. Industries, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019
DM Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307
Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667

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Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
Deltron, Inc., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynage, Inc., Power Supply Corp., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
M E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
EEP Corp., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045
DM Elasco, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
EMCO High Voltage, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043
D Epsco, Inc., Dept. EM, 920 Westwood Dr., Addison, Ill. 60101
M Etatech, Inc., Dept. EM, 187M W. Orangethorpe Ave., Placentia, Cal. 92670
Firing Circuits Inc., Dept. EM, Muller Ave., Box 2007, Norwalk, Conn. 06852
Function Modules, Inc., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
D Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
Instruments Components Co., Dept. EM, 7239 Industrial Park Blvd., Mentor, Ohio 44060
M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
Keltron Corp., Walden Div., Dept. EM, 225 Crescent St., Waltham, Mass. 02154
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
D Lutron Electronics Co., Dept. EM, Coopersburg, Pa. 18036
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
MIL.Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
M Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Northeast Scientific Corp., Dept. EM, 30 Wetherbee St., Acton, Mass. 01720
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
D Nucleonic Prods., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303
NUCOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Omicron Instruments, Dept. EM, 1710 - 19th St., Santa Monica, Cal. 90404
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M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Power Conversion Products Inc., Dept. EM, 42 East St., Crystal Lake, Ill. 60014
Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
Power Pac, Inc., Dept. EM, 18 Marshall St., South Norwalk, Conn. 06854
Power-Pack, Inc., Dept. EM, 1 St. John St., Dover, NH 03820
Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Reich Associates Inc., Dept. EM, PO Box 73, Plano, Tex 75074
D Reliability Inc., Dept. EM, 8000 Harwin, Houston, Tex. 77036
Robicon Corp., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
M Spacetac, Inc., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Teledyne Philbrick, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
VHF Engrg. Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
Viking Electronics, Dept. EM, 406 2nd St., Hudson, Wisc. 54016
Viking Modules, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
M Wells Electronics, Inc., Weltek Div., Dept. EM, 1801 S. Main St., South Bend, Ind. 46613
M Xentek, Inc., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069

Power Supplies, Standby (Emergency)

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 p. 3154
Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042 .... *
Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 .... *
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... *
D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 p. 3362**
M **Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... ***
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 .... p. 3367
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 .... *
Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974 .... p. 3284
D **Elexon Power Sys., Div. Elpac Inc., Dept. EM, 3131 S. Standard Ave., Santa Ana, Cal. 92705 .... p. 3244**
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
Gates Elctrn. Co., Dept. EM, 526 Van Nest Ave., Bronx, N.Y. 10460 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Nova Electric Mfg. Co., Dept. EM, 263 Hillside Ave., Nutley, N.J. 07110 .... *
Power, Inc., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337 .... *
Reacor, Inc., Dept. EM, 718 Lingco Dr., Richardson, Tex. 75081 .... *
Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 p. 3321
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 p. 3342
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 .... *
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311 .... ***
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 .... p. 3356
D Adapter/Charger Prdts., Dept. EM, P.O. Box 3218 8727 N. Pioneer Rd., Peoria, Ill. 61614
D Adtech Power Inc., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
D Gates Energy Prods., Inc., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
DM Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
D Onan Div-Onan Corp., Dept. EM, 1400 73rd Ave. N.E., Minneapolis, Minn. 55432
Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Teledyne Big Beam, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014
Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Viking Modules, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154

Power Supplies, Strain Guage & Transducer

M **Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042** ...... *
Almond Instrs. Co., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724 ...... *
Alpha Power, Inc., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** ...... *
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 ...... *
Dynamics Elctrn. Prods., Inc., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311 ...... *
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974** ...... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 ...... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
M **Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715** ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 ...... *
D **Power One, Dept. EM, 531 Dawson Dr., Camarillo, Cal. 93010** ...... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 ...... *
Semiconductor Circuits, Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830 *
Sorensen Co., Dept. EM, 676 Island Pond Rd., Manchester, N.H. 03103 ...... *
Standard Power, Inc., Dept. EM, 1400 S. Village Way, Santa Ana, Cal. 92705 *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 p. 3342
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 ...... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
American Vector/TDC, Dept. EM, 201 Culver Rd., Dayton, N.J. 08810
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
DM Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
D Dynisco, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
M Glentek, Inc., Dept. EM, 1559 7th St., Santa Monica, Calif. 90401
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
D Instant Instruments Inc., Dept. EM, 306 River St., Haverhill, Mass. 01830
MIL Electronics, Dept. EM, 176 Walker St., Lowell, Mass. 01854
NJE Corp., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810
Power-Pack, Inc., Dept. EM, 1 St. John St., Dover, NH 03820
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Power Supplies, Test Instruments

ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 ...... *

Power Supplies, TWT

Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402 ...... *
D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022** ...... *
M **Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105** ...... *
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 ...... *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 ...... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** ...... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 ...... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** ...... *
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974** ...... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ...... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 ...... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 ...... *
M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** ...... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
NCR Power Systems Div., Dept. EM, 584 S. Lake Emma Rd., Box 898, Lake Mary, Fla. 32746 ...... *
Power/Mate Corp., Dept. EM, 514 S. River St., Hackensack, N.J. 07601 ...... *
Spellman High Voltage Elctrns. Corp., Dept. EM, 7 Fairchild Ave., Plainview, N.Y. 11803 ...... *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 p. 3342
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 ...... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
M Cal-Power Corp., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245
M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
Keltron Corp., Walden Div., Dept. EM, 225 Crescent St., Waltham, Mass. 02154
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
Northeast Scientific Corp., Dept. EM, 30 Wetherbee St., Acton, Mass. 01720
NUÇOR Corp., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Powercube Corp., Dept. EM, 214 Calvary St., Waltham, Mass. 02154
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Power Supplies, Uninterruptable (UPS)

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 p. 3154
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 ...... *
Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042 ...... *
M **Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055** ...... **p. 3358,3359**
DM **A.L.S. Electronics Corp., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806 p. 3360,3361**
ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 p. 3362
Behlman Engineering Corp., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103 ...... **p. 3365,3367**
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 ...... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** ...... *
California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 ...... **p. 3370**
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 ...... *
Clary Corp., Precision Instrs. Div., Dept. EM, 320 W. Clary Ave., San Gabriel, Cal. 91776 ...... **p. 3373**
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 ...... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 ...... **p. 3377**
M **Eanco, Inc., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974** ...... *
Electronic Measurements, Dept. EM, 405 Essex Rd., Neptune, N.J. 07753 p. 3245
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Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 p. 3381
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General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ...... *
Kepco, Inc., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352 ...... *
LH Research, Inc., Dept. EM, 1821 Langley, Irvine, Cal. 92714 ...... **p. 3282**
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Nova Electric Mfg. Co., Dept. EM, 263 Hillside Ave., Nutley, N.J. 07110 ...... *
Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
Reacor, Inc., Dept. EM, 718 Lingco Dr., Richardson, Tex. 75081 ...... *
RO Assocs., Dept. EM, 3705 Haven Ave., Menlo Park, Cal. 94025 ...... *
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 p. 3321
Stevens-Arnold, Inc., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127 p. 3339
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Technipower, Inc., Dept. EM, Benrus Center, Ridgefield, Conn. 06877 p. 3342
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 p. 3400
Unitron Inc., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041 *
Wilmore Elctrns. Co., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705 ...... **p. 3356**
Accurate Electronics Co., Dept. EM, 2635 So. Wabash Ave., Chicago, Ill. 60616
Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727

- Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
- Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
- D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
- Avtel Div, Unitron Corp., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040
- Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
- Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
- Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
- M Eldec Corp., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036
- D Emerson, Industrial Controls Div., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702
- Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
- M International Power Machines Corp., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149
- M Keltec Florida, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548
- KW Controls Inc., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729
- La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
- D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
- North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
- Power Electronics Corp., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867
- Power Supplies, Inc., Dept. EM, 28 Parker St., Wallingford, Conn. 06492
- Power Systems & Controls, Inc., Dept. EM, 3206 Lanvale Ave., Richmond, Va. 23230
- Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
- D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
- Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
- M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
- Teledyne Inet, Dept. EM, 711 Knox St., Gardena, Cal. 90247
- D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
- Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
- M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
- UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
- Viking Modules, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154
- Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Power Supplies, Unregulated

- **ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054** .... *
- **Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042 p. 3174,3175,3186,3187,3194, Inside Front Cover,**
- **Advanced High Voltage Inc., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402** .... *
- D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
- **Almond Instrs. Co., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724** .... *
- D **Alpha Power, Inc., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311** .... *
- M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022** .... *
- D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101** .... *
- M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
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Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Centronics Data Computer Corp., Dept. EM, Wall St., Hudson, N.H. 03051
Computer Terminal Sys., Dept. EM, 52 Newtown Plaza, Plainview, N.Y. 11803
Computer Transceiver Systems, Dept. EM, 66 E. Midland Ave., Paramus, N.J. 07652
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Control Data Corp., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111
Courier Terminal Systems, Dept. EM, 2202 E. University Dr., Phoenix, Ariz. 85034
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Dataproducts Corp., Dept. EM, 6219 DeSoto Ave., Woodland Hills, Cal. 91365
D Datadyne Corp., Dept. EM, Box 247, King of Prussia, Pa. 19406
M Datalog Div., Litton Sys., Dept. EM, 1770 Walt Whitman Rd., Melville, N. Y. 11746
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Documation, Dept. EM, Box 1240, Melbourne, Fla 32901
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
D Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
Florida Data Corp., Dept. EM, 3308 New Haven Ave., W. Melbourne, Fla. 32901
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell Information Sys Inc, Dept. EM, 200 Smith St, Waltham, Mass. 02154
D Houston Instrument, Div. Bausch & Lomb, Dept. EM, 8500 Cameron Rd., Austin, Tex. 78753
D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
Keltron Corp., Dept. EM, 225 Crescent St., Waltham, Mass. 02154
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
Metra Instruments, Inc., Dept. EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Nu-Metrics, Dept. EM, P.O. Box 800, Connellsville, Pa. 15425
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034
Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
Sweda Int'l., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tally Corp., Dept. EM, 8301 S. 180th St., Kent, Wash. 98103
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Trivex, Dept. EM, 3180 Redhill Ave., Costa Mesa, Cal. 92626
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
D Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Printers, Line, Tape-Listing—See Printers, Digital

Printing, Dry Transfer—See Kits, Marking (Dial Instrument)

Probes, Hall

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 ...... *
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 ...... *
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 ...... *
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ...... p. 2863
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 ...... p. 4347**
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Probes, High-Voltage (1,000 Volts & Over)

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 ...... p. 2802
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** ...... *
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 ...... *
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 ...... p. 4607
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 ...... p. 2855,2863**
M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509** ...... *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ...... p. 2102**
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 ...... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** ...... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** ...... *
D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** ...... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2154**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** ...... *
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Probes, Logic Test

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** ...... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** ...... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 ...... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** ...... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ...... p. 2100
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 ...... *
Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** ...... *
Acron Corp., Dept. EM, 1095 Towbin Ave., Lakewood, N.J. 08701
D Alert Technology, Inc., Dept. EM, 3390 Commercial Ave., Northbrook, Ill. 60062
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077

Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
D Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
DM Kurz-Kasch, Inc., Electronics Div., Dept. EM, 711 Hunter Rd, Wilmington, Ohio 45177
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Probes, Microwave

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Nu-Concept Computer Systems, Inc., Dept. EM, Route 309 and Advance Lane, Colmar, Pa. 18915
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Probes, Oscilloscopes

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... **p. 2802**
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
M Dumont Oscilloscope Labs., Inc., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Leader Instruments Corp., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Vu-data Corp., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... **p. 2823**

Probes, R-F

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... **p. 2802**
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 **p. 2813**
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... **p. 2679**
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... **p. 3611**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 **p. 2159,2191**
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Solar Elctrns. Co., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377

Probes, Temperature

D **Edsyn, Inc., Dept. EM, 15958 Arminta St., Van Nuys, Cal. 91406** .... *
Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... **p. 2855,2863**
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 **p. 4317**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154** .... *
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400** .... **p. 4320,4321**
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... **p. 4324**
D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Burns Engrg., Inc., Dept. EM, 10201 Bren Rd. East, Minnetonka, Minn. 55343
Climatronics Corp., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Degussa Inc., Metals Div., Dept. EM, Route 46 & Hollister Rd., Teterboro, NJ 07608
M GIC Thermodynamics Div., Dept. EM, 4949 Delemere, Royal Oak, Mich. 48073
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Gow-Mac Instr. Co., Dept. EM, 100 Kings Rd., Madison, N.J. 07940
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Marlin Manufacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
D Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
Raytek, Inc., Dept. EM, 1277 Terra Bella Ave., Mountain View, Cal. 94043
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
M Relco Prods., Dept. EM, 5594 E. Jefferson Ave., Denver, Colo. 80237
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempkey Inc., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
D United Sensor & Control Co., Dept. EM, 85 School St., Watertown, Mass. 02172
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Probes, Test Lead

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... **p. 2802**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** .. *
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... **p. 4607**
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... **p. 2823**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... *

D Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
D Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2855
D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
D ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2100,2101
DM Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 p. 2889
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
M Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611
M Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... *
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
D Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
D Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2154-2157,2191
D Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
D Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 .... p. 2932
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
D Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
Datawest Corp., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Automation, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
OAS Inc., Dept. EM, 145 Palasades St., Dobbs Ferry, N.Y. 10522
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Production Process, Div. Ind'l. Marine Elctrns. Inc., Dept. EM, Grenier Ind'l. Park, Londonderry, N.H. 03053
D Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502

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Programmers, Cam & Drum

Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 *
D Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... *
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D Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151

Programmers, Matrix Boards—See Boards, Programming

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Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 p. 1703
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Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083 p. 2684
Curtis Electro Devices, Dept. EM, Box 4090, Mountain View, Cal. 94040
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
MilerTronics, Dept. EM, 303 Airport Rd, Greenville, S.C. 29607

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M AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
M Taurus Corp., Dept. EM, Academy Hill, Lambertville, N.J. 08530 .... *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010

Programmers, Tape

Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054

Programs, Computer

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M University Computing Co., Dept. EM, 7720 N. Stemmons Frwy. Box 4791, Dallas, Tex. 75247

Protectors, Brownout

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 .... *
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Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902

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D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
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D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
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Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
D Aiken Industries, Inc., Mechanical Prod. Div., Dept. EM, 1824 River St. Box 729, Jackson, Mich. 49204
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Triac Electronics, Dept. EM. 200 Park Ave., Ste. 303E, New York, N.Y. 10017
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Public Address Systems

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Argos Products Co., Inc., Dept. EM, 600 S. Sycamore St., Genoa, Ill. 60135
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Encom Prods. Co., Inc., Dept. EM, Lower Hopewell Rd., Box 300, Oxford, Pa. 19363
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Newcomb Audio Products Co., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
D Robins Broadcast & Sound Equipment Corp., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Spectra Sonics, Dept. EM, 770 Wall Ave., Ogden, Utah 84404
Tape-Athon Corp., Dept. EM, 502 S. Isis Ave., Inglewood, Cal 90301

Pullers, Circuit Board

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 .... ***
D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... ***
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D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2787**
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
DM Air Quip-Robleyco, Dept. EM, Box 1118, Richardson, Tex. 75080
DM Calmark Corp., Dept. EM, 4947 Walnut Grove, 4947 Walnut Grove, Cal. 91776
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
DM Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902

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Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

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Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
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D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
D Alert Technology, Inc., Dept. EM, 3390 Commercial Ave., Northbrook, Ill. 60062

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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
M Air-Vac Engrg. Co., Dept. EM, 100 Gulf St., Milford, Conn. 06460
Ametek/Lamb Electric, Dept. EM, 627 Lake St., Kent, Ohio 44240
Brailsford & Co., Dept. EM, 670 Milton Rd., Rye, N.Y. 10580
Coleman Instr. Div., Dept. EM, 2000 York Road, Oak Brook, Ill. 60521
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
D Hull Corp., Dept. EM, Davisville Rd., Hatboro, Pa. 19040
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
Molon Motors & Coil Corp., Dept. EM, 3737 Industrial Ave., Rolling Meadows, Ill. 60008
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
D Red Point Corp., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Vacuum Resch. Mfg., Dept. EM, 3100 Crow Canyon Rd., San Ramon, Cal. 94583
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

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M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... p. 1472**
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Chatsworth Data Corp., Dept. EM, 20710 Lassen St., Chatsworth, Cal. 91311 *
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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Documation, Dept. EM, Box 1240, Melbourne, Fla 32901
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meriam Inc., Dept. EM, Box 2134, Hammond, Ind. 46323
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
True Data Corp., Dept. EM, 17092 Pullman St. #B, Irvine, Cal. 92714
W.V. Industries Inc., Dept. EM, Box 1, Franklin Lakes, N.J. 07417
Western Telematic, Inc., Dept. EM, 3001 Red Hill Ave., Costa Mesa, Cal. 92626

Punches, Chassis

AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... p. 1388
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** p. 2169,2170
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D Di-Acro, Div. Houdaille Inds., Inc., Dept. EM, 316 8th Ave., Lake City, Minn. 55041
D Greenlee Tool Co., Dept. EM, 2136-12th St., Rockford, Ill. 61101

Pyrometers, Infrared

Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Capintec Instruments, Inc., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Ircon Inc., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
Mikron Instr. Co., Dept. EM, Box 211, Ridgewood, N.J. 07451
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Raytek, Inc., Dept. EM, 1277 Terra Bella Ave., Mountain View, Cal. 94043
Sensors, Inc., Dept. EM, 3908 Varsity Dr., Ann Arbor, Mich. 48104
D Wahl, Wm. Corp., Dept. EM, 12908 Panama St., Los Angeles, Cal. 90066

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Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
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D Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617

Pyrometers, Recording

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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
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M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
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General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
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D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913

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Racks, Relay & Mounting—See Enclosures, Circuit Board, Module & Relay Mounting

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Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 p. 3058
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** ...... p. 2995
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
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M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
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Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
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Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
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ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101

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* – Company has information in this edition but not on this product.

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DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

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M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 ***
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Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... p. 3280
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
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Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111

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Reactors, Filter

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Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
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Data Peripheral Inc., Dept. EM, 14 Porter St., Hackensack, N.J. 07601
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Rolm Corp., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal: 91311
Sweda Int'l., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teleterminal Corp., Dept. EM, 12 Cambridge St., Burlington, Mass. 01803
TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Readouts—See Tubes, Readout

Reamers

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Receivers, A-M/F-M (Including Precision Test)

Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 p. 2994
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
D Trutone Elctrns., Inc., Dept. EM, 7315 Fulton Ave., No. Hollywood, Cal. 91605
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Waller Corp., Dept. EM, PO Box 340, Crystal Lake, Ill. 60014
Weltron Co., Inc., Dept. EM, 260 Bethpage Spagnoli Rd., Melville, N.Y. 11746

Receivers, Beacon

M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180 .... ***
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St. Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
L-Tronics, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Receivers, Communication

Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... p. 2899
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133

M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
ASC Systems Corp., Dept. EM, 155 W. Main St., Rockville, Conn. 06066
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Iwata Electric Co., Ltd., Dept. EM, 1-16 Chome Soto-Kanda, Chiyoda-ku Tokyo, Japan
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Signatron, Inc., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Field Intensity, Microwave—See Receivers, Microwave

Receivers, Fixed Frequency

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
M Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Radio Development Lab., Dept. EM, Box 164, Deer Park, NY 11729
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Frequency Shift

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Receivers, Headphone—See Handsets, Etc.

Receivers, Loran & Omega

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... **p. 2407**
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250

Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721

Receivers, Microwave

M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 p. 2994
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
M E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
M Electro-Metrics, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M ITT Gilfillan Div. of ITT, Dept. EM, 7821 Orion Ave., Van Nuys, Calif. 91409
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Receivers, Monitoring, Communications

Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** p. 2994
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
E-Systems Inc., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Robyn International Inc., Dept. EM, Box 478 10901 Northland Dr., Rockford, Mich 49341
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Multiplex

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM Rotel of America, Inc., Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Weltron Co., Inc., Dept. EM, 260 Bethpage Spagnoli Rd., Melville, N.Y. 11746

Receivers, Navigation

M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
L-Tronics, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111

Receivers, NBS

Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Efratom California, Inc., Dept. EM, 3303 Harbor Blvd., Costa Mesa, Cal. 92626

Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Panoramic

Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
M **Polarad Elctrn. Instrs., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040** *
M **Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041** *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Nelson Ross Elctrns., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Phase Lock

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
M HRB-Singer, Inc., Dept. EM, Science Park, Box 60, State College, Pa. 16801
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receivers, Radar

Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
DM Radatron Corp., Dept. EM, 2424 Niagara Falls Blvd., N. Tonawanda, NY 14120
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Receivers, Single-Sideband

Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Cushman Electronics, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Receivers, Time Code

M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
McKay Dymek Co., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625

Receivers, Tone

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 p. 1469
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *

D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Cermetek, Inc., Dept. EM, 660 National Ave., Mountain View, Cal. 94040
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Receivers, TV—See Monitors, Video

Receivers, VLF

M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Micro Tech Mfg., Inc., Sub. Sprague Electric Co.; Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Singer Co., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Receptacles—See Connectors; Jacks; Sockets

Recorders, Computer Data

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** ...... *
M **Clary Corp., Precision Instrs. Div., Dept. EM, 320 W. Clary Ave., San Gabriel, Cal. 91776** .... *
Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 p. 2962,2963
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Practical Automation, Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484 *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 2973
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
Applied Data Commun., Dept. EM, 1509 E. McFadden Ave., Santa Ana, Cal. 92705
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
D Auto Trol Corp., Dept. EM, 5650 N. Pecos St., Denver, Colo. 80221
Bell & Howell Co., Elctrns. & Instrs. Grp., Dept. EM, 360 Sierra Madre Villa, Pasadena, Cal. 91109
Braemar Computer Devices, Dept. EM, 11950 Twelfth Ave. S., Burnsville, Minn. 55337
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
D Cipher Data Products, Dept. EM, 5630 Kearny Mesa Rd., San Diego, Cal. 92111
ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Data Recording Sys., Sub. American Videonetics Corp., Dept. EM, 432 Toyama Dr., Sunnyvale, Cal. 94086
Datacom, Inc., Dept. EM, Box 278, Ft. Walton Beach, Fla. 32548
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
Epicom, Inc., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701
D Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
M Genisco Tech. Corp., Tape Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Houston Instrument, Div. Bausch & Lomb, Dept. EM, 8500 Cameron Rd., Austin, Tex. 78753
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Image Graphics, Inc., Dept. EM, 1525 Kings Hwy., Fairfield, Conn. 06430
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
D Intern'l. Computer Prods., Inc., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Memodyne Corp., Dept. EM, 369 Elliot St., Newton Upper Falls, Mass 02164
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Micro Communications Corp., Dept. EM, 80 Bacon St., Waltham, Mass. 02154
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
D Redactron Corp., Dept. EM, 100 Parkway Dr. S., Hauppauge, N.Y. 11787
Sharp Electronics Corp., Dept. EM, 2 Sharp Plaza P.O. Box 389, Paramus, N.J. 07652
Sycor, Dept. EM, 100 Phoenix Dr., Ann Arbor, Mich. 48104
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Time Share Peripherals Corp., Dept. EM, Route 6, Bethel, Conn. 06801
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043
Varian Data Machines, Dept. EM, Box C-19504, Irvine, Cal. 92713
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Recorders, Electrostatic

Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
D Houston Instrument, Div. Bausch & Lomb, Dept. EM, 8500 Cameron Rd., Austin, Tex. 78753
Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Recorders, Event

M **Clary Corp., Precision Instrs. Div., Dept. EM, 320 W. Clary Ave., San Gabriel, Cal. 91776** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 ...... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... p. 2827
D **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224** p. 2962,2963
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
D **Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 p. 2968
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
M Alden Sys. Co., Inc., Dept. EM, Box A, Dept. 262, Westboro, Mass. 01581
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Astro-Med, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Data, Inc., Dept. EM, 210 S. Mason, Box 2071, Ft. Collins, Colo. 80521
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445

Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
Engdahl Enterprises, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626
Epicom, Inc., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701
D General Scanning, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Linear Instrs. Corp., Dept. EM, 17282 Eastman Ave., Irvine, Cal. 92714
Memodyne Corp., Dept. EM, 369 Elliot St., Newton Upper Falls, Mass 02164
M Photron Instrument Co., Dept. EM, 6516 Detroit Ave., Cleveland, Ohio 44102
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Stoelting Co., Dept. EM, 1350 S. Kostner Ave., Chicago, Ill. 60623
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Recorders, F-M—See Recorders, Magnetic Tape

Recorders, Film Strip, Magnetic

International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 *

M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
Image Graphics, Inc., Dept. EM, 1525 Kings Hwy., Fairfield, Conn. 06430
D Intern'l. Computer Prods., Inc., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830

Recorders, Graphic—See Recorders, Specific Types

Recorders, Magnetic Tape (Reel & Cartridge)

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 ...... ***
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ...... *
Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 ...... p. 1114
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115
M **MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 ...... ***
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 ...... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
AcroSys, Dept. EM, Box 687, Philomath, Ore. 97370
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
Applied Data Commun., Dept. EM, 1509 E. McFadden Ave., Santa Ana, Cal. 92705
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Audiotronics, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bell & Howell Co., Elctrns. & Instrs. Grp., Dept. EM, 360 Sierra Madre Villa, Pasadena, Cal. 91109
Braemar Computer Devices, Dept. EM, 11950 Twelfth Ave. S., Burnsville, Minn. 55337
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
California Computer Prods., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801
Carolina Medical Elctrns., Inc., Dept. EM, U.S. 52 Expwy., Box 307, King, N.C. 27021
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Data, Inc., Dept. EM, 210 S. Mason, Box 2071, Ft. Collins, Colo. 80521
Data Recording Sys., Sub. American Videonetics Corp., Dept. EM, 432 Toyama Dr., Sunnyvale, Cal. 94086
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Digi-Data Corp., Dept. EM, 8580 Dorsey Rd., Jessup, Md. 20794
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
D Emerson, Industrial Controls Div., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
Epicom, Inc., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701
M Genisco Tech. Corp., Special Products Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
M Genisco Tech. Corp., Tape Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
Heitz, Inc., Karl, Dept. EM, 979 Third Ave., New York, N.Y. 10022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
D Interdyne, Intercette Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91401
D Intern'l. Computer Prods., Inc., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Micro Communications Corp., Dept. EM, 80 Bacon St., Waltham, Mass. 02154
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Mohawk Data Sciences Corp., Administrative Hdqts., Dept. EM, Palisade St., Herkimer, N.Y. 13350
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Newcomb Audio Products Co., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342
M Pemtek, Inc., Dept. EM, 942 Commercial St., Palo Alto, Cal. 94303
DM Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
D Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
D Redactron Corp., Dept. EM, 100 Parkway Dr. S., Hauppauge, N.Y. 11787
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
Sycor, Dept. EM, 100 Phoenix Dr., Ann Arbor, Mich. 48104
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043
DM V-M Corporation, Dept. EM, Box 1247, Benton Harbor, Mich 49022
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404

Recorders, Polar

Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *

Astro-Med, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893
Brinkmann Instrs., Inc., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Recorders, Pyrometer—See Pyrometers, Recording

Recorders, Sound Level

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ...... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ...... ***
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817 ...... ***
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Bell & Howell Co., Elctrns. & Instrs. Grp., Dept. EM, 360 Sierra Madre Villa, Pasadena, Cal. 91109
D Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Emerson, Industrial Controls Div., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702
Epicom, Inc., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701
M Genisco Tech. Corp., Special Products Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106

Recorders, Strip-Chart

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ...... *
D **Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
D **Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818 ...... p. 2966,2967**
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 ...... p. 2391
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108 ...... p. 2879**
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 p. 2883

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 p. 2968,2969
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... p. 2970,2971
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... p. 2927**
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Analytical Measurements, Dept. EM, 31 Willow St., Chatham, N.J. 07928
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
D Astro-Med, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893
D Auto Trol Corp., Dept. EM, 5650 N. Pecos St., Denver, Colo. 80221
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Bausch & Lomb, A.S. Div., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Brinkmann Instrs., Inc., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590
Coleman Instr. Div., Dept. EM, 2000 York Road, Oak Brook, Ill. 60521
Control Products Division, Devar Inc., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
D General Scanning, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
D Houston Instrument, Div. Bausch & Lomb, Dept. EM, 8500 Cameron Rd., Austin, Tex. 78753
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
D IMPACT-O-GRAPH Div., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
DM Laboratory Data Control, Div. M. Roy Corp., Dept. EM, Box 10235, Riviera Beach, Fla. 33404
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Linear Instrs. Corp., Dept. EM, 17282 Eastman Ave., Irvine, Cal. 92714
Marlin Manufacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
Metrosonics, Inc., Dept. EM, Box 18090, Rochester, N.Y. 14618
M Photron Instrument Co., Dept. EM, 6516 Detroit Ave., Cleveland, Ohio 44102
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
DM Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
VirTis Co., Dept. EM, Rte. 208, Gardiner, N.Y. 12525
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106
Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Recorders, Transient

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... ***
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Data Acquisition Prods. Lab., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446 .... *
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ...... *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 p. 2965
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 ...... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
Echo Science Corp., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Physical Data, Inc., Dept. EM, 8220 S.W. Nimbus Ave., Beaverton, Ore. 97005
Programmed Power, Div., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025
QuantaLog, Inc., Dept. EM, 42 Enterprise Drive, Ann Arbor, Mich 48103
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Westronics, Dept. EM, 5050 Mark IV Pkwy. Box 4619, Fort Worth, Tex. 76106
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Recorders, Vibration

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
D Astro-Med, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
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Image Graphics, Inc., Dept. EM, 1525 Kings Hwy., Fairfield, Conn. 06430
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Mura Corp., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590
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Rectifiers, Germanium

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Rectifiers, Silicon Controlled—See Thyristors

Rectifiers, Thyratron—See Tubes, Thyratron

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D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
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Reference Books—See Technical Books

References, D-C Voltage

Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 2978
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D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Power Components, Inc., Dept. EM, 21243 Vendura Blvd., Woodland Hills, Cal. 91364
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880

Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
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GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Heeger Inc., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021
M Miller-Stephenson Chem. Co., Inc., Dept. EM, George Washington Hwy., Danbury, Conn. 06810
D Rawn Co., Inc., Dept. EM, Box 9, Spooner, Wisc. 54801
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D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D Associated Environmental Systems, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
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M Cincinnati Sub-Zero Products, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206
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D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
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D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
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D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
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DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
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D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
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M Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505
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M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
M Bendix, Electric & Fluid Power Div., Dept. EM, Hwy. 35, Eatontown, N.J. 07724
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
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Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
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Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M Acromag, Inc., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Electro Control, Inc., Dept. EM, Matthews Ave., Canton, Miss. 39046
D Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Relays, Differential

Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Relays, Frequency Selective

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 .... *
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Southwood Electronic Co., Dept. EM, 7624 Lindenwood Dr., Indianapolis, Ind. 46227
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Relays, General Purpose

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** p. 3409,3411
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** p. 3414,3415,3418,3419,3424,3425
ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 .... *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... p. 3449,3450
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
D **Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105** *
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** p. 3458-3460
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DM **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220** .... *
Elmwood Sensors, Inc., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... p. 3516-3520
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 *
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... p. 3538-3541,3545-3547, Inside Front Cover,
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ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 3554-3556,3558,3559
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Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... p. 3586-3588
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D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... p. 3612**
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 3488-3493,3510,3511**
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Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Davis Elec. Co., Dept. EM, Box 38, Cape Girardeau, Mo. 63701
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Wheelock Signals, Dept. EM, 273 Branchport Ave., Long Branch, N.J. 07740

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Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
Crydom Controls, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245 .... p. 3553
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
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Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
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Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
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D Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
D Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
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D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Triridge Corp., Dept. EM, P. O. Box 519, Goleta, CA. 93017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

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D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... ***
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D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... ***
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 .... ***
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M **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... ***
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Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 .... *
M Argent Electronics, Inc., Dept. EM, 477 E. Wenger Rd., Dayton, Ohio 45322
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
D Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
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Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
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Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630

MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757

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A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** p. 3412
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** ...... p. 3417
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... p. 3438,3447
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Elec-Trol, Inc., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350** p. 3480
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... *
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180** *
DM **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220** .... p. 3482,3483
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... p. 3519
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 3556
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
M **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** .... *
DM **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003** p. 3575-3577,3579
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 p. 3583
Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... p. 3592
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
DM **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... p. 3612
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897** .... p. 3615
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... p. 3616,3617
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 ...... p. 3629
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
DM De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
DM Meko Instrument Co., Dept. EM, 1311 Air Way, Glendale, Cal. 91201
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
M Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Triridge Corp., Dept. EM, P. O. Box 519, Goleta, CA. 93017
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
D Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

Relays, Mercury Displacement

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** p. 3407
Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 3438
D **Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514** .... *
Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734 .... p. 3477
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 ...... p. 3631
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
D Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
M PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Mercury-Wetted Contacts

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** p. 3407
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** .... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... p. 3426-3432
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
DM **Elec-Trol, Inc., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350** . *
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... p. 3477
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180** p. 3487
D **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 3515
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... p. 3589
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 ...... p. 3631
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
DM Meko Instrument Co., Dept. EM, 1311 Air Way, Glendale, Cal. 91201
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
D QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071

D Triridge Corp., Dept. EM, P. O. Box 519, Goleta, CA. 93017
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Meter

Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** .... *
Electro Industries, Dept. EM, 109 Nassau Dr., Albertson, NY 11507 .... *
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Jewell Electrical Instruments, Inc., Dept. EM, Grenier Field, Manchester, N.H. 03108** .... p. 2879
LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 .. *
Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 .... *
A & D Electrical Instruments, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
D Int'l. Instrs., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Motor Start

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** *
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** .... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
D **Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514** .... *
Elmwood Sensors, Inc., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907 *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... *
DM **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003** .... *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
D **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... *
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
E-T-A Prods. Co. America, Dept. EM, 7400 N. Croname Rd., Chicago, Ill. 60648
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
KB Electronics Inc., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

Relays, Overload

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Crydom Controls, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602** *
Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 4136
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
DM **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
E-T-A Prods. Co. America, Dept. EM, 7400 N. Croname Rd., Chicago, Ill. 60648
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
D Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Relays, Phase-Sensing

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Betamite Electronic Dev., Dept. EM, 6321 W. Slauson Ave., Culver City, Cal. 90230
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Relays, Plate Circuit

Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 .... *

D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 *
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
DM **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Davis Elec. Co., Dept. EM, Box 38, Cape Girardeau, Mo. 63701
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

Relays, Plug-in

D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** p. 3409,3411
Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** p. 3419,3420,3422-3424
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... p. 3430,3431
Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 *
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... *
Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 p. 3459,3460
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... p. 3464
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180** *
DM **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220** .... p. 3482
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... *
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... p. 3531
DM **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 *
ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 3558,3559
DM **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003** .... *
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... p. 3587
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... p. 3594-3596,3599-3602,3605-3608
D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001** .... p. 3612
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... p. 3613
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... p. 3488,3489,3507,3512,3513
T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... *
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 .... *
Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
DM North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
DM Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
DM WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218

Relays, Polarized

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** *
D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** .... *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** .... *
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 .... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... *
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 .... *
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... *
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180** *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 3562
DM **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003** .... *
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001** .... p. 3612
M **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Cook Elec. Co., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
M Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101

Relays, Power

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *

D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092** .... p. 3421,3425
ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 .... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
D **Crydom Controls, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245** .... *
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** p. 3461
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... p. 3467
D **Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514** .... p. 3473-3476
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... *
Elmwood Sensors, Inc., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... p. 3520
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** .... *
DM **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096** .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 4136
Kurman Relay, Dept. EM, 120 Wilbur Place, Bohemia, N.Y. 11716 .... p. 3564
DM **Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003** p. 3576-3579
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 p. 3583
Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 4149
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 p. 3614
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... p. 3592
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D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... p. 3603,3604
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D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001** .... p. 3612
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... p. 3492-3503,3510-3513
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897** .... *
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Davis Elec. Co., Dept. EM, Box 38, Cape Girardeau, Mo. 63701
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
M Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
King-Seeley Thermos Co., King-Seeley Div. Thermos Co., Dept. EM, Box 423, Kendallville, Ind. 46755
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Relays, Printed Circuit Mounting (Including Transistor & DIP Case Types)

D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714** p. 3410-3412
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... p. 3968
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D **Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514** .... *
DM **Elec-Trol, Inc., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350** p. 3478-3481
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734** .... p. 3477
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Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... p. 3516,3519
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** .... p. 3521
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Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... p. 3616,3617,3619-3624
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D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
D Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hughes Aircraft Co., Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N.J. 08723

ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Thermosen, Inc., Dept. EM, 375 Fairfield Ave., Stamford, Conn. 06904
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
DM WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218

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General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... p. 3529,3530**
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D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498

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Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 p. 3407
American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 ***
D **Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 .... ***
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M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220 .... p. 3003**
D **Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734 .... ***
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M **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220 .... p. 3483**
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M **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... ***
DM **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 .... ***
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 p. 3560-3562,4136
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103 p. 3565,3568-3570**
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... ***
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DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 .... ***
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 .... *
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757

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D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 p. 3407**
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092 p. 3416,3417**
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DM **Elec-Trol, Inc., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350 p. 3478-3480**
Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734 .... *
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180 p. 3485-3487**
DM **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220 .... p. 3484**
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D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... ***
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Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 p. 4261
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 p. 3628-3630
Acrodyne Controls, Dept. EM, Box 1044, Janesville, Wisc. 53545
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Electro Control, Inc., Dept. EM, Matthews Ave., Canton, Miss. 39046
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
D Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648
Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hasco Components, Dept. EM, 920-18 Baychester Ave., Bronx, N.Y. 10475
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
DM Meko Instrument Co., Dept. EM, 1311 Air Way, Glendale, Cal. 91201
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Thermosen, Inc., Dept. EM, 375 Fairfield Ave., Stamford, Conn. 06904
D Triridge Corp., Dept. EM, P. O. Box 519, Goleta, CA. 93017
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Wheelock Signals, Dept. EM, 273 Branchport Ave., Long Branch, N.J. 07740

Relays, Rotary

M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
D **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 .... ***

Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 ..... *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 ..... ***
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 ..... ***
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 ..... *
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
D WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218

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D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 ***
D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 p. 3409**
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092 p. 3421,3422**
ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 ..... *
Barber-Colman Co., Motor Div., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101 ..... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 ..... ***
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 ..... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ..... *
DM **Elec-Trol, Inc., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350 .. ***
Electronics Applications Co., Dept. EM, 4918 Santa Anita Ave., El Monte, Cal. 91734 ..... *
D **Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180 ***
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Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 ..... *
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 ..... ***
DM **Hi-G Co., Inc., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096 ..... ***
ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 ..... p. 3554-3556,3558,3559
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Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
DM **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 ..... p. 3616,3617**
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 ..... *
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
DM De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electro Design Systems, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
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ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
DM WABCO Aerospace Dept., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Relays, Solid-State

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 p. 3407**
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 ..... ***
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 ..... p. 3439-3444**
D **Crydom Controls, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245 ..... p. 3552,3553**
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 p. 3461**
D **Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 ..... p. 3464,3467-3470**
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D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 ..... ***
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Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
D Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
D Elctrn. Control Co., Dept. EM, Box S150, Dresher, Pa. 19025
D Electronic Relays, Inc., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648

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Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
D Fairchild Industrial Prods. Div., Dept. EM, 75 Mall Dr., Commack, N.Y. 11725
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
D Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
D Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Theta-J Relays, Inc., Dept. EM, 1 De Angelo Drive, Bedford, Mass 01730
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
D Vectrol, Inc., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850
Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284
Y-L Products Co., Inc., Dept. EM, Box 188, Yeadon, Pa. 19050

Relays, Stepping

D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 3451**
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... ***
Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188 .... *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... ***
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... ***
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... p. 3612
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
D Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Telephone

D **American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 .... ***
D **Arrow-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092 .... ***
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 3446-3448**
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... ***
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 *
ITT Comps. Capacitors, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845 .... p. 3554-3556
Liberty Controls, Inc., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431 *
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... p. 3589
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... ***
D **Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 .... p. 3612**
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... ***
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Davis Elec. Co., Dept. EM, Box 38, Cape Girardeau, Mo. 63701
D Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
Executone, Printact Relay Div., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Omega Electric, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
M Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Thermal

Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 p. 3454,3455
Elctrn. Instr. & Specialty, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180 *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
Allis-Chalmers, Dept. EM, Box 512, Milwaukee, Wisc. 53201
DM Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
King-Seeley Thermos Co., King-Seeley Div. Thermos Co., Dept. EM, Box 423, Kendallville, Ind. 46755
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
M Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Relays, Time-Delay

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 ***
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *

D American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 .... *
D Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... *
M Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
D Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
D Cornell-Dubilier Electronics, Dept. EM, 150 Avenue "L", Newark, N.J. 07105 *
D Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... *
D Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 .... *
D Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514 .... p. 3471
DM Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... *
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 p. 3551
DM Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... p. 3528-3536
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 .... *
DM Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
D Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
D Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
M North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
D Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
D Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... p. 3606-3609
M Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... p. 3613
DM Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 3508,3512,3513
T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... p. 3615
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
Amperite Co., Inc., Dept. EM, 600 Palisade Ave., Union City, N.J. 07087
D Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
D Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
M Argent Electronics, Inc., Dept. EM, 477 E. Wenger Rd., Dayton, Ohio 45322
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Babcock Electronics, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626
M Betamite Electronic Dev., Dept. EM, 6321 W. Slauson Ave., Culver City, Cal. 90230
M Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
M Deutsch Relays, Inc., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
DM Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
D Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
Jay-El Prods., Dept. EM, 1859 W. 169th St., Gardena, Calif. 90247
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
La Marche Mfg. Co., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
DM Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505
Y-L Products Co., Inc., Dept. EM, Box 188, Yeadon, Pa. 19050
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Relays, Transistor & DIP Case Types—See Relays, Printed Circuit Mounting

Relays, Vacuum Contact

D Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 3560
DM Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103 .. p. 3565-3567
M Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
DM Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 p. 3626,3627
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Vibrating Reed

Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D QTron Corp., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Relays, Voltage Sensitive

D American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 .... *
M Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
Crydom Controls, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245 .... p. 3552
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... p. 3464
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... p. 3516,3518,3519
D Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
Heinemann Elec. Co., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602 *
DM Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... *
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DM Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
DM Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250 .... p. 3620
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M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
DM General Automatic Corp., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840

DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D ITT Comps. Relays, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Magnecraft Elec. Co., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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D Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
M Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
M Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

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Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** ...... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .. p. 3949
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** ...... *
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
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C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
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M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
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D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

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D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** ...... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 ...... *
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501

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D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** p. 3774
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DM **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** ...... p. 3778,3779
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Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ...... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
M **Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204** ...... p. 3701
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M **Resistors, Inc., Dept. EM, 5226 W. 26th St., Chicago, Ill. 60650** ...... p. 3731
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TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 ...... *
D **TRW/IRC Potentiometers, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733** ......Inside Back Cover,
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ...... *
D **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** ...... *
Weston Components & Controls, Div. Sangamo Weston Inc., Dept. EM, Archbald, Pa. 18403 ...... p. 3856,3857
Wilbrecht Electronics, Inc., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107 *
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Diplohmatic Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
M Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
M New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
DM Techno-Comps. Corp., Dept. EM, 7803 Lemona, Van Nuys, Cal. 91405
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
DM Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

Resistors, Ballast (Including Tube & Solid State Devices)

D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** ...... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 ...... *
D **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** ...... *
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
D Taiyo Denki Co., Ltd., Dept. EM, 225-3 7-cho Nakamachi, Ohtori, Sakai City, Japan 593
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2

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American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 ...... p. 3632
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M **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** ...... p. 3688,3689
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D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** p. 1254
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D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** ...... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** ...... p. 3713
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 ...... p. 3734

D **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... ***
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Capar, Dept. EM, 303 Crossways Park Dr., Woodbury, N.Y. 11797
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
DM Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
DM Kahgan Electronics Corp., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D Taiyo Denki Co., Ltd., Dept. EM, 225-3 7-cho Nakamachi, Ohtori, Sakai City, Japan 593
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284
DM Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Ceramic Core

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3662**
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E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
M **Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... p. 3701**
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 3705**
Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 p. 3708,3709
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 p. 3712**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 p. 3762,3763
TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 *
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M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
Stackpole Carbon Co., Electronic Comps. Div./Soft Ferrites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
DM Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Ceramic Metal (Cermet)

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DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
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DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Tri-Sage Inc., Dept. EM, 1212 Pittsford-Victor Rd., Pittsford, NY 14534

Resistors, Chip (For Microcircuits)

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
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Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... ***
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D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 3690,3691**
M **Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 p. 3699**
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3716,3717**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
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D **Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... p. 1383**
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Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
M Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Film Microelectronics, Inc., Dept. EM, 17 A St., Burlington, Mass 01803
M HyComp Inc., Dept. EM, Box 250, Maynard, Mass. 01754
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
M Western Microsystems, Inc., Dept. EM, Box 23192, San Diego, Cal. 92123

Resistors, Composition, Carbon

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** p. 3635
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... p. 3674
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2041
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735** .... p. 3734
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 ....Inside Back Cover,
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
M CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
Stackpole Carbon Co., Electronic Comps. Div./Soft Ferrites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Decade

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... p. 3671
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
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Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Resistors, Disc, Rod & Tube

D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
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D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... *
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... p. 3717
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M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** .... *
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492

Resistors, Film, Metallized & Non-Metallized

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3634
DM **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428** .... p. 3633
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DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... p. 3683
M **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** ....p. 3686,3688,3689,3691
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 p. 3699
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... p. 3713
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3714-3717
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Stackpole Components Co., Dept. EM, Box 14466, Raleigh, N.C. 27610 p. 3735
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D **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** Inside Back Cover,
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** Inside Back Cover,
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... p. 1383
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... *
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... p. 3770
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
DM Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Halex, Inc., Dept. EM, Box 2940, Torrance, Cal. 90509
D International Sensor Systems, Inc., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818
DM Kahgan Electronics Corp., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
M Mepco/Electra, Dept. EM, Box 760, Mineral Wells, Tex. 76067
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M.I.A.L. U.S.A., Inc., Dept. EM, 173 Franklin Ave., Nutley, N.J. 07110
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
M Res-Net Corp., Dept. EM, 53 F South Jefferson Rd., Whippany, N.J. 07981
D Sakata USA Corp., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
D Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
DM Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2

Resistors, Flame Retardant

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *

D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... *
DM **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... *
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** .... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... p. 3724
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
D **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** Inside Back Cover,
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108** Inside Back Cover,
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
DM Kahgan Electronics Corp., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2

Resistors, Fuse

Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 3685
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
ISL Products Ltd. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803 p. 3694
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 4157
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... p. 3725
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** *
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DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108** Inside Back Cover,
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Glass

DM **Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740** *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... p. 3764,4521
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Heat Sink Encased—See Resistors, Integral Heat Dissipator

Resistors, High Frequency

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Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 p. 3645
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... *
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... *
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
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M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** .... *
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M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... *
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
D Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
M Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677

Resistors, High Megohm (Over 22 Megohms)

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M **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428** .... p. 3632
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D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 3685,3689
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M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
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D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... p. 3715
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M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
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M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** .... *
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Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005

Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
D Mepco/Electra, Dept. EM, Box 760, Mineral Wells, Tex. 76067
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2

Resistors, High Temperature (Over 125 C)

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3632
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 p. 3641
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3657,3661,3662,3664,3666,3667,3669**
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... ***
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 3834,3835
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... ***
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 4157
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
M **Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... p. 3701**
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 p. 3706,3707**
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 p. 3710,3711**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 p. 3759-3761
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 .... Inside Back Cover, -
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 .... ***
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... p. 3764-3766**
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3770
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M Mepco/Electra, Dept. EM, Box 760, Mineral Wells, Tex. 76067
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

Resistors, High Voltage (1,000 Volts & Over)

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3632**
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 p. 3644**
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3657-3661,3665,3666,3671**
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 .... *
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 3689**
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 3515
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ...... p. 3696,3697
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... p. 3700
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 p. 3710,3711**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 3876**
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3714**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 3722**
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Stackpole Components Co., Dept. EM, P.O. Box M, Farmville, Va. 23901 p. 3848
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 .... Inside Back Cover,
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 Inside Back Cover,**
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... p. 3764-3769,4521**
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... ***
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M CTS Microelectronics, Inc., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906
D Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
DM Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Oneida Electronics Mfg., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Hot Molded

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3635**
DM **Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 ***
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3658,3668,3669
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 .... p. 3689
E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... p. 3692
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 ***
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... p. 3695**
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 p. 3706,3709**
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 .... ***
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 3727,3730**

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 Inside Back Cover,**
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,**
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Resistors, Integral Heat Dissipator

D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
M **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 3685,3686,3688
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... p. 3697
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... p. 3701
Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 3704,3705
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106** p. 3711
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... p. 3876
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... p. 3719,3722
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... p. 3760
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209

Resistors, Low Temperature Coefficient

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
DM **American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428** .... *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... p. 3657,3668,3670
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830** .... *
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *
D **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601** .... p. 3689
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... p. 3706
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106** .... *
M **Precision Resistor Co., Inc., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205** *
DM **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... *
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
M **Resistors, Inc., Dept. EM, 5226 W. 26th St., Chicago, Ill. 60650** .... *
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601** *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607** .... *
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... *
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... *
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
DM Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
M Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M Mepco/Electra, Dept. EM, Box 760, Mineral Wells, Tex. 76067
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Piher Corp., Dept. EM, 399 Washington St., Woburn, Mass. 01801
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
D Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Metal Glazed

American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3632
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634** .... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... p. 3706
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 .... **Inside Back Cover,**
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 Inside Back Cover,**
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** .... p. 3765
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
D Moririca Elctrns., Ltd., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054

Resistors, Microwave

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2811
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507** .... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... p. 3717
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... *
DM **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355** .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
M Electrotec Inc., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Resistors, Negative Temperature Coefficient

D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 ... ***
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 ... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 ... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ... *
E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 ... *
Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701 ... *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ... *
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 ... ***
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 ... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ... ***
DM **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 ... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... ***
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 ... ***
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 ... ***
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 ... ***
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... ***
M Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Eltec Instruments Inc., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
DM Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Non-Inductive

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 ... ***
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 ... ***
Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 ... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 ... p. 3658,3660,3663-3665**
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 ... p. 3674
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 ... ***
M **Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ... ***
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 ... ***
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 ... ***
D **General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 ***
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 ... ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 ... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 ... *
Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 ... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 ... p. 3703,3704**
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 ... p. 3706**
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 ... ***
M **Precision Resistor Co., Inc., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205 ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 ... ***
M **Resistors, Inc., Dept. EM, 5226 W. 26th St., Chicago, Ill. 60650 ... ***
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 ... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
M **Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 p. 3762,3763**
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 ... Inside Back Cover,
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 ... ***
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 ... ***
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 ... ***
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... ***
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
DM Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
DM Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
DM Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
D Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
DM Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Oil Filled

M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 ... ***
Electro-Techniques, Inc., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054 p. 3838,3839
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 ... ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 ... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 ... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ... *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... *
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
M Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103

Resistors, Plug-In

Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 ... *
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 ... *
Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 ... ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 ... *
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 ... *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 ... *
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 ... *
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 ... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405

Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112

Resistors, Positive Temperature Coefficient

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3669
D **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... ***
D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... ***
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 .... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 ...... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... ***
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 .... *
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067 .... p. 4322**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
M **Precision Resistor Co., Inc., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205 ***
DM **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 3723**
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 .... ***
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 .... ***
Varadyne Industries, Inc., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404 .... *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... ***
M **Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... ***
DM Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
M LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
DM Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
M Vermont Precision Resistor Co., Dept. EM, Box 1170, Stowe, Vt. 05672
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Power (2 Watts & Over)

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 p. 3635
American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3632
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Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 p. 3644,3645
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 p. 2811
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... p. 3656,3658,3660-3665,3668,3670**
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... p. 3674
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 p. 3680,3681**
DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 .... ***
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *
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E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... p. 3692
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 p. 3693
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2052
D **Kelvin, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411 ...... p. 3696,3697**
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... p. 3695**
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 4157
Mills Resistor Co., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720 p. 3698
M **Milwaukee Resistor Corp., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204 .... p. 3700,3701**
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
DM **Nytronics Comps. Group Inc., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532 .... p. 3704,3705**
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 p. 3706-3709,3842**
D **Omtronics Mfg., Inc., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106 p. 3710-3712**
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
M **Precision Resistor Co., Inc., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205 ***
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... p. 3714,3717**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... p. 3719,3720,3722,3724,3727,3730**
M **Resistors, Inc., Dept. EM, 5226 W. 26th St., Chicago, Ill. 60650 .... p. 3731**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Stackpole Carbon Co., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735 .... p. 3734
M **Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 p. 3759-3762**
TRW/IRC Networks, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411 ....Inside Back Cover,
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 Inside Back Cover,**
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 Inside Back Cover,**
DM **TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 Inside Back Cover,**
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... p. 3764-3766,3768,3769**
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3770
Weston Components & Controls, Div. Sangamo Weston Inc., Dept. EM, Archbald, Pa. 18403 .... p. 3856,3857
Airco Speer Electrns., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Baknor Industries Ltd., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
M Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
D Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Diplohmatic Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
D Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
M Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677

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Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
DM Ultronix, Inc., Dept. EM, P.O. Box 1090, Grand Junction, Col. 81501
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
DM Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
D Welwyn Canada Ltd. Film Div., Dale Elctrns. Inc., Dept. EM, Box 2484, 1255 Brydges St., London, Ont., Can. N5W 2C2
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Resistors, Precision

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American Components, Inc., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428 .... p. 3633
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D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... p. 3778**
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C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

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D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. ***
CTS of Berne, Dept. EM, 406 Parr Rd., Berne, Ind. 46711 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101 .... ***
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Astro Elctrns., Inc., Dept. EM, 2478 Fender Ave., Unit "D", Fullerton, Calif. 92631
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
M CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514

Diplohmatic Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
DM Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013

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D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 *
M **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 .... ***
TRW/IRC Resistors, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

Resistors, Suppressor

Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
Ohio Carbon Co., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... *
D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... ***
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 .... *
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Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
Stackpole Carbon Co., Electronic Comps. Div./Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

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D **Caddock Electronics, Inc., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507 .... ***
D **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820 .... ***
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D **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750 .... ***
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 ***
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M **Resistors, Inc., Dept. EM, 5226 W. 26th St., Chicago, Ill. 60650 .... ***
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Tel Labs, Inc., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053 .... *
M **TRW/IRC Resistors, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 ***
D **TRW/IRC Resistors, Dept. EM, Greenway Rd., Boone, N.C. 28607 .... ***
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *

Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 ... *
Airco Speer Electrns., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Constanta Co. of Can., Dept. EM, 280 Regina Ave., Montreal, Can.
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
D Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
DM Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
M Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
D Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550

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DM **Corning Glass Works, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830 ... ***
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DM Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
Dale Electronics, Inc., Dept. EM, Box 74, Norfolk, Nebr. 68701
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051

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D **Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 ... p. 3672,3673**
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D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Sanken Elec. Co., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
DM Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Consolidated Resistance Co. of America, Inc., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
DM Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Dale Electrns. Canada Ltd., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6
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Diplohmatic Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550
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DM Gamble, Charles T. Inds., Dept. EM, 605 Perkins La., Delanco, N.J. 08075
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M Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Lectrohm Div. of Capco, Inc., Dept. EM, Box 1028, Grand Junction, Colo. 81501
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
DM Marstan Resistor, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050
M Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M MICRO OHM CORP., Dept. EM, P.O. Box 287, S. Laguna, Cal. 92677
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Samarius, Inc., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
DM Texas Capacitor, Dept. EM, 7830 Westglen Dr., Houston, Tex. 77042
DM Ultronix, Inc., Dept. EM, P.O. Box 1090, Grand Junction, Col. 81501
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
DM Ward Leonard Elec. Co. Inc., Sub. Unimax Group Inc., Dept. EM, 31 South St., Mt. Vernon, N.Y. 10550
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
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Dale Electronics Inc., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601 ... *
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Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

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Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

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DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
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D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
Gudebrod Bros. Silk Co., Inc., Electronics Div., Dept. EM, 12 S. 12th St., Philadelphia, Pa. 19107
DM Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Retainers, Tube

ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... **p. 2112**
Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 **p. 2119**
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
M Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508

Retractors & Carriers—See Cable Retractors

Reverberation Modules—

RFI Measuring Equipment

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 **p. 2810**
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Electro-Mechanics Co., Dept. EM, Box 1546, Austin, Tex. 78767
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tensor, Dept. EM, Box 14843, Austin, Tex. 78761

RFI Shielding—See Shields, R-F

RFI Testing Services—See Services, Electrical Measurement & Test

Rheostats

D **Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
Angstrohm Precision, Inc., Dept. EM, 1 Precision Pl., Hagerstown, Md. 21740 *
Carter Mfg. Corp., Dept. EM, Sugar Rd., Bolton, Mass. 01740 .... **p. 3823**
M **Clarostat Mfg. Co., Inc., Dept. EM, Washington St., Dover, N.H. 03820** .... *
DM **E-Systems, Inc., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750** .... **p. 3840**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** **p. 3843,3844**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Rings, Retaining

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ....**Inside Back Cover,**
Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Superior Carbon Prods., Inc., Dept. EM, 9115 George Ave., Cleveland, Ohio 44105
M Templeman, D.R. Co., Dept. EM, 8 Park St., Plainville, Conn. 06062
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Tridair Inds., Rexnord Co., Dept. EM, 3000 W. Lomita Blvd., Torrance, Calif. 90505
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
M Waldes Kohinoor, Inc., Dept. EM, 47-16 Austel Pl., Long Island City, N.Y. 11101

Rivets

Allmetal Screw Products Co., Inc., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
M Cherry Fasteners, Townsend Div. Textron Inc., Dept. EM, Box 2157, Santa Ana, Cal. 92707
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Deutsch Fastener Corp., Dept. EM, 7001 W. Imperial Hwy., Los Angeles, Cal. 90045
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
DM ITT Harper, Dept. EM, 8200 Lehigh Ave., Morton Grove, ILL. 60053
Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
M Milford Rivet & Mach., Dept. EM, 857 Bridgeport Ave., Milford, Conn. 06460
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Taylor Electric, Inc., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654
D USM Corp., "POP" Rivet & Eyelet Divs., Dept. EM, 510 River Rd., Shelton, Conn. 06484
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610

Rods, Ground

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
D Premax Prods. Div., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019

Rotators—See Antenna Rotators

Rotors, Motor & Generator—See Motor & Generator Armatures, Rotors, Stators

Rubber, Conductive

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 .. *
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** .... *
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
D 3M Co., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016
Vernay Laboratories, Inc., Dept. EM, S. College St., Yellow Springs, Ohio 45387

Rubber Guards (For Equipment)—See Bumpers

Rubber, Silicone

M **APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631** .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
M **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440** .... *

Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
M Allaco Prods Div., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Connecticut Hard Rubber Co., Dept. EM, 407 East St., New Haven, Conn. 06509
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Formulated Resins Inc., Dept. EM, Box 508, Greenville, R.I. 02828
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
Minnesota Rubber Co., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
D Ram Chems., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
Tra-Con, Inc., Dept. EM, 55 North St., Medford, Mass. 02155
Vernay Laboratories, Inc., Dept. EM, S. College St., Yellow Springs, Ohio 45387

Scale Expanders, Meter—See Multipliers, Meter

Scalers, Binary, Decade

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... *
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
Lecroy Resch. Sys. Corp., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nuclear Meas. Corp., Dept. EM, 2460 N. Arlington Ave., Indianapolis, Ind. 46218
M Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830

Scales, Dial

D **Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093** .... *
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
D Toledo Scale, Div. Reliance Elect. Co., Dept. EM, 350 W. Wilson Bridge Rd., Worthington, Ohio 43085
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Scanners, Crossbar

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121

Scanners, Flying Spot

D **Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876** .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Syntronic Instruments Inc., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101 *
M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010

Scanners, Infrared

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
Bendix Corp., Aerospace Sys. Div., Dept. EM, 3300 Plymouth Rd., Ann Arbor, Mich. 48107
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
FJW Industries, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Innovation Industries Inc., Dept. EM, 5012 S. Main St., Roswell, N.M. 88201
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
M Santa Barbara Resch. Ctr., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126

Scanners, Instrument, Input/Output

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... **p. 1472,1473**
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... **p. 1659**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... **p. 1668**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
D **Philips Test & Measuring Instrs., Inc., Dept. EM, 85 McKee Dr., Mahwah, NJ 07430** .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
Metra Instruments, Inc., Dept: EM, 1161 San Antonio Rd., Mt. View, Cal. 94043
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
M Monarch Marking Sys., Dept. EM, Box 608, Dayton, Ohio 45401
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971

Scanners, Optical

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... **p. 3131**
D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** .... *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
Bausch & Lomb, A.S. Div., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Dest Data Corp., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085
D Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D General Scanning, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545

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Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Photomation, Inc., Dept. EM, Box 460, Mountain View, Cal. 94041
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
Welch Allyn, Inc., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153

Scanners, Reed

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705 **p. 2909**
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Computer Products, Dept. EM, Box 23849, Ft. Lauderdale, Fla. 33307
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801

Scissors

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Clauss Cutlery Co., Dept. EM, Box 667, Fremont, Ohio 43420
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Scope Dollies—See Carts & Dollies, Instrument & Equipment

SCR's—See Thyristors

SCR Firing Controls—See Controls, SCR

Scramblers, Data

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Terminal Data Corp. of Md, Dept. EM, 11878 Coakley Circle, Rockville, Md. 20852

Scramblers, Speech

North Microsystems, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441 .... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Screens, Printed Circuit

D Chemcut Corp., Dept. EM, 500 Science Pk., State College, Pa. 16801
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
NAZ-DAR International, Dept. EM, 1087 N. Branch St., Chicago, Ill 60622
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
D Techniques, Inc., Dept. EM, 235 Jackson St., Englewood, N.J. 07631
TRW/Cinch-Graphik, Elctrn. Comps , Div. TRW INC., Dept. EM, 200 S. Turnbull Canyon Rd., City of Industry, Cal. 91744
M Wells Electronics, Inc., Weltek Div., Dept. EM, 1801 S. Main St., South Bend, Ind. 46613
M Wire Cloth Enterprises, Inc., Dept. EM, 130-132 Gamma Dr., R.I.D.C., Pittsburgh, Pa. 15238
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103

Screwdrivers

D **Channellock, Inc., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335** .... **p. 4327**
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... **p. 2064**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Bondhus Corporation, Dept. EM, Monticello, Minn 55362
D Erikson Specialized Tool Co., Dept. EM, Box 424, Pico-Rivera, Cal. 90660
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
DM High Speed Hammer Co., Inc., Dept. EM, 313 Norton St., Rochester, N.Y. 14621
M H.J.J. Co., Dept. EM, Box 905, Los Gatos, Cal. 95030
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Kedman Co., Dept. EM, Box 25667, Salt Lake City, Utah 84125
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
D Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
DM Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Skyo Industries Inc., Dept. EM, 171 Brook Ave., Deer Park, N.Y. 11729
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Standard Pneumatic Motor Co., Dept. EM, Box 10030, Reno, Nev. 89510
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Screws, Lead, Feed & Translatory—See Drives & Drives Mechanisms (Dial)

Screws—See Fasteners

Scribers

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905

Scribers, Wafer-Also See Machines & Accessories, Semiconductor Manufacturing

General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787

Sealers—See Coatings

Sealing Equipment, Metal-Glass/Ceramic

Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Carbon Control Corp., Dept. EM, 718 S. Columbus Ave., Mt. Vernon, N.Y. 10550
Carpenter Technology, Dept. EM, Box 662, Reading, Pa. 19603

Seals & Feedthrus, Environmental—See Feedthrus & Seals, Environmental

Seals, Ceramic To Metal

Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... **p. 1122**
M **Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
Coors Porcelain Co., Dept. EM, 600 Ninth St., Golden, Colo. 80401
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Diamonite Products Div., Dept. EM, Box 567, Shreve, Ohio 44676
Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Lapp Insulator Div., Interpace Corp., Radio Specialties, Dept. EM, 350 Sumner St., LeRoy, N.Y. 14482
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
D Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Seals, Glass To Metal

M **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613** .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *

ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1877, Inside Back Cover,
Reeves-Hoffman Div., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017** .... *
M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
DM Armstrong Cork Co., Dept. EM, W. Liberty St., Lancaster, Pa. 17604
M Aspe, Inc., Dept. EM, P.O. Box 992, West Caldwell, NJ 07006
Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
Connector Inds. of America, Dept. EM, 639 N. Wayne, Cincinnati, Ohio 45215
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Elctrn. Seals, Dept. EM, 13766 Saticoy St., Van Nuys, Cal. 91402
Fredericks Co., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006
Fusite Div./Emerson Elec., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
DM Plessey Chatsworth, Dept. EM, 20245 Sunburst St., Chatsworth, Cal. 91311
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Viking Inds., Inc., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
M Wilmad Glass Co., Inc., Dept. EM, Buena, N.J. 08310

Seals, Hermetic-Also See Services, Hermetic Sealing

M **Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662**
APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... **p. 3971**
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1951,1955, Inside Back Cover,
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
M Aspe, Inc., Dept. EM, P.O. Box 992, West Caldwell, NJ 07006
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
Connector Inds. of America, Dept. EM, 639 N. Wayne, Cincinnati, Ohio 45215
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Elctrn. Seals, Dept. EM, 13766 Saticoy St., Van Nuys, Cal. 91402
Fusite Div./Emerson Elec., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
Minnesota Rubber Co., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Seals, Microwave—See Gaskets, Shielding, R-F; Seals, Waveguide

Seals, Waveguide

DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** .... *
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
D Parker Hannifin Corp., O-Seal Div., Dept. EM, 10567 Jefferson Blvd., Culver City, Calif. 90230
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Vernay Laboratories, Inc., Dept. EM, S. College St., Yellow Springs, Ohio 45387
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Search Unit, Magnetic Tape—See Tape Search Equipment

Seizers

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006

Selsyns—See Motors, Synchronous

Semiconductor Material—See Crystals, Semiconductor

Semiconductor Wafer Fabrication, Assembling (Packaging)

M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
D Electroglas Inc., Dept. EM, 2901 Coronado Dr., Santa Clara, Cal. 95050
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Semiconductor Wafer Fabrication, Designing (Topological)

M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Silicon Systems Inc., Dept. EM, 2913 Daimler St., Santa Ana, Cal. 92705
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Semiconductor Wafer Fabrication, Maskmaking (Tooling)

Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 .... *
M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
Illumination Industries, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Micro Mask, Inc., Dept. EM, 695 Vaqueros Ave., Sunnyvale, Cal. 94086
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
M TRW/Cinch-Monadnock, An Elctrn. Comps., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749

Semiconductor Wafer Fabrication, Processing

LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 .... *
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017** .... *
Accumet Engineering Corp., Dept. EM, 1 Kane Industrial Dr., Hudson, Mass. 01749
M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
D Electroglas Inc., Dept. EM, 2901 Coronado Dr., Santa Clara, Cal. 95050
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019

General Instrument Corp., Discrete Semiconductor Div., Dept. EM, 600 West John St., Hicksville, N.Y. 11802
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
KSW Electronics Corp., Dept. EM, South Bedford St., Burlington, Mass. 01803
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
Macronetics, Dept. EM, 570 Maude Ct., Sunnyvale, Cal. 94086
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
MSI Electronics, Inc., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nortec Electronics, Dept. EM, 3697 Tahoe Way, Santa Clara, Cal. 95051
Philadelphia Quartz Co., Dept. EM, Box 840, Valley Forge, Pa. 19482
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922
Semiconductor Processing Co., Dept. EM, 10 Industrial Park Rd, Hingham, Mass. 02043
Siltec Corp., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
M TRW/Cinch-Monadnock, An Elctrn. Comps., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749
UCE, Inc., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854
Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Xciton Corp., Dept. EM, 5 Hemlock Dr., Latham, N.Y. 12110

Semiconductor Wafer Fabrication, Testing

Boonton Electronics Corp., Dept. EM, Route #287, Parsippany, N.J. 07054 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ...... *
Alessi Industries, Dept. EM, 3195 Bldg. C, Airport Loop Dr., Costa Mesa, Cal. 92626
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
M American Microsystems, Inc., Dept. EM, 3800 Homestead Rd., Santa Clara, Cal. 95051
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
D Electroglas Inc., Dept. EM, 2901 Coronado Dr., Santa Clara, Cal. 95050
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
GCA/Sunnyvale Div., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Laser Technology, Inc., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
D Lithic Systems, Inc., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014
LSI Computer Systems, Inc., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nortec Electronics, Dept. EM, 3697 Tahoe Way, Santa Clara, Cal. 95051
Research Devices, Dept. EM, 616 Springfield Ave., Berkeley Heights, N.J. 07922
Silicon Systems Inc., Dept. EM, 2913 Daimler St., Santa Ana, Cal. 92705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Semiconductors—See Diodes; Rectifiers; Transistors

Sensors—See Transducer Listings

Sensors, Light

Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 ...... *
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 ...... *
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245** ...... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** ...... *
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Information Control Corp., Light Pen Div., Dept. EM7, Dept. EM, 9610 Bellanca Ave., Los Angeles, Cal. 90045
LEL Co., Dept. EM, 5 Burns Pl., Cresskill, N.J. 07626
D Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
Meret Inc., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404
D Opcon, Inc., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
Quantrol Elect. Inc., Dept. EM, 1820 Mills Ave., El Paso, Tex. 79901
D Reticon Corp., Dept. EM, 910 Benicia Ave., Sunnyvale, Cal. 94086
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Sensors, Temperature—See Bolometers; Thermistors; Transducers

Sequence Controllers—See Controllers, Programmable

Services, Assembly & Fabrication (Including R & D)

M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** ...... p. 1705
Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124 p. 2663
Automatic Connector Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725 ...... p. 1795
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2674
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
D **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** ...... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** ...... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 ...... *
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 ...... p. 2670,2671
Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ...... p. 2674
Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 p. 2142
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 ...... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** ...... *
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 ...... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 ...... *
M **United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220** ...... *
Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 ...... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** ...... *
M All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Action Labs Inc., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
A. M. W. Corp., Dept. EM, 78 Bow, Arlington, Mass. 02174
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
M Argent Electronics, Inc., Dept. EM, 477 E. Wenger Rd., Dayton, Ohio 45322
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Associated Spring-Barnes Group Inc., Dept. EM, 18 Main St., Bristol, Conn. 06010
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Barnes & Reinecke, Inc., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
M Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
ComputerWrap Corp., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Custom Devices, Div. CTL, Inc., Dept. EM, 763 U.S. Hwy. 17-92, Fern Park, Fla. 32730
M Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
Dattilo Enterprises, Inc., Dept. EM, 2302 Taylorsville Rd., Louisville, Ky. 40205
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627

Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
Gridcraft, Inc., Dept. EM, 14520 Lima Rd., Fort Wayne, Ind 46808
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
Interdyne Co., Adept Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91411
ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Kantz Electronic Ind., Dept. EM, 229 W. 4th St., Clifton, N.J. 07011
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
LocAtor Electronics Co., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
Metal Fabricators, Inc., Dept. EM, Box 1946, Greenville, S.C. 29602
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974
National Metal Crafters Inc., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
N.K.R. Precision Mfg. Corp., Dept. EM, Rte. 17M, Box 333, Harriman, N.Y. 10926
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Omnicop, Inc., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
M Peerless Radio Corp., Dept. EM, 19 Wilbur St., Lynbrook, N.Y. 11563
Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Process & Instrs. Corp., Dept. EM, 1943 Broadway, Brooklyn, N.Y. 11207
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
M RCA Service Co., Div. RCA Corp., Dept. EM, Govt. Svcs. 202-1, Camden, N.J. 08101
Relays, Inc., Dept. EM, 162 W. 83rd St., New York, N.Y. 10024
D Russco Electronics Mfg. Inc., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612
Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
DM SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
Ultra Carbon Corp., Dept. EM, Box 747, Bay City, Mich. 48706
Venture Development Corp., Dept. EM, One Washington St., Wellesley, Mass. 02181
Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
D Viking Inds., Inc., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311
M Western Microsystems, Inc., Dept. EM, Box 23192, San Diego, Cal. 92123
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Services, Backplane Wiring

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... p. 2241
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... *
Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... *
Action Labs Inc., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412
Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
M Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
ComputerWrap Corp., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
M Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Interdyne Co., Adept Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91411
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707

Services, Calibration & Instrument Repair

Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
Columbia Resch. Labs:, Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D Electrical Testing Labs., Inc., Dept. EM, 2 East End Ave., New York, N.Y. 10021
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Incal Service Corp., Dept. EM, 73 Southfield Ave., Stamford, Conn. 06902
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Ca. 90406
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Main Electrns., Inc., Dept. EM, 225 Ida, Wichita, Kan. 67211
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
M RCA Service Co., Div. RCA Corp., Dept. EM, Govt. Svcs. 202-1, Camden, N.J. 08101
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Thwing-Albert Instr. Co., Dept. EM, 10960 Dutton Rd., Philadelphia, Pa. 19154
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Services, Coating (All-Types)

Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... p. 4325
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
AMF Tuboscope, Inc., AMF Inc., Dept. EM, P.O. Box 808, Houston, Texas 77001
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M BH Electronics, Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358

Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
M Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
M Press-On Prods., Dept. EM, 1020 S. Westgate Dr., Addison, Ill. 60101
SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Union Carbide, Parylene, Dept. EM, 270 Park Ave., New York, N.Y. 10017
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Services, Computer-Aided Design (CAD)

Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .. p. 2431
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Exetron Corp., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Photocircuits Div., Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Silicon Systems Inc., Dept. EM, 2913 Daimler St., Santa Ana, Cal. 92705
University Computing Co., Dept. EM, 7720 N. Stemmons Frwy. Box 4791, Dallas, Tex. 75247

Services, Crimping

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ...... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Action Labs Inc., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Services, Custom Molding, Plastics

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ...... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
Eby Company, Dept. EM, 4701 Germantown, Philadelphia, Pa. 19144 ...... *
Harbison Ind'l. Prods., Inc., Dept. EM, 7205 Hibbs La., Levittown, Pa. 19057 *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 ...... p. 2670
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 ...... *
M **Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ...... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 ...... ***
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 ...... *
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Acme Plastic Products Co., Inc., Dept. EM, 9629 N. 22nd Ave., Phoenix, Ariz. 85021
Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
Akron Porcelain Co., Dept. EM, 2719 Cory Ave., Akron, Ohio 44314
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M American Plasticraft Co., Dept. EM, 814 N. Sacramento Blvd., Chicago, Ill. 60622
M Applied Design Co., Dept. EM, 2465 Sheridan Dr., Tonawanda, N.Y. 14150
Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
M Caplugs Div., Protective Closures Co., Dept. EM, 2150 Elmwood Ave., Buffalo, N.Y. 14207
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
General Industries Co., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
M GTI/Clover Div., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150
GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Macronetics, Dept. EM, 570 Maude Ct., Sunnyvale, Cal. 94086
Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Minnesota Rubber Co., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
Parabam, Inc., Dept. EM, 3017 E. Las Hermanas St., Compton, Cal. 90221
Parsons Mfg. Corp., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
M Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
M Ronor Systems, Dept. EM, Box 80, 145 N. Plains Ind. Park Rd., Wallingford, Conn. 06492
Rostone Corp., Dept. EM, 2781 S. Concord Rd., Lafayette, Ind. 47902
Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Security Plastics Inc., Dept. EM, 14427 N.W. 60th Ave., Miami Lakes, Fla. 33014
DM SGL Plastics, Dept. EM, Route 248, Nazareth, Pa. 18064
Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Star Tron Corp., Dept. EM, 58 Curtis St., Providence, R.I. 02909
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031
D Teledyne Mecca, Dept. EM, Box 36393, Houston, Tex. 77036
Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
M Unit Industries, Inc., Dept. EM, 529 S. Raymond Ave., Fullerton, Cal. 92631
DM Van Norman Molding Co., Dept. EM, 9599 S. 76th Ave., Bridgeview, Ill. 60455
Vernay Laboratories, Inc., Dept. EM, S. College St., Yellow Springs, Ohio 45387
Vichek Plastics Co., Dept. EM, Middlefield, Ohio 44062
Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613
Westmoreland Plastics Co., Dept. EM, 135 Gertrude St., Latrobe, Pa. 15650
Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176

Services, Decapsulation

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ...... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406

Services, Electrical Measurement & Test

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 ...... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ...... *
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 ...... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ...... *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 ...... *
Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538 p. 2913
Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 ...... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 p. 2142**
Spectrum Control, Inc., Dept. EM, 152 E. Main St., Fairview, Pa. 16415 ...... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aetna Engrg., Dept. EM, P.O. Box 7749, Van Nuys, Cal. 91409
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
M Associated Testing Labs., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803
M Associated Testing Laboratories, Dept. EM, 23 Vincent St., Wayne, N.J. 07470
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Automatic Test Systems, Dept. EM, 23 Poplar St., Malden, Mass. 02148
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733

Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
Dielectric Instr. Corp., Dept. EM, 761 Franklin Ave., Pittsburgh, Pa. 15221
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D Electrical Testing Labs., Inc., Dept. EM, 2 East End Ave., New York, N.Y. 10021
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Incal Service Corp., Dept. EM, 73 Southfield Ave., Stamford, Conn. 06902
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
M Peerless Radio Corp., Dept. EM, 19 Wilbur St., Lynbrook, N.Y. 11563
D Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
M RCA Service Co., Div. RCA Corp., Dept. EM, Govt. Svcs. 202-1, Camden, N.J. 08101
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Signatron, Inc., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
M Teledyne Micronetics, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Venture Development Corp., Dept. EM, One Washington St., Wellesley, Mass. 02181

Services, Encapsulation

D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002** *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** .... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
M Bacon Inds., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172
D Cable Systems & Assembly Co., Inc., Dept. EM, 210 Broadway, Everett, Mass. 02149
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hightemp Resins, Inc., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974
M Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
M Ronor Systems, Dept. EM, Box 80, 145 N. Plains Ind. Park Rd., Wallingford, Conn. 06492
Semicon Assoc., Inc., Dept. EM, Box 832, Lexington, Ky. 40501
D Techcon Systems Inc., Dept. EM, 16016 So. Figueroa St., Gardena, Cal 90248
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031
U.S. Elctrns., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740

Services, Environmental Testing

Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** p. 2142
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Apollo Lasers Inc., Dept. EM, 6357 Arizona Cir., Los Angeles, Cal. 90045
M Ashman Industries (1966) Ltd., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can.
M Associated Testing Labs., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803
M Associated Testing Laboratories, Dept. EM, 23 Vincent St., Wayne, N.J. 07470
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Atlas Engrg. Corp., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110
Atmosphere Controls Prdts., Dept. EM, 295 Polaris, Mt. View, Cal. 94043
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
DM Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
Eagle-Picher Industries, Inc., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
D Electrical Testing Labs., Inc., Dept. EM, 2 East End Ave., New York, N.Y. 10021
Environmental Research Grp., Dept. EM, 313 N. First St., Ann Arbor, Mich. 48103
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
M General Elec., Valley Forge Space Tech. Ctr., Dept. EM, Box 8555, Phila., Pa. 19101
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
L.A.B. Div., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
MTS Systems Corp., Dept. EM, Box 24012, Minneapolis, Minn 55424
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
M Preformed Line Products Co., Dept. EM, Box 91129, Cleveland, Ohio 44101
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
M RCA Service Co., Div. RCA Corp., Dept. EM, Govt. Svcs. 202-1, Camden, N.J. 08101
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Services, Hermetic Sealing

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
Associate General Labs., Inc., Dept. EM, 8934 W. Ogden Ave., Brookfield, Ill. 60513
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
Connector Inds. of America, Dept. EM, 639 N. Wayne, Cincinnati, Ohio 45215
Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
Elctrn. Seals, Dept. EM, 13766 Saticoy St., Van Nuys, Cal. 91402
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
D Viking Inds., Inc., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311

Services, High Vacuum

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
Applied Materials Inc., Dept. EM, 3050 Bowers Ave., Santa Clara, Cal. 95051
M Associated Testing Labs., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803
M Associated Testing Laboratories, Dept. EM, 23 Vincent St., Wayne, N.J. 07470
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
Process & Instrs. Corp., Dept. EM, 1943 Broadway, Brooklyn, N.Y. 11207
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Western Microsystems, Inc., Dept. EM, Box 23192, San Diego, Cal. 92123

Services, Instrument Design (Industrial)

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 .... *
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
Aetna Engrg., Dept. EM, P.O. Box 7749, Van Nuys, Cal. 91409
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
Barnes & Reinecke, Inc., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Brookhaven Instrs. Corp., Dept. EM, Box 3136, Austin, Tex. 78764
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
Dexter Scientific, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Information Handling Services, Dept. EM, 15 Inverness Way East, Englewood, Colo. 80150
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Logical Technical Svcs Corp., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010
D Macrodyne Inc., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Omnicop, Inc., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Process & Instrs. Corp., Dept. EM, 1943 Broadway, Brooklyn, N.Y. 11207
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Venture Development Corp., Dept. EM, One Washington St., Wellesley, Mass. 02181
D Wilson Co., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035

Services, Metal Etching, Engraving

DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
American Chemical Etching, Inc., Dept. EM, 13730 Desmond St., Pacoima, , Cal. 91331
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
Auric Corp., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114
Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
M Etchit, Inc., Dept. EM, 643 13th Ave. S., Hopkins, Minn. 55343
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Micro Line Div. Bausch & Lomb, Dept. EM, 2 Girts Rd., Jamestown, N.Y. 14701
M Peerless Radio Corp., Dept. EM, 19 Wilbur St., Lynbrook, N.Y. 11563
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
M Tech-Etch/Braun, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Services, Metal Parts Fabrication

Cambridge Products Corp., Cambridge Products Corp., Dept. EM, 244 Woodland Ave., Bloomfield, Conn. 06002 .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
M **Equipto Enclosure Systems, Div/Equipto Elec. Corp., Dept. EM, 435 Woodlawn Ave., Aurora, Ill. 60507** .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accumet Engineering Corp., Dept. EM, 1 Kane Industrial Dr., Hudson, Mass. 01749
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
M Advanced Materials Systems, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M American Aluminum Co., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092
A. M. W. Corp., Dept. EM, 78 Bow, Arlington, Mass. 02174
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
M Applied Design Co., Dept. EM, 2465 Sheridan Dr., Tonawanda, N.Y. 14150
Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Associated Spring-Barnes Group Inc., Dept. EM, 18 Main St., Bristol, Conn. 06010
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
M Braxton Mfg. Co., Dept. EM, Echo Lake Rd. N., Watertown, Conn. 06795
D Brooks Mfg. Co., Dept. EM, Box 17602, Philadelphia, Pa 19135
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
D Electronic Enclosures, Div. Wyle Labs, Dept. EM, 225 South Aviation Blvd., El Segundo, Cal. 90245
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
M Etchit, Inc., Dept. EM, 643 13th Ave. S., Hopkins, Minn. 55343
Fusite Div./Emerson Elec., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
M GTI/Clover Div., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150
GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
K & S Engineering, Dept. EM, 6917 W. 59th St., Chicago, ILL. 60638
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Metal Fabricators, Inc., Dept. EM, Box 1946, Greenville, S.C. 29602
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
National Metal Crafters Inc., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125
Nippert Co., Dept. EM, 825 Pittsburgh Dr., Delaware, Ohio 43015
N.K.R. Precision Mfg. Corp., Dept. EM, Rte. 17M, Box 333, Harriman, N.Y. 10926
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Overly-Hautz Co., Dept. EM, 8617 Clinton Rd., Cleveland, Ohio 44144
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
M Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Process & Instrs. Corp., Dept. EM, 1943 Broadway, Brooklyn, N.Y. 11207
PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
M Riester & Thesmacher Co., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Semicon Assoc., Inc., Dept. EM, Box 832, Lexington, Ky. 40501
Servotronics, Inc., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
D South Shore Metal Prods., Inc., Dept. EM, 88 E Allen Blvd., Farmingdale, N.Y. 11735
Star Tron Corp., Dept. EM, 58 Curtis St., Providence, R.I. 02909
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103
M Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Services, Metallizing (Including Electroforming)

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662
Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. *
Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106 .... p. 2677
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
M Craig Sys. Corp., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842
Diceon Electronics, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Metalized Ceramics, Dept. EM, Huntington Industrial Pk., Providence, R.I. 02907
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Servometer Corp., Dept. EM, 501 Little Falls Rd., Cedar Grove, N.J. 07009
Thin Film Services, Dept. EM, Box 188, Gile, Wisc. 54525
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Services, Microprocessor

Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
MilerTronics, Dept. EM, 303 Airport Rd, Greenville, S.C. 29607
Scurry Assocs. Tom, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Services, Molding

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... ***
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... ***
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... p. 2671
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
M Acme Plastic Products Co., Inc., Dept. EM, 9629 N. 22nd Ave., Phoenix, Ariz. 85021
M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
M Atlantic Optical Moulding Co., Dept. EM, Ellis St., Dudley, Mass. 01570
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Barnes & Reinecke, Inc., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007
D Cable Systems & Assembly Co., Inc., Dept. EM, 210 Broadway, Everett, Mass. 02149
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Control Data Corp., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
Electrical Plastics Corp., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Minnesota Rubber Co., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974
M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
M Ronor Systems, Dept. EM, Box 80, 145 N. Plains Ind. Park Rd., Wallingford, Conn. 06492
Rostone Corp., Dept. EM, 2781 S. Concord Rd., Lafayette, Ind. 47902
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Security Plastics Inc., Dept. EM, 14427 N.W. 60th Ave.,, Miami Lakes, Fla. 33014
DM SGL Plastics, Dept. EM, Route 248, Nazareth, Pa. 18064
D Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031
Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
DM Van Norman Molding Co., Dept. EM, 9599 S. 76th Ave., Bridgeview, Ill. 60455
Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613

Services, Packaging

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... ***
Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
GTE Sylvania, Circuit Module Oper., Elctrn. Comps. Grp., Dept. EM, Box 360, Muncy, Pa. 17756
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974
Parsons Mfg. Corp., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025
M Peerless Radio Corp., Dept. EM, 19 Wilbur St., Lynbrook, N.Y. 11563
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
Venture Development Corp., Dept. EM, One Washington St., Wellesley, Mass. 02181

Services, Photographic

GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810

Services, Plastics Fabrication

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Harbison Ind'l. Prods., Inc., Dept. EM, 7205 Hibbs La., Levittown, Pa. 19057 *
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... p. 2670
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Ace Plastic Co., Inc., Dept. EM, 91-30 Van Wyck Expwy, Jamacia, N.Y. 11435
M Acme Plastic Products Co., Inc., Dept. EM, 9629 N. 22nd Ave., Phoenix, Ariz. 85021
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
M Atlas Fibre Co., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645
Atmosphere Controls Prdts., Dept. EM, 295 Polaris, Mt. View, Cal. 94043
Aubin, A.E. Co., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
Budd Co., Polychem Div., Dept. EM, Front & Ford Sts., Bridgeport, Pa. 19405
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
DM Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
M Comco Plastics, Inc., Dept. EM, 98-36 C. Jamaica Ave., Richmond Hill, N.Y. 11418
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Conap, Inc., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Form-It Products Inc., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607
Globe Plastics, Dept. EM, 1342 S. Signal Dr., Pomona, Cal. 91766
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Industrial Mica Div., Columbia Chase Corp., Dept. EM, 223 S. Van Brunt St., Englewood, N.J. 07631
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Molding Technology Inc., Dept. EM, Ivyland, Pa. 18974

M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
Parabam, Inc., Dept. EM, 3017 E. Las Hermanas St., Compton, Cal. 90221
Parsons Mfg. Corp., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
Quartzite Processing, Inc., Dept. EM, 6 Holyoke St., Malden, Mass. 02148
Reynolds Inds., Inc., Dept. EM, Box 1170, Marina Del Rey, Cal. 90291
Rogers Corp., Dept. EM, Rogers, Conn. 06263
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Security Plastics Inc., Dept. EM, 14427 N.W. 60th Ave.,, Miami Lakes, Fla. 33014
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
DM SGL Plastics, Dept. EM, Route 248, Nazareth, Pa. 18064
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D Skydyne,, Div. Brooks & Perkins Inc., Dept. EM, River Rd., Port Jervis, N.Y. 12771
Teledyne Mecca, Dept. EM, Box 36393, Houston, Tex. 77036
D Western Coil & Elec. Co., Dept. EM, 215 State St., Racine, Wisc. 53403
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Services, Plating

Cambridge Products Corp., Cambridge Products Corp., Dept. EM, 244 Woodland Ave., Bloomfield, Conn. 06002 .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... p. 2671
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M Advanced Materials Systems, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Auric Corp., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114
M Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Buckbee Mears Co., Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
M Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
D Sifco Metachemical, Div. Steel Improv. & Forging, Dept. EM, 5708 Schaaf Rd., Independence, Ohio 44131
M Star Tron Corp., Dept. EM, 58 Curtis St., Providence, R.I. 02909
Union Carbide Corp., Linde Div.,.Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103

Services, Qualification—See Services, Environmental Testing

Services, Rental, Electronic Instrumentation

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... p. 2820
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 p. 2923
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... p. 1402
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733
Electro-Rent Corp., Dept. EM, 4131 Van Owen Place, Burbank, Cal. 91505
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
U.S. Instr. Rentals, Inc., Dept. EM, 951 Industrial Rd., San Carlos, Cal. 94070

Services, RFI Measuring—See Services, Electrical Measurement & Test

Services, Silk Screening

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Mac Panel Co., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262 .... *
Mini-Systems, Inc., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761 *
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980** .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
BECO, Inc., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184
Bell Co., Inc., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173
D Decalcraft Corp., Dept. EM, Rte. 309, Hatfield, Pa. 19440
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
National Metal Crafters Inc., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125
D Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006
M Photo Chemical Prods. Cal., Dept. EM, 1715 Berkeley, Santa Monica, Cal. 90404
Photronic Labs., Dept. EM, Commerce Park, Danbury, Conn. 06810
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
M Riester & Thesmacher Co., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130
SGL Graphics, Div. of SGL Inds., Inc., Dept. EM, John Fitch Industrial Park, Warminster, Pa. 18974
Star Tron Corp., Dept. EM, 58 Curtis St., Providence, R.I. 02909
D Western Coil & Elec. Co., Dept. EM, 215 State St., Racine, Wisc. 53403
M Wire Cloth Enterprises, Inc., Dept. EM, 130-132 Gamma Dr., R.I.D.C., Pittsburgh, Pa. 15238
D Zenrad Controls Co., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103

Services, Vibration Surveys

M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Associated Testing Labs., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803
M Associated Testing Laboratories, Dept. EM, 23 Vincent St., Wayne, N.J. 07470
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
M Preformed Line Products Co., Dept. EM, Box 91129, Cleveland, Ohio 44101
Reliance Electric Co., Dept. EM, 24701 Euclid Ave., Cleveland, Ohio 44117

Services, Wire Cutting & Stripping

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
Leecraft Mfg. Co., Inc., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101 .... *
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... *
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... p. 1402
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
Action Labs Inc., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Cable Systems & Assembly Co., Inc., Dept. EM, 210 Broadway, Everett, Mass. 02149

Services, Wire Cutting & Stripping (Cont'd)

D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
De Soto Elec. Prods., Dept. EM, 414 S. Main, De Soto, MO 63020
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
D Electronic Coil Corp., Dept. EM, 347 New Britain Ave., Plainville, Conn. 06062
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Excel Specialty Corp., Dept. EM, 6335 N. Broadway, Chicago, Ill. 60660
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
Hughes Aircraft Co. Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
DM Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031

Services, Wirewrapping Also see Services, Backplane Wiring

M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... p. 1705**
Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... *
D **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... ***
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 p. 1840**
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... p. 2241
M **United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... ***
Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... *
M All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Action Labs Inc., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412
Adcor Electronic Packaging Corp., Dept. EM, 50 E. 41st St., New York, N.Y. 10017
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Circuit Test Labs, Inc., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260
ComputerWrap Corp., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
M Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
DM EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Nova Tran Corp., Dept. EM, 360 4th St., Clear Lake, Wisc. 54005
Paraplegics Mfg., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111

Servo Systems

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 .... ***
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
D **Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... ***
BEI Elctrns., Inc., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Bulova Watch Co., Servo Prods. Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... ***
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949**
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343 .. ***
M **Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... ***
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... p. 3953**
Torque Systems, Sub. Rotron/EG & G Co., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154 .... p. 3126
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... *
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501 .... ***
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Control Systems Research, Inc., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
D Digiac Corp., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
M Farrand Controls Div., Dept. EM, 99 Wall St., Valhalla, N.Y. 10595
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
M H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
Horizons International, Inc., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Jordan Controls, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
M Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Parabam, Inc., Dept. EM, 3017 E. Las Hermanas St., Compton, Cal. 90221
Perfect Gear & Instr. Corp., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Unico, Inc., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Walco Elec. Co., Dept. EM, 303 Allens Ave., Providence, R.I. 02905
M Westamp, Inc., Dept. EM, 1542 15th St., Santa Monica, Cal. 90404

Shaft Encoders, Shaft Position—See Encoders, Shaft Angle

Shaft Locks—See Knobs, Locking, Control Shaft

Shafts & Adapters Also See Couplings, Shaft, Rigid & Flexible

D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2538**
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2181
Airpot Corp., Dept. EM, 27 Lois St., Norwalk, Conn. 06851
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Winfred M. Berg Inc., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518
Control Inds. Inc., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696
Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
Midwest Aluminum, Div. of Kysor Indus. Corp., Dept. EM, 7696 W. Michigan Ave., Kalamazoo, MI 49009
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Skyo Industries Inc., Dept. EM, 171 Brook Ave., Deer Park, N.Y. 11729
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Shake Tables—See Testers, Vibration

Shells, Encapsulation—See Cups, Encapsulation

Shielding Beads, Ferrite

Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 .... *
Fair-Rite Prods. Corp., Dept. EM, Wallkill, N.Y. 12589 .... *
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .. p. 2673
Ferronics, Inc., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
Micrometals, Dept. EM, 228 N. Sunset, City of Industry, Cal. 91744

Shields, Cable—See Braid, Cable

Shields, Cathode-Ray Tube

M **Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 .... ***
M **Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124 p. 2663**
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675

M **Eagle Magnetic Co., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224** .... **p. 2664**
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 2672,4520
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... *
Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ...... **p. 2675**
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Ferranti Elec., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Panelgraphic Corp., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006

Shields, Coil

M **Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975** .... *
M **Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675
M **Eagle Magnetic Co., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224** .... **p. 2664**
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
Krystinel Corp., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573 .... *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... *
Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ...... **p. 2675**
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Midwest Aluminum, Div. of Kysor Indus. Corp., Dept. EM, 7696 W. Michigan Ave., Kalamazoo, MI 49009
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612

Shields, Corona

Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ...... **p. 2675**
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... **p. 3611**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
Acheson Colloids Co., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801

Shields, Electrostatic—See Shields, Tube

Shields, Indicator Light

M **Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975** .... *
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** ...... **p. 2675**
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 .... *
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090

Shields, Magnetic

M **Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 p. 2661**
M **Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124** .... *
Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 .... *
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675
M **Eagle Magnetic Co., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224** .... *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 2672
D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... **p. 2677**
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** ...... **p. 2675**
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
DM Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
M Magnetics, Div/Spang Industries, Inc., Dept. EM, Box 391, Butler, Pa. 16001
M Materials Technology, Inc., Dept. EM, P.O. Box 187, Somerset, N.J. 08873
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
Schonstedt Instr. Co., Dept. EM, 1775 Wiehle Ave., Reston, Va. 22090
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Shields, Photomultiplier

Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 .... *
M **Amuneal Mfg. Corp., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124 p. 2663**
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 p. 2675
Eagle Magnetic Co., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224 .... **p. 2664**
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... **p. 2542**
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** .... **p. 2678**
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Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

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D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
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M Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Evaporated Coatings, Inc., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006
Hartwell Corp., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670
M Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
DM Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
D 3M Co., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119
D Metal Bellows Co., A Div. of Zurn Inds., Inc., Dept. EM, 1075 Providence Hwy., Sharon, Mass. 02067
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Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090

D Technical Wire Products, Inc., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016

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M Allegheny Ludlam Steel Co., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222
M Kinetron Corp., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712
D Lectro Magnetics, Inc., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
SGL Electronics, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612

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M Ad-Vance Magnetics, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975 .... *
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M Atlee Corp., Dept. EM, 8 Gill St., Woburn, Mass. 01801
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
DM Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Micrite Metal Mfg., Inc., Dept. EM, 21531 Strathern St., Canoga Park, Cal. 91304
M Micro-Circuits Co., Inc., Dept EEM I, Dept. EM, New Buffalo, Mich. 49117
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Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

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D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Pacific Technology, Dept. EM, 235 Airport Way, Renton, Wash. 98055
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Stewart-Warner Microcircuits, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

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All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303

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M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
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M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
D California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 .... *
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ..... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 ..... *
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
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D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

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Shunts, Meter

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
C-F Electronics, Inc., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405
M Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
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DM General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Jordan Electric Co., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115

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M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
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Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Signal Averagers

Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... *
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Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112

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Ithaco, Inc., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850 .... *
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Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
B & F Instrs., Inc., Dept. EM, Box 238, Corwells Hgts, Pa. 19020
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M Bay Laboratories, Inc., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
D Diego, Systems, Dept. EM, 7152 Convoy Court, San Diego, CA 92111
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
M Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Honeywell, Inc., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hybrid Systems Corp., Dept. EM, Crosby Dr,, Bedford, Mass. 01730
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Signal Labs, Inc., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Telmar, Inc., Dept. EM, 1150 W. Third Ave., Columbus, Ohio 43212
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
Tri-Com, Inc., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
Vibration Instrs. Co., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801
Vidar Autodata Inc., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Signal Generators—See Generators, Specific Type

Signal Tracers—See Testers, Signal Tracing

Silica, Fused

M Amersil, Inc., Dept. EM, 650 Jernees Mill Rd., Sayreville, NJ 08872
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
D Optics International, Dept. EM, Box 101, Tenafly, N.J. 07670
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045

Simulators, Motion

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010** .... *
Accuride, Div. of Standard Precision, Dept. EM, 12311 S. Shoemaker, Santa Fe Springs, Cal. 90670
Aerotech, Inc., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238
Altek Corp., Dept. EM, 2150 Industrial Pkwy, Silver Spring, MD 20904
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
M Genisco Tech. Corp., Rotating Test Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715

Simulators, Radar

M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** ...... **p. 2995**
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M AIL, Div. Cutler-Hammer, Dept. EM, Comac Road, Deer Park, N.Y. 11729
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
Berkeley Nucleonics, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
GAP Instr. Corp., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
M Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Sinks, Heat—See Transistor, Diode, Thyristor, Heat Dissipators; Heat Sinks, Soldering

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Slide Rules (Circuitry Computing)

D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701** .... *
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204

Slides, Cabinet & Chassis

M **Chassis-Trak, Div., General Devices Co., Inc., Dept. EM, 525 S. Webster Ave., Indianapolis, Ind. 46219** .... **p. 1134,1135**
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... **p. 1538**
M **General Devices Co., Inc., Dept. EM, Box 19188, Indianapolis, Ind. 46219** **p. 1134,1135**
Optima Enclosures, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084 .... *
D **Par-Metal Prods. Inc., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216** **p. 1141**
D **Premier Metal Prods. Co., Div. Sunshine Mining Co., Dept. EM, 381 Canal Place, Bronx, N.Y. 10451** .... *
Stantron Div., Wyco Metal Products, Dept. EM, 6914 Beck Ave., N. Hollywood, Cal. 91605 .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
M Accuride, Div. of Standard Precision, Dept. EM, 12311 S. Shoemaker, Santa Fe Springs, Cal. 90670
DM Barnes Engrg. Co., Dept. EM, 1645 So. Claudina Way, Anaheim, Calif. 92805
D Bud Radio, Inc., Dept. EM, 4605 E. 355th St., Willoughby, Ohio 44094
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
G. F. Business Equipment, Inc., Emcor Prods., Dept. EM, 1600 Fourth Ave. N.W., Rochester, Minn. 55901
M Grant Hardware Co., Div. Buildex Inc., Dept. EM, 525 High St., W. Nyack, N.Y. 10994
Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
D South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
Zero-East Div., Dept. EM, 288 Main St., Monson, Mass. 01057
Zero-South Div., Dept. EM, Box 6275, Clearwater, Fla. 33518

Sliding Loads, Microwave

M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

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Slip-Rings & Assemblies

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 **p. 3066,3067**
M **Fabricast, Inc., Dept. EM, 2517 Seaman Ave., So. El Monte, Cal. 91733** **p. 3078,3079**
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Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
IEC Corporation, Dept. EM, 3100 Longhorn Blvd., Austin, Tex 78758
IMC Magnetics Corp., Hansen Mfg. Co., Inc., Dept. EM, Dept. EM, Box 23, Princeton, Ind. 47670
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
M Maurey Instrument Corp., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629
Meridian Lab. Inc., Dept. EM, 2415 Evergreen Rd., Box 285, Middleton, Wisc. 53562
M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
D Superior Carbon Prods., Inc., Dept. EM, 9115 George Ave., Cleveland, Ohio 44105
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
M Unit Industries, Inc., Dept. EM, 529 S. Raymond Ave., Fullerton, Cal. 92631
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Slotted Lines, Microwave

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Smith Chart Impedance Plotters, Automatic

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Socket Adapters

D **Arco Electronics Inc., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725** *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** **p. 1840**
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D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766** ....**p. 2043,2059,2112,2113**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** **p. 2168**
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Circuit-Stik, Inc., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Erie Technological Products, Dept: EM, PO Box 961, Erie, Pa. 16512
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061

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D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
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D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
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ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
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Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
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D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
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D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
Wells Electronics, Inc., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613

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Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4532
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D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
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D **3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 .... p. 2267-2270**
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D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .... ***
D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ....Inside Back Cover,**
M **United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... ***
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D Air Quip-Robleyco, Dept. EM, Box 1118, Richardson, Tex. 75080
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626
D Circuit-Stik, Inc., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Gibson/Egan Co., Dept. EM, 21 Flower St., Arcadia, Cal. 91006
Industrial Electronic Hardware, Dept. EM, 109 Prince St., New York, N.Y. 10012
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
D Jolo Industries, Inc., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
Plastronics Inc., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
M Scanbe Canoga Industries, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731
D Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
DM Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
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D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007** .... **Inside Back Cover,**
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D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Industrial Electronic Hardware, Dept. EM, 109 Prince St., New York, N.Y. 10012
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M Moldtronics, Inc., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515
D Oneida Electronics Mfg., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
D Showa Musen Kogyo Co.; Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Textool Products, Inc., Dept. EM, 1410 W. Pioneer Dr., Irving, Tex. 75061
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Sockets, Tube, Vibrator

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
D **Eby Company, Dept. EM, 4701 Germantown, Philadelphia, Pa. 19144** **p. 1835**
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
D **ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766** .... **p. 2112**
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
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DM **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ....Inside Back Cover,**
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M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
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D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
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Solar Cells—See Cells, Photovoltaic

Solder (All Types)

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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
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Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Alpha Metals, Inc., Dept. EM, 56 Water St., Jersey City, N.J. 07305
Bow Solder Products, Dept. EM, P.O. Box 488, 900 Hobson St., Union, N.J. 07083
D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
Chemetron Corp., Welding Prods., Dept. EM, 111 E. Wacker Dr., Chicago, Ill. 60601
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M E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
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Microflame Inc., Dept. EM, 3724 Oregon Ave. S., Minneapolis, Minn 55426
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
NL Industries, Inc., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501
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Solder Lugs—See Terminals, Lug (All Types)

Solder Pots & Baths

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D Contact, Inc., Dept. EM, 9 Elm Avenue, Hudson, N.H. 03051
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
D ESICO, Inc., Dept. EM, Box 247, Deep River, Conn. 06417
D Gardiner Solder Co., Div. of Gardiner Metal Co., Dept. EM, 5207 Walnut St, Downers Grove, Ill 60515
D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
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Soldering Accessories

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D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Contact, Inc., Dept. EM, 9 Elm Avenue, Hudson, N.H. 03051
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
Enterprise Development Corp, Dept. EM, 5127 E. 65th St., Indianapolis, Ind. 46220
D Erikson Specialized Tool Co., Dept. EM, Box 424, Pico-Rivera, Cal. 90660
D ESICO, Inc., Dept. EM, Box 247, Deep River, Conn. 06417
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D Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
Miller, Co. L.C., Dept. EM, 717 Monterey Pass Rd., Monterey Park, Cal. 91754
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
Plato Products, Inc., Dept. EM, El Monte, Cal. 91731
DM Precision Elec. Co., Dept. EM, Federal Rd., Kezar Falls, Me. 04047
DM Solder Removal Co., Dept. EM, 1077 E. Edna Pl., Covina, Cal. 91724
D Techcon Systems Inc., Dept. EM, 16016 So. Figueroa St., Gardena, Cal 90248
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Titchener, E.H. & Co., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902
D UNGAR, Div., Eldon Inds., Inc., Dept. EM, 233 E. Manville St., Compton, Cal. 90220
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Wahl Clipper Corp., Dept. EM, 2902 Locust St., Sterling, Ill. 61081
Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501
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Soldering Equip., Induction Heating

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M Cycle-Dyne, Inc., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418
Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
M Lepel High Frequency Labs., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Miller, Co. L.C., Dept. EM, 717 Monterey Pass Rd., Monterey Park, Cal. 91754
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Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Soldering Equip., Printed Circuit

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M Air-Vac Engrg. Co., Dept. EM, 100 Gulf St., Milford, Conn. 06460
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
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D Caig Labs., Inc., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025
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Soldering Equip., Resistance

D **Edsyn, Inc., Dept. EM, 15958 Arminta St., Van Nuys, Cal. 91406** .... *
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D Contact, Inc., Dept. EM, 9 Elm Avenue, Hudson, N.H. 03051
Ewald Instrs. Corp., Dept. EM, Rte. 7R, Kent, Conn. 06757
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Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Solid State Equipment Corp., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034
M Wells Electronics, Inc., Weltek Div., Dept. EM, 1801 S. Main St., South Bend, Ind. 46613

Soldering Systems, Temperature Controlled

D **Edsyn, Inc., Dept. EM, 15958 Arminta St., Van Nuys, Cal. 91406** .... **p. 4329**
D **Hexacon Elec. Co., Dept. EM, 621 W. Clay Ave., Roselle Park, N.J. 07204** **p. 4330,4331,4333**
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
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D Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
ITT Industrial & Automation Systems, Dept. EM, 41225 Plymouth Rd., Plymouth, Mich. 48170
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Soldering Equip., Ultrasonic

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Soldering Guns, Irons & Desoldering Tools

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DM Beau Tech, Inc., Dept. EM, P.O. Box 523, Portland, Me. 04122
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D Plato Products, Inc., Dept. EM, El Monte, Cal. 91731
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D UNGAR, Div., Eldon Inds., Inc., Dept. EM, 233 E. Manville St., Compton, Cal. 90220
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
D Wahl Clipper Corp., Dept. EM, 2902 Locust St., Sterling, Ill. 61081
D Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501
D Weller-Xcelite, The Cooper Group, Dept. EM, Box 728, Apex, NC 27505
DM Wik-It Elctrns. Corp., Dept. EM, 140 Commercial St., Sunnyvale, Cal. 94086
D H. F. Wilson Engrg. Co., Dept. EM, 21W173 Hill Ave., Box 589, Glen Ellyn, Ill. 60137
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zeva Elec. Corp., Dept. EM, 3 Greatmeadow La., Hanover, N.J. 07936

Solenoids, Linear

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** **p. 4357**
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215** **p. 3462,3463**
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M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401** .... **p. 3571-3573**
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D **Magnetec Corp., Sub of Hi-G Inc, Dept. EM, 96 Granby St., Bloomfield, Conn. 06002** .... **p. 3524-3527**
D **Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014** **p. 3614**
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M **Regdon Corp., Dept. EM, 3715 Grand Blvd., Brookfield, Ill 60513** .... **p. 3610**
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Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
M Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
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Facet Enterprises Inc., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903
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Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
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M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
Linear Motions Co., Dept. EM, 17025 Dubesor St., Valinda, Cal. 91744
M Lisk, G.W. Co., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432
D Mark Specialties, Dept. EM, 1780 Monrovia, Costa Mesa, Cal. 92627
Meltronics Inc., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108

Solenoids, Linear (Cont'd)

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Solenoids, Proportional

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InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M Lisk, G.W. Co., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432

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Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Solvents—See Cleaners & Solvents

Sound Absorbing Materials

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Automation Devices, Inc., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415
Edmund Scientific Co., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
GAF Corporation, Dept. EM, 140 W. 51 St., New York, N.Y. 10020
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Soundcoat, Dept. EM, 175 Pearl St., Brooklyn, N.Y. 11201
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Sound Level Indicators—See Meters, Audio Level

Sound Recording Equip.—See Microphones; Recorders; etc.

Spacers

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
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D **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012 .... ***
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .. p. 1836**
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D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... ***
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 p. 2117,2118**
M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742 .... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169,2178,2179**
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D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2784,2786,2788**
Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502 .... *
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DM Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
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Midwest Aluminum, Div. of Kysor Indus. Corp., Dept. EM, 7696 W. Michigan Ave., Kalamazoo, MI 49009
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
D Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
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Spaghetti—See Tubing, Spaghetti

Spark Gaps

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Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611
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DM Era Acoustics, Dept. EM, 311 E. Park St., Moonachie, N.J. 07074

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Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Telephonics Corp., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750

Speakers, Midrange

Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021

D Sonic International Corp., Dept. EM, 19241 N. E. San Rafael, Portland, Ore. 97230
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Wilder Engrg. Prods, Inc., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640

Speakers, Musical Instrument

D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Wilder Engrg. Prods, Inc., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640

Speakers, Paging—See Speakers, Intercom

Speakers, Pillow

D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Speakers, Public Address

D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
Audio Equip., Div. W. Kidde & Co., Inc., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Perma Power Div., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
D Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D TOA Electronics, Inc., Dept. EM, 1023 Grandview Dr., So. San Francisco, Cal. 94080
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
Wilder Engrg. Prods, Inc., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640

Speakers, Replacement (Including Aircraft, Automotive & TV)

Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
D GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... *
D International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 *
D Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
D Jensen Sound Labs., Div. Pemcor, Inc., Dept. EM, 4310 Trans World Rd., Schiller Park, Ill. 60176
Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
DM Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750

Speakers, Submergence-Proof

Era Transpac Corp., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074 .... *
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
DM University Sound, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803

Speakers, Tweeter

Motorola, Inc. Component Prods., Piezo-Ceramic Speaker Dept., Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131 .... *
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107

D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Sonic International Corp., Dept. EM, 19241 N. E. San Rafael, Portland, Ore. 97230
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Wilder Engrg. Prods, Inc., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640

Speakers, Weatherproof

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ..... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** ..... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ..... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** ..... *
M Adec Inc., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
D Atlas Sound Div., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
DM Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Era Acoustics, Dept. EM, 311 E. Park St., Moonachie, N.J. 07074
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
Magitran Co., Dept. EM, 311 E. Park St., Moonachie, N.J. 07074
D Midwest Electronic Industries, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
DM Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
DM Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D University Sound, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750

Speakers, Woofer

D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** ..... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** ..... *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
D Cleveland Electronics, Inc., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
D CTS of Paducah, Inc., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
D Minneapolis Speaker Co., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
D Oxford Speaker Co., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pyle Inds., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750
D Quam-Nichols Co., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637
D Rola Co., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
SHOGYO International Corp., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021
D Sonic International Corp., Dept. EM, 19241 N. E. San Rafael, Portland, Ore. 97230
Sparkomatic Corp., Dept. EM, Milford, Pa. 18337
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Wilder Engrg. Prods, Inc., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640

Spectrometers

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 ..... **p. 3135**
Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 **p. 2930**
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Bausch & Lomb, A.S. Div., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625
Bromberg Engineering, Dept. EM, 461 Conant Rd., Weston, Mass. 02193
Coleman Instr. Div., Dept. EM, 2000 York Road, Oak Brook, Ill. 60521
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
Physical Electronics Industries, Dept. EM, 6509 Flying Cloud Dr., Eden Prairie, Minn. 55343
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Varian Assocs., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Speed Drives, Motor—See Controls, Motor Speed

Spiral Wrap—See Tubing, Spiral Wrap

Splicers, Coaxial Cable

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 ..... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ..... *
D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852** ..... *
ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 ..... **p. 2027,2028**
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ..... **p. 2050**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ..... *
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Phelps Dodge Communications Co., Dept. EM, 5 Corporate Park Dr., White Plains, N.Y. 10604
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Splices, Wire (Including, Butt & Cap Types)

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 ..... *
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** ..... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 ..... *
Appleton Electronic Div., Appleton Electric Co., Dept. EM, 1701 W. Wellington Ave., Chicago, Ill. 60657 ..... **p. 1783**
D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852** **p. 1810**
Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 ..... *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ..... *
DM **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139** ..... **p. 2027,2028,2032**
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 ..... **p. 2050**
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** **p. 4691**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ..... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 **p. 2186**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** ..... *
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735

Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Preformed Line Products Co., Dept. EM, Box 91129, Cleveland, Ohio 44101
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D Sonobond Corp., Sub. Christiana Metals Corp., Dept. EM, 200 E. Rosedale Ave., West Chester, Pa. 19380
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Splicing Equipment, Magnetic Tape

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Data Link Corp., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725

Splitters/Combiners, Power—See Dividers, Power (LF, HF, VHF, UHF)

Spoolers, Punched Tape—See Readers, Punched Tape

Springs (All Types)

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Graphite Metallizing Corp., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702 .... **p. 3082**
Instrument Specialties, Dept. EM, 276 Bergen Blvd., Little Falls, N.J. 07424 **p. 2669**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ...... *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
M Ametek, Inc, Hunter Spring Division, Dept. EM, 1 Spring Ave., Hatfield, Pa. 19440
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Associated Spring-Barnes Group Inc., Dept. EM, 18 Main St., Bristol, Conn. 06010
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
M Braun Co., Inc., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
Helical Prods. Co., Inc., Dept. EM, Box 2296, Santa Maria, Cal. 93454
DM Helix Spring Corp., Dept. EM, 35-10 10th St., Long Island City, N.Y. 11106
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M PIC Design Div., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877
M Suffolk Etched Prods., Inc., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901
M Templeman, D.R. Co., Dept. EM, 8 Park St., Plainville, Conn. 06062

Stablizers, Current—See Current Sources; Power Supplies, D-C Output, Current Regulated; Power Supplies, Constant Current; Regulators, Current

Stabilizers, Line Impedance

M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110** .... *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 .... *
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705

Stablizers, Voltage—See Regulators & Stablizers, Voltage; Transformers, Voltage Regulating; Voltage Sources

Stablizers, Voltage/Current, Automatic—See Power Supplies, Constant Voltage/Constant Current

Stalos (Stabilized Local Oscillators)—See Oscillators, Microwave

Standards, Atomic Beam

M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** .. *
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721

Standards, Capacitance

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Current

CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 .... *
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 **p. 2841**
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... **p. 2924**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Standards, Delay Line

M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** **p. 2505**
M Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

Standards, Frequency

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... **p. 2407**
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229 **p. 2832**
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 **p. 2985**
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** **p. 2734**
M **Greenray Inds., Inc., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055** .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
M **Monitor Prods., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054** .... **p. 2462**
Ovenaire, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901 .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
M **Spectrum Technology Inc., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017** .... *
M **Vectron Labs., Inc., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850** **p. 2488**
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Atomichron, Inc., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
D Efratom California, Inc., Dept. EM, 3303 Harbor Blvd., Costa Mesa, Cal. 92626
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Spectracom Corp., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Tracor, Inc., Dept. EM, 6500 Tracor La., Austin, Tex. 78721
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Inductance

Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Noise

D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730

Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Phase

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
Dranetz Engrg. Labs.; Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229** p. 2832
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Universal Ad-Yu Elctrns., Inc., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207

Standards, Resistance

General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **Precision Resistor Co., Inc., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205** *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Elctrn. Precision Comps. Corp., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N,Y. 10550
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
M Sierracin/Thermal Sys., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Synchro & Resolver

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Temperature

Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Electro-Optical Inds., Inc., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
M H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Oven Industries, Inc., Dept. EM, 800 New Holland Ave., Mechanicsburg, Pa. 17055
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Tempil Div., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080
Trans-Sonics, Inc., Dept. EM, P.O. Box 326, Lexington, Mass. 02173
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Standards, Time

Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... p. 2407
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** p. 2734
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614** .... p. 1686,1687
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Cognitronics Corp., Dept. EM, 25 Crescent St., Stamford, Conn. 06906
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
D Efratom California, Inc., Dept. EM, 3303 Harbor Blvd., Costa Mesa, Cal. 92626
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standards, Voltage

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Ectron Corp., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111 .... *
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 p. 2840,2841
Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090 p. 2985
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
D Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
M AUL Instrs., Inc., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
DM Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
EMI Technology, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Pioneer Instrumentation, Dept. EM, 4800 E. 131st St., Cleveland, Ohio 44105
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Takeda Riken Industry Co., Ltd., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Standards, Voltage Ratio

General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Standoffs—See Bushings, Glass, Plastic, Metal, etc.

Stands, Instruments

D **Buckeye Stamping Co., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207** *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
M **Zero Corp., Dept. EM, 777 Front St., Burbank, Cal. 91502** .... *
M Electro-Rack Products Co., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Overly-Hautz Co., Dept. EM, 8617 Clinton Rd., Cleveland, Ohio 44144
D Peerless Sls. Co., Dept. EM, 4200 W. Chicago Ave., Chicago, Ill 60651
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140

Stators, Motor & Generator—See Motor & Generator Armatures,Rotors, Stators

Stools—See Benches, Consoles, Stools, Tables (Lab & Shop)

Strain Reliefs, Cable & Wire

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... p. 1705
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *

D **Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033 ...... p. 4669**
Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093 .... *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ...... p. 2257,2259,2267,2268,2273
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ...... p. 2169,2182**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 ...... p. 2376**
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
D Tyton Corp., Dept. EM, 2300 W. Florist Ave., Milwaukee, Wisc. 53209
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Strip-Line Components, Microwave

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 ...... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 ...... ***
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ...... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 ...... *
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
M American Chemical Etching, Inc., Dept. EM, 13730 Desmond St., Pacoima, , Cal. 91331
DM Anaren Microwave, Inc., Dept. EM, 1010 James St., Syracuse, N.Y. 13203
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Prods., Inc., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311
D Modpak, Dept. EM, 31 A Green St., Waltham, Mass. 02154
Mu-Del Elctrns., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Strips, Ground

Instrument Specialties, Dept. EM, 276 Bergen Blvd., Little Falls, N.J. 07424 *
Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671 ...... *
American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910

Strips, Marker & Fanning

Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 ...... *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
D **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 ...... p. 2027,2037**
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 ...... p. 4690**
D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ...... Inside Back Cover,**
Vernitron Elec. Comps., Beau Prods., Dept. EM, Box 10, Laconia, N.H. 03246 *
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
DM K.C.C. Shokai Ltd., Dept. EM, No. 31 Ouchi-dori 4-chome, Nada-ku, Kobe, Japan
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
D Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Stroboscopes—See Lights, Stroboscopic Source

Substrates, Ceramic

Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ...... *
Marlow Industries, Inc., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041 *
Accumet Engineering Corp., Dept. EM, 1 Kane Industrial Dr., Hudson, Mass. 01749
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
Coors Porcelain Co., Dept. EM, 600 Ninth St., Golden, Colo. 80401
Diamonite Products Div., Dept. EM, Box 567, Shreve, Ohio 44676
Dielectric Laboratories, Inc., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006
D Electro-Science Labs., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
M Film Microelectronics, Inc., Dept. EM, 17 A St., Burlington, Mass 01803
GTE Sylvania Inc., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Magneco Electronics, Inc., Dept. EM, 135 S. La Salle St., Chicago, Ill. 60603
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Metalized Ceramics, Dept. EM, Huntington Industrial Pk., Providence, R.I. 02907
M National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
M Optical Coating Div., Valtec Corp., Dept. EM, Holliston, Mass. 01746
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Radio Materials Co., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
D Trans-Tech, Dept. EM, 12 Meem Ave., Gaithersburg, Md. 20760
Union Carbide Corp., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913

Substrates, Flexible

3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ...... *
M Chem Aero, Inc., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976

Substrates, Glass

Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. *
3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ...... *
Accumet Engineering Corp., Dept. EM, 1 Kane Industrial Dr., Hudson, Mass. 01749
M Amersil, Inc., Dept. EM, 650 Jernees Mill Rd., Sayreville, NJ 08872
M Atlantic Optical Moulding Co., Dept. EM, Ellis St., Dudley, Mass. 01570
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
Kopp Glass, Inc., Dept. EM, Box 8255, Swissvale, Pittsburgh, Pa. 15218
Melles Griot, Dept. EM, 1770 Kettering St., Irvine, Cal. 92714
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Valley Design, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913

Suppressors, Arc

Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 ...... p. 4015
F-Dyne Elctrns., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605 ...... *
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 ...... ***
M **McG Electronics Inc., Dept. EM, 160 Brook Ave., Deer Park, N.Y. 11729 ...... p. 4153**
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 ...... ***
Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076 ...... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 ...... *
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078

Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754

Suppressors, Noise

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Hopkins Engrg., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342 *
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M **Rtron Corp., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M All-Tronics Inc., Dept. EM, 45 Bond St., Westbury, N.Y. 11590
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Codi Corporation, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410
M DynaMagnetic Engrg, Inc., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
D Ferroxcube Corp., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477
General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Standard Condenser Corp., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613
Stettner-Trush Inc., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035
Taiyo Denki Co., Ltd., Dept. EM, 225-3 7-cho Nakamachi, Ohtori, Sakai City, Japan 593
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Suppressors, Transient Voltage (All Types)

Acopian Corp., Dept. EM, Box 585, Easton, Pa. 18042 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
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M **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901** .... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 .... *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... *
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245** .... *
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Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400** .... *
Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... *
Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401 .... **p. 3878,3886,3887**
DM **Semtech Corp., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320** **p. 3910**
Standard Power, Inc., Dept. EM, 1400 S. Village Way, Santa Ana, Cal. 92705 *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Teledyne Relays, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250** .... *
TRW Capacitors, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153 **Inside Back Cover,**
Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104 .... *
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Control Concepts Corp., Dept. EM, 333 Front St., Binghamton, N.Y. 13905
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
M FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
Joslyn Elctrn. Sys., Div. Joslyn Mfg. & Supply Co., Dept. EM, 6868 Cortona Dr., Box 817, Goleta, Cal. 93017
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
M Transtector Systems, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Switch Handle Boots

APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... *
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603** .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Carlingswitch Inc., Dept. EM, 505 New Park Ave., W. Hartford, Conn. 06110** *
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 **p. 2188**
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

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ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... **p. 2526**
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... **p. 4017,4055**
D **C & K Components, Inc., Dept. EM, 103 Morse St., Watertown, Mass. 02172** *
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D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... **p. 4017,4055**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** .... **p. 4082**
Mechanical Enterprises, Dept. EM, 8000 Forbes Pl., Springfield, VA 22151 *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 **p. 4163,4164,4167,4169,4173,4175,4191**
D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** **p. 2188**
Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .. **p. 4287,4289**
Veetronix, Dept. EM, Box 209, 136 W. 7th St., Cozad, Neb. 69130 .... **p. 4310**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481

Switch Mounting Plates

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
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D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** **p. 2188**
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

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APM-Hexseal, Dept. EM, 44 Honeck St., Englewood, N.J. 07631 .... **p. 3971**
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
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Switchboards

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368** .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445

M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Devco Engrg., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
Mid-West Metal Prods., Inc., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D Sta-Rite Inds., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403
M Stacoswitch, Inc., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626

Switches, Acceleration

M Acrodyne Controls, Dept. EM, Box 1044, Janesville, Wisc. 53545
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518

Switches, Air Flow Actuated

Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
D **Rotron, Inc., Dept. EM, Hasbrouck La., Woodstock, N.Y. 12498** .... **p. 2712**
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735** .... **p. 4305**
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Cook Elec. Co., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
D H. Kuhnke, Inc., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

Switches, Antenna Changeover

M **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
CW Industries, Dept. EM, 550 Davisville Rd., Warminster, Pa. 18974 .. **p. 4059**
M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** .... **p. 3570**
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... **p. 4217**
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
D Kris Inc., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012
Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311

Switches, Cam

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
D **Chicago Lock Co., Dept. EM, 4311 W. Belmont Ave., Chicago, Ill. 60641** **p. 4001**
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647** .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188 .. **p. 4071**
DM **Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634** .... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** .... **p. 3953**
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Candy Mfg. Co., Dept. EM, 626 Grove St., Evanston, Ill 60201
Cogenel, Inc., Entrelec Div., Dept. EM, 101 Executive Blvd., Elmsford, N.Y. 10523
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
DM Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
D General Control Co., Dept. EM, 1196 Soldiers Field Rd, Boston, Mass. 02134
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Risk Inds, Inc., George, Dept. EM, GRI Plaza, Kimball, Neb. 69145
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Switches, Centrifugal

M Acrodyne Controls, Dept. EM, Box 1044, Janesville, Wisc. 53545
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Synchro-Start Products, Inc., Dept. EM, Box 147, 8109 N. Lawndale Ave., Skokie, Ill. 60076
Torq Engineered Products, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146

Switches, Coaxial Cable

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** ...... **p. 1413**
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220** .... *
D **Electronic Specialty Div., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .. **p. 3562,3563**
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** .... **p. 3570**
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Alpha Industries Inc., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801
Arvin Systems, Dept. EM, 1771 Springfield St., Dayton, Ohio 45403
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154

D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Switches, Coded

M **Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803 .... ***
Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... ***
DM **Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 .... ***
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... ***
D **Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... ***
Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504 p. 4139
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
D **Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... ***
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
M **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... ***
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
Standard Grigsby Inc., Dept. EM, 920 Rathbone Ave., Aurora, Ill. 60507 ...... *
M **Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 ***
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Controls Development Corp., Dept. EM, 2100 S. Fairview, Santa Ana, Cal. 92704
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
DM EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
M Flex Key Corp., Dept. EM, 18 Sargent St., Gloucester, Mass. 01930
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833

Switches, Crossbar

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 p. 3968,3969
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... ***
Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... p. 3995,3997
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .... ***
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040 .. ***
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 p. 4285,4289,4296
T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

Switches, Data-Sampling

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 ***
Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 p. 4060-4064
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... ***
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Counterscan Systems, Dept. EM, Box 536, Sutton, Neb. 68979
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
D Monitor Labs, Inc., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121
M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291

Switches, Decade

M **Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803 .... ***
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... ***
DM **Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... *
LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
D **Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... ***
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *
Shallco, Inc., Dept. EM, Box 1089, Smithfield, N.C. 27577 .... *
Standard Grigsby Inc., Dept. EM, 920 Rathbone Ave., Aurora, Ill. 60507 ...... *
M **Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 ***
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Switches, Dip

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... p. 3956**
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 p. 3963,3965,3966
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
CW Industries, Dept. EM, 550 Davisville Rd., Warminster, Pa. 18974 .. p. 4059
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 p. 4074-4076**
IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 p. 4098,4099
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... p. 4199
Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... p. 2127
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 p. 4261
D EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701

Switches, Feed-Through Cord

Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... p. 4054
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... p. 4054
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

Switches, Foot-Pedal, Mat, Ribbon, etc.

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4073
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .. p. 4232
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... p. 4305**
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D General Control Co., Dept. EM, 1196 Soldiers Field Rd, Boston, Mass. 02134
Lektra Labs., Inc., Dept. EM, 129-07 18th Ave., College Point, N.Y. 11356

Switches, Foot-Pedal, Mat, Ribbon, etc. (Cont'd)

DM Line Electric Esterline Co., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054
DM Linemaster Switch Corp., Dept. EM, Box 52, Woodstock, Conn. 06281
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Switches, High-Voltage (Over 250 Volts)

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... p. 3976,3977
Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... p. 4017
DM ASM Corp, Dept. EM, Box 860, 525 Truck Lane, Smithfield, N.C. 27577 ...... *
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... p. 4017
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
DM Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188 .. p. 4071
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4072,4073
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... p. 4134
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... p. 4137
M Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504 .... *
M Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103 .... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... p. 4157
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
Oslo Controls, Dept. EM, 417 Washington St., New Haven, Conn. 06473 p. 4207
Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... p. 3953
Pulsar Assocs., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037 *
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M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
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D Robertshaw Controls Co., Dept. EM, 2101 Marlane Dr., Grove City, Ohio 43123

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Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
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Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Mallory Controls, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041
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D Robertshaw Controls Co., Dept. EM, 2101 Marlane Dr., Grove City, Ohio 43123
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703

Switches, Limit

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1482
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647** .... *
Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** .... *
ILC Data Device Corp., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716 p. 1660
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** .... *
D **Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634** .... **p. 4145**
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
McGill Mfg. Co. Inc., Electrical Div., Dept. EM, 909 Lafayette St., Valparaiso, Ind. 46383 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4198**
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
D **Otto Engrg., Inc., Otto Controls Div., Dept. EM, 36 Main St., Carpentersville, Ill. 60110** .... *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** .... **p. 3953**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .. **p. 4232**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735** .... *
D **Unimax Switch Corp., Sub. Unimax Group, Inc., Dept. EM, Ives Rd., Wallingford, Conn. 06492** .... *
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Burgess Switch Co., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
DM Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D General Control Co., Dept. EM, 1196 Soldiers Field Rd, Boston, Mass. 02134
M Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
Temposonics Inc., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703

Switches, Liquid Level/Pressure

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... **p. 4321**
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Automation Prdts., Dept. EM, 3030 Max Roy, Houston, Tex. 77008
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Cook Elec. Co., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
D Delavan Electronics, Inc., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
Electro Control, Inc., Dept. EM, Matthews Ave., Canton, Miss. 39046
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
Harwil Co., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91409
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
D Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Switches, Lock—See Switches, Key-Lock

Switches, Magnetic Reed

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *

D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** *
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** *
DM **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551** .... p. 4093
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Maxi-Switch Co., Dept. EM, 9697 East River Road, Minneapolis, Minn. 55433 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 *
Veetronix, Dept. EM, Box 209, 136 W. 7th St., Cozad, Neb. 69130 *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 *
D Compac Engineering, Dept. EM, 398 Commercial, San Jose, Cal. 95112
Controls Development Corp., Dept. EM, 2100 S. Fairview, Santa Ana, Cal. 92704
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
Hasco Components, Dept. EM, 920-18 Baychester Ave., Bronx, N.Y. 10475
Hermetic Switch, Inc., Dept. EM, Box 1325, Hwy 92 W., Chickasha, Okla. 73018
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Madison Laboratories, Dept. EM, Box 608, Madison, Conn 06443
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
D Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

Switches, Magnetically Actuated

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** *
M **Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803** *
Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 *
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** *
Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 *
Elmwood Sensors, Inc., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907 *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4072
D **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551** *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** *
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
Maxi-Switch Co., Dept. EM, 9697 East River Road, Minneapolis, Minn. 55433 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** p. 4190,4196
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** *
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** *
Schrack Electrical Sales Corp., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001 *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 *

Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 *
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
De Laval Turbine Inc., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032
D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
Electro-Mechanisms, Inc., Dept. EM, 1163 W. Fourth St., Azusa, Cal. 91702
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
Hasco Components, Dept. EM, 920-18 Baychester Ave., Bronx, N.Y. 10475
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
D Namco Controls, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108
D North American Philips Controls, Dept. EM, Husky Park, Frederick, Md. 21701
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
Reedtron, Inc., Dept. EM, Box 91, E. Bridgewater, Mass. 02333
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311

Switches, Matrix—See Switches, Crossbar; Switches, Reed; Boards, Programming

Switches, Mercury Displacement

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** p. 3406
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** *
D **Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514** .. p. 3471,4066,4067
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4072
D **Mechanical Enterprises, Dept. EM, 8000 Forbes Pl., Springfield, VA 22151** *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** p. 4159,4195
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** *
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095

Switches, Mercury Wetted Contacts

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514** p. 3406
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** *
Coto-Coil Co., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905 *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4072
D **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551** .... p. 4093
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032** *
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 *
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003
D H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
M PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311

Switches, Microwave—See Switches, Coaxial Cable; Switches, Waveguide

Switches, Motor-Driven

D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002** *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** *
D **Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188** *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 p. 4137
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 *
M **Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014** *
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** *
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** *

M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... p. 3611**
Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Switches, Paddle Handle

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... p. 3977**
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
D **C & K Components, Inc., Dept. EM, 103 Morse St., Watertown, Mass. 02172 ***
Carlingswitch Inc., Dept. EM, 505 New Park Ave., W. Hartford, Conn. 06110 p. 3990,3991
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .. p. 4003**
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
McGill Mfg. Co. Inc., Electrical Div., Dept. EM, 909 Lafayette St., Valparaiso, Ind. 46383 .... p. 4156
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4178**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630 .... ***
D American Switch Corp., Dept. EM, 134 Water St., Wakefield, Mass. 01880
J-B-T- Switches, A Cutler Hammer Co., Dept. EM, Box 1904, New Haven, Conn. 06509
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

Switches, Photoelectric—See Cells, Photoconductive; Controls, Photoelectric

Switches, Portable Tool Handle

D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
D **McGill Mfg. Co. Inc., Electrical Div., Dept. EM, 909 Lafayette St., Valparaiso, Ind. 46383 .... ***
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

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D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... p. 3976,3977
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... p. 4017,4024-4030,4046,4047,4049,4055**
DM **ASM Corp, Dept. EM, Box 860, 525 Truck Lane, Smithfield, N.C. 27577 .... ***
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... ***
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .... ***
Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645 .... p. 4005
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... p. 4017,4023-4030,4046,4047,4049,4055**
D **CW Industries, Dept. EM, 550 Davisville Rd., Warminster, Pa. 18974 .... ***
Dressen-Barnes Electronics, Div. American Elctrns., Dept. EM, 1600 E. Valencia Dr., Fullerton, Cal. 92631 .... p. 3237
Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733 .... p. 4069
DM **Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188 .. p. 4071**
Electronic Measurements, Dept. EM, 405 Essex Rd., Neptune, N.J. 07753 .. *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4073
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 p. 4097**
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504 .... ***
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 p. 3573,4141,4143
DM **Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 .... p. 4145**
Littelfuse, Inc., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016 p. 4149
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
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D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4162,4170**
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D **Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... ***
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 p. 4203
D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... p. 4206**
Oslo Controls, Dept. EM, 417 Washington St., New Haven, Conn. 06473 p. 4207
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M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2188
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Stackpole Components Co., Dept. EM, Box 14466, Raleigh, N.C. 27610 p. 4236,4237,4243,4255
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Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 p. 4306,4307
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Unimax Switch Corp., Sub. Unimax Group, Inc., Dept. EM, Ives Rd., Wallingford, Conn. 06492 .... p. 4309
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D American Switch Corp., Dept. EM, 134 Water St., Wakefield, Mass. 01880
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
D Compu-Lite Corp., Dept. EM, 711 W. 17th St. #F12, Costa Mesa, Cal. 92627
M Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
M Radio Switch, Dept. EM, State Hwy. 79, Marlboro, N.J. 07746
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Wadsworth Electric Mfg. Co., Dept. EM, 20 W. 11th St., Covington, Ky. 41011

Switches, Pressure

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *

D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
Faria Meter Corp., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711 .... p. 4116,4117
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 ...... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Accurate Electronics Corp., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Cook Elec. Co., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
M Dietz, Henry G. Co., Inc., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
Electro Control, Inc., Dept. EM, Matthews Ave., Canton, Miss. 39046
M Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D Fairchild Industrial Prods. Div., Dept. EM, 75 Mall Dr., Commack, N.Y. 11725
M Flex Key Corp., Dept. EM, 18 Sargent St., Gloucester, Mass. 01930
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Korry Mfg. Co., Dept. EM, 223 8th Ave. N., Seattle, Wash. 98109
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
DM Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
M Pressure Controls, Inc., Dept. EM, 681 Main St., Belleville, N.J. 07109
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172

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DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
D **Allen-Bradley Co.; Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204** .. *
American Zettler, Inc., Dept. EM, 16881 Hale Ave., Irvine, Cal. 92714 p. 3958
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 p. 3962,3963,3965-3967,3970
Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company; Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **C & K Components, Inc., Dept. EM, 103 Morse St., Watertown, Mass. 02172** p. 3985
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
D **Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647** .. p. 4002
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Electro-Mech Components, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733 .... p. 4069
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4072
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 p. 4084,4089
IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 p. 4095,4099
D **Illuminated Products Inc., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711** .... p. 4104,4105,4114,4115,4120
Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010 .... p. 4134
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** .... *
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... *
Maxi-Switch Co., Dept. EM, 9697 East River Road, Minneapolis, Minn. 55433 *
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
D **Mechanical Enterprises, Dept. EM, 8000 Forbes Pl., Springfield, VA 22151** *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4159,4170
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D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** .... p. 4212-4215
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
DM **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111** .... p. 4218,4220-4222
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
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Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Stackpole Components Co., Dept. EM, Box 14466, Raleigh, N.C. 27610 p. 4235-4237,4239,4242-4245,4248-4251
Standard Grigsby Inc., Dept. EM, 920 Rathbone Ave., Aurora, Ill. 60507 p. 4258
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... p. 4264,4266-4269
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630** .... p. 4289
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Veetronix, Dept. EM, Box 209, 136 W. 7th St., Cozad, Neb. 69130 .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D American Switch Corp., Dept. EM, 134 Water St., Wakefield, Mass. 01880
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Bowmar Instr. Corp., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809
D Burgess Switch Co., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
D Compu-Lite Corp., Dept. EM, 711 W. 17th St. #F12, Costa Mesa, Cal. 92627
D Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
Controls Development Corp., Dept. EM, 2100 S. Fairview, Santa Ana, Cal. 92704
EECO, Dept. EM, 1441 E. Chestnut Ave. Box 659, Santa Ana, Cal. 92701
Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
J-B-T- Switches, A Cutler Hammer Co., Dept. EM, Box 1904, New Haven, Conn. 06509
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Risk Inds, Inc., George, Dept. EM, GRI Plaza, Kimball, Neb. 69145
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Showa Musen Kogyo Co., Ltd., Dept. EM. 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
M Stacoswitch, Inc., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

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D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002** *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... p. 3966
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 4076
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343** *
Info-Lite Corp., Dept. EM, 46-10 104 St., Corona, N.Y. 11368 .... *
Information Transfer Industrial, Inc., Dept. EM, Box 357, Holcomb, N.Y. 14469 .... *
D **Interswitch, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010** .... *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401** .... *
M **LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354** .... *
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 *
D **Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532** .... *
Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 p. 4200
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590** .... *
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... p. 1683
Standard Grigsby Inc., Dept. EM, 920 Rathbone Ave., Aurora, Ill. 60507 p. 4258
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406

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D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Candy Mfg. Co., Dept. EM, 626 Grove St., Evanston, Ill 60201
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
D CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Switches, Proximity

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 p. 3406**
M **Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803 .... ***
D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... p. 3464
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Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4073
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551 .... ***
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4159**
DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102 .... ***
RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137 *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Standex Electronics, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209 *
D **Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... ***
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Burgess Switch Co., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3
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D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
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M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
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D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
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M Aerospace Optics Inc., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118

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D Compu-Lite Corp., Dept. EM, 711 W. 17th St. #F12, Costa Mesa, Cal. 92627
M Control Prods., Inc., Dept. EM, E. Hanover, N.J. 07936
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Durant Digital Instruments, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094
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D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
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D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
M Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
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M Jay-El Prods., Dept. EM, 1859 W. 169th St., Gardena, Calif. 90247
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M Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
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M Milli-Switch Corp., Dept. EM, Box 67, Gladwyne, Pa. 19035
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
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D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
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D Robertshaw Controls Co., Dept. EM, 2101 Marlane Dr., Grove City, Ohio 43123
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
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D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
M Stacoswitch, Inc., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626
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Sys-Tec Inc., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
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Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
M Waldman Corp., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054
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D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
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D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
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D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
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D Wallace Electronic Sls., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284

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Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
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M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220** ...... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
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- **Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .....** *
- D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
- **Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .....** *
- AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
- M Aiken Industries, Inc., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760
- Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
- Alaun Engrg., Dept. EM, 515 South Palm, Alhambra, Cal 91803
- Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
- M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
- Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
- D Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
- M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
- M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
- Electro Space Systems, Inc., Dept. EM, Box 1359, Richardson, Tex. 75080
- M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
- Hasco Components, Dept. EM, 920-18 Baychester Ave., Bronx, N.Y. 10475
- M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
- LRC Inc., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051
- D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
- D Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
- Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
- Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
- M Radio Switch, Dept. EM, State Hwy. 79, Marlboro, N.J. 07746
- Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
- Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
- Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
- M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
- Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
- Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
- M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
- Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
- Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

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- Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
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Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172

D Bendix Corp., The, Electrical Comp. Div., Dept. EM, Sidney, N.Y. 13838

M Betatronix, Inc., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787

D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

Branson Corp., Dept. EM, Box 147, Newton, N.J. 07860

Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010

Carson Mfg. Co., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220

Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501

M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614

M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627

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DM CTS Corp., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514

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M Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947

M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540

D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904

DM Gordos Corp., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003

Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034

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D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223

Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146

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New England Instr., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760

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M Poly-Scientific, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060

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Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510

D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080

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D Burgess Switch Co., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
D Compu-Lite Corp., Dept. EM, 711 W. 17th St. #F12, Costa Mesa, Cal. 92627
M Control Prods., Inc., Dept. EM, E. Hanover, N.J. 07936
DM Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
CTS Corp., Dept EM, 905 N. West Blvd., Elkart, Ind. 46514
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
M Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
M Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
J-B-T- Switches, A Cutler Hammer Co., Dept. EM, Box 1904, New Haven, Conn. 06509
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D Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
M Milli-Switch Corp., Dept. EM, Box 67, Gladwyne, Pa. 19035
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
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D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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D Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
DM Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Robertshaw Controls Co., Dept. EM, 2101 Marlane Dr., Grove City, Ohio 43123
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
DM SGL Waber Electric, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093
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Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Torq Engineered Products, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
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D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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M General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 *
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DM American Nucleonics Corp., Dept. EM, 6036 Variel Ave., Woodland Hills, Cal 91367
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Astro-Geo-Marine Inc., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003
M Baldpate Electronics, Inc., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833
Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735

D – Product sold through distributors M – Product meets MIL specs
* – Company has information in this edition but not on this product.

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Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
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D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
M Crown Microwave, Inc., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862
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D Denison, R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
D Dynair Elctrns, Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
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D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
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M Genisco Tech. Corp., Genistron Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
M GHZ Devices, Inc., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
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Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
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M Micro Power Systems Inc., Dept. EM, 3100 Alfred St., Santa Clara, Cal. 95050
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D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
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D Monsanto-Electronics Div., Dept. EM, 3400 Hillview Ave., Palo Alto, Cal. 94304
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Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
Payne Engrg. Co., Dept. EM, Box 70, Scott Depot, W. Va. 25560
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
M Reed Switch Dev. Co. Inc., Dept. EM, PO Box 1464, Kerrville, Tex. 78028
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Solidstate Controls, Inc., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214
M Somerset Radiation Lab., Dept. EM, Box 17066, Washington, DC 20041
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Synchro-Start Products, Inc., Dept. EM, Box 147, 8109 N. Lawndale Ave., Skokie, Ill. 60076
D Tann Controls Co., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234
D Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

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DM **ASM Corp, Dept. EM, Box 860, 525 Truck Lane, Smithfield, N.C. 27577** ...... *
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Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

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D **Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002** *
DM **ASM Corp, Dept. EM, Box 860, 525 Truck Lane, Smithfield, N.C. 27577** ...... *
D **Clare & Co., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** .... *
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DM **RCL Electronics Div., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102** .... *
M **RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111** .... *
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Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
M General Devices, Inc., Dept. EM, P.O. Box 253, Princeton, N.J. 08540
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D Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Universal Relay Corp., Dept. EM, 42 White St., New York, N.Y. 10013

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D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
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M Chatham Controls Corp., Dept. EM, 33 River Rd., Chatham, N.J. 07928
M Control Prods., Inc., Dept. EM, E. Hanover, N.J. 07936
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
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D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
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D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172

Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039

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Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 p. 3959-3961
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D **C & K Components, Inc., Dept. EM, 103 Morse St., Watertown, Mass. 02172 p. 3984**
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M Chicago Dynamic Industries, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
DM EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
Lineac Corp., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701
Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648

Switches, Time Delay

D **Adams & Westlake Co., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514 p. 3406**
M **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... ***
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Durakool, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514 .... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
D **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 ***
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
M Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Switches, Timing—See Timers

Switches, Toggle

M **Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... ***
DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... p. 3956,3957**
Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... p. 3964
D **Arcolectric Corp., Dept. EM, Box 348, 11120 Chandler Blvd., No. Hollywood, Cal. 91603 .... p. 3977**
DM **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... p. 4018-4035,4054,4055**
D **C & K Components, Inc., Dept. EM, 103 Morse St., Watertown, Mass. 02172 p. 3984,3985**
D **Carlingswitch Inc., Dept. EM, 505 New Park Ave., W. Hartford, Conn. 06110 p. 3987,3988,3990,3991**
Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085 .... p. 3994,3997
Chicago Switch, Inc., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647 .. p. 4003
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... p. 4018-4022,4024-4035,4054,4055**
D **CW Industries, Dept. EM, 550 Davisville Rd., Warminster, Pa. 18974 p. 4058,4059**
Digitran Co., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105 p. 4063
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 4076
D **IEE/Schadow, Inc., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343 ***
Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058 .... *
DM **Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 .... ***
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 *
D **McGill Mfg. Co. Inc., Electrical Div., Dept. EM, 909 Lafayette St., Valparaiso, Ind. 46383 .... p. 4156**
Mc Graw-Edison Co., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103 .... *
DM **Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4159,4177,4179,4180,4182,4183**
D **Oak Inds. Inc., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014 p. 3614,4200,4204**
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 *
DM **Otto Engrg., Inc., Otto Controls Div., Dept. EM, 36 Main St., Carpentersville, Ill. 60110 .... p. 4208**
D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... p. 4212-4214**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2188,2189**
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... p. 4269
D **T-Bar Inc., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897 .... p. 4304**
M **Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 ***
UID Electronics Div., AMF Inc., Dept. EM, 4105 Pembroke Rd., Hollywood, Fla. 33021 .... p. 4308
D **Unimax Switch Corp., Sub. Unimax Group, Inc., Dept. EM, Ives Rd., Wallingford, Conn. 06492 .... ***
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D American Switch Corp., Dept. EM, 134 Water St., Wakefield, Mass. 01880
D Aqualarm Inc., Dept. EM, 544 W. 182nd, Gardena, Cal. 90248
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Centralab Elctrns. Div., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
M Control Prods., Inc., Dept. EM, E. Hanover, N.J. 07936
DM Control Switch, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Essex Controls Div., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947
D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
M Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
J-B-T- Switches, A Cutler Hammer Co., Dept. EM, Box 1904, New Haven, Conn. 06509
Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
DM Machine Components Corp., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803

Mc Graw-Edison, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103
M Milli-Switch Corp., Dept. EM, Box 67, Gladwyne, Pa. 19035
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Seacor, Inc., Dept. EM, 598 Broadway, Norwood, N.J. 07648
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D Specialties Mfg. Co., Inc., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Cherry Electrical Prods. Corp., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085** .... *
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 p. 4073
Master Specialties Co., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627 p. 4152
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 p. 4174,4176
RCL Electronics Div., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111 .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... **p. 4227**
Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... **p. 4305**
Aerospace Optics Inc., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118
Automation Displays Inc., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701
D Burgess Switch Co., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3
D Centralab, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201
D Denison; R.B., Inc., Dept. EM, 103 Broadway, Bedford, Ohio 44146
M Flex Key Corp., Dept. EM, 18 Sargent St., Gloucester, Mass. 01930
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Jaidinger Mfg. Co., Inc., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622
Key Tronic Corp., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
Morex, Inc., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651

Switches, Transfer

Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
DM **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
M **Daico Industries Inc., Dept. EM, Box 5225, Compton, Cal. 90220** .... *
DM **Electro Switch Corp., Dept. EM, King Ave., Weymouth, Mass. 02188** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** .... *
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** .... *
Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... *
Matrix Systems Corp., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311 *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
Tech Labs., Inc., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650 *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Cole Instrument Corp., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
Lakeshore Electric Corp., Dept. EM, 205 Willis, Bedford, Ohio 44146

Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
Relay Service Co., Dept. EM, 1310 N. Pulaski Rd., Chicago, Ill. 60651
Risk Inds, Inc., George, Dept. EM, GRI Plaza, Kimball, Neb. 69145
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Solidstate Controls, Inc., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214
Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

Switches, Vacuum

ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 .... *
DM **Kilovac Corp., Dept. EM, Box 4422, Santa Barbara, Cal. 93103** .... *
M **Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008** .... *
Tapeswitch Corp. Amer., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Anro Elex Inds. Ltd., Dept. EM, 300 Wildcat Rd., Downsview, Ont, Can.
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Columbus Electric Mfg. Co., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
Dwyer Instrs, Dept. EM, Box 373, Michigan City, Ind. 46360
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Fredericks Co., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
M Pressure Controls, Inc., Dept. EM, 681 Main St., Belleville, N.J. 07109
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Switches, Waveguide

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Fifth Dimension, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
M Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal 94040
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Switchlights—See Switches, Illuminated

Synchro Transmitters, Solid-State

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
M **Control Sciences, Inc., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
M **Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072** .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2897**
M **Natel Engineering Co., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306** *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685**
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424

Synchronizers, Klystron & BWO

Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
Micro-Now Instr. Co., Dept. EM, 6104 N. Pulaski Rd., Chicago, Ill. 60646
Microwave/Sys., Inc., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006

Synchros

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1483
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** .... *
Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 .... *
Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 p. 1685
M **Vernitron Corp., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501** .... p. 2406
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
Henschel Corp., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913
M IMC Magnetics Corp., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270
M Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490

Synthesizers, Delay Line

Allen Avionics, Inc., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501 .... *
M **Computer Devices Corp., Dept. EM, 63 Austin Blvd., Commack, N.Y. 11725** *
M **Control Elctrns. Co., Inc., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735** *
M **Data Delay Devices, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011** .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... p. 2849
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304

Synthesizers, Frequency

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 p. 2790,2791
Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
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D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
M **Frequency Elctrns., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040** p. 2734
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M **LogiMetrics Inc., Dept. EM, 121-03 Dupont St., Plainview, NY 11803** .... *
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Scientific Communications, Dept. EM, 3425 Kingsley, Garland, Tex. 75041 *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept: EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dana Labs., Inc., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664
Dynatron Co., Dept. EM, Box 48822, Los Angeles, Cal. 90048
M EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
M Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
FG Engineering Co., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
Frequency West, Inc., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept: EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Snelgrove, C. R. Ltd., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can.
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Synthesizers, Waveform

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Adret Corporation, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601 .... *
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Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Real Time Systems Inc., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Syntest Corp., Dept. EM, 169 Millham St., Marlboro, Mass 01752
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

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M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... p. 2383
D **Beede Electrical Instr. Co., Dept. EM, S. Main St., Penacook, N.H. 03301** p. 2808
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D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** p. 1666
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303** .... *
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** .... *
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D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403** .... *
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210** .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
M Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Gould/Trump-Ross, Dept. EM, 340 Fordham Road, Wilmington, Mass. 01887
M Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Kelk, George Ltd., Dept. EM, 48 Lesmill Rd., Don Mills, Ont., Can. M3B 2T5
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
DM Pioneer Elec. & Resch. Co., Dept. EM, 743 Circle Dr., Forest Park, Ill. 60130
DM Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
M Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Tachometers, Generator

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803 ..... p. 3064**
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D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040 p. 3070**
**Eastern Air Devices Motor Div., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820 ..... *
D **Electro-Craft Corp., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343 .. ***
Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 ..... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Georator Corporation, Dept. EM, Box 70, Manassas, Va. 22110 ..... ***
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 ..... ***
M **Magnetic Technology, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303 ..... p. 3090,3091**
M **Micro-Mo Electronics Inc., Dept. EM, 3691 Lee Rd., Cleveland, Ohio 44120 p. 3096-3099**
Pittman Corp., Dept. EM, 343 Godshall Drive, Harleysville, Pa. 19438 p. 3104
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Servo-Tek Prods. Co., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506 p. 3107
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 ..... p. 3128**
M **Wertronix Corp., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210 p. 3130**
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114 ..... ***
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ..... ***
M Aircraft Appliances Eqpt, Dept. EM, 152 E Dr., Brmalea, Ont, Can.
M American Electronics, Inc., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
D Carter Motor Co., Dept. EM, 2707 W. George St., Chicago, Ill. 60618
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
Electric Tachometer Corp., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142
M Harowe Servo Controls, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380
Hathaway Instruments Inc., Dept. EM, 11616 51st St., Tulsa, Okla. 74145
Horizons International, Inc., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025
Howell Inst. Inc., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107
I M C Magnetics, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590
Indiana Gen'l. Div., Electro-Mechanical Prods., Dept. EM, Oglesby, Ill. 61348
M Inland Motor Div. Kollmorgen, Industrial Drives Group, Dept. EM, 609 Rock Rd., Radford, Va. 24141
M Inland Motor Div. Kollmorgen, Dept. EM, Specialty Prods. Div., 501 First St., Radford, Va. 24141
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
M MPC Prods. Corp., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646
Parametrics, Div. Zero-Max Inds., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477
PMI Motors, Kollmorgen Corp., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
M Sierracin/Magnedyne Inc., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
DM Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824

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D **Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ..... ***
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 ..... ***
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 ..... p. 2928
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Data Link Corp., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
DM Pioneer Elec. & Resch. Co., Dept. EM, 743 Circle Dr., Forest Park, Ill. 60130
M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
DM Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134

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D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111 ..... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ..... ***
M **International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 ***
Mac Panel Co., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262 ..... *
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 ..... *
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
Alinabal, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
D Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
BASF Systems, Dept. EM, Crosby Dr., Bedford, Mass 01730
Bell & Howell Co., Elctrns. & Instrs. Grp., Dept. EM, 360 Sierra Madre Villa, Pasadena, Cal. 91109
DM Capitol Magnetic Prods., Div. Capitol Records, Dept. EM, 1750 N. Vine St., Hollywood, Cal. 90028
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Conrac Corp., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Data Link Corp., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
M Genisco Tech. Corp., Tape Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Instrumentation Prods., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010
D Intern'l. Computer Prods., Inc., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229
M Kenton Engrg. Corp., Dept. EM, 8232 Christiana Ave., Skokie, Ill. 60076
3M Company, Technical Ceramic Prods. Div., Dept. EM; 3M Center 223-4S, St. Paul, MN. 55101
Magnetic Audio/Video Products :Div., 3M Co., Dept. EM, 3M Center, Bldg. 223-5N, St. Paul, Minn. 55101
D Nortronics Co., Inc., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
D Recoton Corp., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
Triple I, Div. Economy Co., Dept. EM, 1901 N. Walnut, Oklahoma City, Okla. 73105
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Tape Search Equipment

M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 ..... ***
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M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 ..... p. 1688**
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Kyros Corp., Dept. EM, Box 406, Madison, Wisc. 53701
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
Video Research Corporation, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876

Tape Winders

D **Data Specialties, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062 ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 ..... ***
MPH Electronics, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733 p. 1670
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Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Possis Corp., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426
Remex, Ex-Cell-O Corp., Dept. EM, 1733 East Alton St., Irvine, Cal. 92714
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590

Tapes, Electrical Insulation

DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 ..... ***
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Connecticut Hard Rubber Co., Dept. EM, 407 East St., New Haven, Conn. 06509

D General Elec. Company, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Press-On Prods., Dept. EM, 1020 S. Westgate Dr., Addison, Ill. 60101
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalō Ave., Freeport, N.Y. 11520

Tapes, Films & Foils, Pressure Sensitive

Applied Graphics, Dept. EM, 58 Shore Rd, Glenwood Landing, N.Y. 11547
Auburn Mfg., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457
D Bishop Graphics, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361
M Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
M Centron Engrg., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
Chartpak, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Circuit-Stik, Inc., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510
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Connecticut Hard Rubber Co., Dept. EM, 407 East St., New Haven, Conn. 06509
D Data Link Corp., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022
D Fitchburg Coated Products, Div. Litton Inds., Dept. EM, P. O. Box 1106, Scranton, Pa. 18501
D Labelon Corp., Dept. EM, 10 Chapin St., Canandaigua, N.Y. 14424
Lamart Corp., Dept. EM, 16 Richmond St., Clifton, N.J. 07015
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
M Markem Corp., Dept. EM, l000 Congress St., Keene, NH 03431
Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
M Press-On Prods., Dept. EM, 1020 S. Westgate Dr., Addison, Ill. 60101
Schweitzer, Div., Kimberly Clark Corp., Dept. EM, Lee, Mass. 01238
Sheldahl, Inc., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057
Tapecon, Inc., Dept. EM, 475 River St., Rochester, N.Y. 14612
Topflight Corp., Dept. EM, 160 East 9th Ave., York, Pa. 17404
D United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

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AGFA-Gevaert, Inc., Dept. EM, 275 North St., Teterboro, N.J. 07608
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
BASF Systems, Dept. EM, Crosby Dr., Bedford, Mass 01730
DM Capitol Magnetic Prods., Div. Capitol Records, Dept. EM, 1750 N. Vine St., Hollywood, Cal. 90028
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Duotone Co., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143
E.I. DuPont de Nemours & Co., Dept. EM, 1007 Market St., Wilmington, Del. 19898
M Hamilton Technology, Inc., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604
Information Terminals, Dept. EM, 323 Soquel Way, Sunnyvale, Cal. 94086
D Intern'l. Computer Prods., Inc., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229
D Irish Magnetic Recording Tape, Dept. EM, 270-78 Newtown Rd., Plainview, N.Y. 11803
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Magnetic Audio/Video Products :Div., 3M Co., Dept. EM, 3M Center, Bldg. 223-5N, St. Paul, Minn. 55101
DM Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
Micro Communications Corp., Dept. EM, 80 Bacon St., Waltham, Mass. 02154
D Robins Ind's. Corp., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725
Superex Electronics Corp., Dept. ÉM, 151 Ludlow St., Yonkers, N.Y. 10705
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tri-Data Corp., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043
Wabash Tape, Dept. EM, 2700 Des Plaines Ave., #112, Des Plaines, Ill 60018
Weltron Co., Inc., Dept. EM, 260 Bethpage Spagnoli Rd., Melville, N.Y. 11746

Technical Books

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4523
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D American Radio Relay League, Dept. EM, 225 Main St., Newington, Conn. 06111
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Cleveland Institute of Elctrns., Dept. EM, 1776 E. 17th St., Cleveland, Ohio 44114
M D.A.T.A. Inc., A Cordura Co., Dept. EM, 45 U.S. Hwy 46, Pine Brook, NJ 07058
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Information Handling Services, Dept. EM, 15 Inverness Way East, Englewood, Colo. 80150
Johnson Research Corp., Dept. EM, 2099 New Hwy., Farmingdale, N.Y. 11735
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
Martin Research, Dept. EM, 3336 Commercial Ave., Northbrook, Ill. 60062
M Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
Omnicop, Inc., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016
DM Sams, Howard W. & Co., Dept. EM, 4300 W. 62nd. St., Indianapolis, Ind. 46268
D Tab Books, Dept. EM, Monterey & Pinola Aves., Blue Ridge Summit, Pa. 17214
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Wiley & Sons Inc., J., Dept. EM, 605 3rd Ave., New York, N.Y. 10016

Tees, Coaxial

DM **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... ***
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
D CES Elctrns., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Norsal Industries, Inc., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717
DM Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Tees, Waveguide

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M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
D CES Elctrns., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
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D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Telecommunication Systems & Equipment—See Comm. Systems, Telephone

Telemetering Indicators—See Analyzers, Telemetric Data

Telemetering Systems, Electronic—See Comm. Systems, Telemetering

Telephone Channel Test & Simulator Equipment - Also see Testers, Telephone

Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Conklin Instr. Corp., Dept. EM, Main St., Pleasant Valley, N.Y. 12569
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
D Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
M Electronic Counters, Inc., Dept. EM, 240 Humphrey St., Englewood, N.J. 07631
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

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Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Centronics Data Computer Corp., Dept. EM, Wall St., Hudson, N.H. 03051
D ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Computer Terminal Sys., Dept. EM, 52 Newtown Plaza, Plainview, N.Y. 11803
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Link Communications Inc., Dept. EM, 260 W. Broadway, New York, N.Y. 10013
M Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
M Teletype Corp., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404

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D ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
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Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Link Communications Inc., Dept. EM, 260 W. Broadway, New York, N.Y. 10013
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034
Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
M Teletype Corp., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076
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Television Systems & Equipment, Cable (CATV) & Master Antenna (MATV)—See CATV Systems & Equipment

Television Systems & Equipment Closed-Circuit

M **Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 p. 1458-1465**
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2904
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D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219 ***
D **Venus Scientific, Inc., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735 .... ***
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
Ampex Corp., Dept. EM, 401 Broadway, Redwood City, Cal. 94063
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
Aviatech Intl. Inc., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
BK Technology, Dept. EM, 504 W. 16th St., Long Beach, Cal. 90813
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
CATV Communications, Div. of Amer. Elctrn. Labs. Inc., Dept. EM, Box 552, Lansdale, Pa. 19446
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
M Cohu, Inc., Elctrns. Div., San Diego Div., Dept. EM, Box 623, San Diego, , Cal. 92112
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Components Corp., Dept. EM, 106 Main St., Denville, N.J. 07834
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
D Cunningham, Sub. Gleason Works, Dept. EM, 10 Carriage St., Honeoye Falls, N.Y. 14472
Di-Tech Inc., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704
D Dynair Elctrns. Inc., Dept. EM, 5275 Market St., San Diego, Calif. 92114
M Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Fairchild Camera & Instr., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791
General Electrodynamics Corp., Dept. EM, 4430 Forest La., Garland, Tex. 75040
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
M General TV Network, Dept. EM, 13225 Capital Ave., Oak Park, Mich. 48237
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D Inter-Market, Inc., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025
D Javelin Div., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
D Peerless Sls. Co., Dept. EM, 4200 W. Chicago Ave., Chicago, Ill 60651
D RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Teknekron/Trax, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
D Teledyne Camera Sys., Dept. EM, 131 N. Fifth Ave., Arcadia, Cal. 91006
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
D Television Microtime, Inc., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002
M Teltron, Inc., Dept. EM, 940 Willow St., Pottstown, Pa. 19464
Thalner Electronic Labs, Inc., Dept. EM, 7235 Jackson Rd., Ann Arbor, Mich. 48103
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Vicon Industries Inc., Dept. EM, 130 E Central Ave., Farmingdale, N.Y. 11735
D Video Automation Systems Inc., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576
Video Sciences International, Dept. EM, 6319 E. DeSoto Ave., Woodland Hills, Cal. 91364
Visual Information Institute Inc., Dept. EM, Box 33, Xenia, Ohio 45385
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601

Temperature Indicators—See Meters, Temperature

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Templates, Printed Circuit Design

HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302

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Terminal Blocks (Including Barrier Types)

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662
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M **Appleton Electronic Div., Appleton Electric Co., Dept. EM, 1701 W. Wellington Ave., Chicago, Ill. 60657 .... p. 1789**

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D **Continental Connector Corp., Dept. EM, 34-63 56th St., Woodside, N.Y. 11377** .... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
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D **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2029,2034,2035**
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D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... p. 2130,2131**
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137 p. 2136,2137**
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D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
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D **Trimm, Inc., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048 .. p. 2281**
D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... Inside Back Cover,**
D **Vernitron Elec. Comps., Beau Prods., Dept. EM, Box 10, Laconia, N.H. 03246** *

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DM ADC Prods., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Cogenel, Inc., Entrelec Div., Dept. EM, 101 Executive Blvd., Elmsford, N.Y. 10523
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
D Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
DM Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
Magnum Elec. Corp., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133
D Marathon Special Prods. Corp., Dept. EM, 13300 Van Camp Rd., Bowling Green, Ohio 43402
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412
D Underwriters Safety Device, An Eltra Co., Dept. EM, 7300 W. Wilson Ave., Chicago, Ill. 60656
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231

Terminal Boards

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D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
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M Advanced Circuitry, Litton Systems Inc., Dept. EM, 4811 W. Kearney St., Springfield, Mo. 65803
Aerolite Elexs Corp., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass 02138
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
M Comco Plastics, Inc., Dept. EM, 98-36 C. Jamaica Ave., Richmond Hill, N.Y. 11418
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
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Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
D Laminated Fabricators, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066
Magnum Elec. Corp., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133
Mechanical Engraving Co., Inc., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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M **Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 .... p. 1688**
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Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
Centronics Data Computer Corp., Dept. EM, Wall St., Hudson, N.H. 03051
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
D Di/An Controls, Inc., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Elcom Industries, Inc., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
Frederick Electronics Corp., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Information Displays, Inc., Dept. EM, 50 Clearbrook Rd., Elmsford, N.Y. 10523
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Memodyne Corp., Dept. EM, 369 Elliot St., Newton Upper Falls, Mass 02164
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
D Omnitec Corporation, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034
D Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
DM Pertec,, Peripheral Equip. Div., Dept. EM, 9600 Irondale Ave., Chatsworth, Cal. 91311
Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Graphics, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Western Telematic, Inc., Dept. EM, 3001 Red Hill Ave., Costa Mesa, Cal. 92626
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.
Wyle Computer Prods., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666

Terminal Strips (Including Barrier Types)

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** .... *
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** .... *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .... *
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ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
D **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139** .... *
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Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
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D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Apahouser Corp. of N.E., Dept. EM, 101 Walnut St., Watertown, Mass. 02172
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M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Christiansen Radio Inc., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651
Cogenel, Inc., Entrelec Div., Dept. EM, 101 Executive Blvd., Elmsford, N.Y. 10523
D Curtis Industries Inc., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223
D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
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Industrial Electronic Hardware, Dept. EM, 109 Prince St., New York, N.Y. 10012
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D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
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D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
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Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
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D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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M **M-tron Industries, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078** *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Anderson Jacobson, Dept. EM, 521 Charcot Ave., San Jose, Cal. 95131
D Applied Digital Data Sys., Inc., Dept. EM, 100 Marcus Blvd., Hauppauge, N.Y. 11787
Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
Burroughs Corp., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109
D ComData Corp., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076
Conrac Corp., Datex Div., Dept. EM, 1600 S. Mountain Ave., Duarte, Cal. 91010
Conrac Div., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722
Control Data Corp., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111
Courier Terminal Systems, Dept. EM, 2202 E. University Dr., Phoenix, Ariz. 85034
Data General Corp., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772
Datamedia, Dept. EM, 7300 N. Crescent Blvd., Pennsauken, N.J. 08110
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Digital Graphics, Dept. EM, 5000 Tuna Canyon, Malibu, Cal. 90265
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Douglas Electronics, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577
Four-Phase Systems, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Instrument Corp., Dept. EM, 1775 Broadway, New York, N.Y. 10019
Grinnell Systems Corp., Dept. EM, 2986 Scott Blvd., Santa Clara, Cal. 95050
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Interface Technology Inc., Dept. EM, 10500 Kahlmeyer Dr., St. Louis, Mo. 63132
International Communications, A Milgo Co., Dept. EM, 8600 NW 41st St., Miami, Fla. 33166
Kinetic Systems Corp., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
D Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
LFE Control System Industries, Dept. EM, 2920 Sand Ysidro Way, Santa Clara, Cal. 95051
McDonnell Douglas Electronics Co., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301
D Megatek Corp., Dept. EM, 1055 Shafter St., San Diego, Cal. 92106
M Memorex Corp., Dept. EM, San Thomas at Central Expwy., Santa Clara, Cal. 95052
D MI2 Corp., Dept. EM, 1212 Kinnear Rd., Columbus, Ohio 43212
Milgo Electronic Corp., Dept. EM, 8600 N.W. 41st Street, Miami, Fla. 33166
D Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
DM Pertec,, Peripheral Equip. Div., Dept. EM, 9600 Irondale Ave., Chatsworth, Cal. 91311
M Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
Ramtek Corp., Dept. EM, 585 N. Mary Ave. P.O. Box 60309, Sunnyvale, Cal. 94086
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
D SC Electronics, Dept. EM, 530 5th Ave. N.W., New Brighton, Minn. 55112
Southwest Tech Prods Corp., Dept. EM, 219 W. Rhapsody, San Antonio, Tex. 78216
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Tec, Inc., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Telesis Laboratory, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601
M Teletype Corp., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076
Terminal Systems Inc., Dept. EM, 11300 Hartland St., N. Hollywood, Cal. 91605
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Trivex, Dept. EM, 3180 Redhill Ave., Costa Mesa, Cal. 92626
M Westinghouse Canada Ltd., Dept. EM, Box 510, Hamilton, Ont., Can.

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M **Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 p. 2662**
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D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... ***
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M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742 .... ***
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
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D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
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M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns.® Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
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D Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
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M General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
D Goe Engrg. Co., Dept. EM, Box 3485, City of Industry, Calif. 91746
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... ***
Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 .... *
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231

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Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515 .... p. 2774**
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D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070 .... ***
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D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... ***
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902 .. ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
DM **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2028,2030-2032,2036**
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ITT Thermotech, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343 .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012 .. ***
National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4691**
M **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
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Vernitron Elec. Comps., Beau Prods., Dept. EM, Box 10, Laconia, N.H. 03246 *
D **W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2370-2375,2377,2785**
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428

Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618

General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201

D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735

D Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735

Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460

DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303

D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178

3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101

D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936

Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716

Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801

D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180

S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647

Seastrom Mfg. Co. Inc., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201

D Showa Musen Kogyo Co., Ltd., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan

Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910

D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007

D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207

D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412

D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409

M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243

M Waldman Corp., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054

M Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720

D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231

D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

DM Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 .... **p. 1122**

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *****

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** .... *****

Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *****

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *****

Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... **p. 1808**

D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 p. 1816**

DM **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** .... *****

Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *****

D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *****

M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .. p. 1836**

DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *****

DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *****

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *****

Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *****

D **Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605** .... **p. 1844,1845**

DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *****

DM **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335** .... *****

Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4691

M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *****

M **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *****

Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *****

D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2150,2194-2199**

Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *****

M **Taurus Corp., Dept. EM, Academy Hill, Lambertville, N.J. 08530** .... *****

TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *****

D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *****

D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *****

Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522

M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510

Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172

M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047

M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927

Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484

Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010

Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605

D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138

Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126

DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504

D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245

DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974

Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720

D Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428

Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618

M General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201

D Goe Engrg. Co., Dept. EM, Box 3485, City of Industry, Calif. 91746

DM Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735

D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223

DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551

D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936

Mark Eyelet & Stamping, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716

Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801

D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148

M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966

D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515

D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453

D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180

Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703

D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150

S.A.E.-Alcon Div., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647

D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150

Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910

Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908

D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412

D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409

M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243

D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231

DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176

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D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *****

D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... **p. 1796**

D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** .... *****

Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... *****

D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852** ...... *****

Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012 .... **p. 1822**

Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *****

Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *****

DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *****

DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *****

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *****

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DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *****

D **Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532** .... **p. 2126**

National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335 .... *****

M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *****

Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... **p. 2143**

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D **TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007** .... *****

Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... **p. 1407**

D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *****

D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2377**

Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522

M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510

D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482

Applied Digital Data Sys., Inc., Dept. EM, 100 Marcus Blvd., Hauppauge, N.Y. 11787

Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172

M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927

DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043

Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484

Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010

M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505

Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605

D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520

D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138

D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111

DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504

Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225

D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245

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Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
D Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
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D Goe Engrg. Co., Dept. EM, Box 3485, City of Industry, Calif. 91746
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
Magnum Elec. Corp., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
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D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
M Penn Engrg. & Mfg. Corp., Dept. EM, Doylestown, Pa. 18901
DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
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D **Beman Mfg., Inc., Dept. EM, PO Box 370, New Cumberland, Pa. 17070** ...... *
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D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509** ...... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ...... *
E & L Instruments, Inc., Dept. EM, 61 First St., Derby, Conn. 06418 ...... *
M **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** ...... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** ...... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ...... *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
DM **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139** ...... **p. 2027,2028,2030-2032,2036**
Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 ...... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
D **Mallory Capacitor Co., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201** ...... *
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** **p. 4691**
D **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** ...... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** **p. 2172-2174**
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 ...... *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ...... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** ...... *
D **W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013** ...... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
M Bussco Engrg., Dept. EM, 119 Standard St., El Segundo, Cal. 90245
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Doran Mfg. Co., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
D Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
D Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
D Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Magnum Elec. Corp., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133
D Malco, A Microdot Co., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936
D Marathon Special Prods. Corp., Dept. EM, 13300 Van Camp Rd., Bowling Green, Ohio 43402
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Terminals, Standoff

Airpax Elctrns., Inc., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613 ...... **p. 1122**
M **Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745** **p. 2662**
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** ...... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** ...... *
DM **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** ...... **p. 1822**
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ...... *
DM **Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895** .. **p. 1836**
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** ...... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
D **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525** ...... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 ...... *
Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 ...... **p. 1844,1845**
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** **p. 2117**
D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335** ...... *
D **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** ...... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
DM **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... **p. 2143**
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** **p. 2166,2176,2177,2191,2193,2198,2199**
M **Taurus Corp., Dept. EM, Academy Hill, Lambertville, N.J. 08530** ...... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** ...... *
Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 ...... *
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Ceramaseal, Inc., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
Edal Inds., Inc., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
Fabri Tek, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
M General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
D Goe Engrg. Co., Dept. EM, Box 3485, City of Industry, Calif. 91746
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627

M Hermetic Seal Corp., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Penn Engrg. & Mfg. Corp., Dept. EM, Doylestown, Pa. 18901
DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Terminals, Threaded

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** .... *
DM **Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012** .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
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DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605 .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
D **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *
DM **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169**
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 ....Inside Back Cover,
Unicorp, Dept. EM, 534 Mitchell St., Orange, N.J. 07050 .... *
D **W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013** .... *
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
M General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Magnum Elec. Corp., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Penn Engrg. & Mfg. Corp., Dept. EM, Doylestown, Pa. 18901
DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
Sterling Instr., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Terminals, Turret

D **Amatom Electronic Hardware, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515** .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012 .... *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
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DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
D **Jones Elctrns., Hiram, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605** .... *
DM **Keystone Elctrns. Corp., Dept. EM, 49 Bleeker St., New York, N.Y. 10012** .. *
M **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137** *
DM **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2176,2177**
Abacus Elctrns. Corp., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522
M Accessories for Electronics, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510
M Armel Electronics, Dept. EM, 1601 75th St., N. Bergen, N.J. 07047
Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
DM D-Cemco, Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504
DM Electrical Inds., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974
Federal Screw Products Inc., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618
M General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
DM Kulka Elec. Corp., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM Precision Metal Prods. Co., Dept. EM, 41 Elm St., Stoneham, Mass. 02180
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
D Useco Div., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
M Waldman Corp., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054
DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176

Terminals, Wirewrap

Allied Systems Corp., Dept. EM, Box 11005, Greensboro, N.C. 27409 .... *
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 .... *
D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** .... *
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703** .... *
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... p. 1806,1807
Concord Elctrns., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012 .... *
Connector Corp., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646 ...... *
Elctrn. Molding Corp., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895 .... *
Elfab Corp., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001 .... *
DM **Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903** .... *
DM **Garry Mfg., Inc., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902** .. *
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1981-1984, Inside Back Cover,
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D **National Tel-Tronics, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335** .... *
D **Positronic Inds., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742** .... *
D **RDI/Reed Devices, Inc., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137** *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** *
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *
D **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342** .... *
D **Vero Electronics, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787** .... *
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632** .... *
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
M Art Wire/Doduco, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927
M Auto-Swage Products Inc., Dept. EM, 726 River Rd., Shelton, Conn. 06484
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
M Avid Electronics Corp., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505
Bead Elctrns., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605
M Bussco Engrg., Dept. EM, 119 Standard St., El Segundo, Cal. 90245
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
General Mfg. Co., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201
Methode Elctrns., Inc., Dept. EM, 7447 W. Wilson Ave., Chicago, Ill. 60656
Micro Contacts Inc., Dept. EM, 62 Alpha Plaza, Hicksville, N.Y. 11801
M Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Mupac Corp., Dept. EM, 646 Summer St., Brockton, Mass. 02402
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
D Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150
Staffall Inc., Dept. EM, 7 Woodland St., Providence, R. I. 02908
M U.S. Terminals, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243
Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
DM Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176
Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

Terminations, Antenna-Also See Dummy Loads

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
D **Barker & Williamson, Inc., Dept. EM, Canal St., Bristol, Pa. 19007** .... *
M **Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139** .... *
Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** ...... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543** .... *
D **W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013** .... *
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alan Industries Inc., Dept. EM, PO Box 1203, Columbus, Ind. 47201
D Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010

Terminations, Antenna (Cont'd)

Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Coaxial Dynamics, Inc., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Connecticut Microwave Corp., Dept. EM, Route 44, New Hartford, Conn. 06057
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
D Javex Elctrns., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
DM Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Terminations, Microwave

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 **p. 3005**
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
D **Pyrofilm Resistor Co., Inc., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981** .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** .... *
Telonic Altair, Dept. EM, Box 277, Laguna Beach, Calif. 92652 .... *
D **Texscan Corp., Dept. EM, 2446 N. Shadeland Dr., Indianapolis, Ind. 46219** *
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
D CES Elctrns., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Coleman Microwave Co., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Connecticut Microwave Corp., Dept. EM, Route 44, New Hartford, Conn. 06057
M Detoronics Corp., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
EMC Technology Inc, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
Metavac, Inc., Dept. EM, 45-68 162nd St., Flushing, N.Y. 11358
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Microwave Filter Co., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Solitron/Microwave, Dept. EM, Box 278, Port Salerno, Fla. 33492
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Transco Prods., Inc., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Terminations, VHF, Video, Pulse

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hope Elctrns., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470 **p. 3005**
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2899**
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
D **W & M Mfg., Dept. EM, 187 Lafayette St., New York, N.Y. 10013** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communications Transistor Corp., Dept. EM, 301 Industrial Way, San Carlos, Cal. 94070
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Engelmann Microwave, Dept. EM, Skyline Dr., Montville, N.J. 07045
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
DM Kings Electronics, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707
Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
DM Pasternack Enterprises, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646
Radiation Devices Co., Dept. EM, Box 8450, Baltimore, Md. 21234
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Test Equipment, Closed Circuit TV-Also See Television Systems & Equipment, Closed-Circuit

M **Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302** **p. 1458-1465**
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2899**
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** .... *
Wavetek Indiana, Inc., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107 *
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Sierra Scientific Corp., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
Visual Information Institute Inc., Dept. EM, Box 33, Xenia, Ohio 45385
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Test Equipment, Color TV

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Colorado Video, Inc., Dept. EM, Box 928, Boulder, Colo. 80302 **p. 1458-1465**
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2899**
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111

D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Mercury Elctrns. Corp., Dept. EM, 244 Mineola Blvd., Mineola, N.Y. 11501
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
D REI Sales Co., Dept. EM, 120 Cambridge St., Burlington, Mass. 01803
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D SYT Corporation, Dept. EM, 1220 Barranca, El Paso, Tex. 79935
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Telemet Co., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701
Television Equip. Assocs., Dept. EM, Box 260, South Salem, N.Y. 10590
Visual Information Institute Inc., Dept. EM, Box 33, Xenia, Ohio 45385

Test Equipment, Mechanical Impedance

Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
DM All American Tool & Mfg. Co., Dept. EM, 8027 Lawndale, Skokie, Ill. 60076
B & F Enterprises, Dept. EM, 119 Foster St., Peabody, Mass. 01960
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Test Equipment, Rental

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
D Atlas Energy Systems, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733

Test Systems, Automatic D-C

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Chatsworth Data Corp., Dept. EM, 20710 Lassen St., Chatsworth, Cal. 91311 p. 2816
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Hughes Aircraft Co., Ind'l. Prods. Div. FACT Sys., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008 .... p. 2871
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075 *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... p. 2961
Addison Div. Muirhead, Inc., Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
DIT-MCO Int'l. Corp., Dept. EM, 5612 Brighton Terr., Kansas City, Mo. 64130
Electronic Systems & Programming Inc., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Test Systems, Computer Controlled (Automatic)

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hughes Aircraft Co., Ind'l. Prods. Div. FACT Sys., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008 .... p. 2871
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Norland Instruments, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538** ...... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
Automatic Test Systems, Dept. EM, 23 Poplar St., Malden, Mass. 02148
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
M Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
M Computer Automation, Inc., Ind. Prods. Div., Dept. EM, 18651 Von Karman, Irvine, Cal. 92664
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
D Davidson Electronic Development Co., Dept. EM, 2211 Peninsula Dr., Erie, Pa. 16506
Digital Gen'l. Corp., Univ. Cir. Resch. Ctr., Dept. EM, 11000 Cedar Ave., Cleveland, Ohio 44106
DIT-MCO Int'l. Corp., Dept. EM, 5612 Brighton Terr., Kansas City, Mo. 64130
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electronic Systems & Programming Inc., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250
Faultfinders, Inc., Dept. EM, 15 Avis Dr., Latham, N.Y. 12110
Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Macrodata, Dept. EM, 6203 Variel Avenue, Woodland Hills, Cal. 91364
MTS Systems Corp., Dept. EM, Box 24012, Minneapolis, Minn 55424
Nucleus Corp., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071
Omnicop, Inc., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Siemens Corp., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Systems Instrs. Resch., Inc., Dept. EM, 331 Luckie St., N.W., Atlanta, Ga. 30313
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Testers, Accelerometer—See Calibrators, Accelerometer

Testers, Battery

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Christie Elec., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043 .... *
Curtis Instrs., Inc., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
M **Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
VIZ Manufacturing Co., Dept. EM, 335 E. Price St., Phila, Pa. 19144 .... *
D **Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523** .... *
Altair Resch. & Mfg. Co., Dept. EM, 1241 E. State St., Ontario, Calif. 91761
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550

Desco Mfg. Co., Dept. EM, 1530 Flower St., Glendale, Cal. 91201
Electronic Measurements Corp., Dept. EM, 625 Broadway, New York, N.Y. 10012
Exide Power Sys. Div., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
New Era Prods. Inc., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102
N.Y. Testing Labs., Inc., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Q.V.S., Inc., Dept. EM, 20 North 15th St., East Orange, N.J. 07017
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Schauer Mfg. Corp., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242
Scientifico Scientific Components Co., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660
Sterling Mfg. Co., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610

Testers, Burn-In, Aging

Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... *
D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
M Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
D Despatch Oven Co., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
M Jettron Prods., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111

Testers, Cable

A. D. Data Sys., Inc., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625 .... *
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** .. *
Chatsworth Data Corp., Dept. EM, 20710 Lassen St., Chatsworth, Cal. 91311 **p. 2816**
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509** .... *
DM **Hughes Aircraft Co., Ind'l. Prods. Div. FACT Sys., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008** .... **p. 2871**
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
Ross Engineering Corp., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... **p. 2929**
D **Switchcraft, Inc., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
AD Automation, Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625
Addison Div. Muirhead, Inc., Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Computer Automation, Inc., Ind. Prods. Div., Dept. EM, 18651 Von Karman, Irvine, Cal. 92664
M Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
DIT-MCO Int'l. Corp., Dept. EM, 5612 Brighton Terr., Kansas City, Mo. 64130
D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Electronic Systems & Programming Inc., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
Faultfinders, Inc., Dept. EM, 15 Avis Dr., Latham, N.Y. 12110
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Systems Instrs. Resch., Inc., Dept. EM, 331 Luckie St., N.W., Atlanta, Ga. 30313
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Viking Inds., Inc., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311

Testers, Capacitor

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
CTS Knights, Inc., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548 **p. 2426**
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
D Electronic Measurements Corp., Dept. EM, 625 Broadway, New York, N.Y. 10012
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Mercury Elctrns. Corp., Dept. EM, 244 Mineola Blvd., Mineola, N.Y. 11501
Metal Fabricators, Inc., Dept. EM, Box 1946, Greenville, S.C. 29602
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
D Possis Corp., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Testers, Circuit—See Testers, Signal Tracing

Testers, Coil

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... **p. 2800**
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** .... **p. 2929**
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 .... *
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Hacker Instrs., Inc., Dept. EM, Box 657, Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115

Testers, Communication Equipment (Automatic)

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... **p. 2794**
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
GRM Corp., Dept. EM, Box 337, Medford, N.J. 08055 .... **p. 1467**
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... **p. 2898**

All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Communication Technique Inc, Dept. EM, 1279 Route 46, Parsippany, NJ 07054
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
D Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
Epicom, Inc., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Component Linearity

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 ..... p. 2793
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 ..... p. 2823
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ..... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ..... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 ..... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 ..... *
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Micro Technical Industries, Dept. EM, 1999 S. Coast Hwy., Laguna Beach, Cal. 92651
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Testers, Corona

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 ..... p. 2793
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 ..... *
M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ..... ***
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 ..... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Techsonics, Dept. EM, Box 251, El Prado, N.M. 87529
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

Testers, Diode

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 ..... p. 2797**
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 ..... p. 2809
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 ..... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 ***
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ..... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
D Fairchild Sys. Technology, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
DM Kurz-Kasch, Inc., Electronics Div., Dept. EM, 711 Hunter Rd, Wilmington, Ohio 45177
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Mastech, Inc., Dept. EM, 478 E. Brighton Ave., Syracuse, N.Y. 13210
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Siemens Corp., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telvac Instr. Co., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
M Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

Testers, Electric Power—See Monitors, Power, A-C & D-C

Testers, Encoder

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
M Base Ten Systems, Inc., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Gould/Trump-Ross, Dept. EM, 340 Fordham Road, Wilmington, Mass. 01887
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Testers, Ground Resistance—See Meters, Ohm

Testers, Hi-Pot—See Meters, Megohm

Testers, Insulation Breakdown—See Meters, Megohm

Testers, Integrated Circuit (Automatic)

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 ..... ***
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 ..... p. 2794
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 ..... p. 2809
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ..... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
Alessi Industries, Dept. EM, 3195 Bldg. C, Airport Loop Dr., Costa Mesa, Cal. 92626
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
Alma, Div. Develco Inc., Dept. EM, 404 Tasman Dr., Sunnyvale, Cal. 94086
D Alpha Data Incorporated, Dept. EM, 20750 Marilla St., Chatsworth, Cal 91311
Automatic Test Systems, Dept. EM, 23 Poplar St., Malden, Mass. 02148
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Biomation, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Computer Automation, Inc., Ind. Prods. Div., Dept. EM, 18651 Von Karman, Irvine, Cal. 92664
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Develco, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043
Digital Gen'l. Corp., Univ. Cir. Resch. Ctr., Dept. EM, 11000 Cedar Ave., Cleveland, Ohio 44106
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
D Fairchild Sys. Technology, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
Macrodata, Dept. EM, 6203 Variel Avenue, Woodland Hills, Cal. 91364
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Siemens Corp., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
M Singer Co., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Testline, Dept. EM, 1625 White Drive, Titusville, Fla. 32780
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040
M Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Integrated Circuit (Manual)

Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
D **Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 ..... p. 2823**
D **E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 ..... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 ..... *
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 ..... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 ..... p. 2929

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Alessi Industries, Dept. EM, 3195 Bldg. C, Airport Loop Dr., Costa Mesa, Cal. 92626
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
D Alpha Data Incorporated, Dept. EM, 20750 Marilla St., Chatsworth, Cal 91311
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Cybersonic Div., C. A. Briggs Co., Dept. EM, Box 151, Glenside, Pa. 19038
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
D Fairchild Sys. Technology, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
IPT Corp., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
DM Kurz-Kasch, Inc., Electronics Div., Dept. EM, 711 Hunter Rd, Wilmington, Ohio 45177
Macrodata, Dept. EM, 6203 Variel Avenue, Woodland Hills, Cal. 91364
Pylon Co., Inc., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Siemens Corp., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Telectro Sys. Corp., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Testline, Dept. EM, 1625 White Drive, Titusville, Fla. 32780
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040

Testers, Life, Component

M **Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682**
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... p. 2895
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... p. 2929
D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
M Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
D Delta Design, Inc., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Loranger Mfg. Corp., Dept. EM, Box 948, Warren, Pa. 16365
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880

Testers, Logic Card

DM **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845 .... ***
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... p. 2823
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... ***
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
Aydin Monitor Systems, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034
M Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
M Computer Automation, Inc., Ind. Prods. Div., Dept. EM, 18651 Von Karman, Irvine, Cal. 92664
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Digital Gen'l. Corp., Univ. Cir. Resch. Ctr., Dept. EM, 11000 Cedar Ave., Cleveland, Ohio 44106
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Electron, Inc., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108
D Fairchild Sys. Technology, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110
Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Omnicop, Inc., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Proto Matic Co., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246
Systems Instrs. Resch., Inc., Dept. EM, 331 Luckie St., N.W., Atlanta, Ga. 30313
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Magnetic Core

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 2672
Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
D ADAR Assocs., Inc., Dept. EM, 11B North Ave., Burlington, Mass. 01803
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
Magnetic Metals Co., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
Siemens Corp., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518

Testers, Magnetron

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... p. 2924
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
E-H Resch. Labs., Inc., Dept. EM, Box 1289, Oakland, Cal. 94604

Testers, Material

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Exact Electronics, Inc., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123 .... p. 2849
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Automation Inds., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
M Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
D Magnos, Incorporated, Dept. EM, Old School House Rd., Harvard, Mass. 01451
MTS Systems Corp., Dept. EM, Box 24012, Minneapolis, Minn 55424
Pacific Transducer Corp., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Thomas & Skinner, Inc., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206
Thwing-Albert Instr. Co., Dept. EM, 10960 Dutton Rd., Philadelphia, Pa. 19154
Walker Scientific, Inc., Dept. EM, Rockdale St., Worcester, Mass. 01606

Testers, Meter

Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... ***
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
TransData Inc., Dept. EM, P.O. Box 518, Dublin, Ohio 43017
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Microwave

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... p. 2986
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** .... *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
M Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
M California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
D Carco Elctrns., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Pacific Meas., Inc., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
M Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Modem

Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
D Alert Technology, Inc., Dept. EM, 3390 Commercial Ave., Northbrook, Ill. 60062
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
Dynatech Laboratories, Inc., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304

Testers, Motor

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2800
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424

Testers, Potentiometer

Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Advance Instr. Corp., Dept. EM, 1707 F. St., Belmar, N. J. 07719
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181

Testers, Power Supply

ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... *
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 .... *
Elgar Corporation, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Universal Voltronics Corp., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549 .... *
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
Sierra Elec., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Pulse Jitter

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... p. 2929
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Testers, Radar

Bird Electronic Corp., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139 .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** .... *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
ASC Systems Corp., Dept. EM, 155 W. Main St., Rockville, Conn. 06066
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
M California Microwave, Inc., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086
Frequency Engrg. Labs., Dept. EM, Box 527, Farmingdale, N.J. 07727
M Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
M Santa Cruz Engrg. Inc., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311

Testers, Ratio Voltage

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** .... *
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Testers, Relay

Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 .... *
Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
Wabash Relay & Elctrns., Dept. EM, Box 708, Wabash, Ind. 46992 .... *
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
D Data Test Corp., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
NOBEX Div., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Qualco, Dept. EM, One First St., Los Altos, Cal. 94022
Sigma Instruments, Inc., Dept. EM, 170 Pearl St., Braintree, Mass. 02184
Solatron Enterprises, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

Testers, Resistivity

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 .... p. 2793
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *

Testers, Resistivity (Cont'd)

Alessi Industries, Dept. EM, 3195 Bldg. C, Airport Loop Dr., Costa Mesa, Cal. 92626
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
COSAR Corp., Dept. EM, 3121 Benton St., Garland, Tex. 75042
Custom Scientific Instrs,, Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
DM Kenco Alloy & Chemical Co., Inc., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
DM Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Testers, Resistor

Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
General Resistance, Inc., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 .... *
London Co., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... *
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
M Associated Testing Labs., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Brown Electro-Measurements Co., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155
D Cutler-Hammer, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
Luft Instrs., Inc., Dept. EM, Old Winter St., Lincoln, Mass. 01773
Mercury Elctrns. Corp., Dept. EM, 244 Mineola Blvd., Mineola, N.Y. 11501
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Penn Airborne Prods., Dept. EM, Industrial Hwy., Southampton, Pa. 18966
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Testers, Servo—See Analyzers, Servo

Testers, Shock

M Blue M Electric Co., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406 p. 2682
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... p. 2539
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Impact-O-Graph Corp., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066
D IMPACT-O-GRAPH Div., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
L.A.B. Div., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Media Recovery Inc., Dept. EM, Box 867, Graham, Tex. 76046
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043

Testers, Short-Turn—See Testers, Coil

Testers, Signal Tracing

D B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794,2797
D Continental Specialties Corp., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509 .... *
Kurz-Kasch, Inc., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177 .... *
DM Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... *
D Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... *
D A.P. Products, Dept. EM, 72 Corwin Dr. Box 110, Painesville, Ohio 44077
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
M Automation Dynamics, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675
M Barber Corp., Dept. EM, Box 271, Waynesville, Ohio 45068
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
D Castle Elctrns., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Computer Automation, Inc., Ind. Prods. Div., Dept. EM, 18651 Von Karman, Irvine, Cal. 92664
Cybersonic Div., C. A. Briggs Co., Dept. EM, Box 151, Glenside, Pa. 19038
Data Numerics, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735
DIT-MCO Int'l. Corp., Dept. EM, 5612 Brighton Terr., Kansas City, Mo. 64130
D Electronic Measurements Corp., Dept. EM, 625 Broadway, New York, N.Y. 10012
Electronic Systems & Programming Inc., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
Fluke Trendar Corp., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
D PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
DM Systron Donner, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
DM Trendar, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Vidaire Electronics Mfg., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Solderability

Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Chemical Etching Equip. & Supply, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310
Hollis Engrg., Inc., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Multicore Solders, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590

Testers, Synchro/Resolver

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1483
M Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018 .... *
M Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 .... *
M Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .... *
M Industrial Control Co., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735 .... p. 3950
M North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... *
Advance Instr. Corp., Dept. EM, 1707 F. St., Belmar, N. J. 07719
M Bendix Corp., Test Systems Div., Dept. EM, Teterboro, N.J. 07608
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
D NH Research, Inc., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Singer Instrumentation, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Testers, Telephone - Also see Telephone Channel Test & Simulator Equipment

Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Frequency Devices, Inc., Dept. EM, 25 Locust St., Haverhill, Mass. 01830 .. *
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Projects Unlimited, Inc., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414 ...... *
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Genisco Technology Corp., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Voice Identification Inc., Dept. EM, Box 714, Somerville, N.J. 08876
D Wiltron Co., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Teletypewriter

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
M Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877

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Terminal Data Corp. of Md, Dept. EM, 11878 Coakley Circle, Rockville, Md. 20852

Testers, Thickness (all types)

Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 p. 2824
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Alessi Inds., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626
D Alignment Enterprises, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
M Custom Scientific Instrs., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981
Gaertner Scientific Corp., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614
General Rand Corp., Dept. EM, 100 Menlo Park, Edison, N.J. 08817
M Hacker Instrs., Inc., Dept. EM, Box 657, Fairfield, N.J. 07006
Leitz, Inc. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
Nuclear Resch. Corp., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Zeiss, Inc. Carl, Dept. EM, 444 5th Ave., New York, N.Y. 10018

Testers, Torque

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
M Anchor Specialty Mfg. Inc., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
D Chatillon John & Sons, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Information Terminals, Dept. EM, 323 Soquel Way, Sunnyvale, Cal. 94086
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
McFadden Elctrns. Co., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281
Owatonna Tool Co., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060
M Power Instrs., Inc., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Tool Group Marketing Division, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Testers, Tracking & Erosion Resistance (Insulation)

Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
ITT Jennings, Instrus. & Systems; Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122

Testers, Transistor

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... p. 2797
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 .. *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
Desco Mfg. Co., Dept. EM, 1530 Flower St., Glendale, Cal. 91201
D Electronic Measurements Corp., Dept. EM, 625 Broadway, New York, N.Y. 10012
D Fairchild Sys. Technology, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110
D Lectrotech, Inc., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mastech, Inc., Dept. EM, 478 E. Brighton Ave., Syracuse, N.Y. 13210
Optimized Devices Inc., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570
D Production Devices, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Telvac Instr. Co., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Testline, Dept. EM, 1625 White Drive, Titusville, Fla. 32780
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
M Trio-Tech, Inc. of Calif., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050
Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Testers, Transmission & Delay

B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2794
Comstron Seg., Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
Marconi Instrs., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647 .... *
Multimetrics Div. of Comstro, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 .... p. 2928
Com/Tech Systems Inc., Dept. EM, 44 Beaver St., New York, N.Y. 10004
Convex Corp., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Decom Systems, Inc., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069
Digitech Data Inds., Inc., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877
D D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
International Communications, A Milgo Co., Dept. EM, 8600 NW 41st St., Miami, Fla. 33166
D International Data Sciences, Dept. EM, 100 Nashua St., Providence, R.I. 02904
Milgo Electronic Corp., Dept. EM, 8600 N.W. 41st Street, Miami, Fla. 33166
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Seg Subsidiary, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850

Testers, Tube

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... *
D **Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108** *
D Electronic Measurements Corp., Dept. EM, 625 Broadway, New York, N.Y. 10012
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Mercury Elctrns. Corp., Dept. EM, 244 Mineola Blvd., Mineola, N.Y. 11501
RIL Elctrns., Inc., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
D Sencore, Inc., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107

Testers, Vibration-Also See Services, Environmental Test

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 p. 2793
Bafco, Inc., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974 .... *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229** *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101 .... *
M **Kay Elemetrics Corp., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058** .... *
M **Tenney Engrg., Inc., Dept. EM, 109 Springfield Rd., Union, N.J. 07083** .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686
Acoustic Power Systems, Inc., Dept. EM, 3152-D E. La Palma, Anaheim, Cal. 92806
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
DM All American Tool & Mfg. Co., Dept. EM, 8027 Lawndale, Skokie, Ill. 60076
Allison Labs., Inc., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
D Epic, Inc., Dept. EM, 150 Nassau St., New York, N.Y. 10038
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
L.A.B. Div., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
MTS Systems Corp., Dept. EM, Box 24012, Minneapolis, Minn 55424

Signal Analysis Oper., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852
Zonic Technical Labs., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236

Testers, Voltage

D **ALCO Electronic Prods., Inc., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845** ... *
Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 ... *
D **Electro-Mechanical Instru. Div., Sheller-Globe Corp., Dept. EM, Box 368, Dublin, PA 18917** ... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 ... *
D **Industrial Devices, Dept. EM, Edgewater, N.J. 07020** ... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 ... **p. 2876**
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 ... **p. 3281**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** ... *
Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401 ... **p. 2928**
D **Triplett Corp., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817** ... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 ... *
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
D JPI, Inc., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
Lark Electronics, Inc., Dept. EM, Box 390, New York, N.Y. 10040
Micro Instrument Co., Marine & Power Instr. Div., Dept. EM, 2250 Micro Pl., Escondido, Cal. 92025
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Sticht Co., Inc. Herman H., Dept. EM, 27 Park Pl., New York, N.Y. 10007
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
ZEHNTEL, Inc., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520

Testers, Voltage Breakdown

Associated Research, Inc., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648 *
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 ... **p. 2794**
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 **p. 2809**
Bertan Assocs., Inc., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791 ... *
Clarke-Hess Comm., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010 ... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 ... *
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 ... *
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M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509** ... *
DM **Hughes Aircraft Co., Ind'l. Prods. Div. FACT Sys., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008** ... **p. 2871**
Industrial Test Equip., Dept. EM, 21 Yennicock Ave., Port Washington, N.Y. 11050 ... *
ITT Jennings, Vacuum Elctrn. Prods., Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 970 McLaughlin Ave., San Jose, Cal. 95122 ... *
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D **Slaughter Co., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401** ... **p. 2928**
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Aerotronic Assocs., Inc., Dept. EM, Riverside Dr., Contoocook, N.H. 03229
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
Automatic Production Systems Inc., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057
M Avtron Mfg., Inc., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105
Beckman Instrs., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009
Bendix Corp., The, Electrical Comp. Div., Dept. EM, Sidney, N.Y. 13838
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
Electronic Systems & Programming Inc., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
ITT Jennings, Instrus. & Systems, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122
Kahle Engrg. Co., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087
Kikusui Elctrns. Corp., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan
Micro Instr. Co., Dept. EM, 12901 Crenshaw Blvd., Hawthorne, Cal. 90250
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070
Teradyne, Inc., Dept. EM, 183 Essex St., Boston, Mass. 02111
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Velonex, Instrument Div., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050

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D **Carborundum Co., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302** ... **p. 4312-4314**
D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701** **p. 4316**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ... *
M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 ... *
Interelectronics Corp., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920 ... *
Keystone Carbon Co., Thermistor Div., Dept. EM, St. Marys, Pa. 15857 **p. 4317-4319**
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400** ... **p. 4320,4321**
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067** ... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ... *
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D **RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005** ... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 ... *
DM Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Cal-R, Inc., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406
D Carbone Lorraine Industries Corp., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Electro Mats. Corp. Amer., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D Mepco/Electra, Inc., Dept. EM, Columbia Rd., Morristown, N.J. 07960
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
M Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
D Victory Engrg. Corp., Dept. EM, Victory Rd., Springfield, N.J. 07081
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760
Western Thermistor Corporation, Dept. EM, 403 Via El Centro, Oceanside, Cal. 92054
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
DM Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Thermocouple Devices & Materials—See Cooling/Heating Modules, Thermoelectric

Thermocouples, Elements & Accessories

Alberox Corp., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745 *
D **Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521** ... *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** ... *

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D **Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154** .... *
D **Modutec, Inc., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854** .... p. 2901
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Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 p. 4324,4325
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... *
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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Acme Elec. Heating Corp., Dept. EM, 4685 E. 11th, Hialeah, Fla. 33013
D Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Barker Elec. Sls., Dept. EM, Box 405, Ship Bottom, NJ 08008
D Bartlett-Emery Instrument Corp., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627
Beckman Instrs., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634
Best Elecs. Div., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Burns Engrg., Inc., Dept. EM, 10201 Bren Rd. East, Minnetonka, Minn. 55343
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
Control Products Corp., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651
Doric Sci., Div. Emerson Elec. Co., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
M GIC Thermodynamics Div., Dept. EM, 4949 Delemere, Royal Oak, Mich. 48073
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Hades Mfg Corp., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Leico Inds., Inc., Dept, EM, 250 West 57th St., New York, N.Y. 10019
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
Marlin Manúfacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111
Materials for Elctrns., Inc., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
Minco Products Inc., Dept. EM, 7300 Commerce Lane, Minneapolis, Minn. 55432
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Simmonds Precision, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
D Temptronic Corporation, Dept. EM, 40 Glen Ave., Newton, Mass. 02159
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
D Uchida of America Corp., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
D United Sensor & Control Co., Dept. EM, 85 School St., Watertown, Mass. 02172
Vacuum Prods., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
D Watlow Elec. Mfg. Co., Dept. EM, 12001 Lackland Rd., St. Louis, Mo. 63141

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Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... p. 2856,2863
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M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855** .... *
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept: EM, 630 E. Young St., Santa Ana, Cal. 92705** .... *
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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
D **Weston Instrs., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114** .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Barnes Engrg. Co., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Burns Engrg., Inc., Dept. EM, 10201 Bren Rd. East, Minnetonka, Minn. 55343
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
D Degussa Inc., Metals Div., Dept. EM, Route 46 & Hollister Rd., Teterboro, NJ 07608
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
M Minco Products Inc., Dept. EM, 7300 Commerce Lane, Minneapolis, Minn. 55432
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Relco Prods., Dept. EM, 5594 E. Jefferson Ave., Denver, Colo. 80237
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tempkey Inc., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

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Elmwood Sensors, Inc., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907 p. 4315
M **KRL Electronics, Dept. EM, 28 Bridge St., Manchester, N.H. 03101** .... *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... p. 4321
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Burling Instr. Co., Dept. EM, 16 River Rd., Box 298, Chatham, N.J. 07928
M Chatham Controls Corp., Dept. EM, 33 River Rd., Chatham, N.J. 07928
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
H-B Instr. Co., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140
Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
Inland Elctrn. Prods. Corp., Dept. EM, 35 E. Glenarm, Pasadena, Cal. 91105
King-Seeley Thermos Co., King-Seeley Div. Thermos Co., Dept. EM, Box 423, Kendallville, Ind. 46755
Kinsekisha Lab. Ltd., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Micro Devices Corp., Dept. EM, Box 501 - Far Hill Sta., Dayton, Ohio 45409
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Princo Instrs., Dept. EM, Industrial Pk., Southampton, Pa. 18966
M PSG Industries Inc., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D United Elec. Controls Co., Dept. EM, 85A School St., Watertown, Mass. 02172
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Watlow Elec. Mfg. Co., Dept. EM, 12001 Lackland Rd., St. Louis, Mo. 63141

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Thyristors (Includes Silicon Controlled Rectifiers)

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** p. 3859
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D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245** .... p. 3866
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D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
DM **Sarkes Tarzian, Inc., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401** .... *
D **Westinghouse Elec. Corp., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697** .... p. 3946
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
Electronic Control Systems, Inc., Dept. EM, Box 1232, Fairmont, W. Va. 26554

Thyristors (Includes Silicon Controlled Rectifiers) (Cont'd)

Electronic Transistors, Dept. EM, 112-15 Northern Blvd., Flushing, N.Y. 11368
FMC Corp., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
Gentron Corp., Dept. EM, 6667 N. Sydney Pl., Milwaukee, Wisc. 53209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hutson Industries, Dept. EM, 2019 W. Valley View, Dallas, Tex. 75234
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
National Electronics, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
D Power Control Corp., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238
PPC Products Corp., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724
D RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., Thyristors & Rectifiers, Dept. EM, Rte. 202, Somerville, N.J. 08876
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
D Teccor Electronics, Inc., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Thyrotek Corp., Dept. EM, 611 109th St. P.O. Box 5407, Arlington, Tx 76011
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

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Time Delays, Precision

Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
M **North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410** .... *
M Argent Electronics, Inc., Dept. EM, 477 E. Wenger Rd., Dayton, Ohio 45322
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Production Process, Div. Ind'l. Marine Elctrns. Inc., Dept. EM, Grenier Ind'l. Park, Londonderry, N.H. 03053
M Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201

Timer Switches—See Switches, Time Delay

Timers, Counting

M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005 .... **p. 2805**
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 **p. 2809**
M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
D **Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043** .... *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** .... *
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NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** .... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
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M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668** .... *
All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
M Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
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Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Knol Enterprise, Dept. EM, 200 Suburban Rd., San Luis Obispo, Cal. 93401
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
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D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
M Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Stoelting Co., Dept. EM, 1350 S. Kostner Ave., Chicago, Ill. 60623
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505

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Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
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D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
D **IVO Industries, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753** .... *
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D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
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M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668** .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *

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M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
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Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
D Intermatic, Inc., Dept. EM, Intermatic Plaza, Spring Grove, Ill. 60081
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
D Master Elctrn. Controls, Dept. EM, 1651-19th St., Santa Monica, Cal. 90404
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Paragon Elect. Co., Inc., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
D Tennelec, Inc., Dept. EM, Box D, Oak Ridge, Tenn. 37830
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Wilmar Elctrns. Inc., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... ***
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... ***
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032 .... ***
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D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... ***
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... ***
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Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 .... ***
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Guardian Electric Co., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
D Master Elctrn. Controls, Dept. EM, 1651-19th St., Santa Monica, Cal. 90404
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
M National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
D Paragon Elect. Co., Inc., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Sara Scientific Co., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
M Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
Y-L Products Co., Inc., Dept. EM, Box 188, Yeadon, Pa. 19050

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Curtis Instrs., Inc., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
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M Fredericks Co., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006
D Master Elctrn. Controls, Dept. EM, 1651-19th St., Santa Monica, Cal. 90404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201

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M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... ***
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *

Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 p. 1498
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M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
M **Janco Corp., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504** .... *
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D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** .... *
UFAD Corp., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508 .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Anadex Instrs., Inc., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
DM Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Data Technology, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704
Dielectric Instr. Corp., Dept. EM, 761 Franklin Ave., Pittsburgh, Pa. 15221
D Dimco-Gray Company, Dept. EM, 8200 S. Suburban Rd., Dayton, Ohio 45459
D Diversified Electronics Inc., Dept. EM, 119 N. Morton Ave., Evansville; Ind. 47711
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
M Dynamic Controls Corp., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
DM ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Haydon Switch & Instr., Inc., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Iveron Corp., Dept. EM, 1152 Morena Blvd., San Diego, Cal. 92110
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Lab-Line Instruments, Inc., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160
Lektra Labs., Inc., Dept. EM, 129-07 18th Ave., College Point, N.Y. 11356
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
D Paragon Elect. Co., Inc., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241
Photobell Co., Inc., Dept. EM, 12M East 22nd St., New York, N.Y. 10010
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Production Process, Div. Ind'l. Marine Elctrns. Inc., Dept. EM, Grenier Ind'l. Park, Londonderry, N.H. 03053
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
M Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
Republic Elctrn. Inds. Corp., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sequential Information Systems, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Soltec Corp., Dept. EM, Box 49, Sun Valley, Cal. 91352
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
DM Stock Drive Prods., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040
Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Sunshine Sci. Instrs., Inc., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tech Serv., Inc., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705
D Technic, Inc., Dept. EM, Box 965, Providence, R.I. 02901
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
M Wahl, Wm. Corp., Dept. EM, 12908 Panama St., Los Angeles, Cal. 90066
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

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Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101 .... *
Austron, Inc., Dept. EM, 1915 Kramer La., Austin, Tex. 78758 .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** .... *
Berkeley Instruments, Inc., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715 p. 2809
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083** .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101 .... *
Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 .... *
Fluke Mfg. Co., Inc. John, Dept. EM, Box 43210, Mountlake Terr., Wash 98043 .... *
D **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
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LVC Inds. Inc., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354 .... *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *

Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... p. 2921
Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... *
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
D **United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... ***
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Dantronics, Inc., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112
Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
D Intermatic, Inc., Dept. EM, Intermatic Plaza, Spring Grove, Ill. 60081
Iveron Corp., Dept. EM, 1152 Morena Blvd., San Diego, Cal. 92110
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Midwest Controls Co., Dept. EM, Box 4435, Lincoln, Neb. 68504
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Paragon Elect. Co., Inc., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
D Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill: 60609

Timers, Sequence

Airflyte Elctrns. Co., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002 *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... ***
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Chrono-log Corp., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083 .... ***
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
D **Deltrol Controls, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215 .... ***
D **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096 .... ***
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
M **Ledex Inc., Dept. EM, 123 Webster St., Dayton, Ohio 45401 .... ***
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... *
Minelco, Div. General Time Corp., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
M **Precision Mechanisms Corp., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590 .... ***
D **Sealectro Corp., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543 .... ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Bulova Systems & Instrument Corp., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582
Candy Mfg. Co., Dept. EM, 626 Grove St., Evanston, Ill 60201
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
Controls Plant, Ingraham Div., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hoagland Instr., Dept. EM, Box 550, Dayton, N.J. 08810
D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
M Ingraham, McGraw Edison Co., Dept. EM, 210 Redstone Hill Rd., Bristol, Conn. 06010
Instr. & Control Sys., Inc., Dept. EM, 129 W. Laura, Addison, Ill. 60101
Iveron Corp., Dept. EM, 1152 Morena Blvd., San Diego, Cal. 92110
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
Mallory Timers, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201
D Master Elctrn. Controls, Dept. EM, 1651–19th St., Santa Monica, Cal. 90404
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
M Raymond Engrg. Inc., Dept. EM, 217 Smith St., Middletown, Conn. 06457
Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
Searle Analytic Inc. & Searle Radiographics Inc., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201

Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
Therm-O-Disc, Inc., Dept. EM, South Main St., Mansfield, Ohio 44907
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vanguard Relay Corp., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757
Warren G-V Communications, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039
D Zenith Controls Inc., Dept. EM, 830 West 40th St., Chicago, Ill. 60609

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Allen-Bradley Co., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204 .. *
D **Arrow-Hart, Inc., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101** .... *
M **Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107** p. 2385
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Connor-Winfield Corp., Dept. EM, W. Chicago, Ill. 60185 .... *
D **Crouse-Hinds Company, Arrow Hart Div., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101** .... *
Ferwalt Inc. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwal, Idaho 83540 .... *
D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... *
M **Hardman Inc., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109** .... *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
DM **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .... *
Matrix Corp., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241 .... p. 1668
D **Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** ..... *
Omron Corp. of America, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172 p. 3593
D **Potter & Brumfield, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671** .... *
PPM, Inc., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139 .... p. 2921
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
M **Statek Corp., Dept. EM, 512 N. Main St., Orange, Cal. 92668** .... p. 2481
M Abrams Instr., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901
Air-O-Tronics Prods., Dept. EM, Box K, Morrisville, N.Y. 13408
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
Amtron Div., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445
Applied Electro Technology, Inc., Dept. EM, 2220 S. Anne St., Santa Ana, Cal. 92704
M Argent Electronics, Inc., Dept. EM, 477 E. Wenger Rd., Dayton, Ohio 45322
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Artisan Elctrns. Corp., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
BH Electronics, Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
Bristol Saybrook Co., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475
Cardinal Control Co., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037
D Control Products Div., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083
Cramer Division, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475
D Crouzet/Cridland, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010
D Cutler-Hammer, Inc., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216
Dataprofits Corp., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241
Datum, Inc., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806
Durgin & Brown, Inc., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
M Electro-Module, Inc., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767
Electronic Counters & Controls Inc., Dept. EM, 1500 McCormick Blvd., Mundelein, Ill. 60060
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
Electronics One Inc., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
D Furnas Elec. Co., Dept. EM, 1197 McKee St., Batavia, Ill. 60510
GECO, Inc., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854
D General Time Corp., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787
Gregg Electric Inc., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761
DM Guardian California, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
DM Guardian Electrical Mfg. Co. of Cal., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503
Hartman Electrical Mfg., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902
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D Industrial Timer Esterline Co., Dept. EM, U.S. Hwy 287, Parsippany, N.J. 07054
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D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
Keltron Instrument Displays Div., Dept. EM, 223 Crescent St., Waltham, Mass. 02154
M Lehighton Electronics, Inc., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235
Litronix, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014
M Logitek, Inc., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735
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MKC Electronics, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Nortec Electronics, Dept. EM, 3697 Tahoe Way, Santa Clara, Cal. 95051
D Omnetics, Inc., Dept. EM, Box 113, Syracuse, N.Y. 13211
D Paragon Elect. Co., Inc., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D Ragen Data Systems, Inc., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
M Regmo Data Corp., Dept. EM, 6992 Oxford St., Minneapolis, Minn. 55426
M Relay Specialties Inc., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Scientronics, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007
D SenSitrol, Div., Dept. EM, 200 S. 4th St., P.O. Box 150, Albion, Ill. 62806
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
S S A C Inc., Dept. EM, Box 395, Liverpool, N.Y. 13088
D Struthers-Dunn, Inc., Dept. EM, Lamb's Rd., Pitman, N.J. 08071
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
D Syracuse Elctrns. Corp., Dept. EM, Box 566, Syracuse, N.Y. 13201
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
DM Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Tenor Co., Inc., Dept. EM, 17020 W. Rogers Dr., New Berlin, Wisc. 53151
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D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
D Bearing Inspection, Dept. EM, 10041 Shoemaker Ave., Santa Fe Springs, Cal. 90670
DM Beau Tech, Inc., Dept. EM, P.O. Box 523, Portland, Me. 04122
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D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
M Daniels Mfg. Corp., Dept. EM, 2266 Franklin Rd., Bloomfield Hills, Mich. 48013
Emporium Specialties Co., Inc., Dept. EM, Box 65, Austin, Pa. 16720
D Erikson Specialized Tool Co., Dept. EM, Box 424, Pico-Rivera, Cal. 90660
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
DM Moody Tools, Inc., Dept. EM, Culver St., Providence, R.I. 02905
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412
D Telvac Instr. Co., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605
Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Tool Group Marketing Division, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131
D Uber Grafic Instrs., Dept. EM, Box 4, Palo Alto, Cal. 94302
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Weller-Xcelite, The Cooper Group, Dept. EM, Box 728, Apex, NC 27505
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Tools & Kits, Cable (Including Sheath Strippers & Slitters; Lacing Needles, etc.)—

Tools & Kits, Contact Insertion/Removal

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M Daniels Mfg. Corp., Dept. EM, 2266 Franklin Rd., Bloomfield Hills, Mich. 48013
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
Robinson-Nugent, Inc., Dept. EM, 802 East 8th St., New Albany, Ind. 47150
D Solder Removal Co., Dept. EM, 1077 E. Edna Pl., Covina, Cal. 91724

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D Erikson Specialized Tool Co., Dept. EM, Box 424, Pico-Rivera, Cal. 90660
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D N T-T/Peerless, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453
D PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
Skyo Industries Inc., Dept. EM, 171 Brook Ave., Deer Park, N.Y. 11729
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
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Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
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D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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D **Molex Inc., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532 .... ***
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... *
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
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M Daniels Mfg. Corp., Dept. EM, 2266 Franklin Rd., Bloomfield Hills, Mich. 48013
D Dracon Industries, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311
M Glenair, Inc., Dept. EM, 1211 Air Way, Glendale, Cal. 91201
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D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
DM Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
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D T&B/Ansley Corp., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
D Teledyne Penn-Union Elec., Dept. EM, Box 723, Edinboro, Pa. 16412
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610

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DM **Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... ***
M **Virginia Panel Corp., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 p. 2377**

M Adcotech Corp., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Ark-Les Switch Corp., Dept. EM, 51 Water St., Watertown, Mass. 02172
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
DM Buchanan Crimp Tool Prods., Amerace Corp. Control Prods. Div., Dept. EM, 1065 Floral Ave., Union, N.J. 07083
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
M Daniels Mfg. Corp., Dept. EM, 2266 Franklin Rd., Bloomfield Hills, Mich. 48013
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Elco Corp., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245
Essex Terminals/Connectors, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Marshall Industries, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
Milbar, Dept. EM, 530 Washington St., Chagrin Falls, Ohio 44022
D Molex Products, Inc., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Pico Crimping Tools Co., Dept. EM, 9832 Jersey Ave., Santa Fe Springs, Calif. 90670
D Porter, H.K., Inc., Dept. EM, 74 Foley St., Somerville, Mass. 02143
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Sjoberg, C. & Son, Inc., Dept. EM, 415 Station St., Cranston, R.I. 02910
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D Superior Mfg. & Instrument Corp., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
Trompeter Electronics, Inc., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101
D Zierick Mfg. Corp., Dept. EM, 44 Radio Circle, Mt. Kisco, N.Y. 10549

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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Harwil Co., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Master Appliance Corp., Dept. EM, 2420 18th St., Box 545, Racine, Wisc. 53403

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D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
DM Beau Tech, Inc., Dept. EM, P.O. Box 523, Portland, Me. 04122
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
Fancort Industries, Inc., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006
Harwil Co., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006

Tools, Microelectronic Handling

Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705 ...... p. 1123
E-Z-Hook, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006 .... p. 2833
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2075,2077-2079
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
Vishay Resistive Systems Grp., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355 .... p. 3771
Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
DM Beau Tech, Inc., Dept. EM, P.O. Box 523, Portland, Me. 04122
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Matrix Engineering Corp., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247
Micro Tech Mfg., Inc., Sub. Sprague Electric Co., Dept. EM, 703 Plantation St., Worcester, Mass. 01605
D Orbit Inds., Div. Countis Inds., Dept. EM, Box 1444, San Luis Obispo, Calif. 93406

Tools, Parts-Handling, Vacuum Operated

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
M Air-Vac Engrg. Co., Dept. EM, 100 Gulf St., Milford, Conn. 06460
D Aremco Prods., Inc., Dept. EM, Box 429, Ossining, N.Y. 10562
Black & Webster, Inc., Dept. EM, 281 Winter St., Waltham, Mass. 02154
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
Henes Products Corp., Dept. EM, 4301 E. Madison St., Phoenix, Ariz. 85034
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
D Telvac Instr. Co., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605

Tools, Relay Servicing

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D Adre Co., Dept. EM, Box 09415, Milwaukee, Wisc. 53209
GTE Automatic Electric Inc., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008

Tools, Resistance Soldering—See Soldering Equip., Resistance

Tools, Wire Wrapping

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4533
Berg Electronics, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070 .... p. 1802,1806,1808
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 p. 1817
Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
Excel Products Co., Inc., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903 .... p. 1839
ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2029
Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4688,4691
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2174
TRW/Cinch Connectors, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007 .... Inside Back Cover,
United Wiring & Mfg. Co., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220 .... p. 1401,1402
Vector Electronic Co., Inc., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342 .... p. 2364
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Computer Numerical Control Corp., Dept. EM, 14 Railroad Ave., Bedford, Mass. 01730
ComputerWrap Corp., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Neuses, Inc. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Standard Pneumatic Motor Co., Dept. EM, Box 10030, Reno, Nev. 89510
H. F. Wilson Engrg. Co., Dept. EM, 21W173 Hill Ave., Box 589, Glen Ellyn, Ill. 60137

Torches, Soldering, Welding & Access.

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***

Air Prods. & Chems., Inc., Dept. EM, Box 538, Allentown, Pa. 18105
Henes Products Corp., Dept. EM, 4301 E. Madison St., Phoenix, Ariz. 85034
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Master Appliance Corp., Dept. EM, 2420 18th St., Box 545, Racine, Wisc. 53403
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
DM Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
Wall-Lenk Mfg. Co., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501

Toroids—See Coils, Toroidal

Torque Control—Knobs, Torque, Incremental, Ratio Drive

Torquers, Gyro—See Motors, Torque

Totalizers, Digital

D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Data Precision Corporation, Dept. EM, Audubon Rd., Wakefield, Mass 01880 *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 **p. 1498**
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
D **Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716** **p. 1666,2394-2396**
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D **Newport Labs., Inc., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705** ...... *
D **Non-Linear Sys., Inc., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075** *
North American Philips Controls Corp., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410 .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
D **Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120** .... *
D **Sodeco Div., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523** .... *
United Systems, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Applied Control Co., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
M ATEC, Inc., Dept. EM, Box 19426, Houston, Tex. 77024
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
Eagle Signal, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808
D Eldorado Instrument Co., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520
Electro-Numerics Inc., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714
Electronic Research Co., Dept. EM, Box 913, Shawnee Mission, Kans. 66201
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
Hecon Corp., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Innovatek Microsystems, Inc., Dept. EM, Smithfield Rd., Millerton, N.Y. 12546
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
DM Precision Dynamics Corp., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Presin Co., Inc., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
Rycom Instruments, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Speed Detectors, Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146
Struthers-Dunn, Inc., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
DM Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Tracers, Curve, Tube & Transistor

Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040

Tracers, Signal—See Testers, Signal Tracing

Tracers, Voltage Curve

Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Scientific Leasing Services, Inc., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Tracking Systems

M **Aeroflex Labs., Inc., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803** .... *
M **Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101** .... *
Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850 .. *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
M ABA Electromechanical Sys. Inc., Dept. EM, Box 507, Pinellas Pk., Fla. 33565
M Atlantic Research Corp., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Datron Systems, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311
Electrac, Inc., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801
Fecker Systems, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
M Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
Parabam, Inc., Dept. EM, 3017 E. Las Hermanas St., Compton, Cal. 90221
D Rantec Div., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
Scientific-Atlanta, Inc., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801
M Tasker Systems, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Transceivers

D **B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635** .... *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
General Elec. Co., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D KLM Electronics, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037
Lundy Elctrns. & Sys., Inc., Dept. EM, Robert La., Glen Head, N.Y. 11545
D Midland International Corp., Dept. EM, PO Box 19032, Kansas City, MO 64141
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Pearce-Simpson, Inc., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
D Ten-Tec Inc., Dept. EM, Industrial Park, Sevierville, Tenn. 37862
Toyo Comm. Equip. Co. Ltd., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan
D TPL Communications Co., Dept. EM, P.O. Box 1415, Gardena, Cal. 90247
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
D Wilson Electronics, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119

Transcription & Record Players—See Phonographs, Parts & Accessories

Transducers, Acceleration—See Accelerometers

Transducers, Displacement

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Bowmar/TIC, Inc., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320** *
M **Clifton Precision, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018** .... *

M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731** *
Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229** *
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Kessler-Ellis Prods., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716 p. 1667
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 *
Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 *
M **Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Brunswick Engineering Inc., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062
C & A Products, Inc., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Kavlico Corp., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
LEL Co., Dept. EM, 5 Burns Pl., Cresskill, N.J. 07626
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
M Litton Systems, Inc., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Northern Precision Labs., Inc., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
M Pickering & Co., Meas. & Controls Div., Dept. EM, 101 Sunnyside Blvd., Plainview, N.Y. 11803
D Research, Inc., Dept. EM, Box 24064, Minneapolis, Minn. 55424
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
M Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
D Scientific Technology, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Skan-A-Matic Corp., Dept. EM, Box S, Elbridge, N.Y. 13060
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Teledyne Gurley, Dept. EM, 514 Fulton St., Troy, N.Y. 12181
Tempo Instrument, Inc., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803
Temposonics Inc., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102
Waters Mfg., Inc., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Transducers, Flow

D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701** *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 p. 4321
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 p. 2404
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Bendix-Guidance Systems, Dept. EM, Teterboro, N.J. 07608
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Carolina Medical Elctrns., Inc., Dept. EM, U.S. 52 Expwy., Box 307, King, N.C. 27021
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
M Flow Technology, Inc., Dept. EM, Box 21346, Phoenix, Ariz. 85036
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Ocean Research Equipment, Inc., Dept. EM, Box 709, Falmouth, Mass. 02541
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Transducers, Force

Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
M **Measurement Sys., Inc., Dept. EM, 523 West Ave., Norwalk, Conn. 06850** *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 p. 2404
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
D Interface, Inc., Dept. EM, 7401 Butherus Dr., Scottsdale, Ariz. 85260
Kavlico Corp., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
M Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Transducers, Frequency—See Transducers, Volt, Watt, Current, etc.

Transducers, Incremental Digital Position, Rotary—See Encoders, Shaft Angle

Transducers, Magnetic Pickup

M **Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803** p. 2382
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 p. 1482
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 *

M **International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 ***
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
Altek Corp., Dept. EM, 2150 Industrial Pkwy, Silver Spring, MD 20904
American Magnetics Corp., Dept. EM, 2424 Carson St., Torrance, Cal. 90501
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Dolan-Jenner Inds., Inc., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176
D Dynapar Corp., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
D Grado Labs., Inc., Dept. EM, 4614 Seventh Ave., Brooklyn, N.Y. 11220
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
LDJ Electronics, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084
PECO Corp., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Richard-Lee Co., Dept. EM, Box 724, New Providence, N.J. 07974
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
D Telex Communications, Inc., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420
D Veeder-Root, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102

Transducers, Power—See Transducers, Volt, Watt, Currents, etc.

Transducers, Pressure

Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385
BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 p. 4340
Gould, Inc., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114 *
Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... p. 4343
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400 .... p. 4321
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... p. 2404
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
M Bendix Corp., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Dynisco, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
M Genisco Tech. Corp., Transducers, Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gould Datametrics, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Honeywell, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Kavlico Corp., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
LEL Co., Dept. EM, 5 Burns Pl., Cresskill, N.J. 07626
D Logicomp Elctrns., Inc., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543
MKS Instrs., Inc., Dept. EM, 22 Third Ave., Burlington, Mass. 01803
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
M Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Setra Systems Inc., Dept. EM, 12 Huron Dr., Natick, Mass. 01760
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Standard Controls, Dept. EM, 2401 S. Bayview St., Seattle, Wash. 98144
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
M Teledyne Taber, Dept. EM, 455 Bryant St., No. Tonawanda, N.Y. 14120
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Transducers, Proximity—See Transducers, Displacement

Transducers, Strain Gage

Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
Micro Switch, Div. Honeywell, Dept. EM, 11 W. Spring St., Freeport, Ill. 61032 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Advance Weight Systems, Inc., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
Ailtech, a Cutier-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
M Conrac Corp., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
D Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
D Dynisco, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090
M Genisco Tech. Corp., Transducers, Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
D Interface, Inc., Dept. EM, 7401 Butherus Dr., Scottsdale, Ariz. 85260
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
M Orbit Instr. Corp., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
D Tyco Instrument Div., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Transducers, Temperature

Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 p. 2385
D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701 .... ***
D **Hamlin Inc., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551 .... ***
M **Harrel, Inc., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855 .... p. 2391**

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154** .... *
Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 .... *
D **Midwest Components, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400** .... *
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212 .... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... *
RFL Inds., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Ailtech, a Cutler-Hammer Co., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Ametek/Rodan Div., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806
D Amprobe Instrument, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
Artronix, Inc., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Burns Engrg., Inc., Dept. EM, 10201 Bren Rd. East, Minnetonka, Minn. 55343
Conax Corp., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225
M Consolidated Controls Corp., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801
M Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
D F & M Systems Co., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229
General Atomic Co., Dept. EM, P.O. Box 81608, San Diego, Cal. 92138
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
M Genisco Tech. Corp., Transducers, Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hutchinson Industrial Corp., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Mack Elec. Devices, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Micro-Measurements Div., Vishay Intertechnology, Inc., Dept. EM, Box 306, Romulus, Mich. 48174
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Raytek, Inc., Dept. EM, 1277 Terra Bella Ave., Mountain View, Cal. 94043
RDF Corp., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051
M Relco Prods., Dept. EM, 5594 E. Jefferson Ave., Denver, Colo. 80237
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Siltran Digital, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676
Stow Labs., Inc., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
M Thermometrics, Inc., Dept. EM, 808 US Hwy No. 1, Edison, N.J. 08817
Trans-Met Engrg., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631
TransData Inc., Dept. EM, P.O. Box 518, Dublin, Ohio 43017
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Tylan Corp., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
Westinghouse Elec. Corp., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Transducers, Thermoelectric—See Transducers, Temperature

Transducers, Torque

Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2905
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
BLH Elctrns., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Dillon, W.C. & Co., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
D Interface, Inc., Dept. EM, 7401 Butherus Dr., Scottsdale, Ariz. 85260
Kavlico Corp., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Lebow Associates, Inc., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Sensotec, Inc., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212
D Transducers, Inc., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vibrac Corp., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025

Transducers, Ultrasonic

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094** .... *
D AKG Acoustics, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430
Andersen & Assoc., Walther M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081
Automation Inds., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810
D Bendix Corp., Instr. & Life Support Div., Dept. EM, 2734 Hickory Grove Rd., Davenport, Iowa 52808
Branson Cleaning Equip. Co., Dept. EM, Parrott Dr., Shelton, Conn. 06484
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
Cleveland Crystals, Inc., Dept. EM, Box 17157, Euclid, Ohio 44117
Crystal Technology, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Dunegan/Endevco, Dept. EM, Rancho Viejo Rd., San Juan Capistrano, Cal. 92675
M Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Gulton Inds., Inc., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840
Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Gulton Inds., Piezo Prods. Div., Dept. EM, Box 4300, Fullerton, Cal. 92634
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D National Sonics, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Ocean Research Equipment, Inc., Dept. EM, Box 709, Falmouth, Mass. 02541
Panametrics Inc., Dept. EM, 221 Cresent St., Waltham, Mass. 02154
Phillips Mfg. Co., National Ultrasonic Div., Dept. EM, 7334 N. Clark St., Chicago, Ill. 60626
D Sonobond Corp., Sub. Christiana Metals Corp., Dept. EM, 200 E. Rosedale Ave., West Chester, Pa. 19380
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
D Ultrasonic Corp., Dept. EM, Box 672, Pipestone, Minn. 56164
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086

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Aeroflex Labs Inc., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803 .... p. 2382
D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701** .... *
Licon Div., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634 .... *
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Disc Instruments, Inc., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
M Humphrey, Inc., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
Kavlico Corp., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
M Montevideo Technology Inc., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Plessey Enviromental Sys., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
M Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Signet Scientific Co., Dept. EM, Box 6489, Burbank, Cal. 91510
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
Temposonics Inc., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803
D Thermo Sys., Inc., Dept. EM, 500 Cardigan Rd., Box 3394, St. Paul, Minn. 55165
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
M Transicoil, Inc., Dept. EM, Worcester, Pa. 19490
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512

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BBN Instruments Co., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138 .... *
M **Dytronics Co., Inc., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229** *
Entran Devices, Inc., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 .... *
Linden Labs., Inc., Dept. EM, Box 920, State College, Pa. 16801 .... *
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 p. 2686
Advanced Devices Lab, Dept. EM, P.O. Box 11455, Reno, Nev. 89510
Advanced Dynamic Instrs. Div., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313
B & K Instruments, Inc., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142
Beckman Instrs., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Channel Inds., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
D Electro Corp., Dept. EM, Box 3049, Sarasota, Fla. 33578
Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Endevco, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675
M Gulton Inds., Inc., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Helm Instr. Co., Dept. EM, 4511 South Ave., Toledo, Ohio 43615
M H H Controls Co., Inc., Dept. EM, 16 Frost St., Arlington, Mass. 02174
IRD Mechanalysis, Inc., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229
M Kaman Sciences Corp., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933
Kinemetrics, Inc., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107
Knowles Elctrns., Inc., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131
Larson Aero Dev., Dept. EM, Box 135, Concord, Cal. 94522
Lion Precision Corp, Dept. EM, 60 Bridge St., Newton, Mass. 02195
Metrix Instrument Co., Metrix Instrument Co., Dept. EM, 1711 Townhurst, Houston, Tex. 77043
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
PCB Piezotronics, Inc., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Sensor Corp., Dept. EM, Box 140, Scottdale, Pa. 15683
Spectral Dynamics Corp. San Diego, Dept. EM, Box 671, San Diego, Cal. 92112
Sprengnether Instr. Co., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110
Sundstrand Data Control, Inc., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052
DM Systron-Donner Inertial Div., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518
Teledyne/Geotech, Dept. EM, Box 28277, Dallas, Tex. 75228
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
D Vibra-Metrics, Inc., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512

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Active Control Instrumentation, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037 .... **p. 2381**
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M **American Aerospace Controls, Inc., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735** .... **p. 4336,4337**
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Autronics Corp., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107 .... *
Bell, Inc., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229 p. 4338
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
D **Fenwal Elctrns., Dept. EM, 63 Fountain St., Framingham, Mass. 01701** .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
M **Hi-G Co., Inc., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096** .... *
Jackson Bros., (London) Ltd., Dept. EM, 258 Bway., New York, N.Y. 10007 *
Leach Corp., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003 .. **p. 3581**
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
M **Ohio Semitronics, Inc., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212** .... **p. 4345,4346**
D **Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907** .... *
Yokogawa Corp. of America, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
ARGA Controls, Dept. EM, 35 E. Glenarm, Pasedena, Cal. 91105
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Electronic Wattmeter Co., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
Greibach Instr. Div., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550
Halmar Electronics, Inc., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
RFL Inds., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M Scientific Columbus, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
TransData Inc., Dept. EM, P.O. Box 518, Dublin, Ohio 43017
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017

Transformers, Audio

M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
DM **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033** .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... **p. 4410**
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
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Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... **p. 3290**
Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... **p. 4438,4439**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** ....**p. 4358,4385-4394,4396-4407**
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 p. 4474,4475**
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 p. 2761,3401
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 p. 4491-4493**
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... **p. 4500,4502**
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
D Davis & Co., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Dynaco Inc., Div Tyco Corp., Dept. EM, Box 88 Coles Rd., Blackwood, N.J. 08012
D Electro-Voice, Inc., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M Johnson Electric Coil Co.; Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018

Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Philmore Mfg. Co. Inc., Dept. EM, 40 Inip Dr., Inwood, N.Y. 11696
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
D Sennheiser Elctrn. Corp., Dept. EM, 10 W. 37th St., New York, N.Y. 10018
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506** .... *
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
B & K Precision Electronic Test Instruments Group, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635 .... p. 2798
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M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
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JM Transformer, Dept. EM, 262 Mott St., New York, N.Y. 10012 .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
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DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
D **Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563** .... *
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Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 .... *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... p. 4501
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Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
D A C Transformer Corp., Dept. EM, 89 Madison St., Newark, N.J. 07105
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Carson Mfg. Co., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
D Frazier, Inc., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
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D Hughey & Phillips, Inc., Dept. EM, 3050 N. California St., Burbank, Cal. 91505
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
Polygon Inds. Ltd., Dept. EM, 50 Northline Rd., Toronto 16, Ont., Canada
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
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DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735** *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** Inside Back Cover, Vol. 2
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918

American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
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M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
D **Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007** .... *
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American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Chen Industries, Inc., Dept. EM, 2740 S. LaCienega Blvd., Los Angeles, Ca. 90034
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
D Davis & Co., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elgin Elctrns., Inc., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
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M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
Ratelco, Inc., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Solidstate Controls, Inc., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750

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Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
Bourns, Inc., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507 .... *
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Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
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Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
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M **Stevens-Arnold, Inc., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127** .... *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
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M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
M **Universal Elctrns. Corp., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311** .... *
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
American Design Components, Dept. EM, 39 Lispenard St., New York, NY 10013
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078

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Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
ESSCO Industries, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PCA Elctrns., Inc., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
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M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
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M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803** ...... *
M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856** .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
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M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
E.S.I. Inc., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
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Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343

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Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
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M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
D Ametek Controls Division, Dept. EM, 860 Pennsylvania Blvd., Feasterville, Pa. 19047
Automatic Timing & Controls Co., Dept. EM, King of Prussia, Pa. 19406
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Bourns, Inc., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506
Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
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Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Trans-Tek, Inc., Dept. EM, Rte. 83, Ellington, Conn. 06029
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Discriminator

D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** **p. 4357**
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** **p. 4470**
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013** .. *
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M BG Electronics, Inc., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
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Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Donut—See Transformers, Toroidal

Transformers, Driver

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ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
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M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
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Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *

Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 .... ***
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358,4385,4392,4393,4396-4407**
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Filament

M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506 .... ***
ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 *
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... p. 4410,4413**
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
JM Transformer, Dept. EM, 262 Mott St., New York, N.Y. 10012 .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4424**
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
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M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358-4363,4380-4384,4397-4407**
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
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D **Todd Systems, Dept. EM, 4 Radford Pl., Yonkers, N.Y. 10701 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... p. 4497-4499**
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Sloan Technology Corp., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
M Transistor Devices, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Flyback

Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618

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Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016

Transformers, Foil-Wound—See Coils, Foil-Wound

Transformers, 400 Hz

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506 .... p. 4350,4351,4353**
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230 .... ***
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
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General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
JM Transformer, Dept. EM, 262 Mott St., New York, N.Y. 10012 .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
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Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 .... *
DM **Staco, Inc., Dept. EM, 2240 E. 3rd St., Dayton, Ohio 45403 .... ***
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358-4363,4369-4376,4381-4384,4397-4407**
Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470.**
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 p. 4494,4495**
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
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Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639

Transformers, High-Voltage (1,000 Volts & Over)

M **AMP Capitron Div./AMP Inc., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022 .... ***
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M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
Computer Power, Inc., Dept. EM, 124E West Main Street, High Bridge, New Jersey 08829 .... *
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... p. 3235**
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
M **Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Kilovolt Corp., Dept. EM, 238 High St., Hackensack, N.J. 07602 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
Megavolt, Corp., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650 .. *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
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M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
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American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
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M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
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G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Glassman High Voltage, Dept. EM, 124 W. Main St., High Bridge, N.J. 08829
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tobe Deutschmann Labs., Inc., Dept. EM, Box 74, Canton, Mass. 02021
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639

Voltek Inc., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750

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D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
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D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
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M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
D Fuji Electrochemical Co., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan
General Instr. of Can. Ltd., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can.
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Gowanda Electronics Corp., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
M Merrimac Inds., Inc., Dept. EM, 41 Fairfield Pl., West Caldwell, N.J. 07006
D Millen Mfg. Co. Inc., James, Dept. EM, 150 Exchange St., Malden, Mass. 02148
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506** .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
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M **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033** .... *
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** .... *
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
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Esterline Angus, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224 .... *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
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M Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 *
M Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 *
Jerome Industries Corp., Dept. EM, 391 Lakeside Ave., Orange, N.J. 07050 *
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D LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
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M North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 *
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M OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 *
M Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 *
M Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 *
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D Simpson Electric Co., Dept. EM, 853 Dundee Ave., Elgin, Ill. 60120 *
M Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 *
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M Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 *
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M TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 *
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Annis R B Co., Dept. EM, 1101 N. Delaware, Indianapolis, Ind. 46202
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Crompton Instruments Inc., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
D Dormeyer Industries, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electrical Instr. Svc., Inc., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
D General Electric Co., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
D Larson Instr. Co., Inc., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Pearson Elctrns. Inc., Dept. EM, 4007 Transport St., Palo Alto, Cal. 94303
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
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M Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 *
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M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
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M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
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Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
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M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
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M Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 *
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D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
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Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
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M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Peschel Instrs., Inc., Dept. EM, 1412 Viscaya Pkwy., Cape Coral, Fla. 33904
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D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
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Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American HV Voltage Test Sys., Inc., Dept. EM, Central Garrett Ind'l Park, Accident, Md. 21520
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
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Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
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Control Data Corp., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
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Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
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Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
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Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
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Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Hughey & Phillips, Inc., Dept. EM, 3050 N. California St., Burbank, Cal. 91505

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Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
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Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
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Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
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D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D Herald Electronics, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Linear Variable-Differential—See Transformers, Differential

Transformers, Magnetic Amplifier

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
M **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... p. 3290
Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007 .... *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763

Transformers, Matching

Amplifier Research Corp., Dept. EM, 160 School House Rd., Souderton, Pa 18964 .... *
Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050 .... p. 2996
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***

Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
DM **Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 .... p. 1423**
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
ENI Power Systems Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650 ***
M **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... ***
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... p. 4417**
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
Kappa Networks, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008 .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4425**
Midtex, Inc., AEMCO Div., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001 .... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .. p. 4429
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865 .... ***
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
D **Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... ***
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 *
D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
D Arista Enterprises, Inc., Dept. EM, 35 Hoffman Ave., Hauppauge, NY 11787
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
D Ava Elctrns., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Elcom Systems, Inc., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
D Finney Co., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
D Jerrold Electronics Corp., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
Palomar Engrs., Dept. EM, Box 455, Escondido, Cal. 92025
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Princeton Applied Resch. Corp., Dept. EM, Box 2565, Princeton, N.J. 08540
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D S & A Electronics, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
Soundolier, Inc., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
M Technical Research & Mfg., Inc., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103
Telrex Labs., Dept. EM, Asbury Park, N.J. 07712
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
D Utah Electronic Div., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Microminiature

M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506 .... ***
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221 .... ***
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Cramer Coil, Div Digital Magnetics Inc, Dept. EM, Box 32, Grafton, Wisc. 53024 .... p. 1423
Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 .... *
Dynamic Instr. Corp., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787 *
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4426**
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... p. 4434-4445**
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Morey Corp., Dept. EM, 2659 Wisconsin Ave., Downers Grove, Ill. 60515
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Rhombus Inds., Inc., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750

Transformers, Microphone

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 p. 4427**
Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4358,4359,4391,4397-4407**
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Gotham Audio Corp., Dept. EM, 741 Washington St., New York, N.Y. 10014
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
Modular Audio Products, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D PASO Sound Products Inc., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
D Primo Microphone Inc., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
D Sescom, Inc., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247
Shure Brothers, Inc., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Mixing

M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... ***
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863 .... ***
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

Transformers, Modulation

M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 .... *
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M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506 .... ***
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
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D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
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M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Components Specialties, Inc., Dept. EM, 393 So. FRanklin St., PO Box 398, Hempstead, N.Y. 11550
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
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Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
InResCo, Dept. EM, 503 Adamston Rd., Bricktown, N. J. 08723
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
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M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
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Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
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M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
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Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
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Carson Mfg. Co., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220
Chen Industries, Inc., Dept. EM, 2740 S. LaCienega Blvd., Los Angeles, Ca. 90034
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Component Specialties, Dept. EM, 9143 E. La Rosa Dr., Temple City, Cal. 91780
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Custom Power/Cal., Inc., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
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Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
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Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
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D Ionics, Inc., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
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Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
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D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
M Syscon Int'l., Inc., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
M **Abbott Transistor Labs., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506 .... ***
M **Arnold Magnetics Corp., Dept. EM, 11520 Jefferson Blvd., Culver City, Cal. 90230 .... ***
D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 .... ***
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 .... ***
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M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
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M **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... ***
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M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787 .... ***
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JM Transformer, Dept. EM, 262 Mott St., New York, N.Y. 10012 .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
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DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
Neshaminy Transformer, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925 .... *
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 .... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
D **Sanford-Miller Corp., Dept. EM, 8 John St., Lynbrook, N.Y. 11563 .... ***
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M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... p. 4499,4501**
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
Accurate Electronics Co., Dept. EM, 2635 So. Wabash Ave., Chicago, Ill. 60616
Acme Electric, Dept. EM, 614 Water St., Cuba, N.Y. 14727
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Bendix, Electric & Fluid Power Div., Dept. EM, Hwy. 35, Eatontown, N.J. 07724
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Eastern Delta Corp., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410
Elcor Prods. Neotec Elctrns. Inc., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Grand Transformers, Dept. EM, Box 188, Grand Haven, Mich. 49417
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Merrimack Magnetics, Dept. EM, 361 Aiken St., Lowell, Mass. 01850
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
Polygon Inds. Ltd., Dept. EM, 50 Northline Rd., Toronto 16, Ont., Canada
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
RoMarNetics, Inc., Dept. EM, 18811 Napa, Northridge, Cal. 91324
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441

D Shester Engineering Co., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 ..... p. 4357**
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DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ..... ***
North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ..... *
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M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 ..... ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
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M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
Ceramic Magnetics, Inc., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Himmelstein & Co., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan

Transformers, Scott-T

Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ..... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040 ..... ***
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 ..... p. 4357**
M **Computer Conversions Corp., Dept. EM, 6 Dunton Ct., East Northport, N.Y. 11731 ..... ***
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 ..... ***
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 ..... *
D **General Magnetics, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003 ..... ***
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 ..... ***
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DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ..... ***
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 ..... ***
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 ..... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701 ..... ***
M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ***
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elma Engineering, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
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M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetics, Div. of Spang Industries, Inc., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
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Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
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M **Perkin-Elmer Corp., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856 ..... ***
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 ..... ***
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M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
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D Jefferson Elec., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104
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Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639

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Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 *
Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ..... *
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M **Transmagnetics, Inc., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735 ..... p. 1685**
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
M Electric Indicator Co., Inc., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
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M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034

Singer Co., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763

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Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** *
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Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
D ITI Electronics, Inc., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
D Nitsuko Ltd., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

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Airpax Elctrns., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313 *
M **Artronic Instr. Co., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902** *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 *
M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** *
Bel Fuse, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302 *
D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** *
Bikor Corporation, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710 *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** *
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Delevan Div., Coil Prods., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052 *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
M **EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033** *
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M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
D **LFE Corp., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154** *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** p. 3290
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DM **Staco, Inc., Dept. EM, 2240 E. 3rd St., Dayton, Ohio 45403** *
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M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** *
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750** *
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
D API Instruments, LFE Corp., Dept. EM, 1601 Trapelo Rd., Waltham, Mass 02154
Automatic Coil Corp., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010
M BH Electronics, Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Coil Specialty Co., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Cross Electronics Inc., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
De Coursey Engrg. Lab., Dept. EM, 11828 W. Jefferson, Culver City, Cal. 90230
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
M El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
Electrocube Inc., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Genisco Technology Corp., Filter Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetic Comps., Inc., Dept. EM, 9367 William St., Rosemont, Ill. 60018
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Novatronics, Inc., Dept. EM, Box 878, Pompano Beach, Fla. 33061
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
M Sawyer Inds., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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D **Bell Industries, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221** *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
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M **Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227** p. 4410
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M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** *
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M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030 .... ***
D **Triad-Utrad, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750 .... p. 4499,4501**
M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Computer Comps., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418
Custom Coil & Transformer Co., Dept. EM, Box 2369, Zanesville, Ohio 43701
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Electrocom Inds., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
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D Hammond Manufacturing Company (U.S.) Inc., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225
Hytronics Corp., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
Mag-Con, Inc.; Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
PCA Elctrns., Inc., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
M Solid State Electronics Corp., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Torelco Inc., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wabash Transformer Corp., Dept. EM, 1375 Swan St., Huntington, Ind. 46750
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418 .... ***
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M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
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EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
NWL Transformers, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505 ...... *
M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551 .... ***
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211 ***
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134 p. 4470**
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M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
D Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Spectran Elctrns., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207

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D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
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D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076 .... p. 4431**
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D **Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 3397,4468**
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M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
M American Trans-Coil Corp., Dept. EM, 124-06 101st Ave, Richmond Hill, N.Y. 11419
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
D Cambridge Thermionic Corp., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138
M Collins, G.L. Corp., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805
M Columbia Resch. Labs., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Piconics Inc., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
Astrosystems, Inc., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040 ...... *
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357**
M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550 .... ***
Douglas Randall Div., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891 .... *
Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061 .... ***
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582 ***
M **North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803 ...... ***
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D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
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M **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 .. ***
D Altec Div., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Basler Electric Co., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Dale Elctrns., Inc., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078
Electro Sci. Inds., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Guildline Instrs., Inc., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
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D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
M Rayco Electronic Mfg. Inc., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441

Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639
Zaring Inds., Inc., Dept. EM, Box 594, Westfield, Ind. 46074

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Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
ACDC Electronics, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054 .... *
Beckman Instrs., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634 .... *
M **Biometrics Instrument Corp., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040** .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
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M **Del Electronics Corp., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550** .... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 .... *
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D **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
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D **Ohmite Mfg. Co., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076** .... *
M **OPT Inds. Inc., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865** .... *
Signal Transformer Co., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696 *
D **Sola Electric, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
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DM **Thordarson Meissner, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863** .... *
Topaz Electronics, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
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American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
American Monarch Corp., Dept. EM, 2801-37th Ave., N.E., Minneapolis, Minn. 55421
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
Cyberex, Inc., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060
E-Tronics, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343
Electro-Pacific, Inc., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
Elin Div., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111
Ferrodyne Corp., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291
Ferro-Tech Corp., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002
Foster Transformer Co., Dept. EM, 3820 Colerain Ave., Ohio 45223
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Johnson Electric Coil Co., Dept. EM, Box 559, Elmhurst, Ill 60126
Kato Engineering Co., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Magnetran Corp., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036
Micron Industries Corp., Constant Voltage Div., Dept. EM, 1830 N. 32nd Ave., Stone Park, Ill. 60165
North Electric Co., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833
M Northlake Engineering, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002
Nortran Co., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Osborne Transformer Corp., Dept. EM, 19636 Derby St., Detroit, Mich. 48203
Phoenix Transformer Co., Dept. EM, 1818 E. Madison, Phoenix, Ariz. 85034
Schott Corp., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441
Solidstate Controls, Inc., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214
Tranex Inc., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043
Transformer Technicians, Inc., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639

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M **Axel Elctrns., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418** .... *
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 p. 1421
M **Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647** p. 4357
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Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080 .... *
M **ESC Elctrns. Corp., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650** *
EWC, Inc., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033 .... *
M **Hisonic, Inc., Dept. EM, 249 N. Troost, Olathe, Kan. 66061** .... *
KGS Electronics, Inc., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103 *
Magnetico, Inc., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742 .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
DM **Microtran Co., Inc., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582** *
Mini-Circuits Lab., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235 .... p. 3006
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M **Pico Elctrns. Inc., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551** .... *
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 .... *
M **Sterling Transformer Corp., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211** *
M **Technitrol, Inc., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134** p. 4470
M **Torotel Inc., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030** .... *
Torotron, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553 .... *
M **Torwico Elctrns., Inc., Dept. EM, Rte. 70, Lakewood, N.J. 08701** .... *
D **TRW/UTC Transformers, Dept. EM, 150 Varick St., New York, N.Y. 10013 Inside Back Cover,**
M Aladdin Elctrns., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210
American Magnetics Corp., Dept. EM, P.O. Box 8, Carterville, Ill. 62918
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
D Blonder-Tongue Labs., Inc., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857
M Bourns Magnetic Prods., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380
M Caddell Coil Corp., Dept. EM, 35 Main St., Poultney, Vt. 05764
Coast Coil Co., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016
Coilcraft, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013
M Coil-Q Corp., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708
Comdel, Inc., Dept. EM, Beverly Airport, Beverly, Mass. 01915
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
M Dietz Design, Inc., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
El-Rad Mfg. Co., Dept. EM, 4300 N. California, Chicago, Ill 60618
Electronic Navigation Inds., Inc., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623
M Electronic Transformer Corp., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509
G & G Tresco Corp., Dept. EM, 1952 E. Allegheny Ave., Phila., PA 19134
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M JB Elctrn, Transformers, Inc., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647
M Lorch Elctrns. Corp., Dept. EM, 105 Cedar La., Englewood, N.J. 07631
M Lorch Devices Inc., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631
Mag-Con, Inc., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113
Magnalectric Corp., Dept. EM, Box 6189, Tulsa, Okla. 74106
M Magnetic Circuit Elements, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940
Nano Pulse Industries, Inc., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665
Oeco Corp., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214
M Polyphase Instr. Co., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405
Pulse Engrg., Inc., Dept. EM, Box 12235, San Diego, Cal 92112
D Radio Resch. Co., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801
D Sinclair Radio Labs., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6
Staco, Inc., Dept. EM, 625 S. "G" St., Richmond, Ind. 47374
Summit Engineering Corp., Dept. EM, Box 938, Bozeman, Mont. 59715
TDK Electronics Co., Ltd., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan
Trans American Transformer, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763
M Vari-L Co., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Wide Band Engrg. Co. Inc., Dept. EM, Box 21652, Phoenix, Ariz. 85036

Transistor, Arrays

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
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D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
D General Transistor Corp., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Semicoa, Inc., Dept. EM, 333 McCormick Ave., Costa Mesa, Cal. 92626
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960

Transistor, Diode, Thyristor Heat Dissipators

D **AAVID Engrg, Inc., Dept. EM, 30 Cook Ct., Laconia, N.H. 03246 .... ***
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 .... ***
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 .... *
D **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... ***
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746 p. 1254
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2168**
Staver Co., Inc., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706 p. 3919
D **Thermalloy, Inc., Dept. EM, 2021 W. Valley View, Dallas, Tex 75234 .. p. 3930**
UNITRACK Div., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082 .... *
Accel Indl Heat Sink, Dept. EM, 5338 Alhambra, Los Angeles, Cal. 90032
DM Air Quip-Robleyco, Dept. EM, Box 1118, Richardson, Tex. 75080
Alpha Components Corp., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245
M Astro Dynamics, Dept. EM, 2 Gill St., Woburn, Mass. 01801
Astrodyne, Inc., Sub. Roanwell Corp., Dept. EM, 353 Middlesex Ave., Wilmington, Mass. 01887
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Cordover & Co., Carl, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020
Delbert Blinn. Co., Dept. EM, Box 2007, Pomona, Calif. 91766
Des Tek Ind., Dept. EM, Box 24163, Los Angeles, Cal. 90024
D General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D Hobson Bros., Inc., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630
DM Inland Elctrn. Prods. Corp., Dept. EM, 35 E. Glenarm, Pasadena, Cal. 91105
D Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Nanotron Relay Co., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502
National Beryllia Corp., Dept. EM, Greenwood Ave, Haskell, N.J. 07420
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
SWS Silicones Corp., Dept. EM, Box 428, Adrian, Mich. 49221
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
TOR Corporation, Dept. EM, 14715 Arminta St., Van Nuys, Cal. 91402
Tran-Tec Corporation, Dept. EM, Box 1022, Columbus, Neb. 68601
DM Vemaline Prods. Div., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481
D Wakefield Engrg., Inc., Dept. EM, Teal & Audubon Rd., Wakefield, Mass. 01880
Waterbury Pressed Metal Div., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720
WEI Corp., Dept. EM, 1405 S. Village Way, Santa Ana, Cal. 92705

Transistors, Chip, Unpackaged

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 ***
Clairex Elctrns. Inc., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550 ...... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
General Instr. Corp., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802 .... p. 3864,3865
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
Spectronics, Inc., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080 .... *
Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
D **TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,**
M Ampower Semiconductor Corp., Dept. EM, 375 Kings Highway, Smithtown, N.Y. 11787
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Avantek, Inc., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051
Communications Transistor Corp., Dept. EM, 301 Industrial Way, San Carlos, Cal. 94070
Electronic Laboratory Supply, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
DM General Semiconductor Industries, Inc., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281
D General Transistor Corp., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
M Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT Semiconductor, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
DM Kertron, Inc., Dept. EM, 7516 Central Ind'l. Dr., Riviera Beach, Fla. 33404
Micro Components Corp., Dept. EM, 99 Bald Hill Rd., Cranston, RI 02920
M Microwave Semiconductor Corp., Dept. EM, 100 School House Rd., Somerset, N.J. 08873
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
Power Monolithics Inc., Dept. EM, 121 International Dr., Corpus Christi, Tex. 78410
M Powertech, Inc., Dept. EM, 0-02 Fairlawn Ave., Fairlawn, N.J. 07410
PPC Products Corp., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876
D RCA Solid State Div., Transistors, Dept. EM, Rte. 202, Somerville, N.J. 08876
D RSM Sensitron Semiconductor, Div. RSM Electron Power, Inc., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729
D Semicoa, Inc., Dept. EM, 333 McCormick Ave., Costa Mesa, Cal. 92626
DM Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Silicon Transistor Corp., Dept. EM, Katrina Rd., Chelmsford, Mass. 01824
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503

Transistors, Darlington

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 p. 3859**
Clairex Elctrns. Inc., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550 p. 3133,3134
D **Delco Electronics Div., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901 .... p. 3860,3861**
D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. ***
D **International Rectifier Corp., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245 .... p. 3868**
National Semiconductors, Ltd., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901 .... p. 3138
D **Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... ***
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 .... ***
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 ***
TRW Power Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
TRW RF Semiconductors, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260 ....Inside Back Cover,
Vactec, Inc., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043 p. 3152,3153
DM Ampower Semiconductor Corp., Dept. EM, 375 Kings Highway, Smithtown, N.Y. 11787
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
D General Transistor Corp., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
DM Kertron, Inc., Dept. EM, 7516 Central Ind'l. Dr., Riviera Beach, Fla. 33404
Lambda Elctrns., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
Power Monolithics Inc., Dept. EM, 121 International Dr., Corpus Christi, Tex. 78410
M Powertech, Inc., Dept. EM, 0-02 Fairlawn Ave., Fairlawn, N.J. 07410
PPC Products Corp., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
DM RCA Solid State Div., Dept. EM, Route 202, Somerville, N.J. 08876

D RCA Solid State Div., Transistors, Dept. EM, Rte. 202, Somerville, N.J. 08876
D Semicoa, Inc., Dept. EM, 333 McCormick Ave., Costa Mesa, Cal. 92626
DM Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
Silicon General Inc., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683
Silicon Transistor Corp., Dept. EM, Katrina Rd., Chelmsford, Mass. 01824
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Transistors, Dual

D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
M **Inductive Components, Inc., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787** .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
D **Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638** .... *
D **Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247** *
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
CSR Industries Inc., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735
D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
D General Transistor Corp., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Hybrid Systems Corp., Dept. EM, Crosby Dr., Bedford, Mass. 01730
DM Intersil, Inc., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014
D ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
DM Kertron, Inc., Dept. EM, 7516 Central Ind'l. Dr., Riviera Beach, Fla. 33404
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
DM Plessey Semiconductors, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714
PPC Products Corp., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724
DM Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
DM Raytheon Semiconductor, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042
D Semicoa, Inc., Dept. EM, 333 McCormick Ave., Costa Mesa, Cal. 92626
DM Semiconductor Technology, Inc., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
SGS-ATES Semiconductor Corp., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
D Solitron Devices, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123
DM Solitron Devices, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404
D Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
DM Teledyne-Crystalonics, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140
DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
DM Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503

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D **General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345** .. *
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M Hughes Aircraft Co., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663
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HEI, Inc., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318
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Optron, Inc., Dept. EM, 1201 Tappon Cir., Carrollton, Tex. 75006
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Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520

Sensor Technology, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311
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Transistors, Power

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ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801
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DM RCA Solid State Div., Transistors, Dept. EM, Rte. 202, Somerville, N.J. 08876
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Transistors, Pressure Sensitive

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D Fairchild Camera & Instr., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042
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D Solid State Scientific, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936
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Transistors, Silicon

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Transistors, Switching

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DM Teledyne Semiconductor, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
DM Transistor Specialtys, Dept. EM, 484 Lowell St., Peabody, Mass. 01960
D Transitron Elctrn. Corp., Dept. EM, 168 Albion St., Wakefield, Mass. 01880
DM Unitrode Corp., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Transistors, Unijunction

D General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 ..... *
D Solid State Devices, Inc., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638 ..... *
D Sprague Products Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247 *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
CSR Industries Inc., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735
General Elec., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201
D General Transistor Corp., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Motorola Semiconductor Prods., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281
NEC America, Inc., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051
PPC Products Corp., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724
Semitronics Corp., Dept. EM, 64 Commercial St., Freeport, NY 11520
D Siliconix, Inc., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054
D Solid State Inc., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003
Sprague Elec. Co., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247
Texas Instruments, Inc., Dept. EM, Box 5012 - MS84, Dallas, Tex. 75222
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
UPI Semiconductor Div., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Translators, Data

M Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 ..... *
Data Translation, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760 .. p. 1497
Hickok Electrical Instr., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108 p. 1658
Interface Engineering Inc., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072 ..... p. 1662
Moxon Inc., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715 p. 2904
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
Superior Electric Co., Dept. EM, 1000 Middle St., Bristol, Conn. 06010 p. 3108,3109
M Trak Systems, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614 ..... p. 1686-1688
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
D Control Equip. Corp., Dept. EM, 220 Tanner St., Lowell, Mass. 01851
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
D Datatron, Inc., Dept. EM, Box 11427, Santa Ana, Cal. 92711
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
M Metric Systems Corp., Dept. EM, 736 N. Beal St., Ft. Walton Beach, Fla. 32548
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Transmission Line, Wire & Cable—See Cable, Transmission Line

Transmission Systems, Data

Control Technology Co., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101 .. p. 3949
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 ..... *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 ..... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Acurex-Autodata, Dept. EM, 485 Clyde, Mountain View, Cal. 94042

M Alden Elctrn. & Impulse Recording Equip. Co., Dept. EM, Washington St., Westboro, Mass. 01581
M Analog Devices, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090
Applied Systems Corp., Dept. EM, 26401 Harper Ave., St. Clair Shores, Mich. 48081
Austin Elctrns., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
DM Bendix Corp. Environmtl. Sci., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cardion Elctrns., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Data-Control Systems, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810
Galileo Electro-Optics Corp., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518
G B Instruments Inc., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hy-Cal Engineering, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670
D International Laser Sys., Inc., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
M LNR Communications, Inc., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787
Mohawk OEM Sales, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406
Monroe, The Calculator Co., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960
Potter Instr. Co. Inc., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803
Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
RCA Service Co., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Systems Data Inc., Dept. EM, 1941 W. Market St., Akron, Ohio 44313
Telecommunications Techniques Corp., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001
Theta Instr. Corp., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006

Transmitters, Beacon

AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607

Transmitters, Fixed Frequency

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... **p. 1470**
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Transmitters, Fixed Station Comm.

AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Transmitters, Microwave

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 .... *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
AEL, Inc., Dept. EM, Richardson Rd., Colmar, Pa. 18915
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Applied Microwave, Div. Epsco Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
D Conic Corp., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
Environmental Communications Inc., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573

Raytheon Data Systems, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Transmitters, Multiplex

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
Beta Technology, Inc., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
San Diego Instrument Lab., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111
Singer - Tele-Signal, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797

Transmitters, Pressure & Flow

Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729 .... **p. 2404**
M Accurate Instrument Co., Dept. EM, Box No. 925, Westbury, N.Y. 11590
Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11530
Gould, Inc., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
M Kratos, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109
Kulite Semiconductor Prod., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657
Robertshaw Controls Co., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230
Robinson-Halpern Co., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462
Rosemount Inc., Dept. EM, Box 35129, Minneapolis, Minn. 55435
Schaevitz Engrg., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110
Standard Controls, Dept. EM, 2401 S. Bayview St., Seattle, Wash. 98144
West Coast Resch. Corp., Dept. EM, Box 25061, Los Angeles, Cal. 90025
D Yellow Springs Instrument Co., Dept. EM, Box 279, Yellow Springs, Ohio 45387

Transmitters, Pulse Code Modulation

Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
D D-Line Corp., Dept. EM, Box 32, N. Brookfield, Mass. 01535
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
D Tau-Tron Inc., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Transmitters, Pulse Phase Modulation

Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
M Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803

Transmitters, Pulse Time Modulation

Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Transmitters, Radar—See Radar Systems

Transmitters, Single-Sideband

AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
D Brelonix, Inc., Dept. EM, 106 North 36th St., Seattle, Wash 98103
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Design Automation, Inc., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173
D Drake Co., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
D Fanon/Courier Corp., Subs., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105
GTE Lenkurt Inc., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
M Hoffman Electronics Corp., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
DM Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
D ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
Rhode & Schwarz Sls., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
D S G C Inc., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005
D Teaberry Electronics, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041

Transmitters, Telemetry

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... **p. 1470**
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Autocon Inds., Inc., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441
Beukers Labs., Inc., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
Biocom, Inc., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Continental Data Sys., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402
M Cubic Corp., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Dataprobe, Inc., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
D EMR Telemetry, A Div. of Sangamo-Weston, Inc., Dept. EM, Box 3041, Sarasota, Fla. 33578
Epsilon-Lambda Elctrn. Corp., Dept. EM, 28 S. Water St., Batavia, Ill. 60510
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
Hathaway Instruments, Inc., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
Resdel Engineering Corp., Dept. EM, 300 E. Live Oak Ave., Arcadia, Cal. 91006
D R F D, Inc., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607

RFL Inds., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Transmitters, Tropospheric Scatter

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
Cober Elctrns., Inc., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902 ...... *
Aydin Energy Systems, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803

Transmitters, Tone

Re-el Circuits, Inc., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662 *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
Sonex, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006 .... *
D Alpha Electronic Services, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680
D Biddle, James G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dantel, Inc., Dept. EM, 1922 North Helm, Fresno, Cal. 93727
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
D Singer Co., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Transmitters, UHF/VHF

M **Applied Research Inc., Dept. EM, 76 S. Bayles Ave., Port Washington, N.Y. 11050** .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706** .... *
D **Johnson Co., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093** .... *
M **MCL, Inc., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525** .... *
REPCO Inc., Dept. EM, Box 7065, Orlando, Fla. 32804 .... p. 1470
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
D Ailtech, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
ASC Systems Corp., Dept. EM, 155 W. Main St., Rockville, Conn. 06066
D Bendix Corp., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
BF Elctrns., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075
M Cincinnati Elctrns. Corp., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Communication Assocs., Inc., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746
Delta-Benco-Cascade LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Elctrn. Comm., Inc., Sub. NCR, Dept. EM, 1501 72nd St., N., St. Petersburg, Fla. 33733
D Emergency Beacon Corp., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801
Farinon Electric, Dept. EM, 1691 Bayport, San Carlos, Calif. 94070
General Instr. Corp, Elctronic Systems, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
HM Electronics, Inc., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Hy-Gain Electronics Corp., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505
IEC Electronics Corp., Dept. EM, 105 Norton St., Newark, N.Y. 14513
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
M Microwave Power Devices, Dept. EM, Adams Ct., Plainview, N.Y. 11803
Mobil Electronics, Inc., Dept. EM, Box 1132, Anderson, Ind. 46015
D Multi-Elmac Co., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050
Pacific Communications, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
D Regency Electronics, Inc., Dept. EM, 7707 Records St., Indianapolis, Ind. 46226
D Rodelco, Dept. EM, 356A Commack Rd., Deer Park, N.Y. 11729
D SBE, Inc., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076
Transcom Electronics, Inc., Dept. EM, Box 9, La Mesa, Cal. 92041
VHF Engrg, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902

Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192
Zeta Laboratories, Inc., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051

Transmitters, ULF/VLF

Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
DM Bayshore Systems Corp., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Delta Elctrn. Control, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
D Pathcom, Inc., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710
Technical Mat'l., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543

Transponders

Columbia Components, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550 .... p. 2504
M **Epsco, Inc., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090** .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
M **Vega Precision Labs., Dept. EM, 800 Follin La., Vienna, Va. 22180** .... *
AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133
M A.R.F. Products, Dept. EM, Box 3226, Boulder, Colo. 80303
ASC Systems Corp., Dept. EM, 155 W. Main St., Rockville, Conn. 06066
M Bendix Corp, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204
Bramco, Div. Ledex Inc., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356
Dynalab Corp., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406
Dynamic Communications, Inc., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
D King Radio Corp., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061
Viable Systems Inc., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192

Transports, card

D **Canon U.S.A., Inc., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040** ...... *
Redactron Corp., Dept. EM, 100 Parkway Dr. S., Hauppauge, N.Y. 11787

Transports, Tape (all kinds)

Crown International, Dept. EM, Box 1000, Elkhart, Ind. 46514 .... p. 1114
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 ...... *
International Electro-Magnetics, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067 p. 1115
MFE Corp., Dept. EM, Keewaydin Dr., Salem, N.H. 03079 .... p. 1669
Amilon Corp., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377
D Ampro Corp., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047
Digi-Data Corp., Dept. EM, 8580 Dorsey Rd., Jessup, Md. 20794
Micro Communications Corp., Dept. EM, 80 Bacon St., Waltham, Mass. 02154
Mohawk Data Sciences Corp., Administrative Hdqts., Dept. EM, Palisade St., Herkimer, N.Y. 13350
M Pertec Corp., Dept. EM, 9600 Irondale, Chatsworth, Cal. 91311
Redactron Corp., Dept. EM, 100 Parkway Dr. S., Hauppauge, N.Y. 11787
D Tape-Athon Corp., Dept. EM, 502 S. Isis Ave., Inglewood, Cal 90301
Triple I, Div. Economy Co., Dept. EM, 1901 N. Walnut, Oklahoma City, Okla. 73105

Triacs—See Thyristors

Triggers, SCR—See Controls, SCR

Tube Heat Dissipators

Int'l. Elctrn. Resch., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Tubes, Backward Wave

D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** .... *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Ballast—See Resistors, Ballast

Tubes, Cathode-Ray, Data Storage, TV Picture

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 4520
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Ball Bros. Research Corp., Electronic Display Div., Dept. EM, Box 3376, St Paul, Minn. 55165
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Clinton Elctrns. Corp., Dept. EM, 6701 Clinton Rd., Rockford, Ill. 61111
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
M Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Rauland, Div. Zenith Radio Corp., Dept. EM, 2407 W. North Ave., Melrose Pk., Ill. 60160
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
D RCA Distr. & Special Prods. Div., Dept. EM, Deptford, N.J. 08096
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
DM Thomas Elctrns., Inc., Dept. EM, 100 Riverview Dr., Wayne, N.J. 07470
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Cathode-Ray, Instrument Use

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... p. 4518,4519
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 4520
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
Ferranti Elec., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803
DM General Atronics, Elctrn. Tube, Dept. EM, 1200 E. Mermaid La., Phila., Pa. 19118
M Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
M International Importers, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
DM Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
DM Thomas Elctrns., Inc., Dept. EM, 100 Riverview Dr., Wayne, N.J. 07470
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Cathode-Ray, Multiple Gun

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
Electro Motive Corp., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746
Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
DM General Atronics, Elctrn. Tube, Dept. EM, 1200 E. Mermaid La., Phila., Pa. 19118
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
DM Thomas Elctrns., Inc., Dept. EM, 100 Riverview Dr., Wayne, N.J. 07470
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Tubes, Cathode-Ray, Projection

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
D Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
DM General Atronics, Elctrn. Tube, Dept. EM, 1200 E. Mermaid La., Phila., Pa. 19118
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Rank Precision Inds., Dept. EM, 411 Jarvis Ave., Des Plaines, Ill. 60018
D RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
DM Thomas Elctrns., Inc., Dept. EM, 100 Riverview Dr., Wayne, N.J. 07470
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Cathode-Ray, Scan Conversion

Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 .. *
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
General Electrodynamics Corp., Dept. EM, 4430 Forest La., Garland, Tex. 75040
Hughes Aircraft Co., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Cathode-Ray, Shaped-Beam

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
DM General Atronics, Elctrn. Tube, Dept. EM, 1200 E. Mermaid La., Phila., Pa. 19118
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Ceramic (Electron)

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
Plessey Ceramic Div., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825
RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604

D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Tubes, Counting

D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503

Tubes, Electrometer

D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207

Tubes, Electron Multiplier

D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Uthe Technology Int'l., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Wagner Elec., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Tubes, Flash

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 *
Gen Rad, Dept. EM, 300 Baker Ave., Concord, Mass. 01742 *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 *
M Amglo Corp., Dept. EM, 5301 Wesley Terr., Rosemont, Ill. 60018
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D GWA Electronics, Inc., Dept. EM, Box 20396, Denver, Colo. 80220
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
U.S. Scientific Instrs., Dept. EM, 61 North Beacon St., Boston, Mass. 02134
Xenon Corp., Dept. EM, 66 Industrial Way, Wilmington, Mass. 01887

Tubes, Forward Wave

DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Tubes, Gas

DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
DM Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Midcom Inc., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
D Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Tubes, Ignitron

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
D **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** *
Advanced Kinetics, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D National Electronics, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Tubes, Image Converter

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 *
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Marco Scientific, Dept. EM, Box 2699, Santa Clara, Cal. 95051
D Princeton Elctrn. Prods., Dept. EM, Box 101, New Brunswick, N.J. 08902
RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Varo Electron Devices, Inc., Dept. EM, 2203 W. Walnut St., Garland, Tex. 75040
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Tubes, Indicator—See Tubes, Readout

Tubes, Industrial Power

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 *
D **International Comps Corp., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746** *
DM **Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803** *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 *
M **Victoreen Instrument Div., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104** *
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
DM Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503

D Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Tubes, Klystron

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D OKI Electronics of America, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Tubes, Laser

Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D Metrologic Instruments, Inc., Dept. EM, 143 Harding Ave., Bellmawr, N.J. 08030
RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
Thermal Amer. Fused Quartz, Dept. EM, Change Bridge Rd., Montville, N.J. 07045
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503

Tubes, Magnetron

General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
DM Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M VTM Microwave, Dept. EM, 3225 Prairie Ave., Boulder, Colo. 80301

Tubes, Microwave

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
General Elec. Co., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 .. *
DM Raytheon Co., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803 .... *
DM Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
M Hughes Aircraft Co., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509
ITT Electron Tube, Dept. EM, Box 100, Easton, Pa. 18042
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
Krohn Ceramics Inc., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507
Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
M Litton Inds., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
M Northrop Defense Sys. Dept., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018
Raytheon Co., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Siemens Corp., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830
M Teledyne Mec., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304
D Temtron Electronics Ltd., Dept. EM, 138-69 Francis Lewis Blvd., Rosedale, N.Y. 12472
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
D Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
D Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
D Varian Palo Alto Microwave Tube Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tubes, Noise Source

DM Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian/Beverly Div., Dept. EM, Salem Rd., Beverly, Mass. 01915
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

Tubes, Photomultiplier

EG&G, Inc., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790 .... *
Melcor/Materials Elctrn. Prods., Dept. EM, 990 Spruce St., Trenton, N.J. 08648 .... *
Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Bailey Instrs., Inc., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662
M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
EMI Gencom Inc., Dept. EM, 80 Express St., Plainview, N.Y. 11803
Gamma Scientific Inc., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123
Hamamatsu Corp., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846
Hamamatsu TV Co., Ltd., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303

Tubes, Readout (CRT, Cold-Cathode, Vacuum Fluorescent, Incandescent, etc.)

D A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735 *
DM Industrial Elctrn. Engrs., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405 p. 2638
Inter-Tech. Grp., Inc., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533 p. 4520
D Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
Refac Elctrns. Pinlite®, Wild Rover®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098 .... *
Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
D Apollo Corp., Dept. EM, 465, Suwa, Takatsuku, Kawasaki, Japan
DM Burroughs Corp., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061
Clinton Elctrns. Corp., Dept. EM, 6701 Clinton Rd., Rockford, Ill. 61111
M Day-light Display Corp., Dept. EM, 11 Fairfield Pl., Box 1231, W. Caldwell, N.J. 07006
GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
Infodex, Inc., Dept. EM, 7 Cherry Ave., Waterbury, Conn. 06702
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Panasonic, Ind'l. Elctrn. Comps., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094 .... *
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D Electro Motive Corporation, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501
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Levit Electronics, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
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Westinghouse, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

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D Dutrex Inds., Inc., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011
D Elctrn. Enterprises, Dept. EM, 65 7th Ave., Newark, N.J. 07104
DM Electrons Co., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856
D GTE Sylvania Inc., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154
D JSH Electronics, Inc., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230
D National Electronics, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Raytheon Co., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169
DM RCA, Electro-Optics & Devices, Dept. EM, New Holland Ave., Lancaster, Pa. 17604
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D Thor Elctrns. Corp., Dept. EM, 741 Livingston St., Elizabeth, N.J. 07207
United Page Inc., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503
Varian, Eimac Div., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
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Tubes, Rectifying, Vacuum

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Tubes, Strobe—See Lights, Stroboscopic Source

Tubes, Switching

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Tubes, Tv Camera Pickup

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M Dumont Electron Tubes & Devices, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015
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Tubes, Thyratron

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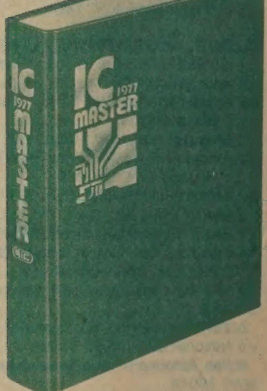

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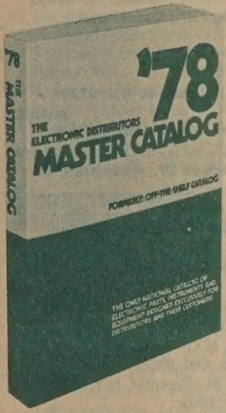

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SGL Graphics, Div. of SGL Inds., Inc., Dept. EM, John Fitch Industrial Park, Warminster, Pa. 18974
M Shakespeare, Dept. EM, Box 246, Columbia, S.C. 29202
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019

Tubing, Glass

Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... *
Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440 .... p. 2977
M Amersil, Inc., Dept. EM, 650 Jernees Mill Rd., Sayreville, NJ 08872
Corning Science Products, Corning Glass Works, Dept. EM, Corning, N.Y. 14830
Esco Products, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438
Garner Glass Co., Dept. EM, 177 S. Indian Hill Blvd., Claremont, Calif. 91711
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
M GTI Corporation, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220
Saegertown Components Div., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130
Sargent Welch Sci. Co., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076
M Wilmad Glass Co., Inc., Dept. EM, Buena, N.J. 08310

Tubing, Heat Shrinkable-Also See Caps, Forms & Tapes, Heat Shrinkable

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** ..... p. 4522,4534
Chomerics, Inc., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801 ..... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ..... p. 4620
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** ..... p. 4633
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ..... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** ..... p. 2974
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ..... *
Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ..... p. 2186
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ..... *
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
M Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
M Automatic Die Cutting Mch, Dept. EM, 149 Church, New York, N.Y. 10007
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
M Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Carborundum Co., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302
D Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
D Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Emerson & Cuming, Inc., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
M Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
3M Company, Technical Ceramic Prods. Div., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101
D Mauratron, Inc., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
DM Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
DM Penntube Plastics, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Russell Inds., Inc., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D T & B/Thomas & Betts, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007
D T & B/Thomas & Betts, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207
DM Zeus Ind'l. Prods., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Tubing, Metal

DM **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426** *
Armco Steel Corp., Dept. EM, Middletown, Ohio 45043
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Carpenter Technology, Dept. EM, Box 662, Reading, Pa. 19603
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
M ITT-Higbie Mfg. Co., Dept. EM, Wagner Rd., Rochester, Mich. 48063
K & S Engineering, Dept. EM, 6917 W. 59th St., Chicago, ILL. 60638
M Kawecki Beryico Inds., Inc., Dept. EM, 220 East 42nd St., New York, NY 10017
Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
NL Industries, Inc., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
Whittaker Corp., Dept. EM, 10880 Wilshire Blvd., Los Angeles, Cal. 90024

Tubing, Plastic-Also See Tubing, Spaghetti

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** ..... p. 4522,4535
D **Bivar, Inc., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705** ..... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ..... *
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** ..... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ..... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** p. 2974,2975,4671
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ..... *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ..... *
DM **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440** ..... p. 2977
Abesto Corp., Dept. EM, Ackerman St., Bloomfield, N.J. 07003
Ace Plastic Co., Inc., Dept. EM, 91-30 Van Wyck Expwy, Jamacia, N.Y. 11435
Acme Model Engrg. Co., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
Anchor Plastics, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106
M Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
DM Blum, Julius & Co., Inc., Dept. EM, Box 292, Carlstadt, N.J. 07072
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Communications Technology Corp., Dept. EM, 2237 Colby Ave., Los Angeles, Cal. 90064
Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
3M Co., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101
Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
DM Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
Norton Co., Public Relations Dept., Dept. EM, One New Bond St., Worcester, Mass. 01606
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
DM Penntube Plastics, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018
M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
Resdel Corp., Dept. EM, Bldg. 22–County Airport, Rio Grande, N.J. 08242
D Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
SGL Homalite, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804
M Stevens Prods., Inc., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019
Synthane Taylor Corp., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482
M Teledyne Aerospace Systems, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031
Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
D Uniroyal, Inc., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020
DM Zeus Ind'l. Prods., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Tubing, Spaghetti

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** ..... p. 4522,4535
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ..... *
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** ..... *
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** ..... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** ..... *
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 ..... *
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 ..... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207** ..... p. 2186
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 ..... *
DM **Varflex Corp., Dept. EM, 514 W. Court St., Rome, N.Y. 13440** ..... p. 2977
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
M Cadillac Plastic & Chemical, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232
D Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Natvar Corp., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065
DM Penntube Plastics, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018
M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
D Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
DM Zeus Ind'l. Prods., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869

Tubing, Spiral Wrap

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** ..... p. 4522
Amp Inc., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105 ..... *
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** ..... *

Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** .... *
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... *
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** .... *
M AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
M Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Budd Co., Polychem Div., Dept. EM, Front & Ford Sts., Bridgeport, Pa. 19405
Central Plastics Dists., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
DM Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
D ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
D Jonesville Paper Tube Corp., Dept. EM, 474 Beck Rd., Jonesville, Mich. 49250
D Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
DM Newman Corp., M. M., Dept. EM, Marblehead, Mass. 01945
NVF Co., Dept. EM, Box 68, Yorklyn, Del. 19736
M Paramount Industries, Inc., Dept. EM, 1430 Progress Rd., Ft. Wayne, Ind. 46808
DM Penntube Plastics, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018
Precision Paper Tube Co., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090
D Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
D Zeus Ind'l. Prods., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Tubing, Waveguide

Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... *
M **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426** *
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Wall A. T. Co., Dept. EM, 55 Service Ave., Warwick, R.I. 02889
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006

Tubing, Zipper

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** p. 4522,4536
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 .. *
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** .... *
Brand Dielectrics, Inc., Dept. EM, Route 203, N. Windham, Conn. 06256
Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Tuners, A-M/F-M

Advance Conversion Devices Co., Dept. EM, 109 Eighth St., Passaic, N. J. 07055 .... *
A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632 *
Shigoto Inds., Ltd., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001 .... *
D Bell PA Products Corp., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201
D Bogen Div., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Dynaco Inc., Div Tyco Corp., Dept. EM, Box 88 Coles Rd., Blackwood, N.J. 08012
Heath Co., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022
D McGohan Inc., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622
D Mitsumi Elec. Co., Ltd., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Precision Electronics, Inc., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131
D PTS Electronics Inc., Dept. EM, Box 272, Bloomington, Ind 47401
DM Rotel of America, Inc. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710
D Trutone Elctrns., Inc., Dept. EM, 7315 Fulton Ave., No. Hollywood, Cal. 91605
Waller Corp., Dept. EM, PO Box 340, Crystal Lake, Ill. 60014
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304

Tuners, Microwave

M **General Microwave Corp., Dept. EM, 155 Marine St., Farmingdale, NY 11735** *
Johanson Mfg. Corp., Dept. EM, Box 329, Boonton, N.J. 07005 .... *
M Aertech Industries, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
Microphase Corp., Dept. EM, 35 River Rd., Cos Cob, Conn. 06807
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
M Omni Spectra, Inc., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
M RHG Elctrns. Lab., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M Teledyne Microwave, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040
D TRG., Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Varian Electron Device Grp., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303
Varian, Solid State West Division, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
M Watkins-Johnson Co., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Weinschel Engrg. Co., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760

Tuning Forks

Bulova Watch Co., Freq Controls Div., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377 .... *
M **Murata Corporation of America, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067** .... *
M **Philamon, Inc., Dept. EM, 33 Dubon Ct., Farmingdale, N.Y. 11735** .... *
American Time Products, Bulova Watch, Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377
M Fork Standards, Inc., Dept. EM, 211 Main St., West Chicago, Ill. 60185
FSI/Fork Standards Inc., Dept. EM, 211 Main St., W. Chicago, Ill. 60185
M Iwata Electric Co., Ltd., Dept. EM, 1-16 Chome Soto-Kanda, Chiyoda-ku Tokyo, Japan
Meloy Laboratories Inc., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151
D Murata Mfg. Co. Ltd., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
T-F Electronics Inc., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759

Tweezers, Hand & Vacuum

D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101** .... *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
M Air-Vac Engrg. Co., Dept. EM, 100 Gulf St., Milford, Conn. 06460
D Circon Corp., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111
Clauss Cutlery Co., Dept. EM, Box 667, Fremont, Ohio 43420
Engineering & Elctrn. Devices, Inc., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038
General Hardware Mfg. Co., Dept. EM, 80 White St., New York, N.Y. 10013
D Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D Orbit Inds., Div. Countis Inds., Dept. EM, Box 1444, San Luis Obispo, Calif. 93406
D Telvac Instr. Co., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
X-ACTO, a unit of CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101

Typewriters, Input-Output (All Types)

Digital Equipment Corp., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752 .... p. 1538
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Digital Equipment Corporation, Dept. EM, 146 Main Street, Maynard, Mass. 01754
D Facit-Addo, Inc., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830
Interface Technology Inc., Dept. EM, 10500 Kahlmeyer Dr., St. Louis, Mo. 63132
Perkin-Elmer Data Systems, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801
Texas Instrs. Inc., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001

Ultraviolet Inspection Lighting-Also See Microscopes, Ultraviolet

D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
American Ultraviolet, Dept. EM, 320 Commerce St., Chatham, N.J. 07928
Aristo Grid Lamp Prdts., Dept. EM, 65 Harbor, Port Washington, N.Y. 11050
D Black Light Corp. Amer., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Clean Room Prods., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706
Gates, Geo. W. & Co., Inc., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
DM Shannon Luminous Mat'ls., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046
D Ultra-Violet Prods., Inc., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778
Westinghouse Elec., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003

Underwater Communication, Detection, Navigation, etc. Equipment

M **Dranetz Engrg. Labs., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080** .... *
Marine Electric Railway Prods. Div., Inc., Dept. EM, 167 National Rd., Edison, N.J. 08817 .... *
NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *

M All Systems, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Chesapeake Instr. Corp., Dept. EM, Shadyside, Md. 20867
Collins Radio, Rockwell International, Dept. EM, Dallas, Tex. 75207
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
M EDMAC Associates Inc., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445
Edo Western Corp., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115
GTE Sylvania Inc., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
ITT Mackay Marine, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611
Kollsman Instr. Co., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054
M Lear Siegler, Inc., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406
Lockheed Elctrns. Co., Dept. EM, Rte. #22, Watchung, N.J. 07060
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
D Oaktron Inds., Inc., Dept. EM, Monroe, Wisconsin 53566
Sanders Assocs. Inc., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060
Telstar Electronics Corp., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971
Video Sciences International, Dept. EM, 6319 E. DeSoto Ave., Woodland Hills, Cal. 91364

Urea Formaldehyde—See Plastic Raw Materials

Valves, Solenoid

D **Gould Inc. Control Sys. Div. Allied Control, Dept. EM, P.O. Box 147, Farmington, Conn. 06032** .... *
Square D Co., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201 .... *
D Airmatic/Beckett-Harcum, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177
D Atkomatic Valve Co., Inc., Dept. EM, Box 11258, 141 South Sherman Dr., Indianapolis, Ind. 46201
Bailey Meter Co., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092
M Bendix Corp., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605
Bicron Elctrns. Co., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
EEMCO Div., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039
M Electro Kinetics Co., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
General Valve Corp., Dept. EM, 110 Rte. 10 Box 342, E. Hanover, N.J. 07936
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Honeywell, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408
IMC Magnetics Corp., Arizona Div., Dept. EM, 1900 East Fifth St., Tempe, Ariz. 85281
DM ITT General Controls, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201
M Janitrol Aero Div., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228
Johnson Corp., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093
M Marotta Sci. Controls, Inc., Dept. EM, Boonton Ave., Boonton, N.J. 07005
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
M Servotronics, Inc., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225
Singer Co., The, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Valves, Vacuum

D **A E G Telefunken, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632** *
Torr Labs., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406 .... *
M Bemco, Inc., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331
D CVC Products, Inc., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603
Edwards High Vacuum, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072
Everett/Charles, Inc., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767
General Valve Corp., Dept. EM, 110 Rte. 10 Box 342, E. Hanover, N.J. 07936
High Voltage Engrg. Corp., Dept. EM, S. Bedford St., Burlington, Mass. 01803
D Hills-McCanna Co., Dept. EM, 400 Maple Ave., Carpentersville, Ill. 60110
IMC Magnetics Corp., Arizona Div., Dept. EM, 1900 East Fifth St., Tempe, Ariz. 85281
Jamesbury Corp., Dept. EM, 640 Lincoln St., Worcester, Mass. 01605
DM Lear Siegler, Inc., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
D Matheson Gas Products, Dept. EM, Box 85, East Rutherford, N.J. 07073
Perkin-Elmer Ultek Inc., Dept. EM, Box 10920, Palo Alto, Cal. 94303
T-M Vacuum Prods., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077
D Ulvac North America, Dept. EM, Colchester Plaza, Colchester, VT 05446
Vactronic Lab. Equip., Inc., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731
Vacuum Resch. Mfg., Dept. EM, 3100 Crow Canyon Rd., San Ramon, Cal. 94583
Varian Assocs., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303
Varian Assocs., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303

Varactors—See Diodes, Varactor

Varistors—See Resistors, Voltage Sensitive

Verification Systems, Tape

NES, Inc., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103 .... *
Instrumentation Tech. Corp., Dept. EM, 18811 Napa St., Northridge, Cal. 91324

VHF Equipment—See Generators; Receivers; etc.

Vibration Test Systems—See Testers, Vibration

Vibrators

D **ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101** p. 3362
Coil Co. of Amer., Dept. EM, 221 Washington St., Northvale, N.J. 07647 p. 4357
Endicott Coil Co., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905 p. 1427
Unholtz-Dickie Corp., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518 *
DM All American Tool & Mfg. Co., Dept. EM, 8027 Lawndale, Skokie, Ill. 60076
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
D GCA/Precision Scientific, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647
D Terado Corp., Dept. EM, 1068 Raymond Ave., St. Paul, Minn. 55108
Wilcoxon Research, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852

Vibrators, Instrument (Stiction Elimination)

ATR Electronics, Inc., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101 p. 3362
M **Vernitech, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729** .... *
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

Vidicon Tubes—See Tubes, TV Camera Pickup

Viewing Hoods, Cathode Ray Tube

D **Jan Hardware Mfg. Co., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101** .... *
GPS Corp., Dept. EM, 14 Burr St, Framingham, Mass. 01701
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Tektronix, Inc., Dept. EM, Box 500, Beaverton, Ore. 97077

Vinyl Compounds—See Plastic Raw Materials

VLF Equipment—See Receivers; Transmitters; etc.

Voltage Sources

Abacus Controls Inc., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876 *
D **Ballantine Laboratories, Inc., Dept. EM, 90 Fanny Rd., Box 97, Boonton, N.J. 07005** .... *
Burr-Brown, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734 .... *
D **California Instrs., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111** .... *
Continental Rentals Div., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730 .... *
Datel Systems Inc., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021 ...... *
Deltec Corp., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110 .... *
Electronic Dev. Corp., Dept. EM, 11 Hamlin St., Boston, Mass. 02127 p. 2840
Freed Transformer Co., Inc., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227 .... *
Hipotronics, Inc., Dept. EM, Brewster, N.Y. 10509 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
North Hills Elctrns., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542 .... *
Power Designs, Inc., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590 .... *
Power Designs Pacific, Inc., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304 .... *
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Trio Labs, Inc., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803 .... *
Advanced Energy Conversion, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002
Analogic Corp., Dept. EM, Audubon Rd., Wakefield, Mass. 01880
Argus International, Dept. EM, Box 38, Hopewell, N.J. 08525
Behlman Div., California Instrs., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111
M Calex Mfg. Co., Inc., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523
Incor Instrumentation, Inc., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704
Julie Research Lab., Dept. EM, 211 West 61st St., New York, N.Y. 10023
D Keithley Instruments Inc., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139
McKee-Pedersen Instrs., Dept. EM, P.O. Box 322, Danville, Cal. 94526
DM National Semiconductor Corp., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051
Precision Monolithics Inc., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050
Sensitive Research Instrs., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550
DM Systron-Donner Corp., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
DM Systron-Donner Instr. Div., Dept. EM, 10 Systron Dr., Concord, Cal. 94518
Todd Products Corp., Dept. EM, 123 Milbar Blvd., Farmingdale, N.Y. 11735
Tucker Electronics Co., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040
Zi-Tech Div., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302

Wafer Fabrication, Semiconductor—See Semiconductor Wafer Fabrication

Wall Plates—See Boxes, Junction, Outlet & Wall Plates

Washers—See Fasteners

Wave Soldering Equipment—See Soldering Equip, Printed Circuit

Waveguide-Coax Adapters

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *

Waveguide-Coax Adapters (Cont'd)

M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... ***
Rental Electronics, Dept. EM, 99 Hartwell Ave., Lexington, Mass. 02173 .... *
Ainslie Corp., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185
M Aircom, Inc., Dept. EM, Rte. 16B, Union, N.H. 03887
M Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Alford Mfg. Co., Dept. EM, 120 Cross St., Winchester, Mass. 01890
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
Cablewave Systems Inc., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473
Coax Devices Inc., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
D Harris Corp., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791
Hewlett-Packard Co., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
M Microlab/FXR, Dept. EM, 10 Microlab Rd., Livingston, N.J. 07039
D Microwave Assocs., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd.; Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Nurad, Inc., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211
Omni Spectra/Americon, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
D R L C Elctrns., Inc., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549
Sivers Lab, Dept. EM, Box 90339, Los Angeles, Cal. 90009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
M UTE Microwave, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Waveguides

Amphenol North America Div., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521 .... *
M **Arra Inc., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706 .... p. 2999**
M **Electro Impulse, Dept. EM, Box 870, Red Bank, N.J. 07701 .... ***
M **Uniform Tubes Inc., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426 ***
M Adams-Russell Co., Inc., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154
Airtron, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950
Andrew Antenna Co. Ltd., Dept. EM, 606 Beech St., Whitby, Ont., Can. L1N 5S2
Andrew Corp., Dept. EM, 10500 W. 153rd St., Orland Park, Ill. 60462
Baytron, Dept. EM, 344 Salem St., Medford, Mass. 02155
Bendix, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838
M Dielectric Comms, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071
M Eastern Microwave Corp., Dept. EM, 4 Gill St., Woburn, MA 01801
Gabriel Elctrns. Inc., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074
Hughes Aircraft Co, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230
Hughes Aircraft Co, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634
Maury Microwave Corp., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730
D Microwave Development Labs., Inc., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194
Narda Microwave Corp., Dept. EM, Plainview, N.Y. 11803
Polyflon Corp., Dept. EM, 35 River St., New Rochelle, N.Y. 10801
M Premier Microwave, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573
Prodelin, Inc., Dept. EM, Box 131, Hightstown, N.J. 08520
Reeve Electronics, Inc., Dept. EM, 609 W. Lake St., Chicago, Ill 60606
RF Systems, Inc., Dept. EM, 155 King St., Cohasset, Mass. 02025
M Servometer Corp., Dept. EM, 501 Little Falls Rd., Cedar Grove, N.J. 07009
DM Systron-Donner Microwave Div., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409
TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801
Waveline, Inc., Dept. EM, Box 718, W. Caldwell, N.J. 07006
Wavetek, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123

Wave Traps—See Filters, Antenna; Filters, Microwave; etc.

Welding Equipment & Access. (Excluding Equip. for Semiconductor Devices)

Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... *
D **Union Carbide Corp., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017 .... ***
D Apollo Lasers Inc., Dept. EM, 6357 Arizona Cir., Los Angeles, Cal. 90045
D Assembly Systems, Inc., Dept. EM, PO Box 9084, Providence, R.I. 02940
Brew Richard D. & Co., Inc., Dept. EM, 90 Airport Rd., Concord, N.H. 03301
British Aircraft Corp. (USA Inc.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202
Chemetron Corp., Welding Prods., Dept. EM, 111 E. Wacker Dr., Chicago, Ill. 60601
Dukane Corp., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174
Ewald Instrs. Corp., Dept. EM, Rte. 7R, Kent, Conn. 06757
Freudenberg, Inc. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020
Hadron Inc., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404
Henes Products Corp., Dept. EM, 4301 E. Madison St., Phoenix, Ariz. 85034
Hilton Industries Inc., Dept. EM, 190 Maple St., Glen Falls, N.Y. 12801
DM Hughes Aircraft Co., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008
Laser Inc., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
M Mallory Metallurgical, Div. P.R. Mallory, Dept. EM, 3029 E. Washington St., Indianapolis, Ind. 46206
D Master Appliance Corp., Dept. EM, 2420 18th St., Box 545, Racine, Wisc. 53403
Microflame Inc., Dept. EM, 3724 Oregon Ave. S., Minneapolis, Minn 55426
Nelson Stud Welding TRW Inc., Dept. EM, 28th & Toledo Ave., Lorain, Ohio 44035
D Precision Timer Co., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498
Quantronix Corp., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787
D Raytheon Co., Spec. Microwave & Device Oper., Dept. EM, 130 Second Ave., Waltham, Mass. 02154
Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
Taylor-Winfield Corp., Dept. EM, 1052 Mahoning Ave. NW, Warren, Ohio 44482
DM Tescom Instr. Div., Dept. EM, 2600 Niagara La. N., Minneapolis, Minn. 55441
Triac Electronics, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017
Union Carbide Corp., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017
M Wells Electronics, Inc., Weltek Div., Dept. EM, 1801 S. Main St., South Bend, Ind. 46613
Westinghouse Elec., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784

Wire & Cable Ties

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... ***
D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
DM **Grayhill Inc., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525 .... p. 4668**
D **Heyman Mfg. Co., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033 p. 4669**
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 ...... *
DM **ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2038**
DM **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 p. 4688-4690**
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 p. 2169,2187**
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
DM Amrad Corp., Dept. EM, Box 876, Paris, Tex. 75460
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
M Dennison Mfg. Co., Fastener Division, Dept. EM, Framingham, Mass. 01701
D Ev-Game Inc., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520
D Eaton Corp., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101
ECP Corp., Dept. EM, 4726 Superior Ave., Cleveland, Ohio 44103
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
DM Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
D Gries Reproducer Co., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801
Hanscom, H.F. Co., Inc., Dept. EM, 225 Chapman St., Providence, R.I. 02905
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
DM ICO/Rally Corp., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Milton Ross Co., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966
Nat'l. Band & Tag, Dept. EM, 721 York St., Newport, Ky. 41072
Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
D Preformed Line Products Co., Dept. EM, Box 91129, Cleveland, Ohio 44101
Richco Plastic Co., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
DM Transcon Mfg. Co., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220
DM Tyton Corp., Dept. EM, 2300 W. Florist Ave., Milwaukee, Wisc. 53209
DM Weckesser Co. Inc., Dept. EM, 4444 W. Irving Park Rd., Chicago, Ill. 60641
Whitso, Inc., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Wire, Airframe

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4611,4619
Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... *
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4626,4635**
Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057 .... p. 4694,4700,4701,4709

Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... p. 4715
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Wire, Bare, Nickel

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Wire, Bare, Nickel-Chrome

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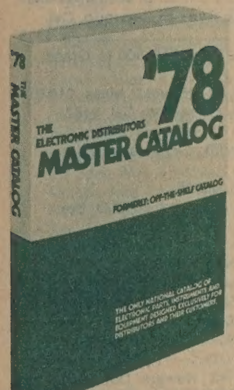

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Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
M Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Wire, Flat Strip—See Cable, Flat

Wire, Glass Insulated

- **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** p. 4522
- D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** .. *
- **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616** .... p. 4588,4619
- DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
- DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** .... p. 4626
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- **Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057** .... p. 4693,4704,4709
- **Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245** .... p. 4715
- **TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075** .... *
- M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
- Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
- D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
- Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
- M Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
- Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
- M General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
- Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
- GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
- Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
- Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
- Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
- D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
- M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
- D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
- Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
- Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Wire, Guy

- **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** p. 4522
- D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744** *
- **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616** .... p. 4588,4619
- D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
- **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** .... p. 4626
- D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
- D Carolina Steel & Wire Corp., Dept. EM, I-20 and S.C. 6, Lexington, S.C. 29072
- D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
- Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
- Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
- Nat'l-Standard Co., Dept. EM, Niles, Mich. 49120
- D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
- DM Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
- D Sitco Antennas, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220
- D South River Metal Prods. Co., Dept. EM, P.O. Box 394, Matawan, N.J. 07747
- D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601

Wire, Heater—See Cable, Heater

Wire, High-Temperature (Over 125 C)

- DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** p. 4522
- DM **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** .. *
- D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744** *
- DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616** .... p. 4588,4619
- DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
- D **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** .... p. 4626,4639,4640
- M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863** .. *
- DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** .... p. 4671
- **National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031** .... *
- **Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907** .... *
- **Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057** .... p. 4695-4697,4700,4701,4703-4705,4709
- M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** p. 4713
- D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... p. 4650,4664-4667
- **Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245** .... p. 4715
- **TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075** .... *
- M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662** .... *
- DM Addington Laboratories, Inc., Maser Hitemp Wire Div., Dept. EM, 800 N. Grand, Covina, Cal. 91724
- M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
- M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
- M Assembled Products Co., Dept. EM, Box 750, St. Albans, Vt. 05478
- Atomergic Chemetals Co., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803
- D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
- D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
- DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
- Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
- M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
- DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
- Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
- DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
- D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
- Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
- D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
- Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
- Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
- Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
- D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
- M General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
- M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
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- Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
- Hoskins Mfg. Co., Dept. EM, 4445 Lawton Ave., Detroit, Mich. 48208
- Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
- M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
- Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
- Leviton Mfg. Co., Inc., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362
- Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
- D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
- M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
- Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
- D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
- Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
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- D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
- SermeTel Inc., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468
- M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
- Teledyne Western Wire & Cable, Dept. EM, 2425 E. 30th St., Los Angeles, Cal. 90051
- DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
- M Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
- D Triangle PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903
- Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
- DM Viking Wire Co., Inc., Dept. EM, Shelter Rock Rd., Box 187, Danbury, Conn. 06810
- Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361
- Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
- Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Wire, High Voltage (1000 Volts & Over)

- **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207** p. 4522
- D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** .. *
- D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744** *
- DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616** .... p. 4588,4612,4619
- D **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** .... *
- DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** .... p. 4626,4629
- M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863** .. *
- DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** .... p. 4670
- **National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031** .... p. 4674
- **Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057** .... p. 4704,4708
- M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** p. 4713
- D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618** .... *
- **Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245** .... p. 4715
- **TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075** ....Inside Back Cover,
- DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605** .... *

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Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
M Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Dielectric Sciences, Dept. EM, 5 South Ave., Burlington, Mass 01803
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
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D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
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D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
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Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
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Phelps Dodge Puerto Rico Corp., Dept. EM, P.O. Box 188, Carolina, Puerto Rico 00630
Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
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M Reynolds Metals Co., Dept. EM, Box 27003, Richmond, VA. 23261
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
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Wire, Hookup (All Types)

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
DM **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4567,4568**
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4585**
DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... p. 4588,4608-4610,4612,4616,4619**
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DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... p. 4626,4628-4630,4635,4638-4641**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2095
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... ***
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D **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 p. 4713**
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DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4649,4657,4664-4667**
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DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605 .... ***
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
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M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
DM Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
Calvert Elctrns., Inc., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
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D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Communication Cable, Dept. EM, 5 Glen Rd. Manchester, Conn. 06040
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Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
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M General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
M Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
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M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Motorola Comms. Div., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172
D Norelcom Electronics, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
D On-Guard Corp. of America, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
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M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
M Rockland Insulated Wire & Cable, Dept. EM, 87 Broadway, Haverstraw, N.Y. 10927
M Sag Harbor Inds., Inc., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
DM Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D Superior Cable Div., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601
DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
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M Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Wire, Irradiated

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
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D **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612 ...... ***
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... *
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 .... ***
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
D Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
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Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
DM Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire, Lead-In & Ground

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 p. 4567**

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D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 ...... p. 4657,4664-4667**
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D ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
DM Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
D Channel Master Div. Avnet, Dept. EM, Rte. 209, Ellenville, N.Y. 12428
Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
Copperweld Bimetallics, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
D General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lance Inds., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pacific Electricord Co., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Phelps Dodge Overseas Mktg. Corp., Dept. EM, 437 Madison Ave., New York, N. Y. 10022
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Superior Cable Div., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601
D Unarco-Rohn, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601
Victor Electric Wire & Cable, Dept. EM, 618 Main St., Coventry, R.I. 02816
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Wire, Litz

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
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M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
D Slepian, Arthur & Co., Dept. EM, 412 Housatonic Ave., Bridgeport, Conn. 06608
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire, Magnet

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
Caddel-Burns Mfg. Co., Inc., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501 *
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M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Phelps Dodge Magnet Wire Co., Dept. EM, 1302 E. Creighton Ave., Ft. Wayne, Ind. 46803
Phelps Dodge Overseas Mktg. Corp., Dept. EM, 437 Madison Ave., New York, N. Y. 10022
M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
D Slepian, Arthur & Co., Dept. EM, 412 Housatonic Ave., Bridgeport, Conn. 06608
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
D Tohoku Metal Inds., Ltd., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan
United Mineral & Chem. Corp., Dept. EM, 129 Hudson St., New York, N.Y. 10013
DM Viking Wire Co., Inc., Dept. EM, Shelter Rock Rd., Box 187, Danbury, Conn. 06810
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire Markers (All Types)-Also see Strips Marker & Fanning

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Datak Corp., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093 ...... *
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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 ...... ***
M Ackerman Gould Co., Inc., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572
Antex Div., M M Newman Corp., Dept. EM, Marblehead, Mass. 01945
M Brady Co., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201
D Cole-Flex Corp., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704
Conrac Corp., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683
ECP Corp., Dept. EM, 4726 Superior Ave., Cleveland, Ohio 44103
DM Electrovert, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
DM K.C.C. Shokai Ltd., Dept. EM, No. 31 Ouchi-dori 4-chome, Nada-ku, Kobe, Japan
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
M Markem Corp., Dept. EM, I000 Congress St., Keene, NH 03431
Matthews & Co., Jas. H., Marking Systems Div., Dept. EM, 6515 Penn. Ave., Pittsburgh, Pa. 15206
Nat'l. Band & Tag, Dept. EM, 721 York St., Newport, Ky. 41072
Newman Corp., M: M., Dept. EM, Marblehead, Mass. 01945
D Penn Fibre & Specialty, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
D Tyton Corp., Dept. EM, 2300 W. Florist Ave., Milwaukee, Wisc. 53209
D Weidmuller Terminations, Inc., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231
D Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Wire, Multiconductor—See Cable, Multiconductor

Wire Nuts

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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 ...... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Gould Inc., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227

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Wire, Plated (All Types)

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M Advanced Materials Systems, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
Kentucky Electronics, Inc., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
Nesor Alloy Corp., Dept. EM, 666 Passaic Ave., W. Caldwell, N.J. 07006
Philips Elmet Corp., Dept. EM, 1560 Lisbon Rd., Lewiston, Me. 04240
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire, Radiation-Resistant

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
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DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817 ... ***
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M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
D General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492

Wire, Resistance

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522
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M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Easy Heat-Wirekraft, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
Hoskins Mfg. Co., Dept. EM, 4445 Lawton Ave., Detroit, Mich. 48208
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
Wireflex Incorporated, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504

Wire, Resistance Thermometer

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522
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M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
Cox & Co., Inc., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire, Ribbon

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 ... p. 4522**
D **Augat Interconnection Prods. Div., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703 ... ***
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 ***
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D **3M Company, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101 ... ***
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D **Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 ... ***
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M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
M Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
Circuit Assembly Corp., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
M Flexible Circuits, Inc., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
GTE Sylvania, Inc., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
GTE Sylvania Inc, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365
Hoskins Mfg. Co., Dept. EM, 4445 Lawton Ave., Detroit, Mich. 48208
Jermyn, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Nesor Alloy Corp., Dept. EM, 666 Passaic Ave., W. Caldwell, N.J. 07006
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
Plessey Inc., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
DM Spectra-Strip Corp., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642
Wilkinson Co., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Wire, Semiconductor Lead

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DM Associated Engrg. & Mfg. Corp., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043
Carpenter Technology, Dept. EM, Box 662, Reading, Pa. 19603
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553

M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Fansteel Inc., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064
Fusite Div./Emerson Elec., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212
General Electric Co., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
M Hadley Components Div., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
Nat'l-Standard Co., Dept. EM, Niles, Mich. 49120
Nesor Alloy Corp., Dept. EM, 666 Passaic Ave., W. Caldwell, N.J. 07006
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D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire, Shielded

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** *
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744** *
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 p. 4611**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** *
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 p. 4626,4629,4635**
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863** *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404** *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** *
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 *
Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057 p. 4703,4709
M **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 p. 4715
Stanford Applied Engineering, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050 *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 *
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605** *
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662 p. 4716,4717**
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
D Anixter-Mark, Dept. EM, 5439 W. Fargo, Skokie, Ill. 60076
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
DM Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
DM Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
M Brand-Rex Co., Dept. EM, Box 498, Willimantic, Conn. 06226
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
D CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630
Essex Int'l., Inc., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
M General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
D Hepco Wire & Cable, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
D Jersey Specialty Co., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
DM Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Nesor Alloy Corp., Dept. EM, 666 Passaic Ave., W. Caldwell, N.J. 07006
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
Permaluster, Inc., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504
DM Phelps Dodge Cable & Wire Co., Dept. EM, Foot of Point St., Yonkers, N.Y. 10702
Phelps Dodge Overseas Mktg. Corp., Dept. EM, 437 Madison Ave., New York, N. Y. 10022
Prestolite Wire Div. Eltra Corp., Dept. EM, Box 649, Port Huron, Mich. 48060
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
M Rockland Insulated Wire & Cable, Dept. EM, 87 Broadway, Haverstraw, N.Y. 10927
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
M Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
Teledyne Western Wire & Cable, Dept. EM, 2425 E. 30th St., Los Angeles, Cal. 90051
DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
M Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire Shielding-Also see Braid, Cable

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522**
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** *
Breeze-Illinois, Inc., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491 p. 4578
Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 *
Cal-Metex Corp., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501 *
D **Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744** *
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 p. 4614**
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458** *
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018** *
M **Magnetic Shield Div., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106** *
DM **Metex Corp., Dept. EM, 970 New Durham Rd., Edison, N.J. 08817** *
DM **Rowe Industries, Inc., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612** *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 *
TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 *
DM **Whitmor Wire & Cable, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605** *
M Aircraft & Elex Spcltys, Dept. EM, Box 126, Plainfield, Ind 46168
M American Electric Cable Co., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040
DM Astrolab, Inc., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
M Capcon, Inc., Dept. EM, 147 W. 25th St., New York, N.Y. 10001
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Estes Engrg. Co., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362
Geyer Systems, Inc., Dept. EM, 1917 Green Spring Dr., Timonium, Md. 21903
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Lenz Electric Mfg. Co., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
M Manger Elec. Co., Inc., Dept. EM, W. Henry St., Stamford, Conn. 06902
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
M Santa Fe Textiles Inc., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
Texas Instruments Control Prods. Div., Dept. EM, 34 Forrest St., Attleboro, Mass. 02703
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705
DM Zippertubing Co., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061

Wire, Strain Gauge

Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 p. 4522
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374** *
D **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616** *
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 *
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
Materials Resch. Corp., Dept. EM, Route 303, Orangeburg, N.Y. 10962
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

Wire Strippers, Automatic

Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 *
D **ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702** *
Artos Engrg. Co., Dept. EM, 15600 W. Lincoln Ave., New Berlin, Wisc. 53151
Autosplice/Dv Gen Staple, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Eubanks Engrg., Dept. EM, 1307 So. Myrtle Ave., Monrovia, Calif. 91016
Ewald Instrs. Corp., Dept. EM, Rte. 7R, Kent, Conn. 06757
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
High Speed Hammer Co., Inc., Dept. EM, 313 Norton St., Rochester, N.Y. 14621

D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
Standard Logic Inc., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707
Tech. Devices Co., Dept. EM, 11250 Playa Ct., Culver City, Calif. 90230

Wire Strippers, Chemical—See Chemicals, Wire Stripping

Wire Strippers, Hand Operated

D **Alpha Wire Corp., Dept: EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... ***
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
D **Burndy Corporation, Dept. EM, Richards Ave., Norwalk, , Conn. 06852 ...... ***
D **Channellock, Inc., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335 .... p. 4327**
D **GC Electronics, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101 .... ***
ITT Cannon Electric, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702 p. 1967, Inside Back Cover,
ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... p. 2027,2029
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477 .... ***
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D **Waldom Electronics, Inc., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632 .... ***
D Adtool Corp., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can.
Allied Electronics, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102
M AMP Special Industries, Dept. EM, Valley Forge, Pa. 19482
Clauss Cutlery Co., Dept. EM, Box 667, Fremont, Ohio 43420
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
D Gagne Assocs., Inc., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
Hoffman Industrial Prods., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735
Hollingsworth Solderless Terminal, Dept. EM, Box 430, Phoenixville, Pa. 19460
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
D Jensen Tools & Alloys, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
D Klein Tools, Inc, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645
D Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
D Micro Electronic Systems, Inc., Dept. EM, 8 Kevin Drive, Danbury, Conn. 06810
National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
D O. K. Machine & Tool Corp., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475
Raychem Corp., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025
D Ripley Co., Inc., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416
D Teledyne Kinetics, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075
Universal Security Instrs., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227
D Vaco Products Co., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610
Western Electronic Prods. Co., Dept. EM, 107 Los Molinos, San Clemente, Cal. 92672
Winegard Co., Dept. EM, 3000 Kirkwood St., Burlington, Iowa 52601
D Workman Electronic Prods., Inc., Dept. EM, Box 3828, Sarasota, Fla. 33578

Wire Strippers, Thermal

Pioneer Magnetics, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404 *
D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462 .... ***
D American Elec. Heater, Dept. EM, 6110 Cass Ave., Detroit, Mich. 48202
D Contact, Inc., Dept. EM, 9 Elm Avenue, Hudson, N.H. 03051
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
D Ideal Industries Inc., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Pace Inc., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910
Western Electronic Prods. Co., Dept. EM, 107 Los Molinos, San Clemente, Cal. 92672

Wire, Test Lead

D **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... ***
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Columbia Elctrn. Cables, Dept. EM, 11 Cove St., New Bedford, Mass. 02744 p. 4585
DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... ***
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
D **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... ***
ITT Pomona Electronics, Dept. EM, 1500 E. 9th St., Box 2767, Pomona, Cal. 91766 .... p. 2095
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... *
D **Smith Inc., Herman H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207 ***
D **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... ***
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M Aircraft & Elex Spcltys, Dept. EM, Box 126, Plainfield, Ind 46168
D Birnbach Co., Inc., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520
Cities Svc. Co., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
D Essex Group, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M Judd Wire Div., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
D Pace Wire & Cable Corp., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572
D Pan American Trade Development Corp., Dept. EM, 2 Park Ave., New York, N.Y. 10016
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
D Rye Inds., Inc., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543
Saxton Prods., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016

Wire, TFE Insulated

DM **Alpha Wire Corp., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207 .... ***
D **Belden Corp., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374 .. ***
DM **Consolidated Wire & Assoc. Corps., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616 .... ***
DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
DM **Dearborn Wire & Cable Co., Dept. EM, 8299 Evenhouse Dr., Rosemont, Ill. 60018 .... ***
M **Electroweave, Inc., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863 .. ***
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... p. 4670,4671**
National Wire & Cable Corp., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031 .... *
Philadelphia Insulated Wire Co. Inc., Dept. EM, 333 New Albany Rd., Moorestown, N.J. 08057 .... p. 4693,4698,4700,4701,4709
DM **Stancor/Essex International, Inc., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618 .... p. 4650,4664-4667**
Standard Wire & Cable Co., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245 .... p. 4715
M **Woven Elctrns., Southern Weaving Co., Dept. EM, Box 169, Mauldin, S. C. 29662 .... ***
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
Astro Products Co., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
M Chemplast, Inc., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470
DM Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Magnet Wire Inc., Dept. EM, 25 Walker St., New York, NY 10013
D Manhattan Elec. Cable Corp., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
M Phoenix Wire, Inc., Dept. EM, 100 Teflon Ave., S. Hero, Vt. 05486
M Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301
DM Thermax Wire Corp., Dept. EM, 32-02 Linden Pl., Flushing, N.Y. 11354
DM Times Wire & Cable, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492
Victor Wire & Cable Corp., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016

Wire, Thermocouple

DM **Daburn Electronics & Cable Corp., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458 .... ***
Gulton Inds., Inc., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818 .... *
Leeds & Northrup Co., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454 *
DM **Markel Corp., Dept. EM, School La., Norristown, Pa. 19404 .... ***
Omega Engrg., Inc., Dept. EM, Box 4047, Stamford, Conn. 06907 .... p. 4324
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TRW/Holyoke Wire & Cable, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075 .... *
Acco, Bristol Div., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720
D Alnor Instrument Co., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648
D Amperex Electronic Corp., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802
M Arco Wire & Cable, Dept. EM, 5618 Vineland Ave., N. Hollywood, Cal. 91601
M ARI Inds., Inc., Dept. EM, 9000 King St., Franklin Pk., Ill. 60131
Barber-Colman Co., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101
D Baron Wire & Cable Corp., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648
D Berk Tek, Inc., Dept. EM, Box 60, RD 1, Reading, Pa. 19607
Boston Insulated Wire & Cable Co., Dept. EM, 65 Bay St., Dorchester, Mass. 02125
Bram Metallurgical-Chem. Co., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144
CCS Hatfield Wire & Cable Group, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016
Cerro Wire & Cable Co., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504
Cimco Wire & Cable, Inc., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401
Cohn, Sigmund, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553

Communication Cable, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040
M Consolidated Refining Co. Inc., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543
D Custom Cable Co., Dept. EM, 242 Butler, Westbury, N.Y. 11590
D Degussa Inc., Metals Div., Dept. EM, Route 46 & Hollister Rd., Teterboro, NJ 07608
Delco Wire & Cable, Inc., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007
Engelhard Minerals & Chem., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083
D Gavitt Wire & Cable Div., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506
General Electric Co., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602
D GIC Thermodynamics Div., Dept. EM, 4949 Delemere, Royal Oak, Mich. 48073
Gordon, Claud S. Co., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071
M Gore, W.L. & Assocs., Inc., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711
GTE Sylvania Inc., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104
Gulton Inds., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627
Honeywell, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034
Hoskins Mfg. Co., Dept. EM, 4445 Lawton Ave., Detroit, Mich. 48208
Icore Int'l., Inc., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086
Leico Inds., Inc., Dept. EM, 250 West 57th St., New York, N.Y. 10019
Lynn Elctrns. Corp., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047
Marlin Manufacturing Corp., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111
M Mil Spec Wire & Cable Corp., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520
Molecu-Wire Corp., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727
NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701
Okonite Co., Dept. EM, Box 340, Ramsey, N.J. 07446
D Revere Corp. of America, Neptune International Corp., Dept. EM, 845 N. Colony Rd., Wallingford, Conn. 06492
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Thermo Elec. Co., Inc., Dept. EM, 109 Fifth St., Saddle Brook, N.J. 07662
TRW Crescent Wire & Cable, Div. of TRW Inc., Dept. EM, Box 850, Trenton, NJ 08605
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Wire Research Corp., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705

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D **Techni-Tool, Inc., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462** .... *
D Eraser Co., Dept. EM, Box 1342, Syracuse, N.Y. 13201
Gardner-Denver Co., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417
Jonard Industries Corp., Dept. EM, 134 Marbledale Rd., Tuckahoe, N.Y. 10707
M MacDonald & Co., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204
Mann, Henry Inc., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006
Rutherford Research Prods. Co., Dept. EM, Box 249, Rutherford, N.J. 07070

Wire Twisters, Hand Operated

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National Camera Inc., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110
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Snap-On-Tools, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140
D Storm Products Co., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301

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ITT Cannon/ETC Terminal Products, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139 .... **p. 2027,2033**
D **Panduit Corp., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477** .... *
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DM Allen Mfg. Co., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002
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Amperex Electronic Corp., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876 .... *
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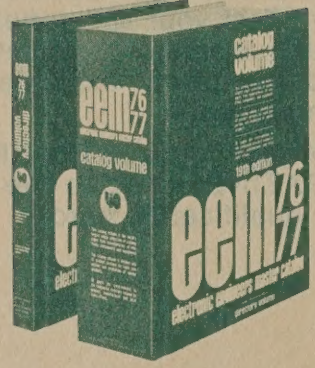

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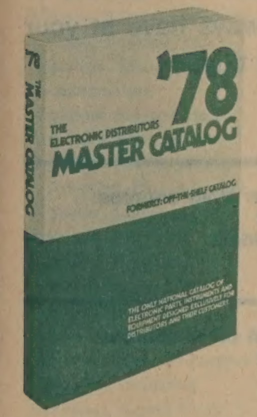

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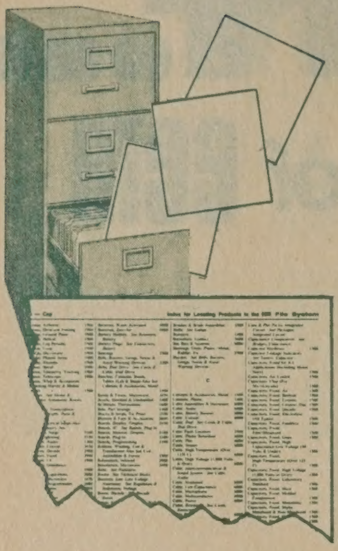

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Bridges, Antenna—See Bridges, R-F	
Bridges, Audio	2900
Bridges, Calorimeter	3400
Bridges, Capacitance	2900
Bridges, Deviation	2900
Bridges, Impedance	2900
Bridges, Inductance	2900
Bridges, Kelvin	2900
Bridges, Limit—See Bridges (Specific Types)	
Bridges, Megohm—See Bridges, Resistance	
Bridges, Power, R-F	2900
Bridges, Programmable—See Bridges (Specific Types)	
Bridges, Q	2900
Bridges, Ratio—See Testers, Ratio Voltage; Meters Ratio	
Bridges, Resistance	2900
Bridges, R-F	2900
Bridges, Schering	2900
Bridges, Silicon Cell	4800
Bridges, Strain Gauge	2900
Bridges, Synchro & Resolver	2900
Bridges, Temperature	2900
Bridges, Wheatstone	2900
Brushes & Brush Assemblies	3500
Bulbs—See Lamps	
Bumpers	1400
Burnishers, Contact	5400
Bus Bars & Systems	6000
Bushings, Glass, Plastic, Metal, Rubber, Etc.	2500
Buzzers—See Bells, Buzzers, Gongs, Sirens & Aural Warning Devices	

C

Cabinets & Accessories, Metal—See Enclosures, Equipment & Panel Mounting	
Cabinets, Plastic—See Enclosures, Non-Metallic	
Cable Assemblies & Harnesses	6000
Cable, Audio	6000
Cable, Battery Booster	6000
Cable, Coaxial	6000
Cable, Dial—See Cords & Cable, Dial Drive	
Cable Fault Locators	2900
Cable, Flame Retardant	6000
Cable, Flat	6000
Cable, Heater	6000
Cable, High Temperature (Over 125Í C)	6000
Cable, High Voltage (1,000 Volts & Over)	6000
Cable, Intercommunication & Sound System—See Cable, Audio	
Cable, Irradiated	6000
Cable, Low-Capacitance	6000
Cable, Microphone	6000
Cable, Multiconductor	6000
Cable, Power	6000
Cable, Retractile—See Cords, Retractile	
Cable Retractors	6000
Cable, Ribbon—See Cable, Flat	
Cable, Rotator Antenna—See Cable, Multiconductor	
Cable, Shielded	6000
Cable, Telephone	6000
Cable, TFE Insulated	6000
Cable, Transmission Line	6000
Cable, Triaxial	6000
Cable, TV (Including Camera)	6000
Cable, Twisted Pair	6000
Cable, Woven Conductor	6000
Cages, Circuit Board—See Racks, Circuit Board	
Calculators, Electrical & Electronic-Also See Computers, Desk Top	2000
Calibrators, Accelerometer	2900
Calibrators, Attenuation	2900
Calibrators, Crystal	2900
Calibrators, Current	2900
Calibrators, Frequency	2900
Calibrators, LVDT	2900
Calibrators, Magnetic Field	2900
Calibrators, Meter—See Testers, Meter	
Calibrators, Oscilloscope	2900
Calibrators, Radar Range	3400
Calibrators, Sound Level	2900
Calibrators, Sweep—See Generators, Sweep	
Calibrators, Synchro	2900
Calibrators, Time-Base	2900
Calibrators, Voltage	2900
Calibrators, VSWR	2900
Calling Sytems—See Intercom Systems	
Calorimeters, Microwave	3400
Cameras, Data Recording	3700
Cameras, Image Converter	3700
Cameras, Infrared	3700
Cameras, Oscilloscope	3700
Cameras, Television	3700
Cameras, Video	1900
Cams	2500
Cans & Flat Packs, Integrated Circuit—See Packages, Integrated Circuit	
Cans, Capacitor, Relay, Semiconductor, Transformer, etc	2500
Capacitance Comparators—See Bridges, Capacitance	
Capacitor Hardware	1500
Capacitor Leakage Indicators—See Testers, Capacitor	
Capacitors, Air Cooled	1500
Capacitors, Chip (For Microcircuits)	1500
Capacitors, Fixed, Air	1500
Capacitors, Fixed, Bathtub	1500
Capacitors, Fixed, Ceramic	1500
Capacitors, Fixed, Ceramic Disc—See Capacitor, Fixed, Ceramic	
Capacitors, Fixed, Decade	1500
Capacitors, Fixed, Electrolytic (All Types)	1500
Capacitors, Fixed, Feedthru	1500
Capacitors, Fixed, Film/Metalized	1500
Capacitors, Fixed for A-C Applications (Including Motor Start)	1500
Capacitors, Fixed, Glass	1500
Capacitors, Fixed, High Capacitance-Low Voltage (50 Volts & Under)	1500
Capacitors, Fixed, High-Temperature (Over 125 C)	1500
Capacitors, Fixed, High Voltage (1,000 Volts or Over)	1500
Capacitors, Fixed, Laboratory Standard	1500
Capacitors, Fixed, Mica	1500
Capacitors, Fixed, Molded Composition	1500
Capacitors, Fixed, Monolithic	1500
Capacitors, Fixed, Mylar, Metallized & Non-Metallized	1500
Capacitors, Fixed, Oil	1500
Capacitors, Fixed, Paper, Metallized & Non-Metal	1500
Capacitors, Fixed, Photoflash	1500
Capacitors, Fixed Plastic	1500
Capacitors, Fixed, Polycarbonate, Metallized & Non-Metallized—See Capacitors, Fixed, Plastic	
Capacitors, Fixed, Polyester, Metallized & Non-Metallized—See Capacitors, Fixed, Mylar, Metallized & Non-Metallized	
Capacitors, Fixed, Polypropylene—See Capacitors, Fixed, Plastic	
Capacitors, Fixed, Polystyrene—See Capacitors, Fixed, Plastic	
Capacitors, Fixed, Polysulfone	1500
Capacitors, Fixed, Porcelain, Enamel	1500
Capacitors, Fixed, Power Factor Correction	1500

Capacitors, Fixed, Pulse-Forming Network 1500
Capacitors, Fixed, Tantalum—See Capacitors, Fixed, Electrolytic (All Types)
Capacitors, Fixed, TFE, & TFE, Metallized 1500
Capacitors, Fixed, TFE, Metallized—Capacitors, Fixed, TFE, & TFE, Metallized
Capacitors, Fixed, Temperature Compensating 1500
Capacitors, Fixed, Vacuum 1500
Capacitors, Overvoltage Protected 1500
Capacitors, Variable, Air 1500
Capacitors, Variable, Ceramic 1500
Capacitors, Variable, Film 1500
Capacitors, Variable, Gas 1500
Capacitors, Variable, Glass 1500
Capacitors, Variable, H-V (Lab Type) Also see Decade Boxes, Capacitance 1500
Capacitors, Variable, High-Temperature (Over 125 C) 1500
Capacitors, Variable, Motor Driven 1500
Capacitors, Variable, Mica 1500
Capacitors, Variable, Neutralizing 1500
Capacitors, Variable, Padder 1500
Capacitors, Variable, Piston—See Capacitors, Variable, Trimmer (All Types)
Capacitors, Variable, Quartz 1500
Capacitors, Variable, TFE 1500
Capacitors, Variable, Temperature Compensating 1500
Capacitors, Variable, Trimmer (All Types) 1500
Capacitors, Variable, Vacuum 1500
Capacitors, Water Cooled 1500
Caps, Connector 2100
Caps, Forms & Tapes, Heat Shrinkable-Also See Tubing, Heat Shrinkable 3100
Caps, Grid & Plate—See Clips & Caps, Grid & Plate
Caps, Lenses, Indicator Light 2450
Caps, Wire-Splicing—See Splicers, Wire
Card Holders, Circuit Board—See Enclosures, Circuit Board, Module, & Relay Mounting
Card Readers—See Punched Card Equipment
Cards, Linear Function (With Discrete Components) 1700
Cards, Linear Function (With IC'S) 1700
Cards, Logic (With Discrete Components) 2000
Cards, Logic (With IC'S) 2000
Carriages, Probe 3450
Carriers—See Holders & Carriers
Carts & Dollies, Instrument & Equipment 1400
Cases, Equipment, Instrument, Meter (Portable)—See Enclosures, Portable, Metallic & Non-Metallic
Cases, Equipment, Instrument, Meter (Stationary)—See Enclosures, Equipment & Panel Mounting
Cases, Shielded—See Enclosures, Shielded
Cases, Transit—See Enclosures, Portable, Metallic & Non-Metallic
Cathode-Ray Readout Tubes—See Tubes, Readout
CATV Systems & Equipment 1900
Cavities, Microwave 3450
Cavities, Power Device 3450
Cells, Electrolytic (Timing)—See Timers, Electrolytic Cell
Cells, Load 5500
Cells, Photoconductive 3700
Cells, Photoemissive 3700
Cells, Photovoltaic 3700
Cells, Solar—See Cells, Photovoltaic
Cements—See Adhesives, (All Types)
Ceramic Resonators 2700
Chambers, Altitude 2550
Chambers, Environmental 2550
Chambers, Explosion 2550
Chambers, Fluid Conditioner 2550
Chambers, Humidity 2550
Chambers, Magnetic Environment 2550
Chambers, Pressure 2550
Chambers, Radiation 2550
Chambers, Shock 2550
Chambers, Space Simulation 2550
Chambers, Temperature 2550
Chambers, Vacuum 2550
Chambers, Vibration 2550
Character Recognition Systems 2000
Chargers, Battery 4000
Chargers, Magnet—See Magnetizers
Chassis, Circuit Board Mounting 1400
Chassis Marking Kits—See Kits, Marking (Dial, Instrument, Equipment, etc.)
Chassis, Metal 1400
Chassis Slides—See Slides, Cabinet, Chassis
Checkers—See Analyzers; Testers
Chemicals, Anti-Static—See Coatings, Anti-Static
Chemicals, Electroplating 1600
Chemicals, Epoxy Stripping 1600
Chemicals, Etching 1600
Chemicals, Fungicidal—See Coatings, Fungicidal
Chemicals, Wire Stripping 1600
Chestsets—See Handsets, Chestsets
Chips, IC—See Circuits, Integrated, Silicon Monolithic, Unpackaged Chips
Chokes, A-F—See Coils, A-F
Chokes, R-F—See Coils, R-F
Chokes, Swinging 1800
Chokes, Waveguide 3450
Choppers - Also see Light Choppers 4050
Chronometers 2900
Circuit Analyzers—See Testers, Signal Tracing
Circuit Board Holders, Jig Type—See Holders, Circuit Board
Circuit Breakers 5100
Circuit Testers—See Testers, Signal Tracing
Circuits, Hybrid, Thick Film 3130
Circuits, Hybrid, Thin-Film 3130
Circuits, Integrated, Monolithic—See IC's (Specific Types)
Circuits, Integrated, Silicon Monolithic, Unpackaged Chips 3130
Circuits, Printed Flexible 1700
Circuits, Printed, Multilayer 1700
Circuits, Printed, Rigid One & Two Sided 1700
Circuits, Printed (With Components)—See Cards, Linear Function (With Discrete Components)
Circuits, Thick Film, Thin Film—See Circuits, Hybrid
Circulators, Ferrite 3450
Citizens Band, Business Band, Marine Band Comm. Systems—See Comm. Systems, Radiotelephone
Clamps & Clips, Cable-Also See Wire & Cable Ties 6000
Clamps & Clips, Component 2100
Clamps & Clips, Ground 1900
Clamps, Rim Clenching 2100
Clamps, Synchro 2100
Clean Room Equipment & Supplies 2550
Cleaners & Solvents 1600
Cleaners, Ultrasonic 4100
Clips, Alligator 2100
Clips & Caps, Grid & Plate 2100
Clips & Holders, Fuse-Also See Panels, Fuse 2100
Clips, Battery 2100
Clips, Board, Harness 2100
Clips, Breadboard 2100
Clips, Fahnestock, Spring Wire 2100
Clips, Logic Test 2900
Clips, Test 2100
Clips, Transistor & Diode—See Retainers, Transistor & Diode
Clocks (All Types) 2000
Clutches, Friction 3500
Clutches, Magnetic 3500
Clutches, Positive 3500
Coatings, Anti-Static 1600
Coatings, Compounds, Lubricants, etc., Heat Conductive 1600
Coatings, Conductive, Electric 1600
Coatings, Corrosion Resistant 1600
Coatings, Electromagnetic Wave-Absorbing 1600
Coatings, Fungicidal 1600
Coatings, High-Temperature, Ceramic, Plasma Spray—See Services, Coating
Coatings, Insulating 1600
Coatings, Moisture Repellant & Waterproofing 1600
Coatings, Protective 1600
Coatings, Radioactive 1600
Coatings, Transducer Forming 5500
Code & Tab Markers—See Wire Markers (All Types)
Coded Discs, Optical—See Encoders, Shaft Angle, Optical
Coders, A-F 1300
Coders, Beacon 3400
Coders, R-F 3400
Coders, Transponder 3400
Coil Assemblies & Forms-Also See Bobbins, Winding, Coil & Transformer 1800
Coil Standards—See Standards, Inductance
Coil-Winding Equipment—See Machines, Coil-Winding
Coils, A-F 1800
Coils, Antenna (Including Loading Type) 1800
Coils, Broadcast 1800
Coils, Chip 1800
Coils, Degaussing 1800
Coils, Field 1800
Coils, Focusing 1800
Coils, Foil-Wound 1800
Coils, High-Q, Low-Frequency 1800
Coils, Hybrid & Repeater 1800
Coils, I-F 1800
Coils, Metallized Glass 1800
Coils, Molded 1800
Coils, Oscillator 1800
Coils, R-F 1800
Coils, Relay 1800
Coils, Saturable Reactor 1800
Coils, Shielded 1800
Coils, Solenoid 1800
Coils, Telephone 1800
Coils, Telephone Pickup (For Recording)—See Pickups, Telephone
Coils, Toroidal 1800
Coils, Transducer 1800
Coils, Transformer 1800
Coils, TV (All Types) 1800
Coils, Variable 1800
Coils, Vidicon Alignment 1800
Cold-Cathode Readout Tubes—See Tubes, Readout
Color Filters, Panel Light Assembly 2450
Combiners, Microwave—See Couplers, Microwave
Comm. Systems, Carrier Current 1900
Comm. Systems, Data 1900
Comm. Systems, Facsimile 1900
Comm. Systems, F-M 1900
Comm. Systems, Frequency Shift 1900
Comm. Systems, Land Mobile Networks 1900
Comm. Systems, Laser 1900
Comm. Systems, Message Switching Centers 1900
Comm. Systems, Microwave 3450
Comm. Systems, Multiplex 1900
Comm. Systems, Radiotelephone 1900
Comm. Systems, Selective Paging 1900
Comm. Systems, Single-Sideband 1900
Comm. Systems, Telemetering 1900
Comm. Systems, Telephone 1900
Comm. Systems, Teletype 1900
Commutators 3500
Comparators, Analog—See Comparators, Voltage
Comparators, Attenuation 3400
Comparators, Capacitance—See Bridges, Capacitance
Comparators, Density—See Densitometers, Electronic
Comparators, Digital 2900
Comparators, Frequency 2900
Comparators, Impedance—See Bridges, Impedance
Comparators, Inductance—See Bridges, Inductance
Comparators, Logic Test 2900
Comparators, Phase 2900
Comparators, Reluctance 2900
Comparators, Resistance—See Bridges, Resistance
Comparators, Voltage 2900
Compounds, Encapsulating, Molding, Potting-Also See Plastic Raw Materials 1600
Compounds, Insulating 1600
Compressors, Data 2000
Computer Logic Circuits—See Cards, Logic; Circuits, Hybrid; Circuits, Integrated; Modules, Logic
Computer Tape Recorders—See Recorders, Computer Data
Computer Type Indicators—See Lights; Dials
Computers, Analog 2000
Computers, Desk Top 2000
Computers, Digital 2000
Computers, Hybrid, Analog-Digital 2000
Computers, Programmable 2000
Computing Equipment, Peripheral—See Converters, Digital To Paper Tape; Printers; Terminals, Data Display
Condensers—See Capacitors
Conditioners, Power Line—See Regulators & Stablizers, Voltage
Conductive Fabrics, Films & Tapes—See Fabrics, Conductive
Conductive Plastic Materials 1600
Conduit, Electrical 6000
Connector Adapters 2100
Connector Blocks, Mother Board 2100
Connector Boxes & Strips, Power Outlet 2100

Connectors & Terminals, Push-On, Quick Disconnect 2100
Connectors, Antenna—See Connectors, R-F, Coaxial & Triaxial
Connectors, Audio 2100
Connectors, Back Panel—See Connectors, Wirewrap (Z-3 Level)
Connectors, Battery 2100
Connectors, Cable 2100
Connectors, Chassis, Rack & Panel 2100
Connectors, Circular, MS/AN 2100
Connectors, Edgeboard—See Connectors, Printed Circuit
Connectors, Filtered 2100
Connectors, Flat Cable (Including Flexible) 2100
Connectors, Heavy Duty, Power 2100
Connectors, Hermetically Sealed, Pressurized & Waterproof 2100
Connectors, High-Voltage (1,000 Volts & Over) 2100
Connectors, Integrated Circuit—See Sockets, Integrated Circuit
Connectors, Miniature, Subminiature & Microminiature 2100
Connectors, Missile (Umbilicals, Interstage, Post Boost) 2100
Connectors, Piggy Back—See Connectors, Wirewrap (Z-3 Level)
Connectors, Plug-In, Program Board 2100
Connectors, Printed Circuit 2100
Connectors, R-F, Coaxial & Triaxial 2100
Connectors, Solderless 2100
Connectors, Stripline 2100
Connectors, Test 2100
Connectors, Thermocouple 2100
Connectors, Wirewrap (Z-3 Level) 2100
Connectors, Wire—See Wire Nuts
Consoles, Cabinet—See Enclosures, Equipment & Panel Mounting
Contact Cleaners—See Cleaners & Solvents-Also See Burnishers, Contact
Contact Strips, Finger 2500
Contactors—See Relays, Power
Contacts, Electrical 2100
Containers, Shielded (All Types) —See Enclosures, Shielded
Containers, Shipping, Metal & Fiberglass—See Enclosures, Shipping, Metallic & Non-Metallic
Containers, Storage 1400
Controllers, Programmable 2200
Control Panels & Systems, Computer—See Boards, Programming
Control Systems, Air Traffic 1900
Controls, Audio System Consoles 2200
Controls, Camera 2200
Controls, Capacitance Operated 2200
Controls, Carbon—See Potentiometers; Rheostats
Controls, Constant Impedance—See Attenuators
Controls, Counting and Sorting 2200
Controls, Density 2200
Controls, Dimension 4100
Controls, Door Opening & Closing (Industrial) 2200
Controls, Environmental Test Equipment 2550
Controls, Fader 1300
Controls, Fluid Conductivity 2200
Controls, Fluid Flow 2200
Controls, Frequency 2200
Controls, Gas 2200
Controls, Hardware, Shafts & Accessories—See Shafts; Dials;etc.
Controls, Humidity 2200
Controls, Ignitron Firing 2200
Controls, Joystick 2200
Controls, Lamp Dimming, Flashing 2200
Controls, Level, Dry Material 2200
Controls, Level, Liquid 2200
Controls, Machine Tool 2200
Controls, Moisture—See Controls, Humidity
Controls, Motor Speed 2200
Controls, Oscillator 2200
Controls, Photoelectric 3700
Controls, Positioning 4100
Controls, Pressure 2200
Controls, Proportional 2200
Controls, Proximity-Also See Controls, Capacitance Operated 2200
Controls, Remote 2200
Controls, Run, Shutdown Command, Start 2200
Controls, SCR 2200
Controls, Sensing, Monitoring-Voltage, Phase, Frequency 2200
Controls, Servo System 4900
Controls, Stepping Motor 2200
Controls, Temperature 5300
Controls, Thyratron Grid 2200
Controls, Timing—See Timers
Controls, Torque-Electronic 2200
Controls, Vibrator 2200
Controls, Voltage Regulating—See Regulators & Stabilizers,Voltage
Controls, Volume & Tone—See Potentiometers; Rheostats
Convection Cooling Packages, Semiconductor—See Transistor, Diode, Thyristor Heat Dissipators
Converters, A-C to D-C (Non-Rotary)—See Power Supplies, A-C to D-C
Converters, Analog To Digital 2000
Converters, Analog To Pulse 2000
Converters, Binary To Decimal 2000
Converters, Card To Tape 2000
Converters, CRT Display 2000
Converters, D-C to D-C, Less Than 30 VDC Output 4000
Converters, D-C to D-C, 30 to 300 VDC Output 4000
Converters, D-C to D-C, 300 to 1,000 VDC Output 4000
Converters, D-C to D-C, Greater Than 1,000 VDC Output 4000
Converters, D-C to Frequency (Power)—See Inverters, D-C to A-C
Converters, D-C to Sine-Cosine 2000
Converters, Digital To Analog 2000
Converters, Digital To Paper Tape 2000
Converters, Digital To Resolver 2000
Converters, Digital To Synchro 2000
Converters, Frequency, Logarithmic 2900
Converters, Frequency Shift Keying 1900
Converters, Frequency, Test 2900
Converters, Frequency to D-C - Also see Power Supplies A-C Input, D-C Output 4000
Converters, Graphic To Digital 2000
Converters, High-Frequency 1900
Converters, Low-Frequency 1900
Converters, Microwave Frequency 3400
Converters, Multiplying, Analog to Digital and Digital to Analog 2000
Converters, Paper Tape To Magnetic Tape 2000
Converters, Paper Tape To Paper Tape 2000
Converters, Phase 2900
Converters, Polar To Rectangular Coordinates 2000
Converters, Power Frequency, Electronic 4050
Converters, Power Frequency, Rotary 4050
Converters, Pressure To D-C, Pressure To Frequency—See Transducers, Pressure
Converters, Pulse To Analog 2000
Converters, Pulse To Digital 2000
Converters, Resolver To Digital 2000
Converters, Rotary—See Motor Electric Generator Sets
Converters, Scan 2000
Converters, Single Sideband Receiver 1900
Converters, Synchro To Digital 2000
Converters, Synchro To Linear D-C 2000
Converters, Synchro To Sine-Cosine 2000
Converters, Tape To Card 2000
Converters, Telemetry 1900
Converters UHF To VHF 1900
Converters, Voltage To Frequency 1900
Coolants, Circuit & Components -Also see Refrigerants, Spray 1600
Cooling Equipment—See Air Conditioners; Blowers & Fans; Heat Exchangers & Systems
Cooling/Heating Modules, Thermoelectric 5300
Cooling Sprays—See Coolants, Circuit & Components; Refrigerants, Spray
Cords & Cable, Dial Drive 2400
Cords & Tapes, Lacing 6000
Cords, Communication, Control, Microphone, etc.—See Cable, Specific Type
Cords, Line & Set, Extension 6000
Cords, Line (Lamp)—See Cable, Multiconductor
Cords, Line, Resistance 6000
Cords, Patch 2100
Cords, Power—See Cable, Power
Cords, Retractile 6000
Cords, Speaker Extension—See Cable, Audio
Cords, Twin Lead—See Cable, Multiconductor
Cores, Ceramic 2500
Cores, Magnetic, Ferrite, EL & E 2500
Cores, Magnetic, Ferrite, Pot/Cup 2500
Cores, Magnetic, Ferrite, Slug 2500
Cores, Magnetic, Ferrite, Toroid 2500
Cores, Magnetic, Ferrite, Yoke Section 2500
Cores, Magnetic, Metal Alloy (Other Than Silicon & Nickel-Iron) 2500
Cores, Magnetic, Nickel-Iron, EL, EE, F & Ring Laminations 2500
Cores, Magnetic, Nickel-Iron, Toroid 2500
Cores, Magnetic, Powdered Iron, Pot/Cup 2500
Cores, Magnetic, Powdered Iron, Slug 2500
Cores, Magnetic, Powdered Iron, Toroid 2500
Cores, Magnetic, Powdered Permalloy, Toroid 2500
Cores, Magnetic, Silicon CI 2500
Cores, Magnetic, Silicon EI, EE & F, Laminations 2500
Cores, Magnetic, Silicon, Toroid 2500
Corners, Waveguide—See Bends & Twists, Microwave
Coulometers—See Timers, Electrolytic Cell
Counters, Bidirectional 2200
Counters, Coil Winding 2200
Counter, Decode 2200
Counters, Directional 2200
Counters, Electro-Magnetic 2200
Counters, Event 2200
Counters, Frequency 2900
Counters, Mechanical 2200
Counters, Particle 2900
Counters, Photoelectric 3700
Counters, Predetermining—See Counters, Preset
Counters, Preset 2200
Counters, Printing 2200
Counters, Proportional—See Counters, Particle
Counters, Pulse 2200
Counters, Reversible—See Counters Bidirectional
Counters, Revolution 2200
Counters, Variable Time Base 2900
Couplers, Acoustic 2000
Couplers, Antenna 1900
Couplers, Directional 3450
Couplers, Microwave 3450
Couplers, Multi-Set—See Couplers, Antenna
Couplers, Power 3450
Couplers, Rotary 3450
Couplings, Quick-Disconnect, Liquid or Gas 2500
Couplings, Shaft, Rigid & Flexible 2400
Covers, Protective (Including Dust) 1400
Crayons, Coatings, Pellets, etc., Temperature Indicating 5300
Crossbars—See Scanners, Crossbar; Switches, Crossbar
Crystal Blanks 2300
Crystals, Frequency Control 2300
Crystals, Piezoelectric 2300
Crystals, Quartz 2300
Crystals, Quartz, for Watches 2300
Crystals, Semiconductor(Ingots & Wafers) 2300
Crystals, Yig 2300
Cups, Encapsulation 2500
Current Sensors-Also See Transducers, Volt, etc. 2200
Current Sources 4000
Cutters, Diagonal—See Cutters, Wire, Hand Operated
Cutters, Wire, Automatic—See Machines, Wire Measuring & Cutting
Cutters, Wire, Hand Operated 5400

D

Dampers, Servo 4900
Dampers, Structural, Chassis, Panel, etc.—See Mounts, Shock & Vibration
Data Acquisition & Reduction Systems 2000
Data Compressors, Digital 2000
Data Display Indicators—See Lights; Dials; Display Devices & Displays; Tubes, Readout
Data Display Systems—See Displays; Terminals, Data Display
Data Loggers 2000
Decade Boxes, Capacitance 2900
Decade Boxes, Delay Line 2900
Decade Boxes, Inductance 2900
Decade Boxes, Resistance 2900
Decade Boxes, Transformer 2900
Decalcomania-Also See Labels, Pressure Sensitive 2400

Decoders, Binary To Decimal—See Converters, Binary To Decimal
Decoders, Digital To Analog—See Converters, Digital To Analog
Decoders, Pulse 1900
Decoders, Readout—See Drivers & Decoders For Readouts
Decoders, Telemetry—See Decoders, Tone
Decoders, Tone 1900
Decoders, Video 1900
Decommutators, Telemetering 1900
Decontaminants—See Cleaners & Solvents
Degaussers—See Demagnetizers; Coils, Degaussing
Degreasing Chemicals—See Cleaners & Solvents
Dehumidifiers (For Equipment) 2600
Dehydrators 4100
Delay Lines, All Types 2350
Delay Lines, Cable 2350
Delay Lines, Distributed, Constant (Fixed) 2350
Delay Lines, Distributed, Constant (Variable) 2350
Delay Lines, Glass & Quartz 2350
Delay Lines, Liquid 2350
Delay Lines, Lumped-Constant (Electrically Variable) 2350
Delay Lines, Lumped-Constant (Fixed) 2350
Delay Lines, Lumped-Constant (Mechanically Variable) 2350
Delay Lines, Magnetostrictive 2350
Delay Lines, Miniature & Subminiature-Also See Specific Types Of Delay Lines 2350
Delay Lines, Solid Blank 2350
Delay Lines, Strip 2350
Delay Lines, Trimmer 2350
Delay Lines, Ultrasonic 2350
Delay Lines, Video—See Delay Lines, Ultrasonic
Delay Lines, Waveguide 2350
Delay Lines, Wire 2350
Delays, Time (Excluding Delay Lines, Time Delay Relays) 2200
Demagnetizers 2900
Demodulators 1900
Demodulators, Magnetic 2200
Densitometers, Electronic 2900
Deposition Equipment, Vacuum & Accessories-Also See Evaporation Equipment, Electron Beam 4100
Desiccators—See Dehumidifiers
Desoldering Tools & Equipment—See Soldering Accessories; Soldering Equip.; Soldering Guns; etc.
Detectors, A-F—See Detectors, Frequency
Detectors, Coaxial 2900
Detectors, Corona—See Testers, Corona
Detectors, Crystal 2300
Detectors, F-M—See Detectors, Frequency
Detectors, Flaw & Defect-Also See Locators, Open-Short 2900
Detectors, Frequency 2900
Detectors, Gas Leak 2900
Detectors, Impedance—See Meters, Impedance
Detectors, Infrared 3700
Detectors, Light Intensity—See Meters, Light, Nonphotographic
Detectors, Magnetic—See Meters, Gauss
Detectors, Microwave 3400
Detectors, Null—See Indicators, Null
Detectors, Phase-Sensitive 2900
Detectors, Photovoltaic —See Cells, Photovoltaic
Detectors, R-F—See Detectors, Frequency
Detectors, Radiation 2900
Detectors, Smoke 2900
Detectors, Standing Wave 2900
Detectors, Ultraviolet 2900
Detectors, Vacuum 4100
Detectors, Vibration—See Transducers, Vibration
Detectors, Video 2900
Detectors, Voltage 2900
Dials, Instrument, Metal, Plastic, etc. 2400
Dials, Telephone-Type 1900
Dials, Turns-Counting 2400
Dielectric Heating Equipment 4100
Dielectrics—See Films; Insulation Materials
Differentials, Mechanical—See Gears & Gear Mechanisms
Digital Tape Recorders—See Recorders, Computer Data
Digitizers, Pencil Follower (Inc. Coordinate & Graphic) 2000
Dimmers, Light—See Controls, Lamp Dimming, Flashing
Diode Arrays (Including Photo) 3700
Diodes, Avalanche 4800
Diodes, Backward 4800
Diodes, Breakdown—See Diodes Avalanche
Diodes, Electroluminescent (Radiating) 4800
Diodes, Frequency Multiplier 4800
Diodes, Germanium 4800
Diodes, Gunn 4800
Diodes, High-Voltage (1,000 Volts & Over) 4800
Diodes, Hot Carrier 4800
Diodes, Impatt 4800
Diodes, Light-Emitting (LED's) 3700
Diodes, Limiting 4800
Diodes, Matched Pairs 4800
Diodes, Matched Quads 4800
Diodes, Microwave Detector 4800
Diodes, Microwave Mixer 4800
Diodes, Noise 4800
Diodes, Photoelectric 3700
Diodes, PIN 4800
Diodes, Schottky 4800
Diodes, Selenium—See Rectifiers, Selenium
Diodes, Silicon 4800
Diodes, Step Recovery 4800
Diodes, Switching 4800
Diodes, Temperature Compensating 4800
Diodes, Trigger—See Diodes, Avalanche
Diodes, Tunnel 4800
Diodes, Varactor 4800
Diodes, Video Detector—See Diodes, Microwave Detector
Diodes, Zener & Stabistors (Forward Reference Diodes) 4800
Diplexers, Antenna 1900
Direction Finders 1900
Disc Packs, Magnetic 2000
Discharge Systems, Energy 4000
Discriminators 1900
Discs, Computer Memory—See Memory Systems, Disc
Discs, Memory, Flexible 2000
Discs, Optical Encoder—See Encoders, Shaft Angle
Displays, Dot Matrix 2450
Displays, Edge-Lit & Back-Lit 2450
Displays, Electroluminescent 2450
Displays, Electromechanical 2450
Displays, Fiberoptcis 2450
Displays, Light-Emitting Diode (LED) 2450
Displays, Lighted Segment 2450
Displays, Liquid Crystal 2450
Displays, Planar Gas Discharge 2450
Displays, Projection Type (CRT; Electromechanical; Film; Light Valve) 2450
Displays, Status 2450
Displays, Tube—See Tubes, Readout
Dissipators, Heat—See Transistors, Diode, Thyristor Heat Dissipators; Heat Sinks, Soldering
Distortion Analyzers, Indicators —See Analyzers, A-F
Dividers, Analog 2000
Dividers, Frequency 2900
Dividers, Magnetic Analog 2200
Dividers, Power (LF, HF, VHF, UHF) 2900
Dividers, Power, Microwave 3450
Dividers, Voltage - Also see Networks, Resistance; Transformers, Voltage Dividing 2900
Doors, Cabinet, Metal—See Cabinets & Accessories, Metal
Doublers, Frequency—See Multipliers, Frequency
Drafting Machines 4100
Drafting Symbols, Dry Transfer, Pressure Sensitive, etc. (Including Lettering) 4100
Drawers, Cash 1400
Drawers, Sliding 1400
Drills & Accessories, Hand & Power 5400
Drivers & Decoders For Readouts 2450
Drivers, Chopper 1100
Drivers, Nut 5400
Drivers, Solenoid 4500
Drivers, Speaker 1300
Drivers, Switch 3450
Drivers, Tube—See Drivers & Decoders for Readouts
Drives & Drive Mechanisms (Dial) 2400
Drums, Computer Memory-Also See Memory Systems, Drum 2000
Dry Transfer Letters & Numbers —See Kits, Marking-Drafting Symbols
Ducts, Wiring 6000
Dummy Loads 4700
Duplexers, Microwave 3400
Duplicators, Magnetic Tape 1300
Duplicators, Paper Tape 2000
Dust Covers—See Covers, Protective
DVM'S—See Meters, Volt, Digital

E

Earphones—See Headphones
Editing Equipment, Tape 1300
Ejectors & Extractors, P-C Boards—See Pullers, Circuit Board
Elastomers, Heat Shrinkable—See Caps, Forms & Tapes, Heat Shrinkable
Electrodes, Electroplating—See Electroplating Equipment & Supplies
Electrodes, High-Voltage 2900
Electronic Switches (Oscilloscope) 2900
Electroplating Equipment & Supplies 4100
Elements, Sensing—See Transducers
Eliminators, Battery-Also See Power Supplies 4000
Encapsulating Materials—See Compounds, Encapsulating, Molding, Potting
Enclosures, Circuit Board, Module & Relay Mounting 1400
Enclosures, Equipment & Panel Mounting 1400
Enclosures, Non-Metallic 1400
Enclosures, Portable, Metallic & Non-Metallic 1400
Enclosures, Shielded 1400
Enclosures, Shipping, Metallic & Non-Metallic 1400
Encoders, Digital—See Encoders, Shaft Angle
Encoders, Displacement, Linear 2000
Encoders, Keyboard 2000
Encoders, Magnetic Strip 2000
Encoders, Shaft Angle, Contacting 2000
Encoders, Shaft Angle, Magnetic 2000
Encoders, Shaft Angle, Optical 2000
Encoders, Shaft Position—See Encoders, Shaft Angle; Resolvers, Synchro
Encoders, Tone 1900
Engineering Reference Books—See Technical Books
Epoxies—See Compounds, Enscapsulating, Molding, Potting; Adhesives
Equalizers, Audio 1300
Equalizers, Delay 1900
Equalizers, Phase 1900
Erasers, Magnetic Tape (Bulk) 1300
Escutcheons 2400
Etchants, Printed Circuit 1600
Evaporation Equipment, Electron Beam 4100
Exciters—See Oscillators
Exciters, Vibration—See Tester, Vibration
Expanders, Data 2000
Expanders, Meter—See Multipliers, Meter
Explosive Gas Indicators—See Detectors, Gas Leak
Extractors, Circuit Board, Tube —See Pullers, Circuit Board
Eyelets 2800

F

Fabrics, Conductive 1600
Facsimile Equipment—See Comm. Systems, Facsimile
Fans—See Blowers & Fans & Accessories
Fasteners, Metal 2800
Fasteners, Non-Metallic 2800
Fault Locators—See Detectors, Flaw & Defect
Feedthrus & Seals, Environmental 2500
Ferrite Material & Parts 2500
Fiber Optic Bundles 3700
Fiber Optic Cables & Components 3700
Films, Capacitor 3100
Films, Masking (Incl. Photographic) 3100
Films, Resistance 4700
Filter Synthesizers 2900
Filters, Active (All Types) 2700
Filters, A-F 2700
Filters, Air—See Air Cleaners & Filters
Filters, Analog—See Filters, Continuously Variable
Filters, Antenna 2700
Filters, Band Elimination 2700
Filters, Band Pass 2700
Filters, Band Reject, Band Stop —See Filters, Band, Elimination
Filters, Ceramic 2700

Filters, Coaxial 2700
Filters, Color, Panel Light 2450
Filters, Comb 2700
Filters, Continuously Variable 2700
Filters, Crystal (Incl. Monolithic Devices) 2300
Filters, Digital 2000
Filters, EMI/RFI 2700
Filters, Equalizer 2700
Filters, Harmonic 2700
Filters, High-Pass 2700
Filters, I-F 2700
Filters, LC 2700
Filters, Line—See Filters, EMI/RFI
Filters, Linear Phase 2700
Filters, Low-Pass 2700
Filters, Mechanical 2700
Filters, Microwave 3450
Filters, Notch—See Filters, Band Elimination
Filters, Optical 2700
Filters, Programmable—See Filters, Variable
Filters, R-F 2700
Filters, Single Sideband 2700
Filters, Synchronous Tracking 2700
Filters, Telemetering 1900
Filters, Tone, Telegraph 2700
Filters, Tunable—See Filters, Continuously Variable
Filters, Tuning Fork 2300
Filters, UHF & VHF 2700
Filters, Variable 2700
Filters, Vestigial Sideband 2700
Filters, Waveguide 3450
Flanges, Waveguide 3450
Flashers 2200
Flashlights & Lanterns 4000
Flat Packages, Integrated Circuit —See Packages, Integrated Circuit
Fluid Flow Indicators—See Meters, Fluid Flow
Flux, Brazing & Soldering Materials 5400
Foil, Capacitor 1500
Foil, Magnetic 2500
Foil, Magnetic Shielding—See Shields, Magnetic
Forks, Tuning—See Tuning Forks
Forms, Coil—See Coil Assemblies & Forms
Forms, Wire 2500
Frames, Cabinet & Rack 1400
Freeze Spray—See Refrigerants, Spray; Coolants, Circuit & Component
Freezer Cabinets—See Refrigerators, Environmental Test
Frequency Analyzers—See Analyzers, Spectrum
Frequency Extenders—See Dividers, Frequency
Frequency Sources—See Oscillators
Function, Modules—See Modules, Logic
Furnaces, Electric 4100
Furnaces, Gas (Production) 4100
Furnaces, Vacuum 4100
Furniture, Electronic Lab.—See Benches, Consoles, Stools, Tables (Lab & Shop)
Fuse Clips—See Clips & Holders, Fuse
Fuses 5100
Fuses, Failure Indicating 5100
Fuses, Thermal 5100
Fuses, Time Delay 5100

G

Gages, Displacement, Linear 5400
Gages, Ionization 2900
Gages, Microwave 2900
Gages, Pressure-Also See Transducers, Pressure 2900
Gages, Strain 5500
Gages, Tension 2900
Gages, Vacuum 2900
Galvanometers—See Meters, Galvanometer
Gaskets—See Seals
Gaskets, Shielding, R-F-Also See Shields, R-F 2500
Gates, Computer Circuit (AND, OR, NOR, ETC.)—See Cards, Logic; IC's, Logic Circuits
Gearheads & Speed Reducers 3500
Gears & Gear Mechanisms (Precision) 2500
Generators, A-M 2900
Generators, A-M/F-M 2900
Generators, Audio 2900
Generators, Bar, Dot & Crosshatch 2900
Generators, Character 2900
Generators, Citizens Band 2900
Generators, Color Bar 2900
Generators, Digital Delay—See Generators Pulse
Generators, Electrical Power 4000
Generators, F-M 2900
Generators, FM/Stereo 2900
Generators, Function 2900
Generators, Gating/Timing 2900
Generators, Hall 5500
Generators, Harmonic 2900
Generators, Infrared—See Lamps, Infrared
Generators, Low-Frequency 2900
Generators, Marker 2900
Generators, Microwave 3400
Generators, Noise, Random (Electrical) 2900
Generators, Phase 2900
Generators, Pulse 2900
Generators, R-F 2900
Generators, Sawtooth, Sine—See Generators, Function
Generators, Sine-Cosine Function (Module) 2000
Generators, Single-Sideband 2900
Generators, Spectrum—See Generators, Sweep
Generators, Square-Wave—See Generators, Function
Generators, Sweep 2900
Generators, Time Code 2000
Generators, Timing, Digital 2000
Generators, Tone 2900
Generators, Tone-Burst 2900
Generators, UHF/VHF 2900
Generators, Ultrasonic 2900
Generators, Word 2000
Geophysical Equip.—See Hydrophones & Accessories; Transducers
Germanium—See Crystals, Semiconductor
Glues—See Adhesives
Governors, Centrifugal 2200
Graphalloy Products 2500
Graphic Recording Instruments —See Recorders
Graphite Parts 2500
Grilles & Accessories, Speaker 1300
Grilles, Metal, Plastic 1400
Grommets 2800
Guides, Circuit Board 1400
Gyros (All Types) 2200

H

Hall Effect Devices—See Generators, Hall; Magnetoresistors, Hall; Multipliers, Hall; Probes, Hall
Handles For Cabinets, Circuit Boards, Racks, etc. 1400
Handsets, Chestsets, Headphones, Headsets, Etc. 1300
Hardware—See Fasteners; Clamps; Terminals; Etc.
Harnesses, Wire—See Cable Assemblies & Harnesses
Headers, Hermetic—See Seals, Hermetic; Services, Hermetic Sealing
Headers, Relay & Transformer 2500
Headers, Transistor & Diode 2500
Headphones 1300
Heads, Audio & Stereo (Recording, Playback & Erase) 1300
Heads, Data (Recording, Playback & Erase) 2000
Heads, Reflective 3700
Heads, Video (Recording, Playback & Erase) 1300
Heat Dissipators—See Transistor, Diode, Thyristor, Heat Dissipators; Heat Sinks, Soldering
Heat Exchangers & Systems 2600
Heat Guns, Production 5400
Heat Shrinkable Elastomers, Plastics—See Caps, Forms & Tapes, Heat Shrinkable; Tubing, Heat Shrinkable
Heat Sinks—See Heat Sinks, Soldering; Transistor, Diode, Thyristor, Heat Dissipators
Heat Sinks, Soldering 5400
Heaters & Accessories, Induction 4100
Heaters & Heating Elements (For Components & Equipment) Also see Ovens 5300
Heaters, Immersion 4100
Hermetic Sealing—See Machines, Hermetic Sealing; Seals, Hermetic; Services, Hermetic Sealing
Hinges—See Fasteners
Holders & Carriers, Chip (Capacitor, IC, LSI) 3130
Holders & Carriers, IC, LSI (Packaged) 3130
Holders, Battery—See Retainers, Battery; Connectors, Battery
Holders, Brush—See Brushes & Brush Assemblies
Holders, Circuit Board (Production Type) 4100
Holders, Crystal 2300
Holders, Fuse—See Clips & Holders, Fuse; Panels, Fuse
Holders, Lamp—See Sockets, Lamp & Lamp Assemblies
Holders, Test Lead 2900
Holders, Tube—See Retainers, Tube
Honeycomb Sheets, Panels, etc. 2500
Horns, Microwave-Also See Antennas, Microwave 3450
Housings, Circuit Module—See Enclosures, Circuit Board, Module & Relay Mounting
Housings, Photomultiplier Tube —See Photomultiplier Tube Housings
Hybrid Voltage Regulators 3130
Hydrophones & Accessories 1300
Hysteresisgraphs 2900

I

Igniters, Arc Lamp—See Power Supplies For Arc Lamp
Image Expanders, Oscilloscope 2900
Impedance Comparators—See Bridges, Impedance
Impedance Converters, Microwave 3400
Incremental Magnetic Recorders —Recorders, Computer Data
Index Assemblies, Switch 5100
Indicator Lights—See Lights, Dial, Panel, etc.
Indicators, Angle—Also See Encoders, Shaft Position 2900
Indicators, Antenna Position 2900
Indicators, Azimuth 2900
Indicators, Capacitor Leakage—See Testers, Capacitor
Indicators, Circuit Condition, On, Off etc. (Electro-Mechanical)-Also see Indicators, Instrument, Flag, Pointer, etc. 2450
Indicators, Computer Type & Data Display—See Lights, Dial, Panel pilot & Accessories, Display Devices; Displays
Indicators, Distortion—See Analyzers, A-F
Indicators, Elapsed-Time 2200
Indicators, Electromechanical—See Indicators, Circuit Condition, On / Off
Indicators, Frequency—See Meters, Frequency
Indicators, Humidity & Moisture (Electronic) 2900
Indicators, Illumination—See Meters, Light (Non Photographic)
Indicators, Instrument, Flag, Pointer, etc. 2450
Indicators, Linear Displacement 2900
Indicators, Liquid Level 2200
Indicators, Magnetic Field 2900
Indicators, Noise-Figure—See Meters, Noise-Figure
Indicators, Null 2900
Indicators, Numeric Readout—See Display Devices & Displays; Tubes, Readout
Indicators, Positioning 2200
Indicators, Power Level—See Monitors, Power
Indicators, Pressure—See Gages, Pressure
Indicators, Proximity 2200
Indicators, R-F—See Meters, Frequency
Indicators, Rotary Shaft Position —See Encoders, Shaft Angle
Indicators, Servo 4900
Indicators, Shorted Turn—See Testers, Coil
Indicators, Sound Level—See Meters, Audio Level
Indicators, Speed 2900
Indicators, Strain (For Use With Strain Gauges) 2900
Indicators, Telemetering—See Analyzers, Telemetric Data
Indicators, Temperature—See Meters, Temperature
Indicators, Temperature (Non-Meter Type) 5300
Indicators, Torque 2900
Indicators, Transducer Output, Analog 2900
Indicators, Transducer Output, Digital 2900
Indicators, Transient Voltage 2900
Indicators, Vacuum—See Gages, Vacuum

Indicators, VSWR—See Meters, Standing Wave Ratio
Inductance Comparators—See Bridges, Inductance
Inductance Standards—See Standards, Inductance
Induction Potentiometers—See Resolvers, Synchro
Inductors—See Coils
Inks For Thick Film Microcircuits 3130
Insertion Loss Measurement Systems 2900
Inserts—See Bushings, etc.
Instrument Parts, Precision—See Bearings; Gears & Gear Mechanisms; Springs; etc.
Insulation Materials 3100
Insulation Parts, Fabricated 3100
Insulators, Antenna 3100
Insulators, Bushing (Metallized) —See Bushings, etc.
Insulators, Clip, Test & Battery 3100
Integrated Circuit Packaging Systems 3130
IC's, Active Filters 3130
IC's, Adders, Full, Half, Modulo-2 Also see IC's, Arithmetric Logic Units 3130
IC's, Amplifiers, Audio 3130
IC's, Amplifiers, Current 3130
IC's, Amplifiers, Instrumentation 3130
IC's, Amplifiers, Logarithmic 3130
IC's, Amplifiers, Operational 3130
IC's, Amplifiers, Operational, Micropower 3130
IC's, Amplifiers, Opto-Electronic 3130
IC's, Amplifiers, R-F 3130
IC's, Amplifiers, Sample-And-Hold—See IC's, Sample And-Hold Circuits
IC's, Amplifiers, Sense Also see IC's, Comparators, Analog 3130
IC's AND, AND-OR-Invert Gates—See IC's Logic Circuits
IC's, Arithmetic Logic Units (ALU) Also see IC's, Adders, Full, Half, Module 3130
IC's, Breadboard Circuits 3130
IC's, Buffers—See IC's, Logic Circuits
IC's, Bus Drivers—See IC's, Data Bus Drivers
IC's, Calculator Kits 3130
IC's, Central Processing Units (CPU) 3130
IC's, Character Generators, Dot-Matrix 3130
IC's, Chroma Amplifiers Demodulators, Signal Processors 3130
IC's, Clock Drivers 3130
IC's, Code Converters—See IC's, Encoders & Decoders
IC's, Communications Circuits 3130
IC's, Comparators, Analog Also see IC's, Amplifiers, Sense 3130
IC's, Comparators, Digital 3130
IC's, Converters, Analog-To-Digital 3130
IC's, Converters, Binary To Binary Code Decimal—See IC's, Encoders & Decoders
IC's, Converters, Digital-To-Analog 3130
IC's, Converters, Voltage-To-Frequency 3130
IC's, Counters and Adapters 3130
IC's, Current Regulators 3130
IC's, Data Bus Drivers 3130
IC's, D-C Amplifiers 3130
IC's, Decoders, Decoder/Drivers (All Types)—See IC's, Encoders & Decoders
IC's, Demultiplexers—See IC's, Multiplexers
IC's, Differential Amplifiers—See IC's, Amplifiers, Operational
IC's, Diode Matrices 3130
IC's, Discriminators, F-M—See IC's, Television, A-M/F-M Sound Circuits
IC's, Display Drivers, 7-Segment, 9-Segment NIXIE, Etc 3130
IC's, Encoders & Decoders 3130
IC's, Exclusive OR Gates—See IC's, Logic Circuits
IC's, Expanders—See IC's, Logic Circuits
IC's, Flip-Flops J-K, R-S, R-S-T, Type D, Pulse Triggered, Etc —See IC's, Logic Circuits
IC's, Four-Quadrant Multipliers —See IC's, Multipliers, Analog
IC's, Frequency Dividers—See IC's, Counters & Adapters
IC's, Frequency-Shift Keyers 3130
IC's, Frequency Synthesizers 3130
IC's, Function Generators 3130
IC's, Gates—See IC's, Logic Circuits
IC's, Hexidecimal Counters—See IC's, Counters & Adapters
IC's, High-Voltage (200 V & Over) 3130
IC's, Intermediate-Frequency Amplifiers—See IC's, Amplifiers, Radio-Frequency
IC's, Inverters—See IC's, Logic Circuits
IC's, Keyboard Encoders—See IC's, Encoders & Decoders
IC's, Lamp Drivers—See IC's, Logic Circuits; IC's, Display Drivers
IC's, Latch—See IC's, Logic Circuits
IC's, Level Shifters, Translators —See IC's, Logic Circuits
IC's, Line Drivers/Receivers & Line Drivers/Transmitters 3130
IC's, Linear Multipliers—See IC's, Multipliers, Analog
IC's, Logic Circuits 3130
IC's, Memories 3130
IC's, Memory & Logic Array, Programmable 3130
IC's, Microprocessors 3130
IC's, Mixers—See IC's, Communications, Circuits
IC's, Modulator/Demodulators, Balanced 3130
IC's, Multiplexers, Analog 3130
IC's, Multiplexers, Digital 3130
IC's, Multipliers, Analog 3130
IC's, Multivibrators 3130
IC's, NAND, NOR & OR/NOR gates—See IC's, Logic Circuits
IC's, Oscillators 3130
IC's, Parity Generator/Checkers 3130
IC's, Phase Lock Loop Circuits 3130
IC's, Power Amplifiers (1 W Minimum) 3130
IC's, Power Gates—See IC's, Logic Circuits
IC's, Pulse Shapers—See IC's, Multivibrators
IC's, Receiver/Transmitter, Asynchronous 3130
IC's, Receivers, A-M, F-M 3130
IC's, Receivers, Teletype 3130
IC's, Relay Drivers—See IC's, Logic Circuits
IC's, Sample-And-Hold Circuits 3130
IC's, Schmitt Triggers—See IC's Logic Circuits
IC's, Shift Registers, Static or Dynamic 3130
IC's, Subtractors—See IC's, Logic Circuits
IC's, Switches, Analog 3130
IC's, Television, A-M/F-M Sound Circuits 3130
IC's, Three-State Logic (TSL) 3130
IC's, Timers 3130
IC's, Transducer, Pressure 3130
IC's, Transistor Arrays 3130
IC's, Translators, ECL to TTL, ECL to MOS, etc. 3130
IC's, Transmitters, Teletype 3130
IC's, Video Amplifiers—See IC's, Amplifiers, Radio-Frequency
IC's, Voltage Regulators 3130
IC's, Waveform Generators—See IC's, Function Generators
IC's, Wideband Amplifiers—See IC's, Amplifiers, Radio Frequency
IC's, Zero-Voltage Switches 3130
Integrators, Electronic 2000
Integrators, Mechanical & Electro-Mechanical 2000
Intensifiers, Image 5700
Intercom Systems - Also see Comm. Systems, Selective Paging 1300
Interferometer Systems 3400
Intervalometers—See Timers
Inverters, A-C to D-C—See Power Supplies, A-C to D-C
Inverters, D-C to A-C—See Power Supplies, A-C Output
Isolators, D-C/D-C Signal 1900
Isolators, Ferrite 3450
Isolators, Line 4050
Isolators, Microwave (All Types) 3450
Isolators, Opto 3700
Isolators, Source—See Isolators, Line

J

Jack Adapters (All Types) 2100
Jack Covers 2100
Jack Panel Assemblies & Accessories—See Panels, Jack
Jacks (All Types) 2100
Jigs And Fixtures, Chassis & Circuit Board 4100
Joint Compounds, Semiconductor—See Coatings, Compounds, Lubricants, Etc., Heat Conductive
Joints, Rotary, Microwave 3450
Jumpers, Bonding 2100
Jumpers, Circuit Board 2100
Jumpers, Wire, Terminated—See Cords, Patch
Junctions, Hybrid, Microwave 3450

K

Keyers, Tone 1900
Keyboards, Alphanumeric & Decimal 2000
Kits, Breadboarding (For Engineers) 1700
Kits, Cable-End Sealing 6000
Kits, Connector 2100
Kits, Marking (Dial, Instrument, Equipment, etc.) 2400
Kits, Potentiometer, Rheostat 4750
Kits, Power Supply 4000
Kits, Printed Circuit 1700
Kits, Programming Board 2100
Kits, Shielding 2500
Kits, Switch Assembling 5100
Kits, Terminal 2100
Kits, Test Equipment 2900
Kits, Training Aid 4100
Knives & Knife Sets 5400
Knobs, All Types 2400
Knobs, Limit Stop 2400
Knobs, Locking, Control Shaft 2400
Knobs, Slip Clutch 2400
Knobs, Torque, Incremental, Ratio Drive 2400

L

Labels, Pressure-Sensitive, Adhesive 2500
Labels, Temperature Indicating 5300
Laboratories, Testing—See Services, Electrical Measurement & Test
Lacing, Cable—See Cords & Tapes, Lacing
Laminates, Metal Clad (Including Copper) 2500
Laminates, Plastic Impregnated (Unclad) 2500
Laminates, Plastic (With Integral Heating Elements) 5300
Laminations, Magnetic Recording Head 2500
Laminations, Transformer & Inductor 2500
Lamp Adapters 2450
Lamp Assembly Color Filters, Lens Mountable 2450
Lamp Drivers 2450
Lamp Holders—See Sockets, Lamp & Lamp Assemblies
Lamps, Arc 2450
Lamps, Dial, Panel, Pilot Incandescent & Accessories 2450
Lamps, Edge Lighting, Panel 2450
Lamps, Electroluminescent—See Panels
Lamps, Exciter, Photographic 2450
Lamps, Flashtube 2450
Lamps, Indicator—See Lamps, Dial, Panel, Pilot, Incandescent, & Accessories
Lamps, Glow—See Lamps, Neon
Lamps, Infrared 2450
Lamps, Magnifying, Inspection 4100
Lamps, Mercury Vapor 2450
Lamps, Miniature & Subminiature 2450
Lamps, Neon 2450
Lamps, Oil Tight 2450
Lamps, Placard—See Lamps, Dial, Panel, Pilot, Incandescent, & Accessories
Lamps, Press-to-Test 2450
Lamps, Projection 2450
Lamps, Solid State-Also see Diodes, Light-Emitting 2450
Lamps, Stroboscopic Source 2450
Lamps, Tungsten Halogen 2450
Lamps, Ultraviolet 2450
Lamps, Xenon 2450
Laser Crystal & Rods 3400
Lasers & Laser Systems 3400
Lasers, Instrumentation 3400
Lead Assemblies & Receptacles, High Voltage-Also See Connectors; Cable Assemblies & Harnesses 2100
Leads, Test & Adaptors 2900
LED's—See Diodes, Light-Emitting (LED's)
Lenses, Filters, Windows, Infrared 3700
Lenses, Optical & Camera 3700
Lenses, R-F 1900
Lenses, Readout & Display 2450
Light Choppers 3700
Light Sources, Photoelectric 3700
Light Sources, Stroboscopic—See Lights, Stroboscopic, Source
Lighting Equipment, Emergency 4000
Limit Stops—See Knobs, Limit Stop

Limit Stops, Mechanical 2500
Limiters, Current 5100
Limiters, Microwave 3450
Limiters, Surge 5100
Line Strechers, Microwave 3450
Liners, Tube Shield—See Shields, Tube
Loads, Electronic, Variable-Also See Dummy Loads 2900
Locators, Open-Short 2900
Locks, Dial & Shaft 2400
Logic Cards (without Components)—See Boards, Plug-In
Logic Circuits—See Cards, Logic; IC's, Logic Circuits; Modules, Logic
Loudspeakers—See Speakers
Louvers, Vents, & Windows (For Equipment)—See Cabinets & Accessories, Metal
Lubricants 1600
Lugs, Terminal—See Terminals, Lug
LVDT's—See Transducers, Displacement

M

Machines & Accessories, Semiconductor Manufacturing 4100
Machines & Tools, Crimping—See Tools, Crimping & Swaging
Machines, Cleaning & Degreasing - Also see Cleaners, Ultrasonic 4100
Machines, Coil-Winding 4100
Machines, Component Handling, Feeding, Insertion & Sorting 4100
Machines, Hermetic Sealing 4100
Machines, Induction Heating (Electronic) 4100
Machines, Lead Cutting & Forming 4100
Machines, Marking & Numbering 4100
Machines, Mask Alignment & Exposure 4100
Machines, Metallizing, Vacuum —See Deposition Equipment, Vacuum & Accessories
Machines, Plastic Molding 4100
Machines, Plating 4100
Machines, Printed Circuit Drilling, Etching & Punching 4100
Machines, Spinner, Photo-Resist 4100
Machines, Terminal Installing 4100
Machines, Transistor Assembling 4100
Machines, Ultrasonic Bonding 4100
Machines, Vibration Fatigue Testing—See Testers, Vibration
Machines, Wafer Alignment—, See Machines, Mask Alignment & Exposure
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Switches, Coaxial Cable 5100
Switches, Coded 5100
Switches, Crossbar 5100
Switches, Data-Sampling 5100
Switches, Decade 5100
Switches, Dip 5100
Switches, Feed-Through Cord 5100
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Terminals, Printed Circuit Board 2100
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Tubes, Cathode-Ray, Projection 5700
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Tubes, Readout (CRT, Cold-Cathode, Vacuum Fluorescent, Incandescent, etc.) 2450
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Wire & Cable Ties 6000
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Wire, Antenna (All Types) 6000
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Wire, Braid (Excluding Shielding) 6000
Wire, Braid (Shielding)—See Braid, Cable
Wire, Ceramic Insulated 6000
Wire, Clad (All Types) 6000
Wire, Enamel Insulated—See Wire, Hookup (All-Types)
Wire, Fiberglass Insulated—See Wire, Glass Insulated
Wire, Flame Retardant 6000
Wire, Flat Strip—See Cable, Flat
Wire, Glass Insulated 6000
Wire, Guy 6000
Wire, Heater—See Cable, Heater
Wire, High-Temperature (Over 125 C) 6000
Wire, High Voltage (1000 Volts & Over) 6000
Wire, Hookup (All Types) 6000
Wire, Irradiated 6000
Wire, Lead-In & Ground 6000
Wire, Litz 6000
Wire, Magnet 6000
Wire Markers (All Types)-Also see Strips Marker & Fanning 6000
Wire, Multiconductor—See Cable, Multiconductor
Wire Nuts 2100
Wire, Plastic Insulated—See Wire Hookup (All Types)
Wire, Plated (All Types) 6000
Wire, Radiation-Resistant 6000
Wire, Resistance 6000
Wire, Resistance Thermometer 6000
Wire, Ribbon 6000
Wire, Semiconductor Lead 6000
Wire, Shielded 6000
Wire Shielding-Also see Braid, Cable 6000
Wire, Strain Gauge 6000
Wire Strippers, Automatic 4100
Wire Strippers, Chemical—See Chemicals, Wire Stripping
Wire Strippers, Hand Operated 5400
Wire Strippers, Thermal 5400
Wire, Test Lead 6000
Wire, TFE Insulated 6000
Wire, Thermocouple 6000
Wire, Transmission—See Cable, Transmission Line
Wire, Twisted Pair—See Cable, Twisted Pair
Wire Twisters, Automatic 4100
Wire Twisters, Hand Operated 5400
Wire Ways 6000
Wiring Panels & Boards, Computer—See Boards, Programming
Work Positioners, Circuit Board & Chassis—See Holders, Circuit Board; Jigs
Wrenches 5400

X

X-Ray Inspection Equipment 4100
X-Y Axis Tables—See Simulators, Motion

Y

Yokes, Deflection, Oscilloscope 1800
Yokes, Deflection, Radar PPI 1800
Yokes, Deflection, Cathode-Ray Tube 1800
Yokes, Deflection, TV Camera 1800

Z

Zone Boxes, Thermocouple—See Thermocouples, Elements & Accessories

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SUB-CLASSIFICATION OF eem PRODUCT SECTIONS

Each of the 43 major **eem** product sections on which the **eem** File System is based may be sub-classified for greater convenience. Depending upon the size of your file and your information requirements, you may find it convenient to sub-classify all or only some of the major categories in your **eem** File System. This breakdown itemizes the optional sub-classifications suggested for each product section.

eem PRODUCT SECTION 1100

AMPLIFIER ASSEMBLIES

- Amplifiers, A-F
- Amplifiers, Charge
- Amplifiers, Compressor
- Amplifiers, Current
- Amplifiers, D-C
- Amplifiers, Decade
- Amplifiers, Deflection
- Amplifiers, Differential
- Amplifiers, Distributed
- Amplifiers, Distribution
- Amplifiers, I-F
- Amplifiers, Instrumentation
- Amplifiers, Facsimile
- Amplifiers, Integrating
- Amplifiers, Isolation
- Amplifiers, Limiting
- Amplifiers, Line
- Amplifiers, Logarithmic
- Amplifiers, Magnetic
- Amplifiers, Mixing
- Amplifiers, Multichannel
- Amplifiers, Narrow-Band
- Amplifiers, Operational
- Amplifiers, Peak-Limiting
- Amplifiers, Power
- Amplifiers, Pulse
- Amplifiers, Pulse-Limiting
- Amplifiers, R-F
- Amplifiers, Sample & Hold
- Amplifiers, Sweep
- Amplifiers, Thyratron
- Amplifiers, Tunnel Diode
- Amplifiers, Ultrasonic
- Amplifiers, Video
- Amplifiers, Voltage Reference
- Amplifiers, Wideband
- Drivers, Chopper

eem PRODUCT SECTION 1300

AUDIO EQUIPMENT & ACCESSORIES

- Amplifiers, Equalization
- Attenuators, Audio
- Audible Signal Devices, Electronic
- Baffles, Speaker
- Coders, A-F
- Controls, Fader
- Drivers, Speaker
- Duplicators, Magnetic Tape
- Editing Equipment, Tape
- Equalizers, Audio
- Erasers, Magnetic Tape (Bulk)
- Grilles & Accessories, Speaker
- Handsets, Chestsets, Headphones, Headsets, Etc.
- Headphones
- Heads, Audio & Stereo (Recording, Playback & Erase)
- Heads, Video (Recording, Playback & Erase)
- Hydrophones & Accessories
- Intercom Systems - Also see Comm. Systems, Selective Paging
- Microphone Accessories (Including Stands, Holders, Booms)
- Microphones, Carbon
- Microphones, Cardioid
- Microphones, Ceramic
- Microphones, Condenser
- Microphones, Crystal
- Microphones, Dynamic
- Microphones, Lavalier
- Microphones, Magnetic
- Microphones, Omnidirectional
- Microphones, Velocity
- Microphones, Wireless
- Mixers, Audio
- Monitors, Power, A-F
- Mounts, Tape Head
- Networks, Crossover, Attenuator (Audio)
- Phonographs, Parts & Accessories
- Pickups, Telephone (For Recording)
- Public Address Systems
- Recorders, Film Strip, Magnetic
- Recorders, Sound Level
- Records, Frequency Test
- Speaker Systems
- Speakers, Explosion & Flame Proof
- Speakers, Horn
- Speakers, Intercom
- Speakers, Midrange
- Speakers, Musical Instrument
- Speakers, Pillow
- Speakers, Public Address
- Speakers, Replacement (Including Aircraft, Automotive & TV)
- Speakers, Submergence-Proof
- Speakers, Tweeter
- Speakers, Weatherproof
- Speakers, Woofer
- Splicing Equipment, Magnetic Tape
- Tape Recording Accessories
- Tapes, Recording, Magnetic (All Types)
- Tuners, A-M/ F-M

eem PRODUCT SECTION 1400

ENCLOSURES/ PACKAGING SYSTEMS

- Benches, Consoles, Stools, Tables (Lab & Shop)-Also See Cabinets & Accessories, Metal
- Bins, Part Storage
- Boxes, Junction, Outlets & Wall Plates
- Bumpers
- Carts & Dollies, Instrument & Equipment
- Chassis, Circuit Board Mounting
- Chassis, Metal
- Containers, Storage
- Covers, Protective (Including Dust)
- Drawers, Cash
- Drawers, Sliding
- Enclosures, Circuit Board, Module & Relay Mounting
- Enclosures, Equipment & Panel Mounting
- Enclosures, Non-Metallic
- Enclosures, Portable, Metallic & Non-Metallic
- Enclosures, Shielded
- Enclosures, Shipping, Metallic & Non-Metallic
- Frames, Cabinet & Rack
- Grilles, Metal, Plastic
- Guides, Circuit Board
- Handles For Cabinets, Circuit Boards, Racks, etc.
- Mounts, Shock & Vibration
- Plug Buttons
- Slides, Cabinet & Chassis
- Stands, Instruments

eem PRODUCT SECTION 1500

CAPACITORS (ALL TYPES)

- Capacitor Hardware
- Capacitors, Air Cooled
- Capacitors, Chip (For Microcircuits)
- Capacitors, Fixed, Air
- Capacitors, Fixed, Bathtub
- Capacitors, Fixed, Ceramic
- Capacitors, Fixed, Decade
- Capacitors, Fixed, Electrolytic (All Types)
- Capacitors, Fixed, Feedthru
- Capacitors, Fixed, Film/ Metalized
- Capacitors, Fixed for A-C Applications (Including Motor Start)
- Capacitors, Fixed, Glass
- Capacitors, Fixed, High Capacitance-Low Voltage (50 Volts & Under)
- Capacitors, Fixed, High-Temperature (Over 125 C)
- Capacitors, Fixed, High Voltage (1,000 Volts or Over)
- Capacitors, Fixed, Laboratory Standard
- Capacitors, Fixed, Mica
- Capacitors, Fixed, Molded Composition
- Capacitors, Fixed, Monolithic
- Capacitors, Fixed, Mylar, Metallized & Non-Metallized
- Capacitors, Fixed, Oil
- Capacitors, Fixed, Paper, Metallized & Non-Metal
- Capacitors, Fixed, Photoflash
- Capacitors, Fixed Plastic
- Capacitors, Fixed, Polysulfone
- Capacitors, Fixed, Porcelain, Enamel
- Capacitors, Fixed, Power Factor Correction
- Capacitors, Fixed, Pulse-Forming Network
- Capacitors, Fixed, TFE, & TFE, Metallized
- Capacitors, Fixed, Temperature Compensating
- Capacitors, Fixed, Vacuum
- Capacitors, Overvoltage Protected
- Capacitors, Variable, Air
- Capacitors, Variable, Ceramic
- Capacitors, Variable, Film
- Capacitors, Variable, Gas
- Capacitors, Variable, Glass

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SUB-CLASSIFICATION OF eem PRODUCT SECTIONS

Capacitors, Variable, H-V (Lab Type) Also see Decade Boxes, Capacitance
Capacitors, Variable, High-Temperature (Over 125 C)
Capacitors, Variable, Motor Driven
Capacitors, Variable, Mica
Capacitors, Variable, Neutralizing
Capacitors, Variable, Padder
Capacitors, Variable, Quartz
Capacitors, Variable, TFE
Capacitors, Variable, Temperature Compensating
Capacitors, Variable, Trimmer (All Types)
Capacitors, Variable, Vacuum
Capacitors, Water Cooled
Foil, Capacitor

eem PRODUCT SECTION 1600

CHEMICALS/ CLEANERS/ COATINGS/ MATERIALS

Abrasive Belts, Compounds, Cords, Powders, etc.
Adhesives, Conducting
Adhesives, General Purpose
Adhesives, Insulating
Adhesives, Liquid Spray
Adhesives, Optical
Alloys, Metal - Ceramic
Bi-Metals, Thermostatic
Chemicals, Electroplating
Chemicals, Epoxy Stripping
Chemicals, Etching
Chemicals, Wire Stripping
Cleaners & Solvents
Coatings, Anti-Static
Coatings, Compounds, Lubricants, etc., Heat Conductive
Coatings, Conductive, Electric
Coatings, Corrosion Resistant
Coatings, Electromagnetic Wave-Absorbing
Coatings, Fungicidal
Coatings, Insulating
Coatings, Moisture Repellant & Waterproofing
Coatings, Protective
Coatings, Radioactive
Compounds, Encapsulating, Molding, Potting-Also See Plastic Raw Materials
Compounds, Insulating
Conductive Plastic Materials
Coolants, Circuit & Components-Also see Refrigerants, Spray
Etchants, Printed Circuit
Fabrics, Conductive
Lubricants
Materials, Graphite
Materials, Self-Lubricating
Metal Compounds, Foils, Powders, Sheet, Stock
Metal Oxides
Metals, Clad
Metals, High Purity
Metals, Precious
Metals, Rare
Metals, Refractory
Paints, Metallic
Paints, Reflective
Paints, Resistive-Also see Inks for Thick-Film Microcircuits
Plastic Raw Materials, Liquids, Pellets, Powders, Resins
Quartz, Fused
Refrigerants, Spray
Rubber, Conductive
Rubber, Silicone
Silica, Fused
Sound Absorbing Materials

eem PRODUCT SECTION 1700

CIRCUIT BOARDS & ASSEMBLIES/ BREADBOARDING KITS

Breadboard Assemblies
Cards, Linear Function (With Discrete Components)
Cards, Linear Function (With IC'S)
Circuits, Printed Flexible
Circuits, Printed, Multilayer
Circuits, Printed, Rigid One & Two Sided
Kits, Breadboarding (For Engineers)
Kits, Printed Circuit
Networks, Hybrid
Networks, Ladder
Networks, LC
Networks, Phase
Networks, Pulse Forming
Networks, RC
Screens, Printed Circuit

eem PRODUCT SECTION 1800

COILS & CHOKES/ ASSEMBLIES/ FORMS

Chokes, Swinging
Coil Assemblies & Forms-Also See Bobbins, Winding, Coil & Transformer
Coils, A-F
Coils, Antenna (Including Loading Type)
Coils, Broadcast
Coils, Chip
Coils, Degaussing
Coils, Field
Coils, Focusing
Coils, Foil-Wound
Coils, High-Q, Low-Frequency
Coils, Hybrid & Repeater
Coils, I-F
Coils, Metallized Glass
Coils, Molded
Coils, Oscillator
Coils, R-F
Coils, Relay
Coils, Saturable Reactor
Coils, Shielded
Coils, Solenoid
Coils, Telephone
Coils, Toroidal
Coils, Transducer
Coils, Transformer
Coils, TV (All Types)
Coils, Variable
Coils, Vidicon Alignment
Reactors, Saturable
Yokes, Deflection, Oscilloscope
Yokes, Deflection, Radar PPI
Yokes, Deflection, Cathode-Ray Tube
Yokes, Deflection, TV Camera

eem PRODUCT SECTION 1900

COMMUNICATIONS/ TELEMETERING EQUIPMENT

Amplifiers, Antenna
Amplifiers, Keying
Amplifiers, Single-Sideband
Amplifiers, Telemetering
Analyzers, Telemetric Data
Antenna Rotators
Antenna Switching Matrices
Antenna Towers & Supports
Antennas, Airborne
Antennas, Direction Finding
Antennas, Ground Plane
Antennas, Helical
Antennas, Log-Periodic
Antennas, Loop
Antennas, Microwave
Antennas, Phased Array
Antennas, Rhombic
Antennas, Spiral
Antennas, Telemetry, Tracking
Antennas, Telescopic
Antennas, Whip & Accessories (Including Marine & Mobile Types)
Attenuators, I-F
Attenuators, R-F
Cameras, Video
CATV Systems & Equipment
Clamps & Clips, Ground
Comm. Systems, Carrier Current
Comm. Systems, Data
Comm. Systems, Facsimile
Comm. Systems, F-M
Comm. Systems, Frequency Shift
Comm. Systems, Land Mobile Networks
Comm. Systems, Laser
Comm. Systems, Message Switching Centers
Comm. Systems, Multiplex
Comm. Systems, Radiotelephone
Comm. Systems, Selective Paging
Comm. Systems, Single-Sideband
Comm. Systems, Telemetering
Comm. Systems, Telephone
Comm. Systems, Teletype
Control Systems, Air Traffic
Converters, Frequency Shift Keying
Converters, High-Frequency
Converters, Low-Frequency
Converters, Single Sideband Receiver
Converters, Telemetry
Converters UHF To VHF
Converters, Voltage To Frequency
Couplers, Antenna
Decoders, Pulse
Decoders, Tone
Decoders, Video
Decommutators, Telemetering
Demodulators
Dials, Telephone-Type
Diplexers, Antenna
Direction Finders
Discriminators
Encoders, Tone
Equalizers, Delay
Equalizers, Phase
Filters, Telemetering
Isolators, D-C/ D-C Signal
Keyers, Tone
Lenses, R-F
Modulators, A-M
Modulators, F-M
Modulators, Phase
Modulators, R-F
Modulators, Telemetering
Monitors, Pulse Code Modulation
Monitors, Video
Mounts, Antenna
Multiplexers, Transmission
Multiplexers, Video
Multipliers, Crystal
Multipliers, Diode
Networks, Directional Antenna Phasing
Networks, Matching
Oscillators, Telemetry
Preselectors
Receivers, Beacon
Receivers, Communication
Receivers, Frequency Shift
Receivers, Loran & Omega
Receivers, Monitoring, Communications
Receivers, Multiplex
Receivers, Navigation
Receivers, Phase Lock
Receivers, Single-Sideband
Receivers, Time Code
Receivers, Tone
Receivers, VLF
Scanners, Crossbar
Scanners, Flying Spot
Scramblers, Speech
Strips, Ground
Teleprinters
Teletypewriters & Equipment
Television Systems & Equipment Closed-Circuit
Terminations, VHF, Video, Pulse
Transceivers
Transmitters, Beacon
Transmitters, Fixed Frequency
Transmitters, Fixed Station Comm.
Transmitters, Multiplex
Transmitters, Pulse Code Modulation
Transmitters, Pulse Phase Modulation
Transmitters, Pulse Time Modulation
Transmitters, Single-Sideband
Transmitters, Telemetry
Transmitters, Tropospheric Scatter
Transmitters, Tone
Transmitters, UHF/ VHF
Transmitters, ULF/ VLF
Transponders
Underwater Communication, Detection, Navigation, etc. Equipment

eem PRODUCT SECTION 2000

COMPUTING, DATA HANDLING EQUIPMENT & ACCESSORIES

Attenuators, Logarithmic
Attenuators, Programmable
Calculators, Electrical & Electronic-Also See Computers, Desk Top
Cards, Logic (With Discrete Components)
Cards, Logic (With IC'S)
Character Recognition Systems
Clocks (All Types)
Compressors, Data
Computers, Analog
Computers, Desk Top
Computers, Digital
Computers, Hybrid, Analog-Digital
Computers, Programmable
Converters, Analog To Digital
Converters, Analog To Pulse
Converters, Binary To Decimal
Converters, Card To Tape
Converters, CRT Display
Converters, D-C to Sine-Cosine
Converters, Digital To Analog
Converters, Digital To Paper Tape
Converters, Digital To Resolver
Converters, Digital To Synchro
Converters, Graphic To Digital
Converters, Multiplying, Analog to Digital and Digital to Analog
Converters, Paper Tape To Magnetic Tape
Converters, Paper Tape To Paper Tape
Converters, Polar To Rectangular Coordinates
Converters, Pulse To Analog
Converters, Pulse To Digital
Converters, Resolver To Digital
Converters, Scan
Converters, Synchro To Digital
Converters, Synchro To Linear D-C
Converters, Synchro To Sine-Cosine
Converters, Tape To Card
Couplers, Acoustic
Data Acquisition & Reduction Systems
Data Compressors, Digital
Data Loggers
Digitizers, Pencil Follower (Inc. Coordinate & Graphic)
Disc Packs, Magnetic
Discs, Memory, Flexible
Dividers, Analog
Drums, Computer Memory-Also See Memory Systems, Drum
Duplicators, Paper Tape
Encoders, Displacement, Linear
Encoders, Keyboard
Encoders, Magnetic Strip
Encoders, Shaft Angle, Contacting
Encoders, Shaft Angle, Magnetic
Encoders, Shaft Angle, Optical
Expanders, Data
Filters, Digital
Generators, Sine-Cosine Function (Module)
Generators, Time Code
Generators, Timing, Digital
Generators, Word
Heads, Data (Recording, Playback & Erase)
Integrators, Electronic
Integrators, Mechanical & Electro-Mechanical
Keyboards, Alphanumeric & Decimal
Matrices, Computer-Also See Boards, Programming
Memories, Buffer
Memory Systems, Core
Memory Systems, Delay Line
Memory Systems, Disc
Memory Systems, Drum
Memory Systems, Tape
Memory Systems, Thin-Film, Planar
Memory Systems, Thin-Film, Plated Wire
Memory Systems, Semiconductor
Microcomputers
Modulator/ Demodulators, Data
Modules, Amplifier
Modules, Analog Multiplier
Modules, Analog-to-Digital Conversion
Modules, Control & Switching
Modules, Decoding
Modules, Digital-to-Analog Conversion
Modules, Encoding
Modules, Filter
Modules, Logic (Encapsulated)-Also See Cards; Circuits; Networks
Modules, Oscillator
Modules, RMS-to-DC Conversion
Multiplexers, Analog
Multiplexers, Digital
Multiplexers, Radio
Multipliers, Analog
Paper Tape Preparation Systems
Perforators, Paper Tape (Electrically Powered)
Perforators, Paper Tape (Manually Operated)
Peripheral Interface Elements
Plates, Core Loading (Memory)
Printers, Digital
Programmers, IC Memory & Logic Array
Programmers, Punched Card
Programmers, Tape
Programs, Computer
Punched Card Equipment
Readers, Badge
Readers, Character
Readers, Microfiche
Readers, Punched Tape
Recorders, Computer Data
Recorders, Magnetic Tape (Reel & Cartridge)
Recorders, Video (including Tape & Disc)
Scalers, Binary, Decade
Scramblers, Data
Shift Registers
Tape Search Equipment
Tape Winders
Terminal Equipment, Digital
Terminals, Data Display (including Alphanumeric & Graphic)
Translators, Data
Transmission Systems, Data
Transports, card
Transports, Tape (all kinds)

Typewriters, Input-Output (All Types)
Verification Systems, Tape

eem PRODUCT SECTION 2100

CONNECTORS, TERMINALS, SOCKETS, ETC.

Adapters, FM
Backpanel Interconnect Systems
Bars, Shorting
Blocks & Strips, Tie Point
Boards, Monitor, Graphic
Boards, Plug-In
Boards, Programming
Caps, Connector
Clamps & Clips, Component
Clamps, Rim Clenching
Clamps, Synchro
Clips, Alligator
Clips & Caps, Grid & Plate
Clips & Holders, Fuse-Also See Panels, Fuse
Clips, Battery
Clips, Board, Harness
Clips, Breadboard
Clips, Fahnestock, Spring Wire
Clips, Test
Connector Adapters
Connector Blocks, Mother Board
Connector Boxes & Strips, Power Outlet
Connectors & Terminals, Push-On, Quick Disconnect
Connectors, Audio
Connectors, Battery
Connectors, Cable
Connectors, Chassis, Rack & Panel
Connectors, Circular, MS/ AN
Connectors, Filtered
Connectors, Flat Cable (Including Flexible)
Connectors, Heavy Duty, Power
Connectors, Hermetically Sealed, Pressurized & Waterproof
Connectors, High-Voltage (1,000 Volts & Over)
Connectors, Miniature, Subminiature & Microminiature
Connectors, Missile (Umbilicals, Interstage, Post Boost)
Connectors, Plug-In, Program Board
Connectors, Printed Circuit
Connectors, R-F, Coaxial & Triaxial
Connectors, Solderless
Connectors, Stripline
Connectors, Test
Connectors, Thermocouple
Connectors, Wirewrap (Z-3 Level)
Contacts, Electrical
Cords, Patch
Jack Adapters (All Types)
Jack Covers
Jacks (All Types)
Jumpers, Bonding
Jumpers, Circuit Board
Kits, Connector
Kits, Programming Board
Kits, Terminal
Lead Assemblies & Receptacles, High Voltage-Also See Connectors; Cable Assemblies & Harnesses
Panels, Edge-lit
Panels, Electroluminescent
Panels, Jack
Panels, Power Bus For IC's
Pins, Electrically Conductive
Plug & Jack Sets
Plug Adapters
Plug Caps & Shells
Plugs, Electrical (All Types)
Plugs, Fused
Posts, Binding
Retainers, Battery
Retainers, Transistor & Diode
Rods, Ground
Socket Adapters
Sockets, Capacitor
Sockets, Crystal
Sockets, Diode
Sockets, DIP and DIL
Sockets, Integrated Circuit
Sockets, Relay
Sockets, SCR
Sockets, Test
Sockets, Transistor
Sockets, Tube, Vibrator
Splices, Wire (Including, Butt & Cap Types)
Terminal Blocks (Including Barrier Types)
Terminal Boards
Terminal Strips (Including Barrier Types)
Terminals, Feedthru
Terminals, Ferrule, Cable-End
Terminals, Lug (All Types)
Terminals, Miniature & Subminiature
Terminals, Printed Circuit Board
Terminals, Solderless
Terminals, Standoff
Terminals, Threaded
Terminals, Turret
Terminals, Wirewrap
Terminations, Antenna-Also See Dummy Loads
Wire Nuts

eem PRODUCT SECTION 2200

CONTROL SYSTEMS & COMPONENTS

Alarms & Alarm Systems
Annunciators
Bells, Buzzers, Gongs, Sirens & Aural Warning Devices
Controllers, Programmable
Controls, Audio System Consoles
Controls, Camera
Controls, Capacitance Operated
Controls, Counting and Sorting
Controls, Density
Controls, Door Opening & Closing (Industrial)
Controls, Fluid Conductivity
Controls, Fluid Flow
Controls, Frequency
Controls, Gas
Controls, Humidity
Controls, Ignitron Firing
Controls, Joystick
Controls, Lamp Dimming, Flashing
Controls, Level, Dry Material
Controls, Level, Liquid
Controls, Machine Tool
Controls, Motor Speed
Controls, Oscillator
Controls, Pressure
Controls, Proportional
Controls, Proximity-Also See Controls, Capacitance Operated
Controls, Remote
Controls, Run, Shutdown Command, Start
Controls, SCR
Controls, Sensing, Monitoring-Voltage, Phase, Frequency
Controls, Stepping Motor
Controls, Thyratron Grid
Controls, Torque-Electronic
Controls, Vibrator
Counters, Bidirectional
Counters, Coil Winding
Counter, Decode
Counters, Directional
Counters, Electro-Magnetic
Counters, Event
Counters, Mechanical
Counters, Preset
Counters, Printing
Counters, Pulse
Counters, Revolution
Current Sensors-Also See Transducers, Volt, etc.
Delays, Time (Excluding Delay Lines, Time Delay Relays)
Demodulators, Magnetic
Dividers, Magnetic Analog
Flashers
Governors, Centrifugal
Gyros (All Types)
Indicators, Elapsed-Time
Indicators, Liquid Level
Indicators, Positioning
Indicators, Proximity
Modulators, Magnetic
Monitors, Current
Multipliers, Magnetic Analog
Process Control Systems
Programmers, Cam & Drum
Timers, Counting
Timers, Cycle & Reset
Timers, Delay - Also See Delays, Time
Timers, Electrolytic Cell
Timers, Interval
Timers, Programmed
Timers, Sequence
Timers, Solid State
Totalizers, Digital

eem PRODUCT SECTION 2300

CRYSTALS/ OSCILLATORS/ CRYSTAL FILTERS

Crystal Blanks
Crystals, Frequency Control
Crystals, Piezoelectric
Crystals, Quartz
Crystals, Quartz, for Watches
Crystals, Semiconductor(Ingots & Wafers)
Crystals, Yig
Detectors, Crystal
Filters, Crystal (Incl. Monolithic Devices)
Filters, Tuning Fork
Holders, Crystal
Mounts, Crystal
Oscillators, Audio (Module)
Oscillators, Beat Frequency (BFO)
Oscillators, Bias
Oscillators, Cavity
Oscillators, Crystal Controlled (Module)
Oscillators, LC
Oscillators, Low-Frequency (Module)
Oscillators, Power (Module)
Oscillators, Pulse (Module)
Oscillators, RC (Module)
Oscillators, Reed
Oscillators, R-F (Module)
Oscillators, Sinusoidal (Module)
Oscillators, Square-Wave (Module)
Oscillators, Temperature Compensated
Oscillators, Tuning-Fork Controlled
Oscillators, UHF/ VHF (Module)
Oscillators, Ultrasonic (Module)
Oscillators, Voltage Controlled (Module)
Ovens, Crystal & Component
Tuning Forks

eem PRODUCT SECTION 2350

DELAY LINES

Amplifiers, Delay Line
Delay Lines, All Types
Delay Lines, Cable
Delay Lines, Distributed, Constant (Fixed)
Delay Lines, Distributed, Constant (Variable)
Delay Lines, Glass & Quartz
Delay Lines, Liquid
Delay Lines, Lumped-Constant (Electrically Variable)
Delay Lines, Lumped-Constant (Fixed)
Delay Lines, Lumped-Constant (Mechanically Variable)
Delay Lines, Magnetostrictive
Delay Lines, Miniature & Subminiature-Also See Specific Types Of Delay Lines
Delay Lines, Solid Blank
Delay Lines, Strip
Delay Lines, Trimmer
Delay Lines, Ultrasonic
Delay Lines, Waveguide
Delay Lines, Wire
Standards, Delay Line
Synthesizers, Delay Line

eem PRODUCT SECTION 2400

PANEL COMPONENTS (EXCLUDING LIGHTING & DISPLAYS)

Bezels, Shielded & Unshielded
Cords & Cable, Dial Drive
Couplings, Shaft, Rigid & Flexible
Decalcomania-Also See Labels, Pressure Sensitive
Dials, Instrument, Metal, Plastic, etc.
Dials, Turns-Counting
Drives & Drive Mechanisms (Dial)
Escutcheons
Kits, Marking (Dial, Instrument, Equipment, etc.)
Knobs, All Types
Knobs, Limit Stop
Knobs, Locking, Control Shaft
Knobs, Slip Clutch
Knobs, Torque, Incremental, Ratio Drive
Locks, Dial & Shaft
Pointers, Dial
Scales, Dial

eem PRODUCT SECTION 2450

DISPLAYS & READOUTS (INCLUDING LAMPS & LIGHTS)

Boards, Display, Graphic
Caps, Lenses, Indicator Light
Color Filters, Panel Light Assembly
Displays, Dot Matrix
Displays, Edge-Lit & Back-Lit
Displays, Electroluminescent
Displays, Electromechanical
Displays, Fiberoptcis
Displays, Light-Emitting Diode (LED)
Displays, Lighted Segment
Displays, Liquid Crystal
Displays, Planar Gas Discharge
Displays, Projection Type (CRT; Electromechanical; Film; Light Valve)
Displays, Status
Drivers & Decoders For Readouts
Filters, Color, Panel Light
Indicators, Circuit Condition, On, Off etc. (Electro-Mechanical)-Also see Indicators, Instrument, Flag, Pointer, etc.
Indicators, Instrument, Flag, Pointer, etc.
Lamp Adapters
Lamp Assembly Color Filters, Lens Mountable
Lamp Drivers
Lamps, Arc
Lamps, Dial, Panel, Pilot Incandescent & Accessories
Lamps, Edge Lighting, Panel
Lamps, Exciter, Photographic
Lamps, Flashtube
Lamps, Infrared
Lamps, Mercury Vapor
Lamps, Miniature & Subminiature
Lamps, Neon
Lamps, Oil Tight
Lamps, Press-to-Test ,
Lamps, Projection
Lamps, Solid State-Also see Diodes, Light-Emitting
Lamps, Stroboscopic Source
Lamps, Tungsten Halogen
Lamps, Ultraviolet
Lamps, Xenon
Lenses, Readout & Display
Sockets, Lamp & Lamp Assemblies
Tubes, Readout (CRT, Cold-Cathode, Vacuum Fluorescent, Incandescent, etc.)

eem PRODUCT SECTION 2500

MECHANICAL COMPONENTS (BEARINGS, CORES, MAGNETS, ETC.)

Bearings
Bobbins, Winding, Coil & Transformer-Also See Coil Assemblies & Forms
Bushings, Glass, Plastic, Metal, Rubber, Etc.
Cams
Cans, Capacitor, Relay, Semiconductor, Transformer, etc
Contact Strips, Finger
Cores, Ceramic
Cores, Magnetic, Ferrite, EL & E
Cores, Magnetic, Ferrite, Pot/ Cup
Cores, Magnetic, Ferrite, Slug
Cores, Magnetic, Ferrite, Toroid
Cores, Magnetic, Ferrite, Yoke Section
Cores, Magnetic, Metal Alloy (Other Than Silicon & Nickel-Iron)
Cores, Magnetic, Nickel-Iron, EL, EE, F & Ring Laminations
Cores, Magnetic, Nickel-Iron, Toroid
Cores, Magnetic, Powdered Iron, Pot/ Cup
Cores, Magnetic, Powdered Iron, Slug
Cores, Magnetic, Powdered Iron, Toroid
Cores, Magnetic, Powdered Permalloy, Toroid
Cores, Magnetic, Silicon C
Cores, Magnetic, Silicon EI, EE & F, Laminations
Cores, Magnetic, Silicon, Toroid
Couplings, Quick-Disconnect, Liquid or Gas
Cups, Encapsulation
Feedthrus & Seals, Environmental
Ferrite Material & Parts
Foil, Magnetic
Forms, Wire
Gaskets, Shielding, R-F-Also See Shields, R-F
Gears & Gear Mechanisms (Precision)
Graphalloy Products
Graphite Parts
Headers, Relay & Transformer
Headers, Transistor & Diode
Honeycomb Sheets, Panels, etc.
Kits, Shielding
Labels, Pressure-Sensitive, Adhesive
Laminates, Metal Clad (Including Copper)
Laminates, Plastic Impregnated (Unclad)
Laminations, Magnetic Recording Head

SUB-CLASSIFICATION OF eem PRODUCT SECTIONS

- Laminations, Transformer & Inductor
- Limit Stops, Mechanical
- Magnets (Lab. Type)
- Magnets, Permanent
- Magnets, Superconducting
- Nameplates
- Rings, Retaining
- Seals, Ceramic To Metal
- Seals, Glass To Metal
- Seals, Hermetic-Also See Services, Hermetic Sealing
- Shielding Beads, Ferrite
- Shields, Coil
- Shields, Corona
- Shields, Indicator Light
- Shields, Magnetic
- Shields, Photomultiplier
- Shields, R-F-Also See Gaskets, Shielding, R-F
- Springs (All Types)
- Tubing, Ceramic
- Tubing, Glass
- Tubing, Metal
- Viewing Hoods, Cathode Ray Tube

eem PRODUCT SECTION 2550

ENVIRONMENTAL TEST EQUIPMENT

- Chambers, Altitude
- Chambers, Environmental
- Chambers, Explosion
- Chambers, Fluid Conditioner
- Chambers, Humidity
- Chambers, Magnetic Environment
- Chambers, Pressure
- Chambers, Radiation
- Chambers, Shock
- Chambers, Space Simulation
- Chambers, Temperature
- Chambers, Vacuum
- Chambers, Vibration
- Clean Room Equipment & Supplies
- Controls, Environmental Test Equipment
- Ovens, Aging, Burn-In, Life Test
- Refrigerators, Environmental Test
- Simulators, Motion
- Testers, Burn-In, Aging
- Testers, Life, Component
- Testers, Material
- Testers, Shock

eem PRODUCT SECTION 2600

FANS/ BLOWERS/ COOLING EQUIPMENT

- Air Cleaners & Filters (Shielded & Unshielded)
- Air Conditioners (For Equipment)
- Blowers & Fans & Accessories
- Dehumidifiers (For Equipment)
- Heat Exchangers & Systems

eem PRODUCT SECTION 2700

FILTERS (EXCLUDING CRYSTAL)

- Ceramic Resonators
- Filters, Active (All Types)
- Filters, A-F
- Filters, Antenna
- Filters, Band Elimination
- Filters, Band Pass
- Filters, Ceramic
- Filters, Coaxial
- Filters, Comb
- Filters, Continuously Variable
- Filters, EMI/ RFI
- Filters, Equalizer
- Filters, Harmonic
- Filters, High-Pass
- Filters, I-F
- Filters, LC
- Filters, Linear Phase
- Filters, Low-Pass
- Filters, Mechanical
- Filters, Optical
- Filters, R-F
- Filters, Single Sideband
- Filters, Synchronous Tracking
- Filters, Tone, Telegraph
- Filters, UHF & VHF
- Filters, Variable
- Filters, Vestigial Sideband

eem PRODUCT SECTION 2800

HARDWARE (NON-CURRENT CARRYING)

- Eyelets
- Fasteners, Metal
- Fasteners, Non-Metallic
- Grommets
- Pins, Mechanical
- Rivets
- Spacers

eem PRODUCT SECTION 2900

INSTRUMENTS, MEASURING & TEST

- Accelerometers
- Altimeters
- Amplifiers, Lock-In
- Amplifiers, Null
- Amplifiers, Phase-Lock Loop
- Analyzers, A-F
- Analyzers, Antenna Pattern
- Analyzers, Coincidence
- Analyzers, Digital
- Analyzers, Engine (Gas & Diesel)
- Analyzers, Gas
- Analyzers, Harmonic
- Analyzers, Impedance
- Analyzers, Interference
- Analyzers, Intermodulation
- Analyzers, Logic
- Analyzers, Magnetic
- Analyzers, Network
- Analyzers, Noise
- Analyzers, Phase & Voltage
- Analyzers, Probability Density, Distribution
- Analyzers, Pulse
- Analyzers, Radar
- Analyzers, SCR
- Analyzers, Sonic & Subsonic
- Analyzers, Spectrum (Including Oscilloscopes With Plug-Ins)
- Analyzers, Transfer Function
- Analyzers, Ultrasonic
- Analyzers, Vibration
- Attenuators, Decade
- Attenuators, Fixed
- Attenuators, Impedance Matching
- Attenuators, Ratio
- Attenuators, Turret
- Attenuators, Variable
- Bolometers, Infrared
- Bridges, Admittance
- Bridges, Audio
- Bridges, Capacitance
- Bridges, Deviation
- Bridges, Impedance
- Bridges, Inductance
- Bridges, Kelvin
- Bridges, Power, R-F
- Bridges, Q
- Bridges, Resistance
- Bridges, R-F
- Bridges, Schering
- Bridges, Strain Gauge
- Bridges, Synchro & Resolver
- Bridges, Temperature
- Bridges, Wheatstone
- Cable Fault Locators
- Calibrators, Accelerometer
- Calibrators, Attenuation
- Calibrators, Crystal
- Calibrators, Current
- Calibrators, Frequency
- Calibrators, LVDT
- Calibrators, Magnetic Field
- Calibrators, Oscilloscope
- Calibrators, Sound Level
- Calibrators, Synchro
- Calibrators, Time-Base
- Calibrators, Voltage
- Calibrators, VSWR
- Chronometers
- Clips, Logic Test
- Comparators, Digital
- Comparators, Frequency
- Comparators, Logic Test
- Comparators, Phase
- Comparators, Reluctance
- Comparators, Voltage
- Converters, Frequency, Logarithmic
- Converters, Frequency, Test
- Converters, Phase
- Counters, Frequency
- Counters, Particle
- Counters, Variable Time Base
- Decade Boxes, Capacitance
- Decade Boxes, Delay Line
- Decade Boxes, Inductance
- Decade Boxes, Resistance
- Decade Boxes, Transformer
- Demagnetizers
- Densitometers, Electronic
- Detectors, Coaxial
- Detectors, Flaw & Defect-Also See Locators, Open-Short
- Detectors, Frequency
- Detectors, Gas Leak
- Detectors, Phase-Sensitive
- Detectors, Radiation
- Detectors, Smoke
- Detectors, Standing Wave
- Detectors, Ultraviolet
- Detectors, Video
- Detectors, Voltage
- Dividers, Frequency
- Dividers, Power (LF, HF, VHF, UHF)
- Dividers, Voltage - Also see Networks, Resistance; Transformers, Voltage Dividing
- Electrodes, High-Voltage
- Electronic Switches (Oscilloscope)
- Filter Synthesizers
- Gages, Ionization
- Gages, Microwave
- Gages, Pressure-Also See Transducers, Pressure
- Gages, Tension
- Gages, Vacuum
- Generators, A-M
- Generators, A-M/ F-M
- Generators, Audio
- Generators, Bar, Dot & Crosshatch
- Generators, Character
- Generators, Citizens Band
- Generators, Color Bar
- Generators, F-M
- Generators, FM/ Stereo
- Generators, Function
- Generators, Gating/ Timing
- Generators, Harmonic
- Generators, Low-Frequency
- Generators, Marker
- Generators, Noise, Random (Electrical)
- Generators, Phase
- Generators, Pulse
- Generators, R-F
- Generators, Single-Sideband
- Generators, Sweep
- Generators, Tone
- Generators, Tone-Burst
- Generators, UHF/ VHF
- Generators, Ultrasonic
- Holders, Test Lead
- Hysteresisgraphs
- Image Expanders, Oscilloscope
- Indicators, Angle—Also See Encoders, Shaft Position
- Indicators, Antenna Position
- Indicators, Azimuth
- Indicators, Humidity & Moisture (Electronic)
- Indicators, Linear Displacement
- Indicators, Magnetic Field
- Indicators, Null
- Indicators, Speed
- Indicators, Strain (For Use With Strain Gauges)
- Indicators, Torque
- Indicators, Transducer Output, Analog
- Indicators, Transducer Output, Digital
- Indicators, Transient Voltage
- Insertion Loss Measurement Systems
- Kits, Test Equipment
- Leads, Test & Adaptors
- Loads, Electronic, Variable-Also See Dummy Loads
- Locators, Open-Short
- Magnetometers
- Meters, A-C Leakage Including Adapters
- Meters, Acceleration
- Meters, Admittance
- Meters, Air Velocity
- Meters, Ampere, A-C
- Meters, Ampere, R-F
- Meters, Ampere, True RMS
- Meters, Ampere-Hour
- Meters, Attenuation
- Meters, Audio Level
- Meters, Capacitance, Inductance
- Meters, Clamp-On
- Meters, Conductance
- Meters, Counting Rate, Nuclear
- Meters, DC
- Meters, Decibel Indicating
- Meters, Deviation
- Meters, Differential
- Meters, Distortion & Noise
- Meters, Edge-Wise
- Meters, Electrometer
- Meters, F-M Deviation
- Meters, Field Strength
- Meters, Fluid Flow
- Meters, Flutter & Wow
- Meters, Flux
- Meters, Frequency
- Meters, Frequency Deviation
- Meters, Frequency (Digital)
- Meters, Galvanometer
- Meters, Gauss
- Meters, Grid Dip
- Meters, Illuminated Scale
- Meters, Impedance
- Meters, Inductance
- Meters, Kilovolt
- Meters, Kilowatt
- Meters, Light (Non Photographic)
- Meters, Megohm
- Meters, Microampere
- Meters, Microhm
- Meters, Microvolt
- Meters, Microwave
- Meters, Milliampere
- Meters, Milliohm
- Meters, Millivolt
- Meters, Modulation
- Meters, Moving Scale
- Meters, Multitester
- Meters, Multitester (Digital)
- Meters, Multitester (Potentiometric)
- Meters, Nanoampere
- Meters, Nanovolt
- Meters, Noise-Figure
- Meters, Noise & Sound Level
- Meters, Null
- Meters, Ohm
- Meters, Output
- Meters, Panel (Analog)
- Meters, Panel (D'Arsonval Movement)
- Meters, Panel (Digital)
- Meters, Period
- Meters, Permeameter
- Meters, Phase-Angle
- Meters, Phase Vector Volt
- Meters, Picoampere
- Meters, Power, AC
- Meters, Power DC
- Meters, Power Factor
- Meters, Power, R-F
- Meters, Pyrometer
- Meters, Q
- Meters, R-F
- Meters, Ratio
- Meters, Recording
- Meters, Reflectometer
- Meters, RFI
- Meters, S-Unit
- Meters, Standing Wave Ratio
- Meters, Temperature (Contacting)
- Meters, Thermal Transfer
- Meters, Vacuum Tube Volt (VTVM)
- Meters, VAR
- Meters, Vibration
- Meters, Volt
- Meters, Volt, Deviation
- Meters, Volt, Digital (DVM) & Accessories
- Meters, Volt, Frequency Selective
- Meters, Volt, Log-Conversion
- Meters, Volt, Peak
- Meters, Volt, Potentiometric
- Meters, Volt, R-F
- Meters, Volt, Sampling
- Meters, Volt, True RMS
- Meters, Volt-Ohm-Milliampere (VOM)
- Meters, Volt-Ohm-Milliamperes, (Vom) Digital
- Meters, VU
- Meters, Watt
- Meters, Watt-Hour
- Meters, Watt, RF Directional
- Meters, Wave
- Monitors, Frequency
- Monitors, Modulation
- Monitors, Phase & Phase-Angle
- Monitors, Phase Sequence & Loss
- Monitors, Power, A-C & D-C
- Monitors, Power Failure
- Monitors, Power, R-F
- Monitors, Thermocouple
- Multipliers, Frequency
- Multipliers, Meter
- Navigation Equipment & Instruments etc.
- Oceanographic Equip. (Electronic)
- Oscillators, Bridge (Test)
- Oscillators, Decade (Test)
- Oscilloscope Plug-Ins
- Oscilloscopes, Digital Readout
- Oscilloscopes, General Purpose
- Oscilloscopes, High-Frequency (Above 75 MHZ)
- Oscilloscopes, Low-Frequency (D-C to 3 MHZ)
- Oscilloscopes, Mid-Frequency (D-C to 75 MHZ)
- Oscilloscopes, Multi-Beam
- Oscilloscopes, Multiple Channel
- Oscilloscopes, Portable, Battery Operated
- Oscilloscopes, Processing
- Oscilloscopes, Programmable
- Oscilloscopes, Sampling
- Oscilloscopes, Storage
- Oscilloscopes, Three-Dimensional
- Potentiometers, Lab Type
- Prescalers
- Probes, High-Voltage (1,000 Volts & Over)
- Probes, Logic Test
- Probes, Oscilloscopes
- Probes, R-F
- Probes, Test Lead
- Pulsers, Logic Test
- Pyrometers, Infrared
- Pyrometers, Optical, Non-Infrared
- Pyrometers, Recording
- Radiometers
- Receivers, A-M/ F-M (Including Precision Test)
- Receivers, Fixed Frequency
- Receivers, NBS
- Receivers, Panoramic
- References, D-C Voltage
- RFI Measuring Equipment
- Scanners, Infrared
- Scanners, Instrument, Input/ Output
- Scanners, Reed

Shifters, Phase, R-F
Shifters, Phase 60/400 CPS
Shunts, Meter
Signal Averagers
Signal Conditioners & Equipment
Simulators, Radar
Smith Chart Impedance Plotters, Automatic
Spectrometers
Stabilizers, Line Impedance
Standards, Atomic Beam
Standards, Capacitance
Standards, Current
Standards, Frequency
Standards, Inductance
Standards, Noise
Standards, Phase
Standards, Resistance
Standards, Synchro & Resolver
Standards, Temperature
Standards, Time
Standards, Voltage
Standards, Voltage Ratio
Synthesizers, Frequency
Synthesizers, Waveform
Telephone Channel Test & Simulator Equipment - Also see Testers, Telephone
Test Equipment, Closed Circuit TV-Also See Television Systems & Equipment, Closed-Circuit
Test Equipment, Color TV
Test Equipment, Mechanical Impedance
Test Equipment, Rental
Test Systems, Automatic D-C
Test Systems, Computer Controlled (Automatic)
Testers, Battery
Testers, Cable
Testers, Capacitor
Testers, Coil
Testers, Communication Equipment (Automatic)
Testers, Component Linearity
Testers, Corona
Testers, Diode
Testers, Encoder
Testers, Integrated Circuit (Automatic)
Testers, Integrated Circuit (Manual)
Testers, Logic Card
Testers, Magnetic Core
Testers, Magnetron
Testers, Meter
Testers, Modem
Testers, Motor
Testers, Potentiometer
Testers, Power Supply
Testers, Pulse Jitter
Testers, Ratio Voltage
Testers, Relay
Testers, Resistivity
Testers, Resistor
Testers, Signal Tracing
Testers, Synchro/Resolver
Testers, Telephone - Also see Telephone Channel Test & Simulator Equipment
Testers, Teletypewriter
Testers, Thickness (all types)
Testers, Torque
Testers, Tracking & Erosion Resistance (Insulation)
Testers, Transistor
Testers, Transmission & Delay
Testers, Tube
Testers, Vibration-Also See Services, Environmental Test
Testers, Voltage
Testers, Voltage Breakdown
Time Delays, Precision
Tracers, Curve, Tube & Transistor
Tracers, Voltage Curve
Vibrators, Instrument (Stiction Elimination)

eem PRODUCT SECTION 3000

INSTRUMENTS, GRAPHIC RECORDING

Oscillographs, Direct Writing
Paper, Graphic Recording
Recorders, Electrostatic
Recorders, Event
Recorders, Polar
Recorders, Strip-Chart
Recorders, Transient
Recorders, Vibration
Recorders, X-Y

eem PRODUCT SECTION 3100

INSULATORS/INSULATION

Caps, Forms & Tapes, Heat Shrinkable-Also See Tubing, Heat Shrinkable
Films, Capacitor
Films, Masking (Incl. Photographic)
Insulation Materials
Insulation Parts, Fabricated
Insulators, Antenna
Insulators, Clip, Test & Battery
Substrates, Flexible
Substrates, Glass
Tapes, Electrical Insulation
Tapes, Films & Foils, Pressure Sensitive
Tubing, Fiberglass
Tubing, Heat Shrinkable-Also See Caps, Forms & Tapes, Heat Shrinkable
Tubing, Plastic-Also See Tubing, Spaghetti
Tubing, Spaghetti
Tubing, Spiral Wrap

eem PRODUCT SECTION 3130

INTEGRATED CIRCUITS & HYBRIDS

Circuits, Hybrid, Thick Film
Circuits, Hybrid, Thin-Film
Circuits, Integrated, Silicon Monolithic, Unpackaged Chips
Holders & Carriers, Chip (Capacitor, IC, LSI)
Holders & Carriers, IC, LSI (Packaged)
Hybrid Voltage Regulators
Inks For Thick Film Microcircuits
Integrated Circuit Packaging Systems
IC's, Active Filters
IC's, Adders, Full, Half, Modulo-2 Also see IC's, Arithmetric Logic Units
IC's, Amplifiers, Audio
IC's, Amplifiers, Current
IC's, Amplifiers, Instrumentation
IC's, Amplifiers, Logarithmic
IC's, Amplifiers, Operational
IC's, Amplifiers, Operational, Micropower
IC's, Amplifiers, Opto-Electronic
IC's, Amplifiers, R-F
IC's, Amplifiers, Sense Also see IC's, Comparators, Analog
IC's, Arithmetic Logic Units (ALU) Also see IC's, Adders, Full, Half, Module
IC's, Breadboard Circuits
IC's, Calculator Kits
IC's, Central Processing Units (CPU)
IC's, Character Generators, Dot-Matrix
IC's, Chroma Amplifiers Demodulators, Signal Processors
IC's, Clock Drivers
IC's, Communications Circuits
IC's, Comparators, Analog Also see IC's, Amplifiers, Sense
IC's, Comparators, Digital
IC's, Converters, Analog-To-Digital
IC's, Converters, Digital-To-Analog
IC's, Converters, Voltage-To-Frequency
IC's, Counters and Adapters
IC's, Current Regulators
IC's, Data Bus Drivers
IC's, D-C Amplifiers
IC's, Diode Matrices
IC's, Display Drivers, 7-Segment, 9-Segment NIXIE, Etc
IC's, Encoders & Decoders
IC's, Frequency-Shift Keyers
IC's, Frequency Synthesizers
IC's, Function Generators
IC's, High-Voltage (200 V & Over)
IC's, Line Drivers/Receivers & Line Drivers/Transmitters
IC's, Logic Circuits
IC's, Memories
IC's, Memory & Logic Array, Programmable
IC's, Microprocessors
IC's, Modulator/Demodulators, Balanced
IC's, Multiplexers, Analog
IC's, Multiplexers, Digital
IC's, Multipliers, Analog
IC's, Multivibrators
IC's, Oscillators
IC's, Parity Generator/Checkers
IC's, Phase Lock Loop Circuits
IC's, Power Amplifiers (1 W Minimum)
IC's, Receiver/Transmitter, Asynchronous
IC's, Receivers, A-M, F-M
IC's, Receivers, Teletype
IC's, Sample-And-Hold Circuits
IC's, Shift Registers, Static or Dynamic
IC's, Switches, Analog
IC's, Television, A-M/F-M Sound Circuits
IC's, Three-State Logic (TSL)
IC's, Timers
IC's, Transducer, Pressure
IC's, Transistor Arrays
IC's, Translators, ECL to TTL, ECL to MOS, etc.
IC's, Transmitters, Teletype
IC's, Voltage Regulators
IC's, Zero-Voltage Switches
Packages, Integrated Circuit
Semiconductor Wafer Fabrication, Assembling (Packaging)
Semiconductor Wafer Fabrication, Designing (Topological)
Semiconductor Wafer Fabrication, Maskmaking (Tooling)
Semiconductor Wafer Fabrication, Processing
Semiconductor Wafer Fabrication, Testing

eem PRODUCT SECTION 3400

MICROWAVE SYSTEMS & SUBSYSTEMS

Absorbers, Microwave
Amplifiers, Klystron
Amplifiers, Microwave
Amplifiers, Parametric
Amplifiers, Standing Wave
Amplifiers, Traveling-Wave Tube
Analyzers, Microwave
Bolometers, Microwave
Bridges, Calorimeter
Calibrators, Radar Range
Calorimeters, Microwave
Coders, Beacon
Coders, R-F
Coders, Transponder
Comparators, Attenuation
Converters, Microwave Frequency
Detectors, Microwave
Duplexers, Microwave
Generators, Microwave
Impedance Converters, Microwave
Interferometer Systems
Laser Crystal & Rods
Lasers & Laser Systems
Lasers, Instrumentation
Masers
Meters, Peak Power
Modulator/Demodulators, Laser
Modulators, Microwave
Modulators, Pulse
Monitors, Laser Energy
Monitors, Line & Program
Radar Systems
Receivers, Microwave
Receivers, Radar
Restorers, Pulse Form
Seals, Waveguide
Sliding Loads, Microwave
Slotted Lines, Microwave
Synchronizers, Klystron & BWO
Testers, Microwave
Testers, Radar
Tracking Systems
Transmitters, Microwave
Tuners, Microwave

eem PRODUCT SECTION 3450

MICROWAVE COMPONENTS & ACCESSORIES

Adapters, Waveguide
Antenna Feed Systems
Attenuators, Coaxial
Attenuators, Microwave
Bends & Twists, Microwave
Carriages, Probe
Cavities, Microwave
Cavities, Power Device
Chokes, Waveguide
Circulators, Ferrite
Comm. Systems, Microwave
Couplers, Directional
Couplers, Microwave
Couplers, Power
Couplers, Rotary
Dividers, Power, Microwave
Drivers, Switch
Filters, Microwave
Filters, Waveguide
Flanges, Waveguide
Horns, Microwave-Also See Antennas, Microwave
Isolators, Ferrite
Isolators, Microwave (All Types)
Joints, Rotary, Microwave
Junctions, Hybrid, Microwave
Limiters, Microwave
Line Strechers, Microwave
Microwave Integrated Circuits (MIC's)
Microwave Prod. Equip. (including modules)
Microwave, Mismatches, Precision
Mixer-Preamplifiers, Microwave
Mixers, Microwave
Mixers, R-F
Mounts, Klystron
Mounts, Microwave
Oscillators, Microwave
Pedestals, Radar
Preselector-Mixers
Probes, Microwave
Radomes & Windows, Microwave
Shifters, Phase, Microwave
Shutters, Microwave
Strip-Line Components, Microwave
Switches, Waveguide
Tees, Coaxial
Tees, Waveguide
Terminations, Microwave
Tubing, Waveguide
Waveguide-Coax Adapters
Waveguides

eem PRODUCT SECTION 3500

MOTORS & DRIVES

Brakes, Magnetic
Brakes, Mechanical
Brushes & Brush Assemblies
Clutches, Friction
Clutches, Magnetic
Clutches, Positive
Commutators
Gearheads & Speed Reducers
Motor & Generator Armatures, Rotors, Stators
Motors, Brushless, D-C
Motors, Clock & Timing
Motors, Control
Motors, Drag Cup
Motors, Fractional Horsepower
Motors, Gearhead
Motors, Gyro
Motors, Hysteresis
Motors, Induction
Motors, Permanent Magnet
Motors, Squirrel Cage
Motors, Stepping
Motors, Synchronous
Motors, Torque (Including Torquers)
Motors, Universal, A-C Or D-C Operation
Reducers, Speed-Also See Gears & Gear Mechanisms
Shafts & Adapters Also See Couplings, Shaft, Rigid & Flexible
Slip-Rings & Assemblies

eem PRODUCT SECTION 3700

ELECTRO-OPTICAL COMPONENTS & ACCESSORIES

Alarms, Controls, Photoelectric
Cameras, Data Recording
Cameras, Image Converter
Cameras, Infrared
Cameras, Oscilloscope
Cameras, Television
Cells, Photoconductive
Cells, Photoemissive
Cells, Photovoltaic
Controls, Photoelectric
Counters, Photoelectric
Detectors, Infrared
Diode Arrays (Including Photo)
Diodes, Light-Emitting (LED's)
Diodes, Photoelectric
Fiber Optic Bundles
Fiber Optic Cables & Components
Heads, Reflective
Isolators, Opto
Lenses, Filters, Windows, Infrared
Lenses, Optical & Camera
Light Choppers
Light Sources, Photoelectric
Microscopes
Microscopes, Infrared
Microscopes, Measuring
Modulators, Light
Optical Component Mounts & Accessories
Scanners, Optical
Sensors, Light
Transistors, Photo (Including Arrays)

eem PRODUCT SECTION 4000

DC POWER SOURCES (INCLUDING BATTERIES)

Batteries, Carbon Zinc

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SUB-CLASSIFICATION OF eem PRODUCT SECTIONS

- Batteries, Dry, Flashlight, Transistor, etc.
- Batteries, Gelled-Electrolyte
- Batteries, Lead-Acid
- Batteries, Lead-Dioxide
- Batteries, Lithium
- Batteries, Magnesium
- Batteries, Manganese Alkaline
- Batteries, Mercury
- Batteries, Nickel-Alkaline
- Batteries, Nickel-Cadmium
- Batteries, Nickel-Zinc
- Batteries, Photoflash
- Batteries, Silver-Cadmium
- Batteries, Silver Oxide
- Batteries, Silver-Zinc
- Batteries, Standard Cell
- Batteries, Storage
- Batteries, Water Activated
- Batteries, Zinc-Air
- Chargers, Battery
- Converters, D-C to D-C, Less Than 30 VDC Output
- Converters, D-C to D-C, 30 to 300 VDC Output
- Converters, D-C to D-C, 300 to 1,000 VDC Output
- Converters, D-C to D-C, Greater Than 1,000 VDC Output
- Converters, Frequency to D-C - Also see Power Supplies A-C Input, D-C Output
- Current Sources
- Discharge Systems, Energy
- Eliminators, Battery-Also See Power Supplies
- Flashlights & Lanterns
- Generators, Electrical Power
- Kits, Power Supply
- Lighting Equipment, Emergency
- Motor Electric Generator Sets
- Power Supplies, A-C Input, Less Than 30 VDC Output
- Power Supplies, A-C Input, 30 to 300 VDC Output
- Power Supplies, A-C Input, 300 to 1,000 VDC Output
- Power Supplies, A-C Input, Greater Than 1,000 VDC Output
- Power Supplies, Arc Lamp
- Power Supplies, Bipolar
- Power Supplies, CRT
- Power Supplies, Computer
- Power Supplies, Constant Current
- Power Supplies, Constant Voltage
- Power Supplies, Constant Voltage/ Constant Current
- Power Supplies, D-C Output, Current Regulated
- Power Supplies, Energy Storage
- Power Supplies, High Current (greater than 8 amperes)
- Power Supplies, Integrated Circuit
- Power Supplies, Klystron
- Power Supplies, Lab (Including Metered Units)
- Power Supplies, Laser
- Power Supplies, Low Current (Less Than 0.4 Ampere)
- Power Supplies, Medium Current (0.4 to 8 Amperes)
- Power Supplies, Modular
- Power Supplies, Multiple Output
- Power Supplies, Open Frame
- Power Supplies, OP Amp
- Power Supplies, Operational
- Power Supplies, Photomultiplier
- Power Supplies, Printed Circuit Card
- Power Supplies, Programmable
- Power Supplies, Radar, Sonar
- Power Supplies, Readout & Display
- Power Supplies, Regulated
- Power Supplies, Standby (Emergency)
- Power Supplies, Strain Guage & Transducer
- Power Supplies, Test Instruments
- Power Supplies, TWT
- Power Supplies, Uninterruptable (UPS)
- Power Supplies, Unregulated
- Power Supplies Welding Electroplating & Flocking
- Power Supply Interfaces & Accessories
- Preamplifiers
- Regulators & Stabilizers, Voltage-Also see Transformers, Voltage Regulating; Hybrid Voltage Regulators; IC's, Voltage Regulators
- Regulators, Current
- Voltage Sources

eem PRODUCT SECTION 4050

AC POWER SOURCES

- Alternators
- Choppers - Also see Light Choppers
- Converters, Power Frequency, Electronic
- Converters, Power Frequency, Rotary
- Isolators, Line
- Power Supplies, A-C Output
- Regulators, Frequency
- Vibrators

eem PRODUCT SECTION 4100

PRODUCTION EQUIPMENT/ MANUFACTURING SERVICES

- Baths, Controlled Temperature (Air & Liquid)
- Cleaners, Ultrasonic
- Controls, Dimension
- Controls, Positioning
- Dehydrators
- Deposition Equipment, Vacuum & Accessories-Also See Evaporation Equipment, Electron Beam
- Detectors, Vacuum
- Dielectric Heating Equipment
- Drafting Machines
- Drafting Symbols, Dry Transfer, Pressure Sensitive, etc. (Including Lettering)
- Electroplating Equipment & Supplies
- Evaporation Equipment, Electron Beam
- Furnaces, Electric
- Furnaces, Gas (Production)
- Furnaces, Vacuum
- Heaters & Accessories, Induction
- Heaters, Immersion
- Holders, Circuit Board (Production Type)
- Jigs And Fixtures, Chassis & Circuit Board
- Kits, Training Aid
- Lamps, Magnifying, Inspection
- Machines & Accessories, Semiconductor Manufacturing
- Machines, Cleaning & Degreasing - Also see Cleaners, Ultrasonic
- Machines, Coil-Winding
- Machines, Component Handling, Feeding, Insertion & Sorting
- Machines, Hermetic Sealing
- Machines, Induction Heating (Electronic)
- Machines, Lead Cutting & Forming
- Machines, Marking & Numbering
- Machines, Mask Alignment & Exposure
- Machines, Plastic Molding
- Machines, Plating
- Machines, Printed Circuit Drilling, Etching & Punching
- Machines, Spinner, Photo-Resist
- Machines, Terminal Installing
- Machines, Transistor Assembling
- Machines, Ultrasonic Bonding
- Machines, Wire Marking, Hand & Automatic
- Machines, Wire Measuring & Cutting
- Magnetizers
- Magnifying Glasses, Inspection
- Microcircuit Production Equip.
- Ovens, Vacuum
- Pumps, Vacuum
- Scribers, Wafer-Also See Machines & Accessories, Semiconductor Manufacturing
- Sealing Equipment, Metal-Glass/ Ceramic
- Services, Assembly & Fabrication (Including R & D)
- Services, Backplane Wiring
- Services, Calibration & Instrument Repair
- Services, Coating (All-Types)
- Services, Computer-Aided Design (CAD)
- Services, Crimping
- Services, Custom Molding, Plastics
- Services, Decapsulation
- Services, Electrical Measurement & Test
- Services, Encapsulation
- Services, Environmental Testing
- Services, Hermetic Sealing
- Services, High Vacuum
- Services, Instrument Design (Industrial)
- Services, Metal Etching, Engraving
- Services, Metal Parts Fabrication
- Services, Metallizing (Including Electroforming)
- Services, Microprocessor
- Services, Molding
- Services, Packaging
- Services, Photographic
- Services, Plastics Fabrication
- Services, Plating
- Services, Rental, Electronic Instrumentation
- Services, Silk Screening
- Services, Vibration Surveys
- Services, Wire Cutting & Stripping
- Services, Wirewrapping Also see Services, Backplane Wiring
- Slide Rules (Circuitry Computing)
- Soldering Equip., Induction Heating
- Soldering Equip., Printed Circuit
- Soldering Equip., Resistance
- Soldering Systems, Temperature Controlled
- Soldering Equip., Ultrasonic
- Technical Books
- Templates, Printed Circuit Design
- Testers, Solderability
- Tools, Heat Sealing
- Tools, Lead Bending & Insertion
- Tools, Wire Wrapping
- Ultraviolet Inspection Lighting-Also See Microscopes, Ultraviolet
- Valves, Vacuum
- Welding Equipment & Access. (Excluding Equip. for Semiconductor Devices)
- Wire Strippers, Automatic
- Wire Twisters, Automatic
- X-Ray Inspection Equipment

eem PRODUCT SECTION 4500

RELAYS & SOLENOIDS

- Drivers, Solenoid
- Relays, Cradle
- Relays, Crystal Can, 1/ 2 Crystal Can
- Relays, Current Sensing
- Relays, Differential
- Relays, Frequency Selective
- Relays, General Purpose
- Relays, High-Voltage (500 Volts & Over)
- Relays, Hybrid
- Relays, Latching
- Relays, Mercury Displacement
- Relays, Mercury-Wetted Contacts
- Relays, Meter
- Relays, Motor Start
- Relays, Overload
- Relays, Phase-Sensing
- Relays, Plate Circuit
- Relays, Plug-In
- Relays, Polarized
- Relays, Power
- Relays, Printed Circuit Mounting (Including Transistor & DIP Case Types)
- Relays, Programmable
- Relays, R-F (Including Antenna & Coaxial)
- Relays, Reed
- Relays, Rotary
- Relays, Sensitive
- Relays, Solid-State
- Relays, Stepping
- Relays, Telephone
- Relays, Thermal
- Relays, Time-Delay
- Relays, Vacuum Contact
- Relays, Vibrating Reed
- Relays, Voltage Sensitive
- Retainers, Relay
- Solenoids, Linear
- Solenoids, Proportional
- Solenoids, Rotary
- Valves, Solenoid

eem PRODUCT SECTION 4700

RESISTORS, FIXED

- Dummy Loads
- Films, Resistance
- Networks, Resistance
- Resistor, Hardware
- Resistors, Adjustable-Also see Potentiometers; Rheostats
- Resistors, Ballast (Including Tube & Solid State Devices)
- Resistors, Carbon Film
- Resistors, Ceramic Core
- Resistors, Ceramic Metal (Cermet)
- Resistors, Chip (For Microcircuits)
- Resistors, Composition, Carbon
- Resistors, Decade
- Resistors, Disc, Rod & Tube
- Resistors, Film, Metallized & Non-Metallized
- Resistors, Flame Retardant
- Resistors, Flux-Sensitive
- Resistors, Glass
- Resistors, High Frequency
- Resistors, High Megohm (Over 22 Megohms)
- Resistors, High Temperature (Over 125 C)
- Resistors, High Voltage (1,000 Volts & Over)
- Resistors, Hot Molded
- Resistors, Integral Heat Dissipator
- Resistors, Low Temperature Coefficient
- Resistors, Metal Glazed
- Resistors, Microwave
- Resistors, Negative Temperature Coefficient
- Resistors, Non-Inductive
- Resistors, Oil Filled
- Resistors, Plug-In
- Resistors, Positive Temperature Coefficient
- Resistors, Power (2 Watts & Over)
- Resistors, Precision
- Resistors, Pressure Sensitive
- Resistors, Rectilinear
- Resistors, Strip
- Resistors, Suppressor
- Resistors, Surge
- Resistors, Tapped
- Resistors, Tin Oxide
- Resistors, Voltage-Sensitive
- Resistors, Wirewound
- Resistors, Wire Woven
- Suppressors, Noise

eem PRODUCT SECTION 4750

RESISTORS, VARIABLE

- Kits, Potentiometer, Rheostat
- Potentiometer, Elements
- Potentiometers, Carbon Ceramic
- Potentiometers, Carbon Film
- Potentiometers, Ceramic-Metal (Cermet)
- Potentiometers, Composition, Carbon
- Potentiometers, Conductive Plastic
- Potentiometers, Hot Molded
- Potentiometers, Linear
- Potentiometers, Metal Film
- Potentiometers, Motorized
- Potentiometers, Multiturn
- Potentiometers, Nonlinear
- Potentiometers, Rectilinear
- Potentiometers, Trimmer
- Potentiometers, Wirewound
- Rheostats

eem PRODUCT SECTION 4800

SEMICONDUCTORS

- Bridges, Silicon Cell
- Diodes, Avalanche
- Diodes, Backward
- Diodes, Electroluminescent (Radiating)
- Diodes, Frequency Multiplier
- Diodes, Germanium
- Diodes, Gunn
- Diodes, High-Voltage (1,000 Volts & Over)
- Diodes, Hot Carrier
- Diodes, Impatt
- Diodes, Limiting
- Diodes, Matched Pairs
- Diodes, Matched Quads
- Diodes, Microwave Detector
- Diodes, Microwave Mixer
- Diodes, Noise
- Diodes, PIN
- Diodes, Schottky
- Diodes, Silicon
- Diodes, Step Recovery
- Diodes, Switching
- Diodes, Temperature Compensating
- Diodes, Tunnel
- Diodes, Varactor
- Diodes, Zener & Stabistors (Forward Reference Diodes)
- Magnetoresistors, Hall
- Multipliers, Hall
- Pads, Transistor Mounting
- Power Drivers, Hybrid (High Current, High Voltage)
- Probes, Hall
- Rectifiers, Bridges & Assemblies
- Rectifiers, Copper Oxide
- Rectifiers, Copper Sulfide
- Rectifiers, Germanium
- Rectifiers, Selenium
- Rectifiers, Silicon
- Regulators & References, Silicon-Also See Diodes, Zener & Stabistors

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- Suppressors, Transient Voltage (All Types)
- Thyristors (Includes Silicon Controlled Rectifiers)
- Transistor, Arrays
- Transistor, Diode, Thyristor Heat Dissipators
- Transistors, Chip, Unpackaged
- Transistors, Darlington
- Transistors, Dual
- Transistors, Field-Effect
- Transistors, Germanium
- Transistors, Power
- Transistors, Pressure Sensitive
- Transistors, R-F
- Transistors, Silicon
- Transistors, Switching
- Transistors, Unijunction

eem PRODUCT SECTION 4900

SERVOMECHANISMS

- Actuators, Servo, Linear
- Actuators, Servo, Rotary
- Amplifiers, Servo
- Amplifiers, Synchro
- Analyzers, Servo
- Controls, Servo System
- Dampers, Servo
- Indicators, Servo
- Motors, Servo
- Multipliers, Servo
- Potentiometers, Servo Mount
- Repeaters, Servo
- Resolvers, Synchro
- Servo Systems
- Synchro Transmitters, Solid-State
- Synchros
- Tachometers, Pulse
- Tachometers, Generator
- Tachometers, Stroboscopic

eem PRODUCT SECTION 5100

SWITCHES/ PROTECTIVE COMPONENTS

- Arresters, Electrical Surge-Also See Suppressors, Arc; Protectors, Surge
- Arresters, Lightning
- Circuit Breakers
- Fuses
- Fuses, Failure Indicating
- Fuses, Thermal
- Fuses, Time Delay
- Index Assemblies, Switch
- Kits, Switch Assembling
- Limiters, Current
- Limiters, Surge
- Panels, Fuse
- Protectors, Brownout
- Protectors, Surge - Also see Suppressors, Arc; Arresters, Electrical Surge; Suppressors, Transient Voltage
- Resistors, Fuse
- Shields, Switch
- Spark Gaps
- Suppressors, Arc
- Switch Handle Boots
- Switch Hardware
- Switch Mounting Plates
- Switch Seals, Environmental
- Switchboards
- Switches, Acceleration
- Switches, Air Flow Actuated
- Switches, Antenna Changeover
- Switches, Cam
- Switches, Centrifugal
- Switches, Coaxial Cable
- Switches, Coded
- Switches, Crossbar
- Switches, Data-Sampling
- Switches, Decade
- Switches, Dip
- Switches, Feed-Through Cord
- Switches, Foot-Pedal, Mat, Ribbon, etc.
- Switches, High-Voltage (Over 250 Volts)
- Switches, Illuminated
- Switches, Joystick
- Switches, Keyboard
- Switches, Key-Lock
- Switches, Lever
- Switches, Limit
- Switches, Liquid Level/ Pressure
- Switches, Magnetic Reed
- Switches, Magnetically Actuated
- Switches, Mercury Displacement
- Switches, Mercury Wetted Contacts
- Switches, Motor-Driven
- Switches, Paddle Handle
- Switches, Portable Tool Handle
- Switches, Power
- Switches, Pressure
- Switches, Printed-Circuit Mountable
- Switches, Program
- Switches, Proximity
- Switches, Pushbutton (All Types)
- Switches, Reed
- Switches, Reed, Matrix
- Switches, R-F
- Switches, Rocker
- Switches, Rotary
- Switches, Slide
- Switches, Snap-Action (All Types)
- Switches, Solid State
- Switches, Stack
- Switches, Step Type
- Switches, Thumbwheel
- Switches, Time Delay
- Switches, Toggle
- Switches, Touch Actuated
- Switches, Transfer
- Switches, Vacuum

eem PRODUCT SECTION 5300

THERMOCOUPLES, ELEMENTS & ACCESSORIES

- Controls, Temperature
- Cooling/ Heating Modules, Thermoelectric
- Crayons, Coatings, Pellets, etc., Temperature Indicating
- Heaters & Heating Elements (For Components & Equipment) Also see Ovens
- Indicators, Temperature (Non-Meter Type)
- Labels, Temperature Indicating
- Laminates, Plastic (With Integral Heating Elements)
- Monitors, Temperature-Also See Controls, Temperature
- Mounts, Thermistor
- Probes, Temperature
- Switches, Thermally Actuated
- Thermistors
- Thermocouples, Elements & Accessories
- Thermometers, Resistance
- Thermostats-Also See Switches, Thermally Actuated; Controls, Temperature

eem PRODUCT SECTION 5400

TOOLS (HAND & POWER)/ SOLDERING SUPPLIES

- Alloys, Brazing
- Burnishers, Contact
- Cutters, Wire, Hand Operated
- Drills & Accessories, Hand & Power
- Drivers, Nut
- Flux, Brazing & Soldering Materials
- Gages, Displacement, Linear
- Heat Guns, Production
- Heat Sinks, Soldering
- Knives & Knife Sets
- Pliers
- Preforms, Precious Metal
- Pullers, Circuit Board
- Pullers, Tube
- Punches, Chassis
- Reamers
- Scissors
- Screwdrivers
- Scribers
- Seizers
- Solder (All Types)
- Solder Pots & Baths
- Soldering Accessories
- Soldering Guns, Irons & Desoldering Tools
- Splicers, Coaxial Cable
- Substrates, Ceramic
- Tool Kits & Sets
- Tools & Kits, Contact Insertion/ Removal
- Tools, Alignment & Tuning
- Tools, Cable Tie
- Tools, Connector
- Tools, Crimping & Swaging
- Tools, Microelectronic Handling
- Tools, Parts-Handling, Vacuum Operated
- Tools, Relay Servicing
- Torches, Soldering, Welding & Access.
- Tweezers, Hand & Vacuum
- Wire Strippers, Hand Operated
- Wire Strippers, Thermal
- Wire Twisters, Hand Operated
- Wrenches

eem PRODUCT SECTION 5500

TRANSDUCERS

- Amplifiers, Transducer-Also See Signal Conditioners
- Cells, Load
- Coatings, Transducer Forming
- Gages, Strain
- Generators, Hall
- Transducers, Displacement
- Transducers, Flow
- Transducers, Force
- Transducers, Magnetic Pickup
- Transducers, Pressure
- Transducers, Strain Gage
- Transducers, Temperature
- Transducers, Torque
- Transducers, Ultrasonic
- Transducers, Velocity
- Transducers, Vibration
- Transducers, Volt, Watt, Current VAR, Power Factor, Frequency
- Transmitters, Pressure & Flow

eem PRODUCT SECTION 5600

TRANSFORMERS

- Reactors, Charging
- Reactors, Filter
- Reactors, Loading
- Shields, Transformer
- Transformers, Audio
- Transformers, Autotransformer
- Transformers, Chopper
- Transformers, Constant Voltage
- Transformers, Converter, D-C To D-C
- Transformers. Decade
- Transformers, Differential
- Transformers, Discriminator
- Transformers, Driver
- Transformers, Filament
- Transformers, Flyback
- Transformers, 400 Hz
- Transformers, High-Voltage (1,000 Volts & Over)
- Transformers, I-F
- Transformers, Input
- Transformers, Instrument
- Transformers, Interstage
- Transformers, Inverter
- Transformers, Isolation
- Transformers, Line
- Transformers, Magnetic Amplifier
- Transformers, Matching
- Transformers, Microminiature
- Transformers, Microphone
- Transformers, Mixing
- Transformers, Modulation
- Transformers, Output
- Transformers, Plate
- Transformers, Power
- Transformers, Printed Circuit Mounting
- Transformers, Pulse
- Transformers, R-F
- Transformers, Rectifier
- Transformers, Reference
- Transformers, Rotary
- Transformers, Scott-T
- Transformers, Servo
- Transformers, Synchro Control
- Transformers, Telephone Coupling
- Transformers, Toroidal
- Transformers, Transistor
- Transformers, Ultrasonic
- Transformers, Variable
- Transformers, Voltage-Dividing
- Transformers, Voltage-Regulating-Also See Regulators & Stabilizers, Voltage
- Transformers, Wideband

eem PRODUCT SECTION 5700

TUBES & TUBE PARTS

- Intensifiers, Image
- Mounts, CRT & Accessories
- Photomultiplier Tube Housings
- Pin Straighteners, Tube
- Retainers, Tube
- Shields, Cathode-Ray Tube
- Shields, Tube
- Tube Heat Dissipators
- Tubes, Backward Wave
- Tubes, Cathode-Ray, Data Storage, TV Picture
- Tubes, Cathode-Ray, Instrument Use
- Tubes, Cathode-Ray, Multiple Gun
- Tubes, Cathode-Ray, Projection
- Tubes, Cathode-Ray, Scan Conversion
- Tubes, Cathode-Ray, Shaped-Beam
- Tubes, Ceramic (Electron)
- Tubes, Counting
- Tubes, Electrometer
- Tubes, Electron Multiplier
- Tubes, Flash
- Tubes, Forward Wave
- Tubes, Gas
- Tubes, Ignitron
- Tubes, Image Converter
- Tubes, Industrial Power
- Tubes, Klystron
- Tubes, Laser
- Tubes, Magnetron
- Tubes, Microwave
- Tubes, Noise Source
- Tubes, Photomultiplier
- Tubes, Receiving
- Tubes, Rectifying, Gas-Filled
- Tubes, Rectifying, Vacuum
- Tubes, Switching
- Tubes, Tv Camera Pickup
- Tubes, Thyratron
- Tubes, Transmit-Receive (TR)
- Tubes, Transmitting
- Tubes, Traveling-Wave
- Tubes, Voltage Reference Or Regulating
- Tubes, X-Ray

eem PRODUCT SECTION 6000

WIRE/ CABLE/ HARNESSES & ACCESSORIES

- Braid, Cable - Also see Wire Shielding
- Bus Bars & Systems
- Cable Assemblies & Harnesses
- Cable, Audio
- Cable, Battery Booster
- Cable, Coaxial
- Cable, Flame Retardant
- Cable, Flat
- Cable, Heater
- Cable, High Temperature (Over 125Ì C)
- Cable, High Voltage (1,000 Volts & Over)
- Cable, Irradiated
- Cable, Low-Capacitance
- Cable, Microphone
- Cable, Multiconductor
- Cable, Power
- Cable Retractors
- Cable, Shielded
- Cable, Telephone
- Cable, TFE Insulated
- Cable, Transmission Line
- Cable, Triaxial
- Cable, TV (Including Camera)
- Cable, Twisted Pair
- Cable, Woven Conductor
- Clamps & Clips, Cable-Also See Wire & Cable Ties
- Conduit, Electrical
- Cords & Tapes, Lacing
- Cords, Line & Set, Extension
- Cords, Line, Resistance
- Cords, Retractile
- Ducts, Wiring
- Kits, Cable-End Sealing
- Posts, Harness Board
- Reels, Cord & Cable
- Strain Reliefs, Cable & Wire
- Strips, Marker & Fanning
- Tubing, Zipper
- Wire & Cable Ties
- Wire, Airframe
- Wire, Antenna (All Types)
- Wire, Bare, Copper
- Wire, Bare, Nickel
- Wire, Bare, Nickel-Chrome
- Wire, Braid (Excluding Shielding)
- Wire, Ceramic Insulated
- Wire, Clad (All Types)
- Wire, Flame Retardant
- Wire, Glass Insulated
- Wire, Guy
- Wire, High-Temperature (Over 125 C)
- Wire, High Voltage (1000 Volts & Over)
- Wire, Hookup (All Types)
- Wire, Irradiated
- Wire, Lead-In & Ground
- Wire, Litz
- Wire, Magnet
- Wire Markers (All Types)-Also see Strips Marker & Fanning
- Wire, Plated (All Types)
- Wire, Radiation-Resistant
- Wire, Resistance
- Wire, Resistance Thermometer
- Wire, Ribbon
- Wire, Semiconductor Lead
- Wire, Shielded
- Wire Shielding-Also see Braid, Cable
- Wire, Strain Gauge
- Wire, Test Lead
- Wire, TFE Insulated
- Wire, Thermocouple
- Wire Ways

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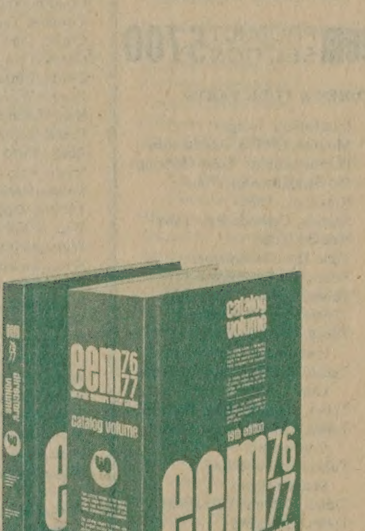

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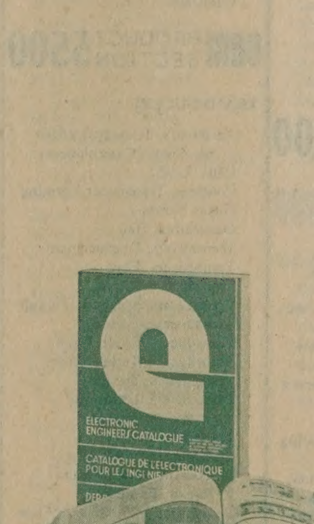

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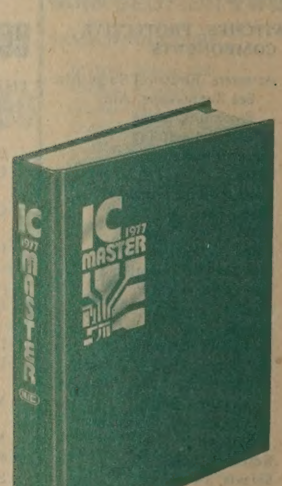

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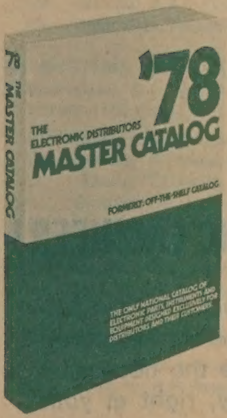
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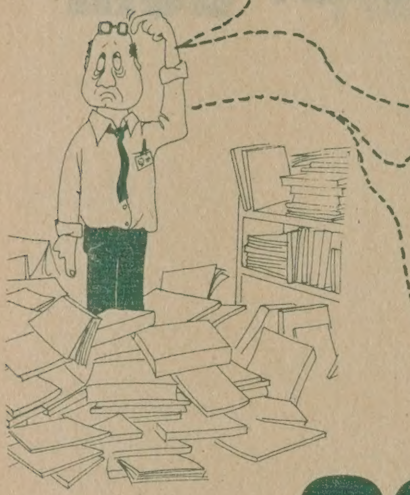

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MANUFACTURERS, SALES OFFICES AND TRADE MARKS DIRECTORY

To locate a manufacturer by name refer to the alphabetical Manufacturers, Sales Offices and Trade Marks Directory. Each listing contains complete address and phone numbers of main offices and key personnel, branch offices, local representatives and local distributors.

Bold face listings indicate manufacturers who have information in this edition. Their catalog page numbers are included. Trade marks with descriptions of the products and names of their manufacturers are intermixed alphabetically and are identified by (TM)

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A & D ELECTRICAL INSTRUMENTS, Dept. EM, 73-07 88th St., Glendale, N.Y. 11227, Tel: 212-275-6516; Empl.: 7

Local Sales Offices & Reps.

NY	Glendale, A & D Electrical Instrs.	212-275-6516
NY	Great Neck, Pacent Engr. Corp	516-HU2-4678

AII SYSTEMS, Dept. EM, 344 New Albany Rd., Moorestown, N.J. 08057, Tel: 609-234-4420, TWX: 710-897-1190; Empl.: 40

Local Sales Offices & Reps.

Cal	Berkeley, ITT Mackay Marine	
La	Metairie, ITT Mackay Marine	
NJ	Elizabeth, ITT Mackay Marine	201-527-0300
Tex	Houston, ITT Mackay Marine	

AAVID ENGRG, INC., Dept. EM, 30 Cook Ct., Laconia, N.H. 03246, Tel: 603-524-4443; FSC No.: 30161; Empl.: 70 .... p. 3858

Sales Manager: P. Johnson

Local Sales Offices & Reps.

Ala	Huntsville, BJR Research & Mfg. Reps.	205-881-3569
Cal	Mountain View, Shaw-Tech	415-961-4775
Fla	Hallandale, Bairstow Assocs.	305-927-2421
Ill	Chicago, L-Tec, Inc.	312-286-1500
Mass	Melrose, P. Johnson	617-665-0666
Mich	Jackson, W. Scroggs	517-750-1170
Minn	Brainerd, M. Johnson	218-963-7875
NJ	Moorestown, L. E. Brown Assocs.	609-234-0382
NY	Baldwin, W. Jay Assocs.	212-229-0150
NY	Rochester, Lloyd Hart Assocs.	716-244-3253
Ohio	Cincinnati, F. E. Kahsar Sls.	513-471-9011
Ohio	Hudson, F. E. Kahsar Sls.	216-653-6808
Tex	Plano, K&H Sls. Co.	214-423-6520

ABA ELECTROMECHANICAL SYS. INC., Dept. EM, Box 507, Pinellas Pk., Fla. 33565, Tel: 813-546-3571, TWX: 810-863-0383; FSC No.: 26795; Empl.: 200

abacus controls inc.

ABACUS CONTROLS INC., Dept. EM, 89 Redington Rd., Somerville, N.J. 08876, Tel: 201-526-6010; FSC No.: 54241; Empl.: 20 .... p. 3154

Local Sales Offices & Reps.

Cal	Santa Ana, J. Franek Co.	714-832-0290
Tex	Dallas, True Technology	214-691-7870
Exp:	Rahway, REA Intl. Ltd.	201-382-7100

ABACUS ELCTRNS. CORP., Dept. EM, 10 Hudson Terr., Dobbs Ferry, N.Y. 10522, Tel: 914-693-1450; Empl.: 25

(TM)ABACUS MICROCOMMAND SYSTEM - microcomputer development system - Information Control Corp.

(TM)ABACUS MICROMODULES - logic modules - Information Control Corp.

(TM)ABACUS MICROSYSTEM - microcomputer systems - Information Control Corp.

(TM)ABACUS MICROWARE - hardware & software for digital logic or programmable systems - Information Control Corp.

ABBOTT SCREW & MFG. CO., Dept. EM, 6525 N. Clark St., Chicago, Ill. 60626, Tel: 312-761-8400; Empl.: 161

ABBOTT TRANSISTOR LABS., Industrial Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016, Tel: 213-930-1040, Telex: 69-1398; Empl.: 14 .... p. 3156-3160

Sales Manager: A. Hilbert Dir. Mktg.

Local Sales Offices & Reps.

Mass	Burlington, Dynamic Sls. of New England	617-273-1199
NJ	Fort Lee, Abbott Transistors	201-224-6900
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685

abbott transistor

ABBOTT TRANSISTOR LABS, Power Supply Div., Dept. EM, 5200 W. Jefferson Blvd., Los Angeles, Cal. 90016, Tel: 213-936-8185, Telex: 69-1398; FSC No.: 15755; Empl.: 125 .... p. 3156,3161-3168

Sales Manager: W. Lovett

Refer to Abbott Transistor Labs. Industrial Div. for sales office information.

ABBOTT TRANSISTOR LABS., Transformer Div., Dept. EM, 639 So. Glenwood Pl., Burbank, Cal. 91506, Tel: 213-841-3630, Telex: 69-6282; Empl.: 15 .... p. 4349-4353

Sales Manager: W. Lovett

Refer to Abbott Transistor Labs Industrial Div. for sales office information.

ABESTO CORP., Dept. EM, Ackerman St., Bloomfield, N.J. 07003, Tel: 201-338-6814

(TM)ABLATAFLUX - Heat Flux sensor - Hy-Cal Engineering

ABLE CABLE DIV., Dept. EM, 115 S. Northwest Hwy., Barrington, Ill. 60010, Tel: 312-381-2460; Empl.: 25

Sales Manager: R. Knaack

Local Sales Offices & Reps.

Ill	Downers Grove, E. Joyner & Co.	312-968-8383
Tex	Dallas, G. Weinreich & Assoc.	214-321-2800

ABLESTIK LABORATORIES, Dept. EM, 833 W. 182nd St., Gardena, Cal. 90248, Tel: 321-6252, TWX: 910-346-7606; FSC No.: 21109

Local Sales Offices & Reps.

Cal	Los Altos, Neal Olson-Ablestik	415-326-8358

Mass	Sudbury, L. J. Maroni Assocs.	617-443-2170
NY	Camillus, H. C. Murray	315-487-0634
Pa	Colmar, E. Lasky Assocs.	215-822-2510
Tex	Dallas, Waddle Sls. Co.	214-638-2860
Wisc	Milwaukee, Process Technology	414-464-6620

ABRAMS INSTR., Dept. EM, 606 E. Shiawassee, Lansing, Mich. 48901, Tel: 517-484-9441, TWX: 810-251-0785; Empl.: 35

Local Sales Offices & Reps.

Ariz	Scottsdale, J.A. Swanson Assocs.	602-946-6950
Cal	N. Hollywood, Jewett Co.	213-789-8103
Conn	New Preston, NBS Assocs.	203-283-5959
Kans	Leawood, Thunderbird Tech. Sls. & Svcs., Inc.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs., Inc.	314-567-6488
Md	Ellicott City, McCourt Co.	301-465-4515
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs., Inc.	314-567-6488
Ohio	Cincinnati, Loesch Assocs.	606-331-4332
Ohio	Cleveland, Loesch Assocs.	216-241-4581

(TM)**ABSAFIL** - fiberglass reinforced ABS - Fiberfil Div. Dart Ind.

(TM)**ABSON** - ABS materials - Goodrich Co. Chemical Div. BF

(TM)**ABSORBO MOP** - sponge mop - Clean Room Prods.

(TM)**ABSORBO-WIPE** - urethane foam wiper - Clean Room Prods.

ACA, Dept. EM, P.O. Box 865, Burlington, Iowa 52601, Tel: 319-753-1625

Local Sales Offices & Reps.

Cal	Van Nuys, A. Szerlip Sls. Co.	213-782-1765
Fla	Ft. Lauderdale, Sproch Sls.	305-587-3792
Ga	Douglasville, I. Jones	404-942-1596
Ill	Centralia, Bob Dunn Sls. Co.	618-533-1775
Iowa	Wever, W.L. Brookhiser	319-372-2513
Mass	Braintree, Rudolph-MacInnis Assoc.	617-843-0908
Mich	Kentwood, Cecil Geer Co.	616-534-9449
Mo	Liberty, Lectro Reps	816-781-2522
NJ	Moorestown, DiVincent & Legato Assoc.	609-235-8299
NY	Elizabethtown, J. Grandrath	518-962-4500
Tex	Dallas, Townsend Sls. Co.	214-241-7791
Tex	Lewisville, J.M. Greiten	214-434-2870

(TM)**ACCELEREX** - high speed gold process. - Sel-Rex Div. Oxy Metal Industries Corp.

ACCEL INDL HEAT SINK, Dept. EM, 5338 Alhambra, Los Angeles, Cal. 90032, Tel: 213-221-9188; Empl.: 18

Local Sales Offices & Reps.

Cal	San Diego, Bill Gorman Assocs.	714-560-8611
Cal	San Francisco, P. O'Neal & Assocs.	415-924-1691

(TM)**ACCELOGRAPH** - planar accelerometer, visual direct recording - Humphrey, Inc.

ACCESSORIES FOR ELECTRONICS, Dept. EM, 800 Merrick Road, Baldwin, N.Y. 11510, Tel: 516-546-1751; FSC No.: 54355; Empl.: 19

Sales Manager: W.J. Epstein

Local Sales Offices & Reps.

Ala	Huntsville, Remco-Huntsville	
Cal	Garden Grove, H. Miller	714-893-4670
Cal	Los Angeles, Corcoran Assocs.	213-823-2425
Fla	Hallandale, L.M. Bairstow Assoc.	305-927-2421
Mass	Melrose, Accessories for Elctrns.	617-665-0666
Minn	Brainerd, M. (Red) Johnson	218-963-7875
Tenn	Bristol, Remco	615-968-4195

ACCESSO-WIRE, see Hepco Wire & Cable

(TM)**ACCESS PROCESS** - decapsulation process - Amphenol North America Div.

(TM)**ACCESS PROCESS** - decapsulation process - Amphenol North America Div.

(TM)**ACCESS 100** - selective decapsulation process - Amphenol North America Div.

(TM)**ACCESS 100** - selective decapsulation process - Amphenol North America Div.

ACCO, BRISTOL DIV., Dept. EM, 40 Bristol St., Waterbury, Conn. 06720, Tel: 203-756-4451, TWX: 203-754-1477; Empl.: 1200

Local Sales Offices & Reps.

Ala	Birmingham	205-871-6111
Ala	Mobile	205-871-6111
Cal	Los Angeles	213-723-9751
Cal	South San Francisco	415-837-2310
Colo	Denver	303-371-5460
Conn	Farmington	203-677-2839
Del	Wilmington	302-652-3166
Ga	Stone Mountain	404-939-2220
Ill	Melrose Park	312-378-2404
La	Baton Rouge	504-927-5829
Mass	Newton	617-969-6130
Mich	Madison Heights	313-399-9303
Mo	Webster Groves	314-961-1113
NJ	Clark	201-381-4100
NY	Buffalo	716-839-1483
NC	Charlotte	704-375-7658
Ohio	Cincinnati	513-351-0328
Ohio	Cleveland	216-333-3915
Okla	Tulsa	918-627-5695
Pa	Haverford	215-527-0301
Pa	Pittsburgh	412-923-2920
Tenn	Knoxville	615-588-3326
Tex	Houston	713-741-3400
Tex	Richardson	214-238-8196
Wash	Seattle	206-623-3361
Wisc	Milwaukee	414-476-1606

(TM)**ACCOPAC** - gasket materials - Armstrong Cork Co.

(TM)**ACCRALINE** - a solid state indicating temperature controller - Barber-Colman Co.

(TM)**ACCUCHART** - recorder chart paper - Gould, Inc.

(TM)**ACCU-COAT** - screen printer - Aremco Prods., Inc.

(TM)**ACCUCOM** - automatic data error corrector - International Data Sciences

(TM)**ACCU-CUT** - substrate cut-off machine - Aremco Prods., Inc.

(TM)**ACCUDATA** - signal conditioning - Honeywell, Inc.

(TM)**ACCUDEX** - positioning tables - Aerotech, Inc.

(TM)**ACCU-DIALS** - clear acrylic and aluminum - Rogan Corp.

(TM)**ACCU-DRILL** - ceramic drilling mach. - Aremco Prods., Inc.

(TM)**ACCUFILM** - drafting film - Bishop Graphics

(TM)**ACCUFLEX** - timers counters - Eagle Signal

(TM)**ACCU-FLO** - metering pump - Beckman Instrs., (AISSD)

(TM)**ACC-U-IOK** - electronic line shaft system - Control Systems Research, Inc.

(TM)**ACCULINE** - automatic rotary dip soldering system - Hollis Engrg., Inc.

(TM)**ACCULOCK** - recorders, magnetic tape - Emerson, Industrial Controls Div.

(TM)**ACCULOG** - recorders, magnetic tape - Emerson, Industrial Controls Div.

(TM)**ACCUMAT** - solid state controller - Hotpack Corp.

ACCUMET ENGINEERING CORP., Dept. EM, 1 Kane Industrial Dr., Hudson, Mass. 01749, Tel: 617-568-8311

Sales Manager: J.B. Snook

(TM)**ACCUMODE** - signal conditioner - Endevco

(TM)**ACCUPOWER** - power supplies-uninterruptible - Emerson, Industrial Controls Div.

(TM)**ACCUPRINT** - drafting vellum - Bishop Graphics

ACCURATE ELECTRONICS CO., Dept. EM, 2635 So. Wabash Ave., Chicago, Ill. 60616, Tel: 312-225-7500; Empl.: 25

Local Sales Offices & Reps.

Cal	San Rafael, H. Wells Assocs.	415-454-5730
Cal	Santa Ana, H. Wells Assocs.	714-547-4455
DC	Washington, Pow/El Corp.	202-333-1339
Ill	Chicago, Ropek-Cahill, Inc.	312-631-0070
Ind	Highland, H.S. Smolen Co.	219-838-2700
Mich	Detroit, R. Smith, Inc.	313-886-3930
Mo	St. Louis, Mocker & Assocs.	314-822-9595
NJ	Cherry Hill, Schindell Assocs.	609-424-1441
NY	Forest Hills, Malin Assocs. Co.	212-268-9122
NC	Charlotte, Engineering Sls. Co.	704-537-3011
Ohio	Cincinnati, Cholmondeley Ind'l. Assocs.	513-321-7094
Ohio	Cleveland, Hird & Son	216-331-7272
Pa	Pittsburgh, C.W. Duffett Co.	412-782-6221
SC	Columbia, Engrg. Sls. Co. of Carolina	803-799-0830
Tenn	Knoxville, Gallaher & Assocs.	615-984-7340
Tex	Dallas, Accurate Machine Prods.	214-241-0102
Tex	Houston, Beeco, Inc.	713-661-3192
Utah	Salt Lake City, D. W. Richardson Co.	801-467-9714
Va	Vienna, W. E. MacDonald Co.	703-938-4242
Wisc	Milwaukee, G. T. Stephenson & Assoc.	414-273-7275

ACCURATE ELECTRONICS CORP., Dept. EM, 169 S. Abbe Rd., P.O. Box R, Elyria, Ohio 44035, Tel: 216-365-1211; FSC No.: 11375; Empl.: 30

ACCURATE INSTRUMENT CO., Dept. EM, Box No. 925, Westbury, N.Y. 11590, Tel: 516-938-9262; Empl.: 12

Sales Manager: M. Scott

ACCURIDE, Div. of Standard Precision, Dept. EM, 12311 S. Shoemaker, Santa Fe Springs, Cal. 90670, Tel: 213-944-6236, TWX: 910-586-1632

Local Sales Offices & Reps.

Ala	Birmingham, Davidson Co.	205-871-0276
Ariz	Phoenix, Kennedy Sls.	602-275-7501
Cal	San Diego, CERCO	714-560-9211
Cal	Santa Clara, Nova-Tronix	
Cal	Santa Fe Springs, Accuride Div., Standard Prec.	213-944-6236
Cal	Tustin, Spaulding Sls. Co.	714-832-1384
Colo	Golden, B. Callister & Assocs.	303-761-0992
Fla	Margate, Davidson Co.	305-971-1865
Fla	Orlando, Davidson Co.	305-855-7675
Ga	Atlanta, Davidson Co.	404-449-6123
Ill	Rolling Meadows, Accuride	312-253-4770
Kans	Overland Park, Ensco-Rep, Inc.	913-381-7557
Mass	Holliston, Accuride	617-429-2474
Mich	Grand Rapids, J.E. Mackay Co.	616-451-4990
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
Mo	St. Louis, Ensco-Rep. Inc.	314-567-3935
NJ	Mountain Lakes, Components for Elctrns.	201-334-2921
NY	Syracuse, Components for Industry	315-472-6832
NC	Pineville, Davidson Co.	704-542-1729
Ohio	Troy, R.J. Pugh & Assoc.	513-335-7846
Pa	Spring House, Accuride	215-643-3777
SC	Clover, Davidson Co.	803-222-7611
Tex	Houston, Zonk Engrg. Co.	713-697-9302
Tex	Richardson, Zonk Engrg. Co.	214-238-7651

(TM)**ACCUSCALES** - precision measuring scales - Bishop Graphics

(TM)**ACCUSONIC** - liquid flowmeter systems (sonic or acoustic types) - Ocean Research Equipment, Inc.

(TM)**ACCUSPEDE** - controls-motor control - Emerson, Industrial Controls Div.

(TM)**ACCUSTAT** - solid state room control thermostat - PSG Industries Inc.

(TM)**ACCU/STAT** - controls - Allis-Chalmers

(TM)**ACCU-STRATES** - substrates .050" with a 2m" B/S - Accumet Engineering Corp.

(TM)**ACCUSWITCH** - reed switches - Morex, Inc.

ACCUTEST CORP., Dept. EM, 5 Esquire Rd., N. Billerica, Mass. 01862, Tel: 617-667-8501

(TM)**ACCUTRIM** - trimming potentiometers - Vishay Resistive Systems Grp.

accutronics | A HAMMOND CORPORATION COMPANY

ACCUTRONICS-A HAMMOND CORP., Dept. EM, 628 North St., Box 27, Geneva, Ill. 60134, Tel: 312-232-2600, TWX: 910-237-1680; FSC No.: 16484; Empl.: 140 .... p. 2408,2409

Sales Manager: W.C. Benson

Local Sales Offices & Reps.

Cal	Mountain View, Nor-Cal	415-961-8121
Cal	Northridge, Tauber-Dreyer Corp.	213-368-4011
Cal	San Diego, Tauber & Assocs., Inc.	714-274-7242

ACDC ELECTRONICS, Dept. EM, 401 Jones Rd., Oceanside, Cal. 92054, Tel: 714-757-1880, TWX: 910-322-1470; Empl.: 490 .... p. 3155

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assocs.	205-881-5031
Ariz	Scottsdale, OEM Specialties	602-948-3360
Cal	Lawndale, Group Three Elctrns Ward Davis Assocs.	213-542-7391
Cal	Oceanside, ACDC Direct	714-754-1880
Cal	San Diego, Harvey King, Inc.	714-566-5252
Cal	Sunnyvale, Group Three Elctrns Ward Davis Assocs.	408-245-4392
Colo	Boulder, PAR Assocs.	303-499-4736
Conn	Hamden, Instrs. Consultants	203-288-5246
Fla	Ft. Lauderdale, Beacon Elctrn. Assocs.	305-776-6074
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assocs.	404-351-3654
Ill	Arlington Heights, Dytec/Central	312-394-3380
Md	Rockville, Elctrn. Mktg. Assoc.	301-744-7700
Mass	Waban, Instr. Consultants	617-969-9881
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	St. Paul, Dytec/North, Inc.	612-645-5816
Mo	St. Louis, Dytec/South, Inc.	314-423-9595
Nev	Las Vegas, Harvey King	702-458-5342
NJ	Fort Lee, Tech. Mktg. Assocs.	201-224-6911
NM	Sandia Park, PAR Assocs.	505-881-5000
NY	East Syracuse, Ossmann Instrs., Inc.	315-437-6666
NY	Fort Lee, Tech. Mkt. Assocs.	201-224-6911
NY	Rochester, Ossmann Instrs., Inc.	716-328-2230
NY	Vestal, Ossmann Instrs., Inc.	607-785-9947
NC	Charlotte, Beacon Elect. Assoc.	704-525-7412
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Lake Oswega, Wilson Applied Inst.	503-636-0965
Pa	King of Prussia, Elctrn. Mktg. Assocs.	215-248-5050
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tenn	Oak Ridge, Beacon Elect. Assoc.	615-482-2409
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-2251
Utah	Salt Lake City, R²M Manf. Rep.	901-972-5646
Wash	Bellevue, Wilson Applied Inst.	206-641-6444

ACE PLASTIC CO., INC., Dept. EM, 91-30 Van Wyck Expwy, Jamacia, N.Y. 11435, Tel: 212-523-5500; Empl.: 100

ACHESON COLLOIDS CO., Div. Acheson Inds., Dept. EM, 1635 Washington Ave., Port Huron, Mich. 48060, Tel: 313-984-5581, TWX: 810-231-5265; Empl.: 150

Local Sales Offices & Reps.

Cal	LaMirada	714-523-8812
Ga	Atlanta	404-451-7452
Ill	Chicago	312-664-2032
Mass	Boston	617-662-6787
Mich	Grosse Pointe Woods	313-885-3043
NJ	Elizabeth	201-353-0414
NY	Rochester	716-381-7610
Ohio	Cincinnati	513-272-1203
Ohio	Cleveland	216-521-1900
Ohio	Hudson, Rep/Douglas Sawyer	216-653-5811
Pa	Exton	215-363-6646
Tex	Dallas	817-292-4264

ACKERMAN GOULD CO., INC., Dept. EM, 10 Neil Ct., Box 188, Oceanside, N.Y. 11572, Tel: 516-678-4110, TWX: 147209 NEPA; Empl.: 20

Sales Manager: A.P. Fiorey

Local Sales Offices & Reps.

Cal	Anaheim, J. Farley Sls	714-992-4603
Fla	Clearwater, MacGregor Assoc	813-446-7310
Ga	Lilburn, MacGregor Assoc	404-921-1300
Ill	Northbrook, Marsland Distr. Corp	312-295-1616
Kans	Baxter Springs, Prod. Automation Corp.	
Ky	Dayton, Electro Enterprise	513-426-6071
Md	Silver Spring, ARA Elctrns	301-565-2585
Mass	Marlboro, Parker Assoc.	617-485-7096
Mich	Grand Rapids, C.A. Geer Co.	616-247-1656
Minn	Minneapolis, Prod. Automation Corp.	612-429-5700
Mo	Raytown, Prod. Automation Corp.	816-737-0066
NY	Spring Valley, Salt Assoc.	914-354-5443
NY	Syracuse, Maloney Sls.	315-488-3440
NC	Charlotte, MacGregor Assoc	704-375-1562
Ohio	Cleveland, Electro Enterprise	216-261-7670
Ohio	Dayton, Electro Enterprise	513-426-6071
Ore	Portland, Vandy	501-292-8633
Pa	Glenside, ARA Elctrns	215-TU 7-5250
Tex	Dallas, Sivright	214-241-9196
Va	Richmond, ARA	804-285-9309

(TM)ACL - pyro-processing system - Allis-Chalmers

ACME BATTERY CORP., Dept. EM, 700 Canal St., Stamford, Conn. 06904, Tel: 203-324-4125; Empl.: 50

Sales Manager: L.M. Dorflinger

ACME CHEMICAL & INSULATION CO., Dept. EM, 166 Chapel St., New Haven, Conn. 06513, Tel: 203-562-2171; Empl.: 75

Local Sales Offices & Reps.

Ariz	Phoenix, E.J. Foley Assoc.	602-945-2665
Cal	Los Angeles, Electrical Specialty	213-724-9600
SC	West Columbia, Wilkie Assoc.	803-359-4531
Tex	Dallas, Kentron Eng.	214-352-7535

ACME ELECTRIC, Dept. EM, 614 Water St., Cuba, N.Y. 14727, Tel: 716-968-2400, TWX: 510-245-2700; Empl.: 1200

Local Sales Offices & Reps.

Ariz	Phoenix, R.A.Poister	602-266-0043
Cal	Menlo Park, Enstor, Inc.	415-368-1600
Cal	Santa Ana, California Elctrn. Mktg.	714-835-2702
Ill	Rolling Meadows, Lightner Assocs.	312-398-3000
NH	Nashua, R.P. Reese	603-883-2407
NJ	Cherry Hill, J.N. Barrett Assocs.	609-429-1551
NY	Manlius, E.D. Sweeney	315-682-6915
NY	Vestal, W.J. Frey	607-748-8053
Ohio	Galion, J.R. Bright Agency	419-468-3787
Va	Lynchburg, J.A. Griffin Co.	804-384-5236

ACME ELEC. HEATING CORP., Dept. EM, 4685 E. 11th, Hialeah, Fla. 33013, Tel: 305-685-8326; Empl.: 12

ACME MODEL ENGRG. CO., Dept. EM, 654 Bergen Blvd., Ridgefield, N.J. 07657, Tel: 201-943-7650; Empl.: 16

ACME PLASTIC PRODUCTS CO., INC., Dept. EM, 9629 N. 22nd Ave., Phoenix, Ariz. 85021, Tel: 602-997-9944; Empl.: 6

ACOPIAN CORP., Dept. EM, Box 585, Easton, Pa. 18042, Tel: 215-258-5441, TWX: 847-4913,510-651-4949; FSC No.: 14749 .... p. 3169-3199, Inside Front Cover

Sales Manager: T. Skopal

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assoc.	602-947-4297
Cal	Los Angeles, Basic Sys. Co.	213-938-2833
Cal	Palo Alto, Held & Mollard, Inc.	415-965-9321
Cal	San Diego, Basic Sys. Co.	714-279-9641
Colo	Denver, Williams Assoc.	303-373-4730
Conn	Enfield, Meas. Equip. Co.	203-745-9050
Fla	Melborne, Acopian Corp.	305-727-1172
Ill	Wheeling, Potter-Mac Co.	312-541-4600
Kans	Olathe, Rush & West Assoc.	913-764-2700
Md	Ellicott City, Doss Elctrns.	301-465-1336
Mass	Wakefield, Meas. Equip. Co.	617-245-4870
Mich	Birmingham, J.C. Hofstetter Co.	313-646-3635
Minn	Minneapolis, Helmann Co.	612-861-6051
Mo	Ballwin, Rush & West Assoc.	314-394-7271
NM	Albuquerque, Williams Assoc.	505-255-1638
NY	Elbridge, L-Tron Corp.	315-689-3787
NY	Huntington, J.N. Sweeney & Co.	516-692-4222
NY	Latham, L-Tron Corp.	518-785-5032
NY	Newark Valley, L-Tron Corp.	607-724-7442
NY	Scottsville, L-Tron Corp.	716-436-4410
NC	Charlotte, Jake Rudisill Assoc., Inc.	704-377-6901
Ohio	Dayton, J.C. Hofstetter Co.	513-296-1010
Ohio	Medina, J.C. Hofstetter Co.	216-725-4477
Okla	Tulsa, Norvell Assoc.	918-663-1247
Pa	Ardmore, Martin Assoc.	215-649-6332
Tex	Austin, Norvell Assoc.	512-458-8106
Tex	Dallas, Norvell Assocs.	214-233-0020
Tex	Houston, Norvell Assocs.	713-777-1666

(TM)ACOUSTALLOY - diaphragm - Electro-Voice, Inc.

(TM)ACOUSTA-MASTER - amplifiers & sound sys - Bogen Div.

(TM)ACOUSTA-VOICING - sound equalization process - Altec Div.

(TM)ACOUSTAZIP - acoustical materials & jacketing - Zippertubing Co.

ACOUSTIC POWER SYSTEMS, INC., Dept. EM, 3152-D E. La Palma, Anaheim, Cal. 92806, Tel: 714-535-5490, Telex: 67-8401; Empl.: 5

Local Sales Offices & Reps.

Cal	Montebello, Tucul Engrg. Co.	213-728-7397
Conn	New Haven, Vibration Sls. & Svc.	203-389-1527
Fla	Fern Park, Bilred Assocs.	305-831-1668
Ill	Des Plaines, Maher Engrg. Co.	312-824-2124
Md	Crofton, Technical Sys.	301-261-6600
Mich	Ferndale, Tiby Co.	313-547-3550
NJ	Teaneck, I. Rudnick	201-836-7392
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
Tex	Dallas, Merit Co.	214-620-0021

(TM)ACOUSTIFOAM - windscreen material - Electro-Voice, Inc.

ACOUSTONE CORP., Dept. EM, 80 Wythe Ave., Brooklyn, NY 11211; Empl.: 50

Local Sales Offices & Reps.

Cal	San Francisco, Meyer & Ross	415-864-8880
Cal	Van Nuys, Oberman-Renner Sales co.	213-997-1124
Colo	Aurora, A-E-S	303-366-0208
Fla	Miami, Raulson Co.	305-226-6013
Ga	Marietta, Guyer & Assoc.	404-971-2831
Ill	Chicago, Lassers & Co.	312-539-0170
Ind	Indianapolis, J. S. Sls.	317-547-7583
Mass	Sharon, A. Appel Assoc.	617-784-3439
Mich	Oak Park, J. Shay Assoc.	313-546-0194
Minn	Minneapolis, Ripley & Assoc.	612-881-8282
Miss	Greenwood, Le Roy Massey Co.	601-GL3-3038
Mo	Jefferson City, C. A. Vignola Assoc.	314-893-3205
NY	Brooklyn, S. Verter Sls. Co.	212-444-3880
Ohio	Columbus, Mandabach-Lehner Co.	614-235-0265
Ore	Portland, R. Minthorne Co.	503-246-4556
Pa	Pittsburg, Mandabach Lehner Co.	412-279-2264
Pa	Willow Grove, R. Lewis Sls.	215-659-0704
Tenn	Memphis, Lewis Jones	901-683-7616
Tex	Houston, Ranger Elctrns. Co.	713-626-1432

ACRO TOOL & DIE WORKS, Dept. EM, 4554 Broadway, Chicago, Ill 60640

(TM)ACROD - hot plates - Acme Elec. Heating Corp.

ACRODYNE CONTROLS, Dept. EM, Box 1044, Janesville, Wisc. 53545, Tel: 608-752-9081; Empl.: 12

(TM)ACRO-LARM - emergency telephone dialer - Acron Corp.

(TM)ACROM - hot plates - Acme Elec. Heating Corp.

ACROMARK CO., Dept. EM, 60 Locust/Dept. 397, Berkeley Hts., N.J. 07922, Tel: 201-464-6474; Empl.: 50

Local Sales Offices & Reps.

Cal	Lafayette, Diablo Pacific	415-283-1313
Cal	Pasadena, J. Dan Culp Sales Co	213-578-1226
Colo	Denver, Plateau Machinery Co.	303-758-0135
Ga	Atlanta, EME Assocs.	404-237-0464
Ill	Downers Grove, Midwest Tech. Ser.	312-968-4343
Mich	Adrian, E. Loncki	517-263-6539
NY	Skaneateles, Tech-Sonic Assocs.	315-685-6144
Tex	Houston, Mercer Engrs.	713-529-6121
Wash	Hoodsport, G.M. Earsley Co.	206-877-9707

ACROMAG, INC., Dept. EM, 30765 Wixom Rd., Wixom, Mich. 48096, Tel: 313-624-1541, Telex: 230-505; Empl.: 52

Local Sales Offices & Reps.

Cal	Buena Park, D.A. Matthews/Assoc.	714-994-4321
Cal	Palo Alto, Priz Co.	415-326-9333
Colo	Denver, C.E.C., Inc.	303-399-6931
Fla	Ruskin, L.E. Rogers Co.	813-645-1453
Ga	Atlanta, R. Freeman Assocs.	404-261-9065
Ill	Schaumburg, Carvel Engrg. Co.	312-885-8800
Kans	Shawnee Mission, D. Allert Co.	913-831-4244
La	Baton Rouge, Petro-Chem. Equip. Co.	504-927-4380
La	Metairie, Petro-Chem. Equip. Co.	504-586-9337
Mass	Norwell, Bordewieck Engrg. & Sls.	617-659-4915
Mich	Ann Arbor, H.C. Heym Assocs.	313-971-6552
Mich	Marquette, NWR Elctrns. Corp.	906-226-7578
Mich	Saginaw, H.C. Heym Assocs.	517-799-0873
Minn	Edina, NWR Elctrns. Corp.	612-831-6240
Minn	Virginia, NWR Elctrns. Corp.	218-741-5080
Mo	St. Louis, Scherrer Instr. Co.	314-644-5362
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NY	Albany, O.R. Lawrence Co.	518-456-4444
NY	Buffalo, O.R. Lawrence Co.	716-839-4422
NY	New York, Neville & Vespo Corp.	212-539-1515
NY	Syracuse, O.R. Lawrence Co.	315-455-5587
NC	Matthews, W.K. Hile Co.	704-847-9125
Ohio	Chagrin Falls, J. Kilroy Corp.	216-247-8997
Ohio	Cincinnati, G.H. Drysdale & Assoc.	513-752-2069
Okla	Tulsa, D. Allert Co.	918-743-7705
Ore	Portland, McLaren, Inc.	503-297-2248
Pa	Bridgeville, Instr. Svcs., Inc.	412-221-3601
Pa	Devon, B & A Assocs.	215-688-5173
Tenn	Knoxville, W.K. Hile, Co.	615-690-1061
Tenn	Memphis, M. Watson Co.	901-272-7495
Tex	Houston, Gay Engrg. & Sls.	713-869-3306
Tex	Midland, Gebhart & Boyd Assoc.	915-697-2263
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Va	Chester, W.K. Hile, Co.	804-737-1721
Wash	Bellevue, McLaren, Inc.	206-454-3400
WVa	St. Albans, Instr. Svcs., Inc.	304-722-2953
Wisc	Glendale, Carvel Engrg.	414-352-6630
Exp:	Mass., Boston, Extech Int'l.	617-227-7090

ACRON CORP., Dept. EM, 1095 Towbin Ave., Lakewood, N.J. 08701, Tel: 201-364-7200, TWX: 710-723-8342; Empl.: 40

Sales Manager: S.W. Heritage

Local Sales Offices & Reps.

Ariz	Phoenix, Mountain West Alarm	602-263-8831
Cal	Glendale, Detectronics	213-240-4035
Cal	Hayward, Consolidated Communications Corp.	415-886-5115
Ga	Atlanta, Detectronics	404-875-8601
Ind	Michigan City, S & B Distrs.	219-872-0569
Mass	Watertown, Detectronics	617-929-1245
Mich	Detroit, Alarm Supp. Co.	313-255-2303
Tex	Dallas, Detectronics	214-363-7377

™ACRO SENSE - electronic motor control - Gould, Inc.

™ACRO SYNC - electronic motor synchronizer - Gould, Inc.

ACROSYS, Dept. EM, Box 687, Philomath, Ore. 97370, Tel: 503-929-5880

Sales Manager: B.A. Miklashek

™ACRYLAFIL - filberglass reinforced styrene-acrylonitrile - Fiberfil Div. Dart Ind.

™ACRYLI-CAL - heat resistant low heat-cured transfers - Meyercord Co.

™ACRYLIGLAS - acrylic-coated glass sleeving - Natvar Corp.

™ACRYLWELD - 2-part acrylic adhesive - Hardman Inc.

™ACTEC - keyboard-multi-function - Auto Trol Corp.

™ACTIGRAPH III - paper radiochromatography counter - Searle Analytic Inc. & Searle Radiographics Inc.

™ACTINIC - stamp pads & inks - Phillips Process Co., Inc.

™ACTIONATOR - heavy duty industrial motors - Honeywell

ACTION LABS INC., Dept. EM, 3238 Washington Ave. N., Minneapolis, Minn. 55412, Tel: 612-522-4391; Empl.: 45

ACTIVE CONTROL INSTRUMENTATION, Dept. EM, PO Box 243-Wildwood Circle, Key Largo, Florida 33037, Tel: 305-451-1000; FSC No.: 55116; Empl.: 6 p. 2381

ACTIVE & PASSIVE COMPONENTS, Dept. EM, 6 Aerial Way, Syosset, N.Y. 11791, Tel: 516-433-5311, TWX: 510-221-1807; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Repcom Inc.	205-534-9959
Ariz	Phoenix, R.L. Davis Co.	602-955-2266
Cal	Gardena, El Tec Systems	213-981-9881
Cal	Oakland, MHR Sls. Agency	415-569-1564
Fla	Ft. Lauderdale, Repcom, Inc.	305-564-1929
Fla	Jacksonville., Repcom, Inc.	904-733-8381
Fla	Melbourne, Repcom Inc.	305-254-1877
Fla	Miami Springs, Repcom, Inc.	305-887-8723
Fla	Orlando, J. Gilbert	305-894-7217
Fla	Pensacola,, Repcom, Inc.	904-476-6522
Fla	Seminole, G. Tillett	813-393-0584
Ga	Warner Robins, O. Bowman	912-923-1393
Ill	Glenview, Crimson Engrg. Co.	312-724-1780
Ind	Fort Wayne, W.W. Bieberich, Inc.	219-432-2537
Ind	New Albany, W. Berberich & Co.	812-934-3187
Md	Baltimore, Bernard White & Co.	301-484-5400
Mass	Brookline, Harman Assocs.	617-232-6687
Mich	Detroit, Nicon Assocs.	313-341-7668
Minn	Minneapolis, G. E. Arneson & Co.	612-835-2177
Mo	Kansas City, K-Mar Sls. & Engr.	816-763-3466
NJ	Cherry Hill, Jay Assocs.	609-662-0399
NJ	Kenilworth, Ventronics, Inc.	201-272-9262
NY	Buffalo, Telesco Assocs.	716-834-1026
NY	Fayetteville, Graydon-Sherman	315-637-9861
NY	Pittsford, Graydon-Sherman	716-381-8838
Ohio	Dayton, S. Tetlebaum	513-276-5808
Tex	Addison, Southland Comps.	214-233-0603
Tex	Houston, Southland Comps.	713-782-4575
Wash	Kirkland, T. Brian Ind.	206-827-5811

™ACTO - automatic frequency measuring system - Systron-Donner Corp.

™ACTOGLAS - epoxy coated glass cloth semi-cured - Natvar Corp.

A C TRANSFORMER CORP., Dept. EM, 89 Madison St., Newark, N.J. 07105, Tel: 201-589-8574; Empl.: 13

™ACTS - automatic continuity test system - Data Numerics

™ACUFLEX - acupuncture equip. - Jaesic Industries Co.

™ACU-MIN - miniature industrial tools - Moody Tools, Inc.

ACUREX-AUTODATA, Dept. EM, 485 Clyde, Mountain View, Cal. 94042, Tel: 415-964-3200, TWX: 910-379-6593; Empl.: 600

Sales Manager: J. Satuloff

Local Sales Offices & Reps.

Ala	Huntsville, Burnette Techno-metrics	205-837-5860
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Costa Mesa, Feeger Lucas Wolf	213-860-4695
Cal	Los Altos, J. Stone & Assocs.	415-948-4563
Cal	San Marino, Dale-Dahl Assocs.	213-682-3417
Colo	Arvada, Figaro-Klebba Assocs.	303-424-0108
Fla	Maitland, Sls. Engrg. Rep.	305-647-2226
Ga	Atlanta, Craft Assocs. Co.	404-393-0400
Ill	Arlington Heights, Dytec Central	312-394-3380
Kans	Overland Park, Dytec South	913-384-2710
Mass	Natick, A. Peskin Corp.	617-653-3919
Mich	Southfield, Stress Analysis Srvcs.	313-356-6686
Minn	St. Paul, Dytec North	612-645-5816
Mo	St. Louis, Dytec South	314-423-9595
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NJ	Englewood, Tridon Sls. Co.	201-569-8011
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Syracuse, Ossman Instrs.	315-437-6666
Ohio	Dayton, RDP Assocs.	513-253-6175
Ohio	Medina, Stress Analysis Srvcs.	216-725-7733
Pa	Jenkintown, PDC Corp.	215-887-9610
Tex	Dallas, Concept Sls.	214-241-5202
Utah	Salt Lake City, Applied Engrg. Prods. Co.	801-582-4942
Wash	Bellevue, Hickey Engrg. Sls. Co.	206-454-0460
Wash	Lynwood, Indl. Elctr. Instrs. Co.	206-775-3516

ACUSHNET CAPACITOR CO., Dept. EM, 720 Belleville, New Bedford, Mass. 02745, Tel: 617-999-3291, TWX: 710-344-6451; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, TMA	205-883-7893
Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Hawthorne, WCV Co.	213-772-4479
Cal	Santa Clara, Fahrner-Miller Assocs.	408-984-1700
Fla	Pompano Beach, TMA	305-942-0774
Ill	Chicago, L-Tec Inc.	312-286-1500
Ind	Indianapolis, F. Campisano	513-662-1616
Kans	Leawood, Thunderbird Sls.	913-642-7220
Md	Baltimore, Burgin-Kreh	301-788-5200
Mass	Lexington, J.E. Boeing Co.	617-862-2500
Minn	Minneapolis, J. Barnes Sls.	612-474-2907
Mo	St. Louis, Thunderbird Sls.	314-567-6488
NJ	W. Caldwell,, Masin-Esco	201-226-2550
NY	Ithaca, B. Dean	607-272-2187
NY	Syosset, Masin-Esco	516-364-0310
NC	Winston-Salem, Burgin-Kreh	919-768-4174
Ohio	Cincinnati, F. Campisano	513-662-1616
Pa	Pittsburgh, G. Root Co.	412-561-4125
Tex	Dallas, Bonser-Philhower	214-234-8438
Va	Lynchburg, Burgin-Kreh	703-845-5600
Wash	Seattle, B. Blum Assoc.	206-282-2590

™AD - vibratory feeders, placement units - Automation Devices, Inc.

AD AUTOMATION, Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625, Tel: 716-381-2370; Empl.: 80

Local Sales Offices & Reps.

Cal	So San Francisco, Howard & Co.	415-589-3050
Cal	Van Nuys, Elliott Assoc.	213-781-8454
Md	Riverdale, Riggs Assocs.	301-927-3380
Mass	Chelmsford, S&S Elctrns.	617-273-0115

A. D. DATA SYS., INC., Dept. EM, 830 Linden Ave., Rochester, N.Y. 14625, Tel: 716-334-9649; Empl.: 35 p. 2789

Sales Manager: H. Turner

Local Sales Offices & Reps.

Cal	Glendale, Gru Assocs.	213-244-8441
Cal	La Canada, Gru Assocs.	213-790-8160
Cal	Mission Viejo, Gru Assocs.	714-586-1992
Cal	Sunnydale, Gru Assocs.	408-734-3000
Ill	Elk Grove, R. Tek	312-439-9090
Mass	Chelmsford, S&S Elctrns.	617-459-2578
Mich	Ferndale, Tiby Co.	313-547-3550
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
Tex	Dallas, Bouco	214-247-6708
Tex	Houston, Bouco	713-665-6121

AD-VANCE MAGNETICS, Dept. EM, 226 E. 7th St., Rochester, Ind. 46975, Tel: 219-223-3158, TWX: 810-290-0294; Empl.: 17 p. 2661

Local Sales Offices & Reps.

Cal	Los Altos, Frauman Assoc.	415-941-0660
Cal	Pasadena, A-F Sls.	213-681-5631
Conn	Meriden, A. Allison	203-237-9232
Fla	Hollywood, A.P. Assocs.	305-987-6720
Ill	Westchester, Brouillette	312-345-6500
Md	Baltimore, D.K. Jones Assoc.	301-752-0577
NJ	Fairlawn, Harris Assoc.	201-796-5200
Ohio	Dayton, D. Grupe Co.	513-298-6644
Pa	Flourtown, Eastern Comps.	215-836-1616
Tex	Dallas, Techno Assoc.	214-357-9213

Local Distributors

Cal	Los Angeles, Mil-Comm Distributors	213-478-0525

ADALET MFG. CO., Div. Scott & Fetzer Co., Dept. EM, 4801 W. 150th St., Cleveland, Ohio 44135, Tel: 216-267-9000, Telex: 98-5349; FSC No.: 73389; Empl.: 123

Local Sales Offices & Reps.

Ala	Birmingham, C.W. Ashby Co.	205-879-1651
Cal	Emeryville, G.E. Honn Co.	415-653-0737
Cal	Los Angeles, H.R. "Tex" Benike Assocs.	213-263-7451
Colo	Denver, Electrical Agencies Co.	303-623-8245
Fla	Coral Springs, Dineen Assocs.	305-752-1646
Ga	Atlanta, Roy E. Wilson Co.	404-876-8833

Ill	Rosemont, L. Butter & Assocs., Inc.	312-671-5040
Ind	Indianapolis, Bennett Elec. Sls. Co.	317-257-1426
Kans	Shawnee Mission, Stover & Assocs.	913-649-6600
La	Metairie, General Power & Control Corp.	504-834-1345
Md	Pikesville, Wilson Assocs., Inc.	301-252-2231
Mass	Boston, C.C. Pierce Co., Inc.	617-268-8816
Mich	Detroit, Engel-Klaes Co.	313-342-9220
Minn	Minneapolis, Pinkney & Assocs., Inc.	716-839-3373
Mo	St. Louis, A. Haumesser Co.	314-781-1225
Neb	Omaha, Electrical Prods. Co.	402-393-7350
NM	Albuquerque, R.B. Black Co.	505-265-0144
NY	Bronx, Schofield/Coe Assocs.	212-933-2900
NY	Rochester, Canavan-Scanlon Assocs., Inc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assocs., Inc.	315-437-1271
Ohio	Cincinnati, C.J. Leesman Sls. Co.	513-681-2081
Ohio	Columbus, C.J. Leesman Sls. Co.	614-457-4700
Ohio	Dayton, C.J. Leesman Sls. Co.	513-866-0312
Okla	Tulsa, C. Mullen & Assocs.	918-749-4991
Pa	Jenkintown, Jacobson-Rodger Assocs.	215-884-5524
Pa	Pittsburgh, Gormley Electric.	412-371-4111
Tex	Dallas, W.J. Heummer Agency	214-339-3600
Tex	Houston, Ampsco	713-523-7486
Utah	Salt Lake City, B. Cable & Equip. Co.	801-364-3452
Va	Portsmouth, H.K. Spencer	703-488-3041
Wash	Seattle, Strohecker, Inc.	206-623-0357
WVa	Charleston, Skaff Engrg. Co.	304-342-0131
Wisc	Milwaukee, A.W. Schwind Co.	414-276-9988

™ADAM - modular bread boarding system - E & L Instruments, Inc.

ADAM CO., INC., W. D., Dept. EM, 630 W. 17th St., Costa Mesa, Cal. 92627, Tel: 714-646-4488

Sales Manager: P. Weigl

ADAMS RITE PRODS., INC., Dept. EM, 540 W. Chevy Chase Dr., Glendale, Cal. 91209, Tel: 213-241-5121, TWX: 910-497-2276; Empl.: 130

Local Sales Offices & Reps.

Cal	N. Hollywood, Air Frame Mfg. & Supply Co.	213-875-2094
Kans	Wichita, D & O Engrg. Co.	316-264-7358
Mass	Waltham, United Engrg. Sls. Co.	617-890-6680
NJ	Livingston, Varrelman Gorman Inc.	201-992-2505
Ohio	Worthington, ROC Assocs.	614-885-1057
Pa	Newton Square, Hagy Assocs.	215-459-0504
Tex	Hurst, Edmar Technical Sls.	817-282-5561
Wash	Bellevue, S. P. Inc.	206-454-0660

ADAMS-RUSSELL CO., INC., Dept. EM, 280 Bear Hill Rd., Waltham, Mass. 02154, Tel: 617-899-3211, TWX: 710-324-0618; Empl.: 450

ADAMS-SMITH INC., Dept. EM, Summer Rd., Boxboro, Mass. 01719, Tel: 617-263-1400; Empl.: 12

Adlake
SINCE 1857

ADAMS & WESTLAKE CO., Dept. EM, 1025 W. Michigan St., Elkhart, Ind. 46514, Tel: 219-264-1141, Telex: 25-8458; Empl.: 380 .... p. 3406,3407

Sales Manager: D.J. Synnott

Local Sales Offices & Reps.

Ala	Birmingham, E.J. Ruth Assoc.	205-979-0511
Cal	Tustin, Sierra-Pacific Engrg.	714-731-3411
Cal	Walnut Creek, P.W. Jasin Co.	415-935-6339
Colo	Englewood, Electronic Sls. Inc.	303-771-6300
Conn	Berlin, White Sls. Co.	203-224-0423
Ill	Chicago, Adams & Westlake Co.	312-754-2727
Ind	South Bend, Valentine-Schillinger Assoc.	219-291-6258
Mass	Needham, White Sls. Co.	617-444-3676
NM	Albuquerque, Cleveland Enterprises Inc.	505-345-2481
NY	East Northport, Jarms Assoc.	516-368-3033
NY	Fayetteville, M.P. Andrews, Inc.	315-637-5291
Ohio	Beachwood, Electronic Salesmasters Inc.	216-831-9555
Ore	Portland, Syscom	503-644-2502
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
Pa	Radnor, W. Henry Cordray Sls. Co.	215-687-1366

Local Distributors

Ala	Birmingham, MG Elctrns. & Equip. Co.	205-328-4525
Cal	Los Angeles, Master Distributors	213-829-4656
Cal	San Francisco, Master Distributors	414-626-0807
Fla	Lakeland, AA Electric	813-682-6181
Ga	Norcross, AA Electric	404-449-8670
Ill	Chicago, Electro-Kinetics	312-286-4200
Mass	Waltham, Deveer Sales Engrg.	617-899-5900
Mich	Bellevue, Dingman Electric Supply	313-697-9151
NJ	Fair Lawn, Relay Specialties	201-797-3313
NC	Greensboro, Energy Conversion	919-378-1221
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Portland, Platt Electric Supply	503-228-6121
Pa	Huntingdon Valley, Shap Electronics	215-698-9550
Pa	McKeesport, Barno Radio Co.	412-664-9394
Wash	Seattle, Platt Electric Supply	206-624-4083
Wisc	Cedarburg, AA Electric	414-377-7500
Wisc	Greenbay, AA Electric	414-499-0258

™ADAPT-A-PATH - computerized numerical control sys. - General Automation

™ADAPT-A-SWITCH - Non Lighted & Lighted Pushbutton Switches - Arrow-Hart, Inc.

ADAPTER/CHARGER PRDTS., Dept. EM, P.O. Box 3218 8727 N. Pioneer Rd., Peoria, Ill. 61614, Tel: 309-691-0810; Empl.: 50

Local Sales Offices & Reps.

Minn	Minneapolis, Jos. Co. Sls. Engrg.	612-835-5858

™ADAPT-O-MOUNT - motor base adapter - Overly-Hautz Co.

™ADAPTS - analog/digital processing and test system - Varian Graphics

ADAR ASSOCS., INC., Dept. EM, 11B North Ave., Burlington, Mass. 01803, Tel: 617-273-1850, TWX: 710-332-6878; Empl.: 65

Local Sales Offices & Reps.

Cal	South El Monte, QPL Assocs.	213-575-8022
Cal	Sunnyvale, Adar West Coast	408-734-3937
Colo	Boulder, Mile High Elctrns.	303-444-5615
Colo	Vail, Mile High Elctrns.	303-476-1149
Fla	W. Palm Beach, Production Sales	305-689-0565
Fla	W. Palm Beach, Production Sls Assoc.	305-689-0575
Ill	Des Plaines, Cozzens & Cudahy	312-298-3600
Ind	Indianapolis, Cozzens & Cudahy	317-244-2456
Md	Randallstown, Beacon Elctrns. Assoc.	301-922-1248
Minn	Minneapolis, Cozzens & Cudahy	612-884-4336
Mo	Kansas City, Cozzens & Cudahy	816-454-5836
Mo	Springfield, Del Tech	417-881-3667
NJ	Wayne, K&J Assocs.	201-694-3334
NY	E. Setauket, K&J Assocs.	516-751-8686
NY	Rochester, Scientific Devices NY	716-334-2445
Ohio	Brecksville, WRR Assocs.	216-526-2023
Tex	Dallas, Crockett Southwest Co.	214-251-1776
Tex	El Paso, Mile High Elctrns.	915-779-6350
Va	Falls Church, Beacon Elctrns. Assoc.	703-534-1673
Wash	Lynnwood, Systems Specialists	206-652-8617

ADC PRODS., Dept. EM, 4900 W. 78th St., Minneapolis, Minn. 55435, Tel: 612-835-6800, TWX: 910-576-2832; Empl.: 723

Local Sales Offices & Reps.

Cal	Menlo pk., ADC Western Sls. Office	415-323-1386
Colo	Denver, Parker-Webster Co.	303-770-1972
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Conn	Fairfield, Northeastern Reg. Sls. Off.	203-255-0644
Fla	Sanford, Southeastern Reg. Sls. Off.	305-322-5422
Ill	Oakbrook, Whitmore Assocs.	312-325-4727
NJ	Cherry Hill, Danco Corp.	609-424-5590
NM	Albuquerque, A.Q. Elctrns.	505-255-8701
Ohio	Cincinnati, J.W. Murray & Assoc.	513-662-1616
Ohio	Cleveland, C.A. Robinson Co.	216-381-9049
Tex	Dallas, ADC Dallas Sls. Office	214-241-6783

Local Distributors

Fla	Jacksonville, Southeast Elctrns., Inc.	904-356-3007
Ga	Atlanta, Power & Tele. Sup.	404-691-6813
Ga	Atlanta, Ack Radio Supply Co.	404-351-6340
Ga	Decatur, Southern Telephone Supply Co.	404-457-5512
Ill	Chicago, Newark Elctrns.	312-638-4411
Ind	Indianapolis, RA-Dis-Co.	317-637-5571
Kans	Lenexa, North Elect. Sup.	913-888-9800
Mo	Kansas City, Alexander Elctrns.	816-474-6656
NJ	Rahway, Terminal Elctrs.	201-381-5700
NY	New York, Harvey Elctrns.	212-575-5211
NY	New York, Gray Bar Elec. Co.	212-532-4000
NY	Woodbury, Harvey Radio Co.	516-921-8700
NC	Lexington, Power & Telephone Supply	704-249-0256
Ohio	Columbus, Buckeye Tele. Co.	614-488-0655
Ohio	Dayton, ESCO, Inc.	513-224-9192
Pa	Philadelphia, Philadelphia Elec.	215-568-7400
Tenn	Kingsport, Radio Elctrns. Supply	
Tenn	Memphis, Power & Tele. Sup.	901-324-8811
Tenn	Nashville, Electra Distr. Co.	
Tex	Dallas, Southern Telephone Supply	214-631-5340
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
For:	Can., Montreal, Que., Payette Radio Ltd.	514-866-6681
For:	Can., Toronto, Ont., Electro Sonic Supply	416-924-9301

ADCOR ELECTRONIC PACKAGING CORP., Dept. EM, 50 E. 41st St., New York, N.Y. 10017, Tel: 212-532-6862; Empl.: 10

ADCOTECH CORP., Dept. EM, 575 Maude Ave., Sunnyvale, Cal. 94086, Tel: 408-733-2820, TWX: 910-339-9238; Empl.: 40

Local Sales Offices & Reps.

Cal	Costa Mesa, Scrantom Engrg.	
Cal	Sunnyvale, Equip. Sls.	408-739-8011
Colo	Vail, Mile High Elctrns.	303-476-1149
Conn	Hamden, Equip. Sls.	203-248-5581
Fla	Ft. Lauderdale, Semquip, Inc.	305-772-3002
Mass	Chelmsford, Equip. Sls.	617-256-8547
Minn	Minneapolis, D.G. Perry & Co.	612-835-3313
NY	White Plains, Bartlett Assocs.	914-949-6476
Pa	Wayne, Bartlett Assocs.	617-879-7530
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Dallas, Crockett Southwest Co.	214-251-1776
Wisc	Milwaukee, Reptronics	
Exp:	Can., Ottawa, Ont., D.M.E. Sls.	613-829-1433

™ADD-A-TRACK - tape recorders - V-M Corporation

ADDELCO CORP., Advanced Dev. Elctrns. Div., Dept. EM, 56 Pickering St., Needham, Mass. 02192, Tel: 617-444-4754, TWX: 617-444-1931; Empl.: 23

ADDINGTON LABORATORIES, INC., Maser Hitemp Wire Div., Dept. EM, 800 N. Grand, Covina, Cal. 91724, Tel: 213-967-5311, TWX: 910-584-1339; FSC No.: 27338

Local Sales Offices & Reps.

Ariz	Phoenix, Clemick-Neenon Assocs.	602-279-7649
Cal	San Diego, Intercom Sls.	714-292-5901
Fla	Orlando, G. F. Bohmon Assoc.	305-855-0274
NJ	Medford, Component Consits.	609-654-2800
Wash	Seattle, H. J. Sls. Co.	206-522-6980

ADDINGTON LABORATORIES, INC., Corp. Hdqts., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086, Tel: 408-738-4940, TWX: 910-338-0208; Empl.: 260

ADDINGTON LABS., INC., Microwave Comps. Div., Dept. EM, 785 Palomar Ave., Sunnyvale, Cal. 94086, Tel: 408-738-4940, TWX: 910-339-9252; Empl.: 80

Sales Manager: Scott T. Porter

Local Sales Offices & Reps.

Cal	Los Altos, Stout-Loeswick	415-948-3265
Cal	Los Angeles, Midwin & Olifson	213-475-8568
Colo	Denver, Thorson Co.	303-759-0809
DC	Washington, Youth Assocs.	301-598-5740
Iowa	Cedar Rapids, S&O Sls.	319-393-1845
Kans	Wichita, Eugene Carbiener Assoc.	316-682-5782
Md	Ellicott City, Youth Assocs.	301-465-1272
Md	Kensington, Youth Assocs.	301-881-5300
Mass	Lexington, Eugene F. Delfino Co.	617-449-4141
Mass	Needham Heights, O'Sullivan & Murphy	617-449-4141
Mass	Reading, Geder & Rotondi Assoc.	617-944-3105
NJ	Westfield, Gray & Reed Assoc.	201-233-6116
NM	Las Cruces, Elctrn. Enterprises	505-524-0126
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Huntington Station, Gray & Reed Assoc.	516-271-6677
Ohio	Dayton, Ashby Assoc.	513-252-5627
Pa	Newtown Square, SWR Assoc.	215-356-8550

Tex	Richardson, Vector Sls.	214-234-4291
Wash	Renton, Baxley Assocs.	206-226-0650

ADDINGTON LABS, INC., Semiconductor Div., Dept. EM, 680 W. Maude Ave., Sunnyvale, Cal. 94086, Tel: 408-733-3883, TWX: 910-339-9230

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Los Altos, Stout-Loeswick	408-255-2085
Cal	Los Angeles, Midwin & Olifson	213-475-8568
Ind	Ft. Wayne, RF Specialists	219-485-8982
Iowa	Cedar Rapids, S & O Sls.	319-393-1845
Kans	Shawnee Mission, Florence & Meyer, Inc.	913-722-5210
Mass	Acton, J. Hohenadel Assoc.	617-245-0600
NY	Huntington Station, Gray & Reed Assocs.	513-433-3333
NY	Liverpool, R & D Assocs.	315-622-2350
Ohio	Dayton, Ashby Assocs.	513-252-5627
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Plano, Zeus Engrg.	214-423-2027

ADDINGTON LABS., INC., Solid State Prods. Div., Dept. EM, 783 Palomar Ave., Sunnyvale, Cal. 94086, Tel: 408-245-6810, TWX: 910-339-9230; Empl.: 120

Sales Manager: J.R. Campbell

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrns. Entprs.	602-266-9841
Cal	Fullerton, Midwin & Olifson, Inc.	213-475-8568
Cal	Los Altos, Stout-Loeswick	415-948-3265
Fla	Clearwater, Reynolds & Assocs.	305-773-4700
Fla	Satellite Beach, Reynolds & Assocs., Inc.	305-773-4700
Kans	Wichita, Eugene Carbiener Assoc.	316-682-5782
Me	Oqunquit, Micronic Assocs.	617-933-2121
Md	Kensington, Elctrn. Mktg. Assoc.	301-881-5300
NM	Las Cruces, Electronic Enterprises	505-524-0126
NY	Huntington Station, Gray & Reed Assoc.	516-271-6677
Ohio	Dayton, Ashby Associates	513-252-5627
Pa	King of Prussia, Elctrn. Mktg. Assoc.	215-248-5050
Tex	Garland, Vector Sls.	214-276-4518
Wash	Renton, Baxley Assocs.	206-226-0650

ADDISON DIV. MUIRHEAD, INC., Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092, Tel: 201-233-0610, Telex: 13-8275; Empl.: 10

Local Sales Offices & Reps.

Ala	Madison, Saber Assocs.	205-534-3385
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	Altedena, Measurement Assocs.	213-671-7651
Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Cal	Oakland, Advanced Technology	415-452-1401
Colo	Denver, Zeus, Inc.	303-770-5666
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Iowa	Cedar Rapids, Tech. Reps. Inc.	319-396-5662
Kans	Olathe, Technical Reps.	913-782-1177
Md	Bethesda, S & S Assocs.	301-654-1434
Mich	Detroit, Electro Entprs.	313-521-1500
Minn	Minneapolis, Engrg. Prods. Assoc.	612-925-1883
Mo	Hazelwood, Tech. Reps. Inc.	314-731-5200
Mo	Independence, Tech. Reps., Inc.	816-737-1414
NM	Albuquerque, Zeus, Inc.	505-268-3941
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Cleveland, Electro Entprs.	216-261-7670
Ohio	Dayton, Electro Entprs.	513-426-6071
Pa	King of Prussia, S & S Assocs.	215-265-3450
Pa	Pittsburgh, Electro Entprs.	412-371-8497
Tex	San Antonio, Ashcraft Assocs.	512-824-7267
Utah	Salt Lake City, Zeus Inc.	810-466-4924

ADDMASTER CORP., Dept. EM, 416 Junipero Serra Dr., San Gabriel, Cal. 91776, Tel: 213-285-1121, Telex: 67-4770; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Cal	Los Altos, Sys. Mktg. Conslts.	415-941-7122
Colo	Denver, Grifco	303-795-1989
Fla	Palm Bay, Scientific Devices	305-723-1800
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Md	Bethesda, S & S Assocs.	301-654-1434
Mass	Wellesley Hills, Datamart	617-235-5520
Minn	Bloomington, Scientific Sls.	612-881-3300
NJ	Ridgewood, Instrumentation Sls.	201-445-5210
NM	Albuquerque, Fry-Gates Co.	505-298-1875
NY	Schenectady, N.W. Alexander & Assoc.	518-377-0581
NC	Raleigh, Scientific Devices	919-872-7066
Ohio	Dayton, Shamrock Elctrn. Sls.	513-258-1227
Pa	King of Prussia, S & S Assoc.	215-265-3450
Tex	Austin, Palatine Sls.	512-451-7463
Tex	Houston, Palatine Sls.	713-783-1492
Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Seattle, Delcom Sls. Co.	206-248-0090

™ADD 8000 - analog-digital designer - E & L Instruments, Inc.

ADEC INC., Dept. EM, 12 Kulick Rd., Fairfield, N.J. 07006, Tel: 201-575-1570; Empl.: 30

Sales Manager: D.L. Wiesen

ADHESIVE MACHINERY CORP., Dept. EM, Folly Hill Rd., Seabrook, NH 03874

™ADJUST-A-SEELS - self sealing locking nuts - APM-Hexseal

™ADJUSTOHM - adjustable wire-wound resistors - Ward Leonard Elec. Co. Inc.

™ADJUSTO TORQ - clutches & brakes - General-Electro Mechanical

™ADLAKE - solid state devices - Adams & Westlake Co.

™AD-MU-00 - magnetic shielding alloy - Ad-Vance Magnetics

™AD–MU–48 - magnetic shielding alloy - Ad-Vance Magnetics

™AD-MU-78 - magnetic shielding alloy - Ad-Vance Magnetics

™AD-MU-80 - magnetic shielding alloy - Ad-Vance Magnetics

ADRE CO., Dept. EM, Box 09415, Milwaukee, Wisc. 53209, Tel: 414-352-3531; Empl.: 50

ADRET CORPORATION, Dept. EM, 1630 Manheim Pike, Lancaster, Pa. 17601, Tel: 717-569-7059, TWX: 510-657-4434 .... p. 2790,2791

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith	205-881-3294
Cal	San Jose, PBC Assocs.	408-377-7001
Conn	Mt. Carmel, Scientific Devices	203-248-9361
Fla	Lake Park, J. L. Highsmith & Co.	305-844-2013
Fla	Orlando, J. L. Highsmith & Co.	305-293-5202
Ga	Acworth, J.L. Highsmith	205-881-3294
Ill	Arlington Heights, Dytec Central	312-394-3380
Kans	Shawnee Mission, EIR Co.	913-362-0919
Md	Timonium, Scientific Devices	301-252-8851
Mass	Waltham, Scientific Devices	617-894-5637
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Cherry Hill, Scientific Reps.	609-482-0059
NJ	Englewood, Eastern Instrumentation	201-567-9505
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Great Neck, LI., Eastern Instrumentation	516-466-9505
NC	Charlotte, J. L. Highsmith & Co.	704-333-7743
Ohio	Chesterland, EQS	216-729-2222
Ohio	Dayton, EQS	513-434-8993
Va	Richmond, J. L. Highsmith & Co.	804-272-5888
Va	Springfield, Scientific Devices	703-451-6500

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Programmable Frequency Synthesizers to 600 MHZ with 0.01 HZ resolution, AM, FM, PM, Sweep and with Inter Polation Oscillator (Search). Also Synthesizer with 0.03 DB Amplitude Level Flatness.

Programmable Spectrum Analyzers to 110 MHZ with 120 db dynamic range, WWV Receivers, Voltage Standards, etc.

™ADS - annunciators - Halmar Electronics, Inc.

ADTECH POWER INC., Dept. EM, 1621 S. Sinclair St., Anaheim, Cal. 92806, Tel: 714-634-9211; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, Electronic Entprs.	602-946-9860
Cal	Santa Clara, Raydex Assocs.	408-247-9891
Colo	Englewood, Dynatech, Inc.	303-773-2830
Conn	North Haven, Northeast Reps.	203-239-2507
DC	Washington, H. Wise & Co.	202-363-9417
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Indianapolis, Coombs Assocs.	317-241-2757
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mass	Needham, Northeast Reps.	617-449-3034
Mich	Royal Oak, D. Ray Assocs.	313-576-4705
Minn	Minneapolis, Josco-Melius, Inc.	612-854-4270
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Randolph, Mos Assocs.	201-361-5773
NM	Albuquerque, Electronic Entprs.	505-256-3561
NM	Las Cruces, Elctrn. Entprs.	505-524-0126
NY	Albany, H.C. Johnson Agencies	518-456-6667
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Floral Park, Mos Assocs.	516-487-3966
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Winston-Salem, Reynolds & Assoc.	939-725-6196
Ohio	Dayton, INH Component Sls.	513-434-8808
Pa	Plymouth Meeting, Scientific Devices Phil.	215-825-9515
Tex	Dallas, So. States Mktg., Inc.	214-387-2489
Tex	Houston, So. States Mktg., Inc.	713-665-0991

ADTOOL CORP., Dept. EM, 10 Ronald Dr., Montreal W P Q, Can., Tel: 514-482-2548, Telex: 05-24462; Empl.: 15

ADVANCE CIRCUITS, INC., Dept. EM, 15102 Minnetonka Ind. Rd., Minnetonka, Minn. 55343, Tel: 612-935-3311

ADVANCE CONVERSION DEVICES CO., Dept. EM, 109 Eighth St., Passaic, N. J. 07055, Tel: 201-778-0707; Empl.: 24 .... p. 3358,3359

Sales Manager: F.C. Lambert

Local Sales Offices & Reps.

Cal	Woodside, N.S. Assocs.	415-854-4870
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Electro-Tech Mktg. Assocs.	312-588-4535
Kans	Leawood, Leemark Engrs.	913-648-0124
Md	Annapolis, Hayden Assocs.	202-296-6059
Mass	Randolph, Abbott-Allison Co.	617-245-0250
NM	Albuquerque, Grady Moore Assocs.	505-262-1416
Tex	Houston, Roger Martin Assocs.	713-444-2944
Wash	Seattle, Datacom Assocs.	206-285-2525

ADVANCE ENGRG. SYSTEMS, Div. Sonnell, Inc., Dept. EM, 18255 S. Hoover St., Gardena, Cal. 90248, Tel: 213-321-3100

Sales Manager: B. Norkon

ADVANCE INSTR. CORP., Dept. EM, 1707 F. St., Belmar, N. J. 07719, Tel: 201-681-2700; Empl.: 12

ADVANCE ROSS ELCTRNS. CORP., see Magneco Electronics, Inc.

ADVANCE WEIGHT SYSTEMS, INC., Dept. EM, 715 W. Smith Rd., Medina, Ohio 44256, Tel: 216-725-6409; Empl.: 12

Sales Manager: A.R. Oxley

Local Sales Offices & Reps.

Ala	Birmingham, Bessemer Scale Co.	205-426-2077
Ariz	Phoenix, Southwestern Scale Co.	602-275-5413
Cal	Anaheim, California Scale Co.	714-956-0741
Cal	Burlingame, Accurate Weighing Sys.	415-348-0606
Colo	Denver, Murphy Scale & Equip. Co.	303-222-5651
Fla	Miami, Weigh & Test Sys.	305-691-2561
Fla	Mulberry, O'Neill Scale Co.	813-425-4905
Fla	Winter Park, Tinsley Scales	305-657-2025
Ill	Alsip, Electromech Scale Co.	312-371-9171
Ill	Alsip, Central Scale & Supply Co.	312-371-4330
Ill	Arlington Heights, Concord Engrg.	312-671-3405
Ill	Chicago, Aaction Scale Co.	312-247-8550
Ill	E. Moline, Midwest Scale Co.	309-755-5044
Ill	Rockford, Northern Illinois Scale Co.	815-226-5681
Ill	Wheeling, Data Weighing Sys	312-392-8250
Iowa	Cedar Rapids, Midwest Scale Co.	319-365-4116
Iowa	Newton, Electronic Sys.	515-792-4942

Iowa	Pleasant Valley, Rogan Scale Svc.	319-355-8333
Kans	Cedar Rapids, M & G Scale Co.	319-846-2760
Ky	Louisville, Richards Scale Co.	502-583-2042
Md	Columbia, Columbia Balance Svc.	301-531-6135
Mass	Dorchester, Boston Scale Co.	617-282-2187
Mass	Worcester, Worcester Scale Co.	617-853-2886
Mich	Grand Rapids, Grand Rapids Scale Co.	616-538-7080
Mich	Orchard Lake, Lampe-Marsh	313-626-4040
Mich	Sterling Heights, Richmond Scale Co.	
Minn	Minneapolis, Kennedy's	612-522-4423
Mo	Lees Summit, R. T. Cox Co.	816-524-1419
NJ	Trenton, Quality Balance Svc.	609-890-0336
NY	New York, Resnick Scale Co.	212-925-4066
NY	Syracuse, Syracuse Scale Co.	315-476-9696
NC	Greensboro, J. A. King & Co.	919-292-0511
NC	Raleigh, Jose M. Orta	919-755-1813
Ohio	Canton, Brechbueler Scale Co.	216-484-2555
Ohio	Cincinnati, Cincinnati Scale Company	513-851-3233
Ohio	Cleveland, Kaspar Scale Co.	216-651-5530
Ohio	Cleveland, Parma Scale Co.	216-651-9363
Ohio	Columbus, Absco Elctrn. Scales	614-262-3774
Ohio	Dublin, Grant & Marshall	614-889-9401
Ohio	Kettering, Haines Scale Co.	513-294-1884
Ohio	Macedonia, Filing Scale Co.	216-425-4961
Ore	Portland, Pacific Scale Co.	503-777-3978
Pa	Philadelphia, General Scale & Equip. Co.	215-769-6300
Pa	Pittsburgh, Acme Scale & Supply Co.	412-782-1808
RI	Warwick, Central Scale Co.	401-467-7500
Tex	Dallas, Nicol Scales	214-747-8181
Tex	Houston, L.L. Perry Scale Co.	713-921-7163
Wash	Seattle, Phillips Scale Co.	206-284-6090
Wisc	Glendale, Cream City Scales	414-228-9090
Wisc	Milwaukee, Battery Shop	414-384-5410
Wisc	Milwaukee, S. A. Meier	414-463-1700
Wisc	Milwaukee, Midwest Scale Co.	414-643-4500
Wyo	Menomonee Falls, Industrial Scale Svc.	414-781-9292

ADVANCED CIRCUITRY, Litton Systems Inc., Dept. EM, 4811 W. Kearney St., Springfield, Mo. 65803, Tel: 417-862-0751, TWX: 910-775-4705; Empl.: 701

Sales Manager: J. Turnbull

Local Sales Offices & Reps.

Cal	San Jose, A.C.D. of Litton	408-227-3800
Colo	Littleton, A.C.D. of Litton	303-798-3001
Fla	Tampa, A.C.D. of Litton	813-259-1323
Ill	Chicago, ACD Litton	312-498-6228
Ind	Indianapolis, ACD Litton	317-251-3707
Minn	Minneapolis, Giefer Sls. Co.	612-884-2395
NH	Nashua, ACD Litton	603-882-4450
NJ	Flanders, A.C.D. of Litton	201-584-0772
NY	Guilderland, Solder Pot	518-355-1829
Pa	Ft. Washington, Kirk-Sandell Inc.	215-643-2100
Tex	Plano, A.C.D. of Litton	214-423-4880
Va	Richmond, A.C.D. of Litton	804-794-6268

ADVANCED CONTROL SYSTEMS CORP., Dept. EM, 28C Vernon St., Wakefield, Mass. 01830, Tel: 617-245-8070

Sales Manager: R.A. Porter

Local Sales Offices & Reps.

Mass	Wakefield, Stickney Engrg. Assocs.	617-245-4212

ADVANCED DEVICES LAB, Dept. EM, P.O. Box 11455, Reno, Nev. 89510; Empl.: 116

Local Sales Offices & Reps.

Cal	Santa Clara	408-241-9282
Ill	Elk Grove Village	312-437-3269
Mo	Bridgeton	314-731-2584
NJ	Long Branch	201-229-7424
NJ	Newfoundland	202-728-1331

ADVANCED DYNAMIC INSTRS. DIV., Electodyne, Inc., Dept. EM, Box 358, Alexandria, Va. 22313, Tel: 703-836-4641; Empl.: 5

Local Sales Offices & Reps.

Cal	Montebello, TUCUL Engrg. Co.	213-728-7397
Haw	Honolulu,, Aloha Assocs.	808-914-1514
Ill	Des Plaines, Maher Engrg. Co.	312-824-2124
Mass	Acton, E.E. Specialists	617-259-9200
Tex	Dallas, Merit Co.	214-352-8040

ADVANCED ENERGY CONVERSION, Dept. EM, 1502 Old County Rd., Belmont, Cal. 94002, Tel: 415-591-4400; Empl.: 15

ADVANCED HIGH VOLTAGE INC., Dept. EM, 14532 Arminta St., Van Nuys, Cal. 91402, Tel: 213-997-7222 .... p. 3200

Sales Manager: J. Richardson

ADVANCED KINETICS, Dept. EM, 1231 Victoria St., Costa Mesa, Calif. 92627, Tel: 714-646-7165; Empl.: 32

ADVANCED MATERIALS SYSTEMS, Dept. EM, 72 Elm St. N., Atteboro, Mass. 02703, Tel: 617-695-1401; Empl.: 100

Local Sales Offices & Reps.

Conn	West Hartford, R.S. Pettigrew & Co.	203-233-8533
Ill	Chicago, Electro-Comp. Sls.	312-763-3636
Mass	West Newton, R.S. Pettigrew & Co.	617-969-5770
NJ	Asbury Park, Lancaster Industrial Sls.	201-988-5401
Pa	Lancaster, Lancaster Industrial Sls.	717-397-2942

ADVANCED MEMORY SYS., INC., Dept. EM, 1275 Hammerwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-4330, TWX: 910-339-9369; Empl.: 650

Local Sales Offices & Reps.

Ariz	Scottsdale, Sprectre Sls.	602-948-8888
Cal	Los Altos, Cain-White Co.	415-948-6533
Cal	Norwalk, Bertrand & Zoolalian	213-921-9791
Cal	Sunnyvale, Advanced Memory Sys.	408-734-1842
Colo	Littleton, Lange Sls.	303-798-1397
Ill	Schaumburg, A.M.S. Sales Off.	312-529-1474
Md	Baltimore, Stemler Assocs.	301-944-8262
Mass	Concord, A.M.S. Sales Off.	617-259-0059
Mass	Lawrence, Mil-Bern Assocs.	617-685-7973
Minn	St. Paul, Cahill Assocs.	612-646-7217
Ohio	Dayton, Ashby Assocs.	513-252-5627
Pa	Huntingdon Valley, Knowles Assocs.	215-947-5641
Tex	Addison, Parvin Sls. Co.	214-661-5374
Va	Alexandria, Stemler Assocs.	703-548-7818

ADVANCED MICRO DEVICES, Dept. EM, 915 DeGuigne Dr., Sunnyvale, Cal. 94086, Tel: 408-732-2400, TWX: 34-6303 910-339-9280; Empl.: 2814; Minimum order: $S. Zelencik

Sales Manager: T. Jones, VP Mktg.; *Distributor Manager:* S. Zelencik

Local Sales Offices & Reps.

Ala	Huntsville, Elctrn. Mfr. Agents	205-623-6440
Ariz	Phoenix, Advanced Micro Devices	602-258-6515
Cal	Beverly Hills, Advanced Micro Devices	213-278-9700
Cal	Los Angeles, Black, Ekizian, Strong	213-870-9191
Cal	San Diego, Bestronics	714-278-2150
Cal	Santa Clara, I² Inc.	408-985-0400
Cal	Sunnyvale, Advanced Micro Devices	408-732-2400
Colo	Parker, Comp. Sls.	303-841-2650
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Ovledo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-1759
Ill	Elk Grove Village, Oasis Sls.	312-640-1850
Ill	Oak Brook, Advanced Micro Devices	312-323-9600
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Kans	Derby, Palatine Engrg. Sls.	316-426-7055
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Baltimore, Advanced Micro Devices	301-744-8233
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Wellesley, Advanced Micro Devices	617-237-2774
Mich	Milford, T. Mulligan & Associates	313-363-5575
Minn	Bloomington, Advanced Micro Devices	612-854-6500
Mo	St. Louis, Palatine Engrg. Sls.	314-426-7055
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Kingston, Ossmann Comp. Sls.	914-385-5505
NY	Plainview, ERA	516-822-9890
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Roslyn Heights, Advanced Micro Devices	516-484-4990
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Centerville, Dolfuss-Root	513-433-6776
Ohio	Rocky River, Dolfuss-Root	216-333-7504
Pa	Ft. Washington, GCM	215-646-7535
Pa	Waterford, Bacon Elctrn. Sls.	814-796-6556
Tex	Dallas, Bosner-Philhower Sls.	214-234-8438
Tex	Dallas, Advanced Micro Devices	214-234-5886
Tex	Houston, Bosner-Philhower Sls.	713-467-4373
Utah	Salt Lake City, R2M	801-972-5646
Va	Lynchburg, Burgin-Kreh Assocs.	804-845-5600
Wash	Bellevue, R. Over Sls.	206-454-4551
Wash	Vancouver, R. Over Sls.	206-695-4637

ADVANCED POWER, INC., See Adtech Power, Inc.

™ADVENTURER - tool boxes - Vichek Plastics Co.

™AD/380 - interactive graphics system - Auto Trol Corp.

A E CORP., Dept. EM, 65 Wellesley Ave., Needham, Mass. 02194, Tel: 617-449-3142; Empl.: 10

Sales Manager: H. Harrison

Local Sales Offices & Reps.

Cal	Pasadena, P. Nurches Co.	213-681-8957
Mass	Needham, C. Lueders & Co.	617-449-0345
Mich	Ferndale, Tiby Co.	313-547-3550
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822

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Pulse and function generators wired or kits, 1 HZ to 5 MHZ. Send for free catalogue, specification sheets and comparison chart. Pulse widths from .2 sec to 100 nsec, rise and fall times less than 15 nsec. Selectable sine, triangle and squarewaves 20 Vpp with adjustable d.c. offset. Prices start at $59.95 each.

A E G TELEFUNKEN, Dept. EM, 570 Sylvan Ave., Englewood Clfs., N.J. 07632, Tel: 201-568-8570, Telex: 13-5497 .... p. 3859

Sales Manager: Semis J. Szafranski; *Distributor Manager:* Tubes V. Pastore

™AEI - Semiconductors - Calvert Elctrns., Inc.

AEL, INC., Dept. EM, Richardson Rd., Colmar, Pa. 18915, Tel: 215-822-2929, TWX: 510-661-4976; Empl.: 1100

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	San Jose, L & M Engrg.	408-292-3220
Colo	Englewood, Shefler-Kahn Co.	303-761-2590
Fla	Ft. Lauderdale, CBC Elctrns.	305-484-7330
Fla	Longwood, CBC Elctrns.	305-831-5380
Md	Timonium, Deshawn Assocs.	301-252-4878
Mass	Reading, R. H. Kelly	617-942-0055
NM	Albuquerque, Shefler-Kahn Co.	505-296-0749
NY	Melville, ASTROREP Inc.	516-423-2266
NY	Syracuse, N.Y. Com., Inc.	315-437-8343
Pa	Plymouth Meeting, Scientific Devices	215-825-9515
Tex	Irving, Kemco, Inc.	214-255-0537
Utah	Salt Lake City, Shefler-Kaha Co.	801-484-4222
Wash	Seattle, Rush Drake Assocs.	206-763-2755
Exp:	D.C., Washington (Pakistan), International Mktg. Assocs. (IMA)	202-232-5757

AEL COMMUNICATIONS CORP., see CATV Communications Corp.

AEMCO DIV., MIDTEX, INC., See Midtex, Inc., Aemco Div.

™AELECTRA - electronic teaching equipment audio visual equipment - Ashman Industries (1966) Ltd.

™AEMETER - acoustic emission detector - Allison Labs., Inc.

™AERO - frequency meters, elapsed time indicators - Arnoux Corp.

AERO INSTRUMENT FACILITY, Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101, Tel: 805-963-3476; Empl.: 20

AERO-MOTIVE MFG CO., Dept. EM, 1-94 At Miller Rd., Kalamazoo, Mich. 49001, Tel: 616-381-1242; Empl.: 150

™AEROBIAX - heater, cable - ARI Inds., Inc.

™AEROCOAX - heater, cable - ARI Inds., Inc.

AEROCOM, Dept. EM, 3090 S.W. 37th Ave., Miami, Fla. 33133, Tel: 305-448-6503, Telex: 51-9209; Empl.: 100

Local Sales Offices & Reps.

Cal	Los Angeles, Aeronautical Elctrn. Sls. Corp.	213-670-5166
Va	Vienna, Aerocom	703-273-3706

™AERODET - resistance thermometer - ARI Inds., Inc.

AEROFLEX LABS INC., Magnetic Prods Div., Dept. EM, 35 S. Service Rd., Plainview, N.Y. 11803, Tel: 516-694-6700, TWX: 510-224-6417; FSC No.: 88379; Empl.: 6 .... p. 2382

AEROFLEX LABS., INC., Motor Prods. Div., Dept. EM, South Service Rd., Plainview, N.Y. 11803, Tel: 516-694-6700, TWX: 510-224-6417; Empl.: 150 p. 3063,3064

Sales Manager: H.W. Cashman

Local Sales Offices & Reps.

Cal	Mountain View, Leddy Assocs.	415-969-6313
Cal	Yorba Linda, D & G Assocs.	714-772-0587
Conn	Thomaston, Tygren Co.	203-283-8722
Fla	Ft. Lauderdale, Reynolds & Assoc.	305-581-6611
Fla	Sattelite Beach, Reynolds & Assoc.	305-773-4700
Fla	St. Petersburgh, Reynolds & Assoc.	813-360-1484
Ga	Atlanta, Reynolds & Assoc.	404-252-5360
Ill	Lombard, Quadtron Assocs.	312-627-6800
Iowa	Cedar Rapids, ARD Sls.	319-393-6392
Kans	Wichita, D & O Engrg. Co.	316-264-7358
Md	Lutherville, P. Knox & Co.	301-252-1288
Mass	Stoneham, K & D Assoc.	617-438-3121
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	St. Paul, Vikeland Sls.	612-645-4647
NY	Melville, Astrorep Inc.	516-423-2266
NY	Vestal, SHR Inc.	607-729-6339
NC	Winston Salem, Reynolds & Assoc.	919-725-6196
Ohio	Fairborne, Tech. Assocs.	513-878-2484
Pa	Jenkintown, Stein Instrumentation	215-885-2370
Tex	Houston, Aid Elctrns.	713-777-3882
Tex	Irving, Aid Elctrns.	214-259-4761
Wash	Seattle, G.M. Gillet & Assoc.	206-284-3344
Exp:	New York City, N.Y., Frathom Co.	212-687-9390

AEROFLEX LABS., INC., Rotating Components Div., Dept. EM, S. Service Rd., Plainview, N.Y. 11803, Tel: 516-694-6700, TWX: 510-224-6417; FSC No.: 02598 p. 3065

Sales Manager: H. Cashman

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	205-536-1941
Cal	Mountain View, Leddy Assocs.	415-969-6313
Cal	Yorba Linda, D & G Assocs.	714-772-0587
Conn	Thomaston, Tygren Co.	203-283-8722
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
Ga	Atlanta, Reynolds & Assoc.	404-252-5360
Ill	Lombard, Quadtron Assoc.	312-627-6800
Iowa	Cedar Rapids, ARD Sls.	319-393-6392
Kans	Wichita, D & O Engrg.	316-264-7358
Md	Lutherville, P. Knox & Co.	301-252-1288
Mass	Stoneham, K & D Assocs.	617-438-3121
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	St. Paul, Vikeland Sls.	612-645-4647
NY	Melville, Astrorep Inc.	516-423-2266
NY	Vestal, SHR Inc.	607-729-6339
NC	Winston Salem, Reynolds & Assocs.	919-725-6196
Ohio	Fairborne, Technical Assocs.	513-878-2484
Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370
Tex	Houston, AID Elctrns.	713-777-3882
Tex	Irving, AID Elctrns.	214-259-4761
Wash	Seattle, G.M. Gillett & Assoc.	216-284-3344

™AEROGARD - thermowell - ARI Inds., Inc.

™AEROGRAPH - gas chromatographs, liquid chromatographs - Varian Assocs.

AEROLITE ELEXS CORP., Dept. EM, 2207 Summit Ave., Union City, N.J. 07087, Tel: 201-863-2956; Empl.: 60

™AERONAUTIC BEARINGS - ball bearings - Raway Bearing Corp.

™AEROPAD - thermocouples - ARI Inds., Inc.

™AEROPAK - thermocouple wire - ARI Inds., Inc.

™AERORQD - heaters - ARI Inds., Inc.

™AEROSEAL - moisture barrier - ARI Inds., Inc.

AEROSPACE AVIONICS, INC., Dept. EM, Airport International Plaza, 110 Wilbur Pl., Bohemia, N.Y. 11716, Tel: 516-589-9200, TWX: 510-228-7889; Empl.: 200

Local Sales Offices & Reps.

Cal	Torrance, Aerospace Avionics	213-540-8562
Ga	Atlanta, Craft Assocs.	404-256-0420
Kans	Wichita, Thunderbird Technical Sls. & Svs.	316-684-3941
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
Tex	Richardson, Barry Sls. Co.	214-234-0255

AEROSPACE OPTICS INC., Dept. EM, 7112 Burns St., Fort Worth, Tex. 76118, Tel: 817-284-2293, Telex: 75-8461

AEROTECH, INC., Dept. EM, 101 Zeta Dr., Pittsburgh, Pa. 15238, Tel: 412-963-7470, TWX: 710-795-3125; Empl.: 50

Local Sales Offices & Reps.

Ariz	Tucson, G. Moore Assocs.	602-795-3176
Cal	Hermosa Beach, Aerotech West	213-376-9698
Colo	LaFayett, G. Moore Assocs.	089-8122019
Conn	Farmington, Aerotech Northeast	203-673-3330
Fla	Winter Park, McMahan Assocs.	305-645-0463
NM	Albuquerque, G. Moore Assocs.	505-292-3322
Ohio	Seville, Aerotech Midwest	216-769-2633

™AEROTORCH - butane torches - Wall-Lenk Mfg. Co.

AEROTRONIC ASSOCS., INC., Dept. EM, Riverside Dr., Contoocook, N.H. 03229, Tel: 603-746-4631; Empl.: 75

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	205-534-3386
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Sunnyvale, Aerotronic Assoc. West	408-734-3020
Colo	Arvada, Figaro-Klebba Assocs.	303-424-0108
Fla	Longwood, Saber Assocs.	305-422-3686
Ill	Arlington Heights, Dytec/Central	312-394-3380
Ind	Greenwood, Aerotronic Assocs.	317-881-2894
Minn	St. Paul, Dytec North	612-645-8516
NM	Albuquerque, Trembly Assocs.	505-293-4444
NC	Raleigh, Saber Assocs.	919-834-3961

AEROVOX INDS., INC., Dept. EM, 740 Belleville Ave., New Bedford, Mass. 02741, Tel: 617-994-9661, TWX: 710-344-6985; Empl.: 485

Sales Manager: O.J. Wood, VP Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Del	Greenville, H. Anderson	302-655-2917
Fla	Oviedo, Conley & Assocs.	305-365-3283
Ill	Chicago, T. B. Hunter Assocs.	312-777-2500
Ill	Wheaton, J-C OEM Sls.	312-668-7621
Ind	Indianapolis, F. J. Campisano Co.	317-247-8623
Mass	Lexington, J. E. Boeing Co.	617-862-2500
Mich	Southfield, Carrier & Gable	313-275-5230
Minn	Minneapolis, Comstrand	612-571-0000
Mo	Grandview, Beneke & McCaul	816-765-2998
NJ	Cherry Hill, J. N. Barrett Assocs.	609-429-1551
NY	Ithaca, B. Dean	607-272-2187
NY	Melville, Comtronic Assocs.	516-249-0505
Ohio	Cincinnati, F. J. Campisano Co.	513-662-1616
Pa	Pittsburgh, Dolfuss/Root	412-561-4125
Tex	Dallas, Hale & Assocs.	214-350-8791
Tex	Houston, Ammon & Rizos Co.	713-781-6240
Wash	Bellevue, Western Tech. Sls.	206-641-3900

AERTECH INDUSTRIES, Dept. EM, 825 Stewart Dr., Sunnyvale, Cal. 94086, Tel: 408-732-0880, TWX: 910-339-9207; Empl.: 400

Local Sales Offices & Reps.

Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Los Altos, J. Stone & Assocs.	415-948-4563
Cal	San Diego, Scientific Devices	714-279-6642
Colo	Boulder, H. Bass & Assocs.	303-499-7509
Colo	Boulder, H. Bass & Assocs.	303-499-7509
Conn	Milford, Wayland Engrg. Sls.	203-878-3755
Fla	Lighthouse Point, Saber Assocs.	800-432-3007
Ill	Northfield, Feller Assocs.	312-446-8065
Kans	Shawnee Mission, Tech. Sls. Assocs.	913-888-3330
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Md	Ellicott City, Doss Elctrns., Inc.	301-465-1336
Md	Ellicott City, Doss Elctrn.	301-465-1336
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Mass	Natick, Wayland Engrg Sls	617-655-6080
Mo	St. Louis, Technical Sls. Assocs.	314-725-5361
Mo	St. Louis, Technical Sls. Assocs.	314-725-5361
NM	Albuquerque, Trembly Assocs.	505-266-8616
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Commack, Dal-tech Devices	516-543-4776
NY	Syracuse, MMI Sls.	315-455-5919
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Pa	Elkins Park, Snow Assocs.	215-379-4700
Tex	Richardson, Lear Assocs.	214-231-5388
Wash	Seattle, Delcom Sls. Co.	206-248-0090

AETNA ENGRG., Dept. EM, P.O. Box 7749, Van Nuys, Cal. 91409, Tel: 213-341-9409; Empl.: 10

™AE-16 ROSIN - activated rosin core solder - Bow Solder Products

™AE-21 NOCHAR - activater rosin core solder - Bow Solder Products

™AGAMP - automatic gain adjusting amplifier - GTE Lenkurt Inc.

™AGASTAT - timing devices, programmers - Control Products Div.

AGFA-GEVAERT, INC., Dept. EM, 275 North St., Teterboro, N.J. 07608, Tel: 201-288-4100, TWX: 710-990-6137; Empl.: 750

Local Sales Offices & Reps.

Cal	Brisbane	415-467-2330
Cal	Burlingame	415-692-2432
Cal	Glendale	213-246-8141
Colo	Denver	303-756-3442
Ga	Atlanta	404-355-7450
Ill	Chicago	312-267-9100
Mass	Waltham	617-890-5430
NJ	Waldwick	201-444-8500
NY	New York	212-685-6641
Tex	Dallas	214-631-7290
Wash	Seattle	206-454-1066

™AGNICON - silver-nickel contact material - GTE Sylvania Inc.

™AGNOSTICK - silver-cadmium oxide contact material - GTE Sylvania Inc.

AIKEN INDUSTRIES, INC., Dept. EM, 9125 Gaither Rd., Gaithersburg, Md. 20760, Tel: 301-948-5210, TWX: 701-828-9706; Empl.: 340

Local Sales Offices & Reps.

Cal	Mountain View	415-969-5777
Md	Gaithersburg	301-948-5210

AIKEN INDUSTRIES, INC., Mechanical Prod. Div., Dept. EM, 1824 River St. Box 729, Jackson, Mich. 49204, Tel: 517-782-0391, TWX: 810-253-0827; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, Mercury Engrg.	602-275-8579
Cal	Panorama City, Mechanical Prods.	213-781-8966
Cal	Pasadena, T. Yeakle	213-684-2275
Fla	Pompano Beach, Hutto Hawkins Peregoy, Inc.	305-943-9593
Ill	Barrington, Perhats Assocs.	312-381-6360
Md	Leonardtown, Minitec	301-475-8961
Mich	Southfield, Eynon-Weyand Assocs.	313-354-3430
Minn	Minneapolis, J. J. Exon Co.	612-571-5340
Ohio	Dayton, Rockford Controls Ohio	513-898-5452
Ohio	Euclid, Rockford Controls Ohio	216-731-5250
Pa	Jenkintown, Arnold Assocs.	215-742-0600
Tex	Dallas, E. B. Robertson, Inc.	214-942-2711

AIL, DIV. CUTLER-HAMMER, Dept. EM, Comac Road, Deer Park, N.Y. 11729, Tel: 516-595-3094, TWX: 510-227-6073; Empl.: 3100

Local Sales Offices & Reps.

Cal	Marina Del Rey, D.O. Ness	213-822-1324
Ohio	Dayton, A.P. Vogel	513-254-3511
Va	Arlington, S. Collin	703-521-3300

AILTECH, Dept. EM, 815 Broad Hollow Rd., Farmingdale, N. Y. 11735, Tel: 516-595-6471, TWX: 510-224-6558; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Electronics	205-881-5031
Ariz	Scottsdale, Inter-Mountain Engrg. Co.	602-947-7379
Cal	La Jolla, Ward/Davis Assoc.	714-459-3351
Cal	Lawndale, Ward/Davis Assoc.	213-542-7740
Cal	Los Angeles, Ailtech, West Coast Oper.	213-965-4911
Cal	Menlo Park, AILTECH	415-854-7200
Colo	Boulder, Herb Bass Assoc.	303-499-7509
Fla	Ft. Lauderdale, Beacon Elctrns.	305-491-4211
Fla	Maitland, Beacon Elctrns.	305-647-3498
Ga	Atlanta, Ailtech	404-939-2016
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Chicago, K. Meyers Co.	312-774-6440
Ind	Indianapolis, K. Meyers Co.	317-243-6681
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Burlington, R.J. Sickles Assocs.	617-272-7285
Mich	Detroit, Micro Sls. Corp.	313-482-1229
Minn	Minneapolis, K. Meyers Co.	612-920-7080
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Englewood, Scientific Dev. East	201-871-3916
NM	Albuquerque, IMEC	505-883-9010
NY	East Syracuse, Ossmann Instrs.	315-437-6666
NC	Charlotte, Beacon Electronics	704-525-7412
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Ambler, W & M Assocs.	215-643-4119
Tenn	Oak Ridge, Beacon Elctrns.	615-482-2409
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Marketing Associates	214-661-0300
Tex	Houston, Data Marketing Associates	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Va	McLean, Creative Mktg. Assoc.	703-893-6612
Wash	Renton, Wilson Applied Instr.	206-228-5880

AILTECH, A CUTLER-HAMMER CO., Dept. EM, 19535 E. Walnut Dr., City of Industry, Cal. 91748, Tel: 213-965-4911, TWX: 910-584-1811; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Scottsdale, I.M.E.C.	602-947-7379
Cal	City of Industry	213-965-4911
Cal	San Fran., Ailtech	415-854-7200
Colo	Boulder, Herb Bass Assoc.	303-499-7509
Conn	Hamden, Scientific Devices	203-248-9361
Ga	Atlantic, Beacon	404-351-3654
Ill	Chicago, K. W. Meyers	312-774-6440
Kans	Shawnee Mission, E.I.R. Co.	913-362-0919
Mass	Burlington, R. J. Sickles Assoc.	617-272-7285
NM	Albuquerque, I.M.E.C.	505-883-9010
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Farmingdale, L.I.	516-595-6471
Ohio	Centerville, Micro Sales Corp.	513-433-8171
Pa	Ambler, W & M Assoc.	215-643-4119
Tex	Houston, Data-Mktg. Assoc Inc.	713-686-2569
Va	McLean, Creative Mktg. Assoc. Ltd.	703-893-6612
Wash	Renton, Wilson Applied Inst.	206-228-5880

AIMSCO INC., Dept. EM, 4000-4024 22nd Ave. W., Seattle, Wash. 98199, Tel: 206-284-5563, TWX: 910-444-1333; Empl.: 30; Minimum order: $E. Chadwick

Sales Manager: C. Ernst; *Distributor Manager:* E. Chadwick

Local Sales Offices & Reps.

Cal	Hollywood	213-934-2122
Cal	Oakland	415-836-2405
Colo	Denver	800-426-0245
Ore	Portland	503-223-4377
Utah	Salt Lake City	800-426-0245

™AIMSERT - inserts - Aimsco Inc.

™AIMSLOCK - cylinder locks - Aimsco Inc.

AINSLIE CORP., Dept. EM, 531 Pond St., S. Braintree, Mass. 02185, Tel: 617-848-0850; FSC No.: 14139; Empl.: 89

AIPHONE USA, Dept. EM, 2116 N. Pacific Ave., Seattle, Wash. 98103, Tel: 206-634-3040, Telex: 32-0288; Empl.: 6

Local Sales Offices & Reps.

Cal	N. Hollywood, Basset & Moore, Inc.	213-877-7129
Cal	Redwood City, Warren & Hickey Sls. Co.	415-368-3849
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Fla	Maitland, Hutto-Hawkins-Pergoy, Inc.	305-831-2474
Ga	Atlanta, H. W. Phillips Co.	404-237-7564
Ill	Chicago, G. Duvall Co.	312-774-5115
Ind	Mulberry, Maish Sls.	317-296-2322
Mass	Needham, Piper Assocs.	617-449-1144
Mich	Detroit, Burcaw Co. & Assoc.	313-533-7700
Minn	Minneapolis, J. E. M. Anderson Co.	612-823-6459
Mo	Kansas City, K.S.W. Assocs.	816-358-5240
NY	Flushing, Bettan Sls.	212-591-7600
NY	Syracuse, Lewis-Dunnigan Co.	315-446-5522
Ohio	Columbus, Mandabach & Assocs.	614-235-0265
Pa	Langhorne, Sher Sls. Co.	215-757-6200
Tex	Dallas, Miller & Assocs.	214-661-5002
Wash	Seattle, R. Merritt Co.	206-746-7337

AIR ELECTRO COMM. CORP., Dept. EM, 17 Meadow Ridge Lane, Glen Head, N.Y. 11545

AIR-MAZE DIV., Dept. EM, 25000 Miles Rd., Cleveland, Ohio 44128, Tel: 216-292-6800

Local Sales Offices & Reps.

Ill	Chicago	312-775-7117
Pa	Pittsburgh	412-835-2137
RI	Cranston	401-467-6863

AIR-O-TRONICS PRODS., Dept. EM, Box K, Morrisville, N.Y. 13408, Tel: 315-684-3705; FSC No.: 16663; Empl.: 10

Local Sales Offices & Reps.

Cal	Los Angeles, W. S. Harmon Co.
Ill	Chicago, Electro-Kinetics

AIR PRODS. & CHEMS., INC., Dept. EM, Box 538, Allentown, Pa. 18105, Tel: 215-398-4911, TWX: 847416 510-651-3686; Empl.: 13000

Local Sales Offices & Reps.

Ala	Birmingham	205-870-5603
Ala	Dothan	205-794-5422
Ala	Mobile	205-433-6513
Ala	Muscle Shoals	205-381-0542
Ark	Little Rock	501-375-1256
Cal	Long Beach	213-432-6411
Cal	Mountain View	415-961-4560
Colo	Broomfield	303-466-9482
Conn	Glastonbury	203-633-6485
DC	Washington	301-864-2345
Fla	Jacksonville	904-786-2662
Fla	Miami	305-592-0709
Fla	Panama City	904-763-1672
Fla	Pensacola	904-994-5511
Fla	Tallahassee	904-222-3015
Fla	Tampa	813-621-2477
Ga	Albany	912-432-0538
Ga	Atlanta	404-252-5850
Ga	Columbus	404-323-1349
Ill	Chicago	312-785-4614
Ill	Granite City	618-452-8100
Ill	Hillside	312-449-5850
Ind	Shelbyville	317-392-1731
Ind	South Bend	219-288-4941
Iowa	Cedar Rapids	319-366-7371
Iowa	Des Moines	515-243-8131
Iowa	Fort Dodge	515-576-7159
Iowa	Sioux City	712-252-4466
Ky	Louisville	502-451-6340
Ky	Paducah	502-443-4589
La	New Orleans	504-241-8310
Md	Salisbury	301-742-3800
Mass	Framingham	617-879-4810
Mich	Detroit	313-893-7420
Minn	Shakopee	612-445-4610
Miss	Clarksdale	601-624-2547
Miss	Greenwood	601-453-5421
Miss	Jackson	601-366-1433
Miss	Tupelo	601-842-5138
Mo	Kansas City	816-421-5495
Neb	Grand Island	308-382-1695
Neb	Lincoln	402-464-3191
Neb	Omaha	402-341-5500
NJ	Camden	609-365-4500
NJ	Iselin	201-548-4600
NY	Albany	518-458-9298
NY	New York	212-730-2249
NC	Asheville	704-254-0958
NC	Charlotte	704-588-2350
NC	Greensboro	919-299-1361
NC	Raleigh	919-828-4462
Ohio	Cleveland	216-333-2300
Ohio	Columbus	614-459-0206
Ohio	Middletown	513-424-1281
Okla	Oklahoma City	405-232-3456
Okla	Tulsa	918-627-2266
Ore	Portland	503-638-8989
Pa	Allentown	215-398-4911
Pa	Creighton	412-226-1511
Pa	York	717-848-1407
SD	Rapid City	605-342-4490
Tenn	Chattanooga	615-265-1019
Tenn	Kingsport	615-247-7193
Tenn	Knoxville	615-522-5153
Tenn	Memphis	901-947-1141
Tex	Arlington	817-265-5185
Tex	Houston	713-869-7507
Va	Hampton	804-826-5430
Va	Richmond	804-321-6913
Va	Roanoke	703-343-3683
WVa	Parkersburg	304-485-1691

AIR QUIP-ROBLEYCO, Dept. EM, Box 1118, Richardson, Tex. 75080, Tel: 214-234-3285; FSC No.: 53507; Empl.: 7; Minimum order: $T. Koonsman

Sales Manager: B. Wessley; *Distributor Manager:* T. Koonsman

Local Sales Offices & Reps.

Cal	Woodland Hills, Cal-Ward Sales	213-883-2202
Ill	Elk Grove Village, Midwest Meridan Corp.	312-437-6531
Iowa	Cedar Rapids, Midwest Meridan Corp.	319-365-6561
Mass	Wellesley, R. P. Mahan Co.	617-237-1040
Mich	Grand Rapids, Midwest Meridan Corp.	616-949-7798
Mo	St. Louis, Midwest Meridan Corp.	314-878-4441
Ohio	Dayton, Midwest-Meridan Corp.	513-276-4137
Tex	Richardson, Robleyco	214-234-3285

AIR-VAC ENGRG. CO., Dept. EM, 100 Gulf St., Milford, Conn. 06460, Tel: 203-874-2541; Empl.: 30

Local Sales Offices & Reps.

Cal	Hawthorne, WCV Co.	213-772-4479
Cal	Walnut Creek, Wilnat Co.	415-938-9629
Conn	Guilford, The Ober Co.	203-453-4361
DC	Washington, H. Wise & Co.	202-363-9417
Fla	Miami, Ludlum Assocs.	305-592-6523
Ill	Downers Grove, The Tipler Corp.	312-969-4343
Ill	Libertyville, R. Klipp Assocs.	312-362-4676
Mich	Detroit, E & E Engrg., Inc.	313-371-2000
Minn	Minneapolis, Air Engrg. & Supply	612-335-4181
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NH	Spofford, Bahr Sls. Co.	603-352-5444
NJ	Bloomfield, Sweeney Assocs.	201-743-3337
NY	Brentwood, Cir-Tech Assocs.	516-231-4440
NY	Syracuse, Mr. J. V. Costello	315-472-0322
NC	Charlotte, Electro Rep Assocs.	704-527-2530
Ohio	Medina, McShane	216-725-4568
Pa	Lansdowne, W.F. Satterthwaite & Co.	215-623-5100
Tex	Dallas, PESO	214-369-3181
Wash	Seattle, Andrew Sproul Assoc.	206-789-3300
Exp:	Fla., Hollandale, EMEC, Inc.	305-925-6366

AIRBORN, INC., Dept. EM, 4321 Airborn Dr., Addison, Tex. 75001, Tel: 214-233-2000, TWX: 910-860-5230; FSC No.: 10400; Empl.: 195 .... p. 1694-1699

Sales Manager: W.A. Clark

Local Sales Offices & Reps.

Cal	Los Angeles, Air Born	213-670-7983
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
NY	E. Northport, Airborn	516-757-6534
NY	Red Hook, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322

AIRCO INDUSTRIAL GASES, Dept. EM, 575 Mountain Ave., Murray Hill, N.J. 07974, Tel: 201-464-8100, TWX: 710-984-7992

Local Sales Offices & Reps.

Ariz	Phoenix	602-273-1255
Cal	City of Industry	213-960-2871
Cal	San Leandro	415-483-8560
Conn	New Haven	203-777-4436
Ga	Atlanta	404-351-2850
Ill	Broadview	312-865-6500
Kans	Lawrence	913-843-1404
La	Metairie	504-887-8596
Mass	South Acton	617-263-7767
Mich	Southfield	313-569-1414
Minn	St. Paul	612-645-6431
Mo	Bridgeton	314-739-0880
NY	Albany	518-489-3719
NY	Buffalo	716-852-4702
Pa	King of Prussia	215-265-3900
Pa	Pittsburgh	412-562-3700
Wash	Seattle	206-762-7251
Wash	Vancouver	206-695-1255

AIRCO SPEER ELECTRNS., Resistor Plant, Dept. EM, Bolivar Rd., Box 547, Bradford, Pa. 16701, Tel: 814-362-5536; TWX: 510-695-5921; Empl.: 1000

Local Sales Offices & Reps.

Ala	Huntsville, CSC	205-881-4753
Ariz	Scottsdale, F. Board Assoc.	602-994-9388
Cal	El Segundo, Varigon	213-322-1120
Cal	Santa Clara, I Squared	408-985-0400
Colo	Boulder, R. G. Enterprises	303-447-9211
Conn	Newton, Gerber Sls.	203-426-3440
Fla	Terra Ceia, CSC	813-894-4366
Ill	Chicago, C. L. Greenslade Sls.	312-561-0156
Ind	Ft. Wayne, J. Kilfoil Co.	219-749-0113
Kans	Shawnee Mission, Mid-America Electronics Mkt.	913-236-4800
Mass	Waltham, Gerber Sales	617-890-8040
Mich	Troy, C. B. Jensen & Assoc.	313-643-0506
Minn	Hopkins, Grayden & Flemmer	612-941-1120
NM	Albuquerque, A. Q. Electronics	505-883-1003
NY	Fayetteville, R. W. Jackson Co.	315-637-3851
NY	Floral Park, MOS Assocs.	516-487-3966
NC	Sanford, CSC	919-832-1897
Ohio	Cincinnati, J. Kilfoil Co.	513-791-6150
Ohio	Cleveland, Divers Elctrns. Prods	216-289-8188
Ore	Beaverton, R & R Assoc	503-643-5754
Pa	Ardmore, Metz	215-649-3966
Tex	Lewisville, J. Hughes Co.	817-430-1683
Wash	Seattle, R & R Assoc	206-762-7664

AIRCO SPEER ELECTRNS., Div. Airco, Inc., Dept. EM, Grand Plaza, 945 Grand Ave., Nogales, Ariz. 85621, Tel: 602-287-5851, TWX: 910-973-9794; Empl.: 1000

Refer to Airco Elctrns., Bradford, Pa. for Sales Office information.

AIRCO SPEER ELECTRNS., Special Comps. Oper., Dept. EM, Packard Rd. at 47th, Niagara Falls, N.Y. 14302, Tel: 716-285-6971, TWX: 710-524-1653; Empl.: 1000

Refer to Airco Elctrns., Bradford, Pa. for Sales Office Information.

AIRCOM, INC., Dept. EM, Rte. 16B, Union, N.H. 03887, Tel: 603-473-2323; Empl.: 10

AIRCRAFT & ELEX SPCLTYS, Dept. EM, Box 126, Plainfield, Ind 46168, Tel: 317-839-2551; FSC No.: 00529; Empl.: 150

AIRCRAFT APPLIANCES EQPT, Dept. EM, 152 E Dr., Brmalea, Ont, Can., Tel: 416-791-1666, TWX: 610-492-4396; Empl.: 250

™AIRE-REQULATOR - temperature humidity chamber - Atlas Electric Devices

™AIRFLEX - clutches & brakes - Eaton Corp.

AIRFLYTE ELCTRNS. CO., Dept. EM, Box 207, 56 Hook Rd., Bayonne, N.J. 07002, Tel: 201-436-2230, TWX: 710-729-4489; Empl.: 60 .... p. 3066,3067

Local Sales Offices & Reps.

Ariz	Phoenix, N. G. Ganem Co.	602-945-0839
Cal	Los Altos, Poltronics	415-941-3020
Cal	Pasadena, RDX Corp.	213-681-3451
Conn	No. Haven, Kitchen & Kutchin	203-239-0212
Fla	Miami Bch., OEM Mktg. Corp.	305-861-3661
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ill	Park Ridge, RF Specialists	312-698-2044
Ind	Ft. Wayne, R. F. Specialists	219-485-8982
Kans	Prairie Village, R. G. Sls.	913-381-8812
Md	Baltimore, R.P. Luce & Co.	301-752-8200
Mass	Lexington, Kitchen & Kutchin	617-862-8230
NJ	Clifton, Avionics Equip., Inc.	201-772-1956
NY	Rochester, R.P. Kennedy Co.	716-271-6322
Pa	Philadelphia, R.P. Luce & Co.	215-884-8365
Tex	Dallas, Jacobson Co.	214-363-7584

AIRMATIC/BECKETT-HARCUM, Dept. EM, 185 Park Dr., Wilmington, Ohio 45177, Tel: 513-382-1691; Empl.: 89

™AIROTOR - blower wheel - Torin Corp.

™AIR PAL - compact 2,3,&4-way valves - Airmatic/Beckett-Harcum

AIRPAX ELCTRNS., INC., Cambridge Div., Dept. EM, Woods Rd., Cambridge, Md. 21613, Tel: 301-228-4600, TWX: 710-865-9655; Empl.: 550 ....p. 1122,3954,3955

Local Sales Offices & Reps.

Ala	Huntsville, Electronic Mfrs. Agents	205-533-6640
Ariz	Phoenix, Gramer & Company	602-279-1231
Cal	Mt. View, Wagner Assoc.	415-964-8300
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Colo	Littleton, Lange Sls.	303-795-3600
Ill	Glen Ellyn, Rockford Controls	312-469-6016
Ind	Indianapolis, Rockford Controls	317-297-2956
Iowa	Cedar Rapids, Reid Assocs., Inc.	319-362-6302
La	Bossier City, Deeco Controls	318-746-2141
Md	Columbia, Rep-Tron	301-953-7580
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Troy, Pine Sls. Inc.	313-524-1860
Minn	Hopkins, Fred Peterson Co.	612-941-5400
Mo	North Kansas City, Weisler & Assoc.	816-421-1679
Mo	St. Louis, Weisler & Assoc.	314-428-3934
NY	Great Neck, Pacent-DiBlasi	516-482-4040
NY	Poughkeepsie, C. W. Floring & Assoc.	914-471-2973
NY	Rochester, J. G. Welch Assoc.	716-244-1100
NC	Winston-Salem, L.G. White	919-725-3612
Ohio	Cincinnatti, Baehr, Greenleaf & Assoc.	513-891-3826
Ohio	Cleveland, Baehr, Greenleaf & Assoc.	216-221-9030
Ohio	Columbus, Baehr, Greenleaf & Assoc.	614-486-4046
Ohio	Dayton, C.P. Haskell	513-298-3331
Okla	Tulsa, T.J. Ray Co.	918-627-1515
Pa	Harleysville, T. Jackson Assoc.	215-643-5560
Pa	Pittsburgh, Friday Engrg. Sls.	412-341-1444
Tex	Dallas, Stevens Sls.	214-350-2476
Tex	Odessa, Barnco Co.	915-332-0294
Wash	Seattle, Don Smith Sls.	206-633-3160
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

AIRPAX ELCTRNS., Controls Div., Dept. EM, 6801 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313, Tel: 305-587-1100, TWX: 510-955-9866; Empl.: 200 p. 2383

Local Sales Offices & Reps.

Ark	Scottsdale, Electro-Marketing Assoc.	602-991-0110
Cal	Buena Park, Sales Engrs. Ltd.	213-921-4337
Cal	Mountain View, Wagner Assoc.	415-964-8300
Colo	Englewood, Inverness Mktg.	303-770-2300
Conn	Trumbull, S.I.R. Assoc.	203-268-2560
Fla	Ft. Lauderdale, Bredesen Assoc.	305-566-3289
Ill	Chicago, K-W Assoc.	312-792-2618
Ind	Indianapolis, Electro Engrg. & Sls.	317-547-5273
Iowa	Cedar Rapids, Reid Assoc.	319-362-6302
La	Baton Rouge, Process Specialty Co.	504-937-0644
La	Bossier City, Deeco Co.	318-742-0856
Md	Phoenix, Rebco Sls	301-592-8907
Mass	Lexington, S.I.R. Assoc.	617-862-1812
Mich	Southfield, Automatic Controls Co.	313-354-1190
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Bogota, Neville & Vespo	201-487-1505
NY	Buffalo, R.M. Newell Co.	716-632-0662
NY	Syracuse, C.W. Floring & Assoc.	315-478-2149
NC	Charlotte, MacGuire & Crawford Instr. Co.	704-366-3454
Ohio	Cincinnati, J.W. Murray & Assoc.	513-662-1616
Ohio	Medina, Automatic Controls Corp.	216-725-7989
Okla	Tulsa, Lucas Controls	918-749-6491
Ore	Portland, Fry Controls	503-226-2620
Pa	Harleysville, T. Jackson & Assocs.	215-643-5560
Pa	Pittsburgh, Friday Engrg. Sls.	412-341-1444
Tex	Dallas, Stevens Sls.	214-350-2476
Tex	Houston, Haltom Co.	713-782-5625
Tex	Odessa, Barnco, Inc.	915-332-0293
Va	Roanoke, Process Specialties	703-345-5683
Va	Rockville, Virginia Meter & Controls Co.	804-285-4228
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

AIRPOT CORP., Dept. EM, 27 Lois St., Norwalk, Conn. 06851, Tel: 203-846-2021

™AIRPOWER - DC to AC static inverters - Avionic Instrs. Inc.

™AIR-QUENCHING - clinker cooler - Allis-Chalmers

™AIRSET - roller mills - Allis-Chalmers

™AIR-TEC - liquid leak detecting fluids - American Gas & Chemical Co., Ltd.

AIRTROL CORP., Dept. EM, 203 W. Hawick St., Rockton, Ill. 61072, Tel: 815-624-8051; Empl.: 30

Sales Manager: N.K. Anderson

Local Sales Offices & Reps.

Ariz	PLS Assocs., Gassner & Clark Co.	602-968-9037
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, J. C. Henberger Co.	714-223-7114
Cal	San Francisco, RDX Corp.	408-734-4500
Colo	Denver, Mike Duffy & Assocs.	303-934-7392
Iowa	Cedar Rapids, Gassner & Clark	319-393-5763
Md	Baltimore, Naudain Assocs.	301-442-2270
Mass	Boston, Sullivan Tech. Sls.	617-237-2600
Mich	Detroit, C. W. Anderson Assocs.	313-642-1250
Minn	Minneapolis, G. E. Arneson & Co.	612-835-2177
NJ	Camden, Naudain Assocs.	609-235-1801
NY	Buffalo, Robert F. Lamb Co.	716-874-4900
NY	New York, SGS Sls. & Mktg. Ltd.	516-921-5335
NY	Rochester, Robert F. Lamb Co.	716-544-5580
NY	Schenectady, Robert F. Lamb Co.	518-393-4844
NY	Syracuse, Robert F. Lamb Co.	315-455-2469
Ohio	Dayton, Dynel Co.	513-434-6467
Pa	Philadelphia, Naudain Assocs.	609-235-1801
Tex	Dallas, J. B. Guenther	214-691-8500
Tex	Houston, J. B. Guenther	713-468-0232
Wash	Seattle, D. C. Grover & Assocs.	206-588-1310
Wisc	Beloit, Dale & Assocs.	608-362-1495

AIRTRON, Div. Litton Inds., Dept. EM, 200 E. Hanover Ave., Morris Plains, N.J. 07950, Tel: 201-539-5500, TWX: 710-986-7473; FSC No.: 80006; Empl.: 350

Local Sales Offices & Reps.

Ariz	Scottsdale, T. Thatford	602-994-8162
Cal	San Jose, MCH Assocs	408-246-7330
Cal	Van Nuys, G.M.A.	213-989-5111
DC	Wash D.C., T. Britt Assoc.	202-296-7029
Fla	Coral Springs, Precision Mktg.	305-752-1700
Ga	Warner Robins, A. J. Erickson	912-743-1950
Ill	Elk Grove, R-TEK	312-439-9090
Md	Baltimore, Dickison Sls. Co.	301-823-0923
Mo	Maryland Hts., Midwest Meridian	314-878-4441
NJ	Merchantville, L. Adezio Sls Co.	609-235-1606
Ohio	Dayton, A. Grimm	513-299-8461
Tex	Dallas, Texport Elctrns.	214-328-5484

AITKEN COMMUNICATIONS INC., Dept. EM, 701 S 10th St., Taft, Cal 93268, Tel: 805-765-5403; Empl.: 4

AJAX MAGNETHERMIC CORP., Dept. EM, 1745 Overland Ave., N.E., Warren, Ohio 44482, Tel: 216-372-8511, Telex: 098-2482; Empl.: 450

Local Sales Offices & Reps.

Ala	Birmingham, Ajax Magnethermic Corp.	205-870-9747
Cal	Fullerton, Ajax Magnethermic Corp.	714-525-8914
Colo	Denver, T.C. Jarrett	303-233-2333
Conn	East Lyme, Ajax Magnethermic Corp.	203-739-9122
Ill	Chicago, Ajax Magnethermic Corp.	312-992-2116
Ind	Indianapolis, Ajax Magnethermic Corp.	317-842-1804
Md	Bel Air, Ajax Magnethermic Corp	301-879-8030
Mich	Southfield, Ajax Magnethermic Corp	313-559-1360
Mo	Kansas City, Boschert Equip Co.	816-561-4050
NY	Rochester, Ajax Magnethermic Corp	716-235-1488
Ohio	Cincinnati, Ajax Magnethermic Corp	513-871-2520
Ohio	Cleveland, Ajax Magnethermic Corp.	216-641-3655
Ohio	Port Clinton, Ajax Magnethermic Corp.	419-797-2927
Pa	Pittsburgh, Ajax Magnethermic Corp	412-931-3737
Tex	Conroe, Ajax Magnethermic Corp	
Wash	Mercer Island, C.R. Monlux Co.	206-232-3100

™AJAXOMATIC - automatic metal pouring - Ajax Magnethermic Corp.

AKG ACOUSTICS, Philips Audio Video Sys. Corp., Dept. EM, 91 McKee Dr, Manwah, N.J. 07430, Tel: 201-529-3800, TWX: 710-988-3157; Empl.: 20

Local Sales Offices & Reps.

Cal	Culver City, Marshank Sls. Co.	213-559-2591
Cal	Walnut Creek, MacPherson Sls. Co.	415-937-1482
Colo	Denver, B & B Elctrn. Prods.	303-773-6700
Conn	Stamford, J. B. Anthony Co.	203-322-9202

Fla Miami, World Wide Prods. 305-754-5475
Ga Atlanta, Fidelicom Inc. 404-451-3471
Ill Chicago, T. Pappas & Assocs. .. 312-685-2338
Iowa Des Moines, Beams Co. 515-255-1148
Md Silver Spring, Taub Sls. Inc. 301-622-0300
Mass Natick, VF Sls. Inc. 617-237-6544
Mich Canton, VF Sls. Inc. 313-453-8720
Minn Minneapolis, Kodo Assoc. Inc. 612-881-1255
Mo St. Louis, Beams Co. 314-569-1060
NY Baldwinsville, B. Darmstedter Assoc. 315-638-1261
Ohio Cleveland, J. B. Parent Co. 216-333-9955
Ohio Medina, J. B. Parent Co. 216-725-8871
Ore Portland, Earl & Brown Co. 503-245-2283
Tex Dallas, Wyborny Sls. Co. 214-348-9657
Tex Houston, Wyborny Sls. Co. 713-772-0961
Utah Salt Lake City, B & B Elctrn. Prods. 801-486-3943
Wash Seattle, Earl & Brown Co. 206-284-1121

Ⓣⓜ AKROBIN - plastic storage bin - Akro-Mils, Inc.

AKRO-MILS, INC., Dept. EM, 1293 S. Main St., Akron, Ohio 44301, Tel: 216-253-5593

AKRON PORCELAIN CO., Dept. EM, 2719 Cory Ave., Akron, Ohio 44314, Tel: 216-745-2159; Empl.: 130

Sales Manager: R. McCann

ALADDIN ELCTRNS., Dept. EM, 701 Murfreesboro Rd., Nashville, Tenn. 37210, Tel: 615-748-3335, Telex: 554466; FSC No.: 06978; Empl.: 250

Local Sales Offices & Reps.
Cal Culver City, De Angelo, Rothman & Co. 213-398-6239
Cal Los Altos, Ewing-Foley 415-941-4525
Cal San Diego, DeAngelo, Rothman & Co. 714-560-5707
Colo Denver, E. W. Johnson Co. 303-985-4810
Fla Winter Park, Young & Lawrence Assoc. 305-647-6929
Ind Indianapolis, Loomis Assocs. 317-299-5644
Iowa Cedar Rapids, Seltec Sales Corp. 319-393-1114
Md Timonium, Glen White & Assoc. 301-252-6360
Mass Waltham, Deveer Sls. Engrg. 617-899-5900
Mich Southfield, Luebbe Sls. Co. 513-357-0355
Mo Kansas City, Automatic General Sls. 816-333-8206
NJ Merchantville, Glen White Assocs 609-662-3540
NJ N. Caldwell, Masin-Esco. 201-226-2550
NY DeRyuter, R.P. Kennedy Co. 315-682-2299
NY Red Hook, R.P. Kennedy Co. 914-876-2700
NY Rochester, R.P. Kennedy Co. 716-271-6322
NY Syosset, Masin-Esco 516-364-0310
NC Raleigh, Glen White Assoc. 919-787-7016
Ohio Cincinnati, Luebbe Sls. Co. 513-871-4211
Ohio Cleveland, Luebbe Sls. Co. 216-333-0425
Ohio Dayton, Luebbe Sls. Co. 513-294-0426
Pa Delmont, Luebbe Sls. Co. 412-468-4019
Tenn Johnson City, Glen White Assocs. 615-928-0184
Tex Dallas, EBR, Inc. 214-942-2716
Va Lynchburg, Glen White Assoc. 804-846-4624

ALAN INDUSTRIES INC., Dept. EM, PO Box 1203, Columbus, Ind. 47201, Tel: 812-372-8869; FSC No.: 52750; Empl.: 25

Local Sales Offices & Reps.
Ala Huntsville, Saber Assoc. 205-534-3386
Cal Canoga Park, California Electronic Mktg. 213-884-7867
Cal Los Altos, Stout-Loeswick, Inc. .. 415-948-3265
Cal Santa Ana, California Electronic Mktg. 714-835-2702
Fla Lighthouse Point, Saber Assocs. 305-943-3076
Fla Longwood, Saber Assocs. 305-422-3686
Fla Sarasota, Saber Assocs. 813-441-1301
Ill Chicago, K. W. Meyers Co. 312-774-6440
Ind Indianapolis, K. W. Meyers Co. .. 317-243-6681
Md Bethesda, S & S Assocs. 301-654-1434
Mass Waltham, Scientific Devices-New England 617-894-5637
Minn Minneapolis, K. W. Meyers co. .. 612-920-7080
NM Albuquerque, A.L. S. Elctrns. 505-298-2575
NY Tuckahoe, Asco Elctrns. 914-779-8110
NC Raleigh, Saber Assocs. 919-834-3961
Pa King of Prussia, S & S Assocs. .. 215-265-3450
Exp: Ind, Columbus, Dage Corp. 203-234-3123

ALAUN ENGRG., Dept. EM, 515 South Palm, Alhambra, Cal 91803, Tel: 213-289-2172; Empl.: 2

Ⓣⓜ ALAUTRONEX - gold alloy plating process - Sel-Rex Div. Oxy Metal Industries Corp.

ALBEROX CORP., Dept. EM, New Bedford Ind'l. Pk., New Bedford, Mass. 02745, Tel: 617-995-1725; Empl.: 80 .... p. 2662

Sales Manager: A.J. Coutu

Local Sales Offices & Reps.
Cal Los Angeles, Alberox Corp. 213-383-3630
Cal Santa Cruz, Alberox Corp. 408-426-3424
Fla Orlando, Buchanan & Abrams Assoc. 305-898-7444
Ill Chicago, Weldin Sls. Co. 312-267-4944
Ind Indianapolis, J. C. Butler 317-253-5143
Kans Kansas City, Kebco 913-649-2168
Mass Weston, J. Goode Assocs. 617-235-3900
Mo Maryland Heights, KEBCO 314-576-4111
NY Pompey, S. F. Foster Co. 315-677-3333
NY Valley Stream, Levison Sls. Co. 516-561-9696
Pa Philadelphia, Stanton J. Shelton 215-248-0131
Tex Dallas, United Comps. 214-324-1448

Ⓣⓜ ALCHROME - heating element alloy - GTE Sylvania Inc.

ALCO ELECTRONIC PRODS., INC., Sub. of Augat, Inc., Dept. EM, 1551 Osgood St., North Andover, Mass. 01845, Tel: 617-685-4371, TWX: 710-342-0552; Empl.: 60; Minimum order: $L. Murphy ......p. 2526,3956,3957

Distributor Manager: L. Murphy

Local Sales Offices & Reps.
Ala Huntsville, Interep Assoc. 205-881-3677
Ark Little Rock, J.Y. Schoonmaker Co. 501-375-2168
Cal Daly City, R. Del. Bucchia & Assocs. 415-756-1664
Cal Newport Beach, W. Bert Knight, Inc. 714-833-8250
Colo Denver, Simpson & Assocs. 303-794-8381
Conn Collinsville, Gerber Sls. Corp. 203-693-2651
Conn Newton, Gerber Sls. Corp. 203-426-3440
Fla No. Miami Beach, Irby & Connolly, Inc. 305-949-5197
Fla Orlando, Irby & Connolly, Inc. 305-894-8471
Ga Atlanta, Interep Assoc. 404-394-7756
Ill Glen Ellyn, Rockford Controls Co. 312-469-6016
Ind Greenwood, Valentine-Schillinger E. Assoc. 317-888-2260
Ind South Bend, Valentine-Schillinger E. Assoc. 219-291-6258
Iowa Marion, Thomas & Modrcin Assoc. 319-377-6261
Kans Shawnee Mission, Thomas & Modrcin Assoc. 913-432-2131
Md Towson, Habco Elctrns. 301-825-9637
Mass E. Longmeadow, Gerber Sls. Corp. 413-525-3059
Mass Waltham, Gerber Sls. Corp. 617-890-8040
Mich Southfield, Valentine-Schillinger 313-559-3680
Minn St. Paul, Countryman Assocs. 612-645-9151
Mo Hazelwood, Thomas & Modrcin Assoc. 314-895-4700
NJ Keasbey, Addem II 516-567-5900
NY Dewitt, Tri-Tech Elctrns. 315-446-2881
NY Endwell, Tri-Tech Elctrns. 607-754-1094
NY Fairport, Tri-Tech Elctrns. 716-223-5720
NY Huntington Station, Addem I 516-567-5900
NY Larchmont, Tri-Tech Elctrns. 914-834-4423
NC Charlotte, Over & Over, Inc. 704-527-3070
Ohio Cincinnati, Luebbe Sales Co. 513-871-4211
Ohio Cleveland, Luebbe Sales Co. 216-333-0425
Ohio Dayton, Luebbe Sales Co. 513-294-0426
Okla Tulsa, J.Y. Schoonmaker Co. 918-936-1423
Pa Feasterville, PSA Inc. 215-355-6244
Pa Pittsburgh, Trymax Co. 412-823-8400
Tex Dallas, J.Y. Schoonmaker Co. 214-349-1650
Tex Houston, J.Y. Schoonmaker Co. 713-926-9510
Utah Salt Lake City, Simpson Assocs. 801-521-3622
Va Lynchburg, Habco Elctrns. 804-384-5236
Wash Seattle, D. Smith Sls. Co. 206-633-3160

Local Distributors
Ala Huntsville, Mock Elctrns. 205-539-2401
Ariz Phoenix, Dalis Elctrns. 602-258-8151
Cal Burbank, Woods Co. 213-849-3211
Cal Gardena, Cal. Switch & Signal .. 213-770-2330
Cal Hayward, Dunlap Elctrns. 415-783-9260
Cal Los Angeles, Elec. Switch 213-664-1141
Cal Mountain View, Abacus Elctrns. Co. 415-961-1500
Cal Oakland, Brill Elctrns. 415-834-5888
Cal Palo Alto, Zack Elctrns. 415-326-5432
Cal Riverside, Elctrn. Supp. 714-787-9220
Cal Sunnyvale, Acacia Sls. 408-745-7200
Cal Van Nuys, Pacific Switch Controls 213-873-4802
Conn W. Hartford, Atlantic Switch Controls 203-523-5259
Fla Hialeah, Switch Controls 305-822-0892
Fla Miami, Elctrn. Equip. 305-871-3500
Fla Tampa, Lykes Elctrn. 813-886-6621
Ill Chicago, Newark Elctrns. 312-638-4411
Ill Elk Grove Village, Lakeland Elctrns. 312-595-1000
Ill Rosemont, Advent Elctrns. 312-298-4210
Ind South Bend, Radio Distributing .. 219-287-2911
Kans Wichita, Interstate Elctrns. 316-264-6317
Md Gaithersburg, Pioneer Washington 301-948-0710
Mass Bellingham, Impact Sls. 617-964-7740
Mass Burlington, Wilshire Elctrns. N/E 617-272-8200
Mass Framingham, Future Elctrns. 617-879-0860
Mass Lynn, Land Elctrns. 617-592-2220
Mass Newton, Cramer Elctrns. 617-969-7700
Mich Ann Arbor, Advent 313-769-8650
Minn St. Paul, Ragon 612-488-0201
Mo St. Louis, Olive Elctrn. Supp. 314-863-7800
NJ Bellmawr, Mid Atlantic Elctrns. .. 609-931-5303
NY Binghamton, Harvey/Federal Elctrns. 607-748-8211
NY Buffalo, Summit Dist. 716-884-3450
NY Farmingdale, Arrow Elctrns. 516-694-6800
NY Hempstead, Elctrn. Equip. 516-538-5510
NY Lynbrook, Peerless Radio 516-593-2121
NC Winston-Salem, Kirkman Elctrns. 919-722-9131
Ohio Columbus, Hughes-Peters 614-294-5351
Ohio Dayton, Stotts-Friedman Co. 513-298-5555
Pa Cornwells Heights, Reliance Merchandizing 215-638-8200
Pa Ivyland, Century Elctrns. 215-824-1897
Pa Philadelphia, Almo Elctrns. 215-676-6000
Pa Pittsburgh, CAM/RPC 412-782-3770
Tenn Knoxville, Ind'l. Elctrns. 615-573-7135
Tex Dallas, Summers Southland Supply 214-748-6533
Tex Houston, Lenert Co. 713-225-1465
Utah Salt Lake City, W.H. Bintz Co. .. 801-363-5821
Va Arlington, Arlington Elctrns. 703-524-2412
Wash Seattle, Zepher Elctrns. 206-575-0922
Wisc Milwaukee, Marsh Elctrns. 414-545-6500
For: Can., Vancouver, B.C., L.A. Varah 604-873-3211

Ⓣⓜ ALCOJET - powder machine detergent - Alconox Inc.

Ⓣⓜ ALCOKNOB - panel & control knobs - ALCO Electronic Prods., Inc.

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ALCON METAL PRODUCTS, INC., Dept. EM, 1750 N. Kimball Ave., Chicago, Ill. 60647

ALCONOX INC., Dept. EM, 217 Park Ave. S., New York, N.Y. 10003, Tel: 212-473-1300; Empl.: 10

Local Distributors

Ala	Birmingham, Sargent-Welch Scientific Co.	205-251-5125
Alas	Anchorage, VWR Scientific	907-272-9507
Ariz	Phoenix, VWR Scientific	602-623-3618
Ark	Little Rock, General Scientific	501-375-9805
Cal	Irvine, Scientific Prods.	714-540-5320
Cal	Los Angeles, VWR Scientific	213-269-9311
Cal	Menlo Park, Scientific Prods.	415-323-7741
Cal	San Francisco, VWR Scientific	415-469-0100
Colo	Denver, Sargent-Welch Scientific Co.	303-299-8220
Conn	New Haven, Macalaster-Bicknell Co.	203-624-4191
Del	Wilmington, J. G. Merkel & Sons	302-654-8818
DC	D.C., Kloman Surgical Supply Co.	202-223-3444
Fla	Ocala, Scientific Prods.	904-732-3480
Ga	Stone Mountain, Scientific Prods.	404-934-4070
Haw	Keneohe, Scientific Prods.	808-235-9987
Idaho	Boise, Intermountain Surgical Supply Co.	208-344-8651
Ill	Mc Gaw Park, Scientific Prods.	312-973-3600
Ill	Skokie, Sargent-Welch Scientific Co.	312-677-0600
Ind	Indianapolis, General Medical/Scientific	317-634-8560
Iowa	Des Moines, Gentec Hospital Supply Co.	515-283-1744
Kans	Wichita, Soutwest Scientific Corp.	316-262-0582
Ky	Louisville, Preiser Scientific,Inc.	502-636-3307
La	New Orleans, C. Matheson Scientific, Inc.	504-524-0475
Me	Portland, George C. Frye Co.	207-774-3981
Md	Columbia, Scientific Prods.	301-997-3300
Mass	Boston, VWR Scientific	617-964-0900
Mich	Detroit, Sargent-Welch Scientific Co.	313-931-0337
Mich	Romulus, Scientific Prods.	313-729-6000
Minn	Minneapolis, Scientific Prods.	612-533-1171
Miss	Jackson, General Medical Jackson	601-939-9515
Mo	Maryland Heights, Scientific Prods	314-569-2960
Mont	Billings, Northwest Scientific, Inc.	406-252-3269
Neb	Omaha, Crosby, Inc.	402-558-4300
Nev	Las Vegas, Standard Surgical Supply	702-382-9675
NH	Manchester, Healthco, Inc.	603-668-3320
NJ	Edison, Scientific Prods	201-494-4000
NJ	Linden, Ace Scientific Supply Co.	201-925-3300
NM	Albuquerque,, New Mexico Chemical-Surgical Co.	505-242-8808
NY	Albany, Krackeler Scientific, Inc.	518-462-4281
NY	Rochester, VWR Scientific	716-288-5881
NY	Syracuse, Macalaster-Bicknell Co.	315-463-9216
NY	West Hempstead, NY Laboratory Supply Co.	212-895-5698
NC	Charlotte, Scientific Prods.	704-525-1021
ND	Fargo, Midland Hospital Supply, Inc.	701-235-4451
Ohio	Cincinnati, Curtin-Matheson Scientific, Inc.	513-671-1200
Ohio	Cleveland, Sargent-Welch Scientific Co.	216-587-3300
Okla	Tulsa, Curtin-Matheson Scientific, Inc.	918-622-1700
Ore	Portland, American Scientific Chemical	503-283-4155
Pa	Philadelphia, A.H. Thomas Co.	215-574-4555
RI	Providence, Eastern Scientific Co.	401-831-4100
SC	Charleston, General Medical Charleston	803-722-3378
SD	Sioux Falls, Kreiser Surgical, Inc.	605-336-1155
Tenn	Memphis, Ideal Chemical & Supply Co.	901-363-7720
Tex	Dallas, Sargent-Welch Scientific Co.	214-357-9381
Tex	Houston, Scientific Prods.	713-462-8000
Utah	Salt Lake City, VWR Scientific	801-486-4851
Vt	Burlington, New England Hospital Supply	802-864-4571
Va	Richmond, General Scientific	804-264-2861
Wash	Redmond, Scientific Prods.	206-885-4131
WVa	Charleston, Preiser Scientific, Inc.	314-343-4031
Wisc	Milwaukee, Gentec Hospital Supply Co.	414-771-9300
Exp:	N.Y., New York, Alconox, Inc.	212-473-1300
For:	Australia, Mt Waverly, Victoria, AE Stancen & Co. Pty. Ltd.	03544-8022
For:	Belgium, B2110 Wijnegem, Pleuger, N.V.	0353-85575
For:	England, London E79QN, Piper Chemicals	01-472-1732
For:	France, 14002 Caen, Laboratorie Standa	31-81-13-40
For:	Greece, Athens 101, P. Bacacos S.A.	532-631
For:	Holland, Amsteldeen 1134, Pleuger Nederlands	020-43-3651
For:	Hong Kong, Hong Kong, Southeast Scientific Co.	5-278-031
For:	Israel, Herzliya, Salan	982-350
For:	Italy, 06100 Perugia, Sibar s.a.s.	075-24864
For:	Japan, Tokyo 107, AHS/Japan Corps.	
For:	Nicarauga, Managua, Promenic, S.A.	25274
For:	Portugal, Lisboa, Mundinter	532-131-7
For:	Puerto Rico, San Juan, Scientific Products	781-0460
For:	Rep. of Panama, Panama 5, Promed International, S.A.	23-5566
For:	Spain, Granada, Eurolab	23-36-90
For:	Sweden, S16391 Spanga, Kebo AB	08-76000-20
For:	Switzerland, Jeneve, Medilec, S.A.	29-60-77
For:	Taiwan, Taipei, Sincere Trad. Co., Ltd.	717-386
For:	Thailand, Bangkok, Medicthai Co., Ltd.	526-694

™ALCOSTRIP - ceramaic strips - ALCO Electronic Prods., Inc.

™ALCOSWITCH - miniature switches - ALCO Electronic Prods., Inc.

™ALCOTABS - machine detergent tablets - Alconox Inc.

ALDEN SYS. CO., INC., Dept. EM, Box A, Dept. 262, Westboro, Mass. 01581, Tel: 617-366-8556, Telex: 92-4451; Empl.: 5

Sales Manager: G. Morrison

ALDEN ELCTRN. & IMPULSE RECORDING EQUIP. CO., Dept. EM, Washington St., Westboro, Mass. 01581, Tel: 617-366-8851, Telex: 94-8404

Sales Manager: L.A. Farrington

ALDSHIR MFG., Dept. EM, 111 Lake, Tuckahoe, N.Y. 10707, Tel: 914-779-1297; Empl.: 8

ALERT TECHNOLOGY, INC., Dept. EM, 3390 Commercial Ave., Northbrook, Ill. 60062, Tel: 312-498-0940; Empl.: 6

Local Sales Offices & Reps.

Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Ft. Wayne, Coombs Assocs.	219-747-0402
Mo	St. Louis, Coombs Assocs.	314-567-3657
Wisc	Greendale, Coombs Assocs.	414-421-2300

ALESSI INDUSTRIES, Dept. EM, 3195 Bldg. C, Airport Loop Dr., Costa Mesa, Cal. 92626, Tel: 714-979-8912, TWX: 910-595-1528; FSC No.: 50093; Empl.: 7

Local Sales Offices & Reps.

Ariz	Scottsdale, Electronic Entprs.	602-946-9860
Cal	Palo Alto, Coherent Mktg. Assoc.	415-327-2217
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Mass	Chelmsford, Equipment Sls. Co.	617-256-8547
Tex	Richardson, Burns Tech. Sls. Co.	214-423-1231
Wash	Seattle, Demarest & Assoc.	206-523-0600

ALESSI INDS., Dept. EM, 3195-C Airport Loop Dr., Costa Mesa, Cal. 92626, Tel: 714-979-8912, TWX: 910-595-1528; Empl.: 10

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrn. Entprs.	602-946-9860
Cal	Palo Alto, Coherent Mktg. Assoc.	415-327-2217
Ill	Chicago, Electro-Tech Kmtg. Assoc.	312-588-4535
Mass	Chelmsford, Equip. Sls. Co.	617-256-8597
NM	Las Cruces, Elctrn. Entprs.	505-524-0126
Tex	Richardson, Burns Tech. Sls.	214-423-1231
Wash	Seattle, Demarest & Assoc.	206-523-0600

™ALFCO - trade name - Aluminum Filter Co.

ALFORD MFG. CO., Dept. EM, 120 Cross St., Winchester, Mass. 01890, Tel: 617-729-8050, TWX: 710-348-1063; Empl.: 48

™ALFRED - sweep oscillators - Singer Instrumentation

™ALGOCLAD - bright gold alloy electroplating process - Sel-Rex Div. Oxy Metal Industries Corp.

ALIGNMENT ENTERPRISES, Dept. EM, 9537 Telstar Ave. #132, El Monte, Cal. 91731, Tel: 213-579-0483, Telex: 69-1623; Empl.: 8; Minimum order: $M. Johnson

Sales Manager: R. Schulthers; *Distributor Manager:* M. Johnson

Local Sales Offices & Reps.

Ariz	Phoenix, Pentech	602-947-7761
Ariz	Scottsdale, Aztech	602-994-5686
Cal	Sunnyvale, B. Oppenheim	408-733-9000
Cal	Van Nuys, McDonald Assocs.	213-782-3327
Kans	Prairie Village, Dougherty & Assocs.	913-649-3515
Mass	Boston, V.J. Huntoon Assocs.	617-235-4260
NJ	Riverdale, B. Most Assocs.	201-839-4333
Tex	Dallas, Teledyne Tac	214-387-4877
Wisc	Hales Corners, Process Technology	414-425-2940

™ALIGN-O-POT - special shaft feature - Bourns, Inc.

ALINABAL, Div. of MPB Corp., Dept. EM, 28 Woodmont Rd., Milford, Conn. 06460, Tel: 203-877-3241, TWX: 710-462-1178; Empl.: 150

ALISSA MFG. CO., Dept. EM, 735 E. Hyde Park Blvd., Inglewood, Cal. 90302, Tel: 213-677-8185; FSC No.: 54795

ALL AMERICAN TOOL & MFG. CO., Dept. EM, 8027 Lawndale, Skokie, Ill. 60076, Tel: 312-673-7084; Empl.: 12

Local Sales Offices & Reps.

Ariz	Phoenix, Pacific Scientific Co.	602-273-7464
Cal	City of Commerce, Pacific Scientific Co.	213-927-5333
Colo	Boulder, Pacific Scientific Co.	303-237-5210
Mich	Detroit, Comtel Instruments Co.	313-255-1970
Mo	St. Louis, Comtel Instruments Co.	314-567-3636
NM	Albuquerque, Pacific Scientific Co.	505-265-6638
NY	Amityville, Testing Machines, Inc.	516-842-5400
Ohio	Cleveland, Comtel Instruments Co.	216-442-8080
Okla	Tulsa, Pacific Scientific Co.	918-749-1244
Ore	Portland, Pacific Scientific Co.	503-256-1770
Pa	Pittsburgh, Comtel Instruments Co.	412-922-5720
Tex	Houston, Pacific Scientific Co.	713-621-2720
Exp:	Evanston, Ill., Inter-Ocean Export Assocs.	312-273-5314

ALL SHIELD ENCLOSURES, See All-Tronics, Inc.

ALL STATES PLASTIC MFG. CO., INC., Dept. EM, 1801 W. Foster Ave., Chicago, Ill. 60640, Tel: 312-728-0525

ALL-TRONICS INC., Dept. EM, 45 Bond St., Westbury, N.Y. 11590, Tel: 516-333-3090, TWX: 510-222-3655; FSC No.: 99870; Empl.: 50

Local Sales Offices & Reps.

Cal	San Diego, Daniels & Doty	714-560-6266
Cal	Santa Clara, Cummings Assocs.	408-247-8656
Cal	Woodland Hills, Cummings Assocs.	213-340-6035
Colo	Denver, Cummings Assocs.	303-455-6860
Conn	Norwalk, Betronics Assocs.	
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Md	Bethesda, Warner Assocs.	301-468-8904
Mass	Waltham, Betronic Assocs.	617-894-8400
NJ	Cherry Hill, Stan Auerbach	215-IV2-6950
NY	Plainview, R. Smith Assocs.	516-681-3155
NY	Spring Valley, Robert Smith Assocs.	914-354-6067
Ohio	Dayton (DESC. ONLY), C. V. Clark Co.	513-435-3000
Wash	Bellevue, TMS Entprs.	206-746-5699

™ALLACAST SYSTEM - epoxy potting & encapsulating - Allaco Prods Div.

ALLACO PRODS DIV., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172, Tel: 617-926-2550, TWX: 710-327-6518; FSC No.: 99098; Empl.: 18

Sales Manager: R.S. Cass

Local Sales Offices & Reps.

Cal	Irvine, Bacon Industries, Inc. of Calif.	714-556-4170

ALLARD INSTR., Div. of Applied Fluidics, Dept. EM, 770 Main St., Westbury, N.Y. 11590, Tel: 516-334-8742, TWX: 510-222-8695; Empl.: 17 .... p. 2567

Sales Manager: H. Hass

ALLEGHENY LUDLAM STEEL CO., Dept. EM, 2000 Oliver Bldg., Pittsburgh, Pa. 15222, Tel: 412-562-4302, TWX: 412-642-3045; Empl.: 20,000

Local Sales Offices & Reps.

Cal	Los Angeles	213-685-9550
Cal	S. San Francisco	415-583-9855
Conn	Meriden	203-688-5241
Ga	Atlanta	404-394-9613
Ill	Chicago	312-774-8600
Mich	Detroit	313-564-6900
Mo	St. Louis	314-991-2900
NY	Buffalo	716-633-8800
NY	New York	914-694-1880
Ohio	Cincinnati	513-351-8000
Okla	Cleveland	216-243-7100
Pa	Philadelphia	215-293-1990
Tenn	Memphis	901-767-6962
Tex	Houston	713-529-2647
Wash	Seattle	206-GL4-6950
Wisc	Milwaukee	414-258-5900

ALLEN AVIONICS, INC., Div. A.K. Allen Co., Dept. EM, 255 E. 2nd St., Mineola, N.Y. 11501, Tel: 516-248-8080 .... p. 2490-2492,2718-2720

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Corp.	205-547-7718
Cal	Culver City, E.V. Roberts & Assocs.	213-870-9561
Cal	Palo Alto, Adtek Assocs.	415-323-5414
Colo	Golden, J.F. Hurlbut Co.	303-279-7796
Fla	Tampa, Nickerson Corp.	813-885-1416
Ill	Chicago, Electro-Tech Mktg. Assocs.	312-588-4535
Kans	Prairie Village, Engrg. Svcs.	913-649-4000
Md	Baltimore, D.K. Jones & Assocs.	301-752-0577
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Minn	Anoka, K. Haugen & Assocs.	612-421-3395
Mo	St. Louis, Engrg. Svcs.	314-997-1515
NJ	Cherry Hill, H.J. White Co.	609-428-4544
NY	Huntington, J.N. Sweeney & Co.	516-692-4222
NY	Rochester, J. G. Welch Assocs.	716-244-1100
NY	Utica, J. G. Welch Assocs	315-736-7821
NC	Kannapolis, Nickerson Corp.	704-932-6772
Ohio	Dayton, Ashby Assocs.	513-252-5627
Ore	Portland, Components West, Inc.	503-643-5588
Tex	Dallas, Texas Avionics	214-368-3566
Wash	Seattle, Components West, Inc.	206-243-2133
Exp:	Conn., Stamford, Dage Corp.	203-324-3123

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ALLEN-BRADLEY

ALLEN-BRADLEY CO., Dept. EM, 1201 S. Second St., Milwaukee, Wisc. 53204, Tel: 414-671-2000, TWX: 910-262-3451; Empl.: 6500; Minimum order: $C. Grimsley .... p. 3634-3639,3773-3775

Distributor Manager: C. Grimsley

Local Sales Offices & Reps.

Ala	Birmingham	205-879-4641
Alas	Anchorage, J.A. Tudor & Assoc.	907-279-5196
Ariz	Scottsdale, A-B Co.	602-994-9547
Ark	Little Rock, C.H. Stout Inc.	501-372-2555
Cal	City of Commerce	213-724-5713
Cal	San Diego, A-B Co.	714-292-4016
Cal	South San Francisco	415-871-0200
Colo	Denver	303-936-7303
Conn	Stratford	203-378-7364
Fla	Fort Lauderdale	305-771-0400
Fla	Jacksonville, Van & Smith Co.	904-384-2376
Fla	Orlando, Van & Smith Co.	305-425-7026
Fla	Tampa, Van & Smith Co.	813-877-8393
Ga	Doraville, A-B Co.	404-455-7422
Haw	Honolulu, J.M. Electrical Sales	808-833-1744
Ill	Chicago	312-922-9302
Ill	Rockford	815-965-8795
Ind	Fort Wayne	219-432-9538
Ind	Indianapolis	317-293-5223
Ind	Merrillville	219-769-7770
Iowa	Bettendorf	319-355-5316
Kans	Wichita, A-B Co.	316-686-9631
Ky	Louisville, A-B Co.	502-893-2571
La	Baton Rouge, A-B Co.	504-927-5955
La	Metairie	504-888-2281
La	Shreveport, C.H. Stout of Shreveport Inc.	318-221-5555
Me	Portland	207-772-3555
Md	Baltimore	301-265-5600
Mass	Agawam	413-785-1984
Mass	Framingham	617-879-5900
Mich	Flint	313-733-3560
Mich	Grand Rapids, E.B. Dewey Co.	616-454-1825
Mich	Kalamazoo, E.B. Dewey Co.	616-344-6163
Mich	Lansing	517-351-4560
Mich	Madison Heights	313-583-9400
Minn	Minneapolis	612-781-3406
Miss	Jackson, A-B Co.	601-981-4191
Mo	Kansas City	816-421-4595
Mo	Maryland Heights	314-567-6326
Neb	Omaha, A-B Co.	402-592-2010
NJ	Bloomfield	201-338-4600
NM	Albuquerque	505-265-7723
NY	Albany	518-869-5373
NY	Buffalo	716-634-2711
NY	Rochester	716-461-3660
NY	Syracuse	315-463-4501
NC	Charlotte	704-394-9341
NC	Greensboro	919-272-5870
Ohio	Akron	216-253-2106
Ohio	Cincinnati	513-793-7580
Ohio	Cleveland	216-442-0000
Ohio	Columbus	614-882-7722
Ohio	Dayton	513-294-4466
Ohio	Toledo	419-841-7726
Okla	Tulsa, J.W. Elder Co.	918-583-9149
Ore	Eugene, J.A. Tudor & Assoc.	503-686-1252
Ore	Portland, J.A. Tudor & Assoc.	503-288-5154
Pa	Allentown	215-437-2401
Pa	Erie	814-868-8214
Pa	King of Prussia	215-337-1990
Pa	Pittsburgh	412-923-1844
Pa	York	717-848-2239
SC	Greenville	803-235-1280
Tenn	Knoxville	615-588-0591
Tenn	Memphis, C.H. Stout of Tennessee Inc.	901-362-1616
Tenn	Nashville	615-834-1860
Tex	Dallas	214-243-3665
Tex	Houston	713-445-8474
Tex	San Antonio	512-732-4362
Utah	Salt Lake City, Stevens Sls. Co.	801-487-8971
Va	Richmond	804-282-4285
Wash	Pasco, J.A. Tudor & Assoc.	509-547-8414
Wash	Seattle, J.A. Tudor & Assoc.	206-682-7444
Wash	Spokane, J.A. Tudor & Assoc.	509-327-3328
WVa	Charleston, S.C. Payne	304-343-4607
Wisc	Appleton	414-731-3202
Wisc	Milwaukee	414-671-2000

Local Distributors

Ariz	Phoenix, Kierulff Elctrns.	602-273-7331
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Los Angeles, Kierulff Elctrns., Inc.	213-685-5511
Cal	Mountain View, Elmar Elctrns., Inc.	415-961-3611
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	San Diego, Liberty Elctrns.	714-565-9171
Colo	Denver, Cramer/Denver Elctrns.	303-758-2100
Conn	North Haven, Cramer/Conn	203-239-5641
Fla	Hollywood, Cramer/Hollywood	305-923-8181
Fla	Orlando, Cramer/Orlando	305-894-1511
Ga	Atlanta, Cramer/Atlanta	404-448-9050
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Peoria, Klaus Radio	309-691-4840
Ind	Ft. Wayne, Ft. Wayne Elctrns. Supply, Sub. of Graham Elctrns. Supply	219-423-3422
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Md	Gaithersburg, Cramer/Washington	301-948-0110
Mass	Newton, Cramer Elctrns.	617-969-7700
Mich	Troy, Schweber Elctrns.	313-583-9242
Minn	Minneapolis, Newark-Minneapolis Elctrn.	612-331-6350
NJ	Somerset, Schweber Elctrns.	201-469-6008
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cincinnati, Newark Elctrns. Corp.	513-874-5115
Ohio	Cleveland, Schweber Elctrns. Corp.	216-464-2970
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Tex	Dallas, Solid State Elctrns. of Tex	214-352-2601
Tex	Houston, Harrison Equip.	713-652-4700
Utah	Salt Lake City, Cramer/Utah	801-487-4131
Wash	Seattle, Kierulff Elctrns.	206-763-1550
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500
For:	Can., Downsview, Ont., Cesco Elctrns.	416-661-0220
For:	Can., Montreal, Que., Cesco Elctrns. Ltd.	514-735-5511
For:	Can., Ottawa, Ont., Cesco Elctrns.	613-729-5118
For:	Can.,Que., Cesco Elctrns. Ltd.	418-524-4641

ALLEN BRADLEY, Sys. Div., Dept. EM, 747 Alpha Dr., Highland Heights, Ohio 44143, Tel: 216-449-6700, TWX: 810-427-2975; Empl.: 500

Sales Manager: R.J. Fredrickson

Local Sales Offices & Reps.

Ala	Birmingham, Allen-Bradley Co.	205-879-4641
Alas	Anchorage, Allen-Bradley Co.	907-274-6350
Ariz	Phoenix, Ind'l. Control	602-959-9547
Cal	Los Angeles, Allen-Bradley Co.	213-724-5713
Cal	S. San Francisco, Allen-Bradley Co.	415-871-0200
Colo	Denver, Allen-Bradley	303-936-7303
Conn	Bridgeport, Allen-Bradley	203-378-7364
Ill	Chicago, Allen-Bradley Co.	312-922-9302
Ill	Rockford, Allen-Bradley Co.	815-965-8795
Ind	Fort Wayne, Allen-Bradley Co.	219-432-9538
Ind	Gary, Allen-Bradley Co.	219-769-7770
Ind	Indianapolis, Allen-Bradley Co.	317-293-5223
Iowa	Davenport, Allen-Bradley Co.	319-355-5316
La	New Orleans, Allen-Bradley Co.	504-888-2281
Me	Portland, Allen-Bradley Co.	207-772-3555
Md	Baltimore, Allen-Bradley Co.	301-265-5600
Mass	Boston, Allen-Bradley Co.	617-879-5900
Mass	Springfield, Allen-Bradley Co.	413-785-1984
Mich	Detroit, Allen-Bradley Co.	313-583-9400
Mich	Flint, Allen-Bradley Co.	313-232-9341
Mich	Lansing, Allen-Bradley Co.	517-393-8600
Minn	St. Paul, Allen-Bradley Co.	612-636-5050
Mo	Kansas City, Allen-Bradley Co.	816-421-4595
Mo	Saint Louis, Allen-Bradley Co.	314-567-6326
NJ	Bloomfield, Allen-Bradley Co.	201-338-4600
NY	Albany, Allen-Bradley Co.	518-869-5373
NY	Buffalo, Allen-Bradley Co.	716-634-271
NY	Rochester, Allen-Bradley Co.	716-461-3660
NY	Syracuse, Allen-Bradley Co.	315-463-4501
NC	Charlotte, Allen-Bradley Co.	704-394-9341
NC	Greensboro, Allen-Bradley Co.	919-272-5870
Ohio	Akron, Allen-Bradley Co.	216-253-2106
Ohio	Cincinnati, Allen-Bradley Co.	513-793-7580
Ohio	Cleveland, Allen-Bradley Co.	216-391-2855
Ohio	Columbus, Allen-Bradley Co.	614-263-6881
Ohio	Dayton, Allen-Bradley Co.	513-294-4466
Ohio	Toledo, Allen-Bradley Co.	419-841-7726
Pa	Allentown, Allen-Bradley Co.	215-437-2401
Pa	Erie, Allen-Bradley Co.	814-868-8214
Pa	Philadelphia, Allen-Bradley Co.	215-337-1990
Pa	Pittsburgh, Allen-Bradley Co.	412-923-1844
Pa	York, Allen-Bradley Co.	717-848-2239
SC	Greenville, Allen-Bradley Co.	803-268-1391
Tenn	Knoxville, Allen-Bradley Co.	615-588-0591
Tenn	Nashville, Allen-Bradley Co.	615-834-1860
Tex	Dallas, Allen-Bradley Co.	214-748-6356
Tex	Houston, Allen-Bradley Co.	713-225-0747
Tex	San Antonio, Allen-Bradley Co.	512-732-4362
Va	Norfolk, Allen-Bradley Co.	804-499-0218
Va	Richmond, Allen-Bradley Co.	804-282-4285
Wisc	Appleton, Allen-Bradley Co.	414-731-3202
Wisc	Milwaukee, Allen-Bradley Co.	414-671-2000

ALLEN ELCTRNS. DIV., Allen Organ Co., Dept. EM, Macungie, Pa. 18062, Tel: 215-965-9801; Empl.: 500

ⓉⓂALLEN-HEAD - hex socket screws - Allen Mfg. Co.

ALLEN MFG. CO., Dept. EM, 22 E. Dudley Town Rd., Bloomfield, Conn. 06002, Tel: 203-242-8511, TWX: 710-425-0099; Empl.: 420

Local Sales Offices & Reps.

Cal	Cerritos, Allen Fastening Sys. Center	213-926-6515
Conn	Hartford, Allen Mfg. Co.	203-243-0391
Ga	Atlanta, Allen Mfg. Co.	404-873-5804

Ill	Franklin Park, Allen Fastening Sys. Center	312-455-5120

ALLIANCE MFG. CO., North American Phillips Co., Dept. EM, Alliance, Ohio 44601, Tel: 216-821-5360

ALLIED CHEMICAL CORP., Specialty Chemicals Div., Dept. EM, Box 1087R, Morristown, N.J. 07960, Tel: 201-455-2000; Empl.: 30000

Local Sales Offices & Reps.

Cal	San Francisco
Ill	Schaumburg
NJ	Saddle Brook

ALLIED CONTROL, see Gould, Inc. Control Systems Div. Allied Control

ALLIED ELECTRONICS, Div. of Tandy Corp., Dept. EM, 401 E. 8th St., Ft. Worth, Tex. 76102, Tel: 817-336-5401, Telex: 75-8314; Empl.: 350

Local Sales Offices & Reps.

Cal	Garden Grove	714-894-7581
Ill	, Elgin	312-697-8200
Mass	Braintree	617-848-4150

ALLIED SYSTEMS CORP., Dept. EM, Box 11005, Greensboro, N.C. 27409, Tel: 919-299-2294; Empl.: 25; Minimum order: $V.W. Buia ..... p. 1703

Sales Manager: E.V. Saude; *Distributor Manager:* V.W. Buia

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	205-536-1941
Cal	Seal Beach, Cairns Engrg. Sls. Corp.	213-430-9084
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Mass	Waltham, ICM Co.	617-891-8059
NY	New Hook, R. P. Kennedy Co.	914-876-2700
NY	Rochester, R. P. Kennedy Co.	716-271-6322
NC	Winston-Salem, Reynolds & Assocs.	919-725-6196
Va	Arlington, H. J. Heffernan Co.	703-522-6666

ALLIS-CHALMERS, Dept. EM, Box 512, Milwaukee, Wisc. 53201, Tel: 414-475-2000, TWX: 910-262-3444; Empl.: 26000

Local Sales Offices & Reps.

Cal	Los Angeles	213-726-0931
Cal	Walnut Creek	415-937-3111
Colo	Lakewood	303-238-7920
Fla	Tampa	813-877-9541
Ga	Atlanta	404-393-0156
Ind	Indianapolis	317-736-7161
Mass	Boston	617-848-5770
Mich	Kalamazoo	616-343-1621
Minn	Bloomington	612-944-1400
Mo	St. Louis	314-567-1074
NJ	Union	201-687-8931
NC	Charlotte	704-364-0412
Ohio	Akron	216-836-7996
Ohio	Cleveland	216-333-9090
Ohio	Norwood	513-351-6700
Pa	Haverford	215-527-2501
Pa	York	717-755-0942
Tex	Dallas	214-369-7300
Tex	Houston	713-522-1081
Va	Richmond	804-222-8441
Wash	Bellevue	206-454-3481
Wisc	Milwaukee	414-475-3724
Wisc	Milwaukee	414-475-4799

ALLISON LABS., INC., Dept. EM, 911 Prairie Trail, Austin, Tex. 78758, Tel: 512-836-5160; Empl.: 3

Local Sales Offices & Reps.

Ill	Deerfield, G. Stowe & Assocs.	312-272-1728
NJ	Bogota, Guinta Assocs.	201-488-4425
Tex	Houston, Vibranalysis Eng. Co.	
Exp:	N.Y., New York, B. Freudenberg	212-PL 7-9130

™ALLMETAL - metal fasteners - Allmetal Screw Products Co., Inc.

ALLMETAL SCREW PRODUCTS CO., INC., Dept. EM, 821 Stewart Ave., Garden City, N.Y. 11530, Tel: 516-222-1200, TWX: 510-222-8132

Local Sales Offices & Reps.

Cal	El Segundo	213-772-3131
Cal	Santa Clara	408-246-7444
Ga	Atlanta	404-455-6840
Ill	Elmhurst	312-279-3980
Md	Columbia	301-730-7550
Mass	Waltham	617-899-2500
Mich	Ferndale	313-548-0730
NJ	Middlesex	210-469-9100
NY	Pittsford	716-385-2550
NC	Charlotte	704-597-1393
Ohio	Cincinnati	513-851-8210
Ohio	Cleveland	216-461-4755
Tex	Dallas	214-350-8951

™ALLROS - non-activated rosin flux - Alpha Metals, Inc.

™ALL-STATE - brazing & soldering alloys - Chemetron Corp.

™ALL-TALK - Telephones - Fanon/Courier Corp., Subs.

ALMA, Div. Develco Inc., Dept. EM, 404 Tasman Dr., Sunnyvale, Cal. 94086, Tel: 415-968-3903, TWX: 910-379-6588; Empl.: 80

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	205-534-3387
Cal	San Diego, QPL, Inc.	714-453-4150
Cal	South Pasadena, QPL, Inc.	213-682-3705
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	305-422-3686
Fla	St. Petersburg, Saber Assocs.	813-441-1301
Ill	Chicago, Sea, Inc.	312-282-6694
Ind	Carmel, Sea, Inc.	317-846-2593
Md	Gaithersburg, Data Time, Inc.	301-948-7666
Md	Randallstown, Beacon North, Inc.	301-922-1248
Mass	Waltham, W.M. Hague Co.	617-899-5600
Minn	Minneapolis, Sea, Inc.	612-425-4455
NJ	Fairfield, KLS Assocs.	201-227-2900
NC	Raleigh, Saber Assocs.	919-787-9675
Pa	Abington, Bach-Stewart Assocs.	215-885-1550
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Irving, Crockett Southwest Co.	214-251-1776
Va	Falls Church, Beacon North, Inc.	703-534-1673
Wash	Seattle, R.S. Drake Assocs.	206-763-2755
Wisc	Waukesha, Sea, Inc.	414-547-6637

ALMOND INSTRS. CO., Dept. EM, 1223 East Edna Pl., Covina, Cal. 91724, Tel: 213-967-4151, TWX: 910-584-1320; Empl.: 55 ..... p. 3204,3205

Local Sales Offices & Reps.

NY	Williston Park, ABC Elctrn. Sls. Co.	516-747-6610

™ALNICO - cast alnico permanent magnets - Colt Industries

™ALNICO 5 CB - permanent magnet grade - Thomas & Skinner, Inc.

™ALNICO 9 NB - permanent magnet grade - Thomas & Skinner, Inc.

ALNOR INSTRUMENT CO., Dept. EM, 7301 N. Caldwell Ave., Niles, Ill. 60648, Tel: 312-647-7866, Telex: 72-4458; Empl.: 160

Local Sales Offices & Reps.

Ariz	Phoenix, Portis & Assocs.	602-947-4379
Cal	Costa Mesa, Tech. Prods. & Controls	714-646-8585
Cal	San Francisco, Elctrn. Engrg. Ltd.	415-593-2189
Colo	Denver, R.A. Mayes Co.	303-444-0782
Fla	Miami, Florida Precision Inst. Co.	305-324-1731
Ga	Atlanta, Measure-Trol Co.	404-255-7249
Haw	Honolulu, Controls, Inc.	808-841-7333
Ind	Indianapolis, Electro Engrg. Sls.	317-547-5273
Iowa	Cedar Rapids, Mueller Sls. Corp.	319-365-3923
Iowa	Davenport, Mueller Sls. Corp.	319-324-4962
La	New Orleans, M. Erichson Co.	504-834-9360
Md	Baltimore, Jobe & Co.	301-235-3502
Mass	Boston, Osgood Engrg. Co.	617-933-4744
Mich	Detroit, B. Turpin Co.	313-272-0746
Minn	Minneapolis, Mueller Sls. Corp.	612-544-8888
Mo	St. Louis, Ind'l. Svc. Labs.	314-535-5760
NJ	S. Bound Brook, Dover Controls	201-469-3391
NY	Buffalo, Thermal Systems, Inc.	716-662-5560
NY	New York City, M. Stock, Inc.	212-227-4380
NY	Rochester, Thermal Systems, Inc.	716-377-1970
NY	Syracuse, Thermal Systems, Inc.	315-458-5202
NC	Charlotte, A.D. Penn Co.	704-847-4426
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Cleveland, Alnor Instr. Co.	216-464-2225
Okla	Tulsa, J. Schoeffler Co.	918-742-5331
Ore	Portland, Fairman B. Lee Co.	503-236-9515
Pa	Philadelphia, W. Clear	215-687-5880
Pa	Pittsburgh, L.H. Boleky Co.	412-761-8994
Tex	Dallas, Gay Sls. Co.	214-368-2325
Tex	Houston, Patterson Equip. Co.	713-688-5533
Utah	Salt Lake City, R.A. Mayes Co.	801-292-6781
Va	Richmond, Virginia Tech. Assoc.	703-266-9654
Wash	Seattle, Fairman B. Lee Co.	206-244-7262
Exp:	Chicago, Ill, A. Torres Export	312-539-3663

™ALPAC - aluminum package bridge - Semtech Corp.

™ALPAC E - single phase bridge rectifier - Semtech Corp.

™ALPAC JR. - aluminum package bridge - Semtech Corp.

™ALPAC SR. - aluminum package bridge - Semtech Corp.

™ALPAC T - 10 AMP full wave bridge - Semtech Corp.

™ALPAC 3 JR - 5 AMP 3 phase bridge - Semtech Corp.

™ALPAC 3T - 10 AMP 3 phase bridge - Semtech Corp.

™ALPAC 50 - 50 AMP full wave bridge, round - Semtech Corp.

™ALPAC 50-R - rectangular full wave bridge - Semtech Corp.

™ALPHA - floated rate integrated gyros - Singer Co.

ALPHA COMPONENTS, INC., Dept. EM, 1106 E. Simpson Rd., Mechanicsburg, Pa. 17055, Tel: 717-697-8595; FSC No.: 52748

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrnis.	205-881-5031
Cal	San Carlos, Westronics Assocs.	415-592-1417
Fla	Ft. Lauderdale, Beacon Elctrnis.	305-776-6074
Fla	Maitland, Beacon Elctrnis.	305-647-3498
Ga	Atlanta, Beacon Elctrnis.	404-351-3654
Md	Towson, Dickison Sls. Co.	301-823-0923
Mass	Randolph, Naton Assocs.	617-986-6417
NJ	Cherry Hill, H. J. White Co.	609-428-4544
NC	Greensboro, Beacon Elctrnis.	919-674-9432
Ohio	Dayton, F. L. Ohmer & Assoc.	513-434-1454
SC	Spartanburg, Beacon Elctrnis.	803-582-4613
Tenn	Oak Ridge, Beacon Elctrnis.	615-482-2409

ALPHA COMPONENTS CORP., Dept. EM, 115 Eucalyptus Dr., El Segundo, Cal. 90245, Tel: 213-322-7780; Empl.: 12

Local Sales Offices & Reps.

Ariz	Phoenix, B.G. Sls.	602-266-7252
Cal	Long Beach, Ross Sls.	213-989-3738
Cal	San Francisco, Weseloh & Assoc.	415-961-0565
Fla	Oldsmar, L. A. Assoc.	813-855-4209
Fla	Tampa, NCF, Inc.	813-855-4209
Haw	Haleiwa, E. Kirkhuff	808-638-7546
Mass	Wilmington, Astrodyne, Inc.	617-272-3850
Minn	Minneapolis, Smith Sales Co.	612-377-3187
Miss	Greenwood, L.R. Massey	601-453-3038
NY	Brooklyn, I. Brown Co.	212-493-1379
NY	Camillus, Trademark Elex Assoc.	315-488-5518
NY	Northport, Production Sls. Assoc.	516-757-0336
Ore	Portland, Dale Weber Co.	503-234-7671
Exp:	Calif. Beverly Hills, Itonra International	213-990-6222

ALPHA DATA INCORPORATED, Dept. EM, 20750 Marilla St., Chatsworth, Cal 91311, Tel: 213-882-6500, TWX: 910-494-4914; Empl.: 46

Sales Manager: L.T. Lincoln, Dir. of Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co.	800-327-6600
Ariz	Phoenix, Industrial Prod. Corp.	602-246-8487
Cal	Campbell, Creative Sls. Tech.	408-255-6336
Cal	San Diego, Mesa Elctrns.	714-278-8021
Colo	Englewood, Data Sys. Mktg.	303-761-3172
Colo	Littleton, Data Sys. Mktg.	303-795-1960
Conn	Southbury, J.J. Wild, Inc. of New Englnad	203-264-9494
Fla	Orlando, Col-Ins-Co.	800-432-4480
Ga	Clarkston, Col-Ins-Co.	800-327-6600
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Rockville, L. G. White & Assocs.	301-770-6556
Mass	Needham, J.J. Wild, Inc. of New England	617-444-2366
Mich	Southfield, Electro Sales Assocs.	313-424-9075
Minn	Bloomington, Scientific Sls.	612-881-3300
Mo	St. Louis, Carter Elctrns.	314-569-1406
NM	Albuquerque, Industrial Prods.	505-256-3561
NY	Jericho, J.J. Wild, Inc.	516-935-6600
NY	Schenectady, N. W. Alexander & Assocs.	518-377-0581
NC	Winston-Salem, Col-Ins-Co.	800-327-6600

Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Ore	Lake Oswego, Wilson Applied Instrs.	503-636-0965
Pa	Audubon, Holmes Assocs.	215-666-0636
Tex	Houston, Data Applications Corp.	713-782-0830
Tex	Richardson, Data Applications Corp.	214-231-4846
Utah	Salt Lake City, Data Sys. Mktg.	801-487-8281
Wash	Bellevue, Wilson Applied Instrs.	206-641-6444

ALPHA ELECTRONIC SERVICES, Dept. EM, 8431 Monroe Ave., Stanton, Cal. 90680, Tel: 714-821-4400; Empl.: 80

Local Sales Offices & Reps.

Cal	Hayward, Solid State Comms.	415-785-4610

ALPHA INDUSTRIES INC., Dept. EM, 20 Sylvan Rd., Woburn, Mass. 01801, Tel: 617-935-5150, TWX: 710-393-1236; FSC No.: 17540; Empl.: 330

Local Sales Offices & Reps.

Ariz	Scottsdale, Semper Fi Sls. Co.	602-991-9197
Cal	Cupertino, Dura Elctrn. Sls.	408-255-2084
Cal	Los Angeles, Cain Technology	213-476-2251
Cal	Orange, Cain Technology, Inc.	714-997-7311
Colo	Denver, J. Smith & Assocs.	
Fla	Clearwater, Southeastern Sls.	831-447-1911
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Iowa	Cedar Rapids, Comstrand, Inc.	319-377-1575
Md	Glen Burnie, Micro-Comp	301-761-4600
Mass	Lexington, Lancer Assoc.	617-861-1720
Mich	Warren, DEM Elctrns. Sls.	313-575-9444
Minn	Minneapolis, Comstrand, Inc.	612-571-0000
Mo	St. Louis, Boweng Reps.	314-429-7327
NJ	Colts Neck, Trionic South	516-466-2300
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Great Neck, Trionic Assocs.	516-466-2300
Ohio	Dayton, Rixan Assocs.	513-278-4216
Pa	Ambler, W.M. Assocs.	215-643-4119
Tex	Garland, Vector Sls.	214-234-4291
Wash	Redmond, Quadra Sls. Corp.	206-883-3550

(TM)ALPHALINE - 2 wire temp. & pressure transmitters - Rosemount Inc.

(TM)ALPHA-LITE - alpha-numeric readout - Refac Elctrns. Pinlite®, Wild Rover®

(TM)ALPHA MAX - d-c servo motor - I M C Magnetics

ALPHA METALS, INC., Dept. EM, 56 Water St., Jersey City, N.J. 07305, Tel: 201-434-6778, Telex: 12-5798; Empl.: 400

Sales Manager: J. Moody

Local Sales Offices & Reps.

Cal	Santa Ana	714-547-7315
Ill	Des Plaines	312-297-0730

ALPHA POWER, INC., Dept. EM, 20536 Plummer St, Chatsworth, Cal. 91311, Tel: 213-998-9873; Empl.: 25 .... p. 3202,3203

Local Sales Offices & Reps.

Ariz	Tempe, J. Smith & Assocs.	602-968-7025
Cal	Los Altos, Westec Electronics	415-948-8880
Cal	Woodland Hills, Burtis Instrumentation Sls.	213-887-1360
Colo	Denver, J. Smith & Assocs.	303-442-7100
Ill	Elk Grove Village, Sieger Assocs.	312-956-0963
Md	Ellicott City, A/O Electronics	301-924-3693
Mass	Lynnfield, Newmar Assocs.	617-245-7960
Mo	Overland Park, Advanced Technical Sales	913-492-4333
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Plainview, Preisick Assocs.	516-681-8444
Tex	Houston, Vista Assocs.	713-661-0119
Tex	Richardson, Vista Assocs.	214-235-4547

(TM)ALPHA TONE - tone encoders, decoders - Alpha Electronic Services

(TM)ALPHATRON - vacuum gauge - Varian Assocs.

ALPHA WIRE CORP., Dept. EM, 711 Lidgerwood Ave., Elizabeth, N.J. 07207, Tel: 201-925-8000, TWX: 710-996-5895 13-9180; Empl.: 250 .... p. 4522-4537

Local Sales Offices & Reps.

Ariz	Little Rock, J.Y. Schoonmaker	501-375-2168
Ariz	Phoenix, Shefler-Kahn Co., Inc.	602-258-7893
Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	Oakland, Moulthrop Sls., Inc.	415-261-7676
Colo	Denver, Shefler-Kahn	303-623-1567
DC	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9593
Fla	Bradenton, Hutto-Hawkins-Peregoy	813-755-4015
Fla	Maitland, Hutto-Hawkins-Peregory, Inc.	305-831-2474
Ga	Atlanta, Millar Elctrns., Inc.	404-261-6160
Ill	Chicago, I.R.I. Inc.	312-647-7755
Ind	Indianapolis, Mktg. Engrs., Inc.	317-546-1523
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
Mich	Detroit, R.C. Merchant	313-535-6000
Mich	St. Joseph, R.C. Merchant	616-983-7378
Minn	Minneapolis, Clark R. Gibb Co.	612-377-1200
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	Kansas City, L.F. Florence Co.	816-561-7222
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-2350
NJ	Elizabeth, Alpha Wire Corp.	201-925-8000
NM	Albuquerque, Shelfler-Kahn	505-265-7077
NY	Rochester, D. Moore	201-925-8000
NC	Raleigh, Millar Elctrns.	919-787-9564
Ohio	Cleveland, Marlow Assocs., Inc.	216-932-0900
Ohio	Xenia, Marlow Assocs.	513-426-6270
Okla	Tulsa, J.Y. Schoonmaker	918-936-1423
Ore	Portland, Earl & Brown Co.	503-245-2283
Tex	Dallas, J.Y. Schoonmaker Co., Inc.	214-357-8481
Tex	Houston, J.Y. Schoonmaker	713-926-9510
Utah	Salt Lake City, Shefler-Kahn	801-484-4222
Wash	Seattle, Earl & Brown Co., Inc.	206-284-1121
Wisc	Cambridge, IRI, Incp.	608-423-4190

ALPS ELECTRIC CO., Dept. EM, 1-7 Yukigaya-Otsuka-Cho Ota-Ku, Tokyo, Japan

A.L.S. ELECTRONICS CORP., Dept. EM, 1400 N. Baxter St., Anaheim, Cal. 92806, Tel: 714-956-9200, TWX: 910-591-2711; FSC No.: 04801; Empl.: 44 p. 3360,3361

(TM)ALSIBASE - multilayer substrates & multi-chip pkgs. - 3M Company, Technical Ceramic Prods. Div.

(TM)ALSICOAT - ceramic coatings - 3M Company, Technical Ceramic Prods. Div.

(TM)ALSIPAK - ceramic packages & chip carriers - 3M Company, Technical Ceramic Prods. Div.

ALTAIR RESCH. & MFG. CO., Dept. EM, 1241 E. State St., Ontario, Calif. 91761, Tel: 714-983-2418; Empl.: 10

ALTEC DIV., Altec Corp, Dept. EM, 1515 S. Manchester Ave., Anaheim, Calif. 92803, Tel: 714-774-2900, TWX: 910-591-1142; Empl.: 1100

(TM)ALTECOM - intercommunications - Altec Div.

ALTEK CORP., Dept. EM, 2150 Industrial Pkwy, Silver Spring, MD 20904, Tel: 301-622-3906; Empl.: 30

Sales Manager: D.S. Larson

Local Sales Offices & Reps.

Md	Silver Spring, Altec Corp.	301-622-3906

ALTHOR PRODS., Dept. EM, 202 Bay 46th St., Brooklyn, N.Y. 11214, Tel: 212-373-7444; FSC No.: 14998; Empl.: 7

Sales Manager: J. Kessler

(TM)ALTI-CODER - altitude measurement & readout system - Kollsman Instr. Co.

(TM)ALUGARD - lightning arresters - General Elec. Co.

(TM)ALUMALYTIC - capacitors - General Elec. Co.

(TM)ALUMA-TRAK - Aluminum Chassis Slides - Zero Corp.

(TM)ALUMEL - thermocouple alloy - Hoskins Mfg. Co.

(TM)ALUMIFOAM - foam dielectric - Times Wire & Cable

(TM)ALUMIFOIL - vidacom cable - Times Wire & Cable

(TM)ALUMINAX - aluminum shielded coaxial cables - Saxton Prods.

(TM)ALUMINEX - speaker bobbins and speakers - CTS Corp.

ALUMINUM FILTER CO., Dept. EM, PO Box 1311, Santa Barbara, Cal. 91302, Tel: 805-684-4214; FSC No.: 17504

Sales Manager: B.L. Baker

Local Sales Offices & Reps.

Cal	Los Angeles, Aluminum Filter Co.	805-684-4214
Cal	San Diego, Aluminum Filter Co.	805-684-4214
Cal	San Francisco, Air Filter/Control	415-871-6808
Colo	Estes Park, Windcliff Service Co.	303-586-5805
Tex	Dallas, W.P. Schoenfield Co.	214-352-2233

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(TM)ALUMOWELD - rod, wire and strand - Copperweld Bimetallics

AMATOM ELECTRONIC HARDWARE, Div. MITE Corp., Dept. EM, 446 Blake St., New Haven, Conn. 06515, Tel: 203-397-3311, Telex: 963-419; FSC No.: 06540; Empl.: 55 .... p. 2774

Local Sales Offices & Reps.

Ariz	Tempe, Jarko Assocs.	602-966-3020
Cal	El Monte, MITE Western	213-686-1354
Cal	Pasadena, T.W. Yeakle	213-684-2275
Cal	Santa Clara, Novatronix	408-243-9530
Colo	Englewood, Dynatech, Inc.	303-773-2830
Conn	Bethany, Reps. Corp.	203-393-0024
Fla	Miami, S.K. Wallace Assocs.	305-691-1654
Fla	Tampa, S.K. Wallace Assocs.	813-932-3568
Ga	Jonesboro, S.K. Wallace Assocs.	404-471-6297
Ill	Downers Grove, S.W. Anderson Co.	312-964-2600
Ill	Glen Ellyn, S.W. Anderson Co.	312-469-7182
Ind	Crown Point, S.W. Anderson Co.	219-663-1707
Ind	Indianapolis, S.W. Anderson Co.	317-255-1971
Mass	Topsfield, Reps. Corp.	617-426-0541
Minn	Minneapolis, C.E. Bohlig Co.	612-922-7011
NY	New Rochelle, A & M Assocs.	914-235-4672
NY	Syracuse, Lenard Co.	315-479-9191
NC	Greensboro, S.K. Wallace Assocs.	919-292-0487
NC	Kernersville, S.K. Wallace Assocs.	919-993-3993
Ohio	Cincinnati, J.O. Olsen Co.	513-922-2176
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Pa	Birchrunville, Jadelectronics Assocs.	215-647-5151
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550
Tenn	Memphis, S.K. Wallace Assocs.	901-682-2281
Tex	Dallas, McCoy Assocs. Co.	214-350-9931
Tex	Houston, McCoy Assocs. Co.	713-649-5756
Wash	Seattle, Blum & Assocs.	206-284-4082
Wisc	Milwaukee, S.W. Anderson Co.	414-476-5100

Local Distributors

Cal	Irvine, Ratel Terminal Elctrn.	714-549-8611
Cal	Sunnyvale, Ratel Elctrn.	408-739-9220
Tex	Dallas, National Precision Prod.	214-357-3921
Tex	Houston, NAPPCO Fastener Co.	713-688-2511

(TM)AMAZER - fiberglass ant. - mobile - Francis Inds., Inc.

(TM)AMBICON - automatic level control - Robins Broadcast & Sound Equipment Corp.

(TM)AMBI-STAT - ambient temperature controllers - Honeywell

AMBI-TECH INDS. INC., Dept. EM, 861 Washington Ave., Westwood, N.J. 07675, Tel: 201-666-0504; Empl.: 12

Local Sales Offices & Reps.

Cal	Montebello, Tucul Engng.	213-728-7397
Ill	Northbrook, McFarland Engrg	312-272-6246
Ind	Indianapolis, Bryant Control, Inc.	317-788-0761
Mass	Reading, V. Banester Co.	617-944-3776
Mich	Farmington Hills, Electromatic, Inc.	313-478-1182
NY	Baldwinsville, Oshex Assocs	315-635-6027
NC	Charlotte, B. J. Shepard & Co.	704-588-0693

Ohio	Canton, Electromatic of Ohio	216-456-6239
SD	Philip, West Centrs. Industrial	605-859-2591

™AMBITROL - constant voltage/current supply - Power Designs, Inc.

AMBROID CO., Dept. EM, P.O. Box 1089, Taunton, MA 02780, Tel: 617-823-1726; Empl.: 10

AMCO ENGINEERING CO., Dept. EM, 7333 W. Ainslie St., Chicago, Ill. 60656, Tel: 312-867-8500, TWX: 910-221-5192; Empl.: 188

Sales Manager: F.A. Johnson

Local Sales Offices & Reps.

Ala	Huntsville, Ridge Instr. Co.	205-837-3211
Ariz	Phoenix, Gramer & Co.	602-279-1231
Cal	Burlingame, Polach & Bensinger, Inc.	415-697-2525
Cal	Santa Ana, Spectrum Assocs.	714-835-4114
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Avon, Instr. Dynamics, Inc.	203-678-1088
Fla	Altamonte Springs, WMM Assocs.	305-862-4700
Fla	Clearwater, WMM Assocs	813-442-3913
Fla	Pompano Beach, WMM Assocs.	305-943-3091
Ga	Tucker, Ridge Instr. Co.	404-939-1554
Ill	Chicago, R.L. Lang & Assocs.	312-867-4241
Ind	Ft. Wayne,, McDonald Sls. Co.	219-747-3650
Md	Rockville, L.G. White & Co.	301-770-6556
Mass	Wakefield, Instr. Dynamics, Inc.	617-245-5100
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	St. Paul, Bonament Heyda Co.	612-484-8531
NJ	Woodcliff Lake, F&F Assocs.	201-778-6767
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Coram, F&F Assocs.	516-928-9666
NY	North Syracuse, NACO Elctrns.	315-699-2651
NC	Winston Salem, L.G. White & Co.	919-725-3612
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Tulsa, Don Shuhart Co.	918-747-4136
Ore	Beaverton, Showalter Instrs., Inc.	503-646-5196
Pa	Broomall, White-Keystone	215-353-6347
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tenn	Oak Ridge, Ridge Instr. Co.	615-483-1311
Tex	Bellaire, Brice Co.	713-666-1788
Tex	Dallas, Don Shuhart Co.	214-239-0185
Wash	Bellevue, Showalter Instruments, Inc.	206-455-4922
Wash	Richland, Showalter Instrs., Inc.	509-943-5288
Exp:	Mahwah, N.J., Transconco, Inc.	201-825-0473

AMCOMP, INC., Dept. EM, 686 W. Maude Ave., Sunnyvale, Cal. 94086, Tel: 408-732-7330, TWX: 910-339-9244; Empl.: 300

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Goleta, Thorson Co.	805-964-8751
Cal	San Diego, Mesa Engrg.	714-278-8021
Cal	Topanga, Amcomp, Inc.	213-883-8413
Colo	Boulder, P.A.R. Assocs.	303-499-4736
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Ill	Schaumburg, Amcomp, Inc.	312-843-8383
Md	Bethesda, Bartlett Assocs.	301-656-3061
Mass	Framingham, Bartlett Assocs.	617-879-7530
Mass	Westwood, Amcomp, Inc.	617-329-6373
NY	White Plains, Bartlett Assocs.	914-949-6476
Pa	Wayne, Bartlett Assocs.	215-688-7325
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504

™AMERICAN - liquid meters - Singer Co.

AMERICAN AEROSPACE CONTROLS, INC., Dept. EM, 131 Verdi St., Farmingdale, N.Y. 11735, Tel: 516-694-5100; Empl.: 30 .... p. 4336,4337

Sales Manager: G. D'Abramo

Local Sales Offices & Reps.

Cal	Los Angeles, Dyna Sls. Co.	213-268-1175

AMERICAN AIRLINE FREIGHT SYSTEM, Dept. EM, 633 3rd Ave., New York, N.Y. 10017, Tel: 212-557-1234

Local Sales Offices & Reps.

Ariz	Phoenix, R. C. Gass	602-273-1221
Cal	Los Angeles, J. C. Boyd	213-776-2520
Cal	San Diego, T. J. Stokes	714-235-5400
Cal	San Francisco, R. C. James	415-761-1300
DC	Washington, H. W. Jones	202-393-6460
Ill	Chicago, R. L. Kragel	312-641-3131
Md	Baltimore, G. J. Martin	301-761-1300
Mass	Boston, M. F. Brueckner	617-567-7700
Mich	Detroit, W. G. Patrick	313-291-7550
Mo	St. Louis, J. P. Bowlin	314-426-5522
NY	Albany, L. H. Larche	518-869-5321
NY	Buffalo, R. H. Butler	716-632-6007
NY	New York, H. W. Coron	212-656-3325
Ohio	Cincinnati, R. R. Trenkamp	606-283-3271
Ohio	Cleveland, M. E. Bradley	216-265-6660
Ohio	Dayton, C. A. Tucker	513-898-5511
Okla	Oklahoma City, R. T. Fitzhugh	405-685-5591
Pa	Philadelphia, T. C. Johnson	215-365-5060
Tex	Dallas, K. M. Miller	214-574-3520
Tex	El Paso, H. P. Hallock	915-778-9484
Tex	Houston, D. J. Charleston	713-228-5237
Tex	San Antonio, G. L. Allison	512-824-1401
Utah	Salt Lake City, J. J. Woerner	801-328-2531

AMERICAN ALUMINUM CO., Dept. EM, 230 Sheffield St., Dept. EEM, Mountainside, N.J. 07092, Tel: 201-AD 3-3500; Empl.: 125

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Schoeffler Assocs.	602-948-3470
Cal	Downey, E. Shyffer & Assoc.	213-928-1824
Cal	Palo Alto, Abbott Engrg. Co.	415-327-0830
Colo	Denver, W. Purdy Co.	303-777-1411
Fla	Orlando, Hi-Co Assocs.	305-273-0571
Ga	Decatur, H. M. Walton Co.	404-482-2794
Ill	Northfield, H. S. Tollaksen Co.	312-441-6644
Ind	Indianapolis, Russell Sales Co.	317-547-0188
Md	North East, Progressive Assocs.	301-287-6422
Mich	Troy, Campbell Metal Parts	313-362-2070
Mo	St. Louis, R. Pratt & Assocs.	314-426-0420
NJ	Boonton, Winter Assocs.	201-334-3434
NJ	Collingswood, K. Randall Co.	609-854-3323
NY	Pittsfield, Anscott Engrg. Co.	716-381-3122
NY	Plainview, Flower Hill Prods.	516-420-8555
NY	Troy, New-Co Assocs.	518-BE 5-0539
NC	Greensboro, Mfr. Sls. Co.	919-274-2474
Ohio	Bay Village, T. R. Heekin	216-871-6939
Pa	Villanova, C.I.V. Co.	215-525-7054
RI	Peace Dale, G. Forman Co.., Inc.	401-789-3021
Tex	Dallas, J. M. Spell Co.	214-620-0040
Tex	Houston, Traton, Inc.	713-782-8234
WVa	Wheeling, D & L Sls. Co.	304-232-0490

AMERICAN ASTRIONICS, Div. of Technicolor, Dept. EM, 291 Kalmus Dr., Costa Mesa, Cal. 92626, Tel: 714-540-4330; Empl.: 30

Local Sales Offices & Reps.

Cal	Costa Mesa, American Astronics	714-540-4330
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AMERICAN COMPONENTS, INC., Dept. EM, 8th Avenue at Harry St., Conshohocken, Pa. 19428, Tel: 215-825-6200, TWX: 510-660-9268; Empl.: 417 p. 3632,3633

Sales Manager: J.W. Rowley

Local Sales Offices & Reps.

Ala	Huntsville, B.J.R. Research & Mftg.	205-881-3569
Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	Van Nuys, Wes-K Assocs.	213-989-3070
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Fla	Ft. Lauderdale, Beacon Elctrns. Assocs.	305-491-4211
Fla	Maitland, Beacon Elctrns. Assocs.	305-647-3498
Fla	Winter Park, Steele Tech. Sls.	305-644-6641
Ga	Atlanta, G. S. O'Hara	404-237-0600
Ill	Westchester, Gassner & Clark	312-345-4245
Mass	Canton, New England Elctrn. Sls.	617-828-4835
Mich	Livonia, Giesting & Assocs.	313-477-6060
Minn	Minneapolis, Electro-Serv Co.	612-827-2907
NJ	Cherry Hill, Danco Corp.	609-424-5590
NJ	Englewood Cliffs, E. Glass Assocs.	201-592-0200
NY	Pompey, S.F. Foster Co. Inc.	315-677-3333
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Ohio	Dayton, Geisting & Assocs.	513-293-4044
Okla	Oklahoma City, Ammon & Rizos	405-373-2748
Tex	Dallas, Ammon & Rizos	214-233-5591
Wash	Seattle, Northmar Inc.	206-524-5170

Local Distributors

Cal	Belmont, Eric Elctrns.	415-593-8284
Cal	Carson, Hi-Rel Distr. Sls.	213-537-6500
Cal	Woodland Hills, Rampart Comps.	213-887-6400
Ill	Chicago, Phoenix Co.	312-237-2828
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Baltimore, Radio Electric Svc. Co.	301-823-0070
Mich	Grand Rapids, Stotts Friedman Elect. Supply	616-459-0216
Minn	St. Louis Park, Dawn Elctrns.	612-546-2212
NY	Central Islip, Semi-Cap Elctrns. Corp.	516-582-4400
NY	Farmingdale, Command Elctrns. Corp.	516-293-1212
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Rampart Comps.	516-273-1111
NY	Plainview, Fairmont Elctrn. Sls.	516-694-8200
NY	Valley Stream, L & S Elctrns.	516-561-2474
NY	W. Hempstead, March Elctrns.	516-486-6511
Ohio	Dayton, Nasco	513-253-8931
Ohio	Solon, Repco	216-248-8900
Pa	Hatboro, Henwarr	215-675-4104
Tex	Fort Worth, Textronics	817-336-8111
Wash	Seattle, Zepher Elctrns.	206-242-2517

AMERICAN DESIGN COMPONENTS, Dept. EM, 39 Lispenard St., New York, NY 10013, Tel: 212-966-5650; Empl.: 20

AMERICAN DEVCO, INC., Dept. EM, 1778 N. Bayshore Dr-#501, Miami, Fla 33132, Tel: 305-358-5000

AMERICAN ELECTRIC CABLE CO., Dept. EM, 181 Appleton St., Holyoke, Mass. 01040, Tel: 413-539-9893; Empl.: 100

Local Sales Offices & Reps.

Cal	Palo Alto, B. Budge Assocs.	415-321-0940
Ind	Zionsville, Matco Co.	317-846-5833
Mass	Holyoke, American Electric Cable Co.	413-539-9893
Minn	Minneapolis, International Sales Co.	612-831-8423
Mo	Kirkwood, Limmit Manufacturers' Repr.	314-822-3015
NJ	Hohokus, D.J. Fisher Co., Inc.	201-652-0090
NC	Raleigh, Wolff's Sls. Svc. Co.	919-781-0164
Ohio	Cleveland, Milber Co.	216-752-7528
Pa	Ardmore, W.K. Metz	215-649-3966

AMERICAN ELEC. HEATER, Dept. EM, 6110 Cass Ave., Detroit, Mich. 48202, Tel: 313-875-2505, TWX: 810-221-5369; Empl.: 75

Local Sales Offices & Reps.

Cal	San Francisco, Maddox Sls. Co.	415-647-5560
Cal	Woodland Hills, Target Sls.	213-781-1122
Colo	Boulder, Mile High Elctr.	303-476-1149
Fla	Clearwater, H.R. Gross Co.	813-446-6649
Ill	Mt. Prospect, American Electrical Heater Co.	312-253-6813
Ind	Indianapolis, Sukup & Cox Inc.	317-253-5501
Iowa	Des Moines, K. Kelly & Co.	515-255-4584
Kans	Shawnee Mission, K. Kelly & Co.	913-722-0000
La	Metairie, F. McKinney Sls. Co.	504-733-9583
Md	New Carrolton, W. A. Brown Co.	301-577-6105
Mass	Wayland, Ellingwood Inc.	617-358-2883
Mo	St. Louis, K. Kelly & Co.	314-968-3800
NY	Hicksville, Wilson Assoc.	516-931-3007
NY	Skaneateles, S & B Tech	315-685-8341
Ohio	Cleveland, Associate Sls. Co.	216-831-0087
Okla	Tulsa, J.F. McKinney Sls. Co.	918-622-5511
Ore	Portland, J.W. EcKersley Co.	503-246-3183
Pa	Norristown, American Electrical Heater Co.	215-272-4818
Pa	Pittsburgh, Dolfuss Root	412-561-4125
SC	Greenville, J.B. Jackson Mfg. Rep. Inc	803-244-2508
Tex	Dallas, J.F. McKinney Sls. Co.	214-631-9450
Tex	Houston, J.F. McKinney Sls. Co.	713-493-9100
Va	Alexandria, W. A. Brown Co.	703-836-1800

AMERICAN ELCTRN. CONTROLS, See Scientronics

AMERICAN ELECTRONICS, INC., Dept. EM, 1600 E Valencia Dr., Fullerton, Cal. 92631, Tel: 714-871-3020, TWX: 910-592-1256; FSC No.: 89321; Empl.: 200

Sales Manager: J. Rock

Local Sales Offices & Reps.

Cal	Los Angeles, Products Supply Co.	213-659-1858

AMERICAN ELECTRONICS INC., Dept. EM, 102 E. Broadway, Greenwood, Ind 46142

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AMERICAN GAS & CHEMICAL CO., LTD., Dept. EM, 5 Tenakill Pk., Cresskill, N.J. 07626, Telex: 127-020; Empl.: 25

Local Sales Offices & Reps.

Ala	Birmingham, J. Swert	205-592-6968
Ariz	Phoenix, Haskel Engrg.	800-423-2515
Cal	Burbank, Haskel Engrg.	213-843-4000
Cal	San Diego, Haskel Engrg.	800-232-2720
Cal	San Francisco, Haskel Engrg.	415-863-1489
Colo	Denver, Haskel Engrg.	303-744-6456
Ill	Chicago, Center Svc. & Equip. Co.	312-449-5254
Md	Camp Springs, Detek, Inc.	301-449-7300
Mich	Livonia, A. Greulick & Assocs.	313-476-5613
Ohio	Cincinnati, Mission Belle Sales	513-761-1403
Ore	Portland, Haskel Engrg.	800-426-4404
Tex	Houston, Gay Engrg.	713-869-3306
Tex	Odessa, M & L Valve Svc.	915-362-6105
Utah	Salt Lake City, Haskel Engrg.	801-487-2238
Wash	Seattle, Haskel Engrg.	206-762-7222

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Sales Manager: R. Blumkin

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Sales Manager: S.E. Tierney

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Local Sales Offices & Reps.

Cal	Thousand Oaks, J. H. Leadam	805-497-2817
Colo	Denver, N. Novosel	303-623-4583
Ill	Elk Grove, L. L. Chamberlain	312-255-3097
Minn	Minneapolis, L. D. Dykstra	612-888-9044
NJ	Moorestown, W. W. Washnock	609-234-7050
NY	Rochester, P. J. Treveiler	716-436-5700
Ohio	Ravenna, S. W. Mackey	216-673-3451

AMETEK/RODAN DIV., Dept. EM, 2905 Blue Star St., Anaheim, Cal. 92806, Tel: 714-630-0081, TWX: 910-591-1684; FSC No.: 15454; Empl.: 52

Local Sales Offices & Reps.

Ariz	Scottsdale, De Angelo, Rothman & Cheever	602-948-2240
Cal	Los Altos, Stout-Loeswick	415-948-3265
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Colo	Denver, Staube Assocs.	303-426-0890
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Park Ridge, Metcom Assocs.	312-696-1490
Ind	Ft. Wayne, Menze Sls. Co.	219-747-5616
Iowa	Cedar Rapids, Snider Sls.	319-362-4410
Kans	Wichita, Dy-Tronix	316-943-6221
Md	Baltimore, Burgin-Kreh Assoc.	301-788-5200
Mass	Andover, Sales Engrg.	617-470-0800
Mich	Troy, C. B. Jensen Assocs.	313-643-0506
Minn	Minneapolis, E.C. Elctrn. Sls.	612-831-0229
Mo	Hazelwood, Dy-Tronix	314-731-5799
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Great Neck, F. Tylinski Co.	516-466-9070
NC	Winston-Salem, Burgin-Kreh Assoc.	919-768-4174
Pa	Ardmore, R. Freedman Assoc.	215-649-3679
Tex	Addison, Southland Components	214-233-0603
Utah	Salt Lake City, Straube Assocs.	801-943-5650
Va	Lynchburg, Burgin-Kreh Assoc.	703-845-5600
Wash	Bellevue, R. Over Sls.	206-454-4551
Exp:	N.Y., New York City, Singer Prod. Inc.	212-432-1400
Exp:	N.Y., Westbury, CPS Intl.	516-334-8500

AMF INC., AMF Cuno Div., Dept. EM, 400 Research Pkwy., Meriden, Conn. 06450, Tel: 203-237-5541

Local Sales Offices & Reps.

Ala	Pelham, G.S. Edwards Co.	205-663-0707
Ariz	Phoenix, Fluid Conditioning Co.	602-273-1308
Cal	Hayward, Filtrex	415-783-3700
Cal	Westminster, G. Yardley, Inc.	714-893-7542
Colo	Denver, W.M. Murphy & Co.	303-433-8307
Conn	Branford, Eastern Filters Sls.	203-488-7221
Fla	Tampa, Gulf Controls Corp.	813-884-0471
Ga	Atlanta, Process & Control Equip. Co.	404-458-7225
Ill	Franklin Park, Semier Ind.	312-671-5650
Ind	Indianapolis, Vonnegut Ind. Prod.	317-632-2321
La	Metairie, Eggelhof Inc.	504-888-3541
La	Shreveport, Eggelhof Inc.	318-422-9251
Mass	Allston, MWM Co.	617-254-2312
Mich	Flint, J.N. Fauver Co.	313-742-3300
Mich	Madison Heights, J.N. Fauver Co., Inc.	313-585-5252
Minn	St. Paul, H.R. Peterson Co.	612-646-4529
Mo	Kansas City, Fitzwater & Assoc.	816-358-8700
Mont	Brentwood, Hagedorn & Gannon	314-968-4300
NJ	Union City, Process Equip. & Sup. Co.	201-866-5050
NY	E. Aurora, Fluid Cond. Equip.	716-655-0330
NC	Charlotte, Process Pneumatics Corp.	704-525-1350
Ohio	Cincinnati, Fischer-Robertson Inc.	513-771-6780
Ohio	Cleveland, Control Comps. Co.	216-881-0166
Okla	Tulsa, Eggelhof Inc.	918-743-7927
Ore	Portland, J.H. Marvin Co.	503-227-2693
Pa	Bridgeville, G.P. Dempler Co.	412-561-4400
Pa	Layfayette Hill, Waco Assocs.	215-825-3300
SC	Greenville, Process-Pneumatics Corp.	803-277-5190
Tex	Beaumont, Eggelhof Incorporated	713-833-6481
Tex	Dallas, Eggelhof Incorporated	214-328-4301
Tex	El Paso, Eggelhof Incorporated	915-778-9467
Tex	Houston, Eggelhof Incorporated	713-923-9461
Tex	Lubbock, Eggelhof Incorporated	806-799-3366
Tex	San Antonio, Eggelhof Incorporated	512-341-2207
Utah	Salt Lake City, C.H. Spencer & Co.	801-486-1081
Wash	Seattle, J.H. Marvin Co.	206-284-0331

AMF ELECTICAL PRODS. DEV. DIV., AMF Inc., Dept. EM, 3001 Centreville Rd, Herndon, Va. 22070, Tel: 703-548-7221; Empl.: 243

AMF INTERNATIONAL, Dept. EM, 110 N. Royal St., Alexandria, Va. 22314, Tel: 703-548-5153

AMF POTTER & BRUMFIELD, see Potter & Brumfield Div. of AMF

AMF TUBOSCOPE, INC., AMF Inc., Dept. EM, P.O. Box 808, Houston, Texas 77001, Tel: 713-748-1300, Telex: 96-2457

Local Sales Offices & Reps.

La	Harvey	504-368-7010
Okla	Oklahoma City	405-427-8671
Tex	Houston	713-741-3380
Tex	Odessa	915-362-2525

AMGLO CORP., Dept. EM, 5301 Wesley Terr., Rosemont, Ill. 60018, Tel: 312-671-4321; Empl.: 21

AMICON CORP., Dept. EM, 25 Hartwell Ave., Lexington, Mass. 02173, Tel: 617-861-9600; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, C.T. Fink & Assoc.	602-992-9884
Cal	Encino, Shelbe Co.	213-981-4200
Fla	Sarasota, A. Hansen	813-388-3882
Ill	Schaumburg, P.J. Scutella	312-541-9600
Ind	Indianapolis, Hoster & Sieloff Assoc.	317-844-9921
Md	Reisterstown, FBD Sls. Corp.	301-356-9449
Mass	Lexington, R. A. Marsella	617-861-9600
Mo	Kirkwood, T. Miller	314-822-3015
NJ	Colonia, M. J. Ficarra Assoc.	201-381-5193
NY	Geneva, P. J. Gavin	315-437-4157
Ohio	Worthington, C. M. Feeny	614-888-0026
SC	W. Colombia, J. W. Wilkie	803-794-2288
Tex	Richardson, C. J. Garvey Co.	214-234-3371
Va	Portsmouth, FBD Sls. Corp.	804-484-3162
Wisc	Elkhorn, J. R. Gilliland	414-742-3663

AMILON CORP., Dept. EM, 49-12 30th Ave., Woodside, N.Y. 11377, Tel: 212-274-1794; Empl.: 50

Sales Manager: L. Rosenblatt

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Fla	Maitland, Lawrence Assocs.	305-647-1188
Ill	Chicago, J. C. Angel & Co.	312-593-7600
Ind	Indianapolis, Scott Elctrns.	317-897-9976
Ky	Louisville, Scott Elctrns.	502-583-3220
Md	Baltimore, R. L. Wilkinson Inc.	301-377-7800
Mass	Lexington, Hathaway Elctrns. Inc.	617-861-7010
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	St. Paul, B. Heyda Co.	612-484-8531
NY	Floral Park, MOS Assocs.	516-487-3966
NC	Winston-Salem, Murcota Corp.	919-722-9445
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Pa	Glenside, R. L. Wilkinson Inc.	215-887-5300
Tex	Houston, Zonk Engrg.	713-697-9302
Tex	Richardson, Zonk Engrg. Inc.	214-238-7651
Wash	Buckley, Halbar Assocs.	206-939-2080

ⓉⓂAMINCO-AIRE - environmental control source - American Instr. Co.

ⓉⓂAMLOC - dryer control - Pall Trinity Micro Corp.

AMMON INSTRS., INC., Dept. EM, 531 Front St. Box 64, Manchester, N.H. 03105, Tel: 603-669-1531; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, Component Sls. Corp.	205-881-4753
Ariz	Scottsdale, Fryco	602-945-3281
Cal	Cupertino, Serra Assocs.	408-738-1117
Cal	Encino, C.D.H. Assocs.	213-345-3111
Conn	Wallingford, Com. Sls.	203-269-7964
Fla	St. Petersburg, Component Sls.	813-894-4366
Iowa	Des Moines, BEAMS	515-255-1148
Kans	Overland Pk., BEAMS	913-341-7744
Mass	Waltham, Com-Sale	617-890-0011
Mich	Utica, Hufferd Co.	313-731-6003
Minn	St. Paul, Skor	612-645-6461
Mo	St. Louis, BEAMS	314-569-1060
NJ	Collingswood, K. Randall Co.	609-854-3323
NY	Buffalo, R.F. Lamb Co.	716-874-4900
NY	Great Neck, Pacent Engrg. Corp.	516-482-4678
NC	Raleigh, Comp. Sls. Corp.	919-832-1897
Ohio	Aurora, EMA Inc.	216-562-6104
Ohio	Centerville, EMA, Inc.	513-433-2800
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Tex	Dallas, Southland Engrg. & Sls., Inc.	214-638-6264
Tex	Houston, Southland Engrg. & Sls., Inc.	713-772-3170

AMORACE CORP., See Esna Div., Amerace Corp.

AMP CAPITRON DIV./AMP INC., Dept. EM, 1595 S. Mt. Joy St., Elizabethtown, Pa. 17022, Tel: 717-367-1105, TWX: 510-657-4561 p. 1472,1473,1700,1701,3201

Sales Manager: W.L. Pharmer

Local Sales Offices & Reps.

Cal	Compton	213-537-4490
Cal	Cupertino	408-255-3830
DC	Wash	202-293-6936
Fla	Orlando	305-841-7771
Ill	Palatina	312-593-1386
Mass	Needham	617-444-4839
Mo	Florissant	314-837-5592
NJ	North Plainfield	201-753-5964
NY	Canadaiga	315-394-0930
Tex	Richardson	214-231-2118

AMP INC., Ind'l. Div., Dept. EM, Box 3608, Harrisburg, Pa. 17105, Tel: 717-564-0100, TWX: 510-657-4110; Empl.: 12,000 p. 3959-3970

Local Sales Offices & Reps.

Cal	Compton	213-537-4490
Cal	Cupertino	408-255-3830
Ga	Atlanta	404-934-6363
Ill	Elk Grove Village	312-439-5800
Mass	Weston	617-891-7500
Mich	Southfield	313-645-5590
Minn	Minneapolis	612-831-8242
NJ	Parsippany	201-334-6662
NY	Pittsford	716-385-2860
Ohio	Columbus	614-486-0276
Pa	Berwyn	215-647-6060
Tex	Dallas	214-357-9151
Va	Alexandria, AMP Inc.	703-683-5955

AMP SPECIAL INDUSTRIES, Dept. EM, Valley Forge, Pa. 19482, Tel: 215-647-1000, Telex: 846-405; Empl.: 550

Local Sales Offices & Reps.

Alas	Anchorage, Yukon Radio Supp.	
Cal	Compton, AMP Special Industries	213-639-1691
Cal	San Mateo, AMP Special Industries	415-573-7722
Colo	Parker, AMP Special Inds.	303-756-9453
Ga	Atlanta, AMP Special Industries	404-939-7604
Haw	Honolulu, AMP Special Industries	538-3774
Ill	Elk Grove Village, AMP Special Industries	312-439-7800
Mass	Weston, AMP Special Industries	617-899-6700
Mich	Southfield, AMP Special Industries	313-557-1210
Minn	Minneapolis, AMP Special Industries	612-831-5454
Mo	Kansas City, AMP Special Industries	816-753-6245
NJ	Cranford, AMP Special Industries	201-276-8300
Ohio	Cincinnati, AMP Special Industries	513-821-6650
Pa	Paoli, AMP Special Industries	215-647-1000
Pa	Philadelphia, AMP Special Industries	215-647-3250
Pa	Pittsburgh, AMP Special Industries	412-344-7900
Tex	Dallas, AMP Special Industries	214-631-0850

AMPEREX-ELECTRO-OPTICAL DEVICES DIV., see Amperex Electronic Corp., Slatersville Div.

ⓉⓂAMPAC - internally matched input & output - Microwave Semiconductor Corp.

ⓉⓂAMPACT - explosive cartridges - Amp Inc.

ⓉⓂAMP-CLAMP - acclamp-on ammeter - Simpson Electric Co.

AMPEREX ELECTRONIC CORP., Hicksville Div., Dept. EM, Box 418 - 230 Duffy Ave., Hicksville, N.Y. 11802, Tel: 516-931-6200, TWX: 510-221-1839; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Marketing, Inc.	205-772-9237

Ariz	Phoenix, Amperex Elctrn. Corp.	
Cal	N. Hollywood, Amperex Electrn. Corp.	
Cal	San Diego, Amperex Electrn. Corp.	714-453-9250
Cal	Santa Clara, Amperex Electrn. Corp.	
Colo	Denver, Amperex Elctrn. Corp.	
Fla	Ft. Lauderdale, Amperex Elctrn. Corp.	
Ga	Norcross, Macro-Marketing Assoc.	
Ill	Elk Grove Village, Amperex Elctrn. Corp.	312-593-8220
Ind	Fort Wayne, Amperex Elctrn. Corp.	
Ind	Indianapolis, Amperex Elctrn. Corp.	
Iowa	Cedar Rapids, Lorenz Sales, Inc.	319-393-6912
Kans	Olathe, B.C. Elctrn. Sls.	
Mass	Waltham, Amperex Elctrn. Corp.	617-899-7100
Mich	Southfield, Amperex Elctrn. Corp.	
Minn	Minneapolis, Siedare Assocs.	612-545-5663
Mo	Hazelwood, B.C. Elctrn. Sls.	
NJ	Rochelle Park, Amperex Elctrn. Corp.	
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	Fairport, Tech-Mark	
NY	Liverpool, Tech-Mark	
NY	Pleasant Valley, Tech-Mark	
NY	Port Chester, Radiation Elctrns.	
NC	Raleigh, Candor Co.	
Ohio	Dayton, Amperex Elctrn. Corp.	
Ore	Portland, Western Tech. Sls.	
Pa	King of Prussia, Amperex Elctrn. Corp.	
SC	Myrtle Beach, Candor Co.	803-448-5213
Tenn	Chattanooga, Candor Co.	
Tex	Dallas, Amperex Elctrn. Corp.	
Va	Richmond, Amperex Elctrn. Corp.	
Wash	Bellevue, Amperex Elctrn. Corp.	
Wash	Bellevue, Western Technical Sls.	

AMPEREX-SOLID STATE & ACTIVE DEVICES, see Amperex Electronic Corp., Slatersville Div.

AMPEREX ELECTRONIC CORP., Slatersville Div., Dept. EM, Providence Pike, Slatersville, R.I. 02876, Tel: 401-762-3800, TWX: 927584 710-382-6332; FSC No.: 73445; Empl.: 565 .... p. 4518,4519

Local Sales Offices & Reps.

Ariz	Tempe	602-968-7917
Cal	North Hollywood	213-980-4212
Cal	Santa Clara	408-249-1134
Colo	Lakewood	303-922-8434
Ill	Elk Grove Village..........................	312-437-8050
Mass	Waltham	617-899-7100
Mich	Farmington	313-478-7666
NY	Hicksville......................................	516-931-6200
Ohio	Dayton..	513-278-7351
Pa	King of Prussia............................	215-265-4240
Tex	Dallas	214-231-3481
Wash	Bellevue	206-746-1212

AMPERITE CO., INC., Dept. EM, 600 Palisade Ave., Union City, N.J. 07087, Tel: 201-UN 4-9504; Empl.: 76

AMPEX CORP., Dept. EM, 401 Broadway, Redwood City, Cal. 94063, Tel: 415-367-2011, TWX: 415-364-9034; Empl.: 10,000

AMPHENOL CANADA LTD. OPER., BUNKER RAMO CORP., Dept. EM, 44 Metropolitan Rd., Scarborough, (Ont.), Can., Tel: 416-291-4401, TWX: 610-492-4379

Refer to Amphenol Sales for sales office and distributor information

AMPHENOL NORTH AMERICA DIV., Bunker Ramo Corp., Dept. EM, 900 Commerce Dr., Oak Brook, Ill. 60521, Tel: 312-986-2700, TWX: 910-651-0191 p. 1705

Sales Manager: D. O'Connell, VP Sls.; *Distributor Manager:* R. Parlissidi, VP Mktg.

Refer to Amphenol Sales for sales office and distributor information

AMPHENOL RF CONNECTOR OPER., Bunker Ramo Corp., Dept. EM, 33 E. Franklin St., Danbury, Conn. 06810, Tel: 203-743-9272, TWX: 710-456-0281

Sales Manager: L.E. Eichenseer, VP Mktg.

Refer to Amphenol Sales for sales office and distributor information

AMPHENOL SALES, BUNKER RAMO CORP., Dept. EM, 2875 S. 25th Ave., Broadview, Ill. 60153, Tel: 312-345-4260, TWX: 910-226-1961

Local Sales Offices & Reps.

Cal	Los Angeles, Bunker Ramo Sls. Div.	213-649-5015
Cal	San Francisco, Bunker Ramo Sls. Div.	408-732-8990
Colo	Denver, Bunker Ramo Sls. Div...	303-758-8033
DC	Washington, Bunker Ramo Sls. Div.	703-524-8700
Fla	Orlando, Bunker Ramo Sls. Div.	305-647-5504
Ga	Atlanta, Bunker Ramo Sls. Div...	404-394-6298
Ill	Chicago, Bunker Ramo Sls. Div.	312-449-1880
Ind	Indianapolis, L.M. DeVoe Co.......	317-257-1227
Kans	Kansas City, Bunker Ramo Sls. Div.	913-888-1514
Mass	Boston, R. Purinton	617-475-7055
Minn	Minneapolis, Bunker Ramo Sls. Div.	612-835-4595
Mo	St. Louis, Bunker Ramo Sls. Div.	314-569-2277
NY	New York, Bunker Ramo Sls. Div.	516-364-2270
NY	Syracuse, Bunker Ramo Sls. Div.	315-455-5786
NC	Greensboro, Bunker Ramo Sls. Div.	919-275-8644
Ohio	Dayton, Bunker Ramo Sls. Div...	513-294-0461
Pa	Philadelphia, Bunker Ramo Sls. Div.	609-234-3434
Tex	Dallas, Bunker Ramo Sls. Div. ..	214-235-8318
Wash	Seattle, Bunker Ramo Sls. Div...	206-455-2525

Local Distributors

Ala	Phoenix, Moltronics of Ariz.	602-272-7951
Ala	Phoenix, Liberty Electronics/Ariz.	602-257-1272
Cal	El Segundo, Liberty Elctrns.........	213-322-8100
Cal	Irvine, Cramer Elctrns.	714-979-3000
Cal	Los Angeles, Kierulff Elctrns.......	213-725-0325
Cal	Mountain View, Elmar Elctrns.....	415-961-3611
Cal	San Carlos, Sterling Elctrns.	415-592-2353
Cal	San Diego, Moltronics.................	714-278-5020
Cal	San Diego, Liberty Elctrns...........	714-565-9171
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	South Gate, Moltronics	213-773-6521
Cal	Sunnyvale, Bell Industries	408-734-8570
Colo	Commerce City, Elmar Elctrns...	303-287-9611
Colo	Denver, Newark Elctrns...............	303-757-3351
Conn	Hamden, Wilshire Elctrns.	203-281-1166
Conn	New Haven, Connector Co.	203-624-0127
Fla	Hollywood, Cramer Elctrns.	305-923-8181
Fla	Hollywood, Schweber Elctrns.....	305-927-0511
Fla	Orlando, Cramer Elctrns.	305-894-1511
Ga	Norcross, Cramer Elctrns.	404-448-9050
Ill	Chicago, Newark Elctrns.............	312-638-4411
Ill	Chicago, Bell Inds........................	312-965-7500
Ill	Elk Grove, Schweber Elctrns.	312-593-2740
Ill	Palatine, Ohm Elctrns.	312-359-5500
Ill	Peoria, Klaus Radio, Inc.	309-691-4840
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Ind	South Bend, Radio Distributing Co.	219-287-2911
Kans	Wichita, Interstate Elctrn. Supply	316-264-6317
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Gaithersburg, Cramer Elctrns.....	301-948-0110
Md	Gaithersburg, Pioneer Elctrns.....	301-948-0710
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	North Wilbraham, Industrial Comps. Corp.	413-596-3854
Mass	Waltham, Schweber Elctrns.	
Mass	Waltham, Schweber Elctrns	
Mich	Ann Arbor, Wedemeyer Elctrn. Supply Co.	313-665-8611
Mich	Livonia, RS Elctrns.	313-525-1155
Mich	Wyoming, Newark Elctrns.	616-241-6681
Minn	Edina, Arrow Elctrns.....................	612-888-5522
Minn	Edina, Cramer/Bonn Co.	612-835-7811
Minn	Minneapolis, Newark Elctrns.......	612-331-6350
Mo	Kansas City, Walter Radio Supply	816-531-7015
Mo	Kansas City, L Comp Elctrns.	816-221-2400
Mo	Maryland Hgts., L Comp Elctrns.	314-647-5505
Mo	University City, Olive Indl. Elctrns.	314-863-7800
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Pennsauken, Radio Electric Svc.	215-925-6900
NJ	Somerset, Schweber Elctrns.	201-469-6008
NY	Binghamton, Harvey Elctrns.	607-748-8211
NY	Buffalo, Genessee Radio Parts Co.	716-873-9661
NY	Buffalo, Summit Distrs.	716-884-3450
NY	East Syracuse, Cramer Elctrns.	315-437-6671
NY	Farmingdale, DRW Elctrns.	516-249-2660
NY	Plainview, Progress Elctrns.........	516-433-1700
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Westbury, Schweber Elctrns.......	516-334-7474
NC	Winston-Salem, Cramer Elctrns.	919-725-8711
Ohio	Beachwood, Schweber Elctrns...	216-464-2970
Ohio	Cincinnati, Schuster Electric Co.	513-984-1600
Ohio	Cleveland, Pioneer/Cleveland Div. Pioneer Std. Elctrns.	216-587-3600
Ohio	Dayton, Pioneer/Dayton Div. Pioneer Std. Elctrns.	513-236-9900
Okla	Oklahoma City, Electro Entprs...	405-478-1752
Pa	Montgomeryville, Pyttronic Ind. ..	215-643-2850
Pa	Philadelphia, Almo Elctrns...........	215-698-4000
Pa	Pittsburgh, CAM/RPC Indl. Elctrns.	412-782-3770
Tenn	Nashville, Electra Distributing Co.	615-329-3971
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	Dallas, Texas Instr. Supply Co...	214-238-6821
Tex	Dallas, Hamilton/Avnet................	214-661-8661
Tex	Ft. Worth, Allied Elctrns...............	817-336-5401
Tex	Houston, Kent Elctrns.	713-780-7770
Tex	Houston, Sterling Rlctrns.............	713-627-9800
Utah	Salt Lake City, Standard Supply Co.	801-355-2971
Wash	Bellevue, Bell Industries	206-747-1515
Wash	Seattle, Liberty Elctrns.	206-763-8200
Wisc	Milwaukee, Electronic Expeditors	414-228-8100

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(TM)AMPLI-BOND - electrical splices & terminals - Amp Inc.

(TM)AMPLIBOX - portable public address system - PASO Sound Products Inc.

(TM)AMPLIBRIDGE - transducers, accelerometers - Gould, Inc.

AMPLICA INC., Dept. EM, 780 Lakefield, Westlake Village, Cal. 91361, Tel: 213-889-8700, TWX: 910-336-1291; FSC No.: 51025; Empl.: 45

Sales Manager: Jerry Moore,

Local Sales Offices & Reps.

Cal	Mt. View, J.L. Assoc.....................	415-969-5552
Cal	Westlake Village, MCA Repco ..	213-889-5553
Fla	Clearwater, Southeastern Comp. Sls. Inc.	813-447-1911
Ill	Elk Grove, R-Tek..........................	312-439-9090
Ind	Indianapolis, IHRIG Assocs.	317-783-7630
Md	Columbia, Neal Dedul Assocs. ..	301-997-4353
Mass	Waltham, Scientific Devices Inc.	617-894-5637
NY	Bayside, R. Diamond....................	212-423-7330
Pa	Plymouth Meeting, Ron Mar Co.	215-825-2841
Tex	Arlington, N&W Sls......................	817-461-4443
Wash	Seattle, R. Drake Assoc.	206-763-2755
Exp:	Los Angeles, Cal., Trans-World Trade	213-472-0444

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SAN FRANCISCO, CA
415/626-1444 1444 Market St. 94102

™AMPLICENTER - paging amplifier - Dracon Industries

™AMPLI-CYCLE - power converter - Electric Machinery Mfg. Co.

™AMPLIDUCER - straingage transducer incorporating highlevel signal amplifier - West Coast Resch. Corp.

AMPLIFIER CORP. OF AMERICA, Dept. EM, 75 Frost St., Westbury, N.Y. 11590, Tel: 516-333-9100, TWX: 510-222-9774; FSC No.: 73446

Sales Manager: A.J. Gillette

AMPLIFIER RESEARCH CORP., Dept. EM, 160 School House Rd., Souderton, Pa 18964, Tel: 215-723-8181; FSC No.: 30639; Empl.: 12 .... p. 1101

Sales Manager: D.W. Roth

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assoc.	800-327-1181
Ariz	Tempe, Trembly Assoc.	602-966-4428
Cal	N. Nollywood, O'Halloran Assoc	213-877-0173
Cal	Palo Alto, O'Holloran Assoc.	415-326-1493
Colo	Boulder, H. Bass. Assoc.	303-499-7509
Conn	Hamden, J.B.L. Assoc.	203-281-3161
DC	Washington, Morar Assoc.	301-924-2645
Fla	Lighthouse Point, Saber Assoc.	305-943-3076
Fla	Longwood, Saber Assoc.	800-432-3007
Fla	Sarosota, Saber Assoc.	800-432-3007
Ill	Chicago, Elctrn. Instr. Assocs.	312-271-3774
Ind	Indianapolis, Elctm. Instr. Assocs.	317-257-7231
Md	Woodbine, Morar Assocs.	301-442-2089
Mass	Burlington, R.J. Sickles	617-272-7285
Mich	Northville, Micro Sls.	313-482-1229
NJ	Westfield, Gray & Reed Assocs.	201-233-6116
NM	Albuquerque, Trembly Assoc.	505-266-8616
NY	Huntington Station, Gray & Reed Assocs.	516-433-3333
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Centerville, Micro Sls.	513-433-8171
Ohio	Cleveland, Micro Sls.	216-331-0900
Okla	Oklahoma City, Airep Elctrns.	405-721-3026
Pa	Melrose Park, R. Meyers Assoc.	215-224-1663
Tex	Austin, Airep Elctrns.	512-444-1273
Tex	Dallas, Airep Elctrns. Inc.	214-827-2120
Tex	Houston, Airep Elctrns.	713-944-2055
Wash	Seattle, J. B. Jolly	206-938-4166
Exp:	Ind., Indianapolis, Texscan Tech. Prods.	317-357-8781

™AMPLIFILM - dielectric material - Amp Inc.

™AMPLIMICA - capacitors - Amp Inc.

™AMPLI-SPEED - magnetic drives - Electric Machinery Mfg. Co.

™AMPLITE-END - closed-end splice - Amp Inc.

™AMPLIVAR - splices - Amp Inc.

™AMPLI-VOX - public address systems - Perma Power Div.

™AMPMODU - interconnection system - Amp Inc.

™AMPOMATOR - making machine - Amp Inc.

™AMPORTAPOWER - hydraulic tools - Amp Inc.

™AMPOWER - splices & terminals - Amp Inc.

AMPOWER SEMICONDUCTOR CORP., Dept. EM, 375 Kings Highway, Smithtown, N.Y. 11787, Tel: 516-582-6767, TWX: 510-227-6959; FSC No.: 52333; Empl.: 45

Local Sales Offices & Reps.

Ariz	Scottsdale, Spectre Sls.	602-948-8888
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Redwood City, J.S. Heaton	415-369-4671
Cal	Tustin, Orion Sls.	714-832-9687
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Fla	St. Petersburg, QXI	813-821-2281
Ill	Addison, Grubb & Company	312-543-8525
Ind	Carmel, S.A.I. Mktg.	317-844-7196
Iowa	Cedar Rapids, Grubb & Co.	
Kans	Overland Park, Sheridan Assocs.	913-383-1636
Md	Baltimore, Coulbourn-Degreif	301-247-4646
Mass	Stoneham, K & D Assocs.	614-438-3121
Mich	Brighton, S.A.I. Mtkg. Corp.	313-227-1786
Mich	Grand Rapids, S.A.I. Mktg. Corp.	616-942-2504
Minn	Edina, Grayden & Flemmer	612-941-1120
Mo	Florissant, S.A.I. Mktg. Corp.	314-837-5200
NJ	Wayne, H. Kagan	201-684-7682
NM	Albuquerque, Waugaman Assocs.	505-294-1436
NY	Dix Hills, McColloch Sls. Co.	516-864-8831
NY	Pittsford, T-Squared Elctrns.	716-381-1551
NY	Syracuse, T-Squared Elctrns.	315-463-8592
Ohio	Cincinnati, S.A.I. Mktg. Corp.	513-761-5432
Ohio	Dayton, S.A.I. Mktg.	513-223-3332
Ore	Portland, Components West	503-643-5588
Pa	Bala Cynwyd, Vantage Sls. Co.	215-667-0990
Tex	Addison, Southland Comps.	214-233-0603
Utah	Salt Lake City, Waugaman Assocs.	801-227-8911
Va	Gladys, Coulburn-Degreif	804-283-5656
Wash	Seattle, Components West	206-243-2133
Wisc	Milwaukee, Grubb & Co.	414-545-7810

AMPRO CORP., Dept. EM, 850 Pennsylvania Blvd., Feasterville, PA. 19047, Tel: 215-322-5100; Empl.: 66

™AMPROBE - clamp-on volt/ammeters and strip chart recorders - Amprobe Instrument

AMPROBE INSTRUMENT, Div. SOS Consolidated Inc., Dept. EM, 630 Merrick Rd., Lynbrook, N.Y. 11563, Tel: 516-LY 3-5600

Sales Manager: W. Eagle

Local Sales Offices & Reps.

Ariz	Phoenix, Maddox Sls.	602-274-3807
Cal	Los Angeles, Maddox Sls. Co.	213-949-5433
Cal	San Diego, Maddox Sls. Co.	714-583-3389
Cal	San Francisco, Maddox Sls. Co.	415-647-5560
Colo	Englewood, J.R. Schmidt & Assocs.	303-751-1655
Conn	Meriden, MacRae-Patton	203-238-1965
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Ga	Atlanta, Millar Elctrns.	404-261-6160
Ill	Downers Grove, Mika Sls.	312-968-8403
Ind	Indianapolis, A. Lee Clifford Co.	317-639-5248
Iowa	Cedar Rapids, J. Bertsch Elec. Sls.	319-366-7719
Mass	Avon, Jack Fay, Inc.	617-963-7100
Mich	Detroit, Young & Champagne	313-491-6500
Minn	Hamel, Elstad Sls. Co.	612-559-4000
Mo	Kirkwood, M. Elec. Sls.	314-966-8659
Mo	Raytown, Arehart Barnels Sls.	816-356-3488
NH	North Hampton, Beaman Assoc.	603-964-8876
NJ	Chatham, Brask-Meyer	201-635-8385
NM	Albuquerque, Maddox Sls.	505-298-2422
NY	Albany, Les Osterman Assoc.	518-869-6346
NY	Cazenovia, Les Osterman Assoc.	315-463-4312
NY	Long Island City, Plunkett & Lynch Assoc	212-937-0379
NY	Rochester, Les Osterman Assoc.	716-546-5780
Ohio	Cleveland, Gordon F. Stoter & Bro.	216-333-0733
Okla	Jenks, Wyane Parker Co.	918-299-5449
Ore	Portland, Northwest Agencies	503-227-5004
Pa	Glenside, R.A. Johnson Co.	215-884-1389
Tenn	Memphis, Hicks Sls	901-396-5725
Tex	Dallas, Glidden Electro Equipt.	214-341-0610
Utah	Salt Lake City, Darger Co.	801-355-2873
Va	Richmond, A. Hoey Co.	804-272-3449
Wash	Seattle, Northwest Agencies	206-623-8882
Wash	Spokane, Northwest Agencies	509-747-0683

™AMPSEAL - connectors - Amp Inc.

AMRAD CORP., Dept. EM, Box 876, Paris, Tex. 75460, Tel: 214-785-4544; Empl.: 17

Local Sales Offices & Reps.

Ill	Chicago, Ropek-Cahill, Inc.	312-631-0070
Mich	Benton Harbor, Ken-Mor Assocs.	616-927-3134
NJ	Berkeley Heights, Cambridge-Allen Assoc.	212-682-5844
Ohio	Cleveland, Loesch Assocs.	216-333-0077

™AMS 6002 - 1024-bit P-channel MOS RAM - Advanced Memory Sys., Inc.

™AMS 6003 - 2048-bit P-channel MOS RAM - Advanced Memory Sys., Inc.

™AMS 7001 - 1024-bit N-channel MOS RAM - Advanced Memory Sys., Inc.

™AMS 7001 STORAGE CARD - high-speed read/write memory card - Advanced Memory Sys., Inc.

™AMS 7101 - 256 x 4 static NMOS RAM - Advanced Memory Sys., Inc.

™AMS 7111 - 256 x 4 static NMOS RAM - Advanced Memory Sys., Inc.

™AMS 7112 - 256 x 4 static NMOS RAM - Advanced Memory Sys., Inc.

™AMS 7270 - 4096 x 1 dynamic MOS RAM - Advanced Memory Sys., Inc.

™AMS 7280 - 4096 x 1 dynamic MOS RAM - Advanced Memory Sys., Inc.

AMTRON DIV., Sippican Corp., Dept. EM, 14820 S. Kedzie Ave., Midlothian, Ill. 60445, Tel: 312-389-3955, TWX: 910-689-4494; Empl.: 360

AMUNEAL MFG. CORP., Dept. EM, 4737 Darrah St., Philadelphia, Pa. 19124, Tel: 215-535-3000; FSC No.: 23740; Empl.: 49 .... p. 2663

Local Sales Offices & Reps.

Ala	Huntsville, REMCO	205-883-9260
Cal	Canoga Park, C.E.M., Inc.	213-884-7867
Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Cal	Santa Ana, C.E.M., Inc.	714-835-2702
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	New Canaan, S. Pierce, Inc.	203-966-4630
Fla	Pompano Beach, Cole Tek Assocs.	305-781-8110
Ill	Chicago, G.Mc L. Cole Co.	312-774-3535
Kans	Overland Park, Advanced Technical Sales	913-492-4333
Md	Baltimore, Muncy Sls.	301-484-6376
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Mich	Jackson, Norwood Scroggs Co.	517-750-1170
Minn	Minneapolis, B. Deming & Assocs.	612-888-5000
NJ	Oaklyn, A. Wetterhahn Co.	609-858-3003
NY	Fayetteville, M.P. Andrews	315-637-5291
NY	Queens Village, Buscaglia Assocs.	212-468-3666
NC	Raleigh, REMCO - Raleigh	919-828-3009
Ohio	Cincinnati, R. Makin Assocs.	513-232-5588
Tex	Richardson, P.J. Scanlon Co.	214-231-4661
Utah	Salt Lake City, Waugaman Assocs.	801-277-8911
Exp:	Teaneck, S. Ginsbury Ltd.	201-837-1100

A. M. W. CORP., Dept. EM, 78 Bow, Arlington, Mass. 02174, Tel: 617-643-9600; Empl.: 25

Local Sales Offices & Reps.

NY	Port Washington, Robbins & Bendror Assoc.	516-868-7220

ANACONDA COMPANY BRASS DIVISION, Dept. EM, 414 Meadow St., Waterbury, Conn. 06720, Tel: 203-574-8500, Telex: 962498; Empl.: 5000; Minimum order: $J. E. Tobin

Sales Manager: B. H. Eisner; *Distributor Manager:* J. E. Tobin

Local Sales Offices & Reps.

Cal	Oakland	415-562-2131
Cal	Paramount	213-636-0321
Colo	Denver	303-534-8764
Conn	Waterbury	203-574-8500
Fla	Tampa	813-839-5363
Ga	Atlanta	404-255-3442
Ill	Hinsdale	312-242-1414
Ind	Indianapolis	317-844-8841
Iowa	Cedar Rapids	319-364-2465
Mass	Braintree	617-848-6680
Mich	Detroit	313-554-3500
Mo	Kansas City	816-753-3341
Mo	St. Louis	314-966-0606
NY	Buffalo	716-874-3400
NY	New York	212-697-1166
NY	Syracuse	315-422-1205
NC	Charlotte	704-568-2422
Ohio	Cincinnati	513-421-9050
Ohio	Cleveland	216-251-1105
Pa	Pittsburgh	412-341-5185
Pa	Wayne	215-647-0600
Tex	Dallas	214-233-7771
Tex	Houston	713-960-1462
Wisc	Milwaukee	414-258-7600

ANADEX INSTRS., INC., Dept. EM, 9825 De Soto, Chatsworth, Cal. 91311, Tel: 213-998-8010, TWX: 910-495-1762; Empl.: 75

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier, Inc.	205-536-5650
Ariz	Scottsdale, PLS Assocs., Inc.	602-957-9110
Cal	Los Altos, J. Stone & Assocs.	415-948-4563
Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	San Diego, Basic Sys.	714-279-9641
Colo	Denver, PLS Assocs.	303-773-1218

Conn	Hamden, P. Jenks Assoc.	203-281-0810
Fla	Orlando, Currie, Peak & Frazier, Inc.	305-855-0843
Haw	Honolulu, EMC Corp.	808-847-1138
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Kans	Mission, Pivan Engrg. Co.	913-722-1030
Md	Wheaton, SONCO	301-942-9420
Mass	Wakefield, P. Jenks Assoc.	617-246-1590
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NJ	Fort Lee, Tech. Mktg. Assocs.	201-224-6911
NM	Albuquerque, PLS Assocs., Inc.	505-255-2330
NY	E. Syracuse, Ossmann Instrs., Inc.	315-437-6666
NY	Rochester, Ossmann Instrs., Inc.	716-328-2230
NY	Vestal, Ossmann Instrs., Inc.	607-785-9947
NC	Greensboro, Currie, Peak & Frazier, Inc.	919-273-3040
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Bala Cynwyd, Sonco	215-667-7670
Pa	Monroeville, Carter, McCormic & Peirce, Inc.	412-372-4415
Tex	Dallas, Data Mktg. Assocs.	14-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Wash	Seattle, R.S. Drake Assocs., Inc.	206-763-2755
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

ANADYNE, Dept. EM, 14830 Valley View Ave., LaMirada, Cal. 90638, Tel: 714-522-8924, TWX: 910-583-4807; Empl.: 100

ANAHEIM AUTOMATION, Dept. EM, 922 Orangefair La., Anaheim, Cal. 92801, Tel: 714-992-6990 p. 3062

Sales Manager: T. Alcott

Local Sales Offices & Reps.

Cal	Buena Park, Sales Engineers Ltd.	714-521-8673
Cal	Palo Alto, Harris Engrg. Assocs.	415-328-3370

ANALOG DEVICES, Dept. EM, Westwood Ind'l Park, Westwood, Mass. 02090, Tel: 617-329-4700, TWX: 710-394-6577; Empl.: 1000

Sales Manager: M. Gross

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier	205-536-5650
Ariz	Mesa, Grady Moore Associates	602-839-3458
Cal	Long Beach, Analog Devices Inc.	213-595-1783
Cal	Mountain View, Analog Devices, Inc.	415-969-8525
Colo	Boulder, Grady Moore Assoc.	303-494-3351
Fla	Orlando, Currie, Peak & Frazier	305-855-0843
Ill	Bloomingdale, Analog Devices, Inc.	312-894-3300
Ill	Northfield, Torkelson Assoc.	312-446-9085
Ind	Indianapolis, Torkelson Assoc.	317-244-7867
Kans	Shawnee Mission, Tech. Sales, Assoc.	913-888-3330
Md	Columbia, Rep-Tron, Inc.	301-953-7580
Mich	Southfield, Electro Sales Assoc.	313-424-9075
Minn	Minneapolis, Torkelson Assoc.	612-835-2414
Mo	Ferguson, Tech. Sales Assoc.	314-725-5361
NJ	Irving, Harwood-Sandler Assoc.	201-399-3748
NM	Albuquerque, Grady Moore Assoc.	505-292-3322
NY	Hamburg, Labtronics, Inc.	716-685-4111
NY	N. Tonawanda, Labtronics, Inc.	716-695-4111
NY	Syracuse, Labtronics, Inc.	315-454-9314
NY	Ulster Park, Labtronics, Inc.	914-471-2806
NY	Woodbury, Harwood-Sandler Assoc.	516-692-6100
NC	Greensboro, Currie, Peak & Frazier	919-273-3040
Ohio	Cleveland, Electro Sales Assoc.	216-261-5440
Ohio	Dayton, Electro Sales Assoc.	513-426-5551
Pa	Glenside, Wyncote Instru. Co.	215-887-4661
Pa	Pittsburgh, Electro Sales Assoc.	412-371-9449
Pa	Reading, Wyncote Instrumentation Co.	215-921-3131
Tex	Houston, Analog Devices	713-664-6704
Tex	Richardson, Analog Devices, Inc.	214-231-5094
Tex	San Antonio, Data Applications Corp.	512-732-7176
Wash	Seattle, Avionics Liaison, Inc.	206-767-3870

ANALOG DEVICES, Semiconductor Div., Dept. EM, 829 Woburn St., Wilmington, Mass 01887

ANALOG DIGITAL DATA SYSTEMS, See A.D. Data Systems

(TM)ANALOGGER - analog data logger - NES, Inc.

ANALOGIC CORP., Dept. EM, Audubon Rd., Wakefield, Mass. 01880, Tel: 617-246-0300, TWX: 94-9307 710-348-0425; Empl.: 295

Sales Manager: M.E. Culverhouse

Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Palo Alto, Analogic	415-327-6710
Cal	Tustin, Analogic	714-838-7243
Colo	Westminster, Harvey Data Sys.	303-427-5299
Conn	Guilford, R.H. Sturdy Co.	203-453-5424
Fla	Orlando, Datarep, Inc.	305-843-5224
Fla	Seminole, Datarep, Inc.	813-393-1741
Ga	Atlanta, Gale Sys.	404-938-6940
Ill	Chicago, Berndt Assoc. Inc.	312-283-0713
Ind	Carmel, Berndt Assoc. Inc.	317-844-0114
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine	913-492-7020
Mass	Wellesley Hills, R.H. Sturdy Co.	617-235-2330
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	Minneapolis, Berndt Assoc. Inc.	612-835-4818
Mo	St. Louis, Palatine Sls	314-426-7055
NJ	Paramus, SDM Reps., Inc.	201-368-0123
NY	Rochester, SDM Reps., Inc.	716-544-8080
NC	Winston Salem, Radco Co.	919-722-9671
Ohio	Cleveland, Geotronix, Inc.	216-526-2535
Ohio	Columbus, Geotronix, Inc.	614-457-8472
Ore	Beaverton, R & R Assoc.	503-643-5754
Pa	Ambler, Data Engrg. Co.	215-542-9876
Pa	Rochester, Geotronix, Inc.	412-266-4819
Tenn	Oak Ridge, Tech. Equip. Supply Co.	615-483-4285
Tex	Austin, Palatine Sls.	512-451-7463
Tex	Houston, Palatine Sls.	713-783-1492
Tex	Richardson, Palatine Sls.	214-231-9489
Va	Arlington, H.J. Heffernan Co.	703-522-6666
Wash	Seattle, R & R Assoc.	206-762-7664
Wisc	Milwaukee, Berndt Assoc.	414-545-8400

Local Distributors

Ariz	Phoenix, Metermaster	602-243-4111
Cal	Los Angeles, Metermaster	213-685-4240
Cal	Los Angeles, E.I.L. Instrs.	213-685-7020
Cal	Palo Alto, Metermaster	415-968-0313
Cal	San Diego, Metermaster	714-560-4841
Ill	Bridgeview, E.I.L. Instrs.	312-430-2292
Ill	Elk Grove Village, Metermaster	312-593-8650
Ind	Indianapolis, E.I.L. Instrs.	317-545-1373
Md	Timonium, E.I.L. Instrs.	301-252-1260
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
NJ	Totowa, Ampower Elctrn. Instr. Co.	201-742-3215
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Farmingdale, Ampower Elctrn. Instr. Co.	516-752-1078
NY	Rochester, Trott Elctrns.	716-473-8010
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, E.I.L. Instrs.	513-435-2134
Pa	Pittsburgh, E.I.L. Instrs.	412-731-5230
RI	North Kingstown, E.I.L. Instrs.	401-885-1773
Tex	Garland, Metermaster	214-271-5671
Va	Alexandria, E.I.L. Instrs.	703-354-4330
Va	Norfolk, E.I.L. Instrs.	804-855-4241
For:	Canada, Brampton, Ont., Thermo Electric Ltd.	416-451-0813

(TM)ANALOK - A/D conversion circuit - Analog Devices

ANALYTICAL MEASUREMENTS, Dept. EM, 31 Willow St., Chatham, N.J. 07928, Tel: 201-273-7500; Empl.: 35

(TM)ANALYTICAL TITRA-KIT - redox and pH measurements. - Analytical Measurements

ANAREN MICROWAVE, INC., Dept. EM, 1010 James St., Syracuse, N.Y. 13203, Tel: 315-476-7901, TWX: 710-541-1507; FSC No.: 31597; Empl.: 165

Sales Manager: R.A. Worden, Mktg. Mgr.

Local Sales Offices & Reps.

Ariz	Phoenix, The Thorson Co.	602-956-5300
Cal	Los Angeles, Cain Technology	213-476-2251
Cal	Palo Alto, Waldman Assocs.	415-961-4100
Colo	Denver, The Thorson Co.	303-355-3521
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
Ind	Fort Wayne, J.B. Engrg. Sls. Co.	219-483-2813
Md	Davidsonville, R.L. Engrg.	301-760-5533
Mass	Reading, Geder-Rotondi Assocs.	617-944-3105
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Minneapolis, Deerland Distrs.	612-331-6433
NM	Albuquerque, The Thorson Co.	505-265-5655
NY	Greenvale, Bertram D. Aaron & Co.	516-621-0630
NY	Skaneateles, Robtron	315-685-5731
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling Co.	513-298-7573
Pa	Ambler, WM Assocs.	215-643-4119
Pa	Pittsburgh, Comtel-Sterling Co.	412-922-5720
Tex	Irving, Kemco, Inc.	214-255-0537
Wash	Seattle, Rush S. Drake Assocs., Inc.	206-763-2755

Local Distributors

Wisc	Milwaukee, Deerland Distrs.	

ANCHOR BOLT & SCREW, Dept. EM, 2950 W. Grand, Chicago, Ill. 60622, Tel: 312-252-2200; Empl.: 100

Local Sales Offices & Reps.

Colo	Denver, Central Western Sls.	303-534-4733
Ind	Columbus, Ritter, Inc.	812-372-1534
Iowa	W. Des Moines, Product Comps.	515-277-1783
Mich	Lansing, Marketing Professionals	517-484-0828
Mich	Southfield, Coskey-Gates Assoc.	313-354-5522
Minn	Minneapolis, G.L. Engstrom & Assoc.	612-546-0001
Mo	Maryland Hts., D.F. Adams & Assoc.	314-567-1785
SC	Columbia, G.E. Younginer & Assoc.	803-772-6671
Tex	Houston, Manco Metals	713-664-8084
Wisc	Milwaukee, Anchor Bolt & Screw Co.	414-342-4800

ANCHOR PLASTICS, Dept. EM, 36-36 36th, Long Island City, N.Y. 11106, Tel: 212-729-1494, Telex: 12-362; Empl.: 200

ANCHOR SPECIALTY MFG. INC., Dept. EM, 300 Hollister Rd., Teterboro, N.J. 07608, Tel: 201-288-1939; Empl.: 10

ANDERSEN & ASSOC., WALTHER M.A., Dept. EM, 4 Main St. Ext., Tariffville, Conn. 06081, Tel: 203-658-7666; FSC No.: 52045; Empl.: 18

ANDERSEN
LABORATORIES
INC.

ANDERSEN LABS., INC., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002, Tel: 203-242-0761, TWX: 710-425-2390; Empl.: 300 p. 2494,2495

Sales Manager: W.A. Crofut, Dir. Mktg.

ANDERSON JACOBSON, Dept. EM, 521 Charcot Ave., San Jose, Cal. 95131, Tel: 408-734-4030; Empl.: 450

Local Sales Offices & Reps.

Cal	Inglewood, Anderson Jacobson	213-674-4051
Cal	San Diego, Anderson Jacobson	714-278-8021
Ga	Atlanta, Anderson Jacobson	404-451-2744
Ill	Northbrook, Anderson Jacobson	312-498-4220
Md	Rockville, Anderson Jacobson	301-424-1767
Mass	Burlington, Anderson Jacobson	617-273-1420
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NJ	Hackensack, Anderson Jacobson	201-488-2525
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Sales Manager: H.J. Swain

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Cal	Claremont	714-626-3505
Cal	Palo Alto	415-323-3139
Colo	Denver	303-534-1788
Md	Rockville	301-762-1900
Mass	Lexington	617-862-0888
NJ	Hawthorne	201-652-1310
Tex	Richardson	214-235-1279

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Sales Manager: G.S. Ollen

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg., Inc.	205-772-9237
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Altos, Recht Assocs.	415-941-0338
Cal	Newport Beach, W. Bert Knight..	714-833-8250
Colo	Denver, Camel Elctrns.	303-757-6191
Ill	Downers Grove, Momak Sls.	312-963-6400
Ind	Greenwood, Valentine-Schillinger & Assoc.	317-888-2260
Ind	South Bend, Valentine-Schillinger & Assoc.	219-291-6258
Md	Ellicott City, Doss Elctrns., Inc. ..	301-465-1336
Md	Hagerstown, Angstrohm Precision, Inc.	
Mass	Framingham, KSA of New England	617-875-5464
Minn	St. Louis Park, Beta Engrg.	612-925-4422
Mo	Blue Springs, CHESCO	816-229-1404
Mo	St. Charles, CHESCO	314-946-6677
NJ	East Hanover, HLM Assoc.	201-386-0794
NY	Northport, H L M Assocs.	516-423-1818
Ohio	Cincinnati, Luebbe Sls.	513-871-4211
Ohio	Cleveland, Luebbe Sls.	216-333-0425
Ohio	Dayton, Luebbe Sls.	513-294-0426
Pa	Philadelphia, S. K. Macdonald, Inc.	215-545-1205
Pa	Pittsburgh, S. K. Macdonald Inc.	412-366-2643
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Wisc	Milwaukee, Star Engrg. Sls.	414-645-3680

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Local Sales Offices & Reps.

Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	Palo Alto, RF Assocs. Co.	415-494-3331
Mass	Waltham, Meas. Consultant Corp.	617-890-4400
NJ	Merchantville, L. Adezro Sls. Co.	609-662-3540

ANN ARBOR TERMINALS, INC., Dept. EM, 6107 Jackson Rd., Ann Arbor, Mich. 48103, Tel: 313-769-0926, TWX: 810-223-6033; Empl.: 55 p. 1475-1481

Sales Manager: K.M. Straith

Local Sales Offices & Reps.

Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Canoga Park, Chandler Assocs.	213-340-6103
Cal	Los Altos, Chandler Assoc.	415-941-1887
Colo	Denver, BFA Corp.	303-837-1247
Conn	Hamden, Digital Sls. Assocs.	203-281-6539
Fla	Orlando, Technical Assocs.	305-894-7531
Ill	Rolling Meadows, SEA, Inc.	312-255-4820
Ind	Carmel, SEA, Inc.	317-846-2593
Mass	Waltham, Digital Sls. Assocs.	617-899-4300
Minn	Minneapolis, SEA, Inc.	612-425-4455
Mo	Grandview, Digital Sys. Sls.	816-765-3337
NM	Albuquerque, BFA Corp.	505-296-8303
NM	Las Cruces, BFA Corp.	505-523-0601
Pa	Jenkintown, Stein Instrumentation	215-885-2370
SC	Spartanburg, Technical Assocs.	803-579-2904
Tex	Dallas, Remtek, Inc.	214-387-2855
Tex	Houston, Remtek, Inc.	713-664-2113
Utah	Salt Lake City, BFA Corp.	801-466-6522
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Mass	Framingham, G-M Assocs.	617-872-4871
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NJ	Mountain Lakes, Components for Elctrns.	201-334-2921

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Ariz	Scottsdale, J. Borman Co.	602-994-8594
Cal	Inglewood, J. Borman Co.	213-649-6111
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Conn	Meriden, Paul Sturgeon Co.	203-237-1112
Fla	Maitland, Hutto, Hawkins, Peregoy	305-831-2474
Ga	Atlanta, Cartwright & Bean	404-255-5262
Haw	Honolulu, H & R Assocs.	808-946-7944
Ill	Arlington Hts., Brainard-Wilson Mktg.	312-437-2700
Iowa	Atlantic, Kimian Sls.	721-243-1626
La	Gretna, Cartwright & Bean	504-362-4649
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Ore	Beaverton, DMS/Vantage	503-643-7468
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Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Robert Nesbitt Co.	214-357-4601
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Wisc	Milwaukee, Brainard-Wilson Mktg.	414-527-1500

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Sales Manager: H.W. Rapalus

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Sales Manager: J. Craven

Local Sales Offices & Reps.

Cal	N. Hollywood, Bassett & Moore, Inc.	213-766-2117
Cal	Redwood City, Logan Sls. Co. ..	415-369-6726
Colo	Denver, K-C Marketeers, Inc.	303-733-5561
Ga	Atlanta, J.E. Joyner & Assocs. ..	404-691-1776
Ill	Chicago, Cem/S, Inc.	312-685-9500
Ind	Indianapolis, New/Era Sls.	317-299-3400
Kans	Shawnee Mission, Maury E. Bettis Co.	913-362-0772
Mass	Concord, Chamberlin & Murray, Inc.	617-369-8013
Mich	Detroit, R.C. Merchant & Co.	313-535-6000
Minn	Minneapolis, Stan Clothier Co. ..	612-888-4666
NJ	Englewood, Bressler & Baum Assoc.	201-569-7600
NY	North Syracuse, L.D. Allen, Inc.	315-458-7470
Ohio	Richfield, Bear Mktg.	216-659-3131
Pa	Enon Valley, NEBco Assocs.	216-457-2333
Pa	Wynnewood, Stinson Assocs.	215-896-7378
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Ill	Northfield, Feller Assocs.	312-446-8065
Kans	Wichita, Eugene Carbiener Assoc.	316-682-5782
Md	Davidsonville, R.L. Engrg.	301-760-5533
Mass	Lowell, Russell Engrg. Svcs.	617-458-7146
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Commack, Dal-Tech Devices	516-543-4776
Ohio	Dayton, Ashby Assocs.	513-252-5627
Pa	Ambler, WM Assocs.	215-643-4119
Tex	Dallas, Stevens Sls.	214-350-2476
Wash	Seattle, Datacom Assoc.	206-285-2525

A. P. CIRCUIT CORP., Dept. EM, 865 West End Ave., New York, N.Y. 10025, Tel: 212-222-0876 .... p. 2721

Local Sales Offices & Reps.

Mich	Detroit, Comtel Instruments	313-255-1970
Ohio	Cleveland, Comtel Instruments ..	216-442-8080
Ohio	Dayton, Comtel Instruments	513-298-7573

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Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne Inc.	602-946-4437
Cal	Irvine, Mission Mktg. Gp.	714-833-1802
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Conn	Washington, Tri-Com Assoc.	203-868-7748
Fla	Orlando, Gra-Mar Inc.	305-894-3351
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Fort Wayne, Elliott Eng'g Sls. Co.	219-447-9623
Md	Baltimore, Compar Chesapeake	301-484-5400
Mass	Burlington, Tri-Com Assoc.	617-272-8163
Mich	Milford, Norm Case Assoc.	313-356-2161
Minn	Minneapolis, C. E. Bohlig Assoc.	612-922-7011
Mo	Grandview, Beneke & McCall Inc.	816-765-2998
Mo	St. Louis, Beneke & McCall Inc.	314-434-6242
NJ	Clifton, Compar New York Inc. ..	201-546-3660
NJ	Haddonfield, Sunday-O'Brien Inc.	609-429-4013
NM	Albuquerque, Piper-Goyne Inc. ..	505-294-1436
NY	Syracuse, Nycom Inc.	315-437-8343
Ohio	Centerville, Norm Case Assocs.	513-433-0966
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Sales Manager: J.G. Long Mktg. Mgr.

Local Sales Offices & Reps.

Ariz	Phoenix, Zeus	602-258-7519
Cal	Encino, Porter Co.	213-999-0171
Colo	Englewood, Elcom, Inc.	303-770-4400
Conn	Newton, Gerber Sls. Corp.	203-426-3440
Fla	Orlando, Buchanan & Abrams Assoc.	305-898-7444
Ill	Hinsdale, Hill-Gray Assoc.	312-325-4810
Ind	Fort Wayne, Val-Skol Sls., Inc.	219-742-9122
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Kans	Wichita, Penzner-Mankus Assoc.	316-264-2662
Mass	E. Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
Mich	Troy, C.B. Jensen & Assoc.	313-643-0506
Mo	Maryland Heights, Penzner-Mankus Assoc.	314-569-1220
NM	Albuquerque, Zeus, Inc.	505-256-9831
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NY	Syracuse, Rep-Tech, Inc.	315-437-2845
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Sales Manager: J. Rutkowski

Local Sales Offices & Reps.

Cal	Del Mar, Interconnect Specialties	714-453-2133
Cal	Thousand Oaks, Appleton Elctrns.	805-529-0276
Conn	Suffield, PJL Engrg. Sls. Assocs.	203-668-0010
Fla	No. Miami, Publicover Assocs.	305-947-5080
Fla	Orlando, Publicover Assocs.	305-898-9361
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Kans	Kansas City, Harris-Hanson Co.	816-444-9494
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APPLIED CIRCUITS, INC., Dept. EM, 36-06 43rd. Ave., Long Island City, N.Y. 11101, Tel: 212-786-7200; Empl.: 20 .... p. 1393

APPLIED CONTROL CO., Dept. EM, 1275 Bloomfield Ave., Fairfield, N.J. 07006, Tel: 201-227-5454; FSC No.: 44725; Empl.: 23

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NJ	Pine Beach, R. Cinalli	201-244-1348

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Cal	Santa Ana, Applied Data Comms.	714-547-6954
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Fla	Ft. Lauderdale, Reynolds & Assoc.	305-581-6611
Ind	Munster, Bexdata	312-221-1411
Minn	Edina, Bexdata	612-835-5220
NH	Derry, Applied Data Comm	603-434-0909

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Sales Manager: T.Y. Smith

APPLIED DIGITAL DATA SYS., INC., Dept. EM, 100 Marcus Blvd., Hauppauge, N.Y. 11787, Tel: 516-231-5400, TWX: 510-227-9886; Empl.: 246

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Ariz	Phoenix	602-945-5086
Cal	Newport Beach, 714-752-6700	
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Sales Manager: Fred Hambrecht

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Colo	Westminster, Harvey Data Sys.	303-427-4323
Conn	Southbury, J J Wild	203-264-9464
Md	Bethesda, Warner Assocs.	301-469-8904
Mass	Needham, J J Wild	617-444-2366
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Tex	Dallas, Remtek	214-387-2855

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Cal	Los Angeles, E. Landa Co.	213-879-0770
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APPLIED FLUIDICS INC., Dept. EM, 770 Main St., Westbury, N.Y. 11590, Tel: 516-334-8742; Empl.: 20

APPLIED GRAPHICS, Dept. EM, 58 Shore Rd, Glenwood Landing, N.Y. 11547, Tel: 516-676-1211; Empl.: 29

APPLIED MAGNETICS CORP., Magnetic Head Div., Dept. EM, 75 Robin Hill Rd., Goleta, Calif. 93017, Tel: 805-964-4881, TWX: 910-334-1195; Empl.: 3000

Local Sales Offices & Reps.

Ariz	Scottsdale, Arcom Sls.	602-947-5745
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Colo	Denver, B5 Inc.	303-426-0222
Fla	Ft. Lauderdale, Banner Elctrn. Sls.	305-721-3240
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NM	Albuquerque, Arcom Sls.	502-296-0606
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Fla	Hallandale, Emec, Inc.	305-925-6366
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Mass	Waban, Bawer Assoc.	617-244-6572
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NY	Plainview, Central Assoc.	516-433-0808
Tex	Fort Worth, Carey Wolf & Assoc.	817-738-1996
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Wash	Seattle, Datacom Assoc.	206-285-2525
Exp:	Fla., Hallandale, Emec, Inc.	305-925-6366

APPLIED MOTORS INC., Dept. EM, Box 106, 4801 Boeing Dr., Rockford, Ill. 61105, Tel: 815-397-2006, Telex: 257-315; Empl.: 173

Sales Manager: R.A. Baird

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Colo	Boulder, Scientific Devices, Intermountain	303-449-9466
Fla	Orlando, Truex Assocs.	305-859-2160
Mass	Stoneham, Ken Corp.	617-438-5464
Mo	Kansas, Pem Sls.	314-427-7200
NJ	Wallington, Com-Tech Sls.	201-935-5454
NY	Skaneateles, Robton, Inc.	315-685-5731
Ohio	Cleveland, Bock Assoc.	216-331-5212
Pa	Media, W. Reeves Assocs.	215-566-6709
Tex	Dallas, Tesco	214-328-5484

ARNOUX CORP., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101, Tel: 805-963-3476; Empl.: 20 p. 2792

Sales Manager: A. Kelley

™ARNOX - Ceramic Permanent Magnets - Arnold Engineering Co.

™AROUND THE HOUSE - personal hand lamps - Teledyne Big Beam

ARRA INC., Antenna & Radome Resch. Assocs., Dept. EM, 15 Harold Ct., Bay Shore, N.Y. 11706, Tel: 516-231-8400, TWX: 510-227-6231; Empl.: 45 p. 2999

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assoc.	800-327-1181
Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Los Angeles, R F Assocs. Inc.	213-478-1586
Cal	Palo Alto, R F Assocs. Inc.	415-494-3331
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Fla	Lighthouse Point, Saber Assoc.	800-432-3007
Fla	Longwood, Saber Assoc.	305-422-3686
Fla	Sarasota, Saber Assoc.	813-441-1301
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Ellicott City, Doss Elctrns.	301-465-1336
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Newtown Sq., SWR Assoc.	215-356-8550
NM	Albuquerque, R. A. Mayes	505-292-2330
NY	Great Neck, EAC	516-466-9798
NY	Syracuse, Tesco Mktg. Assocs.	315-463-4566
NC	Raleigh, Saber Assoc.	919-834-3961
Ohio	Dayton, Haacke Co.	513-254-1951
Pa	Newtown, SWR Assocs. Corp.	215-356-8550
Tex	Houston, R.A. Mayes	713-461-5385
Tex	Richardson, R.A. Mayes	214-235-3043
Utah	Centerville, R.A. Mayes Co.	801-292-6781
Exp:	Fla., Hallandale, Emec Inc.	305-925-6366

ARROW FASTENER CO., INC., Dept. EM, 271 Mayhill St., Saddlebrook, N.J. 07662; Empl.: 600

ARROW-HART, INC., Sub. Crouse-Hinds Company, Dept. EM, 103 Hawthorn St, Hartford, CT 06101, Tel: 203-249-8471, Telex: 99328; Empl.: 4,000 p. 4017-4056

Sales Manager: G.F. Heiden

Refer to Crouse-Hinds Co. Arrow Hart Div. for distributor and sales office information.

ARROW-M, Dept. EM, 250 Sheffield Ave., Mountainside, N.J. 07092, Tel: 201-232-4260, Telex: 138-213 p. 3414-3425

Sales Manager: T. Gottlick

Local Sales Offices & Reps.

Ala	Huntsville, Powertronics	205-852-6347
Ariz	Phoenix, Stitzer-Dodd	602-944-2237
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Madison, United Components Inc.	203-562-4002
Fla	Casselberry, E I R Inc.	305-830-9600
Fla	Palm Beach, EIR Inc.	305-585-7957
Fla	Plantation, EIR Inc.	305-791-6390
Ill	Chicago, Carlson Elctrn Sls. Co.	312-774-9022
Iowa	Cedar Rapids, Engineering Svcs. Co.	319-362-0503
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mich	Milford, T. Mulligan & Assocs	313-363-5575
Minn	St. Paul, Skor	612-645-6461
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NH	Manchester, United Comps.	603-623-8496
NJ	Plainfield, Meg Electronic Sls.	201-757-4332
NY	Buffalo, Quality Comps.	716-839-4170
NY	Manlius, Quality Comps.	315-682-8885
NY	Rochester, Quality Comps.	716-889-1919
NC	Thomasville, Powertronics	919-476-6727
Ohio	Columbus, T. Mulligan & Assoc.	614-457-2242
Pa	King of Prussia, Ziegler & Colburn Assoc.	215-265-5490
RI	Saunderstown, United Components Inc.	617-226-0556
Tex	Houston, Carey Assoc.	713-460-1111
Wash	Mercer Island, Sales & Engrg.	206-232-6550
Wisc	Milwaukee, Carlson Elctrn. Sls. Co.	414-476-2790
Exp:	Wash., Vancouver, Sales & Engrg.	206-573-5161

Local Distributors

Cal	Santa Clara, Conex Elctrns	408-984-2800
Cal	Sunnyvale, Bell Inds.	408-734-8570
Cal	Van Nuys, Patane Avionics	213-988-4455
Colo	Denver, Ratel Elctrn.	303-934-5813
Conn	East Haven, J V Elctrns. Co.	203-469-2321
Conn	Fairfield, U-Tronics	203-255-4521
Fla	Casselberry, Pace Elctrn.	305-834-7777
Fla	W. Palm Beach, Nurmi Elctrn. Supply Inc.	305-686-8553
Mass	Bellingham, Dowiak Assocs	617-966-0404
Mich	Kentwood, R M Elect.	616-531-9300
Minn	St. Paul, Aviation Elctrns.	514-744-2811
NJ	Fair Lawn, Relay Specialties	201-797-3313
NJ	Plainfield, Mars Elctrns.	201-757-4332
NY	Buffalo, Summit Distrb.	716-884-3450
Ohio	Cincinnati, Midwest Equip. Co.	513-793-4060
Ore	Portland, P & R Inds.	503-292-4436
RI	Warwick, W. H. Edwards Inc.	401-781-8000
Tex	Addison, Computer Comps. Corp.	214-239-7151
Wash	Seattle, Liberty Elctrn.	206-763-8200
For:	Can., Montreal, Quebec, Future Elctrns.	514-735-5775

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ART WIRE/DODUCO, Dept. EM, 9 Wing Dr., Cedar Knolls, N.J. 07927, Tel: 201-267-2000, Telex: 136-455; Empl.: 100

Local Sales Offices & Reps.

Ariz	Scottsdale, J. Hagestad	602-945-8415
Cal	Downey, Corbett-Smith	213-927-2788
Cal	San Francisco, D.R. Cox	415-441-8666
Colo	Estes Park, Amidon Co.	303-586-2121
Ga	Atlanta, W.A. Low & Assocs.	404-448-3811
Ill	Zion, A.O. Capp Co.	312-872-8311
Ind	Indpls, Hoster & Sieloff	317-844-9921
Mich	Detroit, W. Crawford Assoc.	313-836-8121
Minn	St. Paul, R. Bittrick	612-226-6178
Mo	Kirkwood, W. White Co.	314-965-1115
Ohio	Chagrin Falls, Alexander Industrial Sls.	216-247-4133
Tex	Dallas, J&R Assocs.	214-348-5752

ARTECH CORP., Dept. EM, 2816 Fallfax Dr., Falls Church, Va. 22042, Tel: 703-560-3292; Empl.: 35

ARTISAN ELCTRNS. CORP., Dept. EM, 5 Eastmans Rd., Parsippany, N.J. 07054, Tel: 201-887-7100; Empl.: 150

Sales Manager: A. Seman

Local Sales Offices & Reps.

Cal	Lawndale, English Sls. Assoc.	213-772-7272
Cal	Sunnyvale, English Sls. Assoc.	408-733-5885
Conn	Bloomfield, Zaslow Sls.	203-242-7781
Conn	Milford, Zaslow Sls.	203-878-1094
Fla	Orlando, Geartner Associates	305-299-1000
Ill	Northfield, Such & Assocs. Inc.	312-446-8934
Md	Bladensburg, L.D. Lowery	301-277-6565
Md	Lutherville, L.D. Lowery	301-823-2172
Mass	Lowell, Zaslow Sls.	617-458-8452
Mass	Northboro, Zaslow Sls.	617-393-8150
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
NJ	N. Caldwell, Masin-Esco	201-226-2550
NY	Chappaqua, Masin-Esco	914-CE 8-8337
NY	Syosset, Masin-Esco	516-364-0310
Ohio	Strongville, J. Finnegan & Co.	216-826-1033
Ohio	W. Carrollton, J. Finnegan & Co.	513-435-0956
Pa	Broomall, L.D. Lowery	215-356-5300
Pa	Harrisburg, L.D. Lowery	717-233-0917
Tex	Addison, Southland Comps.	214-233-0603
Va	Charlottesville, L.D. Lowery	804-943-6672

ARTOS ENGRG. CO., Dept. EM, 15600 W. Lincoln Ave., New Berlin, Wisc. 53151, Tel: 414-782-3300, Telex: 26-9549; Empl.: 300

Local Sales Offices & Reps.

Cal	Fullerton
Conn	Stamford
Ga	Atlanta
Ill	Morton Grove

ARTRONIC INSTR. CO., Dept. EM, 11232 Triangle La., Silver Spring, Md. 20902, Tel: 301-949-1131; FSC No.: 09446 .... p. 2489

ARTRONIX, INC., Dept. EM, 1314 Hanley Industrial Ct., St. Louis, Mo. 63144, Tel: 314-968-4740; Empl.: 200

Local Sales Offices & Reps.

Cal	Irvine	714-752-0052
Del	Newark	302-738-5693
Ga	Atlanta	406-256-5911
Ohio	Cincinnati	
Tex	Dallas	214-638-5650

™ARULAB - ultrasonic test equipment - Arenberg Ultrasonic Inc.

ARVEE ENGRG. CO., Dept. EM, 205 Ave. I #24, Redondo Beach, Cal. 90277, Tel: 213-373-1324; Empl.: 4

ARVIN SYSTEMS, Dept. EM, 1771 Springfield St., Dayton, Ohio 45403, Tel: 513-258-2181, TWX: 810-459-1738; Empl.: 50

ASARCO INTERMETALLICS CORP., Dept. EM, 120 Broadway, New York, N.Y. 10005

ASC SYSTEMS CORP., Dept. EM, 155 W. Main St., Rockville, Conn. 06066, Tel: 203-872-8581, TWX: 710-435-1663; FSC No.: 70117; Empl.: 650

ASCO WIRE & CABLE CO., Dept. EM, 412 Housatonic Ave., Bridgeport, Conn. 06608, Tel: 203-366-5294; Empl.: 30

Local Sales Offices & Reps.

Ill	Schiller Park, Midwest Warehouse Inc.	312-678-6663
NY	Great Neck, Pacent-DiBlasi	516-482-4678

ⓉⓂA-SCOPE - interferometer - Varian Assocs.

ASHLEY-BUTLER, INC., ASHA, Dept. EM, 208 Route 206 South, Somerville, N.J. 08876, Tel: 201-359-5911

Sales Manager: R. Klein

Local Sales Offices & Reps.

Ariz	Scottsdale, Spectre Sls.	602-948-8888
Cal	Newport Beach, Weatherman Assoc.	714-642-0074
Colo	Boulder, PAR Assocs	303-499-4736
Fla	Orlando, Gra-Mar. Inc.	305-894-3351
Ill	Schaumburg, Kingston Comps.	312-529-8055
Ind	Indianapolis, Advanced Comps.	317-545-6441
Mass	Newton, Daner-Hayes, Inc.	617-969-4650
Mich	Pleasant Ridge, Shalco, Inc.	313-547-4771
Minn	New Brighton, TWC Sls.	612-636-1770
NJ	Westwood, Lubell Assoc.	201-664-2262
NY	New Hyde Park, Comptech Sls.	201-935-5454
NY	Syracuse, Lenard Sls.	315-479-9191
Ohio	Highland Heights, Micro-Tec, Inc.	216-442-1555
Pa	Jenkintown, Stein Instrumentation, Inc.	215-885-2370
Tex	Houston, Cunningham Co.	713-461-4197
Wash	Seattle, Del Com Sls.	206-248-0090

ASHLAND ELEC. PRODS., Dept. EM, 32-02 Queens Blvd., L.I.C., N.Y. 11101, Tel: 212-EX 2-4010; Empl.: 150

Local Sales Offices & Reps.

Cal	Burlingame, W.J. Purdy	415-347-7701
Cal	Los Angeles, C. Repp	213-820-1715
Cal	Sacramento, Wm. J. Purdy Co.	916-481-0971
Colo	Denver, Wm. J. Purdy Co.	303-777-1411
Md	Riversdale, Riggs Assocs.	301-927-3380
Mass	Brookline, Harman	617-232-6687
Minn	Minneapolis, Electronic Innovators	612-884-7471
NJ	West Long Branch, Eastern Elctrn. Sls.	201-222-6836
NY	Fairport, TAC Assocs.	716-377-1742
Ohio	Akron, Augnat Assocs.	216-239-1621
Pa	Doylestown, T.O.E. Sales	201-568-5747
Tex	Dallas, Precision Sls.	214-351-6964

ASHMAN INDUSTRIES (1966) LTD., Dept. EM, 66 Brock Rd., Greensville Dundas, Ont., Can., Tel: 416-628-6371; Empl.: 56

ASM CORP, Dept. EM, Box 860, 525 Truck Lane, Smithfield, N.C. 27577, Tel: 919-934-3104; FSC No.: 31336 .... p. 3975

Sales Manager: L.L. Armstrong

Local Sales Offices & Reps.

Cal	Los Altos, Westec North	415-948-8880
Cal	Los Angeles, Astralonics	213-990-5903
Conn	East Haven, Eagle Assocs	203-467-6542
Ga	Alpharetta, Kark Ekmark	404-475-4872
Ind	Ft. Wayne, Scott Elctrns	219-743-1586
Ind	Indianapolis, Scott Elctrns	317-897-9976
Ky	Louisville, Scott Elctrns	502-583-3220
Mich	Plymouth, Scott Elctrns	313-455-2440
NJ	Cherry Hill, Danc. Elctrn Sls	215-627-2218
NY	Plainville, Robert H. Smith Assocs	516-681-3155
NY	Spring Valley, Robert H Smith Assocs	914-354-6067
NC	Smithfield, ASM Corp	919-934-3104
Ohio	Cleveland, Scott Elctrns	216-291-2600
Ohio	Columbus, Scott Elctrns.	614-236-8619
Ohio	Dayton, Scott Elctrns.	513-223-2652
Pa	Pittsburgh, Scott Elctrns	412-781-3112
Exp:	NY, Schenectady, EMB Techn Corp	518-372-5841

Local Distributors

Cal	Los Altos, Westec Dist Co.	415-948-8880
Cal	Sun Valley, Q C Comps, Inc	213-768-6111
Conn	Norwalk, Park Dists	212-931-1680
NJ	Bergenfield, Technical Elctrn Dists	201-384-3643
Tex	Houston, Lenert Co	713-225-1465
For:	Can., Vancouver, BC, L.A. Varah	604-873-3211

ASPE, INC., Dept. EM, P.O. Box 992, West Caldwell, NJ 07006, Tel: 201-575-8770

Sales Manager: R. Sachs

ASSEMBLED PRODUCTS CO., Dept. EM, Box 750, St. Albans, Vt. 05478, Tel: 802-864-7625; Empl.: 22

Sales Manager: A. Sherry

ASSEMBLY SYSTEMS, INC., Dept. EM, PO Box 9084, Providence, R.I. 02940, Tel: 401-331-9154

Sales Manager: D.H. Robbins

ASSOCIATE GENERAL LABS., INC., Dept. EM, 8934 W. Ogden Ave., Brookfield, Ill. 60513, Tel: 312-485-1135; Empl.: 11

ASSOCIATED ENGRG. & MFG. CORP., Dept. EM, 546 Valley Rd., Upper Montclair, N.J. 07043, Tel: 201-783-7800, Telex: 138866; Empl.: 69

ASSOCIATED ENVIRONMENTAL SYSTEMS, Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842, Tel: 617-683-9501, TWX: 710-342-0765; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Comps.	205-539-4411
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Mountain View, IFM, Inc.	415-961-2828
Cal	Van Nuys, Gordon-Elliot, Inc.	213-873-6862
Colo	Denver, Barnhill Three	303-750-1222
Conn	Glastonbury, Edcom, Inc.	203-633-1380
Fla	Orlando, W. A. Brown Comps.	305-425-5505
Ga	Chamblee, W. A. Brown Comps.	404-455-0405
Ill	Chicago, Midwest Elctrn. Sls.	312-777-9700
Ind	Indianapolis, Midwest Elctrn. Sls.	317-253-0590
Iowa	Cedar Rapids, Midwest Elctrn. Sls.	319-362-4410
Kans	Wichita, Aero-Hill Sls.	316-682-2052
Md	Silver Spring, ARA Elctrns., Inc.	301-565-2584
Mass	Newtonville, Edcom	617-969-9710
Mich	Detroit, Electro Entprs., Inc.	313-521-1500
Minn	Minneapolis, Waytek, Inc.	612-933-2133
NM	Albuquerque, Barnhill Three	505-299-7658
NY	Great Neck, Trionic Assocs., Inc.	516-466-2300
NY	Rochester, Scientific Devices of N.Y.	716-334-2445
NC	Raleigh, W. A. Brown Comps.	919-781-9426
Ohio	Cleveland, Electro Entprs., Inc.	216-261-7670
Ohio	Dayton, Electro Entprs., Inc.	513-426-6071
Pa	Glenside, ARA Elctrns., Inc.	215-887-5250
Tex	Houston, Barnhill Two	713-688-9971
Tex	Richardson, Barnhill Two	214-231-2573
Va	Richmond, ARA Electronics, Inc.	804-285-9309
Wash	Monroe, Cascade Equip. Co.	206-794-7163
Wisc	Waukesha, Midwest Elctrn. Sls.	414-542-5129

ASSOCIATED RESEARCH, INC., Dept. EM, 6125 W. Howard St., Niles, Ill. 60648, Tel: 312-647-7850; FSC No.: 04237 .... p. 2793

Sales Manager: E.C. Cantwell

Local Sales Offices & Reps.

Ariz	Scottsdale, Sls. Engrg.	602-945-5781
Cal	Paramount, Brenner-Fiedler Assoc.	213-531-7222
Cal	San Francisco, California Instr. Co.	415-863-0350
Fla	Miami, Ludlum Assocs. Co.	305-592-6523
Fla	Orlando, Ludlum Assocs. Co.	305-894-7761
Ga	Atlanta, Holman-Lobsinger Co.	404-256-9120
Ill	Chicago, Factory Office	312-647-7850
Ind	Indianapolis, C.M. Buck & Assocs.	317-293-5704
Mass	Needham, Northeast Reps.	617-449-3034
Mich	Birmingham, Electro-Mation Assocs.	313-564-6517
Minn	Edina, Ainslie Co.	612-920-2996
Mo	Kansas City, Cleaves-Bessmer-Marietti	816-353-6011
Mo	St. Louis, Fitzgerald Sls. Co.	314-862-1660
Neb	Omaha, F.C. Clatterbaugh Co.	402-333-1600
NJ	Palisades Park, Associated Research	201-461-0168
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
Ohio	Brecksville, D & B Engrg. Sls.	216-526-6320
Pa	Pittsburgh, Bollinger & Bradford	412-561-2340
Tex	Dallas, J.Y. Schoonmaker Co.	214-357-8481
Wash	Seattle, D.A. Olson	206-522-6594

ASSOCIATED SPECIALTIES CO., Dept. EM, 1751 Main St., Orefield, Pa. 18069, Tel: 215-395-9172

ASSOCIATED SPRING-BARNES GROUP INC., Dept. EM, 18 Main St., Bristol, Conn. 06010, Tel: 203-582-9581, TWX: 962449 710-454-0592; Empl.: 6,105

Sales Manager: R. Hufsmith

Local Sales Offices & Reps.

Cal	Gardena	213-323-4833
Conn	Bristol	203-582-9581
Ga	Atlanta	404-256-2610
Ill	Lombard	312-495-4760
Ill	Mattoon	217-235-5601
Mich	Ann Arbor	313-665-8686
Mich	Plymouth	313-453-6100
NY	Syracuse	315-457-9200
NC	Arden	704-684-7836
Ohio	Dayton	513-253-4131
Pa	Corry	814-665-8241
Tenn	Memphis	901-332-4832
Tex	Dallas	214-330-8661
Wisc	Milwaukee	414-482-1600

ASSOCIATED TESTING LABS., Dept. EM, Northwest Ind'l. Pk., Burlington, Mass. 01803, Tel: 617-272-9050; Empl.: 100

Sales Manager: V. Twomey

Local Sales Offices & Reps.

Conn	Stratford, G. Rosen Co.	203-375-5456
Md	Silver Spring, ARA	301-565-2585
Mass	Framingham, G. Rosen Co.	617-879-5505
NH	Hollis, G. Rosen Co.	603-465-7902
Pa	Glenside, ARA	215-887-5250
Va	Richmond, ARA	804-285-9309
Exp:	N.J., Englewood Cliffs, Elymat Corp.	201-947-7331

ASSOCIATED TESTING LABORATORIES, Dept. EM, 23 Vincent St., Wayne, N.J. 07470, Tel: 201-473-6455; Empl.: 45

Sales Manager: V. Twomey, Jr.

Local Sales Offices & Reps.

Conn	Stratford, G. Rosen Co.	203-373-5456
Mass	Framingham, G. Rosen Co.	617-879-5505
NH	Hollis, G. Rosen Co.	603-456-7902
Pa	Glenside, ARA Elctrns.	215-887-5250

ASTATIC CORP., Dept. EM, Box 120, Conneaut, Ohio 44030; Empl.: 500

Local Sales Offices & Reps.

Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Sacramento, W.J. Purdy Co.	916-422-0128
Cal	Van Nuys, M. Roth Sls.	213-989-3738
Colo	Denver, Connors, Inc.	303-934-5829
Conn	Waterbury, Anderson Sls. Assocs.	203-753-2487
Fla	Orlando, Hollingsworth & Still, Inc.	305-671-4515
Ga	Atlanta, Hollingswoth & Still, Inc.	404-394-3270
Ill	Chicago, Markal Sls. Corp.	312-282-5800
Ind	Indianapolis, Sukup & Cox, Inc.	317-253-1215
Iowa	Des Moines, Kathrinus-Kelly & Co.	515-255-4584
Kans	Shawnee Mission, Kathrinus-Kelly & Co.	913-722-0000
La	Chalmette, Cartwright & Bean Inc.	901-276-4442
Md	Silver Spring, Lowery Assocs. Co.	301-439-3542
Mass	Boston, Anderson Sls. Assocs.	617-227-2980
Mich	Southfield, R. Milsk Co.	313-354-3310
Miss	Jackson, Cartwright & Bean Inc.	601-354-1368
Mo	St. Louis, Kathrinus-Kelly & Co.	314-968-3800
NJ	Teaneck, S. Axelrod Assoc.	201-836-6661
NY	Lake Ronkonkoma, S. Axelrod Assoc.	
NY	Syracuse, Paston-Hunter Co., Inc.	315-437-2992
NC	Charlotte, Hollingsworth & Still Inc.	704-536-7047
Ohio	Beachwood, Elctrn. Salesmasters Inc.	216-831-9555
Ohio	Dayton, Elctrn. Salesmasters Inc.	513-837-2379
Ore	Portland, D.G. Weber Co.	503-234-0686
Pa	Broomall, Lowery Assocs. Co.	215-356-5300
Pa	Harrisburg, Lowery Assocs. Co.	215-233-0917
Tenn	Memphis, Cartwright & Bean Inc.	901-276-4442
Tex	Dallas, Maynard & Gunn Sls. Co.	214-742-2384
Tex	Houston, Maynard & Gunn Sls. Co.	713-497-0544
Utah	Bountiful, Connors, Inc.	801-292-4664
Va	Charlottesville, Lowery Assocs. Co.	703-973-6672
Wash	Seattle, D.G. Weber Co.	509-623-5990

Wash	Spokane, D.G. Weber Co.	509-624-3908
Exp:	Plainview, NY, Morhan Exporting Corp.	516-293-5582

ASTROCOM CORP., Dept. EM, 15012 Minnetonka Rd., Minnetonka, Minn 55343, Tel: 612-933-2208; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Canoga Park, Chandler Assocs.	213-340-6103
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Fla	Maitland, Traceco	305-644-6110
Ga	Atlanta, Traceco	404-636-3304
Haw	Honolulu, Western Union of Hawaii	808-523-1326
Md	New Carrolton, W. A. Brown Equip.	301-577-4527
Mass	Lowell, S & S Elctrns.	617-459-2578
Minn	Minneapolis, Deerland Distrs.	612-331-6433
Minn	Minnetonka, Astrocom Corp.	612-933-2208
NM	Albuquerque, Data Handling Co.	505-268-0928
Ohio	Rising Sun, Mecom	419-457-3231
Pa	Audubon, Holmes Assocs.	215-666-0636
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Va	Alexandria, W. A. Brown Equip.	703-836-1800
Wash	Seattle, Computers Unlimited	206-246-4634
WVa	Charleston, W. A. Brown Equip.	304-342-2700

ASTRO ELCTRNS., INC., Dept. EM, 2478 Fender Ave., Unit "D", Fullerton, Calif. 92631, Tel: 714-526-5581; Empl.: 14

Local Sales Offices & Reps.

Ohio	Cincinnati, B. Stephens Manufacturers' Rep.	513-921-0350

ASTRO-GEO-MARINE INC., Dept. EM, 2005 Palma Dr., Ventura, Cal. 93003, Tel: 805-485-3128; FSC No.: 51473; Empl.: 10

ASTRO-MED, Div Atlan-Tol Inds. Inc., Dept. EM, 639 E. Greenwich Ave., West Warwick, R.I. 02893, Tel: 401-828-4000, TWX: 710-382-6409; Empl.: 75

Local Sales Offices & Reps.

Fla	Orlando, Nine Assocs.	305-351-1841
Tex	Houston, Scientific Devices- Gulf Coast	713-623-4250
Tex	Richardson, Scientific Devices-SW	214-231-8106
Utah	San Antonio, Scientific Devices- Alb.	512-293-3494
Va	Fairfax, Nine Assocs.	703-273-1803
Wash	Seattle, R.S. Drake Assoc.	206-763-2755

Ⓣ**ASTRO-AIRE** - fans - Astro Dynamics

Ⓣ**ASTRO BOA FLEX** - coaxial cable (precision) - Astrolab, Inc.

ASTRO CIRCUIT CORP., Dept. EM, 540 Main St., Tewksbury, Mass. 01876, Tel: 851-7229, Telex: 947851; Empl.: 140

Local Sales Offices & Reps.

Mass	Randolph, Naton Assocs.	617-986-6417
NY	Roslyn Heights, Productronics Ltd.	516-484-2619

Ⓣ**ASTRO-COBRA-FLEX** - semi-rigid flexible cable - Astrolab, Inc.

ASTRO DYNAMICS, Dept. EM, 2 Gill St., Woburn, Mass. 01801, Tel: 617-935-4944; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Orange, Current Prod. Sls.	714-633-7414
Cal	Pasadena, Components Corp.	213-681-7448
Colo	Boulder, Components Prods. Sls. Co.	303-444-2730
Fla	Jupiter, Cherry Assocs.	305-746-4591
Ind	Ft. Wayne, TX Sales	219-489-4447
Md	Ellicott City, V.P.I., Inc.	301-465-4060
Mich	Ferndale, Tiby Co.	313-547-3550
Minn	Minneapolis, Components Group	612-824-4222
NH	Agora, Eng. Comp.	603-432-8076
NY	Northport, Production Sls. Assocs.	516-757-0336
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	
Pa	North Wales, V.P.I.	215-474-3200
Tex	Grand Prairie, Howell Sls. Co.	214-262-5153
Va	Merrifield, V.P.I.	703-573-7837
Exp:	Conn., Stanford, Deltron Co.	203-322-7424

ASTRODATA INC., Dept. EM, 240 E. Palais Rd., Anaheim, Cal. 92805, Tel: 714-772-1000, TWX: 910-591-1175; Empl.: 238

Ⓣ**ASTRODOME** - photoelectric control - General Elec. Co.

ASTRODYNE, INC., Sub. Roanwell Corp., Dept. EM, 353 Middlesex Ave., Wilmington, Mass. 01887, Tel: 617-272-3850, TWX: 710-347-0704; Empl.: 60

Sales Manager: Z.B. Laycock

Local Sales Offices & Reps.

Cal	Redwood City, Parks & Pruitt Assoc.	415-364-1640
Cal	San Diego, Earle Assoc.	714-278-5441
Cal	San Gabriel, Van Gott & Assocs	213-285-2148
Colo	Vail, Mile High Elctrns.	303-476-1149
Fla	Eau Gallie, J.J. Smith & Assoc.	305-254-4206
Ill	Skokie, Saffro & Assocs.	312-588-0905
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Md	Silver Spring, Carwithen Assoc.	301-589-9040
Mass	Brookline, Harman Assoc.	617-232-6687
Mich	Birmingham, Forand Sls. Co.	313-644-0087
Minn	Minneapolis, Beta Engrg. Co.	612-546-2215
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NY	Jericho, Metro Tech. Sls.	516-935-3330
NY	Liverpool, Jones-Sudders Inc.	315-457-1180
Pa	Pittsburgh, J.W. Kight Co.	412-781-8303
Tex	Irving, Lee Sls. Corp.	214-363-3831
Wash	Bellevue, COMTEC	206-453-1188
Exp:	New York, Westbury, Minthorne International Co	516-334-3303

Ⓣ**ASTROFLO** - flow generators & flowmeters - Astro Dynamics

Ⓣ**ASTROGIDE** - p.c. card guides; guides circuit board - Bivar, Inc.

ASTROLAB, INC., Dept. EM, 345 Dalziel Rd., Linden, N.J. 07036, Tel: 201-862-0022, TWX: 710-996-5930; FSC No.: 16301; Empl.: 36

Local Sales Offices & Reps.

Cal	Palo Alto, E. Rinker	415-321-7041
Cal	Van Nuys, RF Specialists	213-785-0503
Fla	Clearwater, Brennan Assocs.	813-446-5006
Mass	Reading, Kelly Assocs	617-942-0055
Pa	Plymouth Meeting, Ron Mar Co	215-825-2841
Tex	Fort Worth, McDonald Engrg Co.	817-429-4272
Wash	Renton, Sherman Wilson Assoc.	206-226-0650

Ⓣ**ASTROLIFT** - general cargo lift & Dual parking lift - Astro Dynamics

Ⓣ**ASTROLINE** - console model wave soldering sys. - Hollis Engrg., Inc.

Ⓣ**ASTROLOK** - universal coaxial connector - Astrolab, Inc.

Ⓣ**ASTROMAST TOWERS** - erectable triangular towers - Astro Research Corp.

ASTRO PRODUCTS CO., Dept. EM, 1971 Spear St., S. Burlington, , Vt. 05401, Tel: 802-864-7625; Empl.: 41

Sales Manager: T. Becker

ASTRO RESEARCH CORP., Dept. EM, Box 4128, Santa Barbara, Cal. 93103, Tel: 805-684-6641, TWX: 910-336-1144; FSC No.: 34488; Empl.: 35

Sales Manager: K. Knapp

Local Sales Offices & Reps.

Ala	Huntsville, Repcom, Inc.	205-852-0394
Ariz	Tempe, J.F. Hurlbut Co.	602-967-4652
Cal	San Diego, Windsor Dynamics	714-452-1891
Cal	Sherman Oaks, Windsor Dynamics	213-990-4173
Cal	Sunnyvale, Advent Assocs.	408-245-8660
Colo	Denver, J.F. Hurlbut Co.	303-279-7796
Fla	Melbourne, Repcom, Inc.	305-254-1877
Md	Bethesda, C. G. Kretschmer	301-530-2888
NJ	Tenafly, Budd-tronics, Inc.	201-569-2230
NC	Charlotte, Repcom, Inc.	704-392-1287
Tex	Dallas, Tesco	214-328-5484

Ⓣ**ASTROSCAT** - parabolic reflectors - RF Systems, Inc.

ASTROSYSTEMS, INC., Dept. EM, 6 Nevada Dr., Lake Success, N.Y. 11040, Tel: 516-328-1600, TWX: 510-223-0411; Empl.: 150 .... p. 1482,1483

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Engrg.	205-837-4304
Cal	Los Altos, Tauber-Dreyer Assoc.	415-948-2635
Cal	Northridge, Tauber & Dreyer Corp.	213-368-4011
Cal	San Diego, Tauber Assocs.	714-274-7242
Colo	Englewood, Dynatech Inc	303-773-2830
Fla	Atlanta, Fancher & Assoc.	404-448-7078
Fla	Pompano Beach, Cole-Tek Assoc.	305-781-8110
Ill	Chicago, Electro-Kinetics	312-286-4200
Mass	Lexington, Dimensional Systems	617-862-2700
Mass	Sturbridge, Branford Controls	617-347-7367
Mich	Southfield, Static Controls Corp.	313-358-1460
Minn	Minneapolis, Engrg. Prods.	612-925-1883
NY	Cazenovia, P. DeCew, Inc.	315-655-8602
NY	Melville, Astrorep	516-423-2266
NC	Charlotte, W. Fancher & Assoc.	704-376-1753
Ohio	Dayton, Instrumentation Sys	513-294-2838
Okla	Tulsa, Kemp Eng. Co.	918-299-2636
Ore	Portland, Hayes Tech.	503-238-0001
Pa	Pittsburgh, Instrumentation Sys.	412-243-1111
Tex	Addison, Kemp Engrg.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431
Va	Springfield, Microsystems Inc	703-569-2523
Wash	Seattle, Hayes Technical	206-763-2210
Wisc	Elm Grove, Industrial Mktg Assoc.	414-786-0135
Wisc	Milwaukee, Star Engring. Sls. Co.	414-645-3680

Ⓣ**ASTROTOWER** - stacking modular towers - Astro Research Corp.

Ⓣ**ASTRO/348** - connector - Amphenol North America Div.

Ⓣ**ASYMPTOTIC CALORIMETER** - Heat Flux sensor - Hy-Cal Engineering

ATAKA AMERICA TRADING CO., Dept. EM, 633 3rd Ave., New York, N.Y. 10017

ATEC, INC., Dept. EM, Box 19426, Houston, Tex. 77024, Tel: 713-468-7971; Empl.: 58

Sales Manager: F. Sawberger

Local Sales Offices & Reps.

Ohio	Dayton, Instr. Sys.	513-294-2838
Tex	Dallas, SESCO	214-231-9364
Tex	Houston, Mott Assocs.	713-777-5773

ATKOMATIC VALVE CO., INC., Dept. EM, Box 11258, 141 South Sherman Dr., Indianapolis, Ind. 46201, Tel: 317-357-8421, Telex: 027-345; FSC No.: 70642; Empl.: 45

Sales Manager: A.E. Richardson

Local Sales Offices & Reps.

Ala	Birmingham, Control Specialists	205-871-9679
Ala	Spanish Fort, Control Specialists	205-433-1453
Ariz	Phoenix, Bews & Wallace Co.	602-267-1171
Ariz	Tucson, Bews & Wallace Co.	602-327-6061
Ark	Little Rock, Murrel Haase & Co.	501-376-7227
Cal	Albany, Denco Controls	415-527-8000
Cal	Paramount, Brenner-Fiedler & Assoc.	213-531-7222
Colo	Denver, Hank Thurstin Co.	303-758-2232
Conn	Hamden, Pond Tech. Sls.	203-281-0005
Fla	Orlando, Control Center	305-896-6831
Ga	Atlanta, Rittelmeyer & Co.	404-688-8331
Ill	Chicago, Miller Engrg. Specialties	312-965-6161
Iowa	Cedar Rapids, Skarda Equip. Co.	319-393-3003
Kans	Overland Park, Parker & Foster	913-381-9330
Ky	Louisville, Richard Equip. Co.	502-895-8060
La	Baton Rouge, Del Rio	504-927-9167
Mass	Somerville, Peeco	617-666-4444
Mich	Madison Heights, L.W. Jeffries Co.	313-585-4182
Minn	St. Paul, A-tu-Zee	612-646-6383
Mo	St. Louis, Tepco Ind. Sls.	314-741-1800
Neb	Omaha, Skarda Equip. Co.	402-422-0430
NJ	Rochelle Park, Gale Equip. Co.	201-843-1144
NY	Kenmore, J.H. Manier	716-876-2282
NY	Syracuse, J.R. Manier	315-446-9533
NC	Charlotte, Mec-Tric Control Co.	704-376-8551
Ohio	Cincinnati, Richard Equip. Co.	513-271-8666
Ohio	Cleveland, Commercial Elec. Prods. Corp.	216-241-2886
Ohio	Toledo, Fred H Hall Co.	419-531-4878
Ohio	Worthington, Roc Assocs.	614-885-1057
Okla	Tulsa, Southwestern Controls	918-663-6777

Pa	Broomall, John C. Whiddett Co.	215-353-6343
Pa	Pittsburgh, Controlamatic Co.	412-563-4611
Tenn	Memphis, Murrel Hasse & Co.	901-743-4304
Tex	Dallas, Southwestern Controls	214-742-6266
Tex	Houston, Southwestern Controls	713-666-2801
Va	Richmond, Virginia Carolina Controls Co.	804-288-1623
Wash	Seattle, Greaves Co	206-284-0660
Wisc	New Berlin, D.E. Riley Corp.	414-786-1230

ATLANTIC LAMINATES, Dept. EM, 174 N. Main St., Franklin, N.H. 03235, Tel: 603-934-5736, TWX: 510-298-1170; FSC No.: 53240

Local Sales Offices & Reps.

Cal	San Fernando, MacDonald & Assoc.	213-365-3616
Cal	Santa Clara, Butler Chemical	408-244-4177
Colo	Boulder, R-G Enterprises	303-447-9211
Conn	Southport, JCL Assocs.	203-255-2456
Fla	Ft. Lauderdale, Etchomatic	305-563-5060
Ill	Itasca, Rasco Assocs.	312-773-2130
Minn	Minneapolis, Hamlet & Smith	612-545-3666
Mo	Baldwin, McQuillan Assocs.	314-391-0078
NJ	Rocky Hills, Krone & Rubin Assocs.	609-924-0200
NC	Greensboro, L & D Inc.	919-292-3201
Ohio	Cleveland, Insulation & Components	216-331-4434
Tex	Addison, Metal Clad Corp.	214-661-3900
Wisc	Milwaukee, Hamlet & Smith	414-272-2787

ATLANTIC OPTICAL MOULDING CO., Dept. EM, Ellis St., Dudley, Mass. 01570, Tel: 617-943-1746; Empl.: 6

ATLANTIC RESEARCH CORP., Dept. EM, 5390 Cherokee Ave., Alexandria, Va 22314, Tel: 703-354-3400, TWX: 710-832-9828; FSC No.: 95335; Empl.: 870

ATLAS ELECTRIC DEVICES, Dept. EM, 4114 N. Ravenswood Ave., Chicago, Ill. 60613, Tel: 312-327-4520, Telex: 25-4328; Empl.: 95

Sales Manager: R.R. Metzinger

ATLAS ENERGY SYSTEMS, Dept. EM, 9459 Rush St., S. El Monte, Cal. 91733, Tel: 213-575-0755

Sales Manager: R. Bowyer

Local Sales Offices & Reps.

Cal	Santa Ana	714-558-1290
Ill	Chicago	312-372-2237
Mass	Boston	617-492-2525

ATLAS ENGRG. CORP., Dept. EM, 26 Custer St., W. Hartford, Conn. 06110, Tel: 203-247-4100; FSC No.: 07001; Empl.: 10

ATLAS EYELETS, Dept. EM, Pinkham St., Fairhaven, Mass. 02719, Tel: 617-997-9491

Local Sales Offices & Reps.

Ill	Chicago, E.C. Rowell & Co.	312-238-3401

ATLAS FIBRE CO., Dept. EM, 6970 N. Central Park Ave., Chicago, Ill. 60645, Tel: 312-465-1234; Empl.: 11

Sales Manager: R. Welch

ATLAS SOUND DIV., American Trading & Production Corp., Dept. EM, 10 Pomeroy Rd., Parsippany, N.J. 07054, Tel: 201-887-7800; Empl.: 350; Minimum order: $J. A. Palmieri

Sales Manager: H. M. Jaffe; *Distributor Manager:* J. A. Palmieri

ATLEE CORP., Dept. EM, 8 Gill St., Woburn, Mass. 01801, Tel: 617-933-3510; FSC No.: 99378; Empl.: 40

Local Sales Offices & Reps.

Cal	Burlingame, J. Logan & Assocs.	415-697-6100
Cal	Los Angeles, El-Com Inc.	213-223-1351
Fla	Melbourne, Repcom, Inc.	305-254-1877
Ill	Chicago, Ellinger Sls.	312-763-1570
Mass	Woburn, Atlee Corp.	617-933-3510
Mich	Walled Lake, T. Mulligan & Assocs.	313-624-0174
Minn	Minneapolis, J. Melius Assocs.	612-854-4270
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Rochester, R.A. Murray Co.	716-467-4538
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242

™ATMOSCOPE - soldering & desoldering tool - Edsyn, Inc.

ATMOSPHERE CONTROLS PRDTS., Dept. EM, 295 Polaris, Mt. View, Cal. 94043, Tel: 415-969-2690; Empl.: 16

Local Sales Offices & Reps.

NY	Lewiston, Watmet, Inc.	716-285-3595

™ATOM - aluminum electrolytic capacitors - Sprague Elec. Co.

ATOMERGIC CHEMETALS CO., Dept. EM, 100 Fairchild Ave., Plainview, N.Y. 11803, Tel: 516-822-8800, Telex: 14-4612; Empl.: 30

Sales Manager: H. Gary

Local Sales Offices & Reps.

Cal	Los Angeles, Ron Geller	213-836-2777

ATOMICHRON, INC., Sub. Frequency Elctrns., Inc., Dept. EM, 3 Delaware Dr., New Hyde Park, N.Y. 11040, Tel: 516-328-0100, TWX: 510-223-0418; Empl.: 185

Refer to Frequency Elctrns. for sales office information

™ATOMICLAD II - composite electrical contact rivets - GTE Sylvania Inc.

ATR ELECTRONICS, INC., Dept. EM, 300 E. 4th St., St. Paul, Minn. 55101, Tel: 612-222-3791 ...... p. 3362

Distributor Manager: A.A. Goffstein

™ATS*960 - Automated Test System - Texas Instrs. Inc.

™ATTACHÉ - lamp cord dimmer - Lutron Electronics Co.

™ATTACHE PHONE - phone in a briefcase - Livermore Data Systems, Inc.

™ATTENUATOR-RATED FERRAMICS - ferrites - Indiana General

AUBIN, A.E. CO., Dept. EM, 134 Pine St. P.O. Box 1137, Manchester, Conn. 06040, Tel: 203-643-0321

AUBURN MFG., Dept. EM, Pease Ave. & Stack St., Middletown, Conn. 06457, Tel: 203-346-6631

™AUDIMAX - limiter - CBS Laboratories

AUDIO-TECHNICA U.S., INC., Dept. EM, 33 Shiawassee Ave., Fairlawn, Ohio 44313, Tel: 216-836-0246

Local Sales Offices & Reps.

Ariz	Phoenix, Pacific Audio Sls.	602-959-5710
Cal	Los Angeles	Pacific Audio Sls.
Cal	San Leandro, Paul Seaman Co.	415-352-7860
Colo	Arvada, C B Elctrn. Mktg.	303-422-0561
Fla	Coral Springs, Tech Sls. Corp.	305-753-2520
Ga	Lawrenceville, Audiorep Assoc.	404-963-6575
Ill	Skokie, SER, Inc.	312-673-2250
Ind	Indianapolis, P. Stone Sls. Co.	317-257-9777
Md	Baltimore, D. Brothers Co.	301-764-7189
Mass	Wellesley Hills, B. Gedzelman Sls.	617-235-8775
Mich	Buchanan, Riley & Petchell Sls.	616-695-6356
Mich	Detroit, Riley & Petchell Sls.	313-937-3000
Minn	Minneapolis, SER, Inc.	612-920-9262
Mo	Raytown, Pacer Corp.	816-358-6638
NJ	Ridgefield, Bi-State Mkts.	201-943-5888
NY	Kenmore, Al Toupkin Sls.	716-873-8839
Ohio	Columbus, C.L. Pugh Co.	614-486-9678
Ohio	Newtown Square, G. Conneen Sls.	215-353-2241
Tex	Houston, L.J. Paul Assocs.	713-772-9562
Va	Richmond, D. Brothers Co.	804-359-4620
Wash	Seattle, W.K. Wood Co.	206-623-9950

AUDIO-VIDIO ENGRG. CO., Dept. EM, 65 Nancy Blvd., Merrick, N.Y. 11566, Tel: 516-546-4239

Local Sales Offices & Reps.

Cal	Anaheim, BCD, Inc.	714-528-9505

AUDIO DEVICES, INC., See Capitol Magnetic Prods., Div. Capitol Records

™AUDIO BATON - audio filter - Blonder-Tongue Labs., Inc.

™AUDIODISCS BY CAPITOL - blank discs - Capitol Magnetic Prods.

AUDIO EQUIP., Div. W. Kidde & Co., Inc., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901, Tel: 804-977-8050, TWX: 510-587-5461; Empl.: 50

™AUDIOFILM BY CAPITOL - magnetic film - Capitol Magnetic Prods.

™AUDIO HAILER - S-168M - Audio Equip.

™AUDIOPAK BY CAPITOL - cassettes & cartridges - Capitol Magnetic Prods.

AUDIOSEARS CORP., Dept. EM, South St., Stamford, N.Y. 12167, Tel: 607-652-7305; FSC No.: 97101; Empl.: 100

Local Sales Offices & Reps.

Cal	Huntington Beach, H. Brunning	714-968-7724
NJ	Medford, Mech. Elec. Sls.	609-654-8209
NY	Geneva, J. Sumers Assocs.	315-789-2238

™AUDIOTAPE BY CAPITOL - soundtape - Capitol Magnetic Prods.

™AUDIOTEX - home entertainment accessories - GC Electronics

AUDIOTRONICS, Dept. EM, 7428 Bellaire Ave., N. Hollywood, Cal. 91605, Tel: 213-765-2645, Telex: 69-1241; Empl.: 277

™AUDIOVOICE - portable pa sys - PASO Sound Products Inc.

AUDIOVOX CORP., Dept. EM, 150 Marcus Blvd., Hauppage, NY 11787

AUGAT INTERCONNECTION PRODS. DIV., Dept. E, Dept. EM, 33 Perry Ave., Box 779, Attleboro, Mass 02703, Tel: 617-222-2202, TWX: 710-391-0644; FSC No.: 91506; Empl.: 450 .... p. 1796-1799

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean, Inc.	205-533-3509
Ariz	Phoenix, Howe & Howe Sls., Inc.	602-264-7971
Cal	Los Angeles, P. F. Wiley Co.	213-663-8028
Cal	San Carlos, D. H. Ross Co.	415-591-4411
Cal	San Diego, Wiley Co.	714-270-5720
Colo	Littleton, Simpson Assocs., Inc.	303-794-8381
Conn	New Canaan, Stan Pierce, Inc.	203-966-4630
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233
Fla	Largo, Semtronic Assocs.	813-586-1404
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Ill	Rolling Meadows, Sumer	312-394-4900
Kans	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
Md	Silver Spring, NKA Inc., (Gov't)	301-585-6141
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	Edina, M. Foster Co.	612-835-2252
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
Mo	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NJ	Cherry Hill, NKA Inc., (Gov't)	609-662-2958
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
NM	Albuquerque, Waugaman Assoc.	505-294-1436
NY	Mt. Vernon, D. Sonkin Assocs.	914-668-9809
NY	N. Syracuse, L.D. Allen, Inc.	315-458-7470
NC	Charlotte, Cartwright & Bean, Inc.	704-333-6457
NC	Raleigh, Cartwright & Bean, Inc.	919-781-6560
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ohio	Englewood, A. Nace Co.	513-836-0931
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Pa	Philadelphia, Trinkle Sls.	215-922-2080
Pa	Pittsburgh, A. Nace Co.	412-922-7225
Tenn	Knoxville, Cartwright & Bean	515-693-7450
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	Dallas, Datatex Corp.	214-235-7166
Tex	Houston, Datatex Corp.	713-495-3100
Utah	Salt Lake City, Simpson Assocs., Inc.	801-486-3731
Wash	Seattle, C. K. Shanks & Assoc.	206-632-4290
Wisc	Milwaukee, Sumer Inc.	414-259-9060

Local Distributors

Ala	Birmingham, ACK Radio Supply Co.	205-322-0588
Ala	Huntsville, Hamilton/Avnet Elctrns.	205-533-1170
Ariz	Phoenix, Kierulff Elctrns, Inc.	602-243-1401
Ariz	Phoenix, Cramer/Ariz.	602-267-7321
Ariz	Phoenix, Sterling Elctrns.	602-258-4531
Ariz	Phoenix, Liberty Electrns/Ariz.	602-257-1272

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Ariz Phoenix, Hamilton/Avnet Elctrn. 602-275-7851
Cal Costa Mesa, Avnet Elctrns. 714-754-6111
Cal Culver City, Hamilton Electro Sls. 213-558-2121
Cal El Segundo, Liberty Elctrns/El Segundo 213-322-8100
Cal Los Angeles, Kierulff Elctrns 213-685-5511
Cal Mountain View, Elmar Elctrns 415-961-3611
Cal Mountain View, Hamilton/Avnet Elctrn. 415-961-7000
Cal San Carlos, Sterling Elctrns........ 415-592-2353
Cal San Diego, Liberty Elctrns/San Diego 714-565-9171
Cal San Diego, Hamilton/Avnet Elctrns. 714-279-2421
Cal San Diego, Kierulff Elctrns 714-278-2112
Cal Sunnyvale, Cramer/San Francisco 408-739-3011
Cal Sun Valley, Richey Elctrns, Inc... 213-875-2862
Colo Commerce City, Elmar Elctrns, Inc. 303-287-9611
Colo Denver, Cramer/Denver............. 303-758-2100
Colo Denver, Kierulff Elctrns, Inc......... 303-371-6500
Conn Georgetown, Hamilton/Avnet Elctrns 203-762-0361
Conn Hamden, Arrow Elctrns............... 203-284-3801
Conn North Haven, Cramer/Conn. 203-239-5641
Fla Hollywood, Cramer/Hollywood .. 305-923-8181
Fla Orlando, Cramer/Orlando 305-894-1511
Ga Atlanta, Cramer/Atlanta 404-448-9050
Ga Atlanta, Ack Radio Supply Co. .. 404-351-6340
Ga Norcross, Hamilton/Avnet Elctrns. 404-448-0800
Ill Chicago, Semiconductor Specialists, Inc. 312-279-1000
Ill Elk Grove, Kierulff Elctrns, Inc. .. 312-640-0200
Ill Mt. Prospect, Cramer/Chicago .. 312-593-8230
Ill Schiller Park, Hamilton/Avnet Elctrns. 312-678-6310
Ind Fort Wayne, Fort Wayne Elctrn. Supply 219-423-3422
Ind Indianapolis, Graham Elctrns Supply, Inc. 317-634-8202
Ind Indianapolis, Ra-Dis Company, Inc. 317-637-5571
Iowa Cedar Rapids, Deeco, Inc. 319-365-7551
Kans Lenexa, Hamilton/Avnet Elctrns. 913-888-8900
Kans Wichita, Radio Supply Co. 316-267-5214
Md Baltimore, Hamilton/Avnet Elctrns. 301-796-5000
Md Baltimore, Arrow Elctrns............. 301-247-5200
Md Bethesda, Empire Elctrn Supply 301-656-3300
Md Gaithersburg, Pioneer/Wash....... 301-948-0710
Md Gaithersburg, Cramer/Wash....... 301-948-0110
Md Hanover, Cramer/Baltimore......... 301-796-5790
Md Hyattsville, Milgray/Wash. 301-864-1111
Mass Billerica, Kierulff Elctrns 617-667-8331
Mass Newton, Cramer Elctrns 617-964-4000
Mass Watertown, Sterling Elctrns 617-926-9720
Mass Woburn, Hamilton/Avnet Elctrns 617-933-8020
Mich Ann Arbor, Wedemeyer Elctrns Supply Co. 313-665-8611
Mich Livonia, Pioneer/Mich.................. 313-525-1800
Minn Bloomington, Arrow Elctrns......... 612-888-5522
Minn Edina, Hamilton/Avnet Elctrns. .. 612-941-3801
Minn Edina, Cramer/Minnesota 612-835-7811
Minn St. Paul, Gopher Elctrns............. 612-645-0241
Mo Hazelwood, Hamilton/Avnet Elctrns. 314-731-1144
Mo Kansas City, Walters Radio Supply, Inc. 816-531-7015
Mo St. Charles, Lectronix, Inc........... 314-723-1122
NJ Cedar Grove, Hamilton/Avnet Elctrns. 201-239-0800
NJ Cherry Hill, Cramer/Pa. 609-424-5993
NJ Moonachie, Cramer/NJ 201-935-5600
NJ Moorestown, Arrow Elctrns......... 609-235-1900
NJ Mt. Laurel, Hamilton/Avnet Elctrns 609-234-2133
NJ Rutherford, Kierulff Elctrns. 201-935-2120
NJ Saddlebrook, Arrow Elctrns. 201-797-5800
NM Albuquerque, Hamilton/Avnet Elctrns 505-765-1500
NM Albuquerque, Cramer/NM 505-265-5767
NY Bohemia, Car-Lac Elctrn Ind'l Sls516-567-4200
NY Buffalo, Summit Distrs. 716-884-3450
NY East Syracuse, Cramer/Syracuse 315-437-6671
NY East Syracuse, Hamilton/Avnet Elctrns. 315-437-2642
NY Farmingdale, Arrow Elctrns 516-694-6800
NY Freeport, Milgray Elctrns 516-546-6000
NY Hauppauge, Cramer/L.I................. 516-231-5600
NY Rochester, Hamilton/Avnet Elctrns 716-442-7820
NY Rochester, Cramer/Rochester .. 716-275-0300
NY Rochester, Summit Distrs. 716-334-8110
NC Greensboro, Pioneer/Carolina.... 919-273-4441
NC Winston-Salem, Kirkman Elctrns, Inc. 919-722-9131
NC Winston-Salem, Cramer/Winston-Salem 919-725-8711
Ohio Cleveland, Cramer/Cleveland 216-248-8400
Ohio Cleveland, Milgray/Cleveland 216-881-8800
Ohio Cleveland, Pioneer/Cleveland 216-587-3600
Ohio Cleveland, Pattison Supply Co... 216-441-3000
Ohio Columbus, Thompson Elctrns Supplies, Inc. 614-228-6191
Ohio Dayton, Pioneer/Dayton 513-236-9900
Pa Horsham, Pioneer/Delaware Valley 215-674-5710
Pa Monroeville, Cramer/Pittsburgh.. 412-252-7410
Pa Pittsburgh, Pioneer/Pittsburgh 412-782-2300
Tex Dallas, Cramer/Tex. 214-661-9300
Tex Dallas, Hamilton/Avnet Elctrns .. 214-661-8661
Tex Dallas, Sterling Elctrns 214-357-9131
Tex Houston, Sterling Elctrns 713-627-9800
Utah Salt Lake City, Cramer/Utah...... 801-487-4131
Utah Salt Lake City, Hamilton/Avnet Elctrns. 801-262-8451
Utah Salt Lake City, Standard Supply Co. 801-486-3371
Wash Seattle, Kierulff Elctrns, Inc......... 206-763-1550
Cal Reseda, Electronic Hardware ... 213-881-1832
Cal Santa Clara, Electronic Hardware 408-988-1000
Colo Denver, Hamilton/Avnet Elctrn... 303-534-1212
Fla Fort Lauderdale, Hamilton/Avnet Elctrn. 305-971-2900
Fla Fort Lauderdale, Arrow Elctrn. .. 305-776-7790
Ind Indianapolis, Pioneer/Indiana 317-849-7300
La Metairie, Sterling Elctrn. 504-887-7610
Mass Woburn, Arrow Elctrn.................. 617-933-8000
Mich Livonia, Hamilton/Avnet Elctrn. .. 313-522-4700
NY Binghamton, A.S.I. Elctrn............. 607-723-6326
NY Westbury, Hamilton/Avnet Elctrn.516-333-5800
Ohio Cleveland, Hamilton/Avnet Elctrn. 216-461-1400
Ohio Dayton, Hamilton/Avnet Elctrn... 513-433-0610
Tex Austin, Sterling Elctrn.................. 512-836-1341
Tex Houston, Hamilton/Avnet Elctrn. 713-780-1771
Wash Bellevue, Hamilton/Avnet Elctrn. 206-746-8750
Wash Seattle, Cramer/Seattle 206-762-5755
Wash Seattle, Liberty Elctrns./Northwest 206-763-8200
Wisc New Berlin, Arrow Elctrn. 414-782-2801
For: Argentina, Belgrano, Rayo Electronica S.C.A. 38-1779
For: Australia, N. Brighton, Victoria, Namco Elctrns. 96-2891
For: Austria, Wein, Bacher Elektronische Geraete, Ges. 837152
For: Belgium, Brussels, Nijkerk N.V.......02/7360096
For: Brazil, Rio de Janeiro, RJ, Sociedade Consignataria Hobeco Ltda............... 223-4720
For: Brazil, Sao Paulo, SP, Eletronica Vetenova Ltda.:........ 480-01207
For: Can., Don Mills, Ont., Saynor Elctrns. Ltd. 416-445-2347
For: Can., Edmonton, Alberta, Cardinal Ind'l Elctrns, Ltd.......... 403-455-4122
For: Can., Mississauga (Toronto), Ont., Hamilton-Avnet Int'l (Can.) Ltd. .. 416-677-7432
For: Can., Montreal, Que., Hamilton-Avnet Int'l (Canada) Ltd. 514-735-6393
For: Can., Ottawa, Ont., Hamilton-Avnet Int'l (Can.) Ltd.......... 613-725-3071
For: Can., Ottawa, Ont., Wackid Radio & TV Laboratories 613-728-1821
For: Can., Quebec, Que., Crobel Ltd. 418-524-5201
For: Can., Vancouver, B.C., R-A-E Ind'l Elctrns Ltd. 604-687-2621
For: Can., Winnipeg, Man., Cam Gard Supply Ltd. 204-786-8481
For: Denmark, Copenhagen, Mer-el A/S 01/207444
For: England, Bolton, Lancs., Hird Brown Elctrns. Ltd..........0204/27311
For: England, Hammersmith, London, Rastra Elctrns., Ltd. 01/748-3143
For: England, Hampshire,, S.D.S. Comps. Ltd. 705-65311
For: England, Rugby, Warwichkshire, Augat, Ltd. (0788)75483
For: England, Yiewsley W. Drayton, Middlesex, Semiconductor Specialists, Ltd............ 46415-7
For: Finland, Helsinki, Oy-Sufra AB 490931
For: Germany, Munchen, Neumuller & Co., GmbH 089/59911
For: Holland, Amsterdam-Buitenveldert, Nijkerk Electronika B.V. 020/428933
For: Ireland, Dublin, Neltronics, Ltd. 01/501-845
For: Israel, Ramat-Gan, Elina, Ltd. 03/734129
For: Italy, Milan, Eledra 3S SPA 02/34-93-041
For: Italy, Rome, Eledra 3S SPA..........06/81-27-290
For: Italy, Trieste, Eltrade s.a.r.l. 38087
For: Japan, Otemachi/Chiyoda-Ku, Tokyo, Kyokuto Boeki Kaisha, Ltd. .... (03)244-3511
For: Mexico, Mexico 20, D.F., Nucleoelectronica, S.A. 593-6110
For: New Zealand, Palmerston, E.C.S. (Div./ Airspares New Zealand, Ltd.) N2 3766
For: Norway, Manglerud/6 Oslo, Norsk Marconi AS 02/67-04-80
For: S. Africa, Boksburg E., Allied Electric (Pty.) Ltd.......... 82-4341/2/3/4/5
For: Singapore, General Engrs. Corp. Pte. Ltd. 71042
For: Spain, Madrid, Hispano Electronica S.A. 2-33-31-00/08/09
For: Sweden, Gothenburg, AB Kuno Kallman031/ 803020
For: Sweden, Stockholm, AB Kuno Kallman08/ 671711
For: Switzerland, Zurich, Dewald AG Zurich01/ 45-1300
For: Taipei, Taiwan, Treasure Island Trading Co., Ltd.......... 559-823

AUL INSTRS., INC., Dept. EM, 139-30 34th Rd., Flushng, N.Y. 11354, Tel: 212-886-0600; Empl.: 55

AURIC CORP., Dept. EM, 470 Frelinghuysen Ave., Newark, N.J. 07114, Tel: 201-242-4100; Empl.: 10

AURICH F W & CO, Dept. EM, 4000 22nd Av. W., Seattle, Wash. 98199, Tel: 206-284-5561, TWX: 910-444-1333; Empl.: 25

Sales Manager: C. Ernst

Local Sales Offices & Reps.

Cal Oakland.......................... 415-836-2405

™AURION-X - ion-exchange gold reclamation unit - Sel-Rex Div. Oxy Metal Industries Corp.

™AUROBOND - gold strike - Sel-Rex Div. Oxy Metal Industries Corp.

AUSTIN ELCTRNS., Dept. EM, 450 W. First Ave., Roselle, N.J. 07023, Tel: 201-241-3300, TWX: 710-996-5981; Empl.: 100

Local Sales Offices & Reps.

Vt Burlington, Polhemus Navigation Sciences 802-863-5595

AUSTRON, INC., Dept. EM, 1915 Kramer La., Austin, Tex. 78758, Tel: 512-836-3523, TWX: 910-874-1356; Empl.: 75 .... p. 2407

Sales Manager: R. Ellis

Local Sales Offices & Reps.

Cal Calabasas, M. Shovlowsky 213-348-3402
Md Rockville, T.E. Corp. 301-340-0303
Ohio Columbus, Measurement Instrs. 614-274-1144

™AUTAC - selective gold plating - Viking Inds., Inc.

AUTO TROL CORP., Dept. EM, 5650 N. Pecos St., Denver, Colo. 80221, Tel: 303-458-5900, TWX: 910-931-0563; Empl.: 150

Sales Manager: L.C. Coenen, Jr.

Local Sales Offices & Reps.

Md Rockville 301-424-4650
Tex Dallas 214-661-8027

™AUTO-AMP - servo controls - Hills-McCanna Co.

™AUTO-ANSWER - automatic telephone answer - Bramco, Div. Ledex Inc.

™AUTOBALANCE - automatic true rms AC/DC transfer standard - Ballantine Laboratories, Inc.

™AUTO-BOOST - automatic low-line voltage booster - Microtran Co., Inc.

™AUTO-BRIDGE - automatic limit bridge - Beckman Instrs.

AUTOCON INDS., INC., Sub. Control Data, Dept. EM, 2300 Berkshire La. N., Minneapolis, Minn. 55441, Tel: 612-553-4100; Empl.: 400

Local Sales Offices & Reps.

Ark Little Rock, McCallister Equip. Co. 501-375-4474
Cal Man. Beach, James O. Gierlich Co. 213-772-4434
Cal San Mateo, Ambrosini & Chalmers 415-349-8222

Colo	Denver, Colorado Environmental Equip. Co.	303-758-4338
Fla	Orlando, V. K. Assocs.	305-898-8811
Ga	Atlanta, R. Healey & Asso.	404-351-1861
Ill	W. Chicago, Enviromod Control Sys.	312-231-9180
Ind	Carmel, Wetterlin Eng. Sls.	317-844-3371
Iowa	Ames, Automatic Sys. Co.	515-232-4770
Kans	Shawnee Mission, R.E. Pedrotti Co.	913-384-2282
La	Metairie, Parson & Sanderson Co.	504-834-1330
Md	Baltimore, Durling Elec. Co.	301-467-5560
Mass	Sharon, Adcour	617-784-8123
Mich	Detroit, H. V. Burton Co.	313-261-4220
Minn	St. Paul, Prest Co	612-690-1537
Miss	Jackson, Hartco Services	601-982-1716
Mo	St. Louis, Repp the Rep.	314-843-0730
NJ	Upper Montclair, J.S. Gardner Co.	201-744-8121
NM	Albuquerque, Applied Products	505-898-6603
NY	Derby, R. H. Perry Co.	716-947-4311
NC	Charlotte, Interstate Utility Sls.	704-377-2636
Ohio	Cincinnati, H. P. Thompson	513-891-4414
Ohio	Cleveland, J. P. Bergren Co.	216-932-9445
Okla	Okla. City, Pumpco	405-737-7841
Ore	Portland, Fry Controls, Inc.	503-226-2620
Pa	King of Prussia, Reinbrecht Assocs.	215-265-6180
Pa	Pittsburgh, Electrical Engineered Products	412-892-2129
Tenn	Knoxville, Dickey Engrg Co.	615-524-8641
Tex	Dallas, J. F. Rasco Co.	214-747-0108
Tex	Houston, Hydrodyne, Inc.	713-468-0565
Wash	Seattle, Clair Stebbins Co.	206-246-1170
Wisc	Milwaukee, Allan Engrg Co.	414-353-5070

™AUTO-CONNECT - automatic radio/telephone interconnect - Bramco, Div. Ledex Inc.

™AUTODATA - data acquisition systems - Vidar Autodata Inc.

™AUTO-DRAFT - interactive graphics system - Auto Trol Corp.

™AUTO-FLOW - mark II drafting machine - Keuffel & Esser Co.

™AUTO-GAIN - automatic gain amplifier - Ithaco, Inc.

™AUTOHET - microwave frequency, pulse counter - EIP, Incorporated

™AUTOJUMPER - automatic jumper insertion equipment - Autosplice/Dv Gen Staple

™AUTOLOC - lock-in amplifier - Keithley Instruments Inc.

™AUTOLUG - printed circuit board terminal equipment - Autosplice/Dv Gen Staple

™AUTOMAC - press overload control - Cardinal Control Co.

™AUTOMAGNETIC - (magnetic processing system) - RFL Inds.

™AUTO-MAP - software package - Auto Trol Corp.

AUTOMATIC COIL CORP., Sub. Designatronics Inc., Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010, Tel: 305-883-5311, TWX: 810-848-8097; Empl.: 125

Local Sales Offices & Reps.

Cal	San Mateo, Melvin Sls. Co.	415-349-7444

AUTOMATIC DIE CUTTING MCH, Dept. EM, 149 Church, New York, N.Y. 10007, Tel: 212-962-7658; Empl.: 31

AUTOMATED MEAS. DIV., see E.H. Research Labs., Inc.

™AUTOMATA - card reading equipment - Chatsworth Data Corp.

AUTOMATIC CONNECTOR INC., Dept. EM, 400 Moreland Rd., Commack, N.Y. 11725, Tel: 516-543-5000, TWX: 510-226-3744; FSC No.: 94375; Empl.: 360 .... p. 1793-1795

Local Sales Offices & Reps.

Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Cal	San Diego, Interstate Mktg. Assocs.	213-883-7606
Cal	Woodland Hills, Interstate Mktg. Assocs.	714-278-0870
Colo	Boulder, Component Products Sls. Co. Inc.	303-494-5100
Fla	St. Petersburg, Kirkwood & Assocs.	813-894-8240
Ill	Chicago, S.A.R.G.E., Inc.	312-237-2828
Ill	Elk Grove Village, Carlson Elctrns. sls.	312-956-8240
Kans	Overland Park, Penzner-Mankus Assocs.	913-381-0004
Kans	Wichita, Penzner-Mankus Assocs.	316-264-2662
Mass	Needham, Mcguire Assoc.	617-444-5128
Mich	Southfield, Representative Elctrn. Products Inc.	313-559-1080
Minn	Golden Valley, Beta Engrg. Corp.	612-546-2215
Mo	Maryland Hgts., Penzner-Mankus Assoc.	314-569-1220
NJ	Mountainside, Spectra Intl.	201-722-8081
NJ	Union, J. Onore	201-355-0474
NY	Buffalo, Bowser & Sapecky	716-839-4170
NY	Manlius, Bowser & Sapecky	315-682-8885
NY	Port Washington, P. D. Aaron Assocs.	516-883-3800
Ohio	Aurora, Nationwide Component Reps	216-562-9666
Ohio	Kettering, Government Bidders Svc.	513-296-5991
Pa	Marberth, Electro-Comp. Sls. Co. Inc.	215-664-3576
Tex	Houston, Aid Elctrns	713-777-3882
Tex	Irving, Aid Elctrns.	214-259-4761
Wash	Bellevue, Ray Over Sls.	206-454-4551
Wash	Vancouver, Ray Over Sls.	206-695-6179

Local Distributors

Cal	Gardena, Bell Ind's.	213-321-5802
Fla	Oakland, KSM Elctrns.	305-739-5880
Ga	Atlanta, Electro Air Corp.	404-351-3545
Ill	Chicago, Phoenix Co. of Chicago	312-237-2828
Kans	Wichita, Wichita Aircraft	316-263-5208
Md	Baltimore, Radio Electric Svc. Co.	301-823-0070
Mass	Burlington, B & W Assocs.	617-272-4420
NY	Buffalo, Summit Dist.	716-884-3450
NY	Port Washington, Connector Concepts Corp.	516-883-3800
Pa	Philadelphia, Powell Elctrns.	215-365-1900
For:	Can., Mississauga, Ont., Specialty Elctrns. Toronto	416-678-2105
For:	Can., Montreal Que., Specialty Elctrns., Ltd.	514-336-4500

AUTOMATIC PRODUCTION SYSTEMS INC., Dept. EM, 351 Albany Rd., Moorestown, N.J. 08057, Tel: 609-235-6227, Telex: 831-373; Empl.: 25

Local Sales Offices & Reps.

Cal	N. Hollywood, Crown Elct.	213-877-3550
Ohio	Cleveland, WRR Assocs.	216-526-2023
Tex	Dallas, Data Marketing Assoc.	214-358-4643

AUTOMATIC TEST SYSTEMS, Dept. EM, 23 Poplar St., Malden, Mass. 02148, Tel: 617-322-1122

AUTOMATIC TIMING & CONTROLS CO., Dept. EM, King of Prussia, Pa. 19406, Tel: 215-265-0200; Empl.: 300

Sales Manager: V.C. McMahon

Local Sales Offices & Reps.

Ariz	Phoenix, Portis & Assocs.	602-947-4379
Cal	Glendale, Hundley Co	213-240-3600
Cal	San Francisco, Automated Process Controls Co.	415-467-6162
Colo	Denver, D.E. Bond Assoc.	303-756-1234
Fla	Lakeland, A.A. Elec. Div.	813-682-6181
Ga	Norcross, A.A.Electric Div. of AEC	404-449-8670
Ill	Glen Ellyn, Rockford Controls Co.	312-469-6016
Ind	Indianapolis, Rockford Controls Co.	317-297-2956
Ky	Louisville, Air-Hydro Power Co.	502-451-1000
La	New Orleans, Mid South Sls. Co.	504-822-3030
Md	Baltimore, Jobe & Co.	301-235-3502
Mass	Sturbridge, Branford Corpntrol Co	617-347-7367
Mich	Brighton, H. H. Barnum Co.	313-229-2961
Mich	Lowell, H. H. Barnum Co.	616-451-0980
Minn	Minneapolis, Automated Controls, Inc.	612-377-7727
Mo	Kansas City, Duncan Sales & Engrg., Inc.	816-523-2908
Mo	University City, E. Mooney Co.	314-725-8875
NJ	Newark, Norman Bragar Co.	201-344-1100
NY	Buffalo, Niagara Electric Sls. Co.	716-886-4000
NY	Rochester, Niagara Electric Sls. Co.	716-271-1223
NY	Syracuse, Niagara Elec. Sls. Co.	315-422-9177
NY	Yonkers, Ross Co.	212-TA4-5424
NC	Charlotte, Brown & Morrison	704-333-0774
Ohio	Cincinnati, Anderson-Bolds, Inc.	513-272-3351
Ohio	Cleveland, Anderson-Bolds, Inc.	216-229-4700
Ohio	Worthington, Anderson-Bolds, Inc.	614-885-3933
Okla	Tulsa, Driscoll Automatic Control Co.	918-747-6625
Ore	Eugene, J. A. Tudor & Assoc.	503-344-9212
Ore	Portland, J. A. Tudor & Assoc., Inc.	503-288-5154
Pa	King of Prussia, Applied Controls, Inc.	215-265-3832
Pa	Pittsburgh, Gilson Engrg. Sls. Inc.	412-931-6114
Tenn	Memphis, Engineered Instrs.	901-743-3402
Tex	Houston, Gettys-Eads-Adair	713-781-3005
Utah	Salt Lake City, Control Equip. Co. of Salt Lake	801-487-7741
Va	Richmond, Jobe & Co.	804-282-6508
Wash	Seattle, J. A. Tudor & Assoc.	206-MU 2-7444
Wash	Spokane, J. A. Tudor & Assoc.	509-FA 7-3328
Wisc	Cedarburg, Automation Engrg. Co.	414-377-7500

AUTOMATION DEVICES, INC., Dept. EM, Box A.D., Automation Pk., Fairview, Pa. 16415, Tel: 814-474-5561; Empl.: 60

Local Sales Offices & Reps.

Ariz	Mesa, L.C. Brandt	602-832-0710
Cal	Santa Fe Springs, J. Ellsworth	213-693-3745
Colo	Denver, B.J. Moore	303-222-4858
Conn	Fairfield, W. Whitehead	203-255-4543
Fla	Clearwater, Tangen Drives Inc.	813-446-9178
Fla	Clearwater, Walle & Co.	813-446-9178
Ill	Downers Grove, J. Reisch & Assocs.	312-968-0730
Kans	Overland Park, R. O'Neill	912-649-0742
Mass	Waltham, L. Horne	617-890-0904
Mich	Detroit, J. Bishop	313-538-0595
Mich	Marshall, C. Kallsen	616-781-4291
Minn	Minneapolis, K. Wennik	612-835-4373
Mo	St. Louis, E. Benninger	314-869-7200
NJ	Chatham, G. Crawford	201-635-6868
NY	Yonkers, E. Ross	212-824-5424
NC	Charlotte, J. Dixon	704-366-9661
Ohio	Chagrin Falls, Applied Techniques	216-247-4956
Ohio	Cleveland, J. Schiefferle	814-838-6163
Ohio	Perrysburg, K. Lytle	419-475-4305
Ore	Portland, J.M. O'Brien	503-246-5888
Pa	Erie, W. Baker	814-459-5135
Tenn	Knoxville, Bertelkamp Fluid Power	615-588-7691
Tex	Dallas, S. Lomax	214-361-1134
Wisc	Milwaukee, J. O'Meara	414-271-4841
Exp:	Can., Niagara Falls, Ont., F. Leaver	416-354-2881

AUTOMATION DISPLAYS INC., Dept. EM, 3833 N. White Ave., Eau Claire, Wisc. 54701, Tel: 715-834-9595; Empl.: 13

Local Sales Offices & Reps.

Ariz	Phoenix, Spectrum Co.	602-997-6324
Cal	San Francisco, Technical Sls. Dev.	415-788-7788
Cal	Santa Ana, Spectrum Assocs. Inc.	714-835-4114
Ga	Atlanta, Secom Sys.	404-434-8101
Ill	Chicago, Bex Data Ltd.	312-221-1411
Mass	Lowell, S&S Elctrns.	617-459-2578
Mich	Walled Lake, Berberich Assocs. Inc.	313-624-2211
Minn	Minneapolis, Bex Data Ltd.	612-835-5220
Mo	St. Louis, Bex Data Ltd.	314-872-3357
NJ	Cherry Hill, L.H. Walke Co.	609-424-3766
NJ	Delran, T. McLaughlin Co.	609-461-5243
NM	Albuquerque, Western Consultants	
Tex	Dallas, T-Square Assocs.	214-369-3173
Wash	Bellevue, Hudson Co.	206-455-0773

AUTOMATION DYNAMICS, Div. ABC Digital, Inc., Dept. EM, 25 Charles St., Westwood, N.J. 07675, Tel: 201-666-2458; FSC No.: 53089; Empl.: 15

AUTOMATION INDS., Sperry Div, Dept. EM, Shelter Rock Rd., Danbury, Conn. 06810, Tel: 203-748-3581, TWX: 710-456-0392; Empl.: 350

Local Sales Offices & Reps.

Alas	Anchorage, NDT Sys. of Alaska	907-337-2232
Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Chatsworth, Automation Industries, Inc., Sperry Div.	213-882-2600

Cal	Downey, Automation Industries, Inc., Sperry Div.	213-773-6133
Cal	San Jose, Bartec Co.	408-244-4520
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Conn	Danbury, Automation Inds.	203-748-3581
Ga	Tucker, Jarrett Co.	404-939-8762
Ill	Downers Grove, Borko Co.	312-852-0020
Ill	Park Ridge, Ellis Assocs.	312-298-7626
Ill	Rosemont, Automation Industries, Inc., Sperry Div.	312-671-1672
Mich	Detroit, Electro Sls Assocs.	313-526-8800
Mich	Warren, Automation Industries, Inc., Sperry Div.	313-756-5940
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	Clifton Park, Empire Technology	518-371-2480
Ohio	Cleveland, Electro Sls Assocs.	216-261-5440
Ohio	Dayton, Automation Industries, Inc., Sperry Div.	513-274-0892
Ore	Portland, Rayesco, Inc.	503-233-5761
Pa	Phoenixville, Automation Industries, Inc., Sperry Div.	215-933-8961
Pa	Pittsburgh, Automation Industries, Inc., Sperry Div.	412-371-3335
Pa	Pittsburgh, R. M. Brown Co.	412-344-5611
Pa	Spring City, Pennsylvania Instru. Co.	215-948-8220
Tex	Dallas, Automation Industries, Inc., Sperry Div.	214-351-5381
Tex	Houston, Automation Industries, Inc., Sperry Div.	713-774-9650
Tex	Houston, R.A. Mayes Co.	713-461-5385
Utah	Centerville, R.A. Myaes Co.	801-292-6781
Va	Falls Church, Automation Industries, Inc., Sperry Div.	703-536-8600
Wash	Lynwood, Rayesco, Inc.	206-776-1104
Wash	Richland, Rayesco, Inc.	509-945-2055

AUTOMATION PRDTS., Dept. EM, 3030 Max Roy, Houston, Tex. 77008, Tel: 713-869-0361

(TM)AUTOMEMORY - swept measurement system - Pacific Meas., Inc.

(TM)AUTOMET - automatic weather reporting - E-Systems Inc.

(TM)AUTOMETRONIC - automatic resolution universal counter - Ballantine Laboratories, Inc.

(TM)AUTO MOD - complete telemetry systems - Autocon Inds., Inc.

(TM)AUTO-PC - software package - Auto Trol Corp.

(TM)AUTOPIN - continuous wire pinning machines - Autosplice/Dv Gen Staple

(TM)AUTO-PLEXOR® - lamp demultiplexor - Automation Displays Inc.

(TM)AUTOPOLAR - microwave polarization switch - Teledyne Micronetics

(TM)AUTOPREP - gas chromatograph - Varian Assocs.

(TM)AUTO-PROBE - portable digital multimeter - Keithley Instruments Inc.

(TM)AUTORAD - x-ray exposure control - Torr Labs.

(TM)AUTO-RANGER - charge amplifiers - Unholtz-Dickie Corp.

(TM)AUTOROTOR-HAM II - rotor for amateur operators - Cornell-Dubilier Electronics

AUTO-SWAGE PRODUCTS INC., Dept. EM, 726 River Rd., Shelton, Conn. 06484, Tel: 203-929-1401, Telex: 963-542; Empl.: 170

Sales Manager: R. Mikulsky

Local Sales Offices & Reps.

Ariz	Scottsdale, E.E. Black	602-947-2007
Cal	Campbell, Bates Assocs.	408-734-0070
Cal	Glendale, Haldeman & Frazier	213-247-3330
Colo	Denver, Regional Sls. Co.	303-433-7397
Conn	Newtown, Yankee Engrg.	203-426-5679
Fla	Boca Raton, F/G Assocs	305-395-3907
Ill	Barrington, Perhats Assocs	312-381-6360
Ind	Greensburg, H.K. Feaster	812-663-5689
Minn	Minneapolis, W.R. Maleckar Co.	612-926-7601
Miss	Jackson, Lawrence & Co.	601-982-9513
Mo	Independence, Gribble Sales Engrg.	816-796-4333
NY	Rochester, Gislason Sls.	716-454-4741
Ohio	Chagrin Falls, Bray Assocs.	216-247-4474
Pa	Broomal, AM Tech. Sls. Co.	215-356-0574
Tex	Richardson, C.D. Price Co.	214-231-4321
Exp:	New York, N.Y., Lang & Zysk	212-227-1743

(TM)AUTOSAL - lab salinometer - Guildline Instrs., Inc.

(TM)AUTOSCAN - automatic test equipment - Addison Div. Muirhead, Inc.

(TM)AUTO-SERT - pin insertion machine - Auto-Swage Products Inc.

(TM)AUTO-SNAP® - flexible panel switching - Automation Displays Inc.

AUTOSPLICE/DV GEN STAPLE, Dept. EM, 220 E. 23rd St., New York City, N.Y. 10010, Tel: 212-674-4369, Telex: 420902; Empl.: 40

Sales Manager: O. Nedelkovich

Local Sales Offices & Reps.

Cal	No. Hollywood, Autosplice West	213-769-5844

(TM)AUTOSTAT - static neutralizing bars - Static Inc.

(TM)AUTO-STEP - incremental paper transport system - Varian Graphics

(TM)AUTOSYN - instruments & systems of remote indications - Bendix Corp.

(TM)AUTOSYSTEM-7 - camera test system - National Camera Inc.

(TM)AUTOTAB - high production circuit board hardware - Autosplice/Dv Gen Staple

(TM)AUTOTAK - Automatic tachometer indicator - Howell Inst. Inc.

(TM)AUTOTAPE - positioning system - Cubic Corp.

(TM)AUTOTEMP - automatic temperature indicator - Howell Inst. Inc.

(TM)AUTO-TEN - automatic attenuator - Robins Broadcast & Sound Equipment Corp.

(TM)AUTOTRAK - automatic test equipment - Addison Div. Muirhead, Inc.

AUTOTRON, INC., Dept. EM, 3269 N. Vermilion St., Box 595, Danville, Ill. 61832, Tel: 217-446-0650; Empl.: 30

Local Sales Offices & Reps.

Ariz	Mesa, L.C. Brandt Co.	602-832-0710
Ark	Ft. Smith, Electro-Related Prods.	501-783-7323
Cal	Los Angeles, Electro Comps.	213-264-7100
Cal	San Francisco, J.M. Krotozyner	415-777-4636
Fla	Ft. Lauderdale, R.D. Jacobs	305-524-1932
Ill	Addison, Lectron Controls Co.	312-543-8460
Kans	Shawnee Mission, Automation Specialties	913-362-4422
Mass	Needham, White Sls. Co.	617-444-3676
Mich	Detroit, Basic Service Corp.	313-837-8820
Minn	Minneapolis, Bican Co.	612-827-4734
Mo	St. Louis, Kathrinus, Kelly & Co.	314-968-3800
NY	Elmont, Crane & Egert Corp.	516-488-2100
NY	Rochester, Sweetco Assoc.	716-225-2383
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
Ohio	Cincinnati, J.W. Murray & Assoc.	513-662-1616
Ohio	Cleveland, C.A. Robinson Co.	216-381-9049
Pa	Paoli, Tyler Griffin Co.	215-644-7710
Tex	R. Martin Assoc., RMA/Southland	713-444-2944
Utah	Salt Lake City, Control Agency	801-466-8601
Wash	Seattle, C.B. Parsons & Co.	206-762-7373
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

AUTOTRONICS, INC., Dept. EM, 2700 Davis Blvd., Joplin, Mo 64801

(TM)AUTRONEX - acid type gold electroplating process for ind'l applications. - Sel-Rex Div. Oxy Metal Industries Corp.

AUTRONICS CORP., Dept. EM, 180 N. Vinedo Ave., Pasadena, Cal 91107, Tel: 213-681-3545, TWX: 910-588-1977; FSC No.: 03972; Empl.: 50; Minimum order: $D. Manning, Power Supplies .... p. 2385

Distributor Manager: D. Manning, Power Supplies

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Goleta, Thorson Co.	805-964-8751
Cal	Los Angeles, Thorson Co.	213-476-1241
Cal	Mountain View, Thorson Co.	415-964-9300
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Colo	Denver, Thorson Co.	303-759-0809
Md	Baltimore, R. P. Luce & Co.	301-752-8200
NJ	Berkeley Hgts., R.P. Luce & Co.	201-464-6440
NM	Albuquerque, Thorson Co.	505-265-5655
NY	New Hyde Pk., R. P. Luce & Co	516-437-4550
Pa	Phila., R. P. Luce & Co.	215-884-8365
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellevue, Thorson Co.	206-455-9180

AVA ELCTRNS., Dept. EM, 242 Pembroke Ave., Landsdowne, Pa 19050, Tel: 215-284-2500; Empl.: 80

Local Sales Offices & Reps.

Cal	Van Nuys, Roth Sls	213-989-3738
Fla	Ft. Lauderdale, Sprock Sls	305-587-3792
Ill	Chicago, M. Gottlieb Assoc.	312-775-1151
Md	Kensington, Forti-Austin Assoc.	301-949-4149
Mass	Wellsley Hill, Rudolph & MacInness	617-769-5450
NJ	Fort Lee, TMC Sls. Corp.	201-944-8340
NJ	Willingboro, Forti-Austin Co.	609-871-3720
NY	Syracuse, W. Tauber Co.	315-446-7094
NC	Charlotte, Maitland-Smith	704-587-3792
Ohio	Beechwood, Electronic-Salesmasters	216-831-9555
Pa	Pittsburgh, R. Tanner Co.	412-561-4687
Wash	Seattle, W. Lanphear Dist.	206-633-4900

AVANTEK, INC., Dept. EM, 3175 Bowers Ave., Santa Clara, Cal. 95051, Tel: 408-249-0700, Telex: 346-337; Empl.: 380

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Los Altos, Cain-White & Co.	415-948-6533
Cal	Los Angeles, Cain Technology	213-476-2251
Colo	Denver, Thorson Co.	303-759-0809
DC	Washington, Applied Engrg. Conslts.	301-953-2808
Fla	Ft. Lauderdale, Beacon	305-776-6074
Fla	Maitland, Beacon	305-647-3498
Ga	Atlanta, Beacon	404-351-3654
Ill	Arlington Heights, Dytec/Central	312-394-3380
Kans	Overland Park, Dytec/South	913-432-5596
Md	Ellicott City, Applied Engrg. Conslts.	301-465-1272
Mass	Burlington, R.J. Sickles	617-272-7285
Mich	Detroit, Comtel Instr.	313-255-1970
Mo	St. Louis, Dytec/South	312-423-1234
NJ	Fort Lee, Tech. Mktg. Assocs.	201-224-6911
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Skaneateles, Robtron	315-685-5731
NC	Charlotte, Beacon	704-525-7412
Ohio	Cleveland, Comtel Instr.	216-442-8080
Ohio	Dayton, Comtel Instr.	513-298-7573
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Pa	Pittsburgh, Comtel Instr.	412-922-5720
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellvue, Thorson Co.	206-455-9180

(TM)AVANTI - fluorescent decorator emergency lights - Teledyne Big Beam

AVIATECH INTL. INC., Dept. EM, 75 Carlough Rd, Bohemia, N.Y. 11716, Tel: 516-567-4900, Telex: 967892; FSC No.: 54520; Empl.: 10

AVIATION ELEC., LTD., Sub. Bendix Corp., Dept. EM, Box 2140, St. Laurent, Que, Can. H4L 4X8, Tel: 514-744-2811, Telex: 05-826688; Empl.: 946

AVIBANK MFG. INC., Dept. EM, 210 S. Victory Blvd., Burbank, Calif. 91503, Tel: 213-843-4330, TWX: 910-498-2215; Empl.: 200

Local Sales Offices & Reps.

NY	Smithtown, Avibank Mfg. Inc.	516-979-8045

AVID ELECTRONICS CORP., Dept. EM, Box 426, Baldwin, Pl., N.Y. 10505, Tel: 914-628-6952; FSC No.: 08842; Empl.: 10

Sales Manager: D. McVey

(TM)AVIKRIMP - nylon insulated terminal - ITT Cannon/ETC Terminal Products

AVIONIC INSTRS. INC., Dept. EM, 943 E. Hazelwood Ave., Rahway, N.J. 07065, Tel: 201-382-7100, Telex: 844413; Empl.: 32; Minimum order: $G. Wood

Sales Manager: R. Risley; *Distributor Manager:* G. Wood

Local Sales Offices & Reps.

Exp:	New Jersey, Rahway, REA Int'l. Ltd.	201-382-7100

Local Distributors

Cal	Burbank, Edmo, Inc.	213-843-2129
Cal	San Carlos, Moavco	415-591-7301
Tenn	Memphis, Mid-America Avionic Dist.	901-396-4400
Tex	Dallas, Mid-America Avionic Dist.	214-243-0541

AVIONICS LTD., Dept. EM, Box 200, Niagara-On-Lake, Ont., Can., Tel: 416-468-3632; Empl.: 25

AVTEL DIV, UNITRON CORP., Dept. EM, 2826 W. Kingsley Rd, Box 1331, Garland, Tex. 75040, Tel: 214-271-4531, Telex: 73-0644; Empl.: 75

AVTRON MFG., INC., Dept. EM, 10409 Meech Ave., Cleveland, Ohio 44105, Tel: 216-641-8310, TWX: 810-421-8435; FSC No.: 01014; Empl.: 175

Local Sales Offices & Reps.

Wash	Bellevue, J. Findlay Co.	206-454-5200

AVX CERAMICS, Dept. EM, Box 867, Myrtle Beach, S.C. 29577, Tel: 803-448-3191, TWX: 576496 810-661-2252; FSC No.: 9K916; Empl.: 2387; Minimum order: $R. Goodman .... p. 1171-1179

Sales Manager: R. Baughrum; *Distributor Manager:* R. Goodman

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns	205-881-5031
Ariz	Tempe, Interstate Mktg. Assoc.	602-968-7201
Cal	Sunnyvale, Quadrep Inc.	408-733-7300
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Colo	Denver, Elcom	303-770-4400
Fla	Boca Raton, Conley and Assoc.	305-395-6108
Fla	Oviedo, Conley & Assocs., Inc.	305-365-3283
Fla	Tampa, Conley & Assoc.	813-933-3183
Ga	Atlanta, Beacon Elctrns	404-351-3654
Ill	Chicago, T.B. Hunter Assocs.	312-777-2500
Ind	Indianapolis, F.J. Campisano Co.	317-247-8623
Iowa	Cedar Rapids, Comstrand	319-377-1571
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Lexington, J.E. Boeing Co.	617-862-2500
Mich	Grand Rapids, J.L. Montgomery	616-774-9308
Mich	Southfield, J.L. Montgomery	313-358-2616
Minn	Minneapolis, Comstrand Inc.	612-571-0000
Mo	Grandview, Beneke & McCaul, Inc.	816-765-2998
Mo	St. Louis, Beneke & McCaul	314-569-2660
NJ	Haddonfield, Thomas Assoc.	609-854-3011
NM	Albuquerque, A.Q. Electronics	505-883-1003
NY	Ithaca, B. Dean, Inc.	607-272-2187
NY	Melville, Comtronic Assocs.	516-249-0505
NC	Winston-Salem, Burgin-Kreh	919-768-4174
Ohio	Cincinnati, F.J. Campisano Co.	513-662-1616
Ohio	Dayton, Schmidt & Assoc.	513-293-6652
Ohio	Northfield, F.J. Campisano Co.	216-468-1515
Okla	Oklahoma City, Ammon & Rizos	405-373-2748
Ore	Portland, Western Tech. Sls.	503-297-1711
Tenn	Oak Ridge, Beacon Elctrns	615-482-2409
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Tex	Houston, Ammon & Rizos Co.	713-781-6240
Utah	Salt Lake City, Elcom, Inc.	801-532-7940
Va	Lynchburg, Burgin-Kreh Assoc.	804-845-5600
Wash	Bellevue, Western Tech Sls.	206-641-3900

Local Distributors

Ala	Huntsville, Cramer Elctrns.	205-539-5722
Ariz	Phoenix, Cramer Elctrns.	602-267-7321
Ariz	Phoenix, Liberty Electrns.	602-257-1272
Cal	El Segundo, Liberty Elctrns	213-322-8100
Cal	El Segundo, Texas Instrs. Supply	213-973-2571
Cal	Irvine, Cramer	714-979-3000
Cal	Los Angeles, Texas Instruments Supply	213-776-4490
Cal	Mountain View, Elmar Elctrns	415-961-3611
Cal	San Diego, Cramer	714-565-1881
Cal	San Diego, Liberty Electrns	714-565-9171
Cal	Sunnyvale, Texas Instrs. Supply	
Cal	Sunnyvale, Cramer Elctrns.	408-739-3011
Cal	Woodland Hills, Jaco Elctrns.	213-887-6400
Colo	Commerce City, Elmar Elctrns	303-287-9611
Colo	Denver, Texas Insts. Supply	303-751-1780
Colo	Denver, Cramer Elctrns.	303-758-2100
Conn	N. Haven, Cramer Elctrns.	203-239-5641
Fla	Hollywood, Cramer Elec.	305-923-8181
Fla	Orlando, Cramer	305-894-1511
Ga	Atlanta, Cramer Elctrns.	404-448-9050
Ill	Arlington Heights, Texas Instrs. Supply	312-593-7660
Ill	Mt. Prospect, Cramer Elec.	312-593-8230
Md	Gaithersburg, Cramer Elec.	301-948-0110
Md	Hanover, Cramer Elec.	301-796-5790
Mass	Newton, Cramer Elec.	617-969-7700
Mass	Waltham, Texas Instrs. Supply	617-890-0510
Mich	Livonia, Cramer	313-425-7000
Minn	Edina, Cramer	612-835-7811
NJ	Cherry Hill, Cramer Elctrns.	609-424-5993
NJ	Clark, Texas Instrument Supply	201-382-6400
NJ	Moonachie, Cramer Elec.	201-935-5600
NM	Albuquerque, Cramer Elec.	505-265-5767
NY	Hauppauge, Cramer	516-231-5600
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Rochester, Cramer Elec.	716-275-0300
NY	Syracuse, Cramer	315-437-6671
NC	Winston-Salem, Cramer	919-725-8711
Ohio	Cincinnati, Cramer	513-771-6441
Ohio	Cleveland, Cramer	216-248-8400
Okla	Tulsa, Texas Instrs. Supply	918-437-4555
Pa	Cherryhill, Cramer	609-424-5993
Tex	Dallas, Texas Instrument Supply	214-238-6844
Tex	Dallas, Cramer	214-661-9300
Tex	Houston, Texas Instrument Supply	713-785-4800
Utah	Salt Lake City, Cramer	801-487-4131
Wash	Seattle, Cramer	206-762-5755
Wash	Seattle, Liberty	206-763-8200
Wisc	Oak Creek, Cramer	414-764-1700
For:	Can., Montreal, Que., Future Elctrns	514-735-5775
For:	Can., Toronto, Ont., Future Elctrns.	416-677-7820

(TM)AWAC - alumoweld-aluminum power conductors - Copperweld Bimetallics

AXEL ELCTRNS., Unit of General Signal, Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418, Tel: 212-291-3900, TWX: 710-582-2618; FSC No.: 13058; Empl.: 180 .... p. 1170,2722

Sales Manager: J. Alaimo

Local Sales Offices & Reps.

Cal	Fremont, Spence Assocs.	415-656-9506
Cal	Los Angeles, High Voltage Sls.	213-641-0135
Colo	Denver, Component Sls.	303-750-2254
Fla	Miami, Reptronics	303-251-5478
Ind	Auburn, D. Flanagan	219-925-1757
Iowa	Hiawatha, Gassner & Clark Co.	319-393-5763
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Medway, J. Gallagher	617-533-7292
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Cleveland, E.E. Bock & Assocs.	216-331-5212
Ohio	Dayton, L.D. Bruno Co.	513-434-1847
Pa	Fort Washington, G.C.M.	215-646-7535
Pa	Pittsburgh, Automated Equip. & Engrg.	412-931-7616
Wash	Bellevue, S.P. Inc.	206-454-0060

(TM)AXIAL FLOW - valves, regulators and control devices - Singer Co.

(TM)AXIMAX - fan - Rotron, Inc.

(TM)AXIOHM - axial lead enamel resistors - Ward Leonard Elec. Co. Inc.

AYDIN CONTROLS, Dept. EM, 414 Commerce Dr., Ft. Washington, Pa. 19046, Tel: 215-542-7800, TWX: 510-661-0518; Empl.: 150

Local Sales Offices & Reps.

Cal	Palo Alto, F. Tranfa	415-493-3939
Cal	Westlake Village, C. T. Morton	213-889-1513
Fla	Fort Walton Beach, G. W. Cleveland	904-242-3414

AYDIN ENERGY SYSTEMS, Dept. EM, 3180 Hanover St., Palo Alto, Cal. 94303, Tel: 415-493-3900, TWX: 910-373-1238; Empl.: 300

AYDIN MONITOR SYSTEMS, Dept. EM, 401 Commerce Dr., Ft. Washington, Pa 19034, Tel: 215-646-8100, TWX: 510-661-1520; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, Miller Assocs.	205-534-2652
Ariz	Tempe, Trembly Associates	602-966-4428
Cal	Sunnyvale, Tech Mktg. Assocs.	408-736-3687
Cal	Westlake Village, Aydin Corp.	213-889-1513
Colo	Littleton, Pond Assocs.	303-798-2904
Fla	Orlando, W. A. Brown Instrs.	305-425-5505
Ga	Atlanta, W. A. Brown Instr.	404-939-1674
La	Mandeville, W. A. Brown Instrs.	504-626-9701
Md	Greenbelt, Riffe Assocs.	301-474-8600
NJ	Haddonfield, Williams Assocs.	609-428-6060
NM	Albuquerque, Trembly Assocs.	505-266-8616
NM	Albuquerque, Trembly Assocs.	6-6=377=9727
NY	Melville, Astrorep, Inc.	516-423-2266
NC	Durham, W. A. Brown Instrs.	919-682-2383
SC	Columbia, W. A. Brown Instrs.	803-798-3297
Tenn	Oak Ridge, W. A. Brown Instrs.	615-482-5761
Tex	Arlington, Houston Assocs.	817-265-2931
Wash	Seattle, Drake Assocs.	206-763-2755

(TM)B - potentiometers - Bourns, Inc.

B & B MOTOR & CONTROL, Dept. EM, 96 Spring St., New York, N.Y. 10012, Tel: 212-966-5777, Telex: 14-1484; Empl.: 40

Local Sales Offices & Reps.

Conn	Wallingford	203-869-8494
Ind	Indianapolis	317-248-0396
NJ	Edison	201-420-1466
NY	Rochester	716-473-6640
Tex	Houston, B & B Motor & Control Corp.	713-664-6961

B & F ENTERPRISES, Dept. EM, 119 Foster St., Peabody, Mass. 01960, Tel: 617-531-5774; Empl.: 36; Minimum order: $P. E. Bonifale

Sales Manager: B. Rockett; *Distributor Manager:* P. E. Bonifale

Local Sales Offices & Reps.

NY	Rochester, Allied Action Ltd.	716-342-4700

B & F INSTRS., INC., Dept. EM, Box 238, Corwells Hgts, Pa. 19020, Tel: 215-639-7100, TWX: 510-667-1516; Empl.: 100

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs., Inc.	205-837-4304
Ariz	Phoenix, Cleveland Ent.	602-996-6130
Cal	Anaheim, FLW	714-956-8220
Cal	Culver City, FLW	213-559-7200
Cal	North Hollywood, F.L. Wolfe Inc.	213-877-5518
Cal	San Diego, F.L. Wolfe, Inc.	714-277-0993
Cal	Walnut Creek, D. Dahl Assocs.	415-933-9595
Colo	Arvada, Cleveland Entprs., Inc.	303-423-3707
Fla	Orlando, RJC Assocs.	305-894-7371
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs.	317-244-7867
Iowa	Cedar Rapids, Palatine Engrg. Sls.	319-365-8071
Kans	Andover, Palatine Engrg. Sls.	316-683-7512
Kans	Overland Park, Palatine Engrg. Sls.	913-262-5643
Mass	Natick, Andruss-Peskin Corp.	617-653-3919
Mich	Royal Oaks, Measurement Instrs.	313-352-2144
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	St. Louis, Palatine Engrg. Sls.	314-426-7055
NJ	Stirling, NBS Assocs.	201-464-8500
NM	Albuquerque, Cleveland Entprs., Inc.	505-345-2481
NC	Winston-Salem, Radco Co.	919-722-9671
Ohio	Cincinnati, Measurement Instrs.	513-531-2729
Ohio	Columbus, Measurement Instrs.	614-488-9753
Okla	Tulsa, Palatine Sls.	918-622-0321
Ore	Portland, Applied Arts and Science	503-233-4683
Pa	Jenkintown, PDC Corp.	215-887-9610
Tex	Austin, Palatine Sls.	512-451-7463
Tex	Houston, Palatine Engrg. Sls.	713-783-1492
Tex	Richardson, Palatine Engrg. Sls.	214-231-9489

B & I ELECTRONICS, Dept. EM, P.O. Box 8813 Donaldson Ctr., Greenville, S.C. 29604, Tel: 803-277-5985

(TM)B-A-C-T - burglar alarm circuit tester - LocAtor Electronics Co.

(TM)BAILATCH - fixed module handle - Hartwell Corp.

(TM)BAKELITE - plastics products; vinyl, pe, etc. - Union Carbide, Chemicals & Plastics

(TM)BALCO - resistance alloy - GTE Sylvania Inc.

(TM)BAL-CON - stacking connector - Eby Company

(TM)BALDWIN - optical shaft encoders - BEI Elctrns., Inc.

(TM)BALDWIN - instruments - BLH Elctrns.

(TM)BALLISTIC FLOW CALIBRATOR - transducer flow calibrator - Flow Technology, Inc.

(TM)BALLISTRAK - transducer flow calibrator - Flow Technology, Inc.

(TM)BALL-LOK - quick release pins - Avibank Mfg. Inc.

(TM)BALL-PAK - bearings for disc harrows - Allis-Chalmers

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™BANC-LOK - inserts - Cherry Fasteners

™BANDGLAS - poyester coated glass cloth semi-cured - Natvar Corp.

™BANDIT - numerical control - Summit Engineering Corp.

™BAND-O-CODE - band marking of insulated wire - Storm Products Co.

™BANDOMATIC - installation tooling - Burndy Corporation

™BAND-SCAN - control system - Sequential Information Systems

™BANTAM - miniature round connectors - Burndy Corporation

™BANTAM - leak detector - Varian Assocs.

™BANTAM ROTA-CRIMP - crimping tools - Amp Inc.

™BAN THE BLOB - fluorescent ballasts - Jefferson Elec.

™BAREBONES RECORDERS - basic OEM configurations - Astro-Med

™BAR-LOK - cable tie - Dennison Mfg. Co.

™BARRATRON - transmitting tubes - Litton Inds.

™BARRIER/CAP - capacitor termination - American Technical Ceramics

™BASELINE - thermal relays - Warren G-V Communications

™BAUD VERTER - baud rate converter - Intern'l. Computer Prods., Inc.

™BAYDUR - polyurethane structural foam - Mobay Chem. Corporation

™BAZOOKA - solder gobbler/iron - Air-Vac Engrg. Co.

™BDT - non cyanide gold plating process - Sel-Rex Div. Oxy Metal Industries Corp.

™BEAM-O-MATIC - emergency lights - Teledyne Big Beam

™BEAR - coated abrasives - Norton Co., Public Relations Dept.

™BEAR-TEX - resilient abrasives - Norton Co., Public Relations Dept.

™BEAU - connector, barrier terminal strips - Vernitron Elec. Comps.

™BEAU-TECH TOOLS - soldering aids - Precision Elec. Co.

™BEAVER - tubalar electrolytic - Cornell-Dubilier Electronics

™BECON - printed circuit connectors - Teledyne Kinetics

™BEE LINE - communication connectors - Hughes Aircraft Co., Connecting Devices Div.

™BELDFOIL - alumimum/polyester shield material - Belden Corp.

™BELGARD - burglar alarm - Aqualarm Inc.

™BELLCO NAMEPLATES - plastic & metal identification plates - Bell Co., Inc.

™BELLE KLIPSCH - loudspeaker system - Klipsch & Assocs. Inc.

™BELLOWFORM - printed circuit connector contact - Continental Connector Corp.

™BELT-LINE - teflon transistor sockets - U.S. Terminals

™BEMAC II - ac generators - Electric Machinery Mfg. Co.

™BEMCOIL - surface heat exchange material - Bemco, Inc.

™BEMOL - Lubricants, molybdenum disulfide - Rogers Corp.

™BENAVAC MARK II - hetrodyne processor - Delta-Benco-Cascade LTD.

™BENCHMASTER - bench top test chamber - Tenney Engrg., Inc.

™BENCHMASTER - all-welded electronic bench - Advance Engrg. Systems

™BENDER - axial lead bending tool - Fancort Industries, Inc.

™BERG - pliers - Erikson Specialized Tool Co.

™BERGCON - packaging system - Berg Electronics

™BERGFLO - plating process - Berg Electronics

™BERGLANCE - male pin - Berg Electronics

™BERGLOK - modular interconnection system - Berg Electronics

™BERGOLD - graduated gold plating - Berg Electronics

™BERGPIN - wire wrapping pins - Berg Electronics

™BERGPOST - wire wrapping posts - Berg Electronics

™BERGSTIK - straight and right angle headers - Berg Electronics

™BERLON - beryllium oxide epoxy resin materials - National Beryllia Corp.

™BERLOX - pure oxide ceramics, composite systems, ceramic-to-metal assemblies - National Beryllia Corp.

™BERLOX-STRATE - pure beryllia substrates - National Beryllia Corp.

™BESPONDER - Tracking Radar Devices - Vega Precision Labs.

™BEST - Automotive Speakers, Stereo Kits, & Access. - Oxford Speaker Co.

™BET - RF power transistors - Motorola Semiconductor Prods.

™BEVELOID - conical involute gears - Invincible Gear Co.

™BICOR - tank level sys - Trans-Sonics, Inc.

™BICROAMP - current transformers - split core - Bicron Elctrns. Co.

™BI-FET - linear cirucits - National Semiconductor Corp.

™BI-FILM - resistance elements - Bourns, Inc.

™BIFLEX - type of speaker - Altec Div.

™BIG BEAM - emergency lights, hand lamps & lanterns - Teledyne Big Beam

™BIG-BERTHA - rotatable antenna support masts - Telrex Labs.

™BIG INCH - motors - Haydon Switch & Instr., Inc.

™BIG LOOK - panel meters - General Electric Co.

™BIG MOMMA - heavy duty CB coil - Antenna Specialists Co.

™BIG STICK - antenna - Shakespeare

™BIG STICK II - antenna - Shakespeare

™BIMET - clad metals - Handy & Harman

™BI-MOD - spst, dt & 3t switch modules - Crown Microwave, Inc.

™BIMODE - solid state diodes - Varian Assocs.

™BIMODE - diodes - Varian Electron Device Grp.

™BINAVERTER - Binary to Decimal Converter - Metric Systems Corp.

™BIODE - silver/silver chloride electrode (af/agcl) - Biocom, Inc.

™BIOLINK - telemetry systems - Biocom, Inc.

™BIO-SOLV - solubilizers - Beckman Instrs., (AISSD)

™BI-PAC - mechenical switch module - Controls Development Corp.

™BIPAX - flexible package - Tra-Con, Inc.

™BIRACO - tubing - Birnbach Co., Inc.

™BIRD-EYE - outdoor perimiter security sys. - Faratron Corp.

™BI-SCAN - dual density writing head - Varian Graphics

™BI-SCAN WRITING HEAD - double row electrostatic writing head - Varian Graphics

™BISCUIT - blower - Rotron, Inc.

™BISTABLE AMPLIFIER - ultrasensitive solid state relay - Cross Electronics Inc.

™BIT - miniature audio transformer - TRW/UTC Transformers

™BIT-P - minature pulse transformer - TRW/UTC Transformers

™BITRAN - educational computer - Fabri-Tek, Inc.

™B.I.T.S. - backplane integrated test system - Addison Div. Muirhead, Inc.

™BITSWITCH - PCB-mounted programming device - Stanford Applied Engineering

B+K PRECISION

B & K PRECISION ELECTRONIC TEST INSTRUMENTS GROUP, Dept. EM, 6460 W. Cortland, Chicago, Ill. 60635, Tel: 312-889-9087; Empl.: 250 .... p. 2794-2803

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Cal	Van Nuys, Mike Roth Sls. of Cal.	213-989-3738
Colo	Denver, K-C Mkts., Inc.	303-733-5561
Fla	Ft. Lauderdale, Sproch Sls., Inc.	305-587-3792
Fla	Sarasota, Sproch Sls., Inc.	813-924-7768
Ga	Marietta, Maitland K. Smith, Inc.	404-971-2831
Ill	Centralia, R. Dunn	618-533-1775
Ill	Mt. Prospect, Q & B, Inc.	312-392-1200
La	New Orleans, Texport Co.	504-486-6073
Mich	Detroit, Burcaw Co. & Assoc.	313-533-7700
Minn	Minneapolis, Kodo Assoc.	612-881-1255
Mo	Crestwood, Nevco, Inc.	314-843-7406
Mo	Kansas City, Nevco, Inc.	816-421-1751
NY	Ballston Lake, G. Dworkin	518-877-8586
NY	Grand Island, McTaggart Assoc.	716-773-9222
NY	North Bellmore, L.W. Keller Assoc.	516-785-2826
NC	Charlotte, Maitland K. Smith, Inc.	704-372-1026
Ohio	Conneaut, T. Clements, Reg. S. Mgr.	216-593-1646
Ohio	Novelty, D. Kocher, District S. Mgr.	216-338-3964
Okla	Tulsa, Texport Co.	918-939-1727
Pa	Jenkinton, J. Spangler	215-884-2787
RI	Glouster, A. Previte	401-949-0534
Tenn	Memphis, Texport Co.	901-683-0880
Tex	Houston, Texport Co.	713-464-2828

Wash	Seattle, Fleeheart & Sullivan	206-522-1533
Exp:	Plainview, N.Y., Empire Exporters	516-293-5582
Exp:	Toronto, Canada, Atlas Elctrns., Inc.	416-781-6174

B & K INSTRUMENTS, INC., Dept. EM, 5111 W. 164th St., Cleveland, Ohio 44142, Tel: 216-267-4800, TWX: 810-421-8266; FSC No.: 27591; Empl.: 65

Sales Manager: R.P. Farrell

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Anaheim, B & K Instrs., Inc.	714-778-2450
Cal	San Mateo, B & K Instrs., Inc.	415-574-8100
Colo	Arvada, Figaro-Klebba, Inc.	303-424-0108
Conn	Meriden, B & K Instrs.	203-238-4778
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-945-4222
Haw	Honolulu, J.C. Elctrns.	808-537-6787
Ill	Bensenville, B & K Instrs.	312-595-7470
Md	Rockville, Farrell Assocs.	301-424-9460
Mich	Detroit, B & K Instrs.	313-557-1930
Mo	St. Louis, B & K Instrs.	314-421-5437
NH	Nashua, B & K Instrs.	603-882-8844
NJ	W. Caldwell, B & K Instrs.	201-227-6100
NM	Albuquerque, Trembly Assoc.	505-266-8616
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NC	Raleigh, Lee Assocs., Inc.	919-787-5818
Ohio	Cincinnati, B & K Instrs.	513-874-5379
Tex	Houston, B & K Instrs.	713-334-4785
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Milwaukee, B & K Instrs.	414-453-6440
Wisc	Wilson, B & K Instrs.	612-439-1973

BABCOCK ELECTRONICS, Sub Esterline Corp., Dept. EM, Box 1499, Costa Mesa, Cal. 92626, Tel: 714-540-1234, TWX: 910-595-1517; Empl.: 500

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Cal	Redwood City, Warren & Hickey Sls. Co.	415-368-3849
Colo	Englewood, Checkmate Sls.	303-771-4920
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Clearwater, G.F. Bohman Assoc.	813-422-5606
Fla	Ft. Lauderdale, G.F. Bohman Assocs.	305-564-3081
Fla	Orlando, G.F. Bohman Assocs.	305-855-0274
Ill	Chicago, Carlson Elctrn. Sls.	312-774-4812
Ind	Greenwood, V. Schillinger & Assocs.	317-888-2260
Ind	South Bend, V. Schillinger & Assocs.	219-291-6258
Kans	Olathe, BC Elctrn. Sls.	913-782-6696
Md	Silver Springs, Rep-Tron	301-593-4844
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Minn	Minneapolis, J.J. Exon Co.	612-566-5340
Mo	Hazelwood, BC Elctrn Sls.	314-731-1255
NJ	Haddonfield, Gray Assocs.	609-429-5300
NJ	Teaneck, R.T. Reid Assocs.	201-692-0200
NM	Albuquerque, Data Handling Co.	505-268-4364
NY	North Syracuse, Advanced Comps. Corp.	315-699-2671
NY	Scottsville, Advanced Comps. Corp.	716-889-1429
NC	Winston Salem, Elctrn. Mktg. Assocs.	919-722-5151
Ohio	Cincinnati, Giesting Assocs.	513-931-0812
Ohio	Dayton, Giesting Assocs.	513-293-4044
Ore	Beaverton, Arneson Assocs.	503-643-5754
SC	Greenville, Elctrn. Mktg. Assocs.	803-268-1125
Tex	Richardson, Barry Sls. Co.	214-234-0255
Utah	Salt Lake City, Checkmate Sls.	
Wash	Seattle, Arneson Assocs.	206-762-7664
Wisc	Milwaukee, Carlson Elctrnc. Sls.	414-476-2790

BACHARACH INSTRUMENT CO., Dept. EM, 625 Alpha Dr., Pittsburgh, Pa. 15238, Tel: 412-782-3500, TWX: 710-664-2085; Empl.: 500

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Pa	Philadelphia	215-338-5173
Tex	Houston	713-683-8141

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Sales Manager: R.S. Cass

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Cal	Irvine	714-556-4170

BAFCO, INC., Dept. EM, 717 Mearns Rd., Warminster, Pa. 18974, Tel: 215-674-1700, TWX: 510-665-6860; Empl.: 21 .... p. 2804

Local Sales Offices & Reps.

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Conn	Newton, Daner-Hayes Inc.	203-426-9094
DC	Falls Church, Sci-Rep	703-573-8787
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Md	Baltimore, Sci-Rep	301-321-1411
Mass	Newton Centre, Daner-Hayes Inc.	617-969-4650
NJ	Cherry Hill, Sci-Rep	609-482-0059
NY	Port Washington, Daner-Hayes	516-883-4576
NY	Rochester, Daner-Hayes Inc.	716-467-5100
Ohio	Dayton, P. Glavinos	513-433-2347
Va	Falls Church, Sci-Rep	703-573-8787

BAILEY INSTRS., INC., Dept. EM, 515 Victor St., Saddle Brook, N.J. 07662, Tel: 201-845-7252; Empl.: 11

BAILEY METER CO., Sub. Babcock & Wilcox, Dept. EM, 29801 Euclid Ave., Wickliffe, Ohio 44092, Tel: 216-943-5500, TWX: 216-944-4160; Empl.: 2300

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Ariz	Gilbert, R. Pressnell	602-892-5387
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Fla	Ocala, T. Dawson	904-236-4149
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Ill	Villa Park, Motordor	312-833-2700
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Mass	Cambridge, Rush Assocs.	617-661-1200
Mich	Dearborn, W. Mullins & Assoc.	313-563-3340
Minn	St. Paul, S. Clasen	612-771-8384
Mo	Clayton, Gateway Scientific	314-725-3464
NJ	Newark, Thornton Assocs.	201-622-0905
NY	N. Tonawanda, Harvey Instrs.	716-694-9500
NC	Cary, R. Petty	919-467-9663
Okla	Okla. City, Oklahoma Air Filter Sls. & Svc.	405-521-9918
Pa	Prospectville, M. Hesselgesser	215-646-7660
Tenn	Memphis, Dickson Instr. Co.	901-452-2612
Tex	Houston, Contamination Control	713-943-1883
Wash	Lake Stevens, Northwest Scientific Instrs.	206-259-0123

BAKER, J.T. CHEMICAL CO., Dept. EM, Phillipsburg, N.J. 08865, Tel: 201-859-2151, TWX: 510-235-2924; Empl.: 750

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Ill	Glen Ellyn	312-469-4224
NJ	Phillipsburg	201-859-2151
Ohio	Columbus	614-885-9287
Va	Alexandria	703-823-2313

BAKNOR INDUSTRIES LTD., Dept. EM, 58 Oakwood Ave., N., Port Credit, Ont. L5g3L8, Tel: 416-274-1591, Telex: 06-961252; FSC No.: WJ0905; Empl.: 6

BALDPATE ELECTRONICS, INC., Dept. EM, 225 E. Main St., Georgetown, Mass. 01833, Tel: 617-352-8074; Empl.: 3

Local Sales Offices & Reps.

Cal	S. Pasadena, Beckrep Inc.	213-799-4634
Cal	Sunnyvale, Beckrep Inc.	408-243-4455
Fla	Lighthouse Point, R. C. Simon	305-941-2757
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NJ	Avenel	201-636-2040

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Sales Manager: R. Stagnol, Mktg. Serv. Mgr.

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Cal	San Diego, Moxon Elctrns.	714-292-4820
Cal	Santa Clara, Moxon Elctrns.	408-249-2491
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Conn	Handen, J & J Assocs.	203-624-7800
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Fla	Orlando, Gentry Assocs.	305-894-4401
Fla	St. Petersburg, Gentry Assocs.	813-867-7820
Ill	Arlington Heights, Dytec Central	312-394-3380
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Kans	Shawnee Mission, Eir Co.	913-362-0919
Mass	Burlington, J & J Assocs.	617-272-2606
Mich	Detroit, Electro Sls Assoc.	313-526-8800
Minn	St. Paul, Dytec/North	612-645-5816
Mo	Hazelwood, Eir Co.	314-895-4100
NJ	Saddle Brook, L & M Assocs.	201-843-8700
NY	North Syracuse, NACO Elctrns.	315-699-2651
NY	Utica, NACO Elctrns.	315-732-1801
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Cleveland, Electro Sls. Assoc.	216-261-5440
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
Okla	Norman, Data Mktg. Assoc. Inc.	405-364-8320
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Tex	San Antonio, Data Mktg. Assoc. Inc.	512-828-0937
Va	Alexandria, Dyna Rep Co.	703-354-1222
Exp:	Miami (Caribbean Islánds), West Inies Sls. Co. Ltd.	305-592-8188

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Md	Rockville, Metric Resources	301-881-6700
Mass	Dedham, Gerber Elctrncs.	617-329-2400
Mo	St. Louis, Industrial Svcs	314-535-5760
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NJ	Parlin, JMR Sls.	201-727-5335
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Pa	Philadelphia, Baynton Elctrns. Corp.	215-229-9800
Pa	Philadelphia, Herbach & Rademan, Inc.	215-426-1700
Pa	Philadlephia, Sunshine Scientific Instrs.	215-673-5600
Tenn	Bellvue, McLemore Assocs.	615-646-0062
Tex	Garland, Tucker Elctrns	214-348-8800
Tex	Houston, Lenert	713-225-1465
Va	Vienna, Electronic Equip.	703-938-3350

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Mo	Kansas City, E. M. Thompson Co.	816-471-8248
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NY	Syracuse, R.L. Stone Co.	315-468-2700

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WVa	So. Charleston, Appalachian Controls Co.	304-744-5324
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For:	Can., Montreal, Que., Can-Am Instrs. Ltd.	514-931-2588

BARBER-COLMAN CO., Industrial Instrs. Div., Dept. EM, 1750 Rock St., Rockford, Ill. 61101, Tel: 815-877-0241, TWX: 815-398-0341; Empl.: 4000

Sales Manager: L. F. Smith

Local Sales Offices & Reps.

Ala	Birmingham, Control Equip. Co.	205-879-8211
Ala	Huntsville, Control Equip. Co.	205-883-1330
Cal	Alhambra, Barber-Colman Co., Industrial Instrs. Div.	213-282-9166
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Cal	San Diego, R. Brainard Co.	714-274-1333
Colo	Denver, Technical Engrg. Sls.-Svc. (TESSCO)	303-744-1119
Fla	Miami, G. Brophy Assoc.	305-444-6253
Fla	Winter Park, Control Equip. Co.	305-647-4496
Ga	Atlanta, Barber-Colman Co., Industrial Instrs. Div.	404-633-2566
Ill	Lincolnwood, Barber-Colman Co., Industrial Instrs. Div.	312-673-0551
Ill	Loves Park, Barber-Colman Co., Industrial Instrs. Div.	815-633-9585
Ill	Moline, Barber-Colman Co. Ind. Instr. Div	309-797-0041
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Ind	Lanesville, Barber-Colman Co., Industrial Instrs. Div.	812-952-2653
Kans	Prairie Village, Parker & Foster, Inc.	913-381-9330
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Pa	Frazer, Barber-Colman Co., Industrial Instrs. Div.	215-647-4650
Pa	Pittsburgh, Barber-Colman Co., Industrial Instrs. Div.	412-885-2200
Tenn	Memphis, Combustion & Controls Co.	901-525-7402
Tex	El Paso, Delta Instr. Co.	915-533-4207
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WVa	Charleston, Chemac Co.	304-346-0884
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Wisc	Brookfield, Pyro-Matic Industrials, Inc.	414-781-2222

BARBER-COLMAN CO., MOTOR DIV., Dept. EM, Dept. F, 14116 Rock St., Rockford, Ill. 61101, Tel: 815-877-0241, TWX: 815-962-2420; Empl.: 3500
p. 3068

Sales Manager: M.R. Scheider

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Cal	Menlo Park, Long & Assoc.	415-327-1300
Cal	Sherman Oaks, R. Meussdorffer & Assoc.	213-788-0771
Colo	Englewood, Todd Assoc.	303-761-7801
Conn	Berlin, White Sls. Co.	203-224-0423
Fla	Boca Raton, E. A. Kershaw & Co.	305-392-9263
Ill	Chicago, D. Dolin Sls.	312-286-6200
Ind	Ft. Wayne, Menze Sls.	219-747-5616
Iowa	Cedar Rapids, PMA Corp.	319-362-9177
Kans	Overland Park, PMA Corp.	913-381-0004
Kans	Wichita, PMA Corp.	316-264-2662
Md	Baltimore, Machinery & Equip. Sls.	301-889-2070
Mass	Needham, White Sls. Co.	617-444-3676
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	Maryland Heights, PMA Corp.	314-569-1220
NJ	Mt. Laurel, Naudain & Assoc.	609-235-1801
NJ	Springfield, P. H. Werner, Inc.	201-376-9440
NY	Rochester, Robert F. Lamb Co.	716-544-5580
NY	Rochester, Brundage Assoc.	716-436-3476
NY	Schenectady, Robert F. Lamb Co.	518-393-4844
NY	Syracuse, Robert F. Lamb Co.	315-455-2469
NC	Raleigh, Candor Co.	919-876-4999
SC	Myrtle Beach, Candor Co.	803-448-8361
Tex	Dallas, J. B. Guenther, Inc.	214-691-8500
Tex	Houston, J. B. Guenther, Inc.	713-468-0232
Va	Roanoke, Candor Co.	703-989-0995
Wisc	Milwaukee, Barber-Colman Co.	414-464-5900
Exp:	Wisc., Milwaukee, Dummann World Trade Co.	414-464-0100

BARBER CORP., Dept. EM, Box 271, Waynesville, Ohio 45068, Tel: 513-897-2926; Empl.: 25

BARCO CHEM. PRODS. INC., Dept. EM, 701-703 S. LaSalle, Chicago, Ill. 60605, Tel: 312-427-2957; Empl.: 10

BARDEN CORP., Dept. EM, 200 Park Ave., Danbury, Conn. 06810, Tel: 203-744-2211, TWX: 203-744-0097; Empl.: 1100

BARIOD DIV., N L Inds., Inc., Dept. EM, Box 1675, Houston, Tex. 77001, Tel: 713-524-6381

BARKER ELEC. SLS., Dept. EM, Box 405, Ship Bottom, NJ 08008, Tel: 609-494-8209; FSC No.: 31142; Empl.: 17

Sales Manager: T. Robinson-Cox

Advertisement

Vacuum Thermocouples, Mfr. L.R. Graham Co. UHF and STANDARD Low Frequency styles from 1mA up. Accurate RMS and true SQUARE LAW outputs with Low Reversal Errors, Wilkins Multicouple types. Wide current tracking ratios, long to fast time responses. Single units and matched parameters. Complete technical catalog available.

BARKER & WILLIAMSON, INC., Dept. EM, Canal St., Bristol, Pa. 19007, Tel: 215-788-5581; Empl.: 51
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Sales Manager: M. Zegel

BARNES ENGRG. CO., Dept. EM, 1645 So. Claudina Way, Anaheim, Calif. 92805, Tel: 714-533-7530; Empl.: 27

Sales Manager: G.W. Barnes

Local Sales Offices & Reps.

Cal	Burbank, SoCal Sls Assocs	213-846-3540
Cal	Orange, SoCal Sls Assocs	714-997-0122
Cal	Palo Alto, R.W. Thompson Assocs	415-494-7516
Colo	Broomfield, Clark Manufacturers Rep.	303-466-1901
Fla	Hollywood, A.P. Assocs	305-987-6720
Mass	Natick, B. Peck	617-653-6265
Mo	Florissant, J. Trenshaw	314-355-1516
NJ	Tenafly, Johnson Assocs	201-569-7111
NY	De Ruyter, R.P. Kennedy Co	315-682-2299
NY	Plainview, Robert Smith Assocs	516-681-3155
NY	Red Hook, R.P. Kennedy Co	914-876-2700
NY	Rochester, R.P. Kennedy Co	716-271-6322
NY	Spring Valley, R. Smith Assocs.	914-354-6067
Ohio	Cleveland, CSA Elctrn Sls Agency	216-333-2088
Pa	Ardmore, R.D. Freedman Assocs	215-279-5767
Tex	Houston, Unidyne	713-772-3170
Tex	Richardson, Unidyne	214-234-3050
Wash	Bellevue, Tasco	206-453-1414

BARNES ENGRG. CO., Dept. EM, 30 Commerce Rd., Stamford, Conn. 06902, Tel: 203-348-5381, Telex: 965921; Empl.: 350

Sales Manager: H. Kaplan

Local Sales Offices & Reps.

Ariz	Tempe, Trembly Assocs	602-966-4428
Cal	Los Altos, J. Stone Assocs.	415-948-4563
Cal	Los Angeles, Basic Systems Co.	213-938-2833
Colo	Arvada, Figaro-Klebba Assocs.	303-424-0108
Fla	Orlando, E. G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E. G. Holmes & Assocs.	404-451-6161
Ill	South Holland, Raeco, Inc.	312-331-6001
Md	Silver Spring, Spectro Systems.	301-949-8261
Mass	Marblehead, Northeast Assocs.	617-631-9500
Mich	Madison Heights, WKM Assocs.	313-588-2300
Mo	St. Louis, Engrg. Svc. Co.	314-997-1515
NJ	East Orange, Friedman Assocs.	201-673-2500
NM	Albuquerque, Trembly Assocs.	505-293-4444
NY	Fayetteville, M. P. Andrews	315-637-3144
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Pa	Elkins Park, Snow Assocs.	215-379-4700
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tex	Richardson, Optics & Electrns.	214-690-9799
Tex	Spring, Optics & Electrns.	713-353-9810
Wash	Seattle, Rush S. Drake	206-763-2755

BARNES & REINECKE, INC., Dept. EM, 2375 Estes Ave., Elk Grove Village, Ill. 60007, Tel: 312-640-7200; Empl.: 250

BARON-BLAKESLEE, INC., Dept. EM, 1620 S. Laramie Ave., Chicago, Ill. 60650, Tel: 312-656-7300

Local Sales Offices & Reps.

Cal	Gardena	213-532-0730
Cal	Newark	415-794-6511
Cal	San Diego	714-295-0041
Cal	Santa Fe Springs	213-723-0971
NJ	South Kearny	201-589-5933
NY	Garden City	516-747-8460
Ore	Portland	503-252-3468
Wisc	Oak Creek	414-762-6850

BARON WIRE & CABLE CORP., Dept. EM, 6019 W. Howard St., Chicago, Ill. 60648, Tel: 312-647-8600, Telex: 72-4322; Empl.: 25

Local Sales Offices & Reps.

Alas	Anchorage, C. Timmerman & Assoc.	907-274-1754
Ga	Atlanta, A. Hoge Assoc.	404-758-6815
Ill	Elk Grove Village, D. Andersen Elec. Sls.	312-640-6969
Ind	Indianapolis, Wilder & Logan Inc.	317-632-9379
Kans	Kansas City, Hatfield Sls.	913-281-0533
Kans	Overland Park, Fossell Assoc.	913-648-5165
Ky	Fort Mitchell, Mc Ginnis & Assoc.	513-271-4403
La	New Orleans, Case Sls. Co.	504-835-7713
Mass	Natick, Cable Dynamics	617-653-8756
Mich	Detroit, R.M. Gardner Co.	313-531-1658
Minn	Minneapolis, Lindell Sls.	612-721-5911
NJ	Paramus, Topinka & Assoc.	201-265-7305
NM	Albuquerque, Trembly Assoc.	505-293-4444
NY	Rochester, Gordon Link	716-227-5868
NC	Matthews, N.A. Kober Assoc.	704-364-5925
Ohio	Cleveland, R.C. Childs Co.	216-333-0688
Okla	Jenks, Wayne Parker	918-299-5449
Tenn	Nashville, Jenkins & Hale	615-256-0242
Tex	Dallas, G. Sheppard Co.	214-371-2747
Tex	Houston, Bean-McDaniel Co.	713-649-8606
Wisc	Milwaukee, Andersen Sls.	414-781-1120

BARTLETT-EMERY INSTRUMENT CORP., Dept. EM, 14th & Ave. "M", Ft. Madison, Iowa 52627, Tel: 319-372-8366; Empl.: 25

Local Sales Offices & Reps.

Cal	San Gabriel, R.G. Moye Co.	213-283-1669
Pa	Glenside, W.E. Girard Co.	215-887-4411

BASE TEN SYSTEMS, INC., Dept. EM, 3828 Quakerbridge Rd. Box 3151, Trenton, N.J. 08619, Tel: 609-586-7010, TWX: 510-685-5692; Empl.: 75

Sales Manager: J.W. Pflueger Jr.

Local Sales Offices & Reps.

Ala	Huntsville, KEMP Instrs.	205-837-4304

Ariz	Tucson, G. Moore Assocs.	602-795-3176
Cal	Saratoga, M. Bergman Co.	408-257-5900
Colo	Boulder, G. Moore Assocs.	303-494-3351
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Md	Annapolis, Bartek Assocs.	301-268-0196
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
NM	Albuquerque, G. Moore Assocs.	505-292-3322
Tex	Dallas, Synthenetics	214-631-1740

BASF SYSTEMS, Dept. EM, Crosby Dr., Bedford, Mass 01730; Empl.: 700

Local Sales Offices & Reps.

Cal	Santa Monica, BASF Sys.	213-451-8781
Ill	Melrose Park, BASF Sys.	312-343-6618
NJ	Clifton, BASF Sys.	201-546-9111
Tex	Dallas, BASF Sys.	214-233-6607

Local Distributors

Cal	Oakland, Moulthrop Sls. Inc.	415-261-7676
Colo	Denver, R. & D. Sls.	303-934-5445
Haw	Honolulu, Snider Assoc.	808-941-2400
Kans	Shawnee Mission, Beams Inc.	913-631-0300
Mass	Andover, Berberian/Patterson & Assoc.	617-475-6286
Minn	Minneapolis, Clark R. Gibb Co.	612-377-1200
Tex	Irving, Dobbs Stanford Corp.	214-252-5502

BASIC CERAMICS INC., SUB BASIC INC., See Krohn Ceramics Inc.

BASLER ELECTRIC CO., Dept. EM, Box 269, Rte. 143, Highland, Ill. 62249, Tel: 618-654-2341, TWX: 910-996-2522; Empl.: 850

Local Sales Offices & Reps.

Ala	Birmingham, E.J. Ruth Assocs.	205-979-0511
Ala	Huntsville, Electro-Mech Sls Engrg Co.	205-883-9624
Ariz	Phoenix, F.W. Gorman	602-956-9820
Cal	Buena Park, Sls. Engrs. Ltd.	714-521-8673
Cal	LaHabra, Nolan Assocs.	213-694-2146
Cal	Palo Alto, Abbott Engrg. Co.	415-327-0830
Cal	San Diego, Sls Engrs Ltd.	714-277-5723
Colo	Boulder, Front Range Mktg	303-443-4780
Conn	New Preston, Nelson, Bennett, Skilton Assoc.	203-868-0501
Fla	Ft. Lauderdale, Electrocomp Assoc.	305-564-8571
Fla	Jacksonville, Belcher & Assocs.	904-724-7811
Fla	St. Petersburg, Electrocomp Assoc. Inc.	813-822-9677
Ga	Atlanta, Belcher & Assoc.	404-255-5481
Ga	Atlanta, Electro Mech Sls. Engrg. Co.	404-449-6337
Haw	Honolulu, Kems Inc.	808-847-1395
Ill	Chicago, H. Sam Tollaksen	312-441-6644
Md	Glen Burnie, Faion Lott Co.	301-744-4611
Mass	Braintree, R.F. Duffy Assocs.	617-848-3550
Mich	Farmington, Miltimore Sls. Inc.	313-476-2446
Minn	Minneapolis, White Sls. Co.	612-566-6320
Mo	North Kansas City, H.J. Weisler & Assocs.	816-421-1679
Mo	St. Louis, H.J. Weisler & Assocs.	314-428-3934
NJ	Cherry Hill, L.H. Walke Co.	609-424-3766
NM	Albuquerque, F.W. Gorman	505-247-1596
NY	Memphis, Aero Sls. Co.	315-689-6730
NY	Roslyn, Seidel Assocs.	516-621-1117
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
NC	Raleigh, Electro Mech Sales Engrg. Co.	919-782-7586
Ohio	Cleveland, A.H. Baier Co., & Assocs.	216-461-6161
Ohio	Dayton, A.H. Baier Co. & Assoc.	513-276-4128
Ohio	Montgomery, Seawood Sls.	513-793-6702
Okla	Tulsa, L. Elliott Co.	918-743-7794
Ore	Portland, McLaren Inc.	503-297-2248
Pa	Pittsburgh, Gormley Elec. Co.	412-371-4111
Tenn	Nashville, Electro Mech. Sls. Engrg. Co.	615-256-2516
Tex	Dallas, Wm. Reese Assocs.	214-638-6575
Tex	Houston, Weisler & Assoc.	713-467-1847
Wash	Bellevue, McLaren, Inc.	206-454-3400
Exp:	St. Louis, Mo., Brauner Export Co.	314-426-2600

BASSETT ROTARY TOOL CO., Dept. EM, 519 N. Dewey St., Monticello, Ind. 47960, Tel: 219-583-7166

BAUMKER MFG. CO., Dept. EM, 5144 Enterprise, Toledo, Ohio 43612; Empl.: 8

BAUSCH & LOMB, A.S. DIV., Dept. EM, 820 Linden Ave., Box 9189, Rochester, N.Y. 14625, Tel: 716-385-1000

BAUSCH & LOMB, S.O.P.D. DIV, Dept. EM, 1400 N. Goodman St., Rochester, N.Y. 14602, Tel: 716-338-6470, TWX: 97-8286 716-97-8231; Empl.: 5000

Sales Manager: L. Rowell

Local Sales Offices & Reps.

Cal	San Leandro	415-895-8711
Ga	Atlanta	404-873-2023
Ill	Deerfield	312-948-9290
Md	Sparks	301-666-2109
NJ	Fairfield	201-575-1646

BAUSCH & LOMB, Micro-Line, Dept. EM, RD 1 Johnson Rd., Jamestown, N.Y. 14701, Tel: 716-488-1958

BAY LABORATORIES, INC., Dept. EM, 20160 Center Ridge Rd., Cleveland, Ohio 44116, Tel: 216-333-3898; Empl.: 20

BAY PRODS., Div. American Metal Works, Dept. EM, 8701 Torresdale Ave., Phila., Pa. 19136, Tel: 215-DE8-7300; Empl.: 125

Local Sales Offices & Reps.

Ala	Birmingham, Southern Ind. Sls.	
Ariz	Tucson, Industrial Tool & Supp.	602-624-6656
Cal	Los Angeles, McKinley Eq. Co.	213-263-6931
Cal	San Carlos, James Old & Son	415-591-8231
Del	Wilmington, Bruce Ind. Supp.	302-OL 5-9617
Fla	Miami, Warehouse Equip.	305-264-8991
Ga	Atlanta, Atlanta Bin & Shelving	404-636-4393
Ill	Chicago, Storage Sys. & Shop Equip.	312-973-4408
Ind	Ft. Wayne, Mansfield Mat'l. Handling	219-432-3013
Md	Bladensburg, Thompson & Cooke Co.	301-864-6380
Md	Cockeysville, Fabricators Inc.	301-666-2720
Mass	Boston, Langley Equip.	617-395-8018
Minn	Minneapolis, Haldeman-Homme Co.	612-331-4880
NH	Nashua, Merrimack Handling Equip.	603-889-6133
NJ	Linden, Reliance Eq. Co.	201-381-0770
NJ	Pennsauken, Alden of N.J.	609-662-3484
NY	Long Island City, A. Liss & Co.	212-392-8484
NY	Utica, Utica-Syracuse Handling	315-732-4112
Ohio	Cleveland, A.D. Pfister Co.	216-731-7800
Ohio	Columbus, F.L. Purdy Co.	614-252-1186
Pa	Bala-Cynwyd, Material Handling Co.	215-839-3440
RI	Central Falls, Rand Mat'l. Handling Co.	401-751-7657
Tex	Houston, Texas Mat'l Hangling Co.	713-666-5851
Va	Richmond, Bates Co.	804-233-3002
Wash	Seattle, F. T. Crowe & Co.	206-284-8484
Wisc	Milwaukee, Badger-Beau Equip. Co.	414-453-5581

BAYSHORE SYSTEMS CORP., Dept. EM, 5407 Port Royal Rd., Springfield, Va. 22151, Tel: 703-321-9625; Empl.: 35

Sales Manager: A. Swagerty

Local Sales Offices & Reps.

Tex	Plano, Zeus Engineering	214-423-2027

BAYTRON, Dept. EM, 344 Salem St., Medford, Mass. 02155, Tel: 617-391-1550; FSC No.: 52683; Empl.: 17

Sales Manager: T. Kozul

Local Sales Offices & Reps.

Cal	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
Cal	Woodside, N-S Assocs.	415-854-4870
Colo	Boulder, Herb Bass Assocs.	303-499-7509
Mass	Lexington, Zieco, Inc.	617-861-8300
NY	Greenvale, D. Aaron & Co.	516-621-0630
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Va	Woodbridge, M. Lader Co.	202-296-2497
Exp:	New Jersey, Cresskill, Lars Microwave	201-871-0024

BBN INSTRUMENTS CO., Div. Bolt Beranek & Newman, Inc., Dept. EM, 50 Moulton St., Cambridge, Mass. 02138, Tel: 617-491-0092, Telex: 921-470; Empl.: 35 ... p. 4339

Sales Manager: S. Lopez de Mesa

Local Sales Offices & Reps.

Ala	Huntsville, Currie Peak & Frazier	205-536-5650
Alas	Anchorage, Harry J. Lang & Assocs.	907-279-5751
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	N. Hollywood, Wolfe Entprs.	213-877-5518
Cal	Palo Alto, E.V. Roberts Assocs.	415-494-1671
Cal	San Diego, B.J. Wolfe Entprs.	714-277-0993
Colo	Denver, Williams Assoc.	303-373-4730
Fla	Orlando, Currie Peak & Frazier	305-855-0843
Ill	Northfield, Instronics Assocs.	312-446-3231
Ind	Indianapolis, Loren Green Assocs.	317-293-9827
Md	New Carrollton, W. A. Brown Equip.-Comp, Inc.	301-577-6105
Mass	Norwood, Hoder-Rogers, Inc.	617-762-6564
Mich	Mt. Clemens, R.J. O'Hara Assocs.	313-791-7140
Minn	Minneapolis, Loren Green Assocs.	612-781-1611
NJ	Haledon, Hoder-Rogers	201-790-1621
NJ	North Plainfield, Brady Co.	201-753-7988
NM	Albuquerque, Williams Assoc.	505-255-1638
NY	Dewitt, D. B. Assocs.	315-446-0220
NC	Greensboro, Currie Peak & Frazier	919-273-3040
Ohio	Columbus, R.D. Cloon Assocs.	614-459-2890
Pa	Chester Springs, Letronix, Inc.	215-458-8977
RI	Rumford, Hoder-Rogers, Inc.	401-438-2726
Tex	Dallas, Synthenetics, Inc.	214-631-1740
Va	Alexandria, W. A. Brown Equip.,-Comp., Inc.	703-836-1800
Wash	Seattle, Rush S. Drake Assocs.	206-763-2755
Wisc	Wauwatosa, T.R. Bickler Assocs.	414-453-3772

BEAD ELCTRNS., Div. Bead Chain Mfg. Co., Dept. EM, 110 Mountain Grove St., Bridgeport, Conn. 06605, Tel: 203-334-4124; Empl.: 150

Local Sales Offices & Reps.

Cal	Los Angeles, Yarbrough Sls. Co.	213-254-5101
Ill	Chicago, Electro-Mech Sls. Co.	312-777-0554
Ind	Indianapolis, Hoster & Sieloff Assocs., Inc.	317-844-9921
Mass	Needham, A. G. Anderson	617-449-1418
Mich	Union Lake, Fox Industries, Inc.	313-363-7183
Minn	Minneapolis, Nygaard Sls. Co.	612-881-3727
NJ	Beach Haven, Dyneers, Inc.	609-492-2869
Va	Williamsburg, Dyneers, Inc.	804-229-3612
Wash	Seattle, F.W. Aurich & Co.	206-284-5561
Exp:	N.Y., New York, GTE Sylvania Precision Materials, Inc.	212-486-3200

BEARING INSPECTION, Dept. EM, 10041 Shoemaker Ave., Santa Fe Springs, Cal. 90670, Tel: 213-944-6251; Empl.: 32

BEAU PRODS., See Vernitron Elec. Comps.

BEAU TECH, INC., Dept. EM, P.O. Box 523, Portland, Me. 04122, Tel: 207-775-6139

BECKMAN INSTRS., (AISSD), Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634, Tel: 714-871-4848, TWX: 910-592-1260; Empl.: 3500

Local Sales Offices & Reps.

Cal	Mountain View	415-326-1970
Colo	Denver	303-371-0950
Ga	Atlanta	404-934-3830
Ill	Lincolnwood	312-583-1020
La	Baton Rouge	504-926-5085
Md	Silver Springs	301-622-2500
Mass	Wakefield	617-245-6800
Mich	Southfield	313-424-8800
Minn	Minneapolis	612-835-2202
Mo	Creve Coeur	314-432-5610
NJ	Mountainside	201-232-7600
Ohio	Cleveland	216-886-3020
Ohio	Reading	513-761-9560
Pa	Broomall	215-544-2695
Pa	Pittsburgh	412-921-1530
Tex	Dallas, 214-637-1640	
Tex	Houston	713-781-0810
Wash	Bellevue	206-454-9528

BECKMAN INSTRS., Cedar Grove Opers., Dept. EM, 89 Commerce Rd., Cedar Grove, N.J. 07009, Tel: 201-239-6200, TWX: 710-994-5781; Empl.: 3500

Local Sales Offices & Reps.

Cal	Fullerton	714-521-3700
Ga	Atlanta	404-934-3830
Ill	Lincolnwood	312-583-1020
NJ	Cedar Grove	201-239-6200
Pa	Pittsburgh	412-921-1530
Tex	Houston	713-781-0810
Va	Richmond	804-282-0555

BECKMAN INSTRS., Ectrn. Instrs. Div. Ectrn. Instrumentation, Dept. EM, 3900 N. River Rd., Schiller Park, Ill. 60176, Tel: 312-671-3300, TWX: 910-253-1820; Empl.: 3500

Refer to Beckman Instrs. (AISSD) for sales office information.

BECKMAN INSTRS., Helipot Div., Dept. EM, 2500 Harbor Blvd., Fullerton, Cal. 92634, Tel: 714-871-4848, TWX: 910-592-1260; Empl.: 3500 2978-2980, 3642, 3643, 3776-3780

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Ariz	Scottsdale, Arcom Sls.	602-947-5745
Cal	Fullerton, Beckman	714-871-4848
Cal	Mountain View, Beckman Instrs.	415-961-6817
Cal	San Diego, Beckman	714-565-6244
Colo	Denver, B-5	303-426-0222
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-3183
Ill	Chicago, Carlson Elctrn. Sls. Co.	312-956-8240
Ind	Carmel, SAI Mktg. Corp.	317-844-7196
Ind	Indianapolis, Carlson Elctrn. Sls. Co.	317-253-5610
Iowa	Cedar Rapids, Comstrand	319-377-1575
Md	Silver Spring, Beckman	301-622-2500
Mass	Needham Hgts., Beckman	617-444-9010
Mich	Brighton, SAI Mktg. Corp.	313-227-1786
Mich	Grand Rapids, SAI Mktg. Corp.	616-942-2504
Minn	Minneapolis, Comstrand	612-571-0000
Mo	Florissant, SAI Mktg. Corp.	314-837-5200
NJ	Clifton, Ossmann Comp. Sls. Corp.	201-778-8888
NJ	Mt. Laurel, Beckman	609-235-3314
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Huntington, Ossmann Comps. Sls. Corp.	516-673-9300
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp. Sls. Corp.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Winston-Salem, Murcota Corp.	919-722-9445
Ohio	Beachwood, SAI Mktg. Corp.	216-292-2982
Ohio	Cincinnati, SAI Mktg. Corp.	513-761-5432
Ohio	Dayton, SAI Mktg. Corp.	513-435-3181
Okla	Tulsa, Norvell Assocs.	918-663-1247
Ore	Portland, Electronic Sources	503-292-0701
Pa	Pittsburgh, SAI Mktg. Corp.	412-782-5120
Tex	Austin, Norvell Assocs.	512-458-8106
Tex	Dallas, Norvell Elctrns., Inc.	214-233-0020
Tex	Houston, Norvell Assocs.	713-774-2568
Utah	Bountiful, B-5	801-292-8991
Wash	Bellevue, Electronic Sources, Inc.	206-453-0800
Wisc	Milwaukee, Carlson Elctn. Sls. Co.	414-476-2790

Local Distributors

Ala	Huntsville, M & C Sls.	205-539-8476
Ala	Huntsville, Powell Elctrns.	205-539-2731
Ariz	Phoenix, Liberty Elctrns.	602-257-1272
Ariz	Phoenix, Kierulff Elctrns.	602-243-4101
Ariz	Tempe, Marshall Inds.	602-968-6181
Cal	El Monte, Marshall Inds.	213-686-0141
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Irvine, Marshall Inds.	714-556-6400
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Diego, Liberty Elctrns.	714-565-9171
Cal	San Diego, Marshall Inds.	714-278-6350
Cal	Sunnyvale, Marshall Inds.	408-732-1100
Colo	Arvada, Marshall Inds.	303-423-9670
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Kierulff Elctrns.	303-371-6500
Conn	Hamden, Arrow Elctrns.	203-248-3801
Conn	North Branford, Marshall Inds.	203-484-0488
Fla	Clearwater, Lynch-Gentry Assocs.	813-443-2697
Fla	Fort Lauderdale, Arrow Elctrns.	305-776-7790
Fla	Miami Springs, Powell Elctrns.	305-592-3260
Ill	Elk Grove Village, Kierulff Elctrns.	312-640-0200
Ill	Mount Prospect, Magnuson Elctrns.	312-956-0700
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Indianapolis, Advent Elctrns.	317-297-4910
Iowa	Cedar Rapids, Advent Elctrns.	319-393-8811
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Beltsville, Powell Elctrns.	301-937-4030
Md	Gaitherburg, Kierulff Elctrns.	301-948-0250
Mass	Billerica, Kierulff Elctrns.	617-667-8331
Mass	Newton Highlands, Marshall Inds.	617-965-5115
Mass	Woburn, Arrow Elctrns.	617-933-8130
Mich	Farmington, Sheridan Sls. Co.	313-477-3800
Mich	Farmington, Advent Elctrns	313-477-1650
Minn	Bloomington, Arrow Elctrns.	612-888-5522
Minn	Plymouth, Marshall Inds.	612-559-2211
Minn	St. Paul, Magnuson Elctrns.	612-227-8495
Mo	Florissant, Sheridan Sls. Co.	314-837-5200
NJ	Moorestown, Arrow/Angus	609-235-1900
NJ	Rutherford, Kierulff Elctrns.	201-935-2120
NJ	Saddle Brook, Arrow Elctrns.	201-797-5800
NY	Buffalo, Ossmann Component Sls. Corp.	716-832-4271
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Farmingdale, Marshall Inds.	516-293-4141
NY	Kingston, Ossmann Component Sls. Corp.	914-338-5505
NY	Rochester, Ossmann Component Sls. Corp.	716-442-3290
NY	Syracuse, Ossmann Component Sls. Corp.	315-454-4477
NY	Vestal, Ossmann Component Sls. Corp.	607-785-9949
NC	Winston-Salem, M & C Sls.	919-722-9445
Ohio	Beachwood, Sheridan Sls. Co.	216-831-0130
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Ohio	Cleveland, Arrow Elctrns.	216-464-2000
Ohio	Dayton, Sheridan Sls. Co.	513-223-3332
Ohio	Kettering, Arrow Elctrns.	513-253-9176
Okla	Tulsa, Norvell Elctrns.	918-663-1247
Ore	Portland, Almac/Stroum Elctrns.	503-292-3534
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Pa	Pittsburgh, Sheridan Sls. Co.	412-244-1640
Tex	Dallas, Norvell Elctrns.	214-350-6771
Tex	Houston, Norvell Elctrns.	713-777-1666
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
Wash	Seattle, Liberty Elctrns.	206-763-8200
Wisc	New Berlin, Arrow Elctrns.	414-728-2801
For:	Can., Montreal, Que., Specialty Elctrns.	514-336-4500
For:	Can., Montreal, Que., Semad Elctrns.	514-636-4614
For:	Can., Toronto, Ont., Specialty Elctrns.	416-678-2104
For:	Can., Toronto, Ont., Semad Elctrns.	416-635-9880
For:	Can., Vancouver, BC, Bowtek Elctrns.	604-736-7677

BECKMAN INSTRS., Information Displays Oper., Dept. EM, Box 3579, Scottsdale, Ariz. 85257, Tel: 602-947-8371, TWX: 910-950-1293; Empl.: 150 p. 2570-2575

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Ariz	Scottsdale, Arcom Sls. Co.	602-947-5745
Cal	Fullerton, Beckman Instrs.	714-871-4848
Cal	Mountain View, Beckman Instrs.	415-961-6817
Cal	San Diego, Beckman Instrs.	714-565-6244
Colo	Denver, b5, Inc.	303-426-0222
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-3183
Ill	Chicago, Carlson Elctrn. Sls. Co.	312-956-8240
Ind	Carmel, SAI Mktg. Corp.	317-844-7196
Ind	Indianapolis, Carlson Elctrn. Sls. Co.	317-253-5610
Iowa	Cedar Rapids, Comstrand	319-377-1575
Md	Silver Spring, Beckman Instrs.	301-622-2500
Mass	Needham Heights, Beckman Instrs.	617-444-9010
Mich	Brighton, SAI Mktg. Corp.	313-227-1786
Mich	Grand Rapids, SAI Mktg. Corp.	616-942-2504
Minn	Minneapolis, Comstrand	612-571-0000
Mo	Florissant, SAI Mktg. Corp.	314-837-5200
NJ	Clifton, Ossmann Comp. Sls. Corp.	201-778-8888
NJ	Mt. Laurel, Beckman Instrs.	609-235-3314
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Huntington, L.I., Ossmann Comps. Sls. Corp.	516-673-9300
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Winston-Salem, Murcota Corp.	919-722-9445
Ohio	Beachwood, SAI Mktg. Corp.	216-292-2982
Ohio	Cincinnati, SAI Mktg. Corp.	513-761-5432
Ohio	Dayton, SAI Mktg. Corp.	513-435-3181
Okla	Tulsa, Norvell Assocs.	918-663-1247
Ore	Portland, Electronic Sources	503-292-0701
Pa	Pittsburgh, SAI Mktg. Corp.	412-782-5120
Tex	Austin, Norvell Assocs.	512-458-8106
Tex	Dallas, Norvell Assocs.	214-233-0020
Tex	Houston, Norvell Assocs.	713-744-2568
Utah	W. Bountiful, b-5, Inc.	801-292-8991
Wash	Bellevue, Electonic Sources	206-453-0800
Wisc	Milwaukee, Carlson Elctn. Sls. Co.	414-476-2790

Local Distributors

Ala	Huntsville, Powell Elctrns./Huntsville	205-539-2731
Ala	Huntsville, M&C Sls.	205-539-8476
Ariz	Phoenix, Kierulff Elctrns.	602-243-4101
Ariz	Phoeniz, Liberty Elctrns./Ariz.	602-257-1272
Ariz	Tempe, Marshall Inds.	602-968-6181
Cal	El Mont, Marshall Inds.	213-686-0141
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Irvine, Marshall Inds.	714-556-6400
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Diego, Liberty Elctrns.	714-565-9171
Cal	San Diego, Marshall Inds.	714-278-6350
Cal	Sunnyvale, Marshall Inds.	408-732-1100
Colo	Arvada, Marshall Inds.	303-423-9670
Colo	Commerce City, Elmar Elctrns./Commerce City	303-287-9611
Colo	Denver, Kierulff Elctrns.	303-371-6500
Conn	Hamden, Arrow Elctrns.	203-248-3801
Conn	N. Branford, Marshall Inds.	203-484-0488
Fla	Clearwater, Lynch-Gentry Assocs.	813-443-2697
Fla	Fort Lauderdale, Arrow Elctrns.	305-776-7790
Fla	Miami Springs, Powell Elctrns./Fla.	305-592-3260
Ill	Elk Grove Village, Kierulff Elctrns.	312-640-0200
Ill	Mt. Prospect, Magnuson Elctrns.	312-956-0700
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Indianapolis, Advent Elctrns.	317-297-4910
Iowa	Cedar Rapids, Advent Elctrns.	319-393-8811
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Beltsville, Powell Elctrns./Wash	301-937-4030
Md	Gaitherburg, Kierulff Elctrns.	301-948-0250
Mass	Billerica, Kierulff	617-667-8331
Mass	Newton Highlands, Marshall Inds.	617-965-5115
Mass	Woburn, Arrow Elctrns.	617-933-8130
Mich	Farmington, Sheridan Sls. Co.	313-477-3800
Mich	Farmington, Advent Elctrns.	313-477-1650
Minn	Bloomington, Arrow Elctrns.	612-888-5522
Minn	Plymouth, Marshall Inds.	612-559-2211
Minn	St. Paul, Magnuson Elctrns.	612-227-8495
Mo	Florissant, Sheridan Sls. Co.	314-837-5200
NJ	Moorestown, Arrow/Angus	609-235-1900
NJ	Rutherford, Kierulff Elctrns.	201-935-2120
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Farmingdale, Marshall Inds.	516-293-4141
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Winston-Salem, M & C Sls.	919-722-9445
Ohio	Beachwood, Sheridan Sls. Co.	216-831-0130
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Ohio	Cleveland, Arrow Electronics	216-464-2000
Ohio	Dayton, Sheridan Sls. Co.	513-223-3332
Ohio	Kettering, Arrow Elctrns.	513-253-9176
Okla	Tulsa, Norvell Elctrns.	918-663-1247
Ore	Portland, Almac/Stroum	503-292-3534
Pa	Philadelphia, Powell Elctrns./Philadelphia	215-365-1900
Pa	Pittsburgh, Sheridan Sls. Co.	412-244-1640
Tex	Dallas, Norvell Elctrns.	214-350-6771
Tex	Houston, Norvell Elctrns.	713-777-1666
Wash	Seattle, Liberty Elctrns./Northwest	206-763-8200
Wash	Seattle, Almac/Stroum	206-763-2300
Wisc	New Berlin, Arrow Elctrns.	414-728-2801
For:	Can., Montreal, Que., Semad Elctrns.	514-636-4614
For:	Can., Montreal, Que., Specialty Elctrns.	514-336-4500
For:	Can., Toronto, Ont., Specialty Elctrns.	416-678-2104
For:	Can., Toronto, Ont., Semad Elctrns.	416-635-9880
For:	Can., Vancouver, B.C., Bowtek Elctrns.	604-736-7677

BECO, INC., Dept. EM, Franklin Ind'l. Pk. P.O. Box 67, Wirtz, Va. 24184, Tel: 703-483-9258; FSC No.: 06673; Empl.: 11

BECTON, DICKINSON & CO., Edmont-Wilson Div., Dept. EM, 3157 Walnut St., Coshocton, Ohio 43812, Tel: 614-622-4311

Local Sales Offices & Reps.

Cal	Fountain Valley, R.D. Stowe	714-962-6841
Cal	Fremont, S.S. Stewart	415-656-6840
Cal	Walnut Creek, C.U. Eyster	415-933-0589
Colo	Broomfield, J.D. Powell	303-451-7141
Fla	Tampa, D.A. Mallardi	813-886-5513
Ga	Lilburn, George F. Russell	404-921-6437
Ill	Chicago, G.E. McNeal	312-238-2989
Ind	Indianapolis, A. Stieb Jacks	317-542-1840
Md	Baltimore, G.N. Ball	301-254-4390
Mass	Middleboro, E.A. Wells	617-947-3244
Mich	Grand Rapids, W.H. Figard	616-363-7030
Mich	Livonia, C.W. Davis	313-421-8071
Minn	Cottage Grove, B. Rossi	612-459-6511
Mo	Kansas City, E.L. Barker	816-923-8334
Mo	St. Louis, G. Kahnweiler	314-434-0844
NJ	Wyckoff, D.W. Laauwe	201-652-2958
NY	Glen Oaks, F.A. Vero	212-347-3207
NC	Matthews, L.D. Lindberg	704-366-6815
Ohio	Cincinnati, G.J. Hayward	513-231-2383
Ohio	Northfield, G. Bantum	216-467-0729

Ore	Oregon City, D. Younger	503-632-4077
Pa	Audubon, M.F. Gavet	215-666-5420
Pa	Pittsburgh, W.J. Reed	412-885-2509
Tenn	Memphis, D.C. Lee	901-363-4359
Tex	Dallas, D.T. Cores	214-363-7345
Tex	Houston, S.M. Riley	713-681-2818
Wisc	Brookfield, A.D. White	414-786-5789

BEECHWOOD MFG. CORP., Dept. EM, 360 S. Downey Ave., Indianapolis, Ind. 46219, Tel: 317-356-2493; Empl.: 12

Local Sales Offices & Reps.

Ala	Huntsville, F.M. Assoc.	205-536-9990
Cal	Mt. View, Connolly & Co.	415-967-6988
Fla	Orlando, F.M. Assoc.	305-851-5710
Fla	West Palm Beach, F.M. Assoc.	305-746-3126
NC	Greensboro, F.M. Associates	919-294-2754
Va	Baileys Crossroads, Q.T. Electronic Sls.	703-671-4357

BEEDE ELECTRICAL INSTR. CO., Dept. EM, S. Main St., Penacook, N.H. 03301, Tel: 603-753-6362, TWX: 710-364-6977; Empl.: 500; Minimum order: $R. Lonnberg .... p. 2806

Sales Manager: J. Veldhuizen; *Distributor Manager:* R. Lonnberg

Local Sales Offices & Reps.

Ariz	Phoenix, MR Engineering	602-959-5150
Cal	Los Angeles, Universal Comp. Co.	213-641-4255
Cal	San Carlos, Elctrn. Engrg. Assoc.	415-593-2189
Colo	Denver, Elctrn. Sls, Inc.	303-771-6300
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Coral Springs, Floritronics	305-752-3475
Fla	Winter Park, Floritronics	305-886-4818
Ga	Atlanta, Electrical Concepts	404-491-3154
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ill	Skokie, Saffro & Assocs.	312-588-0905
Kans	Leawood, Thunderbird Tech. Sls. & Svc.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svc.	316-684-3941
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Ann Arbor, O-M Sls. Co.	313-973-9450
Minn	Minneapolis, PSI	612-835-1777
Mo	St. Louis, Thunderbird Tech. Sls. & Svc.	314-567-6488
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Clifton, Ossman Comp.	201-778-8888
NY	Buffalo, Ossman Comp. Sls. Corp.	716-832-4271
NY	Huntington, Ossman Comp	516-673-9300
NY	Kingston, Ossman Comp. Sls. Corp.	914-338-5505
NY	Rochester, Ossman Comp. Sls. Corp.	716-442-3290
NY	Syracuse, Ossman Comp. Sls. Corp.	315-454-4477
NY	Vestal, Ossman Comp. Sls. Corp.	607-785-9949
Pa	Devon, B & A Assocs.	215-688-5173
Tex	Dallas, Southwest Elctrn. Ind.	214-690-9881
Tex	Houston, Southwest Elctrn. Ind.	713-729-1670
Wash	Mercer Island, J. H. Andersen Assocs.	206-232-0484
Wisc	Lake Mills, Saffro & Assocs.	414-648-2605

Local Distributors

Cal	Los Angeles, Metermaster Inc.	213-685-4340
Cal	Los Angeles, EIL Instruments	213-685-7020
Cal	Santa Clara, Dynametron	408-246-6535
Colo	Denver, Metermaster Inst. Corp.	303-722-5766
Conn	Middletown, Mancib Co.	203-346-6646
Fla	Tampa, Tampa Instrumentation CTR	813-870-0183
Ill	Chicago, EIL Instrs.	312-430-2292
Ill	Oak Park, Pacific Indicator	312-261-1330
Ind	Indianapolis, EIL Instrs.	317-545-1373
Kans	Overland Pk., Brooks Elctrn. Svc Co.	913-648-3131
Md	Timonium, EIL Instrs.	301-252-1260
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Clawson, Instr. Specialties	313-435-3311
Minn	Minneapolis, Environ Labs	612-888-7795
Mo	St. Louis, Scherrer Instrs.	314-644-5362
NJ	Pompton Lakes, Ree Instrs. Co.	201-839-7676
NY	Clarence, Trott Elctrns.	716-634-8500
Ohio	Cleveland, Weschler Elec. Corp.	216-251-4609
Ohio	Dayton, EIL Instruments	513-435-2134
Pa	Pittsburgh, EIL Instrs.	412-731-5230
RI	No. Kingston, EIL Instruments	401-885-1773
Tex	Dallas, Dallas Instruments	214-341-2990 o1
Tex	Houston, Electrical Inst. & Meter Co.	713-526-6871
Va	Alexandria, EIL Instrs.	703-354-4330
Wash	Seattle, Eicher-Richards Co.	206-523-7888
For:	Can., Brampton, Ont., Mod Tronics Instrs.	416-457-6322
For:	Can., Sherbrooke, Que., Brunelle Instrs.	819-569-1408
For:	Can., Vancouver, BC, Miller Mktg. Ltd.	604-876-7544

BEHLMAN DIV., CALIFORNIA INSTRS., Div. Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal 92111, Tel: 714-279-8620, Telex: 695-047; FSC No.: 16067; Empl.: 80

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	205-536-9990
Ariz	Scottsdale, Williams Assocs. Inc.	602-947-4297
Cal	Los Altos, J. Stone & Assocs	415-948-4563
Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	San Diego, Basic Sys.	714-279-9641
Colo	Denver, Williams Assocs. Inc.	303-343-2911
Fla	Orlando, FM Assocs.	305-851-5710
Fla	Tequesta, FM Assoc.	305-746-3128
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Sea	312-282-6694
Ind	Carmel, Sea	317-846-2593
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Waltham, McBar Assocs.	617-890-0233
Mich	Royal Oak, Satullo Co.	313-549-3910
Minn	Minneapolis, Waytek	612-933-2133
Mo	Hazelwood, EIR Company	314-895-4100
NJ	Cherry Hill, Scientific Representatives, Inc.	609-482-0059
NM	Albuquerque, Williams Assocs. Inc.	505-255-1638
NY	Great Neck, Eastern Instr. of N.Y.	516-466-9505
NY	North Syracuse, NACO Electronics Inc.	315-699-2651
NC	Greensboro, FM Assocs.	919-294-2754
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	North Olmsted, Hocker Assocs.	216-734-4433
Tex	Houston, Sesco	713-668-7840
Tex	Richardson, Sesco	214-231-9364
Va	Falls Church, Scientific Assocs.	703-573-8787
Wash	Seattle, Datacom Assocs.	206-329-2989

BEHLMAN ENGINEERING CORP., Dept. EM, Box 4518, 427 N. Nopal St., Santa Barbara, Cal. 93103, Tel: 805-963-8691 .... p. 3364-3367

Sales Manager: E.C. Bertolet

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	205-536-1941
Ariz	Phoenix, R.L. Davis Co.	602-955-2266
Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, T. Louis Snitzer Co.	714-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Fla	Satellite, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Md	Rockville, Farrell Assocs., Inc.	301-424-9460
Mass	Needham, Addleco Corp.	617-444-4754
Minn	St. Paul, Dytec North	612-645-5816
NJ	Ridgefield, Ricial Assocs.	201-945-5250
NM	Albuquerque, Scientific Devices	505-293-3494
Pa	King of Prussia, Letronix	215-265-1020
Exp:	Los Angeles, Hanex Inc.	213-556-3807

BEI ELCTRNS., INC., Dept. EM, 1101 McAlmont St., Little Rock, Ark. 72203, Tel: 501-372-7351, TWX: 910-722-7384; Empl.: 338 .... p. 1484-1486

Local Sales Offices & Reps.

Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	El Segundo, BEI Elctrns.	213-322-0655
Conn	North Haven, Northeast Reps., Inc.	203-239-2507
Fla	Orlando, BEI Elctrns.	305-859-5966
Md	Arnold, BEI Elctrns.	301-757-5904
Mass	Needham Heights, Northeast Reps.	617-449-3034
Mo	St. Louis, Cadon Tech. Sls.	314-991-0262
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	Buffalo, H. C. Johnson Agencies	716-632-7880
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NY	Syracuse, H.C. Johnson Agencies	315-637-9383
Ohio	Cincinnati, BEI Elctrns.	513-321-1121
Pa	Pittsburgh, H.C. Johnson Agencies	412-961-0414
Tex	Dallas, BEI Elctrns.	214-233-3868
Tex	Euless, BEI Elctrns.	817-267-9351
Utah	Salt Lake City, R.A. Mayes Co.	801-292-6781

bel BEL FUSE INC.

BEL FUSE, Dept. EM, 203 Van Vorst, Jersey City, N.J. 07302, Tel: 201-432-0463, TWX: 710-730-5301; Empl.: 125 .... p. 2496-2502

Sales Manager: A. Sutta

Local Sales Offices & Reps.

Cal	Escondido, Cirolia Elec. Sls.	714-743-3015
Cal	Mt. View, Leddy Assoc.	415-969-6313
Cal	San Gabriel, Van Gott Assoc.	213-285-2148
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
Ill	Chicago, Memac Sls.	312-545-1033
Md	Reisterstown, FBD Sls.	301-833-9444
Mass	Waban, QRC Corp.	617-332-9600
Minn	Minn., Beta Engrg.	612-546-2215
NY	Hempstead, Kahgan Sls.	516-538-2300
NC	Cary, FBD Sls.	919-467-7595
Pa	Bala Cynwyd, M. Friedman & Assoc.	215-839-3450
Tex	Addison, Parvin Sls.	214-664-2401
Va	Portsmouth, FBD Sls.	804-484-3162

BELDEN

BELDEN CORP., Electronic Div., Dept. EM, Box 1327, Richmond, Ind. 47374, Tel: 317-966-6661; Empl.: 3197 .... p. 4538-4577

Local Sales Offices & Reps.

Cal	Claremont	714-624-7910
Cal	Corona	714-735-3508
Cal	Granada Hills	213-361-7256
Cal	San Jose	408-265-1007
Cal	San Jose	408-238-1859
Cal	West Covina	213-331-2592
Colo	Lakewood	303-238-6809
Fla	Boca Raton	305-395-4392
Ga	Lilburn	404-921-3504
Haw	Honolulu, Dougherty Enterprises	808-847-4144
Ill	Elk Grove	312-593-7513
Ill	Hinsdale	312-654-4462
Ill	West Chicago	312-231-2750
Ind	Indianapolis	317-849-1945
Ind	Richmond	317-966-6661
La	River Ridge	504-737-5314
Mass	Framingham Center	617-877-2120
Mich	Farmington	313-477-3154
Minn	Apple Valley	612-423-2163
Mo	Chesterfield	314-536-2992
NH	Hudson	603-424-2096
NJ	Lake Hiawatha	201-334-8309
NY	Henrietta	716-334-6718
NY	Pomona	914-354-0032
Ohio	Englewood	513-836-3805
Ohio	Medina	216-725-4285
Okla	Tulsa	918-663-5245
Pa	Pittsburgh	412-367-0688
Tenn	Bartlett	901-388-9181
Tex	Dallas	214-823-1423
Tex	Houston	713-444-0844
Tex	Houston	713-444-2704
Wash	Bellevue	206-885-5808
Wisc	Waukesha	414-968-2631

BELL CO., INC., Dept. EM, 106 Morrow Ave., Box 92E, Trussville, Ala. 35173, Tel: 205-655-2135; Empl.: 19

Sales Manager: R. Bell

BELL, INC., F.W., Dept. EM, 4949 Freeway Dr. E., Columbus, Ohio 43229, Tel: 614-888-7501, TWX: 810-337-2851; Empl.: 70 .... p. 2807,4338

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices, Southeast, Inc.	205-356-1969
Cal	Palo Alto, Alpha-Tech Assocs.	415-494-8717
Cal	Pasadena, P. Nurches Co.	213-796-5844
Colo	Denver, G. Moss Elctrns.	303-455-7205
Conn	Middletown, McBar Assoc., Inc.	203-865-4379
Fla	Orlando, Scientific Devices-Southeast, Inc.	305-841-8180
Fla	Palm Bay, Scientific Devices-Southeast, Inc.	305-723-1800
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996

Mass	Waltham, McBar Assoc., Inc.	617-890-0233
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NM	Albuquerque, G. Moss Elctrns.	505-256-3622
NY	Mamaroneck, Cane Tech. Sls.	914-698-4411
NY	North Tonawanda, Labtronics, Inc.	716-685-4111
NY	Syracuse, Labtronics, Inc.	315-454-9314
NY	Ulster Park, Labtronics, Inc.	914-471-2806
NC	Raleigh, Scientific Devices-Southeast, Inc.	919-872-7066
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Ore	Portland, Brett-Ross, Inc.	503-232-4184
Pa	Paoli, T. Griffin Co.	215-644-7710
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tex	Dallas, Carey-Wolf & Assocs.	214-823-5383
Tex	Ft. Worth, Carey-Wolf & Assocs.	817-738-1996
Tex	Houston, Cary-Wolf & Assocs.	713-721-2442
Wash	Seattle, Brett-Ross, Inc.	206-935-8054
Wisc	Milwaukee, Carter Electronics, Inc.	414-464-5555
Exp:	New York, N.Y., J. Plasencia, Inc.	212-867-8084

BELL & HOWELL, BRIDGEPORT, CONN., see Control Products Div. Devar, Inc.

BELL & HOWELL CO., Elctrns. & Instrs. Grp., Dept. EM, 360 Sierra Madre Villa, Pasadena, Cal. 91109, Tel: 213-443-3211, TWX: 910-587-3440

BELL INDUSTRIES, J.W. Miller Div., Dept. EM, 19070 Reyes Ave., Compton, Cal. 90221, Tel: 213-537-5200, TWX: 910-346-6740; FSC No.: 76493; Empl.: 85 p. 1414-1418

Local Sales Offices & Reps.

Ariz	Phoenix, H.A. Moore Sls. Assoc.	602-274-4558
Ark	El Dorado, D. Bellew Sls., Inc.	501-863-8325
Cal	Gardena, Bidwell Sls. Assocs.	213-770-0300
Cal	Redwood City, Logan Sls. Co.	415-369-6726
Colo	Denver, R.G. Bowen Co., Inc.	303-789-1884
Fla	Maitland, Hutto-Hawkins-Peregoy, Inc.	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy, Inc.	305-943-9593
Ga	Atlanta, Millar Electronics, Inc.	404-261-6160
Ill	Chicago, Markal Sls. Corp.	312-282-5800
Ill	Peru, Markal Sls. Corp.	815-223-8006
Ind	Indianapolis, Elctrn. Reps., Inc.	317-894-1414
Ky	Louisville, Electronic Reps.	502-368-4911
La	New Orleans, D. Bellew Sls., Inc.	504-443-3237
Md	Columbia, Par-Nell Sls. Co.	301-992-5454
Mass	North Scituate, W.A. Hendrickson Co.	617-545-0652
Mich	Grand Rapids, Markal Sls Corp.	616-942-2670
Mich	Southfield, Markal Sls. Corp.	313-355-5700
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
Miss	Jackson, Dick Bellew Sls.	601-366-6728
Mo	Raytown, Marty Taraski Sls Co.	816-358-1442
NJ	Englewood, Bressler & Baum Assoc.	201-569-7600
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	E. Aurora, LSM Assocs.	716-652-2878
NY	Ltham, LSM Assocs.	518-783-5606
NY	Phelps, LSM Assocs.	315-548-4891
NC	Raleigh, Millar Elctrns., Inc.	919-787-9564
Ohio	St. Marys, T. Shelby & Co.	419-394-3377
Ore	Portland, Earl & Brown, Co.	503-245-2283
Pa	Holland, Par-Nell Sls. Co.	215-355-9330
Tenn	Memphis, D. Bellew Sls., Inc.	901-365-9437
Tex	Richardson, Campion Sls. Co.	214-238-8145
Wash	Seattle, Earl & Brown Co.	206-284-1121
Exp:	New York City, N.Y., Roburn Agencies, Inc.	212-989-5939

BELL PA PRODUCTS CORP., Dept. EM, 1200 N. Fifth St. Box 8177, Columbus, Ohio 43201; Empl.: 20

Local Sales Offices & Reps.

Ariz	Phoenix, A.C. Smith	602-257-1875
Ga	Atlanta, O. Cavendish	404-394-6570
Ill	Chicago, P. Bunket	815-838-1026
Ore	Portland, J. Wright	503-227-6681

BELTONE ELECTRONICS CORP., Dept. EM, 4201 W. Victoria, Chicago, Ill 60646

BEMAN MFG., INC., Dept. EM, PO Box 370, New Cumberland, Pa. 17070, Tel: 717-938-1451, TWX: 510-650-3539; Empl.: 300; Minimum order: $D. Fortenbaugh p. 3644,3645

Sales Manager: D. Myers Sr., Mktg. Mgr.; *Distributor Manager:* D. Fortenbaugh

Local Sales Offices & Reps.

Cal	Westminster, A.A. Dowers Co.	213-596-4485
Colo	Denver, G. Moss Elctrns.	303-985-8815
Mich	Lathrup Village, R.C. Nordstrim Co.	313-559-7373
Minn	Minneapolis, Furber Sls.	612-881-3620
NY	Syracuse, NYCOM	315-437-8343
Ohio	Cleveland, J. O. Olsen Co.	216-752-5444
Pa	Philadelphia, K. Erdman Co.	215-224-1833
Pa	Pittsburg, J. O. Olsen Co.	412-279-2550
Exp:	N.Y., Westbury, Minthorne Int'l. Co.	516-334-3303

BEMCO, INC., Dept. EM, 9908 San Fernando Rd., Pacoima, Cal. 91331, Tel: 213-899-5296, TWX: 910-496-1520; Empl.: 35

Local Sales Offices & Reps.

Exp:	Los Angeles, Bemco Int'l Mktg. Grp.	213-391-6777

BENDIX CORP., Flight Systems Div., Dept. EM, Teterboro, N.J. 07608, Tel: 201-288-2000, TWX: 710-990-6136; Empl.: 2900

Local Sales Offices & Reps.

Cal	Burbank, Flight Sys. Div.	213-845-8701
Kans	Wichita, Flight Sys. Div.	316-943-9300
Mo	Bridgeton, Flight Sys. Div.	314-291-7171
Ohio	Dayton, Flight Sys. Div.	513-276-2154
Wash	Tukwila, Flight Sys. Div.	206-246-8104

BENDIX-GUIDANCE SYSTEMS, Dept. EM, Teterboro, N.J. 07608, Tel: 201-288-2000, TWX: 201-990-6136; Empl.: 2500

Local Sales Offices & Reps.

Cal	Lakewood, Bendix	213-595-4311
DC	Washington, Bendix	202-331-8200
Ohio	Dayton, Bendix	513-276-2154
Wash	Tukwila, Bendix	206-246-8100
Exp:	New York, N.Y., Bendix Int'l	212-262-8000

BENDIX CORP., Test Systems Div., Dept. EM, Teterboro, N.J. 07608, Tel: 201-288-2000, TWX: 710-990-6136; Empl.: 819

BENDIX CORP., Aerospace Sys. Div., Dept. EM, 3300 Plymouth Rd., Ann Arbor, Mich. 48107, Tel: 313-665-7766, TWX: 810-223-6041; FSC No.: 07038; Empl.: 700

Local Sales Offices & Reps.

Ala	Huntsville, Bendix Corp.	205-533-0180
Ohio	Dayton, Bendix Corp.	513-276-2154
Va	Arlington, Bendix Corp.	703-841-1200

BENDIX CORP., Avionics Div, Dept. EM, Box 9414, Ft. Lauderdale, Fla. 33310, Tel: 305-776-4100, TWX: 510-955-9884; Empl.: 1040

Local Sales Offices & Reps.

Cal	Burbank	213-843-4600
Fla	Fort Lauderdale	305-776-4100
Ga	Atlanta	404-691-3875
Kans	Wichita	316-684-0177
Md	Cockeysville	301-252-7740
Ohio	Dayton	513-224-9214
Tex	Euless	817-267-3641

BENDIX CORP, Communications Div, Dept. EM, East Joppa Rd., Towson, Md. 21204, Tel: 301-823-2200, TWX: 710-232-1823; Empl.: 1,000

BENDIX, Electric & Fluid Power Div., Dept. EM, Hwy. 35, Eatontown, N.J. 07724, Tel: 201-542-2000, TWX: 710-722-6686; FSC No.: 83298; Empl.: 500

Local Sales Offices & Reps.

Ala	Huntsville, Bendix Corp.	205-539-3673
Cal	Los Angeles, Bendix Corp.	213-377-0170
DC	Washington, Bendix Corp.	202-841-1200
Ohio	Dayton, Bendix Corp.	513-276-2154
Wash	Tukwila, Bendix Corp.	206-246-8107

BENDIX CORP., THE, Electrical Comp. Div., Dept. EM, Sidney, N.Y. 13838, Tel: 607-563-9511, TWX: 510-261-7550; FSC No.: 77820; Empl.: 3500

Local Sales Offices & Reps.

Cal	Lakewood	213-920-1711
Cal	Palo Alto	415-494-1224
Fla	Maitland	305-645-2005
Md	Columbia	301-997-3916
Mass	Lexington	617-861-8900
Mo	Florissant	314-647-1111
NJ	Teterboro	201-288-1710
NY	New York, Bendix International	
Ohio	Dayton	513-276-2154
Tex	Dallas	214-243-4394
Utah	Sleepy Hollow	312-428-1709
Wash	Tukwila	206-246-8100

Local Distributors

Cal	Lakewood, Bendix Corp., Elec. Comps. Div.	213-920-1711
Cal	Palo Alto, Bendix Corp., Elec. Comps. Div.	415-494-1224
Fla	Maitland, Bendix Corp., Elec Comps. Div.	305-645-2005
Ill	Sleepy Hollow, Bendix Corp., Elec. Comps. Div.	312-428-1709
Mass	Lexington, Bendix Corp., Elec. Comps. Div.	617-861-8900
Mo	Florissant, Bendix Corp., Elec. Comps. Div.	314-647-1111
NJ	Teterboro, Bendix Corp., Elec. Comps. Div.	201-288-1710
NY	New York City, Bendix Intl. Mktg. Operations	212-262-8000
Ohio	Dayton, Bendix Corp., Elec. Comps. Div.	513-276-2154
Tex	Dallas, Bendix Corp., Elec. Comps. Div.	214-243-4394
Va	Arlington, Bendix Corp., Elec. Comps. Div.	703-841-1200
Wash	Tukwila, Bendix Corp., Elec. Comps. Div.	206-575-4100
For:	Can., Montreal, Que., Aviation Elec. Ltd.	514-744-2811

BENDIX CORP., Electrodynamics Div., Dept. EM, 11600 Sherman Way, N. Hollywood, Calif. 91605, Tel: 213-765-1010, TWX: 910-499-2151; Empl.: 1200

Local Sales Offices & Reps.

DC	Washington, Bendix Corp., Electrodynamics Div.	202-333-8200

BENDIX CORP. ENVIRONMTL. SCI., Dept. EM, 1400 Taylor Ave., Dept. 81, Baltimore, Md. 21204, Tel: 301-825-5200, TWX: 710-232-1805; Empl.: 350

Local Sales Offices & Reps.

Exp:	New York, NY, Bendix Corp., Bendix Int'l. Mktg. Oper.	

BENDIX CORP., Instr. & Life Support Div., Dept. EM, 2734 Hickory Grove Rd., Davenport, Iowa 52808, Tel: 319-324-9101, TWX: 910-525-1197; Empl.: 750

Local Sales Offices & Reps.

Cal	Los Angeles, Barnard & Assocs.	213-973-5050
Cal	San Francisco, Avionics Liaison Inc.	415-783-1131
Ill	Northfield, Marsland Distributing Co.	312-295-1616
Mass	Concord, H. M. Nazor Assocs.	617-259-8784
Wash	Seattle, Avionics Liaison, Inc.	206-767-3870

BENDIX, Microwave Devices Plant, Dept. EM, Sidney, N.Y. 13838, Tel: 607-563-9511, TWX: 510-261-7550

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Phoenix, Shefler Kahn Co.	602-257-9015
Cal	No. Hollywood, Jewett	213-789-8103
Cal	Palo Alto, Bendix Electrical Comps. Div.	415-494-1224
Colo	Denver, Gossard	303-985-0602
Conn	Wethersfield, Underwood Sls.	203-563-3046
Fla	Ft. Lauderdale, CBC, Inc.	305-782-0804
Ill	Chicago, Techrep	312-761-0548
Md	Towson, Dickison Sls.	301-823-0923
Mass	Chelmsford, Underwood Sls.	617-256-8191
Mich	Union Lake, VPI, Inc.	313-363-7179
Minn	Minneapolis, F.B. Hill Co.	612-941-5270
Mo	Florissant, Bendix Electrical Comp. Div.	314-647-1111
NY	E. Aurora, E.E. Harries & Co.	716-652-1221
NY	Fayetteville, E.E. Harries & Co.	315-637-9871
NY	Melville, Astrorep Inc.	516-432-2266
Ohio	Cleveland, Components Inc.	216-243-9200
Ore	Portland, C.K. Shanks	503-292-5656
Pa	Feasterville, PSA, Inc.	215-355-6244
Tex	Dallas, Bendix Electrical Comp. Div.	214-243-4394
Exp:	N.Y., N.Y., Bendix Int'l.	212-262-8000

BENDIX CORP., MOTOR COMPS. DIV., See Facet Enterprises, Inc.

BENTHOS, INC., Dept. EM, Edgerton Dr., N. Falmouth, Mass. 02556, Tel: 617-563-5917, Telex: 94-0884; Empl.: 45

Sales Manager: P.K. Butler

Local Sales Offices & Reps.

Cal	Poway, CCM Entprs	714-487-2871
Tex	Houston, C.A. Richards & Assoc.	713-692-3368
Va	Arlington, Gans-Fryling, Inc.	703-527-3262
Wash	Seattle, J.B. Jolly, Inc.	206-932-8937

BERG ELECTRONICS, Div. E.I. DuPont de Nemours & Co., Dept. EM, York Expwy., New Cumberland, Pa. 17070, Tel: 717-938-6711, TWX: 510-650-3538 p. 1801-1808

Sales Manager: F. Wigfield; *Distributor Manager:* R. Brown

Local Sales Offices & Reps.

Cal	Woodland Hills, Berg Electrns.	213-347-8830
Ill	Lincolnwood, Berg Electrn.	312-982-4280
Mass	East Longmeadow, Berg Electrn.	413-525-4228
Minn	Minneapolis, Berg Electrn.	612-835-4820
Pa	Ft. Washington, Berg Electrn.	215-628-3066

WINFRED M. BERG INC., Dept. EM, 499 Ocean Ave., East Rockaway, N.Y. 11518, Tel: 516-599-5010

Sales Manager: C. Keenan

BERK TEK, INC., Dept. EM, Box 60, RD 1, Reading, Pa. 19607, Tel: 215-376-8071, TWX: 510-651-0511; Empl.: 140

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assoc.	919-674-9432
Ariz	Phoenix, Mr. Engineering Sls.	602-959-5150
Cal	Sunnyvale, Mission Mktg.	408-732-9611
Cal	Tustin, RJM Assoc.	714-838-5880
Colo	Denver, Duffy Assoc.	303-934-7392
Conn	Milford, Conti-Younger Assoc.	203-929-3294
Fla	Ft. Lauderdale, Beacon Elctrns.	305-491-4211
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assoc.	404-351-3654
Ill	Downers Grove, Richmar Elctrns.	312-968-0118
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Ellicott City, J. Winkler Assocs.	301-465-8630
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Mich	Rochester, Kent & Assocs.	313-651-0890
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Ridgefield, Rical Assocs.	201-945-5250
NY	Syracuse, Nycom, Inc.	315-437-8343
NY	Williamsville, Nycom, Inc.	716-633-9735
NC	Greensboro, Beacon Elctrn. Assoc.	919-674-9432
Okla	Tulsa, Palatine Sls.	918-622-0321
Pa	Huntingdon Valley, Inacker Sls.	215-947-5660
SC	Spartanburg, Beacon Elctrn. Assoc.	803-582-4613
Tenn	Oak Ridge, Beacon Elctrn. Assoc.	615-482-2409
Tex	Austin, Palatine	512-541-7463
Tex	Houston, Palatine	713-783-1492
Tex	Richardson, Palatine	214-231-9489
Wash	Medina, H. Paulman Sls.	206-455-3311
Wisc	Waukesha, Richmar Elctrns.	414-547-7777
Exp:	Pa., Philadelphia, Ballagh & Thrall	215-564-4020

BERKELEY NUCLEONICS, Dept. EM, 1198 Tenth St., Berkeley, Cal. 94710, Tel: 415-527-1121; Empl.: 15

BERKELEY INSTRUMENTS, INC., Dept. EM, 2700 Dupont Dr., Irvine, Cal. 92715, Tel: 714-833-3300, TWX: 910-595-2552; Empl.: 25 p. 2809

Sales Manager: H. Mengel

Local Sales Offices & Reps.

DC	Washington, Wright Co.	
Mass	Boston, ICI	
NY	New York City, Eastern Metro Inc.	

BERTAN ASSOCS., INC., Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791, Tel: 516-433-3110; FSC No.: 6130; Empl.: 60 p. 3212

Local Sales Offices & Reps.

Cal	Cain, White Assocs.	415-948-6533
Cal	Encino, King-Way Assoc.	213-788-4124
Colo	Boulder, H. Bass Assocs.	303-499-7509
Conn	Washington, Tri-Com Assocs.	203-868-7748
Ill	Aurora, D. Smith & Assoc.	312-896-0828
Md	Silver Springs, Spectroscopy Sys.	301-949-8261
Mass	Burlington, Tri-Com Assocs.	617-272-8163
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
NM	Albuquerque, Thorson Co.	505-265-5655
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Pa	Audubon, Holmes Assocs.	215-666-0636
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Tex	Dallas, Dwayne Clement & Assocs.	214-341-5860
Exp:	N.Y., New York, Singer Prods. Co.	212-432-1400

BEST ELECS. DIV., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122, Tel: 206-323-5100, TWX: 910-444-2154; Empl.: 4

Local Sales Offices & Reps.

Cal	Menlo Park, Straube Assocs., Inc.	415-323-2476
Colo	Denver, Straube Assocs., Inc.	303-426-0890

Advertisement

Vacuum thermocouples for the measurement of true rms, for use from oc to 300 MHZ. Matched pairs for Linear rms conversion.

BETA TECHNOLOGY, INC., Dept. EM, 94 Verdi St., Farmingdale, N.Y. 11735, Tel: 516-293-4313; Empl.: 6

BETAMITE ELECTRONIC DEV., Dept. EM, 6321 W. Slauson Ave., Culver City, Cal. 90230, Tel: 213-390-3401; Empl.: 12

Local Sales Offices & Reps.

Ariz	Scottsdale, J.A. Swanson Assoc.	602-947-4379
Cal	San Diego, Andrew Elctrn. Sls.	714-747-3015
Mass	Framingham, victor Assocs.	617-879-5710
Wash	Seattle, Carlyle Tech.	206-ME2-4290

BETATRONIX, INC., Dept. EM, 110 Nicon Ct, Hauppauge, N.Y. 11787, Tel: 516-582-6740, TWX: 510-226-3748; Empl.: 35

BEUKERS LABS., INC., Dept. EM, 30 Orville Drive, Bohemia, N.Y. 11716, Tel: 516-567-5100, TWX: 510-228-7888; Empl.: 60

Sales Manager: D.C. Johnson

Local Sales Offices & Reps.

Va	Falls Church, Beukers Labs.	703-532-3266

BF ELCTRNS., Dept. EM, 415 S. Nardo, Solana Beach, Calif. 92075, Tel: 714-755-1881; Empl.: 7

BG ELECTRONICS, INC., Dept. EM, 9 Elm Ave., Mount Vernon, N.Y. 10550, Tel: 914-664-5591; FSC No.: 33791; Empl.: 32

Local Sales Offices & Reps.

Cal	San Carlos, Westronics Assocs.	415-592-1417
Ill	Arlington Heights, Hagan Sls. Co.	312-394-0617
NY	Huntington, Andrews & Andrews Inc.	516-692-8686
Tex	Dallas, J. A. Green Co.	214-631-7450
Tex	Houston, J. A. Green Co.	713-526-2959
Exp:	PA, Lemoyne, Elctrns. Int'l.	717-737-8858

BH ELECTRONICS, Dept. EM, 245 E. 6th St., St. Paul, Minn. 55101, Tel: 612-228-6463; Empl.: 125

Local Sales Offices & Reps.

Cal	Los Angeles, Halbar Assoc.	213-387-8283
Cal	San Mateo, Halbar Assoc.	415-349-4700
Conn	Wallingford, Com Sale	203-269-7964
Fla	Indian Rocks Beach, Tech-Rep Assocs.	813-595-2834
Ill	Chicago, Kennedy Engrg.	312-631-8283
Mass	Boston, Com Sale	617-890-0011
NJ	Plainfield, J.A. Maguire & Co.	201-754-6400
NY	Rochester, R.A. Murray Company	716-467-4538
Ohio	Cleveland, James & Assocs.	216-382-1522
Tex	Dallas, Zonk Engrg.	214-238-7651
Wisc	Cedarburg, TFL Assocs.	414-377-7030

B. H. INDUSTRIES, Dept. EM, 5784 Venice Blvd., Los Angeles, Cal 90019, Tel: 213-937-4763; Empl.: 6

Local Sales Offices & Reps.

Cal	Costa Mesa, Xebex	714-540-3245
Haw	Honolulu, Aloha Assocs.	808-941-1574
Mass	Lexington, MRI	617-861-6270
Exp:	Calif., Los Angeles, Energy Elctrn. Prod. Corp.	213-670-7880

BICRON ELCTRNS. CO., Dept. EM, Box 807, Barlow St., Canaan, Conn. 06018, Tel: 203-824-5125, TWX: 710-420-0411; Empl.: 70

Local Sales Offices & Reps.

Va	Vinton, Cliff Schmitt	703-890-3859

BIDDLE, JAMES G., Dept. EM, Township Line & Jolly Rds., Plymouth Meeting, Pa. 19462, Tel: 215-646-9200, Telex: 83-4423; Empl.: 197

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co., Inc.	800-327-6600
Cal	Mountainview, Tech-Ser., Inc.	415-969-9020
Cal	San Diego, Tech-Ser., Inc.	714-222-1121
Cal	Torrance, Tech-Ser, Inc.	213-538-2267
Colo	Denver, Tessco, Inc.	303-744-1119
Conn	Middletown, The Mancib Co.	203-346-6646
Fla	Largo, Col-Ins-Co.	813-343-0978
Fla	Orlando, Col-Ins-Co., Inc.	305-423-7615
Ga	Atlanta, Williams & Assocs.	404-261-3434
Ill	Chicago, K.W. Meyers Co.	312-774-6440
Ind	Indianapolis, K.W. Meyers Co.	317-243-6681
La	New Orleans, Butler & Land, Inc.	504-722-6363
Md	Silver Spring, Sel-Tronics, Inc.	301-589-3391
Mass	Burlington, The Mancib Co.	617-272-9450
Mich	Royal Oak, Satullo Co.	313-549-3910
Minn	Minneapolis, K.W. Meyers Co.	612-920-7080
Mo	Kansas City, Carlton Co.	816-942-3912
Mo	St. Louis, Carlton Co.	314-961-0700
NJ	Saddlebrook, L & M Assoc.	201-843-8700
NM	Albuquerque, Tech. Marketing Asso.	505-298-4321
NY	Fayetteville, Savage Sales Co.	315-682-2131
NY	New York, L & M Asso.	212-243-6155
NC	Charlotte, Ranson, Wallace, Baesel, Inc.	704-334-4244
Ohio	Cincinnati, Lax Assocs.	513-771-4411
Ohio	Cleveland, Lax Assocs.	216-226-8815
Okla	Tulsa, Butler & Land	918-664-8633
Ore	Portland, ILI Corp.	503-234-6683
Pa	Andalusia, L & M Assoc.	215-639-3100
Pa	Pittsburgh, Lax Assocs.	412-833-5477
Tex	Dallas, Butler & Land, Inc.	214-363-8900
Tex	El Paso, Butler & Land, Inc.	915-566-2923
Tex	Houston, Butler & Land, Inc.	713-464-4662
Va	Richmond, Virginia Tech. Assoc.	804-266-9654
Wash	Bellevue, ILI Corp.	206-747-9410

BIKOR CORPORATION, Dept. EM, 1228 253rd St., Harbor City, Cal. 90710, Tel: 213-325-2820; Empl.: 15 p. 3210,3211

Local Sales Offices & Reps.

Cal	Mountain View, Nor-Cal Assocs.	415-961-8121
NJ	Wallington, Comp. Tech. Sls.	201-935-5454
NY	Syracuse, Advanced Comps.	315-699-2671
Ohio	Cleveland, Ed Beck & Assoc.	216-331-5212
Pa	Media, W. Reeves Assoc.	215-566-6709
Va	Fairfax, Nine Assocs.	703-273-1803

BIOCOM, INC., Dept. EM, 860 Capitolio Way, San Luis Obispo, Cal. 93401, Tel: 805-541-1103; Empl.: 24

BIOMATION, Dept. EM, 10411 Bubb Rd., Cupertino, Cal. 95014, Tel: 408-255-9500, TWX: 910-338-0226; Empl.: 180

Local Sales Offices & Reps.

Biomation

Ariz	Scottsdale, B.F.A. Corp.	602-994-5400
Cal	La Jolla, Ward/Davis Assoc.	714-459-3351
Cal	Lawndale, Ward/Davis Assoc.	213-542-7740
Cal	Sunnyvale, Ward/Davis Assoc.	408-245-3700
Colo	Parker, C.W. Fowler Co.	303-744-9595
Conn	Hamden, P. Jenks Assoc.	203-281-0810
Fla	Orlando, E.G. Holmes & Assoc.	305-894-8901
Ga	Chamblee, E.G. Holmes & Assoc.	404-451-6161
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Mission, Pivan Engrg.	913-722-1030
Mass	Wakefield, P. Jenks Assoc.	617-246-1590
Mich	Madison Heights, WKM Assoc.	313-588-2300
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NM	Albuquerque, C.W. Fowler Co.	505-299-7676
NY	Dewitt, D.B. Assoc.	315-446-0220
NY	Port Chester, Radiation Elctrns.	914-937-2300
Ohio	Cleveland, WKM Assoc.	216-267-0445
Ohio	Dayton, WKM Assoc.	513-434-7500
Ore	Beaverton, Showalter Instrs.	503-646-3004
Pa	Ambler, Data Engrg.	215-542-9876
Pa	Pittsburgh, WKM Assoc.	412-892-2953
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Dallas, Crockett Southwest Co.	214-215-1776
Tex	Needville, Crockett Southwest Co.	713-342-2176
Va	McLean, Creative Mktg. Assoc.	703-893-6612
Va	Virginia Beach, E.G. Holmes Assoc.	804-481-6556
Wash	Seattle, Showalter Instrs.	206-455-4922
Wisc	Brookfield, Pivan Engrg.	414-786-1940

BIOMETRICS INSTRUMENT CORP., Sub. Varo, Inc., Dept. EM, 2201 Walnut, Garland, Tex. 75040, Tel: 214-276-6141, TWX: 910-860-5093; Empl.: 1500 p. 3363

Sales Manager: W.T. Hart

Local Sales Offices & Reps.

NJ	Eatontown, L. Donnelly	201-229-1400
Ohio	Dayton, B. Zunke	513-253-8935
Va	Arlington, A. Fiedler & M. Walker	703-920-4500

BIRD ELECTRONIC CORP., Dept. EM, 30303 Aurora Rd., Solon, Ohio 44139, Tel: 216-248-1200, TWX: 810-427-2687; FSC No.: 70998; Empl.: 252 p. 2810,2811

Sales Manager: W.L. Yochum

Local Distributors

Cal	Los Angeles, Henry Radio	213-477-6701
Cal	Ojai, Bird Elctrn. Corp.	
Ill	Oak Park, Spectronics	312-848-6778
Mich	Rochester, Webster Communications	313-375-0420
Pa	Lancaster, Bird Elctrn. Corp.	
Tex	Grapevine, Hawkins Avionics Co.	817-481-5566

BIRD, RICHARD H. & CO., INC., Dept. EM, 1 Spruce St., Waltham, Mass. 02154, Tel: 617-894-0160, Telex: 923-441; FSC No.: 17706; Empl.: 50

Sales Manager: R.J. Cameron

BIRNBACH CO., INC., Dept. EM, 177 Hanse Ave., Freeport, N.Y. 11520, Tel: 516-223-8400; Empl.: 20

Local Sales Offices & Reps.

Fla	No. Miami, L. Haas Co.	305-949-9143

BISHOP GRAPHICS, Dept. EM, 5388 Sterling Center, Westlake Village, Cal. 91361, Tel: 213-991-2600, Telex: 66-2400; Empl.: 120

Local Sales Offices & Reps.

Cal	Irvine, Bishop Graphics Drafting Supply Center	714-979-8952
Cal	N. Hollywood, Bishop Graphics Drafting Supply	213-984-0300
Cal	Sunnyvale, Bishop Graphics Drafting Supply Center	408-732-9010
Cal	Ventura, B & R Blueprint Supply	213-877-0881

BIVAR, INC., Dept. EM, 1617 E. Edinger Ave., Santa Ana, Cal. 92705, Tel: 714-547-5832; FSC No.: 32559; Empl.: 7 p. 1123

Local Sales Offices & Reps.

Ariz	Scottsdale, Jack Osborn	602-838-9358
Cal	Burlingame, W. J. Purdy	415-347-7701
Cal	San Diego, Qualtronics Co.	714-560-8955
Colo	Denver, W.J. Purdy Co.	303-777-1411
Fla	Winter Park, Young & Lawrence	305-647-6929
Ill	Chicago, Kennedy Engrg.	312-631-8283
Iowa	Marion, Thomas & Modrcin	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin	913-432-2131
Mich	Detroit, Heick & Ralph Assocs.	313-538-3350
Minn	Minneapolis, Thurston Assocs.	612-929-7801
Mo	Hazelwood, Thomas & Modrcin	314-895-4700
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Pa	Elkins Park, K.B. Erdman Co.	215-224-1833
Tex	Dallas, Elcom Co.	214-352-5006
Wash	Seattle, Blum & Assocs.	206-285-2590
Exp:	Resea, Cal., Dynatronics International	213-881-8700

Local Distributors

Cal	El Segundo, Wassco	213-772-8171
Ill	Glen Ellyn, H.F. Wilson Engr.	312-469-8473
Mass	Hudson, Electronic Production Equipment Corp.	617-562-9123

BK TECHNOLOGY, Dept. EM, 504 W. 16th St., Long Beach, Cal. 90813, Tel: 213-436-8406

Sales Manager: B. Winchester

BLACK LIGHT CORP. AMER., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778, Tel: 213-285-3123; Empl.: 65

Local Sales Offices & Reps.

Md	Round Bay, Ultra-Violet Prods. Inc.	301-647-7333

BLACK & WEBSTER, INC., Dept. EM, 281 Winter St., Waltham, Mass. 02154, Tel: 617-890-9100; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, DiEugenio Tool Center, Inc.	602-258-8364
Ark	Little Rock, L.E. Offutt Co	501-225-8192
Cal	Hayward, D. Lewis Assocs	415-785-9650
Cal	Los Angeles, Zonne Industrial Tool Co.	213-747-0561
Colo	Denver, Duboc-Lane & Monckton, Inc.	303-623-1261
Conn	Hartford, Breen Assocs.	203-247-8604
Fla	Sarasota, Florida Fasteners & Parts Corp.	813-921-4461
Ga	Lithonia, LJS Enterprises	404-981-1327
Haw	Honolulu, H.S, Gray Co, Ltd.	808-839-2747
Ill	Westchester, W.H. Brooke Machine Tools, Inc.	312-865-0950
Ind	Buck Creek, Blettner Engrg Co.	317-589-3334
Iowa	Cedar Rapids, C.R. Service Corp	319-393-9319
Kans	Shawnee Mission, Clancey Co	913-432-4550
Ky	Louisville, Marquis Machinery, Inc.	502-451-1441
Mass	Duxbury, T.M. Walsh Assocs	617-934-6210
Mich	Grand Rapids, P.E. Watson Machinery Sls, Inc.	616-453-6386
Mich	Southfield, C.N. Simpson Co.	313-557-8850
Minn	Minneapolis, Giefer Sls Co.	612-884-2395
Mo	St. Louis, J.E. Rush Machinery Co.	314-726-0332
Neb	Omaha, Nebraska Industrial Supply Co	402-331-5540
NJ	Edison, Affiliated Sls, Inc.	201-572-0777
NY	East Rochester, BMH Equip, Inc.	716-381-8550
NY	White Plains, D. Campbell	914-946-4708
NC	Charlotte, Apex Machine Tool Supply, Inc.	704-399-0454
Ohio	Cleveland, Production Tool Co	216-932-1880
Pa	Jenkintown, Riley & Aleshire, Inc.	215-884-1708
Tex	Dallas, Tech Sls Co	214-631-8820
Wash	Seattle, National Co	206-623-7060

™BLACK CAT - molded capacitor - Cornell-Dubilier Electronics

™BLACK-DAYLITE - television receivers - General Elec. Co.

BLACKHAWK NETWORKS CORP., Dept. EM, 14 N. Parker Dr., Janesville, Wisc. 53545, Tel: 608-752-8701; FSC No.: 12724; Empl.: 10

™BLACK KNIGHT - antenna - Shakespeare

™BLACK-MAGIC - Unifield low cross talk Transmission Line flat cable - T&B/Ansley Corp.

™BLACK-OUT - front panel for lighted readout - Info-Lite Corp.

™BLAK-RAY - ultraviolet lamps & fluorescent mat'ls. - Ultra-Violet Prods., Inc.

™BLAK-RAY - black light lamps & fluorescent materials - Black Light Corp. Amer.

™BLAZER - cooling fans - Airtrol Corp.

™BLAZER 40D - CB Rig - Fanon/Courier Corp., Subs.

™BLENDMASTER - metering, mixing, dispensing machines - Hull Corp.

™BLEND-OHM - screenable resistance paste - Methode Elctrns., Inc.

BLH ELCTRNS., Dept. EM, 42 Fourth Ave., Waltham, Mass. 02154, Tel: 617-890-6700, TWX: 710-324-0683; FSC No.: 03089; Empl.: 500

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assoc.	205-881-6220
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Cupertino, T. Louis Snitzer	408-257-8333
Cal	Del Mar, T. Louis Snitzer	714-454-2191
Cal	Los Angeles, T. Louis Snitzer	213-836-6170
Colo	Denver, Barnhill Three	303-750-1222
Conn	Hamden, Applied Measurements	203-288-5288
Fla	Orlando, BCS Assoc	305-896-4881
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg.	319-377-9434
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Md	Baltimore, Sci-Rep	301-256-8144
Mich	Detroit, Comtel Instrs.	313-255-1970
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	Saddle Brook, Tri Inc.	201-791-5225
NM	Albuquerque, Barnhill Three	506-299-7658
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, Comtel Instrs.	216-442-8080
Ohio	Dayton, Comtel Instrs.	513-298-7573
Ore	Portland, SJI Corp.	503-224-0344
Pa	Chester Springs, Letronix	215-458-8977
Tex	Houston, Barnhill Two	713-688-9971
Tex	Richardson, Barnhill Two	214-231-2573
Va	Falls Church, Sci-Rep	703-573-8787
Wash	Seattle, SJI Corp.	206-624-9020
Wisc	Brookfield, Pivan Engrg.	414-786-1940

Local Distributors

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Burbank, Instr. Specialists	213-849-7181
Cal	Santa Clara, Instr. Specialists	408-244-1505
Colo	Denver, Barnhill Three	303-750-1222
Conn	Hamden, Applied Measurements	203-288-5288
DC	Washington, Powell-Pendergraph	301-656-4535
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Mass	Acton, Applied Measurements	617-646-7250
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Arentsen Elctrns.	314-434-3605
NJ	Saddle Brook, Tri Inc.	201-791-5225
NM	Albuquerque, Barnhill Three	506-299-7658
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling Co.	513-298-7573
Pa	Chester Springs, Letronix Inc.	215-458-8977
Tex	Houston, Barnhill Two	713-688-9971
Tex	Richardson, Barnhill Two	214-231-2573
Wash	Seattle, SJI Corp.	206-624-9020
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

™BLI - instrumentation - Beukers Labs., Inc.

BLILEY ELECTRIC CO., Dept. EM, 2545 W. Grandview Blvd., Box 3428, Erie, Pa. 16508, Tel: 814-838-3571, TWX: 510-696-6886; FSC No.: 71034; Empl.: 200 p. 2410,2411

Sales Manager: H.A. Yocum

Local Sales Offices & Reps.

Cal	Los Angeles, Elsner-Rambo Co.	213-664-2928
Conn	Meriden, P.R. Sturgeon Co., Inc.	203-237-1112
Ky	Fern Creek, R.W. Mitscher Co.	502-239-8927
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Elmont, F. Edwin Schmitt Co.	516-437-8150
NY	Manlius, R.W. Mitscher Co.	315-682-2855
NY	Pittsford, R.W. Mitscher Co.	716-381-9115
NY	West Hurley, R.W. Mitscher Co.	914-679-6151
NC	Raleigh, R.W. Mitscher Co.	919-828-0575
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Tenn	Johnson City, R.W. Mitscher Co.	615-929-1141
Tenn	Shelbyville, R.W. Mitscher Co.	615-684-4544
Tex	Grand Prairie, Howell Sls., Inc.	214-262-5153
Va	Virginia Beach, R.W. Mitscher Co.	804-481-7200
Wash	Seattle, C.K. Shanks & Assocs.	206-632-4290
Exp:	Conn., Stamford, Dage Corp.	203-324-3123
Exp:	N.Y., Plainview, Telesco Int'l. Corp.	516-433-6210

™B-LINE - potentiometers - Bourns, Inc.

™BLO - solvent - GAF Corporation

™BLOC-LITE - indicators-lighted - LVC Inds. Inc.

BLONDER-TONGUE LABS., INC., Dept. EM, One Jake Brown Rd., Old Bridge, N.J. 08857, Tel: 201-679-4010; Empl.: 450

Local Sales Offices & Reps.

Alas	Anchorage, H. J. Lang & Assocs	907-279-5741
Ariz	Phoenix, Toward Engrg Assoc.	602-955-3193
Cal	Hayward, Tech-Rep. Assocs.	415-785-4531
Cal	Los Angeles, Southern: E. N. Strassner Co.	213-666-1511
Colo	Denver, R. Bowen Assocs.	303-744-2501
Fla	Port Charlotte, W. F. Hemminger Co.	813-625-6050
Haw	Honolulu, G. Piety Factors	808-841-0195
Ill	Oak Park, G. Petitt Co.	312-261-0342
Ind	Fort Wayne, N. Hoemig Sls Co.	219-747-0826
La	New Orleans, Texport Co.	504-486-6073
Mass	North Scituate, W. A. Hendrickson Co.	617-545-0652
Mich	Brighten, Lectro Sls Co.	313-632-7941
Minn	Edina, M. Folster Co.	612-835-2252
Mo	Kansas City, Forristal-Young Sls Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls Co.	314-645-2360

NM	Albuquerque, C. T. Carlberg & Assocs	505-265-1579
NY	Phelps, LSM Assocs Orchard Park	315-548-4891
NY	Tuckahoe, L-C-A Sls	914-961-4700
NC	Greensboro, Adams & Assocs.	919-272-6838
Ohio	Columbus, Weller Elctrn Sls	614-885-7819
Tenn	Memphis, Texport Co.	901-683-0880
Tex	Dallas, Texport Co.	214-358-3435
Tex	Houston, Spivey-LeBoeuf Assocs.	713-649-1221
Tex	Richardson, Spivey-LeBoeuf Assocs.	214-231-3190
Utah	Salt Lake City, R. Bowen Assocs.	801-299-3920
Wash	Seattle, Pacnor Mktg.	206-284-8020
Exp:	N.Y., Plainview, Morhan Exporting Corp.	516-293-5582

(TM)**BLUE DOT** - precision coaxial connectors - Maury Microwave Corp.

(TM)**BLUE MACS** - insulation displacing connectors for flat cable - T&B/Ansley Corp.

(TM)**BLUE MACS** - installation tools for flat cable - T&B/Ansley Corp.

(TM)**BLUE MACS** - flat cable - T&B/Ansley Corp.

BLUE M ELECTRIC CO., Dept. EM, 138th & Chatham St., Blue Island, Ill. 60406, Tel: 312-385-9000, TWX: 910-689-3398; Empl.: 250 .... p. 2682

Sales Manager: H.G.. Mathews

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-7026
Cal	El Monte	213-442-6672
Cal	Sunnyvale	408-734-8734
Fla	Orlando	305-671-6655
Ga	Atlanta	404-455-3452
Mass	Framingham	617-235-8320
Mich	Allen Park	313-381-2123
NY	Elmsford	914-592-3883
NY	Syracuse	315-437-0192
NC	Charlotte	704-527-2492
Ohio	Cincinnati	513-821-6278
Pa	Ardmore	215-649-1448
Tex	Garland	214-272-2509
Wash	Seattle	206-763-1030

(TM)**BLUE-POINT** - automotive hand tools - Snap-On-Tools

(TM)**BLUE RIBBON** - electrical connectors - Amphenol North America Div.

(TM)**BLUE RIBBON** - electrical connectors - Amphenol North America Div.

(TM)**BLUE STUFF** - cleaner/lubricant - Tech Spray, Inc.

BLUM, JULIUS & CO., INC., Dept. EM, Box 292, Carlstadt, N.J. 07072, Tel: 201-438-4600, TWX: 710-989-0112; Empl.: 40

(TM)**BME CHIPS** - non-noble metal capacitors - Centralab/USCC

BODINE ELECTRIC CO., Dept. EM, 2500 W. Bradley Pl., Chicago, Ill. 60618, Tel: 312-IR8-3515, Telex: 25-3646; Empl.: 735 .... p. 3069

Local Sales Offices & Reps.

Cal	Los Angeles, C.E. Mello	213-626-9159
Cal	Saratoga, E.W. Duemmlein	408-257-0900
Kans	Shawnee Mission, Automation Specialties	913-362-4422
Mass	Andover, L.R. Cascino	617-470-0050
Mich	Grosse Ile, P.S. Miller	313-386-0900
Minn	Minneapolis, E.R. Kaye	612-588-2821
NY	Buffalo, H. Cardoza	716-834-3377
NY	East Syracuse, R.H. Nichols	315-437-2813
NY	Massapequa, D.V. Mayorga	516-541-1611
NY	Rochester, Serr, Anderson & Martin	716-586-6226
Ohio	Mantua, D.E. DeWolf	216-543-1591
Ore	Portland, D.E. Johnson	503-246-3131
Tex	Dallas, General Power Equip.	214-368-4655
Tex	Houston, General Power Equip.	713-524-1895
Exp:	Ill., Export Dept., Bodine Elec.	312-478-3515

Local Distributors

Ala	Mobile, Brownell Electro, Inc.	205-479-5405
Cal	Antioch, King Bearing, Inc.	415-757-4680
Cal	Fremont, King Bearing, Inc.	415-797-8552
Cal	Fresno, King Bearing, Inc.	209-485-7660
Cal	Los Angeles, Andrews Hardware	213-HU3-8110
Cal	Los Angeles, Minarik Electric Co.	213-MA4-3161
Cal	Merced, King Bearing, Inc.	209-722-6218
Cal	Modesto, King Bearing, Inc.	209-529-2880
Cal	Mountain View, King Bearing, Inc.	415-968-8316
Cal	Oakland, King Bearing, Inc.	415-568-6690
Cal	Sacramento, King Bearing, Inc.	916-372-0790
Cal	San Jose, King Bearing, Inc.	408-294-3363
Cal	San Leandro, Republic Supply Co.	415-357-5985
Cal	Stockton, King Bearing, Inc.	209-464-7661
Cal	Tulare, King Bearing, Inc.	209-686-4738
Colo	Denver, Wazee Electric Co.	303-892-7003
Fla	Orlando, Brownell Electro, Inc.	305-843-6770
Ga	Hapeville, Brownell Electro, Inc.	404-762-5181
Ill	Chicago, Samuel Harris & Co.	312-FR2-7272
Ill	Chicago, Excel Electric Service Co.	312-VI7-7220
Ill	Rockford, Samuel Harris & Co.	815-398-0606
Ill	St. Charles, Samuel Harris & Co.	312-584-5000
Ill	Waukegan, Samuel Harris & Co.	312-ON2-0372
Kans	Kansas City, Kornfeld-Thorp Electric	913-321-7070
La	Baton Rouge, Louisiana Bearings, Inc.	504-357-0622
La	Lake Charles, Behring's Bearing Svc.	318-HE9-9001
Mass	Medford, Empire Electrical Co.	617-395-5000
Mass	Somerville, Electro Sls Co.,	617-666-0500
Mich	Detroit, Howard Electric Co.	313-WA3-0430
Minn	Minneapolis, Boustead Electric & Mfg.	612-544-9131
Mo	St. Louis, Zeller Electric, Inc.	314-638-9641
NJ	Cherry Hill, Motor & Control Sys. Div. of Jos. T. Fewkes & Co.	609-424-5810
NJ	Edison, B & B Motor & Control	201-420-1466
NY	Bingamton, Diehl Binghamton, Inc.	607-772-1760
NY	East Syracuse, Diehl Syracuse, Inc.	315-437-2826
NY	N. Y., B & B Motor & Control	212-WO6-5777
NY	Rochester, B & B Motor & Control Corp. of Rochester	716-473-6640
NC	Charlotte, Mize Company, Inc.	704-375-5761
Ohio	Cleveland, Reserve Electric Co.	216-PR1-5764
Ohio	Dayton, Thal Mor Assocs. Inc.	513-298-9939
Okla	Oklahoma City, Dagwell Dixie Co.	405-232-7671
Okla	Tulsa, Dagwell Dixie Co.	918-932-4231
Ore	Portland, Star Machinery Co.	503-226-3011
Pa	Pittsburgh, Braunlich-Roessle Co.	412-471-6995
Tenn	Memphis, Brownell Electro Inc.	901-332-9254
Tenn	Nashville, Tennessee Machinery Co.	615-242-1742
Tex	Dallas, Bearing Chain & Supply	214-ME1-8310
Tex	Fort Worth, Bearing Chain & Supply	817-335-8131
Tex	Houston, Bearing Chain & Supply	713-676-2641
Tex	Houston, B & B Motor & Control	713-664-6961
Tex	Tyler, Bearing Chain & Supply	214-LY2-0873
Va	Richmond, Industrial Supply Corp.	804-EL5-8041
Wash	Seattle, Industrial Electric	206-EA9-3900
Wisc	Milwaukee, Trester Service Elec.	414-264-8170
Wisc	New Berlin, Electric Sls. & Engrg.	414-782-2400
For:	Can., Brantford, Ont., Renold Canada Ltd.	519-756-6118
For:	Can., Edmonton, Alb., Renold Canada Ltd.	403-474-2431
For:	Can., Hampton, NB, Renold Canada Ltd.	506-832-5324
For:	Can., London, Ont., Renold Canada Ltd.	519-453-3420
For:	Can., Montreal, PQ, Renold Canada Ltd.	514-527-8701
For:	Can., Quebec City, PQ, Renold Canada Ltd.	418-522-2011
For:	Can., Rexdale, Ont., Renold Canada Ltd.	416-741-5732
For:	Can., Vancouver, BC, Renold Canada Ltd.	604-255-8455
For:	Can., Winnipeg, Man., Renold Canada Ltd.	204-772-9541

BODINE CO., Dept. EM, 236 Mt. Pleasant Rd., Collierville, Tenn. 38017, Tel: 901-853-7211; Empl.: 30

Local Sales Offices & Reps.

Ala	Birmingham, G.E. Baucom Co.	205-871-4444
Cal	Brisbane, Drath-Jacobs	415-467-5642
Cal	San Diego, Lighting Sls of San Diego	714-440-4550
Cal	San Francisco, Drath-Jacobs	415-467-5642
Cal	Westminster, Lectric Sls. Calif.	714-893-2443
Conn	West Hartford, Nema 11, Inc.	203-236-5941
Fla	Orlando, Hartman & Assocs.	305-894-4151
Ga	Atlanta, J. J. Perry, Jr.	404-237-8239
Haw	Honolulu, Pacific Electrical Sls. Agency	808-536-5145
Haw	Honolulu, Joe Liu & Assocs.	808-531-8155
Ill	Chicago, Electri-Agency	312-439-5030
Ind	Indianapolis, C. M. Buck & Associates	317-293-5704
Kans	Kansas City, Bill Andrews Company	816-931-7195
Ky	Louisville, Winn-Beck Agency	502-426-1126
Md	Baltimore, A. Daniels	301-752-0982
Mich	Detroit, KVA Assocs.	313-892-6000
Minn	Minneapolis, Frven & Vedders Sls.	612-922-1642
Minn	St. Louis Park, Fruen & Vedders Sls	612-922-1642
Miss	Jackson, A. Spencer	601-373-5552
Mo	Kansas City, B. Andrews Co.	816-931-7195
Mo	St. Louis, Consolidated Agencies, Inc.	314-721-1213
NH	Merrimak, Barnard Assocs.	603-424-2702
NJ	Somerville, D. Caughlan & Assocs.	201-725-5623
NM	Albuquerque, McGillan Sls. Co.	505-298-1273
NY	Loudonville, C. Swanson	518-458-1297
NY	New York, Mark Sls. Agency	516-221-2995
NC	Charlotte, C. Alley Assocs.	704-523-1532
Ohio	Cleveland, Verne LaSalle	216-241-3788
Okla	Oklahaoma City, Easlon & Assocs.	405-235-7177
Ore	Portland, George M. Roth Co.	503-233-5561
Pa	Philadelphia, Penn Lighting Assocs.	215-765-6300
Tenn	Memphis, Salomon-Hawkins Co.	901-278-4934
Tenn	Nashville, Factory Sls. Agency	615-327-9051
Tex	Dallas, Easlon & Assocs.	214-241-9441
Tex	Houston, Lighting & Electrical Sls.	713-923-7781
Tex	San Antonio, Hyltin-Ayres	512-828-0624
Utah	Salt Lake City, Electrical Sls Co.	801-486-1367
Va	Roanoke, Westbury Assocs.	703-342-2247
Wash	Spokane, Braymen Sales Agency	509-924-1102
Wash	Spokane, Braymen Sls. Agcy.	509-924-1102
Wisc	Wauwatosa, Llewellyn Lighting Sls Co.	414-475-5599

BOEING MICROELECTRONICS, Dept. EM, Box 24666, Seattle, Wash. 98124, Tel: 206-773-9111, TWX: 910-423-1563; Empl.: 120

Local Sales Offices & Reps.

Cal	Irvine	714-833-3062
Vt	Jeffersonville	802-644-5111

BOGEN DIV., Lear Siegler, Inc., Dept. EM, Box 500, Paramus, N.J. 07652, Tel: 201-343-5700, TWX: 710-990-5047; Empl.: 332

Local Sales Offices & Reps.

Ariz	Scottsdale, Marshank Sls. Co.	602-949-9443
Cal	Culver City, Marshank Sls. Co.	213-559-2591
Cal	Redwood City, Sinai-Johnson	415-365-6263
Cal	Sacramento, Sinai-Johnson	916-452-6619
Colo	Denver, B.Newman & Co.	303-744-2501
Ga	Atlanta, Hollingsworth & Still Inc.	404-394-3270
Haw	Honolulu, Nylen Brothers	808-538-1171
Ill	Lincolnwood, M. Linz Assocs.	312-677-2000
Ind	Indianapolis, Kingston-Sharkey & Assocs.	317-353-9406
La	New Orleans, The Texport Co.	504-486-6073
Md	Baltimore, D. H. Brothers Co.	301-764-7189
Mass	Wellesley Hills, M. Scott Co.	617-236-0102
Mich	Buchanan, Riley & Petchell, Inc.	616-695-6356
Mich	Detroit, Riley & Petchell, Inc.	313-937-3000
Minn	St. Paul, Skor	612-645-6461
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-0800
NJ	Ridgefield, Bi-State Marketers Inc.	201-943-5888
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Buffalo, Waxman-Currant Sls. Co.	716-873-0442
Ohio	Columbus, Weller Elctrn. Sls.	614-885-7819
Okla	Tulsa, The Texport Co.	918-939-1727
Ore	Salem, Pacnor Mktg.	503-363-6445
Pa	Huntingdon Valley, M. Weinberg Assoc.	215-675-6900
Pa	Pittsburgh, F. P. Yarussi Co.	412-221-4676
Tenn	Memphis, The Texport Co.	901-683-0880
Tex	Houston, The Texport Co.	713-464-2828
Tex	Richardson, Texport Co.	214-238-7117

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Utah	Salt Lake City, R. Bowen & Assocs.	801-363-8801
Wash	Seattle, Pacnor Mktg.	206-284-8020
Exp:	New York, N.Y., Genex Corp.	212-563-1755

BOKER'S, INC., Dept. EM, 3106 Snelling Ave. S, Minneapolis, Minn. 55046

BOLT BERANEK & NEWMAN INC., see BBN Instruments Co.

BOMAN INDUSTRIES, Dept. EM, 9300 Hall Dr., Downey, Cal 90241

(TM)BOMB-TAIL - closed-end splice - Amp Inc.

(TM)BONDALUM - transit cases - Craig Sys. Corp.

(TM)BONDEZE(R)-M - magnet wire - Phelps Dodge Magnet Wire Co.

BONDHUS CORPORATION, Dept. EM, Monticello, Minn 55362, Tel: 612-295-2162; Empl.: 32

Local Sales Offices & Reps.

Ala	Birmingham, G. S. Magargee	205-822-3162
Cal	Sepulveda, Kenbil Engrg. Co.	213-893-6315
Colo	Denver, G. Metcalf	303-222-2062
Ill	Evanston, D. Beers	312-475-2435
Md	Kensington, R.F. Johnson Assocs.	301-942-3141
Mich	Birmingham, Marshall Durston Co.	313-646-6144
Mo	Hawk Point, Manufacturers' Svcs.	314-338-4373
Mo	Kansas City, D. White	816-753-1991
NY	New Hartford, V. Clair Assocs.	315-735-8122
NY	New York, F. Loewenthal	212-569-7400
Pa	Pittsburgh, F. Kostman	412-823-3430
RI	Cranston, W.K. Coleman Co.	401-781-7512
Wash	Seattle, D. D. Harader	206-322-5790

(TM)BOOMERANG - sediment corer and bottom grab - Benthos, Inc.

BOONTON

BOONTON ELECTRONICS CORP., Dept. EM, Route #287, Parsippany, N.J. 07054, Tel: 201-887-5110, TWX: 710-986-8241; Empl.: 150
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Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith, Inc.	205-881-3294
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	North Hollywood, O'Halloran Assoc.	213-877-0173
Cal	Orange County, O'Halloran Assoc.	714-636-7562
Cal	Palo Alto, O'Halloran Assocs	415-326-1493
Colo	Denver, Zeus, Inc.	303-770-5666
Conn	Mt. Carmel, Scientific Devices, Conn.	203-248-9361
Fla	Boca Raton, J. L. Highsmith & Co.	305-368-9194
Fla	Orlando, J.L. Highsmith, Inc.	305-293-5202
Ga	Acworth, J.L. Highsmith & Co.	404-926-7298
Ill	Chicago, K.W. Meyers Co.	312-774-6440
Ind	Indianapolis, K.W. Meyers Co.	317-243-6681
Kans	Olathe, Technical Representatives, Inc.	913-782-1177
Md	Silver Spring, Sel-Tronics, Inc.	301-589-3391
Mass	Burlington, R. J. Sickles Assoc.	617-272-7285
Mich	Detroit, Micro Sls. Corp.	313-482-1229
Minn	Minneapolis, K.W. Meyers Co.	612-920-7080
Mo	Hazelwood, Technical Reps, Inc.	314-731-5200
NJ	Englewood, Scientific Devices East	201-871-3916
NM	Albuquerque, Zeus Inc.	505-268-3941
NY	Rochester, Scientific Devices	716-334-2445
NC	Charlotte, J.L. Highsmith	704-333-7743
Ohio	Centerville, Micro Sales Corporation	513-433-8171
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Ore	Beaverton, Scientific Devices-Northwest	503-643-6878
Pa	Melrose Park, R. Meyers Assoc.	215-224-1663
Tex	Dallas, Airep Elctrns. Inc.	214-827-2120
Utah	Zeus, Inc.	801-534-0500
Va	Richmond, J. L. Highsmith & Co.	804-272-5888
Wash	Bellevue, Scientific Devices Northwest	206-454-0900

Local Distributors

SC	Columbia, Dixie Radio Supply Co.	803-AL3-5333

(TM)BOOTS - nuts - Cherry Fasteners

(TM)BOPAC - microwave circuitry components - Varian Electron Device Grp.

(TM)BORAL - boron-aluminum (master alloy) - Kawecki Beryico Inds., Inc.

(TM)BORD PAK - instrument cases & card guides & racks - Buckeye Stamping Co.

BORG WARNER®

BORG-WARNER THERMOELECTRICS, Dept. Borg-Warner, Dept. EM, Wolf & Algonquin Rds., Des Plaines, Ill. 60018, Tel: 312-827-3131; Empl.: 12
p. 2688-2691

Local Sales Offices & Reps.

Wash	Renton, D & D Sls	206-BA6-4120
Exp:	Franklin Park, Ill., Borg-Warner Aerospace Prods. International	312-455-3120

(TM)BOSS - stud drivers - Bostitch

(TM)BOSS - binary option DIP switch - Molex Inc.

(TM)BOSTFLEX - high flexibility industrial cables - Boston Insulated Wire & Cable Co.

(TM)BOSTGARD - high temperature soaking pit cables to 2100°F - Boston Insulated Wire & Cable Co.

BOSTITCH, Div. of Textron, Inc., Dept. EM, Briggs Dr., E. Greenwich, R.I. 02818, Tel: 401-TU 4-2500, Telex: 92-7681; Empl.: 2500

Sales Manager: M.W. Budzenski

Local Sales Offices & Reps.

Cal	Los Angeles	213-724-0440
Cal	San Francisco	415-648-7200
Ga	Atlanta	404-458-2324
Ill	Northbrook	312-498-6550
Ind	Indianapolis	317-353-2171
Mass	Winchester	617-729-6400
Mich	Farmington	313-477-1200
Mo	Maryland Hts.	314-567-6120
NJ	Carlstadt	201-933-8660
NC	Charlotte	704-376-4402
Ohio	Middleburg Heights	216-433-1060
Pa	Montgomeryville	215-643-6200
Tenn	Memphis	901-365-7200
Tex	Dallas	214-631-7580
Wash	Seattle	206-575-0655

BOSTON INSULATED WIRE & CABLE CO., Dept. EM, 65 Bay St., Dorchester, Mass. 02125, Tel: 617-265-2102, Telex: 94-0604; FSC No.: 71102; Empl.: 400

Sales Manager: R. Henry

Local Sales Offices & Reps.

Ariz	Phoenix, Electronic Dev. & Sls.	602-277-7407
Cal	Los Angeles, S. Burchard	213-532-9064
Cal	Los Angeles, Bos. Ins. W & C Connector Sys. Div.	213-532-9064
Cal	Sonoma, H.B. Burley III	707-996-3811
Colo	Denver, Colorado Sun Sls.	303-750-5017
Conn	Southbury, A. Coscina	203-756-2262
Ga	Roswell, Emmett Rushin	404-998-6498
Ga	Tallapoosa, W. Bridges	404-574-2060
Ill	Crestwood, Brisky Assocs.	312-597-7870
Ill	Hinsdale, K. Olson	312-325-6171
Kans	Shawnee Mission, Lowell-Kangas & Assocs., Inc.	913-631-3515
La	Metairie, Aneson Assocs	504-835-6445
Md	Westminster, J. Matthews	301-752-3558
Mich	Royal Oak, M. McAuliffe Sls.	313-545-7177
Mo	St. Louis, Lowell-Kangas & Assocs., Inc.	314-821-4050
NJ	Bogota, Neville & Vespo	201-487-1505
NJ	Cherry Hill, J. Schindell Assocs.	609-424-1441
NM	Albuquerque, Sealect Technology, Inc.	505-299-1137
NY	Jamestown, W. Arnold	716-664-5402
NY	Pittsford, NoCo, Inc.	716-461-4750
NC	Charlotte, Watson Sls.	204-364-6455
Ohio	Chagrin Falls, F. Gunther	216-247-5823
Pa	Ambridge, R. R. Meinert Co.	412-931-6627
Tenn	Knoxville, Engr. Prod. Co.	615-588-3312
Tenn	Memphis, Engr. Prods. Co.	901-761-3270
Tex	Houston, J. R. Woodruff Co.	713-467-8463
Tex	The Woodlands, J. Zackrison	713-367-4030

(TM)BOSTRAD - fire & radiation resistant elec. cables - Boston Insulated Wire & Cable Co.

BOURNS, INC., Instr. Div., Dept. EM, 6135 Magnolia, Riverside, Calif. 92506, Tel: 714-684-1700, TWX: 910-332-6103; Empl.: 250

Local Sales Offices & Reps.

Aerospace

Ala	Huntsville, Kemp Instrs., Inc.	205-837-4304
Cal	Hayward, Avionics Liaison, Inc.	415-783-1131
Cal	San Diego, L.L. Stcakes Inc.	714-274-6281
Colo	Arvada, Cleveland Entprs.	303-423-3707
Fla	Orlando, Truex Assocs., Inc.	305-859-2160
Iowa	Cedar Rapids, Tech. Reps., Inc.	319-363-2489
Mass	Natick, Andruss-Peskin Corp.	617-653-3919
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Mich	Kalamazoo, Carter, McCormic & Peirce Inc.	616-349-9666
Minn	Minneapolis, Furber Sls. Co.	612-861-1518
Mo	Hazelwood, Tech. Reps., Inc.	314-731-5200
Mo	Independence, Technical Representatives	816-737-1414
NM	Albuquerque, Cleveland Entprs.	505-345-2481
NY	Fayetteville, H. C. Johnson Agency, Inc.	315-637-9383
NY	Guilderland, H.C. Johnson Agency, Inc.	518-456-9681
NY	Melville, Astrorep, Inc.	516-423-2266
NY	Rochester, H. C. Johnson Agency, Inc.	716-482-3000
NY	Williamsville, H. C. Johnson Agency, Inc.	716-632-7880
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter McCormic & Peirce	513-278-5873
Ohio	Worthington, Carter McCormic & Peirce	614-888-4466
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Pa	Glenshaw, H. C. Johnson Agency, Inc.	412-961-0414
Pa	Jenkintown, PDC Corp.	215-887-9610
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431

Industrial

Ala	Huntsville, Kemp Instrs., Inc.	205-837-4304
Cal	Foster City, Featherstone Assocs.	415-341-1617
Cal	San Diego, L.L. Stoakes Inc.	714-274-6281
Colo	Arvada, Cleveland Entprs.	303-423-3707
Fla	Orlando, Milne Assocs.	305-855-1533
Ill	Schaumburg, Carvel Engrg.	312-882-6088
La	Harvey, Bourns, Inc.	504-362-2043
Mass	Natick, Andruss-Peskin Corp.	617-653-3919
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Mich	Kalamazoo, Carter, McCormic & Peirce Inc.	616-349-9666
Mo	Hazelwood, Tech. Reps., Inc.	314-731-5200
Mo	Independence, Technical Representatives	816-737-1414
NJ	Stirling, NBS Assocs.	201-464-8500
NM	Albuquerque, Cleveland Entprs.	505-298-7671
NY	Fayetteville, H. C. Johnson Agency, Inc.	315-637-9383
NY	Guilderland, H.C. Johnson Agency, Inc.	518-456-9681
NY	Rochester, H. C. Johnson Agency, Inc.	716-482-3000
NY	Williamsville, H. C. Johnson Agency, Inc.	716-632-7880
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter McCormic & Peirce	513-278-5873
Ohio	Worthington, Carter McCormic & Peirce	614-888-4466
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Ore	Portland, Brett Assocs., Inc.	503-232-4184
Pa	Glenshaw, H. C. Johnson Agency, Inc.	412-961-0414
Pa	Glenside, Elcom, Inc.	215-885-1325
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431
Wash	Seattle, Brett Assocs., Inc.	206-935-8054

BOURNS, INC., Trimpot Prods. Div., Dept. EM, 1200 Columbia Ave., Riverside, Cal. 92507, Tel: 714-781-5311, TWX: 910-332-1252; Empl.: 4000
p. 3647-3655,3782-3821, Back Cover

Sales Manager: C. Nehlsen

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns.	205-881-5031
Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Long Beach, Bourns, Inc.	213-774-8000
Cal	Sunnyvale, Quad Rep. Inc.	408-733-7300
Colo	Denver, Parker Webster	303-770-1972
Fla	Clearwater, Dyne-A-Mark	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
Fla	Ft. Lauderdale, Beacon Elctrns.	305-776-6074
Ga	Atlanta, Beacon Elctrns. Assoc.	404-351-3654
Ill	Chicago, D. Dolin Sls.	312-286-6200
Ind	Ft. Wayne, Given Corp.	219-432-5585
Md	Glen Burnie, Micro-Comp., Inc.	301-761-4600
Mass	Waltham, Datcom, Inc.	617-891-4600
Mass	Wellesley, Bourns, Inc.	617-237-6730
Mich	Detroit, Rathsburg Assoc.	313-882-1717
Minn	Edina, Mel Foster Co., Inc.	612-835-2252
Mo	Hazelwood, Centech	314-731-4220
Mo	Raytown, Centech	816-358-8100
NJ	Haddonfield, Thomas Assoc.	609-854-3011
NM	Albuquerque, A.Q. Elctrns.	505-883-1003
NY	Ithaca, B. Dean, Inc.	607-272-2187
NY	Melville, Bourns, Inc.	516-271-3500
NC	Charlotte, Beacon Elctrns.	704-525-7412
Ohio	Richfield, Bear Mktg	216-659-3131
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	Salem, J.J. Backer Co.	503-362-0717
Pa	Enon Valley, Nebco Assocs.	216-457-2333
Tenn	Oak Ridge, Beacon Elctrns.	615-482-2409
Tex	Dallas, Allied Comps., Inc.	214-238-0408
Tex	El Paso, A.Q. Elctrns.	915-545-2363
Tex	Houston, Allied Components	713-691-3961
Utah	Salt Lake City, Parker Webster Co.	801-261-1058
Wash	Seattle, J. J. Backer Co.	206-285-1300
Wisc	Milwaukee, D. Dolin Sls.	414-355-9100

Local Distributors

Ala	Huntsville, Hamilton/Avnet Elctrns.	205-533-1170
Ariz	Phoenix, Hamilton/Avnet	602-275-7851
Cal	Chatsworth, Westates Elctrns. Corp.	213-341-4411
Cal	Costa Mesa, Avnet Electronics	714-754-6111
Cal	Costa Mesa, Westates Elect.	714-549-8401
Cal	Culver City, Hamilton Electro Sls.	213-558-2121
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	Mountain View, Hamilton/Avnet	415-961-8600
Cal	Riverside, Elctrn. Supp. Corp.	714-683-7300
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	San Diego, Hamilton/Avnet	714-279-2421
Cal	Sunnyvale, Bell Inds.	408-734-8570
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Denver, Hamilton/Avnet	303-534-1212
Colo	Denver, Cramer/Denver	303-758-2100
Conn	Georgetown, Hamilton/Avnet	203-762-0361
Conn	Hamden, Wilshire Elctrns.	203-281-1166
Conn	North Haven, Cramer Elctrns.	203-239-5641
Conn	Norwalk, Harvey Elctrns.	203-853-1515
Fla	Ft. Lauderdale, Hamilton/Avnet	305-925-5401
Fla	Hollywood, Cramer/E.W.	305-923-8181
Fla	Orlando, Cramer/E.W.	305-894-1511
Fla	Orlando, Hammond Elctrns.	305-849-6060
Ga	Atlanta, Cramer/E.W.	404-448-9050
Ga	Norcross, Hamilton/Avnet	404-448-0800
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Mt. Prospect, Cramer Elctrns.	312-593-8230
Ill	Schiller Park, Hamilton/Avnet	312-678-6310
Ind	Fort Wayne, Fort Wayne Elctrns. Supply	219-742-4346
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Ind	Indianapolis, Graham Elctrns. Supp.	317-634-8486
Kans	Lenexa, Hamilton/Avnet	913-888-8900
La	Lafayette, Ralph's of Lafayette	318-234-4507
Md	Gaithersburg, Pioneer Std. Elctrns.	301-948-0710
Md	Gaithersburg, Cramer/E.W.	301-948-0110
Md	Hanover, Hamilton/Avnet	301-796-5000
Mass	Burlington, Wilshire Elctrns./New England	617-272-8200
Mass	Lexington, Harvey Elctrns.	617-861-9200
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Woburn, Hamilton/Avnet	617-933-8000
Mich	Livonia, Pioneer/Michigan	313-525-1800
Mich	Livonia, Hamilton/Avnet	313-522-4700
Minn	Edina, Hamilton/Avnet	612-941-3801
Minn	Edina, Cramer/Bonn Co.	612-835-7811
Minn	Minneapolis, Newark Elctrns.	612-331-6350
Mo	Hazelwood, Hamilton/Avnet	314-731-1144
NJ	Cedar Grove, Hamilton/Avnet	201-239-0800
NJ	Cinnaminson, Wilshire Elctrns.	215-627-1920
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Moonachie, Cramer Elctrns.	201-935-5600
NJ	Mount Laurel, Hamilton/Avnet	609-234-2133
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NM	Albuquerque, Cramer/New Mexico	505-265-5767
NY	Binghamton, Harvey Elctrns.	607-748-8211
NY	Buffalo, Standard Elctrns.	716-685-4220
NY	E. Syracuse, Hamilton/Avnet	315-437-2641
NY	E. Syracuse, Cramer/Eastern	315-437-6671
NY	Hauppauge, Cramer/Esco	516-231-5600
NY	Rochester, Hamilton/Avnet Elctrns.	716-442-7820
NY	Rochester, Cramer, E.W.	716-275-0300
NY	Westbury, Hamilton/Avnet	516-333-5800
NY	Westbury, Schweber Elctrns.	516-334-7474
NY	Woodbury, Harvey Elctrns.	516-921-8700
NC	Winston-Salem, Cramer/E.W.	919-725-8711
Ohio	Cincinnati, Hughes-Peters	513-351-2000
Ohio	Cleveland, Pioneer Standard Elctrns.	216-587-3600
Ohio	Cleveland, Hamilton/Avnet Elctrns.	216-461-1400
Ohio	Columbus, Hughes-Peters	614-294-5351
Ohio	Dayton, Hamilton/Avnet Elctrns.	513-433-0610
Ohio	Dayton, Pioneer-Dayton	513-236-9900
Pa	Philadelphia, ALMO Elctrns.	215-698-4000
Pa	Pittsburgh, Cam-RPC Elctrns.	412-288-2600
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
RI	Providence, Wm. Dandreta & Co.	401-861-2800
Tex	Dallas, Hamilton/Avnet	214-661-8661
Tex	Dallas, Cramer Elctrns.	214-350-1355
Tex	Houston, Harrison Equip. Co.	713-652-4700
Tex	Houston, Hamilton/Avnet	713-526-4661
Utah	Salt Lake City, Calron Elctrns.	801-487-7451
Utah	Salt Lake City, Hamilton/Avnet	801-262-8451
Wash	Bellevue, Hamilton/Avnet	206-746-8750
Wash	Tukwilla, Cramer Elctrns.	206-575-0907
Wisc	Mequon, Taylor Elec. Co.	414-241-4321
Wisc	Milwaukee, Electronic Expeditors	414-228-8100
Exp:	Can., Montreal, Quebec, Zentronics, Ltd.	514-735-5361
For:	Can., Calgary, Alberta, L.A. Varah	403-276-8818
For:	Can., Mississauga, Ont., Hamilton/Avnet	416-677-7432
For:	Can., Montreal, Que., Prelco Elctrns.	514-389-8051
For:	Can., Ottawa, Ont., Hamilton/Avnet	613-226-1700
For:	Can., St. Laurent, Que., Hamilton/Avnet	514-331-6443
For:	Can., Toronto 19, Ont., Zentronics Ltd.	416-789-5111
For:	Can., Vancouver 10, B.C., L.A. Varah Ltd.	604-873-3211

BOURNS MAGNETIC PRODS., Trimpot Div., Dept. EM, Box 1398, Romoland, Cal. 92380, Tel: 714-657-5195, TWX: 910-332-1304; Empl.: 120

Sales Manager: R.F. Miller

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg., Inc.	205-772-9237
Ariz	Scottsdale, De Angelo, Rothman & Cheever, Inc.	602-948-2240
Cal	Escondito, C. Bradley	714-743-0138
Cal	Gilroy, J.W. Harmon	408-842-2843
Cal	Riverside, J.D. Childress	714-781-3788
Ill	Palatine, R.O. Herrell	312-397-7783
Ind	Southbend, Valentine-Schillinger & Assocs.	219-291-6258
Minn	Edina, Mel Foster Tech. Sls.	612-835-2252
NM	Albuquerque, Tri-Tronix	505-265-0172
Ohio	Richfield, Bear Mktg.	216-659-3131
SC	Myrtle Beach, Candor Co., Inc.	803-448-8361

™BOUYOUCOS - soil moisture meas. inst. - Beckman Instrs.

BOW SOLDER PRODUCTS, Dept. EM, P.O. Box 488, 900 Hobson St., Union, N.J. 07083, Tel: 201-589-2266; Empl.: 25

BOWMAN ELECTRICAL PRODS. CORP., Dept. EM, 108 N. Jefferson St., Chicago, Ill. 60606, Tel: 312-372-8556; Empl.: 55

BOWMAR CANADA LTD., Dept. EM, 1257 Algoma Rd., Ottawa, Ont., Canada K1B 3W7, Tel: 613-746-3100, TWX: 610-562-1916; Empl.: 320

Local Sales Offices & Reps.

Ariz	Phoenix, Bowmar Instrs. Corp.	602-959-4760
Exp:	China, Hong Kong, Solid State International	K-672 112-3

BOWMAR INSTR. CORP., Dept. EM, 8000 Bluffton Rd., Ft. Wayne, Ind. 46809, Tel: 219-747-3121, TWX: 810-332-1510; FSC No.: 99479; Empl.: 300

Sales Manager: J.M. Koch, Aerospace; L.F. Slater, Commercial

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Phoenix, Sheffler-Kahn	602-257-9015
Cal	Downey, Trimarco Inc.	213-861-8244
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Cal	West Covina, Bowmar Instr. Corp.	213-330-6626
Colo	Denver, Sheffler-Kahn	303-623-1567
Conn	Suffield, T.P. Dunn Assocs.	203-668-0446
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	305-422-3686
Fla	Sarasota, Saber Assoc.	813-441-1301
Ill	Elk Grove Village, R-Tek, Inc.	312-439-9090
Ill	Palos Park, Cummings & Foley Sls.	312-448-1565
Ind	Fort Wayne, Given Corp.	219-432-5585
Ind	Ft. Wayne, Bowmar Inst. Corp.	219-747-3121
Ind	Indianapolis, Electro Reps, Inc.	317-255-4147
Ind	Indianapolis, Electro Reps.	317-255-4147
Kans	Overland Park, KEBCO	913-649-1051
Md	Churchville, Bob Dean, Inc.	301-879-2236
Md	Gaithersburg, B. Dean Inc.	301-948-5444
Mass	Medway, Gallager Sls. Co.	617-533-7292
Mass	Newton, Impact Sls. Co.	617-964-7744
Mich	Milford, Tom Mulligan & Assocs.	313-363-5575
Minn	Minneapolis, Peterson Elctrns.	612-884-3483
Mo	St. Louis, KEBCO	314-569-2660
NJ	Matawan, Bowmar Instr. Corp.	201-526-0400
NM	Albuquerque, Shefler-Kahn	505-296-0749
NY	Fayetteville, R.D. Sherman, Inc.	315-637-9861
NY	Ithaca, B. Dean Inc.	607-272-2187
NY	Plainview, ERA, Inc.	516-822-9890
NY	Rochester, Tacom Sls./Sherman	716-647-3940
NC	Raleigh, B. Dean Inc.	919-851-2065
Ohio	Columbus, Tom Mulligan & Assocs.	614-487-2242
Pa	Yeadon, Graydon, Inc.	215-664-7316
Tenn	Greenville, 20th Century Mkt.	615-638-4021
Tex	Houston, Semiconductor Sls. Assoc.	713-661-5777
Tex	Richardson, Semiconductor Sls. Assoc.	214-867-4780
Utah	Salt Lake City, Shefler-Kahn	801-484-4222
Wash	Bellevue, SD-R² Prods. & Sls.	206-747-9424

BOWMAR/TIC, INC., Dept. EM, 850 Lawrence Dr., Newbury Park, Calif. 91320, Tel: 805-498-2161, TWX: 910-336-1265; Empl.: 80 .... p. 3781

Sales Manager: K.J. Cox

Local Sales Offices & Reps.

Cal	Downey, Trimarco, Inc.	213-861-8244
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Colo	Denver, Shefler-Kahn	303-761-2590
Conn	Suffield, Terrance Dunn & Assoc.	203-668-0446
Fla	Lighthouse Point, Saber & Assoc.	305-943-3076
Ga	Smyrna, Spartech Assoc.	404-432-3644
Ill	Chicago, Engineered Sls. Co.	312-867-8434
Ind	Ft. Wayne, Insulation Reps.	219-482-1596
Mass	Woburn, R. W. Hatfield Co.	617-933-2324
Mo	St. Louis, Gordon Fixman Engrg.	314-725-5219
NY	Buffalo, Net Sls.	716-467-4538
NY	Jericho, Metro Tech. Sls.	516-935-3330
Ohio	Columbus, T. Mulligan & Assoc.	614-457-2242
Tex	Ft. Worth, J. H. Smith Co.	817-335-9313
Wash	Bellevue, SD-R2 Prods. & Sls.	206-747-9424

™BOXER - airmovers - I M C Magnetics

™BOXER - axial fans - IMC Magnetics Corp.

™BOYD BOLT - self-retained bolts - Tridair Inds.

BP INSTRUMENTS INC, Dept. EM, 10601 De Anza Blvd., Cupertino, Cal. 95014, Tel: 408-446-4322

™BR - relays - Babcock Electronics

BRADY CO., W. H., Industrial Prods. Div., Dept. EM, 2221 W. Camden Rd. Box 2131, Milwaukee, Wis. 53201, Tel: 414-332-8100, TWX: 26-677 910-262-3151

Sales Manager: N.R. Barger, Jr., Mktg. Mgr.

Local Sales Offices & Reps.

Ala	Birmingham	205-324-9196
Cal	Redondo Beach	213-373-6869
Cal	San Mateo	415-574-5822
Colo	Denver	303-455-6232
Conn	Hartford	203-247-1283
Fla	Goldenrod	305-644-0673

Ga	Atlanta	404-636-5581
Ill	Chicago	312-827-6108
Ind	Indianapolis	317-542-8380
Iowa	Bettendorf	319-324-8516
Kans	Kansas City	816-363-4133
Mass	Waltham	617-893-8390
Mich	Birmingham	313-642-6643
Minn	Minneapolis	612-926-4666
Mo	St. Louis	314-535-3406
NJ	So. Orange	201-763-7274
NY	Huntington	516-433-6088
NY	Rochester	716-442-8857
NC	Kernersville	704-333-0928
Ohio	Chagrin Falls	216-382-5090
Ohio	Cincinnati	513-731-3797
Pa	Morristown	215-337-1275
Pa	Pittsburgh	412-766-0555
Tenn	Memphis	901-452-2640
Tex	Dallas	214-363-3710
Vt	Arlington	703-534-4868
Wash	Medina	206-455-1177
Wisc	Milwaukee	414-332-8100

BRAEMAR COMPUTER DEVICES, Dept. EM, 11950 Twelfth Ave. S., Burnsville, Minn. 55337, Tel: 612-890-5135; Empl.: 50

Sales Manager: R. Morris

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Ariz	Scottsdale, Al Williams Assoc.	602-947-4297
Cal	Burbank, Roland Olander & Assoc.	213-843-5200
Cal	Los Altos, McClenning Assoc.	415-941-2113
Colo	Denver, Al Williams Assoc.	303-373-4930
Conn	New London, Media Sys. Inc.	203-447-2244
Fla	Orlando, George Bohman & Assoc.	305-855-0274
Ill	Des Plaines, Coombs Assoc.. Inc	312-298-4830
Mass	Cambridge, Media Sys Inc	617-876-0164
Minn	Burnsville, Braemar Computer Devices, Inc	612-890-5135
Mo	Kansas City, Nevco Inc	816-421-1751
NJ	Fort Lee, Tecnimat	201-461-8686
NM	Albuquerque, Al Williams Assoc	505-255-1638
NY	Syracuse, Naylor Elect Co, Inc	315-656-2251
NC	Winston-Salem, Murcota Corp.	919-722-9445
Ohio	Cleveland, K-M Sls Co	216-761-3585
Pa	Paoli, Action Planning Inc	215-647-4080
Tex	Houston, Boullion Elctrns Sls Co	713-682-3775
Tex	Houston, Boullion Elctrns Sls Co	713-682-3775
Tex	Plano, Boullion Elctrns Sls Co	214-423-8923
Wash	Seattle, Rush Drake Assoc., Inc.	206-763-2755
Wash	Walla Walla, Rush Drake Assoc., Inc.	509-529-2051
Exp:	Cambridge, Techexpert	617-661-9424

BRAILSFORD & CO., Dept. EM, 670 Milton Rd., Rye, N.Y. 10580, Tel: 914-967-1820; Empl.: 20

™BRAKE-PAK - electronic motor brake - Ambi-Tech Inds. Inc.

BRAM METALLURGICAL-CHEM. CO., Dept. EM, 245 W. Chelten Ave., Phila., Pa. 19144, Tel: 215-GE 8-4900; Empl.: 2

Sales Manager: H.H. Bram

BRAMCO, DIV. LEDEX INC., Dept. EM, 1711 Commerce Dr., Piqua, Ohio 45356, Tel: 513-773-8271; Empl.: 75

Local Sales Offices & Reps.

Ala	Huntsville, A.B. Andrews & Co.	205-539-6817
Cal	Burbank, RTS Comms.	213-843-3111
Cal	Santa Clara, RTS Comms.	408-247-2310
Fla	Orlando, Data Rep. Inc.	305-843-5224
Fla	Seminole, Datarep, Inc.	813-393-1741
Kans	Shawnee Mission, Technical Sls. Assoc.	913-888-3330
Minn	Minneapolis, Electrical Jobbers Equip., Inc.	612-721-4815
Mo	St. Louis, Technical Sls. Assoc.	314-725-5361
NY	Liverpool, Lewis & Dunnigan Co.	315-622-2133
NC	Research Triangle Park, A.B. Andrews & Co.	919-549-0563
Ohio	Cincinnati, P. Lax Co.	513-771-4411
Okla	Oklahoma City, Anderson Assocs	405-721-2479
Ore	Portland, Arva-Hudson, Inc.	503-283-3709
Pa	Philadelphia, V. S. Malta	215-836-5122
Pa	Pittsburg, Lax Assocs.	412-833-5477
Utah	Salt Lake City, D. A. Richardson Co.	801-486-3543
Wash	Bellevue, Arva-Hudson, Inc.	206-455-0773
Exp:	Dayton, Ohio, Int'l. Sls. Div., Ledex, Inc.	513-224-9530

BRAND DIELECTRICS, INC., Dept. EM, Route 203, N. Windham, Conn. 06256, Tel: 203-423-6321; Empl.: 5

™BRANDENBURG - high voltage power supplies - Zi-Tech Div.

BRAND-REX CO., Dept. EM, Box 498, Willimantic, Conn. 06226, Tel: 203-423-7771, TWX: 710-440-2247; FSC No.: 71124; Empl.: 1000

Local Sales Offices & Reps.

Cal	San Mateo, Brand-Rex	414-574-0750
Cal	Santa Ana, Brand-Rex Co	714-835-0802
Colo	Denver, Brand-Rex Co	303-759-2751
Conn	Manchester, Brand-Rex	203-649-2102
Conn	West Haven, Brand-Rex	203-384-2318
Fla	Casselberry, E.I.R., Inc.	305-830-9600
Ga	Atlanta, Interep Assocs	404-757-0182
Ill	Rolling Meadows, Brand-Rex Co.	312-392-7362
Ind	Ft. Wayne, Insulation Reps, Inc.	219-482-1596
Iowa	Des Moines, KSW Assocs	515-279-9235
Md	Baltimore, J.A. Maguire & Co.	301-377-0223
Mass	Clinton, Brand-Rex Co.	617-368-8234
Mich	Troy, Plas-Tronics	313-649-2350
Minn	Hopkins, Grayden & Flemmer	612-941-1120
Mo	Kansas City, KSW Assocs.	816-358-5240
Neb	Omaha, KSW Assocs.	402-333-2943
NJ	Dunellen, J.A. Maguire & Co.	201-752-8480
NJ	Pennsauken, J.A. Maguire & Co.	609-665-5136
NY	Rhinebeck, Brand-Rex Co.	914-297-6296
Ohio	Aurora, Clark Sls. Co	216-543-5656
SC	Greenwood, Bamco, Inc.	803-229-6801
Tex	Richardson, C.J. Tellier Co.	214-231-6348
Wash	Redmond, Barrett Sls Nothwest Ltd.	206-885-6991

™BRAND 5 - tape, cassettes, cartridges - Robins Ind's. Corp.

BRANSON CORP., Dept. EM, Box 147, Newton, N.J. 07860, Tel: 201-383-3132; FSC No.: 99928; Empl.: 40

Local Sales Offices & Reps.

Fla	Orlando, Perrott Assoc. Inc.	305-275-1132
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Mo	St. Louis, Engrg. Svcs. Co.	314-726-2233
Ohio	Columbus, T. Mulligan & Assoc.	614-457-2242

BRANSON CLEANING EQUIP. CO., Dept. EM, Parrott Dr., Shelton, Conn. 06484, Tel: 203-929-7301, TWX: 710-450-3543; Empl.: 300

Local Sales Offices & Reps.

Ariz	Phoenix, H. C. Torrey Assocs.	602-944-0352
Cal	Fullerton, Branson Cleaning Equip.	714-870-6360
Cal	Santa Clara, Branson Cleaning Equip.	408-249-2616
Colo	Denver, Crump Co.	303-426-1443
Fla	Clearwater, MacGregor Assocs.	813-446-7310
Fla	Coral Springs, MacGregor Assocs.	305-752-1924
Ga	Lilburn, MacGregor Assocs.	404-921-1300
Haw	Honolulu, Thom Equip. Co.	808-847-2027
Ill	Rolling Meadows, Furnace Finders	312-259-7060
Ill	Streamwood, Branson Cleaning Equip.	312-885-2131
La	Kenner, Automation Supplies	504-722-2217
Mass	Woburn, Branson Cleaning Equip.	617-935-8060
Mich	Novi, Gottsman Machinery Assocs.	313-349-5050
Mo	Kansas City, Process & Control Products	816-444-4344
NJ	Stratford, Branson Cleaning Equip.	609-627-2888
NY	Rochester, Branson Cleaning Equip.	716-288-0100
Ohio	Dayton, Hawkins & Hawkins	513-293-2628
Ohio	Toledo, R.F.D. Assocs	419-535-6881
Ore	Portland, Pacific Scientific Co.	503-256-1770
SC	Fort Mill, Branson Cleaning Equip.	803-548-4334
Tex	Richardson, Branson Cleaning Equip.	214-234-2477
Wash	Seattle, Pacific Scientific Co.	206-762-4260

™BRANSONIC - ultrasonic cleaner - Branson Cleaning Equip. Co.

BRAUN-BRUSH CO., Dept. EM, 43 Albertson Ave., Albertson, N.Y. 11507, Tel: 516-741-6000; Empl.: 26; Minimum order: $B. McVeigh

Sales Manager: M. Braun; *Distributor Manager:* B. McVeigh

BRAUN CO., INC., Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360, Tel: 813-526-9104; Empl.: 50

BRAXTON MFG. CO., Dept. EM, Echo Lake Rd. N., Watertown, Conn. 06795, Tel: 203-274-6781; Empl.: 35

Local Sales Offices & Reps.

Cal	Costa Mesa, Braxton Mfg. Cal.	714-645-7363
Tex	Richardson, Burns Tech. Sls.	214-423-3379

™BRAZALOY - flux - Chemetron Corp.

BREEZE-ILLINOIS, INC., Dept. EM, Main & Agard Sts., Wyoming, Ill. 61491, Tel: 309-695-2511, TWX: 510-390-3691; Empl.: 85 .... p. 4578

Local Sales Offices & Reps.

Cal	San Carlos, Ault Assocs.	415-592-1091
Cal	Woodland Hills, Cal Ward Sls. Co.	213-494-4864
Ga	Chamblee, E. G. Holmes & Assocs.	404-451-6161
Ill	La Grange Park, Bierhaus Sls.	312-354-5100
Mass	Randolph, Naton Assocs.	617-986-6344
Minn	Minnetonka, T. H. Ayre & Assocs.	612-474-4125
Mo	St. Louis, F. R. Krabbe & Assocs.	314-842-4422
NY	Great Neck, Trionic Assocs.	516-466-2300
NY	Syracuse, C. W. Floring & Assocs.	315-478-2149
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Pa	Media, Snyder & Stefkovic Assocs.	215-566-5400
Tex	Irving, Space Elctrns.	214-251-3636
Wash	Bellevue, Martin Poggi Co.	206-454-2026

BRELONIX, INC., Dept. EM, 106 North 36th St., Seattle, Wash 98103, Tel: 206-ME 3-1964; Empl.: 10

Sales Manager: H.W. Blake

™BREWEAVE - tungsten mesh element - Brew Richard D. & Co., Inc.

BREW RICHARD D. & CO., INC., Dept. EM, 90 Airport Rd., Concord, N.H. 03301, Tel: 603-225-6605, Telex: 943-483; Empl.: 55

Local Sales Offices & Reps.

Wash	Seattle, Eustis Co.	206-623-7060

™BRILLO-LOCK - air filters, permanent aluminum - Evans, George Corp.

™BRIMAR - cathode raytubes - Inter-Tech. Grp., Inc.

BRINKMANN INSTRS., INC., Dept. EM, Cantiague Rd., Westbury, N.Y. 11590, Tel: 516-334-7500, TWX: 510-222-8254; Empl.: 150

Local Sales Offices & Reps.

Cal Burlingame
Cal Los Angeles
Ill Des Plaines
Tex Houston

BRISTOL DIV. OF ACCO, See Acco, Bristol Div.

BRISTOL SAYBROOK CO., Dept. EM, 97 Coulter St., Old Saybrook, Conn. 06475, Tel: 203-388-3414, Telex: 966-435; Empl.: 125

Local Sales Offices & Reps.

Cal	Burlingame, J. Logan Assoc.	415-697-6100
Cal	Los Angeles, C.E. Mello Co.	213-626-9159
Conn	Old Saybrook, M.L. Assoc.	203-388-9718
Ill	Palatine, Seversen Engrg.	312-358-8793
Mo	Independence, Gribble Sls. Engr. Co.	816-796-4333
Ore	Beaverton, David Fry Co.	503-643-5448
Tex	Dallas, Ion Assoc.	214-357-9441

Local Distributors

Cal	Los Angeles, Minarik Electic Co.	213-624-3161
Mass	Somerville, Electro Sls. Co.	617-666-0500
NY	Sodus, AED Distributors	315-483-6561

™BRITESORB - synthetic magnesium silicate - Philadelphia Quartz Co.

BRITISH AIRCRAFT CORP. (USA INC.), Intratec Div., Dept. EM, 399 Jefferson Davis Hwy., Arlington, Va. 22202, Tel: 703-979-1400, Telex: 89517; Empl.: 100

BRITISH INFO SERVICE, Dept. EM, 845 Third Ave., New York, N.Y. 10022

(TM)BROAD-BAND RATED FERRAMICS - ferrites - Indiana General

BROADVIEW CHEMICAL, Dept. EM, 2910 S. 18th St., Broadview, Ill. 60153

BROMBERG ENGINEERING, Dept. EM, 461 Conant Rd., Weston, Mass. 02193, Tel: 617-653-4285; Empl.: 6

(TM)BRONCO 66 - flexible cord & cables - Teledyne Western Wire & Cable

BROOKHAVEN INSTRS. CORP., Dept. EM, Box 3136, Austin, Tex. 78764, Tel: 512-442-1216; Empl.: 8

Local Sales Offices & Reps.

NY	Port Chester, Radiation Elctrns. Inc.	914-937-2300
Tenn	Knoxville, Pulcir Inc.	615-693-3461

BROOKS INSTR. DIV., Emerson Elec. Co., Dept. EM, 407 W. Vine St., Hatfield, Pa. 19440, Tel: 215-368-2000, Telex: 83-4211; Empl.: 450

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-8073
Cal	Buena Park	213-921-3486
Ill	Westchester	312-345-2740
NJ	Teaneck	212-753-4628
Ohio	Cleveland	216-464-0800
Pa	King of Prussia	215-242-8840
Tex	Houston	713-784-4930

BROOKS MFG. CO., Dept. EM, Box 17602, Philadelphia, Pa 19135, Tel: 215-425-3395; Empl.: 14

Sales Manager: G. Brooks

Local Sales Offices & Reps.

Cal	San Francisco, Irving Ballard Co	415-781-1781
NC	Charlotte, Dewitt Austin Inc	704-334-0174

(TM)BROOKSMITE - flowmeter - Brooks Instr. Div.

BROOMALL INDUSTRIES, INC., Dept. EM, 682 Parkway, Broomall, Pa. 19008, Tel: 215-328-1040

Local Sales Offices & Reps.

Cal	Culver City, F.L. Wolfe, Inc.	213-559-7200
Cal	Los Altos, Bergis Assocs	415-941-4133
Colo	Boulder, PAR Assocs	303-499-4736
Fla	Indian Harbour Beach, General Technology	305-777-7530
Ga	Decatur, General Technology	404-634-8331
Md	Silver Spring, Spectro Sys. Corp.	301-949-8261
Mass	Framingham, Bartlett Assocs.	617-879-7530
NM	Sandia Park, PAR Assocs	505-281-5602
NY	White Plains, Bartlett Assocs.	914-949-6476
NC	Raleigh, General Technology	919-876-6262
Ohio	Columbus, Measurement Instrs.	614-274-6644
Pa	Southampton, Spectro Sys. Corp.	215-357-6644
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Wash	Seattle, Delcom Sls. Co.	206-248-0090

(TM)BROWN BOOSTER - high-surge voltage regulator - Micron Industries Corp.

BROWNE ENGINEERING CO., Dept. EM, 203 Chapala St., Santa Barbara, Cal. 93101, Tel: 805-963-0371, Telex: 65-8454; Empl.: 30

Local Sales Offices & Reps.

Conn	Stafford Springs, Shaun Cross	203-684-3649
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Ind	Kokomo, Teledyne TAC	317-453-7671
Md	Arnold, D. McGuire	301-544-0174
Tex	Irving, Crockett Southwest	214-251-1176
Wash	Seattle, Demarest & Assocs.	206-523-0600

BROWN ELECTRO-MEASUREMENTS CO., Brown Electro-Meas., Dept. EM, P.O. Box 55169, Seattle, Wash. 98155, Tel: 206-363-8252; Empl.: 7

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Cal	Burlingame, William J. Purdy Co.	415-347-7701
Cal	San Diego, Windsor Dynamics	714-452-1891
Cal	Sherman Oaks, Windsor Dynamics	213-990-4173
Colo	Boulder, Scientific Devices	303-449-9466
Fla	Orlando, Scientific Devices	305-841-8180
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Des Plaines, Scientific Devices	312-297-5240
Kans	Shawnee Mission, Scientific Devices	913-362-8700
Mich	Milford, Scientific Devices	313-685-8912
Minn	Minneapolis, Scientific Devices	612-544-1616
NJ	Fort Lee, Bob Cameron Assocs.	201-461-2595
NJ	Hackensack, Bob Cameron Assocs.	201-487-2133
NM	Albuquerque, Scientific Devices	505-293-3494
NY	New York, Ad Auriema Inc.	212-466-2500
NY	Rochester, Scientific Devices	716-334-2445
NC	Raleigh, Scientific Devices	919-872-7066
Ohio	Dayton, Scientific Devices	513-298-9904
Pa	Plymouth Meeting, Scientific Devices	215-825-9515
Tex	Richardson, Scientific Devices	214-231-8106
Tex	San Antonio, Scientific Devices	512-736-3164
Vt	Virginia-Springfield, Scientific Devices	703-451-6500
Wash	Bellevue, Scientific Devices	206-454-0900

BRUNSWICK ENGINEERING INC., Dept. EM, 330 Melvin Drive, Northbrook, Ill. 60062, Tel: 312-272-7660; Empl.: 12

Local Sales Offices & Reps.

Ariz	Phoenix, Cooke Sls. Co.	602-956-3515
Ark	Little Rock, B. C. MacDonald & Co.	501-376-6331
Cal	San Carlos, Dimensional Control Corp.	415-591-0365
Cal	Santa Ana, Dimensional Control Corp.	714-541-6608
Colo	Denver, I. J. Esbenson Co.	303-222-3808
Fla	Tampa, Tool & Die Supply Co.	813-876-1346
Ill	Highland Park, Radiation Equip. Co.	312-831-2900
Ind	Indianapolis, R.L. Guimont Co.	317-251-9261
Iowa	Cedar Rapids, T. Froeberg Co.	319-362-6547
Kans	Kansas City, B.C. MacDonald & Co.	913-236-7434
Mass	Shrewsbury, Sterling Sls.	617-757-0800
Mich	Grand Rapids, Burton Precision Co.	616-454-3321
Mich	Oak Park, Wagner Sls. Co.	313-548-4770
Minn	Minneapolis, L.O. Hallonquist Co.	612-944-2104
Mo	St. Louis, B.C. MacDonald & Co.	314-993-2833
NJ	Bound Brook, Clarkson & Foreman Inc.	201-469-2884
NY	Rochester, Brook-Anco Corp.	716-271-4100
NC	Charlotte, F.D. Hurka Co.	704-366-0209
Ohio	Cleveland, Production Svc. Co.	216-671-2550
Okla	Oklahoma City, Southwestern Sls. & Gage	405-787-1734
Pa	Media, G. S. Maier Co.	215-565-2010
Tenn	Knoxville, Tool Crib	615-525-6195
Tex	Dallas, Southwestern Sls. & Gage	214-358-5151
Tex	Houston, Southwestern Sales & Gage	713-523-4606
Utah	Salt Lake City, TimeSaver Industrial	801-364-0331
Wash	Seattle, Dimensional Control Corp.	206-362-3803
Wisc	Brookfield, L. Hammond Co.	414-786-9340

(TM)BRUSH - oscillographic recorder line - Gould, Inc.

(TM)BRYANT - drum memory product line - General Instr. Corp.

BRYANT ELECTRIC, Dept. EM, 1421 State St., Bridgeport, Conn. 06602

BRYNLAW PRODS., INC., Dept. EM, 1707 U.S. Hwy. 130 S., Burlington, N.J. 08016, Tel: 609-386-7733; Empl.: 7

Local Sales Offices & Reps.

Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370

BSR (USA) LTD, Dept. EM, Route 303, Blauvelt, NY 10913

(TM)BTM - basic transport mechanism - True Data Corp.

(TM)BTR - broad temp. range elastomer - Lord Kinematics

(TM)BUBBLTROL - pressure operated control - Autocon Inds., Inc.

(TM)BUCHANAN - terminal blocks, connectors - Control Products Div.

BUCHANAN CRIMP TOOL PRODS., Amerace Corp. Control Prods. Div., Dept. EM, 1065 Floral Ave., Union, N.J. 07083, Tel: 201-289-2225, Telex: 138-214; Empl.: 65

Sales Manager: J. Nosti

Local Sales Offices & Reps.

Cal	Van Nuys	213-997-7243
NJ	Union	201-289-225

BUCKBEE MEARS CO., Dept. EM, 245 E. 6th St., St Paul, Minn. 55101, Tel: 612-228-6371; Empl.: 1600

Local Sales Offices & Reps.

Cal	Los Angeles	805-523-7589
Cal	San Jose	408-248-2750
Ill	Elk Grove Village	312-439-6433
Minn	St. Paul	612-228-6371
NH	Nashua	603-883-0316
NJ	E. Windsor	609-443-3340
Ohio	Sylvania	419-882-6918

BUCKEYE STAMPING CO., Dept. EM, 555 Marion Rd., Columbus, Ohio 43207, Tel: 614-445-8433; Empl.: 75 .... p. 1124,2527

Sales Manager: R.E. Osborne VP Mktg.

Local Sales Offices & Reps.

Cal	Palo Alto, Engrg. Assocs.	415-494-7842
Cal	Pasadena, P. Nurches Co.	213-MU1-8957
Colo	Denver, G. Moss Elctrns., Inc.	303-455-7205
Ga	Atlanta, Par Assoc.	404-393-0018
Ill	Chicago, W.J. Doyle Co.	312-BR4-6685
Mass	Belmont, Elctrn. Comps. & Svc.	617-484-8680
Mich	Lathrup Village, R.C. Nordstrom Co.	313-559-7373
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
Mo	Grandview, Production Automation	816-763-4155
NY	Lynbrook, P. Saftler Assoc.	516-593-7880
Ohio	Cleveland, H. N. Heasley Co.	216-486-2800
Ohio	Columbus, McFadden Sls.	614-221-3363
Ore	Portland, Elctrns. Comp. Sls.	503-243-2342
Pa	Paoli, T. Griffin Co.	215-647-1550
Tex	Houston, R. Martin Assoc.	713-444-2944

Local Distributors

Cal	Los Angeles, Elect. Switches	213-660-1310
Mich	Ann Arbor, Wedemeyer Elctrns.	313-665-8611

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Sales Manager: A.N. Haas

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	202-533-3509
Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	San Carlos, D.H. Ross Co.	415-591-4411
Colo	Denver, Lindberg Co.	303-758-9033
Fla	Ft. Lauderdale, Cartwright & Beam Co.	305-791-3938
Fla	Orlando, Cartwright & Bean Co.	305-422-4531
Ga	Atlanta, Cartwright & Bean Co.	404-255-5262
Ill	Chicago, I.R.I. Inc.	312-647-7755
Ind	Indianapolis, Southern Sls. Corp.	317-299-2992
Iowa	Cedar Rapids, P.M.A. Corp.	319-362-9177
Kans	Overland Park, P.M.A. Corp.	910-381-0004
Kans	Wichita, P.M.A. Corp.	316-264-2662
La	Gretna, Cartwright & Bean Co.	504-362-4649
Mass	Needham, Mullin Tech. Sls.	617-444-4780
Mich	St. Clair Shores, J.M. Thorpe	313-779-6363
Minn	Minneapolis, C. Gibb Co.	612-377-1200
Miss	Jackson, Cartwright & Beam Co.	601-981-1368
Mo	Maryland Heights, P.M.A. Corp.	314-569-1220
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Rochester, Marchese & Marsex Assoc.	716-442-9700
NY	Rockville Centre, Willgold	516-764-4022
NC	Charlotte, Cartwright & Bean Co.	704-333-6457
NC	Raleigh, Cartwright & Bean Co.	919-781-6560
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Ohio	W. Carrollton, Marlow Assocs.	513-866-4991
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Pittsburgh, Marlow Assoc.	412-831-6113
Tenn	Knoxville, Cartwright & Bean Co.	615-693-7450
Tenn	Memphis, Cartwright & Bean Co.	901-276-4442
Tex	Dallas, Lund & Co.	214-387-4634
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, Earl & Brown Co.	206-284-1121

BUDD CO., Polychem Div., Dept. EM, Front & Ford Sts., Bridgeport, Pa. 19405, Tel: 215-275-0800; Empl.: 400

™BUDDYBUZZER - dual alarm system - Tapeswitch Corp. Amer.

BUDWIG MFG. CO., Dept. EM, P.O. Box 97, Ramona, Calif. 92065, Tel: 714-789-0900; FSC No.: 31827; Empl.: 50

™BUGBOOKS - tutorial software - E & L Instruments, Inc.

™BULK METAL - resistor and potentiometer elements - Vishay Resistive Systems Grp.

™BULLET - sealing hub connector - T & B/Thomas & Betts

™BULLET - sealing hub connector - T & B/Thomas & Betts

™BULLET BLADE - plows - Allis-Chalmers

™BULLET BOND CLIP - cable shield bonding hardware - Communications Technology Corp.

™BULLET-NOSE - lugs - Sealectro Corp.

™BULLS-EYE - subminiature circular connectors - Hughes Aircraft Co., Connecting Devices Div.

BULOVA WATCH CO., FREQ CONTROLS DIV., Elctrns. Div., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377, Tel: 212-335-6000, TWX: 710-852-2637 p. 2412,2413

Local Sales Offices & Reps.

Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	Menlo Park, Straube Assocs.	415-323-2476
Colo	Boulder, Straube Assocs.	303-443-8600
Conn	Suffield, Terrance P. Dunn Co.	203-668-0446
Fla	Clearwater, Perrott Assocs.	813-531-5513
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Chicago, Techrep, Inc.	312-761-0548
Iowa	Cedar Rapids, J.R. Sls. Engrg. Inc.	319-377-8211
Mass	Chelmsford, Underwood Sls.	617-256-8191
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Guilderland, H.C. Johnson Agencies	518-456-9681
NY	Rochester, H.C. Johnson Agencies	716-482-3000
Ore	Portland, J. J. Backer	503-297-3776
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Pa	Philadelphia, Eastern Comps.	215-927-6262
Tex	Dallas, United Comps.	214-324-1448
Wash	Seattle, J.J. Backer	206-285-1300
Exp:	N.Y., New York, C. Tennant & Sons	212-679-1300

BULOVA WATCH CO., SERVO PRODS. ELCTRNS. DIV., Dept. EM, 61-20 Woodside Ave., Woodside, N.Y. 11377, Tel: 212-335-6000, TWX: 710-582-2637 p. 3947

Local Sales Offices & Reps.

Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	El Segundo, Varigon	213-679-0621
Cal	Palo Alto, A. Barauck Co.	415-327-7711
Cal	San Diego, Varigon	714-299-5413
Colo	Boulder, Straub Assocs.	303-443-8600
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Park Ridge, R.F. Specialists	312-698-2044
Ind	Ft. Wayne, R.F. Specialists	219-485-3228
Kans	Witchita, Thunderbird	316-684-3941
Mass	Chelmsford, Underwood Sls.	617-256-8191
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	St. Louis, Thunderbird	314-567-6488
NJ	Cherry Hill, Sencor, Inc.	215-698-9660
NY	Buffalo, H.C. Johnson Agencies	716-632-2880
NY	Fayetteville, H. C. Johnson Agenices	315-637-9383
NY	Mamaroneck, Cane Technical Sales	914-698-4411
NY	Rochester, H. C. Johnson Agencies	716-482-3000
Pa	Flourtown, Eastern Comps.	215-836-1616
Exp:	New York, C. Tennant	212-679-1300

BULOVA SYSTEMS & INSTRUMENT CORP., Dept. EM, Green Acres Rd., W., Valley Stream, N.Y. 11582, Tel: 516-561-2600, TWX: 510-225-8409; Empl.: 750

Local Sales Offices & Reps.

Exp:	Mass., Mattapoisett, C. Boyd	617-758-3319

BUNKER RAMO, see Amphenol

BUNTING BRASS & BRONZE CO., See N.L. Inds., Bearings Div.

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BUNTING MAGNETICS CO., Dept. EM, 2100 Estes Ave., Elk Grove Village, Ill. 60007, Tel: 312-593-2060; Empl.: 51

Local Sales Offices & Reps.

Ind	Indianapolis	317-359-1010
Mass	Boston	617-533-7391
Mich	Detroit	313-525-0087
NY	Buffalo	716-681-3411
Ohio	Cleveland	216-888-2523

BURDETTE BUSS BARS, INC., Dept. EM, 16 W. Kings Hwy., Box 14, Mt. Ephraim, N.J. 08059, Tel: 609-931-1300; Empl.: 7

Local Sales Offices & Reps.

Fla	Casselberry, Publicover Assocs.	305-834-5775
Md	Timonium, Technical Mktg. Co.	301-252-4780
Mass	Westboro, Technical Mktg. Co.	617-366-8460
NJ	Mt. Ephraim, Burdette Co.	609-931-1309

BUREAU ENGRAVING, INC., Ind'l. Div., Dept. EM, 219 N. Second St., Minneapolis, Minn. 55401, Tel: 612-339-8001, TWX: 910-576-2733; Empl.: 550

BURGESS BATTERY, See Gould Inc., Portable Battery Div.

BURGESS SWITCH CO., Dept. EM, 777 Warden Ave., Scarborough, Ont., Can. M1L 4C3, Tel: 416-751-8280; FSC No.: 36497; Empl.: 1000

Local Sales Offices & Reps.

Fla	Clearwater, Lynch Gentry Assoc.	813-443-2697
Ga	Atlanta, Murphy & Cota	404-875-2525
Ill	Des Plaines, Lincoln Hodges	312-297-3810
Mass	Waltham, R.J.C. Assocs.	617-899-5858
Mich	Bloomfield Hills, R. C. Dakin Co.	313-647-2262
Minn	St. Paul, Kenco Co.	612-645-7717
NJ	Clifton, Faber Assocs.	201-773-8900
NY	Buffalo, Niagara Elec.	716-886-4000
NY	Rochester, Niagara Elec.	716-271-1223
NY	Syracuse, Niagra Elec.	315-437-1656
NC	Charlotte, Murphy & Cota	704-596-4722
Ohio	Cleveland, Anderson-Bolds	216-229-4700
Tex	Dallas, Wm. Reese Corp.	214-638-6575
Wisc	Waukesha, Lincoln Hodges Assocs.	414-542-3087

BURLING INSTR. CO., Dept. EM, 16 River Rd., Box 298, Chatham, N.J. 07928, Tel: 201-635-9481; Empl.: 27

Sales Manager: E. C. Mick

Local Sales Offices & Reps.

Cal	Los Angeles, C. Meriam Co.	213-269-8271
Cal	Mountain View, Claypool Controls Co.	415-968-7488
Colo	Denver, Toncray Equip. Co.	303-629-1102
Conn	Bridgeport, M.A. Selmon Co.	203-366-3651
Fla	Cantonment, C.B. Metcalf Co.	904-476-7710
Fla	Jacksonville, Olen Sls. Corp.	904-744-3988
Fla	Miami, Henning Co.	305-NA4-5832
Ga	Atlanta, J.R. Stilwell Co.	404-237-9844
Haw	Honolulu, Berkley Engrg. & Equip. Co.	808-538-1921
Ill	Chicago, Kelburn Engrg. Co.	312-775-8383
La	New Orleans, Gilbert & Assocs.	504-UN6-7444
Md	Baltimore, G. Goodman Ind.	301-837-3210
Mich	Roseville, H.C. Engelman Co.	313-777-0750
Minn	Minneapolis, Industra Co.	612-929-6224
Mo	Florissant, H & R Sls. & Engrg. Co.	314-921-6242
Neb	Omaha, H.G. Klug Co.	402-397-8910
NJ	Springfield, RJM Sls.	201-467-1210
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Charlotte, Brown & Morrison	704-ED3-0774
Ohio	Cincinnati, BC Engrg. Co.	513-891-6122
Ohio	Cleveland, Franklyn W. Kirk Co.	216-226-1970
Okla	Tulsa, Quigg Process Equip. Co.	918-587-0166
Pa	Broomall, J.C. Whiddett Co.	215-353-6343
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Tex	Arlington, Pan-Tech Engrg. Co.	817-640-3232
Tex	Houston, Pan-Tech Engrg. Co.	713-623-0640
Tex	Odessa, Barnco, Inc.	915-332-0293
Wash	Kirkland, Unit Process Co.	206-822-0241
Exp:	Conn., New Haven, Masten-Wright Corp.	203-288-1638

BURNDY CORPORATION, Dept. EM, Richards Ave., Norwalk, , Conn. 06852, Tel: 203-838-4444, TWX: 710-468-2546; Empl.: 3500 p. 1810-1817

Sales Manager: R. Bergstrom

Local Sales Offices & Reps.

Ala	Huntsville, Interep Assocs.	
Ariz	Phoenix, Burndy Corp.	602-244-9719
Cal	El Segundo, Burndy Corp.	213-772-5401
Cal	Santa Clara, Burndy Corp.	408-249-5353
Colo	Wheatridge, Waugaman Assocs.	
Conn	Norwalk, Burndy Corp.	203-838-4444
Fla	Cocoa, Electro Comp Assocs.	
Fla	Ft. Lauderdale, Electro Comp Assocs.	305-491-4141
Fla	Orlando, Burndy Corp.	305-896-3067
Ga	Atlanta, Interep Assocs.	404-394-7756
Ill	Schiller Park, Burndy Corp.	312-678-5211
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Kans	Olathe, BC Elctrn. Sls.	913-888-6680
Md	Hunt Valley, Burndy Corp.	301-628-2520
Md	Silver Spring, Carwithen Assocs.	301-589-9040
Mass	Dedham, Burndy Corp.	617-326-6386
Mich	Canton, Burndy Corp.	
Mich	Detroit, Rathsburg Assocs.	313-882-1717
Minn	Bloomington, Burndy Corp.	612-854-2100
Minn	Minneapolis, Comstrand, Inc.	612-571-0000
Mo	Hazelwood, Burndy Corp.	
NM	Albuquerque, Waugaman Assocs.	505-294-1436
NY	Camillus, Noeth-Honsinger Assocs.	315-672-3988
NY	Ilion, Noeth-Honsinger Assocs.	315-894-9943
NY	New Rochelle, Burndy Corp.	
NY	Pittsford, Noeth-Honsinger Assocs.	716-461-4750
NC	Charlotte, Burndy Corp.	
Ohio	Cleveland, A.H. Baier Co.	216-461-6161
Ohio	Dayton, A.H. Baier Co.	513-276-4128
Tex	Garland, Burndy Corp.	214-271-4431
Tex	Houston, Cunningham Co.	
Utah	Salt Lake City, Waugaman Assocs.	801-363-0275
Wash	Bellevue, Comtec Mktg. & Sls. Engrgs.	206-453-1188
Wash	Mercer Island, Burndy Corp.	206-624-5442

Local Distributors

Ala	Phoenix, Kierulff Elctrns.
Cal	Irvine, Cramer Elctrns.
Cal	Los Angeles, Kierulff Airline Supply Co.
Cal	Los Angeles, Kierulff Elctns.
Cal	Palo Alto, Kierulff Elctrns.
Cal	San Carlos, Sterling Elctns.

Cal	San Diego, Cramer Elctns.
Cal	San Diego, Kierulff Elctns.
Cal	Van Nuys, Coast Air Supply
Colo	Denver, Kierulff Elctrns.
Conn	Hamden, Arrow Elctrns.
Conn	New Haven, Cramer Elctns.
Fla	Clearwater, Diplomat/Southland
Fla	Ft. Lauderdale, Arrow Electns.
Fla	Hollywood, Cramer Elctrns.
Fla	Orlando, Cramer Elctrns.
Ga	Atlanta, Cramer Elctrns.
Ga	Atlanta, Lykes Elctrns.
Ill	Arlington Hgts., Texas Instr. Supply Co.
Ill	Elk Grove Vil., Kierulff Elctrns.
Ill	Mt. Prospect, Cramer Elctrns.
Kans	Wichita, Wichita Aircraft
Md	Baltimore, Arrow Elctrns.
Md	Gaitherburg, Cramer Elctrns.
Md	Hanover, Cramer Elctrns.
Mass	Lexington, Harvey Elctrns.
Mass	Newton, Cramer Elctrns.
Minn	Bloomington, Arrow Elctrns.
Mo	St. Charles, Lectronix
NJ	Moorestown, Arrow Elctrns.
NJ	Rutherford, Kierulff Elctrns.
NJ	Saddlebrook, Arrow Elctrns.
NY	Binghamton, Harvey Elctrns.
NY	Farmingdale, Arrow Elctrns.
NY	Farmingdale, Iris Elctrns.
NY	Plainview, Progress Elctrns.
NY	Rochester, Cramer Elctrns.
NY	Syracuse, Cramer Elctrns.
NC	Winston Salem, Cramer Elctrns.
Ohio	Cleveland, Cramer Elctrns.
Ohio	Dayton, Arrow Elctrns.
Okla	Tulsa, Texas Instr. Supply
Pa	Montgomeryville, Pyttronic Inds.
Tex	Dallas, Cramer Elctrns.
Tex	Dallas, Texas Instr. Supply
Tex	Houston, Texas Instr. Supply
Wash	Seattle, Kierulff Elctrns.

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BURR-BROWN, Dept. EM, 6730 S. Tucson Blvd., Tucson, Ariz. 85734, Tel: 602-294-1431, TWX: 66-6491 910-952-1111; Empl.: 550 .... p. 2981

Sales Manager: T.W. Fern

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Tucson, Burr-Brown Research Corp.	602-294-1431
Cal	San Jose, Burr-Brown Research Corp.	408-984-7700
Cal	Santa Ana, Burr-Brown Research Corp.	714-835-0712
Conn	Southbury, Burr-Brown Resch. Corp.	800-645-8212
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Addison, Burr-Brown Research Corp.	312-832-6520
Md	Betheseda, Powell-Pendergraph Corp.	301-656-4535
Mass	Wakefield, MECO	617-245-4870
Mich	Brighton, SAI Mktg. Corp.	313-227-1786
Mich	Grand Rapids, SAI Mktg. Corp.	616-942-2504
Mo	Florissant, SAI Mktg. Corp.	314-837-5200
NJ	Camden, QED Elctrns., Inc. of PA	215-925-8711
NY	Clinton, Advanced Comps. Corp.	315-853-6438
NY	Endicott, Advanced Comps. Corp.	607-785-3191
NY	Great Neck, Burr-Brown Research Corp.	516-466-2650
NY	Scottsville, Advanced Comps. Corp.	716-889-1429
NY	Syracuse, Advanced Comps. Corp.	315-699-2671
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cincinnati, SAI Mktg. Corp.	513-761-5432
Ohio	Cleveland, SAI Mktg. Corp.	216-292-2982
Ohio	Dayton, SAI Mktg. Corp.	513-435-3181
Okla	Tulsa, Norvell Assocs.	918-663-1247
Pa	Philadelphia, QED Elctrns.	215-925-8711
Pa	Pittsburgh, SAI Mktg. Corp.	412-782-5120
Tex	Austin, Norvell Assocs.	512-458-8106
Tex	Dallas, Norvell Assocs.	214-233-0020
Tex	Houston, Norvell Assocs.	713-777-1666
Wash	Lynnwood, Industrial Elctrns. Instrs.	206-775-3516

BURROUGHS CORP., Electronic Components Div., Dept. EM, Box 1226 - Mt. Bethel Rd., Plainfield, N.J. 07061, Tel: 201-757-5000, TWX: 83-3456 710-997-9539; Empl.: 550

Sales Manager: B. Ganz, U.S; A. Rifkin, Int'l

Local Sales Offices & Reps.

Cal	Palo Alto	415-321-5363
Cal	Santa Ana	714-835-7335
Ga	Atlanta	404-633-0606
Ill	Schiller Park	312-671-3510
Mass	Brockton	617-583-1140
Mich	Royal Oaks	513-535-3343
Tex	Dallas	214-387-0800

BURROUGHS CORP., OEM Sales, Dept. EM, 460 Sierra Madre Villa, Pasadena, Cal. 91109, Tel: 213-351-6551, TWX: 910-585-1835; Empl.: 50,000

Local Sales Offices & Reps.

Ala	Huntsville	205-539-4433
Ariz	Phoenix	602-264-1281
Ark	Little Rock	501-FR 2-4121
Cal	Los Angeles	213-483-4520
Cal	San Diego	714-560-7222
Cal	San Francisco	415-UN 3-4062
Colo	Denver	303-861-8222
Conn	Hartford	203-528-9871
Del	Wilmington	302-478-4200
DC	Washington	202-296-5720
Fla	Jacksonville	904-721-1660
Fla	Orlando	305-628-0999
Ga	Atlanta	404-321-4022
Haw	Honolulu	808-949-4171
Idaho	Boise	208-343-4911
Ill	Chicago	312-WA2-7600
Ill	Springfield	217-428-6647
Ind	Indianapolis	317-925-9051
Iowa	Cedar Rapids	319-393-1812
Iowa	Sioux City	712-258-7552
Kans	Wichita	316-MU2-6536
Ky	Lexington	606-253-2626
La	Baton Rouge	504-926-0012
Me	Portland	207-SP 3-8119
Md	Baltimore	301-667-9700
Mass	Lexington	617-862-9810
Mich	Detroit	313-972-7300
Mich	Lansing	517-IV 5-9401
Minn	Minneapolis	612-870-1891
Miss	Jackson	601-956-5004
Mo	Kansas City	816-421-0202
Mo	St. Louis	314-997-1700
Neb	Omaha	402-344-4105
NH	Manchester	614-228-0511
NJ	Paterson	201-967-0800
NJ	Trenton	609-883-5670
NM	Albuquerque	505-247-1594
NY	Buffalo	716-877-4774
NY	New York	212-972-3000
NY	Syracuse	315-463-8651
NY	W. Hempstead	516-483-6625
NC	Raleigh	919-876-6822
ND	Fargo	701-AD 2-7135
Ohio	Cincinatti	513-793-7880
Ohio	Cleveland	216-398-6700
Ohio	Columbus	614-228-0511
Okla	Oklahoma City	405-843-9437
Okla	Tulsa	918-LU 7-5138
Ore	Portland	503-639-9660
Pa	Philadelphia	215-LO 8-1400
Pa	Pittsburgh	412-343-3622
RI	E. Providence	401-GE 4-1811
SC	Columbia	803-772-8274
Tenn	Knoxville	615-588-7451
Tenn	Nashville	615-385-0082
Tex	Dallas	214-RI8-9861
Tex	Houston	713-688-6911
Utah	Salt Lake City	801-DA 8-8947
Vt	Burlington	802-864-6861
Va	Roanoke	703-981-1217
Wash	Seattle	206-MA 3-1780
WVa	Wheeling	304-CE 2-0690
Wisc	Milwaukee	414-UP 3-8600

BURTON-ROGERS CO., see Hoyt Electrical Instr. Works

BURWEN LAB. INC., Dept. EM, 209 Middlesex Tpke., Burlington, Mass. 01803, Tel: 617-273-1488; Empl.: 86

(TM)BUSCOMM - buss compatible core memory - Standard Memories,

(TM)BUSS - fuses & fuseholders - Bussmann Manufacturing

BUSSCO ENGRG., Dept. EM, 119 Standard St., El Segundo, Cal. 90245, Tel: 213-322-6580, TWX: 910-348-6295; FSC No.: 29593; Empl.: 95

Sales Manager: J. Beyers

Local Sales Offices & Reps.

Ala	Huntsville, Tech. Mktg.	205-883-7893
Ariz	Scottsdale, Goodreau & Assoc.	602-994-9909
Cal	San Carlos, Lodan, Inc.	415-592-4600
Cal	San Diego, Transdynamic, Inc.	714-298-8215
Colo	Denver, Todd Assoc., Inc.	303-761-7801
Conn	North Haven, Forsberg Sls.	203-239-5111
Fla	Orlando, Tech. Mktg.	305-857-3760
Fla	Pompano Beach, Tech. Mktg.	305-942-0774
Ill	Oak Park, Reith Sls. Co.	312-383-5728
Md	Baltimore, Burgin-Kreh Assoc.	301-788-5200
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Grand Rapids, R. P. Urban & Assoc.	616-245-0511
Minn	St. Paul, Countryman & Assoc.	612-645-9151
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Lebanon, Churchill Assoc.	201-236-6055
NJ	So. Bound Brook, Jolt Elctrn. Sls.	201-469-2030
NY	De Ruyter, R.P. Kennedy Co.	315-662-3996
NY	Red Hook, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R. P. Kennedy Co.	716-271-6322
NC	Winston-Salem, Burgin-Kreh Assoc.	919-768-4174
Okla	Bixby, EBR, Inc.	918-369-5688
Pa	LaFayette Hill, M.C.D. Assoc.	215-828-0560
Tex	Dallas, EBR, Inc.	214-942-2716
Tex	Houston, EBR, Inc.	713-785-6800
Va	Lynchburg, Burgin-Kreh Assoc.	804-845-5600
Wash	Medina, H. Paulman Sls.	206-455-3311

BUSSMAN MFG. DIV. (BRISTOL, CONN.), see Ingraham

BUSSMANN MANUFACTURING, Div. McGraw-Edison Co., Dept. EM, 502 Earth City Expy., St. Louis, Mo. 63045, Tel: 312-739-9600, Telex: 44 841 p. 3978-3983

Local Sales Offices & Reps.

Ala	Montgomery, A. Ashurst	205-933-0360
Ariz	Tempe, W. Louis	602-839-5339
Cal	Los Angeles, L. Waggoner	213-263-7105
Cal	San Francisco, C.R. Wideman	415-282-8220
Colo	Denver, L. Hall	303-322-2189
Conn	Cheshire, J. Miller	203-624-2440
Fla	Clearwater, W. Penhallegon	813-531-5112
Ga	Chamblee, L. Acker	404-457-1356
Ill	Lincoln, V. Saporita	217-735-4181
Ill	Northlake, J. Waters	312-562-3370
Ind	Carmel, J. Adams	317-637-9606
Iowa	Davenport, T. Bates	319-355-5400
Kans	Overland Park, D. Bailey	816-EM3-3700
Ky	Louisville, M. Dickson	502-451-7652
La	Metairie, A. Richard	504-488-5333
Md	Baltimore, J. Rambo	301-243-1717
Mass	Plymouth, P. Walsh	617-586-7069
Mass	Winchester, C. Dane	617-HA6-2122
Mich	Grand Rapids, R. Berry	616-949-4660
Mich	Southfield, T. Ewald	313-961-9405
Minn	Minnetonka, R. Norris	612-935-6280
Mo	St. Louis, P. Friemel	314-421-1740
Neb	Bellevue, B. Shriver	402-341-9224
NJ	Newark, E. Gimbut	201-484-3500
NY	Fairport, G. Goyette	716-377-7591
NY	Liverpool, R. Latchut	315-422-1929
NY	New York, T. Lawless	212-267-1466
NC	Greensboro, K. Williams	919-299-3348
Ohio	Cincinnati, R. Schapp	513-241-1740
Ohio	Euclid, J. Bene	216-561-4875
Ohio	Johnstown, J. Bosko	614-237-9810
Ohio	Toledo, J. Atkins	419-472-8887
Okla	Oklahoma City, H. Gossage	405-751-4996
Okla	Tulsa, L. Welborn	918-742-5914
Ore	Lake Oswego, S. Dymes	503-234-0281
Pa	Pittsburgh, P. Stock	412-371-3956
Pa	St. Davids, H. Thompson	215-KI6-0644
SC	Lexington, S. Robinson	803-765-2657
Tenn	Memphis, R. Terry	901-397-2306
Tenn	Talbott, D. Aldredge	615-475-5141
Tex	Garland, J. Tubbesing	214-357-8357
Tex	Houston, E.H. McGowan	713-526-3101

Utah	Salt Lake City, O. Christiansen	801-363-4596
Va	Hayes, W. Kirkland	804-642-5550
Wash	Seattle, R. Shipek	206-RO3-1350
Wisc	Milwaukee, W. Burbach	414-964-3185

BY-BUK COMPANY, See Webtek Corp.

(TM)BUSTLE - plug-on metal module - NES, Inc.

(TM)BUTTERFLY - double-break mechanism - Licon Div.

(TM)BUTTONEER - plastic fastener - Dennison Mfg. Co.

(TM)BW ORBITAL RIVETER - orbital riveting machines - Black & Webster, Inc.

(TM)BYTREX - pressure tranducers; load cells - Tyco Instrument Div.

C & A PRODUCTS, INC., Dept. EM, 37-12 58th St., Woodside, N.Y. 11377, Tel: 212-779-4303; Empl.: 37

C-COR ELCTRNS., Dept. EM, 60 Decibel Rd., State College, Pa. 16801, Tel: 814-238-2461; FSC No.: 12775; Empl.: 75 .... p. 1102,1103

Sales Manager: J. Ford

Local Sales Offices & Reps.

Exp:	NY, N.Y., S. Ginsbury	212-689-5212

C-F ELECTRONICS, INC., Dept. EM, 14709 Keswick St., Van Nuys, Cal. 91405, Tel: 213-781-3849; FSC No.: 5905; Empl.: 50

Sales Manager: B. Barton

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg.	205-772-9237
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Van Nuys, C.F. Elctrns.	213-781-3982
Fla	Orlando, Perrott Assocs.	305-275-1132
Me	Ellicott City, Doss Elctrns.	301-465-1336
Me	Hagerstown, Angstrohm Precision	301-739-8722
Mass	Framingham, Murata/Angstrohm Sls. Off.	617-872-4843
Mo	St. Charles, Chesco	314-946-6677
NJ	E. Hanover, HLM Assocs.	201-386-0794
NY	New Hartford, Murata/Angstrohm Sls. Off.	315-732-3507
NY	Northport, HLM Assocs.	516-423-1818
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Tex	Houston, B. Hamilton	713-445-7086
Tex	Hurst, Wheelex	817-268-1812
Wash	Seattle, C. K. Shanks & Assocs.	206-632-4290
Wisc	Milwaukee, Star Engrg. Sls.	414-645-3680

C & K COMPONENTS, INC., Dept. EM, 103 Morse St., Watertown, Mass. 02172, Tel: 617-926-0800, TWX: 92-2546, 710-327-0460; FSC No.: 09353; Empl.: 190 p. 3984,3985

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Scottsdale, Sls. Engrg.	602-994-3230
Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	Los Angeles, Universal Comps	213-641-4255
Conn	Glastonbury, Barton-Caron Assoc.	203-633-9417
Fla	Ft. Lauderdale, Beacon	305-971-7320
Ga	Atlanta, Beacon	404-351-3654
Ill	Des Plaines, Control Sls.	312-296-5595
Md	Randallstown, Beacon	301-922-1248
Mass	Watertown, C&K Comps.	617-926-0800
Mich	Novi, A.P. Assocs.	313-476-2300
Minn	Minneapolis, Beta Engrg.	612-546-2215
Mo	Hazelwood, Dy-Tronix	314-731-5799
NJ	Cherry Hill, Quality Comps	609-428-6266
NJ	Mt. Vernon, Sonkin Assoc	914-668-9809
NY	Albany, L-Tron	518-785-5032
NY	Buffalo, L-Tron	716-691-8887
NY	New York City, Sonkin Assocs	914-668-9809
NY	Syracuse, L-Tron	315-689-3787
NC	Charlotte, Beacon	704-525-7412
Ohio	Cincinnati, F E Kahsar Sls	513-471-9011
Ohio	Hudson, F E Kahsar Sls	216-653-6808
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Houston, R F Kimball	800-492-2805
Tex	Richardson, R F Kimball	214-231-3447
Va	Falls Church, Beacon	703-534-7200
Va	Lynchburg, Beacon	804-237-4740
Wash	Seattle, Jon B Jolly	206-938-4166
Wisc	Thinesville, Control Sls	414-242-4580

(TM)CABELSHIELD - insulating, shielding, binding tapes for use in wire & cable - Lamart Corp.

(TM)CABINETROL - motor control - General Elec. Co.

CABLE CONCEPTS CORP., Dept. EM, 1610A Manning Blvd., Levittown, Pa. 19057, Tel: 215-547-5273; Empl.: 15 .... p. 1818,1819

Sales Manager: H. Lorber

Local Sales Offices & Reps.

Cal	Los Angeles, Westernelectromotive/Shephard	213-820-3777
Cal	Redwood City, Warren & Hickey	415-368-3849
Colo	Boulder, Component Prods. Sls. Co.	303-494-5100
Fla	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Kans	Leawood, Thunderbird Tech. Sls.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls.	316-684-3941
Md	Pikesville, Muncy Sls.	301-484-6376
Mich	Detroit, Nicon Assoc.	313-341-7688
Minn	Eden Prairie, F. Peterson Co.	612-941-5400
Mo	St. Louis, Thunderbird Tech. Sls.	314-567-6488
NJ	Wayne, Reward Dev. Entrprs.	201-881-9172
NC	Winston-Salem, Elctrnc. Mktg. Assoc.	919-722-5151
Ore	Portland, United Sls. Co.	503-645-2852
Pa	King of Prussia, Monteiro Assoc.	215-265-0634
SC	Greeneville, Elctrnc. Mktg. Assoc.	803-268-1125
Tex	Richardson, Thunderbird Tech. Sls.	214-690-0763

(TM)CABLE MAKER - terminals - Amp Inc.

(TM)CABLEMASTER - cable test equipment - Chatsworth Data Corp.

(TM)CABLEMATIC - wire stripping tools - Ripley Co., Inc.

CABLE OF AMERICA INC., Dept. EM, 4935 Newport St., Denver, Colo 80207

(TM)CABLE-RAP - plastic spiral wrap tubing - Amrad Corp.

CABLE SYSTEMS & ASSEMBLY CO., INC., Dept. EM, 210 Broadway, Everett, Mass. 02149, Tel: 617-387-7550; FSC No.: 33426; Empl.: 65

CABLEWAVE SYSTEMS INC., Dept. EM, 60 Dodge Ave., North Haven, Conn. 06473, Tel: 203-239-3311, TWX: 710-465-0244; Empl.: 135

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assocs.	205-883-7893
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Redwood City, Woodworth Co.	415-365-0252
Cal	Westlake Village, MCA Repco	213-889-5553
Colo	Denver, Thorson Co.	303-759-0809
Fla	Ormond Beach, Technology Mktg. Assocs.	904-672-2314
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Park Ridge, RF Specialists	312-698-2044
Ind	Ft. Wayne, McDonald Sls. Co.	219-747-3650
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	New Carrollton, W. A. Brown Equip-Comp, Inc.	301-577-4527
Mass	Haverhill, L-K Assocs.	617-373-1313
Mo	St. Louis, Palatine Sls.	314-426-7055
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Syracuse, T2 Elctrns.	315-463-8592
NY	Williston Park, ABC Elctrn. Sls. Co.	516-747-6610
NC	Winston-Salem, Murcota Corp.	919-722-9445
Pa	Fort Washington, Kirk-Sandell, Inc.	215-643-2100
Tex	Dallas, Hillman Entprs.	214-827-4790
Va	Alexandria, W. A. Brown Equip-Comp, Inc.	703-836-1800
Wash	Bellevue, Thorson Co.	206-455-9180

CABTRON SYS., INC., Dept. EM, 200 Anets Dr., Northbrook, Ill. 60062, Tel: 312-498-6090; Empl.: 30 p. 1125

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	205-536-1941
Ariz	Scottsdale, Elctrn. Entpr., Inc.	602-946-9860
Cal	San Jose, Reaction Sls.	408-263-9211
Cal	Tustin, Spaulding Sls. Co.	714-832-1384
Colo	Golden, F. R. Campbell Assocs.	303-238-4174
Conn	Enfield, Meco, Inc.	203-745-9050
Fla	Fort Lauderdale, Reynolds & Assoc.	305-581-6611
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
Fla	St. Petersburg, Reynolds & Assoc.	813-360-1484
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Ill	Northbrook, Cabtron Sys.	312-498-6090
Ind	South Bend, S & S Elctrns.	616-695-3376
Md	Silver Spring, Ansell Engrg.	301-949-1655
Mass	Wakefield, Meco, Inc.	617-245-4870
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	St. Paul, Countryman Assocs.	612-645-9151
Mo	Grandview, Prod. Automation	816-763-4155
Mo	Hazelwood, Prod. Automation	314-731-2331
NM	Albuquerque, Elctrn. Entprs.	505-265-2202
NY	Port Washington, Paul D. Aaron	516-883-0600
NY	Syracuse, Tesco Mktg. Research	315-463-4566
NC	Charlotte, Joe Corn Assocs.	704-527-0991
Ohio	Cleveland, Geotronix-Inc.	216-526-2535
Ohio	Columbus, Geotronix Inc.	614-457-8472
Pa	Feasterville, P.S.A.	215-355-6244
Tex	Addison, Dunbar Assocs.	214-239-7151
Wash	Renton, S. Wilson Co.	206-226-0650

(TM)CADCO - plastics and related chemicals - Cadillac Plastic & Chemical

CADDEL-BURNS MFG. CO., INC., Dept. EM, 40 E. 2nd St., Mineola, N. Y. 11501, Tel: 516-746-2310; Empl.: 30 .... p. 1420-1422

CADDELL COIL CORP., Dept. EM, 35 Main St., Poultney, Vt. 05764, Tel: 802-287-4055; Empl.: 6

Local Sales Offices & Reps.

Fla	Sebastian, R.B. Caddell	305-589-8550

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RF coils for communication, experimentation, avionics, radar, CATV, RF power, tests & measurement.
Send for catalog of stock coils.

CADDOCK ELECTRONICS, INC., Dept. EM, 3127 Chicago Ave., Riverside, Cal. 92507, Tel: 714-683-5361, TWX: 910-332-6108; FSC No.: 19647; Empl.: 120 .... p. 3656-3671

Local Sales Offices & Reps.

Ore	Portland, Elctrn. Sources	503-292-0701
Tex	Houston, Unidyne, Inc.	713-494-6027
Wash	Seattle, Elctrn. Sources	206-453-0800

Local Distributors

Tex	Houston, Lenert Co.	713-225-1465

(TM)CADENCE - musical instrument speakers - Utah Electronic Div.

CADILLAC PLASTIC & CHEMICAL, Dayco Co., Dept. EM, Box 810, Detroit, Mich. 48232, Tel: 313-869-9500, TWX: 810-243-6415; Empl.: 1000

Local Sales Offices & Reps.

Ala	Mobile	205-456-8481
Alas	Anchorage	907-337-2863
Ariz	Phoenix	602-264-0861
Cal	Anaheim	714-634-4011
Cal	North Hollywood	213-980-0840
Cal	Oakland	415-532-1021
Cal	So. San Francisco	415-589-1833
Colo	Denver	303-287-2506
Conn	Hartford	203-278-6900
Del	Wilmington	302-655-1027
DC	Washington	202-638-4552
Fla	Jacksonville	904-724-7274
Ga	Atlanta	404-351-9800
Ill	Chicago	312-342-9200
Ill	Rockford	815-874-9444
Ind	Indianapolis	317-639-5343
Ind	South Bend	219-272-1200
Iowa	Davenport	319-391-2224
Kans	Kansas City	913-888-5950
Ky	Louisville	502-448-6444
La	New Orleans	504-834-6222
Md	Baltimore	301-485-4200

Mass	Boston	617-666-8840
Mich	Flint	313-238-0411
Mich	Grand Rapids	616-452-6926
Mich	Kalamazoo	616-343-1341
Minn	Minneapolis	612-781-6585
Mo	St. Louis	314-991-1790
NH	Manchester	603-627-3583
NJ	Linden	201-862-8900
NJ	Pennsauken	609-662-4100
NM	Albuquerque	505-345-2516
NY	Albany	518-459-3377
NY	Buffalo	716-684-9200
NY	Long Island City	212-721-8484
NY	Rochester	716-235-2260
NY	Syracuse	
NC	Charlotte	704-523-7880
Ohio	Akron	216-644-7183
Ohio	Cincinnati	513-271-2780
Ohio	Cleveland	216-441-2200
Ohio	Columbus	614-228-6991
Ohio	Toledo	419-244-6757
Okla	Tulsa	918-836-6556
Ore	Portland	503-224-1293
Pa	Philadelphia	215-925-3473
Pa	Pittsburgh	412-372-2202
RI	Warwick	401-738-7550
Tenn	Memphis	901-365-6600
Tex	Dallas	214-631-4460
Tex	Ft. Worth	817-332-4421
Tex	Houston	713-928-2581
Tex	San Antonio	512-656-9262
Va	Richmond	804-276-2791
Wash	Seattle	206-682-7252
Wisc	Green Bay	414-499-4551
Wisc	Milwaukee	414-444-7650

™CADNICA - nickel-cadmium rechargeable battery - Sanyo Electric Inc.

CAELUS MEMORIES, Dept. EM, P.O. Box 6297, San Jose, Cal. 95150

™CAGE-TROL - induction-motor controls - Electric Machinery Mfg. Co.

CAI, DIV. BOURNS INC., Dept. EM, 550 W. Northwest Hwy., Barrington, Ill. 60010, Tel: 312-381-2400, TWX: 910-651-1904; Empl.: 650

Local Sales Offices & Reps.

Cal	, Tishman Airport Ctr., 9841 Airport Blvd.	213-641-5103
Cal	Los Angeles	213-641-5103
Va	Arlington, Ora D. Johnson	703-525-2590
Va	Arlington	703-525-2590

CAIG LABS., INC., Dept. EM, 1175-0 Industrial Ave., Box 64, Escondido, Cal. 92025, Tel: 714-743-7143; Empl.: 10

Local Sales Offices & Reps.

Cal	Costa Mesa, Pat Dooley Co.	714-548-2232
Cal	Walnut Creek, Wilnat Co.	415-938-9629
Ill	Palatine, J Clark	312-358-5095
Minn	Minneapolis, Conway Assocs.	612-884-0022

Local Distributors

Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Glendale, Western Elctrn Supply	213-246-4861
Del	Wilmington, Wholesale Elctrn.	302-656-9988
Ill	Champaign, Klaus Radio Inc.	309-691-4840
Ill	Chicago, Complete Reading Elect.	312-454-1234
Ky	Louisville, Burks, P.I.	502-589-3960
La	(Ralphs) Rouge, R.P.S. Elctrns., Inc.	504-344-3761
Md	Bethesda, Empire Elctrns.	301-656-3300
Md	Rockville, Capital Radio Wholesalers	301-881-2270
Mich	Grand Rapids, Stotts-Friedman	616-241-6731
Mo	Kansas City, Walters Radio Supply Inc.	816-531-7015
NJ	Springfield, Federated Purchaser	201-376-8900
NY	New York, Argil Elctrns	212-691-8111
NC	Fayetteville, Southeastern Radio	
Ohio	Cleveland, Complete Reading Elect.	216-267-1000
Tex	El Paso, Midland Spec. Co.	915-533-9555
Tex	Odessa, Midland Specialty Co.	915-337-7365
Va	Norfolk, Radio Parts Dist. Co.	703-855-8095
Va	Norfolk, Priest Elctrns.	703-855-0141

CAL-METEX CORP., Dept. EM, 20437 S. Western Ave., Torrance, Cal. 90501, Tel: 213-320-8910, TWX: 910-328-6100; Empl.: 37 .... p. 2674,2675

Local Sales Offices & Reps.

Ariz	Phoenix, Intermountain Engrg.	602-947-7379
Cal	Los Altos, Frauman Assoc.	415-941-0660
Cal	Los Angeles, Universal Comps.	213-474-1537
Colo	Denver, Walter Assoc.	303-777-5585
Wash	Seattle, Jon B. Jolly, Assoc.	206-938-4166

CAL-POWER CORP., Dept. EM, 140 Kansas St., El Segundo, Calif. 90245, Tel: 213-772-2171, TWX: 910-348-6678; Empl.: 30

CAL-R, INC., Dept. EM, P.O. Box 1397, Santa Monica, Cal. 90406, Tel: 213-451-9761, TWX: 910-343-6966; Empl.: 130

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engrg. Assoc.	602-277-1453
Cal	Mountain View, Caltron/Pyle, Inc.	415-964-3244
Cal	San Diego, LoDan Inc.	714-279-6383
Conn	Woodbridge, Electronic Mktg. Co.	203-397-1461
Fla	Tampa, F. C. Nickerson Co.	813-885-1416
Ill	Northbrook, Raines-Brin Assocs.	312-498-0890
Ind	Greenwood, Valentine Schillinger	317-888-2260
Ind	South Bend, Valentine Schillinger	219-291-6258
Md	Baltimore, Wafer Assocs.	301-744-1133
Minn	St. Louis Park, Beta Engrg. Co.	612-925-4422
NY	Bay Shore, Brunetta Sls. Co.	516-586-1800
Ohio	Cleveland, Del Steffen & Assocs.	216-461-8333
Ohio	Dayton, Del Steffen & Assocs.	513-293-3145
Pa	Narberth, Electro-Comp Sls. Co.	215-664-3576
Exp:	Cal., Santa Monica, Trans-World Trade	213-472-0444

™CALECTRO - experimenter-hobbyist items - GC Electronics

CALEX MFG. CO., INC., Dept. EM, 3305 Vincent Rd., Pleasant Hill, Calif. 94523, Tel: 415-932-3911; FSC No.: 29988; Empl.: 40

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assoc	205-533-5896
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Palo Alto, Gado Instr. Sls.	415-961-2222
Cal	Pasadena, A.F. Sls. Engrg.	213-681-5631
Conn	Washington, Tri-Com	203-868-7748
Fla	Ft Lauderdale, Le Assoc	305-491-7220
Ga	Buford, Lee Assoc	404-945-4222
Md	Columbia, Technical Sls Assoc	800-327-6603
Mass	Burlington, Tri-com	617-272-8163
Mich	Detroit, Jay Mktg. Assocs.	313-837-4100
Minn	Wayzata, Wm. A. Sternad	612-473-4700
NM	Albuquerque, Trembly Assocs.	505-293-4444
NY	Plainview, Era, Inc	516-822-9890
NC	Raleigh, Lee Assoc	919-787-5818
Pa	Ambler, Denco Data Equip. Co.	215-542-9876
Tex	Dallas, W. Reese Assoc	214-638-6575
Tex	Houston, W. Reese Assoc	713-621-3134
Wash	Bellevue, Topp Engr. Sls. Co.	206-747-5401
Wisc	Milwaukee, E.A. Dickinson & Assocs.	414-264-1080

Local Distributors

Cal	Santa Monica, Distr. Specialist	213-829-5401

™CALFAX - speciality fasteners - Tridair Inds.

™CALI-BRAIN - amplitude measuring system (scoper) - B & K Precision Electronic Test Instruments Group

CALIFORNIA AVIONICS LABS., INC., Dept. EM, Box 701, Palo Alto, Calif. 94302, Tel: 415-328-7999; Empl.: 5

CALIFORNIA COMPUTER PRODS., Dept. EM, 2411 W. La Palma Ave., Anaheim, Cal 92801, Tel: 714-821-2011, TWX: 910-591-1154; Empl.: 4000

Local Sales Offices & Reps.

Ala	Huntsville	205-533-6260
Cal	Sunnyvale	408-732-8421
Cal	Torrence	213-320-3260
Colo	Denver	303-371-5255
Conn	Meriden	203-634-3181
Fla	Miami	305-625-8357
Ga	Atlanta	404-449-4610
Ill	Rosemont	312-693-6030
Kans	Shawnee Mission	913-362-0707
Md	Rockville	301-770-5274
Mass	Waltham	617-890-0484
Mich	Southfield	313-569-3123
Minn	Bloomington	612-888-0297
Mo	St. Louis	314-968-5537
NJ	Union	201-686-7100
NY	Hicksville	516-938-7258
Ohio	Cleveland	216-243-7180
Ohio	Dayton	513-276-3915
Ore	Beaverton	503-646-3942
Pa	Bala Cynwyd	215-667-1740
Pa	Pittsburgh	412-922-3430
SC	Greenville	803-288-4564
Tex	Dallas	214-661-2326
Tex	Houston	713-776-3276
Utah	Salt Lake City	801-355-3459
Wash	Bellevue	206-747-9321
Exp:	Cal., Anaheim	714-821-2011

CALIFORNIA EASTERN LABS. INC., Dept. EM, 1 Edward Ct., Burlingame, Cal. 94010

CALIFORNIA INSTRS., Div. Aiken Inds. Inc., Dept. EM, 5150-Convoy St., San Diego, Cal. 92111, Tel: 714-279-8620, Telex: 695047; FSC No.: 16067; Empl.: 80 ....p. 2815,3370,3371

Sales Manager: J. Kope

Local Sales Offices & Reps.

Ala	Huntsville, FM Assoc.	205-536-9990
Ariz	Scottsdale, Williams Assoc.	602-947-4297
Cal	Los Altos, Jay Stone & Assoc.	415-948-4563
Cal	Los Angeles, Basic Systems	800-252-9075
Colo	Denver, Williams Assoc.	303-373-4730
Fla	Orlando, FM Assoc.	305-851-5710
Fla	Tequesta, FM Assoc.	305-746-3128
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ill	Chicago, Sea Inc.	312-282-6694
Ind	Carmel, Sea	317-846-2593
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Waltham, McBar Assocs.	617-890-0233
Mich	Royal Oak, Satullo Co.	313-549-3910
Minn	Minneapolis, Waytek Inc.	612-933-2133
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Cherry Hill, Scientific Reps.	609-482-0059
NM	Albuquerque, Williams Assoc.	505-255-1638
NY	Fayetteville, Andrews Co.	315-637-3144
NY	Great Neck, Eastern Instr. of N.Y.	516-466-9505
NC	Greensboro, FM Assoc.	919-294-2754
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	North Olmsted, Hocker Assocs.	216-734-4433
Tex	Houston, Systems Engrg. Sls. Co.	713-668-7840
Tex	Richardson, Systems Engrg. Sls. Co.	214-231-9364
Va	Falls Church, Scientific Assoc.	703-573-8787
Wash	Seattle, Datacom Assoc.	206-285-2525

CALIFORNIA MICROWAVE, INC., Dept. EM, 455 W. Maude Ave., Sunnyvale, Cal. 94086, Tel: 408-732-4000, TWX: 35-2016 910-339-9231; Empl.: 607

Local Sales Offices & Reps.

Cal	Los Angeles, Cain Technology	213-476-2251
Cal	San Jose, MCH Assocs.	408-246-7330
Colo	Englewood, Cal. Microwave	303-770-8228
Ill	Park Ridge, R. F. Specialists	312-698-2044
Ind	Ft. Wayne, R. F. Specialists	219-485-8982
Kans	Overland Park, California Microwave	913-492-9460
Md	Glen Burnie, Micro-Comp	301-761-4600
Mass	Burlington, R. J. Sickles Assocs.	617-272-7285
NY	Great Neck, Trionic Assocs.	516-466-2300
NY	Skaneateles, Robtron	315-685-5731
Pa	Ambler, W. M. Assocs.	215-643-4119
Tex	Forth Worth, McDonald Engrg.	817-244-2480
Va	Arlington, Cal. Microwave	703-841-1774

CALLINS INDUSTRIES, Dept. EM, Box C, Greenfield, Tenn. 38230, Tel: 901-235-2234, TWX: 810-590-3779; Empl.: 250

Local Sales Offices & Reps.

Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Colo	Englewood, Dynatech, Inc.	303-773-2830
DC	Washington, Harry Wise & Co.	202-363-9417
Fla	Orlando, G. F. Bohman Assocs.	305-855-0274
Ill	Chicago, Industrial Reps.	312-647-7755
Ind	Columbus, Alan Bolenbaugh	812-372-8666
Kans	Shawnee Mission, Delltron Co.	913-362-5512
Ky	Fern Creek, R. W. Mitscher Co.	
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Livonia, Giesting & Assocs.	313-477-6060
Minn	Minneapolis, White Sls. Co.	612-566-6320
Mo	St. Louis, Delltron Co.	314-869-4779
NY	Rye, Charles L. Avery Assocs.	914-967-7610
NC	Raleigh, R. W. Mitscher Co.	919-828-0575
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Ohio	Dayton, Giesting & Assocs.	513-293-4044
Pa	Paoli, Stitzer Assocs.	215-644-5500
Tenn	Johnson City, R. W. Mitscher Co.	615-929-1141
Tenn	Shelbyville, R. W. Mitscher Co.	615-684-4544
Tex	Dallas, P. J. Scanlon Co.	214-231-4661
Wash	Redmond, Quadra Sls. Corp.	206-883-3550
Exp:	Conn., Stamford, Dage Corp.	203-324-3123

CALMARK CORP., Dept. EM, 4947 Walnut Grove, 4947 Walnut Grove, Cal. 91776, Tel: 213-287-0451; FSC No.: 52094; Empl.: 21

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Tempe, Delta Elctrn. Sls. Corp.	602-966-9903
Cal	Foraker Sales Corp.	415-657-2213
Cal	San Gabriel, Calmark Corp.	213-287-0451
Colo	West/Mark Denver	303-433-7181
Fla	Orlando, OEM Mktg Corp	305-299-1000
Ill	Arlington Hgts., Martec Assocs.	312-956-8090
Kans	Olathe, Technical Reps	913-782-1177
Md	Towson, Kraft Electronic Sls.	301-828-5838
Mass	Westboro, Technical Mktg. Svcs. Co.	617-366-8462
Mich	Warren, DEM Elctrn Sls	313-755-9444
Minn	Minneapolis, Components Group	612-824-4222
NJ	Cherry Hill, Benco Sls	609-779-9282
NY	Cooperstown, Fitzelle Assocs.	607-547-9333
NY	Hartsdale, Com-Tec Sls. Co.	914-761-6644
Okla	Oklahoma City, Ammon & Rizos Co.	405-373-2748
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Tex	Houston, Ammon & Rizos Co.	713-781-6240
Wash	Tukwila, General Elctrns.	206-575-4030
Exp:	Cal., Los Angeles, Product Supply Co.	213-659-1858

Local Distributors

Cal	Fremont, Terminal Sls Corp.	415-656-7722
Cal	Temple City, Modern Fasteners	213-579-4600
Ill	Arlington Heights, Martec Assoc	312-956-8090
Mass	Westboro, TMSC Elctrn Supply	617-366-8462

ⓉⓂCALORIMIXER - gas mixing controls - Cutler-Hammer, Inc.

ⓉⓂCALROD - heaters - General Elec. Co.

ⓉⓂCALROD® - electric tubular heaters - General Electric

CAL-TEK ENGRG, Dept. EM, 29 Pemberton Rd., Wayland, Mass. 01778, Tel: 617-653-0355; Empl.: 5

Local Sales Offices & Reps.

Md	Ellicott City, A-O Elctrns	301-531-6700
Wash	Seattle, Data Com Assocs.	206-285-2525
Exp:	Los Angeles, Consolidated Trading Co.	213-397-6231

CALTRON INDUSTRIES, Dept. EM, 2015 Second St., Berkeley, Cal. 94710, Tel: 415-548-1966; Empl.: 18

CALVERT ELCTRNS., INC., Dept. EM, 220 E. 23rd St., New York, N.Y. 10010, Tel: 212-481-5300, TWX: 710-581-4088; Empl.: 50; Minimum order: $P. Page

Sales Manager: F. M. Samuel; *Distributor Manager:* P. Page

Local Sales Offices & Reps.

Cal	San Jose, Calvert Elctrns.	408-265-0521

ⓉⓂCAMBI-CARD - circuit boards - Cambridge Thermionic Corp.

ⓉⓂCAMBION - electronic components & swagers - Cambridge Thermionic Corp.

CAMBRIDGE ELECTRONICS MFG., Dept. EM, Box 1000, Napanoch, NY 12458

CAMBRIDGE PRODUCTS CORP., Cambridge Products Corp., Dept. EM, 244 Woodland Ave., Bloomfield, Conn. 06002; Empl.: 28 .... p. 1820

Sales Manager: R. Wolpoe

CAMBRIDGE THERMIONIC CORP., Dept. EM, 455 Concord Ave., Cambridge, Mass. 02138, Tel: 617-491-5400, TWX: 92-1480 710-320-6399; FSC No.: 71279; Empl.: 500; Minimum order: $C.A. Peterson

Sales Manager: W.G. Nowlin; *Distributor Manager:* C.A. Peterson

Local Sales Offices & Reps.

Cal	Belmont, Cambridge Thermionic	415-592-4524
Cal	Torrance, Cambridge Thermionic	213-326-7822
Colo	Denver, Elcom, Inc.	303-770-4400
Fla	North Miami, Publicover Assocs.	305-947-5080
Fla	Orlando, Publicover Assocs.	305-898-9361
Ill	Chicago, Berndt Assocs., Inc.	312-283-0713
Ind	Carmel, Berndt Assocs., Inc.	317-844-0114
Iowa	Cedar Rapids, BC Elctrns.	319-364-7253
Kans	Olathe, B.C. Elctrn.	913-888-6680
Mass	Cambridge, Cambridge Thermionic	617-491-5400
Mich	Dearborn, Pitcher-Poulin, Inc.	313-582-5450
Minn	St. Paul, Cahill Assocs.	612-646-7217
Mo	Hazelwood, B.C. Elctrn.	314-731-1255
NM	Albuquerque, Zeus	505-256-9831
NC	Charlotte, Robert W. Chapman & Co.	704-525-2421
NC	Raleigh, Robert W. Chapman & Co.	919-782-2624
Ohio	Cleveland, K.W. Elctrn. Sls.	216-831-8292
Ohio	Dayton, K.W. Elctrn. Sls.	513-890-2150
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	Salem, J.J. Backer Co.	503-362-0717
Pa	Allison Park, K W Electronic Sls.	412-487-4300
Pa	Philadelphia, K.B. Erdman Co.	215-224-1833
Tex	Houston, R.F. Kimball	800-492-2805
Tex	Richardson, R.F. Kimball	214-231-3447
Utah	Salt Lake City, Elcom, Inc.	801-532-7940
Wash	Seattle, J.J. Backer Co.	206-285-1300
Wisc	Milwaukee, Berndt Assocs.	414-545-8400

Local Distributors

Ala	Huntsville, Cramer/E.W. Huntsville	205-539-5722
Ariz	Phoenix, Cramer/Arizona	602-263-1112
Cal	Gardena, Bell Inds.	213-321-5802
Cal	Menlo Pk., Bell Inds.	415-323-9431
Colo	Denver, Cramer/Denver	303-758-2100
Conn	Hamden, Wilshire Elctrns.	203-281-1166
Fla	Hollywood, Cramer/E.W. Hollywood	305-923-8181
Ga	Atlanta, Cramer/E.W. Atlanta	404-448-9050
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Mt. Prospect, Cramer/Chicago	312-593-0230
Ind	Ft. Wayne, Fort Wayne Elec. Sup.	219-423-3422
Kans	Lenexa, Hall-Mark Elctrns.	913-888-4747
La	New Orleans, Southern Radio Sup.	504-524-2345
Md	Rockville, Cramer/E.W. Wash.	301-948-0110
Mass	Boston, DeMambro	617-787-1200
Mich	Wyoming, Newark Ind. Elect.	616-241-6681
Minn	Edina, Cramer/Bonn	612-941-4860
Mo	Univ. City, Olive Ind. Elect.	314-863-7800
Neb	Lincoln, Scott Elctrn. Sup.	402-434-8308
NJ	Camden, General Radio Supply	609-964-8560
NJ	Rahway, Terminal Elctrns.	201-381-5700
NM	Albuquerque, Cramer/New Mexico	505-265-5767
NY	Binghamton, Stack Indust. Elect.	607-723-6326
NY	Rochester, Cramer/Rochester	716-275-0300
NC	Winston-Salem, Cramer/E.W. W/Salem	919-725-8711
Ohio	Dayton, Pioneer Standard Ele.	513-236-9900
Okla	Tulsa, Hall-Mark Elctrns.	918-835-8458
Pa	Philadelphia, Philadelphia Elect.	215-568-8288
Tex	Dallas, Cramer/Texas	214-350-1355
Wash	Bellevue, Bell Inds.	206-747-1515
Wisc	Milwaukee, Cramer/Wisconsin	414-462-8300

CAMCAR, Div. Textron Inc., Dept. EM, 600 18th Ave., Rockford, Ill. 61101, Tel: 815-226-3600

CAMUSAT GUEGUEN TELECOM INT'L., see CGTI

ⓉⓂCAMPER - floodlight-nightlight - Teledyne Big Beam

ⓉⓂCAMTROL - electronic limit switch - Theta Instr. Corp.

CAMWIL INC., Dept. EM, 835 Keeaumoku, Honolulu, Haw. 96814, Tel: 808-955-0766; Empl.: 12

CANDY MFG. CO., Dept. EM, 626 Grove St., Evanston, Ill 60201, Tel: 312-869-6070; Empl.: 8

CANNON ELECTRIC, See ITT Cannon Electric

CANON U.S.A., INC., Dept. EM, 10 Nevada Dr., Lake Success, N.Y. 11040, Tel: 516-488-6700, Telex: 96-1333; Empl.: 430 .... p. 3070

Sales Manager: M. Yoshikawa

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engrg Assocs.	602-955-2193
Cal	San Jose, J.T. McFarland Assoc.	408-286-9333
Cal	Thousand Oaks, J.T. McFarland Assoc.	805-492-5678
Colo	Denver, W.J. Purdy Co.	303-777-1411
Conn	Guilford, R. Whitehead, Jr. Assoc.	203-453-3762
Ga	Lilburn, Motion Technology	404-233-4368
Ill	Dundee, J. Huegel Sls.	312-426-6370
Ind	Ft. Wayne, J&B Engrg.	219-483-2813
Md	Lutherville, Greenwood Elctns.	301-252-9296
Mass	Boston, R.H. Whitehead Jr. Assocs.	617-542-7676
Mich	Mt. Clemens, L P Assoc.	313-731-1171
Minn	Minneapolis, Components Grp.	612-824-4222
NY	Penfield, A & D Devices	716-586-8033
NC	Charlotte, Motion Technology	704-525-9855
Ohio	Fairborn, L P Assoc.	513-223-9975
Pa	Phila., Stan Cohen Assoc.	215-698-9660
Tex	Dallas, Blackburn Assoc.	214-692-8885
Wisc	Oconomowoc, J. Huegel Sls.	414-271-6105

CANRAD-HANOVIA, INC., Dept. EM, 100 Chestnut St., Newark, N.J. 07105, Tel: 201-589-4300, Telex: 13-8531; Empl.: 250

Local Sales Offices & Reps.

Cal	Anaheim, R. Martin	714-772-7863
Conn	Fairfield, Magna Engrg. Sls.	203-334-5538
Fla	Winter Park, R. Evans	305-671-8716
Ga	Atlanta, R. H. Smith	404-394-1747
Ill	Glenview, Vico Assocs.	312-729-9240
Kans	Wichita, J. O'Reilly	316-744-0851
Mo	Ballwin, H.J. Lawson	314-394-5688
NJ	Newark, Canrad-Hanovia	201-589-4300
NY	Huntington, N. Bannerton	516-421-3342
NY	Liverpool, R. Ricketson	315 652-6270
NC	Apex, J. W. Kelley, Jr.	919-362-8508
Ohio	Cincinnati, G. Nichols	513-891-5104
Pa	Newton Square, R. Gray	215-356-3117
Tex	Denton, C. Schleeweis	817-387-7219
Wash	Everett, W. Kohlins	206-353-3700

ⓉⓂCAPABLE - computerized logic tester - Computer Automation, Inc.

CAPAR, Dept. EM, 303 Crossways Park Dr., Woodbury, N.Y. 11797, Tel: 516-364-2610, Telex: 144678; Empl.: 7

Sales Manager: P. Tumolo

Local Sales Offices & Reps.

Ala	Huntsville, Remco Assoc.	205-883-9260
Ariz	Phoenix, Cleveland Entprs.	602-944-4679
Cal	Downey, Trimarco	213-861-8244
Cal	Sunnyvale, Winston Assoc.	415-968-5374
Colo	Aurora, Cleveland Entprs.	303-751-3252
Conn	Milford, Conti-Younger	203-929-3294
Fla	Hollywood, Wallace Elect. Sls.	305-961-6640
Ill	Streamwood, A. Holte & Assoc.	312-837-4066
Mass	Waltham, Conti-Younger	617-890-4582
Minn	Minneapolis, W. Lee Assoc.	612-926-1523
Mo	Ballwin, Rush & West Assoc.	314-394-7271
NJ	Cherry Hill, J.N. Barrett Assoc.	609-429-1551
NJ	Fort Lee, Necco Assoc.	201-461-2789
NM	Albuquerque, Cleveland Entprs.	505-266-5594
NY	E. Syracuse, Naylor Assoc.	315-656-2251
NY	Woodbury, Capar Comps. Corp.	516-364-2610
NC	Raleigh, Remco Assoc.	919-834-5820
Ohio	Cleveland, Buckeye Comps. Corp.	216-461-2080
Ohio	Dayton, Buckeye Comps. Corp.	513-278-4279
Pa	Erie, JDS	814-455-8872
Wash	Bellevue, Comtec	206-285-1698

Local Distributors

NY	Mt. Vernon, QAR Elctrns.	914-699-2244
NY	Valley Stream, L & S Elctrns.	516-561-2474

CAPCO, INC., Sub. Eberline Instrument Corp., Dept. EM, Box 2164, Grand Junction, Colo. 81501, Tel: 303-243-87510, TWX: 910-929-6989; Empl.: 200

Local Sales Offices & Reps.

Ariz	Phoenix, Spectrum Assoc.	602-997-6324
Cal	Los Altos, Frauman Assocs.	415-941-0660
Cal	Santa Ana, Spectrum Assoc.	714-835-4114
Colo	Englewood, Dynatech	303-773-2830
Conn	Meridan, P. R. Sturgeon Co.	203-237-1112
Ill	Berkeley, Balhorn & Roeser Inc	312-449-3900
Mass	Babson Park, P. R. Sturgeon Co.	617-237-3506
Minn	St. Paul, Countryman Assocs.	612-645-9151
NY	Buffalo, R. W. Mitscher Co.	716-633-7970
NY	Manlius, R. W. Mitscher Co.	315-682-2855
NY	Massapequa, R.D. McGrath	516-798-0400
NY	Pittsford, R. W. Mitscher Co.	716-596-4012
NY	West Hurley, R. W. Mitscher Co.	914-679-6151
NC	Raleigh, R. W. Mitscher co.	919-828-0575
Ohio	Cleveland, D. Steffen & Assoc.	216-461-8333
Ohio	Dayton, D. Steffen & Assoc.	513-293-3145
Ohio	Lexington, D. Steffen & Assoc.	419-884-2313
Okla	Tulsa, Barry Sls. Co.	918-664-8422
Ore	Beaverton, L. D. Elctrns.	503-649-8556
Pa	Birchrunville, Jadelectronics Assoc.	215-647-5151
Pa	Philadelphia, Jadelectrpnics	
Tenn	Johnson City, R W Mitscher Co	615-929-1141
Tenn	Shelbyville, R. W. Mitscher Co.	615-684-4544
Tex	Houston, Barry Sls.	713-784-5860
Tex	Richardson, Barry Sls. Co.	214-234-0255
Utah	Salt Lake City, Dynatech	
Va	Virginia Beach, R. W. Mitscher Co.	804-481-7200
Wash	Woodinville, L. D. Electronics	206-485-7312

CAPCON, INC., Dept. EM, 147 W. 25th St., New York, N.Y. 10001, Tel: 212-243-6275; FSC No.: 54841; Empl.: 64

Sales Manager: L. Reeves

Local Sales Offices & Reps.

Exp:	Conn., Stamford, Microwave International Corp.	203-322-6911

CAPINTEC INSTRUMENTS, INC., Dept. EM, 136 Summit Ave., Box 412, Montvale, N.J. 07645, Tel: 201-391-3930, Telex: 138630; Empl.: 500

Local Sales Offices & Reps.

Ala	Birmingham, Systematx	205-979-2070
Cal	Berkeley, P. Rosen Co.	415-526-8286
Cal	Marina Del Ray, H.L.C. Assocs.	213-823-8424
Conn	Newtown, C. Lueders & Co.	203-426-3339
Del	Wilmington, Spring Assocs.	302-656-0999
Fla	Eustis, Industrial Systematics Corp.	904-357-5100
Ga	Riverdale, Systematx	404-471-3718
Ill	South Holland, Raeco, Inc.	312-331-6001
Kans	Shawnee Mission, Wehco Tech. Sls.	913-362-8066
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Needham, C. Lueders & Co.	617-449-0345
Mich	Ann Arbor, Hal Heym Assocs.	313-971-6552
Minn	St. Paul, Sabco, Inc.	612-483-1102
Mo	St. Louis, W. Hickman & Co.	314-997-4220
Neb	Omaha, Wehco Tech. Sls.	402-895-0262
NJ	Bogota, Neville & Vespo	201-487-1505
NM	Albuquerque, S.W.E.E. Co.	505-265-6775
NY	Rochester, Unbehaun Sls. Assocs.	716-467-6304
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
Ohio	Cleveland, M.A. Blankenburg & Co.	216-251-7010
Ohio	Columbus, Industrial Data Controls	614-228-1352
Ore	Portland, Topp Engrg. Sls. Corp.	503-244-7265
Pa	Pittsburgh, Capintec Instrs.	412-781-5300
Tex	Dallas, S.W.E.E. Co.	214-827-2621
Tex	Missouri City, S.W.E.E. Co.	713-437-1171
Wash	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
Wisc	New Berlin, Nover Assocs.	414-784-1737

CAPITOL MACHINE & SWITCH CO., Dept. EM, Box 651, Danbury, Conn. 06810, Tel: 203-744-3300; Empl.: 125

Local Sales Offices & Reps.

Ala	Madison, A.P. Spears	205-837-5778
Ariz	Phoenix, Tauber & Assocs.	602-955-2266
Cal	Los Altos, Frauman Assocs.	415-941-0660
Cal	San Diego, Tauber & Assocs. Inc.	714-274-7242
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Colo	Littleton, Franklin Sls. Co.	303-794-3900
Conn	Litchfield, Norcon, Div. of Intrade	203-567-5865
Conn	N. Haven, Comp. Rep.	203-239-9762
Fla	Orlando, B-C Electronics	305-894-6071
Ga	Smyrna, B-C Elctrns.	404-436-5169
Ill	Oak Pk., G. Petitt	312-261-0342
Kans	Shawnee Mission, Lowell, Kangas & Assocs. Inc.	913-631-3515
Mass	Needham Heights, Comp. Rep.	617-444-2484
Mich	Detroit, Heick & Ralph Assoc. Intern'l., Inc.	313-538-3350
Minn	So. Minneapolis, Bitronics Sls. Co.	612-835-7744
Mo	St. Louis, Lowell, Kangas & Assocs., Inc.	314-821-4050
NJ	Livingston, Varrelman-Gorman Co.	201-992-2505
Ohio	Centerville, E. Frost	513-434-5399
Pa	Philadelphia, J. Biernbaum	215-635-1030
Tex	Dallas, Blackburn Assoc.	214-692-8885
Va	Vinton, B-C Electronics	703-890-1128
Wash	Bellevue, Hensley Assoc.	206-641-1740

CAPITOL MAGNETIC PRODS., Div. Capitol Records, Dept. EM, 1750 N. Vine St., Hollywood, Cal. 90028, Tel: 213-462-6252, TWX: 910-321-3723; Empl.: 700

Local Sales Offices & Reps.

Cal	Los Angeles	213-462-6252
Ga	Atlanta	404-321-5441
Ill	Niles	312-775-7101
Md	Germantown	301-428-0795
NY	New York	212-757-7470
Tex	Dallas	214-637-1890

™**CAPITOL 1** - open reel, cassettes, cartridges - Capitol Magnetic Prods.

™**CAPLET** - rivets-insulated - Pylon Co., Inc.

CAPLUGS DIV., Protective Closures Co., Dept. EM, 2150 Elmwood Ave., Buffalo, N.Y. 14207, Tel: 716-876-9855; Empl.: 125

Local Sales Offices & Reps.

Cal	Inglewood, E. Dudley Co.	213-678-9085
Colo	Denver, Plasticrafts	303-433-8801
Conn	West Simsbury, Anchor Engrg. Corp.	203-658-6261
Fla	Tamarac, Keeneth Corp.	305-722-1080
Fla	Vero Beach, Keeneth Corp.	305-567-9206
Ga	Atlanta, Craft Assocs.	404-393-0400
Ill	Chicago, A. J. Ellis Co.	312-262-2708
Iowa	Des Moines, F. R. Johnston Co.	515-255-5865
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Mich	Grand Rapids, Gillespie Sls. Engrg. Co.	616-949-4741
Mich	St. Clair Shores, V. Goethem Co.	313-778-8600
Minn	Minneapolis, Krez-Co.	612-561-2640
Mo	St. Louis, Tanler & Co.	314-645-0590
NJ	Englewood Cliffs, Unisco	201-567-2540
NJ	Spotswood, Banico	201-251-6868
NY	Buffalo, R. Schaefer Co.	716-632-4492
NC	Charlotte, Jaeger	704-332-3602
Ohio	Cincinnati, Gallagher Co.	513-761-1288
Ohio	N. Olmsted, Plus Sls.	216-734-8989
Okla	Tulsa, Koons & Assocs.	918-627-9400
Pa	Pittsburgh, Buchanan Sls. Co.	412-366-6330
Tenn	Hendersonville, B. Lucas Assocs.	615-824-5818
Tex	Hutchins, Prior Gaskets	214-225-4201
Wash	Seattle, R. J. Matzke Co.	206-682-6758

™**CAPOPAD** - combination transistor pad & cap - Bivar, Inc.

™**CAPS** - cannon authorized plug specialist - ITT Cannon Electric

CAPSONIC GROUP, INC., Dept. EM, Fleetwood & Second, Elgin, Ill. 60120

™**CAP-SURE** - component holders - Industrial Devices

CAPTOR CORP., Dept. EM, 5040 S. County Rd. (25A), Tipp City, Ohio 45371, Tel: 513-667-8484; FSC No.: 23939; Empl.: 65

Local Sales Offices & Reps.

Fla	Ft. Lauderdale, CBC Electronics Inc.	305-484-7330
Ill	Chicago, Croydon Elctrns., Inc.	312-237-4343
Ind	Fort Wayne, Croydon-Sarge	219-422-2311
Kans	Wichita, Avionics Engrg. Sls.	316-264-6201
Md	Wheaton, Magyar & Assocs.	301-871-8833
Mass	Framingham, L. Roffer Co.	617-877-4900
NY	Fayetteville, Graydon-Sherman	315-637-9861
Pa	Philadelphia, Magyar & Assocs.	215-763-5044
Tex	Dallas, Blackburn & Assocs.	214-692-8885
Exp:	Melville, C.P.S.	516-420-9559

™**CARAVEL** - fan - Rotron, Inc.

™**CARAVELLE 40D** - CB Rig - Fanon/Courier Corp., Subs.

CARBIDEX CORP., Dept. EM, 1 Carbidex Rd., Southgate, Mich. 48192, Tel: 313-287-8600

™**CARBOFLOW** - microwave absorber (liquid) - Microwave Filter Co.

™**CARB-O-LOCK** - toolholder-insert combinations - General Elec.

™**CARBOLOY** - cemented carbide material & products - General Elec.

™**CARBOLOY 500** - coated carbide material & products - General Elec.

™**CARBOLUBE** - carbon products - Carbone Lorraine Industries Corp.

CARBON CONTROL CORP., Dept. EM, 718 S. Columbus Ave., Mt. Vernon, N.Y. 10550, Tel: 914-668-8856; Empl.: 25

Local Sales Offices & Reps.

Mass	Swansea, J.R. Greenlees Assoc.	617-674-9858

CARBONE LORRAINE INDUSTRIES CORP., Dept. EM, 400 Myrtle Ave., Boonton, N.J. 07005, Tel: 201-DE 4-0700; Empl.: 350

Local Sales Offices & Reps.

Battery Prods. Representation

La	Westwego, Automatic Power	504-347-2384
Tex	Houston, Tideland Signal Corp.	713-681-6101
Tex	Houston, Automatic Power	713-228-9081

Brush Prods.

Cal	San Francisco, Advance Carbon Prod.	415-431-4034
Colo	Arvada, R F S	303-423-1264
Conn	Newington, Interep Co.	203-666-4233
Fla	Delray Beach, J.W. Beaver	305-276-0111
Ill	Park Forest, Carbone	312-798-7400
Ind	Highland, H A Smolen Co.	219-838-2700
Mich	Detroit, Winton Crawford Assocs.	
Mich	Owosso, Cortem Int. Div., Toledo Commutator Co.	517-725-8192
Minn	Minneapolis, W.B. Odegard	
NJ	Morristown, David A. Rugg Co.	201-538-0778
NY	Syracuse, B. Fleckenstein	315-488-7883
Ohio	Copley, Norco	216-666-3774
Pa	Greentown, Beaver Co.	717-676-4895
Pa	Pittsburgh, Bowman & Co.	412-781-5949
Wisc	Milwaukee, F C du Bois & Assocs.	

Carbolube

Cal	San Francisco, Advance Carbon Prods.	415-431-4034
Conn	Newington, Interep Co.	203-666-4233
Fla	Delray Beach, J.W. Beaver	305-276-0111
Ill	Park Forest, Carbone	312-SY8-7400
Ind	Highland, H.A. Smolen Co.	219-838-2700
Ky	Clarksville, Waite Sls.	812-948-8653
Mich	Franklin, Schlee Sls. & Engrg. Co.	313-499-3430
Minn	Minneapolis, William Be Odegard	612-929-2226
Mo	St. Louis, Unterberger	314-863-3136
NJ	East Paterson, Bergen Ind. Supp.	201-796-2600
NJ	Paramus, Tower Sls. Engr. Co.	201-265-2878
NY	Plainview, Atomergic Chemetals Co.	(516) 822-8800
NY	Syracuse, B. Fleckenstein	315-488-7883
Ohio	Copley, Norco	216-666-3774
Pa	PA, Greentown Beaver Co.	717-676-4895
Tex	Dallas, Dynamic Component Sls.	214-363-6191
Wisc	Oconomowoc, McNellis Representatives	414-567-9731

Chemical Equip. Reprs.

Cal	Glendale, Horrell Co.	213-245-6452
Cal	Pinole, Cutino Co.	415-223-5555
Fla	Hastings, Paul Sleeper Assoc.	904-328-5177
Ga	Atlanta, G.H. Crossley & Assocs.	404-261-4278
Ill	Park Forest, J.J. Carey	312-798-7400
La	Gonzales, Wallace Co.	504-644-2861
Md	Millersville, PSI	301-987-1343
Mass	Cambridge, Mooney New England	617-864-5630
Mich	Galesburg, Hagadone Co.	616-665-4982
Mo	St. Louis, Technical Serv. Corp.	314-647-4252
NJ	Boonton, Carbone	201-334-0700
NJ	Little Falls, Mooney Bros. Co.	201-256-6200
NY	Batavia, F.J. Guppenberger	716-343-0115
NC	Charlotte, Carotek	704-847-4406
Ohio	Cincinnati, R.A. Mueller & Assocs.	513-242-2535
Okla	Tulsa, Laster/Castor Corp.	918-663-7365
Pa	McMurray, Kenneth R. Sears	412-941-8574
Pa	Philadelphia, M & S Seitz Co.	215-563-6136
Tenn	Chattanooga, David F. Moore & Assocs.	615-622-2123
Tex	Houston, Mercer Engineers	713-529-6121
Wisc	Milwaukee, A.E. Rasmussen Co.	414-342-2065

CARBORUNDUM

CARBORUNDUM CO., Graphite Prods. Div., Dept. EM, Box 339, Niagara Falls, N.Y. 14302, Tel: 716-278-2731, Telex: 91 555; Empl.: 250
p. 3672-3674,4312-4314

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg.	205-772-9237
Cal	Campbell, Carborundum	408-377-0167
Cal	El Segundo, Varigon Assocs.	213-322-1120
Cal	Palo Alto, O'Donnell Assocs. North	415-327-9260
Cal	San Diego, Varigon Assocs.	714-299-5413
Conn	Greenwich, Crane & Egert	203-622-9191
Fla	Clearwater, WMM Assocs.	813-447-2533
Ill	Berkeley, Carborundum	312-547-3767
Ill	Chicago, T.B. Hunter Assoc.	312-777-2500
Md	Reisterstown, FBD Sls.	301-833-9444
Mass	West Springfield, Carborundum	413-739-7361

NY	Elmont, Crane & Egert Corp.	516-488-2100
NC	Cary, F.B.D. Sls.	919-467-7595
Ohio	Dayton, R.R.M. Assoc.	513-433-7761
Pa	Fort Washington, Kirk-Sandell	215-643-2100
Tex	Houston, Vista Assocs.	713-661-0119
Tex	Richardson, Vista Assocs.	214-235-4547
Va	Portsmouth, F.B.D. Sls.	804-484-3162

CARBORUNDUM CO., Plastics Div., Dept. EM, Carborundum Center, Niagara Falls, New York 14302, Tel: 716-278-2105; Empl.: 600

Local Sales Offices & Reps.

NY	Niagara Falls, High Performance Plastics Dept.	716-278-2105
Pa	Avondale, Protective Plastics Dept.	215-268-3101
Vt	Bethel, G-W Plastics Dept.	802-234-9941

CARCO ELCTRNS., Dept. EM, 195 Constitution Dr., Menlo Park, Calif. 94025, Tel: 415-321-8174, Telex: 348482; Empl.: 50

(TM)CARDILINE - microphone - Electro-Voice, Inc.

CARDINAL CONTROL CO., Dept. EM, 110 Kensington Rd., Kensington, Conn. 06037, Tel: 203-828-6379

CARDION ELCTRNS., Unit General Signal Corp., Dept. EM, Long Island Expwy., Woodbury, N.Y. 11797, Tel: 516-921-7300, TWX: 510-221-2179; FSC No.: 12909; Empl.: 300

CARDON CORP., Dept. EM, 80 Broad St., Boston, Mass. 02110, Tel: 617-357-5898

(TM)CARDOPULL - p.c. card ejectors - Bivar, Inc.

(TM)CAREFREE - rechargeable batteries - Eagle-Picher Inds.

CAREY ELCTRN. ENGRG. CO., Dept. EM, 1880 Clifton Ave., Springfield, Ohio 45505, Tel: 513-323-6300; Empl.: 10-25

Local Sales Offices & Reps.

Cal	Glendale, Yates Prods. Co.	213-245-6951
Cal	Oakland, Sanford Mech. Equip. Co.	415-451-6691
Mich	Lathrup Village, C.J. Brush Co.	313-EL 6-8233
NY	Brooklyn, Bailey Distributors Inc.	212-855-3958
Ohio	Dayton, Related Comps.	513-253-6116
Ore	Portland, Air Pollution Equip. Co.	503-771-1389

CARLINGSWITCH INC., Dept. EM, 505 New Park Ave., W. Hartford, Conn. 06110, Tel: 203-233-5551, TWX: 710-425-0034; Empl.: 1000 .... p. 3987-3991

Local Sales Offices & Reps.

Cal	Van Nuys, Pacific Switch	213-873-4802
Conn	W. Hartford, Atlantic Switch	203-523-5259
Fla	Hialeah, Switch Controls	305-822-0892
Ill	Wheaton, Conectrix	312-653-1130
Mass	Quincy, F. Rybak	617-471-0902
Mich	Stevensville, R. Zwick	616-429-2661
Minn	Stillwater, L. Hartmann	612-888-0665
Mo	Clayton, Mertens Electric	314-721-0058
NJ	Burlington, R. Circus	609-387-9331
NY	Pompey, S. Foster	315-677-3333
NC	Asheville, W. Walton	704-628-2281
Ohio	Columbus, R. Johnson	614-294-7103
Ore	Portland, Elctrn. Comp. Sls.	503-245-2342
Tex	Dallas, Texaswitch	214-357-1768

Local Distributors

Cal	Van Nuys, Pacific Switch Controls	213-873-4802
Conn	West Hartford, Atlantic Switch Controls	203-523-5259
Fla	Hialeah, Switch Controls	305-822-0892
Ill	Wheaton, Conectrix, Inc.	312-653-1130
Tex	Dallas, Texaswitch, Inc.	214-357-1768

CAROLINA MEDICAL ELCTRNS., INC., Dept. EM, U.S. 52 Expwy., Box 307, King, N.C. 27021, Tel: 919-983-5132; Empl.: 30

CAROLINA STEEL & WIRE CORP., Dept. EM, I-20 and S.C. 6, Lexington, S.C. 29072, Tel: 803-359-5501, Telex: 573355; FSC No.: 72954; Empl.: 115

Local Sales Offices & Reps.

Cal	Long Beach, Carolina Steel & Wire Corp.	213-424-1659
Fla	Miami, J.M. Keely Sls.	305-634-8526
Ill	Elk Grove Village, Carolina Steel & Wire Corp.	312-640-0708
NJ	South Hackensack, Carolina Steel & Wire Corp.	201-487-1036
Tex	Houston, R.D. Chapman	713-681-6221

(TM)CAROUSEL IV & IVA - inertial navigation system - Delco Electronics Div.

CARPENTER TECHNOLOGY, Dept. EM, Box 662, Reading, Pa. 19603, Tel: 215-372-4511; Empl.: 4500

Sales Manager: T.E. Murphy

Local Sales Offices & Reps.

Cal	Los Angeles	213-587-9131
Cal	San Francisco	415-593-8461
Conn	Hartford	203-233-7581
Ga	Atlanta	404-768-5883
Ill	Chicago	312-681-3500
Ind	Indianapolis	317-632-4351
Iowa	South Bend	219-234-0093
Mass	Boston	617-361-3400
Mich	Detroit	313-588-5300
Minn	Minneapolis	612-331-8440
Mo	St. Louis	314-652-6700
NJ	West Caldwell	201-227-5400
NY	Buffalo	716-684-3000
NY	Syracuse	315-437-9921
NC	Charlotte	704-596-7555
Ohio	Cincinnati	513-771-0250
Ohio	Cleveland	216-267-6700
Pa	Philadelphia	215-248-2500
Pa	Pittsburgh	412-343-4711
Tenn	Memphis	901-332-8332
Tex	Dallas	214-352-1771
Tex	Houston	713-466-5544
Wisc	Milwaukee	414-353-4900

CARROLL MFG. CO., Dept. EM, 1212 Hagan, Champaign, Ill. 61820

CARSON MFG. CO., Dept. EM, 5453 N. Rural St., Indianapolis, Ind. 46220, Tel: 317-257-3191; Empl.: 125-150

CARTER MFG. CORP., Dept. EM, Sugar Rd., Bolton, Mass. 01740, Tel: 617-779-5501; FSC No.: 03929; Empl.: 25 .... p. 3823

Sales Manager: L.W. Tedstone

Local Sales Offices & Reps.

Cal	Burlingame, Polach & Bensinger Inc.	415-697-2525

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Mass	Burlington, Tri-Com Assocs.	617-272-8163
NJ	Kinnelon, Ind'l. Science Supply Corp.	201-838-8746
NY	Great Neck, Ind'l. Science Supply Corp.	516-487-1174
Ohio	Dayton, Bek Assocs.	513-278-1343
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550
Tex	Dallas, Southern Engrg. & Sls. Co.	214-748-5760
Exp:	Vermont, North Bennington, O'Neil Mktg. Assocs.	802-442-3207

CARTER MOTOR CO., Dept. EM, 2707 W. George St., Chicago, Ill. 60618, Tel: 312-588-7700

Local Sales Offices & Reps.

Cal	San Jose, J.T. McFarland Assocs.	408-286-9333
Cal	Sherman Oaks, R. Meussdorffer & Assocs.	213-788-0771
Colo	Englewood, H. Kaub & Co.	303-761-5881
Conn	Old Lyme, Aid Engrg. Sls.	203-434-1673
Fla	Orlando, C. Ammerman	305-894-6071
Ga	Smyrna, B-C Elctrn. Sls.	404-436-5169
Ill	Oak Brook, A.G. Erickson & Assocs.	312-323-1367
Kans	Shawnee Mission, McCrary Ind'l Sls.	913-341-5401
La	New Orleans, Sam Wells	504-887-1723
Md	Baltimore, Robt. Gable	301-797-8530
Mich	Ann Arbor, V. Miklas	313-769-5181
Mich	Marshall, R. Reed Inc.	616-781-7287
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
Neb	Omaha, S. Adams	402-339-1216
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Floral Park, Cushing Electro Sls.	516-775-7170
NC	Raleigh, J. Nagle	919-828-0575
Okla	Tulsa, R.D. Jay	918-939-5956
Pa	Philadelphia, Clisby & Assocs.	215-425-7724
Tex	Dallas, E.W. Haley	214-742-2515
Tex	Houston, M.F. Klicpera Co.	713-747-3868
Utah	Salt Lake City, Brandon Co.	801-487-2231
Va	Virginia Beach, C. Bludau	804-481-7200
Wash	Seattle, Northmar, Inc.	206-524-5170
Exp:	Ill., Wheaton, CHS Int'l.	312-665-3402

(TM)CARTRIFILE R - magnetic tape and disk systems - Tri-Data Corp.

(TM)CARTROL - industrial memory system - Pacific Technology

(TM)CARY - spectrophotometers - Varian Assocs.

(TM)CASCADE - die-cast coax speakers - Utah Electronic Div.

(TM)CASEY CLIP - cable shield bonding hardware - Communications Technology Corp.

(TM)C-A-S-H - I.C. Packing Harkware - Standard Logic Inc.

CASSO-SOLAR CORP., Dept. EM, 125-10 Queens Blvd., Kew Gardens, N.Y. 11415, Tel: 212-544-2424; Empl.: 30

Sales Manager: Ed Jansen, Dir. Mktg.

Local Sales Offices & Reps.

Ala	Birmingham, Thomas Lane & Assocs.	205-870-0478
Cal	Milbrae, Call Assocs	415-692-1555
Colo	Littleton, Techna-Flo Corp.	303-773-6528
Ill	Elmwood Park, Malovac Sls. Co.	312-637-9090
Mass	Petersham, Kuniholm Assocs.	617-724-3433
Mich	St. Clair Shores, Xanthus, Inc.	313-771-3020
Mich	Troy, Xanthus, Inc.	313-391-3235
Minn	Minneapolis, Applied Technology	612-825-6111
NJ	Wyckoff, Frank A. Sterne Co.	201-891-8780
NY	Nanuet, Shorteck, Inc.	914-623-5838
NY	Orchard Park, Shorteck, Inc.	716-662-7290
NY	Schenectady, Shorteck, Inc.	518-355-4096
Ohio	Dayton, Techmark, Inc.	513-890-0177
Ohio	Toledo, Cubbedge Controls	419-535-5530
SC	Greenville, Cotton-McCauley Co.	803-244-1598
Tenn	Chattanooga, Kaylor Prods.	615-892-5705
Tex	Houston, Clay Sheets Assocs.	713-488-4404
Wash	Seattle, Thomas E. Sill Co.	206-622-1792

(TM)CAST - computerized auto. systems tester - Harris Corp.

CASTALL, INC., Dept. EM, Weymouth Ind. Park, E. Weymouth, Mass. 02188, Tel: 617-337-6075; Empl.: 30

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Cal	Huntington Beach, Polymer-West	213-430-8952
Fla	W. Palm Beach, Production Sls.	305-689-0575
Ill	Chicago, Electro-Mech Sls. Co.	312-777-0554
Mass	Waltham, Betronics Assocs.	617-894-8400
Minn	Lakeville, Dan'l Engrg.	612-332-4848
Pa	Ardmore, R. D. Freedman Assocs.	215-649-3679

CASTLE ELCTRNS., Dept. EM, 5710 N. Western Ave., Chicago, Ill. 60645, Tel: 312-728-1800; Empl.: 17

Local Sales Offices & Reps.

Cal	Los Angeles, Erlanger Sls. Co.	213-731-2238
Del	Newark, Di Vincent & Legato Assoc.	302-731-1475
Fla	Ft. Lauderdale, Unirep, Inc.	305-527-1556
Ga	Atlanta, Wallace Elctrn. Sls.	404-471-6297
Ill	Chicago, Lassers & Co.	312-539-0170
La	New Orleans, Ranger Electrns. Co.	504-737-8074
Minn	Minneapolis, HMR Inc.	612-920-8200
Mo	Raytown, M. Taraski Sls.	816-358-1442
NJ	Moorestown, Di Vincent & Legato	609-235-8299
NC	Greensboro, Wallace Elctrn. Sls.	919-292-0487
NC	Kernersville, Wallace Elctrn. Sls.	919-993-3993
Ohio	St. Mary's, Repp Co.	419-394-4724
Pa	Pittsburgh, Repp Co.	412-561-4687
Tenn	Memphis, Ranger Elctrns. Co.	901-388-5410
Tex	Houston, Ranger Elctrns. Co.	713-529-2812

™CAST-MASTER - die casting machinery - H.P.M. Div.

™CASTOMATIC - solder - Federated Metals Corp.

™CATABOND - copperclad laminates - NVF Co.

™CATALOG #100 - catalog - Workman Electronic Prods., Inc.

CATON CONNECTOR CORP., Dept. EM, 425 Northern Blvd., Great Neck, N.Y. 11021, Tel: 516-466-9288, TWX: 510-223-0820; FSC No.: 52196; Empl.: 14

Sales Manager: F. Tylinski

Local Sales Offices & Reps.

Cal	Torrance, Component Mktg. Assoc.	213-541-2515
NY	Great Neck, F. Tylinski Co.	516-466-9070

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Sales Manager: I.A. Faye, V.P.

Local Sales Offices & Reps.

Mo	Ballwin, R. Hood	314-227-3212
Pa	Lansdale, W. Stone	215-822-2929

™CAVMATIC - ultrasonic generators - Phillips Mfg. Co.

™C-B - coils - Caddel-Burns Mfg. Co., Inc.

™CBE - combression bonded encapsulation - Westinghouse Elec. Corp.

™CB-MATE - cb wattmeters - Bird Electronic Corp.

CBS LABORATORIES, Dept. EM, High Ridge Rd., Stamford, Conn. 06905, Tel: 203-327-2000, TWX: 710-474-0694

Local Sales Offices & Reps.

Cal	LaCanada, CBS Laboratories	213-790-4393

™CC ENVELOPED BY Q - used on all products - Coil-Q Corp.

CCS HATFIELD WIRE & CABLE GROUP, Continental Copper & Steel Industries, Inc., Dept. EM, 12 Commerce Dr., Cranford, N.J. 07016, Tel: 201-272-3850; FSC No.: 6145; Empl.: 1036

Local Sales Offices & Reps.

Ariz	Phoenix, CCS Hatfield Communication Prods.	800-528-3341
Ariz	Phoenix, J. Smith Baker Agency	602-254-5189
Cal	Los Angeles, Agencies Co.	213-263-9561
Cal	Menlo Park, JM Elec. Sls. Co.	415-329-0961
Colo	Denver, Empire Elec. Sls.	303-744-1776
Colo	Denver, CCS Hatfield Communication Prods.	303-757-1004
Fla	Lithia, E & W Assocs.	813-737-3160
Fla	Miami, Clement & Kinzel, Inc.	305-754-1536
Fla	Tampa, Clement-Kinzel	813-253-0981
Ga	Atlanta, CCS Hatfield Wire & Cable Group	404-349-6677
Haw	Honolulu, J.M. Electrical Sls.	808-523-1840
Ill	Chicago, J. Schonthal & Assoc.	312-828-0774
Ill	Melrose Park, CCS Hatfield Wire & Cable Grp.	312-379-4750
Iowa	Clive, Dick Bray Elec. Sls. Co.	515-274-9231
La	New Orleans, Redmann Sls. Co.	504-282-2548
Md	Baltimore, Bloom Assocs.	301-233-2222
Mass	Framingham, J.T. Elec. Sls.	617-620-0222
Mich	Troy, LBO Assocs.	313-689-5424
Minn	Mound, Jerry Finn & Assocs.	612-471-8466
Mo	Blue Springs, J. Edward Jacobson Co.	816-229-4331
Mo	St. Louis, A. Haumesser Co.	314-997-1776
NJ	Cranford, CCS Hatfield Wire & Cable Grp.	201-272-3850
NJ	Linden, E.H. MacLeod & Assoc.	201-862-2233
NM	Albuquerque, Hallek Sls. Co.	505-298-3114
NY	LeRoy, Wagner Bauson Inc.	716-967-6248
NC	Greensboro, Barber-Ayers & Assoc.	919-273-3628
Ohio	Cincinnati, A.L. Ehlers Co.	513-242-4200
Ohio	Cleveland, CCS Hatfield Elec. Distrib. Prods.	216-888-2855
Ore	Portland, Shaffer Nelson Inc.	503-234-7437
Pa	Broomal, Bradley Corp.	215-544-8800
Pa	Pittsburgh, L & R Elec. Corp.	412-781-4811
Pa	Wayne, CCS Hatfield Communication Prods.	215-687-6187
Tenn	Memphis, Garvey Sls. Co.	901-725-0332
Tex	Houston, Brenner Elec. Sls.	713-223-8484
Utah	Price, Schroeder Bros. Co.	801-637-0522
Utah	Salt Lake City, Lyle W. Williams Co.	801-487-7621
Utah	West Jordan, CCS Hatfield Wire & Cable Group	801-561-2275
Wash	Seattle, Shaffer & Nelson	206-523-0664
Wash	Spokane, Shaffer & Nelson	509-624-1339
WVa	Wheeling, R.M. Wilson Co.	304-232-5860
Wisc	Butler, J.F. Nolan & Assoc.	414-781-1140

™CC-4 - printed circuit board - Photocircuits Div., Kollmorgen Corp.

™C-DEK - data entry devices - Mohawk OEM Sales

™CDM - terminal blocks - Curtis Industries Inc.

™CDP - p.a. horn - Electro-Voice, Inc.

CEA *a division of Berkleonics, Inc.*

CEA, Div. Berkleonics, Inc., Dept. EM, 1 Aerovista Pk., San Luis Obispo, Cal. 93401, Tel: 800-235-4150; Empl.: 30 .... p. 3213-3217

Local Sales Offices & Reps.

Cal	Anaheim, Tri-Tek	714-533-1454
Cal	San Luis Obispo, Johnson Assocs.	805-544-7770
Fla	Orlando, Saber Assoc.	813-441-1301
Md	Betheseda, S & S Assocs.	301-654-1434
Mass	Burlington, Tritek	617-272-4550
NJ	S. Orange, S. Simberkoff Assoc.	201-763-7900
NM	Albuquerque, F. Hawker	505-292-2196
Pa	King of Prussia, S & S Assocs.	215-265-3450
Pa	Pittsburgh, R. F. Clark Co.	412-242-9500
Tex	Richardson, Barry Sls. Co.	214-234-0255

Exp:	Cal., Los Angeles, Trans-World Tr.	213-472-0444

™CE-CON - card edge connector - Eby Company

™CEDAR - all servo products - Montevideo Technology Inc.

™CELANESE NYLON - nylon 6/6 resin - Celanese Plastics

CELANESE PLASTICS, Dept. EM, 26 Main St., Chatham, N.J. 07928, Tel: 201-635-2600

Sales Manager: D. Rich

Local Sales Offices & Reps.

Cal	Torrance, C. Dispenziere	213-542-3858
Ill	Schiller Park, D. Anderson	312-671-3322
Mass	Wellesley, G. Kisch	617-237-4990
Mich	Southfield, R. Atherton	313-353-5610
Mo	St. Louis, D. Price	314-434-6060
NJ	Chatham, R. Bareford	201-635-1350
NC	Charlotte, H. Fields	704-377-7411
Exp:	N.J., Chatham, W.K.W. Chen	201-635-2600

™CELANEX - thermoplastic polyester resin - Celanese Plastics

™CELCI - conductive elastomeric contacts - Technical Wire Products, Inc.

CELCO, Constantine Engrg. Labs., Co., Dept. EM, 70 Constantine Dr., Mahwah, N.J. 07430, Tel: 201-327-1123, TWX: 710-988-1018; Empl.: 45

Local Sales Offices & Reps.

Cal	Upland, Celco, Pacific	714-985-9868
Tex	Dallas, P.J. Scanlon	214-231-4661

Advertisement

Manufacturers and designers of high resolution CRT deflection yokes, focus coils, lens assemblies; design, build, program digital-analog large-format scanners and high resolution printers for image processing; 70mm color photo recorders to 4000 lines; precision CRT display systems to 0.0006" spot size, high speed CRT deflection amplifiers; CRT sweep generators, CRT spot analyzers, x-y traveling microscopes
Celco, Mahwah, N.J. 07430
Celco Pacific, Upland, Cal. 91786

™CELCON - acetal copolymer resin - Celanese Plastics

™CELESTA - die-cast coax speakers - Utah Electronic Div.

™CELL-O-AIR - polyethylene dielectric - Superior Cable Div.

™CELLO-FLEX - electrical insulation - Allis-Chalmers

™CELLULINE - tubular tv lead-in wire - Belden Corp.

™CELORON - molded products - Budd Co.

™CEM - magnetrons - Varian Electron Device Grp.

™CEM - coaxial magnetrons - Varian Assocs.

™CENTAUR - fan - Rotron, Inc.

™CENTIGRID - low profile DPDT relay - Teledyne Relays

™CENTI-LOC - connector - ITT Cannon Electric

™CENTRA-GAP - lamination shape - Thomas & Skinner, Inc.

CENTRAL PLASTICS DISTS., Dept. EM, 2701 N. Pulaski Road, Chicago, Ill. 60639, Tel: 312-235-3300; Empl.: 32

Local Sales Offices & Reps.

Ill	Rockford, Rockford Central Plastics	815-397-4465

CENTRALAB DISTRIBUTOR PRODS., Dept. EM, N. 93 W 16112 Megal Dr., Box 38, Menomonee Falls, Wisc. 53051, Tel: 414-228-2911, TWX: 910-260-3620; Empl.: 30; Minimum order: $D. Neubauer

Sales Manager: R. Michaels; *Distributor Manager:* D. Neubauer

Refer to Centralab Elctrns. Div. for Product and Sales Office Information.

CENTRALAB, Electrns. Div. - Globe Union Inc., Dept. EM, 5757 N. Green Bay Ave., Milwaukee, Wisc. 53201, Tel: 414-228-1200, TWX: 026-650 910-262-3084; Empl.: 5000

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Clemick-Neenan & Assoc.	602-279-7649
Cal	Palo Alto, Brooks Technical Group	415-328-3232
Cal	San Diego, Clemick-Neenan & Assoc.	714-465-2895
Cal	Sherman Oaks, Clemick-Neenan & Assoc.	213-990-3150
Cal	Tustin, Clemick-Neenan & Assoc.	714-547-0966
Colo	Denver, Electro-Rep Inc.	303-744-2821
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean, Inc.	305-422-4531
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Haw	Honolulu, Dougherty Enterprises	
Ill	Des Plaines, Centralab	312-694-4870
Ind	Indianapolis, L.M. De Voe Co.	317-257-1227
Iowa	Cedar Rapids, J. Vrbik Co.	319-366-8733
Kans	Shawnee Mission, Lowell-Kangas & Assoc.	913-631-3515.
La	Gretna, Cartwight & Bean	504-362-4649
Md	Damascus, J. Bresson Assoc.	215-664-6460
Md	Towson, Jerry Bresson Assocs.	215-664-6460
Mass	Needham, Centralab	617-444-4847
Mich	Lathrop Village, Centralab	313-559-9095
Minn	Minneapolis, Centralab	612-831-5212
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
Mo	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NJ	Clifton, Centralab..........................	201-778-5900
NY	Albany, Reagan/Compar Albany	518-489-7408
NY	Endwell, Reagan/Compar Albany	607-723-8743
NY	Fairport, Reagan/Compar Albany	716-271-2230
NY	New Hartford, Reagan/Compar Albany	315-732-3775
NC	Charlotte, Cartwright & Bean, Inc.	704-377-5673
NC	Raleigh, Cartwright & Bean, Inc.	919-781-6560
Ohio	Columbus, Centralab	614-888-2150
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	S. E. Salem, J. J. Backer Co.	503-362-0717
Pa	Narberth, J. Bresson Assoc.	215-664-6460
Tenn	Knoxville, Cartwright & Bean, Inc.	615-693-7450
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	El Paso, Centralab	915-779-3968
Va	Lynchburg, J. Bresson Assoc.	215-664-6460
Wash	Seattle, J.J. Backer Co.	206-285-1300
Wisc	Milwaukee, Centralab	414-228-2122

CENTRALAB ELCTRNS. DIV., Globe-Union Inc., Dept. EM, Box 858, Hwy. 20 W., Fort Dodge, Iowa 50501, Tel: 515-955-8534, TWX: 910-520-2493

Refer to Centralab Elctrns. Div. Milwaukee, Wisc. for sales office information.

CENTRALAB ELCTRNS. DIV., Globe Union Inc., Dept. EM, 7158 Merchant Ave., El Paso, Tex. 79915, Tel: 915-779-3966, TWX: 910-964-1311 p. 1358,1360,1361

Refer to Centralab Elctrns. Div. Milwaukee, Wisc., for sales office information.

CENTRALAB/USCC, Div. of Globe-Union Inc., Dept. EM, 4561 Colorado Blvd., Los Angeles, Cal. 90039, Tel: 213-240-4880, TWX: 910-497-2282; Empl.: 625 p. 1357,1359,1362-1380,2770,2771

Sales Manager: D. Hosmer

Local Sales Offices & Reps.

Ala	Huntsville, Rep. Inc........................	205-881-9270
Ariz	Phoenix, Clemick-Neenan & Assoc.	602-279-7649
Cal	Los Angeles, Clemick-Neenan....	213-990-3150
Cal	Mt. View, Caltron Components ..	415-964-3244
Colo	Denver, Electro-Rep., Inc.	303-744-2821
Fla	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Ga	Tucker, Rep. Inc.	404-938-4358
Ill	Des Plaines, Centralab	312-827-4487
Kans	Shawnee Mission, Thomas Modrcin Assoc.	913-432-2131
Md	Towson, Jerry Bresson Assoc. ..	215-664-6460
Mass	Needham, Hatch Assoc...............	617-444-3310
Mich	Lathrup Village, Centralab	313-559-9095
Minn	Minneapolis, Centralab	612-831-5212
Mo	Hazelwood, Thomas-Modrcin Assoc.	314-895-4700
NJ	Clifton, Centralab..........................	201-778-5900
NY	Albany, Reagan/Compar Albany, Inc.	518-489-7408
NY	Plainview, E.R.A.	516-822-9890
NC	Raleigh, Carlwright & Bean, Inc.	704-337-5673
Ohio	Columbus, Centralab	614-888-2150
Ohio	Columbus, McFadden Sls., Inc. ..	614-221-3363
Pa	Narberth, Jerry Bresson Assoc.	215-664-6460
Tenn	Jefferson City, REP, Inc.	615-475-4105
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Tex	Houston, Aid Elctrns., Inc.	713-777-3882
Tex	Irving, Aid Elctrns., Inc.	214-259-4761
Va	Lynchburg, J. Bresson, Assoc. ..	215-664-6460
Wash	Seattle, H.S. Thorpe Comp..........	206-784-3333
Wisc	Milwaukee, Centralab	414-228-2122

CENTRE ENGRG., Dept. EM, 2820 E. College Ave., State College, Pa. 16801, Tel: 814-237-0321, TWX: 510-691-2634; Empl.: 350 .... p. 1180,1181

Sales Manager: H.D. Shirey

Local Sales Offices & Reps.

Ariz	Phoenix, Toribre Enterprises	602-257-0727
Cal	Redondo Beach, J. J. Riley Assocs.	213-374-3468
Cal	San Jose, United Sls. Co.	408-379-0800
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9594
Ga	Atlanta, Millar Elctrns...................	404-261-6160
Ill	West Chester, Wasson-Gallagher	312-261-7517
Ind	Chicago, Croydon Elctrns.	312-237-4343
Mass	Lexington, KCA Comps.	617-861-9024
Minn	Chanhassen, Barnes Assocs.	612-474-2907
NY	Baldwin, Milano Bros. International	516-223-9000
NY	Elmhurst, S. Levinson	212-271-5897
NY	Lewiston, Watmet, Inc.	716-285-3595
NC	Raleigh, Millar Elctrns.	919-787-9564
Ohio	Cleveland, K W Elctrn. Sls.	216-831-8292
Ohio	Dayton, K W Elctrn. Sls...............	513-890-2150
Ore	Aloha, Underwood & Underwood	503-649-5681
Pa	Allison Park, K W Elctrn. Sls.	412-487-4300
Pa	King of Prussia, Colburn Assocs.	215-265-5490
Tex	Dallas, Allied Comps.	214-238-0408
Tex	Houston, Allied Comps.	713-691-3961
Wash	Seattle, Underwood & Underwood	206-243-2133

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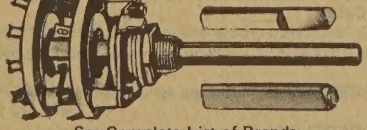

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™CENTRI-STAK - multi-stage compressors - Allis-Chalmers

™CENTRIX - grinding mills - Allis-Chalmers

CENTRON ENGRG., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510, Tel: 213-530-4410, Telex: 69-8223; Empl.: 25

™CENTRONIC - photomultipliers - Bailey Instrs., Inc.

CENTRONICS DATA COMPUTER CORP., Dept. EM, Wall St., Hudson, N.H. 03051, Tel: 603-883-0111, TWX: 710-228-6505; Empl.: 740

Local Sales Offices & Reps.

Cal	Burlingame	415-692-6030
Cal	Santa Ana......................................	714-979-6650
Ga	Atlanta	404-455-7107
Ill	Rolling Meadows	312-398-4500
Mass	Burlington	617-272-8545
Mass	Framingham	617-872-5069
NH	Hudson	603-883-0111
NJ	Medford..	609-268-1331
NY	Plainview	516-433-1730
Ohio	Kettering	513-294-0070
Tex	Arlington	817-461-5711
Va	Falls Church	703-671-2900

™CENTRY - process control instrumentation - Leeds & Northrup Co.

™CENTURA - wallplates, switches, outlets - Leviton Mfg. Co., Inc.

™CENTURION (DIMMERS) - light dimming rotary slide controls - Lutron Electronics Co.

™CENTURION PLL 40 - SSB TRansceiver - Fanon/Courier Corp., Subs.

CERAC, INC., Dept. EM, Box 597, Butler, Wisc 53007

™CERADOT - cermet fixed resistor - CTS Corp.

™CERAFIL - ceramic capacitor - AVX Ceramics

™CERALAM - ceramic capacitor - AVX Ceramics

™CERAMABOND - ceramic adhesive - Aremco Prods., Inc.

™CERAMACAST - castable ceramics - Aremco Prods., Inc.

™CERAMACOAT - ceramic coatings - Aremco Prods., Inc.

™CERAMA-DIP - potting ceramic - Aremco Prods., Inc.

™CERAMA-PROBE - measuring instr/coatings - Aremco Prods., Inc.

CERAMASEAL, INC., Sub. Interpace Corp., Dept. EM, Box 25, New Lebanon Center, N.Y. 12126, Tel: 518-794-7800, Telex: 14-5442; FSC No.: 07601; Empl.: 60

Local Sales Offices & Reps.

Ariz	Wickenburg, H. A. Omley............	602-684-7135
Ark	Little Rock, C.H. Stout, Inc. :........	501-374-8201
Cal	Atherton, Wadsworth-Pacific Mfg. Assoc.	415-321-3619
Cal	Pacific Palisades, Wadsworth-Pacific Mfg. Assoc.	213-454-4313
Colo	Golden, Continental Divide Prods.	303-279-6473

Ill	Mt. Prosepect, Automation Equip. Co.	312-398-7550
La	New Orleans, C.H. Stout of La., Inc.	504-482-3183
La	Shreveport, C.H. Stout of La., Inc.	318-221-5555
Md	Baltimore, R. A. Wafer Assoc.	301-744-1133
Mass	Boston, P-J Engrg. Sls. Co.	617-783-0510
Miss	Clinton, C.H. Stout of Miss., Inc.	601-924-7611
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Charlotte, J. Rudisill Assoc.	704-377-6901
Tenn	Knoxville, C.E. Fox	615-522-4404
Tenn	Memphis, C. H. Stout, Inc.	901-526-7601
Wash	Seattle, J. B. Jolly, Inc.	206-938-4166

CERAMIC MAGNETICS, INC., Dept. EM, 87 Fairfield Rd., Fairfield, N.J. 07006, Tel: 201-227-4222, Telex: 138 730; Empl.: 25

Local Sales Offices & Reps.

Cal	Irvine, A. C. Allen	714-552-9428
Cal	Palo Alto, Testco, Inc.	415-324-1900
Conn	North Haven, Northeast Reprs.	203-239-2507
Ga	Norcross, Macro-Mktg. Assoc.	404-449-7440
Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Ft. Wayne, R.O. Whitesell	219-432-5591
Ind	Indianapolis, R.O. Whitesell	317-359-9283
Ind	Kokomo, R.O. Whitesell	317-453-6868
Iowa	Cedar Rapids, J. G. Twist	319-393-8703
Kans	Prairie Village, J.G. Twist	913-236-4646
Kans	Wichita, J. G. Twist	316-686-6685
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Md	Gaithersburg, Dean Inc.	301-948-5444
Mass	Needham Heights, Northeast Reprs.	617-449-3034
Mich	Grand Rapids, R.O. Whitesell	616-451-8901
Mich	Southfield, R.O. Whitesell	313-358-2020
Mich	St. Joseph, R.O. Whitesell	616-983-7337
Minn	Minneapolis, J.G. Twist Co.	612-854-4600
Mo	St. Louis, J. G. Twist	314-432-2830
NY	Buffalo, H. C. Johnson Agencies	716-632-7880
NY	Dix Hills, K & J Engrg.	516-242-0888
NY	Fayetteville, H. C. Johnson Agencies	315-637-9383
NY	Rochester, H. C. Johnson Agencies	716-482-3000
Ohio	Cincinnati, R.O. Whitesell	513-521-2290
Ohio	Columbus, R.O. Whitesell	614-888-9396
Ohio	Dayton, R.O. Whitesell	513-298-9546
Ohio	Middle-Burg Hts., R.O. Whitesell	216-826-4424
Pa	Pittsburgh, R.O. Whitesell	412-242-0100
Tenn	Greeneville, R. O. Whitesell	615-639-6154
Tex	Dallas, J & R Assocs.	214-348-5752
Wash	Richland, H. Svobada	509-783-6523
Wash	Seattle, J. B. Jolly	206-938-4166
Wisc	Wauwatosa, J. G. Twist	414-475-7755

Ⓣ**CERAMICON** - ceramic capacitors - Erie Technological Products

Ⓣ**CERAMIPEC** - c r network - Murata Mfg. Co. Ltd.

Ⓣ**CERAMO** - thermocouple wire - Thermo Elec. Co., Inc.

Ⓣ**CERAMOCOUPLE** - thermocouple - Thermo Elec. Co., Inc.

Ⓣ**CERAMOLITHIC** - mfg. process - Centralab/USCC

Ⓣ**CERAMVAR** - controlled expansion alloy - GTE Sylvania Inc.

Ⓣ**CERASEAL** - ceramic capacitor - AVX Ceramics

Ⓣ**CERATRCLS** - ceremet potentiometer - CTS Corp.

Ⓣ**CERATRIM** - cermet trimmers - CTS Corp.

Ⓣ**CERATRON** - electron multiplier - Murata Mfg. Co. Ltd.

CERMETEK, INC., Dept. EM, 660 National Ave., Mountain View, Cal. 94040, Tel: 415-969-9433, TWX: 910-379-6931; Empl.: 85

Sales Manager: G. Meadows

Local Sales Offices & Reps.

Ariz	Phoenix, Chapparel-Dorton Enterprises	602-263-0414
Cal	Costa Mesa, Relcom	714-549-3674
Cal	Marina Del Rey, Relcom	213-822-1187
Colo	Boulder, R.G. Enterprises	303-447-9211
Conn	North Haven, Kitchen & Kutchin, Inc.	203-239-0212
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Ill	Chicago, I.R.I.	312-647-7755
La	Kenner, Cunningham Co.	504-722-2217
Mass	Lexington, Kitchen & Kutchin Inc.	617-862-8230
Minn	Minneapolis, Jos Co/Melius, Inc.	612-854-4270
NJ	Clifton, Compar New York	201-546-3660
NM	Albuquerque, Tritronix/Albuquerque	505-265-8400
Pa	King of Prussia, Rivco, Inc.	215-265-5211
Tex	Dallas, Cunningham Co.	214-233-4303
Tex	Houston, Cunningham Co.	713-461-4197
Va	Arlington, H. J. Heffernan Co.	703-522-6666
Wisc	Milwaukee, I.R.I.	414-259-0966
Exp:	Palo Alto, Ca. (Headquarters), Western Int. Trade Corp.	415-321-1240

Ⓣ**CERMIDE** - variable & fixed resistores (primarily high resistance) - CTS Corp.

Ⓣ**CERMOLOX** - ceramic/metal power tubes - RCA, Electro-Optics & Devices

Ⓣ**CEROL** - ceramic capacitor - AVX Ceramics

Ⓣ**CERROBOND** - CATV bonded cable - Cerro Communication Products

CERRO COMMUNICATION PRODUCTS, Dept. EM, Box 2026, Anniston, Ala 36201

CERRO COMMUNICATION PRODUCTS, Dept. EM, Halls Mills Rd., Freehold, N.J. 07728, Tel: 201-462-8700, Telex: 132481; Empl.: 200

Sales Manager: F. Spexarth

Local Distributors

Cal	Culver City, Cable TV Supply Co.	213-390-8002
Cal	Newark, Kaiser Warehouse	415-796-8343
Cal	Pleasanton, Tele-Vue	415-829-1811
Cal	Santa Ana, Anixter-Pruzan	714-556-6270
Ga	Atlanta, Power & Telephone Supply Co.	404-691-6813
Ga	Atlanta, Anixter-Pruzan	404-449-6533
Mo	St. Louis, Anixter-Pruzan	314-423-9555
NJ	Pinebrook, Anixter-Pruzan	201-227-9580
NY	Great Neck, Tele-Wire Supply Co.	516-829-8484
NY	Melville, S.A.L. Communications	516-694-7110
Tex	Houston, Power & Telephone Supply Co.	713-461-8444
Wash	Seattle, Anixter-Pruzan	206-624-6505
For:	Can, Lachine, Quebec, Turmac Industries, Ltd.	514-637-3511
For:	Can, Montreal, Quebec, Deskin Sls Corp.	514-331-2860

Ⓣ**CERROFOAM** - catv trunk cable - Cerro Communication Products

CERRO WIRE & CABLE CO., Div. Cerro Corp., Dept. EM, 285 Nicoll St, P.O. Box 1102, New Haven, Conn. 06504, Tel: 203-772-2250, TWX: 710-465-2149; Empl.: 500

Local Sales Offices & Reps.

Cal	Fremont	415-651-0460
Cal	Sherman Oaks	213-872-1610
Colo	Denver	303-759-3191
Conn	Branford	203-488-1604
Ga	Atlanta	404-449-1868
Ill	Bellwood	312-379-2265
Mo	Clayton	314-721-2498
Mo	Independence	816-358-9191
NJ	Avenel	201-381-2170
NJ	Cherry Hill	609-779-7667
Ohio	Rocky River	216-333-8640
Pa	Pittsburgh	412-343-5022
Tex	Dallas	214-233-2294
Tex	Houston	713-523-6843

Ⓣ**CERT** - antenna/transmission cable - Times Wire & Cable

Ⓣ**CERTACELL** - voltage reference - Codi Corporation

Ⓣ**CERTAVOLT** - voltage ref - Codi Corporation

Ⓣ**CERTI-CRIMP** - crimping tools - Amp Inc.

Ⓣ**CERTI-LOK** - insertion tools - Amp Inc.

Ⓣ**CERTIMESH** - woven wire cloth - Pall Trinity Micro Corp.

Ⓣ**CERTI-SEAL** - splice - Amp Inc.

CES ELCTRNS., Dept. EM, 2968 Avenue Z, Brooklyn, N.Y. 11235; Empl.: 20

Local Sales Offices & Reps.

NY	Brooklyn, Microwave Labs of America	

Ⓣ**CETA** - electronic training sys. - Ashman Industries (1966) Ltd.

CGTI, Dept. EM, 2 Windward Ave., White Plains, N.Y. 10605, Tel: 914-949-3719, TWX: 710-568-1305; Empl.: 270

Sales Manager: G.N. Snider

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CHADWICK-HELMUTH CO., INC., Dept. EM, 111 E. Railroad Ave., Monrovia, Calif. 91016, Tel: 213-358-4567; Empl.: 20

CHAFITZ ENGINEERING, Dept. EM, P.O. Box 2188, Rockville, Md. 20852

CHALCO ENGRG. CORP., Dept. EM, 15126 S. Broadway, Gardena, Cal. 90248, Tel: 213-FA 1-0121, TWX: 910-346-7026; Empl.: 95

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instrs.	205-883-8660
Alas	Phoenix, Thorson Co.	602-956-5300
Cal	Los Angeles, Thorson Co.	213-476-1241
Cal	Mountain View, Thorson Co.	415-964-9300
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Santa Barbara, Thorson Co.	805-964-8751
Cal	Tustin, Thorson Co.	714-544-5121
Cal	Walnut Creek, Thorson Co.	415-938-1359
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Ga	Atlanta, W. A. Brown Instrs.	404-939-1674
Ill	Chicago, P. Lind Elctrns	312-774-1246
La	Gretna, W.A. Brown Instrs.	504-366-5766
Md	Fulton, Gans - Fryling, Inc.	301-837-6311
Mass	Wayland, Centennial Sls Co.	617-358-5161
Minn	Circle Pines, P. Lind Elctrns	612-786-5770
NJ	Hasbrouck Heights, Systronics Mktg, Inc.	201-288-3322
NJ	Wayne, K & J Assocs.	201-694-3334
NM	Albuquerque, Thorson Co.	505-265-5655
NY	East Stauket, K & J Assocs.	516-751-8686
NC	Durham, W.A. Brown Instrs.	919-682-2383
SC	Columbia, W.A. Brown Instrs.	803-798-3297
Tenn	Knoxville, W.A. Brown Instrs.	615-690-3281
Va	Arlington, Gans - Fryling, Inc.	703-527-3262
Wash	Seattle, Thorson Co.	206-455-9180
Exp:	Cal., Los Angeles, Products Supply Co.	213-659-1858

Ⓣ**CHALLENGER** - amplifiers & sound sys - Bogen Div.

Ⓣ**CHALLENGER** - steel electronic cabinets (medium duty) - Equipto Enclosure Systems

Ⓣ**CHA-MP** - tool - Amp Inc.

CHANNEL INDS., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111, Tel: 805-967-0171, Telex: 658-427; Empl.: 75

Local Sales Offices & Reps.

Ohio	Chagrin Falls, Channel Prods.	216-543-8137

CHANNEL MASTER DIV. AVNET, Dept. EM, Rte. 209, Ellenville, N.Y. 12428, Tel: 914-647-5000; Empl.: 1000

Ⓣ**CHANNELITE** - piezoelectric ceramics - Channel Inds.

(TM)CHANNELLIGHT - room construction - Hotpack Corp.

CHANNELLOCK, INC., Dept. EM, 1306 S. Main St., Meadville, Pa. 16335, Tel: 814-724-8700; Empl.: 500
p. 4327

Sales Manager: B. DeArment Jr.

Local Sales Offices & Reps.

Cal	Alhambra, J.J. Brown Co.	213-283-1322
Cal	S. San Francisco, J.J. Brown Co.	415-589-5775
Colo	Denver, Western Ind'l. Sls. & Svcs. Co.	303-758-3972
Fla	Ft. Lauderdale, G.A. Palmer	305-764-3487
Ga	Decatur, J.C. Lyle & Assocs.	404-378-5691
Ill	Chicago, Muzzy & Peters	312-287-1360
Ind	Jeffersonville, Wixson-Clinard Co.	812-283-0955
La	Mansfield, Lynn & Hemphill, Inc.	318-872-1108
Mass	Wellesley, T. Sawyer Sls. Co.	617-235-2667
Mich	Detroit, Wixson-Nehls Co.	313-871-8815
Minn	Minneapolis, Witta Sls. Co.	612-925-1337
Mo	Kansas City, D. Schmelzinger Co.	816-444-5330
Neb	Omaha, J. Pedersen	402-571-8604
NJ	Summit, A.P. Henricks Co., Inc.	201-273-0555
Ohio	Cleveland, H.W. Murray Co., Inc.	216-333-2977
Okla	Oklahoma City, Lynn & Hemphill, Inc.	405-524-9807
Pa	Glenolden, A.P. Henricks Co., Inc.	215-583-3921
Pa	Pittsburgh, E.D. McGinley	412-561-7979
Tex	Dallas, Lynn & Hemphill, Inc.	214-747-4745
Va	Richmond, D. Miller & Assocs.	703-353-5324
Wash	Port Orchard, R.G. Sullivan Co.	206-871-0872
Exp:	Ind., South Bend, United Export Corp.	219-232-8286

(TM)CHANNELTRON - electron multiplier array (CEMA) - Galileo Electro-Optics Corp.

(TM)CHARABAND - computer line printer - Dataproducts Corp.

CHARTPAK, A Times Mirror Co., Dept. EM, 1 River Rd., Leeds, Mass. 01053, Tel: 413-584-5446; Empl.: 165

(TM)CHASE - nipples & couplings - T & B/Thomas & Betts

(TM)CHASE - nipples & couplings - T & B/Thomas & Betts

(TM)CHASSIS-TRAK - slides - General Devices Co., Inc.

CHASSIS-TRAK, DIV., General Devices Co., Inc., Dept. EM, 525 S. Webster Ave., Indianapolis, Ind. 46219, Tel: 317-897-7000, Telex: 27-2169; Empl.: 125
p. 1134,1135

Local Sales Offices & Reps.

Ala	Huntsville, International Sci. Instr.	205-533-6880
Ariz	Scottsdale, Schoeffler Assoc.	602-948-3470
Cal	Los Angeles, M. A. Stolaroff Co.	213-295-7781
Cal	Mtn. View, G. Woempner Co.	415-964-5454
Cal	San Diego, M. A. Stolaroff Co.	714-234-6905
Cal	Van Nuys, J. Thomas	213-782-3820
Colo	Sedalia, Jensen Reps.	303-688-4154
Conn	Cheshire, Coakley, Boyd & Abbett, Inc.	203-272-2261
Fla	North Miami, J. Krutek & Assoc.	305-941-6544
Fla	Tampa, J. Krutek & Assoc.	305-941-6544
Ill	Rolling Meadows, Lightner Assoc.	312-398-3000
Ind	Indianapolis, Mktg. Engineers, Inc.	317-546-1523
Kans	Shawnee Mission, Lowell, Kangas & Assoc.	913-631-3515
Md	Bethesda, G. Rosen Assocs., Inc.	301-530-8448
Mass	Needham, Coakley, Boyd & Abbett, Inc.	617-444-5470
Minn	St. Paul, Northport Engineering	612-698-3841
Mo	St. Louis, Lowell, Kangas & Assocs.	314-821-4050
NY	Fayetteville, H.G. Richter Inc.	315-637-6713
NY	Manhassett, Kalber & Mack	516-627-6620
Ohio	Cincinnati, Components, Inc.	513-721-2997
Ohio	Cleveland, Components, Inc.	216-842-2737
Tex	Dallas, R. Martin Assoc.	214-361-8584
Tex	Houston, R. Martin Assoc.	713-462-4077
Wash	Olympia, Bergford Assoc.	206-866-2001
Exp:	Ind., Indianapolis, General Devices Co.	317-359-5407

CHATHAM CONTROLS CORP., Dept. EM, 33 River Rd., Chatham, N.J. 07928, Tel: 201-635-8892; FSC No.: 04814; Empl.: 11

Local Sales Offices & Reps.

Cal	Pasadena, Components Corp.	213-681-7448
NJ	Fairlawn, PAR Assocs., Inc.	201-447-3722

CHATILLON JOHN & SONS, Dept. EM, 83-30 Kew Gardens Rd., Kew Gardens, N.Y. 11415, Tel: 212-847-5000; Empl.: 135

CHATSWORTH DATA CORP., Dept. EM, 20710 Lassen St., Chatsworth, Cal. 91311, Tel: 213-341-9200; Empl.: 45 p. 2816

(TM)CHECK-LITE - pilot light push button - Adalet Mfg. Co.

(TM)CHEK-A-COLOR - test equipment, color TV - GTE Sylvania Inc.

CHEM AERO, INC., Dept. EM, 231 E. Lomita Blvd., Wilmington, Cal. 90744, Tel: 213-775-2581, TWX: 910-345-6267; FSC No.: 17477; Empl.: 50

Sales Manager: S. Yeager

Local Sales Offices & Reps.

Cal	Daly City, R. DelBucchia	415-756-1664
Mass	Waltham, United Engr. Sls.	617-890-6680
Mich	St. Clair Shores, J. M. Thorpe Co.	313-779-6363
Mo	Florissant, H & R Sls. & Engrg.	314-921-6242
NJ	Livingston, Varrelman-Gorman	201-992-2505
NY	New York, Varrelman-Gorman	212-463-5000
Ore	Portland, Todd-Brian Inds.	503-297-3862
Pa	Philadelphia, Rayco Sls.	215-698-1210
Tex	Dallas, P.J. Scanlon Co.	214-231-4661
Wash	Kirkland, SPS Elctrns.	206-827-5811

(TM)CHEM-BLANKS - photo-etching - Braun Co., Inc.

CHEMCUT CORP., Dept. EM, 500 Science Pk., State College, Pa. 16801, Tel: 814-238-0514, Telex: 842-555; Empl.: 186

Local Sales Offices & Reps.

Cal	Anaheim, Chemcut Corp., Western Dist. Office	714-630-1700
Cal	San Francisco, Chemcut Corp.	408-244-8826
Ill	Elk Grove Village, Chemcut Corp.	312-956-6513

Local Distributors

Cal	Anaheim, Chemcut Corp. Western Dist. Off.	714-630-1700
Fla	Maitland, Photo Chem. Sys.	305-647-1593
Ga	Roswell, Photo Chem. Sys.	404-993-1738
Ill	Chicago, John Plosnich & Assoc.	312-286-7676
Ill	Elk Grove Village, Chemcut-Central Dist. Off.	312-956-6513
Ind	W. Lafayette, Bruce Johnson Co.	317-463-4616
Mass	Waltham, Etchomatic, Inc.	617-893-2020
Minn	Minneapolis, T.K. Gray, Inc.	612-781-4874
NY	East Meadow, Granirer Assoc	516-292-1627
NY	Skaneateles, Spar-Kleen Prod.	315-685-5711
Ohio	Cleveland, L.W. Hodson Machinery Co.	216-587-4500
Okla	Tulsa, Lew Wenzel & Co.	918-587-3371
Ore	Portland, Vandy Corp.	503-297-1900
Tex	Dallas, Lew Wenzel & Co.	214-243-1546
Tex	Houston, Lew Wenzel & Co.	713-225-2147
Va	Alexandria, Chem. Etching Equip. & Supp. Co.	703-971-2646
Wash	Seattle, Vandy corp.	206-789-3300

CHEMETRON CORP., Welding Prods., Dept. EM, 111 E. Wacker Dr., Chicago, Ill. 60601, Tel: 312-565-5000

(TM)CHEMFLUOR - products of teflon - Chemplast, Inc.

(TM)CHEMGRIP - to etch teflon - Chemplast, Inc.

CHEMICAL ELECTRONIC ENG., Dept. EM, Amboy Rd. Box 203, Matawan, N.J. 07747, Tel: 201-566-1601

CHEMICAL ETCHING EQUIP. & SUPPLY, Dept. EM, 7629 Crawford Ct., Alexandria, Va. 22310, Tel: 703-971-2646; Empl.: 5

(TM)CHEMINEX - miniature coaxial cable - Raychem Corp.

(TM)CHEM-O-SEAL - can end sealing compound - CPL Corp.

(TM)CHEM-O-SOL - p.v.c. dispersion-coating, gasketing - CPL Corp.

(TM)CHEM-O-THANE - two-part polyurethane elastomer - CPL Corp.

CHEMPLAST, INC., Dept. EM, 31-150 Dey Rd., Wayne, N.J. 07470, Tel: 201-696-4700, TWX: 710-988-5834; Empl.: 285

Sales Manager: R.M. Hartwell, Dir. Sls.

Local Sales Offices & Reps.

Ariz	Phoenix, Hudson & Assoc.	602-258-2693
Cal	Northridge, M.V. Woldanski	213-360-7798
Cal	Van Nuys, Chemplast-West	213-786-8866
Colo	Denver, West Mark Assocs.	303-433-7181
Conn	Killingworth, W.C. Thompson	203-663-1827
Fla	Vero Beach, J.D. Rule	305-589-5357
Ga	Stone Mountain, R.J. Parker Co.	404-939-5030
Ill	Franklin Pk., W. Cogger	312-671-0099
Kans	Wichita, Regal Plastic & Sup.	316-263-1211
Md	Pasadena, P.J. Simard	301-437-0855
Mass	Watertown, D.M. Burns	617-926-5565
Minn	Minneapolis, Service Tool & Engr. Co.	612-941-7151
Mo	Kansas City, Regal Plastic & Sup. Co.	816-471-6390
Mo	St. Louis, J.A. Crowe	314-842-1353
Neb	Omaha, Regal Plastic & Sup. Co.	402-344-4446
NJ	Mount Holly, J.T. Anderson	609-267-6902
NJ	Waldwick, O.R. Strauch	201-447-5762
NY	New Hyde Park, J.J. Hagmaier	516-742-0524
Ohio	Olmsted Falls, B. Williams	216-886-1050
Tenn	Oak Ridge, I & I Inc.	615-483-8581
Tex	Dallas, Kolster	214-233-4158
Utah	Salt Lake City, Industrial Sls. Co.	801-486-4997
Wash	Seattle, D. Smith Sls. Co.	206-633-3160
Exp:	Wayne, N.J., H. Hamilton	201-696-4700

(TM)CHEMPUTER - circular chemical computer - Coleman Instr. Div.

(TM)CHEMTRON - reed relays - COSAR Corp.

CHEMTRONICS, INC., Dept. EM, 45 Hoffman Ave., Hauppauge, N.Y. 11787, Tel: 516-582-3322; Empl.: 23

Local Sales Offices & Reps.

Cal	Burlingame, Wm. J. Purdy Co.	415-347-7701
Cal	Los Angeles, Erlanger Sls. Co.	213-RE 1-2238
Colo	Denver, W. J. Purdy Co.	303-777-1411
Ga	Norcross, D. Cooper Co.	404-448-5460
Ill	Chicago, Markal Sls. Corp.	312-282-5800
Ind	Indianapolis, New/Era Sls.	317-257-7333
Mass	N. Scituate, W.A. Hendrickson	617-545-0652
Minn	St. Paul, Carl-M Co.	612-699-8004
Mo	Raytown, Taraski Sls. Corp.	816-358-4590
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Grand Island, L.J. McTaggart Assoc.	716-773-9222
Ohio	St. Mary's, Repp Co.	419-394-4724
Pa	Pittsburgh, Repp. Co.	412-561-4687
Tex	Richardson, Willoughby-Fowler Co.	214-235-3664
Wash	Seattle, Fleehart & Sullivan	206-LA 2-1533

CHEN INDUSTRIES, INC., Dept. EM, 2740 S. LaCienega Blvd., Los Angeles, Ca. 90034, Tel: 213-870-1083; Empl.: 20

CHERRY ELECTRICAL PRODS. CORP., Dept. EM, 3623 Sunset Ave., Waukegan, Ill. 60085, Tel: 312-689-7700, TWX: 910-235-1572; Empl.: 1000
p. 3992-3999

Local Distributors

Cal	Chatsworth, Westates Elctrns. Corp.	213-341-4411
Cal	Costa Mesa, Westates Electronics Corp.	714-549-8401
Cal	Sunnyvale, Westates Elec. Co.	408-733-8383
Colo	Denver, Denver Wintronics	303-934-2406
Fla	Miami, ESL Elctrn. Distrs.	305-633-6973
Ill	Palatine, OHM Elctrns.	312-359-5500
Ind	Indianapolis, Ra-Dis-Co	317-637-5571
Ind	South Bend, Genesis Elctrns.	219-287-2911
Kans	Kansas City, C. Tennant Sons & Co., Elec. Div.	913-287-2100
Ky	Louisville, P.I. Burkes Co.	502-589-3960
Md	Savage, Pyttronic Ind.	301-792-7000
Mass	W. Newton, A. W. Mayer	617-965-1111
Mich	Livonia, Rep-Tron Elctrns.	313-525-2700
Mo	St. Charles, Lectronix Inc.	314-946-6424
NY	Mt. Vernon, QAR Ind'l. Elctrn. Sls.	914-699-2224
NY	Rochester, Rochester Radio Supply Co.	716-454-7800
NY	Woodbury, C. Tennant Sons & Co.	516-364-9070
Ohio	Dayton, Esco Inc.	513-226-1133
Okla	Tulsa, Radio Inc.	918-587-9123
Ore	, Tekelectric Control Co.	503-246-5451

Pa	Philadelphia, Herbach & Rademan	215-426-1700
Tex	Dallas, Solid State Elctrns. So.	214-352-2601
Tex	Denison, Denison Radio Supply	214-465-2336
Tex	San Antonio, Sherman Elctrns. Supply	512-224-1004
Tex	Stafford, Southwest Elctrns.	713-494-6021
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Wash	Seattle, Interface Elctrns.	206-285-3500
Wyo	Cheyenne, Houge Radio & Supply	307-632-6474

CHERRY FASTENERS, Townsend Div. Textron Inc., Dept. EM, Box 2157, Santa Ana, Cal. 92707, Tel: 714-545-5511, Telex: 678431; Empl.: 635

Local Sales Offices & Reps.

Ga	Atlanta, J.O. King	404-355-7660
Kans	Wichita, Std. Parts & Equip. Corp.	316-522-1516
Tex	Ft. Worth, Std. Parts & Equip. Corp.	817-336-2521

™CHERRY LOCK - rivets - Cherry Fasteners

CHESAPEAKE INSTR. CORP., Dept. EM, Shadyside, Md. 20867, Tel: 301-867-2151; Empl.: 315

CHESTER CABLE, Dept. EM, Oakland Ave., Chester, N.Y. 10918, Tel: 914-469-2141

CP Chesterfield Products/inc.

CHESTERFIELD PRODS. INC., Dept. EM, 511A Victor St., Saddle Brook, N.J. 07662, Tel: 201-845-6886; Empl.: 27 .... p. 2723

Local Sales Offices & Reps.

Ala	Huntsville, A.B. Andrews & Co.	205-837-5382
Cal	Mission Viejo, E.B. Hoin Assoc	714-586-9774
Cal	Palo Alto, J M Assocs.	415-327-1260
Ill	Chicago, K. W. Meyers Co.	312-774-6440
Ind	Indianapolis, K. W. Meyers Co.	317-243-6681
Md	Edgewater, Commart, Inc.	301-261-4344
Mass	Stoneham, Ken Corp.	617-438-5464
Minn	Minneapolis, K. W. Meyers Co.	612-920-7080
NJ	Saddle Brook, L&M Assocs.	201-843-8700
NY	New York City, L & M Assocs.	212-243-6155
NC	Research Triangle Park, A.B. Andrews & Co.	919-549-0563
Pa	Andalusia, L & M Assocs.	215-639-3100
Tex	Dallas, Bradenco	214-358-3278
Tex	Houston, Bradenco	713-529-9881

CHICAGO DYNAMIC INDUSTRIES, Precision Prods. Div., Dept. EM, 1725 Diversey Blvd., Chicago, Ill. 60614, Tel: 312-935-4600; Empl.: 478

Local Sales Offices & Reps.

Ala	Huntsville, Craft Assocs.	205-837-0221
Cal	Inglewood, Tracker Inc.	
Cal	Menlo Park, West Engrg. Sls.	415-325-2885
Colo	Denver, TESSCO	303-744-1119
Fla	Maitland, Craft Assocs.	305-645-2242
Ga	Atlanta, Craft Assocs.	404-252-5001
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Fort Wayne, Temple Engrg.	744-0362
Md	Glen Arm, Hodgins Assocs.	301-592-7047
Mass	Norwood, JMG	617-762-5333
Mich	Detroit, L. H. Dickelman Co.	313-255-3300
Minn	Edina, M. Foster Co.	612-835-2252
Mo	Kansas City, Harris-Hanson Co.	816-HI4-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Carlin, S.A.M. Assocs.	201-727-5335
NY	Jamaica, S.A.M. Assocs.	212-OL8-8881
NC	Greensboro, L & D, Inc.	919-292-3201
Ohio	Cleveland, L.H. Dickelman Co.	292-5643
Tex	Dallas, Glidden Electro Equip.	214-EM3-6539
Tex	Houston, Glidden Electro Equip.	713-681-1415
Exp:	Westbury, N.Y., Minthorne Int'l. Co.	516-334-3303

CHICAGO LOCK CO., Dept. EM, 4311 W. Belmont Ave., Chicago, Ill. 60641, Tel: 312-282-7177, Telex: 25-4055; Empl.: 408 .... p. 4001

CHICAGO MINIATURE/DRAKE
GENERAL INSTRUMENT COMPANIES

CHICAGO MINIATURE/DRAKE, Dept. EM, 4433 N Ravenswood Ave., Chicago, Ill. 60640, Tel: 312-784-1020, TWX: 910-221-5445; FSC No.: 71744 p. 2576-2582

Sales Manager: J.F. Flanagan

Local Sales Offices & Reps.

Ala	Huntsville, Electro Mech.	205-883-9624
Ariz	Phoenix, Howe & Howe Sls., Inc.	602-264-7971
Cal	Mt. View, CMLW	415-967-2346
Cal	N. Hollywood, Chicago Miniature	213-877-0158
Colo	Denver, Lindberg Co.	303-758-9033
Conn	Collinsville, Gerber Sls.	203-693-2651
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Hollywood, "C" Associates	305-922-5230
Ga	Atlanta, Electro-Mech Sls. Engrg. Co.	404-449-6337
Ind	Indianapolis, Tech. Reprs.	317-849-6454
Iowa	Cedar Rapids, Dy-Tronix Inc.	319-377-8275
Ky	Louisville, Tech. Reps.	502-451-9818
Mass	East Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
Mich	Detroit, Rathsburg Assoc.	313-882-1717
Minn	Minneapolis, Nortec Sls.	612-835-7414
Mo	Hazelwood, Dy-Tronix Inc.	314-731-5799
Mo	Independence, Dy-Tronix Inc.	816-737-1100
NJ	Boonton, TMA	201-263-2946
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Buffalo, L.D. Allen, Inc.	716-837-1955
NY	Fairport, L.D. Allen Inc.	716-377-3530
NY	N. Syracuse, L.D. Allen, Inc.	315-458-7470
NY	Pleasant Valley, L.D. Allen Inc.	914-635-3363
NY	Port Washington, T.M.A.	516-883-2432
NC	Raleigh, Electro-Mech Sls. Engrg. Co.	919-782-7586
Ohio	St. Marys, T. Shelby & Co.	419-394-3377
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	Salem, J.J. Backer Co.	503-362-0717
Tenn	Nashville, Electro-Mech. Sls. Engrg. Co.	615-256-2516
Tex	Dallas, Electra Reps. Inc.	214-387-3594
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, J.J. Backer Co.	206-285-1300
Exp:	Chicago, Ill., Chicago Miniature	312-784-1020

CHICAGO SWITCH, INC., Dept. EM, 1714 N. Damen, Chicago, Ill. 60647, Tel: 312-489-5500, TWX: 910-221-5252; Empl.: 200; Minimum order: $P. Gardanier .... p. 4002,4003

Sales Manager: M. Glendale; *Distributor Manager:* P. Gardanier

Local Sales Offices & Reps.

Ala	Huntsville, JHU Assocs.	205-536-7455
Ariz	Phoenix, Cleveland Entr.	602-949-0872
Cal	San Gabriel, V. Gott & Assoc.	213-285-2148
Colo	Englewood, Elcom Inc.	303-770-4400
Conn	Bethany, Reps. Corp.	203-393-0024
Fla	Ft. Lauderdale, Electrocomp Assocs.	305-773-4700
Ind	Indianapolis, Tech. Reps.	317-849-6454
Mass	Wellesley, Reps. Corp.	617-237-6476
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Mich	Southfield, Kingsley Assoc.	313-424-8181
Minn	Minneapolis, Siedare Assoc.	612-545-5663
NJ	Mountain Lakes, Comps. Elctrns.	201-334-2921
NJ	S. Orange, S. Simberkoff Assoc.	201-763-7900
NM	Albuquerque, Cleveland Entr.	505-266-5594
NY	Rochester, L-Mar Assoc.	716-328-5240
Ohio	Cleveland, IM Tech.	216-826-3400
Ore	Portland, Components West	503-643-5588
Pa	Ardmore, Manreps	215-649-6300
Tex	Dallas, Erickson-Vilter Sls.	214-243-6611
Utah	Salt Lake City, Elcom Inc.	801-846-2317
Wash	Seattle, Components West	206-243-2133

Local Distributors

Cal	Burlingame, Rose Elctrns.	415-692-5700
Cal	Los Angeles, Mil-Comm	213-478-0525
Colo	Englewood, Industrial Elctrns.	303-771-2636
Fla	Ft. Lauderdale, Peerless Radio	305-566-5966
Haw	Honolulu, Industrial Elctrns.	805-533-6096
Mich	Farmington, CMP Distrs.	313-477-7700
Minn	Minneapolis, Joel Co.	612-545-5669
NH	Hudson, C & H Elctrns.	603-882-1133
NY	Mt. Vernon, Qar Indl. Elect.	914-699-2224
NY	Port Washington, Connector Concepts Corp.	516-883-3800
Ohio	Cleveland, CMP Distrs.	216-333-5650
Ohio	Dayton, CMP Distrs.	513-226-1133
Pa	Monroeville, CMP Distrs.	412-372-4415
Tex	Austin, Galtronics, Inc.	512-452-5773

™CHINALAK - varnishes - Dolph, John C. Co.

™CHIPSTRATE - solderable scr & triac chips on standardized substrates - Unitrode Corp.

™CHLOROTHENE NU - chlorinated solvent - Dow Chemical Co.

™CHLOROTHENE VG - chlorinated solvent - Dow Chemical Co.

CHOMERICS, INC., Dept. EM, 77 Dragon Court, Woburn, Mass. 01801, Tel: 617-935-4850, TWX: 710-393-0173; Empl.: 90 .... p. 4000

Sales Manager: K. Dunn

Local Sales Offices & Reps.

COMPONENT

Cal	Los Angeles, El-Com, Inc.	213-223-1351
Tex	Dallas, J. Clay Co.	214-350-1281

RFI Shielding

Cal	Irvine, Chomerics/Inc.	714-557-6741
Cal	Los Angeles, El-Com, Inc.	213-223-1351
Cal	San Carlos, Lo-Dan, Inc.	415-592-4600
Fla	Fern Park, Blair Engrg.	305-834-1244
Ill	Skokie, Mar-Con Assoc.	312-675-6450
Md	Rockville, Mechtronics Sls., Inc.	301-340-2130
Minn	Lakeville, Dan'L Engrg.	612-332-4848
Mo	St. Louis, Chomerics/Mid-America	314-434-3880
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
Okla	Tulsa, Blair Engrg.	918-633-9850
Ore	Portland, Houston Co.	503-235-4174
Pa	Philadelphia, Professional Svc. Assoc.	215-355-6244
Tex	Dallas, Blair Engrg.	214-352-8411
Tex	Houston, Blair Engrg.	713-772-0677
Wash	Seattle, Houston	206-622-0750

Local Distributors

Cal	Los Angeles, El-Com	213-223-1351

™CHO-NECTOR - elastomer interconnector - Chomerics, Inc.

™CHO-SEAL - conductive elastomer RFI gasket - Chomerics, Inc.

™CHO-SHRINK - conductive heat shrinkable plastic - Chomerics, Inc.

™CHO-SIL - conductive elastomer RFI gasket - Chomerics, Inc.

™CHO-THERM - electrically isolating, thermally conductive elastomer - Chomerics, Inc.

CHRISTIANSEN RADIO INC., Dept. EM, 1950 San Remo, Laguna Beach, Cal. 92651, Tel: 714-497-1506; Empl.: 9

Local Sales Offices & Reps.

Cal	Los Altos, Andot Tech. Sls. Co.	415-941-8858

CHRISTIE ELEC., Dept. EM, 3404A W. 67th St., Los Angeles, Cal. 90043, Tel: 213-750-1151, TWX: 910-321-3867; FSC No.: 02294; Empl.: 120 .. p. 3219

Local Sales Offices & Reps.

Cal	Santa Clara, Thomas-Hartman Assoc.	408-247-1252
Fla	Orlando, Newco & Assocs.	305-293-7700
Md	Silver Spg., L. White	301-585-3141
NC	Winston-Salem, L. White & Co.	919-725-3612
Tex	Richardson, C. Tinch	214-231-1322
Exp:	Cal., L.A., Trans-World Trade	213-472-0444

CHROMALLOY-ALCON DIV., see S.A.E.-Alcon Div.

™CHRO-BAR - color bar generator - VIZ Manufacturing Co.

™CHROMAFILTER - filters for display readouts - Panelgraphic Corp.

™CHROMAFUSE - display light deffusers - Panelgraphic Corp.

™CHROMA-LINE - TV pattern generators - Simpson Electric Co.

™CHROMASCREEN - rear projection screen - Panelgraphic Corp.

™CHROMATO-VUE - portable u-v darkroom - Ultra-Violet Prods., Inc.

™CHROMATRIX - color TV picture tubes - GTE Sylvania Inc.

™CHROMA 80 - video tape - Memorex Corp.

™CHROMA 90 - video tape - Memorex Corp.

™CHROMEL - thermocouple & resistance alloys - Hoskins Mfg. Co.

™CHROM-O-SCOPE - two-color-infrared optical pyrometer - Capintec Instruments, Inc.

™CHROMSTAR - TV antenna - Winegard Co.

™CHRONETIC - motors - Haydon Switch & Instr., Inc.

CHRONETICS, INC., Dept. EM, 1 Lefevre La., New Rochelle, N.Y. 10801, Tel: 914-636-5600

Local Sales Offices & Reps.

Ariz	Tempe, Trembly Assoc.	602-966-4428
Cal	Sherman Oaks, Windsor Dynamics	213-989-3631
Cal	Woodside, Windsor Dynamics	415-854-4870
Colo	Parker, Technology Mktg. Assoc.	303-841-3435
Conn	Hamden, Equip. Sls. Co., Inc.	203-248-5581
Fla	Clearwater, Brennan Assocs., Inc.	813-446-5006
Fla	Orlando, Brennan Assocs., Inc.	305-425-2161
Ill	Elk Grove Village, L.F. Green & Assocs.	312-593-0282
Ill	Mt. Prospect, Contemporary Science	312-255-3793
Ind	Indianapolis, L.F. Green & Assocs.	317-253-2087
Md	Bethesda, Powell-Pendergraph, Inc.	301-656-4535
Mass	Chelmsford, Equip. Sls. Co., Inc.	617-256-8547
Minn	Minneapolis, L.F. Green & Assocs.	612-781-1611
NM	Albuquerque, Technology Mktg. Assoc.	505-298-4321
NY	Mt. Vernon, Q.E.D. Elctrns., Inc.	914-664-0080
Ohio	Dayton, Rixan Assocs.	513-278-4216
Ohio	Westerville, Contemporary Science, Inc.	216-292-7533
Pa	Abington, Powell-Pendergraph, Inc.	215-657-0300
Tex	Dallas, R. Martin Assocs, Inc.	214-358-3704
Tex	Houston, R. Martin Assocs., Inc.	713-462-4077
Va	Richmond, Powell-Pendergraph, Inc.	703-264-2341

CHRONO-LOG CORP., Dept. EM, 2 W. Park Rd., Havertown, Pa. 19083, Tel: 215-853-1130; Empl.: 15 p. 1487

Local Sales Offices & Reps.

Exp:	Mass., Medway, Surel, Int'l.	617-533-2041

™CHRONOLOGGER - electronic attendance reporting system - NES, Inc.

™CHRONO-LOK - modems & keyers - Western Telematic, Inc.

CHRONOMITE LABS, Dept. EM, 21011 S. Figueroa St., Carson, Cal. 90745, Tel: 213-320-9452; Empl.: 15

™CHRONOTROL - a indicating program controller - Barber-Colman Co.

™CI - terminal blocks - Curtis Industries Inc.

™CIMARRON - commercial division of Vari-L - Vari-L Co.

™CIMCLAD - copper clad laminate - Cincinnati Milacron

CIMCO WIRE & CABLE, INC., Dept. EM, 250 W. Crescent Ave., Allendale, N.J. 07401, Tel: 201-327-2522, Telex: 13-3443; Empl.: 58

Local Sales Offices & Reps.

Cal	Chatsworth, Cal-Ward Sls. Co.	213-885-1771
Colo	Denver, Nelson Co.	303-573-1516
Fla	Orlando, Royce Elctrn. Sls., Inc.	305-843-6030
Ill	Chicago, Kennedy Engrg.	312-631-8283
Ind	Ft. Wayne, Component/Insulation Corp.	219-485-7114
Kans	Shawnee Mission, K & M Sls.	913-262-1444
Mass	Weston, F.C. Talbot Co.	617-893-6877
Mich	Birmingham, Forand Sls. Co.	313-644-0087
NY	East Syracuse, Mac-Tron Sls. & Engrg. Co.	315-422-2425
Ohio	Cleveland, Component/Insulation Corp.	216-521-3570
Pa	Radnor, Cordray Sales Co.	215-687-1366
Tenn	Memphis, Wm. L. Porter Co.	901-386-7714
Tex	Richardson, Campion Sls. Co.	214-238-8145
Wash	Bellevue, J. Findlay Co.	206-454-5200

CINCH, See TRW Cinch

™CIMRON - digital multimeters - California Instrs.

™CIMRON® - digital multimeters - Elin Div.

CINCINNATI DEV. & MFG. CO., Dept. EM, 5614 Wooster Pike, Cincinnati, Ohio 45227, Tel: 513-271-7280

CINCINNATI ELCTRNS. CORP., Dept. EM, 2630 Glendale Milford Rd., Cincinnati, Ohio 45241, Tel: 513-563-6000, TWX: 810 464-8151; FSC No.: 80045; Empl.: 1400

Sales Manager: D. C. Maxwell, Dir. Bus. Dev.

Local Sales Offices & Reps.

Cal	San Diego	714-582-7622
Ga	Warner Robins	912-922-1571
Mass	Burlington	617-272-4080
NJ	Colts Neck	201-462-9090

CINCINNATI MILACRON, Molded Plastics Division, Dept. EM, P.O. Box 246, Blanchester, Ohio 45107, Tel: 513-783-2464, Telex: 21-4472; Empl.: 10000

Local Sales Offices & Reps.

Cal	Sepulveda, R.L. Assocs	213-782-7826
Colo	Denver, Omega Ltd.	303-758-1508
Ga	Lilburn, C. Little	404-938-6298
Ill	Chicago, Electro-Comp. Sls., Inc.	312-763-3636
Ind	Ft. Wayne, P. Kilfoil	219-749-0113
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	Minneapolis, M. Franklin	612-835-6422
NH	Spofford, Bahr Sls.	603-352-5444
NJ	Springfield, F. F. Sylvester Assoc.	201-376-3324
NM	Albuquerque, A. Q. Elctrns.	505-883-1003
NY	Rochester, Landfear & Brophy	716-442-0430
Ohio	Cincinnati, J.F. Kilfoil Co.	513-791-6150
Ohio	Grafton, A. Risser	216-458-5091
Pa	Fairview Village, R.H. Hilderbrand Co.	215-247-6225
Tex	Garland, G.V. Peck Co.	214-341-8311

CINCINNATI SUB-ZERO PRODUCTS, Dept. EM, 2612 Gilbert Ave., Cincinnati, Ohio 45206, Tel: 513-751-8810; Empl.: 50

Sales Manager: G. E. Eshliman

™CINTEL - metal detection equipment - Rank Precision Inds.

CIPHER DATA PRODUCTS, Dept. EM, 5630 Kearny Mesa Rd., San Diego, Cal. 92111, Tel: 714-279-6550, TWX: 910-335-1251; Empl.: 132

Local Sales Offices & Reps.

Ala	Huntsville, FM Assoc.	205-536-9990
Ariz	Scottsdale, Measurement Conslt	602-994-9519
Cal	Los Altos, Bergis Assoc.	415-941-9519
Cal	Tustin, Gemini Assoc.	714-544-7744
Colo	Boulder, Measurement Consultants	303-449-5294
Fla	Orlando, FM Assoc	305-851-5710
Ind	Columbus, Miltronics	812-376-6321
Mass	Needham, Cifer East Reg. Off.	617-449-3173
NM	Las Cruces, Measurement Conslt	505-526-2491
NC	Greensboro, FM Assoc.	919-294-2754
Ohio	Dayton, E. V. Swede Swenson	513-435-2772
Tex	Dallas, Data Aids	214-620-1551
Tex	Houston, Data Aids	713-862-6685
Utah	Murray, Measurement Conslt.	801-268-3181
Exp:	Mass., Wayland, Int'l Sls Group	617-358-5151

CIR-Q-TEL, INC., Dept. EM, 10504 Wheatley St., Kensington, Md. 20795, Tel: 301-946-1800; Empl.: 20

™CIRCAP - ceramic capacitors - Dilectron

™CIRCA-TIN - immersion tin process - Conversion Chem. Corp.

™CIRCLE "B" - motors and timers - Bristol Saybrook Co.

CIRCON CORP., Dept. EM, 749 Ward Drive, Santa Barbara, Cal. 93111, Tel: 805-967-0404; Empl.: 30

Local Sales Offices & Reps.

Ariz	Phoenix, Jensen Tools & Alloys	602-959-2210
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Fla	Miami, Elctrn. Equip.	305-871-3500
Ill	Chicago, Brooks Engrg. Co.	312-944-1227
Md	Rockville, Research Technology Corp.	301-881-5780
Mass	Framingham, DLG Assocs.	
Mass	Sudbury, DLG Assocs.	617-877-7880
Mich	Detroit, Satullo & Co.	313-549-3910
NM	Albuquerque, Southwestern Engrg. & Equip. Co.	505-265-6775
NY	Binghamton, Stack Ind'l. Elctrns.	607-723-6326
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Huntington Station, Sigma Comms. Assocs.	516-293-3737
Ohio	Cleveland, Harvey Teplitz & Co.	216-486-2800
Ohio	Dayton, Harvey Teplitz & Co.	513-277-6531
Pa	Feasterville, H. Mann	215-355-7200
Pa	Plymouth Meeting, Techni-Tool	215-825-4990
Tex	Dallas, Southwestern Engrg. & Equip. Co.	214-692-8097
Tex	Houston, Southwestern Engrg. & Equip. Co.	713-461-5669
Wash	Seattle, Demarest Assocs.	206-523-0600

CIRCUIT ASSEMBLY CORP., Dept. EM, 3169 Red Hill Ave., Costa Mesa, Cal. 92626, Tel: 714-540-5490, TWX: 910-595-1971; Empl.: 275

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Corp.	205-547-7718
Ariz	Scottsdale, Arcom Sls.	602-947-5745
Ariz	Scottsdale, Barnhill Five	602-947-5745
Cal	Los Angeles, Product Supply Co.	213-659-1858
Cal	San Diego, L & S Assocs.	714-455-0055
Cal	Santa Barbara, Scarab	805-965-1487
Cal	Santa Clara, Mann Elctrns.	408-246-9393
Cal	Santa Clara, Kelley Sales	408-249-0786
Colo	Denver, Barnhill Five	303-426-0222
Colo	Parker, Technology Mktg.	303-841-3435
Conn	Wallingford, Con Sales	203-269-7964
Fla	Fort Lauderdale, Tech-Rep Assocs.	305-792-0962
Fla	Indian Rocks Beach, Tech-Rep Assocs.	813-595-2834
Fla	Largo, Tech Rep. Assocs.	813-595-2834
Ill	Arlington Heights, Delta Tech. Sls.	312-253-9440
Ill	Wilmette, Crest-Assocs.	312-256-5202
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Md	Baltimore, Robert L. Wilkinson	301-377-7800
Mass	Waltham, Con Sales	617-890-0011
Mich	Detroit, Alex Blumenberg Assocs.	313-557-1934
Minn	Osseo, Denny Gaffney Co.	612-425-5484
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Westwood, R. C. Assocs.	201-664-1241
NM	Albuquerque, Barnhill Five	505-293-5956
NM	Albuquerque, Technology Mktg.	505-298-2415
NC	Kannapolis, Nickerson Corp.	704-932-6772
Ohio	Columbus, Micro-Tec	614-888-9761
Ohio	Dayton, Micro-Tec	513-294-6441
Ohio	Highland Heights, Micro-Tec	216-442-1555
Pa	Philadelphia, Rayco Sls.	215-698-1210
Tex	Arlington, N. & W. Sales	817-461-4443
Utah	Salt Lake City, Technology Mktg.	801-485-9381
Wash	Bellevue, Pacific Electro-Fab	206-454-3859
Wash	Bellevue, Hays Industrial	206-883-8888

Local Distributors

Ariz	Tempe, Circuit Specialist	602-966-0764
Cal	Burlingame, Rose Elctrns.	415-692-5700
Cal	Santa Clara, Mann Elctrns.	408-246-9393
Colo	Parker, Technology Mktg.	303-841-3435
Fla	Miami, Electronic Equip.	305-891-3500
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Des Plaines, Edmar Elctrns.	312-298-8380
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mich	Livonia, Camelot Elctrns.	313-427-8660
Mo	St. Louis, Gateway Elctrns.	314-427-6116
NH	Londerry, Yankee Elctrns.	603-625-9746
NJ	Bellmawr, Mid-Atlantic	609-931-5303
NM	Albuquerque, Technology Mktg.	505-298-2415

NY	Bohemia, Car Lac Ind'l.	516-567-4200
NY	Mt. Vernon, QAR	914-699-2224
NC	Raleigh, Southeastern Radio Supply	919-828-2311
SC	Columbia, Dixie Radio	803-253-5333
Tex	Dallas, K A Elctrns.	214-634-7870
Tex	Garland, K A Elctrns.	214-494-2588
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Wash	Seattle, Interface Elctrns.	206-285-3500
For:	Can., Edmonton, Alb., Cardinal Indl.	403-455-4122
For:	Can., Edmonton, Alb., Glad Elctrn. Dist. Inc.	403-454-1511

CIRCUIT-STIK, INC., Dept. EM, 24015 Garnier St., Torrance, Cal. 90510, Tel: 213-530-5530, Telex: 69-8223; FSC No.: 06656; Empl.: 25

Local Sales Offices & Reps.

Ariz	Phoenix, W. B. Knight Co.	602-242-6787
Ariz	Scottsdale, F. Board Assocs.	602-949-9561
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Newport Beach, W. B. Knight, Inc.	714-833-8250
Colo	Denver, W.J. Purdy Co.	303-777-1411
Fla	Orlando, Cartwright & Bean, Inc.	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Hinsdale, Hill-Gray Assoc.	312-325-4810
Ind	Mulberry, Maish Sls.	317-296-2322
Kans	Overland Pk., T.L. Dowell	913-236-8200
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Minn	Minneapolis, D. Borrett Co.	612-929-0028
NJ	Teaneck, Fisher Elect. Assoc.	201-837-1200
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Syracuse, Mar-Com Assocs.	315-437-2843
Ohio	St. Marys, Thomas Shelby & Co.	419-394-3377
Ore	Portland, Earl & Brown Co.	206-284-1121
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442

CIRCUIT STRUCTURES LAB., Div. D-Cemco Inc Inc., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504, Tel: 213-849-6341; Empl.: 4

CIRCUIT TECHNOLOGY, Dept. EM, 160 Smith St., Farmingdale, N.Y. 11735, Tel: 516-293-8686, TWX: 510-224-6555; Empl.: 305

Local Sales Offices & Reps.

Cal	Manhattan Beach	213-374-7446

CIRCUIT TEST LABS, INC., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260, Tel: 602-948-1300

Local Sales Offices & Reps.

Ariz	Phoenix, C. Marchus	602-938-5116

CIRCUITS, INC., Dept. EM, 59 Deming Rd., Berlin, Conn. 06037, Tel: 203-828-3526; Empl.: 90

Local Sales Offices & Reps.

NJ	Fort Lee, NECCO	201-461-2789
NY	Buffalo, J. McDonough Assoc.	716-839-2044

™CIRCUIT BOARD CARRIERS - circuit board holder and transport device - Parsons Mfg. Corp.

™CIRCUIT-DECK - precision cermet switches - Beckman Instrs.

™CIRCUITFLEX - circuits - Flexible Circuits, Inc.

™CIRCUIT GROUND - computer ground planes - Flexible Circuits, Inc.

™CIRCUITIP - level tips for printed-circuit components - Amp Inc.

™CIRCUITRACER - continuity tester - Desco Mfg. Co.

™CIRCUITRIM - trimming potentiometer - TRW/IRC Potentiometers

™CIRCUIT RYDER - infrared thermometer - Raytek, Inc.

™CIRCUITSTRIP - cable - Flexible Circuits, Inc.

™CIRCUIT ZAPS - pc prototype material - Bishop Graphics

™CIRKITBLOCK: - buildingblock power module - Powercube Corp.

™CIRQPIL - plug-in circulator - Cir-Q-Tel, Inc.

™CITCO - wire & cables - Cities Svc. Co.

CITIES SVC. CO., Chester Cable Opers., Dept. EM, Oakland Ave., Chester, N.Y. 10918, Tel: 914-469-2141, TWX: 510-249-4813; Empl.: 400

Local Sales Offices & Reps.

Cal	Huntington Beach, Damco	714-894-8126
Colo	Denver, Colorado Sun Sls.	303-750-5017
Conn	Wethersfield, A. W. Seiffert Co.	203-529-1710
Ga	Atlanta, Measurement & Control	404-321-4697
Ill	Schaumburg, D. Arnesen	
Ky	Ft. Mitchell, G. W. Thelen	606-341-8181
Md	Baltimore, R.A. Wafer Assocs.	301-744-1133
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Sherwood, Ken Wyant	517-741-3472
Minn	Minneapolis, Kurschner Ind'l. Sls.	612-374-2628
Miss	Meridian, Herron Assocs.	601-483-9306
Mo	Maryland Heights, D.F. Adams & Assocs.	314-567-1795
NY	Brooklyn, J. D. Coury	212-836-7387
NY	Great Neck, Cooper-Simon	516-487-1142
NY	Rochester, B. H. Tollefson Assocs.	716-271-4141
Ohio	Stow, B. Cody - G.W. Thelen	216-845-2990
Pa	Emmaus, R.W. Stevens	215-434-2578
SC	Columbia, G.E. Younginer & Assocs.	803-772-6671

™CJ - cold junction reference source - Omega Engrg., Inc.

CLAIREX ELCTRNS. INC., Dept. EM, 560 S. 3rd Ave., Mt. Vernon, N.Y. 10550, Tel: 914-664-6602; Empl.: 120 .... p. 3132-3134

Local Sales Offices & Reps.

Ala	Huntsville, K&E Assoc.	205-883-9720
Cal	Culver City, E.V. Roberts & Assoc.	213-870-9561
Cal	El Toro, Clairex Elctrns.	714-768-4561
Cal	Palo Alto, E.V. Roberts & Assoc.	415-494-1671
Colo	Eastlake, Jenson Reps.	303-688-4151
Conn	Bethel, Livera Polk Assoc.	203-748-4639
Fla	North Miami Beach, Irby & Connolly Inc.	305-949-5197
Fla	Orlando, Irby & Connolly Inc.	305-894-8471
Ga	Hartwell, K&E Assoc.	404-376-5438
Ill	Chicago, L-Tec Inc.	312-286-1500
Ill	Richmond, Clairex Elctrns	815-675-2880
Kans	Overland Park, Advanced Technical Sls	913-492-4333
Md	Lutherville, Cunningham & Assoc.	301-296-4306
Mass	Norwell, Bordewieck Eng. Sls. Co.	617-659-4915
Mich	Ferndale, Hilltronics Inc.	313-398-5556
Minn	Minneapolis, H.M.R. Inc.	612-920-8200
Miss	Corinth, K&E Assoc.	601-287-5369
NJ	Fort Lee, Tecnimat	201-461-8686
NY	Mt. Vernon, Clairex Elctrns.	914-664-6602
NY	Seaford, Abbott Assoc.	516-781-5256
Pa	Media, W. Reeves Assoc.	215-566-6709
Tex	Dallas, J.B. Guenther Inc.	214-691-8500
Tex	Houston, J.B. Guenther Inc.	713-468-0232
Utah	Salt Lake City, Jensen Reps.	801-484-1066
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Greenfield, L-TEC Inc.	414-545-8900

Local Distributors

Ala	Birmingham, M-G Elctrns & Equip., Inc.	205-328-4525
Cal	Culver City, E.V. Roberts & Assocs., Inc.	213-870-9561
Cal	Palo Alto, E.V. Roberts & Assocs., Inc.	415-494-1671
Cal	San Diego, E.V. Roberts & Assocs., Inc.	714-565-4535
Fla	Orlando, Hammond Elctrns., Inc.	305-241-6601
Fla	Tampa, Lykes Elctrns. Corp.	813-886-6621
Idaho	Boise, Kimball Elctrns	208-342-3559
Ill	Skokie, Bell Inds	312-965-7500
Ind	Indianapolis, Graham Elctrns. Supp., Inc.	317-634-8486
Kans	Topeka, Acme Radio Supply	913-235-1363
Ky	Louisville, P.I. Burks Co.	502-589-3960
La	New Orleans, Southern Radio Supply Co.	504-524-2343
Mass	Norwell, Bordewieck Sls. Co.	617-659-4915
Mich	Detroit, Michigan Lectrols Corp.	313-255-4250
Mich	Detroit, R.S. Elctrns.	313-491-1000
Minn	Minneapolis, Stark Elctrns.	612-294-1325
Mo	St. Louis, Van Sickle Radio Elctrns.	314-621-5000
NJ	Cherry Hill, D.F. Assocs.	609-428-3455
NY	Buffalo, Summit Dists.	716-884-3450
NY	New York, Blan Elctrns. Corp.	212-233-6288
NY	Rochester, Summit Elctrns. Rochester,	716-334-8110
NC	Greensboro, Hammond Elctrns., Inc.	919-275-6391
NC	Raleigh, Southeastern Radio Supply Co.	919-828-2311
NC	Winston-Salem, Kirkman Elctrns., Inc.	919-724-0541
Ohio	Cincinnati, Hughes-Peters, Inc.	513-351-2000
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Pa	Pittsburgh, R.P.C. Elctrns.	412-782-3770
SC	Columbia, Dixie Radio Supply Co.	803-253-5333
SC	Greenville, Hammond Elctrns., Inc.	803-233-4121
Tenn	Memphis, Bluff City Dist. Co.	901-276-4501
Tenn	Nashville, Electra Distr. Co.	615-329-3971
Tex	Dallas, Wholesale Elctrn. Supply	214-824-3001
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
Tex	Ft. Worth, Wholesale Elctrn. Supply Co.	817-336-0461
Tex	Richardson, Altair Co.	214-231-5166
Utah	Salt Lake City, Kimball Elctrns	801-328-2075
Wash	Seattle, Radar Elec. Co.	206-282-2551
Wisc	Mequon, Taylor Elec. Co.	414-241-4321
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160
For:	Can., Willowdale, Ont., Electro-Sonic Ind'l. Sls. Ltd.	416-494-1666

™CLAMPITRON - clamp on flowmeter - Controlotron Corp.

CLARE RELAYS

CLARE & CO., C.P., General Instrument, Dept. EM, 3101 Pratt Blvd., Chicago, Ill. 60645, Tel: 312-262-7700, Telex: 25-3775; Empl.: 1500; Minimum order: $B. Hanisko .... p. 3426-3451,4004-4015

Sales Manager: J. Deith; *Distributor Manager:* B. Hanisko

Local Sales Offices & Reps.

Ala	Huntsville, C.P. Clare & Co.	205-883-9130
Ariz	Phoenix, Spectrum Assocs.	602-997-6324
Ark	Fort Smith, Electro-Related Prods.	501-783-7323
Cal	Mountain View, C.P. Clare & Co.	415-968-2831
Cal	Santa Ana, Spectrum Assocs.	714-835-4114
Colo	Denver, Electrodyne, Inc.	303-757-7679
Fla	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
Ga	Atlanta, A. Brown Assocs.	404-457-6381
Ill	Chicago, C.P. Clare & Co.	312-262-7700
Ill	Elk Grove Village,, G. Twist Co.	312-593-0200
Ind	Fort Wayne, Baehr, Greenleaf & Assoc.	219-447-1608
Iowa	Cedar Rapids, G. Twist Co.	319-393-8703
Kans	Prairie Village, G. Twist Co.	913-236-4646
Kans	Wichita, G. Twist Co.	316-686-6685
Md	Ellicott City, Doss Elctrns., Inc.	301-465-1336
Mass	Needham, C.P. Clare & Co.	617-449-4780
Mich	Detroit, A. Blumenberg Assoc.	313-557-1934
Mich	Farmington Hills, G. Twist Co.	313-478-4084
Mich	St. Joseph, A. Blumenberg Assoc.	616-983-0481
Minn	Minneapolis, G. Twist Co.	612-854-4600
Mo	St. Louis, G. Twist Co.	314-432-2830
NJ	Clark, C.P. Clare & Co.	201-381-6660
NY	Syracuse, C.P. Clare & Co.	315-637-3939
NY	Syracuse, Nycom	315-437-8343
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
NC	Raleigh, R.W. Chapman & Co.	919-782-2624
Ohio	Cincinnati, Baehr, Greenleaf & Assoc.	513-891-3826
Ohio	Cleveland, Baehr, Greenleaf & Assoc.	216-221-9030
Ohio	Columbus, Baehr, Greenleaf & Assoc.	614-486-4046
Ohio	Dayton, Baehr, Greenleaf & Assoc.	513-293-1102
Pa	Erie, Foster-McClinton Inc.	814-455-9111
Pa	Maple Glen, C.P. Clare & Co.	215-643-5321
Pa	Pittsburgh, Foster-McClinton Inc.	412-941-4800
Tex	Dallas, C.P. Clare & Co.	214-661-9935
Utah	Salt Lake City, Electrodyne, Inc.	801-277-8392
Wash	Bellevue, C.P. Clare & Co.	206-747-5600
WVa	Huntington, Foster-McClinton, Inc.	304-736-5161
Exp:	Wisc. Wauwatosa, G. Twist Co.	414-475-7755

Local Distributors

Ala	Birmingham, M. G. Elctrns. & Equip.	205-328-4525
Ala	Huntsville, Powell Elctrns.	205-539-2731

Ariz	Phoenix, Kierulff Elctrns.	602-243-1401
Ark	El Segundo, Texas Instrs. Supply	213-973-2571
Ark	Fort Smith, Wise Wholesale Elctrns.	501-783-8925
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	El Segundo, Texas Instrs. Supply Co.	213-973-2571
Cal	Los Angeles, Kierulff Elctrns. Corp.	213-685-5511
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Mountain View, Powell Elctn.	415-964-0820
Cal	Palo Alto, Kierulff Elctrns.	415-968-6292
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	Sunnyvale, Bell Ind. Elctrn. Distr. Div.	408-734-8570
Cal	Sun Valley, Richey Elctrns.	213-768-3800
Colo	Denver, Kierulff Elctrns. Corp.	303-371-6500
Fla	Miami Springs, Powell Elctrns.	305-592-3260
Ga	Atlanta, Specialty Distributing	404-873-2521
Ill	Palatine, Ohm/Elctrns.	312-359-5500
Ill	Peoria, Klaus Radio	309-691-4840
Ind	Ft. Wayne, Ft. Wayne Elctrns. Supply	219-423-3422
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8486
Kans	Wichita, Radio Supply Co., Inc.	316-267-5214
La	LaFayette, Ralph's of LaFayette	318-234-4507
La	Shreveport, Industrial Elctrn. Supply	318-222-9459
Md	Beltsville, Treeko Sls.	301-937-8260
Md	Gaithersburg, Pioneer/Washington Elctrn.	301-948-0710
Mass	Burlington, Wilshire Elctr.	617-272-8200
Mass	Newton, Cramer Elctrns.	617-969-7700
Mich	Livonia, RS Elctrns.	313-525-1155
Minn	Minneapolis, Control Design	612-721-1628
Mo	Kansas City, Walters Radio Supply	816-531-7015
Mo	St. Louis, Olive Elctrns.	314-863-7800
Neb	Lincoln, Scott Electrn. Supply Corp.	402-464-8308
NJ	Clifton, Wilshire Elctrns./N.J.	201-340-1900
NY	Farmingdale, Wilshire Elctrns./L.I.	516-293-5775
NY	Johnson City, Wilshire Elctrns.	607-797-1236
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Winston-Salem, Cramer/Winston-Salem	919-725-8711
Ohio	Cleveland, Pioneer/Cleveland Elctrns.	216-587-3600
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Dayton, Pioneer/Dayton Elctrns.	513-236-9900
Okla	Tulsa, Texas Instrs. Supply	918-437-7904
Pa	Allentown, Federated Elctrns., Div. Federated Purchaser	215-437-4481
Pa	Braddock, M. Leff Radio Parts Co.	412-351-5000
Pa	Philadelphia, Powell Elctrns.	215-365-1900
SC	Columbia, Dixie Radio Supply	803-779-5332
Tenn	Nashville, Electra Distributing Co.	615-329-3971
Tex	Dallas, Texas Instrs. Supply Co.	214-238-6821
Va	Richmond, Sterling Elctrns.	804-359-0221
Wash	Seattle, Kierulff Elctrns.	206-575-4420
Wash	Seattle, Almac-Stroum Elctrns.	206-763-2300
Wisc	Milwaukee, Marsh Elctrns., Inc.	414-475-6000

™CLAREED - reed relays - General Instr. of Can. Ltd.

CLARKE-HESS COMM., Resch. Corp., Dept. EM, 156-5th Ave., New York, N.Y. 10010, Tel: 212-255-2940; FSC No.: 34423 .... p. 2817

Local Sales Offices & Reps.

Cal	Sherman Oaks, Windsor Dynamics	213-990-4173
Cal	Woodside, N.S. Assocs	415-854-4870
Ill	Chicago, P. Lind Elctrns. Co.	312-774-1246
Ind	Indianapolis, P. Lind Elctrns. Co.	317-547-9178
Kans	Leawood, Leemark Engrs., Inc.	913-NI8-0124
Minn	Circle Pines, P. Lind Elctrns. Co.	612-786-5770
Tex	Richardson, Spectra Sls.	214-234-3600
Va	Crossroads, Q.T. Elctrns. Sls. Co.	703-671-4357

CLAROSTAT

CLAROSTAT MFG. CO., INC., Dept. EM, Washington St., Dover, N.H. 03820, Tel: 603-742-1120, TWX: 510-297-4455; Empl.: 600; Minimum order: $H.E. Taylor .... p. 3680,3681,3824-3833

Distributor Manager: H.E. Taylor

Local Sales Offices & Reps.

Ark	Little Rock, J.Y. Schoonmaker Co.	501-375-2168
Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	Menlo Park, Straube Assoc.	415-321-9050
Colo	Westminster, Straube Assoc./Mtn. States	303-426-0890
Fla	Bradenton, Hutto-Hawkins-Peregoy Inc.	813-755-4015
Fla	Maitland, Hutto-Hawkins-Peregoy Inc.	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy Inc.	305-943-9593
Ga	Atlanta, Millar Elctrs. Inc.	404-261-6160
Ill	Chicago, Clarostat Mfg. Co. Inc.	312-792-3898
Ind	Fort Wayne, Needler Sls. Co.	219-447-2123
Ind	Indianapolis, Needler Sls.	317-255-8056
Iowa	Cedar Rapids, Palatine Eng. Sls. Inc.	319-365-8071
Kans	Derby, Palatine Eng. Sls. Inc.	316-788-0621
Kans	Lenexa, Palatine Eng. Sls. Inc.	913-492-7020
Md	Lanham, L.D. Lowery Inc	301-459-1556
Mass	Concord, Clarostat Mfg. Co. Inc.	617-369-7933
Mich	Detroit, R.C. Merchant & Co. Inc.	313-535-6000
Mich	St. Joseph, R.C. Merchant & Co. Inc.	616-983-7378
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
Mo	St. Louis, Palatine Eng. Sls. Inc.	314-426-7055
NM	Albuquerque, Straube Assoc./Mt. States	505-265-7759
NY	Buffalo, Leonard D. Allen Co. Inc.	716-837-1955
NY	Fairport, Leonard D. Allen Co. Inc.	716-377-3530
NY	Manhasset, Win-Cor Elctr. Sls. Corp.	516-627-9474
NY	N. Syracuse, L.D. Allen Inc.	315-458-7470
NC	Raleigh, Millar Elctrs. Inc.	919-787-9564
Ohio	Beachwood, K.W. Elctrs. Sls. Inc.	216-831-8292
Ohio	Dayton, K.W. Elctrs. Sls. Inc.	513-890-2150
Okla	Tulsa, J.Y. Schoonmaker Co.	918-936-1423
Ore	Portland, Electronic Sources	503-292-0701
Pa	Allison Park, K.W. Elctrs. Sls. Inc.	412-487-4300
Pa	Broomall, L.D. Lowery Inc.	215-356-5300
Pa	Camp Hill, Beil & Whitaker Inc.	
Pa	Harrisburg, Beil & Whitaker Inc.	717-652-0184
Pa	Reading, Beil & Whitaker Inc.	215-779-2610
Tex	Dallas, J.Y. Schoonmaker Co. Inc.	214-349-1650
Tex	Houston, J.Y. Schoonmaker Co. Inc.	713-926-9510
Va	Charlottesville, L.D. Lowery Inc.	804-973-6672
Wash	Bellevue, Electronic Sources	206-453-0800
Exp:	New York, N.Y., M. Simons & Sons Co. Inc.	212-227-5513

Local Distributors

Ariz	Phoenix, Sterling Elctrns.	602-258-4531
Cal	Irvine, Terminal Elctrn.	714-549-8611
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	Los Angeles, Kierulff Electr.	213-685-5511
Cal	Los Angeles, Western Electronmotive/Shephard	213-820-3777
Cal	Mt. View, Terminal Elctrn.	415-969-9240
Cal	Oakland, Brill Elctrns.	415-834-5888
Cal	Riverside, Elctrn. Supp.	714-787-9220
Cal	San Carlos, Sterling Elctrns.	415-592-2353
Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Cal	Sun Valley, Richey Elctrns.	213-875-2862
Cal	Woodland Hills, Rampart Comp.	213-887-7260
Colo	Denver, Acacia Sls.	303-232-2882
Colo	Denver, Integrated Elctrn.	303-534-6121
Colo	Denver, Elctrn. Parts Co.	303-266-3755
Conn	Fairfield, U-Tronics	203-255-4521
Conn	North Haven, Cramer Elctrns.	203-239-5641
Conn	Waterbury, Bond Radio	203-753-1184
Del	Stratford, State Elctrn. Parts Corp.	203-375-5961
Fla	Miami, Elctrn. Equip.	305-635-0421
Fla	Norcross, Lykes Electr.	404-355-2223
Fla	Oakland Park, Peerless Radio of Fla.	305-566-5966
Fla	Orlando, Hammond Elctrn.	305-849-6060
Fla	Tampa, Lykes Electr. Corp.	813-886-6621
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Elgin, Allied Radio Corp.	312-697-8200
Ill	Palatine, Ohm Elctrns.	312-359-5500
Ind	Indianapolis, Radisco	317-637-5571
Ind	Indianapolis, Graham Electr.	317-634-8202
Iowa	Cedar Rapids, Deeco	319-365-7551
Iowa	Ft. Wayne, Ft. Wayne Elctr.	219-423-3422
Kans	Wichita, Radio Supply Co.	316-267-5213
Ky	Louisville, P.I. Burks	502-583-2871
La	Lafayette, Ralph's of Lafayette	318-369-9816
Md	Baltimore, Radio Elec. Serv. Co.	301-823-0070
Md	Gaithersburg, Pioneer/Washington	301-948-0710
Mass	Boston, Sager Electrical Supply	617-542-2281
Mass	Dedham, Gerber Radio	617-329-2400
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Newton, Greene-Shaw Co., Inc.	617-969-8900
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mass	West Newton, A. W. Mayer Co.	617-965-1111
Mich	Augusta, Great Lakes Elctrns., Div. Knappen Milling Co.	616-731-4156
Mich	Grand Rapids, Stotts-Friedman	616-459-0216
Mich	Livonia, Pioneer/Michigan	313-525-1800
Minn	Minneapolis, Harry Stark Elctrns. Supp.	612-332-1325
Mo	St. Louis, Olive Ind. Electr	314-863-7800
Mont	Kansas City, L-Comp	816-221-2400
NH	Concord, Evans Radio	603-224-9961
NJ	Hanover, State Elctrns	201-887-2550
NJ	Roselle, Garden State Ind. Elctrn.	201-241-9000
NJ	Springfield, Federated Purchaser	201-376-8900
NY	Buffalo, Summit Distr.	716-884-3450
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Rampart Comp.	516-273-1111
NY	Hempstead, Electronic Equip.	516-538-5510
NY	Long Island City, H.L. Dalis, Inc.	212-361-1100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Plainview, Fairmont Electr.	516-694-8200
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Greensboro, Hammond Elctrns. of Carolina	919-275-6391
NC	Winston-Salem, Kirkman Elctrns.	919-724-0541
Ohio	Akron, Akron Elctrns.	216-762-8818
Ohio	Cleveland, Pioneer-Cleveland	216-587-3600
Ohio	Columbus, Hughes-Peters	614-294-5351
Ohio	Dayton, Stotts-Friedman Co.	513-298-5555
Ohio	Dayton, Pioneer-Dayton	513-236-9900
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Portland, Almac/Stroum Elctrns.	503-292-3534
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Pa	Philadelphia, Almo Ind. Electr.	215-698-4000
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
RI	Pittsburgh, Cam/RPC	412-288-2600
SC	Columbia, Dixie Radio Supp.	803-253-5333
SC	Huntingdon Valley, Shap Electr.	215-298-9550
SD	Warwick, W.H. Edwards Co.	401-781-8000
Tenn	Memphis, Bluff City Dist.	901-725-9500
Tenn	Nashville, Electra Dist.	615-329-3971
Tex	Dallas, Hallmark Elctrn.	214-231-5101
Tex	Ft. Worth, Sweico	817-335-6521
Tex	Ft. Worth, Allied Elctrn.	817-336-5401
Tex	Houston, Sterling Elctrns.	713-623-6600
Va	Charlottesville, Virginia Radio Supp.	804-296-4184
Wash	Seattle, Radar Electric Co.	206-282-2511
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
Wisc	Milwaukee, Electronic Expeditors	414-228-8100
Wyo	New Berlin, Arrow Electr.	414-782-2801

CLARY CORP., Precision Instrs. Div., Dept. EM, 320 W. Clary Ave., San Gabriel, Cal. 91776, Tel: 213-287-6111; Empl.: 50 .... p. 3373

Sales Manager: G.W. Chapman

™CLASPCON - .025" & .045" square wire to crimp terminal - Molex Inc.

™CLASSETTE - tape recorders - Audiotronics

™CLASSIC - motors & gearmotors - Carter Motor Co.

™CLASSIC PLL 40 - CB Rig - Fanon/Courier Corp., Subs.

CLAUSS CUTLERY CO., Dept. EM, Box 667, Fremont, Ohio 43420, Tel: 419-332-7344; Empl.: 175

™CLEAN-N-DRI - detergent - Clean Room Prods.

CLEAN ROOM PRODS., Dept. EM, 56 W. Penataquit Ave., Bay Shore, N.Y. 11706, Tel: 516-968-8282; Empl.: 27

™CLEAR-ALL - solder evacuating device - Nu-Concept Computer Systems, Inc.

™CLEARFLEX - audio cable - Columbia Elctrn. Cables

™CLEAR PRINT - stamp pads & inks - Phillips Process Co., Inc.

™CLEARSIGHT - splice closure - Communications Technology Corp.

CLEMENS MFG. CO., Dept. EM, 630 So. Berry Rd., St. Louis, Mo. 63122, Tel: 314-961-7228; Empl.: 3

CLEMENTS NATIONAL CO., Dept. EM, 6656 S. Narragansett Ave., Chicago, Ill. 60638, Tel: 312-767-7900; Empl.: 40

™CLETALOY - copper/silver-tungsten contact materials - Superior Carbon Prods., Inc.

™CLEVELAND - speed variator - Eaton Corp.

CLEVELAND CRYSTALS, INC., Dept. EM, Box 17157, Euclid, Ohio 44117, Tel: 216-486-6100; FSC No.: 8K400; Empl.: 15

Sales Manager: A. Carlson

CLEVELAND ELECTRONICS, INC., Dept. EM, 14500 Darley Ave., Cleveland, Ohio 44110, Tel: 216-249-3700, TWX: 810-421-8656; Empl.: 500

CLEVELAND INSTITUTE OF ELCTRNS., Dept. EM, 1776 E. 17th St., Cleveland, Ohio 44114, Tel: 216-781-9400; Empl.: 350

CLEVELAND MICA CO., Dept. EM, 1360 Hird Ave., Lakewood, Ohio 44107, Tel: 216-226-1360; Empl.: 50

Local Sales Offices & Reps.

Ill	Northfield, Special Electric Co.	800-558-0640
NY	New York, United Mineral & Chemical Corp.	212-966-4330
Ohio	Cleveland, C.J. Voneman Co.	216-333-5500
Tex	Frankston, Cline & Son, Inc.	214-876-2223
Wisc	Milwaukee, Special Electric Co.	414-383-6370
Wisc	Milwaukee, Special Electric Co	414-383-6370

™CLF - fuses - General Elec. Co.

CLIFTON PRECISION, Litton Systems, Inc., Dept. EM, Marple at Brdway., Clifton Hgts., Pa. 19018, Tel: 215-622-1000, TWX: 510-669-9782; FSC No.: 86197; Empl.: 1000 .... p. 3071

Local Sales Offices & Reps.

Ariz	Phoenix, Clifton Precision	602-242-0910
Cal	Van Nuys, Mitchell Assoc.	213-989-5111
Fla	Altamonte Springs, Clifton Precision	305-831-1441
Ill	Elk Grove Village, Midwest Meridian	312-437-6531
Iowa	Cedar Rapids, Midwest Meridian	319-365-6561
Mass	W. Newton, Larcom Inc.	617-244-2053
Mo	Maryland Hgts., Midwest Meridian	314-878-4441
NY	Greenlawn, Reflex Elctrn.	516-549-1888
Ohio	Dayton, Midwest Meridian	513-256-6960
Tex	Saginaw, Midwest Meridian	817-589-1711

™CLIMATE-LAB - environmental chamber - American Instr. Co.

CLIMATRONICS CORP., Dept. EM, 1324 Motor Pkwy., Hauppauge, N.Y. 11787, Tel: 516-234-2772; Empl.: 25

Local Sales Offices & Reps.

Mass	Bedford, Ambientmetrics	617-274-6450

™CLINCHER - flat conductor cable connecter - Berg Electronics

™CLINCHER - ball valves - Jamesbury Corp.

™CLINCOM - nuclear medicine computer - Searle Analytic Inc. & Searle Radiographics Inc.

™CLINIFLOW - blood flowmeters - Carolina Medical Elctrns., Inc.

CLINTON ELCTRNS. CORP., Dept. EM, 6701 Clinton Rd., Rockford, Ill. 61111, Tel: 815-633-1444, Telex: 257-484

CML-MACARR, INC., See Marine Electric Railway Prods Div.

™CLIP-AC - line voltage regulator - Tele-Dynamics

™CLIP-A-DIP - ic test clip - Micro Electronic Systems, Inc.

™C-LITES - 2 pin cartridge lamps - Genisco Technology Corp.

™CLORINOL - A-C capacitors - Sprague Elec. Co.

™CLR-2 - base antenna - Hy-Gain Electronics Corp.

™C-L-X - wireinconduit system - Okonite Co.

™CMC1200 - elevator control - Cubic Corp.

CNT AUTOMATIC, Dept. EM, 440 Totten Pond Rd, Waltham, Mass. 02154, Tel: 617-890-3305

™CO/ALR - switches & outlets - Leviton Mfg. Co., Inc.

COAST COIL CO., Dept. EM, 5333 W. Washington Blvd., Los Angeles, Calif. 90016, Tel: 213-936-6188; Empl.: 50

COASTCOM, Dept. EM, 2346 Stanwell Dr., Concord, Cal. 94520, Tel: 415-825-7500, TWX: 910-481-5781; Empl.: 25

Sales Manager: J.R. Frazier

Local Sales Offices & Reps.

Cal	Concord, Coastcom	415-825-7500
Conn	Darien, Massini Assocs.	203-323-9945
Md	Edgewater, Commart	301-261-4344

COAX DEVICES INC., Dept. EM, Box 234-EEM, Chelsea, Mass. 02150, Tel: 617-884-6983; Empl.: 10

COAXIAL DYNAMICS, INC., Dept. EM, 13110 Enterprise, Cleveland, Ohio 44135, Tel: 216-267-2233; Empl.: 28

Local Sales Offices & Reps.

Del	Newark, Tom Wright & Assoc.	301-398-3748
Ind	Ft. Wayne, Tx Sales Inc.	219-485-0805
Iowa	Cedar Rapids, S & O Sales	319-393-1845

™COAXICLAMP - connectors & splices - Amp Inc.

™COAXICON - connector - Amp Inc.

™COAXITUBE - coaxial cable - Precision Tube

™CO-AX MAGI-T - coaxed magic tee matched - CES Elctrns.

™COAXWITCH - coaxial switches - Bird Electronic Corp.

COBEHN, INC., Dept. EM, 226 Passaic Ave., Fairfield, N.J. 07006, Tel: 201-227-6675; Empl.: 5

Local Sales Offices & Reps.

Cal	Fullerton, John Broadbent, Jr.	714-879-4974
Cal	San Diego, J. C. Henberger Co.	714-292-5772
Ill	Des Plaines, Marsland Assocs., Inc.	312-298-2620
Ind	Indianapolis, Marsland Assocs., Inc.	317-924-3568
Mass	Pinehurst, Julie Assocs.	617-667-1958
Minn	Minneapolis, Marsland Assocs., Inc.	612-545-4481
Mo	Kansas City, Marsland Assocs., Inc.	816-966-8400
NJ	Montclair, Ameresco, Inc.	201-746-5300
NY	Rochester, Rochester Ind'l. Supply Co.	716-325-2386
Pa	Reading, Chemtronics Div., Ind'l. Abrasives	215-779-3910
Tex	El Paso, Test Equip. Co.	915-755-9192

™CO-BELT - extremely rugged recorders - Genisco Tech. Corp.

COBER ELCTRNS., INC., Dept. EM, 7 Gleason Ave., Stamford, Conn. 06902, Tel: 203-327-0003, TWX: 710-474-3371; FSC No.: 28909; Empl.: 60 .... p. 2986

Local Sales Offices & Reps.

Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	Los Altos, J. Stone	415-948-4563
DC	Wash, Eastern Instr.	301-622-4200
Fla	Palm Bay, SparTech Assocs.	305-727-8045
Ga	Smyrna, SparTech Assocs.	404-432-3644
Mass	Waltham, Meas. Conslts.	617-890-4400
Mich	Detroit, Micro Sls.	313-482-1229
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	E. Syracuse, Ossmann Instr.	315-437-6666
NY	Great Neck, Eastern Instr.	201-567-9505
Ohio	Dayton, Micro Sls.	513-433-8171
Pa	Phila., Eastern Instr.	215-927-7777
Tex	Richardson, Lear Assocs.	214-231-5388

™COBRA - cb 2-way radios - B & K Precision Electronic Test Instruments Group

™COBREFLEX - horn - University Sound

™CODASYN - frequency synthesizer - Adret Corporation

™CODE NO. 249 - military switches - Oak Inds. Inc.

CODI CORPORATION, Dept. EM, Pollitt Dr., Fair Lawn, N.J. 07410, Tel: 201-797-3900, TWX: 710-988-2241; FSC No.: 16352; Empl.: 73

Local Sales Offices & Reps.

Ala	Huntsville, BJR Ind's.	205-881-3569
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Cal	Mountain View, Leddy	415-969-6313
Cal	Santa Ana, California Elctrn. Mktg.	714-835-2702
Colo	Parker, Technology Mktg. Assn.	303-841-3435
Fla	Ft. Lauderdale, CBC Elctrns., Inc.	305-484-7330
Ill	Franklin Pk., Dekotech, Inc.	312-455-5100
Ind	Fort Wayne, Delesa Sls. Co.	219-483-9537
Iowa	Cedar Rapids, S & O Sls. Co.	319-393-1845
Kans	Overland Park, J.F. Guernsey	913-381-2225
Md	Hyattsville, Eastern Components	301-577-2925
Mass	Norwood, J.M.G.	617-762-5333
Mich	Pleasant Ridge, SHALCO	313-547-4771
Mo	Overland Park, J.F. Guernsey	913-381-2225
NY	Hempstead, Kahgan Sls.	516-538-2300
NY	Rochester, Net Sales	716-467-4538
Ohio	Dayton, The Whelan Corp.	513-434-7551
Pa	Flourtown, Eastern Comps.	215-836-1616
Tex	Dallas, J. Clay Co.	214-350-1281
Exp:	N.Y., N. Y., Singer Prods.	212-432-1400

™CODISTOR I - low voltage regulators - Codi Corporation

™CODISTOR II - high voltage silicon rectifiers - Codi Corporation

™COE LINE - compatible, operational, element (analog computing type modules) - GPS Corp.

COGENEL, INC., Entrelec Div., Dept. EM, 101 Executive Blvd., Elmsford, N.Y. 10523, Tel: 914-592-5284, TWX: 710-567-1207

Local Sales Offices & Reps.

Ariz	Phoenix, Airsupply Co.	602-267-3916
Cal	Fullerton, Component Sls.	714-992-1762
Cal	Torrance, Airsupply Co.	213-538-5080
Colo	Denver, K&L Engrg. & Sls.	303-759-1115
Ga	Marietta, Airsupply Co.	404-422-8242
Ill	Berkeley, Airsupply Co.	312-544-7400
Ind	Indianapolis, Airsupply Co.	317-248-8391
Kans	Wichita, Airsupply Co.	316-683-7518
Mass	Newton Highlands, Airsupply Co.	617-965-4710
Mo	Bridgeton, Airsupply Co.	314-731-3011
NY	Clinton, Airsupply Co.	315-735-8341
NY	Port Washington, J.P. Bradley Assoc.	516-833-7333
Ohio	Columbus, Airsupply Co.	
Ohio	Dayton, Airsupply Co.	
Okla	Tulsa, Specialties Sls. Co.	918-835-4578
Pa	King of Prussia, Airsupply Co.	215-265-2717
Tex	Fort Worth, Airsupply Co.	817-335-4541
Tex	Houston, Texas Technical Prods. Co.	713-526-0656
Va	Arlington, Airsupply Co.	703-525-1191
Wash	Bellevue, Airsupply Co.	206-454-7922

COGNITRONICS CORP., Dept. EM, 25 Crescent St., Stamford, Conn. 06906, Tel: 203-327-5307, TWX: 710-474-3523; Empl.: 200

Local Sales Offices & Reps.

Tex	Dallas, The Thorson Co.	214-233-5744

COHN, SIGMUND, Dept. EM, 121 S. Columbus Ave., Mt. Vernon, N.Y. 10553, Tel: 914-664-5300, TWX: 710-562-0112; Empl.: 117

Local Sales Offices & Reps.

Cal	Burbank, S. Cohn Corp. of Calif.	213-VI 9-6777

™COHRLASTIC - silicone rubber - Connecticut Hard Rubber Co.

COHU, INC., ELCTRNS. DIV., San Diego Div., Dept. EM, Box 623, San Diego, , Cal. 92112, Tel: 714-277-6700, TWX: 910-335-1244; Empl.: 210; Minimum order: $R.L. Curwin, Eastern Reg. Mgr.

Sales Manager: E.V. Dempsey; *Distributor Manager:* R.L. Curwin, Eastern Reg. Mgr.

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Scottsdale, Perspective Measurements	602-947-3860

Cal	Anaheim, Perspective Measurements	714-772-5211
Cal	Palo Alto, Cohu	415-326-0280
Cal	San Diego, Perspective Measurements	714-278-8931
Colo	Denver, Scientific Sys.	303-623-6447
Fla	Orlando, BCS Assocs.	305-896-4881
Md	Bethesda, Bartlett Assocs.	301-656-3061
Mass	Bedford, Cohu	617-275-0370
Mich	Sterling Heights, Cohu	313-739-5444
NJ	Florham Park, Cohu	201-377-6636
NC	Greensboro, BCS Assocs.	919-273-1918
Pa	Wayne, Bartlett Assocs.	215-688-7325
Tex	Houston, A. Barnes Assocs.	713-488-0817
Tex	Richardson, A. Barnes Assocs.	214-235-4543
Wash	Seattle, Scientific Sys.	206-363-8600

COIL CO. OF AMER., Dept. EM, 221 Washington St., Northvale, N.J. 07647, Tel: 201-768-3434; Empl.: 25 p. 4357

Sales Manager: M. Gottlieb

COIL-CRAFT INC., See Coil-Q Corp.

COILCRAFT, Dept. EM, 1102 Siler Lake Rd., Cary, Ill. 60013, Tel: 312-639-2361, TWX: 910-651-2251; Empl.: 1400

Local Sales Offices & Reps.

NJ	Mountainside, Henry G. Richter Inc.	201-233-4615
NY	Fayetteville, Henry G. Richter Inc.	315-637-6713

COIL-Q CORP., Dept. EM, 340 Bronxville Rd., Bronxville, N.Y. 10708, Tel: 914-337-4775; Empl.: 7

Advertisement

Our line of turnable RF coils affords highest Q and stability in filter applications from audio thru VHF. Values of .027 to 100,000 uH spaced in a 10% series have overlapping tuning ranges. We also make wideband matching transformers, power splitter-combiners, Directional couplers, audio transformers, fixed and tunable filters. We will also design and fabricate any of the above items to your specific requirements.

COIL SPECIALTY CO., Dept. EM, Box 978, 2730 Carolean Ind'l. Dr., State College, Pa. 16801, Tel: 814-234-7044; Empl.: 25

Sales Manager: H. Hoffman

Local Sales Offices & Reps.

NJ	Englewood Cliffs, A. Morin Assocs.	201-568-8505
NJ	Oaklyn, A. Wetterhahn Co.	609-858-3003
Ohio	Dayton, Kimconics Sls.	513-898-1783
Pa	Waterford, Kimconics Sls.	814-796-6556

Advertisement

Coil Specialty Co. has facilities to manufacture small or large quantity requirements of IF and RF coils, chokes, transformers, hash filters, solenoid, special bobbin, reed switch or any other specialty windings to customer's specifications. Announcing a specialty toroid department.
Quotations and sample requirements given immediate attention.

™COILTITE - wire-wrapping bits & sleeves - O. K. Machine & Tool Corp.

COIL WINDING EQUIP. CO., Dept. EM, Railroad Plaza, Oyster Bay, N.Y. 11771, Tel: 516-922-5660, Telex: 143-128; Empl.: 35

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrn. Entprs.	602-946-9860
NM	Albuquerque, Elctrn. Entprs.	505-256-3561
NM	Las Cruces, Elctrn. Entprs.	505-524-0126
NY	Oyster Bay, Coil Winding Equip. Co.	516-922-5660

™COJAX - coaxial patch jacks - Dynatech Laboratories, Inc.

COLBERT INDS., PanaVise Div., Dept. EM, 10107 Adella Ave., South Gate, Cal 90280, Tel: 213-569-8108; Empl.: 29; Minimum order: $B. McCabe

Sales Manager: J. Hart; *Distributor Manager:* B. McCabe

Local Sales Offices & Reps.

Cal	Gardena, Bidwell Sls. Assocs.	213-770-0300
Ill	Lincolnwood, B. Stein & Co.	312-674-2550
Tex	Dallas, Crockett Sls.	214-748-8209

COLE-FLEX CORP., Dept. EM, 91 Cabot St., W. Babylon, N.Y. 11704, Tel: 516-249-6150; Empl.: 12

Sales Manager: A. Rosenblum

Local Sales Offices & Reps.

Ala	Birmingham, H. Phillips Co.	205-967-5248
Ariz	Phoenix, Stitzer-Dodd	602-944-2237
Cal	Tajunga, Armstrong Sls. Co.	213-353-6366
Colo	Colorado Springs, Norris & Co.	303-576-3324
Del	Newark, Tony DiVincent Assocs.	302-731-1475
Fla	North Miami, Haas/Winfield	305-945-6544
Ga	Rosewell, Henry Phillips Co.	404-992-3070
Ill	Wilmette, J. Wasserman Assocs.	312-256-3566
Ind	Indianapolis, Electronic Reps.	317-894-1414
Ky	Louisville, Electronic Reps.	502-368-4911
La	New Orleans, Texport Co.	504-486-6073
Mass	Norwood, Rudolph & MacInnis Assocs.	617-769-5450
Mich	Pleasant Ridge, Shalco Inc.	315-547-4771
NJ	Moorestown, Tony DiVincent Assocs.	609-235-8299
NY	N. Syracuse, L.D. Allen Inc.	315-458-7470
NY	N.Y., I. Brown & Assoc.	212-493-1379
NC	Charlotte, H. Phillips Co.	704-394-5544
Ohio	St. Mary's, Repptronics	419-394-4724
Okla	Tulsa, Texport Co.	918-939-1727
Ore	Beaverton, DMS/Vantage	206-525-2050
Pa	Pittsburgh, Reptronics	412-561-4687
Tenn	Memphis, Texport Co.	901-683-0880
Tex	Richardson, Texport Co.	214-238-7117
Wash	Seattle, DMS/Vantage Corp.	206-525-2050

COLE INSTRUMENT CORP., Div. F.H. Cole Enterprises, Dept. EM, 2034 Placentia Ave., Costa Mesa, Cal. 92627, Tel: 714-642-8080; Empl.: 35

Local Sales Offices & Reps.

Cal	Foster City, J. W. Wilhoit Co.	415-349-3817
Ill	Schaumberg, Kingston Comps.	312-529-8055
Minn	Lakeville, Dan'l Engrg. Corp.	612-332-4848
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993

COLEMAN CABLE & WIRE CO., Dept. EM, 1900 N. Fifth Ave., River Grove, Ill. 60171

COLEMAN INSTR. DIV., Dept. EM, 2000 York Road, Oak Brook, Ill. 60521, Tel: 312-887-0770; Empl.: 250

COLEMAN MICROWAVE CO., Dept. EM, Box 59, Rte. 22, Lebanon, N.J. 08833, Tel: 201-534-2480, TWX: 710-480-2824; Empl.: 13

Sales Manager: M. Grosso

Local Sales Offices & Reps.

Ariz	Tempe, Jarko Assocs.	602-966-3020
Cal	Los Angeles, R.F. Assocs	415-494-3331
Cal	North Hollywood, Crown Elctrns	213-877-3550
Ill	Chicago, Electron-Tech Mktg. Assoc.	312-588-4535
Ind	Audburn, D.C. Flanagan	219-925-2859
Kans	Mission, Midland Engrg Sls. Asssoc.	913-262-6565
Mass	Topsfield, Aries Assoc.	617-887-6495
NJ	Lebanon, M. Grosso/Coleman M/W	201-534-2480
NJ	Moorestown, Stern Assocs	609-234-0661
Tex	Dallas, Southern Engrg Co.	214-357-0669
Exp:	N.Y., New York, Singen Prods	212-432-1400

COLLIMATION, INC., see Applied Dynamics International, Inc.

COLLINS ELECS, INC., Dept. EM, Old Love Pt. Rd., Stevensville, Md. 21666, Tel: 301-643-5055; FSC No.: 05215; Empl.: 120

COLLINS, G.L. CORP., Dept. EM, 5875 Obispo Ave., Long Beach, Cal. 90805, Tel: 213-636-8141, TWX: 910-346-6707; Empl.: 95

COLLINS RADIO CO., Dept. EM, 160-180, Cedar Rapids, Iowa 52406

COLLINS RADIO, ROCKWELL INTERNATIONAL, Dept. EM, Dallas, Tex. 75207, Tel: 214-690-5000, TWX: 910-867-4709; Empl.: 16000

Local Sales Offices & Reps.

Alas	Anchorage	904-337-2870
Ariz	Nogales	602-287-2101
Ariz	Sierra Vista	602-458-4491
Ark	Limestone	501-428-5257
Cal	Long Beach	213-593-8722
Cal	Los Angeles	213-647-5611
Cal	Sacramento	916-485-2698
Cal	San Mateo	415-342-2131
Fla	Madeira Beach	813-391-8065
Fla	Miami Springs	305-885-8446
Fla	Tallahassee	904-877-2580
Ga	Atlanta	404-996-5400
Ga	Warner Robins	912-922-6616
Ill	Buffalo Grove	312-537-3760
Kans	Wichita	316-942-4201
La	Pineville	318-640-3412
Md	Bethesda	301-223-4222
Mass	Lexington	617-862-8800
Minn	Maple Plain	612-479-2633
Minn	Minneapolis	612-835-4989
Mo	Grandview	816-763-3928
Mo	Kansas City	816-942-4449
NJ	West Long Branch	201-222-5500
NY	Guilderland Center	518-371-6610
NY	Lake Success	212-343-1606
NY	New York City	212-661-6530
Ohio	Cincinnati	513-825-3802
Ohio	Dayton	513-461-4823
Ohio	Galion	419-468-3964
Okla	Oklahoma City	405-632-6801
SC	Rock Hill	803-366-7322
Tenn	Rockford	615-573-9717
Va	Arlington	703-524-9503
Wash	Seattle	206-725-1000

COLLINS RADIO CO., Dept. EM, 1200 N. Alma Rd., Richardson, Tex. 75080, Tel: 214-690-5000

COLLINS RADIO GROUP, Comps. Mktg., Dept. EM, 4311 Jamboree Blvd., Newport Beach, Calif. 92663, Tel: 714-833-4661, TWX: 910-595-1705; Empl.: 800

Local Sales Offices & Reps.

Cal	Burlingame, J. Logan Assocs.	415-697-6377
Cal	Garden Grove, Impact Elctrns.	714-893-8551
Cal	San Jose, Collins Radio Grp.	415-961-1306
Fla	Orlando, Gentry Assocs.	305-894-4401
Ill	Buffalo Grove, Collins Radio Grp.	312-537-3760
Ind	Ft. Wayne, Bieberich, Inc.	219-432-2537
Ky	Lexington, Circuit Sls.	617-861-0567
Md	Bethesda, Collins Radio Grp.	202-223-4222
Mich	Warren, Dem Elctrns. Sls.	313-755-6660
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422
Mo	St. Louis, Engineering Svcs. Co.	314-977-1515
NY	Plainview, E.R.A.	516-822-9890
NY	Syracuse, T² Elctrns. Co.	315-463-8592
Ohio	Dayton, D. Steffen & Assocs.	513-293-3145
Tex	Dallas, Texas Microwave Elctrns.	
Wash	Seattle, R. Johnston Co.	206-524-5170

COLORADO CRYSTAL CORP., Dept. EM, 2303 W. 8th St., Loveland, Colo. 80537, Tel: 303-667-9248; Empl.: 80 p. 2429

Sales Manager: E.W. Morgan

COLORADO VIDEO, INC., Dept. EM, Box 928, Boulder, Colo. 80302, Tel: 303-444-3972, TWX: 910-940-3248; Empl.: 24 p. 1458-1465

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Cal	San Diego, Perspective Meass.	714-278-8931
Cal	Westlake Village, CVI West Coast Sls.	213-889-3653
Colo	Littleton, Cropley, Inc.	303-794-4231
Fla	Orlando, BCS Assocs.	305-896-4881
Mass	Chelmsford, CVI Northeast Sls. Office	617-256-3381
NY	N. Lindenhurst, Sigma Communications Assocs.	516-226-1880
NC	Greensboro, BCS Assocs.	919-273-1918
Tex	Dallas, CVI Southwest Regional	214-233-5497
Va	Williamsburg, BCS Assocs.	804-245-1786

™COLOR BEAM - TV antenna - Winegard Co.

™COLOR BRIGHT 85 RE - color TV picture tubbes - GTE Sylvania Inc.

™COLOR BRIGHT 85 XR - color TV picture tubes - GTE Sylvania Inc.

™COLOR-BRITE - TV tube brighteners - Perma Power Div.

™COLOR CORD - cord sets - Pacific Electricord Co.

™COLOR-KEYED - connectors, tools & dies - T & B/ Thomas & Betts

™COLOR-KEYED - connectors, tools & dies - T & B/ Thomas & Betts

™COLORMASTER - tv/fm antennas - Lance Inds.

™COLOR/MATIC - color analyser - Lektra Labs., Inc.

COLOR/SCIENCE PRODUCTS, INC., Dept. EM, 4867 Chambersburg Rd., Dayton, Ohio 45424

™COLOR SCREEN 85 - color TV picture tubes - GTE Sylvania Inc.

™COLORSEAL® - pre-colored plates - Metalphoto Corp.

™COLORVUE - 50-220 MHZ line of solid state CATV equip - CATV Communications

COLT INDUSTRIES, Crucible Magnetics Div., Dept. EM, Box 100, Elizabethtown, Ky. 42701, Tel: 502-769-1333, Telex: 204-160; Empl.: 600

COLUMBIA COMPONENTS, Div. Computer Instrs., Dept. EM, 100 Madison Ave., Hempstead, N.Y. 11550, Tel: 516-483-8200, TWX: 510-222-4189 .... p. 2504

Sales Manager: L. Eagle

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scien. Instr.	205-837-1601
Cal	Los Angeles, E. Landa	213-897-0770
Cal	Menlo Park, Frauman	415-322-8461
Cal	San Diego, B. Tauber & Assoc. Inc.	714-274-7242
Ill	Chicago, Lightner Assoc.	312-SP 4-1500
Mo	Kansas City, Automatic General Elec.	816-333-8206
NJ	Cherry Hill, Jay Assocs.	609-662-0399
NJ	Morristown, D. Snyder	201-569-8800
NY	Huntington, Andrews & Andrews	516-692-8686
NY	Syracuse, Howard C. Murray & Assocs.	315-487-0634
Ohio	Fairborn, J. C. Hofstetter Co.	216-241-4880
Utah	Salt Lake City, Cannon Eng. & Sls.	206-454-2514

COLUMBIA ELECTRIC MFG. CO., Dept. EM, 4519 Hamilton Ave. N.W., Cleveland, Ohio 44114, Tel: 216-361-8060; Empl.: 60

COLUMBIA ELCTRN. CABLES, Dept. EM, 11 Cove St., New Bedford, Mass. 02744, Tel: 617-999-4451, Telex: 92-9411; Empl.: 2,500 .... p. 4579-4587

Sales Manager: J.R. Fichtl

Local Sales Offices & Reps.

Ariz	Phoenix, J.R. Morgan Agency	602-252-3089
Cal	Gardena, Bidwell Sls. Assocs.	213-770-0300
Cal	San Francisco, Technical Sls. Assocs.	415-467-1434
Colo	Denver, Brake & Assocs.	303-433-8531
Fla	Miami, L. Haas Co.	305-945-6544
Ga	Atlanta, B. Roberts & Assocs.	404-233-6679
Haw	Honolulu, Gene Piety Factors	808-839-9059
Ill	Chicago, Bransky Sls.	312-433-2375
Ind	Indianapolis, Elctrn. Reps.	317-546-5556
Kans	Shawnee Mission, Lowell-Kangas & Assoc.	913-631-3515
La	New Orleans, Texport Co.	504-486-6073
Md	Silver Springs, Mid-Atlantic Sls. Co.	301-593-7749
Mass	Norwood, Rudolph & MacInnis Assoc.	617-769-5450
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	Minneapolis, H. M. R. Inc.	612-920-8200
Mo	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NJ	Clifton, Legtronics Assocs.	201-778-1978
NY	N. Bellmore, L.W. Keller & Assoc.	516-785-2826
NY	Rochester, J. Brown Elctrn. Sls.	716-266-2728
NY	Yonkers, J. Brown Elctrn. Sls.	914-779-7330
Ohio	Columbiana, Nebco Assocs.	216-457-2333
Ohio	Richfield, Bear Mktg.	216-659-3131
Okla	Tulsa, The Texport Co.	918-939-1727
Pa	Philadelphia, S.K. MacDonald, Inc.	215-545-1205
Pa	Reading, Beil-Whitaker	215-779-2610
Tenn	Memphis, Texport Co.	901-683-0880
Tex	Houston, Texport Co.	713-464-2828
Tex	Richardson, Texport Co.	214-238-7117
Wash	Seattle, Pacnor Mktg. Co.	206-284-8020

COLUMBIA MAGNETICS, Dept. EM, 51 W. 52nd St., New York, N.Y. 10019

COLUMBIA RESCH. LABS., Dept. EM, Macdade Blvd. & Bullens La., Woodlyn, Pa. 19094, Tel: 215-532-9464, TWX: 510-669-3625; FSC No.: 07571; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, R. A. Mayes Co.	603-279-5243
Cal	Los Angeles, Ezra Mintz Assoc.	213-670-5410
Colo	Boulder, R. A. Mayes Co.	303-444-0782
Mass	Waltham, Scientific Devices Inc.	617-894-5637
Mich	Detroit, Electro Sls. Assocs., Inc.	313-526-8800
NM	Albuquerque, R. A. Mayes Co.	505-292-2330
NY	Mamaroneck, Cane Tech Sls., Inc.	914-698-4411
Ohio	Cleveland, Electro Sls. Assocs., Inc.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs., Inc.	513-426-5551
Ore	Portland, Topp Engrg. Sls.	503-244-7265
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Houston, R. A. Mayes Co.	713-461-5385
Tex	Richardson, R. A. Mayes Co.	214-235-3043
Utah	Centerville, R. A. Mayes Co.	801-292-6781
Wash	Bellevue, Topp Engrg. Sls., Inc.	206-747-5400
Exp:	N.Y., New York (France), Hofortech Corp.	212-682-3092

COLUMBIA TECH, See Humiseal Div. and Industrial Mica Div.

COLUMBUS ELECTRIC MFG. CO., Dept. EM, Box 289A Rt #2, Piney Flats, Tenn. 37686, Tel: 615-538-8191; Empl.: 160

Local Sales Offices & Reps.

Cal	Los Angeles, F. Alleman	213-222-8128
Cal	Oakland, W. Nott	415-654-3747
Conn	Glaston Bury, Barton-Caron Assoc.	203-633-9417
Ill	Chicago, J. Angel Co.	312-878-0653
Kans	Shawnee Mission, L. McKibben	913-262-1444
Mass	Auburndale, B. Caron	
Mich	Bloomfield Hills, J. Bisha	313-642-0203
NJ	Chatham, J. Churchill	201-236-6055
NY	Rochester, G. Schomberg	716-244-0920
Ohio	Cleveland, F. Kahsar Sls.	513-471-9011
Pa	Philadelphia, Navdain Assoc.	609-235-1801
Tex	Dallas, Blackburn Assoc.	214-351-9991

COM/TECH SYSTEMS INC., Dept. EM, 44 Beaver St., New York, N.Y. 10004, Tel: 212-425-0733; Empl.: 8

Local Sales Offices & Reps.

Minn	Minneapolis, Deerland Distributors Inc.	612-331-6433
NJ	Old Tappan, Glasgal Communication Svcs.	201-666-2869

™COMBAT - boron nitride - Carborundum Co.

™COMBO - EMI/RFI shielding + pressure gasketing - Metex Corp.

™COMBO POLASTRIP - EMI/RFI shielding + pressure gasketing - Metex Corp.

™COMBO STRIP - EMI/RFI shielding + pressure gasketing - Metex Corp.

™COMBO-2 - EMI/RFI shielding + pressure gasketing - Metex Corp.

COMCO PLASTICS, INC., Dept. EM, 98-36 C. Jamaica Ave., Richmond Hill, N.Y. 11418, Tel: 212-849-9000; Empl.: 125

Local Sales Offices & Reps.

Ala	Birmingham, Commercial Plastics & Supply Corp.	205-591-8900
Cal	Gardena, Commercial Plastics & Supply Corp.	213-532-9151
Conn	Orange, Commercial Plastics & Supply Corp.	203-799-2351
Fla	Miami, Commercial Plastics & Supply Corp.	305-576-3333
Ga	Atlanta, Commercial Plastics & Supply Corp.	404-577-2600
Ill	Chicago, Commercial Plastics & Supply Corp.	312-227-4500
Md	Hyattsville, Commercial Plastics & Supply Corp.	301-864-6226
Mass	Somerville, Commercial Plastics & Supply Corp.	617-623-2100
Mich	Warren, Commercial Plastics & Supply Corp.	313-755-1700
NJ	Newark, Commercial Plastics & Supply Corp.	201-824-5400
NJ	Trenton, Commercial Plastics & Supply Corp.	609-883-5100
NY	New York, Commercial Plastics & Supply Corp.	212-477-5000
NC	Raleigh, Commercial Plastics & Supply Corp.	919-828-4100
Ohio	Cleveland, Commercial Plastics & Supply Corp.	216-687-0300
Pa	Philadelphia, Commercial Plastics & Supply Corp.	215-455-8800
RI	E. Providence, Commercial Plastics & Supply Corp.	401-438-0130
Tenn	Knoxville, Commercial Plastics & Supply Corp.	615-637-1000
Tex	Dallas, Commercial Plastics & Supply Corp.	214-631-8170

COMDATA CORP., Dept. EM, 8115 N. Monticello, Skokie, ILL. 60076, Tel: 312-677-3900, TWX: 910-223-3617; Empl.: 65

COMDEL, INC., Dept. EM, Beverly Airport, Beverly, Mass. 01915, Tel: 617-927-3144; Empl.: 10

™COMFORM I - component forming tool - Pace Inc.

™COMLINE - standard mowolithic crystal filters - Piezo Technology Inc.

COMMERCIAL ELEC. HEATING DEVICES & MFG., INC., Dept. EM, 1008 E. Garvey Blvd., Monterey Park, Cal. 91754, Tel: 213-288-9445; Empl.: 12

COMMUNICATION ASSOCS., INC., Dept. EM, 200 McKay Rd., Huntington Station, N.Y. 11746, Tel: 516-271-0800, TWX: 510-226-6998; Empl.: 150

COMMUNICATION CABLE, Dept. EM, 5 Glen Rd, Manchester, Conn. 06040, Tel: 203-647-1468; Empl.: 40

Sales Manager: R. Barksdale

Local Sales Offices & Reps.

Cal	Buena Park, McCamey-Jones	714-994-4852
Cal	Walnut Creek, Vi-King Instr. Co.	415-933-1221
Colo	Englewood, J & B Sls.	303-761-9181
Conn	West Haven, Coakley, Boyd & Abbett	203-934-1411
Fla	Largo, Tech. Comp. & Instr.	813-584-1122
Ill	Chicago, Warner Instr. Sls. Co.	312-631-6778
La	Baton Rouge, Petro-Chem Equip. Co.	504-927-4380
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	Brighton, H H Barnum Co	313-229-2961
Minn	Minneapolis, Arjay Sls. Inc.	612-854-4972
Mo	Kansas City, Boschert Equip. Co.	816-561-4050
NY	Flushing, Petro-Chem Specialties	212-899-6400
NY	Pittsford, Cascade Controls Corp.	716-385-1410
NC	Matthews, W K Hile Co.	704-847-9125
Ohio	Cincinnati, Schlemmer Assocs.	513-522-8340
Ore	Portland, Sea-Port Controls	503-283-1950
Pa	Abington, J R Simpson & Co.	215-885-0566
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Sales Manager: T.A. Garmhausen

Local Sales Offices & Reps.

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NH	Londonderry, Associated Sys.	603-434-0731
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Tex	Houston, Tel-Tek	713-772-1714

COMMUNICATIONS EQUIPMENT CO., INC., Dept. EM, 5134 East 65th Street, Indianapolis, Ind. 46220, Tel: 317-849-9240; Empl.: 23

Sales Manager: T.A. Garmhausen

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Local Sales Offices & Reps.

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Colo	Arvada, D. Eggeman	303-423-3707
Fla	Lighthouse Point, Saber Assocs.	305-943-3076

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Tex	Dallas, Technical Mktg.	214-387-3601
Wash	Tukwila, General Elctrns., Inc.	206-243-5141

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Cal	N. Hollywood, Crown Elctrns.	213-877-3550
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Exp:	N.Y., Baldwin, Milano Brothers	516-223-9000

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p. 1490,1491

Sales Manager: S.J. Renard

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Sales Manager: J. Patnode

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NY	Plainview, Eastern Metro Assocs.	516-931-1414
NY	Skaneateles, Robtron, Inc.	315-685-5731
NC	Raleigh, Saber Assocs.	800-327-1181
Ohio	Cleveland, Comtel-Instruments	216-442-8080
Ohio	Dayton, Comtel-Instruments	513-298-7573
Pa	Philadelphia, M. Lader & Co.	215-825-3177
Pa	Pittsburgh, Comtel-Instruments	412-922-5720
Tex	Houston, Scientific Devices Gulf Coast	713-868-5575
Tex	Richardson, Scientific Devices S.W.	214-231-8106
Tex	San Antonio, Scientific Drvices S.W.	512-736-3164
Utah	Murray, Measurement Consits.	801-268-3181
Wash	Bellevue, Kevin Hall Assocs.	206-455-5526

COMSTRON-SEG MULTIMETRICS, see Multimetrics Div. of Comstron-Seg

™COMTEC - CRT system - Auto Trol Corp.

COMTECH CORP., Dept. EM, 11411 Addison St., Franklin Park, Ill 60131

COMTEC INFORMATION SYSTEMS, INC., Digitronics, Dept. EM, 53 John St., Cumberland, R.I. 02864

™COMTRAN - educational computer - Fabri-Tek, Inc.

™CONACURE - hardeners (curing agents) for epoxies & polyurthanes - Conap, Inc.

CONAP, INC., Dept. EM, 1405 Buffalo St, Olean, N.Y. 14760, Tel: 716-372-9650, TWX: 510-245-2769; Empl.: 85

Sales Manager: D.A. Williamson

Local Sales Offices & Reps.

Ariz	Phoenix, Advance Electrical Sls.	602-955-8927
Cal	Anaheim, Advance Electrical Sls.	714-870-0304
Cal	Belmont, Advance Electrical Sls.	415-592-4550
Cal	San Diego, Advance Electrical Sls.	714-239-1105
Colo	Denver, Advance Electrical Sls.	303-388-0923
Conn	Manchester, Conap, Inc.	203-647-9684
Ga	Macon, Stoneco Assocs.	912-745-4652
Ill	Wood Dale, Lucole Entprs.	312-595-7846
Ind	Indianapolis, Sheer Engrg.	317-852-8766
Kans	Overland Park, Ensco-Rep	913-381-7557
Minn	Bloomington, W.J. Koness	612-881-6558
Mo	St. Louis, Ensco-Rep Inc.	314-542-3935
NJ	Helmetta, Conap, Inc.	201-521-3460
NY	Southampton, Polyester Corp.	516-283-4400
Ore	Wilsonville, Advance Electrical Sls.	503-638-4917
Pa	Meadville, Conap, Inc.	814-332-6541
Tex	Garland, Cogburn & Assocs.	214-271-2029
Wash	Seattle, Advance Electrical Sls.	206-762-2262
Wisc	Brookfield, Techno-Ind'l. Sls. Co.	414-783-4385

™CONAPOXY - epoxy base resins & compounds - Conap, Inc.

™CONATHANE - Polyurethane resins & systems - Conap, Inc.

CONAX CORP., Dept. EM, 2300 Walden Ave., Buffalo, N.Y. 14225, Tel: 716-684-4500; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, Control Equip. Co.	205-883-1330
Cal	Gardena, Instrument Lab.	213-770-0650
Cal	Palo Alto, Instrument Lab.	415-328-1040
Colo	Denver, D.E. Bond Assocs.	303-756-1234
Fla	Winter Park, Control Equip. Co.	305-647-4496
Ga	Atlanta, Control Equip. Co.	404-237-1688
Haw	Honolulu, Camwil Inc.	808-955-0766
Ill	Mt. Prospect, Automation Equip. Co.	312-398-7550
La	Baton Rouge, Process Specialty Co.	504-293-0644
Md	Glen Burnie, Faber-Renoff, Inc.	301-768-4554
Mass	Hathorne, C. T. Morgan Co.	617-774-3215
Mich	Detroit, R. B. Turpin Co.	313-272-0746
Minn	Minneapolis, Automated Controls	612-377-7727
Mo	St. Louis, Barry Sls. Engrg. Co.	314-821-2525
NJ	Newark, N. Bragar Co.	201-344-1100
NY	Buffalo, Niagara Electric Sls. Co.	716-886-4000
NY	East Syracuse, Niagara Electric Sls. Co.	315-437-1656
NY	Rochester, Niagara Elcctric Sls. Co.	716-271-1223
NC	Charlotte, Ranson, Wallace & Baesel	704-334-4244
Ohio	Cincinnati, Myers & Henley	513-861-0038
Ohio	Cleveland, Carll & Swift Co.	216-464-9430
Okla	Tulsa, Barnard Equip. Co.	918-742-2652
Ore	Portland, ILI Corp.	503-234-6683
Pa	Flourtown, Flow Engrg.	215-248-1355
Pa	Pittsburgh, M. S. Jacobs & Assocs.	412-923-2090
Tenn	Knoxville, Control Equip. Co.	615-584-5663
Tex	Arlington, Pan-Tech Engrg. Co.	817-261-4111
Tex	Houston, Pan-Tech Engrg. Co.	713-623-0640
Va	Richmond, United Control Co.	804-285-9927
Wash	Bellevue, ILI Corp.	206-747-9410
WVa	Charleston, M. S. Jacobs & Assocs.	304-343-8906

™CONCENTRIKIT - put together replacement potentiometers (for concentric controls) - CTS Corp.

™CONCO-FOAM - 300 ohm twin lead - Consolidated Wire & Assoc. Corps.

CONCORD ELCTRNS., Dept. EM, 37 Great Jones St., Dept. JE, New York, N.Y. 10012, Tel: 212-777-6571, TWX: 710-581-4930; Empl.: 150 .... p. 1822,1823

Sales Manager: Josie Wheaton

CONDENSER PRODUCTS CORP., Dept. EM, Box 997, Brooksville, Fla. 33512, Tel: 904-796-3562; Empl.: 30

Local Sales Offices & Reps.

Cal	Mountain View, Energy Comps.	415-969-0330
Cal	San Diego, Energy Comps.	714-299-3849
Ill	Chicago, Ropek-Cahill	312-631-0070
Ohio	Aurora, E.M.A., Inc.	216-562-6104
Ohio	Centerville, E.M.A., Inc.	513-433-2800

™CONDOR - propeller fan - IMC Magnetics Corp.

CONDOR PACIFIC INDS. CALIF., Dept. EM, 8740 Remmet Ave., Canoga Park, Cal. 91304, Tel: 213-882-0550; Empl.: 20

™CONDUCTING TWENTY/TWENTY - epoxy/conductive - Packaged Resins Div.

™CONDUCTING TWENTY/TWENTY - conductive epoxy - Allaco Prods Div.

™CONDUCTWEEZ - conductive tweezer - Pace Inc.

™CONDUX - electrically conductive elastomers - Hardman Inc.

™CO-NETIC - magnetic shielding material - Magnetic Shield Div.

™CONFLAT - flanges - Varian Assocs.

CONFORMING MATRIX CORP., Dept. EM, Box 5126, Pt. Pl. Sta., Toledo, Ohio 43611, Tel: 419-729-3777; Empl.: 35

Local Sales Offices & Reps.

Cal	Orange, Omega Ind'l. Sls. Co.	714-997-5700
Ga	Atlanta, EME Assocs.	404-237-0464
Ill	Downers Grove, Midwest Tech. Svc.	312-968-4343
Mich	Adrian, E. Loncki	517-263-6539
NJ	Newark, Grapek Co.	201-485-7605
Ohio	Cincinnati, Lohrer Ind. Equip.	513-922-5000
Tex	Richardson, E. Wuermser Assoc.	215-231-4202

™CONFUZZ - conductive tapes & closures - Technical Wire Products, Inc.

™CONHEX - r.f. connector - Sealectro Corp.

CONIC CORP., Terra Com Div., Dept. EM, 9020 Balboa Ave., San Diego, Cal. 92123, Tel: 714-278-4100, TWX: 910-335-1183; Empl.: 70

™CONITEL - digital data acquisition & supervisory system - Leeds & Northrup Co.

CONKLIN INSTR. CORP., Dept. EM, Main St., Pleasant Valley, N.Y. 12569, Tel: 914-635-2136; Empl.: 18

Local Sales Offices & Reps.

Cal	Mountain View, CSS Telecommunication Specialists	415-964-4335
Cal	Santa Ana, CSS Telecomunnication Specialists	714-546-8430
DC	Washington, Instrucom, Inc.	202-223-1759
Fla	St. Petersburg, Commark Corp.	813-577-0400
Ill	Schaumburg, Kay Sales, Inc.	312-397-1200
Kans	Prarie Village, Giddings Co.	913-831-0727
NJ	Bogata, Neville & Vespo Corp.	201-487-1505

™CONMAX - conductive nickel/silicone - Technical Wire Products, Inc.

CONNECTICUT HARD RUBBER CO., Dept. EM, 407 East St., New Haven, Conn. 06509, Tel: 203-777-3631, TWX: 710-465-0264; Empl.: 80

Local Sales Offices & Reps.

Ala	Birmingham, Commerical Plastics & Supply Corp.	205-591-8900
Ariz	Phoenix, Boyd Indl Rubber, Div. A. B. Boyd	602-269-3456
Cal	Berkeley, C. D. LaMoree Co.	415-841-0601
Cal	City of Industry, Boyd Indl Rubber, Div. A. B. Boyd	213-962-7111
Cal	El Segundo, Insulectro Corp.	213-640-1470
Cal	Gardena, Commercial Plastics & Supply	213-532-9151
Colo	Denver, Plasticrafts	
Conn	Middletown, Auburn Mfg. Co.	203-346-6631
Fla	St. Petersburg, Tri-Tech of Fla.	813-544-8836
Ga	Atlanta, R. H. Carlson Co.	404-455-7656
Ill	Chicago, J. J. Glenn & Co.	312-VI7-6400
Ill	Elk Grove Village, Quality Rubber	312-593-4200
Ind	Indianapolis, Marian Rubber Products Co.	317-638-6525
Iowa	Des Moines, Nott Co.	515-276-8559
Kans	Wichita, Industrial Supply of Wichita	316-265-4623
Ky	Louisville, B & R Rubber & Supply Co.	502-585-5171
La	New Orleans, Gulf Belting & Gasket Co.	504-522-9613
Md	Baltimore, Bronze & Plastic Specialties Co.	301-644-0440
Mass	Cambridge, Greene Rubber Co.	617-547-7655
Mich	Detroit, F.W. Winne & Son	313-259-2595
Mich	Grand Rapids, Grand Rapids Rubber Prods Co.	616-459-3404
Minn	Minneapolis, Nott Co.	612-781-9561
Miss	Jackson, Dixie Rubber & Belting Co.	601-355-6406
Mo	St. Louis, General Gasket Corp.	314-771-9550
Neb	Omaha, Daisley Packaging Sls	402-422-0440
NJ	Livingston, R. McKeown Co.	201-WY2-0700
NJ	Saddle Brook, Mueller Belting & Specialty Co.	201-791-5000
NY	Farmingdale, Commercial Plastics & Supply Corp.	516-293-9090
NY	New York City, Mercer Rubber Corp.	212-227-0140
NY	Schenectady, F. Murken, Inc.	518-356-1060
NY	Syracuse, Chamberlin Rubber Co.	315-478-0935
NC	Charlotte, Catawba Indl Rubber Co.	704-523-8163
Ohio	Cleveland, Philpott Rubber Co.	216-432-1100
Ohio	Reading, Cincinnati Gasket, Packing & Mfg. Co.	513-761-3458
Ore	Portland, Boyd Indl Rubber, Div. A. B. Boyd	503-255-5405
Pa	Philadelphia, Stockwell Rubber Co.	215-426-3200
RI	East Providence, Commercial Plastics & Supply Corp.	401-438-0130
Tenn	Nashville, Nashville Rubber & Gasket	615-244-4885
Tex	Dallas, Longhorn Gasket & Supply Co.	214-748-8421
Tex	Houston, American Packing & Gasket Co.	713-675-5271
Utah	Salt Lake City, Packing Supply Div. of New Draulics	801-484-8751
Va	Richmond, Sutton-Clark Supply	804-643-8311
Wash	Seattle, Boyd Industrial Rubber, Div. A. B. Boyd	206-622-7411
WVa	Charleston, Industrial Rubber Prods Co	304-344-1791
Wisc	Milwaukee, N. L. Kuehn Co.	414-964-3300
Exp:	Pa., Reading, Polypenco, Inc.	215-929-5858

CONNECTICUT MICROWAVE CORP., Dept. EM, Route 44, New Hartford, Conn. 06057, Tel: 203-693-4247; FSC No.: 50974; Empl.: 16

Local Sales Offices & Reps.

Pa	King of Prussia, J.T. Birkhead	215-688-4021
Va	Fairfax, Schibley Assocs.	703-591-3008

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CONNECTOR CORP., Dept. EM, 6025 N. Keystone Ave., Chicago, Ill. 60646, Tel: 312-539-3108
p. 1824,1825

Local Sales Offices & Reps.

Cal	Lynwood, Dick West & Assocs. Inc.	213-636-6124
Ill	Chicago, Bauman Sls.	312-539-3108
Mich	Jackson, E.H. Jordan	517-782-0694
NY	Dewitt, A. Bowser	315-446-5920
NY	Synder, H.J. Sapecky	716-839-4170
NC	Raleigh, J. Nagle	919-782-0213
Tenn	Shelbyville, C. McLanahan	615-684-4544
Va	Virginia Beach, C. Bludau	703-464-0500

CONNECTOR INDS. OF AMERICA, Dept. EM, 639 N. Wayne, Cincinnati, Ohio 45215, Tel: 513-733-3680; FSC No.: 32076; Empl.: 30

Local Sales Offices & Reps.

Ariz	Phoenix, Southwest e/m Engrg., Inc.	602-944-1521
Conn	Branford, W. McCoy Co.	203-488-2012
Ill	Chicago, D. Dolin Sls. Co.	312-286-6200
Mich	Birmingham, Forand Sls. Co.	313-644-0087
Mo	St. Louis, Boweng	314-429-7327
NY	Syracuse, Canavan-Scanlon Assocs.	315-463-9161
Ohio	Cleveland, Component/Insulation Corp.	216-521-3570

CONNOR-WINFIELD CORP., Dept. EM, W. Chicago, Ill. 60185, Tel: 312-231-5270, TWX: 910-230-3231; FSC No.: 21022; Empl.: 25 .... p. 2432,2433

Local Sales Offices & Reps.

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CONRAC CORP, See Cramer Div.

(TM)CON-O-CLAD - thermocouple assemblies - Conax Corp.

(TM)CONOFLUX - oil quantity system - Trans-Sonics, Inc.

(TM)CONOGRAPHICS - graphic display terminal - Hughes Aircraft Co.

(TM)CONQUEROR 40D - CB Rig - Fanon/Courier Corp., Subs.

CONRAC CORP., Datex Div., Dept. EM, 1600 S. Mountain Ave., Duarte, Cal. 91010, Tel: 213-359-5381

CONRAC CORP., Machine Tool Div., Dept. EM, 9200 Bolsa Ave., Westminister, Cal. 92683, Tel: 714-894-4711

Local Sales Offices & Reps.

Cal	Burlingame, Minetti Machinery	415-697-6512
Cal	Westminster, Conrac	714-894-4711
Ind	Indianapolis, El Humston Co.	317-925-9691
Mich	Detroit, A. Morand Machinery Co.	313-571-0770
Mich	Muskegon, Lakeshore Mach. & Supply Co.	616-722-6651
Minn	Minneapolis, Satterlee Co.	612-333-1141
Mo	Kansas City, E. Eichman Machinery Corp.	816-842-1336
NY	Buffalo, Carl F. Ahlheim	205-854-0134
NY	Farmingdale, E. J. Fox Ind. Supplies	516-293-5161
NY	Rego Park, RK Price Assocs.	212-897-4038
NC	Greensboro, Armentrout Machinery Co.	919-272-6142
Ohio	Northfield, Criterion	216-467-5037
Pa	King of Prussia, Mach. & Tool Sys.	215-265-7784
Tenn	Chattanooga, Noland Co.	615-265-3101
Tex	Dallas, Southwest Ind. Sls.	214-243-6171
Tex	Houston, Gulf Supply Co.	713-672-7451
Wisc	Milwaukee, Stoffregen Machinery Crop.	414-352-8181

CONRAC CORP., New Jersey Div., Dept. EM, Sherwood Lane, Fairfield, N.J. 07006, Tel: 201-226-7777

CONRAC DIV., Conrac Corp., Dept. EM, 600 N. Rimsdale Ave., Covina, Calif. 91722, Tel: 213-966-3511

CONRAC CORP., Systems Group, Dept. EM, 330 Madison Ave., New York, N.Y. 10017, Tel: 212-687-3330, TWX: 12-7719 710-581-3065

Sales Manager: L.F. Collins, Gen. Mgr.

Local Sales Offices & Reps.

Cal	Duarte	213-359-9141
Mo	St. Louis	314-567-4504
NY	New York City	212-687-3330
Ohio	Dayton	513-253-1104
Tex	Arlington	812-649-8515

(TM)CONRAD-MISSIMER DIVISION - manufactures standard environmental test chambers & equipment - Bemco, Inc.

(TM)CONSIL - silver alloys - Handy & Harman

CONSOLIDATED CONTROLS CORP., Dept. EM, 15 Durant Ave., Bethel, Conn. 06801, Tel: 203-743-6721, Telex: 969615; FSC No.: 02750; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, Southern Scale	205-852-0335
Ariz	Scottsdale, OEM Specialties	602-948-3360
Cal	Laguna Beach, Inss (Ind'l. & Nuclear Sensors & Sys.)	714-497-1815
Cal	Redwood City, Marchi Assocs.	415-364-3411
Colo	Denver, D. E. Bond Assocs.	303-756-1234
Conn	Meriden, Abbott-Allison Inc.	203-237-9232
Haw	Honolulu, Atecs Corp.	
Ill	La Grange, Olson Engrg. & Sls. Co.	312-482-3300
Md	Silver Spring, Sel-Tronics, Inc.	301-589-3391
Mass	Randolph, Abbott-Allison Inc.	617-245-0250
Minn	Wayzata, W. Sternad	612-473-4700
Mo	St. Louis, Boweng Representatives	314-429-7327
NM	Albuquerque, Industrial Prods. Corp.	505-256-3561
NY	Syracuse, G. O. Miller Co.	315-478-3113
NY	Westbury, Tech-Rep Engrg. Sls.	516-997-7946
Ohio	Cleveland, Jay Industrial Sls. Co.	216-831-9393
Ohio	Toledo, Fee & McCarthy, Inc.	419-693-0765
Pa	Melrose Park, R. Meyers Assocs.	215-224-1663
Pa	Pittsburgh, Ener-Jet Inc.	412-682-0777
Tex	Houston, C. M. Asfahl Agency	713-526-9669
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Wash	Bellevue, M. Poggi Co.	206-454-2026
Wash	Redmond, Electro-Measurements, Inc.	206-883-3300
Exp:	Conn., Stamford, Deltron Corp.	203-322-7300
Exp:	New York, N. Y., Technitron Inc.	212-758-2790

CONSOLIDATED REFINING CO. INC., Dept. EM, 116 Hoyt Ave., Mamaroneck, N.Y. 10543, Tel: 914-698-2300, TWX: 710-566-1112; Empl.: 130

Sales Manager: R. Gordon

Local Sales Offices & Reps.

Ariz	Scottsdale, Reptronics	602-949-7116
Cal	San Jose, California Tech Svs	408-225-5940
Cal	Woodland Hills, California Tech Svs	213-346-6401
Conn	Southington, Libby Assocs.	203-747-5601
Fla	Maitland, V. L. Dorr	305-423-7562
Ind	Carmel, E. McWilliams	317-846-5991
NY	Lewiston, Watmet, Inc.	716-285-3595
Pa	Franconia, Scharas Assoc.	215-368-2017
Tex	Richardson, C. Price	214-AD 1-4321
Wash	Seattle, Demarest & Assocs.	206-523-0600
Wisc	Milwaukee, M-W Entprs	414-352-9150

CONSOLIDATED RESISTANCE CO. OF AMERICA, INC., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701, Tel: 914-YO3-5900; Empl.: 20

Local Sales Offices & Reps.

Mass	Lynnfield, Grady & Assocs.	617-334-6633

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CONSOLIDATED WIRE & ASSOC. CORPS., Dept. EM, 1635 S. Clinton St., Chicago, Ill. 60616, Tel: 312-421-4441; Empl.: 57; Minimum order: $J. Mann
p. 4588-4619

Sales Manager: T. Mann; *Distributor Manager:* J. Mann

Local Sales Offices & Reps.

Cal	Tujunga, Armstrong Sls. Co.	213-353-6366
Colo	Arvada, Arrowhead Sls. Co.	303-423-5556
Conn	West Haven, Johnson Assocs.	203-932-0162
Fla	Hollywood, S.K. Wallace Assoc.	305-961-6640
Fla	Tampa, S.K. Wallace Assoc.	813-961-1037
Ga	Jonesboro, S.K. Wallace Assoc.	404-471-6297
Ill	Chicago, Hutmacher Assoc.	312-631-3248
Ind	Indianapolis, New/ERA Sls.	317-476-6297
Kans	Lenexa, Palatine Engrg. Sls.	913-492-7020
Md	Kensington, Forti-Austin Assoc.	301-949-1706
Mass	Wellesley Hills, Johnson Assoc.	617-235-3977
Mich	Detroit, Burcaw Co. & Assoc.	313-533-7700
Minn	Minneapolis, R.W. Marshall Co.	612-929-0457
Mo	St. Louis, Palatine Engrg. Sals.	314-426-7055
NJ	Willingboro, Forti-Austin Assoc.	609-871-9290
NY	Syosset, Masin-Esco	516-364-0310
NC	Kernersville, S.K. Wallace Assoc.	919-993-3993
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550
Tenn	Memphis, Elctrns. Sls.	901-682-2281
Tex	Dallas, E.L. Wilks & Co.	214-242-5321
Wash	Bellevue, Comtec	206-285-1698
Exp:	N.Y., Plainview, Morhan Exporting	516-293-5582

CONSTANTA CO. OF CAN., Dept. EM, 280 Regina Ave., Montreal, Can., Tel: 514-766-8569; Empl.: 33

Local Sales Offices & Reps.

Cal	Bellflower, Royer Assocs.	213-867-3638
Cal	Walnut Creek, Murray Assocs.	415-937-7577
Md	Towson, W.M. Jones Co.	301-823-5721
Mass	Newton Upper Falls, Brookdale Elctrns. Engrg. Ltd.	617-244-6969
NY	Buffalo, J.M. Glass	716-856-9272
Ohio	Dayton, LI/Corp	513-434-6367

CONSTANTINE ENGRG. LABS CO. (CELCO), See CELCO Constantine Engrg. Labs. Co.

CONSUMER MICROCIRCUITS OF AMERICA, Dept. EM, 114 E. Simmons, Galesburg, Ill. 61401, Tel: 309-342-5311

CONTACT, INC., Dept. EM, 9 Elm Avenue, Hudson, N.H. 03051, Tel: 603-883-7708; FSC No.: M07015

Sales Manager: T. Foresta; *Distributor Manager:* T. Burke

(TM)CONTACT KLEEN - electrical contact cleaner - Chemtronics, Inc.

(TM)CONTEMPO - console system. - Par-Metal Prods. Inc.

CONTINENTAL CONNECTOR CORP., Dept. EM, 34-63 56th St., Woodside, N.Y. 11377, Tel: 212-899-4422, TWX: 710-582-2565; FSC No.: 95238; Empl.: 550 .... p. 1826-1829

Sales Manager: G.H. Palmquist

Local Sales Offices & Reps.

Cal	Encino, Continental Connector Corp.	213-986-6025
Cal	Los Altos, Continental Connector Corp.	415-948-0211
Mass	Chestnut Hill, M.M. Ross	617-469-0674
NY	Liverpool, Continental Connector Corp.	315-652-3983
NY	Woodside, Continental Connector Corp.	212-899-4422
Tex	Dallas, Continental Connector Corp.	214-241-8701

Local Distributors

Cal	Chatsworth, Westates Elctrns.	213-341-4411
Cal	Sunnyvale, Westates Elctrs.	408-733-8383
Mass	Waltham, March Elctrns.	617-899-4220
NY	W. Hempstead, March Elctrns.	516-486-6511

CONTINENTAL DATA SYS., Dept. EM, 40 W. 4th St., Dayton, Ohio 45402, Tel: 513-222-8626; Empl.: 4

CONTINENTAL RENTALS DIV., Continental Leasing, Dept. EM, 175 Middlesex Tpke., Bedford, Mass. 01730, Tel: 617-275-0850; Empl.: 123 p. 2820

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs	205-533-5896
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Costa Mesa, Continental Rentals	714-540-6566
Cal	Los Angeles, Continental Rentals	213-477-7521
Cal	Santa Clara, Contినetal Rentals	408-735-8300
Colo	Denver, PLS Assocs.	303-771-0140
Fla	Ft. Lauderdale, Lee Assocs	305-491-7220
Ga	Buford, Lee Assocs	404-945-4222
Ill	Elk Grove Village, Continental Rental Div	800-323-9656
Ind	Indianapolis, L. Green Assoc.	317-293-9827
Kans	Overland Park, Carter Elctrns	913-649-6996
Md	Gaithersburg, Continental Rental	301-948-4310
Mass	Bedford, Continental Rental Div.	617-275-0850
Mich	Southfield, Electro Sls. Assocs.	313-424-9075
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Moorestown, Continental Rental	609-234-5100
NJ	Scotch Plains, Continental Rental Div.	201-654-6900
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Farmingdale, Continental Rental	516-752-1622
NY	Syracuse, DB Assocs.	315-446-0220
NC	Raleigh, Lee Assocs	919-787-5818
Ohio	Cleveland, Electro Sales Assocs.	216-261-5440
Ohio	Dayton, Electro Sales Assocs.	513-426-5551
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Richardson, Continental Rental Div.	214-690-1706

CONTINENTAL SPECIALTIES CORPORATION

CONTINENTAL SPECIALTIES CORP., Dept. EM, Box 1942, 44 Kendall St., New Haven, Conn. 06509, Tel: 203-624-3103, TWX: 710-465-1227; Empl.: 51 p. 1394-1396,1830,2822,2823

Sales Manager: B. Pascoe

Local Sales Offices & Reps.

Cal	Gardena, Bidwell Sls. Assocs.	213-770-0300
Cal	San Francisco, Continental Specialties	415-421-8872
Cal	San Francisco, J. Pascoe	415-421-8872
Ill	Chicago, Bob Burns Assocs.	312-775-1233
Ind	Indianapolis, Green, Wissler Sls. Co.	317-291-2232
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
Md	Lanham, Lowery Assocs. Co.	301-459-1556
Mich	St. Clair Shores, Jack M. Thorpe Co.	313-779-6363
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-0800
NJ	Englewood, Bressler & Baum Assocs.	201-569-7600
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Ohio	West Carollton, Marlow Assocs.	513-866-4991
Pa	Broomall, Lowery Assocs. Co.	215-356-5300
Pa	Hummelstown, Lowery Assocs. Co.	717-533-7095
Pa	Pittsburgh, Marlow Assocs.	412-831-6113
Tex	Dallas, Erickson Sls.	214-243-6661
Tex	Houston, Erickson Sls.	713-494-9680
Va	Charlotteville, Lowery Assocs. Co.	804-973-6672

Local Distributors

Ariz	Glendale, Quatronix-Lafayette Elctrns.	602-846-9772
Ariz	Glendale, Tri-Trek	602-931-6949
Ariz	Phoenix, Complete Elctrn. Supply	602-279-2321
Ariz	Tempe, Circuit Specialists	602-966-0764
Ariz	Tucson, Ancrona	602-881-2348
Ariz	Yuma, Mesa Elctrns.	602-782-9871
Ark	Little Rock, Computer Prod. Unltd.	501-371-0449
Cal	Berkeley, Elctrns. Etc	415-845-0169
Cal	Berkeley, A Lasher's Elctrns.	415-843-5915
Cal	Buena Park, Ford Elctrns.	714-521-8080
Cal	Buena Park, SJ Elctrns.	714-521-1906
Cal	Burbank, Elctrns. City	213-842-5275
Cal	Canoga Park, Sandy's Elctrn. Supply	213-346-8353
Cal	Chico, Dunlap Elctrns.	916-342-8313
Cal	Costa Mesa, Electronic Store	714-646-5037
Cal	Costa Mesa, Marvac Elctrns.	714-642-0952
Cal	Culver City, Ancrona	213-390-3595
Cal	Cupertino, Interlink Sys.	408-257-7165
Cal	Dublin, Electronic Brain	415-828-7480
Cal	Fresno, Dunlap Elctrns.	209-268-6111
Cal	Fullerton, Or Vac Elctrns.	714-871-1020
Cal	Hayward, Dunlap Elctrns.	415-352-1933
Cal	Hollywood, Pacific Radio Exchange	213-426-1393
Cal	Lakeside, Mouser Corp.	714-449-2220
Cal	Los Angeles, International TV Corp.	213-776-8830
Cal	Los Angeles, Dynaservice Co.	213-268-8531
Cal	Los Angeles, International TV Corp.	213-388-0621
Cal	Los Angeles, Basic Sys. Corp.	213-938-2833
Cal	Merced, Dunlap Elctrns.	209-722-3936
Cal	Modesto, Dunlap Elctrns.	209-524-5191
Cal	Modesto, Lombard's Lafayette	209-521-7410
Cal	Monterey, Zack Elctrns.	408-375-3144
Cal	Mountain View, Haltek Elctrns.	415-969-0510
Cal	N. Hollywood, Sandy's Elctrn. Supply	213-983-2550
Cal	Orange, K. Atwood Entprs.	714-637-7080
Cal	Orange, I. C. Elctrn. Supply	714-997-5343
Cal	Oxnard, Dow Radio	805-486-6353
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Palo Alto, U.S. Elctrns.	415-493-8166
Cal	Pasadena, Dow Radio	213-793-1195
Cal	Redding, Dunlap Elctrns.	916-243-6513
Cal	Redondo Beach, Hawk Elctrns.	213-370-5581
Cal	Redondo Beach, Electronics Warehouse	213-376-8005
Cal	Riverside, Electronics Warehouse	714-686-6186
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	Sacramento, Lombard's Lafayette	916-927-2992
Cal	Sacramento, Zackit Stores	916-446-3131
Cal	Sacramento, Lombard's Lafayette	916-421-4170
Cal	Salinas, Digitronix	408-758-0543
Cal	San Carlos, James Elctrns.	415-592-6718
Cal	San Diego, Basic System Corp.	714-279-9641
Cal	San Diego, Shank & Wright	714-239-0176
Cal	San Diego, I. C. Elctrn. Supply	714-686-6186
Cal	San Diego, Integrated Circuits Unltd.	714-278-4393
Cal	San Francisco, Zack Elctrns.	415-626-1444
Cal	San Francisco, Lombard's Lafayette	415-777-3636
Cal	San Francsico, Computer Store	415-431-0640
Cal	San Jose, Quemont Elctrns.	408-998-5900
Cal	San Leandro, Computer Shack	415-895-9363
Cal	San Raphael, Electronics Plus	415-457-0466
Cal	Santa Ana, Ancrona	714-547-8424
Cal	Santa Barbara, Lombard's Lafayette	805-964-6706
Cal	Santa Barbara, Basic Sys. Corp.	805-963-2071
Cal	Santa Clara, Solid State Music	415-246-2707
Cal	Stockton, Dunlap Elctrns.	209-466-3373
Cal	Sunnyvale, Valley West	408-738-3566
Cal	Thousand Oaks, Sandy's Elctrns. Supply	805-497-7515
Cal	Vallejo, Zackit Stores	707-644-6676
Cal	Van Nuys, Computer Comps.	213-786-7411
Cal	Van Nuys, I. C. Elctrn. Supply	213-894-8171
Cal	Westminster, J. K. Elctrns.	714-894-2532
Cal	Whittier, Oxbow Elctrns.	213-943-0111
Colo	Denver, Gateway Elctrns.	303-458-5444
Conn	Cheshire, JRV Corp.	203-281-1453
Conn	Hartford, Hatry Elctrns.	203-527-1881
Conn	New Haven, Hatry	203-787-5921
Conn	New London, Jabbour Elctrns.	203-442-4386
Conn	Stratford, Hatry Elctrns.	203-375-5866
Conn	Windsor Locks, Computer Store	203-627-0188
DC	Washington, Collins Bros. Elctrns.	301-420-4400
Fla	Cocoa Beach, Fletcher Elctrns	305-783-5496
Fla	Coral Gables, Sunny Computer Stores	305-661-6042
Fla	Melbourne, DynaTek Prods.	305-259-1200
Fla	Miami, ESL Elctrn. Dist.	305-633-6973
Fla	Miami, Electrnoic Equip. Co.	305-871-3500
Fla	N. Miami Beach, Electrex Co.	305-945-6483
Fla	Orlando, Hammond Elctrns.	305-849-6060
Fla	Pensacola, Grice Elctrns.	904-434-2481
Fla	Tampa, J&H Elctrns. Co.	813-935-1208
Fla	Tampa, Microcomputer Sys.	813-879-4301
Fla	W. Palm Beach, Nurmi Elctrn. Supply	305-686-8553
Ga	Atlanta, Ancrona	404-261-7100
Haw	Honolulu, Precision Radio Ltd.	808-537-5291
Haw	Honolulu, V. Kim Elctrns.	808-533-7132
Idaho	Twin Falls, United Elctrns.	208-733-7324
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Chicago, Joseph Elctrns.	312-622-7766
Ill	Chicago, Electronic Dist.	312-283-4800
Ill	Chicago, R. W. Elctrns.	312-248-2480
Ill	Chicago, Howard Elctrns. Sls.	312-254-1777
Ill	Des Plaines, Elctrns. Dist.	312-640-1610
Ill	Harvey, Geroge Elctrns.	312-785-0030
Ill	Niles, WICO Inc.	312-647-7500
Ill	Niles, Joseph Elctrns.	312-297-4200
Ill	Park Ridge, Chicago Computer Store	312-823-2388
Ill	Rockford, J&M Elctrns.	815-963-6445
Ill	Villa Park, Electronic Dist.	312-834-5331
Ill	Waukegan, Electronic Dist.	312-623-4000
Ind	Bloomington, Data Domain	812-334-3607
Ind	E. Chicago, Acro Elctrns.	219-397-8681
Ind	Hammond, Electronic Dist.	219-932-8410
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Ind	Indianapolis, RA-DIS-CO	317-637-5571
Ind	Valparaiso, Professional Elctrns. Serv.	219-462-0914
Kans	Topeka, Acme Radio Supply	913-235-1363
Kans	Wichita, Radio Supply Co.	316-267-5213
Ky	Louisville, Cybertronics	502-499-1551
La	Baton Rouge, Davis Wholesale Elec. Sup.	504-357-6420
La	Lafayette, Ralph's	318-234-4507
La	New Orleans, Wm. B. Allen Sup. Co.	504-525-8222
Md	Beltsville, Treeko Sls.	301-937-8260
Mass	Burlington, Computer Store	617-272-8770
Mass	Lowell, A. B. Co.	617-452-6120
Mass	Needham, You Do It Elctrns.	617-449-1005
Mass	Worcester, R M Elctrns.	617-756-8311
Mich	Adrian, Sword Entrprs.	517-265-8016
Mich	Ann Arbor, Compumart	313-994-4445
Mich	Ann Arbor, Wedemeyer Elctrn. Supply	313-665-8611
Mich	Clawson, RSE Ham Shack	313-435-5660
Mich	Detroit, Radio Supply & Engrg Co.	313-831-3174
Mich	Flint, Shand Elctrns.	313-743-8940
Mich	Grand Rapids, Scotts-Friedman	616-459-0216
Mich	Lansing, Main Elctrns. Co.	517-882-5035
Mich	Saginaw, Shand Elctrns	517-755-2191
Mich	Traverse City, Traverse City Elctrn. Supply	616-946-5153
Minn	Egan, Byte Shop	612-452-1841
Minn	St. Louis Park, Edtronics Co.	612-938-7541
Mo	Kansas City, Walters Radio Supply	816-531-7015
Mo	St. Louis, Gateway Elctrns. Corp.	314-427-6116
Mo	St. Louis, Vansickle Radio & Elctrns.	314-621-5000
Neb	Lincoln, Scott Elctrn. Supply Corp.	402-464-8308
Nev	Reno, Lombard's Lafayette	702-359-1710
Nev	Reno, Electronic Distributing Co.	702-323-2766
NH	Londonberry, Suntronics Co.	603-434-4644
NJ	Berkeley Heights, Feedback	201-464-5181
NJ	Edison, William Elctrns. Supply	201-985-3700
NJ	Greenbrook, Greenbrook Elctrns.	201-968-3371
NJ	Roselle, Garden State Ind. Elec.	201-241-9000
NJ	Springfield, Route Elctrns. 22	201-467-0166
NJ	Springfield, Federated Purchaser	201-376-8900
NJ	Totowa, Route Elctrns. 46	201-256-8555
NJ	Trenton, Jackson Distributors	609-392-8008

NM	Albuquerque, Electronic Parts Co.	505-293-6161
NM	Albuquerque, Computer Shack	505-883-8282
NM	Hobbs, Electronic Module	505-397-3022
NY	Albany, Fort Orange Elctrns.	518-449-3195
NY	Albany, Taylored Sound	518-434-3179
NY	Bohemia, Car-Lac Elec. Ind. Sls.	516-567-4200
NY	Buffalo, Summit Elctrns.	716-884-3450
NY	Corning, Corning Elctrns.	607-962-0555
NY	Farmingdale, Kelvin Elctrns.	516-279-4646
NY	Farmingdale, Fordham Radio	516-752-0050
NY	Flushing, M&K Elctrns. Distributors	212-358-7166
NY	Levittown, Edlie Elctrns.	516-735-3330
NY	Nanuet, Route Elctrns. 59	212-220-1690
NY	New City, Nobel Elctrns.	914-634-3535
NY	New York, Dale Elctrns.	212-255-3660
NY	New York, Harvey Radio Co.	212-575-5216
NY	New York, Midtown Elctrns.	212-575-5194
NY	New York, Sylvan-Wellington	212-226-5811
NY	New York, Advance Elctrns.	212-687-2224
NY	New York, Computer Store	212-221-1404
NY	New York, Computer Mart	212-279-1048
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Rochester, Rochester Radio Supply	716-454-7800
NY	Syosset, Lafayette Radio Elect. Corp.	516-921-7700
NY	Troy, Trojan Elctrn. Supply Co.	518-274-4481
NC	Greensboro, Hammond Elctrns.	919-275-6391
ND	Emerado, CDS Elctrns. & Hobbies	701-594-2411
Ohio	Akron, Sun Radio Co.	216-434-2171
Ohio	Cleveland, REPCO	216-248-8900
Ohio	Cleveland Heights, ELS Sys. Engrg.	216-249-7820
Ohio	Steubenville, Hosfelt Elctrns.	614-264-6464
Ohio	Toledo, Lifetime Elctrns.	419-241-5643
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Okla	Oklahoma City, High Tech.	405-842-2021
Okla	Tulsa, Conponent Specialties	918-664-2820
Okla	Tulsa, Oil Capitol Elctrns.	918-622-8520
Okla	Tulsa, Radio Inc.	918-587-9123
Ore	Eugene, Real Oregon Computer Co. Inv.	503-484-1040
Ore	Portland, Portland Radio Supply Co.	503-228-8647
Ore	Portland, JaMac Prods. Co.	503-252-2929
Ore	Portland, Ancrona	503-254-5541
Ore	Portland, Dunn Elctrns.	503-285-0214
Pa	Chambersburg, Lafayette Assoc. Store	717-264-8214
Pa	Drexel Hill, Kass Elctrn. Dist.	215-449-2300
Pa	Frazer, Personal Computer Corp.	215-647-8460
Pa	Philadelphia, Herbach & Rademan	215-426-1700
SD	Mitchell, Wholesale Elctrns.	605-996-2233
RI	Cranston, Jabbour Electronic City	401-944-2570
RI	Newport, J&S Electronic Dist.	401-847-2977
RI	Pawtucket, Jabbour Electronic City	401-728-4600
SC	Greenville, Hammond Elctrns.	803-233-4121
Tex	Austin, Electrotex	512-476-7644
Tex	Austin, Component Specialties	512-459-3307
Tex	Beaumont, Electrotex	713-838-6421
Tex	Corpus Chirsti, Electrotex	512-854-5306
Tex	Corpus Christi, Douglas Elctrns.	512-883-5103
Tex	Corpus Christi, Wick Radio Supply	512-883-4487
Tex	Dallas, Component Specialties	214-357-4576
Tex	Dallas, Wico Corp.	214-634-7790
Tex	Dallas, K. A. Elctrn. Sls.	214-634-7870
Tex	Fort Worth, Electrotex	817-338-0701
Tex	Garland, K. A. Elctrn. Sls.	214-494-2588
Tex	Houston, Electrotex	713-941-7016
Tex	Houston, Abcor Inc.	713-488-6697
Tex	Houston, Component Specialties	713-771-7237
Tex	Houston, City Elctrn. Supply	713-621-1060
Tex	Houston, Electrotex	713-695-6851
Tex	Houston, Electrotex	713-526-2954
Tex	Irving, Electrotex	214-438-2868
Tex	Lubbock, Trice Wholesale Elctrns.	806-747-2888
Tex	Lufkin, Electrotex	713-632-4409
Tex	San Antonio, Sherman Elctrn. Supply	512-224-1001
Tex	San Antonio, Electrotex	512-735-9271
Tex	Texas City, Elctrns. Supply	713-488-0833
Utah	Ogden, Carter Supply Co.	801-393-8603
Utah	Provo, Central Utah Elctrns. Supply	801-373-7522
Utah	Salt Lake City, Computer Room	801-446-7911
Va	Annandale, Arcade Elctrns.	703-256-4610
Wash	Bellevue, Radar Elect. Co.	206-747-9653
Wash	Seattle, R. E. Priebe Co.	206-682-8242
Wash	Seattle, American Mercantile Co.	206-724-6141
Wash	Seattle, Almac-Stroum Elctrns.	206-763-2300
Wash	Seattle, Radar Elect. Co.	206-282-2511
WVa	Morgantown, Electro Distributing Co.	304-296-5637
WVa	S. Charleston, Bernie's Audiotronics	304-744-9011
Wisc	Madison, Satterfield Elctrns.	608-257-4801
Wisc	Mequon, Taylor Elect. Co.	414-241-4321
Wisc	Milwaukee, Amateur Elctrn. Supply	414-442-4200
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160
Wisc	Oshkosh, Elctrn. Ind.	414-235-8930
Wisc	Watertown, General Precision Elctrns.	414-261-8148

™**CONTROFLEX** - flexible ribbon - Tapeswitch Corp. Amer.

™**CONTROFLUXER** - Regulator/Filter Device - Adtech Power Inc.

CONTROL CONCEPTS CORP., Dept. EM, 333 Front St., Binghamton, N.Y. 13905, Tel: 607-724-2484; Empl.: 25

CONTROL DATA CORP., Dept. EM, 8100 34th Ave. S., Minneapolis, Minn. 55807, Tel: 612-853-3617

CONTROL DATA CORP., Dept. EM, Box 1980, Twin Cities Airport, Minneapolis, Minn. 55111, Tel: 612-853-3617

Local Sales Offices & Reps.

Mich	Rochester, Computer Peripherals	313-651-8810
Minn	Minneapolis, Control Data Corp.	612-830-5741
Minn	Minneapolis, Control Data Corp.	612-830-6018
Minn	St. Paul, Control Data Corp.	612-482-4206
Okla	Oklahoma City, Magnetic Peripherals	405-946-5421

CONTROL DATA CORP., Component Sales, Dept. EM, 7801 Computer Ave So., Minneapolis, Minn. 55435, Tel: 612-830-5800, TWX: 910-576-2978; Empl.: 350

Sales Manager: J. W. Daly

Local Sales Offices & Reps.

Cal	Mt. View, Cindel, Inc.	415-965-2630
Fla	West Palm Beach, Production Sls. Assocs.	305-689-0575
Ill	Elk Grove Village, Sieger Assocs.	312-956-0963
Ind	Carmel, Giesting & Assocs.	317-844-8171
Mich	Livonia, Giesting & Assocs.	313-477-6060
NY	Mamaroneck, Cane Tech. Sls.	914-698-4411
NY	Rochester, Elcom Sls.	716-385-1400
Ohio	Cincinnati, Giesting & Assocs.	513-931-0812

CONTROL DATA CORP., Printed Circuit Operation, Dept. EM, 3965 Meadowbrook Rd., St. Louis Park, Minn 55426

CONTROL DATA CORP., Connector Div., Dept. EM, 31829 W. Tienda Dr., Westlake Village, Cal. 91361, Tel: 213-889-3535, TWX: 910-494-1224; Empl.: 180

Local Sales Offices & Reps.

Cal	Glendale, Orion Sls.	213-240-3151
Cal	Santa Clara, Cindel Sls.	408-249-4424
Cal	Tustin, Orion Sls.	714-832-9687
Colo	Littleton, Simpson Assoc.	303-794-8381
Conn	Cheshire, Coakley, Boyd & Abbett	203-272-2262
Fla	Orlando, Cartwright & Bean	305-422-4531
Ill	Chicago, Such & Assocs. Inc.	312-446-8934
Kans	Overland Park, Advanced Technical Sls.	913-492-4333
Md	Glen Burnie, TMI Components	301-768-2800
Mass	Chelmsford, Northeast Comps.	617-256-8758
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	St. Claire Shores, Jack Thorpe Co.	313-779-6363
Minn	Prior Lake, D.A. Case Assocs.	612-926-0533
NJ	Cherry Hill, J.N. Barrett Assoc.	609-429-1551
NJ	Wayne, GT Assoc	201-694-6040
NJ	Wayne, GT Assocs.	201-694-6040
NY	Syracuse, C.W. Floring	315-478-2149
NY	Syracuse, C.W. Floring	315-478-2149
Ohio	Mansfield, Benchmark Sys.	419-756-9211
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Utah	Salt Lake City, Simpson Assocs.	801-486-3731
Wash	Bellevue, Quadra Sls. Corp.	206-883-3550

CONTROL ELCTRNS. CO., INC., Dept. EM, 153 Florida St., Farmingdale, N.Y. 11735, Tel: 516-694-0125; Empl.: 50 .... p. 2506

Local Sales Offices & Reps.

Cal	Sherman Oaks, R.T. Assocs.	213-788-7588
Ill	Chicago, LGS Elctrn.	312-622-8183
Md	Ellicott City, VPI	301-465-4060
Mass	W. Medway, J. Gallagher	617-533-7292
Pa	Montgomery, VPI	215-474-3200
Exp:	Fla., Hallandale, Emec	305-925-6366

CONTROL EQUIP. CORP., Dept. EM, 220 Tanner St., Lowell, Mass. 01851, Tel: 617-459-0573; Empl.: 10

CONTROL INDS. INC., Dept. EM, 530 Burnside Ave., Inwood, N.Y. 11696, Tel: 212-471-9800; Empl.: 40

CONTROL LOGIC, INC., Dept. EM, 9 Tech Circle, Natick, Mass. 01760, Tel: 617-655-1170, Telex: 94-8352; Empl.: 75

Local Sales Offices & Reps.

Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Los Altos Hills, Bergis Assocs.	415-941-4133
Cal	Santa Ana, Control Logic (West)	714-558-8035
Colo	Denver, PLS Assocs.	303-773-1218
Ill	Schiller Park, Control Logic	312-671-5228
Ind	Indianapolis, Sheridan Assocs.	317-297-3146
Kans	Overland Park, Sheridan Assocs.	913-383-1636
Mich	Madison Heights, WKM Assocs.	810-232-4844
Mo	Florissant, Sheridan Assocs.	314-837-5200
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Tuckahoe, Spectrum Sls.	914-793-1660
NC	Winston-Salem, RADCO	919-722-9671
Ohio	Cleveland, WKM Assocs.	216-267-0445
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Springfield, Control Logic	215-544-7153
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	512-451-5174
Tex	Houston, Data Mktg. Assoc.	512-451-5174
Tex	San Antonio	512-828-2251
Wash	Bellevue, Brennan Assocs.	206-454-9332
Exp:	Exp: Mass., Weston, Maridyne Int'l. Corp.	617-899-3510

CONTROL PRODUCTS CORP., Dept. EM, 4431 W. Division St., Chicago, Ill. 60651, Tel: 312-235-1131; Empl.: 60

Local Sales Offices & Reps.

Mich	Grand Rapids, H.E. Frakie	616-949-4366
Minn	St. Paul, E. C. Stiedemann Co.	612-739-3775
Ohio	Cincinnati, A.H. Parker	513-563-1843
Wash	Bellevue, Topp Engrg. Sls. Corp.	206-747-5401
Wisc	Milwaukee, E.C. Stiedemann Co.	414-332-1250

CONTROL PRODUCTS DIVISION, DEVAR INC., Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06605, Tel: 203-368-6751, Telex: 96-4234; Empl.: 80

Sales Manager: T.W. Tomasko

Local Sales Offices & Reps.

Cal	Chatsworth, Boyle Assocs.	213-885-7205
Cal	Millbrae, Ashby Assocs.	415-692-4442
Mass	Brookline, Technology Prods. Group	617-731-0858
NY	Rochester, Scientific Devices	716-334-2445
Ohio	Dayton, J.C.H. Co.	513-296-1010
Ohio	Medina, J.C.H. Co.	216-241-4880

CONTROL PRODS., INC., Dept. EM, E. Hanover, N.J. 07936, Tel: 201-887-9400; Empl.: 35

Sales Manager: J. R. Nile

CONTROL SCIENCES, INC., Dept. EM, 8399 Topanga Canyon Blvd., Canoga Park, Cal. 91304, Tel: 213-887-7344; FSC No.: 53317; Empl.: 10 .... p. 1494

Sales Manager: H.C. Ericsson

Local Sales Offices & Reps.

Cal	Los Altos, H. Reeser	415-941-4080
Cal	North Hollywood, Crown Elctrns.	213-887-3550
Cal	San Diego, Mesa Engrg. & Sls. Assoc.	714-278-8021

CONTROL SWITCH, A Cutler Hammer Co., Dept. EM, 1420 Delmar Dr., Folcroft, Pa. 19032, Tel: 215-586-7500, Telex: 83-4216; FSC No.: 81640; Empl.: 215

Sales Manager: B. Dilucido, Mktg. Mgr.

Local Sales Offices & Reps.

Ala	Huntsville, Rakes Engrg. & Mktg.	205-883-9260
Ariz	Phoenix, Zeus, Inc.	602-258-7519
Cal	Menlo Park, Control Switch Inc.	415-854-1005
Cal	Northridge, R. L. Assocs.	213-782-7826
Fla	Lighthouse Point, Saber Assocs., Inc.	305-943-3076
Ill	Elk Grove, Carlson Elctrn. Sls. Co.	312-956-8240
Ind	Indianapolis, Carlson Elctrns	317-253-5610
Kans	Mission, Cutler-Hammer	913-236-6313

Md Hyattsville, Eastern Comps. Inc. 301-577-2925
Mass Newton, Control Switch Inc. 617-244-7514
Mich Southfield, F. H. Gehrke & Assocs. 313-559-5363
Minn Minneapolis, Control Switch Inc. 612-831-3560
Mo St. Louis, Cadon Technical Sls. 314-991-0262
NY Oceanside, Bittan Assocs., Inc. 516-678-6222
NY Rochester, Cutler-Hammer 716-271-5460
NC Smithfield, ADI 919-934-8136
Ohio Cleveland, DEPCO 216-289-8188
Ohio Dayton, DEPCO 513-433-3230
Pa Flourtown, Eastern Comps., Inc. 215-836-1616
Pa Pittsburgh, Dolfuss-Root Co. 412-561-4125
Pa York, Eastern Comps. 717-764-3114
Tex Dallas, Control Switch/Cutler Hammer 214-631-3731
Wash Bellevue, Control Switch Inc. 206-747-5560
Wisc Milwaukee, Carlson Elctrn. Sls. Co. 414-476-2790

Local Distributors
Cal Los Angeles, Western Electromotive Shephard, Inc. 213-820-3777
Fla Ft. Lauderdale, Peerless Radio Corp. of Fla. Inc. 305-566-5966
Fla Miami, Electronic Equip. Co. 305-871-3500
Md Kensington, Marine Air Supply 301-949-1353
Mass Boston, Sager Elec. Supply Co. 617-542-2281
NY Lynbrook, Peerless Radio Corp. 516-593-2121
Ohio Dayton, Related Components Inc. 513-253-6116
Tex Dallas, Associated Aircraft Supply Co. Inc. 214-331-4381

CONTROL SYSTEMS RESEARCH, INC., Dept. EM, CSR Bldg., 632 Fort Duquesne Blvd., Pittsburgh, Pa. 15222, Tel: 412-566-1200, TWX: 710-664-4203; Empl.: 150

Local Sales Offices & Reps.
Cal Los Angeles, Halbar Assocs. 213-387-8283
Cal San Mateo, Halbar Assocs. 415-349-4700
Ill Mc Henry, CSR 815-385-8140
Mass Natick, CSR
Mich W. Bloomfield, CSR 313-682-2717
NY E. Aurora, CSR 716-652-6420
NC Charlotte, J. Rudisill Assocs. 704-377-6901
Pa Malvern, Miller & Dietz Co. 215-647-7373
Tex Dallas, Dwayne Clement Assocs. 214-235-2448

CONTROL TECHNOLOGY CO., Dept. EM, 41-16 29th St., L.I.C., N.Y. 11101, Tel: 212-EM 1-2133; FSC No.: 14545; Empl.: 35 p. 3949

Sales Manager: H. Cooper

Local Sales Offices & Reps.
Cal Claremont, W. Roth & Assocs. 714-621-1019

CONTROLCRAFT CORP., See FSI/Fork Standard Inc., Controlcraft Prod. Line

CONTROLOTRON CORP., Dept. EM, 111 Bell St., W. Babylon, N.Y. 11704, Tel: 516-249-4400, Telex: 961447; FSC No.: 21614; Empl.: 44

Local Sales Offices & Reps.
Ala Birmingham, Hayden Indl. Sls. 205-871-0637
Ariz Phoenix, Bews & Wallace Co. 602-267-1171
Cal Los Angeles, Flowmetrics 213-721-5635
Colo Englewood, Tech Sls. 303-789-2213
Ga Tucker, Specialty Equip. & Control 404-934-1110
Ill Chicago, Liz Industrial Sls. Co. 312-943-5122
Ky Bowling Green, Interstate Ultrasonics
Mich Birmingham, Bill Meyer Assoc. 313-855-1170
Minn St. Paul, Northwest Power Equip. Co. 612-646-7904
NY Buffalo, D. J. Schwartz 716-877-0400
NC Charlotte, Systems Service Corp. 704-377-3407
Ohio Findlay, Interstate Ultrasonics 419-423-1163
Ore Portland, Branom Instrument 503-285-9861
Pa Bridgeport, Contwell Assocs. 215-277-6464
Pa Pittsburgh, Friday Engrg. Sls., Inc. 412-341-1444
Tenn Memphis, C.W. Dean 901-327-1657
Tex Dallas, M2B Assoc. 214-233-5535
Tex Houston, M2B Assoc. 713-523-7333
Utah Salt Lake City, Ted R. Brown 801-486-7241
Wash Seattle, Branom Instrument 206-762-6050
Wisc Cedarburg, Liz Ind'l. Sls. Co.
Wisc Madison, L.W. Allen 608-222-8622

CONTROLS PLANT, INGRAHAM DIV., McGraw Edison Co., Dept. EM, College Street Rd., Elizabethtown, Ky. 42701, Tel: 502-765-6131, TWX: 810-533-1260; Empl.: 550

Local Sales Offices & Reps.
Cal Chatsworth, Hansen & Assocs. 213-882-8181
Conn Bethany, Representatives Corp. 213-393-0024
Ill Elk Grove Village, J. G. Twist Co. 312-593-0200
Ind Fort Wayne, R. O. Whitesell & Assocs. 219-432-5591
Ind Indianapolis, R. O. Whitesell & Assocs. 317-359-9283
Ind Kokomo, R. O. Whitesell & Assocs. 317-453-6868
Iowa Cedar Rapids, J. G. Twist Co.
Kans Prairie Village, J. G. Twist Co. 913-236-4646
Ky Louisville, R. O. Whitesell & Assocs. 502-893-7303
Md Silver Spring, H. R. Sieber Co. 301-589-9110
Mass Topsfield, Representatives Corp. 617-426-0541
Mich Grand Rapids, R. O. Whitesell & Assocs. 616-451-8901
Mich Southfield, R. O. Whitesell & Assocs. 313-358-2020
Mich St. Joseph, R. O. Whitesell & Assocs. 616-983-7337
Minn St. Paul, Cahill Assocs. 612-739-8445
Mo St. Louis, J. G. Twist Co. 314-432-2830
NY Rockville Centre, Willgold Elctrnc. Sls.
Ohio Cincinnati, R. O. Whitesell & Assocs. 513-521-2290
Ohio Columbus, R. O. Whitesell & Assocs. 614-888-9396
Ohio Dayton, R. O. Whitesell & Assocs. 513-298-9546
Ohio Lakewood, R. O. Whitesell & Assocs. 216-228-7525
Pa Pittsburgh, R. O. Whitesell & Assocs. 412-242-0100
Tenn Bristol, R. O. Whitesell & Assocs. 615-968-4195
Wisc Waukesha, J. G. Twist Co. 414-786-6330

(TM)CONTROLLER - electronic counters - Veeder-Root

(TM)CONTROLPAC - control systems - Eagle Signal

(TM)CONTROL PLUS - temp controls, counting & timing controls - MKC Electronics

CONTROL PRODUCTS DIV., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083, Tel: 201-964-4400, TWX: 710-985-4687; FSC No.: 3L154; Empl.: 275

Local Sales Offices & Reps.

Agastat Prods.
Ala Birmingham, Control Prods. Div. 205-780-2331
Cal Buena Park, Sls. Engrs. Ltd. 714-521-8673
Cal Mountain View, J. Wilhoit Co. 415-961-3660
Cal San Diego, J. C. Henberger Co. 714-292-5772
Cal Santa Fe Springs, Control Prods. Div. 213-863-5753
Colo Denver, C. Beabout Co. 303-244-3151
Conn Prospect, Control Products Div. 203-758-4221
Fla Orlando, B. Stevens Co. 305-425-3202
Ga Atlanta, Control Prods. Div. 404-261-1224
Haw Miliani Town, H. C. Burgess 808-623-3118
Ill Elk Grove Village, Control Prods. Div. 312-437-8354
Kans Prairie Village, G. H. Pearson 913-341-6210
Ky Edgewood, Control Prods. Div. 606-341-0330
Mich Farmington Hills, Control Prods. 313-474-0317
Neb Omaha, B. Gurney & Assoc. 402-342-8445
NJ Union, Control Prods. Div. 201-355-7770
NM Albuquerque, Sun Sls. 505-345-8321
NY Buffalo, R. F. Lamb Co. 716-874-4900
Ohio Chagrin Falls, Control Prods. 216-543-4233
Ore Portland, Syscom 503-644-2505
Pa New Kensington, Control Prods 412-335-1776
Pa Willow Grove, Cusick Elec. Sls. 215-659-6666
SC Inman, Control Products Div. 803-578-6080
Tex Houston, Control Prods. Div. 713-666-8421
Tex Plano, Control Prods. Div. 214-423-4431
WVa Charleston, Process Instrs. & Equip. Co. 304-344-2337
Wisc Madison, Control Prods.

Buchanan Terminal Blocks
Ala Birmingham, Control Prods. Div. 205-780-2331
Cal Buena Park, Sls. Engrs. 714-521-8673
Cal Mountain View, J. Wilhoit Co. 415-961-3660
Cal Mountain View, J. Wilhoit Co. 415-961-3660
Cal San Diego, J.C. Henberger 714-292-5772
Cal San Diego, J. C. Henberger 714-292-5772
Cal Santa Fe Springs, Control Prods. Div. 213-863-5753
Colo Denver, C. Beabout Co. 303-244-3151
Fla Orlando, Brandel-Stevens Co. 305-425-3202
Ga Atlanta, Control Prods. Div. 404-261-1224
Haw Mililani, H.C. Burgess 808-623-3118
Ill Elk Grove Village, Control Prods. Div. 312-437-8354
Kans Prairie Village, G. Pearson 913-341-6210
Ky Edgewood, Control Prods. Div. 606-341-0330
Mich Farmington Hills, Control Prods. 313-474-0317
Mo Raytown, Arehart-Barnds Sls. Co. 816-356-3448
Mo St. Louis, J. Gallagher 314-822-4080
Neb Omaha, B. Gurney 402-342-8445
NJ Union, Control Prods. Div. 201-297-1511
NM Albuquerque, Sun Sls. 505-345-8321
NY Buffalo, R. F. Lamb Co. 716-874-4900
Ohio Chagrin Falls, Control Prods. 216-543-4233
Ohio Cleveland, V. O'Neill 216-331-4273
Ore Portland, Syscom 503-644-2505
Pa Willow Grove, Cusick Elec. Sls. Co. 215-659-6666
SC Inman, Control Prods. Div. 803-578-6080
Tex Houston, Control Prods. Div. 713-666-8421
Tex Plano, Control Prods. Div. 214-423-4431
WVa Charleston, Process Instrs. & Equip. Co. 304-344-2337

CONTROLS DEVELOPMENT CORP., Dept. EM, 2100 S. Fairview, Santa Ana, Cal. 92704, Tel: 714-549-2990, TWX: 910-595-1106

Local Sales Offices & Reps.
Cal Encino, King-Way Assoc. 213-788-4124
Cal Los Altos, Ewing-Foley 415-941-4525
Fla Orlando, Scientific Devices S.E. 305-841-8180
Ill Downers Grove, Richmar Elctrns. Corp. 312-968-0118
Mich Farmington Hills, W. R. Hummon & Assoc. 313-474-0661
NH Nashua, Bell Controls 603-882-6984
NJ Ridgewood, Hansen Assoc. 212-947-0379
Ohio Medina, J. C. Hofstetter Co. 216-725-4477
Pa Horsham, CMS Mktg. 215-672-8300
Tex Garland, Carter Assocs. 214-276-7151
Wash Mercer Island, J. H. Andersen Assoc. 206-232-0484

(TM)CONTROSWITCHER - switching regulator power supply - Adtech Power Inc.

CONVERSION CHEM. CORP., Dept. EM, 210 E. Main St., Rockville, Conn. 06066, Tel: 203-872-0541, TWX: 710-435-2336; Empl.: 43

Local Sales Offices & Reps.
Cal Montebello, Conversion Chemical 213-726-0825
Ill Chicago, Conversion Chemical Corp. 312-247-7117
Ill Lansing, G. A. Hobbs 312-474-5264
Mass Dudley, J. A. Cristina 617-943-3096
Mich Albion, L. Calicotte 517-629-3502
NY East Syracuse, K. R. MacDonald 315-463-0685
NC Charlotte, Conversion Chemical Corp. 704-394-1378
NC Statesville, B. G. Deal 704-872-3256
Ohio Sylvania, E. P. Agnew 419-882-1282
Ohio Toledo, Conversion Chemical Corp. 419-531-3703
Exp: Rockville, Conn., Kenvert International 203-875-8081

(TM)CONVERTI-FUSE - panelboards, safety switches, switchboards - General Elec. Co.

CONVEX CORP., Dept. EM, 2810 Dorr Ave., Fairfax, Va. 22030, Tel: 703-698-8010

Sales Manager: G. Poisson

Local Sales Offices & Reps.
NJ Ridgewood, Instrumentation Sls. Co. 201-445-5210

(TM)CONVULEX - irradiated convoluted tubing - Raychem Corp.

(TM)COOKE - photographic lenses - Rank Precision Inds.

COOK ELEC. CO., Dept. EM, 6201 Oakton St., Morton Grove, Ill. 60053, Tel: 312-967-6600, TWX: 910-223-3654; Empl.: 800

Local Sales Offices & Reps.
Cal El Segundo, Skytronics 213-772-3231
Iowa Cedar Rapids, Palatine Engrg. 319-365-8071
Kans Andover, Palatine Engrg. 316-683-7512
Kans Overland Pk., Palatine Engrg. 913-262-5643
Mich Fenton, Kundinger Fluid Power 313-629-2248
Mo St. Louis, Palatine Engrg. 314-426-7055
Ohio Cleveland, D. Steffen 216-461-8333
Ohio Dayton, D. Steffen 513-293-3145
Tex Dallas, Economy Gauge & Instr. Supply 214-243-8370
Wisc Appleton, Kundinger Fluid Power 414-739-7463
Exp: Ill., Chicago, E. Magnus 312-334-1503

COOKE ENGINEERING DIV., see Dynatech Labs., Inc.

COOL-AMP COMPANY, Dept. EM, 8621 S.W. 17th Ave., Portland, Ore. 97219

(TM)COOL GLO - light tables - Bishop Graphics

COOPER GROUP, Weller Elctrns. Div., Dept. EM, Box 728, Apex, N.C. 27502, Tel: 919-362-7511, Telex: 57-9497; Empl.: 350

(TM)CO-ORD - matrix boards - LVC Inds. Inc.

COORS PORCELAIN CO., Dept. EM, 600 Ninth St., Golden, Colo. 80401, Tel: 303-279-6565; Empl.: 1200

Local Sales Offices & Reps.

Ariz	Phoenix, Hecht, Henschen & Assoc.	602-275-4411
Cal	Goleta; J.N. Paxson	805-968-3632
Cal	Newport Beach, S. Whisner	714-772-9500
Cal	San Fransisco, J. J. Graham	408-292-1272
Colo	Denver, G. V. Gilbert	303-422-8310
Ill	Chicago, A.S. Deter, Jr.	312-541-8010
Md	Gaithersburg, Bob Dean	301-948-544
Mass	Prides Crossing, R. S. Trayes	617-887-8144
NJ	Flanders, G. P. Rush	201-526-9050
Pa	West Chester, R.L. White	215-692-2674
Tex	Hurst, H.L. Moschel	817-336-4721
Wisc	Mequon, J. C. Thompson	414-352-1123

(TM)COPALUM - terminals & splices - Amp Inc.

(TM)COPATCH - coaxial patch jacks - Dynatech Laboratories, Inc.

(TM)COPEL - resistance alloy - Hoskins Mfg. Co.

(TM)COPPERGARD - shielded coaxials - Superior Cable Div.

(TM)COPPERPLY - lead wire (copper-coated) - Nat'l-Standard Co.

(TM)COPPER SWEAT - plumbers solder - Bow Solder Products

COPPERWELD BIMETALLICS, Div. Copperweld Corp., Dept. EM, Glassport, PA 15045, Tel: 412-664-3500, TWX: 866468 710-794-4806

(TM)COPSCAN - FM Monitor Scanners - Fanon/Courier Corp., Subs.

(TM)COPYPHONE - facsimile transmission systems. - Telautograph Corp.

CORCOM, INC., Dept. EM, 2635 No. Kildare Ave., Chicago, Ill. 60639, Tel: 312-384-7400, TWX: 910-221-5308; FSC No.: 05245; Empl.: 275 p. 2726,2727

Local Sales Offices & Reps.

Ariz	Scottsdale, Q.T. Wiles & Assoc.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assoc.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	Tustin, Q.T. Wiles & Assoc.	714-832-4952
Colo	Boulder, Straube Assocs.	303-426-0890
Conn	Milford, Conti-Younger	203-929-3294
Fla	Casselberry, EIR Inc.	305-830-9600
Fla	Coral Springs, E.I.R. Inc.	305-752-9228
Fla	Ft. Lauderdale, E.I.R. Inc.	305-583-2351
Fla	Plantation, EIR Inc.	305-791-3690
Ga	Atlanta, G.S. O'Hara	404-237-0600
Ill	Downers Grove, Richmar Elctrns. Corp.	312-968-0118
Ind	Fort Wayne, Robert O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, Robert O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, Robert O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, Palatine Eng. Sls.	319-365-8071
Kans	Derby, Palatine Engrg. Sls.	316-788-0621
Kans	Lenexa, Palatine Engrg. Sls.	913-492-7020
Kans	Overland Park, Palatine Eng. Sls.	913-262-6820
Ky	Louisville, Robert O. Whitesell & Assocs.	502-897-1569
Md	Columbia, Rep-Tron Inc.	301-465-6433
Md	Hillside, Rep-Tron, Inc.	301-420-1133
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Mich	Grand Rapids, Robert O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, Robert O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, Robert O. Whitesell & Assocs.	616-983-7337
Minn	Edina, M. Foster Co.	612-835-2252
Mo	St. Louis, Palatine Eng. Sls.	314-426-7055
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Clinton, Advanced Comp. Corp.	315-853-6438
NY	Endicott, Advanced Comp. Corp.	607-785-3191
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
NY	No. Syracuse, Advanced Comp. Corp.	315-699-2671
NY	Scottsville, Advanced Comp. Corp.	716-889-1429
Ohio	Cincinnati, Robert O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, Robert O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, Robert O. whitesell & Assocs.	513-298-9546
Ohio	Middleburg Hts., R.O. Whitesell Assoc.	216-826-4424
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Feasterville, Professional Service Assoc.	215-355-6244
Pa	Pittsburgh, Robert O. Whitesell & Assocs.	412-344-7277
Tenn	Butler, Richmar Electronics	414-781-1730
Tenn	Greenville, R.O. Whitesell Assocs.	615-639-6154
Tex	Plano, K & H Sls.	214-423-6520
Utah	Salt Lake City, Straube Assocs.	801-943-5650
Wash	Seattle, Earl & Brown Co.	206-284-1121

Local Distributors

Ariz	Phoenix, CEC Moltronics	602-272-7951
Cal	Garden Grove, Allied Elctrns.	213-598-8671
Cal	Irvine, Terminal Elctrn.	714-549-8611
Cal	Mt. View, Terminal Elctrns.	415-969-9240
Cal	San Diego, CEC Moltronics	714-278-5020
Cal	Santa Clara, CEC/Moltronics	408-244-7600
Cal	South Gate, CEC/Moltronics	213-773-6521
Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Colo	Denver, Newark Elctrn.	303-757-3351
Colo	Denver, Elctrn. Parts	303-744-1992
Conn	E. Haven, J.V. Elctrns.	203-469-2321
Fla	Orlando, Hammond Elctrns.	305-849-6060
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Elk Grove Village, Pioneer/Chicago	312-437-9680
Ill	Palatine, Ohm Elctrns.	312-359-5500
Md	Baltimore, RESCO/Baltimore	301-823-0070
Md	Beltsville, Resco/Washington	301-937-5890
Md	Savage, Pyttronics Ind.	301-792-7000
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mich	Livonia, Pioneer/Mich.	313-525-1800
Minn	Minneapolis, Newark Elctrns.	612-331-6350
Mo	Grandview, Advanced Elctrn.	816-763-3740
Mo	St. Louis, Olive Elctrns.	314-863-7800
NJ	Bellmawr, Mid Atlantic Elctrn	609-931-5303
NY	Buffalo, Summit Distributing	716-884-3450
NY	Mt. Vernon, QAR Ind. Elctrn.	914-699-2224
NY	Rochester, Summit Distributing	716-334-8110
Ohio	Dayton, Pioneer Standard	513-236-9900
Ore	Portland, Radar Elec. Co.	
Pa	Montgomeryville, Pyttronics Inds.	215-242-6700
SC	Columbia, Dixie Radio Supply	803-253-5333
Tex	Dallas, Component Specialties, Inc.	214-357-6511
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
Tex	Houston, Component Specialties, Inc.	713-771-7237
Tex	Richardson, Prime Distr.	214-231-0170
Utah	Salt Lake City, Diplomat/Alta Land	801-486-7227
Wash	Seattle, Radar Elctrns.	206-282-2511
Wisc	Milwaukee, Marsh Elctrn.	414-475-6000

CORDOVER & CO., CARL, Dept. EM, 3914 North 29th Ave., Hollywood, Fla. 33020, Tel: 305-921-6300; Empl.: 25

(TM)CORDS LIMITED - cord sets - Essex Group

CORNELL-DUBILIER ELCTRNS., Dept. EM, 2070 Maple, Des Plaines, Ill 60018

CORNELL-DUBILIER ELECTRONICS, Dept. EM, 150 Avenue "L", Newark, N.J. 07105, Tel: 201-589-7500; FSC No.: 14655; Empl.: 3000; Minimum order: $E. Larabee p. 1235-1244

Sales Manager: J. Kaplan; *Distributor Manager:* E. Larabee

Local Sales Offices & Reps.

Ariz	Scottsdale	602-946-4437
Cal	Los Altos	415-941-3399
Cal	San Diego	714-566-5252
Cal	Santa Monica	213-829-6731
Colo	Wheatridge	303-423-1020
Fla	Maitland	305-831-1242
Ga	Atlanta	404-261-6160
Ill	Des Plaines	312-299-8171
Ind	Indianapolis	317-849-7154
Mass	Norwood	617-762-5333
Mich	Detroit	313-882-1717
Minn	Minneapolis	612-559-5361
Mo	St. Louis	314-534-4611
NJ	Newark	201-589-7500
NM	Albuquerque	505-294-1436
NY	Rochester	716-544-9580
NC	Raleigh	919-787-9564
Ohio	Cleveland	216-271-5429
Ohio	Dayton	513-298-7224
Ore	Portland	503-297-2581
Pa	Norristown	215-272-0118
Pa	Pittsburgh	412-563-0303
Tex	Dallas	214-357-4024
Utah	Salt Lake City	801-277-8911
Wash	Bellevue	206-455-5846
Exp:	Ill., Des Plaines	312-299-8171

Local Distributors

Ala	Huntsville, Hall Mark Elctrns.	205-539-0691
Ark	Blytheville, Bluff City Dist. Co.	501-763-3885
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Mountain View, Capacitor Sls. Co.	415-964-8880
Cal	Mountain View, Abacus Elctrns.	415-961-1500
Cal	San Diego, Shelley-Neuman	714-453-7133
Cal	San Diego, Moltronics	714-278-5020
Cal	San Diego, Kierluff Elctrns.	714-278-2112
Cal	San Francisco, Zack Elctrns. Co.	415-626-1444
Cal	Southgate, Moltronics	213-773-6521
Cal	Sun Valley, Q.C. Comps.	213-768-6111
Cal	Woodland Hills, Jaco Elctrns.	
Colo	Lakewood, Acacia Sls.	
Conn	Hamden, Wilshire Elctrns.	203-281-1166
Conn	North Haven, Cramer Elctrns.	203-239-5641
Conn	Stratford, State Elctrns. Parts	203-375-5961
Conn	Waterbury, Bond Rapid Supply	203-753-1184
Fla	Ft. Lauderdale, Hall-Mark Elect.	305-971-9280
Fla	Miami, Electronic Equip. Co.	305-871-3500
Fla	Miami, Lykes Elctrns.	305-635-0849
Fla	Orlando, Hammond Elctrns.	
Fla	Orlando, Hall-Mark Elect.	305-849-6060
Fla	Tampa, Lykes Elec. Corp.	813-886-6651
Fla	Winter Park, Electronic Equip. Co.	305-644-4833
Ga	Norcross, Lykes Elctrns.	404-449-9400
Ill	Chicago, Newark Elect. Co.	312-638-4411
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Ft. Wayne, Ft. Wayne Elec. Sy.	219-423-3422
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Iowa	Cedar Rapids, DEE Co.	319-365-7551
Kans	Wichita, Radio Supply	316-267-5214
La	Harvey, Lykes Elec. Corp.	504-368-3355
La	Lafayette, Ralph's of Lafayette	319-234-4507
Md	Gaithersburg, Pioneer/Washington	301-948-0710
Md	Rockville, Capital Radio	301-881-2270
Mass	Burlington, Wilshire Electric/New England	617-272-8200
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	Lynn, Land Elctrn. Supply	617-592-2221
Mass	Newton, Green Shaw	617-969-8900
Mass	Newton, Cramer Elctrns.	617-969-4000
Mass	Watertown, Sterling Elect.	617-926-9720
Mass	West Newton Center, A.W. Mayer Co.	617-965-1111
Mich	Livonia, Pioneer/Michigan	313-525-1800
Mich	Oak Park, Newark-Detroit Elect.	313-548-0250
Minn	Bloomington, Arrow Elec.	612-888-5522
Minn	Minneapolis, Hall Mark Elctrns.	612-884-9056
Minn	St. Paul, Gopher Elect. Co.	612-645-0241
Miss	Greenville, Bluff City Dist. Co.	601-334-4412
Miss	Jackson, Bluff City Dist. Co.	601-354-5700
Miss	Tupelo, Bluff City Dist. Co.	601-842-6832
Mo	Earth City, Hall-Mark Elect.	314-291-5350
Mo	Kansas City, Walter's Radio Sy.	816-531-7015
Mo	St. Louis, Olive Elctrns.	314-863-7800
Neb	Omaha, Radio Equip. Co.	402-341-7700
NH	Concord, Evans Radio	603-224-9961
NJ	Cinnaminson, Wilshire Elect./Philadelphia	215-627-1920
NJ	Clifton, Wilshire Elect.	201-340-1900
NJ	Hanover, State Elctrns.	201-887-2550
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Hauppauge, Ramport Comps.	516-273-1111
NY	Johnson City, Wilshire Elect./N.Y. State	607-797-1236
NY	Rochester, Simcona Elctrns.	716-328-3230

NY	Rochester, Rochester Radio Supply	716-454-7800
NY	Rochester, Summit Dist.	716-334-8110
NC	Greensboro, Hammond Elec.	919-275-6391
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Cincinnati, Hughes Peters	513-351-2000
Ohio	Cleveland, Pioneer Standard	216-587-3600
Ohio	Columbus, H. Peters	614-294-5351
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Dayton, Arrow Elec.	513-253-9176
Ohio	Dayton, Stotts Friedman	513-298-5555
Okla	Tulsa, Radio, Inc.	918-587-9123
Pa	Huntingdon Valley, Hall-Mark Elctrns.	215-355-7300
Pa	Pittsburgh, Cam/RPC	412-782-3770
Pa	Pittsburgh, Pioneer Pittsburgh	412-782-2300
RI	Providence, W. Dandreta	401-861-2800
Tenn	Jackson, Bluff City Dist. Co.	901-424-0236
Tenn	Memphis, Bluff City Dist. Co.	901-523-9500
Tenn	Union City, Bluff City Elctrns.	901-885-1861
Tex	Houston, Harrison Equip. Co.	713-652-4750
Tex	Houston, Altair Co.	713-462-3029
Tex	Richardson, Altair Co.	214-231-5166
Utah	Salt Lake City, Calron Elec. Sy.	801-487-7451
Wash	Seattle, Almac/Stroum Elect.	206-763-2300
Wisc	Milwaukee, Electronic Expeditors	414-228-8100
Exp:	Can., Montreal, Que., Payette Radio Ltd.	514-878-4771
For:	Canada, Calgary, Alberta, Varah's	403-276-8818
For:	Canada, Dartmouth, N.S., Hermes Elctrns.	902-466-7491
For:	Canada, Montreal 205, Que., Electronic Wholesalers Co.	514-769-8861
For:	Canada, Scarborough, Ont., Carsten Elec. Ltd.	416-751-5095
For:	Canada, St. Laurent, Que., Specialty Elctrns. Ltd.	514-336-4500
For:	Can., Don Mills, Ont., Saynor Elctrns.	416-445-0723
For:	Can., Vancouver, BC, L.A. Varah Ltd.	604-873-3211

™CORNING - instruments, meters, electrodes - Corning Science Products

CORNING GLASS WORKS, Electronic Prod. Div., Dept. EM, Houghton Pk., Bldg. A-2, Corning, N.Y. 14830, Tel: 607-974-9000, TWX: 510-252-1385 p. 1234,3683

Local Sales Offices & Reps.

Cal	Orange, Corning Glass Works	714-541-5275
Cal	San Diego, Harvey King Assoc.	714-566-5252
Cal	Sunnyvale, Corning Glass Works	408-737-0221
Ill	Chicago, Corning Glass Works	312-693-6830
Kans	Leawood, H.C. Heyde Co.	913-649-8628
Me	Biddeford, Components, Inc.	207-282-5111
Mass	Littleton, Corning Glass Works	617-486-3125
Mich	Detroit, Rathsburg Assocs.	313-882-1717
NC	Raleigh, Corning Glass Works	919-876-1100
NC	Wilmington, Corning Glass Works	919-791-5040
Pa	Bradford, Corning Glass Works	814-362-5571
Pa	Broomall, L.D. Lowery Assocs.	215-356-5300
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Wash	Seattle, J. J. Backer Co.	206-285-1300

Local Distributors

Ariz	Phoenix, Liberty Elctrns.	602-257-1272
Cal	El Segundo, Liberty Elctrns. Inc.	213-322-8100
Cal	Gardena, Bell Industries	213-321-5802
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Diego, Liberty Elctrns.	714-565-9171
Cal	Sunnyvale, Bell Industries	408-734-8570
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Cramer Elctrns.	303-758-2100
Conn	North Haven, Cramer/Conn.	203-239-5641
Fla	Hollywood, Cramer/Ft. Lauderdale	305-971-3491
Fla	Hollywood, Cramer/Hollywood	305-923-8181
Fla	Orlando, Cramer/Orlando	305-894-1511
Ga	Norcross, Cramer/Atlanta	404-448-9050
Ill	Elk Grove Village, Schweber Elctrns.	312-593-2740
Ill	Skokie, Bell Ind.	312-282-5400
Ind	Indianapolis, Pioneer Ind.	317-849-7300
Kans	Lenexa, Hamilton Avnet Elctrns.	317-888-8900
Md	Baltimore, RESCO/Baltimore	301-823-0700
Md	Gaithersburg, Cramer/Washington, Inc.	301-948-0110
Md	Lanham, Milgray	301-459-2222
Mass	Newton Centre, Cramer Elctrns.	617-969-7700
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mich	Livonia, Pioneer/Michigan	313-525-1800
Minn	St. Paul, Ragon Elctrns.	612-488-0201
NJ	Cherry Hill, Cramer/Penn	609-424-5993
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	E. Syracuse, Cramer/Syracuse,	315-437-6671
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Cramer/Long Island	516-231-5600
NY	Rochester, Cramer/Rochester, Inc.	716-275-0300
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Raleigh, Resco/Raleigh	919-832-2077
NC	Winston-Salem, Cramer/Winston-Salem	513-725-8711
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Cincinnati, Sheridan Sls.	513-761-5432
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Dallas, Hamilton/Avnet Elctrns	214-661-8661
Tex	Houston, Hamilton/Avnet Elctrns.	713-780-1771
Wash	Seattle, Liberty Elctrns./NW	206-763-8200
For:	Can., Montreal, Quebec, Cesco Elctrns.	514-735-5511
For:	Can., Toronto, Ont., Cesco Elctrns.	416-661-0220

CORNING GLASS WORKS, Memory Prods Dept., Dept. EM, 3900 Electronic Dr., Raleigh, N.C. 27602, Tel: 919-876-1100, TWX: 510-928-1840; Empl.: 25

CORNING SCIENCE PRODUCTS, Corning Glass Works, Dept. EM, Corning, N.Y. 14830, Tel: 607-974-9000, Telex: 9324-81/99; Empl.: 8000

Sales Manager: R.T. Cahill

™CORNWALL - loudspeaker system - Klipsch & Assocs. Inc.

™CORONOL - rubber insulated cable - General Electric Co.

™CORRGARD - polyester film - Superior Cable Div.

CORTEC, INC., Dept. EM, 711 W. 17th St. (Bldg. H.I.), Costa Mesa, Cal. 92627, Tel: 714-642-1877; Empl.: 27

Local Sales Offices & Reps.

Cal	Orange, Sls & Mktg. Assoc.	714-997-5720
Cal	Santa Clara, Rodgers	408-984-8110
Minn	St. Paul, Knox Assoc.	612-488-5402
NJ	Old Bridge, S.E.A. Co.	201-679-8800
NC	Charlotte, McLean Sls.	704-366-2675

™CORTEM - conductive spring - Carbone Lorraine Industries Corp.

™CORTITE - brush/spring connection - Carbone Lorraine Industries Corp.

CORTRON DIV., Illinois Tool, Dept. EM, 6601 W. Irving Park Rd., Chicago, Ill. 60634, Tel: 312-282-4040, TWX: 910-221-0275

Local Sales Offices & Reps.

Ala	Huntsville, Electro-Mech. Sls. Engrg. Co.	205-883-9624
Alas	Los Angeles, Cortron Div., I.T.W.	213-723-1181
Cal	Menlo Park, McKnight Co.	415-325-2844
Fla	Orlando, Perrott Assocs.	305-275-1132
Ga	Atlanta, Electro-Mech. Sls. Engrg.	404-449-6337
Ill	Chicago, Cortron Div., I.T.W.	312-282-4040
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Md	Randallstown, Beacon	301-922-1248
Mass	Burlington, Cortron Div., I.T.W.	617-272-5646
Minn	Minneapolis, Comstrand, Inc.	612-571-0000
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
Neb	Lincoln, Mktg. Assocs.	402-464-5244
NJ	Bridgewater, J. F. Coughlin	201-725-1327
NJ	Haddonfield, TAI Corp.	609-854-3011
NY	East Syracuse, Fountain, Young & Co.	315-437-7733
NY	Massapequa, J. F. Coughlin Assocs.	516-799-7743
NC	Raleigh, Electro-Mech Sls. Engrg.	919-782-7586
Ohio	Dayton, Rockford Controls	513-898-5452
Tenn	Nashville, Elctro-Mech Sls. Engrg.	615-256-2516
Tex	Dallas, Microsystems Mktg. Inc.	214-238-7157
Va	Falls Church, Beacon	703-534-7200
Wash	Redmond, Barrett Sls. Northwest Ltd.	206-885-6991

COSAR CORP., Dept. EM, 3121 Benton St., Garland, Tex. 75042, Tel: 214-276-9487, Telex: 730-764; FSC No.: 20891; Empl.: 50

Sales Manager: D.N. Dukes

Local Sales Offices & Reps.

Cal	Fullerton	714-992-4690
Conn	Greenwich	203-661-2325
Ill	Chicago	312-539-6181
Tex	Dallas	214-276-9487
Tex	Houston	713-649-4441

COSMICAR LENS DIV., Asahi Precision Co., Ltd., Dept. EM, 424 Higashi Oizumi, Nerima-Ku, Tokyo, Japan, Tel: 03-921-1441; Empl.: 120

Local Sales Offices & Reps.

NY	NY, Asahi Optical (America) Inc.	212-532-4876

COSMO ELEC. LTD., Dept. EM, 2145 Marion Pl., Baldwin, N.Y. 11510

COSMO PLASTICS CO., Dept. EM, 3239 W. 14th St., Cleveland, Ohio 44109, Tel: 216-861-5594, TWX: 810-421-8444; Empl.: 500

Local Sales Offices & Reps.

Ariz	Phoenix, Electrical Specialty Co.	602-275-5736
Cal	Los Angeles, Electrical Specialty Co.	213-724-9600
Cal	San Diego, Electrical Specialty Co.	714-239-1345
Cal	So. San Francisco, Electrical Specialty Co.	415-589-9611
Colo	Denver, Electrical Specialty Co.	303-321-0226
Conn	Guilford, R.H. Whitehead Jr. & Assocs.	203-453-3762
Ill	Chicago, A.J. Ellis Co.	312-262-2708
Ind	Indianapolis, Blind & Assocs.	317-251-1249
Md	Timonium, Heller Sls. Co.	301-252-4780
Mass	Boston, Whitehead Assocs.	617-542-7676
Minn	Minneapolis, Ladky Assocs. of Minn.	612-884-2125
Mo	Webster Grove, Hippler Sls. Co.	314-961-8499
NJ	Morristown, Andrews & Andrews, Inc.	201-569-8800
NY	Huntington, Andrews & Andrews, Inc.	516-692-8686
NY	Rochester, P.J. Andres	716-271-2201
Ohio	North Olmsted, Plus Sls., Inc.	216-734-8989
Ore	Portland, Electrical Specialty Co.	503-227-3601
Pa	Ardmore, R.D. Freedman Assocs.	215-279-5767
Tenn	Knoxville, T.S. Stone Co.	615-546-9282
Utah	Salt Lake City, Electrical Specialty Co.	801-487-9805
Va	Roanoke, A.B. Kreger Co.	703-989-4738
Wash	Seattle, Electrical Specialty Co.	206-682-3434

™COS/MOS - complementary symmetry metal-oxide-semiconductor - RCA Solid State Div.

™COTERM - coaxial patch jacks - Dynatech Laboratories, Inc.

COTO-COIL CO., Dept. EM, 65 Pavilion Ave., Providence, R.I. 02905, Tel: 401-467-4777; Empl.: 110 p. 3452-3457

Sales Manager: W. Poisson

Local Sales Offices & Reps.

Cal	Palo Alto, Testco Inc.	415-324-1900
Cal	Santa Monica, Rep Assocs.	213-829-5401
Conn	Plantsville, Parnetics Co.	203-628-9343
Fla	Miami, Reptronics	305-251-5478
Fla	St. Petersburg, Reptronics	813-522-8220
NY	Brooklyn, Eastern Elctrn. Sls.	212-763-5180
NY	Rochester, M. C. Matthews Co.	716-271-1910
NY	Rochester, J. Zimmerman Co.	716-271-2604
Tex	Houston, T.C.I. Elctrns.	713-774-5019
Wash	Bellevue, Testco Inc.	206-454-7422

COUNTERSCAN SYSTEMS, Dept. EM, Box 536, Sutton, Neb. 68979, Tel: 402-773-3875; Empl.: 25

COUNTIS INDS., Dept. EM, Box 1444, San Luis Obispo, Cal. 93406, Tel: 805-544-1770; Empl.: 9

™COUNT MODULES - printers - Practical Automation, Inc.

™COUPLATE - thick film circuit - Centralab

™COUPLOID - face couplings - Invincible Gear Co.

COURIER TERMINAL SYSTEMS, Dept. EM, 2202 E. University Dr., Phoenix, Ariz. 85034; Empl.: 600

Local Sales Offices & Reps.

Cal	Los Angeles	213-641-6495
Cal	Los Angeles	213-552-1631
Cal	San Francisco	415-989-6580
Ga	Atlanta	404-294-6166
Ill	Chicago	312-593-2600
Mich	Detroit	313-593-2600
Mo	St. Louis	314-434-3199
NY	New York	212-486-7654
Ohio	Cincinnati	513-984-1555
Ohio	Cleveland	216-831-0300
Pa	Philadelphia	215-265-7620
Tex	Dallas	214-233-9002
Tex	Houston	713-629-0530

(TM)COWECO - coil winding equipment - Coil Winding Equip. Co.

COX & CO., INC., Dept. EM, 215 Park Ave., S., New York, N.Y. 10003, Tel: 212-OR 4-4727, TWX: 710-581-2839; FSC No.: 98085; Empl.: 92

Sales Manager: W. Achenbaum, V.P. Mktg.

Local Sales Offices & Reps.

Cal	Palos Verdes Penninsula, J. E. Scott	213-377-9761
NJ	Westfield, E. Mertz	201-232-4643
Wash	Mukilteo, J. Ransom	206-775-5431

CPL CORP., Chemical Prods. Corp. Div., Dept. EM, King Philip Rd., E. Providence, R.I. 02914, Tel: 401-434-1770, TWX: 401-438-2607; Empl.: 275

(TM)CPPC - synchros & servo motors - Clifton Precision

CPS INC., Dept. EM, 722 E. Evelyn Ave., Sunnyvale, Cal. 94086, Tel: 408-738-0530, Telex: 35-7450; FSC No.: 31640; Empl.: 80 ....p. 1492,1493,3218

Sales Manager: R.E. Neddermeyer

Local Sales Offices & Reps.

Ala	Huntsville, Repcom	205-859-4400
Ariz	Phoenix, Zues	602-253-6104
Cal	Los Angeles, Basic Systems	213-938-2833
Cal	Menlo Park, Marubun	415-854-1097
Cal	San Diego, Basic Sys.	714-279-9641
Cal	Sunnyvale, AMASCO	408-733-8690
Colo	Engelwood, Zues	602-253-6104
Conn	Greenwich, Crane & Egert	213-622-9191
Conn	Manchester, Victor Assoc.	203-646-6448
Fla	Melbourne, REPCOM	305-254-1877
Ill	Des Plaines, Coombs Assoc.	312-298-4830
Kans	Overland Park, Ensco-Rep	913-381-7557
Mass	Framingham, Victor Assoc.	617-879-5710
Minn	Minneapolis, Arjay Sls	612-854-4972
Mo	St. Louis, Ensco-Rep	314-567-3935
NJ	Hohokus, Hansen Assoc.	201-652-7055
NM	Albuquerque, Zues	505-268-3941
NY	Elmont, Crane & Egert	516-488-2100
NC	Charlotte, Repcom	704-597-7491
Ohio	Centerville, Norm Case Assoc.	513-433-0966
Ohio	Rocky River, Norm Case Assoc.	216-333-4120
Tex	Dallas, Jackson Arnold Co	512-447-1068
Tex	Houston, Jackson Arnold Co	713-783-7297
Tex	Irving, Space Elctrns.	214-251-3636
Wisc	Greendale, Coombs Assoc.	414-421-2300

(TM)CRADLE - telephone type relays - Gould Inc. Control Sys. Div. Allied Control

(TM)CRADLECLIP - wire cable harness - Electrovert

(TM)CRAIG - film editing equipment - Kalart Victor Corp.

CRAIG SYS. CORP., Dept. EM, 360 Merrimack St., Lawrence, Mass. 01842, Tel: 617-688-6961, TWX: 710-342-0765; Empl.: 200

Local Sales Offices & Reps.

Cal	Fullerton, Craig Sys. Corp	714-879-3180
Md	Rockville, W. F. Frank Assoc.	301-340-7717
Minn	St. Paul, Debeck Assoc	612-690-1557
Pa	York, California Creations	717-755-2114

CRAMER

COIL DIV.

CRAMER COIL, Div Digital Magnetics Inc, Dept: EM, Box 32, Grafton, Wisc. 53024, Tel: 414-377-7040; Empl.: 50 .... p. 1423

Sales Manager: R. Rubinstein

Local Sales Offices & Reps.

Ala	Huntsville, Elctrn. Mktg.	205-533-3620
Cal	Sunnyvale, Winston Assoc	415-968-5374
Cal	Van Nuys, Edmar Elctrns., West Co.	213-782-9020
Colo	Lakewood, Precision Sls.	303-238-6634
Fla	Miami, Reptronics	305-251-5478
Ill	Chicago, W.T. Adams Sls.	312-956-7685
Ind	Greenwood, Valentine & Schillinger	
Ind	Greenwood, V & S Assoc.	317-888-2260
Ind	South Bend, Valentine & Schillinger	
Ind	South Bend, V & S Assoc.	219-291-6258
Kans	Prairie Village, Engrg Svc Co.	913-649-4000
Mass	Brookline, Technology Prods. Group	
Minn	Minneapolis, W. Lee	612-926-1523
Mo	St. Louis, Engrg Svc Co.	314-997-1515
NY	Syosset, SGS Sls.	516-921-5335
NC	Winston Salem, Elctrn. Mktg. Assoc.	919-722-5151
SC	Greenville, Elctrn Mktg Assoc.	803-268-1125
Tex	Dallas, Precision Sls	214-272-0616

CRAMER DIVISION, Conrac Corporation, Dept. EM, Mill Rock Rd., Old Saybrook, Conn. 06475, Tel: 203-388-3574, Telex: 966-453; Empl.: 350

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co.	205-539-1771
Ariz	Phoenix, Spectrum Assocs.	602-997-6324
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	Santa Ana, Spectrum Assocs.	714-835-4114
Cal	Santa Fe Springs, Conrac Security Detection	213-945-2673
Colo	Denver, I.W. Strong & Assoc.	303-292-6900
Conn	Rocky Hill, Aid Engrg. Sls. Co.	203-673-3692
Fla	Orlando, Col-Ins-Co.	305-423-7615
Ga	Clarkston, Col-Ins-Co.	404-934-7280
Ill	Arlington Heights, Martec Assocs.	312-956-8090
Ind	Indianapolis, Sukup & Cox	317-253-1215
Md	Rockville, L.G. White & Co.	301-770-6556
Mass	Westboro, Aid Engrg. Sls. Co.	617-890-8181
Mich	Birmingham, J.C. Hofstetter Co.	313-643-7203
Minn	Minneapolis, Jos-Co. Sls. Engrg.	612-835-5858
Mo	St. Louis, H.J. Weisler & Assoc.	314-428-3934
NY	Elmsford, Cramer Div./Conrac Corp.	914-592-5500
NY	Rochester, Upstate Comp. Sls.	716-288-1080
NC	Raleigh, Col-Ins-Co.	919-834-6591
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Pa	Broomall, J.C. Whiddett Co.	215-353-6343
Tex	Dallas, Glidden Electro Equip. Co.	214-363-6539
Wash	Mercer Island, J.H. Andersen Assocs.	206-232-0484

CRAMER INDUSTRIES, INC., Dept. EM, 625 Adams St., Kansas City, Kans 66105

(TM)CRAMOLIN - contact cleaner - Caig Labs., Inc.

(TM)CRANEGARD - hookload indicators - Dillon, W.C. & Co.

CRATEX RUBBERIZED ABRASIVES, Dept. EM, 1600 Rollins Rd., Burlingame, Cal. 94010, Tel: 415-697-1600; Empl.: 19

Local Distributors

Cal	So. El Monte, Federated Sls. Co.	213-283-8374
Conn	New Britain, Smith & Klebes, Inc.	203-229-0315
Ill	Chicago, Doxod, Inc.	312-673-5490
NJ	Haledon, Precision Inds.	201-278-7800

CREATIVE PACKAGING CO., Dept. EM, P.O. Box 444, Indianapolis, Ind. 46206

(TM)CREDENZA - tabletop lamp dimmer - Lutron Electronics Co.

(TM)CRESCENT - rings, retaining - Waldes Kohinoor, Inc.

CREST INDUSTRIES, INC., Dept. EM, Box 35, Northbrook, Ill. 60062, Tel: 312-272-2440; Empl.: 10

Local Sales Offices & Reps.

Ala	Gadsen, Nickerson Corp.	205-547-7718
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Cal	No. Hollywood, SY Lewis & Assts. - Dist.	213-769-3202
Cal	Redwood City, Warren & Hickey Sls. Co.	415-368-3849
Cal	Tustin, Spaulding Sls. - OEM	714-832-1384
Colo	Westminster, Electro Tek Sls.	303-623-3370
Fla	Tampa, Nickerson Corp.	813-885-1416
Ind	Indianapolis, Sukup & Cox	317-253-5501
Md	Baltimore, B. White & Co., Inc.	301-484-5400
Mass	Walpole, McCabe Assts.	617-668-6736
NC	Kannapolis, Nickerson Corp.	704-932-6772
Ohio	Cincinnati, John Olsen Co.	513-825-0678
Ohio	Cleveland, John O. Olsen Co.	216-752-5444
Tex	Richardson, Willoighby Fowler Co.	214-235-3664
Wisc	Milwaukee, W.M. Braun & Assts.	414-332-1040

Local Distributors

Ala	Birmingham, ACK Radio Supply	205-322-0588
Alas	Anchorage, Yukon Radio	907-277-6316
Ariz	Tempe, Arizona Electrical	602-968-9037
Cal	Costa Mesa, Marvac Elctrns	714-540-3280
Cal	Hayward, Lectrick Pro Media	
Cal	Los Angleles, West Coast Platen	213-627-2431
Cal	No. Hollywood, Sy Lewis & Assts	213-769-3202
Fla	Panama City, Central Elec. Supply	904-785-0237
Haw	Honolulu, Precision Radio	808-537-5291
Ill	Downers Grove, AMES Supply	312-964-2440
Ind	Seymour, Cummungs Wholesale	812-522-5633
Ky	Florence, Big Star Radio Sls.	606-586-6607
Md	Baltimore, EDJE Elctrns.	301-335-6982
Mass	Boston, O'Donnell Elctrns.	617-254-2234
Mass	Hyannis, Lafayette Radio	617-771-4511
Mich	Benton Harbor, Aircraft Comps.	616-925-8861
Mich	Grand Rapids, Stotts-Friedman	616-241-6731
Minn	Minneapolis, Saterlee Co.	612-370-2555
Mo	St. Louis, Tech Elctrns.	314-645-6200
Nev	Las Vegas, Von Tobels	702-734-8111
NJ	Iselin, Brothers Elctrns.	201-283-3000
NJ	Westfield, Stuarts Audio	201-232-0483
NY	Albany, Audio Visual Sls.	315-446-7094
NY	Gloversville, Montano Elec. Supply	518-725-3139
NY	New York, Altel Sound Sys.	212-889-9700
NY	New York, E. May & Co.	212-CI-7-2400
NC	High Point, Mac Victor Elec.	919-786-4175
Ohio	Columbus, Trans-Audio	614-253-7496
Ohio	Dayton, Audio Inc.	
Tex	Austin, C & M Elctrns.	512-451-6595
Tex	Dallas, KA Electronic Sls.	214-634-7870
Utah	Orem, Hansen Wholesale	801-225-4459
Va	Norfolk, Radio Parts Dist.	703-855-8095
Wash	Mountlake Terr., Tomahawk Corp.	206-776-7598
WVa	Wheeling, Wheeling Antenna Co.	304-242-5600
Wisc	Green Bay, Beemster Elec.	414-437-3238
Wyo	Casper, Hathaway Elec.	307-234-1821

CREST TRANSFORMER CORP., Dept. EM, 405 W. Orange St., Hoopeston, Ill 60942

CRESTRONICS INC., Dept. EM, 23539 Crest Forest Dr., Box "S", Crestline, Cal. 92325, Tel: 714-338-1722; Empl.: 11 .... p. 3221

CRM DIV., See Consolidated Refining Co.

(TM)CRIS-PIC - TV image impresser - Kalart Victor Corp.

(TM)CRITERIA SYSTEM - IC burnin systems - Reliability Inc.

(TM)CRL - electronic components - Centralab

(TM)CRL (WITHIN A DIAMOND) - electronic components - Centralab

CROMPTON INSTRUMENTS INC., Dept. EM, 1562 Parkway Loop, Units A & B, Tustin, Cal. 92680, Tel: 714-731-2333, Telex: 69-2309

Sales Manager: J. Berger

Local Sales Offices & Reps.

Cal	Tustin	714-731-2333
Ill	Elk Grove Village	312-593-1107

(TM)CROP-TROL - temperature controllers - Honeywell

CROSS ELECTRONICS INC., Dept. EM, 100 Commonwealth Dr., Warrendale, Pa. 15086, Tel: 412-776-1591; Empl.: 35

Local Sales Offices & Reps.

Cal	S. Pasadena, Deniston/JDA	213-254-7755
Conn	Meriden, Abbott-Allison Co.	203-237-8671
Ill	LaGrange, Electric Sls. Assocs.	312-354-2147
Mass	E. Bridgewater, Abbott-Allison	617-245-0250
NY	Roslyn Heights, Travco Assocs.	516-621-3223
Tex	Richardson, Concept Sls.	214-690-4521
Wash	Seattle, M. K. Hansen Co.	206-524-8318

(TM)CROSSFIRE - broadband antenna system - Channel Master Div. Avnet

(TM)CROSSFLO - transverse flow blower - Torin Corp.

CROUSE-HINDS COMPANY, ARROW HART DIV., Dept. EM, 103 Hawthorne St., Hartford, Conn. 06101, Tel: 203-249-8471, Telex: 99328 p. 4017-4056

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean, Inc.	205-533-3509
Ariz	Phoenix, Arrow-Hart, Inc.	602-957-2860
Cal	Los Angeles, Arrow-Hart, Inc.	213-926-1338
Cal	San Francisco, Arrow-Hart, Inc.	415-397-8343
Colo	Denver, I.W. Strong Inc.	303-292-6900
Conn	Manchester, Arrow-Hart, Inc.	203-289-6821
Fla	Ft. Lauderdale, Cartwright & Bean, Inc.	305-791-3989
Fla	Orlando, Cartwright & Bean, Inc.	305-422-4531
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Ill	Bensonville, Arrow-Hart, Inc.	312-595-7750
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-452-6065
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
La	New Orleans, Cartwright & Bean, Inc.	504-362-4649
Mass	Norwood, Arrow-Hart, Inc.	617-762-3660
Mich	Detroit, R.O. Whitesell & Assocs.	313-559-5454
Minn	Minnetonka, Arrow-Hart, Inc.	612-935-0173
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
Mo	St. Louis, Arrow-Hart, Inc.	314-351-0770
NJ	Cinnaminson, Arrow-Hart, Inc.	609-829-4777
NY	Endicott, Arrow-Hart, Inc.	607-785-0785
NY	Homer, Arrow-Hart, Inc.	315-458-3955
NY	Rochester, Arrow-Hart, Inc.	716-227-2630
NY	Yorktown Heights, Arrow-Hart, Inc.	212-684-0767
NC	Charlotte, Cartwright & Bean, Inc.	704-337-5674
NC	Raleigh, Cartwright & Bean, Inc.	919-781-6560
Ohio	Cincinnati, R.O. Whitesell & Assocs.	514-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middlebury Hgts., R.O. Whitesell & Assocs.	513-826-4424
Okla	Tulsa, Hodges Co.	918-742-0917
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Knoxville, Cartwright & Bean, Inc.	615-693-7450
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	Houston, Hodges Co.	713-228-4356
Tex	Irving, Hodges Co.	214-438-3343
Tex	San Antonio, Hodges Co.	512-342-5857
Utah	Sandy, P.S. Farley	801-533-9303
Wisc	Milwaukee, Arrow-Hart, Inc.	414-351-0840

Local Distributors

Ark	Little Rock, Carlton-Bates	501-562-9100
Cal	Los Angeles, Eurton Elect.	213-747-9457
Cal	Los Angeles, Electro Comps.	213-264-7100
Cal	Los Angeles, Fisher/Brownell	213-532-2170
Cal	Los Angeles, Electric Switches	213-664-1141
Cal	Los Angeles, California Wholesale	213-728-7209
Cal	Riverside, Electronic Supply	714-683-7300
Cal	San Francisco, Zack Elctrns.	415-626-1444
Cal	San Jose, Consolidated Parts, Inc.	408-294-2303
Cal	San Leandro, Electro Comps.	415-353-5210
Cal	Santa Clara, Fisher/Brownell	408-244-6182
Colo	Denver, Fistell's Elctrns.	303-629-1312
Colo	Denver, Integrated Electrns.	303-534-6121
Colo	Denver, Electronic Parts Co.	303-744-1992
Colo	Lakewood, Acacia Sls.	303-232-2882
Conn	Hartford, GAL Elect. Co.	203-232-9880
Conn	Waterbury, Suburban Supply Co.	203-757-1251
Fla	Miami, Electronic Equip. Co.	305-871-3500
Ga	Atlanta, Ack Radio Supply Co.	404-351-6304
Ill	Broadview, LCOMP Chicago, Inc.	312-865-7600
Ill	Chicago, Electro/Kinetics	312-286-4200
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Rockford, G.C. Elctrns.	815-963-6445
Ill	Rockford, J&M Elctrns.	815-963-6445
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8486
La	Shreveport, Industrial Electric Supply	318-222-9459
Me	Lewiston, Lewiston Supply Co.	207-784-4083
Md	Bethesda, Empire Elctrns.	301-656-3300
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Boston, Sager Electric Supply Co.	617-542-2281
Mass	Cambridge, Hilco Electric Supply Co.	617-876-0610
Mass	West Newton, A.W. Mayer Co.	617-965-1111
Mich	Detroit, R.S. Elctrns.	313-491-1000
Mich	St. Clair Shores, SPEMCO	313-771-2700
Minn	Minneapolis, Sterling Elect. Co.	612-332-4571
Minn	Minneapolis, H.A. Holden Co.	612-336-5353
Minn	St. Paul, Gopher Elctrn. Co.	612-645-0241
Mo	St. Louis, LCOMP St. Louis, Inc.	314-647-5505
NJ	Camden, General Radio Supply Co.	609-964-8560
NJ	East Rutherford, Kappe Elect. Distr.	201-939-5751
NJ	Hanover, State Electrn. Parts	201-887-2550
NY	Binghampton, Florance Elec. Supply	607-724-2455
NY	Brooklyn, Herman H. Smith, Inc.	212-272-9400
NY	Buffalo, Summit Dist. Inc.	716-884-3450
NY	Buffalo, Genesee Radio & Parts, Inc.	716-873-9661
NY	Farmingdale, Arrow Elctrn.	516-694-6800
NY	Hempstead, Electronic Equip. Co.	516-538-5510
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	New York, City Electrical Distr.	212-564-5454
NY	New York, Brownell, Inc.	212-924-6000
NY	Rochester, Rochester Radio Supply	716-454-7800
NC	Winston Salem, Kirkman Electrics, Inc.	919-722-9131
Ohio	Cincinnati, Hughes-Peters, Inc.	513-351-2000
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Cleveland, Midland Elect.	216-861-3200
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Ohio	Dayton, ESCO, Inc.	513-226-1133
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Solon, REPCO	216-248-8900
Ohio	Toledo, Warren Radio	419-248-3364
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Ore	Portland, Tek Electric Controls Co.	503-246-5451
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Pa	Pittsburgh, CAM/RPC Elctrns.	412-288-2600
RI	Providence, Dandreta & Co.	401-861-2800
Tex	Dallas, Assoc. Aircraft	214-331-4381
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Houston, Harrison Equip. Co.	713-224-9131
Va	Richmond, Meridian Elctrns.	804-359-0221
Wash	Bellevue, Bell Inds.	206-747-1515
Wash	Seattle, Radar Elctrns. Co.	206-282-2511
Wisc	Mequon, Taylor Elect. Co.	414-241-4321

CROUZET/CRIDLAND, Dept. EM, 118 Barrington Commons Ct Ste 207, Barrington, Ill. 60010, Tel: 312-381-7044, Telex: 722-403

Sales Manager: G.A. Cridland

Local Sales Offices & Reps.

Cal	Manhattan Beach, Tri-Tek	714-533-1454
Colo	Englewood, Dynatech	303-773-2830
Fla	Winter Park, Young & Lawrence	305-647-6929
Ga	Pine Lake, Hilco	404-294-7157
Ill	Schaumburg, Kingston Comps.	312-539-8055
Mass	Brookline, Harman Assocs.	617-232-6687
Minn	Wayzata, Joe Little Assocs.	612-473-1107
NY	Cazenovia, Peter M. DeCew	315-655-8602
NY	Syosset, Motion Control Sls.	516-921-5656
Ohio	Westlake, Harry Applegate	216-331-2960
Pa	Cornwells Heights, William D. Staats Co.	215-639-5231
Tex	Dallas, B.P. Sls.	713-467-4373
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778

CROVEN, LTD., Dept. EM, 500 Beech St., Whitby, Ont., Can., Tel: 416-668-3324, TWX: 610-384-2750; FSC No.: 00809; Empl.: 250 p. 2434

Sales Manager: R. McCormick

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Sls	602-968-7791
Cal	San Mateo, Melvin Sls. Co.	415-349-7444
Cal	Van Nuys, R.L. Assocs.	213-782-7826
Mass	Randolph, Naton Assoc.	617-986-6417
Ohio	Dayton, F.L. Ohmer & Assocs.	513-434-1454
Tex	Fort Worth, W. Pat Fralia Co.	817-738-2394

CROWN INTERNATIONAL, Dept. EM, Box 1000, Elkhart, Ind. 46514, Tel: 219-294-5571, TWX: 810-294-2160; Empl.: 175 p. 1114

Local Sales Offices & Reps.

Cal	Encino, CDH Assocs.	213-345-3111
Cal	Millbrae, Ashby Assocs.-West	415-692-4442
Conn	Woodbridge, Elctrn. Mktg.	203-397-1461
Ill	Chicago, P. Berndt Assocs.	312-283-0713
Md	Gaithersburg, Wright Co.	301-840-1928
Mich	Ferndale, Shalco	313-547-4771
Minn	St. Paul, Skor	612-645-6461
NJ	Parlin, JMR Sls., Inc.	201-727-5335
NY	E. Rochester, RJC Assoc.	716-385-2770
Ohio	Dayton, Ashby Assocs.	513-252-5627

CROWN MICROWAVE, INC., Sub. Microwave Semiconductor Corp., Dept. EM, 6 Executive Park Dr., N. Billerica, Mass. 01862, Tel: 617-667-4165, TWX: 710-347-1576; Empl.: 90

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
Ariz	Scottsdale, Territorial Mktg.	602-994-8665
Cal	Los Altos, Cain, White & Co.	415-948-6533
Cal	Van Nuys, C. W. Swift Assocs.	213-989-1133
Colo	Wheatridge, Eggeman Assocs.	303-423-3707
Fla	Ft. Lauderdale, Beacon Elctrns. Assocs.	305-971-7320
Ga	Atlanta, Beacon Elctrns. Assocs.	404-351-3654
Ill	Northfield, Feller Assocs.	312-446-8065
Ind	Ft. Wayne, Given Corp.	219-432-5585
Md	Columbia, Neal Deoul Assocs.	301-997-4353
Mass	South Chelmsford, Independent Mktg. Reps.	617-256-8251
NJ	Ft. Lee, Technical Mktg. Assocs.	201-224-6911
NJ	Pennsauken, Megargel/Himnelstein	609-662-3081
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Skaneateles, Robtron	315-685-5731
NC	Charlotte, Beacon Elctrns. Assocs.	704-525-7412
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Ohio	Dayton, M. Ohmer Assocs.	513-293-3761
Tenn	Oak Ridge, Beacon Elctrns. Assocs.	
Tex	Dallas, Texas Avionics Co.	214-368-3566
Wash	Seattle, Datacom Assocs.	206-285-2525

Ⓜ CRT - corona resistant teflon cable - Daburn Electronics & Cable Corp.

Ⓜ CRT-PAC - cathode ray tube silicon high voltage multiplier - Semtech Corp.

Ⓜ CRUCORE - rare earth cobalt permanent magnets - Colt Industries

Ⓜ CRUISE CONTROL - cruise controls - Jaesic Industries Co.

Ⓜ CRUISER - CB Rig - Fanon/Courier Corp., Subs.

CRYDOM CONTROLS, Int'l. Rectifier, Dept. EM, 1521 Grand Ave., El Segundo, Cal. 90245, Tel: 213-322-4987, Telex: 67-4660; Empl.: 75 p. 3552,3553

Sales Manager: Karl Bissell

Local Sales Offices & Reps.

Ala	Birmingham, Com-Trol Corp.	205-823-0897
Cal	Los Angeles, Halbar Assoc.	213-387-8283
Cal	Santa Clara, T. Hartman Assoc.	408-247-1252
Cal	Tustin, Morgan Johnson Co.	714-832-7282
Colo	Denver, Parker-Webster Co.	303-751-2600
Conn	Ridgefield, W. Johnson Co.	203-438-3351
Fla	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Fla	Maitland, Dyne-A-Mark Corp.	305-831-2097
Ill	Elk Grove Village, Carlson Elctrns.	321-956-8240
Ind	Indianapolis, Carlson Elctrns.	317-253-5610
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Mass	Burlington, Contact Sls	617-273-1520
Mich	Bloomfield Hills, Roth Ind'l Sls.	313-626-3171
Minn	Minneapolis, Electronic Innovators	612-884-7471
Mo	St. Louis, Engrg Svcs Co.	314-997-1515
NJ	Keasbey, Addem Group	516-567-5900
NY	Buffalo, R. W. Mitscher Co.	716-633-7970
NY	Huntington Station, Addem Group	516-567-5900
NC	Raleigh, R. W. Mitscher Co.	919-828-0575
Ohio	Cleveland, D. Steffen & Assoc.	216-461-8333
Ohio	Dayton, D. Steffen & Assoc.	513-293-3145
Ore	Portland, Electronic Comp. Sls.	503-245-2345
Pa	Ardmore, Manreps, Inc.	215-649-6300
Tenn	Shelbyville, R. W. Mitscher Co.	615-684-4544
Tex	Ft. Worth, W. Pat Fralia Co.	817-640-9101
Tex	Houston, W. Pat Fralia Co.	713-772-1572
Utah	Salt Lake City, Parker-Webster Co.	801-261-1058
Wisc	Milwaukee, Carlson Elctrns.	414-476-2790

Ⓜ CRYOFIT - heat-recoverable metal fittings - Raychem Corp.

™CRYO-PANEL - thermal shroud tubing - High Vacuum Equip. Corp.

™CRYOSOURCE TM - cryogenic refrigerators - Sargent Welch Sci. Co.

™CRYOTERM - noise sources, cryogenic - Maury Microwave Corp.

™CRYO-TIP - cryogenic cooling tip - Air Prods. & Chems., Inc.

™CRYSTAL-CLEAR - optically clear epoxy adhesive - Packaged Resins Div.

CRYSTAL NETWORK PRODS. CORP., Dept. EM, 818 Parade St., Erie, Pa. 16503, Tel: 814-459-2351; Empl.: 18

CRYSTAL TECHNOLOGY, Dept. EM, 2510 Old Middlefield Way, Mountain View, Cal 94043, Tel: 415-961-9311; Empl.: 75

Sales Manager: L. Castelli

Local Sales Offices & Reps.
Mass Billerica, Drew Associates 617-667-6643
NJ E Windsor, Cook & Weil, Inc. 609-448-7409
NY New York, Cook & Weil 212-741-1053

CRYSTEK CRYSTALS CORP., Dept. EM, 1000 Crystal Dr., Ft. Myers, Fla. 33901, Tel: 813-936-2109, TWX: 510-951-7448; FSC No.: 13454; Empl.: 2500 p. 2435

Local Sales Offices & Reps.
Ala Birmingham, H. W. Phillips Co., Inc. 205-655-8415
Ariz Phoenix, J. R. Morgan Agcy. 602-252-3089
Cal Los Angeles, Crystek Crystals Sls. Office 714-936-8055
Cal San Francisco, J.E. Stricker Co. 415-342-1425
Conn Norwalk, Betronic Assoc. 203-853-7630
Conn Norwalk, Johnson Assoc. 203-787-3661
DC Washington, Sonny Simberkoff Assocs., Inc. 703-525-5898
Fla Ft. Lauderdale, Sproch Sls., Inc. 305-587-3792
Fla Sarasota, Sproch Sls.
Ga Atlanta, H. W. Phillips Co., Inc. .. 404-252-0720
Ill Chicago, Cummings & Foley Sls., Co. 312-725-8110
Ill Chicago, Lassers & Co. 312-539-0170
Ind Indianapolis, Shamrock Elctrn. Sls. 317-251-5527
Iowa Des Moines, Kathrinus-Kelly & Co. 515-255-4584
Kans Kansas City, Kathrinus-Kelly & Co. 913-722-0000
Minn Minneapolis, HMR Co. 612-920-8200
Mo St. Louis, Kathrinus-Kelly & Co. 314-968-3800
NJ South Orange, Sonny Simberkoff Assocs., Inc. 201-763-7900
NY Buffalo, Sonny Simberkoff Assocs., Inc. 716-834-8119
NY New York City, Sonny Simberkoff Assocs., Inc. 212-943-7023
NC Burlington, Sonny Simberkoff Assocs., Inc. 919-584-6450
Ohio Akron, Shamrock Elctrn. Sls....... 216-666-1400
Ohio Dayton, Shamrock Elctrn. Sls..... 513-298-3052
Ore Portland, EBCO 503-245-2283
Pa Philadelphia, Sonny Simberkoff Assocs., Inc. 215-455-9579
Pa Pittsburgh, Shamrock Elctrns. Sls.
Tex Dallas, Collins Co. 214-341-7866
Tex Houston, Collins Co. 713-626-1293
Va Arlington, Sonny Simberkoff Assocs., Inc. 703-525-5898
Wash Seattle, EBCO 206-284-1121

™C-SCAN - solid state keyboard - Controls Development Corp.

™CSI - carrier supported ink - Markem Corp.

CSR INDUSTRIES INC., Semiconductor Div., Dept. EM, 59 Central Ave., E. Farmingdale, N.Y. 11735, Tel: 516-694-3404, TWX: 510-224-6444

™CSS - telecommunications switching equipment - Rolm Corp.

™CTC-71 - energized rosin filled core solder - Alpha Metals, Inc.

CTS CORP., Dept. EM, 905 N. West Blvd., Elkart, Ind. 46514, Tel: 219-293-7511, TWX: 810-294-2167; Empl.: 7,000

Local Sales Offices & Reps.
Ala Huntsville, Interep Assocs. 205-881-3677
Ariz Phoenix, Hecht, Henschen & Assocs. 602-275-4411
Cal Burlingame, Logan & Assocs. 415-697-6100
Cal South Pasadena, CTS Corp. 213-682-1137
Colo Denver, Elcom, Inc. 303-770-4400
Conn North Haven, Comp Rep Assocs. 203-239-9762
Fla Cocoa, Electrocomp Assocs. 305-452-9568
Fla Ft. Lauderdale, Electrocomp Assocs. 305-564-8571
Fla St. Petersburg, Electrocomp Assocs. 813-822-9677
Ga Atlanta, Interep Assocs. 404-394-7756
Ind Elkhart, CTS Corp. 219-293-7511
Iowa Marion, Thomas & Modrcin Assocs. 319-377-6261
Kans Shawnee Mission , Thomas & Modrcin Assocs. 913-432-2131
Md Baltimore, Coulbourn DeGreif, Inc. 301-247-4646
Mass Needham, Comp Rep Assocs. .. 617-444-2484
Mich Grand Rapids, J.L. Montgomery, Inc. 616-774-9308
Mich Southfield, J.L. Montgomery, Inc. 313-358-2616
Minn Minneapolis, R.W. Marshall Co... 612-929-0457
Mo Hazelwood, Thomas & Modrcin Assocs. 314-895-4700
NM Albuquerque, Zeus, Inc. 505-256-9831
NY Jamaica, S-J Sales Assocs. 212-291-3232
NY Syracuse, Nycom, Inc. 315-437-8343
NC Raleigh, Component Sls. 919-782-8433
Ohio Cincinnati, Baehr, Greenleaf & Assocs. 513-891-3827
Ohio Cleveland, Baehr, Greenleaf & Assocs. 216-221-9030
Ohio Dayton, Baehr, Greenleaf & Assocs. 513-293-1102
Ohio Upper Arlington, Baehr, Greenleaf & Assocs. 614-486-4046
Pa Fort Washington, G.C.M. Associated 215-646-7535
Pa Pittsburgh, Covert & Newman Co. 412-531-2002
Tex Addison, Parvin Sls. Co. 214-661-5374
Tex Houston, Parvin Sls. Co. 713-784-9900
Utah Salt Lake City, Elcom, Inc. 801-532-7940
Wash Bellevue, SD-R2 Prods. & Sls. .. 206-747-9424
Exp: Elkhart, Ind., CTS Corp. 219-293-7511

Local Distributors
Ala Huntsville, Hall-Mark Elctrns. Corp.
Ariz Phoenix, Cramer/Phoenix
Ariz Phoenix, R. V. Weatherford Co. 602-272-7144
Cal Burlingame, Rose Elctrns.
Cal Gardena, Bell Inds.
Cal Irvine, Cramer/Los Angeles
Cal Irvine, Terminal Elctrns. Corp.
Cal Los Angeles, Western Electromotive Shephard, Inc. 213-820-3777
Cal Mountain View, Terminal Elctrns.
Cal San Diego, Cramer/San Diego
Cal Sunnyvale, Cramer/San Francisco
Cal Sunnyvale, Bell Inds.
Colo Denver, Cramer/Denver
Conn Fairfield, U-Tronics
Conn N. Haven, Cramer Elctrns.
Fla Clearwater, Diplomat/Southland
Fla Hollywood, Cramer/EW Hollywood
Fla Orlando, Cramer/EW Orlando
Ga Norcross, Cramer/Atlanta
Ill Mount Prospect, Cramer/Chicago
Ill Skokie, Bell Inds.
Ill Westmont, Bodelle Co.
Md Baltimore, Radio Electric Svc.
Md Gaithersburg, Cramer/EW Wash.
Mass Newton, Greene-Shaw Co.
Mass Newton Center, Cramer Elctrns.
Mich Detroit, RS Elctrns. 313-491-1012
Mich Farmington, Diplomat/Northland
Minn Minneapolis, Diplomat Electro-Com
Minn Minneapolis, Cramer/Bonn
Mo St. Louis, Olive Ind.'l Elctrns.
NJ Cherry Hill, Cramer/Penn., Inc.
NJ Moonachie, Cramer/New Jersey
NM Albuquerque, Cramer/New Mexico
NY Buffalo, Summit Distrs.
NY East Syracuse, Cramer/Syracuse
NY Hauppauge, Cramer/Long Island
NY Mount Vernon, QAR Ind'l Elctrn. Sls. 914-699-2224
NY Rochester, Rochester Radio Supply Co.
NY Rochester, Cramer/Rochester
NC Winston-Salem, Cramer/EW Winston-Salem
Ohio Cleveland, Cramer/Cleveland
Ohio Dayton, ESCO Inc.
Pa Philadelphia, Philadelphia Elctrns.
Tex Dallas, Component Specialties, Inc.
Tex Dallas, Cramer/Texas
Tex Richardson, Southwest Elctrns.
Tex Stafford, Southwest Elctrns.
Utah Salt Lake City, Standard Supply Co. 801-486-3371
Wash Seattle, Cramer/Seattle, Inc.

CTS OF BERNE, Dept. EM, 406 Parr Rd., Berne, Ind. 46711, Tel: 219-589-3111, TWX: 810-323-1580; Empl.: 1,079 .... p. 3675-3679,3822

Refer to CTS Corp. for sales office information

CTS KNIGHTS, INC., Dept. EM, 400 Reimann Ave., Sandwich, Ill. 60548, Tel: 815-786-8411, TWX: 910-642-0860; Empl.: 925 .... p. 2414-2428

Refer to CTS Corp. for domestic sales office information

CTS MICROELECTRONICS, INC., Dept. EM, 1201 Cumberland Ave., W. Lafayette, Ind. 47906, Tel: 317-463-2565, TWX: 810-342-1882; Empl.: 275

Refer to CTS Corp. for sales office information

CTS OF PADUCAH, INC., Dept. EM, 1565 N. 8th St., Paducah, Ky. 42001, Tel: 502-442-1641, TWX: 510-546-1152; Empl.: 1000

Local Sales Offices & Reps.
Ark El Dorado, D. Ballew Sls. 501-863-8325
Cal San Francisco, J. Logan & Assoc. 415-697-6100
Cal Van Nuys, Sackley & Co. 213-393-0794
Colo Denver, Cir-Vue Mktg. 303-623-4185
Fla Maitland, Hutto, Hawkins, Peregoy 305-831-2474
Ga East Point, Hollingsworth & Still 404-394-3270
Ill Oak Park, G. Petitt Co. 312-265-0342
Ky Paducah, CTS of Paducah 502-442-1641
Md Silver Springs, Mid Atlantic Sls. 301-593-7749
Mass Boston, Anderson Sls. Assocs. .. 617-227-2980
Mich Plymouth, J. Malcolm Flora 313-453-4296
Minn Minneapolis, Heimann Co. 612-861-6051
Mo St. Louis, Lowell-Kangas & Assocs. 314-821-4050
NJ Caldwell, A. Cerf & Co. 201-226-2263
NY Syracuse, W. Tauber Co. 315-446-7094
Ohio Medina, T. Grant Assocs. 216-725-6528
Pa Enon Valley, Nebco Assocs. 216-457-2333
Tex Dallas, Collins Co. 214-341-7866
Wash Bellevue, SDR² Prods. & Sls. 206-747-9424
Exp: Summit, N.J., N. Christensen Int'l. Mktg. 201-273-3833

™CUBATH - acid copper electroplating process. - Sel-Rex Div. Oxy Metal Industries Corp.

™CUBE-PAC: - module assembly package - Powercube Corp.

™CUBIC - computer tape - Memorex Corp.

™CUBIC - computer tape - Memorex Corp.

CUBIC CORP., Dept. EM, 9233 Balboa Ave., San Diego, Cal. 92123, Tel: 714-277-6780, TWX: 714-279-0267; Empl.: 2100

™CUBITAPE - Surveying tool - Cubic Corp.

™CUBOND - copper brazing paste - Glidden Metals

™CUCLAD - rigid microwave substrate material - 3M Company

™CUE/SPLICE - magnetic tape splice - Tapecon, Inc.

™CUFLEX - flexible pointed circuit material - 3M Company

CUNNINGHAM, Sub. Gleason Works, Dept. EM, 10 Carriage St., Honeoye Falls, N.Y. 14472, Tel: 716-624-2000, TWX: 510-254-4202; Empl.: 108

Local Sales Offices & Reps.
Ariz Scottsdale, L. McMillan 602-949-9437
Cal Walnut Creek, Jaylin Engrg. Co. 415-933-0775
Ga Atlanta, C. Harrison Assocs. 404-449-7696
Ill Chicago, R.R. Hutmacher Assocs. 312-631-3248
Ind Indianapolis, J. O. Goetz Sls....... 317-545-5638
Iowa Des Moines, Pacer Corp. 515-274-3224
Md Bethesda, Bartlett 301-656-3061

Mass	Lexington, F. M. Valenti	617-861-0089
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	St. Paul, Debeck Assocs/Electro Prods. Div.	612-690-1556
Mo	Raytown, Pacer Corp.	816-358-6638
Mo	St. Louis, Pacer Corp.	314-894-1388
Nev	Sparks, Cunningham Corp/Western Fulfillment Ctr.	702-359-4848
NY	Woodhaven, A. Sarfaty & Assocs.	212-846-1952
Ohio	Dayton, J. O. Goetz Sls.	513-274-5628
Ore	Salem, Pacnor Mktg.	503-363-6445
Pa	Pittsburgh, J. Metz Assocs.	412-461-3321
Pa	Wayne, Bartlett	215-688-7325
Tex	Carrollton, El Wilco, Inc.	214-242-5321
Wash	Seattle, Pacnor Mktg.	206-284-8020

™CUPAC - high current stud silicon rectifier - Semtech Corp.

™CUPRON - resistance alloy - GTE Sylvania Inc.

™CUPRONEL - thermocouple alloy - GTE Sylvania Inc.

™CUPROX - analytical reagent - Coleman Instr. Div.

CUR-MEL ENTERPRISES, Dept. EM, P.O. Box 63, Placentia, Cal. 92670, Tel: 714-528-4601

™CURRISTOR - current sensing resistor - General Resistance, Inc.

CURTIS ELECTRO DEVICES, Dept. EM, Box 4090, Mountain View, Cal. 94040, Tel: 415-964-3136; Empl.: 10

™CURTIS INDACHRON -, low cost elapsed time indicato - Curtis Instrs., Inc.

CURTIS INDUSTRIES INC., Dept. EM, 8000 West Tower Ave., Milwaukee, Wisc. 53223, Tel: 414-354-1500; Empl.: 160

Sales Manager: R. VanDer Elson

Local Sales Offices & Reps.

Ariz	Tucson, Morrow & Assoc.	602-296-4719
Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	Santa Monica, Master Representatives	213-395-2637
Colo	Denver, Denver Electrical Sls	303-777-3010
Fla	Lakeland, AA Electric Div. of AEC	813-682-6181
Ga	Atlanta, AA Electric	404-449-8670
Haw	Honolulu, Dougherty Entprs.	
Ill	Downers Grove, Richmar Elctrns. Corp.	312-968-0118
La	New Orleans, W. Case & Assocs.	504-835-7713
Md	Woodbine, Naudain Assocs.	301-252-5378
Mich	Farmington Hills, Electro-Matic	313-478-1182
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	Hazelwood, Dy-Tronix	314-731-5799
Mo	Kansas City, Dy-Tronix	816-737-1100
NJ	Clifton, Ossmann Comp. Inc.	201-778-8888
NJ	Mount Laurel, Naudain Assocs.	609-235-1801
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Huntington, Ossmann Comp. Inc.	516-673-9300
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NC	Winston-Salem, L.G. White & Co.	919-725-3612
Ohio	Cleveland, Nationwide Comps. Reps.	216-562-9666
Pa	Philadelphia, Naudain Assocs.	609-235-1802
Tenn	Memphis, R.D. Thomas Co.	901-683-0341
Tex	Houston, McDaniel & Assoc.	713-649-8606
Tex	Irving, Aid Elctrns.	214-259-4761
Wash	Seattle, C.B. Parsons & Co.	206-762-7373
Wisc	Milwaukee, Richmar Elctrns.	414-781-1730

Local Distributors

NY	Scarsdale, Logicomp Elctrns., Inc.	914-723-3334

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CURTIS INSTRS., INC., Dept. EM, 200 Kisco Ave., Mt. Kisco, N.Y. 10549, Tel: 914-666-2971, TWX: 710-571-2163; Empl.: 50 .... p. 2821

Local Sales Offices & Reps.

Ariz	Phoenix, O'Donnel Assoc.	602-993-9740
Cal	Milbrae, Polach & Bensinger, Inc.	415-697-2525
Cal	Seal Beach, Texel Engrg.	213-596-9411
Colo	Denver, Grifco	303-795-1989
Ill	La Grange Park, Bierhaus Sls.	312-354-5100
Ind	Ft. Wayne, McDonald Sls. Co.	219-747-3650
Mass	Brookline, Harman Assocs.	617-232-6687
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	St. Louis, Fixman Engrg.	314-725-5219
NY	Manhasset, WinCor Elctrn. Sls. Corp.	516-627-9474
NY	Syracuse, Rep. Tech., Inc.	315-437-2845
NC	Winston-Salem, Radco Engrg.	919-722-9671
Pa	Media, W. Reeves Assocs., Inc.	215-LO 6-6709
Tex	Dallas, Etron Corp.	214-245-6633
Va	Arlington, Gans Fryling, Inc.	703-527-3262
Wash	Seattle, Blum & Assocs.	206-285-2590
Wisc	Milwaukee, Bierhaus Sls.	414-332-0900

™CURVACORE - transformers - Allis-Chalmers

™CUSHIONSEAL - 19' racumount shipper - Adam Co., Inc., W. D.

CUSHMAN ELECTRONICS, Dept. EM, 830 Stewart Dr., Sunnyvale, Cal. 94086, Tel: 408-739-6760, TWX: 910-339-9284; Empl.: 190

™CUSIL - brazing alloys - GTE Sylvania Inc.

CUSTOM CABLE CO., Dept. EM, 242 Butler, Westbury, N.Y. 11590, Tel: 516-334-3600; Empl.: 7; Minimum order: $D. Pollack

Sales Manager: J. Michelman; *Distributor Manager*: D. Pollack

CUSTOM COIL & TRANSFORMER CO., Dept. EM, Box 2369, Zanesville, Ohio 43701, Tel: 614-452-6973; Empl.: 75

CUSTOM CONNECTOR CORP., Dept. EM, 1738 E. 30th St., Cleveland, Ohio 44114, Tel: 216-241-1679; Empl.: 36

Local Sales Offices & Reps.

Ala	Decatur, Tenn Tech Sls.	205-350-0630
Cal	Downey, Sierra-Pacific Engrg, Inc.	213-928-1815
Cal	Palo Alto, Held & Hollard	415-965-9321
Colo	Aurora, Comp. Specialties	303-341-0160
Conn	Glastonbury, Barton-Caron Assoc.	203-633-9417
Ill	Schaumberg, Control Design	312-882-7232
Ind	Indianapolis, Control Design	317-788-4559
Mass	Auburndale, Barton-Caron Assoc.	617-322-2021
Mo	St. Louis, Control Design	314-426-3150
NJ	Morristown, W.J. Waldron Assoc.	201-538-5607
Pa	Havertown, W. F. Keegan & Co.	215-528-6640
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
Tex	Garland, Ray-May Assoc.	214-276-5214

™CUSTOM DESIGNS - built to customer's specifications - MarkHon Industries Inc.

CUSTOM DEVICES, Div. CTL, Inc., Dept. EM, 763 U.S. Hwy. 17-92, Fern Park, Fla. 32730, Tel: 305-834-3340; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, Rep, Inc.	205-881-9270
Cal	Los Angeles, Intervend Inds., Ltd.	213-821-7936
Cal	Mountain View, Thresum Assocs.	415-965-9180
Fla	Orlando, Perrott Assocs.	305-275-1132
Ga	Tucker, Rep, Inc.	404-938-4358
Md	Baltimore, Burgin-Hreh Assocs.	301-788-5200
Mass	Burlingon, New England Tech Sls. Corp.	617-272-0434
Minn	St. Paul, D. Nedved Assocs.	612-645-2945
NJ	Moorestown, L.E. Brown Assocs	609-234-0382
NY	Jericho, HRC Comp-Tech	516-822-5550
NY	N. Syracuse, Advanced Comps. Corp.	
NY	Schnectady, N. W. Alexander & Assocs	518-377-0581
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Mansfield, Benchmark Sys	419-756-9211
Va	Lynchburg, Burgin-Kreh Assocs	804-845-5600
Wash	Tukwila, General Elctrns.	206-575-4030

CUSTOM ELCTRNS., Dept. EM, Browne St., Oneonta, N.Y. 13820, Tel: 607-432-3880, TWX: 510-241-8292; Empl.: 60 .... p. 1245

Local Sales Offices & Reps.

Cal	Los Angeles, M.A. Stolaroff Co.	213-295-7781
Cal	Santa Clara, Richards Ass.	408-246-5860
Ill	Chicago, Rozner Sales	312-283-0022
Md	Silver Spring, Youth Assocs.	301-598-5740
Mass	Stow, Musello Assocs.	617-369-5900
Mich	Southfield, C.H. Schmidt Co.	313-353-6000
NY	Dix Hills, Mc Culloch Sls. Co.	516-864-8831
Tex	Dallas, Hillman Entprs.	214-827-4790
Wash	Seattle, Components West Inc.	206-243-2133

CUSTOM INDUSTRIAL CONTROLS, Dept. EM, Box 358, Liberty, Mo. 64068

™CUSTOM/POWER - special power supplies - Trio Labs, Inc.

CUSTOM POWER/CAL., INC., Dept. EM, 740 W. Collins Ave., Orange, Cal. 92667, Tel: 714-639-2390; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Chaparral-Dorton	602-263-0414
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Haw	Honolulu, Aloha Assocs.	808-941-1574
Mass	Lexington, MRI Group	617-861-6270
Mich	Detroit, NICON Assocs.	313-341-7688
NJ	Wayne, G & A Sls.	201-256-8500
NY	Rochester, Upstate Component Sls.	716-288-1080
NC	Winston Salem, Reynolds & Assocs.	919-725-6196

CUSTOM SCIENTIFIC INSTRS., Dept. EM, 13 Wing Dr., Box A, Whippany, N.J. 07981, Tel: 201-538-8500; Empl.: 20

Local Sales Offices & Reps.

SC	Lancaster, Slaughter Machinery Co.	803-283-2038

™CUSTOM VAND VII - pumps - Allis-Chalmers

CUTLER-HAMMER, INC., Dept. EM, 4201 N. 27th St., Milwaukee, Wisc. 53216, Tel: 414-442-7800, TWX: 910-262-3089

Sales Manager: J.A. Anderson; *Distributor Manager*: M.F. Higbie

Local Sales Offices & Reps.

Ala	Birmingham	205-871-1166
Ala	Mobile	205-471-5852
Ariz	Phoenix	602-273-7497
Ark	Little Rock	501-375-8355
Cal	Anaheim	714-776-1910
Cal	Danville	415-820-3930
Cal	Menlo Park	415-854-3757
Cal	San Diego	714-298-5432
Colo	Denver	303-934-5408
Conn	Hartford	203-563-0104
Fla	Jacksonville	904-725-2845
Fla	Tampa	813-839-5493
Ga	Atlanta	404-939-3023
Haw	Honolulu	808-531-0596
Ill	Broadview	312-547-7980
Ill	Peoria	309-685-4031
Ill	Rockford	815-398-6585
Ind	Indianapolis	317-546-4096
Ind	South Bend	219-256-1591
Iowa	Ankeny	515-964-0258
Iowa	Davenport	319-323-8057
Kans	Shawnee Mission	913-236-6313
Kans	Wichita	316-263-5216
Ky	Louisville	502-458-2639
La	New Orleans	504-293-7616
La	Shreveport	318-869-3194
Md	Rockville	301-881-8450
Md	Towson	301-825-6041
Mass	Newton	617-244-7511
Mass	Worcester	617-853-5824
Mich	Bridgeport	517-777-0880
Mich	Grand Rapids	616-243-0152
Mich	Southfield	313-353-3834
Minn	Minneapolis	612-831-3560
Mo	NIXA	417-725-1120
Mo	St. Louis	314-567-3311
Neb	Omaha	402-397-0740
NH	Dover	603-742-1687
NJ	Trenton	215-878-0820
NJ	Union	201-687-4433
NM	Albuquerque	505-293-6280
NY	Melville	516-595-4424
NY	New York	212-687-0707
NY	Rochester	716-271-5460
NY	Syracuse	315-437-7201
NC	Charlotte	704-523-3056
NC	Greensboro	919-272-4567
NC	Raleigh	919-781-6643

Ohio	Cincinnati	513-825-5252
Ohio	Dayton	513-293-2117
Ohio	Toledo	419-874-1115
Okla	Oklahoma City	405-848-4807
Okla	Tulsa	918-627-3312
Ore	Eugene	502-342-8251
Pa	Pittsburgh	412-922-2707
Pa	Wayne	215-878-0820
RI	E. Providence	401-434-8555
SC	Columbia	803-359-5169
SC	Greenville	803-288-4183
Tenn	Memphis	901-458-2631
Tenn	Nashville	615-292-5539
Tex	Dallas	214-631-3731
Tex	Houston	713-526-1205
Utah	Salt Lake City	801-972-3250
Va	Norfolk	801-461-1016
Va	Richmond	804-288-1656
Va	Roanoke	703-354-9901
Va	Roanoke	703-354-9901
Wash	Seattle	206-747-5560
Wash	Spokane	509-326-1610
WVa	Charleston	304-768-7389
Wisc	Milwaukee	414-354-6050

CUTLER-HAMMER, Shallcross Resistor Prods., Dept. EM, US 70 East, Smithfield, N.C. 27577, Tel: 919-934-5181, TWX: 510-939-1463; FSC No.: 54294; Empl.: 130

Sales Manager: L. Hinshaw

Local Sales Offices & Reps.

Ariz	Phoenix, Zeus, Inc.	602-258-7519
Cal	Anaheim, Cutler Hammer	714-776-1910
Cal	Hawthorne, WCV Co.	213-772-4479
Cal	San Carlos, Winco Sls.	415-365-6082
Colo	Denver, R.W. Masterson Co.	303-771-1482
Fla	Oviedo, Conley Assocs.	305-365-3284
Ill	Chicago, Berndt Assocs.	312-283-0713
Kans	Olathe, T.R.I.	913-782-1177
Md	Bethesda, Warren Mount Co.	301-657-9312
Mass	Allston, Vector Sls., Inc.	617-787-2790
Mich	Farmington Hills, H. Lowell Co.	313-581-7474
Minn	Minneapolis, Components Group	612-824-4222
NY	Plainview, ERA, Inc.	516-822-9890
NY	Rochester, Ontec	716-464-8636
NC	Smithfield, ADI	919-934-8136
Ohio	Cincinnati, A.C. Wahl & Assocs.	513-821-3270
Pa	Pittsburgh, Dolfuss/Root Co.	412-561-4125
Tenn	Bristol, Remco Corp.	615-968-4195
Tex	Dallas, Cutler-Hammer	214-631-3731
Wash	Bellevue, Cutler-Hammer	206-747-5560
Exp:	Wisc., Milwaukee, Cutler-Hammer International C.A.	414-442-7800

Local Distributors

Ariz	Phoenix, ACI Electronics	602-277-7661
Cal	Carson, Hi-Rel	213-537-6500
Cal	Hawthorne, Westec	213-772-4479
Cal	Mountain View, Shelley-Rodabaugh	415-969-1820
Cal	San Diego, Shelley-Neumann	714-453-7133
Cal	Santa Monica, Shelley Eltrns.	213-392-3913
Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Conn	Stratford, Electro-Comp	203-375-5811
Fla	Clearwater, Diplomat/Southland	813-443-4514
Ill	Palatine, OHM/Electronics	312-359-5500
Md	Bethesda, Wire Supply	301-657-9333
Mass	Holliston, Diplomat/New England	617-237-2936
Mich	Grand Rapids, Stotts-Friedman Elctrns. Supply	616-459-0216
Minn	Minneapolis, Diplomat/Electro Com	612-788-8601
Mo	St. Louis, Diplomat/St. Louis	314-645-8550
NJ	Haddonfield, Mid-Atlantic	609-428-8288
NY	Farmingdale, Command Elctrns.	516-293-1212
NY	Plainview, ACI	516-293-6630
NY	Vestal, Harvey Federal	607-748-8211
Ohio	Dayton, Diplomat/Ohio	513-228-1080

CVC PRODUCTS, INC., Dept. EM, 525 Lee Rd., Box 1886, Rochester, N.Y. 14603, Tel: 716-458-2550, Telex: 97-8269; Empl.: 160

Local Sales Offices & Reps.

Ariz	Scottsdale, J. Smith & Assoc.	602-947-2495
Cal	Sunnyvale, CVC Prods.	408-739-8500
Colo	Boulder, J. Smith & Assoc.	303-442-7100
Colo	S. Pasadena, CVC	213-787-6001
Ga	Chamblee, CVC	404-455-9096
Ga	Chamblee, E. G. Holmes & Assoc.	404-451-6161
Ill	Roselle, CVC	312-529-9240
Mass	Amesbury, CVC	617-235-8273
Minn	Minneapolis, Scientific Devices-Midwest	703-451-6500
Mo	Clayton, Gateway Scientific Equip.	314-725-3464
NJ	Ridgewood, CVC	201-447-0660
NJ	River Edge, Flow Matics Inc.	201-265-4411
NM	Albuquerque, J. Smith & Assoc.	505-255-2111
Ohio	Cincinnati, Batsner Bros.	513-871-2242
Tex	Round Rock, Chem Elec. Assoc.	512-255-4851
Va	Springfield, Scientific Devices D. C.	703-451-6500
Wash	Kennewick, Ben-Tronics	509-783-3817

™CV-D - microphone - Electro-Voice, Inc.

™CV50 - fixture and test set system for bareboards - Everett/Charles, Inc.

™C-W - coils - Caddel-Burns Mfg. Co., Inc.

CW INDUSTRIES, Dept. EM, 550 Davisville Rd., Warminster, Pa. 18974, Tel: 215-355-7080, TWX: 510-667-1875; Empl.: 500 .... p. 1831,4057-4059

Local Sales Offices & Reps.

Ariz	Phoenix, MR Engrg. Sls.	602-959-5150
Cal	Los Angeles, Western Electromotive/Shephard	213-820-3777
Cal	Redwood City, W. Hickey Sls.	415-368-3849
Colo	Boulder, RG Enterprises	303-447-9211
Fla	Pompano Beach, Cole Tek Assoc.	305-781-8110
Ill	Chicago, G. Mcl Cole	312-774-3535
Ind	Indpls., Southern Sls.	317-299-2992
Iowa	Cedar Rapids, H.R. Brown Sls.	319-366-0635
Md	Pikesville, Muncy Sls. Assoc.	301-484-6376
Mass	Needham, A & M Elctrn. Reps.	617-444-8170
Mich	Detroit, Nicon Assocs.	313-341-7688
Minn	Minneapolis, Jos Co/Melius	612-854-4270
Mo	St. Louis, E. Hill	314-621-1818
NJ	Oaklyn, A. Wetterhahn	609-858-3003
NM	Albuquerque, Staley Co.	505-821-4310
NY	Fairport, Frank Hall	716-377-6584
NY	Hempstead, Kahgan Sls. Corp.	516-538-2300
NY	N. Hartford, H. Lessman	315-737-5038
NY	Syracuse, W.A. Franklin Sls. Corp.	315-474-2954
NC	Carey, T. Santel	919-467-7595
Ohio	Cleveland, Marlow Assoc.	216-932-0900
Ore	Beaverton, LD Elctrns.	503-649-8556
Tenn	Greeneville, Lamons Sls. Co.	615-639-8711
Tex	Dallas, Vista Assocs.	214-235-4547
Va	Portsmouth, F.B.D. Sls.	804-484-3162
Wash	Woodinville, Marvin Klinect	206-485-7312
Exp:	N.Y., N.Y., Roburn Agencies	513-294-1648

CYBEREX, INC., Dept. EM, 7171 Industrial Park Blvd., Mentor, Ohio 44060, Tel: 216-946-1783, Telex: 980-644; Empl.: 40

Local Sales Offices & Reps.

Ala	Birmingham, Crim Sls. & Engrg. Co.	205-871-4084
Cal	Anaheim, Engineering Reps. Co.	714-535-4831
Cal	San Diego, Engineering Reps. Co.	714-535-9831
Cal	San Francisco, Artwel Elec., Inc.	415-467-1880
Colo	Denver, Electrical Agencies Co.	303-623-8246
Conn	Bolton, Metronics, Inc.	203-643-5358
Fla	Brandon, J. Meeks & Assocs.	813-689-6137
Fla	Maitland, Motion Technology	305-834-8004
Fla	Miami, A.C. Chaney & Assocs.	305-754-8857
Ga	Atlanta, Whitehead Assocs.	404-393-0695
Haw	Honolulu, Atlas Elec. Co.	808-571-1906
Ill	Chicago, W. Lamont Assocs.	312-777-8575
Ill	Chicago, Gannon Elec.	312-774-2884
Ind	Indianapolis, R.M. Price	317-255-0665
Kans	Lenexa, Matney & Co.	913-888-6900
La	Jackson, General Power & Control	601-922-5000
La	Metairie, General Power & Control	504-834-1345
Md	Silver Spring, Bradley Electro Sls.	301-587-1866
Md	Timonium, M. F. Co.	301-252-9090
Mass	Framingham, Total Power Corp.	617-237-2024
Mich	Southfield, Engel-Klaes Co.	313-355-1610
Minn	Minneapolis, A.M. Johnson Co.	612-927-8741
Mo	St. Louis, Karraker Co.	314-231-3666
Neb	Omaha, Electric Equip. Sls. Co.	402-556-4198
NM	Albuquerque, Bowden Engrg. & Sls.	505-268-7676
NY	Buffalo, Robinson Assocs.	716-886-7350
NY	Latham, Robinson Assocs.	518-785-5844
NY	New York City, NEPA, Inc.	212-867-0340
NY	Rochester, Robinson Assocs.	716-342-3130
NY	Syracuse, Robinson Assocs.	315-478-0241
NY	White Plaines, Shea Assocs.	914-949-2366
NC	Charlotte, Motion Technology, Inc.	704-525-9855
NC	Charlotte, Ray Waggoner	704-523-5476
NC	Charlotte, R W Chapman	704-525-2421
NC	Greensboro, R.W. Chapman & Co.	919-273-1809
NC	Raleigh, R.W. Chapman & Co.	919-782-2624
Ohio	Cincinnati, Alexander Equip. Co.	513-221-7520
Ohio	Cleveland, Collart Co.	216-333-5550
Ohio	Wadsworth, Ohio Industrial	216-334-2518
Okla	Tulsa, H. Furtney Co.	918-747-6490
Ore	Lake Oswego, United Sls. Assocs.	
Pa	Concordville, Harris & Kenworthey, Inc.	215-459-5532
Pa	Philadelphia, Technicraft Co.	215-483-4700
Pa	Pittsburgh, Waggoner-Ver Hill Assocs.	412-241-5202
SC	Greenville, R.W. Chapman & Co.	803-232-5391
SC	W. Columbia, R.W. Chapman & Co.	803-796-9796
Tenn	Concord, R.W. Chapman & Co.	615-966-6120
Tex	Dallas, United Technical Mktg.	214-231-5611
Wash	Vancouver, Alpha Engrs.	206-693-1855
Wisc	Cedarburg, Osbon Assocs.	414-377-2400

CYBERNETICS MEDICAL, INC., Dept. EM, 206 5th St., Lynchburg, Va. 24504

CYBERSONIC DIV., C. A. Briggs Co., Dept. EM, Box 151, Glenside, Pa. 19038, Tel: 215-885-2244, Telex: 83-4753

Local Sales Offices & Reps.

Md	Sykesville, C.A. Briggs Co.	301-781-4894

™CYBERTONE - audible signalling device - Cybersonic Div.

™CYCLEASE - mold release - Ram Chems.

CYCLE-DYNE, INC., Sub. Axel Elctrns., Inc., Dept. EM, 134-20 Jamaica Ave., Jamaica, N.Y. 11418, Tel: 212-AX 1-3907, TWX: 710-582-2618; Empl.: 50

Local Sales Offices & Reps.

Cal	Fullerton, Western Automation/Power Syst.	714-879-0440
Conn	Newington, Ferrotherm N/E Inc.	203-667-2727
Fla	Clearwater, H.R. Gross & Co.	813-446-6649
Ill	Berwyn, Technical Specialties	312-656-0120
Ind	Indianapolis, Tech Sls. & Mktg.	317-356-3658
Md	Baltimore, Precision Sls. Co.	301-828-4897
Mich	Birmingham, Thibodeau Engrg.	313-642-6620
Minn	White Bear Lake, Tempco Corp.	612-429-4251
Mo	Kansas City, Process & Control Prods.	816-444-4344
Mo	St. Louis, Woodsons Machinery Co.	314-822-8836
NY	Woodmere, Ferrotherm Inc.	516-295-1797
NC	Matthew, Carolina Tech. Reps. Inc.	704-847-4494
Okla	Tulsa, R. Siegele Co.	918-622-9629
Pa	Bala-Cynwyd, J.V. Calhoun Co.	215-839-3000
Pa	Bridgeville, Jacobs Assocs.	412-341-8320
Tenn	Nashville, System Engrg. Co.	615-227-2803
Tex	Dallas, Production Engrg. Sale Organ.	214-369-3181
Wash	Seattle, Hartley Corp.	206-772-2000
Wisc	Butler, AKO Engrg., Sale & Service	414-781-8360
Exp:	N.Y., Woodmere, Ferrotherm Inc.	516-295-1797

™CYCL-FLEX - timers counters - Eagle Signal

™CYCLOHM - fans-blowers - Howard Industries

™CYCLONAIR - blower - Rotron, Inc.

™CYCLONOME - pulse counters & stepping motors - Sigma Instruments, Inc.

™CYCLOPTIC - stereoscopic microscope - American Optical Corp.

™CYCLO-RUBBER - cyclicized rubber materials - Hardman Inc.

CYCLO-TRONICS, INC., Dept. EM, 3858 N. Cicero Ave., Chicago, Ill. 60641, Tel: 312-282-6141; Empl.: 10

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs. Inc.	205-534-3387
Cal	Inglewood, Tracker, Inc.	213-645-6060
Cal	Mt. View, Morse Assocs.	415-968-7772
Fla	Light House Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	305-422-3686
Ill	Elk Grove City, Loren Green Assocs.	312-593-0282
Mass	Stoneham, Production Devices	617-438-2772
Mich	Detroit, Micro Sls. Corp.	313-482-1229

Minn	Minneapolis, Loren Green Assocs.	612-781-1161
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Centerville, Micro Sls. Corp.	513-433-8171
Ohio	Medina, Micro Sls. Corp.	216-331-0900
Wash	Monroe, Cascade Equip. Co.	206-794-7163

™C2R - power switching transistors - General Semiconductor Industries, Inc.

™C-21 - pressure sensitive individual wire seals - Hughes Aircraft Co., Connecting Devices Div.

D-CEMCO, INC., Dept. EM, 3200 N. San Fernando Blvd., Burbank, Calif. 91504, Tel: 213-849-6341; Empl.: 16

D & L SALES CO. INC., Dept. EM, 296 Preakness Ave., Paterson, N.J. 07502, Tel: 201-684-8223, 684-8224; Empl.: 10

DABURN ELECTRONICS & CABLE CORP., Dept. EM, 2360 Hoffman, Bronx, N.Y. 10458, Tel: 212-295-0050, TWX: 710-593-4145; FSC No.: 25706 p. 4620-4624

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Corp.	205-547-7718
Cal	San Mateo, Carelli-EMA	415-341-6666
Fla	Clearwater, Nickerson Corp.	813-536-1260
Fla	Seminola, Nickerson Corp.	813-397-4843
Fla	Tampa, F.C. Nickerson Co.	813-885-1416
Haw	Honolulu, Hawaii Elctrn. Ser.	808-845-8207
Ill	Arlington Hts., C. P. Dombrow Co.	312-253-3493
Ind	Indian, Midstates Mktg.	316-247-7857
Md	Baltimore, HEW Enterprises	301-460-3700
Mass	Boston, Anderson Sls. Co.	617-227-2980
Minn	Minn., Kodo Associates, Inc.	612-881-1255
NY	Plainview, R. Smith Assoc.	516-681-3155
NY	Spring Valley, R. Smith Assoc.	914-354-6067
NY	Syracuse, Lewis-Dunnigan Co.	315-446-5522
NC	Franklin, Nickerson Corp.	704-524-6790
NC	Kannapolis, F.C. Nickerson Co.	704-932-6772
Ohio	Cleveland, Ind'l. Sls. Assoc.	216-721-7500
Tex	Garland, G.V. Peck Co.	214-341-8311
Tex	Houston, G.V. Peck Co.	713-789-7111

DACO INSTR. CO., Dept. EM, 30 Stran Rd., Milford, Conn. 06460, Tel: 203-874-2515, TWX: 710-462-1049; Empl.: 40

™DAFAB - Polyester Monofilament fabric - Wire Cloth Enterprises, Inc.

™DAFLEX - vinyl tubings - Daburn Electronics & Cable Corp.

™DAFLON - teflon tubings - Daburn Electronics & Cable Corp.

™DAG - lubricant - Acheson Colloids Co.

™DAGE - coax connectors - Bendix

™DAGLAS (R) - Magnet Wire - Phelps Dodge Magnet Wire Co.

DAICO INDUSTRIES INC., Dept. EM, Box 5225, Compton, Cal. 90220, Tel: 213-631-1143, TWX: 910-346-6741; Empl.: 40 p. 3000-3003

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Los Altos, Cain-White & Co.	415-948-6533
Cal	Los Angeles, Microwave Technical Sls	213-340-0542
Fla	Palm Bay, Spartech Assocs.	305-727-8045
Ga	Smyrna, Spartech Assocs.	404-432-3644
Ind	Fort Wayne, Berberich Assocs, Inc.	219-749-0600
Mass	Cochituate, Micronic Assocs.	617-872-6561
NY	Tuckahoe, Spectrum Sls	914-793-1660
Ohio	Centerville, Berberich Assocs, Inc.	513-433-0342
Ohio	Cleveland, Berberich Assocs, Inc.	216-289-5094
Pa	Newtown Square, SWR Assocs.	215-EL6-8550
Tex	Ft. Worth, McDonald Engrg	817-244-2480
Va	Fairfax, Schibley Assocs.	703-591-3008

DAI-ICHI SHOJI OF AMERICA, Dept. EM, 151 Dupont St., Plainview, N.Y. 11803, Tel: 516-822-9300

™DAKA WARE - plastic knobs - Davies Molding Co., Harry

DALE®

DALE ELECTRONICS INC., Sub. Lionel Corp., Dept. EM, Box 609, Columbus, Neb. 68601, Tel: 402-564-3131, TWX: 910-626-8314; Empl.: 2000 3684-3691, 3834, 3835

Local Sales Offices & Reps.

Ala	Huntsville, Powertronics, Inc.	205-852-6347
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Del Mar, Reed Elctrn. Mktg.	714-452-1456
Cal	Los Alamitos, Reed Electronic Mktg.	213-598-6676
Cal	Redwood City, J.S. Heaton Co. North	415-369-4671
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Ocala, Graham Assocs.	904-629-6712
Fla	Palm Beach Gardens, Graham Assocs.	305-622-4049
Ill	Chicago, Industrial Representatives Inc.	312-647-7755
Ind	Fort Wayne, Scott Elctrns., Inc.	219-743-1586
Ind	Indianapolis, Scott Elctrns., Inc.	317-897-9976
Kans	Mission, Dale Sls. Office	913-432-9175
Ky	Louisville, Scott Elctrns., Inc.	502-583-3220
Md	Towson, R.L. Wilkinson, Inc.	301-377-7800
Mass	Wakefield, Kaelber & Mack, Inc.	617-245-9359
Mich	Detroit, Jay Mktg. Assoc.	313-837-4100
Mich	Detroit, Burcaw Co. & Assocs.	313-533-7700
Mich	Kentwood, Burcaw Co. & Assocs.	616-531-1000
Mich	Plymouth, Scott Elctns. Inc.	313-357-2088
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422
NJ	Fairlawn, Kaelber & Mack, Inc.	201-797-7782
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Ithaca, Dale Electrs.	607-272-6212
NY	Manhasset, Kaelber & Mack, Inc.	516-543-2924
NC	Thomasville, Powertronics, Inc.	919-476-6727
Ohio	Cincinnati, Scott Elctns. Inc.	513-791-2513
Ohio	Cleveland, Scott Elctrns., Inc.	216-291-2600
Ohio	Columbus, Scott Elctrns., Inc.	614-236-8619
Ohio	Dayton, Scott Elctrns., Inc.	513-294-0539
Ore	Beaverton, L/D Elctrns.	503-649-6177
Pa	Glenside, R. Wilkinson, Inc.	215-887-5300
Pa	Pittsburgh, Scott Elctrns., Inc.	412-828-1073
SC	Greenville, Powertronics, Inc.	803-288-0270
Tex	Dallas, E.F. Aymond Co.	214-826-7620
Tex	Houston, E. F. Aymond Co.	713-442-5791
Wash	Woodinville, L/D Elctrns.	206-485-7312
Wisc	Milwaukee, Industrial Reps. Inc.	414-259-0965

Local Distributors

Ala	Huntsville, Hamilton/Avnet	205-533-1170
Ariz	Phoenix, Hamilton/Avnet Corp.	602-267-9512
Cal	Costa Mesa, Avnet Elctrns.	213-558-2203
Cal	Mountain View, Shelley-Rodabaugh	415-969-1820
Cal	Mountain View, Hamilton/Avnet Corp.	415-961-7000
Cal	San Diego, Shelley-Neumann, Inc.	714-453-7133
Cal	San Diego, Hamilton/Avnet Corp.	714-279-2421
Cal	Santa Monica, F. Shelley Elctrns.	213-392-3913
Cal	Sunnyvale, Acacia Sls., Inc.	408-745-7200
Colo	Denver, Newark-Denver Elctrns.	303-757-3351
Colo	Denver, Hamilton/Avnet Elctrns.	303-534-1212
Colo	Denver, Waco Elctrns.	303-371-4370
Conn	Georgetown, Hamilton/Avnet	203-762-0361
Conn	Stratford, Electro/Comp	203-375-5811
Fla	Fort Lauderdale, Newark Elctrns.	305-587-2372
Fla	Ft. Lauderdale, Hamilton/Avnet	305-971-2900
Fla	Palm Beach Gardens, Legri S. Resistor Corp.	305-626-5400
Ga	Atlanta, Hamilton/Avnet	404-448-0800
Ill	Chicago, Hamilton/Avnet Elctrns.	312-678-6310
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Palatine, Ohm Elctrns.	312-359-5500
Ill	Skokie, Bell Inds.	312-282-5400
Ind	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elec. Supply	317-634-8202
Ind	South Bend, Radio Distributing Co.	219-287-2911
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Lenexa, Hamilton/Avnet	913-888-8900
Kans	Wichita, Radio Supply Co.	316-267-5216
Md	Baltimore, Hamilton/Avnet	301-796-5000
Md	Baltimore, Radio Elec. Svc. Co.	301-823-0070
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mass	West Newton, A.W. Mayer Co.	617-965-1111
Mass	Woburn, Hamilton/Avnet	
Mich	Ann Arbor, Wedemeyer Elctrn. Supply	313-665-8611
Mich	Grand Rapids, Stotts-Friedman	616-459-0216
Mich	Livonia, R S Elctrns.	313-525-1155
Mich	Livonia, Hamilton/Avnet	313-522-4700
Mich	Oak Park, Newark-Detroit Elctrns.	313-548-0250
Mich	Wyoming, Newark Industrial Elec. Corp.	616-241-6681
Minn	Edina, Hamilton/Avnet	612-941-3801
Minn	Minneapolis, Stark Elctrns.	612-332-1325
Minn	St. Paul, Gopher Elctrns. Co.	612-645-0241
Mo	Kansas City, Burstein-Applebee Co.	816-531-5614
Mo	St. Charles, Lectronix, Inc.	314-946-6424
Mo	St. Louis, Hamilton/Avnet	314-731-1144
NJ	Cedar Grove, Hamilton/Avnet Elctrns.	201-239-0800
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Kenilworth, Newark Elctrns. Ctr.	201-272-8410
NJ	Mount Laurel, Hamilton/Avnet Elctrns.	609-234-2133
NJ	Roselle, Garden State Ind'l. Elctrns.	201-241-9000
NJ	Springfield, Federated Purchaser	201-376-8900
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	Binghamton, ASI Elctrn. Inc.	607-723-6326
NY	Buffalo, Summit Dist.	716-884-3450
NY	E. Farmingdale, Harrison Radio Corp.	516-293-7990
NY	E. Syracuse, Hamilton/Avnet	315-437-2641
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Johnson City, Wilshire Elctrns.	607-797-1236
NY	Plainview, Fairmont Elctrns.	516-694-8200
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NY	Rochester, Hamilton/Avnet	716-442-7820
NY	Rockville Centre, Midway Ind'l. Elctrns.	516-764-2400
NY	Rome, Rome Elctrns.	315-337-5400
NY	Westbury, Hamilton/Avnet	516-333-5800
NC	Charlotte, Brownell-Electro	704-394-4341
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Cincinnati, Hughes-Peters, Inc.	513-351-2000
Ohio	Cleveland, W.M. Pattison Supply Co.	216-441-3000
Ohio	Cleveland, Pioneer Standard Elctrns.	216-587-3600
Ohio	Cleveland, Hamilton/Avnet	216-461-1400
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Dayton, Hamilton/Avnet	513-433-0610
Ohio	Lima, Lima Radio	419-228-1220
Okla	Tulsa, Radio, Inc.	918-587-9123
Okla	Tulsa, Oil Capitol Elctrns.	918-622-8520
Pa	Erie, Advacom	814-455-8110
Pa	Philadelphia, Herbach & Rademan	215-426-1700
Pa	Pittsburgh, CAM/RPC	412-782-3770
RI	Providence, W. Dandreta & Co.	401-861-2800
Tenn	Nashville, Electra Distributing Co.	615-329-3971
Tex	Dallas, Hamilton/Avnet	214-661-8661
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	Fort Worth, T.T.I., Inc.	817-335-8111
Tex	Houston, Lenert Co.	713-225-1465
Tex	Houston, Hamilton/Avnet	713-780-1771
Tex	Houston, Sterling Elctrns.	713-623-6600
Utah	Salt Lake City, Hamilton/Avnet	801-262-8451
Va	Richmond, I.T.R.	804-288-7198
Wash	Bellevue, Hamilton/Avnet Corp.	206-746-8750
Wash	Seattle, Radar Elec. Co.	206-282-2511
WVa	Charleston, McJunkin Corp.	304-348-5211

DALE ELECTRNS. CANADA LTD., Dept. EM, Box 5484, 1255 Brydges St., London, Ont., Can. N6A 4L6, Tel: 519-452-3300, Telex: 06-45843; Empl.: 75

DALE ELECTRONICS, INC., Dept. EM, Box 74, Norfolk, Nebr. 68701, Tel: 402-371-0080, TWX: 910-623-0163

Refer to Dale Electronics Columbus, Neb. for sales office and distributor information.

DALE ELECTRONICS INC., Frequency Control Group, Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282, Tel: 602-967-7874, TWX: 910-950-1943 p. 2436, 2437

Local Sales Offices & Reps.

Ariz	Phoenix, Mercury Engrg. Sls.	602-279-2367
Cal	Los Alamitos, Reed Elctrns. Mktg.	213-598-6676
Cal	Redwood City, J. S. Heaton Co.	415-369-4671
Colo	Boulder, G.B. Hess	303-443-4780
DC	Washington, H. Wise & Co.	202-363-9417
Ill	Chicago, I.R.I., Inc.	312-647-7755
Mass	Wellesley Hills, R. H. Sturdy Co.	617-235-2330
Mich	Detroit, Burcaw Co. & Assocs.	313-533-7700
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422

NY	Commack, Kaelber & Mack, Inc.	516-543-2924
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ore	Beaverton, L/D Elctrns.	503-649-6177
Tex	Dallas, Blackburn Assocs.	214-692-8885

DALE ELCTRNS., INC., Yankton Div., Dept. EM, E. Hwy. 50, Box 180, Yankton, S.D. 57078, Tel: 605-665-9301, TWX: 910-668-3605; Empl.: 250 p. 1426, 1832

Refer to Dale Elctrns., Columbus, Neb. for sales office and distributor information.

(TM)DALIC - selective brush electroplating - Sifco Metachemical

(TM)DALITE - H-film kapton wire - Daburn Electronics & Cable Corp.

DAMON CORP., Elctrns. Div., Dept. EM, 80 Wilson Way, Westwood, Mass. 02090, Tel: 617-449-0800, TWX: 710-348-6722; Empl.: 75 .... p. 2438

Local Sales Offices & Reps.

Cal	No. Hollywood, Jewett Assocs.	213-789-8103
Cal	Palo Alto, Waldman Assocs.	415-961-4100
DC	Washington, Stemler Assoc.	301 944-8262
Fla	Melbourne, Repcom, Inc.	305-254-1877
Ill	Northfield, Feller Assoc.	312-446-8065
Md	Baltimore, Stemler Assoc.	301-944-8262
Mass	Allston, Vector Sls.	617-787-2790
NJ	Cherry Hill, Stemler Assocs.	609-966-4070
NM	Albuquerque, ALS Elctrns.	505-298-2575
NY	Cazenovia, S T Wollard Co	315-655-8145
Tex	Addison, Southland Comp.	214-233-0603

(TM)DAMS - dedicated analytical module system for single purpose spectro- or electro-chemical instrumentation. - Bromberg Engineering

DAN-L INC., Dept. EM, 229 Laurel Rd., E. Northport, N.Y. 11731, Tel: 516-757-8000; FSC No.: 28327; Empl.: 22

Local Sales Offices & Reps.

Cal	Burlingame, Logan & Assocs.	415-697-6100
Wash	Bellevue, Pacific N.W. Consultants, Inc.	206-454-2503

DANA EXACT ELECTRONICS, INC., See Exact Electronics, Inc.

DANA LABS., INC., Dept. EM, 2401 Campus Dr., Irvine, Cal. 92664, Tel: 714-833-1234, TWX: 910-595-1136; FSC No.: 21793; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs., Inc.	205-534-9771
Ariz	Phoenix, PLS	602-957-9110
Cal	Irvine, Dana Labs., Inc.	714-833-1234
Cal	La Jolla, Ward-Davis Assocs.	714-459-3351
Cal	Lawndale, Ward-Davis Assocs.	213-542-7740
Cal	Sunnyvale, Ward-Davis Assocs.	408-245-3700
Colo	Denver, PLS	303-773-1218
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Fla	Orlando, Gentry Assocs., Inc.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-237-7272
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg.	319-377-9434
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NJ	Ft. Lee, Tech. Mktg. Assocs.	201-224-6911
NJ	Paramus, SDM Reps.	201-368-0123
NM	Albuquerque, PLS	505-255-2330
NY	Rochester, SDM Reps.	716-544-8080
NC	Burlington, Gentry Assocs. Inc.	919-227-3639
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Lake Oswego, Wilson Applied Instrs.	503-636-0965
Pa	Philadelphia, Eastern Instrumentation of Phil.	215-927-7777
Pa	Pittsburgh, Carter, McCormic & Peirce, Inc.	412-372-4415
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Va	McLean, Creative Mktg. Assocs.	703-893-6612
Wash	Bellevue, Wilson Applied Instrs.	206-641-6444
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

(TM)DANAMETER - digital voltmeter - Dana Labs., Inc.

(TM)DANGER ZONE - utility & hazardous duty lamps & lanterns - Teledyne Big Beam

DANIELS MFG. CORP., Dept. EM, 2266 Franklin Rd., Bloomfield Hills, Mich. 48013, Tel: 313-338-9611; FSC No.: 5120; Empl.: 50

Local Sales Offices & Reps.

Cal	Bellflower, Daniels Mfg. Corp.	714-774-6872
Fla	Orlando, Balmar Ents.	305-851-4041
Md	Bethesda, H & M Assocs.	301-986-8869
Md	Bethesda, H & M Assoc.	301-986-8869

(TM)DANIELSON - drill extension - Price & Rutzebeck

(TM)DAN-L - Relay Socket - DAN-L Inc.

(TM)DANNER - linear motion & rotary attenuators - Gotham Audio Corp.

DANTEL, INC., Dept. EM, 1922 North Helm, Fresno, Cal. 93727, Tel: 209-252-1651; Empl.: 40

Local Sales Offices & Reps.

Cal	Sunnyvale, Rea Assocs.	408-736-6024
Ill	Arlington Heights, James R. McLaughlin	312-394-9475
Mass	Framingham, Harris W. Fuller	617-620-0333
Tex	El Paso, H. Markowitz	915-584-1795

DANTRONICS, INC., Dept. EM, 3175 Hafner Ct., St. Paul, Minn 55112, Tel: 612-484-2108; Empl.: 22

(TM)DANYON - special formulation vinyl insulation on retractile cords - Daburn Electronics & Cable Corp.

(TM)DAPON - prepolymer resin - FMC Corp.

(TM)DAPRENE - shrinkable neoprene tubing - Daburn Electronics & Cable Corp.

(TM)DASHER - terminal printers - Data General Corp.

(TM)DASH FLASHER - auto safety lights - Teledyne Big Beam

(TM)D-A-T-A - digital audio tranlator accumalator (telephone) - Continental Data Sys.

DATA ACQUISITION PRODS. LAB., AEL, Inc., Dept. EM, Box 552, Lansdale, Pa. 19446, Tel: 215-822-2929, TWX: 510-661-4976 .... p. 1474

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	San Jose, L & M	408-292-3220
Colo	Denver, Shefler-Kahn Co.	303-831-9087
DC	Washington, Scientific Sys. Sls. Corp.	202-726-4161
Ill	Mt. Prospect, Contemporary Sciences	312-255-3793
Mass	Burlington, Scientific Sys. Sls. Corp.	617-273-1660
Mo	St. Louis, Kemco, Inc.	314-524-0820
NM	Albuquerque, Shefler-Kahn Co.	505-265-7077
NY	New York, Multiparts Corp.	212-944-4370
NY	Syosett, Scientific Sys. Sls. Corp.	516-921-3737
Pa	Pittsburgh, Scientific Sys. Sls. Corp.	412-391-4499
Tex	Irving, Kemco Inc.	214-255-0537
Utah	Salt Lake City, Shefler-Kahn Co.	801-984-4222
Wash	Seattle, R. S. Drake Assocs.	206-RO 3-2755

D.A.T.A. INC., A Cordura Co., Dept. EM, 45 U.S. Hwy 46, Pine Brook, NJ 07058, Tel: 201-227-3740, TWX: 710-734-4339; Empl.: 36

DATA, INC., Dept. EM, 210 S. Mason, Box 2071, Ft. Collins, Colo. 80521, Tel: 303-493-1222; Empl.: 3

Sales Manager: B. Shilling

DATA-CONTROL SYSTEMS, Dept. EM, Commerce Dr., Box 860, Danbury, Conn. 06810, Tel: 203-743-9241, TWX: 710-456-0376; FSC No.: 08539; Empl.: 87

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs	205-534-9771
Ala	Huntsville, Data-Control Sys.	205-536-0784
Ariz	Scottsdale, BFA Corp.	602-944-5400
Cal	Westminister, Data-Control Sys.	714-894-4471
Colo	Denver, BFA Corp.	303-837-1247
Conn	Bethel, O'Neill Assocs.	203-748-3801
Md	Laytonsville, G T Assocs.	301-949-8060
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
Ore	Norman, Data-Mktg. Assoc.	405-364-8320
Pa	Huntingdon Valley, Rabal Assoc.	215-947-4825
Tex	Austin, Data-Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data-Mktg. Assocs.	713-686-9627
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Utah	Salt Lake City, BFA Corp.	801-466-6522

DATA DELAY DEVICES, Dept. EM, 253 Crooks Ave., Clifton, N.J. 07011, Tel: 201-772-1106; Empl.: 14 p. 2507-2512,2728

Local Sales Offices & Reps.

Cal	Mountain View, Weseloh & Assocs.	415-961-0565
Cal	South Pasadena, Beckrep Inc.	213-799-4634
Ill	Glenview, Crimson Eng. Co.	312-724-1780
Mass	Brookline, Jasmar Assocs.	617-277-4920
Tex	Dallas, IBL Engrg. & Sls. Inc.	214-363-2921

Advertisement

We manufacture, Design, Develop:

- Electromagnetic Delay lines fixed; variable, lumped, distributed, electrically variable.
- Filters Passive & Active of all response types
- Oscillators, Low-Freq. modular

DATA DISC INC., see Amcomp Inc.

DATA DISPLAY PRODUCTS, Dept. EM, Box 91072, Los Angeles, Cal. 90009, Tel: 213-641-1232; FSC No.: 15513; Empl.: 13; Minimum order: $Q. Lodhie

Sales Manager: S. Poynter; *Distributor Manager:* Q. Lodhie

Local Sales Offices & Reps.

Ala	Huntsville, Repcom, Inc.	205-852-0394
Cal	Burlingame, Rose Electrns	415-692-5700
Cal	Inglewood, HMC	213-645-6953
Cal	Menlo Park, G. R. McKnight Co.	415-325-2844
Fla	Melbourne, Repcom, Inc.	305-254-1877
Ill	Lisle, Trend-Tronics	312-963-2210
Mass	Sturbridge, Branford Controls	617-347-7367
Minn	Minneapolis, R. W. Marshall Co.	612-929-0457
NJ	Flanders, K. & R. Enginrg.	201-584-5235
NC	Charlotte, Repcom, Inc.	704-597-7491
Ohio	Brecksville, WRR Assoc	216-526-2023
Pa	Jenkintown, Arnold Assocs.	215-742-0600

DATA GENERAL CORP., Dept. EM, Bldg 6, Route 9, Southboro, Mass. 01772, Tel: 617-485-9100, TWX: 710-390-0309; Empl.: 5930; Minimum order: $R. Weber

Sales Manager: B. Jobe; *Distributor Manager:* R. Weber

Local Sales Offices & Reps.

Ariz	Phoenix	602-254-6412
Cal	El Segundo	213-973-0401
Cal	Palo Alto	415-965-1010
Cal	Sacramento	916-441-0167
Cal	San Diego	714-276-8450
Cal	San Francisco	415-543-6730
Cal	Santa Ana	714-558-9421
Cal	Santa Barbara	805-964-8695
Cal	Van Nuys	213-787-8870
Colo	Englewood	303-773-2620
Conn	North Branford	203-484-2771
Fla	Ft. Lauderdale	305-771-0784
Fla	Orlando	305-851-8230
Fla	Tampa	813-879-2515
Ga	Atlanta	404-325-3181
Ill	Peoria	309-688-2224
Ill	Schaumburg	312-885-0505
Ind	Indianapolis	317-248-8306
Ky	Louisville	502-491-6595
La	Baton Rogue	504-923-0660
Md	Baltimore	301-247-8900
Mass	Wellesley	617-235-8171
Mich	Southfield	313-569-0200
Minn	Minneapolis	612-854-7727
Mo	Clayton	314-726-0811
Mo	Kansas City	816-531-1326
NH	Nashua	603-882-8482
NJ	Wayne	201-785-3910
NM	Albuquerque	505-294-1416

NY	Latham	518-783-3101
NY	Melville	516-427-0311
NY	Newfield	607-272-9440
NY	New York City	212-557-1122
NY	Orchard Park, 716-662-2172	
NY	Rochester	716-385-2000
NY	Syracuse	315-455-1525
NC	Greensboro	919-378-9401
Ohio	Dayton	513-435-1932
Ohio	Euclid	216-289-2660
Okla	Tulsa	918-664-8530
Ore	Portland	503-223-7150
Pa	Blue Bell	215-643-5515
Pa	Carnegie	412-279-3500
Tex	Austin	512-451-7487
Tex	Dallas	214-233-4496
Tex	Houston	713-688-8641
Utah	Salt Lake City	801-972-1338
Va	Hampton	804-826-2411
Va	McLean	703-893-0910
Va	Richmond	804-288-1675
Wash	Kirkland	206-827-0503
Wisc	Menomonee Falls	414-255-3230

DATA LINK CORP., Dept. EM, 1282 Fayette St. P.O. Box 1145, El Calon, Cal. 92022, Tel: 714-448-6716; Empl.: 16

DATA NUMERICS, Dept. EM, 141-A Central Ave., Farmingdale, N.Y. 11735, Tel: 516-293-6600; Empl.: 40

Local Sales Offices & Reps.

Cal	Encino, World Enterprises	213-342-5473
Cal	San Diego, Tauber & Assoc	714-274-7242
Kans	Wichita, Winco, Inc.	316-684-8224
Md	Cockeysville, Advanced Tech. Sls	301-666-9026
Mass	Newton Centre, Daner Hayes	617-969-4650
Mich	Grand Rapids, R. P. Urban & Assoc.	616-245-0511
NY	Farmingdale, Haines Prod	516-420-1177
Pa	Erie, Tuznik Assoc.	814-459-1894
Wash	Seattle, Drake Assoc	206-763-2755

DATA 100 CORP., Dept. EM, 6110 Blue Circle Dr, Minnetonka, Minn. 55343

DATA PANEL, INC, Dept. EM, 7313 S. Washington, Edina, Minn. 55435, Tel: 612-941-3511; Empl.: 8

Local Sales Offices & Reps.

Cal	El Segundo, Varigon	213-679-0621
Cal	Mountain View, Cindel, Inc.	415-965-2630
Ga	Atlanta, Elmar Assocs	404-938-2821
Ill	Des Plaines, Lincoln, Hodges & Assocs	312-297-3810
Mass	Norwell, Bordewieck Engrg & Sls Co.	617-659-4915
Minn	Minneapolis, Grayden & Flemmer, Inc.	612-941-1120
Mo	Hazelwood, Technical Reps, Inc	314-731-5200
NY	Binghamton, Reagon/Compar Albany	607-723-8743
NY	Mount Vernon, Friedman-Smith Electronic	914-664-4866
NY	Rochester, Reagon/Compar Albany	518-489-7408
NY	Utica, Reagon/Compar Albany	315-735-9831
Ohio	Breaksville, Allen Nace Co, Inc.	216-526-4323
Pa	Pittsburgh, Allen-Nace Co, Inc.	412-922-7225
Tex	Dallas, Jacobson Co	214-363-7584
Utah	Salt Lake City, Jensen Rep Co.	303-688-4154
Wisc	Waukesha, Lincoln Hodges & Assoc	414-542-3087

DATA PERIPHERAL INC., Dept. EM, 14 Porter St., Hackensack, N.J. 07601, Tel: 201-488-1151

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith & Co.	205-881-3294
Cal	Montebello, Tucul Engrg. Co.	213-728-7397
Fla	Orlando, J. L. Highsmith & Co.	305-293-5202
Haw	Honolulu, Aloha Assocs., Inc.	808-941-1575
NC	Charlotte, J. L. Highsmith & Co.	702-333-7743
Pa	Jenkintown, Stein Instr. Corp.	215-885-2370

DATA PRECISION

DATA PRECISION CORPORATION, Dept. EM, Audubon Rd., Wakefield, Mass 01880, Tel: 617-246-1600, Telex: 94-9341; FSC No.: 51692; Empl.: 140 .... p. 2824,2825

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	Costa Mesa, Meas. Assocs.	714-540-7160
Cal	Los Angeles, Measurement Assoc.	213-924-6227
Cal	San Diego, Measurement Assocs.	714-224-1577
Cal	Sunnyvale, Amasco	408-733-8690
Colo	Denver, Zeus, Inc.	800-528-4512
Conn	E. Hartford, Tekdata, Inc.	203-525-7647
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winterhaven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-457-7117
Ill	Elk Grove Village, L. F. Green Assoc.	312-593-0282
Ind	Indianapolis, L. F. Green Assoc.	317-293-9827
Md	Silver Spring, Eastern Instr.	301-681-6500
Mass	Burlington, Tekdata, Inc.	617-273-0198
Mich	Detroit, Micro Sls. Corp.	313-482-1229
Minn	Minneapolis, L. F. Green Assoc.	612-781-1611
Mo	Kansas City, Paloma Sls.	816-358-7272
NJ	Camden, QED Elctrns. Inc. of PA	215-925-8711
NJ	Union City, Meas. Tech. Inc.	201-863-5660
NM	Albuquerque, Zeus, Inc.	800-528-4512
NY	DeWitt, DB Assocs.	315-446-0220
NY	Great Neck, Measurement Tech. Inc.	516-482-3500
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Okla	Tulsa, Comspec, Inc.	918-936-3631
Ore	Portland, Hayes Tech.	503-238-0001
Tex	Dallas, Comspec. Inc.	214-234-4137
Tex	Houston, Comspec. Inc.	713-461-4487
Utah	Salt Lake City, Zeus	800-528-4512
Wash	Seattle, Hayes Tech.	206-763-2210
Wyo	, Zeus, Inc.	800-528-4512

Local Distributors

Ala	Huntsville, Lee Assoc./Leeco	205-533-5896
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Ark	Costa Mesa, Measurement Assoc.	714-540-7160
Ark	Raleigh, Lee Assoc./Leeco	919-787-5818
Cal	Sunnyvale, Amasco	408-733-8690
Colo	Denver, Zeus, Inc.	800-528-4512
Conn	W. Hartford, Tekdata	203-525-7647
Fla	Ft. Lauderdale, Lee Assoc./Leeco	305-491-7220
Fla	Winter Haven, Lee Assoc./Leeco	813-294-5815
Ga	Buford, Lee Assoc./Leeco	404-457-7117
Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Ind	Indianapolis, Loren Green Assoc.	317-293-9827
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Burlington, Tekdata Sls.	617-273-0198
Mich	Northville, Micro Sales Corp.	313-482-1229
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
Mo	Kansas City, Paloma Sls. Co.	816-358-7272
NJ	Camden, QED Elctrns.	215-925-8711
NM	Albuquerque, Zeus, Inc.	800-528-4512
NY	DeWitt, DB Assocs.	315-446-0220
NY	Great Neck, MTI Sls. Corp.	516-482-3500
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Okla	Tulsa, Comspec, Inc.	918-936-3631
Ore	Portland, Hayes Technical	503-238-0001
Tex	Houston, Comspec, Inc.	713-461-4487
Tex	Richardson, Comspec, Inc.	214-234-4137
Utah	Salt Lake City, Zeus, Inc.	800-528-4512
Wash	Seattle, Hayes Technical	206-763-2210
For:	Can., Mississauga, Ont., Webster Inst. Ltd.	416-275-2270
For:	Can., N. Vancouver, B. C., National Electrolab Ltd.	604-985-0511

DATAPRODUCTS CORP., Dept. EM, 6219 DeSoto Ave., Woodland Hills, Cal. 91365, Tel: 213-887-8000, Telex: 69-8487; Empl.: 2500

Local Sales Offices & Reps.

Cal	Newport Beach	714-752-7411
Cal	Sunnyvale	408-733-9890
Fla	Coral Springs	305-753-1040
Md	Bethesda	301-652-8120
Mass	Framingham	617-620-1950
Mich	Rochester	313-652-1134
Minn	Minneapolis	612-835-2066
Pa	Wayne	215-293-1810
Tex	Dallas	214-231-2240

DATAPROFITS CORP., Dept. EM, 2260 Distributors Dr., Indianapolis, Ind. 46241

DATA RECORDING SYS., Sub. American Videonetics Corp., Dept. EM, 432 Toyama Dr., Sunnyvale, Cal. 94086, Tel: 408-732-2000, TWX: 910-339-9362; Empl.: 40

DATA SPECIALTIES, Dept. EM, 3455 Commercial Ave., Northbrook, Ill. 60062, Tel: 312-564-1800; Empl.: 50 .... p. 1495

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith & Co.	205-881-3294
Ariz	Glendale, Mountaintek	602-938-2864
Cal	Cupertino, Inter-Linek Sys.	408-257-7165
Colo	Evergreen, Mountaintek	303-674-5255
Fla	Boca Raton, J. L. Highsmith & Co.	305-368-9194
Fla	Orlando, J. L. Highsmith & Co.	305-293-5202
Ga	Acworth, J. L. Highsmith & Co.	404-926-7298
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg.	319-377-9434
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Minn	Minneapolis, Pivan Engrg	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NM	Albuquerque, Mountaintek	505-294-1491
NY	Roslyn Heights, Travco Assocs.	516-621-3223
NC	Charlotte, J. L. Highsmith & Co.	704-333-7743
Ore	Portland, McLaren Inc.	503-297-2248
Pa	Ambler, Denco	215-542-9876
Pa	Norristown, Denco	215-542-9876
Tex	Dallas, Salcor, Inc.	214-234-8072
Utah	Salt Lake City, Mountaintek	801-278-6920
Va	Richmond, J. L. Highsmith & Co.	804-272-5888
Wash	Bellevue, McLaren Inc.	206-454-3400
Wisc	Brookfield, Pivan Engrg	414-786-1940

DATA TECHNOLOGY, Dept. EM, 2700 S. Fairview, Santa Ana, Cal. 92704, Tel: 714-546-7160, TWX: 910-595-1570; Empl.: 150

Local Sales Offices & Reps.

Ariz	Phoenix, Trembly Assocs.	602-253-6104
Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	Mountain View, Prod. Data of No. Calif.	415-941-4410
Cal	San Diego, Basic Sys.	714-279-9641
Colo	Broomfield, Figaro-Klebba Assocs.	303-466-8228
Fla	Orlando, E.G. Holmes	305-894-8901
Ga	Chamblee, E.G. Holmes	404-451-6161
Ill	Chicago, Sea Inc.	312-282-6694
Ind	Carmel, Sea Inc.	317-846-2593
Kans	Prairie Village, Engrg. Svcs	913-649-4000
Md	Bel Air, Dyna Rep. Co.	703-354-1222
Mass	Braintree, Data Technology Corp.	617-843-0954
Mass	Waltham, McBar Assoc.	617-890-0233
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	Minneapolis, Sea Inc.	612-425-4455
Mo	St. Louis, Engrg. Svcs.	314-997-1515
NJ	Bogota, Neville & Vespo	
NJ	Haddonfield, Dyna Rep.	609-795-1700
NY	New Hartford, KLM Assocs.	315-735-8525
NY	No. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
NY	Tuckahoe, Neville & Vespo	212-539-1515
Ohio	Cleveland, Data Equip. Sls. Co.	216-252-3151
Tex	Richardson, Lear Assocs.	214-231-5388
Utah	Salt Lake City, Figaro, Klebba Assoc.	303-466-8228
Va	Alexandria, Dyna Rep Co.	703-354-1222
Va	Virginia Beach, E.G. Holmes	804-481-6556
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Waukesha, Sea Inc.	414-547-6637

DATA TECHNOLOGY, INC., Dept. EM, 4 Gill St., Woburn, Mass. 01801, Tel: 617-935-8820, Telex: 94-9476

Sales Manager: D.E. Skenderian

Local Sales Offices & Reps.

Cal	San Marino, Dale-Dahl	213-682-3417
Cal	Walnut Creek, Dale-Dahl	415-933-9595
Conn	Guilford, Whitehead Assocs.	203-453-3762
Fla	Ft. Lauderdale, MacKay, Smith & Assoc.	305-467-3888
Fla	Orlando, MacKay, Smith & Assoc.	305-277-1513
Ill	Northbrook, Traco Eng.	312-564-2288
Md	Columbia, Rep-Tron	301-465-6433
Mass	Boston, Whitehead	617-542-7676
Mich	Troy, Xanthus	313-771-3020
Minn	Minneapolis, Bican Co.	612-827-4734
NJ	Atlantic Highlands, Robert L. Dalton Assoc.	201-291-0500
NM	Albuquerque, Walter Dolde Sls. Co.	505-255-6716
NY	Penfield, A & D Devices	716-586-8033
NC	Charlotte, MacKay Smith & Assoc.	704-527-0240
Ohio	Cleveland, Geotronix	216-526-2535
Ohio	Columbus, Geotronix	614-457-8472
Okla	Tulsa, John W. Elder Co.	918-583-9149

Pa	Pittsburgh, Geotronix	412-266-4819

DATA TEST CORP., Dept. EM, 2450 Whitman Rd., Concord, Cal. 94518, Tel: 415-689-3583, TWX: 910-481-9973

Local Sales Offices & Reps.

Cal	Oakland, Advanced Technology	415-452-1401
Conn	Middletown, McBar Assocs.	203-865-4376
Fla	Fort Lauderdale, Associated Measurements & Control	305-564-1929
Ga	Atlanta, Associated Measurements & Control	404-252-6808
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Mass	Waltham, McBar Assocs.	617-890-0233
Mich	Detroit, Electro Sls. Assocs.	313-526-8800
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Pennsauken, Megargel/Himmelstein Assoc.	215-629-1072
NJ	Pennsauken, Megargel/Himmelstein Assoc.	609-662-3081
NY	N. Tonawanda, Labtronics	716-685-4111
NY	Syracuse, Labtronics	315-454-9314
NY	Tuckahoe, Asco Elctrns.	914-779-8110
NY	Ulster, Labtronics	914-471-2806
NC	Charlotte, Associated Measurments & Control	704-527-0991
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Utah	San Antonia, Data Mktg. Assocs.	512-828-0937
Va	McLean, Creative Mktg. Assoc.	703-893-6612
Wisc	Milwaukee, Carter Elctrns.	414-464-5555
Exp:	Conn., Vernon, Intertrade Scientific	203-871-0401

DATA TRANSLATION
INC

DATA TRANSLATION, Dept. EM, 23 Strathmore Rd., Natick, Mass. 01760, Tel: 617-655-5300, Telex: 948-474; Empl.: 25 .... p. 1497

Local Sales Offices & Reps.

Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Costa Mesa, Xebex	714-540-3245
Cal	Cupertino, Telemark	408-257-5131
Colo	Denver, BFA Corp.	303-837-1247
Iowa	Cedar Rapids, Engineering Svcs. Co.	319-362-0503
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Md	Fulton, Gans-Fryling & Pugh	301-953-3724
Mass	Waltham, Computer Mktg. Assocs.	617-890-1776
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Parlin, Triple E	201-727-6454
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Rochester, Scientific Devices-New York	716-334-2445
Utah	Salt Lake City, BFA Corp.	801-466-6522
Va	Arlington, Gans-Fryling & Pugh	703-527-3262
Wash	Bellevue, L.B. Robbins Co.	206-455-1246

DATACOM, INC., Dept. EM, Box 278, Ft. Walton Beach, Fla. 32548, Tel: 904-244-6121, TWX: 510-730-7693; Empl.: 40

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak, & Frazier, Inc.	205-536-5650
Fla	Orlando, Currie, Peak & Frazier, Inc.	305-855-0843
Md	Greenbelt, J.E. Cuesta & Co.	301-552-1200
Mich	Detroit, Electro Sls. Assocs.	313-526-8800
Mo	Hazelwood, Technical Reps.	314-731-5200
NC	Greensboro, Currie, Peak, & Frazier, Inc.	919-273-3040
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Pa	Valley Forge, J.E. Cuesta & Co., Inc.	215-265-5800

™DATAB - pressure-sensitive markers (computer printed) - Brady Co., W. H.

™D.A.T.A.BOOKS - electronic information series - D.A.T.A. Inc.

™DATACEL - optoelectronic relay - Sigma Instruments, Inc.

™DATA CHECK 200H - cable & continuity tester - Data Numerics

™DATA CHECK 200S - Cable & continuity tester - Data Numerics

™DATACOLOR 703 - 32-color electronic-scanning microdensitometer - Spatial Data Systems, Inc.

™DATACOLOR 704 - 12-color densitometer - Spatial Data Systems, Inc.

™DATACORD - magnetic tape transport - Data Recording Sys.

™DATA CUBE - electronic racks for packaging - Systems Furniture

DATADYNE CORP., Dept. EM, Box 247, King of Prussia, Pa. 19406, Tel: 215-265-1793; FSC No.: 53032; Empl.: 23

Sales Manager: R.F. Rainer

™DATAFILE - mass memory - Burroughs Corp.

™DATA IV/70 - Key-to-disc Systems - Four-Phase Systems

DATAK CORP., Dept. EM, 65 Seventy-First St., Guttenberg, N.J. 07093, Tel: 201-869-2200 p. 1397,2528

Local Sales Offices & Reps.

Ala	Birmingham, H.W. Phillips	205-967-5248
Ariz	Phoenix, H. Premil	602-939-6787
Cal	Burlingame, Polach & Bensinger	415-697-2525
Cal	West Covina, Don Forth Assocs.	213-962-1431
Conn	Wallingfd., Adams-McGregor	203-269-0225
Fla	Ft. Lauderdale, Unirep, Inc.	305-527-1556
Ga	Boswell, H.W. Phillips Co.	404-992-3070
Ill	O'Hare, W.T. Adams Sls.	312-956-7688
Ind	Carmel, Rich Elctrns. Mktg.	317-844-8462
Iowa	Atlantic, Kimian Sls.	712-243-1626
Md	Kensington, Forti-Austin	301-949-1707
Mich	Pleasant Ridge, Shalco, Inc.	373-547-4771
Minn	Minneapolis, Kodo Assoc.	612-881-1255
Mo	Independence, Kimian SLs.	816-796-4026
NJ	Teaneck, Steve Fisher Sls.	201-837-1200
NJ	Willingboro, Forti-Austin Assocs.	609-871-9290
NY	Skaneateles, Leahy & Thomson	315-685-8122
Ohio	Cleveland, Dolfuss-Root Co.	216-333-7504
Ohio	Dayton, Dolfuss-Root Co.	213-275-4831
Ore	Lake Oswego, McMillan Elctrns.	503-636-7954
Pa	Pittsburgh, Dolfuss-Root Co.	412-561-5707
RI	Lincoln, Adams-McGregor	401-726-1300
Tex	Irving, Antle-Smith Sls.	214-438-1222

Local Distributors

Ala	Huntsville, Mock Elect. Inc.
Alas	Juneau, Juneau Elctrn.
Ariz	Tempe, Circuit Special
Cal	Hawthorne, Graphic Media
Cal	Palo Alto, Zack Elctrns.
Cal	San Francisco, Zack Elctrns.
Cal	W. Los Angeles, Cal. Elect. Supply
Colo	Colorado Springs, Walker Elect.
Conn	Waterbury, Bond Radio Elect.
Del	Wilmington, RESCO
Fla	W. Palm Bch., Nurmi Elect.
Ga	Atlanta, Lykes Elect. Sply.
Haw	Honolulu, Precision Radio Ltd.
Ill	Peoria, Klaus Radio & Elect.
Ind	Indianapolis, Graham Elect.
Ky	Louisville, P.I. Burks Co.
La	N. Orleans, Radio Parts Inc.
Md	Baltimore, A S I Elect.
Mass	Boston, Sager Elctrical Sply.
Mass	Dedham, Gerber Elect.
Mich	Muskegan, Western Elect. Sply.
Minn	Minneapolis, Electronic Ctr.
Mo	Kansas City, Burstein Applebee
Mo	St. Louis, Gateway Elect.
Neb	Lincoln, Scott Elect. Sply.
Nev	Reno, Elect. Dist. Co.
NH	Concord, Evans Radio Inc.
NJ	Spfld., Route Elect.
NM	Albuquerque, Elect. Parts
NY	Buffalo, Summit Distributor
NY	L.I. City, H.L. Dalis, Inc.
NY	Rochester, Rochester Radio Sply.
NY	Syosset, Lafayette Radio
NC	Raleigh, Southeastern Radio
Ohio	Akron, Akron Elect. Sply.
Ohio	Columbus, Hughes-Peters
Okla	Tulsa, Radio Inc.
Ore	Portland, Portland Radio Sply.
Pa	Pittsburgh, R.P.C. Electronics
Pa	Reading, G. D. Barbey
RI	Providence, W. Dandreta & Co.
SC	Columbia, Dixie Radio Sply.
Tenn	Memphis, W & W Distributing
Tex	El Paso, Midland Specialty Co.
Utah	Provo, Central Stan Elect.
Utah	Salt Lake City, Kimball Elect.
Va	Alexandria, Sasco Elctrns.
Va	Arlington, Arlington Elect. Who.
Wash	Seattle, Radar Elect. Co.
Wisc	Milwaukee, Parts Mart Corp.

™DATAKOAT - spray coatings - Datak Corp.

™DATA KROME - optics system - Kollsman Instr. Co.

™DATA-LIT - numeric & alph numeric displays - Litronix

™DATALITE - ultra-miniature indicators - Dialight

DATALOG DIV., LITTON SYS., Dept. EM, 1770 Walt Whitman Rd., Melville, N. Y. 11746, Tel: 516-694-8326, Telex: 96-1355; Empl.: 180

Local Sales Offices & Reps.

Cal	Los Angeles	213-482-3625

DATAMATICS, see Gould Datametrics

™DATAMARK - kits for marking elctrn. equip. - Datak Corp.

™DATA MARK - data module - Memorex Corp.

DATAMEDIA, Dept. EM, 7300 N. Crescent Blvd., Pennsauken, N.J. 08110, Tel: 609-665-2382, TWX: 710-892-1693; FSC No.: 00750; Empl.: 97

Local Sales Offices & Reps.

Cal	Los Angeles	213-397-3556
Ga	Atlanta	404-955-2859
Md	Gaithersburg	301-948-1670

™DATA-MONITOR - annunciators - Tec, Inc.

™DATA MOUNT - desk top electronic cabnet - Systems Furniture

™DATA PANEL - backlighted display systems - Tec, Inc.

™DATAPLOT - software operating systems for printer/plotter - Varian Graphics

DATAPROBE, INC., Dept. EM, 254 Green St., So. Hackensack, N.J. 07606, Tel: 201-489-5588; Empl.: 10

™DATARAMA - status display systems - Ferranti-Packard, Ltd. Elec. Div.

DATARAM CORP., Dept. EM, Princeton-Highstown Rd., Cranbury, N.J. 08512, Tel: 609-799-0071, TWX: 510-685-2542; Empl.: 110

DATASCAN DIV., Anadex Instruments Inc., Dept. EM, 7833 Haskell Ave., Van Nuys, Ca. 91406, Tel: 213-782-9527, TWX: 910-495-1762; Empl.: 95

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assoc. Inc.	205-533-5896
Ariz	Tempe, PLS Assocs.	602-957-9110
Cal	Los Altos, Jay Stone & Assocs.	415-948-4563
Colo	Denver, PLS Assocs.	303-771-0140
Conn	W. Hartford, Instrument Assocs.	203-525-9367
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Kans	Mission, Pivan Engrg. Co.	913-722-1030
Md	Wheaton, Sonco	301-942-9420
Mass	Bedford, Instrument Assocs.	617-275-0700
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Mich	Kalamazoo, Carter, McCormic & Peirce, Inc.	616-349-9666
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NJ	Ft. Lee, Tech. Mktg. Assoc.	201-224-6911
NM	Albuquerque, PLS Assocs.	505-255-2330
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Okla	Norman, Data Mktg. Assocs.	405-364-8320
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Pa	Pittsburgh, Carter, McCormic & Peirce, Inc.	412-824-3760
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Wash	Seattle, R. S. Drake Assocs.	206-763-2755
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

(TM)DATA-SCREEN - data display (crt) terminals - Tec, Inc.

(TM)DATASEEKER - modem/comm. terminal interface test set - Dataprobe, Inc.

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(TM)DATASWITCH - reed relay - Wheelock Signals

(TM)DATATAB - absolute (origin) coordinate digitizing system - Altek Corp.

(TM)DATA TEK 9600 - Communication test equipment - Atlantic Research Corp.

(TM)DATA-TRAK - analog programmer - Research, Inc.

DATATRON, INC., Dept. EM, Box 11427, Santa Ana, Cal. 92711, Tel: 714-540-9330, TWX: 910-595-1589; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, Currie Aerospace	205-536-5650
Cal	Anaheim, Broadcast Comms. Devices	714-528-9505
Cal	Ben Lomond, Broadcast Comms. Devices	408-336-5437
Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	Mountain View, Prod. Data Co.	415-941-4410
Cal	San Diego, Mesa Elctrns.	714-278-8021
Colo	Englewood, Davis Assocs.	303-761-9228
Colo	Evergreen, Didier/Denver	303-674-6000
Fla	Lighthouse Point, Saber Assocs.	305-422-3686
Ga	Atlanta, Radford Assocs.	404-237-6097
Ill	Chicago, Megatek, Inc.	312-889-1277
Md	Gaithersburg, Data-Time	301-948-7666
Mass	North Billerica, Datatron East	617-667-5353
Mich	Detroit, WKM Assocs.	313-892-2500
Mich	Farmington Hills, M. Dyer	313-892-2500
Minn	Minneapolis, Megatek, Inc.	612-933-2133
Mo	Raytown, Production Automation	816-737-0066
NJ	Fairfield, KLS Assocs.	201-227-2900
NM	Albuquerque, Rustco Entprs.	505-296-6474
NY	Garden City, P.M. Elctrns.	516-248-4858
NY	Kings Park, KLS Assocs.	212-233-4849
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Tex	Dallas, Martin, Zienkosky, Browne & Assoc.	214-233-5535
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(TM)DATA-VOICES - voice operated identification computer entry system - Datawest Corp.

(TM)DATAWATCH - alarm monitors & signal transmitters - Metrix Instrument Co.

DATAWEST CORP., Dept. EM, 7333 E. Helm Dr., Scottsdale, Ariz. 85260, Tel: 602-948-3280, TWX: 910-950-1289; Empl.: 19

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Cal	Anaheim, Moxon Elctrns.	714-635-7600
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Cal	Santa Clara, Moxon Elctrns.	408-249-2491
Colo	Littleton, Davis Assocs	303-795-1400
Haw	Honolulu, Aloha Assocs.	808-941-1574
Kans	Leawood, Leemark Engrs., Inc.	913-648-0124
Kans	Leawood, L. Mark Elctrns.	913-648-0124
Md	Columbia, A/O Elecs.	301-924-3693
Md	Ellicott City, A/O Elctrns.	301-997-8033
Mass	Lynnfield, Grady & Assocs.	617-334-6633
Mass	Lynnfield, Grady & Assocs.	617-334-6633
Mich	Madison Heights, W K M Assocs., Inc.	313-588-2300
Ohio	Cleveland, W K M Assocs., Inc.	216-267-0445
Ohio	Dayton, W K M Assocs., Inc.	573-434-7500
Pa	Pittsburgh, W K M Assocs., Inc.	412-892-2953
Tex	Houston, System Tech Assocs.	713-440-8340

(TM)DATAX - data acquisition modules - Data Translation

(TM)DATCHECKER - electronic supermarket p.o.s. systems - National Semiconductor Corp.

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DATEL SYSTEMS INC., Dept. EM, 1020 Turnpike St., Canton, Mass. 02021, Tel: 617-828-8000, TWX: 924461 710-348-0135; Empl.: 215 .... p. 1498,3222

Sales Manager: R. Shea

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scientific Instrs.	205-533-6880
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Ariz	Phoenix, Cleveland Ent.	602-949-0872
Cal	Los Angeles, Datel Sys.	213-933-7256
Cal	Santa Ana, Datel Sys., Inc.	714-835-2751
Cal	Sunnyvale, Datel Sys.	408-733-2424
Colo	Aurora, Cleveland Enterpirses	303-751-3252
DC	Washington, Datel Sys.	301-840-9490
Fla	Lighthouse Point, Saber Assocs., Inc.	800-432-3007
Fla	Longwood, Saber Assocs., Inc.	800-432-3007
Fla	Sarasota, Saber Assocs., Inc.	800-432-3007
Haw	Honolulu, Hawaii Data Sys.	808-946-1533
Ill	Chicago, Carter Elctrns., Inc.	312-585-5485
Ind	Indianapolis, Carter Elctrns., Inc.	317-293-0696
Iowa	Cedar Rapids, Tech Reps	319-396-5662
Kans	Olathe, Technical Reps.	913-782-1177
Md	Gaithersburg, Datel Systems	301-840-9490
Md	Gaithersburg, Datel Sys.	301-840-9490
Mass	Canton, Datel Sys., Inc.	617-828-8000
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Mich	Troy, G.R. Peters Assocs.	313-362-1220
Minn	Minneapolis, Carter Elctrns., Inc.	612-559-1976
Mo	Hazelwood, Technical Reps.	314-731-5200
NJ	Englewood, Eastern Instrumentation	201-567-9505
NM	Albuquerque, Cleveland Ent.	505-266-5594
NY	Great Neck, Eastern Instrumentation	516-466-9505
NY	Liverpool, R & D Assocs.	315-622-2350
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Cleveland, Instrumentation Sys.	216-486-0782
Ohio	Dayton, Instrumentation Sys.	513-294-2838
Pa	Pittsburgh, Instrumentation Sys.	412-243-1111
Tex	Austin, E & M Microsystems	512-266-1750
Tex	Dallas, E & M Microsystems	214-238-7157
Tex	Houston, E & M Microsystems	713-783-2900
Wash	Bellevue, Tasco, Inc.	206-453-1414
Wisc	Milwaukee, Carter Elctrns.	414-464-5555
Exp:	France, Paris, Datel Sys. SARL	603-06-74
Exp:	Japan, Tokyo, Datel KK	499-0631
Exp:	W. Germ., Muenchen, Datelek Sys. GmbH	089/ 78 40 45

Local Distributors

Tex	Austin, Component Specialties, Inc.	512-459-3307
Tex	Houston, Component Specialties, Inc.	713-771-7237
For:	Canada, Missisauga, Ont., Prelco Elctrns. Ltd.	416-678-0401
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DATOTEK, INC., Dept. EM, 13740 Midway Rd., Dallas, Tex. 75240, Tel: 214-233-1030

DATRON SYSTEMS, Dept. EM, 20700 Plummer St., Chatsworth, Cal. 91311, Tel: 213-882-9616, TWX: 910-494-2787; Empl.: 110

Local Sales Offices & Reps.

Ala	Huntsville, P. T. Miller Assocs.	205-534-2652
Cal	Santa Barbara, Kannard Engrg., Inc.	805-682-1928
Fla	Ft. Lauderdale, Snow Co.	305-563-2449
Mass	Needham Hgts., Reptron, Inc.	617-449-4142
Tex	Fort Worth, C. Wolf & Assocs.	817-738-1996

(TM)D-A-T-T - digital accumalator translator transmitter (teletype) - Continental Data Sys.

DATTILO ENTERPRISES, INC., Dept. EM, 2302 Taylorsville Rd., Louisville, Ky. 40205, Tel: 502-491-6262; Empl.: 47

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Ind	Indianapolis, Needler Sls. Co.	317-255-8056
Ky	Louisville, Custom Comp. Sls.	502-969-4473
Ohio	Cleveland, Component/Insulation Corp.	216-521-3570

DATUM, INC., Dept. EM, 1363 State College Blvd., Anaheim, Calif. 92806, Tel: 714-533-6333, TWX: 910-592-1289; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Ala	Huntsville, Datum	205-881-7629
Ariz	Scottsdale, BFA of Arizona, Inc.	602-946-4215
Cal	Lawndale, Ward/Davis Assoc.	213-542-7740
Cal	San Diego, Datum, Inc.	714-453-1633
Cal	Sunnyvale, Ward/Davis Assoc.	408-245-3700
Colo	Denver, BFA of Arizona, Inc.	303-744-3301
Conn	Hamden, P. Jenks Assoc.	203-281-0810
Fla	Ft. Lauderdale, Lee Assocs.	305-525-9767
Fla	Longwood, Southern Data Assocs.	305-831-3311
Fla	Winterhaven, Lee Assocs.	813-294-5815
Ill	Hoffman Estates, Datum, Inc.	312-298-1244
Kans	Wichita, Winco, Inc.	316-684-8224
Md	Silver Spring, K-G Elctrns.	301-588-3000
Mass	Wakefield, P. Jenks Assoc.	617-246-1590
Mass	Waltham, Datum, Inc.	617-899-7474
Mich	Detroit, Electro Sls. Assoc.	313-526-8800
NM	Albuquerque, BFA of Arizona, Inc.	505-292-1212
NM	Las Cruces, BFA of Ariz., Inc.	505-523-0601
NY	Great Neck, Krasner Assocs.	516-487-0690
NY	Melville, Astrorep	516-423-2266
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Ohio	Aurora, EMA, Engrg. Mktg. Assoc.	216-562-6104
Ohio	Centerville, EMA, Inc.	513-433-2800
Ohio	Cleveland, Electro Sls. Assoc.	216-261-5440
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
Pa	Norristown, Denco, Data Engrg. Co.	215-279-8146
Pa	Pittsburgh, Electro Sls. Assoc.	412-371-9449
Tex	Arlington, J. T. Houston Assoc.	817-265-2931
Tex	Dallas, Data Aids Assoc.	214-620-1551
Tex	Dallas, Datum, Inc.	214-352-7411
Tex	Houston, Data Aids Assoc.	713-862-6685
Utah	Salt Lake City, BFA of Ariz.	801-466-6522
Wash	Seattle, Comptronics, Inc.	206-284-4842

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Cal	Belmont, Littrell Western Sls., Inc.	415-592-3346
Cal	Los Angeles, Littrell Western Sls., Inc.	213-261-0164
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Fla	Fort Lauderdale, W. Chester Smith	305-564-1477
Ill	Chicago, R. W. Kruse Co.	312-736-9546
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Iowa	Cedar Rapids, Clancey Co.	319-365-7141
Iowa	Des Moines, Clancey Co.	515-278-1331
Kans	Shawnee Mission, Clancy Co.	913-432-4550
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Mich	Bloomfield Hills, Gitre Co.	313-645-1777
Mo	St. Louis, Clancey Co.	314-432-3633
NY	Syosset, Rywel Sls.	516-364-0888
NC	Charlotte, Anthom, Inc.	704-527-1515
Ohio	Westlake, Foley & Beilstein Co.	216-871-8830
Pa	Erie, M.L. Crowell Co.	814-454-0250
Pa	Paoli, W.G. Walker	215-627-8146
Tenn	Memphis, L.E. Offutt Co.	901-789-1210
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Wash	Seattle, Northwest Plastics Inds.	206-763-0441

Wisc	Milwaukee, Clague Sls. Corp.	414-272-1951

DAVIS ELEC. CO., Dept. EM, Box 38, Cape Girardeau, Mo. 63701, Tel: 314-335-5547; Empl.: 53

Local Sales Offices & Reps.

Cal	Los Altos, Schwerin Assocs.	415-941-3737
Cal	Santa Ana, J. Franek Co.	714-832-0290
Cal	Santa Barbara, Schwerin Assocs.	805-967-7317
Ill	Norridge, Gianaras Sls. Co.	312-774-4600
Mass	Scituate, Near, Inc.	617-545-6327
Mo	Kansas City, Automatic Gen. Elctrn. Sls., Co.	816-333-8206
Ohio	Cleveland, Components Inc.	216-243-9200
Ohio	W. Carrollton, Components, Inc.	513-866-0061
Pa	Pittsburgh, omponents, Inc.	412-833-9380
Pa	Radnor, W. Henry Cordray Sls. Co.	215-878-3737
Tex	Dallas, Stevens Sls. Co.	214-350-2476

DAVIS & CO., J.W., Dept. EM, Box 35313, 9212 Denton, Dallas, Tex. 75235, Tel: 214-352-8405; Empl.: 42

Local Sales Offices & Reps.

Ill	Chicago, B. Burns & Assocs.	312-775-1233
Kans	Overland Park, T. Dowell & Assocs.	913-236-8200
Tex	Dallas, Crockett Sls. Co.	214-748-8209

DAY-LIGHT DISPLAY CORP., Dept. EM, 11 Fairfield Pl., Box 1231, W. Caldwell, N.J. 07006, Tel: 201-575-1045; Empl.: 8

Sales Manager: P. Schneider

DDC, see ILC Data Device Corp.

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Local Distributors

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Cal	Garden Grove, Allied Elctrns.	213-598-6605
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Fla	Miami, Electro-Standard Labs	305-633-6973
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Ill	Elk Grove, GBL Elctrns.	312-593-3222
Ill	Elk Grove, Diplomat/Lakeland	312-595-1000
Ill	Palatine, OHM Elctrns.	312-359-5500
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NY	Rochester, Simcona Elctrns.	716-328-3230
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Va	Ports Mouth, Distributors	703-399-2446
Va	Richmond, Avec Elctrns.	703-359-6071
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500

™DEC - digital equipment corporation - Digital Equipment Corporation

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™DECAP - cured epoxy remover - Dynaloy, Inc.

DECISION DATA COMPUTER CORP., Dept. EM, 100 Witmar Rd., Horsham, Pa 19044

DECOM SYSTEMS, INC., Dept. EM, 1404 Descanso Rd., San Marcos, Ca. 92069, Tel: 714-744-1002; FSC No.: 55744

Sales Manager: G.F. Tremain

Local Sales Offices & Reps.

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Cal	San Diego, L.L. Stoakes	714-274-6281
Cal	San Marcos, Decom Sys., Inc.	714-744-1002
Cal	Torrance, D. Preston	213-370-8251
Fla	Orlando, Scientific Devices S.E.	305-841-8180
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Md	Timonium, Scientific Devices D.C. Inc.	301-252-8851
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NM	Albuquerque, G. Moore Assocs.	505-292-3322
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Va	Springfield, Scientific Devices D.C.	804-266-5156
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Cal	Los Altos, Casey/Johnson	415-941-6892
Cal	Tustin, MQ International	714-751-2005
Ga	Atlanta, Beacon Elctrns. Assoc.	404-351-3654
Ill	Chicago, Data/Elctrns.	312-283-0300
Kans	Shawnee Mission, Inland Assocs.	913-362-2366
Md	Rockville, L G White Co.	301-770-6556
Mich	Brighton, Lowry Assocs.	313-227-7067
Minn	Minneapolis, Data Elctrns.	612-786-9666
NJ	Bogota, Neville & Vespo	212-539-1515
NY	Rochester, A.D. Devices	716-586-8033
Ohio	Cleveland, Geotronix	216-526-2535
Pa	Berwyn, E.C. Brown Assocs.	215-647-1616
Tex	Dallas, Thorson Co.	214-233-5744

™DECITRAK - digital control sys. - Theta Instr. Corp.

™DECOHM - relays - open and hermetically sealed - Davis Elec. Co.

™DECORA - wallplates, switches outlets - Leviton Mfg. Co., Inc.

™DECUS - digital users society - Digital Equipment Corporation

™DEECEEDUCER - pressure-to-dc converter - Solid State Electronics Corp.

™DEEP COUNTRY - personal spotlights - Teledyne Big Beam

™DEEP CYCLE - high performance battery - SGL Batteries Manufacturing Co.

™DEFECTOMETER - ndt - eddy current equipment - Automation Inds.

™DEFENDER - test equipment - Shakespeare

DEFIANCE CIRCUIT CORP., Sub. of Hi-G Inc., Dept. EM, 12 Shepherd St., Lawrence, Mass. 01843, Tel: 617-688-1856; Empl.: 120 p. 1398

Sales Manager: W. McKay

Local Sales Offices & Reps.

Ala	Huntsville, L&D Inc.	205-837-8480
Cal	Downey, Trimarco	213-861-8244
Conn	Easton, John E. Boeing	203-261-9512
Fla	Maitland, Doug Ellis Assocs.	305-644-9014
Ill	Mt. Prospect, Magnuson Assocs.	312-956-0700
Ind	Fort Wayne, Scott Elctrns.	219-743-1586
Ky	Louisville, Scott Elctrns.	502-583-3220
Md	Timonium, Heller Sls.	301-252-4780
Mass	Lexington, John E. Boeing Co.	617-862-2500
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	St. Paul, Maguson Assocs.	612-227-8495
NH	Manchester, Northeast Comps.	603-627-7242
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	Jericho, HRC Comp-Tech	516-822-5550
NY	Rochester, Tech-Mark	716-223-1252
NC	Greensboro, L&D Inc.	919-292-3201
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Dayton, Scott Elctrns.	513-294-0539
Pa	Glenside, Elcom, Inc.	215-885-1325
Pa	Pittsburgh, Scott Elctrns.	412-781-3112
Tex	Bellair, Blackburn, Assocs.	713-665-8190
Tex	Dallas, Blackburn Assoc.	214-692-8885
Va	Richmond, L&D Inc.	804-359-0125
Exp:	N.Y., New York, Eurotronix	212-765-1666

™DEFLECTRON - yokes - CELCO

™DEFLEX - grounding plug & adaptors - APM-Hexseal

™DEGRESTIL - vapor degrestil - Electrovert

DEGUSSA INC., Metals Div., Dept. EM, Route 46 & Hollister Rd., Teterboro, NJ 07608, Tel: 201-288-6500, TWX: 134610, 710-990-6143; Empl.: 65

™DEI MOTOR GUARD - under voltage monitor - Diversified Electronics Inc.

™DEKABOX - decade resistors and capacitors - Electro Sci. Inds.

™DEKABOX - decade resistors and capacitors - E.S.I. Inc.

™DEKABRIDGE - bridge circuit - E.S.I. Inc.

™DEKABRIDGE - bridge circuit - Electro Sci. Inds.

™DEKADIAL - decade dials - Electro Sci. Inds.

™DEKAMATIC - automatic unit - Electro Sci. Inds.

™DEKAMATIC - automatic unit - E.S.I. Inc.

™DEKAPACITOR - decade capacitor - Electro Sci. Inds.

™DEKAPOT - decade potentiometers - Electro Sci. Inds.

(TM)DEKAPOT - decade potentiometers - E.S.I. Inc.

(TM)DEKASTAT - decade rheostat - E.S.I. Inc.

(TM)DEKASTAT - decade rheostat - Electro Sci. Inds.

(TM)DEKAVIDER - decade voltage divider - Electro Sci. Inds.

(TM)DEKAVIDER - decade voltage divider - E.S.I. Inc.

DEK, INC., Dept. EM, 1555-A Hawthorne La., W. Chicago, Ill. 60185, Tel: 312-231-4245

(TM)DEKTAK - surface elevation measuring equip - Sloan Technology Corp.

DE LAVAL TURBINE INC., Gems Sensors Div., Dept. EM, Spring La., Farmington, Conn. 06032, Tel: 203-677-1311, Telex: 99-306; Empl.: 160

Local Sales Offices & Reps.

Ala	Homewood, Activation	205-942-1753
Ala	Mobile, Activation	205-479-6544
Alas	Anchorage, C. V. Reser Co.	907-279-3911
Ariz	Phoenix, Bews & Wallace	602-267-1171
Ariz	Tucson, Bews & Wallace	602-327-6061
Cal	Burlingame, Delaval	415-342-3350
Cal	Downey, Delaval	213-923-7281
Conn	Wethersfield, Delaval	203-563-3737
Fla	Tampa, State Instrs.	813-251-8338
Ga	Atlanta, Delaval	404-261-7063
Ga	Decatur, Activation of Georgia	404-981-6900
Haw	Honolulu, Berkley Eng. & Equip. Co.	808-538-1921
Ill	Moline, R. R. Floody Co.	309-755-2483
Ill	Rockford, R. R. Floody Co.	815-399-1931
Ill	Westchester, Delaval	312-681-4806
Kans	Kansas City, E. A. Akin Engrg. Co.	913-831-3733
La	Metairie, Aries Marine & Ind. Sls.	504-835-2540
Md	St. Michael's, Ray Cantwell	301-745-9010
Mich	Madison Hts., Delaval	313-585-8200
Mich	Royal Oak, R. H. Jackson Co.	313-544-8870
Minn	Minneapolis, W. F. Hartfiel Co.	612-929-1631
Mo	St. Louis, Neff Power	314-647-3002
NJ	Hackensack, Delaval	201-488-5544
NM	Albuquerque, Lietz Equip. Co.	505-266-5821
NC	Charlotte, R. W. Chapman & Co.	704-525-2421
Ohio	Cincinnati, Gallagher Co.	513-761-1288
Ohio	Cleveland, Delaval	216-333-1805
Okla	Tulsa, Tulsa Gauge & Instr.	918-622-5061
Pa	Horsham, Delaval	215-674-1697
Pa	Pittsburgh, Delaval	412-343-5666
Tenn	Knoxville, Activation of Georgia	615-584-2771
Tenn	Memphis, Centro	901-357-1261
Tenn	Nashville, Activation	615-889-8472
Tex	Dallas, Delaval	214-638-1712
Tex	Houston, Delaval	713-697-2897
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Wash	Bellevue, Delaval	206-885-9777
Wash	Redmond, Tower Equip. Co.	206-455-4338
Wisc	Milwaukee, Delaval	414-342-1500

DELAVAN ELECTRONICS, INC., Dept. EM, 14605 No. 73rd St., Scottsdale, Ariz. 85260, Tel: 602-948-6350; Empl.: 500

Local Sales Offices & Reps.

Ala	Birmingham, Dixie Industrial Equip. Co.	205-780-1346
Ariz	Phoenix, Fluid Conditioning Co.	602-273-1308
Cal	Buena Park, Sales Engineers Ltd.	213-921-0681
Colo	Denver, B F Sales Engrg. Co.	303-893-1124
Fla	Lakeland, A-A Electric Inc.	813-682-6181
Ga	Norcross, A-A Electric Co.	404-449-8670
Ill	Chicago, L. Fitz Co.	312-631-5488
Iowa	Bettendorf, J. H. Laas Co.	319-355-6133
Kans	Shawnee Mission, Automation Specialties	913-362-4422
Ky	Louisville, Primary Devices	502-895-6500
Md	Baltimore, H. M. Wood Electric Co.	301-789-4457
Mass	Waltham, Johnston industrial Equip. Co.	617-890-0800
Mich	Detroit, R. D. Ernest Assocs.	313-861-7311
Mich	Marquett, NWR Elctrns.	616-228-9660
Minn	Minneapolis, Engineered Sls. Co.	612-823-8238
Miss	Birmingham, Dixie Ind'l. Equip. Co.	205-780-1346
Mo	St. Louis, Gateway Controls	314-771-1139
NJ	North Bergen, Critides Assoc.	201-868-4300
NY	Buffalo, K.O.M. Lamb Co.	716-874-3530
NC	Charlotte, MacGuire Crawford & Barnes	704-366-3454
Ohio	Cleveland, Control Comps. Co.	216-692-3710
Ohio	Xenia, B. L. Michaelson Co.	513-372-5496
Okla	Tulsa, Pan Tech Engrg. Co.	918-747-2494
Pa	Philadelphia, Y.W. Miller Co.	215-247-9600
Pa	Pittsburgh, H. Woolman Co.	412-922-2420
Tex	Houston, Pan Tech Engrg. Co.	713-263-0640
Utah	Salt Lake City, Control Sys.	801-364-6425
Wash	Spokane, Electro Power Corp.	509-535-2931
Wash	Vancouver, SEA Sls. & Engrg.	206-696-0141
Wisc	Cedarburg, Herb Smith Sls.	414-377-7028

DEL ELECTRONICS CORP., Dept. EM, 250 E. Sandford Blvd., Mt. Vernon, N.Y. 10550, Tel: 914-699-2000, TWX: 710-562-0130; FSC No.: 01378; Empl.: 160 .... p. 3234,3235

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Palo Alto, Brooks Techn. Group	415-328-3232
Cal	San Carlos, Winco Sls.	415-365-6082
Colo	Littleton, Radco Elctrns.	303-794-4279
Fla	Winter Haven, Lee Assocs.	813-294-5815
Fla	Winter Park, Young & Lawrence Assoc.	305-647-6929
Ga	Buford, Lee Assocs.	404-945-4222
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Elmhurst, Scott Assocs.	312-279-5681
Mass	Burlington, TriTek Inc.	617-272-4550
Mich	Dearborn, Pitcher-Poulin	313-582-5450
Minn	Mpls., Josco-Melius	612-854-4270
Mo	Springfield, Del-Tech Assocs.	417-881-3667
NJ	Nutley, I. Brill	201-667-0653
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Huntington, Sweeney & Co.	516-692-4222
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cincinnati, F.J. Campisano	513-662-1616
Ohio	Fairborn, Tech. Assocs.	513-878-2484
Ore	Portland, J.E. Edstrom	503-775-8527
Pa	Ardmore, Martin Elec. Co.	215-649-6332
Tex	Lewisville, J. Hughes Co.	817-430-1683
Tex	Richardson, Athans Sls. Co.	214-235-7859

DELBERT BLINN. CO., Dept. EM, Box 2007, Pomona, Calif. 91766, Tel: 714-629-3900; Empl.: 10

Local Sales Offices & Reps.

Cal	San Carlos, Baytronic's	415-588-0958
Md	Baltimore, Callas Elctrns.	301-744-7711
NY	Manhasset, Kaelber & Mack	516-627-6620
Wash	Kirkland, W. J. Stulgis Co.	206-822-3867

Local Distributors

Minn	Minneapolis, Stark Elctrns.	612-332-1325

DELCO ELECTRONICS DIV., General Motors Corp., Dept. EM, 700 E. Firmin St., Kokomo, Ind. 46901, Tel: 317-457-8461, TWX: 810-269-1921; FSC No.: W.C. Caldwell, Coord. Dist. Sls.; Empl.: 9500 p. 3860,3861

Sales Manager: J.C. Crawford, Gen. Sls. Mgr.

Local Sales Offices & Reps.

Cal	Van Nuys	213-988-7550
Ind	Kokomo	317-459-2175
NC	Charlotte	704-527-4444
Exp:	NY New York, Gen. Motors Overseas Opers, Power & Ind'l. Prods. Dept.	212-486-4412

(TM)DEL-CON - digital systems - Delco Electronics Div.

DELCO WIRE & CABLE, INC., Dept. EM, 257 Rittenhouse Cir., Bristol, Pa. 19007, Tel: 215-785-0511, TWX: 06-964523 510-667-0968

Local Sales Offices & Reps.

Ga	Atlanta	404-427-8435
La	New Orleans	504-835-0363
Okla	Tulsa	918-838-9896
Ore	Philadelphia	215-785-0511
Pa	Pittsburg	412-344-4030
Tex	Houston	713-682-1545
Wash	Seattle	206-455-4950
Exp:	Bristol	215-637-9100

DELEVAN DIV., AMERICAN PREC. INDS., Clutch & Brake Prods., Dept. EM, 270 Quaker Road, E. Aurora, N.Y. 14052, Tel: 716-652-3600, Telex: 91-293; Empl.: 350 .... p. 3074

Local Sales Offices & Reps.

Ariz	Phoenix, Southwest e/m Engrg., Inc.	602-993-0250
Cal	Culver City, Bestronics Inc.	213-870-9191
Cal	Los Altos, Servo-Data	415-964-1325
Cal	San Diego, Bestronics, Inc.	714-278-2150
Colo	Denver, Walter Engrg. Assocs.	303-777-5585
Fla	Boca Raton, Conley & Assocs., Inc.	305-395-6108
Fla	Oviedo, Conley & Assocs., Inc.	305-365-3283
Fla	Tampa, Conley & Assocs., Inc.	813-933-1759
Ill	Downers Grove, Momak Sls.	312-963-6400
Kans	Leawood, H.C. Heyde Co.	913-649-8628
Md	Lutherville, J.A. Dougherty Sls. Co.	301-321-7890
Mass	Brookline, Harman Assocs.	617-232-6687
Mich	Southfield, L.H. Dickelman Co.	313-353-8210
Minn	Minneapolis, E.C. Elctrn. Sls.	612-831-0229
NJ	Parlin, Martech Assocs.	201-721-2200
NJ	Woodstown, Loman Co.	609-769-0055
NY	Manhassett, Martech Assocs.	516-627-1151
NY	Syracuse, M. C. Antil	315-437-4851
Ohio	Cleveland, L.H. Dickelman Co.	216-292-5643
Tex	Dallas, Scott Tech. Sls. Co.	214-352-7698

DELEVAN DIV., COIL PRODS., American Precision Inds., Dept. EM, 270 Quaker Rd., E. Aurora, N.Y. 14052, Tel: 716-652-3600, Telex: 91-293; FSC No.: 99800; Empl.: 275 .... p. 1424,1425

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engrg.	602-955-3193
Cal	Los Angeles, Bestronics, Inc.	213-870-9191
Cal	Menlo Park, Long & Assoc.	415-327-1300
Cal	San Diego, Bestronics Inc. of San Diego	714-278-2150
Colo	Denver, Walter-Engrg.	303-777-5585
Fla	Boca Raton, Conley & Assc.	305-395-6108
Fla	Oviedo, Conley & Assoc.	305-365-3283
Fla	Tampa, Conley & Assoc.	813-933-1759
Ill	Downers Grove, MO-MAK Sls.	312-963-6400
Ind	Ft. Wayne, W.W. Bieberich	219-432-2537
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Kans	Leawood, H.C. Heyde Co.	913-649-8628
Md	Lutherville, J. Dougherty Sls.	301-321-7890
Mass	Boston, P.J. Engrg.	617-924-5950
Minn	Minneapolis, E.C. Electronic Sls.	612-831-0229
NJ	Haddonfield, Thomas Assocs.	609-854-3011
NJ	Parlin, Martech Assc.	201-721-2200
NY	Endicott, Tech-Mark	607-748-7473
NY	Fairport, Tech-Mark	716-223-1252
NY	Liverpool, Tech-Mark, Inc.	315-652-6229
NY	Manhasset, Martech Assc.	516-627-1151
Ohio	Cleveland, C. Robinson	216-381-9049
Ohio	Dayton, C. Robinson	513-275-2412
Ore	Portland, D.G. Weber Co.	503-234-0686
Tex	Dallas, P. Scanlon	214-231-4661
Tex	Houston, P.J. Scanlon	713-781-9036
Wash	Seattle, D. G. Weber Co.	206-623-5990
Exp:	N.Y., Westbury, CPS International Ltd.	516-334-8500

Local Distributors

Ariz	Phoenix, R.V. Weatherford Co.	602-272-7144
Cal	Glendale, R. V. Weatherford	213-849-3451
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Diego, R.V. Weatherford Co.	714-278-7400
Cal	Woodland Hill, Rampart Comps.	213-887-7260
Colo	Denver, Elmar Elctrns.	303-287-9611
Conn	Orange, Milgray Elctrns.	203-795-0711
DC	Washington, Arrow Elctrns.	202-737-1700
Fla	Ft. Lauderdale, Summit Distr.	305-920-6253
Fla	Orlando, Milgrapy Elctrns.	305-647-5747
Ill	Chicago, Genesis Elctrn.	312-530-2272
Ind	Indianapolis, Genesis Elctrns	317-257-2231
Ind	South Bend, Genesis Elctrns.	219-287-2911
Kans	Overland Park, Milgray Elctrns.	913-236-8800
Md	Baltimore, Arrow Elctrns	301-247-5200
Md	Lanham, Milgray Elctrns	301-459-2222
Mass	Boston, P. J. Engrg. Supply	617-783-0510
Mass	Burlington, Milgray Elctrns.	617-272-6800
Mass	Woburn, Arrow Elctrns.	617-273-0100
Minn	Bloomington, Arrow Elctrns.	612-888-5522
NJ	Cherry Hill, Milgray Elctrns.	609-424-1300
NJ	Pennsauken, Radio Elec. Svc. Co.	609-662-4000
NJ	Saddle Brook, Arrow Elctrns.	201-797-5800
NJ	Springfield, Route Elctrns.	201-379-7710
NY	Buffalo, Summit Distributors	716-884-3450
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Freeport, Milgray/New York	516-546-6000
NY	Hauppauge, Rampart Components	516-273-1111
NY	Mt. Vernon, QAR Industrial Elctrn. Sls.	914-699-2224
NY	Rochester, Summit Distrs.	716-334-8110
Ohio	Cleveland, Genesis Elctrns.	216-447-0012
Ohio	Dayton, Genesis Elctrns.	513-252-5609
Pa	Ivyland, Century Elctrn. Comp.	215-824-1897
Pa	Montgomeryville, Pyttronics Inc.	215-643-2850
Tex	Dallas, R.V. Weatherford Co.	214-243-1571
Tex	Houston, R.V. Weatherford Co.	713-688-7406
Wash	Seattle, R.V. Weatherford Co.	206-243-6340
Wisc	New Berlin, Arrow Elctrns.	414-782-2801
For:	Can., Montreal, Quebec, Prelco Elctrns. Ltd.	514-389-8051
For:	Can., Toronto, Ontario, Saynor Elctrns. Ltd.	416-445-2347
For:	Can., Vancouver, British Columbia, R-A-E Industrial Elctrns. Ltd.	604-687-2621

(TM)DELMICA - capacitor - Del Electronics Corp.

(TM)**DELTA** - toll audit systems - Electron, Inc.

DELTA AIRLINES, Dept. EM, Continental Colony Pkwy., Atlanta, Ga 30331, Tel: 404-346-6357

DELTA-BENCO-CASCADE LTD., Dept. EM, 124 Belfield Rd., Rexdale, Ont. Can. M9W 1G1, Tel: 416-241-2651, Telex: 91-6472; Empl.: 500

Local Sales Offices & Reps.

Ala	Decatur, Delta Benco Cascade	205-353-7400
NY	Buffalo, Delta-Benco-Cascade	716-874-6570
Tex	Arlington, Delata Benco Cascade	817-469-7011

(TM)**DELTABESTON** - asbestos-insulated wires - General Electric Co.

DELTA DESIGN, INC., Dept. EM, 5725 Kearny Villa Road, San Diego, Cal 92123, Tel: 714-292-5000, TWX: 910-335-1215; Empl.: 55

Sales Manager: G. Whitlock

Local Sales Offices & Reps.

Ariz	Tempe, Q. P. L.	602-949-9477
Cal	Belmont, Delta Design	415-591-2696
Cal	San Diego, Delta Design	714-292-5000
Cal	S. Elmonte, Q. P. L. Assoc.	213-575-8022
Colo	Littleton, Lange Sls.	303-795-3600
Fla	Longwood, Lenz Engrg.	305-831-9797
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs.	317-244-7867
Kans	Baxter Springs, Production Automation Corp.	316-856-3600
Md	Randallstown, Beacon North	301-922-1248
Mass	Lynfield, Newmar Assocs.	617-245-7960
Mich	Northville, Micro Sls. Corp.	313-482-1229
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	Grandview, Production Automation Corp.	816-763-4155
Mo	Hazelwood, Production Automation Corp.	314-731-2331
NJ	Fairfield, KLS Assocs.	201-227-2900
NY	D./FW., Delta Design	817-267-0701
NY	Kings Park, KLS Assocs.	
NY	New Paltz, Stone Assocs.	914-255-0800
NY	Syracuse, Tesco Assocs.	315-463-4566
NC	Greensboro, Lenz Engrg. Co.	919-299-7879
Ohio	Centerville, Micro Sls. Corp.	513-433-8171
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Pa	Bala Cynwyd, Electech Mfr. Rep.	215-687-5305
Va	Falls Church, Beacon North	703-534-7200
Va	Lynchburg, Beacon North	804-237-4740

DELTA ELECTRIC, Dept. EM, 3302 S. Nebraska, Marion, Ind. 46952

DELTA ELCTRN. CONTROL, Dept. EM, 1601 Pomona Ave., Costa Mesa, Cal. 92627, Tel: 714-646-7776; FSC No.: 33434; Empl.: 50

(TM)**DELTAFILM** - film capacitors - Dearborn Elctrns. Div.

(TM)**DELT ALERT** - Ultrasonic Burglar Alarm - Delta Products

(TM)**DELTAPLY** - fluorocarbon capacitors - Dearborn Elctrns. Div.

DELTA PRODUCTS, Dept. EM, Box 1147, Grand Junction, Colo. 81501, Tel: 303-242-9000; Empl.: 120

Local Sales Offices & Reps.

Ariz	Phoenix, McSherry & Assocs.	602-265-2803
Cal	San Ramon, E. Pfeuffer Elctrns. Unlimited	415-837-4898
Cal	Van Nuys, A. Szerlip Sls.	213-782-1765
Colo	Denver, McSherry & Assoc.	303-238-8361
Colo	Grand Junction, Delta Prods., Inc.	303-242-9000
Fla	Miami, Sochin Sls.	305-235-6048
Haw	Honolulu, A. Mosher	808-732-3636
Ind	Indianapolis, Shamrock Elctrn.	317-251-5527
Md	Severna Park, Hochrein & Assoc.	301-987-4003
Mass	Northboro, W.B. Pray Sls.	617-393-3434
Mich	Brighton, Lectro Sls.	313-532-5725
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	Independence, C.W. Dreese & Assoc.	816-461-7294
Tex	Houston, Ranger Elctrns.	713-526-1044
Exp:	South Bend, Ind., Schwanke & Marshall Int., Inc.	219-232-5948

(TM)**DELTA-T** - digital audio time delay - Gotham Audio Corp.

(TM)**DELTA-TENSION** - self-tensioning tape cartridge - Genisco Tech. Corp.

(TM)**DELTAVERTA** - multichannel data transmission system modules- based on principles of delta-sigma modulation and time-division multiplexing. - Hybrid Systems Corp.

DELTA WIRE, Dept. EM, 1457 W. Diversey, Chicago, Ill. 60636

DELTEC CORP., Dept. EM, 980 Buenos Ave., San Diego, Cal. 92110, Tel: 714-297-4466, TWX: 910-335-1241; FSC No.: 52297; Empl.: 70 p. 3376,3377

Local Sales Offices & Reps.

Ala	Huntsville, F-M Assocs.	205-536-9990
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Pasadena, A-F Sales Engg.	213-681-5631
Cal	Santa Clara, Thomas & Hartman Assocs.	408-247-1252
Colo	Denver, Barnhill Three	303-750-1222
Fla	Jupiter, F-M Assocs.	305-746-2996
Fla	Orlando, F-M Assocs.	305-851-5710
Ga	Atlanta, F. Massocs	404-634-7830
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Andover, Palatine Sls.	316-683-7512
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Silver Springs, Sel-Tronics	301-589-3391
Mass	Waltham, McBar Assocs.	617-890-0233
Mich	Southfield, Data-tron	313-354-6421
Minn	Minneapolis, Electro-Service Co.	612-827-2907
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Pennsauken, Megargel/Himmelstein Assoc.	609-662-3081
NM	Albuquerque, Barnhill Three	505-299-7658
NC	Greensboro, F-M Assocs.	919-294-2754
Ohio	Dayton, Data-tron	513-223-8421
Ohio	Wickliffe, Data-tron	216-585-8421
Ore	Lake Oswego, Wilson Applied Instr.	503-636-0965
Pa	Monroeville, Data-tron	412-243-8421
Tex	Austin, Barnhill Two, Inc.	512-444-2377
Tex	Houston, Barnhill Two, Inc.	713-688-9971
Tex	Richardson, Barnhill Two, Inc.	214-231-2573
Wash	Bellevue, Wilson Intl. Instr.	206-641-6444

DELTROL
controls
Division Of Deltrol Corp.

DELTROL CONTROLS, Dept. EM, 2745 S. 19th St., Milwaukee, Wisc. 53215, Tel: 414-671-6800; Empl.: 300 p. 3458-3463

Local Sales Offices & Reps.

Cal	Los Angeles, Cummings & Assoc.	213-340-6035
Cal	San Francisco, Cummings & Assoc.	408-247-8656
Cal	Santa Clara, Cummings & Assocs.	408-247-8656
Cal	Woodland Hills, Cummings & Assocs.	204-340-6035
Colo	Denver, Cummings & Assocs.	303-455-6860
Conn	Marion, Sands Co.	203-628-4363
Fla	Lighthouse Point, J. Krutek & Assocs.	305-941-6544
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Deltrol Controls	312-547-0500
Ind	Ft. Wayne, W. Bieberich Co.	219-432-2537
Ind	New Albany, W. W. Bieberich	812-945-3187
Md	Lutherville, Timonium, Naudain Assoc.	301-252-5378
Md	Woodbine, Naudain Associates	301-252-5378
Mich	Rochester, Kent & Assoc.	313-651-1890
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	Kansas City, Weisler & Assocs.	314-428-3934
Mo	St. Louis, Weisler & Assocs.	314-428-3934
NJ	Mount Laurel, Naudain Assocs.	609-235-1801
NY	Massapequa, Coughlin Assocs.	516-799-7743
NY	Rochester, Deltrol Controls	716-473-3340
Ohio	Aurora, Nationwide Comp. Reps.	216-562-9666
Ohio	Dayton, Nationwide Comps.	513-294-2303
Pa	Philadelphia, Naudain & Assoc.	609-235-1801
Tex	Garland, R. May Assocs.	214-276-5214
Wash	Seattle, Components West	206-243-2133
Wisc	Wauwatosa, F.C. DuBois & Assoc.	414-774-3100
Exp:	Can., Ontario, Islington, Power Service Products	416-239-2977

Local Distributors

Ala	Birmingham, M-G Elctrn.	205-328-4525
Ala	Montgomery, Southern Controls	205-277-5030
Alas	Anchorage, Alaska Bussell Elec. Co.	907-277-3555
Ariz	Pasadena, Dow Radio Co.	213-793-1195
Ariz	Phoenix, Electronics Parts Co.	602-257-1040
Ariz	Sunnyvale, Diplomat-Westland	408-734-1900
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Los Angeles, Electric Switches	213-664-2125
Cal	Los Angeles, Electro Components Distrs.	213-264-7100
Cal	San Jose, Consolidated Parts	408-294-3202
Cal	Woodland Hills, C & A Elctrns.	213-340-6022
Colo	Aurora, Component Specialties Corp.	303-341-0160
Colo	Denver, Fistell's Elctrn. Supply Co.	303-629-1312
Colo	Denver, Fistell's Elctrns. Supply Co.	303-244-4691
Colo	Grand Junction, Radio & Elctrns. Supply Co.	303-243-3346
Conn	Waterbury, Suburban Supply Co.	203-757-1251
Conn	West Port, Hi-Rel Inds.	203-226-4731
Fla	Deerfield, American Elctrns.	305-428-0262
Fla	Fort Lauderdale, Peerless Radio Corp.	305-566-5966
Fla	Tampa, Leader Elctrns. Distrs.	813-835-1891
Idaho	Boise, Kimball Elctrns.	208-342-3559
Idaho	Pocatello, Kimball Elctrns.	208-232-2201
Ill	Chicago, Merrill Elctrns. Inc.	212-647-0755
Ill	Rockford, J & M Elctrns., Inc.	815-963-6445
Ill	Schaumburg, Control Design	312-882-7232
Ind	, Control Design	317-788-4559
Ind	, Advent Elctrns.	317-297-4910
Ind	Elkhart, Warren Radio Co.	219-523-2398
Ind	Fort Wayne, Warren Radio Co.	219-743-5344
Ind	Fort Wayne, Fort Wayne Elctrns. Supply	219-742-4346
Ind	Indianapolis, Warren Radio Co.	317-634-5566
Iowa	Davenport, Warren Radio	319-323-8051
Iowa	Waterloo, Farnsworth Elctrns.	391-234-6681
Iowa	West Des Moines, Ramco Co.	515-225-6933
Kans	Topeka, Carroll Radio	912-234-6677
Ky	Ashland, Ashland Electric Co.	606-324-4107
Ky	Louisville, Peerless Elctrn. Equip. Co.	502-637-7677
Ky	Paducah, Warren Radio Co.	502-442-4367
La	Amelia, Bayou Bouef Elec.	504-631-2853
La	Baton Rouge, Menard Elctrns.	504-355-0323
Md	Baltimore, Technico Inc.	301-828-6416
Mass	Cambridge, Interstate Elctrns. Equip.	617-868-7440
Mass	Chicopee, Diplomat/I.P.C.	413-592-9441
Mass	Fitchburg, Gettens Elec. Supply Co.	617-343-3711
Mich	Flint, Roth Elec. Supply Co.	313-234-8661
Mich	Grand Rapids, Stotts Friedman Eltrns. Co.	616-459-0216
Mich	Kentwood, R-M Elctrns.	616-531-9300
Minn	Minneapolis, Control Design, Inc.	612-721-1629
Mo	Kansas City, Kornfeld Thorp Elec.	816-221-4000
Mo	St. Louis, Control Design	314-426-3150
Mo	St. Louis, Van Sickle Radio Elctrns.	314-621-5000
NJ	Belleville, Beltronics Corp.	201-751-2250
NJ	Edison, William Elctrns. Supply	201-985-3700
NJ	Totowa, Diplomat/I.P.C.	201-785-1830
NJ	Union City, Nidisco, Inc.	201-863-2111
NY	Brooklyn, Brooklyn Elctrns.	212-748-1300
NY	Cortland, Cortland Elctrns. Supply	607-756-2523
NY	Hempstead, Electronic Equip. Co.	516-895-5757
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	Hicksville, Motors & Armatures	516-935-8800
NY	Jamestown, B&E Elec.	716-483-1519
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Schenectady, Adirondack Elctrns.	518-346-4717
NC	Durham, Vickers Elctrns. Supply Co.	919-688-6311
NC	Raleigh, Southeastern Elctrns.	919-828-2311
ND	Minot, John Iverson	701-838-5466
Ohio	Cincinnati, Schuster Elec. Co.	513-984-1600
Ohio	Cleveland, Winter-radio Elctrns. Supply	216-621-9383
Ohio	Columbus, McJunkin Corp.	614-294-3711
Ohio	Toledo, Warren Radio Co.	419-248-3364
Ohio	Wickliffe, Gateway Megatech	216-944-8565
Okla	Ardmore, Ardmore Elec. Supply	405-223-3571
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Ore	Eugene, Portland Electric & Plumbing	503-342-2101
Ore	Eugene, Tillman & Booth Inc.	503-343-7701
Ore	Portland, Portland Electric & Plumbing Co.	503-243-6832
Pa	Erie, Mace Electronics	814-838-3511
Pa	McKeesport, Barno Radio Co.	412-751-5966

Pa	Philadelphia, Lindley Elec. Supply	215-329-7005
SC	Columbia, Dixie Radio Supply	803-253-5332
Tenn	Chattanooga, Curle Electronics	615-266-4728
Tenn	Memphis, Warren Radio Co.	901-274-2460
Tex	Corpus Christi, Nunn Electric Supply Co.	512-884-0341
Tex	Dallas, Dallas Instruments	214-341-2990
Tex	Dallas, Hall-Mark Elctrns.	214-231-5101
Tex	El Paso, Midland Specialty	915-533-9555
Tex	Houston, Buffalo Elec. Co.	713-228-4431
Tex	Houston, Kent Elctrns.	713-783-9800
Tex	Lubbock, R & R Elec. Co.	806-765-7727
Tex	Midland, ESI Supply Co.	915-694-9657
Tex	Odessa, Midland Specialty Co.	915-337-6365
Tex	San Antonio, Blackburn Drives Controls	512-349-2621
Utah	Salt Lake City, Diplomat-Altaland	801-486-7227
Utah	Salt Lake City, Kimble Elctrns.	801-328-2075
Va	Staunton, Southern Electric Corp.	703-886-6218
Wash	Seattle, Almac Stroum Elctrns.	206-763-2300
Wisc	Mequon, Taylor Electric Co.	414-241-4321
Wisc	Wausau, Electronics Inc.	715-845-4671
For:	Can., Ont., Islington, Power Service Prods.	416-239-2977
For:	Can., Winnepeg, Manitoba, Vanguard Elctrns.	204-786-1471

DELTRON, INC., Dept. EM, Wissahickon Ave., N. Wales, Pa. 19454, Tel: 215-699-9261, TWX: 510-661-8061; Empl.: 75

Local Sales Offices & Reps.

Ariz	Phoenix, M. W. Riedel & Co.	602-971-9758
Cal	Alhambra, M. W. Ridel & Co.	213-283-7694
Cal	Sunnyvale, AMASCO	408-733-8690
Colo	Englewood, Inverness Mktg.	313-770-2300
Conn	Middletown, Bell Controls	203-346-0670
Ind	Indianapolis, Maketing Engrs	317-546-1523
Kans	Shawnee Mission, K & M Sls. Co.	913-262-1444
Mich	Detroit, R. P. Urban & Assocs.	313-535-2355
Mich	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
Minn	Minneapolis, Bill Deming & Assocs.	612-888-5000
Mo	St. Louis, K & M Sales Co.	314-423-2420
NH	Nashua, Bell Controls	603-882-6984
NY	Pittsford, T-Squared Eletrns. Co.	716-381-2551
NY	Syracuse, T-Squared Elctrns. Co.	315-463-8592
NY	Tuckahoe, Spectrum Sls.	914-793-1660
Ohio	Centerville, Micro Sales Corp.	513-885-8171
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Pa	Newtown Square, Holdsworth & Co.	215-EL6-8550
Tex	Austin, Microsystems Mktg.	512-472-2492
Tex	Dallas, Microsystems Mktg.	214-238-7157
Tex	Houston, Microsystems Mktg.	713-783-2900
Utah	Murray, Inverness Mktg.	801-268-0446
Wash	Seattle, Walt Spaulding Co.	206-282-9173

DELTRONIC CRYSTAL INDS., INC., Dept. EM, Box 323, Denville, N.J. 07834, Tel: 201-361-2222; Empl.: 5

™**DEMOD** - demodulator - General Magnetics

DENISON, R.B., INC., Dept. EM, 103 Broadway, Bedford, Ohio 44146, Tel: 216-232-8200, Telex: 98-5424; Empl.: 40

Local Sales Offices & Reps.

Ala	Birmingham, J. Spader Co.	205-879-1366
Cal	Los Angeles, R.B. Clapp Co.	213-225-2395
Cal	San Francisco, Artwel Elec. Inc.	415-467-1880
Colo	Denver, TESSCO	303-744-1119
Conn	Hartford, R. Sawtell Assoc.	413-562-6627
Fla	Indian Rocks Beach, Kirk Sls. Co.	813-595-7353
Ga	Buford, R.L. Matus	404-945-2946
Ill	Chicago, G.H. Anderson	312-728-3927
Ill	Moline, J. Otis & Assoc.	309-762-9311
Ind	Indianapolis, L.W. Loyen Co.	317-255-5111
La	New Orleans, Rapco Assoc.	504-283-7321
Mass	Norwood, R.P. Hyland Co.	617-762-0345
Mass	Westfield, R. Sawtell Assoc.	413-562-6627
Mich	Grand Rapids, Associated Sls. Engrs.	616-455-1170
Mich	Southfield, Static Cont	313-358-1460
Minn	Minneapolis, W.A. Hallock Co.	612-920-6100
Miss	Jackson, Rapco Assoc.	601-969-3221
Mo	Kansas City, R. Greene Co.	816-333-7585
Mo	St. Louis, R. Greene Co.	314-644-2666
NY	Buffalo, A.C. Schultz Inc.	716-839-1010
NY	Flushing, Tri State Comps., Inc.	212-358-1010
NC	Charlotte, W.E. Cook & Assoc.	704-525-3384
Ohio	Cincinnati, Nelcor, Inc.	513-871-2816
Ohio	Cleveland, J.L. Finnicum & Assoc.	216-226-7076
Pa	Malvern, Miller & Dietz Co.	215-647-7373
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
Tex	Dallas, Stout Schmidt Co.	214-272-5585
Tex	Houston, Stout-Jennings-Schmidt	713-729-1994
Va	Richmond, Reynolds Cowardin Assoc.	804-266-3457
Va	Roanoke, Reynolds Cowardin	703-982-0546
Wash	Seattle, H. Campbell Co.	206-634-1200
Exp:	NY, Flushing, Tri State Comps.	212-358-1010

DENNISON MFG. CO., Fastener Division, Dept. EM, Framingham, Mass. 01701, Tel: 617-879-0511, Telex: 948-478; FSC No.: 5975; Empl.: 6000; Minimum order: $F.T. Wright

Sales Manager: C.W. Nelson; *Distributor Manager:* F.T. Wright

Local Sales Offices & Reps.

Cal	Burlingame, Dennison Mf. Co., Fastener Div.	415-347-1487
Cal	Palo Alto, Brooks Tech. Group	415-328-3232
Cal	Rosemead, Dennison Mfg. Co., Fastener Div.	213-283-0214
Ga	Atlanta, Dennison Mfg. Co, Fastener Div.	404-355-7665
Ill	Des Plaines, Dennison Mfg. Co., Fastener Div.	312-298-8870
Mass	Waltham, Dennison Mfg. Co, Fastner Div.	617-890-0035
Mich	Southfield, Dennison Mfg. Co, Fastener Div.	313-354-7440
Minn	Minneapolis, Clark R. Gibb	612-377-1200
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NC	Gastonia, Dennison Mfg. Co., Fastener Div.	704-867-8315
Pa	Wayne, Dennison Mfg. Co. Fastener Div.	215-687-9110
Tex	Dallas, Dennison Mfg. Co., Fastener Div.	214-826-3150

™**DENSICHRON R** - densitometers - Sargent Welch Sci. Co.

™**DENSI-LUX** - enlarging meter - Lektra Labs., Inc.

™**DENSI-METER** - color analyzer - Lektra Labs., Inc.

™**DENSI-TIMER** - automatic enlarging timer - Lektra Labs., Inc.

™**DENSITOCOLOR** - controls, density - Heitz, Inc., Karl

™**DENSITROL** - density control instrument-electric or direct reading - Princo Instrs.

™**DEPEND-A-BOND** - solders - Alpha Metals, Inc.

™**DEPENDEX** - vacuum components - High Voltage Engrg. Corp.

DERINGER MFG. CO., Dept. EM, 1250 Town Line Rd., Mundelein, Ill. 60060, Tel: 312-566-4100, TWX: 910-685-4321; Empl.: 220

DES TEK IND., Dept. EM, Box 24163, Los Angeles, Cal. 90024, Tel: 213-474-5093; Empl.: 3

™**DESCO** - plug-in assemblies - Dietz Design, Inc.

DESCO MFG. CO., Dept. EM, 1530 Flower St., Glendale, Cal. 91201; Empl.: 6

™**DESICOTE** - water-repellent coating compound - Beckman Instrs., (AISSD)

DESIGN AUTOMATION, INC., Dept. EM, 809 Massachusetts Ave., Lexington, Mass. 02173, Tel: 617-862-8998; Empl.: 5

DESIGNATRONICS INC., Dept. EM, 55 S. Denton Ave., New Hyde Park, NY 11040

™**DESIGNERS** - data sheets - Motorola Semiconductor Prods.

™**DESIGN III** - desktop CRT display terminal - Ann Arbor Terminals, Inc.

DE SOTO ELEC. PRODS., Dept. EM, 414 S. Main, De Soto, MO 63020, Tel: 314-586-3381; Empl.: 3

DESPATCH OVEN CO., Dept. EM, P.O. Box 1320, Minneapolis, Minn. 55440, Tel: 612-331-1873, Telex: 29-0704; Empl.: 250

Local Sales Offices & Reps.

Ala	Birmingham, Dilcher Engrg.	205-252-3300
Cal	Santa Fe Springs, Egloff & Graper	213-698-0173
Cal	South San Francisco, Matheson-Doherty Co.	415-583-6161
Colo	Denver, T.C. Jarrett Co.	303-233-2333
Conn	Hamden, Etter Engrg. Co.	203-288-3575
Fla	St. Petersburg, Dilcher	813-343-1041
Haw	Atlanta, Dilcher Engrg. Co.	404-261-1678
Ill	Berkley, Hoge & Assocs.	312-544-9890
Ind	Indianapolis, W.R. Frew Co.	317-253-3271
Ky	Louisville, W.R. Frew Co.	502-451-4616
La	New Orleans, Davies Assocs.	504-522-9026
Mass	Waltham, Etter Engrg. Co.	617-893-8658
Mich	Grosse Pointe Farms, Hartmann-Schaffer Engrg. Co.	313-886-1345
Mich	Southfield, Schaffer Engrg. Co.	313-354-5337
Minn	Minneapolis, Design-Tec, Inc.	612-835-5811
Mo	Kansas City, Boschert Equip. Co.	816-561-4050
Mo	St. Louis, Beaco Equip. Co.	314-965-8600
NJ	Belford, Hasco Sls.	201-787-5504
NY	Grand Island, Nickles Assocs.	716-773-5399
NY	Rochester, Nickles Assocs.	716-586-4988
NC	Charlotte, Sloan Assocs.	704-523-2122
Ohio	Cleveland, Wagner-Green Co.	216-561-4670
Ohio	Dayton, Pier, Inc.	513-254-9771
Okla	Tulsa, R. J. Ely Co.	918-743-9828
Pa	Audubon, Day Engrg. Co.	215-666-7700
Pa	Pittsburgh, L. R. Nourie, Inc.	412-561-1628
Tex	Houston, Selle Alloys & Equip. Co.	713-524-3013
Va	Richmond, Sloan Assocs.	804-359-6051
Wash	Seattle, Hartley Corp.	206-772-2000
Wisc	Butler, W. E. Swanson & Assocs.	414-781-3970

DEST DATA CORP., Dept. EM, 1285 Forgewood Ave., Sunnyvale, Cal. 94085, Tel: 408-734-1234; Empl.: 33

Sales Manager: T.R. Goldsmith

DETECTORS INC., Dept. EM, 2550 Electronic La., Suite 205, Dallas, Tex. 75220

™**DET-O-JET** - liquid machine detergent - Alconox Inc.

DETORONICS CORP., Dept. EM, 10660 E. Rush St., P.O. Box 3805, S. El Monte, Cal. 91733, Tel: 213-579-7130, TWX: 587-3436, 910-587-3436; FSC No.: 29867; Empl.: 45

DEUTSCH CO., Elec. Components Div., Dept. EM, Municipal Airport, Banning, Cal. 92220

DEUTSCH FASTENER CORP., Dept. EM, 7001 W. Imperial Hwy., Los Angeles, Cal. 90045, Tel: 213-649-1400, TWX: 213-673-1000; Empl.: 100

DEUTSCH RELAYS, INC., Dept. EM, 65 Daly Rd., East Northport, N.Y. 11731, Tel: 516-864-6000, TWX: 510-226-0233; Empl.: 420

Local Sales Offices & Reps.

Cal	Burlingame, J. Logan & Assoc.	415-697-6100
Fla	Altamonte Springs, Semtronic Assocs.	305-931-8235
Ga	Atlanta, Grady Duckett	404-451-3529
Ill	Chicago, Berndt Assocs.	312-283-0713
Mass	Waltham, Rantek	617-890-5110
Ohio	Dayton, Electro-Com	513-898-5140
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Tex	Dallas, Allied Inc.	214-238-0408
Wash	Bellvue, Pacific NW Consult.	206-454-2503

DEVAR, Dept. EM, 706 Bostwick Ave., Bridgeport, Conn. 06665, Tel: 203-368-6751

DEVCO ENGRG., Control Sys. Div., Dept. EM, Pier La., W. Caldwell, N.J. 07006, Tel: 201-CA8-0321; Empl.: 36

DEVELCO, Dept. EM, 530 Logue Ave., Mountain View, Cal. 94043, Tel: 408-969-1600, TWX: 910-379-6588; Empl.: 75

Local Sales Offices & Reps.

Md	Gaithersburg, Data Time, Inc.	301-948-7666

™**DEWPROBE** - dewpoint sensors - Honeywell

DEXTER SCIENTIFIC, Dept. EM, 7640 Zeeb Rd, Dexter, MI 48130, Tel: 313-426-3764

™**DFA** - disposable filter assembly - Pall Corp.

(TM)D-I - differential ion pump - Perkin-Elmer Ultek Inc.

DIACON, Dept. EM, 4812 G Kearny Mesa Rd., San Diego, Cal. 92111, Tel: 714-279-6992, Telex: 69-7967; Empl.: 225

Local Sales Offices & Reps.
Mass Fall River, Greenlees Assoc. 617-674-9858
NY New York, Huth Sls. 212-984-1765
Tex Richardson, Marston Co. 214-235-3577

(TM)DIAC - rms AC converters - Dana Labs., Inc.

DI-ACRO, Div. Houdaille Inds., Inc., Dept. EM, 316 8th Ave., Lake City, Minn. 55041, Tel: 612-345-4571, Telex: 290-397; Empl.: 400

Sales Manager: E. Roessle

DI/AN CONTROLS, INC., Dept. EM, 944 Dorchester Ave., Boston, Mass. 02125, Tel: 617-288-7700, TWX: 710-333-1732; FSC No.: 06900; Empl.: 130

Sales Manager: R. Kodis, Pres

(TM)DIACTOR - voltage regulator - General Elec. Co.

(TM)DIAGRAPH - impedance plotter - Rhode & Schwarz Sls.

DIAL PRODS. CO., Dept. EM, 19-21 Cottage St., Bayonne, N.J. 07002, Tel: 201-HE7-0720; Empl.: 100

Local Sales Offices & Reps.
Me Liberty, Adcour - A.H. Lindsay 207-589-3290
Mass Sharon, Adcour 617-784-3996

(TM)DIAL-A-GAIN - voltage amplifiers - Unholtz-Dickie Corp.

(TM)DIAL-AN-AMP - constant current adaptor - General Resistance, Inc.

(TM)DIAL-AN-OHM - dialable resistance decade - General Resistance, Inc.

(TM)DIAL-A-SOURCE - dialable current source - General Resistance, Inc.

(TM)DIALATCH - container latch - Hartwell Corp.

(TM)DIAL-A-TEMP - variable heat soldering station - Hexacon Elec. Co.

(TM)DIALATROL - temperature controllers - Honeywell

(TM)DIAL-A-VIDER - dialable voltage divider - General Resistance, Inc.

(TM)DIAL-A-VOLT - dialable voltage reference - General Resistance, Inc.

(TM)DIAL & CODER - Automatic Telephone Dialer - Delta Products

(TM)DIAL-FLO - oven air velocity control - Hotpack Corp.

(TM)DIALIFE BANDS - special formulated print bands - Monarch Marking Sys.

DIALIGHT, Dept. EM, 203 Harrison Pl., Brooklyn, N.Y. 11237, Tel: 212-497-7600, TWX: 710-584-5487; Empl.: 400 p. 2584,2585

Sales Manager: P. Malecka

Local Sales Offices & Reps.
Ala Huntsville, Cartwright & Bean Inc. 205-533-3509
Ariz Phoenix, Stitzer-Dodd Inc. 602-944-2237
Cal Oakland, Moulthrop Sls. 415-261-7676
Cal Pico Rivera, Westrep 213-949-2551
Colo Denver, R.G. Bowen Co. 303-722-4641
Fla Ft. Lauderdale, Cartwright & Bean, Inc. 305-791-3989
Fla Orlando, Cartwright & Bean, Inc. 305-422-4531
Ga Atlanta, Cartwright & Bean, Inc. 404-255-5262
Ill Hinsdale, Hill-Gray Assocs. 312-325-4810
Ind Indianapolis, Southern Sls. Corp. 317-299-2992
Kans Shawnee Mission, K & M Sls. Co. 913-262-1444
La Gretna, Cartwright & Bean, Inc. 504-362-4649
Md Lanham, L.D. Lowery, Inc. 301-459-1556
Mass Needham, Mullin-Tech. Sls. 617-444-4780
Mich Ferndale, Hilltronics Inc. 313-398-5556
Minn St. Paul, R.G. Ragon, Inc. 612-488-0201
Mo St. Louis, K & M Sls. Co. 314-423-2420
NY No. Syracuse, Precision Sls. 315-458-2223
NC Charlotte, Cartwright & Bean, Inc. 704-337-5673
NC Raleigh, Cartwright & Bean, Inc. 919-781-6560
Ohio Cleveland, K.W. Elctrn. Sls. 216-831-8292
Ohio Dayton, K.W. Elctrn. Sls. 513-890-2150
Ore Portland, Electronic Sources, Inc. 503-292-0701
Pa Allison Park, K.W. Elctrn. Sls. 412-487-4300
Pa Broomall, L.D. Lowery, Inc. 215-528-5170
Tenn Memphis, Cartwright & Bean, Inc. 901-276-4442
Tex Dallas, Tesco 214-328-5484
Utah Salt Lake City, R.G. Bowen Co. 801-363-8801
Wash Bellevue, Almac/Stroum Elctrns. 206-453-0800
Exp: Brooklyn, N.Y., Dialight 212-497-7600

Local Distributors
Ariz Phoenix, Moltronics of Ariz. 602-272-7951
Cal Chatsworth, Westates Elctrns. 213-341-4411
Cal Inglewood, Newark Elctrns. 213-678-0441
Cal Los Angeles, Western Electromotive/Shephard Inc. 213-820-3777
Cal Sacramento, Sacramento Elctrns. 916-441-4821
Cal Santa Clara, Fisher/Brownell 408-244-6182
Cal Sunnyvale, Bell Industries 408-734-8570
Cal Sun Valley, Richey Elctrns., Inc. 213-875-2862
Colo Denver, Newark-Denver Elctrns. 303-757-3351
Colo Denver, Meter Master Instr. 303-722-5766
Conn Waterbury, Surburban Supply 203-757-1251
Fla Ft. Lauderdale, Peerless Radio Corp. of Fla. 305-566-5966
Fla Orlando, Hammond Elctrns. 305-849-6060
Ga Atlanta, Specialty Dist. 404-873-2521
Ga Norcross, Lykes Elctrns. Corp. 404-449-9400
Ill Chicago, Newark Elctrns. 312-638-4411
Ill Peoria, Klaus Radio & Elect. 309-691-4840
Ind Ft. Wayne, Fort Wayne Elctrn. Supply 219-423-3422
Ind Indianapolis, Graham Elctrn. Supply 317-634-8202
Ind South Bend, Radio Dist. 219-287-2911
Ky Louisville, P.I. Burks Co. 502-589-3960
La Lafayette, Ralph's of Lafayette 318-234-4507
La New Orleans, Southern Radio Supply Co. 504-524-2343
Md Baltimore, Radio Elec. Svc. 301-823-0070
Md Gaithersburg, Pioneer Washington Elect. 301-948-0710
Md Gaithersburg, Cramer/EW Wash. 301-948-0110
Md Rockville, Capitol Radio Wholesalers 301-881-2270
Mass Boston, Sager Electrical Supply 617-542-2281
Mass Dedham, Gerber Elctrns. 617-329-2400
Mass Newton, Cramer Elctrns. 617-969-7700
Mass Springfield, T.F. Cushing, Inc. 413-788-7341
Mass Wilbraham, Ind'l. Components 413-596-3854
Mich Ann Arbor, Wedemeyer Elctrn. Supply 313-665-8611
Mich Livonia, RS Elctrns. 313-525-1155
Mich Oak Park, Newark Elctrn. Supply 313-548-0250
Mich Wyoming, Newark Elctrn. 616-241-6681
Minn St. Paul, Gopher Elctrns. 612-645-0241
Mo Kansas City, LCOMP-Kansas City 816-221-2400
Mo Kansas City, Walters Radio Supply 816-531-7015
Mo St. Louis, LCOMP-St. Louis 314-647-5505
Neb Lincoln, Scott Elctrn. Supply 402-466-8221
NJ Hanover, State Elctrns. 201-887-2550
NJ Kenilworth, Newark Elctrns. 201-272-8410
NJ Pennsauken, Resco Elctrns. 609-662-4000
NJ Springfield, Federated Elctrns. 201-376-8900
NJ Wayne, Gordon/Horne Inc. 201-835-7400
NY Binghamton, ASI Elect. Inc. 607-723-6326
NY Buffalo, Summit Distributors 716-884-3450
NY Elmsford, Ancar Electronics Supply 914-592-7100
NY Farmingdale, Harrison Radio 516-293-7990
NY Farmingdale, Arrow Elctrns. 516-694-6800
NY Long Island City, Dalis Industrial Elect. 212-361-1100
NY Lynbrook, Peerless Radio 516-593-2121
NY Rochester, Summit Elctrns. of Rochester 716-334-8110
NY Rome, Rome Elctrns. 315-337-5400
NY Woodbury, Harvey Radio 516-921-8700
NC Greensboro, Hammond Elctrns. of Carolina 919-275-6391
NC Raleigh, Southeastern Radio Supply 919-828-2311
NC Winston-Salem, Cramer/EW 919-725-8711
Ohio Akron, Akron Elctrn. Supply 216-762-8816
Ohio Akron, Sun Radio 216-434-2171
Ohio Cincinnati, Hughes-Peters 513-351-2000
Ohio Cincinnati, United Radio 513-761-4030
Ohio Cincinnati, Newark Elctrns 513-874-5115
Ohio Cleveland, Pioneer-Cleveland 216-587-3600
Ohio Columbus, Hughes-Peters 614-294-5351
Ohio Dayton, Stotts-Friedman 513-298-5555
Ohio Dayton, Pioneer/Dayton 513-236-9900
Ohio Lima, Lima Radio Parts 419-228-1220
Ohio Solon, Radio & Elctrn. Parts (Repco) 216-248-8906
Okla Tulsa, Radio, Inc. 918-587-9123
Ore Portland, Almac/Stroum Elctrns. 503-292-3534
Pa Erie, Seaway Elec. Supply 814-455-1304
Pa Montgomeryville, Pyttronic Industries 215-643-2850
Pa Philadelphia, Philadelphia Elctrns. 215-568-7400
Pa Philadelphia, Almo Elctrns. 215-698-4000
Pa Pittsburgh, Cam RPC Industrial Elect. 412-782-3770
Pa Reading, Barbey Elctrns 215-376-7451
RI Providence, Wm. Dandreta & Co. 401-861-2800
SC Greenville, Hammond Elctrns. of Carolina 803-233-4121
Tenn Kingsport, Radio Elec. Supply 615-247-8111
Tenn Nashville, Electra Distributing 615-329-3971
Tex Dallas, Texas Instr. Supply 214-238-6821
Tex Dallas, Norvell Elctrns 214-233-0020
Tex Garland, Newark Elctrns. 214-271-2511
Tex Houston, Harrison Equip. Co. 713-652-4700
Tex Houston, Newark-Houston Elctrns. Corp. 713-782-4800
Tex Houston, Lenert Co. 713-225-1465
Utah Salt Lake City, Standard Supply Co. 801-486-3371
Va Norfolk, Priest Elctrns. 804-855-0141
Va Richmond, Meridian Elctrns. 804-359-0221
Wash Seattle, Almac/Stroum Elctrns. 206-763-2300
Wisc Milwaukee, Elctrn. Expaditors 414-228-8100
Wisc Milwaukee, Parts Mart 414-276-4160
For: Can., Don Mills, Ont., Saynor Elctrns. Ltd. 416-445-2340
For: Can., Downsview, Ont., Cesco Elctrns. Ltd. 416-661-0220
For: Can., Downsview, Ont., Zentronics, Ltd. 416-635-2822
For: Can., Montreal, Que., Payette Radio Ltd. 514-878-4771
For: Can., Montreal, Que., Cesco Elctrns., Ltd. 514-735-5511
For: Can., Ottawa, Ont., Wackid Radio TV Labs, Ltd. 613-728-1821
For: Can., Vancouver, B.C., L.A. Varah Ltd. 604-873-3211
For: Can., Willowdale, Ont., Electro Sonic Supply Co., Ltd. 416-494-1666
For: Can., Winnipeg, Man., Cam Gard Supply, Ltd. 204-786-8481

(TM)DIAMFILE - diamond contact cleaner - Jonard Industries Corp.

(TM)DIAMOND - vulcanized fibre - Budd Co.

(TM)DIAMOND GRIP - terminals & splices - Amp Inc.

DIAMOND WIRE & CABLE, Dept. EM, 445 Park Ave., Sycamore, Ill 60178

(TM)DIAMONITE - alumina ceramic prods - Diamonite Products Div.

DIAMONITE PRODUCTS DIV., Dept. EM, Box 567, Shreve, Ohio 44676, Tel: 216-567-2145, Telex: 98-6342; Empl.: 250

Sales Manager: C. R. Dougherty

DIA-NETICS INC., Dept. EM, 18823 Napa St., Northridge, Cal. 91324, Tel: 213-886-2616; Empl.: 35

(TM)DIAZO-JET - print machine - Teledyne Rotolite

(TM)DIB - dual in-line bridge - Varo Semiconductor, Inc.

(TM)DI-CAP(TM) - precision single-plate capacitor - Dielectric Laboratories, Inc.

DICEON ELECTRONICS, Dept. EM, 18522 Von Karman Ave., Irvine, Cal. 92664, Tel: 714-833-0870, TWX: 910-595-1794; Empl.: 225

Local Sales Offices & Reps.
Cal Santa Clara, Raydex Assoc. 408-247-9891
Colo Denver, Rope & Williamson 303-758-8507
Fla Ft. Lauderdale, D. Banner 305-776-0814
Ill Barrington, L. Bacher & Assocs. 312-381-6780
Mass Wakefield, Data Engrg. Srvcs. 617-245-4661
Mich Southfield, Luebbe Sls. Co. 313-357-0355
Minn Anoka, K. Haugen & Assocs. 612-421-3395
NJ Livingston, Graydon-Sherman 201-994-9055
NY Fayetteville, Graydon-Sherman 315-637-9861
NY Pittsford, Graydon-Sherman 315-637-9359
Ohio Cincinnati, Luebbe Sls. Co. 513-871-4211

Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Pa	Willow Grove, Graydon-Sherman	215-657-2213
Pa	Yeadon, Graydon-Sherman	215-664-7316
SC	Greenville, Elctrn. Mktg. Assocs.	803-244-8120
Tex	Dallas, Precision Sls.	214-351-6964
Utah	Salt Lake City, Rapier-Richards Mktg.	801-322-0222
Wash	Seattle, Earl & Brown Co.	206-284-1121

DICKSON ELECTRONICS, See Siemens Corp, Comps Div.

DIEGO, SYSTEMS, Dept. EM, 7152 Convoy Court, San Diego, CA 92111, Tel: 714-292-0282; Empl.: 4

Sales Manager: J. Jaquay

™DIEKUT STIK-ONS - drafting aids - Bishop Graphics

DIELECTRIC COMMUNICATIONS

DIELECTRIC COMMS, Div. Sola Basic Inds., Dept. EM, Raymond, Maine 04071, Tel: 207-655-4555, TWX: 710-229-6890; FSC No.: 08441; Empl.: 165

Sales Manager: S.O. Thomas

DIELECTRIC INSTR. CORP., Dept. EM, 761 Franklin Ave., Pittsburgh, Pa. 15221, Tel: 412-731-6566; Empl.: 7

DIELECTRIC LABORATORIES, INC., Dept. EM, 64 Clinton Rd, Fairfield, NJ 07006, Tel: 201-575-8922, Telex: 13-8730; Empl.: 15

Local Sales Offices & Reps.

Cal	Downey, Trimarco/Wright	213-861-8244
Cal	Portola Valley, Kipp Assocs.	417-851-0123
Cal	Portola Valley, Kipp Assocs.	415-851-0123
Fla	Clearwater, Dyne-A-Mark Corp.	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Ill	Elk Grove, J. G. Twist Co.	312-593-0200
Ill	Elk Grove Village, J. G. Twist Co.	312-593-0200
Ind	Ft. Wayne, R.O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, Whitesell & Assoc.	317-359-9283
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Iowa	Cedar Rapids, J. G. Twist Co.	319-393-8703
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Ky	Louisville, R.O. Whitesell	502-895-2582
Ky	Louisville, Whitesell & Assoc.	502-893-7303
Mass	Waban, Bawer-Bee Assoc.	617-475-2124
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	Grand Rapids, Whitesell & Assoc.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assoc.	313-559-5454
Mich	Southfield, Whitesell & Assoc.	313-358-2020
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	Minneapolis, J. G. Twist Co.	612-854-4600
Minn	Minneapolis, J.G. Twist Co.	612-854-4600
Mo	St. Louis, J. G. Twist Co.	314-432-2830
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NJ	West Orange, E-F Technical Sls.	201-731-7203
NY	Huntington Station, E-F Technical Sls.	516-549-1818
NY	Skaneateles, Skanatron	315-685-3745
Ohio	Cincinnati, Whitesell & Assoc.	513-521-2290
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assoc.	216-826-4424
Pa	King of Prussia, Schibley Assoc.	215-688-7207
Pa	Pittsburgh, Whitesell & Assoc.	412-344-7277
Tenn	Greeneville, R.O. Whitesell & Assoc.	615-639-6154
Tex	Dallas, Stevens Sls. Co.	214-350-2476
Va	Fairfax, Schibley Assoc.	703-591-3008
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755
Exp:	NJ, Teaneck, Sylvan Ginsbury	201-837-1100

DIELECTRIC SCIENCES, Dept. EM, 5 South Ave., Burlington, Mass 01803, Tel: 617-272-8960; FSC No.: 50509; Empl.: 8

Local Sales Offices & Reps.

Cal	San Diego, Encom	714-299-1616
Cal	San Francisco, Encom	415-969-0330

DIETZ DESIGN, INC., Dept. EM, 100 Electronics Pkwy., Belton, Mo. 64012, Tel: 816-331-4911; Empl.: 25

DIETZ, HENRY G. CO., INC., Dept. EM, 14-26 28th Ave., Long Island City, N.Y. 11102, Tel: 212-RA 6-3347; Empl.: 20

DIETZGEN CORP., Dept. EM, 250 Wille Rd., Des Plaines, Ill 60018, Tel: 312-391-4400; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles	213-772-8481
Cal	San Francisco	408-984-2460
Conn	North Brunswick	201-297-3500
DC	Washington	202-223-8130
Ga	Atlanta	404-934-5240
La	New Orleans	504-525-7121
Mo	Kansas City	816-471-3340
NJ	North Bruswick	201-297-3500
Ohio	Cincinnati	513-761-2724
Ohio	Cleveland	216-631-2660
Ohio	Columbus	614-497-2030
Pa	Philadelphia	215-688-6400
Pa	Pittsburgh	412-563-6880
Tex	Arlington	214-647-1711
Wash	Seattle	206-244-5440
Wisc	Brookfield	414-671-1518

™DIFFAXIAL - speaker - University Sound

™DIF FILTERS - dual-in-line LC filters - ESC Elctrns. Corp.

™DIFFRACTION HORN - tweeter - Electro-Voice, Inc.

™DIFFSTAK - unique pumping system - Edwards High Vacuum

™DIFILM - film dielectric capacitors - Sprague Elec. Co.

™DIG - power supplies - Nova Tran Corp.

DIGI-KEY CORP., Dept. EM, Box 126, Thief River Falls, Minn 56701

DIGIAC CORP., Dept. EM, 175 Engineers Rd., Smithtown, N.Y. 11787, Tel: 516-273-8600; Empl.: 40; Minimum order: $C. Pastore

Sales Manager: J. Middleton; *Distributor Manager:* C. Pastore

Local Sales Offices & Reps.

Ala	Birmingham, Technical Training Aids	205-822-1326
Ariz	Scottsdale, Peterson Assocs.	602-945-6605
Cal	Fremont, G.L. Oliver Co.	415-794-6720
Colo	Wheatridge, Intermountain Education Sys.	303-422-7869
Fla	Winter Pk., Tech. Training Aids	305-647-5373
Ga	Calhoun, Learning Labs. Inc.	404-629-4624
Ill	Downers Grove, Aidex Corp.	312-963-4270
Iowa	Marion, Gib Klein Co.	319-393-4048
Kans	Marion, G. Klein Co.	319-393-4048
Mich	Plymouth, J. Close	313-453-7531
Minn	Eden Prairie, Lab Corp.	612-944-1807
NH	Windham, Helmar Assocs.	603-893-4586
NY	East Norwich, Tequipment	516-922-6590
NY	Smithtown, Digiac Corp.	516-273-8600
NC	Sanford, A.B. Williams Jr. Assoc.	919-775-4164
Ohio	Toledo, Freeman Supply Co.	419-691-4624
Pa	Philadelphia, Delta Equip. Co.	215-236-6350
SD	Watertown, J.L.H. Assocs.	605-886-4667
Tex	Dallas, Tol-Mark Co.	214-341-6917
Va	Richmond, A.B. Williams, Jr. Assoc.	804-276-9291
Wash	Seattle, Wear Corp.	206-763-2270
Wisc	Milwaukee, Lab Corp.	414-771-2946

™DIGIBEZEL - alpha-numeric display - NOBEX Div.

™DIGIBIT - digital logic modules - Tech Serv., Inc.

™DIGICHEK - digital logic analyzers - Applied Control Co.

™DIGICOM - digital communication - E-Systems Inc.

™DIGICOUNT - bi-directional counters & displays - Itek Corp. Meas. Sys. Div.

DIGI-DATA CORP., Dept. EM, 8580 Dorsey Rd., Jessup, Md. 20794, Tel: 301-489-0200, TWX: 710-867-9254; Empl.: 80

™DIGI DECK - digital recording mag. tape deck - Intern'l. Computer Prods., Inc.

™DIGI DESIGNER - circuit design aid - E & L Instruments, Inc.

™DIGIDIAL - digital turns-counting dial - Beckman Instrs.

™DIGI-DRIVES - control systems - Sequential Information Systems

™DIGI-KLIPS - printed circuit connectors - Components Corp.

™DIGILINE - linear measuring systems - Itek Corp. Meas. Sys. Div.

DIGILIN INC., Dept. EM, 3521 W. Pacific Ave., Burbank, Cal. 91505, Tel: 213-846-1800, TWX: 910-498-2758; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, DeAngelo, Rothman & Cheever	602-948-2240
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	Mountain View, Tech-Ser, Inc.	415-969-9020
Cal	San Diego, DeAngelo, Rothman & Co.	714-560-5707
Colo	Denver, AG Elctrns.	303-771-8088
Ill	Chicago, Warner Assoc.	312-631-6781
Md	Rockville, Marktron	301-762-6210
Mich	Clawson, Instr. Specialties	313-435-3311
Mich	Royal Oak, Satullo	313-549-3910
Minn	Minneapolis, Waytek	612-933-2133
Mo	Kansas City, Harris Hanson Co.	816-444-9494
Mo	St. Louis, Harris Hanson Co.	314-432-3611
NJ	Ridgewood, Hansen Assoc.	201-652-7055
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
Ohio	Cleveland, Satullo	216-486-2800
Ohio	Dayton, Satullo	513-298-8638
Ore	Portland, General Elctrns.	216-693-0025
Pa	Glenside, Elcom, Inc.	215-885-1325
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Wash	Seattle, General Elctrns.	206-243-5141
Exp:	Mass., Medway, Surel Int'l.	617-533-2041

™DIGI-LOCK - control system - Sequential Information Systems

™DIGILOGGER - digital data logger - NES, Inc.

™DIGIMAX - digital data instrumentation - Leeds & Northrup Co.

™DIGIMITE - portable, digital potentiometer - Thermo Elec. Co., Inc.

™DIGIPHASE - digital frequency synthesizers - Dana Labs., Inc.

™DIGI-PROBE - pulse & logic detection & analysis - Automatic Production Systems Inc.

™DIGISCALE - linear measuring system - Itek Corp. Meas. Sys. Div.

™DIGISCOPE - 1320 & 1330 logic analyzer - E-H Resch. Labs., Inc.

™DIGISEC - optical shaft encoders - Itek Corp. Meas. Sys. Div.

™DIGI-SHAFT - shaft/digital converter - Computer Conversions Corp.

™DIGISTROBE - digital stroboscope - Power Instrs., Inc.

™DIGISWITCH - digital (thumbwheel) switches - Digitran Co.

DIGITAL BROADCAST SYS., Dept. EM, 4306 Gov. Dr., Ste O, Huntsville, Ala. 35805, Tel: 205-837-2183; FSC No.: 66; Empl.: 12

Sales Manager: W. Churchill

Local Sales Offices & Reps.

Ala	Huntsville, Leeco	205-533-5896
Cal	Campbell, Sedillo Co.	408-374-5220

Cal	Woodland Hills, Burtis Instrumentation Sls.	213-887-13610
Wash	Seattle, Process Sys.	206-246-0224

DIGITAL COMMUNICATIONS ASSOC., INC., Dept. EM, 135 Technology Park, Atlanta, Ga 30092, Tel: 404-448-1400

Sales Manager: J.W. Spencer

DIGITAL COMPUTER CONTROLS, INC., Dept. EM, 12 Industrial Rd., Fairfield, N.J. 07006; Empl.: 325

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Irvine, Digital Computer Controls	714-556-2760
Cal	Los Angeles, Digital Computer Controls	213-464-7311
Colo	Boulder, P.A.R. Assocs.	303-499-4736
Conn	Danbury, Digital Computer Controls	203-792-1230
Fla	Winter Park, Digital Computer Controls	305-645-0499
Kans	Shawnee Mission, Inland Assocs.	913-362-2366
Md	Rockville, Digital Computer Controls	301-340-2221
Mass	Wakefield, Digital Computer Controls	617-245-6240
Mich	Southfield, Digital Computer Controls	313-559-4633
Minn	Wayzata, Peddler's Inc.	612-941-8614
Mo	St. Louis, Inland Assocs.	314-821-3742
NJ	Fairfield, Digital Computer Controls	201-575-0146
Wash	Seattle, Rush S. Drake Assocs.	206-763-2755
Exp:	N.J., Fairfield, Digital Computer Controls Inc.	201-575-9100

DIGITAL DEV. CORP., Dept. EM, 8615 Balboa, San Diego, Cal. 92123, Tel: 714-278-9920; Empl.: 375

Local Sales Offices & Reps.

Cal	Newport Beach, Digital Dev. Corp.	714-640-1430
Cal	Sunnyvale, Digital Dev. Corp.	714-640-1430
Fla	Orlando, W.A. Brown Instr., Inc.	305-425-5505
Fla	Vero Beach, Digital Dev. Corp.	305-569-5644
Ill	Glenview, H. Kalman DDC	312-729-8039
Mass	Boston, Digital Dev. Corp.	617-897-3037
Mass	Stow, Digital Dev. Corp.	617-897-3037

digital

DIGITAL EQUIPMENT CORPORATION, Dept. EM, 146 Main Street, Maynard, Mass. 01754, Tel: 617-897-5111, TWX: 710-347-0212

Local Sales Offices & Reps.

Ala	Birmingham	205-942-4707
Ariz	Phoenix	602-267-1364
Cal	El Segundo	213-640-1830
Cal	Santa Clara	408-984-0200
Colo	Denver	303-773-6535
Conn	Meriden	203-238-7878
Fla	North Miami	305-652-6841
Fla	Orlando	305-851-4450
Ga	Atlanta	404-455-7177
Haw	Honolulu	808-524-1943
Ill	Rolling Meadows	312-640-5500
Ind	Indianapolis	317-248-9461
Iowa	Battendorf	319-359-7581
Ky	Louisville	502-458-9561
La	Metaire	504-837-0257
Md	Lanham	301-459-7900
Mass	Waltham	617-890-0330
Mich	Framington Hills	313-553-3000
Minn	Minneapolis	612-854-6562
Mo	Kansas City	816-483-5340
Neb	Omaha	402-333-5500
NJ	Fairfield	201-227-9280
NM	Albuquerque	505-296-5411
NY	Albany	518-869-8464
NY	Huntington Station	516-694-4131
NY	New York City	212-971-3300
NC	Chapel Hill	919-493-2531
NC	Charlotte	704-525-0280
Ohio	Cleveland	216-383-8555
Ohio	Dayton	513-294-3323
Ore	Portland	609-452-2940
Pa	Blue Bell	215-825-4200
Pa	Monroeville	412-825-4200
Tenn	Knoxville	615-690-1521
Tenn	Nashville	615-361-5404
Tex	Dallas	214-620-2051
Tex	Houston	713-777-3471
Wash	Bellevue	206-453-5500
Wisc	Brookfield	414-784-1311

DIGITAL EQUIPMENT CORP., Catalog Sales, Dept. EM, One Iron Way, Marlborough, MA 01752, Tel: 617-481-7400, TWX: 710-347-0348 .... p. 1538

Advertisement

Catalog Sales Desk
Hot Line Phone Number
800-225-9480
(Mass. residents 617-481-7400 Ext 6608)

Desk Open 8:30AM to 5PM EST

DIGITAL GEN'L. CORP., Univ. Cir. Resch. Ctr., Dept. EM, 11000 Cedar Ave., Cleveland, Ohio 44106, Tel: 216-721-0440; Empl.: 15

Local Sales Offices & Reps.

Cal	North Hollywood, Crown Elctrns.	213-877-3550
Conn	Manchester, Victor Associates	203-646-6448
Fla	Orlando, Nine Associates Inc.	305-351-1841
Ill	Park Ridge, West-Tronics	312-696-3115
Ill	Rosenville, West-Tronics	312-595-2810
Mass	Framingham, Victor Assocs.	617-879-5710
NJ	Livingston, Graydon-Sherman	201-994-9055
NY	Baldwinsville, Scibetta Reps.	315-622-3993
Ohio	Cleveland, Bradcor Eletrns.	216-692-0881
Pa	Yeadon, Graydon-Sherman	215-664-7316
Tex	Richardson, C. Tinch Sls. Co.	214-231-1322
Va	Fairfax, Nine Assocs.	703-273-1803

DIGITAL GRAPHICS, Dept. EM, 5000 Tuna Canyon, Malibu, Cal. 90265, Tel: 213-457-4195; Empl.: 20

DIGITAL SCIENTIFIC, Dept. EM, 11425 Sorrento Valley Rd, San Diego, Cal. 92121, Tel: 714-453-6050, TWX: 910-322-1136

Local Sales Offices & Reps.

Cal	Los Angeles	213-640-1360
Cal	San Diego	714-453-6050
Ill	Chicago	312-449-5155
Mich	Detroit	314-744-4280
NY	New York	212-884-4666
Tex	Dallas	214-233-9323
Tex	Houston	713-468-8324
Exp:	Damariscotta	207-563-5969

(TM)DIGITEC - electronic test & measurement equipment - United Systems

DIGITECH DATA INDS., INC., Dept. EM, 66 Grove St., Box 547, Ridgefield, Conn. 06877, Tel: 203-438-3731, Telex: 969-623; Empl.: 60

(TM)DIGITEMP® - controller - Delta Design, Inc.

(TM)DIGITENN - microprocessor based programmer - Tenney Engrg., Inc.

(TM)DIGITEST FOURTEEN - shutter/sync tester - National Camera Inc.

(TM)DIGITRAK - signal tracking device - Edo Western Corp.

DIGITRAN CO., Dept. EM, 855 So. Arroyo Pkwy., Pasadena, Cal. 91105, Tel: 213-449-3110, TWX: 910-588-3794 .... p. 4060-4065

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
Ariz	Phoenix, Howe & Howe Sls., Inc.	602-264-7971
Cal	Portola Valley, Shannon Assoc.	415-941-2217
Cal	San Diego, Celtec Co. Inc.	714-279-7961
Colo	Englewood, Todd Assoc.	303-761-7801
Fla	Fort Lauderdale, Beacon Elctrns. Assoc.	305-491-4211
Fla	Maitland, Beacon Elctrns. Assoc.	305-647-3498
Ga	Atlanta, Beacon Elctrns. Assoc.	404-351-3654
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Ft. Wayne, R.O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Des Moines, Beams	515-255-1148
Kans	Shawnee Mission, Beams	913-631-0300
Ky	Louisville, R.O. Whitesell & Assoc.	502-897-1569
Md	Rockville, Marktron, Inc.	301-762-6210
Md	Silver Springs, Mil, Inc.	301-585-6141
Md	Timonium, Marktron, Inc.	301-252-7111
Mich	Grand Rapids, R. O. Whitesell & Assoc.	616-942-5420
Mich	South Field, R. O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
Mo	St. Louis, Beams	314-569-1060
NJ	Cherry Hill, N. Kronstadt Assoc.	609-779-0551
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	Westwood, Dom Ciccone	201-273-6140
NM	Albuquerque, Data Handling Co.	505-268-4364
NY	Liverpool, B. O'Brien	800-962-1480
NC	Charlotte, Beacon Elctrns. Assoc.	704-525-7412
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, Mil, Inc.	513-268-8771
Ohio	Dayton, R. O. Whitesell & Assoc.	513-298-9546
Ohio	Middlebury Heights, R.O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, R & R Elctrns. Assoc.	503-643-5754
Pa	Pittsburgh, Robert O. Whitesell & Assoc.	412-344-7277
Tenn	Oak Ridge, Beacon Elctrns. Assoc.	615-482-0409
Tex	Austin, Allied Comps. Inc.	512-443-9687
Tex	Dallas, Allied Comps., Inc.	214-238-0408
Tex	Houston, Allied Comps., Inc.	713-960-1962
Va	Charlottesville, Marktron, Inc.	301-762-6210
Wash	Seattle, R & R Elctrns. Assocs.	206-762-7664

Local Distributors

Ala	Huntsville, Powell Electrs./Huntsville	205-539-2731
Ala	Huntsville, Controlled Distrs.	205-883-7501
Cal	Los Angeles, El-Com, Inc.	213-223-1351
Cal	Mt. View, Powell Electrns., Inc.	415-964-0820
Conn	Hamden, Impact Sls. Inc.	203-281-1331
Fla	Margate, Controlled Distrs.	305-971-4950
Fla	Miami Springs, Powell Electr./Fla.	305-592-3260
Ill	Mt. Prospect, Magnuson Elctrns.	312-956-0700
Ind	Indianapolis, Pioneer Standard	317-849-7300
Md	Beltsville, Powell Electr./Wash.	301-937-4030
Mass	Newton, Impact Sls. Co.	617-964-7740
Mich	Livonia, Pioneer/Michigan	313-525-1800
Minn	St. Paul, Magnuson Elec., Inc.	612-227-8495
NJ	Clifton, Ossmann Comps.	201-778-8888
NY	Buffalo, Ossmann Comp. Sls. Corp.	716-832-4271
NY	Huntington, Ossman Comps.	516-673-9300
NY	Kingston, Ossmann Comp. Sls. Corp.	914-338-5505
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls. Corp.	315-454-4477
NY	Vestal, Ossmann Comp. Sls. Corp.	607-785-9949
Ohio	Cleveland, Pioneer Standard	216-587-3600
Ohio	Columbus, Electronics Mktg. Corp.	614-299-4161
Ohio	Dayton, Pioneer Standard	513-236-9900
Okla	Tulsa, Norvell Elctrns.	918-663-1247
Pa	Philadelphia, Powell Electr./Philadelphia	215-365-1900
Pa	Pittsburgh, Pioneer Standard	412-782-2300
Tex	Austin, Norvell Elctrns.	512-458-8106
Tex	Dallas, Norvell Elctrns.	214-350-6671
Tex	Dallas, Powell Elctrns./Dallas	214-350-4186
Tex	Houston, Solid State Elctrns. Co. of Texas	214-233-0020
Tex	Houston, Norvell Elctrns.	713-777-1666

(TM)DIGITREND - multipoint digital recording system - Doric Sci., Div. Emerson Elec. Co.

(TM)DIGIVAC S/G - vacuum readout tube - Wagner Elec.

DILECTRON, Div. Bestran Corp., Dept. EM, 2669 S. Myrtle Ave., Monrovia, Cal. 91016, Tel: 213-446-6195, TWX: 910-582-3210; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, K & E Assoc.	205-883-9720
Ariz	Phoenix, W. Bert Knight Co.	602-242-3057
Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Cal	Redwood City, Logan Sls.	415-369-6726
Colo	Parker, Tech. Mktg. Assoc.	303-841-3435
Conn	Vernon, G.M. Assocs.	203-646-4443
Fla	Indian Rocks Beach, Tech-Rep Assocs.	813-595-2834
Ga	Hartwell, K&E Assocs.	404-376-5438
Ill	Chicago, Schumacher Elec. Co.	312-384-6060

Ind Indianapolis, Scott Elctrns. 317-897-9976
Ky Louisville, Scott Elctrns. 502-583-3220
Mass Framingham, G.M. Assocs. 617-872-4871
Mich Plymouth, Scott Elctrns. 313-357-2088
Miss Corinth, K & E Assoc. 601-287-5369
Mo Lake Lotawana, Lotronics 816-578-4498
NJ Cherry Hill, Krouse Assocs. 609-424-3543
NJ Englewood Cliffs, Sprung/Nussbaum Inc. 201-947-6767
NM Albuquerque, Tech. Mktg. Assoc. 505-298-4321
NY Fulton, C.D. Truax 315-592-7184
Ohio Cleveland, Scott Elctrns. 216-291-2600
Pa Ardmore, Wm. K. Metz 215-649-3966
Tex Dallas, Erickson-Vilter Sales 214-243-6611
Utah Salt Lake City, Rapier-Richards Mktg. 801-322-0222
Wash Seattle, Ray Johnston 206-524-5170

™D I LINE - double insulated line - UNGAR, Div.

DILLON, W.C. & CO., Dept. EM, 14620-EP Keswick St., Van Nuys 340, Cal. 91407, Tel: 213-786-8812, Telex: 65-1449; Empl.: 80

Sales Manager: R. Magid

Local Sales Offices & Reps.
Alas Anchorage, Alaska Scale Co.
Ariz Phoenix, Southwest Scale Co.
Ark Boonville, Kirkpatrick Scales 501-675-3302
Cal Escondido, OAL Associates 714-743-7143
Cal Redwood City, Scale-Co United 415-365-5985
Cal San Francisco, California Instr. Co. 415-647-5959
Colo Denver, J. H. Dorough Co. 303-892-0047
Fla Ft. Lauderdale, R. Jacobs 305-462-1932
Ga Decatur, Fredrick Process Equip. 404-299-1245
Haw Honolulu, Automation Hawaii 808-848-1091
Idaho Boise, Adco Equip. Co. 208-344-8451
Ill Alsip, Central Scale & Supply 312-371-4330
Ill Chicago, Service Associated 312-568-4545
Iowa Des Moines, Anderson Scale Co. 515-255-0077
Ky Louisville, H & H Scale Co. 502-634-0958
La Metairie, G. T. Michelli Co. 504-885-9710
Md Baltimore, Jobe & Co. 301-235-3503
Mass Hathorne, Danvers, Osgood Engrg. 617-933-4744
Mich Detroit, Basic Serv. Corp. 313-837-8820
Minn Minneapolis, W. K. Nelson Co. .. 612-374-1970
Mo Kansas City, Acme Scale & Svc. 816-842-2731
Mont Great Falls, Carl Weissman & Sons 406-453-0301
Neb Omaha, Fuchs Machinery & Supply 402-341-7050
Nev Reno, Wedco, Inc. 702-329-1131
NJ Irvington, Fox Scale Co. 201-371-1202
NY Amityville, Testing Machines 516-842-5400
NY Amityville, Long Island, Testing Machines Inc. 516-598-1400
NC Asheville, Braswell Scale & Equip. 704-274-3771
ND Grand Forks, Border States Supply 701-772-3477
Ohio Brecksville, M.A. Blankenburg Co. 216-526-1100
Ohio Cleveland, Northern Ohio Scale Co. 216-861-3840
Ohio Cleveland, M. A. Blankenburg & Co. 216-251-7010
Okla Tulsa, Lambert-Brown Sls. 918-584-2491
Ore Portland, Instrument Laboratory Co. 503-234-6683
Pa Newtown Square, C.W. Middlestead Co. 215-528-5092
SC Taylors, Greenville Scale & Fixture 803-244-4723
Tenn Nashville, Holt Scale Svc. 615-292-1616
Tex Dallas, Dillon Equip. Co. 214-824-2511
Utah Salt Lake City, Mine & Smelter Supply Co. 801-486-7641
Va Richmond, Jobe & Co. 804-282-6508
Wash Renton, O. J. Harper Sls. Co. 206-255-0414
WVa Charleston, Capitol City Supply Co. 304-342-2161
Wisc Milwaukee, Charles V. Kray Co. 414-352-5194
Wyo Mills, Rocky Mountain Meter & Scale 307-237-3593

™DI-MAG - digital magnetic sensor - Electro Corp.

DIMCO-GRAY COMPANY, Dept. EM, 8200 S. Suburban Rd., Dayton, Ohio 45459, Tel: 513-433-7600; Empl.: 130

Sales Manager: R. Cramer

Local Sales Offices & Reps.
Cal Downey, Corbett-Smith 213-923-9872
Conn Westport, Fastech 203-227-6585
Fla Eustis, R.K. Welter 904-357-7796
Ga Atlanta, Electro-Mech Sls. Engr. Co. 404-449-6337
Ill Des Plaines, L. Hodges & Assocs. 312-297-3810
Mich Birmingham, Barribeau-Simmons Co. 313-646-7800
Minn Minneapolis, Crum Co. 612-824-5394
Mo Kansas City, Automatic General Elctrn. Sls. 816-333-8206
NJ Cranbury, Feralite Metals Corp. 609-655-2930
NY Penfield, C. L. Kerr & Assocs..... 716-586-2920
NC Raleigh, Electro-Mech Sls. Engr. Co. 919-782-7586
Ohio Cleveland, C.L. Kerr & Assocs... 216-261-1840
Pa Willow Grove, Techparts 215-659-6900
Wash Seattle, National Co. 206-623-7060
Wisc Waukesha, Lincoln Hodges & Assocs. 414-542-3087

™DI-MESA - thyristor construction technique - Hutson Industries

™DIMIE - capacitors - Dearborn Elctrns. Div.

™DI-MIN-ODE - 1.5 watt zener diode - General Semiconductor Industries, Inc.

™DIM-N-GLO - dimmer with lighted knob - Lutron Electronics Co.

™DIODE-LITE - led indicator lights - Dialight

DIONICS, Dept. EM, 65 Rushmore St., Westbury, N.Y. 11590, Tel: 516-997-7474

™DIP-A-DIP - ic insertion tool - Micro Electronic Systems, Inc.

™DIP ALARM - solid state audio indicator in dip package - Projects Unlimited, Inc.

™DIP-BIT - filters - Cambridge Thermionic Corp.

™DIP-C - SPDT dip switch - Grayhill Inc.

™D-I-P DELAY LINES - digital delay module - Pulse Engrg., Inc.

™DIP-DRY - drying systems - Allied Chemical Corp.

™DIP FLASH - solid state load pulser - Projects Unlimited, Inc.

™DIP GUARD - ceramic capacitor - AVX Ceramics

™DIP-LITE - digital readout with dual-in-line mounting - Refac Elctrns. Pinlite®, Wild Rover®

™DIP/LOC - d.i.p. test clip - Everett/Charles, Inc.

DIPLOHMATIC DIV., Harry Levinson Co., Dept. EM, 1211 E. Denny Way, Seattle, Wash. 98122, Tel: 206-323-5100, TWX: 910-444-2154; Empl.: 4

Local Sales Offices & Reps.
Mass Needham, Hatch Associates 617-444-3310
NY Farmingdale, Service & Technology 516-543-1061

™DIP-PAC - dual-in-line sockets; backpanel; press-fit - Elfab Corp.

™DIP-PAK - hot melt peelable plastic coating - Fidelity Chem. Prods. Corp.

™DI-PROX - proximity switch - Electro Corp.

™DIPSWITCH - 14-pin dual in-line packaged rotary switch - Mc Graw-Edison

™DIRECTOR - Intercoms - Fanon/Courier Corp., Subs.

™DIRECTORR R - direct drive vacuum pump - Sargent Welch Sci. Co.

™DIRECTRON - selenium rectifiers - Sanford-Miller Corp.

™DIRECTWELD - DC welded steel tubing - ITT-Higbie Mfg. Co.

™DISC - integrators - Disc Instruments, Inc.

™DISCAPS - ceramic capacitors - Radio Materials Co.

™DISCASSETTE - video disc recorder - Arvin Systems

DISC INSTRUMENTS, INC., Dept. EM, 102 E. Baker St., Costa Mesa, Ca. 92626, Tel: 714-979-5300, TWX: 910-595-1987; Empl.: 100

Sales Manager: E.L. McElroy

Local Sales Offices & Reps.
Cal Studio City, Pi Instr. 213-995-0077
Cal Sunnyvale, AMASCO 408-733-8690
Conn Trumbull, SIR Assocs. 203-268-2560
Fla Ft. Lauderdale, Reynolds & Assocs. 305-581-6611
Fla Satellite Beach, Reynolds & Assocs. 305-773-4700
Ga Atlanta, Reynolds & Assocs. 404-252-5360
Ill Chicago, EIA, Inc. 312-271-3774
Ind Indianapolis, EIA, Inc. 317-257-7231
Mass Lexington, SIR Assocs. 617-862-1812
Mich Farmington, Carter, McCormic & Peirce, Inc. 313-477-7700
Minn Minneapolis, Waytek, Inc. 612-884-2317
Mo Grandview, Production Automation 816-736-4155
Mo Hazelwood, Production Automation Corp. 314-731-2331
NY Buffalo, Good Components Corp. 716-634-4400
NY White Plains, Swedelco, Inc. 914-946-1122
Ohio Cleveland, Carter, McCormic & Peirce 216-333-5650
Ohio Dayton, Carter, McCormic & Peirce 513-278-5873
Ore Portland, Fry Controls, Inc. 503-226-2620
Pa Glenside, C. A. Briggs Co. 215-885-2244
Pa Monroeville, Carter, McCormic & Peirce 412-372-4415

™DISCOHM - disc type power resistors - Ward Leonard Elec. Co. Inc.

™DISC-R-KAP - electrostatic protection disc - Centralab/USCC

™DISCTOR - minicomputer rotating memory - General Instr. Corp.

™DISPLADUCER - inertial angular displacement transducer - Larson Aero Dev.

DISPLAY COMPONENTS INC., Dept. EM, 550 Newton Rd, Box 488, Littleton, Mass. 01460, Tel: 617-486-3594

Local Sales Offices & Reps.
Cal Encino, King-Way Assocs. 213-788-4124
Cal Los Altos, Cain-White & Co. 415-948-6533
Fla Coral Springs, Precision Mktg. Svcs. 305-971-8270
Mass Concord, Nortech Engrg. Sls. 617-259-0032
Minn St. Paul, Knox Assocs. 612-488-5402
NJ Flanders, K & R Engrg. Sls. 201-584-5235
Ohio Dayton, Frederic Ohmer & Assoc. 513-434-1454
Pa Glenside, Koebert & Assoc. 215-887-2310
Tex Plano, K & H Sls. 214-423-6520

DISPLAY DEVICES, Dept. EM, Box 667, Encinitas, Cal. 92024, Tel: 714-753-0113; FSC No.: 26107 p. 2586,2587

Local Sales Offices & Reps.
Ariz Phoenix, Thorson Co. 602-956-5300
Cal Santa Clara, Nova-Tronix 408-243-9530
Cal Torrance, James W. Johnson 213-371-8580
Conn Middletown, Bell Controls 203-346-0670
Fla Miami, Ludlum Assocs. Co. 305-592-6523
Fla Orlando, Ludlum Assocs. Co. 305-894-7761
Ill Bellwood, Fiat Engrg. Assocs. 312-547-6200
Ind Ft. Wayne, Advanced Comp. Sls. 219-432-2546
Ind Indianapolis, Advanced Comp. Sls. 317-545-6441
Md Towson, Kraft Elctrn. Sls., Inc. .. 301-828-5838
Mich Plymouth, Romarc 313-455-0300
NH Nashua, Bell Controls 603-882-6984
NJ Wayne, G T Assoc. 201-694-6040
NC Winston-Salem, Dula Assocs. 919-768-7166
Ohio Chagrin Falls, Crest Comp. Sls. 216-543-9808
Pa Newton Square, Holdsworth & Co., Inc. 215-356-8550
Tex Dallas, Thorson Co. 214-233-5744
Tex Houston, Thorson Co. 713-771-3504

™DISPLEX - cryogenic refrigerator - Air Prods. & Chems., Inc.

(TM)DISSOPAD - wash away spacers - Bivar, Inc.

(TM)DISTAT - liquid level sys - Trans-Sonics, Inc.

(TM)DISTEC - displacement detecting instruments - Helm Instr. Co.

(TM)DISTIK - dip packaging system - Stanford Applied Engineering

(TM)DI-T - deci-incher transformer - TRW/UTC Transformers

DI-TECH INC., Dept. EM, 315 Wyandanch Ave., North Babylon, N.Y. 11704; Empl.: 5

Sales Manager: T. Bolletino

DIT-MCO INT'L. CORP., Dept. EM, 5612 Brighton Terr., Kansas City, Mo. 64130, Tel: 816-444-9700, Telex: 42-6149; Empl.: 130

Local Sales Offices & Reps.

Cal	Corona, G. Coulter	213-772-4386
Cal	Los Angeles, A. Holtz	213-772-4386
Mass	Beverly, J. Coogan	617-734-5400
NY	N.Y., J. Fitzsimmons	212-682-5844

DIVA, INC., Dept. EM, 607 Industrial Way West, Eatontown, N.J. 07724, Tel: 201-544-9000, TWX: 710-722-6645; Empl.: 80

Local Sales Offices & Reps.

Ariz	Phoenix, P. Martineau	602-991-4141
Cal	Los Angeles, D. Tollefson	213-889-6829
Mass	Bedford, E. H. Gittines	617-275-1436

(TM)DIVCON - low energy diverging/converging collimator for scintillation camera. - Searle Analytic Inc. & Searle Radiographics Inc.

DIVERSIFIED ELECTRONICS CO., Dept. EM, 260 Wolfe Rd., Sunnyvale, Cal. 94086, Tel: 408-738-3911; Empl.: 17

DIVERSIFIED ELECTRONICS INC., Dept. EM, 119 N. Morton Ave., Evansville, Ind. 47711, Tel: 812-426-2806; Empl.: 30

Sales Manager: K. Qualls

Local Sales Offices & Reps.

Cal	Danville, Automation Tech.	415-837-8197
Cal	L.A., Cutlass Elctrns.	213-324-7360
Cal	San Francisco, Automation Tech. Co.	415-837-8197
Cal	Torrance, Cutlass Elctrns.	213-324-7360
Conn	Meriden, Abbott-Allison Co.	203-237-9232
Fla	Leesburg, Diversified Elctrns.	904-787-7259
Ill	Des Plaines, Lincoln Hodges Assoc.	312-297-3810
Ind	Ft. Wayne, McDonald Sls. Co.	219-747-3650
Md	Fulton, S. Jefferies	301-792-7452
Mo	Kansas City, Weisler & Assocs.	816-421-1679
Mo	St. Louis, Weisler & Assocs.	314-428-3934
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NY	Thompson Ridge, Neville & Vespo Corp.	914-361-2839
NC	Charlotte, L.P. Spoon Co.	704-372-3290
Ore	Forest Grove, Doran Sls. Assoc.	503-357-3333
Pa	Narberth, S. A. Jefferies	215-664-8500
SC	Columbia, L. P. Spoon Co.	803-754-4957
Tex	Houston, Weisler & Assocs.	713-467-1847
Wash	Redmond, Doran Sls.	206-855-1885
Wisc	Hales Corners, Automation Prods. Co.	414-425-2250

Local Distributors

Cal	Cathedral City, Consolidated Electl. Distr.	714-328-1131
Fla	Indialantic, Relay Specialties	305-773-7900
Ind	Indianapolis, Ra-Dis-Co	317-637-5571
Ky	Louisville, Peerless Elctrn. Equip.	502-637-7677
Ky	Louisville, E & H Elect. Supply Co.	502-587-0991
Mo	St. Louis, Repp the Rep, Inc.	314-843-0730
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Bohemia, Enuiro Sys. Corp.	
Ore	Portland, Portland Elect. & Plumbing Co.	503-243-6800
Tex	Waco, Smith Pump Co.	817-776-0377
For:	Can. Toronto, Ont., Nedco Ltd.	416-363-8651
For:	Central America, Hondura, Industrial Y Comercio Panaire	52-1054
For:	New York, N.Y., Fredro Corp.	212-233-6190
For:	Puerto Rico, Santurce, Refrigeration Parts & Equip.	809-723-5990
For:	U.S. Virgin Islands, St. Thomas, Universal Supply Corp.	809-774-4671

(TM)DIVIDER BOX - material handling & storage container - LEWISystems

DIX ENGRG. DIV., GTI Corp., Dept. EM, 1399 Logan Ave., Costa Mesa, Cal. 92626, Tel: 714-546-0411; Empl.: 26

Local Sales Offices & Reps.

Ariz	Tempe, Gassner & Clark	602-968-9037-8
Cal	Canoga Park, Calif. Elctrn. Mktg.	213-884-7867
Cal	Los Altos, J.C. Meyer Assocs.	415-964-8844
Cal	Santa Ana, Calif. Elctrn. Mktg.	714-835-2702
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Ill	Westchester, Gassner & Clark	312-345-4245
Ind	Indianapolis, Elctrn. Sls. & Engrg.	317-849-4260
Kans	Overland Park, Electri Rep	913-649-2168
Mass	Wakefield, GTI Corp/Boston	617-245-6020
NJ	Shrewsbury, GTI Corp.	
NM	Alburquerque, AQ Sls. Co.	
NY	Lewiston, Watmet, Inc.	416-356-4925
NC	Charlotte, J. Corn Assocs.	704-527-0991
NC	Greensboro, Lenz Engrg. Co.	919-299-7879
Ohio	Dayton, Sidnell Co.	513-433-7761
Ohio	Mentor, Bishop Co.	216-255-6969
Tex	Dallas, Crockett Southwest	214-251-1776
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979

DIXON AUTOMATION, see Excellon Micronetics

DIXSON, INC., Dept. EM, Box 1449, Grand Junction, Colo. 81501, Tel: 303-242-8863, TWX: 910-929-6991; Empl.: 460

Local Sales Offices & Reps.

Ariz	Phoenix, Kay Entprs.	602-242-6787
Ark	Ft. Smith, Electro-Related Products	501-783-7323
Cal	Long Beach, Emerson Kirk Engrg.	213-439-9559
Cal	San Carlos, D. H. Ross Co.	415-591-4411
Colo	Littleton, Simpson Assocs., Inc.	303-794-8381
Fla	Lighthouse Point, J. Krutek & Assocs.	305-941-6544
Ill	Des Plaines, E. Flaxman Co.	312-298-8580
Kans	Olathe, BC Elctrn. Sls., Inc.	913-888-6680
Md	Pikesville, Imagitron Sls. Co.	301-484-1411
Minn	Minneapolis, Thomas Mktg.	612-823-4880
Mo	Hazelwood, BC Electronic Sls., Inc.	314-731-1255
NY	Mount Vernon, D. Sonkin Assocs.	914-668-9809
NY	Syracuse, Nycom, Inc.	315-437-8343
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Pa	Landisville, Imagitron Sls. Co.	717-898-7633
Tex	Dallas, United Comps.	214-324-1448
Utah	Salt Lake City, Simpson Assocs., Inc.	801-486-3731
Wash	Bellevue, SD-R2	206-747-9424

(TM)D-LASAR - digital test program - University Computing Co.

D-LINE CORP., Dept. EM, Box 32, N. Brookfield, Mass. 01535, Tel: 617-867-3337; Empl.: 12

Sales Manager: G. D. MeMone

Local Sales Offices & Reps.

Cal	Saratoga,, W. O'Neil	408-257-3023
Conn	Darien, Massini Assocs.	203-323-9945
Fla	Melbourne, Dickerson Eng. Sls. Co.	305-254-1591
NC	Charlotte, Electro-Rep Assocs.	704-527-2530
Wash	Fort Worth, L. Bourdeau	817-738-4254
Exp:	N. Brookfield, Mass, D-Line Corp.	617-867-3337

(TM)DMS - transient recorder - Zonic Technical Labs.

D M SEMICONDUCTOR CO., Dept. EM, 162 Tremont St., Melrose, Mass 02182

(TM)DMS/TSA - dynamic & model analysis - Zonic Technical Labs.

(TM)DNF1100 - noise filter - Burwen Lab. Inc.

(TM)DNF1201 - noise filter - Burwen Lab. Inc.

(TM)DNF1500 - noise filter - Burwen Lab. Inc.

(TM)DOCUFAX - 11 inch facsimile sys. - Alden Elctrn. & Impulse Recording Equip. Co.

DOCUMATION, Dept. EM, Box 1240, Melbourne, Fla 32901, Tel: 305-724-1111, TWX: 510-959-6286; Empl.: 849

Sales Manager: K. Nelson

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instrs.	205-883-8660
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Goleta, Thorson Co.	805-964-8751
Cal	Los Angeles, Thorson Co.	213-476-1241
Cal	Los Angeles, Thorson Co.	213-937-5450
Cal	Mountain View, Thorson Co.	415-964-9300
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Colo	Denver, Thorson Co.	303-759-0809
Conn	Southbury, J.J. Wild, Inc.	203-264-9494
Fla	Fort Lauderdale, W.A. Brown Instrs.	305-776-4800
Fla	Indialantic, W.A. Brown Instrs.	305-723-0766
Fla	Melbourne, Documation Inc.	305-724-1111
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W.A. Brown Instrs.	904-678-7932
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Indianapolis, Scientific Sls. Corp.	317-253-4606
Kans	Shawnee Mission, Inland Assocs.	913-362-2366
La	Mandeville, W.A. Brown Instrs.	504-626-9701
Md	Beltsville, RDG, Inc.	301-937-2215
Mass	Needham, J.J. Wild, Inc.	617-444-2366
Mich	Southfield, Data-Tron, Inc.	313-354-6421
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
Mo	Saint Louis, Inland Assocs.	314-821-3742
NJ	Paramus, J.J. Wild, Inc.	
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Jericho, J.J. Wild, Inc.	516-935-6600
NC	Durham, W.A. Brown Instrs.	919-682-2383
Ohio	Dayton, Data-Tron, Inc.	513-223-8421
Ohio	Wickliffe, Data-Tron, Inc.	216-585-8421
Pa	Ambler, Data Engrg. Co.	215-542-9876
Pa	Monroeville, Data-Tron, Inc.	412-243-8421
SC	Columbia, W.A. Brown Instrs.	803-798-3297
Tenn	Oak Ridge, W.A. Brown Instrs.	615-482-5761
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellevue, Thorson Co.	206-455-9180

DOERR ELECTRIC CORP., Dept. EM, Box 67, Cedarburg, Wisc. 53012, Tel: 414-377-0500; Empl.: 1,100

Local Sales Offices & Reps.

Ala	Brimingham, Jim Carns & Assoc.	205-967-8931
Cal	Oakland, Powermatic Assocs.	415-635-6826
Cal	Tustin, Morgan Johnson Co.	714-832-7282
Colo	Denver, Ted D. Miler Assocs.	303-758-3912
Fla	Miami, J. Carl Turner Assocs.	305-625-6556
Ga	Buford, R. L. Matus & Assocs.	404-945-2946
Ill	Northfield, Halliday-Lenhart Assocs.	312-446-9320
Ind	Indianapolis, Neal Engrg. Co.	317-849-4201
Kans	Shawnee Mission, Edward L. Martin	913-648-4746
La	Harahan, Mackenroth-Robbins & Assoc.	504-733-7524
Me	Bedford, Interact	617-275-2050
Md	Silver Spring, H. R. Sieber Co.	301-589-9110
Mich	Detroit, Besco-Detroit	313-559-0444
Mich	Grand Rapids, Besco-West	616-942-1190
Minn	Minneapolis, John J. Exon Co.	612-571-5340
Mo	St. Louis, Terry & Hodges	314-965-0746
NJ	Bayonne, Brundage Assocs.	201-823-1371
NM	Alburquerque, Ted D. Miller Assocs.	505-345-4211
NY	Clarence, Brundage Assocs.	716-741-2255
NY	East Aurora, Brundage Assocs.	716-652-3726
NY	Rochester, Brundage Assocs.	716-436-3475
NC	Charlotte, Electro-Motion Corp.	704-372-8281
Ohio	Cincinnati, Fallon & Sterling Assocs.	513-232-7733
Ohio	Westlake, Harry Applegate Co.	216-331-2960
Okla	Tulsa, Components, Inc.	918-583-9149
Pa	Media, H. B. Stallings	215-566-4100
SC	Greenville, Electro-Motion Corp.	803-232-7616
Tex	Richardson, Ed. Waffle	214-231-7239
Wash	Spokane, Calvert Controls	509-244-3601
Wisc	Cedarburg, Doerr Elect. Corp.	414-377-0500

DOLAN-JENNER INDS., INC., Dept. EM, 10 Ingalls Ct., Melrose, Mass. 02176, Tel: 617-662-8200; Empl.: 80

(TM)DOLFLEX - enamels & compounds - Dolph, John C. Co.

DOLPH, JOHN C. CO., Dept. EM, New Rd., Monmouth Junction, N.J. 08852, Tel: 201-DA 9-2333

(TM)DOLPHON - epoxy resin compounds, polyester resins - Dolph, John C. Co.

™DOLPHSEAL - water repellent - Dolph, John C. Co.

™DOLPH-SPRAY - lacquer, enamel, varnish - Dolph, John C. Co.

DONGAN ELECTRIC MFG. CO., Dept. EM, 2978 Franklin St., Detroit, Mich. 48207, Tel: 313-964-3500

™DONNER - inertial systems - Systron-Donner Inertial Div.

™DOORBELL - rectifier modules - Unitrode Corp.

DORAN MFG. CO., Dept. EM, 1033 Bader St., Cincinnati, Ohio 45225, Tel: 513-681-5424; Empl.: 25

DORIC SCI., DIV. EMERSON ELEC. CO., Dept. EM, 3883 Ruffin Rd., San Diego, Cal. 92123, Tel: 714-565-4415, Telex: 69-5001; Empl.: 50,000

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier	205-536-5650
Cal	Fountain Valley, Doric-West	714-962-1885
Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	Mountain View, MANCO	415-964-7281
Cal	San Diego, Mesa Elctrns.	714-278-8021
Colo	Littleton, Radco Elctrns.	303-794-4279
Conn	Hamden, Applied Measurements	203-288-5288
Conn	Sandy Hook, Doric-Northeast	203-426-3771
DC	Washington, Powell-Pendergraph	301-656-4535
Fla	Orlando, Currie, Peak & Frazier	305-855-0843
Ill	Rolling Meadows, SEA, Inc.	312-255-4820
Ill	Schaumburg, Doric-Midwest	312-397-1455
Ind	Carmel, SEA, Inc.	317-846-2593
Kans	Mission, Vertec Assoc.	913-677-3200
Mass	West Acton, Applied Measurements, Inc.	617-263-2766
Mich	Farmington, Anderson Elctrns.	313-476-9161
Minn	Minneapolis, SEA, Inc.	612-425-4455
Mo	Hazelwood, Technical Reps.	314-731-5200
NJ	Cedar Grove, KLS Assocs., Inc.	201-785-4451
NM	Albuquerque, Rustco Entprs.	505-296-6474
NY	Fairport, Naco Elctrns. Corp.	716-223-4490
NY	N. Syracuse, Naco Elctrns. Corp.	315-699-2651
NY	Utica, Naco Elctrns. Corp.	315-732-1801
NC	Charlotte, Mec-Tric Control	704-376-8551
Ohio	Cleveland, Instrumentation Sys., Inc.	216-486-0782
Ohio	Dayton, Instrumentation Sys., Inc.	513-294-2838
Ore	Beaverton, SJI Corp.	503-224-0344
Pa	Pittsburgh, Instrumentation Sys., Inc.	412-243-1111
Pa	Warminister, Multimeasurements, Inc.	215-675-3082
Tex	Houston, Sesco	713-688-9656
Tex	Richardson, Sesco	214-231-9364
Tex	Spring, Doric-Houston	713-351-0053
Va	Richmond, Powell-Pendergraph, Inc.	804-264-2341
Wash	Seattle, SJI Corp.	206-624-9020
Wisc	Waukesha, SEA, Inc.	414-547-6637

DORMEYER INDUSTRIES, Dept. EM, 3418 N. Milwaukee, Chicago, Ill. 60641, Tel: 312-283-4000; Empl.: 650

™DOROIDAL - coils - Cambridge Thermionic Corp.

™DO-T - deci-ouncer audio transformer - TRW/UTC Transformers

™DOUBLE/BUBBLE - package for 2-part epoxies - Hardman Inc.

™DOUBLE DIAMOND - glass thermometers and bi-metal thermometers - H-B Instr. Co.

™DOUBLE-DIP - DPDT Dip switch - Grayhill Inc.

™DOUBLE-SEAL - ball valves - Jamesbury Corp.

™DOUBLE-TALK - phased mobile antennas - New-Tronics Corp.

DOUGLAS ELECTRONICS, Dept. EM, 718 Marina Blvd., San Leandro, Cal. 94577, Tel: 415-483-8770; Empl.: 20

DOUGLAS-WORKMAN ELCTRNS CORP., Dept. EM, Box 15577, Ft. Lauderdale, Fla. 33318, Tel: 305-791-9390

Sales Manager: D. Workman

DOUGLAS RANDALL DIV., Walter Kidde, Dept. EM, 6 Pawcatuck Ave., Pawcatuck, Conn. 02891, Tel: 203-599-1750; Empl.: 125 .... p. 2729,3464-3470

Local Sales Offices & Reps.

Ala	Huntsville, Leigh Sls., Inc.	205-852-3270
Cal	Fremont, Parsons Co.	415-651-3711
Cal	Los Angeles, Sodaro Assocs.	213-478-7733
Cal	San Diego, Qualtronix	714-560-8955
Colo	Arvada, Sage Sls.	303-841-2487
Fla	Maitland, Ellis Assoc.	305-645-1101
Ill	Chicago, R. Cahill, Inc.	312-631-0070
Mass	Norwood, JMG, Inc.	617-762-5333
Mich	Bloomfield Hills, ENCO Mktg.	313-642-0203
Mich	Mt. Clemens, I.B.N. Research & Devel. Co.	313-462-2200
Minn	St. Paul, Cahill	612-646-7217
Mo	Kansas City, Lotronics	816-578-4498
Mo	Maryland Hgts., Delltron Co.	314-869-4779
NJ	Englewood, Andrews & Andrews	201-569-8800
NY	Huntington, Andrews & Andrews	516-692-8686
NY	Rochester, R.A. Murray Co.	716-467-4538
NC	Knightdale, Leigh Sales	919-266-0105
Ohio	Cleveland, Geotronix Mktg. Assoc.	216-526-2535
Ohio	Columbus, Geotronix Mktg. Assoc.	614-457-8472
Pa	Glenside, Elcom, Inc.	215-885-1325
Tex	Dallas, BESCO	713-782-3775
Utah	Salt Lake City, Sage Sls.	801-290-1234
Wash	Seattle, Carlyle Tech. Sls.	206-622-4288

Local Distributors

Mass W. Newton, A.W. Mayer

DOW CHEMICAL CO., Dept. EM, Box 2020, Midland, Mich. 48640, Tel: 517-636-1000, TWX: 227455 810-266-9490; Empl.: 53,300

Local Sales Offices & Reps.

Cal	Pasadena	213-577-1515
Cal	Walnut Creek	415-944-2000
Conn	Stamford	203-359-3300
Ga	Atlanta	404-394-4141
Ill	Des Plaines	312-391-4700
Ind	Indianapolis	317-257-5271
Kans	Shawnee Mission	913-341-2500
La	Baton Rouge	504-293-2222
Mass	Wellesley	617-237-2070
Mich	Grand Rapids	616-949-9000
Mich	Southfield	313-358-1300
Minn	Minneapolis	612-835-4200
Mo	St. Louis	314-726-5000
NJ	Moorestown	609-234-0400
NJ	Saddle Brook	201-845-5000
NY	Williamsville	716-631-5540
NC	Charlotte	704-525-9030
Ohio	Cincinnati	513-793-6200
Ohio	Cleveland	216-826-6000
Pa	Pittsburgh	412-281-3030
Tenn	Memphis	901-767-5000
Tex	Dallas	214-387-2211
Tex	Houston	713-626-3170
Va	Richmond	804-288-1601
Wash	Bellevue	206-455-7250

DOW KEY, see Kilovac

™DOW KEY - coaxial relays & switches - Kilovac Corp.

™DPR - potting & encapsulating compounds - Hardman Inc.

DRACON INDUSTRIES, Dept. EM, 9541 Mason Ave., Chatsworth, Cal. 91311, Tel: 213-882-8595; Empl.: 150

Local Sales Offices & Reps.

Fla	Melbourn, W.A. Bitter	305-254-3674
Kans	Overland Park, T. Johnson	913-492-6776
NJ	Newton, J.B. Behan	201-393-9225

™DRAGON - rubber & friction tape - Okonite Co.

DRAKE CO., R.L., Dept. EM, 540 Richard St., Miamisburg, Ohio 45342, Tel: 513-866-2421, Telex: 28-8017

DRANETZ

DRANETZ ENGRG. LABS., Dept. EM, 2385 S Clinton Ave., So. Plainfield, N.J. 07080, Tel: 201-755-7080, TWX: 710-997-9553; FSC No.: 23207; Empl.: 130 p. 2827-2831

Sales Manager: A. Ackerman

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs.	205-837-4304
Ariz	Scottsdale, Barnhill III	602-947-7841
Cal	Los Angeles, E. Mintz	213-670-5410
Cal	Palo Alto, Coherent Mktg. Assoc.	415-327-2217
Cal	San Diego, E. Mintz	213-645-2066
Colo	Denver, Barnhill III	303-750-1122
Conn	Hamden, Scientific Devices-Conn.	203-248-9361
Fla	Orlando, Datarep, Inc.	305-843-5224
Ill	Elk Grove Village, L. F. Green & Assocs.	312-593-0282
Ind	Indianapolis, L. F. Green & Assocs.	317-293-9827
Mass	Waltham, Scientific Devices-New England	617-894-5637
Mich	Farmington, Carter McCormic & Peirce Inc.	313-477-7700
Minn	Minneapolis, L. F. Green & Assoc.	612-781-1611
Mo	St. Louis, Delltron Co.	314-869-4779
NJ	Paramus, SDM Rep.	201-368-0123
NM	Albuquerque, Barnhill III	505-299-7658
NY	Rochester, SDM Rep	716-544-8080
NC	Charlotte, Ranson, Wallace & Baesel, Inc.	704-334-4244
Ohio	Cleveland, Carter McCormic & Peirce Inc.	216-333-5650
Ohio	Dayton, Carter McCormic & Peirce Inc.	513-278-5873
Ore	Portland, Topp Eng. Sls.	503-644-3020
Pa	King of Prussia, Electronic Mktg. Assoc.	215-265-1600
Pa	Monroeville, Electronic Mktg. Assoc.	412-372-4415
Tex	Austin, Barnhill Tuvo	512-444-2377
Tex	Houston, Barnhill II	713-688-9971
Tex	Richardson, Barnhill II	214-231-2573
Wash	Bellevue, Topp Engrg. Sls.	206-747-5400

DREMEL MFG. CO., Dept. EM, 4915 21st St., Racine, Wisc 53406

DRESSEN-BARNES ELECTRONICS, Div. American Elctrns., Dept. EM, 1600 E. Valencia Dr., Fullerton, Cal. 92631, Tel: 714-871-3020, TWX: 910-592-1256; FSC No.: 94412; Empl.: 85 p. 3237-3241

Sales Manager: B. Guy

Local Sales Offices & Reps.

Ala	Huntsville, Young & Lawrence Assoc.	205-539-6575
Cal	Pasadena, Dressen-Barnes	213-795-7731
Cal	Sunnyvale, Equiptron	408-736-0741
Fla	Ft. Lauderdale, Young & Lawrence Assoc.	305-563-6717
Fla	St. Petersburg, Young & Lawrence Assoc.	813-894-0026
Fla	Winter Park, Young & Lawrence Assoc.	305-647-6929
Md	Simpsonville, Selrec Assoc.	301-596-5520
Mass	Needham, A. & M. Elec. Reps.	617-444-8170
Mich	Detroit, Hocker Assocs.	313-431-1403
NY	Elmira, A & D Dev.	607-733-0405
NY	Hartsdale, Comp. Sls.	914-725-1050
NY	Rochester, A & D Devices	716-586-8033
NY	Verona, A & D Devices	315-337-7321
Ohio	Dayton, Hocker Assocs.	513-298-8638
Tex	Plano, Zeus Eng.	214-423-2027
Wash	Seattle, Avionics-Liaison	206-767-3870

™DRI-FLO - orifice meters of the metallic bellows type for differential pressure measurement - Singer Co.

™DRIFT-LOCK FLUXMETER - fluxmeter - Walker Scientific, Inc.

™DRI-LOK - fluorescent ballasts - Jefferson Elec.

™DRI-MARK - pressure sensitive transfers - Meyercord Co.

™DRI-MOD - spst, dt, 3t & 4t switch modules - Crown Microwave, Inc.

™DRM2000 - digital ratiometer - Meterex Corp.

™DR: WICK - de soldering braid - American Elec. Heater

™DRYATROL - pneumatic switching valve - Pall Trinity Micro Corp.

™DTF - disciplined time/frequency standard model FE-1050A - Frequency Elctrns.

™DU - null-balance spectrophotometer - Beckman Instrs., (AISSD)

™DUALATCH - connectors - Amp Inc.

™DUALAY - self-supporting aerial cables - Okonite Co.

™DUALCON - double sided edge connector - Molex Inc.

™DUAL-COOLED - transformers - Allis-Chalmers

™DUAL FLEX - detent - Standard Grigsby Inc.

™DUAL HI/LO FILTER - double high pass/low pass filter - Rockland Sys. Corp.

™DUAL-SCAN - supervisory control system - GRM Corp.

™DUAL SOURCE - power supply - Elasco

™DUAL-TROL - recycling timer - Industrial Timer Esterline Co.

™DUB-L-LOC - straps-grommets - Budwig Mfg. Co.

™DUCTER - ohmmeters - Biddle, James G.

DUKANE CORP., Dept. EM, 2900 Dukane Dr., St. Charles, Ill. 60174; Empl.: 700

DUMONT ELECTRON TUBES & DEVICES, Dept. EM, 750 Bloomfield Ave., Clifton, N.J. 07015, Tel: 201-773-2000; FSC No.: 18778; Empl.: 250

Local Sales Offices & Reps.

Cal	La Jolla, J. Garvin	213-887-1645
Colo	Denver, B. Millspaugh	303-756-9886
Fla	Fort Lauderdale, Bolton Assoc.	305-491-5161
Mass	Sudbury, DLG Assoc.	617-877-7880
NJ	Marlboro, Cook & Weil	201-536-3964
NM	Albuquerque, Fry-Gates	505-298-1875
NY	Schenectady, N. W. Alexander & Assoc.	518-377-0581
Ohio	Dayton, F. Ohmer	513-434-1454
Pa	Glenside, R. F. Koebert & Assoc.	215-887-2310
Tex	Richardson, M. Hemmes, Optics & Elctrns.	214-690-9799
Wash	Wheaton, Applied Science Mktg.	703-281-3638

DUMONT OSCILLOSCOPE LABS., INC., Dept. EM, 40 Fairfield Pl., W. Caldwell, N.J. 07006, Tel: 201-575-8666, TWX: 710-734-4308; Empl.: 125

DUNCAN ELECTRONICS, INC., Dept. EM, 2865 Fairview Rd., Costa Mesa, Cal. 92626, Tel: 714-545-8261, TWX: 910-595-1128; FSC No.: 5905; Empl.: 130 .... p. 3836,3837

Sales Manager: R.L. Rissler

Local Sales Offices & Reps.

Ala	Huntsville, L. & D., Inc.	205-859-1690
Ariz	Phoenix, Southwest e/m Engrg., Inc.	602-993-0250
Cal	Costa Mesa, Duncan Elctrns., Inc.	714-545-8261
Cal	Irvine, Comar Co.	714-540-1219
Cal	Mountain View, Caltron Comps. Corp.	415-964-3244
Colo	Denver, Elcom, Inc.	303-770-4400
Ill	Arlington Heights, Delta Tech. Sls.	312-253-9440
Ind	Greenwood, Valentine & Schillinger	317-888-2260
Ind	South Bend, Valentine & Schillinger	219-291-6258
Kans	Shawnee Mission, Florence & Meyer	913-722-5210
Kans	Wichita, Florence & Meyer	316-838-7226
Md	Rockville, Marktron, Inc.	301-762-6210
Md	Timonium, Marktron Inc.	301-252-711
Mich	Grosse Pointe Park, Greiner Assoc.	313-499-0188
Minn	Minneapolis, J.J. Exon Co.	612-571-5340
Mo	Kirkwood, Florence & Meyer	314-822-2629
NY	Copiague, Sencor, Inc.	516-842-7676
NY	De Ruyter, R.P. Kennedy Co.	315-682-2299
NY	Red Hook, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322
NC	Greensboro, L. & D., Inc.	919-292-3201
Ohio	Columbus, Rockford Controls Ohio	614-231-5890
Ohio	Dayton, Rockford Controls Ohio, Inc.	513-898-5452
Ohio	Euclid, Rockford Controls Ohio, Inc.	216-731-5250
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Ore	Portland, C. K. Shanks & Assoc.	503-292-5656
Pa	Monroeville, Rockford Controls Ohio, Inc.	412-373-2531
Pa	Philadelphia, Sencor, Inc.	215-698-9660
SC	Greenville, L. & D., Inc.	803-268-5201
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431
Tex	Houston, Unidyne, Inc. (SLIDELINE ONLY)	713-772-3170
Tex	Richardson, Unidyne, Inc. (SLIDELINE ONLY)	214-234-3050
Utah	Salt Lake City, Elcom, Inc.	801-532-7940
Va	Charlottesville, Marktron, Inc.	804-973-5874
Wash	Seattle, C. K. Shanks & Assoc.	206-632-4290

Local Distributors

Cal	Hollywood, Yale Radio Elect. Co.	213-465-3186
Cal	San Carlos, Sterling Elctrns.	415-592-2353
Cal	Sun Valley, Richey Elctrns.	213-875-2862
Colo	Denver, Ind. Elctrns.	303-771-2636
Fla	Miami, Lykes Elctrns.	305-633-8535
Fla	Tampa, Lykes Elctrns.	813-886-6621
Ill	Westmont, Bodelle Co.	312-323-9670
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mich	Farmington, Advent Elctrns.	313-477-1650
NJ	Wayne, Parts Masters	201-694-5885
NY	NYC, Martin Audio	212-541-5900
Ohio	Akron, Sun Radio Co.	216-434-2172
Ohio	Akron, Akron Elctrns.	216-762-8818
Ohio	Dayton, KM Co.	513-890-6734
Ohio	Warren, REM Elctrn. Supply Co.	216-399-2777
Pa	Allentown, AA Peters	215-434-5237
Pa	Braddock, M. Leff Radio Parts	412-271-2800
Pa	Erie, Mace Elctrns.	814-838-3517
Tex	Richardson, Southwest Elctrns.	214-234-3050
Tex	Stafford, Southwest Elctrns.	713-494-6021
Wash	Seattle, Radar Electric	206-282-2511

™DUNCO - relays - Struthers-Dunn, Inc.

DUNEGAN/ENDEVCO, Dept. EM, Rancho Viejo Rd., San Juan Capistrano, Cal. 92675, Tel: 714-831-9131, TWX: 68-5608 910-596-1415; Empl.: 35

Local Sales Offices & Reps.

Cal	Palo Alto, Dunegan/Endevco	415-969-3212
Cal	Rowland Heights, Dunegan/Endevco	714-493-8181
Cal	San Juan Capistrano, Dunegan/Endevco	714-831-9131
Cal	Santa Clara, Johnson Assocs.	408-984-4626
Ill	Chicago, Dunegan/Endevco	312-867-4505
Md	Towson, Dunegan/Endevco	301-752-0688
NH	Nashua, Dunegan/Endevco	617-969-8063
NJ	E. Brunswick, Dunegan/Endevco	201-254-9600
Ohio	Brecksville, RDP Assocs.	216-659-3138
Ohio	Dayton, RDP Assocs.	513-253-6175
Tex	Houston, Dunegan/Endevco	713-440-3850

™DUOBOND - bonded alumimum shield material - Belden Corp.

™DUODIAL - turns-counting dial - Beckman Instrs.

™DUOFOIL - alumimum/polyester/alumimum shield - Belden Corp.

™DUO MOUNT - tv antenna mounting - South River Metal Prods. Co.

™DUO-PATH - elevator door control - Innovation Industries Inc.

™DUO-SEAL R - vacuum pumps - Sargent Welch Sci. Co.

™DUOSTAT - power supply - Beckman Instrs., (AISSD)

™DUOSTAT - superior record cleaner - Duotone Co.

DUOTONE CO., Dept. EM, 6875 S.W. 81st St., S. Miami, Fla. 33143, Tel: 305-665-1121; Empl.: 35

Sales Manager: S. Nester

™DUOTONE DIAMOND - diamond phonograph needle - Duotone Co.

™DUOTROL - pressure operated control - Autocon Inds., Inc.

™DUO-TYNE - connector - Amp Inc.

™DUO-VOLT - outdoor lighting control - Sigma Instruments, Inc.

™DUPLEX - type of speaker - Altec Div.

DUPONT INDUSTRIAL FIBERS, Dept. EM, Center Rd. Bldg., Wilmington, Del 19898, Tel: 302-999-4171

DUPREE, INC., Dept. EM, 9835 Dupree St., So. El Monte, Cal. 91733, Tel: 213-442-4700; Empl.: 40

Local Sales Offices & Reps.

Cal	San Diego, QualTronics	714-224-6555
Fla	Merritt Island, L. Meldeau	305-452-5975
Kans	Wichita, R. Elston	316-942-4904
Mass	Woburn, Gilway Sls. Co.	617-935-4442
NY	Lynbrook, H.B. Heft Co.	516-599-3351
NY	Rochester, Gislason Sls. Co.	716-454-4741
Pa	King of Prussia, White-Keystone	215-265-1817
Wash	Seattle, Norwest Co.	206-282-3707

DURABLE INTERNATIONAL, INC., Dept. EM, 3-01 27th Ave., Long Island City, NY 11102, Tel: 212-726-1200

™DURA-BLUE - ion sensitive bulbs of glass electrodes - Beckman Instrs., (AISSD)

™DURAC - hydrometers - H-B Instr. Co.

™DURACELL - batteries - Mallory Battery

™DURA CLAD - transformers - Aladdin Elctrns.

™DURACOLOR - foil shielded coax - Columbia Elctrn. Cables

™DURA-CON - microminiature connectors - TRW/Cinch Connectors

™DURAFOAM - patented foam tv transmission line - Columbia Elctrn. Cables

™DURAGLASS - mod. acrylic on glass tubing - Natvar Corp.

DURAKOOL, Dept. EM, 1010 N. Main St., Elkhart, Ind. 46514, Tel: 219-264-1116, Telex: 25-8482; Empl.: 200 .... p. 3471-3476,4066,4067

Local Sales Offices & Reps.

Ala	Alabaster, A. Brown & Assoc.	205-870-3141
Cal	Burlingame, Campbell & George	415-697-2965
Cal	Glendale, Hundley Co.	213-240-3600
Colo	Englewood, E & M Sls.	303-761-6202
Ga	Atlanta, A. Brown Assocs	404-457-6381
Ill	Chicago, Kelburn Engrg Co.	312-775-8383
Ind	Indianapolis, Kelburn Engrg Co.	317-257-9874
Iowa	Davenport, Volco Co.	319-326-5233
Iowa	Des Moines, Volco Co.	515-283-1650
La	Chalmette, L. Elliott Co.	504-737-1895
Md	Glen Burnie, E.J. Varhaly & Son	301-760-3344
Mass	Needham, Northeast Reps.	617-449-3034
Mich	Farmington, CMP Engrg. Sls.	313-477-7700
Minn	Minneapolis, Volco Co.	612-933-4671
Mo	Overland Park, R. Greene Co.	913-492-6886
Mo	St. Louis, R. Greene Co.	314-994-0222
Neb	Omaha, Volco Co.	402-346-2203
NY	Wantagh, DONY Tech. Sls.	516-826-5550
NC	Matthews, Carolina Tech. Reps.	704-847-4494
Ohio	Cleveland, CMP Engrg. Sls.	216-333-5650
Ohio	Dayton, CMP Engrg. Sls.	513-278-5873
Okla	Oklahoma City, L. Elliott Co.	405-842-7885
Okla	Tulsa, L. Elliott Co.	918-743-7794
Ore	Portland, Branom Instr. Co.	503-285-9861
Pa	Monroeville, CMP Engrg. Sls.	412-372-4415
Pa	Narberth, Power Modules Inc.	215-839-1331
Tenn	Brentwood, A. Brown Assocs	615-373-2068
Tenn	Memphis, R. M. Jordan & Assoc.	901-452-7441
Tex	Addison, L. Elliott Co.	214-239-8533
Tex	Missouri City, L. Elliott Co.	713-499-1571
Utah	Salt Lake City, Thermalink Intermountain	801-466-8601
Wash	Seattle, Branom Instr. Co.	206-762-6050
Wisc	Milwaukee, Kelburn Engrg Co.	414-545-2122
Exp:	Ill., Hinsdale, Worldwide Exports	312-654-1315

Local Distributors

Pa	Narberth, Power Modules	215-839-1331

™DURAMIC - diaphragms and parts for use with scientific apparatus and equipment - Singer Co.

DURANT DIGITAL INSTRUMENTS, Cutler Hammer Co., Dept. EM, 901 S. 12th St., Watertown, Wisc. 53094, Tel: 414-261-4070, TWX: 910-260-3713

Local Sales Offices & Reps.

Ala	Birmingham, Spader & Assocs.	205-879-1366

Cal	Cupertino, Durant Digital Instrs.-Cutler-Hammer Co.	408-255-3232
Cal	Los Angeles, Durant Digital Instrs.-Cutler Hammer Co.	213-876-4000
Colo	Denver, Durant Digital Instrs.-Cutler Hammer	303-922-3949
Conn	Stamford, Durant Digital Instrs.-Cutler Hammer Co.	203-327-1750
Fla	Clearwater, H.R. Gross & Co.	813-446-6649
Ill	Elmhurst, Durant Digital Instrs.-Cutler-Hammer Co.	312-279-8220
Kans	Mission, Durant Digital Instrs.-Cutler-Hammer Co.	913-262-2199
Md	Baltimore, Durant Digital Instrs.-Cutler Hammer Co.	301-825-6626
Mass	Wakefield, Durant Digital Instrs.-Cutler Hammer Co.	617-246-0024
Mich	Detroit, Durant Digital Instrs.-Cutler Hammer Co.	313-535-3630
Minn	Minneapolis, Durant Digital Instrs.-Cutler Hammer	612-835-5534
Mo	St. Louis, Durant Digital Instrs.-Cutler Hammer	314-567-3377
NY	Rochester, Durant Digital Instrs.-Cutler Hammer	716-328-5700
NC	Charlotte, Durant Digital Instrs.-Cutler Hammer	704-525-3149
Ohio	Cincinnati, Durant Digital Instrs.-Cutler Hammer	513-531-5073
Ohio	Cleveland, Durant Digital Instrs.-Cutler Hammer	216-464-8787
Ore	Portland, Durant Digital Instrs.-Cutler Hammer	503-226-4317
Pa	Paoli, Durant Digital Instrs.-Cutler Hammer	215-688-5055
Tex	Houston, Durant Digital Instrs.-Cutler Hammer	713-868-2363
Wash	Bellevue, Durant Digital Instrs.-Cutler Hammer	206-747-2001

™**DURA-PAC** - solid state relays - H-B Instr. Co.

™**DURAPERM** - alloy - Hamilton Technology, Inc.

™**DURASEL** - rectifier - Alpha Components Corp.

™**DURATEMP** - microwave switches - Varian Electron Device Grp.

™**DURATEMP** - microwave switches - Varian Assocs.

™**DURATHERM** - high temperature furnace cable - Boston Insulated Wire & Cable Co.

™**DURATRAK** - contact surface - Gen Rad

™**DURAWATT** - power transistors - National Semiconductor Corp.

™**DUREVER** - soldering iron tips - Precision Elec. Co.

DURGIN & BROWN, INC., Dept. EM, 80 Allen Rd., Burlington, Vt. 05401, Tel: 802-863-6873; Empl.: 34

Local Sales Offices & Reps.

Cal	San Diego, Mesa Engrg	714-278-8021
Conn	Enfield, Measurement Equip. Co.	
Ind	Indianapolis, National Engrg. Co.	317-251-1132
Mass	Wakefield, Measurement Equip. Co.	617-245-4870
NY	Sodus, AED Agency	315-483-6561
Pa	Abington, Industrial Mktg. Specialist	215-659-0444
Tex	Dallas, Glidden Electro Equip. Co.	214-363-6539
Wash	Bellevue, Hickey Engineering Sales	206-454-0460

DURIRON CO., INC., Dept. EM, 425 N. Findlay St., Dayton, Ohio 45401, Tel: 513-226-4000

™**DUROTHERM** - soldering tips - Hexacon Elec. Co.

™**DUR-X-THANE** - extruded polyurethane cable jacket - Whitmor Wire & Cable

DUTREX INDS., INC., Dept. EM, 150 Fifth Ave., New York, N.Y. 10011, Tel: 212-989-5000, TWX: 710-581-6234; Empl.: 20

™**DUZALL** - flux - Chemetron Corp.

™**DV 5** - microminiature ceramic variable capacitors - JFD Electronics Components Corp.

DWYER INSTRS, Dept. EM, Box 373, Michigan City, Ind. 46360, Tel: 219-872-9141, Telex: 25-916; Empl.: 300

Sales Manager: H.S. Nelson

Local Sales Offices & Reps.

Cal	Anaheim, Dwyer Instrs. Inc.	714-991-6720
Ga	Marietta, Dwyer Instrs. Inc.	404-427-9406
Mass	Hudson, E. Clark & Assocs.	617-568-8336
NJ	Hightstown, Dwyer Instrs. Inc.	609-448-9200
Pa	Pittsburgh, Bobar Instrs. Inc.	412-327-3700

™**DXS*** - data exchange systems - Texas Instrs. Inc.

™**DYAD** - vibration damping sheet - Soundcoat

™**DY KANO 1** - paper-oil - Cornell-Dubilier Electronics

™**DYMAC** - vibration monitoring systems - Spectral Dynamics Corp. San Diego

™**DYMAX** - engineering adhesives - MPB Corp.

™**DYNAC** - injection molding adaptive control system - Dynisco

™**DYNACLAD** - batteries - Exide Power Sys. Div.

DYNACO INC., Div Tyco Corp., Dept. EM, Box 88 Coles Rd., Blackwood, N.J. 08012, Tel: 609-228-3200, Telex: 831-493; Empl.: 100

™**DYNACOTE** - accelerator - Radiation Dynamics, Inc.

™**DYNA-CRIMP** - hydraulic crimping unit - Amp Inc.

™**DYNA-CU** - magnetic compass transducer sys. - Larson Aero Dev.

™**DYNACUBE** - miniature generator/alternator - Hamilton Technology, Inc.

™**DYNA-FLEX** - flexible couplings - Lord Kinematics

™**DYNAFORM** - coaxial RF siwtches - Amphenol North America Div.

™**DYNAFORM** - coaxial RF switches - Amphenol North America Div.

DYNAGE, INC. CONTROL PRODS GRP., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002, Tel: 203-243-0315, TWX: 710-425-6063

Local Sales Offices & Reps.

Cal	Buena Park, Sales Engineers Ltd.	213-921-0681
Ga	Atlanta, Par Assocs.	404-393-0018
Ill	Lombard, Quadtron Assocs.	312-627-6800
Iowa	Davenport, Volco Co.	319-326-5233
Iowa	Des Moines, Volco Co.	515-283-1650
Ky	Louisville, Richard Equip. Corp.	502-895-8060
La	Baton Rouge, Rise, Inc.	504-766-4645
La	Harvey, Rise, Inc.	504-362-4405
La	Lafayette, Rise, Inc	318-234-0178
Md	Ellicott City, McCourt Co.	301-465-4515
Mich	Birmingham, Electromation Assocs.	313-564-6517
Minn	Minneapolis, Volco Co.	612-933-6631
Miss	Jackson, Rise, Inc.	601-354-2163
Neb	Omaha, Volco Co.	402-346-2203
NJ	Short Hills, W.J. Fraind Assocs.	201-376-6315
NY	Elmira Heights, Courser, Inc.	607-733-2150
Ohio	Cincinnati, Richard Equip. Corp.	513-271-8666
Ohio	Cleveland, Adcon Engrg. Co.	216-238-3915
Okla	Tulsa, The Terry Co.	918-743-3249
Pa	Glenside, Elcom, Inc.	215-885-1715
Pa	Ingomar, Greye Glass Assocs.	412-366-6664
Tex	Houston, R & K Engrg. & Sls. Corp.	713-465-8367
Wisc	Milwaukee, Dynage, Inc.	414--332-3632

DYNAGE, INC., POWER SUPPLY CORP., Dept. EM, 1331 Blue Hills Ave., Bloomfield, Conn. 06002, Tel: 203-243-0315, TWX: 710-425-6063; Empl.: 60

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	205-536-1941
Cal	Palo Alto, Engrg. Assocs.	415-494-7842
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Conn	Orange, C P S Corp.	203-795-3515
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Ill	Northfield, H. Sam Tollaksen Co.	312-441-6644
Kans	Lenexa, Technical Sls. Assocs.	913-888-3330
Md	Ellicott City, A/O Electronics	301-997-8033
Mass	Wakefield, Data Engrg. Svcs.	617-245-6666
Mich	Birmingham, Electro-Mation Assocs.	313-564-6517
Minn	Minneapolis, Bohlig, Charles E. Co.	612-922-7011
Mo	St. Louis, Technical Sls. Assocs.	314-725-5361
NJ	Parlin, Triple E	201-727-6454
NY	Fayetteville, Martin P. Andrews	315-637-5291
NC	Winston-Salem, Reynolds & Assocs.	919-725-6196
Ohio	Chagrin Falls, Midwest Mktg. Assocs.	216-247-6655
Ohio	Dayton, Midwest Mktg. Assoc.	513-433-2511
Pa	Paoli, Stitzer Assocs.	216-644-5500
Tex	Austin, Jackson Arnold Co.	512-447-1068
Tex	Houston, Jackson Arnold Co.	713-783-7297

™**DYNAGEN** - accelerator - Radiation Dynamics, Inc.

™**DYNAGRIP** - solder/flux kit - Chemetron Corp.

DYNAIR ELCTRNS. INC., Dept. EM, 5275 Market St., San Diego, Calif. 92114, Tel: 714-263-7711, TWX: 910-335-2040; FSC No.: 11650; Empl.: 150

Sales Manager: R.A. Jacobs

™**DYNA-JET** - tube tester - B & K Precision Electronic Test Instruments Group

™**DYNAKIT** - high fidelity components in kit form - Dynaco Inc.

DYNALAB CORP., Dept. EM, 7804 Gloria Ave., Van Nuys, Cal. 91406, Tel: 213-781-3151; Empl.: 8

DYNALL, See Key Instruments, Inc.

™**DYNALOAD** - power supply tester - Transistor Devices

DYNALOY, INC., Dept. EM, 7 Great Meadow La., Hanover, N.J. 07936, Tel: 201-887-9270; FSC No.: 27908; Empl.: 19

Local Sales Offices & Reps.

Ariz	Scottsdale, E. J. Foley & Assocs.	602-945-2665
Cal	Westminster, Contronic Devices	714-897-2266
Fla	Ft. Lauderdale, Etchomatic, Inc.	305-563-5060
Ind	Noblesville, G. Cardoza	317-255-6685
Mass	Waltham, Etchomatic	617-893-2020
Minn	Minneapolis, International Sales	612-831-8423
Tex	Dallas, M. Daggett, Jr. & Assoc.	214-368-0135

™**DYNAMAG** - duo-plasmatron ion source - Radiation Dynamics, Inc.

DYNAMAGNETIC ENGRG, INC., Dept. EM, 620 E. Dyer Rd., Santa Ana, Cal. 92705, Tel: 714-540-2081, TWX: 910-595-2588; FSC No.: 52635; Empl.: 7

Local Sales Offices & Reps.

Kans	Wichita, D & O Engrg.	316-264-7358
Mass	Lexington, Hathaway Eltrns	617-861-7010
Wash	Renton, D & D Sls.	206-226-4120

™**DYNAMASTER** - potentiometers - Acco, Bristol Div.

™**DYNA-MATE** - plugs and connectors - General Elec. Company

™**DYNA-MATE II** - plugs & connectors - General Elec. Company

™**DYNAMATIC** - ac & dc adjustable speed drivers - Eaton Corp.

DYNAMIC COMMUNICATIONS, INC., Dept. EM, 948 Ave.E, P.O. Box 10116, Riviera Beach, Fla. 33404, Tel: 305-844-1323; Empl.: 30

Local Sales Offices & Reps.

Cal	Anaheim, Gillingham Assocs.	714-280-6050
Cal	Oakland, Sinclair Elctrn. Assoc.	415-451-1835
Fla	Terra Ceia, Communications Supp. Corp.	813-360-7460
Ga	Altanta, J.E. Joyner Assoc.	404-691-1776
Mass	Newton, Techmar	617-444-8130
Minn	Minneapolis, C.K. Melby Co.	612-884-7688
Mont	Billings, Duane E. Parker & Assoc.	406-245-6349
NY	Greenvale, Bertram D. Aaron & Co.	516-621-0630
NY	Syracuse, Tesco Mktg. Assoc.	315-463-4566
Tex	Richardson, Horizon Engrg. Sls.	214-238-9121
Va	Arlington, Magnum Systems & Comm.	703-524-0884

Wash	Seattle, Robert R. Slater Co.	206-622-3860
Wisc	Brookfield, Steffen Sls. Co.	414-781-7591
Exp:	Chicago, Ill, E.D. Magnus & Assoc.	312-334-1503

DYNAMIC CONTROLS CORP., Dept. EM, 8 Nutmeg Rd., S. Windsor, Conn. 06074, Tel: 203-289-6807, TWX: 710-425-1994; FSC No.: 07148; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles, Ledbetter Assocs.	213-454-2421
Tex	Arlington Hgts., Aero Sls Co.	817-732-6907

DYNAMIC DATA, INC., Dept. EM, 1183 Chesapeake Ave., Columbus, Ohio 43212

DYNAMIC INSTR. CORP., Dept. EM, 933 L.I. Motor Pkwy., Hauppauge, N.Y. 11787, Tel: 516-234-2900, TWX: 510-227-9884; Empl.: 720 .... p. 3236

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Phoenix, Arrowhead Sls. Corp.	602-277-7148
Cal	Burlingame, J. Logan & Assoc.	415-697-6100
Cal	Monrovia, Electro-Mechanical Instr.	213-795-7193
Cal	Pasadena, Electro-Mechanical Instrs.	213-795-7193
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Ill	Rolling Meadows, Sumer Inc.	312-394-4900
Kans	Olathe, BC Elctrns.	913-888-6680
Mass	Littleton Common, Zaslow Sls.	617-486-8915
Mass	Lowell, Zaslow Sls. Corp	617-458-8452
Mass	Northboro, Zaslow Sls.	617-393-8150
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	St. paul, H.A. Cullen Assoc.	612-646-7371
NY	Plainview, Preisick Assoc.	516-681-8444
NY	Syracuse, Naylor Elec. Co.	315-656-2251
NC	Winston Salem, L.G. White Southern	919-725-3612
Ohio	Richfield, Bear Mktg.	216-659-3131
Tenn	Greeneville, 20th Century Mktg.	615-638-4021
Tex	Dallas, E.B. Robertson Inc.	214-942-2716
Utah	Salt Lake City, Arrowhead Sls. Corp.	602-227-7148
Wash	Bellevue, Panoco	206-454-2503
Wisc	Milwaukee, Sumer, Inc.	415-259-9060
Exp:	Can., Downsview, Ont., Zaslow-Can.	416-727-1211

Local Distributors

Cal	Burlingame, J. Logan & Assocs	415-697-6100
Cal	Pasadena, Electro-Mechanical Instrs.	213-795-7193
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Fla	Orlando, Buchanan & Abrams Assoc.	305-898-7444
Ill	Rolling Meadows, Sumer, Inc.	
Mich	Ferndale, Hilltronics	313-398-5556
Minn	St. Paul, H.A. Cullen Assoc.	612-646-7371
NY	Bayshore, D & B Power	516-586-5955
NY	East Syracuse, Naylor Electric Co.	315-656-2251
NY	Plainview, Preisick Assocs.	516-681-8444
NC	Winston Salem, L.G. White Southern	919-705-3612
Ohio	Richfield, Bear Mktg.	216-659-3131
Pa	Devon, Kiley Electric Co.	215-687-9340
Tex	Dallas, Elgin B. Robertson	241-942-2716
For:	Switzerland, Lausanne, Marketing & Liaison	(021) 23 58 15

DYNAMIC MEASUREMENTS CORP., Dept. EM, 6 Lowell Ave., Winchester, Mass. 01890, Tel: 617-729-7870, TWX: 710-348-6596; Empl.: 60

Local Sales Offices & Reps.

Cal	Costa Mesa, Measurement Assocs	714-540-7160
Ill	Northfield, Feller Assocs.	312-446-8065
Md	Fulton, Gans-Fryling	301-837-6311
Mass	Littleton, Hybricon	617-861-6692
Mich	Southfield, R. C. Nordstrom & Co.	313-559-7373
Mich	St. Joseph, R. C. Nordstrom & Co.	616-429-8560
Mo	St. Louis, Ozark Elec. Mktg.	314-423-7200
NJ	Parlin, Triple E	201-727-6454
NY	Locust Valley, Triple E	516-676-1613
Ohio	Chesterland, Electroquipment	216-729-2222
Ohio	Dayton, Electroquipment	513-434-8993
Tex	Richardson, Scientific Sales	214-231-6541
Va	Arlington, Gans-Fryling	703-527-3262

Local Distributors

Ill	Elmhurst, Semiconductor Specialists	

DYNAMIC SYSTEM ELCTRNS., Dept. EM, 35 Anacapa St., Santa Barbara, Cal. 93101, Tel: 805-963-3479; Empl.: 12

DYNAMICS ELCTRN. PRODS., INC., Dept. EM, 9001 Fullbright Ave., Chatsworth, Cal. 91311, Tel: 213-998-8281, Telex: 69-6171 .... p. 1104

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Chatsworth, Dynamics Elctrn. Prods.	213-998-0121
Cal	Concord, Gado Inst. Sls.	
Cal	Palo Alto, Gado Inst. Sls.	415-961-2222
Cal	Palo Alto, Egbert Engrg. Assocs.	415-326-1387
Cal	San Diego, L. L. Stoakes	714-274-6281
Colo	Littleton, J. Smith & Assocs.	303-770-4827
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-945-4222
Haw	Honolulu, Industrial Elctrns.	808-533-6095
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg. Co.	319-377-9434
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
Md	Fulton, Gans-Fryling & Pugh	301-953-3724
Mass	Burlington, Dynamics Sls.	617-272-5676
Mich	Detroit, Comtel Inst. Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NJ	Haddonfield, G. L. Williams Assoc.	609-428-6060
NJ	Kinnelon, Eastern Process Equip. Corp.	201-838-8746
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Great Neck, Eastern Proc. Equip. Corp.	516-487-1173
NY	Penfield, A & Devices Inc.	716-586-8033
NY	Scotia, A & D Devices	578-399-9621
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Comtel Inst. Co.	216-442-8080
Ohio	Dayton, Comtel Inst. Co.	513-298-7573
Pa	Pittsburgh, Comtel Inst. Co.	412-922-5720
Tex	Richardson, Lear Assocs.	214-231-5388
Va	Arlington, Gans-Fryling & Pugh	703-527-3262
Wash	Seattle, Comptronics	206-284-4842
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

™DYNA-MIKE - hi-k ceramic capacitor - ITT Jennings

™DYNAMITRON - accelerator - Radiation Dynamics, Inc.

™DYNA-MOD - audio/video modulator - Dynair Elctrns. Inc.

™DYNAMONITOR - acceleration voltmeter - Endevco

™DYNAMOUNT - automotive speaker system - Jensen Sound Labs.

™DYN/AMP - D.C. current metering - Halmar Electronics, Inc.

DYNAPAR CORP., Dept. EM, 1675 Delany Rd., Gurnee, Ill. 60031, Tel: 312-662-2666, TWX: 910-235-1865; Empl.: 120

Local Sales Offices & Reps.

Ala	Gadsden, Dynapar Corp.	205-546-4213
Cal	San Mateo, Dynapar Corp.	415-347-7774

DYNASCAN CORP., see B&K Precision Electronic Test Instruments Group

™DYNA-PATECH - multi-circuit patch jack - Dynatech Laboratories, Inc.

™DYNAPHASE 28 - dynamic headsets - Stanton Magnetics, Inc.

™DYNAPHASE 40 - dynamic headsets - Stanton Magnetics, Inc.

™DYNAPHASE 60 - dynamic headsets - Stanton Magnetics, Inc.

™DYNAPHASE 65-4C - 4 channel dynamic headset - Stanton Magnetics, Inc.

™DYNAPHONIC - cassette tapes - Allied Electronics

™DYNAPOUR - automatic pouring device - Ajax Magnethermic Corp.

™DYNA-RACE - shock & vibration slides - Grant Hardware Co.

™DYNARANGE, PLAID DESIGN - for magnetic tapes - Magnetic Audio/Video Products :Div.

™DYNASOLVE - cured plastic removers - Dynaloy, Inc.

™DYNASTAT - ionizing air blower - Static Inc.

™DYNA-SWITCH - overload prevention switches - Dillon, W.C. & Co.

™DYNATACH - electric tachometers - Electric Tachometer Corp.

DYNATECH CORP., Dept. EM, 1225 E. Wakeham Ave., Santa Ana, Cal. 92702, Tel: 714-558-8755, TWX: 910-595-1951; Empl.: 150 .... p. 1833

Sales Manager: E.L. Krause

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assoc.	205-883-7893
Ariz	Phoenix, Hecht, Henschen & Assoc.	602-275-4411
Cal	Fountain Valley, Balzer/Wolf Assocs.	714-962-8169
Cal	Los Altos, Frauman Assoc.	415-941-0660
Cal	Los Angeles, Balzer/Wolf Assoc.	213-888-7432
Cal	San Diego, Balzer/Wolf Assocs.	714-272-2200
Cal	Santa Ana, Dynatech Corp.	714-558-8755
Colo	Denver, Rope & Williamson	303-758-8507
Fla	Orlando, Technology Mktg. Assocs.	305-857-3760
Ga	Atlanta, Technical Comps., Inc.	404-394-9401
Ill	Lombard, Jim Fitzpatrick	312-834-1711
Mass	Westboro, Technical Mktg. Svc.	617-366-8462
Minn	Minneapolis, S. Clothier Co.	612-944-3456
NY	Plainview, R. Smith Assoc.	516-681-3155
NY	Spring Valley, R. Smith Assoc.	914-354-6067
NY	Syracuse, D. Dwyre	315-472-8282
NC	Winston-Salem, Technology Mktg. Assoc.	919-768-4174
Ohio	Galion, J.R. Bright Agcy.	419-468-3787
Ohio	Rocky River, CSA Elctrn. Sls. Agcy.	216-333-2088
Ore	Lake Oswego, Ruggles Tech. Sls.	503-636-5902
Pa	Ft. Washington, Kirk-Sandell	215-643-2100
Tex	Houston, Zonk Engrg. Co.	731-697-9302
Tex	Richardson, Zonk Engrg. Co.	214-238-7651
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778

Local Distributors

Cal	Mountain View, Abacus Elctrns.	415-961-1500
NY	Brooklyn, H.H. Smith	212-272-9400
NY	Farmingdale, Broadline Elec. Dist.	516-420-8320
NY	New York, Hofor Ind'l Svcs., Inc.	212-682-3092
Tex	Addison, Computer Comp Corp.	214-239-0271
For:	Can., Vancouver, B.C., Intek Elctrns.	604-324-6831
For:	Japan, Chiyoda-Ku, Tokyo, Sankyo International Corp.	

DYNATECH LABORATORIES, INC., Cooke Engineering Div., Dept. EM, 900 Slaters La., Alexandria, Va. 22314, Tel: 703-548-3889, Telex: 89-9119; Empl.: 100

Sales Manager: D. Kane

DYNATECH R/D CO., Dept. EM, 99 Erie St., Cambridge, Mass. 02139, Tel: 617-868-8050

™DYNATRAC - heterodyne lock-in amplifier - Ithaco, Inc.

™DYNA-TROL - furnaces - L & L Special Furnace Co.

™DYNATROL - controls - Automation Prdts.

DYNATRON CO., Dept. EM, Box 48822, Los Angeles, Cal. 90048, Tel: 213-933-9638; Empl.: 3

™DYNA-TUNE - demodulators - Dynair Elctrns. Inc.

™DYNAVAR - alloy - Hamilton Technology, Inc.

™DYNAYOKE - yokes - CELCO

DYNISCO, Dept. EM, 20 S. West Pk., Westwood, Mass. 02090, Tel: 617-326-8210, Telex: 092-4347; Empl.: 78

Local Sales Offices & Reps.

Cal	Cerritos, Emerson Kirk Engrg.	213-926-2239
Cal	San Francisco, Automated Process Controls	415-467-6162
Conn	Canton, Daner-Hayes, Inc.	203-232-4501
Fla	Ft. Lauderdale, Beacon Elctrn. Assocs. Inc.	305-491-4211
Ga	Atlanta, Beacon Elctrn. Assocs. Inc.	404-351-3654
Ill	Chicago, Thermo/Cense Inc.	312-792-2760
Mass	Newton Centre, D. Hayes Inc.	617-969-4650
Mich	Farmington, Anderson Elctrs.	313-476-9161
Minn	Minneapolis, C.T. Sls.	612-374-1241
Mo	St. Louis, Ozark Elctrn. Mktg.	314-423-7200
NJ	Englewood, Tridon Sls.	201-569-8011
NY	Rochester, D. Hayes Inc.	716-394-5560
NC	Charlotte, Beacon Elctrn. Assocs.	704-525-7412
Ohio	Cincinnati, Schlemmer Assocs.	513-522-8340
Ohio	Cleveland, Orr Assocs.	216-885-1324
Pa	Jenkintown, PDC Corp.	215-887-9610
Tex	Dallas, K. Dawson Co.	214-241-3843
Utah	Salt Lake City, Applied Engrg. Prods. Co.	801-582-4942
Wash	Bellevue, Topp Engrg. Sls.	206-747-5400

™DYNOGRAPH BALANCERS - balancing machines - Annis R B Co.

™DY-NOS-STICK - digital test probe - Nu-Concept Computer Systems, Inc.

™DYTEK - commercial/marine temperature monitors - Aerospace Avionics, Inc.

DYTRONICS CO., INC., Dept. EM, 4800 Evanswood Dr., Columbus, Ohio 43229, Tel: 614-885-3303; Empl.: 25 .... p. 2832

Local Sales Offices & Reps.

Cal	Buena Park, Cost Reduction Equip. Co.	714-523-7330
Conn	Hamden, Applied Measurements	203-288-5288
Ill	Des Plaines, Marsland Assocs.	312-775-1309
La	Baton Rouge, Cecil Doyle Co.	504-925-5386
Mass	Acton, Applied Meas.	617-263-2766
Mich	Marquette, NWR Elctrns. Corp.	906-228-9660
Minn	Edina, NWR Elctrns. Corp.	612-831-6240
Minn	Minneapolis, Marsland Assoc.	612-545-4481
Minn	Virginia, NWR Elctrns. Corp.	218-741-5080
NY	Buffalo, Angus Instrs.	716-634-0640
NY	Marietta, REB Controls	315-636-7765
Ohio	Columbus, Cam-Tech Sls.	614-488-0412
Pa	Harleysville, T. Jackson Assocs.	215-643-5560
Tex	Dallas, Airep Elctrns.	214-827-2120
Tex	Houston, Cecil Doyle Co.	713-771-3490
Exp:	New York, N.Y., Joseph Plasencia, Inc.	212-867-8084

DYTRONICS DIV., GTI Corp., Dept. EM, Box 217, Leesburg, Ind. 46538, Tel: 219-453-3261, Telex: 023-2653; Empl.: 150

Sales Manager: R.A. Ionni

Local Sales Offices & Reps.

Ark	Hot Springs, Meredith Young Assoc.	501-262-1365
Cal	Santa Ana, Calif Elctrn Mktg.	714-835-2702
Ill	Park Ridge, Probe Elctrns.	317-696-2828
Mich	Orchard Lake, J.L. Johnson	313-643-6917
Minn	St. Paul, Kenco Co.	612-645-7717
Miss	Jackson, Meredith Young Assoc.	601-366-8185
NJ	Parsippany, Total Mktg. Approach	201-227-4073
Ohio	Cleveland, Staff Co.	216-331-5100

DZUS FASTENER CO., INC., Dept. EM, 425 Union Blvd., West Islip, N.Y. 11795, Tel: 516-669-0494; Empl.: 100

Local Sales Offices & Reps.

Cal	Anaheim, Dzus Fastener Co.	714-635-0830

Local Distributors

Ill	Downers Grove, S.W. Anderson Co.	312-964-2600
Kans	Wichita, Standard Parts & Equip. Corp.	316-522-1516
Tex	Fort Worth, Standard Parts & Equip. Corp.	817-336-2521
For:	Can., Weston, Ontario, International Fasteners, Ltd.	416-749-0070

™D²AMS - digital dedicated analytical module sytem - Bromberg Engineering

™E - switches, rotary, cam, power, snap-action - Electro Switch Corp.

E-H RESCH. LABS., INC., Dept. EM, Box 1289, Oakland, Cal. 94604, Tel: 415-834-3030, TWX: 910-366-7258; Empl.: 100

Sales Manager: J.B. Long

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	La Jolla, Ward/Davis Assocs.	714-459-3351
Cal	Lawndale, Ward/Davis Assocs.	213-542-7740
Cal	Sunnyvale, Ward/Davis Assocs.	408-245-3700
Colo	Englewood, Zeus, Inc.	303-770-5666
Conn	Avon, Instr. Dynamics	203-678-1088
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Arlington Heights, Dytec/Centra, Inc.	312-394-3380
Kans	Overland Park, Dytec Inc.	913-432-5596
Md	Baltimore, Scientific Representatives, Inc.	301-321-1411
Md	Baltimore, E-H Research Labs.	301-532-7400
Mass	Wakefield, Instr. Dynamics	617-245-5100
Mich	Northville, Micro Sls. Corp.	313-349-7320
Minn	St. Paul, Dytec/North, Inc.	612-645-5816
Mo	St. Louis, Dytec/South, Inc.	314-423-1234
NJ	Cherry Hill, Scientific Representatives, Inc.	609-482-0059
NJ	Paramus, SDM Reps.	201-368-0123
NM	Albuquerque, Zeus, Inc.	505-268-3941
NY	Rochester, SDM Reps.	716-544-8080
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Centerville, Micro Sls.	513-433-8171
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Okla	Norman, Data Mktg.	405-364-8320
Ore	Lake Oswego, Wilson Applied Instrs.	503-636-0965
Tex	Austin, Data Mktg.	512-451-5174
Tex	Dallas, Data Mktg.	214-661-0300
Tex	Houston, Data Mktg.	713-780-2511
Tex	San Antonio, Data Mktg.	512-828-0937
Va	Falls Church, Scientific Representatives, Inc.	703-573-8787
Wash	Belleview, Wilson Applied Instrs.	206-641-6444

E & L INSTRUMENTS, INC., Dept. EM, 61 First St., Derby, Conn. 06418, Tel: 203-735-8774, Telex: 963536; Empl.: 46; Minimum order: $Richard J. Vuillequez, VP Sls. .... p. 1399

Sales Manager: Susan Korzan, Dom.; *Distributor Manager:* Richard J. Vuillequez, VP Sls.

Local Sales Offices & Reps.

Cal	Mountain View, IFM Co.	415-961-2828
Cal	Palos Verdes, Edwards Assocs.	213-377-0975
Colo	Denver, Bill Newman & Co.	303-744-2501
Conn	Woodbridge, Electronic Mktg. Co.	203-397-1461
Fla	Orlando, Nine Assocs.	305-351-1841
Ill	Arlington Heights, Martec Assocs.	312-956-8090
Mo	Kansas City, Sir John Co.	913-649-8952
NJ	Springfield, Shortess-Rawson & Assocs.	201-467-8585
NY	N. Syracuse, Naco Elctrns.	315-699-2651
Ohio	Dayton, Rixan Assocs.	513-222-0011
Pa	Sauderton, Shortess-Rawson & Assoc.	215-723-8733
Tex	Dallas, Tesco, Inc.	214-328-5484
Va	Fairfax, Nine Assocs.	703-273-1803
Wash	Seattle, J. Jolly, Inc.	206-938-4166

Local Distributors

Cal	Mountain View, I.F.M. Inc.	415-961-2828
Cal	Palos Verdes Peninsula, Edwards Assocs.	213-377-0975
Colo	Denver, Bill Newman & Co.	303-744-2501
Conn	Woodbridge, Electronic Mktg. Co.	203-397-1461
Fla	Orlando, Nine Assocs.	305-351-1841
Ill	Arlington Heights, Martec Assocs.	312-956-8090
Kans	Overland Park, Sir John, Inc.	913-649-8952
NJ	Springfield, Shortess-Rawson & Assocs.	201-467-8585
NY	North Syracuse, Naco Elctrns. Corp.	315-699-2651
Ohio	Dayton, Rixan Assocs.	513-222-0011
Pa	Sauderton, Shortess-Rawson & Assocs.	215-723-8733
Tex	Dallas, Tesco, Inc.	214-328-5484
Va	Fairfax, Nine Assocs.	703-273-1803
Wash	Seattle, Jon Jolly, Inc.	206-938-4166

E & M LABORATORIES, INC., see TRAK Microwave Corp.

ESNA DIVISION, Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083, Tel: 201-686-6000, TWX: 1-38243, 710-985-4677; Empl.: 700; Minimum order: $C.W. Dean

Sales Manager: W.H. Riley; *Distributor Manager:* C.W. Dean

Local Sales Offices & Reps.

Cal	Van Nuys	213-873-7420
Ga	Marietta	404-427-5744
Ill	Chicago	312-777-2929
Ind	Indianapolis	317-253-6526
Mass	Boston	617-545-3424
Mich	Southfield	313-646-6700
Mo	Kansas City	816-333-8394
Mo	St. Louis	314-968-1336
NJ	Union	201-686-6000
Ohio	Cincinnati	513-825-8135
Ohio	Dayton	513-298-2346
Ohio	Strongsville	216-238-3351
Pa	Ardmore	215-642-8667
Tex	Dallas	214-231-2391
Wisc	Milwaukee	414-786-4456

E-SYSTEMS INC., Garland Div., Dept. EM, Box 6118, Dallas, Tex. 75222, Tel: 214-272-0515, TWX: 910-860-5187; Empl.: 1700

Local Sales Offices & Reps.

Fla	Fort Walton Beach	904-243-0127
Mass	Lexington	617-861-9050
NJ	W. Long Branch	201-222-0565
NY	Rome	315-336-1911
Ohio	Dayton	513-254-8464
Va	Arlington	703-524-2310
Va	Hampton	703-838-2010

E-SYSTEMS, INC., Memcor Div., Dept. EM, 1320 Flaxmill Rd., Huntington, Ind. 46750, Tel: 219-356-4300, TWX: 810-333-1530; Empl.: 1100 .... p. 3692,3840

Local Sales Offices & Reps.

Ala	Huntsville,, Murcota Inc.	205-539-8476
Cal	Culver City, De Angelo, Rothman & Co.	213-398-6239
Cal	San Carlos, D.H. Ross Co.	415-591-4411
Colo	Denver, Gossard & Assoc.	303-985-0602
Fla	Boca Raton, R.K. Welter Co.	305-391-9067
Ga	Atlanta, Murcota Corp.	404-875-2525
Ill	Chicago, D. Dolin Sls. Co.	312-286-6200
Ind	Ft. Wayne, M & N Prods. Co.	219-747-2461
Iowa	Marion, Thomas & Modrcin Assocs.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assocs.	913-432-2131
Mass	Boston, Anderson Sales Assoc.	617-227-2980
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	St. Paul, H.A. Cullen, Assoc.	612-646-7371
Mo	Hazelwood, Thomas & Modrcin Assocs.	314-895-4700
NJ	East Orange, Masin Esco Inc.	201-674-6505
NY	E. Syracuse, Honsinger Mktg. Assocs.	315-463-5718
NY	Syosset, Masin Esco Inc.	516-364-0310
NC	Burlington, Murcota Corp.	919-585-1577
NC	Winston Salem, Murcota Corp.	919-723-1001
Ohio	Cleveland, Glover Sls. Co.	216-842-4520
Pa	Newtown Square, G.M. Conneen	215-353-2241
Tex	Dallas, Southwest Electronic Ind.	214-233-9816
Tex	Houston, Southwest Electronic Ind.	713-729-1670
Wash	Seattle, R.K. Squibb Inc.	206-632-2450

E-T-A PRODS. CO. AMERICA, Dept. EM, 7400 N. Croname Rd., Chicago, Ill. 60648, Tel: 312-647-8303, Telex: 253780; Empl.: 13

Local Sales Offices & Reps.

Cal	Oakland, Moulthrop Sls., Inc.	415-261-7676
Cal	Tustin, Sierra-Pacific Eng.	714-731-3411
Conn	East Haven, Eagle Assocs., Inc.	203-467-6542
Fla	Orlando, Buchanan & Abrams Assoc., Inc.	305-898-7444
Ill	Chicago, Midwest Elctrn. Sls.	312-777-9700
Iowa	Cedar Rapids, Midwest Elctrn. Sls.	319-362-4410
Md	Baltimore, D.K. Jones & Assoc.	301-752-0577
Mass	Boston, Eagle Assocs., Inc.	617-444-3446
Mich	Benton Harbor, R.C. Nordstrom & Co.	616-429-8560
Mich	Lathrup Village, R.C. Nordstrom & Co.	313-559-7373
Minn	Minneapolis, Wenco Sls., Inc.	612-866-3639
Mo	Hazelwood, Dy-Tronix Inc.	314-731-5799
Mo	Independence, Ey-Tronix, Inc.	816-737-1100
NJ	Fort Lee, S. Justin Assoc.	201-947-4371
Ohio	Cincinnati, J.O. Olsen Co.	513-922-2176
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550

Pa	Willow Grove, Techparts	215-659-6900
Tenn	Hendersonville, Stark & Assoc., Inc.	615-822-1667
Tex	Carrollton, V.J. Sykes Assoc., Inc.	214-242-0511
Utah	Salt Lake City, Frank Merchant	801-277-3775
Wash	Woodinville, W.J. Stulgis Co.	206-486-8539
Wisc	Waukesha, J.C. Morkin Sls. Eng.	414-542-5129

E-TRONICS, Dept. EM, 16774 Schoenborn, Sepulveda, Cal. 91343, Tel: 213-892-7279; Empl.: 28

Local Sales Offices & Reps.

Cal	Sepulveda, E-Tronics	213-892-7279
Conn	West Haven, Techmar	203-934-0261
Ill	Addison, Lectron Controls	312-543-8460
Mass	Newton, Techmar	617-444-8130
Minn	Minneapolis, Volco Co.	612-336-6631
Ohio	Cleveland, Automated Equip. & Engrg.	216-462-2855
Pa	Pittsburgh, Automated Equip. & Engrg.	412-931-7616
Tex	Dallas, Bouco Sls. Assocs.	214-247-6708
Tex	Houston, Bouco Sls. Assocs.	713-661-9640
Va	Fairfax, Schibley Assocs.	703-591-3008

EV-GAME INC., Dept. EM, Box 711, 186 Buffalo Ave, Freeport, N.Y. 11520, Tel: 516-378-0440, Telex: 96-1304; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, B & G Sls. Co.	602-266-5624
Ark	El Dorado, D. Bellew Sls. Co.	501-863-8325
Cal	San Francisco, Technical Sls.	415-467-1434
Cal	W. Covina, D. Forth Assocs.	213-967-2893
Colo	Colorado Springs, Norris & Co.	303-516-3324
Fla	Miami, Raulson & Co.	305-264-6003
Ga	Atlanta, H. W. Phillips Co.	404-992-3070
Ill	Winfield, Ashpole Assocs.	312-665-7787
Ind	Carmal, Mid-Central Sls.	317-846-2974
Ky	Ferncreek, Mid-Central Sls.	502-239-5614
La	Kenner, D. Bellew Sls. Co.	504-443-3237
Md	Silver Spring, Mid-Atlantic Sls.	301-593-7749
Mich	Detroit, Riley & Petchell Sls.	313-937-3000
Minn	Minneapolis, Norcentronix	612-854-8494
Mo	Raytown, Pacer Corp.	816-358-6638
NJ	Englewood, Bressler & Baum Assocs.	201-569-7600
NY	New York, Bressler & Baum Assocs.	212-564-4105
NY	Syracuse, Lewis-Dunnigan Co.	315-446-5522
Ohio	Cleveland, H. Miller Sls. Co.	216-321-3900
Pa	Abington, Mid-Atlantic Sls.	215-657-1256
SC	Rock Hill, Rohr-Wanger Sls.	803-366-9353
Tenn	Memphis, L. Jones	901-683-7616
Tex	Irving, Antle-Smith Sls. Co.	214-438-1222
Wash	Seattle, W. R. Lanphear Sls. Co.	206-285-2012

E-Z-HOOK, Div. of Tektest, Inc., Dept. EM, Box 450 114 E. St. Joseph, Arcadia, Cal. 91006, Tel: 213-446-6175, TWX: 910-582-1614 .... p. 2833

Sales Manager: C. Haskin

Local Sales Offices & Reps.

Cal	Arcadia, Ash M. Wood Co.	213-447-3511

EAC/ELECTRONIC APPLICATIONS CO., see Electronic Applications Co.

™EAGLE "A" - low permeability alloy - Eagle Magnetic Co.

™EAGLE "AA" - medium permeability alloy - Eagle Magnetic Co.

™EAGLE "AAA" - high permeability alloy - Eagle Magnetic Co.

EAGLE MAGNETIC CO., Dept. EM, Box 24283, 7421 Crawfordsville Rd., Indianapolis, Ind. 46224, Tel: 317-297-1030; Empl.: 18 .... p. 2664

Sales Manager: R. Stone

EAGLE-PICHER INDS., Commercial Prods, Dept., Dept. EM, Box 130, Seneca, Mo. 64865, Tel: 417-776-2258; Empl.: 100 .... p. 3242

Sales Manager: J.H. Howell

Local Sales Offices & Reps.

Ariz	Phoenix, Spectrum Assocs.	602-997-6324
Cal	Palo Alto, Abbott Engrg. Co.	415-327-0830
Cal	Santa Ana, Spectrum Assocs.	714-835-4114
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Conn	Milford, Zaslow Sls. Co.	203-878-1094
Ill	Park Ridge, Metcom Assocs. Corp.	312-696-1490
Ind	Ft. Wayne, McDonald Sls. Co.	219-747-3650
Iowa	Cedar Rapids, PMA Corp.	319-362-9177
Kans	Overland Park, PMA Corp.	913-381-0004
Kans	Wichita, PMA Corp.	316-264-2662
Md	Devon, Kilex Elect Co.	215-687-9340
Mass	Northboro, Zaslow Sls. Co.	617-393-8150
Minn	Minneapolis, Ohlin Sls. Co.	612-929-6924
Mo	Maryland Heights, PMA Corp	314-569-1220
NY	Massapequa, H.C. Assocs.	516-541-0262
NY	Syracuse, Naylor Elec. Co.	315-656-2251
NC	Greensboro, L & D	919-292-3201
Ohio	Dayton, Ad-El-Tek/El Compo	513-836-2741
Okla	Bixby, E.B. Robertson	918-369-5688
Pa	Kilex Elect. Co.	215-687-9340
Tex	Dallas, E. B. Robertson	214-942-2716
Va	Richmond, L & D Inc.	804-359-0125
Wash	Bellevue, Pacific Consltnts.	206-454-2503

Local Distributors

Cal	Los Angeles, Mil-Comm	213-478-0525
Cal	Palo Alto, Power Source	415-327-0830
Colo	Englewood, J & B Sls.	303-761-9181
Ga	Smyrna, Mark C. Pope Assocs.	404-435-2471
Kans	Wichita, Radio Supply Co.	316-267-5214
NY	Farmingdale, Battery Power	516-694-3911
Ohio	Englewood, Ad-El-Tek/El Compo	513-836-2741
Ohio	Worthington, Applied Elctrns	
Okla	Oklahoma City, Electro Entprs.	405-478-1752
SC	Columbia, Dixie Radio Supply Co.	803-779-5332
Tex	Richardson, Southwest Elctrns.	214-234-3050
Tex	Stafford, Southwest Elctrns.	713-494-6021
For:	Can., Montreal, Que., ABC Security Prod.	514-389-7818

EAGLE-PICHER INDUSTRIES, INC., Elctrns. Div., Dept. EM, Box 47, Joplin, Mo. 64801, Tel: 417-623-8000, TWX: 910-774-4508; Empl.: 700

EAGLE SIGNAL, Mfg. Div. Gulf & Western Inds., Dept. EM, Box 3585, Davenport, Iowa 52808, Tel: 319-326-8111; Empl.: 600

Sales Manager: F.P. Newburn

Local Sales Offices & Reps.

Ala	Birmingham, McConnell Sls. & Engrg. Corp.	205-942-3501
Ariz	Phoenix, Bews & Wallace Co., Inc.	602-267-1171
Ariz	Tucson, Bews & Wallace Co., Inc.	602-327-6061
Ark	Little Rock, J. Tyler Engrg. Co.	501-562-2296
Cal	Burlingame, Campbell & George Co.	415-697-2965
Colo	Denver, Eagle Signal (Mountain States)	303-773-6024
Fla	Jacksonville, Ward Engrg. Co.	904-388-7656
Fla	Orlando, Ward Engrg. Co.	305-851-0725
Ga	Atlanta, B. Fancher & Assocs.	404-448-7078
Ill	Chicago, Kelburn Engrg. Co.	312-775-8383
Ill	Moline, J. Otis & Assocs.	309-762-9311
Ind	Indianapolis, Kelburn Engrg. Co.	317-257-9874
Kans	Overland Park, R. Greene Co.	913-492-6886
La	Baton Rouge, Thompson Equip. Co.	504-355-6663
La	New Orleans, Thompson Equip. Co.	504-833-6381
Md	Glen Burnie, E.J. Varholy & Sons Inc.	301-760-3344
Mass	Norwood, Gibson Engrg. Co.	617-769-3600
Mich	Detroit, R.D. Ernest Assocs.	313-861-7311
Mich	Spring Lake, Mackinaw Engrg. Co.	616-842-9170
Minn	Minneapolis, W. Hallock Co.	612-920-6100
Mo	St. Louis, R. Greene Co.	314-994-0222
NJ	Saddle Brook, C.H. Ribble Co.	201-791-0233
NY	Buffalo, Munhall Co.	716-856-1212
NC	Charlotte, B. Fancher & Assocs.	704-597-7753
Ohio	Cleveland, J.L. Finnicum & Assocs.	216-226-7076
Ohio	Dayton, Thal-Mor Assocs.	513-298-9939
Okla	Tulsa, L. Elliott Co.	918-743-7794
Ore	Portland, Branom Instr. Co.	503-285-9861
Pa	Havertown, W. F. Keegan & Co.	215-528-6640
Pa	Monroeville, H. A. Deevers & Co.	412-372-4000
Tenn	Knoxville, J. R. Stephenson Agency	615-588-7474
Tex	Addison, L. Elliott Co.	214-239-8533
Tex	Missouri City, L. Elliott Co.	713-499-1571
Wash	Seattle, Branom Instr. Co.	206-762-6050
WVa	Charleston, Skaff Engrg. Co.	304-342-0131
Wisc	Milwaukee, Kelburn Engrg. Co.	414-545-2122
Exp:	Iowa, Davenport, (Eagle Signal - J. Duda)	319-326-8146

EANCO, INC., Mid-Eastern Prods., Dept. EM, 539 Jacksonville Rd., Warminster, Pa. 18974, Tel: 215-672-4800, TWX: 510-665-6752; FSC No.: 061790; Empl.: 30 .... p. 3284,3285

Sales Manager: D. Ellenback, Prod. Mgr.

Local Sales Offices & Reps.

Cal	Los Angeles, Dyna Sls.	213-268-1175
Fla	Alamonte Spg., WMM Assocs.	305-862-4700
Fla	Clearwater, WMM Assocs., Inc.	813-446-0075
Fla	Pompano Bch., WMM Assocs., Inc.	305-943-3091
Mass	Wellesley Hls., R. Sturdy	617-235-2330
Mich	Centerline, Dietrich & Assoc.	313-754-6450
NJ	Cinnaminson, Scott Sls. Co.	609-829-2991
NY	Huntington, C.R. Mayer Co.	516-WA 1-7876
NC	Fayetteville, Zim-Tek Sls. Co.	919-485-2304
Ohio	Cleveland, Dietrich & Assoc.	216-781-1855
Ohio	Dayton, Dietrich & Assoc.	513-223-6042
Pa	Pittsburgh, Dietrich & Assoc.	412-892-2992
Wash	Seattle, Eicher-Richards Co.	206-LA 3-7888

EAST CONTROLS CO., Dept. EM, 3908 N. Kildare Ave., Chicago, Ill. 60641, Tel: 317-542-0385

EASTCRAFT SECURITY SYSTEMS CORP., Dept. EM, Box 876, Melbourne, Fla. 32901, Tel: 305-724-0500; Empl.: 15

EASTERN AIR DEVICES MOTOR DIV., Electro Audio Dynamics, Inc., Dept. EM, 1 Progress Dr., Dover, N.H. 03820, Tel: 603-742-3330, TWX: 510-297-4454; Empl.: 270 .... p. 3075

Local Sales Offices & Reps.

Ala	Decatur, Tenn Tech. Sls.	205-350-0630
Ariz	Tempe, Gassner & Clark	602-945-7979
Cal	Los Altos, Servo Data	415-964-1325
Cal	Pico Rivera, Westrep	213-949-2551
Colo	Boulder, Component Prod. Sls. Co.	303-494-5100
Fla	Orlando, Perrott Assoc.	305-275-1132
Ill	Westchester, Gassner & Clark	312-345-4245
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Detroit, A. Blumenberg Assoc.	313-557-1934
Minn	St. Paul, R. G. Ragon	612-488-0201
NJ	Ridgefield, Rical Assocs	201-945-5250
NY	E. Syracuse, Noeth-Honsinger Assoc.	315-463-5718
Ohio	Dayton, Midwest Mktg Assoc.	513-433-2511
Pa	Newtown Square, Hagy Assoc.	215-459-0504
Tex	Dallas, Blair Engrg Sls	214-352-2556
Wash	Seattle, Seatronics, Inc.	206-767-4330

EASTERN DELTA CORP., Dept. EM, 29-09 S. Broadway, Fair Lawn, N.J. 07410, Tel: 201-797-4200; FSC No.: 18105; Empl.: 31

Local Sales Offices & Reps.

NJ	Fair Lawn, Eastern Delta Corp.	201-797-4200
Exp:	NY, W. Babylon, Delmar Elctrns.	516-420-1234

EASTERN ELECTRONICS MFG. CORP, Dept. EM, 180 Roberts St., East Hartford, Conn. 06108, Tel: 528-9821

Sales Manager: T.P. Dunn

EASTERN MARKING MACHINE CORP., Dept. EM, 30 Alabama Ave., Island Park, N.Y. 11558, Tel: 516-889-9090

Sales Manager: H. Leighton; *Distributor Manager:* L. Sherman

Local Sales Offices & Reps.

Cal	Campbell, C. D. Buerki Co.	408-374-8040
Conn	Bridgeport, Technical Instrs.	203-368-4582
Mass	Wilmington, Technical Instrs.	617-944-3930
NY	Wappingers Falls, Automatic Equip. Svcs.	914-297-8336
Tex	-Dallas, Teamwork, Inc.	214-243-5881

EASTERN MICROWAVE CORP., Dept. EM, 4 Gill St., Woburn, MA 01801, Tel: 617-935-8600; Empl.: 45

Local Sales Offices & Reps.

Cal	Orange, Pacific Microwave	714-633-7991
Colo	Evergreen, Mountaintek, Inc.	303-674-5255
Fla	Palm Bay, Spartech Assocs.	305-727-8045
Ga	Smyrna, Spartech Assocs.	404-432-3644
Mass	Lexington, E. F. Delfino Co.	617-862-1118
NJ	Westfield, Gray & Reed Assocs.	201-233-6116
NM	Albuquerque, Mountaintek	505-294-1491
NY	Guilderland, Electro-Modular Sys.	518-456-2665
NY	Huntington Station, Gray & Reed Assocs.	516-433-3333
Ohio	Dayton, RPA Assocs.	513-252-7067
Utah	Salt Lake City, Mountaintek	801-278-6920
Wash	Renton, Sherm Wilson Co.	206-226-0650

EASTMAN CHEM. PRODS., Sub. Eastman Kodak Co., Dept. EM, Kingsport, Tenn. 37662, Tel: 800-251-0351, TWX: 810-574-5174; Empl.: 1000

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EASTMAN KODAK, Graphic Data Markets, Dept. EM, 343 State St., Rochester, N.Y. 14608, Tel: 716-325-2000

™EASTOBOND - hot-melt adhesives - Eastman Chem. Prods.

™EASY-FLO - silver brazing alloy - Handy & Harman

EASY HEAT-WIREKRAFT, Dept. EM, 555 North Michigan St., Lakeville, Ind. 46536, Tel: 219-784-3011, Telex: 233159

Sales Manager: G.J. McClure

™EASYMATCH - RF tuner - Alford Mfg. Co.

™EASYPOXY - epoxy adhesive kits - Conap, Inc.

EASY-UP INC., Dept. EM, Racine, Wisc. 53401, Tel: 414-633-6389; Empl.: 12

Local Sales Offices & Reps.

Ill	Skokie, M. Bermann Sls. Co.	312-675-3740
Ind	Fort Wayne, N. Hoemig Sls. Co.	219-747-0826
Mich	Detroit, R. Milsk Co.	313-342-6660
Minn	Minneapolis, R. Ripley & Assocs.	612-881-8282
Mo	Ballwin, R.J. Throckmorton Sls. Co.	314-227-7222
NY	Yonkers, J. Mesnick Elctrn. Sls.	914-961-6619

™EATON - precision gearing - Eaton Corp.

™EATON - fluid strainers - Eaton Corp.

™EATON - power transmission equipment - Eaton Corp.

™EATON BRAND - fasteners - Eaton Corp.

EATON CORP., Ind'l. Drives Div., Dept. EM, 9919 Clinton Rd., Cleveland, Ohio 44111; Empl.: 1640

Local Sales Offices & Reps.

Cal	Los Angeles	213-724-5000
Cal	San Leandro	415-635-5027
Colo	Denver	303-623-7011
Conn	Meriden	203-238-3301
Fla	Jacksonville	904-786-3254
Ga	Atlanta	404-448-6600
Ga	Norcross	404-449-9089
Ill	Elk Grove Village	312-439-6200
Iowa	Des Moines	515-278-4540
La	Metairie	504-888-9811
Md	Timonium	301-252-1777
Mass	Westboro	617-235-1624
Mich	Grand Rapids	616-245-8748
Mich	Southfield	313-354-2700
Minn	Minneapolis	612-835-5110
Mo	Maplewood	314-645-4732
NJ	Cherry Hill	215-563-1446
NJ	Fairfield	212-962-4240
NY	Buffalo	716-836-0850
NY	Syracuse	315-463-8202
NC	Charlotte	704-377-2505
Ohio	Cincinnati	513-874-4800
Ohio	Cleveland	216-523-5304
Okla	Tulsa	918-587-7917
Ore	Portland	503-222-1921
Pa	Pittsburgh	412-261-5360
RI	Barrington	617-366-9636
Tenn	Memphis	901-272-1374
Tex	Dallas	214-522-6191
Tex	Fort Worth	817-332-5351
Tex	Houston	713-224-5236
Tex	Odessa	915-332-2617
Wash	Seattle	206-243-9951
Wisc	Appleton	414-733-8535
Wisc	Milwaukee	414-462-3800

EATON CORP., Engineered Fasteners Div., Dept. EM, Box 6688, Cleveland, Ohio 44101, Tel: 216-523-5363, TWX: 810-421-8678; Empl.: 1000

Sales Manager: V.E. Allen

Local Sales Offices & Reps.

Cal	Santa Ana	714-542-7295
Ga	Chamblee	404-457-3106
Ill	Oak Park	312-589-0300
Mich	Southfield	313-354-2810
Minn	Richfield	612-866-3696
NJ	Kenilworth	201-272-8780
Ohio	Cincinnati	513-771-9303
Va	Roanoke	703-389-5454

Local Distributors

Cal	Cerritos, Acacia American Co.	213-926-5543
Cal	Monterey Park, Bolt Prods.	213-268-6753
Fla	Miami, Florida Ind'l. Fasteners	305-633-7446
Ga	Norcross, Atlanta Fasteners	404-448-6375
Ill	Chicago, Anchor Bolt & Screw Co.	312-252-2200
Ind	Indianapolis, Service Supply Co.	317-638-2411
Md	Baltimore, The L. A. Benson Co.	301-342-9225
Mass	Waltham, Electronic Fasteners	617-890-7780
Mich	Farmington, Bamal Corp.	313-477-8100
Minn	St. Paul, Arden Indl. Prods.	612-483-6681
Mo	Maryland Heights, Anchor Bolt & Screw Co.	314-567-1785
NY	New York, Industrial Fasteners Corp.	212-244-0991
NY	Rochester, Fastener House	716-381-9503
NC	Greensboro, L. A. Benson Co.	919-294-4560
Ohio	Cleveland, Fastener House	216-861-8250
Tex	Dallas, Advance Comp.	214-243-4383

™EB-CON - edge board connector - Eby Company

EBY COMPANY, Dept. EM, 4701 Germantown, Philadelphia, Pa. 19144, Tel: 215-842-3000, TWX: 710-670-0452; FSC No.: 72825; Empl.: 150
p. 1834,1835

Local Sales Offices & Reps.

Cal	Mt. View, W-M Assocs.	415-965-4228
Cal	Norwalk, Zoolialian Inc.	213-921-9791
Fla	Orlando, G. F. Bohman Assoc.	305-855-0274
Ind	Fort Wayne, Given Corp.	219-432-5585
Mass	Brookline, Jasmar Assocs.	617-277-4920
Minn	Edina, Grayden & Flemmer	612-941-1120
NY	New York, Eltron Export Corp.	212-966-4710
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Ore	Portland, R. M. Minthorne Co.	503-246-4556
Tex	Dallas, Stevens Sls. Co.	214-350-2476

Local Distributors

Cal	Los Angeles, Dyna Service Co.	213-268-8531
Ill	Des Plaines, Edmar Elctrns.	312-298-8580
NY	Buffalo, Summit Dists.	716-884-3450
NY	Jamaica, Eby Sls. Co.	212-291-3232

ECC CORP., see Teccor Electronics, Inc.

™ECCENTRIX - adjustable shear/alignment pin - Tridair Inds.

™ECCO - epoxies, urethanes, etc. - Emerson & Cuming, Inc.

ECD CORP., Dept. EM, 196 Broadway, Cambridge, MA 02139, Tel: 617-661-4400, TWX: 710-320-6965; Empl.: 54

Sales Manager: E.W. Costello

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assoc.	205-533-5896
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Costa Mesa, Measurement Assoc.	714-540-7160
Cal	Sunnyvale, Amasco	408-733-8690
Colo	Denver, Barnhill Three	303-750-1222
Fla	Winter Haven, Lee Assoc.	813-294-5815
Ga	Buford, Lee Assoc.	404-457-7117
Ill	Elk Grove Vill, L. Green Assoc.	312-593-0282
Ind	Indianapolis, L. Green Assoc.	317-295-9827
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Burlington, Tekdata	617-273-0198
Minn	Minneapolis, L. Green Assoc.	612-781-1611
NJ	Camden, QED Elctrns.	201-925-8711
NM	Albuquerque, Barnhill Three	505-299-7658
NY	Dewitt, D.B. Assocs.	315-446-0220
NY	Great Neck, Measurement Technology Inc.	516-482-3506
NC	Raleigh, Lee Assoc.	919-787-5818
Ohio	Centerville, Micro Sls. Corp.	513-433-8171
Tex	Houston, Barnhill Two	713-688-9971
Tex	Richardson, Barnhill Two	214-231-2573
Exp:	Mass., Medway, Surel Int'l.	617-533-2041

™E-CELL DEVICES - microcoulometers for timing & integrating - Plessey Electro-Products

™ECG - replacement semiconductors - GTE Sylvania Inc.

™ECHO - Intercoms - Fanon/Courier Corp., Subs.

™ECHO GEL II - encaps. compound - Communications Technology Corp.

™ECHORDER - tape recorder - RIL Elctms., Inc.

™ECHORDETTE - tape recorder - RIL Elctrns., Inc.

ECHO SCIENCE CORP., Dept. EM, 485 E. Middlefield Rd., Mountain View, Cal. 94040, Tel: 415-961-7145, TWX: 910-379-6499; Empl.: 180

Local Sales Offices & Reps.

Cal	San Diego, Tauber & Assoc.	714-274-7242
Md	Laytonsville, G-T Assocs.	301-949-8060
NY	Huntington, Data Logic Sls.	516-421-1644
Tex	Lewisville, R.R. Owen	214-434-2145

™ECLIPSE® S100,S200,C300 - computers - Data General Corp.

ECM MOTOR CO., Dept. EM, 1301 E. Tower Rd., Schaumburg, Ill. 60196, Tel: 312-885-4000, Telex: 72-2476; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Ark	Little Rock, Ind'l. Sls. Co.	501-562-5852
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Colo	Denver, Roep & Williamson	303-758-8507
Conn	New Preston, NBS	203-868-0501
Fla	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
Fla	Melbourne, R. I. Smith Assocs.	305-727-3163
Ill	Chicago, M. Gottlieb Assoc.	312-775-1151
Ill	Schaumburg, Charles Kaufman Assoc.	312-885-4000
Ind	Indianapolis, M. Gottlieb Assoc.	317-846-5788
Ky	Nicholasville, W.H. Mathews	606-885-5047
La	New Orleans, Warriner Controls	504-861-4571
Me	Sanford, NBS	207-324-6265
Md	Baltimore, W. S. Warrington & Assoc.	301-823-8759
Mich	Detroit, Nicon Assoc.	313-341-7688
Minn	Minneapolis, Electric Comp. Sls.	612-933-2594
Mo	Kansas City, L.T. Silver	816-531-1144
Mo	St. Louis, Wells-White Co.	314-726-2511
NH	Amherst, NBS	603-673-5800
NJ	Fort Lee, Sydney-Justin Assocs.	201-947-4371
NY	Endicott, Tech-Mark	607-748-7473
NY	Fairport, Tech-Mark	716-223-1252
NY	Liverpool, Tech-Mark	315-652-6229
NC	Raleigh, Remco	919-828-3009
Ohio	Cincinnati, J. O. Olsen Co.	513-922-2176
Ohio	Cleveland, J. O. Olsen Co.	216-752-5444
Okla	Tulsa, T.J. Ray Co.	918-627-1515
Pa	Media, W. Reeves & Assoc.	215-566-6709
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550
Tex	Houston, Barry Sls. Co.	713-784-5860
Tex	Richardson, Barry Sls. Co.	214-234-0255
Wash	Redmond, Desco Northwest	206-455-9325
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

™ECO FUSE - econ limiter fuse - Economy Fuse Div.

™ECOLINE - mobile air filtration unit - Hollis Engrg., Inc.

™E COM - core Memory System - Standard Memories,

™ECONALIGN; POW-R-FLEX; SIMUL-TORQUE - couplings, shaft, rigid & flexible - Metal Bellows Co.

™ECON FUSE - clearsite plug fuse - Economy Fuse Div.

™ECONISTOR - inexpensive resistors - General Resistance, Inc.

™ECONOCAP - capacitance diodes - Motorola Semiconductor Prods.

™ECON-O-CLAD - laminates metal clad - Engelhard Minerals & Chem.

™ECONOFIRE - pastes-thick film microcircuits - Electro Mats. Corp. Amer.

™ECONOFLUX - liquid inorganic acid flux - Alpha Metals, Inc.

™ECONOGIDE - p.c. card guides; guides circuit board - Bivar, Inc.

™ECONO-HEAT - furnaces - Aremco Prods., Inc.

™ECONO-KING - portable oven - Hotpack Corp.

™ECONO-LAP - thick film lapped substrates - Accumet Engineering Corp.

™ECONO-LINE - rotary switches - Oak Inds. Inc.

(TM)ECONOLINE - plastic low-signal transistors - Sprague Elec. Co.

(TM)ECONOLITE - miniature panel lights - Chicago Switch, Inc.

(TM)ECONO-MASTER - furnaces - L & L Special Furnace Co.

(TM)ECONOMITE - miniature slide switches - Chicago Switch, Inc.

ECONOMY FUSE DIV., Federal Pacific Elec. Co., Dept. EM, 2070 Maple St., Des Plaines, Ill. 60016, Tel: 312-299-2211, Telex: 726-453; FSC No.: 72076; Empl.: 200

Refer to Federal Pacific Electric Co. for sales office information.

(TM)ECONOPAK - wavesolder equip. - Electrovert

(TM)ECONO-POLISH - substrates .025" with a 1.5m" one side - Accumet Engineering Corp.

(TM)ECONOPOT - Off-the-shelf Precision Potentiometer - New England Instr.

(TM)ECONO-SKAN - reflective skanner - Skan-A-Matic Corp.

(TM)ECON-O-TAPE - laminates metal clad - Engelhard Minerals & Chem.

(TM)ECONOVAP - vacuum deposition unit - T-M Vacuum Prods.

ECP CORP., Dept. EM, 4726 Superior Ave., Cleveland, Ohio 44103, Tel: 216-391-0444; Empl.: 12

Local Sales Offices & Reps.

Ill	Chicago, Markson Assoc.	312-677-3464
Mich	Detroit, Roth Industrial Sls.	313-626-3171
Pa	Philadelphia, Jacobson, Rodger, Assoc.	215-884-5524

(TM)ECS - fiberglass containers - Environmental Container Sys., Inc.

ECTRON CORP., Dept. EM, 8159 Engineer Rd., San Diego, Cal. 92111, Tel: 714-278-0600, TWX: 910-335-1259; Empl.: 40 .... p. 2834

Local Sales Offices & Reps.

Cal	Costa Mesa, FLW Inc.	714-751-7512
Cal	Palo Alto, Coherent Mktg.	415-327-2217
Cal	San Diego, FLW Inc.	714-277-0993
Colo	Littleton, Aztec Enter.	303-795-0250
Conn	E. Hartford, Tekdata	203-525-7647
Fla	Orlando, RJC Assocs.	305-894-7371
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Kansas City, Carter Elctrns.	913-649-6996
Md	Kensington, Electronic Mktg. Assoc.	301-744-7700
Mass	Burlington, Tekdata	617-273-0198
Mich	Royal Oak, Satullo	313-549-3910
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NM	Albuquerque, Aztec Entprs.	505-255-2440
NY	East Syracuse, Ossmann Instrs.	315-437-6666
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
NC	Winston-Salem, Radco Co.	919-722-9671
Ohio	Cleveland, Instrumentation Sys. Inc.	216-486-0782
Ohio	Dayton, Instrumentation Sys. Inc.	513-294-2838
Pa	King of Prussia, Electronic Mktg. Assoc.	215-248-5050
Pa	Pittsburgh, Instrumentation Sys.	412-243-1111
Tex	Houston, Sesco, Inc.	713-688-9656
Tex	Richardson, Sesco, Inc.	214-231-9364
Wash	Seattle, R.S. Drake Assocs.	206-763-2755
Wash	Walla Walla, Rush Drake	509-529-2051
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

(TM)EC-44 - all electrical contacts cleaner lubricant - Elctrn. Chemical Corp.

EDAL INDS., INC., Dept. EM, 4 Short Beach Rd., E. Haven, Conn. 06512, Tel: 203-467-2591; Empl.: 200

Local Sales Offices & Reps.

Cal	Orange, A.T. Assocs.	714-633-7414
Cal	San Jose, Mission Mktg.	408-732-9611
Fla	Terra Ceia, Component Sls.	813-894-4366
Ill	Chicago, Brock & Cushman	312-622-4110
Mass	Lexington, Hathaway Elctrns.	617-861-7010
Minn	Minneapolis, Furber Sls.	612-881-3620
Mo	Blue Springs, Chesco	816-229-1404
Mo	St. Charles, Chesco	314-946-6677
NJ	Nutley, I. Brill	201-667-0653
NY	Brooklyn, Eastern Eletrn. Sls.	212-763-5180
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Rochester, H.C. Johnson Agencies	716-482-3000
Ohio	Cleveland, Brauer	216-943-0601
Ohio	Vandalia, Brauer & Assoc.	513-898-1224
Pa	Glenshaw, H.C. Johnson	412-961-0414
Pa	Radnor, Cordray Sls.	215-687-1366
Va	Reston, Boyle Assoc.	703-620-9558
Wisc	West Allis, Brock & Cushman	414-778-2030

(TM)EDDYSTONE - communications receivers - Marconi Instrs.

(TM)EDGECON - edge connectors - Molex Inc.

(TM)EDGEGARD HOOD - dust-free work bench - Baker Co., Inc.

(TM)EDGE-ON - pc connector - Burndy Corporation

(TM)EDGE-PAC - PC connectors; backpanel system; press-fit - Elfab Corp.

(TM)EDGE-TITE - card edge pc connector - Burndy Corporation

(TM)EDGE-TO-DOME - contact - T-Bar Inc.

E.D.I. INC., Dept. EM, Box 66, Cairo, Ill. 62914, Tel: 618-734-1694; Empl.: 3

EDISON ELECTRONICS DIV., See McGraw-Edison Co.

EDMAC ASSOCIATES INC., Dept. EM, 333 W. Commercial St., East Rochester, N.Y. 14445, Tel: 716-385-1440, TWX: 510-254-2896; Empl.: 90

EDMUND SCIENTIFIC CO., Dept. EM, 555 Edscorp Bldg., Barrington, N.J. 08007, Tel: 609-547-3488, Telex: 83-1564; Empl.: 175

EDO WESTERN CORP., Dept. EM, 2645 S. 300 West, Salt Lake City, Utah 84115, Tel: 801-486-7481, Telex: 388-315; Empl.: 225

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instr.	205-837-4304
Ariz	Scottsdale, J. Smith & Assocs.	602-947-2495
Cal	Laguna Beach, J. M. Elgar	714-996-4545
Colo	Boulder, J. Smith & Assocs.	303-442-7100
Md	Rockville, E. J. Winston	301-881-5780
Md	Silver Spring, L. G. White & Co.	301-685-1780
Mass	Wakefield, IMF Sls. Assocs.	617-245-8900
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	College Point, Edo Int'l.	212-445-6000
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431
Wash	Seattle, Coccolith & Co.	206-525-8952

EDSYN, INC., Dept. EM, 15958 Arminta St., Van Nuys, Cal. 91406, Tel: 213-873-5115, Telex: 65-1469; Empl.: 25 .... p. 4328,4329

Local Distributors

Ariz	Phoenix, Jensen Tools & Alloys	
Cal	El Monte, Marshall Inds.	
Cal	El Segundo, Wassco	
Cal	San Jose, J. Elctrn. Tool Co.	
Cal	Santa Clara, Com Kyl	
Conn	New London, Jabbour Elctrn.	203-442-4386
DC	Wash., Collins Brothers Elctrn.	301-420-4400
Fla	Orlando, Marshall Inds.	305-859-1620
Ga	Macon, Specialty Distributing Co.	912-743-5421
Ill	Chicago, EMF Co.	
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Leominster, Fitchburg Hardware Co.	617-343-4806
Mich	Detroit, R S Elctrns. Inc.	313-491-1000
Minn	St. Paul, Ragon Elctrns.	612-488-0201
NJ	Saddlebrook, Tool-Tronics	
NY	Mt. Vernon, Electonic Tool Co.	914-664-0088
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Dayton, Claude Michael	513-898-1105
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4415
Ore	Portland, Murphy Ind'l Supply	503-226-6081
Pa	Huntingdon Valley, H. Mann Inc.	
Pa	Plymouth Meeting, Techni-Tool	215-825-4990
Tenn	Memphis, Bluff City Distributing Co.	901-725-9500
Tex	Dallas, Specialized Prods. Co.	214-358-4663
Utah	Salt Lake City, Kimball Elctrns.	801-328-2075
Va	Norfolk, Aveck Elctrns. Corp.	703-627-3502
Wash	Seattle, Seattle Tool Supply	

(TM)EDU - digital clock - Efratom California, Inc.

EDWARDS HIGH VACUUM, Dept. EM, 3279 Grand Isl. Blvd., Grand Island, N.Y. 14072, Tel: 716-773-7552, Telex: 91-536; Empl.: 40

Local Sales Offices & Reps.

Cal	El Segundo, Edwards High Vacuum, Inc.	213-322-7699
Fla	Orlando, Physimetrics, Inc.	305-894-8081
Ga	Atlanta, Physimetrics, Inc.	404-261-8720
Ill	Carol Stream, Edwards High Vacuum	312-682-0877
Mass	So. Weymouth, Edwards High Vacuum, Inc.	617-337-8931
Mich	Dearborn, Anger Assocs.	313-336-3320
NJ	Sussex, Edwards High Vacuum, Inc.	201-835-3925
NM	Albuquerque, Southwestern Engrg. & Equip. Co.	505-265-6775
Tex	Dallas, Southwestern Engrg. & Equip. Co.	214-827-2621
Tex	Missouri City, Southwestern Engrg. & Equip. Co.	713-437-1171

EECO, Dept. EM, 1441 E. Chestnut Ave, Box 659, Santa Ana, Cal. 92701, Tel: 714-835-6000, TWX: 67-8420 910-595-1550; Empl.: 530

Sales Manager: J. Fahy

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	800-327-6600
Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	San Diego, Mesa Engr. & Sls. Assoc.	714-278-8021
Colo	Denver, Thorson Co.	303-759-0809
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Largo, Col-Ins-Co	800-432-4480
Fla	Orlando, Col-Ins-Co	305-423-7615
Ga	Clarkston, Col-Ins-Co	800-327-6600
Ill	Elk Grove Village, Oasis Sls.	312-640-1850
Ind	Carmel, REM	317-844-8462
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls., Inc.	316-788-0621
Kans	Lenexa, Palatine Sls. Inc.	913-492-7020
Md	Rockville, EMA (Elctrn. Mktg. Assts.)	301-881-5300
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	Bloomington, Elctrn. Sls. Agecy.	612-884-8291
Mo	St. Louis, Palatine Sls., Inc.	314-426-7055
NH	Dover, R. Perron Co., Inc.	603-742-2321
NJ	Ft. Lee, Tecnimat	201-461-8686
NM	Albuguerque, Hawk Entprs.	505-294-3666
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	Rochester, EECO	716-325-2160
NC	Winston-Salem, Col-Ins-Co	800-327-6600
Ohio	Aurora, EMA, Inc.	216-562-6104
Ohio	Centerville, EMA, Inc. (Engr. Mktg. Assts.)	513-433-2800
Pa	King of Prussia, EMA (Elctrn. Mktg. Assts.)	215-265-1600
Tex	Houston, Semiconductor Sls. Assoc.	713-661-0681
Tex	- Richardson, Semiconductor Sls. Assoc.	214-231-6181
Wash	Seattle, B. Hirsh Co.	206-783-3423

Local Distributors

Ala	Huntsville, Hall-Mark Elect. Corp.	205-837-8700
Ariz	Tempe, G.S. Marshall Co.	602-968-6181
Cal	Costa Mesa, Schweber Elctrns.	714-556-3880
Cal	El Monte, G.S. Marshall Co.	213-686-0141
Cal	Irvine, G.S. Marshall Co.	714-556-6400
Cal	San Diego, G.S. Marshall Co.	714-278-6350
Cal	Sunnyvale, G.S. Marshall Co.	408-732-1100
Colo	Arvada, G.S. Marshall Co.	303-423-9670
Conn	Danbury, Schweber Elctrns.	203-792-5000
Conn	N. Branford, G.S. Marshall Co.	203-484-0488
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Orlando, Hall-Mark Elctrns.	305-885-4020
Fla	Palm Beach Gardens, G.S. Marshall Co.	305-622-8490
Ga	Atlanta, Schweber Elctrns.	404-449-9170
Ill	Des Plaines, G.S. Marshall	312-298-3700
Ill	Elk Grove Village, Schweber Electronics	312-593-2740
Ill	Elk Grove Village, Hall-Mark Elctrns.	312-437-8800

Iowa	Cedar Rapids, Schweber Elctrns.	319-393-9125
Kans	Lenexa, Hall-Mark Elect. Corp.	913-888-4747
Md	Baltimore, Hall-Mark Elect. Corp.	301-265-8500
Md	Rockville, Schweber Elctrns.	301-881-2970
Mass	Newton Highland, G.S. Marshall	617-965-5115
Mass	Waltham, Schweber Elctrns.	617-890-8484
Mich	Troy, Schweber Elctrns.	313-583-9242
Minn	Bloomington, Hall-Mark Elect. Corp.	612-884-9056
Minn	Edina, Schweber Elctrns.	612-941-5280
Mo	Earth City, Hall-Mark Elect. Corp.	314-291-5350
NJ	Somerset, Schweber Elctrns.	201-469-6008
NY	Farmingdale, Hall-Mark Elctrns.	516-293-7500
NY	Farmingdale, G.S. Marshall Co.	516-293-4141
NY	Rochester, Schweber Elctrns.	716-461-4000
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
NC	Raleigh, Schweber Elctrns.	919-832-8881
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Dayton, G.S. Marshall Co.	513-898-1105
Okla	Tulsa, Hall-Mark Elect. Corp.	918-835-8458
Pa	Trevose, Hall-Mark Elect. Corp.	215-355-7300
Tex	Austin, Schweber Elctrns.	512-837-2890
Tex	Dallas, Hall-Mark Elctrns.	214-231-5101
Tex	Dallas, G.S. Marshall Co.	214-233-5200
Tex	Dallas, Schweber Elctrns.	214-661-5010
Tex	Houston, Schweber Elctrns.	713-784-3600
Tex	Houston, Hall-Mark Elctrns.	713-781-6100
Wash	Bellevue, G.S. Marshall Co.	206-883-1084
Wisc	Milwaukee, Hall-Mark Elect. Corp.	414-476-1270

EEMCO DIV., Datron Sys., Dept. EM, 4585 Electronics Pl., Los Angeles, Cal. 90039, Tel: 213-247-7060, TWX: 910-497-2269; Empl.: 200

Local Sales Offices & Reps.

Fla	Hialeah, Shaw Engrg. & Sls.	305-888-0835
Ga	Clarkston, Power Comps.	
Ill	Chicago, J Golten Co.	312-725-7870
Minn	St. Paul, Vikeland Sls.	612-645-4647
NC	Charlotte, Power Comps.	704-537-8099
Wash	Kirkland, R. Chase	206-454-2514

EEP CORP., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045, Tel: 213-670-7880, TWX: 910-328-6161; Empl.: 16

(TM)**EEV** - Industrial Tubes - Calvert Elctrns., Inc.

(TM)**EFCOR** - electrical fittings. - Gould Inc.

(TM)**E-FORM** - epoxy molding compounds - Acme Chemical & Insulation Co.

(TM)**EFR** - receiver/controller lf/ vlf - Efratom California, Inc.

EFRATOM CALIFORNIA, INC., Dept. EM, 3303 Harbor Blvd., Costa Mesa, Cal. 92626, Tel: 714-556-1620, Telex: 68-5635; Empl.: 28

Local Sales Offices & Reps.

Mass	Reading, Geder-Rotondi	617-944-3105

(TM)**E-GAS** - specially prepared sulfur hexafluoride for etching silicon - Matheson Gas Products

EG&G

EG&G, INC., Electro-Optics Div., Dept. EM, 35 Congress St., Salem, Mass. 01790, Tel: 617-745-3200, TWX: 710-347-6741; FSC No.: 25506; Empl.: 400

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Local Sales Offices & Reps.

Cal	Los Angeles, EG&G, Inc.	213-484-8780
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Salem, E G & G Inc., Electro-Optics Div.	617-745-3200
NJ	Marlboro, Cook & Weil	201-536-3964
NY	Rochester, R. F. Lamb Co.	716-544-5580
Tex	Richardson, Optics & Elctrns. Co.	214-690-9799
Exp:	Can., Waterloo, Ont. N2J-4C3, Optikon Corp., Ltd.	519-743-8571

(TM)**E-GUN** - evaporation source - Varian Assocs.

E.I. DUPONT DE NEMOURS & CO., Dept. EM, 1007 Market St., Wilmington, Del. 19898, Tel: 302-774-2421; Empl.: 110000

Local Sales Offices & Reps.

Cal	Los Angeles	213-843-1038
Del	Wilmington	302-774-2421
DC	Washington	202-DU7-0416
Ill	Chicago	312-982-4050
Md	Baltimore	301-PL2-2506
NY	New York	212-971-4771
Pa	Philadelphia, 215-WA3-2493	
Tex	Houston	713-467-4449

EICO ELECTRONIC INSTR. CO., Dept. EM, 283 Malta St., Brooklyn, NY 11207

EIMAC, DIV. VARIAN ASSOCS., See Varian, Eimac Div.

EIP, INCORPORATED, Dept. EM, 3230 Scott Blvd., Santa Clara, Cal. 95051, Tel: 408-244-7975, TWX: 910-338-0155; Empl.: 70

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	La Jolla, Ward/Davis Assocs.	714-459-3351
Cal	Lawndale, Ward/Davis Assocs.	213-542-7740
Cal	Sunnyvale, Ward/Davis Assocs.	408-245-3700
Colo	Denver, Zeus, Inc.	303-770-4400
Conn	New Canaan, Meas. Consits. Corp.	203-966-4630
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Carter Ejctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Waltham, Meas. Consits. Corp.	617-890-4400
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Fort Lee, Tech. Mktg. Assocs.	201-224-6911
NM	Albuquerque, Zeus, Inc.	505-268-3941
NY	East Syracuse, Ossmann Instrs., Inc.	315-437-6666
NY	Rochester, Ossmann Instrs., Inc.	716-328-2230
NY	Vestal, Ossmann Instrs., Inc.	607-785-9947
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, Comtel Insts.	216-442-8080
Ohio	Dayton, Comtel Insts.	513-298-7573
Okla	Norman, Data Mktg. Assocs., Inc.	405-364-8320
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Tex	Dallas, Data Mktg. Assocs., Inc.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Utah	Salt Lake City, Zeus, Inc.	801-534-0500
Va	McLean, Creative Mktg.	703-893-6612
Wash	Seattle, Arva-Hudson	206-455-0773
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

(TM)**E-KOTE** - conductive coatings - Acme Chemical & Insulation Co.

(TM)**EL** - thyratrons & gas filled rectifiers - Electrons Co.

EL-RAD MFG. CO., Dept. EM, 4300 N. California, Chicago, Ill 60618, Tel: 312-478-7300, TWX: 910-221-0104; FSC No.: 11253; Empl.: 300

Local Sales Offices & Reps.

Cal	Encino, Kingway Assoc.	213-788-4124
Fla	Melbourne, Hanson Assocs.	305-727-7474
Ill	Palatine, Butor Sls. Co.	312-358-2988
Md	Glen Burnie, Faion Lott & Co.	301-744-4611
Minn	Minneapolis, Elctrn. Innovators Inc.	612-884-7471
NY	Rochester, Elcom Sls.	716-385-1400

ELASCO, Div. Buchbinder Corp., Dept. EM, 5 Northwood Rd., Bloomfield, Conn 06002, Tel: 203-242-0708; Empl.: 50

Local Sales Offices & Reps.

Cal	Santa Clara, Cummings & Assoc.	408-247-8656
Cal	Woodland Hills, Cummings & Assoc.	213-340-6035
Colo	Denver, Cummings & Assoc.	303-455-6860
Conn	Bloomfield	203-242-0708
Mich	Plymouth, Romarc	313-455-0300
NJ	Fort Lee, Tecnimat	201-461-8686

Local Distributors

Mass	Dedham, Gerber Elctrns.	617-329-2400

(TM)**ELASTIC STOP NUTS** - self-locking nuts - Esna Div.

(TM)**ELASTIPAR** - insulation compound - Times Wire & Cable

(TM)**ELASTIPAR** - insulation compound - Times Wire & Cable

(TM)**ELASTO-FLEX II** - shock absorbing skids - Craig Sys. Corp.

ELCO, Dept. EM, 2250 Park Pl., El Segundo, Cal. 90245, Tel: 213-675-3311

ELCO CORP., Dept. EM, 2250 Park Pl., El Segundo, CAL 90245, Tel: 213-675-3311, TWX: 910-325-6602; Empl.: 825; Minimum order: $J.E. Fontana

Sales Manager: J.J. Smith; *Distributor Manager:* J.E. Fontana

Local Sales Offices & Reps.

Ala	Huntsville, EMA	205-533-6640
Ariz	Phoenix, Stitzer-Dodd, Inc.	602-944-2237
Cal	Anaheim, LoCal Sls.	714-956-1560
Cal	El Segundo, Elco Pacific	213-675-3311
Cal	Oakland, Moulthrop Sls.	415-261-7676
Cal	San Diego, LoCal Sls	714-298-8630
Colo	Denver, Parker, Webster Co.	303-751-2600
Fla	Ft. Lauderdale, R. I. Smith Assocs.	305-772-5100
Ill	Chicago, Carlson Elctrn. Sls. Co.	312-956-8240
Ind	Ft. Wayne, Baehr, Greenleaf & Assocs.	219-447-1608
Md	Rockville, Marktron Inc.	301-762-6210
Md	Timonium, Marktron Inc.	301-252-7111
Mass	Wilburn, Belmac Corp.	617-935-6810
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	St. Paul, Cahill	612-646-7217
Mo	Crestwood, Nevco Inc.	314-843-7406
Mo	Kansas City, Nevco Inc.	816-421-1751
NY	Buffalo, Canavan-Scanlon Assocs.	716-839-3373
NY	Jericho, Electro Rep	516-938-0540
NY	Rochester, Canavan-Scanlon Assocs.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assocs.	315-437-1271
NC	Winston-Salem, EMA	919-722-5151
Ohio	Cincinnati, Baehr-Greenleaf	513-891-3826
Ohio	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
Ohio	Lakewood, Baehr-Greenleaf	216-221-9030
Okla	Tulsa, H.J. Daly	918-627-4159
Ore	Portland, Vantage Corp.	503-646-3466
Pa	Huntingdon Valley, Inacker Sls	215-947-5660
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Pa	Willow Grove, Elco Corp.	215-659-7000
SC	Greenville, EMA	803-268-1125
Tex	Houston, Aid Elctrns.	713-777-3882
Tex	Irving, Aid Elctrns.	214-259-4761
Utah	Salt Lake City, Parker Webster Co.	801-261-1058
Va	Charlottesville, Marktron Inc.	804-973-5874
Wash	Seattle, Vantage Corp.	206-455-3460
Wisc	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

ELCOM INDUSTRIES, INC., Dept. EM, 10268 Bach Blvd., St. Louis, Mo. 63132, Tel: 314-429-3100; Empl.: 25

Local Sales Offices & Reps.

Cal	Cupertino, Eakins Assocs.	408-255-6494

ELCOM SYSTEMS, INC., Dept. EM, 127F Brook Ave., Deer Pk., N.Y. 11729, Tel: 516-667-5800; Empl.: 6

Sales Manager: D. Pollachek

ELCOR PRODS. NEOTEC ELCTRNS. INC., Dept. EM, 2431 Linden La., Silver Spring, Md. 20910, Tel: 301-589-5211

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrn. Ent.	602-946-9860
Cal	San Mateo, J.E. Lape Co.	415-345-3021
Ill	Addison, R.E. Stemm, Inc.	312-279-2440
Mass	Lexington, Zieco, Inc.	617-861-8300
NJ	Hillsdale, B. Cameron Assoc.	201-461-2595
NM	Albuquerque, Elctrn. Enterprises	505-256-3561
NM	Las Cruces, Elctrn. Enterprises	505-524-0126
NY	Guilderland, Electro Modular Sys.	518-456-2665
Pa	Chester Springs, Letronix	215-458-8977
Exp:	N.Y., N.Y., Henley & Co.	212-986-5544

ELDEC CORP., Dept. EM, Box 100, 16700 13th Ave. W., Lynnwood, Wash. 98036, Tel: 206-743-1313, TWX: 910-449-2855; Empl.: 600

Local Sales Offices & Reps.

Ala	Huntsville, Astro-Tec.	205-881-1861
Cal	Northridge, Tauber & Assocs.	213-368-4011
Cal	Torrance, ELDEC	213-532-8732
Conn	Madison, A & M Elctrn. Reps.	203-245-1031
Ga	Atlanta, Astro-Tec	404-237-0943
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Kans	Wichita, D & O Engrg. Co.	316-264-7358
La	New Orleans, Astro-Tec	504-581-2099
Mass	Needham, A & M Elctrn. Reps.	617-444-8170
Mass	Stoneham, Robertson Elctrn. Prods. Co.	617-438-3113
Mich	Royal Oak, Group Ten	313-549-3910
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	Bridgeton, D & O Engrg. Co.	314-731-3800
NJ	Dover, R.L. Diamond Inc.	
NY	Bayside, R.L. Diamond, Inc.	212-423-7330
NY	Binghamton, Labtronics, Inc.	607-748-0509
NY	Depew, Labtronics, Inc.	716-685-4111
NY	Syracuse, Labtronics, Inc.	315-454-9314
NY	Ulster Park, Labtronics, Inc.	518-372-6649
Ohio	Cleveland, Group Ten	216-486-2800
Ohio	Dayton, Group Ten	513-277-6531
Tex	Arlington, D & O Engrg. Co., Inc.	817-261-2300
Tex	Bedford, Astro Tec	817-267-1361
Va	Arlington, Astro Tec	703-979-2498
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

ELDEN MFG. CO., Dept. EM, 2712 N. Elston Ave., Chicago, Ill. 60647; Empl.: 12

ELDORADO INSTRUMENT CO., Dept. EM, 2151 Arnold Industrial Hwy., Concord, Cal. 94520, Tel: 415-686-4200; Empl.: 20

Local Sales Offices & Reps.

Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, Snitzer	714-454-2191
Cal	Los Angeles, Snitzer	213-836-6170
Colo	Littleton, Aztec Entprs.	303-795-0250
Fla	Orlando, E. Holmes	305-894-8901
Ga	Chamblee, E. Holmes	404-451-6161
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indpls., Carter Elctrns.	317-293-0696
Kans	Leawood, Leemark Engrs.	913-648-0124
Md	Lanham, Brimberg Assocs., Inc.	301-552-2200
Mass	Burlington, J & J Assocs.	617-272-2606
Mich	Farmington, Anderson Elctrns.	313-476-9161
Minn	Mpls., Carter Elctrns.	612-544-9393
Mo	Hazelwood, Carter Elctrns.	314-731-2237
NJ	Fairfield, KLS Assocs.	201-227-2900
NM	Albuquerque, Aztec Entprs.	505-255-2440
NY	N. Syracuse, NACO Elctrns.	315-699-2651
NY	NY, KLS Assocs.	212-233-4849
Pa	Ambler, W M Assocs.	215-643-4119
Tex	Austin, Crockett Southwest Co.	512-476-6801
Tex	Dallas, Crockett Southwest Co.	214-637-6120
Va	Virginia Bch., E.G. Holmes	703-340-6556
Wash	Bellevue, Brennan	206-454-9332
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

ELEC-TROL, INC., Dept. EM, 26477 N. Golden Valley Rd., Saugus, Cal. 91350, Tel: 805-252-8330, TWX: 910-336-1556; FSC No.: 51636; Empl.: 350 p. 3478-3481

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assocs.	205-881-5031
Ariz	Phoenix, Southwest Engrg, Inc.	602-993-0250
Cal	Mt. View, Gene C. Woempner Co.	415-964-5454
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Colo	Denver, Elcom, Inc.	303-770-4400
Conn	Orange, NPM Assocs.	203-878-4066
Fla	Ft. Lauderdale, Beacon Elctrn. Assocs.	305-971-7320
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assocs.	404-351-3654
Ill	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
Mass	Franklin, NPM Assocs.	617-528-5013
Mich	Detroit, Nicon Assocs.	313-341-7688
Minn	Minneapolis, R-J, Inc.	612-922-1425
Mo	Blue Springs, Chesco	816-229-1404
Mo	St. Charles, Chesco	314-946-6677
NY	Clark Mills, KLM Assocs.	315-853-6126
NY	Mt. Vernon, Sonkin Assocs.	914-668-9809
NY	North Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
NC	Charlotte, Beacon Elctrn. Assocs.	704-525-7412
Ohio	Cincinnati, G & H Sls. Co.	513-771-8231
Ohio	Grove City, G & H Sls. Co.	614-878-1128
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Birchrunville, Jadelectronic Associates, Inc.	215-647-5151
Tenn	Oak Ridge, Beacon Elctrn. Assocs.	615-482-2409
Tex	Houston, Aid Elctrns.	713-777-3882
Tex	Irving, Aid Elctrns.	214-259-4761
Utah	Salt Lake City, Elcom, Inc.	801-532-7940
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087

Local Distributors

Ala	Huntsville, C.D.I.	205-883-7501
Cal	Sunnyvale, Acacia Sls.	408-735-0100
Cal	Van Nuys, Patane Avionics	213-988-4455
Colo	Lakewood, Acacia Sls.	303-232-2882
Fla	Clearwater, Diplomat/Southland	813-443-4514
Fla	Margate, C.D.I.	305-971-4950
Ill	Elk Grove Village, Diplomat/Lakeland	312-595-1000
Mass	Holliston, Diplomat/New England	617-429-4121
Mich	Farmington, Diplomat/Northland	313-477-3200
Minn	Minneapolis, Diplomat/Electro-Com.	612-788-8601
Mo	St. Louis, Diplomat/St. Louis	314-645-8550
NJ	Iselin, Brothers Elctrns.	201-283-3000
Ohio	Solon, Repco	216-248-8900
Pa	Huntingdon Valley, Shap Elctrns.	215-698-9550
Tex	Dallas, Solid State Elctrns. Co. of Tex	214-352-2601
Tex	Houston, Harrison Equip. Co.	713-652-4750
Tex	Houston, Solid State Elctrns. Co. of Tex	713-785-5436
Utah	Salt Lake City, Diplomat/Alta-Land	801-486-7227

ELECTRA/MIDLAND CORP., See Mepco/Electra

ELECTRAC, INC., Dept. EM, 1614 Orangethrope Way, Anaheim, Calif. 92801, Tel: 714-879-6021; Empl.: 40

ELECTRIC FIELD MEASUREMENTS, Dept. EM, Box 326, W. Stockbridge, Mass. 01266, Tel: 413-637-1929

Sales Manager: L. Hegl

ELECTRIC INDICATOR CO., INC., Dept. EM, 272 Main Avenue, Norwalk, Conn. 06851, Tel: 203-847-5861, Telex: 96-5945; Empl.: 102

ELECTRIC MACHINERY MFG. CO., Dept. EM, 800 Central Ave., Minneapolis, Minn. 55413, Tel: 612-378-8000, Telex: 29-0165; Empl.: 1600

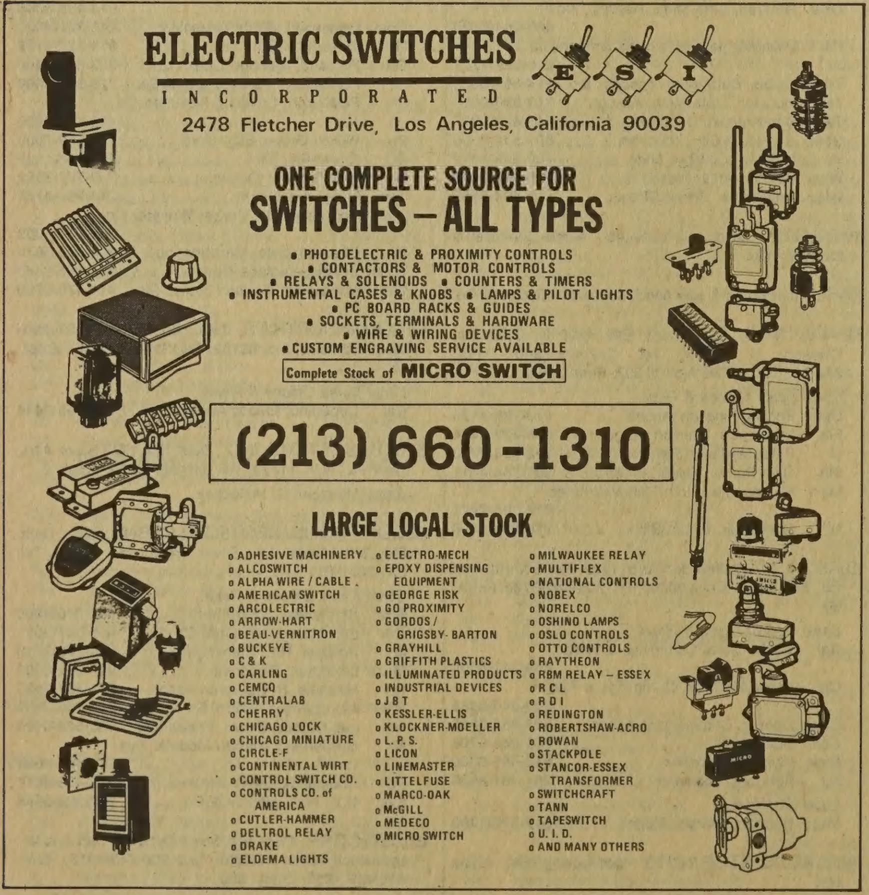
Local Sales Offices & Reps.

Ala	Birmingham	205-822-4474
Ariz	Phoenix	602-244-0331
Cal	Los Angeles	213-921-8411
Cal	San Francisco	415-392-8296
Colo	Denver	303-388-6322
Fla	Tampa	813-872-7859
Ga	Atlanta	404-458-7971
Ill	Barrington	312-381-8091
Ill	Oak Brook	312-325-9620
Ind	Indianapolis	317-546-4053
Kans	Prairie Village	913-362-8540
La	Gretna	504-362-1074
Mass	Waltham	617-890-3792
Mich	Grand Rapids	616-459-8156
Minn	St. Paul	612-483-5438
Mo	St. Louis	314-872-7300
Mont	Butte	406-792-5447
NM	Albuquerque	505-344-3288
NY	Buffalo	716-839-0851
NY	New York	212-697-0955
NC	Charlotte	704-332-6191
Ohio	Cincinnati	513-791-0480
Ohio	Cleveland	216-723-3772
Okla	Tulsa	918-743-9851
Ore	Portland	503-223-7349
Pa	Broomall	215-353-5040
Pa	Pittsburgh	412-563-7603
Pa	York	717-854-0217
Tenn	Memphis	901-767-3555
Tex	Dallas	214-748-6691
Tex	Houston	713-461-8168
Utah	Salt Lake City	801-487-5621
Va	Richmond	703-784-5293
Wash	Spokane	509-535-2931
Wisc	Milwaukee	414-351-4333

ELECTRIC TACHOMETER CORP., Dept. EM, 68th & Upland Sts., Philadelphia, Pa. 19142, Tel: 215-SA6-7723, Telex: 83-1475; FSC No.: 20049; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, VESCO	205-881-8830
Cal	Berkeley, P. Rosen Co.	415-526-8286
Cal	Reseda, T.R. Slocum, Jr.	213-789-3355
Fla	Cocoa Beach, VESCO	305-784-0784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- CHICAGO MINIATURE
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Ill	Hinsdale, Johnson Engrg. & Sls. Co.	312-325-2272
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Mass	Lexington, W.R. Hatfield Assoc.	617-861-0201
Mich	Lake Orion, Service Instr. Sls.	313-391-2266
Minn	St. Paul, Nelson Engineered Sls.	612-631-0646
Mo	St. Louis, C.O. Leaver Co.	314-968-1500
NJ	Fair Lawn, Bixon Assocs.	201-797-5356
NJ	Haddonfield, C.G. Thomson	609-429-5233
NY	Rochester, Holter Assocs.	716-381-7988
NY	Valley Stream, Idalee Elctrns. Corp.	516-825-8955
NC	Greensboro, Associated Agents	919-292-6508
Ohio	Cincinnati, Kammerer Sls. Co.	513-321-1916
Ohio	Cleveland, Fred R. Sharp Co.	216-464-3820
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ELECTRICAL COMPONENTS, Dept. EM, 123 Smith St., East Farmingdale, N.Y. 11735, Tel: 516-694-5400

ELECTRICAL INDS., Div. Philips Elctrns. Inc., Dept. EM, 691 Central Ave., Murray Hill, N.J. 07974, Tel: 201-464-3200, TWX: 701-984-7979; FSC No.: 20093

Sales Manager: D.V. Wilson

Local Sales Offices & Reps.

Ariz	Scottsdale, E.E. Black	602-947-2007
Cal	Culver City, E.V. Roberts & Assoc.	213-870-9561
Cal	Palo Alto, E.V. Roberts & Assoc.	415-324-1671
Conn	Madison, United Comps., Inc.	203-562-4002
Fla	Winter Park, P.J. Costa	305-644-4467
Ill	Chicago, J. Golten Co.	312-725-7870
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Ky	Louisville, R.O. Whitesell & Assoc.	502-895-2582
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	St. Paul, Murnco	612-484-8200
NJ	Madison, Livera-Polk Assocs., Inc.	201-377-3220
NY	Roslyn Heights, Livera-Polk Assocs., Inc.	516-484-1276
NY	Syracuse, C.W. Beach Co.	315-446-9587
NC	Charlotte, McLean Sls. Co.	704-366-2675
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277
Tenn	Bristol, R.O. Whitesell & Assoc.	615-639-6154
Tex	Richardson, R.F. Kimball Co.	214-231-3447

ELECTRICAL INSTR. SVC., INC., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550, Tel: 914-699-9717; FSC No.: 32590; Empl.: 35

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith Co.	205-881-3294
Ariz	Scottsdale, William Assocs.	602-947-4297
Cal	Laguna Hills, English Sls. Assocs.	714-495-6489
Cal	Lawndale, English Sls. Assocs.	213-772-7272
Cal	San Diego, English Sls. Assocs.	714-462-4391
Cal	Sunnyvale, English Sls Assocs.	
Colo	Denver, Williams Assocs.	303-373-4730
Conn	New Canaan, Measurement Consultants Corp.	203-966-4630
DC	Washington, Whitcomb Assocs.	202-737-0763
Fla	Orlando, J. L. Highsmith Co.	305-293-5202
Ill	Skokie, Saffro & Assocs.	312-588-0905
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
Md	Baltimore, Whitcomb Assocs.	301-889-1245
Mass	Waltham, Measurement Consultants Corp.	617-890-4400
Mich	Detroit, Comtel Instrs. Co.	313-255-1970
Minn	Minneapolis, The Heimann Co.	612-861-6051
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Rochester, R. F. Lamb Co.	716-544-5580
NY	Schenectady, R. F. Lamb Co.	518-393-4844
NY	Syracuse, R. F. Lamb Co.	315-454-2469
NC	Charlotte, J. L. Highsmith Co.	704-333-7743
Ohio	Cleveland, Comtel Instrs. Co.	216-442-8080
Ohio	Dayton, Comtel Instrs. Co.	513-298-7573
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Jenkintown, A M T	215-LI9-2080
Pa	Pittsburgh, Comtel Instrs. Co.	412-922-5720
RI	Cumberland, Measurement Consultants Corp.	401-333-6000
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ELECTRICAL PLASTICS CORP., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740, Tel: 201-870-9500; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, Electrical Specialty Co.	602-275-5736
Cal	Anaheim, Electrical Specialty Co.	714-630-7050
Cal	Los Angeles, Electrical Specialty Co.	213-724-9600
Cal	San Diego, Electrical Specialty Co.	714-239-1345
Cal	S. San Francisco, Electrical Specialty Co.	415-589-9611
Colo	Denver, Electrical Specialty Co.	303-321-0226
Conn	Vernon, G & M Assoc.	203-646-4443
Fla	Orlando, Buchannan & Abrams	305-898-7444
Ill	Chicago, A.J. Ellis Co.	312-262-0204
Ind	Indianapolis, Blind & Assocs.	317-251-1249
Md	Timonium, Heller Sls. Co.	301-252-4780
Mass	Framingham, G & M Assoc.	617-872-4871
Minn	Bloomington, Ladky Assocs.	612-884-2125
Mo	Webster Groves, Hippler Sls. Co.	314-961-8499
NJ	Livingston, H. Thaw Sls. Co.	201-992-2711
NY	Rochester, Paul Andres	716-271-2201
Ohio	N. Olmsted, Plus Sls.	216-734-8989
Ore	Portland, Electrical Specialty Co.	503-227-3601
Pa	Ardmore, R. D. Freedman Assocs.	215-649-3679
Utah	Salt Lake City, Electrical Specialty Co.	801-487-9805
Wash	Seattle, Electrical Specialty Co.	206-682-3434

ELECTRICAL STANDARDS DIV., E.S.R.S., Inc., Dept. EM, 7337 Greenbush, N. Hollywood, Cal. 91605, Tel: 213-765-4224; Empl.: 6

Local Sales Offices & Reps.

Ariz	Scottsdale, Biedler & Assocs.	602-945-7821
Conn	Durham, Marr Elec. Co.	203-349-9691
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Sales Manager: C.W. Hyer

Local Sales Offices & Reps.

Cal	Los Angeles, ETL, Inc.	213-726-1725
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Sales Manager: C.H. Brunell

Local Sales Offices & Reps.

Ariz	Phoenix, Airsupply Co.	602-267-3916
Cal	San Diego, Airsupply Co.	714-275-2221
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Ga	Marietta, Airsupply Co.	404-422-8242
Ill	Berkeley, Airsupply Co.	312-544-7400
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ELECTRO CORP., Dept. EM, Box 3049, Sarasota, Fla. 33578, Tel: 813-355-8411, Telex: 52-683; FSC No.: 81692; Empl.: 120

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Ariz	Phoenix, Mesa Engrg. & Sls. Assocs.	602-943-9213
Cal	Newport Beach, Electro Corp.	714-752-8394
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Ill	La Grange, Olson Engrg. & Sls. Corp.	312-482-3300
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Mich	Birmingham, Electro-Mation Assocs.	313-564-6517
Mich	Farmington Hills, W.R. Hummon & Assocs.	313-474-0661
Minn	Minneapolis, Arjay Sls., Inc.	612-854-4972
NY	E. Syracuse, Ossman Instrs., Inc.	315-437-6666
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NY	Vestal, Ossman Instrs., Inc.	607-785-9947
NY	White Plains, Swedelco, Inc.	914-946-1122
NC	Charlotte, Systems Service Corp.	704-377-3407
Ohio	Dayton, Electro Corp.	513-293-3197
Ore	Portland, Tekelectric Control Co.	503-246-5451
Pa	Erie, Ecco Elctrn. Sls. Co.	814-459-8822
Pa	Glenside, C.A. Briggs	215-885-2244
Tex	Houston, Whitson Engrg. Co.	713-645-1801
Tex	Plano, Whitson Engrg. Co.	214-423-5255
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ELECTRO-CRAFT CORP., Dept. EM, 1600 2nd St. South, Hopkins, Minn. 55343, Tel: 612-935-8226, TWX: 910-576-3132; Empl.: 300 .... p. 3077

Local Sales Offices & Reps.

Cal	Los Angeles, Electrocraft Corp.	213-889-3631
Fla	Altamonte Springs, WMM Assocs.	305-862-4700
Fla	Clearwater, WMM Assocs.	813-442-3913
Fla	Pompano Beach, WMM Assocs.	305-943-3091
Ga	Lilburn, Motion Technology Inc.	404-972-5050
Ill	Chicago, Electro-Craft Corp.	312-298-0687
Mass	Boston, Electro-Craft Corp.	617-233-2636
Minn	Minneapolis, Electro-Craft Corp.	612-935-8226
NJ	Williamstown, Electro-Craft Corp.	609-728-2450
NC	Charlotte, Motion Technology Inc.	704-525-9855
Ohio	Cleveland, A.H. Baier Co.	216-461-6161
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ELECTRO-DEVICES, INC., Dept. EM, 4-6 Godwin Ave., Paterson, N.J. 07509, Tel: 201-274-8989; Empl.: 12

ELECTRO DESIGN SYSTEMS, Dept. EM, 401 W. 35th St., Ste. K, National City, CA 92050, Tel: 714-420-2351; Empl.: 30

Local Sales Offices & Reps.

Cal	Lawndale, Makens Co.	213-679-1194
Cal	Palo Alto, R. W. Thompson	415-494-7516
Colo	Denver, Component Sls.	303-750-2254
Fla	Miami, Wallace Elctrn. Sls.	305-625-3239
Ill	Arlington Heights, Aagan Sls.	312-394-0617
NJ	Westwood, Lubell Assocs.	201-664-2262
Ore	Portland, Electronic Comp. Sls.	503-245-2342

ELECTRO IMPULSE, Dept. EM, Box 870, Red Bank, N.J. 07701, Tel: 201-741-0404; Empl.: 70 p. 2695,2835

Local Sales Offices & Reps.

Cal	Hawthorne, Barnard & Assocs.	213-973-5050
Fla	Orlando, Gra-Mar, Inc.	305-894-3351

Md	Ellicott City, VPI, Inc.	301-465-4060
Mass	Reading, Geder Assocs.	617-944-3105
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Greenvale, B.D. Aaron & Co.	516-621-0630
Tex	Richardson, Spectra Sls. Corp.	214-234-3600
Exp:	Teaneck, N.J., Sylvan Ginsbury Ltd.	201-837-1100

ELECTRO INDUSTRIES, Dept. EM, 109 Nassau Dr., Albertson, NY 11507, Tel: 516-621-6652 .... p. 2837

Sales Manager: S. Kagan

ELECTRO KINETICS CO., Sub. HTL Inds., Inc., Dept. EM, 402 E. Gutierrez St., Santa Barbara, Cal. 93102, Tel: 805-963-2055, TWX: 910-334-1177; FSC No.: 02101; Empl.: 160

Sales Manager: N.G. Otis

Local Sales Offices & Reps.

Ariz	Tempe, Russell Assocs.	602-967-1820
Cal	Anaheim, Tri-Tek	714-533-1454
DC	Washington, ElectroKinetics Corp.	703-920-4500
Fla	Pinellas Park, Russell Assoc.	813-526-1134
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Ill	Rockford, Russell Assoc.	815-964-5463
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ELECTRO LIFE, INC., Dept. EM, Box 396, 131 N. Island Ave., Batavia, Ill. 60510, Tel: 312-879-1399; Empl.: 5

ELECTRO MATS. CORP. AMER., Dept. EM, 605 Center Ave., Mamaroneck, N.Y. 10543, Tel: 914-698-8434, TWX: 710-566-1128

Local Sales Offices & Reps.

Cal	Cupertino, EMCA	408-257-2533
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Colo	Parker, J.S. Heaton Co.	301-841-3651
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ELECTRO MECH., Dept. EM, 1826 N. Floradale Ave., S. El Monte, Cal. 91733

ELECTRO-MECH COMPONENTS, Dept. EM, 1826 N. Floradale Ave., So. El Monte, Cal. 91733, Tel: 213-442-7180; FSC No.: 07150; Empl.: 75 .... p. 4069

Local Sales Offices & Reps.

Cal	Los Angeles, Rep Assocs.	213-829-5401
Cal	Palo Alto, Engrg. Assocs.	415-494-7842
Colo	Littleton, Franklin Sls. Co.	303-794-3900
Conn	Milford, Todino Engrg.	203-874-6643
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NY	Vestal, SHR, Inc.	607-729-6339
Ohio	Cincinnati, Scott Elctrns.	513-791-2513
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Sales Manager: R. Jones

Local Sales Offices & Reps.

Ala	Huntsville, Rakes Engrg. & Mktg.	205-883-9260
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Cal	Los Angeles, El-Com, Inc.	213-223-1351
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ELECTRO-MECHANICS CO., Dept. EM, Box 1546, Austin, Tex. 78767, Tel: 512-451-8273; Empl.: 14

Local Sales Offices & Reps.

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Md	Silver Spring, Gawler-Knoop Co.	301-589-4406
NY	Guilderland, Electro-Modular Sys. Inc.	518-456-2665
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Exp:	New York, N.Y., Ad. Auriema, Inc.	212-466-2500

ELECTRO-MECHANISMS, INC., Dept. EM, 1163 W. Fourth St., Azusa, Cal. 91702, Tel: 213-334-4927; Empl.: 25

Local Sales Offices & Reps.

Cal	Redwood City, Warren & Hickey Sls.	415-368-3849
Cal	San Diego, Van Gott & Assoc.	714-272-8452
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Colo	Denver, Cristee-Meade Co.	303-753-9471
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NY	Buffalo, Good Components	716-634-4400
NY	New Hyde Pk., R. P. Luce & Co.	516-437-4550
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Ohio	Dayton, Group Ten	513-277-6531
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ELECTRO-METRICS, Div. Penril Corp., Dept. EM, 100 Church St., Amsterdam, N.Y. 12010, Tel: 518-843-2600; FSC No.: 18581; Empl.: 52

Local Sales Offices & Reps.

Ala	Huntsville, E.G. Holmes & Assoc.	
Cal	Yorba Linda, D. Black Assoc.	714-524-0141
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NJ	E. Orange, Friedman Associates	201-673-2500
NM	Albuquerque, Mountaintek Inc.	505-294-1491
NY	Guilderland, Electro-Modular Sys.	518-456-2665
Ohio	Dayton, G.L. Ashby Assocs.	513-252-5627
Tex	Richardson, Scientific Devices	214-231-8106
Utah	Salt Lake City, Mountaintek Inc.	801-278-6920
Va	Virginia Beach, E.G. Holmes & Assoc.	804-481-6556
Wash	Seattle, G.M. Gillett & Assocs.	206-284-3344
Exp:	Amsterdam, NY, Electro-Metrics	518-843-2600
Exp:	Fla., Hallandale, Emec	305-925-6366

electro-module, inc. TM

ELECTRO-MODULE, INC., Dept. EM, 2855 Metropolitan Place, Pomona, Cal. 91767, Tel: 714-593-3565, Telex: 67-0339; FSC No.: 34217; Empl.: 95

Sales Manager: A. Gudis

Local Sales Offices & Reps.

Colo	Palo Alto, World Wide Sources, Inc.	415-324-1024
NY	Commack, Lawrence K. Haner, Assoc.	516-864-2220
Ohio	Dayton, Rockford Controls-Ohio	513-898-5452
Tex	Dallas, EBR	214-942-2716

ELECTRO MOTIVE CORP., Div. of International Elctrns. Corp., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746, Tel: 516-694-7700, TWX: 510-224-6427; Empl.: 2100

Local Sales Offices & Reps.

Ariz	Phoenix, Interstate Mktg.	602-957-1220
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Denver, Walter Eng.	303-777-5585
Conn	Milford, Conti-Younger Assocs.	203-929-3294
Ill	Chicago, Electro Motive	312-237-4454
Ind	Indianapolis, Electro Motive	317-545-4432
Ky	Owensboro, Great Southern Elctrns.	502-685-4781
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Ore	Milwaukee, R. Thorp Co.	503-659-3965
SC	Florence, Electro Motive Corp.	803-669-2181
Wash	Seattle, R. Thorp Co.	206-763-1236

Local Distributors

Ala	Huntsville, Hall-Mark	205-837-8700
Cal	Los Angeles, Milgray	213-894-4011
Cal	Mt. View, Bell Inds.	213-321-5802
Cal	Woodland Hills, Jaco Elctrns.	213-887-6400
Fla	Ft. Lauderdale, Hall Mark	305-971-9280
Ill	Elk Grove, Hall Mark	312-437-8800
Ill	Skokie, Bell Inds.	312-282-5400
Kans	Kansas City, Hall Mark	913-888-4747
Md	Baltimore, Milgray	301-723-3993
Mass	Boston, Milgray	617-272-6800
Minn	Bloomington, Hall Mark	612-884-9056
Mo	St. Louis, Hall Mark	314-291-5350
NJ	Cherry Hill, Milgray	609-424-1300
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Great Neck, Arco Elctrns.	516-487-0500
NY	Hauppauge, Jaco Elctrns.	516-273-5500
NY	Plainview, Miconics Inds.	516-681-4300
NC	Raleigh, Hall Mark	919-832-4465
Ohio	Cleveland, Milgray	216-881-8800
Okla	Tulsa, Hall Mark	918-835-8458
Pa	Huntingdon Valley, Hall-Mark Elctrns.	215-355-7300
Tex	Dallas, Hall Mark	214-231-6111
Tex	Houston, Hall Mark	713-781-6100
Wash	Seattle, Bell Inds.	206-747-1515
Wisc	Milwaukee, Hall Mark	414-476-1270
For:	N.Y., New York, Roburn Agencies	212-989-5939

ELECTRO MOTIVE CORPORATION, Subsidiary of International Electronics Corp., Dept. EM, Lauter Avenue, Florence, SC 29501, Tel: 803-669-2181, TWX: 810-662-2200; Empl.: 1500

Local Sales Offices & Reps.

Ill	Chicago, S. DiMarco	312-237-4454
Ind	Indianapolis, J. Meltzer	317-545-4432
NY	Melville	516-694-7700
SC	Florence, T. Insalaco	803-669-2181

ELECTRO-NUMERICS INC., Dept. EM, 1811 Reynolds, Irvine, Cal. 92714, Tel: 714-549-8821, Telex: 68-5612; Empl.: 15

Local Sales Offices & Reps.

Cal	Ladera, Cam Pierce Assocs.	415-854-5994
Cal	Santa Ana, Lew Brooks & Co.	714-544-8900
Colo	Englewood, Dynatech Inc.	303-773-2830
Conn	Hamden, Applied Meas., Inc.	203-288-5288
Ill	La Grange, PVA Co.	312-352-1037
Md	Bethesda, Powell-Pendergraph Inc.	301-656-4535
Mass	Acton, Applied Meas., Inc.	617-263-2766
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, Volco Co.	612-933-6631
Mo	Kansas City, Leemark Engs. Inc.	913-648-0124
NY	Plainview, Eastern Metro Assocs. Inc.	516-931-1414
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Pa	Pittsburg, Carter, McCormic & Peirce	412-824-3760
Pa	Willow Grove, Powell-Pendergraph, Inc.	215-657-0330
Tex	Dallas, R. T. Martin Assoc.	214-358-3704
Tex	Houston, R. T. Martin Assoc.	713-462-4077
Utah	Salt Lake City, Dynatech Inc.	801-278-6920
Va	Richmond, Powell-Pendergraph, Inc.	804-264-2341
Wash	Mercer Island, J.H. Anderson Assocs.	206-232-0484
Exp:	Can., British Columbia, J.H. Anderson Assocs.	206-232-0484

ELECTRO-OPTICAL INDS., INC., Dept. EM, 839 Ward Dr., Santa Barbara, Cal. 93111, Tel: 805-964-6701, Telex: 65-8427; Empl.: 40

Sales Manager: J. Lansing Sls. Liaison

ELECTRO-PACIFIC, INC., Dept. EM, 5782 Thornwood Dr., Goleta, Calif. 93017, Tel: 805-964-4878; Empl.: 41

Local Sales Offices & Reps.

Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Wash	Seattle, Halbar Assoc.	206-939-2080

ELECTRO PACKAGING, INC., Dept. EM, 176 Walker St., Lowell, Mass. 01854, Tel: 617-453-4142, Telex: 94-7490; Empl.: 350

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assocs.	205-883-7893
Ariz	Scottsdale, S.C. Blaker Co.	602-948-3061
Colo	Englewood, Holland Co.	303-789-4149
Conn	Meriden, Com-Sl.	203-634-0179
Fla	Ormond Beach, Technology Mktg. Assocs.	904-672-2314
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Northbrook, R.T. Howlett & Assocs.	312-498-5444
Mass	Waltham, Com-SL	617-890-0011
NJ	North Caldwell, Masin-Esco	201-226-2550
NY	Schenectady, N. Alexander & Assocs.	518-377-0581
NY	Syosset, Masin-Esco	516-364-0310
Pa	Newton Square, Danton Assocs.	215-353-0500
Tex	Houston, Cunningham Co.	713-461-4197
Tex	Richardson, Cunningham Co.	214-231-2686

ELECTRO SPACE FABRICATORS, INC., Dept. EM, Topton, Pa. 19562

ELECTRO SPACE SYSTEMS, INC., Dept. EM, Box 1359, Richardson, Tex. 75080, Tel: 214-231-9303, TWX: 910-867-4768; Empl.: 300

ELECTRO-RENT CORP., Dept. EM, 4131 Van Owen Place, Burbank, Cal. 91505, Tel: 213-843-3131, TWX: 910-498-2238; Empl.: 75

Sales Manager: R. Tarullo

Local Sales Offices & Reps.

Cal	Burbank	213-843-3131
Cal	Mountain View	415-964-5500
Cal	Santa Ana	714-979-5620
Md	Gaithersburg	301-948-3050
Mich	Detroit	313-353-6320
NJ	Cedar Grove	201-857-2280
Tex	Dallas	214-691-6086

ELECTRO-RACK PRODUCTS CO., Dept. EM, 1742 So. Clementine St., Anaheim, Cal. 92802, Tel: 714-776-5420; FSC No.: 26073; Empl.: 25

Sales Manager: A. Hough

ELECTRO-SCIENCE LABS., Dept. EM, 2211 Sherman Ave., Pennsauken, N. J. 08110, Tel: 609-663-7777, Telex: 83-4788; Empl.: 70

Local Sales Offices & Reps.

Cal	Hacienda Heights, Wadsworth Pacific Mfg. Assocs. Inc.	213-330-5592
Cal	Menlo Park, West Engrg. Sls.	415-325-2885
Cal	Santa Ana, Micronics	714-835-6311
Fla	Sarasota, W. J. Irvine Co.	813-955-9656
Ill	Downers Grove, Electro-Science Labs	312-964-5431
Mass	Framingham, Microdon	617-879-3800
Minn	Minneapolis, Peterson Elctrns.	612-884-3483
NJ	Nutley, D/R Assocs.	201-667-5900
NY	Whitestone, S.H. Lowe Inc.	212-767-7684
Ohio	Dayton, R.R.M. Assocs.	513-885-4161

ELECTRO SCI. INDS., Dept. EM, 13902 N.W. Science Pk. Dr., Portland, Ore. 97229, Tel: 503-641-4141, Telex: 36-0273; FSC No.: 11837; Empl.: 297

Sales Manager: S. Gressel

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs. Inc.	205-534-9771
Cal	Orange, Bill Lyon	714-633-0643
Cal	Palo Alto, T. White	415-494-7458
Fla	Orlando, Gentry Assocs. Inc.	305-894-4401
Ill	Rosemont, D. Burnett	312-696-4322
Mass	Waltham, D. Erickson	617-899-6633
NJ	Bergenfield, K. Scherzer	201-385-9493
NY	Camillus, Eric Hill	315-487-3155
NC	Burlington, Gentry Assocs. Inc.	919-227-3639
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Crockett Southwest Co., Crockett Engrg. Co.	214-251-1776

ELECTRO STYLUS, Dept. EM, 31 Cheyenne Blvd., Colorado Springs, Colo. 80906, Tel: 303-633-5969; Empl.: 10

ELECTRO SWITCH CORP., Dept. EM, King Ave., Weymouth, Mass. 02188, Tel: 617-335-5200, TWX: 710-388-0377; FSC No.: 82121; Empl.: 200 .. p. 4071

Sales Manager: W.F. Rand

Local Sales Offices & Reps.

Ariz	Scottsdale, OEM Specialties	602-948-3360
Cal	Oakland, W. Nott & Co.	415-654-3747
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Colo	Boulder, Component Prods Sls Co.	303-494-5100
Fla	Winter Park, Floritronics, Inc.	305-886-4818
Ga	Atlanta, Holman-Lobsinger Co.	404-256-9120
Ill	Elk Grove Village, Electro Switch Corp.	312-593-2225
Md	Woodbine, Naudain Assocs.	301-442-2270
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	No. Kansas City, H.J. Weisler & Assoc., Inc.	816-421-1679
Mo	St. Louis, H. J. Weisler & Assoc.	314-428-3934
NJ	Mt. Laurel, Naudain Assocs.	609-235-1801
NY	Melville, Electro Switch Corp.	516-249-3770
NY	Rochester, Sweetco Assoc.	716-225-2383
NC	Winston-Salem, L.G. White Southern, Inc.	919-725-3612
Ohio	Columbus, Rockford Controls	614-231-5890
Ohio	Dayton, Rockford Controls Ohio	513-898-5452
Ohio	Euclid, Rockford Controls Ohio	216-731-5250
Pa	Pittsburgh, R. F. Clark	412-242-9500
Tex	Bellaire, Brice Co.	713-666-1788
Tex	Dallas, Brice Co.	214-233-9808
Wash	Seattle, C.B. Parsons & Co.	206-762-7373
Wisc	Wauwatosa, Larsen Assoc.	414-258-0529
Exp:	Litchfield, Norcon Div. Intrade Inc.	203-567-5865

Local Distributors

Minn	St. Paul, Kenco	612-645-7717
NC	Winston Salem, General Prods Co.	919-725-3612
Ohio	Dayton, KM Co.	513-898-5452
Tex	Bellaire, Barclay Wholesale	713-666-1788
Wash	Seattle, C.B. Parsons Co	206-762-7373

ELECTRO-TECHNIQUES, INC., Dept. EM, 215 Via Del Norte, Oceanside, Cal. 92054, Tel: 714-757-7770, TWX: 910-322-1396; Empl.: 38 .... p. 3838,3839

Local Sales Offices & Reps.

Ariz	Phoenix, Chaparral-Dorton, Inc.	602-263-0414
Cal	Burlingame, Polach & Bensinger	415-697-2525
Cal	Glendale, J.B.R. Inds.	213-242-7324
Cal	San Diego, CERCO	714-560-9143
Colo	Broomfield, Clark Mfrs. Representative	303-466-1901
Fla	Palm Beach Gardens, Brosey Enterprises	305-622-6045
Ill	Glenview, Crimson Engrg.	312-724-1780
Ind	Carmel, Giesting & Assocs.	317-844-8171
Mass	Needham, A & M ELec. Rep.	617-444-8170
Mich	Livonia, Giesting & Assocs.	317-844-8171
Minn	Bloomington, Elctrn. Sls. Agency, Inc.	612-884-8291
NJ	Nutley, Irwin Brill Co.	201-667-0653
Ohio	Cincinnati, Giesting & Assocs.	513-951-7800
Ohio	Cleveland, Giesting & Assocs.	216-621-4240
Ohio	Dayton, Giesting & Assocs.	513-293-4044
Ohio	Galion, Giesting & Assocs.	419-468-3737
Ore	Beaverton, R. & R. Assocs.	503-643-5754
Pa	Willow Grove, BGR Assocs.	215-657-3301
Tex	Houston, Component Sls. & Svcs.	713-521-9771
Wash	Seattle, R & R Assocs.	206-762-7664

Local Distributors

Ariz	Scottsdale, Ambassador Elctrns. Co.	602-991-4660
Cal	Anaheim, A to Z Elctrns.	714-634-3620
Cal	Van Nuys, Tim-Co Sls.	213-781-7370
Colo	Denver, Wintronics	303-934-2406
Colo	Denver, Intergrated Elctrns.	303-266-2543
Fla	Palm Beach Gardens, Brosey Entprs.	305-622-6045
Mich	Livonia, Re-Tron	313-525-2700
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Tex	Houston, Lenert Co.	713-225-1465
Tex	Midland, E.S.I. Co.	915-694-9657
Wisc	Milwaukee, B.W. Elctrns. Supply	414-545-8380

ELECTRO-VOICE, INC., Sub. Gulton Inds., Inc., Dept. EM, 600 Cecil St., Buchanan, Mich. 49107, Tel: 616-695-6831, TWX: 810-270-3135; Empl.: 1,000

Local Sales Offices & Reps.

Ala	Birmingham, M. K. Smith, Inc.	205-967-3080
Alas	Anchorage, H. J. Lang & Assocs.	907-279-5741
Ariz	Phoenix, J. R. Morgan Agency	602-252-3089
Ark	El Dorado, Dick Bellew Sls., Inc.	501-863-8325
Cal	Hollywood, J. Carter Assocs.	213-980-3450
Cal	San Francisco, Meyer & Ross	415-864-8880
Cal	Visalia, Electro-Voice West	209-734-8131
Colo	Denver, Lindberg Co.	303-758-9033
Fla	Fort Lauderdale, Sproch Sls., Inc.	305-587-3792
Fla	Sarasota, Sproch Sls., Inc.	813-924-7768
Ga	Tucker, M. K. Smith, Inc.	404-938-7161
Haw	Honolulu, Dougherty Entprs. Co.	808-847-4144
Ill	Lincolnwood, Wm. M. Linz Assocs.	312-677-2000
Ind	Mulberry, Maish Sls.	317-296-2322
Iowa	Des Moines, Pacer Corp.	515-274-3224
Kans	Olathe, B. C. Elctrn. Sls., Inc.	913-888-6680
La	New Orleans, Dick Bellew Sls., Inc.	504-443-3237
Md	Baltimore, D. H. Brothers Co.	301-764-7189
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mich	Detroit, Riley & Petchell Sls. Inc.	313-937-3000
Minn	St. Paul, SKOR	612-645-6461
Mo	Hazelwood, B.C. Elctrn. Sls.	314-731-1255
Mo	Raytown, Pacer Corp.	816-358-6638
Mo	St. Louis, Pacer Corp.	314-894-1388
NJ	Ridgefield, Bi-State Marketers, Inc.	201-943-5888
NY	Buffalo, Waxman-Currant Sls., Inc.	716-873-0442
NY	Pittsford, Waxman-Currant Sls.	716-586-8112
NC	Charlotte, M. K. Smith, Inc.	704-372-1026
Ohio	Columbia Station, C. L. Pugh & Assocs.	216-235-6028
Ohio	Columbus, C. L. Pugh & Assocs.	614-486-9678
Pa	Newtown Square, G. M. Conneen Co.	215-353-2241
Pa	Pittsburgh, C. L. Pugh & Assocs.	412-531-2731
Tenn	Memphis, Dick Bellew Sls., Inc.	901-365-9437
Tex	Dallas, Collins Co.	214-341-7866
Tex	Houston, Collins Co.	
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, Gemini Elctrns., Inc.	206-542-1116
Exp:	Chicago, Ill., Magnus Inter-America	312-334-1503
Exp:	Plainview N.Y., Telesco Int'l. Corp.	516-484-4920

™ELECTRO-CAM - electronic motion profile control - Control Systems Research, Inc.

(TM)ELECTRO-CARE - phono & tape accessories - Ev-Game Inc.

(TM)ELECTROCOM - solid state commutator - General Devices, Inc.

ELECTROCOM INDS., Dept. EM, 1105 N. Ironwood Dr., S. Bend, Ind. 46615, Tel: 219-232-2743; FSC No.: 27114

(TM)ELECTROCRAFT - electronic components - GC Electronics

ELECTROCUBE INC., Dept. EM, 1710 So. Del Mar Ave., San Gabriel, Cal. 91776, Tel: 213-573-3300, TWX: 910-589-1609; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, Powertronics, Inc.	205-852-6347
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Cal	Mountain View, West/Mark Assocs.	415-969-1700
Colo	Denver, Mike Duffy Assoc.	303-934-7392
Fla	Orlando, G.F. Bohman Assoc., Inc.	305-855-0274
Ill	Downers Grove, Richmar Elctrn. Sls.	312-968-0118
Md	Stevenson, T. Griffin Co.	301-484-0251
Mass	Reading, C. Godfrey Co.	617-944-2230
Mich	Grosse Pointe Park, S. Greiner Assocs.	313-499-0188
Minn	Minneapolis, Electro-Serv Co.	612-827-2907
Mo	Hazelwood, Centech Sls.	314-731-4220
Mo	Raytown, Centech Sls.	816-358-8100
NM	Albuquerque, IMEC	505-883-9010
NY	Floral Park, MOS Assocs.	516-694-5923
NY	Rochester, Gislason Sls.	716-454-4741
NC	Thomasville, Powertronics, Inc.	919-476-6727
Ohio	Cleveland, K.W. Elctrn. Sls.	216-831-8292
Ohio	Dayton, K.W. Elctrn. Sls.	513-890-2150
Pa	Paoli, T. Griffin Co.	215-647-1550
Pa	Waterford, K.W. Elctrn. Sls.	814-796-6714
SC	Greenville, Powertronics	803-288-0270
Tex	Dallas, W. Reese Assocs.	214-638-6575
Tex	Houston, W. Reese Assocs.	713-621-3134
Wash	Bellevue, J. Findley Co.	206-454-5200
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Oak Creek, Richmar Elctrn. Sls.	414-475-0141
Exp:	N.Y., N.Y., C. Tennant, Sons & Co.	212-679-1300

Local Distributors

Cal	Carson, Hi-Rel Dist. Sls.	213-537-6500
Cal	Sunnyvale, Acacia Sls.	408-735-0100
Ohio	Englewood, Argent Inds.	513-836-8633
Ohio	Solon, REPCO, Inc.	216-248-8900
Pa	Erie, Erie Corp. Contractors	814-452-3762
Pa	Pittsburgh, Cameradio	412-288-2600
Tex	Richardson, Altair Co.	214-231-5166

(TM)ELECTRO CUT - insulation, tape & foam cutters. - Automatic Die Cutting Mch

(TM)ELECTRODAG - conductive/resistive coatings - Acheson Colloids Co.

(TM)ELECTRODUCT - PVC wiring duct - Electrovert

(TM)ELECTROFEED - vibratory parts feeder - Black & Webster, Inc.

ELECTROFILM, INC., Dept. EM, 7116 Laurel Canyon Blvd., No. Hollywood, Cal. 91605, Tel: 213-875-1000, TWX: 65-4138 910-499-2173; Empl.: 175

Sales Manager: R.A. Luce

(TM)ELECTROFLO - electroplate fusing sys. - Electrovert

ELECTROGLAS INC., Dept. EM, 2901 Coronado Dr., Santa Clara, Cal. 95050, Tel: 408-246-6500, TWX: 910-338-0500

Sales Manager: A.L. Harmon

Local Sales Offices & Reps.

Ariz	Scottsdale, Electroglas	602-991-4552
Cal	Santa Clara, Electroglas	408-246-6500
Cal	Sunnyvale, Bert Oppenheim	408-733-9000
Fla	Lake Worth, Electroglas	305-965-2502
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Bethesda, Bartlett Assocs.	301-656-3061
Mass	Framingham, Bartlett Assocs.	617-879-7530
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NY	White Plains, Bartlett Assocs.	914-949-6476
Wisc	Milwaukee, Carter Elctrns.	414-242-2261

(TM)ELECTRO-GRIP - full line of electromagnets 1/2lb to 1/2ton holding force - Coil Co. of Amer.

(TM)ELECTROLAB - electricity/rotating maches. trainers - Digiac Corp.

(TM)ELECTRO-LAP SEAL - cable joint terminal kit - Okonite Co.

ELECTROL CO., INC., Dept. EM, 321 Dewey St., York, Pa. 17404, Tel: 717-843-0242; Empl.: 38; Minimum order: $D. Kyle

Sales Manager: R. Dudley; *Distributor Manager:* D. Kyle

Local Sales Offices & Reps.

Cal	San Francisco	415-467-1880
Fla	St. Petersburg	813-867-9504
Ill	Chicago	312-545-2216
Md	Baltimore	301-879-3370
Mass	Boston	617-475-3531
Minn	St. Paul	612-645-4647
NJ	Newark	201-241-0678
NJ	Pennsauken	609-663-6121
NY	Rochester	716-586-8033
NC	Charlotte	704-523-0324
Ohio	Cincinnati	513-793-1738
Pa	Philadelphia	215-923-0668
Tenn	Memphis	901-527-8684
Tex	Dallas	214-239-0407
Va	Richmond	804-266-3457

(TM)ELECTRO-LIFT - garage door openers - Perma Power Div.

(TM)ELECTROLOGIC - single & multiple card reader & interface - Meriam Inc.

(TM)ELECTROMATE - ion measuring instrument - Beckman Instrs., (AISSD)

(TM)ELECTROMAX - signalling controller - Leeds & Northrup Co.

(TM)ELECTRO MODULE - packaged clutch & brake - Warner Elec. Brake & Clutch Co.

ELECTRON, INC., Dept. EM, 12655 Coit Rd., Cleveland, Ohio 44108, Tel: 216-681-4700, Telex: 98-0240; Empl.: 85

ELECTRON-MACHINE CORP., Dept. EM, Box M, Umatilla, Fla. 32784, Tel: 904-669-3101, Telex: 56-4300; Empl.: 55

Local Sales Offices & Reps.

Ala	Anniston, Shelton Ind. Equip.	205-237-1749
Colo	Denver, Equipment Specialties Co.	303-433-3371
Del	Newark, Brennan-Davis Instr. Sls. Co.	302-731-5000
Ill	Chicago, Memeco, Inc.	312-774-0919
Mass	Acton, Six States Engrg.	617-263-8989
Mich	Birmingham, Brooks Equip. Co.	313-645-0950
Minn	Wayzata, Wm. A. Sternad, Consulting Engr.	612-473-4700
Mo	St. Louis, Promac	314-966-8250
NJ	Haddonfield, Brennan-Davis Instr. Sls. Co.	609-429-7687
NJ	Kenilworth, Wolock & Lott	201-241-4333
NY	North Syracuse, V. Luven Company	315-458-8195
NC	Charlotte, MacGuire & Crawford Instr. Co.	704-366-3454
Ohio	Cincinnati, Surkamp & Rowe	513-891-1838
Ohio	Cleveland, Thorrat & Hanmer	216-333-5950
Okla	Tulsa, Telstar Instr. Corp.	918-628-1011
Ore	Portland, R.E. Donelson Co.	503-654-3137
Tex	Bellaire, Cactus Engrg. Co.	713-665-2723
Vt	Springfield, Six States Engrg.	802-885-5253
Va	Richmond, United Control Co.	804-285-9927
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Sales Manager: J. Anderberg

Local Sales Offices & Reps.

Ariz	Phoenix, Zeus	602-257-8037
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NJ	Little Falls, Carbone Assoc.	201-256-9191
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Wash	Seattle, Components West	206-243-2133

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Sales Manager: E. Meagher

Local Sales Offices & Reps.

Ariz	Phoenix, Dorton Entprs.	602-263-0414
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Cal	Mt. View, Caltron/Pyle	415-964-3244
Cal	Newport Beach, Babco Assocs.	213-676-6545
Cal	San Diego, Ohm Spun Elctrns.	714-277-6230
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Conn	Greenwich, Crane & Egert Corp.	203-622-9191
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Fla	Ft. Lauderdale, Electrocomp Assocs. Inc.	305-564-8571
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Ind	Fort Wayne, Given Corp.	219-432-5585
Iowa	Cedar Rapids, Engrg. Svcs. Co.	319-362-0503
Iowa	Cedar Rapids, Engrg. Srvcs. Co.	319-362-0503
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Kans	Prairie Village, Engrg. Srvcs. Co.	913-649-4000
Mass	Waltham, Com-Sale	617-890-0011
Mich	Novi, A.P. Assocs.	313-476-2300
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Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
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NJ	Cherry Hill, EA Eastern Region	609-795-5066
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ELCTRN. CONCEPTS, INC., Dept. EM, Box 627, Eatontown, N.J. 07724, Tel: 201-542-7880; Empl.: 80

Local Sales Offices & Reps.

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Ill	Wood Dale, Elctrn. Concepts	312-766-4847
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NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
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ELECTRONIC CONTROL SYSTEMS, INC., Dept. EM, Box 1232, Fairmont, W. Va. 26554, Tel: 304-363-8690; Empl.: 98

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Sales Manager: J.L. Mosan

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Alas	Anchorage, J.A. Tudor & Assocs.	907-279-5196
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Colo	Lakewood, Intermountain Inst.	303-237-0443
Fla	Casselberry, D. Lange Assoc.	305-339-9696
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Ill	Northbrook, Traco Eng. Co.	312-564-2288
Ind	Indianapolis, Pacer Sls. & Eng. Co.	317-849-1481
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Kans	Overland Park, I.L. Davidson Co.	913-381-1718
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Mich	Grand Rapids, E.B. Dewey Co.	616-454-1825
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Mich	Kalamazoo, E.B. Dewey Co.	616-344-6163
Mich	St. Clair Shore, Xanthus, Inc	313-771-3020
Mich	Troy, Xanthus, Inc.	313-391-3235
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NC	Charlotte, Industrial Drives & Controls	704-535-5414
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Ohio	Cleveland, Servo-Mark, Inc.	216-871-2353
Ore	Eugene, J.A. Tudor & Assoc.	503-686-1252
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Pa	Pittsburgh, Weiss Instrs.	412-371-3020
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Wash	Pasco, J.A. Tudor & Assoc.	509-547-8414
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Local Sales Offices & Reps.

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NY	Fayetteville, M. P. Andrews, Inc.	315-637-3144
Pa	Philadelphia, Eastern Instru.	215-927-7777

ELECTRONIC DEV. CORP., Dept. EM, 11 Hamlin St., Boston, Mass. 02127, Tel: 617-268-9696; FSC No.: 12619 .... p. 2840,2841

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Culver City, Feeger, Lucas, Wolf	714-751-7512
Cal	Los Altos, Wright Engrg.	415-941-4405
Cal	San Diego, Feeger, Lucas, Wolf	714-277-0993
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winterhaven, Lee Assocs.	813-294-5815
Ga	Atlanta, Lee Assocs.	404-945-4222
Ill	Chicago, United Energy Sys., Inc.	312-631-0255
Kans	Mission, Vertec Assocs.	913-677-3200
Md	Bethesda, Powell-Pendergraph Inc.	301-656-4535
Mich	Ferndale, Tiby Co.	313-547-3550
Mo	Manchester, Vertec Assocs.	314-394-6242
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	E. Syracuse, Ossmann Instrs., Inc.	315-437-6666
NY	New City, RMC Associates	914-761-7792
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Tiby	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
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Wash	Richland, Topp Engrg. Sls.	509-783-7515

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Local Sales Offices & Reps.

Cal	Glendale, JBR Inds.	213-242-7324
Cal	Sunnyvale, RDX	408-734-4500
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Ill	Chicago, Rozner Sls.	312-283-0022
Mass	Sharon, Cummings Assocs.	617-828-8370
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Minn	St. Paul, Cahill Assocs.	612-739-8445
Mo	St. Louis, Delltron	816-444-8300
NY	Dix Hills, McCulloch Sls.	516-864-8831
NY	Syracuse, MMI Sls.	315-455-5919
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Ohio	Dayton, Kimconics Sls., Inc.	513-898-1783
Pa	Waterford, Kimconics Sls., Inc.	814-796-6556
SC	Greenville, E.M.A.	803-268-1125
Tex	Dallas, Technical Mktg.	214-387-3601
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Colo	Denver, Marshall Sls.	303-770-6224
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Md	Rockville, Marktron	301-762-6210
Md	Timonium, Marktron, Inc.	301-252-7111
Mass	Needham, Todino Engrg.	617-444-7925
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Utah	Salt Lake City, L. Anderson	801-278-6920

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Local Sales Offices & Reps.

Exp:	N.Y., Westbury, Minthorne Int'l.	516-334-3303

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Local Sales Offices & Reps.

Cal	Los Altos, Schwerin Assoc.	415-941-3737
Cal	Orange, A. T. Assocs.	714-633-7414
Colo	Englewood, A. G. Elctrns.	303-771-8088
Conn	Hamden, Impact Sls. Co.	203-248-9368
Fla	Coral Springs, OEM Mktg.	305-752-6164
Fla	Orlando, OEM Mktg.	305-299-1000
Ill	Chicago, R. E. Sone	312-539-2100
Ill	Chicago, Allen Woods & Assoc.	312-283-7400
Iowa	Cedar Rapids, Penzer-Mankus Assocs.	319-362-9177
Iowa	Ft. Wayne, F. E. Kahsar Sls.	219-489-6717
Kans	Overland Park, Penzner-Mankus Assoc.	913-381-0004
Kans	Wichita, Penzner-Mankus Assocs.	316-264-2662
Md	Pikesville, Imagitron Sls. Co.	301-484-1411
Mass	Newton, Impact Sls. Co.	617-964-7740
Minn	Minneapolis, Betronics Sls. Co.	612-835-7744
Mo	Maryland Hgts., Penzner-Mankus Assocs.	314-569-1220
NJ	Oaklyn, A. Wetterhahn Co.	609-858-3003
NJ	Plainfield, Meg Sls.	201-757-4332
NY	Buffalo, Telesco Assoc.	716-834-1026
NY	Manlius, Telesco Assoc.	315-682-7272
NC	Asheboro, Imagitron Sls.	
NC	Kernersville, Imagitron Sls.	919-993-8369
Ohio	Cincinnati, F.E. Kahsar Sls.	513-471-9011
Ohio	Hudson, F.E. Kahsar Sls.	216-653-6808
Tex	Fort Worth, W. P. Fralia Co.	817-640-9101
Tex	Houston, W. P. Fralia Co.	713-772-1572
Wash	Mercer Island, J.H. Andersen Assoc.	206-232-0484

ELCTRN. INSTR. & SPECIALTY, Dept. EM, 42 Pleasant St., Stoneham, Mass. 02180, Tel: 617-438-5300; FSC No.: 14908; Empl.: 85 p. 3485-3487

Sales Manager: W.K. Crawford

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	San Diego, Cirolia Elctrn Sls	714-743-3015
Fla	Orlando, Publicover Assoc.	305-898-9361
Md	Woodbine, Naudain Assocs.	301-442-2270
Mass	Stoneham, Electronic Instr. & Specialty Corp.	617-438-5300
NJ	Nutley, I. Brill	201-667-0653
Ohio	Cleveland, Buckeye Comp.	216-473-0036
Ohio	Dayton, Buckeye Comps.	513-278-4279
Pa	West Chester, January Mktg. & Sls.	215-793-2265
Tex	Houston, Texas Special Elctrn. Comps.	713-666-5871

Local Distributors

NJ	Wayne, Parts Masters	201-694-5885

ELECTRONIC LABORATORY SUPPLY, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119, Tel: 215-248-2700

ELECTRONIC MEASUREMENTS CORP., Dept. EM, 625 Broadway, New York, N.Y. 10012

ELECTRONIC MEASUREMENTS, Dept. EM, 405 Essex Rd., Neptune, N.J. 07753, Tel: 201-922-9300, Telex: 132-424; Empl.: 70 .... p. 3245-3248

Sales Manager: C. Applegate

ELECTRONIC MEMORIES & MAGNETICS, Semiconductor, Dept. EM, 3883 N. 28th Ave., Phoenix, Ariz. 85017, Tel: 602-263-0202

ELECTRONIC MEMORIES & MAGNETICS CORP., Dept. EM, 12621 Chadron Ave., Hawthorne, Cal. 90250, Tel: 213-644-9881, TWX: 910-325-6213; Empl.: 5000

Sales Manager: W.L. Knaack

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Phoenix, Emm/Semi	602-263-0202
Cal	Burlingame, EMM Corp.	415-692-4250
Cal	Chatsworth, EMM/Semi	213-998-9090
Cal	Encino, EMM Corp.	213-995-1755
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Des Plaines, EMM Corp.	312-297-3110
Mass	Lexington, EMM Corp.	617-861-9650
NY	Melville, EMM	516-423-5800
NC	Burlington, Gentry Assoc.	919-227-3639
Tex	Dallas, EMM Corp.	214-361-7121

ELCTRN. MOLDING CORP., Dept. EM, 96 Mill St., Woonsocket, R.I. 02895, Tel: 401-769-3800, TWX: 710-387-1350; FSC No.: 17117; Empl.: 100 p. 1836,1837

Sales Manager: Irene Dulude

Local Sales Offices & Reps.

Cal	Mountain View, G. C. Woempner Co.	415-964-5454
Cal	Newport Beach, W. B. Knight Co.	714-833-8250
Fla	Altamonte Springs, V.G. Sales Co.	305-831-8688
Fla	Pompano Beach, V.G. Sales Co.	305-971-0900
Md	Columbia, Technical Sls. Assocs.	301-992-9194
NJ	Haddenfield, Mills-Brown Assocs.	609-429-1005
NY	Commack, Prime Mfrs. Reps.	516-938-1239
Tex	Dallas, P. J. Scanlon Co.	214-231-4661
Tex	Houston, P. J. Scanlon Co.	713-781-9036

ELECTRONIC NAVIGATION INDS., INC., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623, Tel: 716-473-6900, Telex: 97-8283; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Cal	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
Cal	Portola Valley, Kipp Assocs.	415-851-0123
Colo	Boulder, Scientific Devices	303-449-9466
Fla	Orlando, Scientific Devices	305-841-8180
Fla	Palm Bay, Scientific Devices	305-723-1800
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Silver Springs, Gawler Knoop Co.	301-589-4406
Mass	South Chelmsford, Independent Mktg. Reps.	617-256-8251
Mich	Ferndale, Tiby Co.	313-547-3550
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NM	Albuquerque, B. Dieruf Assoc.	505-299-0989
NY	Greenvale, B.D. Aaron & Co.	516-621-0630
NY	Rochester, Elctrn. Navigation Ind's.	716-473-6900
NC	Raleigh, Scientific Devices	919-872-7066
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
Pa	Newtown Square, SWR Assocs.	215-356-8550
Tex	Houston, Scientific Devices	713-868-5575
Tex	Richardson, Scientific Devices	214-231-8106
Tex	San Antonio, Scientific Devices	512-736-3164
Wash	Bellevue, Marra & Assocs.	206-641-3535
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

ELCTRN. PRECISION COMPS. CORP., Dept. EM, 11 W. Sandford Blvd., Mt. Vernon, N.Y. 10550, Tel: 914-664-2333; Empl.: 8

ELECTRONIC PROCESSORS, Dept. EM, 1265 W. Dartmouth, Englewood, Colo. 80110

ELECTRONIC RELAYS, INC., Dept. EM, 7106-08 W. Touhy Ave., Niles, Ill. 60648, Tel: 312-647-7727; FSC No.: 53087; Empl.: 83; Minimum order: $R. Kedzior

Sales Manager: R. Savini; *Distributor Manager:* R. Kedzior

Local Sales Offices & Reps.

Ala	Huntsville, A.B. Andrews & Co.	205-539-6817
Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Anaheim, LoCal	714-956-1560
Cal	San Carlos, LoDan Inc.	415-592-4600
Cal	San Diego, LoDan Inc.	714-298-8760
Colo	Englewood, Mikro Sls.	303-770-2623
Fla	Altamonte Springs, WMM Assocs.	305-862-4700
Fla	Clearwater, WMM Assocs.	813-442-3913
Fla	Pompano Beach, WMM Assocs.	305-943-3091
Ill	Arlington Heights, LoDan Elctrns.	312-956-6700
Ind	Indianapolis, Marketing Engrs.	317-546-1523
Mass	Scituate, New England Area Reps.	617-545-6327
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Minn	Minneapolis, Stoss Assocs.	612-925-2757
Mo	St. Louis, Ozark Electronic Mktg.	314-423-7200
NJ	Wayne, G.T. Assocs.	201-694-6040
NY	Manlius, Telesco Assocs.	315-682-7272
NC	Research Triangle Park, A.B. Andrews	919-549-0563
Ohio	Chagrin Falls, Pine Sls. & Engrg.	216-247-6198
Ohio	Chagrin Falls, Pine Sls. & Engrg.	216-247-6198
Ore	Lake Oswego, Ruggles Tech.	503-636-5902
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Tex	Dallas, Elgin B. Robertson	214-942-2716
Tex	Houston, Elgin B. Robertson	713-785-6800
Utah	Salt Lake City, Mikro Sls.	801-277-3775
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Tex	Houston, Kent	713-780-7770

ELECTRONIC RESEARCH CO., Dept. EM, Box 913, Shawnee Mission, Kans. 66201, Tel: 913-631-6700, TWX: 910-749-6477; Empl.: 520

Sales Manager: G. Dehnert

Local Sales Offices & Reps.

Frequency product

Conn	New Canaan, S. Pierce Inc.	203-966-4630
Ill	Oak Brook, Whitmore Assocs.	312-325-4727
Ky	Ft. Mitchell, G. W. Thelen Co.	606-341-8181
Md	Silver Spring, Spectro Sys.	301-949-8261
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Minn	Minneapolis, Nortec Sls. Inc.	612-835-7414
Mo	Springfield, Osbern Sls. Co.	417-887-1773
NJ	Riverdale, Comp Tech Sls.	201-935-5454
NJ	Union, Comp-Tech Sls.	201-687-2484
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
Pa	Wyndmoor, Spectro Sys. Corp.	215-836-1545
Wash	Seattle, Blum & Assocs.	206-285-2590

ELCTRN. SEALS, Dept. EM, 13766 Saticoy St., Van Nuys, Cal. 91402, Tel: 213-873-4982; FSC No.: 12349; Empl.: 25

ELECTRONIC SERVICE CO., Dept. EM, 10 Robert Court, Verona, N.J. 07044, Tel: 201-239-0303

Sales Manager: W. Zilinsky

ELECTRONIC SOLUTIONS INC., Dept. EM, 8070 Engineer Rd., San Diego, Cal. 92111, Tel: 714-292-0242

Sales Manager: B. Shiloff

Local Sales Offices & Reps.

Cal	Costa Mesa, Measurement Assocs.	714-540-7160

ELECTRONIC SPECIALTY DIV., Datron Systems Inc., Dept. EM, 18900 N.E. Sandy Blvd., Portland, Ore. 97220, Tel: 503-665-0121, TWX: 360-453 910-469-8782; FSC No.: 98927 .... p. 3482-3484

Sales Manager: R. Lisdero

Local Sales Offices & Reps.

Ala	Madison, B-C Elctrn. Sls.	205-837-5778
Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Inglewood, Jack Berman	213-649-6111
Cal	Oakland, Moulthrop Sls. Inc.	415-261-7676
Colo	Denver, R.G. Bowen Co.	303-722-4641
Conn	Glastenbury, Barton Caron Assoc.	203-633-9417
Fla	Seminole, Spartak Inc.	813-393-6533
Ga	, B-C Elctrn. Sls.	404-436-5169
Ill	Chicago, L.G.S. Elctrn.	312-456-9616
Iowa	Cedar Rapids, Engrg. Svcs.	319-362-0503
Kans	Prairie Village, Engrg. Svc. Co.	913-649-4000
Md	Columbia, Rep-Tron Inc.	301-465-6433
Mass	Auburndale, Barton Caron Assoc.	617-332-2021
Mich	Novi, A.P. Assoc.	313-476-2300
Minn	St. Paul, Countryman Assoc. Co.	612-645-9151
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Edgewater, TX Sls. Inc.	201-886-0540
NY	Hauppauge, T.X. Sls.	516-231-9111
NY	Poughkeepsie, C.W. Floring	914-471-2973
NY	Syracuse, C.W. Floring & Assoc.	315-478-2149
Ohio	Vandalia, W.J. Brauer & Assoc.	513-898-1224
Ohio	Wickliffe, W.J. Brauer & Assoc.	216-943-0601
Ore	Portland, Quadra Sls. Corp.	506-225-0350
Pa	Ambler, Wyncote Instr. Co.	215-643-2440
Pa	Pittsburgh, W.J. Brauer & Assocs.	412-921-3213
Tex	Dallas, Blackburn Assoc.	214-792-8885
Va	Vinton, B-C Elctrn. Sls.	703-890-1128
Wash	Bellevue, Quadra Sls. Corp.	206-454-4946

Local Distributors

NY	Hauppuage, Rampart Comp. Inc.	516-273-1111

ELECTRONIC SUPPORT SYSTEMS, Dept. EM, 122 W. St. Charles Rd., Villa Park, Ill. 60181, Tel: 312-833-8277; Empl.: 20

ELECTRONIC SYSTEMS & PROGRAMMING INC., Dept. EM, 3355 W. El Segundo Blvd., Hawthorne, Cal. 90250, Tel: 213-973-0262, Telex: 66-4467; Empl.: 22

Local Sales Offices & Reps.

NC	Matthews, John B. MacKenzie	704-366-1344

ELECTRONIC SYSTEMS & PROGRAMMING INC. cont'd

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Complete selection of Computer-Based, Automatic Test Systems featuring Self-Programming and advanced diagnostics and access fixtures designed to meet your interconnection test requirements.

SYSTEM 7100 - CMOS switching for extremely high thruput rates.

SYSTEM 7400 - High voltage system designed to test the entire range of wired assemblies from backplanes to military aircraft.

ACCESS FIXTURING - To simplify the product/system interface and increase thruput.

ELECTRONIC TRANSFORMER CORP., Dept. EM, 460 Totowa Ave., Paterson, N.J. 07509, Tel: 201-279-4445; FSC No.: 72149; Empl.: 65

Local Sales Offices & Reps.

NY	Syracuse, Lenard Co.	315-479-9191
Ohio	Dayton, S. Tetelbaum	513-276-5808

ELECTRONIC TRANSISTORS, Dept. EM, 112-15 Northern Blvd., Flushing, N.Y. 11368, Tel: 212-651-7200, Telex: 96-0173; FSC No.: 12045; Empl.: 45; Minimum order: $L. Braunstein

Sales Manager: L. Braunstein; *Distributor Manager:* L. Braunstein

Local Sales Offices & Reps.

Ohio	Dayton, L.S. Fedotin	513-275-9345
Exp:	N.Y., Westbury, Minthorne Int. Co.	516-334-3303

ELECTRONIC WATTMETER CO., Dept. EM, 2275 Sixth St., Sarasota, Fla. 33577, Tel: 813-959-5905; Empl.: 6

Local Sales Offices & Reps.

Ill	Chicago, Essential Plus	800-323-1554

ELECTRONICS ONE INC., Dept. EM, 2166 Faulkner Rd. NE, Atlanta, Ga. 30324, Tel: 404-321-4960; Empl.: 7

™ELECTRONIK - temperature recorders & controllers - Honeywell

ELECTRONS CO., Unit of General Signal Corp., Dept. EM, 90 Connecticut Ave, Norwalk, Conn. 06856; FSC No.: 80098

™ELECTROPANE R - electrically conducting glass - Libbey Owens-Ford Co.

™ELECTROPUNCH - punch press-electric - Black & Webster, Inc.

™ELECTROSCAN 30 - electroanalytical system - Beckman Instrs., (AISSD)

™ELECTROSET - automatic terminal setter - Black & Webster, Inc.

™ELECTRO-SHIELD - rfi shielding components - Estes Engrg. Co.

ELECTROSTAR SYSTEMS, Dept. EM, 116 Toledo St., Farmingdale, N.Y. 11735, Tel: 516-293-6440

™ELECTROSTAT - stacic d.c. adjustable speed drivers - WER Industrial

ELECTROSTATICS INC., Dept. EM, 7718 Clairemont Mesa Blvd., San Diego, Cal. 92111, Tel: 714-279-1414; FSC No.: 34538; Empl.: 17 .... p. 3243

™ELECTROTABLE - indexing table - Black & Webster, Inc.

™ELECTRO-TACH - tachometer - Electro Corp.

™ELECTROTAPE - surveying tool - Cubic Corp.

ELECTROTEC INC., Dept. EM, 2837 Ladybird La., Dallas, Tex. 75220, Tel: 214-358-4221, TWX: 910-861-4123; Empl.: 32

Local Sales Offices & Reps.

Cal	Burbank, Wright Engrg.	213-843-7240

Cal	Los Altos, Stout-Loeswick Inc.	415-948-3265
Mass	Lowell, Russell Engrg.	617-458-7146
Minn	Anoka, Magner & Assocs.	612-427-5550
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Plainview, ERA	516-822-9890
Wisc	Milwaukee, MW Enterprises	414-352-9150

(TM)ELECTRO TIME - solid state devices - Clare & Co., C.P.

(TM)ELECTROTRIM - load cutter - Electrovert

(TM)ELECTRO-TY - calbe tie - Electrovert

ELECTROVERT, Dept. EM, 86 Hartford Ave., Mt. Vernon, N.Y. 10553, Tel: 914-664-6090, Telex: 1-37483; Empl.: 65

Local Sales Offices & Reps.

Ala	Huntsville, BJR Research Reps	205-881-3569
Ariz	Phoenix, R. Anderson Co.	602-272-8128
Ariz	Phoenix, Kay Ent.	602-242-6787
Ariz	Phoenix, N.G. Ganem Co.	602-945-0839
Cal	Cerritos, Dennis Don & Assoc.	213-587-7125
Cal	Monterey Park, Aere K.A.P.	213-573-5313
Cal	San Francisco, Westech	415-433-0774
Cal	Santa Ana, Production Technology West	714-558-1837
Cal	Santa Ana; Electrovert, Inc.	714-835-2033
Cal	Sunnyvale, Production Technology West	408-739-4479
Colo	Denver, McLoud & Raymond Co	303-756-1589
Colo	Vail, Mile High Elctrns.	303-476-1149
Conn	West Hartford, Charles Segel Co	203-236-2027
Fla	Clearwater, H. R. Gross & Co.	813-447-2581
Fla	Hollywood, Wallace Elctrns.	305-961-6640
Fla	Tampa, Wallace Elctrns.	813-961-1037
Ga	Atlanta, Electrovert	404-451-9366
Ga	Gainesville, Deep South Electrical Sls	404-532-9419
Ill	Chicago, EMF Co.	312-889-8323
Ill	Chicago, Berndt Assoc.	312-283-0713
Ill	Franklin Park, Electrovert, Inc.	312-455-1003
Ill	Westchester, Electrical Mktg. Corp.	312-681-1180
Ind	Carmel, Central States Machinery Co.	317-844-0178
Ind	Indianapolis, Marketing Engrgs.	317-546-1523
Iowa	Des Moines, K S W Inc	515-279-9235
Kans	Overland Park, Electri-Rep	913-649-2168
Md	Silver Springs, ARA Elctrns.	301-565-2584
Mass	Newtonville, Edcom, Inc.	617-969-9710
Mass	Newtonville, C. Segel Assoc.	617-969-6900
Mich	Farmington, Carter, Mc Cormic & Peirce Inc	313-477-7700
Mich	Royal Oak, M. A. Percival Co.	313-548-1971
Minn	Minnetonka, Tonka Electronic Supply	612-933-3786
Minn	St. Paul, Countryman Assoc. Co.	612-645-9151
Mo	Kansas City, K S W Inc.	816-358-5240
Neb	Omaha, K S W Inc.	402-333-2943
NH	Manchester, Electrovert Inc	603-625-5877
NJ	Livingston, Argo Engineering Co	201-992-4367
NY	Guilderland, The Solder Pot	518-355-1829
NY	Plainview, Robert Smith Assoc.	516-681-3155
NY	Rochester, L-Mar Assoc	716-328-5240
NY	Spring Valley, R. Smith Assoc.	914-354-6067
Ohio	Cleveland, J. B. Clough Co.	216-431-2700
Ohio	Cleveland, Marlow Assoc.	216-932-0900
Ohio	Engelwood, Argent Industries	513-836-0981
Ore	Portland, Joseph V. Bezosko Co	503-222-4279
Ore	Portland, Van Voorhees Assoc	503-292-9313
Pa	Glenside, ARA Elctrns. Inc.	215-887-5250
Pa	Narberth, S. A. Jeffries, Inc.	215-664-8500
Pa	Pittsburgh, Marlow Assoc	412-831-6113
Pa	Reading, Beil & Whitaker	215-779-2610
Tenn	Memphis, Al Engelman Co.	901-458-6263
Tex	Dallas, J. Tuite Co.	214-381-2103
Tex	Dallas, Electrovert Inc.	214-241-5696
Tex	Dallas, P. J. Scanlon Co.	214-231-4661
Wisc	Milwaukee, Berndt Assoc.	414-545-8400

(TM)ELECTRO-VOICE - all electro-voice products - Electro-Voice, Inc.

Electroweave, Inc.

ELECTROWEAVE, INC., Dept. EM, 27 E. Foundry St., Central Falls, R.I. 02863, Tel: 401-724-3000; FSC No.: 54207 .... p. 4643

Sales Manager: R. Plancaet

Local Sales Offices & Reps.

Cal	Irvine, Mission Mktg. Group	714-833-1802
Cal	Palo Alto, Brooks Tech Group	415-328-3232
Fla	Lighthouse Point, R.C. Simon	305-941-2757
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
Mass	Clinton, F.J. Coleman & Co.	617-368-0116
Minn	Minneapolis, Jos Co-Melius, Inc.	612-854-4270
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
NJ	Springfield, F.F. Sylvester Assocs.	201-376-3324
NM	Albuquerque, Sealect Technology, Inc.	505-299-1137

ELEXON POWER SYS., Div. Elpac Inc., Dept. EM, 3131 S. Standard Ave., Santa Ana, Cal. 92705, Tel: 714-979-4440, TWX: 910-595-1513; Empl.: 160; Minimum order: $R. Gomez .... p. 3244

Sales Manager: E. Blackman; *Distributor Manager:* R. Gomez

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Sls.	602-968-7791
Colo	Parker, J.S. Heaton Co.	303-841-3651
Conn	Cheshire, Coakley, Boyd & Abbett	203-272-2261
Fla	Ft. Lauderdale, CBC Elctrns.	305-484-7330
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Ill	Berkeley, Balhorn & Roeser	312-449-3900
Md	Baltimore, Component Sls.	301-484-3647
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Thomas Mktg.	612-823-4880
NY	Valley Stream, R & G Sales	516-561-9696
NC	Cary, Montgomery Mktg.	919-467-3619
Ohio	Cincinnati, F.J. Campisano Co.	513-662-1616
Okla	Tulsa, H.J. Daly Co.	918-627-4159
Pa	Doylestown, T.O.E. Sls.	215-348-2212
Tex	Houston, Cunningham Co.	713-461-4197
Wash	Buckley, Halbar Assoc.	206-939-2080

Local Distributors

Cal	Inglewood, Newark Elctrns.	213-678-0441
Cal	Irvine, Cramer Elctrns.	714-979-3000
Cal	Los Angeles, Mil-Comm Dist	213-478-0525
Conn	Fairfield, Utronics	203-255-4521
Ill	Newark Elctrns.	312-638-4411
Md	Columbia, Technico Inc.	301-461-2200
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Waltham, QPL Elctrns.	617-891-0460
Pa	Huntingdon Valley, Shap Elctrns.	215-698-9550
Tex	Houston, Newark Elctrns.	713-782-4800
For:	Italy, Livorni, Romagnoli Elettronica	
For:	South Africa, Capetown, Eagle Elctrns.	45-1421
For:	Sweden, Gnesta, Powerbox AB0158 11920,	10700

ELFAB CORP., Dept. EM, 4200 Wiley Post Rd., Addison, Tex. 75001, Tel: 214-233-3033, TWX: 910-860-5460; Empl.: 150 .... p. 1838

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Tempe, Delta Elctrns.	602-966-9903
Cal	Fremont, Foraker Sls. Corp.	415-657-2213
Cal	Long Beach, Elfab Corp.	213-426-4534
Colo	Boulder, Elfab Corp.	303-499-1560
Conn	New Fairfield, Sales Engrg.	203-746-9516
Fla	Winterpark, Young & Lawrence Assoc.	305-647-6929
Ill	Lisle, Trend-Tronics	312-963-2210
Md	Rockville, Mechtronics Sls.	301-340-2130
Mass	Andover, Sales Engrg.	617-470-0800
Minn	Minneapolis, Components Group	612-824-4222
NH	Seabrook, Elfab Corp.	617-893-3092
NJ	Cherry Hill, Benco Sls.	609-779-9282
NJ	Paramus, Win Cor Elctrn. Sls.	201-967-0242
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
NC	High Point, Engrg. Devices Corp.	919-869-7200
Ohio	Chagrin Falls, Midwest Mktg.	216-247-6655
Ohio	Dayton, Midwest Mktg.	513-433-2511
Okla	Oklahoma City, Ammon & Rizos Co.	405-373-2748
Pa	Huntingdon Valley, Omega Elctrn. Sls.	215-947-4135
Tenn	Jackson, Remco	901-424-0142
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Tex	Houston, Ammon & Rizos Co.	713-781-6240
Wash	Tukwila, General Elctrns, Inc.	206-575-4030

ELGAR CORPORATION

ELGAR CORPORATION, Dept. EM, 8225 Mercury Ct., San Diego, Cal. 92111, Tel: 714-565-1155, TWX: 910-335-1246; FSC No.: 25965; Empl.: 115 p. 3378-3381

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Tempe, Trembly Assoc.	602-966-4428
Cal	La Jolla, Ward/Davis Assocs.	714-459-3351
Cal	Lawndale, Ward/Davis Assocs.	213-452-7740
Cal	Sunnyvale, Ward/Davis Assocs.	408-245-3700
Colo	Arvada, Figaro-Klebba Assoc.	303-424-0108
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Fla	Orlando, BCS Assocs.	305-896-4881
Haw.	Honolulu, Intelect, Inc.	808-845-9016
Ill	Arlington Heights, Dytec/Central, Inc.	312-394-3380
Kans	Overland Park, Dytec/South, Inc.	913-384-2710
Md	Rockville, Electronic Mktg. Assocs.	301-881-5300
Mass	Holbrook, McLellan Assocs.	617-767-4771
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
Mich	Madison Heights, WKM Assoc.	313-588-2300
Minn	Minneapolis, Berndt Assocs., Inc.	612-835-4818
Mo	Edmundson, Dytec/South, Inc.	314-423-9595
NM	Albuquerque, Trembly Assoc.	505-266-8616
NY	Fairport, NACO Elctrns. Corp.	716-223-4490
NY	Great Neck, Measurement Tech. Inc.	516-482-3500
NY	North Syracuse, NACO Elctrns. Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Pa	King of Prussia, Electronic Mktg. Assocs.	215-265-1600
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tex	Dallas, Data Aids Assoc.	214-620-1551
Tex	Houston, Data Aids Assoc.	713-862-6685
Wash	Bellevue, Data Power Sls. Co.	206-453-8200
Exp:	San Diego, Cal., Elgar Intern'l. Corp.	714-565-1155

(TM)ELGARD - Uninterruptible Power Source - Elgar Corporation

ELGENCO, INC., Dept. EM, Box 460, Huricane, Utah 84737, Tel: 801-635-4954; FSC No.: 15455 p. 2842-2847

Local Sales Offices & Reps.

Cal	Sherman Oaks, Windsor Dynamics, Inc.	213-990-4173
Cal	Woodside, N-S Assocs.	415-854-4870
Conn	Glastonbury, Instrs. Reps.	203-633-0777
Mass	Lexington, Instr. Reps., Inc.	617-861-8620
NM	Albuquerque, Technology Mktg. Assoc.	505-298-2415
NY	Great Neck, Harvey J. Krasner Assoc.	516-487-0690
Pa	Newtown Square, Holdsworth & Co.	215-EL6-8550

ELGIN ELCTRNS., INC., Sub. Basic, Inc., Dept. EM, Walnut St., Waterford, PA. 16441, Tel: 814-796-2601, TWX: 510-699-6659; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg., Inc.	205-772-9237
Cal	Mountain View, Microwave Mktg. Assoc.	415-969-3355
Conn	Wilton, Elgin Electronics	203-762-7012
Ill	Woodridge, Elgin Electronics	312-964-4474
NJ	Tenafly, R.J. Monroe Assoc.	201-569-4770
Tenn	Nashville, Toof Audio Sys.	615-244-4755
Tex	Houston, Bill Sneed	713-667-6561
Wash	Seattle, Del Com Sls. Co.	206-248-0090
Exp:	Can., Montreal, Quebec, Assoc. Tele. Equip. Ltd.	514-483-1272

(TM)ELIMINATOR - loudspeaker - Electro-Voice, Inc.

(TM)ELINCO - ac & dc sub-fractional & fractional hp motors & generators. - Electric Indicator Co., Inc.

ELIN DIV., California Instrs. Co., Div. of Aiken Ind., Dept. EM, 5150 Convoy St., San Diego, Cal. 92111, Tel: 714-279-8620, Telex: 695-047; FSC No.: 16067; Empl.: 80

Sales Manager: W.W. Hanford

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	205-536-9990
Ariz	Scottsdale, Williams Associates, Inc.	602-947-4297
Cal	Los Altos, J. Stone & Assocs.	415-948-4563
Cal	Los Angeles, Basic Sys Corp.	213-938-2833
Cal	San Diego, Basic Sys Corp.	714-279-9641
Colo	Denver, Williams Associates, Inc.	303-373-4730
Fla	Orlando, FM Assoc.	305-851-5710
Fla	Tequesta, FM Assoc.	305-746-3128
Haw	Honolulu, Aloha Associates	808-941-1574
Ill	Chicago, Sea	312-282-6694
Ind	Carmel, Sea	317-846-2593
Kans	Shawnee Mission, EIR Co.	913-362-0919
La	Baton Rouge, Systems Engrg Sls Co.	504-924-5102
Mass	Waltham, McBar Assocs.	617-890-0233
Minn	Minneapolis, Waytek	612-933-2133
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Cherry Hill, Scientific Reps.	609-482-0059
NM	Albuquerque, Williams Associates, Inc.	505-255-1638
NY	Great Neck, Eastern Instr. of N.Y.	516-466-9505
NC	Greensboro, FM Assoc.	919-294-2754
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	North Olmsted, Hocker Assocs.	216-734-4433
Tex	Houston, SESCO	713-668-7840
Tex	Richardson, SESCO	214-231-9364
Va	Falls Church, Scientific Assocs.	703-573-8787
Wash	Seattle, Data Com Assoc.	206-285-2525

(TM)ELINVAR EXTRA - alloy - Hamilton Technology, Inc.

(TM)ELIPTI-GRIP - terminals - T & B/Thomas & Betts

(TM)ELIPTI-GRIP - terminals - T & B/Thomas & Betts

(TM)ELITES - breadboarding system - E & L Instruments, Inc.

(TM)ELKALOY - copper base alloy - Mallory Metallurgical

(TM)ELKONITE - impregnated refractory metal - Mallory Metallurgical

(TM)ELKONIUM - precious metal based alloy - Mallory Metallurgical

(TM)ELLIPT-O-REEL - elliptical waveguide - Gabriel Elctrns. Inc.

ELMA ENGINEERING, Dept. EM, 1066 E. Meadow Circle, Palo Alto, Cal. 94303, Tel: 415-494-7303, Telex: 345-560; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Montgomery Bros.	602-253-3431
Cal	Laguna Beach, Marchi-Barus Assocs.	714-497-1815
Cal	Northridge, J.J. Ghiglia	213-349-2525
Cal	Redwood City, Marchi Assocs.	415-364-3411
Conn	Hamden, Godfrey & Assoc.	203-288-1795
Conn	Woodstock, Godfrey & Assocs.	203-928-0332
Del	Newark, J. Harzman	
Fla	Coral Gables, H.G. Wilson & Assoc.	305-446-0014
Ga	Atlanta, Stoughton & Assoc.	404-255-9279
Ill	Arlington, R.K. Orman Co.	312-829-9129
Md	Queenstown, Langmack Sls.	301-827-7007
Mich	Southfield, Engel-Klaes	313-355-1610
Miss	Jackson, Kossen Equip.	601-922-6310
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Charlotte, R.C. Chapman Co.	704-525-2421
Ohio	Cleveland, R.J. Gibbs & Assoc.	216-871-7997
Pa	Pittsburgh, Lax Assoc.	
Tex	Houston, Beeco	713-661-3192

ELMAG CORP., Dept. EM, 54 Clark St., Newark, N.J. 07104, Tel: 201-481-1600; FSC No.: 23160; Empl.: 25

Local Sales Offices & Reps.

NJ	Hillsdale, Martin Klein Assoc.	201-664-8711
NY	E. Rockaway, Wm. Bellenkes Assoc.	516-887-1443
Ohio	Dayton, Irving Atkind Assoc.	513-837-4750
Pa	Narbeth, Samuel A. Jeffries	215-664-8500

EL-MENCO-, See Electro Motive Corp.

(TM)ELMCO - coil winding machinery - Elden Mfg. Co.

(TM)EL-MENCO - capacitors & tubes - Electro Motive Corp.

(TM)ELMET - molybdenum & tungsten - Philips Elmet Corp.

ELMWOOD SENSORS, INC., Dept. EM, 1655 Elmwood Ave., Cranston, RI 02907, Tel: 401-781-6500, TWX: 710-381-6413; Empl.: 400 .... p. 4315

Local Sales Offices & Reps.

Ala	Decatur, Tenn. Tech. Sls.	205-350-0630
Ariz	Phoenix, O'Donnell SW	602-993-9740
Ark	Hot Springs, M. Young Assocs.	501-262-1365
Cal	Palo Alto, O'Donnell	415-327-9061
Cal	Torrance, O'Donnell	213-323-9243
Colo	Boulder, Front Range Mktg.	303-443-4780
Fla	Maitland, D & E Assocs.	305-644-3039
Ga	Atlanta, Electro Svcs.	404-993-0389
Ill	Deerfield, Thermec Inc.	312-945-5300
Ind	Marion, O. Bromberg	317-664-5384
Ky	Louisville, O. Bromberg	502-245-8916
Md	Riderwood, Manreps	301-296-2778
Mich	Farmington, Davis & Martensen	313-474-8300
Minn	Mpls., C. Listug Sls.	612-537-6740
Mo	St. Louis, E.J. Hill Co.	314-621-1818
NH	Durham, G. Forman	603-868-2282
NY	Larchmont, G.M. Moch Co.	914-834-3530
NY	Latham, L-Tron Corp.	518-785-5032
NY	Rochester, Canavan-Scanlon	716-442-0720
NY	Syracuse, Canavan-Scanlon	315-437-1271
Ohio	Cincinnati, O. Bromberg	513-771-9333
Ohio	Cleveland, Allied Entprs.	216-826-3350
Pa	Ardmore, Manreps	215-649-6300
Pa	Murrysville, Christopher Sls. Co.	412-325-3200
Tex	Dallas, Ion Assocs.	214-357-9441
Tex	Fort Worth, T.J. Small Co.	817-332-6352
Wash	Seattle, Temco Northwest	206-935-4845
Wisc	Milwaukee, R. Zingler	414-964-8120

ELPA MARKETING IND., Dept. EM, Thorens & Atlantic Ave., Garden City Park, NY 11040, Tel: 516-746-3002

ELPAC COMPONENTS, Div. Elpac Elctrns., Dept. EM, 3131 So. Standard Ave., Santa Ana, Cal. 92705, Tel: 714-979-4440, TWX: 910-595-1513 .... p. 1247

Sales Manager: D. Allen

Local Sales Offices & Reps.

Ala	Huntsville, Component Sls. Corp.	205-881-4753
Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	Santa Clara, I-Square, Inc.	408-338-0192
Cal	Van Nuys, Wes-K Assocs.	213-989-3070
Colo	Denver, R. W. Masterson Co.	303-771-1482
Fla	Ft. Lauderdale, CBC Elctrns.	305-484-7330
Ill	Chicago, Brock & Cushman	312-622-4110
Iowa	Iowa City, J. Vrbik Co.	319-366-8733
Mass	Needham Heights, Todino Eng. Sls.	617-444-7925
Mich	Birmingham, J. C. Hofstetter Co.	313-646-3536
Minn	Minneapolis, Thomas Mktg.	612-823-4880
NJ	Parlin, JMR Saftler Sls.	201-727-5335
NY	Lynbrook, JMR Saftler Sls.	516-593-7880
NC	Raleigh, Component Sls. Corp.	919-832-1897
Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
Okla	Tulsa, H. J. Daly Co.	918-627-4159
Pa	Doylestown, T.O.E. Sls.	215-348-2212
Tex	Dallas, Hillman Entprs.	214-827-4790
Va	Mt. Laurel, Naudain Assocs.	215-564-3194
Wash	Bellevue, Testco	206-454-7422

Local Distributors

Cal	Los Angeles, MIL-COMM	213-478-0525
Conn	East Hartford, R&S Electronics	203-528-9901
Ill	Des Plaines, Edmar Electronics	312-298-8580
NJ	Bergenfield, Technical Electronics Distributors	201-384-3643
Ohio	Dayton, NASCO	513-253-8931
Tex	Garland, Newark Electronics	214-271-2511
Tex	Houston, Newark Electronics	713-782-4800
Utah	Ft. Worth, T.T.I.	817-335-8111

(TM)ELPH - digital thermocouple indicator - Thermo Elec. Co., Inc.

ELPOWER CORP., Dept. EM, 2117 S. Anne St., Santa Ana, Cal. 92704, Tel: 714-540-6155; Empl.: 129; Minimum order: $P. Basconcillo

Sales Manager: R. Flickinger; *Distributor Manager:* P. Basconcillo

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns.	205-881-5031
Colo	Englewood, R.G. Bowen	303-780-1884
Fla	Ft. Lauderdale, Beacon Elctrns.	305-491-4211
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Chicago, G. McL. Cole Co.	312-774-3535
Iowa	Cedar Rapids, Engineering Svcs. Co.	319-362-0503
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
NJ	N. Caldwell, Masin Esco	201-226-2550
NM	Albuquerque, A.L.S. Elctrns.	505-298-2575
NY	Rochester, Net Sls.	716-467-4538
NY	Syosset, Masin-Esco, Inc.	516-364-0310
NC	Charlotte, Beacon Elctrns.	704-525-7412
Ohio	Columbus, McFadden Sls., Inc.	614-221-3363
Ore	Portland, Components West	503-643-5588
Tenn	Oak Ridge, Beacon Elctrns.	615-482-2409
Tex	Dallas, Roger Martin Assoc.	214-361-8584
Tex	Houston, Roger Martin Assoc.	713-444-2944
Wash	Seattle, Components West	206-243-2133

ELSCO, Dept. EM, 7208 Germantown Ave., Philadelphia, Pa. 19119

(TM)ELSIMATE - a line of calculators - Sharp Electronics Corp.

ELTEC INSTRUMENTS INC., Dept. EM, P.O. Box 9610, Daytona Beach, Fla. 32020, Tel: 904-252-0411, TWX: 810-832-6294

(TM)ELTEX - electronic telex exchange - Frederick Electronics Corp.

(TM)ELTRALEC - catalog - Workman Electronic Prods., Inc.

(TM)ELVOX - intercom sys - PASO Sound Products Inc.

(TM)EL-100 - 1/12 - 1 hp scr controls - Electrol Co., Inc.

(TM)EL-120 - 1/4 - 5 hp scr controls - Electrol Co., Inc.

(TM)EL-20 - 1/1000 - 1 hp shaded pole motor control - Electrol Co., Inc.

(TM)EL-30 - 1/25 - 1/2 hp scr controls - Electrol Co., Inc.

(TM)EL-320 - 2 - 75 hp scr controls - Electrol Co., Inc.

(TM)EL-340 - 5 - 200 hp scr controls - Electrol Co., Inc.

(TM)EL-50 - 1/100 - 1/2 hp scr controls - Electrol Co., Inc.

(TM)EL-75-MO-TO-RATE - 1/15 - 1 hp scr controls - Electrol Co., Inc.

(TM)EMA IRON - microwave absorbing material - Electronautics

(TM)EMC - field intensity analyzer - Singer Instrumentation

EMC TECHNOLOGY INC, Dept. EM, 1971 Old Cuthbert Rd., Cherry Hill, N.J. 08034, Tel: 609-429-7800, TWX: 710 896 0193; FSC No.: 24602; Empl.: 50

Sales Manager: M. Trethaway

Local Sales Offices & Reps.

Cal	Los Altos, Stout-Loeswick, Inc.	415-948-3265
Cal	Los Angeles, RL Comps.	213-823-1048
Colo	Denver, I.W. Strong & Assocs.	303-292-6900
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
Ill	Park Ridge, RF Specialists	312-698-2044
Ind	Ft. Wayne, RF Specialists	219-485-8982
Mass	Needham Heights, Reptron, Inc.	617-449-4141
NY	Liverpool, R & D Assocs.	315-622-2350
NY	Plainview, ERA, Inc.	516-822-9890
Tex	Dallas, Texas Avionics	214-368-3566

EMCO HIGH VOLTAGE, Dept. EM, 2444 Old Middlefield Way, Mt. View, Cal. 94043, Tel: 415-969-3056; Empl.: 10

EMCON DIV., Illinois Tool Works Inc., Dept. EM, 11620 Sorrento Valley :Rd., Box 81542, San Diego, Cal. 92138, Tel: 714-459-4355, TWX: 910-322-1130; Empl.: 350

Local Sales Offices & Reps.

Cal	Irvine, Emcon Regional Office	714-833-9286
Cal	Mt. View, G.C. Woempner Co.	415-964-5454
Cal	San Diego, Emcon Home Office	714-459-4355
Colo	Denver, Camel Elctrns.	303-757-6191
Fla	Altomonte Springs, WMM Assocs.	305-831-4645
Fla	Clearwater, WMM Assocs.	813-447-2533
Fla	Pompano Beach, WMM Assocs.	305-943-3091
Ill	Chicago, Emcon Regional Office	312-282-7383
Ind	Indianapolis, Emcon Regional Office	317-255-9658

Mass	Burlington, Emcon Regional Office	617-273-0365
Mich	Benton Harbor, R.C. Nordstrom Co.	616-857-4653
Mich	Lathrup Village, R.C. Nordstrom Co.	313-559-7373
Minn	St. Paul, Murnco	612-484-8200
NY	Elmont, F.E. Schmitt Co.	516-437-8150
NY	Liverpool, L-Mar Assocs.	315-457-2329
NY	Rochester, L-Mar Assocs.	716-328-5240
NY	Vestal, L-Mar Assocs.	607-729-6339
Ohio	Columbus, Rockford Controls	614-231-5890
Ohio	Dayton, Rockford Controls	513-278-7362
Ohio	Euclid, Rockford Controls	216-731-5250
Pa	Erie, Ecco Elctrns.	814-455-8110
Tenn	Memphis, Emcon Regional Office	901-386-7252
Tex	Houston, R.F. Kimball Co.	800-294-2805
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Utah	Salt Lake City, Camel Elctrns.	801-355-6181
Wash	Seattle, Nemco	
Exp:	Chicago, Ill., Illinois Tool Works Inc.	312-693-3040

Local Distributors

Ala	Huntsville, K & E Assocs.	205-883-9720
Cal	Irvine, EMCON Regional Office	714-833-9286
Cal	Mountain View, G. C. Woempner Co.	415-964-5454
Cal	San Diego, EMCON Regional Office	714-459-4355
Colo	Denver, Camel Elctrns.	303-757-6191
Fla	Clearwater, WMM Assocs.	813-447-2533
Ga	Hartwell, K & E Assocs.	404-376-5438
Ill	Chicago, EMCON Regional Office	312-282-7383
Ind	Indianapolis, EMCON Regional Office	317-846-5071
Md	Randallstown, Beacon North Inc.	301-922-1248
Mass	Burlington, EMCON Regional Office	617-273-0365
Mich	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
Mich	St. Joseph, R. C. Nordstrom & Co.	616-857-4653
Minn	St. Paul, MURNCO	612-484-8200
Miss	Corinth, K & E Assocs.	601-287-5369
NY	East Syracuse, L-Mar Assocs.	315-437-7779
NY	Elmont, F.E. Schmitt Co.	516-437-8150
NY	Rochester, L-Mar Assocs.	716-328-5240
Ohio	Columbus, RCO Columbus	614-231-5890
Ohio	Dayton, RCO Dayton	513-898-5452
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Gwynedd Valley, EMCON Regional Office	215-628-3063
Tex	Houston, R.F. Kimball Co.	800-492-2805
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Va	Falls Church, Beacon North Inc.	703-534-1673
Wash	Seattle, Earl & Brown Co.	206-284-1121
Exp:	Chicago, Ill., EMCON Regional Office-International	312-693-3040
For:	Can., Ajax, Ontario LiS 1L1, R.D. Assocs.	
For:	Can., Montreal, Quebec H3W 3C3, H.W. Brieger Sls.	514-482-0722

™EMCOR - modular enclosure systems - G. F. Business Equipment, Inc.

EMCOR PRODUCTS, Dept. EM, 1600 Fourth Ave. NW, Rochester, Minn. 55901, Tel: 507-289-3371, TWX: 910-565-2374 .... p. 1128

Sales Manager: Gary Ellis

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Instrs.	205-539-4411
Ariz	Scottsdale, PLS Assocs.	602-994-5461
Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, T. Louis Snitzer Co.	714-454-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Colo	Denver, PLS Assocs.	303-773-1218
Conn	Bridgeport, Technical Instrs.	203-368-4582
Fla	Ft. Lauderdale, W. A. Brown Instrs.	305-776-4800
Fla	Melbourne, W. A. Brown Instrs.	305-723-0766
Fla	Orlando, W. A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W. A. Brown Instrs.	904-243-6424
Ga	Atlanta, W. A. Brown Instrs.	404-939-1674
Ill	Des Plaines, Marsland Assocs.	312-694-2262
Ind	Indianapolis, Marsland Assocs.	317-924-3568
La	Mandeville, W.A. Brown Instrs.	504-626-9701
Mass	Wilmington, Technical Instrs.	617-944-3930
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Minneapolis, Marsland Assocs.	612-545-4481
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Ft. Lee, K. E. Hughes Co.	201-944-1600
NM	Albuquerque, PLS Assocs.	505-298-6284
NY	Albany, Reagan/Compar Albany	518-489-4777
NY	Endwell, Reagan/Compar Albany	607-723-9661
NY	Fairport, Reagan/Compar Albany	716-271-2230
NY	New Hartford, Reagan/Compar Albany	315-732-3775
NY	New York City, K. E. Hughes Co.	212-674-6993
NY	Plainview, K. E. Hughes Co.	516-938-7664
NC	Durham	919-682-2383
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling Co.	513-298-7573
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
Pa	Huntingdon Valley, Inacker Sls., Inc.	215-947-5660
Pa	Pittsburgh, Comtel-Sterling Co.	412-922-5720
Tenn	Oak Ridge, W. A. Brown Instrs.	615-482-5761
Tex	Dallas, J. A. Green Co.	214-631-7450
Tex	Houston, J. A. Green Co.	713-526-2959
Utah	Salt Lake City, PLS Assocs.	
Va	Alexandria, Dyna Rep Co.	703-354-1222
Wash	Bellevue, N. R. Schultz Co.	206-454-0300

EMERGENCY BEACON CORP., Dept. EM, 15 River Rd, New Rochelle, N.Y. 10801, Tel: 914-235-9400; Empl.: 25

EMERSON & CUMING, INC., Dielectric Mat'ls. Div., Dept. EM, 869 Washington St., Canton, Mass. 02021, Tel: 617-828-3300, TWX: 710-348-1324; Empl.: 325

Sales Manager: J.R. Copley

Local Sales Offices & Reps.

Cal	Gardena, Emerson & Cuming, Inc.	213-321-6650
Fla	Cocoa Beach, DBM Research Corp.	305-783-2438
Ill	Northbrook, Emerson & Cuming, Inc.	312-272-6700
Md	Silver Spring, Emerson & Cuming, Inc.	301-949-2777
NY	Kings Park, Emerson & Cuming, Inc.	516-724-5216
Pa	Philadelphia, Emerson & Cuming, Inc.	215-848-2040
Tex	Richardson, Emerson & Cuming, Inc.	214-235-7394
Wash	Seattle, Minor B. Brown & Assoc.	206-932-5855

EMERSON, INDUSTRIAL CONTROLS DIV., Dept. EM, 3300 Standard St., Santa Ana, Cal. 92702, Tel: 714-545-5581; Empl.: 400

™EMICO - electrical meters - Electro-Mechanical Instru. Div.

EMI GENCOM INC., Dept. EM, 80 Express St., Plainview, N.Y. 11803, Tel: 516-433-5900, TWX: 510-221-1889; Empl.: 21

Sales Manager: L. Lieberman

Local Sales Offices & Reps.

Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	N. Hollywood, O'Halloran Assocs.	213-877-0173
Cal	Palo Alto, O'Halloran Assocs.	415-326-1493
Colo	Denver, PLS Assocs.	303-773-1218
Fla	Orange Park, Pulcir	904-264-7615
Ill	Chicago, Carter Elctrns.	312-585-5485
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Shawnee, Pivan Engrg.	913-722-1030
Mass	Needham, Addelco Corp.	617-444-4754
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	East Orange, Friedman Assocs.	201-673-2500
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Fayetteville, M.P. Andrews	315-637-3144
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Ore	Beaverton, Underwood Assocs.	206-575-0123
Pa	Elkins Park, Snow Assocs.	215-379-4700
Pa	Pittsburgh, Carter, McCormic & Peirce	412-372-4415
Tenn	Oak Ridge, Pulcir	615-483-6358
Tex	Dallas, Southwestern Eng. & Equip. Co.	214-827-2621
Tex	Houston, Southwestern Eng. & Equip. Co.	713-437-1171
Wash	Bellevue, Underwood Assocs.	206-575-0123
Wash	Seattle, Underwood Assocs.	206-575-0123
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

™EMI MESH STRIP - elastomer core or all metal EMI/RFI gasketing - Metex Corp.

EMI TECHNOLOGY, Dept. EM, 20 Old Ridgebury Rd, Danbury, Conn 06810, Tel: 203-744-3500, TWX: 710-456-3068

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Mt. View, Scientific Devices	415-964-4230
Mass	Waltham, Scientific Devices	617-894-5637
NJ	Englewood, Scientific Devices	201-871-3916
NM	Albuquerque, Southwestern Engrg. & Equip.	505-265-6775
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Tex	Dallas, Southwestern Engrg. & Equip.	214-827-2621
Va	Springfield, Scientific Devices	703-451-6500
Wash	Bellevue, Scientific Devices	206-454-0900

™EMLOCK - miniature connector for flexible cable - Cablewave Systems Inc.

EMM/CALLUS MEMORIES, Dept. EM, Box 6297, San Jose, Calif. 95150

™E-MODULE - ultrasonic generator - Branson Cleaning Equip. Co.

™EMPCO - electromagnetic transducers - Carolina Medical Elctrns., Inc.

™EMPIRICAL-LOG - empirical-logs broad band antenna's - Telrex Labs.

EMPORIUM SPECIALTIES CO., INC., Dept. EM, Box 65, Austin, Pa. 16720, Tel: 814-647-8661; Empl.: 150

Local Sales Offices & Reps.

Ariz	Scottsdale, C.T. Fink & Assocs.	602-947-7981
Cal	Lynwood, D. West & Assocs.	213-636-6124
Cal	Oakland, MHR Sls. Agency	415-569-1564
Conn	Woodbury, Hart, Nininger & Campbell	203-263-4321
Fla	Lighthouse Point, E. Whalen	305-781-6996
Ill	Chicago, K.D. Engle Co.	312-539-1820
Ind	Indianapolis, T. Tuohy	317-356-3001
Md	Ellicott City, Special Prods.	301-465-5922
Mass	Gloucester, P. Hart	617-281-0679
Mich	St. Claire Shores, L. Donlon	313-775-6496
Minn	Anoka, Magner & Assocs.	612-427-5550
NJ	Montvale, H. Herzing	201-573-0967
NJ	Riverton, Given Assocs.	609-829-7249
NY	Roslyn Heights, R. Binder	516-621-8279
NY	Williamsville, N.A. Throm & Assocs.	716-634-2413
NC	Charlotte, B. T. Walker	704-364-8562
Ohio	Chagrin Falls, Bray Assocs.	216-247-4474
Ohio	Cleveland, G.F. Sindelar Co.	216-333-9945
Tex	Richardson, C.J. Garvey Co.	214-234-3371
Wisc	Wauwatosa, C. Garny	414-475-9290

EMPRO MFG. CO., INC., Dept. EM, Box 26064, 10920 E. 59th St., Indianapolis, Ind. 46226, Tel: 317-823-4478; Empl.: 25 .... p. 2850

Local Sales Offices & Reps.

Cal	Gardena, Key Instrs., Inc.	213-321-5891
Ga	Atlanta, Brownell Electro Inc.	404-762-5181
Ill	Elk Grove Village, Metermasters Inc.	312-593-8650
Ill	LaGrange, Penn Engrg.	312-352-1037
Mass	Burlington, Mancib Co.	617-272-9450
NY	Long Island City, D.F. Tobias & Co.	212-545-9191
Ohio	Cleveland, Weschler Elec. Corp.	216-251-4609
Pa	Philadelphia, Sunshine Scientific Inst.	215-673-5600

™EMRALON - dry film lubricants - Acheson Colloids Co.

EMR COMPUTER, Div/Weston Instrs. Inc., Dept. EM, Box 3942, St. Paul, Minn 55165

EMR TELEMETRY, A DIV. OF SANGAMO-WESTON, INC., Dept. EM, Box 3041, Sarasota, Fla. 33578, Tel: 813-371-0811, TWX: 5-2890 810-864-0406; Empl.: 525

Sales Manager: G.E. Breyton

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Cupertino, EMR-Telemetry	408-257-1813
Cal	Lancaster, EMR-Telemetry	805-948-7614
Cal	Playa Del Rey, EMR-Telemetry	213-821-8084
Fla	Sarasota, EMR-Telemetry	813-371-0811
Fla	Winterhaven, Lee Assocs.	813-294-5815
Ill	Chicago, Carter Elctrns., Inc.	312-585-5485

Ind	Indianapolis, Carter Elctrns., Inc.	317-293-0696
Kans	Overland Park, Carter Elctrns., Inc.	913-649-6996
Md	Rockville, Farrell Assocs.	301-424-9460
Md	Silver Spring, EMR-Telemetry	301-588-8200
Mass	Bedford, Claflin Assocs.	617-275-7428
Mich	Southfield, EMR-Telemetry	313-559-2580
Minn	Minneapolis, Carter Elctrns., Inc.	612-544-9393
Mo	Hazelwood, Carter Elctrns., Inc.	314-731-2237
NM	Albuquerque, EMR-Telemetry	505-293-6435
NY	Fayetteville, Savage Sls. Co.	315-682-2131
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Wash	Seattle, EMR-Telemetry	206-243-4330
Wisc	Milwaukee, Carter Elctrns., Inc.	414-464-5555
Exp:	Fla., Sarasota, EMR-Telemetry	813-371-0811

™EMT - reverberation units, compressors, turntables, wow & flutter meters, orchestra tuning standard - Gotham Audio Corp.

™EMTEL - Seismic/Isoamp/Time & Frequency Standards - Develco

™EMULPHOR - surfactant - GAF Corporation

ENCODER DIVISION, Litton Sys. Inc., Dept. EM, 20745 Nordhoff St., Chatsworth, Cal. 91311, Tel: 213-341-6161, TWX: 910-494-1229; Empl.: 175 p. 1488

Local Sales Offices & Reps.

Ariz	Phoenix, Clifton Precision Prod.	602-242-0910
Cal	Van Nuys, G. Mitchell Assoc.	213-989-5111
Ill	Elk Grove Village, Midwest Meridian Corp.	312-437-6531
Iowa	Cedar Rapids, Midwest Meridian Corp.	319-365-6561
Mo	Maryland Heights, Midwest Meridian Corp.	314-878-4441
NY	Chappaqua, R. M. Glueck Assoc.	914-238-9254
Ohio	Dayton, Midwest Meridian Corp.	513-256-6960
Tex	Saginaw, Midwest Meridian Corp.	214-251-3933

™ENCOM - intercom equip. & telephone apparatus - Encom Prods. Co., Inc.

ENCOM PRODS. CO., INC., Dept. EM, Lower Hopewell Rd., Box 300, Oxford, Pa. 19363, Tel: 215-932-9265; Empl.: 10

Local Sales Offices & Reps.

Pa	Pittsburgh, Control Assembly Co.	

Local Distributors

Ala	Birmingham, Sound Engrg. Svc.	205-322-4408
Alas	Anchorage, Electronics Alaska	907-272-5447
Ariz	Phoenix, Comm. Consultants	602-267-1411
Cal	Los Angeles, General Intercom	213-731-6336
Cal	Oakland, Comm. Svc. Co.	415-893-6970
Cal	San Dimas, Pacific Intercom	213-963-1225
Del	Wilmington, Megonigal Elex.	302-652-3178
Fla	Hollywood, Comm. Svc. Co.	305-961-1157
Fla	Orlando, Dictograph/N. Fla.	305-841-1360
Ga	Atlanta, JWM Corp./Comm. Div.	404-875-8175
Ill	Chicago, G & O Industries	312-334-2294
Ill	Chicago, Modern Comms. Inc.	312-677-0700
Ill	Chicago, Industrial Comms.	312-626-7500
Ill	Elkhart, Penwood Sls. Corp.	219-293-3615
Ill	Springfield, Elec. Specialty Co.	217-787-0800
Iowa	Des Moines, Temputer, Inc.	515-265-1586
Kans	Kansas City, A. A. Richards Co.	913-321-3977
Md	Ellicott City, B. F. Whitten Co.	301-465-0797
Mass	Canton, Mass. Tel. Co.	617-828-8400
Mich	Detroit, Stanley's Comms.	313-366-6344
Minn	Minneapolis, Interior Comms.	612-866-4001
Mo	St. Louis, St. Louis Comms.	314-726-2218
NJ	Beverly, Dynasonic Inc.	609-386-6900
NJ	Bloomfield, Bingham Comms.	201-748-3575
NJ	Elizabeth, Tel-A-Tune Music	201-965-1144
NJ	Mahwah, N. A. Philips	201-529-3800
NY	Batavia, Demerly Comms.	716-343-4946
NY	Buffalo, Hunter & Bell Inc.	716-882-2210
NY	Marcellus, Div. Concepts	315-673-2088
NY	Woodside, Imperial Elex.	212-458-7275
NC	Winston-Salem, Long Engrg. Co.	919-725-2306
Ohio	Akron, Elec. Engrg. Co.	216-762-9771
Ohio	Cleveland, Warwick Comms.	216-621-7127
Okla	Lawton, Automatic Music	405-355-4926
Pa	Allentown, Daveland Co.	215-439-8701
Pa	Pittsburgh, Gray Sound	412-761-6130
RI	Providence, Gertz Inc.	401-421-5881
Tenn	Chattanooga, Sound Engrg. Co.	615-624-3381
Tex	Corpus Christi, Sound Distributors	512-882-2282
Va	Richmond, Cottrell Elex.	703-648-8338
Wash	Seattle, Electronic Aids	206-937-3399
WVa	Wheeling, H. Black Co.	304-277-1651
Wisc	Wauwatosa, Krueger Elex. Inc.	414-453-0650

™ENDECO - soldering/desoldering tools - Enterprise Development Corp

ENDEVCO, Div. Becton, Dickinson & Co., Dept. EM, 30700 Rancho Viejo Rd., San Jaun Capistrano, Cal. 92675, Tel: 714-493-8181, TWX: 910-596-1415; FSC No.: 95411; Empl.: 400

Local Sales Offices & Reps.

Cal	Palo Alto	415-969-3212
Ga	Atlanta	404-761-4996
Ill	Crystal Lake	815-459-7226
Md	Towson	301-752-0688
Mass	Bedford	617-969-8063
NJ	Haddonfield	609-428-5285
Ohio	Akron	216-929-3811
Tex	Houston	713-440-3850

ENDICOTT COIL CO., Dept. EM, 24 Charlotte St., Binghamton, N.Y. 13905, Tel: 607-797-1263; Empl.: 110 .... p. 1427,3249

Local Sales Offices & Reps.

Cal	Palo Alto, Testco Inc.	415-324-1900
Cal	Panarama City, Sentenac Assoc.	213-988-2671
Ill	Crystal Lake, Dessco	815-459-8688
Md	Timonium, Heller Assoc.	301-252-4780
Mass	Lexington, Sir Assoc.	617-862-1812
Mich	Detroit, Blumenberg Assoc.	313-557-1934
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NM	Albuquerque, Technology Mktg.	505-298-4321
NY	Endicott, Tech-Mark Inc.	607-748-7473
NY	Valley Stream, Hyrel-Idalee	516-825-8955
Ohio	Dayton, Dynel Co.	513-434-6467
Pa	Ardmore, Freedman Assoc.	215-279-5767
Tex	Richardson, Palatine Inc.	214-231-9489
Wash	Bellevue, Testco	206-454-7422
WVa	Glenshaw, H.C. Johnson	412-961-0414

™ENDURAL - modular tote boxes - Adam Co., Inc., W. D.

™ENDUR-ALL - transformers - Allis-Chalmers

™ENERCON - rotary drives - Control Products Div.

™ENERGIZED - core solder - Alpha Metals, Inc.

ENERGY CONVERSION DEVICES, Dept. EM, 1675 W. Maple Rd., Troy, Mich. 48084

ENERGY ELCTRN. PRODUCTS CORP., Dept. EM, 6060 Manchester Ave., Los Angeles, Cal. 90045, Tel: 213-670-7880, TWX: 910-325-6161; Empl.: 17

ENERGY TECHNOLOGY CORP., See TOR Corp.

™ENERGY MISERS - ferroresonant power supplies - NJE Corp.

™ENERGY OVERLOAD - utility & industrial lamps & lanterns - Teledyne Big Beam

™ENERGY SAVERS - switcher power supplies - NJE Corp.

™ENER/PAK - standby power units - Allis-Chalmers

™ENGALOY - brazing alloys - Engelhard Minerals & Chem.

ENGDAHL ENTERPRISES, Dept. EM, 2850 Monterey Ave., Costa Mesa, Cal. 92626, Tel: 714-540-0398; Empl.: 7

ENGELHARD MINERALS & CHEM., Engelhard Inds. Div., Dept. EM, 2655 U.S. Hwy. #22, Union, N.J. 07083, Tel: 201-589-5000, Telex: 83-3147; Empl.: 3,500

Local Sales Offices & Reps.

Ala	Birmingham	205-822-5592
Cal	Foster City	415-574-3663
Cal	Los Angeles	213-724-1800
DC	Washington, D.C.	202-296-7077
Ill	Skokie	312-673-1900
Mich	Southfield	313-358-1920
Tex	Houston	713-627-2160

Local Distributors

Mich	Detroit, RS Elctrns.	313-491-1012

ENGELMANN MICROWAVE, Dept. EM, Skyline Dr., Montville, N.J. 07045, Tel: 201-334-5700, TWX: 710 987-8344; Empl.: 100

Sales Manager: C. Schraufnagl

Local Sales Offices & Reps.

Cal	Inglewood, L & M Engrg., Inc.	213-674-6850
Cal	Santa Clara, L & M Engrg. Inc.	408-243-2891
Conn	Stamford, Dage Corp.	203-324-3125
Fla	Fort Lauderdale, Snow Co.	305-563-2448
Ga	Smyrna, SparTech Assocs.	404-432-3644
Ill	Highland Park, Feller Assocs.	312-433-3651
Ind	Rochester, Feller Assocs.	219-223-2377
Md	Columbia, Neal Deoul Assocs.	301-997-4353
Mass	Waltham, Measurement Consultants Corp.	617-890-4400
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Huntington, CDB Enterprises, Inc.	516-692-5200
Tex	Garland, Vector Sls. Co.	214-276-4518
Wash	Bellevue, Ray Over Sls.	206-454-4551

ENGINEERED COMPONENTS CO., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401, Tel: 805-544-3800; FSC No.: 32440; Empl.: 90

ENGINEERING & ELCTRN. DEVICES, INC., Dept. EM, 1024 N. McCadden Pl., Los Angeles, Calif. 90038, Tel: 213-463-4175; Empl.: 4

™ENGINEERING STRUCTUAL FOAM - foam resins - General Elec.

ENGIS CORP., Dept. EM, 8035 N. Austin Ave., Morton Grove, Ill 60053

ENI, INC., See Electronic Navigation Inds., Inc.

ENI POWER SYSTEMS INC., Dept. EM, 3000 Winton Rd. S., Rochester, N.Y. 14623, Tel: 716-473-7330, Telex: 97-8283; Empl.: 15 .... p. 1105-1107

ENM, Dept. EM, 5350 Northwest Hwy., Chicago, Ill. 60630, Tel: 312-775-8400, Telex: 25-4068; Empl.: 140

Sales Manager: G. Glynn

Local Sales Offices & Reps.

Cal	San Francisco, USI Int'l.	415-647-3400
Cal	Santa Ana, Patrick W. Bowers	714-997-7857
Colo	Englewood, Mikro Sls. Co., Inc.	303-770-2623
Fla	Orlando, B & M Sls.	305-855-1002
Ill	Chicago, Stevens Engrg.	312-545-4744
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Minn	Minneapolis, Jos. Co./Melius Inc.	612-854-4270
Mo	Independence, Gribble Sls. Engrg.	816-796-4333
NJ	Barrington, Milton E. Carter	609-547-4691
NY	Manhasset, Ray Fara & Assocs.	516-627-1151
NY	Rochester, F.H. Dasson	716-338-1699
Ohio	Perrysburg, ENM Co. - Toledo	419-874-8694
Tex	Richardson, Campion Sls.	214-238-8145

Local Distributors

Cal	Los Angeles, Hartfield, Kennan & Freytag	213-225-1318
Conn	East Hartford, Kawie Tool & Supply	
Ga	Atlanta, Peach State Distributing Co.	
Ill	Chicago, McMaster-Carr Supply Co.	
Ind	Indianapolis, Ra-Dis-Co	
Ky	Louisville, Allied Tool & Supply Co.	502-636-3761
Mass	Somerville, Electro-Sls	617-666-0500
Mich	Brighton, H.H. Barnum Co.	313-229-2961
Mich	Grand Rapids, Purchase Electric Supply Co.	
Minn	Minneapolis, Diplomat/Electro-Com Corp.	612-788-8601
Neb	Omaha, J.B. Distributor Co.	402-341-5525
NJ	Camden, Lectronic Distrs	
NY	Baldwinsville, Scibetta Distrs	315-622-3993
NY	Buffalo, Wehle Electric Supply	
NY	New York, Blan Elctrns.	212-233-6288
NY	Rochester, Rochester Radio Supply	716-454-7800
NC	Charlotte, Count, Inc.	704-392-7496
Okla	Oklahoma City, Trice Wholesale Elctrns	
Ore	Portland, Johnstone Corp.	
Tenn	Kingsport, Radio Electric Supply Co.	
Tex	Dallas, Economy Gauge & Instrs	214-243-8370
Tex	Lubbock, Trice Wholesale Elctrns	
Wisc	Milwaukee, C & H Distrs	

™ENSOLITE - pvc sponge mat'l. - Uniroyal, Inc.

ENTERPRISE DEVELOPMENT CORP, Dept. EM, 5127 E. 65th St., Indianapolis, Ind. 46220, Tel: 317-251-1231; Empl.: 10

Local Sales Offices & Reps.

Cal	Redondo Beach, Oberman-Renner Sls.	213-772-1113
Fla	St. Petersburg, J.F. Thompson Co.	813-866-0045
Ga	Tucker, Elrep Sls. Co.	404-938-7108

Ill	Skokie, M. Berman Sls.	312-679-2293
Ind	Indianapolis, Elctrn. Rep., Inc.	317-894-1414
Mass	Northboro, W.B. Pray Sls.	617-393-3434
Mich	Livonia, F. Peters & Assocs.	313-425-0086
Minn	Minneapolis, Borrett & Lee Corp.	612-929-0028
Mo	Ballwin, R.J. Throckmorton Sls. Co.	314-227-7222
NY	Camillus, Callahan-Ferguson Co.	315-487-3870
Ohio	St. Mary's, T. Shelby & Co.	419-394-3377
Pa	Philadelphia, S.K. Macdonald, Inc.	315-545-1205
Tex	Richardson, Campion Sls. Co.	214-238-8145

Entran

ENTRAN DEVICES, INC., Dept. EM, 145 Paterson Ave., Little Falls, N.J. 07424, Tel: 201-785-4060, Telex: 130-361 .... p. 4340,4341

Sales Manager: D. Slavik

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Cupertino, Saber Entprs.	408-446-4792
Cal	Long Beach, Saber Entprs.	213-595-5646
Conn	Canton, Daner-Hayes	203-426-9094
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-945-4222
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Southfield, Stress Analysis Svcs.	313-356-6686
NY	Port Washington, Daner-Hayes	516-883-4576
NY	Rochester, Daner-Hayes	716-467-5100
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Medina, Stress Analysis Svc.	216-725-7733
Pa	Audibon, Daner-Hayes	215-666-5005
Pa	Frazer, Measurements, Inc.	215-644-7142
Tex	Dallas, Technical Prods.	214-357-9603
Va	Fredericksburg, Measurements, Inc.	703-373-5520
Wash	Bellevue, Topp Engineering Sls. Corp.	206-747-5401

Advertisement

Manufacturer of Miniature Pressure Transducers, Accelerometers, Load Cells and Semiconductor Strain Gages for measuring static and dynamic, with full scale ranges from 5g to 10000g, 2 to 30000psi, 5 to 1500 lb. Direct output in mV/g, mV/psi or mV/lb. Available in sizes as small as 0.050" dia weighing as little as 1/4 gram. 0.7cr damping available.

™ENVIRO-BOND - compound - Superior Cable Div.

ENVIRONMENTAL COMMUNICATIONS INC., Dept. EM, 3150 Pullman St., Costa Mesa, Cal. 92627, Tel: 714-557-7800, TWX: 910-595-1781

ENVIRONMENTAL CONTAINER SYS., INC., Dept. EM, 3560 Rogue River Hwy., Box 188, Grants Pass, Ore. 97526, Tel: 503-476-8871; FSC No.: 24995; Empl.: 100 .... p. 1126,1127

Local Sales Offices & Reps.

Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	San Francisco, J. Innes	503-476-8871
Colo	Boulder, R. A. Mayes Co.	303-444-0782
NH	Nashua, Environmental Container Systems	603-883-3411
NM	Albuquerque, R.A. Mayes Co.	505-293-8010
Okla	Bixby, E. B. Robertson, Inc.	918-369-5688
Tex	Dallas, E.B. Robertson, Inc.	214-942-2716
Tex	Houston, E. B. Robertson, Inc.	713-785-6800
Tex	Houston, R. A. Mayes Co.	713-461-5385
Tex	Richardson, R. A. Mayes Co.	214-235-3043
Utah	Centerville, R. A. Mayes Co.	801-292-6781

ENVIRONMENTAL RESEARCH GRP., Dept. EM, 313 N. First St., Ann Arbor, Mich. 48103, Tel: 313-662-3104; Empl.: 16

Local Sales Offices & Reps.

Mich	Ann Arbor	313-662-3104
Ohio	Cleveland	216-447-0790

™ENVIRO VAC - thermal control system - High Vacuum Equip. Corp.

™E-PAC - UPS System - Instr. & Control Sys., Inc.

™EPCAR - EPDM rubber - Goodrich Co. Chemical Div. BF

EPC LABS, INC., Dept. EM, 123 Brimbal Ave., Beverly, Mass. 01915, Tel: 617-927-2523, Telex: 94-0454; FSC No.: 50631

™EPIBASE - silicon power transistors - Motorola Semiconductor Prods.

™EPICAP - capacitance diodes - Motorola Semiconductor Prods.

EPIC, INC., Dept. EM, 150 Nassau St., New York, N.Y. 10038, Tel: 212-349-2470; Empl.: 8

EPICOM, INC., Dept. EM, 592 N. Douglas Ave., Altamonte Springs, Fla. 32701, Tel: 305-869-5000

Sales Manager: R. Ostrander

™EPION TM - ion implanted diodes & rectifiers - Solid State Devices, Inc.

™EPITRAN - high speed power transistors - Solid State Devices, Inc.

™EPOCAP - epoxy compounds - Hardman Inc.

™EPOCEL - filter medium - Pall Corp.

™EPOCRETE - 2-part epoxy concrete materials - Hardman Inc.

™EPOCURE - epoxy curing agents - Hardman Inc.

™EPOI - microscopes & optical measuring equip. - Nikon, Inc.

™EPOLAST - epoxy compounds - Hardman Inc.

™EPOLENE - polyolefin waxes - Eastman Chem. Prods.

™EPOMARINE - 2-part epoxy compounds for splash zone & underwater application - Hardman Inc.

™EPOSET - epoxy compounds - Hardman Inc.

™EPOSOLVE - solvent for epoxy clean-up - Hardman Inc.

™EPO-TEK - epoxies - Epoxy Technology

™EPOWELD - epoxy compounds - Hardman Inc.

EPOXY TECHNOLOGY, Dept. EM, 65 Grove St., Watertown, Mass. 02172, Tel: 617-926-0136, Telex: 92-2548; FSC No.: 33246; Empl.: 6

Local Sales Offices & Reps.

Ariz	Tempe, Roland Assocs.	602-838-4867
Cal	Atherton, Wadsworth-Pacific Mfg. Assoc. Inc.	415-321-3619
Cal	Hacienda Heights, Wadsworth-Pacific Mfg. Assoc.	213-330-5592
Cal	Pacific Palisades, Wadsworth-Pacific Mfg. Assoc. Inc.	213-454-4313
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Ill	Lake Villa, R.W. Venn Co.	312-395-5353
Ind	Indianapolis, Metron Co.	317-897-6463
Mass	Newton, Normell Assocs.	617-969-5478
Mich	Detroit, EEI of Mich.	313-521-1500
NJ	Califon, C.W. Price Co.	201-638-6850
NY	Liverpool, Wadsworth Mfg. Assoc. Inc.	315-652-6865
NY	liverpool, Feikert Assocs.	315-652-9071
NC	Greensboro, Lenz Eng. Co.	919-299-7879
Ohio	Solon, KDF Co.	216-248-8010
Tex	Richardson, Oeler & Menelaides, Inc.	214-234-6334
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Wash	Seattle, Demarest & Assoc.	206-523-0600
Exp:	Plainville, Mass., Teknis	617-695-3591

EPOXYCAST ELECTRONIC CASE CO., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701, Tel: 914-YO3-5900; Empl.: 20

Local Sales Offices & Reps.

Mass	Lynnfield, Grady & Assocs.	617-334-6633

™EPOXYLITE - products are numbered - Epoxylite Corp.

EPOXYLITE CORP., Dept. EM, 1265 N. Kraemer Blvd., Anaheim, Ca. 92806, Tel: 714-630-7910; Empl.: 60

Local Sales Offices & Reps.

Ohio	Columbus, Epoxylite Corp. of Ohio	614-261-0515

™EPOXY TAB - sealant - Lake Chemical Co.

EPSCO, INC., Dept. EM, 920 Westwood Dr., Addison, Ill. 60101, Tel: 312-543-0410; FSC No.: 53003; Empl.: 6

Local Distributors

Ala	Birmingham, Forbes Dist. Co.	205-251-4104
Alas	Anchorage, Yukon Radio Supply Corp.	907-277-7117
Ariz	Phoenix, R.V. Weatherford Co.	602-272-7144
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Garden Grove, Allied Elctrns.	213-598-6605
Cal	Glendale, Western Elctrn. Supply	213-246-4861
Colo	Denver, R. V. Weatherford Co.	303-761-5432
Conn	New London, Aikins Elctrn. Supply	203-442-4406
Del	Wilmington, Almo Elctrn. Corp.	302-656-9467
DC	Washington, Graybar Electric	202-723-9500
Fla	Tampa, Lykes Elctrns.	813-886-6621
Ga	Atlanta, Spec. Distr. Co.	404-873-2521
Haw	Honolulu, Honolulu Elctrn.	949-5564
Idaho	Twin Fall, Central Elctrn.	
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Chicago, Allied Elctrn.	312-421-2400
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Topeka, Interstate Elctrn. Supply	913-235-2396
Ky	Lexington, Radio-Elctrn. Equip.	606-255-6661
La	New Orleans, Southern Radio Supply	504-524-2324
Me	Portland, Holmes Distr.	207-774-5901
Md	College Park, Allied Elctrn.	301-345-4600
Mass	Braintree, Allied Elctrn.	617-848-4150
Mich	Ann Arbor, Wedemeyer Elctrn. Supply Co.	
Minn	Duluth, Northwest Radio of Duluth	218-727-1565
Miss	Jackson, Ellington Elctrn. Supply	601-355-0561
Mo	Kansas City, Walters Radio Sup.	816-531-7015
Mont	Billings, Elctrn. Supply Co.	406-252-2197
Neb	Lincoln, Scott Elctrn. Supply Co.	402-434-8308
Nev	Las Vegas, Indl. Elctrns.	702-384-2151
NH	Concord, Evans Radio & Elctrns.	603-224-9961
NJ	Kenolworth, Newark Elctrns.	201-272-8410
NJ	Rahway, Quad Parts Distr.	201-381-5400
NM	Albuqerque, R. V. Weatherford Co.	505-265-5671
NY	Buffalo, Wehle Electric Co.	716-854-3270
NY	Buffalo, Summitt Distr.	716-884-3450
NC	Raleigh, Southeastern Supply	919-828-2313
ND	Minot, J-I Co., Inc.	701-838-5466
Ohio	Cleveland, RPC Elctrn. of Ohio	216-461-4700
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-232-2291
Ore	Portland, United Radio Supply	503-233-5346
Pa	Philadelphia, Almo Elctrn.	215-676-6000
RI	Providence, W. Dandretta & Co.	401-861-2100
SC	Columbia, Dixie Radio Supply	803-253-5333
SD	Mitchell, Elctrn. Supply Co.	605-996-4300
Tenn	Kingsport, Radio Supply Co.	615-247-8111
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
Utah	Provo, Central Utah Elctrns.	801-373-7522
Vt	White River Jct., Elctrn. Supply	802-295-3536
Va	Richmond, AVEC Elctrn. Corp.	
Wash	Seattle, Western Elctrns. Co.	206-284-0200
WVa	Charleston, McJunkin Corp.	304-348-4919
Wisc	Milwaukee, Elctrn. Expeditors	414-228-8100
Wyo	Casper, Fleming Supply Co.	
Exp:	Can., Toronto 19, Ont., Atlas Elctrns. Ltd.	416-781-6174

EPSCO, INC., Dept. EM, 411 Providence Hwy., Westwood, Mass. 02090, Tel: 617-329-1500, TWX: 710-348-0484; FSC No.: 99380; Empl.: 150 .. p. 2985

Local Sales Offices & Reps.

Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	San Jose, MCH Assocs.	408-246-7330
Fla	Hallandale, Emec, Inc.	305-925-6366
Ill	Northfield, Feller Assocs.	312-446-8065
Mass	Waban, Bawer Assocs.	617-244-6572
NJ	Hayworth, Central Assocs.	201-568-0808
NY	Plainview, Central Assocs.	516-433-0808
Tex	Fort Worth, C. Wolf & Assocs.	817-738-1996
Tex	Houston, C. Wolf & Assocs.	714-721-2442
Va	Annandale, J. Hopkins Assocs.	703-323-1641
Wash	Seattle, Datacom Assocs.	206-285-2525

™EPSILAM-10 - high dielectric microwave substrate - 3M Company

EPSILON-LAMBDA ELCTRN. CORP., Dept. EM, 28 S. Water St., Batavia, Ill. 60510, Tel: 312-879-6006; Empl.: 5

Local Sales Offices & Reps.

Cal	Los Angeles, McDougall/McLaughlin Co.	213477-8556
Cal	Portola Valley, Kipp Assocs.	415-851-0123
Mass	Lexington, Zieco, Inc.	617-861-8300
NY	Greenville, B. D. Aaron Co.	516-621-0630
Pa	Lafayette Hill, M. Lader Co.........	215-825-3177
Va	Woodbridge, M. Lader Co..........	202-296-2497
Exp:	N.J., Tenafly, Lars Microwave	201-871-0024

(TM)EPTAK - control systems - Eagle Signal

(TM)EQUIPHASE - triple-point of water cell - Trans-Sonics, Inc.

(TM)EQUIPT-AIR - blowers & fans - Equipto Enclosure Systems

(TM)EQUIPTO - steel electronic cabinets (heavy duty) - Equipto Enclosure Systems

EQUIPTO, Aurora Equipment Co., Dept. EM, 225 So. Highland Ave., Aurora, Ill. 60507, Tel: 312-859-1000; Empl.: 300

EQUIPTO ENCLOSURE SYSTEMS, Div/Equipto Elec. Corp., Dept. EM, 435 Woodlawn Ave., Aurora, Ill. 60507, Tel: 312-897-4691; FSC No.: Multiple; Empl.: 40 .... p. 1129

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Buena Park, Sls. Engrs. Ltd.	714-521-8673
Cal	Menlo Park, Long & Assocs.	415-327-1300
Colo	Denver, BFA Corp.	303-837-1247
Conn	Glastonbury, Edcom, Inc.	203-633-1380
Fla	Orlando, J.L. Highsmith Co.........	305-293-5202
Ga	Acworth, J.L. Highsmith Co.........	404-926-7298
Ill	Palatine, J. Clark Co.	312-358-5095
Ind	Indianapolis, Scott Elctrns.	317-897-9976
Ky	Louisville, Scott Elctrns.	502-583-3220
Md	Silver Spring, Sel-Tronics............	301-589-3391
Mass	Newtonville, Edcom, Inc..............	617-969-9710
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	St. Paul, H.A. Cullen & Assocs.	612-646-7371
Mo	Blue Springs, Cairns & Hayes Elctrn. Sls. Co.	816-229-1404
Mo	St. Charles, Cairns & Hayes Elctrn. Sls. Co.	314-946-6677
NM	Albuquerque, BFA Corp..............	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Port Chester, Radiation Elctrns., Inc.	914-937-2300
NY	Syracuse, Labtronics, Inc.	315-454-9314
NC	Charlotte, J.L. Highsmith & Co...	704-333-7743
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Dayton, Scott Elctrns..................	513-294-0539
Pa	Pittsburgh, Scott Elctrns.	412-828-1073
Pa	Valley Forge, J.E. Cuesta & Co.	215-265-5800
Tex	Dallas, Kruvand Assocs..............	214-691-4592
Tex	Houston, Kruvand Assocs.	713-780-9710
Utah	Salt Lake City, BFA Corp.	801-466-6522
Va	Richmond, J.L. Highsmith & Co.	804-272-5888
Wash	Bellevue, Olson, Ferree & Assocs.	206-454-1210
Exp:	Can., Hamilton, Ont., Cartwright Southall Assocs.	416-528-0294

(TM)EQUISEAL - pump stuffing boxes - Allis-Chalmers

ERA ACOUSTICS, Dept. EM, 311 E. Park St., Moonachie, N.J. 07074, Tel: 201-641-3650, TWX: 710-990-5064; Empl.: 100

Local Sales Offices & Reps.

Mich	Grosse Pointe, N.H. Hollerbach Co. (Auto OEM)	313-884-6480

ERA TRANSPAC CORPORATION

ERA TRANSPAC CORP., Sub. Elctrn. Research Assocs., Dept. EM, 311 B East Park St. Dept. 1202, Moonachie, N.J. 07074, Tel: 201-641-3650, TWX: 710-990-5064; FSC No.: 96762; Empl.: 100 p. 3250-3255

Sales Manager: T. Gordon

Local Sales Offices & Reps.

Ala	Huntsville, Repcom Inc.	205-859-4400
Cal	San Jose, L & M Engrg..............	408-292-3220
Cal	Santa Monica, Rep Assocs.........	213-829-5401
Conn	Stonington, Electronic Sls. of New England	203-443-2646
Fla	Melbourne, Repcom	305-254-1877
Ill	Rolling Meadows, Lightner Assoc.	312-398-3000
Md	Fulton, Gans, Fryling & Pugh......	301-837-6311
Mass	Attleboro, ESNE..........................	617-222-4078
NY	Fayetteville, M.P. Andrews Co. ..	315-637-3144
NY	Plainview, R.H. Smith Assocs.....	516-681-3155
NY	Spring Valley, R. Smith Assocs.	914-354-6067
NC	Charlotte, Repcom Inc................	704-525-4666
Pa	Conchohocken, Scientific Devices	215-825-9515
Tex	Houston, Spectra Sls. Corp.	713-524-7800
Tex	Richardson, Spectra Sls. Corp...	214-234-3600
Va	Arlington, Gans, Fryling & Pugh	703-527-3262
Wash	Bellevue, Olson, Ferree & Assoc.	206-454-1210

ERASER CO., Dept. EM, Box 1342, Syracuse, N.Y. 13201, Tel: 315-454-3237, Telex: 93-7442; Empl.: 25

Sales Manager: L. Broadbent

Local Sales Offices & Reps.

Ark	Hot Springs, Meredith Young Assoc.	501-262-1365
Cal	Santa Anna, Kendall Mktg Corp.	714-835-5302
Fla	Riviera Beach, Southeastern Elctrns	305-844-1883
Md	Annapolis, Kirk-Sandell Inc.	301-268-2468
Mass	Wayland, Coby Ellingwood, Inc.	617-358-2883
Minn	Minnetonka, Baillie Sls & Engrg Co.	612-933-7989
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	Syracuse, Fountain, Young & Co.	315-437-7733
Ohio	Strongsville, Jim Finnegan & Co.	216-826-1033
Pa	Ft. Washington, Kirk-Sandell Inc.	215-643-2100
Tex	Dallas, Production Automation Corp.	214-620-0227

Local Distributors

Ala	Huntsville, W. A. Brown Comp. ..	205-539-4411
Cal	El Monte, C. Michael..................	213-686-0141
Cal	El Segundo, Wassco...................	213-640-1060
Fla	Clearwater, Prod. Cupbourdi	813-447-2581
Ga	Atlanta, Elect. Insulating Supp. ..	404-355-1651
Ill	Chicago, EMF Co.	312-889-8323
Minn	Minneapolis, Prod. Auto. Corp. ..	612-866-5700
Miss	Jackson, O. Van Horn Co.	601-354-4321
NY	Guilderland, Solder Pot...............	518-355-1829
NY	Syracuse, Jet Elctrn....................	315-454-3237
NC	Raleigh, W. A. Brown Co.	919-876-9601
Pa	Huntingdon Valley, H. Mann Inc.	215-355-7200
Tex	Richardson, Prod. Auto. Corp.....	214-234-4002

ERC, See Electronic Research Co.

(TM)ERDAC MODEL 1000 - electronic recording systems. - Macrodyne Inc.

(TM)ERDAC MODEL 1100 - - Macrodyne Inc.

ERDCO ENGRG. CORP., Dept. EM, 136 Official Rd., Addison, Ill. 60101, Tel: 312-543-6733; Empl.: 40

Local Sales Offices & Reps.

Cal	San Mateo, Technical Prods. Co.	415-574-2942
Cal	Santa Fe Springs, D.A. Matthews/Assocs.	213-693-5432
Colo	Denver, Davis & Davis	303-744-1316
Conn	Hamden, Etter Engrg. Co.	203-288-3575
Ill	Chicago, Drager Co.	312-478-5022
Ill	Mount Vernon, Tripco, Inc.	618-242-5836
La	New Orleans, R.L. Rowan & Assocs.	504-525-9178
Mass	Hathorne (Danvers), C.T. Morgan Co.	617-933-4744
Mass	Waltham, Etter Engrg. Co.	617-893-8658
Mich	Detroit, Power-Process Engrg. Co.	313-538-3376
NY	New York City, J.A. Moore Co...	212-682-2420
NY	North Syracuse, Van Luven Co.	315-458-8195
NC	Greensboro, R. Poore Assocs. ..	919-299-5876
Ohio	Cincinnati, CKM Ind'l. Sls.	513-871-1413
Ohio	Cleveland, Thorrat & Hanmer	216-333-5950
Okla	Tulsa, Components, Inc..............	918-583-9149
Pa	Fort Washington, W.J. Gallagher Controls	215-646-5710
Pa	Murrysville, Bock Engrg. Co.	412-327-3700
Tex	Fort Worth, Southwest Controls Co.	817-292-0262
Tex	Houston, R.L. Rowan & Assocs.	713-681-5811
Tex	Odessa, Barnco, Inc....................	915-332-0294
Va	Richmond, Indamation Co.	804-222-3049

(TM)ERICKSON - couplings - T & B/Thomas & Betts

(TM)ERICKSON - couplings - T & B/Thomas & Betts

ERIE FREQUENCY CONTROL, Div. Erie, Technological Prods., Dept. EM, 453 Lincoln St., Carlisle, Pa. 17013, Tel: 717-249-2232, Telex: 84-2328; Empl.: 250

Local Sales Offices & Reps.

Cal	Palo Alto	415-327-1520
Cal	Santa Ana..	714-835-4822
Fla	Maitland..	305-644-0954
Ill	Des Plaines.....................................	312-297-5560
Ind	Fort Wayne.....................................	219-484-1528
Mass	Wakefield	617-245-7880
NJ	Pennsauken	609-655-4787
NC	Greensboro......................................	919-299-1905
Tex	Richardson	214-238-8211
Exp:	Pa.	814-453-5611

ERIE TECHNOLOGICAL PRODUCTS, Dept. EM, PO Box 961, Erie, Pa. 16512, Tel: 814-453-5611, Telex: 91-4436; FSC No.: Multiple; Empl.: 2300; Minimum order: $J.H. Ohlrich

Distributor Manager: J.H. Ohlrich

Local Sales Offices & Reps.

Cal	Palo Alto, Erie Technological Prods., Inc.	415-327-1520
Cal	Santa Ana, Erie Technological Prods., Inc.	714-835-4822
Fla	Maitland, Erie Technological Prods., Inc.	305-644-0954
Ill	Des Plaines, Erie Technological Prods., Inc.	312-297-5560
Ind	Fort Wayne, Erie Technological Prods., Inc.	219-484-1528
Mass	Wakefield, Erie Technological Prods., Inc.	617-245-7880
Mo	North Kansas City, LCOMP, Inc./Kansas City	816-221-2400
NJ	Pennsauken, Erie Technological Prods., Inc.	609-665-4787
NC	Greensboro, Erie Technological Prods., Inc.	919-299-1905
Pa	Erie, Erie Technological Prods., Inc.	814-453-5611
Tex	Richardson, Erie Tech. Prod. Inc.	214-238-8211
Exp:	Erie, Pa., Erie Technological Prods. Export Sls.	814-453-5611

Local Distributors

Cal	El Segundo, Liberty Elctrns.........	213-322-8100
Cal	Glendale, R. V. Weatherford Co.	213-849-3451
Cal	Mt. View, Elmar Elctrns.	415-961-3611
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Chicago, L Comp Inc.	312-865-7600
Md	Baltimore, Radio Electric Svc. Co.	301-823-0070
Mass	Newton Centre, Cramer Elctrns.	617-969-7700
NY	Buffalo, Summit Distrs. Inc.	716-884-3450
NY	Farmingdale, Arrow Elctrns.........	516-694-6800
NY	Freeport, Milgray Elctrns............	516-546-6000
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Tex	Richardson, Altair Co..................	214-231-5176

ERIKSON SPECIALIZED TOOL CO., Dept. EM, Box 424, Pico-Rivera, Cal. 90660, Tel: 213-699-3719; Empl.: 4

(TM)ERSA TIP 1G - soldering iron - Edsyn, Inc.

(TM)ERSIN - wire rosin cored solder - Multicore Solders

(TM)ESCAP - motors & tachometer generators - Portescap US

ESC ELECTRONICS CORPORATION

ESC ELCTRNS. CORP., Dept. EM, 534 Bergen Blvd., Palisades Pk., N.J. 07650, Tel: 201-947-0400, TWX: 710-991-9780; Empl.: 120 ....p. 2514,2515,2730,2731

Local Sales Offices & Reps.

Ala	Huntsville, Sci. Devices Southeast, Inc.	205-536-1969
Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	Los Alamitos, Westaironics Inc...	213-431-1101
Cal	Marina Del Ray, Westaironics Inc.	213-821-7958
Cal	San Diego, Hadden Assocs.	714-565-9444
Cal	Santa Clara, Rodgers Assoc.	408-984-8110
Cal	Thousand Oaks, Westaironics, Inc.	805-497-4058

Colo	Denver, M. Duffy Assocs.	303-934-7392
Conn	Norwalk, Betronic Assocs.	203-853-7630
Fla	Orlando, Scientific Devices Southeast, Inc.	305-841-8180
Fla	Palm Bay, Scientific Devices Southeast, Inc.	305-723-1800
Ill	Elk Grove, Carlson Elctrns. Sls. Co.	312-956-8240
Ind	Indianapolis, Carlson Elctrn. Sls. Co.	317-253-5610
Md	Glen Burnie, New Era Sls.	301-768-6666
Mass	Waltham, Betronic Assocs.	617-894-8400
Mich	Mt. Clemens, LP Assoc.	313-731-1171
Minn	New Brighton, TWC Sales	612-636-1770
Mo	St. Louis, Kebco	314-569-2660
NJ	Cherry Hill, S. Auerbach	609-983-7862
NJ	Clifton, A. Clarfield Assocs.	212-757-6454
NC	Raleigh, Sci. Devices Southeast, Inc.	919-872-7066
Ohio	Chagrin Falls, LP Assoc.	216-543-5325
Ohio	Fairborn, LP Assoc.	513-223-9975
Tex	Austin, Palatine Sls.	512-451-7463
Tex	Houston, Palatine Sls.	713-777-4477
Tex	Richardson, Palatine Sls.	214-231-9489
Wisc	Milwaukee, Carlson Elctrn. Sls. Co.	414-476-2790
Exp:	N.J., Palisades Park, ESC Elctrn. Corp.	201-947-0400

(TM)ESCON - special relays - Guardian California

ESCO PRODUCTS, Dept. EM, Oak Ridge Rd., Oak Ridge, NJ 07438, Tel: 201-697-3700; Empl.: 35

(TM)ESCOSIL - optical fused quartz & silica - Esco Products

E.S.I. INC., Dept. EM, 13900 N.W. Science Park Dr., Portland, Oregon 97229, Tel: 503-641-4141, Telex: 360-273; Empl.: 220

Sales Manager: S. Gressel

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Orange, Electro Scientific Inds.	714-633-0643
Cal	Palo Alto, Electro Scientific Inds.	415-494-7458
Fla	Orlando, Gentry Assocs.	305-894-4401
Ill	Rosemont, Electro Scientific Inds.	312-696-4322
Mass	Waltham, Electro Scientific Inds.	617-899-6633
NJ	Bergenfield, Electro Scientific Inds.	201-385-9493
NY	Camillus, Electro Scientific Inds.	315-487-3155
NC	Burlington, Gentry Assocs.	919-227-3639
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Dallas, Crockett Southwest Co.	214-251-1776
Tex	Needville, Crockett Southwest Co.	713-342-2176

(TM)ESIAC - algebraic computer - E.S.I. Inc.

(TM)ESIAC - algebraic computer - Electro Sci. Inds.

ESICO, INC., Dept. EM, Box 247, Deep River, Conn. 06417, Tel: 203-526-5361; Empl.: 40

Local Sales Offices & Reps.

Colo	Westminster, Pathway, Inc.	303-429-4243
Ga	Atlanta, Electr-Mech Sls. Engrg. Co.	404-449-6337
Ill	Chicago, H. Halinton Engrg. Assoc.	312-763-2131
Ohio	Dayton, AMES Corp.	513-435-9730
Tex	Dallas, Tooltronics, Inc.	214-661-0700

(TM)ESIPOT - potentiometer - E.S.I. Inc.

(TM)ESIPOT - potentiometer - Electro Sci. Inds.

(TM)ESLOK - self-locking fasteners - ESNA Division

(TM)ESLOK NUTS - commercial self-locking nuts - Esna Div.

(TM)ESLOK SCREWS/BOLTS - self-locking externally threaded fasteners - Esna Div.

ESNA DIV., Amerace Corp., Dept. EM, 2330 Vauxhall Rd., Union, N.J. 07083, Tel: 201-686-6000, TWX: 1-38243 710-985-4677; Empl.: 700; Minimum order: $A.H. Wighton

Sales Manager: W.H. Riley; *Distributor Manager:* A.H. Wighton

Local Sales Offices & Reps.

Cal	Van Nuys	213-873-7420
Ga	Marietta, Esna Div-Amerace Corporation	404-427-5744
Ill	Chicago	312-777-2929
Ind	Indianapolis	317-253-6526
Mass	Boston	617-545-3424
Mich	Southfield	313-646-6700
Mo	Kansas City	816-333-8394
Mo	St. Louis	314-968-1336
NJ	Union	201-686-6000
Ohio	Cincinnati	513-825-8135
Ohio	Dayton	513-298-2346
Ohio	Strongsville	216-238-3351
Pa	Ardmore	215-642-8667
Tex	Dallas	214-231-2391
Wisc	Milwaukee	414-786-4456

(TM)E-SOLDER - conductive adhesives - Acme Chemical & Insulation Co.

ESSCO INDUSTRIES, Dept. EM, PO Box 515, Sierra Madre, Cal. 91024

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	
Cal	Los Angeles, R. F. Specialists	213-785-0503
Cal	Mountain View, Howard Engrg.	415-969-2851
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	
Ill	Chicago, Midwest Elctrn. Ind.	312-777-9700
Mich	Ferndale, TIBY Co.	313-547-3550
NY	Hartsdale, Com-Tec Sls.	914-761-6644
NC	Winston Salem, Reynolds & Assocs.	
Ohio	Cleveland, TIBY Co.	216-371-5335

ESSEX INT'L, Dept. EM, 3501 W. Addison, Chicago, Ill. 60618

ESSEX INT'L., INC., Telecommunications Prods. Div., Dept. EM, 800 E. Garfield Ave., Decatur, Ill. 62526, Tel: 217-429-2531, TWX: 910-243-4300

ESSEX GROUP, Subsidiary of United Technologies, Dept. EM, 445 Park Ave., Sycamore, Ill. 60178, Tel: 815-895-4501, TWX: 910-639-0611

Sales Manager: E.J. O'Reilly

Local Sales Offices & Reps.

Cal	Anaheim, Essex Int'l., Inc.	213-625-7516
Colo	Denver, Essex Int'l., Inc.	303-399-0521
Ky	Georgetown, Essex Int'l., Inc.	502-863-3321
Mich	Berrien Springs, Essex Int'l., Inc.	616-473-4811
Minn	Minneapolis, Essex Int'l., Inc.	612-331-6370
Mo	St. Louis, Essex Int'l., Inc.	314-382-9000
Ohio	Dayton, Essex Int'l., Inc.	513-277-8964
Pa	Philadelphia, Essex Int'l., Inc.	215-236-7100
SC	Bennettsville, Essex Int'l., Inc.	803-479-6211
Tenn	Nashville, Essex Intl.	615-794-8451
Tex	Dallas, Essex Intl.	214-369-6541

ESSEX INTERNATIONAL CORP., Dept. EM, 1601 Wall St., Ft. Wayne, Ind 46802

ESSEX INT'L., INC., Power Conductor Div., Dept. EM, 2601 S. Adams, Marion, Ind. 46953, Tel: 317-664-6211, TWX: 317-667-6972; Empl.: 700

ESSEX CONTROLS DIV., Essex International, Dept. EM, 131 Godfrey St., Logansport, Ind. 46947, Tel: 219-753-7521, TWX: 810-295-0699

Sales Manager: D. Kampenga; *Distributor Manager:* R. Todd

Local Sales Offices & Reps.

Cal	Anaheim, Essex Int'l., Controls Div.	714-772-9300
Colo	Denver, R.G. Bowen Co.	303-722-4641
Conn	Madison, A & M Elctrn. Reps., Inc.	203-421-4242
Fla	Hollywood, A.P. Assocs.	305-987-6720
Fla	Orlando, A.P. Assocs.	305-298-2816
Fla	St. Petersburg, Reynolds & Assocs.	813-360-1484
Ill	Chicago, Essex Intern'l. Inc. Controls Div.	312-463-7358
Ill	Sycamore, Essex International Controls	815-895-4501
Ind	Logansport, Essex Intern'l. Inc. Controls Div.	219-753-7521
Iowa	Des Moines, Essex International Controls	515-243-8032
Ky	Crestwood, Essex International Controls	502-241-9667
Mass	Needham, A & M Elctrn. Reps.	617-444-8170
Mich	Berrien Springs, Essex Intern'l., Inc. Controls Div.	616-471-2807
Minn	Minneapolis, Essex Intern'l., Inc. Controls Div.	612-331-6370
Mo	St. Louis, Essex International Controls	314-371-2616
NJ	South Hackensack, Essex Internt'l., Inc. Controls Div.	201-641-4408
NY	Dewitt, Essex Intern'tl., Inc. Controls Div.	315-446-0800
NY	New York, Roburn Agencies	212-989-5939
Ohio	Cleveland, Essex International Controls	216-781-2317
Ohio	Dayton, Essex International Controls	513-277-8963
Pa	Frazer, Essex Intern'tl., Inc., Controls Div.	215-236-7100
SC	Bennettsville, Essex International Controls	803-479-6211
Tenn	Franklin, Essex International Controls	615-794-8451
Tenn	Hixson, Essex International Controls	615-875-5473
Tex	Dallas, Essex International Controls	214-369-6541

ESSEX TERMINALS/CONNECTORS, Dept. EM, 3405 Engle Rd., Box 9216, Ft. Wayne, Ind. 46809, Tel: 219-743-0311; Empl.: 465

(TM)ESTANE - polyurethanes, thermoplastic - Goodrich Co. Chemical Div. BF

ESTERLINE ANGUS, Dept. EM, 2772 Lafayette Rd, Indianapolis, Ind. 46224, Tel: 317-244-7611, Telex: 027-419; FSC No.: 72264; Empl.: 300; Minimum order: $H. Knapp ..... p. 2962,2963

Sales Manager: R.K. Mengel; *Distributor Manager:* H. Knapp

Local Sales Offices & Reps.

Ala	Birmingham, Spader & Assocs.	205-879-1366
Ariz	Scottsdale, BFA Corp. of Ariz.	602-994-5400
Ark	Benton, Gilbert & Assoc.	501-372-5916
Cal	City of Industry, Esterline Angus Branch Off.	213-330-1621
Cal	Hayward, Esterline Angus Branch Off.	415-785-8232
Colo	Denver, Cliff Beabout Co.	303-831-7259
Fla	Orlando, Datarep, Inc.	305-843-5224
Ga	Decatur, Spader & Assocs.	404-296-3024
Haw	Honolulu, Berkley Engrg. & Equip. Co.	808-538-1921
Ill	Elmhurst, Esterline Angus Branch Off.	312-833-4410
Ind	Indianapolis, C.D. Arnold Co.	317-546-4053
Iowa	Cedar Rapids, H.E. Ferris Co.	319-362-9156
Iowa	Des Moines, H.E. Ferris Co.	515-255-5008
La	New Orleans, Mid-South Sls. Co.	504-822-3030
Mass	Holliston, Esterline Angus Branch Off.	617-235-5343
Mich	Marquette, NWR Elctrns. Corp.	906-228-9660
Mich	Troy, G. R. Peters Assocs.	313-362-1220
Minn	Minneapolis, Electrical Jobbers Equip. Inc.	612-721-4815
Minn	Virginia, NWR Elctrns. Corp.	218-741-5080
Mo	Crestwood, Carlton Co.	314-961-0700
Mo	Kansas City, Carlton Co.	816-942-3912
NJ	Lodi, Esterline Angus Branch Off.	201-471-0084
NM	Albuquerque, BFA Corporation	505-292-1212
NM	Las Cruces, BFA Corporation	505-523-0601
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Rochester, R. F. Lamb Co.	716-544-5580
NY	Schenectady, R. F. Lamb Co.	518-393-4844
NY	Syracuse, R. F. Lamb Co.	315-454-2469
NC	Charlotte, Ranson, Wallace & Baesel, Inc.	704-334-4244
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Cleveland, M.A. Blankenburg & Co.	216-251-7010
Okla	Tulsa, Kennedy Engrg. Co.	918-835-9975
Ore	Portland, McLaren, Inc.	503-297-2248
Pa	Oreland, Esterline Angus Branch Off.	215-887-2268
Pa	Pittsburgh, Bollinger & Richards	412-561-2340
Tenn	Knoxville, G.W. Massey Co.	615-577-9553
Tenn	Memphis, Gilbert & Assoc.	901-767-7894
Tex	Borger, Kennedy Engrg. Co.	806-273-2871
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Utah	Salt Lake City, Instrumentation Sls.	801-943-1881
Va	Fairfax, Hildenbrand Co.	703-280-2330
Wash	Bellevue, McLaren, Inc.	206-454-3400
WVa	South Charleston, Appalachian Controls Co.	304-744-5324
Wisc	Milwaukee, T.R. Bickler Assocs.	414-453-3772

Local Distributors

Ala	Birmingham, MG Elect. & Equip.	205-328-4525
Cal	Burlingame, Metric Resources	415-347-3067
Cal	City of Industry, Hamilton Instrumentation Inc.	213-330-3380
Ill	Niles, Cole-Parmer Instr. Co.	312-647-0272

La	New Orleans, New Orleans Instr. Works	504-897-0561
Md	Timonium, E.I.L. Instrmts.	301-252-1260
Mich	TroyG. , R. Peters Assoc.	313-524-2920
Neb	Omaha, Schneider Elect.	402-346-5550
NJ	Park Ridge, Gibbs & Stone	201-391-1255
NY	Buffalo, KOM Lamb	716-874-3530
Ohio	Cleveland, Marlin Mfg.	216-941-6200
Pa	Philadelphia, Aquatronics	215-739-0695
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Wash	Seattle, Eicher-Richards	206-523-7888
Wisc	Milwaukee, Taylor Elec.	414-241-4321

ESTES ENGRG. CO., Dept. EM, 930 Marine Dr., Port Angeles, Wash. 98362, Tel: 206-457-0904; FSC No.: 22590; Empl.: 28

™ES-TOOLS - ignition wrenches - Emporium Specialties Co., Inc.

ETATECH, INC., Dept. EM, 187M W. Orangethorpe Ave., Placentia, Cal. 92670, Tel: 714-996-0981; Empl.: 8

Local Sales Offices & Reps.

Cal	Santa Ana, J. Franek Co	714-832-0290

ETCHIT, INC., Dept. EM, 643 13th Ave. S., Hopkins, Minn. 55343, Tel: 612-935-5507; Empl.: 20

Local Sales Offices & Reps.

Ind	Columbus, Ritter	812-372-1534
NJ	Caldwell, A.M. Bakken	201-349-4655
Tex	Houston, Manco Metals	713-664-8084

™ETCH/PATH SYSTEM 100 - semiconductor metal etcher - Qualco

™ETCH/PATH SYSTEM 200 - semiconductor metal etcher - Qualco

™ETERNACELL - lithium organic battery - Power Conversion Inc.

™ETHAFOAM - polyethylene foam - Dow Chemical Co.

™ETHOCEL - ethylcellulose resin - Dow Chemical Co.

™ETHOFIL - fiberglass reinforced polyethylene - Fiberfil Div. Dart Ind.

ETRI INC., Dept. EM, 8002 S. Madison St., Burr Ridge, Ill. 60521, Tel: 312-325-9380, TWX: 910-226-0424; FSC No.: 4N833 .... p. 2692-2694

Sales Manager: G. Wolf

Local Sales Offices & Reps.

Ala	Huntsville, Young & Lawrence Assocs.	205-539-6575
Ala	Huntsville, W. A. Brown Comps.	205-539-4411
Ariz	Phoenix, MR Engrg. Sls. Co.	602-267-7555
Cal	Anaheim, Cen-Tec Sls. Corp.	714-991-4440
Cal	Santa Clara, Nova-Tronix	408-243-9530
Colo	Boulder, Component Prods. Sls. Co.	303-494-5100
Fla	Ft. Lauderdale, Young & Lawrence Assoc.	305-563-6717
Fla	St. Petersburg, Young & Lawrence Assoc.	813-894-0026
Fla	Winter Park, Young & Lawrence Assoc.	305-647-6929
Ill	Des Plaines, Lincoln, Hodges & Assocs.	312-297-3810
Ind	Indianapolis, Marketing Engrs., Inc.	317-546-1523
Md	Frederick, Matrix Sls. Assocs.	301-694-9292
Mass	Lexington, J. E. Boeing Co.	617-862-2500
Mich	St. Clair Shores, Jack M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Milt Westlund Assocs.	612-866-5002
NJ	Mountainside, Henry G. Richter, Inc.	201-233-4615
NY	New York City, Henry G. Richter	212-962-5820
NY	Syracuse, Trademark Elctrn. Assocs.	315-478-2149
Ohio	Dayton, Whelan Corp	513-434-7551
Ore	Lake Oswego, RTS, Inc	503-636-5902
Pa	Media, W. Reeves Assocs.	215-566-6709
Tex	Plano, K & H Sls.	214-423-6520
Wash	Bellevue, RTS, Inc.	206-455-2778
Wisc	Waukesha, Lincoln, Hodges & Assocs.	414-542-3087

Local Distributors

Ariz	Phoenix, Moltronics	602-272-7951
Cal	Costa Mesa, Components Center	714-979-0433
Cal	Garden Grove, Allied Elctrns.	213-598-6605
Cal	South Gate, Moltronics	213-773-6521
Cal	Sunnyvale, Acacia Sls.	408-745-7200
Colo	Denver, Integrated Elctrns	303-534-6121
Colo	Lakewood, Acacia Sls.	303-232-2882
Ill	Elgin, Allied Elctrns	312-697-8220
Ill	Elk Grove Village, GBL Elctrns.	312-593-3220
Ill	Palatine, OHM/Elctrns.	312-359-5500
Ind	East Chicago, Arco Elctrns. Corp.	219-397-8681
Ind	Fort Wayne, Fort Wayne Elctrns. Supply	219-423-3422
Ind	Indianapolis, Meunier Elctrn. Supply	317-635-3511
Ind	Indianapolis, Ra-Dis-Co., Inc.	317-637-5571
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8486
Ind	South Bend, Radio Dist. Co.	219-287-2911
Ky	Louisville, P. I. Burks Co.	502-589-3960
La	Wichita, Radio Supply Co.	316-267-5216
Md	Columbia, Technico	301-461-2200
Mass	Watertown, DRW Elctrns. Corp.	617-923-1900
Mich	Farmington, Advent Elctrns.	313-477-1650
Minn	Minneapolis, Industrial Comps.	612-831-2666
Mo	St. Louis, Van Sickle Radio Elctrns.	314-621-5000
NY	Binghamton, Harvey Elctrns.	607-748-8211
NY	Buffalo, Summit Dist., Inc.	716-884-3450
NY	Farmingdale, DRW Elctrns. Corp.	516-249-2660
NY	Rochester, Summit Elctrns.	716-334-8110
Ohio	Medina, DRW Elctrns. Corp.	216-722-5531
Pa	Harrisburg, Pyttronics Inds.	215-643-2850
Pa	Philadelphia, Almo Elctrns. Corp.	215-698-4000
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Fort Worth, Allied Elctrncs.	817-336-5401
Tex	Houston, Solid State Elctrns.	713-785-5436
Utah	Salt Lake City, W. H. Bintz Co.	801-363-5821
Wash	Seattle, Zepher Elctrn. Sls.	206-575-0922
Wisc	Mequon, Lake-View Elctrns. Corp.	414-377-8250

™ETS - electronic training systems - Digiac Corp.

EUBANKS ENGRG., Dept. EM, 1307 So. Myrtle Ave., Monrovia, Calif. 91016, Tel: 213-357-7011, Telex: 675403; Empl.: 75

Local Sales Offices & Reps.

Ala	Huntsville, Powertronics, Inc.	205-852-6347
Ariz	Phoenix, Tooltronics Inc.	602-257-0768
Cal	Glendale, Tool Tronics, Inc.	213-240-4000
Cal	Santa Clara, Tool Tronics, Inc.	408-241-4000
Colo	Vail, Mile High Elctrns.	303-425-1149
Conn	Bridgeport, Technical Instrs., Inc.	203-368-4582
Fla	Clearwater, H.R. Gross Co.	813-446-6649
Ill	Lake Forest, Marsland Distributing Corp.	312-295-1616
Ind	Indianapolis, Automated Process	317-251-0708
Md	Silver Springs, Ara Elctrns. Inc.	301-565-2584
Mass	Wilmington, Technical Instrs., Inc.	617-944-3930
Mich	Detroit, Electro Entprs., Inc.	313-521-1500
Minn	Minneapolis, Production Automation Corp.	612-866-5700
Mo	Grandview, Production Automation Corp.	816-763-4155
Mo	Hazelwood, Production Automation Corp.	314-731-2331
NJ	Livingston, Argo Engrg. Co.	201-992-4367
NY	Spring Valley, Salit Assocs.	914-354-5443
NY	Syracuse, Maloney Sls. Co.	315-488-3440
NC	Thomasville, Powertronics, Inc.	919-476-6727
Ohio	Cleveland, Electro Entprs., Inc.	216-261-7670
Ohio	Dayton, Electro Entprs., Inc.	513-426-6071
Ore	Portland, Van Voorhees Inc.	503-292-9313
Pa	Glenside, Ara Elctrns. Inc.	215-887-5250
Pa	Pittsburgh, Electro Entprs., Inc.	412-371-8497
Tex	Dallas, Sivright Co.	214-241-9196

™EUC/ARDA - tinning apparatus - Electrovert

EUROTHERM CORP., Dept. EM, 7754 Lucerne Dr., Cleveland, Ohio 44130, Tel: 216-826-4530

™E-V - all electro-voice products - Electro-Voice, Inc.

™EVANOHM - resistance alloy - GTE Sylvania Inc.

EVANS ASSOCS., Dept. EM, Box 5055, Berkeley, Cal. 94705, Tel: 415-848-6839

EVANS, GEORGE CORP., Dept. EM, 121 37th St., Moline, Ill. 61265, Tel: 309-762-9456; Empl.: 180 p. 2696

EVAPORATED COATINGS, INC., Dept. EM, 798 Welsh Rd., Huntingdon Valley, Pa. 19006, Tel: 215-WI 7-1465; Empl.: 17

™EVERDUR - conduit - Anaconda Company Brass Division

EVERETT/CHARLES, INC., Dept. EM, 2806 Metropolitan Pl., Pomona, Cal. 91767, Tel: 714-593-2541; Empl.: 110

Sales Manager: W. L. Lowry

Local Sales Offices & Reps.

Cal	Pleasanton, Everett/Charles	415-462-4772
Fla	St. Petersburg, Everett/Charles	813-391-9084
Ill	Algonquin, Everett/Charles, Inc.	312-658-6656
Ill	Chicago, K.W. Meyers	312-774-6440
Mass	Burlington, Everett/Charles, Inc.	617-273-0632
Pa	Bala Cynwyd, Electech	215-687-5305
Tex	Houston, Data Mktg. Assoc.	713-780-2511
Exp:	Cal., Los Angeles, Kanematsu-Gosho	213-626-1123
Exp:	Cal., Pomona, Western Intl.	714-629-3315

™EVERFAST - liquid cement - Ambroid Co.

™EVM - loudspeaker - Electro-Voice, Inc.

EWALD INSTRS. CORP., Dept. EM, Rte. 7R, Kent, Conn. 06757, Tel: 203-927-3278

EWC, INC., Dept. EM, 725 Federal Ave., Kenilworth, N.J. 07033, Tel: 201-245-3200, TWX: 710-996-5993; FSC No.: 15387; Empl.: 90 .... p. 4408,4409

Sales Manager: C.G. Hiotis

Local Sales Offices & Reps.

Cal	Santa Clara, Cummings & Assocs.	408-247-8656
Cal	Woodland Hills, Cummings & Assocs.	213-340-6035
Colo	Denver, Cummings & Assocs.	303-455-6860
Fla	Orlando, Duay Enterprises	305-277-3296
Fla	Treasure Island, Buening Assoc.	813-360-4973
Md	Baltimore, Stemler Assoc.	301-944-8262
NJ	Edison, Griffin Assocs.	201-549-4602
NC	Winston-Salem, MARS, Inc.	919-748-8152
Ohio	Vandalia, W. Williams	513-898-1224
Ohio	Wickliffe, Walter J. Brauer & Assocs.	216-943-0601
Pa	Pittsburgh, Hal B. Allison	412-921-3213

Local Distributors

Cal	Mountain View, Abacus Elctrns.	415-961-1500
Cal	Woodland Hills, C & A Elctrns.	213-340-6036
Md	Baltimore, Whitney Dist.	

EXACT ELECTRONICS, INC., Dept. EM, Box 160, 455 SE 2nd Ave., Hillsboro, Ore. 97123, Tel: 503-648-6661, TWX: 910-460-8811; FSC No.: 10597; Empl.: 60 .... p. 2848,2849

Sales Manager: J. Foster

Local Sales Offices & Reps.

Ala	Hunstville, BCS Assocs.	205-881-6220
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Cupertino, T.L. Snitzer Co.	408-257-8333
Cal	Los Angeles, T.L. Snitzer Co.	213-836-6170
Cal	San Diego, T.L. Snitzer Co.	714-454-2191
Colo	Aurora, Denning Assocs.	303-755-7765
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Pivan Engrg. Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg Inc.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg. Inc.	913-722-1030
Md	Rockville, Electronic Mktg. Assocs.	301-744-7700
Mass	Needham, Addelco Corp.	617-444-4754
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, Pivan Engrg. Inc.	612-537-4501
Mo	St. Louis, Pivan Engrg. Inc.	314-567-3636
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	DeWitt, DB Assocs.	315-446-0220
NY	Great Neck, Measurement Tech. Inc.	516-482-3500
NC	Greensboro, BCS Assocs. Inc.	919-273-1918
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Ore	Portland, Hayes Technical	503-238-0001
Pa	King of Prussia, Electronic Mktg. Ass.-Carter, McCormic/P	412-472-4415
Tex	Dallas, Crockett Southwest Co.	214-251-1776
Wash	Seattle, Hayes Technical	206-763-2210
Wisc	Brookfield, Pivan Engrg. Inc.	414-786-1940

EXAR INTEGRATED SYSTEMS, Dept. EM, 750 Palomar Ave., Sunnyvale, Cal. 94086, Tel: 408-732-7900, TWX: 910-339-9233; Empl.: 132

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	Los Altos, PM Sls	415-941-4444
Cal	San Diego, DeAngelo, Rothman & Co.	714-560-5707
Cal	Sunnyvale, Exar Integrated Sys.	408-732-7970
Conn	Wallingford, Com-Sale	203-269-7964
Fla	Miami, Reptronics	305-251-5478
Fla	St. Petersburg, Reptronics	813-522-8220
Ga	Atlanta, Electro-Mech	404-449-6337
Ill	Chicago, Janus	312-381-4479
Md	Baltimore, Component Sls.	301-484-3647
Mass	Waltham, Com-Sale	617-890-0011
Minn	Minneapolis, Electronic Innovators	612-884-7471
Mo	Kansas City, Dy-Tronix	816-737-1100
NM	Albuquerque, Tri-Tronix	505-265-8409
NY	Buffalo, Quality Comps.	716-839-4170
NY	Manlius, Quality Comps.	315-682-8885
NY	Williston Park, ABC Elctrn. Sls.	516-747-6610
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Columbus, McFadden Sls.	614-221-3363
Pa	Erie, Ecco Elctrn. Sls.	814-452-3762
Pa	Huntingdon Valley, ABC Elctrn. Sls.	215-947-6960
Tenn	Nashville, Electro-Mech	615-883-1490
Tex	Dallas, Technical Mktg.	214-387-3601
Tex	Houston, Technical Mktg.	713-777-9228
Wash	Bellevue, SD-R2 Products & Sls.	206-747-9424

EXCEL PRODUCTS CO., INC., Dept. EM, 401 Joyce Kilmer Ave., New Brunswick, N.J. 08903, Tel: 201-249-6600, TWX: 710-480-6255; Empl.: 360 p. 1839

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper Sls.	602-946-4437
Cal	Alhambra, M.W. Riedel & Co.	213-283-7694
Cal	Menlo Park, Long Assocs.	415-327-1300
Colo	Arvada, Piper Sls.	303-420-4646
Ind	Fort Wayne, Berberich Assocs.	
Md.	Ellicott City, J. Winkler Assocs.	301-465-8630
Mass	Needham Heights, Todino Engrg.	617-444-7925
Minn	Golden Valley, Beta Engrg.	612-546-2215
NJ	Cherry Hill, J.N. Barrett Co.	609-429-1551
NY	N. Syracuse, Precision Sls.	315-458-2223
NY	Plainview, ERA Inc.	516-822-9890
Ohio	Cleveland, Berberich Assocs.	216-289-5094
Ohio	Dayton, Berberich Assocs.	513-433-0342
Tenn	Greenville, ACM Southeast	615-639-9141
Tex	Dallas, R.D. Spooner Co.	214-357-6636
Tex	Houston, R.D. Spooner Co.	713-521-9771
Wash	Seattle, Seatronics Inc.	206-767-4330

Local Distributors

Ariz	Phoenix, ACI Elctrns.	602-277-7661
Cal	Sunnyvale, Pyramid Elctrns.	408-744-1900
Mass	Cambridge, Apollo Elctrns.	617-868-3120
NJ	Springfield, Federated Elctrns.	201-376-8900
NY	Mamaroneck, Logicomp Elctrns.	914-698-9332
NY	Plainview, Fairmont Elctrns.	516-694-8200
NC	Raleigh, Southeastern Radio Supply	919-828-2311
Ohio	Cincinnati, United Radio	513-761-4030
Ohio	Solon, REPCO	216-248-8900
For:	Can., Ont., Zentronics	416-635-2822
For:	Germany, Munchen-Landsburger, Data Modul	

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EXCEL PRODUCTS CO., INC.
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LOGICOMP ELECTRONICS, INC.
895 Mamaroneck Ave.
Mamaroneck, N.Y. 10543
Phone 914-698-9332
Off the shelf delivery of EXCEL IC Sockets, IC Packaging Panels & Microcomputer Panels.

EXCEL SPECIALTY CORP., Dept. EM, 6335 N. Broadway, Chicago, Ill. 60660, Tel: 312-262-4781; Empl.: 25

EXCELLON AUTOMATION, Div. Excellon Inds., Dept. EM, 23915 Garnier St., Torrance, Cal. 90509

EXCELLON MICRONETICS, Dept. EM, 2675 Skypark Dr. #204, Torrance, Cal. 90505, Tel: 213-325-0410, Telex: 67-4562; Empl.: 8

Sales Manager: B. Donsker

Local Sales Offices & Reps.

Cal	Menlo Park, West Engineering Sls.	415-325-2885

(TM)EXECUTIVE - Intercoms - Fanon/Courier Corp., Subs.

EXECUTONE, PRINTACT RELAY DIV., Dept. EM, 29-10 Thomson Ave., Long Island City, N.Y. 11101, Tel: 212-EX2-4800, TWX: 710-582-2610; Empl.: 500

Local Sales Offices & Reps.

Cal	Orange, Newport Mktg. Assoc.	714-752-6100
Cal	San Francisco, R.R. Slater	415-392-9154
Colo	Denver, Walter Engrg. Assoc.	303-777-5585
DC	Washington, H.A. Goodman	215-247-7116
Fla	Ft. Lauderdale, Sproch Sls.	305-587-3792
Ill	Chicago, Allen Wood & Assocs.	312-283-7400
Ind	Indianapolis, Marketing Engineers	317-546-1523
Mass	Belmont, B-R Marketgroup	617-489-0022
Minn	Anoka, K. Haugen & Assocs.	612-421-3395
NJ	Westwood, Lubell Assocs.	201-664-2262
NM	Albuquerque, IMEC	505-883-9010
NY	Jamaica, S. A. M. Assoc.	212-658-8881
Ohio	Lyndhurst, Technical Sls. Assocs.	216-461-0826
Pa	Philadelphia, H.A. Goodman	215-247-7116
Tex	Dallas, E-Tron Sls.	214-348-4749
Wash	Seattle, R.R. Slater	206-622-3860

(TM)EXEC & VIP - personal hand lamps - Teledyne Big Beam

EXETRON CORP., Dept. EM, 2390 Walsh St., Santa Clara, Cal. 95050, Tel: 408-247-7660, Telex: 357424; Empl.: 215

Local Sales Offices & Reps.

Ariz	Tempe, Delta Elctrn. Sls.	602-966-9903
Cal	Mountain View, Nor-Cal	451-961-8121
Cal	San Diego, J.T.L. Assoc.	714-277-8044
Cal	Woodland Hills, Elctrn. Comp. Mktg.	213-340-1745
Colo	Denver, Straube Assoc.	303-426-0890
Fla	Casselberry, E.I.R.	305-830-6900
Ill	Palatine, Choisser & Clanfield Elctrn. Sls.	312-358-8900
Mass	Burlington, Contact Sls.	617-273-1520
Mich	Grosse Pointe Woods, Elko Sls.	313-884-1955
Mo	St. Louis, Beneke & McCaul	314-434-6242
NJ	Cherry Hill, Barrett Assoc.	609-429-1551
NJ	Irvington, M.G.I.	201-399-4350
Ohio	Cleveland, D. Steffen & Assoc.	216-461-8333
Tenn	Bristol, Rakes Engrg. & Mktg.	615-968-4195
Tex	Dallas, Merino Sls.	214-239-9719
Wash	Bellevue, Western Tech. Sls.	206-641-3900
Wisc	Elm Grove, Choisser & Clanfield Elctrn. Sls.	414-476-0484

EXIDE POWER SYS. DIV., ESB, Inc., Dept. EM, Box 5723, Philadelphia, Pa. 19120, Tel: 215-FI2-8000, TWX: 215-725-7397; Empl.: 2200

Local Sales Offices & Reps.

Ala	Birmingham	205-879-5321
Ariz	Phoenix	602-248-8870
Cal	San Francisco	415-761-1080
Cal	San Francisco	415-589-9005
Cal	Santa Fe Springs	213-723-9384
Colo	Denver	303-427-3684
Conn	Hamden	203-288-6389
Del	Wilmington	302-994-1970
Fla	Miami	305-885-5709
Fla	Tampa	813-248-2173
Ga	Albany	912-435-7101
Ga	Atlanta	404-691-8520
Haw	Honolulu	808-847-0623
Ill	Benton	618-439-6194
Ill	Countryside	312-352-3665
Ill	Peoria	309-692-5050
Ind	Fort Wayne	219-743-0020
Ind	Indianapolis	317-787-3434
Ind	South Bend	219-233-7823
Ky	Louisville	502-585-4500
La	Metairie	504-837-3504
Md	Columbia	301-992-9600
Mass	Medford	617-395-7979
Mass	Springfield	413-785-1034
Mich	Dearborn	313-581-0400
Mich	E. Grand Rapids	616-456-7487
Mich	Flint	313-238-6811
Minn	Roseville	612-631-2150
Mo	Kansas City	816-231-1414
Mo	St. Louis	314-773-1644
Neb	Omaha	402-342-6528
NJ	Newark	201-574-1700
NY	Albany	518-869-6907
NY	East Syracuse	315-437-8481
NY	Rochester	716-865-3800
NY	Williamsville	716-634-6111
NY	Woodside	212-457-4700
NC	Charlotte	704-375-7966
NC	Greensboro	919-274-2222
Ohio	Cincinnati	513-851-3838
Ohio	Cleveland	216-241-6231
Ohio	Columbus	614-846-0224
Okla	Tulsa	918-742-8838
Ore	Portland	503-227-1539
Pa	Bethel Park	412-833-6500
Pa	King of Prussia	215-783-0200
Tenn	Chattanooga	615-267-5850
Tenn	Memphis	901-397-4424
Tenn	Nashville	615-262-9285
Tex	Dallas	214-243-5531
Tex	Houston	713-683-0288
Utah	Salt Lake City	801-359-5766
Va	Ashland	804-798-4511
Va	Roanoke	703-342-0763
Wash	Seattle	206-623-1377
WVa	Bluefield	304-327-5859
WVa	Charleston	304-346-5363
Wisc	New Berlin	414-544-5428

EXIDE SAFETY SYSTEMS DIV., ESB Inc., Dept. EM, Box 116, Randolph, Mass. 02368

(TM)EXPANDOMATIC - ph measuring instruments - Beckman Instrs., (AISSD)

(TM)EXPEEDITER - print machine - Teledyne Rotolite

(TM)EX SERIES - explosion proof hand lamps - Teledyne Big Beam

(TM)EXTENDED RANGE - heat guns - Sigma Sys. Corp.

(TM)EXTRA - liquid scintillation sample vials - Beckman Instrs., (AISSD)

(TM)EXTRUSOL - bar solder - Multicore Solders

(TM)E-Z-CODE - wire markers - T & B/Thomas & Betts

(TM)E-Z-CODE - wire markers - T & B/Thomas & Betts

(TM)E-Z-DUO - cir. breaker "two in one" - Wadsworth Electric Mfg. Co.

(TM)EZEOUT - fiberglass ant. base - Francis Inds., Inc.

(TM)EZE-STIK - pressure sensitive label stock - Fitchburg Coated Products

(TM)E-Z-RED - cir. breakers - Wadsworth Electric Mfg. Co.

(TM)E–Z RELEASE - spring loaded contact - Continental Connector Corp.

(TM)E-Z-TRIM - potentiometer - Bourns, Inc.

(TM)E-2 - OEM display terminal - Information Displays, Inc.

F & M SYSTEMS CO., Dept. EM, 2525 Walnut Hill La., Box 29778, Dallas, Tex. 75229, Tel: 214-241-4242, TWX: 910-860-5502; Empl.: 190

Sales Manager: F.W. Schempf

Local Distributors

Cal	Monrovia, Mart-Con Prods. Co.	213-359-4717
Cal	San Leando, Broadmoor Elect. Co.	415-483-2000
Fla	Miami, North Air Conditioning	305-887-6293
Ga	Lithonia, Engineered Supermarket Prods.	404-482-7012
Ill	Chicago, Midwesco Energy Sys.	312-489-5800
Mich	Troy, Gray Electric	313-585-5230
Mo	St. Louis, Aschinger Energy Sys.	314-865-1721
NY	White Plains, Signacon Controls	914-761-1450
Pa	Allentown, Security Svc. Co.	215-398-2500

F-DYNE ELECTRONICS CO.

F-DYNE ELCTRNS., Dept. EM, 449 Howard Ave., Bridgeport, Conn. 06605, Tel: 203-367-6431, TWX: 710-453-0087; Empl.: 310 ....p. 1248,1249,1301

Local Sales Offices & Reps.

Ala	Huntsville, Jack Whitfield	205-257-2211
Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	Fremont, Spence Assocs.	415-656-9506
Cal	Van Nuys, Myco Sls.	213-988-2288
Colo	Denver, Walter Engrg.	303-777-5585
Conn	Wethersfield, Con/Pak	203-563-4784

Fla	Altamonte Springs, Semtronic Assoc.	305-831-8233
Fla	Largo, Semtronic Assoc.	813-586-1404
Ill	Franklin Park, Al & W Sls.	312-451-1360
Kans	Shawnee, J. Guernsey Co.	913-631-2414
Md	Ellicott City, T. Davis Marketeers	301-461-2209
Mass	Needham, Com/Pak	617-444-1259
Mich	St. Clair Shores, J. M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
NY	Hempstead, Kahgan Sls.	516-538-2300
NY	Syracuse, Naylor Elec.	315-472-9183
NC	Greensboro, L & D, Inc.	919-292-3201
Ohio	Lyndhurst, Technical Sls. Assocs.	216-461-0826
Ore	Portland, SPS Elctrns.	503-645-3769
Tex	Houston, Cunningham Co.	713-461-4197
Va	Fairfax, Davis Marketeers	703-591-7390
Va	Fairfax, T. Davis Marketters	703-591-7390

(TM)FA - fluid adhesives - Bacon Inds.

(TM)FABICON - completely automatic camera tube - Teltron, Inc.

FABRI-TEK, INC., Dept. EM, 5901 S County Rd. #18, Minneapolis, Minn. 55436, Tel: 612-935-8811, TWX: 910-576-2913; Empl.: 1500

Local Sales Offices & Reps.

Cal	Hawthorne	213-973-0484
Cal	San Jose	408-246-8391
Ga	Atlanta	404-455-0515
Ill	Elk Grove Village	312-437-4116
Mass	Auburndale	617-969-5077
NJ	W. Long Branch	201-222-6250
Ohio	Lancaster	614-654-7934
Tex	Dallas	214-661-3155
Tex	Houston	713-723-4934

FABRI-TEK, INC., Computer Systems Div., Dept. EM, 5901 S. County Rd. 18, Minneapolis, Minn. 55436, Tel: 612-935-8811, TWX: 910-576-2913; FSC No.: 21542; Empl.: 1500

Local Sales Offices & Reps.

Cal	Hawthorne	213-973-0484
Cal	San Jose	408-246-8391
Ill	Elk Grove Village	312-437-4116
Mass	Auburndale	617-969-5077
Minn	Minneapolis	612-935-8811
NJ	W. Long Branch	201-222-6250

FABRI TEK, Natl. Connector Div., Dept. EM, 9210 Science Center Dr., Minneapolis, Minn. 55428, Tel: 612-533-3533, TWX: 910-576-2717; Empl.: 250

Sales Manager: P. Van Wyngeeren

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-2194
Ariz	Phoenix, M R Engrg. Sls. Co.	602-267-7555
Cal	Chatsworth, Elcon Elctrns., Inc.	213-882-6760
Cal	Escondido, Cirolia Elctrn. Sls.	714-743-3015
Cal	Fremont, Parson & Meister	415-651-3711
Cal	San Diego, Cerco	714-560-9143
Cal	San Jose, Parsons Co.	408-247-7327
Cal	Woodland Hills, Elcon Elctrns.	213-884-4852
Colo	Parker, Component Sls., Inc.	303-841-2650
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Indialantic, J. Talbot	305-724-2386
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, D. Mitro	305-422-3686
Fla	Sarasota, Daniel McCue	813-441-1301
Ill	Oak Brook, Whitmore & Assoc.	312-325-4727
Ind	Indianapolis, F. Thomas	317-257-4683
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mass	N. Andover, R. Hicks	617-686-6975
Mass	Westwood, B. Reinherz	617-762-9272
Mich	Southfield, L. H. Dickelman Co.	313-353-8210
Minn	Minneapolis, S & R Sls	612-544-3022
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	East Orange, M. Gallegher	201-678-5071
NY	Fairport, D. Kirby Co.	716-325-4190
NC	Raleigh, Dave Grose	919-834-3961
Ohio	Richfield, Bear Mktg.	216-659-3131
Pa	Narberth, Jerry Bresson Assocs.	215-839-6770
Tex	Dallas, Blackburn & Assocs.	214-692-8885
Tex	Richardson, Concept Sls.	214-387-1434
Va	Lynchburg, Burgin-Kreh Assocs.	804-845-5600
Wash	Bellevue, S. P. Inc.	206-454-0660

FABRICAST, INC., Dept. EM, 2517 Seaman Ave., So. El Monte, Cal. 91733, Tel: 213-443-3247; FSC No.: 13345; Empl.: 8 .... p. 3078-3080

(TM)FABRI-PAK - interconnect backpanel concept - Fabri Tek

(TM)FABRITEMP - fabric temperature sensor - Trans-Met Engrg.

FAB-TEK INC., Dept. EM, 17 Sugar Hollow Rd., Danbury, Conn. 06810, Tel: 203-743-3312; Empl.: 5

(TM)FACELOID - involute face gears - Invincible Gear Co.

FACET ENTERPRISES INC., Motor Comps. Div., Dept. EM, Elmira, N.Y. 14903, Tel: 607-737-8303, TWX: 510-252-1594; Empl.: 1000

Local Sales Offices & Reps.

Ala	Birmingham, Wilcox & Allen	205-591-4940
Cal	Oakland, Power Comps. Ind. Co.	415-635-1592
Cal	Tustin, Morgan Johnson Co.	714-832-7282
Conn	Old Lyme, Aid Engrg. Sls. Co.	203-434-1673
Conn	Rocky Hill, Aid Engrg. Sls. Co.	203-529-3228
Ill	Chicago, Halliday-Lenhart	312-446-9320
Mass	Westboro, Aid Engrg. Sls. Co.	617-890-8181
Mich	Birmingham, J. C. Hofstetter Co.	313-646-3635
Mich	Grand Rapids, J.C. Hofstetter	616-942-0650
Minn	Minneapolis, J.J. Exon	612-571-5340
Mo	Kansas City, Terry & Hodges	913-722-1024
Mo	St. Louis, Terry & Hodges	314-965-0746
NJ	Livington, Varrelman-Gorman Co.	201-992-2505
NY	Canaudaigua, R.D. McGavern	315-394-7080
NY	Centerport, Varrelman-Gorman Co.	212-463-5000
NC	Charlotte, M. R. Snyder Co.	704-377-6571
Ohio	Cincinnati, Fremont & Lewis	513-891-3560
Ohio	Cleveland, W.M. Logan Co.	216-321-0204
Ore	Portland, N. Rupp Co.	503-228-4311
Pa	Bridgeville, Foster-McClinton Inc.	412-941-4800
Pa	Erie, F. McClinton	814-455-9111
Pa	Paoli, Joos Equip. Co.	215-644-5875
Tex	Richardson, D. E. Horman Co.	214-234-2021
Wash	Bellevue, N. Rupp Co.	206-455-2130
WVa	Huntington, Foster-McClinton	304-736-5161
Wisc	Wauwatosa, Gille Engrg. Sls.	414-258-4100

FACIT-ADDO, INC., Dept. EM, 66 Field Point Rd., Greenwich, Conn. 06830, Tel: 203-622-9150, TWX: 965998 710-579-2947; Empl.: 125

Sales Manager: O. Bjerkmann

Local Sales Offices & Reps.

Cal	Los Altos, Cain-White, Co.	
Cal	Los Angeles, Facit-Addo, Inc.	213-385-4161
Cal	Sherman Oaks, Elctrn. Mktg. Specialists	213-990-4244
Colo	Evergreen, Fahnestock, Inc.	303-674-5255
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Md	Wheaton, K-G Elctrns.	301-946-4055
Mass	Wakefield, Instr. Dynamics	617-245-5100
Mo	Florissant, Midwest Mktg. Assocs.	314-831-0342
NY	Elmont, Crane & Egert	516-448-2100
Ohio	Wickliffe, Data-tron	216-585-8421
Pa	King of Prussia, Riv-Co.	215-265-5211
Tex	Fort Worth, Carey Wolf & Assocs.	817-738-1996
Wash	Seattle, SJI Corp.	206-624-9020

FACIT ADDO INC., Dept. EM, 501 Winson Dr., Secaucus, N.J. 10019, Tel: 201-866-5111

(TM)FACT - flexible automatic circuit tester - Hughes Aircraft Co.

FAIR-RITE PRODS. CORP., Dept. EM, Wallkill, N.Y. 12589, Tel: 914-895-2055, TWX: 510-249-4819; Empl.: 210 .... p. 2665

Sales Manager: B.G. Tolen

Local Sales Offices & Reps.

Cal	City of Industry, Micrometals	213-968-4718
Cal	Los Altos, Schwerin Assocs.	415-941-3737
Colo	Englewood, A-G Elctrns.	303-771-8088
Conn	W Hartford, R. S. Pettigrew & Assoc.	203-233-8533
Fla	Maitland, Barrett Assocs.	305-678-0172
Ill	Palestine, Fair-Rite Prod.	618-586-2556
Md	Silver Spring, Carwithen Assocs.	301-589-3040
Mass	W. Newton, R.S. Pettigrew & Co.	617-969-5770
Ohio	Cincinnati, F. J. Campisano & Assoc.	513-662-1616
Pa	Easton, Kendon Co.	215-253-3100
Va	Roanoke, A. B. Kreger & Co.	703-989-4738

FAIRCHILD CAMERA & INST CORP., Imaging Sys, Dept. EM, 300 Robbins Lane, Syosset, N.Y. 11791, Tel: 516-931-4500

FAIRCHILD CAMERA & INSTR., Federal Systems Group, Dept. EM, 300 Robbins La., Syosset, N.Y. 11791, Tel: 516-931-4500, TWX: 510-221-1836; Empl.: 800

FAIRCHILD INDUSTRIAL PRODS. DIV., Dept. EM, 75 Mall Dr., Commack, N.Y. 11725, Tel: 516-864-8500, TWX: 510-226-3739

Sales Manager: H. Poschmann

Local Sales Offices & Reps.

Cal	Burlingame, Polach & Bensinger	415-697-2525
Cal	Sherman Oaks, Gee Assocs.	213-788-5961
Colo	Golden, J. F. Hurlbut	303-279-7796
Fla	Fort Lauderdale, Electronic Devices & Controls	
Ill	Wheaton, D. Hausten Co.	312-MO-8-7312
Md	Baltimore, Stemler Assocs.	301-944-8262
Mass	Lexington, G. Hathaway Elctrns.	617-861-7010
Minn	St. Paul, H. Cullen & Assoc.	612-646-7371
NJ	Glendora, Electronic Controls & Devices	609-939-2200
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Manhasset, Everett Mktg. Inc.	516-627-7750
NC	Charlotte, Electro Rep. Assoc.	704-527-2530
Ohio	Cincinnati, J. W. Murray	513-662-1616
Ohio	N. Olmstead, D. Spicer	216-777-1855
Okla	Tulsa, H. Daly Co.	918-627-4159
Ore	Portland, Fry Controls	503-226-2620
Tex	Dallas, United Comps.	214-324-1448

FAIRCHILD CAMERA & INSTR., Dept. EM, 401 Ellis St. MS14-1030, Mountain View, Cal. 94042, Tel: 415-962-2521, TWX: 910-379-6435; Empl.: 17 405

Local Sales Offices & Reps.

Ala	Huntsville, Fairchild Semiconductor	205-883-7020
Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Fairchild Semiconductor	602-264-4948
Cal	Irvine, Celtec Co.	714-752-6111
Cal	Los Angeles, Fairchild Semiconductor	213-466-8393
Cal	Los Angeles, Celtec Co.	213-874-6002
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Santa Ana, Fairchild Semiconductor	714-558-1881
Cal	Santa Clara, Magna Sls.	408-985-1750
Cal	Santa Clara, Fairchild Semiconductor	408-244-1400
Colo	Littleton, Simpson Assocs.	303-794-8381
Conn	Ridgefield, Phoenix Sls.	203-438-9644
Fla	Altamonte Springs, Fairchild Semiconductor	305-834-7000
Fla	Altamonte Springs, Lectromech	305-831-1577
Fla	Hollywood, Lectromech	305-920-2291
Fla	Indialantic, Lectromech	305-727-1250
Fla	St. Petersburg, Lectromech	813-527-2406
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ga	Dunwoody, Fairchild Semiconductor	404-394-5298
Ill	Elk Grove Village, Micro Sls.	312-956-1000
Ill	Rolling Meadows, Fairchild Semiconductor	312-640-1000
Ind	Fort Wayne, Fairchild Semiconductor	219-483-6453
Ind	Indianapolis, L. M. Devoe Co.	317-257-1227
Ind	Indianapolis, Fairchild Semiconductor	317-849-5412
Iowa	Cedar Rapids, B. C. Elctrns.	313-364-7253
Kans	Olathe, B.C. Elctrn. Sls.	913-888-6680
Kans	Overland Park, Fairchild Semiconductor	913-649-3974
Md	Bladensburg, Fairchild Semiconductor	301-779-0954
Md	Bladensburg, Delta III Assocs.	301-779-0977
Mass	Wellesley, Spectrum Assocs.	617-237-2796
Mass	Wellesley Hills, Fairchild Semiconductor	617-237-3400
Mich	Detroit, Rathsburg Assocs.	313-882-1717
Mich	Farmington Hills, Fairchild Semiconductor	313-478-7400
Minn	Edina, Fairchild Semiconductor	612-835-3322
Minn	Minneapolis, PSI Co.	612-835-1777
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Hazelwood, B.C. Electronic Sls.	314-731-1255
NJ	Wayne, Fairchild Semiconductor	201-696-7070
NJ	Wayne, Lorac Sls.	201-696-8875
NM	Albuquerque, Fairchild Semiconductor	505-265-5601
NY	Endwell, Tri-Tech Elect. Inc.	607-754-1094
NY	Fair Port, Tri-Tech Elect.	716-223-5720
NY	Fayetteville, Tri-Tech Elect.	315-446-2881
NY	Melville, Lorac Sls.	516-293-2970
NY	Melville, Fairchild Semiconductor	516-293-2900
NY	Poughkeepsie, Fairchild Semiconductor	914-452-4200

NY	Rochester, Fairchild Semiconductor	716-223-7700
NC	Charlotte, Cartwright & Bean	704-333-6457
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Cleveland, Components	216-243-9200
Ohio	Dayton, Lyons Corp.	513-278-0714
Ohio	Dayton, Fairchild Semiconductor	513-278-8278
Ohio	Highland Hgts., Lyons Corp.	216-461-8288
Okla	Tulsa, Technical Mktg.	918-622-5984
Okla	Tulsa, Fairchild Semiconductor	918-663-7131
Ore	Hillsboro, Quadra Corp.	503-225-0350
Pa	Willow Grove, BGR Assocs.	215-657-3301
Pa	Willow Grove, Fairchild Semiconductor	215-657-2711
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Technical Mktg.	214-387-3601
Tex	Dallas, Fairchild Semiconductor	214-234-3391
Tex	Houston, Technical Mktg.	713-777-9228
Tex	Houston, Fairchild Semiconductor	713-771-3547
Utah	Salt Lake City, Simpson Assocs.	801-486-3731
Wash	Redmond, Quadra Corp.	206-883-3550
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

FAIRCHILD SOUND EQUIPMENT, see Robins Broadcast & Sound Equipment Corp.

FAIRCHILD SYS. TECHNOLOGY, Dept. EM, 1725 Technology Dr., San Jose, Cal. 95110, Tel: 408-998-0123, TWX: 910-338-0558; Empl.: 600

Local Sales Offices & Reps.

Ariz	Tempe, FST	602-966-7297
Cal	Los Angeles, Fairchild Sys. Tech.	213-678-3166
Cal	San Jose, Fairchild Sys. Tech.	408-998-0123
Fla	Altamonte Springs, Fairchild Sys. Tech.	305-834-7070
Ill	Chicago, Fairchild Sys. Tech.	312-671-4480
Mass	Wellesley, FST	617-237-4787
Minn	Minneapolis, Fairchild Sys. Tech.	612-835-3322
NJ	Marlton, FST	609-983-3100
NY	Great Neck, FST	516-466-6393

(TM)FAIRLOC - integral fastener - Sterling Instr.

FANCORT INDUSTRIES, INC., Dept. EM, 111 Clinton Rd., Fairfield, N.J. 07006

Local Sales Offices & Reps.

Ariz	Phoenix, Electronic Entprs.	602-946-9860
Cal	Panorama City, Target Sls.	213-781-1122
Cal	San Jose, California Tech. Svcs.	408-225-5940
Cal	Woodland Hills, California Tech. Svcs.	213-346-6401
Fla	Ft. Lauderdale, Howard Assocs.	800-327-5553
Md	Phoenix, Rebco Sls.	301-592-8907
Mass	Framingham, Microdon	617-879-3800
Mo	Grandview, Production Automation	314-731-2331
NY	Hicksville, Wilson Assocs.	516-931-3007
Pa	Levittown, Rebco Sls.	215-547-4665
Tex	Dallas, Production Automation	214-620-0227
Va	Manassas, J. Dingman	703-361-2928
Wisc	Horicon, Elctronic Comp. & Svcs.	414-485-4320
Exp:	Mass., Plainville, Tehnis	617-695-3591
Exp:	Mass. Winthrop, ZED Co.	617-846-7250

(TM)FANDIAL - fan & blower speed controls - Lutron Electronics Co.

(TM)FANFARE 100F - CB Rig - Fanon/Courier Corp., Subs.

(TM)FAN-FOLD - electronic packaging service - United Wiring & Mfg. Co.

FANON/COURIER CORP., SUBS., Resdel Engineering, Dept. EM, 990 S. Fair Oaks, Pasadena, Cal. 91105, Tel: 213-799-9161, Telex: 67-5448; Empl.: 110

Local Sales Offices & Reps.

Courier

Cal	Foster City, Olson Sls.	415-573-1600
Cal	San Francisco, Hanna Co.	415-863-7627
Cal	Van Nuys, C.H. Mitchell Co.	213-994-9466
Colo	Aurora, Aurora Mktg. Co.	303-344-1415
Conn	Stamford, R.D.A., Inc.	203-357-8835
Ga	Tucker, Elrep Sls., Co.	404-938-7108
Ill	Chicago, Marketing Specialists	312-775-1233
Ill	Collinsville, Fister & Assocs.	618-345-5544
Ill.	Peru, Markal Sls. Corp.	815-223-8006
Ind	Indianapolis, W&S Metro Sls. Co.	387-213-1035
Kans	Overland Park, Fisher & Assocs.	913-341-8272
Kans	Overland Park, Fisher & Assocs.	913-8272
Mass	Stroughton, R & S Sls.	617-341-0400
Mich	Grand Rapids, Markal Sls. Corp.	616-245-2678
Mich	Southfield, Markal Sls. Corp.	313-355-5700
Minn	Minneapolis, G & C Assocs.	612-927-5633
Mo	St. Louis, Louis M. Schukar & Assocs.	314-878-2332
Mo	St. Louis, Louis M. Schukar & Assocs.	314-878-2832
Neb	Omaha, Fisher & Assocs.	402-330-3150
NJ	Fair Lawn, Moses & Kline	201-791-8538
NY	Merrick, Moses & Kline	516-378-1804
NY	Middletown, Quinn-Mazzeo	
NY	New York, Roburn Agencies	212-989-5939
NY	North Pelham, Moses & Kline	914-738-1163
NY	Rochester, Marsey Sls., Inc.	716-338-3269
Ohio	Akron, C.L. Maney Assocs.	216-666-5018
Ore	Portland, Muntz Sls.	503-283-0991
Pa	Willowgrove, R. Lewis Sls.	215-659-0704
Tex	Dallas, Maynard & Gunn Sls.	214-528-9090
Va	Falls Church, R. Lewis Sales	703-534-7732
Wisc	Sheboygan, Markal Sls. Corp.	414-452-1848

Fannon

Ariz	Phoenix, Western Mktg. Corp.	602-955-3210
Cal	Foster City, Olson Sls. Co.	415-573-1600
Cal	Los Angeles, P/F Western Sls. Corp.	213-478-0811
Cal	No. Hollywood, M. Stobin Co.	213-983-1555
Colo	Denver, Brake & Assocs., Inc.	303-433-8531
Conn	Waterbury, Anderson Sls. Assocs.	203-753-2487
Fla	Holiday, Ron Schneid & Assocs	813-938-1100
Fla	Hollandale, Dynasales Corp.	305-921-7300
Fla	North Miami, Haas Winfield	305-945-6544
Fla	Tampa, Haas Winfield	813-884-6500
Ga	Norcross, Dean Cooper Co.	404-448-5460
Ill	Chicago, Markal Sls. Co.	312-282-5800
Ill	Evanston, David-Martin Corp.	312-273-2600
Ind	Indianapolis, Midstates Corp.	317-257-2737
Ky	Louisville, W & S Metro Sls Co.	
Mass	Boston, Anderson Sls. Assocs.	617-227-2980
Mich	Southfield, Aztec Sls. Corp.	313-642-0777
Minn	Minneapolis, G & C Assocs.	612-927-5633
Minn	Minneapolis, Norcentronix	612-854-8494
Mo	St. Louis, Louis M. Schukar & Assocs.	314-878-2332
Neb	Omaha, Fisher & Assocs.	402-330-3150
NJ	Cinnaminson, Arthur Trachtener & Assocs.	215-331-1832
NJ	Fair Lawn, Moses & Kline	201-791-8538
NY	Hilton, Quinn-Mazzeo	716-392-2414
NY	Merrick, Moses & Kline	516-378-1804
NY	North Pelham, Moses & Kline	914-738-1163
NY	Tonawanda, Quinn-Mazzeo	716-692-9347
Ohio	Cleveland, Scope Sls.	216-382-2060
Pa	Philadelphia, Mike Oberst Assocs.	215-743-2512
Tex	Dallas, Maynard-Gunn Sls.	214-528-9090
Tex	Houston, Maynard & Gunn Sls.	713-469-4542
Tex	Houston, Maynard-Gunn Sls.	713-497-0544
Utah	Salt Lake City, Brake & Assocs.	801-485-3324
Va	Arlington, Howard Golenpaul & Assocs.	703-525-5898
Wash	Seattle, W.R. Lanphear & Co.	206-285-2012
Wisc	Colgate, Markal Sls. Co.	414-628-2801
Exp:	N.Y., New York, Roburn Agencies	212-989-5939

FANSTEEL INC., Dept. EM, One Tantalum Pl., N Chicago, Ill. 60064, Tel: 312-689-4900, TWX: 910-235-1577; Empl.: 2800

FARATRON CORP., Dept. EM, 280 Green St., S. Hackensack, N.J. 07606, Tel: 201-488-1440, TWX: 710-990-5022; Empl.: 60 .... p. 3256,3257

Sales Manager: V. Plessner V.P. Mktg.

Local Sales Offices & Reps.

Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Cal	Van Nuys, R. F. Specialties	213-785-0503
Ill	Schaumburg, Kingston Comps.	312-529-8055
Ind	Indianapolis, Loren Green Assoc.	317-293-9827
Mass	Woburn, Martindale Assoc.	617-933-8228
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
NJ	E. Hanover, H. L. M. Assoc.	201-386-0794
NJ	Morris Plains, H.L.M. Assocs.	201-539-8050
NY	Northport, H.L.M. Assocs.	516-757-1606
NY	Syracuse, Nycom Corp.	315-437-8343
Ohio	Brecksville, W R R Assoc.	216-526-2023
Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370

FARIA METER CORP., Dept. EM, 19 Faria Lane, Uncasville, Conn. 06382, Tel: 203-848-9271; Empl.: 150 .... p. 2851

Sales Manager: Gary Dixon

FARINON ELECTRIC, Dept. EM, 1691 Bayport, San Carlos, Calif 94070, Tel: 415-592-4120, Telex: 34-8491; Empl.: 1000

Local Sales Offices & Reps.

SC	S.C., Fair Play	803-882-6391
Tex	Houston	713-688-5569

(TM)FARM-O-STAT - temperature controllers - Honeywell

FARRAND CONTROLS DIV., Dept. EM, 99 Wall St., Valhalla, N.Y 10595, Tel: 914-RO 1-2600; Empl.: 75

Local Sales Offices & Reps.

Cal	Los Angeles, Applied Machinery Co.	213-726-1910
Conn	Torrington, G. Sharpe Co.	203-482-2461
Ga	Atlanta, Scott Mach. Tool Co.	404-522-8311
Haw	Honolulu, H. S. Gray Co., Ltd.	808-839-2747
Ill	Elmhurst, Federal-Bryant Mach.	312-833-4800
La	Shreveport, Richards Mach. & Sup.	314-567-3131
Mass	E. Boston, Wigglesworth Mach.	617-567-7210
Mich	Troy, Applied Mfg. Sys.	313-689-8600
Mo	Springfield, Crossland Mach. Co.	
Neb	Omaha, Crossland Mach. Co.	402-571-2288
NJ	Hasbrouck Hts., G. Sharpe Co.	201-288-2288
NY	Pittsford, R/F Allen Mach.	716-385-2730
Ohio	Cincinnati, Tech. Equip. S.	513-771-3630
Ohio	Cincinnati, Technical Equip. Sls.	513-771-3630
Ore	Portland, Star Machinery	503-226-3011
Pa	Edgemont, G.S. Maier	215-353-6821
Tex	Dallas, C. J. Harter & Son Mach.	214-FL7-1501

(TM)FARVAL - centralized lubricating systems - Eaton Corp.

FASCO INDUSTRIES, INC., Dept. EM, 601 N. Federal Ave., Boca Ratan, Fla. 33432, Tel: 305-368-0600, Telex: 51-5612

Sales Manager: C. Button; *Distributor Manager:* P. Reid

(TM)FAS'N-IT - white glue - Ambroid Co.

(TM)FAST - target training system - ABA Electromechanical Sys. Inc.

(TM)FAST - flux & solder - Lake Chemical Co.

(TM)FASTAIRE - dryers, hand, electric - blowers, portable, electric - Humphrey, Inc.

(TM)FASTATCH - switches and variable resistors - Centralab

(TM)FASTEMP - electronic thermometers - Amprobe Instrument

(TM)FASTIN-FASTON - connectors - Amp Inc.

(TM)FASTLINE - core memory system - Fabri-Tek, Inc.

(TM)FASTON - receptacle & tab terminals - Amp Inc.

(TM)FASTRAK - marker - Gen Rad

(TM)FASTRAPS - wire/cable ties - Grayhill Inc.

(TM)FAST SCAT 204 - transportable troposcatter - RF Systems, Inc.

(TM)FAST STEPPER - step & repeat film printer - Grover Photo Prods.

(TM)F.A.T - fully additive circuitry - Advanced Circuitry

FAULTFINDERS, INC., Dept. EM, 15 Avis Dr., Latham, N.Y. 12110, Tel: 518-783-7786, TWX: 710-4444-968; Empl.: 120

Local Sales Offices & Reps.

Cal	Irvine	714-549-4901
Cal	Sunnyvale	408-732-9020
Ill	Park Ridge	312-696-0335
Mass	Waltham	617-890-4717

(TM)FAYLON - mixing consoles & equalizers - Gotham Audio Corp.

(TM)FAZE SENTRY - phase loss monitor - Coilcraft

(TM)FEATHER - fan - Rotron, Inc.

(TM)FEATHERIDE - cartridge - Electro-Voice, Inc.

FECKER SYSTEMS, Owens-Illinois, Inc., Dept. EM, 4709 Baum Blvd., Pittsburgh, Pa. 15213, Tel: 412-621-3200; Empl.: 80000

Local Sales Offices & Reps.

Cal	Westlake Village, Larry Lutz	213-889-8629

FEDERAL PACKAGE CORP., Dept. EM, 34016 Nevada Ave. N., Minneapolis, Minn. 55427

FEDERAL SCIENTIFIC CORP., See Nicolet Scientific Corp.

FEDERAL SCREW PRODUCTS INC., Dept. EM, 3917 N. Kedzie Ave., Chicago, Ill. 60618, Tel: 312-478-5744, Telex: 25-3677; Empl.: 21

Local Sales Offices & Reps.

Cal	Oakland, Moulthrop Sls.	415-261-7676
Cal	San Gabriel, R.G. Moye Co.	213-283-1669

FEDERATED METALS CORP., Dept. EM, 120 Broadway, New York, N.Y. 10005, Tel: 212-732-9500

Local Sales Offices & Reps.

Cal	Long Beach	213-638-9333
Cal	San Francisco	415-282-3340
Ind	Whiting	219-659-0826
Mass	Medway	617-533-6768
Mich	Detroit	331-871-5040
NJ	Cherry Hill	609-677-6460
NJ	Newark	201-589-0500
NY	Rochester	716-271-7743
Ohio	Cincinnati	513-241-1678
Ore	Portland	503-227-1403
Pa	Pittsburgh	412-682-2410
Tex	Houston	713-674-7611

FEEDBACK, INC., Dept. EM, 438 Springfield Ave., Berkeley Hghts., N.J. 07922, Tel: 201-464-5181; Empl.: 5

Local Sales Offices & Reps.

Fla	Lighthouse Point	305-946-0381
Ind	Indianapolis	317-926-6327

™FE, FI, FO - miniature flatpak inductors - TRW/UTC Transformers

Fenwal™ Electronics

FENWAL ELCTRNS., Dept. EM, 63 Fountain St., Framingham, Mass. 01701, Tel: 617-872-8841, TWX: 710-346-0678; Empl.: 250 .... p. 4316

Local Sales Offices & Reps.

Ala	Huntsville, Col Ins Co.	800-327-6600
Ariz	Phoenix, Dorton Enterprises, Inc.	602-263-0414
Cal	Los Angeles, E. Landa Co.	213-879-0770
Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Colo	Denver, Elcom, Inc.	303-770-4400
Conn	Suffield, Andrews Airtronics, Inc.	203-668-0446
Fla	Orlando, Col Ins Co.	800-327-6600
Ill	Chicago, Midwest Elctrn. Sls.	312-777-9700
Ind	Indianapolis, Midwest Elctrn. Sls.	317-253-0590
Iowa	Marion, Thomas & Modrcin Assocs.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assocs.	913-432-2131
Md	Baltimore, B. White & Co.	301-484-5400
Mass	Lynfield, Andrews Airtronics, Inc.	617-245-5220
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	St. Paul, Northport Engr., Inc.	612-698-3841
Mo	Hazelwood, Thomas & Modrcin Assocs.	314-895-4700
NM	Alburquerque, Zeus, Inc.	505-256-9831
NY	De Ruyter, R.P. Kennedy Co.	315-682-2299
NY	Huntington, CDB Enterprises, Inc.	516-692-5200
NY	Red Hook, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322
NC	Raleigh, Col Ins Co.	800-327-6600
Ohio	Cleveland, A.H. Baier Co. & Assocs.	216-461-6161
Ohio	Dayton, A.H. Baier Co. & Assocs.	513-276-4128
Okla	Tulsa, W.P. Fralia Co.	817-429-3141
Ore	Beaverton, R & R Assocs.	503-643-5754
Pa	Ardmore, W.K. Metz, Inc.	215-649-3966
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Tex	Fort Worth, W.P. Fralia Co.	817-420-3141
Tex	Houston, W.P. Fralia Co.	713-772-1572
Utah	Salt Lake City, Elcom, Inc.	801-486-2317
Wash	Seattle, R & R Assocs.	206-762-7664
Wisc	Waukesha, Midwest Elctrn. Sls.	414-542-5129
Exp:	Mass., Framingham, Fenwal Electronics	617-872-8841

Local Distributors

Ala	Huntsville, Thermal Corp.	205-837-1122
Cal	Burlingame, Rose Elctrns.	
Cal	Los Angeles, Mil-Comm Distrs.	213-478-0525
Colo	Aurora, Jet Elctrns. Supply Co.	303-364-7000
Colo	Denver, Newark-Denver Elctrn. Supply	303-757-3351
Colo	Denver, Indl. Elctrns. Corp.	303-771-2636
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Elgin, Allied Elctrns.	312-697-8200
Ind	Indianapolis, Graham Elctrn Supply	317-634-8486
Mass	Holliston, Diplomat New England, Inc.	617-429-4120
Mass	Newton, A. W. Mayer Co.	617-965-1111
Minn	Minneapolis, Harry Stark, Inc.	612-332-1325
Mo	Kansas City, Burstein-Applebee Co.	816-531-5614
Mo	St. Louis, Olive Indl. Elec.	314-863-4051
NJ	Huntington, CDB Development Corp.	516-692-5200
NM	Albuquerque, Industrial Elctrns.	505-256-9831
NY	Buffalo, Summit Distributors	716-884-3450
NY	Rochester, Summit Elctrns. of Rochester	716-334-8110
NC	Winston-Salem, Kirkman Elctrns., Inc.	919-722-9131
Ohio	Cincinnati, United Radio	513-761-4030
Okla	Tulsa, Radio, Inc.	918-587-9123
Pa	Ardmore, W.K. Metz, Inc.	215-649-3966
RI	Providence, Wm. Dandreta & Co.	401-861-2800
Tex	Fort Worth, Patco Supply	817-738-2394
Utah	Salt Lake City, Standard Supply Co.	801-355-2971
For:	Can., Edmonton, Alb., Cardinal Indl. Elctrns. Ltd.	403-455-4122
For:	Can., Montreal, Que., J.G. Weiss Co. Ltd.	514-489-6887
For:	Can., Montreal West, Que., S. C. Hooker (Cda) Ltd.	514-487-5151
For:	Can., Vancouver 2, BC, RAE Indl. Elctrns. Ltd.	604-687-2621

FERRA FLUX CORP., Dept. EM, 1801 Newport Circle, Santa Ana, Cal. 92705, Tel: 714-979-0225; Empl.: 50

™FERRAMIC - ferrites - Indiana General

FERRANTI ELEC., Dept. EM, East Bethpage Rd., Plainview, N.Y. 11803, Tel: 516-293-8383; Empl.: 15

FERRANTI-PACKARD, LTD. ELEC. DIV., Dept. EM, 121 Industry St., Toronto, Can.M6M 4M3, Tel: 416-762-3661, Telex: 06-22007; Empl.: 140

Local Sales Offices & Reps.

Cal	Mountain View, Mor-Cal Assocs.	415-961-8121
Cal	Pasadena, Luscombe Engrg. Co.	213-684-2000
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ill	Wilmette, Crest Assocs.	312-256-5202
Ind	Indianapolis, Scientific Sls. Corp.	
Mich	Walled Lake, Berberich Assocs.	313-624-2211
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
NH	Nashua, Bell Controls	603-882-6984
NY	Mount Vernon, Sonkin Assocs.	914-668-9809
Ohio	Dayton, Berberich Assocs.	513-433-0342
Pa	Paoli, T. Griffin Co.	215-647-1550
Tex	Richardson, Campion Sls. Co.	214-238-8145
Wash	Seattle, Delcom Sls. Co.	206-248-0090

™FERREX - special wire for EMI/RFI shielding - Metex Corp.

™FERRIMAG - ceramic permanent magnets - Colt Industries

FERRODYNE CORP., Dept. EM, 4240 Glencoe Ave., Venice, Calif. 90291, Tel: 213-821-7933; Empl.: 50

™FERROFLOW - microwave absorber (liquid) - Microwave Filter Co.

™FERROGRAPH - oil quality analyzer - Trans-Sonics, Inc.

FERRONICS, INC., Dept. EM, 60 N. Lincoln Rd., East Rochester, N.Y. 14445, Tel: 716-377-6820, TWX: 510-254-2893; Empl.: 85

Sales Manager: M Northrup

Local Sales Offices & Reps.

Ala	Huntsville, Comp. Sls.	205-881-4753
Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Seal Beach, Texel,	213-596-9411
Colo	Boulder, P.A.R. Assoc.	303-499-4736
Fla	Tera Ceia, Comp. Sls.	813-894-4366
Ill	Chicago, Kennedy Engrg.	312-631-8283
Ind	Fort Wayne, Scott Elctrn.	219-743-1586
Ind	Indianapolis, Scott Elc.	317-897-9976
Md	Baltimore, Bernard White	301-484-5400
Mass	Canton, New England Elctrn. Sls.	617-828-4835
Mich	Birmingham, Forand Sls.	313-644-0087
Minn	St. Paul, Countryman Assoc.	612-645-9151
Mo	Blue Springs, Cairns & Hayes Co.	816-229-1404
NJ	Ft. Lee, B. Cameron	201-461-2595
NY	Syracuse, J Rudy Co.	315-488-3251
NC	Raleigh, Comp. Sls.	919-832-1897
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Pa	Ardmore, Wm. K. Metz, Inc.	215-649-3966
Pa	Pittsburg, Scott Elec.	412-828-1073
Tex	Dallas, Campion Sls.	214-238-8145
Wash	Tukwila, General Elctrns.	206-575-4030
Exp:	Connecticut, Intrane	203-567-5865

™FERROSEARCH - steel in aluminum detector - Rank Precision Inds.

™FERROSORB - microwave absorber (solid) - Microwave Filter Co.

FERRO-TECH CORP., Dept. EM, 6 Northwood Rd., Bloomfield, Conn. 06002, Tel: 203-242-0708; Empl.: 14

Local Sales Offices & Reps.

Conn	Bloomfield	203-242-6479

FERROTRAN ELCTRN., Dept. EM, 683 Broadway, New York, N.Y. 10012, Tel: 212-AL4-5810 .... p. 3258

Sales Manager: H. King

FERROXCUBE CORP., Dept. EM, 5083 Kings Hwy., Saugerties, N.Y. 12477, Tel: 914-246-2811, TWX: 510-247-5410; Empl.: 300; Minimum order: $R. Denison

Sales Manager: J. Turnbull; *Distributor Manager:* R. Denison

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Cal	North Hollywood, Amperex/Ferroxcube	213-980-4212
Cal	San Diego, Repco	714-292-9001
Cal	Santa Clara, Amperex/Ferroxcube	408-249-1134
Colo	Lakewood, NAPECC	303-922-8434
Conn	Shelton, MacPherson Conner	914-638-1976
Fla	Pompano Beach, Technology Mktg. Assoc.	305-942-0774
Ill	Elk Grove Village, Amperex/Ferroxcube	312-437-8050
Ind	Fort Wayne, Amperex/Ferroxcube	219-432-8567
Iowa	Cedar Rapids, Lorenz Sls. Co.	319-393-6912
Kans	Olathe, B. C. Electronics Sls.	913-782-6696
Mass	Waltham, Amperex/Ferroxcube	617-899-7100
Mich	Farmington, Amperex/Ferroxcube	313-478-7666
Minn	Minneapolis, Siedare Assoc.	612-545-5663
Mo	St. Louis, B.C. Electronic Sls.	314-731-1255
NY	Endicott, Tech-Mark Inc.	607-748-7473
NY	Fairport, Tech-Mark Inc.	716-223-1252
NY	Hempstead, Kahgan Sls. Co.	516-538-2300
NY	Liverpool, Tech-Mark Inc.	315-652-6229
NC	Raleigh, Candor Co.	919-787-2652
Ohio	Dayton, Amperex/Ferroxcube	513-278-7351
SC	Myrtle Beach, Candor Co.	803-448-5213
Tex	Dallas, Amperex/Ferroxcube	214-231-3481
Wash	Bellevue, Amperex/Ferroxcube	206-746-1212

Local Distributors

Cal	Canoga Park, Ferroxcube Div.	213-998-7311
Ill	Elk Grove Village, Ferroxcube Div.	312-593-8220
Mass	Waltham, Ferroxcube Div.	617-899-7103
NY	Hempstead, Kahgan Sales	516-538-2300
NY	Woodstock, Elna Ferrite	914-246-5861
Pa	Flourtown, Eastern Comps.	215-836-1616

FERWALT INC. W. H., Dept. EM, Hwy. 95 & Webb Rd., Lapwai, Idaho 83540, Tel: 208-843-2281, TWX: 510-776-0766; FSC No.: 28995; Empl.: 15 .... p. 2439

Sales Manager: R. L. Gruell

Local Sales Offices & Reps.

Pa	Philadelphia, W.F. Assocs.	215-CA4-4120
Exp:	Wash., Seattle, (Japan), IMI Corp.	206-244-8233

™FETRON - solid state tube replacements - Teledyne Semiconductor

™FEURLON - formed self-lubricating structures - Rogers Corp.

™**FEUTRON, OAFLIFE** - synthetic fiber felt filter media - GAF Corporation

™**FFA** - fluid flexible adhesives - Bacon Inds.

™**FFB** - friction brake - General-Electro Mechanical

™**FFC** - friction clutch - General-Electro Mechanical

™**FFRB** - fail-safe friction brake - General-Electro Mechanical

FG ENGINEERING CO., Dept. EM, Box 506, Black Canyon Stage, Phoenix, Ariz. 85020, Tel: 602-465-7735

Sales Manager: F. Griswold

Local Sales Offices & Reps.

Colo	Arvada, Eggeman Assoc.	303-423-3707
Md	Towson, Dickison Sls.	301-823-0923
Mass	Holden, Poulin Assoc.	617-829-6948
NJ	West Orange, H. Berkowitz	201-736-2807

™**FIBERCOM** - fiber-optoelectronic devices - Radiation Devices Co.

FIBERFIL DIV. DART IND., Dept. EM, P.O. Box 3333, Evansville, Ind. 47732, Tel: 812-424-3831, TWX: 810-353-0506

Local Sales Offices & Reps.

Cal	Encino	213-783-3235
Ga	Atlanta	404-525-7184
Ill	Chicago	312-332-6242
Mass	Boston	617-742-1049
Mich	Detroit	313-961-9696
Minn	Minneapolis	612-335-0186
NY	New York	212-765-3690
Ohio	Cincinnati	513-721-3810
Okla	Oklahoma City	405-235-2001
Pa	Philadelphia	215-567-2450

™**FIBERFRAX** - ceramic fiber products - Carborundum Co.

™**FIBER-LITE** - fiber optic illuminators - Dolan-Jenner Inds., Inc.

™**FIBERLOY** - Polymer base materials - Rogers Corp.

FIBER PHOTICS, INC., Dept. EM, 2557 Soquel Dr., Santa Cruz, Cal. 95060, Tel: 408-475-5242

™**FIBERTEMP** - fiber temperature sensor - Trans-Met Engrg.

FIBRA-SONICS ,INC., Dept. EM, 4626 N. Lamon Ave., Chicago, Ill. 60630, Tel: 312-286-7377; Empl.: 30

Sales Manager: A.R. Watson

Local Sales Offices & Reps.

Cal	Gardena, Instrument Labs	213-770-0650
Colo	Denver, Electronic Sls.	303-771-6300
Ga	Atlanta, D. G. Machnery & Gage Co.	404-633-6201
Iowa	Des Moines, Kathrinus-Kelly & Co.	515-255-4584
Mass	Boston, P.J. Engrg. Sls. Co.	617-783-0510
Mich	Dearborn, Pitcher-Poulin	313-582-5420
Minn	St. Paul, Sabco, Inc.	612-483-1102
Mo	St. Louis, Kathrinus-Kelly & Co.	314-968-3800
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	Scaneateles, Tech-Sonics Assocs.	315-685-6144
Ohio	Dayton, Rixan Assocs.	513-222-0011
Pa	Paoli, Stitzer Assocs.	215-644-5500
Tex	Dallas, Teamwork Inc.	214-243-5881
Wash	Seattle, A. Sproul Assocs.	206-789-3300

FIBRE MATERIALS CORP., Dept. EM, 34 Dupont St., Plainview, N.Y. 11803, Tel: 516-433-3660; Empl.: over 100

Sales Manager: S. Rich

™**FIBROFLEX** - fiber optics - Rank Precision Inds.

™**FIBROX** - fiber optics - Rank Precision Inds.

™**FI-CORD** - recorders, magnetic tape - Heitz, Inc., Karl

™**FIDELEX** - metal strippers - Fidelity Chem. Prods. Corp.

FIDELITY CHEM. PRODS. CORP., Dept. EM, 472 Frelinqhuysen Ave., Newark, N.J. 07114, Tel: 201-242-4110; Empl.: 10

FIDELITONE, INC., Dept. EM, 207 N. Woodwork Lane, Palatine, Ill. 60067, Tel: 312-359-8800, Telex: 28-1050

Sales Manager: G. Oakes

Local Sales Offices & Reps.

Alas	Anchorage, Carolson Commercial Corp.	907-279-0593
Ariz	Phoenix, Homer Premil	602-939-6787
Cal	Mill Valley, Anzer Entprs.	415-388-0156
Cal	San Pedro, Ben Duval Co.	213-833-0951
Colo	Denver, 2001 Entprs.	303-321-3671
Fla	Miami, Sochin Sls.	305-235-6048
Ga	Atlanta, Elmar Assocs.	404-938-2821
Haw	Honolulu, Snider & Assocs.	808-941-2400
Ill	Chicago, Bob Burns & Assocs.	312-775-1233
Ind	Indianapolis, Kingston Sharkey & Assocs.	317-353-9406
Md	Olney, Dave Buckley Sls.	301-774-9338
Md	Owings Mills, James Walters	301-356-3590
Mass	Brookline, Michael Jarod & Assocs.	617-738-6338
Mich	Detroit, Dan Neumaier & Assocs.	313-838-3850
Minn	Edina, Marketing Plus	612-920-0221
Mo	Jefferson City, Carmine Vignola & Assocs.	314-893-3205
NM	Albuquerque, C. T. Carlberg Assocs.	505-265-1579
NY	Glen Head, Steindler & Co.	516-759-0850
NY	Syracuse, William Tauber Co.	315-446-7094
NC	Charlotte, Ray Kale Co.	704-372-4252
Ohio	Columbus, Mandabach - Lehner Co.	614-235-0265
Ohio	Mayfield Heights, Sherman Lieberman	216-461-3342
Ohio	Stow, Mandabach - Lehner Co.	216-686-1965
Pa	Philadelphia, Irv Tannenbaum & Assocs.	215-947-0888
Tenn	Nashville, Tennessee Sls. Co.	615-352-1771
Tex	Dallas, Afco Elctrn. Sls.	214-363-3925
Va	Virginia Beach, Pamco Entprs.	804-460-1194
Wash	Seattle, R. K. Squibb Inc.	206-632-2450

™**FIDELPLATE** - electroless plating solutions - Fidelity Chem. Prods. Corp.

™**FIELDIAL** - magnetic field regulators - Varian Assocs.

™**FIELDLAB** - oxygen analyzer - Beckman Instrs., (AISSD)

FIFTH
5-D DIMENSION
INC.

FIFTH DIMENSION, Dept. EM, 707 Alexander Rd., Princeton, N.J. 08540, Tel: 609-452-1200, TWX: 510-685-2387; Empl.: 100 ....p. 3515,4072,4073

Local Sales Offices & Reps.

Ariz	Phoenix, Portis & Assocs.	602-947-4379
Cal	Encino, Porter Co.	213-999-0171
Cal	Menlo Pk., G.R. McKnight Co.	415-325-2844
Colo	Englewood, A-G Elctrns.	303-771-8088
Fla	Orlando, Gra-Mar	305-894-3351
Ill	Northfield, Such & Assocs.	312-446-8934
Mass	Burlington, Tritek Inc.	617-272-4550
Mich	Detroit, Nicon Assocs.	313-341-7688
Minn	Minneapolis, G.E. Arneson & Co.	612-835-2177
Mo	Kansas City, Harris Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NY	Jerico, HRC Comp. Tech.	516-822-5550
Ohio	Aurora, EMA Inc.	216-562-6104
Ohio	Centerville, EMA Inc.	513-433-2800
Pa	Harleysville, T. Jackson Assocs.	215-643-5560
Va	Alexandria, Vanguard Engrg. Sls.	703-768-1660
Wash	Seattle, H. Levinson Co.	206-323-5100

FIGARO ENGRG. INC., Dept. EM, 3-7-3 Higashitoyonaka, Toyonaka City, Osaka, Japan, Tel: 06-849-2156, TWX: 05286155 FIGARO J; Empl.: 64

™**FILAMITE** - filament wound parts - NVF Co.

™**FILMATIC** - polyester film capacitor, self encased - Paktron Div.

™**FILMBRID** - quadrature coupler - Merrimac Inds., Inc.

FILM CAPACITORS, INC., Dept. EM, 100 8th St., Passaic, N.J. 07055, Tel: 201-779-2240; Empl.: 55

Local Sales Offices & Reps.

Cal	San Jose, United Sales Co.	408-379-0800
Ill	Chicago, Berndt Assocs.	312-283-0713
Mass	Randolph, Bengal Assocs.	617-961-4120
NJ	Leonia, Kohl-Camber	201-944-6488
NJ	Moorestown, L.E. Brown Assocs.	609-234-0382
NY	Pittsford, D Hurley Sls.	716-586-6159
Ohio	Dayton, Kimconics	513-898-1783
Ore	Portland, United Sls. Co.	503-297-3548
Tex	Dallas, G. Weinreich & Assocs.	214-DA 1-2800

™**FILMITE** - film dielectric capacitors - Sprague Elec. Co.

FILM MICROELECTRONICS, INC., Dept. EM, 17 A St., Burlington, Mass 01803, Tel: 617-272-5650; Empl.: 75

™**FILMPLATE** - tape preservation fluid - Udel Manufacturing

™**FILMTRIM** - trimmer capacitors - Sprague-Goodman Electronics, Inc.

FILTECH CORP., Dept. EM, 1250 Pratt Blvd., Elk Grove Village, Ill. 60007, Tel: 312-593-0900, TWX: 910-227-4637; Empl.: 95

™**FILTERCON** - RFI Filters - Erie Technological Products

™**FILTER FLO DIFFUSER** - HEPA filtration module - Weber Tech Products

™**FILTER-RATED FERRAMICS** - ferrites - Indiana General

™**FINCO** - antennas & accessories - Finney Co.

FINCOR DIV., North American Rockwell, Dept. EM, 3750 E. Market St., York, Pa. 17405, Tel: 717-757-4641; Empl.: 300

™**FINE LINE** - precision etching - Flexible Circuits, Inc.

™**FINGRIP** - terminal - Burndy Corporation

FINNEY CO., Dept. EM, 34 W. Interstate St., Bedford, Ohio 44014, Tel: 216-232-6161; Empl.: 135

Local Sales Offices & Reps.

Cal	Los Alamitos, Broom's Elctrns.	213-598-3314
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9593
Ga	Atlanta, Cavendish Sls. Co.	404-394-2642
Ill	Chicago, Markal Sls.	312-282-5800
Ind	Indianapolis, Elctrn. Representatives, Inc.	317-894-1414
Kans	Shawnee Mission, Lowell, Kangas & Assocs.	913-631-3515
Mass	Wellesley Hills, L.B. Cole & Co.	617-237-1260
Mass	W. Springfield, L.B. Cole & Co.	413-781-3040
Mich	Buchanan, Riley & Petchell Sls.	616-695-6356
Mich	Detroit, Riley & Petchell Sls.	313-937-3000
Minn	Osseo, R.C. Sls.	612-425-5543
Mo	St. Louis, Lowell, Kangas & Assocs.	314-821-4050
NY	Ellenville, C & W Mktg. Assocs.	914-647-7008
NY	Liverpool, C & W Mktg. Assocs.	315-652-6651
NY	North Bellmore, L.W. Keller & Assocs.	516-785-2826
Ohio	Westlake, T.G. Corpus	216-871-8832
Ore	Beaverton, DMS/Vantage	503-644-6111
Pa	Easton, Kaiser Assoc.	215-258-6477
Tex	Dallas, McKinney Sls. Co.	214-631-9450
Tex	Ft. Worth, L. Smith	817-332-1909
Wash	Seattle, D. Miller Sls.	206-525-2050
Wisc	Colgate, Markal Sls.	414-628-2801

™**FIN-PAC** - family of high voltage silicon rectifiers - Semtech Corp.

™**FIRE AWAY** - portable fire extinguishers - Kidde, Walter & Co.

™**FIREFLY** - instrument light - Dupree, Inc.

™**FIREROD** - cartridge heater - Watlow Elec. Mfg. Co.

™**FIREWALL EP, SR & FIREWALL III** - fire resistant cable-control, power & instrumentation - Cerro Wire & Cable Co.

™**FIREZONE** - high temperature wire - Cerro Wire & Cable Co.

FIRING CIRCUITS INC., Dept. EM, Muller Ave., Box 2007, Norwalk, Conn. 06852, Tel: 203-846-1633, TWX: 710-468-3334; Empl.: 110

Sales Manager: W.P. Walden

(TM)**FIRON** - pastes-thick film microcircuits - Electro Mats. Corp. Amer.

1ST ELECTRONICS CORP., Dept. EM, 71 Vontellern St., Boston, Mass. 02127, Tel: 617-288-2430

FISCHER SPECIAL MFG. CO., Dept. EM, 446 Morgan St., Cincinnati, Ohio 45206, Tel: 513-961-1280; Empl.: 78

FISHER SCIENTIFIC CO., Dept. EM, 711 Forbes Ave., Pittsburgh, Pa. 15219, Tel: 412-562-8300; Empl.: 2500

Sales Manager: T. P. Lawton

Local Sales Offices & Reps.

Cal	Santa Clara	408-249-0660
Fla	Orlando	305-857-3600
Ga	Atlanta	404-449-5050
Ill	Itasca	312-773-3050
Md	Silver Spring	301-587-7000
Mass	Medford	617-391-6110
Mich	Livonia	313-261-3320
Mo	St. Louis	314-991-2400
NJ	Springfield	201-379-1400
NY	Rochester	716-464-8900
NC	Raleigh	919-876-2351
Ohio	Cincinnati	513-793-5100
Ohio	Cleveland	216-292-7900
Pa	King of Prussia	215-265-0300
Pa	Pittsburgh	412-781-3400
Tex	Houston	713-495-6060

FITCHBURG COATED PRODUCTS, Div. Litton Inds., Dept. EM, P. O. Box 1106, Scranton, Pa. 18501, Tel: 717-347-2035; Empl.: 250

(TM)**FIVE/TEN** - electron beam system - Sloan Technology Corp.

FJW INDUSTRIES, Dept. EM, 215 E. Prospect Ave., Mt. Prospect, Ill. 60056, Tel: 312-259-8100, Telex: 910-687-22; FSC No.: 34870; Empl.: 125

Sales Manager: E.A. Wood

(TM)**FLAME** - fiberglass ant. - mobile - Francis Inds., Inc.

(TM)**FLAME-EYE** - flame sensor - Barber-Colman Co.

(TM)**FLAMENOL** - polyvinyl chloride-insulated wires - General Electric Co.

(TM)**FLAMEOTROL** - combustion safeguard - Barber-Colman Co.

(TM)**FLAMON** - flame detector - Bailey Meter Co.

(TM)**FLASH FLOW WELDER** - tap welder - Ewald Instrs. Corp.

(TM)**FLASH FRONT** - back lighted dead front panels - Panelgraphic Corp.

(TM)**FLASH STRIPPER** - shielding stripper - Ewald Instrs. Corp.

(TM)**FLATFORMER** - low profile transformer - Inductive Components, Inc.

(TM)**FLAT PLATE** - slot array antenna - Rantec Div.

(TM)**FLATSO** - radial lead thick film resistor - Pyrofilm Resistor Co., Inc.

(TM)**FLAT STORE** - Core Memory - Standard Logic Inc.

(TM)**FLATTAC** - connector system - Elco Corp.

FLEEHART & SULLIVAN, Dept. EM, 10109 Aurora Ave N, Seattle, Wash. 98133

FLEX KEY CORP., Dept. EM, 18 Sargent St., Gloucester, Mass. 01930, Tel: 617-281-2040, Telex: 94-0333; Empl.: 15

Local Sales Offices & Reps.

Ariz	Phoenix, Stitzer-Dodd	602-994-2237
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Ft. Wayne, Coombs Assocs.	
Minn	Minneapolis, Elctrn. Innovators, Inc.	612-884-7471
Mo	St. Louis, Coombs Assocs.	314-567-3657
NJ	Livingston, G & A Sls.	201-992-3087
NY	Syracuse, Nycom Inc.	315-437-8343
NC	Charlotte, Over & Over	704-366-8601
Tex	Hurst, Wheelex	817-268-1812
Wash	Bellevue, Comtec	206-285-1698
Wisc	Greendale, Coombs Assocs.	414-421-2300

(TM)**FLEXAGUIDE** - flexible waveguide - Airtron

(TM)**FLEX-A-PLUG** - plug-in type power take-off devices - General Elec. Co.

(TM)**FLEX'ATOR** - constant force compression spring - Ametek, Inc

(TM)**FLEXBRAID** - cable shield bonding hardware - Communications Technology Corp.

(TM)**FLEXCON** - connector, test - Air-O-Tronics Prods.

(TM)**FLEX-E-GEAR** - spur gear chain - Winfred M. Berg Inc.

(TM)**FLEX-E-GRIP** - timing belts & pulleys - Winfred M. Berg Inc.

(TM)**FLEXFOAM** - foam dielectric microphone cable - Columbia Elctrn. Cables

(TM)**FLEXFOIL** - laminated aluminum foil/polyester - Columbia Elctrn. Cables

FLEXIBLE CIRCUITS, INC., Dept. EM, Paul Valley Ind'l. Pk., Warrington, Pa. 18976, Tel: 215-DI 3-2300, TWX: 510-665-8532; Empl.: 275

Sales Manager: G.S. Farina

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Phoenix, Vari-Tron Sls.	602-997-0774
Cal	Los Angles, Electro-Mech Pro.	213-848-0922
Cal	San Fransisco, Lodan Assocs.	415-592-4600
Ill	Chicago, J.J. McBride Sls.	312-775-1080
Ind	Fort Wayne, Delesa Sls.	219-483-9537
Md	Silver Spring, Carwithen Assocs.	301-589-9140
Mass	Framingham, STS Sales	617-620-0195
Mich	Grosse Pointe Woods, Elko Sls.	313-884-7893
Minn	Minneapolis, Scott Elctns.	612-929-2985
Mo	Baldwin, McQuillan Co.	314-962-4450
NJ	Springfield, Sylvester Assoc.	201-376-3324
NY	Fairport, TAC Assocs.	716-337-1742
Ohio	Dayton, Midwest Mktg.	513-433-2511
Tex	Dallas, Blackburn Assoc.	214-692-8885

(TM)**FLEXIBUS** - general purpose bus for connecting & interconnecting microcomputer memory & interface I/O modules - PCS., Inc.

(TM)**FLEXI GLOVE** - vinyl glove - Clean Room Prods.

(TM)**FLEXITE** - extruded plastic tubings - Markel Corp.

(TM)**FLEX-KEY** - conductive elastomer switch - Flex Key Corp.

(TM)**FLEXLEAD** - high temperature wire & cable - Markel Corp.

(TM)**FLEXLIFE** - flexible high gloss cable jackets - Columbia Elctrn. Cables

(TM)**FLEX-LOCK** - electric limit switches - Namco Controls

(TM)**FLEXLOK** - flexible pc connector - Burndy Corporation

(TM)**FLEXMAX CIRCUITS** - multilayer flexible printed circuits - Flexprint Div

(TM)**FLEXOBOND** - urethane adhesive - Packaged Resins Div.

(TM)**FLEXOPRENE** - neoprene covered portable cable - Standard Wire & Cable Co.

(TM)**FLEX-PAK** - amplifiers & sound sys - Bogen Div.

(TM)**FLEX-PLATE** - driving components for flexible couplings - Allis-Chalmers

FLEXPRINT DIV, Sanders Assocs., Inc., Dept. EM, Grenier Field, Manchester, N H 03060, Tel: 603-669-4615, TWX: 710-220-1845; Empl.: 700

(TM)**FLEXSTRIP** - Flat cable and Jumpers - T&B/Ansley Corp.

(TM)**FLEXTAC** - connectors - Hypertronics Corp.

(TM)**FLEXTECH** - extruded mechanical tubings - Markel Corp.

(TM)**FLEXTENSION** - special aersol extender - Tech Spray, Inc.

(TM)**FLEX-TEX** - coupling (CAC) - Allis-Chalmers

(TM)**FLEX-WELD** - Welding technique for flat conductor cable - T&B/Ansley Corp.

(TM)**FLIGHTLINE** - multi-circuited test bench - Advance Engrg. Systems

FLIGHT SYS., INC., Dept. EM, Box 25, Mechanicsburg, Pa. 17055, Tel: 717-697-0333; Empl.: 35

(TM)**FLIP-A-DIP** - ic extraction tool - Micro Electronic Systems, Inc.

(TM)**FLIP CHIP** - module family - Digital Equipment Corporation

(TM)**FLIP LOC** - quick detach clamp - Viking Inds., Inc.

(TM)**FLIP-PAK** - solid-state controlling device - De Laval Turbine Inc.

(TM)**FLIPPER** - wire snips - Clauss Cutlery Co.

(TM)**FLIPPY** - reversible flexible disk - Information Terminals

(TM)**FLIP-R** - flip-chip resistor - Mini-Systems, Inc.

FLITE-TRONICS, co., inc.

FLITE-TRONICS CO., INC., Dept. EM, 3314 Burton Ave., Burbank, Cal. 91504, Tel: 213-849-1552, 849-1483, Telex: 69-1487; Empl.: 50 .... p. 3382,3383

(TM)**FLOATROL** - float operated control - Autocon Inds., Inc.

(TM)**FLO FUSE** - automatic stop valve - Marotta Sci. Controls, Inc.

(TM)**FLOMONITOR** - flow transducer - Flow Technology, Inc.

FLORIDA DATA CORP., Dept. EM, 3308 New Haven Ave., W. Melbourne, Fla. 32901, Tel: 305-724-6088; Empl.: 26

Sales Manager: G. Harmou

(TM)**FLO-RITE** - paste solder - Kester Solder Div.

(TM)**FLOTRAC** - displacement instrumentation - Hull Corp.

(TM)**FLOW-FORM** - formed metal parts - ITT Harper

FLOW TECHNOLOGY, INC., Dept. EM, Box 21346, Phoenix, Ariz. 85036, Tel: 602-268-8776, Telex: 668-344; Empl.: 55

Sales Manager: A. Marshall

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs., Inc.	205-837-4305
Ariz	Phoenix, Wisco Equip.	602-968-9063
Cal	Calabasas, D.W. Harmon Co.	213-346-7559
Cal	Walnut Creek, Dale-Dahl Assoc.	415-933-9595
Conn	Hamden, Applied Meas.	203-288-5288
Fla	Tampa, Paul A. Quinn Assoc.	813-254-5211
Idaho	Idaho Falls, Measurements	208-524-2520
Ill	La Grange, Olson Engrg. & Sls. Corp.	312-482-3300
Md	Kensington, Elctrn. Mktg. Assocs.	301-881-5300

Mass	W. Acton, Applied Measurements	617-263-2766
Mich	Detroit, WKM Assocs.	313-892-2500
Minn	Minneapolis, Waytec	612-933-2133
Mo	Hazelwood, Dy-Tronix, Inc.	314-731-1445
NJ	Springfield, RJM Sls.	201-467-1210
NY	Buffalo, Terryberry Engrg. Sls. Co.	716-632-7404
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Pa	King of Prussia, Elctrn. Mktg. Assocs.	215-265-1600
Pa	Pittsburgh, WKM Assocs.	412-892-2953
SC	Greenville, E.C. Capell & assocs.	803-288-4159
Tex	Arlington, P. Vickery Co.	817-261-9544
Tex	Houston, Pro-Quip (Letlow-Collins Assoc.)	713-464-6832
Tex	Midland, Tex-Mex Inds..	915-684-5841
Wash	Seattle, Brett Assocs.	206-935-8054

(TM)FLUID PISONT - bearings for motor-pump units - Allis-Chalmers

FLUKE MFG. CO., INC. JOHN, Dept. EM, Box 43210, Mountlake Terr., Wash 98043, Tel: 206-774-2211, Telex: 32-0013; Empl.: 1428 .... p. 2852-2863

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Alas	Anchorage, Harry Lang Assocs.	907-279-5741
Ariz	Scottsdale, Barnhill Three, Inc.	602-947-7841
Cal	Burbank, Instrument Specialists Sls. Grp.	213-849-7181
Cal	San Diego, Instrument Specialists Sls. Grp.	714-278-7752
Cal	Santa Clara, Instrument Specialists Sls. Grp.	408-244-1505
Colo	Denver, Barnhill Three, Inc.	303-750-1222
Conn	Glastonbury, Instrument Reps. Sls. Grp.	203-633-0777
Fla	Orlando, BCS Assoc. Inc.	305-896-4881
Haw	Honolulu, Ind'l. Elctrns., Inc.	808-533-6095
Ill	Des Plaines, Cozzens & Cudahy Sls. Grp.	312-298-3600
Ind	Indianapolis, Cozzens & Cudahy Sls. Grp.	317-244-2456
Md	Kensington, Mid-Atlantic Sls. Grp.	301-881-3370
Mass	Lexington, Instrument Rep. Sls. Grp.	617-861-8620
Mich	Detroit, WKM Assoc.	313-588-2300
Minn	Minneapolis, Cozzens & Cudahy Sls. Grp.	612-884-4336
Mo	Kansas City, Cozzens & Cudahy Sls. Grp.	816-454-5836
Mo	St. Louis, Cozzens & Cudahy Sls. Grp.	314-731-3388
NJ	Clifton, SBM Reps. Sls. Grp.	201-778-4040
NM	Albuquerque, Barnhill Three, Inc.	505-299-7658
NY	Rochester, SBM Reps. Sls. Grp.	716-266-1400
NC	Greensboro, BCS Assoc.	919-273-1918
Ohio	Cleveland, WKM Assoc.	216-267-0445
Ohio	Dayton, WKM Assoc.	513-434-7500
Ore	Beaverton, Showalter Instrs.	503-646-5196
Pa	Mid-Atlantic Sls. Grp., Elctrn. Mktg. Assoc.	215-265-4040
Pa	Pittsburgh, WKM Assoc.	412-892-2953
Tex	Austin, Barnhill Two, Inc.	512-444-2377
Tex	Houston, Barnhill Two, Inc.	713-688-9971
Tex	Richardson, Barnhill Two, Inc.	214-231-2573
Wash	Bellevue, Showalter Instrs.	206-455-4922
Wash	Richland, Showalter Instrs.	509-943-1264

Local Distributors

Ala	Mobile, Brownell Electro	205-479-5405
Ariz	Phoenix, Liberty Elctrns.	602-257-1272
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Deigo, Liberty Elctrns.	714-565-9171
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Conn	Middleton, Mancib Co.	203-346-6646
Fla	Orlando, Brownell Electro	305-843-6770
Ga	Atlanta, Brownell Electro	404-762-5181
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Livonia, Pioneer/Michigan	313-525-1800
NM	Albuquerque, Liberty Electrns.	505-299-8293
NC	Charlotte, Brownell Electro	704-394-4341
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ore	Beaverton, Liberty Elctrns.	503-644-4783
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
Tenn	Memphis, Brownell Electro	901-323-8554
Tenn	Nashville, Brownell Electro	615-889-8230
Wash	Seattle, Liberty Elctrns.	206-763-8200

FLUKE TRENDAR CORP., Dept. EM, 630 Clyde Ave, Mountain View, Cal. 94043, Tel: 415-965-0350, TWX: 910-379-6573; Empl.: 40

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Alas	Anchorage, H. J. Lang & Assocs.	907-279-5741
Ariz	Scottsdale, Barnhill Three, Inc.	602-947-7841
Cal	Burbank, Instr. Specialists, Inc.	213-849-7181
Cal	Glendale, Instr. Specialists, Inc.	213-243-9404
Cal	San Diego, Instr. Specialists, Inc.	714-565-2555
Cal	Santa Clara, Instr. Specialists, Inc.	408-244-1505
Colo	Denver, Barnhill Three, Inc.	303-934-5505
Conn	Glastonbury, Instr. Reps.	203-633-0777
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Des Plaines, Cozzens & Cudahy, Inc.	312-298-3600
Ind	Indianapolis, Cozzens & Cudahy, Inc.	317-244-2456
Md	Kensington, Elctrn. Mktg. Assocs.	301-881-5300
Mass	Lexington, Instr. Reps.	617-861-8620
Mich	Detroit, W K M Assocs.	313-892-2500
Minn	Minneapolis, Cozzens & Cudhay, Inc.	612-884-4336
Mo	St. Louis, Cozzens & Cudhay, Inc.	314-423-1234
NJ	Union, S B M Reps., Inc.	201-687-8737
NM	Albuquerque, Barnhill Three, Inc.	505-299-7658
NY	Pleasantville, S B M Reps., Inc.	914-769-1811
NY	Rochester, S B M Reps., Inc.	716-266-1400
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, W K M Assocs.	216-267-0445
Ohio	Dayton, W K M Assocs.	513-434-7500
Ore	Beaverton, Showalter-Judd, Inc.	503-646-3004
Pa	King of Prussia, Elctrn. Mktg. Assocs.	215-265-1600
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tex	Houston, Barnhill Two, Inc.	713-621-0040
Tex	Richardson, Barnhill Two, Inc.	214-231-2573
Wash	Bell, Showalter-Judd, Inc.	206-455-4922

(TM)FLUORALLOY - solutions and mixes - Beckman Instrs., (AISSD)

(TM)FLUOROGLIDE - dry lubricants - Chemplast, Inc.

(TM)FLUORO-XECON - elastomer for EMI/RFI shielding + pressure gasketing - Metex Corp.

(TM)FLUOR-X - nuclear gauges - Nuclear Resch. Corp.

(TM)FLUSH-SEAL PRESSURE PLUGS - socket head plugs - Allen Mfg. Co.

FMC CORP., Ind'l. Chemical Div., Dept. EM, 2000 Market St., Philadelphia, Pa 19103, Tel: 215-299-6000; Empl.: 800

FMC CORP., Semiconductor Products Div., Dept. EM, 800 Hoyt St., Broomfield, Colo. 80020, Tel: 303-469-2161, TWX: 910-320-0763; Empl.: 300

Local Sales Offices & Reps.

Ariz	Phoenix, Hecht Henschen & Assoc.	602-275-4411
Cal	Palo Alto, Engrg. Assocs.	415-494-7842
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Colo	Denver, Gossard & Assocs.	303-985-0602
Colo	Denver, Brian Bachman	303-469-2161
Conn	Branford, David H. Minshall	203-481-2125
Fla	Miami, A. Frank Assocs.	305-947-5080
Ill	Barrington, Janus, Inc.	312-381-4479
Ind	Fort Wayne, Mc Donald Sls.	219-747-3650
Md	Baltimore, Callas Elctrns.	301-744-7711
Mich	Livonia, B. Hacker	313-261-0162
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	St. Louis, H.J. Weisler & Assocs.	314-428-3934
NJ	Summit, B. Ringalda	201-273-2502
NY	Penfield, J. Lazor Assocs.	716-385-3300
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
Ohio	Brecksville, A. Nace Co.	216-526-4323
Pa	Easton, Kendon Co.	215-253-3100
Pa	Pittsburgh, Allen Nace Co.	412-922-7225
Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Olympia, Bergford & Assocs.	206-866-2001
Wisc	Mequon, T.V. Stumm	414-241-8050
Exp:	NY, New York, Singer Prods.	212-432-1400

Local Distributors

Cal	Mt. View, Time Elctrns.	415-965-8000
Cal	Torrance, Time Elctrns. West	213-320-0880
Conn	E. Haven, JV Elctrns.	203-469-2321
Fla	Miami, ESL Elctrn. Distr.	305-633-6973
Ga	Atlanta, A-C Equip. Co.	404-451-2747
Ill	Chicago, Electro-Kinetics	312-286-4200
Ill	Mt. Vernon, Fairmont Supply Co.	618-244-5344
Ill	Rockford, Mid-West Associated	815-962-8036
Ill	Rosemont, Advent Elctrns.	312-298-4210
Iowa	Waterloo, Farnsworth Elctrns.	319-234-6681
Md	Savage, Pyttronic Inds.	301-792-0780
Mass	Wakefield, Semtex	617-245-9050
Mich	Kentwood, R-M Elctrn. Co.	616-531-9300
Minn	Edina, Industrial Comps.	612-831-2666
Mo	St. Louis, Rectifier Engr. & Supply	314-968-0303
NM	Albuquerque, Century Elctrns.	505-292-2700
NY	Buffalo, Summit Distributors	716-884-3450
NY	New Rochelle, Tri Met Elctrns.	914-632-5600
NY	Rochester, Summit Elctrns.	716-334-8110
Ohio	Akron, Sun Radio Co.	216-434-2171
Ohio	Cleveland, Darrah Elect. Co.	216-631-0912
Ohio	Dayton, Stotts-Friedman Co.	513-298-5555
Ore	Portland, Dunn Elctrns.	503-285-0214
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Pa	Washington, Fairmont Supply Co.	412-222-5200
SC	Greenville, S. S. Elctrn. Supply Co.	803-244-2204
Tex	Dallas, Thyristor Power Div. - Titan Reps	214-661-5350
Tex	Forth Worth, D. C. International	817-332-6835
Tex	Houston, Wayne Broyles Engr. Corp.	713-223-4811
Wash	Bellevue, Bell Inds.	206-747-1515
WVa	Bluefield, Fairmont Supply Co.	304-325-6186
WVa	Fairmont, Fairmont Supply Co.	304-366-4300
Wisc	Milwaukee, Marsh Elctrns.	414-475-6000

(TM)FOAMCONE - radar-augmentation device - Teledyne Micronetics

(TM)FOAMFLEX - semi-rigid cable - Cablewave Systems Inc.

(TM)FOAM/FOIL - RFI shielding - Tapecon, Inc.

(TM)FOAM WIPE - urethane foam wiper - Clean Room Prods.

(TM)FOBALLOY - substitute for gold-tin solder - Plessey Inc.

(TM)FOCAL - programming language - Digital Equipment Corporation

FOGG SYSTEM CO., Dept. EM, 15592 E. Batavia Dr., Aurora, Colo. 80011, Tel: 303-344-1883; Empl.: 7

(TM)FONO-MAGIC - nonship chemical - R-Columbia Products, Inc.

(TM)FOOTROL - foot switches - General Control Co.

(TM)FORBON - vulcanized fibre - NVF Co.

FORK STANDARDS, INC., Dept. EM, 211 Main St., West Chicago, Ill. 60185, Tel: 312-231-3511; Empl.: 14

Local Sales Offices & Reps.

Cal	Los Altos, Horne Assoc.	415-948-0788
Cal	Torrance, Component Mktg. Assoc.	213-921-8491
Fla	Fort Lauderdale, Sproch Sls.	305-587-3792
Ill	Glen Ellyn, Rockford Controls Co.	312-469-6016
Mass	Waltham, Betronic Assoc.	617-894-8400
NJ	Englewood Cliffs, F. J. Kenny Inc.	201-666-3444
Pa	Paoli, Tyler Griffin Co.	215-647-1550
Exp:	N.Y., Westbury, Minthorne Intl. Co.	516-334-3303

FORM-IT PRODUCTS INC., Dept. EM, 1540 W. Carroll, Chicago, Ill 60607, Tel: 312-421-7337; Empl.: 21

Local Sales Offices & Reps.

Ill	Chicago, Special Electric Co.	800-558-0650
Wisc	Milwaukee, Special Electric Co.	414-383-6370

(TM)FORMALDAFIL - fiberglass reinforced acetal - Fiberfil Div. Dart Ind.

FORMA SCIENTIFIC, INC., Dept. EM, Box 649, Marietta, Ohio 45750, Tel: 614-373-4763, Telex: 24-5394; Empl.: 200

FORMICA METAL PRODS. CO., INC., Dept. EM, Corporation Way, Dept. M, Medford, Mass. 02155, Tel: 617-395-5656; Empl.: 35 .... p. 1131

FORMULATED RESINS INC., Dept. EM, Box 508, Greenville, R.I. 02828, Tel: 401-949-2060; Empl.: 15

Sales Manager: H.R. Oldham

Local Sales Offices & Reps.

Ill	Arlington Heights, R. Diethert Co.	312-593-7600
Mich	Southfield, Associated Electric Sls. Co.	313-354-1177

NJ	Bayonne, Seletar Prods.	201-437-1220
Ohio	Cleveland, E. Bock & Assoc.	216-331-5212
Ore	Portland, J.E. Edstrom Co.	503-775-8527

(TM)FORUM - conference system - Robins Broadcast & Sound Equipment Corp.

FOSTER TRANSFORMER CO., Dept. EM, 3820 Colerain Ave., Ohio 45223, Tel: 513-681-2420, TWX: 810-461-2584; Empl.: 250

Sales Manager: A.W. Reynolds

Local Sales Offices & Reps.

Cal	Santa Ana, Spectrum	
Fla	Casselberry, EIR, Inc.	
Ill	Evanston, W.F. Swinke & Assocs.	312-869-3577
Ky	Ft. Mitchell, G. Thelen Co.	606-341-8181
Md	Towson, Kraft Elctrn. Sls.	301-828-5838
Mass	Brockton, Forsberg Sls.	207-522-6302
Minn	Minneapolis, R.W. Marshall Co.	612-929-0457
NJ	Ho-Ho-Kus, Alto Assoc.	201-447-1770
NY	Pittsford, D. Hurley Sls.	716-586-6159
Ohio	Cleveland, Martin-Rettger	216-791-8787
Tex	Dallas, Lund & Co.	
Wisc	Menomonee Falls, W.M. Braun & Assoc.	414-332-1040

(TM)FOTOFET - light sensitive FET - Teledyne-Crystalonics

(TM)FOTOLECTRIC - electronic controls - Worner Elctrn. Devices

(TM)FOUNDATION - panel instrument line - Westinghouse Elec. Corp.

FOUR-PHASE SYSTEMS, Dept. EM, 19333 Vallco Pkwy., Cupertino, Cal 95014, Tel: 408-255-0900, TWX: 910-338-0250

Local Sales Offices & Reps.

Cal	Los Angeles	213-640-1438
Cal	San Francisco	415-692-4360
Conn	Hartford	203-549-0054
Conn	Stamford	203-357-1860
DC	Washington	202-785-9222
Fla	Miami	305-592-3620
Ga	Atlanta	404-351-0070
Ill	Chicago	312-694-3250
Ind	Indianapolis	317-923-1341
Kans	Kansas City	913-384-0080
Mass	Boston	617-245-9600
Mich	Detroit	313-557-8844
Minn	Minneapolis	612-854-4461
Mo	St. Louis	314-862-3030
NJ	Rochelle Park	201-845-0252
NY	New York	212-575-5656
Ohio	Cincinnati	513-771-0670
Ohio	Cleveland	216-661-0720
Ohio	Columbus	614-459-0414
Pa	Philadelphia	609-234-0200
Tex	Dallas	214-634-2240

FOURJAY INDUSTRIES, Dept. EM, Box 1465 Northridge Br., Dayton, Ohio 45414, Tel: 513-278-9416

FPC ELECTRONICS CORP., Dept. EM, 2301 York Rd., Timonium, Md 21093

(TM)FPL - control systems - Sequential Information Systems

(TM)FRAHM - resonant reed frequency meters, tachometers - Biddle, James G.

FRANCIS INDS., INC., Dept. EM, 431 W. Broad St., Pataskala, Ohio 43062, Tel: 614-927-4091; Empl.: 25

Local Sales Offices & Reps.

Ill	Chicago, Pappas & Assoc., Inc.	312-685-2338

FRAZIER, INC., Dept. EM, 1930 Valley View La., Dallas, Tex. 75234, Tel: 214-241-3441; Empl.: 30

Local Sales Offices & Reps.

Cal	Los Angeles, J.G. Humble & Assocs.	714-991-1964
Cal	San Francisco, J.G. Humble & Assocs.	714-991-1964
Colo	Denver, B & B Elctrn. Prods.	303-773-6700
Conn	W. Hartford, Robert Smith Co.	203-523-0512
Ga	Atlanta, Secom	404-261-8935
Haw	Honolulu, J.C. Elctrns.	808-537-6787
Ill	Chicago, R.R. Hutmacher Assocs.	312-631-3248
Mich	Ferndale, Shalco Inc.	313-547-4771
Minn	Moorhead, Northland Assocs.	218-233-4616
NJ	Greenbrook, Eldiserco Co.	201-968-0344
Ohio	Dayton, N. Browning Co. Ltd.	513-298-5973
Tex	Dallas, B. Amos & Assocs.	214-741-3674
Wash	Seattle, D. Smith Sls. Co.	206-633-3160

FREDERICK ELECTRONICS CORP., Dept. EM, Hayward Rd. P.O. Box 502, Frederick, Md. 21701, Tel: 301-662-5901, Telex: 893438; Empl.: 350

Sales Manager: J.V. Murphy, V.P. Mktg

Local Sales Offices & Reps.

Cal	Santa Cruz, Plantronics	408-426-5858
Cal	Valencia, Plantronics	805-255-7997
Fla	Jacksonville	904-721-3322
Md	Bethesda, Warner Assocs.	202-469-8904
Mo	Ballwin, Plantronics	314-391-0209
NY	New York, Frederick Elctrns. Corp.	212-422-2449
Ohio	Cincinnati, Plantronics	513-474-2064
Pa	Shippensburg, Plantronics	717-532-4425
Tex	Dallas, Plantronics	214-341-9500
Wash	Seattle, Plantronics	206-624-8861

FREDERICKS CO., Dept. EM, Philmont & Anne Sts., Huntingdon Valley, Pa. 19006, Tel: 215-947-2500; Empl.: 85

FREED TRANSFORMER CO.

FREED TRANSFORMER CO., INC., Dept. EM, 1718 Weirfield St., Brooklyn, N.Y. 11227, Tel: 212-386-1300; Empl.: 200 .... p. 2864,2865,4410-4413

Sales Manager: M. Salzberg

Local Sales Offices & Reps.

Cal	San Gabriel, R. G. Moye Co.	213-283-1669
Colo	Denver, Nelson Co.	303-573-1516
Ga	Smyrna, B-C. Elctrn. Sls.	404-436-5169
Md	Baltimore, B. White & Co.	301-484-5400
Mass	Allston, Vector Sls.	617-787-2790
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Trotwood, I. Atkind & Assoc.	513-837-4750
Pa	King of Prussia, Montiero Assocs.	215-265-0634
Exp:	N.Y., Plainview, Morhan Exporting Corp.	516-293-5582

FREEPORT INDUSTRIAL & COMML LTD., American Devco, Inc., Dept. EM, Box F2666, Freeport, Bahamas

(TM)FREON - flourinated solvents & refrigerants - E.I. DuPont de Nemours & Co.

(TM)FREQMETER - frequency-to-dc converter - Solid State Electronics Corp.

FREQUENCY DEVICES, INC., Dept. EM, 25 Locust St., Haverhill, Mass. 01830, Tel: 617-374-0761, TWX: 710-347-0314; Empl.: 35 .... p. 2732,2733

Local Sales Offices & Reps.

Cal	Seal Beach, CESCO	213-430-9084
Md	Columbia, Rep-Tron, Inc.	301-953-7580
NJ	Fort Lee, Tecnimat	201-461-8686
NY	Guilderland, Electro-Moduler Sys.	516-456-2665
NC	Winston-Salem, Radco	919-722-9671

FREQUENCY ELCTRNS., Dept. EM, 3 Delaware Dr., New Hyde Pk., N.Y. 11040, Tel: 516-328-0100, TWX: 510-223-0418; Empl.: 185 .... p. 2734,2735

Sales Manager: A. Vulcan

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scien.	205-533-6880
Ariz	Scottsdale, Semper Fl Sls. Co.	602-991-9197
Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	Mountain View, Weil & Bisman Assoc.	415-965-4300
Fla	Orlando, Truex Assoc.	305-859-2160
Ill	Chicago, Pivan Engrg.	312-539-4838
Md	Rockville, Marktron Inc.	301-762-6210
Mass	Reading, Kanan Assocs.	617-944-8484
Mo	St. Louis, Pivan Engrg.	314-567-3636
NY	Plainview, ERA Inc.	516-822-9890
NY	Rochester, Ossmann Comps.	716-442-3290
NC	Winston Salem, Int'l. Scien.	919-722-1783
Ohio	Cleveland, Tiby Co.	216-371-5335
Pa	Glenside, Elcom Inc.	215-885-1325
Tex	Houston, R. Martin Assocs.	713-444-2944
Va	Charlottesville, Marktron, Inc.	804-973-5874
Wash	Renton, S. Wilson Co.	206-226-0650
Exp:	New York, N.Y., Henley Elctrns.	212-986-5544

FREQUENCY ENGRG. LABS., Dept. EM, Box 527, Farmingdale, N.J. 07727, Tel: 201-938-9221, TWX: 710-723-6941; Empl.: 400

Sales Manager: J.M. Ruskin

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs	205-534-3387
Cal	Los Angeles, Fetty/Schoenduve	213-651-4050
Cal	Palo Alto, Fetty/Schoenduve	415-321-7041
Cal	San Diego, Fetty/Schoenduve	714-292-5136
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Ind	Ft. Wayne, Scott Elctrns.	219-743-1586
Ky	Louisville, Scott Elctrns.	502-583-3220
Md	Annapolis, Spectro Sys.	301-268-1984
Mass	Wakefield, MECO	617-245-4870
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	St. Paul, Deerland Distrs.	612-633-7999
NY	Tuckahoe, ASCO Elctrns.	914-779-8110
NC	Raleigh, Saber Assocs	919-834-3961
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Columbus, Scott Elctrns.	614-236-8619
Pa	Pittsburgh, Scott Elctrns.	412-828-1073
Tex	Ft. Worth, Carey-Wolf Assocs.	817-738-1996
Tex	Garland, Carey-Wolf Assocs.	214-823-5383
Exp:	N.J., Cresskill, Lars Microwave	201-871-0024

FREQUENCY WEST, INC., Dept. EM, 3140 Alfred St., Santa Clara, Cal. 95050, Tel: 408-249-2850, TWX: 910-338-0163; FSC No.: 8F150; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Goleta, Thorson Co.	805-964-8751
Cal	Los Angeles, Thorson Co.	213-476-1241
Cal	Palo Alto, Waldman Assocs.	415-961-4100
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Fla	Clearwater, Southeastern Comps. Sls.	813-447-1911
Fla	Orlando, FM Assocs., Ltd.	305-851-5716
Ill	Chicago, Tech. Sls.	312-237-7210
Kans	Overland Park, J. F. Guernsey Co.	913-381-2225
Md	Ellicott City, Applied Engrg. Consultants	301-465-1272
Mass	Needham Hts., O'Sullivan & Murphy	617-449-4141
Mo	Maryland Heights, Hitt Assocs.	314-878-5404
NM	Albuquerque, Thorson Co.	505-265-5655
NY	New York, Ad. Auriema	212-466-2500
NY	N. Syracuse, NACO ELCTRNS.	315-699-2651
NY	Tuckahoe, Spectrum Sls.	914-793-1660
Ohio	Cleveland, Contel-Sterling Co.	216-442-8080
Ohio	Dayton, Contel-Sterling Co.	513-298-7573
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Tex	Addison, Dunbar Assocs.	214-239-7151
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellevue, Thorson Co.	206-455-9180
Exp:	Cal, Cupertino (Japan), Rikei Corp.	257-7943

FREUDENBERG, INC. B., Dept. EM, 50 Rockefeller Plaza, New York, N.Y. 10020, Tel: 212-757-9130; Empl.: 8

(TM)FRICTION-AIRE - elementless electric oven - Blue M Electric Co.

FRIEND'S MFG., Dept. EM, Rd. 5, Box 74, Williamstown, N.J. 08094, Tel: 609-629-7919; Empl.: 2

(TM)FRIGICHIP - thermoelectric cooling modules - Melcor/Materials Elctrn. Prods.

(TM)FRIGID-AIR - circuit coolant - Elctrn. Chemical Corp.

(TM)FRIGIDRI - refrigerated dryer - Pall Trinity Micro Corp.

(TM)FRIGITOTE - thermoelectric portable 12 v. refrigerator - Melcor/Materials Elctrn. Prods.

(TM)FRK - miniature rubidium frequency stabled - Efratom California, Inc.

(TM)FROST AID - coolant - Chemtronics, Inc.

(TM)FROST-OFF - de-icer - Merix Chem. Co.

(TM)FRT - rubidium laboratory standard - Efratom California, Inc.

FSI/FORK STANDARDS INC., Dept. EM, 211 Main St., W. Chicago, Ill. 60185, Tel: 312-231-3511; Empl.: 14

FUJITSU LTD., Dept. EM, 2-chone 6-1, Marunochi, Chiyoda-ku, Japan 100, Tel: 03-216-3211; Empl.: 32380

FUJI ELECTROCHEMICAL CO., Dept. EM, Hamagomu Bld. 5 36-11 Shinbashi, Minato-ku, Tokyo, Japan, Tel: 03-434-1271, TWX: 2422174 (FNOVEL J); Empl.: 2500

Local Sales Offices & Reps.

Cal	Gardena	213-323-1134

™**FULL-VIEW** - flowmeter - Brooks Instr. Div.

™**FULMAR** - axial fans - IMC Magnetics Corp.

FUNCTION MODULES, INC., Dept. EM, 282 Brokaw Rd., Santa Clara, Cal. 95050, Tel: 714-645-6001, TWX: 910-596-1384; FSC No.: 52467; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Mesa Engrg. & Sls. Assocs.	602-224-1995
Cal	Pasadena, A-F Sales.	213-681-5631
Cal	San Diego, Mesa Engrg.	714-278-8021
Cal	Sunnyvale, RDP Instr., Inc.	408-735-9040
Colo	Denver, Lindberg Co.	303-758-9033
Fla	Altamonte Springs, Wmm Assocs. Inc.	305-831-4645
Fla	Clearwater, Wmm Assocs. Inc.	813-726-8871
Fla	Pompano Beach, Wmm Assocs. Inc.	305-943-3091
Ill	Hinsdale, Momak Sls.	312-654-4524
Iowa	Cedar Rapids, Palatine Engrg. Sls.	319-365-8071
Kans	Andover, Palatine Engrg. Sls.	316-683-7512
Kans	Overland Park, Palatine Engrg. Sls.	913-262-5643
Md	Baltimore, J.R. Daniel & Co.	301-825-3330
Mass	Needham, Massa & Maquire	617-329-0354
Mich	Farmington, Rep-Tron	313-478-1024
Minn	Minneapolis, Nortec Inc.	612-920-9526
Mo	St. Louis, Palatine Engrg. Sls.	314-426-7055
NM	Albuquerque, Lindberg Co.	505-345-2489
NY	Kingston, Ossmann Component Sales	914-338-5505
NY	Manhasset, Win-Cor Elctrn. Sls.	516-627-9474
NY	Rochester, Ossmann Component Sales	716-442-3290
NY	Syracuse, Ossmann Component Sales	315-454-4477
NY	Vestal, Ossman Component Sales	607-785-9949
NC	Greensboro, J.R. Daniel & Co.	919-294-1065
Ohio	Dayton, Neal Bear Corp.	513-299-3566
Ohio	West Richfield, Bear Mktg.	216-659-3331
Ore	Portland, Western Tech. Sls.	503-297-1711
Pa	Ambler, Wm Assocs.	215-643-4119
Pa	Delmont, T.F. Laslo & Assocs.	412-468-5045
Tex	Dallas, Comspec, Inc.	214-234-4137
Tex	Houston, Comspec, Inc.	713-461-4487
Tex	Houston, Palatine Engrg. Sls.	713-747-6537
Tex	Richardson, Palatine Engrg. Sls.	214-231-9489
Utah	Salt Lake City, Lindberg Co.	801-364-6409
Wash	Bellevue, Western Tech. Sls.	206-454-3906

™**FUNELET** - funnel flanged eyelets - Circon Corp.

FURNAS ELEC. CO., Dept. EM, 1197 McKee St., Batavia, Ill. 60510, Tel: 312-879-3410, Telex: 72-0458; Empl.: 1100; Minimum order: $R. Lanser

Sales Manager: J.V. Shannon; *Distributor Manager:* R. Lanser

Local Sales Offices & Reps.

Ariz	Phoenix, Hart & Assoc.	602-246-9732
Ark	Little Rock, Ransom Sls. Co.	501-225-7332
Cal	Burlingame, Furnas Elec. Co.	415-692-5656
Cal	Los Angeles, Calhoun & Poxon Co.	213-225-2328
Cal	Sacramento, R.G. Mitchell Co.	916-444-3789
Colo	Lakewood, Western Reps.	303-986-6025
Conn	North Haven, Furnas Elec. Co.	203-239-5605
Fla	Miami, J.C. Turner Assoc.	305-625-6556
Fla	Orlando, J.C. Turner Assoc.	305-859-4705
Ga	Atlanta, A. Brown Assoc.	404-457-6381
Ill	Chicago, Furnas Elec. Co.	312-521-7450
Ind	Fort Wayne, Neal Eng. Co.	219-484-5090
Ind	Indianapolis, Neal Eng. Co.	317-849-4201
Iowa	Bettendorf, Furnas Elec. Co.	319-359-4418
Kans	Kansas City, R.E. Gooley	913-831-0200
Ky	Louisville, Neal Engr. Co.	502-267-8337
La	Harahan, MacKenroth-Robbins & Assocs.	504-733-7524
Md	Bel Air, "L" Inc.	301-879-6644
Mass	Boston, Electrical Comp.	617-655-2225
Mass	Longmeadow, Electrical Comp.	617-655-2225
Mich	Detroit, C.H. Armstrong Co.	313-524-1414
Mich	Grand Rapids, J.M. Perry Co.	616-949-0271
Minn	Minneapolis, H. Mercer Co.	612-933-7111
Miss	Jackson, MacKenroth-Robbins & Assoc.	601-355-3946
Mo	St. Louis, Kattelmann & Co.	314-434-6875
Neb	Omaha, Orlin I. Wahl	402-451-4276
NJ	Fairfield, Furnas Elec. Co.	201-227-5122
NM	Albuquerque, Elec. Locator & Sls. Co.	505-867-5340
NY	Buffalo, H.H. Cardozo	716-834-3377
NY	New York City, Furnas Elec. Co.	212-285-9732
NY	Rochester, F. Serr	716-586-6226
NY	Syracuse, R.H. Nichols	315-437-2813
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
NC	Greensboro, R.W. Chapman & Co.	919-282-0740
NC	Raleigh, R.W. Chapman & Co.	919-782-2624
Ohio	Akron, R.R. Smith	216-334-2518
Ohio	Cincinnati, Fallon & Sterling Assoc.	513-232-7733
Ohio	Dayton, W. Hammer & Assoc.	513-435-5432
Okla	Tulsa, Industrial Sls. & Engr. Co.	918-743-3610
Ore	Portland, Donal Co.	503-246-3131
Pa	Bridgeville, Foster-McClinton Inc.	412-941-4800
Pa	Erie, Foster-McClinton Inc.	814-455-9111
Pa	Philadelphia, H.B. Stallings & Assoc.	215-566-4100
SC	Greenville, R.W. Chapman & Co.	803-232-5391
SC	W. Columbia, R.W. Chapman & Co.	803-796-9796
Tenn	Brentwood, A. Brown Assoc.	615-373-2068
Tenn	Memphis, Ransom Sls. Co.	901-332-0036
Tex	Dallas, Titan Reps Inc.	214-661-5350
Tex	Houston, Beeco Corp.	713-661-3192
Tex	San Antonio, Dudley Co.	512-337-4804
Utah	Salt Lake City, Electrical Sls. Co.	801-486-1367
Va	Richmond, Marchant Electrical Sls. Co.	804-262-7333
Wash	Spokane, Electro-Power Corp.	509-535-2931
WVa	Huntington, Foster-McClinton Inc.	304-736-5161
Wisc	Appelton, H. Mercer Co.	414-739-6223
Wisc	Milwaukee, H. Mercer Co.	414-786-6431

™**FUSECOR** - glass reinforced vinyl cable filler - Whitmor Wire & Cable

™**FUSEPLUG** - fused electrical connector - Arco Electronics Inc.

™**FUSETRON** - fuses & fuseholders - Bussmann Manufacturing

™**FUSIONBRAZED** - brazed steel tubing - ITT-Higbie Mfg. Co.

FUSION SYSTEMS CORP., Dept. EM, 11810 Parklawn Dr., Rockville, Md. 20852, Tel: 301-881-5934; Empl.: 30

Sales Manager: R. W. Pray, VP

Local Sales Offices & Reps.

Md	Beltsville, Kelly Scientific Instrs.	301-937-4350

™**FUSIONWELD** - AC welded steel tubing - ITT-Higbie Mfg. Co.

FUSITE DIV./EMERSON ELEC., Dept. EM, 6000 Fernview Ave., Cincinnati, Ohio 45212, Tel: 513-731-2020, TWX: 810-461-2810; Empl.: 200

™**FUSON** - semi-automatic heat transfer system - Meyercord Co.

FUTABA CORP., Dept. EM, Super Bldg. 1-11-5, Sotokanda Chiyoda-ku, Japan, Tel: 03-255-5881, Telex: J26532; Empl.: 1400

Local Sales Offices & Reps.

Cal	Compton, Futaba Industries, U.S.A.	213-537-9610

™**FUTURA** - ion measuring electrodes - Beckman Instrs., (AISSD)

™**FUZ-ION SEALED** - metalized polycarbonate capacitors - Dearborn Elctrns. Div.

™**FUZZ BUTTONS** - electrical contacts - Technical Wire Products, Inc.

™**FWACO** - fasteners - Aimsco Inc.

™**FYRITE** - oxygen & carbon dioxide indicator - Bacharach Instrument Co.

™**FYR-LACE** - lacing tape - Gudebrod Bros. Silk Co., Inc.

™**GAASLITES** - light emitting diodes - Monsanto-Electronics Div.

GABRIEL ELCTRNS. INC., Dept. EM, Box 626, Scarborough Ind'l. Pk., Scarborough, Me. 04074, Tel: 207-883-5161; Empl.: 120

Sales Manager: D.B. Crisman

GAERTNER SCIENTIFIC CORP., Dept. EM, 1261 Wrightwood Ave., Chicago, Ill. 60614, Tel: 312-281-5335, Telex: 28-5376; Empl.: 80

Sales Manager: R. Kutko, Scien. Div.

Local Sales Offices & Reps.

Ariz	Phoenix, Griot Assocs.	602-275-4991
Cal	Los Angeles, Griot Assocs.	415-941-2533
Cal	Tustin, Griot Assocs.	714-838-2330
Colo	Denver, Edward Johnson Co.	303-985-4810
Fla	Winter Park, Mc Mahan Assocs.	305-645-0463
Ill	Des Plaines, Bryan Ellis	312-298-7626
La	New Orleans, Church Dailing	504-866-9632
Md	Randallstown, Beacon North	301-922-1248
Mass	Belmont, K.A. Dawson Co.	617-484-7900
Mo	Kansas City, Byron Ellis Assocs.	
NJ	Fairlawn, Dengel Associates	201-791-7633
NY	Rochester, Brook Anco	716-271-4100
Ohio	Columbus, Dietrich & Assocs.	614-878-6138
Pa	Newton Square, Holco, Inc.	215-353-2060
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
Tex	Lucas, Optical Services Co.	214-442-2011
Va	Falls Church, Beacon North	703-534-1675
Va	Lynchburg, Beacon North	804-237-4740
Wash	Bellevue, Griot Associates	206-454-8592

™**GAF** - - GAF Corporation

™**GAFAC** - cleaner, surface-active agent - GAF Corporation

GAF CORPORATION, Dept. EM, 140 W. 51 St., New York, N.Y. 10020, Tel: 212-582-7600, Telex: 14-7224; Empl.: 21,000

Local Sales Offices & Reps.

Cal	La Habra, Chemicals	714-526-6601
Cal	Los Angeles, Chemicals	213-694-3861
Cal	San Francisco, Chemicals	415-873-4454
Conn	Greenwich, Industrial Prod	203-531-8807
Ga	Atlanta, Chemicals	404-448-5544
Ill	Melrose Pk, Chemicals, Indl.	312-681-9180
Mo	Maryland Heights, Ind. Prods.	314-432-6270
NJ	Linden, Chemicals	201-862-2652
NY	New York City, Chemicals & Ind. Prods.	212-582-7600
NC	Charlotte, Chemical + Ind. Prods.	704-333-4121
Tenn	Chattanooga, Chemical Prods.	615-867-7807
Tex	Texas City, Chemical Prods.	713-945-3411
Exp:	NYC, GAF International	212-582-7600

™**GAFITE** - thermoplastic resin - GAF Corporation

™**GAFLIFE** - felt filter media - GAF Corporation

™**GAFTERGE** - scour - GAF Corporation

™**GAFTEX** - scour - GAF Corporation

GAGNE ASSOCS., INC., Dept. EM, 1080 Chenango St., Dept. 3EE-27, Binghamton, N.Y. 13901, Tel: 607-723-9556; Empl.: 45

Sales Manager: S. Morrisey

GALILEO ELECTRO-OPTICS CORP., Dept. EM, Galileo Pk., Sturbridge, Mass. 01518, Tel: 617-347-9191, TWX: 710-347-1190; FSC No.: 28719; Empl.: 500; Minimum order: $L.P. Thompson

Sales Manager: J.M. O'Neil; *Distributor Manager:* L.P. Thompson

Local Sales Offices & Reps.

Ariz	Phoenix, Griot Assocs.	602-275-4991
Cal	El Segundo, Griot Assocs.	213-322-8383
Cal	Los Altos, Griot Assocs.	415-941-2533
Cal	Tustin, Griot Assocs.	714-838-2330
Colo	Aurora, Cleveland Entprs.	303-751-3252
Conn	Meridan, Sturgeon Co.	
Fla	Winter Park, McMahan Assocs.	305-645-0463
Ill	Chicago, LGS Elctrns. Corp.	312-456-9616
Ind	Carmel, S.A.I. Mktg. Corp.	317-547-7777
Md	Silver Spring, Kelly Scientific Instr.	301-937-4350
Mass	Wellesley, Sturgeon Co.	617-237-1040
Mich	Brighton, S.A.I. Mktg. Corp.	313-477-3800
Mich	Grand Rapids, S.A.I. Mktg. Corp.	616-942-2504
Minn	St. Paul, Northport Engrg.	612-698-3841

Mo	Florissant, S.A.I. Mktg. Corp.	314-837-5200
NJ	Tenafly, Budd-Tronics	201-569-2230
NM	Albuquerque, Cleveland Entprs.	505-345-2481
NY	Rochester, Irondequoit Inds.	716-544-6257
Ohio	Cincinnati, S.A.I. Mktg. Corp.	513-761-5432
Ohio	Dayton, S.A.I. Mktg. Corp.	513-277-8911
Ore	Portland, ES/Chase Co.	503-620-9616
Pa	Elkins Park, Snow Assocs.	215-379-4700
Tex	Richardson, R.S. Marston Co.	214-235-3577
Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Seattle, ES/Chase Co.	206-762-4824
Exp:	Mass., Plainville, Teknis	617-695-3591

(TM)GALITE(TM) - optical communication fiber & cable - Galileo Electro-Optics Corp.

GAMBLE, CHARLES T. INDS., Dept. EM, 605 Perkins La., Delanco, N.J. 08075, Tel: 609-461-1900; Empl.: 150

Sales Manager: W. Snyder

Local Sales Offices & Reps.

Cal	Carson, Associated Reps. Corp.	213-639-2211
Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Fla	Fern Park, M. G. Assocs.	305-841-8793
Ill	Glenview, Crimson Eng.	312-724-1780
Ky	Akron, Augnat Assocs.	216-239-1621
Mass	Millis, Selmark Assocs.	617-376-2914
NY	Hempstead, Kahgan Sls. Corp.	516-538-2300
NY	Rochester, L. G. Marchese Assocs.	716-544-4300
Ohio	Akron, Augnat Assocs.	216-239-1621
Pa	Erie, ECCO Elctrn. Sls.	814-452-3762
Tex	Houston, J. Arnold Co.	713-783-7297
Wash	Bellevue, Hensley & Assocs.	206-746-5152

(TM)GAMMAMET - high voltage & current contact - GTE Sylvania Inc.

GAMMA SCIENTIFIC INC., Dept. EM, 3777 Ruffin Rd., San Diego, Cal. 92123, Tel: 714-279-8034, Telex: 69-7938; Empl.: 45

Sales Manager: G.C. Unangst

Local Sales Offices & Reps.

Ariz	Phoenix, Griot Assocs.	602-275-4991
Cal	El Segundo, Griot Assocs.	213-322-8383
Cal	Los Altos, Griot Assocs.	415-941-2533
Cal	Tustin, Griot Assocs.	714-838-2330
Fla	Winter Park, McMahan Assocs.	305-645-0463
Ill	Chicago, Brooks Engrg.	312-944-1227
Md	Kensington, C.W. Hench Assocs.	301-946-7822
Mass	Sudbury, DLG Assocs.	617-877-7880
NY	Plainview, Eastern Metro Assocs.	516-931-1414
Pa	Elkins Park, Snow Assocs.	215-379-4700
Tex	Lucas, Optical Svcs. Co.	214-442-2011
Wash	Bellevue, Griot Assocs.	206-454-8592

(TM)GAMMATROL - nuclear gauges - Nuclear Resch. Corp.

(TM)GAP - graphic applications package - Varian Graphics

GAP INSTR. CORP., Dept. EM, 110 Marcus Blvd., Hauppauge, N.Y. 11787, Tel: 516-273-0909, TWX: 510-227-6237; FSC No.: 00607; Empl.: 50

Local Sales Offices & Reps.

Cal	Irvine, Aero Components Co.	
Exp:	N.Y.C., N.Y., Frathom Co., Div. of Henley Overseas Sls.	212-687-9390

(TM)GAP KAP - discharge disc capacitor - Centralab/USCC

GAR ENTERPRISES, Dept. EM, 2031 N. Lincoln Ave., Pasadena, Cal. 91103, Tel: 213-798-0785; Empl.: 25

(TM)GARALEASE - mold release agent - Ram Chems.

(TM)GARALYST - resin curing catalyst - Ram Chems.

GARDINER ELCTRNS., Dept. EM, 4729 North 7th Ave., Phoenix, Ariz. 85013, Tel: 602-274-9681

GARDINER SOLDER CO., Div. of Gardiner Metal Co., Dept. EM, 5207 Walnut St, Downers Grove, Ill 60515, Tel: 312-968-6593, TWX: 910-221-2510; Empl.: 100

Local Sales Offices & Reps.

Ala	Huntsville, Alps Distributing Co.	205-837-6060
Ariz	Scottsdale, F. Board Assocs.	602-994-9388
Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	Pico Rivera, G. Solder Co.	213-685-5266
Colo	Arvada, AVS Elctrns.	303-426-0545
DC	Washington, H. Wise & Co.	202-363-9417
Fla	Clearwater, H. R. Gross & Co.	813-446-6649
Ill	Chicago, G. Solder Co.	312-847-0100
Ky	Louisville, Lamb, Zwischenberger & Assoc.	502-425-1828
Mich	Hillsdale, Zaiser Assocs.	517-437-4589
Minn	Minneapolis, Hamlet & Smith	612-545-3666
Mo	Springfield, Osbern Sls. Co.	417-887-1773
NY	Medford, Pace Center of Long Island	516-654-1197
NC	Albuquerque, A. Q. Elctrns.	505-883-1003
NC	Charlotte, Electro-Rep. Assocs.	704-527-2530
RI	Manville, Nemco Metals	401-722-4355
Tex	El Paso, A. Q. Elctrns.	915-545-2363
Wash	Bellevue, W. M. Buehler	206-455-5512
Wisc	Milwaukee, Hamlet & Smith	414-272-2787

GARDNER-DENVER CO., Pneutronics Div., Dept. EM, 1333 Fulton St., Grand Haven, Mich. 49417, Tel: 616-842-0200, Telex: 22-8457; Empl.: 5000

Local Sales Offices & Reps.

Ala	Birmingham, Gardner-Denver Co.	205-871-3543
Ariz	Phoenix, Gardner-Denver Co.	602-272-0451
Cal	San Francisco, Gardner-Denver Co.	415-589-3305
Cal	Whittier, Gardner-Denver Co.	213-692-1258
Colo	Denver, Gardner-Denver Co.	303-399-1321
Colo	Grand Junction, Gardner-Denver Co.	303-242-4157
Conn	Bloomfield, Gardner-Denver Co.	203-243-0311
Ga	Atlanta, Gardner-Denver Co.	404-938-6633
Idaho	Wallace, Gardner-Denver Co.	208-752-6291
Ill	Broadview, Gardner-Denver Co.	312-681-2210
Kans	Shawnee Mission, Gardner-Denver Co.	913-888-1040
La	New Orleans, Gardner-Denver Co.	504-340-4174
La	Shreveport, Gardner-Denver Co.	318-424-4446
Md	Ellicott City, Gardner-Denver Co.	301-465-1155
Mass	Hopkinton, Gardner-Denver Co.	617-435-6311
Mich	Livonia, Gardner-Denver Co.	313-525-9110
Minn	Duluth, Gardner-Denver Co.	218-727-5078
Minn	Minneapolis, Gardner-Denver Co.	612-888-4647
Mo	Bridgeton, Gardner-Denver Co.	314-291-2800
NJ	Mahwah, Gardner-Denver Co.	201-529-4760
NY	Buffalo, Gardner-Denver Co.	716-836-8300
NY	Rochester, Gardner-Denver Co.	716-254-1260
NC	Charlotte, Gardner-Denver Co.	704-366-8532
Ohio	Cleveland, Gardner-Denver Co.	216-524-1856
Ohio	Springdale, Gardner-Denver Co.	513-671-7270
Okla	Oklahoma City, Gardner-Denver Co.	405-677-5737
Okla	Tulsa, Gardner-Denver Co.	918-622-2800
Pa	Horsham, Gardner-Denver Co.	215-672-3003
Pa	Pittsburgh, Gardner-Denver Co.	412-923-1511
Tenn	Knoxville, Gardner-Denver Co.	615-523-6195
Tex	Corpus Christi, Gardner-Denver Co.	512-882-6155
Tex	Dallas, Gardner-Denver Co.	214-233-0100
Tex	Houston, Gardner-Denver Co.	713-626-2220
Tex	Odessa, Gardner-Denver Co.	915-563-1350
Utah	Salt Lake City, Gardner-Denver Co.	801-466-8610
Wash	Lynwood, Gardner-Denver Co.	206-775-4474
Wisc	Milwaukee, Gardner-Denver Co.	414-774-2210
Wyo	Casper, Gardner-Denver Co.	307-235-5794
Exp:	Tex., Dallas, Gardner-Denver Int'l.	214-634-8491

Local Distributors

Alas	Anchorage, Anixter/Alasks	907-274-8525
Ark	Little Rock, M. Haase & Co	501-376-7227
Cal	Burlingame, Teglen-Airdraulics, Div. Bearing Specialty	415-347-4761
Cal	City of Commerce, Teglen-Airdraulics, Div. Bearing Specialty	213-685-8505
Cal	San Diego, Barbee Valve & Supply	714-297-4213
Colo	Denver, Wild Co.	303-373-4840
Conn	Bloomfield, Pearse-Pearson Co.	203-242-7777
Fla	Fort Lauderdale, Mid Florida Indl Tools	305-973-1122
Ga	Augusta, Augusta Tool & Specialty Co.	404-722-2684
Ill	Bensenville, Schutt-Huelsman	312-595-7800
Ind	Ft. Wayne, K.C. Mosier Co.	219-747-7568
Ind	Indianapolis, K.C. Mosier Co.	317-897-1496
Iowa	Cedar Rapids, Mid-Iowa Tools	319-366-7771
Kans	Kansas City, Nichols Equip	913-281-0135
Kans	Wichita, Cullum & Brown	316-265-0891
Ky	Lexington, Air Hydro Power, Inc.	606-252-8444
Ky	Louisville, Air Hydro Power, Inc.	502-451-1000
Ky	Millis, Pearse-Pearson Co	617-376-2947
Mich	Flint, Mahar Tool Supply Co	313-767-6820
Mich	Kalamazoo, Wilson Air Equip Co	616-342-0138
Mich	Saginaw, Mahar Tool Supply Co	517-799-5530
Mich	Spring Lake, Kelly Sales & Engrg. Co.	616-846-3260
Minn	Minneapolis, Minnesota Industrial Tools	612-333-8281
Mo	Columbia, Solid State Sys	800-325-2981
Mo	St. Louis, Nichols Equip.	314-569-0222
Neb	Omaha, Midwest Indl Tools	402-334-2011
NY	Buffalo, Madac Corp	716-633-7200
NY	Rochester, Madac Corp	716-247-5383
NY	Roslyn, North Atlantic Tool Co	516-484-0548
Ohio	Cleveland, Quiet Airtronics, Inc.	216-521-4331
Ohio	Dayton, K.C. Mosier Co	513-298-9846
Ore	Portland, Mitchell, Lewis & Staver Co	503-233-4921
Pa	Franklin, Jolley Industrial Supply Co.	814-437-3085
Pa	Sharon, Jolley Industrial Supply Co.	412-981-5400
Pa	York, Ramclif Supply Co.	717-854-5534
Tenn	Memphis, Murrel Haase & Co.	901-743-4304
Tex	Addison, Wilson Co	214-233-1081
Tex	El Paso, Wisco, Inc.	915-544-8294
Tex	Houston, Stewart & Stevenson Supply Co.	713-683-8286
Tex	Lubbock, Brandon & Clark Electric Co.	806-747-3866
Utah	Salt Lake City, Wild Co	801-487-3601
Wash	Seattle, E.F. Bailey Co.	206-762-4840
WVa	South Charleston, K.C. Mosier Co.	304-744-5356
Wisc	Milwaukee, Milwaukee Indl Tools	414-462-8550

GARDNER-DENVER CO., Dept. EM, Box 47114, Dallas, Tex 75247

(TM)GARDSMAN - temperature controllers, millivoltmeters - Gulton Inds., Inc.

GARNER GLASS CO., Dept. EM, 177 S. Indian Hill Blvd., Claremont, Calif. 91711, Tel: 714-NA 4-5071; Empl.: 61

(TM)GAROX - resin curing catalyst - Ram Chems.

GARRY MFG., INC., Dept. EM, 1010 Jersey Ave., New Brunswick, N.J. 08902, Tel: 201-545-2424; Empl.: 250 .... p. 1840

Local Sales Offices & Reps.

Ariz	Phoenix, Chaparral-Dorton	602-263-0414
Cal	Burbank, SoCal Sls. Assoc.	213-846-3540
Cal	Mountainview, Westmark Assocs.	415-969-1700
Colo	Denver, Westmark Assocs.	303-433-7181
Fla	Pompano Beach, Hutto, Hawkins & Peregoy	305-943-9593
Ga	Norcross, Macro Mktg.	404-449-7440
Ill	Downers Grove, Richmar Elctrns.	312-968-0118
Ind	Ft. Wayne, TX Sls.	219-489-4447
Kans	Lenexa, Ensco-Rep. Inc.	314-567-3935
Md	Glen Burnie, New Era Sls.	301-768-6666
Mass	Needham, Northeast Reps.	617-449-3034
Mich	Farmington Hills, W.R. Hommon & Assoc.	313-474-0661
Minn	Edina, Grayden & Flemmer	612-941-1120
Mo	St. Louis, Ensco-Rep. Inc.	314-567-3935
NJ	Haddonfield, Thomas Assocs.	609-854-3011
NY	Mount Vernon, Friedman Smith Elec. Sls.	914-664-4866
NY	Syracuse, I. A. Hotze	315-479-6641
NC	Greensboro, Macro Mktg.	404-449-7440
Ohio	Cinncinati, Giesting & Assoc.	513-851-7800
Tex	Dallas, Kruvand Assoc.	214-691-4592
Wash	Kirkland, Freed Assocs.	206-822-8100

Local Distributors

Ariz	Phoenix, R.V. Weatherford Co.	602-272-7144
Cal	Anaheim, R.V. Weatherford Co.	714-547-0891
Cal	Glendale, R.V. Weatherford Co.	213-849-3451
Cal	Palo Alto, R.V. Weatherford Co.	415-493-5373
Colo	Englewood, R.V. Weatherford Co.	303-761-5432
Ill	Palatine, Ohm Elctrns.	312-359-5500
Md	Columbia, Technico	301-828-6416
Mass	Newton Upper Falls, In-Stock	617-964-6200
Mass	Woburn, Time Elctrns.	617-935-8080
NJ	Perth Amboy, Sterling	201-442-8000
NY	West Hempstead, March	516-486-6511
Pa	Horsham, Pioneer	215-674-5710
Tex	Dallas, R.V. Weatherford Co.	214-243-1571
Tex	Houston, R.V. Weatherford	713-688-7406
Wash	Seattle, R.V. Weatherford Co.	206-243-6340
Wisc	Mequon, Taylor Elctrns.	
For:	Belgium, Brussels, Eleutron	(02) 5137384
For:	Denmark, Copenhagen, Tage Schouboe A/S	(01) 39 25 00
For:	Finland, Helsinki, Oy. Flinkenberg & Co. AB	630686
For:	France, Montreuil, Euromega	858-9009
For:	Germany, Munich, Spezial Elctrn KG	
For:	Germany, Munich, Componenta	89 601 4893
For:	Germany, Unterhaching, Bart Green	616 772

For:	Great Britain, Maidenhead, Berks, Intercontinental Comps. (Maidenhead) Ltd.	04120-24200
For:	Holland, Vianen, Arcobel B.V.	04120-24200
For:	India, Bangalore, Aviation Supplies Corp.	
For:	Italy, Milan, Aemme Elettronica S.A.S.	692 805
For:	Japan, Tokyo, Takachiho Koheki Co., Ltd.	
For:	Norway, Oslo, Norfax	
For:	Spain, Barcelona, Difitronic S.A.	253-2457
For:	Sweden, Humblegatan, Ultra Elctrns. AB	
For:	Switzerland, Zurich, Kurt Hirt AG	

™GASK-O-SEAL - gasket - Parker Hannifin Corp.

™GAS-POINTER - dual range combustible gas indicator - Bacharach Instrument Co.

GATES ELCTRN. CO., Dept. EM, 526 Van Nest Ave., Bronx, N.Y. 10460, Tel: 212-TU1-5900 .... p. 3259

GATES ENERGY PRODS., INC., Dept. EM, 1050 S. Broadway, Denver, Colo. 80217, Tel: 303-744-4806, Telex: 045-511; Empl.: 172; Minimum order: $T. Lockwood

Sales Manager: T. G. Moore; *Distributor Manager:* T. Lockwood

Local Sales Offices & Reps.

Ariz	Phoenix, Tauber & Assocs., Inc.	602-939-6787
Cal	Los Angeles, M. Geery	213-374-3448
Cal	San Diego, Tauber & Assocs.	714-274-7242
Ga	Valdosta, Charles E. Hopper	912-247-2574
Ill	Glen Ellyn, W. J. Barcus	312-858-9590
Ind	Indianapolis, France Entprs.	317-894-0593
Md	Towson, William B. MacLEA	301-321-0852
Mass	Maynard, Robert W. Ojalehto	617-897-6991
Minn	Minneapolis, HMR, Inc.	612-920-8200
Mo	Kansas City, H. Hanson Co.	816-444-9494
Mo	St. Louis, H. Hanson Co.	314-432-3611
NY	Brooklyn, D. H. Pantiel	212-332-9635
Okla	Tulsa, Ammon & Rizos	405-373-2748
Ore	Portland, C.K. Shanks & Assoc.	503-292-5656
Tex	Dallas, Ammon & Rizos	214-233-5591
Tex	Houston, Ammon & Rizos	713-781-6240
Wash	Seattle, C.K. Shanks & Assoc.	206-632-4290

Local Distributors

Cal	Burlingame, Rose Elctrns.	415-692-5700
Cal	Culver City, National Electro-Sls. Corp.	213-391-6294
Cal	San Diego, Tauber Elctrns. Dist.	714-274-7242
Colo	Denver, Electronic Parts	303-744-1992
Fla	Miami, Electronic Equip. Co.	305-871-3500
Ill	Broadview, LCOMP Chicago, Inc.	312-865-7600
Ill	Niles, Joseph Elctrns.	312-297-4200
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Kans	Wichita, Radio Supply Co.	316-267-5213
Mass	Winchester, Keystone Battery Corp.	617-729-8333
Minn	Minneapolis, Stark Elctrns.	612-332-1325
Mo	Kansas City, Lcomp Kansas City	910-771-3148
Mo	St. Louis, Olive Ind'l. Elctrns.	314-863-7800
NJ	Bergenfield, Technical Elect. Dist.	201-384-3643
NY	Farmingdale, Battery Specialists of NY	516-752-0011
NY	New York, Advance Elctrns.	212-687-2224
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Tex	Dallas, Southwest Radio Supply	214-741-6272
Va	Arlington, Perrott Engr. Labs, Inc.	703-528-5861
Wash	Seattle, Robert E. Priebe Co.	206-682-8242

GATES, GEO. W. & CO., INC., Dept. EM, Hempstead Tpke. & Lucille Ave., Franklin Sq., N.Y. 11010, Tel: 212-347-0787; Empl.: 8

GAVIN ELECTRONICS DIV., Dept. EM, P.O. Box #520, Somerville, N.J. 08876, Tel: 201-356-3500; Empl.: 95

Local Sales Offices & Reps.

Ala	Birmingham, J.F. Russell Co.	205-822-2196
Cal	Culver City, H. Feldman Sls. Co.	213-870-5973
Cal	Walnut Creek, M. Pherson Sls. Co.	415-937-1482
Colo	Westminster, Electro-Tek Sls.	303-255-4566
Conn	Waterbury, Anderson Sls. Assocs.	203-753-2487
Fla	Miami, Raulson & Co.	305-264-6003
Ill	N. Prospect, Q & B, Inc.	312-392-1200
Md	Kensington, Forti-Austin Assocs.	301-949-1707
Mass	Boston, Anderson Sls. Assocs.	617-227-2980
NJ	Caldwell, Art Cerf & Co.	201-226-2263
NY	Liverpool, Lewis & Dunnigan	315-662-2133
NC	Charlotte, DeWitt Austin Co.	704-366-4643
Ohio	Akron, Audio Mktg. Assocs.	216-864-8988

GAVITT WIRE & CABLE DIV., RSC Inds., Inc., Dept. EM, Brookfield, Mass. 01506, Tel: 617-867-6476; Empl.: 150

Local Sales Offices & Reps.

Cal	Los Angeles, W.S. Harmon Co.	213-937-1460
Cal	San Carlos, D.H. Ross Co.	415-591-4411
Colo	Denver, Camel Elctrns.	303-757-6191
Fla	Orlando, Geartner Assoc.	305-299-1000
Ill	Chicago, Ropek-Cahill	312-631-0700
Ind	Noblesville, D.M. Assocs.	317-773-3600
Minn	Minneapolis, S&R Comp. Sls.	612-544-3022
NH	Spofford, Bahr Sls. Co.	603-352-5444
NY	Larchmont, L. Freed & Co.	914-834-6510
NY	N. Syracuse, Precision Sls.	315-458-2223
Ohio	Cleveland, Loesch Assocs.	216-241-4581
SC	Columbia, G.E. Younginer & Assoc.	803-772-6671
Tex	Dallas, J.A. Green Co.	214-631-7450
Wash	Seattle, J.J. Backer Co.	206-285-1300

ETC TERMINAL PRODUCTS, see ITT Cannon/ETC Terminal Products

™GAZ/TEC - liquid leak detecting fluids - American Gas & Chemical Co., Ltd.

™GA-16/110 - 16-bit single board micro computer - General Automation

™GA-16/220 - 16-bit system micro computer - General Automation

™GA-16/330 - 16-bit OEM minicomputer - General Automation

™GA-16/440 - megamini - General Automation

G B INSTRUMENTS INC., Dept. EM, 2030 Coolidge St., Hollywood, Fla. 33020, Tel: 305-920-0225, TWX: 510-954-9813; FSC No.: 31601; Empl.: 45

Sales Manager: B. J. Weiss

Local Sales Offices & Reps.

NM	Las Cruces, BFA Assoc.	505-523-0601

GC
ELECTRONICS

GC ELECTRONICS, Div. Hydrometals, Dept. EM, 400 So. Wyman St., Rockford, Ill. 61101, Tel: 815-968-9661; Empl.: 550 .... p. 1388

GCA/BURLINGTON DIV., Dept. EM, 174 Middlesex Tpke., Burlington, Mass. 01803, Tel: 617-272-5600, Telex: 94-9352; Empl.: 130

Local Sales Offices & Reps.

Exp:	N.Y., N.Y., Sumitomo Shoji American	

GCA/PRECISION SCIENTIFIC, Dept. EM, 3737 W. Cortland St., Chicago, Ill. 60647, Tel: 312-227-2660, TWX: 910-221-3122; Empl.: 325

Local Sales Offices & Reps.

Cal	Los Angeles	213-283-7815
Cal	Santa Clara	408-248-5566
Ga	Marietta	404-432-8737
Ill	Chicago	312-729-1270
Mass	Boston	617-227-1515
Mo	St. Louis	314-968-3880
NJ	Milford	201-686-9392
NC	Charlotte	704-332-4850
Ohio	Columbus	617-272-8414
Tex	Houston	713-785-3238

GCA/SUNNYVALE DIV., Dept. EM, 1050 Kifer Rd., Sunnyvale, Cal. 94086, Tel: 408-732-5330, TWX: 910-339-9211; Empl.: 230

Sales Manager: D. Bauman

Local Sales Offices & Reps.

Cal	Los Angeles, Sumitomo Shoji America	213-627-4783
Cal	Santa Clara, GCA/Sunnyvale Div.	408-732-5330
Pa	Plymouth Meeting, GCA/Sunnyvale Div.	215-825-4840
Tex	Dallas, GCA/Sunnyvale Div.	214-661-8402
Exp:	Cal., Burlingame, Traffic Int'l. Corp.	415-348-5131

™GEARMOTOR - subfractional hp gearmotor - Motoresearch Mfg. Co.

GECO, INC., Dept. EM, 145 Penn St. Box 423, Millheim, Pa. 16854, Tel: 814-349-5555; Empl.: 8

GEMS SENSORS DIV., See Delaval Turbine, Inc.

™GEL/CELL - rechargeable gelled electrolyte bat. - Globe Union, Inc.

™GELYTE - lead acid battery - Gould, Inc.

™GEMCOR - clutches & brakes - General-Electro Mechanical

™GE-MOV - metal oxide varistor - General Elec. Co.

™GE-MOV VARISTORS - metal oxide varistors - General Elec.

™GENAL - injection phenolics - General Elec.

™GENALEX - instruments - General Elec. Co.

GENERAL ATOMIC CO., Dept. EM, P.O. Box 81608, San Diego, Cal. 92138, Tel: 714-455-3000

GENERAL ATRONICS, Elctrn. Tube, Dept. EM, 1200 E. Mermaid La., Phila., Pa. 19118, Tel: 215-248-3700, TWX: 215-242-1295; FSC No.: 20183/5960; Empl.: 60

Sales Manager: C.J. Stanko

GENERAL AUTOMATIC CORP., Dept. EM, 70 Liberty St., Metuchen, N.J. 08840, Tel: 201-494-9300; Empl.: 28

GENERAL AUTOMATION, Dept. EM, 1055 South East St., Box 4883, Anaheim, Cal. 92805, Tel: 714-778-4800, TWX: 910-591-1695; Empl.: 1800

Sales Manager: P.B. Pitsker

Local Sales Offices & Reps.

Ala	Huntsville	205-883-9620
Cal	San Diego	714-239-5546
Cal	San Francisco	415-398-2361
Colo	Denver	303-758-7323
Fla	Altamonte Springs	305-831-5603
Ga	Decatur	404-296-5750
Ill	Des Plaines	312-298-1830
Ill	Rockford	815-962-8000
Ind	Indianapolis	317-248-0377
La	Metairie	504-455-1601
Md	Silver Springs	301-587-7090
Mass	Waltham	617-899-8600
Mich	Farmington Hills	313-478-2640
Minn	Minneapolis	612-854-0440
Mo	St. Louis	314-997-1830
NJ	Hasbrouck Heights	201-288-6560
NY	New York	212-682-7015
NY	Rochester	716-442-0780
Ohio	Cincinnati	513-563-0860
Ohio	Rocky River	216-333-3544
Pa	Philadelphia	716-442-0780
Pa	Pittsburgh	412-325-3300
Tex	Dallas	214-661-5370
Tex	Houston	713-464-2815
Wash	Bellevue	206-747-0720
Wisc	Brown Deer	414-355-1220

GENERAL AVIATION ELCTRNS, Dept. EM, 4141 Kingman Dr., Indianapolis, Ind 46225

GENERAL COMPUTERS, INC., Dept. EM, 5990 W. Pico Blvd., Los Angeles, Calif. 90035, Tel: 213-939-7687; Empl.: 20

GENERAL CONTROL CO., Dept. EM, 1196 Soldiers Field Rd, Boston, Mass. 02134, Tel: 617-782-7440; Empl.: 25

Local Sales Offices & Reps.

Mass	Boston, EACO Engrg. Corp.	617-782-7440

GENERAL DEVICES, INC., Dept. EM, P.O. Box 253, Princeton, N.J. 08540, Tel: 609-924-2500, Telex: 84-6473; FSC No.: 05285; Empl.: 32

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assoc.	205-536-1941
Conn	New Canaan, Nerem, Inc.	203-966-2580
Fla	Ft. Lauderdale, Reynolds & Assoc.	305-581-6611
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
Fla	St. Petersburg, Reynolds & Assoc.	813-360-1484
Ga	Atlanta, Reynolds & Assoc.	404-252-5360
Mass	Wakefield, Nerem, Inc.	617-245-4426
NJ	Mountainside, Service & Technology Inc.	201-232-2666

NY	Farmingdale, Service & Technology Inc.	516-694-7330
NY	Pompey, S. F. Foster Co., Inc.	315-677-3333
NY	Webster, S.F. Foster Co.	716-872-5220
NC	Greensboro, Reynolds & Assoc.	919-275-3725
Wash	Seattle, Comptronics	206-284-4842

GENERAL DEVICES CO., INC., Dept. EM, Box 19188, Indianapolis, Ind. 46219, Tel: 317-897-7000, Telex: 27-2169; Empl.: 125 .... p. 1132-1135

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Schoeffler Assocs.	602-959-3011
Cal	Los Angeles, M.A. Stolaroff Co. Inc.	213-295-7781
Cal	Mountain View, G. Woempner Co.	415-964-5454
Cal	San Diego, M.A. Stolaroff Co., Inc.	714-234-6905
Cal	Van Nuys, J.R. Thomas	213-782-3820
Colo	Sedalia, Jensen Representatives	303-688-4154
Conn	Cheshire, Coakley, Boyd & Abbett, Inc.	203-272-2261
Fla	North Miami, J. Krutek & Assoc.	305-941-6544
Ill	Rolling-Meadows, Lightner Assocs.	312-398-3000
Ind	Indianapolis, Mktg. Engrs., Inc.	317-546-1523
Kans	Shawnee Mission, Lowell & Kangas Assocs.	913-631-3515
Md	Bethesda, G. Rosen & Assocs.	301-530-8448
Mass	Needham, Coakley, Boyd & Abbett, Inc.	617-444-5470
Minn	St. Paul, Northport Engrg., Inc.	612-698-3841
Mo	St. Louis, Lowell & Kangas Assocs.	314-821-4050
NY	Fayettville, H.G. Richter, Inc.	315-637-6713
NY	Manhasset, Kaebler & Mack	516-627-6620
Ohio	Cleveland, Components, Inc.	216-842-2737
Ohio	Hamilton, Components, Inc.	513-721-2997
Tex	Dallas, R. Martin Assocs.	214-361-8584
Tex	Houston, R. Martin Assocs.	713-462-4077
Wash	Olympia, Bergford & Assocs.	206-866-2001

GENERAL ELECTRIC CO., Dept. EM, 897 Peters Creek Pkwy, Winston-Salem, N.C. 27103

GE CAPACITOR, Dept. EM, 6071 St Andrews Rd., Columbia, S.C. 29210

GENERAL ELEC., Carboloy Systems Dept., Dept. EM, Box 237, Detroit, Mich. 48232, Tel: 313-536-9100, TWX: 810-226-9617; Empl.: 1800

GENERAL ELECTRIC CO., Dept. EM, General Electric Dr., Waynesboro, Va. 12980

GENERAL ELEC. CO., Communication Systems Div., Dept. EM, Box 4197, Lynchburg, Va. 24502, Tel: 804-846-7311; Empl.: 4000

Sales Manager: J. Hurley

GENERAL ELECTRIC CO., Dept. EM, 316 E. 9th St., Owensboro, Ky. 42301, Tel: 502-683-2401

GENERAL ELEC. CO., Elctrn. Comp. Sls., Dept. EM, Schenectady, N.Y. 12345 ....p. 1250,1251,3081

Local Sales Offices & Reps.

Ala	Huntsville	205-883-9220
Ariz	Phoenix	602-264-1751
Cal	Los Angeles	213-479-7763
Cal	Palo Alto	415-493-2600
Colo	Denver	303-320-3031
Conn	Bridgeport	203-334-1012
Fla	Winter Pk.	305-628-1811
Ill	Chicago	312-777-1600
Ind	Fort Wayne	219-482-4557
Ind	Indianapolis	317-923-7221
Kans	Overland Pk	913-967-6200
Mass	Wellesley	617-237-2050
Mich	Southfield	313-355-3552
Minn	Minneapolis	612-835-2550
Mo	St. Louis	314-429-6941
NJ	Fairfield	201-227-6050
NY	Albany	518-458-7755
NY	Jericho	516-681-0900
NY	Rochester	716-461-5400
NY	Syracuse	315-456-2196
NC	Greensboro	919-273-6981
Ohio	Cleveland	216-266-2900
Ohio	Dayton	513-298-0311
Okla	Oklahoma City	405-943-9015
Pa	Erie	814-455-5466
Pa	Pittsburgh	412-921-4134
Pa	Wayne	215-962-1500
Tex	Dallas	214-661-8582
Tex	Houston	713-777-3443
Va	Falls Church	703-790-1700
Va	Portsmouth	804-397-8752
Va	Waynesboro	703-943-1151
Wash	Seattle	206-575-2865
Wisc	Milwaukee	414-271-5000

GENERAL ELECTRIC, Ind'l Heating Business Dept, Dept. EM, 1 Progress Rd, Shelbyville, Ind. 46176, Tel: 317-398-4411, TWX: 810-260-2616

Sales Manager: C.R. Knowles; *Distributor Manager:* S.M. Davidson

Local Sales Offices & Reps.

Ala	Birmingham, Southern Combustion & Controls Co.	205-324-7044
Ariz	Phoenix	602-253-3431
Cal	Burlingame	415-697-6500
Cal	Los Angeles	213-589-6321
Cal	San Diego	714-224-1212
Colo	Denver	303-759-2749
Conn	Hamden, Etter Engrg. Co.	203-288-3575
Conn	Waltham	617-893-8658
Fla	Miami, 305-592-6523	
Fla	Orlando	305-894-7761
Ga	Atlanta, Southern Combustion & Controls	404-252-7114
Haw		808-847-0998
Ill	Glen Ellyn	312-858-6320
Ind	Indianapolis, G. E. Booth Co.	317-248-9261
La	Baton Rouge	504-581-3434
La	Lake Charles	318-439-8173
La	New Orleans	504-733-9550
Mass	Waltham, Etter Engrg. Co.	617-893-8658
Mo	Kansas City	816-561-4050
Mo	St. Louis	314-993-5810
NJ	Caldwell	201-228-2220
NY	Buffalo, Lawrence Ind'l. Sls.	716-685-1993
NY	Syracuse, Symtrol Corp.	315-437-2233
NC	Charlotte	704-523-2122
Ohio	Cincinnati	513-574-0800
Ohio	Hudson	216-656-2577
Ore	Portland	910-464-8065
Pa	Pittsburgh	412-371-3266
Pa	St. Davids	215-687-5650
Tenn	Chattanooga, Southern Combustion & Controls Co.	615-266-4831
Tenn	Memphis, Combustion & Controls Co.	901-525-7402
Tex	Dallas, Leake Co.	214-826-6350
Utah	Salt Lake City	801-363-3555
Va	Richmond	804-359-6051
Wash	Seattle	206-762-4100

GENERAL ELECTRIC CO., Chemical Materials Dept., Dept. EM, 1 Plastics Ave., Pittsfield, Mass. 01201, Tel: 617-594-0100; Empl.: 600

Refer to GE Electrn. Comps. Sls. Dept. for sales office information

GENERAL ELEC. CO., Laminated & Insulating Matls. Bus. Dep., Dept. EM, Coshocton, Ohio 43812, Tel: 614-622-5310, TWX: 810-255-2921; Empl.: 1100

Sales Manager: R.L. Morris

Local Sales Offices & Reps.

Cal	El Segundo, Insulectro	213-640-1470
Cal	Mountain View, Insulectro	415-969-7010
Fla	Tampa, General Elec. Co.	813-877-8311
Ill	Arlington Heights, Gen. Elec. Co.	312-439-9080
Ind	Indianapolis, General Elec. Co.	317-842-0187
Ind	Lowell, General Elec. Co.	617-458-8751
NY	Liverpool, General Elec. Co.	315-456-2144
NC	Greensboro, General Elec. Co.	919-288-0153
Ohio	Elyria, General Elec. Co.	216-322-3749
Pa	Berwyn, General Elec. Co.	215-962-3685
Tex	Irving, Bunker Inds.	214-438-3300

GENERAL ELEC. LAMP GLASS, See General Elec. Lamp Parts & Equip. Sales Oper.

GENERAL ELECTRIC CO., Battery Business Dept., Dept. EM, Box 861, Gainesville, Fla. 32602, Tel: 904-377-6960

Local Sales Offices & Reps.

Cal	Los Angeles	213-826-0997
Cal	Palo Alto	415-493-4850
Conn	Bridgeport	203-334-1012
Ill	Chicago	312-777-1600
Mich	Southfield	313-355-3552
Mont	St. Louis	314-429-6930
NJ	Clifton	201-472-8100
Ohio	Dayton	513-298-0311
Tex	Dallas	214-661-8582
Va	Falls Church	703-790-1700

GENERAL ELECTRIC CO., Lamp Parts & Equip. Sls. Oper., Dept. EM, 21800 Tungsten Rd., Cleveland, Ohio 44117, Tel: 216-266-2451

Local Sales Offices & Reps.

Cal	San Jose	408-298-4126
Mass	Newton Upper Falls	617-332-6200
Mo	Lee's Summit	816-524-5300
NJ	West Orange	201-736-5305
Ohio	Cleveland	216-266-2451
Pa	Pittsburgh	412-531-5700

GENERAL ELECTRIC, Microwave & Imaging Devices Sect., Dept. EM, Rm. 301, Bldg. 7, Elctrns. Pk., Syracuse, N.Y. 13201, Tel: 315-456-3231

GENERAL ELECTRIC CO., Miniature Lamp Dept., Dept. EM, Nela Park, Clevland, Ohio 44112, Tel: 216-266-2121

Local Sales Offices & Reps.

Alas	Achorange	907-272-1211
Cal	Los Angeles	213-723-2541
Cal	Oakland	415-436-9447
Cal	Palo Alto	415-493-0652
Colo	Denver	303-320-3598
Conn	Bridgeport	203-334-1012
Fla	Jacksonville	904-399-5566
Fla	Miami	305-693-3811
Ga	Atlanta	404-897-6390
Haw	Honolulu	808-537-3280
Ill	Chicago	312-671-6390
Ind	Indianapolis	317-547-5511
La	New Orleans	504-835-6421
Md	Baltimore	301-242-5700
Mass	Newton Upper Falls	617-332-6200
Mich	Detroit	313-883-0200
Minn	New Hope	612-535-5151
Mo	North Kansas City	816-471-0123
Mo	St. Louis	314-429-6930
NJ	Newark	201-622-8000
NY	New York	212-896-6000
NY	Rochester	716-461-5900
NY	Utica	315-733-0922
NC	Charlotte	704-376-6585
Ohio	Cincinnati	513-559-3607
Ohio	Cleveland	216-266-4337
Ohio	Columbus	614-294-4115
Okla	Oklahoma City	405-842-4028
Ore	Portland	503-221-5120
Pa	King of Prussia	215-688-5900
Pa	Pittsburgh	412-665-3764
Tenn	Memphis	901-948-2642
Tex	Dallas	214-358-5321
Tex	Houston	713-644-3264
Va	Richmond	804-355-3289
Wisc	Milwaukee	414-462-3860

GENERAL ELEC., Plastics, Dept. EM, 1 Plastic Ave., Pittsfield, Mass. 01201, Tel: 413-494-1110

Local Sales Offices & Reps.

Cal	City of Industry	213-965-4973
Ga	Atlanta	404-897-6245
Ill	Oakbrook	312-986-3480
Ind	Indianapolis	317-923-7221
Kans	Shawnee Mission	913-432-5851
Ky	Louisville	502-454-5458
Mass	Wellesley Hills	617-237-9125
Mich	Southfield	313-355-4460
Minn	Minneapolis	612-835-3111
Mo	St. Louis	314-429-7002
NJ	Cranford	201-276-8472
NY	E. Rochester	716-381-8500
Ohio	Cleveland	216-523-6335
Ohio	Dayton	513-298-0311
Tex	Dallas	214-233-5683

GENERAL ELECTRIC CO., Product Specialist, Dept. EM, P.O. Box 1388, Columbia, S.C. 29202, Tel: 803-772-2500

GENERAL ELEC., Semiconductor Prods., Dept. EM, Electronics Pk., Box 1122, Syracuse, NY 13201, Tel: 315-456-2798, TWX: 710-541-0498; Empl.: 400000

Local Sales Offices & Reps.

Ala	Huntsville	205-883-9220
Ariz	Phoenix	602-264-1751
Cal	Los Angeles	213-479-7763
Cal	Palo Alto	415-493-2600
Cal	San Diego	714-236-1266
Colo	Denver	303-388-5771
Conn	Bridgeport	203-334-1012
Fla	North Palm Beach	305-844-5202
Ill	Chicago	312-777-1600
Ind	Ft. Wayne	219-482-4557
Ind	Indianapolis	317-923-7221
Mass	Wellesley	617-237-2050
Mich	Southfield	313-355-3552
Minn	Minneapolis	612-835-2550
Mo	Kansas City	816-221-4033
Mo	St. Louis	314-429-6941

NJ	Clifton	201-472-8100
NY	Albany	518-458-7755
NY	Great Neck	516-466-8800
NY	Rochester	716-461-5400
NY	Syracuse	315-456-3108
NC	Greensboro	919-273-6981
Ohio	Cleveland	216-266-2900
Ohio	Dayton	216-298-0311
Okla	Oklahoma City	405-943-9015
Pa	Erie	814-455-5466
Pa	Pittsburgh	412-921-9917
Pa	Wayne	215-962-1500
Tex	Dallas	214-661-8582
Va	Falls Church	703-790-1700
Va	Portsmouth	804-397-8752
Va	Waynesboro	703-943-1151
Wash	Seattle	206-575-2866
Wisc	Milwaukee	414-271-5000

Local Distributors

Ala	Birmingham, Forbes Dist Co.	205-251-4107
Ala	Huntsville, Hamilton/Avnet	205-533-1170
Ariz	Phoenix, Kierulff Elctrns. Inc.	602-273-7331
Ariz	Phoenix, Hamilton/Avnet	602-275-7851
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Culver City, Hamilton Electro Corp.	213-870-7171
Cal	El Monte, G. S. Marshall Co.	213-686-0141
Cal	Irvine, Cramer Elctrns. Inc.	213-771-8300
Cal	Los Angeles, Kierulff Elctrns. Inc.	213-685-5511
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	Mountain View, Hamilton/Avnet	415-961-7000
Cal	Oakland, Brill Elctrns.	442-834-5888
Cal	Palo Alto, Kierulff Elctrns. Inc.	415-968-6292
Cal	San Diego, Kierulff Elctrns., Inc.	714-278-2112
Cal	San Diego, Hamilton/Avnet	714-279-2421
Cal	Sunnyvale, Cramer Elctrns.	408-739-3011
Colo	Denver, Hamilton/Avnet	303-534-1212
Colo	Denver, Electronics Parts Co.	303-744-1992
Conn	Danbury, Schweber Elctrns.	203-792-3500
Conn	No. Haven, Cramer Elctrns. Inc.	203-239-5641
Conn	Waterbury, Bond Radio Supp	203-757-0546
Conn	Wilton, Hamilton/Avnet	203-762-0361
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Hollywood, Cramer Elctrns. Inc.	305-923-8181
Fla	Hollywood, Hamilton/Avnet	305-925-5401
Fla	Orlando, Cramer Elctrns. Inc.	305-894-1511
Fla	Orlando, Hammond Elctrns. Inc.	305-241-6601
Ga	Atlanta, Cramer Elctrns. Inc.	404-448-9050
Ga	Atlanta, Lykes Elctrns.	404-355-2223
Ga	Atlanta, Schweber Elctrns.	404-449-9170
Ga	Norcross, Hamilton/Avnet	404-448-0800
Ill	Chicago, Semiconductor Specs Inc.	
Ill	Chicago, Newark Elctrns Corp.	312-638-4411
Ill	Elk Grove, Schweber Elctrns.	412-593-2740
Ill	Mount Prospect, Cramer Elctrns.	312-593-8230
Ill	Schiller Park, Hamilton/Avnet Elctrn.	312-678-6310
Ind	Evansville, Hutch & Son Inc.	812-425-7201
Ind	Ft. Wayne, Ft. Wayne Elctrns. Supp	219-423-3422
Ind	Indianapolis, Graham Elctrns. Supp	317-634-8202
Ind	Indianapolis, Pioneer Standard	317-849-7300
Iowa	Cedar Rapids, DEECO Inc.	319-365-7551
Kans	Lenexa, Hamilton/Avnet	913-888-8900
La	New Orleans, Lykes Elctrns. Corp. Epcor Div.	504-486-7441
Md	Gaithersburg, Cramer-Washington Inc.	301-948-0110
Md	Gaithersburg, Pioneer-Washington Elctrns. Inc.	301-424-3300
Md	Hanover, Hamilton/Avnet	301-796-5000
Md	Hanover, Cramer/Baltimore Inc.	301-796-5790
Md	Rockville, Schweber Elctrns.	301-881-2970
Mass	Burlington, Hamilton/Avnet	617-273-2120
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	Newton, Cramer Elctrns. Inc.	617-969-7700
Mass	Springfield, T.F. Cushing Inc.	413-788-7341
Mass	Waltham, Schweber Elctrns.	617-890-8484
Mich	Detroit, RS Elctrns.	313-491-1000
Mich	Farmington, Semiconductor Specs.	313-255-0300
Mich	Livonia, Hamilton/Avnet	313-522-4700
Mich	Troy, Schweber Elctrns.	313-583-9242
Minn	Edina, Cramer Elctrns. Inc. Cramer/Bonn Div.	612-835-7811
Minn	St. Paul, Gopher Elctrns.	612-645-0889
Mo	Hazelwood, Hamilton/Avnet	314-731-1144
Mo	North Kansas City, L-Comp-Kansas City Inc.	816-221-2400
Mo	University City, Olive Ind. Elctrns.	314-873-7800
Neb	Lincoln, Scott Elctrns.	402-464-8308
NJ	Camden, General Radio Supp.	609-964-8560
NJ	Cedar Grove, Hamilton/Avnet	201-239-0800
NJ	Cherry Hill, Cramer Elctrns. Inc.	609-424-5993
NJ	Moonachie, Cramer Elctrns. Inc.	201-935-5600
NJ	Mt. Laurel, Hamilton/Avnet	609-234-2123
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NM	Albuquerque, Cramer Elctrns. Inc.	505-265-5767
NY	Cheetowaga, Standard Elctrns. Inc.	716-685-4220
NY	E. Syracuse, Cramer Elctrns. Inc.	315-437-6671
NY	E. Syracuse, Hamilton/Avnet	315-437-2642
NY	Farmingdale, Arrow Elctrns. Inc.	516-694-6800
NY	Hauppauge, Cramer Elctrns. Inc.	516-231-5600
NY	Rochester, Hamilton/Avnet	716-442-7820
NY	Rochester, Schweber Elctrns.	716-328-4180
NY	Rochester, Cramer Elctrns. Inc.	716-275-0330
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Rome, Rome Elctrns.	315-476-2033
NY	Westbury, Hamilton/Avnet	516-333-5800
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Charlotte, Dixie Radio Supply	704-377-5413
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
NC	Winston-Salem, Cramer Elctrns.	919-725-8711
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Cincinatti, Hughes Peters Inc.	513-351-2000
Ohio	Cleveland, Pioneer Standard Elctrns. Inc.	216-587-3600
Ohio	Columbus, Elctrns. Marketing Corp.	614-299-4161
Ohio	Columbus, Hughes Peters Inc.	614-294-5351
Ohio	Dayton, Pioneer Standard Elctrns. Inc.	513-236-9900
Ohio	Warren, Rem Elctrns. Supp.	216-399-2777
Okla	Tulsa, Oil Capitol Elctrns. Corp.	918-836-2541
Pa	Philadelphia, Almo Elctrns. Corp.	215-676-6000
Pa	York, Rosen Elctrns.	717-843-3875
RI	Warwick, Edwards Co. WH	617-329-2400
SC	Columbia, Dixie Radio Supp.	803-253-5333
Tenn	Chattanooga, Harpe Elctrns.	615-267-2381
Tenn	Knoxville, Ind. Elctrns. Inc.	615-573-7135
Tex	Dallas, Hamilton/Avnet Elctrns.	214-661-8661
Tex	Dallas, Sterling Elctrns. Inc.	214-357-9131
Tex	Dallas, Norvell Elctrns. Inc.	214-350-6771
Tex	Houston, Sterling Elctrns. Inc.	713-627-9800
Tex	Houston, Hamilton/Avnet	713-526-4661
Utah	Salt Lake City, Newark Elctrns. Inc.	801-486-1048
Utah	Salt Lake City, Hamilton/Avnet	801-262-8451
Va	Charlottesville, Virginia Radio Supp.	804-828-2311
Wash	Bellevue, Hamilton/Avnet	206-746-8750
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
WVa	Nitro, McJunkin Charleston Electrical Div.	304-348-5211
Wisc	Milwaukee, Electronics Expeditors	414-228-8100
Wisc	Milwaukee, Marsh Radio Inc.	414-545-6500

GE SILICONE PRODS, Dept. EM, Mechanicsville Rd., Waterford, N.Y. 12188

GENERAL ELECTRIC CO., Specialty Material Dept., Dept. EM, P.O. Box 568, Worthington, Ohio 43085, Tel: 615-438-2000

GENERAL ELEC., Valley Forge Space Tech. Ctr., Dept. EM, Box 8555, Phila., Pa. 19101, Tel: 215-962-5474, TWX: 510-660-2034; Empl.: 2100

GENERAL ELECTRIC CO., Wire & Cable, Dept. EM, 1285 Boston Ave., Bridgeport, Conn. 06602, Tel: 203-334-1012, Telex: 96-4209

Local Sales Offices & Reps.

Ala	Birmingham, General Electric Co.	205-879-2030
Cal	Los Angeles	213-572-5330
Cal	Oakland	415-638-0725
Conn	Meriden	203-235-3264
Fla	Jacksonville	904-396-3896
Ga	Atlanta	404-633-4522
Ill	Elk Grove Village	312-595-3210
Ind	Indianapolis	317-923-7221
Ky	Louisville	502-452-3191
La	New Orleans	504-486-7267
Md	Baltimore	301-944-2273
Mass	Natick	617-237-2050
Mich	Detroit	313-552-3195
Mich	Grand Rapids	616-452-2121
Minn	Minneapolis	612-542-0288
Mo	Kansas City	913-677-3040
Mo	St. Louis	314-342-7794
NY	Albany	518-458-7243
NY	New York	212-683-6104
NY	Syracuse	315-456-7568
NC	Charlotte	704-372-8541
NC	Greensboro	919-288-7906
Ohio	Cincinnati	513-871-6300
Ohio	Cleveland	216-267-6300
Ore	Portland	503-221-5023
Pa	Philadelphia	215-289-6310
Pa	Pittsburgh	412-921-5150
Tenn	Nashville	615-329-3535
Tex	Bedford	817-267-9361
Tex	Houston	713-675-6681
Utah	Salt Lake City	801-364-1894
Wash	Seattle	206-575-2940
Wisc	Milwaukee	414-271-5000

GENERAL ELEC. COMPANY, Wiring Device Business Dept., Dept. EM, 95 Hathaway St., Providence, R.I. 02904, Tel: 401-781-1800, Telex: A20EA

Local Sales Offices & Reps.

Ala	Birmingham	205-933-2670
Ariz	Phoenix	602-264-1751
Cal	El Monte	213-572-5200
Cal	Los Angeles	213-572-5320
Cal	Oakland	415-635-6500
Colo	Denver	303-388-4545
Conn	Hartford	203-246-6841
Fla	Jacksonville	904-398-6944
Fla	Tampa	813-877-8311
Ga	Atlanta	404-897-6116
Ill	Chicago	312-986-3141
Ind	Indianapolis	317-923-7221
Iowa	Bettendorf	319-355-0231
La	New Orleans	504-486-5851
Md	Columbia	301-730-7740
Mass	Wellesley	617-237-2050
Mich	Southfield	313-355-4400
Minn	Minneapolis	612-544-6699
Mo	Kansas City	913-842-9745
Mo	St. Louis	314-342-7670
NJ	Millburn	201-376-9000
NY	Harrison	914-698-7450
NY	Syracuse	315-456-7804
NC	Charlotte	704-375-5571
Ohio	Cincinnati	513-861-3400
Ohio	Cincinnati	513-861-3400
Ohio	Cleveland	216-523-6100
Okla	Oklahoma City	405-528-4521
Ore	Portland	513-221-5028
Pa	Camp Hill	717-761-2304
Pa	Philadelphia	215-568-1800
Pa	Pittsburgh	412-281-9230
SC	Greenville	803-232-1584
Tenn	Memphis	901-332-7460
Tenn	Nashville	615-254-3411
Tex	Dallas	214-631-3110
Tex	Houston	713-623-6440
Tex	San Antonio	512-828-0561
Utah	Salt Lake City	801-364-1818
Va	Richmond	804-288-4071
Wash	Seattle	206-575-2884
Wisc	Milwaukee	414-271-5000

GENERAL-ELECTRO MECHANICAL, Dept. EM, 785 Hertel Ave., Buffalo, N.Y. 14207, Tel: 716-876-9685, Telex: 91-222; Empl.: 121 ...... p. 3084

Sales Manager: B.M. Roberts

GENERAL ELECTRODYNAMICS CORP., Dept. EM, 4430 Forest La., Garland, Tex. 75040, Tel: 214-276-1161, TWX: 910-860-5193; Empl.: 113

Sales Manager: E.A. Olzewski

GENERAL HARDWARE MFG. CO., Dept. EM, 80 White St., New York, N.Y. 10013, Tel: 212-431-6100

GENERAL INDUSTRIES CO., Dept. EM, Taylor & Olive St., Elyria, Ohio 44035, Tel: 216-323-3136, TWX: 810-424-2109; Empl.: 1500

Local Sales Offices & Reps.

Ark	Hot Springs, Meredith Young Assoc.	501-262-1365
Cal	Encino, Viking Sls. Co.	213-788-5501
Ill	Chicago, K-W Assocs.	312-792-2618
Ill	Glenview, J & H Engrg. & Sls.	312-729-2221
Mich	Southfield, T. Barr Sls. Agency, Inc.	313-357-1266
Minn	Minneapolis, J.B. Wright & Assoc.	612-335-7833
NJ	Medford, Mech-Elec Sls. Co.	609-654-8209
NY	New York, P. Saftler Assoc.	212-247-3855
NY	Rochester, R.H. Eisenhart, Inc.	716-473-2657
Ohio	Mansfield, Mong & Assoc.	419-524-2835
Ohio	Marysville, B. Sewell	513-642-2751
Tex	Dallas, Kesco	214-369-5136

GENERAL INSTR. OF CAN. LTD., Dept. EM, 6205 Airport Rd., Mississauga, Ont., Can., Tel: 416-678-2400; Empl.: 2,000

GENERAL INSTRUMENT CORP., Dept. EM, 1775 Broadway, New York, N.Y. 10019, Tel: 212-541-8200

GENERAL INSTR. CORP, ELCTRONIC SYSTEMS, Dept. EM, 600 W. John St., Hicksville, N.Y. 11802, Tel: 516-733-3000, TWX: 510221-1865; Empl.: 500

Local Sales Offices & Reps.

DC	Washington, General Instr. Corp.	202-965-3712

GENERAL INSTR. CORP., Microelectronics Div., Dept. EM, 2355 W. Williams Field Rd., Chandler, Ariz. 85224, Tel: 516-733-3107, TWX: 510-221-1866

GENERAL INSTRUMENT CORP., Hybrid Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802, Tel: 516-733-3000, TWX: 510-221-1865

Refer to General Instr. Corp. Semiconductor Prods. Div for sales office information

GENERAL INSTR. CORP., Microelectronics Div., Dept. EM, 600 W. John St., Hicksville, N.Y. 11802, Tel: 516-733-3107, TWX: 510-221-1866 ...... p. 3864,3865

Local Sales Offices & Reps.

Ariz	Chandler, General Inst. Corp.	602-963-7373
Cal	El Segundo, Varigon Assoc.	213-322-1120
Cal	Los Altos, PM Sls.	415-941-4444
Cal	Newport Beach, General Inst. Corp.	714-833-9400
Conn	Stratford, G. Rosen Co.	203-375-5456
Fla	Maitland, Hutto, Hawkins & Peregoy	305-831-2474
Fla	Pompano Beach, Hutto, Hawkins & Peregoy	305-943-9593
Ill	Chicago, General Inst. Corp.	312-338-9200
Ill	Park Ridge, Metcom Assoc.	312-696-1490
Ind	Greenwood, V. S. & Assoc.	317-888-2260
Ind	South Bend, V. S. & Assoc.	219-291-6258
Iowa	Cedar Rapids, PMA	319-362-9177
Kans	Overland Park, PMA	913-381-0004
Kans	Wichita, PMA	316-264-2662
Md	Baltimore, Component Sls.	301-484-3647
Md	Hunt Valley, General Inst. Corp.	301-628-2120
Mass	Framingham, G. Rosen	617-879-5505
Mass	Weston, General Inst. Corp.	617-899-8800
Mich	Southfield, V. S. & Assoc.	313-559-3680
Minn	Minneapolis, Quantum Sls.	612-831-8583
Mo	Maryland Heights, PMA	314-569-1220
NJ	Teaneck, R.T. Reid Assoc.	201-692-0200
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Richfield, Bear Mktg.	216-659-3131
Ore	Portland, Jas. J. Backer Co.	503-297-3776
Pa	Bridgeville, Foster-McClinton	412-941-4800
Pa	Erie, Foster-McClinton	814-455-9111
Pa	Horsham, General Inst. Corp.	215-674-4800
Pa	Huntingdon Valley, Knowles Assoc.	215-947-5641
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Seattle, Jas. J. Backer Co.	206-285-1300
WVa	Huntington, Foster-McClinton......	304-763-5161

GENERAL INSTRUMENT CORP., Discrete Semiconductor Div., Dept. EM, 600 West John St., Hicksville, N.Y. 11802, Tel: 516-733-3333, TWX: 510-221-1865

Sales Manager: G. Stein; *Distributor Manager:* R. Graziano

Local Sales Offices & Reps.

Ariz	Phoenix, Mercury Engrg. Sls.......	602-279-2367
Cal	El Segundo, Varigon Assocs.......	213-322-1120
Cal	San Diego, Varigon Assocs.	714-299-5413
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	Stratford, Rosen Co.	203-375-5456
Fla	Hollywood, "C" Assocs.	305-922-8917
Ga	Atlanta, Electro-Mech Sls. Engrg. Co.	404-449-6337
Ill	Chicago, General Instr. Corp.	312-338-9200
Ill	Park Ridge, Metcom Assocs. Corp.	312-696-1490
Md	Baltimore, Component Sls.	301-484-3647
Mass	Framingham, G. Rosen Co.	617-879-5505
Minn	Minneapolis, Quantum Sls.	612-831-8583
NJ	Teaneck, R. T. Reid Assocs. Inc.	201-692-0200
NY	Buffalo, Quality Comps.	716-839-4170
NY	Manlius, Quality Comps.	315-682-8885
Ohio	Cincinnati, G & H Sls. Co.	513-771-8231
Pa	Narberth, J. Bresson Assocs.	215-664-6460
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Tex	Houston, Ammon & Rizos Co.....	713-781-6240
Utah	Salt Lake City, Waugaman Assocs.	801-277-8911
Wash	Seattle, J. J. Backer Co.	206-285-1300

Local Distributors

Ariz	Phoenix, Cramer Elctrns.	602-267-7321
Cal	Irvine, Cramer Elctrns.	714-979-3000
Cal	San Diego, Cramer Elctrns.	714-565-1881
Cal	Santa Ana, Intermark Elctrns.	714-540-1322
Cal	Sunnyvale, Diplomat/Westland Inc.	408-734-1900
Colo	Wheatridge, Century Elctrns.	303-424-1985
Conn	Hamden, Arrow Elctrns.	203-248-3801
Fla	Ft. Lauderdale, N.R.C.	305-792-2600
Ga	Atlanta, Cramer Elctrns.	404-448-9050
Ill	Elmhurst, Semiconductor Specialists	312-279-1000
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Lenexa, Hall-Mark Elctrns.	913-888-4747
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Newton, A.W. Mayer Co.	617-965-1111
Mass	Newton, Greene-Shaw Co.	617-969-8900
Mich	Farmington, Semiconductor Specialists	313-478-2700
Mich	Grand Rapids, Stotts-Friedmand Co.	616-459-0216
Minn	Minneapolis, Berquist Co., Inc.....	612-835-2322
Mo	St. Louis, Olive Elctrns.	314-863-7800
Neb	Lincoln, Scott Elctrns. Supply	402-464-8308
NJ	Morrestown, Arrow Elctrns.	609-235-1900
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800
NM	Albuquerque, Century Elctrns.....	505-292-2700
NY	East Syracuse, Cramer Elctrns.	315-437-6671
NY	Elmsford, Zeus Comps.	914-592-4120
NY	Johnson City, Wilshire Elctrns. ..	607-797-1236
NY	Syosset, Nasco	516-822-9450
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cleveland, Arrow Elctrns.	216-464-2000
Ohio	Dayton, Arrow Elctrns.	513-253-9176
Okla	Tulsa, Component Specialties Inc.	918-664-2820
Ore	Portland, N.W. Radio & Elctrns.	503-234-9787
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
SC	Greenville, Hammond Elctrns.	803-233-4121
Tex	Dallas, Component Specialties, Inc.	214-357-4576
Tex	Houston, Lenert Co.	713-225-1465
Utah	Salt Lake City, Alta Elctrns.	801-486-7227
Wash	Seattle, Sterling Elctrns.	206-762-9100
Wisc	Mequon, Taylor Elctrns.	414-241-4321

GENERAL INSTR. CORP., Systematics Div., Dept. EM, 13040 S. Cerise Ave., Hawthorne, Cal. 90250, Tel: 213-973-1741, TWX: 910-325-6301; Empl.: 450

Local Sales Offices & Reps.

Ariz	Scottsdale, RepTronics	602-949-7116
Cal	Costa Mesa, King Engrg. Co.	714-645-6873
Cal	San Francisco, W. C. Bennison Co.	415-543-5438
Fla	Hollywood, CES (Comp. Engrg. Sls.)	305-922-5230
Haw	Honolulu, Aloha Assocs.	808-941-1574
Mass	Wayland, Centennial Sls.	617-358-5161
NJ	Fort Lee, K. E. Hughes	201-944-1600
NM	Albuquerque, Data Handling Co.	505-268-4364
Pa	King of Prussia, Rivco, Inc.	215-265-5211
Tex	Fort Worth, Carey Wolfe & Assoc.	
Tex	McKinney, G. I., RMP	214-442-3251
Wash	Seattle, J. J. Backer Co.	206-285-1300

GENERAL MAGNETIC CO., Dept. EM, 10001 Erwin Ave., Detroit, Mich. 48234, Tel: 313-921-7558; Empl.: 130

Local Sales Offices & Reps.

Cal	Los Angeles, G.B. Leland	213-851-4933
Ill	Chicago, R.T. Thompson	312-359-0159
Ill	Chicago, H.J. Corey & Assoc.....	312-539-6310
Mass	Beverly, Gysan Assoc.	617-774-2012
Ohio	Euclid, Rockford Controls	216-731-5250

GENERAL MAGNETICS, Dept. EM, 211 Grove St., Bloomfield, N.J. 07003, Tel: 201-743-2700; FSC No.: 99165; Empl.: 60 .... p. 2386-2390

GENERAL MFG. CO., Dept. EM, 724 Ruberta Ave., Glendale, Calif. 91201, Tel: 213-243-2069; FSC No.: 10454

Local Sales Offices & Reps.

Ill	Chicago, Electro-Mech. Sls. Co.	312-777-0554

GENERAL MICROWAVE CORP., Dept. EM, 155 Marine St., Farmingdale, NY 11735, Tel: 516-MY4-3600, TWX: 510-224-6406; FSC No.: 11332; Empl.: 120 .... p. 3004

Sales Manager: M. Wind

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	800-327-1181
Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	Palo Alto, RF Assocs.	415-494-3331
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Darby, Palatine Sls., Inc.	316-788-0621
Kans	Lenexa, Palatine Sls., Inc.	913-492-7070
Mo	St. Louis, Palatine Sls., Inc.	314-426-7055
NH	Windham, REPCO	603-893-9539
NJ	Long Branch, Mer Mon Elctrn. Instrumentation	201-229-3172
NJ	West Orange, EF Technical Sls., Inc.	201-731-7203
NY	Huntington, EF Technical Sls., Inc.	516-549-1818
NY	Liverpool, R & D Assocs.	315-622-2350
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Lancaster, Cain & Co.	614-654-4800
Tex	Dallas, Cain & Co.	214-233-6809
Va	McLean, Creative Mktg. Assoc., Ltd.	703-893-6612
Wash	Seattle, H. Levinson & Co.	206-323-5100

GENERAL MONITORS, INC., Dept. EM, 3019 Enterprise St., Costa Mesa, Cal. 92626, Tel: 714-540-4895, Telex: 67-8372; Empl.: 130

Local Sales Offices & Reps.

Ala	Mobile, Horton Instr. Co.	205-476-6808
Alas	Anchorage, Alaska Controls, Inc.	907-272-3629
Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	Costa Mesa, Technical Prods.....	714-646-8585
Cal	Sacramento, E. Freitag	916-489-8831
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Ill	Chicago, Nomad Engrg.	312-764-0403
Iowa	Des Moines, Deco Engrg. Prods., Inc.	515-274-9356
La	Baton Rouge, C. Doyle Co.	504-921-5386
Mass	Randolph, Power Specialties	617-963-8910
Mich	Royal Oak, The Satullo Co.	313-549-3910
Minn	Minneapolis, E.R. Berg & Assoc.	612-890-1221
Mo	St. Louis, Fisk Process Equip.	314-426-1410
Neb	Omaha, Deco Engrg. Prods., Inc.	402-341-4836
NJ	East Orange, Industrial Flow Control, Inc.	201-672-5220
NM	Albuquerque, R. A. Mayes Co. ..	505-292-2330
NY	Elbridge, L-Tron Corp.	315-689-3787
Ohio	Cincinnati, Surkamp & Rowe	513-891-1838
Ohio	Cleveland, Loesch Assocs., Inc.	216-241-4581
Okla	Tulsa, J. Schoeffler Co.	918-742-5331
Ore	Portland, Set-Point Control Inc. ..	503-288-8868
Pa	Pittsburgh, Cotter Assoc.	412-833-5477
Pa	Wayne, OR Instrumentation	215-293-1225
Tex	Houston, Groth Equip. Corp.	713-675-6151
Va	Richmond, Virginia Tech Assocs.	804-266-9654
Wash	Bellevue, Set-Point Control Inc...	206-454-0155
WVa	So. Charleston, Allied Controls Co.	304-768-7313

GENERAL MOTORS CORP., Dept. EM, 3044 W. Grand Blvd., Detroit, Mi. 48202

GENERAL PRECISION SYSTEMS, see Hertner Div., General Battery Corp.

GENERAL RADIO CO., See GenRad

GENERAL RAND CORP., Dept. EM, 100 Menlo Park, Edison, N.J. 08817, Tel: 201-548-1591; Empl.: 11

GENERAL
RESISTANCE

GENERAL RESISTANCE, INC., Dept. EM, 75 Haven Ave., Mt. Vernon, N.Y. 10553, Tel: 914-699-8010, TWX: 710-562-0199; FSC No.: 05591; Empl.: 50 p. 2866,3693

Sales Manager: J L Jamieson

Local Sales Offices & Reps.

Instruments

Cal	Los Altos, J. Stone & Assoc.	415-948-4563
Cal	Van Nuys, Gordon-Elliot, Inc	213-873-6862
Colo	Littleton, Radco	303-794-4279
Fla	Orlando, Truex Assocs.	305-859-2160
Ill	Des Plaines, Marslano Associates, Inc	312-694-2262
Mass	Framingham, J.M. Lancaster Co.	617-873-8893
Mich	Farmington, Anderson Elctrns.....	313-476-9161
NJ	Paramus, S D M Representatives, Inc.	201-368-0123
NM	Albuquerque, RUSTCO	505-296-6474
NC	Matthews, W.K. Hile Co.	704-847-9125
Ohio	Dayton, RIXAN Assocs.	513-278-4216
Pa	Delmont, LASLO & Assoc.	412-468-5045

Pa	Jenkintown, Stein Instrumentation	215-885-2370
Tex	Houston, SESCO	713-668-7840
Tex	Richardson, SESCO	214-231-9364
Va	Baileys Crossroads, Q.T. Elctrn. Sls.	703-671-4357
Wash	Seattle, Datacom Assocs.	206-285-2525

Components

Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Downey, Groh Assocs.	213-923-0963
Cal	Palo Alto, TESTCO	415-324-1900
Colo	Golden, J.F. Hurlbut Co	303-279-7796
Conn	Washington, TRI-COM Assocs.	203-868-7748
Fla	Lighthouse Point, R.C. Simon	305-941-2757
Ga	Atlanta, Electro-Mech Sales Engrg Co	404-449-6337
Ill	Elk Grove Village, Micro Sales	312-956-1000
Mass	Burlington, TRI-COM Assocs.	617-272-8163
Mich	Farmington, W.R. Hummon & Assoc.	313-474-0661
NJ	Wallington, Comp-Tech Sls.	201-935-5454
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
NY	Syracuse, NYCOM	315-437-8343
Ohio	Dayton, RIXAN Assocs.	513-278-4216
Pa	Bala Cynwyd, Vantages Sales Co	215-667-0990
Pa	Delmont, Laslo	412-468-5045
Tex	Dallas, Blackburn Assocs	214-692-8885
Utah	Salt Lake City, J.F. Hurlbut Co	801-299-4034
Va	Falls Church, BEACON	703-534-1868
Wash	Bellevue, TESTCO, Inc.	206-454-7422

Local Distributors

Ill	Dayton, Rixan Assoc.	513-278-4216

GENERAL SCANNING, Dept. EM, 150 Coolidge Ave., Watertown, Mass. 02172, Tel: 617-924-1010, TWX: 710-327-6673; Empl.: 100

GENERAL SEMICONDUCTOR INDUSTRIES, INC., Dept. EM, 2001 W. 10 Pl., Box 3078, Tempe, Ariz. 85281, Tel: 602-968-3101, TWX: 910-950-1942; FSC No.: 24444; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Scottsdale, DAR-C, Inc.	602-948-2240
Cal	Del Mar, Reed Elctrn. Mktg.	714-452-1456
Cal	Los Alamitos, Reed Elect. Mktg.	714-821-9600
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Colo	Parker Component Sls.	303-841-2650
Fla	Casselberry, EIR	305-830-9600
Ill	Berkeley/Hillside, Balhorn & Roeser	312-449-3900
Kans	Shawnee Mission, Technical Sls. Assoc.	913-888-3330
Md	Glen Burnie, Tri-Mark	301-768-2800
Mass	Waltham, Datcom	617-891-4600
Mich	Livonia, Giesting & Assoc.	313-477-6060
Minn	Minneapolis, Professional Sls. Ind.	612-835-1777
Mo	Ferguson, Technical Sls. Assocs.	314-725-5361
NM	Albuquerque, EMI	505-292-2700
NY	Burnt Hills, Ken D. Corsetti Co.	518-399-9200
NY	Burnt Hills, K. D. Corsetti	518-399-9200
NY	Westbury, J-Square Mktg.	516-997-6210
NC	Raleigh, Remco	919-828-3009
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Pa	Willow Grove, BGR Assocs.	215-657-3301
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Redmond, Desco-Northwest	206-455-9325

Local Distributors

Ariz	Phoenix, Moltronics of Arizona	602-272-7951
Ariz	Phoenix, Kachina Elctrn. Dist.	602-269-6201
Cal	Gardena, Bell Industries	213-321-5802
Cal	San Diego, Moltronics	714-278-5020
Cal	San Dimas, Zeus Comps.	714-599-8374
Cal	Santa Clara, Moltronics	408-244-7600
Cal	South Gate, Moltronics	213-773-6521
Cal	Sunnyvale, Bell Inds.	408-734-8570
Cal	Woodland Hills, Semiconductor Concepts	213-884-4560
Colo	Wheatridge, Century Elctrns.	303-424-1985
Fla	Clearwater, Southland Elctrns.	813-443-4514
Fla	Pompano Beach, Zeus Comps.	305-942-4312
Ill	Palatine, Ohm Elctrns.	312-359-5500
Ind	Indianapolis, Sheridan	317-297-3146
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Md	Columbia, Technico	301-461-2200
Md	Gaithersburg, Pioneer Washington Elctrns.	301-948-0710
Mass	Burlington, Zeus Comps.	617-273-0750
Mass	Cambridge, Apollo Elctrns	617-868-3120
Mass	Natick, Lafayette Indl. Elctrns.	617-969-6100
Mich	Farmington, Sheridan	313-477-3800
Mich	Grand Rapids, Sheridan	616-942-2504
Mo	St. Louis, L Comp.	314-647-5505
Neb	Kansas City, L Comp.	816-221-2400
NM	Albuquerque, Century Elctrns.	505-292-2700
NY	Elmsford, Zeus Comps.	914-592-4120
NY	Hempstead, Kahgan Comps.	516-538-2300
NY	New Hyde Park, Lafayette Indl. Elec.	516-488-6600
NC	Greensboro, Pioneer Elctrns.	919-273-4441
Ohio	Beachwood, Sheridan	216-831-0130
Ohio	Cincinnati, Sheridan	513-761-5432
Pa	Horsham, Pioneer Elctrns.	215-674-5710
Pa	Pittsburgh, Sheridan	412-244-1640
Tex	Houston, Oeler & Meneladies	713-722-0730
Utah	Salt Lake City, Century Elctrns.	801-487-8551
Wash	Seattle, Zepher Elctrn. Sls.	206-575-0922
Wisc	Mequon, Taylor Electric Co.	414-241-4321
For:	Can., Downsview, Ont., Zentronics Ltd.	416-635-2822
For:	Can., Montreal, Que., Future Elctrns. Corp.	514-735-5775
For:	Can., Ottawa, Ont., Zentronics Ltd.	613-238-6411
For:	Can., Rexdale, Ont., Future Elctrns. Corp.	416-677-7820
For:	Can., Town of Mt. Royal, Que., Zentronics Ltd.	514-735-5361

GENERAL SENSORS, INC., Dept. EM, P. O. Box 401347, Garland, Tex. 75040, Tel: 214-276-6905; Empl.: 20

Local Sales Offices & Reps.

Cal	San Jose, McFarland Assoc.	408-285-9333
Cal	Woodland Hills, McFarland Assoc.	213-340-5690
Ga	Lilburn, Motion Technology	404-233-4368
Mass	Sudbury, Heinecke Corp.	617-443-3247
Mich	Birmingham, Forand Sls. Co.	313-644-0087
NC	Charlotte, Motion Technology	704-525-9855
Ore	Aloha, Underwood & Underwood	503-649-5681
Pa	Elkins Park, Snow Assoc.	215-379-4700
Tex	Addison, Southland Comps.	214-233-0603
Wash	Seattle, Underwood & Underwood	206-243-2133

GENERAL SYSTEMS INTERNATIONAL INC., Dept. EM, 1440 Allec, Anaheim, Cal. 92805, Tel: 714-956-7183

Local Sales Offices & Reps.

Cal	Cupertino, Telemark	408-257-5131
Cal	Palo Verdes, Edwards Assoc.	213-377-0975
Colo	Denver, Thorson Co.	303-759-0814
Fla	Indian Rocks, Tech Reps. Assoc.	305-763-5374
Kans	Shawnee Mission, Inland Assoc.	913-362-2366
Mass	Waltham, Computer Mktg. Assoc.	617-890-1776
Minn	St. Paul, De Beck Assoc.	612-690-1557
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Va	Annadale, Lankenau Assoc.	703-256-0800

GENERAL TAPE CORPORATION, Dept. EM, 3171 W. 1st Nat'l Bank Bldg., St. Paul, Minn 55101

GENERAL TV NETWORK, Dept. EM, 13225 Capital Ave., Oak Park, Mich. 48237, Tel: 313-548-2500; Empl.: 25

GENERAL TIME CORP., Industrial Controls Div., Dept. EM, 135 S Main St., Thomaston, Conn. 06787, Tel: 203-283-5881; Empl.: 350

Local Sales Offices & Reps.

Cal	Pasadena, C.A. Williams	213-793-1161
Cal	San Francisco, C. Myers	415-825-4770
Colo	Denver, R.L. Palmer Co.	303-771-6827
Conn	Thomaston, P. Allison	203-283-5881
Ga	Atlanta, Motion Technology	404-233-4368
Ill	Des Plaines, T. Sauer	312-296-7751
Kans	Shawnee Mission, E.L. Martin Co.	913-648-4746
Mass	Boston, T. Weafer	617-762-1466
Minn	Mpls, General Time	612-333-2815
Mo	St. Louis, Automation Components	314-872-7111
NY	New York City, General Time	201-289-5959
NY	Rochester, R. King	716-546-4766
NC	Charlotte, Motion Technology	704-525-9855
Ohio	Cincinnati, W. Tomlinson	513-421-3366
Ohio	Cleveland, A.F. Blaine	216-752-2083
Ore	Portland, C. Myers	415-825-4770
Pa	Philadelphia, General Time	215-696-3443
Tex	Dallas, Titan Reps.	214-661-5350
Wisc	Milwaukee, W. Ferguson	414-353-5422

GENERAL TRANSISTOR CORP., Dept. EM, 12591 Crenshaw Blvd., Hawthorne, Cal. 90250, Tel: 213-679-9721

Distributor Manager: B. Holtzman

Local Sales Offices & Reps.

Cal	Los Angeles, Duo Dynamics	213-240-4111
Cal	San Jose, Rical/North	408-253-7559
Ohio	Chagrin Falls, Crest Comps. Sls.	216-543-9808

GENERAL VALVE CORP., Dept. EM, 110 Rte. 10 Box 342, E. Hanover, N.J. 07936, Tel: 201-887-9460, Telex: 13-6369

Local Sales Offices & Reps.

Cal	Los Angeles, A.G. Anderson	714-828-4827
Ohio	Cincinnati, W. Watkins Assocs.	513-891-0313

™GENESOLV - fluorinated solvents - Allied Chemical Corp.

™GENIE - cord - General Electric Co.

GENISCO TECH. CORP., Special Products Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221, Tel: 213-537-4750, TWX: 910-346-6773; Empl.: 350

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs.	205-837-4304
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Encino, Scientific Devices	213-872-1951
Cal	Los Alamitos, Scientific Devices	
Cal	Mountain View, Scientific Devices	415-964-4230
Cal	San Diego, Scientific Devices	714-279-6642
Colo	Denver, C.W. Fowler Co.	303-744-9595
DC	Wash, Mr. R. Kent White	301-839-5858
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Baltimore, Scientific Devices	301-788-6611
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Detroit, Electro Sls. Assoc.	313-526-8800
Minn	Minneapolis, Carter Elctrns.	612-544-9393
Mo	Hazelwood, Carter Elctrns.	314-731-2237
NM	Albuquerque, Thorson Co.	505-265-5657
Ohio	Cleveland, Electro Sls. Assoc.	216-261-5440
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
Pa	Bethayres, Control Instrs. Sls. Co.	215-676-1808
Pa	Pittsburgh, Electro Sls. Assoc.	412-371-9449
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Va	Norfolk, Scientific Devices	804-499-8133
Va	Springfield, Scientific Devices	703-451-6500
Wash	Seattle, R.S. Drake Assoc.	206-763-2755
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

GENISCO TECHNOLOGY CORP., Eldema Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221, Tel: 213-537-4750, TWX: 910-346-6773; FSC No.: 03797; Empl.: 450

Sales Manager: W. R. Esser

Local Sales Offices & Reps.

Cal	Los Altos, E. Foley, Inc.	415-941-4525
Cal	Newport Beach, W.B. Knight Co.	714-833-8250
Colo	Littleton, McCarthy Co.	303-771-1638
Conn	Meriden, P.R. Sturgeon Co.	203-237-1112
DC	Washington, S.K. MacDonald	202-265-3938
Fla	Miami Beach, OEM Mktg.	305-861-3661
Fla	Orlando, OEM Mktg.	305-299-1000
Ill	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
Ind	Indianapolis, Mktg. Engrs. Inc.	317-546-1523
Iowa	Cedar Rapids, Palatine Sls. Inc.	319-365-8071
Kans	Derby, Palatine Sls. Inc.	316-788-0621
Kans	Lenexa, Palatine Sls. Inc.	913-492-7020
Md	Baltimore, S.K. MacDonald Inc.	301-254-3380
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Minn	Minneapolis, Nygaard Sls. Co.	612-881-3727
Mo	St. Louis, Palatine Sls. Inc.	314-426-7055
NJ	Englewood Cliffs, Sprung-Nussbaum Inc.	201-947-6767
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NC	Charlotte, Electro Rep Assocs.	704-527-2530
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242
Pa	Philadelphia, S.K. MacDonald Inc.	215-545-1205
Pa	Pittsburg, S.K. MacDonald Inc.	412-366-2643
Tenn	Shelbyville, R.W. Mitscher Co.	615-684-4544
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Tex	Houston, R.E. Nesbitt Co.	713-224-3633
Wash	Seattle, Comps. West Inc.	206-243-2133

Local Distributors

Ark	Little Rk., Carlton-Bates	501-375-5375
Cal	Burlingame, Rose Elctrns.	415-697-0224
Cal	Hollywood, Yale Radio	213-465-3186
Cal	Inglewood, Cal. Switch & Signal	213-776-3550
Cal	Los Angeles, Radio Prod. Sls.	213-748-1271
Cal	Los Angeles, Cal. Elect. Supply	213-879-0760
Cal	Mt. View, Ratel Elctrns.	415-965-2010
Cal	Oakland, Brill Elctrns.	415-834-5888

Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Riverside, MacRudie Group	714-683-7711
Cal	San Diego, Radio Prod. Sls.	
Cal	San Francisco, Zack Elctrns.	415-626-1444
Colo	Denver, Electronic Parts	303-266-3755
Colo	Lakewood, Acacia Sls.	303-232-2832
Conn	Hartford, R & S Elctrns.	203-528-6581
Fla	Miami, Elect. Equip.	305-635-0421
Fla	Pensacola, Grice Elctrns.	904-434-4281
Ind	Indianapolis, Graham Elctrns.	317-635-5453
Iowa	Cedar Rap., Iowa Radio Supply	319-364-6154
Kans	Wichita, Radio Supply Co.	316-267-5214
La	Baton Rouge, Ralphs	504-344-3761
La	Lafayette, Ralphs	318-234-4507
La	New Orleans, Radio Parts	504-581-5959
La	Shreveport, Industrial Elctrns.	615-573-7135
Md	Baltimore, ASI	301-265-5100
Md	Bethesda, Empire Elctrns.	301-656-3300
Md	Rockville, Pioneer/Wash.	301-427-3300
Md	Savage, Pyttronics	301-792-7000
Mass	Lynn, Land Elctrns.	617-592-2220
Mass	Newton, Greene Shaw	617-969-8900
Mass	W. Newton, A.W. Mayer	617-267-5530
Mich	Muskegon, Fitzpatrick Elect.	616-722-6621
Mich	Wyoming, Newark Ind. Elect.	616-241-6681
Minn	Minneapolis, Electronics Center	612-338-5881
Mo	St. Louis, Olive Ind. Elect.	314-863-7800
NJ	Camden, General Radio Supply	609-964-8560
NJ	Cinnaminson, Wilshire Elctrns.	609-786-8990
NJ	Little Falls, Ind'l. Prods.	201-785-1830
NY	Babylon, Delmar Elctrns.	516-420-1234
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Carle Place, Electronic Precepts	516-997-5380
NY	Mt. Vernon, QAR Elctrns.	914-699-2224
NY	Plainview, ACI	516-293-6630
NY	Rochester, Rochester Radio	716-454-7800
NY	Rochester, Summit Dist.	716-334-8810
NY	Rome, Rome Elctrns.	315-337-5400
Ohio	Columbus, Hughes-Peters	614-294-5351
Okla	Oklahoma City, Trice Whsle Elctrns.	405-524-4415
Pa	Allentown, A.A. Peters	215-434-5237
Pa	Allentown, Valley Elctrns.	215-435-9696
Pa	Altoona, Allegheny	814-946-0871
Pa	Erie, J.V. Duncomke	
Pa	Harrisburg, Pyttronics	717-233-6591
Pa	McKeesport, Barno Radio	412-751-5966
RI	Warwick, W.H. Edwards	401-781-8000
SC	Colombia, Dixie Radio	
Tex	Dallas, Whsle. Elect. Supply	214-824-3001
Tex	El Paso, Midland Specialty	915-533-9555
Tex	Houston, Kent Elctrns.	713-783-9805
Tex	Houston, Solid State Elect.	713-785-5436
Utah	Salt Lake, Kimball Elctrns.	801-328-2075
Va	Arlington, Arlington Elctrns.	703-524-2412
Va	Charlottesville, Virginia Radio	804-296-4186
Wash	Seattle, Interface	206-285-3500
Wash	Seattle, Sterling Elect.	206-762-9100

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Local Sales Offices & Reps.

Cal	Los Altos, Ewing-Foley, Inc.	415-941-4525
Cal	San Diego, F. Nagel Co.	714-298-4850
Md	Severna Park, D. Hughes	301-647-6327
Minn	St. Paul, Countryman Assocs.	612-645-9151

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Sales Manager: D. Pizzo

Local Sales Offices & Reps.

Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	San Diego, F. Nagel	714-298-4850
Colo	Denver, DHS Assocs.	303-831-1424
Md	Severna Pk., D. Hughes	301-647-6327
Minn	St. Paul, Countryman	612-645-9151

GENISCO TECH. CORP., Tape Div., Dept. EM, 18435 Susana Rd., Compton, Cal. 90221, Tel: 213-537-4750, TWX: 910-347-6773; FSC No.: 96682; Empl.: 450

Sales Manager: P.A. Godinez

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs.	205-837-4304
Cal	Sunnyvale, Tech Mktg. Inc.	408-736-3687
Colo	Littleton, Pono Assocs.	303-798-2904
Conn	Newtown, Daner-Hayes	617-969-4650
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Southfield, Electro-Sls. Assoc.	313-424-9075
Mo	St. Louis, PEM Sls. Co.	314-427-7200
NM	Albuquerque, Thorson Co.	505-265-5655
Ohio	Cleveland, Electro-Sls. Assoc.	216-261-5440
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
Pa	Huntingdon Valley, Control Instr. Sls. Co.	215-676-1808
Pa	Pittsburgh, Electro Sls. Assoc.	412-371-9449
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellevue, Tasco	206-453-1414
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

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Sales Manager: F. Schodlbauer

Local Sales Offices & Reps.

Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	Carson, Abco Co.	213-537-5152
Colo	Boulder, R. A. Mayes Co.	303-444-0782
Conn	Newtown, Daner-Hayes	203-426-9094
Iowa	Cedar Rapids, Palatine Engrg.	319-365-8071
Kans	Lenexa, Palatine Engrg.	913-492-7020
Mass	Newton Center, Daner-Hayes	617-969-4650
Minn	Hopkins, Tech Co.	612-941-3919
Mo	St. Louis, Palatine Engrg.	314-426-7055
NM	Albuquerque, R. A. Mayes Co.	505-292-2330
NY	Canandaigua, Daner-Hayes Inc.	716-467-5100
Pa	Huntington Valley, Control Instr. Sls.	215-676-1808
Tex	Houston, R. A. Mayes Co.	713-461-5385
Tex	Richardson, R. A. Mayes Co.	214-235-3043
Utah	Centerville, R.A. Mayes Co.	801-292-6781
Wash	Bellevue, Tasco Inc.	206-453-1414

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Sales Manager: J. Muhleman

Local Sales Offices & Reps.

Ala	Huntsville, Incotech	205-837-6061
Cal	Costa Mesa, FLW	714-751-7512
Fla	St. Petersburg, Russell Assocs.	813-526-2939
Iowa	Cedar Rapids, Palatine Engrg.	319-365-8071
Kans	Andover, Palatine Engrg.	316-683-7512
Kans	Lenexa, Palatine Engrg.	913-492-7020
Minn	Hopkins, F. Peterson	612-941-3919
Mo	St. Louis, Palatine Engrg.	314-426-7055
NY	Buffalo, Russell Assocs.	716-634-3377
Ohio	Columbus, Meas. Instr., Inc.	614-274-1144
Pa	Huntingdon Valley, Control Instr. Sls.	215-676-1808
Tex	Houston, Palatine Engrg.	713-783-1492
Tex	Richardson, Palatine Engrg.	214-231-9489
Wash	Bellevue, Tasco Inc.	206-453-1414

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Local Sales Offices & Reps.

Cal	Irvine	714-540-9830
Cal	Santa Clara	408-985-0662
Ga	Atlanta	404-394-5380
Ill	Chicago	312-992-0800
Md	Gaithersburg	301-948-7071
Mass	Bolton	617-646-0550
NJ	Saddle Brook	212-964-2722
Ohio	Dayton	513-294-1500
Tex	Richardson	214-234-3357

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Cal	Mountain View, Energy Comp.	415-969-0330
Cal	San Diego, Power Assocs.	714-275-0641
Cal	Santa Ana, John Franek Co.	714-832-0290
Colo	Denver, Component Sls.	303-750-2254
Fla	Orlando, Gra-Mar	305-894-3351
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Mass	Lynnfield, Grady & Assocs.	617-334-6633
Minn	Minneapolis, Beta Engrg. Corp.	612-546-2215
NJ	South Orange, Smith Co.	201-763-1770
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Ohio	Dayton, K.R.W. Sls.	513-885-3330
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Ariz	Scottsdale, Piper-Goyne, Inc.	602-946-4437
Cal	Burlingame, W. J. Purdy Co.	415-347-7701
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Cal	El Toro, Vavigon Assoc.	714-581-3121
Cal	San Diego, Col-Rob Elctrns.	714-565-6814
Colo	Littleton, Piper-Goyne, Inc.	303-798-8955
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
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Md	Baltimore, Coulbourn DeGreif	301-247-4646
Mass	Framingham, Stone Comp. Sls.	617-872-1694
Mich	Southfield, Doral Sls. Co.	313-352-1667
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NM	Albuquerque, Piper-Goyne, Inc.	505-265-6794
NY	Syracuse, Nycom, Inc.	315-437-8343
Ohio	Cleveland, KW Elctrns.	216-831-8292
Ohio	Dayton, KW Elctrns.	513-890-2150
Ore	Portland, C. K. Shanks & Assoc.	503-292-5656
Pa	Allsion Park, KW Elctrns.	412-487-4300
Pa	Glenside, Elcom Inc.	215-885-1325
Tenn	Bristol, R.E.M.C.O.	615-968-4195
Tex	Houston, Cummingham Co.	713-461-4197
Tex	Richardson, Cummingham Co.	214-233-4303
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Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, T. Louis Snitzer Co.	714-454-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Colo	Denver, Rope & Williamson	303-758-8507
Conn	Bridgeport, Tech. Instrs.	203-368-4582
Fla	Fort Lauderdale, W.A. Brown Instrs.	305-776-4800
Fla	Indialantic, W. A. Brown Instrs.	305-723-0766
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W. A. Brown Instrs.	904-678-7932
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674

Ill	Des Plaines, Marsland Assocs.	312-775-1309
Ind	Indianapolis, Marsland Assocs.	317-924-3568
La	Gretna, W.A. Brown Instrs.	504-366-5766
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Mo	St. Louis, Harris-Hanson Co.	314-432-3611
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Tex	Dallas, J.A. Green Co.	214-631-7450
Tex	Houston, J.A. Green Co.	713-526-2959
Va	Alexandria, Dyna Rep. Co.	703-354-1222
Wash	Bellevue, N.R. Schultz Co.	206-454-0300

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GHZ DEVICES, INC., Dept. EM, 16 Maple Road, So. Chelmsford, Mass. 01824, Tel: 617-256-8101, TWX: 710-343-0404; Empl.: 66

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Cal	Los Angeles, Thorson Co.	213-937-0790
Cal	Palo Alto, Waldman Assocs.	415-961-4100
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Fla	Orlando, F.M. Assocs., Ltd.	305-851-5716
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Kans	Shawnee, F. Guernsey Co.	913-631-2414
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NY	Tuckahoe, Spectrum Sls. Inc.	914-793-1660
NC	Greensboro, F.M. Assocs. Ltd.	919-294-2754
Ohio	Dayton, K.W. Elctrn. Sls., Inc.	513-890-2150
Tex	Dallas, Thorson Co.	214-233-5744
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Local Sales Offices & Reps.

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Minn	Minneapolis, Control Assemblies	612-544-3364
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Minn	Minneapolis, Nygaard Sls.	612-881-3727
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Cal	Redwood City, Logan Sls.	415-369-6726
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Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-1020
Md	Lanham, L. D. Lowery	301-459-1556
Md	Lutherville, L. D. Lowery	301-823-2172
Mass	E. Longmeadow, Gerber Sls. Co.	413-525-3059
Mass	Waltham, Gerber Sls. Co.	617-890-8040
Minn	Minneapolis, E. C. Electronic Sls.	612-831-0229
Mo	Palatine Sls., Lowell-Kangas Assoc.	314-426-2055
NJ	Teaneck, R. T. Reid Assoc.	201-692-0200
NM	Albuquerque, Straube Assoc./Mt. States	505-265-7759
NY	Rochester, W. H. Zimmermann	716-586-4450
NY	Syracuse, W. H. Zimmermann	315-474-4889
NC	Winston Salem, Electronic Mktg Assoc.	919-722-5151

Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
Ohio	Medina, J. C. Hofstetter Co.	216-241-4880
Ore	Portland, J. J. Backer	503-297-3776
Pa	Broomall, L. D. Lowery	215-528-5170
SC	Greenville, Electronic Mktg. Assoc.	803-268-1125
Tex	Dallas, E. Smith Sls. Co./Mc Coy Assoc.	214-350-9931
Tex	Houston, E. Smith Sls. Co.	713-649-5756
Utah	Salt Lake City, Straube Assoc./Mt. States	801-943-5650
Va	Charlottesville, L. D. Lowery	804-973-6672
Wash	Seattle, J. J. Backer Co.	206-285-1300
Wisc	Milwaukee, D. Dolin Sales	414-355-9100

Local Distributors

Ala	Birmingham, James W. Clary Co.	205-322-2486
Ariz	Phoenix, Micro-Components	602-955-3193
Cal	Los Angeles, Radio Prod Sls Inc.	213-748-1271
Cal	Mountain View, Energy Sls.	415-969-0800
Cal	Mountain View, Abacus Elctrns.	415-961-1500
Colo	Denver, Ratel Elctrns	303-934-5813
Fla	N. Miami, Pro Cam Inc.	305-944-8800
Haw	Honolulu, Hawaiian Pacific Battery Corp.	
Ill	Skokie, Bell Ind.	312-965-7500
Ind	Indianapolis, Ra-Dis-Co.	317-637-5571
La	New Orleans, Wm. B. Allen Supply Co.	504-525-8222
Md	Baltimore, Radio Elect. Svc. Co.	301-823-0070
Md	Beltsville, Radio Elect Svc Co	301-937-5890
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mich	Livonia, R. S. Ectrns	313-525-1155
Minn	Bloomington, Arrow Elctrns. Inc.	612-888-5522
Mo	Kansas City, Burstein-Applebee Co.	816-531-5614
Mo	St. Louis, Olive Ind. Elctrns.	314-863-7800
NJ	Hanover, State Elctrns. Parts Corp.	201-887-2550
NY	Buffalo, Summit Dist. Inc.	716-884-3490
NY	Plainview, Fairmont Elec. Sls. Corp.	516-694-8200
NY	Syracuse, Stewart W. Smith	315-422-0323
NC	Charlotte, Dixie Radio & Supply	704-377-5413
Ohio	Cleveland, Pioneer-Standard	216-587-3600
Ohio	Dayton, Pioneer-Standard	513-236-9900
Ohio	Dayton, Sunray Elctrns. Inc.	513-253-4114
Ohio	Solon, REPCO	216-248-8900
Pa	Drexel Hill, KASS Elctrn. Dist.	215-449-2300
Pa	Hatboro, Henwarr Inc.	215-675-4104
Pa	Philadelphia, Almo Elctrns Corp.	215-676-6000
Pa	Pittsburgh, CAM/RPC Indl. Elctrns.	412-782-3770
RI	Providence, Wm Dandreta Co.	401-861-2800
SC	Columbia, Dixie Radio & Supply	803-779-5332
Tenn	Memphis, Bluff City Dist. Co.	901-725-9500
Tex	Dallas, Solid State Elec. Co. of Tex.	214-352-2601
Tex	Houston, Lenert Co.	713-225-1465
Tex	San Antonio, Sherman Elec. Supp.	512-224-1001
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Va	Arlington, Perrott Engrg. Labs	703-528-5861
Va	Charlottesville, Virginia Radio Supply Co.	804-296-4184
Wash	Seattle, James J. Backer Co.	206-285-1300
Exp:	Tex, El Paso (Mexico), International Elctrns.	915-778-9761
For:	Can., Downsview, Ont., Zentronics Ltd.	416-635-2822
For:	Can., Montreal, PQ, Payette Radio Ltd.	514-878-4771
For:	Can., Ottawa, Ont., Wackid Radio & TV	613-728-1821
For:	Can., Vancouver, BC, RAE Industrial Elec. Ltd.	604-687-2621
For:	Can., Willowdale, Ont., Electro-Sonic Ind. Sls.	416-494-1660

GLOBEMASTER INC., Dept. EM, 9714 Old Katy Rd., Houston, Tex 77055

™**GLO-DOT** - pilot lights - Industrial Devices

GLOWLITE CORP., Sub. ELT, Inc., Dept. EM, Pauls Valley, Okla. 73075, Tel: 405-238-5541, TWX: 910-830-6590; Empl.: 300

Local Sales Offices & Reps.

Cal	Los Altos, ELT, Inc.	415-941-6720
Cal	Santa Ana, A.C. Inds.	714-979-9830
Fla	Lighthouse Point, J. Krutek & Assoc.	305-941-6544
Ill	Northfield, ELT, Inc.	312-441-6650
Ind	Fort Wayne, W.W. Bieberich	219-432-2537
Mass	Canton, Comteck Assoc.	617-828-2948
Mich	Oak Park, W. Spenser Co.	313-398-8005
Minn	Minneapolis, PSI Co.	612-835-1777
NY	Massapequa, R. McGrath	526-798-0400

GLUCO, INC., Dept. EM, Box 336, Monroeville, Pa. 15146, Tel: 412-327-7575; FSC No.: 83508; Empl.: 20

Sales Manager: W. Gluck

™**GLYDER** - 600w sliding light dimmer - Lutron Electronics Co.

GNT AUTOMATIC INC., Dept. EM, 440 Totten Pond Rd., Waltham, Mass 02154, Tel: 617-890-3305

™**GOAT** - mobile transporter - Craig Sys. Corp.

GOE ENGRG. CO., Dept. EM, Box 3485, City of Industry, Calif. 91746, Tel: 213-330-7401; FSC No.: 00866; Empl.: 45

Sales Manager: G.H. Reynolds

Local Sales Offices & Reps.

Cal	Palo Alto, W. W. Tompkins & Co.	415-DA6-7940
Colo	Denver, T. Crump Co.	303-426-1443
Ill	Chicago, Ellinger Sls. Corp.	312-763-1570
NJ	S. Orange, S. Simberkoff Assocs.	201-763-7900
Tex	Arlington, D/FW Sls. Co.	817-461-0681

™**GOL-BOND** - selective gold plating - Braun Co., Inc.

™**GOLD STAR** - TV antenna - Winegard Co.

™**GOLD TOP** - hi temperature batteries - General Elec. Co.

GOODRICH CO. CHEMICAL DIV. BF, Dept. EM, 6100 Oak Tree Blvd., Cleveland, Ohio 44131, Tel: 216-524-0200, TWX: 980-427, 810-427-2660

Sales Manager: P.J. Weaver

Local Sales Offices & Reps.

Cal	Los Angeles	213-386-7436
Ga	Atlanta	404-434-7761
Ill	Oak Brook	312-654-4700
Mass	Wellesley Hills	617-235-8700
Mich	Southfield	313-357-3939
Mo	Kansas City	816-353-6440
NJ	Saddle Brook	201-368-9400
Pa	Fort Washington	215-643-6805

GOODRICH, B.F., Engineered Sys., Dept. EM, 500 S. Main, Akron, Ohio 44318, Tel: 216-379-2000

GOODRICH DIV., Conrac Corp., Dept. EM, 3560 Chicago Dr., Hudsonville, Mich. 49426, Tel: 616-669-1000, Telex: 22-6346; Empl.: 130

™**GOODWIN** - sporting goods - Midland International Corp.

GOODYEAR AEROSPACE CORP., Dept. EM, 1210 Massillon Road, Akron, Ohio 44315, Tel: 216-794-3631, TWX: 810-431-2080; Empl.: 4000

Local Sales Offices & Reps.

Cal	Los Angeles	213-776-5577
DC	Washington	202-331-9500
Fla	Coral Gables	305-446-8124
Fla	Ft. Walton Beach	904-242-4231
Ga	East Point	404-762-9527
Kans	Wichita	316-262-5265
Mo	St. Louis	314-731-1986
NY	Bay Shore	516-666-8200
Ohio	Dayton, Goodyear Aerospace Corp.	513-224-8301
Okla	Tulsa	918-836-5511
Tex	Dallas	214-631-6340
Utah	Clearfield	801-773-3131

GORDON, CLAUD S. CO., Sub. Pneumo Corp., Dept. EM, 5710 Kenosha St., Richmond, Ill. 60071, Tel: 815-678-2211, Telex: 72-2427; Empl.: 200

Local Sales Offices & Reps.

Cal	San Carlos, C. S. Gordon Co.	415-591-7070
Cal	Torrance, C. S. Gordon Co.	213-775-8688
Colo	Denver, J.M.C. Instr.	303-744-7035
Conn	Manchester, C. S. Gordon Co.	203-633-6887
Fla	Ruskin, L. E. Rogers Co.	813-645-1453
Ga	Atlanta, R. Freeman Assocs.	404-261-9065
Ind	Indianapolis, C. S. Gordon Co.	317-547-1057
Kans	Wichita, B. J. Alberts Co.	316-263-4941
La	Baton Rouge, Hahn Sls. Co.	504-356-2596
Mich	Detroit, C.S. Gordon Co.	313-531-7881
NJ	Scotch Plaines, Buck Sls.	201-322-8747
NM	Farmington, J. Neff Co.	505-325-6449
Ohio	Cleveland, C. S. Gordon Co.	216-321-7777
Pa	Norristown, C. S. Gordon Co.	215-546-7255
Pa	Pittsburgh, C. S. Gordon Co.	412-371-2600
SC	Greenville, C.S. Gordon Co.	803-246-7442
Tex	Houston, C. S. Gordon Co.	713-224-2964
Utah	Salt Lake City, Wiscomb-Weidner Co.	801-328-3205
Wash	Seattle, Eustis Co., Inc.	206-623-7060
Wisc	Milwaukee, C. S. Gordon Co.	414-645-2380
Exp:	Westbury, N.Y., C. S. Gordon Export Dept.	516-334-3303

GORDON ENGINEERING CORP., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804, Tel: 203-775-4501; Empl.: 20

Local Sales Offices & Reps.

Ala	Huntsville, B J R Reps.	205-881-3569
Ariz	Phoenix, A. Norton Co.	602-278-6481
Cal	Paramount, Fredric Engrg.	213-531-7676
Cal	San Francisco, C. Tunnell	415-388-5038
Colo	Denver, H. Kaub & Co.	303-399-1520
Conn	Brookfield, L. Najman	203-775-4501
Conn	Ridgefield, Technical Mgr. Co.	203-438-2740
Fla	Clearwater, H.G. Gross Co.	813-446-6649
Ill	Northbrook, McFarland Engrg.	312-272-6246
Ind	Wabash, Richard Scales Assocs.	219-563-4886
Iowa	Des Moines, Deco Engrg.	515-274-9356
Mich	Troy, Morco Corp.	313-585-3910
Mo	Webster Groves, Components & Equip.	314-962-2799
Neb	Omaha, Deco Engrg.	402-341-4836
NY	E. Aurora, H.D. McCleery Assoc.	716-652-1042
NC	Monroe, Price Equip. Co.	704-283-4788
Ohio	Cincinnati, H. C. Jahn	513-521-0172
Ohio	Twinsburg, J. Hubbard & Assoc.	
Pa	Hershey, Niets Assocs.	717-533-3679
Wash	Bellevue, Hickey Engrg. Sls.	206-454-0460
Wisc	Milwaukee, Star Engrg. Sls.	414-543-3469

GORDOS CORP., Dept. EM, 250 Glenwood Ave., Bloomfield, N.J. 07003, Tel: 201-743-6800, TWX: 710-994-4787; Empl.: 600

Local Sales Offices & Reps.

Ariz	Phoenix, Clemick-Neenan & Assoc.	602-279-7649
Cal	Los Angeles, Clemick-Neenan & Assoc.	213-476-1272
Cal	Palo Alto, Engrg. Assocs.	415-326-7842
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Fla	Maitland, Barrett Assocs.	305-678-0172
Ga	Atlanta, Millar Elctrns., Inc.	404-261-6160
Ill	Chicago, Berndt Assocs.	312-283-0713
Ind	Indianapolis, Rockford Controls Co.	317-297-2956
Mass	Braintree, R.F. Duffy Assocs.	617-848-3550
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	St. Louis, Beneke & Mc Caul	314-434-6242
NJ	Cherry Hill, Gordon Co.	609-667-6644
NM	Albuquerque, Waugaman Assocs., Inc.	505-265-4097
NY	Fayetteville, Henry G. Richter Inc.	315-637-6713
NY	Great Neck, F. Tylinski Co.	516-466-9070
NC	Raleigh, Millar Elctrns., Inc.	919-787-9564
Ohio	Cleveland, A.H. Baier Co. & Assoc.	216-461-6161
Ohio	Dayton, A.H. Baier Co. & Assoc.	513-276-4128
Tex	Houston, R. Martin	713-444-2944
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Brookfield, Berndt Assocs.	414-786-6950

Local Distributors

Cal	Inglewood, Time Elctrns.-West	213-649-6900
Cal	Mt. View, Time Elctrns/N. Cal.	415-965-8000
Colo	Denver, Integrated Elctrns.	303-534-6121
Fla	Orlando, Hammond Elctrns.	305-849-6060
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Schaumburg, Control Design	312-882-7232
Md	Bethesela, Empire Elctrnc. Supply Co.	301-656-3300
Mass	Woburn, Time Elctrns.-New England	617-935-8080
Minn	Minneapolis, Control Design	612-721-1628
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NY	Farmingdale, DRW Elctrns. Corp.	516-249-2660
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cleveland, Radio Distributing Co.	216-461-9090
Tex	Dallas, K. A. Elctrn. Sls.	214-634-7870
Tex	Houston, Newark Elctrns.	713-782-4800

GORE, W.L. & ASSOCS., INC., Dept. EM, 555 Paper Mill Rd., Newark, Del. 19711, Tel: 302-738-4880, TWX: 510-666-0825; Empl.: 233

Sales Manager: A. B. Chase

Local Sales Offices & Reps.

Ariz	Flagstaff	602-526-1290
Ariz	Phoenix	602-248-8631
Cal	Mt. View	415-697-8058
Cal	Newport Beach	415-968-3540
Colo	Denver	303-770-8545

Del	Newark	302-738-4880
Ga	Woodstock	404-432-8137
Md	Elkton	301-398-6400
Mass	Wakefield	617-246-1818
Mich	Brighton	313-227-1080
Minn	Bloomington	612-861-1820
NJ	Neshanic Station	201-469-8178
NY	Skaneateles	315-685-3268
Tex	Dallas	214-691-8797

GORMAN-REDLICH MFG. CO., Dept. EM, 6 Curtis St., Athens, Ohio 45701, Tel: 614-593-3150; Empl.: 4

GOTHAM AUDIO CORP., Dept. EM, 741 Washington St., New York, N.Y. 10014, Tel: 212-741-7411, Telex: 12-9269; Empl.: 14

Local Sales Offices & Reps.

Cal	Hollywood, Gotham Audio Corp.	213-874-4444

GOULD

GOULD INC. CONTROL SYS. DIV. ALLIED CONTROL, Dept. EM, P.O. Box 147, Farmington, Conn. 06032, Tel: 203-628-9654, TWX: 710-473-0079; Empl.: 450; Minimum order: $M. Freyermuth p. 3516-3520

Sales Manager: R.E. Brodeur; *Distributor Manager:* M. Freyermuth

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Tempe, Delta Elctrns. Sls.	602-966-9903
Cal	Los Angeles, El-Com Sls.	213-223-1351
Cal	Redwood City, Parks & Pruitt Assoc.	415-364-1640
Colo	Denver, Elctrn. Sls.	303-771-6300
Conn	Cheshire, Selmark Assoc.	203-272-8764
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ga	Atlanta, O'Hara Assocs.	404-237-0600
Ill	Chicago, D. Dolin Sls.	312-286-6200
Kans	Olathe, Technical Representatives	913-782-1177
Md	Bladensburg, Delta III Assoc.	301-779-0977
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Milford, VPI, Inc.	313-643-0506
Minn	Minneapolis, P.S.I.	612-835-1777
NH	Manchester, Selmark Assoc.	603-623-5774
NJ	Wayne, R. Horne Assocs.	201-835-7400
NM	Albuquerque, Cleveland Enterprises	505-266-5594
NY	Ililon, Noeth Honsinger Assoc.	315-894-9943
NC	Burlington, P.J. Nahser Co.	919-226-8053
Ohio	Beachwood, Elctrn. Salesmaster	216-831-9555
Ore	Portland, Frank Jackson Assoc.	503-292-2638
Pa	Pittsburgh, Process Engrg. Co.	412-561-5050
Pa	Willow Grove, B.G.R. Assoc.	215-657-3301
Wash	Seattle, F. Jackson Co.	206-523-6300
Wisc	Milwaukee, D. Dolan Sls.	414-482-1111

Local Distributors

Ala	Huntsville, Cramer/EW	205-539-5722
Ariz	Phoenix, Cramer/Ariz.	602-263-1112
Cal	Los Angeles, El-Com, Inc.	213-223-1351
Cal	San Francisco, Master Distributors	213-829-3017
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Denver, Newark-Denver Elect.	303-757-3351
Conn	Waterbury, Bond Radio	203-757-0546
Fla	Ft. Lauderdale, Peerless Radio	305-566-5966
Ga	Atlanta, Lykes Elctrns.	404-355-2223
Ill	Chicago, Newark Elctrns.	312-638-4411
Ind	Fort Wayne, Fort Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elctrn.	317-634-8486
Kans	Wichita, Radio Supply	316-267-5214
Md	Columbia, Technico, Inc.	301-461-2200
Mass	Newton, Greene-Shaw Co.	617-969-8900
Mass	Newton, Cramer Elctrns.	617-969-7700
Mich	Oak Park, Newark Detroit Elect.	313-548-0250
Minn	Minneapolis, Industrial Comps.	612-831-2666
Mo	Kansas City, LCOMP-Kansas City	816-221-2400
Mo	St. Louis, Interstate Ind.	314-481-6110
NJ	Moonachie, Cramer/N.J.	201-935-5600
NJ	Wayne, Gordon/Horne	201-835-7400
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	Buffalo, Summit Distributing	716-884-3450
NY	Buffalo, Standard Elctrns.	716-685-4220
NY	Hauppauge, Cramer	516-231-5600
NY	Rome, Rome Elctrn.	315-337-5400
NC	Winston-Salem, Kirkman Elect.	919-724-0541
Ohio	Akron, Akron Elctrns.	216-762-8818
Ohio	Dayton, Stotts-Friedman Co.	513-224-1111
Ohio	Wickliffe, Gateway-Megatech	216-944-8565
Okla	Tulsa, Cramer/Tulsa	918-836-3371
Pa	McKeesport, Barno Radio Co.	412-751-5966
Pa	Philadelphia, Philadelphia Elctrns.	215-568-8288
Pa	Pittsburgh, Cam Rpc Ind'l. Elctrns.	412-288-2600
Tenn	Nashville, Electra Distributing	615-329-3971
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	El Paso, Midland Spec. Co.	915-533-9555
Tex	Houston, Geophysical Supply	713-224-0621
Utah	Salt Lake City, Alta-Land Elctrns.	801-486-7227
Va	Arlington, Republic Elctrns.	703-528-3973
Wash	Seattle, Western Elctrns.	206-284-0200
Wisc	Milwaukee, Cramer/Wisc.	414-462-8300

GOULD DATAMETRICS, Dept. EM, 340 Fordham St., Wilmington, Mass. 01887, Tel: 617-658-5410, TWX: 710-347-7672; Empl.: 150

Sales Manager: P. Blaiklock

GOULD INC., Electrical Comps. Div., Dept. EM, 123 Smith St., E. Farmingdale, N.Y. 11735, Tel: 516-694-5400, Telex: 96-1348; Empl.: 400

Sales Manager: R. Dorman

Local Sales Offices & Reps.

Ala	Birmingham, Bishop & Brogdon	205-822-4524
Alas	Anchorage, Rostel Corp.	
Ariz	Phoenix, T. Geiss & Assoc.	602-252-7694
Ark	Little Rock, Percy Williams & Co.	501-663-8069
Cal	Los Angeles, Gould Inc./ECD	213-266-3364
Cal	Sacramento, Gould Inc./ECD	916-371-6953
Colo	Denver, Stemco Sls. Co.	303-355-3573
Fla	Brandon, Gould Inc./ECD	813-685-3471
Fla	Jacksonville, Gould Inc./ECD	904-743-4628
Fla	Miami, Gould Inc./ECD	305-667-9669
Ga	Atlanta, Bishop & Brogdon	404-522-8124
Haw	Honolulu, Sunburst Designs	808-841-2217
Ill	Bellwood, Gould, Inc./ECD	312-547-5900
Ind	Indianapolis, Pfeiffer-Boyle Sls. Co.	317-255-2553
Iowa	Cedar Rapids, A. Sell & Assoc.	319-393-4225
Kans	Kansas City, D. Hatfield Sls. Co.	913-281-0533
Ky	Louisville, Pfeiffer-Boyle Sls. Co.	502-896-9876
La	Metairie, Rapco Assoc. Inc.	504-837-3384
Md	Baltimore, Specialty Elec. Sls. Co.	301-486-8666
Mass	Braintree, B.N. Yanow & Co.	617-848-7300
Mich	Detroit, Popkin-Segall Inc.	313-832-1700
Minn	Minneapolis, Lawless Electrical Sls.	612-925-3663
Miss	Jackson, Rapco Assoc.	601-982-7421
Mo	St. Louis, Cooper Elec. Sls.	314-638-3434
NY	Brooklyn, B. Cooper, Inc.	212-383-1900
NY	Jamaica, Warshaw Elec. Co.	212-525-8150
NY	Syracuse, Elec. Sls. Agents, Inc.	315-437-1676
NC	Charlotte, Gould Inc./ECD	704-554-0287
Ohio	Cleveland, J. Natt & Assoc.	216-526-4200
Okla	Tulsa, Gould Inc./ECD	918-743-4081
Ore	Tigard, Gould Inc./ECD	503-227-4330
Pa	Philadelphia, Specialty Elec. Sls. Co.	800-638-3410
Pa	Pittsburgh, Gould Inc./ECD	412-922-5114
Tenn	Nashville, Matthews & Park, Inc.	615-242-3309
Tex	Dallas, Gould Inc./ECD	214-638-8550
Utah	Salt Lake City, L. Vordos Agency	801-521-2111
Wash	Lynwood, Gould Inc./ECD	206-682-3444
Wisc	Milwaukee, Lawless Elect. Sls.	414-352-4850
Exp:	Pa., Spring House, I-T-E World Trade Corp., Ltd.	215-628-7400

GOULD, INC., Instr. Sys. Div., Dept. EM, 3631 Perkins, Cleveland, Ohio 44114, Tel: 216-361-3315, TWX: 810-421-8580; Empl.: 630 p. 2965

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instr., Inc.	205-883-8660
Cal	Burlingame, Gould Inc., Instr. Sys. Div.	415-697-9345
Cal	El Monte, Gould Inc., Instr. Sys. Div.	213-442-7755
Colo	Denver, Gould Inc., Instr. Sys. Div.	303-758-4922
Conn	Stratford, Gould Inc., Instr. Sys. Div.	203-377-1332
Fla	Ft. Lauderdale, W.A. Brown Instrs.	305-776-4800
Fla	Ft. Walton Beach, W.A. Brown Instrs.	904-678-7932
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674
Ill	Rolling Meadow, Gould Inc., Instr. Sys. Div.	312-640-4000
La	Gretna, W.A. Brown Instrs.	504-626-9701
Md	Lanham, Gould Inc., Instr. Sys. Div.	301-459-7350
Mass	Burlington, Gould Inc., Instr. Sys. Div.	617-272-0750
Mich	Southfield, Gould Inc., Instr. Sys. Div.	313-356-6600
Minn	Minneapolis, Gould Inc., Instr. Sys. Div.	612-452-1500
Mo	St. Louis, Gould Inc., Instr. Sys. Div.	314-878-6110
NJ	Saddle Brook, Gould Inc., Instr. Sys. Div.	201-845-0220
NY	Schenectady, Gould Inc., Instr. Sys. Div.	518-370-1404
NY	Syracuse, Gould Inc., Sys. Div.	716-222-4490
NC	Durham, W. A. Brown Instrs.	919-682-2383
Ohio	Cleveland, Gould Inc., Instr. Sys. Div.	216-361-3315
Ohio	Dayton, Gould Inc., Instr. Sys. Div.	513-433-9586
Pa	Bala Cynwyd, Gould Inc., Instr. Sys. Div.	215-839-7066
Pa	Pittsburgh, Gould Inc., Instr. Sys. Div.	412-931-3660
Tenn	Knoxville, W. A. Brown Instrs.	615-482-5761
Tex	Dallas, Gould Inc., Instr. Sys. Div.	214-241-5131
Tex	Houston, Gould Inc., Instr. Sys. Div.	713-644-3671
Va	Richmond, Gould Inc., Instr. Sys. Div.	604-288-2888
Wash	Bellevue, Gould Inc., Instr. Sys. Div.	206-453-8100

GOULD, INC. INSTR. SYS. DIV. POWER SUPPLY DEPT., Dept. EM, 3631 Perkins Ave., Cleveland, Ohio 44114, Tel: 216-361-3315, TWX: 810-421-8580 p. 3262,3263

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg. Inc.	205-772-9237
Cal	Los Angeles, El-Com, Inc.	213-223-1351
Cal	Mission Viejo, Powerhouse	714-830-5666
Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Colo	Denver, Electronic Sls.	303-771-6300
Fla	Winter Park, Young & Lawrence	305-647-6929
Ga	Atlanta, O'Hara Assocs.	404-237-0600
Ill	Elk Grove Village, Oasis Sls. Corp.	312-640-1850
Kans	Olathe, Technical Reps.	913-782-1177
Md	Bladensburg, Delta III Assocs.	301-779-0977
Mass	Millis, Selmark Assocs.	617-376-2914
Minn	Minneapolis, P.S.I.	612-835-1777
NJ	Haddonfield, TAI Corp.	609-854-3011
NJ	Wayne, R. Horne Assocs.	201-835-7400
NM	Albuquerque, Cleveland Entprs.	505-345-2481
NY	East Syracuse, Noeth Honsinger Assocs.	315-463-5718
NY	Ilion, Noeth Honsinger Assocs.	315-894-9943
NC	Burlington, P.J. Nahser	919-226-8053
NC	Greensboro, D.M.I.	919-885-4634
Ohio	Beachwood, Electronic Salesmasters	216-831-9555
Pa	Pittsburgh, Automated Equip. & Engrg.	412-931-7616
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Wash	Seattle, F. Jackson Assocs.	206-523-6300

GOULD INC., Ind'l. Battery Div., Dept. EM, 2050 Cabot Blvd. W., Langhorne, PA. 19047, Tel: 215-752-0555, TWX: 510-667-2056

Local Sales Offices & Reps.

Ala	Birmingham, C. S. Phillips & Son	205-870-0640
Cal	Paramount, Gould Inc., Ind'l Battery Div.	213-531-7661
Fla	Maitland, Rowe Engrg Sls.	305-834-2700
Ind	Indianapolis, Cory, Crum & English	317-545-8593
Mass	Brimfield, E. L. Flowers & Sons	413-245-7922
Mich	Dearborn, D. P. Seyfried Co.	313-274-4900
Mo	Kansas City, Cleaves-Bessmer-Marietti	816-353-6011
Mo	St. Louis, Electrorep	314-872-7300
Neb	Omaha, F. C. Clatterbaugh Co.	402-333-1600
NJ	Saddle Brook, Gould Inc., Ind'l Battery Div.	201-845-0220
NJ	Upper Montclair, R. Cunningham & Assocs.	201-783-4647
NY	Grand Island, Gould Inc., Ind'l Battery Div.	716-773-7568
NC	Charlotte, Gould Inc., Ind'l Battery Div.	704-376-1817
NC	Charlotte, W. Chapman & Co.	704-525-2421
Ohio	Middleburg Heights, Gould Inc., Ind'l Battery Div.	216-433-1330
Pa	Conshohocken, Electircal Distrs. Co.	215-825-1305
RI	Pittsburgh, Waggoner-Ver Hill Assocs.	412-241-5202
Tex	Dallas, Gettys-Eads-Adair	214-233-0337
Tex	Houston, Gettys-Eads-Adair	713-781-3005

Va	Arlington, COMPower	703-528-5393
Wisc	Milwaukee, Kirchmayer-Seidel Co.	414-462-3512

GOULD, INC., Measurement Sys. Div., Dept. EM, 2230 Statham Blvd., Oxnard, Cal. 93030, Tel: 805-487-8511, Telex: 65-9223; Empl.: 660

Local Sales Offices & Reps.

Ala	Anchorage, Engrd. Equip. Co.	907-277-7924
Cal	Walnut Creek, Vi-King Instr. Co.	415-933-1221
Colo	Lakewood, Intermountain Instr.	303-237-0443
Fla	Winter Park, Gould Inc., Measurement Sys. Div.	305-644-0632
Ill	Park Ridge, Fluid Equip. Assocs.	312-692-6988
La	Baton Rouge, Strander-Allen Corp.	504-357-7828
La	Harvey, Strander Corp.	504-367-4389
Minn	Minneapolis, Waytek Inc.	612-933-2133
NJ	Saddle Brook, Gould Inc., Measurement Sys. Div.	201-845-0220
NM	Albuquerque, Telemetry Sls. Corp.	505-266-7861
Ohio	Cleveland, WKM Assocs., Inc.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Tulsa, Lucas Controls	918-749-6491
Ore	Portland, Branom Instr. Co.	503-285-9861
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Tex	Dallas, Synthetics Inc.	214-631-1740
Tex	Dallas, Gould Inc., Measurement Sys. Div.	214-358-4871
Tex	Houston, AWC	713-488-2730
Tex	Odessa, Control Devices	915-332-0813
Tex	Richardson, P.J. Scanlon Co.	214-231-4661
Utah	Salt Lake City, Process Instrs. & Controls	801-487-9896
Wash	Seattle, Branom Instr. Co.	206-762-6050

GOULD, INC., Portable Battery Div., Dept. EM, 931 Vandalia, St. Paul, Minn. 55114, Tel: 612-645-8531, 800-328-9146, Telex: 29-7086

Sales Manager: B.S. Huret; *Distributor Manager:* R. Degel

GOULD/TRUMP-ROSS, Dept. EM, 340 Fordham Road, Wilmington, Mass. 01887, Tel: 617-658-5410, TWX: 710-347-7672; Empl.: 55

Sales Manager: P. Lajoie

Local Sales Offices & Reps.

Cal	Benicia, Drive Sys. Tech., Inc.	707-745-5117
Cal	Encino, King-Way Associates	213-788-4124
Colo	Littleton, Radco Electronics	303-794-4279
Ill	Chicago, United Energy Sys. Inc.	312-631-0255
Mass	Waltham, J. W. Simpson Co.	617-899-7700
Mich	Royal Oak, Dave Ray & Associates	313-576-4705
NJ	Randolph, Elctrn. Drives & Controls	201-895-2010
NY	Clark Mills, KLM Assocs.	315-853-6126
NY	Rochester, KLM Assocs.	716-442-0820
NY	Syracuse, KLM Assocs.	315-458-6214
NC	Winston-Salem, Radco Co.	919-722-9671
Ohio	Chagrin Falls, J. Kilroy Corp.	216-247-8997
Pa	Harleysville, T. Jackson Assocs.	215-643-5560
Tex	Dallas, Concept Sls.	214-241-5202
Wash	Bellevue, Al Smith Co.	206-746-6770

GOW-MAC INSTR. CO., Dept. EM, 100 Kings Rd., Madison, N.J. 07940, Tel: 201-377-3450, Telex: 136-331; Empl.: 45

Sales Manager: R.J. Mathieu

GOWANDA ELECTRONICS CORP., Dept. EM, 179 Broadway Rd., Gowanda, N.Y. 14070, Tel: 716-532-2236, TWX: 710-529-1211; FSC No.: 24226; Empl.: 200

Local Sales Offices & Reps.

Cal	Redwood City, Parks & Pruitt Assocs.	315-364-1640
Cal	Van Nuys, W.J. Barron Co.	213-780-0509
Colo	Golden, J.F. Hurlbut Co.	303-279-7138
Ill	Chicago, W.F. Hamilton Co.	312-545-7576
Iowa	Cedar Rapids, Snider Sls. Co.	319-362-4410
Mass	Reading, Lincoln Assocs.	617-944-9020
Minn	Minneapolis, Technical Assoc.	612-929-6721
Mo	St. Louis, Beneke & McCaul	314-434-6242
NJ	Medford, Mech Elec Sls. Co.	609-654-8209
NY	Plainview, R. Smith Assoc.	516-681-3155
NY	Syracuse, Naylor Elec. Co.	315-472-9138
NC	Greensboro, L & D	919-292-3201
Ohio	Cleveland, Geotronix Mktg. Assocs.	216-238-8520
Tex	Dallas, SEI (Southwest Elctrns. Ind.)	214-690-9881
Wash	Olympia, Bergford and Assocs.	206-943-6664

Local Distributors

Cal	San Leandro, KEA Electrn. Dist. Co.	415-352-2277
NY	Farmingdale, Broadline Electrns	516-420-8320

™GOZINTA - tuner cleaner tool - Workman Electronic Prods., Inc.

™GP/DUROID - Fiber-elastomer materials - Rogers Corp.

GPS CORP., Dept. EM, 14 Burr St, Framingham, Mass. 01701, Tel: 617-875-0607; Empl.: 25

™GP-612 - digital printer - Gulton Inds., Inc.

GRACE, W.R. & CO., Davison Chemical Div., Dept. EM, 4000 N. Hawthorne St., Chattanooga, Tenn. 37406, Tel: 615-698-3461

GRADO LABS., INC., Dept. EM, 4614 Seventh Ave., Brooklyn, N.Y. 11220, Tel: 212-435-5340

Local Sales Offices & Reps.

Cal	North Hollywood, J.W. Steinberg Co.	213-982-6700
Cal	San Francisco, Meyer, Ross Co.	415-864-8880
Conn	W. Hartford, R. Smith Co.	203-523-0512
Fla	Orlando, J. Perfito	305-273-9216
Ga	Tucker, Audio Sls.	404-938-7108
Ill	Chicago, T. Pappas & Assocs.	312-685-2338
Mich	Ypsilanti, Sound Sls	313-482-0808
Minn	Willmar, More Sls., Inc.	612-235-0034
NY	Thiells, R.M. Nader Sls Corp.	914-429-5124
Ohio	Medina, J.H. Podolny Co.	216-725-8814
Okla	Norman, L. Bernstein	405-321-3205
Ore	Portland, Harris Representatives N.W.	503-223-4929
Pa	Willow Grove, Estersohn Assocs.	215-657-1414
Utah	Salt Lake City, Partridge Elctrns Sls	801-943-0127
Exp:	N.Y., Plainview, Delrama Int'l.	516-293-8740

™GRAHAM - vacuum thermal converters - Barker Elec. Sls.

™GRALEX - digital panel meters - General Microwave Corp.

GRALEX INDS., Div. Gen. Microwave, Dept. EM, 155 Marine St., Farmingdale, N.Y. 11735, Tel: 516-694-3600, TWX: 510-224-6406; FSC No.: 11332; Empl.: 25 .... p. 2867

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	Hawthorne, Bernard & Assoc.	213-973-5050
Cal	Mt. View, Leddy Assoc.	415-969-6313
Colo	Littleton, Barron Farquhar Co.	303-979-4591
Conn	Newtown, Daner Hayes	203-426-9094
DC	Washington, H. Wise Co.	202-363-9417
Fla	Clearwater, Brennan	813-446-5006
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ind	Fort Wayne, Scott Elctrns.	219-743-1586
Ind	Indianapolis, Scott Elctrns.	317-897-9976
Mass	Newton Centre, Daner-Hayes, Inc.	
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	Minneapolis, L.F. Green & Assoc.	612-781-1611
Mo	Lake Lotawana, Lotronics	816-578-4498
NY	Huntington, C.R. Mayer Assoc.	516-921-7876
NY	Rochester, Daner Hayes	716-467-5100
Ohio	Cleveland, Scott Elctrns. Inc.	216-291-2600
Ohio	Columbus, Scott Elctrns.	614-236-8619
Ohio	Dayton, Scott Elctrns.	513-294-0539
Pa	Audubon, Daner-Hayes	215-666-5005
Pa	Pittsburgh, Scott Elctrns.	412-781-3112
Tex	Dallas, John B. Guenther	214-691-8500
Tex	Houston, John B. Guenther	713-468-0232

Local Distributors

Cal	Santa Clara, Dynametron	408-246-6535
Tex	Houston, Meters & Instrs.	713-644-1631

™GRAND SLAM - computer printing on 8½"x11" paper - Potter Instr. Co. Inc.

GRAND TRANSFORMERS, Dept. EM, Box 188, Grand Haven, Mich. 49417, Tel: 616-842-5430; Empl.: 175

Local Sales Offices & Reps.

Cal	San Gabriel, Van Gott & Assocs.	
Fla	Orlando, Buchanan & Abrams Assocs.	
Ill	Streamwood, A Holte & Assocs.	312-837-4066
Mich	Grand Rapids, R. Van Riper Sls.	616-452-0464
NY	Floral Park, MOS Assocs.	516-694-5923
Ohio	Cleveland, D. Steffen & Assocs.	216-261-5055
Pa	Ardmore, Rothenheber & Wurts, Inc.	215-642-6911
Tex	Dallas, W.T. Blackburn Assocs.	214-351-9991

GRANT HARDWARE CO., Div. Buildex Inc., Dept. EM, 525 High St., W. Nyack, N.Y. 10994, Tel: 914-EL8-4400, TWX: 914-358-3541; FSC No.: 83508; Empl.: 300

Local Sales Offices & Reps.

Cal	Anaheim, Cen-Tec Sls. Corp.	714-991-4440
Cal	Menlo Park, The McKnight Co.	415-325-2844
Cal	So El Monte, Grant Hardware Co.	213-686-2110
Colo	Denver, Camel Ectrns Inc	303-757-6191
Fla	Ft. Lauderdale, Electro-Comp Assocs.	305-564-8571
Ill	Des Plaines, Lincoln, Hodges & Associates	312-297-3810
Kans	Overland Park, J. Singer	913-381-3684
Mass	Lexington, E.F. Del Fino Co.	617-862-1118
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Minn	St. Paul, R. G. Ragon, Inc.	612-488-0201
NJ	Ridgefield, M - D Industries	201-941-3113
NY	Jericho, HRC Comptech	516-822-5550
NY	Liverpool, Vertex Corp.	315-622-3060
NY	Syracuse, Vertex Corp.	315-458-2223
NC	Charlotte, J Corn Assocs.	704-527-0991
Ohio	Cincinnati, Tri State Mktg. Inc.	513-761-7993
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Pa	Monroeville, Carter McCormic & Peirce	412-472-4415
Tex	Dallas, Blackburn Associates	214-692-8885
Wisc	Waukesha, Lincoln, Hodges & Assoc	414-542-3087

™GRANULATOR - grinding mill - Allis-Chalmers

™GRAPHALLAST - submerged bearing - Graphite Metallizing Corp.

™GRAPHALLOY - bearing, elec brush, or contact - Graphite Metallizing Corp.

GRAPHIC CONTROLS CORP., Recording Chart Div., Dept. EM, 189 Van Rensselaer St., Buffalo, N.Y. 14210, Tel: 716-853-7500, Telex: 9-1306; Empl.: 600; Minimum order: $A.J. Amelotte

Sales Manager: C.J. Evans; *Distributor Manager:* A.J. Amelotte

Local Sales Offices & Reps.

Ala	Phoenix	602-996-4851
Cal	Canoga Park	213-347-8621
Cal	Santa Clara	408-241-9960
Colo	Denver	303-573-0620
Conn	Windsor	203-688-8501
Ga	Atlanta	404-451-4738
Haw	Honolulu	808-531-3161
Ill	Barrington	312-381-6540
Mich	Farmington	313-851-6340
NY	Buffalo	716-847-7560
NY	Rochester	716-586-2910
Ohio	Akron	216-253-7910
Ohio	Cincinnati	513-385-1476
Ohio	Cleveland	216-531-8993
Ohio	Columbus	614-221-2040
Okla	Tulsa	918-622-3444
Ore	Portland	503-297-2672
Pa	Frazer	215-647-6565
Pa	Pittsburgh	412-281-7717
Tex	Houston	713-781-9870
Tex	Richardson	214-235-1237
Vt	Murray	801-262-5211
Wash	Bellevue	206-455-1755

GRAPHIC SYSTEMS, Dept. EM, 925 Danville Rd., DL-10, Yanceyville, N.C. 27379

™GRAPHILM - lubricant to 1000°F - Graphite Metallizing Corp.

GRAPHITE METALLIZING CORP., Dept. EM, 1036 Nepperhan Ave., Yonkers, N.Y. 10702, Tel: 914-968-8400, Telex: 13-1571; Empl.: 165 p. 3082,3083

™GRAPHLON - submerged bearing - Graphite Metallizing Corp.

™GRAPHMETEX - insulating material - Graphite Metallizing Corp.

™GRAPHWARE - graphic software - Varian Graphics

™GRATE-KILN - kiln processing system - Allis-Chalmers

Ⓣⓜ GRAVEL MACHINES - marking machines - Eastern Marking Machine Corp.

Ⓣⓜ GRAVITAIN - filter element - Pall Trinity Micro Corp.

GRAYHILL INC., Dept. EM, 569 Hillgrove Ave., LaGrange, Ill. 60525, Tel: 312-354-1040, TWX: 910-683-1850; FSC No.: 5930; Empl.: 350 p. 1841,3521,4074-4092,4668

Local Sales Offices & Reps.

Ala	Huntsville, Rep, Inc	205-881-9270
Ariz	Phoenix, Mercury Engineering Sls. Inc.	602-279-2367
Cal	Garden Grove, Impact Elctrns.	714-893-8551
Cal	Los Altos, Nickerson-Gray Assoc.	415-941-5777
Cal	San Diego, Earle Assocs	714-278-5441
Colo	Denver, Lindberg Co.	303-758-9033
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ga	Atlanta, Rep, Inc.	404-938-4358
Ill	Hinsdale, Hill-Gray Assoc.	312-325-4810
Ind	Ft. Wayne, Menze Sls.	219-747-5616
Iowa	Cedar Rapids, Reid Assoc.	319-362-6302
Kans	Overland Park, P.M.A. Corp.	913-381-0004
Md	Woodbine, Naudain Assoc.	301-442-2270
Md	Woodbine, Naudain Assocs Southern	301-442-2270
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mich	Troy, C.B. Jensen & Assoc.	313-643-0506
Minn	St. Paul, Northport Engrg. Inc.	612-698-3841
Mo	Hazelwood, P.M.A. Corp.	314-569-1220
NJ	Mount Laurel, Naudain Assoc.	609-235-1801
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	Ithaca, B. Dean Inc.	607-272-2187
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
Ohio	Cleveland, A.H. Baier Co. & Assoc.	216-461-6161
Ohio	Dayton, A.H. Baier Co. & Assoc.	513-276-4128
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Tenn	Jefferson City, Rep Inc.	615-475-4103
Tex	Ft. Worth, W.P. Fralia Co.	817-640-9101
Tex	Houston, W.P. Fralia Co.	713-772-1572
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, Seatronics, Inc.	206-767-4330

Local Distributors

Ala	Huntsville, Powell Elctrns	205-539-2731
Ariz	Phoenix, Kachina Elctrns	602-269-6201
Ariz	Phoenix, Mirco Elctrns	602-997-5931
Cal	Los Angeles, Electric Switches	213-660-1310
Cal	Mountain View, Powell Elctrns	415-964-0820
Cal	Riverside, Electronic Supply	714-683-7300
Cal	Santa Clara, Fisher Switches	408-244-6182
Cal	Sun Valley, Richey Elctrns	213-875-2862
Colo	Denver, Electronic Parts	303-744-1992
Conn	Wallingford, Midan Elctrns	203-265-2077
Fla	Oakland Park, Peerless Radio	305-566-5966
Ga	Miami Springs, Powell Elctrns	305-592-3260
Ill	Broadview, L'Comp - Chicago	312-865-7600
Ill	Northbrook, Classic Comp Supply	312-272-9650
Ind	Evansville, Hutch & Son	812-425-7201
Iowa	Cedar Rapids, Deeco Inc.	319-365-7551
Kans	Wichita, Radio Supply	316-267-5214
Md	Beltsville, Powell Elctrns	301-937-4030
Md	Gaithersburg, Pioneer/Wash	301-948-0710
Mass	Boston, Sager	617-542-2281
Mass	Worcester, R M Elctrns	617-756-8311
Mich	Livonia, Pioneer/Mich	313-525-1800
Mich	Livonia, R.S. Elctrns	313-525-1155
Minn	St. Paul, Gopher Elctrns	612-645-0241
Mo	Kansas City, Walters Radio	816-531-7015
Mo	Kansas City, L'Comp - Kansas City	816-221-2400
Mo	St. Louis, L'Comp - St. Louis	314-647-5505
Nev	Lincoln, Scott Elctrns	402-466-8221
NJ	East Hanover, State Elec.	201-887-2550
NM	Albuquerque, Walker Radio	505-247-2288
NY	Binghamton, A.S.I. Elctrns	607-723-6326
NY	Bohemia, Car-Lac	516-567-4200
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Vestal, Harvey/Federal	607-748-8211
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Columbus, Hughes-Peters Inc	614-294-5351
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Okla	Oklahoma City, Electro Enterprises	405-478-1752
Ore	Portland, United Radio	503-233-5346
Pa	Erie, Mace Elctrns.	814-838-3517
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Pa	Philadelphia, Almo Elctrns.	215-698-4000
RI	Warwick, W.H. Edwards	401-781-8000
Tex	Dallas, Solid State	
Tex	Houston, Kent Elctrns.	713-780-7770
Tex	Houston, Harrison Equip	713-652-4700
Utah	Salt Lake City, Standard Supply	801-486-3371
Va	Richmond, Meridian	804-359-0221
Wash	Seattle, Interface Elctrns	206-285-3500
Wisc	Milwaukee, Marsh Elctrns	414-475-6000

GREAT WESTERN AVIATION, See GWA Electronics, Inc.

Ⓣⓜ GREAT OUTDOORS - camp & patio lanterns - Teledyne Big Beam

Ⓣⓜ GREENCAPS - low cost capacitors - Radio Materials Co.

GREENLEE TOOL CO., Dept. EM, 2136-12th St., Rockford, Ill. 61101, Tel: 815-963-4881; Empl.: 1200

Local Sales Offices & Reps.

Cal	Monterey Park	213-721-1147
Ga	Atlanta	404-448-6121
NY	Long Island City	212-392-3414
Wisc	Milwaukee	414-481-5768
Exp:	Fla., Coral Gables	305-667-7496

Ⓣⓜ GREENLINE (FINCO) - MATV & components - Finney Co.

Ⓣⓜ GREEN PEAK CELL - silicon cell peaks at 555 nm. - Sensor Technology

GRI

GREENRAY INDS., INC., Dept. EM, 840 W. Church Rd., Mechanicsburg, Pa. 17055, Tel: 717-766-0223, TWX: 510-650-4939; FSC No.: 16681; Empl.: 60 p. 2440

Sales Manager: G. R. Kurzenknabe

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
Ariz	Tempe, Sedco Sales	602-968-7791
Cal	Los Angeles, Cain Technology	213-476-2251
Cal	Mountain View, Weil & Disman Assocs.	415-965-4300
Colo	Boulder, H. Bass Assocs.	303-499-7509
DC	Washington, Hayden Assocs.	202-296-6059
Fla	Fort Lauderdale, Beacon Elctrns.	305-971-7320
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Wauconda, Cudahy Sls.	312-526-2484
Mass	Reading, Geder Assoc.	617-944-3105
Mich	Grand Rapids, Thies & Assocs.	616-245-0319
NM	Albuquerque, Trembly Assocs.	505-293-4444
NY	Huntington, Andrews & Andrews, Inc.	516-692-8686
NY	Pittsford, RJC Assocs.	716-385-2770
Ohio	Dayton, F. Ohmer Assoc.	513-434-1454
Pa	Glenside, R. F. Koebert & Assocs.	215-887-2310
Pa	McMurray, WDR Entpr.	412-941-7442
SC	Spartanburg, Beacon Elctrns. Assocs.	803-582-4613
Tex	Garland, Vector Sls. Co.	214-276-4518
Wash	Redmond, Barrett Sls. Northwest, Ltd.	206-885-6991
Exp:	Pa., Lemoyne, Elctrns. Int'l.	717-737-8858

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GREGG ELECTRIC INC., Electronics Div., Dept. EM, 608 W. Emporia, Ontario, Cal. 91761, Tel: 714-983-1794; FSC No.: 53014; Empl.: 8

Local Sales Offices & Reps.

Cal	Burlingame, Leddy Assocs.	415-347-5247
Cal	Van Nuys, Gordon-Elliott	213-873-6862
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Meriden, Abbot-Allison Co.	203-237-9232
Ill	Addison, R. Edward Stemm Inc.	312-279-2440
Ohio	Centerville, McShane Inc.	513-435-3530
Ohio	Medina, McShane Inc.	216-725-4568
Pa	Birchrunville, JADElectronic Assocs.	215-647-5151
Tex	Dallas, R. W. Mureen Co.	214-369-7561

GREIBACH INSTR. DIV., Electrical Inst. Svc., Inc., Dept. EM, 25 Dock St., Mt Vernon, N.Y. 10550, Tel: 914-699-9717; FSC No.: 32590; Empl.: 35

Local Sales Offices & Reps.

Cal	Laguna Hills, English Sls. Assocs.	714-495-6489
Cal	Lawndale, English Sls. Assocs.	213-772-7272
Cal	San Diego, English Sls. Assocs.	714-462-4391
Ill	Skokie, Saffro & Assocs.	312-588-0905
Minn	Minneapolis, Heimann Co.	612-861-6051
NY	Buffalo, R.F. Lamb Co.	716-874-4900
NY	Rochester, R.F. Lamb Co.	716-544-5580
NY	Schenectady, R.F. Lamb Co.	518-393-4844
NY	Syracuse, R.F. Lamb Co.	315-454-2469
Wisc	Lake Mills, Saffro & Assocs.	414-648-2605

Advertisement
GREIBACH INSTRUMENTS
Complete line of bifilar suspension analog meters - AC-DC True RMS current meters from 25 uA to 100 A., voltmeters from 30 mV to 1500 V.; AC Wattmeters - 10 mV to 100 KW.; DC Ammeters from 50 Nanoamperes to 100 A.; DC Voltmeters from 1 mV to 1000 V.

GRI COMPUTER CORP., Dept. EM, 320 Needham St., Newton, Ma. 02164

GRIDCRAFT, INC., Dept. EM, 14520 Lima Rd., Fort Wayne, Ind 46808, Tel: 219-637-3141; Empl.: 60

Sales Manager: T.J. Martin

Local Sales Offices & Reps.

Ill	Chicago, Rinaldi	312-763-4848
Ind	Columbus, J. Weaver Co.	812-372-3625
Ky	Lexington, Carter Brown	606-254-4560
Mich	Grand Rapids, R.P. Urban & Assocs.	616-245-0511
Mo	St. Louis, Kebco	314-569-2660
NY	Clark Mills, KLM Assocs.	315-853-6126
Ohio	Loudonville, Arndt Engr. Sls.	419-994-3990
Wisc	Oconomowoc, Sales Assocs.	414-567-8482

GRIES REPRODUCER CO., Div. Coats & Clark Inc., Dept. EM, 162 Beechwood Ave., New Rochelle, N.Y. 10801, Tel: 914-633-8600, TWX: 914-235-2188; Empl.: 600

Local Sales Offices & Reps.

Ariz	Scottsdale, Carter Assoc.	602-947-4355
Cal	B. A. Dixon, B. A. Nixon Co.	213-268-2661
Cal	San Ramon, Leaf Lyons & Assoc.	415-592-6804
Cal	Santa Ana, M. Leverso	714-581-6184
Conn	Manchester, P. Broussard	203-646-5636
Fla	Ft. Lauderdale, Tropi-Tec Co.	305-463-0988
Ill	Hinsdale, D. J. Galinski	312-986-1990

Kans	Lenexa, Palatine Sls.	913-492-7020
La	Shreveport, J.A. Huddleston	318-686-0401
Mich	No. Muskegon, Stank Co.	616-744-1814
Mich	Warren, Stank Co.	313-573-4920
Minn	Minneapolis, Crum Co.	612-824-5394
NY	Glen Cove, P. Dollin	516-671-3097
NC	Charlotte, B. De Stefani	704-375-3978
Ohio	Dayton, C. T. Peterson	513-434-6665
Pa	King of Prussia, R.J. Cimperman	215-265-5388
Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Seattle, R. R. Slater	206-622-2552
Wisc	Elm Grove, W. J. Peters	414-786-7180

GRIFFITHS ELECTRONICS INC., Dept. EM, Box 12007, Jacksonville, Fla 32209

GRINNELL SYSTEMS CORP., Dept. EM, 2986 Scott Blvd., Santa Clara, Cal. 95050, Tel: 408-988-2100

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Instrs.	205-883-8660
Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Anaheim, Moxon Elctrns.	714-635-7600
Cal	San Diego, Moxon Elctrns.	714-292-4820
Cal	Santa Clara, Moxon Elctrns.	408-249-2491
Colo	Aurora, BFA Corp.	303-344-3800
Fla	Ft. Lauderdale, W. A. Brown Instrs.	305-776-4800
Fla	Indialantic, W. A. Brown Instrs.	305-723-0766
Fla	Orlando, W. A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W. A. Brown Instrs.	904-678-7932
Ga	Atlanta, W. A. Brown Instrs.	404-939-1674
Ind	Munster, Bexdata Ltd.	312-221-1411
La	Gretna, W. A. Brown Instrs.	504-366-5766
Mass	Cambridge, Media Sys.	617-661-9424
Mich	Detroit, Dietrich & Assocs.	313-961-4540
Minn	Edina, Bexdata Ltd.	612-835-5220
Mo	St. Louis, Bexdata Ltd.	314-872-3357
NM	Albuquerque, B F A Corp.	505-292-1212
NM	Las Cruces, B F A Corp.	505-523-0601
NC	Durham, W. A. Brown Instrs.	919-682-2383
Ohio	Cleveland, Dietrich & Assocs.	216-781-1855
Ohio	Dayton, Dietrich & Assocs.	513-223-6042
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
SC	Columbia, W. A. Brown Instrs.	803-798-3297
Tenn	Knoxville, W. A. Brown Instrs.	615-690-3281
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Utah	Salt Lake City, B F A Corp.	801-466-6522
Va	Culpeper, Graphic Display Reps.	703-825-3085
Wash	Seattle, Northwest Inds.	206-725-1400
Exp:	Mass., Cambridge, Techexport, Inc.	617-661-9424

GRISBY-BARTON, INC., See Gordos Corp.

(TM)GRIPEZE (R) - Magnet Wire - Phelps Dodge Magnet Wire Co.

(TM)GRIPLET CONNECTOR - terminal - Berg Electronics

(TM)GRIPRING - rings, retaining - Waldes Kohinoor, Inc.

(TM)GRIPWELL - lever-latch handle - Hartwell Corp.

GRM CORP., Dept. EM, Box 337, Medford, N.J. 08055, Tel: 609-267-7950; FSC No.: 21870; Empl.: 100
p. 1466,1467

Sales Manager: T.A. McGarrity

(TM)GROMMES - hi fi & stereo components public address & sound equipment - Precision Electronics, Inc.

(TM)GROMMET STRIP - continuous strip grommeting - Electrovert

(TM)GROMSTRIP - extruded channel - ICO/Rally Corp.

(TM)GROUNDAMATIC - outlets - Leviton Mfg. Co., Inc.

GROVER PHOTO PRODS., Dept. EM, 341 Arden Ave., Glendale, Cal. 91203, Tel: 213-245-4400; Empl.: 4

GRYCZUK ELECTRONICS, see GECO, Inc.

(TM)GR874R - coaxial components - Gen Rad

(TM)GR900 - precision coaxial components - Gen Rad

GTE AUTOMATIC ELECTRIC INC., Dept. EM, 400 N. Wolf Rd., Northlake, Ill. 60164, Tel: 312-562-7100, TWX: 910-226-1975; FSC No.: Multiple; Empl.: 12,000

Local Sales Offices & Reps.

Cal	Burlingame	415-697-6400
Cal	North Hollywood	213-766-5203
Cal	San Diego	714-283-2095
Conn	Stamford	203-329-0981
Ga	Atlanta	404-261-7441
Mass	Newton	617-965-3770
Mich	Detroit	313-538-6040
Minn	Minneapolis	612-835-4222
Mo	Kansas City	816-241-4760
NY	Albany	518-438-3511
Ohio	Cleveland	216-884-0955
Ohio	Dayton	513-299-6481
Pa	Haverford	215-265-1717
Va	Falls Church	703-533-0636

GTE LENKURT INC., Dept. EM, 1105 County Rd., San Carlos, Cal. 94070, Tel: 415-591-8461, TWX: 910-376-4396; Empl.: 4000

Sales Manager: D. Webster

Local Sales Offices & Reps.

Ga	Atlanta	404-261-8282
Ill	Arlington Hgts.	312-398-6700
Tex	Dallas	214-363-0286
Va	Falls Church	703-533-3344

GTE SYLVANIA, INC., W.M. Chace Co., Dept. EM, 1600 Beard Ave., Detroit, Mich. 48209, Tel: 313-842-7400; Empl.: 260

Sales Manager: J.W. Sullivan

GTE SYLVANIA, INC., Chem. & Metallurgical Div., Dept. EM, Towanda, Pa. 18848, Tel: 717-265-2121; Empl.: 1400

Sales Manager: J.F. Barnyak

Local Sales Offices & Reps.

Cal	Burlingame	415-697-3500
Conn	Hartford	203-246-0608
Ill	Elk Grove Village	312-593-3400
Mass	Danvers	617-777-1900
Mich	Dearborn	313-582-8754
NJ	Teterboro	201-288-9484
NY	Camillus	315-672-3111
NC	Charlotte	704-334-4671
Ohio	Dayton	513-223-6227
Pa	Philadelphia	215-477-5000
Pa	Pittsburgh	412-531-4975
Tex	Dallas	214-239-8171

GTE SYLVANIA, Circuit Module Oper., Elctrn. Comps. Grp., Dept. EM, Box 360, Muncy, Pa. 17756, Tel: 717-546-3191; Empl.: 395

Local Sales Offices & Reps.

Md	Phoenix	301-628-2330
Mass	Danvers	617-777-1900
NJ	Teterboro	201-288-9484

GTE SYLVANIA INC., Wilbur B. Driver Sub., Dept. EM, 1875 McCarter Hwy., Newark, N.J. 07104, Tel: 201-481-3110; Empl.: 637

Sales Manager: W.R. Brady

Local Sales Offices & Reps.

Cal	Los Angeles	213-478-4021
Conn	West Hartford	203-233-4047
Ill	Elk Grove Village	312-593-3400
NJ	Teterboro	201-288-9484
NC	Charlotte	704-375-8568
SC	Orangeburg	803-534-6910

GTE SYLVANIA INC., Elctrn. Comps. Grp., Dept. EM, 100 First Ave., Waltham, Mass. 02154, Tel: 617-890-9200; Empl.: 4213; Minimum order: $E. H. Frost

Sales Manager: D.R. Kronenwetter; *Distributor Manager:* E. H. Frost

Local Sales Offices & Reps.

Cal	Burlingame	415-697-3500
Cal	Los Angeles	213-726-1666
Ga	Atlanta	404-762-1781
Ill	Elk Grove Village	312-593-3400
Mass	Danvers	617-777-1900
NJ	Teterboro	201-288-9484
Ohio	Cleveland	216-267-6800
Tex	Dallas	214-239-8171

GTE SYLVANIA INC., Elctrn. Sys. Gp., Dept. EM, 1800 N. Kent St., Washington, D.C. 22209, Tel: 703-841-9020; Empl.: 5200

GTE SYLVANIA INC., Gibson Electric Subsidiary, Dept. EM, Delmont, Pa. 15626, Tel: 412-468-4121; Empl.: 250

Sales Manager: L. E. Antonelli

Local Sales Offices & Reps.

NC	Charlotte	704-334-8940
Pa	Philadelphia	215-477-5000

GTE SYLVANIA

GTE SYLVANIA INC., Miniature Lighting Prods., Dept. EM, W. Main St., Hillsboro, N.H. 03244, Tel: 603-464-5533, TWX: 710-366-0387; Empl.: 300
p. 2589-2591

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Los Altos, W.W. Posey Co.	415-948-7771
Cal	N. Hollywood, Bassett & Moore	213-766-2117
Colo	Arvada, Arrowhead Sls.	303-423-5556
Colo	Arvada, Arrowhead Sales Corp.	303-423-5556
Conn	Cheshire, Coakley, Boyd & Abbett	203-272-2261
Conn	West Haven, Coakley, Boyd & Abbott	800-226-8402
Fla	Bradenton, Hutto Hawkins Peregoy	813-755-4015
Fla	Maitland, Hutto, Hawkins, Peregoy	305-831-2474
Fla	Pompano Beach, Hutto, Hawkins, Peregoy	305-943-9593
Ga	Atlanta, Millar Elctrns	404-261-6160
Ga	Atlanta, Millar Elctrns.	404-261-6160
Ill	Oak Park, G. E. Finnegan	312-383-9098
Ind	Fort Wayne, R. O. Whiteall & Assoc.	219-926-2787
Ind	Indianapolis, R. O. Whiteall & Assoc.	317-359-9283
Ind	Kokimos, R. O. Whiteall & Assoc.	317-453-3692
Iowa	Atlantic, Kimian Sls.	712-243-1626
La	Gretna, Cartwright & Bean	504-362-4649
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-451-8901
Mich	Southfield, R.O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	Minneapolis, Stoss Assocs.	612-925-2757
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Independence, Kimian Sls.	816-796-4026
NJ	Long Valley, P.A. Sweeney	201-852-1434
NM	Phoenix, Arrowhead Sls. Corp.	502-722-7148
NY	Camillus, Callahan-Ferguson Co.	315-487-3870
NY	Rochester, Fowler Beach Corp.	716-586-0468
NY	Tuckahoe, LCA Sls.	914-961-4700
NC	Raleigh, Millar Elctrns.	919-787-0664
NC	Raleigh, Millar Elctrns.	919-787-9564
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R. O. Whitesell	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assoc.	216-826-4424
Pa	Glenside, Shelmar Elctrns.	215-885-0800
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Addison, Dunbar Assoc.	214-239-7151
Wash	Seattle, Blum & Assocs.	206-285-2590
Wisc	Milwaukee, F.C. Du Bois & Assoc.	414-774-3100

GTE SYLVANIA INC, Parts Div., Dept. EM, 816 Lexington Ave., Warren, Pa 16365; Empl.: 1880

Sales Manager: R. F. Scalise

Local Sales Offices & Reps.

Cal	Burlingame	415-697-3500
Cal	Los Angeles	213-726-1666
Conn	Watertown	203-274-5435
Fla	Orlando	305-859-6220
Ill	Elk Grove Village	312-593-3400
Me	Bangor	207-947-8386
Mass	Danvers	617-777-1900
NJ	Teterboro	201-288-9484
NY	Camillus	315-672-3111
Pa	Philadelphia	215-477-5000
Pa	York	717-764-9853
Tex	Dallas	214-239-8171

GTE SYLVANIA, INC., Connector Prods. Oper., Dept. EM, Box 29, Titusville, Pa. 16354, Tel: 814-589-7071, TWX: 510-692-6763 .... p. 1842,1843

Sales Manager: R. Sanders

Local Sales Offices & Reps.

Cal	Burlingame	415-697-3500
Fla	Orlando	305-859-6220
Ill	Elk Grove Village	312-593-3400
Mass	Waltham	617-890-9200
NY	Camillus	315-672-3111

GTE SYLVANIA INC., Western Gold & Platinum Sub., Dept. EM, 555 Harbor Blvd., Belmont, Cal. 94002, Tel: 415-593-3121; Empl.: 320

Sales Manager: W.S. Smith

Local Sales Offices & Reps.

Cal	Torrance, Western Gold & Platinum Co.	213-375-6191
Ill	Long Grove, Western Gold & Platinum Co.	312-438-4488
Mass	Salem, Western Gold & Platinum Co.	617-745-1826
Minn	Minneapolis, Western Gold & Platinum Co.	612-920-3288
Pa	Drexel Hill, Western Gold & Platinum Co.	201-483-7467

GTI/CLOVER DIV., GTI Corp., Dept. EM, 600 Young St., Tonawanda, N.Y. 14150, Tel: 716-693-1331

GTI CORPORATION, Dept. EM, 480 Manor Oak Two, 1910 Cochran Rd., Pittsburgh, Pa. 15220, Tel: 412-343-4070, Telex: 866-483; Empl.: 800

Local Sales Offices & Reps.

Cal	Santa Clara	408-244-2938
NJ	Red Bank	201-842-6682
Ohio	Centerville	513-433-7913

GTI/TENSOR ELECTRONICS, Dept. EM, 11558 Sorrento Valley Rd., San Diego, Cal. 92121, Tel: 714-453-7262, Telex: 69-5056; Empl.: 34

Local Sales Offices & Reps.

Ark	Hot Springs, M. Young Assocs.	510-262-1365
Cal	Downey, Trimarco, Inc.	213-861-8244
Colo	Denver, Gossard & Assocs.	303-985-0602
Ill	Des Plaines, Butor Sls. Co.	312-298-0555
Md	Lutherville, Cunningham & Assocs.	301-296-4306
Mich	Rochester, Kent Assocs.	313-651-1890
Minn	Minneapolis, D. G. Perry & Co.	612-920-3212
Miss	Jackson, M. Young & Assocs.	601-366-8185
NJ	Haddonfield, Keefe Elctrn. Sls. Co.	609-429-4650
NY	Syracuse, T-Squared-L Elctrns.	315-463-8592
NC	Charlotte, B. Jackson	704-366-6678
Wash	Seattle, R. K. Squibb, Inc.	206-632-2450

™GUARDETTE - motor overload protectors - General Elec. Co.

GUARDIAN CALIFORNIA, Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503, Tel: 213-772-8511, TWX: 910-344-7381; Empl.: 48

Local Sales Offices & Reps.

Ala	Birmingham, Immco Inc.	205-879-0739
Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Denver, Arrowhead Sls.	303-222-5645
Fla	Winter Park, Floritronics	305-424-5070
Ga	Marietta, Immco Inc.	404-435-0079
Haw	Honolulu, G Piety Factors	808-841-0185
Ill	Chicago, Guardian Elec. Mfg.	312-243-1100
Ind	Fort Wayne, Needler Sls.	219-447-2123
Md	Ellicott City, Mc Court Co.	301-465-4515
Mass	Concord, Sales Engrg. Co.	617-369-3943
Mich	Westland, Miltimore Sls.	313-349-5820
Mo	Kansas City, H.J. Weisler & Assocs.	
Mo	St. Louis, H.J. Weisler & Assocs.	
NM	Albuquerque, Arrowhead Sls.	505-247-0287
NY	Massapequa, Coughlin Assocs.	516-799-7743
NY	Rochester, Elcom Sales	716-385-1400
Ohio	Miamisburg, W. C. Schmidt	513-866-3640
Ohio	Richmond Heights, W. A. Rowell, Jr.	216-291-0647
Pa	Delmont, T.F. Laslo & Assocs.	
Pa	Doylestown, T.O.E. Sls.	215-348-5333
Tex	Dallas, W Reese Assocs.	214-638-6575
Utah	Salt Lake City, Arrowhead Sls.	801-487-3444
Wash	Seattle, R. K. Squibb	206-632-2450

GUARDIAN ELECTRICAL MFG. CO. OF CAL., Dept. EM, 4030 W. Spencer St., Torrance, Cal. 90503, Tel: 213-542-8651, TWX: 910-344-7381; Empl.: 50; Minimum order: $J. Susswain

Sales Manager: F. Gertz; *Distributor Manager:* J. Susswain

Local Sales Offices & Reps.

Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Boulder, G. Hess	303-443-4780
Fla	Ft. Lauderdale, C.B.C. Elctrns.	305-484-7330
Ga	Atlanta, Electro-Mech Sls. Eng. Co.	404-449-6337
Haw	Honolulu, L. Garber	808-841-0185
Ill	Addison, F. Nitti	312-243-1100
Ind	Fort Wayne, Needler Sls. Co.	219-447-2123
Md	Ellicott City, McCourt Co.	301-465-4515
Mass	Andover, Sales Engrg. Co.	617-470-0800
Minn	Minneapolis, R.K. Sls.	612-335-8252
Mo	Hazelwood, Dy-Tronix Inc.	314-731-5799
NJ	Englewood, T.O.E. Sales	201-568-5747
NY	Binghamton, Elcom Sls.	607-723-9270
NY	Rochester, Elcom Sls	716-385-1400
NY	Whitestone, D. Horrocks	212-961-6470
Ohio	Cleveland, Depco	216-289-8188
Ohio	Miamisburg, W.C. Schmidt	513-298-4451
Pa	Delmont, T.F. Laslo & Assoc.	412-468-5045
Pa	Doylestown, T.O.E. Sls.	215-348-2212
Tex	Dallas, ION Assocs.	214-357-9441
Wash	Seattle, RK Squibb	206-632-2450

GUARDIAN ELECTRIC CO., Dept. EM, 1550 W. Carroll Ave., Chicago, Ill. 60607

Local Sales Offices & Reps.

Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Fla	Winter Park, Floritronics	305-886-4818
Ga	Atlanta, Electro-Mech. Eng. Sls.	404-256-4414
Haw	Honolulu, G. Piety Factors Inc.	808-841-0185
Ill	Chicago, F. Nitti	312-243-1100
Ind	Ft. Wayne, Needler Sls. Co.	219-447-2123
Ind	Indianapolis, Needler Sls. Co.	317-255-8056
Mass	West Concord, Sls. Eng. Co.	617-369-3943
Mich	Novi, Miltimore Sls.	313-476-2446
Minn	St. Paul, R.A. Karr	612-335-8552
Mo	Kansas City, H.J. Weisler & Assoc.	816-421-1679
Mo	St. Louis, H.J. Weisler & Assoc.	314-428-3934
NY	Binghamton, Elcom Sls.	607-723-9270
NY	Massapequa, Coughlan Assocs.	516-799-7743
NY	Rochester, Elcom Sls.	716-385-1400
NY	Whitesboro, Electro-Mech Sls. Eng. Co.	919-782-6452
Ohio	Cleveland, Depco	216-289-8188
Ohio	Miamisburg, W. Schmidt	513-298-4451
Pa	Doylestown, T.O.E. Sls. Inc.	215-348-2212
Tex	Dallas, Wm. Reese Assoc.	214-638-6575
Utah	Salt Lake City, Arrowhead Sls. Corp.	801-485-3362
Wash	Seattle, R.K. Squibb, Inc.	206-632-2450

GUDEBROD BROS. SILK CO., INC., Electronics Div., Dept. EM, 12 S. 12th St., Philadelphia, Pa. 19107, Tel: 215-922-1122

Local Sales Offices & Reps.

Cal	Glendale	213-245-2674
Ill	Chicago	312-DE7-3025
Mass	Boston	617-HA6-5347
NY	Valley Stream	516-825-4616
NC	Charlotte	704-333-9591

™GUDE-DIAL CORD & CHAMPION-DIAL CORD - dial cord - Gudebrod Bros. Silk Co., Inc.

™GUDE-GLASS - lacing tape - Gudebrod Bros. Silk Co., Inc.

™GUDELACE - lacing tape - Gudebrod Bros. Silk Co., Inc.

GUDEMAN CORP., Dept. EM, 340 W. Huron St., Chicago, Ill. 60610, Tel: 312-337-7400, TWX: 910-221-3863; FSC No.: 72928; Empl.: 180

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne Co.	602-946-4437
Cal	Redondo Beach, J.J. Riley	213-374-3468
Cal	Santa Clara, Fahrner-Miller	408-984-1700
Colo	Denver, Walker Assocs.	303-623-8713
Fla	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
Ill	Downers Grove, Momak Sls.	312-963-6400
Ind	Ft. Wayne, R. G. Frederick	219-745-2461
Ind	Indianapolis, Electro Reps	
Mass	Chelmsford, Underwood Sls.	617-256-8191
Minn	Minneapolis, C. Bohlig Co.	612-922-7011
Mo	Kansas City, R.R. Burton Sls.	816-644-8300
NJ	Englewood Cliffs, E. Glass Assocs.	201-592-0200
NY	Liverpool, George Corp.	315-652-8317
NY	Rochester, J. Semple Co.	716-342-1413
NC	Winston-Salem, C. Dula Assocs.	919-768-7166
Ohio	Cincinnati, A.C. Wahl Assocs.	513-821-3270
Ohio	Fairborn, R.G. Siff	513-252-7785
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Tex	Dallas, Technical Mktg.	214-387-3601

Local Distributors

Cal	Mountain View, Capacitor Sls. Co.	415-964-8880
Cal	Woodland Hills, Jaco Elctrns	213-887-6400
Colo	Denver, Walker Assocs.	303-623-8713
Mass	Chelmsford, Underwood Prods.	617-256-8191
Pa	Bristol, Indisco	215-785-6565
Wash	Seattle, Shannon Ltd	206-763-1236

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GUILDLINE INSTRS., INC., Dept. EM, 1997 Palmer Ave., Larchmont, N.Y. 10538, Tel: 914-834-8100; Empl.: 85

GULTON INDS., INC., Elctrn. Comps. Div., Dept. EM, 212 Durham Ave., Metuchen, N.J. 08840, Tel: 201-548-2800, TWX: 710-998-0592; Empl.: 125

Local Sales Offices & Reps.

Cal	Los Angeles, Cal. Cem, Inc.	714-835-2702
Cal	Mountain View, Tri-Rep	415-965-1822
Cal	Redondo Beach, California-J.J. Riley Assoc.	213-348-9812
Cal	San Diego, California - Cem, Inc.	714-835-2702
Cal	Santa Ana, California - Cem, Inc.	714-835-2702
Colo	Denver, Comtech	303-756-6815
Fla	Palm Beach Gardens, Florida-Service Representative Assoc.	305-622-4049
Ill	Westchester, Wasson-Gallagher	312-261-7517

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Md	Hyattsville, Eastern Components	301-577-2925
Mass	Chelmsford, Underwood Sls.	617-256-8191
Mich	Grand Rapids, Elko Sls.	616-949-1451
Minn	St. Paul, H.A. Cullen	612-646-7371
NJ	Wallington, Comp-Tech Sls.	201-935-5454
NM	Albuquerque, Elctrn. Mktg.	505-265-7837
NY	Rochester, J.L. Semple	716-342-1413
NC	Winston-Salem, Dula Assocs.	919-768-7166
Ohio	Cincinnati, A.C. Wahl	513-821-3270
Ohio	Fairborn, R.G. Siff & Assocs.	513-252-7785
Ohio	Lyndhurst, A.C. Wahl	513-821-3270
Okla	Tulsa, Allied Comps.	918-939-2848
Tex	Dallas, Allied Comps.	214-238-0408

GULTON INDS., SCD Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627, Tel: 714-642-2400, TWX: 910-596-1352; Empl.: 90

Local Sales Offices & Reps.

Cal	Del Mar, Interconnect Specialties	714-453-2133
Cal	Santa Fe Springs, Interconnect Specialties	213-921-0307
Cal	Sunnyvale, Interconnect Specialties	408-245-8660
Cal	Ventura, Interconnect Specialties	805-642-2281
Colo	Englewood, Dynatech Inc.	303-773-2830
Conn	West Sinsbury, Anchor Engrg. Corp.	203-658-6261
Fla	Orlando, Glenn Tech. Sls.	305-299-8700
Md	Ellicott City, Mktg. Tech. Inc.	301-465-5944
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Minn	Minneapolis, Milt Westlund Assocs.	612-866-5002
NY	Manhasset, Win-Cor Elctrns. Sls. Corp.	516-627-9474
Ohio	Aurora, Nationwide Comps.	216-562-9666
Pa	Philadelphia, Rayco Sls.	215-698-1210
Tex	Garland, G.V. Peck Co.	214-341-8311
Tex	Houston, G.V. Peck Co.	713-789-7111
Tex	Irvine, Gordon V. Peck Co.	713-664-1435

GULTON INDS., INC., Measurement & Control Systems Div., Dept. EM, Gulton Ind'l. Pk., E. Greenwich, R.I. 02818, Tel: 401-884-6800, TWX: 710-387-1500; Empl.: 400 ....p. 2588,2966,2967

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Ala	Huntsville, W.A. Brown Comps.	205-539-4411
Ariz	Scottsdale, PLS Assocs	602-957-9110
Ariz	Scottsdale, Williams Assoc.	602-947-4297
Cal	Cerritos, M.C.S. Div.	714-523-2033
Cal	Gardena, Instrument Lab.	213-770-0650
Cal	Palo Alto, E.V. Roberts & Assoc.	415-494-1671
Cal	Palo Alto, Instrument Lab.	415-328-1040
Cal	San Diego, Lodan	714-279-6383
Colo	Denver, PLS Assocs	303-773-1218
Colo	Denver, Williams Assoc. Inc.	303-373-4730
Fla	Clearwater, J.J. Galleher & Co.	813-446-7706
Fla	Orlando, W.A. Brown Comp. Inc.	305-425-5505
Ga	Chamblee, W.A. Brown Comp.	404-455-0405
Haw	Honolulu, Yett Co. Inc.	808-847-2521
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ill	Chicago, Warner Instr. & Sls.	312-631-6778
Ind	Ft. Wayne, Scott Elctrns.	219-743-1586
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Ind	Mishawaka, Robinson Equip. Co.	
Iowa	Des Moines, Harry E. Ferris Co.	515-255-5008
Kans	Olathe, Tech Reps	913-782-1177
La	Lafayette, Kemp Engrg	318-984-3516
La	New Orleans, Gilbert & Assocs.	504-866-7444
Md	New Carrollton, W.A. Brown Equip. Comp. Inc.	301-577-4527
Mass	Norwood, Gibson Engrg. Co.	617-769-3600
Mich	Farmington, Applied Instrs. Co.	313-476-9060
Mich	Milford, Milford Scientific	313-685-8912
Mich	Royal Oak, D. Ray & Assoc.	313-276-4705
Minn	Minneapolis, Pivan Engrg	612-537-4501
Mo	Hazelwood, Tech. Reps. Inc.	314-731-5200
Mo	Kansas City, Boschert Equip. Co.	816-561-4050
Mo	University City, E. Mooney Co.	314-725-8875
NJ	Metuchen, Gulton M.C.S. Div.	201-548-2800
NJ	Newark, Norman Bragar Co.	201-344-1100
NM	Albuquerque, Williams Assoc. Inc.	505-255-1638
NM	Albuquerque, PLS Assocs	505-255-2330
NY	Buffalo, Niagara Elec. Sls. Co.	716-886-4000
NY	E. Syracuse, Niagara Elec. Sls. Co.	315-437-1656
NY	Rochester, Niagara Elec. Sls. Co.	716-271-1223
NY	Syracuse, Labtronics Inc.	315-454-9314
NC	Charlotte, James L. Highsmith & Co.	704-333-7743
NC	Raleigh, W. A. Brown Comp.,	919-876-9601
NC	Winston-Salem, W.A. Brown Comp. Inc.	919-725-5384
Ohio	Cincinnati, Scott Elctrns.	513-791-2513
Ohio	Cincinnati, Schlemmer Assocs.	513-522-8340
Ohio	Cleveland, Scott Elctrns	216-291-2600
Ohio	Cleveland, Instrumentation Sys.	216-486-0782
Ohio	Columbus, Scott Elctrns.	614-236-8619
Ohio	Dayton, Instrumentation Sys.	513-294-2838
Okla	Tulsa, Kemp Engrg	918-299-2636
Okla	Tulsa, Olson Engrg	918-742-3720
Ore	Portland, Branom Instr. Co.	503-285-9861
Pa	King of Prussia, Wistex	215-337-1240
Pa	Murrysville, Bobar Engrg Co.	412-327-3700
Pa	Pittsburgh, Instrumentation Sys.	412-327-1111
RI	East Greenwich, MCS Div	401-884-6800
Tenn	Memphis, Gilbert & Assocs.	901-767-7894
Tex	Addison, Kemp. Engrg. Co.	214-661-0400
Tex	Arlington, Pan Tech. Engrg. Co.	817-261-4111
Tex	Houston, Kemp Engrg. Co.	713-688-1431
Va	Alexandria, W.A. Brown Equip. Comp. Inc.	703-836-1800
Va	Richmond, James L. Highsmith & Co.	804-272-5888
Wash	Mercer Island, Sales & Engrg. Assoc.	206-232-6550
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940
Wisc	Menomonee Falls, Fritz Engrg. Sls. Co.	414-251-6590

Local Distributors

Ala	Mobile, Instrument & Control Div, Brownell Electro	205-479-8581
Ariz	Phoenix, Metermaster	602-273-7331
Ariz	Phoenix, R.V. Weatherford	602-272-7144
Ark	El Dorado, Indl. Elctrns. Supp.	501-862-4901
Ark	Little Rock, Carlton Bates Co.	501-375-2383
Cal	Culver City, E.V. Roberts	213-870-9561
Cal	Gardena, Instr. Labs	213-770-0650
Cal	Glendale, R. V. Weatherford Co.	213-849-3451
Cal	Inglewood, Newark Elctrns. Corp.	213-678-0441
Cal	Los Angeles, Fisher/Brownell	213-532-2170
Cal	Los Angeles, Metermaster	213-685-4340
Cal	Palo Alto, R.V. Weatherford Co.	415-321-5373
Cal	Palo Alto, Metermaster	415-968-0313
Cal	San Diego, R.V. Weatherford Co.	714-278-7400
Cal	Santa Clara, Fisher/Brownell	408-244-6182
Colo	Denver, Newark Elctrns. Corp.	303-757-3351
Colo	Denver, Insco Co.	303-255-7665
Colo	Denver, Waco	303-371-4370
Conn	Middletown, Mancib Co.	203-347-5629
Fla	Lakeland, A.A. Elctrns. Div. of Auto. Engrg. Co.	813-682-6181
Fla	Orlando, Brownell Electro.	305-843-6770
Ga	Atlanta, Brownell Electro	404-762-5181
Haw	Honolulu, Yett Co.	808-847-2521
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Elk Grove Village, Metermaster	312-593-8650
Ill	Oak Park, Pacific Indicator Co.	312-383-0220
Ill	Worth, Premium Instrs. Co.	312-371-0500
Ind	Ft. Wayne, Ft. Wayne Elctrns. Supp.	219-742-4346
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Ind	South Bend, Radio Dist. Co.	219-288-4666
Iowa	Ames, Skarshaug Engrg. & Testing Lab	515-292-1422
Kans	Overland Park, Brooks Instr	
Kans	Wichita, Main Elctrns.	316-267-3581
La	Lafayette, Ralph's	318-234-4507
La	Shreveport, Indl. Elctrn. Supp.	318-222-9459
La	Shreveport, Analytical Logging	318-424-8126
Md	Elkridge, Sunshine Scientific Instrs.	301-796-5600
Mass	Billerica, Metermaster	617-667-8346
Mass	Burlington, Mancib Co.	617-272-9450
Mass	Norwood, Timer Srv.	617-769-3600
Mich	Farmington, Applied Instrs	313-476-9060
Mich	Hastings, Hastings Fiberglass Prods.	616-945-9541
Mich	Muskegon, Applied Instrs	616-722-1318
Mich	Royal Oak, George Instrument Co.	313-576-4700
Minn	Duluth, Mielke Elect. Works	218-727-7411
Minn	Minneapolis, Instr. Control Co.	612-336-7744
Miss	Jackson, Ellington Elctrns. Supp.	601-335-0561
Mo	St. Louis, Indl. Srvc. Labs	314-535-5760
Mo	St. Louis, Scherrer Instr.	314-644-5362
Mo	St. Louis, Olive Indl. Elctrns.	314-863-7800
NJ	Bridgewater, Raritan Instrs.	201-968-2261
NJ	Lodi, Elnik Instrs.	201-779-7388
NJ	Newark, Norman Bragar Prods Co.	201-344-1101
NJ	Princeton, Science Assocs.	609-924-4470
NM	Albuquerque, WACO	505-255-1638
NY	Albany, Edwin E. Taylor Co.	518-489-5600
NY	Amityville, Testing Machines	
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Long Island City, Metermod ilstr. Corp.	212-726-4850
NY	Rochester, Summit Dist	716-334-8110
NC	Charlotte, Brownell Electro	704-393-4341
NC	Charlotte, J.L. Highsmith Co.	704-333-7743
NC	Charlotte, Sys. Svc. Corp.	704-377-3407
NC	Matthews, W.K. Hile	704-847-9125
NC	Raleigh, Southeastern Radio Supply	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-724-0541
Ohio	Cincinnati, Hughes Peters	513-351-2000
Ohio	Cincinnati, Schlemmer Assoc.	513-522-8340
Ohio	Cleveland, Pioneer Standard Elctrns., Pioneer Elect-Instrs. Lab.	216-587-3600
Ohio	Columbus, Hughes Peters	614-294-5351
Ohio	Dayton, Instrumentation Sys	513-294-2838
Ohio	Dayton, Pioneer/Dayton, Div. of Pioneer-Standard Elctrns.	513-224-0971
Okla	Tulsa, Oil Capitol Elctrns. Corp.	918-836-2451
Pa	Myrrsville, Bobar Inst	412-327-3700
Pa	Philadelphia, Sunshine Scientific Instrs.	215-673-5600
Pa	Pittsburgh, Cameradio	412-288-2600
Pa	Pittsburgh, Air Serco	412-621-6980
Tenn	Memphis, Bluff City Distr. Co.	901-725-9500
Tenn	Memphis, Brownell Electro.	901-452-2181
Tenn	Nashville, Brownell Electro	615-889-8230
Tex	Beaumont, Ralph Indl. Elctrns.	713-833-9443
Tex	Dallas, Economy Gauge, Div. of McGatlin	214-358-5381
Tex	Dallas, Dallas Instrs.	214-341-0504
Tex	El Paso, Kernco	915-566-9651
Tex	Houston, American Analog	713-481-6520
Tex	Houston, Van London Co.	713-526-1567
Tex	Stafford, Southwest Elctrns.	713-494-6021
Utah	Salt Lake City, Control Equip. Co.	801-487-7741
Va	Richmond, Avec Elctrns. Corp.	804-359-6071
Wash	Seattle, Branom Instrument	206-762-6050
Wash	Seattle, Liberty Elctrns	206-763-8200
Wisc	Cedarburg, Automation Engrg. Co.	414-377-7500
Wisc	Milwaukee, Electro-Mechano Co.	414-272-4050

GULTON INDS., INC., Servonic/Instrumentation Div., Dept. EM, 1644 Whittier Ave., Costa Mesa, Cal. 92627, Tel: 714-642-2400, TWX: 910-596-1352; Empl.: 256

Local Sales Offices & Reps.

Ark	Little Rock, Tyler Engrg. Co.	501-562-2296
Cal	Los Angeles, Thorson Co.	
Cal	Mission Viejo, Miracle & Assocs.	714-586-5510
Cal	San Diego, Miracle & Assocs.	714-276-8619
Colo	Littleton, Pond Assocs., Inc.	303-798-2904
Conn	No. Haven, Kitchen & Kutchin, Inc.	203-239-0212
Fla	Clearwater, Reynolds & Assocs.	813-726-2373
Fla	Ft. Lauderdale, Reynolds & Assocs.	305-581-6611
Fla	Hollywood, Reynolds & Assocs.	305-987-6720
Fla	Palm Beach Gardens, Reynolds & Assocs.	305-622-6850
Fla	Satellite, Reynolds & Assocs.	305-773-4700
Fla	St. Petersburg, Reynolds & Assocs.	813-360-1484
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Ill	Chicago, Carvel Engrg. Co.	312-885-8800
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
Md	Baltimore, Stemler Assocs., Inc.	301-944-8262
Mass	Lexington, Kitchen & Kutchin, Inc.	617-862-8230
Mich	Detroit, MC Entprs.	313-525-2700
Minn	Minneapolis, Westlund Assocs.	612-886-5002
Mo	St. Louis, Thunderbird Tech Sls. & Svcs.	314-567-6488
NJ	Cherry Hill, Stemler Assocs.	215-441-0433
NJ	Laurel Springs, Stemler Assocs.	215-644-3477
NJ	Springfield, SM Service & Tech., Inc.	201-232-2666
NY	Chappaqua, R. M. Glueck & Assoc.	914-238-3233
NC	Charlotte, Reynolds & Assocs.	919-765-8112
Ohio	Cleveland, Instrumentation Sys.	216-486-0782
Ohio	Dayton, Instrumentation Sys. Inc.	513-294-2838
Pa	Pittsburgh, Instrumentation Sys., Inc.	412-243-1111
Pa	Warminster, Stemler Assoc.	215-441-0433
Tex	Garland, Gordon V. Peck Co.	214-341-8311
Tex	Houston, Gordon V. Peck Co.	713-780-2220
Utah	Salt Lake City, Applied Engrg. Prods. Co.	801-582-4942
Va	Alexandria, Stemler Assocs.	703-548-7818
Wash	Bellevue, Thorson Co.	206-455-9880
Wisc	Milwaukee, Carvel Engrg. Co.	414-352-6630

GULTON INDS., Piezo Prods. Div., Dept. EM, Box 4300, Fullerton, Cal. 92634, Tel: 714-871-2150, TWX: 910-592-1247; Empl.: 100

Sales Manager: C.G. Edmiston

Local Sales Offices & Reps.

Ariz	Phoenix, C.T. Fink & Assocs	602-992-9884
Cal	Los Angeles, El Com	213-223-1351
Ill	Westchester, Wasson-Gallagher	312-261-7517
Ind	Fort Wayne, Given Corp.	219-432-5585
Iowa	Cedar Rapids, J.R. Sls Engrg	319-377-8211
Md	Ellicott City, J. Winkler Assocs.	310-465-5922
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	Grand Rapids, Elko Sls Corp.	616-949-1451
Minn	St. Paul, H. Cullen & Assocs.	612-646-7371
Ohio	Rocky River, N. Case Assocs.	216-333-4120
Tex	Dallas, Allied Comps	214-238-0408
Tex	Houston, Allied Comps	713-691-3961

(TM)GUY-GRIP DEAD-END - guy termination device - Preformed Line Products Co.

GWA ELECTRONICS, INC., Dept. EM, Box 20396, Denver, Colo. 80220, Tel: 303-355-4468; Empl.: 2

Local Sales Offices & Reps.

Cal	Van Nuys, Szerlip Sls. Co.	213-782-1765
Colo	Denver, C. B. Elctrn. Mktg.	303-422-0561
Mich	Grand Rapids, L. Drieborg	616-953-1242
Ohio	Columbus, Mandabach & Assoc.	614-235-0265
Pa	Pittsburgh, Mandabach & Assoc.	412-279-2264

(TM)GYROFLEX - non-floated (dry) gyro - Singer Co.

(TM)GYRO FLUX GATE - remote indicating compass system - Bendix Corp.

(TM)GYROPOISE - turntable - Stanton Magnetics, Inc.

(TM)GYROSURVEYOR - borehole surveying gyros and systems - Humphrey, Inc.

HABER INSTRUMENTS, Dept. EM, Box 342, South Station, Framingham, Mass. 01701, Tel: 617-655-4142

HACKENSACK CABLE CORP., See Carolina Steel & Wire Corp.

(TM)HACKENSACK® - wire ropes & cables - Carolina Steel & Wire Corp.

HACKER INSTRS., INC., Dept. EM, Box 657, Fairfield, N.J. 07006, Tel: 201-226-8450; Empl.: 10

HADES MFG CORP., Dept. EM, 151-A Verdi St., Farmingdale, N.Y. 11735, Tel: 516-249-4244; FSC No.: 51578

Sales Manager: G. Brand

HADLEY COMPONENTS DIV., GTI Corp., Dept. EM, R.D. #2, Box 77, Hadley, Pa. 16130, Tel: 412-253-3161, Telex: 914-545

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Cal	Canoga Park, California Elctrn. Mktg.	213-884-7867
Cal	San Mateo, California Elctrn. Mktg.	415-574-1113
Cal	Santa Ana, California Elctrn. Mktg.	714-835-2702
Cal	Santa Clara, GTI Corp.	408-244-2938
Colo	Boulder, Mile High Elctrns.	303-444-5615
Conn	Brookfield, E.J. Hughes Assocs.	203-775-4541
Conn	Old Saybrook, E.J. Hughes Assocs.	203-399-7636
Fla	Longwood, Lenz Engrg.	305-831-9797
Ill	Westchester, Gassner & Clark Co.	312-345-4245
Ind	Indianapolis, Electronic Sls. & Engrg. Co.	317-849-4260
Mass	Attleboro, E.J. Hughes Assocs.	617-226-0050
Mass	Beverly, E.J. Hughes Assocs.	617-927-7171
Mich	Southfield, Eynon-Weyand Assocs.	313-354-3430
Minn	Minneapolis, D.G. Perry & Co.	612-920-3212
NJ	Brielle, Semi-Mat Co.	201-528-7439
NJ	Shrewsbury, GTI Corp.	201-842-6682
NY	Skaneatelis, MCK Assocs.	315-685-7122
NC	Charlotte, B. Henry Assocs.	704-375-8958
Ohio	Dayton, Sidnell Co.	513-885-4161
Ohio	Mentor, Bishop Co.	216-255-6969
Tex	Richardson, R.S. Marston Co.	214-235-3577

HADRON INC., Korad Div. of Hadron, Inc., Dept. EM, 2520 Colorado Ave., Santa Monica, Cal. 90404, Tel: 213-829-3377, TWX: 910-343-6870; Empl.: 100

Local Sales Offices & Reps.

Ariz	Tucson, G. Moore Assocs.	602-795-3176
Cal	Anaheim, Applied Inst.	714-535-6551
Cal	San Jose, Applied Inst.	415-941-5928
Colo	Boulder, G. Moore Assocs.	303-494-3351
Fla	Longwood, Lenz Engrg. Co.	305-831-9796
Ill	Park Ridge, B. Ellis Assoc.	312-298-7626
Md	Silver Spring, Spectro Sys. Corp.	301-949-8261
Mass	Chelmsford, Equipment Sls. Co.	617-256-8547
NJ	Oakford, Non Linear Devices	201-337-0666
NM	Albuquerque, G. Moore Assocs.	505-292-3322
NY	Lewiston, Watmet, Inc.	716-285-3595
NC	Greensboro, Lenz Engrg. Co.	919-299-7879
Ohio	Berea, B. Ellis Assocs.	216-826-0559

(TM)HAILER JR - S-203 - Audio Equip.

HAL COMMUNICATIONS CORP., Dept. EM, Box 365, 807 E. Green St., Urbana, Ill. 61801

HALEX, INC., Dept. EM, Box 2940, Torrance, Cal. 90509, Tel: 213-772-4461

Local Sales Offices & Reps.

Cal	Los Altos, W. W. Posey Co.	415-948-7771
Colo	Eastlake, Jensen Reps.	303-452-1609
Fla	Atamonte Springs, WMM Assocs.	305-831-4645
Fla	Clearwater, WMM Assocs.	813-726-8871
Fla	Pompano Beach, WMM Assocs.	305-943-3091
NY	Hyde Park, R.P. Kennedy Co., Inc.	914-229-2269
NY	Rochester, R. P. Kennedy Co.	716-271-6322

HALLICRAFTERS, Dept. EM, 600 Hicks Rd., Rolling Meadows, Ill 60008

(TM)HALLTIPLIER - Watt & Var Transducers - Scientific Columbus

(TM)HALLTRON - hall effect probes & hall effect instrumentation - Ohio Semitronics, Inc.

HALMAR ELECTRONICS, INC., Dept. EM, 1544 W. Mound St., Columbus, Ohio 43223, Tel: 614-276-0131, TWX: 810-482-1654; Empl.: 80

(TM)HALSTED PRESS - professional, reference books - Wiley & Sons Inc., J.

HAMAI ELECTRIC LAMP CO., LTD., Dept. EM, 9-26, Kasuga 1-chome, Bunkyo-Ku, Tokyo, Japan 112, Tel: (03) 813-8811, TWX: 272-2408 HAMAI J; Empl.: 200 .... p. 2592,2593

Local Distributors

Cal	Los Angeles, Sakata Shokai Ltd.	213-622-4977
Ill	Elk Grove Village, Sakata U.S.A. Corp.	312-593-3211
NY	Westbury, Mura Corp.	516-935-3640

HAMAMATSU CORP., Dept. EM, 120 Wood Ave., Middlesex, N. J. 08846, Tel: 201-469-6640, Telex: 83-3403; Empl.: 450

Local Sales Offices & Reps.

Cal	Burlingame, California Eastern Labs	415-342-7744

HAMAMATSU TV CO., LTD., Dept. EM, 1126 Ichino-Cho, Hamamatsu City, Shizuoka Pref, Japan, Tel: 0534-34-3311; Empl.: 530

Local Sales Offices & Reps.

NJ	Middlesex, Hamamatsu Corp.	201-469-6640

HAMILTON TECHNOLOGY, INC., a Sub. of HMW Industries Inc., Dept. EM, Box 1609, Lancaster, Pa. 17604, Tel: 717-299-2581, Telex: 84-8415; Empl.: 960

Local Sales Offices & Reps.

Ariz	Scottsdale, J. M. Houghton Assocs.	602-947-7489
Cal	Costa Mesa, Hamilton Tech., Inc.	714-546-0780
Cal	Los Angeles, E. A. Wilcox Co.	213-723-6436
Cal	Mountain View, Melchior/Wesley Assocs.	415-964-2321
Colo	Denver, Electro-Rep, Inc.	303-744-2655
Conn	W. Hartford, R. S. Pettigrew & Co.	203-233-8533
Fla	Winter Park, Lancaster Ind'l Sls.	305-671-7775
Ill	Des Plaines, Electro-Comp Sls., Inc.	312-297-1455
Mass	W. Newton, R. S. Pettigrew & Co.	617-969-5770
Minn	Navarre, MagCo, Inc.	612-471-8538
Mo	St. Louis, Holtgrieve & Co.	314-725-6602
NY	Mamaroneck, International Sls. Office	914-698-2783
NC	Raleigh, Lancaster Int'l Sls.	919-755-0249
Ohio	Dayton, D. H. Grupe	513-298-6644
Ohio	Grafton, A. W. Risser Co.	216-458-5091
Pa	Lancaster, Lancaster Ind'l. Sls., Inc.	717-397-2942
Tex	Richardson, Hamilton Technology	214-213-0834
Wash	Seattle, E. A. Wilcox Co.	206-243-5450

HAMLIN inc

HAMLIN INC., Dept. EM, Lake & Grove Sts., Lake Mills, Wisc. 53551, Tel: 414-648-2361, TWX: 910-260-3740; Empl.: 800 .... p. 2594,3523,4093

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Palo Alto, Testco Inc.	415-324-1900
Cal	Pico Rivera,, Westrep	213-949-2551
Cal	San Diego, Elctrn. Comp. Mktg.	714-295-6122
Cal	San Diego, Westrep	714-276-0751
Cal	Woodland Hills, Elctrn. Comps. Mktg.	213-649-5374
Colo	Boulder, R-G Entprs.	303-447-9211
Conn	Berlin, White Sls. Co.	203-224-0423
Fla	Hollywood, Wallace Elctrn. Sls.	305-961-6640
Fla	Tampa, Wallace Elctrn. Sls.	813-961-1037
Ga	Jonesboro, Wallace Elctrn. Sls.	404-471-6297
Ill	Des Plaines, Lincoln, Hodges	312-297-3810
Ill	Skokie, Saffro & Assocs.	312-588-0905
Iowa	Marion, Thomas & Modrcin	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin	913-432-2131
Md	Woodbine, Naudain Assoc.	301-442-2270
Mass	Needham, White Sls. Co.	617-444-3676
Mich	Bloomfield Hills, Enco Mktg. Corp.	313-642-0203
Minn	Minneapolis, R-J, Inc.	612-922-1425
Mo	Hazelwood, Thomas & Modrcin	314-895-4700
NJ	Mount Laurel, Naudain Assoc.	609-235-1801
NJ	West Caldwell, Grimm Siegil	201-575-9300
NM	Albuquerque, AQ Elctrns.	505-883-1003
NY	DeRuyter, R.P. Kennedy Co., Inc.	315-662-3996
NY	E. Northport, Jarms Assoc.	516-822-7085
NY	Red Hook, R.P. Kennedy Co., Inc.	914-876-2700
NY	Rochester, R. Kennedy	716-271-6322
NC	Greensboro, Wallace Elctrn. Sls.	919-292-0487
NC	Kernersville, Wallace Elctrn. Sls.	919-993-3993
Ohio	Cincinnati, G & H Sales Co.	513-771-8231
Ohio	Grove City, G & H Sales Co.	614-878-1128
Tex	Dallas, Allied Comp., Inc.	214-238-0408
Tex	Houston, Allied Comp., Inc.	713-960-1962
Wash	Bellevue, Testco, Inc.	206-454-7422
Wisc	Lak Mills, Saffro Assocs.	414-648-2605
Wisc	Waukesha, Lincoln Hodges	414-542-3087

Local Distributors

Ala	Huntsville, Mock Elctrns.	205-539-2401
Cal	Palo Alto, Testco	415-324-1900
Cal	Van Nuys, Patane Avionics	213-988-4455
Colo	Denver, Ind. Elctrns.	303-771-2636
Conn	New Haven, Hatry Ectrns.	203-787-5921
Fla	Miami, ESL	305-633-6973
Ga	Augusta, Dixie Radio Supp.	404-722-2055
Ill	Chicago, Newark Elctrns.	312-638-4411
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Md	Gaithersburg, Pioneer/Washington	301-948-0710
Mass	Dedham, Gerber Elctrns.	617-329-2400
Miss	Newton, May Elctrns.	601-683-6400
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NY	Buffalo, Summit Dist.	716-884-3450
NY	Long Island, Peerless Radio Corp.	516-593-2121
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Solon, Repco	216-248-8900
Okla	Tulsa, Radio, Inc.	918-587-9124
RI	Providence, Wm. Dandreta & Co.	401-861-2800
SC	Columbia, Dixie Radio Supp. Co.	803-253-5333
Tex	Dallas, KA Elctrn. Sls.	214-634-7870
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Wash	Seattle, Radar Elec. Co.	206-282-2511

(TM)HAM-MATE - radio amateur wattmeters - Bird Electronic Corp.

HAMMOND MANUFACTURING COMPANY (U.S.) INC., Dept. EM, 385 Nagel Dr., Buffalo, NY 14225, Tel: 716-683-8181; Empl.: 600

Local Sales Offices & Reps.

Cal	San Mateo, J. E. Lape Co.	415-345-3021
Conn	Milford, ElectroTech Sls.	203-877-1241
Fla	N. Miami, L. Haas Co.	305-949-9143
Ga	Atlanta, Colston Sls. Agency	404-448-9174
Ill	Chicago, Power Prod. Co.	312-545-2216
Mass	Needham, AR Booth & Co.	617-444-4880
Minn	St. Paul, Vikeland Sls	612-645-4647

NY	Buffalo, W.S. Stamp & Assoc.	716-683-5854
NY	Elmsford, Com Tech Sls. Co.	914-592-5550
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Chagrin Falls, RPM Indl. Sls.	216-247-3295
Pa	Media, HB Stallings & Assoc.	215-566-4100
Tex	Dallas, Berthold Sls. Co.	214-526-8329

HAMMOND SOUND PRODUCTS/BOWMAN, Dept. EM, 9300 Hall Rd., Downey, Cal 90241

™HAMPTON MFG. - PCB assembly equip. - Mann, Henry Inc.

™HAND-HOLE - buried plant enclosure - Superior Cable Div.

™HAN-D-MAG - audiophile demagnetizers - Annis R B Co.

™HANDY FLUX - fluxes for brazing - Handy & Harman

HANDY & HARMAN, Dept. EM, 850 Third Ave., New York, N.Y. 10022, Tel: 212-752-3400; Empl.: 800

Local Sales Offices & Reps.

Cal	El Monte	213-283-8181
Ill	Elk Grove Village	312-437-3883
Mass	Attleboro	617-226-1000
Mich	Southfield	313-569-2373
Ohio	Cleveland	216-333-2166
Tex	Dallas	214-387-2501

™HANDYLAB - prepacked devices - Motorola Semiconductor Prods.

™HAND-Y-TEST - continuity tester - Micro Electronic Systems, Inc.

HANKSCRAFT MOTORS, Div. of Gerber Prods. Co., Dept. EM, PO Box 120, Reedsburg, Wisc. 53959, Tel: 608-524-4341; Empl.: 400

Local Sales Offices & Reps.

Cal	Westminster, Electric Motor Specialists	213-564-7372
Ga	Atlanta, V. Avis McCorvey Co.	404-636-2502
Ill	Libertyville, Matthews-Midwest Co.	312-362-8200
Ind	Indianapolis, W.F. Sondermann	317-849-2769
Md	Bethesda, Mount & Co.	301-530-9303
Mass	Salem, Forbes Engrg.	617-744-1693
Mich	Jackson, N. Scroggs Co.	517-782-5211
Minn	St. Paul, W.E. Taubert	612-636-6414
NJ	Mahwah, Kent Assocs.	201-327-7878
NY	Skaneateles, Henkell Mktg. Co.	315-685-6945
Ohio	Fairborn, Technical Assocs.	513-878-2484
Tex	Dallas, Dynamic Comp. Sls.	214-363-6191

HANSCOM, H.F. CO., INC., Dept. EM, 225 Chapman St., Providence, R.I. 02905, Tel: 401-941-1456; Empl.: 50

HANSEN MFG. CO., see IMC Magnetics Corp., Hansen Mfg. Co.

™HANSCOM-TIES - wire & tubing ties - Hanscom, H.F. Co., Inc.

HAPCO, Dept. EM, Box 1205, Boulder, Colo. 80302, Tel: 303-447-0441; Empl.: 5

HARBISON IND'L. PRODS., INC., Dept. EM, 7205 Hibbs La., Levittown, Pa. 19057, Tel: 215-943-9000, Telex: 84-3446; Empl.: 115 .... p. 1428

HARDMAN INC., Dept. EM, 600 Cortlandt St., Belleville, N.J. 07109, Tel: 201-751-3000; Empl.: 85 p. 1389

Local Sales Offices & Reps.

Cal	Huntington Beach, Litco Assoc.	714-536-8004
Conn	W. Hartford, C. Segel Co.	203-236-2027
Fla	Maitland, D & E Assocs.	305-644-3039
Ga	Avendale Estates, Candor Co.	404-296-1666
Mass	Newtonville, C. Segel Co.	617-969-6900
NJ	Flemington, Lescon Inc.	201-782-2242
NJ	Old Bridge, Seaco	201-679-8800
NY	DeRuyter, Madison Technical Sls. Co.	315-662-3996
NC	Raleigh, Candor Co.	919-876-4999
Ohio	Chagrin Falls, D. L. Guilian Assoc.	216-543-5323
SC	Myrtle Beach, Candor Co.	803-448-8361
Tenn	Chattanooga, Candor Co.	615-894-9686
Tex	Dallas, Apogee Svcs. Inc.	214-352-2083
Va	Richmond, Candor Co.	804-320-7375
Wash	Seattle, Atlas Packing & Rubber Co.	206-623-4697
Wisc	Milwaukee, Special Electric Co.	800-558-0650

™HARDSET - heat-curing hard rubber compound - Hardman Inc.

™HAROSYN - brushless synchros - Harowe Servo Controls

HAROWE SERVO CONTROLS, Dept. EM, 48 Westtown Rd., W. Chester, Pa. 19380, Tel: 215-692-2700, TWX: 510-663-0335; Empl.: 350

Local Sales Offices & Reps.

Ariz	Scottsdale, Fred Schoeffler Assoc. Inc.	602-948-3470
Cal	Hollywood, Westaironics	213-466-6201
Colo	Denver, Franklin Sls.	303-922-3623
Conn	Bloomfield, Zaslow Sls.	203-242-7781
DC	Washington, Tradeways Ltd.	
Fla	Ormond Beach, Technology Mktg. Assoc.	904-672-2314
Ill	Chicago, Carlson Elctrn.	312-SP 4-4812
Ind	Ft. Wayne, McDonald Sls.	219-745-9214
Mass	Lowell, Zaslow Sls. Co.	617-458-8452
Minn	Minneapolis, Nortec Sls. Inc.	612-926-2855
Mo	St. Louis, Cadon Tech. Sls.	314-991-0262
NJ	Fairfield, R.C. Assocs.	201-664-1241
NY	Jericho, Electro Rep	516-938-0540
Ohio	Cleveland, Rockford Controls	216-731-5250
Ohio	Dayton, Rockford Controls	513-274-1931
Tex	Addison, Parvin Sls. Co.	214-239-9148

HARREL, INC., Dept. EM, 16 Fitch St., E. Norwalk, Conn. 06855, Tel: 203-866-2573 .... p. 2391

Sales Manager: W. Becker

Local Sales Offices & Reps.

Cal	Sherman Oaks, Windsor Dynamics, Inc.	213-989-3631
Cal	Walnut Creek, Viking Instr.	415-933-1221
Fla	Coral Springs, Shaw Engrg. & Sls.	305-752-7596
Ga	Atlanta, Specialty Equip. & Control Co.	404-394-6633
Ill	Glen Ellyn, Harrel, Inc.	312-668-6622
Kans	Overland Park, Carter Elctrns.	913-649-6996
Ky	Williamstown, C. Burnitt Agency	606-823-6451
Minn	Northfield, Com-Cal Inc.	507-645-4530
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Glen Rock, Fin Engrg. Svcs.	201-652-3608
NY	Cazenovia, P.M. Decew, Inc.	315-065-8602
NY	Lincolndale, Graham Assocs.	914-248-7100
NC	Charlotte, Beck Sls.	704-366-5366
Ohio	North Olmstead, Odessa Instr. Co.	216-734-6777
Pa	Elkins Park, Edwin F. Gregg	215 CA4-0248
Tex	Dallas, Hatfield & Co.	
Tex	Houston, Hatfield & Co.	713-468-1703
Va	Richmond, Commonwealth Controls	804-358-5700

HARRINGTON & KING & PERFRTNG CO., Dept. EM, 5655 Fillmore St., Chicago, Ill. 60644

HARRIS CORP., Computer Systems Div., Dept. EM, PO Box 23550, Fort Lauderdale, Fla. 33307, Tel: 305-974-1700, TWX: 510-956-3096; FSC No.: 29436; Empl.: 650

Local Sales Offices & Reps.

Ariz	Scottsdale	602-945-5955
Cal	Newport Beach	714-752-0910
Cal	San Mateo	415-349-5037
Fla	Fort Lauderdale	305-735-1881
Ga	Atlanta	401-261-6995
Ill	Des Plaines	312-299-4427
Kans	Shawnee Mission	913-384-0882
Md	Rockville	301-762-5600
Mass	Waltham	617-890-5410
Mo	St. Louis	314-961-9927
NY	E. Syracuse	315-437-1181
NY	Huntington	516-549-8787
Ohio	Cleveland	216-461-1510
Tex	Dallas	214-243-3478
Tex	Houston	713-789-6232
Wash	Seattle	206-243-3013

HARRIS CORP., PRD Elctrns. Div., Dept. EM, 6801 Jericho Tpke., Syosset, N.Y. 11791, Tel: 516-364-0400, TWX: 510-222-4494; FSC No.: 77327; Empl.: 1700

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Burbank, PRD Elctrns.	213-842-9566
Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, T. Louis Snitzer Co.	714-454-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Colo	Littletown, Aztec Entprs.	303-795-0250
Fla	Orlando, Gentry Assocs.	305-894-4401
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Mass	Waltham, Measurement Conslts.	617-890-4400
Mich	Detroit, S. Sterling Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NM	Albuquerque, Aztec Entprs.	505-255-2440
NY	Great Neck, Eastern Instrumentation	516-466-9505
NY	Westbury, PRD Elctrns.	516-334-7810
NC	Burlington, Gentry Assocs.	19-227-3639
Ohio	Cleveland, S. Sterling Co.	216-442-8080
Ohio	Dayton, S. Sterling Co.	513-298-7573
Okla	Tulsa, Data Applications Corp.	918-622-3753
Pa	Pittsburgh, S. Sterling Co.	412-922-5720
Tex	Houston, Data Appls. Corp.	713-661-4501
Tex	Richardson, Data Appls. Corp.	214-231-4846
Tex	San Antonio, Data Applications Corp.	512-732-7176
Va	Bailey's Crossroads, Q.T. Elctrns. Sls.	703-671-4357
Wash	Seattle, Arva, Inc.	206-622-0177
Wisc	Brookfield, Pivan Engrg.	414-786-1940

HARRIS SEMICONDUCTOR, Dept. EM, Box 883, Melbourne, Fla. 32901, Tel: 305-724-7430, TWX: 510-959-6259; FSC No.: 34371; Empl.: 1265

Local Sales Offices & Reps.

Ala	Huntsville, Elctrn. Mktg. Assocs.	205-533-6640
Ariz	Scottsdale, Q. T. Wiles & Assocs.	602-948-5590
Cal	Goleta, Thorson Co.	805-964-8751
Cal	Long Beach, Harris Semiconductor	213-426-7687
Cal	Mountain View, Nor-Cal Assocs.	415-961-8121
Cal	Palo Alto, Harris Semiconductor	415-964-6443
Cal	San Diego, Hadden Assocs.	714-565-9444
Colo	Denver, Thorson Co.	303-759-0809
Conn	East Norwalk, Mill-Bern Assocs.	203-838-1493
DC	Washington, Harris Semiconductor	202-337-3170
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-1759
Ill	Elk Grove Village, Oasis Sls.	312-640-1850
Ill	Hinsdale, Harris Semiconductor	312-325-4242
Ind	Fort Wayne, Tech. Rep.	219-484-1432
Ind	Indianapolis, Tech. Rep.	317-849-6454
Iowa	Cedar Rapids, Dy-Tronix	319-377-8275
Md	Lahanm, L. D. Lowery	301-459-1556
Mass	Boston, Harris Semiconductor	617-237-5430
Mass	Burlington, Mill-Bern Assocs.	617-273-1313
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	Minneapolis, Harris Semiconductor	612-835-2505
Mo	Hazelwood, Dy-Tronix	314-731-5799
Mo	Independence, Dy-Tronix	816-737-1100
NJ	Keasby, Addem Group	516-567-5900
NJ	West Caldwell, Addem Group	516-567-5900
NM	Albuquerque, The Thorson Co.	505-265-5655
NY	Albany, Reagan/Compar Albany	518-489-7408
NY	Endwell, Harris Semiconductor	607-754-5464
NY	Huntington Station, Addem Group	516-567-5900
NY	Melville, Harris Semiconductor	516-249-4500
NC	Winston Salem, Elctrn. Mktg. Assocs.	919-722-5151
Ohio	Cleveland, K. W. Elctrn. Sls.	216-831-8292
Ohio	Dayton, K. W. Elctrn. Sls.	513-890-2150
Ohio	Dayton, Harris Semiconductor	513-226-0636
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Allison Park, K. W. Elctrn. Sls.	412-487-4300
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Pa	Philadelphia, Harris Semiconductor	215-687-6680
SC	Greenville, Elctrn. Mktg. Assocs.	803-268-1125
Tex	Dallas, Kruvand Assocs.	214-691-4592
Tex	Houston, Kruvand Assocs.	713-780-9710
Tex	Richardson, Harris Semiconductor	214-231-9031
Va	Charlottesville, L. D. Lowery	804-973-6672
Wash	Bellevue, N.R. Schultz Co.	206-454-0300

Local Distributors

Ala	Huntsville, Hamilton/Avnet	205-533-1170
Ariz	Phoenix, Hamilton/Avnet	602-275-7851
Ariz	Phoenix, R.V. Weatherford	602-272-7144
Cal	Anaheim, R.V. Weatherford	714-634-9600
Cal	Costa Mesa, Avnet Elctrn.	714-754-6021
Cal	Costa Mesa, Schweber	714-556-3880
Cal	Culver City, Hamilton Electro Sls.	213-558-2011
Cal	Glendale, R.V. Weatherford	213-849-3451
Cal	Mountain View, Hamilton/Avnet	415-961-7000
Cal	Palo Alto, R.V. Weatherford	415-493-5373

Cal	Pomona, R.V. Weatherford	714-623-1261
Cal	San Diego, R.V. Weatherford	714-278-7400
Cal	San Diego, Hamilton/Avnet	714-279-2421
Colo	Denver, Hamilton/Avnet	303-534-1212
Colo	Englewood, R.V. Weatherford	303-761-5432
Conn	Danbury, Schweber	800-645-7381
Conn	Georgetown, Hamilton/Avnet	203-762-0361
Conn	Norwalk, Harvey Elctrns.	203-853-1515
Fla	Ft. Lauderdale, Hamilton/Avnet	800-432-4884
Fla	Hollywood, Schweber	305-927-0511
Ga	Atlanta, Schweber	404-449-9170
Ga	Norcross, Hamilton/Avnet	404-448-0800
Ill	Elk Grove, Schweber	312-593-2740
Ill	Schiller Park, Hamilton/Avnet	312-678-6310
Kans	Lenexa, Hamilton/Avnet	913-888-8900
Md	Hanover, Hamilton/Avnet	301-796-5000
Md	Rockville, Schweber	301-881-3300
Mass	Lexington, Harvey	617-861-9200
Mass	Waltham, Schweber	617-890-8484
Mass	Woburn, Hamilton/Avnet	
Mich	Livonia, Hamilton/Avnet	313-522-4700
Mich	Troy, Schweber	313-583-9242
Minn	Edina, Hamilton/Avnet	612-941-3801
Minn	Edinprairy, Schweber Elctrns.	612-941-5280
Mo	Hazelwood, Hamilton/Avnet	314-731-1144
NJ	Cedar Grove, Hamilton/Avnet	201-239-0800
NJ	Fairfield, Harvey Elctrns.	201-227-1262
NJ	Mt. Laurel, Hamilton/Avnet	609-234-2133
NJ	Somerset, Schweber	201-469-6008
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	Binghamton, Harvey	607-748-8211
NY	E. Syracuse, Hamilton/Avnet	315-437-2641
NY	Rochester, Schweber	716-461-4000
NY	Rochester, Hamilton/Avnet	716-442-7820
NY	Westbury , Schweber	516-334-7474
NY	Westbury, Hamilton/Avnet	516-333-5800
NY	Woodbury, Harvey	516-921-8700
Ohio	Beachwood, Schweber	216-464-2970
Ohio	Cleveland, Hamilton/Avnet	216-461-1400
Ohio	Dayton, Hamilton/Avnet	513-433-0610
Pa	Horsham, Schweber Elctrns	215-441-0600
Tex	Dallas, Hamilton/Avnet	214-661-8661
Tex	Dallas, Schweber	214-661-5010
Tex	Dallas, R.V. Weatherford	214-243-1571
Tex	Houston, Schweber	713-784-3600
Tex	Houston, Hamilton/Avnet	713-780-1771
Tex	Houston, R.V. Weatherford	713-688-7406
Utah	Salt Lake City, Hamilton/Avnet	801-262-8451
Wash	Bellevue, Hamilton/Avnet	206-746-8750
Wash	Seattle, R.V. Weatherford	206-243-6340
For:	Can., Mississauga, Ont., Hamilton/Avnet	416-677-7432
For:	Can., Mississaugua, Ont., Prelco Elctrns.	416-678-0401
For:	Can., Montreal, Que., Prelco Elctrns.	514-389-8051
For:	Can., Montreal, Que., Hamilton/Avnet	514-331-6443
For:	Can., Ottawa, Ont., Prelco Elctrns.	613-226-3491
For:	Can., Ottawa, Ont., Hamilton/Avnet	613-226-1700

HARSHAW CHEMICAL CO., CRYSTAL & ELCTRN. PRODS. DEPT., A Kenanee Industry, Dept. EM, 6801 Cochran Rd., Solon, Ohio 44139, Tel: 216-248-7400

Local Sales Offices & Reps.

Cal	Los Angeles, D. Cropsey	714-838-6340
Cal	San Francisco, R. Lowe	415-968-2171
DC	Washington, W. Todd Nuclear Products	703-356-9570
Ga	Atlanta, A. Barber	404-255-4616
Ill	Chicago, N. Pawluk	312-325-4179
Mass	Norwood, K. Babeaux	617-769-5065
NJ	Ramsey, M. Aguinas	201-327-8850
Ohio	Cleveland, D. Leslie	216-248-7400
Ohio	Solon, R. Kasulones Optical Prods.	216-248-7400
Tex	Houston, J. Owens	713-522-8377
Wash	Seattle, Showalter Instruments	206-455-4922

™HARTLOCK - Locking & Non-Locking Caps & Connectors - Arrow-Hart, Inc.

HARTMAN ELECTRICAL MFG., Div. A-T-O Inc., Dept. EM, 175 N. Diamond St., Mansfield, Ohio 44902, Tel: 419-524-1411, TWX: 810-448-2814; Empl.: 250

Local Sales Offices & Reps.

Ariz	Phoenix, Airsupply Co.	606-267-3916
Cal	Dublin, Airsupply Co.	415-829-0870
Cal	San Diego, Airsupply Co.	714-298-1121
Cal	San Monica, Airsupply Co.	213-829-1781
Ga	Marietta, Airsupply Co.	404-422-8242
Ill	Berkeley, Airsupply Co.	312-544-7400
Ind	Indianapolis, Airsupply Co.	317-248-8391
Kans	Wichita, Airsupply Co.	316-683-7518
Mass	Boston, Airsupply Co.	617-232-5020
Minn	Bloomington, Airsupply Co.	612-884-8950
Mo	Bridgeton, Airsupply Co.	314-731-3011
NY	Clinton, Airsupply Co.	315-735-8341
NY	Huntington Station, Airsupply Co.	516-249-1410
Ohio	Columbus, Airsupply Co.	614-861-1129
Ohio	Dayton, Airsupply Co.	513-224-0728
Pa	Valley Forge, Airsupply Co.	215-933-8924
Tex	Fort Worth, Airsupply Co.	817-355-4541
Va	Arlington, Airsupply Co.	703-525-1191
Wash	Bellevue, Airsupply Co.	206-454-7922
Exp:	Rye, N.Y., American Avitron	914-937-5300

HARTWELL CORP., Dept. EM, 900 S. Richfield Rd., Placentia, Cal. 92670, Tel: 714-993-4200, TWX: 910-596-1294; FSC No.: 83014; Empl.: 425

Local Sales Offices & Reps.

NJ	Hackensack, Hartwell Corp.	201-342-2964
Tex	Fort Worth, Hartwell Corp.	817-535-0824

HARWIL CO., Dept. EM, 1548 17th St., Santa Monica, Calif. 90404, Tel: 213-394-4710; Empl.: 5

™HASCO - tags - Nat'l. Band & Tag

HASCO COMPONENTS, Dept. EM, 920-18 Baychester Ave., Bronx, N.Y. 10475, Tel: 212-671-7057; Empl.: 13

Sales Manager: M. Hauser

Local Sales Offices & Reps.

Cal	Mountain View, Leddy Assoc.	415-969-6313
Ill	Des Plaines, Coombs Assoc	312-298-4830
NY	New York, Hasco Comp. Inc.	212-671-7057
Wisc	Milwaukee, Coombs Assoc.	414-671-1945

™HATFLEX - non-metallic cable - CCS Hatfield Wire & Cable Group

HATHAWAY INSTRUMENTS INC., Dept. EM, 11616 51st St., Tulsa, Okla. 74145, Tel: 918-663-0110, TWX: 910-845-2129; Empl.: 300

Local Sales Offices & Reps.

Terminals

Ariz	Phoenix, Airsupply Co.	602-267-3916
Cal	Dublin, Airsupply Co.	910-343-6861
Cal	Santa Monica, Airsupply Co.	213-670-6722
Ga	Marietta, Airsupply Co.	404-422-8242
Ill	Berkeley, Airsupply Co.	312-544-7400
Ind	Indianapolis, Airsupply Co.	317-248-8391
Kans	Wichita, Airsupply Co.	316-683-7518
Mass	Boston, Airsupply Co.	617-232-5020
Minn	Bloomington, Airsupply Co.	612-884-8950
Mo	Bridgeton, Airsupply Co.	314-731-3011
NY	Clinton, Airsupply Co.	315-735-8341
NY	Huntington, Airsupply Co.	516-249-1410
Ohio	Columbus, Airsupply Co.	614-861-1129
Ohio	Dayton, Airsupply Co.	513-224-0728
Pa	Valley Forge, Airsupply Co.	215-933-8924
Tex	Fort Worth, Airsupply Co.	817-335-4541
Va	Arlington, Airsupply Co.	703-525-1191
Wash	Bellevue, Airsupply Co.	206-454-7922

Motors

Ariz	Phoenix, Airsupply Co.	602-267-3916
Cal	Dublin, Airsupply Co.	415-829-0870
Cal	Santa Monica, Airsupply Co.	213-670-6722
Fla	Orlando, Von Kamecke Assoc.	305-843-5294
Ga	Marietta, Airsupply Co.	404-422-8242
Ill	Berkeley, Airsupply Co.	312-544-7400
Ind	Indianapolis, Airsupply Co.	317-248-8391
Kans	Wichita, Airsupply Co.	316-683-7518
Mass	Boston, Airsupply Co.	617-232-5020
Minn	Bloomington, Airsupply Co.	612-884-8950
Mo	Bridgeton, Airsupply Co.	314-731-3011
NY	Clinton, Airsupply Co.	315-735-8341
NY	Huntington Sta., Airsupply Co.	516-249-1410
Ohio	Columbus, Airsupply Co.	614-861-1129
Ohio	Dayton, Airsupply Co.	513-224-0728
Pa	Valley Forge, Airsupply Co.	215-933-8924
Tex	Fort Worth, Airsupply Co.	817-335-4541
Va	Arlington, Airsupply Co.	703-525-1191
Wash	Bellevue, Airsupply Co.	206-454-7922

HATHAWAY INSTRUMENTS, INC., Dept. EM, 5250 E. Evans Ave., Denver, Colo. 80222, Tel: 303-756-8301, TWX: 910-931-0568; Empl.: 150

Local Sales Offices & Reps.

Ariz	Sun City, WGT Sls. Co.	602-977-1997
Cal	El Monte, Randolph Inds.	213-283-7901
Cal	San Francisco, Davis & Gregory Co.	415-989-4137
Colo	Denver, K & L Engrg. & Sls.	303-759-1115
Ga	Atlanta, M.J. Fein & Co.	404-938-0190
Ill	Northbrook, M.J. Fein & Co.	312-564-0430
La	Bossier City, Roy L. Adley Co.	318-747-2180
Mass	Holliston, M.J. Fein & Co.	617-236-2546
Mo	Kansas City, Cleaves-Bessmer-Marietti, Inc.	816-353-6011
NJ	Livingston, M.J. Fein & Co.	201-994-3575
NY	Scarsdale, M.J. Fein & Co.	914-472-1100
Tex	Waco, Van Valin Sls. Co.	817-772-5906

™HATRON - nbr/pvc jacket (color) - CCS Hatfield Wire & Cable Group

™HATVINOL - pvc insulation - CCS Hatfield Wire & Cable Group

™HAVAR - alloy - Hamilton Technology, Inc.

HAYDON SWITCH & INSTR., INC., Dept. EM, 1500 Meriden Rd., Waterbury, Conn. 06705, Tel: 203-756-7441, TWX: 710-477-2580; FSC No.: 02005; Empl.: 130

Local Sales Offices & Reps.

Ala	Huntsville, Incotech, Inc.	205-837-6061
Ariz	Phoenix, Airsupply Co.	602-267-3916
Cal	Dublin, Airsupply Co.	415-829-0870
Cal	San Diego, Airsupply Co.	714-298-1121
Cal	Torrance, Airsupply Co.	213-538-5080
Ill	Westchester, Gassner & Clark	312-345-4245
Iowa	Hiawatha, Gassner & Clark Co.	319-393-5763
Kans	Wichita, Airsupply Co.	316-683-7518
Mo	Bridgeton, Airsupply Co.	314-731-3011
NY	Clinton, Airsupply Co.	315-735-8341
NY	Mineola, Transaero, Inc.	516-248-0400
Ohio	Cleveland, A. H. Baier Co.	216-461-6161
Ohio	Dayton, A. H. Baier Co.	513-276-4128
Pa	King of Prussia, Airsupply Co.	215-265-2717
Tex	Fort Worth, Airsupply Co.	817-335-4541
Va	Arlington, Airsupply Co.	703-525-1191
Wash	Bellevue, Airsupply Co.	206-454-7922
Exp:	N.Y., Mineola, Transaero	516-248-0400

™HAYSITE - fiberglass reinforced plastics - Synthane Taylor Corp.

H-B INSTR. CO., Dept. EM, 4315 N. American St., Philadelphia, Pa. 19140, Tel: 215-329-9125; Empl.: 45

Local Sales Offices & Reps.

Cal	Oakland, Leland Green Co.	415-836-1880
Cal	Sherman Oaks, R.S. Hopkins Co.	213-788-5501
Ill	Chicago, A.D. Clark	312-274-0304
NC	Charlotte, JMW Sys.	704-334-8481
Ohio	Cincinnati, Hitt Equip. Co.	513-761-9966
Tex	Dallas, SWK	214-351-9985
Wash	Seattle, Fairman Lee Co.	206-244-7262

HBM, Dept. EM, 17 Milcer Rd, Natick, Mass. 01760, Tel: 617-655-0950

HBS EQUIPMENT DIV., Dept. EM, 3000 Supply Ave., Los Angeles, Calif. 90040, Tel: 213-726-3033, TWX: 910-580-3179; Empl.: 40

Sales Manager: K. Lowery

Local Sales Offices & Reps.

Fla	Orlando, Gra-Mar Inc.	305-894-3351
Ill	Itasca, English Sls. Co.	312-773-9449
Mass	Waltham, Etchomatic, Inc.	617-893-2020
Minn	Minneapolis, D.G. Perry & Co., Inc.	612-835-3313
NJ	Allamuchy, Aztec Assocs.	201-852-1745
NJ	Pennington, Chemtek	609-466-1414
Ohio	Cleveland, Gilbert Tramer Co.	216-771-2751
Tex	Richardson, Oliver Sls.	214-231-1522
Utah	Salt Lake City, Retep	801-486-3141
Va	Alexandria, Chemical Etching Equip. & Supply Co.	703-971-2646
Wash	Seattle, Chemithon Corp.	206-937-9954

™HC HOLTZER - Cabot Motors - Eastern Air Devices Motor Div.

™HD - heavy duty detergent cleaner - Clean Room Prods.

™HDC - filter medium - Pall Corp.

™HDT - hitemp adhesive - Allaco Prods Div.

HEADWAY RESEARCH, INC., Dept. EM, 3713 Forest La., Garland, Tex. 75042, Tel: 214-272-5431

Local Sales Offices & Reps.

Cal	Santa Ana, Nelson Engrg.	714-545-2550
Cal	Sunnyvale, Wilson Entprs.	408-732-9050

™HEALTHKIT - kit-form products - Heath Co.

™**HEALTH/SCHLUMBERGER** - test & measurement instruments - Heath Co.

™**HEATBANK** - heat recovery system - Hughes Aircraft Co.

™**HEAT GUARD** - elec. soldering iron holders - Hexacon Elec. Co.

HEATH CO., Dept. EM, Dept. 180, Benton Harbor, Mich. 49022, Tel: 616-982-3411, Telex: 72-9421; Empl.: 1500

Local Sales Offices & Reps.

Ariz	Phoenix, Heathkit Elctrn. Center	602-279-6247
Cal	Anaheim, Heathkit Elctrn. Center	714-776-9420
Cal	El Cerrito, Heathkit Elctrn. Center	415-236-8870
Cal	La Mesa, Heathkit Elctrn. Center	714-461-0110
Cal	Los Angeles, Heathkit Elctrn. Center	213-749-0261
Cal	Pomona, Heathkit Elctrn. Center	714-623-3543
Cal	Redwood City, Heathkit Elctrn. Center	415-365-8155
Cal	Woodland Hills, Heathkit Elctrn. Center	213-883-0531
Colo	Denver, Heathkit Elctrn. Center..	303-422-3408
Conn	Avon, Heathkit Elctrn. Center	203-678-0323
Fla	Hialeah, Heathkit Elctrn. Center	305-823-2280
Fla	Tampa, Heathkit Elctrn. Center..	813-884-3102
Ga	Atlanta, Heathkit Elctrn. Center..	404-252-4341
Ill	Chicago, Heathkit Elctrn. Center	312-583-3920
Ill	Downers Grove, Heathkit Elctrn. Conter	312-852-1304
Ind	Indianapolis, Heathkit Elctrn. Center	317-257-4321
Kans	Mission, Heathkit Elctrn. Center	913-362-4486
Ky	Louisville, Heathkit Elctrn. Center	502-245-7811
La	Kenner, Heathkit Elctrn. Center..	504-722-6321
Md	Baltimore, Heathkit Elctrn. Center	301-661-4446
Md	Rockville, Heathkit Elctrn. Center	301-881-5420
Mass	Wellesley, Heathkit Elctrn. Center	617-237-1510.
Mich	Detroit, Heathkit Elctrn. Center ..	313-535-6480
Mich	E. Detroit, Heathkit Elctrn. Center	313-772-0416
Minn	Hopkins, Heathkit Elctrn. Center	612-938-6371
Mo	St. Louis, Heathkit Elctrn. Center	314-291-1850
Neb	Omaha, Heathkit Elctrn. Center	402-391-2071
NJ	Fair Lawn, Heathkit Elctrn. Center	201-791-6935
NY	Amherst, Heathkit Elctrn. Center	716-835-3090
NY	Jericho, Heathkit Elctrn. Center	516-334-8181
NY	New York, Heathkit Elctrn. Center	212-765-4590
NY	No. White Plaines, Heathkit Elctrn. Center	914-761-7690
NY	Rochester, Heathkit Elctrn. Center	716-227-4750
Ohio	Cleveland, Heathkit Elctrn. Center	216-886-2590
Ohio	Columbus, Heathkit Elctrn. Center	614-475-7200
Ohio	Toledo, Heathkit Elctrn. Ctr.........	419-537-1887
Ohio	Woodlawn, Heathkit Elctrn. Center	513-771-8850
Pa	Frazer, Heathkit Elctrn. Center ..	215-647-5555
Pa	Philadelphia, Heathkit Elctrn. Center	215-288-0180
Pa	Pittsburgh, Heathkit Elctrn. Center	412-824-3564
RI	Warwick, Heathkit Elctrn. Center	401-738-5150
Tex	Dallas, Heathkit Elctrn. Center ..	214-826-4053
Tex	Houston, Heathkit Elctrn. Center	713-623-2090
Va	Norfolk, Heathkit Elctrn. Ctr.	804-460-0997
Wash	Seattle, Heathkit Elctrn. Center..	206-682-2172
Wisc	Milwaukee, Heathkit Elctrn. Center	414-873-8250

HEATH DYNAMICS, Rengency Elect. (Shepard Inds.), Dept. EM, 6050 N. 52 Ave., Glendale, Ariz. 85301, Tel: 602-934-5234

Sales Manager: M. Story

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-833-9260
Cal	San Jose, Frequency Control Assoc.	408-253-4677
Fla	Maitland, Hawkins-Hutto-Peregoy	305-831-2474
Ind	Indianapolis, J. Ihrig Assocs.	317-783-7630
NY	Dix Hills, K & J Engrg.	516-242-0888
Ohio	Medina, J. C. Hofstetter Co.	216-241-4880
Wash	Kirkland, Manon Engrg................	206-827-7449

™**HEAT-LES** - desiccant dryer - Pall Corp.

™**HEAT PROBER** - thermister type electronic thermometer - Wahl, Wm. Corp.

™**HEAT PROVER** - combustion analyzer - Bailey Meter Co.

™**HEATRAM** - power supply dissipator - Power Designs, Inc.

™**HEATRAX** - heat shrinkable tubing - ICO/Rally Corp.

™**HEAT-SEAL STIK** - sealant & pipe thread compound - Lake Chemical Co.

™**HEAT SPY** - infrared thermometers - Wahl, Wm. Corp.

™**HEATZONE** - high temperature wire - Cerro Wire & Cable Co.

™**HEBBAR** - anti-reflective coating - Melles Griot

H 890 HECON®

HECON CORP., Dept. EM, 31 Park Rd., Tinton Falls, N.J. 07724, Tel: 201-542-9200, Telex: 13-2457; Empl.: 200

Local Sales Offices & Reps.

Ariz	Tempe, Gassner & Clark Corp...	602-968-9037
Cal	Chatsworth, Hecon Corp............	213-998-7190
Cal	Sunnyvale, RDP Instrs................	408-735-9040
Colo	Littleton, Radco Elctrns.	303-794-4279
Fla	Bradenton, Hutto-Hawkins-Peregoy, Inc.	813-755-4015
Fla	Maitland, Hutto-Hawkins-Peregoy, Inc.	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy, Inc.	305-943-9593
Ind	Indianapolis, James Woolgar Co.	317-849-3930
Mass	Brookline, Hecon Corp................	617-734-8525
Minn	St. Paul, Howard A. Cullen & Assoc.	612-646-7371
NJ	Laurel Springs, Hecon Corp.	609-784-2334
NJ	Wayne, Hecon Corp......................	201-839-5454
NC	Monroe, Hecon Corp.	704-283-1233
Ohio	Cleveland, Hecon Corp.	216-331-2230
Ore	Portland, Fry Controls, Inc.	503-226-2620
Tex	Houston, Unidyne	713-772-3170
Exp:	Can., Rexdale, Ont., Hecon Can., Ltd.	416-675-3663

Local Distributors

Ala	Birmingham, Applebee-Church ..	205-879-4417
Ariz	Phoenix, Petro Elctrns.	602-269-9375
Cal	Burlingame, Control Devices Pacific	415-343-2773
Cal	Los Angeles, Pacific Elctrnc. Sls.	213-663-8060
Cal	Los Angeles, California Wholesale Elec. Co.	213-723-6711
Cal	San Francisco, Steven Engrg. Co.	415-583-5868
Cal	San Francisco, Master Distrs.	415-626-0807
Cal	Santa Monica, Master Distrs.......	213-829-4656
Conn	Middletown, Mancib Co.	203-346-6646
Conn	Stratford, State Elctrns. Parts Corp.	203-375-5961
Fla	Lakeland, A-A Electric Div. AEC	813-682-6181
Fla	Miami, Electro Standards Labs ..	305-633-6973
Ga	Atlanta, Applebee-Church	404-451-2747
Ill	Addison, Lectron Controls Co.....	312-543-8460
Ill	Chicago, Don Johns, Inc.	312-666-2210
Ill	Mount Prospect, Automation Equip. Co.	312-398-7550
Ill	Park Ridge, Automation Comp Sls.	312-823-8075
Ind	Indianapolis, Graham Elctrns. Sup.	317-634-8202
Kans	Overland Park, Parker & Foster, Inc.	913-381-9330
Ky	Louisville, D. Johns of Kentucky	502-491-3495
La	Kenner, Automation Specialists..	504-721-3497
Md	Baltimore, E.I.L. Instrs.	301-252-1260
Mass	Burlington, Mancib Co.	617-272-9450
Mass	Worcester, F. X. Bonneau Assocs.	617-754-7655
Mich	Detroit, Motion Control Corp.......	313-478-1640
Minn	St. Paul, Power/Mation Div.........	612-645-0781
Minn	St. Paul, United Elec. Corp.	612-333-1111
Mo	University City, E. W. Mooney Co.	314-725-8875
NJ	Elmwood Park, Richards Co.......	201-797-6300
NJ	Hanover, State Elctrns................	201-887-2550
NJ	Piscataway, Fromm Electric Supply Co.	201-981-0400
NY	Albany, Edwin E. Taylor Co.	518-438-7811
NY	Buffalo, KOM Lamb, Inc.	716-874-3530
NY	Mamaroneck, Logicomp Elctrns.	914-698-9332
NC	Winston-Salem, Kirkman Elctrns.	919-724-0541
Ohio	Cincinnati, United Radio, Inc.	513-761-4030
Ohio	Dayton, Summit Inds., Inc.	513-434-8192
Ohio	Toledo, Toldedo Ind'l. Repair......	419-382-2261
Ohio	Warren, Rem Electronics Supply Co.	216-399-2777
Okla	Tulsa, Radio, Inc..........................	918-587-9123
Ore	Portland, Platt Electric Supply....	503-228-6121
Pa	Erie, J. H. Cross Co.....................	814-833-1104
Pa	Murrysville, Bobar Instrs.	412-327-3700
Pa	Philadelphia, Royal Electric Supply Co.	215-221-1200
Pa	Reading, Barbey Elctrns., G. D. Barbey Co.	215-376-6116
Pa	Wilkinsburg, Fuller Instr. Svc., Inc.	412-241-6789
SC	Greenville, Barker Controls	803-244-6495
Tex	Beaumont, Ralph's Ind'l. Elctrns.	713-833-9443
Tex	Dallas, Wholesale Elctrn. Co.	214-824-3001
Tex	Dallas, Dallas Instrs.	214-349-1180
Tex	Fort Worth, Allied Elctrns. Corp.	817-336-5401
Tex	Houston, Ralph's Ind'l. Elctrns. ..	713-641-0267
Tex	Houston, Wofford Elctrn. Parts Co.	713-644-1838
Tex	Houston, T & J Instrs..................	713-666-2308
Tex	Odessa, Kobe, Inc.	915-362-7391
Va	Alexandria, E.I.L. Instrs.	703-354-4330
Va	Richmond, Avec Elctrns. Corp. ..	804-359-6071
Wash	Seattle, Radar Electric Co.	206-282-2511
Wisc	Cedarburg, Automation Engrg. Co.	414-377-7500

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HEEGER INC., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021, Tel: 213-627-9310; Empl.: Ten

Local Sales Offices & Reps.

Ala	Birmingham, J.F. Russel Co.	
Ariz	Phoenix, B.G. Sls. Co..................	602-266-5624
Cal	Burlingame, Carelli EMA.............	415-697-8862
Colo	Aurora, A.E.S.	303-366-0208
Fla	Ft. Lauderdale, Unirep	
Ill	Chicago, PBE Mkts......................	312-OR4-3018
Ind	Mulberry, Maish Sls.	
Mass	Farmingham, Northeastern Rep	617-877-4850
Mich	Bloomfield Hills, S.F. McMedhan	313-852-4308
Minn	Minneapolis, A.J. Warner	
Mo	St. Louis, K. Kelly & Co.	
NY	Camillus, W.M. Ferguson	
NY	Yonkers, J. Brown Elctrn............	914-779-7330
NC	Charlotte, De Witt-Austin Co.......	704-366-4643
Ohio	Stow, J.A. Mandabach	216-686-1965
Ore	Portland, J.W. Eckersley	503-246-3183
Pa	Holland, Parnell Sls. Co.	215-355-9330
Tex	Houston, B. Wylds Co.	

™**HEETSTRIP** - heating element - Therm-O-Lab Corp.

HEI, INC., Dept. EM, Jonathan Ind'l. Ctr., Chaska, Minn. 55318, Tel: 612-448-3510, TWX: 910-578-0832; Empl.: 175

Sales Manager: R.D. Young

Local Sales Offices & Reps.

Cal	Burlingame, Leddy Assocs.	415-347-5247
Cal	Los Angeles, M.A. Stolaroff Co.	213-295-7781
Colo	Denver, Thorson Co......................	303-759-0809
Fla	Ft. Lauderdale, CBC Elctrns.......	305-484-7330
Ill	Northbrook, Raines-Brin Assocs.	312-498-0890
Md	Baltimore, Stitzer Assocs.	301-823-2600
Mass	Andover, Sales Engrg..................	617-470-0800
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	St. Paul, Cahill Assocs.	612-646-7217
Mo	St. Louis, Thunderbird..................	314-567-6488
NY	Fairport, Franklin Sls.	716-377-6584
NY	Massapequa, Coughlin Assoc.....	516-799-7743
NY	New Hartford, Franklin Sls.	315-737-5038
NY	Syracuse, Franklin Sls..................	315-472-5273

Ohio	Rocky River, C. H. Dolfuss, Jr. & Co.	216-333-7504
Pa	Paoli, Stitzer Assocs.	215-644-5500
Tex	Dallas, ION Assocs.	214-357-9441
Wash	Bellevue, Comtec	206-453-1188

HEINEMANN GMBH, see Capintec Instruments

HEINEMANN ELEC. CO., Dept. EM, 2636 Brunswick Pike, Trenton, N.J. 08602, Tel: 609-882-4800; FSC No.: 74193; Empl.: 405 .... p. 3551,4094

Local Sales Offices & Reps.

Ala	Birmingham, J. Spader Co.	205-879-1366
Ariz	Phoenix, O'Donnell Assocs.	602-993-9740
Cal	Burlingame, Campbell & George	415-697-2965
Cal	Encino, Porter Co.	213-999-0171
Colo	Denver, P.A. Douden	303-744-1497
Fla	Boca Raton, Conley & Assoc. Inc.	305-395-6108
Fla	Oviedo, Conley & Assocs., Inc.	305-365-3283
Fla	Tampa, Conley	813-933-1759
Ga	Decatur, Spader & Associates	404-296-3024
Ill	Chicago, D. Dolin Sls.	312-286-6200
Ind	Marion, O. Bromberg	317-664-5384
Ky	Louisville, O. Bromberg	502-245-8916
Md	Ellicott City, McCourt	301-465-4515
Mass	Framingham, Sullivan Tech. Sls.	617-620-0195
Mich	Detroit, L. H. Dickelman Co.	313-353-8210
Minn	Minneapolis, H. Smith	612-881-3620
Mo	St. Louis, Hill & Co.	314-621-1818
NJ	Ridgewood, Ballou, Inc.	201-444-6990
NJ	Trenton, Kriegner Sls.	609-882-6330
NY	Rochester, Canavan-Scanlon	716-442-0720
NY	Syracuse, Canavan-Scanlon	315-437-1271
NC	Charlotte, J. Rudisill Assocs., Inc.	704-377-6901
Ohio	Cincinnati, O. Bromberg	513-771-9333
Ohio	Cleveland, Brown Elect. Prod.	216-331-2072
Okla	Tulsa, Comps. Inc.	918-583-9149
Pa	Pittsburgh, Brown Elec. Equip.	412-279-1101
Tex	Dallas, Glidden Electro Equip.	214-341-0610
Tex	Houston, Glidden Electro Equip.	713-681-1415
Wash	Mercer Island, J. Andersen	206-232-0484
Wisc	Thiensville, Control Sales	414-242-4580

™HEINTZ & KAUFMAN - electron tubes - JSH Electronics, Inc.

HEITZ, INC., KARL, Dept. EM, 979 Third Ave., New York, N.Y. 10022, Tel: 212-421-5220; Empl.: 17

™HELIAX - coaxial cable - Andrew Corp.

™HELIAX - cable and waveguide - Andrew Antenna Co. Ltd.

™HELI-CAL - flexible shaft coupling - Helical Prods. Co., Inc.

HELICAL PRODS. CO., INC., Dept. EM, Box 2296, Santa Maria, Cal. 93454, Tel: 805-925-8651; FSC No.: 13201; Empl.: 15

Local Sales Offices & Reps.

Cal	Los Angeles, TechRep Assocs.	213-641-5830
Ill	Chicago, Engineered Sls.	312-867-8434
Md	Baltimore, R. P. Luce Co.	301-752-8200
Mass	Lexington, Hathaway Elctrn.	617-861-7010
Mich	Grand Rapids, Ray Van Riper Sls.	616-452-0464
Minn	St. Paul, W. Taubert	612-636-6414
NJ	Berkeley Hts., R. P. Luce & Co.	201-464-6440
NY	DeRuyter, R. P. Kennedy Co.	315-682-2920
NY	New Hook, R. P. Kennedy Co.	914-876-2700
NY	New Hyde Park, R. P. Luce & Co.	516-437-4550
NY	Rochester, R. P. Kennedy Co.	716-271-6322
Ohio	Fairburn, Tech. Assocs.	513-878-2484
Pa	Philadelphia, R. P. Luce & Co.	215-884-8365
Va	Richmond, R.P. Luce & Co.	804-276-2903

HELIOTEK, See Spectrolab, Inc.

™HELICOP HUT - electronic equipment shelters - Craig Sys. Corp.

™HELICORD - retractile cords - Storm Products Co.

™HELIDEL - delay lines - Beckman Instrs.

™HELIFLUX - magnetometers - Schonstedt Instr. Co.

™HELILUBE - potentiometer lubricant - Beckman Instrs.

™HELIOTEK - solar cells - Spectrolab, Inc.

™HELIPOT - precision potentiometers - Beckman Instrs.

™HELITRIM - trimming potentiometers - Beckman Instrs.

™HELI-TUBE - spiral wrap tubing - Newman Corp., M. M.

™HELI-TUBE - spiral wrap tubing - Antex Div.

™HELI-WHIP - whip antennas - Anixter-Mark

™HELIX DESIGN - potentiometers, transducers & delay lines - Beckman Instrs.

HELIX SPRING CORP., Dept. EM, 35-10 10th St., Long Island City, N.Y. 11106, Tel: 212-YE2-0303; Empl.: 25

HELM INSTR. CO., Dept. EM, 4511 South Ave., Toledo, Ohio 43615, Tel: 419-531-0146; Empl.: 14

Local Sales Offices & Reps.

Ark	Little Rock, M. Robinson Co.	501-666-2170
Cal	La Jolla, R.S. Purinton	714-459-9185
Ill	Lagrange, Olson Eng.	312-482-3300
Ind	Fort Wayne, G.A. Stacy & Asc.	219-483-8331
Mo	St. Louis, Woodsons Machinery Co.	314-822-8836
NJ	Wyckoff, Vard-Smith Assocs.	
Pa	Oreland, N.H. Rogers & Co.	
Pa	Pittsburgh, WKM Asc. Inc.	412-892-2953
Tex	Houston, Mepco	713-941-6969

™HELM-PAK - modular instrument controls & monitors - Helm Instr. Co.

HENES PRODUCTS CORP., Dept. EM, 4301 E. Madison St., Phoenix, Ariz. 85034, Tel: 602-275-4126; Empl.: 25

Local Sales Offices & Reps.

Cal	Costa Mesa, Scrantom Engrg. Inc.	714-979-6373
Cal	Los Altos, C.D. Buerki Co.	415-941-3343
Conn	Bridgeport, Tech. Instrs., Inc.	203-368-4582
Ill	Roselle, Automated Process, Inc.	312-885-1095
Ind	Cumberland, Automated Process, Inc.	317-251-0708
Mass	Wilmington, Tech. Insts., Inc.	617-944-3930
Minn	Minneapolis, Automated Process, Inc.	612-545-4481
Mo	Hazelwood, Production Automation Corp.	314-731-2331
Mo	Raytown, Production Automation Corp.	816-737-0066
NJ	Saddle Brook, L & M Assocs.	201-843-8700
NY	Brentwood, L & M Assocs.	516-231-8363
NY	New York, L & M Assocs.	212-675-7486
NC	Raleigh, F.G. Speidel	919-787-4521
Ohio	Dayton, H. Noyes & Assocs.	513-274-2871
Ore	Yamhill, Walsh-Ehlers, Inc.	503-662-3207
Pa	Andalusia, L & M Assocs.	215-639-3100
Tex	Dallas, R.W. Mureen Co.	214-369-7561
Wash	Bellevue, Walsh-Ehlers, Inc.	206-454-2211
Wisc	Milwaukee, Automated Process, Inc.	414-354-4370
Exp:	N.Y., New York, E.D. Allmendinger, Inc.	212-269-0090

HENSCHEL CORP., Dept. EM, 14 Cedar St., Amesbury, Mass. 01913, Tel: 617-388-1103, Telex: 94-7444; FSC No.: 28199; Empl.: 120

Local Sales Offices & Reps.

Cal	Los Angeles, Allied Ind.	213-770-0004
Cal	San Francisco, Beck Elc. Supply Co.	415-495-8870
La	New Orleans, Carstone Corp.	504-525-2231
NJ	Jersey City, Henschel Corp.	201-434-1113
NJ	Morristown, C. Gilfillan	609-235-3376
Ohio	Cleveland, Electro-Marine Corp.	216-631-3082
Wash	Bellevue, Ralston Cunningham Assocs.	206-455-0316
Wisc	Superior, Benson Elec. Co.	715-394-5548

™HEP - hobby devices - Motorola Semiconductor Prods.

HEPCO WIRE & CABLE, Dept. EM, Box 76, Garnvl., Garnersville, N.Y. 10923, Tel: 914-947-1220; Empl.: 18

Sales Manager: S. Grant

Local Sales Offices & Reps.

NJ	Paramus, Topinka Assocs.	201-265-7305

HERALD ELECTRONICS, Dept. EM, 6611 N. Lincoln Ave., Chicago, Ill. 60645, Tel: 312-675-1100; Empl.: 13

Sales Manager: H. Katz

Local Sales Offices & Reps.

Ariz	Phoenix, H. Moore Sls. Assoc.	602-274-4558
Cal	Foster City, Olson Sls.	415-573-1600
Cal	Northridge, I. Fenton & Assoc.	213-363-0971
Fla	Pembroke Pines, Joe Wanger Sls.	305-987-8766
Ind	Indianapolis, Ronald Munn Co.	317-546-5556
Mich	Detroit, Markal Sls.	313-355-5700
Mich	Grand Rapids, Markal Sls.	616-942-2670
NY	Middle Village, BCD Sls.	212-894-1331
Pa	Philadelphia, Carmine Assoc.	215-334-4533
Tex	Houston, Buck Rogers Co.	713-626-5370
Exp:	Chicago, Ill., Magnus & Assoc.	312-334-1503

™HERESY - loudspeaker system - Klipsch & Assocs. Inc.

™HERGA - air activated control - Logicomp Elctrns., Inc.

™HERGAIR - air activated switch - Logicomp Elctrns., Inc.

HERMAN STUDIOS, A., Dept. EM, 4558 Farmdale Ave., N. Hollywood, Cal. 91602, Tel: 213-761-7160

™HERMASEAL - glass to metal seals - Durakool

™HERMEFLEX - hermetic rotary seals - Singer Co.

HERMES ELECTRONICS LTD., Dept. EM, Suite 315, 2020 F. Street N.W., Washington, D.C. 20006

™HERMETICOOL - refrigeration system - Tenney Engrg., Inc.

HERMETIC SEAL CORP., Dept. EM, 4232 Temple City Blvd., Rosemead, Cal. 91770, Tel: 213-283-0411, TWX: 910-587-3352; FSC No.: 04820; Empl.: 100

HERMETIC SWITCH, INC., Dept. EM, Box 1325, Hwy 92 W., Chickasha, Okla. 73018, Tel: 405-224-4046,; Empl.: 100

Local Sales Offices & Reps.

Cal	San Diego, V. Gott & Assocs.	714-272-8452
Cal	San Gabriel, V. Gott & Assocs.	213-285-2148
Conn	Bristol, New England Elctrn. Sls.	203-583-3650
Md	Timonium, Heller Sls.	301-252-4780
Mass	Canton, New England Elctrn. Sls.	617-828-4835
Mich	Troy, Pine Sls.	313-524-1860
Minn	Minneapolis, Peterson Elctrns.	612-884-3483
NY	Oceanside, Current Ind's.	516-678-3895
Ohio	Chagrin Falls, Pine Sls.	216-247-6198
Tex	Houston, R. F. Kimball Co.	800-492-2805
Tex	Richardson, R. F. Kimball Co.	214-231-3447

HERTNER DIV., General Battery Corp., Dept. EM, 12690 Elmwood Ave., Cleveland, Ohio 44111, Tel: 216-252-4242, Telex: 98-5552; Empl.: 125

Sales Manager: S. Stevens

Local Sales Offices & Reps.

Cal	Canoga Park, R.C. Kruse Assocs.	213-341-3020
Mass	Boston, Total Power Corp.	617-879-2066
Ohio	New Philadelphia, T. E. Adamich Co.	216-343-1601

HERTZ FILTER, Dept. EM, 3 Aerial Way, Syosset, N.Y. 11791, Tel: 516-822-4770; Empl.: 22 .... p. 2736

™HETROCOLOR - time base corrector - Television Microtime, Inc.

HEWLETT-PACKARD CO., Dept. EM, 1501 Page Mill Rd., Palo Alto, Cal. 94304, Tel: 415-493-1501, TWX: 910-373-1267; Empl.: 31000

Local Sales Offices & Reps.

Ala	Huntsville	205-881-4591
Ariz	Phoenix	602-244-1361
Ariz	Tucson	602-294-3148
Cal	Fullerton	714-870-1000
Cal	Los Angeles	213-649-2511
Cal	North Hollywood	213-877-1282
Cal	Sacramento	916-482-1463
Cal	San Diego	714-279-3200
Cal	Santa Clara	408-249-7000
Colo	Englewood	303-771-3455
Conn	New Haven	203-389-6551
Fla	Ft. Lauderdale	305-731-2020
Fla	Orlando	305-859-2900
Ga	Atlanta	404-434-4000

Haw	Honolulu	808-955-4455
Ill	Rolling Meadows	312-255-9800
Ind	Indianapolis	317-842-1000
Iowa	Iowa City	319-338-9466
La	Kenner	504-443-6201
Md	Baltimore	301-944-5400
Md	Rockville	301-948-6370
Mass	Lexington	617-861-8960
Mich	Farmington	313-476-6400
Minn	St. Paul	612-636-0700
Mo	Kansas City	816-763-8000
Mo	Maryland Hghts	314-567-1455
NJ	Paramus	201-265-5000
NM	Albuquerque	505-292-1330
NM	Las Cruces	505-526-2485
NY	Albany	518-458-1550
NY	Poughkeepsie	914-454-7330
NY	Rochester	716-473-9500
NY	Syracuse	315-454-2486
NY	Woodbury	201-265-5000
NY	Woodbury	516-921-0300
NC	High Point	919-885-8101
Ohio	Cleveland	216-243-7300
Ohio	Columbus	614-436-1041
Ohio	Dayton	513-859-8202
Okla	Oklahoma City	405-721-0200
Ore	Tualatin	503-620-3350
Pa	King of Prussia	215-265-7000
Pa	Pittsburgh	412-782-0400
SC	Columbia	803-782-6493
Tex	Houston	713-781-6000
Tex	Richardson	214-231-6101
Tex	San Antonio	512-434-8241
Utah	Salt Lake City	801-487-0715
Va	Richmond	803-285-3431
Wash	Bellevue	206-454-3971
Wisc	West Allis	414-541-0550

HEXACON ELEC. CO., Dept. EM, 621 W. Clay Ave., Roselle Park, N.J. 07204, Tel: 201-CH5-6200, Telex: 13-8812; Empl.: 150 .... p. 4330-4333

Local Sales Offices & Reps.

Ala	Huntsville, BJR Manufacturers' Representatives	205-881-3569
Ariz	Tucson, Ross Ribaudo	602-299-1425
Cal	Burlingame, Dillon Stevens	415-697-3022
Cal	L.A., Dillon Stevens Co.	213-747-9221
Conn	Woodstock, HDQ & HV Neff	203-974-1281
Fla	Merritt Island, J.A. Kennedy Co.	305-452-9821
Ill	Des Plaines, Process Specialties, Inc.	312-299-8570
Kans	Kansas City, L.E. Bruns	913-287-5242
Ky	Walton, J. Parker	606-384-3641
Md	Phoenix, REBCO Sls.	301-592-8907
Minn	Minneapolis, Westlund Assocs.	612-866-5002
NY	New Hartford, V. Clair	315-735-8122
NY	New York City, Dunn & Bryan	212-964-8091
Ohio	Cleveland, Im Tech, Inc.	216-826-3400
Ore	Milwaukie, Northcoast Mfrs. Agency Inc.	503-659-3811
Pa	Levittown, REBCO Sls	215-547-4665
Tex	Richardson, P.J. Scanlon	214-231-4661
Wash	Seattle, Northcoast Mfrs. Agency, Inc.	206-284-5024
Exp:	N.Y., New York, W.D. Blood & Co.	212-344-0210
Exp:	P.R., Hato Rey, M. Anderson	809-726-0225

™HEX-A-CORN - self-sealing acorn nuts - APM-Hexseal

™HEXCLAD - contact mfg. process - Plessey Inc.

™HEXSEALS - switch sealing boots - APM-Hexseal

™HEX WIK - solder remover - Hexacon Elec. Co.

™HEYCO - strain relief bushings, insulating bushings & cable clamps - Heyman Mfg. Co.

HEYMAN MFG. CO., Dept. EM, 147 N. Michigan Ave., Kenilworth, N.J. 07033, Tel: 201-245-2345, 800-558-0917, TWX: 710-996-5986; FSC No.: 28520; Empl.: 86 .... p. 4669

Local Sales Offices & Reps.

Wisc	Waukesha, Heyman Mfg. Co.	800-242-0985

HGA ELCTRNS., INC., Dept. EM, 519 S. Fifth Ave., Mt. Vernon, N.Y. 10550, Tel: 914-664-5393; Empl.: 3

™HGA/TRANSTECH - amplifiers-powerpacks - HGA Elctrns., Inc.

™HG BRIGHT GOLD - 23kt low stress, hard & bright - Technic, Inc.

H H CONTROLS CO., INC., Dept. EM, 16 Frost St., Arlington, Mass. 02174, Tel: 617-646-2626; Empl.: 22

Local Sales Offices & Reps.

Cal	Montebello, TUCUL Engrg. Co.	213-728-7397
Ill	Park Ridge, Electrical Materials & Equip.	312-696-1540
Mass	Stoneham, K & D Elctrns.	617-438-3002
Ohio	Cleveland, Adcon Engrg. Co.	216-238-3916
Ore	Portland, A.L. Polich	503-246-5451
Tex	Houston, C. Butt Co.	713-526-3101
Va	Roanoke, Johnson Custom Controls	703-774-5550

HI-G CO., INC., Electronic Prods., Dept. EM, 580 Spring St., Windsor Locks, Conn. 06096, Tel: 203-623-2481, TWX: 710-420-0592; FSC No.: 02289 .. p. 3528-3537

Local Sales Offices & Reps.

Ala	Huntsville, L & D Inc.	205-837-8480
Ariz	Scottsdale, Fryco	602-945-3281
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Easton, J.E. Boeing Co.	203-261-9512
Fla	Coral Springs, Shaw Engrg. & Sls.	305-752-7596
Ill	Mt. Prospect, Magnuson Assocs.	312-956-0700
Ind	Ft. Wayne, Given Corp.	219-432-5585
Kans	Overland Park, Buse Sls. Co.	913-648-7748
Kans	Wichita, Buse Sls. Co.	316-685-8036
Md	Riderwood, Manreps	301-296-2778
Mass	Lexington, J.E. Boeing Co.	617-862-2500
Mich	Grand Rapids, Elliott Sls. Co.	616-949-1451
Minn	St. Paul, Magnuson Assocs.	
Mo	St. Charles, Buse Sls. Co.	314-723-1122
NY	Jericho, HRC Comp-Tech	516-822-5550
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Greensboro, L & D Inc.	919-292-3201
Ohio	Cincinnati, Components	513-866-0661
Ohio	W. Carollton, Components	216-243-9200
Ore	Lake Oswego, Ruggles Technical Sls.	503-636-5902
Pa	Ardmore, Manreps	215-649-6300
SC	Greenville, L & D, Inc.	803-268-5201
Tex	Dallas, United Comps.	214-324-1448
Utah	Salt Lake City, Omega, Ltd.	801-266-9617
Wash	Bellevue, Ruggels Tech. Sls.	206-455-2778

Local Distributors

Ala	Montgomery, Southern Controls	1-800-392-5700
Cal	Woodland Hills, Rampart Comps.	213-887-6400
Conn	Brideport, Tower-Olshan Corp.	203-367-7401
Conn	Hartford, F.A. Blesso	203-327-6461
Fla	Miami, ESL Elctns.	305-633-6973
Ga	Rome, Battey Mach. Co.	404-291-4141
Ill	Chicago, Electro-Kinetics	312-286-4200
Ill	Mount Prospect, Magnuson Elctns.	312-956-0700
Ill	Westmont, Bodelle Co.	312-323-9670
Ind	Ft. Wayne, Ft. Wayne	219-423-3422
Ind	Indianapolis, Graham Elctns.	317-634-8486
Kans	Wichita, American Elec. Co.	316-267-5311
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Holliston, Diplomat/New England	
Mich	Ferndale, Ram Meter	313-398-6767
NY	Binghamton, Harvey/Federal	607-748-8211
NY	Hauppauge, Rampart Comps.	516-273-1111
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rochester, Masline Elctrns.	716-546-5373
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cincinnati, Graham Mytronic	513-733-1661
Ohio	Dayton, Esco Inc.	513-226-1133
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
SC	Greenville, Hammond Elctrns.	803-233-4121
SC	Greenville, Hammond Elctrns.	803-233-4120
SD	Memphis, Bluff City Distr. Co.	901-725-9500
Tenn	Knoxville, Industrial Elctns.	615-573-7135
Tex	Dallas, Dallas Instrs.	214-341-0504
Tex	Houston, Electrical Instr. & Meter Co.	713-526-6871
Wash	Seattle, Zepher Elctrns. Corp.	206-575-0922
Wisc	Mequon, Taylor Elctric Co.	414-241-4321
For:	Canada, Montreal, Que., Specialty Elctrns. Ltd.	514-336-4500
For:	Canada, Toronto, Ont., Specialty Elctms. Ltd.	416-678-2104

HI-G CO., INC., Relay Prods. Div., Dept. EM, Spring St. & Rte. 75, Windsor Locks, Conn. 06096, Tel: 203-623-2481, TWX: 710-420-0592; FSC No.: 02289; Empl.: 420 .... p. 3538-3549, Inside Front Cover

Local Sales Offices & Reps.

Ala	Huntsville, L & D, Inc.	205-859-1690
Ariz	Scottsdale, Fryco	602-945-3281
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Easton, J. E. Boeing Co.	203-261-9512
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-3183
Ill	Mt. Prospect, Magnuson Assoc.	312-956-0700
Ind	Ft. Wayne, Given Corp.	219-432-5585
Md	Riderwood, Manreps Inc.	301-296-2778
Mass	Lexington, J.E. Boeing Co.	617-862-2500
Mich	Grand Rapids, Elliot Sales	616-949-1451
Minn	St. Paul, R.G. Ragon, Inc.	612-488-0201
Mo	St. Charles, Buse Sls. Co.	314-946-6430
NY	Jericho, HRC Comp-Tech, Inc.	516-822-5550
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Greensboro, L & D, Inc.	919-292-3201
Ohio	Cincinnati, Components, Inc.	513-866-0661
Ohio	Cleveland, Components, Inc.	216-243-9200
Ore	Lake Oswego, Ruggles Tech Sls	503-636-5902
Pa	Ardmore, Manreps Inc.	215-649-6300
SC	Greenville, L&D Inc	803-268-5201
Tex	Dallas, United Comps.	214-324-1448
Utah	Salt Lake City, Omega Ltd.	801-278-6920
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778

Local Distributors

Cal	Chatsworth, Westates Elctrns. Corp.	213-341-4411
Cal	Irvine, Terminal Elctrn. Corp.	714-549-8611
Cal	Los Angeles, Radio Prod. Sls.	213-748-1271
Cal	Mt. View, Terminal Elctrns. Corp.	415-969-9240
Cal	San Diego, Radio Prod. Sls.	714-292-5611
Cal	Sunnyvale, Bell Inds.	408-734-8570
Cal	Woodland Hills, Rampart Elctrns.	213-887-6400
Fla	Orlando, Hallmark Elctrns. Corp.	305-855-4020
Ill	Westmont, Bodelle Co.	312-323-9670
Ind	Indianapolis, Graham Elctrns. Sup.	317-634-8486
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Lexington, Harvey/ R & D Elctrns.	617-861-9200
Minn	St. Paul, Ragon Elctrns.	612-488-0201
Mo	St. Charles, Lectronix	314-723-1122
NY	Binghamton, Harvey/Federal Elctrns.	607-748-8211
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Woodbury, Harvey Radio Co.	516-921-8700
Ohio	Cleveland, Arrow Elctrns.	216-464-2000
Ohio	Dayton, Arrow Elctrns.	513-253-9176
Okla	Oklahoma City, Electro-Enterprises Inc.	405-478-1752
Pa	Harrisburg, Pyttronic Inds.	717-233-6591
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Tex	Dallas, Hallmark Elctrns. Corp.	214-231-5101
For:	Can., Mississauga, Ont., Specialty Elctrns., Ltd.	416-678-2104
For:	Can., Montreal, Que., Specialty Elctrns., Ltd.	514-336-4500

HI-TRON SEMICONDUCTOR CORP., Dept. EM, 841 Merrick Rd., Baldwin, NY 11510

™HIATT CLIPS - coaxial cable clips - Electrovert

™HI-BLUE CELL - silicon cell enhanced-greater response at 400nm. - Sensor Technology

™HI-BREAK - electric circuit breakers - General Elec. Co.

™HI-BRITE, SHANNON-GLOW - paints - Shannon Luminous Mat'ls.

HICKOK

HICKOK ELECTRICAL INSTR., Dept. EM, 10514 DuPont Ave., Cleveland, Ohio 44108, Tel: 216-541-8060, TWX: 810-421-8286; Empl.: 450 p. 1658

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown	205-883-8660
Cal	Costa Mesa, FLW	714-751-7512
Cal	Palo Alto, Coherent Mktg.	415-327-2217
Fla	Ft. Lauderdale, W.A. Brown	305-776-4800
Fla	Orlando, W.A. Brown	305-425-5505
Ga	Atlanta, W.A. Brown	404-939-1674
La	Gretna, W.A. Brown	504-394-8829
NJ	Plainfield, S. Glassman Assoc.	201-561-3866
NY	Glen Cove, S. Glassman Assoc.	516-676-1039
NY	N. Tonowanda, Labtronics	716-685-4111
NY	Syracuse, Labtronics	315-454-9314
NY	Ulster Park, Labtronics	914-471-2806
NC	Durham, W.A. Brown	919-682-2383
Ohio	Cleveland, Bradcor Inc.	216-692-0881
SC	Columbia, W.A. Brown	803-772-7803
Tenn	Oak Ridge, W.A. Brown	615-690-2730
Wisc	Waukesha, J. C. Morkin	414-542-5129

™HICKORY BRAND - wire & cable - Superior Cable Div.

™HICO - relays - Hoagland Instr.

™HI-COAT - insulation resin - Murata Mfg. Co. Ltd.

™HI-COR - organic flux filled solder - Alpha Metals, Inc.

™HI-CYCLIC - directional control valves - Airmatic/Beckett-Harcum

™HI-DENSITY - feeders - Allis-Chalmers

™HI-D JAX - phone jack - Switchcraft, Inc.

™HI-D SWITCH - pushbutton switch - Switchcraft, Inc.

™HI-ETCH - capacitors - General Elec. Co.

™HI-EX - fire extinguishing foam - Kidde, Walter & Co.

™HI-FLUX - magnetic equipment - Annis R B Co.

™HI FY - gas chromatographs - Varian Assocs.

™HIGH ENERGY - for helical videotapes & videocassettes - Magnetic Audio/Video Products :Div.

HIGH ENERGY CORP., Dept. EM, Lower Valley Rd., Parkesburg, Pa. 19365, Tel: 215-593-2424, TWX: 510-0663-0322 p. 1252

Sales Manager: Russ Grasso, Mktg. Mgr.

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier	205-536-5650
Cal	Encino, King-Way Assocs.	213-788-4124
Cal	Mountain View, Weil & Disman Assocs.	415-965-4300
Colo	Denver, J. Smith & Assocs.	303-442-7100
Fla	Orlando, Currie, Peak & Frazier	305-855-0843
Ill	La Grange Park, Beirhaus Sls.	312-354-5100
Ind	Fort Wayne, TX Sls.	219-489-4447
Md	Fulton, Gans, Fryling & Pugh	301-792-4818
Mass	Canton, New England Sls. Corp.	617-828-4835
Mich	Birmingham, Clifford Armstrong Co.	313-851-1404
Minn	Chanhassen, Jack Barnes Assocs.	612-474-2907
NJ	Albuquerque, J. Smith & Assocs.	505-265-3406
NJ	Englewood Cliffs, Frank J. Kenny	201-666-3444
NM	Albuquerque, Scientific Sls. Assocs.	515-266-7861
NY	Liverpool, D. J. Hurley	315-457-1180
NY	Pittsford, D. J. Hurley	716-586-6159
NC	Greensboro, Currie, Peak & Frazier	919-273-3040
Ohio	Cleveland, John O. Olsen Co.	216-752-5444
Okla	Cincinnati, John O. Olsen Co.	513-922-2176
Pa	Pittsburgh, John O. Olsen Co.	412-279-2550
Tex	Richardson, Carl Tinch Sls. Co.	214-231-1322
Va	Arlington, Gans, Fryling & Pugh	703-527-3262

™HIGHER - virtual-batch operating system software - Information Displays, Inc.

™HIGHER TIMESHARE - timesharing operating system software - Information Displays, Inc.

HIGH SPEED HAMMER CO., INC., Dept. EM, 313 Norton St., Rochester, N.Y. 14621, Tel: 716-CO 6-6740; Empl.: 25

Sales Manager: D.W. Marcellus

Local Sales Offices & Reps.

Conn	Bridgeport, P. Kennedy	203-333-7948
Ill	Chicago, R. Ziskal	815-385-9150

HIGH VACUUM EQUIP. CORP., Dept. EM, 110 Industrial Pk Rd, Hingham, Mass. 02043, Tel: 617-749-9000, TWX: 710-348-0160; Empl.: 31

Local Sales Offices & Reps.

Haw	Honolulu, H. S. Gray Co., Ltd.	

HIGH VOLTAGE DEVICES, INC., Dept. EM, 7435 Ave., Visalia, Cal. 93277, Tel: 209-733-3870, TWX: 910-377-3493; FSC No.: 52306; Empl.: 60

Sales Manager: K.D. Corsetti

Local Sales Offices & Reps.

Ariz	Phoenix, Clemick-Neenan & Assoc.	602-279-7649
Cal	Los Angeles, High Voltage Sls.	213-641-0135
Cal	San Carlos, Kottmeier Assoc.	415-592-8333
Colo	Denver, Comp. Sls.	303-841-2650
Fla	Orlando, Buchan & Abrams Assoc.	305-898-7444
Minn	Minneapolis, L. F. Green Assoc.	612-781-1611
NY	Burnt Hills, K. D. Corsetti	518-399-9200
NY	Jericho, J. Square Mktg.	516-997-6210
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	Salem, J.J. Backer Co.	503-362-0717
Pa	Paoli, Tyler Griffin Co.	215-647-1550
Tex	Dallas, Hillman Entprs.	214-827-4790
Wash	Seattle, J.J. Backer Co.	206-285-1300

HIGH VOLTAGE ENGRG. CORP., Dept. EM, S. Bedford St., Burlington, Mass. 01803, Tel: 617-272-1313, TWX: 710-332-0245; Empl.: 750

HIGHTEMP RESINS, INC., Dept. EM, 225 Greenwich Ave., Stamford, Conn. 06902, Tel: 203-357-7401; Empl.: 5

™HI-HAT - ribbons and carbon paper - Phillips Process Co., Inc.

™HI-JUL - energy capacitors - Dearborn Elctrns. Div.

™HILGER WATTS - analytical instruments - Rank Precision Inds.

HILLS-MCCANNA CO., Dept. EM, 400 Maple Ave., Carpentersville, Ill. 60110, Tel: 312-426-4100, Telex: 72-2442; Empl.: 700

Local Sales Offices & Reps.

Cal	San Francisco, Hills-McCanna Co.	415-981-3829
Cal	Santa Fe Springs, Hills-McCanna Co.	213-864-3758
Colo	Denver, Collison Berger, Inc.	303-733-3791
Ga	Atlanta, Hills-McCanna Co.	404-448-7173
Ill	Hinsdale, Hills-McCanna Co.	312-325-5640
Mich	Madison Heights, Bradbury-Kenrick Assoc.	313-564-5410
Mo	St. Louis, Corva Corp.	314-878-4100
NJ	Edison, Hills-McCanna Co.	201-494-9400
Ohio	Cleveland, Hills-McCanna Co.	216-433-4520
Okla	Tulsa, C.J. Co.	918-627-8162
Pa	Pittsburgh, D.D. Foster Co.	412-281-0864
Tex	Houston, Hills-McCanna Co.	713-688-5747

™HI/LO FILTER - high pass/low pass filter - Rockland Sys. Corp.

HILTON INDUSTRIES INC., Dept. EM, 190 Maple St., Glen Falls, N.Y. 12801, Tel: 518-783-3473; Empl.: 120

Local Sales Offices & Reps.

Cal	Los Angeles, Corcoran Assocs.	213-823-2425
Cal	Westminster, Corcoran Assocs.	714-893-4670
Conn	Madison, A & M Elctrn. Reps.	203-421-4242
Fla	Orlando, Buchanan & Abrams Assocs.	305-898-7444
Ill	Streamwood, Al Holte & Assocs.	312-837-4066
Mass	Needham, A & M Elctrn. Reps.	617-444-8170
Minn	Minneapolis, Al Holte & Assocs.	612-926-1523
NJ	Springfield, Service and Technology	201-232-2666
Tex	Richardson, Unidyne	214-234-3050
Tex	Stafford, Unidyne	613-494-6027

™HILUME - ballastless fluorescent dimming systems - Lutron Electronics Co.

™HI-MEG - insulator - Dolph, John C. Co.

HIMMELSTEIN & CO., S., Dept. EM, 2500 Estes Ave., Elk Grove Village, Ill. 60007, Tel: 312-439-8181; Empl.: 40

Sales Manager: K.J. Olsen

Local Sales Offices & Reps.

Cal	Long Beach, Saber Enterprises	910-341-6412
Cal	Mountain View, IFM, Inc.	415-961-2828
Colo	Littleton, Radco Electronics	303-794-4279
DC	D.C., Powell-Pendergraph	301-656-4535
Iowa	Bettendorf, White Equip. Co.	319-355-5623
Mass	Needham, Addelco Corp.	617-444-4754
Mich	Livonia, S. Himmelstein & Co.	313-427-2066
Minn	Wayzata, W. A. Sternad Assocs.	612-473-4700
NY	Elbridge, L-Tron Corp.	315-689-3787
NY	Latham, L-Tron Corp.	518-785-5032
NY	Rochester, L-Tron Corp.	716-436-4410
Pa	Willow Grove, Powell-Pendergraph	215-657-0330
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Wash	Bellevue, Topp Engrg. Sls. Corp.	206-747-5401

™HI NIL - high noise-immunity logic - Teledyne Semiconductor

™HINJON - lugs - T & B/Thomas & Betts

™HINJON - lugs - T & B/Thomas & Betts

HIOKI NEW YORK CORP., Dept. EM, 42-16 235th St., Douglaston, N.Y. 11363

™HIPOTRODE - high voltage sparker electrode - Hipotronics, Inc.

HIPOTRONICS ®

HIPOTRONICS, INC., Dept. EM, Brewster, N.Y. 10509, Tel: 914-279-8091, TWX: 710-574-2420; Empl.: 155 p. 2868,2869,3264,3265

Local Sales Offices & Reps.

Ariz	Scottsdale, PLS. Assocs.	602-957-9110
Cal	Pasadena, RDX Corp.	213-681-3452
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Denver, PLS Assocs.	303-773-1218
Haw	Honolulu, Aloha Assocs.	941-1574
Ind	Ossian, V. Schumacher	219-622-4346
Mass	Bellingham, J. Kirkup	617-966-2121
NJ	East Orange, Friedman Assocs.	201-673-2500
NM	Aubuquerque, PLS Assocs.	505-255-2330
NY	Cazenovia, Peter De Cew Agency	315-HT 3-3261
Ore	Portland, Data Power Sls.	206-453-8200
Pa	Downingtown, Kenn Ebert-Hipotronics, Inc.	215-269-5898
Tex	Fort Worth, D. Wells	817-244-2204
Wash	Bellevue, Data Power Sls.	206-453-8200

HIRAM JONES ELECTRONICS, See Jones Electronics, Hiram

™HI POW - high power dummy loads - Electronautics

™HIPPO-CLIP - clips - Mueller Electric Co.

™HIRAD - instr. cable for nuclear power plants - Times Wire & Cable

HISONIC, INC., Dept. EM, 249 N. Troost, Olathe, Kan. 66061, Tel: 913-782-0012, Telex: 4-2562; FSC No.: 11402; Empl.: 105 p. 2738,2739,3267,4417

Sales Manager: W.S. Bonebright

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper Sls. Co.	602-946-4437
Cal	Canoga Park, TKO Elctrns., Inc.	213-883-3822
Cal	Mountain View, Caltron/Pyle	415-964-3244
Colo	Aryada, Piper Sls. Co.	303-420-4646
Kans	Shawnee Mission, Florence & Meyer, Inc.	913-722-5210
Md	Baltimore, R. A. Wafer Assocs.	301-744-1133
NJ	Dover, Richman Salesco-Wenco	201-584-8444
NJ	Haddonfield, Gray Assocs.	609-429-5300

NY	Commack, Richman Salesco.	516-543-5532
Tex	Houston, AID Ectrns	713-777-3882
Tex	Irving, AID Elctrns., Inc.	214-259-4761

™*HIT - ultra-shielded powerline isolation transformer - TRW/UTC Transformers

HI-TEK CORP., Dept. EM, 3115 W. Warner, Santa Ana, Cal. 92704, Tel: 714-540-3520, Telex: 6-78486; Empl.: 180; Minimum order: $E.L. McGuire

Distributor Manager: E.L. McGuire

HITACHI AMERICA LTD., Dept. EM, 111 E. Wacker Drive, Chicago, Ill.

™HI-TEMP - thermistors from 500°C to 1000°C - Fenwal Elctrns.

™HI-THERM - varnish - Dolph, John C. Co.

™HI-THRO - fluoborate plating baths - Allied Chemical Corp.

™HI-VOLT - voltage testers - Industrial Devices

™HI-Z - ground fault sensors - Electrons Co.

™HI-Z - voltmeter & accessories - Ross Engineering Corp.

H.J.J. CO., Dept. EM, Box 905, Los Gatos, Cal. 95030, Tel: 408-356-4040; Empl.: 4

Local Sales Offices & Reps.

Cal	San Mateo, J. Hand	415-341-5516
Pa	Pittsburgh, F. Kostman	412-823-3430

™HKP - cutting machine - Porter, H.K., Inc.

™HLT - stressed panel fastener - Tridair Inds.

™HMC - hybrid microelectronic circuits - AEL, Inc.

HM ELECTRONICS, INC., Dept. EM, 6151 Fairmount Ave., San Diego, Cal. 92120, Tel: 714-280-6050; Empl.: 35

Local Sales Offices & Reps.

Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	Palo Alto, RF Assocs.	415-494-3331
Minn	Minneapolis, Scientific Devices	612-544-3725
NC	Greensboro, FM Assocs.	919-294-2754

HOAGLAND INSTR., Dept. EM, Box 550, Dayton, N.J. 08810, Tel: 201-329-4681, TWX: 710-480-5674; Empl.: 30

Sales Manager: P.F. Monte

Local Sales Offices & Reps.

NJ	Cranford, Martech Assocs.	201-272-5510
Wash	Seattle, Carmody	206-682-2330

HOBBS, Div. of Steward Warner, Dept. EM, Ash at Yale Blvd., Springfield, Ill 62705, Tel: 217-525-0330

™HOBBY TIME - toys, games, kits - Western Coil & Elec. Co.

HOBSON BROS., INC., Dept. EM, 4940 W. Lawrence Ave., Chicago, Ill. 60630, Tel: 312-283-3600; Empl.: 90

Local Sales Offices & Reps.

Ind	Indianapolis, Specialty Mfrs.	317-635-2723
NY	Buffalo, R. W. Mitscher Co.	716-633-7970
Va	Virginia Beach, R. W. Mitscher Co.	804-481-7200

HOFFMAN ELECTRONICS CORP., NavCom Systems Div., Dept. EM, 4323 N. Arden Drive, El Monte, Cal. 91734, Tel: 213-442-0123, TWX: 910-587-3428; Empl.: 1,299

Local Sales Offices & Reps.

DC	Washington, W. R. Chaires	
Ohio	Dayton, L.S. Fedotin	513-275-9345
Va	Herndon, R.H. Harrison, Jr.	703-471-1373

HOFFMAN ENGINEERING CO., Div. Federal Cartridge Corp., Dept. EM, 9th & Tyler Sts., Anoka, Minn. 55303, Tel: 612-421-2240, TWX: 910-578-2211

Local Sales Offices & Reps.

Ala	Birmingham, C.W. Ashby Co.	205-879-1651
Ariz	Scottsdale, N.F. Ross	602-945-7262
Ark	Little Rock, Hicks Sls. Agency Inc.	501-568-2388
Cal	Santa Fe Springs, J. H. Grace Co.	213-862-2145
Cal	Walnut Creek, W.A. Borden Co.	415-937-5196
Colo	Denver, Gaer Sls.	303-777-3740
Conn	West Hartford, L. Bell	203-236-0395
Fla	Pompano Beach, Shannon Assoc.	305-943-5848
Fla	St. Petersburg, Shannon Assocs.	813-822-3146
Ga	Atlanta, Holman-Lobsinger Co.	404-256-9120
Haw	Honolulu, Specialty Prods. Co.	808-531-0596
Ill	Maywood, KGA Engrg. Co.	312-343-6500
Ind	Indianapolis, Lester Sls. Co.	317-783-9251
Ky	Louisville, Lester Sls. Co.	502-634-8930
La	Metairie, Schell-Ranna Co.	504-837-7837
Md	Millersville, O.T. Hall & Son	301-987-5990
Mass	Framingham, H. Standish	617-879-1220
Mich	Farmington, W.L. Trombley & Son	313-477-5800
Mich	Grand Rapids, J.M. Perry Co.	616-949-0271
Minn	Minneapolis, R.D. Schwen Engrg. Inc.	612-553-1398
Mo	Kirkwood, Martin Electrical Sls. Inc.	314-966-8659
Mo	Raytown, Arehart-Barnds Sls. Co.	816-356-3488
Neb	Omaha, Electrical Prods. Co.	402-393-7350
NJ	Edison, Burgoyne Elec. Sls. Inc.	201-225-0450
NJ	Morristown, W.J. Waldron Assocs.	201-538-5607
NY	Syracuse, J.C. Fox & T.R. Fox	315-488-0200
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
NC	Raleigh, R.W. Chapman & Co.	919-782-2624
Ohio	Cleveland, M.M. Haley Co.	216-238-3650
Ohio	Dayton, W.W. Baerbalck & Assocs.	513-278-4217
Okla	Jenks, W.G. Parker Co.	918-299-5449
Ore	Portland, D. Fry Co.	503-226-2620
Pa	Carnegie, M.F. Smith & Assocs.	412-276-5363
Pa	Willow Grove, Cusick Electrial Sls.	215-659-6666
SC	Greenville, R.W. Chapman & Co.	803-232-5391
SC	West Columbia, R.W. Chapman & Co.	803-796-9796
Tenn	Memphis, Hicks Sls. Agency	901-396-5725
Tex	Dallas, Electrical Agencies Co.	214-747-0108
Tex	Houston, J. Edwards Co.	713-691-4343
Utah	Salt Lake City, J.H. Jones Co.	801-485-9372
Va	Richmond, J.H. Thrower	804-794-6819
Wash	Seattle, Muth-Richards Co.	206-323-2127
Wisc	Milwaukee, KGA Engrg. Co.	414-355-5500

HOFFMAN INDUSTRIAL PRODS., Dept. EM, 170 Allen Blvd., Farmingdale, N.Y. 11735, Tel: 516-293-5244, Telex: 14-4578; Empl.: 30; Minimum order: $D. Bloom

Sales Manager: W. Goudy; *Distributor Manager:* D. Bloom

Local Sales Offices & Reps.

Ala	Montgomery, Meredith Young Assoc.,	601-366-8185
Fla	Brandon, R. Herig	813-689-1573
Ga	Atlanta, C. Roach	404-261-7184
Ill	Chicago, A. J. Ellis Co.	312-262-2708
Ill	Elk Grove, P. A. Vrame & Assoc.	312-569-2016
Ind	New Albany, Service Sls.	812-945-9191
Kans	Buhler, R. F. Ramsay	316-662-4711
Kans	Overland Park, T. L. Dowell	913-236-8200
La	New Orleans, R. Ong.	504-484-9716
Mass	Sharon, Howard Sls. Corp.	617-326-6442
Mass	Waltham, Betronics Assoc. Inc.	617-894-8400
Mich	Detroit, G. N. DePerro Co.	313-875-4010
Mich	Lansing, Mktg. Professionals	517-484-0828
Minn	Minneapolis, Quantum Sls.	612-831-8583
NJ	Cherry Hill, J. McCoy	609-428-3444
NJ	Clifton, MASCO	201-772-3598
NY	Farmingdale, Haines Products	516-420-1177
NY	Merrick, D. Obstgarten	212-682-0276
NY	New Rochelle, C. Erickson	914-636-8477
NY	Rochester, Tacom Sls. Co.	717-647-3940
NC	Charlotte, Cushman Agcy.	704-523-3312
Ohio	Aurora, Nationwide Comps.	216-562-9666
Ohio	Manchester, Hayes Electrical	314-481-4226
Ohio	Shaker Heights, Martin-Rettger	216-283-5600
Pa	Cornwells Heights, D. Glick	215-757-9046
Tex	Dallas, J. E. Bill Morton	214-341-1414
Tex	Houston, Ampair	713-443-0613
Wisc	Milwaukee, Star Engrg. Sls. Co.	414-645-3680

HOFFMAN CO., P. R., Div. of Aiken Inds., Inc., Dept. EM, 321 Cherry St., Carlisle, Pa. 17013, Tel: 717-243-2011, TWX: 510-650-2285; Empl.: 275

™HOLE-IN-THE-HEAD - tamper-proof screws - Pan-L-Fast

HOLEX CORP, Dept. EM, 2544 W. Main St., Norristown, Pa. 19401, Tel: 215-539-0828

Sales Manager: H.L. Goldberg

Local Distributors

Cal	Los Angeles, Light & Sound	213-930-0175
Cal	Santa Monica, Kalt	213-870-6137
Colo	Englewood, National Camera	303-789-1893
Ill	Chicago, Fisher Scientific Co.	312-378-7770
Ill	Chicago, McMillan	312-488-4100
Iowa	Cedar Falls, Porters	319-268-0104
Mo	St. Charles, Billy Citrin	314-946-6488
NJ	Barrington, Edmund Scientific	609-547-3488
NJ	Interlaken, Thoronodyne Corp.	201-870-3050
NY	Buffalo, Wm. Brennan	716-832-4882
NY	Flushing, Spiratone	212-886-2000
NY	Mamaroneck, Lazart	914-698-4250
NY	Roslyn Heights, Tiffen	516-621-2700
NY	Tonawanda, Science Kit	
Pa	Philadelphia, Herback & Rademan	215-426-1700

™HOLLI-CUTTER - pc board component lead cutter - Hollis Engrg., Inc.

HOLLINGSWORTH CO., JOHN R., Dept. EM, Nutt & French Creek Rds., Phoenixville, Pa. 19460, Tel: 215-933-8951; Empl.: 135

HOLLINGSWORTH®

HOLLINGSWORTH SOLDERLESS TERMINAL, Dept. EM, Box 430, Phoenixville, Pa. 19460, Tel: 215-933-8947, Telex: 846143; Empl.: 750

Local Sales Offices & Reps.

Cal	N. Hollywood	213-875-3740
Cal	San Jose	408-287-8888
Ga	Chamblee	404-451-0328
Ill	West Chicago	312-231-3090
Mass	Quincy	617-328-3488
Ohio	Cleveland	216-461-8252
Pa	Phoenixville	215-935-2350
Tex	Richardson	214-231-9358
Wash	Bellevue	206-455-4460

Advertisement

SOLDERLESS TERMINALS, CONNECTORS, HAND AND AUTOMATIC CRIMPING TOOLS - Choose from over 5000 terminal products for wire sizes 26 AWG through 250 MCM. Insulated, non-insulated styles and the most complete line of fully pre-insulated styles available. Many parts UL, CSA & Mil Spec approved. Full line of crimping tools includes maintenance crimpers, quality matched rachet tools, pneumatic tools and automatic tape and strip crimping presses. Competitive prices, direct factory salesmen, & fast delivery from our 9 regional sales offices.

HOLLIS ENGRG., INC., Dept. EM, Charron Ave., Box 1189, Nashua, 03061 03061, Tel: 603-889-1121, TWX: 710-228-1881; Empl.: 121

Sales Manager: R. Abercrombie

Local Sales Offices & Reps.

Ariz	Phoenix, Tooltronics, Inc.	602-257-0768
Cal	Glendale, Tooltronics, Inc.	213-240-4000
Cal	Inglewood, Hollis Engrg.	213-678-7141
Cal	Santa Clara, Tooltronics, Inc.	408-241-4000
Colo	Denver, West/Mark Assoc.	303-433-7181
Fla	Kissimmee, Hollis Engrg.	305-846-6344
Ga	Atlanta, DG Machinery & Gage Co.	404-449-3414
Ga	Norcross, Hollis Engrg.	404-448-7046
Ill	Chicago, Solid State Elctrns.	312-889-8033
Ill	Schaumburg, Hollis Engrg.	312-882-8020
Ind	Indianapolis, Tech Sls. & Mktg.	317-356-3658
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Md	Baltimore, D.K. Jones & Assocs.	301-752-0577
Mass	Hudson, E.P.E. Corp.	617-562-9123
Minn	Minneapolis, M. Westlund Assoc.	612-866-5002
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Montclair, Hollis Engrg.	201-783-5151
NJ	Princeton, Krone & Rubin Assoc.	609-452-1500
NY	Lake Grove, Krone & Rubin Assoc.	516-585-3996
NY	Rochester, Krone & Rubin Assoc.	716-266-4630
Ohio	Dayton, A.M.E.S. Corp.	513-435-9730
Pa	Norristown, Glove Engrg. Co.	215-275-9875

Tex	Dallas, Tooltronics, Inc.	214-661-0700
Tex	Grapevine, Hollis Engrg.	817-481-5514
Wash	Bellevue, Rowe/Northwest	206-455-2686

(TM)**HOLLUSTER 2** - Emergency & Auxiliary Lighting Units - Hollingsworth Co., John R.

HOLUB INDUSTRIES, Dept. EM, 413 DeKalb Ave., Sycamore, Ill. 60178

(TM)**HOMALITE-LR** - low reflectance plastic sheet - SGL Homalite

(TM)**HOMETAXIAL** - RCA power trasnsistor technology offering low-charge carrier density at the collector junction for reduced heating effect - RCA Solid State Div.

(TM)**HOMOSIL** - clear fused quartz - Amersil, Inc.

(TM)**HONEY BEE** - video audio tape motor - Hurst Mfg. Corp.

HONEYWELL, Aerospace & Def., Dept. EM, Honeywell Plaza, Minneapolis, Minn. 55408, Tel: 612-870-5200, TWX: 910-576-2692; Empl.: 600

Local Sales Offices & Reps.

Ala	Huntsville	205-881-2711
Cal	Los Angeles	213-670-7500
Cal	Orange	714-558-7400
Cal	San Diego	714-299-5311
Cal	San Jose	408-998-3131
Cal	Sherman Oaks	213-986-6310
Fla	Orlando	305-894-3131
Fla	Shalimar	904-651-0310
Ga	Atlanta	404-321-2000
Iowa	Davenport	319-355-6456
Mass	Boston	617-782-3100
Mo	Creve Coeur	314-991-4100
NJ	Westfield	201-233-9200
NY	Elmsford	914-592-3200
NY	Liverpool	315-451-4000
NY	Plainview	516-931-1500
Ohio	Dayton	513-461-4480
Pa	Bala Cynwyd	215-835-2500
Tex	Dallas	214-634-8880
Tex	Houston	713-785-3200
Va	Arlington	703-524-8200
Wash	Mercer Island	206-233-2088

HONEYWELL INC., Commercial Div., Dept. EM, 200 Bond St., Wabash, Ind. 46992, Tel: 219-563-2161, TWX: 810-290-2725; Empl.: 350

Local Sales Offices & Reps.

Colo	Denver, E. W. Johnson Co.	303-985-4810
Fla	Maitland, Beacon Elctrns.	305-647-3498
Fla	Palm Beach Gardens, Beacon Elctrns.	305-622-2770

HONEYWELL INC., Commercial Div., Dept. EM, 200 Bond St., Wabash, Ind. 46992, Tel: 219-563-2161, TWX: 810-290-2725; Empl.: 350

Local Sales Offices & Reps.

Colo	Denver, E. W. Johnson Co.	303-985-4810
Fla	Maitland, Beacon Elctrns.	305-647-3498
Fla	Palm Beach Gardens, Beacon Elctrns.	305-622-2770
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ind	Ft. Wayne, R. O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R. O. Whitesell & Assoc.	317-359-9283
Ky	Louisville, R. O. Whitesell & Assoc.	502-893-7303
Md	Lanham, Eastern Compts.	301-794-8610
Mass	Burlington, Schaal Assocs.	617-272-7940
Mich	Grand Rapids, R. O. Whitesell & Assoc.	616-451-8901
Mich	Southfield, R. O. Whitesell & Assoc.	313-358-2020
Mich	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
Minn	St. Paul, Northport Engrg.	612-698-3841
Ohio	Dayton, R. O. Whitesell & Assoc.	513-298-9546
Pa	Flowertown, Eastern Comps.	215-836-1616
Pa	Pittsburgh, R. O. Whitesell & Assoc.	412-242-0100
SC	Spartanburg, Beacon Elctrns.	803-582-4613
Tex	Dallas, Blair Engrg. Sls.	214-352-8411
Tex	Houston, Blair Engrg.	713-772-0677

HONEYWELL INFORMATION SYS INC, Dept. EM, 200 Smith St, Waltham, Mass. 02154, Tel: 617-890-8400

Sales Manager: R.R. Douglas

HONEYWELL, Process Control Div./Ft. Wash., Dept. EM, 1100 Virginia Dr., Ft. Washington, Pa. 19034, Tel: 215-643-1300, TWX: 510-661-0328

Local Sales Offices & Reps.

Ala	Birmingham	205-323-2431
Alas	Anchorage	907-344-0522
Ariz	Phoenix	602-249-7178
Ark	Little Rock	501-372-0166
Cal	Los Angeles	213-726-6000
Cal	San Francisco	415-957-2500
Colo	Englewood	303-771-2340
Conn	Hartford	203-549-3800
Fla	Orlando	305-894-3131
Ga	Atlanta	404-321-2000
Ill	Chicago	312-478-9266
Ill	Lansing	312-474-9300
Ind	Indianapolis	317-243-0831
Iowa	Davenport	319-359-3441
Kans	Wichita	316-522-3431
Ky	Louisville	502-459-5970
La	Baton Rouge	504-924-4236
Me	Portland	207-775-3501
Md	Lutherville	301-828-0900
Mass	Boston	617-782-3100
Mich	Farmington Hills	313-478-1600
Mich	Grand Rapids	616-451-0621
Minn	Minneapolis	612-830-3500
Miss	Jackson	601-956-6311
Mo	St. Louis	314-878-2400
Mont	Billings	406-252-5646
Neb	Omaha	402-393-8300
NJ	Westfield	201-233-9200
NM	Albuquerque	505-345-1656
NY	Long Island City	212-392-4300
NY	Syracuse	315-451-4000
NC	Charlotte	704-364-4770
ND	Fargo	701-235-4221
Ohio	Cleveland	216-881-0300
Okla	Oklahoma City	405-848-2811
Ore	Portland	503-235-8411
Pa	Philadelphia	215-226-2400
SC	Columbia	803-779-3240
Tenn	Memphis	901-396-6222
Tex	Houston	713-785-3200
Utah	Salt Lake City	801-487-0681
Va	Richmond	804-285-8211
Wash	Seattle	206-233-2000
WVa	Charleston	304-744-5341
Wisc	Milwaukee	414-771-6300

HONEYWELL MICRO SWITCH DIV., See Micro Switch, Div. Honeywell

HONEYWELL, Residential Div., Dept. EM, Honeywell Plaza, Mpls., Minn. 55408, Tel: 612-870-5200

Sales Manager: D.F. Pillen; *Distributor Manager:* D.L. Flamm

Local Sales Offices & Reps.

Cal	Los Angeles	213-726-6000
Cal	San Francisco	415-957-2500
Colo	Englewood	303-771-2340
Fla	Miami	305-592-8140
Ga	Atlanta	404-321-2000
Ill	Chicago	312-478-9266
Ill	Lansing	312-474-9300
Ind	Indianapolis	317-243-0831
Iowa	Des Moines	515-288-3601
Mass	Boston	617-275-2860
Mich	Southfield	313-424-3500
Minn	Edina	612-830-3500
Mo	Kansas City	816-358-4200
Mo	St. Louis	314-991-4100
NJ	Westfield	201-233-9200
NY	Huntington Station	516-420-8290
NY	Syracuse	315-451-4000
NC	Charlotte	704-364-4770
Ohio	Cleveland	216-881-0300
Ohio	Columbus	614-486-5971
Pa	Blue Bell	215-835-2500
Pa	Pittsburgh	412-922-4422
Tenn	Nashville	615-385-3400
Tex	Dallas	214-661-5459
Va	McLean	703-790-3000
Wash	Mercer Island	206-233-2000
Wisc	Milwaukee	414-771-6300

HONEYWELL, INC., Test Instrs. Div., Dept. EM, 4800 E. Dry Creek Rd., Box 5227, Denver, Colo. 80217, Tel: 303-771-4700; Empl.: 850

Local Sales Offices & Reps.

Cal	Los Angeles	213-726-6000
Cal	San Jose	408-998-3131
Colo	Denver	303-771-2340
Fla	Orlando	305-894-3131
Ga	Atlanta	404-321-2524
Haw	Honolulu	808-845-2991
Ill	Lansing	312-474-9300
Ill	Skokie	312-674-9770
Md	Lutherville	301-828-0900
Mass	Bedford	617-275-2630
Mich	Farmington Hills	313-478-1600
Minn	Minneapolis	612-830-3500
Mo	St. Louis	314-878-2400
NJ	Westfield	201-233-9200
NM	Albuquerque	505-345-1656
NY	Albany	518-456-7000
NC	Greensboro	919-292-1556
Ohio	Cleveland	216-881-0300
Ohio	Dayton	513-461-4480
Pa	Bala Cynwyd	215-835-2500
Pa	Pittsburgh	412-922-4422
Tex	Dallas	214-661-5459
Va	Mc Lean	703-790-3000
Wash	Mercer Island	206-232-2086

HOPE ELCTRNS., Dept. EM, 20 Newark Pompton Tpke., Wayne, N.J. 07470, Tel: 201-777-3522; Empl.: 20 .... p. 1108,2441,3005,3268,3269

Local Distributors

NJ	Wayne, Parts Masters	201-777-7706
NY	New York, Can Elctrn. Distributing Corp.	212-893-8300

HOPKINS ENGRG., Dept. EM, 12900 Foothill Blvd., San Fernando, Cal. 91342, Tel: 213-361-8691, TWX: 910-496-1531; Empl.: 65 .... p. 2737

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	205-534-3387
Ariz	Tempe, J. F. Hurlbut Co.	602-968-5962
Cal	San Carlos, Kottmeier Assocs., Inc.	415-592-8333
Cal	San Fernando, Hopkins Direct Sls.	213-361-8691
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Conn	Bristol, New England Elctrn. Sls.	203-583-3650
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Ill	Chicago, K. W. Meyers Co.	312-774-6440
Ind	Indianapolis, K. W. Meyers Co.	317-243-6681
Iowa	Cedar Rapids, G. Fixman Engrg.	319-362-6301
Kans	Overland Park, G. Fixman Engrg. Co.	913-648-7748
Md	Rockville, Marktron, Inc.	301-762-6210
Md	Timonium, Marktron, Inc.	301-252-7111
Mass	Canton, New England Elctrns. Sls.	617-828-4835
Mich	Jackson, Norwood Scroggs Co.	517-750-1170
Minn	Minneapolis, K. W. Meyers Co.	612-920-7080
Mo	St. Louis, Gordon Fixman Engineering Co.	314-725-5219
NJ	Cherry Hill, Benco Sls.	609-799-9282
NJ	Wayne, G T Assocs.	201-694-6040
NY	Rochester, J. G. Welch Assocs.	716-244-1100
NY	Syracuse, J. G. Welch Assocs.	315-468-4050
NY	Utica, J. G. Welch Assocs.	315-736-7821
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Dayton, Berberich Assocs., Inc.	513-433-0342
Pa	Ardmore, Benco Sls.	215-649-3966
Tex	Dallas, Stevens Sls.	214-350-2476
Utah	Salt Lake City, J. F. Hurlbut Co.	801-299-4034
Wash	Seattle, Blum & Assoc.	206-285-2590

(TM)**HOPPER STAKER** - swaging machines - Cambridge Thermionic Corp.

(TM)**HOPSTRETCHER** - antenna feed - Gabriel Elctrns. Inc.

HOPT CO., K., Dept. EM, 118 First Ave., Atlantic Highlands, N.J. 07716, Tel: 201-291-0633, Telex: 132496

Sales Manager: G.C. Ellis

(TM)**HORIZON LINE** - voltmeters & ammeters - General Elec. Co.

HORIZONS INTERNATIONAL, INC., Dept. EM, 716 Willow Rd., Menlo Park, Cal. 94025, Tel: 415-328-1111, TWX: 910-373-1170; Empl.: 150

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-533-6029
Cal	Menlo Park, Long & Assocs.	415-327-1300
Cal	Sherman Oaks, R. Meussdorfer & Assocs.	213-788-0771
Conn	Milford, Todino Engrg. Sls.	203-874-6643
Ill	Chicago, Engineered Sls. Co.	312-867-8434
Md	Baltimore, R.L. Wilkinson	301-377-7800
Mass	Needham Heights, Todino Engrg. Sls.	617-444-7925
Mich	St. Claire Shores, J. M. Thorpe	313-779-6363
Minn	St. Paul, D. Nedved Assoc.	612-645-1425
Miss	Jackson, Remco	901-424-0142

Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Wayne, S. H. Lagerveld Assoc.	201-523-1714
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	High Point, Remco	704-738-4716
Ohio	Chagrin Falls, Drivex Corp.	216-247-6701
Ohio	Cincinnati, Drivex	513-742-2000
Pa	Glenside, R.L. Wilkinson	215-424-8400
Tenn	Bristol, Remco	615-968-4195
Tex	Dallas, M. Kruvand Co.	214-691-4592
Tex	Houston, M. Kruvand Co.	713-661-3007
Wash	Seattle, Seatronics	206-767-4330

HORIZONS RESEARCH, INC., Dept. EM, 23800 Mercantile Rd., Cleveland, Ohio 44122, Tel: 216-464-2424; Empl.: 175

™HORNET - miniature soldering iron - Hexacon Elec. Co.

HOSKINS MFG. CO., Dept. EM, 4445 Lawton Ave., Detroit, Mich. 48208, Tel: 313-895-2860, TWX: 810-221-1409; Empl.: 400

Local Sales Offices & Reps.

Cal	Los Angeles, Hoskins Mfg. Co.	213-685-5550
Conn	Stamford, Hoskins Mfg. Co.	203-348-4442
Ill	Chicago, Hoskins Mfg. Co.	312-724-6880
Mo	St. Louis, Hoskins Mfg. Co.	314-966-2290
Ohio	Cleveland, Hoskins Mfg. Co.	216-371-9529

™HOSPITAL/INDUSTRIAL - wiring devices - General Elec. Company

™HOT HAND - tubing shrinkers - American Elec. Heater

™HOT LINE TELEPHONE - automatic dial telephone - Warren G-V Communications

HOTPACK CORP., Dept. EM, 5148 Cottman Ave., Phila., Pa. 19135, Tel: 215-333-1700, TWX: 710-670-1694; Empl.: 130

Local Sales Offices & Reps.

Cal	Reseda, B. Milner Assoc.	213-342-5181
Cal	San Jose, H. Waldeck Assoc.	408-274-9007
Fla	Ft. Lauderdale, H. Z. Hays Entprs.	305-772-4982
Ga	Atlanta, J. L. Morris Assoc.	404-233-5118
Ill	Chicago, A. Stanley Co.	312-973-7376
La	Metairie, Lassco, Inc.	504-837-7866
Mass	Cambridge, Rush Assoc.	617-661-1200
Minn	St. Paul, S. L. Clasen Co.	612-771-8384
NJ	Cherry Hill, F. J. Lucchesi	609-428-3537
NY	New York, Hotpack Corp.	212-247-5554
NY	Penn Field, Upstate Tech Equip. Co.	716-381-0930
Ore	Portland, A. W. Shirley	503-234-0281
Pa	Pittsburgh, K. J. Lesker Co.	412-653-0800
Tex	Dallas, South Western Engr. & Equip.	214-692-8097

Local Distributors

Cal	Los Altos, Herb Waldeck Assoc.	415-964-4699
Cal	Reseda, Bob Milner & Assoc.	213-877-1444
Colo	Denver, PLS Assoc., Inc.	303-771-0141
Fla	Ft. Lauderdale, Hays Enterprises	305-772-4982
Ga	Atlanta, J. L. Morris Assoc.	404-233-5118
Ill	Chicago, A. Stanley Co.	312-973-7376
Iowa	Des Moines, H. E. Ferris Co.	515-255-5008
Md	Rockville, Guerra Technical Sls.	301-929-1444
Minn	Minneapolis, Gibbco Scientific Co.	612-377-1200
Mo	St. Louis, Herdlein Scientific	314-423-4834
NJ	Cherry Hill, F. Lucchesi	609-428-3537
NY	New York, G. Kobin	212-247-5554
NY	No. Tonowanda, Harvey Instr.	716-694-9500
NC	Raleigh, G. W. Mitchell	919-833-8655
Ohio	Cincinnati, Witt Sales Co.	513-761-5602
Pa	Pittsburgh, Giangarlo Scientific	412-687-6415
Tenn	Germantown, John Sellers	901-362-8651
Tex	Dallas, Southwestern Engrg. & Equip.	214-826-6661

™HOT TIP - soldering accessory - Air-O-Tronics Prods.

™HOT TIP - resistence soldering & thermal stripping equip. - Contact, Inc.

HOUSTON INSTRUMENT, Div. Bausch & Lomb, Dept. EM, 8500 Cameron Rd., Austin, Tex. 78753, Tel: 512-837-2820, TWX: 910-874-2022; Empl.: 10,000

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Ariz	Scottsdale, Measurement Consits.	602-994-9519
Cal	Long Beach, CTI Data Sys.	213-426-7375
Cal	Los Altos, Casey-Johnston, Inc.	415-941-6892
Cal	Los Angeles, Basic Sys. Corp.	213-938-2833
Cal	San Mateo, Dayton Assocs.	415-347-9419
Colo	Englewood, Davis Assocs.	303-761-9228
Colo	Littleton, Aztec Entprs.	303-795-0250
Fla	Orlando, J.L. Highsmith & Co.	305-293-5202
Ga	Acworth, J. L. Highsmith & Co.	404-926-7298
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Downers Grove, Data Dev.	312-887-8480
Kans	Overland Park, Carter Elctrns. Inc.	913-649-6996
Mass	Framingham, J.M. Lancaster Co.	617-873-8893
Mich	Detroit, Data-Tron	313-354-6421
Minn	Chanhassen, Professional Mktg. Svcs.	612-474-5939
Mo	Grandview, Digital Systems Sls.	816-765-3337
Mo	St. Louis, Carter Elctrns. Inc.	314-569-1406
NJ	Englewood, Scientific Dev.-East	201-871-3916
NM	Albuquerque, Aztec Entprs.	505-255-2440
NM	Las Cruces, Measurement Consits.	505-526-2491
NY	Fayetteville, Doolittle Elctrns.	315-637-3222
NC	Charlotte, J.L. Highsmith & Co.	704-333-7743
Ohio	Wickliffe, Data-Tron	216-585-8421
Okla	Tulsa, Comspec, Inc.	918-936-3631
Ore	Lake Oswego, Wilson Applied Inst.	503-636-0965
Pa	King of Prussia, S & S Assocs.	215-265-3450
Pa	Monroeville, Data-Tron	412-243-8421
Tex	Houston, Comspec, Inc.	713-461-4487
Tex	Richardson, Comspec, Inc.	214-234-4137
Va	Fairfax, Nine Assocs.	703-273-1803
Va	Richmond, J.L. Highsmith & Co.	703-272-5888
Wash	Bellevue, Marra & Assoc.	206-641-3535

HOWARD INDUSTRIES, Div. of MSL, Dept. EM, Box 287, Milford, Ill. 60953, Tel: 815-889-4105, TWX: 910-642-2950; Empl.: 500; Minimum order: $A. Mancuso

Sales Manager: A. Grau; *Distributor Manager:* A. Mancuso

Local Sales Offices & Reps.

Ala	Huntsville, Electro-Mech Sls. Engrg.	205-883-9624
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Los Angeles, Techrep Assocs.	213-641-5830
Cal	Santa Clara, Richards & Assocs.	408-246-5860
Colo	Denver, Thorson Co.	303-759-0809
Conn	Torrington, Motoreps of New England	203-482-3193
Fla	Tampa, Tech-Rep Assoc.	813-595-2834
Ga	Atlanta, Electro-Mech Sls. Engrg.	404-449-6337
Ill	Chicago, K.M.G. Sls. Co.	414-639-9005
Mich	Southfield, Fred H. Gehrke & Assoc.	313-559-5363
Minn	Prior Lake, Bob Aret	612-447-4110
Mo	St. Ann, Lawton Sls. Co.	314-725-1330
NJ	Red Bank, Motoreps of New York	201-741-3356
NM	Albuquerque, Thorson Co.	505-265-5655
NC	Raleigh, Electro-Mech Sls. Engrg.	919-782-7586
Ohio	Dayton, Electrical Sys. Co.	513-434-9822
Tenn	Nashville, Electro-Mech Sls. Engrg.	615-256-2516
Tex	Dallas, Thorsen Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Bellevue, Thorson Co.	206-455-9180
Wisc	Racine, K.M.G. Sls. Co.	414-639-9005

™HOWELL-BUNGER - hydraulic free discharge regulating valve - Allis-Chalmers

HOWELL INST. INC., Dept. EM, 3479 W. Vickery Blvd., Ft. Worth, Tex. 76107, Tel: 817-336-7411, Telex: 75-8233; FSC No.: 98869; Empl.: 150

Local Sales Offices & Reps.

Cal	Fullerton	714-870-6380
Mo	St. Charles	314-946-6911
NY	Valley Stream	516-561-9220
Va	Norfolk	804-587-4966

HOYT ELECTRICAL INSTR. WORKS, Burton-Rogers Co., Sls. Div., Dept. EM, 556 Trapelo Rd., Belmont, Mass. 02179, Tel: 617-489-1520; Empl.: 200 .... p. 2870

Sales Manager: R. Reardon

Local Sales Offices & Reps.

Cal	Hollywood, Duncan Engrg. Sls. Co.	213-462-5880
Ill	Palatine, Claeson Assocs.	312-359-7230
Ind	Fort Wayne, Val-Skol Sls.	219-742-9122
Ind	Indianapolis, Val-Skol Sls.	317-926-5063
Md	Baltimore, R.L. Wilkinson, Inc.	301-377-7800
NJ	West Caldwell, Peterson-Rudnick Assocs.	201-226-4363
NY	Bronx, Peterson-Rudnick Assocs.	212-671-1923
NC	Charlotte, K-I Assocs.	704-523-0324
Ohio	Cincinnati, Val-Skol Sls.	513-563-6790
Ohio	Cleveland, Val-Skol Sls.	216-229-2822
Pa	Glenside, R.L. Wilkinson	215-424-8400
Tex	Dallas, Stevens Sls.	214-350-2476
Wash	Bellevue, Elden Bowden Co.	206-822-5608
Exp:	Mass., Belmont, Burton-Rogers Co.	617-489-1520

Local Distributors

Ariz	Phoenix, Metermaster, Inc.	602-273-7331
Cal	Los Angeles, Metermaster/LA	213-685-4340
Cal	Palo Alto, Metermaster, Inc.	415-968-0313
NJ	Little Falls, Hosica Labs	201-256-7724
Tex	Garland, Metermaster	214-271-2471

H.P.M. DIV., Koehring Co., Dept. EM, Marion Rd., Mt. Gilead, Ohio 43338, Tel: 419-946-0222; Empl.: 675

HRB-SINGER, INC., Dept. EM, Science Park, Box 60, State College, Pa. 16801, Tel: 814-238-4311, TWX: 510-691-2610; Empl.: 575

Local Sales Offices & Reps.

DC	Wash, K.E. O'Neil	202-223-4100

™HRTMP - heat resistant transfers - Meyercord Co.

™H-TORQ - synchronous motors - Bowman Electrical Prods. Corp.

™HUB-CLAMP - fastener - Sterling Instr.

™HUBLOC - component fastening device - Stock Drive Prods.

™HUB-LOCK - fastener - Sterling Instr.

HUDSON MAGNETIC CORP., Dept. EM, 62 Water St., Ossining, N.Y. 10562, Tel: 914-941-8500; Empl.: 15

Local Sales Offices & Reps.

Conn	Winsted, Hudson Wire Co.	203-379-0717
Ga	Trenton, Hudson Wire Co.	404-657-4321
Ill	Franklin Park, Hudson Wise Co.	312-678-8810

HUDSON TOOL & DIE CO., Dept. EM, 18 Malvern St., Newark, N.J. 07105

HUGHES AIRCRAFT CO, Aerospace Grps., Dept. EM, Centinela Ave & Teale St, Culver City, Cal. 90230

HUGHES AIRCRAFT CO., Communication Prods. Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave. Dept. E6, Newport Beach, Cal. 92663, Tel: 714-548-0671, TWX: 910-596-1374 .... p. 2443

Sales Manager: V. Gill

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engrg. Assocs.	602-955-3193
Cal	Mountain View, Caltron Comps.	415-964-3244
Cal	San Diego, Wes-K/San Diego	714-271-5048
Cal	Van Nuys, Wes-K Assocs.	213-989-3070
Colo	Englewood, A-G Electrns.	303-771-8088
Conn	No. Haven, Kitchen & Kutchin	203-239-0212
Fla	Maitland, Delmac Sls.	305-423-1425
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Detroit, A. Blumenberg Assocs.	313-557-1934
Mich	Southfield, Luebbe Sls. Co.	313-357-0355
Minn	St. Paul, Northport Engr.	612-698-3841
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NY	Dewitt, Tri Tech Elctrns.	315-446-2881
NY	East Rochester, Tri Tech Elctrns.	716-223-5720
NY	Great Neck, Cooper-Simon & Co.	516-487-1142
NY	Larchmont, Tri Tech Elctrns.	914-834-4423
Ohio	Cleveland, Duebbe Sls. Co.	513-871-4211
Ohio	Dayton, Leubbe Sls. Co.	513-294-0426
Ore	Beaverton, R.J. Sls.	503-655-2550
Pa	Narbeth, Electro-Comp Sls.	215-664-3576
Tex	Dallas, Southern State Mktg.	214-387-2489
Tex	Houston, Southern State Mktg.	713-665-0991
Wash	Bellevue, R.J. Sls.	206-454-5450
Wisc	Milwaukee, Coombs Assocs.	414-671-1945
Exp:	Cal., Newport Beach, Hughes Aircraft Co.	714-548-0671

HUGHES AIRCRAFT CO., CONNECTING DEVICES DIV., Dept. EM, 17150 Von Karman Ave., Irvine, Cal. 92714, Tel: 714-549-5701, TWX: 910-595-2523; Empl.: 436 .... p. 1847

Local Sales Offices & Reps.

Ala	Huntsville, L & D Inc.	205-859-1690
Ariz	Tucson, J.C. Goodsell	602-749-5026
Cal	Newport Bch., W. E. S. T., Inc.	714-540-9040
Cal	San Jose, J. T. McFarland Assoc. Corp.	408-286-9333
Fla	Ft. Lauderdale, Bolton Assocs.	305-491-5161
Fla	St. Petersburg, Bolton Assocs.	813-864-2294
Ill	Park Ridge, Probe Elctrns	312-696-2828
Kans	Overland Pk, Ensco-Rep	913-381-7557
Md	Towson, Kraft Elctrns. Sls.	301-828-5838
Mass	Brookline, L-K Harman, Inc.	617-232-6687
Mass	Haverhill, L-K Harman, Inc.	617-373-1313
Mass	Lee, L-K Harman, Inc.	413-243-1158
Mich	Southfield, Luebbe Sls.	313-357-0355
Minn	Mpls., B. Deming & Assocs.	612-888-5000
Mo	St. Louis, Ensco-Rep.	314-567-3935
NJ	Pompton Plains, T.A. Adamo Assoc.	201-835-5344
NC	Greensboro, L & D Inc.	919-292-3201
Ohio	Cincinnati, Luebbe Sls.	513-871-4211
Ohio	Cleveland, Luebbe Sls.	216-333-0425
Ohio	Dayton, Luebbe Sls.	513 294-0426
Pa	Delmont, Luebbe Sls. Co.	412-468-4019
SC	Greenville, L & D Inc.	919-292-3201
Tex	Irving, Space Elctrns.	214-251-3636
Va	Richmond, L & D Inc.	804-359-0125
Exp:	Cal., Los Angeles, Hughes Int'l	213-534-2121

HUGHES AIRCRAFT CO., Electron Dynamics Div., Dept. EM, 3100 W. Lomita Blvd., Torrance, Cal. 90509, Tel: 213-534-2121, TWX: 910-347-6238; Empl.: 1200

Local Sales Offices & Reps.

Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	San Jose, MCH Assocs	408-246-7330
Colo	Littleton, Grifco	303-795-1989
Fla	Orlando, E. G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E. G. Holmes & Assocs.	404-451-6161
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Indianapolis, Scientific Sls. Corp.	317-253-4606
Mass	Chelmsford, Independent Mktg. Reps.	617-256-8251
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
NH	Nashua, Independent Mktg. Reps.	603-889-8285
NM	Albuquerque, Fry-Gates Co.	505-298-1875
NY	Fayetteville, R.D. Sherman	315-637-9861
NY	Rochester, R.D. Sherman Inc.	716-647-3940
NY	Tuckahoe, Asco Elctrns.	914-779-8110
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Utah	Salt Lake City, Grifco	
Va	Virginia Beach, E. G. Holmes & Assocs.	804-481-6556
Va	Woodbridge, M. Lader Co.	202-296-2497
Wash	Seattle, Datacom Assocs.	206-285-2525

HUGHES AIRCRAFT CO, Ground Sys. Grp., Dept. EM, 1901 Malvern St., Box 3310, Fullerton, Cal. 92634, Tel: 714-871-3232; Empl.: 5000

HUGHES AIRCRAFT CO., Hybrid Microelectronic Circuits Dept., Microelectronic Prods. Div., Dept. EM, 500 Superior Ave., (E 4/5), Newport Bch., Cal. 92663, Tel: 714-548-0671, TWX: 910-596-1374

Sales Manager: F. Albertson

Refer to Communications Prods Dept., Microelectronic Products Div. for sales office information.

HUGHES AIRCRAFT CO., Image Devices Ind'l. Prods. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008, Tel: 714-438-9191, TWX: 910-322-1393; Empl.: 600

HUGHES AIRCRAFT CO., Ind'l. Prods. Div. FACT Sys., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008, Tel: 714-438-9191, TWX: 910-322-1393 p. 2871

Local Sales Offices & Reps.

Ill	Park Ridge, Hughes Aircraft Co.	312-823-5126
Tex	Dallas, Bradenco	214-358-3278

HUGHES AIRCRAFT CO., Ind'l. Prods. Div., Prod. Equip. Div., Dept. EM, 6155 El Camino Real, Carlsbad, Cal. 92008, Tel: 714-438-9191, TWX: 910-322-1393; Empl.: 500

Local Sales Offices & Reps.

Ariz	Scottsdale, Allen Assocs.	602-994-1305
Cal	Cambell, C.D. Buerki Co.	408-374-8040
Cal	Glendale, Tooltronics Inc.	213-246-4000
Cal	Los Angeles, International Sls.	213-534-2121
Fla	Clearwater, MacGregor Assocs.	813-446-7310
Fla	Coral Springs, MacGregor Assocs.	305-752-1924
Ga	Lilburn, MacGregor Assocs.	404-921-1300
Ill	Chicago, Diethert Angel	312-593-7600
Kans	Kansas City, Ransom Assocs.	913-299-2789
Md	Baltimore, A.L. Myers Co.	301-426-5583
Mass	Acton, E. E. Specialists	617-259-9200
NJ	Saddle Brook, L & M Assocs.	201-843-8700
NY	Brentwood, L & M Assocs.	516-231-8363
NY	New York, L & M Assocs.	212-243-6155
NY	Penfield, Upstate Tech. Equip.	716-381-0930
NY	Solvay, Upstate Tech. Equip.	315-487-6161
NC	Charlotte, MacGregor Assocs.	704-375-1562
Ohio	Dayton, R.R.M. Assocs.	513-433-7761
Ohio	Dayton, R. G. Sidnell & Co.	513-433-7761
Pa	Andalusia, L & M Assocs.	215-639-3100
Pa	Andalusia, L & M Assocs.	215-639-3100
Tex	Dallas, Bradenco	214-358-3278
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Wash	Seattle, Penryn Sls. & Engrg.	206-783-4334

HUGHES AIRCRAFT CO., MOS Dept. Solid State Products Div., Dept. EM, 500 Superior Ave., Newport Beach, Cal. 92663, Tel: 714-548-0671, TWX: 910-596-1374

Sales Manager: W.S. Eckess

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engrg.	602-955-3193
Cal	Mountain View, Caltron-Pyle	415-964-3244
Cal	Van Nuys, Wes-K Assoc.	213-989-3070
Colo	Englewood, A-G Elctrns.	303-771-8088
Conn	N. Haven, Kitchen & Kutchin	203-239-0212
Fla	Maitland, Delmac Sls.	305-644-2526
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Md	Ellicott City, Marketing Technology	301-465-5944
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Detroit, A. Blumenberg Assocs.	313-557-1934
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	St. Louis, Engineering Svcs.	314-997-1515
NY	Bayside, R. Diamond, Inc.	212-423-7330
NY	Endwell, Tri Tech Elctrns.	607-754-1094
NY	Fairport, Tri Tech Elctrns.	716-223-5720
NY	Fayetteville, Tri Tech Elctrns.	315-446-2881
Ohio	Cincinnati, Leubbe Sls.	513-871-4211
Ohio	Dayton, Leubbe Sls.	513-294-0426
Ore	Beaverton, R.J. Sls.	503-655-2550
Pa	Narbeth, Electro-Comp Sls.	215-664-3576
Tex	Dallas, Southern State Mktg.	214-387-2489
Tex	Houston, Southern State Mktg.	713-665-0991
Wash	Bellevue, R.J. Sls.	206-454-5450
Wisc	Greendale, Coombs Assocs.	414-421-2300

Local Distributors

Cal	Santa Ana, Calmarc Sls.	714-558-6961
NY	College Point, Semiconductor Technology	212-445-4466

HUGHEY & PHILLIPS, INC., Dept. EM, 3050 N. California St., Burbank, Cal. 91505, Tel: 213-849-1104, TWX: 910-498-2252; FSC No.: 94295; Empl.: 42

HULL CORP., Dept. EM, Davisville Rd., Hatboro, Pa. 19040, Tel: 215-672-7800, TWX: 510-665-6822; Empl.: 275

Local Sales Offices & Reps.

Cal	Santa Barbara	805-967-3678
NC	Brevard	704-883-3061
RI	Warwick	401-739-2050
Exp:	Pa. Hatboro	215-672-7800

™HUMIDOLAIN - ceramic products - Star Porcelain Co.

HUMISEAL DIV., Columbia Chase Corp., Dept. EM, 26-60 Bklyn-Queens Expwy., Woodside, N.Y. 11377, Tel: 212-932-0800, Telex: 22-4657; Empl.: 150 p. 1390,1391

Local Sales Offices & Reps.

Cal	Alhambra, M.W. Riedel Co.	213-283-7694
Cal	Mountain View, Weseloh & Assocs.	415-961-0565
Conn	Norwalk, Betronic Assocs.	203-853-7630
Fla	Maitland, Barrett Assocs.	305-678-0172
Ill	Northbrook, R. T. Howlett & Assoc.	312-498-5444
Kans	Kansas City, L.E. Bruns Co.	913-287-5242
Md	Cockeysville, Advanced Tech. Sls.	301-666-9027
Mass	Waltham, Betronic Assocs.	617-894-8400
Mich	Southfield, J.M. Norton Assocs.	313-642-2526
Minn	Minneapolis, Thomas Mktg.	612-823-4880
NJ	Livingston, H. Thaw Sls.	201-992-2711
NY	Rochester, Gislason Sls.	716-454-4741
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Tex	Dallas, R. D. Spooner	214-357-6636
Wash	Kirkland, R.R. Chase & Assoc.	206-454-2514
Wisc	Neenah, Howlett & Assocs.	414-722-2946

Local Distributors

Cal	Alhambra, M. W. Riedel & Co.	213-283-7694
Cal	Mountain View, Target Elctrns.	415-961-1170
Tex	Dallas, R. D. Spooner Co.	214-357-6636

™HUMISTAT - relative humidity controller - American Instr. Co.

™HUMP-GARD - railroad recorder - Impact-O-Graph Corp.

HUMPHREY, INC., Dept. EM, 9212 Balboa Ave., San Diego, Calif. 92123, Tel: 714-565-6631, TWX: 910-335-2001; Empl.: 110

Local Sales Offices & Reps.

Cal	Burbank, TransDynamics	213-849-6262
Cal	Palo Alto, Harris Assocs.	415-328-3370
Cal	San Diego, TransDynamics	714-298-8215
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Kans	Wichita, Humphrey, Inc.	316-685-7563
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Mich	Farmington, Carter, McCormick & Peirce	313-477-7700
NY	Holbrook, Aviatech Int'l.	516-981-9300
NY	Plainview, Eastern Metro Assocs.	516-931-1414
Ohio	Cleveland, Carter, McCormick & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormick & Peirce	513-278-5873
Pa	Philadelphia, Humphrey, Inc., Eastern Div.	215-542-9150
Pa	Pittsburgh, Carter, McCormick & Peirce	412-824-3760
Tex	Dallas, W.N. Rider Co.	214-357-2246
Tex	El Paso, Nokomis Prods.	915-778-2801

Advertisement

Humphrey, Inc. designs and manufactures electro-mechanical and inertial reference instruments, including electro-fluidic angular rate sensors, gyroscopes (free, rate, directional, vertical); all-electric attitude and directional gyros and repeaters for general aviation and avionics OEMs; bore hole survey systems for offshore and inland drilling; angular and rectilinear displacement transducers; accelerometers and acceleration switches; planar accelerometers (Accelograph); pendulums; inertial reference systems for automotive, aircraft, and oceanographic performance testing. Proven and qualified as required for military and industrial applications.

HUNTER STANLEY ELEC., Dept. EM, 208 Russell St., Nashville, Tenn. 37213, Tel: 615-254-6532; FSC No.: 21675; Empl.: 10

HUNTER TOOLS, See Marshall Inds.

HURST MFG. CORP., Dept. EM, Box 326, Princeton, Ind. 47670, Tel: 812-385-2564, TWX: 810-350-2341; Empl.: 140

Sales Manager: W.W. Taylor

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Los Angeles, Sierra Ind'l. Engrg. Co.	213-624-3123
Cal	Menlo Park, Long & Assoc.	415-327-1300
Colo	Englewood, Shefler-Kahn Co.	303-761-2590
Fla	Orlando, Cartwright & Bean, Inc.	305-422-4531
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Ill	Chicago, D. Dolin Co.	312-286-6200
Ind	Indianapolis, Pacer Sls. & Engrg. Co.	317-849-1481
La	New Orleans, Cartwright & Bean, Inc.	504-362-4649
Md	Glen Arm, Hodgins Assoc.	301-592-7047
Mass	Lexington, Hathaway Elctrns.	617-861-7010
Mich	Grand Rapids, R. Van Riper Sls.	616-452-0464
Minn	Minneapolis, Banke Assoc.	612-784-4270
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
NJ	Little Falls, D. Carbone	201-256-9191
NM	Albuquerque, Shefler-Kahn Co., Inc.	505-265-7077
NY	Rochester, W.H. Zimmerman Co.	716-586-4450
NY	Syracuse, W.H. Zimmerman Co.	315-474-4889

NC	Charlotte, Cartwright & Bean, Inc.	704-333-5673
NC	Raleigh, Cartwright & Bean, Inc.	919-781-6560
Ohio	Chagrin Falls, Kilroy Sls. Co.	216-247-8997
Tenn	Knoxville, Cartwright & Bean, Inc.	615-693-7450
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	Dallas, John B. Guenther, Inc.	214-691-8500
Utah	Salt Lake City, Sheflet-Kahn Co.	801-484-4222
Wash	Gig Harbor, F.H. Haight Co.	206-297-3212
Wisc	Oak Creek, D. Dolin	414-355-9100
Exp:	New York, Westbury, Minthorne International	516-334-3303

™HUSTLER - communication antennas & accessories - New-Tronics Corp.

HUTCHINSON INDUSTRIAL CORP., Dept. EM, 44 W. Highland Park, Hutchinson, Minn. 55350, Tel: 612-879-2371; Empl.: 150

Local Sales Offices & Reps.

Cal	San Raphael, Hutchinson Indl. Corp.	415-472-2670
Cal	Santa Clara, King Assocs.	408-249-1022

HUTSON INDUSTRIES, Dept. EM, 2019 W. Valley View, Dallas, Tex. 75234, Tel: 214-241-3511, TWX: 910-860-5537; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, K&E Assocs.	205-883-9720
Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Redwood City, Parks & Pruitt	415-364-1640
Cal	Tustin, Orion Sls.	714-832-9687
Colo	Denver, Electrodyne	303-757-7679
Conn	Newton, Gerber Sls.	203-426-3440
Del	Collinsville, Gerber Sls.	203-693-2651
Fla	Lighthouse Point, R. C. Simon	305-941-2757
Ga	Hartwell, K&E Assocs.	404-376-5438
Ill	Chicago, L-TEC, Inc.	312-286-1500
Md	Baltimore, Stemler Assoc.	301-944-8262
Md	Pasadena, Stemler Assocs.	703-548-7818
Mass	East Longmeadow, Gerber Sls.	413-525-3059
Mass	Waltham, Gerber Sls.	617-890-8040
Mich	Grosse Point Park, S. Greiner Assoc.	313-499-0188
Minn	Minneapolis, Bitronics Sls.	612-835-7744
Miss	Corinth, K&E Assocs.	601-287-1471
Mo	Hazelwood, Dytronix	314-731-5799
Mo	Independence, Dytronix	816-737-1100
NJ	East Orange, M. Gallagher	201-678-5071
NJ	Haddonfield, Sunday O'Brien	609-429-4013
NM	Albuquerque, Tritronics	505-265-8400
NY	N. Syracuse, Precision Sls.	315-458-2223
Ohio	Chagrin Falls, Midwest Mktg. Association	216-247-6655
Ohio	Dayton, Midwest Mktg. Assoc.	513-433-2511
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Tex	Plano, Precision Devices	214-423-7618
Utah	Salt Lake City, Electrodyne	801-486-3801
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Greenfield, L-Tec	414-545-8900

Local Distributors

Cal	Newport Beach, Semicomp	714-833-3070
Cal	San Leandro, Kea Elctrn.	415-352-2277
Cal	Santa Ana, Rical	714-557-7131
Conn	Norwalk, Harvey Elctrn.	203-853-1515
Fla	Clearwater, Diplomat - Southland	813-443-4514
Fla	Miami, All American Transistor	305-754-5531
Mich	Farmington, Sheridan Sls.	313-477-3800
Minn	Minneapolis, Cassidy Elctrn.	612-835-7744
Mo	Florissant, Sheridan Sls.	314-837-5200
NJ	Camden, Gen. Radio Supply Co.	609-964-8560
NJ	Cinnaminson, Sheridan Sls.	215-627-1920
NY	Rochester, Rochester Radio	716-454-7800
NC	Winston Salem, Kirkman Elctrn.	919-722-9131
Ohio	Beachwood, Sheridan Sls.	216-831-0130
Ohio	Cincinnati, Sheridan Sls.	513-761-5432
Ohio	Dayton, Sheridan Sls.	513-223-3332
Pa	Pittsburgh, Sheridan Sls.	412-244-1640
Tex	Austin, Quality Comp	512-458-4181
Tex	Dallas, K A Electrn.	214-634-7870
Tex	Houston, Altair	713-462-3029
Tex	Richardson, Altair	214-231-5166
Utah	Salt Lake City, Alta Electrn.	801-486-7227
Wisc	Milwaukee, B-W Elctrn.	414-545-8380
For:	Can., Downsview, Ont., Semad Elctrn.	416-635-9880
For:	Can., Vancouver, B.C., Intek Elctrn.	604-324-6831

HY-CAL ENGINEERING, Dept. EM, 12105 Los Nietos Rd., Santa Fe Springs, Cal 90670, Tel: 213-698-7785, Telex: 67-4494; FSC No.: 12199; Empl.: 70

Sales Manager: A.E. Bowman

HY-GAIN ELECTRONICS CORP., Dept. EM, 8601 N.E. Highway 6, Lincoln, Neb. 68505, Tel: 402-464-9151, Telex: 48-6424; Empl.: 750

Local Sales Offices & Reps.

Ala	Birmingham, Downey-Mickwee Inc.	205-251-9802
Alas	Anchorage, Far North Reps.	907-337-1221
Cal	San Jose, Sierra Mktg.	408-293-6101
Cal	Van Nuys, M. Markman Co.	213-779-1063
Colo	Englewood, On-Mark Sls.	303-798-5822
Fla	Miami, Eagle Assoc.	305-625-8324
Haw	Honolulu, S & A Ltd.	808-941-2400
Ind	Carmel, Alpha Sls. Co.	317-846-7735
Kans	Overland Park, H. Curry	
Md	Olney, A B & T Sls. Corp.	301-924-4976
Mass	Auburndale, Grossman Sls.	617-527-7754
Mich	Farmington, Phillip G. Flora Assoc.	313-478-4020
Minn	Plymouth, Sonic Sls.	612-546-1368
Miss	Michigan City, J. Fisher Sls. Co.	601-224-6470
NY	Rochester, Jenkins Sls. Co.	716-271-2200
NY	Staten Island, Jack Niesi Sls. Co. Inc.	212-727-5570
NC	Charlotte, Owen-Harpole & Assocs.	704-847-4777
Ohio	Cleveland, Astro Sls.	216-461-4500
Pa	King of Prussia, A B & T Sls. Corp.	215-265-1028
Pa	Rydal, J.B. Duggan Co. Inc.	215-886-1437
Tex	Dallas, Century Sls. Ltd.	214-387-2140
Wash	Vancouver, Jim Wasson & Assocs.	206-696-3384
Wisc	Brookfield, Steffen Sls. Co.	414-781-7596

HYCOMP INC., Dept. EM, Box 250, Maynard, Mass. 01754, Tel: 617-897-4578; Empl.: 54

Sales Manager: N.S. Palazzini

Local Sales Offices & Reps.

Ariz	Phoenix, MR Engineering Sls. Co.	602-959-5150
Cal	Mountain View, Thresum Assocs.	415-965-9180
Cal	Pasadena, Mar-Land Entprs.	213-681-9440
Ind	Indianapolis, Scott Elctrns.	317-897-9976
Ky	Louisville, Scott Elctrns.	502-583-3220
Md	Ellicott City, J. Winkler Assoc.	301-465-8630
Mass	Waltham, Dynasel Assocs.	
NJ	Fort Lee, Northern Elctrn Comp Co.	201-461-2789
NY	Rochester, W.H. Zimmerman, Inc.	716-586-4450
NY	Syracuse, W.H. Zimmerman, Inc.	315-474-4889
Ohio	Cleveland, Scott Elctrns	810-421-8503

™HY-A-SIL - silicon rectifiers - Sanford-Miller Corp.

HYBRICON CORP., Dept. EM, 410 Crest Rd., Litteton, Mass. 01460, Tel: 617-861-6692

™HYBRIDGE - RF bridge - Alford Mfg. Co.

™HYBRID MODULES - precision resistor divider networks - Pulse Engrg., Inc.

HYBRID SYSTEMS CORP., Dept. EM, Crosby Dr., Bedford, Mass. 01730, Tel: 617-275-1570, TWX: 710-326-7584; Empl.: 250

Sales Manager: L. Wayne Peacock

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assoc.	205-883-7893
Ariz	Scottsdale, DAR-C Inc.	602-948-2240
Cal	Los Altos, Cain-White & Co.	415-948-6533
Cal	Marina del Rey, Relcom	213-822-1187
Cal	San Diego, Relcom	714-292-0165
Colo	Parker, Component Sls.	303-841-2650
Fla	Orlando, Technology Mktg. Assoc.	305-857-3760
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Wheaton, Len Felder Assoc.	312-665-9070
Kans	Overland Park, KEBCO	913-649-2168
Md	Baltimore, Burgin Kreh Assoc.	301-788-5200
Mass	Holbrook, McLellan Assocs.	617-767-4771
Minn	Minneapolis, Northstar Components	612-553-1888
Mo	St. Louis, KEBCO	314-569-2660
NJ	Haddonfield, Thomas Assocs.	609-854-3011
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	Albany, H.C. Johnson Agencies	518-456-6667
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Plainview, ERA Inc.	516-822-9890
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Winston-Salem, Burgin Kreh Assocs.	919-768-4174
Ohio	Dayton, Berberich Assocs.	513-433-0342
Okla	Tulsa, Technical Mktg.	918-622-5984
Ore	Portland, Northwest Mktg. Assoc.	503-297-2581
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Tex	Dallas, Technical Mktg.	214-387-3601
Tex	Houston, Technical Mktg.	713-777-9228
Va	Lynchburg, Burgin Kreh Assocs.	804-845-5600
Wash	Bellevue, Northwest Marketing Assocs.	206-455-5846
Wisc	Milwaukee, J.M. Sls. Co.	414-546-0040

™HY-BUTE/60 - butyl gum, for insulation - General Elec. Co.

™HYCAR CTBN - reactive liquid polymers - Goodrich Co. Chemical Div. BF

™HYDENT - compression terminals & splices - Burndy Corporation

™HYDRIVE - high output amplifiers - Infodex, Inc.

™HYDROCONE - crushers - Allis-Chalmers

™HYDROFEED - recording lathe - Components Corp.

™HYDRO-FLOW FLUID - soldering leveling & fusing chemical - Kenco Alloy & Chemical Co., Inc.

™HYDROPRESS - book pressing machine - A. M. W. Corp.

™HYDROSET - crusher mechanism for vertical shaft movement - Allis-Chalmers

™HYDROSOLV - liquid organic water soluble flux - Alpha Metals, Inc.

™HYDROTECTOR - package r-h inspection sys - American Instr. Co.

™HYE-QUE - antenna connector - Budwig Mfg. Co.

™HYFEN - connector contacts - Burndy Corporation

™HY-FI - gas chromatograph - Varian Assocs.

™HYFLUX - alnico 5 magnets - Indiana General/Div. Emm Corp.

™HY-GAIN - CB transceivers - Hy-Gain Electronics Corp.

™HYGRADE - fabric base sleevings - Markel Corp.

™HYGRO-CEL - cup r-h sensor device - American Instr. Co.

™HYGRO-CHAMP - clamp r-h measuring device - American Instr. Co.

™HYGRODYNAMICS - hygrometer product line - American Instr. Co.

™HYGROSENSOR - relative humidity transducer - American Instr. Co.

™HYGROTRAN - convertors, humidity signal (resistance) - American Instr. Co.

™HYJOULE - high energy fault Locators - Associated Research, Inc.

HYKON MFG. CO., Dept. EM, 163 E. State St., Box 923, Alliance, Ohio 44601, Tel: 216-821-2320; Empl.: 8

™HYLINK - compression splice - Burndy Corporation

™HYLOK - connector system - Burndy Corporation

™HYLUG - compression terminal - Burndy Corporation

™HYPERION - ballastless mercury vapor dimming systems - Lutron Electronics Co.

™HYPER SEL - rectifier - Alpha Components Corp.

™HYPERTAC - connectors - Hypertronics Corp.

™**HYPERTAC** - PC rack & panel connectors - Industrial Electronic Hardware

HYPERTRONICS CORP., Dept. EM, 154 Great Rd., P.O. Box 254, Stow, Mass. 01775, Tel: 617-897-3236, Telex: 94-8338; FSC No.: 50541; Empl.: 16

Local Sales Offices & Reps.

Cal	N. Hollywood, Jewett Co.	213-789-8103
Cal	San Carlos, Winco Sls.	415-365-6082
Conn	Bethany, Representatives Corp.	203-393-0024
DC	Wash, Tyler Griffin Co.	EN1-4821
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Ill	No. Riverside, Joe Popp Sls. Co.	312-447-6124
Md	Baltimore, Tyler Griffin Co.	EN9-4821
Mass	Wellesley, Representatives Corp.	617-237-6476
Minn	Minneapolis, Electronic Innovators	612-884-7471
NY	Huntington, C.R. Mayer Co.	516-921-7876
Ohio	Medina, McShane, Inc.	216-725-4568
Pa	Paoli, Tyler Griffin Co.	215-647-1550
Tex	Plano, Burns Technical Sls.	214-423-1231

™**HYPOINT** - leadless ic receptacle - Burndy Corporation

™**HYPOT** - high potential Testers - Associated Research, Inc.

™**HYPRESS** - installation tooling - Burndy Corporation

™**HYRING** - two piece compression terminations - Burndy Corporation

™**HY-SCAN** - monitor receivers - Hy-Gain Electronics Corp.

™**HY SEAS** - VHF marine equipment - Hy-Gain Electronics Corp.

HY-TEMP TRANSDUCERS, Dept. EM, Box 11522, Philadelphia, Pa. 19116, Tel: 215-947-1200

™**HY-THERM** - Heat flux sensor - Hy-Cal Engineering

HYTRONICS CORP., Dept. EM, 6231 72nd Ave. N., Pinellas Park, Fla. 33565, Tel: 813-546-2421; FSC No.: 29525; Empl.: 70

Local Sales Offices & Reps.

Ariz	Scottsdale, J. B. Hower & Co.	602-948-0430
Cal	San Jose, Silicon Valley Sls.	408-997-1493
Cal	Santa Ana, Cal. Elctrns. Mktg.	714-835-2702
Colo	Englewood, Dynatech, Inc.	303-773-2830
Fla	Seminole, Harvey Pipe	813-391-3057
Mass	Canton, New England Elctrn. Sls. Corp.	617-828-4835
Mich	Grosse Pointe Park, Greiner Assocs.	313-499-0188
Minn	Minneapolis, Scott Elctrns.	612-929-2985
NY	Syracuse, J.V. Costello	315-472-0322
Ohio	Dayton, F. L. Ohmer	513-434-1454
Pa	Furlong, Avenir	215-348-8290
Tex	Richardson, Vista Engrg.	214-235-4547

I-T-E ELECTRICAL COMPS. GRP., see Gould Inc., Electrical Comps. Div.

™**H-ZONE** - high temperature wire - Cerro Wire & Cable Co.

™**H-10** - servicemen's leak detector - General Electric Co.

IBM CORP., General Systems Div., Dept. EM, 875 Johnson Ferry Rd. N.E., Atlanta, Ga. 30342

™**IBR** - integrated bridge rectifier - Varo Semiconductor, Inc.

™**ICE** - in-circuit emulator for microprocessors - Intel Corp.

™**ICEM** - magnetrons - Varian Electron Device Grp.

™**ICE-TROL** - ambient-compensated temperature controllers - Honeywell

™**ICKYPIC II** - compound - Communications Technology Corp.

ICO/RALLY CORP., Dept. EM, Edward J. Bush, Palo Alto, Cal. 94303, Tel: 415-324-0970, Telex: 348-335; FSC No.: 51705; Empl.: 30; Minimum order: $E.J. Bush

Distributor Manager: E.J. Bush

Local Sales Offices & Reps.

Cal	Palo Alto	415-324-0970
NJ	Deptford	609-228-4600
Tex	Dallas	214-243-8521

ICOM DIV., Dept. EM, 6741 Variel Ave., Canoga Park, Cal. 91303, Tel: 213-348-1391, TWX: 910-494-2788; Empl.: 50

Sales Manager: Gen. Sls. Mgr.

ICON DIVISION, U.S.M. Corp., Dept. EM, 156 Sixth St., Cambridge, Mass. 02142, Tel: 617-868-5400, TWX: 710-321-1883; Empl.: 100

Local Sales Offices & Reps.

Cal	Los Angeles, Icon Corp.	714-556-7711
Cal	San Francisco, McFarland Assoc.	408-286-9333
Ill	Chicago, Icon Corp.	312-259-3778
Mich	Detroit, Xanthus	313-391-3235
Minn	Minneapolis, Applied Sls. Engrg.	612-544-3308
NY	North Port, Icon	516-271-1110
NY	Rochester, H. C. Johnson Agencies	716-482-3000
Ohio	Cincinnati, J. Murray Assoc.	513-662-1616
Ohio	Cleveland, Del Steffen Assoc.	216-461-8333

ICORE INT'L., INC., Dept. EM, 180 N. Wolfe Rd., Sunnyvale, , Cal. 94086, Tel: 408-732-5400, TWX: 910-339-9269; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, E. Finn	205-859-1750
Ill	Palatine, Bu-Nell Engrg. Co.	312-358-2300
Mass	Haverhill, ABC Elctrn. Sls. Co.	617-373-9832
Minn	Minneapolis, Compons. Grp.	612-824-4222
Mo	Hazelwood, Dy-tronix	314-731-5799
NJ	Tenafly, ABC Elctrn. Sls.	201-568-2354
NY	N. Tarrytown, ABC Elctrn. Sls. Co.	914-631-2650
NY	Smithtown, J. Ryan	
NY	Williston Park, ABC Elctrns. Sls. Co.	516-747-6610
Pa	Huntingdon Valley, ABC Elctrn. Sls. Co.	215-947-6960
Tex	Richardson, Barry Sls.	214-234-0255
Wash	Seattle, Norwest Co.	206-282-3707

™**ICSOTIMER** - time delay - Instr. & Control Sys., Inc.

™**IDEA** - integrated diesel engine analyzer - Harris Corp.

IDEAL INDUSTRIES INC., Dept. EM, 4450 Becker Pl., Sycamore, Ill. 60178, Tel: 815-895-5181, TWX: 910-639-0613; Empl.: 650

Local Sales Offices & Reps.

Ala	Birmingham, Ideal Industries, Inc.	205-979-1438
Ala	Mobile, Zeller & Constantine Inc.	205-479-7667
Ariz	Phoenix, Maddox Sls. Co.	602-274-3807
Cal	Los Angeles, Ideal Electrical Ind. Inc.	213-726-1213
Cal	Pico Rivera, Maddox Sls. Co.	213-949-5433
Cal	San Francisco, Maddox Sls. Co.	415-431-2953
Colo	Denver, Ideal Inds.	303-753-0673
Conn	Avon, Electrical Agencies, Inc.	203-673-9296
Conn	West Haven, Electrical Agencies, Inc.	203-WE3-2985
Fla	Clearwater, Ideal Ind. Inc.	813-441-9192
Fla	Miami, Ideal Inds.	305-661-0136
Ga	Atlanta, Ideal Industries Inc.	404-351-4256
Haw	Honolulu, H.H. Sawyer Co.	808-847-1411
Ill	Chicago, Ideal Industries Inc.	312-775-4343
Ind	Indianapolis, Ideal Industries Inc.	317-881-9994
Iowa	Cedar Rapids, F.C. Clatterbaugh Co.	319-364-5557
Iowa	Des Moines, F.C. Clatterbaugh Co.	515-282-3213
Kans	Kansas City, Walker-Loudermilk Co.	816-483-8200
La	Metairie, Zeller & Constantine, Inc.	504-889-1995
Me	S. Berwick, Electrical Agencies, Inc.	207-384-5321
Md	Millersville, O. T. Hall & Son	301-987-5990
Mass	Boston, Electrical Agencies Inc.	617-268-9300
Mich	Southfield, Ideal Industries	313-646-6169
Minn	Hamel, Elstad Sls. Co.	612-559-4000
Miss	Jackson, Zeller & Constantine, Inc.	601-982-2745
Mo	Villa Ridge, Ideal Industries	314-742-2366
Neb	Lincoln, F.C. Clatterbaugh Co.	402-489-5912
Neb	Omaha, F.C. Clatterbaugh Co.	402-333-1600
NJ	Linden, Ideal Industries Inc.	201-925-0575
NM	Albuquerque, Maddox Sls. Co.	505-298-2422
NY	Canandaiqua, Ideal Industries Inc.	315-394-3411
NY	Elnora, Ideal Industries Inc.	518-371-5129
NC	Charlotte, Ideal Industries Inc.	704-525-7186
NC	Greensboro, Ideal Industries Inc.	919-288-7121
Ohio	Cincinnati, Ideal Industries Inc.	513-874-5631
Ohio	Cleveland, Ideal Industries Inc.	216-831-1600
Okla	Oklahoma City, Hamco Sls.	405-946-6503
Okla	Tulsa, Hamco Sls.	918-627-2262
Ore	Portland, Northwest Agencies Inc.	503-227-5004
Pa	Philadelphia, Ideal Industries Inc.	215-VI4-6300
Pa	Pittsburgh, Ideal Industries Inc.	412-561-8335
SC	Columbia, Ideal Industries Inc.	803-772-1629
Tenn	Memphis, Ideal Industries Inc.	901-323-9162
Tenn	Nashville, Ideal Industries Inc.	615-356-2511
Tex	Dallas, Ideal Inds.	214-369-4850
Utah	Salt Lake City, L. W. Williams Co.	801-487-7821
Va	Richmond, Ideal Industries Inc.	804-262-5311
Wash	Seattle, Northwest Agencies Inc.	206-MA3-8882
Wisc	Pewaukee, Ideal Industries Inc.	414-464-3230

IDEAL PRECISION METER CO., Dept. EM, 214 Franklin St., Brooklyn, N. Y. 11222, Tel: 212-383-6904; Empl.: 150

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	San Francisco, Artwel Electric Inc.	415-467-1880
Cal	Van Nuys, Cummings & Assoc.	213-340-6035
Ill	Chicago, Ellinger Sls	312-763-1570
Iowa	Cedar Rapids, H. R. Brown Sls. Co.	319-366-0635
Md	Baltimore, M E & Assoc. Inc.	301-825-1130
Mich	Benton Harbor, Mc Nabb & Sasoc.	616-925-2166
Minn	Minneapolis, R.G. Ragon	612-488-0201
Mo	Florissant, Sheridan Assocs.	314-837-2500
NJ	Cherry Hill, M E & Assoc.	609-667-6110
NY	Liverpool, L.P. Garner	315-451-1323
NY	New York, Spectrum Sls.	914-793-1660
Ohio	Cincinnati, F. E. Kahsar Sls.	216-653-6808
Tex	Dallas, Blackburn Assocs.	214-692-8885
Wash	Seattle, Seatronics, Inc.	206-767-4330

™**IDENTOLINE** - underground warning tape - Brady Co., W. H.

™**IDIGRAF** - display terminal - Information Displays, Inc.

™**IDIIOM/II** - computer controlled display - Information Displays, Inc.

™**I-DIT** - industrial miniature incher transformer - TRW/UTC Transformers

™**I-DOT** - industrial miniature audio transformer - TRW/UTC Transformers

™**IDRAW** - automatic drafting system software - Information Displays, Inc.

IE MANUFACTURING CO., Dept. EM, 3039 W. Carroll Ave., Chicago, Ill 60612

IEC CORPORATION, Dept. EM, 3100 Longhorn Blvd., Austin, Tex 78758, Tel: 512-836-0547; Empl.: 35

IEC ELECTRONICS CORP., Dept. EM, 105 Norton St., Newark, N.Y. 14513, Tel: 315-331-7742, TWX: 510-250-2515; Empl.: 460

Local Sales Offices & Reps.

Mass	Lexington, J.E. Boeing Co.	617-862-2500

IEE, Connector, Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405, Tel: 213-787-0311

™**IEE-APOLLO** - incandescent digital displays - Industrial Elctrn. Engrs.

™**IEE-ARGUS** - dot matrix message panels - Industrial Elctrn. Engrs.

™**IEE-ATLAS** - mounting hardware & decoder/drivers - Industrial Elctrn. Engrs.

™**IEE-AURORA** - incandescent flatpack digital displays - Industrial Elctrn. Engrs.

™**IEE-ELECTRA** - subminiature lamps - Industrial Elctrn. Engrs.

™**IEE-HELIOS** - fiberoptic displays - Industrial Elctrn. Engrs.

™IEE-HERCULES - light emitting diode digital displays - Industrial Elctrn. Engrs.

™IEE-IRIS - transilluminated digital displays and annunciators - Industrial Elctrn. Engrs.

™IEE-JUPITER - solid state indicators - Industrial Elctrn. Engrs.

IEE/SCHADOW, INC., Dept. EM, 8081 Wallace Rd., Eden Prairie, Minn. 55343, Tel: 612-944-1820, Telex: 29-0556; Empl.: 75 .... p. 4095-4099

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Angeles, M.A. Stolaroff Co.	213-295-7781
Cal	Mt. View, Weseloh & Assocs.	415-961-0565
Cal	San Diego, M.A. Stolaroff Co.	714-234-6905
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Ft. Lauderdale, Beacon	305-971-7320
Fla	Maitland, Beacon	305-647-3498
Ga	Atlanta, Beacon	404-351-3654
Ill	Chicago, ILIS, Inc.	312-631-1122
Md	Randallstown, Beacon	301-922-1248
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Benton Harbor, R. C. Nordstrom	616-429-8560
Mich	Lathrop Village, R.C. Nordstrom Co.	313-559-7373
NH	Bedford, Ray Perron & Co.	603-472-3030
NH	Dover, R. Perron & Co.	603-742-2321
NM	Albuquerque, Tri-Tronix	505-265-8409
NY	Kenmore, Nycom	716-876-1973
NY	Mt. Vernon, David Sonkin Assocs.	914-668-9809
NY	Syracuse, Nycom	315-437-8343
NC	Charlotte, Beacon	704-525-7412
Ore	Portland, C. K. Shanks & Assocs.	503-292-5656
Pa	Ambler, Wyncote Instrumentation	215-643-2440
RI	Mt. Penn, Wyncote Instrumentation	215-643-2440
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Fort Worth, W.P. Fralia Co.	817-640-9101
Tex	Houston, W. Pat Fralia Co.	713-772-1572
Va	Falls Church, Beacon	703-534-7200
Va	Lynchburg, Beacon-North	804-237-4740
Wash	Seattle, C. K. Shanks & Assocs.	206-632-4290

Local Distributors

Cal	Inglewood, Time Elctrns. Wese	213-649-6900
Cal	Los Angeles, Western Electromotive	213-820-3777
Cal	Mt. View, Target Elctrns.	415-961-1170
Colo	Denver, Integrated Elctrns.	303-534-6121
Conn	Waterbury, Suburban Supply	203-757-1251
Ill	Westmont, R.M. Bodell	800-323-7434
Kans	Wichita, Radio Supply Co.	316-267-5216
Md	Beltsville, Treeko Sls.	301-937-8260
Mass	Boston, Sager Electrical Co.	617-542-2281
Mass	Waltham, Impact Sls. Co.	617-964-7740
Mich	Kentwood, R. M. Electrns.	616-531-9300
NY	Mount Vernon, QAR Industrial Electrn. Sls.	914-699-2224
Ohio	Medina, DRW	216-722-5531
Tex	Stafford, Southwest Elctrns.	713-494-6021
Wash	Seattle, Zepher Elctrn. Sls. Corp.	206-575-0922

™IEE/SOURIAU - connectors - Industrial Elctrn. Engrs.

™IEE-TITAN - projection readouts - Industrial Elctrn. Engrs.

IET LABS INC., Dept. EM, 419 W. 119th St., New York, N.Y. 10027, Tel: 212-222-3990

Local Sales Offices & Reps.

Mass	Waltham, IET Labs Inc.	617-890-5105

™IGEPAL - cleaner, washing & scouring agent - GAF Corporation

DDC®

ILC DATA DEVICE CORPORATION

ILC DATA DEVICE CORP., Dept. EM, Airport Int'l. Plaza, Bohemia, N.Y. 11716, Tel: 516-567-5600, TWX: 510-228-7324; FSC No.: 19645; Empl.: 320 p. 1660,1661

Sales Manager: J.P. Sheahan, Nat'l. Sls. Mgr.

Local Sales Offices & Reps.

Ala	Huntsville, Rep Inc.	205-881-9270
Ariz	Scottsdale, OEM Specialties	602-948-3360
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	No. Hollywood, IIC Data Device	213-982-6454
Cal	Palo Alto, Coherent Mrktg. Assocs.	415-327-2217
Cal	San Diego, DeAngelo, Rothman & Co.	714-560-5707
Colo	Boulder, Herb Bass Assocs.	303-499-7509
Fla	Casselberry, EIR, Inc.	305-830-9600
Ga	Tucker, REP Inc.	404-938-4358
Ill	Arlington Heights, Dytec/Central	312-394-3380
Md	Wheaton, Data Sys. Mktg.	301-933-6111
Mass	Burlington, Dynamic Sls. of N.E.	617-272-5676
Mich	Southfield, Luebbe Sls. Co.	313-569-1189
Minn	St. Paul, Dytec/North	612-645-5816
Mo	St. Louis, Dytec/South	314-423-1234
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Great Neck, Meas. Tech., Inc.	212-895-7177
NY	Great Neck, Meas. Tech., Inc.	516-482-3500
NY	Syracuse, Nycom, Inc.	315-437-8343
NC	Raleigh, Rep, Inc.	919-851-3007
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Pa	King of Prussia, Rivco	215-265-5211
Tenn	Jefferson City, Rep, Inc.	615-475-4105
Tex	Dallas, MZB Co.	214-235-5535
Tex	Houston, MZB Co.	713-523-7333
Wash	Redmond, DESCO Northwest	206-455-9325
For:	Australia, Brookvale N.S.W., Allied Capacitors Pty. Ltd.	02-938-2135
For:	Belgium Bruxsels, Techmation Benelus	02-241-65-73
For:	England, Edgware, Middx., Techmation, Ltd. UK	01-958-5636
For:	France, Luynes, Techmation France	91-24-01-19
For:	France, Paris, Techmation France	01-200-11-05
For:	France, Toulouse, Techmation France	61-80-86-94
For:	India, Amahabad, Industrial Elctrn. Instrs.	272-79678
For:	Israel, Tel Aviv, RDT Elctrns.	3-48-32-11-5
For:	Italy, Milan, Microel Italia	02-479487
For:	Italy, Rome, Microel Italia	06-836243
For:	Japan, Tokyo, Shinkoh-DDC Co. Ltd.	03-293-0964
For:	Japan, Tokyo, NMB	03-293-9521
For:	Norway, Oslo, Henaco A/S	02-15-75-50
For:	Sweden, Tyreso, Hybridteknik AB	08-712-76-20
For:	Switzerland, Mutschellen, Stolz, AG	057-54070
For:	West Germany, Berlin, Ernst Fey	030-8-52-1855
For:	West Germany, Munchen, Ernst Fey	089-18-40-41
For:	West Germany, Norderstedt, Ernst Fey	040-5-23-29-33
For:	Yugoslavia, Ljubljana, Electrotehna	61-32-02-41

ILLINOIS CAPACITOR INC., Dept. EM, 6284 W. Oakton, Morton Grove, Ill. 60053, Tel: 312-967-6270, Telex: 72-4361; Empl.: 10 .... p. 1253

Sales Manager: C. Kurland

Local Sales Offices & Reps.

Ala	Huntsville, K & E Inc.	205-993-9720
Ariz	Tempe, Jarko Assocs.	602-966-3020
Cal	Mountain View, Weseloh & Assocs.	415 961-0565
Cal	Orange, Sales & Mktg. Assocs.	714-997-5720
Cal	Van Nuys, Myco Sls.	213-988-2827
Colo	Denver, Elcom	303-770-4400
Ga	Hartwell, K & E Assocs.	404-376-5438
Ill	Morton Grove, T-Squared Assocs.	312-965-1515
Iowa	Des Moines, Kathrinus-Kelly & Co.	
Kans	Shawnee Mission, Kathrinus-Kelly & Co.	913-722-0000
Mass	Brookline, Technology Prods. Grp.	617-731-0858
Mich	Warren, Dem Elctrns. Sls.	313-755-6660
Minn	Minneapolis, Grayden & Flemmer	612-941-1120
Miss	Corinth, K & E Assocs.	601-287-5369
NJ	W. Caldwell, Peterson-Rudnick Assoc.	201-226-4363
NY	Bronx, Peterson-Rudnick Assoc.	212-671-1923
NY	E. Meadow, S. Shapiro Assocs.	516-483-4185
NY	Rochester, R. A. Murray Co.	716-467-4538
Ohio	Brunswick, Kimconics Sls.	216-225-6111
Ohio	Dayton, Kimconics Sls.	513-898-1783
Ore	Beaverton, Barrett-Squibb & Assoc.	503-644-2550
Pa	Narberth, J. Bresson Assocs.	215-664-6460
Pa	Waterford, Kimconics Sls.	814-796-6556
Tex	Roanoke, J. Hughes Co.	817-430-1683
Tex	Stafford, J. Hughes Co.	713-771-9353
Va	Arlington, H. Golenpaul & Assocs.	703-525-5898
Wash	Redmond, Barrett-Squibb & Assocs.	206-885-6991
Wisc	Oak Creek, Erdman Sls. Co.	414-643-0506

Local Distributors

Cal	Mountain View, Target Elctrns.	415-961-1170
Cal	Van Nuys, Micro Sls.	213-988-2288
Colo	Englewood, Ind'l. Elctrns. Inc.	303-771-2636
Mass	Wakefield, Semtex	617-245-9050
Mich	Farmington, CMP Distrs.	313-477-7700
Wisc	Oak Creek, Badger Capacitor Sales	414-761-2120

ILLINOIS LOCK, Dept. EM, 301 W. Hintz Rd., Wheeling, Ill 60090

ILLUMINATED PRODUCTS INC., Dept. EM, 2620 S. Susan St., P.O. Box 11930, Santa Ana, Cal. 92711, Tel: 714-540-9471, TWX: 910-595-1504; FSC No.: 87034; Empl.: 75 .... p. 2595-2635,4100-4127

Local Sales Offices & Reps.

Lamps

Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Altos, Oak Inds.	415-941-1237
Cal	Santa Ana, Oak Inds.	714-540-0565
Colo	Denver, I.W. Strong & Assocs.	303-292-6900
Fla	Altamonte, Oak Inds.	305-831-5411
Ill	Crystal Lake, Oak Inds.	815-459-5000
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
La	Metaire, McKinney Sls.	504-733-9583
Mass	Reading, Oak Industries Inc.	617-944-0094
Minn	Minneapolis, G. E. Arnerson & Co.	612-835-2177
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Bergenfield, Harold Gray Assocs.	
NJ	Haddonfield, Gray Assocs.	609-429-5300
NY	Rochester, Irondequoit Ind.	716-544-6257
NC	Raleigh, Oak Industries Inc.	919-876-7591
Ohio	Cincinnati, Oak Industries Inc.	513-851-4411
Okla	Tulsa, McKinney Sls.	918-742-6791
Ore	Beaverton, R & R Assocs.	503-643-5754
Tex	Dallas, McKinney Sales Co.	214-631-9450
Wash	Seattle, R & R Assocs.	206-762-7664
Exp:	Cal., Santa Ana, Illuminated Prods.	714-540-9471

Switches & Indicators

Ariz	Tempe, Argus Sales	602-967-8709
Cal	Los Altos, Oak Inds.	415-941-1237
Cal	Santa Ana, Oak Inds.	714-540-0565
Colo	Denver, I.W. Strong & Assoc.	303-292-6900
Fla	Altamonte Springs, Oak Inds.	305-831-5411
Ill	Crystal Lake, Oak Inds.	815-459-5000
La	Metaire, McKinney Sls.	504-733-9583
Mass	Reading, Oak Inds.	617-944-0094
Minn	Minneapolis, G. E. Arneson & Co.	612-835-2177
NJ	Bergenfield, H. Gray Assocs.	201-384-3643
NJ	Haddonfield, Gray Assocs.	609-429-5300
NY	Rochester, Irondequoit Ind.	716-544-6257
NC	Raleigh, Oak Inds.	919-876-7591
Ohio	Cincinnati, Oak Inds.	513-851-4411
Okla	Tulsa, McKinney Sales	918-742-6791
Ore	Portland, Oak Inds.	503-292-0878
Tex	Dallas, McKinney Sales	214-631-9450

Local Distributors

Ala	Huntsville, Hall-Mark Elect.	205-837-8700
Ariz	Tempe, G. S. Marshall Co.	602-968-6181
Cal	El Monte, G. S. Marshall Co.	213-686-1500
Cal	Irvine, G. S. Marshall Co.	714-664-2125
Cal	Los Angeles, Electric Switches	213-664-2125
Cal	San Diego, G. S. Marshall Co.	714-278-6350
Cal	Sunnyvale, G. S. Marshall Co.	408-732-1100
Colo	Arvada, G. S. Marshall Co.	303-423-9670
Conn	Hamden, Wilshire Elctrns./Conn.	203-281-1166
Conn	North Branford, G.S. Marshall Co.	203-484-0488
Fla	Ft. Lauderdale, Hall-Mark Elctrns.	305-971-9280
Fla	Orlando, G. S. Marshall Co.	350-859-1620
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Ga	Lawrenceville, Hall-Mark Elctrns.	404-963-9728
Ill	Des Plaines, G. S. Marshall Co.	312-298-3700
Ill	Elk Grove Village, Hall-Mark Elctrns.	312-437-8800
Ill	Rosemont, Advent Elctrns.	312-298-4210
Iowa	Cedar Rapids, Hall-Mark Elctrns. Corp.	319-393-3556
Kans	Shawnee Mission, Hall-Mark Elctrns.	913-888-4747
Kans	Wichita, Hall-Mark Elctrns.	316-682-2073
Md	Baltimore, C.E.I. Distributors	301-744-7711
Md	Baltimore, Hall-Mark Elctrns.	301-265-8500
Mass	Burlington, Wilshire Elctrns./N.E.	617-272-8200

Mass	Newton Highlands, G. S. Marshall Co.	617-965-5115
Mich	Farmington, Advent Elctrns.	313-477-1650
Minn	Bloomington, Hall-Mark Elctrns.	612-884-9056
Minn	Edina, G. S. Marshall Co.	612-831-4904
Minn	Minneaplis, G. E. Arneson & Co.	612-835-2177
Minn	Minneapolis, Industrial Comps., Inc.	612-831-2666
Mo	Earth City, Hall-Mark Elctrns. Corp.	314-291-5350
Mo	Kansas City, L Comp	816-221-2400
Mo	Maryland Heights, L Comp	314-291-6200
Mo	St. Louis, Olive Industrial Elctrns.	314-863-7800
NJ	Cinnaminson, Wilshire Elctrns.	215-627-1920
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NY	Farmingdale, G. S. Marshall Co.	516-293-4141
NY	Farmingdale, Hall-Mark Elctrns. Corp.	516-293-7500
NY	Farmingdale, Wilshire Elctrns./L.I.	516-293-5775
NY	Hauppauge, Hall-Mark Electronics Corp.	516-273-0030
NY	Jamaica, Calson Co.	212-525-5900
NY	Johnson City, Wilshire Elctrns./N.Y. State	607-797-1236
NC	Raleigh, Southeastern Radio Supply	919-828-2311
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
Ohio	Dayton, Hall-Mark Elctrns.	513-294-0437
Ohio	Dayton, G. S. Marshall Co.	513-898-1100
Ohio	Wickliffe, Gateway Megatech, Inc.	216-944-8565
Okla	Tulsa, Hall-Mark Elctrns.	918-835-8458
Pa	Huntingdon Valley, Hall-Mark Elctrns.	215-355-7300
Pa	King of Prussia, G. S. Marshall Co.	215-337-3330
Tex	Austin, Hall-Mark Elctrns.	512-837-2814
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Dallas, G. S. Marshall Co.	214-233-5200
Tex	El Paso, Hall-Mark Elctrns.	
Tex	Houston, Hall-Mark Elctrns. Corp.	713-781-6100
Wash	Bellevue, G. S. Marshall	206-883-1084
Wisc	Mequon, Taylor Elec. Co.	414-241-4321
Wisc	West Allis, Hall-Mark Elctrns. Corp.	414-476-1270

ILLUMINATION INDUSTRIES, Dept. EM, 825 E. Evelyn Ave., Sunnyvale, Cal. 94086, Tel: 408-738-2744, TWX: 910-339-9214; Empl.: 120

Local Sales Offices & Reps.

Ariz	Scottsdale, Allen Assocs.	602-994-1305
Colo	Denver, Camel Elect.	303-757-6191
Fla	Ft. Lauderdale, Semquip	305-772-3002
Mass	Alton, Hohenadel Assoc.	617-245-0600
NJ	Nutley, D/R Assocs.	201-667-5900
Tex	Dallas, R. Tindel & Assocs.	214-238-0471

IMAGE GRAPHICS, INC., Dept. EM, 1525 Kings Hwy., Fairfield, Conn. 06430, Tel: 203-333-7918

Sales Manager: J.P. Whitley

™**IMAGESCOPE** - fiber optic flexible image device - Galileo Electro-Optics Corp.

™**IMCAIR** - propeller fans/centrifugal blowers - IMC Magnetics Corp.

IMC MAGNETICS CORP., Arizona Div., Dept. EM, 1900 East Fifth St., Tempe, Ariz. 85281, Tel: 602-968-4441

I M C MAGNETICS, Eastern Div., Dept. EM, 570 Main St., Westbury, N.Y. 11590, Tel: 516-334-7070, TWX: 510-222-4469; Empl.: 175

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assoc.	800-327-1181
Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	Los Angeles, Elcom Inc.	213-223-1351
Colo	Denver, Linberg Co.	303-758-9033
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Lighthouse Point, Saber Assocs.	800-432-3007
Ill	Angola, Berndt Assocs.	312-283-0713
Ind	Angola, Waid & Assocs.	219-665-7622
Md	Baltimore, D.K. Jones & Assoc.	301-752-0577
Mass	E. Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	St. Paul, Northport Eng.	612-698-3841
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Haddonfield, Mesa Tech. Assoc.	609-429-9531
NY	Great Neck, Trionics Assocs.	516-466-2300
NY	Rochester, Fowler-Beach Corp.	716-586-0468
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Dayton, BEK Assocs.	513-278-1343
Ore	Portland, C. K. Shanks & Assoc.	503-292-5656
Tex	Dallas, Electra III Co.	214-243-5969
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, C. K. Shanks & Assoc.	206-632-4290

IMC MAGNETICS CORP., Hansen Mfg. Co., Inc., Dept. EM, Dept. EM, Box 23, Princeton, Ind. 47670, Tel: 812-385-3415, Telex: 27-8458

Local Sales Offices & Reps.

Cal	Encino, R. S. Hopkins Co.	213-788-5501
Cal	Fremont, H. K. F., Inc.	415-863-2200
Conn	Essex, Winslow Elec. Co.	203-767-8229
Ill	Oakbrook Terrace, Fromm Co.	312-627-9595
NJ	Teaneck, H. Rude Assocs.	201-836-6778
NY	Rochester, H. C. Johnson Agency	716-482-3000
Pa	Devon, Kiley Elec. Co.	215-687-9340
Tex	Houston, Cary & Assocs.	713-460-1111
Tex	Richardson, Carey & Assocs.	214-234-2202
Wash	Vancouver, H. K. F., Inc.	503-228-1683

IMC MAGNETICS CORP., New Hampshire Div., Dept. EM, Rte. 16B, Rochester, N.H. 03867, Tel: 603-332-5300, TWX: 510-297-4466; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assoc.	800-327-1181
Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	Los Angeles, Elcom Inc.	213-223-1351
Colo	Denver, Lindberg Co.	303-758-9033
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Lighthouse Point, Saber Assoc.	800-432-3007
Ill	Rolling Meadows, Sumer Inc.	312-394-4900
Md	Baltimore, D.K. Jones & Assoc.	301-752-0577
Mass	E. Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp	617-890-8040
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Minneapolis, Nortec Sls. Inc.	612-835-4447
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Haddonfield, Mesa Technical Assocs.	609-429-9531
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Great Neck, Trionics Assocs.	516-466-2300
NY	Rochester, Fowler-Beach	716-586-0468
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Dayton, Bek Assocs.	513-278-1343
Ore	Portland, C. K. Shanks & Assoc.	503-292-5656
Pa	Pittsburgh, Dolfuss/Root & Co.	412-561-4125
Tex	Dallas, Electra III	214-243-5969
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, C. K. Shanks & Assoc.	206-632-4290

IMC MAGNETICS CORP., Western Div., Dept. EM, 6058 Walker Ave., Maywood, Cal. 90270, Tel: 213-583-4785, TWX: 910-321-3089; FSC No.: 99743; Empl.: 110

Local Sales Offices & Reps.

Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	Los Angeles, El Com Inc.	213-223-1351
Colo	Denver, Lindberg Co.	303-758-9033
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Orlando, Duay Entprs.	305-277-3296
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Ind	Angola, Wald & Assoc.	219-665-7622
Md	Baltimore, D. K. Jones & Assoc.	301-752-0577
Mass	E. Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp	617-890-8040
Minn	Minneapolis, Northport Engr.	612-698-3841
Mo	Kansas City, Harris-Hanson	816-444-9494
Mo	St. Louis, Harris-Hanson	314-432-3611
NJ	Haddonfield, Mesa Tech. Assoc.	609-429-9531
NY	Great Neck, Trionic Assocs.	516-466-2300
NY	Rochester, SBM Reps.	716-266-1400
Ohio	Dayton, Bek Assocs.	513-278-1343
Ore	Portland, C. K. Shanks & Assoc.	503-292-5656
Tex	Dallas, M. Kruvand Co. Inc.	214-827-8043
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, C. K. Shanks & Assoc.	206-632-4290

™**IMCOM** - brushless d-c motor - I M C Magnetics

™**IMCOOL** - tubeaxial fans - I M C Magnetics

™**IMIDEZE (R) A** - magnet wire - Phelps Dodge Magnet Wire Co.

™**IMLEC** - electronic components, indicators, legend displays, CCTV equipment, thumbnail switches - Inter-Market, Inc.

™**IMMERSION GOLD** - immersion plating process. - Sel-Rex Div. Oxy Metal Industries Corp.

™**IMPAC** - commercial medium current silicon rectifier - Semtech Corp.

™**IMPAC** - Digital Panel Meters - Velonex, Display Prods.

™**IMPAC** - stripline input/output matched package - Microwave Semiconductor Corp.

™**IMPACT-O-GRAPH** - omni-directional recording accelerometer - IMPACT-O-GRAPH Div.

IMPACT-O-GRAPH CORP., Dept. EM, 4943 McConnell Ave., Los Angeles, Cal. 90066, Tel: 213-822-2332; Empl.: 15

Local Sales Offices & Reps.

Cal	Inglewood, G. B. Woodcock & Co.	213-678-4286
Cal	S. San Francisco, R.M. Bracamonte & Co.	415-583-8451
Minn	Minneapolis, Container Sys.	612-861-1566
NY	Syracuse, J. Birchard	315-469-4689
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992

IMPACT-O-GRAPH DIV., Torq Engineered Prods., Inc., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146, Tel: 216-439-6116; Empl.: 8

™**IMPAC 3** - high current silicon rectifier - Semtech Corp.

™**IMPERIAL LINE** - heavy-duty production - UNGAR, Div.

™**IMPERVITRAN** - environmentalized transformer - Micron Industries Corp.

™**IMPLION** - ion implanted semiconductors - KSW Electronics Corp.

INCAL SERVICE CORP., Dept. EM, 73 Southfield Ave., Stamford, Conn. 06902, Tel: 203-327-9668, TWX: 710-474-3546; Empl.: 40

™**INCERT** - edge-mount leadless ceramic pkg. - Metalized Ceramics

™**INCOR** - rare earth magnets - Indiana General/Div. Emm Corp.

INCOR INSTRUMENTATION, INC., Dept. EM, 144 Lamar St., West Babylon, N.Y. 11704, Tel: 516-643-7070; FSC No.: 23132; Empl.: 25

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrn. Entprs.	602-946-9860
Conn	Newton, Daner-Hayes	203-426-9094
DC	Washington, Powell Pendergraph	301-656-4535
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Saginaw, VonBerg & Assocs.	517-799-0873
NM	Albuquerque, Elctrn. Entprs.	505-256-3561
NM	Las Cruces, Elctrn. Entprs.	505-524-0126
NY	Rochester, Daner-Hayes	716-467-5100
Ore	Portland, Topp Engr. Sls. Corp.	503-244-6265
Pa	Audobon, Daner-Hayes	215-666-5005
Pa	Glenshaw, Wainwright Tech.	412-487-3358
Va	Richmond, Powell-Pendergraph.	804-264-2341
Wash	Bellevue, Topp Engrg. Sls. Corp.	206-747-5400
Wash	Richland, Topp Engr. Sales Corp.	509-783-7515

™**INCRE-LOCK** - control systems - Sequential Information Systems

™**INCUSIL 10** - brazing alloys - GTE Sylvania Inc.

™**INCUSIL 15** - brazing alloys - GTE Sylvania Inc.

™**INDEX-SYN** - industrial position and speed controls - Control Systems Research, Inc.

INDIANA GEN'L. DIV., Electro-Mechanical Prods., Dept. EM, Oglesby, Ill. 61348, Tel: 219-462-3131

Local Sales Offices & Reps.

Conn	Old Lyme, Aid Engrg. Sls. Co.	203-434-1673
NY	Coram, Machine Dynamics	516-473-7770
NC	Charlotte, Industrial Drives & Controls	704-535-5414
Tex	DeSoto, Automatic Sys.	214-224-7159

INDIANA GENERAL, Elctrn. Prods., Dept. EM, Crows Mill Rd., Keasbey, N.J. 08832, Tel: 201-826-5100, Telex: 138878; Empl.: 1,200

Sales Manager: J Breickner

INDIANA GENERAL/DIV. EMM CORP., Magnet Prods., Dept. EM, 405 Elm St., Valparaiso, Ind. 46383, Tel: 219-462-3131, TWX: 910-690-4891; Empl.: 1200

Local Sales Offices & Reps.

Cal	Cupertino	408-996-2811
Ill	Villa Park	312-833-5698
Mass	Hingham	617-749-2003
NJ	Haddonfield	609-428-2706
NJ	Hillsdale	201-666-8668
Ohio	Cleveland	216-289-4600

™INDOMICA - mica - Humiseal Div.

™INDOX - ceramic magnets - Indiana General/Div. Emm Corp.

™INDUCT-A-RING - shaker armature - Unholtz-Dickie Corp.

INDUCTIVE COMPONENTS, INC., Dept. EM, 181 Bridge Rd., Hauppauge, N.Y. 11787, Tel: 516-582-9370; FSC No.: 25159; Empl.: 40 p. 4418-4420

Sales Manager: B. Jansen

Local Sales Offices & Reps.

Cal	Los Altos, Tauber-Dreyer Kolm	415-948-2635
Cal	Northridge, Tauber-Dreyer Kolm	213-386-4011
Cal	San Diego, Tauber-Dreyer Kolm	714-274-7242
Fla	Maitland, Barrett Assocs.	305-678-0172
Fla	Melbourne, Barrett Assocs.	305-727-2491
Fla	Miami, Barrett Assocs.	305-681-4957
Fla	St. Petersburg, Barrett Assocs.	813-345-3585
Ill	Mount Prospect, Delta Tech Sls. Corp.	312-253-9440
Md	Glen Burnie, New Era Sls.	301-768-6666
NY	Northport, F. F. Marin Co.	516-261-2410

™INDUCTOSYN - encoder - Del Electronics Corp.

™INDUCTOSYN - transducers - Farrand Controls Div.

™INDUCTROL - induction voltage-regulator - General Elec. Co.

INDUSTRIAL CONDENSER CORP., Dept. EM, 3243 N. California Ave., Chicago, Ill. 60618, Tel: 312-463-2200; FSC No.: 74861; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles, W.S. Harmon Co.	213-937-1460
Mass	Waltham, Com-Sale	617-890-0011
NJ	Haddonfield, TAI Corp.	609-854-3011
NJ	South Orange, S. Simberkoff Assocs.	201-763-7900

INDUSTRIAL CONTROL CO., Dept. EM, Central Ave. at Pinelawn, Farmingdale, N.Y. 11735, Tel: 516-694-3000; Empl.: 20 p. 3950,3951

Sales Manager: I. Nobil

INDUSTRIAL DEVICES, Dept. EM, Edgewater, N.J. 07020, Tel: 201-224-4700, Telex: 12-7459; Empl.: 200; Minimum order: $M. Diceglie p. 2636,2637

Sales Manager: R. Solowski; *Distributor Manager:* M. Diceglie

Local Sales Offices & Reps.

Cal	Los Altos, Frauman Assocs	415-941-0660
Cal	Los Angeles, Western Electromotive/Shephard	213-820-3777
Colo	Denver, Connors Inc.	303-934-5829
Conn	W. Simsbury, Anchor Engrg. Corp.	203-658-6261
Fla	Lauderhill, Comps. Sls. Corp.	305-739-7545
Fla	St. Petersburg, Comps. Sls	813-894-4366
Ill	Chicago, K.D. Engle	312-539-1820
Mass	Newton Upper Falls, Anchor Engrg.	617-964-6205
Mich	Oak Pk., W. Spenser	313-967-0808
Minn	Kansas City, F. P. Williams & Assoc.	816-471-1617
Minn	St. Paul, Cahill Assoc.	612-646-7217
NY	Albany, Niagara Electric Sls.	518-869-0130
NY	Buffalo, Niagara Elec. Sls.	716-886-4000
NY	Commack, Kaelber & Mack, Inc.	516-543-2924
NY	E. Syracuse, Niagara Electric Sls.	315-437-1656
NY	Rochester, Niagara Elec. Sls. Co.	716-BR1-1223
NC	Raleigh, Comps Sls. Corp.	919-832-1897
Ore	Portland, Fleehart & Sullivan	503-297-1033
Pa	Media, Snyder & Stefkovic Assoc.	215-566-5400
Tenn	Chattanooga, Ind'l. Hardgoods Co.	615-267-0907
Tex	Dallas, Blackburn Assocs.	214-692-8885
Tex	Lubbock, Blackburn Assocs.	806-744-2943
Va	Fairfax, Snyder & Stefkovic Assoc.	703-273-1413
Wash	Seattle, Fleehart & Sullivan	206-522-1533
Exp:	NJ Ft. Lee, J.A. Gross	201-944-3609

Local Distributors

Ariz	Phoenix, Parts Elctrns.	602-258-6476
Ariz	Tucson, Elliot Elctrns.	602-793-1755
Cal	Costa Mesa, Marvac Elctrns.	714-642-0952
Cal	Fullerton, Orvac Elctrns.	714-871-1020
Cal	Los Angeles, Electric Switches	213-664-1141
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Pasadena, Dow Radio	213-681-3416
Cal	Pasadena, Empire Elctrn. Dist.	213-681-2711
Cal	San Diego, Shanks & Wright	714-239-0176
Cal	San Francisco, Zack Elctrns.	415-626-1444
Cal	San Jose, Quement Elctrns.	408-998-5900
Colo	Denver, Wintronics	303-934-2406
Conn	Waterbury, Bond Radio Elctrns.	203-757-0546
Fla	Miami, Electro Standard Lab (ESL)	305-633-6973
Fla	Tampa, Leader Elctrns.	813-835-1891
Idaho	Pocatello, Kimball Elctrns.	208-232-2201
Ill	Arlington Hts., S & R Corp.	312-593-2545
Ill	Chicago, Electro-Kinetics	312-286-4200
Ill	Rockford, Mid-West Assocs.	815-962-8036
Ill	Villa Park, Melvin Elctrns.	312-279-5015
Ind	Evansville, Hutch & Son	812-425-7201
Ind	Indianapolis, Graham Elctrns.	317-635-5453
Iowa	Cedar Rapids, Iowa Radio Supply	319-364-6154
Kans	Wichita, Interstate Elctrns.	316-264-6316
La	Lafayette, Ralph's	318-234-4507
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Md	Timonium, MX-IV Elctrns.	301-252-1192
Mass	Boston, Sager Electrical Supply	617-542-2281
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	N. Wilbraham, Ind'l. Comps. Corp.	413-596-3854
Mass	Worcester, RM Elctrns.	617-756-8311
Mich	Flint, Shand Elctrns.	313-743-8940
Mich	Muskegon, Western Elctrns. Supply Co.	616-722-7628
Minn	Minneapolis, Elctrn. Center	612-338-5581
Mo	St. Louis, Van Sickle Radio-Elec.	314-621-5000
Mo	St. Louis, Olive Ind'l. Elctrns.	314-863-7800
Neb	Lincoln, Scott Elctrn. Supply Corp.	402-434-8308
NH	Concord, Evans Radio	603-224-9961
NJ	Fairlawn, Relay Specialties Inc.	201-797-3313
NJ	Hanover, State Elctrns. Parts Corp.	201-887-2550
NJ	Springfield, Route Elctrns.	201-379-7710
NY	Albany, E. E. Taylor Co.	518-438-4461
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Broadline Elctrns.	516-420-8320
NY	Hempstead, Elctrn. Equip. Co.	516-538-5510
NY	Mt. Vernon, Q.A.R. Ind'l. Elctrn. Sls.	914-699-2224
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Raleigh, Southeastern Radio Supply Co.	919-828-2311
Ohio	Cincinnati, United Radio	513-761-4030
Ohio	Columbus, Hughes Peters	614-294-5351
Ohio	Solon, REPCO Inc.	216-248-8900
Ohio	Toledo, Warren Radio Co.	419-248-3364
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-JA4-4411
Okla	Tulsa, Oil Capitol Elctrns. Corp.	918-TE6-2541
Ore	Portland, Central Distrs.	503-234-0711
Pa	Allentown, A.A. Peters	215-434-5237
Pa	Drexel Hill, Kass Elctrns. Dist.	215-449-2300
Pa	Erie, Mace Elctrns.	814-838-3511
Pa	Harrisburg, Cumberland Elctrns.	717-232-9715
Pa	Philadelphia, Philadelphia Elctrns.	215-LO8-7400
Pa	Pittsburgh, R P C Elctrns.	412-782-3770
Pa	Scranton, Pursell Elctrns.	717-346-2011
Pa	York, Rosen Elctrns.	717-843-3875
RI	Warwick, W.H. Edwards	407-781-8000
SC	Columbia, Dixie Radio Supply Co.	803-253-5333
Tenn	Knoxville, Roden Electrical Supply	615-524-9851
Tenn	Nashville, Randolph & Rice Co.	615-255-5601
Tex	Fort Worth, Swieco Inc.	817-335-6521
Tex	San Antonio, Sherman Elctrns. Supply	515-224-1001
Utah	Salt Lake City, Standard Supply Co.	801-355-2971
Va	Arlington, Arlington Elctrn. Wholesalers	703-524-6256
Wash	Seattle, Western Elctrns. Co.	206-284-0200
Wisc	Milwaukee, Marsh Radio Supply Co.	414-545-6500
For:	Can., Calgary, Alb., Canadian Elctrns. Ltd.	403-287-1800
For:	Can., Edmonton, Alb., Cardinal Ind'l. Elctrns. Ltd.	403-455-4122
For:	Can., Kitchener, Ont., Westburne Industrial Ent. Ltd.	519-742-1711
For:	Can., London, Ont., Poole Elctrn. Supplies Ltd.	519-433-0101
For:	Can., London, Ont., C.M. Peterson Co. Ltd.	519-434-3204
For:	Can., Montreal, Que., Payette Radio	
For:	Can., Ottawa, Ontario, K1Y 1G3, Wackid Radio & Television Labs.	613-728-1821
For:	Can., Peterborough, Ont., Weesco	705-745-2493
For:	Can., Quebec City, Crobel Ltd.	
For:	Can., St. Catharines, Ont., Industro-Serv Elctrns.	416-684-7413
For:	Can., Vancouver, B.C., R.A.E. Ind'l. Elctrns.	604-687-2621
For:	Can., Victoria, B.C., Queale Elctrns., Ltd.	604-386-2991
For:	Can., Willowdale, Ont., Electrosonic Ltd.	
For:	Can., Winnipeg, Manitoba, Canadian Elctrns. Ltd.	

INDUSTRIAL ELCTRN. ENGRS., Dept. EM, 7740 Lemona Ave., Van Nuys, Cal. 91405, Tel: 213-787-0311, TWX: 910-495-1707; Empl.: 220 p. 2638

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assocs. (TMA)	205-883-7893
Ariz	Phoenix, Gramer & Co.	602-279-1231
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	San Diego, L.L. Stoakes	714-274-6281
Cal	Torrence, Components Mktg. Assocs.	213-541-2515
Colo	Boulder, Component Prod. Sls. Co.	303-494-5100
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Orlando, Technology Mktg. Assocs. (TMA)	305-857-3760
Fla	Pompano Beach, Technology Mktg. Assocs. (TMA)	305-942-0774
Ill	Highland Park, Bransky Sls.	312-433-2375
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Iowa	Cedar Rapids, PMA	319-362-9177
Kans	Overland Park, PMA	913-381-0004
Kans	Wichita, PMA	316-264-2662
Md	Rockville, Marktron	301-762-6210
Md	Timonium, Marktron	301-252-7111
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Southfield, L.H. Dickelman Co.	313-353-8210
Minn	Minneapolis, M. Franklin Co.	612-835-6422
Mo	Maryland Hgts., PMA	314-569-1220
NM	Albuquerque, Int'l. Elctrns.	505-345-0579
NY	Albany, Reagan/Compar Albany Inc.	518-489-7408
NY	Endwell, Reagan/Compar Albany Inc.	607-723-8743
NY	Fairport, Reagan/Compar Albany Inc.	716-271-2230
NY	New Hartford, Reagan/Compar Albany	315-732-3775
NY	Plainview, E.R.A.	516-822-9890
NC	Charlotte, Over & Over	704-527-3070
Ohio	Cleveland, Geotronix Inc. Assocs.	216-526-2535
Ohio	Columbus, Geotronix Inc. Assocs.	614-457-8472
Ore	Portland, Electronic Component Sls.	503-245-2342
Pa	Pittsburgh, Russell F. Clark	412-242-9500
Pa	West Chester, January Mktg. & Sls.	215-793-2265
Tex	Dallas, E. B. Robertson, Inc.	214-942-2716
Tex	El Paso, International Elctrns.	914-778-9761
Tex	Houston, E.B. Robertson, Inc.	713-223-0618
Va	Charlottesville, Marktron, Inc.	804-973-5874

Local Distributors

Ala	Huntsville, CDI	205-883-7501
Ariz	Glendale, Tri-Tek Elctrns.	602-931-6949
Ariz	Tempe, Circuit Specialist Co.	602-966-0764
Ark	Little Rock, Electro Entprs.	501-664-9207
Cal	Garden Grove, Allied Elctrns.	714-894-7581
Cal	Manhattan Beach, Prime Electro Prods. Corp.	213-376-3433
Cal	Manhattan Beach, U.S. Electro Sls.	213-376-3456
Cal	Mountain View, Waltronic Sls.	415-965-4131
Cal	Santa Monica, Master Dist.	213-829-4656
Cal	Sun Valley, Richey Elctrns.	213-768-3800

Colo	Denver, Integrated Elctrns.	303-534-6121
Conn	East Haven, JV Elctrns.	203-469-2321
Fla	Margate, CDI	305-971-4940
Fla	Miami, Elctrn. Equip. Co.	305-644-4833
Fla	Winter Park, Elctrn. Equip	305-644-4853
Ill	Arlington Heights, S & R Corp.	312-593-2545
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Elk Grove Village, GBL Elctrns. Corp.	312-569-2730
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ill	Skokie, Bell Inds.	312-282-5400
Ind	E. Chicago, Acro Elctrns.	219-397-8681
Ind	Evansville, Hutch & Son	812-425-7201
Ind	Indianapolis, Ra-Dis-Co	317-637-5571
Ind	Indianapolis, Advent Elctrns.	317-297-4910
Kans	Wichita, Radio Supply Co.	316-267-5213
La	Houma, Kent Elctrns.	504-872-2473
Md	Beltsville, Treeko Sls.	301-937-8260
Md	Gaithersburg, Pioneer/Wash	301-948-0710
Mass	Watertown, DRW Elctrns. Corp.	617-923-1900
Mass	West Newton, A.W. Mayer Co.	617-965-1111
Mich	Farmington, CMP Dist. Co.	313-477-7700
Minn	Minneapolis, Stark Elctrn. Supply Co.	612-332-1325
Mo	Kansas City, L Comp.	816-221-2400
Mo	St. Louis, Olive Indust. Elctrns.	314-863-7800
NM	Alburquerque, International Elctrns.	505-345-0579
NY	Elmira, Masline Elctrns.	607-733-5676
NY	Mamaroneck, Logicomp Elctrns.	914-698-9332
NY	New York, Holt Electrical Dist. Corp.	212-524-9200
NY	Rochester, Ossmann Comps. Sls.	716-442-3290
NY	Rochester, Masline Elctrns.	716-546-5373
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cleveland, CMP Dist. Co.	216-333-5650
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INSTRULAB, INC., Dept. EM, 1205 Lamar St., Dayton, Ohio 45404

INSTRUMENTS COMPONENTS CO., Dept. EM, 7239 Industrial Park Blvd., Mentor, Ohio 44060, Tel: 216-951-3030; Empl.: 15

INSTRUMENT RESEARCH CO., Dept. EM, Box 40207, Santa Barbara, Cal. 93103, Tel: 805-962-8336; Empl.: 6

Local Sales Offices & Reps.

Ariz	Tucson, G. Moore Assoc.	602-795-3176
Colo	Boulder, G. Moore Assoc.	303-494-3351
NM	Albuquerque, G. Moore Assoc.	505-292-3322
Exp:	Fla., Hallandale, EMEC	305-925-6366

INSTRUMENT SPECIALTIES, Dept. EM, 276 Bergen Blvd., Little Falls, N.J. 07424, Tel: 201-256-3500, TWX: 710-988-5732; Empl.: 220 .... p. 2666-2669

Local Sales Offices & Reps.

Ariz	Phoenix, O'Donnell Assocs.	602-993-9740
Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Ill	Arlington Heights, Instrument Specialties Co.	312-392-0292
NC	Charlotte, McLean Sls. Co.	704-554-7675
Tex	Irving, Lee Sls. Co.	214-363-3831

INSTR. & CONTROL SYS., INC., Dept. EM, 129 W. Laura, Addison, Ill. 60101, Tel: 312-543-6200, TWX: 910-991-5945; Empl.: 50

Sales Manager: H. Washington

Local Sales Offices & Reps.

, Industrial Control Prod Reps.

Cal	Camplee, Cummings & Co.	408-374-1533
Cal	Santa Clara, Cummings & Co.	408-247-8656
Cal	Woodland Hills, Cummings & Co.	213-340-6035
Colo	Denver, Cummings & Co.	303-455-6860
Conn	Norwalk, Betronic Assoc.	203-853-7630
Fla	Miami, Hummel Ind'l. Sls.	305-651-0196
Ill	Dundee, Jack Huegel Sls.	312-426-6370
Mass	Waltham, Betronic Assocs.	617-894-8400
Mich	Southfield, Static Controls	313-358-1460
Mich	Troy, Pine Sls. & Engrg.	313-524-1860
Mo	St. Louis, Consolidated Agencies	314-721-1213
NJ	Old Bridge, Ross Co.	212-824-5424
NY	Fairport, RBG Sls.	716-377-1390
NY	Yonkers, Ross Co.	212-824-5424
NC	Charlotte, John Hutson Co.	704-542-3155
Ohio	Chagrin Falls, Pine Sales & Engrg.	216-247-6198
Tex	Houston, Jackson Arnold	713-783-7297
Utah	Salt Lake City, Stuart Elct. Supply	801-466-8603
Wisc	Elm Grove, Industrial Mktg.	414-786-0135
	, Power Supply Prod. Reps. ELECTRO-PAK Div.	
Ariz	Temple, J. Smith & Assoc.	602-968-7025
Cal	LaMirada, Marrs & Assoc.	213-947-2095
Cal	Walnut Creek, W. A. Borden Co.	415-937-5196
Colo	Littletown, J. Smith & Assoc.	303-442-7100
Fla	Orlando, RJC. Assoc.	305-894-7371
Ill	Bartlett, Tech Sys.	312-830-0060
Mass	Burlington, J & J Assocs.	617-272-2606
Mich	Rockville, Marktron, Inc.	301-762-6210
Mich	Troy, Pine Sls. & Eng.	313-524-1860
Mo	Kansas City, Varitron Corp.	816-842-0668
NJ	Upper Montclair, Cunningham & Assoc.	201-783-4647
NM	Albuquerque, J. Smith & Assoc.	505-265-3406
NY	Rochester, Ronco Power Sys.	716-442-7900
NY	Tonawanda, Ronco Power Sys.	716-873-0760
NC	Charlotte, Electro-Rep Assoc.	704-527-2530
Ohio	Chagrin Falls, Pine Sales & Engrg.	216-247-6198
Pa	Valley Forge, J E Cuesta & Co.	215-265-5800
Tex	Dallas, Gettys-Eads-Adair	214-233-0337
Tex	Houston, Gettys-Eads-Adair	713-781-3005
Va	Charlottesville, Marktron, Inc.	804-973-5874
Wash	Washington, Instrucom, Inc.	202-223-1759
Minn	Minneapolis, HMR, Inc.	612-920-8200

INSTRUMENTATION PRODS., 3M Co., Dept. EM, 300 S. Lewis Rd., Camarillo, Cal. 93010, Tel: 805-482-1911, TWX: 910-336-1676; Empl.: 500

Local Sales Offices & Reps.

Ariz	Phoenix, PLS Assocs., Inc.	602-957-9110
Cal	Cupertino, T. L. Snitzer Co.	408-257-8333
Cal	Los Angeles, T. L. Snitzer Co.	213-836-6170
Colo	Denver, PLS Assocs., Inc.	303-771-0140
Ill	Chicago, L. F. Green & Assocs.	312-286-6824
Ind	Indianapolis, L. F. Green & Assocs.	317-253-2087
Kans	Lenexa, Scientific Devices-Midwest, Inc.	913-888-2050
Mich	Franklin, Scientific Devices-Midwest, Inc.	313-851-5945
Minn	Minneapolis, L. F. Green & Assocs.	612-781-1611
NJ	Englewood, Scientific Devices-East	201-871-3916
NM	Albuquerque, PLS Assocs., Inc.	505-255-2330
Ohio	Cleveland, Scientific Devices-Midwest, Inc.	216-261-2000
Ohio	Dayton, Scientific Devices-Midwest, Inc.	513-298-9904
Pa	Valley Forge, J. E. Cuesta & Co.	215-265-5800
Tex	Houston, Scientific Sls. Co.	713-781-2711
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Utah	Salt Lake City, PLS Assocs., Inc.	801-259-7973
Wash	Bellevue, Scientific Devices-Northwest	206-614-0900

INSTRUMENTATION TECH. CORP., Dept. EM, 18811 Napa St., Northridge, Cal. 91324, Tel: 213-886-2034; FSC No.: 34090; Empl.: 30

INSTRUMENTS FOR INDUSTRY, INC., Dept. EM, 151 Toledo St., Farmingdale, N.Y. 11735, Tel: 516-694-1414; Empl.: 25 .... p. 2872

Local Sales Offices & Reps.

Cal	Yorbalinda, Del Black Assocs.	714-524-0141
Colo	Evergreen, Mountaintek, Inc.	303-674-5255
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mich	Detroit, Harvey Teplitz & Co.	313-537-9058
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	No. Plainfield, Brady Co.	201-753-7988
NM	Albuquerque, Mountaintek Inc.	505-294-1491
NY	Guilderland, Electro Modular Sys.	518-456-2665
Ohio	Cleveland, Harvey Teplitz & Co.	216-486-2800
Ohio	Dayton, Harvey Teplitz & Co.	513-277-6531
Utah	Salt Lake City, L. Anderson	801-278-6920
Wash	Bellevue, Scientific Devices-Northwest	206-GL 4-0900
Exp:	Fla., Hallandale, Emec Inc.	305-925-6366

INSTRUMENTS, INC., Dept. EM, 3432 Midway Dr., San Diego, Cal. 92110, Tel: 714-223-7156; FSC No.: 34563; Empl.: 22

Local Sales Offices & Reps.

Wash	Seattle, Datacom Assocs.	206-285-2525

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™INSULTEK - insulating finish - Int'l. Elctrn. Resch.

™INSULUBE - insulating finish - Int'l. Elctrn. Resch.

™INSULUG - insulated compression terminal - Burndy Corporation

INTECH/FUNCTION MODULES, Dept. EM, 282 Brokaw, Santa Clara, Cal. 95050, Tel: 408-244-0500, TWX: 910-338-0254; FSC No.: 33967; Empl.: 165

Sales Manager: H. Douglas

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Lawndale, Group Three	213-542-7391
Cal	San Diego, Mesa Eng. & Sls. Assoc.	714-278-8021
Cal	Sunnyvale, RDP Instrs.	408-735-9040
Colo	Steamboat Springs, R. C. Sls.	303-879-1834
Fla	Clearwater, Brennan Assocs	813-446-5006
Ill	Elk Grove Village, L.F. Green & Assocs.	312-593-0282
Ind	Indianapolis, L.F. Green & Assocs.	317-293-9827
Mass	Peabody, Murray Sls.	617-535-3058
Mich	Ann Arbor, A P Assoc.	313-476-2300
Minn	Minneapolis, L.F. Green & Assocs.	612-781-1611
NJ	Cherry Hill, Scientific Assoc.	609-482-0059
NJ	Clifton, Compar N.Y.	201-546-3660
NM	Albuquerque, Tri Tronix	505-265-0172
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NC	Greensboro, DMI	919-885-4634
Ohio	W. Richfield, Bear Mktg.	216-659-3131
Ore	Portland, Western Tech. Sls.	503-297-1711
Pa	Delmont, T.F. Laslo & Assoc.	412-468-5045
Tex	Dallas, Cunningham Co.	214-233-4303
Tex	Houston, Cunningham Co.	713-461-4197
Va	Falls Church, Scientific Assoc.	703-573-8787
Wash	Bellevue, Western Techn. Sls.	206-641-3900
Wisc	Milwaukee, E.A. Dickinson & Assoc.	414-264-1080
Exp:	N.Y., New York, Multiparts Corp.	212-944-4370

Local Distributors

Cal	Sunnyvale, Intermark Electrns.	408-738-1111
Ind	Indianapolis, RA-DIS-CO.	317-637-5571
Mass	Framingham, Cadence	617-879-3000
NM	Albuquerque, Century Electrns.	505-292-2700
Ohio	Dayton, WKM Assocs.	513-434-7500
Tex	Dallas, Quality Components	214-387-4949
Tex	Houston, Quality Components	713-789-9320
Wash	Seattle, Almac/Stroum Electrns.	206-854-4991

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INTEGRATED CIRCUITS, INC., Dept. EM, 13256 Northrup Way, Bellevue, Wash. 98005, Tel: 206-747-8556, TWX: 910-443-2302; FSC No.: 50821; Empl.: 45 .... p. 2982,3271

Sales Manager: W.L. Traynor

Local Sales Offices & Reps.

Ala	Huntsville, Technical Sls.	205-881-1750
Cal	Los Angeles, Groh Associates	213-923-0963
Cal	Menlo Park, Straube Assocs.	415-323-2476
Colo	Denver, Straube Assocs./Mtn. States	303-426-0890
Ind	Fort Wayne, W. W. Bieberich	219-432-2537
Mich	Detroit, R.P. Urban & Assocs.	313-535-2355
Mich	Grand Rapids, R.P. Urban & Assocs.	616-245-0511
NM	Albuquerque, Straube Assoc./Mtn. States	505-294-1880
Utah	Salt Lake City, Straube Assoc./Mtn. States	801-328-4513
Wash	Seattle, Halbar Assocs.	206-829-1750

INTEGRATED MICROSYSTEMS INC., Dept. EM, 1215 Terra Bella Ave., Mountain View, Cal. 94043, Tel: 415-965-3900; Empl.: 100

Sales Manager: M. Weisberg

Local Sales Offices & Reps.

Ariz	Scottsdale, Sales Engrg.	602-994-3230
Cal	San Diego, Littlefield & Smith Assoc.	714-455-0055
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Denver, Parker Webster	303-751-2600
Conn	Ridgefield, Phoenix Sls.	203-438-9644
Ill	Wauconda, Cudahy Sls.	312-526-2484
Kans	Overland Park, Advanced Tech. Sls.	913-492-4333
Minn	Minneapolis, Quantum Sls.	612-831-8583
NY	Jericho, Electro Rep.	516-938-0540
Ohio	Cleveland, KRW Sls.	216-741-4711
Ohio	Dayton, KRW Sls.	513-885-3330
Ore	Aloha, L. D. Elctrns.	503-649-6177
Pa	Pittsburgh, KRW Sls.	412-243-2284
Tex	Houston, Palatine Sls.	713-783-1492
Tex	Richardson, Palatine Sls.	214-231-9489
Utah	Salt Lake City, Parker Webster.	801-261-1058
Va	Falls Church, Beacon North	703-534-7200
Wash	Woodinville, L. D. Elctrns.	206-485-7312

INTEGRATED PHOTOMATRIX, Dept. EM, 1101 Bristol Rd., Mountainside, N.J. 07092, Tel: 201-233-7200; Empl.: 60

Sales Manager: M. Rozar

Local Sales Offices & Reps.

Cal	Sunnyvale, Dynetics International	408-257-7776
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Ft. Wayne, Fiat Engrg. Assoc.	219-482-2408
Md	Silver Spring, Spectro Sys.	301-949-8261
Mass	Amesbury, ATM World Trade	603-394-7874
Minn	Minneapolis, International Sls. Co.	612-831-8423
Mo	Lake Lotawanna, Lotronics	816-578-4498
NH	So. Hampton, ATM World Trade	603-394-7874
NY	New York City, ATM World Trade	212-687-5244

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INTEL CORP., Dept. EM, 3065 Bowers Ave., Santa Clara, Cal. 95051, Tel: 408-246-7501, TWX: 910-338-0026; Empl.: 7200

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	305-423-7615
Ariz	Scottsdale, Sls. Engrg.	602-845-5781
Cal	Cupertino, Mac-I	408-257-9880
Cal	Fountain Valley, Mac-1	714-839-3341
Cal	San Diego, Earle Assocs.	714-278-5441
Cal	Santa Ana, Intel Corp.	714-835-9642
Cal	Sunnyvale, Intel Corp.	408-738-3870
Cal	Woodland Hills, Mac-1	213-347-1374
Colo	Denver, BFA Corp.	303-837-1247
Colo	Denver, Intel Corp.	303-373-4920
Conn	Danbury, Intel Corp.	203-792-8366
Fla	Ft. Lauderdale, Intel Corp.	305-971-7200
Fla	Orlando, Col-Ins-Co	305-423-7615
Fla	Orlando, Intel Corp.	305-628-2393
Ga	Stone Mountain, Col-Ins-Co	305-423-7615
Ill	Chicago, Data Elctrncs.	312-283-0300
Ill	Oakbrook, Intel Corp.	312-325-9510
Ind	Indianapolis, Data Elctrns.	817-784-6360
Iowa	Cedar Rapids, Tech. Rep. Inc.	319-396-5662
Kans	Olathe, Technical Representatives	913-782-1177
Md	Timonium, G. White Assocs.	301-252-7742
Mass	Chelmsford, Intel Corp.	617-256-4131
Mass	Waltham, Comp. Mktg.	617-890-1776
Mich	Farmington Hills, Carter, McCormic & Peirce	313-477-7700
Mich	Southfield, Intel Corp.	313-353-0920
Minn	Bloomington, Intel Corp.	612-835-6722
Minn	Minneapolis, Data Elctrns.	612-786-9666
Mo	Hazelwood, Technical Representatives	314-731-5200
NJ	Camden, Q.E.D.	215-925-8711
NJ	Edison, Intel Corp.	201-985-9100
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
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NY	Pittsford, T-Squared	716-381-2551
NY	Poughkeepsie, Intel Corp.	914-473-2303
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NY	Syosset, Intel Corp.	516-364-9860
NY	Syracuse, T-Squared	315-463-8592
NC	Winston Salem, Col-Ins-Co.	305-423-7615
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Ohio	Dayton, Intel Corp.	513-890-5350
Ohio	Euclid, Intel Corp.	216-289-0101
Ore	Beaverton, ES/Chase Co.	503-642-2732
Pa	Ft. Washington, Intel Corp.	215-542-9444
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Tex	Dallas, Microsystems Mktg.	214-238-7157
Tex	Dallas, Intel Corp.	214-661-8829
Tex	Houston, Microsystems Mktg.	713-783-2900
Utah	Salt Lake City, BFA Corp.	801-466-6522
Wash	Seattle, E.S./Chase Co.	206-762-4824

INTEL MEMORY SYSTEMS, Dept. EM, 1302 N. Mathilda, Sunnyvale, Cal. 94086, Tel: 408-734-8102, TWX: 910-339-9361; FSC No.: 34649; Empl.: 600

Sales Manager: G. Andersen, Mktg. Mgr.

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	205-852-4263
Ala	Huntsville, Glen White Assoc.	205-883-9394
Ariz	Scottsdale, Sales Engrg.	602-994-3230
Cal	Berkeley, MAC-I	415-843-7625
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Cal	Woodland Hills, Mac-I	213-347-1374
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Ill	Oak Brook, Intel Corp.	312-325-9510
Ind	Indianapolis, Data Elctrn.	317-784-6360
Iowa	Cedar Rapids, Tech. Rep. Inc.	319-396-5662
Kans	Olathe, Technical Representatives	913-782-1177
Md	Timonium, Intel Corp.	301-252-7742
Md	Timonium, G. White Assocs.	301-252-7742
Mass	Chelmsford, Intel Corp.	617-256-4131
Mass	Waltham, Computer Mktg. Assoc.	617-890-1776
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Mich	Farmington Hills, Carter, McCormic & Peirce	313-477-7700
Minn	Bloomington, Intel Corp.	612-835-6722
Minn	Minneapolis, Data Elctrn.	612-784-4642
Mo	Hazelwood, Technical Representatives	314-731-5200
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NJ	Tinton Falls, Measurement Tech.	201-747-6810
NY	Great Neck, Measurement Tech.	516-482-3500
NY	Poughkeepsie, Intel Corp.	914-473-2303
NY	Rochester, Intel Corp.	716-328-7340
NY	Syosset, Intel Corp.	516-364-9860
NY	Syracuse, T-Squared Elctrns.	315-463-8592
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NC	Winston-Salem, Col-Ins-Co	919-748-0297
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Ohio	Dayton, Intel Corp.	513-890-5350
Ohio	Euclid, Intel Corp.	216-289-0101
Ore	Beaverton, E/S Chase Co.	503-642-2732
Pa	Fort Washington, Intel Corp.	215-542-9444
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Tenn	Germantown, G. White Assoc.	901-754-0483
Tenn	Johnson City, Glen White Assoc.	615-928-0184
Tex	Dallas, Intel Corp.	214-661-8829
Tex	Dallas, Mycrosystems Mktg.	214-238-7157
Tex	Houston, Mycrosystems Mktg., Inc.	713-783-2900
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(TM)INTENNA - cb in-car antenna d/n 3355 CBA. - Microwave Filter Co.

INTERCONNECTION TECHNOLOGY, Dept. EM, Executive Dr., Hudson, N.H. 03051, Tel: 603-882-1661

INTER-MARKET, INC., Dept. EM, 1946 Lehigh Ave., Glenview, Ill. 60025, Tel: 312-729-5330, TWX: 910-651-1997; FSC No.: 34165; Empl.: 10

Local Sales Offices & Reps.

Ala	Huntsville, Macro Mktg. Assocs.	205-883-9630
Cal	San Diego, Van Gott & Assoc.	714-273-4797
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Colo	Denver, Nelson Co.	303-573-1516
Conn	Berlin, White Sls.	203-224-0423
Fla	Orlando, W. Ben Wimberly Co.	305-423-2514
Ill	Downers Grove, Richmar Elctrns	312-968-0118
Ind	Carmel, Richmar Elctrns.	317-846-6383
Mass	Needham, White Sls.	617-444-3676
Mich	Birmingham, J.C. Hofstetter Co.	313-643-7203
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	St. Louis, Kebco Co.	314-569-2660
NY	E. Northport, Jarms Assoc.	516-822-7085
NY	Syracuse, Nycom Inc.	315-437-8343
Ohio	Dayton, J.C. Hofstetter Co.	513-296-1010
Ohio	Medina, J.C. Hofstetter Co.	216-725-4477
Pa	Birchrunville, Jadelectronic Associates	215-647-5151
Tex	Dallas, McCoy Associates	214-350-9931
Tex	Houston, Bill Hamilton Co.	713-445-7086
Wisc	Butler, Richmar Elctrns.	414-781-1730

INTER-TECH. GRP., INC., Dept. EM, Box 23, Irvington-on-Hudson, N.Y. 10533, Tel: 914-LY 1-8822, TWX: 710-564-0802; Empl.: 10 .... p. 2672,4520

Local Sales Offices & Reps.

Ariz	Phoenix, Palmer Assoc.	602-996-9077
Cal	Garden Grove, Impact Elctrns.	213-431-3581
Cal	San Carlos, Winco Sls.	415-365-6082
Colo	Denver, Palmer Assocs.	303-255-9961
Fla	Melbourne, Repcom	305-254-1877
Ill	Chicago, J. Golton Co.	312-725-7870
Md	Timonium, Heller	301-252-4780
Mass	Newton, Normell Assocs.	617-969-5478
Minn	Minneapolis, Int'l. Sls.	612-831-8423
NY	Lynbrook, H.B. Heft	516-LY 9-3351
NY	Syracuse, Naylor Elec.	315-GR 2-9183
Ohio	Dayton, BEK Assocs., Inc.	513-278-1343
Pa	Ardmore, Freedman Assoc.	215-649-3679
Tex	Dallas, J. Clay Co.	214-350-1281
Wash	Seattle, H. Levinson	206-323-5100

INTERDATA, see Perkins-Elmer Data Systems/Terminals Div.

INTERDESIGN INC., Dept. EM, 1255 Reamwood Ave., Sunnyvale, Cal. 94086, Tel: 408-734-8666, TWX: 910-339-9374; Empl.: 50

INTERDYNE CO., ADEPT DIV., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91411, Tel: 213-787-6800, TWX: 910-495-1754; FSC No.: 31598; Empl.: 75

Sales Manager: R.R. Lindstrand

Local Sales Offices & Reps.

Ariz	Phoenix, Interstate Mktg.	
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Boulder, Component Prod. Sls.	303-494-5100
Fla	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
Ill	Oakbrook, Whitmore & Assocs.	312-325-4727
Kans	Kansas City, Nevco	816-421-1751
Md	Baltimore, Bernard White Co.	301-484-5400
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	Minneapolis, Stoss Assocs.	612-925-2757
Mo	St. Louis, Nevco	314-843-7406
NJ	Livingston, Varrelman-Gorman	201-992-2505
NM	Albuquerque, Carl Carlberg Assocs.	505-265-1579
Ohio	Akron, Augnat Assocs.	216-725-6087
Ohio	Dayton, Augnat Assocs.	513-223-5002
Okla	Tulsa, Hugh Daly Co.	918-627-4159
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Tex	Dallas, Southern States Mktg.	214-387-2489
Tex	Houston, Southern States Mktg.	713-665-0991
Wash	Bellevue, Ruggles Technical Sls.	206-455-2778

(TM)INTERCAP - capacitors - International Comps Corp.

(TM)INTERCETTE - digital cassette tape transports - Interdyne

(TM)INTERCHECK - thermal switch - Guildline Instrs., Inc.

(TM)INTERCON - backpanels and connectors - Dynatech Corp.

(TM)INTERCONNECT PABX TELEPHONE SYSTEMS - 20 lines & up - Milgo Electronic Corp.

INTERDYNE, Intercette Div., Dept. EM, 14761 Califa St., Van Nuys, Cal. 91401, Tel: 213-787-6800, TWX: 910-495-1754; FSC No.: 31598; Empl.: 80

Local Sales Offices & Reps.

Cal	Costa Mesa, King Engrg.	714-645-6873
Cal	Los Altos, Cain-White Co.	415-948-6533
Colo	Littleton, Data Systems	303-761-3172
Conn	Guilford, R.H. Sturdy	203-453-5424
Fla	Winter Park, Young & Lawrence	305-647-6929
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Electrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Baltimore, B. White & Assocs.	301-484-5400
Mass	Stoneham, REPCO	617-438-3113
Mass	Wellesley Hills, R.H. Sturdy	617-235-2330
Mich	Southfield, Data Tron.	313-354-6421
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elect.	314-569-1406
NJ	Livingston, Varrelman-Gorman	201-992-2505
NJ	Union, SBM Representatives	201-687-8737
NY	Pleasantville, SBM Representatives	914-769-1811
NY	Rochester, SBM Representatives	716-266-1400
Ohio	Wickliffe, Data-Tron	216-585-8241
Pa	King of Prussia, Rivco	215-265-5211
Utah	Salt Lake City, Data Systems	801-487-8281
Wash	Bellevue, Breenan	206-747-2928
Wisc	Milwaukee, Carter Elctrns.	414-464-5555
Ariz	Phoenix, Vari-Tron Sls.	602-997-0774
Cal	Fremont, Parsons & Meister	415-651-3711
Cal	Los Altos, Parsons & Meister	415-941-4745
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Boulder, Component Prod. Sls.	303-444-2730
Fla	Ft. Lauderdale, RI Smith	305-772-5100
Ill	Oakbrook, Ray Whitmore	
Mich	Farmington, Miltimore Sales	313-476-2446
Minn	Minneapolis, Stoss Assocs.	612-925-2757
Mo	Kansas City, Nevco	816-421-1751
NM	Albuquerque, Interstate Mktg.	505-265-1579
NY	Rochester, R.P. Kennedy Co.	716-271-6322
Ohio	Akron, Augnot	216-239-1621
Ohio	Wickliffe, W.J. Brauer	216-943-0601
Okla	Tulsa, Hugh Daly Co.	918-627-4159
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778

INTERELECTRONICS CORP., Dept. EM, Interelectronics Park, 550 U.S. Rte. 303, Congers, N.Y. 10920, Tel: 914-EL8-8000 .... p. 3270

Sales Manager: M.H. Pintell, Adv. Mgr.; *Distributor Manager:* G. Sherwood

INTERFACE, INC., Dept. EM, 7401 Butherus Dr., Scottsdale, Ariz. 85260, Tel: 602-948-5555, Telex: 668-394; FSC No.: 32311

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co.	305-423-7615
Ariz	Scottsdale, Electronic Entprs.	602-946-9860
Cal	Concord, Gado Instrument Sls.	415-933-5566
Cal	Long Beach, Saber Ent.	213-595-5646
Cal	Mountain View, Gado Instr. Sls.	415-961-2222
Conn	Hamden, Northeast Engrg.	203-248-4481
Fla	Largo, Col-Ins-Co.	305-423-7615
Fla	Orlando, Col-Ins-Co.	305-423-7615
Ga	Clarkston, Col-Ins-Co.	305-432-7615
Ill	Des Plaines, Marsland Assoc.	312-298-2620
Ind	Indianapolis, Marsland Assoc.	317-924-3568
Md	Randlestown, Beacon North	301-922-1248
Mass	Danvers, Northeast Engrg.	617-774-3010
Mich	Farmington, Anderson Electrns.	313-476-9161
Minn	Minneapolis, Marsland Assoc.	612-545-4481
Mo	Kansas City, Marsland Assoc.	816-966-8400
NM	Albuquerque, Electronic Entprs.	505-256-3561
NM	Las Cruces, Electronic Entprs.	505-524-0126
NY	Albany, H. C. Johnson Agencies	518-456-6667
NY	Fayetteville, H. C. Johnson Agencies	315-637-9383
NY	Manhasset, Northeast Engineer	516-365-9633
NY	Rochester, H. C. Johnson Agencies	716-482-3000
NY	Williamsville, H.C. Johnson Agencies	716-632-7880
NC	Winston-Salem, Col-Ins-Co.	305-423-7615
Ohio	Cleveland, Instrumentation Systems	216-486-0782
Ohio	Dayton, Instrumentation Systems	513-294-2838
Ore	Portland, Topp Engrg. Sls.	503-244-6265
Pa	Jenkintown, PDC Corp.	215-887-9610
Pa	Pittsburgh, Instrumentation Syst.	412-243-1111
Tex	Houston, SESCO-Houston	713-668-9656
Va	Falls Church, Beacon North	703-543-7200
Wash	Bellevue, Topp Engrg. Sls.	206-747-5400
Wash	Richland, Topp Engineering	509-783-7515
Exp:	Cal., Los Angeles, Trans-World Trade	213-472-0444

(TM)INTERFACE: A - speaker system - Electro-Voice, Inc.

INTERFACE ENGINEERING INC., Dept. EM, 386 Lindelof Ave., Stoughton, Mass. 02072, Tel: 617-344-7383; FSC No.: 14352; Empl.: 18 p. 1662,1663

Local Sales Offices & Reps.

Mass	Lynnfield, Grady & Assocs.	617-334-6633
Va	Arlington, Gans-Fryling	703-527-3262

Advertisement

INTERFACE ENGINEERING manufactures analog, synchro, and digital code converters, analog and digital function generators, digital angle operators, coordinate converters, digital couplers, and accessory power supplies and displays for the measurement, control, simulation, and display of shaft position.

INTERFACE TECHNOLOGY INC., Dept. EM, 10500 Kahlmeyer Dr., St. Louis, Mo. 63132, Tel: 314-426-6880; Empl.: 35

Local Sales Offices & Reps.

Ga	Atlanta, Flex-Comm International	404-237-9242
Mo	St. Louis, Vertec Assocs.	314-394-6242
NY	Great Neck, H. J. Krasner & Assocs.	516-487-0690
Ohio	Akron, System Mktg. Corp.	216-666-6789

(TM)INTERFACE 33 - styled modular instrument enclosures - Amco Engineering Co.

(TM)INTERKIT - component kit assortments - International Comps Corp.

INTERLOK, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010, Tel: 415-348-5625, TWX: 349373 910-374-2353; Empl.: 30; Minimum order: $D.R. Pue p. 1136-1139,2530-2532

Sales Manager: F.L. Nelson, Mktg. Mgr.; *Distributor Manager:* D.R. Pue

Local Sales Offices & Reps.

Ala	Mobile, Hollingsworth & Still	205-344-1641
Ariz	Phoenix, Stitzer-Dodd	602-944-2237
Ark	Little Rock, J.Y. Schoonmaker Co.	501-375-2168
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Cal	San Diego, Daniels & Doty Sls. Co.	714-560-6266
Colo	Denver, W.J. Purdy Co.	303-777-1411
Conn	Meriden, P.R. Sturgeon Co.	203-237-1112
DC	Washington, S.K. MacDonald	202-265-3938
Fla	Fort Lauderdale, Hollingsworth & Still	305-782-0069
Fla	Orlando, Hollingsworth & Still	305-834-2356
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Ill	Hinsdale, Hill-Gray Assoc.	312-325-4810
Ind	Indiaanapolis, Sukup & Cox	317-253-5501
Iowa	Marion, Thomas & Modrcin Assoc.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assoc.	913-432-2131
Md	Baltimore, S.K. MacDonald	301-254-3380
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	Minneapolis, HMR	612-920-8200
Mo	Hazelwood, Thomas & Modrcin Assoc.	314-895-4700
NJ	Bergenfield, Harold Gray Assocs.	201-384-3643
NM	Albuquerque, W.J. Purdy Co.	505-266-7959
NY	Syracuse, Mar-Com Assocs.	315-437-2843
NC	Greensboro, Hollingsworth & Still	919-855-9033
Okla	Tulsa, J.Y. Schoonmaker Co.	918-936-1423
Ore	Portland, Western Tech. Sls.	503-297-1711
Pa	Enon Valley, Nebco Assoc.	216-457-2333

Pa	Philadelphia, S.K. MacDonald	215-545-1205
Tenn	Nashville, Hollingsworth & Still	615-883-9126
Tex	Dallas, J.Y. Schoonmaker Co.	214-357-8481
Tex	Houston, J.Y. Schoonmaker Co.	713-926-9510
Wash	Bellevue, Western Tech. Sls.	206-641-3900

Local Distributors

Ariz	Phoenix, Moltronics	602-272-7951
Cal	Berkeley, A. Lasher's Elctrns.	415-843-5915
Cal	Calabasas, Panel Parts Co.	213-346-8036
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	San Diego, Moltronics	714-278-5020
Cal	Santa Clara, Dynametron	408-246-6535
Cal	Santa Clara, Moltronics	408-244-7600
Cal	South Gate, Moltronics	213-773-6521
Cal	Sunnyvale, Ratel Elctrns.	408-739-9220
Colo	Lakewood, Acacia Sls.	303-232-2882
Fla	West Palm Beach, Nurmi Elctrn Supply	305-686-8553
Mass	Boston, Sager Electrical Supply Co.	617-542-2281
Mich	Ann Arbor, Wedemeyer Elctrn. Supply Co.	313-665-8611
Minn	Minneapolis, Stark Elctrn. Supply Co.	612-332-1325
NJ	Bergenfield, Technical Elctrn. Distrs.	201-384-3643
NJ	Camden, General Radio Supply Co.	609-964-8560
NM	Hobb, Electronic Module	505-397-3022
NY	Buffalo, Summit Distributors	716-884-3450
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Portland, Dunn Elctrns.	503-285-0214
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Tex	Houston, Lenert Co.	713-225-1465
Utah	Salt Lake City, Calron Elec. Supply	801-487-7451
Va	Richmond, Instrument Tech. Rep.	804-288-7198

INTERMARK, Dept. EM, 1020 Steward Dr., Sunnyvale, Cal 94086

(TM)INTERMATIC - time switches-photo controls - Intermatic, Inc.

INTERMATIC, INC., Dept. EM, Intermatic Plaza, Spring Grove, Ill. 60081, Tel: 815-675-2321, Telex: 25-265; Empl.: 700

Local Sales Offices & Reps.

Ariz	Phoenix, T. Geis & Assocs.	602-252-7694
Cal	Los Angeles, Intermatic, Inc.	213-627-1506
Cal	San Francisco, Keeler, White Co.	415-431-2900
Colo	Denver, E.O. Sales	303-744-7081
Fla	Coral Springs, T. Fitzgerald	305-561-1953
Ga	Atlanta, R. Kolze & Assocs.	404-351-0814
Haw	Honolulu, H.H. Sawyer Co.	808-847-1411
Ind	Indianapolis, Warble-Purdue & Assoc.	317-632-1465
Iowa	Cedar Rapids, A. Sell & Assocs.	319-393-4225
Kans	Shawnee Mission, Stover & Assocs.	913-649-6600
Ky	Covington, Hackman-Bryan & Assocs.	606-291-3800
La	New Orleans, United Sls. Assocs.	504-733-8711
Mass	Woburn, Yusen Assocs.	617-935-8500
Mich	Southfield, Linder Assocs.	313-353-4334
Minn	Hamel, Elstad Sales Co.	612-559-4000
Mo	Kirkwood, Martin Electrical Sls.	314-966-8659
Neb	Omaha, Midwest Equip. Co.	402-734-1020
NJ	S. Plainfield, Nash & Cornell	201-756-2400
NM	Albuquerque, Maddox Sls. Co.	505-298-2422
NY	New Hartford, F.W. Laver & Son	315-724-2304
NC	Charlotte, E.F. Lombardi	704-334-1637
Ohio	Bedford Heights, Riffle & Assocs.	216-439-5500
Okla	Oklahoma City,, Stover & Assocs	405-789-2728
Ore	Portland, M.H. Gerrard	503-224-0864
Pa	Philadelphia, W.C. Welde & Sons	215-243-1120
Pa	Pittsburgh, H.W. Groetzinger Co.	412-322-6280
Tex	Dallas, T.C. Kissel Co.	214-742-2349
Tex	Houston, Kopinitz Co.	713-692-0022
Utah	Salt Lake City, J.R. Christensen & Assocs.	801-486-0031
Wash	Seattle, Tal Agencies	206-624-3355
Wisc	Wauwatosa, G.R. Adams & Assocs.	414-453-7130

INTERNATIONAL BUSINESS SYS., INC., Dept. EM, 2522 18th St., Racine, Wisc. 53403, Tel: 414-634-2328

INTERNATIONAL COMMUNICATIONS, A Milgo Co., Dept. EM, 8600 NW 41st St., Miami, Fla. 33166, Tel: 305-592-7654, TWX: 810-848-6588; Empl.: 1400

Local Sales Offices & Reps.

Cal	Campbell, Intl Comm Corp	408-377-4575
Cal	Los Angeles, Kirby Assocs.	213-879-9045
Cal	Los Angeles, Intl. Comm. Corp.	213-641-3961
Cal	Oakland, Persons & Assocs.	415-569-6461
Colo	Littleton, Cropley, Inc.	303-794-4231
Conn	Westport, T.H. Maguire & Assocs.	203-227-1976
DC	Washington, Intl. Comm. Corp.	202-296-4940
Ga	Atlanta, Intl. Comm. Corp.	404-763-0304
Ill	Alton, Information Prods.	314-355-4340
Ill	Chicago, HH Sls.	312-337-4478
Ill	Des Plaines, Intl. Comm. Corp.	312-298-7150
Md	Silver Springs, Computer Complements Inc.	301-589-2802
Mass	Danvers, John Melanson & Assocs.	617-774-1220
Mich	Southfield, Data Processing Sciences	313-569-2490
Minn	Minneapolis, Delta Comms. Sys.	612-884-0202
Mo	Independence, Information Prods. Inc.	816-252-3700
NJ	Bellmawr, Applied Delta Sys.	609-931-3100
NY	Great Neck, Harvey J. Krasner Assocs. Inc.	516-487-0690
NY	Ilion, Gall & Annese Assocs.	315-895-7469
NY	Massapequa, L.E. Walz & Assocs.	516-798-3119
NY	New York, Int'l. Comm. Corp.	212-687-5040
Ohio	Cleveland, Data Specifications Corp.	216-333-6740
Ohio	Columbus, Data Specifications Corp.	614-885-6682
SC	Greenville, Int'l. Comm. Corp.	803-268-7411
Tex	Richardson, Computer Mktg. Corp.	214-231-1426
Wash	Seattle, SJI Inc.	206-624-9020
Wisc	Milwaukee, Delta Commus. Sys.	414-774-1989

INTERNATIONAL COMPS CORP., Dept. EM, 105 Maxess Rd, Melville, N.Y. 11746, Tel: 516-293-1500, TWX: 510-224-6409; Empl.: 100; Minimum order: $J. De Maria .... p. 1254,1255

Distributor Manager: J. De Maria

Local Sales Offices & Reps.

Conn	Vernon, G-M Assoc.	203-646-4443
Ill	Glenview, Price Elctrns	312-272-7453
Iowa	Marion, Thomas & Modrcin Assoc.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assoc.	913-432-2131
Mass	Framingham, G-M Assoc.	617-872-4871
Mo	Hazelwood, Thomas & Modrcin Assoc.	314-895-4700
NJ	Harrington Park, Metro Technical Sls.	201-768-8495
NY	Jericho, Metro Technical Sls.	516-935-3330
NY	Syracuse, Nycom	315-437-8343
Pa	Philadelphia, Paragon Sls.	215-563-7060
Tex	Dallas, United Comps.	214-324-1448
Wash	Seattle, R. Thorpe Co.	206-763-0545

Local Distributors

Cal	San Jose, Greenway Distrs.	408-379-0800
Cal	Van Nuys, R.G. Allen Co.	213-989-1700
Cal	Van Nuys, Edmar Elctrns./West	213-782-9020
Conn	East Haven, J V Elctrns.	203-469-2321
Conn	Westport, Components Plus	203-226-4731
Fla	Ft. Lauderdale, NRC, Inc.	305-792-2600
Ill	Des Plaines, Edmar Elctrns.	312-298-8580
Ind	Ft. Wayne, Fort Wayne Elctrns.	219-423-3433
Ind	South Bend, Radio Distrs.	219-287-2911
Md	Baltimore, Tully Elctrns.	301-788-4200
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Waltham, TLC	617-890-1882
Minn	Minneapolis, Cassidy Elctrns.	612-835-7746
Mo	University City, Olive Elctrn. Supply	314-863-7800
Neb	Lincoln, Scott Elctrns.	402-464-8308
NH	Concord, Evans	603-224-9961
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Hauppauge, Components Plus	516-231-9200
NY	Jericho, Metro Sls.	516-935-3330
NY	Patchogue, T & M	
NY	Rochester, Masline	716-546-5373
NY	Rome, Rome Elctrns.	315-337-5400
NY	Syosset, Nasco	
Ohio	Dayton, Sunray Elctrns	513-253-4114
Ohio	Dayton, Nasco	513-253-8931
Okla	Tulsa, Radio, Inc.	918-587-9123
Pa	Huntingdon Valley, Shap Elctrns.	215-698-9550
Pa	Scranton, Pursell	717-346-2011
RI	Providence, W. Dandretta & Co.	401-861-2800
Tenn	Memphis, Majestic	901-794-9494
Tenn	Memphis, Bluff City	901-725-9500
Tex	Dallas, KA Elctrn. Sls.	214-634-7870
Tex	Houston, Altair Co.	713-462-3029
Utah	Salt Lake City, Alta Elctrns.	801-486-7227
Wash	Olympia, J & W Elctrns.	206-943-1071
Wash	Seattle, Shannon, Ltd.	206-763-0545
Wisc	Mequon, Lakeview Elctrns.	414-377-8250

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INTEROHM RESISTORS - including carbon composition, and carbon film. INTERCAP CAPACITORS - miniature electrolytics, dipped tantalums, and miniature film. INTERNATIONAL SERVICEMASTER & 10M RECEIVING TUBES - all domestic & foreign types. ALL PRODUCTS ARE STOCKED IN DEPTH. LARGE QUANTITIES OF STANDARD VALUES AVAILABLE.

INTERN'L. COMPUTER PRODS., INC., Dept. EM, 2925 Merrell Rd., Dallas, Tex. 75229, Tel: 214-350-6951, Telex: 73-0475; Empl.: 117; Minimum order: $D. Birk

Sales Manager: G. Rocky; *Distributor Manager:* D. Birk

Local Sales Offices & Reps.

Conn	Stamford, ICP East Coast Regional Off.	203-327-6263
Minn	Minneapolis, Loonam Assocs.	612-831-1616

INTERNATIONAL CRYSTAL MFG., Dept. EM, 10 N. Lee St., Oklahoma City, Okla. 73102, Tel: 405-CE 6-3741, TWX: 910-831-3177 .... p. 2444-2448,2873

INTERNATIONAL DATA SCIENCES, Dept. EM, 100 Nashua St., Providence, R.I. 02904, Tel: 401-274-5100, TWX: 710-381-0285; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	800-327-6600
Ariz	Scottsdale, Barnhill Three	602-947-7841
Cal	Anaheim, Moxon Elctrns.	714-635-7600
Colo	Denver, Barnhill Three	303-934-5505
Conn	Wallingford, IMF Sls. Assocs.	203-265-0215
Ill	Elk Grove Village, L.F. Green & Assoc.	312-593-0282
Ind	Indianapolis, L.F. Green Assoc.	317-293-9827
Md	Silver Springs, Terminal Networks	301-622-3535
Mass	Wakefield, IMF Sls. Assocs.	617-245-8900
Minn	Minneapolis, L.F. Green & Assoc.	612-781-1611
NJ	Pennsauken, Megargel/Himmelstein Assoc.	609-622-3081
NJ	Ridgewood, Instrumentation Sls. Co.	201-445-5210
NM	Albuquerque, Barnhill Three	505-299-7658
NY	E. Syracuse, Ossmann Instr.	315-437-6666
NC	Winston-Salem, FM Assocs.	800-327-6600
Ohio	Dayton, Ashby Assocs.	513-252-5627
Tex	Richardson, Barnhill Two	214-231-2573
Wash	Bellevue, Scientific Devices	206-454-0900
Wash	Seattle, Delcom Sls. Co.	206-248-0090

INTERNATIONAL DEVICES, INC., Dept. EM, 3370 Livonia Ave., Los Angeles, Cal. 90034

INTERNATIONAL DIODE CORP., Dept. EM, 229 Cleveland Ave., Harrison, NJ 07029, Tel: 201-482-6518; Empl.: 9

INTERNATIONAL ELECTRO EXCH. CORP., See IEE/Schadow, Inc.

INTERNATIONAL ELECTRO-MAGNETICS, Dept. EM, 350 N. Eric Dr., Palatine, Ill. 60067, Tel: 312-358-4622; Empl.: 30 .... p. 1115

Sales Manager: T. Pretto

INT'L. ELCTRN. RESCH., Dept. EM, 135 W. Magnolia Blvd., Burbank, Cal. 91508, Tel: 213-849-2481, TWX: 910-498-2206; FSC No.: 98978; Empl.: 110

Sales Manager: J.S. Smith

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Cal	Burlingame, J. Logan	415-697-6100
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Colo	Englewood, Elcom, Inc.	303-770-4400
Fla	Maitland, Lawrence Assocs.	305-647-1188
Ill	Mt. Prospect, Magnuson	312-956-0700
Kans	Leawood, Thunderbird Tech.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls.	316-684-3941
Mass	Lexington, Hathaway Elct.	617-861-7010
Minn	St. Paul, Magnuson	612-227-8495
Mo	St. Louis, Thunderbird Tech.	314-567-6488
NJ	Clifton, Compar N.Y.	201-546-3660
NY	Buffalo, Ossmann Component Sls. Corp.	716-832-4271
NY	Kingston, Ossmann Component Sls. Corp.	914-338-5505

NY Rochester, Ossmann Component Sls. Corp. 716-442-3290
NY Syracuse, Ossmann Component Sls. Corp. 315-454-4477
NY Vestal, Ossmann Component Sls. Corp. 607-785-9949
NC Winston-Salem, Murcota Corp. 919-722-9445
Ohio Centerville, N. Case Assocs. 513-433-0966
Ohio Rocky River, N. Case Assocs. 216-333-4120
Okla Tulsa, Blair Engrg. 918-747-3100
Pa Philadelphia, Kenneth B. Erdman Co. 215-224-1833
Pa Pittsburgh, R. F. Clark Co. 412-242-9502
Tex Dallas, Blair Engrg. 214-352-8411
Tex Houston, Blair Engrg. 713-776-0011
Wash Seattle, F. Jackson Co. 206-523-6300

Local Distributors

Ariz Phoenix, Mirco Elctrn. Distrs. 60-997-6194
Cal Burlingame, Rose Elctrns. 415-692-5700
Cal Los Angeles, Mil-Comm Distrs. 213-478-0525
Colo Denver, Integrated Elctrns. 303-534-6121
Conn Norwalk, Park Distrs. 203-853-2011
Fla Clearwater, Lynch Gentry Assocs. 813-443-2697
Ga Atlanta, ACK Radio Supply Co. 404-351-6340
Ill Mt. Prospect, Magnuson Elctrns. 312-956-0700
Md Towson, Jones-Maryland Elctrns. 301-823-5721
Mass Methuen, C & H Elctrns. 603-882-4687
Mass Watertown, Sterling Elctrns. 617-926-9720
Mass West Newton, A. W. Mayer Co. 617-965-1111
Minn St. Paul, Magnuson Elctrns. 612-227-8495
NY Bohemia, Car-Lac Elctrn. Ind'l Sls. 516-567-4200
NY Rochester, Ossmann Comp. Sls. Corp. 716-442-3290
NY West Hempstead, March Elctrns. 516-486-6511
Ohio Reading, Sheridan Sls. Co. 513-761-5432
Pa Erie, Advacom, Inc. 814-455-8110
RI Providence, W. Dandreta & Co. 401-861-2800
Tex Houston, Lenert Co. 713-225-1465
Utah Salt Lake City, Kimball Electronics Incorporated 801-328-2075
Wash Seattle, Elwood Inds. 206-523-6300
For: Can., Burlington, Ont., White Radio Ltd. 416-632-6894
For: Can., Montreal, Que., White Radio Ltd. 514-481-0158

INTERNATIONAL ELECTRONICS CORP., See Electro Motive Corp.

INTERNATIONAL IDENTIFICATIONS, see Geyer Systems, Inc.

INTERNATIONAL IMPORTERS, Dept. EM, 2244 S. Western Ave., Chicago, Ill. 60608, Tel: 312-847-6363, TWX: 910-221-1394; Empl.: 35

Sales Manager: J. Ambrose

Local Sales Offices & Reps.

Ala Huntsville, 20th Century Mktg. 205-772-9237
Cal Marina Del Ray, Intervend 213-821-7936
Cal San Jose, United Sls. Co. 408-379-0800
Colo Denver, Franklin Sls. 303-922-3623
Fla Ft. Lauderdale, Component Sls. Corp. 305-739-7545
Fla Satellite Beach, Component Sls. Corp. 305-773-5575
Fla St. Petersburg, Component Sls. 813-898-0009
Ill Chicago, Fred Kitty 312-965-7595
Ind Indianapolis, W. Deem & Assoc. 317-852-8006
Kans Overland Park, Adv. Tech. Sls. 913-492-4333
Mass Burlington, Discrete Tech. 617-273-0626
Minn St. Paul, D. Countryman & Assoc. 612-645-9151
NY NYC, C. Avery & Assoc. 212-823-5224
NY Rye, C. Avery & Assoc. 914-967-7610
NC High Point, Engrg. Devices 919-869-7200
Ore Portland, United Sls. Co. 503-297-3548
Pa Philadelphia, Danton Assoc. 215-353-0500
Tex Dallas, Techno Assoc. 214-357-9213

INT'L. INSTRS., Div. Sigma Instrs., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477, Tel: 203-795-4711, TWX: 710-465-2897; Empl.: 275

Local Sales Offices & Reps.

Ala Huntsville, Brandel-Stephens & Co. 205-883-0445
Ariz Tempe, Gassner & Clark 602-968-9037
Cal Burlingame, Engrg. Rep. Co. 415-692-2581
Cal Los Angeles, Barnard & Assocs. 213-973-5050
Cal San Diego, Engrg. Rep. Co. 714-565-6366
Colo Englewood, Tech Sls. 303-761-9710
Fla Deerfield Beach, Brandel-Stephens & Co. 305-427-8558
Fla Orlando, Brandel-Stephens & Co. 305-425-3202
Ga Atlanta, Brandel-Stephens & Co. 404-261-7579
Ill Chicago, Memeco Sls. & Svc. 312-774-0919
Iowa Cedar Rapids, Gassner & Clark 319-393-5763
Kans Shawnee Mission, Tech. Sls. Assoc. 913-888-3330
La Harahan, Williams Equipment Co. 504-737-4082
Md Glen Burnie, New Era Sls. 301-768-6666
Mass Needham Heights, Northeast Reps. 617-449-3093
Minn Wayzata, Yukon Sls. Assocs. 612-473-3274
Mo Ferguson, Tech. Sls. Assocs. 314-725-5361
NJ Stirling, NBS Assocs. 201-464-8500
NY Fayetteville, H.C. Johnson Agencies 315-637-9383
NY Rochester, H.C. Johnson Agencies 716-482-3000
NY Williamsville, H.C. Johnson Agencies 716-632-7880
NC Charlotte, D.G.W., Inc. 704-334-7090
NC Winston Salem, D.G.W., Inc. 919-768-7166
Ohio North Olmsted, Advanced Tech. Assocs. 216-777-8010
Okla Tulsa, Telstar Instr. Corp. 918-628-1011
Ore Portland, Garland Affolter Engr. 503-223-7349
Pa Glenshaw, H.C. Johnson Agencies 412-961-0414
Pa Paoli, Stitzer Assocs. 215-644-5500
Tex Dallas, J. B. Guenther, Inc. 214-691-8500
Tex Houston, Instrumatics, Inc. 713-225-6626
Tex Houston, J.B. Guenther 713-468-0232
Wash Kirkland, Garland Affolter Engr. 206-822-2275

Local Distributors

Ariz Phoenix, Metermaster 602-243-411
Cal Los Angeles, E.I.L. Instrs. 213-685-7020
Cal Los Angeles, Metermaster 213-685-4340
Cal Palo Alto, Metermaster 415-968-0313
Cal San Diego, Metermaster 714-560-4841
Cal Santa Clara, Dynametron 408-246-6535
Colo Denver, Metermaster Instr. Corp. 303-722-5766
Conn Middletown, Mancib Co. 203-346-6646
Ill Bridgeview, E.I.L. Instrs. 312-430-2292
Ind Indianapolis, E.I.L. Instrs. 317-545-1373
Kans Wichita, Main Elctrns. 316-267-3581
La Harahan, Ind. Instr. Works 504-733-8355
Md Timonium, E.I.L. Instrs. 301-252-1260
Mass Burlington, Mancib Co. 617-272-9450
Mich Ferndale, Ram Meter 313-398-6767
Minn Minneapolis, Control Assemblies Co. 612-544-3364
NY Clarence, Trott Elctrns. 716-634-8500
NY Long Island City, Metermod Instr. Corp. 212-726-4850
Ohio Cleveland, Weschler Electric. 216-251-4606
Ohio Dayton, E.I.L. Instrs. 513-435-2134
Pa Philadelphia, Sunshine Scientific 215-673-5600
Pa Pittsburgh, Cam/Rpc Co. 412-782-3770
Pa Pittsburgh, E.I.L. Instrs. 412-731-5230
RI N. Kingston, E.I.L. Instrs. 401-885-1773
Tex Garland, Meter Master 214-271-5671
Tex Houston, Meters & Instr. 713-644-1631
Wash Seattle, Eicher Richards 206-523-7888

INTERNATIONAL LASER SYS., INC., Dept. EM, 3404 N. Orange Blossom Trail, Orlando, Fl. 32804, Tel: 305-295-4010, TWX: 810-850-0195; Empl.: 250

Local Sales Offices & Reps.

Ariz Scottsdale, Measurement Consits. 602-994-9519
Cal N. Hollywood, O'Halleran Assocs. 213-877-0173
Colo Boulder, Measurement Consits. 303-499-5294
DC Wash., Hench Assocs. 301-946-7822
Fla Orlando, McMahan Assocs. 305-645-0463
NJ Northvale, Interactive Radiation 201-767-1910
NM Albuquerque, Measurement Consits. 505-526-2491
Utah Murray, Measurement Consits. 801-268-3181

INTERNATIONAL MKTG & MFG., Dept. EM, Box 1413, El Cajon, Cal 92022

INTERNATIONAL MICROSYSTEMS, Dept. EM, 122 Hutton St., Gaithersburg, Md. 20760

INTERNATIONAL NICKEL CO., Huntington Alloy Prods. Div., Dept. EM, Huntington, W.Va. 25720

INTERNATIONAL POWER MACHINES CORP., Dept. EM, 3328 Executive Blvd., Box 724, Mesquite, Tex. 75149, Tel: 214-288-7501, Telex: 73-0992; Empl.: 104

Sales Manager: F. Cullum

Local Sales Offices & Reps.

Ala Birmingham, C.S. Phillips Co. 205-870-0640
Ariz Scottsdale, BFA Corp. 602-994-5400
Cal Emeryville, Ingalls & Assoc. 415-658-5622
Cal Emeryville, Ingalls & Assoc. 415-658-5622
Cal La Jolla, Wheelock Assoc. 714-454-3473
Cal Los Angeles, Int'l. Power Machines 714-752-0666
Cal Sierra Madre, Ontare Sls. Co., Inc. 213-359-1516
Colo Denver, BFA Corp. 303-837-1247
DC Washington, Compower 703-528-5393
Fla Maitland, Rowe Engrg. Sls., Inc. 305-834-2700
Fla St. Petersburg, Rowe Engrg. Sls., Inc. 813-522-6317
Ga Dunwoody, General Tech. Reps. Inc. 404-455-1319
Ill Schaumburg, Tech-Sys. 312-830-0060
Mass Concord, R.D.S. Assocs. 617-369-9327
Mich Brighton, Lowry & Assoc., Inc. 313-227-7067
Mich Royal Oak, Satullo Co. 313-549-3910
Minn Chanhassen, Professional Mktg. Svcs. 612-474-5939
Mo Kansas City, Cleaves-Bessmer-Marietti 816-353-6011
Mo St. Louis, Richter Assocs. 314-567-1829
NJ Upper Montclair, D. Cunningham 201-783-4647
NM Albuquerque, BFA Corp. 505-292-1212
NM Las Cruces, BFA Corp. 505-523-0543
NY New York, Hank Zebrowski 212-687-8838
NY Rochester, Ronco, Inc. 716-442-7900
NY Rochester, Ronco
NY Town of Tonawanda, Ronco, Inc. 716-873-0760
Ore Portland, Ingalls Engrg. Co. 503-232-7487
Ore Portland, Ingalls Engrg. 503-232-7487
Pa Fort Washington, Variable Electric Products Co. 215-927-4200
Pa Pittsburgh, Muller Harper, Inc. 412-931-6460
Tex Houston, L.P. Spencer & Assocs. 713-337-2751
Tex Richardson, Tech. Plan Inc. 214-690-1994
Utah Salt Lake City, BFA Corp. 801-466-6522
Wisc Milwaukee, Kirchmayer-Seidel Co. 414-462-3512

INT'L. PRODS. INC., Dept. EM, Box 405, Atchison, Kans. 66002, Tel: 913-EM 7-1934; Empl.: 3

Local Sales Offices & Reps.

Ariz Phoenix, Toward Engrg. Assocs. 602-955-3193
Cal Mountain View, Connolly & Co. 415-967-6988
Cal Van Nuys, C.H. Mitchell Co. 213-994-9466
Colo Greeley, Moss Elctrns. 303-353-1452
Fla Melbourne, REPCOM Inc. 305-254-1877
Mass Belmont, Elctrn. Comps. & Svc. 617-484-8680
Mich Jackson, Norwood Scroggs Co. 517-782-5211
NJ West Caldwell, Peterson-Rudnick Assocs. 201-CA6-4363
NY Rochester, Ossmann Comp. Sls. Corp. 716-442-3290
NC Charlotte, Power Engrg. Co. 704-537-8099
Ohio Cleveland, Brownie & Assocs. 216-795-7472
Ore Portland, J. E. Edstrom 503-775-8527
Tex Houston, M. R. Summers Assocs. 713-524-7800
Wash Seattle, W.J. Stulgis 206-AT2-7870

INTERNATIONAL RECTIFIER CORP., Semiconductor Div., Dept. EM, 233 Kansas St., El Segundo, Cal. 90245, Tel: 213-678-6281, TWX: 910-348-6291; Empl.: l200 .... p. 3866-3868

Local Sales Offices & Reps.

Ala Huntsville, Macro Mktg. Assocs. 205-883-9630
Alas Anchorage, H.J. Lang & Assoc. 907-279-5741
Ariz Phoenix, Shefler-Kahn Co. 602-257-9015
Cal El Segundo, Int'l. Rectifier 213-678-2181
Cal El Segundo, Varigon Assocs. 213-322-1120
Cal San Diego, Harvey King 714-566-5252
Cal San Francisco, Thomas-Hartman Assocs. 415-969-0660
Cal Santa Clara, Thomas-Hartman Assocs. 408-247-1252
Colo Denver, Parker-Webster 303-751-2600
Fla Ft. Lauderdale, International Rectifier 305-566-5885
Ill Des Plaines, Int'l. Rectifier 312-299-7181
Ind Greenwood, Valentine-Schillinger & Assoc. 317-888-2260
Ind South Bend, Valentine-Schillinger & Assoc. 219-291-6258
Iowa Cedar Rapids, Seltec Sls. Corp. 319-393-1114
Md Towson, International Rectifier 301-296-0086
Mass Lexington, Int'l. Rectifier 617-861-1820
Mich Livonia, Int'l. Rectifier 313-477-3131
Minn Edina, Int'l. Rectifier 612-831-6400
Mo Hazelwood, Int'l. Rectifier 314-895-3400
NJ Palisades Park, Int'l. Rectifier 201-943-4554
NM Albuquerque, Shefler-Kahn Co. 505-296-0749
NY Buffalo, R.W. Mitscher Co. 716-633-7970
NY New York, Int'l. Rectifier 212-695-5350
NC Charlotte, Int'l. Rectifier 704-372-9190
Ohio Cleveland, Int'l. Rectifier 216-261-2135
Ohio Kettering, Int'l. Rectifier 513-299-2635

Ore	Beaverton, Vantage Corp.	503-644-6111
Tenn	Shelbyville, R.W. Mitscher Co.	615-684-4544
Tex	Fort Worth, W. Pat Fralia Co.	817-640-9101
Tex	Houston, W. Pat Fralia Co.	713-772-1572
Utah	Salt Lake City, Parker-Webster	801-261-1058
Wash	Bellevue, Vantage Corp.	206-455-3460
Wisc	Brookfield, Int'l. Rectifier	414-784-2480

Local Distributors

Ala	Huntsville, Powell Elctrns.	205-539-2731
Ala	Huntsville, Hall-Mark Elctrns.	205-837-8700
Ariz	Phoenix, Kierulff Elctrns.	602-273-7331
Cal	Costa Mesa, Schweber Elctrns.	213-924-5594
Cal	Inglewood, Newark Elctrns.	213-678-0441
Cal	Los Angeles, RPS Elctrns.	213-725-0325
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Mountain View, Time NOR/Cal Elctrns.	415-965-8000
Cal	Mountain View, Abacus	415-961-1500
Cal	Oakland, Brill Elctrns.	415-834-5888
Cal	Palo Alto, Kierulff Elctrns.	415-968-6292
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	San Diego, Liberty Elctrns.	714-565-9171
Cal	San Diego, Intermark Elctrns.	714-279-5200
Cal	Santa Ana, Intermark Elctrns.	213-436-5275
Cal	Sunnyvale, Intermark Elctrns	408-738-1111
Cal	Torrance, Time Elctrns.-West	213-320-0880
Colo	Denver, Newark Elctrns.	303-SK7-3351
Colo	Denver, Kierulff Elctrns.	303-371-6500
Conn	Danbury, Schweber Elctrns.	203-792-3500
Conn	Hamden, Wilshire Elctrns.	203-281-1166
DC	Washington, Kierulff	301-948-0250
Fla	Ft. Lauderdale, Hall-Mark Elctrns.	305-971-9280
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Miami, Powell Elctrns.	305-592-3260
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Ga	Atlanta, Schweber Elctrns.	404-449-9170
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Chicago, Semiconductor Specialists	312-279-1000
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Elk Grove, Schweber Elctrns.	312-593-2740
Ill	Elk Grove Village, Hall-Mark Elctrns.	312-437-8800
Ill	Skokie, Bell Inds.	312-282-5400
Ind	Fort Wayne, Fort Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Kans	Lenexa, Hall-Mark Elctrns.	913-888-4747
Md	Baltimore, Hall-Mark Elctrns.	301-796-9300
Md	Gaithersburg, Kierulff Elctrns.	301-948-0250
Md	Rockville, Schweber Elctrns.	301-881-3300
Md	Rockville, Wilshire Elctrns.	301-340-7900
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Waltham, Schweber Elctrns.	617-890-8484
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mich	Troy, Schweber Elctrns.	313-583-9242
Minn	Eden Praire, Schweber Elctrns.	612-941-5280
Minn	Minneapolis, Hall-Mark Elctrns.	612-884-9056
Minn	Minneapolis, Stark Elctrns.	612-333-3361
Mo	Earth City, Hall-Mark Elctrns.	314-291-5350
Mo	Saint Louis, Olive Ind'l. Elctrns.	314-863-7800
NJ	Cinnaminson, Wilshire Elctrns.	609-786-8990
NJ	Clifton, Wilshire Elctrns./N.J.	201-340-1900
NJ	Somerset, Schweber Elctrns.	201-469-6008
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Farmingdale, Wilshire Elctrns.	516-293-5775
NY	Freeport, Milgray/N.Y.	516-546-6000
NY	Hauppauge, Hall-Mark Elctrns.	516-273-0030
NY	Johnson City, Wilshire Elctrns.	607-754-1570
NY	Rochester, Rochester Radio Supply	716-454-7800
NY	Rochester, Schweber Elctrns.	716-461-4000
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Cleveland, Arrow Elctrns.	216-464-2000
Ohio	Dayton, Esco Elctrns.	513-226-1133
Okla	Tulsa, T.I. Supply	918-582-8272
Okla	Tulsa, Hall-Mark Elctrns.	918-835-8458
Ore	Portland, United Radio Supply	503-233-7151
Pa	Erie, Mace Elctrns.	814-838-3511
Pa	Horsham, Schweber Elctrns.	215-441-0600
Pa	Huntington Valley, Hall-Mark Elctrns.	215-672-0920
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Pa	Pittsburgh, CAM/RPC Elect.	412-288-2600
Tex	Dallas, T.I. Supply	214-238-6971
Tex	Dallas, Schweber Elctrns.	214-661-5010
Tex	Dallas, Hall-Mark Elctrns.	214-231-5101
Tex	Houston, Schweber Elctrns.	713-784-3600
Tex	Houston, T.I. Supply	713-777-6011
Tex	Houston, Harrison Equip.	713-652-4700
Tex	Houston, Hall-Mark Elctrns.	713-781-6100
Wash	Seattle, Kierulff Elctrns.	206-763-1550
Wash	Seattle, Intermark Elctrns.	206-767-3160
WVa	Charleston, McJunkin Corp.	304-348-4930
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500
Wisc	West Allis, Hall-Mark Elctrns.	414-476-1270

INTERNATIONAL SENSOR SYSTEMS, INC., Dept. EM, Aurora Industrial Pk., Box 345, Aurora, Neb. 68818, Tel: 402-694-6111; Empl.: 45

Local Sales Offices & Reps.

Ariz	Scottsdale, Aztech Sls. Co.	602-994-5686
Cal	Los Angeles, Mission Mktg. Grp.	714-833-1802
Cal	Millbrae, Ashby Assocs. of N. Cal.	415-692-4442
Colo	Denver, R. W. Masterson Co.	303-771-1482
Ga	Smyrna, B. C. Elctrn. Sls.	404-436-5169
Ill	Des Plaines, Electro-Comp Sls.	312-297-1455
Kans	Overland Park, Electri-Rep	913-649-2168
Mass	Lynnfield, Grady & Assocs.	617-334-6633
NJ	Hohokus, D. J. Fisher Co.	201-652-0090
Ohio	Dayton, Ashby Assocs.	513-252-5627
Pa	Oreland, CMS Mktg.	215-885-5106
Tex	Dallas, Teledyne/Tac	214-387-4877
Tex	El Paso, Nokomis Consumer Prods.	915-778-2801
Wash	Tukwila, General Elctrns.	206-575-4030

™INTERNATIONAL SERVICEMASTER - tubes - International Comps Corp.

INTERNATIONAL WIRE PRODUCTS CO., Dept. EM, 500 W. Main St., Wyckoff, N.J. 07481

™INTEROHM - resistors - International Comps Corp.

™INTERPIN™ - I.C. free-standing contact - Interdyne Co., Adept Div.

™INTERROSPONDER - Tracking Radar Devices - Vega Precision Labs.

™INTERSHAKE - communication test equipment - Atlantic Research Corp.

INTERSIL, INC., Dept. EM, 10900 N. Tantau Ave., Cupertino, Cal. 95014, Tel: 408-996-5000, TWX: 910-338-0228; FSC No.: 32293; Empl.: 750

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Carson, Intersil Inc.	213-532-3544
Cal	Cupertino, Intersil, Inc.	408-984-2170
Cal	San Diego, Daniels & Doty Sls. Co.	714-560-6266
Colo	Denver, Parker Webster	303-751-2600
Fla	Casselberry, E.I.R. Inc.	305-830-9600
Fla	Ft. Lauderdale, Intersil	305-772-4122
Ill	Franklin Park, Dekotech, Inc.	312-455-5100
Ill	Hinsdale, Intersil Inc.	312-986-5303
Ind	Ft. Wayne, Delesa Sls.	219-483-9537
Ind	Indianpolis, Delesa Sls.	317-894-3778
Kans	Overland Park, Kebco	913-649-1051
Md	Glen Bernie, New Era Sls. Inc.	301-768-6666
Mass	Lexington, Intersil, Inc.	617-861-6220
Mich	Livonia, Giesting & Assoc.	313-348-9050
Minn	Minneapolis, Intersil, Inc.	612-925-1844
Mo	Maryland Heights, Kebco	314-576-4111
NJ	Cherry Hill, Barrett Assocs.	609-429-1551
NJ	Englewood Cliffs, Intersil, Inc.	201-567-5585
NM	Albuquerque, Shefler-Kahn Co.	505-265-7077
NY	Endicott, Intersil, Inc.	607-754-7406
NY	Syracuse, Nycom, Inc.	315-437-8343
Ohio	Chagrin Falls, Crest Component Sls.	
Ohio	Cincinnati, Giesting & Assoc.	513-851-7800
Ohio	Cleveland, Giesting & Assocs.	216-621-4240
Ohio	Dayton, Intersil, Inc.	513-278-4837
Ohio	Dayton, Giesting & Assocs.	513-293-4044
Ore	Beaverton, LD Elctrns.	503-649-8556
Tex	Dallas, Intersil Inc.	214-387-0539
Tex	Dallas, Southern State Mkt.	214-387-2489
Tex	Houston, Southern Sate Mkt.	713-665-0991
Utah	Salt Lake City, Parker Webster	801-261-1058
Wash	Woodenville, LD Elctrn.	206-485-7312

INTERSTATE ELECTRONICS, Dept. EM, Box 1117, Dept. 7000, Anaheim, Cal. 92803, Tel: 714-549-8282, TWX: 655443, 910-591-1197; Empl.: 1700; Minimum order: $R. L. Visser .... p. 2874,2875

Sales Manager: P. Brance; *Distributor Manager:* R. L. Visser

Local Sales Offices & Reps.

Ariz	Scottsdale, Barnhill III	602-947-7841
Cal	Costa Mesa, Meas. Assocs.	714-540-7160
Cal	Santa Clara, General Radio Co.	408-985-0662
Colo	Denver, Barnhill III	303-750-1222
Colo	Denver, Barnhill III	303-750-1222
Conn	Hamden, J & J Assoc.	203-624-7800
Ga	Atlanta, General Radio Co.	404-394-5380
Ill	Elk Grove Village, Loren Green Assoc.	312-593-0282
Ind	Indianapolis, Loren Green Assoc.	317-293-9827
Md	Silver Spring, Eastern Instrumentation	301-681-6500
Mass	Burlington, J & J Assocs.	617-272-2606
Minn	Minneapolis, Loren Green Assoc.	612-781-1661
NJ	Cedar Grove, KLS Assocs., Inc.	201-785-4450
NM	Albuquerque, Barnhill III	505-299-7658
NY	Syracuse, Labtronics, Inc.	315-454-9314
Ohio	Richmond Heights, Bradcor	216-692-0881
Pa	Melrose Park, R. Meyers Assoc.	215-224-1663
Tex	Austin, Barnhill II	512-444-2377
Tex	Houston, Barnhill II	713-688-9971
Tex	Richardson, Barnhill II	214-231-2573
Wash	Bellvue, Tasco	206-453-1414

INTERSWITCH, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010, Tel: 415-347-8217, TWX: 34-9373 910-374-2353; Empl.: 30; Minimum order: $D.R. Pue .... p. 4130-4134

Sales Manager: F. Nelson Mktg. Mgr.; *Distributor Manager:* D.R. Pue

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Stitzer-Dodd	602-944-2237
Ark	Little Rock, J.Y. Schoonmaker	501-375-2168
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Cal	San Diego, Daniels & Doty Sls. Co.	714-560-6260
Colo	Denver, W.J. Purdy Co.	303-777-1411
Conn	Meriden, P.R. Sturgeon Co.	203-237-1112
DC	Washington, S.K. MacDonald	202-265-3938
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Hinsdale, Hill-Gray	312-325-4810
Ind	Indianapolis, Sukup & Cox	317-253-5501
Iowa	Marion, Thomas & Modrcin Assocs.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assocs.	913-432-2131
Md	Baltimore, S.K. MacDonald	301-254-3380
Mass	Babson Park, P. Sturgeon Co.	617-237-3506
Mich	Ferndale, Hilltronics Inc.	313-398-5556
Minn	Minneapolis, HMR, Inc.	612-920-8200
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Hazelwood, Thomas & Modrcin Assocs.	314-895-4700
NJ	Bergenfield, H. Gray Assoc.	201-384-3643
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Syracuse, Mar-Com Assocs.	315-437-2843
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean Co.	919-781-6560
Ohio	Richfield, Bear Mktg.	216-659-3131
Okla	Tulsa, J.Y. Schoonmaker Co.	918-936-1423
Ore	Portland, Western Tech. Sls.	503-297-1711
Pa	Enon Valley, NEBCO Assoc.	216-457-2333
Pa	Philadelphia, S.K. MacDonald	215-545-1205
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, J. Schoonmaker	214-357-8481
Tex	Houston, J.Y. Schoonmaker	713-926-9510
Wash	Bellevue, Western Tech. Sls.	206-641-3900

Local Distributors

Ariz	Phoenix, Moltronics	602-272-7951
Cal	Los Angeles, Fisher/Brownell	213-532-2170
Cal	San Diego, Moltronics	714-278-5020
Cal	Santa Clara, Fisher/Brownell	408-244-6182
Cal	Santa Clara, Moltronics	408-244-7600
Cal	S. Gate, Moltronics	213-773-6521
Colo	Denver, Elctrn. Parts Co.	303-744-1992
Idaho	Pocatello, Kimball Elctrns.	208-232-2201
Ill	Broadview, L Comp-Chicago	312-865-7600
Mass	Lynn, Land Elctrn. Supply Co.	617-592-2220
Mich	Livonia, RS Elctrns.	313-525-1155
NJ	Bergenfield, Technical Elctrn.	201-384-3643
NJ	Camden, General Radio Supply Co.	609-964-8560
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Rochester, Summit Distrs.	716-334-8110
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Cincinnati, Hughes-Peters, Inc.	513-351-2000
Ohio	Columbus, Hughes-Peters, Inc.	14-294-5351
Okla	Tulsa, Oil Capitol Elctrns. Corp.	918-836-2541
Ore	Portland, Dunn Elctrns.	503-285-0214
Tex	Houston, Harrison Equip. Co.	713-652-4700
Utah	Salt Lake City, Calron Elect. Supply	801-487-7451
Wisc	Mequon, Taylor Electric Co.	414-241-4321

™INTERVOX - speakers - International Comps Corp.

™INTERZONE - polyimide insulated wire - Cerro Wire & Cable Co.

™INTER-8-WEAVE - shielded signal loads - Magnetic Shield Div.

™INTRACON - backpanels and connectors - Dynatech Corp.

™INTRASPOT - cctv accessories - Vicon Industries Inc.

™INTRI-CUT - chemical milling process - Chem Aero, Inc.

INTRONICS INC., Dept. EM, 57 Chapel St., Newton, Mass. 02158, Tel: 617-332-7350, TWX: 710-335-6835; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	Santa Ana, California Elctrn. Mktg.	714-835-2702
Cal	Sunnyvale, Amasco	408-733-8690
Conn	Newtown, Kanan Assocs.	203-426-8157
Ill	Elmhurst, Schuten Assocs.	312-833-0980
Md	Hyattsville, Eastern Comps.	301-577-2925
Mass	Reading, Kanan Assocs.	617-944-8484
Mich	St. Clair Shores, J. M. Thorpe Co.	313-779-6363
Minn	New Brighton, TWC Sls.	612-636-1770
Mo	St. Louis, Ensco-Rep., Inc.	314-567-3935
NJ	Fort Lee, Tecnimat	201-461-8686
NY	Buffalo, F. Lamb Co.	716-874-4900
Ohio	Wickliffe, Walter J. Brauer & Assocs.	216-943-0601
Pa	Berwyn, Tucker Assocs.	215-644-0142
Tex	Richardson, Scientific Sls. Co.	214-231-6541

™INVERTED-VEE - balun fed doublet antenna kit - Telrex Labs.

™INVERTER-RATED FERRAMICS - ferrites - Indiana General

™INVERTO-TRAN - ferrite inverter transformer series - Pulse Engrg., Inc.

™INVERTRON® - AC power sources - Elin Div.

INVINCIBLE GEAR CO., Dept. EM, 14938 Telegraph Rd., Detroit, Mich. 48239, Tel: 313-533-7524; Empl.: 25

™INVOLOID - internal rack generated - Invincible Gear Co.

IOMEC, Dept. EM, 3300 Scott Blvd., Santa Clara, Cal. 95050, Tel: 408-246-2950

™"ION-AIR" - ionizing vacuum brush - Static Inc.

™IONFLO - ion deflection measurement - Thermo Sys., Inc.

IONICS, INC., Electronics Div., Dept. EM, 65 Grove St., Watertown, Mass 02172, Tel: 617-926-2500; Empl.: 175

™IPAC - time sequencer - Instr. & Control Sys., Inc.

IPT CORP., Dept. EM, 2875 Northwestern Pkwy., Santa Clara, Cal. 95051, Tel: 408-985-1850, TWX: 910-338-0275; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, Topping Assoc.	602-994-9519
Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Cal	San Jose, M. S. Instrumentation	408-268-0299
Colo	Vail, Mile High Elctrns.	303-476-1149
Conn	West Hartford, Tekdata	203-525-7647
Fla	Fort Lauderdale, Semquip	305-772-3002
Ill	Elk Grove Village, L.F. Green & Assocs.	315-593-0282
Ind	Indianapolis, L.F. Green Assocs.	317-293-9827
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Md	Gaithersburg, Wright Co.	301-948-5151
Mass	Burlington, Tekdata	617-273-0198
Mich	Detroit, E.E.I. of Michigan	513-426-6071
Minn	Minneapolis, L.F. Green & Assocs.	612-781-1611
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Wayne, K & J Assocs.	201-694-3334
NY	E. Setauket, K & J Assocs.	516-751-8686

™IPT-400 SERIES - comp. test handler - IPT Corp.

™IPT-700 SERIES - comp. test handler - IPT Corp.

™IPT-800 SERIES - comp. test handler - IPT Corp.

IRCON INC., Dept. EM, 7555 N. Linder Ave, Skokie, Ill. 60076, Tel: 312-967-5151, Telex: 72-4412; Empl.: 60

Local Sales Offices & Reps.

Ala	Huntsville, Burnette Techno-Metrics	205-837-5860
Ariz	Scottsdale, J.T. Aldrich Co.	602-945-8598
Cal	Costa Mesa, Robinson Tech. Assoc.	714-557-1622
Cal	San Diego, R. Brainard Co.	714-274-1333
Cal	San Mateo, Ircon, Inc.	415-348-0122
Colo	Lakewood, Intermountain Instrs.	303-237-0444
La	New Orleans, Mid-South Sls.	504-822-3030
La	Shreveport, JDJ Sls.	318-865-2393
Mass	Framingham, J.M. Lancaster Co.	617-873-8893
Mass	Pittsfield, Ircon, Inc.	413-445-4016
Mich	Troy, George R. Peters Assocs.	313-362-1220
Minn	Minneapolis, Arjay Sls.	612-854-4972
NJ	Palisades Park, Scientific Devices-East	201-871-3916
NY	Rochester, Nickles Assocs.	716-586-4988
NC	Matthews, Datatech, Inc.	704-847-4464
Ohio	Cincinnati, Schlemmer Assoc.	513-522-8340
Ohio	Grafton, A. Risser Co.	216-458-5091
Okla	Tulsa, Olson Engrg. Co.	918-742-3720
Pa	Glenside, Elcom, Inc.	215-885-1715
Pa	Pittsburgh, Weiss Instrs.	412-371-3020
Tenn	Memphis, Combustion & Controls Co.	901-525-7402
Tex	Houston, JD Inds.	713-468-8087
Utah	Salt Lake City, Wiscomb Weidner Co.	801-328-3205
Va	Richmond, Commonwealth Controls Co.	804-358-5700
Wisc	Wauwatosa, T. R. Bickler Assocs.	414-453-3772

IRD MECHANALYSIS, INC., Dept. EM, 6150 Huntley Rd., Columbus, Ohio 43229, Tel: 614-885-5376, Telex: 24-5318; Empl.: 250

Local Sales Offices & Reps.

Cal	Lafayette	415-283-2065
Cal	Tustin	714-838-3446
Ga	Atlanta	404-237-4875
Ill	Schaumburg	312-843-0010
La	Baton Rouge	504-272-0355
Mich	Ypsilanti	313-483-2323
Mo	St. Louis	314-644-4691
NY	New York City	212-687-6754
NY	Williamsville	716-632-6699
Pa	Rosemont	215-477-0922
Pa	Verona	412-795-1606
Tex	Arlington	817-469-7583
Tex	Houston	713-921-2145

™IRIDITRON - gamma radiography machines - Automation Inds.

™IRISCORDER - Videopupillography - Hamamatsu TV Co., Ltd.

IRISH MAGNETIC RECORDING TAPE, Dept. EM, 270-78 Newtown Rd., Plainview, N.Y. 11803, Tel: 516-293-5582, Telex: 96-7880; Empl.: 17

Sales Manager: G. Krug

Local Sales Offices & Reps.

Ala	Birmingham, Maitland K. Smith	205-967-3080
Cal	San Francisco, Meyer & Ross	415-864-8880
Cal	Van Nuys, Mike Roth Sls. of Cal.	213-989-3738
Colo	Aurora, A-E-S	303-366-0208
Fla	Ft. Lauderdale, Sproch Sls.	305-587-3792
Fla	Sarasota, Sproch Sls.	813-924-7768
Ga	Marietta, Maitland K. Smith	404-971-2831
Ga	Tucker, Maitland K. Smith	404-938-7161
Ill	Skokie, Mike Bermann Sls.	312-675-3740
Ind	Indianapolis, C. Scheffler	317-253-6337
La	Metairie, Jack F. McKinney Sls. Co.	504-887-1723
Mich	Trenton, Rodco Sls.	313-676-5188
Minn	Maple Grove, R.C. Sls.	612-425-5543
Mo	Grand View, Moeller/Pickett Assoc.	816-765-1224
Neb	Omaha, Moeller/Pickett Assoc.	402-554-1942
NY	No. Bellmore, Keller & Assoc.	516-785-2826
NY	Tonawanda, M. Farber Assoc.	716-692-1620
NC	Charlotte, Maitland K. Smith, Inc.	704-372-1026
Okla	Tulsa, Jack F. McKinney Sls. Co.	918-742-6791
Pa	Willow Grove, R. Lewis Sls.	215-659-0704
Tex	Dallas, Jack F. McKinney Sls. Co.	214-631-9450
Wash	Bellevue, R. Merritt Co.	206-746-7337

Exp:	Plainview, N.Y., Morhan Exporting Corp.	516-293-5582

ISC MAGNETICS DIV., See Aeroflex Labs, Inc. Magnetic Prods Div.

ISKRA, See ISL Products Ltd. (ISKRA)

™IRONCLAD - battery plates - Exide Power Sys. Div.

™IRON GRIP, V-GRIP - shelving, racks, bins - Equipto

™ISLATROL - AC line filter - Control Concepts Corp.

ISL PRODUCTS LTD. (ISKRA), Dept. EM, 50 Werman Ct., Plainview, N.Y. 11803, Tel: 516-694-2686; Empl.: 25,000 .... p. 1256,1257,3694,3869

Sales Manager: J. Kawaller

Local Sales Offices & Reps.

Cal	Los Altos, Affiliated Inds. Corp.	415-964-1322
Cal	Santa Ana, Lew Brooks Co.	714-544-8900
Fla	Orlando, Publicover Assocs.	305-898-9361
Ill	Chicago, Minitron Inc.	312-774-6815
La	Kenner, Automation Supplies	504-721-3497
Md	Pikesville, Muncy Sls.	301-484-6376
Mass	Wollaston, RFC Assocs.	617-472-4234
Tex	Dallas, McReynolds Assocs.	214-422-2012

Local Distributors

Ill	Des Plaines, Edmar Elctrns. Co.	312-298-8580
NY	Bohemia, ADI Elctrns.	516-567-3555
Tex	Dallas, McReynolds Elctrn. Sls.	214-422-2012

™ISOBASE - accelerometer - Endevco

™ISOBOX - enclosure that isolates an accelerometer from changing ambient conditions. - Endevco

ISOCHEM RESINS CO., Dept. EM, 99 Cook St., Lincoln, R.I. 02865, Tel: 401-723-2100; Empl.: 26

™ISO-CURVE - R-T, curve-matched, interchangeable thermistors - Fenwal Elctrns.

™ISO-ELASTIC - temperature compensated alloy - Chatillon John & Sons

™ISOFILM - electronic capacitors - General Elec. Co.

™ISOFORMER - transformer - Elcor Prods. Neotec Elctrns. Inc.

™ISOGLAS - isocyanate-coated glass fabric - Natvar Corp.

™ISOLASTANE - isocyanate elastomer coated glass sleeving - Natvar Corp.

™ISO-LATCH - iso thermal latching valve - General Valve Corp.

™ISOLATIONIST - line isolation transformers - CEA

™ISOLENE - liquid cis 1,4 polyisoprene rubber polymer - Hardman Inc.

™ISO-LIT - opto isolators (couplers) - Litronix

™ISO-OP-AMP - solid state modular isolation operational amp. - Burr-Brown

™ISO-PAK - modular dc/dc converter power supplies - Stevens-Arnold, Inc.

™ISOPIL - plug-in isolator - Cir-Q-Tel, Inc.

™ISOPLEX - three-layer glass/polyester-resin combinations - Natvar Corp.

™ISOPLY - isolated power supply - Elcor Prods. Neotec Elctrns. Inc.

™ISOPODS - electronic packaging system (module) - Hughes Aircraft Co

™ISOPOLAR REFERENCE - ultrastable precision reference - Data Precision Corporation

™ISOREX - transformer - Elcor Prods. Neotec Elctrns. Inc.

™ISO-SEAL - temperature compensated scale - Chatillon John & Sons

™ISOTAB - plastic tab-mount thyristor - Hutson Industries

™ISOTERAGLAS - isocyanate elastomer coated dacron-glass fabric - Natvar Corp.

™ISOTHERM - thermistors - Victory Engrg. Corp.

™ISOTHERMAL - RF transistors - Motorola Semiconductor Prods.

™ISO-TIP - cordless rechargeable soldering iron - Wahl Clipper Corp.

ISOTRONICS, INC., Dept. EM, 12 Coffin Ave., New Bedford, Mass. 02746, Tel: 617-997-4575, TWX: 710 344 1961

Local Sales Offices & Reps.

Ala	Huntsville, Rep., Inc.	205-881-9270
Ariz	Scottsdale, E. J. Foley & Assocs.	602-945-2665
Cal	San Diego, Hadden Assocs.	714-565-9444
Cal	Sunnyvale, Isotronics	408-736-1064
Colo	Englewood, Marshall Sls.	303-770-6224
Fla	Longwood, Lenz Engrg.	305-831-9797
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Ft. Wayne, W. Bieberich	219-432-2537
Kans	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
Md	Silver Springs, Spectroscopy Sys.	301-949-8261
Minn	Minneapolis, Elctrn. Innovators	612-884-7471
NM	Albuquerque, Piper-Goyne	505-294-1436
NY	DeWitt, Tri-Tech Elctrns.	315-446-2881
Ohio	Dayton, Electro-Com	513-898-5140
Pa	Feasterville, Professional Svc. Assocs.	215-355-6244
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Bellevue, Quadra Sls.	206-454-4946

™ISOVAR - power supply automatic current to volatage crossover - Elcor Prods. Neotec Elctrns. Inc.

™ISOWATT - isolated VERSAWATT type - RCA Solid State Div.

ISRAEL AIRCRAFT INDUSTRIES INC., Dept. EM, 505 Park Ave., New York, N.Y. 10022, Tel: 212-752-8100

™I SUPPLY - constant current source - Calex Mfg. Co., Inc.

™ITECO - test equipment - Industrial Test Equip.

ITEK CORP. MEAS. SYS. DIV., Dept. EM, Christina St., Newton, Mass. 02161, Tel: 617-969-7300, TWX: 710-335-6783; Empl.: 100

Local Sales Offices & Reps.

Cal	Los Angeles, Measurement Sys. Div.	213-641-8251
Fla	Orlando, K.S. Chaney, Inc.	305-423-9465
Ill	Des Plaines, Marsland Assocs. Inc.	312-298-2620
Ind	Indianapolis, Marsland Assocs. Inc.	317-924-3568
Minn	Minneapolis, Marsland Assocs. Inc.	612-545-4481
Mo	Kansas City, Marsland Assocs.	816-966-8400
NJ	Union, Measurement Sys. Div.	201-964-3000

ITHACO

ITHACO, INC., Dept. EM, 735 W. Clinton St., Ithaca, N.Y. 14850, Tel: 607-272-7640, TWX: 510-255-9307; Empl.: 120 .... p. 1109,2741

Sales Manager: J. Hanson

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instr., Inc.	205-883-8660
Ariz	Tucson, G. Moore Assocs.	602-795-3176
Cal	Cupertino, T. Louis Snitzer Co.	408-257-8333
Cal	Del Mar, T. Louis Snitzer Co.	714-454-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Colo	Boulder, G. Moore Assocs.	303-494-3551
Conn	Easton, Jarrold Corp.	203-259-6900
Fla	Fort Lauderdale, W.A. Brown Instrs., Inc.	305-776-4800
Fla	Orlando, W.A. Brown Instrs., Inc.	305-425-5505
Ga	Atlanta, W.A. Brown Instrs., Inc.	404-939-1674
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
La	Mandeville, W.A. Brown Instrs., Inc.	504-626-9701
Md	Timonium, Scientific Devices-DC	301-252-8851
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Electrns.	314-569-1406
NJ	Englewood, Scientific Devices - East	201-871-3916
NM	Albuquerque, Grady Moore Assocs.	505-292-3322
NY	Dewitt, DB Assocs.	315-446-0220
NC	Durham, W. A. Brown Instrs.	919-682-2383
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Ore	Beaverton, Scientific Devices - N.W.	503-643-6878
SC	Columbia, W.A. Brown Instr. Inc.	803-798-3297
Tenn	Oak Ridge, W.A. Brown Instr.	615-482-5761
Tex	Richardson, Moore Assoc.	214-690-4929
Va	Springfield, Scientific Devices-D.C., Inc.	703-451-6500
Va	Virginia Beach, Scientific Devices-D.C.	804-461-8133
Wash	Bellevue, Scientific Devices-N.W.	206-454-0900
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

ITI ELECTRONICS, INC., Dept. EM, 369 Lexington Ave., Clifton, N.J. 07015, Tel: 201-546-3900; Empl.: 50

ITOH ELECTRONICS, INC. C., Dept. EM, 280 Park Ave., New York, N.Y. 10017, Tel: 212-682-0420; Empl.: 100 .... p. 1665

Sales Manager: F.I. Makstein, VP Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, Technical Assocs.	205-881-8494
Ariz	Scottsdale, BFA Corp.	602-946-4215
Cal	Marina Del Rey, Delta Mutual Sls.	213-823-0643
Colo	Denver, BFA Corp.	303-744-3301
Fla	Orlando, Technical Assocs.	305-894-7531
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Iowa	Cedar Rapids, Tech. Reps.	319-363-2489
Kans	Olathe, Tech. Reps.	913-782-1177
La	Shreveport, IBL Engrg. & Sls.	
Mass	Chelmsford, S & S elctrns.	617-256-8731
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	Hopkins, Grayden & Flemmer	612-941-1120
Mo	Hazelwood, Technical Reps.	314-731-5200
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Mamaroneck, Cane Tech. Sls.	914-698-4411
Ohio	Cleveland, Components Inc.	216-842-2737
Okla	Oklahoma City, IBL Engrg. & Sls.	405-843-9434
Pa	Norristown, Data Engrg. Co.	215-279-8146
SC	Spartanburg, Technical Assocs.	803-579-2904
Tex	Dallas, IBL Engrg. & Sls.	214-363-2921
Utah	Salt Lake City, BFA Corp.	801-466-6522
Wash	Seattle, R. S. Drake Assocs.	206-763-2755

™ITRON - screen printer for circuit boards - Chemcut Corp.

ITT AUTOMOTIVE, Dept. EM, 21301 Civic Center Dr., Southfield, Mich. 48075

ITT
CANNON ELECTRIC

ITT CANNON ELECTRIC, Dept. EM, 666 E. Dyer Rd., Santa Ana, Cal. 92702, Tel: 714-557-4700, TWX: 910-595-1131; FSC No.: 71468; Empl.: 1500; Minimum order: $D. Conca p. 1849-2026, Inside Back Cover

Sales Manager: J. Clark; *Distributor Manager:* D. Conca

Local Sales Offices & Reps.

Ala	Huntsville, Brandel-Stephens & Co.	205-883-0445
Ariz	Phoenix, ITT Cannon Elec.	602-273-0755
Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	San Marcos, ITT Cannon Elec.	714-743-4554
Colo	Boulder, Component Prod. Sls. Co.	303-494-5100
Conn	Tolland, ITT Cannon Elec.	203-872-2119
Fla	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Ga	Atlanta, Brandel-Stephens & Co.	404-261-7579
Ill	Des Plaines, ITT Cannon Elec.	312-297-3150
Ind	Fort Wayne, ITT Cannon Elec.	219-749-1535
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
Mass	Wakefield, ITT Cannon Elec.	617-246-2510
Mich	Mount Clements, ITT Cannon Elec.	313-468-6611
Minn	Minneapolis, ITT Cannon Elec.	612-854-1973
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
NJ	Pennsauken, ITT Cannon Elect.	716-385-4940
NY	Elmsford, ITT Cannon Elec.	914-592-2505
Ohio	Kettering, ITT Cannon Elec.	513-434-8181
Ohio	Solon, ITT Cannon Elec.	216-248-8800
Pa	Feasterville, Professional Svc. Assocs.	215-355-6244
Pa	Fort Washington, ITT Cannon Elec.	215-646-2801
Tex	Dallas, ITT Cannon Elec.	214-661-0302
Tex	Houston, ITT Cannon Elec.	713-665-2996
Va	Roanoke, ITT Cannon Elec.	703-362-0749
Va	Vienna, ITT Cannon Elect.	703-560-1569
Wash	Bellevue, ITT Cannon Elec.	206-454-3903
Exp:	Cal., Santa Ana, ITT Cannon Elec.	714-557-4700

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns. Corp.	205-837-8700
Ariz	Phoenix, Liberty Elctrns./Ariz.	602-257-1272
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Los Angeles, Kierulff Elctrns.	213-725-0325
Cal	Mountain View, Time Elctrns.-Nor/Cal	415-965-8000
Cal	San Diego, Liberty Elctrns./San Diego	714-565-9171
Cal	San Diego, Cramer Elctrns.	714-565-1881
Cal	Sun Valley, Richey Elctrns.	213-875-2862, 768-3800
Cal	Torrance, Time Elctrns. West	213-320-0880
Colo	Denver, Cramer Elctrns.	303-758-2100
Conn	New Haven, A.S.I./Connector Corp. of America	203-624-0127
Fla	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
Ga	Atlanta, Electro Air Corp.	404-351-3545
Ill	Elk Grove Village, Hall-Mark Elctrns. Corp.	312-437-8808
Ill	Elmhurst, Genesis Elctrns.	312-530-2272
Ill	Mt. Prospect, Cramer Elctrns.	312-593-8230
Ind	South Bend, Genesis Elctrns.	219-287-2911
Kans	Lenexa, Hall-Mark Elctrns. Corp.	913-888-4747
Md	Rockville, Schweber Elctrns.	301-881-3300
Mass	Newton, Cramer Elctrns.	617-964-4000
Mass	Waltham, Schweber Elctrns.	617-890-8484
Mass	Woburn, Time Elctrns./New England	617-935-8080
Minn	Bloomington, Hall-Mark Elctrns. Corp.	612-884-9056
Minn	Minneapolis, Cramer/Bonn	612-835-7811
Mo	Earth City, Hall-Mark Elctrns. Corp.	314-291-5350
NM	Albuquerque, Cramer Elctrns.	505-265-5767
NY	Buffalo, Summit Distributors	716-884-3450
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
NY	Plainview, A.S.I./Progress Elctrns. Co.	516-433-1700
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Winston-Salem, Cramer Elctrns.	919-725-8711
Ohio	Cleveland, Genesis Elctrns.	216-447-0012
Okla	Tulsa, Hall-Mark Elctrns. Corp.	918-835-8458
Pa	Clifton Heights, Time/Mid-Atlantic	215-622-2500
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-5101
Tex	Houston, Harrison Equip. Co.	713-652-4700
Tex	Houston, Hall-Mark Elctrns. Corp.	713-781-6100
Utah	Salt Lake City, Cramer Elctrns.	801-487-4131
Wash	Seattle, Kierulff Elctrns.	206-575-4420
Wisc	West Allis, Hall-Mark Elctrns. Corp.	414-476-1270
For:	Can., Calgary, Alb., Cam Gard Supply Ltd.	403-287-0520
For:	Can., Don Mills, Ont., Saynor Elctrns., Ltd.	416-445-2340
For:	Can., Edmonton, Alb., Cam Gard Supply Ltd.	403-424-7114
For:	Can., Halifax, N.S., Cam Gard Supply Ltd.	902-454-8581

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For:	Can., Montreal, Que., Payette Radio Ltd.	514-878-4771
For:	Can., Ottawa, Ont., Wackid Radio T.V. Labs Ltd.	613-728-1821
For:	Can., Regina, Saskatchewan, Cam Gard Supply Ltd.	306-525-1317
For:	Can., Saskatoon, Saskatchewan, Cam Gard Supply Ltd.	306-652-6424
For:	Can., Scarborough, Ont., Carsten Elctrns. Ltd.	416-751-2371
For:	Can., Vancouver, B.C., L.A. Varah Ltd.	604-873-3211
For:	Can., Whitby, Ont., ITT Cannon Elec.	416-668-8881
For:	Can., Willowdale, Ont., Electrosonic Ind'l. Sls. Ltd.	416-494-1666
For:	Can., Winnipeg, Man., CAM Gard Supply Ltd.	204-786-8401

ITT
CANNON/ETC
Terminal Products

ITT CANNON/ETC TERMINAL PRODUCTS, Dept. EM, 29000 Aurora Rd., Solon, Ohio 44139, Tel: 216-248-8800, 800-362-9122, TWX: 98-5597 810-427-9404; FSC No.: 98410; 7K539; Empl.: 275; Minimum order: $T. Cornhoff .... p. 2027-2038

Sales Manager: Tom Kupke; *Distributor Manager:* T. Cornhoff

Local Sales Offices & Reps.

Ariz	Phoenix, ITT Cannon Elec.	602-273-0755
Ariz	Scottsdale, T. Goodreau & Assoc.	602-994-9909
Cal	Anaheim, LoCal Sls.	714-956-1560
Cal	San Carlos, LoDan, Inc.	415-592-4600
Cal	Santa Ana, ETC Terminal Products	714-557-4700
Conn	West Simsbury, Anchor Engrg.	203-658-6261
Fla	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Ill	Arlington Heights, Lo Dan, Inc.	312-956-6700
Ill	Wood Dale, May Assoc.	312-595-3444
Ind	Ft. Wayne, J & B Engrg.	219-483-2813
Iowa	Cedar Rapids, Jerry Vrbik Co.	319-366-8733
Ky	Lexington, T. Lengal & Assoc.	606-233-7140
La	Kenner, Automation Supplies	504-721-3497
Md	Baltimore, J.A. Maguire Co.	301-377-0223
Mass	Newton Upper Falls, Anchor Engrg.	617-964-6205
Mass	Wakefield, ITT Cannon Elec.	617-246-2510
Mich	Southfield, L.H. Dickelman	313-353-8210
Minn	Edina, Grayden & Flemmer	612-941-1120
Minn	Minneapolis, ITT Cannon Elec.	612-854-1973
Mo	Kansas City, F.P. Williams Co.	816-471-1617
NJ	Pennsauken, J.A. Maguire Co.	609-665-5136
NJ	Wayne, GT Assoc.	201-694-6040
NY	Rochester, L.G. Marchese Assoc.	716-544-4300
NC	Charlotte, JWL Assoc.	704-364-3177
Ohio	Cleveland, Components	216-243-9200
Ohio	Dayton, Components	513-721-2997
Ohio	Kettering, ITT Cannon Elec.	513-434-8181
Okla	Bixby, EBR, Inc.	918-369-5688
Pa	Delmont, T.F. Laslo & Assoc.	412-468-5045
Pa	Fort Washington, ETC Terminal Products	215-646-2801
Tex	Dallas, EBR, Inc.	214-942-2711
Tex	Dallas, ITT Cannon Elec.	214-661-0302
Tex	Houston, EBR, Inc.	713-223-0618
Utah	Salt Lake City, Sage Sls.	801-531-0531
Wash	Seattle, F. Jackson Assoc.	206-523-6300
Wisc	Milwaukee, DeVos & Assocs.	414-272-0356
Exp:	Santa Ana, Cal., ETC Terminal Products	714-557-4700

Local Distributors

Ala	Birmingham, EIS	205-252-9046
Cal	Belmont, Advance Electrical Sls.	415-592-4550
Cal	Irvine, Acacia Sls.	714-549-0954
Cal	Sunnyvale, Acacia Sls.	408-745-7200
Cal	Sun Valley, Richey Elctrns.	213-875-2862
Colo	Denver, Industrial Elctrns.	303-771-2636
Colo	Lakewood, Acacia Sls.	303-232-2882
Conn	Hartford, Eckhart & Finard	203-246-7411
Fla	Casselberry, American Fastener/Comps.	305-831-6630
Fla	Dania, Arco Distrs., Inc.	305-925-1999
Fla	Orlando, EIS	305-855-7100
Ga	Atlanta, EIS	404-355-1651
Ill	Arlington Heights, Lo Dan Elctrns.	312-956-6700
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Iowa	Cedar Rapids, J. Vrbik Co.	319-366-8733
Kans	Kansas City, C. Tennant Elctrns.	913-287-2100
La	Harahan, MG Elctrns.	504-733-0070
La	Shreveport, Industrial Elctrns.	318-222-9459
Md	Baltimore, ASI Elctrns.	301-265-5100
Mass	Newton Upper Falls, In-Stock Prods. Co.	617-964-6200
Mich	Livonia, Pioneer/Mich.	313-525-1800
Minn	Minneapolis, Bergquist Co.	612-835-2322
Miss	Jackson, Ellington Elctrn. Supply	601-355-0561
NJ	Fairfield, Industrial Elctrns.	201-575-8420
NJ	Jersey City, Cuny & Guerber	201-653-0222
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NM	Albuquerque, Industrial Elctrns.	505-266-8721
NY	Bohemia, Car-Lac Elctrn. Industrial Sls.	516-567-4200
NY	Long Island City, Hardware Specialty Co.	212-361-9393
NY	Mount Vernon, Qar Industrial Elctrn. Sls.	914-699-2224
NY	Rochester, Rochester Radio	716-454-7800
NY	Rome, Rome Elctrns.	315-337-5400
NC	Charlotte, EIS	704-392-2306
NC	Charlotte, J.O. King, Inc.	704-527-0054
NC	Greensboro, Allied Sys.	919-299-2294
Ohio	Cincinnati, EIS	513-771-4073
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Mentor, Mentor Elect. Co.	216-946-8950
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
Tenn	Memphis, EIS	901-947-4176
Tex	Arlington, A.J. Elctrns.	817-461-9473
Tex	Dallas, National Precision Prods.	214-357-3921
Tex	Houston, Texas Electrical Wholesalers	713-688-9651
Tex	Houston, Kent Elctrns.	713-780-7770
Tex	Richardson, Altair Co.	214-231-5166
Va	Richmond, EIS	804-649-9221
Wash	Seattle, Interface Elctrns.	206-285-3500
Wash	Seattle, Frank Jackson Assoc.	206-523-6300
Wisc	Mequon, Lake-View Elctrns. Corp.	414-377-8250
For:	Can., Burlington, Ont., Neeco Inds., Ltd.	416-632-1403
For:	Can., Montreal, Que., Prelco Elctrns.	514-389-8051

ITT Components - Capacitors

ITT COMPS. CAPACITORS, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845, Tel: 617-688-1881, TWX: 947-130 710-342-0718 .... p. 1258-1261,3554-3559

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	San Diego, Littlefield & Smith	714-455-0055
Cal	Santa Ana, Rical Assocs.	714-557-6543
Cal	Sunnyvale, Trident Assoc.	408-734-5900
Colo	Englewood, Dynatek	303-773-2830
Conn	New Haven, Datcom, Inc.	203-288-7005
Fla	Ft. Lauderdale, Beacon	305-971-7320
Fla	Maitland, Beacon/Maitland	305-647-3498
Ga	Atlanta, Beacon, Inc.	404-351-3654
Ill	Elk Grove Village, Oasis Sls. Corp.	312-640-1850
Ind	Bloomington, Giesting & Assoc.	816-336-0391
Iowa	Cedar Rapids, Penzner-Mankus	319-362-9177
Kans	Overland Park, Penzner-Mankus	913-381-0004
Kans	Wichita, Penzner-Mankus	316-264-2662
Md	Randallstown, Beacon - North	301-922-1248
Mass	Waltham, Datcom	617-891-4600
Mich	Livonia, Giesting & Assoc.	313-477-6060
Minn	Edina, Mel Foster Tech. Sls. Inc.	612-835-2252
Mo	Maryland Hgts., Penzner-Mankus	314-569-1220
NJ	Pennsauken, J.A. Maguire & Co.	215-627-1670
NJ	Teaneck, R.T. Reid Assocs.	201-692-0200
NM	Albuquerque, Tri-Tronix	505-265-0172
NY	Buffalo, L.D. Allen	716-837-1955
NY	Fairport, L.D. Allen	716-377-3530
NY	North Syracuse, L.D. Allen	315-458-7470
NY	Pleasant Valley, Leonard D. Allen	914-635-3363
NY	Snyder, Leonard D. Allen	716-839-3300
NC	Charlotte, Beacon, Inc.	704-525-7412
Ohio	Cincinnati, Giesting Assocs.	513-851-7800
Ohio	Cleveland, Giesting & Assoc.	216-621-4240
Ohio	Dayton, Giesting & Assoc.	513-293-4044
Ohio	Galion, Giesting & Assoc.	419-468-3737
Ore	Beaverton, Vantage Corp.	503-646-3466
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Austin, Microsystems Marketing	512-472-2492
Tex	Dallas, Microsystems Mktg.	214-238-7157
Tex	Houston, Microsystems Mktg.	713-783-2900
Utah	Salt Lake City, Rapier-Richards	801-486-3415
Va	Falls Church, Beacon-North	703-534-7200
Va	Lynchburg, Beacon-North	804-237-4740
Wash	Bellevue, Vantage Corp.	206-455-3460

Local Distributors

Ariz	Phoenix, R.V. Weatherford	602-272-7144
Ariz	Phoenix, Cramer	602-267-7321
Cal	Glendale, R.V. Weatherford	213-849-3451
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	Mountainview, Capacitor Sls.	415-964-8880
Cal	San Diego, Shelley-Neumann Inc.	714-453-7133
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	Santa Monica, Frank-Shelley	213-871-0930
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Cal	Woodland Hills, Jaco Elctrns.	213-887-6400
Colo	Denver, Cramer/Denver	303-758-2100
Colo	Englewood, R.V. Weatherford	303-761-5432
Conn	North Haven, Cramer Elec.	203-239-5641
Fla	Hollywood, Cramer Elec.	305-929-8181
Fla	Orlando, Cramer Elec.	305-894-1511
Ga	Norcroff, Cramer/EW Atlanta	404-448-9050
Ill	Des Plaines, Edmar Elec.	312-298-8580
Ill	Elmhurst, Semiconductor Spec.	312-279-1000
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Ill	Skokie, Esco Elec.	312-675-6450
Ind	Indianapolis, Semiconductor Spec.	317-243-8271
Iowa	Cedar Rapids, Deeco Elec.	319-365-7551
Kans	Wichita, Radio Supply Co.	316-267-5216
Md	Gaithersburg, Cramer/EW Wash.	301-948-0110
Mass	Newton, Impact	617-964-7740
Mass	Newton, Greenshaw	617-969-8900
Mass	Newton, Cramer Elec.	617-969-7700
Mich	Farmington, Semiconductor Spec.	313-478-2700
Mich	Livonia, Reptron/Mich.	313-525-2700
Minn	Edina, Cramer/Bonn	612-835-7811
Minn	Edina, Cassidy Elec.	612-835-7744
Minn	Minneapolis, Semiconductor Spec.	612-845-8841
Mo	Kansas City, Walters Radio Supply	
Mo	St. Louis, Olive Ind. Elec.	314-863-7800
NJ	Cherry Hill, Cramer/Pa.	609-424-5993
NJ	Moonachie, Cramer/N.J.	201-935-5600
NJ	Mt. Laurel, I.P.C. Diplomat	609-234-8080
NJ	Totowa, Diplomat IPC Corp.	201-785-1830
NM	Albuquerque, International Elect.	505-265-6453
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Hauppauge, Cramer/Sys.	516-231-5682
NY	Hauppauge, Cramer/L.I.	516-231-5600
NY	Hauppauge, Jaco Elec.	516-273-5500
NY	Rochester, Cramer/Rochester	716-275-0300
NC	Winston-Salem, Cramer/EW Winston-Salem	919-725-8711
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Columbus, Reptron/Ohio	614-443-0231
Ohio	Dayton, Randko Elec.	513-429-2920
Ohio	Dayton, Nasco	513-253-8843
Pa	Pittsburgh, Semiconductor Spec.	412-781-8120
Tex	Austin, Quality Comps.	512-458-4181
Tex	Dallas, Cramer Elec.	214-661-9300
Tex	Dallas, Quality Comps.	214-887-4949
Tex	Houston, Quality Comps.	713-789-9320
Utah	Salt Lake City, Diplomat Alta Elec.	801-486-7227
Wash	Seattle, Zepher Elec.	206-575-0922
Wash	Tukwila, Cramer Seattle	206-575-0907
Wisc	Mequan, Taylor Elec.	414-241-4321
Wisc	Milwaukee, Semiconductor Specialists	414-257-1330

ITT Components - Relays

ITT COMPS. RELAYS, Dept. EM, 1551 Osgood St., N. Andover, Mass. 01845, Tel: 617-688-1881, TWX: 947-130 710-342-0718

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Angeles, M. A. Stolaroff Co.	213-295-7781
Cal	San Diego, Littlefield & Smith Assocs.	714-455-0055
Cal	Sunnyvale, Trident Assocs.	408-734-5900
Colo	Englewood, Dynateck, Inc.	303-773-2830
Conn	Milford, Conti-Younger Assocs.	203-929-3294
Fla	Ft. Lauderdale, Beacon	305-971-7320

Fla	Maitland, Beacon	305-647-3498
Ga	Atlanta, Beacon	404-351-3654
Ill	Elk Gròve Village, Oasis Sls. Corp.	312-640-1850
Ind	Bloomington, Giesting & Assocs.	812-336-0391
Md	Baltimore, J. A. Maguire & Co.	301-377-0223
Md	Randallston, J.A. Beacon	301-922-1248
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Mich	Livonia, Giesting & Assocs.	313-477-6060
NJ	Dunellen, J.A. Maguire & Co.	201-752-8480
NJ	Pennsauken, J.A. Maguire & Co.	215-627-1670
NJ	Teaneck, R.T. Reid Assocs.	201-692-0200
NM	Albuquerque, Tri-Tronix	505-265-8400
NY	Buffalo, L.D. Allen, Inc.	716-837-1955
NY	Fairport, L.D. Allen, Inc.	716-377-3530
NY	North Syracuse, L.D. Allen, Inc.	315-458-7470
NY	Pleasant Valley, L.D. Allen, Inc.	914-635-3363
NC	Charlotte, Beacon	704-525-7412
Ohio	Cincinnati, Giesting & Assocs.	513-931-0812
Ohio	Dayton, Giesting & Assocs.	513-293-4044
Ohio	Galion, Giesting & Assocs.	419-468-3737
Ore	Beaverton, Vantage Corp.	503-646-3466
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Dallas, Mycrosystmes Mktg.	214-238-7157
Tex	Houston, Mycrosystems Mktg.	713-783-2900
Utah	Salt Lake City, Rapier & Richards Mktg.	801-486-3415
Va	Falls Church, Beacon	703-534-7200
Va	Lynchburg, Beacon	804-237-4740
Wash	Bellevue, Vantage Corp.	206-455-3460

Local Distributors

Ariz	Phoenix, Cramer/Ariz.	602-267-7321
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Cal	Woodland Hills, Rampart Comps.	213-887-6400
Colo	Denver, Cramer/Denver	303-758-2100
Conn	North Haven, Cramer/Conn.	203-239-5641
Fla	Hollywood, Cramer/Hollywood	305-923-8181
Fla	Orlando, Cramer/Orlando	305-894-1511
Ga	Norcroff, Cramer/Atlanta	404-448-9050
Ill	Mount Prospect, Cramer/Chicago	312-593-8230
Iowa	Cedar Rapids, Deeco Elctrns.	319-365-7551
Md	Gaithersburg, Cramer/Wash.	301-948-0110
Mass	Newton, Impact Elctrns.	617-964-7740
Mass	Newton, Cramer Elctrns.	617-964-4000
Mich	Livonia, Reptron/Mich. Elec. Inc.	313-525-2700
Minn	Edina, Cramer/Minn.	612-835-7811
NJ	Cherry Hill, Cramer/Pa.	609-424-5993
NJ	Little Falls, Diplomat/IPC Corp.	201-785-1830
NJ	Moonachie, Cramer/N.J.	201-935-5600
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Hauppage, Rampart Comps.	516-273-1111
NY	Hauppauge, Cramer/LI	516-231-5600
NY	Rochester, Cramer/Roch	716-275-0300
NY	Rome, Rome Elctrns.	315-337-5400
NC	Gastonia, United Electrical Sply.	704-867-4401
NC	Winston-Salem, Cramer Winston-Salem	919-725-8711
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Dayton, NASCO	513-253-8843
Tex	Austin, Quality Comp. Aust.	512-458-4181
Tex	Dallas, Cramer Texas	214-661-9300
Tex	Dallas, Quality Comps.	214-387-4949
Tex	El Paso, Intern'l Elctrns.	915-778-9761
Tex	Houston, Quality Comp.	713-789-9320
Wash	Seattle, Zepher Elctrns.	206-575-0922
Wash	Tukwila, Cramer/Seattle	206-575-0907

ITT ELECTRON TUBE, Dept. EM, Box 100, Easton, Pa. 18042, Tel: 215-252-7331, Telex: 847494; FSC No.: 20948; Empl.: 550

Local Sales Offices & Reps.

Cal	Los Angeles	213-786-0756
Ill	Chicago	312-782-4359
Md	Baltimore	301-467-5733
Mass	Waltham	617-893-5579
NJ	Nutley	201-284-2762

ITT GENERAL CONTROLS, Dept. EM, 801 Allen Ave., Glendale, Cal. 91201, Tel: 213-842-6131, TWX: 910-498-2225; Empl.: 1892

Local Sales Offices & Reps.

Cal	Burlingame	415-342-8391
Ill	Des Plaines	312-299-2237
Kans	Shawnee Mission	913-631-1188
Mich	Birmingham	313-642-1847
NJ	Teaneck	201-836-2444
NC	Charlotte	704-334-6511
Ohio	Dayton	513-298-8771
Ohio	Mayfield Hgts.	216-442-6697
Ohio	Troy	513-335-3583
Okla	Tulsa	918-627-9145
Pa	Fairview Village	215-631-1230
RI	Warwick	401-739-6336
Tenn	Hendersonville	615-824-6838
Tex	Dallas	214-358-2555
Tex	Houston	713-666-4261

ITT GILFILLAN DIV. OF ITT, Dept. EM, 7821 Orion Ave., Van Nuys, Calif. 91409, Tel: 213-988-2600, TWX: 910-495-1787; FSC No.: 24930; Empl.: 1500

ITT HARPER, Dept. EM, 8200 Lehigh Ave., Morton Grove, ILL. 60053, Tel: 312-966-6000, TWX: 910-223-3625; Empl.: 875

Sales Manager: H.K. Swan

Local Sales Offices & Reps.

Ala	Birmingham	205-942-0516
Cal	Monterey Park	213-268-1345
Cal	San Leandro	415-357-2655
Colo	Denver	303-433-7397
Fla	Hialeah	305-887-8151
Ga	Atlanta	404-696-1242
Ill	Elk Grove Village	312-595-7220
La	New Orleans	504-246-0000
Md	Baltimore	301-866-1600
Mass	Winchester	617-729-8700
Mich	Troy	313-585-7510
Mo	St. louis	314-781-9906
NY	Castleton-on-Hudson	518-732-7711
NY	Mt. Vernon	914-664-7555
NC	Charlotte	704-392-8308
Ohio	Cincinnati	513-733-4411
Ohio	Cleveland	216-781-4411
Pa	Philadelphia	215-928-1144
Pa	Pittsburgh	412-242-8901
Tex	Houston	713-688-9725
Wash	Seattle	206-783-9200
Wisc	Milwaukee	414-272-3565

ITT-HIGBIE MFG. CO., Dept. EM, Wagner Rd., Rochester, Mich. 48063, Tel: 313-651-5300, TWX: 810-232-1592; Empl.: 1500

Local Sales Offices & Reps.

Cal	Los Angeles, E.J. Brookes Co.	213-723-8431
Ill	Lombard, A.G. Pinder	312-627-4678
NJ	Rumson, Phillips Tube Co.	201-842-5168
Tenn	Hermitage, Cap-I-Tol Sls.	615-254-8295
Tex	Dallas, W.P. Schoenfield	214-352-6200

ITT INDUSTRIAL & AUTOMATION SYSTEMS, Dept. EM, 41225 Plymouth Rd., Plymouth, Mich. 48170, Tel: 313-453-9200, Telex: 23-5816; Empl.: 200

Sales Manager: M. Wylic

Local Sales Offices & Reps.

Ala	Birmingham, E. Pickett Co.	205-879-4726
Ariz	Phoenix, Bews & Wallace Co.	602-267-1171
Cal	Alhambra, H.E. Wales & Assocs.	213-576-0953
Cal	San Francisco, Process Equip. Co.	415-397-1496
Colo	Englewood, G.M. Wallace & Assocs.	303-771-5960
Conn	Bloomfield, Wetzel Tool Corp.	203-242-8535
Fla	Orlando, B. Woodruff, Inc.	305-424-2771
Ga	Atlanta, Crigler Engrg.	404-351-3733
Ill	Chicago, Mills-Winfield Engrg. Sls.	312-648-1373
Ky	Louisville, Miller-Harrington Ind'l. Sls.	502-893-5859
Mass	Boston, Harris & Underhill	617-426-3544
Mich	Farmington, Garrett-Burgess	313-477-7440
Minn	Minneapolis, W.H. Schulz Co.	612-544-0133
Minn	Minneapolis, Mills-Winfield	612-920-1199
Mo	St. Louis, Process & Chemical Equip. Co.	314-771-4741
Mo	St. Louis, Ind'l. Process Equip.	314-534-3100
NJ	Mountain Lakes, Dearie & Farrell Co.	201-334-4848
NY	Rochester, Brook-Anco Corp.	716-271-4100
NC	Charlotte, F. D. Hurka Co.	704-366-0209
NC	High Point, Hersey-Thomas	919-882-1132
Ohio	Cuyahoga Falls, W.T. Kendall Co.	216-928-3636
Ohio	Dayton, Production Engrg. Sls.	513-278-4741
Okla	Oklahoma City, Southwestern Gage & Sls.	405-787-1734
Ore	Portland, N. Rupp Co.	503-228-4311
Pa	Bethel Park, D.A. Roberts & Sons	412-561-6404
Pa	Newtown Squares, Holco, Inc.	215-353-2060
SC	Greenville, Hersey-Thomas	803-232-5261
Tenn	Memphis, M-P Sls. Co.	901-726-1866
Tex	Dallas, Southwestern Gage & Sls.	214-358-5151
Tex	Houston, Southwestern Gage & Sls.	713-523-4606
Utah	Salt Lake City, Pelton Equip. Co.	801-484-3522
Va	Alexandria, Chemical Etching Equip. & Supply	703-971-2646
Wash	Bellevue, H.F. Soderling	206-885-2535
Wisc	Elm Grove, Mills-Winfield Engrg. Sls.	414-782-5372

ITT JENNINGS, INSTRUS. & SYSTEMS, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, Box 1990, San Jose, Cal. 95122, Tel: 408-292-4025, TWX: 910-338-0159; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Brandel-Stephens	205-883-0445
Ariz	Scottsdale, BFA Corp.	602-946-4215
Cal	Newport Beach, West, Inc.	714-540-9040
Colo	Denver, BFA Corp.	303-344-3800
Fla	Deerfield Beach, Brandel-Stephens	315-427-8558
Fla	Orlando, Brandel-Stephens	315-425-3202
Ga	Atlanta, Brandel-Stephens	404-261-7579
Ill	Chicago, Elctrn. Instr. Assocs.	312-271-3774
Ind	Indianapolis, Electronic Instrument Assocs.	317-257-7231
Md	Rockville, Marktron	301-762-6210
Mass	Haverhill, ABC Elctrn. Sls.	617-373-9832
Mich	Troy, G. R. Peters Assoc.	313-362-1220
Mo	St. Louis, Scherrer Inst.	314-644-5362
NJ	Tenafly, ABC Elctrn. Sls.	210-568-2354
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Syracuse, Nycom	315-437-8343
NY	Williston Park, ABC Elctrn. Sls.	516-747-6610
NC	Greensboro, Brandel-Stephens	919-274-6952
Ohio	Dayton, Whelan Corp.	513-434-7551
Pa	Huntingdon Valley, ABC Elctrn. Sls.	215-947-6960
Tex	Houston, P.J. Scanlon	214-231-4661
Tex	Richardson, P.J. Scanlon	Enterprise 2838
Utah	Salt Lake City, BFA Corp.	801-466-6522
Va	Charlottesville, Marktron	301-762-6210
Wash	Bellevue, Conrard-Carlson	206-455-1336

ITT JENNINGS, Monrovia Plant, Dept. EM, 1960 Walker Ave., Monrovia, Cal. 91016, Tel: 213-359-8281, TWX: 910-585-1830; Empl.: 160

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Board & Assocs.	602-994-9388
Cal	Mountain View, Nor-Cal	415-961-8121
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Colo	Denver, Components Sls.	303-750-2254
Conn	Brookfield, H. Geiling	203-775-4541
Fla	W. Palm Beach, J-F Sls.	305-833-2803
Ill	Northbrook, Raines & Brin	312-498-0890
Ind	Indianapolis, Technical Representative	317-849-6454
Mass	Waltham, Technical Sls.	617-890-1102
Mich	Ferndale, Shalco Co.	313-547-4771
Minn	St. Paul, R. G. Ragon Inc.	612-488-0201
NJ	Clifton, A. Clarfield	212-757-6454
NJ	Tenafly, ABC Elctrn. Sls.	201-568-2354
NM	Albuquerque, Cleveland Entpr.	505-345-2481
NY	Syracuse, Nycom	315-437-8343
Ohio	Dayton, Midwest Mktg.	513-433-2511
Tex	Richardson, Campion Sls. Co.	214-238-8145

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Cal	Los Angeles, Western Electromotive Sls.	213-820-3777
Cal	Orange, Newport Ind.	714-540-2283
Cal	San Francisco, Cap Sls.	415-964-8880

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Local Sales Offices & Reps.

Ala	Huntsville, Brandel-Stephens	205-883-0445
Ariz	Scottsdale, BFA Corp.	602-946-4215
Cal	San Jose, Silicon Valley Sls.	408-997-1493
Cal	Van Nuys, R.F. Specialists	213-785-0503
Colo	Denver, BFA Corp.	303-837-1247
Fla	Deerfield Beach, Brandel-Stephens	315-427-8558
Fla	Orlando, Brandel-Stephens	315-425-3202
Ga	Atlanta, Brandel-Stephens	404-261-7579
Ill	Chicago, Berndt Assocs.	312-283-0713
Ind	Carmel, Berndt Assoc.	317-844-0114
Iowa	Cedar Rapids, Reid Assoc.	319-362-6302
Kans	Shawnee Mission, Lowell-Kangas & Assoc.	913-631-3515
Md	Rockville, Marktron, Inc.	301-762-6210
Md	Timonium, Marktron, Inc.	301-252-7111
Mass	Haverhill, L. K. Harman Assoc.	617-373-1313
Mo	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NJ	Tenafly, ABC Elctrns. Sls.	201-568-2354
NM	Albuquerque, BFA Corp.	505-292-1212

NM	Las Cruces, BFA Corp.	505-523-0601
NY	Syracuse, Nycom Inc.	315-437-8343
NY	Williston Pk., ABC Elctrn. Sls.	516-747-6610
NC	Greensboro, Brandel-Stephens	919-274-6952
Ohio	Dayton, Whelan Corp.	513-434-7551
Pa	Huntingdon Valley, Omega Elctrns.	215-947-4135
Pa	Huntington Valley, ABC Elctrn. Sls.	215-947-6960
Tex	Houston, P. J. Scanlon Co.	Enterprise 2838
Tex	Richardson, P.J. Scanlon	214-231-4661
Utah	Salt Lake City, BFA Corp.	801-466-6522
Va	Charlottesville, Marktron	301-762-6210
Wisc	Brookfield, Berndt Assoc.	414-786-6950

ITT MACKAY MARINE, Dept. EM, 2912 Wake Forest Rd., Raleigh, N.C. 27611, Tel: 919-828-4441, Telex: 57-9451; Empl.: 525

Sales Manager: E. A. Engebretson

Local Sales Offices & Reps.

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Local Sales Offices & Reps.

Ala	Madison, South Eastern Assoc.	205-722-9616
Ariz	Phoenix, H.A. Moore Sls. Co.	602-274-4558
Ariz	Scottsdale, DeAngelo, Rothman & Cheever, Inc.	602-948-2240
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Cal	San Diego, De Angelo, Rothman & Co.	714-560-5707
Colo	Denver, AES, Inc.	303-777-8733
Fla	Longwood, L. Haas Co.	305-831-1276
Fla	No. Miami, L. Haas	305-945-6544
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Mo	St. Louis, NEVCO	314-843-7406
NJ	Cedar Grove, Tobias	201-239-8585
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Pa	Philadelphia, D.S. Linz	215-379-0734
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Tex	Dallas, Techno Assocs.	214-357-9213
Wash	Seattle, R.K. Squibb	206-632-2450

ITT SEMICONDUCTOR, Dept. EM, 3301 Electronics Way, West Palm Beach, Fla. 33407, Tel: 305-842-2411, TWX: 510-952-7605; Empl.: 1350

Local Sales Offices & Reps.

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Cal	Palo Alto, ITT Semiconductors	415-961-5265
Cal	San Diego, JTL Assocs.	714-277-8044
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Denver, Checkmate Sls.	303-771-4920
Fla	Palm Beach Gardens, Trainor Sls.	305-622-1383
Fla	West Palm Beach, ITT Semiconductors	305-842-2411
Ill	Chicago, ITT Semiconductors	312-693-7070
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Iowa	Cedar Rapids, S & O Sls. Co.	319-393-1845
Md	Baltimore, Coulbourn-DeGreif, Inc.	301-247-4646
Mass	Lexington, ITT Semiconductors	617-861-0880
Mich	Farmington, ITT Semiconductors	313-477-6060
Mich	Livonia, Rep-Tron	313-261-7446
Minn	Minneapolis, ITT Semiconductors	612-920-2943
Mo	Grandview, Beneke & McCaul, Inc.	816-765-2998
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NY	Jericho, ITT Semiconductors	516-938-1191
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ITT, Semiconductor Div., Dept. EM, 74 Commerce Way, Woburn, Mass. 01801, Tel: 617-935-7910, TWX: 710-342-0764; Empl.: 1600; Minimum order: $J. Abbott

Sales Manager: W. Riner; *Distributor Manager:* J. Abbott

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Cal	Palo Alto, ITT Semiconductors	415-961-5265
Cal	San Diego, Littlefield & Smith Assocs.	714-277-8044
Cal	San Diego, Littlefield & Smith Assocs.	714-455-0055
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Colo	Englewood, Checkmate Sls.	303-773-0666
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Ga	Tucker, ITT Semiconductors	404-939-6715
Ill	Elk Grove Village, Sieger Assocs.	312-956-0963
Ill	Schaumburg, ITT Semiconductors	312-884-0990
Iowa	Cedar Rapids, S & O Sls. Co.	319-393-1845
Md	Baltimore, Coulborn-DeGreif	301-247-4646
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Minn	Minneapolis, Nortec Sls.	612-835-7414
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NJ	Cherry Hill, J.N. Barrett Assocs.	609-429-1551
NM	Albuquerque, Cleveland Entprs.	505-266-5594
NY	Huntington, Caravan Sls.	516-692-2839
NY	Liverpool, ITT Semiconductors	315-451-5980
NY	Rochester, L-Mar Assocs.	716-328-5240
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Ohio	Cincinnati, Giesting Assocs.	513-931-0812
Pa	Wayne, ITT Semiconductors	215-688-6990
Tex	Dallas, ITT Semiconductors	214-243-7851
Tex	Dallas, West Assocs.	214-661-9400
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ITT THERMOTECH, Div. Int'l. Telephone & Telegraph Corp., Dept. EM, 1203 S. 5th St., Hopkins, Minn. 55343, Tel: 612-938-7671, Telex: 29-0414; Empl.: 368 p. 2670,2671

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Ariz	Phoenix, Toward Engrg. Assoc., Inc.	602-955-3193
Cal	Glendale, Secana Co.	213-240-7570
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Mass	Newton Upper Falls, Anchor Engrg.	617-964-6205
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Mich	Farmington, L. George	313-474-1505
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Mo	St. Louis, E. Monnig	314-991-2512
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NY	Pittsford, P. B. Schumacher	716-586-8161
NC	Charlotte, Spartan Assoc.	704-523-8419
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Ala	Huntsville, Electro-Mech Sls. Engrg. Co.	205-883-9624
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Cal	Menlo Park, McKnight Co.	415-325-2844
Fla	Orlando, Perrott Assocs.	305-275-1132
Ga	Atlanta, Electro-Mech Sls. Engrg.	404-449-6337
Ill	Chicago, Cortron Div., I.T.W.	312-282-4040
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Md	Randallstown, Beacon	301-922-1248
Mass	Burlington, Cortron Div., I.T.W.	617-272-5646
Minn	Minneapolis, Comstrand Inc.	612-571-0000
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
Neb	Lincoln, Marketing Assocs.	402-464-5244
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NY	East Syracuse, Fountain, Young & Co.	315-437-7733
NY	Massapequa, J.F. Coughlin Assocs.	516-799-7743
NC	Raleigh, Electro-Mech Sls. Engrg.	919-782-7586
Ohio	Dayton, Rockford Controls Ohio	513-898-5452
Tenn	Nashville, Electro-Mech Sls. Engrg.	615-256-2516
Tex	Dallas, Microsystems Mktg.	214-238-7157
Va	Falls Church, Beacon	703-534-7200
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Ⓣⓜ IVACON - ac line conditioner - Deltec Corp.

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Cal	San Diego, Basic Sys. Corp.	714-279-9641
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Mich	Farmington, Anderson Elctrns.	313-476-9161
NJ	Fairfield, KLS Assocs.	201-227-2900
NY	New York; KLS Assocs.	212-233-4849
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Ohio	Dayton, Instrumentation Sys.	513-294-2838
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Va	Richmond, Powell-Pendergraph Inc.	804-264-2341

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IVO INDUSTRIES, Dept. EM, 1109 Green Grove Rd., Neptune, N.J. 07753, Tel: 201-922-3600, Telex: 132-414 .... p. 2393

Sales Manager: J.D. Tannar

Local Sales Offices & Reps.

Cal	Mountainview, J. W. Wilhoit, Inc.	415-961-3660
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Kans	Wichita, Parker & Foster, Inc.	
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NJ	West Caldwell, Grim, Siegel Assocs.	201-575-9300
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NC	Greensboro, Ron Ingle Assocs.	919-273-4042
Ohio	Cleveland, Imaginative Tech.	216-826-3400
Ohio	Dayton, IM Tech, Inc.	513-278-6507
Ore	Portland, Syscom	503-644-2505
Pa	Newton Square, Holdworth & Co.	215-356-8550
Tex	Dallas, Glidden Electro Equip. Co.	214-341-0610
Tex	Houston, Glidden Electro Equip. Co.	713-681-1415
Wisc	Waukesha, Craighead & Assocs.	414-542-2868

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Ill	Arlington Heights, Martec Assocs.	312-965-8090
Kans	Overland Park, De-Mar Assocs.	913-381-6810
Mich	Detroit, E & E Engrg.	313-371-2000
Minn	St: Paul, Power/Mation Div.	612-645-0781
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NY	Rochester, Trott Elctrns.	716-473-8010
Ohio	Toledo, Toledo Indl. Repair, Inc.	419-382-2261
Ore	Portland, Portland Electric & Plumbing Co.	503-226-2531
Pa	Wilkinsburg, Fuller Instrs.	412-241-6789
Tex	Dallas, Dallas Instrs.	214-341-2990
Wisc	Waukesha, Power/Mation Div.	

IWATA ELECTRIC CO., LTD., Dept. EM, 1-16 Chome Soto-Kanda, Chiyoda-ku Tokyo, Japan, Tel: 03-253-2363, Telex: J 24481; Empl.: 70; Minimum order: $T. Suzuki

Sales Manager: Y. Masaki; *Distributor Manager:* T. Suzuki

Local Sales Offices & Reps.

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Ⓣ IZUKAR - lenses - Cosmicar Lens Div.

Ⓣ I² - ion implantation - American Microsystems, Inc.

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Sales Manager: K.F. Swenson

J-B-T INSTRS., INC., Dept. EM, Box 1818, New Haven, Conn. 06508, Tel: 203-772-2220; Empl.: 300

Local Sales Offices & Reps.

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Cal	La Mesa, J. Berman Co.	714-583-6457
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Conn	Wallingford, Adams-McGregor, Inc.	203-269-5816
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Fla	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9593
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Ill	Oak Park, G. Petitt Co.	312-369-8940
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NY	Rochester, J. G. Welch Assocs.	716-244-1100
NY	Syracuse, H.R. Murray, Inc.	315-446-5555
NC	Raleigh, Millar Elctrns., Inc.	919-787-9564
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Tex	Dallas, Lund & Co.	214-358-4335
Wash	Seattle, J.J. Backer Co.	206-285-1300

J-B-T- SWITCHES, A CUTLER HAMMER CO., Dept. EM, Box 1904, New Haven, Conn. 06509, Tel: 203-772-2220; Empl.: 160

Local Sales Offices & Reps.

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Fla	Tampa, Cutler-Hammer	813-839-5493
Ga	Atlanta, Cutler-Hammer	404-939-3023
Ill	Broadview, Cutler-Hammer	312-547-7980
Ind	Fort Wayne, W.W. Bieberich	219-432-2537
Iowa	W. Des Moines, T.L. Dowell & Assoc.	515-225-1620
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Mass	Scituate, Adams-McGregor	617-545-2213
Mich	Southfield, Cutler-Hammer	313-353-3834
Minn	Minneapolis, Cutler-Hammer	612-831-3560
Mo	Shrewsbury, T.L. Dowell & Assoc.	314-647-7067
NJ	Cedar Grove, D.F. Tobias & Co.	201-239-8585
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Pa	Pittsburgh, Dolfuss-Root & Co.	412-561-4125
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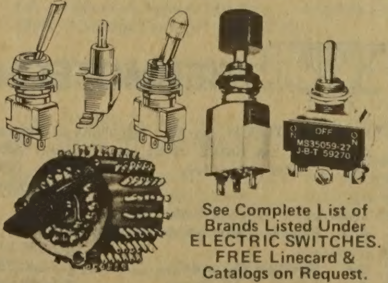

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Ariz	Phoenix, Kay Entprs.	602-242-6787
Cal	Mountain View, Shaw-Tech, Inc.	
Ill	Westchester, W.G. Brouillette	312-345-6500

JAESIC INDUSTRIES CO., Dept. EM, 29830 Beck, Wixom, Mich. 48096, Tel: 313-624-6411; Empl.: 18

Local Sales Offices & Reps.

Fla	Hollywood, R. L. Tomecek Co.	305-752-0226
Fla	Stuart, G. McMaken	305-287-0360
Ill	Lombard, A. Bolin	312-627-6802
Ind	Indianpolis, Ellinger Sls.	317-251-2757
Mich	Bloomfield, Encoe Mktg.	313-642-0203
Mich	Detroit, Professional Med. Dist.	313-624-6413

Ⓣ JAICO - relays & blade switches - Jaidinger Mfg. Co., Inc.

JAIDINGER MFG. CO., INC., Dept. EM, 1921 W. Hubbard St., Chicago, Ill. 60622, Tel: 312-421-1090; Empl.: 35

Ⓣ JAK-SWITCH - jack adapter switch - Chicago Switch, Inc.

JAMESBURY CORP., Dept. EM, 640 Lincoln St., Worcester, Mass. 01605, Tel: 617-852-0200, TWX: 710-340-1268; Empl.: 800

Local Sales Offices & Reps.

Ala	Pleasant Grove, Jamesbury Corp.	205-787-1429
Cal	Mill Valley, Jamesbury Corp.	415-982-0606
Cal	Westlake Village, Jamesbury Corp.	213-264-7508
Fla	Jacksonville, Jamesbury Corp.	904-768-0411
Ill	Prestbury, Jamesbury Corp.	312-858-1060
La	Baton Rouge, Jamesbury Corp.	504-344-1933
Mich	Milford, Jamesbury Corp.	313-547-5070
Mo	Kansas City, Jamesbury Corp.	816-531-2700
NY	New York, Jamesbury Corp.	212-964-8852
NY	Pittsford, Jamesbury Corp.	716-671-8173
NC	Charlotte, Jamesbury Corp.	704-376-6393
Ohio	Chagrin Falls, Jamesbury Corp.	216-543-4202
Ohio	Dayton, Jamesbury Corp.	513-579-0847
Pa	Newtown Square, Jamesbury Corp.	215-353-4670
Pa	Pittsburgh, Jamesbury Corp.	412-341-3338
Tex	Farmers Branch, Jamesbury Corp.	214-243-6109
Tex	Houston, Jamesbury Corp.	713-622-1671
Wash	Mercer Island, Jamesbury Corp.	206-682-6997
Exp:	Tenn., Murfreesboro, Jamesbury Corp.	615-256-0643

JAN HARDWARE MFG. CO., Dept. EM, 47-27 36th St., Long Island City, N.Y. 11101, Tel: 212-361-0800; FSC No.: 99813; Empl.: 60 p. 2534-2549

Local Sales Offices & Reps.

Ga	Avondale Estates, Candor Co.	404-458-6713
Haw	Honolulu, Aloha Assoc.	808-922-3810
Ill	Chicago, Croydon Elect.	312-237-4343
Ind	Huntington, Croydon Elect.	219-422-2311
Md	Woodbine, Naudain Assocs. Southern	301-442-2270
Mass	Brookline, Harman Assocs.	617-232-6687
Mo	Crestwood, Nevco	314-843-7406
Mo	Kansas City, Nevco	816-421-1751
NJ	Bergenfield, H. Gray Assoc.	201-384-3643
NC	Raleigh, Candor Co.	919-876-4999
Ohio	Cleveland, Goory Sls.	216-777-2011
Pa	Mount Laurel, Naudain Assoc.	215-564-3194
SC	Myrtle Beach, Candor Co.	803-448-8361
Tenn	Chattanooga, Candor Co.	615-894-7454
Tex	Dallas, Loss & Stewart Assoc.	214-747-0081
Va	Lynchburg, Candor Co.	804-846-6579
Exp:	Can., Scarborough, Ont., Banke Elctrns., Ltd.	416-291-7529

JANCO CORP., Dept. EM, Box 3038-Glenoaks Sta., Burbank, Cal. 91504, Tel: 213-845-7473, TWX: 910-498-2701; FSC No.: 91812; Empl.: 150 p. 4138,4139

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne	602-946-4437
Ark	Dallas, M. Kruvand Co.	214-827-8043
Cal	Menlo Park, McKnight Co.	415-325-2844
Colo	Arvada, Piper-Goyne Inc.	303-420-4646
Conn	Glastonbury, Barton-Caron Assocs.	203-633-0417
Fla	Orlando, MacKay, Smith & Assocs.	305-277-1513

Ga	Atlanta, N.D. Russell	404-255-2918
Ill	Chicago, Engineered Sls. Co.	312-867-8434
Kans	Wichita, T-Bird Tech. Sls. & Svc.	316-684-2941
Md	Silver Spring, H.R. Sieber Co.	301-589-9110
Mass	Auburndale, Barton-Caron Assocs.	617-332-0342
Minn	Minneapolis, Electro-Serv Co.	612-827-2907
Mo	St. Louis, T-Bird Sls. & Svc.	314-567-6488
NJ	Cherry Hill, Quality Comps. Co.	609-428-6266
NY	Albertson, C.F. Ward	516-742-5561
NC	Charlotte, MacKay, Smith & Assoc.	704-527-0240
Ohio	Cleveland, Comps., Inc.	216-842-2737
Pa	Pittsburgh, Components	412-833-9380
Tex	Dallas, Mark Kruvand Co.	214-827-8043
Wash	Seattle, Norwest Co.	206-282-3707

™JANETTE - Speed Reducers, Gearmotors - Eastern Air Devices Motor Div.

JANITROL AERO DIV., Midland Ross Corp., Dept. EM, 4200 Surface Rd., Columbus, Ohio 43228, Tel: 614-276-3561, TWX: 810-482-1622; FSC No.: 89513; Empl.: 420

Sales Manager: R.W. Schilling

Local Sales Offices & Reps.

Cal	Torrance	213-530-0890
Kans	Wichita	316-685-5324
Tex	Fort Worth	817-926-3386

™JANSET - knobs - Jan Hardware Mfg. Co.

™JANUS - security - Poly-Scientific

JAPANESE PRODS. CORP., Dept. EM, 7 Westchester Plaza, Elmsford, N.Y. 10523, Tel: 914-592-8880, Telex: 13-1581; Empl.: 6 p. 3085-3087

Local Sales Offices & Reps.

Fla	Orlando, D. Lang & Assoc.	305-339-9696
Ga	Atlanta, Hilco	404-469-8638
Ill	Chicago, Technical Reps Inc	312-882-1414
Md	Baltimore, R. L. Wilkinson Inc.	301-377-7800
Mass	Boston, Forbes Engrg	617-744-1693
Mich	Novi, A.P. Assoc.	313-476-2300
NJ	Cherry Hill, S Auerbach	609-983-7862
NY	Syosset, Motion Control Sls	516-921-5656
Ohio	Dayton, Technical Assoc Inc	513-878-2484
Pa	Philadelphia, S Auerbach	609-983-7862
Tex	Dallas, P.J. Scanlon Co.	214-231-4661
Tex	Houston, P.J. Scanlon Co.	713-781-9036
Exp:	Elmsford, NY, Scott-Thompson Corp.	914-592-3515

Local Distributors

Cal	Mountain View, Abacus Elctrns	415-961-1500
Cal	Santa Monica, Davidson Assoc	213-829-1731
Ill	Schaumburg, Servo Comp	312-882-4865
NY	New York, B&B Motor & Control Corp.	212-966-5777
Ohio	Cleveland, Pioneer Standard	216-587-3600
Tex	Fort Worth, Allied Elec. Corp.	817-336-5401

™JAQUET - Speed Indicators - Sticht Co., Inc. Herman H.

™JARECKI - hydro mechanical presses - Taylor-Winfield Corp.

JAVELIN DIV., Apollo Lasers, Inc., Dept. EM, 6357 Arizonia Circle, Los Angeles, Cal. 90045, Tel: 213-641-4490, Telex: 69-8204; Empl.: 48

Sales Manager: S. Raia

Local Sales Offices & Reps.

Cal	Los Angeles, Javelin	213-641-4490
Ill	Naperville, All-Media Sls. Co.	312-420-0429
Ind	Indianapolis, Sur-Up & Cox	317-253-5501
Mass	Waban, ICI, Inc.	617-969-9881
Minn	Minneapolis, HMR Inc.	612-920-8200
NY	Buffalo, Waxman Currant Sls.	716-873-0442
NY	Flushing, Bettan Sls.	212-591-7600
NY	Pittsford, Waxman Currant Sls.	716-586-8112
NC	Raleigh, Applied Video Concepts	919-781-1241
Ohio	Cincinnati, United Transifier	513-793-3426
Pa	Bala-Cynwyd, M. Friedman Assoc.	215-839-3450
Tex	Houston, Sound Ideas Assocs.	713-686-4838
Va	Anandale, Javelin Electrns.	703-978-7558
Wash	Bellevue, R. Merritt Co.	206-746-7337
Wisc	Sussex, All-Media Sls. Co.	414-246-6130

JAVEX ELCTRNS., Dept. EM, 9509 Oak Glen Rd., Cherry Valley, Cal. 92223, Tel: 714-845-3986; Empl.: 60

JAY-EL PRODS., Dept. EM, 1859 W. 169th St., Gardena, Calif. 90247, Tel: 213-321-3260, TWX: 910-346-7633; FSC No.: 08719; Empl.: 100

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Gardena, Jay-El Prods., Inc.	213-323-7130
Cal	Santa Clara, Nova Tronix, Representative	408-243-9530
Mass	Chelmsford, North East Components	603-668-1372
NY	Plainview, Jay-El Direct Sls.	516-931-6195
Pa	Lafayette Hill, R. Tschopp (Direct Sls.)	215-825-3666
Tex	Dallas, Allied Comp.	214-238-0408
Wash	Seattle, Norwest Co.	206-AT 2-3707

JB ELCTRN, TRANSFORMERS, INC., Dept. EM, 2300 W. Armitage Ave., Chicago, Ill 60647, Tel: 312-342-0080, TWX: 910-221-1283; FSC No.: 11700; Empl.: 150

Local Sales Offices & Reps.

Ala	Huntsville, JHU Assoc.	205-536-7455
Cal	Los Alimitos, Westaironics, Inc.	213-431-1101
Cal	Marina Del Rey, Westaironics, Inc.	213-821-7958
Cal	San Diego, Earle Assoc.	714-278-5441
Colo	Littleton, Lange Sls.	303-795-3600
Fla	Hollywood, AP Assocs.	305-987-6720
Ill	Barrington, Janus Inc.	312-381-4479
Ind	Carmel, SAI Mktg. Corp.	317-844-7916
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Mass	Woburn, Belmac Corp.	617-935-6810
Mich	Brighton, SAI Mktg. Corp.	313-227-1786
Mich	Grand Rapids, SAI Mktg. Corp.	616-942-2504
NY	Great Neck, F. Tylinski Co.	516-466-9070
Ohio	Cincinnati, SAI Mktg. Corp.	513-761-5432
Ohio	Dayton, SAI Mktg. Corp.	513-277-8911
Pa	Huntingdon Valley, Knowles Assoc.	215-947-5641
Wisc	Milwaukee, JM Sls. Co.	414-546-0040

J.D.N. ELECTRONICS INC., Dept. EM, Box 156, 239 Morristown Rd., Gillette, N.J. 07933, Tel: 201-647-2400; Empl.: 8

Local Sales Offices & Reps.

Ala	Huntsville, EMA Inc.	205-837-6061
Fla	Port Richey, H. R. Delaney Sls.	813-842-9176
Ill	Chicago, Croydon Elctrns.	312-237-4343
NY	Port Washington, P. Du Aaron Assoc.	516-883-0600
Wash	Seattle, Walt Spaulding Co.	206-282-9173

JEFFERSON ELEC., Div. Litton Inds., Dept. EM, 840 S. 25th Ave., Bellwood, Ill. 60104, Tel: 312-626-7700, Telex: 72-8408; Empl.: 600

Local Sales Offices & Reps.

Ariz	Scottsdale, J. Bennan Sls. Co.	602-945-2394
Ark	Little Rock, Southland Sls. Inc.	501-753-4013
Cal	Los Angeles, J.G. Pomeroy Co.	213-263-9381
Cal	San Francisco, Black & Egbert	415-282-0840
Colo	Denver, E-O Sls. Co.	303-744-7081
Fla	Brandon, Swanson & Co.	813-685-4864
Ga	Atlanta, Powell-McLaughlin	404-875-0755
Haw	Honolulu, Atlas Elec. Co. Inc.	808-531-2717
Ill	Westchester, EMC, Electrical Mktg. Corp.	312-681-1180
Ind	Indianapolis, C. Warblee & Assoc.	317-632-1465
Kans	Kansas City, D. Hatfield Sls. Co.	913-281-0533
Ky	Covington, Bryan, Haley & Hackman	606-291-3800
La	New Orleans, Corrigan Mktg. Agency	504-821-5571
Mass	Staughton, North Coast Sls. Co.	617-344-1007
Mich	Dearborn, Electrical Materials	313-541-1650
Mo	St. Louis, Electrical Mktg. Inc.	314-726-2920
Neb	Omaha, Joe Bertsch Elec'l Sls.	402-895-9444
NY	Jamaica, Warshaw Electric Co.	212-525-8150
NY	New Hartford, F.W. Laver & Son	315-724-2304
NC	Charlotte, W.H. Lassiter, Sls. Co.	704-523-2736
Ohio	Bedford Heights, Riffle & Assoc.	216-439-5500
Pa	Philadelphia, Electrical Sls. Assoc.	609-541-7452
Pa	Pittsburgh, Squire & Main Assoc.	412-364-3700
Tenn	Memphis, Southland Sls. Agents	901-525-0142
Tenn	Nashville, Southland Sls. Agents	615-889-4738
Tex	Dallas, Rich Co.	214-742-1758
Tex	Houston, McIver & Slavin Co.	713-868-2571
Utah	Sandy, Pete Farley Agcy.	801-561-1588
Wash	Seattle, Bangs Assoc.	206-762-0262
Wisc	Butler, J.F. Nolan & Assoc.	414-781-1140

Local Distributors

Ala	Birmingham, Mayer Electric Supply	205-322-4581
Ariz	Phoenix, Electric Supply	602-252-2343
Ark	N. Little Rock, Keathley Paterson Electric Co.	501-945-7143
Cal	El Monte, Howland Electric Whlse. Co.	213-444-0503
Cal	Los Angeles, Assoc. of Los Angeles	213-268-8411
Cal	San Francisco, Herning Co.	415-552-3223
Cal	San Jose, Consolidated Elec'l. Distrib.	408-297-2200
Colo	Denver, Ryall Electric Co.	303-222-7721
Conn	Stonington, Mystic Electric Supply Co.	203-535-0661
Fla	W. Palm Beach, Peninsular Elec'l. Distrib.	305-832-1626
Ga	Atlanta, Electrical Wholesalers	404-521-1571
Haw	Honolulu, Atlas Electric Co.	808-531-2717
Ill	Chicago, Revere Electric Supply	312-738-3636
Ill	Peoria, Kiefer Electric Supply	309-674-1143
Ind	Indianapolis, Economy Electric Supply	317-635-4350
Iowa	W. Des Moines, Ramco Co.	515-274-2548
Kans	Wichita, Delta Electric Supply	316-262-3756
Ky	Louisville, Tafel Electric Supply	502-636-1381
La	New Orleans, Reily Bros.	504-525-8233
Me	New Port, Gilman Electric Supply	207-368-4356
Md	Baltimore, Lee Electric Co.	301-752-4080
Mass	Boston, Eagle Electric Supply	617-268-9500
Mich	Detroit, Cadillac Electric Supply	
Mich	Muskegon, Fitzpatrick Electric Supply	616-722-6621
Minn	Minneapolis, Graybar Electric	612-721-3545
Miss	Jackson, S.C. Irby Co.	601-355-4532
Mo	St. Louis, Glasco Electric Co.	314-231-2222
Mont	Billings, Glacier State Electric Supply	
Neb	Omaha, Graybar Electric	402-346-7676
NH	Manchester, Seaman's Supply Co.	603-669-2700
NJ	Secaucus, Franklin & Smith	201-864-0555
NM	Albuquerque, Electric Supply Co.	505-243-4454
NY	Buffalo, Wehle Electric Co.	716-854-3270
NY	New York, Dever & Edds	212-989-1100
NC	Shelby, Shelby Supply Co.	704-482-6781
ND	Fargo, Border States Electric	701-232-3314
Ohio	Cincinnati, Richard's Electric Supply	513-242-8800
Ohio	Cleveland, Midland Electric Supply	216-861-3200
Okla	Oklahoma City, Hunzicker Bros.	405-236-3731
Ore	Eugene, Vitus Electric Supply Co.	503-345-4378
Pa	Philadelphia, Royal Electric Supply	215-386-7000
RI	Pawtucket, Major Electric Supply	401-724-7100
SC	Greenville, Shealy Elec'l. Wholesalers	803-242-6880
Tenn	Memphis, Tenn. Valley Electric Co.	901-525-4751
Tex	Dallas, Watson Electric Supply	214-742-8441
Tex	Houston, Warren Electric Co.	713-225-0971
Utah	Salt Lake City, Calron Electric Supply	801-487-7451
Va	Roanoke, Williams Supply	703-342-3413
Wash	Seattle, Graybar Electric	206-682-0123
Wisc	Milwaukee, Standard Electric Supply	414-272-8100

™JELLYCLEAN - solvent - Communications Technology Corp.

™JEM - jet engine monitor - Howell Inst. Inc.

JENSEN SOUND LABS., Div. Pemcor, Inc., Dept. EM, 4310 Trans World Rd., Schiller Park, Ill. 60176, Tel: 312-671-5680, TWX: 910-227-3728; Empl.: 42

Local Sales Offices & Reps.

Ariz	Phoenix, Sal Bova Sls.	602-266-1137
Cal	Long Beach, CMA	213-426-0306
Cal	Redwood City, Sinai-Johnson, Inc.	415-365-6263
Colo	Aurora, Scowcroft & Assoc.	303-755-2422
Haw	Honolulu, G. Piety Factors	808-839-9059
Ill	LaGrange, E.N. Seversen & Assoc.	312-352-2055
Ind	Carmel, Alpha Sls. Corp.	317-846-7735
Kans	Overland Park, Nackman-Brod-Vann & Co.	913-381-6560
Md	Silver Springs, M.F. Taylor	301-589-4002
Mass	Norwood, Market Reps., Inc.	617-762-0155
Mich	Lake Orion, T.A. Firaneck Sls.	313-391-1177
Minn	Minneapolis, G & C Assocs.	612-927-5633
Mo	St. Louis, Nackman-Brod-Vann & Co.	314-991-2424
Neb	Omaha, Nackman-Brod-Vann	402-333-4346
NY	Phelps, LSM Assocs.	315-548-4891
NY	Yonkers, Adelman-Pinz Sls. Corp.	914-423-4747
Ohio	Cleveland, MS Sls. Corp.	216-382-2060
Okla	Oklahoma City, T. Wachendorfer Assoc.	405-721-9170
Ore	Portland, Fleehart & Sullivan	503-297-1033

Tex	Houston, T. Wachendorfer Assoc.	713-465-3092
Wash	Seattle, Fleehart & Sullivan	206-522-1533
Exp:	Ill., Chicago, J. D. Marshall Int'l.	312-583-6060

JENSEN TOOLS & ALLOYS, Dept. EM, 4117 N. 44th St., Phoenix, Ariz. 85018, Tel: 602-959-2210, TWX: 910-950-1154; Empl.: 52

JERMYN, Dept. EM, 712 Montgomery St., San Francisco, Cal. 94111, Tel: 415-362-7431; Empl.: 6

Local Sales Offices & Reps.

Ariz	Tempe, J. F. Hurlbut Co.	602-968-5962
Cal	Garden Grove, Impact Elctrns. ..	213-431-3581
Colo	Denver, Cristee-Meade Co.	303-753-9471
Fla	Casselberry, E. I. R.	305-830-9600
Ill	Northbrook, R. T. Howlett	312-498-5444
Mass	Waltham, Impact Sls.	617-893-2850
NY	Huntington Station, Addem Group	516-567-5900
Pa	Birchrunville, Jadelectronics Assoc.	215-647-5151
Wash	Seattle, Fleehart & Sullivan	206-522-1533

JEROME INDUSTRIES

JEROME INDUSTRIES CORP., Dept. EM, 391 Lakeside Ave., Orange, N.J. 07050, Tel: 201-678-9595; Empl.: 120 .... p. 3272

Sales Manager: J. DiGiralamo

Local Sales Offices & Reps.

Ala	Huntsville, Rakes Engrg. & Mktg. Corp.	205-883-9260
Cal	Novato, Wright Assocs, Inc.	415-897-7963
Cal	Santa Monica, REP Assocs.	213-829-5401
Colo	Englewood, Mikro Sls.	303-770-2300
Fla	Winter Haven, Sears Assocs.	813-324-1349
Ill	Chicago, Ed Joyner & Co.	312-792-1277
Ind	Indianapolis, Electronic Sales & Engrg. Inc.	317-849-4260
Md	Glen Arm, Hodgins Assoc.	301-592-7047
Mass	Woburn, American Marketing Assocs.	617-935-4464
Mich	Warren, AEM Elctrn. Sls.	313-755-6660
Minn	St. Paul, Countrymen Assocs.	612-645-9151
Mo	St. Louis, Engrg. Svc. Co.	314-997-1515
NJ	Plainfield, MEG Electronic Sales	201-757-4332
Tex	Addison, Parvin Sls.	214-661-2401
Wash	Bellevue, Vantage Corp.	206-455-3460

JERROLD ELECTRONICS CORP., Distributor Sales Div., Dept. EM, 200 Witmer Rd., Horsham, Pa. 19044, Tel: 215-674-4800, Telex: 834-613

Distributor Manager: B. Wolf

Local Sales Offices & Reps.

Mo	No. Kansas City, W. Woody........	816-842-1555
Pa	Horsham, Lenny Elkins	215-674-4800

JERSEY SPECIALTY CO., Dept. EM, Box 248, Burgess Pl., Wayne, N.J. 07470, Tel: 201-694-6200; Empl.: 40

Local Sales Offices & Reps.

Cal	Los Angeles, Erlanger Sls. Co. ..	213-731-2238
Del	Newark, F. S. Carmine Co.	302-738-5966
Fla	Miami, Raulson & Co.	305-226-6013
Ga	Atlanta, H. W. Phillips Co.	404-237-7564
Ill	Chicago, Lassers & Co.	312-539-0170
Ind	Indianapolis, D. Powers Sls., Inc.	317-846-0790
Mass	Lynn, Keene Sls. Co.	617-595-2300
Mich	Brighton, Lectro Sls. Co.	313-632-7941
Minn	Minneapolis, Kodo Assoc.	612-881-1255
Mo	Raytown, M. Taraski Sls. Co.	816-358-1442
NJ	Teaneck, Fisher Elctrn. Assocs.	201-837-1200
NY	Liverpool, Lewis-Dunnigan Co. ..	315-622-2133
NC	Charlotte, D. Austin Co.	704-366-4643
Ohio	Medina, T. Grant Assocs.	216-692-3050
Ore	Portland, R. M. Minthorne............	503-246-4556
Tex	Dallas, Crockett Sls. Co.	214-748-8209
Exp:	New York, N.Y., Roburn Agencies	212-989-5939

™JETCAL - jet engine tester - Howell Inst. Inc.

™JETFLOW - channel inductors - Ajax Magnethermic Corp.

™JET FLUX - liquid flux - Chemetron Corp.

™JETLINE - low cost plastic servo products - Montevideo Technology Inc.

™JET PAK - 16 hr tape magazine - Tape-Athon Corp.

™JET PLATER - self-contained plating unit - Sel-Rex Div. Oxy Metal Industries Corp.

™JET-TEMP - thermocouples - General Elec. Co.

JETTRON PRODS., Dept. EM, P.O. Box 337, E. Hanover, N.J. 07936, Tel: 201-887-0571; FSC No.: 04435; Empl.: 30

Local Sales Offices & Reps.

NY	New York, Eltron Export Co.	212-944-7635

JEWELL ELECTRICAL INSTRUMENTS, INC., Dept. EM, Grenier Field, Manchester, N.H. 03108, Tel: 603-669-6400, Telex: 943435; Empl.: 400 p. 2878,2879

Sales Manager: G.R. Scott

Local Sales Offices & Reps.

Ala	Huntsville, Currie Peak & Frazier	205-536-5650
Ark	Little Rock, J.Y. Schoonmaker	
Cal	Costa Mesa, F.L.W. Inc.	213-860-4695
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	San Diego, F.L.W., Inc.	714-277-0993
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Orlando, Currie Peak & Frazier..	305-855-0843
Ill	Barrington, F.J. Peck Co.	312-381-3388
Iowa	Des Moines, Kathrinus, Kelly & Co.	515-255-4584
Kans	Shawnee Mission, Kathrinus, Kelly & Co.	913-722-0000
Mass	East Longmeadow, Gerber Sls. Corp.	413-523-3059
Mass	Waltham, Gerber Sls. Corp.........	617-890-8040
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Edina, M. Foster Co.	612-835-2252
Mo	St. Louis, Kathrinus & Kelly	314-968-3800
NJ	Cherry Hill, Trinkle Sls.................	609-795-4200
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Melville, Comtronics Assocs.	516-249-0505
NY	Rochester, Ontec..........................	716-464-8636
NC	Greensboro, Cartwright & Bean, Inc.	704-377-5673
Ohio	Beachwood, Elctrns. Salesmaster	216-831-9555
Okla	Tulsa, J.Y. Schoonmaker	918-936-1423
Ore	Portland, Frank Jackson Co.	503-228-1656
Tex	Dallas, J.Y. Schoonmaker Co.....	214-394-1650
Tex	Houston, J.Y. Schoonmaker Co.	713-926-9510
Wash	Seattle, F. Jackson Co.	206-523-6300
Exp:	Conn., Cheshire, Techmark Overseas Corp.	412-941-6490

Local Distributors

Ariz	Phoenix, Metermaster, Inc..........	602-243-4111
Cal	Los Angeles, E.I.L. Instr..............	213-685-7020
Cal	Los Angeles, Metermaster, Inc...	213-685-4340
Cal	Palo Alto, Metermaster, Inc.	415-968-0313
Cal	San Diego, Metermaster, Inc.	714-560-4841
Cal	Santa Clara, Dynametron............	408-246-6535
Colo	Denver, Meter-Master Instr. Co.	303-722-5766
Conn	Middletown, Mancib Co.	203-346-6646
Ill	Bridgeview, E.I.L. Instr.	312-430-2292
Ill	Elk Grove Village, Metermaster, Inc.	312-593-8650
Ill	Oak Park, Pacific Indicator Co. ..	312-261-1330
Ind	Evansville, Electro Lab Svc.........	812-423-5211
Ind	Indianapolis, E.I.L. Instr.	317-545-1373
Kans	Wichita, Main Electrn.	316-267-3581
La	Kenner, New Orleans Instr. Works	504-722-6357
Md	Elkridge, Sunshine Scientific Instrs.	301-796-5600
Md	Timonium, E.I.L. Instrs.	301-252-1260
Mass	Billerica, Metermaster, Inc...........	617-667-8346
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Ferndale, Ram Meter, Inc.	313-398-6767
Minn	Minneapolis, Control Assemblies Co.	612-544-3364
NH	Portsmouth, A & M Instr./Northeast	603-431-7912
NJ	Hanover, State Electrn. Parts Corp.	201-887-2550
NJ	So. Plainfield, Brownell Electro...	201-753-4600
NM	Albuquerque, Walker Radio Co.	505-247-2288
NY	Buffalo, Genesee Radio & Parts Co.	716-873-9661
NY	Clarence, Trott Elctrns	716-634-8500
NY	New York, Brownell Electro.........	212-924-6000
NY	Rockville Centre, A & M Instr.....	516-678-6960
NC	Winston-Salem, Kirkman Elctrn.	919-722-9131
Ohio	Cleveland, Pioneer/Instrumentation	216-587-3600
Ohio	Cleveland, Weschler Electrn. Corp.	216-251-4609
Ohio	Dayton, E.I.L. Instr.	513-435-2134
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Okla	Tulsa, Oil Capitol Electrn. Corp.	918-622-8520
Pa	Philadelphia, Sunshine Scientific Inst.	215-673-5600
Pa	Pittsburgh, CAM/RPC Indl. Elctrn.	412-782-3770
Pa	Pittsburgh, EIL/IMPAC	412-731-5230
RI	North Kingstown, E.I.L. Instr.	401-885-1773
SC	Greenville, Industrial Controls	803-235-7424
Tenn	Knoxville, Industrial Elctrn.	615-573-7135
Tex	Dallas, Ultra Instr.	214-357-0297
Tex	Garland, Metermaster, Inc...........	214-271-5671
Tex	Houston, Geophysical Supply Co.	713-659-2233
Tex	Houston, Quality Instr. Labs........	713-524-0528
Va	Alexandria, E.I.L. Instr.	703-354-4330
Va	Richmond, Instrument Tech Reps.	804-288-7198
Wash	Seattle, Branom Instrs., Co.........	206-762-6050
Wisc	Milwaukee, Electro-Mechano Co.	414-272-4050
Exp:	Conn, Cheshire, Techmark Overseas Corp.	203-272-3559

JFD ELECTRONICS COMPONENTS CORP., Dept. EM, 1462 62nd St., Bklyn., N.Y. 11219, Tel: 212-331-1000, TWX: 710-584-2462; Empl.: 325

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.....	205-772-9237
Ariz	Tempe, Argus Sls.........................	602-967-8709
Cal	Los Altos, Recht Assocs.	415-941-0336
Cal	Van Nuys, JFD So. Cal.	213-785-0487
Colo	Denver, Omega Ltd.	303-758-1508
Fla	Altamonte Springs, SemTronic Assocs.	305-831-8233
Fla	Ft. Lauderdale, SemTronic Assocs.	305-771-0010
Ga	Atlanta, G. Duckett Sls. Co.........	404-451-3529
Ill	Chicago, MCA	312-992-2090
Ind	Indianapolis, Given Corp.	219-432-5585
Kans	Prairie Village, Engrg. Svcs. Co.	914-649-4000
Md	Elicott City, Doss Elctrns.............	301-465-1336
Mich	Southfield, Giesting Assoc...........	313-477-6060
Minn	St. Louis Park, Beta Engrg. Corp.	612-925-4422
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Jericho, HRC Comp-Tech, Inc. ..	516-822-5550
NY	Rochester, R.P. Kennedy Co.	716-271-6322
Ohio	Bloomington, Giesting Assoc.......	812-336-0391
Ohio	Cincinnati, Giesting Assoc.	513-851-7800
Ohio	Galion, Giesting Assoc.................	419-468-3737
Pa	Philadelphia, S.K. MacDonald	215-545-1205
Tex	Dallas, United Comps.	214-861-4306
Wash	Seattle, H. Levinson Co.............	206-EA 3-5100
Wisc	Milwaukee, Star Engrg. Sls.........	414-543-3469

Local Distributors

Cal	Gardena, Bell Inds.	213-321-5802
Cal	Sunnyvale, Bell Inds.....................	408-734-8570
Cal	Sun Valley, Sterling Elctrns.	
Fla	Orlando, Hammond Elctrns..........	305-849-6060
Ill	Mt. Prospect, Cramer Elctrns.	312-593-8230
Md	Baltimore, Blanco..........................	301-948-0110
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Watertown, Sterling Elctrns.........	617-926-9720
NJ	Perth Amboy, Sterling Elctrns.....	201-442-8000
NY	Plainview, Fairmont Elctrns.	516-694-8200
Pa	Philadelphia, Almo Elctrns...........	215-676-6000
Tex	Dallas, J&S Entprs.	214-324-1448

JFD ELECTRONICS CORP., Dept. EM, Pine Tree Rd., Oxford, N.C. 27565, Tel: 919-693-3141

JKL COMPONENTS CORP., Dept. EM, 2226 Barry Ave., W. Los Angeles, CA 90064, Tel: 213-478-3591, TWX: 910-342-6883; FSC No.: 55335; Empl.: 8

Sales Manager: Joe S. Velas

Local Sales Offices & Reps.

Ala	Huntsville, Component Sls. Corp.	205-881-4753
Ariz	PHoenix, R.E.B. Elctrn. Sls.	602-931-5361
Cal	Redwood City, J. S. Heaton Co.	415-367-9000
Cal	San Diego, Reed Elctrn. Mktg. ..	714-452-1456
Colo	Denver, J. S. Heaton Co.	303-841-3651
Fla	St. Petersburg, Component Sls. Corp.	813-898-0009
Haw	Honolulu, Hawaii Elctrn. Sls.	808-845-8207
Ill	Mt. Prospect, Magnuson Assocs.	312-956-0700
Kans	Overland Park, Sheridan Assocs.	913-383-1636
Md	Towson, ISC Sls.	301-484-1411
Mass	Framingham, KSA of New England	617-875-5464
Mich	Farmington, Sheridan Assocs.....	313-477-3800
Minn	St. Paul, Magnuson Assocs.	612-227-8495
Mo	Florissant, Sheridan Assocs.	314-837-5200
NJ	Clifton, Ossmann Comps.............	201-778-8888
NM	Albuquerque, Cleveland Entprs.	505-266-5594
NY	Buffalo, Ossmann Comps. Sls. Corp.	716-832-4271

NY	Kingston, Ossmann Comps. Sls. Corp.	914-338-5505
NY	Rochester, Ossmann Comps. Sls. Corp.	716-442-3290
NY	Syracuse, Ossmann Comps. Sls. Corp.	315-454-4477
NY	Vestal, Ossmann Comps. Sls. Corp.	607-785-9949
NC	Raleigh, Component Sls. Corp.	919-832-1897
Ohio	Beachwood, Sheridan Assocs.	216-831-0130
Ohio	Cincinnati, Sheridan Assocs.	513-761-5432
Ohio	Dayton, Sheridan Assocs.	513-277-8911
Okla	Tulsa, Norvell Assocs.	918-663-1247
Pa	Pittsburgh, Sheridan Assocs.	412-244-1640
Tex	Dallas, Norvell Assocs.	214-233-0020
Tex	Houston, Norvell Assocs.	713-774-2568

Local Distributors

Cal	Los Angeles, Welco Elctrns.	213-254-6187
Cal	Mountain View, Target Elecs.	415-961-1170
Cal	Santa Ana, Norstan	714-540-4165
Haw	Honolulu, Hawaii Elctrn. Sls.	808-845-8207
Ill	Mt. Prospect, Magnuson Comp. Sls.	312-956-0700
Mass	Bellingham, Dowiak Assocs.	617-966-0404
Mass	Framingham, Future	617-879-0860
Mich	Farmington, Sheridan Sls. Co.	313-477-3800
NJ	Little Falls, Diplomat	201-785-1830
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Tex	Dallas, Norvell Comp. Sls.	214-350-6771
Utah	Salt Lake City, Diplomat	801-486-7227
For:	Can., Montreal, Speciality Elctrns.	514-336-4500
For:	Can., Montreal, Que., Cesco Elctrns. Ltd.	514-735-5511

JM TRANSFORMER, Dept. EM, 262 Mott St., New York, N.Y. 10012, Tel: 212-966-4195 .... p. 4421

Sales Manager: J. Millman

JOHANSON MFG. CORP., Dept. EM, Box 329, Boonton, N.J. 07005, Tel: 201-334-2676, TWX: 710-987-8367; Empl.: 240 .... p. 1266

Local Sales Offices & Reps.

Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Menlo Pk., Straube Assocs.	415-321-9050
Cal	Pico Rivera, Westrep	213-949-2551
Colo	Denver, Straube Assoc.-Mountain States, Inc.	303-426-0890
Fla	Orlando, Perrott Assocs., Inc.	305-275-1132
Ind	South Bend, Valentine & Schillinger	219-291-6258
Md	Columbia, Rep-Tron	301-465-6433
Mass	Seekonk, J. Murphy Assocs.	617-761-7153
NY	Fayetteville, R.D.-Sherman	315-637-9861
NY	Mt. Vernon, Friedman-Smith Elctrn. Sls.	914-664-4866
Ohio	Dayton, Electro-Com	513-898-5140
Pa	Feasterville, P.S.A.	215-355-6244
Tex	Ft. Worth, W. Pat Fralia Co.	817-429-3141
Wash	Seattle, Northmar	206-524-5170

Local Distributors

Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Cal	Woodland Hills, Jaco Elctrns.	213-887-6400
Fla	Orlando, Pelcor Co.	305-275-1132
Ill	Chicago, Newark Elctrns.	312-638-4411
Md	Baltimore, Radio Elec. Svc.	301-823-0700
Mass	Medford, Blake Assocs.	617-391-7890
NY	Hauppauge, Jaco Elctrns.	516-273-5500
Pa	Philadelphia, Philadelphia Elctrns	215-568-7400
Tex	Ft. Worth, PATCO Co.	817-640-9101

JOHANSON DIELECTRICS INC., Dept. EM, Box 6456, Burbank, Cal. 91510, Tel: 213-848-4465, TWX: 910-498-2735; Empl.: 154 .... p. 1267

Local Sales Offices & Reps.

Ariz	Scottsdale, Q.T. Wiles	602-948-5590
Cal	Menlo Park, Straube Assocs.	415-323-2476
Cal	Pico Rivera, Westrep	213-949-2551
Colo	Boulder, Straube/Mountain States, Inc.	303-443-8600
Fla	Orlando, Pelcor	305-275-1132
Ill	, Johanson Mfg. Co.	312-446-4021
Ind	South Bend, Valentine & Schillinger	219-291-6258
Md	Silver Springs, Rep-Tron, Inc.	301-593-4844
Mass	Seekonk, J. W. Murphy Assoc.	617-761-7153
NJ	Mt. Vernon, Friedman-Smith Elect. Sls.	914-664-4866
NY	Fayetteville, R.D. Sherman, Inc.	315-637-9861
Ohio	Cleveland, Electro-Com	216-886-2404
Pa	Philadelphia, Professional Service Assoc.	215-722-8222
Pa	Pittsburgh, Electro-Com	216-886-2404
Tex	Arlington, W. Pat Fralia Co.	817-640-9101
Wash	Seattle, Northmar Inc.	206-524-5170

JOHNATHAN MFG., Dept. EM, 1101 South Acacia Ave., Fullerton, Calif.

JOHNSON CORP., Dept. EM, 805 Wood St., Three Rivers, Mich. 49093, Tel: 616-278-1715; Empl.: 98

E. F. JOHNSON COMPANY ®

JOHNSON CO., E.F., Dept. EM, 299 10th SW Ave., Waseca, Minn. 56093, Tel: 507-835-6222, Telex: 29-0470; Empl.: 1400 p. 1268-1270,2114,2115,2776,2777

Sales Manager: G. Mena

Local Sales Offices & Reps.

Ariz	Phoenix, Clemick-Neenan & Assoc.	602-254-2327
Cal	Redwood City, Logan Sls. Co.	415-369-6726
Colo	Denver, Camel Elctrns.	303-757-6191
Conn	Meriden, P.R. Sturgeon Co.	203-237-1112
Fla	Bradenton, Hutto-Hawkins-Peregoy, Inc.	813-755-4015
Fla	Maitland, Hutto-Hawkins-Peregoy, Inc.	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy, Inc.	305-943-9593
Ga	Atlanta, Millar Elctrns. Inc.	404-261-6160
Ill	Chicago, Ellinger Sls. Corp.	312-763-1570
Iowa	Cedar Rapids, J. Vrbik Co.	319-377-8244
Kans	Overland Park, T.L. Dowell & Assocs.	913-238-8200
La	Chalmette, McFadden Sls. Inc.	614-221-3363
La	Gretna, Cartwright & Bean	504-362-4649
Md	Baltimore, Bresson Assocs.	215-839-6770
Md	Towson, Bresson Assocs.	215-664-6460
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Mich	Detroit, R.C. Merchants & Co.	313-535-6000
Mich	St. Joseph, R.C. Merchants & Co.	616-983-7378
Minn	Minneapolis, S. Clothier Co.	612-888-4666
Miss	Jackson, Cartwright & Bean	504-354-1368
Mo	Shrewsbury, T.L. Dowell & Assocs.	314-647-7067
NJ	Palisades Park, E.F. Johnson Co.	201-461-6463
NY	Elmont, F.E. Schmitt Co.	516-437-8150
NY	Syracuse, Mor-Com Assocs.	315-437-2843
NC	Raleigh, Millar Elctrns., Inc.	404-261-6160
Ohio	Columbus, McFadden Sls., Inc.	614-221-3363
Ore	Portland, J.J. Backer Co.	503-297-3776
Ore	Salem, J.J. Backer Co.	503-362-0717
Pa	Narberth, Bresson Assocs.	215-839-6770
Pa	Pittsburgh, Covert & Newman Co.	412-563-0303
Tenn	Memphis, Cartwright & Bean Inc.	901-276-4442
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Tex	Houston, R.E. Nesbitt Co.	713-224-3633
Va	Lynchberg, Bresson Assocs.	215-839-6770
Wash	Seattle, J.J. Backer Co.	206-285-1300
Exp:	New York, Roburn Agencies	212-989-5939

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Local Sales Offices & Reps.

Minn	Minneapolis, E.C. Elctrn. Sls.	612-831-0229
Wisc	Milwaukee, J. M. Sls. Co.	414-546-0040

JOHNSON RESEARCH CORP., Dept. EM, 2099 New Hwy., Farmingdale, N.Y. 11735, Tel: 516-694-5330

JOLO INDUSTRIES, INC., Dept. EM, 11861 Cardinal Circle, Garden Grove, Cal. 92603, Tel: 714-636-4940; Empl.: 15

Sales Manager: J.S. Giampiccolo, Jr.

Local Sales Offices & Reps.

Ariz	Tempe, Roland Assocs.	602-838-4867
Cal	Mountain View, Leddy Assocs.	415-969-6313
Colo	Englewood, Inverness Mktg.	303-770-2300
Fla	N. Miami, Irby & Connolly	305-949-5197
Fla	Orlando, Irby & Connolly	305-894-8471
Ill	Northbrook, Rendell Sls. Co.	312-498-9860
Md	Hyattsville, Eastern Comps.	301-577-2925
Mass	Brookline, Harman Assocs.	617-232-6687
Minn	Lakeville, Dan'l Engrg. Corp.	612-332-4848
NY	Manhasset, Everett Mktg. Corp.	516-627-7750
NY	Vestal, Systems Hardware Reps.	607-729-6339
Ohio	Cleveland, Geotronix Mktg. Assocs.	216-526-2535
Ohio	Columbus, Geotronix Mktg. Assocs.	614-457-8472
Pa	Flourtown, Eastern Comps. Inc.	215-836-1616
Pa	York, Eastern Comps. Inc.	717-764-3114
Wash	Kirkland, Manon Engrg.	206-827-7449

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Sales Manager: B. Osten; *Distributor Manager:* R. Fersen

Local Distributors

Cal	Garden Grove, Allied Elctrns.	213-598-6605
Cal	Inglewood, Newark Elctrns.	213-678-0441
Colo	Englewood, National Camera	303-789-1893
Fla	Miami, Electro-Standards Labs.	305-633-6975
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Elgin, Allied Elctrns.	312-697-8200
La	Lafayette, Ralph's of Lafayette	318-234-4507
NY	Mount Vernon, Elctrn. Tool	914-664-0088
NY	New York, Graybar Elec.	212-532-4000
Okla	Tulsa, S & S Radio Sup.	918-582-8242
Pa	Plymouth Meeting, Techni-Tool	215-825-4990
Tex	Dallas, Specialized Prods.	214-358-4663

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JONES ELCTRNS., HIRAM, Dept. EM, 11607 Vanowen St., No. Hollywood, Cal. 91605, Tel: 213-875-0213; FSC No.: 04867; Empl.: 8 p. 1844,1845

Local Sales Offices & Reps.

Ark	Little Rock, Packard Assocs.	501-372-0000
Exp:	N.Y., New York, C. Tennant	212-679-1300

Local Distributors

Tex	Houston, Lenert Co.	713-225-1465
Tex	Paris, Electro Hardware Co.	214-785-4544

JONESVILLE PAPER TUBE CORP., Dept. EM, 474 Beck Rd., Jonesville, Mich. 49250, Tel: 517-849-9963; Empl.: 40

JORDAN CONTROLS, Dept. EM, 5607 W. Douglas Ave., Milwaukee, Wisc. 53218, Tel: 414-461-9200; Empl.: 65

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Conn	Simsbury, Canner Assocs.	203-658-5074
Ga	Atlanta, F.B. Culwell & Assocs.	404-939-1660
Ill	Chicago, Clarkson Engrg. Co.	312-286-2314
Ind	Indianapolis, Garstang Engrg. Co.	317-632-9903
Kans	Shawnee Mission, W. Hickman Co.	913-362-8066
Mass	Marblehead, Canner Assocs.	617-639-0073
Mich	Birmingham, Electro-Mation Assocs.	313-564-6517
Minn	St. Paul, Kenco Co.	612-645-7717
Mo	St. Louis, Wehco Tech. Sls.	314-997-4420
Neb	Omaha, Wehco Tech. Sls.	402-895-0262
NJ	Newark, N. Brager Co., Inc.	201-344-1100
NY	Buffalo, J.W. Simpson Co.	716-634-3995
NY	New York, N. Brager Co. Inc.	212-697-1050
NC	Charlotte, Beck Sls. & Engrg. Co.	704-366-5366
Ohio	Chagrin Falls, J. Kilroy Corp.	216-247-8997
Pa	Bala Cynwyd, Jackson-Bowden Automation	215-664-9611
Pa	Erie, Foster-McClinton Inc.	814-453-5786
Pa	Pittsburgh, Foster-McClinton Inc.	412-561-4800
Tex	Dallas, Peso-Production Engrg.	214-369-3181
Va	Roanoke, Johnson Custom Controls	703-981-0780
WVa	Huntington, Foster-McClinton Inc.	304-736-5161
Exp:	Conn., New Haven, Master-Wright Corp.	203-288-1638

JORDAN ELECTRIC CO., Dept. EM, 14707 Keswick St., Van Nuys, Cal. 91405, Tel: 213-781-3849; FSC No.: 5905; Empl.: 50

Sales Manager: B.M. Barton

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg.	205-772-9237
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Van Nuys, Jordan Elect. Co.	213-875-5782
Fla	Orlando, Perrott Assocs.	305-275-1132
Md	Ellicott City, Doss Elctrns.	301-465-1336
Md	Hagerstown, Angstrohm Precision	301-739-8722
Mass	Framingham, Murata/Angstrohm Sls. Off.	617-872-4843
Mo	St. Charles, Chesco	314-946-6677
NJ	E. Hanover, HLM Assocs.	201-386-0794
NY	New Hartford, Murata/Angstrohm Sls. Off.	315-732-3507
NY	Northport, HLM Assocs.	516-423-1818
Ore	Portland, C. K. Shanks & Assocs.	503-292-5656
Tex	Houston, B. Hamilton	713-445-7086
Tex	Hurst, Wheelex	817-268-1812
Wash	Seattle, C. K. Shanks & Assocs.	206-632-4290
Wisc	Milwaukee, Star Engrg. Sls.	414-645-3680
Exp:	Can., Toronto, Ont., Wilson Entprs.	416-769-0585

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Local Sales Offices & Reps.

NJ	Clifton, Grimm, Siegel Assocs.	201-546-5010

Ⓣⓜ JOTDRAFT - printed circuit symbols - Datak Corp.

Ⓣⓜ J-PAK - solid state relays - Theta-J Relays, Inc.

JPI, INC., Dept. EM, 1507 San Vicente Blvd., Santa Monica, Cal. 90402, Tel: 213-395-2018; Empl.: 3

Sales Manager: S. Kondo

JSH ELECTRONICS, INC., Dept. EM, 8549 Higuera St., Culver City, Cal. 90230, Tel: 213-559-6900, TWX: 910-340-6356; FSC No.: 2B436; Empl.: 127

Local Sales Offices & Reps.

Mass	Belmont, Cunningham Sales Co.	617-489-2180
Mich	Birmingham, Forand Sales Co.	303-644-0087

Ⓣⓜ JUDCO - insulated wire & cable - Judd Wire Div.

JUDD WIRE DIV., Electronized Chems. Corp., Dept. EM, 57 Turnpike Rd., Turners Falls, Mass. 01376, Tel: 413-863-4357, TWX: 510-290-2147; Empl.: 70

Local Sales Offices & Reps.

Ariz	Phoenix, Toribre Entprs.	602-257-0727
Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	San Diego, H. King	714-566-5252
Fla	Pompano Beach, Technology Mktg.	305-942-0774
Ill	Wheaton, Mark Sls.	312-665-7044
Md	Baltimore, Burgin-Kreh Assoc.	710-862-1450
Mass	Marlborough, O.K. Engrg.	617-481-6400
Mich	Sturgis, Kesler Assoc.	616-651-7619
Minn	Edina, W.L. Ruth & Assoc.	612-941-6350
NJ	Wayne, G.T. Assocs.	201-694-6040
NY	Syracuse, D. Dwyre	315-472-8282
Ohio	Dayton, Whelan Corp.	513-434-7551
Pa	Haddonfield, Mesa Tech. Assoc.	609-429-9531
Tex	Dallas, Stevens Sls. Co.	214-350-2476
Va	Lynchburg, Burgin-Kreh Assoc.	804-845-5600

JULIE RESEARCH LAB., Dept. EM, 211 West 61st St., New York, N.Y. 10023, Tel: 212-245-2727; Empl.: 40

Local Sales Offices & Reps.

Cal	Pasadena, Luscombe Engineer	213-684-2000
Cal	San Mateo, Luscombe Engineer	415-342-7057
Mass	E. Pepperill, Leger Labs.	617-433-6940
Tex	San Antonio, Teletronics Labs., Inc.	512-735-6179

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Ⓣⓜ J--W - gas detection product logo - Bacharach Instrument Co.

K & S ENGINEERING, Dept. EM, 6917 W. 59th St., Chicago, ILL. 60638

KABO ELECTRONICS, Dept. EM, 123 Bacon St., Natick, Mass. 01760, Tel: 617-653-0015; Empl.: 5; Minimum order: $R. Malley

Sales Manager: R. Dawley; *Distributor Manager:* R. Malley

Local Sales Offices & Reps.

Ariz	Scottsdale, Spectre Sls.	602-946-5997
Cal	Mt. View, Wagner Assoc.	415-964-8300
Cal	Yorba Linda, D & G Assocs.	714-528-5555
Fla	Pompano Beach, Cole-Tek	305-781-8110
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Elctro-Tech Mktg.	312-588-4535
Mass	Bedford, R.E. Yates	617-257-7576
Mass	Leominster, R. O'Malley	617-537-1536
Minn	Minneapolis, Luse and Assoc.	612-884-8698
NY	Lynbrook, MWM Assoc.	516-593-6190
NY	Rochester, Tacom Sls.	716-647-3940
Ohio	Cleveland, RCS Inc.	216-469-0490
Ohio	Columbus, Micro Tech	216-442-1555
Pa	Valley Forge, J.E. Cuesta & Co.	215-265-5800
Tex	Dallas, Southern Eng.	214-231-3065

Local Distributors

Mass	Lawerence, Ralph Pill Supply	617-683-2423
Mass	Quincy, Hub Safety Equip.	617-773-2487

KAHGAN ELECTRONICS CORP., Dept. EM, 556 Peninsula Blvd., Hempstead, NY 11550, Tel: 516-538-2300; Empl.: 12

Local Sales Offices & Reps.

Ala	Huntsville, J.K. Whitfield	205-883-7794
Cal	City of Industry, Micrometals	213-968-4718
Fla	Maitland, T. Pridmore Co.	305-678-0172
Fla	Melbourne, T. Pridmore Co.	305-727-2491
Fla	Miami, T. Pridmore Co.	305-681-4957
Fla	Treasure Island, T. Pridmore Co.	813-360-4973
Ill	Chicago, Ropek-Cahill, Inc.	312-631-0070
Kans	Overland Park, J. F. Guernsey Co.	913-381-2225
Mich	Detroit, Nicon Assocs.	313-341-7688
Minn	Minneapolis, Thomas Mktg.	612-823-4880
NY	Rochester, L. Hart Assocs.	716-244-3253
Pa	Reading, Beil-Whitaker	215-779-2610
Tex	Addison, Southland Comps.	214-233-0603
Va	Alexandria, Potomac Elctrns.	703-836-1630

KAHLE ENGRG. CO., Dept. EM, 3344 Hudson Ave., Union City, N.J. 07087, Tel: 201-867-6500; Empl.: 50

Advertisement

KAHLE Automatic Production Machines and Machine Systems are custom engineered for precision, high speed processing or assembling of lamps, tubes, semi-conductors, diodes, transistors, electrical sub-assemblies, switches, vacuum bottles, etc. Hermetic seal and exhaust machines include those for most vacuum and gasfilled devices; two or three piece lead-and-cap, lead-slug butt welding by resistance or capacitor discharge welding machines with 100-200 per minute capacity; cat-whisker or current carrying element welding. Glass machinery of all types.

Ⓣⓜ KALAR - elastomeric compounds - Hardman Inc.

KALART VICTOR CORP., Dept. EM, Hultenius St., Plainville, Conn. 06062, Tel: 203-747-1663

Sales Manager: J.J. Costag

Ⓣⓜ KALENE - elastomeric compounds - Hardman Inc.

Ⓣⓜ KALEX - polyurethane elastomers - Hardman Inc.

KALMUS & ASSOC., Dept. EM, 2424 S. 25th Ave., Broadview, ILL. 60153, Tel: 312-343-7004; Empl.: 210

Sales Manager: D.R. Capparelli, Sr., V.P. Sls. & Mktg.

Ⓣⓜ KALOTRON - temperature-limited diodes - Thermosen, Inc.

Ⓣⓜ KAMAG 14+18 - generators - Kato Engineering Co.

KAMAN SCIENCES CORP., Dept. EM, 1500 Garden of the Gods Rd. P.O. Box 7463, Colorado Springs, Colo. 80933, Tel: 303-599-1500; Empl.: 450

Local Sales Offices & Reps.

Cal	Temple City, Kaman Sciences	213-579-4867
Conn	Simsbury, Kaman Sciences	203-821-6989
Pa	Bethayres, Control Instr. Sls. Co.	215-676-1808

KANTZ ELECTRONIC IND., Dept. EM, 229 W. 4th St., Clifton, N.J. 07011, Tel: 201-772-6785

Sales Manager: L. Herold

KAPPA NETWORKS, INC.

KAPPA NETWORKS, Dept. EM, 165 Roosevelt Ave, Carteret, N.J. 07008, Tel: 800-631-5653; Empl.: 40 p. 2516,2517

Sales Manager: M. Traum, Dir. Mktg.

Local Sales Offices & Reps.

Cal	Alhambra, M.W. Ridel Co.	213-283-7694
Cal	Los Altos, Tauber-Dreyer	415-984-2635
Colo	Englewood, Dynatch	303-773-2830
Fla	Satellite Beach, Reynolds Assoc.	305-773-4700
Mass	Norwood, Stan Pierce Inc.	617-762-3164
Minn	Osseo, Denny Gaffney Agcy.	612-425-5484
NJ	Carteret, Kappa Networks	201-541-1600
NJ	Cherry Hill, Benco Sales	609-779-9282
NY	Roslyn Heights, Livera-Polk Assoc.	516-484-1276
Utah	Salt Lake City, Monarch Distributing & Representing	801-266-9617

KAPPA SCIENTIFIC CORP., Dept. EM, Box 30585, Santa Barbara, Cal. 93105, Tel: 805-967-2396; Empl.: 4

Ⓣⓜ KAPSEAL - low friction seal - Minnesota Rubber Co.

Ⓣⓜ KARADIO - Applicable to auto radio sets - ATR Electronics, Inc.

Ⓣⓜ KARAK - carbon graphite parts - Ohio Carbon Co.

Ⓣⓜ KARATCLAD - heavy gold electroplating process, high karat bright gold alloy - Sel-Rex Div. Oxy Metal Industries Corp.

Ⓣⓜ KARI - float switch - Zi-Tech Div.

Ⓣⓜ KASIL - potassium silicate - Philadelphia Quartz Co.

KATO ENGINEERING CO., Dept. EM, 1415 1st Ave., Mankato, Minn. 56001, Tel: 507-625-4011, Telex: 29-0786; Empl.: 450

Local Sales Offices & Reps.

Cal	San Rafael, H. Wells Assocs.	415-454-5730
Cal	Santa Ana, Harold Wells Assocs.	714-547-4455
Colo	Lakewood, Century Sls. Co.	303-988-6149
Fla	Miami, J. Carl Turner Assocs.	305-625-6556
Fla	Orlando, J. Carl Turner Assocs.	305-859-4705
Ga	Atlanta, Industrial Apparatus Co.	404-875-8086
Ill	Deerfield, Electrocon Inc.	312-948-0320
La	Jefferson, General Power & Control Corp.	504-733-7340
Md	Baltimore, Wilson Assocs., Inc.	301-485-5100
Mass	Sharon, Adcour	617-784-8124
Mich	Southfield, Doral Sls. Co.	313-352-1667
Minn	St. Paul, Nelson Engrd. Sls., Inc.	612-631-0646
Minn	St. Paul, DeBeck Assocs.	612-690-1557
Miss	Jackson, General Power & Control	601-922-5000
NY	Seaford, Greer Tech. Sls., Inc.	516-785-6919
NC	Charlotte, Robert W. Chapman & Co.	704-525-2421
Ohio	Columbus, Arthur N. Ulrich Co.	614-253-2705
Okla	Tulsa, Gibbs Co., Inc.	918-622-1523
Tex	Houston, General Power Equip. Co.	713-524-1895
Tex	Richardson, Kreekon Energy Svcs.	214-234-5959
Va	Richmond, Frazier & Gregg, Inc.	804-784-5293
Wash	Kirkland, Jim Landweer	206-822-2276

KAVLICO CORP., Dept. EM, 20869 Plummer St., Chatworth, Cal. 91311, Tel: 213-882-2400, Telex: 65-1481; Empl.: 120

Local Sales Offices & Reps.
Ariz Phoenix, G.D.S. Engr'ing Sls. Co. 602-935-5321
Cal Chatsworth, Kavlico Corp. 213-882-2400
Cal San Diego, Mes Engr. & Sls. Assoc. 714-278-8021
Conn Canton, Kavlico Reg. Off. 203-693-0646
Kans Wichita, M. L. Garrison Co. 316-682-1312
Mich Detroit, Sls. Consultants Co.
Tex Dallas, United Technical Mkt. 214-231-5611

KAWECKI BERYICO INDS., INC., Dept. EM, 220 East 42nd St., New York, NY 10017, Tel: 212-682-7143, TWX: 710-581-5199; Empl.: 1925

Local Sales Offices & Reps.
Cal Compton, Kawecki Berylco Ind., Inc. 213-639-5651
Cal Palo Alto, Kawecki Berylco Ind., Inc. 415-323-9625
Conn Thomaston, Eyelets for Industry, Inc. 203-283-8213
Conn Thomaston, Summit Finishing Div. 203-283-4391
Ga Atlanta, Kawecki Berylco Inds., Inc. 404-458-7824
Ill Elk Grove, Kawecki Berylco Inds., Inc. 312-593-3600
Mass Boston, Metalonics Div. 617-268-4450
Mass Waltham, Kawecki Berylco Inds., Inc. 617-890-8270
Mich Dearborn, Kawecki Berylco Inds., Inc. 313-292-0300
NJ Palisades Park, Duramic Prods. 201-947-8313
Ohio Cleveland, Kawecki Berylco Inds., Inc. 216-464-8860
Ore Albany, Zirconium Technology Corp. (Zirtech) 503-926-7743
Ore Springfield, National Metallurgical Div. 503-746-7674
Pa Reading, Kawecki Berylco Inds., Inc. 215-929-0781
Pa Revere, Penn Rare Metals Div. 215-847-5121
Tenn Athens, Precision Cast Prods. Div. 615-745-6871
Wash Wenatchee, Wenatchee Works 509-663-2165

Local Distributors
Ala Birmingham, J.M. Tull Inds. 205-324-8583
Ariz Phoenix, E. Jordan Brookes Co. 602-947-7489
Cal Los Angeles, E. Jordan Brookes Co. 213-723-8431
Cal San Francisco, E. Jordan Brookes Co. 408-241-4844
Colo Denver, Reynolds Aluminum Supply Co. 303-399-2150
Fla Tampa, J.M. Tull Inds. 813-236-5741
Ga Atlanta, J.M. Tull Inds. 404-449-1611
Ill Chicago, Clark Brass & Copper Co. 312-625-1350
Ill Chicago, Guardian Metal Sls. 312-583-4400
Ind Indianapolis, Clark Brass & Copper Co. 317-898-1600
Iowa Cedar Rapids, Vincent Brass & Aluminum Co. 319-366-6251
Ky Louisville, Williams & Co. 502-582-3321
La New Orleans, J.M. Tull Inds. 504-721-0281
Md Baltimore, Brass & Copper Supply 301-247-5500
Mass Boston, Eastern Metal Mill Prods. 617-329-1200
Mich Detroit, Meier Metal Svc. Centers 313-398-1900
Minn Minneapolis, Vincent Brass & Aluminum 612-378-1131
Mo Kansas City, Reynolds Alumunum Supply Co. 816-842-2200
NJ Hillside, N.Y. Brass & Copper Co. 201-926-5300
NJ Newark, Vincent Brass & Aluminum Co. 201-687-4300
NY Buffalo, Ontario Metal Supply 716-668-8200
NY Buffalo, Williams & Co. 716-897-2000
NY Rochester, Ontario Metal Supply, Co. 716-473-4400
NY Syracuse, Ontario Metal Supply 315-457-5441
NC Charlotte, Vincent Brass & Aluminum Co. 704-372-9900
Ohio Cleveland, Williams & Co. 216-441-1000
Ohio Cleveland, Clark Brass & Copper Co. 216-587-6560
Okla Tulsa, Reynolds Aluminum Supply Co. 918-939-3305
Ore Portland, Alaskan Copper & Brass Co. 503-238-7171
Pa Philadelphia, Brass & Copper Sls. 609-786-8800
RI Providence, Clifford Metal Sls. Co. 401-861-4100
SC Greenville, J.M. Tull Inds. 803-242-5242
Tenn Nashville, Williams & Co. 615-255-5621
Tex Dallas, Reynolds Aluminum Supply Co. 214-631-1860
Va Richmond, J.M. Tull Inds. 804-222-0031
Wash Seattle, Alaskan Copper & Brass Co. 206-623-5800
WVa Charleston, Williams & Co. 304-744-5363
Wisc Milwaukee, Pegg Metals 414-786-1730

KAY

KAY ELEMETRICS CORP., Dept. EM, 12 Maple Ave., Pine Brook, N.J. 07058, Tel: 201-227-2000, TWX: 710-734-4347; FSC No.: 80138; Empl.: 86 p. 2880-2885

Local Sales Offices & Reps.
Ariz Tempe, J. Smith & Assoc. 602-968-7025
Cal N. Hollywood, O'Halloran Assocs. 213-877-0173
Cal Palo Alto, O'Halloran Assocs. 817-268-0811
Colo Boulder, J. Smith & Assoc. 303-442-7100
Fla Sarasota, Enjay Assoc. 813-958-9533
Ill Northfield, Feller Assocs. 312-446-8065
Ind Indianapolis, L. Green Assoc. 317-293-9827
Md Silverspring, Eastern Instrumentation Corp. 301-681-6500
Md Silver Spring, Eastern Instrumentation Co. 301-622-4200
Mass Needham, Addelco Corp. 617-444-4754
NJ Pine Brook, Kay Elemetrics 201-227-2000
NM Albuquerque, J. Smith & Assoc. 505-265-3406
Ohio Chesterland, Electro Equip. Sls. 216-729-2222
Okla Oklahoma City, Anderson Assoc.
Ore Beaverton, Scientific Devices 503-643-6878
Tex Hurst, Anderson Assoc. 817-268-0811
Wash Bellevue, Scientific Devices 206-454-0900

KAY-TOWNES ANTENNA CO., Dept. EM, Turner Chapel RD., P.O. Box 593, Rome, Ga 30161, Tel: 404-235-0141; Empl.: 100

Local Sales Offices & Reps.
Ala Birmingham, Bailiff Sls. Co. 205-967-6117
Cal Burlingame, Casey-Rochek & Assoc. 415-692-2306
Colo Arvada, C B Elctrn. Mktg. 303-422-0561
Del Newark, Carmine & Assocs. 302-731-0697
Ind Indianapolis, F. J. McSweeney & Assoc. 317-849-5726
Md Cockeyville, Carmine & Assocs. 301-666-8128
Mass Norwood, JMG, Inc. 617-762-5333
Mich Milford, Polyphase Sls. Co. 313-363-4176
Miss Meridian, Bailiff Sls. Co. 601-681-6443
NJ Mapelwood, Shea Sls. 201-762-2382
NC Charlotte, Lesco 704-523-3327
Pa Philadelphia, Carmine & Assocs. 215-334-4533
Tenn Birmingham, Bailiff Sls. Co. 205-967-6117
Exp: Fla., Hialeah, Telexport 305-888-3980

KB ELECTRONICS INC., Dept. EM, 5801 Foster Ave., Brooklyn, N.Y. 11234, Tel: 212-968-8000; Empl.: 40

Sales Manager: A Bueller

Local Sales Offices & Reps.
Cal Freemont, Hartfield, Kennan Freytag 415-863-2200
Cal Los Angeles, TechRep Assocs. 213-641-5830
Fla Ft. Lauderdale, Tropi-Tec Co. 305-523-4988
Ill Oak Brook, A. G. Erickson Assocs. 312-323-1367
Kans Shawnee Mission, Delltron Co. 913-362-5512
Mass Bedford, Interact Co. 617-275-2050
Mich Grand Rapids, J Orr Assocs. 313-534-4029
Minn St. Paul, Vikeland Sls. Co. 612-645-4647
Mo St. Louis, Delltron Co. 314-869-4779
Neb Lincoln, Delltron Co. 402-464-1485
NJ Roselle, A. E. Nelson Co. 201-241-0678
NY Liverpool, L.P. Garner & Assocs. 315-451-1323
NC Charlotte, Industrial Drives & Controls 704-535-5414
Ohio Dayton, Electrical Sys. Co. 513-434-9822
Ohio Toledo, Electrical Sys Co. 419-475-9390
Pa Glenside, Elcom, Inc. 215-885-1325
Pa Paoli, Tyler Griffin Co 215-647-1550
Tex Dallas, K.B.J. Sls Co. 214-661-0788
Wash Vancouver, Hartfield, Kennan, Freytag 503-228-1683

Local Distributors
Ala Mobile, Brownell Electro Inc.
Cal Los Angeles, Brownell Electro Inc. 213-532-1150
Cal Oakland, L.L. Burror Co 415-834-9533
Colo Denver, Ward Electric Supply Co. 303-222-3541
Fla Orlando, Brownell Electro Inc.
Ga Atlanta, Brownell Electro Inc. 404-762-5181
Ill Chicago, Complete Reading Elctric Co. 312-454-1234
Ill Palatine, Brownell Electro Inc.
La New Orleans, Complete Reading Electric Co. 504-944-5561
Md Baltimore, Temsco Inc. 301-685-4523
Mass Cambridge, Brownell Electro Inc. 617-864-5600
Mich Warren, Complete Reading Electric Co 313-755-6020
Minn Minneapolis, H.A. Holden Inc. 612-336-5353
Mo Kansas City, Complete Reading Electric Co. 816-471-5966
NJ S. Plainfield, Brownell Electro Inc.
NY New York, Brownell Electro Inc. 212-924-6000
Ohio Cleveland, Complete Reading Electric Co. 216-267-1000
Ohio Hilliard, Universal Eelctric Supply Co. 614-876-2496
Ore Portland, C.E. Riggs Inc. 503-226-3286
Pa Philadelphia, Brownell Electro Co. 215-632-3030
Tenn Memphis, Brownell Electro Inc.
Tex Dallas, Complete Reading Electric Co.
Tex Houston, Complete Reading Electric Co. 713-224-5731
Wisc Mequon, Complete Reading Electric Co. 414-241-3880

K.C.C. SHOKAI LTD., Dept. EM, No. 31 Ouchi-dori 4-chome, Nada-ku, Kobe, Japan, Tel: 078-871-0271, TWX: 05622-835 WMKCC J; Empl.: 120

Local Sales Offices & Reps.
Cal Redwood City, U.S. KCC Inds. 415-365-6011

KD COMPONENTS, INC., Dept. EM, 3016 S. Orange Ave., Santa Ana, Cal. 92707, Tel: 714-545-7108; Empl.: 9

Local Sales Offices & Reps.
Cal Fremont, Spence Assoc. 415-656-9506
Fla Oldsmar, NCF Sls. 813-855-4209
Ill Streamwood, Al Holte & Assoc. 312-837-4066
Kans Wichita, E. Carbiner Assoc. 316-682-5782
Mass Sharon, Cummings Assoc. 617-828-8370
NJ Kenilworth, Ventronics, Inc. 201-272-9262
Tex Dallas, J. Cunningham Co. 214-233-4303
Tex Houston, J. Cunningham Co. 713-461-4197
Wash Seattle, Northmar, Inc. 206-LA4-5170
Exp: N.Y., Schenectady, EMB Technical Corp. 518-372-5841

Local Distributors
Cal Santa Ana, KD Comps. 714-545-7108
Tex Houston, Lenert Co. 713-225-1465

(TM)K-DET - sync instrument motor - Hurst Mfg. Corp.

KEDMAN CO., Dept. EM, Box 25667, Salt Lake City, Utah 84125, Tel: 801-363-4413; Empl.: 60

(TM)KEENSERTS - inserts & studs - Tridair Inds.

(TM)KEEPER - cables for ion measuring electrodes - Beckman Instrs., (AISSD)

(TM)KEF - speakers, musical, midrange, tweeter, woofer - British Aircraft Corp. (USA Inc.)

KEITHLEY INSTRUMENTS INC., Dept. EM, 28775 Aurora Rd., Cleveland, Ohio 44139, Tel: 216-248-0400, Telex: 98-5469; Empl.: 200

Sales Manager: A.N. Into

Local Sales Offices & Reps.
Cal Cupertino, T.L. Snitzer Co. 408-257-8333
Cal Del Mar, T.L. Snitzer Co. 714-454-2191
Cal Los Angeles, T.L. Snitzer Co. 213-836-6170
Colo Littleton, Aztec Entprs., Inc. 303-795-0250
Fla Orlando, WA Brown Instrs. 305-425-5505
Ill Chicago, Carter Elctrns., Inc. 312-585-5485
Ind Indianapolis, Carter Elctrns., Inc. 317-293-0696
Iowa Cedar Rapids, Palatine Sls. 319-365-8071
Kans Lenexa, Palatine Sls 913-492-7020
Md Bethesda, Powell-Pendergraph 301-656-4535
Mass Wakefield, MECO, Inc. 617-245-4870
Minn Minneapolis, Carter Elctrns., Inc. 612-559-1976
Mo St. Louis, Palatine Sls. 314-426-7055
NM Albuquerque, Aztec Entprs., Inc. 505-255-2440
NY E. Setauket, Keithley Instrs. 516-751-6167
NY Syracuse, Labtronics 315-454-9314
Ohio Chesterland, Electroquipment Sls. Co. 216-729-2222
Ore Portland, McLaren, Inc. 503-297-2248
Pa Willow Grove, Powell-Pendergraph 215-657-0330
Tex Austin, Palatine Sls. 512-451-7463
Tex Houston, Palatine Sls. 713-783-1492

Tex	Richardson, Palatine Sls., Inc.	214-231-9489
Va	Richmond, Powell-Pendergraph.	804-264-2341
Wash	Bellevue, McLaren, Inc.	206-454-3400
Wisc	Milwaukee, Carter Elctrns., Inc.	414-464-5555
Exp:	Ohio, Cleveland, Keithley Int'l. Sls. Corp.	216-248-0400

KELK, GEORGE LTD., Dept. EM, 48 Lesmill Rd., Don Mills, Ont., Can. M3B 2T5, Tel: 416-445-5850, Telex: 06-966670; Empl.: 66

KELTEC FLORIDA, A Div. of Aiken Inds., Inc., Dept. EM, Box 1348, Fort Walton Beach, Fla. 32548, Tel: 904-651-1210, TWX: 510-730-7775; FSC No.: 09062; Empl.: 197

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Los Altos, Stout-Loeswick	415-948-3265
Cal	Los Angeles, Cain Technology	213-476-2251
Colo	Denver, PLS Assocs.	303-773-1218
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Park Ridge, RF Specialists	312-698-2044
Ind	Fort Wayne, RF Specialists	219-485-8982
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Ellicott City, VPI	301-465-4060
Mass	Needham Heights, Reptron	617-449-4141
Mich	Detroit, Micro Sls. Corp.	313-482-1229
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Westfield, Gray & Reed Assocs.	201-233-6616
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Huntington Station, Gray & Reed Assocs.	516-433-3333
NY	Syracuse, Labtronics	315-454-9314
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Pa	Montgomerysville, VPI	215-474-3200
Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Seattle, Delcom Sls. Co.	206-248-0090

(TM)KELTIP - cryogenic sensor - Degussa Inc.

KELTRON CORP., Dept. EM, 225 Crescent St., Waltham, Mass. 02154, Tel: 617-894-0525

Sales Manager: T. Chadurjian

Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Buena Park, Sales Engrs.	213-921-0681
Cal	Mountain View, Tri-Rep	415-965-1822
DC	Washington, H. Wise & Co.	202-363-9417
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Minn	Bloomington, Scientific Sls.	612-881-3300
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NY	Jericho, Metro Tech. Sls.	516-935-3330
Pa	Abington, Bach Stewart	215-885-1550
Wash	Bellevue, A. Smith Co.	206-746-6670

KELTRON CORP., Walden Div., Dept. EM, 225 Crescent St., Waltham, Mass. 02154, Tel: 617-894-0525

Sales Manager: T. Chadurjian

Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Buena Park, Sales Engrs.	213-921-0681
Cal	Los Altos, Frauman Assoc.	415-941-0660
Fla	Orlando, G. F. Bohamn Assoc.	305-855-0274
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Minn	Bloomington, Scientific Sls.	612-881-3300
NJ	Flanders, K & R Engrg.	201-584-5235
Ohio	Dayton, F. Ohmer Assoc.	513-434-1454
Pa	Glenside, Koebert Assoc.	215-887-2310
Tex	Dallas, Tesco	214-328-5484
Va	Alexandria, Koebert Assoc.	703-780-3971

KELTRON INSTRUMENT DISPLAYS DIV., Dept. EM, 223 Crescent St., Waltham, Mass. 02154, Tel: 617-894-0525; Empl.: 30

Sales Manager: T. Chadurjian

Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Buena Park, Sls. Engrs., Ltd.	213-921-0681
Cal	Mountain View, Tri-Rep	415-965-1822
DC	Washington, H. Wise & Co.	202-363-9417
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Minn	Bloomington, Scientific Sls.	612-881-3300
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NY	Jericho, Metro Tech. Sls.	516-935-3330
Pa	Abington, Bach-Stewart	215-885-1550
Wash	Bellevue, A. Smith Co.	206-746-6670

KELVIN, Dept. EM, 5919 Noble Avenue, Van Nuys, Cal. 91411, Tel: 213-782-6662, Telex: 65-1417; FSC No.: 07088; Empl.: 250 .... p. 3696,3697

Sales Manager: R A Featherston

Local Sales Offices & Reps.

Cal	Mountain View, G.C. Woempner Co.	415-964-5454
Cal	San Diego, Wes-K Assoc.	714-271-5048
Colo	Boulder, R-G Entprs.	303-447-9211
Conn	Milford, Todino Engrg. Sls.	203-874-6643
Fla	Fort Lauderdale, Electro-Comp.	305-564-8571
Ga	Smyrna, B-C Elctrns.	404-436-5169
Ill	Des Plaines, Coombs Assoc.	312-298-4830
Mass	Needham Hgts., Todino Engrg.	617-444-7925
Mich	Birmingham, Forand Sls.	313-644-0087
Minn	New Brighton, TWC Sls.	612-636-1770
NY	Great Neck, Trionic	516-466-2300
NY	Pompey, S.F. Foster	315-677-3333
NY	Webster, S.F. Foster	716-265-2072
Ohio	Dayton, Kimconics Sls.	513-898-1783
Okla	Tulsa, Allied Comps.	918-492-7771
Pa	Waterford, Kimconics Sls.	814-796-6556
Tex	Dallas, Allied Comps.	214-238-0408
Tex	Houston, Allied Comps.	713-960-1962
Wash	Tukwila, General Elctrncs.	206-575-4030

Local Distributors

Ariz	Phoenix	602-272-7951
Cal	San Diego	714-278-5020
Cal	Santa Clara	408-244-7600
Cal	South Gate	213-773-6521

(TM)KELVIN KLAMPS - four-terminal clamps - Electro Sci. Inds.

(TM)KELVIN KLIPS - four-terminal clips - E.S.I. Inc.

(TM)KELVIN KLIPS - four-terminal clips - Electro Sci. Inds.

(TM)KEMET - tantalum, ceramic & film capacitors - Union Carbide Corp.

(TM)KEMFUZE - chemical fuse - Bel Fuse

KEMLITE LABS., INC., Dept. EM, 1819 W. Grand Ave., Chicago, Ill. 60622, Tel: 312-829-6050; Empl.: 65

Sales Manager: J.V. Daniels

KEMPER ENGINEERING CO., Dept. EM, 9337 Shoshone Ave., Northridge, Cal. 91324, Tel: 213-886-0121; Empl.: 7

(TM)KEMPURE - inert gas purifiers - Kewaunee Scien. Equip. Corp.

KEMTRON ELECTRON PRODS., INC., Dept. EM, 14 Prince Pl., Newburyport, Mass. 01950, Tel: 617-462-4464

(TM)KENBRITE - zinc plating bath - Conversion Chem. Corp.

(TM)KENCAD - cadmium plating bath - Conversion Chem. Corp.

KENCO ALLOY & CHEMICAL CO., INC., Dept. EM, 418 W. Belden Ave., Addison, Ill. 60101, Tel: 312-543-2510; Empl.: 12

Local Sales Offices & Reps.

Ariz	Phoenix, K. Jahn Co.	602-956-9060
Cal	Burbank, L. Marraffino Co.	213-849-6565
Cal	Mountain View, Morse Assocs.	415-968-7722
Colo	Broomfield, Karl Jahn Co.	303-469-4446
Fla	Ft Lauderdale, Howard Assocs.	305-771-0817
Ind	Indianapolis, Metron Co.	317-897-6463
Mass	Hudson, E.P.E. Corp.	617-562-9123
Minn	Minneapolis, Production Automation Corp.	612-866-5700
Mo	Springfield, Del-Tech Assocs.	417-881-3667
NJ	Princeton, Krone & Rubin Assocs.	
NY	Lake Grove, LI, Krone & Rubin Assoc.	516-585-3996
NY	Rochester, Krone & Rubin Assoc.	716-266-4630
Ore	Portland, Precision Chemical Co.	
Tex	Dallas, Production Automation Corp.	214-620-0227
Exp:	Ill., Addison, Kenco Alloy & Chemical Co.	

(TM)KENCOR - magnetic drum memories - Kenton Engrg. Corp.

KENNEDY CORP., M.S., Dept. EM, Pickard Dr., Syracuse, N.Y. 13211, Tel: 315-455-7077

(TM)KEN-RAD - radio tubes - General Elec. Co.

KENTON ENGRG. CORP., Dept. EM, 8232 Christiana Ave., Skokie, Ill. 60076, Tel: 312-677-8280; FSC No.: 18308; Empl.: 23

(TM)KENTRIX - multimeter & meter line & its accs. - Uchida of America Corp.

KENTUCKY ELECTRONICS, INC., Dept. EM, 1204 Industrial Dr., Box 507, Owensboro, Ky. 42301, Tel: 502-684-0431, Telex: 20-4305; Empl.: 300

Local Sales Offices & Reps.

Ariz	Scottsdale, Biedler & Biedler	602-947-5773
Cal	Atherton, Wadsworth-Pacific Mfg. Assocs.	415-321-3619
Cal	Hacienda Heights, Wadsworth-Pacific Mfg. Assocs.	213-330-5592
Cal	Pacific Palisades, Wadsworth-Pacific Mfg. Assocs.	213-454-4313
Ind	Richmond, Bartelmy & Assoc.	317-966-6021
Tex	Dallas, Waddle Sls. Co.	214-638-2860

(TM)KENVERT - sealers, acids, dry powders - Conversion Chem. Corp.

KEPCO, INC., Dept. EM, 131-38 Sanford Ave., Flushing, N.Y. 11352, Tel: 212-461-7000, TWX: 710-582-2631; Empl.: 200 .... p. 3274-3279

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith Co.	205-881-3294
Ariz	Tempe, J.F. Hurlbut Co.	602-968-5962
Cal	Los Angeles, Windsor Dynamics	213-990-4173
Cal	San Francisco, N-S Assocs.	415-854-4870
Colo	Denver, J.F. Hurlbut Co.	303-279-7796
Conn	Farmington, R. Perron Co.	203-673-4825
Conn	Trumball, R. Perron Co.	203-268-9631
Fla	Orlando, J.L. Highsmith Co.	305-293-5202
Ill	Chicago, Midwest Elctrn. Sls.	312-777-9700
Iowa	Cedar Rapids, Midwest Elctrn. Sls.	319-362-4410
Kans	Shawnee Mission, K. Kelly & Co.	913-722-0000
Md	Baltimore, Eastern Instrumentation	301-792-7039
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Boston, R. Perron Co.	617-762-8114
Mich	Detroit, Carter McCormick & Peirce Inc.	313-477-7700
Minn	Minneapolis, E.C. Elctrn. Sls.	612-831-0229
Mo	St. Louis, Kathrinus, Kelly & Co.	314-968-3800
NH	Dover, R. Perron & Co.	603-742-2321
NM	Albuquerque, Technology Mktg. Assoc.	505-298-4321
NY	New York, Eastern Instrumentation	201-567-9505
NY	Rochester, NACO Elctrns. Corp.	716-223-4490
NY	Syracuse, Naco Elctrns. Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
NC	Charlotte, J.L. Highsmith Co.	704-333-7743
Ohio	Cleveland, Carter McCormick & Peirce Inc.	216-333-5650
Ohio	Dayton, Carter McCormick & Peirce Inc.	513-278-5873
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Pa	Pittsburgh, Carter McCormick & Peirce	412-372-4415
Tex	Dallas, Airep Elctrns.	214-827-2120
Va	Norfolk, Eastern Instrumentation	800-638-2720
Va	Richmond, J.L. Highsmith Co.	804-272-5888
Wash	Seattle, H. Levinson Co.	206-323-5100
Wisc	Milwaukee, Midwest Elctrn. Sls.	414-542-5129

KEPRO CIRCUIT SYSTEMS, INC., Dept. EM, 3630 Scarlet Oak Blvd., Tree Court Ind'l. Pk., St. Louis, Mo. 63122, Tel: 314-225-5166; Empl.: 12

Local Sales Offices & Reps.

Cal	La Jolla, Phelan Co.	714-454-6444
Cal	La Selva Beach, Belchamber & French	408-722-0444
Colo	Westminster, Electro-Tek Sls.	303-255-4566
Ill	Skokie, M. Bermann Sls.	312-675-3740
Iowa	Des Moines, Kathrinas-Kelly & Co.	515-255-4584
Kans	Shawnee Mission, Kathrinas-Kelly & Co	913-722-0000
Md	Baltimore, Par-Nell Sales Co.	301-992-5454
Mass	Sharon, A. Appell Assocs.	617-784-3439
Minn	Minneapolis, C. Gibb Co.	612-377-1200
Mo	St. Louis, Kathrinas-Kelly & Co.	314-968-3800

NY	Long Island City, D.F. Tobias & Co.	201-239-8585
Ohio	St. Mary's, Repp-Tronics	419-394-4724
Pa	Holland, Par-Nell Sls. Co.	215-355-9330
Pa	Pittsburgh, Repp-Tronics	412-561-4687
Tex	San Antonio, W.R. Retzloff Co.	512-533-7839
Exp:	Mo., St. Louis, Brauner Export Co.	314-426-2600

™KERN - lenses - Heitz, Inc., Karl

KERTRON, INC., Dept. EM, 7516 Central Ind'l. Dr., Riviera Beach, Fla. 33404, Tel: 305-848-9606, TWX: 510-952-7611; Empl.: 160

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Inc.	602-950-1149
Cal	Palos Verdes Peninsular, B. Gray & Assocs.	213-373-1820
Cal	Redwood City, Parks & Pruitt	415-364-1640
Colo	Denver, Camel Elctrns.	303-757-6192
Ill	Chicago, Derndt Assoc.	312-283-0713
Kans	Overland Park, Palatine Engrg. Sls.	913-262-5643
Md	Silver Spring, Rep-Tron	301-593-4844
Mass	Framingham, G. Rosen Co.	617-879-5505
Mich	Southfield, Reps. Elctrn. Prods.	313-354-9066
Mo	St. Louis, Engrg. Svcs.	314-997-1515
NY	East Rockaway, W. Bellenkes & Assoc.	516-887-1443
Ohio	Cincinnati, Giesting Assocs.	513-931-0812
Okla	Tulsa, Palatine Engrg. Sls.	918-622-0321
Pa	Ambler, WM Assocs.	215-643-4119
Tenn	Bristol, Rakes Engrg. & Mktg. Co.	615-968-4195
Tex	Richardson, Palatine Engrg. Sls.	214-231-9489

KEP

KESSLER-ELLIS PRODS., Dept. EM, 120 1st Ave., Atlantic Highlands, N.J. 07716, Tel: 201-291-0500, 800-631-2165, Telex: 13-2496; FSC No.: 28222; Empl.: 50; Minimum order: $C. Ellis p. 1666,1667,2394-2396

Sales Manager: L. Gleason; *Distributor Manager:* C. Ellis

Local Sales Offices & Reps.

Ala	Huntsville, Electro Mech Sls	205-883-9624
Cal	Downey, Groh Ass.	213-923-0963
Cal	Los Altos, Serra Assocs.	408-738-1117
Colo	Denver, Palmer Assocs.	303-629-0112
Fla	Clearwater, WMM Assoc.	813-447-2533
Ga	Atlanta, Electro Mech Sls.	404-449-6337
Ill	Des Plaines, Lincoln Hodges	312-297-3810
Kans	Overland Park, Electri-Rep	913-649-2168
Md	Silver Springs, H.R. Siebar	301-589-9110
Mass	Woburn, Gilway Sls. Co.	617-935-4442
Mich	Dearborn, Pitcher-Paulin	313-582-5450
Minn	Minneapolis, R.J. Sls.	612-922-1425
NY	Rochester, Tacom Sls.	716-647-3940
NY	White Plains, Swedelco Inc	914-946-1122
NC	Raleigh, Electro Mech Sls	919-782-7586
Ohio	Worthington, Industrial Comp Sls Co.	614-846-5358
Pa	Media, W. Reeves	215-566-6709
Pa	Pittsburgh, Grey Glass	412-366-6664
Tenn	Nashville, Electro Mech Sls	615-256-2516
Tex	Houston, W. Carey Assocs.	713-460-1111
Tex	Richardson, W. Carey Assocs.	214-234-2202
Utah	Salt Lake City, Palmer Assocs.	801-534-0862
Wash	Seattle, C. Parsons	206-762-7373
Wisc	Waukesha, Rockwell, Brown, Lincoln, Hodges	414-542-3087

KESTER SOLDER DIV., Litton Systems Inc., Dept. EM, 4201 Wrightwood Ave., Chicago, Ill. 60639, Tel: 312-235-1600; Empl.: 350

Local Sales Offices & Reps.

Cal	Anaheim	714-871-0280
NJ	Newark	201-589-0246

KEUFFEL & ESSER CO., Dept. EM, 20 Whippany Rd., Morristown, N.J. 07960, Tel: 201-285-5181; Empl.: 2200

Local Sales Offices & Reps.

Alas	Anchorage	907-277-2506
Cal	Los Angeles	213-747-7601
Cal	S. San Francisco	415-873-6850
Colo	Denver	303-733-2451
Fla	Jacksonville	904-398-6471
Fla	Orlando	305-423-1641
Ga	Norcross	404-448-6352
Ill	Northbrook	312-564-0880
Kans	Wichita	316-265-8505
Md	Baltimore	301-252-3344
Mich	Troy	313-549-9100
Mo	Kansas City	816-842-9077
Mo	St. Louis	314-773-8500
NJ	Teterboro	201-288-3900
NJ	Trenton	609-882-8000
NY	E. Syracuse	315-437-1417
NY	Long Island City	212-361-2190
NY	New York	212-MU7-6512
Ohio	Cleveland	216-241-7807
Ohio	Cuyahoga Falls	216-929-8371
Ohio	Toledo	419-475-3427
Pa	Ft. Washington	215-643-2570
Tex	Dallas	214-630-8083
Tex	Houston	713-789-9800
Tex	San Antonio	512-223-3811
Va	Arlington	703-524-9000
Va	Norfolk	804-625-2591
Wash	Seattle	206-623-5535
Wisc	Milwaukee	414-444-1890

KEWAUNEE SCIEN. EQUIP. CORP., Dept. EM, 4012 Logan St., Adrian, Mich. 49221, Tel: 517-263-5731; Empl.: 750

KEY INSTRUMENTS, INC., Dept. EM, 1520 W. Rosecrans Ave., Gardena, Cal. 90249, Tel: 213-324-1194, TWX: 910-346-7021

Local Sales Offices & Reps.

Cal	Los Angeles, Intervene Inds	213-821-7936
Del	Wilmington, Spring Assocs.	302-571-1195

KEY TRONIC CORP., Dept. EM, Bldg. 14, Spokane Ind'l. Pk., Spokane, Wash. 99216, Tel: 509-928-8000, TWX: 510-773-1885; FSC No.: 52833; Empl.: 425

Local Sales Offices & Reps.

Ala	Huntsville, Barnhill & Assocs.	205-883-9434
Ariz	Scottsdale, Fred Board Assocs.	602-994-9388
Cal	Canoga Park, Chandler Assocs.	213-340-6103
Cal	Los Altos, Casey-Johnston	415-941-6892
Colo	Denver, Thorson Co.	303-759-0809
Conn	North Haven, Datcom	203-288-7005
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Chicago, L-Tec, Inc.	312-286-1500
Ind	Indianapolis, Sheridan Assocs.	317-547-7777
Kans	Overland Park, Sheridan Assocs.	913-383-1636
Md	Timonium, Barnhill & Assocs.	301-252-6360
Mass	Waltham, Datcom	617-891-4600
Mich	Farmington, Sheridan Assocs.	313-477-3800
Minn	Minneapolis, M. Foster Tech. Sls.	612-835-2252
Mo	Florissant, Sheridan Assocs.	314-837-5200
NJ	Camden, QED Elctrns.	215-925-8711
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Elmont, Crane & Egert Corp.	516-488-2100
NY	Pittsford, NoCo, Inc.	716-461-4750
NC	Raleigh, Barnhill & Assocs.	919-876-5617
Ohio	Beachwood, Sheridan Assocs.	216-831-0130
Ohio	Cincinnati, Sheridan Assocs.	513-761-5432
Ohio	Dayton, Sheridan Assocs.	513-277-8911
Ore	Portland, Western Tech. Sls.	503-297-1711
Pa	Pittsburgh, Sheridan Assocs.	412-244-1640
Tex	Dallas, Ralph Matthews Elctrns.	214-233-0363
Va	Lynchburg, Barnhill & Assocs.	804-846-4624
Wash	Bellevue, Western Tech. Sls.	206-641-3900
Wisc	Greenfield, L-Tec, Inc.	414-545-8900

Keystone

KEYSTONE CARBON CO., Thermistor Div., Dept. EM, St. Marys, Pa. 15857, Tel: 814-781-1591, Telex: 91-4517; Empl.: 1100 p. 4317-4319

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Cal	San Carlos, Electro Pacific	415-592-3114
Cal	Sierra Madre, McCornack & Assocs.	213-355-0466
Conn	Wethersfield, L.J. Labant	203-529-0048
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Elk Grove Village, Knoblock & Assoc.	312-593-5940
Ind	Fort Wayne, R.O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assoc.	317-453-3592
Iowa	Cedar Rapids, F.A. Noll	319-364-3271
Kans	Shawnee, Benson Engrg.	913-631-4113
Ky	Louisville, R.O. Whitesell & Assoc.	502-897-1569
La	Gretna, Cartwright & Bean	504-362-4649
Md	Baltimore, Coulbourn DeGreif	301-247-4646
Mich	Grand Rapids, J.L. Montogomery Co.	616-774-9308
Mich	Southfield, J.L. Montgomery Assoc.	313-358-2616
Minn	Minneapolis, Stoss Assocs.	612-925-2757
Miss	Jackson, Cartwright & Bean	601-981-1368
NJ	Cinnaminson, T. McLaughlin	609-786-0477
NY	Pompey, S.F. Foster Co.	315-677-3333
NY	Webster, S.F. Foster Co.	716-265-2072
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburg Hgts., R.O. Whitesell & Assoc.	216-826-4424
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277
Tenn	Greenville, R.O. Whitesell & Assocs.	615-639-6154
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Benson Engrg.	214-352-7541
Exp:	N.Y., Westbury, Minthorne Int'l.	516-334-3303

KEYSTONE ELCTRNS. CORP., Dept. EM, 49 Bleeker St., New York, N.Y. 10012, Tel: 212-475-4600; FSC No.: 91833; Empl.: 50; Minimum order: $D. Rosenberg p. 2116-2120

Sales Manager: J. Banks; *Distributor Manager:* D. Rosenberg

Local Sales Offices & Reps.

Ala	Birmingham, Maitland Smith Inc.	205-979-4894
Ariz	Phoenix, Arrowhead Sals	602-277-7148
Cal	Daly City, R. Del Bucchia Assocs.	415-756-1664
Cal	Palos Verdes Est., Vedax	213-378-3685
Colo	Arvada, Arrowhead Sls.	801-487-3444
Conn	Milford, Conti-Younger Assocs.	203-929-3294
Fla	N. Miami, Len Hass Co.	305-949-9143
Ga	Tucker, Maitland Smith Inc.	404-938-7161
Ill	Chicago, Memac Sls.	312-545-1033
Ind	Indianapolis, Marketing Engrs Inc.	317-546-1523
Iowa	Cedar Rapids, PMA Corp.	319-362-9177
Kans	Overland Park, Penzner Assocs.	913-381-0004
Kans	Wichita, PMA Corp.	316-264-2662
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Mich	Grand Rapids, Van Riper Sls.	616-452-0464
Minn	Minneapolis, Marsh Sls.	612-881-7511
Mo	Maryland Heights, PMA Corp.	314-569-1220
NJ	Berkeley Heights, Cambridge-allen Assocs.	201-464-0203
NJ	Medford Lakes, Component Consultants	609-654-2800
NY	Fayetteville, Martin P. Andrews Inc.	315-637-3144
NY	New York City, Cambridge-Allen Assocs.	212-682-5844
NC	Charlotte, Maitland K. Smith	704-372-1026
Ohio	Brecksville, WRR Assocs.	216-526-2023
Tex	Houston, Wheelex Inc.	713-771-2214
Tex	Hurst, Wheelex Inc.	817-268-1812
Wash	Seattle, R. K. Squibb, Inc.	206-632-2450

KGS ELECTRONICS, INC., Dept. EM, 2029 N. Lincoln Ave., Pasadena, Cal. 91103, Tel: 213-798-0786; Empl.: 25 p. 3273,4422

™K & H - speaker systems, equalizers - Gotham Audio Corp.

KIDDE, WALTER & CO., Belleville Div., Dept. EM, 675 Main St., Belleville, N.J. 07109, Tel: 201-759-5000, TWX: 710-995-4925

Local Sales Offices & Reps.

Cal	Signal Hill	213-595-5488
Ga	Atlanta	404-451-6122
Ill	LaGrange	312-352-1910
NJ	Totowa	201-785-4224

™KIFIS - integrated flight instrument system - Kollsman Instr. Co.

KIKUSUI ELCTRNS. CORP., Dept. EM, 3-1175, Shinmaruko-Higashi, Kawasaki City, Kanagawa-Pref., Japan, Tel: 044-41-0111

™KILO-PAC - Power Supply - Velonex, Instrument Div.

(TM)KILOVAC - vacuum relays - Kilovac Corp.

KILOVAC CORP., Dept. EM, Box 4422, Santa Barbara, Cal. 93103, Tel: 805-684-4560, TWX: 910-336-1141; FSC No.: 18741; Empl.: 100 .... p. 3565-3570

Local Sales Offices & Reps.

Ariz	Tempe, Gassner & Clark (Arizona)	602-968-9037
Cal	Fremont, Spence Assocs.	415-656-9506
Cal	Los Angeles, Rep. Assocs.	213-829-5401
Conn	Newton, Kanan Assocs.	203-426-8157
Fla	Seminole, Harvey Pipe	813-391-3057
Ill	Westchester, Gassner & Clark	312-345-4245
Iowa	Cedar Rapids, H.R.Brown Sls. Co.	319-366-0635
Kans	Shawnee Mission, M. Bettis	913-362-0772
Kans	Wichita, M.E. Bettis Co.	316-685-7441
Mass	Reading, Kanan Assocs.	617-944-8484
Minn	St. Paul, De Beck	612-690-1557
Mo	St. Louis, M. Bettis	314-429-2099
NM	Albuquerque, Data Handling	505-268-4364
NY	Cazenovia, S.T./Woolard, Co.	315-655-8145
NY	Great Neck, Trionic	516-466-2300
NY	Rochester, Lamb	716-544-5580
NC	Charlotte, DGW, Inc.	704-334-7090
NC	Winston-Salem, DGW, Inc.	919-768-7166
Ohio	Cleveland, Components	216-243-9200
Ohio	Hamilton, Components	513-721-2997
Ohio	W. Carrollton, Components	513-866-0661
Okla	Tulsa, Norvell Assocs., Inc.	918-663-1247
Ore	Portland, Components West, Inc.	503-649-5681
Pa	Library, Components	412-833-9380
Pa	Paoli, Tyler Griffin	215-647-1550
Tex	Austin, Norvell Assocs.	512-458-8106
Tex	Dallas, Norvell Assocs.	214-233-0020
Tex	Houston, Norvell	713-777-1666
Wash	Seattle, Components West	206-243-2133

KILOVOLT CORP., Dept. EM, 238 High St., Hackensack, N.J. 07602, Tel: 201-488-7373; Empl.: 22 .... p. 3280,3281

Local Sales Offices & Reps.

Cal	Sherman Oaks, Windsor Dynamics, Inc.	213-990-4173
Conn	Meriden, Abbott-Allison Co., Inc.	203-237-9232
Ill	Chicago, P. Lind Elctrns. Co.	312-774-1246
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Mich	Kalamazoo, Carter, McCormic & Peirce	616-349-9666
Minn	Circle Pines, Lind Elctrns.	612-786-5770
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415

(TM)KILOVOLT STAC - high voltage silicon rectifier for oil - Semtech Corp.

KIMBERLY-CLARK CORP., Interior Packaging Dept., Dept. EM, N. Lake St., Neenah, Wisc. 54956

(TM)KIMFOL - polycarbonate film - Schweitzer, Div.

(TM)KIMFONE - polysulphone film - Schweitzer, Div.

(TM)KINAMATIC - machines electric motors & generators - General Elec. Co.

(TM)KINATROL - machines & controls - General Elec. Co.

(TM)KINE-FINISH - roll-finishing dies - MPB Corp.

(TM)KINEFORM - roll forming dies - MPB Corp.

KINEMETRICS, INC., Dept. EM, 222 Vista Ave., F. 2, Pasadena, Cal. 91107, Tel: 213-287-9789, Telex: 67-5402; Empl.: 45

Local Sales Offices & Reps.

NJ	Berkeley Heights, Kinemetrics, Inc.	201-464-3933

(TM)KINE-MISER - roll-roll-forming & roll-finishing attachments on turning machine - MPB Corp.

(TM)KINE-ROLLER - roll-forming & roll-finishing machines - MPB Corp.

KINETIC SYSTEMS CORP., Dept. EM, 11 Maryknoll Dr., Lockport, Ill. 60411, Tel: 815-838-0005, TWX: 910-638-2831; Empl.: 40

KINETRON CORP., Dept. EM, 1416 Roller Rd, Asbury Park, N.J. 07712, Tel: 201-776-9595; Empl.: 12

KINGMANN-WHITE, INC., Dept. EM, Box 669, Placentia, Cal. 92670, Tel: 714-528-2111

KING RADIO CORP., Dept. EM, 400 N. Rogers Rd., Olathe, Kans. 66061, Tel: 913-782-0400, Telex: WJD4-2299; Empl.: 2300

Sales Manager: B. Glover, V.P.

Local Sales Offices & Reps.

Cal	Los Angeles	213-821-5113
Ga	Atlanta	404-763-0083
Kans	Olathe	913-782-0400
Kans	Wichita	316-686-7435
Tex	Dallas	214-661-0161

KING-SEELEY THERMOS CO., King-Seeley Div. Thermos Co., Dept. EM, Box 423, Kendallville, Ind. 46755, Tel: 219-347-1000; Empl.: 450

KING-WAY ASSOC., Dept. EM, 16400 Ventura Blvd., Encino, Cal 91316, Tel: 213-788-4124

KINGS ELECTRONICS, Dept. EM, 40 Mabledale Rd., Tuckahoe, N.Y. 10707, Tel: 914-793-5000, TWX: 710-562-0110; FSC No.: 91836; Empl.: 360

Local Sales Offices & Reps.

Alas	Anchorage, H. Lang Assocs.	907-279-5741
Cal	Daly City, R. Del Bucchia & Assoc.	415-756-1664
Cal	Westminster, A. A. Dowers Co.	714-894-1123
Colo	Denver, Lindberg Co.	303-758-9033
Fla	St. Petersburg, Reptronics	813-522-8220
Ga	Norcross, Macro-Mktg.	205-883-9630
Ill	Chicago, D. Dolin Sls. Co.	312-286-6200
Iowa	Marion, Thomas & Modrcin Assocs.	319-377-6261
Md	Lutherville, Dougherty Sls. Co.	301-321-7890
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mo	St. Louis, Boweng Co.	314-429-7327
NY	Massapequa, Coughlin Assocs.	516-799-7743
NY	Rochester, Telesco Assoc.	716-271-3780
Ohio	Dayton, F. L. Ohmer & Assoc.	513-434-1454
Pa	Doylestown, T.O.E. Sls.	201-568-5747
Tex	Dallas, Bradenco	214-358-3278
Wash	Seattle, R. K. Squibb	206-632-2450

KINGSLEY MACH. CO., Aero-Space Div., Dept. EM, 850 Cahuenga Blvd., Hollywood, Calif. 90038, Tel: 213-469-7243, TWX: VCL-465-4191

(TM)KINGSLEY WIRE-MARKING MACHINES - marking machines - Kingsley Mach. Co.

(TM)KINGSPLICE - large size splicing equipment - Autosplice/Dv Gen Staple

(TM)KINK-LOC - lead formations - Radio Materials Co.

(TM)KINOPTIK - camera lenses & accessories - Heitz, Inc., Karl

KINSEKISHA LAB. LTD., Dept. EM, 23-17 2-chome Miyasaka, Setagaya-ku Tokyo, Japan, Tel: 429-2111, Telex: J24-22659; Empl.: 735

KISTLER INSTR. CO., see Sunstrand Data Control, Inc.

KLEIN, MATHIAS & SONS, INC., see Klein Tools, Inc.

(TM)KINTRAC VII - kinetic rate monitoring instruments - Beckman Instrs., (AISSD)

(TM)KISTLER - dynamic instruments - Sundstrand Data Control, Inc.

(TM)KITTRAY ASSEMBLY CENTER - small parts assembly station - Parsons Mfg. Corp.

(TM)KLEEN-STRIP - self-stripping foil-shielded cables - National Wire & Cable Corp.

(TM)KLEENTROL - contact cleaner - R-Columbia Products, Inc.

(TM)KLEER SPRAY - acrylic coating - Chemtronics, Inc.

KLEIN TOOLS, INC, Dept. EM, 7200 McCormick Rd., Chicago, Ill. 60645, Tel: 312-588-6820, Telex: 72-4431

(TM)KLIP-BLOK - solderless lead connector - Vector Electronic Co., Inc.

(TM)KLIPRING - rings, retaining - Waldes Kohinoor, Inc.

KLIPSCH & ASSOCS. INC., Dept. EM, Box 688, Hope, Ark 71801, Tel: 501-777-6751; Empl.: 53

Local Sales Offices & Reps.

Ark	Little Rock, J. Fountain	501-821-3546
Cal	Palo Alto, J. Thornton Co.	415-494-2761
Colo	Boulder, Justiss & Assoc.	303-442-4827
Fla	Tampa, Repelect	813-227-5051
Md	Gaithersburg, Electronic Marketers	301-840-1887
Mass	Holliston, W. H. Bell	617-429-2424
Mich	Detroit, D. Neumaier & Assoc.	313-838-3850
NY	Gloversville, D Croucher	518-725-1145
NY	Great Neck, Audio Plus	516-482-8676
Wash	Seattle, R. Johnston Co.	206-524-5171

(TM)KLIPSCHORN - loudspeaker system - Klipsch & Assocs. Inc.

(TM)KLIP SELS - transient surge suppressors - International Rectifier Corp.

(TM)KLIPSOCKET - lampholders - Chicago Switch, Inc.

(TM)KLIPTITE - push-on terminal tabs - Kulka Elec. Corp.

(TM)KLIXON - motor controls - Texas Instruments Control Prods. Div.

KLM ELECTRONICS, Dept. EM, 17025 Laurel Rd., Morgan Hill, Cal. 95037, Tel: 408-779-7363; Empl.: 19

KLOCKNER MOELLER CORP., Dept. EM, 4 Strathmore Rd., Natick, Mass. 01760, Tel: 617-655-1910

KMC SYSTEMS INC., Dept. EM, 200 State Highway 17, Mahwah, N.J. 07430, Tel: 201-529-4220, Telex: 138-798

KMS INDUSTRIES, INC. , Dept. EM, 220 E. Huron St., Ann Arbor, Mich 48108

(TM)K & N LEVEL - zinc plating bath - Conversion Chem. Corp.

(TM)KNOBPOT - potentiometer - Bourns, Inc.

KNOL ENTERPRISE, Dept. EM, 200 Suburban Rd., San Luis Obispo, Cal. 93401, Tel: 805-544-4881; Empl.: 4

KNOWLES ELCTRNS., INC., Dept. EM, 3100 N. Mannheim Rd., Franklin Park, Ill. 60131, Tel: 312-455-3600, Telex: 72-8397

(TM)KODACEL - plastic film & sheet - Eastman Chem. Prods.

KOH-I-NOOR RAPIDOGRAPH, Dept. EM, 100 North St., Bloomsbury, N.J. 08804, Tel: 201-479-4124, TWX: 510-235-3340

Sales Manager: R. M. LaBarre

KOLE ENTERPRISES, INC., Dept. EM, 3553 N.W. 50th St., Miami, Fla. 33142, Tel: 305-633-2556

Sales Manager: C. Chartrand

KOLIN INDUSTRIES, Dept. EM, 59 W. Pondfield Rd., Bronxville, N.Y. 10708, Tel: 914-961-5065

KOLLSMAN INSTR. CO., Dept. EM, Daniel Webster Hwy., Merrimack, N.H. 03054, Tel: 603-889-2500, TWX: 710-366-6883; Empl.: 1100

Local Sales Offices & Reps.

Cal	Long Beach	213-595-5441
DC	Arlington	703-979-1200
Ohio	Xenia	513-429-2999
Wash	Seattle	206-641-4742

KONTAKT-CHEMIE DIV., see Regmo Data Corp.

(TM)KOLOR-KODE - card ejectrors - UNITRACK Div.

(TM)KONTACT 60 - aerosol contact cleaner - Jonard Industries Corp.

™KONTAKT-CHEMIE - sprays for electronic equipment - Regmo Data Corp.

™KONTAKT WL - degreaser-washer - Regmo Data Corp.

™KONTAKT 60 - contact cleaner - Regmo Data Corp.

™KONTAKT 61 - anti-corrosion lubricator - Regmo Data Corp.

™KON-TORK - torque proportioning differentials - Allis-Chalmers

™KOOLER-GUIDE - metal heat sink card guide - UNITRACK Div.

™KOOLER-KAGE - p.c. card rack with built-in blower - UNITRACK Div.

™KOOLER-KROWN - heat dissipator - UNITRACK Div.

KOOLTRONIC INC., Dept. EM, Hamilton Ave., Hopewell, N.J. 08525, Tel: 609-466-3400, Telex: 84-3345; Empl.: 150

Sales Manager: C.W. Thompson

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns	205-881-5031
Ariz	Tempe, Jarko Assocs.	602-966-3020
Cal	Canoga Pk., Ebert Entprs.	213-887-7578
Cal	San Mateo, Halbar Assoc.	415-349-4700
Colo	Denver, McLoud & Raymond	303-756-1589
Fla	Maitland, Beacon Elctrns	305-647-3498
Ga	Atlanta, Beacon Elctrns	404-351-3654
Ill	Palatine, J. Clark Co.	312-358-5095
Kans	Shawnee Mission, Inland Assoc.	913-362-2366
Md	Randallstown, Beacon North Inc.	301-922-1248
Minn	Minneapolis, C. R. Gibb Co.	612-377-1200
Mo	St. Louis, Inland Assoc.	314-821-3742
NY	Rochester, Precision Sls.	716-473-6310
NY	Syracuse, Precision Sls.	315-458-2223
NC	Greensboro, Beacon Elctrn. Assocs.	919-674-9432
Ohio	Sylvania, Deo-Volente & Assoc.	419-882-2830
Pa	Bala Cynwyd, Elec-Tech Inc.	215-687-5305
SC	Spartanburg, Beacon Elctrns	803-582-4613
Tex	Dallas, Blackburn Assoc.	214-692-8885
Va	Falls Church, Beacon North Inc.	703-534-1673

KOPP GLASS, INC., Dept. EM, Box 8255, Swissvale, Pittsburgh, Pa. 15218, Tel: 412-271-0190; Empl.: 175

™KORLESS ELECTRODES - edm electrodes - Uniform Tubes Inc.

KORRY MFG. CO., Dept. EM, 223 8th Ave. N., Seattle, Wash. 98109, Tel: 206-223-5400, TWX: 910-444-2295; Empl.: 156

Local Sales Offices & Reps.

Ala	Huntsville, Craft Assoc. Co.	205-837-0221
Ariz	Phoenix, Toward Engr. Assoc.	602-955-3193
Cal	Mountain View, Westrep	415-968-5800
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Conn	New Canaan, S. Pierce, Inc.	203-966-4639
Fla	Maitland, W.H. Boggs	305-647-2226
Ga	Atlanta, Craft Assoc. Co.	404-393-0400
Haw	Pico Rivera, Westrep	213-949-2551
Ill	Chicago, Engineered Sls. Co.	312-867-8434
Ind	Fort Wayne, McDonald Sls. Co.	219-747-3650
Kans	Wichita, R. Elston	316-682-7082
Md	Glen Arm, Hodgins Assoc.	301-592-7047
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Mo	St. Louis, Ensco-Rep	314-542-3935
NY	New Rochelle, Display Comps. Sls. Co.	914-636-4664
Ohio	Dayton, Whelan Corp.	513-434-7551
Tex	Dallas, Ammon & Rizos	214-233-5591

™KORVEX - shrinkable tubing - Chemplast, Inc.

™KPMP - powdered metal products - Kwikset Powdered Metal Prods.

™K-PRENE - urethane material - Di-Acro

K R ELECTRONICS, INC., Dept. EM, 91 Avenel St., Avenel, N.J. 07001, Tel: 201-636-1900; Empl.: 18

Local Sales Offices & Reps.

Cal	S. Pasadena, Beckrep, Inc.	213-799-4634

KRACO ENTERPRISES INC., Dept. EM, 2411 N. Santa Fe Ave., Compton, Cal 90224

™KRAK-STIK - sealant & pipe thread compound - Lake Chemical Co.

™KRALASTIC - electroplating chem. - Uniroyal, Inc.

KRATOS, Dept. EM, 403 S. Raymond Ave., Bin 45, Pasadena, Cal 91109, Tel: 213-449-3090, TWX: 910-588-3288; FSC No.: 34830; Empl.: 340

Local Sales Offices & Reps.

Cal	San Carlos, Pyramid Sls.	415-494-8888
Conn	Bethel, JSR Assoc.	617-532-0348
Fla	Miami, Ludlum Assoc.	305-592-6523
Fla	Orlando, Ludlum Assoc.	305-894-7761
Ga	Atlanta, Electro-Mech Sls. Engrg. Co.	404-449-6337
Ill	Addison, R. Edward Stemm, Inc.	312-279-2440
Md	Glen Arm, Hodgins Assocs.	301-592-7047
Mass	Peabody, JSR Assocs.	617-532-0348
Minn	St. Paul, Cullen & Assocs.	612-646-7371
Mo	St. Louis, PEM Sales Co.	314-427-7200
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	N. Massapequa, C. B. Hopkins Co.	516-796-0066
NY	Syracuse, Labtronics, Inc.	315-454-9314
Ohio	Cleveland, Imtech Corp.	216-826-3400
Okla	Tulsa, Knight Engineering Company, Inc.	918-749-7785
Tex	Hurst, Kratos Dallas Sls. Off.	817-268-4165
Wash	Bellevue, Doland Co.	206-454-4952
Wisc	West Allis, Electric Power & Light Equipment Co.	414-258-8488

KRECKMAN, HERB CO., Dept. EM, Cresco, Pa. 18326, Tel: 717-595-2212; Empl.: 4

™KRECO - communications antennas - Kreckman, Herb Co.

™KRIMPTITE - butted seam terminal - ITT Cannon/ETC Terminal Products

KRIS INC., Dept. EM, N144 W5660 Pioneer Rd., Cedarburg, Wisc. 53012, Tel: 414-375-1000, TWX: 910-276-3616; Empl.: 100

Sales Manager: B. Garry

Local Sales Offices & Reps.

Ariz	Phoenix, H. Moore Sls.	602-274-4558
Cal	Sunnyvale, Connor & Assocs.	408-733-6433
Cal	Torrance, Barstow & Doran Inc.	213-325-2244
Colo	Arvada, CB Elctrn. Mktg.	303-422-0561
Fla	Hollywood, Wallace Elctrn. Sls.	305-625-3239
Fla	Tampa, Wallace Elctrn. Sls.	813-961-1037
Ga	Jonesboro, Wallace Elctrns. Sls.	404-471-6297
Ill	Highland Park, Bransky Sls.	312-433-2375
Ind	Indianapolis, Marketing Engrs.	317-546-1523
Mass	Sherborn, Sam Adelman Assocs.	617-653-7960
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Lowell M. Fisher Co.	612-881-0944
Mo	Kansas City, Forristal-Young Sls.	816-358-6771
Mo	St. Louis, Forristal-Young Sls.	314-645-2360
Neb	Omaha, Forrsital-Young Sls.	402-333-0800
NY	Tonawanda, M. Farber Assoc.	716-692-1620
NC	Greensboro, Wallace Elctrn. Sls.	919-292-0487
NC	Kernersville, Wallace Elctrn. Sls.	919-993-3993
Ohio	Cleveland, Schroeder Sls.	216-268-3636
Pa	Philadelphia, H. Lewis Co.	215-567-2068
Tenn	Chattanooga, Wallace Elctrn. Sls.	615-875-0786
Tex	Richardson, J & A Mktg.	214-231-2156
Wash	Seattle, D. Smith Sls. Co.	206-633-3160

KRL ELECTRONICS, Dept. EM, 28 Bridge St., Manchester, N.H. 03101, Tel: 603-668-3210, TWX: 710-220-1662; Empl.: 25 .... p. 3695

Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Mt. View, Shaw-Tech, Inc.	415-961-4775
Conn	Madison, A & M Electrns. Reps., Inc.	203-421-4242
Ill	Palatine, Professional Sls.	312-359-2253
Ind	Carmel, S.A.I. Mktg. Corp.	317-297-3146
Mass	Needham, A & M Electrns. Reps., Inc.	617-444-8170
Mich	Brighton, S.A.I. Mktg. Corp.	313-227-1786
Mich	Grand Rapids, S.A.I. Mktg. Corp.	616-942-2504
Mo	Florissant, S.A.I. Mktg.	314-837-5200
NY	Port Washington, R.E. Breuer Co.	516-883-7810
Ohio	Beachwood, S.A.I. Mktg.	216-292-2982
Ohio	Cincinnati, S.A.I. Mktg.	513-761-5432
Ohio	Dayton, S.A.I. Mktg.	513-435-3181
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Pittsburgh, S.A.I. Mktg.	412-782-5120
Tex	Dallas, Precision Sls., Inc.	214-351-6964

Local Distributors

SC	Myrtle Bch., Candor Co.	803-448-5213
Tex	Dallas, Norvell Assocs.	214-350-6771
Tex	Houston, Norvell Assocs.	713-774-2568
Tex	Tulsa, Norvell Assocs.	918-663-1247
Wash	Seattle, Earl & Brown Co.	206-284-1121

KROHN CERAMICS INC., Dept. EM, 221 Seventh Ave., Hawthorne, N.J. 07507, Tel: 201-933-9696, Telex: 138631; Empl.: 30

KROHN-HITE CORP., Dept. EM, Avon Ind'l Pk, Bodwell St., Avon, Mass. 02322, Tel: 617-580-1660, TWX: 710-345-0831; Empl.: 120 .... p. 2886,2887

Sales Manager: E. C. Lutfy

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Scottsdale, PLS Assocs., Inc.	602-957-9110
Cal	Inglewood, L&M South., Inc.	213-674-6850
Cal	San Jose, L&M Engrg., Inc.	408-292-3220
Colo	Denver, PLS Assocs., Inc.	303-773-1218
Conn	West Hartford, Tekdata, Inc.	203-525-7647
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs., Inc.	404-237-7272
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Arlington Heights, Dytec/Central	312-394-3380
Kans	Overland Park, Dytec/South	913-432-5596
La	Lafayette, Kemp Engrg Co., Inc.	318-984-3516
Md	Baltimore, Sci-Rep	301-321-1411
Mass	Burlington, Tekdata, Inc.	617-273-0198
Minn	St. Paul, Dytec/North	612-645-5816
Mo	St. Louis, Dytec/South	314-423-9595
NJ	Cherry Hill, Sci-Rep	609-482-0059
NM	Albuquerque, PLS Assocs, Inc.	505-255-2330
NY	Elmont, Crane & Egert Corp.	516-488-2100
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Syracuse, Ossman Instr.	315-437-6666
NY	Vestal, Ossmann Instrs.	607-785-9947
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Chesterland, Electroquipment Sls.	216-729-2222
Ohio	Dayton, Electroquipment Sls	513-434-8993
Okla	Tulsa, Kemp Engrg Co., Inc.	918-299-2636
Ore	Portland, McLaren, Inc.	503-297-2248
Tex	Dallas, Kemp Engrg Co., Inc.	214-661-0400
Tex	Houston, Kemp Engrg Co., Inc.	713-688-1431
Va	Falls Church, Sci-Rep	703-573-8787
Wash	Bellevue, McLaren Inc.	206-454-3400

KRYLON, Div. Borden, Dept. EM, Box 390, Norristown, Pa. 19404, Tel: 215-279-1950, TWX: 510-660-0335; Empl.: 200

Local Sales Offices & Reps.

Ala	Atlanta, Cartwright & Bean	404-255-5262
Cal	Los Angeles, G.B. White & Assoc.	213-749-4168
Cal	Millbrae, G.B. White & Assoc.	415-EM 6-8234
Colo	Denver, Western Indus. Sls. & Svcs.	303-758-3972
Ill	Chicago, Q & B Inc.	312-725-4999
Ind	Indianapolis, Mktg. Engineers	317-545-1523
Kans	Shawnee Mission, Thomas & Modrcin Assoc.	913-HE 2-2131
Mass	Boston, Ellingwood Corp.	617-423-4075
Mich	Detroit, Riley & Petchell Sls.	313-838-9100
Minn	Minneapolis, Godden-Olson	612-927-4434
NY	New York, Newhope Corp.	212-LE 2-7372
NY	Syracuse, Paston-Hunter Co.	315-437-2992
Ohio	Cleveland, J. O. Olsen Co.	216-752-5444
Pa	Philadelphia, K. B. Erdman	215-CA 4-1833
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, H. Frazier	214-824-0117
Tex	Houston, H. Frazier	713-461-2866
Wash	Seattle, R. Merritt Co.	206-682-7337

KRYLON DEPT., Borden Chemical, Dept. EM, 50 W. Broad St., Columbus, Ohio 43215

KRYSTINEL CORP., Dept. EM, Fox Island Rd., Port Chester, N. Y. 10573, Tel: 914-937-5252, TWX: 710-569-1604; Empl.: 135 .... p. 2673

Local Sales Offices & Reps.

NJ	S. Orange, S. Simberkoff Assocs.	201-763-7900

™K-SET - magnetic tape head - Michigan Magnetics

™KSR - capacitors - General Elec. Co.

KSW ELECTRONICS CORP., Dept. EM, South Bedford St., Burlington, Mass. 01803, Tel: 617-273-1730; Empl.: 18

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps	205-539-4411
Cal	Encino, CDH Assocs.	213-345-3111
Cal	Los Altos, Stout-Loeswick, Inc.	415-948-3265
Colo	Denver, W.J. Purdy Co.	303-777-1411
Fla	Orlando, W.A. Brown Comps	305-425-5863
Ga	Chamblee, W.A. Brown Comps	404-455-0405
Ill	Addison, Grubb Co.	312-543-8525
Kans	Mission, Midland Engrg. Sls. Assoc.	913-262-6565
Md	Baltimore, Stemler Assocs	301-944-8262
Mass	Lexington, Circuit Sales Co.	617-861-0567
NY	Plandome, F. Spellman Co.	516-627-3399
NC	Raleigh, W.A. Brown Comps	919-781-9426
Ohio	Cincinnati, F. J. Campisano & Assoc.	513-662-1616
Ore	Portland, F. Jackson & Assoc.	503-292-2638
Wash	Seattle, F. Jackson & Assoc.	206-523-6300
Wisc	Milwaukee, Grubb Co.	414-545-7810
Exp:	Conn., Stamford, Deltron Corp.	203-322-7300

™KTNCASSY - cable assemblies - Times Wire & Cable

H. KUHNKE, INC., Dept. EM, 1 E. Highland Ave., Atlantic Highlands, N.J. 07716, Tel: 201-291-3334, Telex: 132496*

Sales Manager: G. Gyssels

KULITE SEMICONDUCTOR PROD., Dept. EM, 1030 Hoyt Ave., Ridgefield, N.J. 07657, Tel: 201-945-3000, Telex: 13-5458; Empl.: 140

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	205-539-1771
Cal	Hollywood, B. J. Wolfe Entprs.	213-877-5518
Cal	Walnut Crk., Dale-Dahl Assocs.	415-933-9595
Colo	Littleton, Aztec Entprs	303-795-0250
Conn	Hamden, Northeast Engrg	203-248-4481
Fla	Orlando, Col-Ins-Co.	305-423-7615
Ga	Clarkston, Col-Ins-Co	404-934-7280
Ill	Chicago, EIA, Inc.	312-271-3774
Md	Kensington, Kinney Tech Prod	301-727-2122
Mass	Danvers, Northeast Engrg	617-774-3010
Mich	Detroit, WKM Assoc.	313-892-2500
Mo	St. Louis, Ozark Elctrn Mktg	314-423-7200
NM	Albuquerque, Amonette Entprs	505-255-2440
NY	Manhasset, Northeast Engrg	516-365-9633
NY	Melville, Astrorep Inc.	516-423-2266
NY	Williamsville, Maxwell Bennett Assoc.	716-634-2107
NC	Raleigh, Col-Ins-Co.	919-834-6591
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ore	Portland, Brett-Ross	503-232-4184
Pa	Jenkintown, PDC Corp	215-887-9610
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Wash	Seattle, Brett-Ross	206-935-8054

KULKA ELEC. CORP., Dept. EM, 520 S. Fulton Ave., Mt. Vernon, N.Y. 10551, Tel: 914-664-4024, TWX: 710-562-0104; Empl.: 500

Sales Manager: P Lauria

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Los Angeles, E E Strassner	213-666-1511
Cal	Redwood City, Warren-Hickey Sls.	415-368-3849
Colo	Englewood, Shefler-Kahn Co.	303-761-2590
Conn	Cheshire, Coakley, Boyd & Abbett	203-272-2261
Fla	Pompano Beach, V&G Sls	305-971-0900
Ga	Atlanta, H&H Mktg.	404-296-9830
Ill	Chicago, Dolin Sls	312-286-6200
Ind	Indianapolis, New Era Sls	317-299-3400
Kans	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
La	Metairie, J. F. McKinney Sls.	504-887-1723
Md	Glen Burnie, Faion Lott & Co	301-744-4611
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	Pleasant Ridge, Shalco	313-547-4771
Mo	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NM	Albuquerque, Shefler-Kahn	505-296-0749
NY	Great Neck, Cooper-Simon	516-487-1142
Ohio	Richfield, Bear Mktg	216-659-3131
Okla	Tulsa, J. F. McKinney Sls.	918-742-6791
Ore	Portland, Earl & Brown	503-245-2283
Pa	Feasterville, P.S.A., Inc.	215-355-6244
Pa	Pittsburgh, Trymax Co.	412-823-8400
Tex	Dallas, J. F. McKinney Sls.	214-631-9450
Tex	Houston, J. F. McKinney Sls	713-493-9100
Wash	Seattle, Earl & Brown	206-284-1121

Local Distributors

Ala	Birmingham, MG Elctrns	205-328-4525
Ariz	Phoenix, Mountain West Alarm	602-263-8831
Ariz	Phoenix, Parts Elctrns.	602-258-6474
Cal	Los Angeles, Radio Prod. Sls.	213-748-1271
Cal	Los Angeles, Fisher Brownell	213-532-2170
Cal	Santa Clara, Fisher Brownell	408-244-6182
Cal	Sunnyvale, Ratel Elctrns.	408-739-9220
Colo	Denver, Integrated Elctrns	303-534-6121
Colo	Denver, Denver Wintronics	303-935-2401
Colo	Denver, Industrial Elctrns	303-771-2636
Conn	Fairfield, Utronics	203-255-4521
Conn	Waterbury, Bond Radio	203-757-0546
Fla	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
Fla	Miami, Electronic Equip. Co.	305-871-3500
Fla	Winter Park, Electronic Equip. Co.	305-644-4833
Ill	Addison, Lectro Comps.	312-543-1680
Ill	Broadview, L-Comp.	312-865-7600
Ill	Chicago, Merrill Elctrns.	312-647-0755
Ill	Rockford, Mid West Associated	815-962-8036
Ill	Rosemount, Advent Elctrns.	312-298-4210
Ill	Schaumburg, Control Design	312-882-7232
Ind	Indianapolis, Ra-Dis-Co, Inc.	317-637-5571
Ind	Indianapolis, Graham Elctrn. Supply	317-634-8486
Ind	South Bend, Radio Distributing Co.	219-287-2911
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Iowa	Des Moines, Mid State Distributing	515-288-7231
Kans	Wichita, Radio Supply Co.	316-267-5216
Ky	Louisville, Peerless Elctrn. Equip.	502-637-7677
La	New Orleans, Radio Parts	504-581-5959
Md	Baltimore, Radio Electric	
Mass	Dedham, Gerger Elctrns.	617-329-2400
Mass	Newton, Greene Shaw Co.	617-969-8900
Mich	Augusta, Great Lakes Elctrns.	616-731-4156
Mich	Farmington, CMP Distrs.	313-477-7700
Mich	Grand Rapids, Scotts Friedman	616-459-0216
Minn	St. Paul, Ragon Elctrns.	612-488-0201
Miss	Newton, May Elctrn. Supply	601-683-6511
Mo	St. Louis, L-Comp	816-531-7015
Neb	Lincoln, Scott Elctrns. Supply	402-434-8308
Nev	Reno, Elctrns. Distributing Corp.	702-323-2766
NJ	E. Rutherford, Kappe Electrical Distrs.	201-939-5751
NM	Alburquerque, Walker Radio	505-247-2288
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Elmsford, Ancar Elctrns.	914-592-7100
NY	Hempstead, Elctrn. Equip.	516-538-5510
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Mt. Vernon, Qar Ind'l Elctrns.	914-699-2224
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Summit Distrs.	716-334-8110
NY	Rockville Center, Midway Ind'l	516-764-2400
NC	Raleigh, Southeastern Radio Supply	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Cincinnati, Hughes Peters	513-351-2000
Ohio	Cincinnati, Newark Herrlinger	513-874-5115
Ohio	Cleveland, RPC Co.	216-461-2280
Ohio	Cleveland, W. Pattison Supply	216-441-3000
Ohio	Columbus, Hughes Peters	614-294-5351
Ohio	Columbus, Electronics Mktg.	614-299-4161
Okla	Oklahoma City, Electro Entps.	405-478-1752
Ore	Portland, Eoff Electric Co.	503-222-9411
Pa	Altona, Allegheny Elctrns.	814-946-0871
Pa	Erie, Mace Elctrns.	814-838-3517
Pa	Erie, Advacom	412-678-9390
Pa	Montgomeryville, Pyttronic Inds.	215-634-2850
Pa	Philadelphia, Almo	215-698-4000
Pa	Philadilphia, Simco Elctrns.	215-229-1880
Pa	Pittsburgh, RPC Electronics	412-782-3770
Pa	Reading, D. Barbey	215-376-7451
SC	Columbia, Dixie Radio Supply	803-779-5332
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Tex	Dallas, KA Elctrns Sls	214-634-7870
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Ft. Worth, Industry Elctrns	817-531-2961
Tex	Stafford, Southwest Elctrns.	713-494-6021
Utah	Salt Lake City, Ra-Elco, Inc	801-487-0571
Va	Charlottesville, Virginia Radio Supply	804-296-4184
Wash	Seattle, Radar Electric	206-282-2511
Wash	Seattle, Almac/Stroum	206-763-2300
WVa	Beckley, Halley Elctrns. Co.	304-253-2151
For:	Can., Downsview, Ontario, Zentronics, Ltd.	416-635-2822
For:	Can., Montreal, Quebec, Cesco Elctrns	416-661-0220

KURMAN RELAY, Dept. EM, 120 Wilbur Place, Bohemia, N.Y. 11716, Tel: 516-567-0009 ...... p. 3564

Local Sales Offices & Reps.

Mass	Randolf, Bengal Assocs.	617-961-4120
Mich	Southfield, Luebbe Sls. Co.	313-375-0355
Minn	St. Paul, Don Nedved Assocs.	612-645-2945
NY	East Northport, Jarms Assocs.	516-822-7085
NY	Fayetteville, Martin P. Andrews	315-637-5291
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Pa	Delmont, Luebbe Sls. Co.	412-468-4019

Local Distributors

Fla	Miami, Electronic Equip.	305-871-3500
Mass	Holyoke, Falcetti & Clark	413-532-9402
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Buffalo, Summit Distr.	716-884-3450
NY	Hempstead, Electronic Equip.	516-538-5510
NY	Rochester, Summit Distr.	716-334-8110

KURZ-KASCH, INC., Electronics Div., Dept. EM, 711 Hunter Rd, Wilmington, Ohio 45177, Tel: 513-296-0330; Empl.: 14

Local Sales Offices & Reps.

Colo	Denver, Walter Engineering	303-777-5585
Conn	Wallingford, Adams-McGregor, Inc.	203-269-5816
Ill	Libertyville, R. Klipp Assoc.	312-362-4676
Iowa	Des Moines, KSW Inc.	515-279-9235
Mass	Scituate, Adams-McGregor, Inc.	617-545-2213
Minn	St. Paul, Skor	612-645-6461
Mo	Kansas City, KSW Inc.	816-358-5240
Mo	St. Louis, KSW Inc.	
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	Rochester, Marsey Sls., Inc.	716-442-9700
Ore	Portland, D.G. Weber Co.	503-234-7671
RI	Lincoln, Adams-McGregor, Inc.	401-726-1300
Exp:	N.Y., New York, Singer Products Co.	

KURZ-KASCH, INC., Knob Div., Dept. EM, 711 Hunter Dr., Wilmington, Ohio 45177, Tel: 513-382-0966 p. 2550

Sales Manager: T. Neff

Local Sales Offices & Reps.

Ariz	Phoenix, Mercury Engrg. Sls	602-279-2367
Cal	Los Angeles, W. S. Harmon Co.	213-937-1460
Cal	Menlo Park, G. R. McKnight Co.	415-325-2844
Conn	Bristol, New England Elctrn Sls.	203-583-3650
Fla	Orlando, Cartwright & Bean	305-422-4531
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Libertyville, R. Klipp Assocs.	312-362-4676
La	Gretna, Cartwright & Bean	504-362-4649
Mass	Canton, New England Elctrn. Sls. Corp.	617-828-4835
Mich	Farmington, Carter, McCormic & Pierce	313-477-7700
Minn	St. Paul, Cahill Assocs.	612-646-7217
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Kansas City, KSW Assocs.	816-385-5240
NJ	Cherry Hill, Snyder & Stefkovic Assoc., Inc.	609-667-6110
NJ	Mountain Lakes, Components for Elctrns.	201-334-2921
NM	Albuquerque, A Q Elctrns.	505-883-1003
NY	Rochester, Upstate Comps. Sls.	716-377-1555
Ohio	Cleveland, Carter, McCormic & Pierce	216-333-5650
Ohio	Dayton, Carter, McCormic & Pierce	513-278-2573
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Garland, Gordon Peck Co.	214-341-8311
Tex	Houston, Gordon Peck Co.	713-789-7111
Va	Fairfax, Snyder & Stefkovic Assoc. Inc.	703-273-1413
Wash	Seattle, R.R. Slater Co.	206-622-2552

Local Distributors

Ariz	Phoenix, Mirco Elctns. Dist.	602-944-2281
Cal	Hollywood, Yale Radio	213-456-3186
Cal	Mountain View, Waltronic Sls.	415-965-4131
Cal	San Diego, Shanks & Wright	714-239-0176
Cal	San Jose, Quement Elctns.	408-294-0464
Colo	Denver, Elctrn. Parts	303-744-1992
Conn	Waterbury, Suburban Supply	203-757-1251
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Chicago, Waldom Elctns.	312-585-1212
Ill	Peoria, Klaus Radio	
Ind	Fort Wayne, Fort Wayne Elctns.	
Ind	Indianapolis, Grahm Elcrns.	317-634-8486
Iowa	Des Moines, Mid-State Elec.	
Kans	Wichita, Radio Supply Co.	316-276-5216
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Canton, New England Elec. Sls.	617-828-4835
Mass	Worcester, RM Elctrns.	
Mich	Ann Arbor, Wedemeyer Elctns.	313-665-8611
Mich	Grand Rapids, Stotts-Friedman Co.	
Minn	Minn., Stark Elctrns.	612-332-1325

Minn	Minn., Cassidy Elctrns.	
Mo	Kansas City, Walters Radio Supply	816-531-7015
Mo	St. Louis, Olive Ind. Elec.	314-863-7800
Neb	Lincoln, Scott Elctrn. Supply	
NJ	Springfield, Federated Purchaser	201-376-8900
NY	Buffalo, Summit Dist.	716-884-3450
NY	E. Farmingdale, Harrison Elctrns.	516-293-7990
NY	Rochester, Summit Dist.	716-334-8100
NC	Greensboro, Hammond Elctrns.	919-275-6391
Ohio	Cinn., Hughes Peters	513-351-2000
Ohio	Columbus, Hughes Peters	614-294-5351
Ohio	Dayton, Stotts Friedman Co.	
Okla	Tulsa, Radio Inc.	918-587-9123
Pa	Phila., Simco Elctrns.	
SC	Greenville, Hammond Elctrns.	803-232-6740
Tex	Stafford, Southwest Elctrns.	713-494-6021
Utah	Salt Lake City, Standard Supply Co.	801-355-2971
Va	Charlottesville, Virginia Radio	
Wash	Seattle, Radar Elect Co.	206-282-2511
Wisc	Milwaukee, Marsh Elctrns.	
Wisc	Milwaukee, Parts Marts Co.	414-276-4160
For:	Canada, Scarborough, Ont., John R. Tilton Ltd.	416-757-4171

™KV-PAC - microwave oven silicon rectifier - Semtech Corp.

™KV PAC PLUS - 1 amp high voltage rectifier - Semtech Corp.

™KVPAC SR. - 2 amp high voltage rectifier - Semtech Corp.

KW CONTROLS INC., Dept. EM, 151-17 W. Industry Ct., Deer Park, N.Y. 11729, Tel: 516-667-7842, Telex: 96-7842

Local Sales Offices & Reps.

Cal	Los Angeles, Industrial Power Sys.	213-254-0897
Minn	Minneapolis, Professional Mktg.	612-474-5939
Tex	Dallas, Tech-Plan	214-690-1994

™KWICK-KONNECT - connectors - Sealectro Corp.

KWIKSET POWDERED METAL PRODS., Kwikset Div-Emhart Inds. Inc., Dept. EM, Box 4250P, Anaheim, Cal. 92803, Tel: 714-535-8111; Empl.: 65

™KWIKSET SEAL-BOLT - high security seals - Kwikset Powdered Metal Prods.

™KWIKSET SEAL-LOK - high security seals - Kwikset Powdered Metal Prods.

™KWIK-TAB - quick connect terminal - Accurate Electronics Corp.

™KWIK-WAY - water applied decals - Meyercord Co.

™KW PAC - high power assembly - Semtech Corp.

KYODO ELCTRN. LAB. INC., Dept. EM, 11-18 2-chome Sonan Sagamihara, Shi Kanagama-Ken, Japan

™KYREAD - magnetic tape developer - Kyros Corp.

KYROS CORP., Dept. EM, Box 406, Madison, Wisc. 53701, Tel: 608-238-3587; Empl.: 4

L & L SPECIAL FURNACE CO., Dept. EM, 166 Conchester Rd., Twin Oaks, Pa. 19016, Tel: 215-HU5-6334; Empl.: 32

Local Sales Offices & Reps.

Mich	Dearborn, W. Mullins & Assocs.	313-425-5900
Ohio	Cleveland, E.F. Burke, Inc.	216-382-3646
Tex	Dallas, Textec	214-233-1928

L & R MFG., Dept. EM, 577 Elm St., Kearny, N.J. 07032, Tel: 201-991-5330; Empl.: 150

Local Sales Offices & Reps.

Cal	Los Angeles, L&R Mfg. Co.	213-386-6670
Ill	Des Plaines, L&R Mfg. Co.	312-298-6150

™LAB - circuit development transformer - TRW/UTC Transformers

LAB-LINE INSTRUMENTS, INC., Dept. EM, 15th & Bloomingdale, Melrose Park, Ill. 60160, Tel: 312-345-7400; Empl.: 225

L.A.B. DIV., Mech. Tech., Dept. EM, 981 Onondaga St., Skaneateles, N.Y. 13152, Tel: 315-685-5781; Empl.: 30

LABCONCO CORP., Dept. EM, 8811 Prospect, Kansas City, Mo 64132, Tel: 816-363-6330; Empl.: 170

Sales Manager: J.T. McCall

LABELON CORP., Dept. EM, 10 Chapin St., Canandaigua, N.Y. 14424, Tel: 716-394-6220, TWX: 510-254-7147; Empl.: 135

Local Sales Offices & Reps.

Cal	Los Angeles, R. L. Smith Co.	213-746-1710
Ill	Chicago, P. Coridon & Assoc.	312-286-5144
NY	New York, Labelon Corp.	212-947-4049

LABORATORY DATA CONTROL, Div. M. Roy Corp., Dept. EM, Box 10235, Riviera Beach, Fla. 33404, Tel: 305-844-5241; Empl.: 52

Local Sales Offices & Reps.

Ala	Huntsville, Newcomb, Assoc.	205-852-0304
Cal	Cupertino, Laboratory Data Control	408-996-3273
Del	Newark, Benchmark	302-366-8797
Ill	Park Ridge, Laboratory Data Control	312-825-8892
Iowa	Ames, Midwest Instr.	515-292-5413
Mass	Boston, Richman Assoc.	
Mass	Holliston, Richman Assoc.	617-879-5011
Minn	Minneapolis, Midwest Inst.	612-333-0319
Mo	St. Louis, Gateway Scientific	314-725-3464
NJ	Englewood Cliffs, Laboratory Data Control	201-568-8280
NC	Raleigh, Newcomb Assoc.	919-893-5721
Pa	Chaddsford, Laboratory Data Control	215-459-0177

™LABPOT - potentiometers - Bourns, Inc.

™LA-CO - fluxes and sealing compounds - Lake Chemical Co.

™LA-CO LOC - plastic pipe cements - Lake Chemical Co.

LAKE CHEMICAL CO., Dept. EM, 250 N. Washtenaw Ave., Chicago, Ill. 60612, Tel: 312-826-1700; Empl.: 65

LAKESHORE ELECTRIC CORP., Dept. EM, 205 Willis, Bedford, Ohio 44146, Tel: 216-232-0200, Telex: 98-0253; Empl.: 40

Sales Manager: J.M. Cowen

Local Sales Offices & Reps.

Ariz	Phoenix, Cullyford Agcy.	602-939-3455
Cal	Redondo Beach, Control Switches, Inc.	213-772-1582
Cal	San Francisco, Artwel Elec., Inc.	415-467-1880
Colo	Denver, M & G Assocs.	303-750-8272
Fla	Jacksonville, R.J. Hines	904-641-9503
Fla	Miami, A.C. Chaney & Assoc.	305-754-8857
Ga	Atlanta, Whit-Shaw Co.	404-351-8400
Haw	Honolulu, Pacific Energy Equip.	808-373-1037
Iowa	Des Moines, I.L. Davidson Co.	515-288-0958
Ky	Covington, Schueler Elec. Sls.	606-291-0600
Md	Baltimore, Adcour	301-486-1211
Mass	Sharon, Adcour	617-784-8123
Mich	Detroit, Webco, Inc.	313-862-4673
Minn	Minneapolis, G.L. Brusacoram Sls.	612-721-4286
NY	New York, F. Toolan Co.	516-822-8137
NC	Charlotte, Power Sys.	704-537-8099
Ohio	Cleveland, R.V. Fischer & Assoc.	216-461-2892
Ore	Portland, Lynch Equip.	503-655-4495
Pa	Pittsburgh, Muller Harper, Inc.	412-931-6460
Tenn	Knoxville, Tubbs Agency	615-577-0689
Tenn	Memphis, Underwood Sls.	901-362-0586
Tenn	Memphis, Underwood Sls. Co.	901-362-0586
Tex	Garland, Stout-Jennings-Schmidt Co.	214-272-5585
Tex	Houston, Stout-Jennings-Schmidt Co.	713-729-1994
Utah	Salt Lake City, Tri-Western Assocs.	801-487-1881
Wisc	Osbon Assoc., Weldy-Osbon Assoc.	414-377-2400
Exp:	N.J., Trenton, Equip. Export	609-393-6483

™LAKIN - hickey - T & B/Thomas & Betts

™LAKIN - hickey - T & B/Thomas & Betts

™LAM - linearized altenuator modulators - Crown Microwave, Inc.

LA MARCHE MFG. CO., Dept. EM, 106 Bradrock Drive, Des Plaines, Ill. 60018, Tel: 312-299-1188, Telex: 28-2524; Empl.: 225

Local Sales Offices & Reps.

Ala	Birmingham, Evans Controls & Sls.	205-871-3355
Ariz	Phoenix, Osborn Assoc.	602-279-5556
Cal	Santa Fe Springs, Trojan Battery	213-945-1471
Colo	Denver, Hensley Battery & Supply Co.	303-455-3643
Fla	Miami, Samsco IN & RNL	305-625-6556
Ga	Marietta, Charlotte Battery Co.	404-422-1487
Ill	Bensenville, Delta Equip. Co.	312-766-6600
Ill	Indianapolis, MVM	317-925-9033
Ill	Wilmette, A. Seehafer	312-299-1188
La	New Orleans, Chambers Indust. Supply	504-525-3497
Md	Baltimore, Wilson Assoc.	301-485-5100
Mass	Sharon, Adcour	617-784-8123
Mich	Detroit, Webco, Inc.	313-862-4673
Minn	Minneapolis, W. Ruva	612-721-7444
Mo	St. Louis, R. Link, Bob McHale	314-966-3506
Neb	Omaha, Electric Equip. Sls. Co.	402-556-4198
NJ	Hillside, J.P. Grech	201-353-3434
NY	Jericho, Frank J. Toolan Co.	516-822-8137
NY	Middleport, Electruk Battery Co.	716-735-7711
NC	Charlotte, Charlotte Battery Co.	704-375-3249
Ohio	Columbus, A. Ulrich	614-253-2705
Ore	Portland, Wagstaff Battery Co.	503-282-5531
Pa	Glenside, Bohlinger	215-885-0416
Tenn	Jackson, D. Hallman	901-423-1366
Tex	Dallas, P/S Assocs.	214-341-7066
Tex	Garland, B. Knipp	214-278-8161
Tex	Houston, Sabayrac Battery Svc.	713-923-2246
Tex	Houston, Texford Battery Co.	713-222-0125
Tex	Lubbock, Consolidated Energy Sys.	806-797-9013
Tex	Odessa, B. McEntyre	915-332-1429
Utah	Salt Lake City, M.L. Burbidge	801-484-7098
Wash	Seattle, Pan West Co.	206-RO2-3834
Wisc	Milwaukee, Storage Battery Service Co.	414-962-0160
Exp:	Ill., River Forest, S. Isola	312-299-1188

LAMART CORP., Dept. EM, 16 Richmond St., Clifton, N.J. 07015, Tel: 201-772-6262

Local Sales Offices & Reps.

Cal	Palo Alto, Lockwood Assocs.	415-328-3999
NJ	Clifton, Lamart Corp.	201-772-6262
Ohio	Chagrin Falls, Electrolock Inc.	216-543-5125
RI	Bristol, Lamart Corp.	401-253-9625

LAMBDA ELCTRNS., Dept. EM, 515 Brd. Hollow Rd., Melville, N.Y. 11746, Tel: 516-694-4200, TWX: 510-224-6484; Empl.: 500

Sales Manager: B. Chenes

Local Sales Offices & Reps.

Ariz	Phoenix	602-996-1010
Cal	No. Hollywood	213-875-2744
Cal	Sunnyvale	408-738-2541
Fla	Largo	813-596-5151
Ill	Arlington Heights	312-593-2550
Mass	Lexington	617-861-8585
Minn	Minneapolis	612-935-6194
NY	Poughkeepsie	914-297-4800
NY	Rochester	716-454-6770
NC	Pineville	704-542-1991
Ohio	Cleveland	216-585-7808
Pa	Norristown	215-279-5644
Tex	Dallas	214-341-5130
Tex	Houston	713-464-6554
Va	Fairfax	703-451-9340
Exp:	N.Y., Melville	516-694-4200

™LAMICOR - polyester fiberglass - NVF Co.

LAMINATED FABRICATORS, Dept. EM, 1145 San Mateo Ave., San Bruno, Calif. 94066, Tel: 415-583-5092

Sales Manager: H.L. Jacobs

LAMINATED SHIM CO., INC., See Alinabal

LAMPS, INC., see Illuminated Products, Inc.

™LAMPLIGHTER - photoelectric street lighting control - Cardinal Control Co.

™LAMTAC - connectors - Hypertronics Corp.

LANCE INDS., Dept. EM, P.O. Box 4156, Sylmar, Calif. 91342, Tel: 213-367-1811

™LANCELOK - terminals - Amp Inc.

™LANDMARK - high fidelity music system - Electro-Voice, Inc.

LANSDALE TRANSISTOR, Dept. EM, 3600 W. Osborn Rd., Phoenix, Ariz. 85019, Tel: 602-269-6262

LANSDALE TRANSISTOR & ELCTRNS., see McGuirk Electronics Co., Inc.

™LAPFLO - lap reflow sold. kit - Pace Inc.

LAPP INSULATOR DIV., INTERPACE CORP., Radio Specialties, Dept. EM, 350 Sumner St., LeRoy, N.Y. 14482, Tel: 716-967-6221, TWX: 716-967-2511; Empl.: 1310

Local Sales Offices & Reps.

Ala	Birmingham, C.W. Ashby Co.	205-879-1651
Ark	Little Rock, C. H. Stout	501-372-2555
Fla	Jacksonville, Belcher & Assocs.	904-724-7811
Ga	Atlanta, E. A. Thornwell	404-351-6535
Kans	Kansas City, Power Equip. Sls.	913-384-3898
Ky	Lexington, Dyer-Pederson Agency	606-266-7412
La	Shreveport, C. H. Stout	318-221-5555
Md	Annapolis, Rumsey Elec. Co.	301-268-9644
Miss	Jackson, C. H. Stout of Miss.	601-354-4326
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
Okla	Tulsa, C. B. Anderson Elec. Co.	918-836-4661
Pa	Pittsburgh, Muller, Harper & Assocs.	412-931-6460
Tenn	Memphis, C. H. Stout of Tenn.	301-362-1616
Tex	Dallas, E. B. Robertson	214-942-2711
Va	Richmond, Rumsey Elec. Co.	804-335-4379

LARK ELECTRONICS, INC., Dept. EM, Box 390, New York, N.Y. 10040, Tel: 212-942-2535; FSC No.: 52682

LARSON AERO DEV., Dept. EM, Box 135, Concord, Cal. 94522, Tel: 415-228-7870; Empl.: 15

Local Sales Offices & Reps.

Cal	Long Beach, Sabre Entprs.	213-595-5646
Cal	Mt. View, Gado Instr. Sls.	415-961-2222
Fla	Maitland, D & E Assoc.	305-644-3039
Mich	Detroit, TIBY Co.	313-547-3550
Ohio	Cleveland, TIBY Co.	216-371-5335
Ohio	Dayton, TIBY Co.	513-277-3822

LARSON INSTR. CO., INC., Dept. EM, Greenbush Rd., Orangeburg, N.Y. 10962, Tel: 914-359-3800; Empl.: 14

Local Sales Offices & Reps.

Cal	Palo Alto, Mauldin Co.	415-969-1233
Cal	Pasadena, L-Tronix Assoc.	213-797-1838
Del	Wilmington, Spring Assoc.	302-571-1195
Ill	Oak Park, Geo. Petitt Co.	312-261-0342
Ind	Richmond, Kennedy Sls.	317-966-1933
Mass	Belmont, Electronic Comps. Svc.	617-484-8680
Pa	Ingomar, R. W. Moulton Assocs.	412-366-3333
Tex	Houston, T.L.C.	713-524-9976
Wash	Seattle, Instr. Engrg.	206-682-1123

™LA SCALA - loudspeaker system - Klipsch & Assocs. Inc.

™LASE-A-LIGN - laser alignment autocollimator - Laser Inc.

LASER INC., Dept. EM, Laser Lane, Box 537, Sturbridge, Mass. 01566, Tel: 617-347-7314; Empl.: 12

Local Sales Offices & Reps.

Ala	Birmingham, SISCO	205-251-2076
Cal	Palos Verdes Penninsula, W.J. Miller Co	213-375-3001
Haw	Honolulu, C and F Machinery Corp.	808-524-1033
Ill	Elk Grove Village, Automation Assocs.	312-593-1514
Ind	Indianapolis, Tech Sls. & Mktg.	317-356-3658
Md	Silver Spring, Spectroscopy Sys.	301-949-8261
Mass	Waltham, Betronic Assocs.	617-894-8400
Mich	Detroit, H Teplitz & Co	313-534-3306
NY	Buffalo, Robinson Assocs.	716-886-7350
NY	Mineola, J.B. Lilly Co.	516-746-2226
NC	Waxhaw, W. William Dyrkacz	704-847-6557
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Okla	Oklahoma City, Macor Sls	405-737-4631
Ore	Portland, Tak Inds.	503-227-2401
Pa	Southampton, Spectroscopy Sys.	215-357-6644

™LASERSCRIBE - automatic wafer scriber - Quantronix Corp.

LASER SYSTEMS CORP., Dept. EM, 117 N. First St., Ann Arbor, Mich. 48108, Tel: 313-761-7150; Empl.: 6

LASER TECHNOLOGY, INC., Dept. EM, 10624 Ventura Blvd., N. Hollywood, Calif. 91604, Tel: 213-763-7091; Empl.: 18

Sales Manager: H.B. McLaughlin

LASERMETRICS, INC., Dept. EM, 111 Galway Pl., Teaneck, N.J. 07666, Tel: 201-837-9090, Telex: 13-4492; FSC No.: 34983; Empl.: 18

Sales Manager: J. Salg

™LASERTRIM - resistor trimming system - Apollo Lasers Inc.

™LASTEC - diamond impregnated wire & saws - Laser Technology, Inc.

™LASTOFLEX - laminated bearings - Lord Kinematics

™LATICRETE - coatings, anti-static & conductive - Uniroyal, Inc.

LATTIN RADIO LABS., Dept. EM, 1431 Sweeney, Box 44, Owensboro, Ky. 42301, Tel: 502-683-2868; Empl.: 3

™LAUDA - constant temperature circ - Brinkmann Instrs., Inc.

™LAVOLAIN - ceramic products - Star Porcelain Co.

™LC - tuners - JFD Electronics Components Corp.

™LCA - low coefficient of expansion adhesives - Bacon Inds.

L-COMP, Dept. EM, 2605 S. Hanley Rd., St. Louis, Mo. 63144

™LC2 - mercury film switch - Fifth Dimension

LDJ ELECTRONICS, Dept. EM, 1064 Naughton Ave., Troy, Mich. 48084, Tel: 313-689-3623; Empl.: 12

™LD-400 - damping material - Lord Kinematics

LEACH CORP., Dept. EM, 5915 Avalon Blvd, Los Angeles, Cal. 90003, Tel: 213-232-8221, TWX: 910-321-2303; FSC No.: 35344; Empl.: 500; Minimum order: $F. Winer p. 3574-3581

Sales Manager: D. Cope; *Distributor Manager:* F. Winer

Local Sales Offices & Reps.

Cal	San Mateo, Halbar Assocs.	415-349-4700
Colo	Denver, Brown Technical	303-233-0863
Fla	Orlando, Craft Assocs.	305-843-5224
Ga	Atlanta, Craft Assocs.	404-256-0420
Md	Rockville, Markton, Inc.	301-762-6210
Md	Timonium, Marktron	301-252-7111
Mass	Medford, Blake Assocs.	617-391-7890
Mo	Ferguson, Leach Corp.	314-524-2880
NJ	Fort Lee, Leach Corp.	201-461-6550
NY	Fayetteville, Graydon-Sherman	315-637-9861
Ohio	Dayton, Leach Corp.	513-434-8151
Pa	Feasterville, PSA, Inc.	215-355-6244
Tex	Dallas, Caton Sales	214-661-5792
Va	Charlottesville, Marktron, Inc.	301-762-6210
Wash	Bellevue, Leach Corp.	206-746-7263

Local Distributors

Cal	El Segundo, Liberty Elctrns. Corp.	213-322-8100
Cal	Mountain View, Time/Nor-Cal	415-965-8000
Cal	Torrance, Time Elctrns. West	213-320-0880
Ga	Atlanta, Electro Air Corp.	404-351-3545
Mass	Woburn, Time/New England	617-935-8080
NY	Hauppauge, Time Elctrn. Sls.	516-273-0100
Pa	Clifton Heights, Time/Mid-Atlantic	215-622-2500
Tex	Dallas, Associated Aircraft Supply	214-331-4381
Wash	Seattle, Liberty/Northwest	206-763-8200

LEADER INSTRUMENTS CORP., Dept. EM, 151 Dupont St, Plainview, N.Y. 11803, Tel: 516-822-9300; Empl.: 15

™LEAK-PRUF - acid core solder - Alpha Metals, Inc.

™LEAK-TEC - liquid leak detecting fluids - American Gas & Chemical Co., Ltd.

LEAR SIEGLER, INC., Dept. EM, 3171 S. Bundy Dr., Santa Monica, Cal. 90406, Tel: 213-391-7211, TWX: 910-343-6463; Empl.: 17,123

Local Sales Offices & Reps.

Cal	Anaheim, Lear Siegler, Inc., Elctrn. Instr. Div.	714-774-1010
Cal	Burbank, Lear Siegler, Inc., Bogen Div.	213-843-3111
Cal	Menlo Park, Lear Siegler, Sierra Elctrn. Div.	415-321-5374
Colo	Englewood, LSI Evironmental Technology Div.	303-770-3300
Mass	Lexington, LSI Environmental Technology Div.	617-862-8975
Mich	Grand Rapids, LSI Instrument Div.	616-241-7000
Mich	Southfield, Acts Computing Corp.	313-557-6800
NJ	Paramus, LSI Bogen Div.	201-343-5700
NY	Rye, American Avitron Div.	914-937-5300
Ohio	Maple Heights, LSI Power Equip. Div.	216-662-1000
Okla	Oklahoma City, LSI Management Svcs.	405-424-5551
Tex	Dallas, LSI Power Equip. Div.	214-247-1212
Va	Arlington, Div. Sls. Off.	703-920-7640
Wash	Seattle, LSI Instr. Div.	206-774-2811
Exp:	New York, Rye, American Avitron Div.	914-937-5300

LEAR SIEGLER, Elctrn. Instr. Div., Dept. EM, 714 N. Brookhurst St., Anaheim, Cal. 92803, Tel: 714-774-1010, TWX: 910-591-1157; Empl.: 600 p. 2121

Sales Manager: J. Anderson

Local Sales Offices & Reps.

Cal	Los Altos, Shannon Assoc.	415-941-2217
Cal	San Francisco, Shannon Assoc.	415-941-2217
Colo	Denver, Moss Elec.	303-353-1452
Colo	Greeley, Gordon Moss Eltrns. Inc.	303-353-1452
Ga	Atlanta, Grady Duckett	404-451-3529
Ga	Atlanta, Grady Duchett Sls. Co.	404-451-3529
Ill	Chicago, Mauer Co.	312-677-4771
Ill	Skokie, Mauer Co. Inc.	312-677-4771
Ind	Indianapolis, Electronic Sls. & Engr. Inc.	317-849-4260
Iowa	Cedar Rapids, Pallantine Sls. Inc.	319-365-8071
Kans	Lenexa, Pallantine Sls. Inc.	913-492-7020
Mass	Haverhill, L.K. Harmon & Assocs.	617-373-1313
Mich	Detroit, Hummon Assoc.	313-474-0661
Mo	St. Louis, Pallatine Sls. Co.	314-426-7055
NJ	Bellmawr, Mid Atlantic Corp.	609-931-5303
NJ	Tenafly, ABC Elec. Sls. Co.	201-568-2354
NJ	Tenafly, ABC Elec.	201-568-2354
NM	Albuquerque, Moss Elec.	505-821-6101
NY	Williston Park, ABC Elec.	516-747-6610
Ohio	Cleveland, Geotronix	216-526-2535
Ohio	Columbus, Geotronix	614-457-8472
Okla	Tulsa, Pallatine Sls. Co.	918-622-0321
Ore	Portland, Syscom	503-644-2505
Tex	Austin, Pallatine Sls. Co.	512-451-7463
Tex	Houston, Pallatine Sls. Co.	713-783-1492
Tex	Richardson, Pallatine Sls. Co.	214-231-9489

Local Distributors

For:	Eng., Eastleigh Hants, Vero Electronics Ltd.	TWX 851-47-551
For:	Japan, Tokyo, Hakuto Co. Ltd.TWX	78-12-2912

LEAR SIEGLER, INC., Transportation Support Div., Dept. EM, 11135 Condor Ave., Fountain Valley, Cal. 92708, Tel: 714-546-3060, Telex: 67-8454; Empl.: 200

Sales Manager: G.N. Nichols

LEAR SIEGLER, INC., Romec Div., Dept. EM, 241 S. Abbe Rd., Elyria, Ohio 44035, Tel: 216-323-3211, TWX: 216-322-7265; Empl.: 230

Local Sales Offices & Reps.

Cal	Los Angeles
Mass	Waltham
Ohio	Dayton
Exp:	N.Y., Rye, American Avitron

LEBOW ASSOCIATES, INC., Dept. EM, 1728 Maplelawn Rd., Troy, Mich. 48084, Tel: 313-643-0220, TWX: 810-232-4818; Empl.: 80

Local Sales Offices & Reps.

Ala	Huntsville, Vaughn Electrosources	205-539-8716
Ariz	Scottsdale, PLS Assoc.	602-957-9110
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Santa Clara, Johnson Assoc.	408-984-4626
Colo	Denver, PLS Assocs.	303-773-1218
Conn	Hamden, P. Jenks Assoc.	203-281-0810

Fla	Cocoa Beach, Vaughn Electrosources	305-784-0784
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg.	319-377-9434
Kans	Mission, Vertec Assoc.	913-677-3200
La	Baton Rouge, Vaughn Electrosources	504-923-0297
Mass	Wakefield, P. Jenks Assoc.	617-246-1590
Mich	Detroit, Comtel Instr	313-255-1970
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	Manchester, Vertec Assoc.	314-394-6242
NJ	Bogota, Neville & Vespo Inc.	201-487-1507
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Williamsville, Maxwell Bennett Co.	716-634-2107
NC	Charlotte, Vaughn Elctrosources	704-525-0769
Ohio	Cleveland, Comtel Instr.	216-442-8080
Ohio	Comtel Instr., S. Sterling	513-298-7573
Ore	Beaverton, Showalter Instr., Inc.	503-646-5196
Pa	Comtel Instr., S. Sterling	412-922-5720
Pa	Radnor, Roberts Engrg. Sls.	215-688-6525
Tex	Dallas, Tech. Prods.	214-357-9603
Tex	Houston, Tech. Prods.	713-777-7360
Wash	Bellevue, Showalter Instr., Inc.	206-455-4922
Wash	Richland, Showalter Instr., Inc	509-943-5288
Wisc	Brookfield, Pivan Engrg.	414-786-1940

™LE CARBONE - brushes & contacts - Carbone Lorraine Industries Corp.

™LE CARBONE-AD - batteries - Carbone Lorraine Industries Corp.

LECROY RESCH. SYS. CORP., Dept. EM, 126 N. Rte. 303, West Nyack, N.Y. 10994, Tel: 914-358-7900, TWX: 710-575-2629; Empl.: 85

™LECTR-AU-LYTE - acid type electroplating process of 80% gold and 20% nickel - Sel-Rex Div. Oxy Metal Industries Corp.

LECTRODRYER DIV., Dept. EM, Box 4599, Pittsburgh, Pa. 15205, Tel: 412-923-2970

™LECTRODUCT - shielded electrical raceways - Lectro Magnetics, Inc.

LECTROETCH, Dept. EM, 14925 Elderwood Ave., E. Cleveland, Ohio 44112, Tel: 216-451-8080; Empl.: 20

Local Sales Offices & Reps.

Cal	El Segundo, Applied Prods. Co.	213-678-6441
Conn	So. Glastonbury, E.D. Geiger	203-633-7646
Fla	Boca Raton, Aeromark Corp.	305-395-3320
Ill	Chicago, W.C. Kamin Co.	312-371-2870
Mass	Belmont, A.D. Geiger Co.	617-489-3322
Mich	Grosse Ile, C.H. Webster	313-676-6510
Mo	Kansas City, Liepsner & Co.	816-421-2511
Mo	St. Louis, Wagner Engraving Co.	314-821-3133
NY	Rochester, R.A. Haehl	716-467-6074
Ohio	Cleveland, J.G. Seifert	216-451-8080
Pa	Feasterville, J.C. Moore	215-322-5510
Pa	Pittsburgh, E.A. McKinney	412-281-3138

™LECTROFILM - capacitors - General Elec. Co.

LECTROHM DIV. OF CAPCO, INC., Dept. EM, Box 1028, Grand Junction, Colo. 81501, Tel: 303-243-8480, TWX: 910-929-6989; Empl.: 200

Local Sales Offices & Reps.

Ariz	Phoenix, Spectrum Assoc.	602-997-6324
Cal	Los Altos, Frauman Assocs.	415-941-0660
Cal	Santa Ana, Spectrum Assoc.	714-835-4114
Colo	Englewood, Dynatech	303-773-2830
Conn	Meridan, P.R. Sturgeon Co.	203-237-1112
Ill	Berkeley, Balhorn & Roeser	312-449-3900
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Minn	St. Paul, Countryman Assocs.	612-645-9151
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Manlius, R.W. Mitscher Co.	315-682-2855
NY	Massapequa, Richard D. McGrath	516-798-0400
NY	Pittsford, R. W. Mitscher Co.	716-586-4012
NY	W. Hurley, R. W. Mitscher Co.	914-670-6151
NC	Raleigh, R. W. Mitscher Co.	919-828-0575
Ohio	Cleveland, D. Steffen & Assocs.	216-461-8333
Ohio	Dayton, D. Steffen & Assocs.	513-293-3145
Ohio	Lexington, D. Steffen & Assocs.	419-884-2313
Okla	Tulsa, Barry Sls. Co.	918-664-8422
Pa	Birchrunville, Jadelectronic	215-647-5151
Pa	Philadelphia, Jadelectronic	215-647-5151
Tenn	Johnson City, R. W. Mitscher Co.	615-929-1141
Tenn	Shelbyville, R. W. Mitscher Co.	615-684-4544
Tex	Houston, Barry Sls. Co.	713-784-5860
Tex	Richardson, Barry Sls. Co.	214-234-0255
Utah	Salt Lake City, Dynatech	
Va	Virginia Beach, R. W. Mitscher Co.	804-481-7200
Wash	Bellevue, R. Over Sls. Co.	206-454-4551
Wash	Vancouver, Ray Over Sls.	206-695-6179

™LECTROLESS - electroless gold plating process - Sel-Rex Div. Oxy Metal Industries Corp.

™LECTRO LINE - RFI/EMI power line filters - Lectro Magnetics, Inc.

LECTRO MAGNETICS, INC., Dept. EM, 6056 W. Jefferson Blvd., Los Angeles, Cal. 90016, Tel: 213-870-9383; FSC No.: 29098; Empl.: 45

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Ariz	Phoenix, J.S. Heaton Co.	602-264-7887
Cal	Los Altos, Frauman Assoc.	415-941-0660
Cal	Santa Monica, McDonald Assoc.	213-393-7195
Colo	Denver, Scientific Devices, S.W.	303-573-9466
Fla	Orlando, J.L. Highsmith & Co.	305-293-5202
Ill	Belleville, E.E. Pauley Co.	618-233-3524
Ill	Chicago, Tollaksen & Assoc.	312-441-6644
Md	Wheaton, Magyar & Assoc.	301-871-8833
Mass	Waltham, Meas. Conslts. Corp.	617-890-4400
NM	Albuquerque, Scientific Devices, S.W.	505-268-6729
NY	East Syracuse, Ossmann Instrs.	315-437-6666
NC	Charlotte, J.L. Highsmith & Co.	704-333-7743
Ohio	Dayton, Ashby Assoc.	513-252-5627
Pa	Philadelphia, Magyar & Assoc.	215-763-5044
Tex	Dallas, Scientific Devices, S.W.	214-231-8106
Tex	Houston, Scientific Devices, S.W.	713-623-4250
Tex	San Antonio, Scientific Devices, S.W.	512-694-6251
Wash	Seattle, Rush S. Drake Assoc.	206-763-2755

™LECTRO-NIC - nickel plating process - Sel-Rex Div. Oxy Metal Industries Corp.

™LECTROSHIELD - shielded room & cabinets - Lectro Magnetics, Inc.

LECTROTECH, INC., Dept. EM, 5810 N. Western Ave., Chicago, Ill. 60659, Tel: 312-769-6262; Empl.: 65

Local Sales Offices & Reps.

Ariz	Phoenix, P.Z. Ray Assocs.	602-942-2502
Cal	Culver City, H. Feldman Co.	213-397-4471
Cal	Newport Beach, Roman Mktg.	714-540-2270
Cal	San Francisco, Tech. Sls. Assocs.	415-467-1434
Colo	Aurora, Aurora Mktg.	303-344-1415
Fla	Maitland, Hutto, Hawkins, Peregoy Inc.	305-831-2474
Fla	Ormond Beach, J.F. Thompson Co.	904-677-2298
Ga	Atlanta, Murphy & Cota	404-875-2525
Ill	Skokie, M. Berman Sls.	312-OR5-3740
Kans	Shawnee Mission, Maury Bettis Co.	913-362-0772
Md	Silver Springs, Mid-Atlantic Sls.	215-657-2815
Mich	Detroit, R. Milsk Co.	313-354-3310
Minn	Minneapolis, Melby-Communications	612-884-7688
Minn	St. Paul, C.M. Sales Co.	612-699-8004
NH	Portsmith, Adams-McGregor	
NY	East Northport, F. Tabman Sls	212-263-4646
NY	Syracuse, W. Tauber Co.	315-446-7094
NY	Tonawanda, Maury Farber Assoc.	716-692-1620
Ohio	Cleveland, H. Miller Sls.	216-321-3900
RI	Lincoln, Adams-McGregor	401-726-1300
Tex	Dallas, Loss & Stewart Assocs.	214-691-6039
Wash	Seattle, D.G. Weber Co.	503-254-0686
Exp:	Westbury, N. Y., Minthorne Intl Co.	516-334-3303

™LECTROVENT - shielded air ventilators - Lectro Magnetics, Inc.

™LECTURE - A.V. cassettes - Robins Ind's. Corp.

™LEC-16 - digital computer - Lockheed Elctrns. Co.

™L.E.D. - light emitting diode - Packaged Resins Div.

™LED - light emitting diode castings sys. - Allaco Prods Div.

LEDCO, INC.

LEDCO DIV., Wilbrecht Elctrns., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107, Tel: 612-222-2791, TWX: 297-428, 910-563-3617; FSC No.: 55292; Empl.: 20

Local Sales Offices & Reps.

Ariz	Scottsdale, DeAngelo, Rothman & Cheever	602-948-2240
Cal	Palos Verdes Estates, Vedax	213-378-3685
Cal	San Carlos, D.H. Ross Co.	415-591-4411
Cal	San Diego, Cerco	714-560-9143
Colo	Broomfield, Clark Mfrs. Representatives	303-466-1901
Conn	Woodbridge, Elctrn. Mktg. Co.	203-397-1461
Fla	Clearwater, Brennan Assocs.	813-446-5006
Ill	Northfield, Feller Assocs.	312-446-8065
Kans	Overland Park, J. F. Guernsey Co.	913-381-2225
Md	Baltimore, Stitzer Assocs.	301-823-2600
Mich	Detroit, Nicon	313-341-7688
Minn	Minneapolis, Siedare Assocs.	612-545-5663
Mo	St. Louis, Hitt & Assocs.	314-878-5404
NY	Buffalo, Telesco Assocs.	716-834-1026
NY	New York, F. Tylinski Co.	516-466-9070
Ohio	Cleveland, Goory Sls. Co.	216-777-2011
Pa	Paoli, Stitzer Associates	215-644-5500
Tex	Arlington, Hite Elctrn. Sls. Co.	817-265-2912
Wash	Bellevue, Comtec	206-453-1188
Exp:	Conn., Litchfield, Norcon Div. Intrade Inc.	203-567-5865

Local Distributors

Cal	Culver City, National Electro Sls	213-391-6294
Colo	Denver, Integrated Elctrns	303-534-6121
Minn	Minneapolis, Stark Elctrn. Supply	612-332-1328
NY	Rochester, Ossmann Comp. Sls. Corp.	716-442-3290
Wash	Seattle, Interface Elctrns.	206-285-3500
For:	Can. Scarborough, Ontario, Carsten Elctrns., Ltd.	416-751-5095

LEDEX INC., Dept. EM, 123 Webster St., Dayton, Ohio 45401, Tel: 513-224-9530, TWX: 28-8228 810-459-1646; FSC No.: 81840; Empl.: 515 p. 3089,3571-3573,4141-4143

Sales Manager: J. Leland

Local Sales Offices & Reps.

Ariz	Scottsdale, Arcom Sls.	602-947-5745
Cal	Palo Alto, Testco	415-324-1900
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Colo	Denver, B-5 Inc.	303-426-0222
Conn	Trumbull, SIR Assocs.	203-268-2560
Fla	Orlando, W.B. Wimberly Co.	305-423-2514
Ill	La Grange Park, Bierhaus Sls., Inc.	312-354-5100
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Services	316-684-3941
Mass	Lexington, SIR Assocs.	617-862-1812
Mich	Benton Harbor, R.C. Nordstrom & Co.	616-429-8560
Mich	Lathrup Village, R.C. Nordstrom & Co.	313-559-7373
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
NM	Albuquerque, Arcom Sls.	505-296-0606
NY	Liverpool, L.P. Garner Assocs.	315-451-1323
NY	Oceanside, Bittan Assocs.	516-678-6222
NC	Research Triangle Park, A.B. Andrews & Co.	919-549-0563
Ohio	Dayton, Ledex Inc.	513-224-9530
Pa	Philadelphia, V.S. Malta	215-836-5122
Tex	Richardson, Thunderbird Tech. Sls. & Svcs. Inc.	214-690-0763
Wash	Bellevue, Testco	206-454-7422
Wisc	Milwaukee, Bierhaus Sls. Inc.	414-332-0900

™LEE-BUS - bus bars - Atlee Corp.

™LEECAST - potting compounds - Leepoxy Plastics

LEECE NEVILLE DIV., Sheller Globe Corp., Dept. EM, 1374 East 51st St., Cleveland, Ohio 44103, Tel: 216-431-0740

Local Sales Offices & Reps.

Mich	Farmington, Leece-Neville	313-474-4992
Wash	Redmond, B. Schmidt	206-454-3077

LEECRAFT MFG. CO., INC., Dept. EM, 21-16U 44th Rd., Long Island City, N.Y. 11101, Tel: 212-392-8800, TWX: 710-582-2897; Empl.: 250; Minimum order: $R. Nelson .... p. 2641

Distributor Manager: R. Nelson

Local Sales Offices & Reps.

Ala	Huntsville, Murcota	205-539-8476
Ark	Hot Springs, Meridith Young & Assocs.	501-262-1365
Cal	Los Angeles, Hartfield-Kennan-Freytag	213-225-1318
Colo	Arvada, Arrowhead Sls. Co.	303-423-5556
Conn	Bloomfield, Zaslow Sls.	203-242-7781
Fla	Lighthouse Point, J. Krutek & Assoc.	805-497-1300
Ill	Hinsdale, Hill & Gray	312-325-4810
Iowa	Des Moines, K-S-W	515-279-9235
Mass	Lowell, Zaslow Sls.	617-458-8452
Mich	Troy, C. Jensen	313-643-0506
Minn	St. Paul, R. Ragon	612-488-0201
Miss	Jackson, Meredith Young Assoc.	601-366-8185
Mo	Kansas City, K-S-W	816-358-5240
Mo	St. Louis, K-S-W	314-781-6111
NJ	Parlin, Cooper Simon & Co. Inc.	516-487-1142
NY	Cazenvia, B. H. Tollefson Assoc., Inc.	716-271-4141
NY	Great Neck, C. Simon & Co.	516-487-1142
Ohio	Cleveland, Anderson-Bolds	216-229-4700
Okla	Tulsa, Erickson-Vilter Sls.	214-243-6611
Pa	Pittsburgh, R. W. Moulton Assoc.	412-366-3333
Tex	Dallas, Erickson-Vilter Sls.	214-243-6611
Utah	Salt Lake City, Arrowhead Sls.	801-487-3444
Wash	Seattle, Almac Stroum	206-763-2300
Exp:	Long Island City, NY, Leecraft Int'l. Corp.	212-392-8800

Local Distributors

Cal	El Monte, Kimball Stark	213-444-2594
Cal	Garden Grove, Allied Elctrns	714-894-7581
Cal	Inglewood, Newark Electronics	213-678-0441
Cal	Los Angeles, Fisher/Brownell	213-532-2170
Cal	Sacramento, Sacramento Elctrns.	916-441-4821
Cal	Santa Clara, Fisher/Brownell	408-244-6182
Cal	W. Los Angeles, Western Electromotive/ Shephard Inc.	213-820-3777
Colo	Denver, Newark Denver Supplyy	303-757-3351
Conn	Waterbury, Suburban Supply Corp.	203-757-1251
DC	Miami, Electronic Equip.	305-871-3500
Fla	Deerfield Beach, American Elctrn. Supply Corp.	305-428-0262
Fla	Orlando, Hammond Eletrns	305-849-6060
Fla	Orlando, E. W. Cramer	305-894-1511
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Elgin, Allied Elctrns. Corp.	312-697-8200
Ill	Western Springs, Industribution Inc.	312-325-0296
Ind	Evansville, Hutch & Son, Inc.	812-425-7201
Ind	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Ra-Dis-Co.	317-637-5571
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Ky	Louisville, P. I. Burks Co.	502-589-3960
La	New Orleans, Southern Radio Supply Co.	504-524-2345
Md	Baltimore, Radio Elec. Sve. Co.	301-823-0071
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Boston, Sager Electrical Supply	617-542-2281
Mass	Newton, Cramer Elctrns, Inc.	617-969-7700
Mich	Ann Arbor, Wedemeyer Elec. Supply	313-665-8611
Mich	Livonia, RS Elctrns.	313-525-1155
Minn	St. Paul, Gopher Elctrns.	612-645-0241
Mo	St. Louis, LCOMP St. Louis, Inc.	314-291-6200
NJ	Cherry Hill, Milgray/Delaware Valley	609-424-1300
NJ	Hanover, State Elctrns., Inc.	201-887-2550
NJ	Kenilworth, Newark Elctrns.	201-272-8410
NJ	Pennsauken, Resco Elctrns	609-662-4000
NJ	Springfield, Federated Purchasers, Inc.	201-376-8900
NY	Binghamton, ASI Elctrns.	607-723-6326
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Elmsford, Ancar/Elctrns.	914-592-7100
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Mt. Vernon, Qar Ind'l., Elctrns.	914-699-2224
NY	New York, City Electric Inc.	212-564-5454
NY	New York, Barbizon Elect. Co.	212-586-1620
NY	Rochester, Summit Distrs., Inc.	716-334-8110
NY	Rockville Center, Midway Indl. Elctrns.	516-764-2400
NC	Greensboro, Hammond Elctrns.	919-275-6319
Ohio	Akron, Sun Radio Co.	216-434-2171
Ohio	Cincinnati, Hughes Peters, Inc.	513-351-2000
Ohio	Cincinnati, Newark Elctrns.	513-874-5115
Ohio	Cleveland, Pioneer Standard Elect.	216-587-3600
Ohio	Columbus, Hughes Peters	614-294-5351
Ohio	Dayton, S. Friedman	513-298-5555
Ohio	Dayton, Pioneer Standard	513-236-9900
Pa	Boston, Barno Radio	412-462-7574
Pa	Philadelphia, Philadelphia Elctrns., Inc.	215-568-7400
Pa	Philadelphia, Herbach Rademan, Inc.	215-426-1700
Pa	Philadelphia, Almo Indl., Elctrns.	215-698-4000
Pa	Pittsburgh, CAM/RPC	412-782-3770
Pa	Reading, G. D. Barbey Co.	215-376-7451
RI	Providence, W. Dandretta & Co.	401-861-2800
Tenn	Kingsport, Radio Elec. Supply Corp.	615-247-8111
Tenn	Nashville, Electra Distributing Corp.	615-329-3971
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Garland, Newark Elctrns.	214-271-2511
Va	Richmond, Sterling/Meridian Elctrns.	804-359-0221
Wash	Seattle, Almac Stroum Elctrns.	206-763-2300
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160
Exp:	Can., Richmond Hills, Ont., Leecraft Inds. Ltd.	416-889-2744
Exp:	Long Island City, N.Y., Leecraft Int. Corp.	212-392-8800
For:	Can., Vancouver, B.C., L. A. Varah, Ltd.	604-873-3211
For:	Can., Winnipeg, Man., Cam Gard Supply Co., Ltd.	204-786-8401

LEEDS & NORTHRUP CO., Dept. EM, Sumneytown Pike, North Wales, Pa. 19454, Tel: 215-643-2000; Empl.: 4800 .... p. 2888,2889,2968,2969

Sales Manager: R.C. Thomas

Local Sales Offices & Reps.

Ala	Birmingham	205-870-5310
Ala	Mobile	205-342-8929
Ariz	Phoenix	602-966-3870
Cal	Anaheim	714-635-6040
Cal	San Mateo	415-349-6656
Colo	Denver	303-759-2701
Conn	Avon	203-678-0270
Del	Wilmington	302-478-6970
DC	Washington	301-621-1353
Fla	Miami	305-428-2861
Fla	Orlando	305-851-3911
Ga	Atlanta	404-938-8946
Ill	Chicago	312-775-4141
Ill	South Holland	312-596-8480
Ind	Indianapolis	317-259-7161
Iowa	Davenport	319-355-6481
Kans	Mission	913-432-3727
Ky	Louisville	502-897-0631
La	Baton Rouge	504-272-4020
La	Shreveport	318-861-1861
Md	Columbia	301-465-9494
Mass	Boston	617-326-8816
Mich	Detroit	313-398-3035
Mich	Grand Rapids	616-458-3691
Minn	Minneapolis	612-835-7722
Mo	Kansas City	913-432-3727
Mo	St. Louis	314-726-0853
Neb	Omaha	402-895-0886
NJ	Union	201-686-5200
NY	Albany	518-785-1354
NY	Buffalo	716-836-5900
NY	Rochester	716-235-1700
NY	Syracuse	315-446-8446
NC	Raleigh	919-718-4580
NC	Winston-Salem	919-723-1087
Ohio	Canton	216-492-7400
Ohio	Cincinnati	513-791-2274
Ohio	Cleveland	216-291-2100
Ohio	Columbus	614-891-1615
Ohio	Toledo	419-531-4489
Okla	Tulsa	918-622-4515
Ore	Portland	503-292-8945
Pa	Allentown	215-434-4417
Pa	Harrisburg	717-737-8628
Pa	Philadelphia	215-646-5500
Pa	Pittsburgh	412-561-7808
Pa	Sharon	412-346-3585
SC	Columbia	803-772-4770
Tenn	Knoxville	615-693-1838
Tenn	Memphis	901-365-9026
Tex	Beaumont	713-838-6848
Tex	Dallas	214-234-3363
Tex	Houston	713-784-2720
Utah	Salt Lake City	801-266-6931
Va	Richmond	804-276-9720
Va	Roanoke	703-345-9532
Wash	Seattle	206-455-4450
WVa	Charleston	304-342-6678
Wisc	Milwaukee	414-774-6000

LEEPOXY PLASTICS, Dept. EM, 3324 Ferguson Rd., Ft. Wayne, Ind. 46809, Tel: 219-747-7411; Empl.: 15

Local Sales Offices & Reps.

Tex	Dallas	817-594-1461

(TM)LEE-STRIP - bus strip - Atlee Corp.

(TM)LEE-TAC - lam. bus bar insulation - Atlee Corp.

LEHIGHTON ELECTRONICS, INC., Dept. EM, RD1 4Mi. West on Rt. 443, Lehighton, Pa 18235, Tel: 717-386-4156; Empl.: 65

Sales Manager: J Holt

Local Sales Offices & Reps.

Cal	Covina, Romar Intl.	213-332-8548
Cal	Saratoga, Dahlin & Assocs.	408-257-0121
Fla	Pompano Beach, Cole-Tek Assocs.	305-781-8110
Mich	Spring Lake, Walch Engrg.	
NJ	Haddonfield, Sunday-O-Brien	609-429-4013
NJ	Lebanon, Churchill Assocs.	201-236-6055
NJ	Martinsville, Tri-J Corp.	201-469-9300
NY	New York, Nissho-Iwai American Corp.	212-730-2225
NY	Rochester, E.J. Schomburg	716-244-0920

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(TM)LEICA - cameras - Leitz, Inc. E.

LEICO INDS., INC., Dept. EM, 250 West 57th St., New York, N.Y. 10019, Tel: 212-765-5290

LEITZ, INC. E., Dept. EM, Link Crescent, Rockleigh, N.J. 07647, Tel: 201-767-1100, Telex: 13-5356; Empl.: 200

Sales Manager: G. Faulhaber

Local Sales Offices & Reps.

Cal	San Francisco	415-873-7560
Ga	Tucker	404-939-5426/12
Ill	Park Ridge	312-692-4133
Md	Kensington	301-946-9306

LEKTRA LABS., INC., Dept. EM, 129-07 18th Ave., College Point, N.Y. 11356, Tel: 212-939-7171; Empl.: 60

(TM)LEKTRA/LITE - diffusion light source - Lektra Labs., Inc.

(TM)LEKTRON - sound lectern - PASO Sound Products Inc.

LEL CO., Dept. EM, 5 Burns Pl., Cresskill, N.J. 07626, Tel: 201-569-8641; Empl.: 10

LEMO USA, Dept. EM, 2015 Second St., Berkeley, Cal. 94710, Tel: 415-548-1966, Telex: 33-5393

Local Sales Offices & Reps.

Cal	Berkeley, Caltron Industries	415-548-1966
Cal	Los Angeles, Ezra Mintz Assocs.	213-645-2066
Mass	Lexington, Zieco	617-861-8300
Ore	Portland, Earl & Brown Co.	503-245-2283
Wash	Seattle, Earl & Brown Co.	206-284-1121

LEMO USA cont'd

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Quick Connect/Dis-connect cylindrical connectors for round cables. Coaxial, multi-contact, and high voltage types. All metal shells are satin-chrome plated and complement other high quality front panel components.

LEMOSA, INC., Dept. EM, 465 California St., San Francisco, Cal. 94104, Tel: 415-989-5515

LENK MFG. CO., INC., See Wall-Lenk Mfg. Co.

LENOX-FUGLE ELCTRNS., INC., Dept. EM, 100 Sylvania Pl., S. Plainfield, N.J. 07080, Tel: 201-756-1164; Empl.: 18

Local Sales Offices & Reps.

Cal	Los Angeles, Western Electromotive/Shephard	213-820-3777
Colo	Arvada, Arrowhead Sls. Corp.	303-772-3483
Fla	Orlando, Ludlum Assocs. Co.	305-894-7761
Ill	Chicago, L-Tec, Inc.	312-286-1500
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mo	Kansas City, R. R. Burton Sls. Co.	816-578-4498
NM	Albuquerque, Arrowhead Sls. Corp.	505-247-0287
NY	Rochester, H. C. Johnson Agencies	716-482-3000
NY	Schenectady, E M B Elctrns. Corp.	518-372-5841
NY	Yonkers, J. Brown Elec. Sls. Reps.	914-779-7330
Ohio	Dayton, R. P. Calhoun & Assoc.	513-299-4144
Pa	Philadelphia, Paragon Sls. Co.	215-563-7060
Utah	Salt Lake City, Arrowhead Sls. Corp.	505-247-0287

LENOX INSTR. CO., Dept. EM, 121 E. Luray St., Philadelphia, Pa. 19120, Tel: 215-DA 4-4543; Empl.: 40

(TM)**LENSCOTE** - anti-reflection optical coating - Metavac, Inc.

LENZ ELECTRIC MFG. CO., Dept. EM, 1751 N. Western Ave., Chicago, Ill. 60647, Tel: 312-276-4454

(TM)**LEONARD** - trash rakes for intake of hydraulic turbines - Allis-Chalmers

(TM)**LEPAK** - cap sealing equipment - Lepel High Frequency Labs.

LEPEL HIGH FREQUENCY LABS., Dept. EM, 59-21 Queens-Midtown Expwy., Maspeth, N.Y. 11378, Tel: 212-HA 6-4580, TWX: 12303 Lepelab; Empl.: 200

Sales Manager: J. Coiffi

Local Sales Offices & Reps.

Ala	South Birmingham, Dilcher Engrg. Co.	205-252-3300
Ariz	Scottsdale, Mercury Engrg. Sls., Inc.	602-275-8579
Cal	Half Moon Bay, R.F. Thompson	415-467-9444
Cal	Irvine, Lepel High Frequency Labs., Inc.	714-540-1650
Colo	Denver, R. J. Primus	303-433-8997
Conn	Simsbury, T. V. Evans	203-658-5579
Fla	St. Petersburg, Dilcher Engrg. Co.	813-343-1041
Ga	Atlanta, Dilcher Engrg. Co.	404-261-1678
Ill	Chicago, Lepel High Frequency Labs., Inc.	312-832-4225
Ind	Indianapolis, Processing Equip. Co.	317-253-9400
Kans	Prairie Village, Heat Process & Control	913-341-1800
Mass	Wakefield, Eastern Appliance Co.	617-245-8530
Mich	Mount Clemens, E. L. Kemper & Assocs.	313-468-9797
Minn	Minneapolis, C. W. Stone Co.	612-870-8104
Mo	St. Louis, Beaco Equipment Co.	314-965-8600
NC	Charlotte, Dilcher Engrg. Co.	704-364-9272
Ohio	North Canton, H. D. Denton	216-499-3091
Okla	Tulsa, Marsuco	918-584-5271
Pa	Havertown, E. G. Murphy	215-446-4414
Tenn	Chattanooga, Young Equip. Sls.	615-265-3862
Tex	Houston, Selle Alloys & Equip. Co.	713-524-3013
Wash	Seattle, Eustis Co., Inc.	206-623-7060
Wisc	Waukesha, Schram Assocs.	414-547-0600

(TM)**LERLOY** - soldering equip. & hand tools - Engineering & Elctrn. Devices, Inc.

(TM)**LEVELAIR** - soldering sys. - Electrovert

(TM)**LEVEL-TEK** - detection & control sys - Robertshaw Controls Co.

(TM)**LEVEL-TEL** - detection & control sys - Robertshaw Controls Co.

LEVIT ELECTRONICS, C. M., Dept. EM, 200 Park Ave. S., New York, N.Y. 10003, Tel: 212-777-5517, Telex: 42-2509

Sales Manager: D.H. Spilke; *Distributor Manager:* M Levit

LEVITON MFG. CO., INC., Dept. EM, 59-25 Little Neck Pkwy., Little Neck, N.Y. 11362, Tel: 212-229-4040, TWX: 710-582-2632

(TM)**LEV-O-LET** - switches, outlets - Leviton Mfg. Co., Inc.

(TM)**LEVOLIER** - switches - McGill Mfg. Co. Inc.

(TM)**LEV-O-LOCK** - plugs, connectors - Leviton Mfg. Co., Inc.

(TM)**LEWIS VERTICAL** - amateur vertical antenna - Universal Products Engrg.

LEWISYSTEMS, Menasha Corp., Dept. EM, 426 Montgomery St., Watertown, Wisc. 53094, Tel: 414-261-3162, Telex: 26-9403; FSC No.: 81841; Empl.: 189

Local Sales Offices & Reps.

Ill	Chicago	312-631-1451
Mich	Detroit	313-886-1181
NJ	Livingston	201-992-3500
NY	Flushing	212-463-3890
Ohio	Cleveland	216-333-2797
Pa	Latrobe	412-537-5808
Wisc	Milwaukee	414-774-4350

(TM)**LEXAN** - polycarbonate resin - General Elec.

LFE CONTROL SYSTEM INDUSTRIES, Dept. EM, 2920 Sand Ysidro Way, Santa Clara, Cal. 95051, Tel: 408-732-9400, TWX: 910-339-9282; Empl.: 135

Local Sales Offices & Reps.

Tex	Houston	713-661-5390

LFE CORP., Process Control Div., Dept. EM, 1601 Trapelo Rd., Waltham, Mass. 02154, Tel: 617-890-2000, TWX: 710-324-0681 ...... p. 2890-2893

Sales Manager: R. Arslanian; *Distributor Manager:* C. Davis

Local Sales Offices & Reps.

Ariz	Phoenix, Zeus	602-253-6104
Cal	Irvine, LFE Corp.	714-979-8472
Cal	Sunnyvale, Mission Mktg.	408-732-9611
Ga	Doraville, PAR Assocs.	404-393-0018
Ill	Mount Prospect, G & E Instrs.	312-593-5551
Kans	Overland Park, G & E Instrs.	913-649-0121
Mich	Royal Oak, G. Instrt. Co.	313-576-4700
Minn	Minneapolis, CMI	612-757-5090
NJ	Oakland, Applied Process Instrs.	201-337-6163
NM	Albuquerque, Zeus	505-268-3941
NY	N. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
NY	Utica, KLM Assocs.	315-735-8525
NC	Charlotte, Sys. Svc. Corp.	704-377-3407
Ohio	Dayton, Mohawk Intronics	513-434-8873
Okla	Chagrin Falls, RPM Ind'l. Sls.	216-247-3295
Pa	Newtown Square, DCI Sys.	215-353-0772
RI	Ingomar, Greye Glass Assoc.	412-366-6664
Tex	Dallas, Carey-Wold & Assoc.	214-923-5383
Tex	Houston, Carey-Wolf & Assoc.	713-721-2442
Utah	Salt Lake City, Zeus	801-532-7940
Wash	Seattle, Comptronics	206-284-4842

Local Distributors

Ala	Birmingham, M.G. Elctrns.	205-328-4525
Ala	Mobile, Brownell Electro	205-479-5405
Ariz	Phoenix, Metermaster	602-244-9441
Cal	Inglewood, Newark Elctrns.	213-678-0441
Cal	Los Angeles, Metermaster	213-685-4340
Cal	N. Hollywood, B.J. Wolfe Entprs.	213-877-5518
Cal	Oakland, Western Electro-Mechanical Co.	415-452-1936
Cal	Palo Alto, Metermaster	415-968-0313
Cal	San Diego, Metermaster	714-560-4841
Cal	Santa Clara, Dynametron	408-246-6535
Cal	S. El Monte, California Alloy Co.	213-579-3230
Colo	Denver, Newark Elctrn.	303-757-3351
Conn	Middletown, Mancib Co.	203-346-6646
Conn	Stamford, Omega Engrg.	203-359-1660
Conn	Westport, Newark Elctrns.	203-226-6921
Fla	Ft. Launderdale, Newark Elctrns.	305-587-2372
Fla	Orlando, Brownell Electro Inc.	305-843-6770
Fla	W. Palm Beach, Florida Standards Lab., Inc.	305-585-9363
Ga	Atlanta, Brownell Elctro Inc.	404-762-5181
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Elk Grove Village, Metermaster	312-398-3267
Ill	Oak Park, Pacific Indicator Co.	312-383-0220
Ind	Anderson, Electronic Supply	317-644-3381
Ind	Fort Wayne, Ft. Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Ind	Muncie, Muncie Elctrns.	317-288-8837
Ind	South Bend, Koontz-Wagner Electric	219-232-2051
Iowa	Cedar Rapids, Newark Elctrns.	319-362-1171
Kans	Shawnee Mission, Newark Elctrns.	913-384-4545
La	Harahan, M.G. Elctrns.	504-733-0070
La	Harahan, Industrial Instr. Works	504-733-8355
La	Kenner, Butler & Land	504-722-6363
Md	Beltsville, Newark Elctrns.	310-937-5085
Md	Elk Ridge, Sunshine Scientific Instrs.	301-796-5600
Mass	Burlington, Mancib Co.	617-272-9450
Mass	Cambridge, H. Young Jr, Inc.	617-547-3873
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Woburn, Newark Elctrns.	617-935-8350
Mich	Oak Park, Newark Elctrns	313-548-0250
Mich	Royal Oak, George Instr. Co.	313-576-4700
Mich	Wyoming, Newark Elctrns.	616-241-6681
Minn	Minneapolis, Newark Elctrns.	612-331-6350
Minn	Minneapolis, Control Assemblies Inc.	612-544-3364
Mo	St. Louis, Industrial Svc. Labs	314-535-5760
Mo	University City, Olive Industrial Elctrns.	314-863-7800
NJ	Kenliworth, Newark Elctrns.	201-272-8410
NY	Clarence, Trott Elctrns. Inc.	716-634-8500
NY	Long Island, Metermod Instr. Corp.	212-726-4850
NY	New York, Martin Audio Video Corp.	212-359-1660
NY	Plainview, Newark Elctrns.	516-822-5000
NY	Rochester, Newark Elctrns.	716-473-6600
NY	Rochester, Trott Elctrns. Inc.	716-473-8010
NC	Charlotte, Brownell Electro Inc.	704-394-4341
Ohio	Cincinnati, Newark Elctrns.	513-874-5115
Ohio	Cincinnati, Graham/Mytronics	513-733-1661
Ohio	Cleveland, Newark Elctrns.	216-361-4700
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Pa	Philadelphia, Sunshine Scientific Instrs.	215-673-5600
Pa	Pittsburgh, CAM/RPC Ind/l. Elctrns.	412-288-2372
Tenn	Memphis, Brownell Electro Inc.	901-332-9254
Tenn	Nashville, Brownell Electro Inc.	615-889-8230
Tex	Austin, Newark Elctrns.	512-459-3163
Tex	Garland, Newark Elctrns.	213-271-2511
Tex	Garland, Metermaster	214-271-5671
Tex	Houston, Quality Instr. Lab.	713-524-0528
Tex	Houston, Newark Elctrns.	713-782-4800
Utah	Salt Lake City, Newark Elctrns.	801-486-1048
Va	Fairfax, Nine Assocs., Inc.	703-273-1803
Wash	Seattle, Eicher Richards Co.	206-523-7888
Wisc	Brookfield, Newark Elctrns.	414-781-2450
Wisc	Milwaukee, Electro-Mechano Co.	414-272-4050

(TM)**LGH** - high voltage lead - Amp Inc.

LH RESEARCH, INC., Dept. EM, 1821 Langley, Irvine, Cal. 92714, Tel: 714-546-5279, TWX: 910-595-2540; Empl.: 100 ...... p. 3282

Sales Manager: J.C. Graham

Local Sales Offices & Reps.

Ariz	Scottsdale, DeAngelo, Rothman & Cheever	602-948-2240
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	Irvine, L H Research	714-546-5279
Cal	San Jose, L H Research	408-268-5115
Colo	Denver, PLS Assocs.	303-773-1218
Fla	Oviedo, Conley & Assocs	305-365-3283
Ill	Schaumburg, Kingston Comps.	312-529-8055
Iowa	Des Moines, Beams Co.	515-255-1148
Kans	Shawnee Mission, Beams Co.	913-631-0300
Md	Laytonsville, G-T Assocs.	301-949-8060
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
Minn	St. Paul, Cahill Assoc.	612-646-7217
Mo	St. Louis, Beams Co.	314-569-1060
NH	Nashua, Bell Controls	603-882-6984
NJ	Wayne, G & A Sls.	201-256-8500
NY	Syracuse, Nycom, Inc.	315-437-8343

Ohio	Cleveland, Goetronix Mktg. Assocs.	216-526-2535
Ohio	Columbus, Geotronix	614-457-8472
Pa	Ambler, Data Engrg.	215-542-9876
Tex	Dallas, R. Martin Assocs.	214-361-8584
Tex	Houston, R. Martin Assocs.	713-444-2944
Wash	Seattle, C.K. Shank & Assocs.	206-632-4290
Exp:	Cal., Reseda, Dynatron Int'l.	213-881-8700

LIBBEY OWENS-FORD CO., Liberty Mirror Div., Dept. EM, 811 Madison Ave., Toledo, Ohio 43695, Tel: 419-247-4797; Empl.: 125

Local Sales Offices & Reps.

Cal	Los Angeles	213-846-2153
Ill	Chicago	312-236-2490
NJ	Fort Lee	201-947-8000
Ohio	Cincinnati	513-563-8920
Tex	Dallas	214-521-3782

LIBERTY CONTROLS, INC., Dept. EM, 500 Brookforest Ave., Shorewood, Ill. 60431, Tel: 815-725-2241; Empl.: 60 .... p. 3582,3583

Local Sales Offices & Reps.

Cal	Palo Alto, Alpha Tech. Assoc.	415-494-8717
Cal	Santa Monica, REP Assoc.	213-829-5401
Colo	Littleton, Lange Sls.	303-795-3600
Fla	Sarasota, R.F. Carlson	813-388-3086
Ill	Chicago, Schuten Assoc.	312-833-0980
Mass	Bedford, CNC Sls.	617-275-2890
Mich	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
Minn	St. Paul, Countryman Assocs.	612-645-9151
Mo	St. Louis, R. Carlson	314-961-4485
NJ	Fort Lee, Necco	201-461-2789
NY	Buffalo, Niagara Elec. Sls.	716-886-4000
NY	Rochester, Niagara Elec.	716-271-1223
Ohio	Cleveland, E. Bock	216-331-5212
Ore	Portland, Pacific Electric Sls.	503-235-3456
Pa	Bryn Mawr, Vantage Sls.	215-525-0304
Tex	Dallas, D. Shuhart Co.	214-239-0185

LICON

LICON DIV., Illinois Tool Works, Dept. EM, 6615 W. Irving Park Rd., Chicago, Ill. 60634, Tel: 312-282-4040, TWX: 910-221-0275; Empl.: 450 .... p. 4144-4147

Local Sales Offices & Reps.

Cal	Los Angeles, Licon	213-723-1181
Cal	Menlo Pk., McKnight Co.	415-325-2844
Colo	Englewood, Licon, Div. I.T.W.	303-773-0666
Fla	Clearwater, Perrott Associates, Inc.	813-585-3327
Fla	Ft. Lauderdale, Perrott Associates, Inc.	305-792-2211
Fla	Orlando, Perrott Assoc.	305-275-1132
Ga	Atlanta, Electro Mech.	404-449-6337
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
Md	Randallstown, Beacon	301-922-1248
Mass	Burlington, Licon Div. I.T.W.	617-273-0365
Mich	Birmingham, Licon	313-642-9876
Minn	Minneapolis, Comstrand Inc.	612-571-0000
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	314-567-6488
Neb	Lincoln, Mktg. Assoc.	402-464-5244
NJ	Bridgewater, J.F. Coughlin Assocs.	201-725-1327
NJ	Haddonfield, TAI Corp.	609-854-3011
NY	Massapequa, J.F. Coughlin	516-799-7743
NY	Syracuse, Fountain, Young & Co.	315-437-7733
NC	Raleigh, Electro Mech.	919-782-7586
Ohio	Columbus, Rockford Controls	614-231-5890
Ohio	Dayton, Rockford Controls	513-898-5452
Ohio	Euclid, Rockford Controls	216-731-5250
Tenn	Nashville, Electro Mech Sls. Engrg. Co.	615-256-2516
Tex	Microsystems Mktg. Inc., Evans-McDowell	214-238-7157
Tex	Microsystems Mktg. Inc., Evans-McDowell	713-783-2900
Wash	Redmond, Barrett Sls. Northwest Ltd.	206-885-6991

Local Distributors

Ariz	Phoenix, Cramer Elctrns.	602-267-7321
Cal	Burlingame, Rose Elctrns. Distr. Co.	415-692-5700
Cal	Los Angeles, Electric Switches	213-660-1310
Cal	Los Angeles, Kierulff Airline Supply	
Cal	Santa Clara, Fisher Brownell	408-244-6182
Cal	Sun Valley, Richey Elctrn.	213-768-3800
Colo	Denver, Cramer Elctrn.	303-758-2100
Conn	Hartford, L.E. Whelan Co.	203-246-5694
Fla	Orlando, Cramer Elctrns.	305-894-1511
Ill	Chicago, Electronic Expeditors	312-236-1088
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ind	Indianapolis, RA DIS Co.	317-637-5571
Kans	Wichita, Radio Supply Co.	316-267-5214
Me	Kensington, Marine Air Supply	301-949-1353
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mass	W. Springfield, Tectrol Assocs.	413-733-3695
Mich	Detroit, Fife Elct. Supply Co.	313-963-1160
Mich	Wyoming, Newark Indl. Elctrns.	616-241-6681
Minn	N. Minneapolis, Stark Elctrns. Supply	612-332-1325
Neb	Lincoln, Scott Elctrns. Supply	402-466-8221
NJ	Hackensack, Nassor Elec. Supply Co.	201-342-3737
NY	Binghamton, ASI Elctrns.	607-723-6326
NY	Buffalo, Summit Distributors	716-884-3450
NY	Farmingdale, Iris Elctrns.	516-420-8400
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Akron, Akron Elctrns. Supply	216-762-8818
Ohio	Dayton, Esco Elctrns.	513-226-1133
Pa	McKeesport, Barno Radio	412-751-5966
Pa	Montgomeryville, Pyttronics Inds.	215-643-2850
Tex	Dallas, Wholesale Elctrns. Supply	214-824-3001
Tex	Houston, Lenert Co.	713-225-1465
Wash	Bellevue, Bell Industries	206-747-1515
Wisc	Milwaukee, Electronic Expeditors	414-228-8100

™LID - leadless inverted device (micro-semiconductor) - Amperex Electronic Corp.

™LIFESAVER - battery-operated emergency light - Teledyne Big Beam

™LIGHT CONDITIONING - dimmer control - Leviton Mfg. Co., Inc.

™LIGHT WATCHMAN - photoelectric controls - Ripley Co., Inc.

LIKA, Dept. EM, 405 Aldo Ave., Santa Clara, Cal. 95050, Tel: 408-249-0464; Empl.: 80

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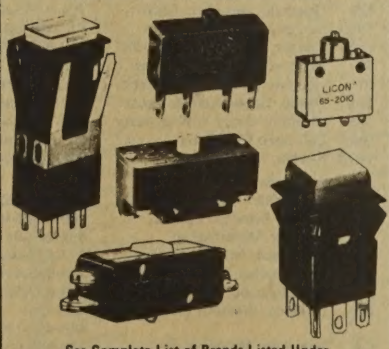

See Complete List of Brands Listed Under ELECTRIC SWITCHES.
FREE Linecard & Catalogs on Request.

™LIMITAMP - motor control - General Elec. Co.

™LIMITRON - fast acting fuses - Bussmann Manufacturing

™LIMITSTAT - safety thermostat - Hotpack Corp.

™LINAMATIC - book backlining machine - A. M. W. Corp.

™LINC TAPE - mini computer tape memory system - Computer Operations

™LINDE ALUMINA - alumina polishing powder - Union Carbide Corp.

LINDEN LABS., INC., Dept. EM, Box 920, State College, Pa. 16801, Tel: 814-355-5491; FSC No.: 20872; Empl.: 50 .... p. 4343

LINE ELECTRIC ESTERLINE CO., Dept. EM, U.S. Hwy. 287, Parsippany, N.J. 07054, Tel: 201-887-8200, Telex: 13-6494; Empl.: 217

Sales Manager: W. Roginski

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Cal	Tustin, Sierra Pacific Engrg.	714-731-3411
Conn	Berlin, White Sls. Co.	203-224-0423
Fla	Clearwater, Lynch Gentry Assocs.	813-443-2697
Ill	Palatine, Bu-Nell Engrg. Co.	312-358-2300
Ind	Indianapolis, Val-Skol Sls., Inc.	317-926-5063
Mass	Needham, White Sls. Co.	617-444-3676
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, Deltron Co.	314-869-4779
NJ	Leonia, Associated Controls & Equip.	201-944-9218
NY	Rochester, ONTEC	716-464-8636
NC	Winston-Salem, Murcota Corp.	919-722-9455
Ohio	Dayton, Electro-Com	513-989-5140
Ore	Forest Grove, Doran Sls. Assoc.	503-357-3333
Pa	Abington, Industrial Mktg. Specialists	215-659-0444
Tex	Dallas, Techno Assocs.	214-357-9213
Wash	Redmond, Doran Sls. Assocs.	206-885-1885
Exp:	N.J., Bloomfield, Buck Int'l. Co.	201-743-8110

LINEAC CORP., Dept. EM, 222 Lake Ave., Yonkers, N.Y. 10701, Tel: 914-YO3-5900; Empl.: 20

Local Sales Offices & Reps.

Mass	Lynnfield, Grady & Assos.	617-334-6633

LINEAR INSTRS. CORP., Dept. EM, 17282 Eastman Ave., Irvine, Cal. 92714, Tel: 714-546-6776, Telex: 68-5613; Empl.: 60

Sales Manager: J.M. Gafner, Mktg. Mgr.

Local Sales Offices & Reps.

Ariz	Tempe, J. F. Hurlbut Co.	602-968-5962
Cal	Richmond, Tegal Scientific	415-232-1757
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Ill	Deerfield, Serco, Inc.	312-945-8180
Ill	St. Louis, P.J. Cobert Assocs.	314-423-8388
La	Kenner, Scimetrics	504-722-4412
Md	Wheaton, Applied Science Mktg.	301-933-2566
Mo	St. Louis, P.J. Cobert Assocs.	314-423-8388
Ohio	Cincinnati, Tekmar Co.	513-761-0633
Ore	Portland, Extech, Ltd.	503-292-9219
Tex	Houston, Scimetrics	713-772-3609
Tex	Irving, Scimetrics	214-252-5635

LINEAR MOTIONS CO., Dept. EM, 17025 Dubesor St., Valinda, Cal. 91744, Tel: 213-333-7056; FSC No.: 5945

Sales Manager: L. Wolby

LINEAR NETWORKS CO., Dept. EM, Box 775, Westminster, Cal. 92683, Tel: 213-430-9342; Empl.: 7

LINEAR SYSTEMS, INC., See SBE, Inc.

™LINEAR PROX - analog proximity system - Electro Corp.

LINEMASTER SWITCH CORP., Dept. EM, Box 52, Woodstock, Conn. 06281, Tel: 203-974-1000; FSC No.: 979180; Empl.: 130

™LINE-O-LITE - pilot lights - Industrial Devices

™LINE RADIATOR - speaker system - Electro-Voice, Inc.

(TM)LINE RADIATOR - loudspeaker - Electro-Voice, Inc.

(TM)LINE-VOLT - voltage testers - Industrial Devices

(TM)LINISTOR - linear thermistor - Keystone Carbon Co.

(TM)LINK/CHEK - data link verifier - Com/Tech Systems Inc.

LINK COMMUNICATIONS INC., Dept. EM, 260 W. Broadway, New York, N.Y. 10013, Tel: 212-267-2575; Empl.: 43

(TM)LINOBATE - optical lithium niobate - Crystal Technology

LION PRECISION CORP, Dept. EM, 60 Bridge St., Newton, Mass. 02195, Tel: 617-969-4710; FSC No.: 25404; Empl.: 30

Sales Manager: R.R. Kozlow

Local Sales Offices & Reps.

Cal	San Carlos, Dimensional Control Corp	415-591-0365
Cal	Santa Ana, Dimensional Control Corp	714-541-6608
Fla	Fort Lauderdale, D.G. Machinery & Gage Co.	305-484-0354
Ga	Norcross, D.G. Machinery & Gage Co.	404-449-3414
Ill	LaGrange, Olson Engrg & Sls	312-482-3300
Ind	Anderson, Olson Engrg & Sls	317-644-1690
Mass	Stoneham, Production Devices Corp	617-438-2773
Mich	Livonia, Dunn Engrg & Sls	313-425-9090
Minn	Wayzata, Yukon Sls Assocs	612-473-3274
NJ	Morristown, Leon Assocs	201-540-0209
NY	Rochester, R.G. Lowenguth Co.	716-458-4366
NC	Raleigh, D.G. Machinery & Gage Co	919-467-6940
Pa	Philadelphia, Y. Wayne Miller Co.	215-247-9602
Tex	Dallas, Crescent Gage & Tool Co.	214-357-5141

LIPPS, INC., Dept. EM, 1630 Euclid St., Santa Monica, Cal., 90404, Tel: 213-393-0449; Empl.: 200 p. 1116,1117

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Listed Under ELECTRIC SWITCHES.
FREE Linecard & Catalogs on Request.

Sales Manager: D.S. Elderson

Local Sales Offices & Reps.

Mich	Grand Rapids, R.P. Urban Assoc.	616-245-0511
NJ	Teaneck, H. Rude Assoc.	201-836-6778
Ohio	Dayton, Electrical Sys. Co.	815-889-4105
Pa	Huntingdon Valley, Knowles Assocs.	251-947-5641

(TM)LIQUIFLEX - adjustable speed drives (formerly accutrol - Allis-Chalmers

(TM)LIQUILITE - liquid level controls - Controlotron Corp.

(TM)LIQUI-NOX - liquid manual detergent - Alconox Inc.

(TM)LIQUITEC - level detector - Trans-Sonics, Inc.

(TM)LIRA - infrared analyzer - Mine Safety Appliances Co.

LISK, G.W. CO., Dept. EM, 2 South St., Clifton Springs, N.Y. 14432, Tel: 315-462-2611, Telex: 97-8395; Empl.: 125

Local Sales Offices & Reps.

Cal	Fullerton, J.J. Crowley	714-870-9671
Colo	Denver, Palmer Assocs.	303-629-0112
Ga	Roswell, Wyco	404-993-5020
Ill	Chicago, K-W Assocs.	312-792-2618
Mich	Farmington Hills, W.R. Hummon & Assocs.	313-474-0661
Minn	Minneapolis, Murphy Assocs.	612-544-9723
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Okla	Tulsa, Blair Engrg.	918-747-3100
Tex	Dallas, Blair Engrg.	214-352-8411
Tex	Houston, Blair Engrg.	713-776-0011
WVa	Harpers Ferry, W.V. Fox Assocs.	304-725-4333
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

(TM)LITE BOX - hilo limit control - Brunswick Engineering Inc.

(TM)LITE-MIKE - light meter - EG&G, Inc.

LITHIC SYSTEMS, INC., Dept. EM, 10101 Bubb Rd., Box 869, Cupertino, Cal. 95014, Tel: 408-867-5600; FSC No.: 51083; Empl.: 6

Local Sales Offices & Reps.

Ill	Rolling Meadows, Lightner Assocs.	312-398-3000
Exp:	Cal., Cupertino, Nasem Co.	408-257-4610

(TM)LITHOCON - silicon storage tube - Princeton Elctrn. Prods.

LITRONIX, Dept. EM, 19000 Homestead Rd., Cupertino, Cal. 95014, Tel: 408-257-7910, TWX: 910-338-0022; FSC No.: 50579; Empl.: 1700; Minimum order: $A.L. Shadlick

Sales Manager: A.L. Shadlick; *Distributor Manager:* A.L. Shadlick

Local Sales Offices & Reps.

Ala	Huntsville, Rep. Inc.	205-881-9270
Ariz	Scottsdale, Q.T. Wiles & Assoc.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assoc.	213-478-0183
Cal	San Diego, Q. T. Wiles	714-565-6895
Cal	Sunnyvale, Trident Assocs.	408-734-5900
Cal	Tustin, Q. T. Wiles	714-832-4952
Colo	Denver, Parker-Webster Co.	303-751-2600
Fla	Clearwater, Dyne-A. Mark	813-441-4702
Fla	Ft. Lauderdale, Dyne-A. Mark	305-771-6501
Ill	Elk Grove Village, J. G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell	219-432-5591
Ind	Indianapolis, R.O. Whitesell	317-359-9283
Ind	Kokomo, R.O. Whitesell	317-453-3592
Iowa	Cedar Rapids, J. G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell	502-893-7303
Md	Baltimore, Component Sls.	301-484-3647
Mass	Burlington, New England Tech. Sls.	617-272-0434
Mich	Grand Rapids, R.O. Whitesell	616-942-5420
Mich	Southfield, R.O. Whitesell	313-559-5454
Mich	St. Joseph, R.O. Whitesell	616-983-7337
Minn	Edina, M. Foster Tech. Sls.	612-835-2252
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, Tri-Tronix Inc.	505-265-8409
NY	Baldwin, Rome	516-623-3344
NY	Pittsford, T-Squared	716-381-2551
NY	Syracuse, T-Squared	315-463-8592
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Cincinnati, R.O. Whitesell	513-521-2290
Ohio	Columbus, R.O. Whitesell	614-888-9396
Ohio	Dayton, R.O. Whitesell	513-298-9546
Ohio	Middleburg Heights, R.D. Whitesell	216-826-4424
Pa	Ft. Washington, G.C.M.	215-646-7535
Pa	Pittsburgh, R.O. Whitesell	412-344-7277
Tenn	Greenville, R.O. Whitesell	615-639-6154
Tenn	Jefferson City, Rep Inc.	615-475-4105
Tex	Dallas, Bonser-Philhouier Sls.	214-234-8438
Tex	Houston, Bonser-Philhouier Sls.	713-467-4373
Utah	Salt Lake City, Parker-Webster	801-261-1058
Wash	Seattle, E.S. Chase	206-762-4824
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755

Local Distributors

Ala	Huntsville, Hamilton-Avnet	205-533-1170
Ariz	Phoenix, Moltronics, Inc.	602-272-7951
Ariz	Phoenix, Hamilton-Avnet	602-275-7851
Ariz	Phoenix, R.V. Weatherford	602-272-7144
Ariz	Phoenix, Cramer Elctrns.	602-267-7321
Cal	Anaheim, R.V. Weatherford	714-633-9633
Cal	Culver City, Hamilton Electro Sls.	213-558-2020
Cal	Glendale, R.V. Weatherford	213-849-3451
Cal	Irvine, Cramer Elctrns.	714-979-3000
Cal	Mt. View, Hamilton-Avnet	415-961-7000
Cal	Palo Alto, R.V. Weatherford	415-493-5373
Cal	San Diego, Cramer Elctrns.	714-565-1881
Cal	San Diego, R.V. Weatherford	714-278-7400
Cal	San Diego, Hamilton-Avnet	714-279-2421
Cal	San Diego, Moltronics, Inc.	714-278-5020
Cal	Southgate, Moltronics, Inc.	213-773-6521
Cal	Sunnyvale, Cramer Elctrns.	408-739-3011
Colo	Denver, Hamilton-Avnet	303-534-1212
Colo	Denver, Cramer Elctrns.	303-758-2100
Colo	Englewood, R.V. Weatherford	303-761-5432
Conn	Georgetown, Hamilton-Avnet	203-762-0361
Conn	Hamden, Arrow Elctrns.	203-248-3801
Conn	Northhaven, Cramer Elctrns.	203-239-5641
Fla	Ft. Lauderdale, Hamilton-Avnet	305-971-2900
Fla	Hollywood, Cramer Elctrns.	305-923-8181
Fla	Orlando, Cramer Elctrns.	305-894-1511
Ga	Atlanta, Cramer Elctrns.	404-448-9050
Ga	Norcross, Hamilton-Avnet	404-448-0800
Ill	Mt. Prospect, Cramer Elctrns.	312-593-8230
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ill	Schiller Park, Hamilton-Avnet	312-678-6310
Ind	Indianapolis, Pioneer-Standard	317-849-7300
Kans	Lenexa, Hamilton-Avnet	913-888-8900
Md	Gaithersburg, Cramer Elctrns.	301-948-0110
Md	Gaithersburg, Pioneer-Wash. Elctrns.	301-948-0710
Md	Hanover, Hamilton-Avnet	301-796-5000
Md	Hanover, Cramer Elctrns.	301-796-5790
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	Newton, Cramer Elctrns.	617-964-4000
Mass	Woburn, Hamilton-Avnet	617-933-8020
Mich	Livonia, Hamilton-Avnet	313-522-4700
Mich	Livonia, Pioneer-Mich.	313-525-1800
Minn	Edina, Cramer Elctrns.	612-835-7811
Minn	Minneapolis, Hamilton-Avnet	612-941-3801
Mo	St. Louis, Hamilton-Avnet	314-731-1144
NJ	Cedar Grove, Hamilton-Avnet	201-239-0800
NJ	Cherry Hill, Cramer Elctrns.	609-424-5993
NJ	Moonachie, Cramer Elctrns.	201-935-5600
NJ	Mt. Laurel, Hamilton-Avnet	609-234-2133
NM	Albuquerque, R.V. Weatherford	505-842-0868
NM	Albuquerque, Century Elctrns.	505-292-2700
NM	Albuquerque, Cramer Elctrns.	505-265-5767
NM	Albuquerque, Hamilton-Avnet	505-765-1500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	East Syracuse, Cramer Elctrns.	315-437-6671
NY	E. Syracuse, Hamilton-Avnet	315-437-2642
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Semiconductor Concepts	516-273-1234
NY	Hauppauge, Cramer Elctrns.	516-231-5600
NY	Rochester, Hamilton-Avnet	716-442-7820
NY	Rochester, Cramer Elctrns.	716-275-0300
NY	Rochester, Summit Distrs.	716-334-8110
NY	Westbury, Hamilton-Avnet	516-333-5800
NC	Greensboro, Pioneer-STD Elctrns.	919-273-4441
NC	Winston-Salem, Cramer Elctrns.	919-725-8711
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Cleveland, Hamilton-Avnet	216-461-1400
Ohio	Cleveland, Cramer Elctrns.	216-248-8400
Ohio	Cleveland, Pioneer-Standard	216-587-3600
Ohio	Dayton, Pioneer-Standard	513-236-9900
Ohio	Dayton, Hamilton-Avnet	513-433-0610
Pa	Pittsburgh, Pioneer-Standard	412-782-2300
Tex	Dallas, Hamilton-Avnet	214-661-8661
Tex	Dallas, Cramer Elctrns.	214-661-9300
Tex	Dallas, R.V. Weatherford	214-243-1571
Tex	Dallas, Component Specialties	214-357-6511
Tex	Houston, Component Specialties	713-771-7237
Tex	Houston, Hamilton-Avnet	713-780-1771
Tex	Houston, R.V. Weatherford	713-688-7406
Utah	Salt Lake City, Hamilton-Avnet	801-262-8451
Wash	Bellevue, Hamilton-Avnet	206-746-8750

Wash	Seattle, Cramer Elctrns.	206-575-0907
Wash	Seattle, R.V. Weatherford	206-243-6340
For:	Can., Calgary Alb., Varah's Ltd.	403-276-8818
For:	Can., Downsview Ont., Cramer Elctrns.	416-661-9222
For:	Can., London, Ont., C.M. Peterson	519-434-3204
For:	Can., Mississauga, Tor., Hamilton-Avnet	416-677-7432
For:	Can., Montreal, Que., Future Elctrns.	514-735-5775
For:	Can., Montreal, Que., Hamilton-Avnet	514-331-6443
For:	Can., Montreal, Que., Prelco Elctrns.	514-389-8051
For:	Can., Ottawa, Ont., Prelco Elctrns. Ltd.	613-237-6150
For:	Can., Ottawa, Ont., Future Elctrns.	613-232-7757
For:	Can., Ottawa, Ont., Hamilton-Avnet	613-725-3071
For:	Can., Toronto, Ont., Future Elctrns.	416-677-7820
For:	Can., Vancouver, B.C., L.A. Varah's Ltd.	604-929-1068
For:	Can., Willowdale, Ont., Electro Sonic	416-494-1666
For:	Can., Winnipeg, Manitoba, L.A. Varah's Ltd.	204-633-6190

LITTELFUSE, INC., Dept. EM, 800 E. Northwest Hwy., Des Plaines, Ill. 60016, Tel: 312-824-1188 ·p. 2644,2645,4148,4149

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Corp.	205-547-7718
Ariz	Phoenix, H. Moore Sls. Assocs.	602-274-4558
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Inglewood, J. Berman Co.	213-649-6111
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Conn	West Hartford, C. Segel Co.	203-236-2027
Fla	Tampa, Nickerson Corp.	813-885-1416
Ill	Arlington Heights, C.P. Dombrow Co.	312-253-3326
Ind	Indianapolis, L.M. DeVoe Co.	317-257-1227
Iowa	West Des Moines, T.L. Dowell & Assocs.	515-225-1620
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Md	Silver Spring, Mid Atlantic Sls.	301-593-7749
Mass	Newtonville, C. Segel Co.	617-969-6900
Mich	Detroit, R.C. Merchant & Co.	313-535-6000
Minn	Edina, M. Foster Tech. Sls.	612-835-2252
Mo	St. Louis, T.L. Dowell & Assocs.	314-968-4234
NJ	Englewood, Bressler & Baum Assocs.	201-569-7600
NJ	N. Caldwell, Masin Esco., Inc.	201-226-2550
NM	Albuquerque, W.J. Purdy Co.	505-266-7959
NY	Buffalo, R.W. Mitscher	716-633-7970
NY	Syosset, Masin Esco, Inc.	516-364-0310
NC	Kannapolis, Nickerson Corp.	704-932-6772
Ohio	Richfield, Bear Mktg.	216-659-3131
Ore	Portland, J.V. Belusko Co.	503-222-4279
Pa	Enon Valley, Nebco Assocs.	216-457-2333
Pa	Narbeth, S.A. Jeffries, Inc.	215-664-8500
Pa	Reading, Beil & Whitaker	215-779-2610
Tex	Dallas, Lund & Co.	214-387-4634
Va	Virginia Beach, R.W. Mitscher Co.	804-481-7200
Wash	Seattle, Earl & Brown Co.	206-284-1121
Exp:	Ill., Chicago, Littlefuse, Inc.	312-824-1188

LITTON ABS/OEM PRODS DIV., See Sweda International/OEM Prods Div.

(TM)LITTEL JAX - phone jack - Switchcraft, Inc.

(TM)LITTEL PLUG - phone plug - Switchcraft, Inc.

(TM)LITTEL SWITCH - pushbutton switch - Switchcraft, Inc.

(TM)LITTLE CAESAR - retention assembly - ITT Cannon Electric

(TM)LITTLE GEM - drawers - Equipto

(TM)LITTLE GIANT - antenna - Shakespeare

(TM)LITTLE JOE - tools - MacDonald & Co.

LITTON INDS., Electron Tube Div., Dept. EM, 960 Industrial Rd., San Carlos, Calif. 94070, Tel: 415-591-8411, TWX: 34-8484 910-376-4900; FSC No.: 80080; Empl.: 950

Sales Manager: E.D. Taylor

Local Sales Offices & Reps.

DC	Washington	202-554-2570
Ga	Warner Robins	912-923-3397
NY	Melville	516-694-8300
Ohio	Dayton	513-258-1243
Pa	Williamsport	717-326-3561
Tex	Dallas	214-369-2184

LITTON SYSTEMS, INC., Potentiometer Div., Dept. EM, 226 E. Third St., Mt. Vernon, N.Y. 10550, Tel: 914-664-7733, TWX: 710-562-0129; FSC No.: 04454; Empl.: 300

Sales Manager: G.T. Erbe

Local Sales Offices & Reps.

Cal	Van Nuys, G. Mitchell Assocs.	213-989-5111
Fla	Maitland, Lawrence Assocs, Inc.	305-647-1188
Ill	Elk Grove Village, Midwest Meridian Corp.	312-437-6531
Iowa	Cedar Rapids, Midwest Meridian Corp.	319-365-6561
Mass	Allton, Vector Sls.	617-787-2790
Mo	Maryland Heights, Mid West Meridian Corp.	314-878-4441
Mo	St. Louis, Mid West Meridian Corp.	314-878-4441
NY	Chappaqua, R.M. Glueck Assocs.	914-238-3233
NY	New York, Trionic Assocs., Inc.	516-466-2300
Ohio	Dayton, Rixan Assocs., Inc.	513-278-4216
Pa	Newton Square, Quarracino & Geary	215-353-4300
Tex	Saginaw, Midwest Meridian Corp.	214-251-3933

(TM)LIVE-LOCK - structural panel fastener - Tridair Inds.

LIVERMORE DATA SYSTEMS, INC., Dept. EM, 2050 Research Dr., Livermore, Cal. 94550, Tel: 415-447-2252, TWX: 910-386-8343; Empl.: 80

Local Sales Offices & Reps.

Ark	Scottsdale, PLS Assocs.	602-957-9110
Cal	Agoura, Modern Communications	
Cal	Burbank, Professional Telephone & Elctrns.	213-849-4636
Cal	Burlingame, Communico	415-692-2800
Cal	Long Beach, Phone Consits.	213-426-7077
Cal	Los Angeles, Communications Facility	213-654-7000
Cal	Oakland, Travelling Telepnones	415-635-6365
Cal	Redwood City, Communicators	415-365-4000
Cal	Sacramento, EM-MACK Corp.	
Cal	Santa Ana, Advanced Telecommunications	714-835-5861
Cal	Sunnyvale, Candela	408-738-3800
Colo	Denver, PLS Assocs.	303-773-1218
Haw	Honolulu, Territorial Elctrns.	808-536-4690
Ill	Des Plains, Cozzens & Cudahy	312-298-3600
Ind	Indianapolis, Cozzens & Cudahy	317-244-2456
Md	Edgewater, Commart	301-261-4344
Mass	Framingham, Victor Assoc.	617-879-5710
Mich	Southfield, Nation Wide Communications	313-559-4440
Minn	Minneapolis, Cozzens & Cudahy	612-884-4336
Mo	Kansas City, Cozzens & Cudahy	816-454-5836
Mo	St. Louis, Cozzens & Cudahy	314-423-1234
Nev	Reno, Sierra Communications	602-942-3412
NM	Albuquerque, PLS Assocs.	505-255-2330
NM	Silver City, Sierra Communications	
NY	Roslyn Hts., Travco Assoc.	516-621-3223
Ore	Lake Oswego, Cartel	503-636-5226
Utah	Salt Lake City, PLS Assocs.	

(TM)LLOYD - lampholders, flourescent - Westmoreland Plastics Co.

(TM)LM - spot welders - Price & Rutzebeck

(TM)LMB - small aluminum enclosures - LMB Heeger, Inc.

(TM)LMB - small aluminum enclosurers - Heeger Inc.

LMB HEEGER, INC., Dept. EM, 725 Ceres Ave., Los Angeles, Cal. 90021, Tel: 213-627-9310; Empl.: 11

Local Sales Offices & Reps.

Ala	Birmingham, J. F. Russell Sls.	
Ariz	Phoenix, B.G. Sls.	602-266-5624
Cal	Burlingame, Carelli-EMA	415-697-8862
Colo	Aurora, A.E.S. Inc.	303-366-0208
Fla	Fort Lauderdale, Unirep Inc.	305-527-1556
Ill	Chicago, PBE Mktg.	312-084-3018
Ind	Mulberry, Marsh Sls.	
Mass	Framingham Center, Northeastern Rep.	617-877-4850
Mich	Bloomfield Hills, S.F. McMechan	313-852-4308
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
Mo	St. Louis, Kathrinus-Kelly & Co.	
NY	Yonkers, J. Brown Ele. Reps.	914-779-7330
Ohio	Stow, J.A. Mandabach	216-686-1965
Ore	Portland, J.W. Eckersley	503-246-3183
Pa	Holland, Parnell-Sls. Co.	215-355-9330
Tex	Houston, W. Wylds	713-467-0072

LNR COMMUNICATIONS, INC., Dept. EM, 180 Marcus Blvd., Hauppauge, N.Y. 11787, Tel: 516-273-7111, TWX: 510-227-9871; FSC No.: 51029; Empl.: 120

Local Sales Offices & Reps.

Cal	Mountain View, Microwave Mktg. Assoc.	415-969-3355

(TM)LOAD-PAK - solid-state controlling device - De Laval Turbine Inc.

(TM)LO-CATE - tracking & positioning sys. - Beukers Labs., Inc.

(TM)LOCATOR - fire alarm system - LocAtor Electronics Co.

LOCATOR ELECTRONICS CO., Dept. EM, South Country Ind'l Pk., Drawer 10609, St. Louis, Mo. 63129, Tel: 314-894-0800, Telex: 44-3437

LOCKHEED ELECTRONICS, Dept. EM, 16811 El Camino Real, Mail Station C-17, Houston, Tex. 77058, Tel: 713-483-3471

LOCKHEED ELCTRNS. CO., Dept. EM, Rte. #22, Watchung, N.J. 07060, Tel: 201-757-1600, TWX: 710-997-9541; Empl.: 4,000

Local Sales Offices & Reps.

Cal	Azusa	213-334-8211
Cal	Cupertino	408-257-3357
Cal	Downey	213-869-1187
Ga	Atlanta	404-266-0730
Ill	Elmhurst	312-833-4600
Mass	Lexington	617-861-1880
Mich	Southfield	313-557-5037
Minn	Bloomington	612-888-6080
Pa	Ambler	215-542-7740
Tex	Dallas	214-357-9496
Va	Arlington	703-525-3600

(TM)LOCKIT-SOCKET - integrated circuit sockets - U.S. Terminals

(TM)LOCK-O-SEAL - fastener seal - Parker Hannifin Corp.

(TM)LOCK TIE - wire or cable tie - All States Plastic Mfg. Co., Inc.

(TM)LOCKTITE - connectors - T & B/Thomas & Betts

(TM)LOCKTITE - connectors - T & B/Thomas & Betts

(TM)LOCKWELL - quick release pins - Hartwell Corp.

(TM)LO-COG - d-c motors - Pittman Corp.

(TM)LOC-TRAC - zipper tubing track - Alpha Wire Corp.

(TM)LOCUST - automated test systems - Julie Research Lab.

(TM)LO-FLO - fuel oil meters - Singer Co.

(TM)LOGAN - antenna - Instruments for Industry, Inc.

(TM)LOGCELL - mercury film switch - Fifth Dimension

LOGICAL TECHNICAL SVCS CORP., Dept. EM, 71 W. 23rd St., New York, N.Y. 10010, Tel: 212-741-8340, Telex: 12-7698; FSC No.: 54333; Empl.: 85

Sales Manager: P.J. Teller

Local Sales Offices & Reps.

Cal	Santa Ana, Lew Brooks Co.	714-544-8900
Colo	Golden, J.F. Hurlbut Co.	303-279-7796
Fla	Maitland, Cascol Maitland	305-644-7720
Ill	La Grange, PVA Co.	312-352-1037
Mass	Wakefield, NEREM	617-245-4426
Minn	Minneapolis, Volco Co.	612-933-6631
NY	Vestal, Vestal Elctrn. Devices	602-754-7121
NC	Charlotte, JMW Sys	704-377-3607
Ohio	Cleveland, Tiby Co.	216-371-5335
Tex	Richardson, Spectra Sls	214-234-3600
Utah	Salt Lake City, Technical Devices	801-972-5935
Va	Baileys Crossroad, Q.T. Elctrn. Sls.	703-671-4357

Exp:	Conn., Stamford, Deltron Corp	203-322-7300
Exp:	N.Y., New York, Ad Auriema, Inc.	212-466-2517

LOGICAL TECHNICAL SVCS, Instr. Div., Dept. EM, P.O. Box 39 Pheasant Run, Newtown, Ind'l Commons, Newtown, Pa. 18940

™LOGICATOR - electro magnetic readout - Bowmar Instr. Corp.

LOGICOMP ELCTRNS., INC., Dept. EM, 895 Mamaroneck Av., Mamaroneck, N.Y. 10543, Tel: 914-698-9332; Empl.: 6

Local Sales Offices & Reps.

Fla	N. Miami, Publicover Assocs	305-947-5080
Fla	Orlando, Publicover Assocs.	305-898-9361
Ohio	Cleveland, Orr Assocs	216-885-1324

™LOGICTESTER - digital logic test station - Trendar

™LOGIC TIMER - digital timing instruments - Durgin & Brown, Inc.

LOGIMETRICS INC., Dept. EM, 121-03 Dupont St., Plainview, NY 11803, Tel: 516-681-4700, TWX: 510-221-1833; FSC No.: 33013; Empl.: 49 p. 2894,2987

Sales Manager: J. Kirch

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns	205-582-4613
Ala	Huntsville, Beacon Elctrns	205-881-5031
Cal	Los Angeles, L & M Engrg	213-674-6850
Cal	San Jose, L &M Engrg. North	408-292-3220
Colo	Denver, Scientific Devices Intermountain	303-573-9466
Fla	Ft. Lauderdale, Maitland, Beacon Elctrns.	305-491-4211
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs	317-244-7867
Kans	Shawnee Mission, Pivan Engrg., Inc.	913-722-1030
Md	Lanham, Brimberg Assocs.	301-552-2200
Mass	Burlington, Tritek Inc.	617-272-4550
Mich	Detroit, Comtel-Sterling	315-255-1970
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	St. Louis, Pivan Engrg., Inc.	314-567-3636
NM	Albuquerque, I.M.E.C.	505-883-9010
NY	Jericho, Dal-Tech Devices, Inc.	516-433-7448
NY	Skaneateles, Robtron	315-685-5731
NC	Greensboro, Beacon Elctrns.	919-674-9432
ND	Minneapolis, Torkelson Assocs.	612-835-2414
Ohio	Cleveland, Comtel-Sterling	216-442-8080
Ohio	Dayton, Comtel-Sterling	513-298-7573
Pa	Ambler, WM Assoc	215-643-4119
Pa	Pittsburgh, Comtel-Sterling	412-922-5720
SC	Spartanburg, Beacon Elctrns.	803-582-4613
Tex	Houston, Scientific Devices S.W.	713-623-4250
Tex	Richardson, Scientific Devices S.W.	214-231-8106

LOGITEK, INC., Dept. EM, 42 Central Ave., Farmingdale, N.Y. 11735, Tel: 516-694-3080; FSC No.: 15420; Empl.: 40

Local Sales Offices & Reps.

Cal	San Diego, Power Assoc.	714-633-7992
Fla	Satellite Beach, Reynolds and Assoc.	305-773-4700
Mo	Kansas City, Automatic Gen. Elct. Sls.	816-333-8206
NJ	Parlin, Martech	210-721-2200
Ohio	Dover, A.J. Assoc.	216-343-2224
Ohio	Medina, J.C. Hofstetter Co	216-241-4880
Pa	Wayne, William Clear	215-687-5880
Tex	Richardson, Vista Assoc.	214-235-4547
Exp:	Mass., Waltham, M & S Engrg Sls Inc	617-376-5647

™LOGITRAN - educational computer - Fabri-Tek, Inc.

™LOHMETER - accessory for low ohm readings - Alpha Components Corp.

™LOKON - locknuts - Allen Mfg. Co.

™LONCO COPPERBRITE - copper cleaner - London Chemical Co.

™LONCO SEALBRITE - solderable protective coating - London Chemical Co.

™LONCO SONIC-SOLVE - degreasing & flux removal - London Chemical Co.

™LONCOTERGE - flux removal & cleaning & copper cleaner - London Chemical Co.

LONDON CHEMICAL CO., Dept. EM, 240 Foster Ave., Bensenville, Ill. 60106, Tel: 312-766-5902, Telex: 72-6360; Empl.: 25

Local Sales Offices & Reps.

Cal	Burbank, London Chemical West, Inc.	213-846-8666
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Fla	Miami, Norm Black, Assoc.	305-651-4132
Md	Baltimore, D.K. Jones	301-752-0577
Mass	Waltham, Etchomatic, Inc.	617-893-2020
Minn	Minnatonka, Tonka, Inc.	612-938-9461
Mo	Raytown, Production Automation	816-737-0066
NY	Skaneateles, Spar-Kleen Prods.	315-685-5711
Ohio	Cleveland, Hodson Co.	216-587-4500
Pa	Doylestown, P & C Corp.	215-345-9472
Tex	Dallas, Steven-Daniels Corp.	214-241-2333
Exp:	Ill., Rensenville, London Chemical Co. Inc. International Dept.	312-287-9477

THE
LONDON COMPANY

LONDON CO., Dept. EM, 811 Sharon Dr., Westlake, Ohio 44145, Tel: 216-871-8900, Telex: 985276; Empl.: 115 .... p. 2895

Sales Manager: J.R. Bush

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assoc.	205-534-3386
Cal	Los Altos, Wright Engrg.	415-941-4405
Conn	Hamden, Inst. Consultants Inc.	203-288-5246
Fla	Lighthouse Point, Saber Assoc.	305-943-3076
Ill	Chicago, Bernot Assoc.	312-283-0713
Mass	Waban, Inst. Consultants Inc.	617-969-9881
Mich	Royal Oaks, Satullo Co.	313-549-3910
Minn	Minneapolis, Bernot Assoc.	612-835-4818
NJ	Springfield, Shortess-Rawson Assoc.	201-467-8585
NC	Raleigh, Saber Assoc.	919-834-3961
Ohio	Cleveland, Satullo Co.	216-486-2800
Ohio	Cleveland, London Co.	216-871-8900
Pa	Audubon, Holmes Assoc.	215-666-0636
Wisc	Milwaukee, Bernot Assoc.	414-545-8400

™LONER - soldering instrument (iron) - Edsyn, Inc.

™LONGFELLOW - linear motion position transducer - Waters Mfg., Inc.

™LONGHAIR - record brush - Stanton Magnetics, Inc.

LONG-LOK FASTENERS CORP., Dept. EM, 10630 Chester Rd., Cincinnati, Ohio 45215, Tel: 513-772-1880, TWX: 810-464-8123; Empl.: 100

Local Sales Offices & Reps.

Cal	Los Angeles, Long-Lok Fasterners Corp.	213-821-5028
Cal	Palos Verdes Estates, Alfred C. Redlitz & Assocs.	213-377-3985
Cal	Saratoga, E.F. Nason	408-867-2562
Colo	Littleton, W. H. Allen Co.	303-794-6301
Fla	Sarasota, R. F. Carlson Co.	813-959-6668
Ga	Norcross, Atlanta Fasteners	404-448-6375
Ind	Indianapolis, Ed Spellman	317-356-6558
Mass	Braintree, R. F. Duffy Assocs.	617-848-3550
Mich	Howell, M. R. Nelson Assocs.	517-546-7931
Minn	Edina, R. Deick	612-926-1611
Mo	St. Louis, R. F. Carlson Co.	314-961-4485
NY	N.Y., A. H. Scheiner	516-466-5850
NY	Rochester, Eggleston Assocs.	716-663-4554
NC	Bethania, R. E. Lee Jr.	919-924-8245
Ohio	Cleveland, R. D. Cistone Assocs.	216-321-0999
Pa	Philadelphia, K. B. Erdman Co.	215-635-3202
Tex	Ft. Worth, Fasteners Et Al	817-589-1127
Wisc	Lake Geneva, R. G. Wieber Assocs.	414-248-9506

LORANGER MFG. CORP., Dept. EM, Box 948, Warren, Pa. 16365, Tel: 814-723-2250; Empl.: 350

Local Sales Offices & Reps.

Ariz	Scottsdale, Sahr Inds.	602-996-5710
Cal	Anaheim, M.T.E. Assocs.	714-998-6790
Cal	Sunnyvale, B. Oppenheim, Inc.	408-733-9000
Conn	Middletown, McBar Assocs.	203-865-4376
Fla	Fort Lauderdale, SEMQUIP	305-772-3002
Mass	Waltham, McBar Assoc.	617-890-0233
NJ	Flanders, D. Zingone	201-584-7845
NY	Rochester, Scientific Devices	716-334-2445
Tex	Richardson, C.J. Garvey Co.	214-234-3371

™LORCAP - ceramic discs and monolythic capacitors - Arco Electronics Inc.

LORCH ELCTRNS. CORP., Dept. EM, 105 Cedar La., Englewood, N.J. 07631, Tel: 201-569-8282, TWX: 710-991-9718; FSC No.: 29971

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices S.E.	205-536-1969
Ariz	Phoenix, Williams Assocs.	602-947-4297
Cal	Inglewood, L & M Engrg South	213-674-6850
Cal	San Jose, L & M Engrg. Inc.	408-292-3220
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Orlando, Scientific Devices S.E.	305-841-8180
Ill	Chicago, Pivan Engrg., Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg., Inc.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg., Inc.	913-722-1030
Md	Silver Spring, Eastern Instrumentation	301-744-3675
Mass	Andover, Bee Assocs.	617-475-2124
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg., Inc.	612-537-4501
Mo	St. Louis, Pivan Engrg., Inc.	314-567-3636
NJ	W. Orange, E-F Technical Sls.	201-731-7203
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Liverpool, R & D Assocs.	315-622-2350
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling	513-298-7573
Pa	Jenkintown, AMT	215-549-2080
Pa	Pittsburgh, Comtel-Sterling Co.	412-922-5720
Tex	Dallas, AIREP Elctrns.	214-827-2120
Va	Suffolk, Eastern Instrumentation	804-497-0001
Wash	Seattle, G.M. Gillett & Assocs.	206-284-3344
Wisc	Brookfield, Pivan Engrg., Inc.	414-786-1940
Exp:	New York, N.Y., Ad. Auriema, Inc.	212-466-2500

LORCH DEVICES INC., Dept. EM, 105 Cedar Lane, Englewood, N.J. 07631, Tel: 201-569-8282, TWX: 710-991-9718; FSC No.: 53432

Sales Manager: M. Bock

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Ariz	Phoenix, Williams Assocs.	602-947-4297
Cal	Cupertino, Allis Assocs.	408-379-2883
Cal	Marina Del Rey, R L Comps.	213-823-1048
Colo	Denver, Williams Assoc.	303-373-4730
Fla	Orlando, Scientific Devices -- Southeast	305-843-1826
Ill	Chicago, Pivan Eng., Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Prairie Village, Engrg. Svc. Co.	913-649-4000
Md	Silver Spring, Eastern Instrumentation	301-744-3675
Mass	Andover, Bee Assoc.	617-475-2124
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Minneapolis, Pivan Engg	612-537-4501
Mo	St. Louis, Engrg. Svcs.	314-997-1515
NJ	West Orange, E-F Tech. Sls.	201-731-7203
NM	Albuquerque, Williams-Assocs.	505-255-1638
NY	Liverpool, R & D Assocs.	315-622-2350
Ohio	Cleveland, Comtel-Instr. Co.	216-442-8080
Ohio	Dayton, Comtel-Instr.	513-298-7573
Pa	Montgomeryville, VPI Inc.	215-474-3200
Pa	Pittsburgh, Comtel-Instr. Co.	412-274-5265
Tex	Dallas, Airep Elctrns.	214-363-5291
Wash	Seattle, G. M. Gillett & Assocs.	206-284-3344
Wisc	Brookfield, Pivan Engg	414-786-8497
Exp:	New York, N.Y., Ad. Auriema Inc.	212-466-2500

LORD KINEMATICS, Lord Corp., Dept. EM, 1635 W. 12th St., Erie, Pa. 16512, Tel: 814-456-8511; Empl.: 1400

Local Sales Offices & Reps.

Pa	Erie, Lordco Supply, Lord Kinematics	814-838-4588

™LO-TORQUE - low force limit switch - Denison, R.B., Inc.

™LOUDMOUTH - fiberglass ant. - mobile - Francis Inds., Inc.

™LO-VOLT - voltage testers - Industrial Devices

™LOWBOY - fiberglass ant. mobile - Francis Inds., Inc.

™LOW-HEAD - vibrating and gyratory screens - Allis-Chalmers

™LOW-VAR - capacitors, fixed, ceramic - Republic Elctrns. Corp.

™LOXARMOR - interlocked armor cables - Okonite Co.

™LOXSWITCH - limit switch - Denison, R.B., Inc.

™LOX THERMISTOR - thermistors - Victory Engrg. Corp.

LOYOLA INDUSTRIES, A Div. of Astrophysics Research Corp., Dept. EM, 1526 West 240th. St., Harbor City, Cal. 90710, Tel: 213-534-4370; FSC No.: 15710; Empl.: 75

Sales Manager: L.A. Crane

Local Sales Offices & Reps.

Ala	Birmingham, Gaines & Co.	205-879-0574
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Oakland, Belilove Co.	415-658-9011
Cal	Santa Ana, Electramation	714-541-4434
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Miami, Ludlum Assocs. Co.	305-592-6523
Ill	Northfield, Instronics Assocs.	312-446-3231
Ind	Noblesville, Couchman-Conant	317-849-9890
Iowa	Des Moines, H. P. Sls.	515-243-3113
Mich	Royal Oak, George Inst. Co.	313-576-4700
Minn	St. Paul, Cullern & Assoc.	612-646-7371
NH	Manchester, Engrg. Assocs. of New England	603-623-7294
NJ	Oakland, Applied Process Instrs.	201-337-6163
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Clark Mills, KLM Assocs.	315-853-6126
NY	Rochester, KLM Assocs.	716-442-0820
NY	Syracuse, KLM Assocs.	315-458-6214
NC	Matthews, W. K. Hile Co.	704-847-9125
Ohio	Chagrin Falls, RPM Industrial Sls.	216-247-3295
Ohio	Dayton, Whelan Corp.	513-434-7551
Pa	Havertown, W. F. Keegan & Co.	215-528-6640
Tenn	Memphis, R. M. Jordan Assocs.	901-452-7441
Tex	Houston, L. P. Spencer & Assocs.	713-337-2751
Tex	Richardson, Carl Tinch Sls Co.	214-231-1322
Va	Chester, W. K. Hile Co.	804-271-0014
Wash	Seattle, Comptronics	206-284-4842

Advertisement

SCR control of power is Loyola's business, not a side line. The oldest and most experienced builder of SCR control equipment offers both phase and burst fired power control. Up to 1660 KVA is a standard catalog item for heating applications. Larger specials are built by the Systems Group. DC motor drives to 150 HP and AC reduced voltage motor starter to 300 HP are standard. Most all small and medium controls shipped from stock.

™LPB - lighted pushbutton switch - Unimax Switch Corp.

™LP LIQUID POLYSULFIDE POLYMEN - liquid polymens - Thiokol Chemical Div.

LPS RESEARCH LABS, Dept. EM, 2050 Cotner Ave., Los Angeles, Cal. 90025, Tel: 213-478-0095, TWX: 910-342-7557; Empl.: 61

Local Sales Offices & Reps.

Cal	Cerritos, B. Einson	213-478-0095
Cal	Novato, V. Mansfield	415-897-7402
Fla	Lighthouse Pt., G. Reilly	305-781-5397
Ga	Stone Mountain, E. R. Eigen	404-469-2698
Ill	Riverwoods, N. Barton	312-695-7612
Ill	Rockford, D. King	312-685-7612
Mass	Canton, P. Bowes	617-828-3743
Minn	Edina, R. D. O'Bryan	612-993-0344
NJ	Barnegat, J. L. Markley	609-698-6692
Ohio	Vermillion, J. Lacinak	216-777-4952
Pa	Chester Heights, G. Queensberry	215-459-3779
Pa	Coroapolis, E. Raymond	412-264-4814
Tex	Arlington, A. V. Heavin	817-461-9770
Wash	Seattle, J. Aldrich	206-789-0862

LRC INC., Dept. EM, 101 Digital Dr., Hudson, N.H. 03051, Tel: 603-883-9351, TWX: 710-228-1377; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	San Diego, KCE Corp.	714-278-7640
Cal	San Francisco, Jack Logan & Assoc.	415-697-6100
Cal	Tustin, Thorson Co.	714-455-5121
Colo	Denver, Thorson Co.	303-355-3521
Conn	Hamden, Impact Sls.	203-281-1331
Fla	Orlando, Gra-Mar Inc.	305-894-3351
Ill	Palatine, CC Electronics	312-358-8900
Mass	Waltham, Impact Sls.	617-893-2850
Mich	Detroit, R.C. Merchant & Co.	313-535-6000
NH	Hudson, LRC Inc.	603-883-9351
NJ	Clifton, Compar Inc.	201-546-3660
NM	Albuquerque, IMEC	505-344-2212
NY	Rochester, Schomburg & Burke Grp.	716-244-0920
Ohio	Dayton, Berberich Assoc.	513-433-0342
Pa	Jenkintown, AMT	215-549-2080
Va	Baileys Crossroads, QT Elctrn. Sls.	703-671-4357
Wash	Seattle, Thorson Co.	206-632-0710

™LR SERIES - digital electronics innovator series - E & L Instruments, Inc.

™LSHV - high voltage cables - Boston Insulated Wire & Cable Co.

LSI COMPUTER SYSTEMS, INC., Dept. EM, 1235 Walt Whitman Rd., Melville, N.Y. 11746, Tel: 516-271-0400, TWX: 510-226-7833; FSC No.: 55261; Empl.: 20

Sales Manager: R. Colino

Local Sales Offices & Reps.

Ariz	Scottsdale, Verein Corp.	602-948-3571
Cal	San Diego, Mesa	714-278-8021
Ill	Elk Grove Village, Steger Assocs.	312-956-0963
NH	Merrimack, Mech-Tron	603-424-5300
NJ	Wallington	201-935-5454
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628

™LSI-11 - microcomputer - Digital Equipment Corporation

LSL PRODUCTS LTD., Dept. EM, 1757 Merrick Ave., Merrick, N.Y. 11566

™LST - low skin temperature oven - Hotpack Corp.

™LTN & LTNM - linear thermistor networks (LTN) and modules (LTN) - Fenwal Elctrns.

L-TRONICS, Dept. EM, 5546 Cathedral Oak Rd., Santa Barbara, Cal. 93111, Tel: 805-967-4859

™LUBRI-SHINE - dry film lubricant - Tech Spray, Inc.

™LUBRI-STAT - record cleaner spray - Fidelitone, Inc.

™LUBRITROL - mill lubrication system - Allis-Chalmers

LUFF RESEARCH, Dept. EM, Box 449, Jackson Hgts., N.Y. 11372, Tel: 212-429-5900

Sales Manager: A.M. Christopher

LUFT INSTRS., INC., Dept. EM, Old Winter St., Lincoln, Mass. 01773, Tel: 617-259-9215; Empl.: 25

™LUG-IT - lugs - T & B/Thomas & Betts

™LUG-IT - lugs - T & B/Thomas & Betts

™LUMA-CORD - fiber optic cabels - Fiber Photics, Inc.

™LUMAPAC - inverter/ballasts - EWC, Inc.

™LUMEN METER - light measuring instrument - EG&G, Inc.

™LUMIGRAPH - electronic analog indicator - Sigma Instruments, Inc.

LUMINATOR DIV., Gulton Industries, Dept. EM, 1200 E. Dallas N. Pkwy., Plano, Tex 75074, Tel: 214-424-6511, Telex: 073-2373; Empl.: 300

Sales Manager: J. Pavlik

Local Sales Offices & Reps.

Cal	Pacific Palisades, Ledbetter Assocs.	213-454-2421
Ill	Chicago, Terhune-Van Eften	312-346-0053
Mass	Boston, Sands-Barnard Assocs.	617-631-7533
Tex	Dallas, Blair Engrg. Sls. Co.	214-352-8411
Wash	Kirkland, R.R. Chase & Assocs.	206-454-2514

Local Distributors

Ga	Atlanta, Electro Air Corp.	404-351-3545
NY	Purchase, Aerotech World Trade Corp.	914-428-3500

™LUMITEN - light controlled attenuator - Robins Broadcast & Sound Equipment Corp.

LUNDY ELCTRNS. & SYS., INC., Dept. EM, Robert La., Glen Head, N.Y. 11545, Tel: 516-671-9000, TWX: 12-6929 510-223-0605; Empl.: 547

Sales Manager: D. Casadonte

Local Sales Offices & Reps.

Cal	Los Angeles	213-487-4040
Cal	San Francisco	415-731-7237
Fla	Pompano Beach	305-943-1500
Ga	Atlanta	404-296-0777
Ill	Chicago	312-726-3103
NJ	Howell	201-364-5799
NC	Charlotte	704-394-1161
Tex	Houston	713-521-0818
Va	Annandale	703-941-1900

™LUSTRE-ZINC - zinc chromate plating - Titchener, E.H. & Co.

LUTRON ELECTRONICS CO., Dept. EM, Coopersburg, Pa. 18036, Tel: 215-282-3800, TWX: 510-651-3755; Empl.: 200; Minimum order: $D. Savage

Sales Manager: J. Longenderfer; *Distributor Manager:* D. Savage

™LUXICON - light conduit - Dolan-Jenner Inds., Inc.

LUXO LAMP CORP., Dept. EM, Monument Park, Port Chester, N.Y. 10573, Tel: 914-937-4433, Telex: 137-336; Empl.: 100

Sales Manager: R Buckingham

Local Sales Offices & Reps.

Cal	Corte Madera, E. Myer	415-332-5660
Cal	Studio City, J. Barnett	213-877-5896
Conn	Norwalk, N. Tarrant	203-866-2420
Fla	Port Charlotte, W. Hemminger Co.	813-625-6050
Ga	Atlanta, Dotson & Co.	404-325-9173
Ill	Kenilworth, J.S. Sprenger	312-256-3130
Md	Baltimore, H. Abrams	301-486-3040
Mass	Lynnfield, R.O. Hart	617-426-4200
Minn	St. Louis Park, Borrett & Lee	612-929-0028
NC	Charlotte, Coleman Co.	704-525-2046
Ohio	Cleveland, R. DeLambo	216-732-9943
Ore	Portland, T.E. Ferris	503-646-8659
Tex	Conroe, T. O'Neill	713-273-1215

LVC INDS. INC., Co-Ord Switch Bloc-Lite Divs., Dept. EM, 135-25 37th Ave., Flushing, N.Y. 11354, Tel: 212-939-9777; FSC No.: 32759; Empl.: 29 p. 4150,4151

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Associates	205-536-1941
Cal	Los Angeles, Dyna Sls. Co.	213-268-1175
Cal	Los Angeles, Dynasales Co.	213-268-1175
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Ill	Lombard, Quadtron Assocs.	312-627-6800
Mass	Waban, Instrument Conslts.	617-969-9881
Mich	Ferndale, Tiby Co.	313-547-3550
NJ	Cranford, Hyrel-Idalee Assocs.	201-276-5677
NY	Valley Stream, Hyrel-Idalee Assocs.	516-825-8955
NC	Winston Salem, Reynolds & Assocs.	919-725-6196
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
Pa	Philadelphia, V.S. Malta	215-836-5122

™LX-CJ - self powered cold junction reference source - Omega Engrg., Inc.

LYNN ELCTRNS. CORP., Dept. EM, 915 Pennsylvania Blvd., Feasterville, Pa. 19047, Tel: 215-677-6700, TWX: 510-667-1988; FSC No.: 19151; Empl.: 50

Sales Manager: D. Giacomarra

LYON METAL PRODUCTS, INC., Dept. EM, 47 Railroad Ave., Aurora, Ill. 60507, Tel: 312-892-8941; Empl.: 1200

Local Sales Offices & Reps.

Cal	Los Angeles	213-965-0680
Cal	San Francisco	415-347-7067
DC	Washington	703-683-2755
Ga	Atlanta	404-237-9205
Ill	Chicago	312-344-5670
Mass	Boston	617-825-0100
Mich	Detroit	313-352-5860
Minn	Minneapolis	612-927-5695

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Mo	Kansas City	816-363-6801
NY	New York City	212-964-6030
NY	Syracuse	315-478-0947
NC	Charlotte	704-527-0410
Ohio	Cincinnati	513-221-4688
Ohio	Cleveland	216-241-3535
Pa	Philadelphia	215-687-6232
Pa	Pittsburgh	412-344-5577
Tenn	Memphis	901-682-9664
Tex	Dallas	214-691-7341

ⓉⓂLYREC - tape timers - Gotham Audio Corp.

ⓉⓂLYRIC - fan - Rotron, Inc.

LYTRON, INC., Dept. EM, 3 Dragon Ct., Woburn, Mass. 01801, Tel: 617-933-7300; FSC No.: 11245 .. p. 2697

Sales Manager: Melvin W. Tracey

Local Sales Offices & Reps.

Cal	Los Angeles, J. D. Gratiot Co.	213-256-2191
Cal	San Diego, L. L. Stoakes, Inc.	714-274-6281
Conn	Enfield, R. Cote Assoc.	203-745-1994
Ill	Lake Bluff, Anderson-Duerr Co.	312-234-4595
Kans	Shawnee Mission, American Industrial Sls.	913-384-4949
Mass	Waltham, J. W. Simpson Co.	617-899-7700
NJ	Westfield, E. R. Mertz Inc.	201-232-4643
NY	Buffalo, J. W. Simpson Co.	716-634-3995
Ohio	Cincinnati, W. W. Cross Co.	513-321-3255
Ohio	Cleveland, E. E. Bock Assoc.	216-331-5212
Pa	Chester Springs, McCullough Engrg. & Sls.	215-827-7419
Tex	Houston, Cron Chemical Corp.	713-644-7561

3M COMPANY, Electronic Products Div., Dept. EM, 3M Center, St. Paul, Minn. 55101, Tel: 612-733-3350 p. 2256-2280

Local Sales Offices & Reps.

Alas	Anchorage	907-276-2363
Cal	Los Angeles	213-726-1511
Cal	So. San Francisco	415-589-2663
Ga	Atlanta	404-449-6666
Haw	Honolulu	808-841-0147
Ill	Chicago	312-496-6500
Mass	Boston	617-449-0300
Mich	Detroit	313-477-5000
Minn	St. Paul	612-733-3300
Mo	St. Louis	314-991-1320
NJ	West Caldwell	201-227-9100
NC	High Point	919-886-7181
Ohio	Cincinnati	513-242-2313
Ohio	Cleveland	216-267-1800
Pa	Philadelphia	215-742-0200
Tex	Dallas	214-327-7311
Wash	Seattle	206-244-7200

Local Distributors

Ala	Huntsville, Powell Elctrns. Inc.	205-539-2731
Ariz	Phoenix, Richey Elctrns.	602-959-0271
Ariz	Scottsdale, B-5, Inc.	602-947-5745
Cal	Irvine, Acacia Sls.	714-549-0954
Cal	Mt. View, Powell Elctrns. Inc.	415-964-0820
Cal	San Diego, Richey Elctrns.	714-565-4444
Cal	Sunnyvale, Ratel Elctrns.	408-739-9220
Cal	Sun Valley, Richey Elctrns. Inc.	213-768-3800
Colo	Denver, B-5, Inc.	303-426-0222
Colo	Denver, Ratel Elctrns.	303-934-5813
Conn	Hamden, Impact Elctrns.	203-281-1331
Fla	Miami Springs, Powell Elctrns., Inc.	305-592-3260
Fla	Orlando, Deanco, Inc.	305-851-2480
Ill	Chicago, Prehler Electrical Insulation Co.	312-384-6100
Ill	Mt. Prospect, Magnuson Elctrns.	312-956-0700
Ind	Indianapolis, Sheridan Sls. Co.	317-297-3146
Iowa	Des Moines, Beams Co.	515-255-1148
Kans	Overland Park, Lectronix, Inc.	913-648-7748
Kans	Shawnee Mission, Beams Co.	913-631-0300
Md	Baltimore, Powell Elctrns.	301-792-8686
Md	Beltsville, Powell Elctrns.,	301-937-4030
Md	Gaithersburg, Deanco, Inc.	301-948-5444
Mass	Newton, Impact Elctrns.	617-964-7740
Mich	Farmington, Sheridan Sls. Co.	313-477-3800
Mich	Grand Rapids, Sheridan Sls. Co.	616-942-2504
Minn	St. Paul, Ragon Elctrns., Inc.	612-488-0201
Mo	Florissant, Sheridan Sls. Co.	314-837-5200
Mo	St. Charles, Lectronix, Inc.	314-946-6424
Mo	St. Louis, Beams Co.	314-569-1060
NJ	Fairfield, Deanco, Inc.	201-575-7960
NY	Farmingdale, D.R.W. Elctrns. Corp.	516-249-2660
NY	Ithaca, Deanco, Inc.	607-272-2198
NY	Melville, Addem Distributors	516-549-8400
NC	Raleigh, Deanco, Inc.	919-851-2065
Ohio	Beachwood, Sheridan Sls. Co.	216-831-0130
Ohio	Chardon, Electronics Mktg. Corp.	216-286-9201
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Ohio	Cleveland, Prehler Electrical Insulation Co.	216-267-2650
Ohio	Columbus, Elctrns Mktg. Corp.	614-299-4161
Ohio	Dayton, Electronics Mktg. Corp.	513-294-0434
Ohio	Dayton, Sheridan Sls. Co.	513-277-8911
Okla	Tulsa, Norvell Elctrns., Inc.	918-663-1247
Pa	Philadelphia, Powell Elctrns., Inc.	215-365-1900
Pa	Pittsburgh, Sheridan Sls. Co.	412-244-1640
Tex	Austin, Norvell Elctrns.	512-458-8106
Tex	Dallas, Powell Elctrns., Inc.	214-350-4186
Tex	Dallas, Norvell Elctrns., Inc.	214-233-0020
Tex	Ft. Worth, Powell Elctrns.	817-263-8393
Tex	Houston, Norvell Elctrns., Inc.	713-777-1666
Wash	Seattle, Zepher Elctrns. Sls. Corp.	206-575-0922

3M CO., Industrial Electrical Prods. Div., Dept. EM, 3M Center, St. Paul, Minn. 55101, Tel: 612-733-0219; Empl.: 37000

Local Sales Offices & Reps.

Cal	Los Angeles	213-726-1511
Cal	S. San Francisco	415-761-1155
Ga	Chamblee	404-451-1661
Ill	Bedford Park	312-458-2200
Mass	Needham Heights	617-449-0300
Minn	St. Paul	612-733-1110
Mo	St. Louis	314-991-1320
NJ	Caldwell	201-227-9100
NY	Buffalo	716-894-5214
NY	New York	212-285-9600
NC	High Point	919-883-0141
Ohio	Cincinnati	513-242-2313
Ohio	Cleveland	216-267-1800
Pa	Philadelphia	215-742-0200
Tex	Dallas	214-327-7311
Wash	Seattle	206-244-7200

3M CO., Static Control Systems, Dept. EM, 3M Center Bldg. 223-25, St. Paul, Minn. 55119, Tel: 612-733-4730, TWX: 910-563-3712; Empl.: 200

Sales Manager: P.V. Kohlhaas

3M COMPANY, TECHNICAL CERAMIC PRODS. DIV., Dept. EM, 3M Center 223-4S, St. Paul, MN. 55101, Tel: 612-733-1110, TWX: 910-563-3712; Empl.: 83000

3M CO., Visual Prods./Indus. Optics, Dept. EM, 3M Center, Bldg. 220-10W, St. Paul, MN. 55101, Tel: 612-736-0524, TWX: 29-7023, 910-563-3712

Sales Manager: B.P. Rappa

Local Sales Offices & Reps.

Cal	Glendora	213-963-1300
Cal	San Francisco	415-589-2663
Ga	Duluth	404-476-5732
Minn	White Bear Lake	612-777-7364
NY	East Meadow	516-489-6838
Pa	Mechanicsburg	717-761-5700

M & T CHEMICALS INC., Sub. American Can Co., Dept. EM, Rahway, N.J. 07065, Tel: 201-499-0200, TWX: 710-996-5842; Empl.: 1600

M-TRON INDUSTRIES, Dept. EM, P.O. Box 630, E. Hwy 50, Yankton, S.D. 57078, Tel: 605-665-9321, TWX: 910-668-3603; Empl.: 500 p. 2460,2461

Sales Manager: K. Klapper

Local Sales Offices & Reps.

Cal	Burlingame, Willaim J. Purdy Co.	415-347-7701
Cal	Cerritos, Anderson Assocs.	213-926-7739
Cal	Los Angeles, Wallace & Wallace	213-747-0401
Cal	Santa Clara, I²	408-985-0400
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Colo	Denver, McLoud & Raymond	303-756-1589
Fla	Bradenton, Hutto-Hawkins-Peregoy	813-837-2512
Fla	Largo, Tech-Rep Assocs.	813-595-2834
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Ga	Atlanta, Millar Elctrns.	404-261-6160
Ill	Chicago, Ellinger Sls. Corp.	312-763-1570
Ind	Fort Wayne, Given Corp.	219-432-5585
Ind	Indianpolis, Kingston Sharkey & Assoc.	317-353-9406
Kans	Overland Park, T.L. Dowell & Assoc.	913-236-8200
La	Chalmette, Cartwright & Bean	504-279-4598
Md	Silver Spring, Mid-Atlantic Sls.	301-593-7749
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Mass	Lexington, J.E. Boeing Co.	
Mich	Benton Harbor, McNabb & Assoc.	616-925-2166
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Maple Grove, R.C. Sls. Co.	612-425-5543
Mo	Shrewsbury, T.L. Dowell & Assoc.	314-647-7067
NY	Elmont, F.E. Schmitt Co.	516-437-8150
NY	New York City, C. Tennant, Sons & Co.	212-679-1300
NY	N. Syracuse, Leonard D. Allen	315-458-7470
Ohio	Columbus, Weller Elctrnc. Sls.	614-885-7819
Ohio	Dayton, BEK Assoc.	513-278-1343
Ore	Salem, M.K. Widdekind Co.	503-363-6445
Pa	Glenside, Elcom, Inc.	215-885-1715
Pa	Huntingdon Valley, W & M Entrprs.	215-675-6900
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Tex	Houston, R.E. Nesbitt Co.	713-224-3633
Wash	Seattle, Pacnor Mktg.	206-284-8020

Local Distributors

Cal	Burlingame, William J. Purdy Co.	415-347-7701
Cal	Cerritos, Anderson Associates	213-926-7739
Cal	Los Angeles, Wallace & Wallace	213-747-0401
Cal	Santa Clara, I² Inc.	408-985-0400
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Fla	Largo, Tech-Rep Associates, Inc.	813-595-2834
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Ga	Atlanta, Millar Electronics, Inc.	404-261-6160
Ga	Atlanta, Millar Elect. Inc.	404-261-6160
Ill	Chicago, Ellinger Sales Corp.	312-763-1570
Ill	Chicago, Ellinger Sales Corp.	312-763-1570
Ind	Fort Wayne, Given Corporation	219-432-5585
Ind	Indianapolis, Kingston-Sharkey & Assoc.	317-353-9406
Kans	Overland Park, Thomas L. Dowell & Assocs.	913-236-8200
Kans	Overland Park, Thomas L. Dowell & Assoc.	913-236-8200
Md	Silver Spring, Mid-Atlantic Sales Co.	301-593-7749
Mass	Babson Park, Paul R. Sturgeon Co.	617-237-3506
Mich	Benton Harbor, McNabb & Associates, Inc.	616-925-2166
Mich	Bloomfield Hills, Enco Marketing	313-642-0203
Mich	Bloomfield Hills, Enco Marketing	313-642-0203
Minn	Maple Grove, R.C. Sales	612-425-5543
NY	Elmont, F. Edwin Schmitt Co.	516-437-8150
NY	N. Syracuse, Leonard D. Allen Inc.	315-458-7470
Ohio	Columbus, Weller Electronic Sales	614-885-7819
Ohio	Dayton, BEK Associates	513-278-1343
Pa	Glenside, Elcom, Inc.	215-885-1715
Pa	Huntingdon Valley, W & M Enterprises	215-675-6900
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Robert E. Nesbitt Co.	214-357-4601
Tex	Dallas, Robert E. Nesbitt Co.	214-357-4601
Wash	Seattle, Pacnor Marketing, Inc.	206-284-8020
Wash	Seattle, Pacnor Marketing, Inc.	206-284-8020
Exp:	New York, New York, C. Tennant, Sons & Co. of NY	212-679-1300

MAC PANEL CO., Dept. EM, Box 5027, 216 Pine St., High Pt., N.C. 27262, Tel: 919-882-8138; FSC No.: 16654; Empl.: 31 p. 2122,2123

Sales Manager: J.L. Craycroft

Local Sales Offices & Reps.

Cal	Los Altos, Casey Johnston, Inc.	415-941-6892
Cal	Santa Ana, M.Q.I. Assoc.	714-751-2005
Ill	Chicago, Megateck	312-889-1277
Mass	Needham, J.J. Wild, Inc.	617-444-2366
Minn	St. Paul, Bonament Heyda Co.	612-484-8531
NJ	Hawthorne, J.J. Wild	201-265-5450
NY	Jericho, J.J. Wild, Inc.	516-935-6600
NC	High Point, Mac Panel Co.	919-882-8138
Ohio	Dayton, B. Hocker & Assocs.	513-298-8638
Ore	Portland, J J Backer Co.	503-297-3776
Pa	Southampton, J.J. Wild, Inc.	215-357-6645
Tex	Dallas, K.O. Brown & Co.	214-357-3996
Va	Waynesboro, World Enterprises	703-942-4159
Wash	Seattle, J.J. Backer Co.	206-285-1300

MACDONALD & CO., Dept. EM, 213 S. Brand Blvd., Glendale, Calif. 91204, Tel: 213-241-1101, TWX: 910-497-4782; FSC No.: 13102; Empl.: 18

Local Sales Offices & Reps.

Cal	Sunnyvale, Wyman Engrg. Sls.	408-735-0598
Colo	Denver, Soldering Supply Specialists	303-455-0104

Ill	Chicago, EMF Co.	312-889-8323
Ind	Indianapolis, Blind & Assoc.	317-251-1249
Md	Baltimore, D. K. Jones & Assoc.	301-752-0577
Mich	Grand Rapids, C. A. Geer Co.	616-534-9449
Minn	St. Paul, Ragon Elctrns.	612-488-0201
Mo	Kansas City, Burke Sls. Co.	816-842-5511
NJ	Haddonfield, Mills Equip. Co.	609-429-1005
NY	New York, Van Valkenburg Assoc.	212-254-3722
NC	Winston-Salem, Kirkman Elctrns.	
Ohio	Cleveland, P. Lohse Co.	216-381-4424

MACHINE COMPONENTS CORP., Dept. EM, 70 Newtown Rd., Plainview, N.Y. 11803, Tel: 516-694-7222; FSC No.: 15531; Empl.: 20

Sales Manager: D.L. Dubov

Local Sales Offices & Reps.

Cal	San Jose, McFarland Assoc.	408-286-9333
Ind	Indianapolis, Pacer Sls. & Eng'g Co.	317-849-1481
Mass	Woburn, Stockwell Technical Sls. Co.	617-935-5770
NY	Pittsford, W. E. Jordan Technical Assoc.	716-381-2820
NC	Matthews, S & F Co.	704-847-4451
Wash	Mercer Island, J. H. Andersen Assoc.	206-232-0484

MACK ELEC. DEVICES, Dept. EM, 32 Glenside Ave., Wyncote, Pa. 19095, Tel: 215-884-8123, Telex: 83-1427; Empl.: 16

(TM)MACK RELAYS - mercury relays - Mack Elec. Devices

(TM)MACO - a solid state programmable sequence logic control system - Barber-Colman Co.

MACOM INDUSTRIES, Dept. EM, Box 66217, Los Angeles, Cal 90066

MACRODATA, Dept. EM, 6203 Variel Avenue, Woodland Hills, Cal. 91364, Tel: 213-887-5550; Empl.: 475

MACRODYNE INC., Dept. EM, 1900 Maxon Rd., Box 1079, Schenectady, N.Y. 12301, Tel: 518-372-5619; Empl.: 23

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	205-536-9990
Cal	San Jose, Carnahan Assocs.	408-265-5085
Cal	W. Hollywood, B.J. Wolfe Entprs.	213-877-5518
Colo	Parker, Western Mktg. Assocs.	303-841-2788
Fla	Jupiter, FM Assocs.	305-746-2996
Fla	Orlando, FM Assocs.	305-851-5710
Ga	Atlanta, FM Assocs.	404-634-7830
Ill	Glen Ellyn, G.B. Hall Co.	312-858-1700
Md	Rockville, Sls. Technology	301-340-0015
Mich	Southview, Electro Sls. Assocs.	313-424-9075
NJ	Parlin, Triple E	201-727-6454
NM	Albuquerque, Southwestern Engrg. Co.	505-265-6775
NC	Greensboro, FM Assocs. Ltd.	919-294-2754
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Houston, Southwestern Engrg. Co.	
Tex	Missouri City, Southwestern Engrg.	713-437-1171
Utah	Logan, Western Mktg. Assocs.	801-753-0073
Wash	Seattle, Comptronics	206-284-4842

MACRONETICS, Dept. EM, 570 Maude Ct., Sunnyvale, Cal. 94086, Tel: 733-3700, TWX: 910-339-9263; Empl.: 75

Sales Manager: T. McKee

MADISON LABORATORIES, Dept. EM, Box 608, Madison, Conn 06443, Tel: 203-245-4280; Empl.: 6

Local Sales Offices & Reps.

Cal	Glendale, James L. McCoy Co.	213-246-2134
Mass	Hingham, R. J. Wilson Assocs.	617-749-7575
NY	New York City, Mc Intosh EquiP. Corp.	212-349-3288
Pa	Philadelphia, Technicraft Co.	215-182-2323
Tenn	Memphis, Engineered Instr.	901-743-3402

(TM)MAGCENTRIC - magnetic' bearings - Cambridge Thermionic Corp.

MAG-CON, INC., Dept. EM, 1626 Terrace Dr., St. Paul, Minn. 55113, Tel: 612-633-8820; Empl.: 50

Sales Manager: B. Campbell

Local Sales Offices & Reps.

Cal	San Francisco, Tech. Sls. Dev. Co.	415-346-1655
Md	Wheaton, Magyar & Assocs.	301-871-8833
Mass	Allston, Magyar & Assocs.	617-566-9759
NJ	Westfield, ER Mertz	201-232-4643
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ohio	Englewood, A. Nace Co.	513-836-0931
Pa	Philadelphia, Magyar & Assocs.	215-763-5044
Pa	Pittsburgh, A. Nace Co.	412-922-7225
Vt	Bennington, Magyar & Associates	802-442-5858
Wisc	Oak Creek, T.F.L. Erdman, Inc.	414-761-2120

(TM)MAGFLO - bath magnetic stirrer - Hotpack Corp.

(TM)MAGIC CIRCLE - electronic remote control - A.R.F. Products

(TM)MAGIC SERIES - airborne digital computers - Delco Electronics Div.

(TM)MAGIC TIP - screw holding screw driver - Marshall Industries

(TM)MAGIC WAND - Electrostatic Neutralizers - Sticht Co., Inc. Herman H.

(TM)MAGITRAN - wafer thin loudspeaker systems - Era Acoustics

MAGITRAN CO., Dept. EM, 311 E. Park St., Moonachie, N.J. 07074, Tel: 201-641-3650, TWX: 710-990-5064; Empl.: 100

Local Sales Offices & Reps.

Ala	Birmingham, Maitland Smith	205-967-3080
Cal	San Mateo, Olson Sls.	415-347-7071
Cal	Van Nuys, A. Szerlip Sls.	213-782-1765
Colo	Littleton, On-Mark Sls.	303-798-5822
Fla	Miami, Raulson & Co.	305-264-6003
Ga	Marietta, Maitland Smith	404-971-2831
Ill	Winfield, Ashpole Assoc.	312-665-7787
Ind	Indianapolis, Charles Scheffler Co.	317-253-6337
Md	Kensington, Forti-Austin Assoc.	301-949-1706
Mich	Oak Park, J. Shay Assoc.	313-546-0194
Minn	Maple Grove, R C Sls.	612-425-5543
Mo	Raytown, M. Taraski Sls.	816-558-1442
NJ	Teaneck, S. Axelrod Assoc.	201-836-6661
NJ	Willingboro, Forti-Austin Assoc.	609-871-9290
NY	New York, S. Axelrod, Assoc.	212-594-4090
NY	Phelps, LSM Assoc.	315-548-4891
NC	Charlotte, Maitland Smith	704-372-1026
Ohio	Beachwood, Stan Goos & Assoc.	216-464-5680
Pa	Pittsburg, Yarussi Co.	412-221-4676
Tex	Dallas, Collins Co.	214-341-7866
Wash	Seattle, Pacnor Marketing	206-284-8020
Exp:	N.Y., New York, Auriema Inc.	212-466-2500

(TM)MAGMAN - permanent plate magnets - Stearns Magnetics Inc.

(TM)MAGMOD - magnetic modulator - General Magnetics

(TM)MAGNACAPS - low voltage capacitors - Radio Materials Co.

(TM)MAGNACORD - tape equipment - Telex Communications, Inc.

MAGNAFLUX CORP. , Dept. EM, 7328 W. Lawrence Ave., Chicago, Ill 60656

(TM)MAGNAGUIDE - magnetic escort memories - Electron, Inc.

MAGNALECTRIC CORP., Dept. EM, Box 6189, Tulsa, Okla. 74106, Tel: 918-425-5524; Empl.: 15

(TM)MAGNAPAK - magnetostrictive spaced lamination transducers - Westinghouse Elec.

(TM)MAGNA-PRESS - small bench presses - Airmatic/Beckett-Harcum

(TM)MAGNA-SET - thermoregulator - Princo Instrs.

(TM)MAGNATRAK - ultrasonic cleaning generator - Westinghouse Elec.

MAGNECO ELECTRONICS, INC., Dept. EM, 135 S. La Salle St., Chicago, Ill. 60603, Tel: 312-KI3-660; Empl.: 80

Local Sales Offices & Reps.

Ariz	Scottsdale, E. J. Foley & Assocs.	602-945-2665
Cal	Long Beach, Semi-Dice	213-597-0358
Cal	Mountain View, Melchior/Wesley Assocs.	415-964-2321
Ill	Chicago, M. Gottlieb Assocs.	312-775-1151
Kans	Overland, Electri-Rep	913-649-2168
Mass	Carlisle, Carlisle Tech. Sls.	
NJ	Ringwood, Harvey Assocs.	201-962-7871
Tex	Dallas, Waddle Sls. Co.	214-638-2860
Wisc	Milwaukee, MW Entprs.	414-352-9150

MAGNECRAFT ELEC. CO., Dept. EM, 5575 N. Lynch Ave., Chicago, Ill. 60630, Tel: 312-282-5500, TWX: 910-221-5221; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, BJR Research & Mfg.	205-881-3569
Ariz	Phoenix, Gramer & Co.	602-279-1231
Cal	Los Angeles, Universal Comp. Corp.	213-641-4255
Cal	San Carlos, Kottmeier Assoc.	415-592-8333
Colo	Denver, Camel Elctrn. Inc.	303-757-6191
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233
Fla	Largo, Semtronic Assocs.	813-586-1404
Ill	Downers Grove, Momak Sls.	312-963-6400
Ind	Ft. Wayne, Menze Sls. Inc.	219-747-5616
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Detroit, R.P. Urban & Assoc.	313-535-2355
Mich	Grand Rapids, R.P. Urban & Assoc.	616-245-0511
Minn	St. Paul, Northport Engr.	612-698-3841
Mo	St. Louis, Palatine Sls.	314-426-7055
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Haddonfield, Thomas Assocs.	215-627-6615
NJ	South Orange, S. Simberkoff & Assoc.	201-763-7900
NY	New York, S. Simberkoff & Assoc.	212-943-7023
NY	Syracuse, W. A. Franklin Sls	315-472-5273
NC	Burlington, S. Simberkoff & Assoc.	919-584-6450
Ohio	Centerville, Dolfuss-Root & Co.	513-433-6776
Ohio	Rocky River, Dolfuss-Root & Co.	216-333-7504
Okla	Tulsa, H.J. Daly Co.	918-627-4159
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Pittsburgh, Dolfuss-Root & Co.	412-561-4125
Tex	Bellaire, McKinney Sls.	713-665-3653
Tex	Dallas, McKinney Sls.	214-631-9450
Tex	Houston, McKinney Sls.	713-493-9100
Wash	Seattle, Earl & Brown Co.	206-284-1121
Exp:	Ill., Chicago, Magnecraft Int'l.	312-282-5500

(TM)MAGNEFORM - metal forming equip. - Maxwell Labs., Inc.

(TM)MAGNE-GAGE - plating thickness gauge - American Instr. Co.

(TM)MAGNEHELIC - differential pressure gage - Dwyer Instrs

(TM)MAGNELOGIC - saturable reactors - Coilcraft

(TM)MAGNEMETRICS - magnetic measuring instrumentation - Walker Scientific, Inc.

(TM)MAGNEMODULES - misc. derm & electro magnets - Stearns Magnetics Inc.

(TM)MAGNERASER - tape demagnetizer - Amplifier Corp. of America

(TM)MAGNEREED - power reed - Solid State Electronics Corp.

(TM)MAGNESEARCH - low magnetic flux densities - RFL Inds.

(TM)MAGNESIL - magnetic materials - Magnetics

MAGNET WIRE INC., Dept. EM, 25 Walker St., New York, NY 10013, Tel: 212-226-0900; FSC No.: 8M759; Empl.: 6

MAGNETEC CORP., Sub of Hi-G Inc, Dept. EM, 96 Granby St., Bloomfield, Conn. 06002, Tel: 203-243-8941, TWX: 710-420-0592; Empl.: 150 p. 3524-3527

Sales Manager: G. Molleur

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Fairfield, C. Weber	203-259-5386
Fla	Boca Raton, Conley & Assocs., Inc.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs., Inc.	813-933-1759
Ill	Mt. Prospect, Magnuson Assocs.	312-956-0700
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Ind	Ft. Wayne, Menze Sls., Inc.	219-747-5616
Kans	Overland Park, Reese & Assocs.	913-648-7748
Md	Riderwood, Manreps Inc.	301-296-2778
Mass	Lexington, J. E. Boeing Co.	617-862-2500
Minn	St. Paul, Magnuson	612-227-8495
Mo	St. Charles, Buse Sls. Co.	314-723-1122
NJ	Westwood, c/o R.C. Assocs. HRC Comp-Tech., Inc.	201-664-1241
NY	Jericho, HRC Comp-Tech, Inc.	516-822-5550
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
Ohio	Dayton, P. E. Montplaisir	513-434-4316
Pa	Ardmore, Manreps, Inc.	215-649-6300
Tex	Dallas, United Comps.	214-324-1448
Utah	St. Lake City, Omega Ltd.	801-278-6920
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778

MAGNETIC AUDIO/VIDEO PRODUCTS :DIV., 3M Co., Dept. EM, 3M Center, Bldg. 223-5N, St. Paul, Minn. 55101, Tel: 612-733-1110, TWX: 910-563-3712; Empl.: 38,351

Local Sales Offices & Reps.

Alas	Anchorage	907-279-6481
Cal	Burbank	213-848-5534
Cal	Los Angeles	213-726-1511
Cal	San Francisco	415-589-2663
DC	Washington, D.C.	202-331-6900
Ga	Atlanta	404-449-6666
Haw	Honolulu	808-841-0147
Ill	Argo	312-496-6500
Mass	Needham	617-449-0300
Mich	Farmington	313-477-5000
Minn	St. Paul	612-733-3300
Mo	St. Louis	314-991-1320
NJ	West Caldwell	201-227-9100
NC	High Point	919-886-7181
Ohio	Cincinnati	513-242-2313
Ohio	Cleveland	216-267-1800
Pa	Philadelphia	215-742-0200
Tex	Dallas	214-327-7311
Wash	Seattle	206-244-7200

MAGNETIC CIRCUIT ELEMENTS, Dept. EM, 2455A Garden Rd., Monterey, Cal. 93940, Tel: 408-373-0456, TWX: 910-360-7088; FSC No.: 09349; Empl.: 24

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MAGNETIC COMPS., INC., Dept. EM, 9367 William St., Rosemont, Ill. 60018, Tel: 312-671-0632; Empl.: 72

Local Sales Offices & Reps.

Minn	St. Paul, Countryman Assocs.	612-645-9151

MAGNETIC DIELECTRICS, Dept. EM, Industrial Dr., W. Milford, N.J. 07480, Tel: 201-728-8171; Empl.: 7

MAGNETIC METALS CO., Dept. EM, Hayes Ave. at 21st St., Camden, N.J. 08105, Tel: 609-964-7842, TWX: 710-891-7054; Empl.: 500

Local Sales Offices & Reps.

Cal	Westminster, Magnetic Metals Co.	714-892-6627
Ill	Chicago, Magnetic Metals Co.	312-259-6080
SC	Myrtle Beach, Candor Co.	803-448-8361
Exp:	Pa, Philadelphia, Ballagh & Thrall, Inc.	215-564-4020

MAGNETIC SHIELD DIV., Perfection Mica, Dept. EM, 750 North Thomas Dr., Bensenville, Ill. 60106, Tel: 312-766-7800, TWX: 910-256-4815; Empl.: 43 p. 2677-2679

Sales Manager: C. Nielsen

Local Sales Offices & Reps.

Ala	Madison, Saber Assoc.	800-327-1181
Cal	San Carlos,, Kottmeier Assoc.	415-592-8333
Cal	Woodland Hills, Cal-Ward Sls. Co.	213-883-2202
Colo	Denver, E. Johnson	303-985-4810
Conn	Hartford, Tekdata	203-525-7647
Fla	Lighthouse Pt., Saber Assoc.	800-432-3007
Fla	Sarasota, Saber Assoc.	800-432-3007
Fla	St. Petersburg, Saber Assoc.	800-432-3007
Kans	Olathe, B.C. Electronic Sales	913-888-6680
Md	Wheaton, Applied Science Marketing	301-933-2566
Mass	Burlington, Tekdata	617-273-0198
Minn	Minneapolis, Josco-Melius & Assoc.	612-854-4270
Mo	Hazelwood, B.C. Electronic Sales	314-731-1255
NJ	Mountain Lakes, Comps. for Elctrns.	201-334-2921
NM	Albuquerque, IMEC	505-883-9010
NY	Buffalo, Telesco Assoc.	716-834-1026
NY	Manlius, Telesco Assoc.	315-682-7272
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Cleveland, Marlow Assoc.	216-932-0900
Ohio	Dayton, Marlow Assoc.	513-866-4991
Pa	Media, W. Reeves Assoc.	215-566-6709
Pa	Pittsburgh, Marlow Assoc.	412-831-6113
Tex	Dallas, Electra III	214-243-5969
Wash	Seattle, J.B. Jolly	206-938-4166

MAGNETIC SPECIALTIES, Dept. EM, 10 Albemarle Ave., Trenton, N.J. 08638

MAGNETIC TECHNOLOGY, Vernitron Corp., Dept. EM, 21001 Kittridge St., Canoga Pk., Cal. 91303, Tel: 213-887-7700, TWX: 910-494-1217; Empl.: 125 p. 3090,3091

Sales Manager: E. Erdman

Local Sales Offices & Reps.

Cal	Los Altos, Servo Data	415-964-1325
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Ill	Chicago, Engr. Sls.	312-867-8434
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Detroit, A. Blumenberg Assoc.	313-557-1934
Minn	Eden Prairie, Techco Ltd.	612-941-3919
NH	Plaistow, Selmark Assocs.	603-382-4796
NJ	Harrington Pk., Metro Tech.	201-768-8495
NY	Jericho, Metro Tech.	516-935-3330
NY	Pittsford, Magna Sales Corp.	716-586-8748
Wash	Buckley, Halber Assocs.	206-939-2080

MAGNETICO, INC., Dept. EM, 182 Morris Ave., Holtsville, N.Y. 11742, Tel: 516-654-1166; Empl.: 45 p. 4423

Local Sales Offices & Reps.

Mass	Brookline, Technology Prods. Group	

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MAGNETICO specializes in SCOTT T & precision transformers. Synchro to Resolver & Resolver to Synchro Types – stock & specials. Synchro driver transformers. Miniature and low profile types, power switching, inverter, pulse hi voltage, telephone hybrid, current & wideband units & filters. the Best in Transformers – MAGNETICO

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Cal	San Jose, L. J. Anglin	408-253-0591
Cal	S. El Monte, J. A. McMillin	213-686-0920
Colo	Arvada, B. P. Brenner	303-466-6961
Fla	St. Petersburg, D.A. King	813-381-5344
Ill	Chicago, H.G. Pretat	312-255-6011
Mass	South Deerfield, B.E. Gray	413-665-2225
NJ	Westfield, T.G. Fitch	201-233-8811
NY	Rochester, Fowler-Beach Corp.	716-586-0468
NC	Greensboro, E.A. Siebenaler	919-288-3669
Ohio	Findlay, H.A. Beck	419-424-0592
Pa	Doylestown, F.A. Sank	215-794-7312
Tex	Garland, F.H. Hall	214-272-5697
Exp:	New York, N.Y., B. Freudenberg, Inc.	212-757-9130

MAGNETICS, DIV. OF SPANG INDUSTRIES, INC., Ind'l. Control Div., Dept. EM, Sandy Lake, Pa. 16145, Tel: 412-376-7515, TWX: 510-461-3334; Empl.: 150

™MAGNETIC TWEEZER - pick-up tool - Orbit Inds.

MAGNETRAN CORP., Dept. EM, 5701 Savoy Lane, Houston, Tex. 77036, Tel: 713-785-4202

™MAGNETREATER - de-magnetizer (variable) - RFL Inds.

™MAGNETTE - circuit breakers - Heinemann Elec. Co.

™MAGNION - laboratory magnet systems - Walker Scientific, Inc.

™MAGNI-WHIRL - constant temperature baths - Blue M Electric Co.

MAGNOS, INCORPORATED, Dept. EM, Old School House Rd., Harvard, Mass. 01451, Tel: 617-456-8880; Empl.: 4

Local Sales Offices & Reps.

Mass	Belmont, Electronic Comps. & Svcs.	617-484-8680

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Specialists in instrumentation for; Magnetic Measurement, Magnetic Material Tests, Quality Control Systems. Manufacturer of Fluxmeters, Hall Gaussmeters, Coercivity Meters, Electromagnets and associated Power Supplies. Solenoids, Helmholtz Coils and Material Test Coil Sets to specifications.

™MAGNUM - high current bridges - Unitrode Corp.

MAGNUM ELEC. CORP., Dept. EM, Drawer 247, 6385 Dixie Hwy., Erie, Mich. 48133, Tel: 313-848-2555; Empl.: 75

Local Sales Offices & Reps.

Cal	Fremont, H.K. Foraker Co.	415-657-2213
Cal	Lynwood, D. West & Assocs.	213-636-6124
Conn	East Haven, Eagle Assocs.	203-235-9036
Fla	Ft. Lauderdale, R.I. Smith Assocs.	305-772-5100
Fla	Largo, R.I. Smith Assocs.	813-585-2980
Ill	Des Plaines, Control Sls.	312-296-5595
Ind	Ft. Wayne, Baehr, Greenleaf & Assocs.	219-447-1608
Mich	Utica, E.H. Hufferd Co.	313-731-6003
Minn	Minneapolis, E. Melius Assocs.	612-854-4270
NJ	Haddonfield, TAI Corp.	215-627-6615
NY	Great Neck, Frank Tylinski Co.	516-466-9070
NY	Rochester, E.J. Schomburg Co.	716-244-0920
Ohio	Cincinnati, Baehr, Greenleaf & Assocs.	513-891-3826
Ohio	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
Ohio	Columbus, Baehr, Greenleaf & Assocs.	614-486-4046
Tenn	Greenvale, ACM Southeast	615-639-9141
Wisc	Milwaukee, Control Sls.	414-964-3322

Local Distributors

Cal	Fremont, Terminal Sales	415-656-7722
Minn	Minneapolis, Control Design	612-721-1629

MAGNUSONIC DEVICES, INC., Dept. EM, 290 Duffy Ave., Hicksville, N.Y. 11801, Tel: 516-938-4700, TWX: 510-221-1850; Empl.: 200

Sales Manager: K.A. Both

Local Sales Offices & Reps.

Cal	Covina, DCM Assocs.	213-331-7114
Mass	Burlington, New England Tech. Sls. Co.	617-272-0434
Minn	Minneapolis, Siedare Assoc.	612-545-5663
NY	Farmingdale, Magnetic Prods. Co.	516-249-2156
Okla	Tulsa, H.J. Daly Co.	918-627-4159
Tex	Dallas, Mycrosystems Mktg.	214-238-7157

™MAGOLITE - lightweight insulating cement - Varian Assocs.

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™MAGSTRIP - Terminal Strip - Magnum Elec. Corp.

™MAGSWITCH - magnet operated switch - Denison, R.B., Inc.

™MAGTECH - d.c. tachometer generators. d. c. torque & servo motors - Magnetic Technology

™MAGTERM - Independent Perimeter Terminals - Magnum Elec. Corp.

™MAILSCAN - x-ray inspection system - Torr Labs.

MAIN ELECTRNS., INC., Dept. EM, 225 Ida, Wichita, Kan. 67211, Tel: 316-267-3581; Empl.: 10

Local Sales Offices & Reps.

Kans	Shawnee Mission, Main Elctrns.	913-362-2121

™MAJOR - fan - Rotron, Inc.

MAJOR DATA CONCEPTS, INC., Dept. EM, 1796 Monrovia Ave., Costa Mesa, Cal. 92627, Tel: 714-646-2455; Empl.: 10

Local Sales Offices & Reps.

Cal	Santa Ana, Shelly Assocs.	714-549-3414

MALCO, A MICRODOT CO., Dept. EM, 12 Progress Dr. F., Montgomeryville, Pa. 18936, Tel: 312-287-6700, TWX: 910-221-1296; Empl.: 400

MALLINCKRODT, INC., Dept. EM, 2nd & Mallinckrodt Sts., St. Louis, Mo. 63147, Tel: 314-731-4141, TWX: 910-761-0443; Empl.: 2500

MALLORY BATTERY, P.R. Mallory, Dept. EM, S. Broadway, Tarrytown, N.Y. 10591, Tel: 914-591-7000, TWX: 131548, 710-564-0810; Empl.: 3000

Sales Manager: R. Mainzer

Local Sales Offices & Reps.

Cal	Buena Park	213-921-7939
Cal	Palto Alto	415-326-4282
Fla	Boca Raton	305-395-1535
Ill	Schiller Park	312-671-3422
Mass	Manchester	617-526-1407
Minn	Connon Falls	507-263-4360
NJ	Cinnaminson	215-355-7343
Ohio	Dayton	513-433-1210
Tex	Lewisville	817-430-1701

MALLORY CAPACITOR CO., Div. P.R. Mallory, Dept. EM, 3029 E. Washington, Box 372, Indianapolis, Ind. 46201, Tel: 317-636-5353 ....p. 1118,1119,1272-1275

Local Sales Offices & Reps.

Ala	Huntsville	205-539-1751
Ariz	Scottsdale	602-949-7788
Cal	La Mirada	213-921-7939
Cal	Los Angeles	714-523-7992
Cal	San Francisco	415-326-4282
Colo	Denver	303-750-4606
Fla	Orlando	305-855-6353
Ill	Chicago	312-992-1050
Mass	Boston	617-965-5011
Mich	Detroit	313-646-0100
Minn	Minneapolis	612-884-2881
Mo	St. Louis	314-727-8695
NJ	Cinnaminson	609-829-7902
NJ	Hillsdale	201-666-3600
NY	Rochester	716-647-3410
NC	Locust	704-888-2704
NC	Statesville, P.R. Mallory	704-872-0586
Ohio	Dayton	513-299-5505
Ore	Portland	503-643-1203
Pa	Carnegie	412-279-4248
Tex	Dallas	214-324-2448

MALLORY CONTROLS, P.R. Mallory, Dept. EM, Box 327, Frankfort, Ind. 46041, Tel: 317-654-5501, TWX: 810-260-2296

MALLORY METALLURGICAL, Div. P.R. Mallory, Dept. EM, 3029 E. Washington St., Indianapolis, Ind. 46206, Tel: 317-636-5353, TWX: 317-634-4214; Empl.: 600

Local Sales Offices & Reps.

Cal	Los Angeles	213-921-7939
Ill	Chicago	312-671-3422
Mass	Newton Upper Falls	617-965-5011
Mich	Birmingham	313-646-0100
NJ	Cinnaminson	609-829-7902
NC	Lexington	704-249-9101
Pa	Pittsburgh	412-563-3142

MALLORY TIMERS, P.R. Mallory, Dept. EM, 3029 E. Washington St., Indpls., Ind. 46201, Tel: 317-636-5353, TWX: 317-634-4214; Empl.: 2,000

(Refer to Mallory, P.R. & Co. Inc. for sales office information.)

™M. A. MILLER - replacement phonograph stylii - Pageant/M.A. Miller Industries

™MANCHEX - batteries - Exide Power Sys. Div.

MANGER ELEC. CO., INC., Dept. EM, W. Henry St., Stamford, Conn. 06902, Tel: 203-348-7761

MANHATTAN ELECTRIC CABLE, Dept. EM, 225 Passaic St., Passaic, N.J. 07055, Tel: 212-855-0500

MANHATTAN ELEC. CABLE CORP., Dept. EM, 1 Station Plaza, Rye, N.Y. 10580, Tel: 201-779-331, 800-631-7742, Telex: 12-6141; Empl.: 75

Sales Manager: R. Burke

Local Sales Offices & Reps.

Cal	Burlingame, Manhattan Elec. Cable	415-697-7016
Cal	Foster City, Raymond I. Wittrey, Inc.	415-341-5273
Cal	Los Angeles, Manhattan Elect. Cable Corp.	213-685-5500
Fla	Orlando, O.C. Puckett Co. Inc.	305-422-7197
Ga	Atlanta, J. McDuffie & Assoc.	404-351-8400
Ill	Melrose Park, Manhattan Elec. Cable	312-344-5040
Mich	Southfield, Knaus, Holley & Schiller Inc.	313-356-1040
Miss	Jackson, Walter Bishop Co.	601-354-5075
NJ	Passaic, Manhattan Electric Cable	201-779-3331
NY	Buffalo, The Lewis Agcy.	716-884-6858
NC	Greensboro, Electri-Products Group Inc.	919-294-6230
Ohio	Cleveland, Manhattan Elec. Cable	216-749-7500
Ohio	Westlake, Scanlon & Assoc.	216-871-7856
Tenn	Brentwood, E.J. Kutz & Assoc.	615-790-1283
Tex	Houston, Texas-Manhattan Elect. Insulated Cable	713-868-2222

™MANIX MFG - production equip. - Mann, Henry Inc.

MANN, HENRY INC., Dept. EM, Mann Rd., Box 496, Huntingdon Valley, Pa. 19006, Tel: 215-355-7200, 800-523-1960, TWX: 510-667-1767; Empl.: 75

™MANSON - friction tape - Okonite Co.

™MANUMATIC - leak detector - Varian Assocs.

™MARAGLAS - water white epoxy compounds - Acme Chemical & Insulation Co.

™MARASET - liquid epoxy compounds - Acme Chemical & Insulation Co.

MARATHON BATTERY CO., c/o Marathon Manufacturing Co., Dept. EM, 1900 Marathon Bldg., 600 Jefferson Box 61589, Houston, Tex. 77002, Tel: 817-776-0650, TWX: 910-894-5203; Empl.: 360

Local Sales Offices & Reps.

Cal	Daly City, R. DelBucchia & Assoc.	415-756-1664
Cal	Westminster, A.A. Dowers, Inc.	714-894-1123
Colo	Denver, Brown Tech.	303-233-0863
Fla	Winter Pk., Young & Lawrence	305-647-6929
Ill	Hinsdale, D. Patton	312-325-2170
Kans	Wichita, D & O Engrg. Co.	316-264-7358
Mich	Farmington Hill, H. Lowell Co.	313-851-7474
NY	Buffalo, R. Mitscher	716-633-7970
Ohio	Cleveland, Components, Inc.	216-243-9200
Pa	Hummelstown, R.T. Lloyd	717-566-0013
Pa	Phila., C.H. Newson & Assoc.	215-248-3377
Tex	Dallas, Ion Assocs.	214-357-9441
Tex	Houston, Ion Assocs.	713-461-5311
Wash	Seattle, R.K. Squibb	206-632-2450

MARATHON SPECIAL PRODS. CORP., Dept. EM, 13300 Van Camp Rd., Bowling Green, Ohio 43402, Tel: 419-352-8441; Empl.: 150

Local Sales Offices & Reps.

Ill	Elk Grove Village	312-593-6500
Ohio	Cleveland	216-331-2910
Pa	Allentown	215-837-1273

MARCO SCIENTIFIC, Dept. EM, Box 2699, Santa Clara, Cal. 95051, Tel: 408-739-9418, Telex: 35-7454; Empl.: 10

Local Sales Offices & Reps.

NY	Mineola, J. B. Lilly Co.	516-746-2226

™MARCOFLEX - illuminated pushbutton switch - Illuminated Products Inc.

MARCOMM, Dept. EM, Box 1528, Lancaster, Pa. 17604

MARCONI INSTRS., Div. Marconi Elctrns. Inc., Dept. EM, 100 Stonehurst Ct., Northvale, N.J. 07647, Tel: 201-767-7250, TWX: 710-991-9752 ...... p. 2897-2899

Local Sales Offices & Reps.

Ala	Huntsville, Lee	205-533-5896
Ariz	Phoenix, D. Menegay	602-994-9519
Cal	Anaheim, Moxon Elctrns.	714-635-7600
Cal	San Diego, Moxon Elctrns.	714-292-4820
Cal	Santa Clara, Moxon Elct.	408-249-2491
Colo	Boulder, Par Assocs.	303-499-4736
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs., Inc.	404-945-4222
Ill	Chicago, K.W. Meyers	312-774-6440
Ind	Indpls., K. Meyers	317-243-6681
Md	Bethesda, S & S	301-654-1434
Mass	Stoneham, Ken Corp.	617-438-5464
Minn	Mpls., K.W. Meyers	612-920-7080
Mo	Grandview, P. A. C.	816-763-4155
NJ	Saddle Brook, L & M Assocs.	201-843-8700
NM	Las Cruces, P. Cantrell	505-526-2491
NY	Fayetteville, Savage Sales Co.	315-682-2131
NY	New York City, L & M Assocs.	212-243-6155
NC	Raleigh, Lee Assocs., Inc.	919-787-5818
Ohio	Waldo, Ohio Instr.	614-726-2828
Pa	Andalusia, L & M	215-639-3100
Tex	Dallas, Bradenco	214-358-3278
Utah	Salt Lake City, Par Assocs.	303-499-4736
Wash	Seattle, Tasco	206-453-1414

™MARINE BIG STICK - antenna - Shakespeare

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415/626-1444 1444 Market St. 94102

MARINE ELECTRIC RAILWAY PRODS. DIV., INC., Dept. EM, 167 National Rd., Edison, N.J. 08817, Tel: 201-287-2810, TWX: 710-998-0560; FSC No.: 00062; Empl.: 100 .... p. 3387-3390

Local Sales Offices & Reps.

Cal	La Marinda, Marrs & Assoc.	213-947-2095
Cal	Walnut Creek, W. A. Borden Co.	415-937-5196
Del	Wilmington, Spring Assocs.	302-656-0999
Fla	Orlando, Datarep	305-843-5224
Ill	Des Plaines, Marsland Assocs.	312-694-2262
Ind	Indianapolis, Marsland Assocs.	317-924-3568
Md	Fulton, Gans-Fryling & Pugh, Inc.	301-837-6311
Mass	Attleboro, Electronic Sls. of New England	617-222-4078
Mich	Detroit, H. Teplitz	313-537-9058
Minn	Minneapolis, Marsland Assocs.	612-545-4481
Mo	Kansas City, Marsland Assocs.	816-966-8400
NJ	Springfield, Shortess-Rawson & Assocs.	201-467-8585
NY	Fayetteville, M. P. Andrews	315-637-3144
NC	Winston Salem, Radco Co.	919-722-9671
Ohio	Cleveland, H. Teplitz & Co.	216-486-2800
Ohio	Dayton, H. Teplitz & Co.	315-277-6531
Va	Gans-Fryling & Pugh, Inc., Gans-Fryling	703-527-3262

(TM)MARINEFAX - 11 inch radiofacsimile recorder - Alden Elctrn. & Impulse Recording Equip. Co.

(TM)MARINE LANCER - antenna - Shakespeare

(TM)MARINER - marine radio - VHF/FM - Intech/Function Modules

(TM)MARINE SEABEE - antenna - Shakespeare

(TM)MARK - microwave antennas - Anixter-Mark

MARK EYELET & STAMPING, Dept. EM, 185 Wakelee Rd., Wolcott, Conn. 06716, Tel: 203-756-8847; Empl.: 50

Local Sales Offices & Reps.

Ill	Chicago, Weber Assocs.	312-943-5225
Mich	Detroit, W. L. Crawford	313-836-8121
Minn	St. Paul, C. Vandervort	612-489-5222
Pa	Wayne, Miller & Smith Co.	215-687-0750

MARK SPECIALTIES, Dept. EM, 1780 Monrovia, Costa Mesa, Cal. 92627, Tel: 714-642-7757; Empl.: 4

MARKAL CO., Dept. EM, 250 N. Washtenaw Ave., Chicago, Ill. 60612, Tel: 312-826-1700; Empl.: 65

(TM)MARK C - switches - Cole Instrument Corp.

(TM)MARK-EL - parts marking service - Acme Model Engrg. Co.

MARKEL
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MARKEL CORP., Dept. EM, School La., Norristown, Pa. 19404, Tel: 215-272-8960, TWX: 510-660-0929; FSC No.: 03890; Empl.: 450 .... p. 2974,2975,4670,4671

Local Sales Offices & Reps.

Ariz	Pheonix, K. Jahn Co.	602-956-9060
Ark	Hot Springs, Meredith Young Assocs.	501-262-1365
Cal	L.A., National Wire & Cable	213-225-5611
Cal	Los Angeles, C.D. LaMoree	213-225-5631
Cal	Torrance, Insulation Supply	213-320-9400
Colo	Denver, Ward Elec. Supply	303-222-3541
Fla	Clearwater, WMM Assocs.	813-442-3913
Ill	Chicago, J.J. Glenn & Co.	312-847-6400
Kans	Overland Park, Mathews & Co.	913-642-9063
Md	Glenn Burnie, F. Lott & Co.	301-744-4611
Mass	Wellesley, Sturgeon Co.	617-237-1040
Mich	Farmington, L. George Agency	313-474-1505
Minn	Hopkins, F. Peterson	612-941-5400
Mo	Webster Groves, Hippler	314-961-8499
NJ	Colonia, H.B. Heft Assocs.	201-381-5389
NY	Lynbrook, H.B. Heft	516-599-3351
NY	Rochester, Gislason	716-454-4741
NC	Charlotte, H.T. Altman Co.	704-535-4049
Ohio	Chagrin Falls, Electrolock	216-543-5125
Okla	Oklahoma City, J. Cole	405-235-1761
Ore	Portland, C. Riggs	503-226-3286
Pa	Munhall, PEI Sls. Corp.	412-462-6300
Pa	Phila., C. Newson	215-248-3377
Tenn	Chattanooga, Jackson	615-267-4260
Tex	Frankston, Cline & Son	214-876-2223
Wash	Seattle, C. Riggs	206-623-5707

Local Distributors

Cal	Los Angeles, C.D. LaMoree	213-225-5631
Cal	Los Angeles, National Wire & Cable Corp.	213-225-5611
Cal	Torrance, Insulation Supply Co.	213-320-9400
Colo	Denver, Ward Elec. Supply Co.	303-222-3541
Ill	Chicago, J. J. Glenn & Co.	312-847-6400
Ohio	Chagrin Falls, Electrolock	216-543-5125
Okla	Oklahoma City, J. H. Cole Co.	405-235-1761
Ore	Portland, C. E. Riggs	503-226-3286
Pa	Munhall, PEI Sls. Corp.	412-462-6300
Wash	Seattle, C. E. Riggs	206-623-5707
For:	Can., Mississauga, Ont., Marflex, Ltd.	416-828-0220

MARKEM CORP., Dept. EM, 1000 Congress St., Keene, NH 03431, Tel: 603-352-1130, TWX: 710-366-1800; Empl.: 1500

Sales Manager: S. Struble

Local Sales Offices & Reps.

Cal	Industry, Markem Corp.	213-965-3345
Ill	Elk Grove Village, Markem Corp.	312-625-2866
Mo	St. Louis, Mfg. Supplies Co.	314-231-7886
NJ	Princeton, Markem Corp.	609-452-9191
NC	Charlotte, Markem Corp.	704-525-1445
Ohio	Cincinnati, L. G. Freeman Co.	513-721-1080
Tenn	Nashville, Mfg. Supplies Co.	615-383-2343
Tex	Richardson, Markem Corp.	214-231-8297

MARKETING ENGINEERS, INC., Dept. EM, 2511 E. 46th St., Indianapolis, Ind. 46206

(TM)MARKETTE - flexible disk - Memorex Corp.

MARKHON INDUSTRIES INC., Dept. EM, 200 Bond St., Wabash, Ind. 46992, Tel: 219-563-2161, TWX: 810-290-2725; Empl.: 300

Local Sales Offices & Reps.

Colo	Denver, Christee-Meade Co.	303-753-9471
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	305-422-3686
Ill	Chicago, Tom Smola, Comp. Rep.	312-496-0128
Md	Hyattsville, Eastern Components	301-577-2925
Mass	Burlington, Schaal Assocs.	617-272-7940
NY	Williston Park, ABC Elctrns. Sls. Co.	516-747-6610
Ohio	Mansfield, Benchmark Sys.	419-756-9211
Okla	Tulsa, Blair Engrg. Sls. Co.	918-747-3100
Pa	Flourtown, Eastern Components	215-836-1616
Pa	York, Eastern Components	717-764-3114
Tex	Dallas, Blair Engrg. Sls. Co.	214-352-8411
Tex	Houston, Blair Engrg. Sls. Co.	713-667-9864

(TM)MARK I - wave solder mach. - Tech. Devices Co.

(TM)MARK II - wire cutter & stripper - Tech. Devices Co.

(TM)MARK II - liquid scintillation counter - Searle Analytic Inc. & Searle Radiographics Inc.

(TM)MARK III - circuit card fixture - Tech. Devices Co.

(TM)MARK III - alpha numeric printer - Gulton Inds., Inc.

(TM)MARK IV - solid state CATV amplifiers - CATV Communications

(TM)MARK IV HAMMER - impact printing mechanism - Dataproducts Corp.

(TM)MARK IX - comp. lead trimmer - Tech. Devices Co.

(TM)MARKSMAN - temperature recorders - Gulton Inds., Inc.

(TM)MARK TEN, MARK TEN "B", MARK TEN "C" - Electronic Ignition Systems - Delta Products

(TM)MARK V - component lead former - Tech. Devices Co.

(TM)MARK V - solid state CATV amplifiers - CATV Communications

(TM)MARK X - disc packs - Memorex Corp.

(TM)MARK XI - disc packs - Memorex Corp.

(TM)MARK 4 - plotter - Auto Trol Corp.

MARLIN MANUFACTURING CORP., Dept. EM, 12404 Triskett Rd., Cleveland, Ohio 44111, Tel: 216-941-6200; Empl.: 55

Sales Manager: A. Tymkewicz

Local Sales Offices & Reps.

Ariz	Phoenix, Carter Assoc.	602-947-4355
Mass	Norwell, Bordewieck Engrg. & Sls.	617-659-4915
Mich	Detroit, Marlin	313-774-4440
NY	Cohoes, HJM Sls. Co.	518-237-3725
Ohio	Cincinnati, Seawood Sls. Co.	513-393-9582
Pa	Broomall, AM Tech. Sls. Co.	215-356-0574
Pa	Pittsburgh, Marlin	412-276-7117
Tenn	Chattanooga, Coleman Assocs.	615-821-0235
Tex	Houston, Marus Inc.	713-960-1930

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MARLOW INDUSTRIES, INC., Dept. EM, 1021 S. Jupiter Rd., Garland, Tex. 75041, Tel: 214-494-2521, TWX: 910-860-5161; Empl.: 25 .... p. 2698

Local Sales Offices & Reps.

Ariz	Phoenix, Griot Assocs.	602-275-4991
Cal	El Segundo, Griot Assocs.	213-322-8383
Cal	Los Altos, Griot Assocs.	415-941-2533
Cal	Tustin, Griot Assocs.	714-838-2330
Wash	Bellevue, Griot Assocs.	206-454-8592

(TM)MARLOX - metal sheathed thermocouples - Marlin Manufacturing Corp.

MAROTTA SCI. CONTROLS, INC., Dept. EM, Boonton Ave., Boonton, N.J. 07005, Tel: 201-334-7800, TWX: 710-987-8358; FSC No.: 99657; Empl.: 165

Sales Manager: W.T. Browne

Local Sales Offices & Reps.

Ala	Huntsville, General Hydraulics Corp.	205-859-2670
Cal	Tustin, Marotta Scientific Controls	714-544-2160

(TM)MARQUIS - loudspeaker, enclosures - Electro-Voice, Inc.

(TM)MARS - multiplex audio response sys. - Cognitronics Corp.

MARSHALL INDUSTRIES, Hunter Tools, Dept. EM, 9674 Telstar Ave., El Monte, Cal. 91731, Tel: 213-686-0141, TWX: 910-587-1565; Empl.: 75

Local Sales Offices & Reps.

Cal	Los Angeles, Gignac, Oldfield & Weaver	213-747-9544
Cal	Santa Cruz, R. R. & F. Co.	408-423-3277
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Fla	Ft. Lauderdale, Unirep Inc.	
Ga	Atlanta, Murphy & Cota	404-875-2525
Ill	Chicago, McBride Sls., Inc.	312-775-1080
Ind	Indianapolis, Elctrn. Reps.	317-897-9326
Md	Phoenix, Rebco Sls.	301-592-8907
Mass	Lynn, J. Grant	617-595-6411
Mich	Detroit, Burcaw Co. & Assoc.	313-533-7700
Minn	Minneapolis, Stone Olsen Sls.	612-929-6121
Mo	Liberty, Lectro-Reps	816-781-2522
NY	Elmhurst, Wilson Assoc.	212-899-0929
NY	Rochester, Marsey Sls.	716-442-9700
Ohio	Cincinnati, Paten Sls. Co.	513-574-0813
Ohio	St. Marys, Shelby & Co.	419-394-3377
Ore	Portland, J. V. Belusko Co.	503-222-4279
Pa	Willow Grove, Dick Lewis	215-659-0704
Tex	Dallas, Techno Assoc.	214-357-9213
Utah	Salt Lake City, Arrowhead Sls. Corp.	801-487-3444

MARSTAN RESISTOR, Balco Elctrns., Inc., Dept. EM, 307 Washington St., Orange, N.J. 07050, Tel: 201-677-1200, TWX: 710-994-5812; FSC No.: 5905; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Schoeffler Assocs.	
Cal	Culver City, Sodaro Co.	213-870-6001
Conn	Meriden, Abbott-Allison	203-237-9232
Ill	Northbrook, R.T. Howlett & Assocs.	312-498-5444
Kans	Overland Park, B. Rush Assocs.	913-831-4259
Mich	Northbrook, R.T. Howlett & Assocs.	312-498-5444
NJ	Harrington Pk, Metro Tech Sls.	201-768-8495
NY	Jericho, Metro Tech Sls.	516-935-3330

Wash	Seattle, J. B. Jolly	206-938-4166
Wisc	Milwaukee, Gentron Co.	414-543-8110
Exp:	New York, N.Y., Multiparts Corp.	212-944-4372
Exp:	Westbury, N.Y., Minthorne International Inc.	516-334-3303

™MARTECH - extruded & molded bio-medical prods. - Markel Corp.

MARTIN RESEARCH, Dept. EM. 3336 Commercial Ave., Northbrook, Ill. 60062, Tel: 312-498-5060; Empl.: 6

Local Distributors

Cal	Los Angeles, Semiconductor Specialists	
Ill	Chicago, Semiconductor Specialists	
Ind	Indianapolis, Semiconductor Specialists	
Mich	Detroit, Semiconductor Specialists	
Minn	Minneapolis, Semiconductor Specialists	
Mo	Kansas City, Semiconductor Specialists	
Mo	St. Louis, Semiconductor Specialists	
Ohio	Dayton, Semiconductor Specialists	
Pa	Pittsburgh, Semiconductor Specialists	412-781-8120
Tex	Dallas, Semiconductor Specialists	214-358-5211
Wisc	Milwaukee, Semiconductor Specialists	414-257-1330
For:	Can., Malton Toronto, Semiconductor Specialists	416-678-1444
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™MASKCOAT - plating stop-off - Western Coating Co.

™MASK-N-GLASS - plastic/glass cleaner/polisher - Chemtronics, Inc.

™MASQ-MATIC - automatic plating sys. for continuous strip IC lead frame plating. - Sel-Rex Div. Oxy Metal Industries Corp.

MASTECH, INC., Dept. EM, 478 E. Brighton Ave., Syracuse, N.Y. 13210, Tel: 315-478-3133, TWX: 710-541-1546; FSC No.: 27694; Empl.: 20

Local Sales Offices & Reps.

Cal	Los Angeles, Dyna Sls. Co.	213-268-1175
Mass	Waltham, W.M. Hagne Co.	617-899-5600

MASTER APPLIANCE CORP., Dept. EM, 2420 18th St., Box 545, Racine, Wisc. 53403, Tel: 414-633-7791; Empl.: 50

Local Sales Offices & Reps.

NY	New Hyde Park, Harris & Aldrich Sls.	516-466-4122
Pa	Media, Snyder & Stefkovic Assocs.	215-566-5400

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Local Sales Offices & Reps.

Cal	Los Angeles, Master Distributors	213-829-4656
Cal	San Francisco, Master Dist.	415-626-0807
Ill	Park Ridge, G. E. Collins Sls.	312-823-8075

™MASTERLINE - matv equipment - Blonder-Tongue Labs., Inc.

™MASTER-MITE - flameless heat gun - Master Appliance Corp.

MASTER SPECIALTIES CO., Dept. EM, 1640 Monrovia St., Costa Mesa, Cal. 92627, Tel: 714-642-2427, Telex: 67-8433; Empl.: 350 .... p. 4152

Sales Manager: J. Gabriel

Local Sales Offices & Reps.

Cal	Los Altos, Recht Assoc.	415-941-0336
Colo	Denver, Dynatech	303-773-2830
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Ill	Edison, H. Grubb Co.	312-543-8525
Kans	Olathe, Technical Reps.	913-782-1177
Md	Glen Burnie, Micro Comp	301-761-4600
Mass	Andover, R. Purinton	617-475-7055
Mass	Woburn, Master Specialties Co.	617-933-3669
Minn	Minneapolis, Scott Elctrns. Sls.	612-929-2985
NY	Jericho, Electro-Rep	510-221-1891
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
Ohio	Wickliffe, Master Specialties Co.	216-946-5552
Pa	Erie, Ecco Elctrns.	814-459-8822
Pa	Huntingdon Valley, Inacker Sls.	215-947-4660
Tex	Dallas, Kruzand Assoc.	214-691-4592
Utah	Salt Lake City, R² Mktg.	801-972-5646
Wash	Seattle, F. Jackson Assoc.	206-523-6300

MASTERITE CORPORATION, Dept. EM, 2841 Lomita Blvd., Torrance, Cal. 90505, Tel: 213-775-3471, TWX: 910-347-6237; FSC No.: 05041; Empl.: 380; Minimum order: $G. Peterson

Sales Manager: C.J. Huebert; *Distributor Manager:* G. Peterson

Local Sales Offices & Reps.

Ariz	Phoenix, S.O. Rush	602-959-3594
Cal	Mountain View, West/Mark Assoc.	415-969-1700
Colo	Denver, West/Mark Assoc.	303-433-7181
Fla	St. Petersburg, Russell Assoc.	813-526-2939
Ga	Atlanta, Russell Assoc.	404-255-8422
Ill	Wood Dale, L. Bacher Assoc.	312-766-1922
Kans	Overland Park, Penzner-Mankus Assoc.	913-381-0004
Mass	Waltham, UNESCO	617-890-6680
Mich	Grand Rapids, R.P. Urban Assoc.	616-245-0511
Minn	St. Paul, Countryman Assoc.	612-645-9151
Mo	Hazelwood, Penzner-Mankus Assoc.	314-731-4334
NJ	Livingston, Varrelman-Gorman Co.	201-992-2505
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Camillus, Varrelman-Gorman Co.	315-458-4774
NY	Centerport, Varrelman-Gorman Co.	212-463-5000
Ohio	Tipp City, Tech. Comps.	513-667-1216
Okla	Broken Arrow, P.J. Scanlon Co.	918-251-1427
Pa	Newtown Square, Hagy Assoc.	215-459-0504
Tex	Richardson, P.J. Scanlon Co.	214-231-4661

™MAT - magnetic amplifiers - TRW/UTC Transformers

™MATE-N-LOK - connectors - Amp Inc.

MATERIALS FOR ELCTRNS., INC., Dept. EM, 149-32 132nd St., Jamaica, N.Y. 11430, Tel: 212-322-9400, Telex: 23-2695

MATERIALS RESCH. CORP., Dept. EM, Route 303, Orangeburg, N.Y. 10962, Tel: 914-359-4200, TWX: 710-576-2656; Empl.: 300

Sales Manager: R.A. Styles

Local Sales Offices & Reps.

Cal	Mountain View	415-964-7272
Ill	Chicago	
NY	Pearl River	914-359-4200
Tex	Dallas	214-235-9008

MATERIALS TECHNOLOGY, INC., Dept. EM, P.O. Box 187, Somerset, N.J. 08873, Tel: 201-246-1000; Empl.: 11

MATHESON GAS PRODUCTS, Dept. EM, Box 85, East Rutherford, N.J. 07073, Tel: 201-933-2400, TWX: 710-989-0173; Empl.: 500

Local Sales Offices & Reps.

Cal	Cucamonga	714-987-4611
Cal	Newark	415-793-2559
Ga	Morrow	404-478-7274
Ill	Joliet	815-727-4848
Mass	Gloucester	617-283-7700
NJ	East Rutherford	201-933-2400
Tex	La Porte	713-471-2544

MATRECS INDUSTRIES INC., Dept. EM, 235 Carver, Winslow, Ill 61089

™MATRI DOT - Printers - Practical Automation, Inc.

MATRIX CORP., Dept. EM, 2260 Distributors Dr. Park Fletcher Ind'l & Research Ctr., Indianapolis, Ind. 46241, Tel: 317-248-2036; Empl.: 10 .... p. 1668

Local Sales Offices & Reps.

Tex	Dallas, Sys. Engrg. Sls.	214-231-9364
Tex	Houston, System Engrg.	713-668-7840

MATRIX ENGINEERING CORP., Dept. EM, 17000 S. Western Ave. 19, Gardena, Cal. 90247, Tel: 213-770-0521; Empl.: 7

Local Sales Offices & Reps.

Ariz	Phoenix, Davis Co.	602-955-2266
Colo	Denver, Soldering Supply Specialists	303-455-1352
Ill	Chicago, EMF Co. Inc.	312-889-8323
Mass	Burlington, Contact East Inc.	617-272-5051
Ore	Portland, Murphy Ind. Supply Co.	503-226-6081
Pa	Feasterville, H. Mann Inc.	215-355-7200
Tex	Dallas, Atlan Inds.	214-243-6216
Utah	Salt Lake City, Technical Devices Co.	801-277-1029

Local Distributors

Ill	Chicago, E.M.F. Co.	312-889-8323
Mass	Burlington, Contact East	617-272-5051
Pa	Huntingdon Val., Henry Mann	215-355-7200
Pa	Plymouth Meeting, Techni-Tool	215-825-4990

™MATRIX IV - Electronic Cabinetry - Zero Corp.

MATRIX SYSTEMS CORP., Dept. EM, 9411 Lurline Ave., Chatsworth, Cal. 91311, Tel: 213-882-2008, TWX: 910-494-4975; Empl.: 18 .... p. 3585

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds Assoc.	205-536-1941
Cal	Mountain View, IFM, Inc.	415-961-2828
Cal	N. Hollywood, Crown Elctrns.	213-877-3550
Conn	Hamden, Instrument Consultants, Inc.	203-288-5246
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, Pivan Engrg., Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg., Inc.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Mass	Waban, Instrument Consultants, Inc.	617-969-9881
Mich	Detroit, Comtel-Instr. Assocs.	313-255-1970
Minn	Minneapolis, Pivan Engrg., Inc.	612-537-4526
Mo	St. Louis, Pivan Engrg., Inc.	314-542-3636
NY	Cortland, RJC Assocs.	716-385-2770
NY	Scarsdale, Bassin Tech. Sls. Co.	914-723-3334
NC	Winston Salem, Reynolds Assoc.	919-725-6196
Ohio	Cleveland, Comtel-Instr. Assocs.	216-442-8080
Ohio	Dayton, Comtel-Instr. Assocs.	513-298-7573
Okla	Tulsa, Carter Assocs.	918-749-3311
Pa	Pittsburgh, Comtel-Instr. Assocs.	412-922-5720
Va	Fairfax, Schibley Assocs.	703-591-3008
Wisc	Brookfield, Pivan Engrg., Inc.	414-786-1940

MATSUO ELCTRNS. OF AMERICA, Dept. EM, 831 S. Douglas St., El Segundo, Cal. 90245, Tel: 213-679-0379, TWX: 910-325-7164

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Interstate Mktg. of Ariz.	602-957-1220
Cal	Redwood City, Logan Sls.	415-369-6726
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Colo	Boulder, R G Entprs.	303-447-9211
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Chicago, Berndt Assocs.	312-283-0713
Ind	Greenwood, Valentine-Schillinger & Assocs.	317-888-2260
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Mass	Needham, Hatch Assocs.	617-444-3310
Mich	Southfield, Valentine-Schillinger & Assocs.	
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Haddonfield, Sunday O'Brien	609-429-4013
NJ	Kenilworth, Ventronics, Inc.	201-272-9262
NM	Albuquerque, A. Q. Elctrns.	505-883-1003
NY	Buffalo, J. McDonough Assoc.	716-839-2044
NC	Charlotte, Cartwright & Bean	704-333-6457
NC	Raleigh, Cartwright & Bean	919-832-7128
Ohio	Cleveland, Imtech, Inc.	216-826-3400
Ore	Aloha, Inderwood & Underwood	503-649-5681
Tenn	Knoxville, Cartwright & Bean	615-693-7450

Wash	Seattle, Underwood & Underwood	206-243-2311

Local Distributors

Ariz	Phoenix, Mirco	602-944-2281
Cal	Belmont, Eric Elctrns.	415-593-8284
Cal	Carson, Hi Rel Distrs.	213-537-6500
Cal	Lakeside, Mouser Elctrns.	714-449-2220
Cal	Los Angeles, Western Electromotive/Shephard	213-820-3777
Cal	Los Angeles, Energy Elctrns.	213-670-7880
NJ	Kenilworth, Ventronics	201-272-9262
Tex	Dallas, Components Specialties	214-357-5476
Tex	Houston, Components Specialties	713-771-7237
Wash	Seattle, Components West	206-243-3800
Wash	Seattle, Shannon, Ltd.	206-763-0545

MATSUO ELEC. CO., LTD., Dept. EM, 3-5, 3-chome, Sennari-chu, Toyonaka-shi, Osaka, Japan, Tel: 06-332-0871, TWX: 523-4164 OSA; Empl.: 700

Local Sales Offices & Reps.

Cal	El Segundo, Matsuo Elctrns. of America, Inc.	213-679-0379

MATTHEWS & CO., JAS. H., Marking Systems Div., Dept. EM, 6515 Penn. Ave., Pittsburgh, Pa. 15206, Tel: 412-362-6500, Telex: 86-6215; Empl.: 250

Local Sales Offices & Reps.

Cal	La Palma, D. Connor	213-921-0994
Cal	San Francisco, T.E. Graves	415-474-8300
Ga	Atlanta, R.F. Abbs	404-355-6677
Ill	Chicago, S.C. Gurtner	312-463-0333
NJ	Clifton, S. Zeeble	201-471-2945
NY	Buffalo, J.V. Mason	716-856-7812
Ohio	Cincinnati, H.C. Bathe	513-631-0133
Ohio	Cleveland, J. O'Toole	216-696-6676
Pa	Philadelphia, S. Zeeble	215-482-8792
Pa	Pittsburgh, T.J. Keevers	412-362-6500
Tenn	Memphis, J.J. Ford	901-525-0316
Tex	Dallas, L.S. Maguire	214-638-1775
Exp:	Pa., Pittsburgh, C.A. Prezikowski	412-362-6500

MAURATRON, INC., Dept. EM, 1115 S. Broadway, Carrollton, Tex. 75006, Tel: 214-242-0512; Empl.: 7

Local Sales Offices & Reps.

Cal	San Diego, Tauber & Assocs.	714-274-7242
Kans	Mission, Admack Sls. Co.	913-432-5550
Md	Lutherville, Cunningham & Assoc.	301-296-4306
Mass	Northboro, Henik Assocs.	617-891-5660
Tex	Dallas, V.J. Sykes Assocs.	214-243-2221

Local Distributors

Cal	W. Los Angeles, Mil-Comm Distributor	213-478-0525

MAUREY INSTRUMENT CORP., Dept. EM, 4555 W. 60th St., Chicago, Ill. 60629, Tel: 312-581-4555; FSC No.: 03942; Empl.: 50

Sales Manager: C.B. Wells

Local Sales Offices & Reps.

Ariz	Tempe, Whitronics, Inc.	602-966-4417
Cal	Van Nuys, Myco Sls.	213-988-2288
Conn	Thomaston, NBS Assocs.	203-283-5959
Fla	Coral Springs, Shaw Engrg. & Sls.	305-752-7596
NM	Albuquerque, A.L.S. Elctrns.	505-294-8555
NY	Jamestown, W.R. Arnold, Inc.	716-664-5402
Wash	Bellevue, Comtec	206-453-1188

MAURY MICROWAVE CORP., Dept. EM, 8610 Helms Ave., Cucamonga, Calif. 91730, Tel: 714-987-4715; FSC No.: 13047; Empl.: 30

Sales Manager: T.C. Koster

Local Sales Offices & Reps.

Ariz	Phoenix, Southwest e/m Engrg.	602-993-0250
Cal	Cupertino, Dura Elctrn. Sls.	408-255-2084
Cal	Goleta, Thorson Co.	805-964-8751
Cal	San Diego, Thorson Co.	714-298-8385
Colo	Parker, TMA, Inc.	303-841-3435
Fla	Orlando, G.F. Bohman Assoc.	305-425-0507
Kans	Overland Park, J.F. Guernsey Co.	913-381-2225
Md	Greenbelt, Riffe Assoc., Inc.	301-474-8600
Mass	Lexington, Zieco, Inc.	617-861-8300
Mo	Maryland Heights, J.F. Guernsey Co.	314-878-5404
NJ	Dover, Richman Sls. Co.	201-584-8444
NM	Albuquerque, TMA, Inc.	505-298-4321
NY	Commack, Richman Sls. Co.	516-543-5532
Ohio	Dayton, F. L. Ohmer & Assoc.	513-434-1454
Okla	Oklahoma City, Airep Electronics	405-721-3026
Tex	Dallas, Airep Elctrns.	214-827-2120
Utah	Salt Lake City, TMA Assocs.	801-485-9381
Wash	Bellevue, J. Findlay Co.	206-454-5200

(TM)MAX-C - piston trimmer capacitors - JFD Electronics Components Corp.

(TM)MAXEAL V AND VII - pumps - Allis-Chalmers

(TM)MAXI-COLOR - unshielded tv lead-in wire - Belden Corp.

(TM)MAXIDEK - 10½" tape transport - Digi-Data Corp.

(TM)MAXIPOWER - single output switching supplies - Trio Labs, Inc.

(TM)MAXI-QUBETM - case b 110 mil chip capacitor - American Technical Ceramics

MAXI-SWITCH CO., Dept. EM, 9697 East River Road, Minneapolis, Minn. 55433, Tel: 612-755-7660; Empl.: 100 .... p. 4154,4155

Sales Manager: D.E. Powellek

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assoc.	602-947-4297
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Ark	Hot Springs, Barry Sls. Co.	501-624-3215
Cal	Canoga Park, R.C. Kruse	213-341-3020
Cal	San Jose, The Parsons Co.	408-247-7327
Colo	Denver, Williams Assoc.	303-373-4730
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Pompano, V.G. Sales Co.	305-971-0900
Ill	Oak Brook, Whitmore Assoc.	312-325-4727
Kans	Olathe, Rush & West Assoc.	913-764-2700
Md	Lutherville, C & D Sls.	301-296-4306
Mass	Chelmsford, M. Flynn	617-256-6229
Mich	Detroit, R.P. Urban Assoc.	313-535-2355
Mich	Grand Rapids, R.P. Urban & Assocs.	616-245-0511
Minn	Minneapolis, Quantum Sls.	612-831-8583
NJ	East Orange, Murray Gallagher	201-678-5071
NJ	Riverton, Valley Sales Co.	609-829-2892
NM	Albuqurque, Williams Assocs.	505-255-1638
NY	Penfield, John Blair	716-586-1419
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Chagrin Falls, Crest Component Sls.	216-543-9808
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Okla	Tulsa, Barry Sls. Co.	918-664-8422
Ore	Portland, Hayes Technical	503-238-0001
Tex	Dallas, Barry Sls. Inc.	214-661-5184
Tex	Houston, Barry Sls. Co.	713-784-5860
Tex	Richardson, Barry Sls. Co.	214-234-0255
Wash	Seattle, Hayes Technical	206-763-2210

MAXWELL LABS., INC., Dept. EM, 9244 Balboa Ave., San Diego, Calif. 92123, Tel: 714-279-5100, TWX: 910-335-2063; Empl.: 250

(TM)MAZEMASTER - wiring aide - Addison Div. Muirhead, Inc.

MBC ENGINEERING INC., Dept. EM, 2501 Walsh Ave., Santa Clara, Cal. 95050, Tel: 408-244-9242; Empl.: 95

MCCOY ELECTRONICS, Sub Oak Inds. Inc., Dept. EM, Chestnut & Watts, Mt Holly Spr., Pa. 17065, Tel: 717-486-3411, TWX: 510-650-3548 ...... p. 2450-2457

Local Sales Offices & Reps.

Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Altos, OAK Inds. Inc.	415-941-1237
Colo	Denver, I.W. Strong & Assocs.	303-292-6900
Fla	Altamonte Springs, Oak Inds., Inc.	305-831-5411
Fla	Boca Raton, Oak Inds. Inc.	305-735-4495
Ill	Crystal Lake, Oak Mid-West	815-459-5000
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Mass	Norwood, JMG, Inc.	617-762-5333
Minn	Minneapolis, Wagner Conslts. Corp.	612-721-2411
Mo	Kansas City, Automatic Gen. Elctrn. Sls.	816-333-8206
NJ	Clifton, Albert Clarfield	212-757-6454
NJ	Haddonfield, Gray Assocs.	609-429-5300
NY	Pompey, S.F. Foster Co.	315-677-3333
NY	Webster, S.F. Foster Co.	716-265-2072
NC	Raleigh, OAK Inds. Inc.	919-876-7591
Ohio	Cincinnati, OAK Inds. Inc.	513-851-4411
Ore	Portland, F. Jackson Assocs.	503-292-2638
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Wash	Seattle, F. Jackson Assocs.	206-523-6300
Exp:	N.J., Teaneck, Sylvan Ginsbury Ltd.	201-837-1100

(TM)MCCULLY - crushers and other minerals processing machinery - Allis-Chalmers

MCDONNELL DOUGLAS ELECTRONICS CO., Dept. EM, P.O. Box 426, St. Charles, Mo. 63301, Tel: 314-232-0232; Empl.: 1200

MCFADDEN ELCTRNS. CO., Dept. EM, 8953 S. Atlantic Blvd., South Gate, Cal. 90281, Tel: 213-564-5958; FSC No.: 25750; Empl.: 15

Local Sales Offices & Reps.

Ala	Huntsville, Space Engrg. Sls.	205-837-6060
Ind	Indianapolis, Tri-State Tech. Sls.	317-924-3568
Mass	Salem, Forbes Engrg.	617-744-1693

MCG ELECTRONICS INC., Dept. EM, 160 Brook Ave., Deer Park, N.Y. 11729, Tel: 516-586-5125; Empl.: 25 .... p. 4153

Local Sales Offices & Reps.

Ala	Huntsville, Beacon	205-881-5031
Cal	Los Angeles, Dyna Sls.	213-268-1175
Colo	Westminster, Harvey Data Sys.	303-427-4323
Fla	Ft. Lauderdale, Beacon	305-491-4211
Fla	Maitland, Beacon	305-647-3498
Ga	Atlanta, Beacon	404-351-3654
Md	Randallstown, Beacon	301-922-1248
Minn	Minnetonka, T.H. Ayre Assoc.	612-474-4125
NC	Greensboro, Beacon	919-674-9432
SC	Spartanburg, Beacon	803-582-4613
Tenn	Oak Ridge, Beacon	615-482-2409
Tex	Richardson, Spectra Sls.	214-234-3600
Va	Falls Church, D. Snow-Beacon	703-534-1673
Wisc	Germantown, Pridmore Assoc.	414-255-2120
Exp:	Mass., Medway, Export Manager, Surel International	617-533-2041

MCGILL MFG. CO. INC., Electrical Div., Dept. EM, 909 Lafayette St., Valparaiso, Ind. 46383, Tel: 219-464-4911, TWX: 910-690-4892; Empl.: 295 p. 4156

Local Sales Offices & Reps.

Ark	Hot Springs, M. Young Assocs.	501-262-1365
Cal	Los Angeles, Allied Factory Reps.	213-666-1564
Cal	San Francisco, Maddox Sls. Co.	415-647-5560
Cal	Santa Clara, Nova-Tronix	408-243-9530
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ind	Arcadia, D. Rickards	317-253-8689
Ind	South Bend, United Export Corp.	219-232-8286
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Benton Harbor, Ken-Mor Assocs.	616-927-3134
Minn	Minneapolis, Elec. Comp. Sls.	612-933-2594
Mo	St. Louis, Larco Sls., Inc.	314-863-1242
NY	Baldwin, C. Glianna	516-378-2700
NY	North Syracuse, Advanced Comp. Corp.	315-699-2671
Ohio	Cleveland, Allied Entprs.	216-826-3350
SC	Columbia, H. Heaton	803-779-4016
Tex	Hurst, Wheelex, Inc.	817-268-1812
Utah	Salt Lake City, Sage Sls.	801-290-1234
Wash	Seattle, Strohecker, Inc.	206-623-0357

MCGOHAN INC., D., Dept. EM, 691 N. Sangamon St., Chicago, Ill 60622, Tel: 312-829-2928; Empl.: 15

Sales Manager: J. McGohan

Local Sales Offices & Reps.

Ariz	Phoenix, R. Fissell Co.	602-264-4031
Cal	Los Angeles, E.E. Strassner Co.	213-666-1511
Cal	Redwood City, Warren & Hickey Sls.	415-368-3849
Fla	St. Petersburg, J.F. Thompson Co.	813-866-0045
Ill	Chicago, R.R. Hutmacher Assocs.	312-631-3248
Ind	Mulberry, Maish Sls. Co.	317-296-2322
Kans	Kansas City, Lowell-Kangas & Assoc.	913-631-3515
Mass	Needham, Piper Assocs.	617-449-1144
Mich	Pontiac, T. Firaneck Sls. Co.	313-373-9595
Mo	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NY	Kingston, Irv. Brown Co.	212-493-1379
Ohio	Columbus, Mandabach-Lehner Co.	614-035-0265
Ohio	Stow, Mandabach & Lehner Co.	216-686-1965
Pa	Pittsburgh, Mandabach & Lehner Co.	412-279-2264
Tenn	Memphis, Electronic Sls. Co.	901-682-2281
Exp:	Chicago, Magnus Inter-America, Inc.	312-334-1502

MC GRAW-EDISON, Edison Elctrns. Div., Daven Comps., Dept. EM, Grenier Field, Manchester, N.H. 03103, Tel: 603-669-0940, TWX: 710-220-1747; FSC No.: 14140; Empl.: 700

Local Sales Offices & Reps.

Ariz	Phoenix, Chaparral	602-263-0414
Cal	Menlo Park, Straube Assoc.	415-321-9050

Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Colo	Denver, McLoud & Raymond	303-756-1589
Conn	New Canaan, S. Pierce	203-966-4630
Fla	St. Petersburg, Kirkwood & Assoc.	813-894-8240
Ill	Northfield, Such & Assocs.	312-446-8934
Ind	Indianapolis, Campisano Assocs.	317-247-8625
Iowa	Cedar Rapids, S & O Sls.	319-393-1845
Kans	Shawnee Mission, Technical Sls. Assoc.	913-888-3330
Md	Townson, Holden Engrg. Sls.	301-823-3763
Mass	Norwood, S. Pierce	617-762-3164
Minn	Minneapolis, R. J. Inc.	612-922-1425
Mo	Ferguson, Technical Sls. Assoc.	314-725-5361
NC	Burlington, P.J. Nahser	919-226-8053
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ohio	Englewood, A. Nace Co.	513-836-7548
Pa	Pittsburgh, A. Nace Co.	412-922-7225
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Seattle, Carlyle Tech. Sls.	206-622-4288
Exp:	N.Y., New York, Lothar Sanford Corp.	212-757-3881

McGRAW-EDISON COMPANY
Edison Electronics Division

MC GRAW-EDISON CO., Edison Elctrns. Div., Meas. Instrs., Dept. EM, Grenier Field, Manchester, N.H. 03103, Tel: 603-669-0940, TWX: 710-220-1747; FSC No.: 14140; Empl.: 700 .... p. 2896,4157

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assocs.	602-947-4267
Cal	Santa Clara, Fischer Assocs.	408-733-7350
Cal	Yorba Linda, D & G Assocs.	714-528-5555
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Wallingford, Adams & McGregor	203-269-5816
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	305-422-3686
Fla	St. Petersburg, Saber Assocs.	813-441-1301
Ill	Chicago, Midwest Elctrns. Ind.	312-777-9700
Ind	Fort Wayne, J & B Engrg. Sls.	219-483-2813
Ind	Indianapolis, Midwest Elctrns. Ind.	317-253-0590
Iowa	Cedar Rapids, S & O Sls.	319-393-1845
Kans	Shawnee Mission, Technical Sls. Assoc.	913-888-3330
Md	Silver Springs, Gawler-Knoop Co.	301-589-4406
Mich	Ferndale, Tiby Co.	313-547-3550
Minn	Wayzata, J. Little Assocs.	612-473-1107
Mo	St. Louis, Technical Sls. Assoc.	314-725-5361
NH	Portsmouth, Adams & McGregor	603-436-2732
NJ	Mountain Lakes, Manson Elctrns.	201-334-6183
NM	Albuquerque, Williams Assocs.	505-255-1638
NC	Burlington, P. J. Nahser Co.	919-266-8053
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822
RI	Lincoln, Adams & McGregor	401-726-1300
Tex	Dallas, Diversity Communications	214-352-2069
Wisc	Waukesha, Midwest Elctrns. Ind.	414-542-5129
Exp:	N.Y., New York, Lothar Sanford Corp.	212-757-3881

MCGRAW HILL BOOK CO., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020

MCGUIRK ELECTRONICS CO. INC., Dept. EM, Bldg. 4, Shetland Ind'l. Pk., Andover, Mass. 01810, Tel: 617-933-3500; Empl.: 10

™MCI-II - pc board assembly director - Hollis Engrg., Inc.

™M.C. JONES - microwave devices - Bendix

MCKAY DYMEK CO., Dept. EM, 675 N. Park Ave., Box 2100, Pomona, Cal. 91766, Tel: 714-623-1236; Empl.: 15

MCKEE-PEDERSEN INSTRS., Dept. EM, P.O. Box 322, Danville, Cal. 94526, Tel: 415-937-3630; Empl.: 8

Sales Manager: R.G. McKee

MCKINSTRY METAL WORKS, INC., Dept. EM, 285 McKinstry Ave., Chicopee, Mass. 01013

MCL, INC., Dept. EM, 10 North Beach Ave., LaGrange, Ill. 60525, Tel: 312-354-4350, TWX: 910-683-1899; FSC No.: 16469; Empl.: 80 .... p. 2988-2993

Sales Manager: T.P. Rys

Local Sales Offices & Reps.

Cal	Cupertino, Allis Assocs.	408-252-2883
Cal	Orange, Pacific Microwave, Inc.	714-633-7991
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Md	Baltimore, Stemler Assocs.	301-944-8262
Mass	Reading, Geder Assocs.	617-944-3105
NJ	Cherry Hill, Stemler Assocs.	609-966-4070
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	North Syracuse, Naco Elctrns	315-699-2651
NY	Plainview, Eastern Metro Assocs.	516-931-1414
Ohio	Lancaster, Cain & Co	614-654-4800
Pa	Blue Bell, Stemler Assocs.	215-644-3477
Tex	Dallas, Texas Avionics Co.	214-363-6324
Va	Alexandria, Stemler Assocs.	703-548-7818
Exp:	Canada, Mississauga, Ont., David R. Beattie, Ltd.	416-822-4414

mclean

MCLEAN ENGRG. LABS., Dept. EM, 70 Washington Rd., Princeton Jctn., N.J. 08550, Tel: 609-799-0100, Telex: 84-3422; Empl.: 74 .... p. 2700-2703

Local Sales Offices & Reps.

Ala	Huntsville, W. Brown	205-883-8660
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Cupertino, T. Snitzer	408-257-8333
Cal	Del Mar, T. Snitzer	714-454-2191
Cal	L.A., T. Snitzer	213-836-6170
Colo	Denver, PLS Assoc.	303-773-1218
Conn	Bridgeport, Technical Instrs.	203-FO 8-4582
Fla	Ft. Lauderdale, W. Brown	305-776-4800
Fla	Indialantic Beach, W. A. Brown Instrs.	305-723-0766
Fla	Orlando, W. Brown	305-425-5505
Fla	Valparaiso, W. A. Brown Instrs.	904-678-7932
Ga	Atlanta, W. Brown	404-939-1674
Ill	Elmhurst, Scott Assocs.	312-279-5681
La	Mandeville, W.A. Brown Inst. Co.	504-626-9701
Mass	Wilmington, Tech. Instrs.	617-944-3930
Mich	St. Clair Shores, J. Thorpe	313-779-6363
Minn	Minneapolis, Scott Elctrn. Sls.	612-929-2985
Mo	Kansas City, Harris-Hanson	816-HI4-9494
Mo	St. Louis, Harris-Hanson	314-432-3611
NJ	Ft. Lee, K.E. Hughes Co.	201-944-1600
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Albany, J. Reagan	518-489-4777
NY	Endwell, Reagan/Compar Albany	607-723-8743
NY	Fairport, Reagan/Compar Albany	716-473-2115
NY	New Hartford, J. Reagan	315-732-3775
NC	Durham, W. A. Brown Instrs.	919-682-2383
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Ohio	Dayton, Marlow Assocs.	513-866-4991
Pa	Huntingdon Valley, Inacker Sls.	215-947-5660
Pa	Pittsburgh, Marlow Assocs.	412-831-6113
SC	Columbia, W. A. Brown Instrs.	803-798-3297
Tenn	Oak Ridge, W. A. Brown Instrs.	615-482-5761
Tex	Dallas, J.A. Green Co.	214-631-7450
Tex	Houston, J.A. Green Co.	713-526-2959
Va	Alexandria, Dyna Rep. Co.	703-354-1222

™M.C.M. - low inertia moving coil motors - Electro-Craft Corp.

™MC (MC5000) - digital high speed printers - Datalog Div., Litton Sys.

™MCMOS - complementary MOS logic IC's - Motorola Semiconductor Prods.

™MCRT - torque meters & rotary transformers - Himmelstein & Co., S.

™MCS - micro computer systems - Intel Corp.

™MCSIM - Microcontroller simulator - Scientific Micro Sys.

MDB SYSTEMS INC., Dept. EM, 1995 N. Batavia St., Orange, Cal. 92665, Tel: 714-998-6900, TWX: 910-593-1339; Empl.: 50

™MDTL - diode-transistor logic IC's - Motorola Semiconductor Prods.

™MD-1 - micro designer - E & L Instruments, Inc.

™MD12 - micro computer - Fabri-Tek, Inc.

™MEASURE-MATIC - positive displacement pumps - Airmatic/Beckett-Harcum

MEASUREMENT SYS., INC., Dept. EM, 523 West Ave., Norwalk, Conn. 06850, Tel: 203-838-5561, TWX: 710-468-2185; Empl.: 20 .... p. 2397

Sales Manager: F.J. Stevens

Local Sales Offices & Reps.

Iowa	Cedar Rapids, S & O Sls. Inc.	319-393-1845
Mass	Hudson, Data Rep.	617-481-0333
Pa	Melrose Park, R. Meyers Assocs.	215-224-1663

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MECHANICAL ENGRAVING CO., INC., Dept. EM, 4500 Bullard Ave, Bronx, New York 10470, Tel: 212-324-4455; FSC No.: 99040; Empl.: 35

MECHANICAL ENTERPRISES, Dept. EM, 8000 Forbes Pl., Springfield, VA 22151, Tel: 703-321-8282, TWX: 710-832-0942; Empl.: 20 .... p. 4158

Sales Manager: R.H. Twyford

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Reps	205-881-5031
Cal	Buena Park, Sls. Engrs. Ltd.	213-921-0681
Cal	San Diego, Sls. Engrs. Ltd.	714-277-5723
Conn	Harwinton, Barc Elctrn. Sls.	203-482-8633
Fla	Ft. Lauderdale, Beacon Reps.	305-491-4211
Fla	Maitland, Beacon Reps.	305-647-3498
Ga	Atlanta, Beacon Reps	404-351-3654
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Fort Wayne, Coombs Assocs.	317-251-2757
Kans	Overland, Kebco	913-649-1051
Md	Glen Arm, Hodgins Assocs.	301-592-7047
Mich	Jackson, Norwood Scroggs	517-750-1170
Minn	Minneapolis, C.E. Bohlig Co.	612-922-7011
Mo	St. Louis, Kebco	314-434-6242
NY	Mt. Vernon, Sonkin Assocs.	914-668-9809
NY	Rochester, L. Hart	716-244-3253
NC	Charlotte, Beacon Reps.	704-525-7412
Pa	Wayne, Hoogins Assoc.	215-688-9056
Tenn	Oak Ridge, Beacon Reps.	615-482-2409
Wisc	Greendale, Coombs Assoc.	414-421-2300

MECHANICAL PROD., See Aiken Inds., Inc., Mechanical Prod. Div.

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MEDIA RECOVERY INC., Dept. EM, Box 867, Graham, Tex. 76046, Tel: 817-549-5462; Empl.: 30

Sales Manager: R.C. Foley

Local Sales Offices & Reps.

Cal	Santa Monica, Media Recovery of Cal	213-828-5528
Conn	Tolland, Media Recovery of N.J.	203-871-1611
Tex	Dallas, Media Recovery of Tex.	214-350-0425
Tex	Houston, Media Recovery of Tex	713-681-5464

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™MEDWIRE - medical wire products - Cohn, Sigmund

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™MEGAMEMORY - large scale memory system - Electronic Memories & Magnetics Corp.

™MEGASON - ultrasonic cleaners, vapor degreasers - Ultrasonic Instrs. Int'l., Inc.

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MEGATEK CORP., Dept. EM, 1055 Shafter St., San Diego, Cal. 92106, Tel: 714-224-2721, TWX: 910-335-2056; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith & Co.	205-881-3294
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Fla	Orlando, J. L. Highsmith & Co.	305-293-5202
Haw	Honolulu, Aloha Assocs.	808-941-1574

Ill	Schaumburg, Systems Mktg. Consolidated, Ltd.	312-593-6220
Md	Beltsville, RDA, Inc.	301-937-2215
Mass	Lowell, S & S Elctrns.	617-459-2578
Mich	Southfield, Datatron	313-354-6421
Minn	Chanhassen, Professional Mktg. Svcs.	612-474-5939
Mo	Grandview, Digital Sys. Sls.	816-765-3337
NY	Plainview, TRAC Assocs.	516-938-7664
NY	Saratoga Springs, S & S Elctrns.	518-587-2313
NC	Charlotte, J. L. Highsmith & Co.	704-333-7743
Pa	King Of Prussia, Rivco, Inc.	215-265-5211
Tex	Dallas, Remtek, Inc.	214-387-2855

(TM)MEGATROMETER - high megohm meter - Penn Airborne Prods.

(TM)MEGAVOICE - power megaphone - PASO Sound Products Inc.

MEGAVOLT, CORP., Dept. EM, 150 W. Edsall Blvd., Palisades Pk., N.J. 07650, Tel: 201-944-6410; Empl.: 12 .... p. 3283

Sales Manager: H. Tekel

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MEGURO ELECTRONIC INSTR. CO., Dept. EM, 5-1 2-Chome Chu-Cho Meguro-ku, Tokyo, Japan, Tel: Tokyo 715-1211, TWX: 2468208 MEGURO J; Empl.: 250

Sales Manager: T. Date

MEISEI CORP., Dept. EM, 2226 Stoner Ave., Los Angeles, Cal. 90064, Tel: 213-478-2123

MEKO INSTRUMENT CO., Dept. EM, 1311 Air Way, Glendale, Cal. 91201, Tel: 213-240-4664; Empl.: 10

Local Sales Offices & Reps.

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Cal	San Diego, Golden West Elctrns.	714-292-4891
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Colo	Englewood, Marshall Sls.	303-770-6224
Conn	Marion, Sands Co.	203-628-4363
Fla	Orlando, Geartner Assocs	813-393-2974
Fla	Orlando, Geartner Assocs	305-299-1000
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Chicago, C. L. Greenslade Sls.	312-561-0156
Ill	Chicago, Electro Tech Mktg.	312-588-4535
Md	New Carrollton, W. A. Brown	703-836-1800
Minn	White Bear Lake, Sims and Assocs.	612-224-4079
NJ	Fort Lee, B. Cameron Assocs.	201-461-2595
Ohio	Brunswick, Kincomics Sls. Inc.	216-225-6111
Ohio	Dayton, Kimcomics Sls. Inc.	513-898-1783
Okla	Tulsa, Allied Comps. Inc.	918-492-7771
Tex	Dallas, Allied Comps., Inc.	214-238-0408
Tex	Houston, Allied Comps. Inc.	713-960-1962
Va	Alexandria, W. A. Brown	703-836-1800
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WVa	Charleston, W. A. Brown	304-342-2700

Local Distributors

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(TM)MEKTRON - Printed circuitry - Rogers Corp.

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(TM)MELCOR - thermoelectric cooling module - Melcor/Materials Elctrn. Prods.

MELCOR

MELCOR/MATERIALS ELCTRN. PRODS., Dept. EM, 990 Spruce St., Trenton, N.J. 08648, Tel: 609-393-4178, Telex: 84-3314; FSC No.: 32333; Empl.: 44 .... p. 2699

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Ill	Skokie, Spartan Engrg. Co.	312-674-2950

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Conn	Danbury, Melles Griot	203-792-2002

MELOY LABORATORIES INC., Instrus. & Sys. Div., Dept. EM, 6715 Electronic Dr., Springfield, Va. 22151, Tel: 703-354-2600, Telex: 89-9440; Empl.: 475

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Mass	Hingham, Meloy Labs Inc.	617-749-4842
Ore	Portland, Pacific Scientific Co.	503-256-1770
Pa	Pittsburgh, Scientific Pittsburgh	412-655-2800
Wash	Seattle, Pacific Scientific Co.	206-762-4260
Exp:	N.Y., New York, Landseas Corp. (Tel-Aviv)	212-265-8323

MELPAR, Div. LTV Electrosystems, Dept. EM, 7700 Arlington Blvd., Falls Church, Va 22046

MELTRONICS INC., Dept. EM, Route #3 Box 225, Leeds, Ala. 35094, Tel: 205-699-2186; Empl.: 20

MEMCOR DIV. E-SYSTEMS, See E-Systems, Memcor Div.

MEMODYNE CORP., Dept. EM, 369 Elliot St., Newton Upper Falls, Mass 02164, Tel: 617-527-6600, Telex: 92-2537; Empl.: 25

Sales Manager: N.H. Renaud

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Conn	Hamden, JBL Assocs	203-281-3161
Fla	Orlando, Currie, Peak & Frazier	305-855-0843
Haw	Honolulu, Hawaii Data Sys.	808-946-1533
Ill	Elmhurst, Scott Assocs.	312-279-5681
Md	Fulton, Gans-Fryling	301-792-4818
Mass	Holbrook, McLellan Assocs	617-767-4771
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NY	North Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
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Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
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Pa	Ambler, Data Engrg	215-542-9876
Pa	Pittsburgh, Electro Sls. Assoc.	412-371-9449
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Tex	Houston, Data Mktg	713-780-2511
Tex	San Antonio, Data Mktg Assoc	512-828-0937
Va	Arlington, Gans-Fryling	703-527-3262
Wash	Seattle, Datacom Assocs.	206-285-2525

(TM)MEMOFLEX - memory planes, plated wire - Flexible Circuits, Inc.

(TM)MEM-O-REE - inventory management systems - Mylee Digital Sciences

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Ark	Little Rock	501-374-0279
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MEPCO/ELECTRA INC., Dept. EM, 11468 Sorrento Valley Rd., San Diego, Cal. 92121, Tel: 714-453-0332, Telex: 69-5093; FSC No.: 1H847; Empl.: 200

Local Sales Offices & Reps.

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Cal	North Hollywood, North American Philips	213-762-2118
Cal	San Diego, North American Philips	714-453-9250
Cal	Santa Clara, North American Philips	408-249-1134
Colo	Denver, North American Philips	303-922-8434
Fla	Fort Lauderdale, North American Philips	305-772-2840
Fla	Fort Lauderdale, CBC Elctrns	305-484-7330
Fla	Orlando, CBC Elctrns	305-644-2277
Ga	Avondale Estates, Candor Co.	404-296-1666
Ill	Elk Grove Village, North American Philips	312-593-8220
Ind	Fort Wayne, McDonald Sls.	219-747-3650
Ind	Fort Wayne, A. Corrao, North American Philips	219-432-8567

Ind	Indianapolis, McDonald Sls.	317-357-2626
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
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NY	Hicksville, North American Philips	516-931-6200
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Cal	North Hollywood, Mepco/Electra, Inc.	213-762-2118
Cal	San Diego, The Rep Co.	714-292-9001
Cal	Santa Clara, Mepco/Electra, Inc.	408-988-2870
Colo	Lakewood, Mepco/Electra, Inc.	303-922-8177
Fla	Fort Lauderdale, Mepco/Electra, Inc.	305-491-0196
Fla	Ft. Lauderdale, CBC Elctrns.	305-484-7330
Fla	Longwood, CBC Elctrn.	305-484-7330
Ill	Elk Grove Village, Mepco/Electra, Inc.	312-593-8220
Ind	Ft. Wayne, Mepco/Electra, Inc.	219-432-8567
Ind	Ft. Wayne, Insul-Reps	219-482-1596
Iowa	Cedar Rapids, B C Electrn. Sls.	319-364-7253
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Kans	Olathe, B C Electrn. Sls.	913-888-6680
Md	Bladensburg, Delta III Assocs.	301-779-0977
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Mass	Wellesley Hills, Spectrum Assoc.	617-237-2796
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NC	Raleigh, Candor Co.	919-876-4999
Ohio	Dayton, Mepco/Electra, Inc.	513-278-5843
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Tenn	Chattanooga, Candor Co.	615-894-9686
Tex	Dallas, Mepco/Electra, Inc.	214-231-8274
Tex	Houston, Jackson Arnold	713-783-7297
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Va	Richmond, Candor Co.	814-320-7375
Wash	Bellevue, Mepco/Electra, Inc.	206-746-3600
Wisc	Wauwatosa, Larsen Assocs.	414-258-0529

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Minn	Minnetonka, T. H. Ayres Assoc. Inc.	612-474-4125
Mo	St. Louis, Delltron Co.	314-434-3804
NY	New York, Eastern Elctrn. Sls.	212-763-5180
NY	Penfield, A & D Devices	716-586-8033
Ohio	Bay Village, Speed Controls	216-835-2952
Pa	Sharon, Products Associated	412-981-5407
Tex	Dallas, Dwayne Clement & Assoc.	214-239-4197
Wash	Bellevue, Pacific Consultants	206-454-2503

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Cal	Canoga Park, P. Reisman	213-881-2969
Conn	Sherman, Lectro Assoc.	203-355-0575
Mass	Marlboro, OK Engineering	617-481-6400
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MERCURY ELECTRONICS CORP., Dept. EM, 339 E Cottage Place, York, Pa. 17403, Tel: 717-854-9557; Empl.: 35

Local Sales Offices & Reps.

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Pa	West Chester, S. E. Balint	

MERET INC., Dept. EM, 1815 24th St., Santa Monica, Cal. 90404, Tel: 213-828-7496, Telex: 65-2468; Empl.: 12

Local Sales Offices & Reps.

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Md	Silver Spring, Spectro Sys. Corp.	301-949-8261
Mass	Burlington, Tritek, Inc.	617-272-4550
NY	Greenvale, B. Aaron & Co.	516-621-0630
Pa	Wyndmoor, Spectro Sys. Corp.	215-836-1545
Exp:	N.Y., New York, Extron Enterprises	PL2-4278

MERIAM INC., Dept. EM, Box 2134, Hammond, Ind. 46323, Tel: 219-980-3566, Telex: 72-5449; Empl.: 4

MERIDIAN LAB. INC., Dept. EM, 2415 Evergreen Rd., Box 285, Middleton, Wisc. 53562, Tel: 608-836-7571; Empl.: 8

Local Sales Offices & Reps.

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Md	Lutherville, Phil Knox & Co.	301-252-1288
Minn	St. Paul, Morlock & Assoc.	612-645-2303
NJ	Fair Lawn, Phil Ross (Par Assoc.)	201-447-3722
Ohio	Painesville, Purchasing Inc.	216-357-5182
Tex	Bellaire, Optics & Electronics	713-666-8622

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Sales Manager: D.S. Brodow

Local Sales Offices & Reps.

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Ariz	Scottsdale, Territorial Mktg.	602-994-8665
Cal	Mountain View, Weil & Disman	415-965-4300
Cal	Westlake Village, MCA Repco	213-889-5553
Colo	Boulder, Herb Bass Assoc.	303-499-7509
Conn	Stamford, Dage Corp.	203-324-3123
Fla	Fort Lauderdale, Beacon Elctrn. Assocs.	305-971-7320
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assocs.	404-351-3654
Ill	Chicago, Technical Sls.	312-237-7210
Ind	Indianapolis, Ihrig Assocs.	317-783-7630
Md	Lanham, Brimberg Sls.	301-552-2200
Mass	Lexington, Lancer Assocs.	617-861-1720
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Mo	Independence, Dy-Tronix	816-737-1100
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NY	Syracuse, T^2 Elctrns.	315-463-8592
NY	Tuckahoe, Spectrum Sls.	914-793-1660
NC	Charlotte, Beacon Elctrn. Assocs.	704-525-7412
Ohio	Cleveland, Bererich Assocs.	216-289-5094
Ohio	Dayton, Berberich Assocs.	513-433-0342
Pa	Philadelphia, Eastern Instrumentation of Phila.	215-927-7777
Tenn	Oak Ridge, Beacon Elctrn. Assocs.	615-482-2409
Tex	Richardson, Carl Tinch Sls. Co.	214-231-1322
Wash	Seattle, Jon B. Jolly	206-938-4166

MERRIMACK MAGNETICS, Dept. EM, 361 Aiken St., Lowell, Mass. 01850, Tel: 617-458-1487; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles, Reed Elec. Mktg.	213-558-6676
Cal	San Francisco, F. Miller	408-984-1700
Colo	Denver, Omega Ltd.	303-758-1508
Conn	No. Haven, Comp. Rep.	203-239-9762
Mich	Grand Rapids, R.P. Urban Assoc.	616-245-0511
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Sales Manager: J. Severinsen

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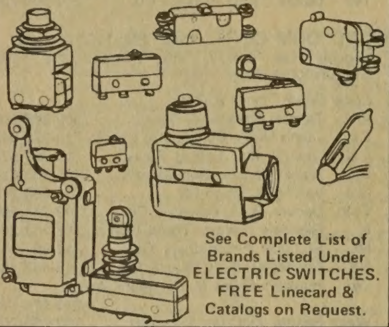
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MICROSONICS, Div. Sangamo Elec. Co., Dept. EM, 60 Winter St., Weymouth, Mass. 02188, Tel: 617-337-4200, TWX: 710-388-6833; Empl.: 140 p. 2449

Local Sales Offices & Reps.

Cal	Los Altos, Tauber-Dreyer Assoc.	415-948-2635
Cal	Los Angeles, Tauber-Dreyer	213-368-4011
Cal	San Diego, Tauber Assocs.	714-274-7242
Fla	Orlando, Technology Mktg. Assoc.	305-857-3760
Fla	Pompano Bch., Technology Mktg. Assoc.	305-942-0774
Ind	Ft. Wayne, G & D Electrn. Sls., Inc.	219-432-5585
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Needham, Reptron	617-449-4141
NJ	Cherry Hill, Danco	609-424-5590
NY	Rochester, Ontec	716-464-8636
NC	Winston-Salem, Burgin-Kreh Assoc.	919-768-4174
Ohio	Cleveland, Whelan Corp.	216-692-1266
Ohio	Dayton, Whelan Corp.	513-434-7551
Pa	Fairview Vill., Danco	215-627-2218
Tex	Richardson, Lear Assocs.	214-231-5388
Va	Lynchburg, Burgin-Kreh	703-845-5600

™MICROSOURCE - power supply - Elasco

™MICROSPEC - infrared spectrophotometer - Beckman Instrs., (AISSD)

™MICRO-STAC - subminiature rectifier - Semtech Corp.

™MICROSTAR - laboratory microscope - American Optical Corp.

™MICRO-SYNCLAMPS - sub-min. servo clamps - Timber-Top, Inc.

™MICRO-T - miniature package (transistors) - Motorola Semiconductor Prods.

MICROTECH, Dept. EM, 1420 Conchester Hwy, Boothwyn, Pa. 19061, Tel: 215-459-3566

Sales Manager: H. Carter

™MICROTEL - microwave radio - GTE Lenkurt Inc.

™MICROTEMP MULTIPROTECTOR - senses heat-current - Micro Devices Corp.

™MICROTOOL - small hand tools - Circon Corp.

™MICRO-TOPOGRAPHER - three-dimensional surface analyzer - Gould, Inc.

MICROTRAN CO., INC., Dept. EM, 145 E. Mineola Ave., Valley Stream, N.Y. 11582, Tel: 516-561-6050, TWX: 510-225-8412; FSC No.: 00348; Empl.: 100 p. 4424-4427

Sales Manager: W. Benscher

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Corp.	205-547-7718
Ariz	Scottsdale, F. Schoeffler	602-959-3011
Cal	El Monte, Cook Entprs.	213-686-2120
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Colo	Denver, Gossard & Assocs.	303-985-0602
Fla	Tampa, Nickerson Corp.	813-885-1416
Ill	Highland Park, Bransky Sls. Co.	312-433-2375
Kans	Overland Pk., J.F. Guernsey Co.	913-381-2225
La	New Orleans, Coastal Sls. Co.	504-737-8074
Md	Baltimore, Callas Elctrns., Inc.	301-744-7711
Mass	Wakefield, Meco	617-245-4870
NJ	Englewood Cliffs, E. Glass Assocs.	212-586-8440
NY	Rochester, J.G. Welch Assocs., Inc.	716-244-1100
NC	Kannapolis, Nickerson Corp.	704-932-6772
Ohio	Cincinnati, J.O. Olsen Co.	513-922-2176
Ohio	Cleveland, J.O. Olsen	216-752-5444
Pa	Jenkintown, Arnold Assocs.	215-887-7870
Pa	Pittsburgh, J.O. Olsen Co.	412-279-2550
Tenn	Memphis, Al Engleman Co.	901-458-6263
Tex	Grand Prairie, Howell Sls., Inc.	214-AN2-5153
Wash	Seattle, Don Newman Co.	206-365-1190
Exp:	N.Y., Valley Stream, Microtran Co.	516-561-6050

Local Distributors

Ala	Birmingham, MG Elctrns. & Equip.	205-328-4525
Ala	Huntsville, Hall-Mark Elctrns.	205-539-0691
Ariz	Phoenix, Moltronics, Inc.	602-272-7951
Cal	San Diego, Moltronics, Inc.	714-278-5020
Cal	Santa Clara, Moltronics, Inc.	408-244-7600
Cal	South Gate, Moltronics, Inc.	213-773-6521
Colo	Denver, Electronic Parts Co.	303-744-1992
Conn	Hamden, Arrow Elctrns.	203-248-3801
Fla	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Ill	Rosemont, Advent Elctrns.	312-297-6200
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Lenexa, Hall-Mark Elctrns.	913-888-4747
Kans	Wichita, Radio Supply Co.	316-267-5216
Md	Columbia, Technico	301-461-2200
Md	Savage, Pyttronic Inds., Inc.	301-792-0780
Mass	Boston, Sager Electrical Supply	617-542-2281
Mass	Waltham, QPL Elctrn. Distr., Inc.	617-891-0460
Mich	Oak Park, Newark-Detroit	313-548-0250
Mo	Earth City, Hall-Mark Elctrns.	314-291-5350
NJ	Moorestown, Arrow/Elctrns.	609-235-1900
NJ	Saddle Brook, Arrow Elctrns.	201-797-5800
NJ	Springfield, Federated	201-376-8900
NM	Albuquerque, Electronics Parts Co.	505-293-6161
NY	Binghamton, Federal Elctrns.	607-748-8211
NY	Buffalo, Summit Distrs., Inc.	716-884-3450
NY	Farmingdale, Harrison Elctrns.	516-293-7979
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Summit Distributors, Inc.	716-334-8110
NC	Raleigh, Southeastern Radio Supply	919-828-2311
Ohio	Cincinnati, Newark Elctrns.	513-874-5115
Ohio	Cleveland, Pattison Supply Co.	216-441-3000
Ohio	Dayton, J.A. Becker Co.	513-226-1341
Okla	Tulsa, Hall-Mark Elctrns.	918-835-8458
Pa	Harrisburg, Pyttronic Inds.	717-233-6591
Pa	Huntingdon Valley, Shap Electrns.	215-698-9550
Pa	McKeesport, Barno Radio Co.	412-751-5971
Tenn	Nashville, Electra Distributors	615-255-8444
Tex	Dallas, Hall-Mark Elctrns.	214-AD1-6111
Tex	Houston, Lenert Co.	713-225-1465
Utah	Salt Lake City, Newark Elctrns.	801-486-1048
Wash	Seattle, Sterling Elctrns.	206-762-9100
Wisc	New Berlin, Arrow/Milwaukee	414-782-2801

™MICROTRANSMITTER - monolithic radio transmitter (1C) - Lithic Systems, Inc.

™MICROTRON - cooking tubes - Litton Inds.

™MICRO-VECTORBORD - Small Hole Perforated Insulating Board - Vector Electronic Co., Inc.

™MICRO VIDEO METROLOGY - television microscopic measuring sys. - Circon Corp.

™MICROVOX - magnetic tape - Micro Communications Corp.

™MICROVOX WAFER - miniature tape transports - Micro Communications Corp.

MICROWAVE ASSOCS., Dept. EM, Northwest Industrial Pk., Burlington, Mass. 01803, Tel: 617-272-3000, TWX: 710-332-6789

Local Sales Offices & Reps.

Ala	Huntsville, Tech. Mktg. Assocs.	205-883-7893
Ariz	Scottsdale, Microwave Assocs.	602-947-5431
Cal	Long Beach, Microwave Assocs.	213-426-9531
Cal	Sunnyvale, Microwave Assocs.	408-733-0330
Fla	Ormond Beach, Tech. Mktg. Assocs.	904-672-2314
Fla	Pompano Beach, Tech. Mktg. Assocs.	305-942-0774
Ill	Franklin Park, Dekotech, Inc.	312-455-5100
Ind	Fort Wayne, Delesa Sls.	219-483-9537
Ind	Indianapolis, Delesa Sls.	317-894-3778
Iowa	Cedar Rapids, Seltec Sls. Corp.	319-393-1114
Kans	Andover, Palatine Sls.	316-683-7512
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Burlington, Burlington Sls., Inc.	617-272-7655
Mich	Farmington, Sheridan Assocs.	313-477-3800

Mich	Grand Rapids, Sheridan Assocs.	616-942-2504
Mo	St. Louis, Palatine Sls.	314-426-7055
NY	Pittsford, T2 Elctrns Co.	716-381-2551
NY	Plainview, ERA, Inc.	516-822-9890
NY	Syracuse, T2 Elctrns.	315-463-8592
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Beachwood, Sheridan Assocs.	216-831-0130
Ohio	Cincinnati, Sheridan Assocs.	513-761-5432
Ohio	Dayton, Sheridan Assocs.	513-277-8911
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Pa	Fort Washington, G.C.M., Inc.	215-646-7535
Pa	Pittsburgh, Sheridan Assocs.	412-244-1640
Tex	Richardson, Microwave Assocs.	214-234-2463
Va	Lynchburg, Burgin-Kreh Assocs.	804-845-5600
Wash	Seattle, C.K. Shanks & Assocs.	206-632-4290

MICROWAVE DEVELOPMENT LABS., INC., Dept. EM, 87 Cresent Rd., Needham Hgts., Mass. 02194, Tel: 617-449-0700, TWX: 710-325-1739; Empl.: 180

Sales Manager: R. Tucker

Local Sales Offices & Reps.

Cal	Orange, J. E. Hachten Co.	714-998-6020
Cal	Palo Alto, J. E. Hachten Co.	415-326-1252
Fla	Orlando, Hi Co Assocs., Inc.	305-273-0571
Md	Lanham, Brimberg Assoc.	301-552-2200
Mass	Wayland, Wayland Engrg. Sls.	617-655-6080
NY	DeWitt, D.B. Assocs., Inc.	315-446-0220
NY	Great Neck, Trionic Assocs., Inc.	516-466-2300
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Texas Microwave	214-231-5381
Wash	Seattle, Jon B. Jolly	206-938-4166
Exp:	Conn., Stamford, Dage Corp.	203-324-3123

MICROWAVE DIODE CORP., Dept. EM, 13 Pleasant St. Box 47, Colebrook, N.H. 03576, Tel: 603-237-4822, TWX: 710-366-7575; Empl.: 15

Local Sales Offices & Reps.

Cal	Santa Ana, Rical Assocs.	714-557-6543
Md	Towson, L. H. Kolman & Co.	301-752-8756
Mass	Sharon, Cummings Assoc.	617-828-8370

MICROWAVE FILTER CO., Dept. EM, 6743 Kinne St., East Syracuse, N.Y. 13057, Tel: 315-437-4529, TWX: 710-541-0493; Empl.: 40; Minimum order: $D. Hughes

Sales Manager: E. Bostick, V.P. Mktg.; *Distributor Manager:* D. Hughes

MICROWAVE POWER DEVICES, Dept. EM, Adams Ct., Plainview, N.Y. 11803, Tel: 516-433-1400, TWX: 510-221-1862; Empl.: 53

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	Inglewood, L & M Engrg. S.	213-674-6850
Cal	San Jose, L & M Engrg.	408-292-3220
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Fla	Orlando, Gentry Assocs.	305-894-4401
Fla	St. Petersburg, Gentry Assocs.	813-867-7820
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Kans	Prairie Village, Engrg. Servs. Co.	913-649-4000
Md	Silver Springs, Eastern Instrumentation Corp.	301-622-4200
Mass	Burlington, Tritek, Inc.	617-272-4550
Mo	St. Louis, Engrg. Serv. Co.	314-997-1515
NJ	Englewood, Scientific Devices - East	201-871-3916
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	N. Syracuse, Naco Elctrns. Corp.	315-699-2651
NY	Rochester, Naco Elctrns. Corp.	716-244-4720
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Lancaster, Cain & Co.	614-654-4800
Pa	Philadelphia, Eastern Instrumentation of Philadelphia	215-927-7777
Tex	Houston, R.A. Mayes Co.	713-461-5385
Tex	Richardson, R.A. Mayes Co.	214-235-3043
Utah	Centerville, R.A. Mayes Co.	801-292-6781
Exp:	Fla., Hallandale, Emec Inc.	305-925-6366

MICROWAVE SEMICONDUCTOR CORP., Dept. EM, 100 School House Rd., Somerset, N.J. 08873, Tel: 201-469-3311, TWX: 83-3473 710-480-4730; Empl.: 350

Sales Manager: A. Cox

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
Ariz	Scottsdale, Territorial Mktg.	602-994-8665
Cal	Los Altos, Cain, White & co.	415-948-6533
Cal	Van Nuys, C.W. Swift Assocs.	213-989-1133
Colo	Boulder, H. Bass Assocs.	303-499-7509
Fla	Ft. Lauderdale, Beacon Elctrns. Assoc.	305-491-4211
Ga	Atlanta, Beacon Elctrns. Assoc.	404-351-3654
Ill	Northfield, Feller Assocs.	312-446-8065
Md	Columbia, Neal Deaul Assocs.	301-997-4353
Mass	Lowell, Russell Engrg. Svcs. Ltd.	617-458-7146
NJ	Westfield, Gray & Reed Assocs.	201-233-6116
NM	Albuquerque, J. Smith & Assocs.	505-255-2111
NY	Huntington Station, Gray & Reed Assocs.	516-433-3333
NY	Syracuse, T Square Elctrns.	315-463-8592
Ohio	Centerville, Micro-Sls	513-433-8171
Pa	Elkins Park, Snow Assocs.	215-379-4700
Tex	Richardson, Vector Sls. Co.	214-234-4291

MICROWAVE TECHNOLOGY, Div. Greenray Inds., Dept. EM, 840 W. Chirch Rd., Mechanicsburg, PA. 17055, Tel: 717-766-0223, TWX: 510-650-4939; FSC No.: 16681; Empl.: 12

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	San Jose, MCH Assocs.	408-246-7330
Colo	Boulder, H. Bass Assocs.	303-499-7509
Md	Annapolis, Hayden Assocs.	301-656-2214
Mass	Wakefield, Nerem	617-245-4426
NM	Albuquerque, Trembly Assocs.	505-293-4444
Tex	Richardson, CTS Co.	214-231-1322

MICROWAVE PRODS., INC., Dept. EM, 9533 Irondale Ave., Chatsworth, Cal. 91311, Tel: 213-882-3434; Empl.: 70

MICROWAVE/SYS., INC., Dept. EM, 1 Adler Dr., E. Syracuse, N.Y. 13057, Tel: 315-437-9951; Empl.: 50

Local Sales Offices & Reps.

Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	Portola Valley, Kipp Assocs.	415-851-0123
Colo	Boulder, H. Bass Assocs.	303-499-7509
Fla	Orlando, E.G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E.G. Holmes & Assocs.	404-451-6161
Ill	Chicago, Pivan Eng.	312-539-4838
Kans	Shawnee Mission, Pivan Eng.	913-722-1030
Mass	Waltham, Meas. Conslts. Corp.	617-890-4400
Mich	Detroit, S. Sterling Co.	313-255-1970
Mo	St. Louis, Pivan Eng.	314-567-3636
NJ	Closter, Central Assocs.	201-568-0808
NY	Bethpage, Central Assocs.	516-433-0808
NY	Syracuse, Ossmann Instrs.	315-437-6666
Ohio	Cleveland, S. Sterling Co.	216-442-8080
Ohio	Dayton, S. Sterling Co.	513-298-7573
Tex	Richardson, Lear Assocs.	214-231-5388
Wash	Bellevue, Scientific Devices N.W.	206-454-0900

™MICRO-WELL - ink rollers - Mohawk OEM Sales

™MICROZONE - electrophoreses apparatus - Beckman Instrs., (AISSD)

MIDCOM INC., Dept. EM, 1650 Tower Blvd., N. Mankato, Minn. 56001, Tel: 507-625-6521, TWX: 910-565-2244; Empl.: 50

Sales Manager: C.R. Wight

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assoc.	205-881-5031
Cal	Mountain View, West/Mark Assocs.	415-969-1700
Conn	Middleton, Bell Controls	203-346-0670
Fla	Ft. Lauderdale, Beacon Elctrn. Assoc.	305-491-4211
Fla	Maitland, Beacon Elctrn. Assoc.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assc.	404-351-3654
Ill	Downers Grove, Richmar Elctrn. Sls.	312-968-0118
Ind	Carmel, Richmar Elctrns. Sls.	317-846-6383
Md	Randallstown, Beacon North, Inc.	301-922-1248
NH	Nashua, Bell Controls	603-882-6984
NC	Charlotte, Beacon Elctrn. Assoc.	704-525-7412
Tenn	Oak Ridge, Beacon Elctrn. Assoc.	615-482-2409
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Va	Falls Church, Beacon North, Inc.	703-534-7200
Va	Lynchburg, Beacon North, Inc.	804-237-4740
Wash	Bellevue, Olson, Ferree & Assoc.	206-454-1210
Wisc	Bulter, Richmar Elctrn. Sls.	414-781-1730

MID GARD ELECTRONICS, Dept. EM, 26 Walnut St., Watertown, Mass. 02172, Tel: 617-924-9053

MID-EASTERN INDS., see Eanco, Inc., Mid-Eastern Prods.

MID-WEST METAL PRODS., INC., Dept. EM, 456 E. Donovan Rd., Kansas City, Kans. 66115, Tel: 913-342-8171; Empl.: 150

™MIDA - miniature integral diode assemblies - Motorola Semiconductor Prods.

™MIDGET - modular integrated digital equipment tester - Harris Corp.

MIDGET LOUVER CO., Dept. EM, 800 Main Ave., Norwalk, Conn. 06852, Tel: 203-866-2342; Empl.: 10

™MIDGI-CODER - bcd to numeric decoder/driver - Refac Elctrns. Pinlite®, Wild Rover®

™MIDGI-COUNTER - decode counter, encoder - Refac Elctrns. Pinlite®, Wild Rover®

™MIDGI-DIAL - dial assy. - Theta Instr. Corp.

™MIDGI-LITE - digital readout - Refac Elctrns. Pinlite®, Wild Rover®

™MIDIDEK - 8½" tape transport - Digi-Data Corp.

™MIDLAND - communication, home entertainment - Midland International Corp.

MIDLAND ELECTRONICS CO., Dept. EM, 1690 N. Topping Ave., Kansas City, Mo 64120

MIDLAND INTERNATIONAL CORP., Dept. EM, PO Box 19032, Kansas City, MO 64141, Tel: 913-384-4200, Telex: 04-2536; Empl.: 200

Local Sales Offices & Reps.

Ala	Birmingham, Adams & Assocs.	205-822-8109
Ark	El Dorado, D. Bellew Sls.	501-863-8325
Cal	Los Altas, W.W. Posey Co.	415-948-7771
Cal	Torrance, Barston & Doran	213-325-4140
Colo	Englewood, E.S.P. Co.	303-781-4409
Ill	Chicago, W. Linz & Assoc.	312-677-2000
Ind	Indianapolis, Kingston - Sharkey Assocs.	317-353-9406
Iowa	Des Moines, Beams	515-282-0292
La	Kenner, D. Bellew Sls.	504-729-4550
Md	Seabrook, Taylor Mktg.	301-864-4011
Mass	Lynne, Keene Sls. Co.	617-595-2300
Mich	Brighton, Lectro Sls. Co.	313-632-7941
Minn	Minneapolis, H.M.R.	612-920-8200
NJ	Teaneck, S. Axelrod Assocs.	201-836-6661
NM	Albuquerque, G. Emerson Sls.	505-293-8088
NY	Skaneateles, Leahy & Thomson	315-685-8122
NC	Greensboro, Adams & Assocs.	919-272-6838
Ohio	Columbus Station, C.L. Pugh & Assocs.	216-235-6028
Pa	Laverock, M. Weinberg Assocs.	215-549-1122
Tenn	Memphis, G. Venable	901-365-9437
Tex	Dallas, Roman Sls. Co.	214-358-2152
Wash	Seattle, James J. Backer Co.	206-285-1300
Exp:	Mo Kansas City, G. W. Vogel	

MIDTEX

MIDTEX, INC., AEMCO DIV., Dept. EM, 1650 Tower Blvd., No. Mankato, Minn. 56001, Tel: 507-625-6521, TWX: 910-565-2244; Empl.: 548 .... p. 3586-3589

Local Sales Offices & Reps.

Ala	Huntsville, Twentieth Century Mktg.	205-772-9237
Ariz	Scottsdale, Sls. Engrg., Inc.	602-994-3230
Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, McLoud & Raymond	303-756-1589
Conn	Middletown, Bell Controls	203-346-0670
Fla	Bradenton, Hutto-Hawkins-Peregoy	813-755-4015
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9593
Ill	Downers Grove, Richmar Elctrns. Corp.	312-968-0118
Ind	Carmel, Richmar Elctrns. Corp.	317-846-6383
Iowa	Des Moines, BEAMS	515-255-1148
Kans	Shawnee Mission, BEAMS	913-631-0300
Md	Pikesville, L & M Assocs.	301-484-7970
Md	Rockville, Mechtronics Sls.	301-340-2130
Mich	Detroit, Nicon Assocs.	313-341-7688
Mo	St. Louis, BEAMS	314-569-1060
NH	Nashua, Bell Controls	603-882-6985
NJ	Ridgewood, Ballou Inc.	201-444-6990
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Rochester, R. F. Lamb Co.	716-544-5580
NY	Schenectady, R. F. Lamb Co.	518-393-4844
NY	Syracuse, R. F. Lamb Co.	315-455-2469
NC	Raleigh, Component Sls. Inc.	919-782-8433
Ohio	Cleveland, K.W. Elctrn. Sls.	216-831-8292

Ohio	Dayton, K.W. Elctrn. Sls.	513-890-2150
Pa	Allison Park, K.W. Elctrn. Sls.	412-487-4300
Pa	Feasterville, Professional Sls. Assocs.	215-355-6244
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Medina, H. Paulman Sls.	206-455-3311
Wisc	Butler, Richmar Elctrns. Corp.	414-781-1730
Exp:	Can., Downsview, Ont. M3J 2E5, Weber Elctrns., Ltd.	416-638-1322

Local Distributors

Cal	Santa Ana, Royal Wholesale Electric	213-638-8794
Cal	Woodland Hills, Rampart Comps.	213-887-7260
Colo	Denver, Integrated Elctrns.	303-534-6121
Fla	Oakland Park, Peerless Radio Corp.	305-566-5966
Ill	Addison, Lectron Controls	312-543-8460
Ill	Arlington Heights, S & R Corp.	312-593-2545
Ill	Chicago, Newark Electronica	312-638-4411
Ill	Wheaton, Lectro Comps.	312-690-1880
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Iowa	Cedar Rapids, J. Vrbik Co.	319-366-8733
Mass	Lowell, F. McCartin Co.	617-454-9101
Mass	Newton, Green-Shaw Co., Inc.	617-969-8900
Mass	West Springfield, Control Engrg.	413-739-5134
Minn	Minneapolis, Berquist Co.	612-835-2322
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Buffalo, Genesee Radio & Parts Co.	716-858-1287
NY	Hauppauge, Ramparts Comps.	516-273-1111
NY	Hempstead, Kahgan Comps.	516-538-2300
NY	Rochester, Masline Elctrns.	716-546-5373
NY	Rockville Center, Midway Ind. Elctrns.	516-764-2400
NY	Woodside, Switches Unlimited	212-651-0935
NY	Woodside, Switches Unlimited	212-651-0935
Ohio	Akron, Hardware & Supply Co.	216-535-1831
Ohio	Akron, Sun Radio Co.	216-434-2171
Okla	Tulsa, Component Specialties	918-664-2820
Pa	Erie, Advacom Inc.	814-455-8110
Tex	Dallas, Component Specialties	214-357-6511
Tex	Houston, Component Specialties	910-881-2422
Tex	San Antonio, Blackburn Drives & Controls	512-349-2621
Utah	Salt Lake City, Rand Equip. Corp.	801-487-5631
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500
For:	Canada, Vancouver, B.C., Intek Elctrns. Ltd.	604-324-6831
For:	Can., Dorval, Que., Semad Elctrns.	514-636-4614
For:	Can., Downsview, Ont., Semad Elctrns.	416-635-9880
For:	Can., Ottawa, Ont., Semad Elctrns.	613-722-6571
For:	Can., Scarborough, Ont., Carsten Elctrns.	416-751-2371

MIDTEX INC., Dept. EM, 10 State, Mankato, Minn. 56011

(TM)MIDWAY - wall plates - Leviton Mfg. Co., Inc.

MIDWEC DIV., Independent Cable, Dept. EM, Box 417 G, Scottsbluff, Neb. 69361, Tel: 308-632-4127, TWX: 910-627-0061; Empl.: 300

Local Sales Offices & Reps.

Ariz	Phoenix, Toward Engr. Assoc.	602-955-3193
Cal	Long Beach, Emerson Kirk Engr.	213-439-9559
Cal	Mountain View, Caltron/Pyle Inc.	415-964-3244
Colo	Denver, Checkmate Sls.	303-773-0666
Conn	Newtown, Kanan Assocs.	203-426-8157
Fla	Maitland, Ellis & Assocs.	305-645-1101
Ga	Atlanta, G. Duckett Sls.	404-451-3529
Md	Baltimore, Kaufholz Assoc.	301-252-3664
Mass	Reading, Kanan Assocs.	617-944-8484
Mich	Plymouth, Romarc	313-455-0300
Minn	St. Paul, Knox Assoc.	612-488-5402
Neb	Lincoln, Mktg. Assoc.	402-464-5244
NY	Pleasant Valley, L.D. Allen	914-635-3363
NY	Port Washington, P.D. Aaron	516-883-0600
NY	Syracuse, L.D. Allen Inc.	315-458-7470
NC	Charlotte, G. Duckett Sls.	404-451-3529
Ohio	Dayton, Kimconics Sls.	513-898-1007
Ore	Portland, C.K. Shanks Assoc.	503-292-5656
Pa	Newton Square, Kaufholz Assoc.	215-356-5000
Pa	Waterford, Kimconics Sls.	814-796-6556
Tex	Dallas, United Comps.	214-324-1448
Wash	Seattle, C.K. Shanks & Assocs.	206-632-4290

Local Distributors

Cal	Belmont, Eric Electronics	415-593-8284
Ind	Indianapolis, Ra-Dis-Co.	317-637-5571
Mass	Newton, Greene-Shaw	617-969-8900
NY	Buffalo, Summit Dr.	716-884-3450
NY	Port Washington, Connector Concepts	516-883-3800
Ohio	Cleveland, Gateway	216-944-8565
Ohio	Dayton, Arrow Elctrns	
Pa	Huntington Valley, Hallmark	215-355-7300

MIDWEST ALUMINUM, Div. of Kysor Indus. Corp., Dept. EM, 7696 W. Michigan Ave., Kalamazoo, MI 49009, Tel: 616-375-3000; Empl.: 100

MIDWEST ELECTRONIC INDUSTRIES, Dept. EM, 4945 W. Belmont Ave., Chicago, Ill. 60641, Tel: 312-685-3500, TWX: 910-221-5247; Empl.: 64

Local Sales Offices & Reps.

Ind	Indianapolis	317-426-3736
Iowa	Cedar Rapids	319-362-4410
Wisc	Waukesha	414-542-5129

MIDWEST COMPONENTS, Dept. EM, 1981 Port City Blvd., Muskegon, Mich. 49400, Tel: 616-777-2602, TWX: 510-394-4130; FSC No.: 50157; Empl.: 45 p. 4320,4321

Sales Manager: G.J. Hoffman

Local Sales Offices & Reps.

Ala	Huntsville, Murcota	205-529-8476
Cal	Inglewood, HMS	213-645-6060
Cal	Palo Alto, Testco	415-326-5320
Colo	Westminster, RMS Sls.	303-429-1842
Ill	Chicago, D. Dolin Sls. Co.	312-286-6200
Ind	Indianapolis, Technical Reps.	317-849-6454
Mass	Framingham, KSA of New England	617-875-5464
Minn	St. Paul, R. G. Ragon	612-488-0201
NJ	Ft. Lee, Necco, Inc.	201-461-2789
NJ	Haddonfield, Thomas Assoc.	609-854-3011
NY	Fairport, W.A. Franklin Sls. Co.	716-223-5102
NY	New Hartford, W.A. Franklin Sls. Co.	315-737-5038
NY	New York, Necco, Inc.	201-461-2789
NY	Syracuse, W.A. Franklin Sls. Co.	315-472-5273
NC	Winston-Salem, Murcota	919-722-9445
Ohio	Datyon, Jay Engrg. Co.	513-253-2151
Ohio	N. Royalton, Jay Engrg. Co.	216-237-4235
Okla	Tulsa, Norvell Assoc.	918-663-1247
Tex	Dallas, Norvell, Assoc.	214-350-6771
Tex	Houston, Norvell, Assoc.	713-777-1666
Wash	Bellevue, Testco	206-454-7422
Wisc	Milwaukee, D. Dolin Sls. Co.	414-762-1054

Local Distributors

Ill	Chicago, Newark Elctrns.	312-638-4411

MIDWEST CONTROLS CO., Dept. EM, Box 4435, Lincoln, Neb. 68504, Tel: 515-856-8553; Empl.: 3

MIDWEST CRYSTAL CO. , Dept. EM, 8106 B. Independence Dr., Mentor, Ohio 44060

(TM)MIGHTY MITE - antenna - Shakespeare

MIIDA ELECTRNS., Dept. EM, 14 Henderson Dr., W. Caldwell, NJ 07006

MIKRON INSTR. CO., Dept. EM, Box 211, Ridgewood, N.J. 07451, Tel: 201-891-7330, TWX: 710-988-5821; Empl.: 20

Local Sales Offices & Reps.

Ala	Mobile, Alford, Woods & Childs	205-343-0300
Ariz	Tempe, Lietz Equip. Co.	602-968-4991
Cal	Gardena, Instr. Lab.	213-770-0650
Cal	Palo Alto, Instr. Lab.	415-328-1040
Colo	Denver, TESSCO	303-744-1119
Conn	Westport, A. J. Abrams Co.	203-226-3010
Fla	Winter Haven, Engineered Equip. Co.	813-294-6520
Haw	Mililani Town, H. C. Burgess & Assocs.	808-623-3118
Ill	Westchester, Murphy & Dickey	312-344-5660
Iowa	Cedar Rapids, H. E. Ferris	319-362-9156
Iowa	Des Moines, H. E. Ferris	515-255-5008
La	Baton Rouge, Alford, Woods & Childs	504-275-5480
La	Harahan, Alford, Woods & Childs	504-733-9550
Me	Lake Charles, Alford, Woods & Childs	318-439-8173
Mass	Lowell, Moisan Assocs.	617-459-6800
Mich	Dearborn, Ind. Temperature Control	313-278-2210
Minn	Minneapolis, G. J. Winikates & Co.	612-546-5770
Mo	Kansas City, Midwestern Engineered Equip.	816-531-1077
Mo	St. Louis, EV Miller Co.	314-821-2610
NJ	Brielle, H. W. Good Co.	201-528-5251
NJ	Riverdale, B. Most Assocs.	201-839-4333
NM	Albuquerque, Lietz Equip. Co.	505-266-5821
NY	E. Rochester, Thermal Systems	716-377-1970
NY	N. Syracuse, Thermal Systems	315-458-5202
NC	Charlotte, J. L. Highsmith & Co.	704-333-7743
Ohio	Brecksville, D & B Engrg. Sls.	216-526-6320
Ohio	Cincinnati, G. H. Drysdale & Assocs.	513-528-2200
Okla	Tulsa, Wallace Equip. Co.	918-747-6749
Ore	Portland, Branom Instr. Co.	503-285-9861
Pa	Bridgeville, Instr. Servs.	412-221-3600
Tenn	Oak Ridge, Tech. Equip. Supp.	615-483-4285
Tex	Houston, Alford, Woods & Childs	713-488-2730
Va	Richmond, Richmond Ind'l Sls Co.	804-270-7182
Wash	Seattle, Branom Instr. Co.	206-762-6050
WVa	St. Albans, Instr. Servs.	304-722-2953
Wisc	Menomonee Falls, Fritz Engrg. Sls. Co.	414-251-6590

MIL ELECTRONICS, Dept. EM, 176 Walker St., Lowell, Mass. 01854, Tel: 617-453-4142, Telex: 94-7490; Empl.: 35

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Dev.	205-536-1969
Ala	Huntsville, Scientific Dev SE	
Cal	Lynwood, Dick West & Assocs.	213-636-6124
Cal	San Carlos, Winco Sls.	415-365-6082
Colo	Englewood, Hall Co.	303-789-4149
Conn	North Haven, Northeast Reps.	203-239-2507
Fla	Fort Lauderdale, Scientific Devs S.E.	
Fla	Orlando, Scientific Dev - Southeast	305-841-8180
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Mass	Medway, Surel Int'l.	617-533-2041
Mass	Needham, Northeast Reps.	617-449-3034
Mass	Needham Heights, Northeast Reps.	
Mich	Bloomfield Hills, Ellinger Sls.-Mich.	313-642-0203
NJ	Marmora, Holdsworth & Co.	
NY	Rochester, Tacom Sls. Co.	716-647-3940
NY	Tuckahoe, Spectrum Sls.	914-793-1660
NC	Burlington, Scientific Devs., S.E.	
Ohio	Dayton, Ashby Assoc.	513-252-5627
Pa	Newton Square, Holdsworth & Co.	215-356-8550
Tex	Dallas, Precision Sls.	214-351-6964
Va	Annandale, J. Hopkins Assocs.	703-280-2086
Wash	Bellevue, A. Smith Co.	

MILBAR, Dept. EM, 530 Washington St., Chagrin Falls, Ohio 44022, Tel: 216-247-4600; Empl.: 75

MIL SPEC WIRE & CABLE CORP., Dept. EM, 311 N. Main St., Freeport, N.Y. 11520, Tel: 516-546-5454, Telex: 96-7871; Empl.: 25

(TM)MIL-ENE 783551 - polyester laminate insulation covering for electrical conductors - Gore, W.L. & Assocs., Inc.

MILERTRONICS, Dept. EM, 303 Airport Rd, Greenville, S.C. 29607, Tel: 803-242-9232; Empl.: 11; Minimum order: $S. S. Mullikin

Sales Manager: M. D. Webb; *Distributor Manager:* S. S. Mullikin

Local Sales Offices & Reps.

Conn	Canton, Daner-Hayes	203-426-9094
Mass	Newton Centre, Daner-Hayes	617-969-4650
NY	Canandaigua, Daner Hayes	716-467-5100
NY	Port Washington, Daner-Hayes	516-883-4576
NY	Rochester, Daner-Hayes	716-467-5100
NY	St. James, Daner-Hayes	516-584-6871
Pa	Audubon, Daner-Hayes	215-666-5005
Vt	Ludlow, Daner Hayes	802-228-8774

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(TM)MIL-E-STORE - military core memory system - Dataproducts Corp.

MILFORD RIVET & MACH., Dept. EM, 857 Bridgeport Ave., Milford, Conn. 06460, Tel: 203-878-4631, TWX: 964363 710-462-0538; Empl.: 527

Local Sales Offices & Reps.

Ariz	Phoenix, J. Russell Smith	602-248-7802
Cal	City of Commerce, Paikos & Hicks Assocs.	213-721-7535
Cal	San Francisco, D. R. Cox	415-441-8666
Colo	Denver, Regional Sls. Co.	303-433-7397
Conn	Southport, R.M. Johnson	203-259-2290
Fla	Orlando, A-Gen-Teers Entprs.	305-293-6269
Ga	Atlanta, G.E. Younginer & Assoc.	803-772-6671
Ill	Elmhurst, Midwest Sls. Off.	314-834-3820
Ill	Moline, Ekdahl & Co.	309-762-3100
Ind	Clermont, L. T. Clower	317-293-3598
Mass	Westwood, G. W. Byron	617-762-2878
Mich	Warren, W. T. Peterson Co.	313-751-0600
Mo	St. Louis, Smith-Bollinger & Co.	314-351-1177
NJ	Edison, Affiliated Sls.	201-572-0777
NY	Fairport, E.F. LaCrosse Assoc.	716-223-7378
NY	New York, Affiliated Sls.	212-227-4782
Ohio	Cleveland, G. E. Goehring Co.	216-884-3456
Pa	Jenkintown, Riley & Aleshire	215-884-1708
SC	Columbia, G.E. Younginer & Assoc.	803-772-6671
Tenn	Memphis, L. E. Offutt & Co.	901-789-1210
Tex	Dallas, Tech Sls. Co.	214-631-8820
Tex	Houston, Tech Sls. Co.	713-528-2039
Va	Axton, Riley & Aleshire	804-977-3220
Wash	Seattle, National Co.	206-623-7060
Wisc	DePere, Kosnar Sls. Co.	414-435-2541
Exp:	NY, N.Y., Comercio E. Industria Neva, S.A.	212-422-7480

MILGO ELECTRONIC CORP., Dept. EM, 8600 N.W. 41st Street, Miami, Fla. 33166, Tel: 305-592-8600, TWX: 810-848-6588; Empl.: 1400

™MILK-TROL - ambient-compensated temperature controllers - Honeywell

MILLEN MFG. CO. INC., JAMES, Dept. EM, 150 Exchange St., Malden, Mass. 02148, Tel: 617-324-4108; FSC No.: 76487; Empl.: 500

Local Sales Offices & Reps.

Cal	Los Angeles, W.S. Harmon Co.	213-937-1460
Cal	Millbrae, Polach & Bensinger, Inc.	415-697-2525
Ill	Streamwood, Al Holte & Assoc.	312-837-4066
NJ	Union, J. BiBlasi Assoc.	201-687-6914
NY	Great Neck, J. DiBlasi Assoc.	516-482-4040
NY	Liverpool, M. E. Jones	315-457-1180
NY	Pittsford, D. Hurley Sls., Inc.	716-586-6159
Tex	Richardson, Air Quip Sls. Co.	214-234-3285
Exp:	Lakehurst, N.J., Tech. Equip. Co.	201-349-1716

Local Distributors

Ala	Birmingham, J. W. Clary Co.	205-322-2486
Alas	Ketchikan, Svc. Electric Co.	
Ariz	Phoenix, E G R Co.	602-959-0320
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Colo	Denver, C. W. Elctrns. Sls. Co.	303-244-5523
Conn	Hartford, Hatry Elctrns.	
Fla	Miami, Elctrn. Equip. Co.	305-871-3500
Ga	Atlanta, ACK Radio Supply Co. of Ga.	404-351-6340
Haw	Honolulu, Honolulu Elctrns.	808-949-5564
Ill	Peoria, Klaus Radio	309-691-4840
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8486
Iowa	Cedar Rapids, DEECO, Inc.	319-365-7551
Kans	Salina, Elctrns.	913-827-7377
Ky	Louisville, Peerliss Elctrn. Equip. Co.	502-637-7677
La	New Orleans, Radio Parts	504-581-5959
Md	Rockville, Capitol Radio Wholesalers	310-881-2270
Mass	Boston, Sager Electrical Supply Co.	617-542-2281
Mich	Muskegon, Elctrn. Distrs.	
Minn	Duluth, Northwest Radio of Duluth	218-727-1565
Mo	St. Louis, Olive Ind'l Elctrns.	314-863-7800
Neb	Omaha, Radio Equip. Co.	402-341-7700
NJ	Springfield, Route Elctrns.	201-379-7710
NM	Hobbs, Stells Sls. & Svc.	
NY	Farmingdale, Harrison Radio Corp.	516-293-7990
NC	Otto, Slep Elctrns. Co.	704-524-7519
Ohio	Dayton, Srepco Elctrns.	513-224-0871
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Portland, Portland Radio Supply Co.	503-228-8647
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
RI	Providence, W. Dandretta & Co.	401-861-2800
SC	Charleston, Wholesale Radio Supply Co.	803-722-2643
Tenn	Knoxville, Industrial Elctrns,	615-573-7135
Tex	El Paso, Midland Specialty Co.	
Utah	Salt Lake City, Standard Supply Co.	801-355-2971
Va	Roanoke, Peoples Radio & T.V. Supply Co.	703-DI2-8933
Wash	Seattle, Westlake Elctrn. Supply	206-622-6600
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160
Exp:	N.J., Lakehurst, Technical Equip. Co.	201-349-1716
For:	Can., Montreal, Que., Payette Radio Ltd.	514-878-4771
For:	Can., N. Vancouver, B.C., Glenwood Trading Co., Ltd.	604-984-0404
For:	Can., Ottawa, Ont., Wackid Radio & T.V. Labs. Ltd.	613-728-1821

MILLER, J.W. CO., See Bell Inds.

MILLER, CO. L.C., Dept. EM, 717 Monterey Pass Rd., Monterey Park, Cal. 91754, Tel: 213-268-3611; Empl.: 49

MILLER, SANFORD CORP., See Sanford-Miller Corp.

MILLER-STEPHENSON CHEM. CO., INC., Dept. EM, George Washington Hwy., Danbury, Conn. 06810, Tel: 203-743-4447; Empl.: 500

Local Sales Offices & Reps.

Ariz	Phoenix, H.C. Torrey Assoc.	602-944-0352
Cal	Los Angeles, Miller-Stephenson Chem.	213-624-3887
Ill	Chicago, Miller-Stephenson Chem.	312-761-4272

Local Distributors

For:	France, Montgeron, POLYTRONIX S.A.	903-22-50
For:	G. B., Scotland, D. Fraser & Co.Uddingston	3476
For:	Germany, Hamburg, Detakta	0411-513051
For:	Italy, Milano, Aldo Garzanti S.A.S.	654-621
For:	Netherland, Amsterdam, G. L. Loos & Co's.	020-822851
For:	Spain, Valencia, JASO	23-70-90
For:	Switzerland, Basle, Matera AG Basle	061-22-0630

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MS-190/MS190HD/ Freon TMC Solvent-Cleaner
MS-122 Mold Release Agent/Dry Lubricant
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MS-226 Cobra® Solvent Brush/Aerosol Converter

Miller-Stephenson Chemical Co., Inc.
Danbury, Conn 06810 Los Angeles
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MILLER, W. A. CO., INC., Dept. EM, Mingo Loop, Oquossoc, Me. 04964, Tel: 207-864-3344; Empl.: 32

Sales Manager: D. Hunger

™MILLIKEN - igh-speed cameras (16 mm) - Teledyne Camera Sys.

™MILLISEC - ultra high speed relays - Stevens-Arnold, Inc.

MILLI-SWITCH CORP., Dept. EM, Box 67, Gladwyne, Pa. 19035, Tel: 215-MI 2-9222; Empl.: 15

™MILLITORR - ionization gauge - Varian Assocs.

™MIL-LOC - mil-std stressed panel fastener - Deutsch Fastener Corp.

MILLS RESISTOR CO., Dept. EM, 3840 Catalina St., Los Alamitos, Cal. 90720, Tel: 213-598-2454; FSC No.: 34238; Empl.: 30 .... p. 3698

Local Sales Offices & Reps.

Ariz	Scottsdale, Verein Corp.	602-948-3571
Cal	Los Altos, Frauman Assocs.	415-941-0660
Ill	Morton Grove, T Squared Assoc.	312-965-1515
Ind	Carmel, Rich Elctrns. Mktg.	317-844-8462
Mass	Waltham, Dynasel Assocs.	617-890-6777
Mo	Kansas City, Nevco	816-421-1751
Tex	Houston, Ev Smith Sls.	713-649-5756
Va	Lynchburg, J. A. Griffin	804-384-5236
Wash	Bellevue, Reptronix	206-454-5190

Local Distributors

Cal	Bellflower, Royer Assocs.	213-862-1222
Cal	Westminister, Base Elctrns.	714-894-1303
Ohio	Cleveland, RCS Inc.	216-464-0490

™MILMASTER - electronic micrometers - Electron-Machine Corp.

™MIL-ON 941877 - polyester laminate & PTFE insulated electrical conductor - Gore, W.L. & Assocs., Inc.

™MIL POWER - military power supplies - Trio Labs, Inc.

™MILROS - mildly activated rosin flux - Alpha Metals, Inc.

MILTON ROSS CO., Dept. EM, 210 Second St. Pike, Southampton, Pa. 18966, Tel: 215-355-0200, TWX: 510-667-1702; Empl.: 165

Local Sales Offices & Reps.

Cal	Anaheim	714-533-7571

MRC

MILWAUKEE RESISTOR CORP., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204, Tel: 414-271-9900; FSC No.: 82807; Empl.: 90 p. 3700,3701

Local Sales Offices & Reps.

Ala	Gadsden, F.C. Nickerson Co.	205-547-7718
Colo	Denver, Nelson Co.	303-573-1516
Conn	Hamden, Johnson Assocs.	203-787-3661
Fla	Tampa, F.C. Nickerson Co.	813-885-1416
Ga	Atlanta, F.C. Nickerson Co.	205-547-7718
Ill	Evanston, W.F. Swinke & Assocs.	312-248-4343
Ind	Ft. Wayne, W.W. Bieberich	219-432-2537
Ind	New Albany, W.W. Bieberich	812-945-3187
Mass	Wellesley, Johnson Assocs.	617-235-3977
Mich	Southfield, L. H. Dickelman Co.	313-353-8210
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
Mo	Maryland Heights, Kattelmann & Co.	314-434-6875
NH	E. Wakefield, Johnson Assoc.	603-522-8512
NJ	Haddonfield, Braddock Assocs.	609-429-0087
NY	New York City, Miller Co.	212-263-4446
NY	Rochester, Gislason Sls.	716-454-4741
NC	Kannapolis, F.C. Nickerson Co.	704-932-6772
Ohio	Cleveland, Weschler Electric Corp.	216-251-4609
Ore	Portland, R.M. Minthorne Co.	503-246-4556
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Tex	Houston, R.E. Nesbitt Co.	713-224-3633
Exp:	Can., Rexdale, Ont., F. Eakin Ltd.	416-245-3600
Exp:	N.J. Teaneck, S. Ginsbury, Ltd.	201-837-1100

™MILWAUKEE WROT - washers & stampings - Wrought Washer Mfg., Inc.

™MINA - ball bearings - MPB Corp.

™MINA-GEAR - gear-motors - General Elec. Co.

™MINAPAR - plastic bearing retainers - MPB Corp.

™MINAPURE - lubricant - MPB Corp.

MINCO PRODUCTS INC., Dept. EM, 7300 Commerce Lane, Minneapolis, Minn. 55432, Tel: 612-571-3121, TWX: 910-576-2848; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Technical Sls.	205-881-1750
Cal	Los Gatos, Industrial Mktg. Assocs.	408-358-1734
Cal	South Pasadena, Pentagon Co.	213-799-7141
Ill	Chicago, Thermo/Cense	312-792-2760
Md	Wheaton, Magyar & Assocs.	301-871-8833
Mass	Needham Heights, Magyar & Assocs.	617-444-9095
Mich	Ann Arbor, O-M Sls.	313-973-9450
Mo	St. Louis, Ozark Elctrn.	314-423-7200
NJ	Livingston, A.A. Budde & Assoc.	201-994-1210
NM	Albuquerque, Industrial Prods. Corp.	505-256-3561
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ore	Portland, McLaren, Inc.	503-297-2248
Pa	Philadelphia, Magyar & Assocs.	215-763-5044
Tex	Richardson, Air Quip Sls. Co.	214-234-3285
Vt	Bennington, Magyar & Assoc.	802-442-5858
Wash	Bellevue, McLaren, Inc.	206-454-3400

MINE SAFETY APPLIANCES CO., Dept. EM, 600 Penn Center Blvd., Pittsburgh, Pa 15235, Tel: 412-273-5000, TWX: 812453 710-797-3895; Empl.: 2000

Sales Manager: J.C. Sheehan

Local Sales Offices & Reps.

Ala	Birmingham	205-956-0200
Ariz	Tucson	602-623-1814
Cal	Los Angeles	213-875-2905
Cal	San Diego	714-Ze 2-5720
Cal	San Francisco	800-232-2150
Conn	Bridgeport	203-335-9639
DC	Washington	202-621-1221
Ill	Chicago	312-921-7474
Ind	Indianapolis	317-547-4407
Kans	Lenexa	913-888-2628
La	New Orleans	504-486-5368
Md	Baltimore	301-828-6363
Mass	Boston	617-364-2828
Mich	Detroit	313-272-7717
Minn	Duluth	218-722-5397
Mo	St. Louis	314-533-2550
NJ	Mountainside	201-232-3490
NY	New York	212-267-6297
NY	Tonawanda	716-694-2737
Ohio	Cleveland	216-461-6300
Ore	Portland	503-Co 9922
Pa	Philadelphia	215-622-2121
Pa	Pittsburgh	412-241-6332
RI	Esmond	401-231-6900
Tex	Dallas	214-631-2670
Tex	Houston	713-785-4040
Utah	Salt Lake City	801-355-7517
Wash	Seattle	206-575-0405
WVa	Bluefield	304-327-5171

(TM)MINEAC - miniature electronic auto collimator - Barnes Engrg. Co.

MINELCO, DIV. GENERAL TIME CORP., , Dept. EM, 135 S. Main St., Thomaston, Conn. 06787, Tel: 203-283-8261, TWX: 710-475-1091; FSC No.: 07479; Empl.: 66 ....p. 2398,2647-2649,4199

Local Sales Offices & Reps.

Ariz	Phoenix, M. W. Riedel & Co.	602-971-9758
Cal	Alhambra, M.W. Riedel & Co.	213-283-7694
Cal	Daly City, R Del Bucchia & Assoc.	415-756-1664
Colo	Denver, Camel Elctrns.	303-757-6191
Conn	Southington, KSA of New England	203-747-5883
Ga	Atlanta, Beacon Elec. Assoc.	404-351-3654
Ill	Highland Park, Bransky Sales	312-433-2375
Kans	Kansas City, Weisler & Assoc.	816-421-1679
Mass	Framingham, KSA of New England	617-875-5464
Mich	Oak Park, Willard Spenser Co.	313-398-8005
Minn	St. Paul, Northport Eng.	612-698-3841
Mo	St. Louis, Weisler & Assoc.	314-428-3934
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Melville, Addem Group	516-567-5900
NY	Syracuse, Noeth-Homsinger Assoc.	315-463-5718
Ohio	Cleveland, Geotronix Mktg. Assoc.	216-243-8520
Tex	Houston, Weisler & Assoc.	713-467-1847
Wash	Seattle, Barrett-Squibb & Assocs.	206-885-6991

(TM)MIN-E-PITCH - miniature chain drive - Winfred M. Berg Inc.

(TM)MINERALIGHT - short wave ultraviolet lamps - Ultra-Violet Prods., Inc.

(TM)MINERTIA MOTOR - DC servo motor - Yaskawa Electric America, Inc.

(TM)MINESPOT - lighting system - Mine Safety Appliances Co.

(TM)MINIATURE - Relay Socket - DAN-L Inc.

(TM)MINI-AUD - audio power amplifier - Dynair Elctrns. Inc.

(TM)MINI-BAL - balanced amplifier - Dynair Elctrns. Inc.

(TM)MINI BEE - video audio tape motor - Hurst Mfg. Corp.

(TM)MINIBOX - radial film capacitors - Plessey Capacitors

(TM)MINIBREAKER - small circuit protectors - Aiken Industries, Inc.

(TM)MINIBRIDGE - silicon rectifier - Elctrn. Devices

(TM)MINI/BUS - Electrical power distribution systems - Rogers Corp.

(TM)MINIBUTTON - digital (thumbwheel) switches - Digitran Co.

(TM)MINICAM - camera - CBS Laboratories

(TM)MINI-CATOR - indicator lights - Industrial Devices

(TM)MINICHINE - miniature machine - Pace Inc.

MINI-CIRCUITS LAB., Div. Scientific Comps. Corp., Dept. EM, 2625 E 14th St., Brooklyn, N.Y. 11235, Tel: 212-342-2500, Telex: 62-0156 .... p. 3006

Local Sales Offices & Reps.

Cal	Los Altos, Cain-White & CO.	415-948-6533
Cal	N. Hollywood, Crown Elctrns.	213-877-3550
Ill	Mount Prospect, Cain & Co.	312-253-3578
Mass	Reading, Geder Assocs.	617-944-3105
NJ	Englewood, Scientific Devices, East	201-871-3916
NY	Skaneateles, Robtron	315-685-5731
Pa	Lafayette Hill, M. Lader & Co.	215-825-3177
Tex	Dallas, Cain & Co.	214-233-6809
Va	Woodbridge, M. Lader & Co.	703-494-4731

Local Distributors

Cal	Los Altos, Cain-White & Co.	415-948-6533
Cal	N. Hollywood, Crown Elctrns.	213-877-3550

(TM)MINI-COAX - CATV miniture cable - Cerro Communication Products

(TM)MINI-CONSOLE - small plastic instrument enclosure - Techmar Corp.

(TM)MINICOUNTER, PANEL MOUNTED - electronic veeder root type of counter - Dynamics Elctrn. Prods., Inc.

(TM)MINI-CUBER - case a 55 mil chip capacitor - American Technical Ceramics

(TM)MINI-DAP - pulse DA - Dynair Elctrns. Inc.

(TM)MINI-DATA RECORDER - digital cassette recorder - Raymond Engrg. Inc.

(TM)MINI-DAV - video DA - Dynair Elctrns. Inc.

(TM)MINI-DAVS - sync-mixing video DA - Dynair Elctrns. Inc.

(TM)MINIDEK - 7" tape transport - Digi-Data Corp.

(TM)MINI-DIAL - dial assy. - Theta Instr. Corp.

(TM)MINI-DIP - miniature dip packaged digital readout - Refac Elctrns. Pinlite®, Wild Rover®

(TM)MINIDISC PACKAGE - impatt diodes - Hughes Aircraft Co.

(TM)MINIDISK - flexible disk 5.25" - Information Terminals

(TM)MINI-DOT - indicator lights - Industrial Devices

(TM)MINIDUCTOR - miniature hi-q coil - TRW/UTC Transformers

(TM)MINI-FADE - 2-input video fader - Dynair Elctrns. Inc.

(TM)MINI-GATOR - Clips - Mueller Electric Co.

(TM)MINI-GUN - heat tool - Raychem Corp.

(TM)MINI-IMP - pumping system - T-M Vacuum Prods.

(TM)MINIKEY - keyboards - Digitran Co.

(TM)MINILAMP - minature indicator lights - Int'l. Prods. Inc.

(TM)MINILEVER - digital (thumbwheel) switches - Digitran Co.

(TM)MINILOAD - miniature rf loads - Bird Electronic Corp.

(TM)MINILOK - terminal blocks - Burndy Corporation

(TM)MINI-MATRIX - plugboard switch - NES, Inc.

(TM)MINI-METOXILITE - metoxilite sub-miniature silicon rectifier - Semtech Corp.

(TM)MINI-METRIC - conductive plastic variable resistor - Allen-Bradley Co.

(TM)MINI-MIKE - miniature slide switches - Chicago Switch, Inc.

(TM)MINI MITE - portable potentiometer - Thermo Elec. Co., Inc.

(TM)MINI-MIX - audio mixer - Switchcraft, Inc.

(TM)MINI-MOD - audio-video modulator - Dynair Elctrns. Inc.

(TM)MINI MODEM - hybrid modem modules - Cermetek, Inc.

(TM)MINI-MONITOR - miniature rf wattmeters - Bird Electronic Corp.

(TM)MINI-MOP - video cable equalizer - Dynair Elctrns. Inc.

(TM)MINI-MOUNTS - a sys. for prototype circuit assembly (breadboarding) - Christiansen Radio Inc.

(TM)MINI-MOV - metal oxide varistor - General Elec. Co.

(TM)MINIOHM - miniature resistors - General Resistance, Inc.

(TM)MINIPAK - temperature controllers - Honeywell

(TM)MINI-PRE - audio pre-amplifier - Dynair Elctrns. Inc.

(TM)MINIPROGRAMMER - programming switches - Cole Instrument Corp.

(TM)MINI-PROX - proximity switch - Electro Corp.

(TM)MINI-READER - portable rh-temp indicator - American Instr. Co.

(TM)MINI-RECORDER - digital cassette recorder - Raymond Engrg. Inc.

(TM)MINIREED - miniature reed relay - Solid State Electronics Corp.

(TM)MINISAT - low VCE (sat) transistor - Powertech, Inc.

(TM)MINISCAT - parabolic reflectors - RF Systems, Inc.

(TM)MINI SENTRY - infrared intrusion detector - Laser Systems Corp.

(TM)MINISERT - miniature p.c. socket - Berg Electronics

(TM)MINISERVO - Compact Lab Recorder - Esterline Angus

™MINI-SLIDE - pilot lights & sockets - Industrial Devices

™MINISOURCE - power supply - Elasco

™MINI-SPEED - over/under speed switch - Electro Corp.

™MINISPLICE - miniature size splicing equipment - Autosplice/Dv Gen Staple

™MINI-SPLIT - special effects generator - Dynair Elctrns. Inc.

™MINISTAC - sub-miniature high bridge - Semtech Corp.

™MINISTAC FAST - high voltage silicon rectifier - Semtech Corp.

™MINISTIC - sub-miniature silicon rectifier - Semtech Corp.

™MINI-STORE - commercial core memory system - Dataproducts Corp.

™MINI-STUD - miniature silicon voltage regulator - Semtech Corp.

™MINI-STUD - superfast silicon rectifiers - Semtech Corp.

™MINISWITCH - digital (thumbwheel) switches - Digitran Co.

™MINI-SYNCLAMPS - min. servo clamps - Timber-Top, Inc.

™MINI-SYSTEM - digital strain recorder - B & F Instrs., Inc.

MINI-SYSTEMS, INC., Dept. EM, 20 David Rd., North Attleboro, Mass. 02761, Tel: 617-695-0206, TWX: 710-348-0564; FSC No.: 50316; Empl.: 58 p. 2983,3699

Local Sales Offices & Reps.

Ariz	Phoenix, Clemick-Neenan	602-279-7649
Cal	Los Angeles, Clemick-Neenan	213-476-1272
NY	Huntington Sta., E-F Technical Sls.	516-549-1818
Wash	Seattle, Blair Hirsh Co.	206-783-3423

™MINITAC - connectors - Hypertronics Corp.

™MINI-TACH - f-to-dc converter - Electro Corp.

™MINIT-CURE - epoxy adhesive - Allaco Prods Div.

™MINI-TECH - patch & monitor modules - International Data Sciences

™MINI-TEST - continuity tester - Industrial Devices

™MINI-TEST - data com interface monitor & bkout panels - International Data Sciences

™MINITHIN - thin wall teflon wire - Thermax Wire Corp.

™MINI-TWISTER - wire twisting device - Storm Products Co.

™MINI-VOLT - voltage testers - Industrial Devices

™MINI-3 - 3 input video switcher - Dynair Elctrns. Inc.

™MINI-6 - video switcher - Dynair Elctrns. Inc.

MINNEAPOLIS SCIENTIFIC CONTROLS CORP., Dept. EM, 5555 W. 78th St., Minneapolis, Minn 55424

MINNEAPOLIS SPEAKER CO., Dept. EM, 3806 Grand Ave. S., Minneapolis, Minn. 55409, Tel: 612-825-1010; FSC No.: 14208

Sales Manager: D.C. Ringham

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Ala	Birmingham, J.F. Russell Sls. Co.	205-822-2196
Cal	Van Nuys, M. Roth Sls. Co.	213-989-3738
Fla	Tampa, Rektronic Mktg	
Ill	Chicago, T. Pappas & Assoc.	312-685-2338
Kans	Shawnee Mission, E. Bettis Co.	913-362-0772
Md	Columbia, Par-Nell Sls. Co.	301-992-5454
Mich	Bloomfield Hills, Central Elctrns. Sls. Co.	313-852-4308
Mo	St. Louis, M. E. Bettis Co.	314-429-2099
NY	Roslyn Heights, S.I.R. Sls., Inc.	516-621-7485
NY	Syracuse, Wm. Tauber Co.	315-446-7094
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Ohio	Goshen, J.O. Olsen Co.	513-625-6791
Pa	Holland, Par-Nell Sls. Co.	215-355-9330
Pa	Pittsburgh, J.O. Olsen Co.	412-341-8391
SC	Greenville, H.C. Norman Sls. Co.	802-244-6254
Tenn	Memphis, H. C. Norman Sls.	901-683-7616
Tex	Dallas, Techno Assocs.	214-357-9213
Wash	Seattle, D. Smith Sls. Co.	206-633-3160

MINNESOTA ELECTRIC TECH. INC., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104, Tel: 612-644-7851, Telex: 297430

Local Sales Offices & Reps.

Cal	Santa Monica, Davidson Assoc. Inc.	213-829-1731
Ind	Indianapolis, EMSCO	317-849-2769
Mich	Southfield, Doral Sls. Co.	313-352-1667
Minn	St. Paul, Vikeland Sls. Inc.	612-645-4647
NY	Rochester, Tacom Sls. Co.	716-647-3940
Ohio	Vandalia, W. J. Brauer & Assoc.	513-898-1224
Ohio	Wickliffe, W. J. Brauer & Assoc.	216-943-0601
Pa	Pittsburgh, W. J. Brauer & Assoc.	412-921-3213

MINNESOTA RUBBER CO., Dept. EM, 3630 Wooddale Ave., Minneapolis, Minn. 55416, Tel: 612-929-6781; Empl.: 800

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Cal	Los Angeles, Minnesota Rubber Co.	213-927-4788
Colo	Denver, Todd & Assoc.	303-761-7801
Ill	Chicago, Minnesota Rubber Co.	312-298-3777
Ind	Indianapolis, Minnesota Rubber Co.	317-251-5958
Iowa	Bettendorf, Minnesota Rubber Co.	319-355-1021
Mich	Detroit, Minnesota Rubber Co.	313-535-4949
Minn	Minneapolis, Minnesota Rubber Co.	612-929-6781
Mo	St. Louis, Minnesota Rubber Co.	314-725-9400
NJ	Wayne, Minnesota Rubber Co.	201-694-3062
NY	N Y, Minnesota Rubber Co.	212-563-0365
NY	Rochester, Minnesota Rubber Co.	716-381-8125
NC	Charlotte, Minnesota Rubber Co.	704-536-3360
Ohio	Cleveland, Minnesota Rubber Co.	216-886-0990
Tex	Dallas, Andy & Assoc.	214-357-3978
Wisc	Milwaukee, Minnesota Rubber Co.	414-461-6200

™MINNIE - connector - Amphenol North America Div.

™MINNISCRUBBERS - tuner cleaner aditive - Tech Spray, Inc.

™MIPS - microwave pulse storage - Tasker Systems

™MIRR-MAID - mirror pictures - Thin Film Services

™MIRROPANE - transparent mirrors - Libbey Owens-Ford Co.

™MISCO REDLINE - replacement & specialty speakers - Minneapolis Speaker Co.

™MISER - micropower led flasher (1C) - Lithic Systems, Inc.

™MISSILITE - Rectangular Annunciator Light - Illuminated Products Inc.

MITEG INC., Dept. EM, 100 Ricefield La., Hauppauge, N.Y. 11787, Tel: 516-543-8873, TWX: 510-226-3781; Empl.: 35

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Cal	Mountain View, Microwave Mktg. Assocs.	415-969-3355
Cal	North Hollywood, Crown Elctrns.	213-877-3550
NJ	Haworth, Central Assocs.	201-568-0808
NJ	Moorestown, N. Stern	609-234-0661
NY	Plainview, Central Assocs.	516-433-0808
Ohio	Dayton, Ashby Assocs.	513-252-5627

MITSUBISHI INT'L CORP., MGA Div., Dept. EM, 7045 N. Ridgeway Ave., Lincolnwood, Ill. 60645

MITSUMI ELEC. CO., LTD., Dept. EM, 8-2, 8-Chome, Kokuryo, Chofu-City, Tokyo, Japan, Tel: 489-5333, TWX: J28846/J24935; Empl.: 1500

Local Sales Offices & Reps.

NY	Flushing, Mitsumi Electronic Corp.	212-271-3722

™MIX-KIT - package device for 2-part compounds - Hardman Inc.

MKC ELECTRONICS, Dept. EM, 454 E. Donovan Rd., Kansas City, Kans. 66115, Tel: 913-371-1351; Empl.: 26

™MKS BARATRON - pressure-vacuum meter - MKS Instrs., Inc.

MKS INSTRS., INC., Dept. EM, 22 Third Ave., Burlington, Mass. 01803, Tel: 617-272-9255; Empl.: 75

™MLC - multilayer monolytic capacitor - Radio Materials Co.

™ML6 - hi-friction, precision, elastomeric coatings - Meridian Lab. Inc.

™MMD-1 - mini micro designer - E & L Instruments, Inc.

M M ELCTRN. ENCLOSURES, Dept. EM, 111 Bloomingdale Rd., Hicksville, N.Y. 11801, Tel: 516-935-9400, TWX: 510-221-1857

Local Sales Offices & Reps.

Ala	Huntsville, BJR Inds.	205-881-3569
Ariz	Scottsdale, Vinson	602-947-7371
Cal	Los Angeles, Daton Engrg. Co.	213-479-4211
Cal	Santa Clara, Vico Sls. Co.	408-298-5944
Colo	Denver, Vinson Assocs.	303-757-5151
Conn	Kensington, N.S. Stachalek	203-VA 8-4587
Fla	Indian Rocks Bch., Tech. Rep.	813-595-2834
Fla	Melbourne, Tech. Rep. Assocs.	305-723-9140
Ga	Jonesboro, Tech. Rep. Assocs.	404-753-0111
Ill	Northfield, Adcon Assocs.	312-446-6486
Kans	Mission, Tech. Sls. Assocs.	913-831-2888
Mass	W. Acton, K.B. Reidy	617-CO 3-7146
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Mpls., Hasse & Assocs.	612-588-0551
Mo	St. Louis, Tech-Sls.	314-725-5361
NJ	Haddonfield, M & S Assocs.	609-HA 9-7055
NJ	Raritan, J & L Assocs.	201-722-0682
NM	Albuquerque, Vinson Assocs.	505-298-7442
NY	Utica, R. J. Davis Assoc.	315-724-5773
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Pa	Pittsburgh, Carter, McCormic & Peirce, Inc.	412-824-3760
Tex	Dallas, Blair Engrg. Sls.	214-352-8411

™MMOS - MOS logic IC's - Motorola Semiconductor Prods.

MOBAY CHEM. CORPORATION, Dept. EM, Pittsburgh, Pa. 15205, Tel: 412-923-2700

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Ga	Atlanta	404-955-1348
Ill	Chicago	312-297-0550
Mich	Southfield	313-559-3560
NJ	Mountainside	201-654-6200
Ohio	Akron	216-762-0351

™MOBILARM - back-up alarms - Midwest Electronic Industries

™MOBILEFLASH - alternating flasher - Midwest Electronic Industries

MOBIL ELECTRONICS, INC., Dept. EM, Box 1132, Anderson, Ind. 46015, Tel: 317-642-7976; Empl.: 6-9

™MOBILFONE - radio communication equip. - Mobil Electronics, Inc.

™MOBILITE - L.V. lights - Midwest Electronic Industries

™MOBILMATIC - remote control - Mobil Electronics, Inc.

™MOBILPAGE - business sound system - Midwest Electronic Industries

™MOBILPAK - electronic components - Mobil Electronics, Inc.

™MOBILTEL - mobile telephone equipment - GTE Lenkurt Inc.

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(TM)MOBILTEMP - remote temp. indicator - Midwest Electronic Industries

(TM)MOBILTONE - tone signalling equip. - Mobil Electronics, Inc.

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(TM)MODEL AP - tape/ticket printer - ITT General Controls

(TM)MODEL D DECADE - digital printer - ITT General Controls

(TM)MODEL T - sync instrument motor - Hurst Mfg. Corp.

(TM)MODEL UP - universal ticket printer - ITT General Controls

(TM)MODEMS - medium and high speed data sets - International Communications

MODPAK, Dept. EM, 31 A Green St., Waltham, Mass. 02154, Tel: 617-891-7048, TWX: 710-324-6484; Empl.: 4

Local Sales Offices & Reps.

Cal	Downey, Trimarco Wright, Inc.	213-861-8244
Cal	Los Altos, Wright Eng.	415-941-4405
Colo	Englewood, Cliff-John Elctrns.	303-770-2300
Colo	Inglewood, Mikro-Sls. Co., Inc.	303-770-2623
Conn	Durham, Marr Electric Co.	203-349-9691
Fla	Palm Bay, Spar-Tech Assocs.	305-727-8045
Ga	Smyrna, Spar-Tech Assocs.	404-432-3644
Ill	AMF O'Hare, W. T. Adames Sls.	312-956-7685
Mass	Waltham, Russell Engrg. Sls.	617-458-7146
NY	Bridgeport, Lightstone Corp.	315-699-5747
NY	Dix Hill, K & J Engrg. Co.	516-242-0888
NY	Huntington Sta., E.F. Tech. Sls.	516-549-1818
Pa	Ambler, WM Assocs.	215-643-4119
Va	Alexandria, Vanguard	703-768-1660

(TM)MOD POT - hot molded variable resistors (modular) - Allen-Bradley Co.

(TM)MODSCAN - data acquisition & control systems - LFE Control System Industries

(TM)MODUCAL - lightweight fiberglass panels - SGL Graphics

(TM)MOD-U-CARD - modular plug-in circuit cards - NES, Inc.

(TM)MODU/FLEX - electronics enclosure - Industrial Fabrication

(TM)MODULAIR - cabinet panel - Rotron, Inc.

MODULAR AUDIO PRODUCTS, Dept. EM, 50 Orville Dr., Bohemia, N.Y. 11716, Tel: 516-567-9620; FSC No.: 52202; Empl.: 5

Sales Manager: R. Belmont

Local Sales Offices & Reps.

Cal	Marina Del Rey, Cara Pacific Sls. Co.	213-821-7898
Ill	Hinsdale, J. D. Allyn Co.	312-325-0495
Ohio	Dayton, Rixan Assoc.	513-278-4216
Exp:	N.J., Teaneck, Sylvan Ginsbury Ltd.	201-837-1100

MODULAR COMPUTER SYSTEMS, Dept. EM, P.O. Box 6099, Ft. Lauderdale, Fla. 33310, Tel: 305-974-1380

MODULAR DEVICES, INC., Dept. EM, 50 Orville Dr., Bohemia, N. Y. 11716, Tel: 516-567-9620; FSC No.: 52202; Empl.: 28

Sales Manager: R. Belmont

Local Sales Offices & Reps.

Exp:	Cal., San Diego, Total Elctrns. Int'l.	714-224-3291
Exp:	Ill., Hinsdale, J.D. Allyn Co.	312-325-0495
Exp:	Ohio, Dayton, Rixan Assocs.	513-278-4216

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(TM)MODULE-MASQ - semi-automatic selective gold plating sys. for sheet & strip. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)MODULE-MATIC - tape controlled plating sys. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)MODULENS - controlled light transmission - SGL Graphics

(TM)MODULES - computer system - Artronix, Inc.

(TM)MODULE-X - modular plating equip. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)MODULINE - rotary switches - Oak Inds. Inc.

(TM)MODULITE - sign panels and displays - SGL Graphics

(TM)MODUL/MATIC - color analyzer - Lektra Labs., Inc.

(TM)MODULOAD - rf loads with integral heat exchangers - Bird Electronic Corp.

(TM)MODULOK - terminal blocks - Burndy Corporation

(TM)MODU-MOUNT CABINETRY SERIES 50 - 11 gage construction relay racks - MarkHon Industries Inc.

(TM)MODU-MOUNT CABINETRY SERIES 70 - rfi cabinetry - MarkHon Industries Inc.

(TM)MODU-MOUNT CABINETRY STYLELINE 4000 SERIES - 14 gage construction relay racks - MarkHon Industries Inc.

(TM)MODUPAC - modular logic circuits - Analogic Corp.

(TM)MODUPERF - modular tape perforator - Data Specialties

(TM)MODUPRINT - printers - Practical Automation, Inc.

(TM)MODUPULSE - cctv accessories - Vicon Industries Inc.

MODUTEC, INC., Dept. EM, 18 Marshall St., Norwalk, Conn. 06854, Tel: 203-853-3636, TWX: 710-468-2039; Empl.: 300 .... p. 2900-2903

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assocs.	205-881-5031
Cal	Los Gatos, Luscombe Engrg. Co.	408-354-6496
Cal	Pasadena, Luscombe Engrg. Co.	213-684-2000
Colo	Arvada, Arrowhead Sls. Co.	303-423-5556
Conn	Bristol, New England Elctrn. Sls.	203-583-3650
Fla	Fort Lauderdale, Beacon Elctrn. Assoc.	305-776-6074
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assocs.	404-351-3654
Ill	Arlington Hts., Brainard-Wilson Mktg.	312-437-2700
Ind	Indianapolis, Brainard-Wilson Mktg.	317-844-2800
Kans	Prairie Village, Engrg. Service Co.	913-649-4000
Md	Randallstown, Beacon Elec. Inc.	301-922-1248
Mass	Canton, New England Elctrn. Sls. Corp.	617-828-4835
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, R.J. Inc.	612-922-1425
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NJ	Englewood Cliffs, Sprung/Nussbaum, Inc.	201-947-6767
NJ	Marmora, Holdsworth & Co.	609-398-4340
NM	Albuquerque, Aztec Enterprises, Inc.	505-255-2440
NY	DeRuyter, R.P. Kennedy Co.	315-682-2299
NY	Red Hook, R.P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322
NC	Charlotte, Beacon Elctrn. Assoc.	704-525-7412
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Pa	Newtown Square, Holdsworth & Co.-SWR	215-356-8550
Tenn	Oak Ridge, Beacon Elctrn. Assoc.	615-482-2409
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Va	Falls Church, Beacon Elctrns.	703-534-1673
Va	Lynchburg, Beacon Elctrns.	804-237-4740
Wash	Seattle, Barrett Squibb, Inc.	206-632-2450
Exp:	New York N.Y., Frathom Co.	212-687-9390

Local Distributors

Cal	Lakeside, Mouser Elctrns.	714-449-2220
Cal	Riverside, Materiel Techniques, Inc.	714-686-6186
Colo	Denver, Denver Elctrns.	303-934-2406
Conn	Norwalk, Audiotronics	203-838-4877
Ill	Niles, Joseph Elctrns., Inc.	312-297-4200
Ind	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
NY	Farmingdale, Harrison Radio Corp.	415-293-7990
NY	Hempstead, Davis Elctrns. Corp.	516-483-9200
NY	New York City, Harvey Radio Co.	212-575-5200
Pa	Philadelphia, Sunshine Scientific, Inc.	215-673-5600
Tex	Houston, Electrotex	713-526-3456
Utah	Salt Lake City, Kimball Elctrns., Inc.	801-328-2075
Wash	Olympia, J.W. Elctrns., Inc.	206-943-1071
Wash	Seattle, Western Electrns.	206-284-0200
Wash	Seattle, Electronics Supply Co.	206-632-2222
Wash	Seattle, Amateur Radio Supply	206-767-3222
Wash	Spokane, H.C.J. Elctrns.	509-924-2343
Wisc	Milwaukee, Electro-Mechano Co.	414-272-4050

(TM)MODUTRIM - microminiature ceramic variable capacitors - JFD Electronics Components Corp.

(TM)MOHAWK - fan - Rotron, Inc.

MOHAWK DATA SCIENCES CORP., Administrative Hdqts., Dept. EM, Palisade St., Herkimer, N.Y. 13350, Tel: 315-867-6000, Telex: 939454; Empl.: 3800

Local Sales Offices & Reps.

Cal	Anaheim, J. Engstrom	714-772-0803
Mass	Waltham, H. Johnson	617-890-5870
Exp:	Herkimer, E. Gilbert	315-867-6181

MOHAWK OEM SALES, Dept. EM, 1008 West 8th Ave., King of Prussia, Pa. 19406, Tel: 215-337-1910, Telex: 84-6453; Empl.: 5400

Local Sales Offices & Reps.

Cal	Anaheim	714-772-0803
Cal	Los Angeles	213-933-5571
Cal	San Mateo	415-573-6400
Fla	Orlando	305-841-3091
Ill	Oak Brook	312-654-8630
Ind	Indianapolis	317-243-7547
Mass	Waltham	617-890-5870
Mich	Southfield	313-352-9160
Mo	Clayton	314-727-0175
NY	Liverpool	315-457-3248
NY	Utica	315-792-2022
Ohio	Independence	216-398-4700
Pa	Wayne	215-687-8452
Tenn	Nashville	615-383-1393
Tex	Houston	713-681-6601
Va	Richomnd	804-359-9283
Wisc	Wauwatosa	414-771-7830
Exp:	Utica, N.Y.	315-792-2045

(TM)MOISTURPUMP - industrial dehumidifiers - Electro Impulse

™MOLALLOY - solid lubricant components - Pure Carbon Co., Inc.

™MOLAN - computer control language - Harrel, Inc.

™MOLD-EASE CONC. PCR - mold lubricant - Merix Chem. Co.

™MOLDED HEAT - molded to shpae electrical heater - Sierracin/Thermal Sys.

MOLDING TECHNOLOGY INC., Dept. EM, Ivyland, Pa. 18974, Tel: 215-355-3110, Telex: 831457; Empl.: 80

Sales Manager: E.O. Goelz

Local Sales Offices & Reps.

Ariz	Scottsdale, Allen Assocs.	602-994-1305
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Mass	Duxbury, T. M. Walsh Assocs.	617-585-6440
Mass	Framingham, John Breen	203-247-8604
Mich	Royal Oak, Murray A. Percival and Co.	313-548-1971
Minn	Minneapolis, D. G. Perry Co.	612-835-3313
Mo	Kansas City, Manufacturers Mktg. Assoc.	816-361-6859
NY	Lewiston, Watmet Inc.	716-285-3595
NC	Charlotte, Triple E Sls. Inc.	704-535-2894
Pa	Bala Cynwyd, Electech	215-687-5305
Tex	Dallas, Molding Technology Inc.	
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979
Wisc	Milwaukee, M. W. Entprs. Inc.	414-352-9150

MOLDTRONICS, INC., Dept. EM, 707 Roger St., Downers Grove, Ill. 60515, Tel: 312-968-7000; Empl.: 170

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	San Diego, Miracle & Assocs.	714-276-8619
Cal	San Jose, United Sls. Co.	408-379-0800
Colo	Denver, Thorson Co.	303-759-0809
Fla	Orlando, Hi-Co Assocs.	305-273-0571
Ga	Atlanta, Davidson Co.	404-993-4570
Ill	Hinsdale, Hill-Gray Assocs.	312-325-4810
Ind	Indianapolis, Stoltenberg Sls. Co.	317-547-1169
Iowa	Marion, Thomas & Modrcin Assocs.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assocs.	913-432-2131
Md	Woodbine, Naudain Assocs.	301-252-5378
Mass	Wellesley Hills, Michael Scott Co.	617-235-0102
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	Hazelwood, Thomas & Modrcin Assocs.	314-895-4700
NJ	Mount Laurel, Naudain Assocs.	609-235-1801
NY	Rochester, Fowler Beach Corp.	716-586-0468
Ohio	Dayton, H. G. Lake Co.	513-277-8181
SC	Columbia, Davidson Co.	803-788-3538
Tenn	Nashville, Davidson Co.	615-356-2905
Tex	Garland, G. V. Peck Co.	214-341-8311
Wash	Bellevue, H. Paulman Sls.	206-455-3311

MOLECU-WIRE CORP., Dept. EM, P.O. Box 495, Farmingdale, N.J. 07727, Tel: 201-922-9400, TWX: 710-723-6943; Empl.: 150

Local Sales Offices & Reps.

Cal	La Canada, R. D. Dahl Co.	213-790-6111
Ill	Chicago, Kennedy Engrg.	312-631-8283
Minn	Wayzata, Schlenker & Assoc.	612-473-5417
Mo	St. Louis, Renner & Co.	314-434-3623
NJ	N. Plainfield, Tri-J Corp.	201-469-9300
Ohio	Cleveland, Qualiform Insul.	216-671-8300
Pa	Pittsburgh, Patterson Elec. Co.	412-244-1818
Wash	Seattle, Comptronics	206-284-4842

MOLEX INC., Dept. EM, 2222 Wellington Ct., Lisle, Ill. 60532, Tel: 312-969-4550; Empl.: 1000; Minimum order: $B. Ryan .... p. 2124-2127

Sales Manager: B. Hickey; *Distributor Manager:* B. Ryan

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Encino, R.H. McDonald & Assocs.	213-986-5832
Cal	Mt. View, Cindel Sls.	415-965-2630
Cal	Westlake Village, D. Barton	213-991-2026
Colo	Denver, Thorson Co.	303-759-0809
Fla	Pompano Beach, V.G. Sls.	305-971-0900
Ill	Crystal Lake, E.S. Healy & Assocs.	815-459-4386
Ind	Crawfordsville, D. Miller & Assocs.	317-362-6348
Ind	Fort Wayne, Insul-Reps.	219-482-1596
Kans	Overland Park, Palatine Engrg. Sls.	913-262-5643
Mass	Andover, Sales Engrg. Co.	617-470-0800
Mich	Benton Harbor, Hampton Askin & Assocs.	616-925-0341
Mich	Warren, W. Harte	313-574-2890
Minn	Minneapolis, C. Diehl	612-854-4448
Mo	Bridgeton, B. Roberts	314-291-1694
NJ	Sparta, A.B. Jent	201-729-2128
NJ	Springfield, F. F. Sylvester Assocs.	201-376-3324
NY	Canandaigua, D. Nebbia	315-394-3960
NY	Rochester, L-Mar Assocs.	716-328-5240
Ohio	Mansfield, R. Meckling Assocs.	419-526-1250
Pa	Malvern, E. Caporellie	215-647-9400
Pa	Pittsburgh, Sheridan Assocs.	412-244-1640
Tenn	Chattanooga, Peirson, Deakins & McGinness	615-821-4501
Tex	Houston, Thorson Co.	713-771-3504
Tex	Richardson, Palatine Sls. Inc.	214-231-9489
Va	Lynchburg, Barnhill & Assocs.	804-846-4624
Wash	Bellevue, H. Paulman Sls.	206-455-3311

Local Distributors

Cal	Chalsworth, Westates	213-341-4411
Cal	Inglewood, Force Elctrns.	213-328-6112
Cal	S. San Francisco, Peters-delaet	415-873-9595
Cal	Sunnyvale, Westates	714-964-1700
Colo	Denver, Integrated Elctrns.	303-534-6121
Fla	Pompano Beach, Components South	305-971-0900
Ill	Chicago, Waldom Elctrns.	312-585-1212
Ill	Crystal Lake, Sub-Sem	815-459-4139
Ill	Mount Prospect, Magnuson Elctrns.	312-956-0700
Mass	Waltham, Impact	617-893-2850
Mass	Watertown, DRW Elctrns.	617-923-1900
Mich	Kentwood, R-M Elctrns. Co.	616-531-9300
Minn	Minneapolis, Industrial Comps.	612-831-2666
Mo	St. Charles, Lectronix	800-325-3348
NJ	Camden, Genral Radio	609-964-8560
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Plainview, Progress Elctrns	516-433-1700
Ohio	Beachwood, Sheridan Sls. Co.	216-831-0130
Ohio	Reading, Sheridan Sls. Co.	513-761-5432
Pa	Harrisburg, Pyttronic Inds.	
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Houston, Solid State Elctrns.	713-785-5436
Va	Lynchburg, Components Unlimited	804-847-1015
Wash	Seattle, Radar Electric	206-282-2511
Wash	Seattle, Almac/Stroum	206-763-2300

MOLEX PRODUCTS, INC., Dept. EM, 5224 Katrine, Downers Grove, Ill. 60515, Tel: 312-969-4550, TWX: 910-695-3229; Empl.: 1000

Local Sales Offices & Reps.

Cal	Chatsworth, Westates Elctrns.	213-341-4411
Cal	Encino, R. H. McDonald & Assocs.	213-986-5832
Cal	Inglewood, Force Elctrns.	213-776-1324
Cal	Mountain View, Cindel Sales, Inc.	415-965-2630
Cal	S. San Francisco, Peters-deLaet	415-873-9595
Colo	Denver, Thorson Co.	303-759-0809
Colo	Denver, Integrated Elctrns.	303-534-6121
Fla	Clearwater, WMM Assocs.	813-447-2533
Ill	Chicago, Waldon Elctrns.	312-585-1212
Ill	Crystal Lake, E.S. Healy & Assocs.	815-459-4386
Ill	Mt. Prospect, Magnuson Elctrns.	312-956-0700
Ind	Crawfordsville, Dale A. Miller & Assocs.	317-362-6348
Kans	Overland Park, Palatine Engrg. Sls.	913-262-5643
Mass	Andover, Sls. Engrg. Co.	617-470-0800
Mass	Watertown, DRW Elctrns.	617-923-1900
Mich	Benton Harbor, Hampton, Askin & Assocs.	616-925-0341
Mich	Kentwood, ROM Elctrns. Co.	
Mich	Southfield, D.D. Douglass & Assocs.	313-352-7180
Minn	Bloomington, Chuck Diehl	612-854-4448
Minn	Minneapolis, Industrial Comps.	612-831-2666
Mo	St. Louis, Palmer Still & Assocs.	314-993-2077
NJ	Riverton, Valley Sls.	609-829-2892
NM	Albuquerque, Cleveland Enterprises, Inc.	505-345-2481
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Lynbrook, P. Saftler & Assocs.	516-593-7880
NY	Plainview, Progress Elctrns.	516-443-1700
NY	Rochester, L-Mar Assocs.	716-328-5240
Ohio	Mansfield, Ralph Meckling & Assocs.	419-524-5963
Ohio	Reading, Sheridan Sls. Co.	513-761-5432
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Pa	Pittsburgh, Sheridan Assocs., Inc.	412-244-1640
Tenn	Chattanooga, Peirson, Deakins & McGinness	615-821-4501
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Richardson, Palatine Sls., Inc.	214-231-9489
Va	Lynchburg, Glen White Assocs.	804-846-4624
Va	Lynchburg, Components Unltd.	804-847-1015
Wash	Seattle, Radar Elctric	206-282-2511

Local Distributors

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Northridge, R. H. McDonald & Assocs.	213-349-7911
Cal	San Diego, Mesa Engrg. & Sls.	714-278-8021
Colo	Denver, Thorson Co.	303-759-0809
Fla	Pompano Beach, V.G. Sls.	305-971-0900
Ind	Ft. Wayne, Insul-Reps	219-482-1596
Kans	Lenexa, Palatine Engrg. Sls.	913-492-7020
Mich	Warren, W. Harte	313-574-2890
Wash	Medina, H. Paulman Sls.	206-455-3311

™MOLGARD - mold release agent - Ram Chems.

™MOLI-SPRAY - Lubricants, molybdenum disulfide aerosol - Rogers Corp.

MOLON MOTORS & COIL CORP., Dept. EM, 3737 Industrial Ave., Rolling Meadows, Ill. 60008, Tel: 312-259-3750, TWX: 910-687-0428; Empl.: 300

Local Sales Offices & Reps.

Cal	Sunnyvale, RDX Corp.	408-734-4500
Cal	Torrance, O'Donnell & Assocs.	213-323-9243
Colo	Denver, Parker Webster	303-770-1972
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Mich	Benton Harbor, I.E. Hampton & Assocs.	616-925-0341
Minn	Minneapolis, Molon Motor & Coil Corp	612-835-4255
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Great Neck, Pacent/DiBlasi	516-482-4678
Ohio	Cleveland, E.B. Kaercher	216-TE1-8098
Ohio	Peppers Pike, Kaercher	216-831-8098
Pa	Cornwall Hghts., W.D. Staats	215-ME9-5231
Tex	Dallas, ION Assocs.	214-357-9441

™MOLYDAG - dry film lubricants - Acheson Colloids Co.

™MOLYSPRAY - molybdenum metallizing wire - Philips Elmet Corp.

MONACO ENTERPRISES, Dept. EM, Box 22484, Denver, Colo 80222

™MONARCH - rotary converter - Carter Motor Co.

MONARCH MARKING SYS., Dept. EM, Box 608, Dayton, Ohio 45401, Tel: 513-866-7401; Empl.: 1200

Local Sales Offices & Reps.

Cal	Garden Grove	714-893-0511
Cal	San Leandro	415-351-7243
Ga	Atlanta	404-691-5455
Ill	Chicago	312-282-3900
Mass	Framingham	617-879-5800
Mich	Farmington	313-477-8800
NJ	Fairfield	201-227-1855
NY	New York	212-736-1715
NC	Charlotte	704-535-0520
Ohio	Centerville	513-433-4351
Tex	Dallas	214-631-4890

MONITOR LABS, INC., Dept. EM, 4202 Sorrento Vly. Blvd., San Diego, Cal. 92121, Tel: 714-453-6260, TWX: 910-337-1278; Empl.: 85

Local Sales Offices & Reps.

Ala	Huntsville, F.M. Assocs.	205-536-9990
Colo	Boulder, Measurement Conslts.	303-499-5294
Fla	Jupiter, F. M. Assocs.	305-746-2996
Fla	Orlando, F.M. Assocs.	305-851-5710
Ga	Atlanta, F. M. Assocs.	404-634-7830
Ill	Palatine, Qumran	312-358-8660
Kans	Prairie Village, J. Shartran Co.	913-362-0204
Md	Silver Spring, Monitor Labs East	301-587-7332
Mass	Nonatum, ETA Assocs.	617-527-4544
Minn	Anoka, Ken Haugen & Assoc.	612-421-3395
NM	Albuquerque, Measurement Conslts.	505-265-6471
NM	Las Cruces, Measurement Conslts.	505-526-2491
NC	Greensboro, F.M. Assocs.	919-294-2754
Pa	Pittsburgh, K. J. Lesker Co.	412-892-2996
Tex	Houston, Ind'l Sci.	713-528-1258
Wash	Mercer Island, S.E.A.	206-232-6550

MONITOR PRODS., Dept. EM, Box 1966, 502 Via Delmonte, Oceanside, Cal. 92054, Tel: 714-433-4510, TWX: 910-322-1381; Empl.: 80 .... p. 2462

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	Burbank, Socal Frequency Sls.	213-843-4075
Cal	Los Altos, S. Loeswick	415-948-3265
Colo	Denver, Electrodyne, Inc.	303-757-7679
Conn	Rocky Hill, Walworth Controls	203-563-4380
Fla	Indian Rock Bch., Tech. Rep. Assocs., Inc.	813-595-2834
Ill	Glenview, Crimson Engrg.	312-724-1780
Iowa	Cedar Rapids, H. R. Brown Assoc.	319-366-0635
Minn	Minneapolis, Elctrn. Innovators	612-884-7471
NY	Great Neck, Trionic Assoc.	516-466-2300
NY	Rochester, L-Mar Assocs.	716-328-5240
NY	Syracuse, L-Mar Assocs.	315-437-7779
Tex	Dallas, Tesco	214-328-5484
Utah	Salt Lake City, Electrodyne, Inc.	801-277-8392

MONITOR SYSTEMS, see Aydin Monitor Systems

(TM)MONOBEAM - infrared analyzers - Beckman Instrs., (AISSD)

(TM)MONO BLOC - single shaft M-G set - KW Controls Inc.

(TM)MONOBLOC - monolithic ceramic capacitors - Erie Technological Products

(TM)MONOBOND - epoxy adhesive - Packaged Resins Div.

(TM)MONOCERAM - monolythic type ceramic capacitor - San Fernando Elec. Mfg.

(TM)MONOCHIP - custom integrated circuit - Interdesign Inc.

(TM)MONO-GLASS - glass encapsulated - Centralab/USCC

(TM)MONO-KAP - ceramic capacitors - Centralab/USCC

MONOLITHIC MEMORIES INC., Dept. EM, 1165 E. Arques Ave., Sunnyvale, Cal. 94086

(TM)MONO-POLE - steel antenna supporting mast structures - Telrex Labs.

(TM)MONOPOXY - single-component epoxy resin adhesive - Hardman Inc.

(TM)MONOXOR - carbon monoxide detector & indicator - Bacharach Instrument Co.

MONROE, THE CALCULATOR CO., Div. Litton Inds., Dept. EM, Box 9000R, Morristown, N.J. 07960, Tel: 201-540-7635, TWX: 710-986-7445; Empl.: 3000

Local Sales Offices & Reps.

Ala	Birmingham	205-933-1120
Ala	Dothan	205-792-8922
Ala	Florence	205-764-1491
Ala	Gadsden	205-492-7430
Ala	Huntsville	205-536-1721
Ala	Mobile	205-479-4531
Ala	Montgomery	205-264-8455
Ala	Tuscaloosa	907-344-9431
Alas	Anchorage	907-279-0311
Ariz	Flagstaff	602-774-4332
Ariz	Phoenix	602-263-0694
Ariz	Tucson	602-327-6607
Ariz	Yuma	602-782-4265
Ark	Fort Smith	501-646-3449
Ark	Little Rock	501-372-3487
Cal	Bakersfield	805-327-3556
Cal	Canoga Park	213-884-9621
Cal	Chico	916-342-8914
Cal	Eureka	707-442-5037
Cal	Fresco	209-233-8634
Cal	Long Beach	213-595-1738
Cal	Los Angeles	213-385-6141
Cal	Merced	209-722-8200
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Cal	San Bernardino	714-886-5358
Cal	San Carlos	415-592-2610
Cal	San Diego	714-276-8920
Cal	San Francisco	415-986-4001
Cal	Santa Ana	714-534-6292
Cal	Santa Clara	408-984-7464
Cal	Santa Rosa	707-542-3002
Cal	South El Monte	213-579-5550
Cal	Stockton	209-948-8008
Cal	Vallejo	707-643-5265
Cal	Ventura	805-642-1364
Cal	Visalia	209-732-0213
Colo	Boulder	303-443-2030
Colo	Colorado Springs	303-633-4467
Colo	Denver	303-757-1274
Colo	Grand Junction	303-243-1910
Colo	Pueblo	303-544-1506
Conn	Fairfield	203-366-4591
Conn	New Haven	203-777-3437
Conn	Newington	203-667-0848
Conn	Uncasville	203-848-1211
Conn	Waterbury	203-756-3619
Del	Wilmington	302-478-1440
DC	Washington	202-337-5100
Fla	Cape Coral	813-542-4326
Fla	Cocoa Beach	305-783-4130
Fla	Gainesville	904-378-3340
Fla	Jacksonville	904-396-2707
Fla	Miami	305-649-8303
Mo	Joplin	417-623-5273
Mo	Kansas City	816-221-3285
Mo	Springfield	417-866-5245
Mo	St. Joseph	816-279-2600
Mo	St. Louis	314-645-4080
Mont	Billings	406-259-4592
Mont	Butte	406-792-1251
Mont	Great Falls	406-452-7177
Mont	Helena	406-442-9283
Mont	Missoula	406-549-5757
Neb	Grand Island	308-382-4629
Neb	Lincoln	402-435-2941
Neb	Norfolk	402-371-9638
Neb	Omaha	402-342-5581
Nev	Las Vegas	702-735-4314
Nev	Reno	702-323-0008
NH	Keene	603-352-6202
NH	Manchester	603-669-7667
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NJ	Gloucester	609-456-8550
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NC	Asheville	704-253-1811
NC	Charlotte	704-333-9659
NC	Fayetteville	919-424-2650
NC	Greensboro	919-273-9476
NC	Hickory	704-327-8911
NC	Kinston	919-523-5293
NC	Raleigh-Durham	919-782-9510
NC	Rocky Mount	919-442-9841
NC	Wilmington	919-763-4317
NC	Winston-Salem	919-724-6929
ND	Bismarck	701-223-1843
ND	Fargo	218-233-1589
ND	Grand Forks	701-775-5021
ND	Minot	701-839-3200
Ohio	Akron	216-535-4185
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Ohio	Cincinnati	513-751-1120
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Pa	Bradford	814-368-8094
Pa	Butler	412-287-5706
Pa	DuBois	814-371-8750
Pa	Dupont	717-655-2951
Pa	Erie	814-452-2050
Pa	Greensburg	412-837-3950
Pa	Harrisburg	717-564-8270
Pa	Havertown	215-528-5246
Pa	Jeffersonville	215-539-4585
Pa	Johnstown	814-266-6033
Pa	Lancaster	717-569-5728
Pa	New Castle	412-652-5596
Pa	Philadelphia	215-985-1500
Pa	Philadelphia	215-224-1226
Pa	Pittsburgh	412-563-6860
Pa	State College	814-237-7708
Pa	West Reading	215-372-7848
Pa	Williamsport	717-326-1721
RI	East Providence	401-434-4207
SC	Anderson	803-226-4502
SC	Charleston Heights	803-744-0362
SC	Columbia	803-799-6080
SC	Florence	803-669-8235
SC	Greenville	803-235-3481
SC	Spartanburg	803-583-5488
SD	Sioux Falls	605-336-6611
Tenn	Chattanooga	615-894-5676
Tenn	Jackson	901-427-1242
Tenn	Knoxville	615-523-0709
Tenn	Memphis	901-726-5555
Tenn	Nashville	615-242-3397
Tex	Abilene	915-698-8821
Tex	Amarillo	806-372-8774
Tex	Austin	512-472-6231
Tex	Beaumont	713-833-9485
Tex	Bryan	713-822-1024
Tex	Corpus Christi	512-882-2677
Tex	Dallas	214-741-5261
Tex	El Paso	915-779-6650
Tex	Ft. Worth	817-332-7666
Tex	Galveston	713-765-5353
Tex	Harlingen	512-423-6146
Tex	Houston	713-528-0651
Tex	Laredo	512-722-2362
Tex	Longview	214-753-3884
Tex	Lubbock	806-763-4611
Tex	Lufkin	713-632-7793
Tex	Midland	915-683-5336
Tex	San Angelo	915-655-3866
Tex	San Antonio	512-342-3248
Tex	Sherman	214-892-2333
Tex	Texarkana	214-794-4211
Tex	Tyler	214-592-1741
Tex	Victoria	512-575-5861
Tex	Waco	817-753-4468
Tex	Wichita Falls	817-723-0969
Utah	Ogden	801-394-6591
Utah	Salt Lake City	801-486-7549
Fla	Pompano Beach	305-942-7371
Fla	Sarasota	813-355-7362
Fla	Tallahassee	904-385-4141
Fla	Tampa	813-877-8286
Ga	Albany	912-435-5581
Ga	Athens	404-548-5270
Ga	Atlanta	404-874-9756
Ga	Augusta	404-724-0143
Ga	Columbus	404-324-3581
Ga	Macon	912-745-5831
Ga	Rome	404-232-5887
Ga	Savannah	912-233-8076
Haw	Honolulu	808-536-0012
Idaho	Boise	208-375-5524
Idaho	Idaho Falls	208-522-0022
Idaho	Pocatello	208-237-5121
Idaho	Twin Falls	208-733-1540
Ill	Alton	618-462-8941
Ill	Champaign	217-356-9619
Ill	Chicago	312-427-9142
Ill	Chicago	312-286-7121
Ill	Chicago Heights	312-755-2800
Ill	Danville	217-442-6319
Ill	Des Plaines	312-824-8158
Ill	Elgin	312-741-8012
Ill	Loves Park	815-877-1936
Ill	Marion	618-997-5469
Ill	Peoria	309-692-7544
Ill	Quincy	217-224-0200
Ill	Springfield	217-528-4301
Ind	Daleville	317-378-0276
Ind	Evansville	812-424-4567
Ind	Fort Wayne	219-484-3122
Ind	Hammond	219-932-0410
Ind	Indianapolis	317-638-1385
Ind	Lafayette	317-447-0913
Ind	South Bend	219-277-0333
Ind	Terre Haute	812-232-9681
Iowa	Burlington	309-752-5763
Iowa	Cedar Rapids	319-363-3539
Iowa	Des Moines	515-244-6151
Iowa	Dubuque	319-583-3043
Iowa	Mason City	515-423-9211
Iowa	Sioux City	712-255-7255
Iowa	South Bettendorf	319-355-1828
Iowa	Waterloo	319-234-2891
Kans	Garden City	316-276-8877
Kans	Hutchinson	316-662-1771
Kans	Salina	913-827-5802
Kans	Topeka	913-233-3278
Kans	Wichita	316-264-4675
Ky	Lexington	606-299-8429
Ky	Louisville	502-637-5492
La	Alexandria	318-422-8300
La	Baton	504-383-7781
La	Lafayette	318-235-9781
La	Lake Charles	318-436-6525
La	Monroe	318-322-1940
La	New Orleans	504-821-9221
La	Shreveport	318-425-5436
Me	Bangor	207-947-6101
Me	Portland	207-773-3852
Md	Baltimore	301-296-6000
Md	Cumberland	301-722-5646
Md	Easton	301-822-3355
Md	Hagerstown	301-739-5860
Vt	Colchester	802-862-3704
Va	Bristol	703-669-7021
Va	Charlottesville	804-296-1715
Va	Danville	804-792-9244
Va	Fairfax	703-273-1257
Va	Lynchburg	804-847-6689
Va	Newport News	804-595-3668
Va	Norfolk	804-622-2198
Va	Richmond	804-355-5759
Va	Roanoke	703-344-5101
Wash	Bellingham	206-733-3420
Wash	Clarkston	509-758-7971
Wash	Everett	206-252-3900
Wash	Longview	206-423-5630
Wash	Olympia	206-383-5754
Wash	Seattle	206-632-4450
Wash	Spokane	509-535-7621
Wash	Tacoma	206-383-5754
Wash	Yakima	509-453-1318
WVa	Bluefield	304-327-8900
WVa	Bridgeport	304-842-2471
WVa	Dunbar	304-768-9741
WVa	Huntington	304-529-7379
WVa	Parkersburg	304-422-7443
WVa	Wheeling	304-242-6720
Wisc	Eau Claire	715-835-5057
Wisc	Green Bay	414-432-5124
Wisc	Madison	608-238-6386
Wisc	Milwaukee	414-271-4698
Wisc	Oshkosh	414-235-7060
Wisc	Racine	414-552-9070
Wisc	Wausau	715-842-0696
Wyo	Cheyenne	307-632-4900
Mass	Boston	617-277-2852
Mass	New Bedford	617-758-4562
Mass	Sharon	617-668-4420
Mass	Springfield	413-781-1774
Mass	Worcester	617-853-6122
Mich	Ann Arbor	313-662-3574
Mich	Coopersville	616-837-8108
Mich	Detroit	313-255-1500
Mich	Escanaba	906-786-5352
Mich	Flint	313-239-9401
Mich	Galesburg	616-665-7056
Mich	Lansing	517-393-9301
Mich	Saginaw	517-799-4272
Mich	Traverse City	616-947-1404
Minn	Duluth	218-722-2502
Minn	Mankato	507-388-1516
Minn	St. Cloud	612-252-1562
Minn	St. Louis	612-927-4305
Minn	St. Paul	612-222-8571
Minn	Winona	507-452-2297
Miss	Brockhaven	601-833-9763
Miss	Columbus	601-328-7911
Miss	Greenville	601-332-0367
Miss	Greenwood	601-453-7316
Miss	Hattesburg	601-584-7368
Miss	Jackson	601-354-1566
Miss	Meridian	601-482-3362
Miss	Pascagoula	601-762-6311
Mo	Cape Girardeau	314-335-6451
Mo	Jefferson City	314-636-7513

MONSANTO, Dept. EM, Box 8, St. Peters, Mo. 63376,
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Local Sales Offices & Reps.

Cal	Santa Clara, Monsanto Co.	408-243-0414
Mass	Westwood, Monsanto Co.	617-329-2530
Mo	St. Peters, Monsanto Co.	314-272-6281
Tex	Garland, Monsanto Co.	214-272-6974

MONSANTO-ELECTRONICS DIV., Dept. EM, 3400
Hillview Ave., Palo Alto, Cal. 94304, Tel: 415-493-3300,
TWX: 910-373-1767; Empl.: 500

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assoc.	205-881-5031
Ariz	Phoenix, Shefler-Kahn Assoc.	602-258-7893
Cal	Burlingame, W. J. Purdy	415-347-7701
Cal	Los Angeles, Black/Ekizian/Strong	213-870-9191
Cal	San Diego, H. King	714-566-5252
Colo	Denver, Straube Assoc.	303-420-0890
Conn	Orange, CPS	203-795-3515
Fla	Ft. Lauderdale, Beacon Elctrn. Assoc.	305-776-6074
Ga	Atlanta, Beacon Elctrn. Assoc.	404-351-3654
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Greenwood, Valentine/Schillinger	317-888-2260
Iowa	Cedar Rapids, Lorenz Sls.	319-393-6912
Kans	Wichita, Dy-Tronix	316-943-6221
Mass	Waltham, Datcon	617-891-4600
Mich	Grand Rapids, J.L. Montgomery Assoc.	616-774-9308
Mich	Southfield, J.L. Montgomery Assoc.	313-358-2616
Minn	Minneapolis, Technical Assoc.	612-929-6721
Mo	Kansas City, Dy-Tronix	816-761-6543
NM	Albuquerque, W.J. Purdy	505-266-7959
NY	Ithaca, B. Dean, Inc.	607-272-2187
Ohio	Chagrin Falls, Midwest Mktg. Assoc.	216-247-6655
Ohio	Dayton, Midwest Mktg. Assoc.	513-433-2511
Ore	Portland, Western Techn. Sls.	503-297-1711
Pa	Pittsburgh, Waggoner-VerHill Assoc.	412-241-5202
SC	Spartanburg, Beacon Elctrn. Assoc.	803-582-4613
Tex	Dallas, E. McDowell Assoc.	214-238-7157
Utah	Salt Lake City, Stravbe Assoc.	801-533-0125

Va	Falls Church, Beacon Elctrn. Assoc.	703-534-1673
Wash	Bellevue, Western Tech. Sls.	206-641-3900

MONTEVIDEO TECHNOLOGY INC., Dept. EM, 4716 Wilford Way, Edina, Minn. 55435, Tel: 612-265-6562; FSC No.: 54572; Empl.: 140

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps.	205-539-4411
Cal	Buena Park, Sale Engrgs. Ltd.	714-521-8673
Cal	Chatsworth, J.E. Albrecht MTI	213-885-7449
Cal	Hayward, Avionics Liaison, Inc.	415-783-1132
Cal	Newbury Park, Sales Engrs. Ltd.	805-498-0103
Cal	Sacramento, Marketing Consultants West	916-481-8311
Cal	San Diego, Sales Engrgs. Ltd.	714-277-5723
Colo	Denver, Omega	303-758-1508
Conn	Weathersfield, Underwood Sls. Corp.	203-563-3046
Fla	Coral Springs, W.A. Brown Comps.	
Fla	Orlando, W.A. Brown Comps.	305-851-5747
Ga	Chamblee, W.A. Brown Comps.	
Ga	Perry, Aero Reps., Inc.	912-987-2174
Ill	Moline, Iowa Midland Supply	309-762-7239
Iowa	Cedar Rapids, Iowa Midland Supply	319-366-3555
Md	New Carrollton, W.A. Brown Equip-Comp.	301-577-4527
Mass	Chelmsford, Underwood Sls. Corp.	617-256-8191
Minn	Edina, W.J. Orndorff MTI	612-920-1050
Minn	Montevideo, F. Judson Snell MTI	612-269-6562
Minn	Wayzata, Joe Little Assocs.	612-473-1107
Mo	Webster Groves, Iowa Midland Supply	314-961-1113
Neb	Omaha, Iowa Midland Supply	402-341-4466
NY	Mamaroneck, Cane Technical Sls.	914-698-4411
NY	Pompey, S.F. Foster Co.	315-677-3333
NY	Webster, S.F. Foster Co.	716-265-2072
NC	Raleigh, W.A. Brown Comps.	919-781-9426
Ohio	Cleveland, RDP Assocs.	216-659-3138
Ohio	Dayton, RDP Assocs.	513-253-6175
Pa	Huntingdon Valley, Rabal Assocs.	215-947-4825
Pa	Pittsburgh, RDP Assocs.	412-487-2217
Tenn	Knoxville, W.A. Brown Comps.	615-637-3542
Tex	Houston, R.F. Kimbal Co.	800-492-2805
Tex	Richardson, R.F. Kimbal Co.	214-231-3447
Utah	Salt Lake City, Monarch, Inc.	801-266-9617
Va	Alexandria, W.A. Brown Equip-Comp.	703-836-1800
Wash	Seattle, Avionics Liaison, Inc.	206-767-3870
Exp:	New York, Lothar-Sanford Corp.	212-757-3881

MOODY TOOLS, INC., Dept. EM, Culver St., Providence, R.I. 02905, Tel: 401-421-5032; Empl.: 11

Local Sales Offices & Reps.

Ala	Birmingham, Henry W. Phillips Co. Inc.	205-967-5248
Cal	Long Beach, L. P. Feeley & Assocs.	213-595-5421
Cal	San Carlos, A. Williams	415-591-7043
Ga	Atlanta, Henry W. Phillips Co. Inc.	404-992-3070
Ill	Palatine, Witz-Knight, Inc.	312-358-8050
Kans	Lenexa, D.H. Donegan	913-888-8284
Md	Baltimore, Coastline Sls. Co.	301-828-8520
Mich	Ann Arbor, Hancock Sls. Co.	313-668-7916
Mo	Chesterfield, Modern Mktg.	314-532-1794
NY	New York, A. Mizner Assocs., Inc.	212-989-7227
NY	Orchard Park, S & B Tech. Sls.	716-634-6544
NC	Charlotte, Henry W. Phillips Co. Inc.	704-394-5544
Ore	Portland, R. Minthorne Co.	503-246-4556
Pa	Pittsburgh, F. Kostman	412-823-3430
RI	East Providence, G. Goddard Assocs.	401-434-3824
Tex	Arlington, C.W. Cortez Co.	817-469-8499

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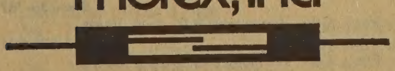

MOREX, INC., Dept. EM, 48 Progress Pkwy, Maryland Hgts., Mo. 63043, Tel: 314-434-0311

Sales Manager: W.F. Orr

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Exp:	NY, Schenectady, EMB Trading Corp.	518-372-5841

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MORIRICA ELCTRNS., LTD., Dept. EM, 205 Tozuka-machi, Tozuka-Ku, Yokohama, Japan, Tel: 045-881-2331; Empl.: 350

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Ill	Skokie, Solar Systems Inc.	
Wisc	Dodgeville, Solar Sys. c/o Silicon Sensors	608-935-2707

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MORTON CHEMICAL CO., Div. Morton Norwich Prods., Dept. EM, 110 N. Wacker Dr., Chicago, Ill. 60606, Tel: 312-621-5732, TWX: 312-222-9394; Empl.: 150

MORTRONICS, Dept. EM, 1315 El Solyo Ave. , Campbell, Cal 95008

MOSLEY ELECTRONICS, INC., Dept. EM, 4610 N. Lindbergh Blvd., Bridgeton, Mo 63044

MOS TECHNOLOGY, INC., Dept. EM, 26921 Grasmere Pl., Hayward, Cal. 94542

MOS TECHNOLOGY, INC., International Div., Dept. EM, 950 Rittenhouse Rd., Norristown, Pa. 19401, Tel: 215-666-7950

MOSTEK CORP., Dept. EM, 1215 W. Crosby Rd., Carrollton, Tex. 75006, Tel: 214-242-0444; Empl.: 1800; Minimum order: $D. Lake

Sales Manager: D. Konrad; *Distributor Manager:* D. Lake

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Assoc.	205-881-5031
Cal	Irvine, Mostek Corp.	714-549-0397
Cal	Redwood City, J. Heaton Co.	415-367-9000
Cal	San Diego, H. King	714-566-5252
Cal	San Jose, Mostek Corp.	408-287-5080
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	W. Hartford, New England Tech. Sls.	203-236-4705
Fla	Clearwater, Dyne-A-Mark Corp.	813-441-4702
Fla	Fort Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Fla	Maitland, Dyne-A-Mark Corp.	305-831-2097
Ga	Atlanta, Beacon Assoc.	404-351-3654
Ill	Rolling Meadows, Sumer Inc.	312-394-4900
Ind	Ft. Wayne, Electro Reps	219-743-4611
Ind	Indianapolis, Electro Reps	371-255-4147
Ind	Jeffersonville, Electro Reps.	502-587-6265
Kans	Olathe, B. Rush Assoc.	913-764-2700
Md	Rockville, Marktron, Inc.	301-762-6210
Md	Timonium, Marktron, Inc.	301-252-7111
Mass	Burlington, New England Tech. Sls.	617-272-0434
Mass	Waltham, Mostek Corp.	617-899-9107
Mich	Grosse Point Park, Greiner Assocs.	313-499-0188
Mo	Ballwin, Rush & West Assoc.	314-394-7271
NJ	East Hanover, HLM Assocs.	201-386-0794
NJ	Morris Plaines, HLM Assoc.	201-539-8050
NM	Albuquerque, Waugaman Assoc.	505-294-1436
NY	Liverpool, J. Semple Assocs.	315-458-4775
NY	Northport, HLM Assocs.	516-757-1606
NY	Rochester, J. Semple Assocs.	716-544-8583
NC	Charlotte, Beacon Elctrns. Assoc.	704-525-7412
Ohio	Brecksville, Mostek Corp.	216-526-6747
Ohio	Cincinnati, Makin Assoc.	513-871-2424
Pa	Ft. Washington, Mostek Corp.	215-628-9050
Pa	Oreland, CMS Mktg.	215-885-5106
Tenn	Oak Ridge, Beacon Assoc.	615-482-2409
Tex	Dallas, West & Assoc., Inc.	214-661-9400
Tex	Ft. Worth, W. Pat Fralia Co.	817-738-2394
Utah	Salt Lake City, Waugaman Assoc.	801-277-8911
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Wash	Tukwila, General Elctrns.	206-575-4030

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MOTORESEARCH MFG. CO., Dept. EM, 1600 Junction Ave., Racine, Wisc. 53403, Tel: 414-632-5131; Empl.: 16

MOTOROLA COMMS. DIV., Parts Dept., Dept. EM, 1313 E. Algonquin Rd., Schaumburg, Ill. 60172, Tel: 312-397-3500, TWX: 910-693-1592

Local Sales Offices & Reps.

Cal	El Segundo	213-644-1101
Cal	Foster City	415-349-3111
Ga	Decatur	504-981-9800
Ill	Lombard	312-620-3000
Md	Linthicum	301-796-8660
NJ	Glen Rock	201-447-4000
Ohio	Parma	216-267-2210
Tex	Dallas	214-241-2151

MOTOROLA DISPLAY, Dept. EM, 455 E. North Ave., Wheaton, Ill. 60187, Tel: 312-690-1400

MOTOROLA, INC., Compt. Prods. Clock Oscillator Dept., Dept. EM, 2553 N. Edgington, Franklin Park, Ill. 60131, Tel: 312-451-1000, TWX: 910-227-0799 p. 2463

Sales Manager: Barnie III

Local Sales Offices & Reps.

Ala.	Huntsville, Barnhill Assocs.	205-883-9394
Ariz	Scottsdale, F. Board Assocs.	602-994-9388
Cal	Inglewood, J. Berman Co.	213-776-1281
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Skokie, Mar-Con Assocs.	312-675-6450
Ind	Indianapolis, Sheridan Assocs.	317-547-7777
Md	Timonium, Barnhill Assocs.	301-252-5610
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Mich	Farmington, Sheridan Assocs.	313-477-3800
Mo	Florissant, Sheridan Assocs.	314-837-5200
NJ	Keasby, Addem 3	516-567-5900
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
NY	Deer Park, Addem 12	516-567-5900
NY	Huntington Station, Addem 1	516-567-5900
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Massapequa Park, Addem 4	516-567-5900
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Raleigh, Barnhill Assocs.	919-876-5617
Ohio	Beachwood, Sheridan Assocs.	216-831-0130
Ohio	Cincinnati, Sheridan Assocs.	513-761-5432
Ohio	Dayton, Sheridan Assocs.	513-277-8911
Okla	Tulsa, H.J. Daly Co.	918-627-4159
Ore	Portland, Almac/Stroum Electronics	503-292-3534
Pa	Bala Cynwyd, Vantage Sls. Co.	215-667-0990
Pa	Pittsburgh, Sheridan Assocs.	412-242-1640
Tenn	Johnson City, Barnhill Assocs.	615-928-0184
Tex	Dallas, R.M. Electronics	214-233-0363
Tex	Houston, R.M. Electronics	713-664-7131
Va	Lynchburg, Barnhill Assocs.	804-846-4624
Wash	Seattle, Almac/Stroum Electronics	206-763-2300
Exp:	New York, Ad. Auriema Inc.	

Local Distributors

Ala	Huntsville, Hall-Mark Electrns.	205-837-8700
Ala	Huntsville, Hamilton/Avnet Elctrns.	205-533-1170

Ariz	Phoenix, Hamilton/Avnet Elctrns.	602-275-7851
Ariz	Phoenix, Liberty Elctrns./Ariz.	602-257-1272
Cal	El Segundo, Liberty Elctrns.	213-322-8100
Cal	Irvine, Cramer/Los Angeles	213-771-8300
Cal	Los Angeles, Hamilton Electro Sls.	213-558-2121
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	Mountain View, Hamilton/Avnet Elctrns.	415-961-7000
Cal	San Diego, Liberty Elctrns./San Diego	714-565-9171
Cal	San Diego, Hamilton/Avnet Elctrns.	714-279-2421
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Hamilton/Avnet Elctrns.	303-534-1212
Conn	Danbury, Schweber Elctrns.	203-792-3500
Conn	Georgetown, Hamilton/Avnet Elctrns.	203-762-0361
Conn	North Haven, Cramer/Conn.	203-239-5641
Fla	Hollywood, Cramer/Hollywood	305-923-8181
Fla	Hollywood, Hamilton/Avnet Elctrns.	305-925-5401
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Orlando, Cramer/Orlando	305-894-1511
Ga	Atlanta, Cramer/Atlanta	404-448-9050
Ga	Norcross, Hamilton/Avnet Elctrns.	404-448-0800
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Chicago, Semiconductor Specialists	312-279-1000
Ill	Elk Grove Village, Schweber Elctrns.	312-593-2740
Ill	Mount Prospect, Cramer/Chicago	312-593-8230
Ill	Schiller Park, Hamilton/Avnet Elctrns.	312-678-6310
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Ind	Indianapolis, Pioneer/Indianapolis	317-849-7300
Kans	Lenexa, Hamilton/Avnet Elctrns.	913-888-8900
Md	Gaithersburg, Pioneer/Wash. Elctrns.	301-948-0710
Md	Hanover, Hamilton/Avnet Elctrns.	301-796-5000
Md	Rockville, Cramer/Wash.	301-948-0110
Md	Rockville, Schweber Elctrns.	301-881-3300
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Burlington, Hamilton/Avnet Elctrns.	617-273-2120
Mass	Lexington, Harvey Elctrns.	617-861-9200
Mass	Newton Centre, Cramer Elctrns.	617-969-7700
Mass	Waltham, Schweber Electronics	617-890-8484
Mich	Detroit, RS Elctrns.	313-491-1012
Mich	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
Mich	Livonia, Pioneer/Detroit	313-525-1800
Minn	Edina, Hamilton/Avnet Elctrns.	612-941-3801
Minn	Edina, Schweber Elctrns.	612-941-5280
Minn	Edina, Cramer/Minneapolis	612-835-7811
Mo	Hazelwood, Hamilton/Avnet Elctrns.	314-731-1144
Mo	St. Louis, Hall-Mark Elctrns.	314-291-5350
NJ	Cedar Grove, Hamilton/Avnet Elctrns.	201-239-0800
NJ	Cherry Hill, Cramer/Pennsylvania	609-424-5993
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Mt. Laurel, Hamilton/Avnet Elctrns.	609-234-2133
NJ	Pennsauken, Radio Electric Svc. Co.	609-662-4000
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NY	East Syracuse, Hamilton/Avnet Elctrns.	315-437-2642
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Cramer/L.I.	516-231-5600
NY	Rochester, Hamilton/Avnet Elctrns.	716-442-7820
NY	Rochester, Cramer/Rochester	716-275-0300
NY	Rochester, Schweber Elctrns.	716-461-4000
NY	Westbury, Hamilton/Avnet Elctrns.	516-333-5800
NY	Westbury, Schweber Elctrns.	516-334-7474
NY	Woodbury, Harvey Elctrns.	516-921-8700
NC	Winston-Salem, Cramer/Winston-Salem	919-725-8711
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Cleveland, Hamilton/Avnet Elctrns.	216-461-1400
Ohio	Cleveland, Pioneer-Standard Elctrns.	216-587-3600
Ohio	Dayton, Hamilton/Avnet Elctrns.	513-433-0610
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Solon, Cramer/Cleveland	216-248-8400
Pa	Philadelphia, Pioneer/Philadelphia	215-674-5710
Pa	Pittsburgh, Cameradio	412-288-2600
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
SC	Columbia, Dixie Radio Supply Co.	803-253-5333
Tex	Dallas, Schweber Elctrns.	214-661-5010
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	Dallas, Hamilton/Avnet Elctrns.	214-661-8661
Tex	El Paso, Midland Specialty Co.	915-533-9555
Tex	Houston, Hall-Mark Elctrns.	713-781-6100
Tex	Houston, Hamilton/Avnet Elctrns.	713-526-4661
Tex	Houston, Sterling Elctrns.	713-627-9800
Utah	Salt Lake City, Cramer/Utah	801-487-4131
Utah	Salt Lake City, Hamilton/Avnet Elctrns.	801-262-8451
Wash	Bellevue, Hamilton/Avnet Elctrns.	206-746-8750
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
Wash	Seattle, Liberty Elctrns. Corp.	206-763-8200
For:	Can., Edmonton, Alb., Bowtek Electric	403-426-1072

MOTOROLA, INC. COMPONENT PRODS., Piezo-Ceramic Speaker Dept., Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131, Tel: 312-451-1000, TWX: 910-227-0799 .... p. 2463

Sales Manager: C. Wessel

MOTOROLA, INC. COMPONENT PRODS., Quartz Time Piece, Dept. EM, 2553 N. Edgington St., Franklin Park, Ill. 60131, Tel: 312-451-1000, TWX: 910-227-0799 .... p. 2463

Sales Manager: W. Deutschmann

MOTOROLA SEMI, Dept. EM, 3501 Ed Bluestein Blvd., Austin, Tex. 78721

MOTOROLA SEMICONDUCTOR PRODS., H0500, Dept. EM, 2002 W. 10th Pl., Tempe, Ariz. 85281, Tel: 602-968-6211, TWX: 910-951-1334; Empl.: 10000

Local Sales Offices & Reps.

Ala	Huntsville	205-533-1650
Ariz	Phoenix	602-244-6326
Cal	Encino	213-986-6850
Cal	Orange	714-634-2844
Cal	San Diego	714-560-4644
Cal	San Jose	408-985-0510
Colo	Denver	303-770-2122
Conn	Hamden	203-281-0771
DC	Washington	301-577-6200
Fla	Ft. Lauderdale	305-291-4333
Fla	Maitland	305-644-3422
Fla	St. Petersburg	813-576-6030
Ga	Atlanta	404-255-2043
Ill	Schiller Park	312-678-7205
Ind	Ft. Wayne	219-485-1691
Ind	Indianapolis	317-849-7060
Iowa	Cedar Rapids	319-393-8632
Kans	Mission	913-384-3050
Md	Hyattsville	301-779-1100
Mass	Lexington	617-861-1350
Mich	Garden City	313-261-6200
Mich	Saugatuck	616-857-2159
Minn	Minneapolis	612-545-0251
Mo	St. Louis	314-872-7681
NJ	River Edge	201-488-1200
NY	Fishkill	914-896-8970
NY	Hauppauge	516-231-9000
NY	Rochester	716-381-7220
NY	Syracuse	315-454-9373
NC	Raleigh	919-782-7604
Ohio	Cleveland	216-461-3160
Ohio	Dayton	513-294-2231
Ohio	Worthington	614-846-9460
Okla	Tulsa	918-664-5227
Ore	Portland	503-297-2235
Pa	Ft. Washington	215-643-4500
SC	Columbia	803-788-0585
Tex	Dallas	214-661-9829
Tex	Houston	713-688-4583
Wash	Bellevue	206-455-3700
Wisc	Wauwatosa	414-476-5554

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns.	205-539-0691
Ariz	Phoenix, Hamilton/Avnet Elctrns.	602-275-7851
Ariz	Phoenix, Liberty Elctrns./Arizona	602-257-1272
Cal	El Segundo, Liberty Elctrns. Corp.	213-322-8100
Cal	Irvine, Cramer/Los Angeles	213-771-8300
Cal	Los Angeles, Hamilton Electro Sls.	213-870-7171
Cal	Mountain View, Hamilton/Avnet Elctrns.	415-961-7000
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	San Diego, Hamilton/Avnet Elctrns.	714-279-2421
Cal	San Diego, Liberty Elctrns./San Diego	714-565-9171
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Hamilton/Avnet Elctrns.	303-534-1212
Conn	Danbury, Schweber Elctrns.	203-792-3500
Conn	North Haven, Cramer Elctrns.	203-239-5641
Fla	Hollywood, Hamilton/Avnet	305-925-5401
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Hollywood, Cramer Elctrns.	305-923-8181
Fla	Orlando, Cramer Elctrns.	305-894-1511
Ga	Norcross, Hamilton/Avnet Elctrns.	404-448-0800
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Chicago, Semiconductor Specialists	312-279-1000
Ill	Schiller Park, Hamilton/Avnet Elctrns.	312-678-6310
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Kans	Lenexa, Hamilton/Avnet Elctrns.	913-888-8900
Md	Rockville, Pioneer/Washington Elctrns.	301-424-3300
Md	Rockville, Schweber Elctrns.	301-881-2970
Md	Rockville, Cramer Elctrns.	301-948-0110
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Burlington, Hamilton/Avnet Elctrns.	617-273-2120
Mass	Lexington, Harvey Elctrns.	617-861-9200
Mass	Newton Centre, Cramer Elctrns.	617-969-7700
Mich	Detroit, RS Elctrns.	313-491-1012
Mich	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
Minn	Edina, Hamilton/Avnet Elctrns.	612-941-3801
Minn	Edina, Cramer/Minneapolis	612-835-7811
Mo	Hazelwood, Hamilton/Avnet Elctrns.	314-731-1144
NJ	Cedar Grove, Hamilton/Avnet Elctrns.	201-239-0800
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Mt. Laurel, Hamilton/Avnet Elctrns.	609-234-2133
NJ	Pennsauken, Radio Elect. Svc. Co.	609-662-4000
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Hauppague, Cramer Elctrns.	516-231-5600
NY	Rochester, Cramer Elctrns.	716-275-0300
NY	Westbury, Schweber Elctrns.	516-334-7474
NY	Woodbury, Harvey Elctrns.	516-921-8700
NC	Winston-Salem, Cramer Elctrns.	919-725-8711
Ohio	Cleveland, Pioneer-Standard Elctrns.	216-587-3600
Ohio	Dayton, Hamilton/Avnet Elctrns.	513-433-0610
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Solon, Cramer/Cleveland	216-248-8400
Pa	Pittsburgh, Cameradio	412-288-2600
SC	Columbia, Dixie Radio Supply Co.	803-253-5333
Tex	Dallas, Hamilton/Avnet Elctrns.	214-661-8661
Tex	Dallas, Hall-Mark Elctrns.	214-231-6111
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	El Paso, Midland Specialty Co.	915-533-9555
Tex	Houston, Hamilton/Avnet Elctrns.	
Tex	Houston, Sterling Elctrns.	713-623-6600
Utah	Salt Lake City, Cramer Elctrns.	801-487-4131
Wash	Bellevue, Hamilton/Avnet Elctrns.	206-746-6720
Wash	Seattle, Liberty Elctrns.	206-763-8200
For:	Can., London, Ont., CM Peterson Co.	519-434-3204
For:	Can., Mississauga, Ont., Hamilton/Avnet	416-677-7432
For:	Can., Montreal, P.Q., Electronic Wholesalers Co.	514-769-8851
For:	Can., Montreal, P.Q., Hamilton/Avnet	514-735-6393
For:	Can., Ottawa, Ont., Electronic Wholesalers Co.	613-237-4703
For:	Can., Ottawa, Ont., Hamilton/Avnet	613-725-3071
For:	Can., Toronto, Ont., Zentronics, Ltd.	416-787-1271
For:	Can., Vancouver, B.C., Bowtek Elec. Co.	604-736-7677
For:	Can., Vancouver, B.C., L. A. Varah	604-873-3211
For:	Can., Winnipeg, Man., Jang Elctrns.	204-786-7521

™MOTOTROL - pressure operated control - Autocon Inds., Inc.

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(TM)MOUNTY - clamp-on-battery hand lamps - Teledyne Big Beam

MOXON INC., Dept. EM, 2222 Michelson Dr. Bldg. E, Irvine, Cal. 92715, Tel: 714-833-2000, TWX: 910-596-1362; FSC No.: 62767; Empl.: 85 p. 2904,2905

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scientific Instrs.	205-533-6880
Cal	Anaheim, Moxon Elctrns.	714-635-7600
Cal	San Diego, Moxon Elctrns.	714-292-4820
Cal	Santa Clara, Moxon Elctrns.	408-249-2491
Colo	Boulder, PAR Associates	303-499-4736
Fla	Orlando, Truex Assocs.	305-859-2160
Ill	Arlington, Dytech Central, Inc.	312-394-3380
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Stoneham, Ken Corp.	617-438-5464
Mich	Southfield, Electro Sls. Assocs.	313-424-9075
Mo	St. Louis, Dytech South, Inc.	314-423-9595
NJ	Paramus, SDM Rep, Inc.	201-368-0123
NM	Albuquerque, Rustco Enterprises	505-296-6474
NY	Rochester, SDM Rep, Inc.	716-544-8080
NC	Winston Salem, Int'l. Scientific Instrs.	919-722-1783
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370
Tex	Dallas, COMSPEC, Inc.	214-234-4137
Tex	Houston, COMSPEC, Inc.	713-461-4487
Wash	Seattle, R. Drake Assocs.	206-763-2755

MPB CORP., Dept. EM, Precision Park, Keene, N.H. 03431, Tel: 603-352-0310, TWX: 710-366-1801; Empl.: 1600

Local Sales Offices & Reps.

Cal	Glendale	213-245-6413
Conn	Milford	203-877-3208
Ill	Rolling Meadows	312-259-7800

(TM)MPC - precision coaxial connectors - Maury Microwave Corp.

MPC PRODS. CORP., Dept. EM, 4200 W. Victoria Ave., Chicago, Ill. 60646, Tel: 312-583-5100, TWX: 910-221-2576; Empl.: 115

(TM)MPF - precision waveguide flanges - Maury Microwave Corp.

MPH ELECTRONICS, Dept. EM, 9654 Alpaca St., S. El Monte, Cal. 91733, Tel: 213-442-7818; FSC No.: 16845 .... p. 1670

Sales Manager: A. Pastecki

(TM)MP-SYSTEM 1000 - modular instrumentation system - McKee-Pedersen Instrs.

(TM)M-PYROL - solvent for resins & coatings - GAF Corporation

(TM)MP12 - microcomputer - Fabri-Tek, Inc.

(TM)MR: BATTERY - custom battery designs - Power, Inc.

MRC ALARM SYSTEMS & DEVICES CO., Dept. EM, 700 W. Virginia St., Milwaukee, Wisc. 53204, Tel: 414-271-4343

Local Sales Offices & Reps.

Cal	San Francisco, P. Flanagan	415-282-0840
Cal	Westlake Village, K. Jensen	213-889-1606
Ga	Chamblee, R. J. Shafer	404-458-7483
Haw	Honolulu, J. J. Harding Co., Ltd.	808-841-0941
Ky	Versailles, J. Range	606-873-3278
Mont	Great Falls, H. James Dist.	406-761-2420
NY	New York, R. Policastro	212-631-0339
Pa	Bala-Cynwyd, M. Friedman Assocs.	215-839-3450

(TM)MRTL - resistor-transistor logic IC's - Motorola Semiconductor Prods.

MSI ELECTRONICS, INC., Dept. EM, 34-32 57th St., Woodside, N.Y. 11377, Tel: 212-672-6500; FSC No.: 18518; Empl.: 14

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-533-6029
Cal	Mt. View, Tri-Rep	415-965-1822
Cal	Norwalk, Bertrand-Zoolalian	213-921-9791
Colo	Englewood, Inverness Mktg.	303-770-2300
Fla	Lighthouse Point, R. C. Simon	305-941-2757
Ill	Crystal Lake, Mesa, Inc.	312-639-3359
Ind	Ft. Wayne, Menze Sls. Inc.	219-747-5616
Iowa	Cedar Rapids, J. R. Sls. Engrg. Co.	319-393-2232
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Mo	St. Louis, Technical Sls. Assoc.	314-725-5361
NJ	Spring Valley, R. Smith Assocs.	914-354-6067
NY	Plainview, R. Smith Assocs.	516-681-3155
Pa	Jenkintown, Arnold Assocs.	215-887-7870
Tenn	Bristol, Remco	615-968-4195
Tex	Richardson, C. Tinch Sls. Co.	214-231-1322
Va	Alexandria, Potomac Elctrns.	703-836-1630
Wash	Tukwila, General Elctrns.	206-243-5141
Wash	Vancouver, General Elctrns.	206-693-0025
Exp:	Woodside, New York, MSI Elctrns. Inc.	212-672-6500

(TM)MSP - miniature surge protector - Joslyn Elctrn. Sys.

(TM)MSTRE GRIP - epoxy adhesive - Mereco Products Div.

(TM)MS-111 - epoxy stripper/resins/curing agents - Miller-Stephenson Chem. Co., Inc.

(TM)MS-122 - release agent/dry lubricant - Miller-Stephenson Chem. Co., Inc.

(TM)MS-1500 EN-RUST NONFLAMMABLE - rust inhibitor - Miller-Stephenson Chem. Co., Inc.

(TM)MS-160 FREON - t-p 35 solvent - Miller-Stephenson Chem. Co., Inc.

(TM)MS-166 EN-STAT - static elimator - Miller-Stephenson Chem. Co., Inc.

(TM)MS-170 1,1,1 - trichlroethane - Miller-Stephenson Chem. Co., Inc.

(TM)MS-175 FREON - te solvent - Miller-Stephenson Chem. Co., Inc.

(TM)MS-180 FREON - tf solvent - Miller-Stephenson Chem. Co., Inc.

(TM)MS-185 FREON - ta solvent - Miller-Stephenson Chem. Co., Inc.

(TM)MS-190/MS-190 HD - flux removers - Miller-Stephenson Chem. Co., Inc.

(TM)MS-200 - magnetic tape head cleaner - Miller-Stephenson Chem. Co., Inc.

(TM)MS-220 AERO-DUSTER - removes microscopic dust - Miller-Stephenson Chem. Co., Inc.

(TM)MS-226 COBRA - extension nozzle and brush - Miller-Stephenson Chem. Co., Inc.

(TM)MS-230 CONTACT RE-NU - cleans contacts - Miller-Stephenson Chem. Co., Inc.

(TM)MS-238 CONTACT RE-NU & LUBE - cleans contacts, lubricates - Miller-Stephenson Chem. Co., Inc.

(TM)MS-240 QUIK-FREEZE - cools to 50 below - Miller-Stephenson Chem. Co., Inc.

(TM)MS-260 - cleaner plastic/glass metal - Miller-Stephenson Chem. Co., Inc.

(TM)MS-450 - protective varnish - Miller-Stephenson Chem. Co., Inc.

(TM)MS-500 PORTA-VAC - portable vacuum - Miller-Stephenson Chem. Co., Inc.

(TM)MS-520 PORTA-PUMP - portable pump - Miller-Stephenson Chem. Co., Inc.

(TM)MTLC - ultraminiature tuners - JFD Electronics Components Corp.

(TM)MTM - magnetic tape memory - Raymond Engrg. Inc.

(TM)MTNS - metal thick nitride semiconductor - General Instr. Corp.

(TM)MTOS - metal thick oxide semiconductor - General Instr. Corp.

MTS SYSTEMS CORP., Dept. EM, Box 24012, Minneapolis, Minn 55424, Tel: 612-944-4000; Empl.: 500

Sales Manager: K. Floren

(TM)MTTL - transistor-transistor logic IC's - Motorola Semiconductor Prods.

(TM)MU-CAPS - capacitors, fixed, ceramic - Republic Elctrns. Corp.

(TM)MUCON - capacitors, fixed, ceramic - Republic Elctrns. Corp.

MU-DEL ELCTRNS., Dept. EM, 2426 Linden La., Silver Spring, Md. 20910, Tel: 301-587-6087; FSC No.: 31563; Empl.: 6

Sales Manager: I. Kuzminsky

Local Sales Offices & Reps.

Ala	Huntsville, Anderson Assocs.	205-881-6770
Cal	Sunnyvale, Tec West	408-252-4011
Cal	Woodland Hills, Interstate Mktg. Assoc.	213-883-7606
Colo	Boulder, G. Moore Assocs.	303-494-7875
Fla	Orlando, Unirep	305-295-4817
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ind	Indianapolis, Advanced Comp. Sls.	317-545-6441
Md	Greenbelt, Riffe Assocs.	301-474-8600
Mass	Wakefield, Nerem	617-245-4426
NM	Albuquerque, Grady Moore Assocs.	505-292-3322
Tex	Arlington, J. T. Houston Assoc.	817-265-2931
Va	Bailey's Crossroads, Q.T. Elctrn. Sls.	703-671-4357
Exp:	N.Y., New York, Technitron	212-758-2790

MUELLER ELECTRIC CO., Dept. EM, 1583 East 31st St. Dept. 20, Cleveland, Ohio 44114, Tel: 216-771-5225; Empl.: 156 .... p. 2128,2129

Sales Manager: E.H. deConingh Jr.

Local Sales Offices & Reps.

Ala	Hunstville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Maddox Sls. Co.	602-274-3807
Cal	Pico Rivera, Maddox Sls. Co.	213-949-5433
Cal	San Francisco, Maddox Sls. Co.	415-647-5560
Colo	Denver, L B Putnam Co.	303-825-5066
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Libertyville, R. Klipp Assocs.	312-362-4676
Ind	Indianapolis, Sukup & Cox Inc.	317-253-5501
Kans	Shawnee Mission, K & M Sls. Co.	913-262-1444
Mass	Lynn, Keene Sls. Co.	617-595-2300
Mich	Ferndale, Hilltronics Inc.	313-398-5556
Minn	Minneapolis, Electronic Comp. Sls.	612-933-2594
Miss	Jackson, Cartwright & Bean	601-981-1368
NY	Buffalo, R W Mitscher Co.	716-663-7970
NY	Port Washington, Joseph Assocs.	516-883-7770
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Columbus, Mandabach-Lehner Co.	614-235-0265
Ore	Portland, Richard Legg Co.	503-292-8824
Pa	Easton, Kaiser Assocs.	215-258-6477
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Waco, Allied Western Co.	817-776-3236
Utah	Salt Lake City, L B Putnam Co.	801-277-0375
Exp:	Can., Toronto, Downsview, W H Cooper & Co.	416-630-3900

(TM)MUFFIN - fan - Rotron, Inc.

(TM)MUFFLE MODULE - sound enclosure - Automation Devices, Inc.

MULTI-ELMAC CO., Dept. EM, 22700 Heslip Dr., Novi, Mich. 48050, Tel: 313-349-3990; Empl.: 150

Local Sales Offices & Reps.

Cal	Orange, Multi-Elmac Co.	714-997-1251
Colo	Denver, Howard Sls.	303-936-0134
Mich	Linden, R. Zerull	313-735-7497
Mo	Marshall, T.J. McCune	816-886-5308
Pa	Morrisville, E.F. Weiss	215-295-8254
Tex	Rockwall, Southwestern Sls. Co.	214-722-6515

(TM)MULTIBIT - multi state core for memory applications - Electronic Memories & Magnetics Corp.

™MULTI-CELL II - silicon high-current rectifiers - Motorola Semiconductor Prods.

™MULTI-CJ - multi calibration cold junction reference source - Omega Engrg., Inc.

MULTICORE SOLDERS, Dept. EM, Long Island Expwy., Westbury, N.Y. 11590, Tel: 516-334-7450, TWX: 510-222-2219; Empl.: 1000

Local Sales Offices & Reps.

Mo	Kansas City, Forristal-Young Sls. Co.	316-358-6771

™MULTI/COUNT - parts-counting system - H H Controls Co., Inc.

™MULTIDEX - rotary switches - Oak Inds. Inc.

™MULTIDIAL - turns counting dial - Spectrol Electronics Corp.

™MULTIDUCTOR - tripple frequency convertor - Ajax Magnethermic Corp.

™MULTIFLASH - flash equipment - EG&G, Inc.

™MULTIFLEX - circuitry - Flexible Circuits, Inc.

™MULTIMEMORY - semiconductor memory system - Electronic Memories & Magnetics Corp.

MULTIMETRICS DIV. OF COMSTRO, Comstron-Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11580, Tel: 516-546-9700, TWX: 510-225-3699; Empl.: 50 .... p. 2724,2725

Sales Manager: F. Greenhalgh

Local Sales Offices & Reps.

Ala	Madison, Saber Assocs.	800-327-1181
Ariz	Scottsdale, Measurement Consits.	602-994-9519
Cal	Signal Hill, Saber Entprs.	213-595-5646
Colo	Boulder, Measurement Consits.	303-499-5294
Conn	Hamden, J & J Assocs.	203-624-7800
Fla	Lighthouse Point, Saber Assocs.	800-432-3007
Fla	Longwood, Saber Assocs.	800-432-3007
Fla	St. Petersburg, Saber Assocs.	800-432-3007
Kans	Shawnee Mission, EIR Co.	913-362-0919
Md	Lanham, Brimberg Assocs.	301-552-2200
Mass	Burlington, J & J Assocs.	617-272-2606
Mich	Detroit, Comtel-Instrs.	313-255-1970
Mo	Hazelwood, EIR Co.	314-895-4100
NM	Las Cruces, Measurement Consits.	505-265-6471
NY	Plainview, Eastern Metro Assocs., Inc.	516-WE1-1414
NY	Skaneateles, Robtron, Inc.	315-685-5731
NC	Raleigh, Saber Assocs.	800-327-1181
Ohio	Cleveland, Comtel-Instrs.	216-442-8080
Ohio	Dayton, Comtel-Instrs.	513-298-7573
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Pa	Pittsburgh, Comtel-Instrs.	412-922-5720
Tex	Houston, Scientific Devices - Gulf Coast	713-868-5575
Tex	Richardson, Scientific Devices SW	214-231-8106
Tex	San Antonio, Scientific Devices SW	512-736-3164
Utah	Murray, Measurement Consits.	801-268-3181
Exp:	Can., Ottawa, Ont., Comtest Communications Prods.	613-828-5236

™MULTI MITE - portable potentiometer - Thermo Elec. Co., Inc.

™MULTI-MODE TONOTRON - direct view storage tube - Hughes Aircraft Co.

™MULTIPAK - powder compacting presses - Pentronix Div.

™MULTIPLE MICROFLASH - flash equipment - EG&G, Inc.

™MULTIPLIER® - multipurpose hand crimper - Hollingsworth Solderless Terminal

™MULTIPOWER - multiple output switching supplies - Trio Labs, Inc.

™MULTI-PRINTER - digital printer - ITT General Controls

™MULTIREED - reed-type relays - Thermosen, Inc.

™MULTI-STRIP 834484 - flat conductor ribbon cables - Gore, W.L. & Assocs., Inc.

™MULTI-SWAGE - swaged electronic components - Bead Elctrns.

™MULTI-SWITCH - multiple-station pushbutton switch - Switchcraft, Inc.

™MULTISYN - encoder - Del Electronics Corp.

™MULTITERM - hard-copy data terminal - Terminal Systems Inc.

™MULTI-TERM - flat ribbon cable & connectors - Stanford Applied Engineering

™MULTI-TET 680712 - round conductor ribbon cables - Gore, W.L. & Assocs., Inc.

™MULTITRON - gamma radiography machines - Automation Inds.

™MULTITUBE - insulated control tubing - TRW Crescent Wire & Cable

™MULTIWIRE - circuit board - Photocircuits Div., Kollmorgen Corp.

™MULT-PAC - stacked PC BD; backpanel system, press-fit - Elfab Corp.

MUPAC CORP., Dept. EM, 646 Summer St., Brockton, Mass. 02402, Tel: 617-588-6110, TWX: 710-345-0194; Empl.: 70

Local Sales Offices & Reps.

Cal	Anaheim, Lodan, Inc.	213-924-1691
Cal	Fremont, Foraker Sls.	415-657-2213
Cal	San Diego, LoDan, Inc.	714-279-6383
Conn	North Haven, Forsberg Sls.	203-239-5111
Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Md	Columbia, Rep-Tron	301-465-6433
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Brighton, SAI Mktg. Corp.	313-227-1786
Mich	Grand Rapids, SAI Mktg. Corp.	616-942-2504
Minn	Minneapolis, L.F. Green Assoc.	612-781-1611
Mo	Blue Springs, Chesco	816-229-1404
Mo	St. Charles, Chesco	314-946-6677
NJ	Flanders, K & R Engrg Sls Co.	201-584-5235
NY	Bayside, K & R Engrg Sls Co.	212-225-8879
NY	Syracuse, Labtronics, Inc.	315-454-9314
Ohio	Beachwood, SAI Mktg. Corp.	216-292-2982
Ohio	Cincinnati, SAI Mktg. Corp.	513-761-5432
Ohio	Dayton, SAI Mktg. Corp.	513-435-3181
Pa	King of Prussia, Rivco	215-265-5211
Pa	Pittsburgh, SAI Mktg. Corp.	412-782-5120
Wash	Seattle, Datacom Assocs.	206-285-2525

MURA CORP., Dept. EM, 177 Cantiague Rock Rd, Westbury, NY 11590, Tel: 516-935-3640, Telex: 96-7879; Empl.: 25; Minimum order: $P. Callery, V.P., Mktg.

Sales Manager: E. Weisl, V.P., Sls.; *Distributor Manager:* P. Callery, V.P., Mktg.

MURATA CORPORATION OF AMERICA, Dept. EM, 1148 Franklin Rd., S.E., Marietta, Ga. 30067, Tel: 404-422-9777, TWX: 54-2329 810-763-4723; Empl.: 12 .... p. 1276,1277,2743,3841,4322

Sales Manager: G. Beylouny

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Altos, Recht. Assocs.	415-941-0336
Cal	Van Nuys, MCA - Los Angeles	213-988-7020
Colo	Denver, Omega Ltd.	303-758-1508
Fla	Ft. Lauderdale, Semtronic Assocs.	305-771-0010
Ill	Chicago, MCA Chicago	312-992-2090
Ill	Elk Grove Village, Micro-Sls.	312-956-1000
Ind	Indianapolis, Electro-Reps	317-255-4147
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Md	Ellicott City, Doss Elctrns.	301-465-1336
Mass	Framingham, MCA Boston	617-872-4843
Mich	Southfield, Luebbe Sls. Co.	313-357-0355
Minn	Golden Valley, Beta Engrg. Corp.	612-546-2215
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Jericho, HRC Comp-Tech	516-822-5550
NY	Rochester, R. P. Kennedy Co.	716-271-6322
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Pa	Willow Grove, H. Nash Asssoc.	215-657-2213
Tex	Dallas, United Comps.	214-324-1448
Utah	Salt Lake City, Omega Ltd.	801-278-6920
Wash	Seattle, H. Levinson	206-323-5100

MURATA MFG. CO. LTD., Dept. EM, 16, Kaiden Nishijin-cho, Nagaoka-Kyo-Shi, Kyoto, Japan, Tel: 075-921-9111; Empl.: 1500

Local Sales Offices & Reps.

Ga	Rockmart, Murata Corp. of America	404-684-7821
Ill	Chicago, Murata Corp. of America	312-992-2090
NY	Elmsford, Murata Corp. of America	914-592-9180

™MUSICASTER - speaker system - Electro-Voice, Inc.

™MU-STAT - miniaturized thermal switch - Princo Instrs.

™MVM - air variable - JFD Electronics Components Corp.

MVP ELECTRONICS, Dept. EM, 1161 N. Tustin, Orange, Cal. 92667, Tel: 714-639-9246

Sales Manager: M. V. Plaats

Advertisement

We specialize in high frequency logarithmic and feedback amplifiers. Our product line includes video Logarithmic amplifiers with an 80 Db dynamic range, and a frequency response of 40 Mhz. Feedback amplifiers include variable gain amplifiers which are digitally programmable. Both standard and custom designs are available.

™MW MRTL - resistor-transistor logic IC's - Motorola Semiconductor Prods.

™MX2503 - 3½ digit meter - Meterex Corp.

™MYCRO Z - polished silicon wafers - Siltec Corp.

™MYKROY - glass bonded mica - Synthane Taylor Corp.

MYLEE DIGITAL SCIENCES, Dept. EM, 155 Weldon Pkwy., Maryland Heights, Mo. 63043, Tel: 314-567-3420; Empl.: 100

Sales Manager: G. Graves

Local Sales Offices & Reps.

Ala	Birmingham, Automation Inc.	205-595-7787
Alas	Anchorage, Alaska Digital	907-272-4414
Ariz	Phoenix, Accounting Equip. Corp.	602-272-7137
Fla	Longboat Key, Mylee Digital Sciences	813-383-1424
Ga	Atlanta, H & B Office Machines	404-872-4236
Haw	Honolulu, Automated Data Sys.	808-261-2039
Ill	Northfield, Amco Computer	312-446-3002
Ind	Indianapolis, Indianapolis Office Machines	317-353-8261
Ind	Jasper, Ohio Valley Sound	812-482-3535
Iowa	West Des Moines, Electronic Business Sys., Inc.	515-225-2489
Kans	Kansas City, Mid Central Data Sys.	816-363-0470
Ky	Louisville, Accounting Machines Sls. & Service	502-583-4417
La	Gretna, Delta Business Machines	504-368-3402
Md	Towlson, Natl. Business & Security Sys.	301-296-0600
Mass	Boston, Systems Automation, Inc.	617-246-1620
Mich	Ann Arbor, Data Machines Corp.	313-761-0450
Minn	Minneapolis, Information Products, Inc.	612-721-6391
Miss	Clinton, Regional Sls. Corp.	601-924-5696
Mo	St. Louis, Mylee Digital Sciences	314-567-3420
NJ	Cinnaminson, Mylee Digital Sciences	609-829-3574
NY	Rochester, Business Machines of NYS	716-271-2010
NC	Raleigh, G. Conner	919-876-1830
Ohio	Sylvania, Automated Business Sys.	419-885-4407
Ore	Portland, Abbott & Lind	503-282-3245
Pa	Allison Park, Mylee Digital Sciences	412-364-2707
Pa	Horsham, Mylee Digital Sciences	215-674-4517
Tenn	Memphis, Automation Inc.	901-396-7248
Tex	Dallas, Selectronic Inventory Sys.	214-363-2531

Tex	Houston, Selectronic Inventory Sys.	713-498-0356
Utah	Salt Lake City, Herrscher & Co.	801-363-4551
Va	Norfolk, American Business Mach.	804-461-2602
Wash	Spokane, Murphy's Business Equip.	509-325-2551

MYSTIK TAPE, BORDEN INC., Dept. EM, 1700 Winnetka Ave., Northfield, Ill 60093

NAE, Dept. EM, 69 Bennett St., Lynn, Mass 01905, Tel: 617-598-4800

(TM)NAFOAM - low-capacity instrumentation cables - National Wire & Cable Corp.

(TM)NAFOIL - foil-shielded cables - National Wire & Cable Corp.

NAMCO CONTROLS, Acme-Cleveland Co., Dept. EM, 170 E. 131st St., Cleveland, Ohio 44108, Tel: 216-268-4200; Empl.: 200

Local Sales Offices & Reps.

Cal	Thousands Oaks	213-931-3881
Fla	Pompano Beach	305-942-9880
Ga	Marietta, 404-427-0241	
Ill	Chicago	312-693-3745
La	Kenner	504-722-6363
Mass	Danvers	617-777-0450
Mich	Detroit	313-357-5414
Mo	Kansas City	816-781-3770
Mo	St. Louis	314-965-5880
NJ	Montclair	201-744-6222
NC	Charlotte	704-392-2155
Ohio	Cincinnati	513-271-1530
Ohio	Cleveland	216-942-1496
Ohio	Jefferson	216-576-4074
Ohio	Tiffin	419-447-1291
Ore	Portland	503-760-3400
Pa	Willow Grove	215-563-0878
Tex	Dallas	214-361-6631
Tex	Houston	713-464-4662
Wisc	Walworth	414-275-2771

(TM)NAMOGRAPH - marking machines - Kingsley Mach. Co.

(TM)NANALINE - delay line fixed - Bel Fuse

(TM)NANISTOR - high speed resistors - General Resistance, Inc.

NAN MAC, Dept. EM, 9 Mayhew St., Framingham, Mass. 01701, Tel: 617-872-4811; Empl.: 22; Minimum order: $J. Manigian

Sales Manager: C. Alex; *Distributor Manager:* J. Manigian

(TM)NANOCOM - telemetry commutator - General Devices, Inc.

NANO-FAST INC., Dept. EM, 416 W. Erie St., Chicago, Ill 60610

(TM)NANOHEX - connectors - Sealectro Corp.

(TM)NANOLOGIC - data acquisition and timing system - Chronetics, Inc.

(TM)NANOMEMORY - core memory system - Electronic Memories & Magnetics Corp.

NANO PULSE INDUSTRIES, INC., Dept. EM, 249-D E. Emerson Ave., Orange, Cal. 92665, Tel: 714-998-2360, TWX: 910-593-1617; Empl.: 165

Local Sales Offices & Reps.

Ariz	Phoenix, Dorton Ent.	602-263-0414
Cal	San Francisco, Testo Co.	415-324-1900
Cal	Santa Barbara, Astralonics	805-962-7101
Cal	Sherman Oaks, Astralonics	213-990-5903
Fla	Maitland, Ellis & Assoc.	305-645-1101
Ill	Chicago, El-Rad Mfg. Co.	312-478-7300
Minn	Minneapolis, Elctrn. Innovators	612-884-7471
NC	Greensboro, L & D Inc.	919-292-3201
Pa	Point Pleasant, Jax Assocs.	215-297-5674
Tex	Dallas, Merino Sls. Co.	214-239-9719
Wash	Seattle, Testo Co.	206-454-7422

(TM)NANOS - fan - Rotron, Inc.

(TM)NANO-SKAN - reflective skanner - Skan-A-Matic Corp.

(TM)NANOSWITCH - solid state relay - Nanotron Relay Co.

NANOTRON RELAY CO., Sub. Veradyne Corp., Dept. EM, 330 N. Victory, Burbank, Cal. 91502, Tel: 213-849-3123; Empl.: 12

NARDA MICROWAVE CORP., Dept. EM, Plainview, N.Y. 11803, Tel: 516-433-9000, TWX: 510-221-1867; FSC No.: 99899; Empl.: 328

Sales Manager: R. Nopper

Local Sales Offices & Reps.

Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Menlo Pk., Straube Assocs.	415-321-9050
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Fla	Orlando, E.G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E.G. Holmes & Assocs.	404-451-6161
Ill	Chicago, Scientific Sls. Co.	312-775-7594
Ind	Indianapolis, Scientific Sls. Co.	317-253-4606
Kans	Shawnee Mission, EIR Co.	913-362-0919
Md	Rockville, Elctrn. Mktg. Assocs.	301-881-5300
Mass	Burlington, Tritek, Inc.	617-272-4550
Mich	Northville, Micro Sls. Corp.	313-482-1229
Minn	Bloomington, Scientific Sls. Co.	612-881-3300
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Pennsauken, Megargel/Himmelstein Assoc.	215-629-1072
NJ	Westfield, Gray & Reed Assoc., Inc.	201-233-6116
NM	Albuquerque, IMEC	505-883-9010
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	E. Syracuse, Ossmann Instrs., Inc.	315-437-6666
NY	Huntington Sta., Gray & Reed Assoc.	516-433-3333
Ohio	Centerville, Micro Sls. Corp.	513-433-8171
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Portland, SJI Corp.	503-224-0344
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Va	Virginia Beach, E.G. Holmes & Assocs.	804-481-6556
Wash	Seattle, SJI Corp.	206-624-9020

(TM)NARROW-CAPS - capacitors, fixed, ceramic - Republic Elctrns. Corp.

NATEL ENGINEERING CO., Dept. EM, 8954 Mason Ave., Canoga Park, Cal. 91306, Tel: 213-882-9620, TWX: 910-494-1959; Empl.: 35 .... p. 1671

Sales Manager: Ed Berman, Mktg. Mgr.

Local Sales Offices & Reps.

NY	Westbury, J Square Mktg., J. Alford	516-997-6210
Tex	Dallas, Bonser-Philhower	214-234-8438
Tex	Houston, Bonser-Philhower	713-467-4373

(TM)NATGLAS - fiberglass sleeving heat treated - Natvar Corp.

(TM)NATIONAL - bands - Nat'l. Band & Tag

NAT'L. BAND & TAG, Dept. EM, 721 York St., Newport, Ky. 41072, Tel: 606-261-2035; Empl.: 50

NATIONAL BERYLLIA CORP., Dept. EM, Greenwood Ave, Haskell, N.J. 07420, Tel: 201-839-1600, TWX: 710-988-5363; Empl.: 200

Local Sales Offices & Reps.

Ariz	Scottsdale, Smolen Assocs.
Cal	Tarzana, Smolen Assocs.
Conn	W. Hartford, Pettigrew Assocs.
Md	Randallstown, Beacon North
Mass	Watertown, Pettigrew Assocs.
Minn	St. Paul, Knox Assocs.
Tex	Dallas, Merino Sls.
Va	Falls Church, Beacon North

NATIONAL CAMERA INC., Dept. EM, 2000 W. Union Ave., Englewood, Colo. 80110, Tel: 303-789-1893; Empl.: 70

Sales Manager: A. McLendon, Director of Mktg.

NATIONAL CAPACITOR SUPPLY, Dept. EM, 7231-A Garden Grove Blvd., Garden Grove, Cal. 92641, Tel: 213-598-9611, TWX: 910-596-1316; Empl.: 32; Minimum order: $R. Ostlie

Sales Manager: S. Bromberg, VP Sls/Mktg; *Distributor Manager:* R. Ostlie

Local Sales Offices & Reps.

Ala	Huntsville, JHD Assocs.	205-536-7455
Cal	Garden Grv., National Capacitor Supply	800-854-2451
Cal	San Jose, Silicon Valley Sls.	408-997-1493
Cal	San Jose, Silicone Valley Sls.	213-598-9611
Fla	Inidalatlantic, M M Assocs.	305-733-2701
Ill	Bensenville, J&R Assocs.	312-595-3420
Ill	Chicago, LGS	312-456-9616
Md	Baltimore, JMS Elctrns.	301-788-8211
Mass	Burlington, Tri-Com Assocs.	617-272-8163
Mich	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
Minn	Minneapolis, Components Group	612-824-4222
NJ	Cherry Hill, Stan Auerbach	609-983-7862
NY	Syracuse, MMI Sls.	315-455-5919
Ohio	Cleveland, J. Finnegan & Co.	216-826-1033
Tex	Arlington, D/FW Sls. Co.	817-461-0681
Wash	Bellevue, Wm Buehler Co.	206-455-5512

NAT'L CERAMIC CO., Dept. EM, 500 Southard St., Trenton, N.J. 08602, Tel: 609-394-5373; Empl.: 60

Local Sales Offices & Reps.

Iowa	Cedar Rapids, J. R. Sls. Engr.	319-393-2232
NY	Liverpool, Wadsworth Mfg. Assocs.	315-652-6865

NATIONAL COMPONENT INDS., INC., A North American Philips Co., Dept. EM, 2182 Dupont Dr., Ste. 219, Irvine, Cal. 92715, Tel: 714-752-9131

NAT'L COMPONENTS IND., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407

NATIONAL CONNECTOR, see Fabri-Tek National Connector Div.

NATIONAL ELECTRONIC SUPPLY, INC., see National Capacitor Supply

NATIONAL ELECTRONICS, Varian Div., Dept. EM, Box 269, Geneva, Ill. 60134, Tel: 312-232-4300, TWX: 910-237-1685; Empl.: 400

Sales Manager: D. Mackowak

Local Sales Offices & Reps.

Cal	Los Altos	415-968-7633
Cal	Marina Del Ray	213-822-8026
NJ	Springfield	201-467-8020
Ohio	Euclid	216-261-2115

NATIONAL METAL CRAFTERS INC., Dept. EM, Belgrade & Oxford Sts., Phila., Pa. 19125, Tel: 215-423-0804; Empl.: 60

NATIONAL RADIO, Dept. EM, 89 Washington St., Melrose, Mass. 02176, Tel: 617-662-7700

NATIONAL SEMICONDUCTOR CORP., Dept. EM, 2900 Semiconductor Dr., Santa Clara, Cal. 95051, Tel: 408-737-5000, TWX: 346353 910-339-9240; Empl.: 24,000; Minimum order: $T. Klein

Sales Manager: D. Beadle; *Distributor Manager:* T. Klein

Local Sales Offices & Reps.

Ala	Huntsville, National Semiconductor	205-881-0622
Ala	Huntsville, Inter Rep. Assocs., Inc.	205-881-3677
Ariz	Scottsdale, National Semiconductor	602-945-8473
Ariz	Scottsdale, Fred Board Assocs.	602-994-9388
Cal	San Diego, National Semiconductor Dist. Off.	714-565-8411
Cal	San Diego, S.R. Electronics	714-565-8411
Cal	Santa Cla, National Semiconductor	408-247-6397
Cal	Sherman Oaks, National Semiconductor	213-783-8272
Cal	Sunnyvale, Quad Rep, Inc.	408-733-7300
Cal	Tustin, National Semiconductor	714-832-8113
Colo	Denver, Electrodyne Inc.	303-757-7679
Conn	Westport, NRG Ltd.	203-226-7527
Conn	Wilton, National Semiconductor	203-762-0378
Fla	Ft. Lauderdale, National Semiconductor Reg. Off.	305-772-6970
Fla	Maitland, QXI	305-647-1188
Fla	Miami, National Semiconductor	305-446-8309
Fla	St. Petersburg, QXI	813-821-2281
Fla	Tamarc, QXI	305-485-6030
Ga	Atlanta, Inter Rep. Assoc.	404-394-7756
Ill	Mt. Prospect, National Semiconductor	312-394-8040
Ill	Mt. Prospect, Delta Tech. Sls.	312-253-0440

Ind Ft. Wayne, Advanced Comp. Sls. 219-484-0722
Ind Indianapolis, Advanced Comp. Sls. 317-545-6441
Ind Indianapolis, National Semiconductor 317-255-5822
Iowa Cedar Rapids, Gassner & Clark Co. 319-393-5763
Md Glen Burnie, Trimark 301-768-2800
Md Glen Burnie, National Semiconductor 301-760-5220
Mass Lexington, A/D Systems Sls....... 617-861-6370
Mass Lexington, National Semiconductor 617-861-6090
Mich Farmington, National Semiconductor 313-477-0400
Mich Grand Rapids, Representative Elctrn. Prod. 616-942-1320
Mich Southfield, Representative Elctrn. Prod. 313-559-1080
Minn Minneapolis, National Semiconductor 612-888-3060
Minn Minneapolis, Stan Clothier Co. .. 612-944-3456
Mo Hazelwood, Cen Tech................. 314-731-4220
Mo Raytown, Cen Tech..................... 816-358-8100
NJ Englewood Cliffs, National Semiconductor 201-461-5959
NJ Fort Lee, NJ NECCO 201-461-2789
NM Albuquerque, A.Q. Elctrns........... 505-883-1003
NY Melville, LEJ Components Sls. .. 516-694-9090
NY Poughkeepsie, National Semiconductor 914-462-2380
NY Rochester, Electra Sls. Corp. 716-436-4030
NY Syracuse, National Semiconductor 315-455-5858
NY Syracuse, Electra Sls. Corp. 315-455-5783
NC Highpoint, Engrg. Devices Corp. 919-869-7200
Ohio Columbus, Micro-Tec 614-888-9761
Ohio Dayton, Micro-Tec 513-294-6441
Ohio Highland Heights, National Semiconductor Reg. Off. 216-461-0191
Ohio Highland Heights, Micro-Tec 216-461-0191
Ore Beaverton, Vantage Corp. 503-646-3466
Pa Ft. Washington, National Semiconductor Reg. Off.. 215-628-8877
Pa Huntington Valley, Omega Elctrn. Sls. 215-947-4135
Tex Dallas, National Semiconductor.. 214-690-4552
Tex El Paso, A Q Elctrns. 915-545-2363
Tex Garland, Carter Assocs.............. 214-276-7151
Tex Houston, Carter Assocs. 713-621-6930
Utah Salt Lake City, Electrodyne 801-277-8392
Wash Bellevue, National Semiconductor 206-454-4600
Wash Bellevue, Vantage Corp............... ,206-455-3460
Exp: Fla., Miami (Latin America), National Semiconductor 305-446-5881

Local Distributors

Ala Huntsville, Hamilton/Avnet Elctrns. 205-533-1170
Ala Huntsville, Hall-Mark Elctrns. Corp. 205-837-8700
Ariz Phoenix, Liberty Elctrns.............. 602-257-1272
Ariz Phoenix, Hamilton/Avnet Elctrns. 602-275-7851
Ark Little Rock, Carlton Bates 501-562-9100
Cal Costa Mesa, Avnet Elctrns. 213-558-2345
Cal Culver City, Hamilton Elctro Sls. 213-558-2121
Cal El Segundo, Liberty Elctrns......... 213-322-8100
Cal Mountain View, Elmar Elctrns.....: 415-961-3611
Cal Mountain View, Hamilton/Avnet Elctrns. 415-961-7000
Cal San Diego, Liberty Elctrns/San Diego 714-565-9171
Cal San Diego, Hamilton/Avnet Elctrns. 714-279-2421
Cal Sunnyvale, Bell Inds..................... 408-734-8570
Colo Commerce City, Elmar Elctrns/Denver 303-287-9611
Colo Denver, Hamilton/Avnet Elctrns. 303-534-1212
Colo Wheatridge, Century Elctrns....... 303-424-1985
Conn Danbury, Schweber Elctrns......... 203-792-3500
Conn Georgetown, Hamilton/Avnet Elctrns. 203-762-0361
Conn Hamden, Wilshire Elctrns/Conn. 203-281-1166
Conn Norwalk, Harvey Elctrns. 203-853-1515
Fla Fort Lauderdale, Hamilton/Avnet Elctrns. 305-971-2900
Fla Ft. Lauderdale, Hall-Mark Elctrns. Corp. 305-971-9280
Fla Hollywood, Schweber Elctrns..... 305-927-0511
Fla Orlando, Hammond Elctrns......... 305-849-6060
Fla Orlando, Hall-Mark Elctrns. Corp. 305-855-4020
Ga Norcross, Hamilton/Avnet Elctrns. 404-448-0800
Ill Elk Grove, Schweber Elctrns. 312-593-2740
Ill Elk Grove Village, Hall-Mark Elctrns. Corp. 312-437-8800
Ill Elk Grove Village, Pioneer Elctrns.
Ill Rosemont, Advent Elctrns........... 312-298-4210
Ill Schiller Park, Hamilton/Avnet Elctrns 312-678-6310
Ind Indianapolis, Pioneer Indiana Elctrns. 317-849-7300
Ind Indianapolis, Advent Indiana........ 317-297-4910
Iowa Cedar Rapids, Advent Elctrns. .. 319-363-0221
Kans Lenexa, Hamilton/Avnet Elctrns. 913-888-8900
Kans Lenexa, Hall-Mark Elctrns Corp. 913-888-4747
Ky Louisville, P.I. Burks Co.............. 502-589-3960
Md Gaithersburg, Pioneer Washington Elctrns. 301-948-0710
Md Hanover, Hamilton/Avnet Elctrns. 301-796-5000
Md Rockville, Schweber Elctrns. 301-881-2970
Mass Burlington, Wilshire Elctrns. 617-272-8200
Mass Burlington, Lionex Inc.................. 617-272-9400
Mass Waltham, Schweber Elctrns. 617-890-8484
Mass Woburn, Hamilton/Avnet Elctrns. 617-933-8000
Mich Farmington, Advent Elctrns......... 313-477-1650
Mich Kentwood, R-M Elctrns. Co......... 616-531-9300
Mich Livonia, Hamilton/Avnet Elctrns. 313-522-4700
Mich Livonia, Pioneer/Mich.................. 313-525-1800
Minn Bloomington, Hall-Mark Elctrns. Corp. 612-884-9056
Minn Edina, Hamilton/Avnet Elctrns. .. 612-941-3801
Mo Earth City, Hall-Mark Elctrns. Corp. 314-291-5350
Mo Hazelwood, Hamilton/Avnet Elctrns. 314-731-1144
NJ Cedar Grove, Hamilton/Avnet Elctrns. 201-239-0800
NJ Fairfield, Harvey Elctrns. 201-227-1262
NJ Mount Laurel, Hamilton/Avnet Elctrns. 609-234-2133
NJ Somerset, Schweber Elctrns. 201-469-6008
NM Albuquerque, Hamilton/Avnet Elctrns. 505-765-1500
NM Albuquerque, Century Elctrns..... 505-292-2700
NY Binghamton, Harvey Elctrns. 607-748-8211
NY Buffalo, Summit Distrs................. 716-884-3450
NY E. Syracuse, Hamilton/Avnet Elctrns. 315-437-2642
NY Farmingdale, Wishire Elctrns. 516-293-5775
NY Rochester, Summit Elctrns. 716-334-8110
NY Rochester, Hamilton/Avnet Elctrns. 716-442-7820
NY Westbury, Schweber Elctrns....... 516-334-7474
NY Westbury, Hamilton/Avnet Elctrns. 516-333-5800
NY Woodbury, Harvey Elctrns. 516-921-8700
NC Greensboro, Hammond Elctrns of Carolina 919-275-6391
NC Raleigh, Hall-Mark Elctrns. Corp. 919-832-4465
Ohio Cleveland, Pioneer Standard...... 216-587-3600
Ohio Cleveland, Hamilton/Avnet Elctrns. 216-461-1400
Ohio Dayton, Pioneer Standard 513-236-9900
Ohio Dayton, Hamilton/Avnet Elctrns. 513-433-0610
Okla Oklahoma City, Radio, Inc. 405-235-1551
Okla Tulsa, Hall-Mark Elctrns. Corp. .. 918-835-8458
Okla Tulsa, Radio, Inc. Ind'l. Elctrns. .. 918-587-9124
Ore Portland, Almac/Stroum Elctrns. 503-292-3534
Pa Erie, Mace Elctrns. 814-838-3511
Pa Horsham, Schweber Elctrns. 215-441-0600
Pa Huntington Valley, Hall-Mark Elctns. Corp. 215-355-7300
Pa Pittsburgh, Cameradio Elctrns. .. 412-288-2600
Pa Pittsburgh, Pioneer/Pittsburgh...: 412-782-2300
SC Greenville, Hammond Elctrns. of Carolina 803-233-4121
Tex Austin, Hall-Mark Elctrns. Corp. 512-837-2814
Tex Dallas, Sterling Elctrns. 214-357-9131
Tex Dallas, Hall-Mark Elctrns. Corp. 214-231-6111
Tex Dallas, Hamilton/Avnet Elctrns... 214-661-8661
Tex El Paso, Hall-Mark Elctrns. Corp.
Tex Houston, Hall-Mark Elctrns. Corp. 713-781-6100
Tex Houston, Sterling Elctrns............ 713-623-6600
Tex Houston, Hamilton/Avnet Elctrns. 713-526-4661
Utah Salt Lake City, Hamilton/Avnet Elctrns. 801-262-8451
Utah Salt Lake City, Century Elctrns. 801-487-8551
Wash Bellevue, Hamilton/Avnet Elctns. 206-746-8750
Wash Seattle, Liberty Elctrns. Northwest 206-763-8200
Wash Seattle, Almac/Stroum Elctns. .. 206-763-2300
Wisc Milwaukee, Taylor Electric Co. .: 414-241-4321
For: Can., Calgary, Alberta, L.A. Varah Ltd. 403-276-8818
For: Can., Vancouver, B.C., Bowtek Electric Co. Ltd.. 604-736-1141
For: Can., Dorval, Que., Semad Elctrns. Ltd.
For: Can., Downsview, Ont., Semad Elctrns. Ltd. 416-635-9880
For: Can., Edmonton, Alb., Bowtek Electric Co. Ltd. 403-426-1072
For: Can., Mississauga, Ont., Prelco Elctrns. Ltd. 416-678-0401
For: Can., Mississauga, Ont., Hamilton/Avnet Elctrns. Ltd. 416-677-7432
For: Can. Montreal 12, Que., Prelco Elctrns. Ltd. 514-389-8051
For: Can., Ottawa, Ont., Hamilton/Avnet Elctrns. 613-725-3071
For: Can., St. Laurent, Que., Hamilton/Avnet Elctrns. Ltd. 514-331-6443
For: Can., Vancouver, BC, L.A. Varah Ltd. 604-873-3211
For: Can., Willowdale, Ont., Electro Sonic Inc. 416-494-1666
For: Can., Winnepeg Manitoba, L.A. Varah Ltd. 204-633-6190
For: Can., Winnipeg, Man., Bowtek Electric Co., Ltd.. 204-786-7521

NATIONAL SEMICONDUCTORS, LTD., Dept. EM, 331 Cornelia St., Plattsburgh, N.Y. 12901, Tel: 518-561-3160, TWX: 610-421-3362; Empl.: 150 p. 3138

Local Sales Offices & Reps.

Ala Huntsville, BJR Research........... 205-881-3569
Ariz Phoenix, KCE Corp.
Cal Los Altos, Affiliated Ind. Corp..... 415-964-1322
Cal San Gabriel, Van Gott & Assocs. 213-285-2148
Colo Denver, Elcom Inc. 303-770-4400
Conn Middletown, Bell Controls..........: 203-346-0670
Fla Ft. Lauderdale, Tech-Rep Assocs. 305-763-5374
Fla Indian Rocks Beach, Tech-Rep Assocs. 813-595-2834
Ill Addison, Hill Sls. Corp................. 312-543-4111
Kans Overland Park, Kebco................. 913-649-2168
Md Timonium, Glen White Assoc. Inc. 301-252-6360
Mich Farmington, Davis-Martensen Co. 313-474-8300
Minn St. Paul, Northport Engrg. 612-698-3841
Mo St. Louis, Kebco........................... 314-569-2660
NH Nashua, Bell Controls.................. 603-882-6984
NJ Nutley, D/R Assoc. of N.J. 201-667-5900
NY Huntington, Andrews & Andrews, Inc. 516-692-8686
Ohio Cleveland, D. Steffen 216-461-8333
Ohio Dayton, D. Steffen....................... 513-293-3145
Ore Beaverton, R&R Electronic Assoc., Inc. 503-643-5754
Tex Dallas, J. Clay Co. 214-350-1281
Va Lynchburg, Glen White Assoc., Inc. 804-384-6920
Wash Seattle, R&R Electronic Assoc., Inc. 206-762-7664

NATIONAL SONICS, Div. Envirotech Corp., Dept. EM, 250 Marcus Blvd., Hauppauge, N.Y. 11787, Tel: 516-273-6600, Telex: 14-4545; Empl.: 77

Sales Manager: J. Kristoffersen

Local Sales Offices & Reps.

Ariz Phoenix, G. L. Warden & Sons .. 602-253-1719
Cal Lakewood, Measurement Variables 213-531-7540
Cal S. San Francisco, Loomis Equip. Co. 415-871-8375
Colo Denver, R. I. Warden Co............ 303-255-2966
Del Wilmington, Briggs-Cooper Controls 302-478-3548
Fla Clearwater, Tech. Comps. & Instrumentation 813-584-1122
Haw Honolulu, Aloha Assocs............... 808-941-1574
Ill La Grange, Pro-Quip.................... 312-352-5732
Ind Indianapolis, Chemical Plant Equip. 317-259-8288
La Baton Rouge, Tech-Quip 504-927-4284
Mass Norwell, Bordewieck Engrg. Sls. Co. 617-659-4915
Mich Royal Oak, R. H. Jackson Co. .. 313-542-5059
Minn Minneapolis, Simone Engrg......... 612-941-5225
Mo Kansas City, Midwestern Engineered Equip. 816-531-1077
Mo St. Louis, Scherrer Instrs............ 314-644-5362
NY Orchard Park, Shorteck 716-662-7290
NY Schenectady, Shorteck................ 518-355-4096
NY Westbury, Long Island, Tech-Rep Engrg. Sls. Co. 516-997-7946
NC Charlotte, M. C. Schroeder Co... 704-392-2260
Ohio Cincinnati, Chemical Plant Equip. 513-821-3340
Ohio Cleveland, Thorrat & Hanmer 216-333-5950
Ohio Columbus, Chemical Plant Equip. 614-252-9600
Okla Tulsa, Telstar Instr. Corp............ 918-628-1011
Pa Philadelphia, Briggs - Cooper 215-459-1476
Pa Pittsburgh, Ener-Jet...................... 412-682-0777
Tenn Concord, L. E. Dotts Assocs....... 615-966-1391
Tenn Memphis, Allan Engrg. Equip. 901-396-3816
Tex Dallas, Flow Sys......................... 214-241-1931
Tex Pasadena, Tech-Quip.................. 713-473-2891
Utah Salt Lake City, T. R. Brown & Assocs. 801-486-7241
Va Richmond, United Controls.......... 804-285-9927

Wash	Seattle, Fairman B. Lee Co.	206-244-7262
Wisc	Appleton, Simone Engrg.	414-731-4111
Wisc	Milwaukee, Simone Engrg.	414-354-3600
Exp:	Can., Kitchener, Ont., Brian Engrg. Ltd.	519-576-2040
Exp:	Can., Montreal, Que., Brian Engrg. Ltd.	514-735-1671
Exp:	Can., N. Vancouver, BC, BCA Indl. Controls	604-988-6321
Exp:	Can., Rexdale, Ont., Brian Engrg. Ltd.	416-248-0226
Exp:	Can., Sarnia, Ont., Brian Engrg. Ltd.	519-337-7591

NAT'L-STANDARD CO., Dept. EM, Niles, Mich. 49120, Tel: 616-683-8100, TWX: 810-270-3153; Empl.: 1000

NATIONAL TEL-TRONICS, Div. Electro Audio Dynamics, Inc., Dept. EM, State Road Hill, Meadville, Pa. 16335, Tel: 814-724-6440, Telex: 91-4405; Empl.: 250 p. 2130,2131

Sales Manager: H.F. Gearhart

Local Sales Offices & Reps.

Ala	Huntsville, J. Eberle & Assocs.	205-881-8315
Cal	Burlingame, J. Logan Assocs.	415-697-6100
Cal	Van Nuys, Western Electromotive/Shephard	213-820-3777
Colo	Englewood, Inverness Elctrns.	303-770-2300
Fla	Maitland, Barrett Assocs.	305-678-0172
Ill	Chicago, Rozner Sls. Co.	312-283-0022
Ind	Indianapolis, Tech. Reps. Inc.	317-849-6454
Mass	Framingham, G-M Assocs.	617-872-4871
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, J. J. Mueller	314-353-3656
NJ	Nutley, Falk-Baker Assoc.	201-661-2430
Ohio	Chagrin Falls, D.C. Prior Co.	216-247-7999
Ohio	Cincinnati, R. Makin Assocs.	513-871-2424
Pa	Cherry Hill, Ned Krause Assocs.	609-424-3543
SC	Myrtle Beach, Candor Co.	803-448-8361
Tex	Dallas, Allied Comps.	214-238-0408
Wash	Bellevue, Panoco	206-454-2503
Exp:	N.Y., Plainview, Empire Exporters Inc.	516-293-5582

NATIONAL WIRE & CABLE CORP., Dept EEM, Service Div., Dept. EM, 136 San Fernando Rd., Los Angeles, Cal. 90031, Tel: 213-225-5611, TWX: 910-321-4155; FSC No.: 04569; Empl.: 114 p. 4672-4686

Local Sales Offices & Reps.

Ariz	Phoenix, Arrowhead Sls. Co.	602-277-7148
Ark	Fort Smith, Electro-Related Products	501-783-7323
Cal	La Jolla, Rep. Sls. Co.	714-454-1500
Cal	Redwood City, National Wire & Cable Corp.	415-365-1952
Cal	San Mateo, National Wire & Cable Corp.	415-344-3066
Colo	Arvada, Arrowhead Sls. Co.	303-423-5556
Conn	Wethersfield, Com/Pak Ltd., Inc.	203-563-4784
Fla	Maitland, J.W. Barrett Assocs.	305-678-0172
Fla	North Miami, J.W. Barrett Assocs.	305-681-4957
Fla	Orlando, National Wire & Cable Corp.	305-898-3801
Ill	Northfield, H.S. Tollaksen Co.	312-441-6644
Md	Glen Burnie, Faion Lott Co.	301-744-4611
Mass	Framingham, Com/Pak Ltd.	617-879-8580
Mich	Southfield, Luebbe Sls. Co.	313-569-1189
Minn	Minneapolis, Tech. Assocs.	612-929-6721
Mo	Grandview, Production Automation	816-763-4155
Mo	Hazelwood, Production Automation	314-731-2331
NJ	Wayne, GT Assoc.	201-694-6040
NY	Ontario Center, Kehoe Comp. Sls.	315-524-2491
NC	Charlotte, J. Rudisill Assocs.	704-377-6901
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Pa	Bala Cynwyd, Vantage Sales Co.	215-667-0990
Pa	Delmont, Luebbe Sls. Co.	412-468-4019
Tex	Fort Worth, J.H. Gibbs Assocs.	817-237-1455
Wash	Olympia, Bergford Assocs.	206-866-2001

NATIONWIDE ELECTRONIC SYSTEMS, See NES, Inc.

™NATITE - industrial ceramic materials - Nat'l Ceramic Co.

™NATRAK - printed circuit card guides - National Metal Crafters Inc.

NATVAR CORP., Dept. EM, P.O. Box 67E, Rahway, N.J. 07065, Tel: 201-388-8800, TWX: 710-996-5860; Empl.: 172

Local Sales Offices & Reps.

Ala	Birmingham, Electrical Insulation Suppliers, Inc.	205-252-9046
Ariz	Phoenix, Elec. Specialty	602-275-5739
Ark	Little Rock, Hisco, Inc.	501-568-3105
Cal	Anaheim, Advance Electrical Sls., Inc.	714-870-0300
Cal	Belmont, Advance Electrical Sls., Inc.	415-592-4550
Cal	Los Angeles, Elec. Specialty	213-724-9600
Cal	San Diego, Electrical Specialty Co. Inc.	714-239-1345
Cal	San Diego, Advance Electrical Sls., Inc.	714-239-1105
Cal	So. San Francisco, Elec. Specialty	415-589-9611
Colo	Denver, Advance Elect. Sls.	303-388-0923
Colo	Denver, Elec. Specialty	303-321-0226
Fla	Orlando, Electrical Insulation Suppliers, Inc.	305-855-7100
Ga	Atlanta, Electrical Insulation Suppliers, Inc.	404-355-1651
Ill	Chicago, W. Maxwell Co.	312-BR 4-3164
Ind	Indianapolis, C. Dykema Agency	317-293-6355
Md	Baltimore, Temsco	301-685-4523
Mass	Woburn, E.B. Beach Co. of New England	617-935-3150
Mich	Detroit, McNaughton-McKay Elec. Co.	313-399-7500
Minn	Minneapolis, D.A. Schultz Co.	612-339-7701
Mo	Ballwin, J.A. McQuillan Co.	314-962-4450
Mo	St. Louis, Mega Co.	314-567-3932
NJ	Livingston, R. McKeown Co.	201-992-0700
NJ	Newark, Eisco Plus	201-589-2929
NY	Penfield, C H P Sls. Corp.	716-DU 1-2800
NC	Charlotte, Electrical Insulation Suppliers, Inc.	704-392-2306
Ohio	Cincinnati, Electrical Insulation Suppliers, Inc.	513-771-4073
Ohio	Cleveland, E. B. Beach Co.	216-341-4300
Ohio	Cleveland, Qualiform Insulation Co.	216-671-8300
Okla	Oklahoma City, J. H. Cole Co.	405-235-2447
Okla	Tulsa, J.H. Cole Co.	
Ore	Portland, Electrical Specialty Co.	503-227-3601
Pa	Pittsburgh, E. B. Beach Co.	412-242-0400
Pa	Yeadon, E. B. Beach Co.	215-MA 2-2210
Tenn	Memphis, Electrical Insulation Suppliers, Inc.	901-947-4176
Tex	Garland, Hisco, Inc.	214-272-5411
Tex	Houston, Hisco, Inc.	713-683-0311
Tex	San Antonio, Hisco, Inc.	512-657-4110
Utah	Salt Lake City, Elec. Specialty Co.	801-487-9805
Va	Richmond, Electrical Insulation Suppliers	804-649-9221
Wash	Seattle, Advance Electrical Sls., Inc.	206-762-2262
Wash	Seattle, Elec. Specialty	206-MU 2-3434
Wisc	Menomonee Falls, Electro Energy Supply	414-251-9650

NAUGLER ENGRG., INC., Dept. EM, Off Dunham Rd., Beverly, Mass. 01915, Tel: 617-922-5634; FSC No.: 05222; Empl.: 5

™NAVTRAK - navigation systems - Edo Western Corp.

NAZ-DAR INTERNATIONAL, Dept. EM, 1087 N. Branch St., Chicago, Ill 60622

Local Sales Offices & Reps.

Cal	Los Angeles, Naz-Dar Co. of Cal.	213-232-4911
Mich	Troy, Naz-Dar Co. of Mich.	313-588-4900
NY	Long Island City, Naz-Dar Co. of N.Y.	212-784-8140

™NCC STANTS - new concepts in capacitors - Matsuo Elec. Co., Ltd.

NCI, INC., Dept. EM, 5900 Australian Ave., W. Palm Beach, Fla. 33407, Tel: 305-842-3201, TWX: 510-952-7618; FSC No.: 26769; Empl.: 460

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Sls	602-968-7791
Cal	Los Alamitos, Reed Elctrn. Mktg.	213-598-6676
Cal	San Diego, Reed Elctrn. Mktg.	714-452-1456
Cal	Santa Clara, I. Squared Inc.	408-985-0400
Colo	Parker, J. S. Heaton Co.	303-758-5130
Fla	Fort Lauderdale, CBC	305-484-7330
Fla	Winter Park, CBC, Inc.	305-644-2277
Ga	Atlanta, Macro-Mktg. Assocs.	404-449-7440
Ill	Chicago, Brock & Cushman, Inc.	312-622-4110
Kans	Leawood, H. C. Heyde Co.	913-649-8628
Kans	Olathe, BC Elctrn. Sls.	913-782-6696
Md	Glen Arm, Glen White Assoc.	301-252-6360
Mass	Burlington, New England Tech. Sls.	617-272-0434
Mich	Farmington, Miltimore Sls. Inc.	313-476-2446
Minn	St. Paul, R.G. Ragon, Inc.	612-488-0201
NJ	Englewood Cliffs, E. Glass Assocs.	201-592-0200
NY	Ontario Center, Kehoe Comps.	315-524-2491
NC	Raleigh, Glen White Assoc.	919-787-7061
Ohio	Dayton, J. C. Hofstetter Co.	513-269-1010
Ohio	Medina, J.C. Hofstetter	216-241-4880
Pa	Fort Washington, GCM Assocs.	215-646-7535
Tenn	Johnson City, Glen White Assoc.	615-929-0184
Tex	Richardson, P. J. Scanlon Co.	214-231-4661
Va	Lynchburg, Glen White Assoc.	804-384-6920
Wash	Bellevue, NAPECC Northwest	206-746-3600

Local Distributors

Ariz	Phoenix, Mirco Elctrn. Distrs.	602-944-2281
Cal	Belmont, Eric Elctrns.	415-593-8284
Cal	Carson, Hi Rel Distr. Sls.	213-537-6500
Cal	Chatsworth, Westates Elctrns. Corp.	213-341-4411
Cal	San Diego, Mock III	714-560-0505
Cal	San Diego, Frank Shelly Elctrn.	714-453-7133
Cal	Santa Ana, Textronics	213-924-6346
Cal	Santa Monica, Frank Shelly Elctrn.	213-392-3913
Cal	Sun Valley, Sterling Elctrns.	213-767-5030
Cal	Sun Valley, Q. C. Components	213-768-6110
Conn	Hamden, Arrow Elctrn.	203-248-3801
Conn	Norwalk, Harvey	203-853-1515
Fla	Ft. Lauderdale, Arrow Elctrn.	305-776-7790
Fla	Orlando, Pioneer	305-859-3600
Ill	Elk Grove, Mepco/Electra-CDC	312-593-8220
Kans	Wichita, Wichita Acft.	316-263-5208
Md	Baltimore, Arrow Elctrn.	301-247-5200
Md	Gaithersburg, Pioneer	301-948-0710
Mass	Burlington, Lionex	617-272-9400
Mass	Waltham, Q P L Elctrns.	617-891-0460
Mich	Romulus, Pioneer/Michigan	313-729-8500
Minn	Bloomington, Arrow Elctrn.	612-888-5522
Minn	St. Paul, Ragon Inc.	612-488-0201
NJ	Clifton, Wilshire Elctrns.	201-365-2600
NJ	Moorestown, Arrow Elctrn.	609-235-1900
NY	Central Islip, Semi Cap	516-582-4400
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Ontario Center, Pace Elctrn. Prods.	315-524-2491
NY	Plainview, Fairmont Elctrn. Sls. Corp.	516-694-8200
NC	Greensboro, Pioneer	919-273-4441
Ohio	Cleveland, Pioneer	216-587-3600
Ohio	Dayton, Arrow Elctrn.	513-253-9176
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Okla	Tulsa, Radio Inc.	918-587-9123
Pa	Huntington Valley, Hallmark Elctrns.	215-355-7300
Tex	Ft. Worth, Textronics	817-335-8111
Tex	Richardson, Altair Co.	214-231-5166
Utah	Salt Lake City, Diplomat	801-486-7227
Wash	Seattle, Shannon	206-763-0545

NCR, Dept. EM, S. Main & K Sts., Dayton, Ohio 45409

NCR CORP., Data Entry Div., Dept. EM, Babcock Hall, Ithaca, N.Y. 14850, Tel: 607-273-5310

NCR CORP., Terminal Sys Div., Dept. EM, Box 490, Ithaca, N.Y. 14850, Tel: 607-273-5310

NCR MICROELECTRONICS DIV., Dept. EM, 8181 Byers Rd., Miamisburg, Ohio 45342

NCR

NCR POWER SYSTEMS DIV., Dept. EM, 584 S. Lake Emma Rd., Box 898, Lake Mary, Fla. 32746, Tel: 305-295-5850, TWX: 56-7478 Scott ORL; FSC No.: 21908; Empl.: 830 p. 3286,3287

Sales Manager: J.E. Loudermilk

Local Sales Offices & Reps.

Ariz	Scottsdale, Runyon Co.	602-959-6060
Cal	Los Angeles, RF Assoc. Inc.	213-478-1586
Minn	Minneapolis, Scott Electronics Sls., Inc.	612-929-2985
NY	New York, H.C. Assocs.	516-541-0262
NY	Syracuse, Naylor Elec. Co.	315-656-2251
NC	Greensboro, L & D Inc.	919-292-3201

Tex	Dallas, Bouillion Engrg. Sls. Co.	214-376-1929

NEC AMERICA, INC., Electron Devices Div., Dept. EM, 3070 Lawrence Expwy, Santa Clara, Cal. 95051, Tel: 408-738-2180, Telex: 35-7475; Empl.: 200

Sales Manager: J. Stewart

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Comps.	205-539-4411
Ariz	Phoenix, NEC America, Inc.	602-252-4497
Cal	Los Angeles, Electronic Comps. Mktg.	213-649-5374
Cal	San Diego, Electronic Comps. Mktg.	714-295-6122
Cal	Santa Clara, J. O. Technical Sls.	408-248-0417
Colo	Denver, Electro-Rep, Inc.	303-744-2821
Conn	Wallingford, Com-Sale	203-269-7964
Ga	Chamblee, W.A. Brown Comps.	404-455-0405
Ill	Chicago, Gianaras Sls. Co.	312-457-1200
Ind	Indianapolis, Advanced Comps.	317-545-6441
Kans	Mission, Admack Sls. Co.	913-432-5550
Mass	Waltham, Com-Sale	617-890-0011
Mass	Woburn, NEC America, Inc.	617-933-8910
Mich	Benton Harbor, R.C. Nordstrom & Co.	
Mich	Southfield, R.C. Nordstrom & Co.	313-559-7373
Minn	Minneapolis, Thomas Mktg.	612-823-4880
NH	Londonderry, Com-Sale	603-668-1440
NM	Albuquerque, Rontek	505-299-4124
NC	Raleigh, W.A. Brown Comps.	919-781-9426
Tex	Dallas, Merino Sls. Co.	214-233-6002

NEC MICROCOMPUTERS, INC., Dept. EM, 5 Militic Dr., Lexington, Mass. 02173, Tel: 617-862-6410

NEC MICROSYSTEMS, See North Microsystems

ⓉⓂNEEDLE/CARTRIDGE FINDER - needle/cartridge merchandiser - Ev-Game Inc.

NEFF INSTRUMENT CORP., Dept. EM, 1088 E. Hamilton Rd., Duarte, Cal. 91010, Tel: 213-357-2281, TWX: 910-585-1833; Empl.: 55 .... p. 1672

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Phoenix, Cleveland Entprs.	602-949-0872
Cal	Los Angeles, Neff Instrs.	213-357-2281
Colo	Denver, Figaro-Klebba Assocs.	
Conn	Hartford, Instrument Reps., Inc.	203-633-0777
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs.	317-244-7867
Mass	Boston, Instrument Reps., Inc.	617-861-8620
Mass	Boston, Instrument Reps.	617-861-8620
Mich	Detroit, Electro Sls. Assocs.	313-424-9075
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	Kansas City, Vertec Assocs.	314-394-6242
NM	Albuquerque, Cleveland Entprs.	505-345-2481
NY	Rochester, Ossman Instrs.	716-328-2230
NY	Syracuse, Ossman Instrs.	315-437-6666
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Portland, Showalter Instr.	503-646-5196
Pa	Philadelphia, PDC Corp.	215-887-9610
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg Assoc.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Utah	Salt Lake City, Figaro-Klebba Assocs.	801-486-3217
Wash	Seattle, Showalter Instr.	206-455-4822
Wisc	Milwaukee, Carter Elctrns., Inc.	414-464-5555

ⓉⓂNEG'ATOR - constant force spring - Ametek, Inc

ⓉⓂNELCO - lacquers & coating system - CPL Corp.

NELSON ROSS ELCTRNS., Dept. EM, 5 Delaware, Lake Success, N.Y. 11040, Tel: 516-328-1100, TWX: 510-223-0414; FSC No.: 82199; Empl.: 150

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith	205-881-3294
Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Cupertino, T. Snitzer	408-257-8333
Cal	Del Mar, T. Snitzer	714-454-2191
Cal	Los Angeles, T. Snitzer	213-836-6170
Colo	Boulder, H. Bass Assocs.	303-499-7509
Conn	New Canaan, Measurement Conslitnt.	203-966-4630
DC	DC, Brimberg Assocs.	301-552-2200
Fla	Orlando, J. Highsmith	305-293-5202
Ill	Chicago, Carter Elctrn.	312-585-5485
Ind	Indianapolis, Cater Elctrn.	317-293-0696
Kans	Overland Park, Carter Elctrn.	913-649-6996
Md	Silver Spring, Eastern Instrumentation Corp.	301-681-6500
Mass	Waltham, Measurement Consltnts.	617-890-4400
Mich	Detroit, H. Teplitz & Co.	313-537-9058
Minn	Minneapolis, Carter Elctrn.	612-559-1976
Mo	St. Louis, Carter Elctrn.	314-569-1406
NJ	West Orange, E-F Tech. Sls.	201-731-7203
NM	Albuquerque, IMEC	505-883-9010
NY	Huntington Station, E-F Tech. Sls.	516-549-1818
NY	Liverpool, R & D Assocs.	315-622-2350
NC	Charlotte, J. Highsmith	704-333-7743
Ohio	Cleveland, H. Teplitz & Co.	216-486-2800
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Ore	Portland, Arva-Hudson, Inc.	503-227-4916
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Tex	Richardson, Lear Assoc.	214-231-5388
Tex	San Antonio, Data Appls. Corp.	512-732-7176
Wash	Bellevue, Arva-Hudson, Inc.	206-455-0773
Wisc	Milwaukee, Carter Elctrn.	414-464-5555

NELSON STUD WELDING TRW INC., Dept. EM, 28th & Toledo Ave., Lorain, Ohio 44035, Tel: 216-245-6931; Empl.: 500

Local Sales Offices & Reps.

Ala	Birmingham	205-942-8109
Colo	Denver	303-744-3495
Conn	Hartford	203-236-5218
Fla	Jacksonville	904-725-8881
Ga	Atlanta	404-457-7291
Ind	Ft. Wayne	219-484-5356
Iowa	Des Moines	515-274-2769
Kans	Overland Park	913-381-3060
La	Metairie	504-737-1082
Md	Rockville	301-762-9511
Md	Towson	301-821-6862
Mich	Grand Rapids	616-455-9020
Mich	Southfield	313-357-3700
Minn	Minneapolis	612-884-4108
Mo	St. Louis	314-567-5320
NJ	Palisades Park	201-947-2291
NY	Buffalo	716-876-7790
NC	Winston-Salem	919-724-2262
Ohio	Cincinnati	513-771-1581
Ohio	Cleveland	216-524-5470
Okla	Tulsa	918-627-3487
Ore	Portland	503-281-7693
Pa	Pittsburgh	412-922-2515
SC	Columbia	803-798-0415
Tenn	Memphis	901-452-6770
Tex	Dallas	214-358-1588
Tex	Houston	713-524-7429
Utah	Salt Lake City	801-322-4122
Va	Richmond	804-233-5520
Wisc	Milwaukee	414-351-0705

ⓉⓂNELTAPE - tape - New England Laminates Co., Inc.

ⓉⓂNELWELD - equipment - Nelson Stud Welding TRW Inc.

ⓉⓂNEOFLEX - neoprene insulated welding cable - CCS Hatfield Wire & Cable Group

NES, INC., Dept. EM, 1536 Brandy Pkwy., Streamwood, Ill. 60103, Tel: 312-289-8820, TWX: 910-651-3190; Empl.: 145 .... p. 2907

Local Sales Offices & Reps.

Ala	Birmingham, Applebee-Church	205-879-4417
Ariz	Tempe, J. Smith & Assocs.	602-968-7025
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Denver, J. Smith & Assocs.	303-442-7100
Fla	Ft. Lauderdale, Reynolds & Assocs.	305-581-6611
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Fla	St. Petersburg, Reynolds & Assocs.	813-360-1484
Ga	Atlanta, Applebee-Church	404-451-2747
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Md	Bethesda, S & S Assocs.	301-654-1434
Mich	Ann Arbor, Hal C. Heym	313-971-6552
Mich	Saginaw, Hal C. Heym	517-792-7928
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	DeWitt, DB Assocs.	315-446-0220
NY	Endicott, DB Assocs.	607-785-7123
NY	Williamsville, DB Assocs.	716-634-4354
Ohio	Cincinnati, Anderson-Bolds	513-272-3351
Ohio	Cleveland, Anderson-Bolds	216-229-4700
Ohio	Worthington, Anderson-Bolds	614-885-3933
Ore	Portland, Fry Controls	503-226-2620
Pa	King of Prussia, S & S Assocs.	215-265-3450
SC	Columbia, Applebee-Church	803-772-3142
Tex	Dallas, BOUCO Sls. Assocs.	214-247-6708
Tex	Houston, BOUCO Sls. Assocs.	713-665-6121
Wash	Seattle, Fry Controls	206-243-1353
Wisc	Waukesah, Michaels Digital Sys.	414-547-6637

NESHAMINY TRANSFORMER, Div. Neshaminy Elctrn., Dept. EM, Edison-Furlong Rd., Furlong, Pa. 18925, Tel: 215-794-7411; Empl.: 130 .... p. 4428

Local Sales Offices & Reps.

Fla	Maitland, Peregoy, Inc.	305-831-2474
Ill	Lisle, B.N.I. Electronics	312-964-5321
NH	Nashua, Bell Controls	603-882-6984
NJ	Haddonfield, Thomas	609-UL 4-3011
NY	Syracuse, W. Zimmerman	315-GR 4-4889
Pa	Philadelphia, Thomas Assocs.	215-627-6615

NESOR ALLOY CORP., Dept. EM, 666 Passaic Ave., W. Caldwell, N.J. 07006, Tel: 201-575-0400; Empl.: 230

Local Sales Offices & Reps.

Ariz	Scottsdale, E.J. Foley & Assoc.	602-945-2665
Ill	Riverside, Mannella & Assoc.	312-447-7724
Mich	Birmingham, Carmco, Inc.	313-642-2068
NJ	Belleville, R. H. B. Sls. Co.	201-687-6220
NJ	Montclair, Controlyne	201-744-8378
NJ	Nutley, D & R Assocs.	201-667-5900
NC	Southern Pines, R. C. Schwahl	919-944-7551

ⓉⓂNETIC - magnetic shielding material - Magnetic Shield Div.

ⓉⓂNEUMANN - condenser microphones, disk cutting equip., rumble meters, phase correlation meters - Gotham Audio Corp.

ⓉⓂNEURO CAT - computerized tomography system - Artronix, Inc.

NEUSES, INC. P.K., Dept. EM, 1401 Rohlwing Rd., Rolling Meadows, Ill. 60008, Tel: 312-253-6555; Empl.: 8

ⓉⓂNEUTRALITE - device for voltage regulators - Allis-Chalmers

ⓉⓂNEUTRONEX - neutral noncyanide gold electroplating process. - Sel-Rex Div. Oxy Metal Industries Corp.

ⓉⓂNEWDAMP - balancing fluid - Bacon Inds.

ⓉⓂNEW EASY - cutting machine - Porter, H.K., Inc.

NEW ENGLAND INSTR., Dept. EM, 14 Kendal Lane, Natick, Mass. 01760, Tel: 617-873-9711, TWX: 710-346-0398; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, E.J. Foley & Assoc.	602-945-2665
Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Denver, Electrodyne	303-757-7679
Conn	Wethersfield, Underwood Sls.	203-563-3046
Ga	Atlanta, Electro-Mech Sls. Eng. Co.	404-256-4414
Ill	Oak Park, J. Popp Sls. Co.	312-626-3711
Kans	Overland Park, Penzner-Mankus Assoc.	913-381-0004
Kans	Wichita, Penzner-Mankus Assoc.	316-264-2662
Md	Silver Spring, Rep-Tron, Inc.	301-593-4844
Mass	Chelmsford, Underwood Sls.	617-256-8191
Mich	Farmington, W.R. Hummon & Assoc.	313-474-0661
Minn	Minneapolis, R.W. Marshall Co.	612-929-0457
Mo	Hazelwood, Penzner-Mankus Assoc.	314-731-4334
NJ	Newfoundland, T.A. Adamo Prod. Dev. Inc.	201-697-2450
NY	Kingspark, T.A. Adamo Prod. Dev. Inc.	603-474-9112
NY	New Hartford, KLM Assocs.	315-735-8525
NY	No. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
NC	Raleigh, Electro-Mech Sls. Eng. Co.	919-782-6452
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Pa	King of Prussia, Monteiro Assocs.	215-265-0634
Tex	Dallas, Evans & McDowell Assoc.	214-238-7157
Wash	Renton, S. Wilson Co.	206-226-0650

NEW ENGLAND LAMINATES CO., INC., Dept. EM, 25 Crescent St., Glenbrook, Conn. 06906, Tel: 203-359-0330, TWX: 710-474-2492; Empl.: 400

NEW ERA PRODS. INC., Dept. EM, 6305 Barberton Ave., Cleveland, Ohio 44102, Tel: 216-351-1097; Empl.: 25

NEW HAMPSHIRE BALL BEARINGS, INC., Dept. EM, Peterborough, N.H. 03458, Tel: 603-924-3311, TWX: 710-364-1805; Empl.: 750

Local Sales Offices & Reps.

Cal	Carson	213-770-4920
Ill	Des Plaines	312-827-6646
NY	Plainview	516-938-2011
Tex	Dallas	817-268-3141
Tex	Ft. Worth	817-284-1451

Local Distributors

Cal	Los Angeles, Jamaica Bearings	213-649-0480
Fla	Miami, Florida Bearings	305-573-8424
Ga	Atlanta, Dixie Bearings	404-522-7620
Iowa	Cedar Rapids, Iowa Midland Supply	319-366-3555
Minn	Minneapolis, Arrowhead Bearings	612-335-1111
Mo	Kansas City, Bearing Distrs.	816-471-0666
NY	Jamaica, Jamaica Bearings	212-526-1350
Okla.	Tulsa, Allied Brg. Supply	918-583-0164
Pa	Pittsburg, Bearings, Inc.	
Tex	Dallas, Jamaica Brgs.	214-352-8496
Wash	Bellevue, J. E. Phillips Co.	206-747-6538

NEWMAN COMPUTER EXCHANGE, Dept. EM, 1250 N. Main St., Ann Arbor, Mich. 48104, Tel: 313-994-3200

NEWMAN CORP., M. M., Dept. EM, Marblehead, Mass. 01945, Tel: 617-631-7100

NEW-TRONICS CORP., Dept. EM, 15800 Commerce Park Dr., Brookpark, Ohio 44142, Tel: 216-267-3150; Empl.: 325

Local Sales Offices & Reps.

Cal	Los Altos, W.W. Posey Co.	415-948-7771
Cal	Woodland Hills, Chick Ryel & Co.	213-883-8118
Colo	Colorado Springs, Norris & Co.	303-576-3324
Fla	Pembroke Pines, J. Wanger Sls.	305-987-8766
Ga	Atlanta, Murphy & Cota Co.	404-875-2525
Ill	Skokie, M. Bermann Sls.	312-675-3740
Iowa	West Des Moines, Irvine Assocs.	515-225-7900
Mo	Liberty, Lectro Reps	816-781-2522
NY	Flushing, Bettan Sls. Inc.	212-591-7600
NC	Burlington, Murphy & Cota Co.	919-584-1577
Ohio	Twinsburg, F. Ohman Inc.	216-425-7445
Tex	Dallas, I. Harrison	214-239-2479
Wash	Seattle, Fleehart & Sullivan Inc.	206-522-1533
Exp:	New York, N.Y., Roburn Agencies Inc.	212-989-5939

NEWCOMB AUDIO PRODUCTS CO., Dept. EM, 12881 Bradley Ave., Sylmar, Cal. 91342, Tel: 213-367-1921

Sales Manager: B. McKnight

Local Sales Offices & Reps.

Ala	Birmingham, M.F. Taylor Co.	205-853-3181
Ark	Little Rock, Crockett Sls. Co.	501-224-3573
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Colo	Colorado Springs, Norris & Co.	303-576-3324
Fla	Casselberry, M.F. Taylor Co.	305-339-0821
Iowa	Des Moines, K.S.W. Assocs.	515-279-9235
Md	Silver Spring, M.F. Taylor Co.	301-589-4002
Mass	Belmont, A. Reinherz	617-484-7784
Mich	Ferndale, Shalco, Inc.	313-547-4771
Minn	Minneapolis, S. Olsen & Assoc.	612-929-6121
Mo	Kansas City, K.S.W. Assocs.	816-358-5240
Neb	Omaha, KSW Assocs.	402-333-2943
NJ	Teaneck, Fisher Elctrns. Assocs.	201-837-1200
NY	Grand Island, L.J. McTaggart	716-773-9222
NC	Charlotte, M.F. Taylor	704-537-7201
Ohio	Mansfield, K. White	419-756-3363
Pa	Pittsburgh, M.F. Taylor	412-247-1529
Tex	Dallas, Crockett Sls. Co.	214-748-8209
Wash	Seattle, Vantage Corp.	206-525-2050

NEWPORT LABS., INC., Dept. EM, 630 E. Young St., Santa Ana, Cal. 92705, Tel: 714-540-4914, TWX: 910-595-1787; Empl.: 150 .... p. 2908,2909

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown	205-883-8660
Ariz	Scottsdale, Measurement Conslts.	602-994-9510
Cal	Pasadena, A&F Sls.	213-681-5631
Cal	Sunnyvale, RDP Instrs.	408-735-9040
Colo	Boulder, Meas. Conslts.	303-499-5294
Conn	Manchester, Victor Assocs.	203-646-6448
Fla	Ft. Lauderdale, W.A. Brown	305-776-4800
Fla	Indialantic, W.A. Brown Instrs.	305-723-0766
Fla	Orlando, W.A. Brown	305-425-5505
Fla	Valparaiso, W. A. Brown	904-243-6424
Ga	Atlanta, W.A. Brown	404-939-1674
Ill	Chicago, Data Elctrns.	312-283-0300
Ind	Indianapolis, Data Elctrns.	317-784-6360
La	Gretna, W.A. Brown	504-366-5766
Md	Lanham, Brimberg Sls.	301-552-2200
Mass	Framingham, Victor Assocs.	617-879-5710
Mich	Southfield, Data-Tron	313-354-6421
Minn	Minneapolis, Data Elctrns.	612-786-9666
Mo	Crestwood, Carlton Co.	314-961-0700
Mo	Kansas City, Carlton Co.	816-363-5300
NJ	Pennsauken, Megargel & Himmelstein	609-662-3081
NM	Albuquerque, Meas. Conslts.	505-265-6471
NY	Buffalo, R.F. Lamb	716-874-4900
NY	Elmont, Crane & Egert	516-488-2100
NY	Rochester, R.F. Lamb	716-544-5580
NY	Schenectady, Robert F. Lamb Co.	518-393-4844
NY	Syracuse, R. F. Lamb	315-454-2469
NC	Durham, W. A. Brown	919-682-2383
Ohio	Dayton, Data-Tron	513-223-8421
Ohio	Wickliffe, Data-Tron	216-585-8421
Ore	Portland, Brett-Ross, Inc.	503-232-4184
Pa	Philadelphia, Megargel-Himmelstein	609-662-3081
Pa	Pittsburgh, Data-Tron	412-325-2844
SC	Columbia, W. A. Brown	803-798-3297
Tenn	Oak Ridge, W. A. Brown	615-482-5761
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Utah	Murray, Meas. Conslts.	801-268-3181
Wash	Seattle, Brett-Ross, Inc.	206-935-8054

Local Distributors

Cal	Pasadena, A-F Sales Engrg.	213-681-5631
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Ill	Chicago, Data Elctrncs. Co.	312-283-0300
La	New Orleans, Mid-South Sls. Co.	504-822-3030
Mass	Framingham, Victor Assocs.	617-879-5710
Minn	Minneapolis, Data Elctrncs. Co.	312-283-0300
Mo	Crestwood, Carlton Co.	314-961-0700
NY	Buffalo, Robert F. Lamb Co.	716-874-4900
NY	Elmont, Crane & Egert Corp.	516-488-2100
Ohio	Wickliffe, Data-Tron	216-585-8421
Pa	King of Prussia, Applied Controls, Inc.	215-265-3832
Tex	Houston, AWC Texas, Inc.	713-488-2730
Va	Richmond, Instrument Tech. Reps.	804-285-3931
Wash	Seattle, Brett-Ross, Inc.	206-935-8054

(TM)NEWTRON - digital readout tube - Apollo Corp.

N.Y. TESTING LABS., INC., Dept. EM, 81 Urban Ave., Westbury, N.Y. 11590, Tel: 516-334-7770, TWX: 212-297-1449; Empl.: 50

(TM)N-GAS - special mixture for chemical vapor deposition of silicon nitride. - Matheson Gas Products

NH RESEARCH, INC., Dept. EM, 1510 S. Lyon St., Santa Ana, Cal. 92705, Tel: 714-835-1616, Telex: 67-8377; FSC No.: 24862; Empl.: 30

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Santa Ana, Schlines-Richardson	714-832-1949
Del	Newark, Dyna Rep Co.	302-738-7081
Fla	St. Petersburg, Greenstein Assocs.	813-822-5342
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Chicago, Pat Lind Elctrns. Co.	312-774-1246
Ind	Indianapolis, Pat Lind Elctrns. Co.	317-547-9178
Mass	Waltham, W.M. Hague Co.	617-899-5600
Mich	Southfield, Electroquipment Sls.	313-569-4497
Minn	Circle Pines, Pat Lind Elctrns. Co.	612-786-5770
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NY	Huntington, Hansen Assocs.	212-947-0379
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Chestlerland, Electroquipment Sls.	216-729-2222
Ohio	Dayton, Electroquipment Sls.	513-434-8993
Ore	Beaverton, Showalter Instrs.	503-646-5196
Tex	El Paso, Systems Design Conslts.	915-544-5124
Utah	Murray, Measurement Conslts. Ltd.	801-268-3181
Va	Alexandria, Dyna Rep Co.	703-354-1222
Wash	Bellevue, Showalter Instr.	206-455-4922

(TM)NIAL - thermocouple alloy - GTE Sylvania Inc.

(TM)NICAD - nickel cadmium battery - Gould, Inc.

NICHICON AMERICA CORP., Dept. EM, 6435 N. Proesel Ave., Chicago, Ill. 60645, Tel: 312-679-6530

Local Sales Offices & Reps.

Ala	Huntsville, Interep	205-881-3677
Ariz	Phoenix, Chaparral	602-263-0414
Cal	El Segundo, Varigon	213-679-0621
Cal	Mt. View, Caltron/Pyle	415-964-3244
Cal	San Diego, Varigon	714-299-5413
Conn	Hamden, Impact Sls.	203-281-1331
Fla	Miami, Reptronics	305-251-5478
Fla	St. Petersburg, Reptronics	813-522-8220
Ga	Atlanta, Interep	404-394-7756
Ill	Chicago, Midwest	312-777-9700
Ind	Indianapolis, Midwest	317-253-0590
Iowa	Cedar Rapids, Midwest	319-362-4410
Md	Baltimore, Comp. Sls.	301-484-3647
Mass	Waltham, Impact Sls.	617-893-2850
Mich	Gross Pointe, Greiner Assoc.	313-499-0188
Minn	Minneapolis, R.W. Marshall	612-929-0457
NJ	Clark, Dolan	201-382-2797
NY	Bohemia, Nichicon Branch	516-567-2994
NY	N. Syracuse, L. D. Allen	315-458-7470
NC	Raleigh, Component Sales	919-782-8433
Ohio	Cleveland, KW Elctrn. Sls.	216-831-8292
Ohio	Dayton, KW Elctrn. Sls.	513-890-2150
Pa	Ft. Washington, BGR	215-643-4111
Tex	Dallas, W. Reese	214-638-6775
Wash	Bellevue, Ray Over Sls.	206-454-4551

(TM)NICKELPLY - steel wire (nickel-coated) - Nat'l-Standard Co.

(TM)NICKEL SWITCH - subminiature switch - Fabri Tek

NICOLET INSTRUMENTS CORP., Dept. EM, 5225 Verona Rd., Madison, Wisc. 53711, Tel: 608-271-3333, TWX: 910-286-1713; Empl.: 329 .... p. 2910,2911

Local Sales Offices & Reps.

Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Mountainview, Scientific Devices	415-964-4230
Cal	San Diego, Scientific Devices	714-279-6642
Colo	Littleton, Aztec Enterprises	303-795-0250
Ga	Decatur, Nicolet Instr.	404-289-4113
Md	Silver Spring, Sel-Tronics, Inc.	301-589-3391
Mass	Auburndale, Nicolet Instr.	617-969-7420
NJ	Fairfield, KLS Assocs., Inc.	201-227-2900
NJ	Medford, Nicolet Instr.	215-467-7070
NM	Albuquerque, Aztec Entrprs.	505-255-2440
NY	Liverpool, Rayelco Elctrns., Inc.	315-652-5272
Ohio	Cleveland, Nicolet Instr.	216-295-0025
Tex	Houston, Nicolet Instr. Co.	713-460-5887
Wisc	Brookfield, Nicolet Instr.	414-782-4280

NICOLET SCIENTIFIC CORP., Dept. EM, 245 Livingston St., Northvale, N.J. 07647, Tel: 201-767-7100, TWX: 710-991-9619; Empl.: 96

Local Sales Offices & Reps.

Cal	Irvine, Nicolet Scientific	714-549-1199
Ga	Decatur, Nicolet Instrument	404-289-4113
Md	Silver Spring, Nicolet Scientific	301-681-5800
Mass	Auburndale, Nicolet Instrument	617-969-7420
NJ	Cedar Grove, KLS Assoc	201-785-4450
NJ	Medford, Nicolet Scientific	215-467-7070
NY	Liverpool, Rayelco Elctrns	315-652-5272
Ohio	Worthington, Nicolet Scientific	614-888-6060
Tex	Houston, Nicolet Scientific	713-523-9181
Wash	Bellevue, Scientific Devices/Northwest	206-454-0900
Wisc	Brookfield, Nicolet Scientific	414-782-4280

(TM)NICORO - brazing alloys - GTE Sylvania Inc.

(TM)NICORO 80 - brazing alloys - GTE Sylvania Inc.

(TM)NICUSIL 3 - brazing alloys - GTE Sylvania Inc.

NIDEC AMERICA CORP., Dept. EM, 1821 University Ave., St. Paul, Minn. 55104, Tel: 612-644-9900, Telex: 29-7430; Empl.: 240; Minimum order: $R. Johnston

Sales Manager: C. Hajec; *Distributor Manager:* R. Johnston

Local Sales Offices & Reps.

Cal	Santa Monica, Davidson Assoc.	213-829-1731
Fla	Clearwater, WMM Assocs.	813-442-3913
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mich	Southfield, Doral Sls. Co.	313-352-1667
Minn	St. Paul, Vikeland Sls.	612-645-4647
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Hartsford, Com-Tec Sls.	914-761-6644
NY	Rochester, Upstate Component Sls.	716-377-1555

Ore	Portland, SPS Elctrns.	503-645-3769
Tex	Houston, Zonk Engrg. Co.	713-697-9302
Tex	Richardson, Zonk Engrg. Co.	214-238-7651

™NIGHT LARK - portable power failure lights - Teledyne Big Beam

™NIGHTRIDER 40DR - CB Rig - Fanon/Courier Corp., Subs.

™NIGHTSUN - searchlights - Spectrolab, Inc.

™NIGUARD - ceramic capacitor - AVX Ceramics

NIHON DEMPA KOGYO CO., LTD., Dept. EM, 1-21-2 Nishihara, Shibuya-Ku, Tokyo, Japan, Tel: 03-460-2111; Empl.: 800

NIKON, INC., Instr. Div. Ehrenreich Photo-Optical Ind., Dept. EM, 623 Stewart Ave., Garden City, N.Y. 11530, Tel: 516-222-0200, Telex: 96-7806; Empl.: 500

Sales Manager: I. Feldman

™NIMPAC - Power Supply - Velonex, Instrument Div.

™NIORO - brazing alloys - GTE Sylvania Inc.

NIPPERT CO., Dept. EM, 825 Pittsburgh Dr., Delaware, Ohio 43015, Tel: 614-363-1981, Telex: 24-5396; Empl.: 250

NIPPON-DENSAN CORP., See Nidec America

NIPPON PULSE MOTOR CO., LTD., Dept. EM, 13-16, 2-chome, Hongo, Bunkyo-ku, Tokyo 113 Japan, Tel: (03) 813-8841, TWX: PULSMO J23539; Empl.: 250

™NIROMET - controlled expansion alloy - GTE Sylvania Inc.

™NIRON - controlled expansion alloy - GTE Sylvania Inc.

™NI SPAN C ALLOY 902 - temperature compensated material - Engelhard Minerals & Chem.

™NITE-HAWK - vehicle alarm system - LocAtor Electronics Co.

NITRON DIV., McDonnell Douglas Corp., Dept. EM, 10420 Bubb Rd., Cupertino, Cal. 95014

™NITROPHYL - Cellular hard rubber floats - Rogers Corp.

™NITROX® - reactor system - Applied Materials Inc.

NITSUKO LTD., Dept. EM, 14-13, Udagawa-cho, Shibuya-ku, Tokyo Japan, Tel: (03) 464-1801, TWX: 2422757 (NTK J); Empl.: 2500

Local Sales Offices & Reps.

Conn	Stamford, TIE/Communications	203-327-4800
NJ	Saddle Brook, MH & W. Int'l Corp.	201-791-6277

™NIXIE - indicator tube - Burroughs Corp.

™NIXOX - catalyst chamber - Air Prods. & Chems., Inc.

NJE CORP., Dept. EM, Box 50, Culver Rd., Dayton, N.J. 08810, Tel: 201-329-4616, TWX: 710-480-5674; FSC No.: 98380; Empl.: 75

Sales Manager: P.L.F. Monte

Local Sales Offices & Reps.

Ariz	Phoenix, Cleveland Enterprises, Inc.	602-944-4679
Cal	Mission Viejo, The Powerhouse	714-840-5666
Colo	Cleveland, Enterprises of Colorado Inc	303-751-3252
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Minn	Edina, Grayden & Flemmer	612-941-1120
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Long Branch, Mer-Mon	201-229-3172
NJ	Long Branch, Mer-Mon	201-229-3172
NM	Albuquerque, Cleveland Entprs.	505-266-5594
Okla	Richardson, TX, Palatine Sls.	214-231-9489
Tex	Austin, Palatine Sls.	512-451-7463
Tex	Houston, Palatine Sls.	713-783-1492
Tex	Richardson, Palatine Sls.	214-231-9489

N.K.R. PRECISION MFG. CORP., Dept. EM, Rte. 17M, Box 333, Harriman, N.Y. 10926, Tel: 914-782-8562

N.L. INDS., INC., BEARINGS DIV., Dept. EM, 5461 Southwyck Blvd., Toledo, Ohio 43614, Tel: 419-385-9911, Telex: 28-6413; Empl.: 1000; Minimum order: $A.B. Koch

Sales Manager: OEM-R.A. Peterson; *Distributor Manager:* A.B. Koch

Local Sales Offices & Reps.

Cal	French Camp	209-982-0961
Cal	Los Angeles	213-747-5566
Ga	Atlanta	404-876-6316
Ill	Elk Grove Village	312-593-2750
NJ	Robbinsville	609-587-5705

NL INDUSTRIES, INC., Metal Div., Dept. EM, 1221 Ave. of Americas, New York, N.Y. 10020, Tel: 212-730-2722

Local Sales Offices & Reps.

Cal	Oakland	415-261-3600
Colo	Denver	303-222-4450
Ga	Atlanta	404-876-7361
Ill	Chicago	312-226-3700
Ill	Granite City	618-452-3000
Mich	Detroit	313-893-0100
Minn	St. Louis Park	612-929-2675
Neb	Omaha	402-393-3024
NJ	Perth Amboy	201-826-6000
NY	Depew	716-683-6840
Ohio	Cincinnati	513-922-4100
Ohio	Cleveland	216-621-2361
Ore	Portland	503-224-3370
Pa	Altoona	814-946-1611
Pa	Pittsburgh	412-687-3910
Tex	Dallas	214-948-3521

N L INDS., INC., Dutch Boy Paints Div., Dept. EM, P.O. Box 500, W. Caldwell, N.J. 07006, Tel: 201-575-0970

Local Sales Offices & Reps.

Cal	Burlingame	415-692-4111
Cal	Los Angeles	213-263-7121
Fla	Ft. Lauderdale	305-564-7531
Ill	Chicago	312-226-3700
Mass	Westwood	617-762-7400
Mo	St. Louis	314-241-8782
NY	Woodbury	516-921-7380
Ohio	Cincinnati	513-922-4100
Ohio	Cleveland	216-696-3800
Ore	Portland	505-235-2191
Pa	Philadelphia	215-426-0600
Pa	Pittsburgh	412-687-3910
Tex	Dallas	214-948-3521
Wash	Seattle	206-622-1950

™NMP - solvent - GAF Corporation

™NOALA - automatic noise level adjuster - Altec Div.

™NO ARC - hi voltage insulator - Chemtronics, Inc.

NOBEX DIV., Griffith Plastics Corp., Dept. EM, 1027 California Dr., Box 4365, Burlingame, Cal. 94010, Tel: 415-342-8170, TWX: 910-374-2840; FSC No.: 32767; Empl.: 35

Local Sales Offices & Reps.

Cal	Burlingame, J. Logan & Assocs.	415-697-6100
Cal	Inglewood, V & L Assocs.	213-671-7688
Fla	Delray Beach, F. A. Cullman Co.	305-276-5071
Ill	Chicago, Comm. Engrs.	312-761-0548
Ind	Ft. Wayne, McDonald Sls. Co.	219-745-9214
La	Metairie, McKinney Sls. Co.	504-887-1723
Md	Baltimore, M/E Assocs.	301-825-1130
Mass	N. Scituate, W.A. Hendrickson Co.	617-545-0652
Minn	Minneapolis, Wenco Sls.	612-866-3639
NJ	Cherry Hill, M/E Assocs.	609-667-6110
NY	Bayside, W. Jay Assocs.	212-762-4238
Okla	Tulsa, McKinney Sls. Co.	918-742-6791
Tex	Bellaire, McKinney Sls. Co.	713-665-3653
Tex	Dallas, McKinney Sls. Co.	214-631-9450
Va	Richmond, M/E Assocs.	703-266-3457
Wash	Seattle, C.K. Shanks & Assoc.	206-632-4290

Local Distributors

Cal	Burlingame, Rose Elctrns., Inc.	415-697-0224
Cal	Los Angeles, Electric Switches, Inc.	213-664-1141
Mass	Newton, Greene-Shaw Co.	617-969-8900
NY	Bohemia, Car-Lac Elctrns.	516-567-4200
NY	Buffalo, Summit Distributors	716-884-3450
Okla	Tulsa, Oil Capitol Elctrns.	918-836-2541
Tex	Dallas, K-A Electronic Sls.	214-634-7870
Wisc	Mequon, Taylor Electric Co.	414-241-4321

™NOBRUSH - permanent magnet converters, frequency-generators, & alternators - Georator Corporation

™NOISEFOE - ear muffs - Mine Safety Appliances Co.

NOLATRON INC., Dept. EM, 3809 Paxton St., Harrisburg, Pa. 17111, Tel: 717-564-3398; Empl.: 5

™NOMAD - portable cases - B & F Instrs., Inc.

™NO-MAR - set screws - PIC Design Div.

™NO-NIK - wire stripper - Clauss Cutlery Co.

NON LINEAR FILTERS, Dept. EM, Box 338, Trumbull, Conn. 06611, Tel: 203-268-6309; Empl.: 8

NON-LINEAR SYS., INC., Dept. EM, 533 Stevens Ave., Solana Beach, Cal. 92075, Tel: 714-755-1134, TWX: 910-322-1132; Empl.: 76 .... p. 2912

Local Sales Offices & Reps.

Ala	Mobile, Hollingsworth & Still	205-344-1641
Ariz	Phoenix, Arrowhead Sls. Corp.	602-277-7148
Cal	Cardiff, Tech-Sources Unlimited	714-436-0515
Cal	Los Altos, W.W. Posey Co.	415-948-7771
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Fla	Orlando, Hollingsworth & Still	305-834-2356
Fla	Pompano Beach, Hollingsworth & Still	305-782-0069
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Haw	Honolulu, Hawaii Elctrn. Sls.	808-845-8207
Ill	Chicago, T. Pappas & Assocs.	312-685-2338
Iowa	Des Moines, Pacer Sls. Corp.	515-274-3224
Md	Silver Spring, Mid-Atlantic Sls.	301-593-7749
Mass	N. Scituate, W.A. Hendrickson Co.	617-545-0652
Minn	St. Paul, Skor	612-645-6461
Mo	Raytown, Pacer Sls. Corp.	816-358-6638
Neb	Ferndale, Shalco	313-547-4771
NY	Liverpool, J. Brown Elctrn. Sls. Reps.	315-451-1471
NY	Rochester, J. Brown Elctrn. Sls. Reps.	716-266-2728
NY	Yonkers, J. Brown Elctrn. Sls. Reps.	914-779-7330
NC	Charlotte, Hollingsworth & Still	704-535-4604
Ohio	Cleveland, D. Steffen & Assocs.	216-461-8333
Ohio	Dayton, D. Steffen & Assocs.	513-293-3145
Pa	Abington, Mid-Atlantic Sls.	215-657-2815
Tex	Dallas, Berthold Sls.	214-526-8329
Wash	Seattle, D. Nelson & Assocs.	206-242-3430

Local Distributors

Ariz	Phoenix, Metermaster	602-273-7331
Cal	Los Angeles, Metermaster	213-685-4340
Cal	Oakland, Western Electro Mechanical	415-452-1936
Cal	Orange, I.C. Elctrns.	714-997-5343
Cal	Palo Alto, Metermaster	415-968-0313
Conn	N. Branford, Marshall Inds.	
Fla	Miami, ESL Electronic Distrs.	305-633-6973
Ga	Atlanta, Specialty Distributing Co.	404-873-2521
Ill	Chicago, Union Elctrns.	312-723-1500
Ill	Des Plaines, Marshall Inds.	312-298-3700
Ind	Indianapolis, Ra-Dis-Co	317-637-5571
Ky	Louisville, P.I. Burks	502-589-3960
La	Shreveport, Industrial Elctrns. Supply	318-222-9459
Md	Elkridge, Sunshine Scientific Instrs.	301-796-5600
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Boston, Sager Electrical Supply	617-542-2281
Mass	Newton Highlands, Marshall Inds.	617-965-5115
Mich	Ferndale, Ram Meter	313-547-1000
Minn	Plymouth, Marshall Inds.612-831-4904	612-559-2211
NJ	New Brunswick, Bay Elctrns. Distributing Co.	201-863-3971
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Farmingdale, Marshall Inds.	516-293-4141
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
Ohio	Cincinnati, Hughes-Peters	513-351-2000
Ohio	Wickliffe, Gateway-Megatech	216-944-8565
Okla	Tulsa, Radio Inc.	918-587-9123
Ore	Portland, United Radio Supply	503-434-2171
Pa	Allentown, Resco of L.V.	215-435-6743
Pa	Philadelphia, Sunshine Scientific Instrs.	215-673-5600
Tenn	Chattanooga, Curle Elctrns.	615-266-4728
Tex	Ft. Worth, Sweico	817-335-6521
Tex	Houston, Madison Elctrn. Supply	713-224-2668
Tex	Irving, Electrotex	214-438-2868

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Tex	San Antonio, Sherman Elctrns. Supply	512-224-1001
Va	Arlington, Arlington Elctrn. Wholesalers	703-524-2412
Wash	Tukwilla, Central Elctrns. Distrs.	206-575-0711
Wisc	Milwaukee, Acme Radio Supply	414-271-0641

(TM)NO NOISE - volume control & contact restorer - Elctrn. Chemical Corp.

(TM)NONTACT - non-contact temperature sensor - Trans-Met Engrg.

(TM)NORAC - non-rotating armored cable - Boston Insulated Wire & Cable Co.

(TM)NORBATHERM - temperature controller - Cross Electronics Inc.

(TM)NORDIC - high density connector - Viking Inds., Inc.

NORDSON CORP. , Dept. EM, 356 Jackson St., Amherst, Ohio 44001, Tel: 216-988-4471

(TM)NORELCO - current lamp production - North American Philips Lighting Corp.

NORELCOM ELECTRONICS, Dept. EM, 200 Allen Blvd., Farmingdale, N.Y. 11735, Tel: 516-249-7262; Empl.: 10

NORFIELD ELECTRONIC, INC., Dept. EM, 3 Depot Pl., E. Norwalk, Conn. 06855, Tel: 203-853-2777

NORLAND INSTRUMENTS
A Subsidiary of Cordis Corporation

NORLAND INSTRUMENTS, Dept. EM, Norland Dr., Ft. Atkinson, Wisc. 53538, Tel: 414-563-8456, TWX: 910-260-3732; Empl.: 50 .... p. 2913

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assoc.	205-533-5896
Colo	Boulder, PAR Assoc.	303-499-4736
Fla	Ft. Lauderdale, Lee Assoc.	305-491-7220
Fla	Winter Haven, Lee Assoc.	813-294-5815
Ga	Buford, Lee Assoc.	404-945-4222
Ill	Chicago, Berndt Assoc.	312-283-0713
Ind	Carmel, Berndt Assoc.	317-844-0114
Kans	Shawnee Mission, Scientific Devices	913-362-8700
Md	Silver Spring, Spectro	301-949-8261
Mich	Southfield, Electro Sls.	313-424-9075
Minn	Minneapolis, Berndt Assoc.	612-835-4814
NM	Sandia Pk., PAR Assoc.	505-881-5000
NY	DeWitt, db Assocs.	315-446-0220
NC	Raleigh, Lee Assoc.	919-787-5818
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Dallas, Martin, Zienkosky, Brown & Assocs.	214-233-5535
Tex	Houston, Martin, Zienkosky, Brown & Assocs.	713-523-7333
Wash	Seattle, Rush Drake Assoc.	207-763-2755
Wisc	Milwaukee, Berndt Assoc.	414-545-8400

(TM)NORMATIC - solid state welder control - Square D Co.

(TM)NORMATYPE - drytransfer lettering - Keuffel & Esser Co.

(TM)NORPAK - solid state logic control - Square D Co.

NORPLEX, Div. Universal Oil Prods., Dept. EM, 10 V.O.P. Plaza, Des Plaines, Ill. 60016, Tel: 312-391-2000

NORPLEX DIV., Universal Oil Products, Dept. EM, Norplex Dr., LaCrosse, Wisc. 54601, Tel: 608-784-6070, Telex: 29-3422; Empl.: 850

Sales Manager: J.A. Parker

Local Sales Offices & Reps.

Ariz	Phoenix, Karl Jahn Co.	602-956-9060
Cal	Alhambra, Ralph Little & Assocs.	213-282-2114
Cal	Santa Clara, Ralph Little & Assocs.	408-247-7750
Colo	Sedalia, Jensen Reps. Co.	303-688-4154
Conn	West Hartford, R.S. Pettigrew & Co.	203-233-8533
Fla	Largo, Almac Assocs.	813-581-0444
Fla	Naples, Norplex Div. UOP	813-262-6982
Ga	Tucker, Cartier & Wilson Co.	404-939-2547
Ill	Wheaton, Norplex Div, UOP	312-653-1283
Ind	Indianapolis, Norplex Division, UOP	317-773-3600
Iowa	Cedar Rapids, J. Vrbik Co.	319-366-8733
Mass	West Newton, R.S. Pettigrew & Co.	617-969-5770
Mich	Detroit, Hohlfeldt Engrg., Inc.	313-839-4592
Minn	Minneapolis, Norplex Div., UOP	612-835-5530
Mo	Ballwin, Norplex Div. UOP	314-394-2626
Mo	St. Louis, Phelan-Tramelli Sls. Agency	314-394-2626
NJ	Union, Plastech, Inc.	201-687-4810
NY	East Rochester, J.N. Powderly Co.	716-546-7820
Ohio	Cleveland, R.A. Paisley	216-333-0569
Ohio	Dayton, Wm. S. McClellan Assocs.	513-298-1417
Pa	Ardmore, Midlantic Plastics Sls. Co.	215-649-2436
Tex	Arlington, N & W Sls., Inc.	817-461-4443
Utah	Salt Lake City, Jensen Rep.	801-487-2611
Wash	Olympia, Bergford & Assocs.	206-866-2001
Wisc	Wauwatosa, Industrial Sls. Tech.	414-453-2710

NORSAL INDUSTRIES, INC., Dept. EM, 34 Grand Blvd., Brentwood, N.Y. 11717, Tel: 516-231-4040, TWX: 510-227-9865; FSC No.: 19136; Empl.: 21

Local Sales Offices & Reps.

Ariz	Scottsdale, Elctrn. Entprs.	602-943-9657
Cal	Los Angeles, E. Mintz Assoc.	213-645-2066
Cal	Los Gatos, Donahue Assoc.	408-356-1717
Fla	Clearwater, Brennan Assoc.	813-446-5006
Md	Silver Spring, Youth Assocs.	301-598-5740
NM	Albuqurque, Elctrn. Entprs.	505-298-0285
NM	Las Cruces, Elctrn. Entprs.	602-946-9860
NY	Stony Brook, Brendan de Milt	516-751-8415
Ohio	Dayton, F. L. Ohmer, Assoc.	513-434-1454

(TM)NORSEMAN - hand tools - Erikson Specialized Tool Co.

(TM)NORSMAN - wire wrap connector - Viking Inds., Inc.

NORTEC ELECTRONICS, Dept. EM, 3697 Tahoe Way, Santa Clara, Cal. 95051, Tel: 408-245-4930, Telex: 34-8359; Empl.: 150

Sales Manager: J. Scheinberg

Local Sales Offices & Reps.

Cal	Menlo Park, Straube Assocs.	415-321-9050
NJ	Ft. Lee, Tech. Sls.	201-944-3642

NORTH AMERICAN PHILIPS CONTROLS CORP., Dept. EM, Cheshire Industrial Pk. Box E, Cheshire, Conn. 06410, Tel: 203-272-0301, TWX: 710-455-4048; Empl.: 525 p. 2399,3102,3103,3590,3591

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Components	205-539-4411
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Buena Park, Sales Engrs. Ltd.	213-921-0681
Cal	North Hollywood, No. Amer. Philips Controls	213-877-0536
Cal	San Diego, Sales Engs. Ltd.	714-277-5723
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Cheshire, Selmark Assocs.	203-272-8764
Fla	Coral Springs, W. A. Brown Comps.	305-753-1650
Fla	Orlando, W.A. Brown Comps.	305-425-5863
Ga	Chamblee, W. A. Brown Comps.	404-455-0405
Ill	Rolling Meadows, Sumer	312-394-4900
Ind	Ft. Wayne, Temple Engrg.	219-743-0362
Iowa	Cedar Rapids, S & O/Nortec Sls.	319-393-1845
Md	Lanham, L. D. Lowery	301-458-1556
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Troy, McPhail Corp.	313-689-6444
Minn	Mpls, Nortec Sls.	612-835-7414
Mo	Hazelwood, Dy-Tronix Inc.	314-731-5799
Mo	Independence, Dy-Tronix Inc.	816-737-1100
NH	Manchester, Selmark Assocs.	603-623-5774
NJ	Livingston, A.A. Budde	201-994-1210
NM	Albuquerque, Williams Assoc.	505-255-1638
NY	Forest Hills, Malin Assocs.	212-268-9122
NY	Rochester, Electra Sls.	716-436-4030
NY	Syracuse, Electro Sls. Corp.	315-455-5783
NC	Raleigh, W.A. Brown Comps.	919-781-9426
Ohio	Cleveland, C. Robinson Co.	216-381-9049
Ohio	Dayton, C. Robinson Co.	513-275-2412
Pa	Broomall, L.D. Lowery	215-528-5170
Tex	Dallas, R. Kimball Co.	214-231-3447
Va	Charlottesville, L.D. Lowery	804-973-6672
Wash	Bellevue, W.M. Buehler Co.	206-455-5512
Wisc	Milwaukee, Sumer	414-259-9060

Local Distributors

Cal	San Deigo, Sterling Elctrns.	714-565-2441
Cal	Sun Valley, Sterling Elctrns.	213-767-5030
Colo	Denver, Waco Elctrns.	303-371-4370
Fla	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
Ill	Elk Grove Village, G.B.L. Elctrns.	312-593-3220
Minn	Minneapolis, Bergquist Co.	612-835-2322
NY	Lynbrook, Peerless Radio Corp.	
NY	Rockville Centre, Midway Industrial Elctrns.	
Pa	Horsham, Pioneer/Pennsylvania	215-674-5710
Tex	Houston, Altair Co.	713-462-3029
Tex	Richardson, Altair Co.	214-231-5166

NORTH AMERICAN PHILIPS CONTROLS, Dept. EM, Husky Park, Frederick, Md. 21701, Tel: 301-663-5141, TWX: 710-862-0901; Empl.: 310

Local Sales Offices & Reps.

Ala	Huntsville, W. Brown	205-539-4411
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Buena Park, Sales Engrs., Ltd.	213-921-0681
Cal	Palo Alto, Harris Engrg.	415-328-3370
Cal	San Diego, Sales Engrs., Ltd.	714-277-5723
Colo	Denver, Williams-Assocs.	303-343-4730
Conn	Cheshire, Selmark Assoc.	203-272-8764
Fla	Coral Springs, W.A. Brown Comps.	305-753-1650
Fla	Orlando, W. Brown	305-425-5505
Ga	Chamblee, W.A. Brown Comps.	404-455-0405
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Ft. Wayne, Temple Engrg.	219-743-0362
Iowa	Cedar Rapids, S & O/Nortec Sls.	319-393-1845
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Md	Baltimore, Coulbourn DeGreif	301-247-4644
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Troy, McPhail Corp.	313-689-6444
Minn	Minneapolis, Nortec Sls.	612-835-7414
Mo	St. Louis, T.L. Dowell & Assocs.	314-968-4234
NH	Manchester, Selmark Assocs.	603-623-5774
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Hicksville, Wilson Assocs.	516-931-3007
NY	Rochester, Electra Sls.	716-436-4030
NY	Syracuse, Electro Sls. Corp.	315-455-5783
NC	Raleigh, W.A. Brown	919-781-9426
Ohio	Cleveland, C. Robinson	216-381-9049
Ohio	Dayton, C. Robinson	513-275-2412
Pa	Fort Washington, G. C. M. Assocs.	215-646-7535
Tex	Richardson, R.F. Kimball Inc.	214-231-3447
Wash	Bellevue, W.M. Buehler Co.	206-455-5512
Wisc	Milwaukee, Sumer, Inc.	414-259-9060

Local Distributors

Cal	San Diego, Sterling Elctrns.	714-565-2441
Cal	Sun Valley, Sterling Elctrns.	213-767-5030
Cal	Torrance, Airsupply Co.	213-538-5080
Colo	Denver, Waco Elctrns.	303-371-4370
Fla	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
Ill	Elk Grove Village, G.B.L. Elctrns.	312-593-3220
Minn	Minneapolis, Bergquist Co.	612-835-2322
NY	Rockville Centre, Midway Ind'l. Elctrns.	516-764-2400
Pa	Horsham, Pioneer/Penn.	215-674-5710
Tex	Houston, Altair Co.	713-462-3029
Tex	Richardson, Altair Co.	214-231-5166

NORTH AMERICAN PHILIPS LIGHTING CORP., Dept. EM, Bank St., Hightstown, N.J. 08520, Tel: 609-448-4000, TWX: 510-685-5651; Empl.: 600

Sales Manager: P. Spillane

Local Sales Offices & Reps.

Ariz	Phoenix, GND Sls.	602-971-9758
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	El Monte, Cook Entprs.	203-686-2120
Cal	San Diego, D & D Sls. Co.	714-560-6266
Colo	Denver, W.J. Purdy Co.	303-777-1411
Conn	Milford, Conti-Younger Assoc.	203-929-3294
Ga	Avondale Estates, Candor Co.	404-296-1666
Ill	Park Ridge, Metcom Assocs.	312-696-1490
Kans	Shawnee Mission, Lowell-Kangas	913-631-3515
Mass	Waltham, Conti-Younger Assoc.	617-890-4582
Minn	Minneapolis, Siedare Assoc.	612-545-5663
Mo	St. Louis, Lowell-Kangas	314-821-4050
NJ	Fort Lee, Necco OEM	201-461-2789
NY	Endicott, Tech-Mark	607-748-7473
NY	Fairport, Tech-Mark	716-223-1252
NY	Liverpool, Tech-Mark	315-652-6229
NC	Raleigh, Candor Co.	919-876-4999
Ohio	Beachwood, Elctrn. Salesmasters	216-831-9555
SC	Myrtle Beach, Candor Co.	803-448-8361
Tex	Dallas, Erickson Sls.	214-243-6611
Tex	Sugarland, Erickson Sls.	713-494-9680
Va	Roanoke, Candor Co.	703-989-0995

Wash	Seattle, Fleehart & Sullivan	206-522-1533

NORTH AMERICAN PRINTED CIRCUIT DIV., Tyco Labs., Inc., Dept. EM, Box 145, Stafford, Conn. 06075, Tel: 203-684-2703; Empl.: 140

NORTH ATLANTIC

NORTH ATLANTIC INDS., Dept. EM, 200 Terminal Dr., Plainview, N.Y. 11803, Tel: 516-681-8600, TWX: 510-221-1879; FSC No.: 07342; Empl.: 225 p. 1673,2915

Sales Manager: K. Sale

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ala	Mobile, BCS Assoc.	205-666-2796
Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Mountain View, Scientific Devices-CA	415-964-4230
Cal	North Hollywood, Elect. Standards Repair Svc.	213-765-4224
Cal	San Diego, Scientific Devices-CA	714-279-6642
Colo	Littleton, Aztec Enterprises	303-795-0250
Conn	Hartford, Tekdata	203-525-7647
Fla	Orlando, BCS Assocs.	305-896-4881
Ga	Decatur, BCS Assocs.	404-321-0980
Ill	Chicago, P. Lind	312-774-1246
Ind	Indianapolis, P.Lind	317-547-9178
Iowa	Cedar Rapids, Tech Reps	319-396-5662
Kans	Olathe, Tech Reps.	913-782-1177
Ky	Valley Station, BCS Assoc.	502-935-9634
Md	Lanham, Brimberg Sls. Co.	301-552-2200
Mass	Burlington, Tekdata	617-273-0198
Mich	Troy, G. R. Peters Assocs.	313-362-1220
Minn	Circle Pines, P. Lind	612-786-5770
Mo	Hazelwood, Tech. Reps.	314-731-5200
NM	Albuquerque, Aztec Enterprises	505-255-2440
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Dayton, ARC Elctrn. Assoc.	513-294-6987
Ohio	Rocky River, ARC Elctrn. Assoc.	216-333-8375
Pa	Philadelphia, Tech Instru. Sls.	215-885-6571
Tex	Houston, Scien. Sls.	713-666-5318
Tex	Richardson, Sci. Sls.	214-231-6541

NORTH ELECTRIC CO., Electronics Div., Dept. EM, Portland Way N., Galion, Ohio 44833, Tel: 419-468-8100, TWX: 810-248-2907; Empl.: 1000

Local Sales Offices & Reps.

NJ	Cherry Hill, Benco Sls.	609-779-9282
NJ	Fair Lawn, Bixon Assoc.	201-797-5356

NORTH HILLS ELCTRNS., Dept. EM, Alexander Pl., Glen Cove, N.Y. 11542, Tel: 516-671-5700; FSC No.: 98821; Empl.: 45 .... p. 1429,2400,3056,3288,4429

Sales Manager: H.H. Marx

Local Sales Offices & Reps.

Cal	Los Angeles, Sodaro Co.	213-478-7733
Cal	San Francisco, J. Staschover	415-441-8377
Minn	Minneapolis, Heimann Co., Inc.	612-861-6051
NY	Great Neck, Industron Assocs., Inc.	516-487-2620
Tex	Houston, Mott Assoc.	713-777-5773

NORTH MICROSYSTEMS, Div. of North Electric Co., Dept. EM, 700 Hillsboro Pl., Deerfield Beach, Fla. 33441, Tel: 305-421-8450, TWX: 510-953-7253 p. 2984

Sales Manager: D.F. Speed

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Board Assocs.	602-994-9388
Cal	Huntington Beach, North Microsystems	714-846-5979
Cal	Los Altos, W. W. Posey Co.	415-948-7771
Cal	San Diego, S.R. Elctrns.	714-565-8411
Colo	Denver, Electrodyne	303-757-7679
Fla	Orlando, Col-Ins-Co.	305-423-7615
Ill	Northfield, Such & Assocs.	312-446-8934
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mass	Waltham, McBar Assoc., Inc.	617-890-0233
Mich	Pleasant Ridge, Shalco	313-547-4771
Minn	Minneapolis, Scott Elctrn. Sls.	612-929-2985
NM	Albuquerque, A.Q.Elctrns.	505-883-1003
NY	Syracuse, Lenard Co.	315-479-9191
NY	Valley Stream, Idalee Electns Corp	516-825-8955
Ohio	Galion, J. R. Bright Agency	419-468-3787
Pa	Huntingdon Valley, Knowles Assocs.	215-947-5641
Tex	Richardson, Hytech, Inc.	214-234-3375

NORTHEAST SCIENTIFIC CORP., Dept. EM, 30 Wetherbee St., Acton, Mass. 01720, Tel: 617-263-2711; Empl.: 10

Local Sales Offices & Reps.

Cal	Santa Clara, Ray Marg	408-248-5199
DC	Washington, Whitcomb Assocs.	202-737-0763
Ill	Des Plaines, Marsland Assocs., Inc.	312-775-1309
Ind	Indianapolis, Marsland Assocs., Inc.	317-924-3568
Md	Baltimore, Whitcomb Assocs.	301-889-1245
Minn	Minneapolis, Marsland Assocs.	612-545-4481
Mo	St. Peters, Marsland Assocs.	314-278-6949
NH	Salem, Bilowich Enterprises	603-898-5408
Pa	Audubon, Holmes Assocs.	215-666-0636

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NORTHERN ENGINEERING LABS., Dept. EM, 357 Beloit St., Burlington, Wisc. 53105, Tel: 414-763-3591; FSC No.: 00815; Empl.: 200

Local Sales Offices & Reps.

Cal	Palo Alto, R.W. Thompson Assocs.	415-494-7516
Cal	Pasadena, P. Nurches Co.	213-796-5844
Colo	Parker, James B. Heaton Co.	303-841-3651
Fla	Clearwater, Brennan Assocs.	813-446-5006
Ill	Palatine, M.J. Petersen Assocs.	312-358-8855
Ill	Skokie, Mar-Con Assocs.	312-675-6450
Kans	Olathe, B. Rush Assocs.	913-764-2700
Mass	Needham, Hatch Assocs.	617-444-3310
Minn	Chanhassen, Barnes Sls Assocs.	612-474-2907
NJ	Bergenfield, H. Gray Assocs.	201-384-3643
NY	Syracuse, Naylor Elctrns. Co.	315-656-2251
Ohio	Wickliffe, W.J. Brauer & Assocs.	216-943-0601
Tex	Addison, Southland Comps., Inc.	214-233-0603

NORTHERN PRECISION LABS., INC., Dept. EM, 202 Fairfield Rd., Fairfield, N.J. 07006, Tel: 201-227-4800, TWX: 710-734-4301; Empl.: 56

NORTHFIELD PRECISION INSTR. CORP., Dept. EM, 4400 Austin Blvd., Island Park, N.Y. 11558, Tel: 516-431-1112; FSC No.: 12639; Empl.: 18

NORTHLAKE ENGINEERING, Dept. EM, 999 Anita Ave., Antioch, Ill. 60002, Tel: 312-395-5710; FSC No.: 50638

Sales Manager: M.R. Whitman

Local Sales Offices & Reps.

Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Ill	Deerfield, Glenn Neal	312-945-5438
Mass	Norwell, Bordewieck Engrg. Sls.	617-659-4915
NY	Baldwinsville, Scibetta Reps.	315-622-3993
NY	Syosset, Motion Control Sls.	516-921-5656
Ohio	Akron, Augey Natalino Assocs.	216-725-6071
Ore	Forest Grove, Doran Sls. Assocs.	503-357-3333
Wash	Redmond, Doran Sls. Assocs.	206-885-1885

NORTHROP DEFENSE SYS. DEPT., Dept. EM, 175 W. Oakton St., Des Plaines, Ill. 60018, Tel: 312-299-4436, TWX: 910-233-4597; Empl.: 50

Local Sales Offices & Reps.

Ohio	Dayton, Ashby Assocs.	513-252-5627

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NORTON CO., PUBLIC RELATIONS DEPT., Dept. EM, One New Bond St., Worcester, Mass. 01606, Tel: 617-853-1000; Empl.: 3000

NORTRAN CO., Dept. EM, 96 Milton Rd, Rochester, New Hampshire 03867, Tel: 603-332-3334, TWX: 510-2974-462

Sales Manager: B.A. Hakala

Local Sales Offices & Reps.

Mass	Cohassett, Minot Assocs.	
NY	White Plains, Swedelco, Inc.	914-946-1122

NORTRONICS CO., INC., Dept. EM, 8101 Tenth Ave., N., Minneapolis, Minn. 55427, Tel: 612-545-0401, Telex: 29-0304; Empl.: 600

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NOVA ELECTRIC MFG. CO., Dept. EM, 263 Hillside Ave., Nutley, N.J. 07110, Tel: 201-661-3434; FSC No.: 29019; Empl.: 50 .... p. 3392,3393

Sales Manager: K. Niovitch

Local Sales Offices & Reps.

Cal	Los Angeles, Basic Sys.	213-938-2833
Cal	Mountain View, Gado Instr.	415-961-2222
Colo	Boulder, A.L.S. Elctrns.	303-447-2436
Fla	Orlando, Data Rep	305-843-5224
Ill	Chicago, Ampol Svcs. & Engrg.	312-685-1350
La	Lafayette, Kemp Engrg.	318-984-3516
Md	Bethesda, Powell-Pendergraph	301-656-4535
Mass	Wakefield, Bordewieck Engrg. Sls. Co.	617-659-4915
Mich	Farmington, Anderson Elctrns.	313-476-9161
Minn	Minneapolis, R-J Inc.	612-922-1425
NM	Albuquerque, A.L.S. Elctrns.	505-294-8555
NY	Elmont, Crane & Egert Corp.	516-488-2100
NY	Fayetteville, M.P. Andrews Mfrs. Rep.	315-637-5291
NC	Charlotte, J. Rudisill Assoc.	704-377-6901
Ohio	Aurora, EMA Inc.	216-562-8516
Ohio	Centerville, EMA Inc.	513-433-2800
Okla	Tulsa, Paul King Co.	918-836-2501
Ore	Portland, Richard Legg Co.	503-792-8824
Pa	Philadelphia, Powell-Pendergraph	215-657-0330
Pa	Pittsburgh, Wainwright Tech. Sls.	412-487-5055
Tex	Dallas, Kemp Engrg.	214-661-0400
Tex	Houston, Kemp Engrg.	713-688-1431

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Sales Manager: R. Olson

Local Sales Offices & Reps.

Cal	Montclair, Nova Tran Corp, Western Operations	714-985-1874
Cal	Montclair, Nova Tran Corp.	714-985-1874
Mass	Attleboro, Lawrence Habershaw	617-222-8979
Pa	Bethlehem, Steinmetz Assocs.	215-868-6101
Pa	Bethlehem, Steinmetz Assocs.	215-868-6101
Wisc	Clear Lake, Nova Tran Corp.	715-263-2333

NOVATRONICS, INC., Dept. EM, Box 878, Pompano Beach, Fla. 33061, Tel: 305-942-5200, TWX: 510-956-9878; Empl.: 150

Local Sales Offices & Reps.

Fla	Pinellas Park, Russell Assocs.	813-526-1134
Mass	Waltham, Russell Assocs.	617-899-6500
Mo	Berkeley, Manufacturers Sls. & Svc.	314-521-8500
NJ	Fairhaven, Russell Assocs.	201-747-0600
Tex	Hurst, EdMar Tech. Sls.	817-282-5561

™NOVA-1200,830,3 - computers - Data General Corp.

™NP-7 - numeric printer - Gulton Inds., Inc.

™N-S ROCKET WIRE - high-tensile wire - Nat'l-Standard Co.

™NTP - peak indicating audio meters, compressor and limiter amplifiers - Gotham Audio Corp.

N T-T/PEERLESS, Dept. EM, 40 Jytek Dr., Leominister, Mass. 01453, Tel: 617-537-6001, TWX: 710-347-0326; Empl.: 120

Local Sales Offices & Reps.

Cal	Burlingame, Carelli-EMA	415-697-6286
Cal	Van Nuys, Markman Co.	213-787-6151
Fla	Orlando, Hollingsworth & Still	305-834-2356
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Ill	Bolingbrook, G. Sangwin	312-739-7966
Iowa	Des Moines, Pacer	515-274-3224
Mass	Wellesley, L. Cole	617-237-1260
Mich	Milford, Polyphase Sls.	313-685-3003
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	Raytown, Pacer	816-358-6638
NY	Bayside, New Hope Co.	212-428-2000
NY	Rochester, Marsey Sls.	716-442-9700
Ohio	Columbus, Mandabach & Assoc.	614-235-0265
Ore	Salem, Pacnor Mktg.	503-363-6445
Pa	Willow Grove, R. Lewis Sls.	215-659-0704
Tex	Dallas, Berthold Sls.	214-526-8329
Wash	Seattle, Pacnor Mktg.	206-284-8020
Wisc	Brookfield, G. Sangwin Co.	414-782-3240

NU-CONCEPT COMPUTER SYSTEMS, INC., Dept. EM, Route 309 and Advance Lane, Colmar, Pa. 18915, Tel: 215-822-8400; Empl.: 17

Local Sales Offices & Reps.

Ariz	Phoenix, Scottsdale Tool & Supply	602-273-7376
Cal	El Monte, Marshall Inds.	213-686-0141
Fla	Ft. Lauderdale, Howard Assocs.	305-566-8192
Haw	Honolulu, Electrical Equip. Co. Ltd.	533-3884
Mass	Burlington, Contact East	617-272-5051
Mich	Flint, Shand Elctrns.	313-743-8940
NJ	Camden, Arch Mfg. & Sls.	609-966-3835
NJ	Saddle Brook, Tool-Tronics	201-478-2203
NY	Elmhurst, Wilson Assocs.	212-899-0929
NY	Farmingdale, Marshall Inds.	800-732-5052
NY	Mt. Vernon, Electronic Tool Co.	914-664-0088
NY	Thornwood, Electronic Tool Co.	914-769-8070
Ore	Portland, Dunn Elctrns.	503-222-4279
Pa	Plymouth Meeting, Techni-Tool	215-825-4990
Tex	Dallas, Techno Assocs.	214-357-9313
WVa	Huntington, Electric Supply	304-523-6443
Exp:	Ill., Chicago, E.D. Magnus & Assocs.	312-334-1503

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NUCLEAR MEAS. CORP., Dept. EM, 2460 N. Arlington Ave., Indianapolis, Ind. 46218, Tel: 317-546-2415, TWX: 810-341-3137; Empl.: 46

Local Sales Offices & Reps.

Cal	Menlo Park, Robt. W. Healy Co.	415-828-6044
Colo	Denver, T. Buirley	303-841-2754
DC	Washington, Hildenbrand Co., Inc.	703-280-2330
Fla	Jacksonville, Pulcir, Inc.	904-743-5700
Ill	Chicago, Memeco, Inc.	312-774-0919
NY	Syosset, Scientific Sys. Sls. Corp.	516-921-3737
NC	Charlotte, MacGuire & Crawford, Inc.	704-366-3454
Pa	Pittsburgh, Scientific-Pittsburgh	412-655-2800
Tex	Dallas, Tech. Instr. Co.	214-387-0606
Wash	Bellevue, Showalter Elctrns.	206-455-4922

NUCLEAR RESCH. CORP., Dept. EM, 1105 Indl. Hwy., Southampton, Pa. 18966, Tel: 215-357-5015; FSC No.: 96696; Empl.: 50

Sales Manager: D.T. McIntyre, V.P.

Local Sales Offices & Reps.

Ariz	Scottsdale, J.T. Aldrich Co.	602-945-8598
Cal	Chula Vista, Charles W. Fowler Co.	714-422-5408
Cal	Inglewood, Charles W. Fowler Co.	213-678-5211
Cal	Menlo Park, Charles W. Fowler Co.	415-322-5374
Colo	Denver, Charles W. Fowler Co.	303-499-2141
Conn	Weston, Westek Co.	203-227-2724
DC	Washington, Scientific Sys. Sls. Corp.	202-726-4161
Md	Baltimore, MRT Co.	301-685-7425
Mich	Detroit, Basic Svc. Corp.	313-837-8820
NJ	So. Bound Brook, DCI	201-469-3391
NC	Charlotte, BinCo.	704-366-5092
Ohio	Columbus, Cam-Tech Sls., Inc.	614-488-0412
Pa	Chadds Ford, Valcon Sls. Engrg. Co.	215-459-2071
Wash	Bellevue, Charles W. Fowler Co.	206-454-8600

NUCLEONIC PRODS., Dept. EM, Box 1454, 6660 Variel Ave., Canoga Pk., Cal. 91303, Tel: 213-887-1010, TWX: 698481, 910-494-1954; Empl.: 101

NUCLEUS CORP., Dept. EM, 25131 Dequindre, Madison Hgts., Mich. 48071, Tel: 313-399-3610; Empl.: 37

NUCOR CORP., Power Supply Div., Dept. EM, 2 Richwood Pl., Denville, N.J. 07834, Tel: 201-627-4200, TWX: 710-987-8487; Empl.: 115

Local Sales Offices & Reps.

Cal	Long Beach, Cairns Engrg. Sls.	213-432-7444
Fla	Clearwater, Brennan Assocs.	305-466-5006
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Iowa	Cedar Rapids, Palatine Sales	319-365-8071
Kans	Overland Park, Palatine Sls.	913-262-5643
Md	Timonium, DeShawn Assocs.	301-252-4878
Mass	Burlington, R.J. Sickles Assoc.	617-272-7285
Mich	Warren, DEM Elctrn. Sls.	313-755-6660
Mo	St. Louis, Palatine Sls.	314-426-7055
NY	Cortland, R.J.C. Associates	607-753-3909
NY	Huntington Station, Addem Group	516-567-5900
Okla	Tulsa, Vista Engrg.	918-627-7557
Tex	Richardson, Vista Engrg.	214-235-4547

NUMARK ELCTRNS. CORP., Dept. EM, 503 Raritan Ctr., Edison, N.J. 08817

NURAD, INC., Dept. EM, 2165 Druid Pk. Dr., Baltimore, Md. 21211, Tel: 301-462-1700; Empl.: 50

Local Sales Offices & Reps.

Md	Baltimore, C. L. Malinow & Co.	301-922-2092
NJ	Totowa, H. M. Holzberg Assocs.	201-256-0455
NY	New York, Auriema Int'l. Group	212-466-2500
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Wash	Mercer Island, Bennett Engrg. Assocs.	206-232-3550

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NVF CO., Dept. EM, Box 68, Yorklyn, Del. 19736, Tel: 302-239-5281, Telex: 83-5434; Empl.: 1500

Local Sales Offices & Reps.

Pa	Kennett Square, Technical Prods. Div.	215-444-2800

NWL TRANSFORMERS, Dept. EM, Rising Sun Rd., Bordentown, N.J. 08505, Tel: 609-298-7300; Empl.: 100 .... p. 3289,4430

Local Sales Offices & Reps.

Mass	Randolph, Naton Assoc	617-986-6417
NY	Elmira Hgts., REECO	607-733-1387
Tex	Dallas, Titan Reps	214-357-8266
Wisc	Milwaukee, C. Johnson & Assoc.	414-771-3031

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(TM)NYGRIP - nylon cable clamp - Weckesser Co. Inc.

(TM)NYLAFIL - fiberglass reinforced nylon - Fiberfil Div. Dart Ind.

(TM)NYLAKRIMP - nylon insulated terminal - ITT Cannon/ETC Terminal Products

(TM)NYLATCH - panel fastener - Hartwell Corp.

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(TM)NYLOCLIP - nylon cable clip - Burndy Corporation

(TM)NYLODE - talc reinforced nylon - Fiberfil Div. Dart Ind.

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NYTRONICS COMPS. GROUP INC., Sub Nytronics, Dept. EM, Orange St., Darlington, S.C. 29532, Tel: 803-393-5421, TWX: 810-665-2182; FSC No.: 83125; Empl.: 250 p. 1278-1288,1430-1446,3703-3705

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Inc.	205-539-4411
Ariz	Scottsdale, Summit Sales	602-994-4587
Cal	Los Altos, W.W. Posey	415-948-7771
Cal	Sherman Oaks, Clemick & Neenan & Assoc.	213-990-3150
Colo	Denver, M. Duffy Assoc.	303-934-7392
Fla	Fort Lauderdale, W.A. Brown Comp. Inc.	305-776-4800
Fla	Orlando, W.A. Brown Comp. Inc.	305-425-5863
Ga	Chamblee, W.A. Brown Components	404-455-0405
Ind	Indianapolis, Southern Sls. Corp.	317-299-2992
Kans	Overland Pk., Beams Comp.	913-341-7744
Md	Bethesda, Warren Mount Comp.	301-657-9312
Mass	Bedford, F.R. Lesser	617-275-7558
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Mich	Saginaw, H.C. Neym Assoc.	517-799-7928
Minn	Edina, Wagner Consits.	612-721-5781
Mo	St. Louis, Beams Comp.	314-569-1060
NY	Fairport, W.A. Franklin Sls. Corp.	716-223-5102
NY	New Hartford, W.A. Franklin Sls. Corp.	315-737-5038
NY	Syracuse, W.A. Franklin Sls. Corp.	315-472-5273
NY	Valley Cottage, LRC Assocs.	914-634-7973
Ohio	Cleveland, Imtech Inc.	216-826-3400
Ohio	Dayton, Imtech Inc.	513-278-6507
Pa	Narbeth, J. Bresson Assoc.	215-664-6460
Tex	Austin, Palatine Sls., Inc.	512-451-7463
Tex	Houston, Palatine Sls., Inc.	713-783-1492
Tex	Richardson, Palatine Sls., Inc.	214-231-9489
Wash	Seattle, Seatronics, Inc.	206-767-4330

Local Distributors

Ala	Huntsville, Cramer Elect.	205-539-5722
Cal	Carson, Hi Rel	213-537-6500
Cal	Gardena, Bell Inds.	213-321-5802
Cal	Sunnyvale, Bell Industries	408-734-8570
Colo	Denver, Newark Elec.	303-757-3351
DC	Beltsville, Newark Elec.	301-937-5085
Fla	Ft. Lauderdale, Newark Elect.	305-587-2372
Ga	Atlanta, Cramer Elect.	404-448-9050
Ill	Chicago, Newark Elect.	312-638-4411
Ill	Skokie, Bell Inds.	312-965-7500
Ind	Ft. Wayne, Ft. Wayne Elect.	219-742-4346
Iowa	Cedar Rapids, Newark Elect.	312-362-1171
Md	Baltimore, Radio Elect.	301-823-0070
Md	Rockville, Wilshire Elec.	301-340-7900
Mass	Newton, Cramer Elect.	617-969-7700
Mass	Watertown, Sterling Elec.	617-926-9720
Mich	Livonia, Reptron Elctrn.	313-525-2700
Minn	Minneapolis, Joel Co.	612-545-5669
Minn	Minneapolis, Newark Elect.	216-361-4700
NJ	Kenilworth, Newark Elect.	201-272-8410
NY	Farmingdale, Pride Elctrns.	516-293-4020
NY	Hauppauge, Jaco Elect.	516-273-5981
NY	Plainview, Fairmont Elctrns.	516-694-8200
NY	Plainview, ACI Elect.	516-293-6630
NC	Winston Salem, Cramer Elect.	919-725-8711
Ohio	Centerville, C.V. Clark	513-435-3000
Ohio	Cleveland, Newark Elect.	216-361-4700
Ohio	Columbus, Reptron/Ohio	614-443-0231

Pa	Montgomeryville, Pyttronic Indust.	215-643-2850
Pa	Philadelphia, Philadelphia	215-568-8288
Tex	Dallas, Wholesale Elect.	214-824-3001
Utah	Salt Lake City, Newark Elect.	801-486-1048
Wash	Bellevue, Bell Industries	206-747-1515
Wisc	Brookfield, Newark Elect.	414-781-2450
Exp:	Can., Montreal 301, Que., Cesco Elctrns.	514-735-5511
For:	Germany, 8 Munchenz, Karlstasse, Neumuller GM BH	59 2421

™NYTYE - wire & cable ties - Heyman Mfg. Co.

™N-4 - zirconium copper alloy - Nippert Co.

™#800 DIPSERT IC BASE - dispenses IC's - Solder Removal Co.

™#880 INSERTIC TOOL - inserts integrated circuits - Solder Removal Co.

™#885 PUL-N-SERTIC TOOL - inserts & extracts IC's - Solder Removal Co.

OAK INDS. INC., Switch Div., Dept. EM, Dept. DA, Crystal Lake, Ill. 60014, Tel: 815-459-5000, TWX: 722-447 910-634-3353; FSC No.: 76854; Empl.: 1200; Minimum order: $J. Vodnansky .... p. 3614,4200-4204

Sales Manager: R. Cotter; *Distributor Manager:* J. Vodnansky

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-kahn	602-257-9015
Cal	Los Altos, D. Jacoby	415-941-1237
Cal	Santa Ana, J. Kent	714-540-0565
Colo	Denver, I.W. Strong	303-292-6900
Fla	Altamonte Springs, D. Green	305-831-5411
Haw	Honolulu, Pegart Int'l. Hawaii	808-839-6574
La	Metairie, J. McKinney Sls.	504-733-7583
Md	Laurel, Oak Inds.	301-776-5514
Mass	Reading, R. Kolarik	617-944-0094
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
Mo	Raytown, Centech Corp.	816-358-8100
NJ	Haddonfield, Gray Assocs.	609-429-5300
NJ	Mountainside, H. Richter	201-233-4615
NJ	Nutley, Falk-Baker Assoc.	201-661-2430
NM	Albuquerque, Shefler-Kahn Co.	505-296-0749
NY	Fayetteville, H. G. Richter, Inc.	315-637-6713
NY	New York, H. G. Richter, Inc.	212-962-5820
NC	Raleigh, R. Burns	919-876-7591
Ohio	Cincinnati, L. Grabinger	513-851-4411
Okla	Tulsa, J.F. McKinney Sls. Co.	918-622-5511
Ore	Portland, B. Bartos	503-292-0878
Tex	Dallas, J. McKinney Sls.	214-631-9450
Tex	Houston, J.F. McKinney Sls. Co.	713-493-9100
Wash	Bellevue, Oak Inds.	206-453-1810
Exp:	Ill., Crystal Lake, Oak Industries Inc.	815-459-5000

Local Distributors

Ala	Huntsville, Hall Mark Elctrns.	205-837-8700
Ariz	Phoenix, Parts Elect. of Ariz.	602-258-6476
Ariz	Tempe, G.S. Marshall Co.	602-968-6181
Cal	El Monte, G.S. Marshall Co.	213-686-1500
Cal	Irvine, G.S. Marshall Co.	714-556-6400
Cal	San Diego, G.S. Marshall Co.	714-278-6350
Cal	Sunnyvale, G.S. Marshall Co.	408-732-1100
Colo	Arvada, G.S. Marshall Co.	303-423-9670
Conn	No. Branford, G.S. Marshall Co.	203-484-0480
Fla	Ft. Lauderdale, Hall Mark Elctrns.	305-971-9280
Fla	Orlando, G.S. Marshall Co.	305-859-1620
Fla	Orlando, Hall Mark Elctrns.	305-855-4020
Ill	Arlington Heights, Lodan Elctrns.	312-956-6700
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Des Plaines, Edmar Elctrns.	312-298-8580
Ill	Des Plaines, G.S. Marshall Co.	312-298-3700
Ill	Elk Grove Village, Hall Mark Elctrns.	312-437-8800
Ill	Palatine, Ohm/Elctrns.	312-359-5500
Ill	Peoria, Klaus Radio	309-691-4840
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Kans	Shawnee Mission, Hall Mark Elctrns.	913-888-4747
Md	Baltimore, Hall Mark Elctrns.	301-796-9300
Md	Lanham, Milgray/Washington	301-459-2222
Mass	Newton Highland, G.S. Marshall Co.	617-965-5115
Mass	N. Wilbraham, Industrial Comps.	413-596-3854
Mass	Watertown, DRW Elctrns.	617-923-1900
Minn	Bloomington, Hall Mark Elctrns.	612-884-9056
Minn	Minneapolis, Industrial Comps.	612-831-2666
Minn	Plymouth, G. S. Marshall Co.	612-559-2211
Mo	Earth City, Hall Mark Elctrns.	314-291-5350
NJ	Springfield, Federated Purchaser	201-376-8900
NY	Binghamton, Harvey/Federal Elctrns.	607-748-8211
NY	Farmingdale, G.S. Marshall Co.	516-293-4141
NY	Farmingdale, DRW Elctrns.	516-249-2660
NY	Freeport, Milgray Elctrns.	516-546-6000
NC	Raleigh, Hall Mark Elctrns.	919-832-4465
NC	Raleigh, Southeastern Radio Supply	919-828-2311
Ohio	Dayton, G.S. Marshall Co.	513-898-1105
Ohio	Medina, DRW Elctrns.	216-722-5531
Okla	Tulsa, S & S Radio Supply	918-582-8242
Okla	Tulsa, Hall Mark Elctrns.	918-835-8458
Pa	Huntingdon Valley, Hall Mark Elctrns.	215-355-7300
Pa	King of Prussia, G.S. Marshall	215-337-3330
Tex	Austin, Hall Mark Elctrns.	512-837-2814
Tex	Dallas, Hall Mark Elctrns.	214-231-6111
Tex	Dallas, G.S. Marhsall Co.	214-233-5200
Tex	Houston, Hall Mark Elctrns.	713-781-6100
Tex	Houston, G. S. Marshall	713-777-0358
Wash	Seattle, Radar Electric Co.	206-282-2511
Wash	Seattle, Zepher Elctrn. Sls.	206-575-0922
Wisc	West Allis, Hall Mark Elctrns.	414-476-1270

OAKTRON INDS., INC., Dept. EM, Monroe, Wisconsin 53566, Tel: 608-325-2121; Empl.: 250

Local Sales Offices & Reps.

Ariz	Phoenix, R. Fissell Co.	602-264-4031
Cal	Los Altos, Ewing-Foley, Inc.	415-941-4525
Cal	No. Hollywood, J. Carter Assoc.	213-980-3450
Colo	Arvada, C B Elctrn. Mktg.	303-422-0561
DC	Washington, Lienau Assoc.	301-770-6800
Fla	No. Miami, Haas/Winfield Co.	305-945-6544
Fla	No. Miami, Winfield Elect. Sls.	305-945-6544
Ga	Atlanta, Millar Elect.	404-261-6160
Ill	Chicago, Markal Sls.	312-282-5800
Ind	Indianpolis, Shamrock Elect.	317-547-0080
Md	Bethesda, Lienau Assoc.	301-654-8444
Mass	Norwood, Rudolph & MacInnes	617-769-5450
Mich	Pleasant Ridge, Shalco Inc.	313-547-4771
Minn	St. Paul, Norcen Tronix	612-854-8494
Mo	Kansas City, Nevco, Inc.	816-421-1751
Mo	St. Louis, Nevco, Inc.	314-843-7406
NY	Rochester, J. Brown Elect. Sls.	716-266-2728
NY	Yonkers, J. Brown Elect. Sls.	914-779-7330
NC	Raleigh, Millar Elect.	919-787-9564
Ohio	Akron, Shamrock Elect.	216-666-3796
Ohio	Dayton, Shamrock Elect.	513-258-1227
Pa	Butler, Shamrock Elect.	412-282-1660
Pa	Philadelphia, Lienau Assoc.	215-464-9444
Tenn	Memphis, Al. Engleman Co.	901-458-6263
Tex	Irving, Antle Smith Sls.	214-259-8707
Wash	Bellevue, Ron Merritt Co.	206-746-7337
Exp:	Ill., Chicago, E.D. Magnus Assoc.	312-334-1503

OAL ASSOCS., INC., Dept. EM, P.O. Box 64, Escondido, Cal. 92025, Tel: 714-743-7143; Empl.: 10

Local Sales Offices & Reps.

Cal	Costa Mesa, Pat Dooley Co.	714-548-2232
Cal	Walnut Creek, Wilnat Co.	415-938-9629
Ill	Palatine, Jos. Clark Co,	312-358-5095
Mich	Southfield, Stewart Sls. Co.	313-275-5335
Minn	Minneapolis, Conway Assocs.	612-884-0022
NY	Amityville, Testing Machines	516-842-5400
NY	Great Neck, W&A Holland	516-487-8877

OAS INC., Dept. EM, 145 Palasades St., Dobbs Ferry, N.Y. 10522, Tel: 914-693-9001

Sales Manager: N. Merritt

Local Sales Offices & Reps.

Mass	Needham Heights, Magyar & Assocs.	617-444-9095
NJ	Morristown, Power Sls. & Engrg.	201-539-4212
NJ	South Orange, Smith Co.	201-763-1770
Pa	Pittsburgh, Weiss Instrs.	412-371-3020
Vt	Bennington, Magyar & Assocs.	802-442-5858

™OBSERVER - cctv cameras - Blonder-Tongue Labs., Inc.

OCEAN RESEARCH EQUIPMENT, INC., Dept. EM, Box 709, Falmouth, Mass. 02541, Tel: 617-548-5800, Telex: 94-0859; Empl.: 125

™OCTOPUS - fiberglass ant. base - Francis Inds., Inc.

ODELL CO., M. P., Dept. EM, 26612 Center Ridge Rd., Cleveland, Ohio 44145, Tel: 216-871-8000; Empl.: 7

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs	800-327-1181
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Carson, Schlines Richardson	213-538-5800
Cal	Palo Alto, Coherent Mktg. Assoc.	415-327-2217
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Lighthouse Point, Saber Assocs.	800-432-3007
Ill	Addison, R. Edward Stemm	312-279-2440
Kans	Leavenworth, R. Edward Stemm	913-651-2929
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Acton, E.E. Specialists	617-259-9200
Mich	Madison Heights, WKM Associates	313-588-2300
Minn	Minneapolis, R. Edward Stemm	616-922-3643
Mo	St. John's, R. Edward Stemm	314-426-2500
NJ	East Orange, Friedman Assocs.	201-673-2500
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Fayetteville, Doolittle Elctrns. Corp.	315-637-3222
NC	Raleigh, Saber Assocs.	800-327-1181
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Pa	Audubon, Holmes Assocs.	215-666-0636
Tex	Dallas, Martin, Zienkosky, Browne & Assoc.	214-233-5535
Tex	Houston, Martin, Zienkosky, Browne & Assoc.	713-523-7333
Exp:	Cleveland, Brandes Int'l. Co.	216-333-0754

™ODIN - edgeboard connnector - Viking Inds., Inc.

™ODS - overhead distribution systems - Wiremold Co.

OECO CORP., Dept. EM, 712 S.E. Hawthorne Blvd., Portland, Ore. 97214, Tel: 503-238-2440, Telex: 36-0350; FSC No.: 95266; Empl.: 330

Sales Manager: R. J. Bunker

Local Sales Offices & Reps.

Cal	Laguna Niguel, J. Wray	714-493-0190
Cal	Palo Alto, B & J Sls.	415-326-3622
Fla	St. Petersburg, QXI, Inc.	813-821-2281
Mass	Waltham, Omega Sls. Corp.	617-890-1111
Minn	Minneapolis, Nortec Sls.	612-835-7414
Tex	Plano, K & H Sls.	214-423-6520

™OFFSCAT - offset parabolic reflectors - RF Systems, Inc.

OGALLALA ELCTRNS., Div. Arnold Engrg. Co., Dept. EM, Box 59, Ogallala, Neb. 69153, Tel: 308-284-4093; Empl.: 30

™O-GAS - special mixture for chemical vapor deposition of silicon dioxide. - Matheson Gas Products

™OHFST - clear fused quartz - Amersil, Inc.

OHIO CARBON CO., Dept. EM, 12508 Berea Rd., Cleveland, Ohio 44111, Tel: 216-252-6100; FSC No.: 76868

Local Sales Offices & Reps.

Cal	Los Angeles, Marwood Ltd.	213-628-3241
Cal	San Francisco, Marwood Ltd.	415-431-7893
Ga	Atlanta, W. Gilbert	404-255-8152
Ill	Arlington Hgts., Eschner & Keranen	312-259-8184
Ill	Chicago, M. Smith	312-787-3371
Kans	Shawnee Mission, K&M Sls.	913-262-1444
Mass	Sharon, Adcour Engrg. Reps.	617-784-3996
Mich	Bay City, Allsopp Assoc.	517-684-6120
Mo	St. Louis, K&M Sls.	314-423-2420
NJ	Andover, W. Proshek	201-347-6205
Ohio	Cleveland, Greenleaf Assoc.	216-333-5480
Ore	Portland, Marwood Ltd.	503-223-5130
Pa	Sewickley, R. Clark	412-923-1980
Wash	Seattle, Marwood Ltd.	206-623-4747

™OHIOHM - resistors - Ohio Carbon Co.

OHIO SEMITRONICS, INC., Dept. EM, 1205 Chesapeake Ave., Columbus, Ohio 43212, Tel: 614-486-9561; FSC No.: 12066; Empl.: 30 p. 4344-4347

Local Sales Offices & Reps.

Ala	Huntsville, Anderson Assoc.	205-881-6770

™OHMEGA - conductor-resistor laminates - Mica Corporation

OHMITE MFG. CO., Dept. EM, 3601 W. Howard St., Skokie, Ill. 60076, Tel: 312-675-2600, TWX: 910-223-0805

p. 3592,3706-3709,3842-3844,4206,4431

Local Sales Offices & Reps.

Alas	Anchorage, H.J. Lang & Assocs.	907-279-5741
Cal	Los Angeles, Paul F. Wiley Co.	213-663-8028
Cal	Palo Alto, Ohmite Mfg. Co.	415-494-6953
Colo	Denver, I.W. Strong & Assocs.	303-292-6900
Conn	Waterbury, Coakley, Boyd & Abbett, Inc.	203-756-8766
Fla	Orlando, Cartwright & Bean	305-896-2031
Ga	Atlanta, Ohmite Mfg. Co.	404-457-3780
Kans	Shawnee Mission, K & M Sls. Co.	913-262-1444
La	Chalmette, Cartwright & Bean	504-279-4598

Mass	Needham, Coakley, Boyd & Abbett, Inc.	617-444-5470
Mich	Birmingham, Ohmite Mfg. Co.	313-642-6040
Minn	St. Paul, Cahill Assocs.	612-646-7217
Mo	St. Louis, K & M Sls. Co.	314-423-2420
NJ	Hackensack, Ohmite Mfg. Co.	201-488-3690
NJ	Pennsauken, Ohmite Mfg. Co.	609-663-1703
NY	Buffalo, Telesco Assocs.	716-834-1026
NC	Charlotte, Poleytec Svs.	704-332-6191
Ohio	Cleveland, Ohmite Mfg. Co.	216-261-6000
Ohio	Dayton, Ohmite Mfg. Co.	513-277-6543
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Erickson & Vilter Sls.	214-243-6611
Wash	Western Tech. Sls., Western Tech. Sls.	206-641-3900

(TM)OILDAG - lubricant - Acheson Colloids Co.

(TM)OILON PV80 - self lubricating plastic - Cadillac Plastic & Chemical

(TM)OILOSTATIC - oil pressure pipe type cable transmission systems - Okonite Co.

OKI ELECTRONICS OF AMERICA, Dept. EM, 4031 N.E. 12th Terr., Ft. Lauderdale, Fla. 33308, Tel: 305-563-6234, TWX: 510-955-9837; Empl.: 250

Local Sales Offices & Reps.

Cal	Los Angeles, R.F. Assocs.	213-478-1586
Cal	Palo Alto, R.F. Assocs.	415-327-5531
NY	Bayside, R. Diamond Inc.	212-423-7330

O. K. MACHINE & TOOL CORP., Dept. EM, 3455 Conner St., Bronx, N.Y. 10475, Tel: 212-994-6600, Telex: 12-5091; Empl.: 100

(TM)OKOCLAD - aluminum sheathed wiring systems - Okonite Co.

(TM)OKOCORD - portable cord & flexible cable - Okonite Co.

(TM)OKOFLEX - instrument control tubing - Okonite Co.

(TM)OKOGUARD - high-voltage cable - Okonite Co.

(TM)OKOLENE - (polyethylene) insulated wire - Okonite Co.

(TM)OKOMETAL - fatigue-resistant alloyed lead sheaths - Okonite Co.

OKONITE CO., Dept. EM, Box 340, Ramsey, N.J. 07446, Tel: 201-825-0300; Empl.: 1800

Local Sales Offices & Reps.

Ala	Birmingham	205-592-8968
Cal	Los Angeles	213-685-7610
Cal	S. San Francisco	415-589-2362
Colo	Denver	303-759-2776
Fla	Jacksonville	904-721-2800
Ga	Smyrna	404-434-3388
Ill	LaGrange	312-352-7200
La	New Orleans	504-944-0259
Mass	Hingham	617-749-3374
Mich	Royal Oak	313-588-3525
Minn	Minneapolis	612-888-7925
Mo	Frontenac	314-997-2320
Mo	Kansas City	816-471-6991
NJ	Cherry Hill	215-567-5739
NY	Syracuse	315-479-8313
NC	Charlotte	704-535-6535
Ohio	Cincinnati	513-761-1333
Ohio	Cleveland	216-661-2550
Ore	Portland	503-228-3172
Pa	Pittsburgh	412-344-8181
Tex	Dallas	214-243-3318
Tex	Houston	713-691-3716
Utah	Salt Lake City	801-484-7642
Va	Vienna	703-938-4770
Wisc	Milwaukee	414-476-4550

(TM)OKOPRENE - cable & wire protective coverings - Okonite Co.

(TM)OKOSEAL - chemical resistant cable & wire - Okonite Co.

(TM)OKOSHEATH - covering for lead sheathed cable - Okonite Co.

(TM)OKOTHERM - high temperature cable - Okonite Co.

OLSON ELECTRONICS, Dept. EM, 260 S. Forge St., Akron, Ohio 44308

(TM)OLYMPIC SERIES - CATV systems & equipment - C-COR Elctrns.

OLYMPUS CORP. AMERICA, Dept. EM, Two Nevada Dr., New Hyde Park, N.Y. 11040, Tel: 516-488-3880, Telex: 96-0199; Empl.: 120

Sales Manager: P.T. Monachese

(TM)OMAG, MULTISCOPE - magnifiers, microscopes - Heitz, Inc., Karl

(TM)OMEGA - data reduction sys. - Beckman Instrs., (AISSD)

(TM)OMEGACLAD - insulated wire - Omega Engrg., Inc.

OMEGA ELECTRIC, Div. of F & B Mfg. Co., Dept. EM, 4363 W. Montrose, Chicago, Ill. 60641, Tel: 312-283-4411, Telex: 25-3584; Empl.: 70

Local Sales Offices & Reps.

Cal	Encino, Porter Co.	213-999-0171
Cal	Fremont, Foraker Sls	415-657-2213
Colo	Denver, Elcom	303-770-4400
Conn	New Preston, NBS Assoc.	203-868-0501
Fla	Tallahassee, Southern Engrg. & Sls.	904-386-3313
Ga	Atlanta, Southern Engrg. & Sls.	404-872-4801
Ill	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
Ind	Indianapolis, Brainard-Wilson Mktg.	317-844-2800
Me	Sanford, NBS Assocs.	207-324-6265
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Minneapolis, Electric Comp. Sls.	612-933-2594
NH	Amherst, NBS Assoc.	603-673-5800
NY	Buffalo, R.W. Mitscher Co., Inc.	716-633-7970
NY	Manlius, R. W. Mitscher CO.	315-682-2855
NY	Pittsford, R.W. Mitscher Co., Inc.	716-381-9115
NY	Port Washington, Paul D. Aaron Assoc.	516-883-0600
NY	West Hurley, R.W. Mitscher Co., Inc.	914-679-6151
NC	Raleigh, R.W. Mitscher Co., Inc.	919-828-0575
Ohio	Cleveland, Del Steffen & Assoc.	216-461-8333
Ohio	Dayton, Del Steffen & Assoc.	513-293-3145
Ohio	Lexington, Del Steffen & Assoc.	419-884-2313
Tenn	Johnson City, RW Mitscher	615-929-1141
Tenn	Shelbyville, R.W. Mitscher Co., Inc.	615-684-4544
Tex	Dallas, United Comps.	214-324-1448
Utah	Salt Lake City, Elcom	801-532-7940
Va	Virginia Beach, R. W. Mitscher Co.	804-481-7200
Wisc	Milwaukee, Brainard-Wilson Mktg.	414-527-1500

Local Distributors

Cal	Woodland Hills, PoCo Sls.	213-999-0171
Conn	Hartford, L. E. Whelan	203-246-5694
Ga	Atlanta, AC Equip	404-451-2747
Ill	Addison, Lectro Comps.	312-543-1680
Ill	Niles, Josephs Elctrns.	312-297-4200
Minn	Minneapolis, Control Design	612-721-1628
NY	Rochester, Rochester Radio Supply	716-454-7800

Advertisement

Omega Electric, a Division of F. & B. Mfg. Co., has been serving leaders in the electrical/electronic industry with General Purpose and Telephone Relay products for over 25 years. In addition Omega manufactures actuators, buzzers and solenoids. We not only produce relays equivalent to P & B, Guardian, Struthers Dunn, Midtex and others, but also have the research, design and production expertise for special type relays per customer requirement.

OMEGA ENGRG., INC., Dept. EM, Box 4047, Stamford, Conn. 06907, Tel: 203-359-1660, Telex: 99-6404; Empl.: 100 .... p. 4324,4325

(TM)OMEGALOK - compression fitting - Omega Engrg., Inc.

(TM)OMEGA METER - resistivity tester - Kenco Alloy & Chemical Co., Inc.

(TM)OMEGATITE - thermocouple insulators - Omega Engrg., Inc.

OMICRON INSTRUMENTS, Dept. EM, 1710 - 19th St., Santa Monica, Cal. 90404, Tel: 213-829-5074

(TM)OMMI-COAT - nuclear gauges - Nuclear Resch. Corp.

(TM)OMNEPHASE - AC phase controls - Omnetics, Inc.

OMNETICS, INC., Dept. EM, Box 113, Syracuse, N.Y. 13211, Tel: 315-699-5262; FSC No.: 52516; Empl.: 65

Local Sales Offices & Reps.

Ark	Fort Smith, Electro-Related Products	501-646-7756
Cal	La Habra, Nolan Assocs.	213-694-2145
Cal	Oakland, Powermatics	415-635-6826
Colo	Denver, TESSCO	303-744-1119
Conn	Trumbill, SIR Assocs.	203-268-2560
Fla	North Miami, L. Haas Co.	305-949-9143
Ill	Des Plaines, Control Sls.	312-774-1674
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
La	Metairie, Electro Related Products	504-888-2908
Mass	Lexington, SIR Assocs.	617-862-1812
Mich	Troy, Xanthus, Inc.	313-391-3236
Mo	St. Louis, Technical Sls. Assocs.	314-725-5361
NJ	Pitman, Colrud Co.	609-589-5866
NJ	Ridgewood, Ballou	212-964-4640
NM	Albuquerque, TESSCO	505-298-2415
NY	Skaneatles, MCK Assocs.	315-685-7122
NC	Charlotte, W. E. MacDonald Co.	704-372-7012
Ohio	Cleveland, E. E. Bock & Assocs.	216-331-5212
Ohio	Dayton, W. Hammer & Assocs.	513-294-4531
Ore	Beaverton, D. Fry Co.	504-643-5448
Pa	Erie, ECCO Elctrn. Sls.	814-455-8110
Tex	Houston, M. R. Summers Assocs.	713-524-7800
Va	Richmond, Marchant-Field Sls. Co.	804-262-7333
Va	Vienna, W. E. MacDonald Co.	703-938-4242
Wash	Seattle, D. Fry Co.	503-643-2391
WVa	Charleston, W. E. MacDonald Co.	304-342-8557
Wisc	Cedarburg, TFL Assocs.	414-377-7030

Local Distributors

Ala	Huntsville, Wittichen Supply Co.	
Ala	Montgomery, R & H Supply Co.	
Ark	Crossett, Launius Elctrns.	501-364-3015
Ark	Ft. Smith, Wise Whsl. Elec.	501-783-8925
Cal	El Segundo, Alpha Components Corp.	213-322-7780
Cal	Redwood City, Electrical Sls. Prod.	415-364-2621
Colo	Denver, TESSCO	303-744-1119
Fla	Miami, Electro-Standards Labs	305-633-6975
Fla	Tampa, Leader Elec. Dist.	813-835-1891
Ga	Atlanta, Electrical Control Prods.	404-455-1216
Ga	Atlanta, Faulkner Co.	404-758-6316
Ill	Chicago, Fluid-Tek	312-582-2872
Ill	Franklin Park, Lumenite Elec. Co.	312-455-1450
Ind	Indianapolis, Jackson Controls Co.	317-787-9944
Mass	Cambridge, H. Young Jr.	617-547-3873
Mass	West Springfield, Control Eng'g Inc.	413-739-5134
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Rochester, Simcona Elec. Corp.	716-328-3230
NY	Rochester, K.M.V.G.	716-328-2800
NY	Woodside, Switches Unlimited	212-651-0945
Ohio	Cleveland, Air Rite Entprs.	
Ohio	Columbus, Columbus Elec. Works	614-294-4651
Ohio	Dayton, Duellman Elec.	513-461-5010
Ore	Portland, Platt Elec. Supply	503-228-6121
Pa	Braddock, M. Leff Radio Parts	412-271-2800
Pa	Erie, Advacom	814-455-8110
Tex	Corpus Christi, Wicks Radio Equip. Co.	512-883-4481
Tex	San Antonio, American Elctrns. Co.	512-696-0387
Va	Richmond, Meridian Elctrns.	804-359-0221
Wash	Seattle, Radar Elec. Co.	206-282-2511
Wisc	Mequon, Taylor Elec. Co.	414-241-4321

(TM)OMNETIME - solid state timers - Omnetics, Inc.

(TM)OMNI-AMP - thermocouple amplifiers & transmitters - Omega Engrg., Inc.

(TM)OMNI CELL - shielded ventilating panel - Metex Corp.

(TM)OMNICLOSURE - electronic enclosures - Techmar Corp.

OMNICOP, INC., Dept. EM, 5150 N 16th St, Ste 253, Phoenix, Ariz. 85016, Tel: 602-264-2475

(TM)OMNIDAPTOR - universal 45 RPM adaptor - Aldshir Mfg.

(TM)OMNIFEROUS - real-time FFT analyzers - Nicolet Scientific Corp.

(TM)OMNIFLO - turbine flow transducer - Flow Technology, Inc.

(TM)OMNI-G - omni-directional shock indicators - IMPACT-O-GRAPH Div.

(TM)OMNI-G - shock indicator - Impact-O-Graph Corp.

(TM)OMNI-GLOW - pilot lights - Industrial Devices

(TM)OMNIGRAPHIC - graphic recorders - Houston Instrument

(TM)OMNI-II - deposit control master - Sloan Technology Corp.

(TM)OMNI-LERT - programmable indicator lights - Industrial Devices

(TM)OMNILOGIC - ic fast logic system - Lecroy Resch. Sys. Corp.

(TM)OMNIPROX - proximity sensors - Scientific Technology

(TM)OMNISCRIBE - strip chart recorders - Houston Instrument

(TM)OMNISORT - document sorting system - E-Systems Inc.

OMNI SPECTRA/AMERICON, Dept. EM, 140 Fourth Ave., Waltham, Mass. 02154, Tel: 617-890-4750, TWX: 92-3474 710-324-6377; FSC No.: 26805; Empl.: 234; Minimum order: $E.J. DeVita

Sales Manager: R.C. Foulks; *Distributor Manager:* E.J. DeVita

Local Sales Offices & Reps.

Cal	Newport Beach, Omni Spectra/Americon S/W	714-833-8860
Cal	Santa Clara, Omni Spectra/Americon N/W	408-249-5172
Fla	Palm Bay, Spartech Assoc.	305-727-8045
Ga	Smyrna, Spartech Assoc.	404-432-3644
Kans	Shawnee Mission, Tech. Sls. Assoc.	913-888-3330
Md	Randallstown, C. L. Malinow & Co.	301-922-2092
Mass	Burlington, Burlington Sls.	617-272-7655
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Syracuse, C.W. Floring & Assoc.	315-478-2149
NY	Tuckohoe, Asco Elctrns.	914-779-8110
Ohio	Cleveland, Components Inc.	216-243-9200
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Omni Spectra, Inc.	214-234-4213
Wash	Redmond, Desco, Northwest	206-455-9325

Local Distributors

Ariz	Phoenix, Mirco Elctrn. Dist.	602-997-5931
Cal	Van Nuys, C.W. Swift & Assocs.	213-989-1133
Fla	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
Md	Randallstown, CLM Sls.	301-922-7717
Mass	Medford, Blake Assocs.	617-391-7890
Mass	Needham Heights, Cavalier Comps.	617-449-3112
NY	Harrison, RDI Dists.	914-835-4985
Ohio	Dayton, Sunray Elctrns.	513-253-4114
Tex	Dallas, Hall-Mark Elctrns.	214-231-6111
Tex	Dallas, Omni Spectra	214-234-4213
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300

OMNI SPECTRA, INC., OSM Div., Dept. EM, 21 Continental Blvd., Merrimack, NH 03054, Tel: 603-424-4111, TWX: 710-366-0674; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, DeAngelo, Rothman & Cheever	602-948-2240
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	San Carlos, LoDan, Inc.	415-592-4600
Cal	San Diego, DeAngelo, Rothman & Co.	714-560-5707
Colo	Boulder, H. Bass Assocs.	303-499-7509
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Iowa	Cedar Rapids, Engrg. Svcs. Co.	319-362-0503
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Md	Randallstown, C.L. Malinow & Co., Inc.	301-922-2092
Mass	Lowell, Russell Engrg.	617-458-7146
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Bayside, R. Diamond Inc.	212-423-7330
NY	Fayetteville, Graydon-Sherman, Inc.	315-637-9861
Ohio	Cleveland, Components	216-243-9200
Ohio	W. Carrollton, Components	513-866-0661
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Texas Microwave	214-231-5381
Wash	Seattle, H. Levinson Co.	206-323-5100

Local Distributors

Ariz	Phoenix, Mirco Elec. Distrs.	602-944-2281
Cal	Gardena, Santa Monica Bell Elec.	213-321-5802
Cal	Mountain View, Waltronic Sls.	415-965-4131
Cal	San Carlos, Sterling Elctrns.	415-592-2353
Cal	San Diego, Sterling Elctrns.	714-565-2441
Cal	Van Nuys, C. W. Swift & Assocs.	213-989-1133
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Ill	Rosemont, Advent Elctrns.	312-298-4210
Md	Baltimore, Arrow Elctrns.	301-247-5200
Mass	Medford, Blake Assocs.	617-391-7890
NJ	Moorestown, Arrow-Angus	215-928-1800
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Rampart Comps.	516-273-1111
Ohio	Dayton, Sunray Elctrns.	513-298-2452
Tex	Dallas, Hall-Mark Elctrns.	214-231-6111
Wash	Seattle, Almac-Stroum Elctrns.	206-763-2300

OMNI-SPECTRA, Arizona Div., Dept. EM, 1040 W. Alameda Dr., Tempe, Ariz. 85282, Tel: 602-966-1471, TWX: 910-950-1296; Empl.: 165

Local Sales Offices & Reps.

Cal	Van Nuys, C.W. Swift & Assocs.	213-989-1133
Md	Randallstown, C.L. Malinow & Co.	301-922-2092
Mass	Medford, Blake Assocs., Inc.	617-391-7890
NY	Fayetteville, Graydon-Sherman, Inc.	315-637-9861
Tex	Dallas, Texas Microwave Elctrn.	214-358-1172

(TM)OMNI-SPRA - special aerosol extender - Tech Spray, Inc.

OMNITEC CORPORATION, Dept. EM, 2405 S. 20th St., Phoenix, Ariz. 85034, Tel: 602-258-8244, TWX: 910-951-4247; FSC No.: 09736; Empl.: 500

Local Sales Offices & Reps.

Alas	Juneau, Systems Northwest	907-586-6140
Ariz	Phoenix, Data Sys. Mktg.	602-277-4732
Ariz	Scottsdale, BFA Corp.	602-946-4215
Cal	Irvine, Data Sys. Mktg.	714-540-2312
Cal	Los Altos, Data Sys. Mktg.	415-941-0240
Cal	San Diego, Data Sys. Mktg.	714-560-9222
Cal	San Francisco, Data Sys. Mktg.	415-391-1111
Colo	Denver, BFA Corp.	303-744-3301
Colo	Littleton, Data Sys. Mktg.	303-795-1960
Conn	Greenwich, Data Dimensions	203-661-1700
DC	Washington, Data Dimensions	202-223-8727
Fla	Miami, Broadmoor Pharmacy dba Rosow Info. Sys.	800-327-5259
Kans	Shawnee Mission, Inland Assocs.	913-362-2366
Md	Silver Spring, Computer Prods. Unltd.	301-588-8134
Mass	Somerville, Selecterm	617-623-7800
Mich	Southfield, Data Tron	313-354-6421
Mo	St. Louis, Inland Assoc.	314-821-3742
NJ	Cherry Hill, Data Dimensions	609-662-2833
NJ	Roselle, Teletypewriter Svc. Co.	201-245-6333
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Alburquerque, Data Systems Mktg.	505-294-5790
NM	Las Cruces, BFA Corp.	505-523-0601
NY	New York, Data Dimensions	212-687-2030
NY	Rochester, Ossmann Instrs.	716-328-2230
NY	Vestal, Ossmann Instrs.	607-785-9947
NY	Wappingers Falls, Ossmann Instrs.	914-297-7777
Ohio	Dayton, Data Tron	513-223-8421
Ohio	Wickliffe, Data Tron	216-585-8421
Ore	Beaverton, Showalter Distributing	206-455-4922
Pa	Ambler, Denco Data Engrg.	215-542-9876
Pa	Pittsburgh, C. G. Distrs.	412-366-5056
Tex	Dallas, Electric Rentals	214-352-1780
Utah	Salt Lake City, BFA Corp.	801-466-6522
Utah	Salt Lake City, Data Sys. Mktg.	801-487-8281
Wash	Bellevue, Showalter Distributing	206-455-4922

(TM)OMNITESTER - automatic circuit test set - Automatic Production Systems Inc.

(TM)OMNY-BUS - laminar bus bar - Methode Elctrns., Inc.

(TM)OMNY-PAC - printed circuits/I. C. applications - Methode Elctrns., Inc.

(TM)OMQ - omni spectra miniature quick-connect - Omni Spectra, Inc.

OMRON

OMRON CORP. OF AMERICA, Dept. EM, 233 S. Wacker Dr., Chicago, Ill. 60172, Tel: 312-876-0800, Telex: 28-3539 .... p. 3593

Local Sales Offices & Reps.

Ariz	Scottsdale, Q. T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q. T. Wiles & Assocs.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	San Diego, Q. T. Wiles & Assocs.	714-565-6895
Cal	Tustin, Q. T. Wiles & Assocs.	714-832-4952
Colo	Denver, Straube Assocs.	303-426-0890
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Ft. Lauderdale, Bolton Assocs.	305-491-5161
Ga	Avondale Estates, Candor Co.	404-296-1666
Ill	Chicago, L-TEC, Inc.	312-286-1500
Ind	Greenwood, Valentine Schillinger & Assocs.	317-888-2260
Ind	South Bend, Valentine Schillinger & Assocs.	219-291-6258
Kans	Olathe, BC Elctn. Sls.	913-888-6680
Mass	East Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
Mich	Benton Harbor, R. C. Nordstrom & Co.	616-429-8560
Mich	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
Minn	Minneapolis, Quantum Sls.	612-831-8583
Mo	Hazelwood, BC Elctrn. Sls.	314-731-1255
NJ	Cherry Hill, Trinkle Sls.	800-257-8210
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Jamaica, S-J Assocs.	212-291-3232
NY	Rochester, Andres Comp. Sls.	716-244-2445
NC	Raleigh, Candor Co.	919-876-4999
Ohio	Richfield, Bear Mktg.	216-659-3131
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
SC	Myrtle Beach, Candor Co.	803-448-8361
Tex	Dallas, Kruvand Assocs.	214-691-4592
Tex	Houston, Kruvand Assocs.	713-661-3007
Utah	Salt Lake City, Straube Assocs.	801-533-0125
Va	Roanke, Candor Co.	703-989-0995
Wash	Bellevue, N. R. Schultz Co.	206-454-0300
Wisc	Greenfield, L-TEC, Inc.	414-545-8900

OMTRONICS MFG., INC., Dept. EM, 2420 S. 60th St., Omaha, Neb. 68106, Tel: 402-551-5100, TWX: 910-622-8220; Empl.: 125 .... p. 3710-3712

Sales Manager: J. Matejka, Sr.

Local Sales Offices & Reps.

Ariz	Phoenix, Dorton Entprs., Inc.	602-263-0414
Cal	Redwood City, Woodworth Co.	415-365-0252
Cal	Santa Ana, RMS Assocs.	714-556-4155
Colo	Littleton, Lange Sls.	303-795-3600
Fla	Winter Haven, Sears Assocs.	813-324-1349
Ill	Elk Grove Village, Loren Green Assoc.	312-593-0282
Ill	Melrose Park, Belford Elctrns.	312-865-2402
Ind	Indianapolis, Loren Green Assoc.	317-293-9827
Iowa	Des Moines, T.L. Dowell & Assoc.	515-225-1620
Kans	Overland Park, T.L. Dowell & Assoc.	913-236-8200
La	Metarrie, J.F. McKinney Sls. Co.	504-733-9583
Md	Baltimore, Stitzer Assocs.	301-823-2600
Mass	Canton, New England Elctrn. Sls.	617-828-4835
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
Mo	St. Louis, T.L. Dowell & Assoc.	314-968-4234
NY	Farmingdale, Septronics Co.	516-694-5143
Okla	Tulsa, J.F. McKinney Sls. Co.	918-622-5511
Pa	Paoli, Stitzer Assocs.	215-644-5500
Tenn	Memphis, Ransom Co.	901-332-0036
Tex	Dallas, J.F. McKinney Sls. Co.	214-631-9450
Tex	Houston, J.F. McKinney Sls. Co.	713-777-9780
Exp:	Fla., Miami, Speedway Int'l.	305-638-2710

Local Distributors

Ariz	Phoenix, Mirco Elctrnc.	602-997-5931
Cal	Costa Mesa, Orange County	714-979-3597
Cal	Costa Mesa, Comps. Center	714-979-0433

Colo	Denver, Newark Elctrns.	303-757-3351
Conn	East Hartford, R & S Elctrn. Distr.	203-528-9901
Fla	Miami, Elctrn. Equip.	305-871-3500
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Newton, Greene-Shaw Co.	617-969-8900
Mo	Kansas City, Walters Radio Supply	816-531-7015
Neb	Omaha, Omaha Radio Equip.	402-341-7700
NJ	Hanover, State Elctrns.	201-887-2550
NJ	Midland Park, Dynastat	201-444-2272
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Rochester, Rochester Radio Supply	716-454-7800
NY	White Plains, Equiptex	914-948-3300
Ohio	Dayton, Esco Elctrns.	513-226-1133
Okla	Tulsa, Hall Mark Elctrns.	918-835-8458
Pa	Huntingdon Valley, Hall Mark Elctrns.	215-355-7300
SC	Greenville, Hammond Elctrns.	803-233-4121
Tex	Austin, Hall Mark Elctrns.	512-837-2814
Tex	El Paso, Ideal Indl. Elect. Supply	915-565-4671
Tex	Houston, Hall Mark Elctrns.	713-781-6100
Tex	Houston, Quality Comps.	713-789-9320
Tex	Richardson, Altair Co.	214-231-5166
Wash	Seattle, R. E. Priebe Co.	206-682-8242
Wisc	Mequon, Lakeview Electrns. Co.	414-377-8250

ON-GUARD CORP. OF AMERICA, Dept. EM, 350 Gotham Pkwy., Carlstadt, NJ 07072, Tel: 201-939-5822, Telex: 13-3364; Empl.: 95

Local Sales Offices & Reps.

Cal	San Jose, R R & F Co.	408-266-8916
Cal	Van Nuys, Art Szerlip Sls.	213-782-1765
Fla	Miami, Seaman Sls. Inc.	305-271-5728
Ill	Bolingbrook, Sangwin Co.	312-739-7967
Ill	Bolingbrook, George Sangwin Co.	312-739-7966
Ind	Indianapolis, Norman Epstein & Assoc.	317-842-0800
Kans	Lenexa, Palatine Sls.	913-492-7020
Ky	Louisville, Norman Epstein & Assoc.	502-635-5200
Mich	Ferndale, Irving J. Flanders Assoc.	313-545-4633
Mo	St. Louis, Palatine Sls.	314-426-7055
Neb	Omaha, Palatine Sls.	402-397-9190
NY	Roslyn Heights, Sir Sls.	516-621-7485
NY	State Grand Island, McTaggert Assoc.	716-634-2030
Ohio	Medina, T. Grant Assoc.	216-723-3696
Tex	Houston, Sidney Katzoff Assoc.	713-666-1636
Utah	Salt Lake City, R.D. Mktg.	801-262-0089
Exp:	NY Westbury, Minthorne International	516-334-3303

ONAN DIV-ONAN CORP., Dept. EM, 1400 73rd Ave. N.E., Minneapolis, Minn. 55432, Tel: 612-574-5000; Empl.: 1300

ONEIDA ELECTRONICS MFG., Dept. EM, 843 N. Cottage St., Meadville, Pa. 16335, Tel: 814-336-2125; Empl.: 25

Local Sales Offices & Reps.

Colo	Westminister, Electro-Tex Sls.	303-255-4566
Fla	Ft. Lauderdale, J. Sprock	305-587-3794
Haw	Mililani, C&L Distrs.	808-949-1087
Ill	Chicago, Lassers & Co.	312-539-0170
Kans	Shawnee Mission, K&M Sls. Co.	913-262-1444
Md	Silver Springs, Mid-Atlantic Sls. Co.	301-593-7749
Mass	North Boro, W.B. Pray Sls. Co.	617-393-3434
Mich	Milford, Polyphase Sls. Co.	313-685-3003
Minn	Maple Grove, R.C. Sls. Co.	612-425-5543
NY	Yonkers, J. Brown Sls. Co.	914-779-7330
NC	Charlotte, M.K. Smith	704-372-1026
Ohio	Akron, Shamrock Elctrn. Sls.	216-666-3796
Pa	Abington, J. Robinson	215-657-1256
Pa	Pittsburgh, Tanner Co.	412 561-4687
Tex	Hurst, Ranger Elctrns. Co.	817-281-2736
Wash	Seattle, Fleehart & Sullivan	206-522-1533

ONTEL CORP., Dept. EM, 250 Crossways Park Dr., Woodbury, NY 11797, Tel: 516-364-2121

(TM)ON THE BALL - aerospace chemical - Merix Chem. Co.

(TM)ON THE ROAD - auto safety lights, kits & flashers - Teledyne Big Beam

OPAMP LABS, INC., Dept. EM, 1033 N. Sycamore Ave, Los Angeles, Cal. 90038, Tel: 213-934-3566; FSC No.: 24699; Empl.: 18 .... p. 1120

OPCOA, DIV. IDSI, Dept. EM, 330 Talmadge Rd., Edison, N.J. 08817, Tel: 201-287-0355, TWX: 710-998-0555; Empl.: 60

Sales Manager: C. Ratner

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Tempe, Delta Elctrn. Sls	602-966-9903
Cal	Los Angeles, Electronic Comp. Mktg.	213-649-5374
Cal	Palo Alto, Brooks Tech.	415-328-3232
Cal	San Diego, Electronic Comp. Mktg.	714-295-6122
Colo	Denver, W. J. Purdy Co.	303-777-1411
Conn	Easton, J.E. Boeing Co.	203-261-9512
Fla	Oviedo, Conlez & Assoc.	305-365-3283
Ill	Chicago, L-Tec, Inc.	312-286-1500
Ind	Ft. Wayne, Delesu Sls.	219-483-9537
Kans	Prairie Village, Engineering Svc.	913-649-4000
Md	Towson, J. Bresson Assocs.	215-839-6770
Mass	Lexington, Boeing Co.	617-862-2500
Mich	Grosse Point Park, Greiner & Assoc.	313-499-0188
Minn	Edina, Grayden & Flemmer	612-941-1120
Mo	St. Louis, Engineering Svc.	314-997-1515
NY	Buffalo, Bowser & Sapecky	716-839-4170
NY	Jamaica, S-J Sls.	212-291-3232
NY	Marlivs, Bowser & Sapecky Assocs.	315-682-8885
NC	Raleigh, Remco	919-828-3009
Ore	Portland, C. K. Shanks	503-292-1029
Pa	Narbeth, J. Bresson Assoc.	215-664-6460
Tex	Houston, Vista Assoc.	713-661-0119
Tex	Richardson, Vista Assoc.	215-235-4547
Va	Lynchburg, J. Bresson Assocs.	215-839-6770
Wash	, C. K. Shanks	206-632-4290
Wisc	Greenfield, L-Tec, Inc.	414-545-8900
Exp:	Edison, N. J., Opcoa, Inc.	201-287-0355

OPCON, INC., Dept. EM, 720 80th St. S.W., Everett, Wash. 98203

Local Sales Offices & Reps.

Ark	El Dorado, Industrial Assocs.	501-862-2051
Cal	San Jose, J.T. McFarland Assocs.	408-286-9333
Conn	Waterbury, A.I.D. Engrg. Sls.	203-573-0700
Ga	Lilburn, Motion Technology, Inc.	404-972-5050
Ill	Dundee, J. Huegel Sls.	312-426-6370
Ill	Hillside, L. Morrow	312-449-2230
Ind	Indianapolis, Ihrig Assocs.	317-783-7630
Mich	Farmington Hills, W.R. Hummon & Assocs.	313-474-0661
Minn	Burnsville, D.L. Gooch Co.	612-894-2151
Mo	St. Louis, Barry Sls. Engrg.	314-821-2525
NY	Coram, Machine Dynamics	516-473-7770
NY	Liverpool, Automation Controls & Power Sys.	315-475-1084
NC	Charlotte, Motion Technology	704-525-9855
Ohio	Medina, J.C.H. Co.	216-241-4880
Ore	Portland, Fry Controls	503-226-2620
Pa	Blue Bell, R. Van Haren	215-628-3216
Pa	King of Prussia, Wistex, Inc.	215-337-1240
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
Tex	Dallas, Titan Reps.	214-661-5350
Tex	Midland, Tital Reps.	915-682-6962
Wash	Airway Heights, Calvert Controls	509-244-3601
Wisc	Oconomowoc, J. Huegel Sls.	414-271-6105

(TM)OPEN-AIRE - stero headphones - Sennheiser Elctrn. Corp.

(TM)OPERATIONAL FILTER - multifunction variable filter - Rockland Sys. Corp.

OPT INDS. INC., Data Products Div., Dept. EM, 41 East 42 St. Ste. 1420, Phillipsburg, N.J. 08865, Tel: 201-454-2600; Empl.: 160; Minimum order: $B. Dull p. 2466,3290

Sales Manager: J. Smith; *Distributor Manager:* B. Dull

Local Sales Offices & Reps.

Cal	Cupertino, Dura Elctrn. Sls.	408-255-2084
Fla	Ft. Lauderdale, Bolton Assoc.	305-491-5161
Ill	Chicago, Croyden Elctrns.	312-237-4343
Md	Lanham, L.D. Lowery	301-459-1556
NJ	Union, J. Onore	201-687-0668
NY	Hempstead, Kahgan Sls.	516-538-2300
NY	Syracuse, Franklin Sls.	315-472-5273
Pa	Bromall, L.D. Lowery	215-528-5170
Va	Charlottesville, L.D. Lowery	804-973-6672
Wash	Kirkland, Freed Assocs.	206-822-8100

(TM)OPTACH - shaft encoder - H H Controls Co., Inc.

(TM)OPTEC - digitizer system - Auto Trol Corp.

(TM)OPTECON - optical incremental encoder - DATA TECHnology, Inc.

OPTEL CORP., Dept. EM, Box 2215, Princeton, N.J. 08540, Tel: 609-452-9250, Telex: 843339

Sales Manager: J. Goldmacher

Local Sales Offices & Reps.

Cal	El Segundo, Varigon Assoc.	213-322-1120
Cal	Menlow Park, Straube Assoc.	415-321-9050
Colo	Wheatridge, Waugaman Assoc.	303-432-1020
Fla	Casselberry, E.I.R.	305-830-9600
Ill	Schaumburg, Kingston Comp.	312-529-8055
Ind	Fort Wayne, Temple Engrg.	219-743-0362
Md	Baltimore, Lee Cohen	301-484-6376
Mass	Burlington, Mill-Bern Assoc.	617-273-1313
Mo	St. Louis, Kebco Mfr. Rep.	314-569-2660
NJ	E. Hanover, HLM Assoc.	201-386-0794
Pa	Oreland, CMS Mktg.	215-885-5106
Tex	Dallas, West & Hoffman Assoc.	214-661-9400

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Optel, the Display company, provides the correct solution for your display needs. From hermetic package construction to high purity liquid crystal materials in order to achieve a contaminant free system. The Optel technology offers total display flexibility with low power consumption and a high contrast ratio in both ambient and bright light conditions.

OPTICAL COATING DIV., Valtec Corp., Dept. EM, Holliston, Mass. 01746, Tel: 617-429-6280, TWX: 710-346-6703; Empl.: 90

Local Sales Offices & Reps.

Cal	Costa Mesa, Wolff Engrg. Div. Valtec Corp.	714-646-7214

OPTICAL ELECTRONICS, INC., Dept. EM, Box 11140, Tucson, Ariz. 85734, Tel: 602-624-8358, TWX: 910-952-1283; Empl.: 26

Local Sales Offices & Reps.

Ariz	Tempe, J.F. Hurlbut Co.	602-968-5962
Colo	Golden, J.F. Hurlbut Co.	303-279-7796
NJ	Parlin, Triple E	201-727-6454
Pa	Abington, Bach-Stewart Assocs.	215-885-1550
Tex	Richardson, Palatine Sls.	214-321-9489
Va	Annandale, J. Hopkins Assocs.	703-323-1641

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OPTICS TECHNOLOGY, Dept. EM, 1902 McGaw Ave., Irvine, Cal. 92714, Tel: 415-364-3830, Telex: 33-4440; Empl.: 20

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OPTIMA ENCLOSURES, Div. Scientific Atlanta, Dept. EM, 2166 Mountain Ind'l Blvd., Tucker, Ga. 30084, Tel: 404-939-6340, TWX: 810-766-3967; Empl.: 125 p. 1140

Sales Manager: B. Holman

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns.	205-881-5031
Ariz	Scottsdale, Arcom Sls. Co.	602-947-5745
Cal	Irvine, Celtec Co.	714-752-6111
Cal	Los Altos, Frauman Assocs.	415-941-0660
Cal	Maitland, Beacon Elctrns.	305-647-3498
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Sherman Oaks, Celtec Co.	213-990-3440
Colo	Denver, B-5 Inc.	303-426-0222
Fla	Ft. Lauderdale, Beacon Eltrns.	305-491-4211
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Arlington Heights, Diethert/Angel	312-593-7600
Kans	Derby, Palatine Sls. Inc.	316-788-0621
Kans	Lenexa, Palatine Sls. Inc.	913-492-7020
Md	Randallstown, Beacon Elctrns.	301-922-1248

Mass	Lexington, Zieco	617-861-8300
Mich	Detroit, L.H. Dickelman Co.	313-353-8210
Minn	St. Paul, R.G. Ragon Inc.	612-488-0201
Mo	St. Louis, Palatine Sls. Inc.	314-426-7055
NJ	Leonia, Scien.-Atlanta	201-461-3650
NY	Buffalo, Ossmann Comp. Sls.	716-832-4271
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NY	Rochester, Ossmann Comp. Sls.	716-442-3290
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NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Charlotte, Beacon Elctrns.	704-525-7412
Ohio	Cleveland, C.A. Robinson Co.	216-381-9049
Ohio	Dayton, C.A. Robinson Co.	513-275-2412
Ore	Portland, S.J.I. Corp.	503-224-0344
Tenn	Oak Ridge, Beacon Elctrns.	615-482-2409
Tex	Ft. Worth, Carey-Wolf	817-738-1996
Tex	Garland, Carey-Wolf	214-823-5383
Tex	Houston, Carey-Wolf	713-721-2442
Va	Falls Church, Beacon Elctrns.	703-534-7200
Va	Lynchburg, Beacon Elctrns.	804-237-4740
Wash	Seattle, S.J.I. Corp.	206-624-9020

OPTIMAX, INC., Optimax, Div. Alpha Industries, Inc., Dept. EM, Box 105, Advance Lane, Colmar, Pa. 18915, Tel: 215-822-1311, TWX: 510-661-7370; FSC No.: 31091; Empl.: 32

Sales Manager: E.T. Andrews

Local Sales Offices & Reps.

Ariz	Scottsdale, Darci	602-948-2240
Cal	Culver City, Darco	213-298-6239
Cal	Cupertino, Dura Electr. Sls.	408-255-2084
Fla	Palm Bay, Spar Tech Assocs.	305-727-8045
Ill	Elk Grove Village, Seiger Assoc.	312-956-0963
Ind	Carmel, Rich Electrn. Mktg.	317-844-8462
Md	Annapolis, Spectro Systems Corp.	301-268-1984
Md	Silver Spring, Spectro Systems Corp.	301-949-8261
Mass	Lexington, Lancer Assocs.	617-861-1720
NY	Great Neck, Trionics Assoc.	516-466-2300
NY	Syracuse, Ossman Instr.	315-437-6666
Pa	Southampton, Spectro Systems Corp.	215-357-6644
Tex	Richardson, Vector Sls.	214-234-4291

OPTIMIZED DEVICES INC., Dept. EM, 220 Marble Ave., Pleasantville, N.Y. 10570, Tel: 914-769-6100; Empl.: 30

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Cal	Los Angeles, DynaSales Co.

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™**OPTO PACK** - small phototransistor package - Sensor Technology

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OPTO 22, Dept. EM, 5842 Research Dr., Huntington Beach, Cal. 92649, Tel: 714-892-3313, Telex: 692-386; Empl.: 40

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	San Diego, Cerco	714-560-9143
Cal	Santa Clara, Fahrner-Miller Assocs.	408-984-1700
Colo	Denver, Williams-Assocs.	303-373-4730
Conn	Bethel, Livera-Polk Assocs.	203-748-4639
Fla	Ft. Lauderdale, Bredesen & Assocs.	305-566-3289
Md	Mount Airy, Strayton Assocs.	301-831-7007
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Farmington Hills, W. R. Hummon & Assocs.	313-474-0661
Minn	Minneapolis, Bitronics Sls. Co.	612-835-7744
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	North Syracuse, Precision Sls.	315-458-2223
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
NC	Matthews, W. K. Hile Co.	704-847-9125
Ohio	Cleveland, E.M.A.	216-562-6104
Ohio	Dayton, E.M.A.	513-433-2800
Pa	Ingomar, Greye Glass Assocs.	412-366-6664
Pa	Media, W. Reeves Assocs.	215-566-6709
Tex	Plano, R. T. Mullins	214-423-7618
Wash	Seattle, R & R Assocs.	206-763-1236
Wisc	Milwaukee, Taylor Electric	414-241-4321

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Cal	Huntington Beach, Opto 22 Distibutor Sls.	714-892-3313
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NY	Buffalo, Summit Distributors	716-884-3450
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
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Tex	Dallas, Quality Comps.	214-387-4949
Tex	Houston, Altair	713-462-3029
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For:	Canada, Richmond, B.C., Eltron Entprs, Ltd.	604-278-5952
For:	Canada, Winnipeg, Man., Electro Sys. Grp. Ltd.	204-772-8209
For:	Can., Rexdale, Ontario, Canadian Chromalox Co., Ltd.	416-743-8000
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For:	Scandanavia, Farsta, Electrona-Telekomponent A.B.	Vx-08-93-08-80
For:	Spain, Madrid, Instrumentos Electronicos de Precision	274-10-07
For:	Switzerland, Lyss, Selectron Lyss AG	032-84-56-61

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Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Ariz	Scottsdale, Verein Corp.	602-948-3571
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Tustin, Orion Sls.	714-832-9687
Colo	Wheat Ridge, Waugaman Assocs.	303-423-1020
Conn	Milford, Conti-Younger Assocs.	203-929-3294
Fla	Clearwater, Lawrence Assoc., Inc.	813-443-2697
Fla	Maitland, Lawrence Assoc.	305-647-1188
Ill	Chicago, Carlson Elctrn. Sls.	312-956-8240
Ind	Indianapolis, Carlson Elctrn. Sls. Co.	317-253-5610
Ind	Santa Clara, I^2, Inc.	
Kans	Olathe, B. Rush Assocs.	913-764-2700
Mass	Waltham, Conti-Younger Assocs.	617-890-4582
Mich	Detroit, R.P. Urban Assocs.	313-535-2355
Mich	Grand Rapids, R.P. Urban Assocs.	616-245-0511
Minn	Minneapolis, Electronic Innovators	612-884-7471
Mo	Ballwin, Rush & West Assoc.	314-394-7271
NJ	Ridgefield, Rical Associates	201-945-5250
NM	Albuquerque, A.Q. Elctrns.	505-883-1003
NY	E. Syracuse, Noeth-Honsinger Assocs.	315-463-5718
NY	Pittsford, Noeth-Honsinger Assocs.	716-461-4750
NC	Winston Salem, Murcota Corp.	919-722-9445
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Ohio	Cleveland, Baehr, Greenleaf & Assocs.	216-221-9030
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Ohio	Dayton, Baehr, Greenleaf & Assoc.	513-293-1102
Pa	Huntingdon, Knowles Assoc.	215-947-5641
Tex	Dallas, M. Kruvand Co.	214-691-4592
Tex	Houston, M. Kruvand Co.	713-780-9710
Utah	Salt Lake City, Waugaman Assocs.	801-277-8911
Wash	Tukwila, General Elctrns., Inc.	206-575-4030
Wash	Vancouver, General Elctrns., Inc.	206-693-0025
Wisc	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

Local Distributors

Ariz	Scottsdale, V.C. Elctrns.	602-948-3571
Cal	Newport Beach, Semi Comp Corp.	714-833-3070
Cal	Santa Ana, Rical Elctrns. Dist.	714-557-7131
Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Cal	Sunnyvale, Semi Comp Corp.	408-736-2330
Colo	Denver, Integrated Elctrns.	303-534-6121
Colo	Wheatridge, Century Elctrns.	303-424-1985
Fla	Clearwater, M & C Sls.	813-443-2697
Ill	Elmhurst, Genesis Elctrns.	312-530-2272
Ind	Indianapolis, Genesis Elctrns.	317-257-2231
Ind	South Bend, Genesis Elctrns.	219-287-2911
Md	Baltimore, Whitney Dist. Inc.	301-944-8080
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NJ	Totowa, Diplomat/I.P.C. Corp.	201-785-1830
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NY	Marcy, Mohawk Scientific Prods.	315-732-6042
NY	Woodbury, Diplomat Elctrns.	516-921-9373
NC	Winston Salem, M & C Sls.	919-722-9445
Ohio	Cincinnati, Hughes Peters, Inc.	513-351-2000
Ohio	Cleveland, Genesis Elctrns.	216-447-0012
Ohio	Columbus, Hughes Peters, Inc.	614-294-5351
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Tex	Dallas, Quality Comps., Inc.	214-387-4949
Tex	Houston, Quality Comps., Inc.	713-789-9320
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ORBIT INSTR. CORP., Dept. EM, 131 Eileen Way, Syosset, N.Y. 11791, Tel: 516-WA 1-6310, TWX: 510-221-2122; FSC No.: 11263; Empl.: 65

Local Sales Offices & Reps.

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Cal	Woodland Hills, Orbit Instrument Corp.	213-340-7000

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ORMOND INC., Dept. EM, 11969 E. Rivera Rd., Santa Fe Springs, Cal. 90670, Tel: 213-698-0641, TWX: 910-586-1635; Empl.: 40

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™OROSENE 999 - 24kt-acid bright gold - Technic, Inc.

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™OROTHERM HT - heat resistant 24kt acid bright gold - Technic, Inc.

™ORTHOMODE - hybrid mixers - Varian Assocs.

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Sales Manager: R.E. Osborne

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Sales Manager: T. Koyama

Local Sales Offices & Reps.

Cal	Costa Mesa, Wamco Tech. Sls., Inc.	714-833-9361
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OSLO CONTROLS, Dept. EM, 417 Washington St., New Haven, Conn. 06473, Tel: 203-239-3515 p. 4207

Sales Manager: J.J. Martinez

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Cal	Los Altos, Ewing-Foley	415-941-4525
Cal	Los Angels, M.A. Stolaroff	213-295-7781
Colo	Englewood, Todd Assocs.	303-761-7801
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Fla	Oviedo, Conley Assocs.	305-365-3283
Ill	Westchester, Wasson-Gallagher	312-344-0690
Md	Rockville, L.G. White & Co.	301-770-6556
Mich	Grosse Pointe Park, Grewer Assoc.	313-499-0188
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Mo	St. Louis, Hill & Co.	314-621-1818
NJ	Denville, Grimm Siegel Assoc.	201-625-1900
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Ohio	Cincinnati, O.H. Bromberg & Assoc.	513-771-9333
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Pa	Broomall, White-Keystone	215-353-6347
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Wash	Mercer Island, J.H. Andersen & Assocs.	206-232-0484

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™OTA - operational transconductance amplifier - RCA Solid State Div.

OTTO ENGRG., INC., Otto Controls Div., Dept. EM, 36 Main St., Carpentersville, Ill. 60110, Tel: 312-428-7171; FSC No.: 21649; Empl.: 48 .... p. 4208

Local Sales Offices & Reps.

Ariz	Phoenix, O'Donnell Assocs. - Southwest Inc.	602-993-9740
Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Fla	Orlando, W. Ben Wimberly Co.	305-423-2514
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Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
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NY	Rochester, Tacom Sls. Co.	716-647-3940
Ohio	Cleveland, A.H. Baier Co.	216-461-6161
Ohio	Dayton, A.H. Baier Co.	513-276-4128
Tex	Dallas, Ion Assocs.	214-357-9441
Wash	Bellevue, J. Findlay Co.	206-454-5200

Local Distributors

Cal	Culver City, Avnet Elctrns. Div.	213-870-0111
Cal	Los Angeles, Electric Switches, Inc.	
Cal	Sunnyvale, Pyramid Elctrns.	408-744-1900
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Ga	Atlanta, Electro Air Corp.	404-351-3545
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Ill	Skokie, Bell Inds.	312-965-7500
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Mass	Watertown, DRW Elctrns.	617-923-1900
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NY	Woodside, Durham Aircraft Srvc.	212-274-9000
Tenn	Nashville, Electra Dist.	615-329-3971
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Local Sales Offices & Reps.

Ariz	Scottsdale, S.C. Blaker Co.	602-948-3061
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Cal	San Carlos, Westronics Assoc.	415-592-1417
Ill	Skokie, Saffro & Assocs.	312-588-0905
La	Baton Rouge, Covington Instr. Co.	504-924-1784
Mass	Reading, Geder Assocs.	617-944-3105
Minn	Minneapolis, C.E. Bohlig Co.	612-922-7011
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NY	Huntington, Andrews & Andrews	516-692-8686
NY	Syracuse, Mike Antil	315-463-0266
Ohio	Medina, McShane, Inc.	216-725-4568
Pa	Ambler, W & M Assocs.	215-643-4119
Tex	Dallas, Bouco Sls. Assocs.	214-247-6708
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OVENAIRE, Div. Walter Kidde & Co., Dept. EM, 706 Forrest St., Charlottesville, Va. 22901, Tel: 804-977-8050, TWX: 510-587-5461; Empl.: 125 p. 2464,2465

Local Sales Offices & Reps.

Ala	Huntsville, L & D, Inc.	205-859-1690
Cal	San Mateo, Melvin Sl.	415-349-7445
Cal	Van Nuys, R.L. Assocs.	213-780-1666
Fla	Maitland, Ellis & Assocs.	305-645-1101
Ind	Fort Wayne, TX Sls., Inc.	219-489-4447
Md	Towson, Dickison Sls CO.	301-823-0923
Mass	Randolph, Naton Assocs., Inc.	617-986-6417
Minn	St. Paul, Countryman	612-645-9151
Mo	Blue Springs, Chesco	816-229-1404
Mo	St. Charles, Chesco	314-946-6677
NJ	Cherry Hill, H. J. White Co.	609-428-4544
NJ	Springfield, F.F. Sylvester Assocs	201-376-3342
NY	Buffalo, Quality Comps.	716-839-4170
NC	Greensboro, L & D, Inc.	919-292-3201
Ohio	Dayton, O'Donnell & Assocs.	513-435-4300
Tex	Dallas, Stevens Sls.	214-350-2476
Va	Richmond, L & D, Inc.	804-737-7443
Wash	Seattle, Carlyle Tech. Sls.	206-622-4288

™OVERLAY - RCA's high-frequency RF technology - RCA Solid State Div.

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OWATONNA TOOL CO., Dept. EM, 395 Eisenhower Dr., Owatonna, Minn. 55060, Tel: 507-451-5310; Empl.: 1035

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Ala	Birmingham, J.R. Kuehn	205-853-0980
Cal	Arcadia, R. Long	213-447-0081
Cal	San Jose, G. Packer	408-378-1853
Cal	Santa Ana, G. Weers	213-283-2933
Colo	Longmont, R. Durrum	303-772-3319
Conn	Killingworth, W. Buckingham	203-663-2271
Fla	Tampa, L. Rickett, Jr.	813-839-7352
Ga	Riverdale, C. Crews	404-471-8046
Idaho	Idaho Falls, Owatonna Tool Co.	208-522-3690
Ill	Chicago, G.J. Reilly	312-274-6993
Ind	Fairland, Owatonna Tool Co.	317-835-7026
Iowa	Des Moines, D. Vandermeulin	515-276-2290
Iowa	Des Moines, M. Seskis	515-265-0843
Md	Finksburg, Owatonna Tool Co.	301-876-2188
Mich	Royal Oak, Owatonna Tool Co.	313-588-4217
Minn	Minneapolis, C. Johnson	612-888-4957
Mo	Florissant, P. Stumpe	314-741-4444
NJ	Cedar Knolls, C. Knill	201-538-3846
NJ	Parlin, J. Stowers	201-727-6020
NJ	Willingboro, C.V. Bareikis	609-871-0399
NY	Rochester, J. Jenkinson	716-385-3217
NC	Charlotte, R.J. Ludes, Sr.	704-366-4963
Ohio	Mentor, D. Dye	216-946-9579
Ohio	Westlake, D.O. Schneider	216-871-8820
Ore	Tigard, J. Davenport	503-639-6644
Tex	Euless, L. Johnson	817-267-4828
Tex	Houston, W. Parker	713-468-6157
Tex	Richardson, J.W. Cissne	214-235-6127
Wisc	Milwaukee, Owatonna Tool Co.	414-871-3899

OWENS CORNING FIBERGLASS CORP., Dept. EM, Fiberglass Tower Bldg., Toledo, Ohio 43659

OXFORD INSTR. INC., Oxford Instr. Inc., Dept. EM, Box 1829, 222 Severn Ave., Annapolis, Md. 21403, Tel: 301-268-2350; Empl.: 4

OXFORD SPEAKER CO., Dept. EM, 4237 West 42nd Pl., Chicago, Ill. 60632, Tel: 312-254-6730, TWX: 910-221-5029; Empl.: 250

Sales Manager: H. Sundberg

Local Sales Offices & Reps.

Ariz	Culver City, H. Feldman Co.	213-870-5973
Cal	Culver City, H. Feldman Co.	213-870-5973
Cal	San Francisco, Tech. Sls. Assoc.	414-467-1434
Fla	St. Petersburg, J.F. Thompson	813-866-0045
Idaho	Atlantic, Kimian Sls.	712-243-1626
Ill	Chicago, G. MCL Cole Co.	312-774-3535
Mo	Independance, Kimian Sls.	816-796-4026
NY	Tuckahoe, L-C-A Sls. Co.	
Pa	Philadelphia, L-C-A Sls. Co.	215-667-1788
Tex	Dallas, Wyborny Sls. Co.	214-348-9657
Wisc	Milwaukee, G. MCL Cole Co.	414-251-2011
Exp:	New York, N.Y., Roburn Agencies, Inc.	219-989-5939

PACE DIV., PATHCOM, INC., See Pathcom, Inc., Pace Two-Way Radio Prods.

(TM)OXY-TEC - liquid leak detecting fluids - American Gas & Chemical Co., Ltd.

(TM)OXYTRON - complete pre-plate sys. for printed circuit production. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)OYLTITE-STIK - sealant & pipe thread compound - Lake Chemical Co.

(TM)O-30 - ceramic oxide mat'l. and prods. - General Elec.

(TM)PACE - panel meters - A & D Electrical Instruments

(TM)PACECOM - computer cables - Pace Wire & Cable Corp.

PACE INC., Dept. EM, 9337 Fraser Ave., Silver Spring, Md. 20910, Tel: 301-587-1696, Telex: 89-8476; Empl.: 35

Local Sales Offices & Reps.

Ala	Madison, South Eastern Assoc.	205-772-9616
Cal	Mountain View, Tech-Ser Inc.	415-969-9020
Cal	Torrance, Tech-Ser Inc.	213-538-2267
Colo	Vail, Mile High Elctrns.	303-476-1149
Fla	Miami, N. Black Assoc.	305-651-4132
Ga	Norcross, D. G. Machinery & Gage Co.	404-449-3414
Haw	Honolulu, Pacific Instrumentation	808-373-1287
Ill	Mt. Prospect, E.T. Champion & Assoc.	312-593-1150
Md	Baltimore, A.L. Myers Co.	301-426-5583
Mass	Woburn, R.W. Hatfield Co.	617-933-2324
Mich	Royal Oak, Murray Percival Co.	313-548-1971
Minn	Minneapolis, Production Automation Corp.	612-866-5700
Mo	Hazelwood, Production Automation Corp.	314-731-2331
Mo	Raytown, Production Automation Corp.	816-737-0066
NY	Nesconset, Tool Technology	516-360-0510
NY	Warwick, Wingate & Assocs.	201-825-0747
Ohio	Mator, Perry Lohse Co.	216-951-3026
Pa	Media, Gil-Tec	215-565-0403
Tex	Dallas, Production Automation Corp.	214-620-0227
Tex	Houston, Production Automation Corp.	713-783-4742
Wash	Bellevue, Doland Co.	206-454-4952

(TM)PACENTER - desoldering equipment - Pace Inc.

(TM)PACE/PAK - modular hydrid circuits - International Rectifier Corp.

(TM)PACER - mercury-vapor photo printers - Chemcut Corp.

PACE WIRE & CABLE CORP., Dept. EM, 3590 Oceanside Rd., Oceanside, N.Y. 11572, Tel: 516-678-2275; Empl.: 35

(TM)PACHYDYNE(TM) - R. F. power supply - Applied Materials Inc.

PACIFIC COMMUNICATIONS, Dept. EM, 2041 S. Grand Ave. #A, Santa Ana, Cal. 92705, Tel: 714-546-0147; Empl.: 26

PACIFIC ELECTRICORD CO., Dept. EM, 747 W. Redondo Beach Blvd., Box 10, Gardena, Cal. 90247, Tel: 213-532-6600, TWX: 910-346-7619; Empl.: 475

Local Sales Offices & Reps.

Cal	San Diego, AAA Sls, Co.	714-565-0122
Tex	Dallas, Allied Comps.	214-238-0408
Tex	Houston, Allied Comps.	713-691-3961
Wash	Bellevue, Quadra Sls. Corp.	206-454-4946

Local Distributors

Ariz	Phoenix, Storm Products Co.	602-269-3485
Cal	Los Angeles, Storm Products Co.	213-649-6141
Cal	Palo Alto, Storm Products Co.	415-494-6621
Colo	Broomfield, Storm Products Co.	303-466-1991
Tex	Dallas, Storm Products Co.	214-330-1381

PACIFIC ELECTRONIC ENTERPRISES, Dept. EM, 2643 N. San Gabriel Blvd., Rosemead, Cal. 91770, Tel: 213-573-1686 .... p. 3394,3395

Sales Manager: S. Tullock

Local Sales Offices & Reps.

Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Cal	Sunnyvale, AMASCO	408-733-8690
Conn	W. Hartford, Tekdata Assocs., Inc.	203-525-7647
Md	Silver Springs, Eastern Instrumentation	301-681-6500
NY	DeWitt, D & B Assocs.	315-446-0220
Ohio	Waldo, Ohio Instr. Co.	614-726-4242
Pa	Philadelphia, Eastern Instrumentation	215-927-7777

PACIFIC MEAS., INC., Dept. EM, 470 San Antonio Rd, Palo Alto, Calif. 94306, Tel: 415-494-2900, TWX: 910-373-1171; Empl.: 56

Sales Manager: D. Armann

Local Sales Offices & Reps.

Ariz	Phoenix, P L S Assocs., Inc.	602-957-9110
Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	San Jose, MCH Assocs.	408-246-7330
Colo	Denver, P L S Assocs., Inc.	303-773-1218
Conn	Middletown, McBar Assocs.	203-865-4376
Fla	Orlando, Nine Assocs.	305-351-1841
Ill	Chicago, Scientific Sls.	312-775-7594
Ind	Indianapolis, Scientific Sls.	317-253-4606
Kans	Shawnee Mission, EIR Co.	913-362-0919
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Waltham, McBar Assocs.	617-890-0233
Mass	Waltham, MC Bar Assocs.	617-890-0233
Mich	Northville, Micro Sls.	313-482-1229
Minn	Bloomington, Scientific Sls.	612-881-3300
Mo	Hazelwood, EIR Co.	314-895-4100
NJ	Haworth, Central Assocs.	201-568-0808
NJ	Pennsauken, M/H Assocs.	609-662-3081
NM	Albuquerque, P L S Assocs., Inc.	505-255-2330
NY	East Syracuse, Ossmann Instrus.	315-437-6666
NY	Old Bethpage, Central Assocs.	516-433-0808
Ohio	Centerville, Micro Sls.	513-433-8171
Ohio	Cleveland, Micro Sls.	216-331-0900
Tex	Richardson, Lear Assocs.	214-231-5388
Va	Annandale, Nine Assocs.	703-273-1803
Wash	Seattle, Delcom Sls.	206-248-0090

PACIFIC SEMICONDUCTORS, Dept. EM, 200 Florence, Inglewood, Cal. 90301

PACIFIC TECHNOLOGY, Dept. EM, 235 Airport Way, Renton, Wash. 98055, Tel: 206-623-9080, Telex: 32-1051; Empl.: 60

Local Sales Offices & Reps.

Ala	Huntsville, Vesco	205-539-8716
Ariz	Scottsdale, Utility Prods.	602-947-9326
Cal	El Monte, Randolph Industries, Inc.	213-283-7901
Cal	Los Angeles, Randolph Inds.	213-283-7901
Cal	San Diego, Randolph Inds.	714-436-3049
Cal	Santa Clara, Natkin Srvc.	408-244-2770
Colo	Englewood, Utility Prods., Inc.	303-771-9080
Del	Wilmington, Spring Assocs.	302-656-0999
Fla	Cocoa Beach, Vesco	305-784-0784
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Indianapolis, Scientific Sls. Corp.	317-253-4606
Kans	Kansas City, W. Hickman Co.	913-362-8066
Kans	Wichita, W. Hickman Co.	316-264-8882
La	Baton Rouge, Vesco	504-923-0297
Md	Baltimore, Elctrn. Mktg. Assoc.	301-744-7700
Mich	Birmingham, Thibodeau Engrg.	313-642-6620
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
Mo	St. Louis, Floyd Gilliam Assoc.	314-961-5555
Neb	Omaha, W. Hickman	402-895-0262
NY	Brooklyn, Roytran	212-782-1505
NY	Buffalo, Robinson Assoc.	716-886-7350
NY	Latham, Robinson Assocs.	518-785-5844
NY	Rochester, Robinson Assocs.	716-342-3130
NY	Syracuse, Robinson Assocs.	315-478-0241
NC	Charlotte, Carolina Tech. Rep.	704-847-4494
Ohio	Cleveland, Morlan & Assocs.	216-235-1689
Ore	Portland, Topp Engrg.	503-244-7265
Pa	Pittsburg, Morlan & Assocs.	412-941-8544
Tex	Houston, W. W. Scherwitz Co.	713-527-8866
Utah	Salt Lake City, Utility Prods.	801-466-2036
Wash	Richland, Topp Engrg. Sls.	509-783-7515

PACIFIC TRANSDUCER CORP., Dept. EM, 2301 Federal, Los Angeles, Cal. 90064, Tel: 213-478-1134; Empl.: 20

PACKAGED RESINS DIV., Bacon Inds., Inc., Dept. EM, 192 Pleasant St., Watertown, Mass. 02172, Tel: 617-926-2550, TWX: 710-327-6518; FSC No.: 99098; Empl.: 18

Sales Manager: R.S. Cass

PACKARD INSTRUMENT CO., INC., Dept. EM, 2200 Warrenville Rd., Downers Grove, Ill 60515

(TM)PACPOLE - electrical utility poles - Electrovert

(TM)PACPOLE - office utility poles - Electrovert

(TM)PADLOAD - paper for X-Y recorder - MFE Corp.

(TM)PAESAR - automatic energy management dimming systems - Lutron Electronics Co.

(TM)PAGE-ALL - Telephones - Fanon/Courier Corp., Subs.

PAGEANT/M.A. MILLER INDUSTRIES, Dept. EM, 605 Northern Blvd., Chinchilla, Pa. 18501, Tel: 717-587-4771; Empl.: 14

Local Sales Offices & Reps.

Cal	Van Nuys, A. Szerlip Sls. Co.	213-782-1765
Fla	St. Petersburg, John F. Thompson Co.	813-866-0045
Ga	Atlanta, Murphy & Cota	404-875-2525
Ill	O'Hare, W.T. Adams Sls.	312-956-7685
Ind	Fort Wayne, Norm Hoemig Sls. Co.	219-747-0826
La	Chalmette, Ohmtronics, Inc.	504-271-1976
Md	Baltimore, M. Fradin Assoc.	301-484-7222
Mass	Natick, Larry Cole, Inc.	677-237-1260
Mich	Lake Orion, T. Firaneck Sls.	313-391-1177
Minn	Minneapolis, H.M.R.	612-920-8200
NY	Liverpool, C&W Mktg.	315-652-6651
Ohio	Cleveland, Spectra Sls.	216-561-8900
Pa	Pittsburgh, Dow Small & Assoc.	412-561-6432
Utah	Murray, Kenealey Assoc.	801-288-3111
Wash	Snohomish, Skyta Co.	206-334-4518

(TM)PAGE KOM - telephone intercom sys. - Soundolier, Inc.

(TM)PAGEMASTER - paging sys - Bogen Div.

(TM)PAGEPAC - complete paging unit - Dracon Industries

(TM)PAK-DRIVES - control systems - Sequential Information Systems

(TM)PAK-RAK - storage rack - test rack or shipping container - UNITRACK Div.

(TM)PAK SERIES - 4 to 12kw electron beam power supplies - Sloan Technology Corp.

PAKTRON DIV., Illinois Tool Works, Inc., Dept. EM, 900 Follin Lane, S.E., Vienna, Va. 22180, Tel: 703-281-2810, TWX: 710-833-0682; FSC No.: 19396

Local Sales Offices & Reps.

Cal	Los Angeles, M. A. Stolaroff Co.	213-295-7781
Cal	Mountain View, G. Woempner Co.	415-964-5454
Cal	Newport Beach, Paktron Regional Sls. Off.	714-833-9286
Cal	San Diego, Emcon	714-459-4355
Colo	Denver, Camel Elctrns., Inc.	303-757-6191
Fla	Altamonte Springs, W M M Assocs.	305-831-4645
Fla	Clearwater, W M M Assocs.	813-447-2533
Fla	Pompano, W M M Assocs.	305-943-3091
Ill	Chicago, Elctrn. Div., Illinois Tool Works, Inc.	312-693-3040
Ind	Indianapolis, Paktron Regional Sls. Off.	317-255-9658
Mass	Burlington, Paktron Regional Sls. Off.	617-273-0365
Mass	Burlington, Tri-Com Assoc.	617-272-8163

Mich	Benton Harbor, R.C. Nordstrom & Co.	616-857-4653
Mich	Lathrup Village, R.C. Nordstrom & Co.	313-559-7373
Minn	St. Paul, Murnco	612-484-8200
Mo	North Kansas City, H. J. Weisler & Assocs.	816-421-1679
Mo	St. Louis, H. J. Weisler & Assocs.	314-HA 8-3934
NY	Elmont, F.E. Schmitt Co.	516-437-8150
NY	New York, Landseas Corp.	212-265-8323
NY	Rochester, L-Mar Assocs.	716-328-5240
NY	Vestal, L-Mar Assocs.	607-729-6339
NC	Smithfield, Byrd & Barbour Sls.	919-934-8136
Ohio	Columbus, Rockford Controls, Inc.	614-231-5890
Ohio	Dayton, Rockford Controls, Inc.	513-278-7362
Ohio	Euclid, Rockford Controls, Inc.	216-731-5250
Ore	Portland, Earl & Brown	503-245-2283
Pa	Erie, ECCO Electronic Sls.	814-452-3762
Tenn	Memphis, Paktron Regional Sls. Off.	901-386-7252
Tex	Houston, R.F. Kimball & Co.	800-294-2805
Tex	Richardson, R.F. Kimball & Co.	214-231-3447
Wash	Seattle, Earl & Brown Co.	206-284-1121

Local Distributors

Ala	Huntsville, Hall-Mark	205-837-8700
Cal	Goleta, Radio Prod. Sls.	805-964-6823
Cal	Los Angeles, *	213-748-1271
Cal	San Diego, Radio Prod. Sls.	714-292-5611
Cal	Sunnyvale, Acacia	408-735-0100
Conn	Stratford, Stepco	203-375-5961
Fla	Ft. Lauderdale, Hall-Mark	305-971-9280
Fla	Orlando, 7233 Lake Ellenor Dr.	
Ga	Lawrenceville, Hall-Mark	404-963-9728
Ill	Skokie, Bell Inds.	312-965-7500
Mass	Framingham, Future	617-879-0860
Mich	Farmington, Advent	313-477-1650
Mich	Kentwood, R-M Elctrns.	616-531-9300
Minn	St. Paul, Gopher	612-645-0241
NJ	Hanover, State Elctrns.	201-887-2550
NM	Albuquerque, Century Elec.	505-292-2700
NY	Farmingdale, Iris Elctrns.	516-420-8400
NY	Rochester, Simcona Elec.	716-328-3230
NC	Raleigh, Hall-Mark	919-832-4465
Ohio	Dayton, Sunray Elec.	513-253-4114
Pa	Erie, Advacom	814-455-8110
Tex	Houston, Altair	713-462-3029
Tex	Richardson, Altair	214-231-5166
Utah	Salt Lake City, Century Elec.	801-466-6000
Wash	Seattle, Zepher	206-575-0922
Exp:	Montreal, Future	514-735-5775

™**PAK-X-TRAC** - DIP desoldering tool - Nu-Concept Computer Systems, Inc.

™**PALCO** - brazing alloys - GTE Sylvania Inc.

™**PALL** - filters - Pall Trinity Micro Corp.

™**PALLABAR** - neutral brilliant palladium - Technic, Inc.

™**PALLADEX** - palladium plating process - Sel-Rex Div. Oxy Metal Industries Corp.

™**PALLADIUM RT** - a highly efficient soluble palladium - Technic, Inc.

™**PALLAMERSE** - dense pore-free palladium barrier layer - Technic, Inc.

™**PALLCELL** - filter medium - Pall Corp.

PALL CORP., Dept. EM, 30 Sea Cliff Ave., Glen Cove, N.Y. 11542, Tel: 516-671-4000, TWX: 510-223-0606; Empl.: 1500

Local Sales Offices & Reps.

Cal	Mission Viejo, PTM Western Region	714-495-4880
Conn	Fairfield, Pall Regional Sls. Office	203-255-6324
Ga	Marietta, PTM Regional Sls. Office	404-926-2952
Mich	Detroit, PTM Regional Sls. Office	313-533-3060
NJ	Vauxhall, Pall Trincor Corp.	201-245-8400
Tex	Houston, PTM Regional Sls. Office	713-667-3373

™**PALL-FLO** - valve - Pall Trinity Micro Corp.

™**PALLMATIC** - drain valve - Pall Trinity Micro Corp.

PALL TRINITY MICRO CORP., Dept. EM, Rte. 281, Cortland, N.Y. 13045, Tel: 607-756-7535, TWX: 93-7295, 510-252-0791; Empl.: 390; Minimum order: $E. Tomlinson, III, Field Sls.

Sales Manager: M. G. Kachur, VP; *Distributor Manager:* E. Tomlinson, III, Field Sls.

Local Sales Offices & Reps.

Ala	Mobile, AWC Alabama	205-343-0300
Ala	Mobile, F. A. Thomas Co.	205-471-1593
Ala	Pelham, G. S. Edwards Co.	205-663-0707
Cal	S. El Monte, Pall Western Corp.	213-686-2786
Cal	Sunnyvale, Mensco	408-739-8690
Colo	Denver, Ross Equip. Co.	303-759-4215
Conn	Hamden, Pond Tech. Sls.	203-281-0005
Fla	Tampa, J. M. Clontz Assocs.	813-961-4511
Ga	Atlanta, Thomas Engrg. Co.	404-261-5070
Haw	Honolulu, Berkley Engrg.	808-538-1921
Ill	Villa Park, Enpro Inc.	312-279-2525
La	Baton Rouge, AWC Inc.	504-275-5480
Me	Winslow, Chisholm Corp.	207-873-2111
Mich	Kalamazoo, Hose & Seals Inc.	616-375-1290
Mich	Taylor, North Central Engrg.	313-942-0900
Minn	Minneapolis, Industra Co.	612-929-6224
Mo	Kansas City, Condit Co.	816-561-4660
Mo	St. Louis, Durkin Equip. Co.	314-542-1444
Mo	St. Louis, Process & Chemical Equip.	314-878-6161
Neb	Omaha, H. G. Klug Co.	402-553-1377
NJ	Vauxhall, Pall Trincor Corp.	201-245-8400
NY	Cortland, Prosco Prods.	607-753-9113
NY	Cortland, E.P.S. Corp.	607-753-9308
NC	Raleigh, Abernathy-Thomas Engrg.	919-876-1811
Ohio	Cleveland, Lester Johnson Co.	216-751-7040
Okla	Tulsa, Condit Co.	918-743-6651
Ore	Portland, Set Point Control	503-288-8868
Pa	Pittsburgh, Biltmore Products Co.	412-563-0808
RI	Cranston, Chisholm Corp.	800-556-6436
SC	Greenville, Abernathy-Thomas Engrg.	803-288-2833
Tenn	Hermitage Abernathy-Thomas Engrg.	615-833-9080
Tenn	Kingsport, Abernathy-Thomas Engrg.	615-245-6151
Tenn	Memphis, Condit Co.	901-761-0854
Tex	El Paso, Engineered Equip.	915-533-4221
Tex	Houston, AWC Inc.	713-488-2730
Va	Richmond, Dynamation Inc.	804-649-7666
Wash	Bellevue, Set Point Control	206-454-0155
Wisc	Milwaukee, Chipley & Zeman Inc.	414-228-1300

PALOMAR ENGRS., Dept. EM, Box 455, Escondido, Cal. 92025, Tel: 714-747-3343; Empl.: 10

™**PALORO** - brazing alloys - GTE Sylvania Inc.

™**PAMCO** - electro-mechanical assembly service - Paraplegics Mfg.

PAMOTOR, Dept. EM, 770 Airport Blvd., Burlingame, Cal. 94010, Tel: 415-347-1203, TWX: 34-9373 910-374-2353; Empl.: 30; Minimum order: $D.R. Pue p. 2704-2709

Sales Manager: F.L. Nelson, Mktg. Mgr.; *Distributor Manager:* D.R. Pue

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Stitzler-Dodd	602-944-2237
Ark	Little Rock, J.Y. Schoonmaker Co.	501-375-2168
Cal	Burlingame, W. J. Purdy Co.	415-347-7701
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Cal	San Diego, Daniels & Doty Sls. Co.	714-560-6260
Colo	Denver, W. J. Purdy Co.	303-777-1411
Conn	Meriden, P. R. Sturgeon	203-237-1112
DC	, S. K. MacDonald	202-265-3938
Fla	Ft. Lauderdale, Cartwright & Bean, Inc.	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Hinsdale, Hill-Gray	312-325-4810
Ind	Indianapolis, Sukup & Cox	317-253-5501
Iowa	Marion, Thomas & Moorcin Assoc.	319-377-6261
Kans	Shawnee Mission, Thomas & Moorcin Assoc.	913-432-2131
Md	Baltimore, S. K. MacDonald	301-254-3380
Mass	Babson Park, P. R. Sturgeon Co.	617-237-3506
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	Edina, M. Foster	612-835-2252
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Hazelwood, Thomas & Moorcin Assoc	314-895-4700
NJ	Bergenfield, H. Gray Assoc.	201-384-3643
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Syracuse, Mar-Com Assocs.	315-437-2843
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean Co.	919-781-6560
Ohio	Richfield, Bear Mktg.	216-659-3131
Okla	Tulsa, J.Y. Schoonmaker Co.	918-936-1423
Ore	Portland, Western Technical Sls.	503-297-1711
Pa	Enon Valley, Nebco Assoc.	216-457-2333
Pa	Philadelphia, S. K. MacDonald	215-545-1205
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, J. Schoonmaker Co.	214-357-8481
Tex	Houston, J.Y. Schoonmaker Co.	713-926-9510
Wash	Bellevue, Western Technical Sls.	206-641-3900

Local Distributors

Ala	Birmingham, J. W. Clary Co.	205-322-2486
Ala	Birmingham, Forbes Distributing Co.	404-251-4104
Ariz	Phoenix, Moltronics	602-272-7951
Ariz	Phoenix, Liberty/Ariz	602-257-1272
Ariz	Tucson, Inland Elctrn. Supply	602-294-2628
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	El Segundo, Liberty/EL Segundo	213-322-8100
Cal	Fresno, J. C. Arbuckle Co.	209-264-6554
Cal	Garden Grove, Allied Elctrns.	213-598-8671
Cal	Hayward, Dunlap Elctrns.	415-783-9260
Cal	Inglewood, Newark/Inglewood	213-678-0441
Cal	Mountain View, Elmar Elctrns.	415-961-3611
Cal	Mountain View, Abacus Electronics Co.	415-961-1500
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Sacramento, Sacramento Elctrns.	916-441-4821
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	San Diego, Liberty/San Diego	714-565-9171
Cal	San Diego, Moltronics	714-278-5020
Cal	Santa Clara, Moltronics	408-244-7600
Cal	South Gate, Moltronics	213-773-6521
Cal	Sunnyvale, Ratel Elctrns.	408-739-9220
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Newark/Denver	303-757-3351
Colo	Denver, Fistell Elctrns. Supply Co.	303-244-4691
Colo	Denver, Elctrn. Parts Co.	303-744-1992
Conn	Hamden, Wilshire Elctrns./Conn.	203-281-1166
Conn	Waterbury, Bond Radio Elctrns.	203-757-0546
Fla	Jacksonville, Southeast Elctrns.	904-356-3007
Fla	Miami, Electronic Equip. Co.	305-871-3500
Fla	Pensacola, Grice Elctrns.	904-434-2477
Ga	Norcross, Lykes Elctrns. Corp.	404-449-9400
Haw	Honolulu, Honolulu Elctrns.	808-949-5564
Ill	Broadview, L Comp - Chicago	312-865-7600
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Chicago, Newark/Chicago	312-638-4411
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Rockford, Midwest Assocs.	815-962-8036
Ind	E. Chicago, Acro Distributors	219-397-8681
Ind	Ft. Wayne, Fort Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8202
Ind	Michigan City, Tri-State Electrical Supply	219-872-5551
Ky	Lexington, Radio Elctrn. Equip. Co.	606-255-6661
Ky	Louisville, Peerless Elctrn. Equip.	502-637-7677
La	Harvey, Lykes Elctrns. Corp.	504-368-3358
La	Lafayette, Ralph's Of Lafayette	318-234-4507
La	New Orleans, Southern Radio Supply Co.	504-524-2343
La	Shreveport, Industral Elctrn. Supply	318-222-9459
Md	Baltimore, Radio Electric Svc. Co.	301-823-0070
Md	Gaithersburg, Pioneer/Wash.	301-948-0710
Mass	Boston, Sager Electrical Supply Co.	617-542-2281
Mass	Burlington, Wilshire Elctrns./New England	617-272-8200
Mass	Lynn, Land Elctrn. Supply Co.	617-592-2220
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mich	Ann Arbor, Wedemeyer Elctrn. Supply Co.	313-665-8611
Mich	Flint, Shand Elctrns.	313-743-8940
Mich	Livonia, RS Elctrns. Co.	313-525-1155
Mich	Wyoming, Newark/Wyoming	616-241-6681
Minn	Bloomington, Arrow Elctrns.	612-888-5522
Minn	Minneapolis, Newark/Minneapolis	612-331-6350
Mo	Kansas City, L Comp - Kansas City	816-221-2400
Mo	St. Louis, Olive Ind'l Elctrns.	314-863-7800
Mo	St. Louis, L Comp - St. Louis	314-647-5505
Neb	Lincoln, Scott Elctrn. Supply Corp.	402-464-8221
NH	Concord, Evans Radio	603-224-9961
NJ	Kenilworth, Newark/Kenilworth	201-272-8410
NY	Albany, E. E. Taylor Co.	518-438-4461
NY	Buffalo, Summit Distrs.	716-884-3450

NY	Plainview, Fairmont Elctrn. Sls. Corp.	516-694-8200
NY	Vestal, Harvey/Federal Elctrns.	607-748-8211
NC	Raleigh, Southeastern Radio Supply Co.	919-828-2311
Ohio	Cincinnati, Hughes-Peters	513-351-2000
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Columbus, Hughes-Peters	614-294-5351
Ohio	Solon, Repco	216-248-8900
Okla	Tulsa, Radio, Inc.	918-587-9123
Pa	Altoona, Allegheny Elctrns.	814-946-0871
Pa	Erie, Mace Elctrns.	814-838-3517
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Pa	Pittsburgh, CAM/RPC Ind'l Elctrns.	412-782-3770
RI	Warwick, W. H. Edwards Co.	401-781-8000
SC	Charleston, Wholesale Radio Supply Co.	803-722-2634
SC	Columbia, Dixie Radio Supply	803-253-5333
Tenn	Kingsport, Radio Electric Supply Co.	615-247-8111
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Tenn	Memphis, Bluff City Dist. Co.	901-725-9500
Tex	Dallas, Wholesale Elctrns. Supply Co.	214-824-3001
Tex	El Paso, Midland Specialty Co.	915-533-9555
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Fort Worth, Wholesale Elctrns. Supply Co.	817-261-4122
Tex	Houston, Harrison Equip. Co.	713-652-4750
Tex	San Antonio, Sherman Elctrns.	512-224-1001
Utah	Salt Lake City, Kimball Elctrns.	801-328-2075
Utah	Salt Lake City, Newark/Salt Lake City	801-486-1048
Va	Norfolk, Avec Elctrns. Corp.	804-627-3502
Va	Richmond, Meridian Elctrns.	804-359-0221
Wash	Seattle, Liberty/Northwest	206-763-8200
Wash	Seattle, Radar Electric Co.	206-282-2511
WVa	Beckley, Halley Elctrns.	304-253-2561
Colo	Colorado Springs, D&M Elctrns.	303-633-4666
Colo	Lakewood, Acacia Sls., Inc.	303-232-2882
Fla	Miami, ESL Elctrn. Distributors	305-633-6973
Mich	Oak Park, Newark/Detroit	313-967-0600
Nev	Reno, Electronic Distributing Co.	702-323-6766
NJ	Camden, General Radio Supply Co.	609-964-8560
Ore	Portland, Dunn Electrns.	503-285-0214
Tex	Corpus Christi, Wicks Radio Equip. Co.	512-883-4481
Utah	Salt Lake City, Calron Electric Supply	801-487-7451
WVa	Charleston, McJunkin Corp.	304-348-4906
WVa	Huntington, Elctrnc. Supply	304-523-6443
Wisc	Mequon, Taylor Electric Co.	414-241-4321
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160

PAN-L-FAST, Dept. EM, 13205 Sherman Way, N. Hollywood, Cal. 91605, Tel: 213-875-0831; Empl.: 8

™PANALYZER - x-ray spectrochemical analyzer - Panametrics Inc.

PAN AMERICAN TRADE DEVELOPMENT CORP., Dept. EM, 2 Park Ave., New York, N.Y. 10016, Tel: 212-481-1882, TWX: 710-581-6567

Sales Manager: I. Weinstein; *Distributor Manager:* R. White

PANAMETRICS INC., Dept. EM, 221 Cresent St., Waltham, Mass. 02154, Tel: 617-899-2719, Telex: 92-3406; Empl.: 60

Local Sales Offices & Reps.

Mich	Chelsea, Michigan Nondestructive Gage Co.	313-994-5117
Pa	Downingtown, Testech	215-269-2705
Tex	Dallas, NDE-Aids	214-363-3217

™PANAPLEX - panel display - Burroughs Corp.

™PANAPRESS - small arbor press - Colbert Inds.

PANASONIC, Consumer Parts Div., Dept. EM, 30-30 60th St., Woodside, NY 11377

PANASONIC CO., Dept. EM, 2960 Hart Dr., Franklin Park, Ill. 60131, Tel: 312-455-3105

Panasonic

PANASONIC, IND'L. ELCTRN. COMPS., Matsushita Elec. Corp. Amer., Dept. EM, One Panasonic Way, Secaucus, N.J. 07094, Tel: 201-348-7000, TWX: 701 992-8920; Empl.: 25 p. 1294-1296, 2744, 3291-3293, 3713, 3845, 3870-3876

Local Sales Offices & Reps.

Ala	Huntsville, Rep, Inc.	205-881-9270
Ariz	Phoenix, Arrowhead Sls. Corp.	602-277-7148
Cal	Cerritos, Panasonic Co.	714-522-3520
Cal	Los Angeles, West Inc.	213-625-1868
Cal	New Port Beach, West Inc.	714-540-9040
Cal	San Jose, Allgood-North	408-288-6731
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Fla	Casselberry, EIR, Inc.	305-830-9600
Fla	Coral Springs, EIR, Inc.	305-752-9227
Fla	Plantation, EIR, Inc.	305-791-6390
Ga	Atlanta, Rep, Inc.	404-938-4358
Ill	Chicago, Brock & Cushman	312-622-4110
Ill	Franklin Park, Panasonic Co. Elctrn. Comps. Dept.	312-455-3105
Iowa	Des Moines, B.E.A.M.S., Inc.	515-255-1148
Kans	Shawnee Mission, B.E.A.M.S., Inc.	913-631-0300
Md	Ellicott City, Tom Davis Marketers	301-461-2209
Mass	Cambridge, Vector Sls., Inc.	617-787-2790
Mich	Detroit, NICON Assocs.	313-341-7688
Minn	Minneapolis, Jos-Co/Melius	612-854-4270
Mo	St. Louis, B.E.A.M.S., Inc.	314-569-1060
NJ	Plainfield, Meg Elctrn. Sls.	201-757-4332
NY	New York, MEG Elctrn. Sls.	212-233-9059
NY	Ontario Center, Kehoe Comp. Sls.	315-524-2491
NC	Winston Salem, Murcota Corp.	919-722-9445
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242
Ore	Portland, Electronic Sources	503-292-0701
Pa	King of Prussia, Monteiro Associates, Inc.	215-265-0634
Tenn	Jefferson City, Rep Inc.	615-475-4105
Tex	Addison, Dunbar Assocs.	214-239-7151
Utah	Salt Lake City, Arrowhead Sls. Corp.	801-485-3362
Va	Fairfax, Tom Davis Marketers	703-591-7390
Wash	Bellevue, Electronic Sources	206-453-0800
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
Exp:	Can., Mississauga, Ont., RFQ Ltd.	416-626-1445

Local Distributors

Ala	Huntsville, Resistacap	205-881-9270
Cal	Los Angeles, Western Electromotive-Shephard	213-820-3777
Fla	Dania, Arco Dist.	305-925-1999
Fla	West Palm Beach, Nurmi Industrial Div.	305-684-0320
Mich	Detroit, RS Elctrns.	313-491-1000
Minn	Thief River Falls, Digi-Key Corp.	218-681-2550
NJ	Plainfield, Mars Elctrns.	201-757-4332
NY	Ontario Center, Pace Elctrn. Prods.	315-524-2491
Ohio	Cincinnati, Midwest Equip. Co.	513-793-4060
Tex	Addison, Computer Comps. Corp.	214-239-0271
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300

™PAN-A-TROL - control panels - General Elec. Co.

™PANAVOX - ceiling &/or wall loud speaker - Wilder Engrg. Prods, Inc.

™PANCAKE - overfloor raceways systems - Wiremold Co.

™PANDUCT (R) - plastic wiring duct - Panduit Corp.

PANDUIT CORP., Dept. EM, 17301 Ridgeland Ave., Tinley Park, Ill. 60477, Tel: 312-532-1800, Telex: 25-4560 p. 4688-4691

Local Sales Offices & Reps.

Ala	Birmingham, James E. Heusser Agency	205-836-3896
Ariz	Phoenix, Panduit Corp.	602-252-4515
Ark	Little Rock, Byron Carson Co.	501-568-3342
Cal	Los Altos, Ewing-Foley, Inc.	415-941-4525
Cal	Westminster, Panduit Corp.	714-554-2300
Colo	Denver, I. W. Strong & Assocs.	303-292-6900
Conn	Glastonbury, Barton-Caron Assocs.	203-633-9417
Fla	Winter Park, Floritronics	305-886-4818
Ga	Atlanta, Panduit Corp.	404-252-6483
Haw	Honolulu, A. J. Vivas Co.	808-946-6233
Ill	Tinley Park, Panduit Corp.	312-532-1800
Ind	Fort Wayne, Val-Skol Sls., Inc.	219-742-9122
Ind	Indianapolis, Val-Skol Sls., Inc.	317-926-5063
Iowa	Marion, Thomas & Modrcin Assoc.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assoc.	913-432-2131
Ky	Jeffersontown, A.L. Pickens Co.	502-491-4215
La	Metairie, Panduit Corp.	504-455-0130
Md	Rockville, L.G. White & Co.	301-792-0660
Mass	Auburndale, Barton-Caron Assocs.	617-332-2021
Mich	Flint, Panduit Corp.	313-233-0501
Mich	Troy, Panduit Corp.	313-362-2570
Minn	Minneapolis, Electric Comp. Sls.	612-933-2594
Mo	Hazelwood, Thomas & Modrcin Assoc.	314-895-4700
NJ	Leonia, Panduit Corp.	201-461-7790
NY	Colonie, Panduit Corp.	518-869-6913
NY	Rochester, Panduit Corp.	716-244-9480
NY	Syracuse, Panduit Corp.	315-476-6161
NC	Winston-Salem, L.G. White Southern, Inc.	919-725-3612
Ohio	Cincinnati, Val-Skol Sls., Inc.	513-563-6790
Ohio	Cleveland, Val-Skol Sls., Inc.	216-526-2156
Ohio	Columbus, Val-Skol Sls., Inc.	614-291-4123
Okla	Oklahoma City, Panduit Corp.	405-848-6916
Ore	Portland, Panduit Corp.	503-248-1971
Pa	Broomall, L.G. White-Keystone, Inc.	215-353-6347
Pa	Carnegie, Myles F. Smith & Assoc.	412-276-5363
Tenn	Memphis, Byron Carson Co.	901-396-4553
Tenn	Nashville, Panduit Corp.	615-254-7538
Tex	Dallas, Panduit Corp.	214-638-7280
Tex	Houston, Panduit Corp.	713-784-1680
Wash	Bellevue, Panduit Corp.	206-454-7267
Wisc	Appleton, H. Mercer Co.	414-739-6223
Wisc	Brookfield, H. Mercer Co.	414-786-6431

PANEL COMPONENTS CORP., Dept. EM, 2015 Second St., Berkeley, Cal. 94710, Tel: 415-548-1966, Telex: 335-393

Local Sales Offices & Reps.

Cal	Berkeley, Caltron Incs.	415-548-1966
Cal	Los Angeles, Ezra Mintz Assoc.	213-670-5410
Ill	Northbrook, Raines-Brin Assoc. Inc.	312-498-0890
Mass	Lexington, Ziew	617-861-8300
NM	Albuquerque, Burt Dieruf Assoc.	505-299-0989
Ore	Portland, Earl & Brown Co.	503-245-2283
Wash	Seattle, Earl & Brown Co.	206-284-1121

PANEL CONTROLS CORP., Dept. EM, 1000 Mt. Elliott Ave., Detroit, Mich. 48207, Tel: 313-568-2400; Empl.: 22

Local Sales Offices & Reps.

Ala	Chattanooga, Jackson & Assocs.	615-267-4260
Ariz	Phoenix, Davia Pkg. Supplies	602-942-5484
Cal	Westminster, Contronic Devices	714-897-2266
Ill	Glenview, F.W. Castle Co.	312-724-3075
Mass	Burlington, Contract East	617-272-5051
Mich	Dearborn, F.B. Wright Co.	313-843-8250
Minn	Anoka, A. & R. Assocs.	612-421-0751
Mo	Maryland Heights, Allied Assocs.	314-291-1120
NJ	Mountain Lakes, J.P. Dearie Co.	201-334-4848
NC	Durham, R.H. Davis Co.	919-596-8472
Ohio	Dayton, Dynel Co.	513-434-6467
Ore	Portland, Commercial Products Co.	503-286-4040
Tex	Dallas, W.W. Cannon Co.	214-357-2846
Utah	Salt Lake City, American Handling & Packaging	801-487-4673
Wash	Seattle, Commercial Products Co.	206-767-5313

PANELGRAPHIC CORP., Dept. EM, P.O. Box 1216 10 Henderson Dr., Caldwell, N.J. 07006, Tel: 201-227-1500, TWX: 710-734-4367; Empl.: 100

Local Sales Offices & Reps.

Cal	Irvine, Design Comps.	714-549-1725
Cal	Los Altos, Westec Elctrns./North	415-948-8880
Ill	La Grange, Panelgraphic Mid-West	312-354-0480
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Minn	Minneapolis, TWC Sales	612-636-1770
NJ	Mt. Lakes, Comp. for Electronics	201-334-2921
NJ	W. Caldwell, Panelgraphic/Northeast	201-227-1500
NY	Rochester, L. Hart	716-244-3253
Ohio	Cleveland, Components Inc.	216-842-2737

Ohio W. Carrollton, Components 513-866-0661
Pa Library, Components.................... 412-833-9380
Pa Media, Snyder & Massey 215-566-5400
Tex Dallas, Precision Sls. 214-351-6964
Va Fairfax, Snyder & Massey 703-273-1413
Wash Bellevue, Hickey Eng. Sales 206-454-0460
Wisc Milwaukee, Sumer, Inc................ 414-259-9061

™PANEL MITE - standard size thumbwheel switch - Tech Labs., Inc.

™PANELTONE 87D - metal display panels - Panelgraphic Corp.

™PANHANDLE - carrier equipment - GTE Lenkurt Inc.

™PAN-L-CLAD - plastic-metal laminated panels - Photo Chemical Prods. Cal.

™PAN-L-SCREW - panel fastener - Dupree, Inc.

™PAN-TERM (R) - solderless terminals - Panduit Corp.

™PANTHER - rubber, friction & plastic tapes - Okonite Co.

™PAN-TY (R) - cable ties - Panduit Corp.

™PAPER RITER - felt tip marker - Lake Chemical Co.

PAR-METAL PRODS. INC., Dept. EM, 1260 Atlantic Ave., Brooklyn, N.Y. 11216, Tel: 212-772-5800; Empl.: 75 .... p. 1141

Local Sales Offices & Reps.
Ala Huntsville, Repcom, Inc. 205-859-4400
Cal Haywood, Avionics Liason Inc.
Cal Lynwood, D. West Assoc. 213-636-6124
Colo Boulder, Herb Bass Assoc. 303-499-7509
Conn Manchester, Victor Assoc. 203-646-6448
Fla Melbourne, Repcom, Inc. 305-254-1877
Ill Skokie, Saffro & Assoc. 312-588-0905
Md Baltimore, ME & Assoc. 301-825-1130
Mass Framingham, Victor Assoc. 617-879-5710
NJ Cherry Hill, Snyder & Massey Assoc.
609-667-6110
NY New York, Miller Co.................... 212-772-5800
NY Syracuse, C. W. Floring & Assoc.
315-478-2149
NC Greensboro, ME & Assoc. 919-886-7814
NC Greensboro, Snyder & Massey .. 919-886-7814
Ohio Cleveland, KRW Sls.................... 216-741-4711
Ohio Dayton, KRW Sls. 513-885-3330
Pa Pittsburgh, KRW Sls..................... 412-243-2284
Tex Dallas, Techno Assoc. 214-357-9213
Utah Murray, Measurement Consultants
801-268-3181
Va Fairfax, Snyder & Massey 703-273-1413
Wash Seattle, Avionics Liaison Inc. 206-767-3870

Local Distributors
Cal Oakland, Brill Ectrns. 834-5888
Md Bethesda, Empire Ectrn. Sup. 301-OL6-3300
Md Rockville, Capital Radio 301-881-2270
NJ Greenbrook, Greenbrook Elec. .. 201-968-3500
NJ Hanover, State Ectrns. 201-887-2550
NY Buffalo, Summit Dist..................... 716-884-3450
NY L.I.C., H.L. Dalis.......................... 212-361-1100
NY Rockville Center, Midway Industrial Elect.
516-764-2400
SC Charleston, Wholesale Radio Supply
803-577-6388
Tex Houston, Geophysical Sup. Co... 713-224-0621

PARABAM, INC., Dept. EM, 3017 E. Las Hermanas St., Compton, Cal. 90221, Tel: 213-537-1771; Empl.: 32

™PARACONVERTER - parametric amplifier/downconverter - LNR Communications, Inc.

™PARAFORMER - line conditioner - Tele-Dynamics

PARAGON ELECT. CO., INC., Sub. of AMF, Dept. EM, 606 Parkway Blvd., Two Rivers, Wisc. 54241, Tel: 414-793-1161, Telex: 26-3450; Empl.: 725

™PARAJUST - electronic speed control for AC motors - Parametrics, Div. Zero-Max Inds.

™PARALOG - T.V. antennas - General Instr. of Can. Ltd.

PARAMETRICS, DIV. ZERO-MAX INDS., Dept. EM, 284 Racebrook Rd., Orange, Conn. 06477, Tel: 203-799-2333; Empl.: 45

Sales Manager: D.W. Maass

PARAMETRIC INDS., INC., Dept. EM, 742 Main St., Winchester, Mass. 01890, Tel: 617-729-7333, Telex: 94-9421; FSC No.: 21455; Empl.: 78

Sales Manager: J.P. Corvino

Local Sales Offices & Reps.
Ariz Tempe, Gassner & Clark 602-968-9037
Cal Cupertino, Allis Assocs. 408-379-2883
Cal Inglewood, L&M Engrg................ 213-678-5409
Colo Boulder, H. Bass Assocs............ 303-449-7509
Fla Coral Springs, Precision Mktg. Svcs.
305-971-8270
Ill Westchester, Gasner & Clark 312-345-4245
Kans Wichita, E. Carbiener Assocs. 316-682-5782
Md Woodbridge, M. Lader Co........... 202-296-2497
Mass Winchester, Parametric Inds. 617-729-7333
NJ Morris Plains, Richman Sls. Co. 516-543-5532
NY Utica, Richman Sls. Co. 315-733-2460
Pa Lafayette Hill, M. Lader Co......... 215-825-3177
Tex Dallas, Stevens Sls. Co............... 214-350-2476
Wash Seattle, Datacom Assocs. 206-285-2525
Exp: Cal., Culver City, J S H International
213-559-6900

PARAMOUNT INDUSTRIES, INC., Dept. EM, 1430 Progress Rd., Ft. Wayne, Ind. 46808, Tel: 219-484-4111; Empl.: 44

PARAPLEGICS MFG., Dept. EM, 304 N. York Rd., Bensenville, Ill. 60106, Tel: 312-625-7740; Empl.: 65

™PARA PROBE - modular probe system - Alignment Enterprises

™PARATROL - electronic speed control for DC motors - Parametrics, Div. Zero-Max Inds.

™PARBAK BACK-UP RING - back-up ring - high pressure - Parker Hannifin Corp.

PARKER HANNIFIN CORP., O-Seal Div., Dept. EM, 10567 Jefferson Blvd., Culver City, Calif. 90230, Tel: 213-837-5101, TWX: 910-340-6764; Empl.: 360

Sales Manager: J.P. Lynch

PARLEX CORP, Dept. EM, 145 Milk St., Methuen, Mass. 01844, Tel: 617-685-4341, TWX: 710-342-1538; Empl.: 180

Sales Manager: R. Blais

Local Sales Offices & Reps.
Cal Escondido, Cirolia Elec. Sls 714-743-3015
Cal Fullerton, Parlex Corp................. 714-526-0222
Cal Santa Clara, Novatronix 408-243-9530
Conn North Haven, Kitchen & Kutchin 203-288-6596
Fla Ft. Lauderdale, CBC Elctrns 305-484-7330
Ga Stone Mountain, H & H Mktg...... 404-296-9830
Ill Palatine, Claeson Assocs............ 312-359-7230
Mass Lexington, Kitchen & Kutchin 617-862-8230
Mich Grand Rapids, J.L. Montgomery Assoc.
616-774-9308
Mich Southfield, J.L. Montgomery Assoc.
313-358-2616
Minn Minneapolis, P. Ericson & Associates
612-884-1969
NJ E. Orange, M. Gallagher 201-678-5071
NY Melville, M. Gallagher 516-271-6940
NY Rochester, W.H. Zimmerman...... 716-586-4450
NY Syracuse, W.H. Zimmerman 315-474-4889
Ohio Aurora, Nationwide Comps Reps 216-562-9666
Tex Dallas, E.B. Robertson 214-942-2716
Wash Seattle, J.B. Jolly......................... 206-939-4166

PARSONS MFG. CORP., Dept. EM, 1055 O'Brien Dr., Menlo Park, Cal. 94025, Tel: 415-324-4726

Sales Manager: C.E. Plummer

Local Sales Offices & Reps.
Cal So. El Monte, Parsons Mfg. Corp.
213-443-3277
Ill Lagrange, Seversen 312-352-2055
Minn St. Paul, Bonament Heyda Co. .. 612-484-8531
Tex Dallas, Merit Co. 214-620-0021

PASO SOUND PRODUCTS INC., Dept. EM, 251 Park Ave. S., New York, N.Y. 10010, Tel: 212-254-2282; Empl.: 50.

Local Sales Offices & Reps.
Cal Los Alamitos, Broom's Elctrns. .. 213-598-7630
Cal Sausalito, R. Cohen Sls.............. 415-352-6181
Colo Westminster, Electro-Tek Sls. 303-255-4566
Fla Hollywood, J. Wanger Sls. Co. .. 305-987-8766
Ill La Grange, E. N. Seversen & Assocs.
312-352-2055
Ind Huntington, Albrecht & Co. 219-356-1555
La Metaire, McKinney Sls. Co. J. F. 504-887-1723
Md Silver Springs, R. Lewis Sls. 301-434-5868
Mass Wellesley, L. Cole, Inc................ 617-237-1260
Mich Rochester, Albrecht & Co. 313-652-2520
Minn Maple Grove, RC Sls.................. 612-425-5543
NH Manchester, L. Cole, Inc. 603-623-5425
NY Jericho, Gim Sls. Corp................ 516-433-4080
Ohio Medina, J. H. Podolny Co. 216-725-8814
Okla Tulsa, McKinney Sls. Co., J. R... 918-742-6791
Ore Portland, D. G. Weber Co. 503-234-7671
Pa Willow Grove, R. Lewis Sls......... 215-659-0704
SC Rock Hill, Rohr-Wanger Sls. 803-366-9353
Tex Dallas, McKinney Sls. Co., J. F. 214-631-9450
Tex Houston, McKinney Sls. Co., J.F. 713-774-3232

PASTERNACK ENTERPRISES, Dept. EM, 8538 Hamilton Ave., Huntington Beach, Cal. 92646, Tel: 714-536-7511; FSC No.: 7F118; Empl.: 7

Local Sales Offices & Reps.
Cal Los Angeles, RF Assocs............. 213-478-1586
Cal Palo Alto, RF Assocs.................. 415-327-5531
Exp: Conn., Stamford, J.P. Int'l. Corp. 203-348-2691

™PATCH-OHM - resistor block - Cambridge Thermionic Corp.

PATHCOM, INC., Pace Two-Way Radio Prods., Dept. EM, 24105 S. Frampton Ave., Harbor City, Calif. 90710, Tel: 213-325-1290; Empl.: 600

™PATHE ELECTRONIC - cameras, motion picture 16mm & double-super 8mm - Heitz, Inc., Karl

™PATHFINDER - circuit tracer - Brady Co., W. H.

™PATINATE - lead plating process - Conversion Chem. Corp.

™PATRICIAN - deluxe spkr. sys. - Electro-Voice, Inc.

™PATRIOT - fan - Rotron, Inc.

PAYNE ENGRG. CO., Dept. EM, Box 70, Scott Depot, W. Va. 25560, Tel: 304-755-4353, Telex: 88-5452; Empl.: 16

Local Sales Offices & Reps.
Cal Santa Fe Springs, Sierra-Pacific Eng.
Conn Ridgefield, Himes Co.
Fla Ft. Lauderdale, R. D. Jacobs...... 305-462-1932
Ill Chicago, Ash Equip. Co.
Mass Dover, A. E. Bahrt 617-785-1024
Mass Hingham, R. J. Wilson Assoc. 617-749-7575
Mich Farmington, Applied Instrs. Co. .. 313-476-9060
Minn St. Paul, Power/Mation Div.
Mo St. Louis, Tines Ind. Sls.
NJ Kenilworth, Wolock & Lott
NY Syracuse, Application Specialists
NY White Plains, Swedelco
Ohio Cincinnati, J. W. Murray & Assoc.
Ohio Cleveland, Collart Co.
Okla Tulsa, Spec-Trol, Inc. 918-622-0171
Pa Frazer, Engineered Specialty Prods.
Pa Pittsburgh, Process Engrg. Co.
Tex Houston, Clarke, Inc.................... 713-526-4908
Va Richmond, Gregg & Assocs. 804-435-1525
Wisc Sullivan, Power/Mation Div. 414-593-8860

PCA ELCTRNS., INC., Dept. EM, 16799 Schoenborn St., Sepulveda, Cal. 91343, Tel: 213-892-0761, TWX: 67-4681, 910-496-1525; FSC No.: 97722; Empl.: 45

Sales Manager: K. Puhl

Local Sales Offices & Reps.
Ariz Phoenix, Toward Engrg. Assocs., Inc.
602-955-3193
Cal San Diego, Littlefield & Smith 714-455-0055
Cal Santa Clara, Fahrner-Miller Assocs
408-984-1700
Colo Englewood, Inverness Mktg. 303-770-2300
Conn Southington, KSA of New England
203-747-5883
Fla Clearwater, Lawrence Assocs., Inc.
813-443-2698
Fla Maitland, Lawrence Assocs. 305-647-1188
Ill Westchester, W. G. Brouillette & Assocs., Inc.
312-345-6500
Kans Overland Park, Ensco-Rep. 913-381-7557
Mass Framingham, KSA of New England
617-875-5464
Minn Minneapolis, J. H. Hanson Co. .. 612-824-0814
Mo St. Louis, Ensco-Rep. 314-567-3935
NJ Wayne, H. Kagan Assocs........... 201-684-7682
NY Fairport, RBG Sls. 716-377-1390
Ohio Cleveland, Weschler Elec. Co. .. 216-251-4609
Ore Portland, Electronic Compt. Sls. 503-245-2342
Tex Dallas, Blackburn Assocs. 214-692-8885

Utah	Murray, Inverness Mktg.	801-266-3490

™PCB IMPAC - PCB mini bridge rectifiers - Semtech Corp.

PCB PIEZOTRONICS, INC., Dept. EM, 5800 Transit Rd., Depew, N.Y. 14043, Tel: 716-684-0001, TWX: 710-263-1371; Empl.: 42

Local Sales Offices & Reps.

Cal	Long Beach, Saber Entprs.	213-595-5646
Cal	San Jose, Richards Assocs.	408-246-5860
Colo	Parker, Western Mktg. Assoc.	303-744-9595
Conn	Hamden, Northeast Engrg., !nc.	203-248-4481
Fla	Orlando, Physimetrics, Inc.	305-894-8081
Ga	Atlanta, Physimetrics, Inc.	404-261-8720
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs.	317-244-7867
Md	Fulton, Gans-Fryling, Inc.	301-837-6311
Mass	Danvers, Northeast Engrg., Inc.	617-774-3010
Mich	Farmington, Carter, McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
Mo	St. Louis, Adelphi, Inc.	314-821-1232
NM	Albuquerque, Rustco Entprs.	505-296-6474
NY	Liverpool, Rayelco Elctrns., Inc.	315-652-5272
NY	Manhasset, Northeast Engrg., Inc.	516-365-9633
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Ore	Portland, Brett Assocs.	503-232-4184
Pa	Jenkintown, AMT	215-549-2080
Pa	Monroeville, Carter, McCormic & Peirce, Inc.	412-372-4415
Tex	Dallas, Tech. Prods., Inc.	214-357-9603
Tex	Houston, Technical Prods.	713-777-7360
Utah	Logan, Western Mktg. Assoc.	801-753-0073
Va	Arlington, Gans-Fryling, Inc.	703-527-3262
Wash	Seattle, Brett Assocs.	206-935-8054

PCI SUB. NORTH AMERICAN PHILIPS CONTROLS CORP, Dept. EM, Husky Pk., Frederick, Md. 21701, Tel: 301-663-5141, TWX: 710-862-0901 .... p. 4323

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comp.	205-539-4411
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Buena Park, Sales Engr. Ltd.	213-921-0681
Cal	Los Altos, Nickerson-Gray & Assocs.	415-941-5777
Cal	San Diego, Sales Engr. Ltd.	714-277-5723
Colo	Denver, Williams-Assocs.	303-373-4730
Conn	Cheshire, Selmark Assoc.	203-272-8764
Fla	Orlando, R.S. Byers	305-855-2455
Ga	Chamblee, W.A. Brown Comp.	404-455-0405
Ill	Elk Grove Village, Somers-Reagan, Inc.	312-593-2713
Mass	Millis, Selmark Assoc.	617-376-2914
Mich	Troy, McPhail Corp.	313-689-6444
NJ	Pitman, Colrud Corp.	609-589-5866
NM	Albuquerque, Williams-Assocs.	505-255-1638
NY	Flushing, Tri-State Comps.	212-358-1016
NY	Pittsford, Noeth-Honsinger Assocs.	716-461-4750
NC	Charlotte, R. W. Chapman	704-525-2421
Ohio	Cleveland, Jubell Assocs.	216-662-2884
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Wash	Bellevue, W. M. Buehler Co.	206-455-5512

PCS., INC., Dept. EM, 750 N. Maple Rd., Saline, Mich. 48176, Tel: 313-767-8920, TWX: 810-235-8667; Empl.: 100

Local Sales Offices & Reps.

Cal	Pomona, PCS	714-593-7581
Md	Bethesda, S & S Assocs.	301-654-1434
Mich	Grand Rapids, Reps. Elctrns. Prods.	616-942-1320
Minn	St. Paul, Cullen & Assocs.	612-646-7371
NJ	Bricktown, PCS	201-477-8080
Ohio	Cleveland, Instrumentation Sys.	216-486-0782
Ohio	Dayton, Instrumentation Sys.	513-294-2838
Pa	King of Prussia, S & S Assocs.	215-265-3450
Pa	Pittsburgh, Instrumentation Sys.	412-243-1111
Utah	Salt Lake City, T. R. Brown	801-486-7241

™PC-6 - multi-image camera - Princeton Elctrn. Prods.

™PDC - solid state & incandescent display sys. - Precision Dynamics Corp.

™PDP - family of DEC computers - Digital Equipment Corporation

™PDQ - modular edgeboard connector - Stanford Applied Engineering

™PEAC - photo-electronic auto collimator - Barnes Engrg. Co.

™PEAK ACCELERATION RECORDER - instrument for sensing & recording peak acceleration - Engdahl Enterprises

™PEAKLITE - indicator light - Penn Keystone Corp.

™PEAK-N-NOTCH - active band pass/stop filter - Radiation Devices Co.

™PEAK SHOCK ANNUNCIATOR - instrument for indicating exceedence of response spectrum - Engdahl Enterprises

™PEAK SHOCK RECORDER - instrument for sensing & recording response spectrum - Engdahl Enterprises

PEARCE-SIMPSON, INC., Div/Gladding Corp., Dept. EM, 4701 N.W. 77th Ave., Miami, Fla. 33166, Tel: 305-592-5550, Telex: 51 9379; Empl.: 200

Sales Manager: D. Henry

PEARSON ELCTRNS. INC., Dept. EM, 4007 Transport St., Palo Alto, Cal. 94303, Tel: 415-494-6444; FSC No.: 05280; Empl.: 16

PECA, INC., Dept. EM, 4957 Pearson Ave., Philadelphia, Pa. 19114

PECO CORP., Dept. EM, 450-9 Montague Expwy., Milpitas, Cal. 95035, Tel: 408-262-4050, Telex: 346-347; Empl.: 70

Local Sales Offices & Reps.

Cal	Huntington Beach, W. Spell	714-963-6444
Cal	Milpitas, A. Khan	408-262-4050
Ga	Atlanta, J. Luttrell & Assocs.	404-237-4551
Ill	Chicago, T. Regenczuk	312-763-3656
Mass	Cochituate, W. F. Humphrey Co.	617-653-7918
Minn	Edina, D.L. Christensen & Assocs.	612-922-2420
Mo	St. Louis, Williams Equipment Co.	314-997-1030
NJ	Bogota, Neville & Vespo	201-487-1505
NJ	Willingboro, J. D. Miller	609-877-2031
NY	Rochester, H. M. Cross & Sons	716-442-6200
Ohio	Toledo, P. Hensing	419-478-4506
Tex	Dallas, Production Engrg. Sls. Org.	214-369-3181

PEERLESS INDS., see Peerless Sales Co.

™PEC (WITHIN A DIAMOND) - thick film circuits - Centralab

™PEDALINE - footswitches - Line Electric Esterline Co.

™PED-A-VAC - low cost desoldering equipment - Pace Inc.

™PEEM - lubricant - GAF Corporation

™PEEM - lubricant - GAF Corporation

PEERLESS RADIO CORP., Dept. EM, 19 Wilbur St., Lynbrook, N.Y. 11563, Tel: 516-593-2121, TWX: 510-225-8422; Empl.: 40

Sales Manager: T. Griffin

Local Sales Offices & Reps.

Conn	Brookfield, Herb Geiling Assocs.	203-775-4541
Fla	Oakland Park, Peerless Radio Corp.	305-566-5966
Mass	Attleboro, E.J. Hughes Assocs.	617-226-0050
NY	Vestal, SHR, Inc.	607-729-6339

PEERLESS SLS. CO., Dept. EM, 4200 W. Chicago Ave., Chicago, Ill 60651, Tel: 312-772-1900; Empl.: 45

Sales Manager: H. Stevens

Local Sales Offices & Reps.

Cal	Irvine, J. Thommen & Co.	714-551-0845
Cal	Mountain View, F. X. Shaw Assoc.	
Ga	Atlanta, J. W. Bell Jr. & Assoc.	404-237-6819
Haw	Honolulu, G. Dougherty	808-847-4144
Ill	Palos Park, K. Parr Assocs.	312-448-8488
Ky	Louisville, B. Dawson & Assocs.	
Minn	Minneapolis, J. E. M. Anderson Co.	612-823-6459
NJ	W. Trenton, S. Marks & Assocs.	201-676-2373
Ore	Portland, Fleehart & Sullivan	503-297-1033
Tex	Dallas, Sound Ideas	214-363-0977
Tex	Houston, Sound Ideas	713-686-4838
Wash	Seattle, Fleehart & Sullivan	206-522-1533

™PEE-WEE - Clips - Mueller Electric Co.

™PEGI - insulating cable cleats - Adalet Mfg. Co.

™PELASPAN PAC - protective packaging foam - Dow Chemical Co.

™PELICAN - hydraulic flow control gates - Allis-Chalmers

™PEM - self-clinching fasteners - Penn Engrg. & Mfg. Corp.

™PEMFLEX - self-locking fasteners - Penn Engrg. & Mfg. Corp.

™PEMHEX - self-clinching, self-locking fasteners - Penn Engrg. & Mfg. Corp.

™PEMSERT - self-clinching flush fasteners - Penn Engrg. & Mfg. Corp.

™PEM-SERTER - automated press - Penn Engrg. & Mfg. Corp.

PEMTEK, INC., Dept. EM, 942 Commercial St., Palo Alto, Cal. 94303, Tel: 415-494-7411; Empl.: 25

™PENFILE - burnisher cleaner - Jonard Industries Corp.

PENN AIRBORNE PRODS., Dept. EM, Industrial Hwy., Southampton, Pa. 18966, Tel: 215-355-3400; FSC No.: 25805; Empl.: 33

Local Sales Offices & Reps.

Cal	Palo Alto, Mauldin Co.	415-326-5291
Haw	Honolulu, Atecs Corp.	808-841-6694
Iowa	Des Moines, H.E. Ferris	515-255-1757
Mich	Royal Oak, Stillings Instr. Sys.	313-549-6030
Neb	Omaha, Interstate Ind'l. Inst.	402-331-3535
Ohio	Dublin, Analytco	614-889-1224
Ohio	W. Carrollton, Analytco	513-434-8940
Pa	Downingtown, Reinbrecht	215-265-6180
Pa	Pittsburgh, W. Wells	412-833-1632
Tex	Lufkin, Waller Sls. Inc.	713-632-7759
Va	Richmond, Instrument Technical Representatives	703-288-7198

PENN ENGRG. & MFG. CORP., Dept. EM, Doylestown, Pa. 18901, Tel: 215-766-8853, TWX: 510-665-9338; FSC No.: 46384; Empl.: 130

Sales Manager: J.W. Segraves

PENN FIBRE & SPECIALTY, Dept. EM, 2020 E. Westmoreland St., Phila., Pa. 19134, Tel: 215-RE 9-4862; Empl.: 60

Sales Manager: W.K. Davis

Local Sales Offices & Reps.

Ill	Chicago, B. Finder & Assocs. Inc.	312-262-2020

PENN KEYSTONE CORP., Dept. EM, Division St., Ansonia, Conn. 06401, Tel: 203-734-3301, Telex: 96-3554; FSC No.: 03034; Empl.: 65

Sales Manager: E.M. Parker

Local Sales Offices & Reps.

Cal	Huntington Beach, ASC Sls. Co.	714-847-7515
NJ	Pitman, Colrud Co.	609-589-5866
NJ	Wayne, SHL Assocs.	201-523-1714
NY	Rochester, L. Hart Assoc., Inc.	716-244-3253
Ohio	Cincinnati, Tri-State Mktg., Inc.	513-761-7993

PENNTUBE PLASTICS, Dept. EM, Madison Ave. & Holly St., Clifton Heights, Pa. 19018, Tel: 215-622-2300, Telex: 845-212; Empl.: 145

Local Sales Offices & Reps.

Ariz	Scottsdale, Quintec	602-991-2370
Cal	Burlingame, Quintec Inds.	415-969-7010
Cal	El Segundo, Quintec Inds.	231-640-1400
Cal	San Diego, Quintec Inds.	714-276-6604
Colo	Denver, Plastic Supply & Fabrication Co.	303-623-5534
Fla	Largo, Almac Assocs.	813-581-0444
Ga	Atlanta, D. Wix	404-361-2550
Ill	Northbrook, R. H. Stone	312-446-2156
Ind	Indianapolis, Hoster & Sieloff Assocs.	317-844-9921
Kans	Overland Park, Ensco-Rep, Inc.	913-381-7557
Minn	Minneapolis, Aeromat	612-890-4697
Mo	St. Louis, Rubber, Plastic & Specialty Co.	618-344-8485

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NY	Mineola, R. A. Colucci Co.	516-746-0397
NY	Rochester, Potter Assocs.	716-288-3750
NC	Sanford, G. Simpson	919-776-3701
Pa	Aston, J. F. Walls	215-459-8377
RI	Bristol, J. White & F. Mooers	401-253-2000
Tex	Richardson, C. J. Garvey Co.	214-234-3371
Wash	Seattle, G. G. Gallup	206-525-2543

PENNWALT CORP., Chemical Specialties Div., Dept. EM, Three Pkwy., Philadelphia, Pa. 19102, Tel: 215-587-7000, TWX: 215-569-9748

™PEN-RAY - pencil quartz lamps - Black Light Corp. Amer.

™PEN-RAY - pencil quartz lamps - Ultra-Violet Prods., Inc.

PENRIL CORP., Data Communications Div., Dept. EM, 5520 Randolph Rd., Rockville, Md. 20852, Tel: 301-881-8151, TWX: 710-828-0522; Empl.: 250

Sales Manager: B. Myers, V.P. Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instrs.	205-883-8660
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Goleta, Thorson Co.	805-964-8751
Cal	Los Angeles, Thorson Co.	213-476-1241
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Colo	Denver, Thorson Co.	303-759-0809
Conn	Avon, Instrument Dynamics, Inc.	203-678-1088
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674
Ill	Wilmette, Information Syst.	312-256-5892
La	Mandeville, W.A. Brown Instrs.	504-626-9701
Md	Bethesda, S & S Assocs.	301-654-1434
Mass	Wakefield, Instrument Dynamics	617-245-5100
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	St. Paul, Northport Engrg.	612-698-3841
Mo	Grandview, Digital Sys. Sls.	816-765-3337
NJ	Fort Lee, Technical Mktg. Assocs.	201-224-6911
NM	Albuquerque, Thorson Co.	505-265-5655
NC	Durham, W.A. Brown Instrs. Inc.	919-682-2383
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Pa	King of Prussia, S & S Assocs.	215-265-3450
SC	Columbia, W.A. Brown Instrs.	803-798-3297
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504
Wash	Seattle, Rush S. Drake Assocs.	206-763-2755

™PENTAFLOW - premium grade miniature fans - Pamotor

™PENTAPLUG - wood preservative - Communications Technology Corp.

PENTRONIX DIV., Dept. EM, 1737 Cicotte, Lincoln Park, Mich. 48146, Tel: 313-388-3100, Telex: 23-0398; Empl.: 12

™PEP-500 - solid state image memory scan converter - Princeton Elctrn. Prods.

™PERFAB - Perlon monofilament fabric - Wire Cloth Enterprises, Inc.

PERFECT GEAR & INSTR. CORP., Sub. Designatronics, Dept. EM, 455 E 10th Ave., Hialeah, Fla 33010, Tel: 305-883-5311, TWX: 810-848-8097; Empl.: 160

PERFECTION MICA CO., see Magnetic Shield Div.

™PERI-APOLLAR - lenses - Heitz, Inc., Karl

PERKIN-ELMER DATA SYSTEMS, Terminals Div., Dept. EM, Rt. 10 & Emery Ave., Randolph, N.J. 07801, Tel: 201-366-5550, TWX: 710-987-7913; Empl.: 1100

Local Sales Offices & Reps.

Ariz	Phoenix	602-968-2477
Cal	Los Angeles	213-641-4881
Cal	San Diego	714-565-0602
Cal	San Francisco	408-249-5540
Cal	Tustin	714-544-9093
Colo	Denver	303-773-2855
Conn	E. Granby	203-653-3430
DC	Washington	703-821-1740
Fla	Orlando	305-851-6962
Ga	Atlanta	404-457-6361
Ill	Chicago	312-437-5120
Mass	Boston	617-890-0557
Mich	Detroit	313-356-9690
Minn	Bloomington	612-854-4264
Mo	Kansas City, 913-384-1606	
NJ	Fort Lee	201-947-2200
NY	Binghamton	607-722-4233
NY	Rochester	716-385-3083
Ohio	Cleveland	216-461-8344
Ohio	Dayton	513-434-4193
Okla	Tulsa	918-749-0925
Pa	Philadelphia	215-687-2511
Pa	Pittsburgh	412-922-8904
Tex	Dallas	214-234-8880
Tex	Houston	713-783-3060
Wash	Seattle	206-455-0680

PERKIN-ELMER CORP., Elctrn. Prods. Dept., Dept. EM, Main Ave., Norwalk, Conn. 06856, Tel: 203-762-4786, TWX: 710-468-3213; Empl.: 40 p. 4433

Local Sales Offices & Reps.

Ariz	Scottsdale, Arcom Sls. Co.	602-947-5745
Cal	Encino, C.D.H. Assocs.	213-345-3111
Cal	San Diego, Qualtronics Corp.	714-224-6555
Colo	Denver, Electrodyne Inc.	303-757-7679
Fla	Ft. Lauderdale, Snow Co.	305-563-2448
Md	Temple Hills, Wyncote Instrumentation Co.	301-423-8523
Mich	Grand Rapids, Thies & Assocs.	616-457-2052
Mo	St. Louis, ENSCO-Rep Inc	314-567-3935
Pa	Ambler, Wyncote Instrumentation Co.	215-643-2440
Tex	Dallas, Southern Engrg. Co.	214-357-0669
Wash	Redmond, Quadra Sales Corp.	206-883-3550

PERKIN-ELMER ULTEK INC., Dept. EM, Box 10920, Palo Alto, Cal. 94303, Tel: 415-967-2100, TWX: 910-379-6442; Empl.: 150

Local Sales Offices & Reps.

Cal	Huntington Beach, Perkin-Elmer Ultek	714-968-1030
Cal	Laguna Hills, Perkin-Elmer Ultek	714-768-3100
Cal	San Jose, Perkin-Elmer Ultek	408-292-7044
Ga	Atlanta, W. L. Schoonover, Inc.	404-255-0761
Ill	Wilmette, Perkin-Elmer Ultek	312-256-2688
Mass	Stoneham, H. W. Gath Assoc.	617-438-5428
Ohio	North Olmsted, Perkin-Elmer Ultek	216-331-5709
Tex	Richardson, Yardrough Southwest	214-690-0800
Va	Reston, Perion-Elmer Ultek	703-620-2010

PERMA POWER DIV., Chamberlain Mfg. Corp., Dept. EM, 5740 N. Tripp Ave., Chicago, Ill. 60646, Tel: 312-539-7171; Empl.: 1500

Local Sales Offices & Reps.

Ark	El Dorado, D. Bellew Sls.	501-863-8325
Cal	Redondo Beach, Oberman-Renner Sls. Co.	213-772-1113
Cal	San Francisco, Technical Sls. Assocs.	415-467-1434
Colo	Denver, A. E. S.	303-777-8733
Conn	West Hartford, Smith Co.	203-523-0512
Ill	Lincolnwood, W. Linz & Assoc.	312-677-2000
Ind	Ft. Wayne, N. Hoemig Sls. Co.	219-747-0826
Mich	Plymouth, J. Malcolm Flora	313-453-4296
Minn	St. Paul, W. Engelbretson Co.	612-457-8836
Mo	Jefferson City, C. A. Vignola Assoc.	314-893-3205
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NY	Commack, Landau & Mack	516-543-2775
NY	Phelps, L. S. M. Assocs.	315-548-4891
NC	Greensboro, Adams & Assocs.	919-272-6838
Ohio	Whitehall, Mandabach-Lehner Co.	614-235-0265
Tex	Dallas, Berthold Sls. Co.	214-526-8329
Wash	Seattle, Fleehart & Sullivan	206-522-1533

™PERMA BRUSH - rotating switch - General Devices, Inc.

™PERMA-CELL - rechargeable batteries - General Elec. Co.

PERMACOR, Div. Radio Cores, Inc., Dept. EM, 9540 S. Tulley Ave., Oak Lawn, Ill 60454, Tel: 312-422-3353; Empl.: 80

™PERMAFOAM - shielded foam transmission line - Columbia Elctrn. Cables

PERMAG CORP., Dept. EM, 88-06 Van Wyck Expwy., Jamaica, N.Y. 11418, Tel: 212-657-1818; Empl.: 50

Local Sales Offices & Reps.

Cal	Los Angeles, Permag Pacific Corp.	213-776-5656
Cal	Sunnyvale, Permag Sierra Corp.	408-738-1080
Ga	Atlanta, Permag Dixie Corp.	404-351-0994
Ill	Elk Grove Village, Permag Central Corp.	312-956-1140
Mass	Billerica, Permag Northeast Corp.	617-273-2890
Ohio	Toledo, Permag Magnetics Corp.	419-385-4621
Tex	Dallas, Permag Southwest Corp.	214-748-6909

™PERMALENE EP - ethylene propylene rubber insulation - CCS Hatfield Wire & Cable Group

™PERMALENE XP - crosslinked polyethylene insulation - CCS Hatfield Wire & Cable Group

™PERMALEX - electrical apparatus - General Elec. Co.

™PERMALINE - cable jacketing material - Columbia Elctrn. Cables

PERMALUSTER, INC., Dept. EM, 1844 N. Keystone St., Burbank, Calif. 91504, Tel: 213-849-4543; Empl.: 9

PERMANENT MAGNET CO., Dept. EM, 4437 Bragdon St., Indianapolis, Ind. 46226, Tel: 317-547-1336; Empl.: 150

Local Sales Offices & Reps.

Cal	Pasadena, T.W. Yeakle	213-684-2275
Ill	Hillside, L.M. Holt, Permanent Magnet Co.	312-449-7660
Ind	Indianapolis, Hoster & Sieloff Assocs.	317-884-9921
Mass	Wakefield, Howard Jappe Co.	617-245-9359
Minn	Minneapolis, Peterson Entprs.	612-784-6628
NY	Manhasset, Kaelber & Mack, Inc.	516-627-6620

™PERMANODE - platinized tentalum anodes. - Sel-Rex Div. Oxy Metal Industries Corp.

™PERMAPRENE - neoprene jacket - CCS Hatfield Wire & Cable Group

™PERMA-PROBE - leak detector sniffer probe - Varian Assocs.

™PERMA-RESIN - resin coating systems - Photo Chemical Prods. Cal.

™PERMA-SHIELD - pressure-sensitive wire markers - Brady Co., W. H.

™PERMA-TORQ - coil forms - Cambridge Thermionic Corp.

™PERMOHM - uniform web lead-in wire - Belden Corp.

™PERMOPAD - permanent p.c. component spacers - Bivar, Inc.

PERROTT ENG. LABS, Dept. EM, 1020 N. Fillmore St., Arlington, Va. 22201

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Tex	Dallas, Pertec PED	214-387-2817
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Wash	Seattle, Rush Drake Assocs.	206-763-2755

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Cal	Santa Ana, Pertec	714-542-2348
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Ill	Rosemont, Pertec	312-696-2460
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Md	Rockville, L. G. White & Co.	301-770-6556
Mass	Waltham, Pertec	617-890-6230
Minn	Minnetonka, Pertec	612-933-1030
Mo	Hazelwood, E.I.R. Co.	314-895-4100
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Ohio	Englewood, Pertec	513-836-6364
Pa	Malvern, Pertec	215-644-4910
SC	Spartanburg, T. A. Instrs.	803-579-2904
Tex	Dallas, Remtex	214-387-2855
Tex	Dallas, Pertec	214-387-2855
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Wash	Seattle, Rush Drake Assoc.	206-763-2755

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Fla	Orlando, Boynton & Assocs.	305-423-0555
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Ind	Indianapolis	312-299-7600
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Mass	Waltham	617-890-6110
Mich	Southfield	313-557-3000
Minn	Minneapolis	612-835-5517
Mo	St. Louis	314-863-0424
NY	Yonkers	914-963-8200
NC	Charlotte	704-364-6770
Okla	Tulsa	918-664-2081
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Tex	Arlington	214-298-4201
Tex	Houston	713-461-4461
Wash	Bellevue	206-455-1095

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Ga	Atlanta	404-691-8920
Ill	Des Plaines	312-299-7795
NJ	Marlboro	201-462-1880
Okla	Tulsa	918-664-2081

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Ill	Des Plaines	312-299-0186
Ind	Fort Wayne	219-456-4455
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Mich	Southfield	313-557-3000
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Fla	Vero Beach, J. Rule Assocs.	305-589-5357
Ga	Atlanta, B. Roberts & Assocs.	404-233-6679
Ill	Highland Park, Bransky Sls.	312-433-2375
Md	Ellicott City, Marketing Technology	301-465-8630
Mass	Framingham, Medfield Assocs.	617-875-4679
Minn	Minneapolis, All Phase Agency	612-835-4940
Mo	St. Louis, Thurderbird	314-567-6488
NJ	S. Orange, Maurice Wachstein	201-272-3850
NY	Camillus, O N T E C	315-487-0596
NY	Fayetteville, O N T E C	315-446-2580
NY	Grand Island, O N T E C	716-773-9319
NY	Mineola, R.A. Colucci Co.	516-746-0397
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Tex	Dallas, McCoy Assocs. Co.	214-350-9931

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PHILAMON, INC., Dept. EM, 33 Dubon Ct., Farmingdale, N.Y. 11735, Tel: 516-249-2700, TWX: 510-224-6512; FSC No.: 95267; Empl.: 27 .... p. 2467

Sales Manager: B.F. Grib

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NJ	Ramsey, R. A. Vachon	201-825-4070

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Sales Manager: A. Katz

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Ariz	Phoenix, Cleveland Ent.	602-949-0872

Cal	N. Hollywood, Philips Test & Measuring Inst.	213-762-8776
Cal	San Diego, Mesa Engr. & Sls.	714-278-8021
Cal	Santa Clara, Philips Test & Measuring Instrs.	408-243-7363
Del	Delaware, Wright Co.	
DC	Washington, Wright Co.	840-1928
Fla	Lake Park, J.L. Highsmith & Co.	305-844-2013
Fla	Orlando, J.L. Highsmith & Co.	305-293-5202
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs.	317-244-7867
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Gathersburg, Wright Co.	301-840-1928
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Mich	Centerline, Dietrich & Assocs.	313-754-6450
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Mo	St. Louis, Palatine Sls.	314-426-7055
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NC	Charlotte, J.L. Highsmith & Co.	704-333-7743
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Ohio	Dayton, Dietrich & Assocs.	513-223-6042
Okla	Tulsa, Palatine Sls., Inc.	918-622-0321
Pa	Philadelphia, Philips Test & Measuring Inst.	215-677-5770
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
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Tex	Houston, Palatine Sls., Inc.	713-777-4477
Tex	Richardson, Palatine Sls., Inc.	214-231-9489
Va	Virginia, Wright Co.	301-840-1928
Wash	Seattle, R. S. Drake & Assoc.	206-763-2755

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Sales Manager: R.M. Soble

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Cal	Pico Rivera, Acto-Kleen Co.	213-723-8505
Cal	San Mateo, Batina Machinery Co.	415-342-9554
Colo	Denver, Chemical Sls.	303-623-8481
Fla	Clearwater, Datco Inc.	813-531-4255
Ga	Marietta, G.S. Hefner	404-422-5645
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Md	Baltimore, W.L. Lawrence	301-235-4161
Mich	Detroit, J. Matteson	313-342-4575
Mich	Kalamazoo, L. Riege	616-342-6437
Minn	Minneapolis, Minnesota Ind'l. Tool Co.	612-333-8281
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Local Sales Offices & Reps.

Cal	Burbank, EM Southwest	213-846-9373
Cal	San Diego, Dorado Sls.	714-487-1974
Cal	Sunnyvale, RDP Instrs., Inc.	408-735-9040
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Kans	Wichita, Forristal, Young Sls. Co.	816-561-7222
Md	Bethesda, W. Mount Co.	301-657-9312
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Fla	Maitland, Beacon Elctrns	305-647-3498
Ga	Atlanta, Beacon Elctrns	404-351-3654
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NJ	East Orange, Friedman Assocs.	201-673-2500
NM	Albuquerque, Southwestern Engrg. & Equip.	505-265-6775
NC	Charlotte, Beacon Elctrns	704-525-7412
Ohio	Rising Sun, Mecom, Inc.	419-457-3231
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™PHOTOBRIDGE - photo displacement detector - Moririca Elctrns., Ltd.

PHOTOCIRCUITS DIV., KOLLMORGEN CORP., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542, Tel: 516-448-1000, TWX: 516-671-3155; Empl.: 850

PHOTOCIRCUITS CORP., Multi-Wire Div., Dept. EM, 491 Amherst St., Nashua, New Hampshire 03060, Tel: 609-889-0083

™PHOTO ETCH - printed circuit set - Datak Corp.

™PHOTOFLUOROMETER - photoelectric fluorometer - Coleman Instr. Div.

™PHOTOFORMING - chemical milling - Hamilton Technology, Inc.

™PHOTOHELIC - differential pressure switch/gage - Dwyer Instrs

™PHOTO-LUX - back illuminated panels - Photo Chemical Prods. Cal.

PHOTOMATION, INC., Dept. EM, Box 460, Mountain View, Cal. 94041, Tel: 415-967-8992; Empl.: 12

Local Sales Offices & Reps.

Cal	Fullerton, Western Automation/Power Sys.
Colo	Denver, Tessco
Haw	Hilo, Hawaiian Distrs.
Ill	Westchester, Industrol, Inc.
Ind	Indianapolis, J. Woolgar Co.
Kans	Kansas City, Process Svce. & Equip. Co.
Mass	Sturbridge, Electrical Apparatus Co.
Mich	Detroit, R.D. Ernest & Assoc.
Minn	St. Paul, Measurement and Control
Mo	St. Louis, Schwaig Engrg. Co.
NJ	Short Hills, W. Fraid Assoc.
NY	Syracuse, Thomas J. McGough
Ohio	Cincinnati, Jeffrey Equip Co.
Ohio	Cleveland, Adcon Eng. Co.
Ohio	Columbus, Strickler Assocs.
Ore	Portland, Portland Electric & Plumbing Co.
Pa	Champion, Roy J. Cellich
Pa	Narberth, Clayton A. Denault
Tenn	Chattanooga, C.H. Cloer & Assoc.
Tex	Houston, Enviromation & Assocs.
Utah	Salt Lake City, E. C. Coffin Co.
Va	Richmond, Martin's Control & Equip. Co.
Wash	Seattle, C. Stebbins
WVa	Charleston, Engrg. Prods. Co.
Wisc	Milwaukee, G H Fredricks & Co.

™PHOTOMOD - photocell coupler - Clairex Elctrns. Inc.

™PHOTO-OPTIC - photoelectric controls - Dolan-Jenner Inds., Inc.

™PHOTOREPEATER - automatic sys-electro-mechanical-optical - GCA/Burlington Div.

™PHOTORIST-L - Visible-Laser Sensitive Photoresist - Horizons Research, Inc.

™PHOTORIST-U - UV Sensitive Photoresist - Horizons Research, Inc.

PHOTRON INSTRUMENT CO., Dept. EM, 6516 Detroit Ave., Cleveland, Ohio 44102, Tel: 216-281-7020; Empl.: 10

PHOTRONIC LABS., Dept. EM, Commerce Park, Danbury, Conn. 06810, Tel: 203-744-6800; Empl.: 55

Sales Manager: R.J. Parille

PHYSICAL DATA, INC., Dept. EM, 8220 S.W. Nimbus Ave., Beaverton, Ore. 97005, Tel: 503-643-6411, Telex: 360-694; Empl.: 21

Sales Manager: J. Gordon

Local Sales Offices & Reps.

Ariz	Scottsdale, Measurement Consultants	602-994-9510
Cal	Cupertino, T.L. Snitzer Co.	408-257-8333
Cal	Del Mar, T.L. Snitzer Co.	714-454-2191
Cal	Los Angeles, T.L. Snitzer Co.	213-836-6170
Colo	Boulder, Measurement Consultants	303-449-5294
Conn	Hamden, Instrument Consultants	203-288-5246
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Waban, Instrument Consultants	617-969-9881
Mich	Detroit, Comtel-Instr	313-255-1970
NM	Albuquerque, Measurement Consultants	505-265-6471
NY	Plainview, Eastern Metro Assoc.	516-931-1414
NY	Williamsville, M. Bennett Assocs.	716-634-2107
Ohio	Cleveland, Comtel-Instr	216-442-8080
Ohio	Dayton, Comtel-Instr	513-298-7573
Pa	Pittsburgh, Comtel-Instr	412-922-5720
Pa	Plymouth Meeting, Scientific Devices-Philadelphia Inc.	215-825-9515
Utah	Murray, Measurement Consultants	801-268-3181

PHYSICAL ELECTRONICS INDUSTRIES, Dept. EM, 6509 Flying Cloud Dr., Eden Prairie, Minn. 55343, Tel: 612-941-5540, Telex: 29-0407; FSC No.: 034762; Empl.: 115

Sales Manager: L.W. Karkela

Local Sales Offices & Reps.

Cal	San Jose	408-247-7767
Ill	Park Ridge	312-297-7730
Md	Glen Burnie	301-761-3053
Mass	North Attleboro	617-695-7504
NJ	Springfield	201-376-3650
Tex	Richardson	214-231-8661

™PIANO-DIP - SPST side actuated dip switch - Grayhill Inc.

™PICABOND - communications splice - Amp Inc.

™PIC-A-DIP - ic dispenser - Micro Electronic Systems, Inc.

™PIC-A-RATIO - gear box - PIC Design Div.

PIC DESIGN DIV., Benrus Corp., Dept. EM, Benrus Center, Rte 7, Ridgefield, Conn. 06877, Tel: 203-431-1500, TWX: 710-467-0666; Empl.: 1000+

Local Sales Offices & Reps.

Cal	Van Nuys, Pic Design Div. Benrus Corp.	213-782-6702
Ill	Chicago, Pic Design Div. Benrus Corp.	312-259-5868
Md	Baltimore, Pic Design Div. Benrus Corp.	301-864-4011
NY	Rochester, Pic Design Div. Benrus Corp.	716-671-1178
Ohio	Cincinnati, J.O. Olsen Co.	513-922-2176
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Okla	Oklahoma City, Robco Inc.	405-235-8990
Pa	Philadelphia, K.B. Erdman Co.	215-224-1833
Tex	Dallas, Robco Inc.	214-631-7191
Tex	Houston, Robco Inc.	713-641-3331

PICKERING & CO., Meas. & Controls Div., Dept. EM, 101 Sunnyside Blvd., Plainview, N.Y. 11803, Tel: 516-681-0200; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, W. C. Burnette	205-837-5860
Cal	Los Angeles, Fetty/Schoenduve, Inc.	213-651-4050
Colo	Denver, Walter Engrg. Assoc.	303-777-5585
Fla	Maitland, W. H. Boggs	305-647-2226
Ill	Lombard, Quadtron Assoc. Inc.	312-627-6800
Mass	Norwell, Bordewieck Engrg. Sls. Co.	617-659-4915
Mich	Ferndale, Tiby Co.	313-547-3550
Mo	St. Louis, Ozark Elctrn-Mktg.	314-423-7201
NJ	North Caldwell, Masin, Esco, Inc.	201-226-2550
NY	Syosset, Masin Esco, Inc.	516-364-0310
NY	Syracuse, Labtronics Inc.	315-454-9314
Ohio	Cleveland, Tiby Co.	216-371-5335
Pa	Bethayres, Control Instr. Sls. Co.	215-OR6-1808
Tex	Dallas, G. Weinreich & Assoc.	214-321-2800
Wash	Seattle, G. M. Gillett	206-284-5324

™PICOCLAREED - switching assemblies - Clare & Co., C.P.

PICO CRIMPING TOOLS CO., Dept. EM, 9832 Jersey Ave., Santa Fe Springs, Calif. 90670, Tel: 213-723-2150; Empl.: 12

PICO ELCTRNS. INC., Dept. EM, 453 North MacQuesten Parkway, Mount Vernon, N.Y. 10551, Tel: 914-699-5514 800-431-1064 .... p. 4434-4445

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper Sls. co.	602-946-4437
Cal	San Diego, Van Gott & Assocs.	714-272-8452
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Cal	Santa Clara, Fisher Assocs.	408-733-7350
Colo	Arvada, Piper Sls co.	303-420-4646
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Grady Duckett Sls. Co.	404-451-3529
Minn	Minneapolis, F. B. Hill & Co.	612-941-5270
Mo	St. Charles, Buckman & Assocs.	314-724-6690
Ohio	Dayton, BEK Assocs. Inc.	513-278-1343
Tex	Houston, Vista Engrg.	713-661-0119
Tex	Richardson, Vista Engrg.	214-235-4547
Wash	Seattle, W. Spaulding Co.	206-282-9173

™PICOFUSE - miniature fuses - Littelfuse, Inc.

™PICOMIN - microminiature vibration transducer - Endevco

PICONICS INC., Dept. EM, Cummings Rd., Tyngsboro, Mass. 01879, Tel: 617-649-7501, TWX: 710-347-6663; Empl.: 48

Local Sales Offices & Reps.

Cal	No. Hollywood, Jewett Co.	213-789-8103
Cal	Palo Alto, J/M Assocs.	415-327-1261
Colo	Englewood, Inverness Mktg. Div. Cliff-John Elctrns.	303-770-2300
Fla	Longwood, Lenz Engrg.	305-831-9797
Mass	Wayland, Wayland Engrg. Sls. Co.	617-655-6080
Minn	New Brighton, TWC Sls.	612-636-1770
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NY	Huntington, Regulus Ind'l. Sls. Co.	516-271-7966
NY	Utica, Micro Comp. Sls.	315-733-2460
Ohio	Cincinnati, Com-Tek Sls. Co.	513-793-3611
Pa	Glenside, R.F. Koebert & Assocs.	215-887-2310
Tex	Addison, Southland Comps.	214-233-0603
Exp:	Huntington, N.Y., Regulus Ind'l. Sls. Co.	516-271-7966

™PICO-PAC - Power Supply - Velonex, Instrument Div.

™PICOREED - switching assemblies - Clare & Co., C.P.

™PICOTRIM - capacitors - Voltronics Corp.

™PIDG - terminals & splices - Amp Inc.

™PIELEFORK - piezoelectric tuning fork - Murata Mfg. Co. Ltd.

™PIELEOSCILATOR - piezoelectric tuning fork oscillator - Murata Mfg. Co. Ltd.

™PIERCE - rust inhibitor - Lake Chemical Co.

™PIEZITE - ceramic crystal - Endevco

PIEZO CRYSTAL CO., Dept. EM, 100 "K" St., Carlisle, Pa. 17013, Tel: 717-249-2151; Empl.: 250

Local Sales Offices & Reps.

Fla	Maitland, Delmac	305-644-2526
Tex	Dallas, Southern States Mktg.	214-387-2489
Tex	Houston, Southern States Mktg.	713-665-0991

PIEZO TECHNOLOGY INC., Dept. EM, 2525 Shader Rd., Orlando, Fla. 32804, Tel: 305-298-2000, TWX: 810-850-4136; FSC No.: 25120; Empl.: 420 p. 2468,2469

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	San Mateo, Melvin Sls. Co.	415-349-7444
Cal	Van Nuys, R.L. Assocs.	213-782-7826
Colo	Denver, Walter Engrg. Assoc.	303-777-5585
Fla	Maitland, Ellis & Assocs.	305-645-1101
Ill	Chicago, T.B. Hunter Assocs.	312-777-2500
Ind	Greenwood, V. Schillinger & Assocs.	317-888-2260
Kans	Overland Park, Reese & Assocs.	913-648-7748
Md	Baltimore, C.O. Emrich	301-747-8348
Mass	Randolph, Bengal Assocs.	617-961-4120
Mich	Southfield, V. Schillinger & Assocs.	313-559-3680
Minn	Chanhassen, Barnes Sls. Assocs.	612-474-2907
NJ	Haddonfield, Mesa Tech. Assocs.	609-429-9531
NY	Buffalo, Quality Comps., Inc.	716-839-2044
NY	Hauppauge, TX Sls. Inc.	516-979-8750
NC	Greensboro, L&D, Inc.	919-292-3201
Ohio	Cincinnati, A. C. Wahl & Assocs.	513-761-5500
Tex	Dallas, Stevens Sls.	214-350-2476

™PIEZOTITE - ceramic ultrasonic transducer - Murata Mfg. Co. Ltd.

™PIEZOTRON - dynamic instruments - Sundstrand Data Control, Inc.

™PIGGY - wire connectors - T & B/Thomas & Betts

™PIGGY - wire connectors - T & B/Thomas & Betts

™PIGMY-HIPPO - clips - Mueller Electric Co.

PIHER CORP., Dept. EM, 399 Washington St., Woburn, Mass. 01801, Tel: 617-935-8750, TWX: 710-393-6784; Empl.: 100

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps.	205-539-4411
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Indianapolis, France Entprs.	317-894-0593
Mass	Andover, R. Purinton	617-475-7055
Mich	Farmington Hills, W.R. Hummon & Assoc.	313-474-0661
Mo	Kansas City, KSW Assocs.	816-358-5240

NJ Cherry Hill, Trinkle Sls. 609-795-4200
NM Albuquerque, Cleveland Entprs. 505-345-2481
NY Garden City, Comtronic Assoc. 516-741-8966
NY Rochester, Ossmann Component Sls. Corp. 716-442-3290
Ohio Beachwood, Elctrn. Salesmasters 216-831-9555
Tex Richardson, P.J. Scanlon Co. 214-231-4661
Wash Seattle, C.K. Shanks & Assoc. 206-632-4290

Local Distributors
Ariz Tempe, Circuit Specialists Co. 602-966-0764
Ariz Tuscon, Elliott Elctrns. 602-884-7394
Ark Little Rock, Carlton-Bates Co. 501-563-9100
Cal Burbank, T.A.W. 213-846-3911
Cal Costa Mesa, Components Ctr. 714-979-0433
Cal Mountainview, Terminal Elctrns. 415-969-9240
Cal Sunnyvale, Acacia Sls. 408-735-0100
Colo Lakewood, Acacia Sls. 303-232-2882
Conn Hamden, Wilshire Elctrns./Conn. 203-281-1166
Ill Des Plaines, Edmar Elctrns. 312-298-8580
Ill Palatine, Ohm Elctrns. 312-359-5500
Ind Indianapolis, Graham Elctrns. 317-634-8486
Kans Wichita, Radio Supply Co. 316-267-5213
Mass Burlington, Wilshire Elctrns./N.E. 617-272-8200
Mass Burlington, Baldwin Component Ctr. 617-272-1161
Mich Kentwood, R M Elctrns. 616-531-9300
Minn Minneapolis, Dawn Elctrns. 612-546-2212
Neb Lincoln, Scott Elctrn. Supply Corp. 402-464-8308
NJ Cinnaminson, Wilshire Elctrns. 609-786-8990
NJ Hanover, State Elctrns. 201-887-2550
NJ Moorestown, Arrow Elctrns. 609-235-1900
NY Deer Park, Baldwin Component Ctr. 516-586-2230
NY Johnson City, Wilshire Elctrns./NYS 607-797-1236
NY Mt. Vernon, QAR Inds. 914-699-2224
NY Rochester, Masline Elctrns. 716-546-5373
NC Winston-Salem, Kirkman Elctrns. 919-722-9131
Ohio Beachwood, Arrow Elctrns. 216-464-2000
Ohio Cincinnati, Sheridan Sls. 513-761-5432
Ohio Dayton, Arrow Elctrns. 513-253-9176
Tenn Nashville, Electra-Distributing Co. 615-329-3971
Tex Dallas, Norvell Assocs. 214-350-6771
Tex El Paso, International Elctrns. 915-772-2097
Wash Seattle, R.E. Priebe Co. 206-682-8242
Wisc Milwaukee, Taylor Electric Co. 414-241-4321
For: Can., Downsview, Ont., Semad Elctrns. 416-635-9880

PINLITES, See Refac Elctrns./Pinlites

™PIL - miniature pulse transformer - TRW/UTC Transformers

™PILL - drop in pill termination, attenuators, resistors & capacitors - EMC Technology Inc

™PIN BAR - common spaced bussing - Lear Siegler, Inc.

™PIN BAR® - solderless bus bar - Lear Siegler

™PINCOMM - pin compatible core memory - Standard Memories,

™PINLITE - micro-miniature lamps - Refac Elctrns. Pinlite®, Wild Rover®

™PIN SAVER - pin straightener, connector - Air-O-Tronics Prods.

™PINSETTER - —pinsetting equipment - Molex Inc.

PIONEER ELEC. & RESCH. CO., Dept. EM, 743 Circle Dr., Forest Park, Ill. 60130, Tel: 312-771-8242; Empl.: 100

PIONEER INSTRUMENTATION, Dept. EM, 4800 E. 131st St., Cleveland, Ohio 44105, Tel: 216-587-3600; Empl.: 10

Local Sales Offices & Reps.
Ohio Cleveland, Pioneer/Instrumentation 216-587-3600
Pa Media, W. Reeves Assocs. 215-566-6709

PIONEER MAGNETICS, Dept. EM, 1745 Berkeley St., Santa Monica, Cal. 90404, Tel: 213-829-6751, TWX: 910-343-6249; FSC No.: 08676 p. 3294,3295

Sales Manager: F. Heath

Local Sales Offices & Reps.
Ariz Scottsdale, Williams Assocs. 602-947-4267
Cal Los Altos, Frauman Assocs. 415-941-0660
Colo Denver, Williams Assocs. 303-373-4730
Conn Canton, Daner-Hayes 203-426-9094
Fla Orlando, Technical Assocs. 305-894-7531
Ill Skokie, Saffro and Assocs. 312-588-0905
Kans Shawnee Mission, E.I.R. Co. 913-362-0919
Mass Newton Centre, Daner-Hayes 617-969-4650
Mich Farmington, CMP 313-477-7700
Minn Minneapolis, Electro-Serv. Co. 612-827-2907
Mo Hazelwood, E.I.R. Co. 314-895-4100
NJ Englewood Cliffs, Power Conversion and Control 201-569-0015
NM Albuquerque, Williams Assocs. 505-255-1638
NY Rochester, Daner-Hayes 716-394-5560
Ohio Cleveland, CMP 216-333-5650
Ohio Dayton, CMP 513-278-5873
Ore Lake Oswego, RTS, Inc. 503-636-5902
Pa Jenkintown, Stein Instrumentation 215-885-2370
SC Spartanburg, Technical Assocs. 803-579-2904
Tex Dallas, Remtek Inc. 214-387-2855
Tex Houston, Remtek Inc. 713-664-2113
Wash Bellevue, RTS, Inc. 206-455-2778
Wisc Lake Mills, Saffro and Assocs. 414-648-2605

™PIP - pulse transformer - TRW/UTC Transformers

™PIPETITE PASTE & STIK - sealants & pipe thread compound - Lake Chemical Co.

™PIPIX - fiber optic crt's - Litton Inds.

™PISTONCAP - trimmer capacitors - Sprague-Goodman Electronics, Inc.

™PITMO - d-c motors - Pittman Corp.

™PITOT HEATER CURRENT DETECTOR - current defector (sensor) - Micro Technical Industries

™PITRAN - pressure sensitive transistors - Stow Labs., Inc.

PITTMAN CORP., Dept. EM, 343 Godshall Drive, Harleysville, Pa. 19438, Tel: 215-256-6601, TWX: 510-661-8696; FSC No.: 98938; Empl.: 100 .. p. 3104

Sales Manager: C.A. Pittman, VP

Local Sales Offices & Reps.
Ariz Scottsdale, Williams-Assocs. 602-947-4297
Cal Los Angeles, Halbar Assocs. 213-387-8283
Cal San Mateo, Halbar Assocs. 415-349-4700
Colo Denver, Williams-Assocs. 303-373-4730
Fla Ft. Lauderdale, Tropi-Tec Co. 305-463-0988
Ga Atlanta, Electro-Rep Assocs. 404-636-8533
Ill Chicago, K-W Assocs. 312-792-2618
Ind Fort Wayne, Neal Engrg. Co. 219-484-5090
Ind Indianapolis, Neal Engrg. Company 317-849-4201
Mass Salem, Forbes Engrg. 617-744-1693
Mich Birmingham, J.C. Hofstetter Co. 313-646-3635
Mo St. Louis, Gordon Fixman Engrg. 314-725-5219
NJ Summit, R.A. Potter Assocs. 201-277-0220
NM Albuquerque, Williams-Assocs. 505-255-1638
NY Buffalo, Application Specialists 716-834-3377
NY East Syracuse, Application Specialists 315-437-2813
NY Rochester, Application Specialists 716-586-6226
NC Charlotte, Electro-Rep Assocs., Inc. 704-527-2530
Ohio Dayton, J.C. Hofstetter Co. 513-296-1010
Ohio Medina, J.C. Hofstetter Co. 216-241-4880
Okla Tulsa, Blair Engrg. Sls. Co. 918-747-3100
Tex Dallas, Blair Engrg. Sls. Co. 214-352-8411
Tex Houston, Blair Engrg. Sls. Co. 713-776-0011
Wash Buckley, Halbar Assocs. 206-939-2080

™PIXIE - force transducer - Endevco

™PIXIEPOT - 10-turn potentiometer - Duncan Electronics, Inc.

™PLACOVAR - alloy - Hamilton Technology, Inc.

™PLANETGEAR - counters - Haydon Switch & Instr., Inc.

™PLANETOR - wood boring bits - Price & Rutzebeck

™PLAQOHM - placque type power resistors - Ward Leonard Elec. Co. Inc.

™PLASLODE - talc reinforced polypropylene - Fiberfil Div. Dart Ind.

™PLASLUBE - lubricated thermoplastics - Fiberfil Div. Dart Ind.

™PLASMAC - a-c plasma display - National Electronics

™PLASMAFLUX - high field air core solenoids - Walker Scientific, Inc.

™PLASMA-LUX/PLASMALUX - digital readouts - Cherry Electrical Prods. Corp.

™PLASMA-POWER - laser power supplies - Crestronics Inc.

™PLASTI-BOND - terminals - Amp Inc.

™PLASTIBOX - small parts bins - LEWISystems

™PLASTI-CAL - top-laminated transfers - Meyercord Co.

PLASTIC CAPACITORS, INC., Dept. EM, 2623 N. Pulaski Rd., Chicago, Ill. 60639, Tel: 312-489-2229, TWX: 910-221-1354; FSC No.: 99120; Empl.: 125

Sales Manager: F.J. Pavey

Local Sales Offices & Reps.
Ala Huntsville, B.J.R., Inc. 205-881-3569
Cal Los Angeles, E.E. Strassner Co. 213-666-1511
Cal San Jose, Parsons Co. 408-247-7327
Conn E. Haven, Eagle Assocs. 203-467-6542
Ill Chicago, Carlson Elctrn. Sls. Co. 312-956-8240
Ind Fort Wayne, W.W. Bieberich, Inc. 219-432-2537
Ind New Albany, W.W. Bieberich, Inc. 812-945-3187
Md Hyattsville, Eastern Comps. 301-577-2925
Mass Boston, Eagle Assocs. 617-444-3446
Mo St. Louis, Cadon Technical Sls. 314-991-0262
NJ Springfield, F.F. Sylvester Assoc. 201-376-3324
NY Rochester, Swenson Assoc. 716-385-1235
NY Rushville, E. Scovel Co. 315-584-6522
Ohio Cleveland, Electro-Com 216-886-2404
Ohio Dayton, Electro-Com 513-898-5140
Pa Flourtown, Eastern Comps., Inc. 215-836-1616
Pa York, Eastern Comps., Inc. 717-764-3114
Tex Dallas, Packard Assocs. 214-785-4544
Wisc Milwaukee, Carlson Elctrn. Sls. Co. 414-476-2790
Exp: New York, N.Y., B. Freudenberg 212-757-9130

™PLASTICOTE - wires & cables - Cities Svc. Co.

™PLASTIC-PACK - concave backing material - Allis-Chalmers

PLASTICS ENGRG. CO., Dept. EM, 3518 Lakeshore Rd., Sheboygan, Wisc. 53081, Tel: 414-458-2121, TWX: 910-264-3878; Empl.: 475

Local Sales Offices & Reps.
Ill Arlington Heights, H. Sanders 312-437-6930
Ill La Grange Park, O. B. Buss 312-354-4285
Ill Schaumburg, J. Wood 312-894-7038
Mich Marshall, B. L. Young 616-781-5415
Mo Manchester, K. A. Pickell 314-527-0476
NJ North Plainfield, S. C. Dusza 201-757-2059
Ohio Grafton, E. D. Larrick 216-458-4570
Pa Doylestown, R. P. Draper 215-348-3666
Pa Erie, N. B. Duffett 814-833-4386
Wisc Plymouth, R. T. Johnson 414-892-8556
Wisc Sheboygan, F. Shaw 414-452-7849

™PLASTIFORM - flexible magnets - 3M Co.

™PLASTI-GRIP - terminals & splices - Amp Inc.

™PLASTILEASE - mold release agent - Ram Chems.

™PLASTI-METAL - krome & gold like trim - Anchor Plastics

™PLASTI-PAK - plastic packaging material - Centralab

™PLASTO-JOINT STIK - pipe thread compound - Lake Chemical Co.

™PLAST'O'WIRE - plastic coated wirewound (hybrid) - Electronic Controls, Inc.

PLASTRONICS INC., Dept. EM, 3111 Gardenbrook, Dallas, Tex. 75234, Tel: 214-243-0611, TWX: 910-860-5542; Empl.: 47

Local Sales Offices & Reps.
Ariz Phoenix, Clemick-Neenan & Assocs. 602-279-7649
Cal Los Angeles, Clemick-Neenan & Assocs. 213-476-1272
Cal Menlo Park, Richfull Assoc. 415-325-2844

Cal	San Diego, Clemick-Neenan & Assocs.	714-465-5930
Cal	Tustin, Clemick-Neenan & Assocs.	714-547-0966

(TM)PLATANEX - platinum plating process - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)PLATANIUM ANODES - platinum plated titanium anodes - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)PLATINUM N - a superior platinum, stable, easy to control - Technic, Inc.

(TM)PLATINUM TP - most pore-free deposit of any platable metal - Technic, Inc.

PLATO PRODUCTS, INC., Dept. EM, El Monte, Cal. 91731, Tel: 213-283-0466, Telex: 673-488; FSC No.: 32399; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, Scottsdale Tool	602-992-9858
Cal	San Diego, L. Angione	714-223-6951
Cal	San Jose, M. Miller	408-246-8181
Cal	Santa Clara, Com-Kyl	408-249-6220
Colo	Arvada, Coast Tool Co.	303-422-1097
Colo	Denver, Grenfell Supply	303-893-3111
Ill	Bensenville, Plato Prods.	312-766-4996
Kans	Shawnee Mission, Burke Sls. Co.	913-384-5577
Mass	Beverly, Plato Prods. Inc.	617-922-1483
Mich	Royal Oak, Murray Percival Co.	313-548-1971
Minn	St. Paul, R. G. Ragon Co.	612-488-0201
NJ	Mount Arlington, Plato Prods. Inc.	201-398-0015
NY	Guilderland, Solder Pot	518-355-1829
Ore	Portland, Murphy Supply	503-226-6081
Tex	Dallas, Redco	214-653-1041

PLATT LUGGAGE, Dept. EM, 2301 S. Prairie, Chicago, Ill. 60616, Tel: 312-225-6670; Empl.: 75

(TM)PLATULAR - heat exchanger design - Janitrol Aero Div.

(TM)PLENCO - thermoset molding compounds - Plastics Engrg. Co.

(TM)PLESA - passivated diodes - Varian/Beverly Div.

PLESSEY CAPACITORS, Dept. EM, 5334 Sterling Center Dr., Westlake Village, Cal. 91361, Tel: 213-889-4120, TWX: 910-494-4779

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Cal	Los Alamitos, Reed Elctrn. Mktg.	213-598-6676
Cal	Redwood City, J. S. Heaton Co.	415-369-4671
Cal	San Diego, Reed Elctrn. Mktg.	714-821-9600
Colo	Parker, J. S. Heaton Co.	303-841-2391
Fla	Lighthouse Point, R. C. Simon	305-941-2757
Ga	Douglasville, 20th Century Mktg.	404-942-6483
Ill	Chicago, T. B. Hunter Assocs.	312-777-2500
Ind	Indianapolis, F. J. Campisano Co.	317-247-8623
Md	Ellicott City, Doss Elctrns.	301-465-1336
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
NY	Garden City, Comtronic Assocs.	516-741-8966
NY	Ithaca, Bob Dean, Inc.	607-272-2187
NC	Raleigh, Bob Dean, Inc.	919-851-2065
Ohio	Cincinnati, F. J. Campisano Co.	513-662-1616
Ohio	Cleveland, F. J. Campisano Co.	216-381-4949
Ore	Portland, Western Tech. Sls.	503-297-1711
Tex	Dallas, Allied Comps.	214-238-0408
Tex	Houston, Allied Comps.	713-691-3961
Wash	Bellevue, Western Tech. Sls.	206-641-3900

PLESSEY INC., Dept. EM, 320 Long Island Expwy. S., Melville, N.Y. 11746, Tel: 516-694-7900, TWX: 510-224-6411; Empl.: 2000

Sales Manager: L. Lattanzi

Local Sales Offices & Reps.

Ariz	Mesa, Plessey Inc.	602-969-7281
Cal	Los Angeles, Plessey Inc.	213-390-7844
Cal	Mt. View, Plessey Inc.	415-965-1400
Colo	Vail, Mile High Elctrns.	303-476-1149
Ill	Chicago, Professional Sls. Co.	312-359-2253
Ill	Schiller Park, Plessey Inc.	312-671-2686
Mass	Reading, Plessey Inc.	617-944-7000
NJ	Florham Park, Plessey Inc.	201-822-0500
NY	Melville, Plessey Inc.	516-694-7900
Ohio	Columbus, McFadden Sls. Inc.	614-221-3362
Tex	Dallas, Plessey Inc.	214-235-2307

PLESSEY CERAMIC DIV., Plessey N.J. Inc., Dept. EM, 8th & Harrison Sts., Frenchtown, N.J. 08825, Tel: 201-996-2121, TWX: 510-235-3399; Empl.: 198

Local Sales Offices & Reps.

Ariz	Mesa, Plessey Materials	602-969-7281
Cal	Los Angeles, Plessey Materials	213-390-7844
Cal	Mountain View, Plessey Materials	415-965-1400
NY	Melville, Plessey Materials	516-694-7900
Tex	Dallas, C. Geller	214-341-7026

PLESSEY CHATSWORTH, Dept. EM, 20245 Sunburst St., Chatsworth, Cal. 91311, Tel: 213-341-7770; Empl.: 300

Sales Manager: J. Fulton

PLESSEY ELECTRO-PRODUCTS, Dept. EM, 3860 Centinela Ave., Los Angeles, Cal. 90066, Tel: 213-390-3585, TWX: 910-343-6483 .... p. 2401

PLESSEY ENVIROMENTAL SYS., Dept. EM, 3939 Ruffin Rd., San Diego, Cal. 92123, Tel: 714-278-6500, Telex: 69-5053; Empl.: 75

Sales Manager: G.N. Clausen

Local Sales Offices & Reps.

Md	Rockville, C. Blakely	301-946-0082

PLESSEY SEMICONDUCTORS, Dept. EM, 1674 McGaw Ave., Irvine, Cal. 92714, Tel: 714-540-9945, TWX: 910-595-1930; FSC No.: 52648; Empl.: 14

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-822-9260
Ariz	Phoenix, Eltron	602-997-1042
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	La Jolla, Littlefield & Smith	714-455-0055
Cal	Marina del Rey, Relcom	213-822-1187
Cal	Mountain View, Thresum Assocs.	415-965-9180
Colo	N. Denver, West/Mark Denver, Inc.	303-433-7181
Fla	St. Petersburg, Kirkwood Assocs.	813-894-8240
Ill	Chicago, Semi. Specialists	312-279-1000
Ill	Elk Grove Village, R-Tech	312-439-9090
Ill	Park Ridge, R F Specialists	312-698-2044
Ill	Schiller Park, Plessey Reg. Office (L. Scalzo)	312-678-3280
Ind	Fort Wayne, R. F. Specialists	219-485-8982
Kans	Prairie Village, Engr. Services Co.	913-649-4000
Md	Ellicott City, Applied Engrg. Consultants	301-465-1272
Mass	Wayland, Wayland Engrg. Sls.	617-655-6080
Minn	Minneapolis, Technical Assocs.	612-929-6721
Mo	St. Louis, Engr. Services Co.	314-997-1515
NY	Plainview, Erde Assocs.	516-822-5357
NY	Syracuse, Syracuse Technical Reps.	315-487-7777
Tenn	Bristol, Remco	615-968-4195
Tex	Fort Worth, W. Pat Fralia Co.	817-640-9101
Wash	Olympia, Bergford & Assocs.	206-866-2001
WVa	Woodbridge, Applied Engrg. Consultants	703-550-9429

PLEXUS, INC., Dept. EM, 7345 E. Evans Rd., Scottsdale, Ariz. 85260

(TM)PLIKE - wire stripping plier - Marshall Industries

(TM)PLUG-IN ANALYZERS - spectrum analyzers - Nelson Ross Elctrns.

(TM)PLUGMOLD - multioutlet systems - Wiremold Co.

(TM)PLUG-N-PROBE - probe, test - Air-O-Tronics Prods.

(TM)PLUG STAT - temp sw - Control Prods., Inc.

(TM)PLUMBICON - TV camera tubes - Amperex Electronic Corp.

(TM)PLUSISTOR - positive temperature coefficient thermistors - Victory Engrg. Corp.

(TM)PLYCON - harness systems - Methode Elctrns., Inc.

(TM)PLYO-DUCT - flat, flexible cable - Methode Elctrns., Inc.

(TM)PMB - magnetic brake - General-Electro Mechanical

(TM)PMC - magnetic clutch - General-Electro Mechanical

(TM)PMI - phono accessories & parts - Pageant/M.A. Miller Industries

PMI MOTORS, KOLLMORGEN CORP., Dept. EM, 31 Sea Cliff Ave., Glen Cove, N.Y. 11542, Tel: 516-448-1234, TWX: 516-671-3155

Local Sales Offices & Reps.

Cal	Pasadena, PMI Motors	213-386-6214
Cal	Sunnyvale, RDX Corp.	408-734-4500
Fla	Orlando, Mackay, Smith & Assoc.	305-277-1513
Ill	Des Plaines, Control Sls.	312-296-5595
Iowa	Des Moines, I. L. Davidson, Inc.	515-288-0958
Md	Silver Spring, Hal R. Sieber Co.	301-589-9110
Mass	Beverly, PMI Motors	617-922-4007
Mass	Wakefield, Meco, Inc.	617-245-4870
NJ	Willingboro, PMI Motors	609-871-4086
NY	Syosset, Motion Control Sls.	516-921-5656
Ohio	Cleveland, ImTech, Inc.	216-826-3400
Ohio	Englewood, PMI Motors	513-836-5000
Tex	Dallas, Dwayne Clement & Assoc.	214-341-5860
Wash	Bellevue, Thornson Co.	206-455-9180

(TM)PNEU-THERM - pneumatic-temp tranducers - Dynamic Controls Corp.

(TM)PNR - control cable - Cerro Wire & Cable Co.

(TM)PNRX-90 - control cable - Cerro Wire & Cable Co.

(TM)POCKET MAGNETOMETERS - gauss meters - Annis R B Co.

(TM)POGO CONTACT - connectors (contacts-spring loaded) - Pylon Co., Inc.

(TM)POGO LAMP - miniature lamp - Dupree, Inc.

(TM)POKE-HOME - crimp contacts - Amphenol North America Div.

(TM)POLAFRAME - EMI/RFI shielding + pressure gasketing - Metex Corp.

(TM)POLA-H - EMI/RFI shielding + pressure gasketing - Metex Corp.

POLARAD ELCTRN. INSTRS., Dept. EM, 5 Delaware Dr., Lake Success, N.Y. 11040, Tel: 516-328-1100, TWX: 510-223-0414; FSC No.: 82199; Empl.: 150 .... p. 2920

Local Sales Offices & Reps.

Ala	Huntsville, J. Highsmith	205-881-3294
Ariz	Scottsdale, BFA Corp. of Ariz.	602-994-5400
Cal	Cupertino, T. Snitzer	408-257-8333
Cal	Del Mar, T. Snitzer	714-454-2191
Cal	Los Angeles, T. Snitzer	213-836-6170
Colo	Boulder, H. Bass Assocs.	303-499-7509
Conn	New Canaan, Measurement Consits. Corp.	203-966-4630
DC	D.C., Brimberg Assocs.	301-552-2200
Fla	Orlando, J. Highsmith	305-293-5202
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Silver Spring, Eastern Instrumentation Corp.	301-681-6500
Mass	Waltham, Measurement Consits.	617-890-4400
Mich	Detroit, H. Teplitz & Co.	313-537-9058
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	West Orange, E-F Tech. Sls.	201-731-7203
NM	Albuquerque, IMEC	505-883-9010
NY	Huntington Station, E-F Tech. Sls.	516-549-1818
NY	Liverpool, R&D Assocs.	315-622-2350
Ohio	Cleveland, H. Teplitz & Co.	216-486-2800
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Ore	Portland, Arva-Hudson, Inc.	503-227-4916
Pa	Phila., East Instrumentation Phila. Inc.	215-927-7777
Tex	Richardson, Lear Assoc.	214-231-5388
Tex	San Antonio, Data Applications	512-732-7176
Wash	Bellevue, Arva-Hudson, Inc.	206-455-0773
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

(TM)POLARFLEX 10 - hot-melt strippable coating - Western Coating Co.

(TM)POLARHEX - positive polarization means for coupling connectors - Hughes Aircraft Co., Connecting Devices Div.

(TM)POLARING - EMI/RFI shielding + pressure gasketing - Metex Corp.

POLARIS, Dept. EM, 2862 Fulton St., Brooklyn, N.Y. 11207

POLARIS MARINE ELECTRONICS, see Di-Tech Inc.

™POLARIZING SCREWLOCKS - locking device for rack & panel connector - Continental Connector Corp.

™POLAR PATH - gyro magnetic compass system - Bendix Corp.

™POLASHEET - EMI/RFI shielding + pressure gasketing - Metex Corp.

™POLASTICK - EMI/RFI shielding + pressure gasketing - Metex Corp.

™POLASTRIP - EMI/RPI shielding + pressure gasketing - Metex Corp.

™POLASTRIP - conductive gasketing - Cal-Metex Corp.

™POLICEFAX - transmission of fingerprints - Datalog Div., Litton Sys.

™POL-LAR - formed capacitor covers - Precision Paper Tube Co.

POLY-SCIENTIFIC, Litton Sys., Dept. EM, 1213 N. Main St., Blacksburg, Va. 24060, Tel: 703-552-3014, TWX: 710-875-3694; Empl.: 350

Local Sales Offices & Reps.

Cal	Huntington Beach	714-968-0434
Fla	Orlando, Bilres, Inc.	305-831-1668
Mass	Sturbridge	617-347-9388
Mo	Maryland Heights, Midwest Meridian	314-878-4441
NY	Mineola, Kahn Assocs.	516-742-1900
Ohio	Dayton, INH Component Sls.	513-434-8808
Tex	Fort Worth, Carey, Wolf & Assoc.	817-738-1996

POLYCASE PRODUCTS DIV.,, ECP Corp., Dept. EM, 4726 Superior Ave., Cleveland, Ohio 44103, Tel: 216-391-0444; Empl.: 4

™POLY-C - capacitor - General Elec. Co.

™POLYCARBAFIL - fiberglass reinforced polycarbonate - Fiberfil Div. Dart Ind.

™POLYCASE - multi-purpose elctrn. enclosures - ECP Corp.

™POLYCHIP - copper-plated teflon chip capacitor - Polyflon Corp.

™POLY-CLEAN - polypropylene in-line water cleaner for PC's - Hollis Engrg., Inc.

™POLYCYCLE - motor-generators - General Elec. Co.

™POLY-DIMENSIONAL - styled small instrument enclosures - Amco Engineering Co.

™POLYDIP - water repellent liquid plastic - Communications Technology Corp.

™POLYDYNE - speed drives - General Elec. Co.

POLYFLON CORP., Dept. EM, 35 River St., New Rochelle, N.Y. 10801, Tel: 914-636-7222, TWX: 710-563-0619; Empl.: 60

Local Sales Offices & Reps.

Fla	Lighthouse Point, Ed Whalen Assocs.	305-781-6996
Ill	Arlington Heights, Bunting & Assocs.	312-392-3370
Exp:	N.Y., New Rochelle, Polyflon Corp.	914-636-7222

POLYGON INDS. LTD., Dept. EM, 50 Northline Rd., Toronto 16, Ont., Canada, Tel: 416-755-3301; Empl.: 75

™POLYLEWTON - handling sys. - LEWISystems

™POLY-LOK - polyethylene compound - Superior Cable Div.

POLYMER CORP., Dept. EM, 2120 Fairmont Ave., Reading, Pa. 19605

POLYMERIC SYSTEMS INC, Dept. EM, South & Hanover Sts, Pottstown, PA 19464

POLYPHASE INSTR. CO., Dept. EM, 126 E. Fourth St., Bridgeport, Pa. 19405, Tel: 215-279-4660, Telex: 84-6327; FSC No.: 98330; Empl.: 150

Sales Manager: R.H. Simmons

Local Sales Offices & Reps.

Ariz	Phoenix, Hecht-Henchen	602-275-4411
Cal	Hollywood, Crown Elctrns.	213-877-3550
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Golden, Callister Assoc.	303-761-0992
Fla	N. Palm Beach, Lectro Mech.	305-842-2458
Ill	Chicago, Probe Elex	312-696-2828
Ind	Indianapolis, Needler Sls. Co.	317-255-8056
Mass	Needham, Stone Comp. Sls.	617-444-1405
Mich	Dearborn, ENCO	313-642-0203
Minn	Wayzata, Little Assoc.	612-473-1107
NY	, Andrews Assoc.	315-637-5291
NY	Valley Cottage, LRC Assocs.	914-634-7973
Ohio	Dayton, Rixan Assoc.	513-278-4216
Pa	Ft. Washington, GCM Assoc.	215-646-7535
Tex	Addison, Southland Comps.	214-233-0603

™POLY-PLANAR - plastic wafer-thin loudspeakers - Magitran Co.

™POLY Q - liquid scintillation sample vials - Beckman Instrs., (AISSD)

™POLYRAD - Cross-Linked Polyethylene Insulated Wire - Brand-Rex Co.

™POLYSCIN - polycrystalline scintillation phosphor - Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept.

™POLYSEAL - motors, insulation, coils, windings - General Elec. Co.

™POLYSET - epoxy transfer molding compound - Morton Chemical Co.

™POLYSKOP - sweep test sys. - Rhode & Schwarz Sls.

™POLY-SONIC - outdoor speakers - Magitran Co.

™POLYTEMP - coated glass cloth - Natvar Corp.

™POLYTERAGLAS - polyester-coated dacron-glass fabric - Natvar Corp.

™POLYTRAN - polycrystalline optical material - Harshaw Chemical Co., Crystal & Elctrn. Prods. Dept.

POLYTRAN DEVICES, Dept. EM, Box 398 - River St. Sta., Patterson, N.J. 07524, Tel: 201-523-5000

Local Sales Offices & Reps.

Cal	Yorba Linda, D. G. Assocs.	714-528-5555
Fla	Largo, Synergetic Reps.	813-596-5331
Ill	Chicago, Electro-Tech Mktg.	312-588-4535
Mass	Wakefield, N.E.R.E.M	617-245-4426
Mich	Milford, Milford Scientific	313-685-8912
NJ	Springfield, Service Technology	201-232-2666
Ohio	Lyndhurst, Technical Sls. Assocs.	216-461-0826
Tex	Richardson, Carl-Tinch Sls. Co.	
Exp:	N.Y., New York City, Singer Prods. Co.	212-432-1400

Local Distributors

NY	Farmingdale, Six-One Industrial Distrs.	516-694-2626

POMONA ELECTRONICS, DIV OF ITT, see ITT/Pomona Electronics Div.

™POLYTWIST - flex-lead assembly - Poly-Scientific

™POLYVOLT - lighting controls - General Elec. Co.

™POP RIVETS - blind fasteners - USM Corp.

™PORCUPINE - EMI/RFI shielding + pressure gasketing - Metex Corp.

™PORCUPINE METALASTIC - EMI/RFI shielding + pressure gasketing - Metex Corp.

™PORON - Porous plastic materials - Rogers Corp.

™PORTA/FLEX - vapor degreaser, portable - Gagne Assocs., Inc.

™PORTALARM - portable security alarms - Scientific Technology

™PORTAMETRIC - portable measuring instrument - E.S.I. Inc.

™PORTAMETRIC - portable measuring instrument - Electro Sci. Inds.

™PORTA-PEAK - portable strain gage measuring instruments - Helm Instr. Co.

™PORTATEMP - portable hand held digital T/C pyrometer - Trans-Met Engrg.

™PORTA-TEST - leak detector - Varian Assocs.

™PORTA-TRACE - portable light boxes - Gagne Assocs., Inc.

PORTER, H.K., INC., Dept. EM, 74 Foley St., Somerville, Mass. 02143, Tel: 617-776-8200, Telex: 92-1420; Empl.: 250

PORTESCAP US, Dept. EM, 730 Fifth Ave., New York, N.Y. 10019, Tel: 212-245-7715, Telex: 14-7267; Empl.: 14 .... p. 3105

Local Sales Offices & Reps.

Cal	Hayward	415-886-1618
Cal	Simi Valley	805-522-4330
Ill	Glendale Heights	312-858-8667
NH	Nashua	603-888-4000
Tex	Dallas	214-690-9000

Local Distributors

NY	New Hyde Park, Stock Drive Prods.	516-328-3300

™PORTIONATOR - epoxy dispenser - Glenmarc Mfg. Inc.

™POSI-GROUND - voltage leakage elimination in soldering irons - Hexacon Elec. Co.

™POSISTOR - thermistor (positive t.c. thermistor) - Murata Mfg. Co. Ltd.

™POSITRAK™ - transfer track system - Delta Design, Inc.

POSITRONIC INDS., Dept. EM, 208 W. Center St., Drawer H, Rogerville, Mo. 65742, Tel: 417-753-2851, Telex: 436445; Empl.: 115 .... p. 2132,2133

Sales Manager: J.E. Myers

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Co.	205-539-4411
Ariz	Scottsdale, Biedler & Assoc.	602-947-5773
Cal	Del Mar, Interconnect Specialties	714-962-8169
Cal	Mountain View, Gene Woempner Co.	415-964-5454
Cal	Santa Fe Springs, Interconnect Specialties, Inc.	213-888-9188
Cal	Ventura, Interconnect Specialties	805-647-9610
Colo	Denver, M. Duffy Assoc.	303-934-7392
Conn	Fairfield, Schumacher/Yarrington	203-259-0772
Ga	Chamblee, W. A. Brown	404-455-0405
Ill	Arlington Heights, Brainard-Wilson Mktg.	213-437-2700
Ind	Indianapolis, Brainard-Wilson	317-844-2800
Kans	Lenexa, Buckman, Assoc.	913-492-8470
Md	Randallstown, Beacon-No.	301-922-1248
Minn	Minneapolis, Components Group	612-824-4222
Mo	St. Charles, Buckman, Assoc.	314-724-6690
NJ	Medford, Component Consultants	609-654-2800
NJ	Paramus, Astrorep	201-265-8574
NY	Cooperstown, Fitzelle, Assoc.	607-547-9333
NY	Johnson City, Fitzelle Assoc.	607-797-0183
NY	Melville, Astrorep, Inc.	516-423-2266
NC	Raleigh, W.A. Brown	919-781-9421
Ohio	Dayton, Myers Assoc.	513-435-1309
RI	Warwick, Schumacher/Yarrington	401-884-5671
Tex	Houston, Zonk Engrg.	713-697-9302
Tex	Richardson, Zonk Engrg. Co.	214-238-7651
Va	Falls Church, Beacon-No.	703-534-7200
Va	Lynchburg, Beacon-No.	804-237-4740
Wash	Olympia, Todd Brian Ind.	206-866-2001

Local Distributors

Cal	Sunnyvale, Acacia Sls.	408-745-7209
Colo	Lake Wood, Acacia Sls.	303-232-2882
Fla	Miami, Southeast Connectors	305-887-2635
Mass	Newton, Impact Elctrns.	617-964-7740
NY	Port Washington, Restart Elctrns.	516-883-3500
Ohio	Wickliffe, Gateway Megatech	216-944-8565
Tex	Addison, Computer Comps.	214-239-0271
Tex	Houston, Kent Elctrns.	713-780-7770

POSSIS CORP., Dept. EM, 825 Rhode Island Ave., S., Minneapolis, Minn. 55426, Tel: 612-545-1471, Telex: 29-0516; Empl.: 100

POMONA ELECTRONICS, DIV. OF ITT, See ITT/ Pomona Electronics Div.

AMF | POTTER & BRUMFIELD

POTTER & BRUMFIELD, Div of AMF, Dept. EM, 200 Richland Creek Dr., Princeton, Ind. 47671, Tel: 812-386-1000, TWX: 810-350-2343; Empl.: 3000 p. 3594-3609

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Howe & Howe Sls.	602-264-7971
Cal	Culver City, Bestronics	714-523-1223
Cal	Los Altos, E. Recht Assocs.	415-941-0336
Cal	San Diego, Bestronics	714-278-2150
Cal	San Juan Capistrano, Potter & Brumfield	714-493-4503
Colo	Littleton, Simpson Assocs.	303-794-8381
Fla	N. Miami Beach, Irby & Connolly, Inc.	305-949-5197
Fla	Orlando, Irby & Connolly, Inc.	305-894-8471
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Ill	Berkeley/Hillside, Balhorn & Roeser	312-449-3900
Ill	LaGrange Park, Bierhaus Sls., Inc.	312-354-5100
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Associates, Inc.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Ind	Princeton, Potter & Brumfield	812-386-1000
Kans	Overland Park, P-M-A Corp.	913-381-0004
Kans	Wichita, P-M-A Corp.	316-264-2662
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
La	Gretna, Cartwright & Bean, Inc.	504-362-4649
Md	Glen Burnie, Micro-Comp, Inc.	301-761-4600
Mass	Braintree, Potter & Brumfield	617-848-6550
Mass	Lexington, Hathaway Elctrns., Inc.	617-861-7010
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Edina, M. Foster Co.	612-835-2252
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
Mo	Maryland Heights, P-M-A Corp.	314-569-1220
NJ	Cherry Hill, J. McCoy, Inc.	609-428-3444
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Buffalo, Ossmann Comp. Sls. Corp.	716-832-4271
NY	Kingston, Ossmann Comp. Sls. Corp.	914-338-5505
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Rochester, Ossmann Comp. Sls. Corp.	716-442-3290
NY	Syracuse, Ossmann Component Sales Corp.	315-454-4477
NY	Vestal, Ossmann Component Sales Corp.	607-785-9949
NC	Charlotte, Cartwright & Bean, Inc.	704-337-5673
NC	Raleigh, Cartwright & Bean, Inc.	919-781-6560
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Cleveland, Scott Elctrns., Inc.	216-291-2600
Ohio	Columbus, Scott Electronics, Inc.	614-236-8619
Ohio	Dayton, R.O. Whitsell & Associates, Inc.	513-298-9546
Okla	Tulsa, Comps., Inc.	918-583-9149
Pa	Camp Hill, Beil & Whitaker, Inc.	717-233-1254
Pa	Harrisburg, Beil & Whitaker, Inc.	717-652-0184
Pa	Orefield, Beil & Whitaker, Inc.	215-395-0150
Pa	Philadelphia, Jack McCoy, Inc.	215-922-7333
Pa	Pittsburg, Scott Electronics, Inc.	412-828-1073
Pa	Reading, Beil & Whitaker, Inc.	215-779-2610
Tenn	Knoxville, Cartwright & Bean, Inc.	615-693-7450
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	Dallas, J.B. Guenther, Inc.	214-691-8500
Tex	Houston, J.B. Guenther, Inc.	713-468-0232
Utah	Salt Lake City, Simpson Assocs.	801-486-3731
Wash	Seattle, Northmar, Inc.	206-524-5170
Wisc	Milwaukee, E.A. Dickinson & Assocs.	414-264-1080

POTTER CO., Dept. EM, 6035 Paseo Canyon Dr., Malibu, Cal 90265

POTTER CO., Dept. EM, Box 337 North Hwy 51, Wesson, Miss. 39191, Tel: 601-643-2216, TWX: 510-981-4072; FSC No.: 13050; Empl.: 200

Local Sales Offices & Reps.

Ariz	Phoenix, Chaparral	602-996-9648
Cal	Malibu, Potter Co.	213-457-7835
Cal	Redwood City, Parks & Pruitt Assoc.	415-364-1640
Cal	Woodland Hills, Interstate Mktg. Assocs.	213-883-7606
Colo	Denver, Omega Limited	303-758-1508
Fla	Ft. Lauderdale, G.F. Bohman Assocs.	305-564-3081
Fla	Orlando, G.F. Bohman Assocs.	305-855-0274
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Ill	Park Ridge, R.F. Specialists	312-698-2044
Mass	Pittsfield, Potter Co.	413-499-2677
Mich	Grand Rapids, Thies & Assocs.	616-245-0319
Minn	Minneapolis, Northport Engrg.	612-698-3841
Mo	St. Louis, PEM Sls. Co.	314-427-7200
NJ	Haddonfield, Gray Assocs.	609-429-5300
NY	Mineola, R.A. Colucci Co.	516-746-0397
NY	Syracuse, C.W. Floring & Assoc.	315-478-2149
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ohio	St. Marys, Potter Co.	513-278-5030
Okla	Tulsa, W. Pat Fralia Co.	918-663-8707
Pa	Pittsburgh, Allen Nace Co.	412-922-7225
Tex	Fort Worth, W.P. Fralia Co.	817-640-9101
Tex	Houston, W.P. Fralia Co.	713-772-1572
Utah	Salt Lake City, Omega Limited	801-278-6920

POTTER INSTR. CO. INC., Dept. EM, 151 Sunnyside Blvd., Plainview, N.Y. 11803, Tel: 516-681-3200, Telex: 96-7805; FSC No.: 11-1563382; Empl.: 150

Sales Manager: R. Maloney

POWELL ELECTRONICS, Dept. EM, S. Island Rd., Box 8765, Philadelphia, Pa. 19101, Tel: 215-365-1900, TWX: 710-670-0465; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Powell/Huntsville	205-539-2731
Cal	Hawthorne, Century Aero	213-772-1166
Cal	Mountainview, Powel/Cal.	415-964-0820
Fla	Miami Springs, Powell/Fla.	305-592-3260
Md	Beltsville, Powell/Wash.	301-937-4030
NY	Deer Park, Jorames Sls.	516-586-586-4458
NY	E. Syracuse, Fountain & Young	315-437-7733
Tex	Dallas, Powell/Southwest	214-350-4186
Wash	Seattle, Carlyle Tech. Sls.	206-622-4288

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POWER CONTROL CORP., Dept. EM, 122 Gamma Dr., Pittsburgh, Pa. 15238, Tel: 412-782-3120; Empl.: 65

Local Sales Offices & Reps.

Mass	Boston, Eaco Engrg. Corp.	617-782-7440
Mich	Saginaw, Von Berg & Assocs.	517-799-0873
NJ	Plainfield, Brady Co.	201-753-7988
NY	Rochester, H.C. Johnson Agency	716-482-3000
Ohio	Cleveland, Whitehill Industrial	216-562-5530
Pa	Philadelphia, Rothenheber & Wurts	215-649-6300

POWER CONTROLS CORP., Dept. EM, 447 W. Terminal Dr., PO Box 32969, San Antonio, Tex. 78216, Tel: 512-822-0933

POWER CONVERSION INC., Dept. EM, 70 MacQuesten Pkwy. S., Mt. Vernon, N.Y. 10550, Tel: 914-699-7333; Empl.: 60

Local Sales Offices & Reps.

Cal	Los Altos, Tauber-Dreyer Corp.	415-948-2635
Cal	Northridge, Tauber-Dreyer Corp.	213-368-4011
Cal	San Diego, Tauber-Dreyer Corp.	714-274-7242

POWER CONVERSION PRODUCTS INC., Dept. EM, 42 East St., Crystal Lake, Ill. 60014, Tel: 815-459-9100, TWX: 910-634-3356; FSC No.: 31751; Empl.: 95

Sales Manager: C. Seyer

™POWER-CRATER - engines - Allis-Chalmers

POWER DESIGNS, INC., Dept. EM, 1700 Shames Dr., Westbury, N.Y. 11590, Tel: 516-333-6200, TWX: 510-222-6561; Empl.: 200 p. 3298-3301

Sales Manager: Mrs. R. Roth

Local Sales Offices & Reps.

Ariz	Phoenix, Zeus Inc. (Hytronic Meas.)	602-253-6104
Cal	North Hollywood, O'Halloran Assocs.	213-877-0173
Cal	Palo Alto, O'Halloran Assocs.	415-326-1493
Cal	San Diego, O'Halloran Assocs.	714-224-2824
Colo	Denver, Zeus Inc. (Hytronic Meas.)	303-770-4400
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Ind	Indianapolis, Loren Green & Assocs.	317-293-9827
Mass	Waltham, Mc Bar Assocs.	617-890-0233
Mich	Detroit, H. Teplitz & Co.	313-537-9058
Minn	Minneapolis, Loren Green & Assocs.	612-781-1611
Nev	Clark County, Zeus Inc. (Hytronic Meas.)	602-253-6104
NM	Albuquerque, Zeus, Inc.	505-268-3941
NY	East Syracuse, Ossmann Instrs.	315-437-6666
NY	Rochester, Ossmann Instrs.	716-328-2230
Ohio	Cleveland, H. Teplitz & Co.	216-371-2044
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Pa	Abington, Powell-Pendergraph	215-657-0330
Utah	Salt Lake City, Zeus, Inc.	801-466-4924
Va	Richmond, Powell-Pendergraph	703-264-2341

POWER DESIGNS PACIFIC, INC., Sub. Power Designs, Inc., Dept. EM, 3381 Miranda Ave., Palo Alto, Cal. 94304, Tel: 415-493-6111, TWX: 910-373-1251 p. 3298-3301

Sales Manager: Mrs. R. Daugherty

Refer to Power Designs, Westbury, N.Y. for sales office information.

™POWERDIAL - power, temperature, voltage controls - Lutron Electronics Co.

™POWER DIP - solid state relays - Theta-J Relays, Inc.

™POWER-DYNE - torque wrench - Raymond Engrg. Inc.

POWER ELECTRONICS CORP., Dept. EM, 96 Milton Rd., Rochester, New Hampshire 03867, Tel: 603-332-3334, TWX: 510-2974-462

Sales Manager: B.A. Hakala

Local Sales Offices & Reps.
Mass Cohassett, Minot Assocs. 617-3831823
NY White Plains, Swedelco, Inc. 914-946-1122

™POWERFET - 2 watt fet amplifier - Teledyne-Crystalonics

™POWERFLEX - electronic switching & controlling systems - Sigma Instruments, Inc.

™POWERFORMER - dry type transformer - Jefferson Elec.

™POWER-GLAS - glassivation of junctions - General Elec.

™POWERGRIP - belts - Uniroyal, Inc.

™POWERHOUSE - utility & industrial searchlights - Teledyne Big Beam

POWER, INC., Marketing Div., Dept. EM, 12809 Eagle Ridge Dr., Burnsville, Minn. 55337, Tel: 612-890-1360; FSC No.: 25441; Empl.: 500 .... p. 3296,3297

Local Sales Offices & Reps.
Ala Huntsville, Reynolds & Assocs. 205-536-1941
Fla Ft. Lauderdale, Reynolds & Assocs. 305-581-6611
Fla Satellite Beach, Reynolds & Assocs. 305-773-4700
Fla St. Petersburg, Reynolds & Assocs. 813-360-1484
Fla Winston-Salem, Reynolds & Assoc. 919-725-6196
Ga Atlanta, Reynolds & Assocs. 404-252-5360

POWER INSTRS., INC., Dept. EM, 7352 N. Lawndale Ave., Skokie, Ill. 60076, Tel: 312-676-2300; Empl.: 22

Local Sales Offices & Reps.
Ala Huntsville, Vaughn Electrosources Co. 205-881-8830
Cal Santa Monica, Davidson Assocs. 213-829-1731
Fla Cocoa Beach, Vaughn Electrosources Co. 305-784-0784
Kans Lenexa, S. Sterling Co. 913-888-2995
Mich Detroit, S. Sterling Co. 313-255-1970
Mo St. Louis, S. Sterling 314-567-3636
Tex Dallas, Teamwork, Inc. 214-243-5881
Wisc Milwaukee, W. Klinger & Son 414-351-1775

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POWER/MATE CORP., Dept. EM, 514 S. River St., Hackensack, N.J. 07601, Tel: 201-343-6294, TWX: 710-990-5023; Empl.: 280 .... p. 3306

Local Sales Offices & Reps.
Ariz Phoenix, Thorson Co. 602-956-5300
Cal Los Angeles, Thorson Co. 213-476-1241
Cal Mountain View, Thorson Co. 415-964-9300
Cal San Diego, Thorson Co. 714-298-8385
Cal Tustin, Thorson Co. 714-544-5121
Colo Denver, Thorson Co. 303-759-0809
Conn Hartford, Victor Assocs. 203-246-5643
Fla Ft. Lauderdale, W. A. Brown Instr. 305-776-4800
Fla Orlando, W. A. Brown Instr. 305-425-5505
Ga Atlanta, W. A. Brown Instr. 404-939-1674
Ill Chicago, Data Elctrns. Co. 312-283-0300
Md Rockville, Marktron 301-762-6210
Md Timonium, Marktron 301-252-7111
Mass Framingham, Victor Assocs. 617-879-5710
Mich Detroit, R.P. Urban & Assocs. 313-535-2355
Mich Grand Rapids, R.P. Urban & Assocs. 616-245-0511
Minn Minneapolis, T.H. Ayre Assocs. 612-474-4125
Mo Grandview, Beneke & McCaul 816-765-2998
Mo St. Louis, Beneke & McCaul 314-567-3399
NJ Hackensack, PMC 201-343-6294
NM Albuquerque, Rustco 505-296-6474
NY Elmont, Crane & Egert Corp. 516-488-2100
Ohio Aurora, EMA Inc. 216-562-6104
Ohio Centerville, EMA Inc. 513-433-2800
Pa Philadelphia, QED Elctrns. 215-925-8711
Tex Dallas, R. Martin Assoc. 214-361-8584
Tex Houston, R. Martin Assoc. 713-462-4077
Vt Burlington, Victor Assoc. 802-862-2172
Wash Seattle, Thorson Co. 206-455-9180
Exp: Hackensack, N.J., Power/Mate 201-343-6294

Local Distributors
Cal Los Angeles, Thorson Co. 213-476-1241
Fla Ft. Lauderdale, W.A. Brown Instrs. 305-776-4800
Ill Chicago, Data Elctrns. Co. 312-283-0300
NY Elmont, Crane & Egert Corp. 516-488-2100
Tex Dallas, Thorson Co. 214-233-5744
For: Can., Mississauga, Ont., Webster Instrs. Ltd. 416-275-2270

POWER MONOLITHICS INC., Dept. EM, 121 International Dr., Corpus Christi, Tex. 78410, Tel: 512-883-6251, TWX: 910-876-1404; Empl.: 150

Sales Manager: B. Chenes

Local Sales Offices & Reps.
Ariz Phoenix, Lambda Elctrns. 602-996-1010
Cal Carson, Lambda Elctrns. 213-537-8341
Cal Sunnyvale, Lambda Elctrns. 408-738-2541
Fla Largo, Lambda Elctrns. 813-596-5151
Ill Arlington Heights, Lambda Elctrns. 312-593-2500
Mass Lexington, Lambda Elctrns. 617-861-8585
Minn Minneapolis, Lambda Elctrns. 612-935-6194
NY Melville, Lambda Elctrns. 516-694-4200
NY Wappinger Falls, Lambda Elctrns. 914-297-4800
NC Pineville, Lambda Elctrns. 704-542-3711
Ohio Cleveland, Lambda Elctrns. 216-585-7808
Pa Frazer, Lambda Elctrns. 215-647-4379
Tex Corpus Christi, Lambda Elctrns. 512-883-6251
Tex Dallas, Lambda Elctrns. 214-341-5130
Tex Houston, Lambda Elctrns. 713-464-6654
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Local Distributors
Cal Burlingame, Logan Assocs. 415-697-6100
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POWER ONE, Dept. EM, 531 Dawson Dr., Camarillo, Cal. 93010, Tel: 805-484-2806, TWX: 910-336-1297; FSC No.: 54407; Empl.: 150; Minimum order: $B. Turkish .... p. 3302,3303

Sales Manager: S. Cole; *Distributor Manager:* B. Turkish

Local Sales Offices & Reps.
Ariz Scottsdale, PLS Assocs. 602-957-9110
Cal Los Angeles, A-F Sls. Engrg. Inc. 213-681-5631
Cal San Diego, Col-Rob Elect. 714-565-6814
Cal Santa Clara, Richards Assocs. 408-246-5860
Colo Denver, PLS Assocs. 303-773-1218
Conn Hamden, Digital Sls. Assocs. 203-281-6539
Fla Orlando, Gra-Mar, Inc. 305-894-3351
Ill Chicago, Holsapple & Assoc. 312-858-8355
Ind Indianapolis, Holsapple Assocs. 317-899-2890
Md Lanham, Brimberg Assoc. 301-552-2200
Mass Waltham, Digital Sls. Assoc. 617-899-4300
Minn Minneapolis, Engrg. Prods. Assoc. 612-925-1883
NJ Madison, Livera-Polk Assoc. 201-377-3220
NM Albuquerque, PLS Assocs. 505-255-2330
NY Burnt Hills, Mktg. Rep. 518-399-9200
NY Roslyn Heights, Livera-Polk Assoc. 516-484-1276
Ore Portland, Hayes Technical 503-238-0001
Tex Dallas, Rogers Martin Assoc. 214-361-8584
Tex Houston, Roger Martin Assoc. 713-444-2944
Wash Seattle, Hayes Technical 206-763-2210

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Cal Santa Clara, Richards Assocs. 408-246-5860
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Fla Orlando, GRA-MAR, Inc. 305-894-3351
Ind Indianapolis, Holsapple & Assocs. 317-899-2890
Md Lanham, Brimberg Assoc. 301-552-2200
Mass Waltham, Digital Sls. Assoc. 617-899-4300
Minn Minneapolis, Engineering Prods. Assoc. 612-925-1883
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NY Roslyn Hts., Livera-Polk Assoc. 201-377-3220
Tex Dallas, Roger-Martin Assoc. 214-361-8584
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POWER PAC, INC., Dept. EM, 18 Marshall St., South Norwalk, Conn. 06854, Tel: 203-866-4484; FSC No.: 53998; Empl.: 85

Sales Manager: G. Falkenthal

Local Sales Offices & Reps.
Cal Hawthorne, WCV Co. 213-772-4479
Cal Mountain View, Thresum Assoc. 415-965-9180
Colo Littleton, Aztec Entprs. 303-795-0250
Conn E. Hartford, Tekdata 203-525-7646
Fla Sattelite Beach, A. M. Lueck, Assoc. 305-773-9270
Ill Chicago, PN Industrial Sls. 312-761-7887
Md New Carrolton, W. A. Brown-Equip. Co. 301-577-4527
Mass Burlington, TEKDATA 617-273-0198
Mich Farmington Hills, Lowell Co. 313-851-7474
Minn Minneapolis, R.J. Inc. 612-922-1425
NM Albuquerque, Aztec Entprs. 505-255-2440
NY Cazenovia, S.T. Woolard 315-655-8145
NY Mt. Vernon, D. Sonkin Assocs. 914-668-9809
Pa Reading, Beil & Whitaker 215-779-2610
Va Alexandria, W. A. Brown-Equip. Co. 703-836-1800
WVa Charleston, W. A. Brown-Equip. Co. 304-342-2700

POWER-PACK, INC., Dept. EM, 1 St. John St., Dover, NH 03820, Tel: 603-749-2929

Local Sales Offices & Reps.
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Cal Long Beach, E. Kirk Engrg. Co. 213-439-9559
Iowa Hiawatha, Gassner & Clark Co. 319-393-5763
Mass Lynnfield, Andrews Airtronics 617-245-5220
NY Fayetteville, Doolittle Elctrns. Corp. 315-637-3222

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Cal Los Angeles, English Sls. Assocs. 714-831-1132
Conn Newtown, Kanan Assocs. 203-426-8157
Ill Chicago, Ropek-Cahill 312-631-0070
Md Baltimore, Callas 301-744-7711
Mass Reading, Kanan Assocs. 617-944-8484
NY Wantagh, Dony Tech Sls. 516-826-5550
Pa Media, W. Reeves Assocs. 215-566-6709
Tex Dallas, R. E. Nesbitt Co. 214-357-4601
Tex Houston, R. E. Nesbitt Co. 713-224-3633
Wash Bellevue, Vantage Corp. 206-455-3460

Local Distributors
Ariz Phoenix, Scottsdale Tool & Supply 602-273-7376

Cal	Hayward, Consolidated Communications	415-783-8181
Cal	Los Alamitos, Protection Prods.	213-598-4212
Cal	Mountain View, C. E. M. Security Prods.	415-965-9000
Cal	Van Nuys, Patane Avionics	213-988-4455
Fla	Miami, ESL Elctrn. Distributors	305-633-6973
Ill	Chicago, Alarm Supply Co.	312-843-8800
Mass	Boston, Security Supply Svc.	617-566-1212
Mass	Boston, Alarm Devices Supply	617-933-8430
Mich	Detroit, Alarm Supply Co.	313-425-2500
Mo	St. Louis, Olive Elctrns.	314-863-7800
NY	New York, Defensive Security Corp.	516-364-0970
Okla	Oklahoma City, Electronic Supply Co.	405-232-5215
Ore	Portland, Sanderson Safety Supply	503-238-5700
Pa	Pittsburgh, Newbrite Inds.	412-361-1600
Tex	Dallas, Dallas Instrs.	214-349-1180
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Ill	Mt. Prospect, Cain & Co.	312-253-3578
Mass	Reading, Gader & Rotundi	617-944-3105
NJ	Livingston, G & A Sales	201-992-3087
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Ohio	Reynoldsburg, Cain & Co.	614-861-2119
Pa	Lafayette Hill, M. Lader & Co.	215-825-3177
Va	Woodbridge, M. Lader & Co.	703-494-4731

POWER SYSTEMS, INC., Dept. EM, 12 Tobey Rd., Bloomfield, Conn. 06002, Tel: 203-243-0357; FSC No.: 50463; Empl.: 50 ... p. 3304,3305

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	205-534-3387
Conn	Wallingford, Com-Sale	203-269-7964
Fla	Clearwater, Brennan Assocs.	813-446-5006
Ill	Wood Dale, K Assocs.	312-595-8343
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Mass	Waltham, Com-Sale	617-890-0011
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NH	Londonderry, Com-Sale	800-258-5200
NJ	Cherry Hill, Scientific Reps.	609-482-0059
NJ	Paramus, S.D.N. Representatives	201-368-0123
NY	Rochester, S.D.M. Representatives	716-544-8080
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Chesterland, Electroquipment Sls.	216-729-2222
Ohio	Dayton, Electroquipment Sls.	513-434-8993

POWER SYSTEMS & CONTROLS, INC., Dept. EM, 3206 Lanvale Ave., Richmond, Va. 23230, Tel: 804-355-2803; Empl.: 40

Local Sales Offices & Reps.

Iowa	Des Moines, Beckley Electric Co.	515-288-3201
Mass	Framingham, C. Pappas Assocs.	617-877-2984
Minn	Minneapolis, Electro-Serv Co.	612-827-2907
Mo	Florissant, C. Mark Corp.	314-921-4444
NY	Great Neck, H.J. Krasner Assocs.	516-487-0690
Ohio	Cincinnati, Data Processing Sciences Corp.	513-961-0776
Tex	Richardson, Computer Mktg. Corp.	214-231-1426
Wash	Seattle, SJI Corp.	206-624-9020

POWER TECHNOLOGY, INC., Dept. EM, Box 4403, 7925 Mablewave Cutoff, Little Rock, Ark. 72204, Tel: 501-568-1995; Empl.: 18 ... p. 1468

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POWER WAVES INC., Dept. EM, Box 1353, Asbury Park, N.J. 07712, Tel: 201-774-8322; Empl.: 6

Local Sales Offices & Reps.

Cal	San Francisco, Microwave of Cal.	415-467-1071
NJ	Middletown, Juno-Mutz	201-774-8322

POWERCUBE CORP., Dept. EM, 214 Calvary St., Waltham, Mass. 02154, Tel: 617-891-1830, TWX: 710-324-0300; FSC No.: 31557; Empl.: 95

Local Sales Offices & Reps.

Ala	Huntsville, REMCO - Huntsville	205-533-6029
Ariz	Phoenix, Interstate Mktg. of Ariz.	602-968-7201
Cal	Palo Alto, Brooks Tech. Grp.	415-328-3232
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Littleton, Simpson Assocs.	303-794-8381
Conn	East Hartford, Tekdata	203-525-7647
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-8183
Iowa	Cedar Rapids, Technical Reps.	319-396-5662
Kans	Olathe, Technical Reps.	913-782-1177
Md	Ellicott City, Applied Engrg. Consultants	301-465-1272
Mass	Burlington, Tekdata	617-273-0198
Mich	Milford, T. Mulligan & Assocs.	313-363-5575
Mo	Hazelwood, Technical Reps.	314-731-5200
NJ	Clifton, Compar New York	201-546-3660
NY	Albany, Reagan/Compar Albany	518-489-7408
NY	Endwell, Reagan/Compar Albany	607-723-8743
NY	Fairport, Reagan/Compar Albany	716-271-2230
NY	New Hartford, Reagan/Compar Albany	315-732-3775
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242
Ore	Portland, Almac/Stroum Elctrns.	503-292-3534
Tenn	Bristol, Remco	615-968-4195
Tex	Dallas, Electra III Co.	214-243-5969
Utah	Salt Lake City, Simpson Assocs.	801-486-3731
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300

POWERMATIC, Dept. EM, 8057 Raytheon Rd., San Diego, Cal.

POWERTEC, INC., Dept. EM, 9168 DeSoto Ave., Chatsworth, Cal. 91311, Tel: 213-882-0004, TWX: 910-494-2092; Empl.: 300 ... p. 3307

Local Sales Offices & Reps.

Ala	Huntsville, Murcota Corp.	205-539-8476
Ariz	Scottsdale, Barnhill Three Inc.	602-947-7841
Cal	Los Altos, Powertec, Inc.	415-941-6200
Colo	Denver, Barnhill Three Inc.	303-750-1222
Fla	Ft. Lauderdale, Powertec, Inc.	305-491-8862
Ill	Wood Dale, K-Assoc.	312-595-8343
Ind	Carmel, S.A.I. Mktg. Corp.	317-297-3146
Iowa	Cedar Rapids, Comstrand	319-377-1575
Kans	Wichita, Tech Reps. Inc.	316-681-0011
Md	Wheaton, Data Sys. Mktg.	301-933-6111
Mass	Wakefield, Powertec Inc.	617-245-1390
Mich	Brighton, S.A.I. Mktg.	313-227-1786
Mich	Grand Rapids, S.A.I. Mktg. Corp.	616-942-2504
Minn	Minneapolis, Comstrand Inc.	612-571-0000
Mo	Hazelwood, Tech Reps. Inc.	314-731-5200
NJ	Tenafly, ABC Elctrn. Sls.	201-568-2354
NM	Albuquerque, Barnhill Three Inc.	505-299-7658
NY	Endicott, Tech-Mark Inc.	607-748-7473
NY	Fairport, Tech-Mark Inc.	716-223-1252
NY	Liverpool, Tech-Mark Inc.	315-652-6229
NY	Tarrytown, ABC Elctrn. Sls.	914-631-2650
NY	Williston Park, ABC Elctrn. Sls.	516-747-6610
NC	Winston-Salem, Murcota Corp.	919-722-9445
Ohio	Beachwood, SAI Mktg.	216-292-2982
Ohio	Cincinnati, S.A.I. Mktg. Corp.	513-761-5432
Ohio	Dayton, S.A.I. Mktg. Corp.	513-277-8911
Pa	Huntingdon Valley, R. Knowles Assoc.	215-947-5641
Pa	Pittsburg, SAI Mktg.	412-782-5120
Tex	Dallas, P.J. Scanlon Co.	214-231-4661
Tex	Houston, P.J. Scanlon Co.	713-781-9036
Va	Springfield, Scientific Devices D.C.	703-451-6500
Wash	Bellevue, A. Smith Co.	206-746-6770
Exp:	Los Angeles, Kanematsu-Gosho (USA) Inc.	213-483-2598

POWERTECH, INC., Dept. EM, 0-02 Fairlawn Ave., Fairlawn, N.J. 07410, Tel: 201-791-5050; FSC No.: 32953; Empl.: 25

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™POW'RIVETERS - riveting tool - Vaco Products Co.

™POW'RIVETS - blind (pop) rivets - Vaco Products Co.

™POW-R PAC - converter, rectifier - Price & Rutzebeck

™POXYLUBE - dry-film lubricants - General Devices Co., Inc.

PPC PRODUCTS CORP., Dept. EM, 542 Industrial Way West, Eatontown, N.J. 07724, Tel: 201-542-1393, 800-631-2149, Telex: 132445; FSC No.: 5961; Empl.: 35

Sales Manager: A. Scornavacca

Local Sales Offices & Reps.

Ariz	Phoenix, Mercury Engrg. Sls.	602-279-2367
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Ill	Rolling Meadows, Lightner Assocs.	312-398-3000
Mass	Needham, Stone Comp. Sales	617-444-1405
Mich	Benton Harbor, R. C. Nordstrom & Co.	616-429-8560
Mich	Lathrup, R.C. Nordstrom & Co.	313-559-7373
NY	Fairport, RBG Sls.	716-377-1390
Ohio	Dayton, Buckeye Comps.	513-278-4279
Ohio	Lyndhurst, Technical Sls. Assocs.	216-461-0826
Tex	Houston, Wheelex Inc.	713-771-2114
Tex	Hurst, Wheelex Inc.	817-268-1812
Wash	Seattle, Blum & Assocs.	206-285-2590

PPM, INC., Dept. EM, 7575 Bond St., Cleveland, Ohio 44139, Tel: 216-232-4140; Empl.: 10 ... p. 2921

Sales Manager: A.L. Bletcher

Local Sales Offices & Reps.

Ariz	Tempe, J. Smith & Assocs.	602-968-7025
Colo	Denver, J. Smith & Assocs.	303-442-7100
Mich	Ferndale, Tiby Co.	313-547-3550
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NC	Charlotte, Binco	704-366-5092
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822

PRACTICAL AUTOMATION, INC., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484, Tel: 203-929-5381, Telex: 96-4217; Empl.: 150 ... p. 1678

Sales Manager: R. Banzaca

Local Sales Offices & Reps.

Cal	Montebello, Tucul Engrg.	213-728-7397
Cal	San Carlos, Electro Pacific	415-593-1334
Conn	Boulder, Par Assocs	303-499-4736
Conn	Southbury, J. J. Wild	203-264-9494
Fla	Coral Springs, ShaW Engrg. & Sls.	305-752-7596
Ill	Arlington Heights, Martec Assocs., Inc.	312-956-6090
Kans	Kansas City, Sheridan Assocs.	913-383-1636
Mass	Needham, J. J. Wild	617-444-2366
Mich	Grand Rapids, R. P. Urban & Assocs.	616-245-0511
Minn	Mpls., Wenco Sls.	612-866-3639

Mo	St. Louis, Sheridan Assocs	314-837-5200
NJ	Woodbridge, J. J. Wild	201-636-7780
NY	Jericho, J. J. Wild	516-935-6600
NY	Rochester, KLM Assocs.	716-442-0820
NY	Syracuse, KLM Assocs.	315-458-2199
NY	Utica, KLM Assoc.	315-735-8525
Ohio	Chagrin Falls, J. Kilroy	216-247-8997
Pa	Newtown Sq., Holdsworth	215-356-8550
Tex	Dallas, Glidden Engrg. & Elctrn. Eqpt.	214-363-6539
Tex	Houston, Glidden Engrg. & Elctrn. Eqpt.	713-681-1415

PRD ELCTRNS., DIV. OF HARRIS CORP., see Harris Corp., PRD Electronics Div.

(TM)PRAM - four channel programmable amplifier - Harris Semiconductor

(TM)PRECISION - vacuum pumps - GCA/Precision Scientific

(TM)PRECISION AERON - air pollution test equipment - GCA/Precision Scientific

PRECISION CONCEPTS, INC., Dept. EM, 1595 B. Ocean Ave., Bohemia, N.Y. 11716, Tel: 516-567-0995

PRECISION DIPBRAZE/TOR., See TOR Corp.

PRECISION DYNAMICS CORP., Elctrns. Div., Dept. EM, 3031 Thornton, Burbank, Cal. 91504, Tel: 213-845-7606, Telex: 69-1336; Empl.: 85

Local Sales Offices & Reps.

Cal	San Diego, Ohm Spun Sls.	714-277-6230
Cal	Sunnyvale, Cutlass Elctrns.	408-733-5885
Cal	Torrance, Cutlass Elctrns.	213-324-7360
NY	Kew Garden Hills, Jacques Edeline	212-861-6387

PRECISION ELECTRONICS, INC., Dept. EM, 0101 King Ave., Franklin Park, Ill 60131, Tel: 312-678-5350; Empl.: 75

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-536-0476
Cal	Los Angeles, E. E. Strassner Co.	213-666-1511
Cal	San Francisco, Meyer & Ross	415-285-8880
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ind	Indianapolis, R. Milsk Co.	317-546-5468
La	New Orleans, Cartwright & Bean	504-279-4598
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Minneapolis, J. E. Anderson	612-823-6459
Miss	Jackson, Cartwright & Bean	601-981-1368
NH	Londonderry, Associated Sys.	603-434-0731
NJ	Westfield, Electro Mktg.	201-232-7531
NC	Raleigh, Cartwright & Bean	919-834-1186
Ohio	North Olmsted, Avcom, Inc.	216-777-2060
Okla	Tulsa, J. F. McKinney Sls.	918-742-6791
SC	Charlotte, Cartwright & Bean	704-333-6157
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, J. F. McKinney Sls.	214-631-9450
Exp:	Ill., Chicago, E.D. Magnus & Associated	312-334-1502
Exp:	N.Y., Plainview, Morhan Exporting Corp.	516-293-5582

Local Distributors

Conn	Hartford, Communications Prods.	203-522-9117
Mich	Grand Rapids, Bursma Radio Supply Co.	616-459-4328
Nev	Reno, Executone of Northern Nev.	702-329-3116
Okla	Oklahoma City, Oklahoma Theatre Supply	405-236-8691
Pa	Broomal, High Fidelity Hse.	215-544-4420
Tex	Fort Worth, H. Jordan Sound	
Tex	Odessa, Elctrn. Svc. Center	915-337-0328
Utah	Salt Lake City, Marshall Inds./General Comm.	801-266-2428
Wash	Spokane, National Music Svc. Corp.	509-327-7784

PRECISION ELEC. CO., Dept. EM, Federal Rd., Kezar Falls, Me. 04047, Tel: 207-625-3243, TWX: 710-990-7506; Empl.: 10

(TM)PRECISION ELECTROMECHANICAL CERAMICS - ferrites, barium, titanate and PZT materials - Uthe Technology Int'l.

PRECISION FILTERS, INC., Dept. EM, 303 W. Lincoln St., Ithaca, N.Y. 14850, Tel: 607-277-3550 p. 2745

Sales Manager: Don Chandler

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Cal	Costa Mesa, FLW, Inc.	213-860-4645
Cal	San Diego, FLW, Inc.	714-277-0993
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-945-4222
Md	Fulton, Gans, Fryling & Pugh	301-837-6311
Mass	Concord, RDS Assocs.	617-369-7935
NM	Albuquerque, Burt Dieruf Assocs.	505-299-0989
NY	Liverpool, Rayelco Assocs.	315-652-5272
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Columbus, R.D. Cloon Assocs.	614-459-2890
Pa	Chester Springs, Letronix	215-458-8977
Tex	Dallas, Cary Wolf	214-823-5383
Tex	Ft. Worth, Cary Wolf	817-738-1996
Tex	Houston, Cary Wolf	713-721-2442
Va	Arlington, Gans, Fryling & Pugh	703-527-3262

PRECISION LAMP, INC., Dept. EM, 950 N. Rengstorff Ave., Mountain View, Cal. 94043, Tel: 415-965-1333, Telex: 348498; Empl.: 25

Local Sales Offices & Reps.

Cal	Los Angeles, Duo Dynamics	213-240-4111
Cal	San Jose, Verwer Assocs.	408-866-9102
Conn	North Haven, Comp Rep Dists.	203-239-9762
Fla	Lighthouse Point, J. Krutek & Assocs.	305-941-6544
Ill	Chicago, G. McL. Cole Co.	312-774-3535
Ind	Fort Wayne, W.W. Bieberich Co.	219-432-2537
Ind	New Albany, W.W. Bieberich Co.	812-945-3187
Mass	Needham, Comp. Rep. Distrs.	617-444-2484
Mich	Grand Rapids, J.L. Montgomery Assocs.	616-774-9308
Mich	Southfield, J.L. Montgomery Assocs.	313-358-2616
Minn	Minneapolis, R-J Inc.	612-922-1425
NJ	Flanders, K & R Engrg. Sls. Co.	201-584-5235
NJ	Upper Montclair, Controlyne, Inc.	201-746-8900
Pa	Newtown Square, Kaufholz Assocs.	215-356-5000
Tex	Dallas, Scott Tech. Sls.	214-352-7698
Wash	Bellevue, W.M. Buehler Co.	206-455-5512
Wisc	Menomonee Falls, G. McL. Cole Co.	414-251-6083
Exp:	Cal., Mountain View, Precision Lamp	415-965-1333

(TM)PRECISION MAG-MIX - magnetic stirrers - GCA/Precision Scientific

PRECISION MECHANISMS CORP., Dept. EM, 44 Brooklyn Ave., Westbury, N.Y. 11590, Tel: 516-ED 3-5955; FSC No.: 08127; Empl.: 26 ...... p. 1679,3953

Local Sales Offices & Reps.

Cal	Cupertino, Eakins ASSOC.	408-255-6494
Conn	Southbury, J.J. Wild, Inc.	203-264-9494
Mass	Needham, J.J. Wild, Inc.	617-444-2366
Mich	Brighton, Lowry & Assocs.	313-227-7067
NJ	Woodbridge, J.J. Wild, Inc.	201-636-7780
NY	Jericho, J.J. Wild, Inc.	516-935-6600
NY	Penfield, A & D Devices	716-586-8033
NC	Charlotte, B. Fanchier & Assoc.	704-376-1753
Pa	Southampton, J.J. Wild, Inc.	215-357-6645

PRECISION METAL PRODS. CO., Dept. EM, 41 Elm St., Stoneham, Mass. 02180, Tel: 617-438-3650, TWX: 710-393-0113; FSC No.: 86577; Empl.: 54

Local Sales Offices & Reps.

Ariz	Phoenix, J. Osborn Assocs.	602-996-1291
Cal	Corte Madera, P. Oneal & Assocs.	415-924-1691
Cal	Garden Grove, Impact Elctrns., Inc.	213-431-3581
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Fla	Winter Park, Steele Tech. Sls.	305-644-6641
Ga	Atlanta, Mr. G. O'Hara	404-237-0600
Ill	Hinsdale, Hill-Gray Assocs.	312-325-4810
Ind	Indianapolis, New/Era Sls., Inc.	317-299-3400
Mich	Lathrup Village, R.C. Nordstrom & Co.	313-559-7373
NY	Mount Vernon, Zauderer Assocs., Ins.	914-664-7385
NY	Syracuse, C.W. Floring & Assocs.	315-478-2149
NC	Greensboro, D M I Mfrs.	919-885-4634
Ohio	Cleveland, Electro-Com	216-886-2404
Ohio	Dayton, Electro-Com	513-276-3993
Pa	Media, Snyder & Stefkovic Assocs. Inc.	215-566-5400
Tex	Arlington, Chaparral Inds.	817-265-2418
Wash	Woodinville, W.J. Stulgis Co.	206-486-8539

PRECISION MONOLITHICS INC., Dept. EM, 1500 Space Dr., Santa Clara, Cal. 95050, Tel: 408-246-9222, TWX: 910-338-0528; Empl.: 250

Sales Manager: H. Sharek

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps.	205-539-4411
Ariz	Tempe, Argus Sales, Inc.	602-967-8709
Cal	Mt. View, Thresum Assoc.	415-965-9180
Cal	San Diego, L & S Assocs.	714-455-0055
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	Wallingford, Com-Sale	203-269-7964
Fla	Clearwater, Dyne-A-Mark	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
Ga	Chamblee, W.A. Brown Comps.	404-455-0405
Ill	Rolling Meadows, Sumer Inc.	312-394-4900
Ind	Indianapolis, Jerry Ihrig Assoc., Inc.	317-783-7630
Iowa	Cedar Rapids, Comstrand	319-377-1575
Kans	Olathe, Tech Reps	913-782-1177
Mass	Waltham, Com-Sale	617-890-0011
Mich	Detroit, A. Blumenberg Assocs.	313-557-1934
Mich	St. Joseph, A. Blumberg Assoc.	616-983-0481
Minn	Minneapolis, Comstrand	612-571-0000
Mo	Hazelwood, Tech Reps	314-731-5200
NM	Albuquerque, Waugaman Assocs.	505-294-1436
NY	Jericho, J-Square Mktg.	516-997-6210
NC	Raleigh, W.A. Brown Comps.	919-781-9426
Ohio	Cleveland, D. Steffen & Assocs.	216-461-8333
Ohio	Dayton, D. Steffen & Assoc.	513-293-3145
Ohio	Lexington, D. Steffen & Assoc.	419-884-2313
Ore	Portland, SJI, Corp.	503-224-0344
Tex	Houston, Oeler & Menelaides, Inc.	713-772-0730
Tex	Richardson, Oeler & Menelaides, Inc.	214-234-6334
Utah	Salt Lake City	801-363-0275
Wash	Seattle, Showalter-Judd, Inc.	206-624-9020
Wisc	Milwaukee, Sumer	414-259-9060

Local Distributors

Ala	Huntsville, Hallmark Elctrns.	205-837-8700
Ariz	Phoenix, Sterling Elctrns.	602-258-4531
Cal	Chatsworth, Westates Elctrns.	213-341-4411
Cal	Costa Mesa, Westates Elctrns.	714-549-8401
Cal	Gardena, Bell Industries	213-321-5802
Cal	San Diego, Intermark Elctrns.	714-279-5200
Cal	Santa Ana, Intermark Elctrns.	714-540-1322
Cal	Sunnyvale, Bell Industries	408-734-8570
Cal	Sunnyvale, Intermark Elctrns.	408-738-1111
Colo	Wheatridge, Century Elctrns.	303-424-1985
Conn	Norwalk, Harvey Elctrns.	203-853-1515
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Fla	Orlando, Harvey Elctrns.	305-855-4020
Ill	Chicago, Pioneer Elctrns.	312-437-9680
Ill	Chicago, Hallmark Elctrns.	312-437-8800
Ind	Indianapolis, Pioneer Elctrns.	317-849-7300
Kans	Shawnee Mission, Hallmark Elctrns.	913-888-4747
Md	Baltimore, Hallmark Elctrns.	301-796-9300
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	Lexington, Harvey Elctrns.	617-861-9200
Mich	Livonia, Pioneer Elctrns.	313-525-1800
Minn	Bloomington, Hallmark Elctrns.	612-884-9056
Mo	Earth City, Hallmark Elctrns.	314-291-5350
NJ	Fairfield, Harvey Elctrns.	201-227-1262
NM	Albuquerque, Century Elctrns.	505-292-2700
NY	Binghamton, Harvey (Federal) Elctrns.	607-748-8211
NY	West Henrietta, Harvey Elctrns.	716-334-5920
NY	Woodbury, Harvey (Radio) Elctrns.	516-921-8700
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Ohio	Dayton, Pioneer Elctrns.	513-236-9900
Okla	Tulsa, Hallmark Elctrns.	918-835-8458
Pa	Huntingdon Valley, Hallmark Elctrns.	215-355-7300
Pa	Pittsburgh, Pioneer Elctrns.	412-782-2300
Tex	Austin, Hallmark Elctrns.	512-837-2814
Tex	Dallas, Hallmark Elctrns.	214-231-5101
Tex	Dallas, Sterling Elctrns.	214-357-9131
Tex	Houston, Hallmark Elctrns.	713-718-6100
Tex	Houston, Sterling Elctrns.	713-627-9800
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For:	Can., Toronto, Ont., Westburne Elctrns.	416-787-2461
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PRECISION PAPER TUBE CO., Dept. EM, 1049 S. Noel Ave., Wheeling, Ill. 60090, Tel: 312-537-4250; Empl.: 185

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Cal	Los Angeles, C.E. Riggs, Inc./C.D. Lamoree Co.	213-225-5631

Conn	West Hartford, R.S. Pettigrew & Co.	203-233-8533
Ga	Douglasville, 20th Century Mktg.	404-942-6483
Ind	Indianapolis, J. Berger	317-357-1494
Kans	Prairie Village, TMR Materials Co.	913-362-3500
Mo	St. Louis, TMR Materials Co.	314-832-8689
NJ	Rocky Hill, Krone & Rubin Assoc.	609-924-0200
NY	Webster, J. Giovenco	716-671-6709
Ohio	Westlake, Buckeye Bobbin & Mfg. Div.	216-871-9020
Ore	Portland, C.E. Riggs Inc./C.D. Lamorree Co.	503-226-3286
Wash	Seattle, C.E. Riggs Inc./C.D. Lamorree Co.	206-623-5707
Exp:	Can., Mississauga, Ont., Anbak Sls., Can., Ltd.	416-625-1061

(TM)PRECISION P/S ALLOY - laboratory clamps - GCA/Precision Scientific

PRECISION RESISTOR CO., INC., Dept. EM, 109 U.S. Hwy. 22, Hillside, N.J. 07205, Tel: 201-926-3036; FSC No.: 48615; Empl.: 40 .... p. 3718

(TM)PRECISION TEMPSTIR - lab. mixer/stirrer/temp. controller - GCA/Precision Scientific

(TM)PRECISION THELCO, FREAS - ovens, incubators, baths - GCA/Precision Scientific

PRECISION TIMER CO., Dept. EM, 13 Westbrook Ind'l. Park, Westbrook, Conn. 06498, Tel: 203-399-6253; Empl.: 25

Local Sales Offices & Reps.

Conn	Westbrook, Precision Timer Co.	203-399-6253

PRECISION TUBE, Dept. EM, Church Rd. & Wissahickon, No. Wales, Pa. 19454, Tel: 215-699-5801, Telex: 84-6439; FSC No.: 82413; Empl.: 170

Local Sales Offices & Reps.

Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	Mt. View, Walter Assoc., Inc.	415-965-4131
Cal	Santa Ana, RMS Assocs.	714-556-4155
Fla	Melbourne, Hanson Assocs.	305-727-7474
Ga	Alpharetta, K. Ekmark	404-475-4872
Ill	Crystal Lake, MESA, Inc.	312-639-3359
Ind	Indianapolis, Sukup & Cox, Inc.	317-253-1215
Iowa	Cedar Rapids, Snider Sls. Co.	319-362-4410
Mass	Burlington, Tri Tek, Inc.	617-272-4550
Minn	St. Louis Park, Xylem Co.	612-920-9626
Mo	St. Charles, Buse Sls. Co.	314-946-6430
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Huntington, CDB Enterprises, Inc.	516-692-5200
NY	Utica, B. D. Hummel Co.	315-736-7821
NC	Charlotte, McLean Sls. Co.	704-366-2675
Tex	Dallas, Stevens Sls.	214-350-2476
Va	Fairfax, Schibley Assocs.	703-591-3008
Wash	Seattle, Blum & Assocs.	206-285-2590

(TM)PRECO - bobbin lugger - Precision Paper Tube Co.

(TM)PREENX - heater cable & cord - General Electric Co.

PREFORMED LINE PRODUCTS CO., Dept. EM, Box 91129, Cleveland, Ohio 44101, Tel: 216-461-5200, Telex: 980-407; Empl.: 450

Local Sales Offices & Reps.

Ala	Birmingham, Belcher & Assocs.	205-322-1733
Ala	Birmingham, Glenn, Huhman & Mills, Inc.	205-956-6620
Ark	Little Rock, C.H. Stout, Inc.	501-372-2555
Ark	Rogers, Preformed Line Prods. Co.	501-636-7600
Cal	Palo Alto, Preformed Line Prods. Co.	415-493-0170
Cal	San Francisco, K.M. Ryals Co.	415-495-7090
Cal	Woodland Hills, Smith Co. Div.	213-887-8600
Colo	Denver, Peterson Co.	303-388-6322
Colo	Littleton, R.J. Hodona	303-979-1079
Fla	Jacksonville, Belcher & Assocs.	904-724-7811
Fla	Miami, Belcher & Assocs.	305-661-3116
Fla	St. Petersburg, Belcher & Assocs.	813-822-3531
Ga	Atlanta, Belcher & Assocs.	404-255-5481
Ga	Decatur, Glenn, Huhman & Mills, Inc.	404-294-6295
Ga	Tucker, Preformed Line Prods. Co.	404-938-6820
Haw	Honolulu, J.W. Smith	808-988-3079
Ill	Schiller Park, JSG Elec. Co.	312-678-5990
Ind	Indianapolis, Cory, Crum & English, Inc.	317-545-8593
Iowa	Cedar Rapids, F.C. Clatterbaugh Co.	319-364-5557
Iowa	Des Moines, F.C. Clatterbaugh Co.	515-282-3213
Ky	Bowling Green, Dyer-Pederson Agency	502-842-9346
Ky	Lexington, Dyer-Pederson Agency	606-266-7412
Ky	Morganfield, Dyer-Pederson Agency	502-389-1744
La	Baton Rouge, C.H. Stout of La. Inc.	504-927-8097
La	New Orleans, C.H. Stout of La. Inc.	504-486-3707
La	Shreveport, C.H. Stout of Shreveport, Inc.	318-221-5555
Md	Annapolis, P.J. Martini & Assocs.	301-267-7462
Md	Reistertown, Electrical Distributors Co.	301-833-7372
Mass	Brimfield, E.L. Flowers & Sons	413-245-7922/23
Mich	Dearborn, G.R. Horne & Co.	313-561-1360
Mich	Jackson, G.R. Horne & Co.	517-536-4387
Minn	Faribualt, Great Lakes Telephone Supply Co.	507-334-2269
Minn	Minneapolis, Bergstrom-Verbarg Co.	612-339-0028
Miss	Clinton, C.H. Stout of MS, Inc.	601-924-7611
Mo	Kansas City, Cleaves-Bessmer-Marietti, Inc.	816-353-6011
Mo	St. Louis, Ken Way Co.	314-961-3062
Neb	Lincoln, F.C. Clatterbaugh Co.	402-489-5912
Neb	Omaha, F.C. Clatterbaugh Co.	402-333-1600/1603
NM	Albuquerque, McKinley Sls. Co.	505-293-6277
NY	Eastchester, M.N. Snyder & Sons, Inc.	914-337-6000
NY	Horseheads, Canavan-Scanlon Assoc.	607-739-0810
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
Ohio	Vermilion, R.S. Howley Co.	216-967-8787
Okla	Oklahoma City, C.B. Anderson Elec. Co.	405-751-2771
Okla	Tulsa, C.B. Anderson Elec. Co.	918-836-4661
Ore	Portland, Shaffer & Nelson, Inc.	503-234-7437
Pa	Conshohocken, Electrical Distributors Co.	215-825-1305
Pa	Pittsburgh, Burns Elec. Co.	412-823-5874
SC	Columbia, Engr. Sls. Co. of Carolina, Inc.	803-799-0830
Tenn	Memphis, C.H. Stout of TN, Inc.	901-362-1616
Tenn	Nashville, J.S. Baron Assocs.	615-883-4748
Tex	Dallas, E.B. Robertson, Inc.	214-942-2711
Tex	Houston, E.B. Robertson, Inc.	713-785-6800
Tex	Lubbock, E.B. Robertson, Inc.	806-746-6527
Utah	Salt Lake City, Shaffer & Nelson, Inc.	801-972-2323
Wash	Seattle, Shaffer & Nelson, Inc.	206-523-0664
Wash	Spokane, Shaffer & Nelson, Inc.	509-624-1339

(TM)P/REL - programmable rotary encoded logic switch - Standard Grigsby Inc.

PREMAX PRODS. DIV., Chisholm-Ryder Co., Dept. EM, Highland & College Aves., Niagara Falls, N.Y. 14305, Tel: 716-285-9186, Telex: 91-531; FSC No.: 74183; Empl.: 350

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Culver City, DeAngelo, Rotham & Co.	213-398-6239
Cal	La Selva Beach, Belchamber & French	408-684-1007
Colo	Denver, G. Moss Elctrns., Inc.	303-455-7205
DC	Washington, S.K. Macdonald, Inc.	202-265-3938
Kans	Shawnee Mission, K & M Sls. Co.	913-262-2444
Md	Baltimore, S.K. Macdonald, Inc.	302-254-3380
NY	Rockville Centre, L.I., Willgold Elctrn. Sls. Corp.	516-764-4022
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Ohio	Goshen, J.O. Olsen Co.	513-625-6791
Ore	Portland, R.M. Minthrone Co.	503-246-4556
Pa	Philadelphia, S.K. Macdonald, Inc.	215-545-1205
Pa	Pittsburgh, S.K. Macdonald, Inc.	412-366-2643
Tex	Carrollton, E. L. Wilks Co.	214-242-5321
Exp:	New York City, N.Y., M. Simons & Son Co.	212-227-5513

(TM)PRE-MET FILTER - plating solution filter - Sel-Rex Div. Oxy Metal Industries Corp.

PREMIER METAL PRODS. CO., Div. Sunshine Mining Co., Dept. EM, 381 Canal Place, Bronx, N.Y. 10451, Tel: 212-993-9200; Empl.: 70 .... p. 1142-1147

Local Sales Offices & Reps.

Ala	Birmingham, Adams & Assocs.	205-979-2459
Ariz	Phoenix, MR Engrg. Sls.	602-959-5150
Cal	Culver City, DeAngelo, Rothman & Co.	213-398-6239
Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Conn	East Haven, Eagle Assocs.	203-467-6542
Fla	Orlando, Adams & Assocs.	305-894-7185
Ga	Marietta, Adams & Assocs.	404-973-0853
Ill	Chicago, Ellinger Sls.	312-763-1570
Kans	Shawnee Mission, Delltron Co.	913-362-5512
Md	Silver Spring, Eastern Instrumentation	301-622-4200
Mass	Needham, Eagle Assocs.	617-444-3446
Minn	Minneapolis, J.E.M. Anderson Co.	612-823-6459
Mo	St. Louis, Delltron Co.	314-869-4779
NY	Mt. Vernon, Sonkin Assocs.	914-668-9809
NY	New Hyde Park, Harris & Aldrich Sls.	516-488-2622
NY	Syracuse, Lewis-Dunnigan Co.	315-446-5522
NC	Greenboro, Adams & Assocs.	919-272-6838
Ohio	Cleveland, ImTech Inc.	216-826-3400
Pa	Easton, Kaiser Assocs.	215-258-6477
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Tenn	Knoxville, Adams & Assocs.	615-577-4241
Tex	Garland, G.V. Peck	214-341-8311
Tex	Houston, G.V. Peck	713-780-2220
Exp:	Hallandale, Fla., Emec, Inc.	305-925-6366

Local Distributors

Ala	Opelika, Southern Elctrns.	205-745-5298
Ariz	Phoenix, Dalis Elctrns.	602-258-8151
Cal	Burlingame, Rose Elect Distrs.	415-697-6267
Cal	San Jose, Quement Elctrns.	408-998-5900
Conn	Waterbury, Bond Radio Elec. Co.	203-757-0546
Fla	Miami, Electronic Equip. Co.	305-871-3500
Fla	Tampa, Lykes Elctrn. Corp.	813-886-6621
Haw	Honolulu, Honolulu Elctrns.	808-949-5564
Ill	Elk Grove Vlg., GBL Elctrns. Corp.	312-593-3220
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Md	Baltimore, A.S.I. Elctrns	301-265-5100
Md	Baltimore, Radio Elec. Serv. of Balt.	301-823-0070
Md	Bethesda, Empire Elctrn. Supply	301-656-3300
Mass	Boston, Sager Elctrn, Corp.	617-542-2281
Mass	Chicopee, Diplomat/IPC of Mass.	423-592-9441
Mass	Newton, Greene Shaw Co.	617-969-8900
Mich	Augusta, Great Lakes Elctrns.	612-731-4156
Mo	Fenton, Television Engr. Dist.	314-343-5605
NJ	Hanover, State Elctrns. Pts.	201-887-2550
NJ	Springfield, Federated Purchasers	212-DI9-3050
NJ	Union City, Nidisco Inc.	201-863-2111
NY	Albany, E. E. Taylor Co.	518-438-4461
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Elmsford, Ancar Elctrns. Supply	914-592-7100
NY	Farmingdale, Broadline Elec. Dist.	516-420-8320
NY	L. I. C., H.L. Dalis, Inc.	212-361-1100
NY	Lynbrook, Peerless Radio Dist Corp.	212-523-3456
NY	New York, Martin Audio Corp.	212-541-5900
NY	New York, Argil Elec. Ltd.	212-691-8111
NY	Port Chester, Wise Elctrns	914-939-3540
NY	Rochester, Summit Distrs.	716-334-8110
NY	Rockville, Midway Industrial	516-764-2400
NY	Syosset, Lafayette Radio Corp.	516-921-7700
NY	Woodbury, Harvey Radio Corp.	516-895-9260
NY	Yonkers, Yonkers Elctrns Supply	914-969-6044
Ohio	Cleveland, D & N Elctrns.	216-888-7426
Pa	Allentown, A. A. Peters	215-434-5237
Pa	Philadelphia, Philadelphia Elctrns.	215-568-7400
Pa	Reading, Barbey Elctrns.	215-376-6116
RI	Providence, W. Dandreta Co.	401-861-2800
Tex	Dallas, Summers Southland	214-748-6533
Tex	Ft. Worth, Swieco Inc.	817-335-6521
Tex	Houston, Lenert Co.	713-225-1465
Va	Arlington, Arlington Elctrns.	703-524-2412
Wash	Seattle, Radar Electric Co.	206-282-2511

PREMIER MICROWAVE, Dept. EM, 35 New Broad St., Port Chester, N.Y. 10573, Tel: 914-939-8900, TWX: 710-569-1609; FSC No.: 15870; Empl.: 45

Local Sales, Offices & Reps.

Cal	Los Angeles, R.F. Assocs.	213-478-1586
Cal	San Mateo, Melvin Sls. Co.	415-349-7444
Fla	Orlando, BC Elctrns. Sls. Corp.	305-894-6071
Ga	Smyrna, BC Electrnc. Sls. Corp.	404-436-5169
Ill	Chicago, L.G.S. Elctrns. Sls.	312-456-9616
La	Metairie, J. F. McKinney Sls. Co.	504-887-1723
Md	Catonsville, Callas Elctrns. Dist.	301-744-7711
Mass	Natick, Gerald Rosen Co.	617-879-5505
Mo	St. Louis, G Fixman Engrg.	314-725-5219
NY	Huntington, C.D.B. Entprs.	516-692-5220
Ohio	Dayton, BEK Assocs.	513-278-1343

Okla	Tulsa, J. F. McKinney Sls.	918-742-6791
Tex	Bellaire, J. F. McKinney Sls. Co.	713-665-3653
Tex	Dallas, J. F. McKinney Sls.	214-631-9450
Va	Vinton, BC Elctrnc. Sls. Corp.	703-890-1128
Exp:	Cal., No. Hollywood, Air Frame Mfg. & Supply	213-765-2600
Exp:	New York, N.Y., Singer World Prods. Inc.	212-432-1400

PREMIX, INC., Dept. EM, 4641 Dorchester Dr., Erie, Pa. 16509

™PRE-PACK - architectural dimming systems - Lutron Electronics Co.

™PREP-LAP - seam welders - Taylor-Winfield Corp.

™PRES-BOND - gasketing tapes - Press-On Prods.

PRESIDENT ELECTRONICS, Dept. EM, 7922 N. Northwood Dr., Kansas City, Mo. 64151

PRESIN CO., INC., Dept. EM, Trap Falls Rd., Shelton, Conn. 06484, Tel: 203-929-5381, Telex: 96-4217; Empl.: 150

Local Sales Offices & Reps.

Cal	Montebello, Tucul Engrg.	213-728-7397
Cal	San Carlos, Electro Pacific	415-593-1334
Colo	Denver, Tessco	303-744-1119
Fla	Hialeah, Shaw Engrg. & Sls.	305-822-6141
Ill	Arlington Heights, Martec Assocs.	312-956-8090
Md	Towson, Kraft Elctrn.	301-828-5838
Mich	Detroit, R.P. Urban & Associates	313-535-2355
Mich	Grand Rapids, R.P. Urban & Associates	616-245-0511
Minn	Mpls., Wenco Sls.	612-866-3639
NY	New Hartford, KLM Associates Inc.	315-735-8525
NY	Rochester, KLM Associates Inc.	716-442-0821
NY	Syracuse, KLM Associates Inc.	315-458-2199
NC	McLeansville, Ron Ingle Assoc.	919-697-0787
Ohio	Chagrin Falls, J. Kilroy	216-247-8997
Pa	Newtown Sq., Holdsworth	215-356-8550
Tex	Dallas, Glidden Engrg. & Elctrn. Equip. Corp.	214-363-6539
Tex	Houston, Glidden Engrg. & Elctrn. Equip. Corp.	713-681-1415

™PRES-LOC - pres to open or close - Deutsch Fastener Corp.

™PRES-MOUNT - double coated adhesive foam tape - Press-On Prods.

™PRES-PAK - pressure sensitive adhesive coated corrugated - Press-On Prods.

™PRESSFAX & PRESSFAX DRR - transmission of newspaper/magazine pages - Datalog Div., Litton Sys.

™PRESS-FIT - teflon-insulated terminals - Sealectro Corp.

™PRESSLITE - Illuminated Pushbutton Switch - Illuminated Products Inc.

PRESS-ON PRODS., Dept. EM, 1020 S. Westgate Dr., Addison, Ill. 60101, Tel: 312-543-9466; Empl.: 40

Sales Manager: T. Cummins

™PRESS-SURE-MATE - gas tight, interface connector - Molex Inc.

™PRESSTAKER - component assemble machine - Goodrich Div.

PRESSURE CONTROLS, INC., Dept. EM, 681 Main St., Belleville, N.J. 07109, Tel: 201-751-5002

Sales Manager: P. Emmarco

™PRESSURE-LOCK - receptacle terminals - General Elec. Company

™PRESSURETROL - pressure controllers - Honeywell

PRESTA DIGITAL, Dept. EM, 1331 Newbridge Rd., No. Bellmore, N.Y. 11701

™PRESTEST - indicating light with test circuit - Cutler-Hammer, Inc.

PRESTOLITE WIRE DIV. ELTRA CORP., Dept. EM, Box 649, Port Huron, Mich. 48060, Tel: 313-987-6300, TWX: 810-231-7050; Empl.: 1300; Minimum order: $J.L. Lilyquist

Sales Manager: S.W. Weidenbach; *Distributor Manager:* J.L. Lilyquist

Local Sales Offices & Reps.

Cal	Los Angeles, Prestolite	213-770-2400
Ga	Stone Mountain, Prestolite	813-782-4186
Ill	Boling Brook, Prestolite	312-759-2006
Mich	Marysville, Prestolite	313-364-8453
Mo	St. Louis, Meiners Sls. Co.	314-383-4833
NJ	Ramsey, Prestolite	201-327-7695
NY	Binghamton, Prestolite	607-723-9270
Ohio	Lima, Prestolite	
Ohio	Wyoming, Prestolite	513-761-3145
Tex	Dallas, Dahlin Assocs.	214-521-2939
Wisc	Wauwatosa, Prestolite	414-257-4184

PRESTON SCIENTIFIC INC., Dept. EM, 805 E. Cerritos Ave., Anaheim, Cal. 92805, Tel: 714-776-6400, Telex: 655-321; Empl.: 85 ....p. 1112,1113,1680,1681

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scientific Instrs.	205-533-6880
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Anaheim, Preston-Ana	714-776-6400
Cal	San Jose, PBC Assocs.	408-377-7001
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Avon, Inst. Dynamics Inc.	203-678-1088
Fla	Orlando, Truex Assocs.	305-859-2160
Ill	Glen Ellyn, Holsapple & Assocs.	312-858-8355
Ind	Indianapolis, Holsapple & Assocs.	317-353-9441
Kans	Shawnee Mission, Techn. Sls. Assocs.	913-888-3330
Md	Greenbelt, Riffe Assocs.	301-474-8600
Mass	Wakefield, Instr. Dynamics Inc.	617-245-5100
Mo	Ferguson, Techn. Sls. Assocs.	314-725-5361
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Pittsford, RJC Assocs.	716-385-2770
NC	Winston-Salem, Radco	919-722-9671
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	N. Olmsted, Hocker Assocs.	216-734-4433
Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370
Tex	Dallas, R. Martin Assocs.	214-361-8584
Tex	Houston, R. Martin Assocs.	713-444-2944
Wash	Bellevue, Brennan Assocs.	206-454-9332

Local Distributors

Ala	Huntsville, International Scientific Instrs.	205-533-6880
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	San Jose, PBC Assocs.	408-377-7001
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Avon, Instruments Dynamics	203-678-1088
Fla	Orlando, Truex Assocs.	305-859-2160
Ill	Glen Ellyn, Holsapple & Assocs.	312-858-8355
Ind	Indianapolis, Holsapple & Assocs.	317-353-9441
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Md	Greenbelt, Riffe Assocs.	301-474-8600
Mass	Wakefield, Instrument Dynamics	617-245-5100
Mo	Ferguson, Technical Sls. Assocs.	314-725-5361
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Pittsford, RJC Assocs.	716-385-2770
NC	Winston-Salem, Radco	919-722-9671
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	N. Olmsted, Hocker Assocs.	216-734-4433
Pa	Jenkintown, Stein Instrumentation Corp.	215-885-2370
Tex	Dallas, Roger Martin Assoc.	214-361-8584
Tex	Houston, Roger Martin Assoc.	713-444-2944
Wash	Bellevue, Brennan Assocs.	206-454-9332

™PRE-VENT - filler/funnel - Gould Inc.

PRICE & RUTZEBECK, Dept. EM, Box 30, Hayward, Calif. 94543, Tel: 415-582-3062

PRIME COMPUTER INC., Dept. EM, 145 Pennsylvania Ave., Framingham, Mass. 01701

™PRIMEWIRE - premium alum. welding wire - Chemetron Corp.

PRIMO COMPANY LTD., Dept. EM, 25-1, 6-Chome, Mure, Mitakashi, Tokyo, Japan, Tel: 0422-43-3121, Telex: 2822-326; Empl.: 400

Sales Manager: M. Nomura

Local Sales Offices & Reps.

Ill	Chicago, Primo Microphone Inc.	312-595-1022

PRIMO MICROPHONE INC., Dept. EM, 2468 Delta La., Elk Grove Village, Ill. 60007, Tel: 312-595-1022, Telex: 28-3474; Empl.: 6

Local Sales Offices & Reps.

Ill	Chicago, W.J. Doyle Co.	312-274-6685
Ind	Fort Wayne, Morris-Cunningham Assoc.	219-485-3612
Ind	Indianapolis, Morris-Cunningham Assoc.	317-255-2458
Minn	Minneapolis, Stan Clothier Co.	612-888-4666
NJ	Englewood, Bressler & Baum Assoc.	201-569-7600
Ohio	Cleveland, Olsen Co.	216-752-5444
Tex	Addison, Parvin Sls.	214-661-5374
Tex	Houston, Parvin Sls.	713-784-9900

™PRINCESS LINE - micro-precision production - UNGAR, Div.

PRINCETON APPLIED RESCH. CORP., Dept. EM, Box 2565, Princeton, N.J. 08540, Tel: 609-452-2111, Telex: 84-3409; Empl.: 250

Local Sales Offices & Reps.

Cal	Anaheim, Princeton Applied Resch. Corp.	714-635-6710
Cal	Burlingame, Princeton Applied Resch. Corp.	415-347-0786
Colo	Denver, Fry-Gates Co.	303-756-9886
Ga	Chamblee, H.G. Holmes & Assoc.	404-451-6161
Ill	Deerfield, Princeton Applied Resrch. Corp.	312-498-5858
Kans	Shawnee Mission, EIR Co.	913-362-0919
Md	Rockville, Princeton Applied Resch. Corp.	301-881-3120
Mass	Bedford, Princeton Applied Resch. Corp.	617-275-2100
Mo	Hazelwood, EIR Co.	314-895-4100
NM	Albuquerque, Fry Gates Co.	505-298-1875
Ohio	Dayton, Princeton Applied Resrch. Corp.	513-278-4221
Tex	Richardson, Princeton Applied Research Corporation	214-234-2813
Va	Virginia Beach, E.G. Holmes & Assoc.	804-481-6556

PRINCETON CASE CO., Dept. EM, 667 Lehigh Ave., Union, N.J. 07083, Tel: 201-687-1750; Empl.: 60

Sales Manager: S.E. Parker

Local Sales Offices & Reps.

Cal	Costa Mesa	714-631-2352

PRINCETON ELCTRN. PRODS., Dept. EM, Box 101, New Brunswick, N.J. 08902, Tel: 201-297-4448, TWX: 710-480-3832; Empl.: 70

Local Sales Offices & Reps.

Ariz	Scottsdale, Measurement Cons.	602-994-9519
Cal	Anaheim, Moxon	714-635-7600
Cal	San Diego, Maxon Elctrns.	714-292-4820
Cal	Santa Clara, Moxon	408-249-2491
Colo	Evergreen, Mountaintek	303-674-5255
Ga	Atlanta, Flex-Comm Int'l	404-237-9242
Md	Rockville, Wiltronix	301-460-1454
Mass	Cambridge, Media Systems	617-876-0164
NM	Albuquerque, Mountaintek	505-294-1491
NY	Lindenhurst, Sigma	516-226-1880
Okla	Norman, Data Marketing Assoc. Inc.	405-364-8320
Pa	Ambler, Data Engrg. Co.	215-542-9876
Tex	Dallas, Data Marketing Assoc. Inc.	214-661-0300
Tex	Houston, Data Marketing Assoc. Inc.	713-780-2511
Tex	San Antonio, Data Mktg.	512-828-0937
Utah	Salt Lake City, Mountaintek	801-278-6920
Wash	Seattle, J.B. Jolly	206-938-4166

™PRINCETON 801 - graphic computer terminal - Princeton Elctrn. Prods.

PRINCO INSTRS., Dept. EM, Industrial Pk., Southampton, Pa. 18966, Tel: 215-EL 5-1500; Empl.: 80

™PRINTACT - Printed Contact Relay - Executone, Printact Relay Div.

™PRINT N MARK - Component Marking & Printing Equipment - Dix Engrg. Div.

™PRINT STIX - pressure sensitive paper stock - Topflight Corp.

™PRINTWEIGH - weight printer - Toledo Scale

™PRITCHARD PHOTOMETER - photometer - Photo Research Corp.

™PROBEYE - infra-red imaging system - Hughes Aircraft Co.

™PROBOTROL - liquid contact probe - Autocon Inds., Inc.

PROCESS ANALYZER INC., Dept. EM, 1101 State Rd., Princeton, N.J. 08540, Tel: 609-921-7330, TWX: 510-685-9254

PROCESS & INSTRS. CORP., Dept. EM, 1943 Broadway, Brooklyn, N.Y. 11207, Tel: 212-452-8380; Empl.: 28

™PROCESS 87-D - marking & finishing panel process - Panelgraphic Corp.

PRODELIN, INC., Dept. EM, Box 131, Hightstown, N.J. 08520, Tel: 609-448-2800, Telex: 843494; FSC No.: 94661; Empl.: 125

Sales Manager: J.A. Morrissey

Local Sales Offices & Reps.

Cal	Santa Clara, Prodelin Inc.	408-244-4720
Fla	Coral Springs, Precision Mktg. Svcs.	305-742-1700
Md	Towson, Dickison Sls. Co.	301-823-0923
Mass	Lexington, Prodelin	617-861-1720
NY	New York, Prodelin	212-679-1300
NC	Charlotte, Prodelin	704-377-6901
Tex	Dallas, Prodelin	214-350-2476
Exp:	New York, Allied International	212-689-6126

™PRODEX - plastic extrusion equipment - H.P.M. Div.

PRODUCTION DEVICES, Dept. EM, 7857 Raytheon Rd., San Diego, Cal 92111, Tel: 714-278-1141

Local Sales Offices & Reps.

Ala	Huntsville, Elmar Assocs.	205-881-0274
Ariz	Phonenix, B. G. Sls. Co.	602-266-7252
Cal	Encino, Wayne Dinsmore	213-622-2849
Cal	San Francisco, Technical Sls. Assocs.	415-467-1434
Cal	Simi, Wayne Dinsmore	805-527-1097
Colo	Colorado Springs, Norris & Co...	303-635-9319
Colo	Denver, Norris & Co.	303-988-6430
Ga	Atlantic, Elmar Assocs.	404-261-4345
Ill	Chicago, Markal Sls. Corp.	312-282-5800
Ind	Indianapolis, Mid-Central Sls. Co.	317-283-1727
Ky	Louisville, Mid-Cental Sls. Co.	502-239-5614
Md	Silver Springs, Sherr Assocs.	301-593-2477
Mass	Lynn, Keene Sls. Co.	617-595-2300
Minn	Minneapolis, John E. M. Anderson Co.	612-823-6459
Mo	St. Louis, Baumhauer & Assocs.	314-843-4123
NY	Massapequa Park, Brown Elctrn. Sls.	914-779-7330
NY	Rochester, Brown Elctrn. Sls.	716-266-2728
NY	Yonkers, Brown Elctrn. Sls.	914-779-7330
NC	Burlington, E. P. Ester Co.	919-584-1568
Ohio	Cleveland, H. Miller Sls. Co.	216-321-3900
Ohio	Jamestown, Hank Miller Sls.	513-675-2059
Ore	Portland, R. M. Minthorne Co.	503-246-4556
Pa	Pittsburg, H. Miller Sls.	412-782-1882
Tex	Dallas, Berthold Sls. Co.	214-526-8329

PRODUCTION PROCESS, Div. Ind'l. Marine Elctrns. Inc., Dept. EM, Grenier Ind'l. Park, Londonderry, N.H. 03053, Tel: 603-668-2101

Sales Manager: K. Ritzinger

Local Sales Offices & Reps.

Cal	Santa Anna, Lew Brooks Co.
Kans	Overland Park, G&E Instrs.
Mich	Southfield, Static Controls Corp.
NY	Buffalo, D & O Engrg.
NY	Cazenovia, Peter De Cew
NC	Fayetteville, Lem-Tek

PRODUCTS FOR RESEARCH, INC., Dept. EM, 78 Holten St., Danvers, Mass. 01923, Tel: 617-774-3250, Telex: 940-287; Empl.: 22

Local Sales Offices & Reps.

Ariz	Phoenix, Griot Assoc.	602-275-4991
Cal	El Segundo, Griot Assoc.	213-322-8383
Cal	Los Altos, Griot Assoc.	415-941-2533
Cal	Tustin, Griot Assoc.	714-838-92680
Ill	Aurora, Dwight Smith & Assoc...	312-896-0828
Md	Wheaton, Applied Science Mktg.	301-933-2566
NM	Albuquerque, Thorson Co.	505-265-5655
Va	Vienna, Applied Science Mktg. ..	703-281-3638
Wash	Bellevue, Griot Assoc.	206-454-8592

™PROFESSIONAL - transistor & diode test equipment - Components Corp.

™PROFIL - fiberglass reinforced polypropylene - Fiberfil Div. Dart Ind.

PROGRAMMED POWER, DIV., Dept. EM, 141 Jefferson Dr., Menlo Park, Cal. 94025, Tel: 415-323-8454, Telex: 34-8323; Empl.: 20

Local Sales Offices & Reps.

Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	Oakland, Advanced Technology	415-452-1401
Cal	Van Nuys, Gordon-Elliot	213-873-6862
Colo	Boulder, R. A. Mayes Co.	303-444-0782
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Des Plaines, Cozzens & Cadahy	312-298-3600
Ind	Indianapolis, Cozzens & Cadahy	317-244-2356
Kans	Olathe, Technical Reps.	913-782-1177
Md	Silver Spring, Tri-Tech Engrg.	301-585-8280
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
Minn	Minneapolis, Cozzens & Cadahy	612-884-4336
Mo	Hazelwood, Technical Reps.	314-731-5200
Mo	St. Louis, Cozzens & Cahahy	314-423-1234
Mont	Kansas City, Cozzens & Cahahy	816-454-5836
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	DeWitt, db Assocs.	315-446-0220
NY	Great Neck, Meas. Technology Inc.	516-482-3500
Ohio	Dayton, Hocker Assocs.	513-298-8680
Ohio	N. Olmsted, Hocker Assocs.	216-734-4433
Pa	Ambler, Data Engrg. Co.	215-542-9876
Tex	Houston, R.A. Mayes Co.	713-461-5385
Tex	Richardson, R.A. Mayes Co.	214-235-3043
Utah	Centerville, R.A. Mayes Co.	801-292-6781
Wash	Seattle, Dayne Hansen & Assocs.	206-248-1884

™PRO-GRIP - propionate cable clamps - Weckesser Co. Inc.

PROJECTS UNLIMITED, INC., Dept. EM, 3680 Wyse Rd., Dayton, Ohio 45414, Tel: 513-890-1918, TWX: 810-450-2523; Empl.: 75 .... p. 1121

Local Sales Offices & Reps.

Ala	Huntsville, Rakes Engrg. & Mktg. Corp.	205-883-9260
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Anaheim, L & M Sls.	714-774-0492
Cal	Santa Clara, Nova Tronix	408-243-9530
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Ft. Lauderdale, C.B.C. Elctrns. ..	305-484-7330
Ill	Addison, R. Stemm, Inc.	312-279-2440
Mass	Sharon, Adcour	617-784-3396
Mich	Detroit, Carter McCormic & Peirce	313-477-7700
Mich	Farmington, Carter McCormic & Peirce	313-477-7700
NJ	Wayne, Robert Horne Assoc.	201-835-7400
NM	Albuquerque, Williams Assoc.	505-255-1638
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Ore	Portland, Frank Jackson Co.	503-228-1656
Pa	Concordville, J. Hanlon Jr.	215-459-4276
Pa	Pittsburgh, Carter McCormic & Peirce	412-824-3760
Wash	Seattle, F. Jackson Co.	206-782-2211

Local Distributors

Cal	Costa Mesa, Marvac Elctrns.	714-642-0952
Cal	Sunnyvale, Pyramid Elctrns.	408-744-1900
Colo	Denver, WACO	303-371-4370
Mass	Sharon, Adcour	617-784-3996
Mich	Detroit, Carter McCormic & Peirce	313-477-7700
Mo	St. Louis, Olive Elctrns.	314-863-7800
NJ	Wayne, Gordon/Horne Inc.	201-835-7400
NY	Rochester, Ossmann Comps.	716-442-3290
Ohio	Cincinnati, Hughes Peters Inc.	513-351-2000
Ohio	Cleveland, Carter McCormic & Peirce	216-333-5650
Ohio	Columbus, Hughes Peters Inc. ..	614-294-5351
Ohio	Dayton, NASCO	513-253-8843
Ohio	Lima, Lima Radio Parts Co.	419-228-1220
Tex	Dallas, K.A. Elctrns	214-634-7870
Utah	Salt Lake City, Newark Elctrns.	801-486-1048
Wisc	Milwaukee, Taylor Electric	414-241-4321
For:	Denmark, Copenhagen, Inatec	(01) 948033
For:	England, Rye, East Sussex, Roxburgh Elctrns. Ltd.	Rye 3777
For:	France, Paris, Decelect	331-98-14
For:	Germany, Norderstedt, WPB-Digisound	5-22-17-11(0411)
For:	Italy, Milano, Forind Avio	324-120
For:	Netherlands, Rotterdam, Van Dam Electronika	010-670022
For:	Norway, Oslo, Henaco	(02) 15-75-50
For:	South Africa, Bedfordview, Pace Electronic Comps.	616-5303
For:	Spain, Madrid, Diode	45501-40
For:	Sweden, Jonkoping, ABH Transmissioner	036-12-58-00
For:	Switzerland, Zurich, Egli, Fischer & Co. Ltd.	25-02-34

PROMEMCO, INC., See Inductive Comps., Inc.

™PROLOID - radar-augmentation device - Teledyne Micronetics

™PRO-MED - acupuncture equip. - Jaesic Industries Co.

™PROMPT - small development system for microprocessors - Intel Corp.

™PRONG-LOCK - rings, retaining - Waldes Kohinoor, Inc.

™PRONTO - transaction processing system - Varian Data Machines

™PROPELLON - Coolants - Heeger Inc.

™PROPIMAX - fan - Rotron, Inc.

™PROPORTIONALL - heat input control - Hotpack Corp.

™PRO-TEC - security devices - Jaesic Industries Co.

™PROTECT-A-PAK - shock indicator - Impact-O-Graph Corp.

PROTECTIVE ENCLOSURES CO., Dept. EM, 2150 G Elmwood Ave., Buffalo, N.Y. 14207, Tel: 716-876-9855, Telex: 91-244; Empl.: 125

Sales Manager: R.G. Schneider

Local Sales Offices & Reps.

Cal	Inglewood, E. Dudley Co.	213-678-9085
Cal	Los Altos, Marketek, Inc.	415-941-0882
Colo	Denver, Plasticrafts	303-433-8801
Conn	West Simsbury, Anchor Engrg. Corp.	203-658-6261
Fla	Tamarac, Keeneth Corp.	305-722-1080
Fla	Vero Beach, Keeneth Corp.	305-567-9206
Ga	Atlanta, B.M. Schneider c/o Keeneth Corp.	404-435-2220
Ill	Chicago, A.J. Ellis Co.	312-262-2708
Iowa	Des Moines, F.R. Johnston Co...	515-255-5865
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Mich	Grand Rapids, Gillespie Sls. Engrg. Co.	616-949-4741
Mich	St. Clair Shores, V. Goethem Co.	313-778-8600
Minn	Minneapolis, Krez-Co.	612-561-2640
Mo	St. Louis, Tanler & Co.	314-645-0590
NJ	Englewood Cliffs, Unisco	201-567-2540
NJ	Spotswood, Banico Inc.	201-251-6868
NY	Buffalo, R. Schaefer Co.	716-632-4492
NC	Charlotte, Jaeger, Inc.	704-332-3602
Ohio	Cincinnati, Gallagher Co.	513-761-1288
Ohio	North Olmsted, Plus Sls.	216-734-8989
Okla	Tulsa, Koons & Assocs.	918-627-9400
Pa	Pittsburgh, Buchanan Sls. Co.	412-366-6330
Tenn	Hendersonville, Burt Lucas Assocs.	615-824-5818
Tex	Hutchins, Prior Gaskets	214-225-4201
Wash	Seattle, R. J. Matzke Co.	206-682-6758

™PROTECTOCOATS - solderability protection - Alpha Metals, Inc.

™PROTECTOSWITCH - operator safety device for punch presses - Black & Webster, Inc.

PROTECTOWIRE CO., Dept. EM, Hanover, Mass. 02339, Tel: 617-826-3878; Empl.: 17

Sales Manager: P.A. Thomas

™PROTECTOX - anti-tarnish for silver, copper & gold - Technic, Inc.

™PROTISTOR - fuses - Carbone Lorraine Industries Corp.

™PROTO-BOARD - solderless breadboard - Continental Specialties Corp.

PROTO MATIC CO., Dept. EM, 11699 Chesterdale Rd., Cincinnati, Ohio 45246, Tel: 513-771-1780; Empl.: 30

Local Sales Offices & Reps.

Pa	Pittsburgh, Pittsburgh Tech. Sls.	412-373-8440

™PROTONEX - gold electroplating process that tolerates metallic contamination. - Sel-Rex Div. Oxy Metal Industries Corp.

™PROTOTYPES BY KOTOKAST - experimental molded parts - Minnesota Rubber Co.

™PROTYPE - carbon paper-inked ribbons - Phillips Process Co., Inc.

™PROXAGARD - presence sensing equipment - Gordon Engineering Corp.

™PROXIMIT - proximity light switches - Tann Controls Co.

™PROXISWITCH - (capacitance proximity devices) - Photobell Co., Inc.

™PROXSWITCH - proximity switch - Denison, R.B., Inc.

PSG INDUSTRIES INC., Dept. EM, 1225 Tunnel Road, Perkasie, Pa. 18944, Tel: 215-257-3621; Empl.: 74

Local Sales Offices & Reps.

Cal	Hawthorne, WCV Co.	213-772-4479
Ill	Glenview, Vico Assocs.	312-729-9240
Md	Mount Airy, Strayton Assocs.	301-831-7007
Mass	Sturbridge, Brandford Controls	617-347-7367
Mich	Southfield, Static Controls Corp.	313-358-1460
NY	Brooklyn, Eastern Elctrn. Sls.	212-763-5180
NY	Skaneateles, Henkell Mktg.	315-685-6945
Ohio	Cleveland, Orr Assocs.	216-885-1324
Pa	Morrisville, Glove Engrg.	215-275-9875
Tex	Plano, Zeus Engrg.	214-423-2027

™P*-SHOOTER (*POLYMER) - polymeric sealant applicator gun - Hardman Inc.

™PSI - captive screw, low cost - Tridair Inds.

™PSS - filter media - Pall Trinity Micro Corp.

™PSS - packaged sound sys - PASO Sound Products Inc.

™PTC - instruments - Pacific Transducer Corp.

™PTM-66 - color analyzer - Lektra Labs., Inc.

PTS ELECTRONICS INC., Dept. EM, Box 272, Bloomington, Ind 47401, Tel: 812-824-9331; Empl.: 250

Local Sales Offices & Reps.

Ala	Birmingham	205-323-2657
Ariz	Phoenix	602-279-8718
Cal	Los Angeles	213-266-3728
Cal	Sacramento	916-482-6220
Cal	San Diego	714-280-7070
Colo	Arvada	303-423-7080
Fla	Jacksonville	904-389-9952
Fla	Tampa	813-839-5521
Ind	Indianapolis	317-631-1551
Kans	Kansas City	913-831-1222
La	Metairi	504-885-2349
Md	Silver Spring	301-565-0025
Mass	Somerville	617-666-4770
Mass	Springfield	413-734-2737
Mich	Detroit	313-862-1783
Minn	Minneapolis	612-824-2333
Mo	St. Louis	314-428-1299
NJ	E. Paterson	201-791-6380
NY	Buffalo	716-891-4935
NC	Charlotte	704-332-8007
Ohio	Cincinnati	513-821-2298
Ohio	Cleveland	216-845-4480
Ohio	Columbus	614-237-3820
Okla	Oklahoma City	405-947-2013
Ore	Portland	503-282-9636
Pa	Philadelphia	215-724-0999
Pa	Pittsburgh	412-761-7648
Tenn	Memphis	901-365-1918
Tex	Houston	713-644-6795
Tex	Longview	214-753-4334
Va	Norfolk	804-625-2030
Wash	Seattle	206-623-2320
Wisc	Milwaukee	414-643-8800

™PTS-100 - display terminal system - Raytheon Data Systems

™PTS/1200 - distributed processing system - Raytheon Data Systems

™PUL-A-DIP - ic extraction - Micro Electronic Systems, Inc.

PULEO ELECTRONICS, INC., Dept. EM, 39 Hutcheson Pl., Lynbrook, N.Y. 11563, Tel: 516-599-4875

Local Sales Offices & Reps.

Cal	San Francisco, Puleo Elctns.	415-986-8120
Conn	Darien, Massini Assocs.	203-323-9945
Pa	Ingomar, Greye Glass Assocs.	412-366-6664
Tex	Houston, Sesco-Houston	713-688-9656

™PULL-THRU - contact insertion tool - Hughes Aircraft Co., Connecting Devices Div.

PULSAR ASSOCS., Dept. EM, 7911 Herschel Ave., Ste. 400, La Jolla, Cal. 92037, Tel: 714-459-3426 p. 2922

Sales Manager: L. K. Richter

Local Sales Offices & Reps.

Exp:	N.Y., New York, Singer Prods. Co.	212-432-1400

™PULSCRIPT - printing demandmeters - General Elec. Co.

™PULSECURITY - wireless remote alarm - A.R.F. Products

™PULSE-DOT - soldering equip. - Circon Corp.

PULSE ENGRG., INC., Dept. EM, Box 12235, San Diego, Cal 92112, Tel: 714-279-5900, TWX: 910-335-1527; Empl.: 300

Local Sales Offices & Reps.

Cal	San Diego	714-279-5900
Cal	Santa Clara	408-248-6040
Cal	Studio City	213-872-0735
Fla	Boca Raton	305-391-3803
Ill	Chicago	312-992-3720
Mass	Waltham	617-894-0950
Pa	Abington	215-887-4343

™PULSELECTOR - resonant reed device - A.R.F. Products

™PULSENDER - mechanical pulser - A.R.F. Products

™PULSE-RATED TOROIDS - ferrites - Indiana General

PULSE TECHNIQUES, INC., Dept. EM, 1411 Palisade Ave., Teaneck, N.J. 07666, Tel: 201-837-2575

™PULSIGNAL - electronic remote control - A.R.F. Products

™PULSISTOR - power thermistors - Victory Engrg. Corp.

™PULTEC - equalizers, filters and amplifiers - Pulse Techniques, Inc.

™PUPPETS - PC circuit layout & design system - Bishop Graphics

™PUR-A-GOLD - gold electroplating process for semiconductor applications - Sel-Rex Div. Oxy Metal Industries Corp.

™PUREBIDE - ceramic graphite - Pure Carbon Co., Inc.

™PUREBON - mechanical carbon - Pure Carbon Co., Inc.

PURE CARBON CO., INC., Dept. EM, 441 Hall Ave., St. Marys, Pa. 15857; Empl.: 750

Local Sales Offices & Reps.

Cal	Altadena, Pure Carbon Co.	213-798-6597
Conn	Bristol, Pure Carbon Co.	203-589-5033
Ga	Marietta, Pure Carbon Co.	404-433-0407
Ill	East Peoria, Pure Carbon Co.	309-699-1935
Ill	Park Ridge, Pure Carbon Co.	312-825-7686
Ind	Hammond, W.C. Boldt	219-931-7091
Mich	Plymouth, Pure Carbon Co.	313-453-7310
NY	Rock Hill, Pure Carbon Co.	914-796-3524
Ohio	Chagrin Falls, Pure Carbon Co.	216-338-3900
Pa	St. Marys, Pure Carbon Co.	814-781-7971
Tex	Plano, Pure Carbon Co.	214-423-8943
Wash	Seattle, Pure Carbon Co.	206-542-1844

™PURITAN - all tantalum capacitor - Tansitor Elctrns.

PURVIS SYSTEMS, Dept. EM, 6901 Jericho Tnpk., Syosset, N.Y. 11791, Tel: 516-364-9690

™PUSH-PENNY - plugs - T & B/Thomas & Betts

™PUSH-PENNY - plugs - T & B/Thomas & Betts

™PUSHTITE - thread forming screw - Camcar

™PV - female receptacles - Berg Electronics

™PVB - potentiometric voltmeter bridge - E.S.I. Inc.

™PVB - potentiometric voltmeter bridge - Electro Sci. Inds.

™PVCA - Vinyl Insulated Aluminum Strip - Brand-Rex Co.

™PVZ - capacitors - General Elec. Co.

™PWR-PAC - stacked PC BD and copper plane; press-fit - Elfab Corp.

™PYGMY - connector - Bendix Corp., The

PYLE INDS., Dept. EM, 2050 U.S. 24 East, Huntington, Ind. 46750, Tel: 219-356-1200; Empl.: 155; Minimum order: $A. Pyle

Distributor Manager: A. Pyle

Local Sales Offices & Reps.

Cal	Culver City, Wes Alderson	213-870-9286
Cal	San Francisco, Featherstone Sls. Co.	415-467-3133
Cal	Sepulvada, RL Assocs.	213-782-7826
Colo	Denver, Mountain Rep. Inc.	303-988-6430
Fla	Pembroke Pines, J. Wanger Sls. Co.	305-987-8766
Ill	Chicago, EIA, Inc.	312-271-3774
Ill	Collinsville, Elctrn. Mktg. Assoc.	618-345-5544
Ill	Skokie, Mike Bermann	312-OR5-3740
Mass	Wellesley, L. Cole, Inc.	617-237-1260
Mich	Rochester, R. A. Albrecht & Co.	313-652-2520
Minn	Richfield, JW Sls. Co.	612-869-7650
NJ	Teaneck, Allied Elctrn. Sls.	201-836-6699
Ohio	Cleveland, Component Mktg. Consultants	216-449-1122
Ore	Portland, D. Weber Co.	503-234-7671
Pa	Easton, Kaiser Assoc.	215-258-6477
Pa	McMurray, Cooper & Assoc.	412-941-6473
Tex	Houston, B. Rogers & Co.	713-626-5370
Exp:	Ind., Indianapolis, Mid-American International Corp.	317-635-4622

PYLE NATIONAL CO., Dept. EM, 1334 N. Kostner, Chicago, Ill. 60651, Tel: 312-342-6300

PYLON CO., INC., Dept. EM, 51 Newcomb St., Attleboro, Mass. 02703, Tel: 617-222-3726; Empl.: 30

Local Sales Offices & Reps.

Cal	Fremont, Hartfield, Kennan & Freytag Co.	415-863-2200
Cal	Los Angeles, Hartfield, Kennan & Freytag Co.	213-225-1318
Fla	Orlando, Buchanan & Abrams Assoc.	305-898-7444
Ill	Elk Grove Village, Somers-Reagan	312-593-2713
Mass	Plainville, Teknis	617-695-3591
Mich	Spring Lake, Walch Engrg. Co.	616-846-2944
NJ	Summit, R. Potter	201-277-0220
Ohio	Worthington, H.L. Simcox	614-885-8995
Pa	Lafayette Hill, MCD Assocs.	215-828-0560
Tex	Dallas, Sivright Co.	214-241-9196
Va	Manassas Pack	703-361-2928
Wash	Vancouver, Hartfield, Kennan & Freytag Co.	503-228-1683

™PYRAL - master recording & reference lacquers - Gotham Audio Corp.

™PYRANOL - capacitor & dielectric material - General Elec. Co.

™PYRANOL TRANSFORMER - electric transformer - General Elec. Co.

™PYR-AU-BOND - gold electroplating process developed for wire & eutectic bonding & leaded glass semi-conductor devices. - Sel-Rex Div. Oxy Metal Industries Corp.

™PYROBOND-PT-333 - silicon carbide graphite conversion - Ultra Carbon Corp.

™PYROCON - surface temperature pyrometer - Alnor Instrument Co.

PYROFILM RESISTOR CO., INC., Dept. EM, 60 S. Jefferson Rd., Whippany, N.J. 07981, Tel: 201-887-8100, TWX: 710-986-8220; Empl.: 200 p. 3714-3717

Local Sales Offices & Reps.

Cal	Los Angeles, E. Landa Co.	213-879-0770
Cal	Mountain View, J.L. Technical Sls	415-969-5552
Cal	San Carlos, Winco	415-365-6082
Colo	Littleton, Lange Sls	303-798-1397
Conn	Bethel, Livera-Polk Assocs.	203-748-4639
Fla	Orlando, Irby & Connoly, Inc.	305-894-8471
Ill	Chicago, Berndt Assocs.	312-283-0713
Ind	Carmel, Berndt Assocs.	317-844-0114
Md	Columbia, Neal Deoul Assocs.	301-997-4353
Mass	Lowell, Russell Engrg. Svc. Co.	617-458-7146
Mich	Royal Oak, Satullo Co.	313-549-3910
Minn	New Brighton, TWC Sls	612-636-1770
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NM	Albuquerque, IMEC	505-344-2212
NY	Bayside, R. Diamond, Inc.	212-423-7330
NY	Camillus, Ontec	315-487-0596
NY	Fayetteville, Ontec	315-446-2587
NY	Grand Island, Ontec	716-773-9319
NY	Rochester, Ontec	716-464-8636
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
NC	Burlington, P.J. Nahser, Co.	919-226-8053
Ohio	Cleveland, Satullo Co.	216-486-2800
Tex	Dallas, Hillman Entprs.	214-827-4790
Wash	Bellevue, Ray Over Sls.	206-454-4551
Exp:	Stamford, Conn., Dage Corp.	203-324-3123

Local Distributors

Cal	Los Angeles, Mil-Comm	213-879-0770
Cal	Mountain View, Target Elctrns.	415-961-1170
Fla	N. Palm Beach, Legri S. Resistor	305-626-5400
NJ	Bergenfield, Technical Elctrn. Distrs.	201-384-3643
Tex	Houston, Lenert Co.	713-225-1465

™PYROFUZE - wire, ribbon, braid, foil, granules, discs, tubing - Cohn, Sigmund

™PYROMARK - refractory coatings - Tempil Div.

™PYROMATIC - solid-state temp control - Alnor Instrument Co.

™PYRO PANEL - infrared heat panel - Research, Inc.

™PYRO-TECH - pyrolytic coated graphite - Ultra Carbon Corp.

™PYROTEST - hand held potentiometer - Gulton Inds., Inc.

™PYROTROLLER - electronic temp control - Alnor Instrument Co.

™PYROTRON - thermometer, thermocouple, smoke recorder - Bailey Meter Co.

™PZT - piezoelectric ceramics - Vernitron Piezoelectric Div.

™P-10 LOW - LOSS - linear solenoid - Barber Corp.

Q-TECH CORP., Dept. EM, 2201 Carmelina Ave., Los Angeles, Cal. 90064, Tel: 213-820-4921, Telex: 69-6140 p. 2470,2471

Sales Manager: H. Phillips

Local Sales Offices & Reps.

Cal	Los Altos, Tauber-Dreyer	415-948-2635
Cal	Northridge, Tauber-Dreyer	213-993-0048
Cal	San Diego, Tauber Assocs.	714-274-7242
Fla	Ormond Beach, Tech. Mktg. Assoc.	904-672-2314
Fla	Pompano Beach, Tech. Mktg. Assoc.	315-942-0774
Mass	Andover, R.Purinton Inc.	617-475-7055
NY	New York, AstroRep Inc.	516-423-2266
Ohio	Dayton, Berberich Assocs.	513-433-0342
Tex	Houston, TCI Elctrns.	713-774-5019

QANTEX, the peripherals division of North Atlantic Inds., Dept. EM, 200 Terminal Dr., Plainview, N.Y..11803, Tel: 516-681-8350, TWX: 510-221-1879; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Ariz	Temple, J. Cain & Assoc.	602-838-3404
Cal	Burbank, E-M Southwest	213-845-4400
Cal	Mountain View, Repco	415-965-8581
Colo	Littleton, Cropley Inc.	303-794-4231
Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-457-7117
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Md	Bethesda, Bartlett Assoc.	301-656-3061
Mass	Wellesley Hills, Datamart	617-235-5520
Mich	Brighton, Lowry & Assoc.	313-227-7067
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	Camden, Q.E.D. Elctrns.	215-925-8711
NY	White Plains, Bartlett Assoc.	914-949-6476
NC	Raleigh, Lee Assoc.	919-787-5818
Pa	Wayne, Bartlett	215-688-7325
Tex	Dallas, Remtek	214-387-2855
Tex	Houston, Quantum	713-464-5651
Tex	Houston, Remtek	713-664-2113
Utah	Salt Lake City, Cropley Inc.	801-355-8321
Wash	Bellevue, Scientific Devices NW	206-454-0900
Wisc	Brookfield, Pivan Engrg.	414-786-1940

™QC - mic connector - Electro-Voice, Inc.

™QCC - quick custom cable - Alpha Wire Corp.

™Q COMPOUND - encaps. compound - Communications Technology Corp.

™Q-FLEX - accelerometers - Sundstrand Data Control, Inc.

™QHT - transformers - General Elec. Co.

™QIKLATCH - mother-daughter pc connector - Burndy Corporation

™QIKSTACK - stacking connector - Burndy Corporation

™QO - molded case circuit breakers - Square D Co.

™Q-PEX - alkaline etchant - Conversion Chem. Corp.

™QR - rotary fastener - Tridair Inds.

™Q-RING - reciprocating seal - Parker Hannifin Corp.

™Q/SPLICE - 8-track cartridge splices - Webtek Corp.

™QSR - electronic capacitors - General Elec. Co.

™Q-TRON - optoisolator - Quantrol Elect. Inc.

QTRON CORP., Dept. EM, 10661 Ellis Ave #J, Fountain Valley, Cal. 92708, Tel: 714-556-1184; FSC No.: 75-2848591; Empl.: 20

Local Sales Offices & Reps.

Colo	Denver, Comtech	303-756-6815
Ill	Arlington Heights, Hagan Sls.	312-394-0617
Ind	Indianapolis, Marketing Engineers	317-546-1523
Minn	Minneapolis, Components Group	612-824-4222
NY	Commack, L.K. Haner	516-864-2220
Ore	Portland, Wes-Tek	503-297-1711
Tex	Houston, E. Smith Sls.	713-649-5756

Q.V.S., INC., Dept. EM, 20 North 15th St., East Orange, N.J. 07017, Tel: 201-673-3996; FSC No.: 89820; Empl.: 45

QUADRA SALES CORP., Dept. EM, 14825 NE 40th, Suite 340, Redmond, Wash. 98052, Tel: 206-833-3550

QUALCO, Dept. EM, One First St., Los Altos, Cal. 94022, Tel: 415-964-7666; Empl.: 11

™QUAD - logs on printed material & decals on components - CVC Products, Inc.

™QUAD-O-DYN - hydraulic seal - Minnesota Rubber Co.

™QUAD-O-STAT - hydraulic seal - Minnesota Rubber Co.

™QUADRADAR - surveillance and precision approach radar - ITT Gilfillan Div. of ITT

™QUADRAPHASIC CONVERSION - high speed integration technique - Data Precision Corporation

™QUADRA-POWR - valve actuator - Jamesbury Corp.

™QUAD-X - hydraulic seal - Minnesota Rubber Co.

QUAKER ELCTRNS., Dept. EM, Box 215, Hunlock Creek, Pa. 18621, Tel: 717-256-3477; Empl.: 5

™QUALICOMP - electronic components - International Importers

™QUALIFIER 901 - digital ic tester - Fairchild Sys. Technology

QUAM-NICHOLS CO., Dept. EM, 234 E. Marquette Rd., Chicago, Ill. 60637, Tel: 312-488-5800; Empl.: 200

Local Sales Offices & Reps.

Cal	Gardena, Bidwell Sls.	213-770-0300
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, B. Newman & Co.	303-744-2501
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Chicago, R. R. Hutmacher Assoc.	312-631-3248
Ind	Indianapolis, R. Milsk Co.	317-546-5468
Kans	Overland Park, T. L. Dowell	913-236-8200
Mass	Needham, Mullin Technical Sls. Co.	617-444-4780
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Edina, M. Foster Co.	612-835-2252
NJ	Cherry Hill, Trinkle Sls	609-795-4200
NY	Camillus, Callahan-Ferguson	315-487-3870
NY	Flushing, Bettan Sls	212-591-7600
Ohio	Beachwood, Electronic Salesmasters	216-831-9555
Ore	Portland, J. V. BeLusko Co.	503-222-4279
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, El Wilco Inc.	214-242-5329

QUAN-TECH DIV. SCIENTIFIC ATLANTA, see Scientific Atlanta, Inc., New Jersey Div.

™QUANTACHRON - time based programmer - Matrix Corp.

™QUANTALATCH - transient recorder - QuantaLog, Inc.

QUANTALOG, INC., Dept. EM, 42 Enterprise Drive, Ann Arbor, Mich 48103, Tel: 313-769-4936; Empl.: 19

Local Sales Offices & Reps.

Alas	Anchorage, H. J. Lang & Assocs.	907-279-5741
Cal	North Hollywood, O'Halloran Assocs.	213-877-0173
Cal	Palo Alto, O'Halloran Assoc.	415-326-1493
Cal	San Diego, O'Halloran Assocs.	714-224-2824
Conn	Manchester, Addelco Corp.	
Ill	Chicago, Electronic Instr. Assocs.	312-271-3774
Ind	Indianapolis, Electronic Instr. Assocs.	317-257-7231
Md	Silver Springs, Eastern Instrumentation	301-681-6500
Mass	Needham, Addelco Corp.	617-444-4754
Mich	Farmington, Anderson Elctrns.	313-476-9161
NY	Great Neck, Eastern Instrumentation	516-466-4500
NY	Syracuse, Tesco Mktg Assocs.	315-463-4566
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	North Olmsted, Hocker Assocs.	216-734-4433
Pa	Abington, Bach-Stewart Assocs.	215-885-1550
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Wash	Bellevue, Brennan Assocs.	206-454-9332

Local Distributors

For:	Japan, 108-17 Yaesou, Chuo-Ku, Tokyo,	Chitose Corp.
For:	Switzerland, Zurich 8048, Kontron Elctrn.	International

QUANTRAD CORPORATION, Dept. EM, 139 Illinois St., El Segundo, Cal. 90245, Tel: 213-322-2086, TWX: 910-348-6292; FSC No.: 15713; Empl.: 40

Sales Manager: W. Stevenson

Local Sales Offices & Reps.

Ariz	Tempe, Trembly Assocs.	602-967-2058
Cal	Costa Mesa, Scranton Eng'g.	714-979-6373

Conn	Mount Carmel, Scientific Devices	203-248-9361
Fla	Winter Park, McMahan Assocs.	305-645-0463
Md	Silver Spring, Spectro Sys. Corp.	301-949-8261
Mass	Waltham, Scientific Devices	617-894-5637
Mich	Royal Oak, Murray A. Percival Co.	313-548-1971
Minn	Minneapolis, C. T. Sls.	612-374-1241
NJ	Englewood, Scientific Devices	201-871-3916
NM	Albuquerque, Trembly Assocs. ..	505-293-4444
NY	Clifton Park, Empire Technology	518-371-2480
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
Pa	Colmar, E. L. Assocs.	215-822-2510
Wash	Seattle, Underwood Assocs.	206-575-0123
Wisc	Hales Corners, Process Technology	414-425-2940

QUANTROL ELECT. INC., Dept. EM, 1820 Mills Ave., El Paso, Tex. 79901, Tel: 915-532-4651; Empl.: 20

Local Sales Offices & Reps.

Minn	Minneapolis, Heimann Co.	612-861-6051

QUANTRONIX CORP., Dept. EM, 225 Engineers Rd., Smithtown, N.Y. 11787, Tel: 516-273-6900, Telex: 967-782; Empl.: 70

Sales Manager: R.J. Bruno

Local Sales Offices & Reps.

Cal	Palo Alto, Quantronix Corp.	408-247-9987
Fla	Ft. Lauderdale, Semquip	
NM	Alburquerque, Technology Mktg.	505-298-4321

™**QUANTUM** - broadband antenna system - Channel Master Div. Avnet

™**QUANTUM L** - computer tape - Memorex Corp.

QUARTZITE PROCESSING, INC., Dept. EM, 6 Holyoke St., Malden, Mass. 02148, Tel: 617-322-1380; Empl.: 11

Sales Manager: P.S. Yanofsky

™**QUARTZQ** - coil dope - Millen Mfg. Co. Inc., James

™**QUAT 2** - biocidal-fungicidal cleaner - Clean Room Prods.

™**QUENCHARC** - capacitor resistor rc network - Paktron Div.

™**QUICK BREAK** - hideaway CB antennas - Antenna Specialists Co.

™**QUICK-CLIP** - component test clip - Micro Instr. Co.

™**QUICK CONNECT** - thermal relays - Warren G-V Communications

™**QUICK-CRIMP** - crimp terminals & connectors - Gould Inc.

™**QUICK-E-POLES** - divided, vertical multioutlet assemblies - Wiremold Co.

™**QUICKEY** - low profile keyboard - Chomerics, Inc.

™**QUICK-SET** - thermo-regulators - H-B Instr. Co.

™**QUICK-SITE** - thermometers - H-B Instr. Co.

™**QUICK-TRACER** - transistor/diode checker - VIZ Manufacturing Co.

™**QUICK-WEDGE** - screw holding screwdriver - Kedman Co.

™**QUIET** - Ultra Low Noise Mixer - RHG Elctrns. Lab.

QUIETROLE CO., Dept. EM, 395 St. John, Spartenburg, S.C. 29302, Tel: 803-583-1451

Local Sales Offices & Reps.

Mo	St. Louis, B & C Sls. Co.	
Ohio	Euclid, W. Peters Co.	216-261-2330
Tex	Dallas, E.L. Wilks Co.	214-242-5321

™**QUIK/BUS** - Power distribution conductors - Rogers Corp.

™**QUIK-CHANGE** - indicator lights - Industrial Devices

™**QUIK-CIRCUITS** - printed circuit board hobby line - Circuit-Stik, Inc.

™**QUIK-E** - D.C. voltage calibrator - Pioneer Instrumentation

™**QUIK/PIK** - small parts storage - Akro-Mils, Inc.

™**QUIK-WRAP** - wire wrapping & unwrapping tools - Jonard Industries Corp.

™**QUSO** - micro-fine silica - Philadelphia Quartz Co.

™**QVT MCA** - charge, voltage, time multichannel analyzer - Lecroy Resch. Sys. Corp.

™**QWIK-TY** - connector strain releif - Glenair, Inc.

™**Q200** - metal & plastic degreaser - Barco Chem. Prods. Inc.

R-COLUMBIA PRODUCTS, INC., Dept. EM, 2008 St. John's Ave., Highland Park, Ill. 60035, Tel: 312-432-7915; Empl.: 12

RAACO CORP., Dept. EM, 372 Ely Ave., S. Norwalk, Conn. 06854, Tel: 203-853-2120

™**RA-CON** - right angle connector - Eby Company

RADATRON CORP., Dept. EM, 2424 Niagara Falls Blvd., N. Tonawanda, NY 14120, Tel: 716-731-4171, TWX: 710-269-1792; Empl.: 85

Sales Manager: L. Pauly

Local Sales Offices & Reps.

Cal	San Rafael, Levin-Schwartz Sls.	415-454-1940
Ga	Savannah, Len Sherman Assoc.	912-925-3660
Ill	Skokie, Mike Bermann Sls.	312-675-3740
Ind	Indianapolis, Dewey Power Sls.	317-846-0790
Md	Rockville, Lienau Assoc. Inc.	301-770-6800
Mich	Grand Rapids, Cecil Geer Co.....	616-534-9449
Minn	Burnsville, C. Carlson	612-890-7893
Mo	Raytown, Marty Taraski Sls.	816-358-1442
NY	Farmingdale, Chester Drexler Sls.	516-249-8206
Ohio	Columbus, Mandabach-Lehner Co.	614-235-0265
Tenn	Memphis, L. Jones	901-683-7616
Tex	Dallas, Collins Co.	214-341-7866
Wash	Seattle, DMS/Vantage	206-784-6800

™**RADAX** - spkr. cone design - Electro-Voice, Inc.

™**R.A.D.I.** - random accers digital ndication - Westronics

RADIAL CONTROLS, Dept. EM, 2555 E. 55th Place, Indianapolis, Ind. 46220, Tel: 317-255-2796; Empl.: 25

Sales Manager: R.L. Newsom

RADIATION DEVICES CO., Dept. EM, Box 8450, Baltimore, Md. 21234, Tel: 301-628-2240; Empl.: 6

Local Sales Offices & Reps.

Ariz	Phoenix, Kay Ents.	602-242-6787
Cal	Encino, CDH Assocs.	213-345-3111
Cal	Yucca Valley, CDH Assocs.........	213-345-3111
NM	Albuquerque, J & D Assocs.	505-255-2377

RADIATION DYNAMICS, INC., Dept. EM, 316 S. Service Rd., Melville, N.Y. 11746, Tel: 516-334-3990, Telex: 96-7776; Empl.: 160

™**RADIAX** - radiating coaxial cable - Andrew Antenna Co. Ltd.

™**RADI-FLUX** - Heat Flow Calibration - Hy-Cal Engineering

RADIO DEVELOPMENT LAB., Dept. EM, Box 164, Deer Park, NY 11729, Tel: 516-242-0999; Empl.: 6

™**RADIOHM** - variable resistor - Centralab

RADIO MATERIALS CO., Div. P.R. Mallory, Dept. EM, 4242 W. Bryn Mawr Ave., Chicago, Ill. 60646, Tel: 312-478-3600, TWX: 910-221-2915; FSC No.: 91418; Empl.: 500

Sales Manager: J. Kirschner

Local Sales Offices & Reps.

Ala	Huntsville, Electromech Sls. Eng. Co.	205-883-9624
Ariz	Scottsdale, RMC Div. of P.R. Mallory	602-949-7788
Cal	Buena Park, RMC Div. of P.R. Mallory	213-921-7939
Cal	Palo Alto, RMC Div. of P.R. Mallory	415-326-4282
Conn	East Haven, Eagle Assocs.	203-467-6542
Fla	Orlando, P.R. Mallory & Co.	305-855-6353
Ga	Atlanta, Electromech Sls. Eng. Co.	404-449-6337
Ill	Chicago, RMC Div. of P.R. Mallory	312-478-3600
Mo	Bridgeton, P.R. Mallory & Co.	314-291-8223
NY	Plandome, F. Spellman Co.	516-627-3399
NY	Syracuse, N.J. Matchuk Co.	315-487-6951
NC	Raleigh, Electromech Sls. Eng. Co.	919-782-7586
Ore	Portland, Earl & Brown Co.	503-245-2283
Tenn	Nashville, Electromech Sls. Eng. Co.	615-256-2516
Tex	Garland, G. Peck Co.	214-341-8311
Wash	Seattle, Earl & Brown Co.	206-284-1121
Exp:	Indianapolis, Ind., Mallory Int'l. Co.	317-636-5353

RADIO RESCH. CO., Dept. EM, 54 W. Blackwell St., Dover, N.J. 07801, Tel: 201-361-5350; Empl.: 6

Local Sales Offices & Reps.

Exp:	N.J., Teaneck, Sylvan Ginsbury Ltd.	201-837-1100

RADIO SWITCH, Dept. EM, State Hwy. 79, Marlboro, N.J. 07746, Tel: 201-462-6100

Sales Manager: J.L. Bernard

RAGEN DATA SYSTEMS, INC., Dept. EM, 125 Schmitt Blvd., Farmingdale, N.Y. 11735, Tel: 516-293-1333, TWX: 510-224-6405; Empl.: 52

Local Sales Offices & Reps.

Cal	Los Angeles, Western Aircraft, Inc.	213-477-1548
Cal	San Diego, Temp Tech................	714-560-0545
Iowa	Cedar Rapids, Palatine	319-365-8071
Kans	Andover, Palatine.........................	316-683-7512
Mass	Stoneham, Data Engrg. Svcs.	617-245-6666
Minn	Minneapolis, Bitronics Sls. Co. ..	612-866-3035
Mo	St. Louis, Palatine	314-426-7055
NY	Great Neck, EAC Assocs.	516-466-9798
Tex	Dallas, Barry Sls. Co.	214-234-0255
Va	Alexandria, Vanguard Engrg.	703-768-1660
Wash	, Thorson Co.	206-455-9180

RAGEN PRECISION INDS., INC., Dept. EM, 9 Porete Ave., N. Arlington, N.J. 07032; Empl.: 250

RAGEN SEMICONDUCTOR, Dept. EM, 50 S. Jefferson Rd., Whippany, N.J. 07981, Tel: 201-887-4141; Empl.: 75

™**RAHAM** - radiation hazard meter - General Microwave Corp.

™**RAINBOW** - Color Changing cap presslite switch - Illuminated Products Inc.

™**RAISEDLAY** - laminates metal clad - Engelhard Minerals & Chem.

™**RALLY RAP** - spirally cut tubing - ICO/Rally Corp.

™**RAMANEL** - polyester enamel - Ram Chems.

™**RAMASET** - epoxy enamel - Ram Chems.

RAM CHEMS., Div. Whittaker Corp., Dept. EM, 210 E. Alondra Blvd., Gardena, Calif. 90248, Tel: 213-FA 1-0710; Empl.: 65

™**RAMCON** - rotary actuators - Hills-McCanna Co.

™**RAM-PAC POWER SOURCES** - DC-DC converters - Reliability Inc.

™**RAM PART** - mold release system - Ram Chems.

™**RAMROD** - zener diodes - Motorola Semiconductor Prods.

RAMSEY ENGINEERING, Dept. EM, 1853 W. County Rd. C, St. Paul, Minn. 55113, Tel: 612-633-5150, Telex: 29-7001; Empl.: 160

Local Sales Offices & Reps.

Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Conn	Hamden, Scientific Devices-Connecticut	203-248-9361
Fla	West Palm Beach, Production Sls. Assocs.	305-689-0575
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns. ..	913-649-6996
Mass	Waltham, MCBA Assocs.	619-890-0233

Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Palisades Park, Scientific Devices-East	201-871-3916
NY	Rochester, Scientific Devices-New York	716-334-2445
Ohio	Cleveland, Jim Finnegan	216-826-1033
Ohio	Dayton, Jim Finnegan	513-435-0956
Okla	Norman, Data Mktg. Assoc.	405-364-8320
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data Mktg. Assoc.	713-686-9627
Tex	San Antonio, Data Mktg. Assoc.	512-828-0937
Va	Norfolk, Scientific Devices-E/Tech	703-499-8133
Va	Springfield, Scientific Devices-E/Tech	703-451-6500
Wash	Seattle, Avionics Liaison	206-767-3870

RAMTEK CORP., Dept. EM, 585 N. Mary Ave. P.O. Box 60309, Sunnyvale, Cal. 94086, Tel: 408-735-8400, TWX: 910-339-9379; Empl.: 215

Sales Manager: R. Thomason

Local Sales Offices & Reps.

Cal	Santa Ana, Ramtek Corp.	714-545-0409
Fla	Maitland, Ramtek Corp.	305-628-0444
NH	Nashua, Ramtek Corp.	603-889-9740
Va	Alexandria, Ramtek Corp.	703-548-2604

(TM)RANCHO - flexible cord - Teledyne Western Wire & Cable

(TM)RANCHOPRENE - flexible cord - Teledyne Western Wire & Cable

(TM)RANGE RIDER - modem test sets, printers, analysers - International Data Sciences

(TM)RANGLER 40D - CB Rig - Fanon/Courier Corp., Subs.

RANK PRECISION INDS., Dept. EM, 411 Jarvis Ave., Des Plaines, Ill. 60018, Tel: 312-297-7720, Telex: 72-6441; Empl.: 65

Local Sales Offices & Reps.

Cal	Newport Beach, Omega Inds.	714-642-0746
NY	West Nyack, Rank Precision Ind.	

RANSCO INDUSTRIES, Dept. EM, 2221 Statham Blvd., Oxnard, Cal. 93030, Tel: 805-487-7777, Telex: 65-9235; Empl.: 30 .... p. 2683

Local Sales Offices & Reps.

Cal	Fullerton, S. Garfield Assocs.	714-871-5492
Cal	Los Angeles, S. Garfield & Assocs.	213-888-1768
Cal	Mountain View, Morse Assocs.	415-968-7722
Conn	Middletown, McBar Assocs.	203-865-4376
Fla	West Palm Beach, Production Sls. Assocs.	305-689-0575
Mass	Waltham, McBar Assocs.	617-890-0233
Pa	Valley Forge, Ransco Inds.	215-948-0300

RANTEC DIV., Emerson Elec. Co., Dept. EM, 24003 Ventura Blvd., Calabasas, Calif. 91302, Tel: 213-347-5446, TWX: 910-494-1218; Empl.: 265

(TM)RAPIDOGRAPH - drawing inks - Koh-I-Noor Rapidograph

(TM)RAPIDOGRAPH - technical pens - Koh-I-Noor Rapidograph

(TM)RAPIDOMETRIC - technical pens - Koh-I-Noor Rapidograph

RAPIDPRINT INC., Dept. EM, 2055 S. Main St., Middletown, Conn. 06457, Tel: 203-346-9283, TWX: 9-9394 710-428-7944; Empl.: 125

Sales Manager: J.B. Thaxter

(TM)RAPID RACK - card packaging - Scanbe Canoga Industries

(TM)RAPIDRAW - drafting film - Koh-I-Noor Rapidograph

(TM)RAPID-SET - cyanoacrylate adhesive - Mereco Products Div.

(TM)RAPID-SYN - steppers, drivers, pulse sources & preset indexers - Computer Devices of Calif.

RATELCO, INC., Dept. EM, 610 Pontius Ave. N., Dept. EEM, Seattle, Wash. 98109, Tel: 206-624-7770, Telex: 32-1200; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, Bryant Co.	602-973-6334
Cal	Long Beach, Matzinger Wells Inc.	213-433-1111
Cal	Menlo Park, Howe-Stephens Co.	415-322-1788
Colo	Denver, Hamilton Assocs., Inc.	303-629-0901
Conn	Wallingford, Total Power Corp.	203-265-2879
Ill	Park Ridge, Electrical Materials & Equip. Co.	312-696-1540
Mass	Framingham, Total Power Corp.	617-237-2024
Minn	Minneapolis, Klass Co., Inc.	612-338-8427
NM	Albuquerque, Bryant Co.	505-296-5158
NY	Brooklyn, Roytran	212-782-1505
Okla	Oklahoma City, R. C. Ramsey Co.	405-235-6818
Pa	Radnor, J. Claflin Co.	215-688-1990
Tenn	Chattanooga, J.R. Murray Co.	615-267-3889
Tex	Dallas, E.B. Robertson	214-942-2711
Tex	Houston, E.B. Robertson	713-785-6800
Exp:	Seattle, Ratelco	206-624-7770

Advertisement

Designers and manufacturers of Constant Voltage Battery Chargers and Eliminators, Ringing Generators, Dry CEMF Cells, DC-DC Converters, DC-AC Inverters, Communications Power Distribution Boards, Uninterruptible Power Systems (U.P.S.), AC-DC Test Bench Power Supply Units (Battery Eliminators), Alternator Power Converters, Mobile 2-Way Truck Intercoms.

(TM)RATEMASTER - variable area flowmeter - Dwyer Instrs

(TM)RATIOHMIC RESISTANCE - high accuracy resistance measurements - Data Precision Corporation

(TM)RATIOMETRIC OHMS - ohms converters - Dana Labs., Inc.

(TM)RATIO-PROBE - two-color-infrared optical pyrometer - Capintec Instruments, Inc.

(TM)RATIO-SCOPE - two-color-infrared optical pyrometer - Capintec Instruments, Inc.

RAULAND, Div. Zenith Radio Corp., Dept. EM, 2407 W. North Ave., Melrose Pk., Ill. 60160, Tel: 312-345-4700

Sales Manager: T.M. Snow

RAWAY BEARING CORP., Dept. EM, 8 Melnick Rd., Monsey, N.Y. 10952, Tel: 914-352-4944; FSC No.: 3110-3120; Empl.: 6

Sales Manager: Rachim Baskin

RAWN CO., INC., Dept. EM, Box 9, Spooner, Wisc. 54801, Tel: 715-635-8711; Empl.: 12

Local Sales Offices & Reps.

Ala	Birmingham, Henry W. Phillips Co.	404-992-3070
Ariz	Phoenix, R. Fissell Co.	602-264-4031
Cal	Culver City, H. Feldman Co.	213-870-5973
Fla	Ft. Lauderdale, Jack Sprock Sls. Co.	305-587-3792
Ga	Atlanta, H. W. Phillips Co.	404-237-7564
Ga	Roswell, Henry W. Phillips Co.	404-992-3070
Haw	Honolulu, Hawaii Elctrn. Sls.	808-845-8207
Mo	Ballwin, R. J. Throckmorton Sls. Co.	314-227-7222
NY	Yonkers, J. Brown Elctrn. Sls.	914-779-7330
Ore	Beaverton, DMS/Vantage Sls. Co.	
Tex	Irving, Antle-Smith Sls. Co.	214-259-8707
Tex	Irving, Antle-Smith Sls. Co.	214-259-8707
Wash	Seattle, DMS/Vantage (D. Miller Sls. Co.)	206-525-2050

RAY-O-VAC DIV., ESB Inc., Dept. EM, 101 E. Washington Ave., Madison, Wisc. 53703, Tel: 608-252-7400, TWX: 910-286-273; Empl.: 2931

Local Sales Offices & Reps.

Cal	North Hollywood, Bassett & Moore	213-877-7129
Cal	Oakland, Moulthrop Sls.	415-261-7676
Cal	Placentia, Bassett & Moore	213-877-7129
Colo	Denver, W. J. Purdy Co.	303-777-1411
Fla	Orlando, Cartwright & Bean	305-422-4531
Fla	Plantation, Cartwright & Bean	305-791-3989
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Chicago, G. Mcl. Cole Co.	312-774-3535
Ind	Indianapolis, Sukup & Cox	317-253-1215
Mass	Needham, Mullin Tech. Sls.	617-444-4780
Mich	Detroit, R.C. Merchant Co.	313-535-6000
Mich	St. Joseph, R.C. Merchant Co.	616-983-7378
Minn	Minneapolis, Olsen & Assocs.	612-929-6121
Mo	Kansas City, Forristal-Young Sls.	816-358-6771
Mo	St. Louis, Forristal-Young Sls.	314-645-2360
Neb	Omaha, Forristal-Young Sls.	402-333-0800
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	Teaneck, Fisher Elctrn. Assocs.	201-837-1200
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Camillus, Trademark Elctrns.	315-487-3870
NY	Port Washington, Fisher Elctrn. Assocs.	516-883-0600
NC	Charlotte, Cartwright & Bean	704-333-6457
NC	Raleigh, Cartwright & Bean	919-832-7128
Ohio	Richfield, Bear Mktg.	216-659-3131
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Tesco/Texport	214-690-4004
Wash	Seattle, Fleehart & Sullivan	206-522-1533
Wisc	Milwaukee, G. McL. Cole	414-545-6083

(TM)RAYCARL - cold heading process - Camcar

RAYCHEM CORP., Dept. EM, 300 Constitution Dr., Menlo Park, Cal. 94025, Tel: 415-329-3333, TWX: 910-373-1728; FSC No.: 06090; Empl.: 3160

Local Sales Offices & Reps.

Cal	Irvine, Raychem Corp.	714-833-3630
Cal	San Diego, Raychem Corp.	714-299-9562
Cal	Sherman Oaks, Raychem Corp.	213-788-9872
Colo	Denver, Raychem Corp.	303-758-1936
Conn	Norwalk, Raychem Corp.	203-853-2700
Fla	Orlando, Raychem Corp.	305-855-4214
Ga	Atlanta, Raychem Corp.	404-261-3657
Ill	Des Plaines, Raychem Corp.	312-298-1100
Kans	Overland Park, Raychem Corp.	913-649-6930
Md	Bethesda, Raychem Corp.	301-652-9057
Mass	Hingham, Raychem Corp.	617-749-6850
Minn	Minneapolis, Raychem Corp.	612-529-9114
Mo	Berkeley, Raychem Corp.	314-521-5111
NJ	Bloomfield, Raychem Corp.	201-744-6261
NJ	Maple Shade, Raychem Corp.	609-667-4280
NY	Dix Hills, Raychem Corp.	516-864-4400
Ohio	Cleveland, Raychem Corp.	216-692-2141
Ohio	Warren, Raychem Corp.	216-856-4979
Pa	Johnstown, Raychem Corp.	814-255-1142
Pa	West Chester, Raychem Corp.	215-692-8660
Tenn	Knoxville, Raychem Corp.	615-667-3027
Tex	Dallas, Raychem Corp.	214-350-8871
Wash	Bellevue, Raychem Corp.	206-455-0903
Exp:	Dorval 760, Quebec Can., Raychem Canada Ltd.	514-636-1680
Exp:	Toranto I9, Ont, Can., Raychem Canada Ltd.	416-789-7425

(TM)RAYCHRON - timers - Bristol Saybrook Co.

RAYCO ELECTRONIC MFG. INC., Dept. EM, 1625 12th St., Santa Monica, Cal. 90404, Tel: 213-394-3137; Empl.: 12

RAYMOND CONTROLS CORP., see Rapidprint Inc.

(TM)RAYCORDER - digital magnetic tape recorder - Raymond Engrg. Inc.

(TM)RAYLAY - light controlled relay - Solid State Electronics Corp.

(TM)RAYMASTER - all light source equipment - Gates, Geo. W. & Co., Inc.

(TM)RAYMER - tuners-amplifiers-receivers for background music & general purpose - Trutone Elctrns., Inc.

RAYMOND ENGRG. INC., Dept. EM, 217 Smith St., Middletown, Conn. 06457, Tel: 203-632-1000, TWX: 710-428-7944; FSC No.: 92059; Empl.: 427

(TM)RAYNGER - infrared thermometer - Raytek, Inc.

(TM)RAYOTUBE - temperature detector (radiation-type) - Leeds & Northrup Co.

(TM)RAYOVIN - hook-up wire - Raychem Corp.

(TM)RAYSISTOR - photo-optical isolator - Raytheon Co.

(TM)RAYSISTOR - optoelectronic devices - Raytheon Co.

RAYTEK, INC., Dept. EM, 1277 Terra Bella Ave., Mountain View, Cal. 94043, Tel: 415-961-1650, Telex: 348-351; Empl.: 35

Local Sales Offices & Reps.

Cal	Los Altos, Wanic Tech.	415-941-3339
Cal	Van Nuys, Pacific Thermal Sls.	213-997-1772
Fla	Clearwater, J. Barber Co.	813-442-8713
Ga	Jonesboro, W.L. Anderson Co.	404-478-9648
Ill	Park Ridge, L.R. Fitz Co.	312-631-5488
Ind	Indianapolis, Couchman-Conant, Inc.	317-849-9890
La	Baton Rouge, R.S. & P. Sls.	504-937-4828
Mass	Acton, Abbott Assocs.	617-263-5047
Mich	Orchard Lake, W.C. Fay Co.	313-851-4750
Minn	Minneapolis, Bican Co.	612-827-4734
Mo	St. Louis, R. Greene Co.	314-644-2666
Neb	Omaha, H.G. Klug Co.	402-553-1377
NJ	Fair Lawn, Par Assocs.	201-447-3722
NM	Albuquerque, A.L.S. Elctrns.	505-298-2575
NC	Matthews, W.K. Hile Co.	704-847-9125
Ohio	Cincinnati, A.H. Parker, Jr.	513-563-1843
Ore	Portland, McLaren, Inc.	503-297-2248
Pa	Mt. Lebanon, Advance Instrs., Inc.	412-341-3252
Pa	Wayne, R. Schadler Co.	215-687-0969
Tex	Houston, Dixon Engrg.	713-644-8052
Va	Richmond, Hile Co.	804-359-6051
Wash	Bellevue, McLaren, Inc.	206-454-3400
Wisc	Brookfield, S.F. Boyd Co.	414-781-7170

RAYTHEON DATA SYSTEMS, Dept. EM, 1415 Boston Providence Tpke., Norwood, Mass. 02062, Tel: 617-762-6700, TWX: 710-336-0646; Empl.: 1200

Local Sales Offices & Reps.

Cal	Los Angeles	213-770-4240
Cal	San Francisco	415-692-4640
Colo	Denver	313-358-3990
Conn	Hartford	203-243-2939
DC	Wash.	703-979-6100
Fla	Miami	305-592-3884
Ga	Atlanta	404-321-3064
Ill	Chicago	312-671-0410
Mass	Boston	617-762-6700
Mass	Wellesly	617-237-4190
Mo	Kansas City	816-741-1560
NY	Lake Success	212-895-2567
NY	New York	212-661-2790
NC	Greensboro	919-294-5811
Okla	Tulsa	918-663-7852
Tex	Dallas	214-231-6391
Tex	Houston	713-771-5851
Va	Arlington	703-979-6100

RAYTHEON

RAYTHEON CO., Distributor Prods. Oper., Dept. EM, Fourth Ave., Burlington, Mass. 01803, Tel: 617-272-6400, TWX: 710-332-7641 p. 2134, 2135, 2557-2566, 2778, 3139-3146, 4209-4217

Sales Manager: R. Knight

Local Sales Offices & Reps.

Cal	El Monte, Cook Entprs.	213-686-2120
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, Connors, Inc.	303-934-5829
Fla	N. Miami, Haas-Winfield Co.	305-949-9143
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Haw	Honolulu, L. Gaber	808-839-9059
Ill	Chicago, I.R.I.	312-647-7755
Ind	Carmel, J. T. Hoolihan & Assoc.	317-846-3504
Ind	Indianapolis, Green-Wissler Sls. Co.	317-251-9114
Minn	Edina, Mel Foster Co.	612-835-2252
Mo	Kansas City, Forristal & Young Sls.	816-358-6771
Mo	St. Louis, Forristal & Young Sls.	314-645-2360
Neb	Omaha, Forristal & Young Sls.	402-333-0800
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	Teaneck, Fisher Elctrn. Assoc.	201-837-1200
NY	Skaneateles, Leahy & Thompson	315-685-8122
Ohio	Beachwood, Electronic Salesmasters	216-831-9555
Ohio	Cleveland, Imtech	216-826-3400
Ohio	Dayton, Imtech	513-837-5610
Ore	Portland, D.G. Weber Co.	503-234-0686
Tenn	Memphis, Crockett Sls. Co.	901-388-5410
Tex	Dallas, Crockett Sls. Co.	214-748-8209

RAYTHEON CO., Indl. Comps. Oper., Dept. EM, 465 Centre St., Quincy, Mass. 02169, Tel; 617-479-5300, TWX: 710-337-6879

Sales Manager: R. Punchard

Local Sales Offices & Reps.

Cal	Los Angeles	714-898-4444
Cal	Mountain View	415-964-4754
Ga	Warner Robins, Raytheon Co.	912-922-8471
Ill	Elmhurst	312-833-6760
Mass	Waltham	617-899-8080
NY	Great Neck	516-482-8480
Ohio	Dayton	513-254-3571
Tex	Dallas	214-233-2939
Va	Arlington	703-979-6100
Exp:	Lexington, Mass.	617-862-6600

RAYTHEON CO., Spec. Microwave & Device Oper., Dept. EM, 130 Second Ave., Waltham, Mass. 02154, Tel: 617-890-8080, TWX: 710-324-6568

Sales Manager: W.C. Jones

RAYTHEON CO., Microwave & Power Tube Div., Dept. EM, 190 Willow St., Waltham, Mass 02154, Tel: 617-899-8400, TWX: 710-324-6568

Local Sales Offices & Reps.

Cal	Los Angeles	714-898-4444
Cal	Mountain View	415-964-4754
Fla	Longwood	305-830-6670
Ga	Warner Robins	912-922-8471
Ill	Elmhurst	312-833-6760
Mass	Waltham	617-899-8080
NY	Great Neck	516-482-8480
NY	Rome	315-337-2500
Ohio	Dayton	513-254-3571
Tex	Dallas	214-233-2939
Va	Arlington	703-979-6100
Exp:	Mass., Lexington	617-862-6600

RAYTHEON SEMICONDUCTOR, Dept. EM, 350 Ellis St., Mountain View, Cal. 94042, Tel: 415-968-9211, TWX: 910-379-6481; FSC No.: 07933; Empl.: 950; Minimum order: $W. McMillan

Sales Manager: E. Neubauer; *Distributor Manager:* W. McMillan

Local Sales Offices & Reps.

Ariz	Scottsdale, Semper Fi Sls. Co	602-991-9197
Cal	El Segundo, Varigon Assoc.	213-322-1120
Cal	Irvine, Raytheon Semiconductor	714-833-9042
Cal	Mountain View, Raytheon Semiconductor	415-969-3475
Cal	San Diego, Varigon Assoc.	714-299-5413
Cal	Sunnyvale, Mission Mktg.	408-732-9611
Colo	Boulder, R. G. Entprs.	303-447-9211
Fla	Fort Lauderdale, Perrott Assocs.	305-792-2211
Fla	Largo, Perrott Assocs.	813-585-3327
Fla	Orlando, Perrott Assocs.	305-275-1132
Fla	St. Petersburg, Raytheon Semiconductor	813-576-2221
Ill	Des Plaines, Raytheon Semiconductor	312-297-5540
Md	Riderwood, ISC	301-484-1411
Mass	Burlington, Raytheon Semiconductor	617-272-8500
Mass	Lexington, Circuit Sls. Co.	617-861-0567
Mich	Farmington, Miltimore Sls.	313-476-2446
Minn	Bloomington, Elctrn. Sls. Agcy.	612-884-8291
Minn	New Brighton, Raytheon Semiconductor	612-636-7696
NJ	Pennsauken, Raytheon Semiconductor	609-663-4066
NY	Baldwin, R.O.M.E., Inc.	516-623-3344
NY	Melville, Raytheon Semiconductor	516-420-0700
NY	Pittsford, T-Squared Co.	716-381-2551
NY	Syracuse, T-Squared Co.	315-463-8592
Ohio	Brunswick, Kimconics Sls. Co.	216-225-6111
Ohio	Dayton, Kimconics Sls. Co.	513-898-1783
Tex	Dallas, ION Assocs.	214-357-9441
Tex	Houston, ION Assocs.	713-461-5311
Wisc	Milwaukee, Carlson Elctrn. Sls.	414-476-2790
Exp:	Mt. View, Raytheon Overseas Ltd.	415-968-9211

RBM CONTROLS, See Essex Controls Div.

RCA ASTROELECTRONICS DIVISION, Dept. EM, Edinburg Rd., Box 800, Princeton, N. J. 08540, Tel: 609-448-3400

RCA DISTR. & SPECIAL PRODS. DIV., Dept. EM, Deptford, N.J. 08096, Tel: 609-963-8000

RCA, ELECTRO-OPTICS & DEVICES, Dept. EM, New Holland Ave., Lancaster, Pa. 17604, Tel: 717-397-7661

See RCA Solid State Div. for Sls. Reps.

RCA PARTS & ACCESSORIES, See RCA Distr. & Special Prods. Div.

ⓉⓂR-CASE - rack-mountable CRT display terminal - Ann Arbor Terminals, Inc.

RCA SERVICE CO., Div. RCA Corp., Dept. EM, Govt. Svcs. 202-1, Camden, N.J. 08101, Tel: 609-779-5176, TWX: 710-892-0905; Empl.: 4000

Local Sales Offices & Reps.

Cal	Camarillo	805-484-3898
Va	Arlington	703-558-4441

RCA SOLID STATE DIV., Dept. EM, Route 202, Somerville, N.J. 08876, Tel: 201-685-6000, TWX: 710-480-9333; FSC No.: 19089

Local Sales Offices & Reps.

Ala	Huntsville	205-881-4100
Ariz	Scottsdale	602-947-7235
Cal	Hollywood	213-461-9171
Cal	Los Altos	415-948-8996
Cal	San Diego	714-279-0420
Cal	Tustin	714-832-5302
Colo	Denver	303-433-8841
Fla	Lake Park	305-626-6350
Ill	Des Plaines	312-391-4380
Ind	Fort Wayne	219-432-3973
Ind	Indianapolis	317-546-4001
Kans	Overland Park	913-642-7656
Mass	Needham Heights	617-444-7200
Mich	Birmingham	313-644-1151
Minn	Minneapolis	612-929-0676
NJ	Cherry Hill	609-424-3650
NJ	Clark	201-574-3550
NY	Fairport	716-223-5240
NY	Huntington Station	516-293-0180
Ohio	Pepper Pike	216-831-0030
Tex	Dallas	214-638-6200
Va	Arlington	703-558-4161

RCA SOLID STATE DIV., COS/MOS IC Mktg., Dept. EM, Rte. 202, Somerville, N. J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCA SOLID STATE DIV., Linear Integrated Circuits, Dept. EM, Rte. 202, Somerville, N. J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCA SOLID STATE DIV., Micro Processors, Dept. EM, Route 202, Somerville, N.J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCA SOLID STATE DIV., RF & Microwave Devices, Dept. EM, Rte. 202, Somerville, N. J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps

RCA SOLID STATE DIV., Thyristors & Rectifiers, Dept. EM, Rte. 202, Somerville, N.J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCA SOLID STATE DIV., Transistors, Dept. EM, Rte. 202, Somerville, N.J. 08876, Tel: 201-685-6000, TWX: 710-480-9333

See RCA Solid State Div. for Sls. Reps.

RCA SERVICE CO., Tech. Prods. Svc. Div. RCA Corp., Dept. EM, Bldg. 204-2, Cherry Hill, Camden, N.J. 08101, Tel: 609-779-4129, TWX: 710-892-0905; Empl.: 6000

Local Sales Offices & Reps.

Cal	Montebello, RCA Service Co.	213-685-3069
Ga	Tucker, RCA Svc. Co.	404-934-9333
Ill	Skokie, RCA Service Co.	312-965-7550
NJ	Jersey City, RCA Service Co.	201-451-2222
Ohio	Strongsville, RCA Service Co.	216-238-9555
Pa	Philadelphia, RCA Service Co.	215-467-3300
Tex	Dallas, RCA Service Co.	214-631-8770

RCI DATA, See Re-el Circuits, Inc.

RCL ELECTRONICS DIV., AMF, Incorporated, Dept. EM, 195 McGregor St., Manchester, N.H. 03102, Tel: 603-627-3831, TWX: 710-220-1876; Empl.: 900 p. 2518-2523,3719-3730

Local Sales Offices & Reps.

Ala	Huntsville, K & E Assocs.	205-883-9720
Ariz	Tempe, Toribre Entprs.	602-894-2263
Cal	Palo Alto, Held Mollard	415-965-0321
Cal	San Diego, S.R. Elctrns.	714-565-8411
Cal	Woodland Hills, Interstate Mktg.	213-883-7606
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233

Fla	Largo, Semtronic Assocs.	813-586-1404
Ga	Hartwell, K & E Assocs.	404-376-5438
Ill	Westchester, Gassner & Clark	312-345-4285
Ind	Indianapolis, Leslie M DeVoe Assocs.	317-257-1227
Iowa	Hiawatha, Gassner & Clark	319-393-5763
Kans	Derby, Palatine Sls	316-788-0621
Kans	Lexana, Palatine Sls	913-492-7020
Md	Glen Burnie, Micro Comp, Inc.	301-761-4600
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Grosse Pointe Park, Greiner Assocs.	313-499-0188
Minn	Bloomington, Electronic Sls. Agency	612-884-8291
Miss	Corinth, K & E Assocs.	601-287-1471
Mo	St. Louis, Palatine Sls.	314-426-7053
NJ	East Orange, MGI	201-678-5071
NJ	Haddonfield, TAI Corp.	609-854-3011
NM	Albuquerque, Waugaman Assocs.	505-294-1436
NY	Buffalo, Quality Comps	716-839-4170
NY	Manilus, Quality Comps.	315-682-8885
Ohio	Cleveland, KW Elctrns. Sls.	216-831-8292
Ohio	Columbus, KW Elctrns. Sls.	614-888-0483
Ohio	Dayton, KW Elctrns. Sls.	513-890-2150
Ore	Portland, Elctrn. Sources	503-292-0701
Pa	Allison Park, KW Elctrn. Sls.	412-487-4300
Tex	Houston, R.F. Kimball Co.	800-942-2805
Tex	Richardson, R.F. Kimball Co.	214-231-3447
Utah	Salt Lake City, Waugaman Assocs.	801-277-8911
Wash	Bellevue, Elctrn. Sources	206-453-0800

Local Distributors

Cal	Burlingame, Rose Electric Dist. Co	415-697-0224
Cal	Carson, Hi-Rel Dist. Sls.	213-537-6500
Cal	Los Angeles, Electric Switch	213-660-1310
Cal	San Diego, Mock III Sls. Co.	714-560-0515
Cal	Van Nuys, Bertronics Inc.	
Cal	Woodland Hills, Rampart Comp.	213-887-7261
Colo	Denver, Integrated Elctrns.	303-534-6121
Colo	Lakewood, Acacia Sls.	303-232-2882
Conn	Stratford, Electro/Comp.	203-375-5811
Fla	Clearwater, Diplomat/Southland	813-443-4514
Fla	Ft. Lauderdale, National Register Co.	305-792-2600
Fla	Orlando, Hammond Elctrns.	305-849-6060
Fla	Tampa, Impala Elctrns.	813-855-4747
Ill	Elks Grove Village, GBL Elctrns.	312-593-3220
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Indianapolis, Sheridan Assoc.	317-297-3146
Iowa	Cedar Rapids, Advent Elctrns.	329-363-0221
Kans	Overland Park, Sheridan Assoc.	913-383-1636
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Baltimore, Radio Electric	301-823-0070
Md	Gaithersburg, Pioneer-Washington Elctrns.	301-948-0710
Mass	Burlington, RC Comp.	617-273-1860
Mich	Farmington, Sheridan Assoc.	313-477-3800
Mich	Farmington, Advent Elctrns.	313-477-1650
Mich	Grand Rapids, Sheridan Assoc.	616-942-2504
Mich	Livonia, Camelot Elctrns.	313-427-8660
Minn	Bloomington, Arrow Elctrns.	612-888-5522
Minn	Minneapolis, Diplomat/Electro-Comp.	612-788-8601
Mo	Florissant, Sheridan Assoc.	314-837-5200
NJ	Totowa, Diplomat IPC	201-785-1830
NY	Farmingdale, Command Elctrns. Corp.	516-293-1212
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Hauppauge, Rampart, Inc.	516-273-1111
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Beachwood, Sheridan Assoc.	216-831-0130
Ohio	Cincinnati, Sheridan Assoc.	513-761-5432
Ohio	Dayton, Stotts Friedman	513-298-5555
Ohio	Dayton, Sheridan Assoc.	513-277-8911
Ohio	Solon, Repco	216-248-8900
Pa	Philadelphia, Almo Elctrns. Corp.	215-676-6000
Pa	Pittsburgh, Sheridan Assoc.	412-244-1640
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-5101
Tex	Dallas, Southwest Radio & Supply Co.	214-741-6272
Tex	Richardson, Southwest Elctrns.	214-234-3050
Tex	Stafford, Southwest Elctrns.	713-494-6021
Utah	Salt Lake City, Calron Electric Supply	801-487-7451
Wash	Seattle, Almac/Stroum	206-763-2300
Wisc	Mequon, Taylor Electric Co.	414-241-4321
For:	Canada, Dorval, Semad Elctrns., Ltd.	514-636-4614
For:	Canada, Downsview, Semad Elctrns., Ltd.	416-635-9880
For:	Canada, Ottawa, Semad Elctrns., Ltd.	613-722-6571
For:	Canada, Winnipeg, Vanguard Elctrn. Dist. Ltd.	204-786-1471

RCL ELECTRONICS DIV., AMF Incorporated, Dept. EM, 700 S. 21st St., Irvington, N.J. 07111, Tel: 201-374-3311, TWX: 710-999-5511; Empl.: 750 p. 2551-2554,4218-4226

Refer to RCL Electronics Div., Manchester, N.H. for distributor and sales office information.

RDF CORP., Dept. EM, 23 Elm Ave., Hudson, N.H. 03051, Tel: 603-882-5195, TWX: 710-228-1882; Empl.: 65

RDI/REED DEVICES, INC., Dept. EM, 21 W. 183 Hill Ave., Glen Ellyn, Ill. 60137, Tel: 312-858-2050, Telex: 72-1527; FSC No.: 53337 p. 2136-2138

Local Sales Offices & Reps.

Ala	Alabaster, Austin Brown Assocs.	205-870-3141
Ariz	Phoenix, McKnight/Zeus	602-257-8037
Ark	Eldorado, D. Bellew Sls.	501-863-8325
Cal	Los Angeles, Universal Comp. Co.	213-641-4255
Cal	Menlo Park, G. R. McKnight Co.	415-325-2844
Colo	Englewood, Elcom Inc.	303-770-4400
Conn	Norwalk, Betronic Assocs.	203-853-7630
Fla	Hollywood, S.K. Wallace Assoc.	305-961-6640
Fla	Tampa, S. K. Wallace Assoc.	813-961-1037
Ga	Atlanta, Austin Brown Assoc.	404-457-6381
Ill	Glen Ellyn, Rockford Controls	312-469-6016
Ind	Indianapolis, Rockford Controls Co.	317-297-2956
Kans	Lenexa, Palatine Sls.	913-492-7020
La	Kenner, D. Bellew Sls.	504-443-3237
Md	Randallstown, Beacon North	301-922-1248
Mass	Waltham, Betronic Assocs.	617-894-8400
Mich	Brighton, H. H. Barnum Co.	313-229-2961
Mich	Lowell, H. H. Barnum Co.	616-451-0980
Minn	Minneapolis, HMR	612-920-8200
NM	Albuquerque, McKnight/Zeus	505-268-3981
NY	Buffalo, H.C. Johnson Ags.	716-632-7880
NY	Fayetteville, H.C. Johnson Ags.	315-637-9383
NY	Port Washington, TMA	516-883-2432
NY	Rochester, H.C. Johnson Ags.	716-482-3000
NC	Greensboro, S. K. Wallace Assoc.	919-292-0487
Ohio	Cincinnati, Val-Skol Sls.	513-563-6790
Ohio	Cleveland, Val-Skol Sls.	216-526-2156
Ohio	Columbus, Val-Skol Sls.	614-291-4123
Pa	Glenshaw, H. C. Johnson Agencies	412-961-0414
Tenn	Brentwood, A. Brown Assoc.	615-373-2068
Tenn	Memphis, D. Bellew Sls.	901-365-9437
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Tex	Houston, R.E. Nesbitt Co.	713-224-3633
Utah	Salt Lake City, Control Agency, Inc.	801-466-8601
Wash	Seattle, Northmar	206-524-5170

Local Distributors

Ala	Huntsville, Controlled Dist.	205-883-7501
Ark	Little Rock, Carlton-Bates Co.	501-562-9100
Cal	Anaheim, Electro Comps.	714-634-0222
Cal	Burlingame, Rose Elec.	415-697-5700
Cal	Los Angeles, Electric Switches	213-660-1310
Cal	San Jose, Consolidated Parts	408-263-9521
Colo	Aurora, Component Specialties	303-341-0160
Conn	Hartford, Hartford Elec. Supp.	203-233-3694
Fla	Miami, Electro Standard Labs	305-633-6973
Ga	Atlanta, Electrical Control Prods.	404-455-1216
Ill	Addison, Lectro Comps.	312-543-1680
Ill	Broadview, LComp Chicago	312-865-7600
Ill	Chicago, Otto Frankenbush	312-647-0755
Ill	Rockford, Mid-West Assoc.	
Ill	Schaumburg, Control Design	312-882-7232
Ind	Ft. Wayne, Ft. Wayne Elec.	219-423-3422
Ind	Indianapolis, Ra-Dis-Co	317-637-5571
Ind	Indianapolis, Control Design	317-788-4559
Kans	Wichita, Interstate Elec. Supply	316-264-6316
La	New Orleans, Southern Radio	504-524-2343
Md	Beltsville, Treeko Sls.	301-937-8260
Mass	Waltham, QPL Elec. Dist.	617-891-0460
Mich	Sterling Hgts., Double R Elctrn.	313-264-0706
Minn	Minneapolis, Control Design	612-721-1629
Mo	St. Louis, LComp	314-647-5505
Neb	Lincoln, Scott Elctrn.	402-466-8221
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	Jersey City, Cuny & Guerber	201-653-0222
NJ	So. Plainfield, Brownell Electro	201-753-4600
NY	Buffalo, Summit	716-884-3450
NY	Rochester, Requa Elec. Supply	716-442-2020
NY	Rochester, Summit Elctrn.	716-334-8110
NC	Raleigh, Southeastern Radio	
NC	Shelby, Dixie Indl. Supply	704-482-5641
Ohio	Akron, Akron Elctrn. Supply	216-762-8818
Ohio	Cincinnati, Mytronics	513-733-1661
Ohio	Cleveland, Repco	216-248-8900
Ohio	Dayton, ESCO Inc.	513-224-9192
Okla	Tulsa, Radio Inc.	918-587-9123
Ore	Portland, Consolidated Elec. Dist.	503-232-3142
Pa	Erie, Advacom Inc.	814-455-8110
Pa	Philadelphia, Philadelphia Elec. Co.	215-568-7400
Tenn	Knoxville, J. R. Stephenson	615-588-7474
Tenn	Memphis, Brownell Electro	901-332-9254
Tex	Dallas, Dallas Instru.	214-349-1180
Tex	Ft. Worth, Swieco	817-335-6521
Tex	Stafford, Southwest Elex.	713-494-6021
Utah	Salt Lake City, Standard Supply	801-355-2971
Wash	Seattle, Radar Elec.	206-282-2511
Wisc	Milwaukee, Marsh Elex.	414-475-6000

™RDS-500 - minicomputer - Raytheon Data Systems

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REACOR, INC., Dept. EM, 718 Lingco Dr., Richardson, Tex. 75081, Tel: 214-231-7218; FSC No.: 5K492; Empl.: 30 p. 3308,3309

Sales Manager: R. Bartlett

Local Sales Offices & Reps.

Cal	San Jose, Silicon-Valley Sls.	408-997-1493
Fla	Clearwater, Lawerence Assocs.	813-443-2698
Haw	Honolulu, Aloha Assocs.	808-941-1574
Minn	Minneapolis, Electro Svc.	612-827-2907
NJ	Bogota, Naville & Vespo Corp.	201-487-1505
NM	Albuquerque, Staley Co.	505-821-4311
Tex	Richardson, Barry Sls.	214-234-0255

REAL TIME SYSTEMS INC., Dept. EM, 152 S. MacQuesten Pkwy., Mt. Vernon, N.Y. 10550, Tel: 914-667-0425

Sales Manager: A. Citrin

Local Sales Offices & Reps.

Ala	Huntsville, Lee Assocs.	205-533-5896
Md	Silver Spring, Eastern Instrumentation	301-681-6500
Wash	Bellevue, Scientific Devices Northwest	206-454-0900

RE-EL CIRCUITS, INC., Dept. EM, 520 Victor Street, Saddle Brook, N.J. 07662, Tel: 201-843-3738; Empl.: 15 p. 1469

Local Sales Offices & Reps.

Mass	Needham, White Sls. Co.	617-444-3676
NY	E. Northport, Jarms Assoc.	516-368-4096
NY	Fayetteville, M. P. Andrews Mfrs. Rep.	315-637-5291

RECORDER SYS DIV., See Gulton Inds, Meas. & Control Sys. Div.

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™REACTOSPEED - variable speed motor control - Autocon Inds., Inc.

™REACTROL - regulator - General Elec. Co.

™READ-A-DIP - ic logic checker - Micro Electronic Systems, Inc.

™REAL-AL - dacron mat - Acme Chemical & Insulation Co.

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™REALITY - data base management system - Microdata Corp.

™REAL TIME I, II, III - microprogrammable array transform processor - Datawest Corp.

™REBEL 40 - CB Rig - Fanon/Courier Corp., Subs.

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™RECIPROMATIC - counter - Gen Rad

™RE-CIRK-IT - circuit breakers - Heinemann Elec. Co.

(TM)RE-COIL - induction heater accessory - Miller, Co. L.C.

RECOTON CORP., Dept. EM, 46-23 Crane St., Long Island City, N.Y. 11101, Tel: 212-392-6442

Local Sales Offices & Reps.

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Ariz	Phoenix, SWM Sls. Corp.	602-258-6868
Cal	Culver City, Marshank Sls. Corp.	213-559-2591
Cal	Walnut Creek, Mac Pherson Sls. Co.	415-937-1482
Colo	Aurora, SPS Assocs.	303-341-1776
Fla	Casselberry, Morris Taylor Co.	305-838-0821
Haw	Mililani, C & L Dists.	808-623-2762
Ill	Chicago, W. Doyle Co.	312-274-6685
Kans	Leawood, W. Menezes & Assocs.	913-649-2680
La	Metairie, Tape City U.S.A.	504-888-2505
Md	Silver Spring, Morris Taylor Co.	301-946-3569
Mass	Lynn, Keene Sls. Co.	617-595-2300
Mich	Southfield, Aztec Sls. Corp.	313-642-0777
Minn	Maple Grove, R. C. Sls. Co.	612-425-5543
NJ	Lake Pine, Morris Taylor	609-983-1712
NM	Albuquerque, SWM Sls. Corp.	505-296-2620
NY	New York, Newhope Corp.	212-532-7372
NY	Yonkers, J. Brown Electr. Sls. Reps.	914-779-7330
NC	Charlotte, Morris Taylor Co.	704-523-7932
Ohio	Cleveland, M.S. Sls. Co.	216-382-2060
Pa	Philadelphia, Morris Taylor Co.	215-698-9757
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Wash	Yakima, Barnsley-Weis Assocs.	509-453-5537

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Local Sales Offices & Reps.

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Pa	Willow Grove, H. Nash Assocs.	215-657-2213

(TM)RECTODYNE - power supplies - Christie Elec.

RED POINT CORP., Dept. EM, 105 W. Spazier, Burbank, Cal. 91503, Tel: 213-842-4895; Empl.: 12

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Sales Manager: T. Reantillo; *Distributor Manager:* R. Schadt

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Cal	Palo Alto, Eakins Assocs. Inc.	415-328-7871
Cal	Pasadena, Advanced Techniques	213-681-1093
Colo	Englewood, Davis Assocs.	303-761-9228
Conn	Hartford, Newmar Assocs.	203-523-0402
Fla	Orlando, Gra-Mar Inc.	305-894-3351
Ill	Chicago, Berndt Assocs.	312-283-0713
Ind	Carmel, Berndt Assocs.	317-844-0114
Kans	Shawnee Mission, IBL Engrg. & Sls., Inc.	913-262-1374
Md	Silver Springs, QED Elctrns.	301-588-8134
Mass	Lynnfield, Newmar Assocs.	617-245-7960
Mich	Royal Oaks, Hocker Assocs. Inc.	313-549-3910
NM	Albuquerque, Trembly Assocs.	505-293-4444
NY	Mamaroneck, Cane Tech. Sls., Inc.	914-698-4411
Ohio	N. Olmstead, Hocker Assocs.	216-734-4433
Okla	Oklahoma City, IBL Engrg. & Sls., Inc.	405-843-9434
Tex	Bellair, IBL Engrg. & Sls.	713-661-2511
Tex	Dallas, IBL Engrg. & Sls., Inc.	214-EM3-2921
Tex	Houston, IBL Engrg. & Sls., Inc.	713-781-5171
Wash	Bellevue, Conrad-Carlson Assocs.	206-455-1336
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(TM)REDBALL - CB Rig - Fanon/Courier Corp., Subs.

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(TM)REDI LINE - motor-generator to 1000 watts - Applied Motors Inc.

REDINGTON COUNTERS, INC., Dept. EM, 130 Addison Rd., Windsor, Conn. 06095, Tel: 203-688-6207

Local Sales Offices & Reps.

Conn	Windsor, Redington Counters, Inc.	203-688-6200

(TM)RED LIGHTNING - #72 "red lightning" soft solder liquid flux - Superior Flux & Mfg. Co.

(TM)RED LINE - thermal relays - Warren G-V Communications

(TM)RED-LIT - discrete led lamps - Litronix

(TM)RED MARVEL - #74 "red marvel" soft solder liquid flux - Superior Flux & Mfg. Co.

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NJ	Cherry Hill, Danco Elctrn. Sls.	609-424-5590
NJ	Plainfield, S. Glassman Assoc.	201-561-3866
NJ	Rahway, Reedtron	201-382-1930
NY	Glen Cove, S. Glassman Assoc.	516-676-1039

REEVE ELECTRONICS, INC., Dept. EM, 609 W. Lake St., Chicago, Ill 60606, Tel: 312-726-9755; Empl.: 40

Sales Manager: M.A. Boaz

Local Sales Offices & Reps.

Ala	Huntsville, Powertronics, Inc.	205-852-6347
Ariz	Phoenix, Montgomery Bros.	602-253-3431
Cal	Burlingame, Montgomery Bros.	415-697-6500
Colo	Denver, Montgomery Bros.	303-759-2749
Fla	Titusville, Powertronics, Inc.	305-267-5699
Ill	Morton Grove, Thermal Equip. Co.	312-679-6395
Ill	Villa Park, Thermal Process Engrg.	312-833-6270
Md	Silver Spring, ARA Elctrns.	301-565-2584
Mass	Wilmington, Technical Instrs.	617-944-3930
Mich	Troy, C. H. Armstrong Co.	313-524-1414
Minn	Minneapolis, Production Automation Corp.	612-866-5700
Mo	Hazelwood, Production Automation Corp.	314-731-2331
Mo	Raytown, Production Automation Corp.	816-737-0066
NJ	Bayonne, Selstar Prods. Co.	201-437-1220
NC	Raleigh, Powertronics, Inc.	919-787-9090
NC	Thomasville, Powertronics, Inc.	919-476-6727
Ore	Portland, Montgomery Bros.	503-223-4197
Tex	Dallas, Production Automation Corp.	214-620-0227
Utah	Salt Lake City, Montgomery Bros., Inc.	801-363-3555
Wash	Seattle, Montgomery Bros.	206-762-4100
Wisc	Menomonee Falls, W.M. Braun & Assocs.	414-251-8685

(TM)REEVELEC - heating equipment - Reeve Electronics, Inc.

REEVES-HOFFMAN DIV., Dynamics Corp. of Amer., Dept. EM, 400 W. North St., Carlisle, Pa. 17013, Tel: 717-243-5929, TWX: 510-650-3510; Empl.: 830 p. 2472-2475

Sales Manager: R.B. Davis, Dir. Mktg.

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Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Md	Ellicott City, R. F. Assocs.	301-465-5944
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Minn	Minneapolis, J.G. Twist Co.	612-854-4600
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NY	Larchmont, G.M. Moch Co.	914-834-3530
NC	Raleigh, Candor Co.	919-876-4999
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Pa	Philadelphia, C.H. Newson & Assoc.	215-248-3377
SC	Myrtle Beach, Candor Co.	803-448-5213
Tex	Richardson, Hytech, Inc.	214-234-3375
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755
Exp:	Cal., Palo Alto, Centauri Trading Co.	415-493-0813

REFAC ELCTRNS. PINLITE®, WILD ROVER®, Dept. EM, Box 809, W. Hill Rd., Barkhamsted, Conn 06098, Tel: 203-379-2731, TWX: 710-449-6464; FSC No.: 28564; Empl.: 80 p. 2652,2653,4227

Local Sales Offices & Reps.

Ala	Huntsville, Glen White Assocs.	205-883-9394
Ariz	Scottsdale, E. J. Foley & Assocs.	602-945-2665
Cal	Los Gatos, Luscombe Eng. Co.	408-354-6496
Cal	Pasadena, Luscombe Eng. Co.	213-684-2000
Colo	Denver, I. W. Strong & Assoc.	303-292-6900
Conn	Bristol, New England Elctrn. Sls. Corp.	203-583-3650
Fla	Orlando, Technology Mktg. Assoc.	305-857-3760
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
Ind	Indianapolis, Brainard-Wilson Mktg.	317-844-2800
Iowa	Cedar Rapids, J. R. Sls.	319-393-2232
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Md	Timonium, Glen White Assocs.	301-252-6360
Mass	Canton, New England Elctrn. Sls. Corp.	617-828-4835
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Mo	St. Louis, Forristal-Young Sls.	314-645-2360
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NY	Northport, HLM Assocs.	516-757-1606
NY	Red Hook, R. P. Kennedy Co. Inc.	914-876-2700
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Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
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Tenn	Johnson City, Glen White Assocs.	615-928-0184
Tex	Dallas, Glidden Electro Equip. Co.	214-341-0610
Tex	Houston, Glidden Electro Equip. Co.	713-681-1415
Va	Lynchburg, Glen White Assocs.	804-384-6920
Wash	Seattle, Northmar	206-524-5171
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Local Sales Offices & Reps.

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Cal	Orange, I. Greene	714-637-1356
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Mich	Southfield, R. Milsk Co.	313-354-3310
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Ore	Portland, J. LeBrun Co.	503-244-6805

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Sales Manager: N. Krasowsky

Local Sales Offices & Reps.

Ariz	Scottsdale, Q.T. Wiles & Assoc.	602-948-5590
Cal	San Francisco, Shonin, Inc.	415-467-8700
Colo	Arvada, Arrowhead Sales Corp.	303-423-5556
Ga	Atlanta, Mr. George O'hara	404-237-0600
Ill	Downers Grove, Richmar Elect. Corp.	312-968-0881
Mass	Waltham, Conti-Younger Associates, Inc.	617-890-4582
Minn	Minneapolis, R.J. Inc.	612-922-1425
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Ill	Des Plaines, Rental Elctrns.	312-827-6670
Md	Gaithersburg, Rental Elctrns.	301-948-0620
Mass	Burlington, Rental Elctrns.	617-273-2770
NJ	Oakland, Rental Elctrns.	201-337-3757
Tex	Dallas, Rental Elctrns.	214-661-8082
Tex	Houston, Rental Elctrns.	713-683-9261
Exp:	Lexington, Mass., Rental Elctrns.	617-862-6905

REICH ASSOCIATES INC., Dept. EM, PO Box 73, Plano, Tex 75074, Tel: 214-424-7904; Empl.: 10

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Tex	Houston, TCI Elctrns.	713-774-5019

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RELAY SPECIALTIES INC., Dept. EM, 1300 Plaza Rd., Fair Lawn, N.J. 07410, Tel: 201-797-3313; Empl.: 57

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Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Mass	Lexington, Hathaway Elctrns.	617-861-7010
NY	Mt. Vernon, Sonkin Assocs.	914-668-9809

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Okla	Tulsa, Tex. Instr. Supp. Co.	918-437-4555
SC	Greenville, Egan Assocs.	803-228-4450
Tex	Austin, Tex. Instr. Supp. Co.	512-258-1636
Tex	Dallas, Tex. Instr. Supp. Co.	214-238-6821
Tex	Houston, Tex. Instr. Supp. Co.	713-785-4800
Tex	Richardson, Semiconductor Sls. Assocs.	214-231-6181
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Ala	Birmingham, Reliance Electric Co.	205-942-8556
Ala	Mobile, Reliance Electric Co.	205-476-2750
Cal	El Monte, Reliance Electric Co.	213-442-8650
Cal	Fresno, Reliance Electric Co.	209-225-1346
Cal	Sacramento, Reliance Electric Co.	916-929-2364
Cal	San Diego, Reliance Electric Co.	714-270-4730
Cal	San Mateo, Reliance Electric Co.	415-574-8860
Colo	Denver, Reliance Electric Co.	303-573-8213
Colo	Denver, Peterson Co.	303-388-6322
Conn	Wallingford, Reliance Electric Co.	203-265-6776
DC	D.C., Reliance Electric Co.	202-347-3049
Fla	Davie, Reliance Electric Co.	305-792-1551
Fla	Jacksonville, Reliance Electric Co.	904-724-7080
Fla	Tampa, Reliance Electric Co.	813-884-8431
Ga	Smyrna, Reliance Electric Co.	404-436-2413
Haw	Honolulu, Specialty Prods. Co.	808-531-0596
Ill	Rockford, Reliance Electric Co.	815-965-6707
Ill	Schiller Park, Reliance Electric Co.	312-671-5500
Ind	Hammond, Reliance Electric Co.	219-845-8110
Ind	Indianapolis, Reliance Electric Co.	317-849-6100
Ind	South Bend, Reliance Electric Co.	219-287-1844
Iowa	Bettendorf, Reliance Electric Co.	319-355-6448/6449
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Ky	Louisville, Reliance Electric Co.	502-897-1876
La	Baton Rouge, Reliance Electric Co.	504-927-0600
La	Monroe, Reliance Electric Co.	318-387-2697
La	New Orleans, F.N. Johnston Co.	504-733-8283
Me	Bangor, Reliance Electric Co.	207-942-5843
Md	Baltimore, Reliance Electric Co.	301-744-2400
Mass	Wellesley Hills, Reliance Electric Co.	617-237-6560
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Mich	Oak Park, Reliance Electric Co.	313-968-0100
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Pa	King of Prussia, Reliance Electric Co.	215-687-3511

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Mass	Framingham, Victor Assoc.	617-879-5710
Mich	Centerline, Dietrich & Assocs.	313-754-6450
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Mo	Manchester, Vertec. Assoc.	314-394-6242
NJ	Ridgewood, Hansen Assocs.	201-652-7055
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NY	Syracuse, Ossmann Instr.	315-437-6666
NY	Vestal, Ossmann Instrs.	607-785-9947
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Ohio	Dayton, Dietrich & Assocs.	513-223-6042
Pa	Ambler, Data Engineering Co.	215-542-9876
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
Tex	Dallas, Data Mktg.	214-661-0300
Tex	Houston, Data Mktg.	713-780-2511
Tex	San Antonio, Data Mktg.	512-828-0937
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Sales Manager: M. Rogers

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Sales Manager: J.E. Jant

Local Sales Offices & Reps.

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Cal	Los Altos, Affiliated Inds.	415-964-1322
Cal	San Diego, Sales Engrs. Ltd.	714-277-5723
Mass	Littleton, Hybricon Sls.	617-861-6692
Minn	Minneapolis, J.H. Hanson Co.	612-922-3643
NY	Cohoes, HJM Sls. Co.	518-237-3725
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Tex	Richardson, Palatine Sls.	214-231-9489
Wash	Bellevue, Thorson Co.	206-455-9180

(TM)RENEGADE 40 - CB Rig - Fanon/Courier Corp., Subs.

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Ill	Des Plaines	312-827-6670
Md	Gaithersburg	301-948-0620
Mass	Burlington	617-273-2770
Mass	Burlington	617-273-2777
NJ	Oakland	201-337-3757
Tex	Dallas	214-661-8082
Tex	Houston	713-780-7218

REO INDS, INC., Dept. EM, 633 3rd St., N.W., Massillon, Ohio 44646, Tel: 216-833-9951; Empl.: 150

REPCO INC., Dept. EM, Box 7065, Orlando, Fla. 32804, Tel: 305-843-8484, TWX: 810-850-0120; Empl.: 350; Minimum order: $W. Nelson .... p. 1470

Sales Manager: D. Grant; *Distributor Manager:* W. Nelson

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Mass	Needham, Andy Bower	617-449-3420

REPUBLIC ELCTRNS. CORP., Dept. EM, 176 E. 7th St., Paterson, NJ 07524, Tel: 201-279-0300, TWX: 710-988-5908; FSC No.: 93958; Empl.: 125 .. p. 1297

Sales Manager: G. Wolter

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Cal	Los Angeles, Corcoran Assoc. ..	213-823-2425
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Cal	San Carlos, Winco Sls.	415-365-6082
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Fla	Orlando, OEM Mktg.	305-299-1000
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Kans	Overland Park, Reese Assoc.	913-648-7748
Md	Bethesda, W. Mount Co.	301-657-9312
Mass	Chelmsford, Underwood Sls. Corp.	617-256-8191
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NC	Charlotte, J. Rudisill Assocs.	704-377-6901
Ohio	Columbus, T. Mulligan & Assoc.	614-457-2242
Okla	Tulsa, H.J. Daly Co.	918-627-4159
Pa	Ardmore, Manreps Inc.	215-649-6300
Tex	Dallas, West & Assocs.	214-661-9400

REPUBLIC ELCTRN. INDS. CORP., Dept. EM, 575 Broad Hollow Rd., Melville, N.Y. 11746, Tel: 516-249-1414, Telex: 96-1460; FSC No.: 95750; Empl.: 170

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Tex	Arlington, K. Dawson Co.	817-265-6426
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WVa	Charleston, W.A. Brown Equip. ..	304-342-2700
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Mich	Lathrup Village, R.C. Nordstrom & Co.	313-353-0210
NY	New York City, Symon Assocs.	212-757-3638
NC	Charlotte, Jake Rudisill Assocs., Inc.	704-377-6901
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Sales Manager: G. Hansell; *Distributor Manager:* G. Hansell

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Fla	Orlando, Technology Mkt. Assoc.	305-857-3760
Fla	Pompano Beach, Technology Mkt. Assoc.	315-942-0774
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Minn	Minneapolis, Arjay Sls. Inc.	612-854-4972
Mo	Derby, Palatine Sales, Inc.	316-788-0621
Mo	Lenexa, Palatine Sales, Inc.	913-492-7020
Mo	St. Louis, Palatine Sales, Inc.	314-426-7055
NJ	Pennsauken, Megargel/Himmelstein Assoc.	609-662-3081
NJ	Pennsauken, Mergargel/Himmelstein Assoc.	609-662-3081
NM	Albuquerque, Waugaman Assocs.	505-294-1436
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NY	Huntington, CDB Entprs., Inc.	516-692-5200
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NY	Kingston, Ossmann Comp. Sls. Corp.	914-338-5505
NY	Rochester, Ossmann Comp. Sls. Corp.	716-442-3290
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(TM)REVER-SYNCLAMPS - reverse servo clamps - Timber-Top, Inc.

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(TM)REV-TROL - reversing scr controls - Electrol Co., Inc.

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RF INTERONICS, Dept. EM, 100 Pine Air Dr., Bay Shore, N.Y. 11706, Tel: 516-231-6400, TWX: 510-227-6233; FSC No.: 13619; Empl.: 150 .. p. 2746

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Exp:	New York, N.Y., Ad. Auriema, Inc.	212-466-2516

RF SYSTEMS, INC., Dept. EM, 155 King St., Cohasset, Mass. 02025, Tel: 617-383-1200, TWX: 710-346-7605; Empl.: 49

Local Sales Offices & Reps.

Cal	Mountain View, Microwave Mktg. Assocs.	415-969-3355
Fla	Orlando, R F Sys. of Fla.	305-857-0036
NY	Old Bethpage, Walker Assocs.	516-938-5595

R F D, INC., Dept. EM, 5024 Nassau St., Tampa, Fla. 33607, Tel: 813-872-1502; FSC No.: 21992; Empl.: 32

Sales Manager: S. Bailey

Local Sales Offices & Reps.

Cal	Los Altos, Stout/Loeswick Assoc.	415-948-3265
Cal	Woodland Hills, Interstate Mktg. Assoc.	213-883-7606
Colo	Boulder, H. Bass Assoc.	303-499-7509
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
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NJ	Westfield, Gray & Reed Assoc.	201-233-6116
NY	Huntington Station, Gray & Reed Assoc.	516-433-3333
Va	Fairfax, Schibley Assoc.	703-591-3008

RFL INDS., Comms. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005, Tel: 201-334-3100, TWX: 710-987-8352; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, Portis & Assocs.	602-947-4379
Cal	Los Gatos, Luscombe Engrg. Co.	408-354-6496
Cal	Pasadena, Luscombe Engrg. Co.	213-684-2000
Colo	Lakewood, Claredon Co.	303-238-4462
DC	Wash, Instrucom, Inc.	202-223-1759
Fla	St. Petersburg, Commark Corp.	813-577-0400
Idaho	Boise, Instrumentation/Control Sys., Inc.	208-343-0285
Ill	Schaumburg, R. Rosenkoetter Assoc.	312-529-8523
La	New Orleans, Mid South Sls.	504-822-3030
Minn	Minneapolis, R.W. Marshall Co.	612-929-0457
Mo	Cameron, Comm. Systems	816-632-7616
Ohio	Columbus, RFL Industries	614-888-7255
Okla	Tulsa, Control Interface	918-252-7222
Ore	Beaverton, Instrumentation/Control Sys., Inc.	503-643-1631
Tex	Houston, Control Interface, Inc.	713-464-6571
Tex	Richardson, Horizon Engrg. Sls. Co.	214-238-9121
Wash	Bellevue, Instrumentation/Control Sys., Inc.	206-454-9716

RFL INDS., Instr. Div., Dept. EM, Powerville Rd., Boonton, N.J. 07005, Tel: 201-334-3100, TWX: 710-987-8352; Empl.: 250

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Costa Mesa, FLW, Inc.	213-860-4695
Cal	Mountain View, IFM, Inc.	415-961-2828
Colo	Denver, Williams Assocs.	303-373-4730
Conn	Middletown, The Mancib Co.	203-347-5629
Fla	Sarasota, R.S. Cushing	813-383-1770
Idaho	Boise, Instrumentation/Control Sys., Inc.	208-343-0285
Ill	Des Plaines, Marsland	312-298-2620
Ind	Indpls, Marsland	317-924-3568
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Farmington, Carter, McCormic & Pierce, Inc.	313-477-7700
Minn	Mpls, Marsland Assocs., Inc.	612-545-4481
NJ	Cherry Hill, Scientific Reps, Inc.	609-482-0059
NJ	Hillsdale, CB Assocs.	201-664-6230
NM	Albuquerque, Williams Assocs.	505-255-1638
NY	Elbridge, L-Tron Corp.	315-689-3787
NY	Latham, L-Tron Corp.	518-785-5023
NY	Newark Valley, L-Tron	607-724-7442
NY	Scottsville, L-Tron Corp.	716-436-4410
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Carter, McCormic & Pierce	216-333-5650
Ohio	Dayton, Carter, McCormic & Pierce	513-278-5873
Ore	Beaverton, Instrumentation/Control Sys., Inc.	503-643-1631
Pa	Monroeville, Carter, McCormic & Pierce	412-372-4415
Tex	Houston, Scientific Sls.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Va	Falls Church, Scientific Assocs.	703-573-8787

RFL INDS., Thermocontrol Div., Dept. EM, Boonton, N.J. 07005, Tel: 201-334-3100, TWX: 710-987-8352; Empl.: 250 .... p. 2924,4326

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps., Inc.	205-539-4411
Ariz	Scottsdale, Williams	602-947-4297
Cal	Mountain View, IFM, Inc.	415-961-2828
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Ft. Lauderdale, W.A. Brown Comps.	305-776-4800
Fla	Indialantic, W.A. Brown Comps.	305-727-2787
Fla	Orlando, W.A. Brown Comps., Inc.	305-425-5505
Ga	Atlanta, W.A. Brown Comps.	404-455-0405
Idaho	Boise, Instrumentation/Control Sys., Inc.	208-343-0285
Md	Mount Airy, Strayton Assoc.	301-831-7007
Mass	Woburn, Gilway Sls. Co.	617-935-4442
Mich	Farmington, Carter, McCormic & Peirce	313-477-7700
Minn	Minneapolis, Waytek Co.	612-933-2133
NJ	Boonton, RFL Inds., Inc.	201-334-3100
NJ	Westfield, E.R. Mertz, Inc.	201-232-4643
NM	Albuquerque, Williams	505-255-1638
NY	Elbridge, L-Tron Corp.	315-689-3787
NY	Latham, L-Tron Corp.	518-785-5032
NY	Newark, L-Tron Corp.	607-724-7442
NY	Scottsville, L-Tron Corp.	716-436-4410
NC	Raleigh, W.A. Brown Comps.	919-876-9601
NC	Winston-Salem, W.A. Brown Comps., Inc.	919-725-5384
Ohio	Cleveland, Carter, McCormic & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Ore	Beaverton, Instrumentation/Control Sys., Inc.	503-643-1631
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Pa	Valley Forge, Gil-Tronics, Inc.	215-933-8525
Tex	Dallas, Economy Gauge & Instrument Supply	214-243-8370
Tex	Houston, Economy Gauge & Instrument Supply	713-688-4494
Wash	Bellevue, Instrumentation/Control Sys., Inc.	206-454-9716

Local Distributors

Ala	Mobile, Brownell Electro	205-479-5405
Cal	Glendale, IFM, Inc.	213-246-7261
Cal	Mountain View, IFM, Inc.	415-961-2828
Conn	Waterbury, Suburban Supply	203-757-1251
Ga	Atlanta, Brownell Electro	404-762-5181
Ill	Rockford, MD Distributing	815-965-7100
Ind	Indianapolis, Rockwell Engrg.	417-251-9453
Mass	Boston, Sager Electrical	617-542-2281
Mass	Burlington, Instrs./Div of Mancib	617-272-9450
Mass	Cambridge, Brownell Electro	617-864-7500
Mich	Farmington, C,M,&P Distrs.	313-477-7700
Minn	Minneapolis, Waytek, Inc.	612-933-2133
NJ	Fairlawn, Relay Specialties	201-797-3313
NJ	S. Plainfield, Brownell Electro	201-753-4600
NY	Clarence, Trott Elctrns.	716-634-8500
NY	New York, Brownell Electro	212-924-6000
NC	Charlotte, Brownell Electro	704-394-4341
NC	Charlotte, Process Control Parts	704-523-0327
Ohio	Cleveland, CMP Distributor Co.	216-333-5650
Ohio	Dayton, CMP Distributor Co.	513-278-5873
Pa	Monroeville, CMP Distributor Co.	412-372-4415
Pa	Philadelphia, Brownell Electro	215-632-3030
Tenn	Memphis, Brownell Electro	901-332-9254
Tenn	Nashville, Brownell Electro	615-889-8230
Tex	Dallas, Economy Gauge & Inst. Supply	214-243-8370
Tex	Houston, Economy Gauge & Instrument Supply	713-688-4494

(TM)RHENEX - rhenium plating process. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)RHENIUM A - highest melting point of any platable metal - Technic, Inc.

(TM)RHEOMET - paste solder - Kester Solder Div.

RHG ELCTRNS. LAB., Dept. EM, 161 E. Industry Ct., Deer Park, N.Y. 11729, Tel: 516-242-1100, TWX: 510-227-6083; FSC No.: 15286; Empl.: 80

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Los Altos, Cain-White & Co.	415-948-6533
Cal	Los Angeles, Thorson Co.	213-937-0790
Cal	San Diego, Thorson Co.	714-298-8385
Cal	Tustin, Thorson Co.	714-544-5121
Fla	Orlando, Gentry Assocs.	305-894-4401
Md	Annapolis, Hayden Assocs.	202-296-6059
Mass	Reading, Geder Assocs.	617-944-3105
NM	Albuquerque, IMEC Co.	505-883-9010
NY	New Hartford, KLM Assocs.	315-736-5466
NY	N. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
NY	Tuckahoe, Spectrum Sls.	914-793-1660
NC	Burlington, Gentry Assocs.	919-227-3639
Pa	Newtown Square, SWR Assocs.	215-356-8550
Tex	Dallas, Cain & Co., Inc.	214-233-6809
Wash	Seattle, Thorson Co.	206-632-0710

(TM)RHINO-HIDE - cable - Pacific Electricord Co.

RHODE & SCHWARZ SLS., Dept. EM, 14 Gloria La., Fairfield, N.J. 07006, Tel: 201-575-0750, Telex: 13-3310; Empl.: 15

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices SE	205-536-1969
Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Mountain View, Scientific Devices	415-964-4230
Cal	San Diego, Scientific Devices	714-279-6642
Colo	Boulder, Scientific Devices	303-449-9466
Fla	Orlando, Scientific Devices SE	305-841-8180
Ind	Indianapolis, L.F. Green Assocs.	317-293-9827
Mass	Waltham, Scientific Devices NE	617-894-5637
NM	Albuquerque, Scientific Devices	505-293-3494
NY	Rochester, Scientific Devices	716-334-2445
NC	Raleigh, Scientific Devices SE	919-872-7066
Ohio	Cleveland, Harvey Teplitz & Co.	216-486-2800
Ohio	Dayton, Harvey Teplitz & Co.	513-277-6631
Pa	Plymouth Meeting, Scientific Devices	215-825-9515
Tex	Houston, Scientific Devices SW	713-623-4250
Tex	Richardson, Scientific Devices SW	214-231-8106
Va	McLean, CMA Ltd.	703-893-6612
Wash	Renton, Wilson Gmba	206-228-5880

(TM)RHODEX - rhodium plating process - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)RHODIUM SULPHATE TP - high purity, low stress fine grain rhodium - Technic, Inc.

RHOMBUS INDS., INC., Dept. EM, 22119 Vermont Ave., Torrance, Cal. 90502, Tel: 213-320-9772, TWX: 910-349-7512; Empl.: 30

Local Sales Offices & Reps.

Ariz	Scottsdale, S. C. Blaker Co.	602-948-3061
Cal	Downey, Groh Assocs.	213-923-0963
Colo	Parker, J. Heaton	303-841-3651
Mass	Waltham, Impact Sls. Co.	617-964-7740
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422
Tex	Irving, Space Elctrns.	214-251-3636
Exp:	Cal, Los Angeles, Product Supply Co.	213-659-1858

(TM)RIBBON WRAP - wire wrappable ribbon cables - Gore, W.L. & Assocs., Inc.

(TM)RIBFLEX - ribbon wound power resistors - Ward Leonard Elec. Co. Inc.

(TM)RIB LOCK - indicator light, front panel mounting - Genisco Technology Corp.

RICOH OF AMERICA, Dept. EM, 1900 Quail Ave., Newport Beach, Cal. 92660, Tel: 714-833-9750

RICHARD-LEE CO., Dept. EM, Box 724, New Providence, N.J. 07974, Tel: 201-665-1333; Empl.: 6

Local Sales Offices & Reps.

Ore	Portland, Topp Engineering Sls. Corp.	503-244-6265
Wash	Bellevue, Topp Engineering Sls. Corp.	206-747-5400

RICHCO PLASTIC CO., Dept. EM, 5825 N. Tripp Ave., Chicago, Ill 60646, Tel: 312-539-4060, TWX: 910-221-1938; Empl.: 400

RICHMAN ELECTRONIC COMPONENTS, Dept. EM, 208 Devonshire Rd., Barrington, Ill 60010

RIESTER & THESMACHER CO., Dept. EM, 6880 Lake Abrams Dr., Cleveland, Ohio 44130, Tel: 216-243-5550; Empl.: 80

(TM)RIGIMESH - filter medium - Pall Corp.

RIL ELCTRNS., INC., Dept. EM, 1105 Ind'l. Hwy., Southampton, Pa. 18966, Tel: 215-EL 5-1361; Empl.: 25

(TM)RIM - Research Instrument Module System - Princeton Applied Resch. Corp.

(TM)RIM - remote data acquisition & control sys. - General Automation

(TM)RING-GUN - assembly tool - Waldes Kohinoor, Inc.

(TM)RING-JECTOR - assembly tool - Waldes Kohinoor, Inc.

(TM)RING-MOUNT - assembly tool - Waldes Kohinoor, Inc.

(TM)RING-O-MAT - assembly tool - Waldes Kohinoor, Inc.

RIPLEY CO., INC., Dept. EM, 46 Nooks Hill Road, Cromwell, Conn. 06416, Tel: 203-635-2200; Empl.: 120

Sales Manager: R.S. Clark

Local Sales Offices & Reps.

Cal	Downey, Sierra Pacific Engrg. Co.	
Cal	Mountain View, Connolly & Co.	415-967-6988
Conn	Cheshire, Techmark Corp.	203-272-7131
Ill	Elmhurst, Schuten Assocs.	312-833-0980
Mass	Framingham, Sullivan Technical Sls.	617-620-0195
NY	Great Neck, F. Tylinski Co.	516-466-9070
NY	Rochester, Application Specialists, Inc.	716-586-8226
Ohio	Cleveland, Scott Electronics, Inc.	216-291-2600

(TM)RIPL-FLO - vibrating screens - Allis-Chalmers

(TM)RIPPLE ROUND - anodes - Alpha Metals, Inc.

(TM)RIPPLEWELD - lead attach process for filmatic R capacitors - Paktron Div.

RISK INDS, INC., GEORGE, Dept. EM, GRI Plaza, Kimball, Neb. 69145, Tel: 308-235-4645, TWX: 910-620-9040; Empl.: 50

Sales Manager: K. R. Risk

Local Sales Offices & Reps.

Ariz	Phoenix, MR Engrg. Sls. Co.	602-959-5150
Cal	Redwood City, Woodworth Co.	415-365-0252
Colo	Denver, B. Masterson	303-771-1482
Fla	Tampa, Nickerson Co.	813-885-1416
Ill	Chicago, Essential Plus	312-456-1777
Me	Sharon, Cummings Assocs.	617-828-8370
Mich	Ferndale, Shalco, Inc.	313-547-4771
Minn	Minneapolis, Merrill Franklin Co.	612-835-6422
Mo	Kansas City, Nevco Inc.	816-421-1751
Mo	St. Louis, Nevco	314-843-7406
NJ	Springfield, Shortess, Rawson & Assocs.	201-467-8585
NY	Syracuse, I. A. Hotze Co.	315-479-6641
Ohio	Cleveland, Del Steffen & Assocs.	216-461-8333
Ohio	Dayton, Del Steffin & Assocs.	513-293-3145

Ore	Portland, T. R. Moore	503-297-3862
Pa	Paoli, Tyler Griffin	215-647-1550
Tex	Dallas, McCoy Assocs.	214-350-9931
Tex	Houston, McCoy Assocs.	
Exp:	Cal., Laguna Niguel, Ind. Export Management	714-493-2589

RITE-LINE, Dept. EM, 172 Rollins Ave., Rockville, Md. 20852, Tel: 301-881-3000

™RIVET-LOC - terminals - Sealectro Corp.

R L C ELCTRNS., INC., Dept. EM, 83 Radio Cir., Mt. Kisco, N.Y. 10549, Tel: 914-241-1334; FSC No.: 12598; Empl.: 30

Sales Manager: P.H. Wright

Local Sales Offices & Reps.

Cal	Cupertino, Dura Elctrn. Sls.	408-255-2084
Cal	Los Angeles, Fetty-Schoenduve	213-651-4050
Conn	Hamden, Instr. Conslts.	203-288-5246
DC	Washington, M. Lader Co.	202-296-2497
Kans	Wichita, Carbiener Assocs.	316-682-5782
Mass	Waban, Instr. Conslts.	617-969-9881
NJ	Plainfield, R & G Assocs.	201-561-3866
NY	Mt. Kisco, RLC	914-241-1334
NY	Valley Stream, R & G Assocs.	516-561-9696
Pa	Elkins Park, Snow Assocs.	215-379-4700
Tex	Richardson, Vector Sls.	214-234-4291
Va	Woodbridge, M. Lader Company	703-494-4731

™R-LITES - relampable light holders - Genisco Technology Corp.

™R/M PREDICTOR - reliability/maintainability analysis - University Computing Co.

RMS ELECTRONICS INC., Dept. EM, 50 Antin Pl., Bronx, NY 10462

™R-N - discreet ultraprecision metal film resistors & networks - Res-Net Corp.

RO ASSOCS., Dept. EM, 3705 Haven Ave., Menlo Park, Cal. 94025, Tel: 415-322-5321, TWX: 910-378-5929; Empl.: 60 .... p. 3311

Sales Manager: R.D. Okada

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	205-881-9512
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Diego, Mesa	714-278-8021
Cal	San Francisco, Amasco	408-733-8690
Conn	Hamden, J&J Assoc.	203-624-7800
DC	Wash., G. Fryling	703-527-3262
Fla	Orlando, Colinsco	305-423-7615
Fla	St. Petersberg, Col-Ins-Co	813-581-8233
Ga	Atlanta, Col-Ins-Co	404-299-2138
Ill	Chicago, Mar-Con	312-675-6450
La	Baton Rouge, Col-Ins-Co	504-292-1755
Md	Baltimore, Gans-Fryling	301-837-6311
Mass	Boston, J&J Assoc.	617-272-2606
Minn	Minneapolis, R–J Inc.	612-922-1425
NJ	Ft. Lee, Technimat	201-461-8686
NM	Albuquerque, Fry-Gates Co.	505-298-1875
NC	Winston Salem, Col-Ins-Co	919-748-0297
Ohio	Cleveland, A.H. Baier Co.	216-461-6161
Ohio	Dayton, A.H. Baier Co.	513-276-4128
Tex	Dallas, McCoy Assoc. Co.	214-350-9931
Tex	Houston, Ev Smith Sls. Co.	713-649-5756

ROBERT BOSCH CORP., Dept. EM, 2800 S. 25th Ave., Broadview, Ill. 60153

ROBERTSHAW CONTROLS CO., Dept. EM, 2101 Marlane Dr., Grove City, Ohio 43123, Tel: 614-875-2351, TWX: 810-335-2560; Empl.: 500

ROBERTSHAW CONTROLS CO., Ind'l. Instr. Div., Dept. EM, 1809 Staples Mill Rd., Richmond, Va. 23230, Tel: 804-358-2301, TWX: 710-956-0121

Local Sales Offices & Reps.

Ala	Birmingham, J.W. Eshelman	205-879-3462
Ariz	Phoenix, Special Sys. Co.	602-964-5807
Ark	Little Rock, Tag Inc.	501-565-7770
Cal	Anaheim, Robertshaw Controls	213-860-2491
Cal	San Diego, G. L. Parkhurst Co.	714-232-0721
Cal	So. San Francisco, Robertshaw Controls	415-871-7767
Cal	Taft, Oilfield Controls, Inc.	805-763-1561
Colo	Denver, Peterson Co.	303-388-6322
Conn	Hamden, Pond Tech.	203-288-6278
Fla	Jacksonville, Robertshaw Controls	904-264-8640
Ga	Atlanta, Specialty Equipment and Control	404-394-6633
Haw	Kailau, Oahu, CBC, Inc.	808-262-6561
Ill	Elk Grove Village, Robertshaw	312-437-6060
Ind	Indianapolis, Process Controls Co.	317-846-4775
Iowa	Clinton, H. G. Klug, Inc.	319-243-3642
Ky	Louisville, Control Prods. Co.	502-367-6421
La	Baton Rouge, Control Sys. Consultants	504-924-1227
La	New Orleans, Turner & Co.	504-834-3848
La	Shreveport, Deeco Co.	318-742-0856
Md	Baltimore, Reco Inc.	301-647-0926
Mass	Boston, Robertshaw Controls Co.	617-747-8432
Mich	Detroit, G. R. Peters Assoc.	313-546-1166
Mich	Portage, G. R. Peters Assoc.	616-327-8390
Minn	Minneapolis, Northwest Power Equip.	612-646-7904
Mo	Kansas City, Power Specialties	816-531-6550
Mo	St. Louis, C. F. Gast Co.	314-993-2870
Mont	Billings, Industrial Sys.	406-252-6671
Neb	Omaha, H. G. Klug Co.	402-553-1377
NJ	Morrestown, D. J. Hettich	609-235-3411
NY	Buffalo, Nickles Engrg. Co.	716-773-5399
NY	Liverpool, Nickles Engrg. Co.	315-457-8224
NY	New York, Buck Sls.	201-322-8747
NY	Rensselaer, Ashley Equip. Co.	518-436-9151
NY	Rochester, Nickles Engrg. Co.	716-586-4988
NC	Charlotte, BGV Inc.	704-376-8551
Ohio	Cincinnati, Rawdon Myers, Inc.	513-791-4224
Ohio	Cleveland, E. J. Hodan & Assoc.	216-331-9344
Okla	Tulsa, Myers-Aubrey Co.	918-622-3500
Ore	Portland, Arthur Forsythe	503-297-3121
Pa	Philadelphia, Robertshaw Controls	215-337-3550
Pa	Pittsburgh, Robertshaw Controls	412-344-5232
SC	Greenville, Robertshaw Controls Co.	803-233-2787
Tenn	Knoxville, Robertshaw Controls	615-546-0550
Tex	Corpus Christi, Duke - Lane Co.	512-888-5222
Tex	Dallas, Controls Intl. Co.	214-233-9397
Tex	Houston, Robertshaw Controls	713-498-0500
Tex	Odessa, The Barnco Co.	915-332-0293
Utah	Salt Lake City, Peterson Co.	801-487-5621
Wash	Richmond, Robertshaw Controls	804-358-2301
Wash	Seattle, A. Forsyth Co.	206-283-5716
Wash	Spokane, A. Forsyth	509-326-2700
Wisc	Milwaukee, Jensen Reynolds	414-442-2200
Wisc	Milwaukee, Allen Engrg.	414-353-5070
Wyo	Casper, Moltec	307-234-5309
Exp:	Richmond, Va., Robertshaw Controls Intl. Mktg.	804-282-9561

ROBICON CORP., Dept. EM, Plus Ind'l. Pk., Pittsburgh, Pa. 15239, Tel: 412-327-7000, Telex: 812-441; Empl.: 175

Local Sales Offices & Reps.

Cal	Calabasas, Delta Servo Prods.	213-888-5263
Cal	San Francisco, Automated Process Controls Co.	415-467-6162
Conn	Durham, Marr Electric	203-349-9691
Conn	Wilton, James H. Burnett Co.	203-762-8862
Ga	Atlanta, Hal Homer Assts.	404-255-8669
Ill	Park Ridge, Thermo/Cense	312-792-2760
La	Metarie, Marsh Yohana	504-885-4475
Mass	Lynn, Terra Co.	617-599-6424
Mich	Southfield, Harris-Blancett & Assoc.	313-352-9505
Minn	St. Paul, Century Controls	614-454-7710
Mo	St. Louis, F. Gilliam Assoc.	314-961-5555
NJ	S. Orange, Smith Co.	201-763-1770
NY	Boston, Markle Co.	716-649-7700
NY	Elmira Hts., Runey Elec.	607-733-1387
NY	Rochester, Markle Co.	716-223-4820
NC	Charlotte, Power Sys.	704-537-8099
Ohio	Chagrin Falls, Energy Sys.	216-247-3436
Ohio	Cleveland, PSI Sls.	216-526-5260
Okla	Tulsa, Terry Co.	918-743-3249
Pa	Pittsburgh, Weiss Instrs.	412-371-3020
Pa	West Chester, Becker Eng.	215-431-4539
Tex	Houston, R & K Engineering	713-465-8367
Wash	Bellevue, A. Smith Co.	206-746-6770
WVa	Charleston, Hedrick Engineering	304-925-7655

Advertisement

SCR thyristor power control and conversion equipment. Robicon supplies standard SCR devices and custom packaged systems in fields of temperature control for process and comfort industries; speed/position control for motor drives to 2000 HP, both unidirectional and static reversing; and materials melting systems to 10,000 KVA.

ROBINS BROADCAST & SOUND EQUIPMENT CORP., Sub. Robins Inds., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725, Tel: 516-543-5200; Empl.: 35

Local Sales Offices & Reps.

Colo	Westminster, Electro-Tek Sls., Inc.	303-255-4566
Fla	Tampa, Repelect	813-227-5051
Ga	Atlanta, Cavendish Sls. Co.	404-394-2642
Haw	Honolulu, Gene Piety Factors, Inc.	808-839-9059
Iowa	Des Moines, KSW Assocs.	515-279-9235
Md	Baltimore, David Bros. Co.	301-764-7189
Mich	Southfield, Robert Milsk Co.	313-354-3310
Minn	Minneapolis, John E.M. Anderson Co.	612-823-6459
Mo	Kansas City, KSW Assocs.	816-363-5651
Neb	Omaha, KSW Assocs.	
NJ	Ridgefield, Bl State Marketers	201-943-5888
NY	Phelps, LSM Assocs.	315-548-4891
Ohio	Columbus, Mandabach Assocs.	614-235-0265
Ore	Portland, R. Minthorne	503-246-4556

Local Distributors

Ala	Birmingham, Sound Engineering Svc.	205-322-4408
Cal	Hollywood, Hollywood Sound Sys.	213-466-2416
Cal	Hollywood, Audio Concepts	
Cal	San Francisco, Sound Genesis	415-391-8776
Cal	San Francisco, Langevin Co.	415-621-7421
DC	Washington, McBee Labs	202-244-2345
Fla	Jacksonville, Southeast Elctrn.	904-356-3007
Ga	Atlanta, Electronic Equip., Inc.	404-873-5842
Haw	Honolulu, EMC Corp.	808-847-1138
Ill	Chicago, Swiderski Elctrns.	312-775-3232
Ill	Franklin Park, Rich, Inc.	312-678-3100
NY	Long Island City, Sound Sys.	212-786-4474
NY	New York, Martin Audio	212-541-5900
NY	New York, Sonocraft	212-760-9300

ROBINS IND'S. CORP., Consumer Products Div., Dept. EM, 75 Austin Blvd., Commack, N.Y. 11725, Tel: 516-543-5200; Empl.: 125

Sales Manager: C. Condike

Local Sales Offices & Reps.

Ala	Birmingham, J. Russell Sls. Co.	205-822-2196
Cal	N. Hollywood, GDS Mktg	213-877-8191
Cal	San Francisco, Olson Sls.	415-573-1600
Colo	Westminster, Electro-Tek Sls.	303-529-3070
Fla	Hollywood, Intercoastal Elect. Sls.	305-921-2032
Haw	Honolulu, Lee Gaber Co.	808-839-9039
Ill	Chicago, R. R. Hutmacher Assoc.	312-631-3248
Md	Balt., D. H. Brothers Co.	301-764-7189
Mass	Milton, Cowan Assocs.	617-696-0391
Mich	Detroit, L. Drieborg	616-GL3-1242
Mich	Detroit, L. Dreiburh Co.	616-455-7616
Minn	St. Paul, SKOR	612-645-6461
Mo	Kansas City, Forristal Young Sls.	816-358-6771
Mo	St. Louis, Forristal Young Sls.	314-645-2360
Neb	Omaha, Forristal Young Sls.	402-393-6344
NY	Flushing, Bettan Sls.	212-969-7600
NY	Latham, L S M Assocs.	518-783-5606
NY	Phelps, L S M Assocs.	315-548-4891
Ohio	Twinsburg, F. Bauer Assoc	216-425-2927
Ore	Portland, R. Minthorne Co.	503-246-4556
Pa	Newtown Square, G. Conneen Co.	215-353-2241
SC	Greenville, H. C. Norman Sls.	803-244-6254
Tex	Dallas, Campion Sls.	214-238-8145
Exp:	N.Y., Plainview, Morhan Sls.	516-293-5582

ROBINSON-HALPERN CO., Dept. EM, One Apolio Rd., Plymouth Meeting, Pa. 19462, Tel: 215-825-9200, TWX: 510-660-8637

Sales Manager: C.H. Bach

Local Sales Offices & Reps.

Ala	Huntsville, Burnette Techno-Metric	205-837-5860
Ariz	Scottsdale, J. T. Aldrich Co.	602-945-8598
Cal	Costa Mesa, Robinson Tech. Assoc.	714-557-1622
Cal	Palo Alto, A. Barauck Co.	415-327-7711
Colo	Lakewood, Intermountain Instrs.	303-237-0443
Fla	Maitland, W. H. Boggs	305-647-2226
Ill	Fox Lake, W. M. Warlin	312-587-1456
Mich	Troy, G. R. Peters Assoc.	313-362-1220
Minn	St. Paul, Synergic Engrg. Corp.	612-941-8906
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NY	Williamsville, M. Bennett Assoc.	716-634-2107
Ohio	Lakewood, Baehr, Greenleaf & Assoc.	216-221-9030
Pa	Radnor, Roberts Engrg. Sls.	215-688-6525
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Wash	Bellevue, McLaren	206-454-3400

ROBINSON-NUGENT, INC., Dept. EM, 802 East 8th St., New Albany, Ind. 47150, Tel: 812-945-0211, TWX: 810-540-4082; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Electronic Mktg. Assoc.	205-533-6640
Ariz	Phoenix, Stitzer Dodd	602-944-2237
Cal	El Monte, Cook Ent.	213-686-2120
Cal	Redwood City, Logan Sls. Co.	415-369-6726
Colo	Denver, W.J. Purdy Co.	303-777-1411
Fla	Boca Raton, Conley Assoc.	305-395-6108
Fla	Oviedo, Conley & Assoc.	305-365-3283
Fla	Tampa, Conley Assoc.	813-933-1759
Idaho	Cedar Rapids, PMA Corp.	319-362-9177
Ill	Park Ridge, Metcom Assoc.	312-696-1490
Ind	Ft. Wayne, Technical Reps.	219-484-1430
Ind	Indianapolis, Technical Reps.	317-849-6454
Kans	Overland Park, PMA Corp.	913-381-0004
Kans	Wichita, PMA Corp.	
Ky	Louisville, Tech. Reps.	502-451-9818
Md	Lanham, L.D. Lowery Inc.	301-459-1556
Mass	Clinton, F.J. Coleman Co.	617-368-0116
Mich	Sturgis, Kesler & Assoc.	616-651-7619
Minn	Minneapolis, Stan Clothier Co.	612-888-4666
Mo	Maryland Heights, PMA Corp.	314-569-1220
NM	Albuquerque, W.J. Purdy Co.	505-266-7959
NY	Manhasset, Win-Cor	516-627-9474
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Winston-Salem, Elect. Mktg. Assoc.	919-722-5151
Ohio	Cincinnati, Tri-State Mktg.	513-761-7993
Ore	Portland, J.V. BeLusko Co.	503-222-4279
Pa	Broomall, L.D. Lowery, Inc.	215-356-5300
SC	Greenville, Elect. Mktg. Assoc.	803-268-1125
Tex	Irving, Space Elect. Corp.	214-251-3636
Va	Charlottesville, L.D. Lowery Inc.	804-973-6627

Local Distributors

Ala	Birmingham, M-G Elctrns.	205-328-4525
Ariz	Phoenix, Kachina Elctrn. Dist.	602-269-6201
Ariz	Phoenix, Moltronics	602-272-7951
Cal	Los Angeles, RPS	213-748-1271
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Riverside, Elec. Supp.	714-787-9220
Cal	San Diego, Moltronics	714-278-5020
Cal	Southgate, Moltronics	213-773-6521
Cal	Sunnyvale, Acacia Sls.	408-745-7200
Cal	Sunnyvale, Intermark Elec.	408-738-1111
Colo	Lakewood, Acacia Sls.	303-232-2882
Fla	Orlando, Hammond Elec.	305-849-6060
Ill	Rosemount, Advent Elctrns.	312-297-6200
Ill	Westmont, RM-Bodelle Co.	312-323-9670
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Md	Baltimore, Resco	301-823-0070
Mass	Holliston, Diplomat Elctrns.	617-429-4120
Mass	Waltham, QPL Ektrn. Dist.	617-891-0460
Mich	Kentwood, RM Elctrns.	616-531-9300
Minn	Minneapolis, Diplomat Electro-Com	612-788-8601
Mo	Maryland Heights, L-Comp St. Louis	314-291-6200
Neb	Lincoln, Scott Elec.	402-464-8308
NH	Hudson, C & H Elctrns.	617-685-7010
NY	Bohemia, Carlac	516-567-4200
NY	Buffalo, Summit Dist.	716-884-3450
NY	Farmingdale, Harrison Elec.	516-293-7990
NY	Mt. Vernon, QAR Elect.	914-699-2224
NC	Greensboro, Hammond Elec.	919-275-6391
Ohio	Dayton, Esco	513-226-1133
Pa	Philadelphia, Almo	215-676-6000
SC	Greenville, Hammond Elec.	803-233-4121
Tex	Dallas, Component Spec.	214-357-6511
Tex	Houston, Geophysical Supp.	713-224-0621
Tex	Stafford, Southwest Elctrns.	713-494-6021
Va	Charlottesville, Virginia Radio	804-296-4184
Wash	Seattle, Radar Elec. Co.	206-282-2511

ROBISON ELCTRNS., Dept. EM, 3580 Sacramento Dr., San Luis Obispo, Cal. 93401, Tel: 805-544-8000; FSC No.: 19080; Empl.: 90

™ROBISTAT - reduced voltage starter - Robicon Corp.

™ROBOT - scientific/industrial photography system - Heitz, Inc., Karl

™ROBOTEC - electronic overload protection - Power Designs, Inc.

ROBYN INTERNATIONAL INC., Dept. EM, Box 478 10901 Northland Dr., Rockford, Mich 49341, Tel: 616-866-1557

™ROCK-A-LITE - lighted rocker switch - Leecraft Mfg. Co., Inc.

™ROCKCYL - grinding mill - Allis-Chalmers

™ROCKETTE - rocker operated switches - Cutler-Hammer, Inc.

ROCKLAND INSULATED WIRE & CABLE, Dept. EM, 87 Broadway, Haverstraw, N.Y. 10927, Tel: 914-429-3103; FSC No.: 12111

Local Sales Offices & Reps.

Cal	Los Angeles, Bucky Harris Co.	213-973-2345

ROCKLAND SYS. CORP., Dept. EM, 230 W. Nyack Rd., W. Nyack, N.Y. 10994, Tel: 914-623-6666, TWX: 710-575-2631; Empl.: 55 .... p. 2747,2925

Local Sales Offices & Reps.

Ariz	Phoenix, Cleveland Entprs.	602-944-4679
Cal	San Jose, Beckrep	408-243-4455
Cal	So. Pasadena, Beckrep	213-799-4634
Colo	Aurora, Cleveland Entprs.	303-751-3252
Conn	Hamden, Instrument Conslts.	203-288-5246
Fla	Orlando, Truex Assocs.	305-859-2160
Ga	Atlanta, Magaro & Assocs.	404-252-6609
Ill	Chicago, EIA	312-271-3774
Ind	Indianapolis, EIA	317-257-7231
Iowa	Cedar Rapids, Technical Reps.	319-396-4645
Kans	Olathe, Technical Reps.	913-782-1177
Md	Rockville, Mesa	301-881-8430
Mass	Newton, Instrument Conslts.	617-969-9881
Mich	Detroit, Electro Sls. Assocs.	313-424-9075
Mo	Hazelwood, Technical Reps.	314-731-5200
NM	Albuquerque, Cleveland Entprs.	505-266-5594
NY	Buffalo, Labtronics, Inc.	716-685-4111
NY	Port Chester, Radiation Elctrns.	914-937-2300
NY	Poughkeepsie, Labtronics	914-471-2806
NY	Rochester, Labtronics	716-235-8530
NY	Syracuse, Labtronics	315-454-9314
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Portland, TOPP Engrg. Sls. Corp.	503-244-7265
Pa	Bristol, MESA	609-786-0284
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data Mktg.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Wash	Bellevue, TOPP Engrg. Sls. Corp.	206-747-5400

ROCKWELL INT'L., Microelectronic Device Div., Dept. EM, Box 3669, 3310 Miraloma Ave., Anaheim, Cal. 92803, Tel: 714-632-3729, TWX: 910-591-1179; FSC No.: 34576

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assocs.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	San Diego, Q.T. Wiles & Assocs.	714-565-6895
Cal	Tustin, Q.T. Wiles & Assocs.	714-832-4952
Colo	Denver, Straube Assocs. Mtn. States	303-426-0890
Conn	Manchester, Victor Assocs.	203-646-6448
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Fort Wayne, O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-452-6065
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J.G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell & Assocs.	502-893-7303
Mass	Framingham, Victor Assocs.	617-879-5710
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-451-8901
Mich	Southfield, R.O. Whitesell & Assocs.	313-358-2020
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Minneapolis, J.G. Twist Co.	612-854-4600
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NJ	Cherry Hill, Dyna Rep Co.	609-424-1060
NJ	Hohokus, Hansen Assocs.	201-652-7055
NM	Albuquerque, Straube Assocs. Mtn. States	505-292-0295
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Manlius, R.W. Mitscher Co.	315-682-2855
NY	West Hurley, R.W. Mitscher Co.	914-679-6151
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assocs.	216-228-7525
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Greeneville, R.O. Whitesell & Assocs.	615-639-6154
Tex	Dallas, Remtek, Inc.	214-387-2855
Tex	Houston, Remtek, Inc.	713-664-2113
Utah	Salt Lake City, Straube Assocs. Mtn. States	801-533-0125
Va	Alexandria, Dyna Rep Co.	703-354-1222
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755

RODAN INDS., see Ametek/Rodan Div.

™ROCK-WIPE SWITCH - switches - Cherry Electrical Prods. Corp.

™RODAR - controlled expansion alloy - GTE Sylvania Inc.

RODELCO, Dept. EM, 356A Commack Rd., Deer Park, N.Y. 11729, Tel: 516-643-5110; Empl.: 9

™RODPEB - grinding mills - Allis-Chalmers

™RO-FLO - compressors and vacuum pumps - Allis-Chalmers

ROGAN CORP., Dept. EM, 3455 Woodhead Dr., Northbrook, Ill. 60062, Tel: 312-498-2300, TWX: 910-686-0008; Empl.: 85

Local Sales Offices & Reps.

Ariz	Phoenix, O'Donnell Southwest	602-993-9740
Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Arvada, Arrowhead Sls.	303-423-5556
Conn	North Haven, Comp Rep Assocs.	203-239-9762
Fla	Fort Lauderdale, Electro Comp.	305-564-8571
Haw	Hanalei, TJR Sls. Co.	
Mass	Needham, Comp Rep Assocs.	617-444-2484
Mich	Grand Rapids, Montgomery Assocs.	616-774-9308
Mich	Southfield, Montgomery Assocs.	313-358-2616
Minn	Minneapolis, R.W. Marshall Co.	612-929-0457
NJ	Pitman, Colrud Co.	609-589-5866
NY	Jamaica, S-J Assocs.	212-291-3232
Ohio	Dayton, J.C. Hofstetter Co.	513-298-0662
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Tex	Dallas, W. Reese Assocs.	214-638-6575
Tex	Houston, W. Reese Assocs.	713-621-3134
Utah	Salt Lake City, Arrowhead Sls.	801-487-3444
Wash	Bellevue, SD-R2 Sls.	206-747-9424

Local Distributors

Cal	Palo Alto, O'Donnell Assocs.	415-327-9260
Cal	Torrance, O'Donnell Assocs.	213-323-9243
NJ	Pitman, Colrud Co.	609-589-5866
NY	Jamaica, S-J Components	212-291-3232
Tex	Stafford, Southwest Electronics	713-494-6021

ROGERS CORP., Dept. EM, Rogers, Conn. 06263, Tel: 203-774-9605, TWX: 710-448-0047; Empl.: 1500

Local Sales Offices & Reps.

Ariz	Tempe, M. Iosue	602-839-5478
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Orange, F. R. Fahland	714-998-2580
Cal	Santa Clara, G.W. Spak	408-296-0646
Cal	Sunnyvale, Trident Assocs.	415-734-5900
Cal	Woodland Hills, A. W. Riel	213-347-7435
Colo	Littleton, G. B. Lange	303-795-3600
Conn	Essex, D. Dewey, Jr.	203-767-1118
Conn	Willimantic, G. D. Smith	203-774-9605
Conn	Woodstock Valley, E.A. Neumann	617-332-1285
Ill	Hazel Crest, J. R. Menees	312-798-5800
Ind	Indianapolis, Electro-Reps.	317-255-4147
Mich	Grosse Point, W.T. Wallrich Assoc.	313-822-0100
Mich	Onsted, B. Widegren	313-467-4163
Mich	Rochester, E.T. Mooney	313-645-0433
Minn	Coon Rapids, G.S. Jordan	612-757-1496
Minn	Fridley, H. R. Crowder	612-560-1340
NJ	Mount Laurel, P. Taparauskas	609-235-4747
NJ	Springfield, S. Wellen	201-944-7777
NM	Albuquerque, Tritronix	505-265-0172
NY	Pittsford, P. R. Pratt	716-461-1167
NY	Roslyn, D. R. Dunay	516-621-8723
NY	Saugerties, W.C. Schunmann	914-471-4707
Ohio	Xenia, J. Link Forte	513-426-8993
Pa	Sharon, H. A. Harriman	412-347-3129

Tex	Richardson, Air-Quip Sales	214-234-3285
Va	Boones Mill, J. L. Settles	703-342-3120
Va	Reston, Boyle Assoc.	703-620-9558
Wash	Mercer Island, Tritronix, NW	206-232-4993

ROGERS CORP., Dept. EM, Box 700, Chandler, Ariz. 85224

ROHN MFG., DIV. UNARCO INDS., See Unarco-Rohn, Div. Unarco Inds. Inc.

(TM)ROGUE 40 - CB Rig - Fanon/Courier Corp., Subs.

(TM)ROL-A-CHART - permanent & flexible plastic magnets - Rol-a-chart Div.

ROL-A-CHART DIV., Wm. A. Steward Co., Dept. EM, Box 367, Diamond Springs, Cal. 95619, Tel: 916-622-2437; Empl.: 8

ROLA CO., Div. Pemcor, Inc., Dept. EM, 21010 Miles Pkwy., Cleveland, Ohio 44128, Tel: 216-475-9200, TWX: 810-422-228; Empl.: 600

(TM)ROLECOR - high fidelity components - Rotel of America, Inc.

(TM)ROLL-MARK - automatic application system - Meyercord Co.

(TM)ROLLPIN - self-locking spring pins - Esna Div.

(TM)ROLLTEMP - roll temperature sensor - Trans-Met Engrg.

(TM)ROLLTRONIC - Roll Temperature Control System - Trans-Met Engrg.

(TM)ROLM CBX - computerized PBX-"the business switch" - Rolm Corp.

ROLM CORP., Dept. EM, 4900 Old Ironsides Dr., Santa Clara, Cal. 95050, Tel: 408-988-2900, TWX: 910-338-0247; FSC No.: 14345; Empl.: 517; Minimum order: $R. Nugent

Sales Manager: C. Kotsaftis; *Distributor Manager:* R. Nugent

Local Sales Offices & Reps.

Cal	Escondido, Rolm Corp.	714-741-2801
Cal	Long Beach, Rolm Corp.	213-420-2441
Cal	Santa Clara, Rolm Corp.	408-733-6200
Fla	Orlando, Rolm Corp.	404-955-1145
Mass	Ipswich, Rolm Corp.	617-356-0321
NJ	Lakewood, Rolm Corp.	201-367-6100
NY	Wappingers Falls, Rolm Corp.	914-297-9533
Ohio	Dayton, Rolm Corp.	513-429-3260
Tex	Plano, Rolm Corp.	214-661-8905
Va	Vienna, Rolm Corp.	703-893-2696
Exp:	New York, NY, Technitron, Int'l.	212-758-2790

(TM)ROLOCON - rolling rotary contacts (capsules) - Meridian Lab. Inc.

(TM)ROLOX - 2-part epoxy compounds - Hardman Inc.

(TM)ROL-PAK - rings, retaining - Waldes Kohinoor, Inc.

(TM)ROLY-POLY - round wafer-thin replacement speakers - Magitran Co.

ROMARNETICS, INC., Dept. EM, 18811 Napa, Northridge, Cal. 91324, Tel: 213-886-1812; Empl.: 15

(TM)ROM-SIMULATOR - Microcontroller simulator - Scientific Micro Sys.

RONOR SYSTEMS, Dept. EM, Box 80, 145 N. Plains Ind. Park Rd., Wallingford, Conn. 06492, Tel: 203-265-2110; Empl.: 12

ROSEMOUNT INC., Dept. EM, Box 35129, Minneapolis, Minn. 55435, Tel: 612-941-5560; Empl.: 1300

Local Sales Offices & Reps.

Cal	Bellflower, Rosemount Inc.	213-866-8224
Cal	Chatsworth, Rosemount Inc.	213-341-3944
Cal	San Diego, Rosemount Inc.	714-565-9133
Cal	San Jose, Rosemount Inc.	408-269-7550
Colo	Boulder, Rosemount Inc.	303-447-9231
Ga	Atlanta, Rosemount Inc.	404-256-4806
Ill	Chicago, Rosemount Inc.	312-963-0750
La	Baton Rouge, Rosemount Inc.	504-926-8916
Mass	Boston, Rosemount Inc.	617-861-0750
Mich	Detroit, Rosemount Inc.	313-626-0900
Minn	Minneapolis, Arjay Sls. Inc.	612-925-1833
Mo	St. Louis, Rosemount Inc.	314-731-6881
NJ	Englewood, Rosemount Inc.	201-568-6366
NC	Charlotte, Rosemount Inc.	704-333-1271
Ohio	Cleveland, Rosemount Inc.	216-777-3961
Ohio	Dayton, Rosemount Inc.	513-433-6383
Pa	Philadelphia, Rosemount Inc.	215-353-3344
Tex	Dallas, Rosemount Inc.	817-267-3514
Tex	Houston, Rosemount Inc.	713-664-8891
Va	Richmond, Rosemount Inc.	804-285-3424
Wash	Seattle, Rosemount Inc.	206-747-4900

ROSEMONT-NASHVILLE, INC., Dept. EM, 100 Heil Quacker Blvd., Lavergne, Tenn., Tel: 615-793-7561, TWX: 810-380-4370

(TM)ROSITE R, GCD & TA - inorganic cold molded parts - Rostone Corp.

(TM)ROSITE 2150 - melamine, cold molded, arc quenching - Rostone Corp.

(TM)ROSITE 3250 & 3550 - glass reinforced polyester, non-tracking - Rostone Corp.

(TM)ROSITE 3450 - glass reinf. polyester, corrosion resistant - Rostone Corp.

ROSS ENGINEERING CORP., Dept. EM, 559 Westchester Dr., Campbell, Cal. 95008, Tel: 408-377-4621; FSC No.: 23598; Empl.: 40 .... p. 3611

Local Sales Offices & Reps.

Ariz	Scottsdale, J. Smith & Assoc.	602-968-7025
Cal	Mt. View, ENCOM	415-969-0330
Colo	Denver, J. Smith & Assoc.	303-442-7100
Md	Baltimore, Aerospace Elctrns.	301-882-2333
Mass	Sturbridge, Branford Controls Corp.	617-347-7367
Mo	St. Louis, Cemsco	314-842-4212
NJ	Haddonfield, M & S Assocs.	609-429-7055
NM	Albuquerque, J. Smith & Assoc.	505-265-3406
NY	Cazenovia, P. DeCew Agency	315-655-8602
Pa	Philadelphia, M & S Assocs.	215-229-7575
Wisc	Waukesha, Tom Berenson Elec.	414-544-5725
Exp:	N.Y., New York, Ardry Trading Co.	212-582-5058

Local Distributors

Md	Baltimore, Aerospace Elctrns. Corp.	

ROSTONE CORP., Dept. EM, 2781 S. Concord Rd., Lafayette, Ind. 47902, Tel: 317-474-2421, TWX: 810-342-1887; Empl.: 600

Sales Manager: L. Van Camp

(TM)ROTA-CRIMP - crimping tools - Amp Inc.

(TM)ROTASWITCH - shaft encoder - Disc Instruments, Inc.

ROTEL OF AMERICA, INC. , Dept. EM, 2642 Central Park Ave., Yonkers, NY 10710, Tel: 914-337-2676, Telex: 13-1420; Empl.: 30

Local Sales Offices & Reps.

Cal	Gardena, Rotel of America	213-329-7715

(TM)ROTOCON - mercury rotating contacts - Meridian Lab. Inc.

(TM)ROTO-CONE - valves - Allis-Chalmers

(TM)ROTOLITE - print machine - Teledyne Rotolite

(TM)ROTOPULSER - rotary pulse transducer - Dynapar Corp.

(TM)ROTOSIL - opaque fused silica - Amersil, Inc.

(TM)ROTO-TELLITE - indicator light - Master Specialties Co.

(TM)ROTO-TRACK - chassis slides - Barnes Engrg. Co.

(TM)ROTOVALVE - hydraulic flow control valve - Allis-Chalmers

(TM)ROTRAN - rotary generator - Inland Motor Div. Kollmorgen

ROTRON, INC., Dept. EM, Hasbrouck La., Woodstock, N.Y. 12498, Tel: 914-679-2401, TWX: 510-247-9033; Empl.: 871; Minimum order: $F. P. Casdia p. 2710-2713

Sales Manager: P. C. Faxon; *Distributor Manager:* F. P. Casdia

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg. Inc.	205-772-9237
Ariz	Phoenix, Shefler-Kahn	602-257-9015
Cal	Garden Grove, Rotron District Sls. Office	714-898-5649
Cal	Los Altos, Rotron Inc.	415-948-6800
Colo	Denver, F. Gossard Associates	303-985-0602
Fla	Orlando, G. Bohman	305-855-0274
Haw	Honolulu, R. Clark	808-531-5897
Ill	Chicago, Mid West Elctrn. Sls.	312-777-9700
Ind	Indianapolis, MidWest Elctrn. Sls.	317-253-0590
Iowa	Cedar Rapids, Midwest Elctrn. Sls.	319-393-1845
Kans	, CenTech Inc.	816-358-8100
Mass	Lexington, Circuit Sls.	617-861-0567
Mich	Farmington, W.R. Hummon & Assoc.	313-474-0661
Minn	Mpls, E.C. Elctrn. Sls.	612-831-0229
Mo	Earth City, CenTech, Inc.	314-291-4230
Mo	Raytown, Cen Tech, Inc.	816-358-8100
Mo	Raytown, Cen Tech, Inc.	816-358-8100
NJ	Springfield, F. Sylvester	201-376-3324
NM	Albuquerque, Shefler-Kahn	505-296-0749
NY	Woodstock, Rotron Inc.	914-679-2401
NC	Charlotte, Over & Over	704-527-3070
Ohio	Cincinnati, F. J. Campisano	513-662-1616
Ohio	Cleveland, Comp., Inc.	216-243-9200
Okla	Okla Cy, Ammon & Rizos	405-373-2748
Pa	King of Prussia, C.A. Brenneman	215-337-3190
Tenn	Greenville, 20th Century Mktg. Inc.	615-638-4021
Tex	Dallas, Ammon & Rizos	214-233-5591
Tex	Houston, Ammon & Rizos	713-781-6240
Wash	Seattle, Blum & Assocs.	206-285-2590
Wisc	Waukesha, Midwest Elctrn. Sls.	414-542-5129
Exp:	N.Y., NY, A. Auriema	212-466-2500

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns.	205-837-8700
Ariz	Phoenix, R.V. Weatherford	602-272-7144
Ariz	Phoenix, Kierulff Elctrns.	602-243-1401
Ariz	Phoenix, Cramer/Arizona	602-267-7321
Cal	Anaheim, R.V. Weatherford	714-547-0891
Cal	Glendale, R.V. Weatherford	213-849-3451
Cal	Irvine, Cramer/Los Angeles	213-771-8300
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Palo Alto, R.V. Weatherford	415-493-5373
Cal	Palo Alto, Kierulff Elctrns.	415-968-6292
Cal	Pomona, R.V. Weatherford	714-623-1261
Cal	San Diego, R.V. Weatherford	714-278-7400
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Denver, Kierulff Elctrns.	303-343-7090
Colo	Denver, Cramer/Denver	303-758-2100
Colo	Englewood, R.V. Weatherford	303-761-5432
Conn	Hamden, Arrow Elctrns.	203-248-3801
Conn	North Haven, Cramer/Connecticut	203-239-5641
Fla	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
Fla	Ft. Lauderdale, Hall Mark Elctrns.	305-971-9280
Fla	Hollywood, Cramer/Ew Hollywood	305-923-8181
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Fla	Orlando, Cramer/Ew Orlando	305-894-1511
Ga	Atlanta, Cramer/Ew Atlanta	404-448-9050
Ill	Elk Grove Village, Kierulff Elctrns.	312-640-0200
Ill	Elk Grove Village, Hall Mark Elctrns. Corp.	312-437-8800
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Kans	Shawnee Mission, Hall-Mark Elctrns.	913-888-4747
Md	Baltimore, Arrow Elctrns.	301-948-0110
Md	Gaithersburg, Cramer/Ew Washington	301-948-0110
Md	Gaithersburg, Kierulff Elctrns.	301-948-0250
Mass	Billerica, Kierulff Elctrns.	617-667-8331
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Woburn, Arrow Elctrns.	617-933-8130
Mich	Livonia, RS Elctrns.	313-525-1155
Mich	Livonia, Pioneer/Michigan	313-525-1800
Minn	Bloomington, Arrow Elctrns.	
Minn	Edina, Cramer/Minnesota	612-835-7811
Minn	Minneapolis, I.C.I.	612-831-2666
Mo	Earth City, Hall-Mark Elctrns.	314-291-5350
NJ	Cherry Hill, Cramer/Pennsylvania	609-424-5930
NJ	Moonachie, Cramer/New Jersey	201-935-5600
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Pennsauken, Resco Elctrns.	609-662-4000
NJ	Rutherford, Kierulff Elctrns.	201-935-2120
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800

NM	Alberquerque, Cramer/New Mexico	505-265-5767
NM	Alberquerque, R.V. Weatherford	505-265-5671
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Fishkill, Arrow Elctrns.	914-896-7530
NY	Hauppauge, Cramer/Long Island	516-231-5600
NY	Rochester, Cramer/Rochester	716-275-0300
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
NC	Winston-Salem, Cramer/Ew Winston-Salem	919-725-8711
Ohio	Cleveland, Pioneer Standard Elctrns.	216-587-3600
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Cleveland, Arrow Elctrns.	216-464-2000
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Kettering, Arrow Elctrns.	513-253-9176
Okla	Tulsa, Hall-Mark Elctrns.	918-835-8458
Pa	Moorestown, Arrow Elctrns.	609-235-1900
Pa	Pittsburgh, Pioneer Standard Elctrns.	412-782-2300
Tex	Dallas, Cramer/Dallas	214-661-9300
Tex	Dallas, Hall-Mark Elctrns.	214-231-5101
Tex	Dallas, R.V. Weatherford	214-243-1571
Tex	Houston, R.V. Weatherford	713-688-7406
Tex	Houston, Hall-Mark Elctrns.	713-781-6100
Utah	Salt Lake City, Cramer/Utah	801-487-4131
Wash	Seattle, Cramer/Seattle	206-575-4420
Wash	Seattle, Kierulff Elctrns.	206-763-1550
Wash	Seattle, R.V. Weatherford	206-243-6340
Wisc	New Berlin, Arrow Elctrns.	414-782-2801
For:	Can., Montreal 357, P.Q., Prelco Elctrns., Ltd.	514-389-8051
For:	Can., Montreal, Que., Payette Radio	514-878-4771
For:	Can., Ottawa, Ont., Prelco Elctrns. Ltd.	613-237-6150
For:	Can., Scarborough, Ont., Carsten Elctrns. Ltd.	416-751-5002
For:	Can., Vancouver 10, B.C., L.A. Varah	604-873-3211
For:	Can., Willowdale, Ont., Electro Sonic Industrial Sales	416-494-1666

ROWAN CONTROLLER DIV., ITE Imperial, Dept. EM, Springhouse, Pa. 19477

ROWE
INDUSTRIES

ROWE INDUSTRIES, INC., Dept. EM, 6225 Benore Rd., Toledo, Ohio 43612, Tel: 419-729-9761, TWX: 810-442-1734; Empl.: 80 .... p. 2140-2142,4713

Sales Manager: D.L. Mang

Local Sales Offices & Reps.

Ala	Huntsville, Rowe Enterprize	205-837-3643
Ala	Huntsville, Redstone Arsenal	205-881-7049
Ariz	Scottsdale, Biedler & Biedler	602-275-5505
Cal	Mountain View, V. C. Robinson	415-969-4831
Cal	Newbury Park, Val C. Robinson	805-529-1331
Cal	S. San Francisco, Westarep, Inc.	415-873-8343
Conn	Wethersfield, Underwood Sls. Corp.	203-563-3046
Fla	Miami, Publicover Assocs.	305-898-9361
Fla	Orlando, Publicover Assocs.	305-947-5080
Ill	Antioch, Tri Delta Sls.	312-395-3980
Md	Baltimore, R.A. Wafer Assocs.	301-744-1133
Mass	Chelmsford, Underwood Sls. Corp.	617-256-8191
NJ	Haddonfield, Mills-Brown Assocs.	609-429-1005
NY	Melville, Astrorep, Inc.	516-423-2266
NY	Rochester, Canavan-Scanlon Assocs.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assocs.	315-437-1271
NC	Charlotte, Dula Assocs.	704-334-7090
NC	Winston-Salem, Dula Assocs.	919-768-7166
Ohio	Beachwood, Richardson-Champ Assocs.	216-292-4954
Ohio	Cincinnati, Com-Tek Sls.	513-793-3611
Ohio	Cleveland, C.J. Voneman Co.	216-333-5500
Ohio	Louisville, D.H. Risher & Co.	216-456-5774
Tex	Dallas, United Comps.	214-324-1448

ROYCE ELECTRONICS CORP., Dept. EM, 1747 Levee Rd., No. Kansas City, Mo. 64116, Tel: 816-842-7505; Empl.: 75

Local Sales Offices & Reps.

Cal	Los Angeles, Cavanah & Fier	213-483-9760
Cal	San Francisco, ARWC	415-653-3838
Colo	Denver, B. Newman & Co.	303-744-2501
Del	Chesnut Hills, Divincent & Legato	302-731-1475
Fla	Pembroke Pines, Joe Wanger Sls. Co.	305-987-8766
Ga	Atlanta, Ross & Assoc.	404-548-5568
Ill	Chicago, Markal Sls.	312-282-5800
Ind	Indianapolis, Lyons & Assoc.	317-352-0475
Mich	Detroit, Cowie Assoc.	313-689-7252
Minn	Minneapolis, Terry Ripley & Assoc.	612-881-8282
Mo	Kansas City, Vern Kingcade & Assoc.	816-474-5230
Neb	Elkhorn, Vern Kingcade & Assoc.	402-289-2909
NJ	Moorestown, Divincent & Legato Assoc.	609-235-8299
NM	Albuquerque, Steve Brimer Sls.	915-544-6562
NY	N.Y.C., Fisher Sls.	201-837-1200
Ohio	Akron, D.F.H.	614-876-7823
Ore	Oak Grove, J.B. Sls. Co.	503-654-8617
Pa	Pittsburgh, F.P. Yarrusi	412-221-4676
Tex	Houston, Buck Rogers & Assoc.	713-626-5370
Utah	Salt Lake, Rasmussen & Cavanah	801-467-6615

(TM)ROYTRON - paper tape reader/punch - Sweda Int'l.

(TM)RP INDUSTRIAL FILTER - air filter - Research Prods. Corp.

(TM)RP MV EZ KLEEN AIR FILTER - air filter - Research Prods. Corp.

(TM)RP SUPER E Z KLEEN AIR FILTER - air filter - Research Prods. Corp.

RSM SENSITRON SEMICONDUCTOR, DIV. RSM ELECTRON POWER, INC., Dept. EM, 221 W. Industry Ct., Deer Park, N.Y. 11729, Tel: 516-586-7600, Telex: 96-7737; Empl.: 180; Minimum order: $H.W. Van Pelt

Sales Manager: C. Fischer; *Distributor Manager:* H.W. Van Pelt

Local Sales Offices & Reps.

Ariz	Phoenix, Vertron	602-943-2932
Cal	Lafayette, Phillips Assocs.	415-284-2579
Cal	Sherman Oaks, Astralonics	213-990-5903
Colo	Denver, Electro-Rep, Inc.	303-744-2821
Ill	Elk Grove, R-Tek, Inc.	312-439-9090
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Iowa	Cedar Rapids, Reid Assocs.	
Kans	Overland Park, Advanced Tech. Sls. Inc.	913-492-4333
Md	Baltimore, Stemler Assocs.	301-944-8262
Mass	Waltham, Datcom Inc.	617-891-4600
Mich	Dearborn, Pitcher-Poulin	313-582-5450
Minn	St. Paul, R K Sls.	612-439-1643
NY	Burnt Hills, K. Corsetti Sls.	518-399-9200
NY	Hempstead, Kahgan Sls.	516-538-2300
Ohio	Dayton, INH Component Sls.	513-434-8808
Okla	Tulsa, H. J. Daly Co.	918-627-4159
Tex	Irving, Space Elctrns. Corp.	214-251-3636
Wash	Tukwila, General Elctrns.	206-243-5141

(TM)RT - stripping solutions - Allied Chemical Corp.

(TM)RT/DUROID - Fiber-reinforced plastic material - Rogers Corp.

(TM)RT, HYBRIDISC,ULR - ceramic capacitors - Dilectron

R/T LABS., INC., Dept. EM, 4126 Colerain Ave., Cincinnati, Ohio 45223, Tel: 513-681-3444; Empl.: 48

Local Sales Offices & Reps.

Cal	Mountain View, Wesloh & Assocs.	415-951-0565
Mass	Canton, New England Elctrn. Sls. Corp.	617-828-4835

® ROTRON
INCORPORATED

RTRON CORP., Dept. EM, 7324 Lawndale, Skokie, Ill. 60076, Tel: 312-679-7180; FSC No.: 19130 p. 2748,2749

Sales Manager: R. McLean

Local Sales Offices & Reps.

Ariz	Phoenix, Gramer & Co.	602-279-1231
Cal	Los Gatos, Wedemeyer Sls.	408-378-3883
Cal	San Diego, SR Elctrns.	714-565-8411
Colo	Denver, Brown Technical	303-233-0863
Conn	Orange, NPM Inc.	203-878-4066
Ill	Chicago, Rinaldi Inc.	312-763-4848
Mass	Franklin, NPM Inc.	617-528-5013
Mich	Detroit, R.P. Urban & Assoc.	313-535-2355
Mich	Grand Rapids, R.P. Urban & Assoc.	616-245-0511
Minn	St. Paul, Cahill Assoc.	612-739-8445
NJ	Plainfield, S. Glassman Assoc.	201-561-3866
NY	Glen Cove, S. Glassman Assoc.	516-676-1039
Ohio	Cincinnati, J. Olsen Co.	513-922-2176
Ohio	Cleveland, J. Olsen Co.	216-752-5444
Ore	Portland, Elctrnc. Comp. Sls.	503-245-2342
Pa	Jenkintown, Arnold Assoc.	215-PI 2-0600
Pa	Pittsburgh, J. Olsen Co.	412-279-2550
Tex	Dallas, Precision Sls.	214-351-6964
Va	Annandale, J. Hopkins Assoc.	703-323-1641

(TM)RUBBON - fluxless solder - Chemetron Corp.

(TM)RUBICON - bridges, potentiometers, colorimeters - Penn Airborne Prods.

(TM)RUBRGLAS - silicone rubber compound - APM-Hexseal

RUBY CHEMICAL CO., Dept. EM, Box 1108, Columbus, Ohio 43216; Empl.: 2

(TM)RUBYFLUID - soldering flux & paste - Ruby Chemical Co.

(TM)RUBYS - stainless steel soldering flux - Ruby Chemical Co.

(TM)RUF-NEK - waterproof seismic connectors - Hughes Aircraft Co., Connecting Devices Div.

(TM)RUGGEDNOVA - miltarized version of DGC nova - Rolm Corp.

(TM)RUSH - wire strippers - Eraser Co.

RUSSCO ELECTRONICS MFG. INC., Dept. EM, 1070 Brookhaven Dr., Clovis, Cal. 93612, Tel: 209-299-2167; Empl.: 15

RUSSELL INDS., INC., Dept. EM, 3069 Lawson Blnd., Oceanside, N.Y. 11572, Tel: 516-536-5000

(TM)RUSTRAK - miniature graphic recorders - Gulton Inds., Inc.

(TM)RUTHENEX - ruthenium electroplating process. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)RUTHENIUM TP - high hardness platinum group metal - Technic, Inc.

RUTHERFORD RESEARCH PRODS. CO., Dept. EM, Box 249, Rutherford, N.J. 07070, Tel: 201-933-2091; Empl.: 25

(TM)RX GEARS - high precision instrument gears - Instru-Lec Corp.

RYCOM INSTRUMENTS, Dept. EM, 9351 E. 59th St., Raytown, Mo. 64133, Tel: 816-353-2100; FSC No.: 14410; Empl.: 37

Local Sales Offices & Reps.

Cal	Mission Viejo, E. B. Hoin & Assocs.	714-586-9774
Cal	Palo Alto, J/M Assocs.	415-327-1260
Colo	Lakewood, Claredon	303-238-4462
DC	Washington, Instrucom	202-223-1759
Fla	St. Petersburg, Commark Corp.	813-527-3281
Ill	Chicago, Kay Sls.	312-397-1215
Kans	Prairie Village, B. Giddings Co.	913-831-0727
Mass	Medford, Techmar, Inc.	617-395-4002
Mo	Cameron, Comm Sys. Assoc.	816-632-7616
NY	Plainview, Eastern Metro Assocs.	516-931-1414
Tex	Richardson, Horizon Engr. Sls. Co.	214-238-9121
Wash	Seattle, Reeves Supply	206-789-1234

RYE INDS., INC., Dept. EM, 125 Spencer Pl., Mamaroneck, N.Y. 10543, Tel: 914-698-0080; Empl.: 50

Local Sales Offices & Reps.

Cal	Los Angeles, Marshank	213-938-2591
Colo	Colorado Springs, Norris	303-685-9319
Ga	Marietta, Clymer Entprs.	404-971-2831
Haw	Honolulu, Av-Tronic Sls.	
Ill	Chicago, W.J. Doyle	
Kans	Overland Pk., Penzner	913-DU 1-0004
Mass	Cohasset, Montague	617-383-0634
Ore	Portland, Van Voorhees	503-287-6633
Pa	Havertown, J. Mustico	215-HI 6-1961

Tex	Addison, Campion Sls.	214-239-9196

RYSTL ELECTRONICS CORP., Dept. EM, 328 N.W. 170th St., N. Miami Beach, Fla. 33169, Tel: 305-652-3838

™**R620/L-100** - ruggedized computer - Varian Data Machines

S & A ELECTRONICS, Div. Scott & Fetzer Co., Dept. EM, 202 W. Florence, Toledo, Ohio 43605, Tel: 419-693-0528; Empl.: 100

S & EI MFG., Dept. EM, Box 832, Northridge, Cal. 91324, Tel: 213-349-4111, TWX: 910-493-1252; FSC No.: 24152; Empl.: 85

Local Sales Offices & Reps.

Ariz	Phoenix, MR Engrg. Sls. Co.	602-959-5150
Cal	San Diego, Qualtronics	714-560-8955
Ill	Chicago, Ropek-Cahill Inc.	312-631-0070
Ind	Ft. Wayne, J & B Engrg. Sls.	219-483-2813
Mass	Needham, Hatch Assocs.	617-444-3310
Mich	Walled Lake, Berberich Assoc.	313-624-2211
Minn	Minneapolis, Technical Assocs.	612-929-6721
NJ	Cherry Hill, Danco Corp.	609-627-2218
NY	Hempstead, Kahgan Sls.	516-538-2300
Ohio	Dayton, Berberich & Assocs.	513-433-0342
Tex	Ft. Worth, J. Hughes Co.	817-430-1683
Tex	Stafford, J. Hughes Co.	713-771-9353

™**SABER-CHAMP** - blade probe rh measuring device - American Instr. Co.

™**SABRE TOOTH** - connectors - T & B/Thomas & Betts

™**SABRE TOOTH** - connectors - T & B/Thomas & Betts

SADELCO, INC. , Dept. EM, 299 Park Ave., Weehawken, NJ 07087, Tel: 201-866-0912; Empl.: 35

Sales Manager: M. Brink

S.A.E.-ALCON DIV., Dept. EM, 1750 N Kimball Ave., Chicago, Ill. 60647, Tel: 312-BE 5-5030; Empl.: 350

Sales Manager: J.W. Widuch

Local Sales Offices & Reps.

Conn	Southington, R. Nolan	203-621-6634
Fla	St. Petersburg, Comps. Sls.	813-360-7460
Ill	Chicago, Alcon Metal Prods.	312-BE 5-5030
Ill	Downers Grove, Momak Sls.	312-963-6400
Ill	Rolling Meadows, Sumer, Inc.	312-394-4900
Ind	Indianapolis, Electronic Sls.	317-849-4260
Tex	Dallas, Wm. Reese Assoc.	214-638-6575
Va	Lynchburg, J. A. Griffin	703-384-5236

SAEGERTOWN COMPONENTS DIV., GTI Corp., Dept. EM, R #2 Box 77, Hadley, Pa. 16130, Tel: 814-763-2515

™**SAFE-ALARM** - fire alarm cable - Thermax Wire Corp.

™**SAFE-PAK** - solid-state controlling device - De Laval Turbine Inc.

™**SAFESCAN** - curtain of light machine safety controls - Dolan-Jenner Inds., Inc.

™**SAFE START** - boating safety equip. - Jaesic Industries Co.

™**SAFE-T-KLIP** - test clip - Industrial Devices

™**SAFE-T-KORD** - test cord - Industrial Devices

™**SAFETY WHITE** - fluorescent ballasts - Jefferson Elec.

SAFEWAY PRODUCTS, Dept. EM, 440 Middlefield St., Middletown, Conn. 06457, Tel: 203-346-6601; Empl.: 158

SAFT AMERICA INC., Dept. EM, Box 1886, Valdosta, Ga. 31601, Tel: 201-548-2800, TWX: 710-998-0528; Empl.: 270

Local Sales Offices & Reps.

Cal	Torrance, T. Pierce	213-378-3623
Tex	Fort Worth, J. B. Schusler	817-237-4620

™**SAF-T-PLUG** - wall-mounted power supply - Dynamic Instr. Corp.

™**SA-FUSE** - electrical controls - Electric Machinery Mfg. Co.

SAG HARBOR INDS., INC., Dept. EM, Bayview St., Sag Harbor, N.Y. 11963, Tel: 516-725-0440; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Conn	Kensington, Kenson Co.	203-828-4143
Mich	Grosse Pointe Farms, J.E. Landino Assocs.	313-886-8144

™**SAICOR** - real time, narrow band, spectrum analysis - Signal Analysis Oper.

SAKATA USA CORP., Dept. EM, 651 Bonnie La., Elk Grove Village, Ill. 60007, Tel: 312-593-3211, Telex: 28-0534; Empl.: 12

Local Sales Offices & Reps.

Cal	Sunnyvale, Diplomat/Westland	408-734-1900
Cal	Van Nuys, R.G. Allen	213-989-1700
Colo	Wheatridge, Century Elctrns.	303-424-1985
Conn	East Haven, Electrns.	203-469-2321
Fla	Miami, Elctrn. Equip. Co.	305-871-3500
Ill	Arlington Hts., S&R Elctrns.	312-593-2545
Ill	Elk Grove Vill., GRL Elctrns.	312-593-3220
Kans	Wichita, Radio Supply Co.	316-267-5216
Mass	W. Newton, AW Meyer Co.	617-965-1111
Mich	Grand Rapids, RM Elctrns.	616-459-0216
Mich	Kentwood, RM Elctrn. Co.	616-531-9300
Mo	Kansas City, Walters Radio	816-531-7015
NJ	Springfield, Federated Purchaser	201-376-8900
NY	Mt. Vernon, QAR Ind. Sls.	914-699-2224
NY	Plainview, Fairmont Elctrn. Sls.	516-694-8200
NY	Rochester, Rochester Radio	716-454-7000
NY	Rome, Rome Elctrns.	315-337-5400
NC	Charlotte, Dixie Radio	704-377-5413
Ohio	Cincinnati, United Radio	313-761-4030
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Pa	Drexel Hills, Kass Elctrns.	215-449-2300
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Utah	Salt Lake City, Diplomat/Altaland	801-480-7277
Wash	Seattle, Zepher Sls.	206-573-0922

SAKI MAGNETICS INC., Dept. EM, 1649 12th St., Santa Monica, Cal. 90404, Tel: 213-451-8611; Empl.: 45

™**SALI** - insulating bushings - Adalet Mfg. Co.

™**SALMET** - Flux - Heeger Inc.

™**SAL-MET** - flux - LMB Heeger, Inc.

™**SAM** - low cost reader - Decitek

SAMARIUS, INC., Dept. EM, 300 Seymour Ave., Derby, Conn. 06418, Tel: 203-735-7405, TWX: 710-451-2495; Empl.: 50

Local Sales Offices & Reps.

Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Md	Silver Spring, Globe	301-587-0060
Mo	St. Louis, Boweng	314-429-7327
Pa	Media, W. Reeves	215-566-6709

™**SAMGUARD** - security - Aerolite Elexs Corp.

™**SAMR** - monitoring SSB/AM receiver - Brelonix, Inc.

SAMTEC, Dept. EM, 810 Progress Blvd., New Albany, Indiana 47150, Tel: 812-944-6733; FSC No.: 55322; Empl.: 7

Local Sales Offices & Reps.

Ala	Huntsville, Elctrnc. Mfgrs. Agents	205-533-6640
Cal	Los Angeles, Ed Landa Co.	213-879-0770
Cal	San Carlos, Kottmeier Assocs.	415-592-8333
Colo	Boulder, Front Range Mktg.	303-443-4780
Fla	Winter Park, Young & Lawrence	305-647-6929
Ill	Streamwood, Al Holte & Assoc.	312-837-4066
Mass	Woburn, Belmac Corp.	617-935-6810
Minn	St. Paul, R-K Sls.	612-335-8252
NJ	Verona, C. K. Wall Co., Inc.	201-746-4832
NY	Syracuse, MMI Sls. Inc.	315-455-5919
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Cleveland, Imtech, Inc.	216-826-3400
Pa	Huntingdon Valley, Inacker Sls. Inc.	215-947-5660
Wash	Bellevue, Quadra Sls. Corp.	206-454-4946
Exp:	Ill., Chicago, Worldwide Exports	312-654-1315

SAMS, HOWARD W. & CO., Dept. EM, 4300 W. 62nd. St., Indianapolis, Ind. 46268, Tel: 317-291-3100

Local Sales Offices & Reps.

Cal	Gardena, Bidwell Sls. Assocs.	213-770-0300
Cal	Oakland, Moulthrop Sales	415-261-7676
Colo	Denver, Newman & Assocs.	303-744-2501
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Chicago, B. Burns & Assocs.	312-775-1233
Ind	Indianapolis, R. Milsk Co.	317-546-5468
Kans	Overland Park, T. L. Dowell & Assocs.	913-236-8200
La	Gretna, Cartwright & Bean	504-362-4649
Md	Lanham, Lowery Assocs.	301-459-1556
Mass	Needham, Mullin Techn. Sls.	617-444-6363
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Minneapolis, Borrett & Lee	612-929-0028
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	St. Louis, Kathrinus, Kelly, & Co.	314-968-3800
NJ	Englewood, Bressler & Baum	201-569-7600
NM	Albuquerque, C.T. Carlberg & Assoc.	505-265-1579
NY	Syracuse, Paston-Hunter	315-437-2992
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Columbus, C. L. Pugh Co.	614-486-9678
Ore	Portland, J.V. Belusko Co.	503-222-4279
Pa	Broomall, Lowery Assocs.	215-356-5300
Pa	Hummelstown, Lowery Assocs.	717-533-7095
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Lund & Co.	214-387-4634
Va	Charlottesville, Lowery Assoc.	804-973-6672
Va	Richmond, Lowery Assoc.	804-355-6117

™**SAM-100** - aircraft S&B radio - Brelonix, Inc.

SAN DIEGO INSTRUMENT LAB., Dept. EM, 7969 Rd. Road, San Diego, Cal 92111, Tel: 714-292-0646

Sales Manager: R. Ryan

Local Sales Offices & Reps.

Ala	Huntsville, Vesco	205-539-8716
Cal	Anaheim, D & G Assocs.	714-772-0587
Cal	Concord, Gado Inst. Sls.	415-933-5566
Cal	Palo Alto, Gado Instr. Sls.	415-961-2222
Cal	Yorba Linda, D & G Assocs.	714-528-5555
Conn	Durham, Marr Elect. Co.	203-349-9691
Fla	Cocoa Beach, Vesco	305-784-0784
La	Baton Rouge, Vesco	504-923-0297
Md	Rockville, Farrell Assocs.	301-424-9460
Mich	Southfield, Electroquipment Sls.	313-569-4497
NC	Charlotte, Vesco	705-525-0769
Ohio	Chesterland, Electroquipment Sls.	216-729-2222
Tex	Dallas, Bouco Sls. Assocs.	214-247-6708
Tex	Houston, Bouco Sls. Assocs.	713-665-6121
Wash	Seattle, Underwood Assocs.	206-575-0123

SAN FERNANDO ELEC. MFG., Dept. EM, 1501 1st St., San Fernando, Cal. 91341, Tel: 213-365-9411, TWX: 910-496-1535; Empl.: 1000

Local Sales Offices & Reps.

Ariz	Tucson, West-Cap Arizona	602-294-2646
Cal	, SF Electric Mfg. Co.	213-365-9411
Cal	Concord, SF Electronic Mfg. Co.	415-825-5133
Conn	Stratford, G. Rosen Co.	203-375-5456
Fla	Clearwater, Perrott Assocs.	813-585-3327
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Chicago, Mid Western Regional Off.	312-859-0099
Md	Glen Burnie, Micro-Comp	301-761-4600
Mass	Framingham, G. Rosen Co.	617-879-5505
Minn	St. Paul, Smith Engrg. Assoc.	612-646-4851
NJ	, Eastern Regional Off.	216-245-7292
NY	Chester, San Fernando Elec. Mfg.	914-469-9620
Pa	King of Prussia, SFER Co.	215-337-3488
Tex	Dallas, San Fernando Elec. Mfg.	214-750-8633
Wash	Seattle, General Electronics	206-575-4030

™**SAN-DEL** - instrument cleaning systems - Odell Co., M. P.

SANDERS ASSOCS. INC., Corp. Hdqts., Dept. EM, Daniel Webster Hwy., Nashua, NH 03060, Tel: 603-885-4321; Empl.: 6000

SANDERS ASSOCS, Flexprint, Dept. EM, Grenier Field, Manchester, N.H. 03103, Tel: 603-669-4615

SANDERS ASSOCIATES, Products Div. - Spectrum Analyzer, Dept. EM, 95 Canal St., Nashua, NH 03060, Tel: 603-885-5400, TWX: 710-228-1894; Empl.: 6000

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Inc.	205-539-4411
Cal	Los Alamitos, Scien. Device	213-598-7678
Conn	Hamden, Pat Jenks	203-281-0810

Fla	Orlando, W. A. Brown Inc.	305-425-5505
Ga	Atlanta, W. A. Brown Inc.	404-939-1674
Ill	Elk Grove Village, Loren Green Assoc.	312-593-0282
Ind	Indianapolis, Loren Green Assoc.	317-293-9827
La	Gretna, W. A. Brown Inc.	504-366-5766
Md	Rockville, Mesa	301-881-8430
Mass	Wakefield, Pat Jenks Assoc.	617-246-1590
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
Mo	St. Louis, Eng. Serv. Comp.	314-997-1515
NJ	Cinnaminson, Mesa Inc.	609-786-0284
NY	Syracuse, Labtronics	315-454-9314
NC	Res. Tri. Park, W. A. Brown Inc.	919-489-1546
Ohio	Cleveland, Electro	
Okla	Norman, Data Mktg. Assoc.	405-364-8320
Tenn	Knoxville, W. A. Brown Inc.	615-584-2614
Tex	Dallas, Data Mktg. Assoc.	214-661-0300

SANFORD-MILLER CORP., Dept. EM, 8 John St., Lynbrook, N.Y. 11563, Tel: 516-593-2025; Empl.: 10 p. 3877

Local Sales Offices & Reps.

Cal	Lynwood, Dick West & Assoc.	213-636-6124

Local Distributors

Ala	Huntsville, Mock Elctrns.	
Ark	Little Rock, Carlton-Bates Co.	501-375-2383
Cal	San Francisco, Dahl-Beck Elctrns.	
Conn	Waterbury, Bond Radio Elctrns.	203-753-1184
Fla	Orlando, Hammond Elctrns.	
Ga	Atlanta, Specialty Dist. Co.	
Ind	So. Bend, Radio Dist. Co.	219-287-2911
Ky	Louisville, P.I. Burks Co.	502-589-3960
La	New Orleans, Southern Radio Supply	
Md	Rockville, Capital Radio Wholesalers	301-881-2270
Mass	Worcester, Radio Maintenance	
Mich	Benton Harbor, Benton Harbor Elctrns.	616-WA5-0069
Minn	Duluth, Northwest Radio	218-727-1565
Miss	Jackson, Ellington Elctrn. Supply	601-355-0561
Mo	Joplin, Four State Radio	
Neb	Omaha, Radio Equipt. Co.	
NC	Greenboro, Hammond Elctrns.	919-275-6391
Ohio	Lima, Lima Radio Parts	419-223-5075
Okla	Tulsa, Radio Inc.	
Pa	Reading, Barbey Elctrns.	215-376-7451
Pa	West Chester, West Chester Elctrns.	215-923-1520
SC	Greenville, Sawyer Elctrns.	803-CE5-0438
Tenn	Nashville, Electra Distrib Co.	
Tex	El Paso, Medland Specialty Co.	915-533-3555
Va	Richmond, Meridian Elctrns.	703-355-0669

SANGAMO CAPACITOR DIV., Dept. EM, Box 128, Pickens, S.C. 29671, Tel: 803-878-6311, TWX: 810-397-2496

Sales Manager: W. Bakes

Local Sales Offices & Reps.

Ariz	Scottsdale, P. Murphy & Assoc.	602-946-2457
Cal	Irvine, Celtec	714-752-6111
Cal	Los Angeles, Celtec	213-874-6002
Cal	Placentia, El-Kap	714-528-3750
Cal	Redwood City, Sangamo	415-364-5066
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Sherman Oaks, Astralonics	213-990-5903
Colo	Denver, Parker-Webster	303-770-1972
Ill	Roselle, Sangamo	312-894-9170
Kans	Shawnee Mission, K & M Sls. & AAssoc.	913-262-1444
Md	Randallstown, Beacon North	301-922-1248
Mass	Hingham, Sangamo	617-747-7306
Mich	Farmington, W.R. Hummon & Assoc.	313-474-0661
Minn	Mpls., S. Clothier	612-888-4666
Mo	St. Louis, K & M Sls. & Assoc.	314-423-2420
NM	Albuquerque, A-Q Elctrns.	505-883-1003
NY	Elmont, F. E. Schmitt	516-437-8150
NY	Ontario Center, Kehoe Comp. Sls.	315-524-2491
Ohio	Rocky River, Sangamo	216-331-5222
Okla	Tulsa, T.J. Ray Co.	918-627-1515
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Pa	Ft. Washington, G. C. M., Inc.	215-646-7535
SC	Pickens, Sangamo Elec. Co.	803-878-6311
Tex	Dallas, Bonser-Philhower Sls.	214-234-8438
Tex	El Paso, A-Q Elctrns.	915-545-2363
Tex	Houston, Bonser-Philhower	713-467-4373
Utah	Salt Lake City, Parker-Webster Co.	801-486-3737
Va	Falls Church, Beacon North	703-534-1673

SANKEN ELEC. CO., Dept. EM, 1-22-8 Nishi-Ikebukuro, Toshima-Ku, Tokyo, Japan, Tel: 03-986-6151, Telex: 272-2323; Empl.: 2,500; Minimum order: $T. Kunimi

Sales Manager: K. Imaizumi; *Distributor Manager:* T. Kunimi

SAN-O INDUSTRIAL CORP., Dept. EM, 35-P Orville Dr., Bohemia, N.Y. 11716, Tel: 516-567-5556

(TM)SANS-A-FUSE - fusing device - Workman Electronic Prods., Inc.

SANTA BARBARA RESCH. CTR., Dept. EM, 75 Coromar Dr., Goleta, Cal. 93017, Tel: 805-968-3511, TWX: 213-871-5210; Empl.: 710

SANTA CRUZ ENGRG. INC., Dept. EM, 300 Harvey West Blvd., Santa Cruz, Cal. 95060, Tel: 408-427-3131; Empl.: 10

SANTA FE TEXTILES INC., Dept. EM, 3151 W. Adams St., Santa Ana, Cal. 92704, Tel: 714-751-7733

Sales Manager: J. Tressen; *Distributor Manager:* F. Frakes

SANYO ELECTRIC INC., Dept. EM, 51 Joseph St., Moonachie, N.J. 07074, Tel: 201-641-2333, Telex: 134-394

Sales Manager: H. Tamada

Local Sales Offices & Reps.

Cal	Compton, Sanyo Electric Inc.	213-537-5830

(TM)SAR - silicon avalanche rectifier - Varo Semiconductor, Inc.

SARA SCIENTIFIC CO., Dept. EM, P.O. Box 321, San Francisco, Calif. 94101, Tel: 415-421-3172; Empl.: 3

(TM)SARA-SONIC - ultrasonic cleaners - Sara Scientific Co.

(TM)SARA 7 - detergent - Sara Scientific Co.

SARGENT WELCH SCI. CO., Vacuum Prods. Div., Dept. EM, 7300 N. Linder Ave., Skokie, Ill. 60076, Tel: 312-677-0600, TWX: 910-223-4541; Empl.: 500

Sales Manager: J. Schmunk

Local Sales Offices & Reps.

Ala	Birmingham	205-251-5125
Cal	Anaheim	714-772-3550
Colo	Denver	303-399-8220
Mich	Detroit	313-931-0337
NJ	Springfield	201-376-7050
Ohio	Cincinnati	513-771-3850
Ohio	Cleveland	216-587-3300
Tex	Dallas	214-357-9381

SARKES TARZIAN, INC., Semiconductor Div., Dept. EM, 415 No. College Ave., Bloomington, Ind. 47401, Tel: 812-332-1435; Empl.: 500 p. 3878-3887

Local Sales Offices & Reps.

Ala	Huntsville, Murphy & Cota Co.	205-539-8476
Ark	El Dorado, D. Bellew Sls. Co.	501-863-8325
Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Cal	Torrence, Mitronics	213-323-7934
Colo	Denver, Nelson Co.	303-733-5528
Fla	Lighthouse Point, Jack Krutek & Assoc.	305-941-6544
Ga	Atlanta, Murphy & Cota Co.	404-875-2525
Ill	Chicago, Saffro & Assocs.	312-588-0905
Ind	Indianapolis, Sukup & Cox	317-253-5501
Kans	Leawood, Thunderbird Sls. Co.	913-642-7220
Kans	Wichita, Thunderbird Sls. Co.	316-684-3941
La	Kenner, D. Bellew Sls. Co.	504-443-3237
Mass	Reading, C.E. Godfrey Co.	617-944-2230
Mich	Warren, Dem Elctrn. Sls.	313-575-9444
Minn	Minneapolis, Scott Elctrn. Sls.	612-929-2985
Mo	St. Louis, Thunderbird Sls.	314-567-6488
NJ	S. Orange, S. Simberkoff Sls.	201-763-7900
NY	New York City, A. Auriema, Inc.	212-466-2500
NC	Winston-Salem, Murphy & Cota Co.	919-722-9445
Ohio	Cleveland, Del Steffen & Assocs.	216-461-8333
Ohio	Dayton, D. Steffen & Assocs.	513-293-3145
Pa	Fegsterville, PSA Inc.	215-355-6244
Tex	Dallas, RM Elctrns.	214-233-0363
Tex	Houston, R. Matthews & Assoc.	713-664-7131
Wash	Bellevue, SD-R2 Prods. & Sls.	206-747-9424

Local Distributors

Ala	Birmingham, J.W. Clary Co.	205-332-2486
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Riverside, Electronic Supply Corp.	714-787-9220
Cal	San Leandro, KEA Elctrn. Dist.	415-352-2277
Cal	Westminster, B A S E Elctrns.	714-894-1303
Conn	Hamden, Wilshire Elctrns.	203-281-1161
Conn	Waterbury, Bond Radio Elctrns.	203-753-1184
Fla	Miami, ESL Elctrns. Div.	305-633-6973
Fla	Orlando, Hammond Elctrns.	305-849-6060
Ga	Atlanta, Specialty Dist. Co.	404-873-2521
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Joliet, Keck Elect. Svc. Ctr.	815-726-6513
Ill	Rockford, Midwest Assocs.	815-962-8036
Ind	Indianapolis, Graham Elctrns. Supply	317-634-8486
Iowa	Cedar Rapids, Deeco	319-365-7551
Kans	Wichita, Interstate Elect. Supply	316-264-6316
Ky	Louisville, P I Burks	502-589-3960
La	Shreveport, Industrial Elect. Supply	318-222-9459
Me	New Orleans, Radio Parts	504-581-5959
Md	Rockville, Wilshire/Washington	301-340-7900
Mass	W. Newton, A.W. Mayer Co.	617-965-1111
Mich	Ann Arbor, Wedemeyer Elect. Supply	313-665-8611
Mich	Detroit, R S Elctrns.	313-491-1012
Mich	Flint, Shand Elctrns.	313-743-8940
Minn	Minneapolis, Electronic Center	612-338-5881
Mo	Kansas City, Walters Radio Supply	816-531-7015
Mo	St. Louis, Olive Inds. Elects.	314-863-7800
NJ	Camden, General Radio Supply	609-964-8560
NJ	Hanover, State Elctrn. Parts	201-887-2550
NY	Buffalo, Summit Dist.	716-884-3450
NY	Hauppauge, Semiconductor Concepts	516-273-1234
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rochester, Rochester Radio Supply	716-454-7800
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Southeastern Radio Supply	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-724-0541
Ohio	Cincinnati, Hughes-Peters	513-351-2000
Ohio	Cincinnati, United Radio	513-761-4030
Ohio	Dayton, Stotts-Friedman	513-224-1111
Ohio	Dayton, Esco	513-226-1133
Ohio	Lima, Lima Radio Parts	419-228-1220
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Okla	Tulsa, Radio Inc.	918-587-9123
Ore	Portland, EOFF Elect. Co.	503-222-9411
Pa	Erie, Mace Elctrns.	814-838-3511
RI	Providence, Wm. Dandretta Co.	401-861-2800
RI	Warwick, W.H. Edwards Co.	401-781-8000
Tex	Houston, Harrison Equip. Co.	713-652-4750
Wash	Seattle, Robert E. Priebe Co.	206-682-8242
Wisc	Milwaukee, Parts Mart Co.	414-276-4160

(TM)SARVAC - direct-drive vacuum pump - Sargent Welch Sci. Co.

(TM)SATINTONE 87D - metal display panels - Panelgraphic Corp.

(TM)SAUCER - fan - Rotron, Inc.

SAVOY ELECTRONICS, Dept. EM, P.O. Box 5727, Ft. Lauderdale, Fla. 33310, Tel: 305-563-1333, Telex: Savoylaud; Empl.: 82

Sales Manager: J. Harris V.P. Sls.

Local Sales Offices & Reps.

Ala	Huntsville, Remco - Rakes Eng. & Mkt. Corp.	205-833-9260
Cal	Campbell, United Sls. Co.	408-379-0800
Cal	San Diego, Qualtronics	714-560-8955
Cal	Torrance, Component Mktg. Assoc.	213-541-2515
Ill	Wheaton, Archie Joyner Assoc.	312-668-5775
Md	Riverwood, I.S.C.	301-484-1411
Mass	Wakefield, N.E.R.E.M.	617-245-4426
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
Ore	Medina, J.C. Hofstetter Co.	503-296-1010
Tex	Dallas, Bradenco Corp.	214-358-3278
Exp:	N.Y., N.Y. (France), Multiparts Corp.	202-425-1560

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SAWYER INDS., Dept. EM, 5649 Peck Rd., Arcadia, Cal. 91006, Tel: 213-442-5981, TWX: 910-587-3534; FSC No.: 18098; Empl.: 140

Local Sales Offices & Reps.

NJ	Tenafly, Budd-Tronics, Inc.	201-569-2230

SAXTON PRODS., Dept. EM, 215 N. Rte. 303, Congers, N.Y. 10920, Tel: 914-268-6848; Empl.: 230

Local Sales Offices & Reps.

Cal	Canoga Park, L. Gould	213-463-3123
Cal	Cerritos, Saxton Prod.	213-342-9847
Cal	Millbrae, P. Rush	415-697-4995
Cal	Sherman Oaks, Vantage Sls.	213-789-4921
Cal	Topanga, D. Epstein	213-346-9631
Conn	Hartford, J. Colavecchio	203-522-0596
Ga	Stone Mountain, A. Stayton	404-469-2779
Ill	Chicago, D. Abo	312-327-9642
Ill	Des Plaines, R. Davis	312-298-7689
Md	Greenbelt, M. Needle	301-345-8026
Pa	Philadelphia, L. Feinstein	215-677-6497
Pa	Pittsburgh, S. Schindel	412-366-1481
Tenn	Knoxville, J. Dickens	615-947-8068
Tex	Dallas, D. McMonigle	817-457-2476

SC ELECTRONICS, Dept. EM, 530 5th Ave. N.W., New Brighton, Minn. 55112, Tel: 612-633-3131, Telex: 69-1241; Empl.: 130

Sales Manager: R. Thomas

SBE, INC., Dept. EM, 220 Airport Blvd., Watsonville, Cal. 95076, Tel: 408-722-4177, TWX: 910-330-6371; Empl.: 150

Local Sales Offices & Reps.

Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	Los Gatos, L & H Mktg. Co.	408-268-8629
Fla	Miami, L.P. Hench Co.	305-251-4343
Ga	Norcross, D. Cooper Co.	404-448-5460
Ill	Chicago, R.R. Hutmacher Assocs.	312-631-3248
Ind	Indianapolis, New/Era Sls.	317-299-3400
Iowa	Atlantic, Kimian Sls	712-243-1626
Md	Columbia, Par-Nell Sls	301-992-5454
Mich	Auburn Heights, Cantral Elctra. Sls. Co.	313-852-4308
Minn	Minneapolis, Jensen Sls.	612-941-7181
Mo	Independence, Kimian Sls.	816-796-4026
NY	Buffalo, L.D. Allen	716-837-1955
NY	North Syracuse, L.D. Allen	315-458-7470
NY	Valley Cottage, S. Cohn Assocs.	914-268-9216
Ohio	Brook Park, Eastern Regional Sls Off.	216-267-0410
Ohio	Columbus, Weller Elctrn. Sls.	614-885-7819
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Enon Valley, NEBco Assocs.	216-457-2334
Pa	Holland, Par-Nell Sls.	215-355-9330
Tex	Dallas, Collins Co.	214-341-7866
Wash	Seattle, Earl & Brown Co.	206-284-1121

™SBG - chemicals - Mallinckrodt, Inc.

™SCA - transistors - Semicoa, Inc.

SCANBE CANOGA INDUSTRIES, Dept. EM, 3445 Fletcher Ave., El Monte, Cal. 91731, Tel: 213-579-2300, TWX: 910-587-3437; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, W A Brown Comps.	205-539-4411
Ariz	Phoenix, Cleveland Entprs.	602-949-0872
Cal	Anaheim, Cen-Tec Sls.	714-991-4440
Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Cal	San Diego, Earl Assocs.	714-278-5441
Colo	Sedalia, Jensen Reps. Co.	303-688-4154
Conn	Cheshire, Coakley, Boyd & Abbett	203-272-2261
Fla	Altamonte Springs, WMM Assocs.	305-862-4700
Fla	Clearwater, WMM Assocs.	813-447-2533
Fla	Pompano Beach, WMM Assocs.	305-943-3091
Ga	Altanta, W A Brown Comps.	404-455-0405
Ill	Chicago, D Dolin Sls. Co.	312-286-6200
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Kans	Mission, Inland Assocs.	913-362-2366
Md	Ellicott City, Doss Elctrns.	301-465-1336
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	St. Clair Shores, J. M. Thorpe	313-779-6363
Minn	Minneapolis, C. Gibb Co.	612-377-1200
Mo	St. Louis, Inland Assocs.	314-821-3742
NM	Albuquerque, Cleveland Entprs.	505-345-2481
NY	DeWitt, Tri-Tech Elctrns., Inc.	315-446-2881
NY	Great Neck, H. J. Krasner	516-487-0690
NC	Winston-Salem, W.A. Brown Comps.	919-725-5384
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Ohio	Dayton, Marlow Assocs.	513-426-6270
Pa	Feasterville, Professional Svc. Assocs.	215-355-6244
Tex	Dallas, E-Tron Sls.	214-348-4749
Utah	Salt Lake City, Jensen Reps.	801-484-1066
Wash	Seattle, F. Jackson Assocs.	206-523-6300

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns.	205-837-8700
Ala	Huntsville, Powell Elctrns.	205-539-2731
Ariz	Phoenix, Moltronics	602-272-7951
Cal	Burlingame, Rose Elctrns.	415-692-5700
Cal	San Diego, Moltronics	714-278-5020
Cal	Santa Clara, Moltronics	408-244-7600
Cal	So. Gate, Moltronics	213-773-6521
Colo	Denver, Elctrn. Parts	303-744-1992
Fla	Miami, Hall-Mark Elctrns.	305-971-9280
Fla	Orlando, Hall-Mark Elctrns.	305-855-4020
Ga	Atlanta, Hall-Mark Elctrns.	404-963-9728
Ill	Elk Grove Village, Hall-Mark Elctrns.	312-437-8800
Ind	Indianapolis, Pioneer/Indiana	317-849-7300
Ind	Indianapolis, Advent Elctrns.	317-297-4910
Kans	Kansas City, Hall-Mark Elctrns.	913-888-4747
Kans	Wichita, Hall-Mark Elctrns.	316-682-2073
Md	Baltimore, Hall-Mark Elctrns.	301-265-8500
Md	Beltsville, Treeko Sales	301-937-8260
Mass	Newton, Greene-Shaw Co.	617-969-8900
Mass	Waltham, QPL Elctrns.	617-891-0460
Mass	Woburn, Time Elctrns.	617-935-8080
Mich	Livonia, Pioneer Std.	313-525-1800
Minn	Minneapolis, Hall-Mark Elctrns.	612-884-9056
Minn	Minneapolis, Ind'l. Comp.	612-831-2666
Mo	St. Louis, Olive Elctrns.	314-863-7800
Mo	St. Louis, Hall-Mark Elctrns.	314-291-5350
NJ	Roselle, Garden State	201-241-9000
NY	Bohemia, Car-Lac	516-567-4200
NY	Buffalo, Summit Distr.	716-884-3450
NY	New York, Hall-Mark Elctrns.	516-273-0030
NY	Rochester, Summit Elctrns.	716-334-8110
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
Ohio	Cincinnati, Hughes-Peters	513-351-2000
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Columbus, Hughes-Peters	614-294-5351
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Dayton, Hall-Mark Elctrns.	513-294-0437
Ore	Portland, Almac/Stroum	503-292-3534
Pa	Montgomeryville, Pyttronics	215-643-2850
Pa	Philadelphia, Hall-Mark Elctrns.	215-355-7300
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
Tex	Austin, Hall-Mark Elctrns,	512-837-2814
Tex	Dallas, Specialized Prod.	214-358-4663
Tex	Dallas, Hall-Mark Elctrns.	214-231-6111
Tex	El Paso, Hall-Mark Elctrns.	915-545-1763
Tex	Houston, Hall-Mark Elect.	713-781-6100
Tex	Tulsa, Hall-Mark Elctrns.	918-835-8458
Wash	Seattle, Almac/Stroum	206-763-2300
Wisc	Milwaukee, Hall-Mark Ectrns.	414-476-1270
Wisc	W Allis, Marsh Elctrns.	414-545-6500
For:	Can., Downsview, Ont., Semad Elctrns.	416-635-9880

™SCANFARE - FM Monitor Scanners - Fanon/Courier Corp., Subs.

™SCAN-X - x-ray power supply - Del Electronics Corp.

SCHAEVITZ ENGRG., Dept. EM, U.S. 130, Union Ave., Pennsauken, N.J. 08110, Tel: 609-662-8000, TWX: 710-892-0714; Empl.: 190

Sales Manager: R.L. Anderson

Local Sales Offices & Reps.

Ala	Huntsville, JMS Co.	205-883-0654
Ariz	Scottsdale, Meas. Consits.	602-994-9519
Cal	Pasadena, Deniston/JDA	213-254-7755
Cal	San Carlos, Elctrn. Engrg.	415-593-2189
Colo	Boulder, Meas. Consit.	303-449-5294
Fla	Pompano Beach, Colo-Tek Assocs.	305-781-8110
Ill	Northfield, Torkelson Assoc.	312-446-9085
Ind	Indianapolis, Torkelson Assoc.	317-244-7867
La	Harahan, MG Elctrns. & Equip.	504-733-0070
Mass	Needham, Addelco Corp.	617-444-4754
Mich	Farmington, Anderson Elctrns.	313-476-9161
Minn	Mpls., Industra	612-929-6224
Mo	Manchester, Vertec Assocs.	314-394-6242
NJ	Cherry Hill, Markey Engrg.	609-667-3809
NM	Las Cruces, Meas. Consits.	505-526-2491
NY	Elbridge, L-Tron Corp.	315-689-3787
NC	Winston-Salem, Radco Co.	919-722-9671
Ohio	Columbus, R.D. Cloon Assoc.	614-459-2890
Tenn	Knoxville, Tool Crib, Inc.	615-525-6195
Tex	Richardson, Concept Sls.	214-690-4521
Utah	Murray, Meas. Consit.	801-268-3181
Wash	Bellevue, A. Smith	206-746-6770

SCHAUER MFG. CORP., Dept. EM, 4500 Alpine Ave., Cincinnati, Ohio 45242, Tel: 513-791-3030, Telex: 21-4576; Empl.: 254; Minimum order: $R. Parsons

Sales Manager: A.A. Groenewold; *Distributor Manager:* R. Parsons

Local Sales Offices & Reps.

Cal	Carson, Associated Reps. Corp.	213-869-2516
Cal	Palto Alto, Ellis Enterprises	415-494-1441
Conn	East Haven, Eagle Assocs.	203-467-6542
Conn	Meriden, Eagle Assocs.	203-467-6542
Fla	Dunedin, H. O. Norberg	813-733-9102
Ga	Smyrna, B-C Elctrn. Sls.	404-436-5169
Ill	Chicago, Ellinger Sls. Corp.	312-763-1570
Mich	Detroit, Rathsburg Assocs.	313-882-1717
Mo	Kansas City, Nevco, Inc.	816-421-1751
NY	Long Island City, D.F. Tobias Co.	212-549-9191
Ohio	Cleveland, John O. Olsen Co.	216-752-5444
Pa	Philadelphia, Kenneth B. Erdman Co.	215-224-1833
Tex	Dallas, J.Y. Schoonmaker Co.	214-357-8481
Wash	Seattle, DMS/Vantage	206-525-2050

SCHILLER INDUSTRIES, Dept. EM, 7111 E. Eleven Mile Rd., Warren, Mich. 48092

SCHLUMBERGER, See Heath Co.

SCHNEIDER INSTR. CO., Dept. EM, 8115 Camargo Rd., Cincinnati, Ohio 45243, Tel: 513-561-6803; Empl.: 17

Local Sales Offices & Reps.

Ala	Birmingham, Spader & Assocs.	205-879-1366
Ga	Atlanta, Spader & Assocs.	404-296-3024

SCHONSTEDT INSTR. CO., Dept. EM, 1775 Wiehle Ave., Reston, Va. 22090, Tel: 703-471-1050; Empl.: 35

SCHOTT CORP., Dept. EM, 3140 B Harbor Lane No., Minneapolis, Minn. 55441, Tel: 612-559-2742, TWX: 910-576-2964; FSC No.: 80023; Empl.: 150

Sales Manager: O. Schott

Local Sales Offices & Reps.

Cal	Palo Alto, A. Barauck Co.	415-327-7711
Colo	Aurora, Robbins Assoc.	303-399-6618
Ill	Des Plaines, Electro-Comp. Sls.	312-297-1455
Mass	Needham, Hatch Assocs.	617-444-3310
Minn	Minneapolis, S & R Sls.	612-544-3022
NJ	Springfield, F.F. Sylvester Assocs.	201-376-3324
Tex	Arlington, Hite Elctrn. Sls.	817-265-2912

SCHOTT OPTICAL GLASS INC., Dept. EM, York Ave., Duryea, Pa. 18642, Tel: 717-457-7485, Telex: 831 823; FSC No.: 23-169-1403; Empl.: 500

Sales Manager: J. Nimmerfroh

Local Sales Offices & Reps.

Cal	Fullerton	714-871-0800

SCHRACK ELECTRICAL SALES CORP., Dept. EM, 1140 Broadway Rm 204, New York, N.Y. 10001, Tel: 212-683-0790; Empl.: 3 .... p. 3612

Local Sales Offices & Reps.

Cal	Encino, R.S. Hopkins Co.	213-788-5501
Cal	Palo Alto, Alpha-Tech Assoc.	415-494-8717
Colo	Denver, Nelson Co.	303-573-1516
Conn	Ellington Lane, Grady Assoc.	203-872-3504
Ill	Chicago, R.M. Krueger Co.	312-282-8444
Ill	Indianapolis, Loomis Assoc.	317-299-5644
Kans	Overland Park, Ensco-Rep.	913-381-7557
Md	Towson, Kraft Elctrns.	301-828-5838
Mass	Lynnfield, Grady & Assoc.	617-334-6633
Minn	Minneapolis, Wendell E. Lee & Assoc.	612-926-1523
Mo	St. Louis, Ensco-Rep.	314-567-3935
NJ	S. Plainfield, S. Glassman Assocs.	201-561-3866
NY	Glen Cove, S. Glassman Assocs.	516-676-1039
NY	Rochester, Irondequoit Ind.	716-544-6257
Ohio	Cleveland, KRW Sls.	216-741-4711
Ohio	Dayton, KRW Sls.	513-885-3330
Ore	Portland, Pacific Elec. Sls.	503-235-3456
Pa	Ardmore, R.D. Freedman Assocs.	215-649-3679
Pa	Pittsburgh, KRW Sls.	412-243-2284
Tex	Houston, Spectra Sls. Corp.	713-524-7800
Tex	Richardson, Spectra Sls. Corp.	214-234-3600

SCHWEITZER, DIV., Kimberly Clark Corp., Dept. EM, Lee, Mass. 01238, Tel: 413-243-1000, TWX: 413-243-2121; Empl.: 750

™SCIENCE FAIR - training kits - Allied Electronics

SCIENTIFIC-ATLANTA, INC., New Jersey Div., Dept. EM, Randolph Park W., Rte 10, Randolph Township, N.J. 07801, Tel: 201-361-3100, TWX: 710-987-7946

Sales Manager: R.A. Struble

Local Sales Offices & Reps.

Cal	Long Beach	213-428-7515
Cal	San Jose	408-286-9152
Ga	Atlanta	404-449-2452
Md	Crofton	301-261-3233
Mass	Burlington	617-272-1256
Tex	Dallas	214-357-1855

SCIENTIFIC COLUMBUS, Dept. EM, 1035 W. 3rd Ave., Columbus, Ohio 43212, Tel: 614-294-5671, Telex: 24-5426; Empl.: 75

Local Sales Offices & Reps.

Ala	Birmingham, Spader & Assocs.	205-879-1366
Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Glendale, R.A. Young & Co.	213-242-2171
Colo	Denver, Cliff Beabout Co., Inc.	303-831-7259
DC	Fairfax, Va., Hildenbrand Co.	703-280-2330
Fla	Orlando, RJC Assocs.	305-894-7371
Ga	Decatur, Spader & Assocs.	404-296-3024
Haw	Honolulu, Berkley Engrg. & Equip. Co.	808-538-1921
Ill	Park Forest, J.M. Livingston	312-481-9700
Ind	Indianapolis, C.D. Arnold Co.	317-546-4053
Iowa	Cedar Rapids, H.E. Ferris Co.	319-362-9156
Iowa	Des Moines, H.E. Ferris Co.	515-255-5008
La	New Orleans, Mid-South Sls. Co.	504-822-3030
Mass	Needham Heights, Danek Assocs.	617-444-8838
Mich	Marquette, NWR Elctrns. Corp.	906-226-7578
Mich	Troy, G.R. Peter Assocs.	313-362-1220
Minn	Edina, NWR Elctrns. Corp.	612-831-6240
Minn	Virginia, NWR Elctrns. Corp.	218-741-5080
Mo	Crestwood, Carlton Co.	314-961-0700
Mo	Kansas City, Carlton Co.	816-363-5300
NM	Albuquerque, BFA Corp.	505-296-8303
NM	Las Cruces, BFA Corp. of Arizona	505-523-0601
NY	Buffalo, Robert F. Lamb Co.	716-874-4900
NY	Lynbrook, R.A. Keeler	212-895-6890
NY	Rochester, Robert F. Lamb Co.	716-544-5580
NY	Schenectady, R. F. Lamb Co.	518-393-4844
NY	Syracuse, Robert F. Lamb Co.	315-454-2469
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
NC	Raleigh, R.W. Chapman & Co.	919-782-2624
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Cleveland, M.A. Blankenburg & Co.	216-251-7010
Ore	Portland, McLaren Inc.	503-297-2248
Pa	Allentown, Bradley Corp.	215-432-7733
Pa	Broomall, Bradley Corp.	215-544-8800
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
SC	W. Columbia, R.W. Chapman & Co.	803-796-9796
Tenn	Knoxville, R.W. Chapman	615-966-6120
Tenn	Memphis, R. M. Archibald Co.	901-685-1722
Tex	Dallas, McCoy Assocs.	214-350-9931
Tex	Houston, E. Smith Sls. Co.	713-649-5756
Utah	Salt Lake City, Instrumentation Sls.	801-943-1881
Wash	Bellevue, McLaren, Inc.	206-454-3400
Wisc	Milwaukee, T.R. Bickler Assocs.	414-453-3772
Exp:	Cal., San Francisco, Wrathall & Krusi	415-397-3593

SCIENTIFIC COMMUNICATIONS, Dept. EM, 3425 Kingsley, Garland, Tex. 75041, Tel: 214-271-3685, TWX: 910-860-5172; Empl.: 65 ......p. 2994,3057,3058

Sales Manager: T. Humphries

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	Los Altos, Stout-Loeswick	415-948-3265
DC	Washington, R. May - Scientific Comms.	301-887-7387
Fla	Ft. Lauderdale, Snow Co.	305-563-2448
Ga	Atlanta, MacKay, Smith & Assocs.	404-449-7444
Ill	Elk Grove Village, Midwest Meridian Corp.	312-437-6531
Iowa	Cedar Rapids, Midwest Meridian Corp.	319-365-6561
Mass	Needham Heights, O'Sullivan & Murphy/ Reptron	617-449-4141
Mo	Maryland Heights, Midwest Meridian	314-878-4441
NY	Greenvale, Bertran D. Aaron & Co.	516-621-0630
NY	Utica, B.D. Hummel & Co.	315-736-7821
Ohio	Dayton, Berberich & Assocs.	513-433-0342
Pa	Philadelphia, Tom Wright & Assocs.	215-676-5432
Va	Alexandria, Vanguard Engrg.	703-768-1660
Va	Arlington, Ray May	703-841-0807
Exp:	Md., Rockville, R. F. Int'l.	301-340-1175

SCIENTIFIC DEVICES-SOUTHEAST, INC., Dept. EM, 806 26th St., Orland, Fla. 32805, Tel: 305-841-8180

SCIENTIFIC EDUCATIONAL PRODS., SEP Instrs. Div., Dept. EM, Box 1686, FDR Sta., N.Y., N.Y. 10022, Tel: 212-867-9480

SCIENTIFIC LEASING SERVICES, INC., Dept. EM, 330 Great Neck Rd., Great Neck, N.Y. 11021, Tel: 516-487-7800; Empl.: 7

Local Sales Offices & Reps.

Kans	Leewood, Leemark Engrs.	

SCIENTIFIC MEASUREMENTS, Dept. EM, 1319 Dobson, Evanston, Ill. 60202, Tel: 312-864-9295

SCIENTIFIC MICRO SYS., Dept. EM, 520 Clyde St., Mountain View, Cal. 94043, Tel: 415-964-5700, TWX: 910-379-6577; Empl.: 80

Local Sales Offices & Reps.

Cal	Mountain View	415-964-5700
Ill	Chicago	312-298-0388
Mass	Boston	617-246-2540

SCIENTIFIC RESEARCH CORP., Sub. TRAK Microwave Corp., Dept. EM, 4726E Eisenhower Blvd., Tampa, Fla. 33614, Tel: 813-884-1411, Telex: 52827; FSC No.: 32533; Empl.: 30

Sales Manager: T.L. Roberts

Local Sales Offices & Reps.

Cal	Cupertino,, Weil & Disman Assocs.	408-446-0746
Cal	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
Colo	Denver, Omega Ltd.	303-758-1508
Fla	, Cole-Tek Assocs.	305-781-8110
Ind	Ft. Wayne, Texas Sls.	219-489-4447
Iowa	Cedar Rapids, J.R. Sls. Engrg.	319-393-2232
Mass	Andover, Bawer-Bee Assoc.	617-475-2124
Mo	Hazelwood, Dy-Tronix, Inc.	314-731-5799
NY	Liverpool, R&D Assocs.	315-622-2350
NY	Tuckahoe, ASCO Elctrns., Inc.	914-779-8110
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Cain & Co.	214-233-6809
Utah	Salt Lake City, Monarch Distributing & Representing Co.	801-226-9617
Va	Woodbridge, M. Lader Co.	703-494-3321
Wash	Seattle, Datacom Assocs.	206-285-2525
Exp:	Conn., Stamford, Dage Corp.	203-324-3123

SCIENTIFIC TECHNOLOGY, Dept. EM, 1201 San Antonio Rd., Mountain View, Cal. 94043, Tel: 415-965-0910, Telex: 34-5506; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Technical Sls.	205-881-1750
Cal	Mountain View, L. Palmer	415-965-0910
Md	Rockville, L.G. White	301-770-6556
Mass	Newton Center, Daner-Hayes	617-969-4650
Mich	Royal Oak, R. H. Jackson Co.	313-544-8870
Mich	Saginaw, Von Berg & Assocs.	517-799-0873
Ohio	Cincinnati, H.C. Jahn	513-521-0172
Ohio	Cleveland, Thorrat & Hanmer	216-333-5950
Pa	Ingomar, Greye Glass Assocs.	412-366-6664
Tex	Dallas, D. Shuhart Co.	214-239-0185
Wisc	Hales Corners, Automation Prods.	414-425-2250

Local Distributors

Cal	Oakland, Western Electro Mechanical Co.	415-452-1936
Cal	San Diego, J. C. Henberger Co.	714-292-5772
Cal	San Francisco, Argo International	415-989-2100
Cal	Sherman Oaks, H. Gee Assocs.	213-788-5961
Conn	Wolcott, Technical Mgrs. Co.	203-879-0941
Ga	Atlanta, R. E. Wilson Co.	404-876-8833
Ill	Chicago, Excel Electric Svc. Co.	312-847-7220
Mich	Royal Oak, R. H. Jackson Co.	313-544-8870
NY	Buffalo, Kaylor Industrial Prods.	716-675-2400
NY	Short Hills, W. J. Fraind Assocs.	
Ohio	Cincinnati, Richard Equip. Co.	513-271-8666
Tex	Dallas, D. Shuhart Co.	214-239-0185
Wisc	Milwaukee, Milchap Prods.	414-321-3111
For:	Can., Kitchener, Ont., Westburne Industrial Entprs.	519-742-1711
For:	Can., Lasalle, Quebec, Electrodesign Ltd.	614-748-2392
For:	Can., N. Vancouver, B.C., Southwell Controls, Ltd.	604-980-3688

SCIENTIFICO SCIENTIFIC COMPONENTS CO., Dept. EM, 350 Vista Baya, Newport Beach, Cal. 92660, Tel: 714-642-2543; Empl.: 5

SCIENTRONICS, Dept. EM, 25 Clark Dr., Barrington, N.J. 08007, Tel: 609-546-5792; Empl.: 23

™**SCINTISCAN** - whole body scan accessory to pho/gamma scintillation camera - Searle Analytic Inc. & Searle Radiographics Inc.

™**SCOPE--MOBILE** - cart, oscilloscope, wheeled - Tektronix, Inc.

™**SCOTCH** - electrical insulating tapes - 3M Co.

™**SCOTCHCAST** - electrical insulating resins - 3M Co.

™**SCOTCHFLEX** - cable/connector system - 3M Company

™**SCOTCH, HIGHLANDER** - for magnetic tapes, cassettes & 8-track cartridges - Magnetic Audio/Video Products :Div.

™**SCOTCHTITE** - tubings - 3M Co.

SCOTTY ELECTRONICS, Dept. EM, Line St., Archbald, Pa. 18403

SCOTT ELECTRONICS, NCR, Dept. EM, 1875 Maywood Rd., Winter Park, Fla. 32792, Tel: 305-323-9280

SCOTT ELECTRONICS CORP., see NCR Power Systems Div.

™**SCREW LAUNCHER** - screw holding drivers - Vaco Products Co.

™**SCR-RATED** - PM DC motors - Indiana Gen'l. Div.

SCURRY ASSOCS. TOM, Dept. EM, 4599 N. Broadway, Boulder, Colo. 80302, Tel: 303-444-4802

Sales Manager: T. Scurry

™**S-D77** - programmable controllers - Struthers-Dunn, Inc.

SEACOR, INC., Dept. EM, 598 Broadway, Norwood, N.J. 07648, Tel: 201-768-6070, Telex: 135-354; Empl.: 20

Local Sales Offices & Reps.

Ala	Huntsville, BJR	205-881-3569
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Santa Clara, Roger Assocs.	408-984-8110
Colo	Denver, Williams Assocs.	303-343-2911
Conn	Madison, A & M Elctrn. Reps	203-421-4242
Conn	North Haven, Comp Rep Assocs.	203-239-9762
Fla	Ft. Lauderdale, B. Baker Assocs.	305-484-6500
Ill	Skokie, Mar-Con	312-675-6450
Kans	Shawnee Mission, TSA Tech. Sls.	913-831-2888
Mass	Needham, A & M Elctrn. Reps	617-444-8170
Mass	Needham, Comp Rep Assocs.	617-444-2484
Mich	Grosse Pointe Park, Greiner Assocs.	313-499-0188
Minn	Mpls., Heimann Co.	612-861-6051
NJ	Nutley, Falk-Baker	201-661-2430
NY	East Rockaway, W. Bellenkes Assocs.	516-887-1443
NY	Rochester, E. J. Schomburg Co.	716-244-0920
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242
Pa	Ardmore, R.D. Freedman Assocs.	215-649-3679
Tex	Addison, Southland Comps	214-233-0603
Va	Lynchburg, G. White Assocs.	804-846-4624
Wash	Tukwila, General Elctrns.	206-243-5141

SEAL-PEEL, INC., Dept. EM, Box 250, Troy, Mich. 48084, Tel: 313-588-1055; Empl.: 10

Local Sales Offices & Reps.

Cal	San Gabriel, Seal-Peel	213-284-9330
Conn	Farmington, R.M. Jones & Co.	203-677-2654
Ohio	Cleveland, Reserve Ind. Supply	216-381-4746
Okla	Tulsa, Marsoco	918-LU4-5273
Tex	Fort Worth, O.H. Van Horn Co.	817-335-4484

™**SEALCOR** - aluminum rod - Chemetron Corp.

™**SEALDBIN, SEALDTANK, SEALDRUM** - containers, storage - Uniroyal, Inc.

™SEALECTROBOARD - cordless program board - Sealectro Corp.

™SEALECTROCARD - static card readers - Sealectro Corp.

SEALECTRO CORP., Dept. EM, 225 Hoyt St., Mamaroneck, N.Y. 10543, Tel: 914-698-5600, TWX: 710-566-1110; Empl.: 1100 .... p. 1683,2143

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Mt. View, Sealectro West	415-965-1212
Cal	Sherman Oaks, Sealectro West	213-990-8131
Colo	Englewood, Inverness Marketing Inc.	303-770-2300
Conn	Andover, Sls. Engrg. Co.	617-470-0800
Conn	Southbury, J.J. Wild Co.	203-264-9494
Fla	Orlando, OEM Marketing Corp.	305-299-1000
Ill	Arlington Heights, Diethert-Angel, Inc.	312-593-7600
Iowa	Des Moines, Beams	515-255-1148
Kans	Shawnee Mission, Beams	913-631-0300
Md	Rockville, Mechtronics Sls., Inc.	301-340-2130
Mass	Needham, J.J. Wild Co.	617-444-2366
Mo	Creve Cover, Beams	314-569-1080
NJ	Paramus, J.J. Wild Co.	201-265-5450
NY	Jericho, J.J. Wild Co.	516-935-6600
NY	Mt. Vernon, Friedman-Smith Co.	914-664-4866
NY	Syracuse, I.A. Hotze Assoc.	315-479-6641
NC	Burlington, P.J. Nahser Co.	919-226-8053
Ohio	Columbus, McFadden Sls. Co.	614-221-3363
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Narberth, S.A. Jeffries Co.	215-664-8500
Pa	Southampton, J.J. Wild Co.	215-357-6645
Pa	Willow Grove, BGR Assocs	215-643-4111
Tex	Dallas, Allied Comps., Inc.	214-238-0408
Wash	Bellevue, N.R. Schultz Co.	206-454-0300

Local Distributors

Ala	Huntsville, Powell Elctrns.	205-539-2731
Ariz	Phoenix, R.V. Weatherford Co.	602-272-7144
Cal	Gardena, Bell Inds.	213-321-5802
Cal	Glendale, R.V. Weatherford Co.	213-849-3451
Cal	Mr. View, Powell Elctrns.	415-964-0820
Cal	Mt. View, Elmar Elctrns.	415-961-3611
Cal	Mt. View, Waltronic Sls.	415-964-4131
Cal	Palo Alto, R.V. Weatherford Co.	415-321-5373
Colo	Denver, Cramer Elctrns.	303-758-2100
Colo	Denver, Elctrn. Parts Co.	303-744-1992
Conn	N. Haven, Cramer Elctrns	203-239-5641
Fla	Hollywood, Cramer Elctrns.	305-923-8181
Fla	Miami Springs, Powell Elctrns.	305-592-3260
Ill	Mt. Prospect, Cramer Elctrns.	312-593-8230
Ind	Indianapolis, Graham Elctrn.	317-634-8486
Ind	South Bend, Radio Distr.	219-287-2911
Iowa	Cedar Rapids, Deeco Inc.	319-365-7551
Kans	Wichita, Radio Supp. Co.	316-267-5214
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Beltsville, Powell Elctrn.	301-937-4030
Md	Gaithersburg, Pioneer Elctrns.	301-948-0710
Mass	Burlington, Milgray Elctrns.	617-272-6800
Mass	Newton Center, Cramer Elctrns.	617-969-7700
Mass	Woburn, Arrow Elctrns.	617-273-0100
Minn	Minneapolis, Ind. Comps.	612-831-2666
Mo	St. Louis, L-Comp.	314-647-5505
NJ	Mooretown, Arrow Elctrns.	609-235-1900
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800
NJ	Springfield, Federated Elctrns.	201-376-8900
NM	Albuquerque, Cramer Elctrns.	505-265-5767
NY	Bohemia, Car-Lac Elect. Ind'l. Sls.	516-567-4200
NY	Buffalo, Summit Distrs.	800-462-1880
NY	E. Syracuse, Cramer Elctrns.	315-437-6671
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Rampart	516-273-1111
NY	Rochester, Summit Distrs.	800-462-1880
NY	Rochester, Cramer Elctrns.	716-275-0300
NC	Greensboro, Pioneer Elctrns.	919-273-4441
NC	Winston-Salem, Kirkman Elctrn.	919-722-9131
Ohio	Cincinnati, Cramer	513-771-6441
Ohio	Cleveland, Cramer Elctrns.	216-248-8400
Ohio	Solon, Radio & Elctrn. Parts	216-248-8900
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Tex	Dallas, Tex Instr. Supp.	214-238-6821
Tex	Dallas, Wholesale Elctrn.	214-824-3001
Wash	Seattle, R.V. Weatherford	206-243-6340
For:	Can., Calagary, Ont., L. A. Varah Ltd.	403-276-8818
For:	Can., Downsview, Ont., Cramer Can. Ltd.	416-661-9222
For:	Can., Malton, Ont., Prelco Elctrns.	416-678-0401
For:	Can. Montreal, Que.	
For:	Can. Ottawa, Ont., Prelco Elctrns.	613-237-6150
For:	Can. Vancouver, B.C., L. A. Varah Ltd.	604-873-3211

™SEALECTROSWITCH - programming switches - Sealectro Corp.

SEALED AIR CORP., Dept. EM, 19-01 State Hwy. 208, Fair Lawn, N.J. 07410

™SEALFLEX - insulation - Electric Machinery Mfg. Co.

™SEALINK - sealed splice - Burndy Corporation

™SEALOCK - corrosion-resistant receptacles - General Elec. Company

™SEALOX - microcircuit packages, silicon - National Beryllia Corp.

™SEAL-PAC - transformer - General Elec. Co.

™SEAL-STOP - stop-off for electroplating - Seal-Peel, Inc.

™SEARCH & RESCUE - high-power portable searchlights - Teledyne Big Beam

SEARLE ANALYTIC INC. & SEARLE RADIOGRAPHICS INC., Dept. EM, 2000 Nuclear Dr., Des Plaines, Ill. 60018, Tel: 312-298-6600; Empl.: 700

™SEASPACE - oceanography apparatus - Exide Power Sys. Div.

SEASTROM MFG. CO. INC., Dept. EM, 701 Sonora Ave., Glendale, Cal. 91201, Tel: 213-245-9121, TWX: 910-497-2271; FSC No.: 86928; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Hecht Henschen & Assoc.	602-275-4411
Cal	San Diego, Hampton-Donley Co.	714-276-1934
Cal	San Jose, A. J. Mollica Co.	408-578-6221
Colo	Denver, Industrial Hardware Co.	303-426-1440
Fla	Sarasota, RF Carlson Co.	813-388-3086
Ga	Atlanta, Electro Mech Sls. Engrg.	404-393-0444
Ill	Hinsdale, Hill-Gray Assoc.	312-325-4810
Mich	Stockbridge, Erhart Engrg.	313-229-6958
Minn	Minneapolis, Giefer Sls. Co.	612-884-2395
NH	Spofford, Bahr Sls. Co	603-352-5444
NY	Lindenhurst, Long Island Mach'y Sls. Corp.	516-884-2100
NY	Syracuse, T Squared Elctrns.	315-463-8592
NC	Raleigh, Electro Mech. Sls.	919-782-6452
Pa	Narberth, Samuel A. Jeffries	215-664-8500
Tenn	Nashville, Electro Mech. Sls. Engrg.	615-883-1490
Tex	Dallas, Blair Engrg. Sls. Co.	214-352-2556
Wash	Seattle, F. W. Aurich & Co.	206-284-5561

™SECRE/DATA - data scrambler - Com/Tech Systems Inc.

™SECRE/FAX - facsimile scrambler - Com/Tech Systems Inc.

™SECRE/VOX - voice scrambler - Com/Tech Systems Inc.

™SECUR-A-TACH - plastic fastener - Dennison Mfg. Co.

™SECUR-A-TIE - cable tie - Dennison Mfg. Co.

™SECURE-COPY VIDEO CASSETTE - coded video on video cassette - Video Automation Systems Inc.

™SE-CUR-IT - wood glue - Ambroid Co.

SECURITY PLASTICS INC., Dept. EM, 14427 N.W. 60th Ave.,, Miami Lakes, Fla. 33014, Tel: 305-823-5440; Empl.: 350

Sales Manager: A. Gomez

Local Sales Offices & Reps.

Cal	Fullerton	714-992-5612
Ill	Elk Grove Village	312-593-1910
Ohio	Dayton	513-236-3584

SECURITEX , Dept. EM, 831 W. 39th St., Kansas City, Mo 64111

™SE/DUROID - Resin bonded fibrous material - Rogers Corp.

™SEED - shield effectiveness evaluation device - Belden Corp.

™SEE-FLO - flowmeters - Erdco Engrg. Corp.

™SEELBOLTS - self-sealing bolts - APM-Hexseal

™SEELRIVITS - self sealing rivits - APM-Hexseal

™SEELSKREWS - self sealings screws - APM-Hexseal

™SE EYELETS - eyelets - USM Corp.

SEG SUBSIDIARY, Comstron Seg, Dept. EM, 200 E. Sunrise Hwy, Freeport, N.Y. 11520, Tel: 516-546-9700, TWX: 510-225-3699; Empl.: 50

Sales Manager: F. Greenhalgh

Local Sales Offices & Reps.

Ala	Madison, Saber Assocs.	800-327-1181
Ariz	Scottsdale, Meas. Conslts.	602-994-9519
Cal	Inglewood, L & M Engrg.	213-674-6850
Cal	Mountain View, CSS Telecommunications Specialists, Inc.	415-964-4335
Cal	San Jose, L & M Engrg.	408-292-3220
Colo	Boulder, Meas. Consits.	303-449-5294
Conn	Hamden, Instrument Consultants	203-288-5246
Conn	Hamden, J & J Assocs.	203-624-7800
Fla	Lighthouse Point, Saber Assocs.	800-432-3007
Fla	Longwood A, Saber Assocs.	800-432-3007
Fla	St. Petersburg, Saber Assocs.	800-432-3007
Kans	Shawnee Mission, EIR Co.	913-362-0919
Mass	Burlington, J & J Assocs.	617-272-2606
Mass	Waban, Instrument Consultants	617-969-9881
Mich	Detroit, Comtel-Instruments	313-255-1970
Mo	Hazelwood, EIR Co.	314-895-4100
NM	Las Cruces, Meas. Consits.	505-526-2491
NY	Plainview, Eastern Metro Assocs.	516-WE1-1414
NY	Skaneateles, Robtron Inc.	315-685-5731
NC	Raleigh, Saber Assoc.	800-327-1181
Ohio	Dayton, Comtel-Instruments	513-298-7573
Pa	Philadelphia, M. Lader & Co.	215-825-3177
Pa	Pittsburgh, Cpmtel-Instruments	412-922-5720
Tex	Houston, Scientific Devices Gulf Coast	713-868-5575
Tex	Richardson, Scientific Devices S.W.	214-231-8106
Tex	San Antonio, Scientific Devices S.W.	512-736-3164
Utah	Murray, Meas. Consits.	801-268-3181
Wash	Bellevue, Kevin Hall Assocs.	206-455-5526

SELF-ORGANIZING SYS., see Cosar Corp.

™SEICO - surface temperature sensors - Syscon Int'l., Inc.

™SELECTAKRIMP - crimping tool - ITT Cannon/ETC Terminal Products

™SELECTASHAFT - rotary switches - Centralab

™SELECT-A-SHELF - vertical handling & storage sys. - LEWISystems

™SELECTION - specific ion electrodes - Beckman Instrs., (AISSD)

™SELECTOFRAME - lead frame - Plessey Inc.

™SELECTROL - float operated control - Autocon Inds., Inc.

™SELECTRONIC - data terminal - Anderson Jacobson

™SELECT-TALK - Telephones - Fanon/Courier Corp., Subs.

™SELF-LOC-K - removable, crimp contacts - AirBorn, Inc.

™SELF-ORGANIZING - resistivity testers - COSAR Corp.

™SELF-SCAN - panel display - Burroughs Corp.

™SELISTOR - arc suppressor - Eastern Delta Corp.

™SELLECTRIC - wiring devices - Leviton Mfg. Co., Inc.

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(TM)SEL-MASQ - semi-automatic selective strip electroplating machine - Sel-Rex Div. Oxy Metal Industries Corp.

SEL-REX DIV. OXY METAL INDUSTRIES CORP., Dept. EM, 75 River Rd., Nutley, N.J. 07110, Tel: 201-667-5200, TWX: 710-989-1423; Empl.: 250

Local Sales Offices & Reps.

Cal Buena Park, Oxy Metal Inds. Corp. 213-921-0891
Cal Burlingame, Oxy Metal Inds. Corp. 415-697-7123
Cal Chatsworth, Sel-Rex Div. 213-882-9444
Ga Atlanta, Oxy Metal Inds. Corp. 404-458-9101
Ill Chicago, Oxy Metal Inds. Corp. 312-889-2853
Ill Elmhurst, Oxy Metal Inds. Corp. 312-832-9450
Mich Grand Rapids, Oxy Metal Industries 616-459-6214
Mich Madison Heights, Parker Div. 313-583-9300
Mich Warren, Oxy Metal Inds. Corp. 313-497-9100
Mo St. Louis, Oxy Metal Inds. Corp. 314-997-4430
NJ Mt. Laurel, Oxy Metal Inds. Corp. 609-234-2331
NJ Nutley, Sel-Rex Div. 201-667-5200
Ohio Cincinnati, Oxy Metal Inds. Corp. 513-793-6690
Ohio Cleveland, Oxy Metal Inds. Corp. 216-267-2320
Ore Portland, Oxy Metal Inds. Corp. 503-288-5134
RI Warwick, Sel-Rex Div. 401-781-0700

(TM)SEMBO - dispenser cathodes - Semicon Assoc., Inc.

(TM)SEMIAC - semiconductor variac - Alpha Components Corp.

SEMICOA, INC., Dept. EM, 333 McCormick Ave., Costa Mesa, Cal. 92626, Tel: 714-979-1900, TWX: 678-315 910-595-1961; FSC No.: 34156; Empl.: 65

Sales Manager: R.L. Boughan

Local Sales Offices & Reps.

Ariz Tempe, Delta Elect Sls. 602-838-5087
Cal Los Angeles, Westaironics 213-821-7958
Cal Redwood City, Logan Sls. 415-369-3726
Cal San Diego, Fetty/Schoenduve 714-292-5136
Colo Denver, M. Duffy Assocs. 303-934-7392
DC Wash., H. Wise 202-363-9417
Fla Ft. Lauderdale, Reynolds 305-581-6611
Fla Sattelite Bch., Reynolds 305-773-4700
Fla St. Petersburg, Reynolds 813-360-1484
Ill Park Ridge, Metcom Assoc. 312-696-1490
Ind Carmel, Rich Elect. Mktg. 317-844-8462
Mass Burlington, Contact Sls., Inc. 617-273-1520
Minn Minneapolis, Furber Sls. Co. 612-881-3620
Mo Blue Springs, Chesco 816-229-1404
Mo St. Charles, Chesco 314-946-6677
NJ Teaneck, S. Axelrod Assoc. 201-871-0600
Ohio Dayton, Del Steffen & Assocs. 216-461-8333
Tex Dallas, Cunningham Co 214-233-4303
Tex Houston, Cunningham Co. 713-461-4197
Wash Seattle, R & R Assocs. 206-762-7664
Exp: Can., Que., RPS Elctrns. 514-331-3377

SEMICON ASSOC., INC., Dept. EM, Box 832, Lexington, Ky. 40501, Tel: 606-255-2446; Empl.: 45

SEMICON INC., Dept. EM, 10 North Ave., Burlington, Mass. 01803, Tel: 617-272-9015, TWX: 710-332-1919; Empl.: 300

Local Sales Offices & Reps.

Ala Huntsville, W.A. Brown Components Inc. 205-539-4111
Ariz Tempe, Delta Elec. Sls. Corp. 602-839-0917
Cal Los Angeles, Electronic Components Mkt. 213-649-5374
Fla Margate, W.A. Brown Components Inc. 305-753-1650.
Fla Orlando, W.A. Brown Components Inc. 305-425-5863
Ga Chamblee, W.A. Brown Components Inc. 404-455-0405
Ill Chicago, Fiat Engrg. Assocs., Inc. 312-547-6200
Kans Olalhe, B. Rush Assocs. 913-764-2700
Md Baltimore, B. White & Co. 301-484-5400
Mass Lexington, Circuit Sls. Co. 617-861-0567
Mich Gross Point Park, S. Greiner Assocs. 313-499-0188
Minn St. Paul, Ragon Inc. (R.G.) 612-488-0201
NJ Burlington, Semicon
NY Camillus, Tri-Tech 315-446-2881
NY Larchmont, Hingston-Walsh Assocs., Inc. 914-834-5781
NC Raleigh, W.A. Brown Components Inc. 919-781-9426
Ohio Dayton, The Whelan Corp. 513-434-7551
Pa Cherry Hill, Danco Corp. 609-424-5590
Tex Dallas, ION Assoc. Inc. 214-357-9441
Tex Houston, ION Assoc. Inc. 713-461-5311
Exp: New York City, N.Y., C. Tennant Sons & Co. 212-679-1300

SEMICONDUCTOR CIRCUITS, INC.
POWER SOURCES DIVISION

SEMICONDUCTOR CIRCUITS, INC., Dept. EM, 306 River St., Haverhill, Mass. 01830, Tel: 617-373-9104, TWX: 710-347-0269; Empl.: 210 p. 3312-3319

Sales Manager: T. Brewster, Prod. Mgr.

Local Sales Offices & Reps.

Ala Huntsville, Scientific Devices-Southeast 205-536-1969
Ariz Mesa, Nakoma 602-834-6549
Cal Norwalk, Bertrand & Zoolalian 213-921-9791
Cal Sunnyvale, Lee/Allan Assocs. 408-732-2030
Colo Englewood, Klein Aerospace 303-781-4967
Conn Guilford, R.H. Sturdy Co. 203-453-5424
Fla Orlando, Scientific Devices-Southeast 305-841-8180
Fla Palm Bay, Scientific Devices-Southeast 305-723-1800
Ill Elmhurst, Scott Assocs. 312-279-5681
Mass Wellesley Hills, R.H. Sturdy Co. 617-235-2330
Mich Farmington Hills, H. Lowell Co. 313-851-7474
Minn Minneapolis, Scott Electronic Sls. 612-929-2985
Mo St. Louis, Ozark Electronic Mktg. 314-423-7200
NJ Fort Lee, Tecnimat 201-461-8686
NM Albuquerque, BFA Corp. 505-292-1212
NM Las Cruces, BFA Corp. 505-523-0601
NY Clark Mills, KLM Assocs. 315-853-6126
NY North Syracuse, KLM Assocs. 315-458-2199
NY Rochester, KLM Assocs. 716-422-0820
NC Raleigh, Scientific Devices-Southeast 919-872-7066
Ohio Cleveland, Geotronix Mktg. Assoc. 216-526-2535
Ohio Columbus, Geotronix Mktg. Assoc. 614-457-8472
Pa King of Prussia, Rivco 215-265-5211
Pa Rochester, Geotronix 412-266-4819
Tex Dallas, Ralph Matthews Elctrns. 214-233-0363
Tex Houston, Ralph Matthews Elctrns. 713-664-7131
Utah Salt Lake City, BFA Corp. 801-466-6522
Va Fairfax, Nine Assocs. 703-273-1803
Wash Bellevue, Olson, Ferree & Assocs. 206-454-1210

SEMICONDUCTOR PROCESSING CO., Dept. EM, 10 Industrial Park Rd, Hingham, Mass. 02043, Tel: 617-749-3140

Sales Manager: S. Mayburg

Local Sales Offices & Reps.

NY Plainview, Erde Assocs. 516-822-5637

SEMICONDUCTOR SPECIALISTS, Dept. EM, 195 W. Spangler, Elmhurst, Ill. 60126

SEMICONDUCTOR TECHNOLOGY, INC., Dept. EM, 124-14 22nd Ave., College Point, N.Y. 11356, Tel: 212-445-4466, TWX: 710-582-2571; Empl.: 45

Local Sales Offices & Reps.

Ariz Scottsdale, Verein Corp. 601-948-3606
Cal Mountainview, Leddy Assocs. 415-969-6313
Conn New Haven, Datcom 203-288-7005
Ill Chicago, Rinaldi 312-763-4848
Md Ellicott City, Mktg. Tech. 301-465-8630
Mass Waltham, Datcom 617-891-4600
Mich Detroit, A. Blumenberg Assoc. 313-557-1934
Minn Minneapolis, Charles Bohlig Assoc. 612-922-7011
NY Great Neck, Cooper Simon & Co. 516-487-1142
Ohio Dayton, John Cleary Sls. 513-276-3974
Ohio Fairview Park, Norm Case Assocs. 216-333-4120
Ore Portland, Components West 503-643-5588
Pa Narbeth, Electro Comp Sls. 215-664-3576
Tex Addison, Southland Comp.s 214-233-0603
Wash Seattle, Components West 206-243-2133
Wisc Milwaukee, Grubb Co. 414-545-7810

Local Distributors

Cal Sepulveda, Milgray Elctrns. 213-894-4011
Fla Orlando, Milgray Elctrns. 305-647-5747
Kans Overland Park, Milgray Elctrns. 913-236-8800
Md Hyattsville, Milgray Elctrns. 301-864-1111
Mass Burlington, Milgray Elctrns. 617-272-6800
NJ Cherry Hill, Milgray Elctrns. 609-424-1300
NY Freeport, Milgray Elctrns. 516-546-6000
Ohio Cleveland, Milgray Elctrns. 216-881-8800

(TM)SEMI/DYNE - traveling wabe tube amplifiers - LogiMetrics Inc.

(TM)SEMINAR PROGRAM - basic, digital & microprocessor courses - E & L Instruments, Inc.

SEMITRONICS CORP., Dept. EM, 64 Commercial St., Freeport, NY 11520, Tel: 516-623-9400, TWX: 510-225-7509; FSC No.: 31338; Empl.: 30

Local Sales Offices & Reps.

Mass Wakefield, Semtex Industrial Corp. 617-245-9050
NY Port Washington, R.E. Brever Co. 516-883-7810
Pa Philadelphia, D. Linz 215-379-0734

(TM)SEMITUNG - tungsten powder - Semicon Assoc., Inc.

(TM)SEMPAC - molded silicon rectifier - Semtech Corp.

SEMTECH CORP., Dept. EM, 652 Mitchell Rd., Newbury Park, Cal. 91320, Tel: 213-628-5392, TWX: 910-336-1264; FSC No.: 14099; Empl.: 598 p. 1298,1299,3888-3917

Local Sales Offices & Reps.

Ariz Scottsdale, Sls. Engr., Inc. 602-994-3230
Cal Newbury Park, Semtech, Western Regional Sls. Off. 213-628-5392
Cal Palo Alto, Semtech Northwestern Sls. Off. 415-494-3113
Cal San Diego, F. Nagel Co. 714-298-4850
Colo Denver, Electrodyne 303-467-7067
Fla Winter Park, Semtech Southeastern Dist. Sls. Off. 305-644-5404
Ill La Grange, Semtech Central Regional Sls. Off. 312-352-3227
Md Beltsville, Semtech Mideastern Dist. Sls Off. 301-937-0070
Mass Needham, Stone Comp. Sls.
Mass Weston, Ebbco, Inc. 617-891-8670
Minn Bloomington, Elctrn. Sls. Agcy. 612-884-8291
NJ Clifton, Compar NY 201-546-3660
NJ Springfield, Semtech Eastern Regional Sls. Off. 301-654-4884
NM Albuquerque, Rustco Entprs. 505-296-6474
Ohio Cincinnati, Scott Elctrns. 513-791-2513
Ohio Cleveland, Scott Elctrns. 216-291-2600
Ohio Columbus, Scott Elctrns. 614-236-8619
Ohio Dayton, Scott Elctrns. 513-294-0539
Ore Portland, Western Techn. Sls. 503-297-1711
Pa Pittsburgh, Scott Elctrns. 412-781-3112
Tex Dallas, Semtech Central District Sls Off. 214-234-6523
Utah Salt Lake City, Electrodyne 801-467-7067
Wash Bellevue, Western Tech. Sls. 206-641-3900
Wash Bellevue, Ray Over Sls. 206-454-4551
Wash Vancouver, Ray Over Sls. 206-695-6197

Local Distributors

Ala Huntsville, Powell Elctrns. 800-633-2911
Cal Chatsworth, Westates Elctrns. Corp. 213-341-4411
Cal Costa Mesa, Westates Elctrns. Corp. 714-549-8401
Cal Mountain View, Powell Elctrns. 415-964-0820
Cal Riverside, Elctrn. Supply Co. 714-683-8110
Cal San Diego, Westates Electronics Corp. 714-292-5693
Cal Sunnyvale, Diplomat/Westland Elctrns. 408-734-1900
Cal Sunnyvale, Westates Electronics Corp. 408-733-8383
Fla Clearwater, Diplomat/Southland Elec. 813-443-4514
Fla Miami Springs, Powell Elctrns. 800-432-9701
Md Beltsville, Powell Elctrns. 301-937-4030
Md Bethesda, Empire Elctrns. 301-656-3300
Minn Minneapolis, Stark Elctrns. 612-332-1325
Mo St. Louis, Olive Electronics Inc. 314-863-7800
NY Woodbury, Diplomat/Elctrns. 516-921-9373
Ohio Cincinnati, H. Peters 513-381-7625
Ohio Cleveland, W. M. Pattison Supply Co. 216-441-3000
Ohio Columbus, Hughes Peters 614-294-5351
SC Greenville, Hammond 803-233-4121
SC Greenville, Black Electrical Supply
SC Greenville, S/S Electronic Supply 803-244-2204
Tex Dallas, Solid State Elctrns. 214-352-2601
Tex Houston, Solid State Elctrns. 713-785-5436
Utah Salt Lake City, Standard Supply Co. 801-355-2971

Va	Charlottesville, Virginia Radio Supply Co.	804-296-4184
Wisc	Mequon, Taylor Electric Co.	414-241-4321

SENCORE, INC., Dept. EM, 3200 Sencore Dr., Sioux Falls, S.D. 57107, Tel: 605-339-0100, TWX: 910-660-0300; Empl.: 250

Local Sales Offices & Reps.

Ga	College Park	404-768-0606

SENNHEISER ELCTRN. CORP., Dept. EM, 10 W. 37th St., New York, N.Y. 10018, Tel: 212-239-0190; Empl.: 28

Local Sales Offices & Reps.

Ala	Birmingham, Paul Hayden Assoc.	205-853-0946
Cal	Los Angeles, Morris Tait Assocs.	213-877-4424
Cal	North Hollywood, Morris-Tait Assoc.	213-877-4424
Colo	Denver, J.A. Gedney Co.	303-572-1900
Conn	West Haven, Robert S. Reiss Assoc.	203-933-8542
Fla	Miami, Sochin Sls.	305-235-6048
Ga	East Point, Paul Hayden Assoc.	404-766-0261
Haw	Honolulu, Snider & Assoc.	808-941-2400
Ill	Chicago, CEM/S	312-384-1600
Ind	Indianapolis, Dewey Powers Sls., Inc.	317-846-0790
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
Md	Bethesda, Gene Rosen & Assoc.	301-530-8448
Mass	Framingham, Robert S. Reiss Assoc.	617-620-1171
Mich	Rochester, R.A. Albrecht & Co.	313-652-2520
Minn	Minneapolis, Clark R. Gibb Co.	612-377-1200
Mo	Kansas City, Forristal-Young Sls., Co.	816-358-6771
Neb	Omaha, Forristal-Young Sls., Co.	402-333-0800
NM	Albuquerque, J.A. Gedney Co.	505-293-0900
NY	Roslyn Heights, Sir Sls., Inc.	516-621-7485
NC	Greensboro, Paul Hayden Assoc.	919-288-6754
Ohio	Cleveland, Robert W. Peters Co.	215-261-2330
Ore	Portland, Harris Reps., NW	503-223-4929
Tex	Dallas, Bob Amos & Assoc.	214-823-7820

™SENSABLE - Heat Flow Gage - Hy-Cal Engineering

™SENSALL - level sensing systems - National Sonics

™SENSAR - TV antenna - Winegard Co.

™SENSCO - industrial radiation pyrometers - Electro-Optical Inds., Inc.

™SENSIFLEX - sensitive pressure switches and equip. for fluidics - Gagne Assocs., Inc.

™SENSIMATIC - accounting machine - Burroughs Corp.

™SENSIMETER - Readout system, temp. meas. - Hy-Cal Engineering

SENSITIVE RESEARCH INSTRS., Dept. EM, 25 Dock St., Mt. Vernon, N. Y. 10550, Tel: 914-699-9717; FSC No.: 32590; Empl.: 35

Local Sales Offices & Reps.

Ala	Huntsville, J. L. Highsmith & Co.	205-881-3294
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	Laguna Hills, English Sls. Assocs.	714-495-6489
Cal	Lawndale, English Sls. Assocs.	213-772-7272
Cal	San Diego, English Sls. Assocs.	714-462-4391
Colo	Denver, Williams Assocs.	303-373-4730
Conn	New Canaan, Measurement Consultants Corp.	203-966-4630
DC	Washington, Whitcomb Assocs.	202-737-0763
Fla	Orlando, J. L. Highsmith & Co.	305-293-5202
Ill	Skokie, Saffro & Assocs.	312-588-0905
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
Md	Baltimore, Whitcomb Assocs.	301-889-1245
Mass	Waltham, Measurement Consits. Corp.	617-890-4400
Mich	Detroit, Comtel Instrs. Co.	313-255-1970
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NM	Alburquerque, Williams Assocs.	505-255-1638
NY	Buffalo, R. F. Lamb Co.	716-874-4900
NY	Rochester, R. F. Lamb Co.	716-544-5580
NY	Schenectady, R.F. Lamb Co.	518-393-4844
NY	Syracuse, R. F. Lamb Co.	315-454-2469
NC	Charlotte, J. L. Highsmith & Co.	704-333-7743
Ohio	Cleveland, Comtel Instrs. Co.	216-442-8080
Ohio	Dayton, Comtel Instrs. Co.	513-298-7573
Okla	Norman, Data Mktg. Assocs., Inc.	405-364-8320
Pa	Jenkintown, AMT	215-LI9-2080
Pa	Pittsburgh, Comtel Instrs. Co.	412-922-5720
RI	Cumberland, Measurement Consultants Corp.	401-333-6000
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs., Inc.	214-661-0300
Tex	Houston, Data Mktg. Assocs., Inc.	713-780-2511
Tex	San Antonio, Data Mktg. Assoc.	512-828-0937
Va	Richmond, J. L. Highsmith & Co.	804-272-5888
Wash	Seattle, R. S. Drake Assocs., Inc.	206-763-2755
Wisc	Lake Mills, Saffro & Assocs.	414-648-2605

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VAW Volt Amp Wattmeters
100 KV NBS Design Park Divider

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Local Sales Offices & Reps.

Ariz	Mesa, Nakoma	602-834-6549
Cal	Encino, KCE Corp.	213-990-0511
Cal	San Diego, KCE Corp.	714-278-7640
Ga	Atlanta, PAR Assocs.	404-393-0018
Ill	Elmhurst, Scott Assocs.	312-279-5681
NJ	Oakland, Applies Process Instrs.	201-337-6163
Ohio	Chagrin Falls, RPM Ind'l. Sls.	216-247-3295
Ohio	Dayton, Mohawk Intronics	513-434-8873
Pa	Pittsburgh, Greye Glass Assocs.	412-366-6664

Local Distributors

Fla	Miami, ESL Elctrn. Distrs.	305-633-6973
Idaho	Idaho Falls, Electrical Contractors Supply Co.	
Idaho	Pocatello, Electrical Contractors Supply Co.	
Idaho	Twin Falls, Magic Valley Elec. Supply	
Ind	Evansville, Hutch & Son	812-425-7201
Ind	Indianapolis, Advent Elctrns.	317-297-4910
Ky	Louisville, E & H Elec. Supply Co.	502-587-0991
Ky	Paducah, E & H Elec. Supply Co.	502-442-2735

™SENSO LABELS - pressure-sensitive labels - Monarch Marking Sys.

™SENSOMATIC IMPRINTER/APPLICATOR - auto imprinter/applicator - Monarch Marking Sys.

SENSOR CORP., Dept. EM, Box 140, Scottdale, Pa. 15683, Tel: 412-887-4080; Empl.: 12

Local Sales Offices & Reps.

Conn	Durham, Marr Electric Co.	203-349-9691
Mich	Detroit, Owen Engrg.	313-538-5515
Mo	St. Louis, W. Adler	314-423-7200

SENSOR TECHNOLOGY, Dept. EM, 21012 Lassen St., Chatsworth, Cal. 91311, Tel: 213-882-4100, TWX: 910-494-4776; Empl.: 175

Local Sales Offices & Reps.

Cal	Redwood City, Logan Sales	415-369-6726
Colo	Englewood, Marshall Sls.	303-770-6224
Fla	Lighthouse Pt., Saber Assocs.	305-943-3076
Ill	Chicago, G. McL. Cole Co.	312-774-3535
Ind	Indianapolis, I Hrig. Assoc.	317-783-7630
Mass	Worcester, W. Porter Sls.	617-852-4396
Mich	Detroit, A. Blumenberg Assocs.	313-557-1934
Minn	Minneapolis, Siedare Assoc.	612-545-5663
Mo	St. Louis, B. Human & Assoc.	314-644-0970
NJ	Cherry Hill, Bi-Tech, Inc.	609-667-7374
NM	Albuquerque, The Thorson Co.	505-265-5655
NY	Great Neck, Cooper-Simon & Co.	516-487-1142
NY	Manlius, Bowser & Sapecky Assoc.	315-682-8885
Ohio	Dayton, J.C. Hofstetter Co.	513-296-1010
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Ore	Beaverton, Es Chase Co.	503-649-6177
Va	Lynchburg, G. White Assoc.	804-846-4624
Wash	Seattle, Es/Chase Co.	206-762-4824

SENSORS, INC., Dept. EM, 3908 Varsity Dr., Ann Arbor, Mich. 48104, Tel: 313-973-1400, Telex: 23-5681; Empl.: 35

Local Sales Offices & Reps.

Ariz	Tucson, Grady Moore Assoc.	602-795-3176
Cal	Los Angeles, C H Scientific	213-476-7341
Colo	Boulder, Grady Moore Assoc.	303-494-3351
Colo	Lafayette, G. Moore Assocs.	303-494-3351
Ill	Des Plaines, Byron Ellis Assoc.	312-298-7626
Md	Randallstown, Beacon North	301-922-1248
Mass	Burlington, Drew Assoc.	617-272-9150
Minn	Minneapolis, CT Sls.	612-374-1241
NJ	East Brunswick, Eastern Metro Assoc.	201-254-2555
NM	Albuquerque, Grady Moore Assoc.	505-292-3322
NY	N. Lindenhurst, Sigma Communications Assoc. Inc.	516-226-1880
NY	Rochester, Irondequoit Inds.	716-544-6257
Ohio	Berea, B. Ellis Assocs.	216-826-0559
Tex	Lucas, Optical Svcs. Co.	214-442-2011
Va	Falls Church, Beacon North, Inc.	703-534-7200

SENSOTEC, INC., Dept. EM, 1400 Holly Ave., Columbus, Ohio 43212, Tel: 614-294-5436, TWX: 810-482-1188; Empl.: 55

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Denver, Thorson Co.	303-759-0809
Conn	Milford, Todino Engrg. Sls.	203-874-6643
Fla	Orlando, Physimetrics	305-894-8081
Ga	Atlanta, Physimetrics	404-261-8720
Ill	Chicago, Pivan Engrg. Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Inc.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg. Inc.	913-722-1030
Md	Rockville, Farrell Assocs. Inc.	301-424-9460
Mass	Needham Hgts., Todino Engrg. Sls.	617-444-7925
Mich	Detroit, Comtel Inststr.	313-255-1970
Minn	Minneapolis, Pivan Engrg. Inc.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Melville, Astrorep Inc.	516-423-2266
NY	New Hartford, KLM Assocs.	315-735-8525
NY	North Syracuse, KLM Associates	315-458-6214
NY	Rochester, KLM Associates	716-442-0820
Ohio	Cleveland, Comtel Instrs.	216-442-8080
Ohio	Dayton, Comtel Instrs.	513-298-7573
Pa	Philadelphia, Scientific Dev.	215-825-9515
Pa	Pittsburgh, Process Engrg.	412-561-5050
Tex	Houston, SESCO, Inc.	713-668-7840
Tex	Richardson, SESCO, Inc.	214-231-9364
Wisc	Brookfield, Pivan Engrg. Inc.	414-786-1940

™SENS-O-TRONIC - Industrial Battery Chargers - Hollingsworth Co., John R.

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™SENTINEL - pre-engineered fire extinguishing systems - Kidde, Walter & Co.

™SENTRILINE - filter-couplers, rf - Bird Electronic Corp.

™SENTRY - loudspeaker - Electro-Voice, Inc.

™SENTRY MASTER - hotel TV theft alarm - Channel Master Div. Avnet

™SEO-GRIP - nylon cable clamp - Weckesser Co. Inc.

SEQUENTIAL INFORMATION SYSTEMS, Dept. EM, 249 N. Saw Mill River Rd., Elmsford, N.Y. 10523, Tel: 914-592-5930, TWX: 710-567-1212; Empl.: 110

Sales Manager: F. Gorda

Local Sales Offices & Reps.

Cal	Campbell, Sedillo Co.	408-374-5220
Cal	Huntington Beach, Wheatcroft Engrg.	714-842-5569
Ill	Chicago, Pivan Engrg., Inc.	312-539-4838
Ind	Indianapolis, Pivan Engrg., Inc.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg., Inc.	913-722-1030
Md	Silver Spring, Spectroscopy Sys	301-949-8261
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Farmington Hills, McBride Co.	313-474-2300
Minn	Minneapolis, Pivan Engrg., Inc.	612-537-4501
Mo	St. Louis, Pivan Engrg., Inc.	314-567-3636

NJ	W. Long Beach, Eastern Electronic Sls. Co.	201-222-6836
NY	Canandaigua, Daner-Hayes	716-467-5100
Ohio	Cincinnati, J.W. Murray & Assocs.	513-662-1616
Ohio	Medina, T.M.T. Ind'l Controls Co.	216-725-7989
Pa	Wyndmoor, Spectroscopy Sys.	215-VE6-1545
Tex	Dallas, Data Aids	214-620-1551
Tex	Houston, Data Aids	713-862-6685
Wash	Seattle, Penryn Sls. & Engrg. Co.	206-634-0240
Wisc	Brookfield, Pivan Engrg., Inc.	414-786-1940

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™SERENDIP - SPST solid state relay - Teledyne Relays

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™SERIES 200 - modular CRT display terminal - Ann Arbor Terminals, Inc.

™SERIES 500 SIGNAL CONDITIONERS - signal transmitters & conditioners - Telmar, Inc.

™SERIES 6000 - tape drive - Microdata Corp.

™SERIES 8000 - disc drive - Microdata Corp.

™SERMABOND - cement type coatings - SermeTel Inc.

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™SERMALUBE - dry film lubrication coatings - SermeTel Inc.

™SERMASEAL - sealants & top coating systems - SermeTel Inc.

SERMETEL INC., Sub. Teleflex Inc., Dept. EM, 155 Limerick Rd., Limerick, Pa 19468, Tel: 215-948-5100, TWX: 84-6335, 710-637-1263

Local Sales Offices & Reps.

Cal	Lawndale	213-973-1142
Okla	Midwest City	405-732-1392

™SERTA-PAK - conformal coated metalized axial lead polyester or polycarbonate - Paktron Div.

SERVO-INSTRUMENTS CORP., Dept. EM, R.R. 1, Box 75B, Spring Valley, Ill. 61362, Tel: 815-664-2348

Sales Manager: R.A. Small

Local Sales Offices & Reps.

Ala	Huntsville, Young & Lawrence	205-539-6575
Cal	Sherman Oaks, Meussdorffer & Assoc.	213-788-0771
Conn	Bristol, Texell Co.	203-583-0703
Fla	Winter Park, Young & Lawrence	305-647-6929
Ill	Schaumburg, Kingston Comps.	312-529-8055
Iowa	Cedar Rapids, Reid Assoc.	319-362-6302
Kans	Wichita, Penn	
Mass	Randolph, Naton Assoc.	617-986-6417
Minn	St. Paul, Countryman & Assocs.	612-645-9151
NY	Rochester, Upstate Comp. Sls.	716-288-1080
Tex	Dallas, McCoy Assocs.	214-350-9931
Tex	Houston, McCoy Assocs.	713-649-5756

SERVO-TEK PRODS. CO., Dept. EM, 1086 Goffle Rd., Hawthorne, N.J. 07506, Tel: 201-427-3100; Empl.: 86 .... p. 3107

Local Sales Offices & Reps.

Cal	Van Nuys, Servo-Tek Calif.	213-786-0690
Mass	Salem, Forbes Engrg. Co.	617-744-1693
Ohio	Chagrin Falls, K.F. Nauerz Co.	216-338-8450

™SERVO-CAP - hi current ceramic capacitors - Centralab/USCC

™SERVO-LINEAR - speaker system - Electro-Voice, Inc.

SERVOMETER CORP., Dept. EM, 501 Little Falls Rd., Cedar Grove, N.J. 07009, Tel: 201-785-4630; FSC No.: 18469; Empl.: 65

Sales Manager: D. Walker

Local Sales Offices & Reps.

Cal	Cerritos, B.S. & G. Inc.	213-860-2422
Cal	Redwood City, B.S. & G. Inc.	415-365-5444
Ind	South Bend, H. G. Lake Co.	219-291-5804
NY	East Aurora, Clarke Thrasher	716-652-0423
Ohio	Dayton, H. G. Lake Co.	513-277-8181
Ohio	Richmond Heights, H. G. Lake Co.	216-486-1477

™SERVOSPEED - electronic motor speed control - Electro-Devices, Inc.

SERVOTRONICS, INC., Dept. EM, 3901 Union Rd., Buffalo, N.Y. 14225, Tel: 716-633-5990, TWX: 710-523-1855; Empl.: 81

™SERV-RITE - thermocouples & T/C wire - Gordon, Claud S. Co.

SESCOM, INC., Dept. EM, 12931 Budlong Ave. Box 590, Gardena, Cal. 90247, Tel: 213-770-3510, 800-421-1828, TWX: 910-346-7023; Empl.: 21

Sales Manager: F.J. Miller

Local Sales Offices & Reps.

Cal	Inglewood, Sescom, Inc.	213-770-3510
NY	Brooklyn, I. Brown Co. Inc.	212-493-1379

™SETCHELL CARLSON - video monitors, uhf/vhf receivers - SC Electronics

SETRA SYSTEMS INC., Dept. EM, 12 Huron Dr., Natick, Mass. 01760, Tel: 617-655-4645; FSC No.: 53367; Empl.: 32

Local Sales Offices & Reps.

Ala	Huntsville, Burnette Techno-Metrics	205-837-5860
Cal	Los Angeles, DynaSls. Co.	213-268-1175
Colo	Westminster, RMS Sls.	303-429-1842
Fla	Maitland, Wade Boggs	305-647-2226
Ga	Atlanta, Craft Assocs.	404-256-0420
Ill	Chicago, Data Elctrns.	312-283-0300
Ind	Indianapolis, Data Elctrns.	317-784-6360
Kans	Leawood, Leemark Engrs.	913-648-0124
Mass	Framingham, J.M. Lancaster Co.	617-873-8893
Mich	Ferndale, Tiby Co.	313-547-3550
Minn	Minneapolis, Data Elctrns.	612-786-9666
NJ	East Orange, Friedman Assoc.	201-673-2500
NY	Penfield, A&D Devices	716-586-8033
NY	Scotia, A & D Devices	518-399-9621
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co,	513-277-3822
Ore	Portland, McLaren, Inc.	503-297-2248
Pa	Jenkintown, Stein Instrumentation	215-885-2370
Tex	Dallas, Economy Gage & Instr. Supply	214-243-8370
Tex	Houston, Economy Gauge & Instr. Supply	713-688-4494
Wash	Bellevue, McLaren	206-454-3400

™SF/DUROID - Electrical insulating materials - Rogers Corp.

S G C INC., Dept. EM, 13737 SE 26th St., Bellevue, Wash. 98005, Tel: 206-746-6310, Telex: 32-8834; Empl.: 28

Local Sales Offices & Reps.

Fla	Pompano Beach, Comark	305-785-2000
Mass	Sudbury, Commercial Mktg. Assoc.	617-443-9442
Wash	Bellevue, S G C Int'l.	206-746-6310

SGL ABRASIVES, Dept. EM, North Pitt St. Ext., Carlisle, Pa. 17013, Tel: 717-243-3471, TWX: 510-560-3513; Empl.: 150

Sales Manager: J.G. Wagner

Local Sales Offices & Reps.

Cal	Maywood, J. Mullaney	213-585-5697
Ill	Northfield, B. Boak	312-446-3374
NC	Charlotte, T. Arnold	704-535-4279
Pa	Allentown, Coleman Assoc.	215-797-0401
Pa	Hazleton, Barrett Haentjens Co.	717-455-7711
Pa	New Cumberland, J. Tio	717-774-2351
Pa	Newtown Square, E. Parkin	215-644-5849
Pa	Philadelphia, F. Spangler	215-723-8402
Tex	Houston, T. Dolan	713-667-8812
Wisc	Milwaukee, George Mills	414-639-1225
Wisc	Racine, Webster Weiss	414-639-3634
Wisc	West Bend, T. Sullivan	414-334-4385

SGL BATTERIES MANUFACTURING CO., A Subsidiary of SGL Industries, Inc., Dept. EM, 14650 Dequindre, Detroit, Mich. 48212, Tel: 313-868-6410; Empl.: 60

SGL ELECTRONICS, Dept. EM, 300 Harvard Avenue, Westville, N.J. 08093, Tel: 609-456-7300, TWX: 710-944-0758; Empl.: 60

Local Sales Offices & Reps.

Cal	Fullerton, Magnetic Materials	213-694-2063
Conn	West Simsbury, Anchor Engrg. Corp.	203-658-6201
Fla	Orlando, Buchanan & Abrams Assoc.	305-898-7444
Ill	Chicago, P.K. Pitt	312-478-3124
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Mich	Milford, T. Mulligan Assoc.	313-363-5575
Minn	St. Paul, R.G. Ragon	612-488-0201
NJ	Berkeley Heights, Cambridge Allen	212-682-5844
NY	DeRuyter, R. P. Kennedy Co.	315-682-2299
NY	New York, Cambridge Allen Assoc.	212-682-5844
NY	Red Hook, R. P. Kennedy Co.	914-876-2700
NY	Rochester, R.P. Kennedy Co.	716-271-6322
Ohio	Columbus, T. Mulligan & Assoc.	614-457-2242
Ore	Portland, Freed Assocs.	503-223-3374
Tex	Dallas, Southwest Elctrn. Inds.	214-690-9881
Tex	Houston, Dunkel Elctrns Assoc.	713-729-1670
Wash	Kirkland, Freed Assoc.	206-822-8223

SGL GRAPHICS, Div. of SGL Inds., Inc., Dept. EM, John Fitch Industrial Park, Warminster, Pa. 18974, Tel: 215-672-3600; Empl.: 45

SGL HOMALITE, Div. of SGL Inds., Inc., Dept. EM, 11 Brookside Dr., Wilmington, Del. 19804, Tel: 302-652-3686, TWX: 510-666-3450; Empl.: 55; Minimum order: $A.J. Half

Sales Manager: R.H. Cahill; *Distributor Manager:* A.J. Half

Local Sales Offices & Reps.

Cal	Lynwood, D. West Assocs.	213-636-6124
Cal	Palo Alto, R. W. Thompson Assocs.	415-494-7516
Colo	Denver, M. Duffy Assocs.	303-934-7392
Conn	New Canaan, S. Pierce Assocs.	203-966-4630
Fla	Fort Lauderdale, L. Gentry Assocs.	305-763-5374
Ill	Chicago, Electro-Tech Market	312-588-4535
Mass	Norwood, S. Pierce Assocs.	617-762-3164
Mich	Farmington Hills, H. Lowell Co.	313-851-7474
NJ	Cherry Hill, B & G Assocs.	609-235-4878
NY	Skaneateles, Beardsley Assocs.	315-685-7638
NC	Winston-Salem, Murcota	919-722-9445
Ohio	Akron, Augnat Assocs.	216-239-1621
Tex	Richardson, Campion Sls.	214-238-8145
Wash	Seattle, J.B. Jolly	206-938-4166

SGL INDUSTRIES, Dept. EM, 76 Euclid Ave, Haddenfield, N.J. 08033

SGL PLASTICS, Dept. EM, Route 248, Nazareth, Pa. 18064, Tel: 215-759-0280; Empl.: 50

Local Sales Offices & Reps.

Pa	Jenkintown, Ailey & Aleshire, Inc.	215-884-1708

SGL PRINTED CIRCUITS, Div. SGL Inds., Inc., Dept. EM, 827 Black Oak Ridge Rd., Wayne, N.J. 07470, Tel: 201-835-2765; Empl.: 34

Sales Manager: T. Staviski

Local Sales Offices & Reps.

NJ	Cherry Hill, B & G Assoc.	609-235-4878
NJ	Fairfield, Glad Assocs.	201-227-5555
Tex	Houston, J. Arnold Co.	713-783-7297

SGL WABER ELECTRIC, Dept. EM, 300 Harvard Avenue, Westville, NJ 08093, Tel: 609-456-5400, TWX: 710-944-0758; Empl.: 50

Local Sales Offices & Reps.

Ala	Mobile, Hollingsworth & Still	205-478-8108
Cal	Burlingame, Carelli-EMA	415-697-6286
Cal	Inglewood, Unger Sls. Assocs.	213-649-6238
Colo	Denver, Walter Eng. Assoc.	303-777-5585
Fla	Orlando, Hollingsworth & Still	305-671-4515
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Haw	Honolulu, Gene Piety Factors	808-841-0185
Ill	Chicago, W. Linz Assoc.	312-677-2000
Ind	Indianapolis; R. Milsk Co.	317-546-5468
Iowa	Des Moines, Kathrinus-Kelly & Co.	515-255-4584
Kans	Shawnee Mission, Kathrinus-Kelly & Co.	913-722-0000
Md	Silver Springs, Sherr Assocs.	301-593-2477
Mass	Scituate, K. J. Walsh Assocs.	617-545-3145
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, Kathrinus-Kelly	314-968-3800

NM	Albuquerque, C. T. Carlberg & Assoc.	505-265-1579
NY	Liverpool, J. Brown Elctrn. Sls.	315-451-1471
NY	Rochester, J. Brown Elctrn Sls.	716-266-2728
NY	Yonkers, J. Brown Elctrn. Sls.	914-779-7330
NC	Charlotte, Hollingsworth & Still	704-536-7047
Ohio	Beechwood, Electrn. Salesmasters	216-831-9555
Ore	Salem, Pacnor Mktg.	503-363-6445
Pa	Philadelphia, D. S. Linz Co.	215-379-0734
Pa	Pittsburgh, Covert & Newman Co.	412-531-2002
Tex	Dallas, Lund & Co.	214-358-4335
Wash	Seattle, Pacnor Mktg.	206-284-8020

SGS ATES

SGS-ATES SEMICONDUCTOR CORP., Dept. EM, 79 Massasoit St., Waltham, Mass. 02154, Tel: 617-891-3710, Telex: 923495; Empl.: 7000

Local Sales Offices & Reps.

Ala	Huntsville, Rep. Inc.	205-881-9270
Ariz	Phoenix, Hecht, Henschen & Assoc.	602-275-4411
Cal	Los Angeles, ECM	213-649-5372
Cal	Mountain View, Shaw-Tech Inc.	415-961-4775
Cal	San Diego, CERCO	714-560-9143
Colo	Englewood, Elcom	303-770-4400
Fla	Clearwater, Dyne-A-Mark	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
Ga	Tucker, Rep. Inc.	404-938-4358
Ill	Bellwood, Fiat Engrg.	312-547-6200
Ind	Indianapolis, Lattronics Mfg.	317-846-5788
Md	Towson, C.H. Newson & Assocs.	301-296-2293
Mass	Needham, Stone Comp. Sls.	617-444-1405
Mich	Grosse Pointe Park, Greiner Assocs.	313-499-0188
Minn	Minneapolis, L. F. Green Assocs.	612-781-1611
Mo	St. Louis, KEBCO	314-569-2660
NY	Jerico, J. Square Mktg.	516-997-6210
NY	Pompey, S.F. Foster Co.	315-677-3333
NY	Webster, S.F. Foster Co.	716-265-2072
NC	Raleigh, Rep Inc.	919-851-3007
Ohio	Cleveland, Imtech Inc.	216-826-3400
Ohio	Dayton, Imtech Inc.	513-278-6507
Pa	Philadelphia, C.H. Newson & Assoc.	215-248-3377
Tenn	Jefferson City, Rep. Inc.	615-475-4105
Tex	Dallas, Blackburn Assocs.	214-692-8885
Va	Reston, Boyle Assocs.	703-620-9558
Wash	Seattle, Northmar Inc.	206-524-5170

Local Distributors

Cal	Hawthorne, General Transistor Corp.	213-679-9721
Cal	Los Angeles, Energy Elctrns. Prods.	213-670-7880
Cal	San Dimas, Zeus Comps.	714-871-0391
Cal	Santa Ana, Rical Assocs.	714-557-6543
Cal	Santa Clara, Re-Coil Elctrns.	408-984-0400
Fla	Pompano Beach, Zeus Comps.	305-942-4312
Ill	Des Plaines, Edmar Elctrns. Co.	312-298-8580
Mass	Burlington, Zeus Comps.	617-273-0750
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Wakefield, Semtex	617-245-9050
Mich	Livonia, Camelot Elctrns.	313-427-8660
NJ	Cinnaminson, Wilshire Elctrns.	609-786-8990
NY	Elmsford, Zeus Comps.	914-592-4120
Ohio	Dayton, Esco, Inc.	513-226-1133
Tex	Dallas, KA Elctrns. Sls.	214-634-7870
Wash	Seattle, Radar Elec. Co.	206-282-2511
For:	Mexico, Mexico City, Mexel	905-575-7868

™SHADOWEIGHT - tone arm - V-M Corporation

SHAFFSTALL CORP., Dept. EM, 5149 E. 65th St., Indianapolis, Ind. 46220, Tel: 317-251-1476; Empl.: 15

Sales Manager: E.L. Shaffstall, Pres.

SHAKESPEARE, Dept. EM, Box 246, Columbia, S.C. 29202, Tel: 803-779-5800; Empl.: 452

Sales Manager: T. Bryant

Local Sales Offices & Reps.

Ariz	Phoenix, J.R. Morgan Agency	602-252-3089
Cal	Belmont, D. Dodge Sls. Co.	415-591-9871
Cal	Los Angeles, Wallace & Wallace	213-747-0401
Fla	Ft. Lauderdale, Sproch Sls.	305-587-3792
Ga	Savannah, Len Sherman Assocs.	912-925-3660
Ill	Chicago, Lassers & Co.	312-539-0170
Ind	Indianapolis, Dewey Powers Sls.	317-846-0790
Kans	Overland Park, R.C. Howard	913-492-7182
Md	Silver Spring, B.F. Targoff	301-924-2524
Mass	Norwood, Rudolph-MacInnis	617-769-5450
Minn	Minneapolis, Melby Comm.	612-884-7688
Miss	Jackson, Gordon Clapper	601-956-8661
NY	Farmingdale, C. Drexler Co.	516-249-8206
Ohio	Youngstown, Repcom of Ohio	216-788-9404
Ore	Portland, J. W. Eckersley Co.	503-246-3183
SC	Columbia, P.B. Boyer Sls. Co.	803-772-9151
Tex	Dallas, Collins Co.	214-341-7866
Utah	Salt Lake City, Jim Hall	801-466-6105

SHALLCO, INC., Dept. EM, Box 1089, Smithfield, N.C. 27577, Tel: 919-934-3135; Empl.: 45 .... p. 4228-4231

Sales Manager: M.D. Sutton

Local Sales Offices & Reps.

Cal	Los Angeles, WCV Co.	213-772-4479
Cal	Mountain View, WCV Co.	415-961-5096
NJ	So. Orange, SSAI	201-763-7900
NY	Rochester, D. Hurley Sls.	716-586-6159
NC	Smithfield, Byrd & Barbour Sls., Inc.	919-934-8136
Tex	Dallas, Unidyne, Inc.	214-234-3281
Wash	Seattle, Underwood & Underwood, Inc.	206-243-2133

SHALLCROSS, See Cutler Hammer Shallcross Resistor Prods.

SHANNON LUMINOUS MAT'LS., Div. Shannon-Glow Inc., Dept. EM, 7356 Santa Monica Blvd., Hollywood, Cal. 90046, Tel: 213-876-2660; Empl.: 10

Local Sales Offices & Reps.

Cal	Downey, Uresco	213-773-3828

SHAPIRO SCIENTIFIC INST., Dept. EM, 3500 E. Coast Hwy., Corona del Mar, Cal. 92625, Tel: 714-675-1024; Empl.: 5

SHARP ELECTRONICS CORP., Dept. EM, 2 Sharp Plaza P.O. Box 389, Paramus, N.J. 07652, Tel: 201-265-5600, Telex: 13-4327

Local Sales Offices & Reps.

Cal	Long Beach
Ill	La Grange

™SHARPFAX - a line of copiers - Sharp Electronics Corp.

™SHAWNEE - solid state counter - Automatic Timing & Controls Co.

™SHEARITE - hand tools - Amp Inc.

SHELDAHL, INC., Electrical Prods. Div., Dept. EM, Box 170, Northfield, Minn. 55057, Tel: 507-645-5633, TWX: 910-565-2180; Empl.: 219

Local Sales Offices & Reps.

Ariz	, R.H. McDonald & Assoc.	213-986-5832
Ark	, Aid Elctrns.	214-259-4671
Cal	Encino, R.H. McDonald & Assocs.	213-986-5832
Cal	Fremont, Foraker Sls. Corp.	415-657-2213
Colo	Boulder, Component Prods. Sls. Co.	303-444-2730
Fla	Cocoa, Electro Comp. Assoc.	305-452-9568
Fla	Ft. Lauderdale, Electro Comp. Assoc.	305-564-8571
Fla	Orlando, MacKay, Smith, & Assocs.	305-277-1513
Idaho	, Component Prod. Sls. Co.	303-444-2730
Ill	Arlington Hts., R. Diethert Co.	312-593-7600
Ind	, McFadden Sls.	614-221-3363
Iowa	, B.E.A.M.S.	515-255-1148
Kans	, B.E.A.M.S.	913-341-7744
Mass	Norwood, Sheldahl	617-762-5703
Mich	Benton Harbor, I.E. Hampton & Assoc.	616-925-0341
Mich	Troy, McPhail Corp.	313-689-6444
Mo	, B.E.A.M.S.	314-569-1060
NJ	Riverton, Valley Sls. Inc.	609-829-2892
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Jamaica, S-J Sls. Assocs.	212-291-3232
NC	Raleigh, R.W. Mitscher Co.	919-828-0575
Ohio	Columbus, McFadden Sls., Inc.	614-221-3363
Tenn	Shelbyville, R.W. Mitscher Co.	615-684-4544
Tex	Houston, Aid Elctrns., Inc.	713-777-3882
Tex	Irving, Aid Elctrns., Inc.	214-259-4761
Va	Virginia Beach, R.W. Mitscher Co.	804-481-7200
Wash	Medina, H. Paulman Sls.	206-455-3311
Wisc	, R. Diethert Co.	414-547-6575

SHELLER-GLOBE CORP., ELECTRO-MECHANICAL INSTR. DIV., See Electro-Mechanical Instr. Div., Sheller-Globe Corp.

SHELLY ASSOCS., Sub. of Datatron Inc., Dept. EM, 1562 Reynolds Ave, Irvine, Cal. 92714, Tel: 714-549-3414, TWX: 910-595-1589; Empl.: 35

Local Sales Offices & Reps.

Ala	Huntsville, Tech. Reps.	205-881-5925
Ariz	Scottsdale, Williams Assoc.	602-947-4297
Cal	Anaheim, LoCal Sls.	714-956-1560
Cal	Beverly Hills, I.A.S.	213-274-7578
Cal	San Carlos, Lo Dan Inc.	415-592-4600
Cal	San Diego, LoDan Inc	714-279-6383
Colo	Denver, Williams-Assoc.	303-373-4730
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Indian Rocks Beach, Tech. Reps.	813-595-2834
Ill	Broadview, Edemco	312-365-7600
Ill	Chicago, G. McI. Cole Co.	312-774-3535
Md	Baltimore, Callas Elctrns.	301-744-7711
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Walled Lake, Berberich Assoc.	313-624-2211
Minn	Minneapolis, G.E. Arneson & Co.	612-835-2177
Mo	N. Kansas City, Edemco	816-221-2400
Mo	St. Louis, Edemco	314-647-5505
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NM	Albuquerque, Williams-Assoc.	505-255-1638
NY	Fayetteville, M.P. Andrews	315-637-3144
NY	Jamaica, Material for Electronics	212-322-9400
NY	Jericho, Metro Tech. Sls.	516-935-3330
Ohio	Dayton, Berberich Assoc.	513-433-0342
Pa	King of Prussia, White-Keystone	215-265-1817
Tex	Ft. Worth, Dyna Reps.	817-451-1392
Wash	Seattle, R. Thorpe & Co.	206-763-0545

SHESTER ENGINEERING CO., Dept. EM, 8530 W. Washington Blvd., Culver City, Cal. 90230, Tel: 213-837-3332; Empl.: 9

Local Sales Offices & Reps.

Cal	San Rafael, Bender Sys.	415-479-6009
Idaho	Pocatello, G. Aggeler	208-233-5690
Wisc	Milwaukee, Manufacturers Aids Co.	414-354-2970

Local Distributors

Cal	Los Angeles, Permag Pacific Corp.	213-776-5656
Cal	San Rafael, Bender Sys.	415-479-6009
Cal	Santa Fe Springs, McMaster-Carr Supply	213-945-1311
Cal	Sunnyvale, Permag Sierra Corp.	408-738-1080
Colo	Denver, Alldredge-McCabe	303-744-6351
Ga	Atlanta, Permag Dixie Corp.	404-351-0994
Idaho	Pocatello, G. Aggeler	208-233-5690
Ill	Chicago, McMaster-Carr Supply Co.	312-281-1010
Ill	Chicago, Adams Magnetic Prods. Co.	312-286-6686
Ill	Elk Grove Village, Permag Central Corp.	312-956-1140
Md	Randallstown, Maryland Magnet Co.	301-922-2272
Mass	Billerica, Permag Northeast Corp.	617-273-2890
NY	Jamaica, Permag Corp.	212-657-1818
Ohio	Toledo, Permag Magnetics	419-385-4621
Pa	Pittsburgh, Stockman-Dunn Co.	412-343-7477
Tex	Dallas, Permag Southwest Corp.	214-748-6909
Tex	Garland, Texas Magnet Corp.	214-271-2551
Wisc	Milwaukee, Manufacturers Aids Co.	414-354-2970

™SHIELD CELL - shielded ventilating panel - Metex Corp.

™SHIELDFLEX - shielding materials - Magnetic Metals Co.

™SHIELD-KON - grounding sheath connectors - T & B/Thomas & Betts

™SHIELD-KON - grounding sheath connectors - T & B/Thomas & Betts

™SHIELDMESH - EMI/RFI shielding gasket - Metex Corp.

™SHIELDMU - shielding materials - Magnetic Metals Co.

™SHIELDSCREEN - shielded ventilating panel - Metex Corp.

™SHIELD-STRIPP - hand tool for stripping braided coax shielding - Gagne Assocs., Inc.

(TM)SHIELD TAPE - knitted wire tape for EMI/RFI shielding - Metex Corp.

(TM)SHIELD-VU - EMI/RFI shielded windows - Metex Corp.

(TM)SHIELD WRAP - knitted wire tape for EMI/RFI shielding - Metex Corp.

SHIGOTO INDS., LTD., Dept. EM, 350 Fifth Ave., New York, N.Y. 10001, Tel: 212-695-0200, Telex: 22-4219; Empl.: 362 .... p. 4232,4714

Local Sales Offices & Reps.

Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Cal	Santa Clara, I² Inc.	408-985-0400
Wash	Seattle, Seatronics Inc.	206-767-4330

(TM)SHOCK-FUSE - shock indicator - Impact-O-Graph Corp.

(TM)SHOCKWATCH - precise-low cost-impact recorder - Media Recovery Inc.

SHOGYO INTERNATIONAL CORP., Dept. EM, 300 Northern Blvd., Great Neck, N.Y. 11021, Tel: 516-466-0911, Telex: 12218

Sales Manager: M.A. Rubin; *Distributor Manager:* H. Rubin

(TM)SHO RATE - flowmeter - Brooks Instr. Div.

(TM)SHOREWALL - sheet piling - Overly-Hautz Co.

(TM)SHORT STOP - electronic motor brake - Ambi-Tech Inds. Inc.

SHOWA MUSEN KOGYO CO., LTD., Dept. EM, 5-5 6-Chome Togoshi, Shinagawa-Ku, Tokyo Japan, Tel: 785-1111, TWX: 2466301 SMKTOK J; Empl.: 800

Local Sales Offices & Reps.

Ala	Huntsville, Electro-Mech	205-883-9624
Cal	Carson, SMK Elctrns. Corp. of America	213-770-8915
Cal	Lawndale, Babco Assocs.	213-676-6545
Cal	Palo Alto, R.W. Thompson Assocs.	415-494-7516
Cal	San Diego, SR Elctrns.	714-565-8411
Colo	Parker, Technology Mktg. Assocs.	303-841-3435
Fla	Satellite Beach, A. Lueck Co.	305-773-9270
Ga	Atlanta, Electro-Mech	404-449-6337
Ill	Park Ridge, Metcom Assocs. Corp.	312-696-1490
Ind	Greenwood, Valentine-Schillinger	317-888-2260
Ind	South Bend, Valentine-Schillinger	219-291-6258
Kans	Overland Park, K E B C O	913-649-1051
Mich	South Field, Valentine-Schillinger	313-559-3680
Minn	St. Paul, H.A. Cullen & Assocs.	612-646-7371
Mo	Columbia, K E B C O	314-449-8120
Mo	St. Louis, K E B C O	314-569-2660
NY	Plandome, F. Spellman Co.	516-627-3399
NY	Rochester, R.P. Kennedy Co.	716-271-6322
NC	Raleigh, Electro-Mech	919-782-7586
Ohio	Cincinnati, G & H Sls.	513-771-8231
Ohio	Grove City, G & H Sls. Co.	614-878-1128
Pa	Willow Grove, H. Nash Assocs.	215-657-2213
Tenn	Nashville, Electro-Mech	615-256-2516
Tex	Dallas, Blackburn Assocs.	214-692-8888
Utah	Salt Lake City, Technology Mktg. Assocs.	801-483-9381
Wash	Bellevue, SD-R2 Prod. Sls.	206-747-9424

(TM)SHRINKDOWN - heat shriknable tubings - Markel Corp.

SHUGART ASSOCS., Dept. EM, 435 Indio Way, Sunnyvale, Cal. 94086, Tel: 408-733-0100, TWX: 910-339-9355; Empl.: 166

Local Sales Offices & Reps.

Ala	Huntsville, W. A. Brown Instrs.	205-539-4411
Cal	Cupertino, Shugart Sls.	408-252-6860
Fla	Orlando, W. A. Brown Instrs.	305-425-5505
Ga	Atlanta, W. A. Brown Instrs.	404-939-1674
Ill	Chicago, Data Elctrns. Co.	312-283-0300
Ind	Indianapolis, Data Elctrns. Co.	317-784-6360
La	Gretna, W. A. Brown Instrs.	504-366-5766
Mass	Boston, Shugart Assoc.	617-890-0808
Mich	Detroit, Electro Sls. Assoc.	313-526-8800
Mich	South Lion, Electro Sls. Assoc.	
Minn	Minneapolis, Data Elctrns. Co.	612-786-9666
NJ	Landing, Shugart Sls.	201-398-2345
NC	Durham, W. A. Brown Instrs.	919-682-2383
Ohio	Cleveland, Electro Sls. Assoc.	216-261-5440
Ohio	Dayton, Electro Sls. Assoc.	513-426-5551
SC	Columbia, W. A. Brown Instrs.	803-798-3297
Tenn	Knoxville, W. A. Brown Instrs.	615-690-3281

SHURE BROTHERS, INC., Dept. EM, 222 Hartrey, Lock Box 1036, Evanston, Ill. 60204, Tel: 312-866-2200, TWX: 72-4381 910-231-0048

Sales Manager: R.W. Ponto

(TM)SHURE SQUEEZER - tool - T & B/Thomas & Betts

(TM)SHURE SQUEEZER - tool - T & B/Thomas & Betts

(TM)SHURE-STAKE - tool - T & B/Thomas & Betts

(TM)SHURE-STAKE - tool - T & B/Thomas & Betts

SHURITE METERS, Dept. EM, 428 Chapel St., New Haven, Conn. 06508, Tel: 203-787-5824, TWX: 710-465-3165

Local Sales Offices & Reps.

Cal	Inglewood, J. Berman Co.	213-678-1281
Cal	La Mesa, J. Berman Co.	714-583-6457
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, Nelson Co.	303-573-1516
Conn	Wallingford, Adams-McGregor	203-269-5816
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy	305-943-9593
Ga	Atlanta, Millar Elctrns.	404-261-6160
Ill	Oak Park, G. Petitt Co.	312-369-8940
Ind	Fort Wayne, W.W. Bieberich	219-432-2537
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Md	Reisterstown, Massey Assocs.	301-833-2039
Mich	St. Clair Shores, J.M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Heimann Co.	612-861-6051
NY	Long Island City, D.F. Tobias & Co.	212-545-9191
NY	Rochester, J.G. Welch Assocs.	716-244-1100
NC	Raleigh, Millar Elctrns.	919-787-9564
Ohio	Dayton, C.H. Dolfuss, Jr. & Co.	513-275-4831
Ohio	Rocky River, C.H. Dolfuss, Jr. & Co.	216-333-7504
Pa	Media, Snyder & Massey Assocs.	215-566-5400
Pa	Pittsburgh, G.S. Root & Co.	412-561-4125
RI	Lincoln, Adams-McGregor	401-726-1300
Tex	Dallas, Lund & Co.	214-358-4335
Wash	Seattle, J.J. Backer Co.	206-285-1300

(TM)SIDICON - silicon vidicon tube - Teltron, Inc.

SIEMENS CORP., Comps Div., Dept. EM, Box 1390, Scottsdale, Ariz. 85252

SIEMENS CORP., Dept. EM, 186 Wood Ave., S., Iselin, N.J. 08830, Tel: 201-494-1000, TWX: TWX 710-998-0588; Empl.: 800

Local Sales Offices & Reps.

Ala	Huntsville, Interep Assocs.	205-881-3677
Ariz	Scottsdale, Siemens	602-947-2231
Cal	Burlingame, Siemens	415-697-6851
Cal	El Segundo, Varigon Assocs.	213-679-0621
Cal	Newport Beach, Siemens	714-540-2487
Cal	San Diego, S. R. Elctrns.	714-565-8411
Cal	San Leandro, Quadrep	415-352-5942
Cal	Sunnyvale, Quadrep	408-733-7300
Cal	Torrance, Siemens	213-370-3611
Colo	Denver, Omega Limited	303-758-1508
Conn	West Simsburg, Anchor Engrg. Corp.	203-658-6261
Fla	Clearwater, Perrott Assocs.	813-585-3327
Fla	Orlando, Perrott Assocs.	305-275-1132
Ga	Atlanta, Interep Assocs.	404-394-7756
Ill	Chicago, Siemens Corp.	312-671-2810
Iowa	Hiawatha, Gassner & Clark	319-393-5763
Kans	Wichita, Dy-Tronix, Inc.	316-943-6221
Md	Baltimore, J.A. Maguire Co.	301-377-0223
Mass	Lexington, KCA Comps.	617-861-9024
Mass	Newton Upper Falls, Anchor Engrg. Corp.	617-964-6205
Minn	St. Paul, Cahill Assocs.	612-646-7217
Mo	Hazelwood, Dy-Tronix	314-731-5799
Mo	Kansas City, Dy-Tronix Inc.	816-761-6543
NJ	Haddonfield, Thomas Assocs.	609-854-3011
NJ	Iselin, Siemens	201-494-1000
NJ	Pennsauken, J.A. Maguire & Co.	609-665-5136
NM	Albuquerque, A. Q. Elctrns.	505-255-8701
NY	Plainview, E.R.A., Inc.	516-822-9890
NY	Rochester, Electra Sls.	716-436-4030
NY	Syracuse, T-Squared	315-463-8592
NY	Syracuse, Electra Sales	315-455-5783
NC	Raleigh, Siemens	919-872-1331
NC	Winston-Salem, J. A. Maguire	919-723-5980
Ohio	Centerville, Dolfuss-Root & Co.	513-433-6776
Ohio	Cleveland, C. Dolfuss Co.	216-333-7504
Pa	Pittsburg, Dolfuss-Root & Co.	513-433-6776
Tex	Arlington, Siemens	817-261-6543
Tex	Dallas, Siemens	214-424-8333
Tex	El Paso, A.Q. Elctrns.	915-545-2363
Utah	Salt Lake City, Omega, Ltd.	801-266-9617
Wash	Bellevue, R. Over Sales	206-454-4551

Local Distributors

Ala	Huntsville, Hallmark	205-837-8700
Ala	Huntsville, Cramer Inc.	205-539-5722
Ariz	Phoenix, Crammer Inc.	602-267-7321
Ariz	Phoenix, Micro-Elec. Distrib.	602-944-2281
Cal	Burbank, TAW Elect.	213-846-3911
Cal	El Monte, G.S. Marshall Co.	213-686-0141
Cal	Irvine, Crammer Inc.	714-979-3000
Cal	Mt. View, Capacitor Sls.	415-964-8880
Cal	Newport Beach, Semicomp. Corp.	714-833-3070
Cal	San Diego, Intermark Elec.	
Cal	San Diego, Cramer Inc.	714-365-1881
Cal	Santa Anna, Intermark Elect.	
Cal	Sunnyvale, Cramer Inc.	408-739-3011
Cal	Sunnyvale, Bell Ind.	408-734-8570
Cal	Sunnyvale, Intermark Elec.	
Cal	Woodland Hills, Jaco Elec.	213-887-6400
Cal	Woodland Hills, Semiconduct. Specialists	213-887-6400
Colo	Arvada, G.S. Marshall Co.	303-423-9670
Colo	Denver, Cramer Inc.	303-758-2100
Conn	North Haven, Cramer Inc.	303-758-2100
Fla	Hollywood, Cramer Inc.	305-923-8181
Fla	Orlando, Hall-Mark Elec.	305-855-4020
Fla	Orlando, Cramer Inc.	305-894-1511
Fla	Pompano Beach, Zeus Compon.	305-942-4312
Ga	Atlanta, Cramer Inc.	404-448-9050
Ill	Chicago, Semiçonductor Specialists	312-279-1000
Ill	Elk Grove Village, Itall-Mark Elctrns.	312-437-8800
Ill	Mt. Prospect, Cramer	312-593-8230
Ill	Rosemont, Advent Elect.	312-298-4210
Ind	Indianapolis, Sheridan Sls. Co.	317-547-7777
Kans	Lenexa, Hallmark Elctrns.	913-888-4747
Md	Baltimore, Radio Electric Svc. Co.	301-823-0700
Md	Baltimore, Hall-Mark Elec.	
Md	Gaithersburg, Cramer Inc.	301-948-0110
Md	Hanover, Cramer Inc.	301-796-5790
Md	Hyattsville, Milgray Elect.	
Mich	Detroit, Semiconductor Specialists	313-478-2700
Mich	Farmington Hills, Sheridan Sales	
Minn	Bloomington, Hall-Mark Elec.	612-884-9056
Minn	Bloomington, Arrow Elect.	612-888-5522
Minn	Edina, Cramer Inc.	612-835-7811
Minn	Minneapolis, Hall-Mark Elec.	612-437-8800
Mo	Earth City, Hallmark Elctrns.	314-291-5350
Mo	N. Kansas City, L-Comp.	816-221-2400
Mo	St. Louis, L-Comp	314-647-5505
NJ	Cherry Hill, Cramer Inc.	609-424-5993
NJ	Hackensack, Components Plus	201-187-0565
NJ	Haddonfield, Mid-Atlantic	609-428-8288
NJ	Moonachei, Cramer	201-935-5600
NM	Albuquerque, Century Elctrns.	505-292-2700
NM	Albuquerque, Cramer	505-265-5767
NY	Elmsford, Zeus Comps.	914-592-4120
NY	Endwell, Cramer Inc.	607-754-6661
NY	E. Syracuse, Cramer Inc.	315-437-6671
NY	Farmingdale, Hall-Mark Elctrns.	516-293-7500
NY	Hauppauge, Semiconductor Specialists	516-273-1234
NY	Hauppauge, Cramer	516-488-6600
NY	Hauppauge, Cramer	516-231-5600
NY	Hauppauge, Jaco Elec.	516-273-5500
NY	New Hyde Park, Lafayette Ind., Elec.	516-488-6600
NY	Plainview, ACI Elec.	516-293-6630
NY	Rochester, Simocona Elec. Corp.	716-328-3230
NY	Rodhester, Cramer	716-275-0300
NC	Raleigh, Hall-Mark Elctrns.	919-832-4465
NC	Winston-Salem, Cramer Assoc.	919-725-8711
Ohio	Cincinnati, Sheridan	513-761-5432
Ohio	Cincinnati, Crammer Assoc.	513-771-6441
Ohio	Cleveland, Sheridan	
Ohio	Cleveland, Cramer Assoc.	216-248-8400
Ohio	Dayton, Arrow	513-253-9176
Ohio	Dayton, Sheridan	
Pa	Dallas, TI Supply	214-238-6852
Pa	Dallas, Hallmark	214-241-6111
Pa	Dallas, Cramer	214-661-9300
Pa	Houston, Hallmark	713-781-6100
Pa	Houston, Lenert Co.	713-225-1465
Pa	Huntington Valley, Hallmark	
Pa	Trevose, Hall-Mark Elctrns.	215-355-7300
Tex	Dallas, G.S. Marshall Co.	214-358-0161
Tex	Dallas, Hall-Mark Elec.	214-231-6111

Utah	Salt Lake City, Century Elect.	801-466-8721
Utah	Salt Lake City, Cramer	801-487-4131
Wash	Bellevue, Bell Inds.	206-747-1515
Wash	Seattle, Cramer	206-762-5755
Wash	Seattle, KAM Elec.	206-303-5100
Wisc	Oak Creek, Crammer	414-764-1700

SIEMENS CORP., Dept. EM, 3 Computer Dr., P.O. Box 5006, Cherry Hill, N.J. 08034, Tel: 609-424-2400, Telex: 845120; Empl.: 225

Local Sales Offices & Reps.

Ariz	Scottsdale, PLS Inc.	602-957-9110
Cal	North Hollywood, E. Momjian Assocs.	213-764-4891
Cal	Santa Clara, Siemens Corp.	408-244-5034
Cal	Santa Clara, Raydex Assoc.	408-247-9891
Colo	Denver, PLS Inc.	303-773-1218
Fla	Sarasota, W. J. Irvine Co.	813-955-9656
Md	Bethesda, Powell-Pendergraph Inc.	301-656-4535
Mass	Chelmsford, Equipment Sls. Co.	617-256-8547
Minn	Minneapolis, Engineering Prods Assoc.	612-925-1883
NM	Albuquerque, PLS Inc.	505-255-2330
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	N. Olmstead, Hocker Assocs.	216-734-4433
Pa	Willow Grove, Powell-Pendergraph Inc.	215-657-0330
Tex	Arlington, Siemens Corp.	817-461-1673
Tex	Dallas, Data Aids Assocs.	214-620-1551
Tex	Houston, Data Aids Assocs.	713-862-6685
Va	Richmond, Powell-Pendergraph Inc.	804-264-2341

SIERRA ELEC., Div. Sola Basic Inds., Dept. EM, 15100 S. Figueroa St., PO Box 85, Gardena, CA 90247, Tel: 213-321-1000, Telex: 67-4319

Sales Manager: C.L. Keeshen

SIERRA SCIENTIFIC CORP., Dept. EM, 2189 Leghorn St., Mountain View, Cal. 94043, Tel: 415-969-9315; Empl.: 55

Sales Manager: N.B. Montagnon

Local Sales Offices & Reps.

Cal	Millbrae, Ashby Assocs. of No. Cal.	415-692-4442
Cal	Pasadena, A-F Sls. Engrg.	213-681-5631
Mass	Attleboro, Elctrn. Sls. of New England	617-222-4078
Mass	Cambridge, Media Systems	617-876-0164
NJ	Totowa, H.M. Holzberg Assocs.	201-256-0455
NM	Albuquerque, Integrated Sys.	505-255-8127
Ohio	Dayton, Genelco	513-299-1819
Okla	Norman, Data Mktg Assocs.	405-364-8320
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-686-9627
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Va	Vienna, Sutter & Co.	703-938-0505
Wash	Seattle, Underwood Assocs.	206-575-0123

SIERRACIN/MAGNEDYNE INC., Dept. EM, 5580 El Camino Real, Box 458, Carlsbad, Cal. 92008, Tel: 714-438-3321, TWX: 910 322-1391; Empl.: 55

Local Sales Offices & Reps.

Ariz	Scottsdale, Kachina Assocs.	602-947-4472
Cal	Anaheim, Tri-Tek	714-533-1454
Cal	Palo Alto, O'Donnell Assocs.-North	415-327-9260
Fla	Ft. Lauderdale, Electrocomp Assocs.	303-564-8571
Ind	Indianapolis, Pacer Sls. & Engrg. Co.	317-849-1481
Mass	Needham Heights, Todino Engrg. Sls., Inc. (TESCO)	617-444-7925
NY	Williston Park, A B C Elctrn. Sls. Co.	516-747-6610
Ohio	Cleveland, Servo-Mark, Inc.	216-871-2353
Okla	Oklahoma City, Johnson-Coates	405-737-2141
Tex	Denton, C. J. Schleeweis	817-387-7219
Wash	Bellevue, SD-R^2 Products & Sls.	206-747-9424

SIERRACIN/THERMAL SYS., Dept. EM, 13920 S. Broadway, Los Angeles, Cal. 90061, Tel: 213-FA1-4350, TWX: 910-346-6774; FSC No.: 11416; Empl.: 110

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs.	205-837-4304
Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Palo Alto, Harris Engr. Assoc.	415-328-3370
Colo	Boulder, R.A. Mayes Co.	303-444-07782
Conn	Guilford, R.H. Whitehead Assoc.	203-453-3762
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Boston, R.H. Whitehead Assocs.	617-542-7676
NJ	East Orange, Friedman Assoc.	201-673-2500
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	Buffalo, H.C. Johnson Agen.	716-632-7880
NY	Rochester, H.C. Johnson Agen.	716-482-3000
Pa	Glenside, Elcom	215-885-1325
Wash	Renton, D & D Sls.	206-226-4120

™SIERRACORE - hi-temp rope heaters - Sierracin/Thermal Sys.

SIFCO METACHEMICAL, Div. Steel Improv. & Forging, Dept. EM, 5708 Schaaf Rd., Independence, Ohio 44131, Tel: 216-881-8600; Empl.: 25

Local Sales Offices & Reps.

Cal	Monrovia, Piddington & Assocs.	213-357-7976
Cal	Oakland, Cantua & Co.	415-483-2204
Cal	Pasadena, Piddington Assoc.	213-357-7976
Fla	Orlando, Gulf Atlantic	305-894-0901
Ill	Chicago, Lantry	312-724-3508
Mass	Brookline, Nehfoo	617-277-4828

SIGMA INSTRUMENTS, INC., Dept. EM, 170 Pearl St., Braintree, Mass. 02184, Tel: 617-843-5000, TWX: 94-0645 710-348-1161; Empl.: 1,000

Local Sales Offices & Reps.

Meters

Ala	Huntsville, Brandel-Stephens & Co.	205-883-0445
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Cal	Burlingame, Engrg. Reps. Co.	415-692-2581
Cal	Hawthorne, Barnard & Assocs.	213-973-5050
Cal	San Diego, Engrg. Reps. Co.	714-565-6366
Colo	Englewood, Tech Sls.	303-761-9710
Conn	North Haven, Northeast Reps.	203-239-2507
Fla	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Ga	Atlanta, Brandel-Stephens & Co.	404-261-7579
Ill	Chicago, Memeco, Inc.	312-774-0919
Iowa	Hiawatha, Gassner & Clark Co.	319-393-5763
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
La	Harahan, Williams Equip. Co.	504-737-4082
Md	Glen Burnie, New Era Sls.	301-768-6666
Mass	Needham, Northeast Reps.	617-449-3093
Minn	Wayzata, Yukon Sls. Assoc.	612-473-3274
Mo	Ferguson, Technical Sls. Assocs.	314-725-5361
NJ	Stirling, NBS Assocs.	201-464-8500
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Charlotte, D.G.W., Inc.	704-334-7090
NC	Winston-Salem, D.G.W., Inc.	919-768-7166
Okla	Tulsa, Telstar Inst. Corp.	918-628-1011
Ore	Portland, Garland Affolter Engrg. Corp.	503-223-7349
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Pa	Philadelphia, Stitzer Assocs.	215-644-5500
Tex	Dallas, J.B. Guenther	214-691-8500
Tex	Houston, Instrumatics, Inc.	713-225-6626
Tex	Houston, J.B. Guenther	713-468-0232
Wash	Kirkland, Garland Affolter Engrg. Corp.	206-822-2275

Motors

Ariz	Phoenix, REB Elctrn. Sls.	602-931-5361
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Jose, J. T. McFarland Assocs.	408-286-9333
Colo	Denver, Thorson Co.	303-759-0809
Conn	Torrington, Motoreps of New England	203-482-3193
Ga	Lilburn, Motion Technology	404-972-5050
Ill	Des Plaines, Control Sls.	312-774-1674
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Mich	Troy, Xanthus, Inc.	313-391-3235
Minn	Minnetonka, T.H. Ayre, Assoc.	612-474-4125
Mo	Ferguson, Technical Sls. Assocs.	314-725-5361
Mo	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
NJ	Camden, QED Elctrns.	215-925-8711
NJ	Red Bank, Motoreps of N.Y.	201-741-3356
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NC	Charlotte, Motion Technology	704-525-9855
Ohio	Chagrin Falls, Drivex-North	216-247-6701
Ohio	Cincinnati, Drivex Corp.	513-742-2000
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Tex	Dallas, P.J. Scanlon Co.	214-231-4661
Va	Alexandria, W.A. Brown Equip-Comp.	703-836-1800
Wash	Tukwila, General Elctrns.	206-575-4030
Wisc	Thiensville, Control Sls.	414-242-4580

Relays

Ala	Huntsville, Brandel-Stephens & Co.	205-883-0445
Ariz	Tempe, Gassner & Clark Co.	602-968-9037
Cal	El Segundo, Varigon Assocs.	213-322-1120
Cal	Los Altos, Ewing-Foley, Inc.	415-941-4525
Cal	San Diego, Daniels & Doty Sls. Co.	714-560-6266
Colo	Denver, Thorson Co.	303-759-0809
Conn	North Haven, Northeast Reps.	203-239-2507
Fla	Deerfield Beach, Brandel-Stephens & Co.	305-427-8558
Fla	Orlando, Brandel-Stephens & Co.	305-425-3202
Ga	Atlanta, Brandel-Stephens & Co.	404-261-7579
Ill	Chicago, Control Sls.	312-774-1674
Ind	Indianapolis, Electro Reps., Inc.	317-255-4147
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Md	Glen Burnie, Faion Lott & Co.	301-744-4611
Mass	Needham, Northeast Reps.	617-449-3034
Mich	Ann Arbor, A.P. Assocs.	313-476-2300
Minn	Minneapolis, Northstar Comp.	612-553-1888
Mo	Ferguson, Technical Sls. Assocs.	314-725-5361
NJ	Cherry Hill, Trinkle Sls., Inc.	609-795-4200
NJ	East Orange, M. Gallagher, Inc.	201-678-5071
NY	Binghamton, H.C. Johnson Agencies	607-723-6500
NY	Buffalo, H.C. Johnson Agencies	716-632-7880
NY	Fayetteville, H.C. Johnson Agencies	315-637-9383
NY	Rochester, H.C. Johnson Agencies	716-482-3000
NY	Syracuse, H.C. Johnson Agencies	315-637-9383
NC	Charlotte, D.G.W., Inc.	704-334-7090
NC	Winston-Salem, D.G.W., Inc.	919-768-7166
Ohio	Chagrin Falls, Midwest Mktg. Assocs.	216-247-6655
Ohio	Dayton, Midwest Mktg. Assoc.	513-433-2511
Ohio	No. Olmsted, Advanced Technology Assoc.	216-777-8010
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414
Tex	Dallas, P.J. Scanlon Co.	214-231-4661
Tex	Garland, Instrumatics, Inc.	214-495-6108
Wash	Tukwila, General Elctrns.	206-575-4030
Wisc	Thiensville, Control Sls.	414-242-4580

SIGMA INSTRUMENTS INC., International Instr. Div., Dept. EM, 88 Marsh Hill Rd., Orange, Conn. 06477, Tel: 203-795-4711

SIGMA SYS. CORP., Dept. EM, 3163 Adams Ave., San Diego, Calif. 92116, Tel: 714-283-3193; Empl.: 9 p. 2685

™SIGNAFAX - 4 inch facsimile sys. - Alden Elctrn. & Impulse Recording Equip. Co.

™SIGNAFLO - Transmission Line flat cable - T&B/Ansley Corp.

™SIGNAGUARD - encrypted alarm device - Signatron, Inc.

SIGNAL ANALYSIS OPER., Honeywell Inc., Dept. EM, 595 Old Willets Path, Hauppauge, N.Y. 11787, Tel: 516-234-5700

Local Sales Offices & Reps.

Cal	Los Angeles, O'Halloran Assocs.	213-877-0173
Cal	San Francisco, O'Halloran Assocs.	415-326-1493
Colo	Denver, Honeywell Inc.	303-771-2340
Conn	Hamden, Sci. Devices Inc.	203-248-9361
DC	Washington, Gans Fryling Inc.	703-527-3262
Fla	Orlando, Honeywell Inc.	305-894-3131
Ga	Atlanta, Honeywell Inc.	404-875-9561
Ill	Chicago, Honeywell Inc.	312-478-9266
Md	Baltimore, Gans Fryling Inc.	301-837-6311
Mass	Boston, Sci. Devices Inc.	617-894-5637
Mich	Detroit, Honeywell Inc.	313-352-1900
Minn	Minneapolis, Honeywell Inc.	612-835-5400
Mo	St. Louis, Honeywell Inc.	314-991-4100
NJ	Westfield, Honeywell Inc.	201-233-4200
NM	Albuquerque, Honeywell Inc.	505-345-1656
NY	Syracuse, Labtronics	315-454-9314
NC	Greensboro, Honeywell Inc.	919-292-1556
Ohio	Dayton, Honeywell Inc.	513-461-4480
Pa	Philadelphia, Honeywell Inc.	215-835-2500
Tex	Houston, R. Martin Assoc.	713-462-4077
Wash	Seattle, Honeywell Inc.	206-232-5030

SIGNAL LABS, INC., Dept. EM, 202 N. State College Blvd., Orange, Cal. 92668, Tel: 714-634-1533; FSC No.: IM 562; Empl.: 20

Sales Manager: Wm. A. Chidester

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Local Sales Offices & Reps.

Cal	Cupertino, Saber Entprs.	408-446-4792
Cal	Long Beach, Saber Entprs.	213-595-5646
Fla	Cocoa Beach, Teqspec, Inc.	305-784-1320
Mass	Peabody, Murray Sls. Assoc.	617-535-3058

SIGNAL TRANSFORMER CO., Dept. EM, 500 Bayview Ave., Inwood, N.Y. 11696, Tel: 516-239-7200; Empl.: 90 .... p. 4446-4459

Sales Manager: A. Leibowitz

(TM)**SIGNALEX** - electro-mechanical digital readouts - Staver Co., Inc.

SIGNALITE DIV., Gen. Instr., Dept. EM, 1933 Heck Ave., Neptune, N.J. 07753, Tel: 201-775-2490, TWX: 201-775-2255; Empl.: 300

Local Sales Offices & Reps.

Cal	N. Hollywood, Chicago Miniature	213-877-0887
Colo	Denver, Lindberg Co.	303-758-9033
Conn	Newton, Gerber Sls. Co.	203-426-3440
Fla	Hollywood, Component Engr. Sls.	305-922-5230
Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell Assocs.	317-452-6065
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Ky	Louisville, R.O. Whitesell & Assocs.	502-893-7303
Mass	East Longmeadow, Gerber Sls. Co.	413-525-3059
Mass	Waltham, Gerber Sls. Co.	617-890-8040
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-358-2020
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Minneapolis, Nortec Sls. Inc.	612-835-7414
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NJ	Neptune, Signalite	201-775-2490
NY	Syracuse, Nycom Inc.	315-437-8343
NC	Charlotte, J. Corn Assoc.	704-527-0991
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Hgts., R.O. Whitesell & Assocs.	212-826-4424
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Bristol, Rakes Engr. & Mkt. Corp.	615-968-4195
Tex	Dallas, Chicago Minature	214-337-3594
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Va	Woodbridge, M. Lader Co.	202-296-2497
Wash	Seattle, Blum & Assocs.	206-285-2590
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755

(TM)**SIGNAL KICKER** - antennas - Turner Div.

(TM)**SIGNALOCK** frequency locking system - LogiMetrics Inc.

SIGNATRON, INC., Dept. EM, 12 Hartwell Ave., Lexington, Mass. 02173, Tel: 617-861-1500, TWX: 710-326-6323

Sales Manager: J.H. Kelley

(TM)**SIGNET** - signal network cables - Superior Cable Div.

SIGNET SCIENTIFIC CO., Dept. EM, Box 6489, Burbank, Cal. 91510, Tel: 213-849-6071, TWX: 910-498-2212; Empl.: 35

SIGNETICS CORP., Dept. EM, 811 E. Arques Ave., Sunnyvale, Cal. 94086, Tel: 408-739-7700, TWX: 910-339-9220; Empl.: 6000; Minimum order: $K. Lababera

Sales Manager: M. Hackworth; *Distributor Manager:* K. Lababera

Local Sales Offices & Reps.

Ariz	Phoenix, Signetics Corp.	602-971-2517
Cal	Irvine, Signetics Corp.	714-833-8980
Cal	San Diego, Signetics Corp.	714-560-0242
Cal	San Diego, Mesa Engrg.	714-278-8021
Cal	Sherman Oaks, Astralonics	213-990-5903
Cal	Sunnyvale, Signetics Corp.	408-736-7565
Colo	Denver, Parker/Webster Co.	303-770-1972
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233
Fla	Ft. Lauderdale, Semtronic Assocs.	305-771-0010
Fla	Largo, Semtronic Assocs.	813-586-1404
Fla	Pompano Beach, Signetics Corp.	305-782-8225
Ill	Chicago, L-TEC, Inc.	312-286-1500
Ill	Rolling Meadows, Signetics Corp.	312-259-8300
Kans	Shawnee Mission, Buckman & Assocs.	913-722-5210
Kans	Wichita, Buckman & Assocs.	316-267-3655
Me	Glen Burni, MICROCOMP, Inc.	301-761-4600
Mass	Reading, Kanan Assocs.	617-944-8484
Mich	Bloomfield Hills, Ellinger Sls.	313-642-0203
Minn	Edina, Mel Foster Technical Assoc.	612-835-2234
Minn	Minneapolis, Signetics Corp.	612-884-7451
Mo	St. Charles, Buckman & Assocs.	314-724-6690
NJ	Cherry Hill, Signetics Sls.	609-665-5071
NJ	Haddonfield, Thomas Assocs. Inc.	609-854-3011
NJ	Piscataway, Signetics Corp.	201-981-0123
NM	Albuquerque, Staley Co.	505-294-2660
NY	E. Rochester, Tri Tech Elctrns.	916-381-2722
NY	Larchmont, Tri Tech Elctrns.	914-834-4423
NY	Larchmont, Tri-Met	914-632-5600
NY	Wappingers Falls, Signetics Corp.	914-297-4074
NC	Cary, Montgomery Sls.	919-467-6319
Ohio	Centerville, N. Case Assocs.	513-433-0966
Ohio	Fairview Park, N. Case Assocs.	216-333-4120
Ohio	Worthington, Signetics Sls.	614-888-7143
Ore	Portland, Western Tech. Sls.	503-297-1711
Tex	Dallas, Signetics Corp.	214-661-1296
Tex	Houston, Cunningham Co.	713-461-4197
Tex	Richardson, Cunningham Co.	214-231-2686
Utah	Salt Lake City, Parker/Webster	801-486-3737
Wash	Bellevue, Western Tech. Sls.	206-641-3900
Wisc	Greenfield, L-TEC, Inc.	414-545-8900

(TM)**SIL-BOND** - selective silver plating - Braun Co., Inc.

(TM)**SIL-CLAD** - insulation - Electric Machinery Mfg. Co.

(TM)**SILCO-FLEX** - motor and generator insulation - Allis-Chalmers

(TM)**SILCORO 60** - brazing alloys - GTE Sylvania Inc.

(TM)**SILENT BLOC** - noise reduced freq. conv. M-G - KW Controls Inc.

(TM)**SILENT PAGER** - waitress paging system - Baumker Mfg. Co.

(TM)**SILENT 700*** - electronic data terminals - Texas Instrs. Inc.

(TM)**SILFARED** - infrared filter - Metavac, Inc.

(TM)**SILFLEX** - silicone sleeving - Varflex Corp.

(TM)**SILFLO** - brazing alloys - Chemetron Corp.

(TM)**SIL-FOS** - silver brazing alloy - Handy & Harman

(TM)**SILGAN** - RTV elastomer - SWS Silicones Corp.

(TM)**SILGAR** - tube - Alpha Components Corp.

(TM)**SILICANE** - low cost silicone substitute - Packaged Resins Div.

SILICON GENERAL INC., Dept. EM, 7382 Bolsa Ave., Westminster, Cal. 92683, Tel: 714-892-5531, TWX: 910-596-1804

Local Sales Offices & Reps.

Ala	Huntsville, Murcota	205-539-8476
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	San Diego, Q.T. Wiles	714-565-6895
Cal	Tustin, Q.T. Wiles	714-832-4952
Colo	Denver, Straube Assocs.	303-426-0890
Fla	Clearwater, Dyne-A-Mark	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark	305-771-6501
Ill	Elk Grove Village, John G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assoc.	317-452-6065
Iowa	Cedar Rapids, S & O Sls.	319-393-1845
Kans	Prairie Village, John G. Twist Co.	913-236-4646
Ky	Louisville, R.O. Whitesell & Assoc.	502-893-7303
Md	Baltimore, Conroy Sls.	301-296-2444
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assoc.	313-358-2020
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	Minneapolis, Comstrand	612-571-0000
Mo	St. Louis, John G. Twist Co.	314-432-2830
NH	Nashua, Bell Controls	603-882-6984
NJ	Teaneck, R. T. Reid Assocs.	201-692-0200
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Buffalo, Ossmann Comp. Sls.	716-822-4271
NY	Kingston, Ossmann Comp. Sls.	914-338-5505
NY	Rochester, Ossmann Comp. Sls.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls.	315-454-4477
NY	Vestal, Ossmann Comp. Sls.	607-785-9949
NC	Raleigh, Component Sls.	919-782-8433
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assoc.	216-826-4424
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277
Tenn	Greeneville, R.O. Whitesell & Assoc.	615-639-6154
Utah	Salt Lake City, Straube Assocs.	801-943-5650
Wisc	Wauwatosa, John G. Twist Co.	414-475-7755
Exp:	Cal., San Diego, Total Elctrns. Int'l.	714-224-3291

SILICON SYSTEMS INC., Dept. EM, 2913 Daimler St., Santa Ana, Cal. 92705, Tel: 714-979-0941; Empl.: 14

SILICON TRANSISTOR CORP., Dept. EM, Katrina Rd., Chelmsford, Mass. 01824, Tel: 617-256-3321, TWX: 710-343-0576; FSC No.: 07256; Empl.: 125

Local Sales Offices & Reps.

Ariz	Phoenix, Southwest e/m Engrg.	602-993-0250
Cal	Marina Del Rey, Relcom	213-822-1187
Cal	Mountain View, Trident Assocs.	415-967-7031
Colo	Denver, Electrodyne	303-757-7679
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Indianapolis, Coombs Assocs.	317-251-2757
Kans	Overland Park, Ensco-Rep	913-381-7557
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Lexington, J. E. Boeing Co.	617-862-2500
Mich	Ann Arbor, A. P. Assocs.	313-878-3217
Minn	St. Paul, Cahill Assocs	612-646-7217
Mo	St. Louis, Ensco-Rep.	314-567-3935
NJ	Clifton, Compar New York, Inc.	201-546-3660
NM	Albuquerque, Tri-Tronix	505-265-0172
NY	Rochester, Electra Sls. Corp.	716-436-4030
NY	Syracuse, Electra Sls. Corp.	315-455-5783
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Richfield, Bear Mktg.	216-659-3131
Pa	Horsham, CMC Mktg.	215-672-8300
Tex	G. V. Peck Co.	214-341-8311
Tex	Houston, G. V. Peck Co.	713-787-7111
Utah	Salt Lake City, Electrodyne	801-277-8392
Va	Lynchburg, Burgin-Kreh Assocs.	703-845-5600

(TM)**SILIC-O-NETIC** - time-delay relay - Heinemann Elec. Co.

SILICONIX, INC., Dept. EM, 2201 Laurelwood Rd., Santa Clara, Cal 95054, Tel: 408-246-8000, TWX: 910-338-0227; FSC No.: 17856; Empl.: 1000; Minimum order: $D. Delane

Sales Manager: L. Lynberg; *Distributor Manager:* D. Delane

Local Sales Offices & Reps.

Ala	Huntsville, Rep., Inc.	205-881-9270
Ariz	Phoenix, Siliconix, Inc.	602-252-5885
Cal	Huntington Beach, Siliconix, Inc.	213-592-1336
Cal	Irvine, Celtec Co.	714-752-6111
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Santa Clara, Magna Sls.	408-985-1750
Cal	Santa Clara, Siliconix, Inc.	408-246-8000
Cal	Sherman Oaks, Celtec Co.	213-990-3440
Colo	Littleton, Siliconix, Inc.	303-795-3187
Conn	Ridgewood, Phoenix Sls. Co.	203-438-9644
Fla	Ft. Lauderdale, Perrott Assoc.	305-792-2211
Fla	Largo, Perrott Assocs.	813-585-3327
Fla	Orlando, Perrott Assocs.	305-275-1132
Ga	Tucker, Rep	404-938-4358

Ill	Kildeer, Technology Sls.	312-438-3300
Ill	Wheeling, Siliconix, Inc.	312-541-0131
Ind	Carmel, Rich Elctrn. Mktg.	317-844-8462
Kans	Olathe, BC Elctrns.	913-888-6680
Md	Baltimore, Coulbourn DeGreif	301-247-4696
Mass	Waltham, Siliconix, Inc.	617-890-7180
Mich	Detroit, Rathsburg Assoc.	313-882-1717
Minn	Minneapolis, Siliconix, Inc.	612-835-2515
Mo	Hazelwood, BC Elctrns.	314-731-1255
NY	Baldwin, R.O.M.E.	516-623-3344
NY	Melville, Siliconix, Inc.	516-694-8474
NY	Pittsford, T2 Elctrns.	716-381-2551
NY	Syracuse, T2 Elctrns.	315-463-8592
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Brunswick, Kimconics Sls.	216-225-6111
Ohio	Dayton, Kimconics Sls.	513-898-1783
Pa	Ft. Washington, GCM Assoc.	215-646-7535
Pa	Waterford, Kimconics Sls.	814-796-6556
Tenn	Jefferson City, Rep. Inc.	615-475-4105
Tex	Dallas, Siliconix	214-234-6927
Tex	Houston, Semiconductor Sls. Assoc.	713-661-0681
Tex	Richardson, Semiconductor Sls. Assoc.	214-231-6181
Utah	Salt Lake City, Rapier - Richards Mktg.	801-486-3415
Wash	Seattle, B. Hirsh Co.	206-783-3423
Wisc	Milwaukee, JM Sls.	414-546-0040

Local Distributors

Ala	Huntsville, Hamilton/Avnet Elctrns.	205-533-1170
Ariz	Phoenix, Hamilton/Avnet Elctrns.	602-275-7851
Cal	Costa Mesa, Avnet Elctrns.	213-558-2345
Cal	Culver City, Hamilton Electro Sls.	213-558-2193
Cal	Mt. View, Elmar Elec.	415-961-3611
Cal	Mt. View, Hamilton/Avnet Elctrns.	415-961-8600
Cal	San Diego, Hamilton/Avnet Elctrns.	714-279-2421
Colo	Commerce City, Elmar Elctrns.	303-287-9611
Colo	Denver, Hamilton/Avnet Elec.	303-534-1212
Conn	Hamden, Wilshire Elec.	203-281-1166
Conn	Wilton, Hamilton/Avnet Elctrns.	203-762-0361
Fla	Ft. Lauderdale, Hamilton/Avnet Elctrns.	305-925-5401
Fla	Orlando, Pioneeer Elec.	305-859-3600
Ga	Norcross, Hamilton/Avnet Elctrns.	404-448-0800
Ill	Elmhurst, Semiconductor Specialists	312-279-1000
Ill	Schiller Park, Hamilton/Avnet Elctrns.	312-671-6094
Ind	Indianapolis, Semiconductor Specialists	317-243-8271
Kans	Lenexa, Hamilton/Avnet Elctrns.	913-888-8900
Md	Gaithersburg, Pioneer Elec.	301-948-0710
Md	Hanover, Hamilton/Avnet Elctrns.	301-796-5000
Mass	Burlington, Wilshire Elec.	617-272-8200
Mass	Woburn, Hamilton/Avnet Elctrns.	617-933-8000
Mich	Farmington, Semiconductor Specialists	313-478-2100
Mich	Livonia, Hamilton/Avnet Elec.	313-522-4700
Minn	Edina, Hamilton/Avnet Elec.	612-941-3801
Minn	Minneapolis, Semiconductor Spec.	612-854-8841
Mo	Hazelwood, Hamilton/Avnet Elec.	314-731-1145
Mo	Hazelwood, Semiconductor Spec.	314-731-2400
Mo	Kansas City, Semiconductor Spec.	816-452-3900
NJ	Cedar Grove, Hamilton/Avnet Elec.	201-239-0800
NJ	Cinnaminson, Wilshire Elec.	609-786-8990
NJ	Clifton, Wilshire Elec.	201-340-1900
NJ	Jersey City, Wilshire Elec.	201-653-4939
NJ	Mt. Laurel, Hamilton/Avnet Elec.	609-234-2133
NM	Albuquerque, Hamilton/Avnet Elec.	505-765-1500
NY	Endwell, Wilshire Elec.	607-754-1570
NY	Farmingdale, Wilshire Elec.	516-293-5775
NY	Hauppauge, Components Plus	516-231-9200
NY	Rochester, Hamilton/Avnet Elec.	716-442-7820
NY	Rochester, Wilshire Elec.	716-442-9560
NY	Syracuse, Hamilton/Avnet Elec.	315-437-2642
NY	Westbury, Hamilton/Avnet Elec.	516-333-5800
NC	Greensboro, Pioneer Elec.	919-273-4441
Ohio	Cleveland, Hamilton/Avnet Elec.	216-461-1400
Ohio	Dayton, Semiconductor Spec.	513-278-9455
Ohio	Dayton, Hamilton/Avnet Elec.	513-433-0610
Pa	Horsham, Pioneer Elec.	215-674-5710
Pa	Pittsburgh, Semiconductor Spec.	412-781-8120
Tex	Dallas, Hamilton/Avnet Elec.	214-661-8661
Tex	Dallas, Quality Comps.	713-777-7116
Tex	Houston, Quality Comps.	713-777-7116
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For:	Can., Ottawa, Ont., Hamilton/Avnet Elec.	613-226-1700
For:	Can., Rexdale, Ont. M9W 1K5, Future Elec.	416-7820
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For:	Can., Vancouver, BC, R. A. E. Indl. Elec.	604-687-2621

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SILTEC CORP., Dept. EM, 3717 Haven Ave., Menlo Park, Cal. 94025, Tel: 415-365-8600, Telex: 34-5503; Empl.: 250

Local Sales Offices & Reps.

Ariz	Phoenix, Sterns and Assocs.	602-996-9077
Cal	Menlo Park, Siltec Corp.	415-365-8600
Conn	Ridgefield, RHB Sls.	203-438-8334
Fla	Fort Lauderdale, Semquip, Inc.	305-772-3002
NJ	Belleville, RHB Sls. Co.	201-687-6220
Pa	Franconia, RHB Sls. Co.	215-368-2017
RI	Woonsecket, TEC Sls. of New England	401-766-3531
Tex	Dallas, KTI Chemicals	214-827-6480
Utah	Salt Lake City, Specialty Sls.	801-262-2979
Wash	Seattle, Demarest & Assocs.	206-523-0600

SILTRAN DIGITAL, Dept. EM, 14831 Kitterman, Box 437, Silverado, Cal. 92676, Tel: 714-649-2704

Sales Manager: M.F. Hordeski, Cust. Svcs.

Local Sales Offices & Reps.

Ariz	Tucson, G. Moore Assoc.	602-795-3176
Cal	San Gabriel, Controls for Industry	213-289-6958
Colo	Boulder, G. Moore Assoc.	303-494-3351
NM	Albuquerque, G. Moore Assoc.	505-292-3322
NC	Charlotte, Binco	704-366-5092
Pa	Bethayres, Control Instr. Sls.	215-676-1808
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™SILVER-GRIP - set screws - PIC Design Div.

™SILVER II - silver oxide watch battery - Ray-O-Vac Div.

™SILVER SERIES - personal hand lamps - Teledyne Big Beam

™SILVERWELD - terminations - Bourns, Inc.

™SILVREX - silver plating process - Sel-Rex Div. Oxy Metal Industries Corp.

SIMMONDS PRECISION, Engine Systems Div., Dept. EM, Norwich, N.Y. 13815, Tel: 607-334-3264, TWX: 510-261-7776; Empl.: 450

Sales Manager: L.S. Colwell

Local Sales Offices & Reps.

Cal	Orange	714-634-0844
La	Marrero	504-347-5416
Tex	Houston	713-960-8590

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Sales Manager: M.O. Buehring; *Distributor Manager:* J. Rothenbach

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Alas	Anchorage, H.J. Lang	279-5741
Cal	Burlingame, W.J. Purdy Assoc.	415-347-7701
Cal	Monrovia, Simpson Sls.	213-359-8132
Cal	Sacramento, W.J. Purdy Assoc.	916-422-0128
Colo	Englewood, R.G. Bowen Co.	303-789-1884
Conn	Meriden, P.R. Sturgeon	203-237-1112
DC	Washington, S.K. MacDonald	202-265-3938
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ind	Ft. Wayne, Baehr-Greenleaf & Assoc.	219-447-1608
Ind	Indianapolis, L.M. De Voe Co.	317-257-1227
Iowa	Des Moines, Kathrinus-Kelly	515-255-4584
Kans	Shawnee Mission, Kathrinus-Kelly	913-722-0000
La	Gretna, Cartwright & Bean	504-362-4649
Md	Baltimore, S.K. MacDonald, Inc.	301-254-3381
Md	Wheaton, A. H. Swanson Co.	301-949-7440
Mass	Babson Park, P.R. Sturgeon Co.	617-237-3506
Mich	Detroit, R.C. Merchant Co.	313-535-6000
Mich	St. Joseph, R.C. Merchant Co.	616-983-7378
Minn	Edina, M. Foster Tech. Sls.	612-835-2252
Miss	Jackson, Cartwright & Bean Co.	601-981-1368
Mo	St. Louis, Kathrinus-Kelly	314-968-3800
NM	Albuquerque, C.T. Carlberg	505-265-1579
NY	Buffalo, L.D. Allen Inc.	716-837-1955
NY	Fairport, D. Allen Inc.	716-377-3530
NY	Great Neck, Simpson Instrs. Sls.	516-482-3103
NY	North Syracuse, L.D. Allen Inc.	315-458-7470
NY	Pleasant Valley, L.D. Allen Inc.	914-635-3363
NC	Charlotte, Cartwright & Bean	704-333-6457
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Centerville, A. H. Swanson Co.	513-433-6668
Ohio	Cincinnati, Baehr-Greenleaf & Assoc.	513-891-3826
Ohio	Cleveland, Baehr-Greenleaf & Assoc.	216-221-9030
Ohio	Columbus, Baehr-Greenleaf & Assoc.	614-486-4046
Ohio	Dayton, Baehr-Greenleaf & Assoc.	513-293-1102
Okla	Tulsa, J.Y. Schoonmaker Co.	918-936-1423
Ore	Portland, Earl & Brown	503-245-2283
Pa	Philadelphia, S.K. Macdonald Inc.	215-545-1205
Pa	Pittsburgh, S.K. MacDonald Inc.	412-366-2643
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean Co.	901-276-4442
Tex	Dallas, J.Y. Schoonmaker Co.	214-349-1650
Tex	Houston, J. Y. Schoonmaker Co.	713-926-9510
Tex	San Antonio, A. H. Swanson Co.	
Wash	Seattle, Earl & Brown	206-284-1121
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SINCLAIR RADIO LABS., Dept. EM, 122 Rayette Road, Concord, Ontario, Can. L4K 1B6, Tel: 416-669-1244, Telex: 06-964598; Empl.: 100

Sales Manager: W.H. Galpin

Local Sales Offices & Reps.

NY	Tonawanda

SINCLAIR RADIONICS, INC., Dept. EM, 375 Park Ave., New York, N.Y. 10022, Tel: 212-688-6623

SINGER CO., American Meter Div., Dept. EM, 13500 Philmont Ave., Philadelphia, Pa. 19116, Tel: 215-673-2100, TWX: 710-670-0965

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Cal	Fullerton
Colo	Denver
Ga	Atlanta
Ill	Hinsdale
Kans	Kansas City
Mass	Waltham
Mich	Chelsea
Minn	Minneapolis
Neb	Omaha
NJ	Clark
Okla	Tulsa
Ore	Lake Oswego
Pa	Philadelphia
Pa	Pittsburgh
Tex	Garland
Tex	Houston
Wash	Mercer Island
Wisc	Beaver Dam

SINGER CO., THE, Controls Div., Appl. & Auto. Controls, Dept. EM, 9655 W. Soreng Ave., Schiller Park, Ill. 60176, Tel: 312-678-4150; Empl.: 1500

SINGER CO., HRB - Singer, Inc., Dept. EM, Box 60, Science Park, State College, Pa. 16801, Tel: 814-238-4311

SINGER CO., Kearfott Div., Dept. EM, 1150 McBride Ave., Little Falls, N.J. 07424, Tel: 201-256-4000, TWX: 710-988-5700; Empl.: 4600

Local Sales Offices & Reps.

Ariz	Phoenix, Southwest e/m Engrg., Inc.	602-944-1521
Cal	Glendale, Singer Co., Kearfott Div.	213-247-8076
Cal	San Jose, Richards Assocs.	408-246-5860
Fla	Melbourne, Tech-Rep Assocs., Inc.	305-723-9140
Ga	Atlanta, Tech-Rep Assocs., Inc.	404-939-8339
Ill	Oakbrook, Singer Co., Kearfott Div.	312-654-0800
Mo	St. Louis, Singer Co., Kearfott Div.	314-521-0100
NJ	Clifton, Singer Co., Kearfott Div.	201-256-4000
NJ	Little Falls, Singer Co., Kearfott Div.	201-256-4000
NC	Raleigh, Candor Co., Inc.	919-787-2652
Ohio	Dayton, Singer Co., Kearfott Div.	513-222-8942
Ore	Portland, J.J. Backer Co.	503-297-3776
SC	Myrtle Beach, Candor Co., Inc. ..	803-448-5213
Tenn	Chattanooga, Candor Co., Inc. ..	615-894-7454
Tex	Irving, Singer Co., Kearfott Div...	214-352-1764
Va	Lynchburg, Candor Co., Inc.	703-846-6579
Wash	Renton, Singer Co., Kearfott Div.	206-228-4356

SINGER CO., Librascope Div., Dept. EM, 833 Sonora Ave., Glendale, Cal. 91201, Tel: 213-245-8711, TWX: 910-497-2266; Empl.: 1600

Local Sales Offices & Reps.

DC	Washington	202-223-4100
NJ	West Long Branch......................	201-870-1222

SINGER INSTRUMENTATION, Los Angeles Oper., Dept. EM, 5340 Alla Rd., Los Angeles, Cal. 90066, Tel: 213-822-3061, TWX: 910-343-6969; Empl.: 320

Sales Manager: W. Becher, Mktg. Dir.

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs	205-534-9771
Ariz	Scottsdale, Williams Assocs.	602-947-4297
Ariz	Tucson, Ross Com......................	602-885-5368
Cal	Covina, Ross Comms.	213-966-9121
Cal	Marina Del Rey, Ross Com.	213-966-9121
Cal	Redding, Ross Com.	916-241-0579
Cal	Sunnyvale, Ross Com.	415-941-6467
Colo	Denver, Williams' Assocs.	303-373-4730
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2065
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Shawnee Mission, EIR Co.	913-362-0919
Md	Rockville, Electronic Mktg. Assocs.	301-881-5300
Mass	Waltham, Measurement Consits. Corp.	617-890-4400
Mich	Madison Heights, WKM Assocs..	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	Hazelwood, EIR Co.	314-895-4100
Mo	St. Louis, Carter Elctrn.	314-569-1406
NJ	Paramus, SDM Rep.	201-368-0123
NM	Albuquerque, Williams Assocs....	505-255-1638
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs	513-434-7500
Okla	Norman, Data Mktg. Assoc.	405-364-8320
Ore	Portland, SJI Corp.	503-224-0344
Pa	King of Prussia, Electronic Mktg. Assocs.	215-248-5050
Pa	Pittsburg, WKM Assocs.	412-892-2953
RI	Cumberland, Measurement Consits. Corp.	401-333-6000
Tex	Austin, Data Mktg. Assoc.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assoc.	512-828-0937
Va	Richmond, Electronic Mktg. Assocs.	804-740-2130
Wash	Seattle, SJI Corp.	206-624-9020
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

SINGER - TELE-SIGNAL, Dept. EM, 250 Crossways Pk. Dr., Woodbury, N.Y. 11797, Tel: 516-921-9400, TWX: 510-221-2121; FSC No.: 10241; Empl.: 400

Local Sales Offices & Reps.

Cal	Los Angeles, H. Lucas	213-483-4800
Cal	Sacramento, R. Hutter	916-488-8145
DC	Wash, M. Walker	202-223-4100
Fla	Orlando, Singer Tele-Signal........	305-851-4420
NY	Webster, Singer/Tele-Signal	716-872-4839
Pa	Philadelphia, Singer Tele-Signal	215-568-1165
Tex	Plano, Singer Tele-Signal	214-424-8615

(TM)S.I.R. - syncronous inverter regulator system of electronic voltage control - Acme Electric

SITCO ANTENNAS, Dept. EM, 10330 N.E. Marx St., Portland, Ore. 97220, Tel: 503-253-2000; Empl.: 18

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SIVERS LAB, Dept. EM, Box 90339, Los Angeles, Cal. 90009, Tel: 213-821-0213; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles, Cleland & Co.........	213-821-0213
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Local Sales Offices & Reps.

NY	Mattydale, W.M. Onyx Co.	315-446-7930

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Local Sales Offices & Reps.

Cal	Los Gatos, Luscombe Engrg. Co.	408-354-6496
Cal	Pasadena, Luscombe Engrg. Co.	213-684-2000
Colo	Lakewood, Intermountain Instrs.	303-237-0443
Conn	Meriden, Abbott-Allison Co.	203-237-9232
Fla	Orlando, Datarep, Inc..................	305-843-5224
Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Ill	La Grange, Olson Engrg. & Sls. Corp.	312-482-3300
Ind	Anderson, K. E. Schneider	317-644-1690
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Randolph, Abbott-Allison Co.	617-986-6507
Mich	Birmingham, Electro-Mation Assocs.	313-564-6517
Minn	Minneapolis, Loren Green Assocs.	612-781-1611
NJ	Bogota, Neville & Vespo Corp. ..	201-487-1505
NY	Elbridge, L-Tron Corp.	315-689-3787
NC	Charlotte, Systems Service Corp.	704-377-3407
Ohio	Cleveland, Fred R. Sharp Co.	216-464-3820
Pa	Glenside, C.A. Briggs Co............	215-885-2244
Pa	Pittsburgh, R.W. Moulton & Assocs.	412-366-3333
Tex	Dallas, Concept Sls. Co.	214-241-5202
Va	Richmond, Systems Svc. Corp...	804-231-7309
Wisc	Milwaukee, Olson Engrg. & Sls. Corp.	414-873-7330

(TM)SKAN-COAX - reflective skanner - Skan-A-Matic Corp.

SKIA CORP., Dept. EM, 460 Division St., Campbell, Cal. 95008, Tel: 408-374-5840; Empl.: 25

Sales Manager: W. Zinky

Local Sales Offices & Reps.

Cal	Campbell, SKIA Corp..................	408-374-5841

(TM)SKIP-A-DIP - dummy ic - Micro Electronic Systems, Inc.

(TM)SKIPPER - fan - Rotron, Inc.

SKOTTIE ELECTRONICS INC., Dept. EM, Line St., Archbold, Pa. 18403

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(TM)SKY-TIE - bus drop cable clamps - Adalet Mfg. Co.

(TM)SL - chemicals - Mallinckrodt, Inc.

SLAUGHTER CO., Dept. EM, Moore & Hailey Sts., P.O. Box 1805, Ardmore, Okla. 73401, Tel: 405-223-4773, TWX: 910-830-6972; FSC No.: 05611 .. p. 2928,2929

(TM)SLEEPATRON - electronic sleep inducer - Gardiner Elctrns.

(TM)SLEEV-SCRU - fastener-insulated - Pylon Co., Inc.

SLEPIAN, ARTHUR & CO., Dept. EM, 412 Housatonic Ave., Bridgeport, Conn. 06608, Tel: 203-366-5294; Empl.: 5

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(TM)SLIMLINE - digital panel instruments - NES, Inc.

(TM)SLIMPAC - high voltage rectifier - Semtech Corp.

(TM)SLIMPAC JR. - high voltage rectifier - Semtech Corp.

(TM)SLIMPAC SR. - high voltage rectifier - Semtech Corp.

(TM)SLIM SR. - miniature soldering iron - Hexacon Elec. Co.

(TM)SLIM-TRACK - chassis slides - Barnes Engrg. Co.

(TM)SLIP-LOCK - teflon insulated terminals - U.S. Terminals

(TM)SLIP-SYNC - automatic synchronizer - Chadwick-Helmuth Co., Inc.

SLOAN COMPANY, Dept. EM, 7704 San Fernando Rd., Sun Valley, Cal. 91352, Tel: 213-875-1123, TWX: 910-498-2250; Empl.: 21 .... p. 2654-2657

Sales Manager: G.M. Elsner

Local Sales Offices & Reps.

Cal	Los Angeles, P. Wiley Co.	213-663-8028
Cal	San Diego, Wiley Co.	714-270-5720
Colo	Englewood, Dynatech	303-773-2830
Conn	Meriden, Eagle Assocs.	203-235-9036
Fla	Pompano Beach; Cole-Tek Assocs.	305-781-8110
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
Md	Silver Springs, H.R. Sieber Co...	301-389-9110
Mass	Pinehurst, Eagle Assocs.	617-444-3446
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-0800
NJ	Cherry Hill, Quality Components	609-428-6266
NJ	Englewood Cliffs, E. Glass Assocs.	212-586-8440
NY	Rochester, J. G. Welch Assocs.	716-244-1100
Utah	Salt Lake City, Dynatech	801-278-6920
Wash	Seattle, D. Smith Sls.Co.	206-633-3160

Local Distributors

Ala	Huntsville, Powell/Gulf Elctrns...	205-539-2731
Cal	Los Angeles, El-Com, Inc.	213-223-1353
Cal	Mountain View, Powell Elctrns. ..	415-964-0820
Colo	Denver, Newark-Denver Elctrns.	303-757-3351
Conn	Waterbury, Bond Radio Elctrns.	203-757-0546
Fla	Ft. Lauderdale, Peerless Radio Corp.	305-566-5966
Fla	Miami, Electronic Equip. Co.	305-635-0421
Fla	Miami, Powell/Gulf Elctrns.	305-592-3260
Fla	Winterpark, Electronic Equip. Co.	305-644-4833
Ill	Des Plaines, Edmar Elctrns. Co.	312-298-8580
Kans	Wichita, Interstate Elctrn. Supply	316-264-6316
Md	Beltsville, Powell Elctrns./Wash.	301-937-4030
NY	Buffalo, Genesee Radio & Parts	716-873-9661
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
Ohio	Solon, Repco	216-248-8900
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Tex	Houston, Altair Co.	713-462-3029
Tex	Richardson, Southwest Elctrns...	214-234-3050
Tex	Richardson, Altair Co.	214-231-5166
Tex	Stafford, Southwest Elctrns.	713-494-6021
Wash	Seattle, Zepher Elctrn. Sls. Corp.	206-242-2517

SLOAN TECHNOLOGY CORP., Dept. EM, 535 E. Montecito St., Santa Barbara, Cal. 93103, Tel: 805-963-4431, TWX: 910-334-4901; Empl.: 100

Local Sales Offices & Reps.

Cal	Sunnyvale, Sloan Technology	408-733-8522
Cal	Whittier, Micro-tech West	213-694-2124
Colo	Denver, G. O'Brien Sls. Agency	303-477-4713
Ga	Atlanta, G.H. Crossley Assocs. ..	404-261-4278
Ill	Park Ridge, B. Ellis & Assocs.....	312-298-7626
Mass	Boston, Industrial Equip. & Sls. ..	617-227-8112
NY	Clifton Park, Empire Technology, Inc.	518-371-2480
NY	Rochester, Empire Technology, Inc.	716-225-5820
Pa	Pittsburgh, Kurt J. Lesker Co.	412-892-2996
Tex	Richardson, Yarbrough Southwest Co.	214-690-0800
Va	Alexandria, Sloan Technology	703-780-4647
Va	Fairfax, Capitol Research Equip.	703-560-1616

(TM)SLO-BLO - miniature fuses - Littelfuse, Inc.

(TM)SLO-SWITCH - cushioned-starter - East Controls Co.

(TM)SLO-SYN - synchronous/stepping motors, controls, drives - Superior Electric Co.

(TM)SMART - add on & replacement core memory - Standard Memories,

(TM)SMART COUNTERS - 6 digit display counter - Nu-Metrics

(TM)SMART/MUX - intelligent communications networks - Digital Communications Assoc., Inc.

SMC MICROSYSTEMS CORP., Dept. EM, 35 Marcus Blvd, Hauppauge, N.Y. 11787, Tel: 516-273-3100

SMITH INC., HERMAN H., Dept. EM, 812 Snediker Ave., Brooklyn, N.Y. 11207, Tel: 212-272-9400, TWX: 710-584-2363; FSC No.: 83330; Empl.: 200; Minimum order: $S. Fleischman .... p. 2144-2199

Sales Manager: S. Fleischman; *Distributor Manager:* S. Fleischman

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn..................	602-258-7893
Cal	Los Angeles, E.E. Strassner Co.	213-666-1511
Cal	Redwood City, Warren-Hickey Sls.	415-368-3849
Colo	Denver, Shefler-Kahn	303-831-9087
Conn	Waterbury, Coakley, Boyd & Abbett	203-272-2261
Fla	Bradenton, Hutto Hawkins Peregoy	813-755-4015
Fla	Maitland, Hutto Hawkins Peregoy	305-831-2474
Fla	Pompano Beach, Hutto Hawkins Peregoy	305-943-9593
Ill	Chicago, J.J. McBride Sls.	312-775-1080
Ind	Indianapolis, Schroeder & Loomis	317-251-4571
Kans	Overland Park, Lowell Kangas & Assoc.	913-631-3515
La	Metairie, J.F. McKinney Sls.........	504-887-1723
Md	Lutherville, L.D. Lowery	301-823-2172
Md	Silver Spring, L.D. Lowery	301-439-3542
Mass	Needham, Coakley, Boyd & Abbett	617-444-5470
Mich	Ferndale, Shalco	313-547-4771
Minn	Minneapolis, C.R. Gibb	612-377-1200
Mo	St. Louis, Lowell Kangas & Assoc.	314-821-4050
NM	Albuquerque, Shefler-Kahn	505-265-7077
NY	North Syracuse, L.D. Allen..........	315-458-7470
NY	Snyder, L.D. Allen	716-839-3300
NY	Yonker, J. Brown Elctr.................	914-779-7330
Ohio	Dayton, Bear Mktg.	513-299-3566
Ohio	Richfield, Bear Mktg.....................	216-659-3331
Okla	Tulsa, J.F. McKinney Sls.	918-742-6791
Ore	Portland, Dale Weber	503-234-7671
Pa	Broomall, L.D. Lowery	215-356-5300
Pa	Pittsburg, Trymax Co.	412-823-8400
RI	Harrisburg, L.D. Lowery	717-233-0917
Tex	Bellaire, J.F. McKinney Sls.	713-774-3232
Tex	Dallas, J.F. McKinney Sls.	214-631-9450
Va	Charlottesville, L.D. Lowery	804-973-6672
Va	Fredricksburg, L.D. Lowery	703-371-5099
Wash	Seattle, D. Weber Co....................	206-623-5990
Wash	Spokane, D. Weber Co.	509-624-3908

(TM)SMITTY - folding hex wrench set - Marshall Industries

(TM)-S/N- - fatigue life gage - Micro-Measurements Div.

(TM)SNAIL - connectors - Pylon Co., Inc.

(TM)SNAPBLOCKS - Sectional terminal blocks - Kulka Elec. Corp.

(TM)SNAP-COUPLER - tractor quick hitches - Allis-Chalmers

(TM)SNAP-IN - captive screws - Tridair Inds.

(TM)SNAPLITE - indicator light - Leecraft Mfg. Co., Inc.

(TM)SNAP-LOCK - limit switches - Namco Controls

(TM)SNAP-ON - automotive hand tools - Snap-On-Tools

SNAP-ON-TOOLS, Dept. EM, 8192-A 28th Ave., Kenosha, Wisc. 53140, Tel: 414-654-8681; Empl.: 2500

Sales Manager: M. Gregory

Local Sales Offices & Reps.

Ala	Birmingham..................................	205-956-1722
Ariz	Phoenix	602-272-2615
Cal	Anaheim	714-635-4550
Cal	Carson..	213-321-6223
Cal	Emeryville	415-654-8666
Cal	Santa Clara	408-247-9200
Colo	Denver..	303-936-2363
Conn	Wethersfield	203-529-7481
Fla	Jacksonville	904-786-3746
Fla	Miami Lakes	305-558-0292
Ga	Atlanta..	404-875-9682
Haw	Kaneohe	808-235-3673
Ill	Elk Grove Village..........................	312-437-6112
Ill	La Grange.....................................	312-352-3741
Ind	Indianapolis..................................	317-545-7563
Iowa	Davenport	319-322-5978
La	Harahan	504-733-0200
Md	Hanover..	301-796-5055
Mass	Marlboro	617-481-1700
Mich	Farmington Hills...........................	313-476-7300
Minn	Minneapolis..................................	612-927-7994
Mo	Kansas City	816-931-2322
Mo	St. Louis	314-647-2338
Neb	Omaha	402-592-2555
NJ	Delran	609-764-0172
NJ	Fairfield	201-575-1666
NY	Buffalo..	716-633-2727
NY	Latham	518-783-9444
NY	West Babylon................................	516-420-8550
NC	Charlotte.......................................	704-554-7881
Ohio	Cincinnati......................................	513-771-9114
Ohio	Eastlake	216-951-3457
Ohio	Toledo	419-729-3771
Okla	Oklahoma City	405-528-2825
Pa	Camp Hill	717-761-6767
Pa	Irwin...	412-242-5551
Pa	West Chester................................	215-431-2080
Tenn	Memphis	901-396-5703
Tex	Dallas	214-631-4700
Tex	Houston..	713-869-0311
Tex	San Antonio	512-661-4606
Utah	Salt Lake City	801-487-0607
Va	Richmond	804-288-5749
Wash	Seattle..	206-246-3200
Wisc	New Berlin	414-786-7055

(TM)SNAP-OUT - aluminum tower - Up-Right Scaffolds

(TM)SNAP-PAK - rings, retaining - Waldes Kohinoor, Inc.

(TM)SNAPPER - DC servo motors - Torque Systems, Sub. Rotron/EG & G Co.

(TM)SNAPPER - plastic hose clamps - Tyton Corp.

(TM)SNAPSEELS - commercial switch seals - APM-Hexseal

(TM)SNAP-TITE - variable resistor - Centralab

(TM)SNAPTRACK - relay/timer mounting system - RDI/Reed Devices, Inc.

(TM)SNAPTROL - snap together replacement potentiometers - CTS Corp.

(TM)SNAP-WRAP - modular connector panels - Amphenol North America Div.

(TM)SNAP-WRAP - modular connector panels - Amphenol North America Div.

SNELGROVE, C. R. LTD., Dept. EM, 141 Bond Ave., Don Mills 404 Ont., Ont. Can., Tel: 416-447-8531, TWX: 610-492-1354; Empl.: 175

Local Sales Offices & Reps.

Cal	Encino, El-Tec Inc.	
Ind	Fort Wayne, Component/Insulation Corp.	219-485-7114
Iowa	Cedar Rapids, PMA Corp.	319-362-9177
Kans	Overland Park, PMA Corp.	913-381-0004
Mass	Waban, QRC Co.	
Mo	Hazelwood, PMA Corp.	314-731-4334
Ohio	Cleveland, Component/Insulation	
Tex	Plano, Zeus Engrg.	214-423-2027

(TM)SNIFFER - portable combustible gas indicator - Bacharach Instrument Co.

(TM)SNIPE - Snap Switch - Illuminated Products Inc.

(TM)SNORTINI - desoldering tool (mini) - Edsyn, Inc.

(TM)SNOW-BEE - snow thrower - Allis-Chalmers

(TM)SOCKS - connectors - T & B/Thomas & Betts

(TM)SOCKS - connectors - T & B/Thomas & Betts

(TM)SOCREM - step motors - Portescap US

SODECO DIV., Landis & Gyr, Inc., Dept. EM, 4 Westchester Plaza, Elmsford, N.Y. 10523, Tel: 914-592-4400, TWX: 710-567-1219; Empl.: 65 p. 2402

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Electronic Assos., Inc.	205-881-5031
Ariz	Tempe, Trembly Assocs.	602-966-4468
Cal	Los Altos, Recht	415-941-0336
Cal	Los Angeles, Universal Comps.	213-641-4255
Colo	Denver, Thorson Co.	303-759-0809
Fla	Ft. Lauderdale, Beacon Elctrns.	305-776-6074
Fla	Maitland, Beacon Elctrns.	305-647-3498
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Haw	Honolulu, Berkley Engrg.	808-538-1921
Ill	Rolling Meadows, Sumer	312-394-4900
Iowa	Cedar Rapids, Pallatine Sls.	319-365-8071
Kans	Derby, Pallatine Sls.	316-788-0621
Kans	Lenexa, Pallatine Sls.	913-492-7020
Md	Glen Arm, Hodgins Assocs.	301-592-7047
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Detroit, L. Dickelman	313-255-3300
Minn	New Brighton, TWC Sls.	612-636-1770
Miss	Hernando, Beacon Elctrns.	601-368-9008
Mo	St. Louis, Pallatine Sls.	314-426-7055
NM	Albuquerque, Trembly Assocs.	505-293-4444
NY	Buffalo, Application Specialists	716-834-3377
NY	East Syracuse, Application Specialists	315-437-2813
NY	Mt. Vernon, D. Sonkin	914-668-9809
NY	Rochester, Application Specialists	716-586-6226
NC	Greensboro, Beacon Elctrns.	919-674-9432
SC	Spartanburg, Beacon Elctrns.	803-582-4613
Tex	Dallas, RMA	214-361-8584
Tex	Houston, RMA	713-444-2944
Wash	Mercer Island, J. Andersen	206-232-0484

Local Distributors

Cal	Glendale, Western Elctrns. Supply	213-246-4861
Colo	Englewood, R.V. Weatherford	303-761-5431
Conn	Hamden, Dowiak Assocs.	213-281-1331
Ill	Chicago, Revere Elect. Supply Corp.	312-738-3636
Ind	Indianapolis, B & B Motor & Control Corp.	317-248-0396
Mass	Bellingham, Dowiak Assocs.	617-966-0404
Mass	Newton, Impact Sls. Co.	617-984-7740
NY	New York, B & B Motor & Control Corp.	212-966-5777
NY	Rochester, B & B Motor & Control Corp.	716-473-6640
Ore	Seattle, R. V. Weatherford Co.	206-243-6340

(TM)SODEREZE (R) - Magnet Wire - Phelps Dodge Magnet Wire Co.

(TM)SODER-MASK - a temporary solder resist - Solder Removal Co.

(TM)SODER-WICK - a desoldering tool - Solder Removal Co.

(TM)SODR-X-TRACTOR - desoldering tool - Pace Inc.

(TM)SOFT SWITCHING - power supplies - Elgin Elctrns., Inc.

(TM)SOFTY - work hats - Clauss Cutlery Co.

(TM)SO-HOT - heater - Therm-O-Lab Corp.

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SOLA ELECTRIC, Dept. EM, 1717 Busse Rd., Elk Grove Village, Ill. 60007, Tel: 312-439-2800, Telex: 28-3451; Empl.: 450 .... p. 3321

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Zeus	602-253-6104
Cal	Inglewood, J. Berman Co.	213-649-6111
Cal	Oakland, Moulthrop Sls.	415-261-7676
Colo	Denver, Zeus	303-770-4400
Colo	Englewood, Zeus	303-770-5666
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Chicago, IRI, Inc.	312-647-7755
Ind	Fort Wayne, Baehr, Greenleaf & Assoc.	219-447-1608
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
La	Gretna, Cartwright & Bean	504-362-4649
Mass	Norwood, JMG, Inc.	617-762-5333
Mich	Detroit, R.C. Merchant & Co.	313-535-6000
Mich	St. Joseph, R.C. Merchant & Co.	616-983-7378
Minn	St. Paul, Northport Engrg.	612-698-3841
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-0800
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NM	Albuquerque, Zeus	505-268-3941
NY	Port Washington, TMA	516-883-2432
NY	Rochester, L-Mar Assocs.	716-328-5240
NY	Syracuse, L-Mar Assocs.	315-437-7779
NC	Charlotte, Cartwright & Bean,	704-333-6457
NC	Raleigh, Cartwright & Bean,	919-781-6560
Ohio	Cincinnati, Baehr, Greenleaf & Assoc.	513-891-3826
Ohio	Columbus, Baehr, Greenleaf & Assoc.	614-486-4046
Ohio	Dayton, Baehr, Greenleaf & Assoc.	513-293-1102
Ohio	Lakewood, Baehr, Greenleaf & Assoc.	216-221-9030
Ore	Portland, Earl & Brown Co.	503-245-2283
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, Erickson Sls.	214-243-6611
Wash	Seattle, Earl & Brown Co.	206-284-1121
Wisc	Milwaukee, Industrial Reps.	414-259-0965

SOLAR ELCTRNS. CO., Dept. EM, 901 N. Highland, Hollywood, Cal. 90038, Tel: 213-462-0806; FSC No.: 13222; Empl.: 10

SOLAR ELCTRNS. CO. cont'd

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A UNIQUE LINE OF INSTRUMENTS, COMPONENTS AND ACCESSORIES TO ASSIST THE RFI/EMC ENGINEER IN COMPLYING WITH MIL-STD-461 AND OTHER EMI SPECS. TRANSIENT GENERATORS, AUDIO POWER SWEEP GENERATORS, LISNS, CURRENT PROBES, ISOLATION TRANSFORMERS, FEED-THRU CAPACITORS, EMI FILTERS AND WAVE FILTERS.

(TM)SOLAR HEATER - flat quartz radiant infrared heat source - Casso-Solar Corp.

(TM)SOLAR UNITUBE HEATER - unidirectional tubular quartz heater - Casso-Solar Corp.

SOLATRON ENTERPRISES, Dept. EM, 421 E. Beach Ave., Inglewood, Calif. 90302, Tel: 213-678-4981; Empl.: 20

(TM)SOLDAPULLT - desoldering tool - Edsyn, Inc.

(TM)SOLDASIP - resoldering wick - Edsyn, Inc.

(TM)SOLDAVAC - desoldering tool - Edsyn, Inc.

(TM)SOLDERCON - IC & transistor sockets - Molex Inc.

(TM)SOLDEREX - tin-lead composition and components thereof - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)SOLDER MASTER - elec. soldering irons - Hexacon Elec. Co.

(TM)SOLDERPAK - - Raychem Corp.

SOLDER REMOVAL CO., Dept. EM, 1077 E. Edna Pl., Covina, Cal. 91724, Tel: 213-967-3681, TWX: 910-584-1820; Empl.: 45

Sales Manager: H.M. Cramer, Dir. Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, Repcom, Inc.	205-859-4400
Ariz	Phoenix, Maddox Sls. Co.	602-274-3807
Cal	Los Angeles, Maddox Sls. Co.	213-949-5433
Cal	San Francisco, Maddox Sls. Co.	415-431-2953
Colo	Arvada, Sage Sls.	303-841-2487
Conn	Glastonbury, Barton-Caron & Assoc.	203-633-9417
Fla	Melbourne, Repcom, Inc.	305-254-1877
Fla	Orange Park, R. Hartman	904-269-2371
Ill	Chicago, Gaudian Ind.	312-725-9011
Md	Westminster, B. Brookhart	301-876-2472
Mass	Auburndale, Barton-Caron & Assoc.	617-332-2021
Minn	Minneapolis, Norton & Assocs.	612-881-6226
NM	Albuquerque, Maddox Sls. Co.	505-298-2422
NY	Great Neck, F. Tylinski Co.	516-466-9070
Ohio	Cleveland, Buckeye Components	216-292-2889
Ohio	Dayton, Buckeye Components	513-278-4279
Ore	Portland, J.V. BeLusko & Co.	503-222-4279
Pa	York, E. F. Classen & Assoc.	717-741-1689
SC	Greenville, J & L Assocs.	803-244-2508
Tex	Dallas, E. Tron Sls.	214-348-4749
Utah	Salt Lake City, Sage Sls.	801-531-0531
Wisc	Milwaukee, Gaudian Ind. Sls.	

(TM)SOLDER SLEEVE - wire shield terminations - Raychem Corp.

(TM)SOLDER TACTS - cable contact terminations - Raychem Corp.

(TM)SOLDER-WRAP - electronic packaging service - United Wiring & Mfg. Co.

(TM)SOLID-D - polyethylene dielectric - Superior Cable Div.

(TM)SOLID-GEL - rechargeable batteries - Elpower Corp.

(TM)SOLID-LITE - solid state lamps & displays - OPCOA, Div. IDSI

(TM)SOLID STATE - dry reed hybrid modules - Struthers-Dunn, Inc.

SOLID STATE INC., Dept. EM, 46 Farrand St., Bloomfield, N.J. 07003, Tel: 201-429-8700, TWX: 710-994-4780; Empl.: 80

Sales Manager: T. King

Local Sales Offices & Reps.

Cal	Seal Beach, Texel Sls.	213-596-9411
Ill	Chicago, C L Greenslade Sls.	312-561-0156
NJ	Bloomfield, Solid State	201-429-8700
NY	New York, Solid State Inc.	212-964-5682

SOLID STATE CIRCUITS, Dept. EM, 616 Boonville, Springfield, Mo. 65806, Tel: 417-869-4678, TWX: 910-775-4762; Empl.: 115

Local Sales Offices & Reps.

Ala	Huntsville, K & E Assoc.	205-883-9720
Cal	LaJolla, J. Phelan	714-454-6444
Ga	Atlanta, K & E Assoc.	404-376-5438
Ill	Northbrook, Rendell Sls. Co.	312-498-9860
Miss	Corinth, K & E Assoc.	601-287-1471
Mo	Springfield, Del-Tech & Assocs.	417-881-3667
NJ	Clark, L. Curtin Assocs.	201-382-3533
Ohio	Dayton, Berberich & Assocs.	513-433-0342

SOLID STATE DEVICES, INC., Dept. EM, 14830 Valley View Ave, P.O. Box 577, LaMirada, Cal. 90638, Tel: 213-921-9660, TWX: 910-583-4807; FSC No.: 30043; Empl.: 100 .... p. 3918

Local Sales Offices & Reps.

Ariz	Scottsdale, Arcom	602-947-5745
Cal	Escondido, Cirolia Elctrn. Sls.	714-743-3015
Cal	Los Altos, Stout-Loeswick Elect. Mktg.	415-948-3265
Cal	Ventura, Interconnect Specialties	805-642-2281
Colo	Denver, Barnhill Five	303-426-0222
Fla	Tampa, Nickerson Co.	813-885-1416
Mass	Brookline, Technology Prods.	617-731-0858
Mich	Warren, DEM Elctrns.	313-575-9444
Minn	Minneapolis, Bitronics Sls.	612-835-7744
NJ	Wallington, Comp-Tech Sls.	201-935-5454
NY	Rochester, Ontec	813-885-8633
Ohio	Englewood, Daytech Sls.	513-836-8633
Wash	Seattle, J.J. Backer	206-285-1300

Local Distributors

Cal	Sante Fe Springs, Intercomp	213-921-3518
NY	Port Washington, Connector Concepts	516-883-3800

SOLID STATE ELECTRONICS CORP., Dept. EM, 15321 Rayen St., Sepulveda, Cal. 91343, Tel: 213-894-2271; Empl.: 15

SOLID STATE EQUIPMENT CORP., Dept. EM, 430 Delaware Drive, Fort Washington, Pa. 19034, Tel: 215-643-7900, TWX: 510-661-0197; Empl.: 50

Sales Manager: M.R. Sharp

Local Sales Offices & Reps.

Ariz	Scottsdale, Allen Assocs.	602-994-1305
Cal	Sunnyvale, Solid State Equip. Corp.	408-732-5288
Tex	Dallas, Springer Tech. Sls.	214-234-3273

SOLID STATE SCIENTIFIC, Dept. EM, Montgomeryville Ind'l. Pk., Montgomeryville, Pa. 18936, Tel: 215-855-8400, TWX: 510-661-7267; Empl.: 400

Sales Manager: D.R. Saban, Dir. Mktg.

Local Sales Offices & Reps.

Ala	Huntsville, Rep Inc.	205-881-9270
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Glendale, Orion Sls.	213-240-3151
Cal	Mountainview, Thresum Assoc.	415-965-9180
Cal	San Diego, Littlefield & Smith Assoc.	714-455-0055
Conn	Milford, Conti-Younger Assoc.	203-929-3294
Fla	Casselberry, EIR Inc.	305-830-9600
Fla	Maitland, Delmac Sls.	305-423-7562
Ga	Tucker, Rep Inc.	404-938-4358
Ill	Franklin Park, Dekotech Inc.	312-455-5100
Ind	Fort Wayne, Delesa Sls.	219-483-9537
Ind	Indianapolis, Delesa Sls.	317-894-3778
Iowa	Cedar Rapids, S&O Sls.	319-393-1845
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Baltimore, Stemler Assoc.	301-944-8263
Mass	Waltham, Conti-Younger Assoc.	617-890-4582
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Minneapolis, Nortec Sls.	612-835-7414
Mo	St. Louis, Palatine Sls.	314-426-7055
NM	Albuquerque, Tri-Tronix	505-265-0172
NY	Pittsford, T-Squared Elctrns.	716-381-2551
NY	Plainview, E.R.A. Inc.	516-822-9890
NY	Syracuse, T-Squared Elctrns.	315-463-8592
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Cincinnati, Giesting & Assoc.	513-851-7800
Okla	Tulsa, H. Daly Co.	918-627-4159
Pa	Delmont, T.F. Laslo & Assoc.	412-468-5045
Pa	Narberth, Bresson Assoc.	215-664-6460
Tenn	Jefferson City, Rep Inc.	615-475-4105
Tex	Dallas, Mycrosystems Mktg.	214-238-7157
Wash	Bellvue, SDR-2	206-747-9424

SOLID STATE SYSTEMS, Dept. EM, Box 773, Columbia, Mo 65201

SOLIDSTATE CONTROLS, INC., Dept. EM, 600 Oakland Park Ave., Columbus, Ohio 43214, Tel: 614-263-1886, Telex: 24-5338; Empl.: 80

Local Sales Offices & Reps.

Ala	Birmingham, Spader & Assocs.	205-879-1366
Ariz	Phoenix, Utility Prods.	602-959-3455
Ark	Little Rock, Gregory-Salisbury & Co.	501-565-1546
Cal	San Francisco, Garland Affolter Engrg. Corp.	415-397-1800
Cal	San Gabriel, Garland Affolter Engrg. Corp.	213-287-1149
Colo	Denver, Utility Prods.	402-895-9221
Fla	Lake Wales, J. Carter & Assocs.	813-676-1474
Ga	Atlanta, M.J. Fein & Co./C.A. Legg	404-938-0190
Ga	Decatur, Spader & Assocs.	404-296-3024
Ill	Glen Ellyn, J.T. Becker Assocs.	312-858-1910
Ind	Indianapolis, Utility & Ind'l. Prods., Inc.	317-924-3607
La	New Orleans, Gregory-Salisbury & Co.	504-524-5207
Mass	Holliston, M.J. Fein & Co.	617-429-4008
Mich	Troy, C.H. Armstrong Co.	313-524-1414
Minn	Minneapolis, Electrical Jobbers Equip., Inc.	612-721-4815
Miss	Jackson, Gregory-Salisbury & Co.	601-362-1761
Mo	Crestwood, Carlton Co.	314-961-0700
Neb	Omaha, Utility Prods.	402-895-9221
NJ	Livingston, M.J. Fein & Co.	201-994-3575
NY	Scarsdale, M.J. Fein & Co.	914-472-1100
Ohio	Columbus, R.D. Cloon Assocs.	614-459-2890
Okla	Tulsa, D. Allert Co.	918-743-7705
Ore	Portland, Garland Affolter Engrg. Corp.	503-223-7349
Pa	Media, Sys. Control Assocs.	215-565-2077
Tenn	Memphis, Gregory-Salisbury & Co.	901-365-6660
Tex	Arlington, Pan Tech. Engrg.	817-261-4111
Tex	Houston, Pan Tech. Engrg.	713-623-0640
Utah	Salt Lake City, Utility Prods.	801-466-2036
Wash	Bellevue, Garland Affolter Engrg. Corp.	206-454-2485

™SOLID-TUBES - silicon rectifier - Elctrn. Devices

™SOLISTRAND - terminals & splices - Amp Inc.

™SOLITHANE LIQUID URETHANE RESINS - liquid polymen - Thiokol Chemical Div.

SOLITRON DEVICES, Dept. EM, 8808 Balboa Ave., San Diego, Cal. 92123, Tel: 714-278-8780, TWX: 910-335-1221; Empl.: 900

SOLITRON DEVICES, Transistor Div., Dept. EM, 1177 Blue Heron Rd., Riviera Beach, Fla. 33404, Tel: 305-848-4311, TWX: 510-952-7610; FSC No.: 21845; Empl.: 550

Sales Manager: M. Giraud, Jr.

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne	602-946-4437
Cal	Canoga Park, TKO	213-883-3822
Colo	Denver, Piper-Goyne, Inc.	303-934-6971
Colo	Littleton, Piper-Goyne, Inc.	303-973-2777
Conn	Washington, Tri-Com Assocs.	203-868-7748
Fla	Tequesta, Alexander Assocs.	305-746-4129
Haw	Honolulu, Aloha Assocs.	808-941-1574
Ill	Downers Grove, Momak Sls.	312-963-6400
Ill	Hinsdale, Momak Sls.	312-654-4524
Ind	Indianapolis, Electro Reps.	317-255-4147
Mass	Boston, Kenneth Schaeffer	617-535-4703
Mass	Burlington, Tri-Com Assocs.	617-272-8163
Minn	Edina, Wagner Consultants	612-941-6310
Mo	Saint Charles, Buckman & Assocs.	314-724-6690
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NM	Albuquerque, Piper-Goyne	505-294-1436
NY	Jamaica, S-J Sls. Assocs.	212-291-3232
NY	Rockland, Rubin Sls.	914-623-9237
NY	Syracuse, Nycom	315-437-8343
NY	Tappan, Solitron Devices	914-359-5050
NY	Tappan, Solitron Devices	914-359-5050
NY	West Nyack, Rubin Sales & Assocs.	914-623-9237
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0427
Ore	Portland, C. K. Shanks & Assocs.	503-292-5656
Pa	Delmont, Luebbe Sls. Co.	412-468-4019
Tex	Richardson, P. J. Scanlon Co.	214-231-4661
Wash	Seattle, C. K. Shanks & Assocs.	206-ME2-4290
Exp:	Fla., Riviera Beach, Solidev. Int'l. Sls. Corp.	305-848-4311
Exp:	Mass, Boston, Kenneth Schaeffer	617-535-4703

Local Distributors

Ala	Huntsville, Hallmark Elctrns.	205-837-8700
Ariz	Phoenix, Mirco Elctrns.	602-944-2281
Cal	Glendale, R.V. Weatherford Co.	213-849-3451
Cal	Palo Alto, R.V. Weatherford Co.	415-493-5373
Cal	Pomona, R.V. Weatherford Co.	714-623-1261
Cal	Santa Ana, Intermark Elctrns.	714-540-1322
Cal	Sunnyvale, Intermark Elctrns.	408-738-1111
Cal	Sunnyvale, Bell Inds.	408-734-8570
Colo	Englewood, R.V. Weatherford Co.	303-761-5432
Fla	Ft. Lauderdale, Hallmark Elctrns.	305-971-9280
Fla	Orlando, Hallmark Elctrns.	305-855-4020
Fla	Pompano Beach, Zeus Comps.	305-942-4312
Haw	Honolulu, V. Kim Elctrns.	808-533-7132
Ill	Elk Grove, Hallmark Elctrns.	312-437-8800
Ill	Palatine, OHM/Elctrns.	312-359-5500
Ind	Ft. Wayne, Ft. Wayne Elctrns. Supply	219-423-3422
Md	Columbia, Technico, Inc.	301-461-2200
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mich	Detroit, R. S. Elctrns.	313-491-1012
Mich	Livonia, Reptron Elctrns.	313-525-2700
Minn	Minneapolis, Industrial Comps.	612-831-2666
NH	Londonderry, Yankee Elctrns. Supply	603-625-9746
NY	Elmsford, Zeus Comps.	914-592-4120
NY	Hauppauge, Semiconductor Concepts	516-273-1234
NY	Rome, Rome Elctrns.	315-337-5400
NY	Woodbury, Diplomat Elctrns.	516-921-9373
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Columbus, Reptron Elctrns.	614-443-0231
Ohio	Dayton, Arrow Elctrns.	513-253-9176
Ohio	Dayton, Esco	513-294-0427
Okla	Tulsa, Component Specialties	918-664-2820
Pa	Huntingdon Valley, Hallmark Elctrns.	215-355-7300
Tenn	Kingsport, Radio Elctrns. Supply Co.	615-247-8111
Tex	Dallas, R.V. Weatherford Co.	214-243-1571
Tex	Dallas, Component Specialties, Inc.	214-357-4576
Tex	Houston, R.V. Weatherford Co.	713-688-7406
Tex	Houston, Harrison Equipment Co.	713-224-9131
Tex	Houston, Component Specialties, Inc.	713-771-7237
Wash	Bellevue, Bell Inds.	206-747-1515
Wash	Seattle, Intermark Elctrns.	206-767-3160
Wisc	Milwaukee, Marsh Radio Supply	414-545-6500
Exp:	Fla., Riviera Beach, Solidev International Sls. Corp.	305-848-4311
For:	Can., Scarborough, Ontario, Intl. Rectifier Canada Ltd.	416-755-7793

SOLITRON DEVICES, INC., Dept. EM, 256 Oak Tree Rd., Tappan, N.Y. 10983, Tel: 914-359-5050, TWX: 710-576-2654

SOLITRON/MICROWAVE, Dept. EM, Box 278, Port Salerno, Fla. 33492, Tel: 305-287-5000, TWX: 510-953-7500; FSC No.: 95077; Empl.: 125

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
Ariz	Scottsdale, Piper Sls.	602-946-4437
Cal	Los Angeles, RF Assocs.	213-478-1586
Cal	Palo Alto, RF Assocs.	415-494-3331
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Arvada, Piper Sls.	303-420-4646
Conn	North Haven, Forsberg Sls	617-522-6300
Fla	Ft. Lauderdale, Beacon Elctrns.	305-776-6074
Fla	Maitland, Beacon Elctrns.	305-647-3498
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Downers Grove, Momak Sls	312-963-6400
Ind	Indianapolis, Sukup & Cox	317-253-1215
Md	Ellicott City, Applied Engrg. Consultants Inc.	301-465-1272
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Southfield, Luebbe Sales	313-357-0355
Minn	Minneapolis, Wagner Consultants	612-721-5781
Mo	St. Louis, Engineering Svs Co.	314-997-1515
NJ	Haddonfield, M & S Assocs.	609-429-7055
NJ	Wayne, H. Kagan Assocs.	201-684-7682

NY	Charlotte, Beacon Elctrns Assocs.	704-525-7412
NY	Syracuse, Nycom, Inc.	315-437-8343
Ohio	Cincinnati, Luebbe Sales	513-871-4211
Ohio	Cleveland, Luebbe Sales	216-333-0425
Ohio	Dayton, Luebbe Sales	513-294-0426
Pa	Delmont, Luebbe Sales	412-468-4019
Tenn	Oak Ridge, Beacon Elctrns Assocs.	615-482-2409
Tex	Plano, Zeus Engrg.	214-231-4661
Wash	Seattle, Harry Levinson	206-323-5100
Exp:	N.Y., New York (Japan), Ataka America, Inc.	212-697-7480

Local Distributors

Cal	Encino, W.E. Zimmerman	213-986-3400
Cal	Mt. View, Terminal Elctrns	415-969-9240
Ill	Chicago, Phoenix Co	312-237-2828
Md	Ellicott City, Applied Engrg. Consultants	301-465-1272
NJ	Mount Laruel, Aztec Engrg	609-237-0596
NY	Brooklyn, Connector Resources	212-383-2208
NY	Commack, Microwave Distr	516-543-4771
NY	Plainview, Progress Elctrns	516-433-1700
Ohio	Dayton, Koehlke Comps	513-193-2122
Ohio	Dayton, Arrow Elctrns	513-253-9176
Okla	Tulsa, Component Specialties	918-664-22820
Tex	Dallas, Component Specialties	214-357-6411
Tex	Houston, Component Specialties	713-771-7237

SOLTEC CORP., Dept. EM, Box 49, Sun Valley, Cal. 91352, Tel: 213-767-0044, Telex: 67-4188; Empl.: 14; Minimum order: $L. Cox

Sales Manager: B. McIntire; *Distributor Manager:* L. Cox

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Cal	San Carlos, Elctrn. Engrg. Assocs.	415-593-2189
Colo	Arvada, Air-Row Insts.	303-421-4202
Colo	North Glenn, Chet Anderson	303-452-7817
Fla	Orlando, Scientific Devices	305-841-8180
Fla	Palm Bay, Scientific Devices	305-723-1800
Ill	Des Plaines, Byron Ellis Assocs.	312-298-7626
Kans	Mission, Vertec Assocs.	913-677-3200
Mass	Nonantum, ETA Assocs.	617-527-4544
Mich	Madison Heights, WKM Assocs.	313-588-2300
Mo	Manchester, Vertec Assocs.	314-394-6242
NJ	Paramus, SDM Reprs.	201-368-0123
NC	Raleigh, Scientific Devices	919-872-7066
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Ore	Portland, Extech, Ltd.	503-292-9219
Pa	Pittsburgh, WKM Assocs.	412-892-2953
Pa	Warrington, Pace Assocs.	215-343-1781
Tex	Austin, Vacuum Tech. Co.	512-837-5040

(TM)SOLU BRIDGE - solution conductivity instrument - Beckman Instrs.

(TM)SOLU CHEK - electrical conductivity meters - Beckman Instrs.

(TM)SOLU METER - liquid measuring instrs. - Beckman Instrs.

(TM)SOL-U-SALT - plating salts - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)CAEON 27 & 28 - solvent - Caig Labs., Inc.

(TM)SOLVOFEN HM - solvent - GAF Corporation

SOMERSET RADIATION LAB., Dept. EM, Box 17066, Washington, DC 20041

(TM)SONAC - ultrasonic controls - Delavan Electronics, Inc.

(TM)SONA GRAPH - Sound Spectrum Analyzer - Kay Elemetrics Corp.

(TM)SONBLASTER - ultrasonic cleaner - Ultrasonic Corp.

SONEX, Dept. EM, 2337 Philmont Ave., Huntingdon Valley, Pa. 19006, Tel: 215-947-6100, TWX: 510-665-5073; Empl.: 21 .... p. 1471

Sales Manager: M. Dadario

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Fla	Orlando, J.L. Highsmith	305-293-5202
Ind	Columbus, Miltronics	812-376-6321
NC	Charlotte, J.L. Highsmith & Co.	704-333-7743
Va	Richmond, J. L. Highsmith & Co.	804-272-5888

SONIC INTERNATIONAL CORP., Dept. EM, 19241 N. E. San Rafael, Portland, Ore. 97230, Tel: 503-665-0187, Telex: 36-0325; Empl.: 54

Local Sales Offices & Reps.

Ariz	Pheonix, S. Bova Sls.	602-266-1137
Cal	Chatsworth, Prods. West/Mark Boone	213-993-0263
Cal	Chatsworth, Products West	213-993-0263
Cal	Hayward, Foster Sls.	415-534-2530
Colo	Denver, B. Scowcroft	303-371-5280
Fla	Miami Beach, E & J Assoc.	305-531-4260
Ga	Atlanta, B. Elliott Assoc.	404-435-2849
Ill	Chicago, Tech. Prods.	312-677-8144
Ind	Indianapolis, B. Richey & Assocs.	317-542-0605
Kans	Shawnee Mission, Nackman-Brod-Vann	913-381-9560
Md	Baltimore, Bernie Smith Assoc.	301-247-0033
Mass	Newtonville, Arbetter Sls.	617-969-4128
Mich	Berkley, L. Bressler Assocs.	313-542-1887
Minn	Minneapolis, Felson & Moscoe Co.	612-831-1881
Mo	St. Louis, Nackman-Brod-Vann Co.	314-991-2424
Neb	Omaha, Nackman-Brod-Vann Co.	402-895-4866
NY	N.Y., B & S Sls.	212-736-3035
NY	Rochester, V. Lulla Assoc.	716-244-7772
Ohio	Cleveland, KAM Mktg.	216-464-7717
Ohio	Enon Valley, Nebco Assocs.	216-457-2333
SC	Columbia, Carolina Mktg.	803-794-7359
Tex	Houston, J. Abramson	713-688-7482
Utah	S.L.C., Austin Riggs	801-363-4408
Wash	Vancouver, J. Wasson & Assocs.	206-696-3384

(TM)SONO - cleaning solvents - Ultrasonic Instrs. Int'l., Inc.

SONOBOND CORP., Sub. Christiana Metals Corp., Dept. EM, 200 E. Rosedale Ave., West Chester, Pa. 19380, Tel: 215-696-4710; Empl.: 50

Local Sales Offices & Reps.

Ill	Glen Ellyn, J. M. Collins Assocs.	312-858-6459
Ind	Columbus, Bildico, Inc.	812-342-3721
Mass	Amesbury, ATM World Trade	603-394-7874
Mich	Detroit, Martin Electric Co.	313-368-2883
NJ	Union, Plastech, Inc.	201-687-4810
NY	Lewiston, Watmet, Inc.	716-285-3595
NC	Raleigh, Wolff's Sls. Svc. Co.	919-781-0164
Pa	Villanova, C.I.V. Co	215-525-7054

(TM)SONOCASTER - speaker system - Electro-Voice, Inc.

(TM)SONODOME - high frequency speakers - Jensen Sound Labs.

(TM)SONOFLUX - ndt - magnetic particle equipment - Automation Inds.

(TM)SONOGEN - cleaners & degreasers - Branson Cleaning Equip. Co.

(TM)SONOSOLDER - soldering equipment - Sonobond Corp.

(TM)SONOTITE - piezoelectric ceramic - Linden Labs., Inc.

(TM)SONOWELD - welding equipment - Sonobond Corp.

(TM)SON-TECTOR - ultrasonic detector - Techsonics

SONY CORP. OF AMERICA, Dept. EM, 47-47 Van Dam St., Long Island City, N.Y. 11101

SORENSEN CO., Dept. EM, 676 Island Pond Rd., Manchester, N.H. 03103, Tel: 603-668-4500, TWX: 710-220-1339; Empl.: 600 .... p. 3322-3333

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs. Inc.	205-881-6220
Ariz	Tempe, Trembly Assoc.	602-966-4428
Cal	San Francisco, Sorensen Co.	415-348-3013
Cal	Torrance, Sorensen Co.	213-540-5452
Colo	Arvada, Figaro-Klebba Assoc.	303-424-0108
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Pivan Engrg. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg. Co.	319-377-9434
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
La	Lafayette, Kemp Engrg. Co.	318-984-3516
Md	Baltimore, Sci-Rep Inc.	301-992-4350
Mich	Detroit, Comtel Instrs. Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NJ	Cherry Hill, Sci-Rep Inc.	609-482-0059
NJ	Paramus, SDM Reps.	201-368-0123
NM	Albuquerque, Trembly Assoc.	505-266-8616
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, Comtel Instrs. Co.	216-442-8080
Ohio	Dayton, Comtel Instrs. Co.	513-298-7573
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Pa	Pittsburgh, Comtel Instrs. Co.	412-922-5720
Tex	Addison, Kemp Engrg.	214-661-0400
Tex	Houston, Kemp Engrg.	713-688-1431
Va	Falls Church, Sci-Rep Inc.	703-573-8787
Wisc	Brookfield, Pivan Engrg. Co.	414-786-1940

SORENSON LIGHTED CONTROLS, Dept. EM, 530 Oakwood Ave., W. Hartford, Conn. 06110, Tel: 203-236-3267; Empl.: 100 .... p. 2658,2659

Local Sales Offices & Reps.

Cal	Van Nuys, Pacific Switch Controls	213-873-4802
Conn	West Hartford, Atlantic Switch Controls	203-523-5259
Fla	Hialeah, Switch Controls	305-822-0892
Ill	Wheaton, Conectrix, Inc.	312-653-1130
Mass	Quincy, F. Rybak	617-471-0902
Mich	Stevensville, R. Zwick	616-429-2661
Minn	Stillwater, L. Hartman	612-888-0665
Mo	Clayton, J. Mertens	314-721-0058
NJ	Burlington Township, R. Circus	609-387-9331
NY	Pompey, S. Foster	315-677-3333
NC	Asheville, W. Walton	704-628-2281
Ohio	Columbus, R. Johnson	614-294-7103
Ore	Portland, Electronic Comp. Sls.	503-245-2342
Tex	Dallas, Texaswitch, Inc.	214-357-1768

SOSHIN ELEC. CO., Dept. EM, 1-18-18 Nakamogome, Ota-Ku, Tokyo, Japan, Tel: (03) 775-2111, Telex: 246-6377; Empl.: 800 .... p. 1300

Sales Manager: N. Hiraide, Exp. & Imp. Dept.

Local Sales Offices & Reps.

NY	Commack, Arco Elctrn.	516-487-0500

SOTCHER MEASUREMENT, INC., Dept. EM, 1120 Stewart Court, Sunnyvale, Cal. 94086, Tel: 408-732-9171; Empl.: 6

Local Sales Offices & Reps.

Fla	Tampa, E. L. Ebert Sls. Agency	813-837-2867
Ill	Elk Grove, IMI Equip. Supply	312-593-7666

SOUNDLITE SYSTEMS INC., Dept. EM, 6940 Valjean Ave., Van Nuys, Cal 91406

(TM)SOUNDCASTER - mobile sound system - PASO Sound Products Inc.

SOUNDCOAT, Dept. EM, 175 Pearl St., Brooklyn, N.Y. 11201, Tel: 212-858-4100, Telex: 125-514; Empl.: 38

Sales Manager: C. Wolaver

Local Sales Offices & Reps.

Colo	Denver, E.N. Murray Co.	303-892-1106
Fla	Miami, Voyce-Legier, Inc.	305-576-3356
Ga	Atlanta, J. L. Underwood Co.	404-691-1500
Ill	Des Plaines, Maher Engrg. Co.	312-824-2124
La	Kenner, R. H. Creager Inc.	504-729-6432
Mass	Ashland, SVA-Sussman Assocs.	617-877-1631
Mich	Madison Heights, J. N. Fauver Co.	313-585-5252
Minn	Minneapolis, Horner Co.	612-824-2654
Minn	Parkville, Willow Mfg. Co.	218-741-0073
Mo	St. Louis, Fischer Equip. Co.	314-647-1636
NY	Buffalo, Knarr, Kinkel & Welge, Inc.	716-875-9854
NY	Scarsdale, Lerner Equip. Co.	212-SC5-1700
Ohio	Cleveland Heights, Acoustic Hazard Solutions Org.	216-321-8878
Ohio	Dayton, Anchor Rubber Co.	513-223-5191
Pa	Pittsburgh, Busch Co.	412-362-6000

(TM)SOUND DIRECTOR - sound columns - Argos Products Co., Inc.

(TM)SOUND DISCRIMINATOR - audio detection system - Acron Corp.

(TM)SOUND ENHANCERS - mini components, accessories - Robins Ind's. Corp.

(TM)SOUNDFOAM - sound absorption, foams - Soundcoat

(TM)SOUNDMAT - sound barriers - Soundcoat

SOUNDOLIER, INC., Dept. EM, 9380 Watson Ind'l. Pk., St. Louis, Mo 63126, Tel: 314-962-9870; Empl.: 200

Sales Manager: B. Bauer

Local Sales Offices & Reps.

Ariz	Phoenix, J.R. MOrgan Agcy.	602-252-3089
Cal	Los Angeles, E. Strasswell Sls.	213-666-1511
Cal	Redwood City, W. Hickey Sls.	415-368-9483
Colo	Arvada, CB Elctrn. Mktg.	303-422-0561
Fla	Ocala, Bencsik Assocs.	904-732-9775
Ga	Chamblee, Tech. Sys. Reps.	404-457-0426
Haw	Honolulu, L. Gaber Co.	808-839-9059
Ill	Chicago, Nutmacher Assocs.	312-631-3248
Ind	Indianapolis, F. McSweeney	317-849-5726
Mass	Needham, Piper Assocs.	617-449-1144
Mich	Detroit, Riley & Petchell Sls.	313-937-3000
Minn	St. Paul, Skor	612-645-6461
Mo	St. Louis, Rancilio Assocs.	314-842-6443
NY	Phelps, LSM Assocs.	315-548-4891
NY	Yonkers, Adelman-Pinz Sls.	914-423-4747
Ohio	North Olmsted, Avcom, Inc.	216-777-2060
Pa	Philadelphia, R.S. Pass Assocs.	215-464-9444
SC	Greenville, H.C. Norman Sls.	803-244-6254
Tex	Dallas, Miller & Assocs.	214-661-5002
Wash	Seattle, Vector Corp.	206-322-4343

™SOUND POWER - automotive speaker - Vidaire Electronics Mfg.

™SOUND SPOT - microphone - Electro-Voice, Inc.

SOUTH RIVER METAL PRODS. CO., Dept. EM, P.O. Box 394, Matawan, N.J. 07747, Tel: 201-254-5252; Empl.: 85

SOUTH SHORE METAL PRODS., INC., Dept. EM, 88 E Allen Blvd., Farmingdale, N.Y. 11735, Tel: 516-249-3322; Empl.: 30

Sales Manager: A.G. Bauer

Advertisement

S.S. offers a stock size line of deep drawn cans trimmed to customer's length requirement at no extra cost. Will also produce special sizes and shapes complete with mounting brackets, studs, etc. - mumetal and other shielding type enclosures are regularly shipped. Tape control drilling and machining available for panel boards, plug in strips, etc. Quality control program to MIL-1-45208.

SOUTHERN ELECTRONICS CO., Dept. EM, 726 So. Flower St., Burbank, Cal. 91502, Tel: 213-845-2458; Empl.: 310 .... p. 1301

Local Sales Offices & Reps.

Ala	Huntsville, Jack Whitfield	205-257-2211
Ariz	Scottsdale, Carter Assoc.	602-947-4355
Cal	Van Nuys, Myco Sls.	213-988-2288
Colo	Denver, Walter Engrg.	303-777-5585
Conn	Wethersfield, Con/Pak	203-563-4784
Fla	Altamonte Springs, Semtronic Assoc.	305-831-8233
Fla	Largo, Semtronic Assoc.	813-586-1404
Ill	Franklin Park, AL&W Sls.	312-451-1360
Kans	Shawnee, J. Guernsey Co.	913-631-2414
Md	Ellicott City, T. Davis Marketeers	301-461-2209
Mass	Needham, Com/Pack	617-444-1259
Mich	St. Clair Shores, J. M. Thorpe Co.	313-779-6363
Minn	Minneapolis, Loren Green Assoc.	612-781-1611
NY	Hempstead, Kahgan Sls.	516-538-2300
NY	Syracuse, Naylor Elec.	315-472-9183
NC	Greensboro, L & D, Inc.	919-292-3201
Ohio	Lyndhurst, Technical Sls. Assoc.	216-461-0826
Ore	Portland, SPS Elctrn.	503-645-3769
Tex	Dallas, Cunningham Co.	214-231-2686
Tex	Houston, Cunningham Co.	713-461-4197
Va	Fairfax, T. Davis Marketeers	703-591-7390

SOUTHWEST TECH PRODS CORP., Dept. EM, 219 W. Rhapsody, San Antonio, Tex. 78216, Tel: 512-344-0242; Empl.: 34

SOUTHWOOD ELECTRONIC CO., Dept. EM, 7624 Lindenwood Dr., Indianapolis, Ind. 46227, Tel: 317-888-0238; Empl.: 5

™SPACEMAKER - electric motor controls - Allis-Chalmers

SPACE POWER ELCTRNS, Dept. EM, Jeffrey Lane, RD 1, Glen Gardner, N.J. 08826, Tel: 201-537-2184

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Md	Columbia	301-953-3360

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SPARKOMATIC CORP., Dept. EM, Milford, Pa. 18337, Tel: 717-296-6444, TWX: 510-260-2682; Empl.: 264

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™SPASAVER - miniature switches - Chicago Switch, Inc.

SPATIAL DATA SYSTEMS, INC., Dept. EM, P.O. Box 249 508 S. Fairview, Goleta, Cal. 93017, Tel: 805-967-2383; Empl.: 27

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™SPC-16 - 16-bit general purpose automation minicomputer - General Automation

SPEC PLASTICS INC., Dept. EM, 7224 Atoll Ave., No. Hollywood, Cal. 91605, Tel: 213-982-0300; Empl.: 43

SPECIALTIES MFG. CO., INC., Dept. EM, 23425 Harper, St. Clair Shores, Mich. 48080, Tel: 313-771-2700; Empl.: 6

Local Sales Offices & Reps.

DC	Pompano Beach, Hollingsworth & Still	305-782-0069
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Ga	Atlanta, Hollingsworth & Still	404-255-8200
Ill	Chicago, B. Burns & Assoc.	312-775-1233
Ind	Indianapolis, Sukup & Cox	317-253-5501
Mo	St. Louis, Kathrinus Kelly Co.	314-962-5627
NJ	Caldwell, Art Cerf & Co.	201-226-2263
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Pa	Warminster, A. Cerf & Co.	215-343-1339
Tenn	Nashville, Hollingsworth & Still	615-883-9126

SPECIALTY CONNECTOR CORP., Dept. EM, 3560 Madison Ave., Indianapolis, Ind. 46227, Tel: 317-787-6368; Empl.: 100

Local Sales Offices & Reps.

Cal	Los Angeles, M.A. Stolaroff	213-295-7781
Cal	Palo Alto, W.W. Tompkins & Co.	415-326-7940
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Conn	Meriden, Eagle Assocs.	203-235-9036
Ga	Atlanta, Grady Duckett Sls. Corp.	404-451-3529
Ill	Oak Park, W. Gallagher	312-261-7517
Ill	Weschester, W. Gallagher	312-344-0690
Ind	Fort Wayne, S & S Elctrns.	219-743-4611
NJ	Bergenfield, H. Gray Assocs.	201-384-3643
NJ	Mount Laurel, Naudain Assocs.	609-235-1801
NJ	Syracuse, Naylor Electric Co.	315-472-9183
Ohio	Akron, A. Natalino Assocs.	216-725-6087
Tex	Richardson, Oeler & Menelaides, Inc.	214-234-6334
Wash	Seattle, H.S. Thorpe & Co.	206-784-3333

™SPEC-MASTER - outlets, switches - Leviton Mfg. Co., Inc.

™SPEC STAT - temp sw - Control Prods., Inc.

SPECTMAN INSTRS., Dept. EM, Box 891, 418 E. Lahabra Blvd., Lahabra, Cal. 90631, Tel: 213-694-3995

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SPECTRACOM CORP., Dept. EM, 1667 Penfield Rd., Rochester, N.Y. 14625, Tel: 716-381-4827; Empl.: 6

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Cal	N. Hollywood, O'Halloran Assocs.	213-877-0173
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Fla	Winter Haven, Lee Assocs.	813-294-5815
Ga	Buford, Lee Assocs.	404-945-4222
Ill	Chicago, Electronic Instr. Assocs.	312-271-3774
Ind	Indianapolis, Electronic Instrs. Assocs.	317-257-7231
Md	Silver Spring, Gawler-Knoop Co.	301-589-4406
Mass	Waltham, Scientific Devices - N.E.	617-894-5637
NJ	Englewood, Scientific Devices - East	201-871-3916
NY	Rochester, Spectracom Corp.	716-381-4827
NC	Raleigh, Lee Assocs.	919-787-5818
Ohio	Cleveland, Micro Sls. Corp.	216-331-0900
Ohio	Dayton, Micro Sls. Corp.	513-433-8171
Okla	Oklahoma City, Data Mktg. Assoc.	405-528-6071
Tex	Austin, Data Mktg. Assoc.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data Mktg. Assoc.	713-686-9627
Tex	San Antonio, Data Mktg. Assoc.	512-828-0937
Wash	Seattle, R. S. Drake Assoc.	206-763-2755

SPECTRA SONICS, Dept. EM, 770 Wall Ave., Ogden, Utah 84404, Tel: 801-392-7531; Empl.: 25

Local Sales Offices & Reps.

Cal	Hollywood	213-461-4321

SPECTRA-STRIP CORP., Dept. EM, 7100 Lampson Ave., Box 415, Garden Grove, Cal. 92642, Tel: 714-892-3361, TWX: 910-596-1314; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps. Inc.	205-539-4411
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	Culver City, Bestronics, Inc.	213-870-9191
Cal	Menlo Park, G.R. McKnight Co.	415-325-2844
Cal	San Diego, Hadden Assocs.	714-565-9444
Colo	Denver, Thorson Co.	303-759-0809
Conn	Wethersfield, Com/Pak Inc.	203-563-4784
Fla	Coral Springs, W.A. Brown Comps.	305-753-1650
Fla	Orlando, W.A. Brown Comps.	305-425-5505
Ga	Chamblee, W. A. Brown Comps.	404-455-0405
Ill	Chicago, IRI	312-647-7755
Ind	Ft. Wayne, J&B Engrg. Sls. Co.	219-483-2813
Mass	Framingham, Com/Pak	617-879-8580
Mich	Birmingham, J. C. Hofstetter Co.	313-646-3635
Minn	Minneapolis, M. Westlund Assocs.	612-866-5002
Mo	Kansas City, Nevco	816-421-1751
Mo	St. Louis, Nevco	314-843-7406
NJ	Clifton, Compar N. Y. Inc.	201-546-3660
NM	Albuquerque, Zeus, Inc.	505-256-9831
NY	East Syracuse, Advanced Comps. Corp.	315-699-2671
NC	Raleigh, W.A. Brown Comps.	919-876-9601
Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
Ohio	Medina, J. C. Hofstetter Co.	216-241-4880
Pa	Ft. Washington, Kirk-Sandell Inc.	215-643-2100
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Tex	Houston, J. B. Guenther, Inc.	713-468-0232
Utah	Bountiful, Logistic Specialties	801-292-3030
Wash	Seattle, D. Smith Sls. Co.	206-633-3160
Wisc	Milwaukee, IRI	414-259-0965

Local Distributors

Ariz	Phoenix, Micro Elctrns.	602-944-2281
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Cal	Irvine, Terminal Elec.	714-549-8611
Cal	Irvine, Marshall Inds.	714-556-6400
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Cal	Palo Alto, Storm Prod.	415-494-6621
Cal	San Carlos, Sterling Elctrns.	415-592-2353
Cal	San Diego, Sterling Elctrns.	714-565-2441
Cal	San Diego, Marshall Inds.	714-278-6350
Cal	Sunnyvale, Marshall Inds.	408-732-1100
Cal	Sun Valley, Sterling Elctrns.	213-767-5030
Colo	Arvada, Marshall Inds.	303-423-9670
Colo	Bloomfield, Storm Prods. Co.	303-466-1991
Conn	No. Branchford, Marshall Inds.	203-484-0488
Fla	Orlando, Marshall Inds.	
Ill	Chicago, Allied Elec.	312-697-8200
Ill	Des Plaines, Marshall Inds.	312-298-3700
Ill	Palatine, Ohm/Elctrns.	312-359-5500
Kans	Wichita, Radio Supply Co.	316-267-5213
Mass	N. Billerica, Pacer Elctrns.	617-862-3300
Mass	Newton Highland, Marshall Inds.	617-965-5115
Mass	Waltham, QPL Elctrn. Dist.	617-891-0460
Minn	Edina, Marshall Inds.	612-831-4904
NY	Binghampton, Stack Industrial Elctrns.	607-723-6326
NY	Buffalo, Summitt Elec.	716-884-3450
NY	Farmingdale, Marshall Inds.	516-293-4141

NY	Farmingdale, Vertex Elec.	516-239-9880
NY	Tuckahoe, Bi-Tronics, Inc.	914-961-4700
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Dayton, Marshall Inds.	513-898-1105
Ohio	Dayton, Astro Ind.	513-253-5118
Pa	Harrisburg, Pyttronic Ind.	717-233-6591
Pa	King of Prussia, Marshall Inds.	215-337-3330
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Tex	Dallas, Marshall Inds.	214-233-5200
Tex	Ft. Worth, Allied Elec.	817-336-5401
Tex	Houston, Solid State Elctrns.	713-785-5436
Tex	Houston, Marshall Inds.	713-777-0358
Utah	Salt Lake City, Standard Supp.	801-355-2971
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Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Alas	Anchorage, Industrial Analyzing & Instrumentation	907-344-5619
Ariz	Phoenix, R. A. Mayes Co.	602-279-5243
Cal	El Monte, Spectral Dynamics - L.A. District Office	213-686-0970
Cal	Sunnyvale, Spectral Dynamics	408-733-0602
Colo	Boulder, R. A. Mayes Co.	303-444-0782
Conn	Hamden, Northeast Engrg. Inc.	203-248-4481
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Berndt Assoc., Inc.	312-283-0713
Ind	Indianapolis, Tri-State Tech. Sls.	317-924-3568
Md	Riverdale, Spectral Dynamics - Wash. Area Distr. Off.	301-779-5580
Mass	Danvers, Northeast Engrg.	617-774-3010
Mich	Southfield, Spectral Dynamics	313-358-0880
Minn	Minneapolis, Berndt Assocs.	612-835-4818
Mo	St. Louis, Adelphi	314-821-1232
NM	Albuquerque, R. A. Mayes Co.	505-292-2330
NY	DeWitt (Syracuse), DB Assocs.	315-446-0220
NY	Great Neck, MTI	516-482-3500
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ore	Portland, Brett-Ross, Inc.	503-232-4184
Pa	Chester Springs, Letronix	215-458-8977
Pa	Pittsburgh, WKM Assocs	412-892-2953
Tex	Houston, Carey-Wolf & Assoc., Inc.	713-721-2442
Utah	Centreville, R. A. Mayes Co.	801-292-6781
Wash	Seattle, Brett-Ross, Inc.	206-935-8054
Wisc	Milwaukee, Berndt Assocs.	414-545-8400

SPECTRAN ELCTRNS., Div. Novatronics, Inc., Dept. EM, P.O. Box 878, Pompano Beach, Fla. 33061, Tel: 305-942-5200, TWX: 510-956-9878

(TM)SPECTRASCOPE - spectrum analyzer - Spectral Dynamics Corp. San Diego

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(TM)SPECTRA-ZIP - gray laminated cable - Spectra-Strip Corp.

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(TM)SPECTROCOLORIMETER - spectrophotometer-colorimeter - Beckman Instrs., (AISSD)

SPECTRO EQUIPMENT, INC., Dept. EM, 6021 Royalton Rd., N. Royalton, Ohio 44133, Tel: 216-237-8910

SPECTROL ELECTRONICS CORP., Dept. EM, 17070 East Gale Ave., City of Industry, Cal. 91745, Tel: 213-964-6565, TWX: 910-584-1314; Empl.: 600 p. 3846,3847

Local Sales Offices & Reps.

Ala	Huntsville, Rep, Inc.	205-881-9270
Ariz	Phoenix, Howe & Howe Sls.	602-264-7971
Cal	Mountain View, Factory Sls. Off.	415-964-3260
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Cal	San Diego, Daniels & Doty Sls.	714-560-6266
Cal	Sherman Oaks, Astralonics	213-990-5903
Colo	Denver, Lindberg Co.	303-758-9033
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233
Fla	Largo, Semtronic Assocs.	813-586-1404
Ga	Atlanta, Rep, Inc.	404-938-4358
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Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
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Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Fayetteville, Tri-Tech Elctrns.	315-446-2881
NY	Plainview, E.R.A., Inc.	516-822-9890
NC	Raleigh, Rep, Inc.	919-851-3007
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Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Okla	Oklahoma City, Ammon & Rizos Co.	405-373-2748
Ore	Beaverton, Barrett Squibb & Assoc.	503-644-2250
Pa	Pittsburgh, R.F. Clark Co.	412-242-9500
Tenn	Jefferson City, Rep, Inc.	615-475-4105
Tex	Dallas, Ammon & Rizos Co.	214-233-5591
Tex	Houston, Ammon & Rizos Co.	713-781-6240
Utah	Salt Lake City, Lindberg Co.	801-534-1501
Wash	Redmond, Barrett Sls. Northwest Ltd.	206-885-6991

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Ala	Huntsville, Hall-Mark/Huntsville	205-837-8700
Ariz	Phoenix, Sterling Elec.	602-258-4531
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Cal	Anaheim, Weatherford Co.	714-634-9600
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Cal	Los Angeles, Kierulff	213-685-5511
Cal	Mt. View, Abacus	415-961-1500
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Cal	Pomona, Weatherford Co.	714-623-1261
Cal	San Carlos, Sterling Elec.	415-592-2353
Cal	San Diego, Moltronics	714-278-5020
Cal	San Diego, Kierulff	714-278-2112
Cal	Southgate, Moltronics	213-773-6521
Cal	Sun Valley, Sterling Elec.	213-767-5030
Colo	Denver, Kierulff	303-371-6500
Colo	Denver, Newark/Denver El.	303-757-3351
Colo	Englewood, R.V. Weatherford	303-761-5432
Conn	Hamden, Arrow Elec.	203-248-3801
Conn	N. Haven, Cramer Elec.	203-239-5641
Fla	Ft. Lauderdale, Hall-Mark	305-971-9280
Fla	Orlando, Hall-Mark	305-855-4020
Ill	Chicago, Newark	312-638-4411
Ill	Elk Grove, Kierulff	312-640-0200
Ill	Elk Grove Village, Lakeland Elect.	312-595-1000
Ill	Elk Grove Village, Hall-Mark/Chicago	312-437-8800
Ind	Indianapolis, Graham	317-634-8202
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Shawnee Mission, Hall-Mark/Kansas	913-888-4747
La	Metairie, Sterling Elec.	504-887-7610
Md	Baltimore, Hall-Mark/Baltimore	301-796-9300
Md	Baltimore, Arrow Elec.	202-737-1700
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Minn	St. Paul, Gopher Elec.	612-645-0241
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Pa	Pittsburgh, RPC Elec.	412-782-3770
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Tex	Dallas, Sterling	214-357-9131
Tex	Dallas, Texas Instr. Supply	214-238-6971
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Tex	Houston, Sterling Elec.	713-623-6600
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Utah	Salt Lake City, Altaland	801-486-7227
Wash	Seattle, Weatherford Co.	206-243-6340
Wash	Tukwila, Kierulff Elec.	206-575-4420
Wisc	West Allis, Hall-Mark	414-476-1270
For:	Can., Don Mills, Ont., Saynor Elec.	416-445-2340
For:	Can., Vancouver, B.C., Deskin	604-324-6331

SPECTROLAB, INC., Dept. EM, 12500 Gladstone Ave., Sylmar, Cal. 91342, Tel: 213-365-4611, TWX: 910-496-1488; Empl.: 250

Spectronics
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SPECTRONICS, INC., Dept. EM, 830 E. Arapaho Dr., Richardson, Tex. 75080, Tel: 214-234-4271, Telex: 73-0890; Empl.: 400 p. 3148-3150

Sales Manager: G. Null

Local Sales Offices & Reps.

Cal	Culver City	213-398-6239
Cal	Redwood City	415-367-9000
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Cal	San Diego, M.A. Stolaroff Co.	714-234-6905
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Iowa	Hiawatha, Gassner & Clark Co.	319-393-5763
Minn	Minneapolis, Barnes Sls. Assoc.	612-474-2907
NJ	Martinsville, Spectrum Control Inc.	201-469-6056
Exp:	Pa., Fairview, Spectrum Control, Inc.	814-747-5593

Local Distributors

Ala	Huntsville, Hall-mark	205-837-8700
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Cal	Burlingame, Rose Elctrns	415-697-0224
Cal	Los Angeles, Moltronics	213-773-6521
Cal	San Diego, Moltronics	714-278-5020
Cal	Santa Clara, Moltronics	408-244-7600
Fla	Ft. Lauderdale, Hall Mark	305-971-9280
Fla	Orlando, Hallmark	305-855-4020
Ill	Elk Grove, Hallmark	312-437-8800
Kans	Shawnee Mission, Hallmark	913-888-4747

Md	Baltimore, Hallmark	301-796-9300
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Mo	Earth City, Hallmark	314-291-5350
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SPECTRUM DYNAMICS, Dept. EM, 11 B North Ave., Burlington, Mass. 01803, Tel: 617-273-1850, TWX: 710-332-6878; Empl.: 62

Local Sales Offices & Reps.

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Colo	Vail, Mile High Elctrns.	303-476-1149
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Ga	Atlanta, Beacon	404-351-3654
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ill	Des Plaines, Cozzens & Cudahy	312-298-3600
Ind	Indianapolis, Cozzens & Cudahy	317-244-2456
Kans	Kansas City, Cozzens & Cudahy	816-454-5848
Md	Randallstown, Beacon Elctrns. North	301-922-1248
Mass	Burlington, Spectrum Dynm.	617-273-1850
Mass	Waltham, W.M. Hague Assoc.	617-899-5600
Miss	Minneapolis, Cozzens & Cudahy	612-884-4336
Mo	St. Louis, Cozzens & Cudahy	314-423-1234
NY	Fayetteville, M. P. Andrews Mfg.	315-637-3144
NY	Port Chester, Radiation Elctrns.	914-937-2300
NC	Greensboro, Beacon Elctrns.	919-674-9432
Pa	Bala Cynwyd, Electech	215-687-5305
SC	Spartanburg, Beacon	803-582-4613
Tex	Houston, Comspec	713-497-1762
Tex	Richardson, Comspec	214-234-4137

SPECTRUM TECHNOLOGY INC., Dept. EM, 300 Frederic Lopez Rd., Goleta, Cal. 93017, Tel: 805-964-7791; FSC No.: 32464; Empl.: 75 p. 2476,2477

Sales Manager: P. Howe

Local Sales Offices & Reps.

Ala	Huntsville, Saber Assocs.	800-327-1181
Cal	Canoga Park, EL/TEC, Inc.	213-999-3821
Cal	Mountain View, West/Mark Assocs.	415-969-1700
Colo	Littleton, Lange Sls.	303-795-3600
Conn	Milford, Todino Engrg. Sls.	203-874-6643
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Fla	Longwood, Saber Assocs.	800-432-3007
Fla	Sarasota, Saber Assocs.	800-432-3007
Ill	Elgin, Spectrum Tech. Assoc.	312-695-8552
Mass	Needham, Todino Engrg. Sls.	617-444-7925
NJ	Clifton, Compar N.Y., Inc.	201-546-3660
NJ	Haddonfield, Mesa Tech. Assocs.	609-429-9531
NM	Albuquerque, I.M.E.C.	505-883-9010
NC	Raleigh, Saber Assocs.	800-327-1181
Tex	Dallas, ION Assocs.	214-357-9441
Tex	Houston, ION Assocs.	713-461-5311
Va	Fairfax, Schibley Assocs.	703-591-3008
Wash	Bellevue, Olsen, Ferree & Assocs.	206-454-1210

™SPECULAG - silver plating bath - Conversion Chem. Corp.

™SPEECH DIRECTOR - sound system lectern - Argos Products Co., Inc.

™SPEECHMAKER - digital to voice converter - Cognitronics Corp.

SPEED DETECTORS, INC., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146, Tel: 216-232-1880; Empl.: 60

Local Sales Offices & Reps.

Ariz	Glendale, Harvey Data Systems	602-247-5818
Cal	Long Beach, Saber Entprs.	213-595-5646
Colo	Westminster, Harvey Data Systems	303-427-5299
Conn	Hamden, J & J Assocs.	203-624-7800
Md	Rockville, E. Winston & Co.	301-881-5780
Mass	Burlington, J & J Assocs.	617-272-2606
Mich	Ferndale, Tiby Co.	313-547-3550
NY	Syracuse, J. D. Birchard	315-469-4689
NC	Charlotte, Binco	704-366-5092
Ohio	Cleveland, Tiby Co.	216-371-5335
Ohio	Dayton, Tiby Co.	513-277-3822

™SPEEDETEX - speed detection equipment - Speed Detectors, Inc.

™SPEEDFOIL - high speed radiant heater - Armstrong Cork Co.

™SPEEDIAL - motor speed controls - Lutron Electronics Co.

™SPEED NUT - fasteners - Eaton Corp.

™SPEEDOMAX - electronic indicators, recorders, controllers - Leeds & Northrup Co.

™SPEEDREADER - remote meter reading attachments - Singer Co.

™SPEED SERTS - inserts & studs - Tridair Inds.

™SPEED SERVO II - Servo Chart Recorders - Esterline Angus

™SPEED-WRAP - wire-wrapping tools - O. K. Machine & Tool Corp.

™SPEEDY - wire snips - Clauss Cutlery Co.

SPELLMAN HIGH VOLTAGE ELCTRNS. CORP., Dept. EM, 7 Fairchild Ave., Plainview, N.Y. 11803, Tel: 516-822-2130, TWX: 710-593-4135; Empl.: 130 p. 3334,3335

Local Sales Offices & Reps.

Cal	Pasadena, A-F Sls.	213-681-5631
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Ill	Chicago, Ropek-Cahill	312-287-7292
Md	Hyattsville, Eastern Components	301-577-2925
Mass	Concord, Nortech Engrg. Sls.	617-259-0032
NJ	Tenafly, Budd-Tronics	201-569-2230
NM	Albuquerque, Cleveland Enterprises	505-345-2481
Pa	Flourtown, Eastern Components	215-836-1616
Tex	Dallas, R. Martin Assoc.	214-361-8584
Tex	Houston, R. Martin Assoc.	713-462-4077

SPEMCO SWITCHES, See Specialties Mfg. Co.

™SPEMCO - switches - Specialties Mfg. Co., Inc.

SPERRY UNIVAC, Dept. EM, Box 500, Blue Bell, Pa. 19422, Tel: 215-542-4217; Empl.: 51,000

SPHERE CORP., Dept. EM, PO Box 213, Bountiful, Utah 84010

™SPHINCTER - sockets - Pylon Co., Inc.

™SPINGUARD - ceramic capacitor - AVX Ceramics

™SPIRADEL - high Q constant delay line - Allen Avionics, Inc.

™SPIRAFIL - semi-rigid cable - Cablewave Systems Inc.

™SPIRAKORE - transformer - General Elec. Co.

™SPIRAL - blower - Rotron, Inc.

™SPIRALTRON - electron multiplier (SEM) - Galileo Electro-Optics Corp.

™SPIRAL WRAP HEATERS - heaters wraped around cylinders - Sierracin/Thermal Sys.

™SPIRAP - wire & cable binding - Amp Inc.

™SPIRA-SHIELD - flexible cable sheath - Magnetic Shield Div.

™SPIR'ATOR - constant force spiral spring - Ametek, Inc

™SPIR-O-FOAM - foam dielectric coax cable - Prodelin, Inc.

™SPIR-O-GUIDE - elliptical wave guide - Prodelin, Inc.

™SPIR-O-LINE - air dielectric coax cable - Prodelin, Inc.

™SPIR-O-LOK - coax cable connectors - Prodelin, Inc.

™SP I, SP II, SP III - data desk, desk with electronic packaging - Systems Furniture

™SPLICETTE - cassette splices - Webtek Corp.

™SPLIT - ball bearings - MPB Corp.

™SPOOLARC - spooled wire - Chemetron Corp.

™SPORTSMAN - flashlights and lanterns - Ray-O-Vac Div.

™SPOT CHECK - surface temperature thermometers - Pacific Transducer Corp.

™SPOT-LOK - nylok spot-lok socket screws - Allen Mfg. Co.

™SPOTMATIC - selective gold plating machine - Auric Corp.

™SPOTMETER - photometer - Photo Research Corp.

SPRAGUE ELEC. CO., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247, Tel: 413-664-4411, TWX: 710-369-1360; Empl.: 8000

Local Sales Offices & Reps.

Ala	Huntsville, Sprague Elec. Co.	205-883-0520
Ariz	Tempe, Sprague Elec. Co.	602-279-5435
Cal	Burlingame, W. J. Purdy Co.	415-347-7701
Cal	Inglewood, Sprague Elec. Co.	213-649-2600
Cal	San Diego, KCE Corp.	714-278-7640
Colo	Denver, W.J. Purdy Co.	303-777-1411
Conn	Trumbull, Sprague Elec. Co.	203-261-2551
DC	Washington, Sprague Elec. Co.	202-337-7820
Fla	Longwood, Sprague Elec. Co.	305-831-3636
Ill	Schiller Park, Sprague Elec. Co.	312-678-2262
Ind	Indianapolis, Sprague Elec. Co.	317-253-4247
Mass	North Adams, Sprague Elec. Co.	413-664-4411
Mass	Norwood, R. Perron & Co.	617-762-8114
Mass	Waltham, Sprague Elec. Co.	617-899-9100
Mich	Jackson, Sprague Elec. Co.	517-787-3934
Minn	Minneapolis, HMR, Inc.	612-920-8200
Mo	St. Louis, Sprague Elec. Co.	314-781-2420
NJ	Cherry Hill, Sprague Elec. Co.	609-795-2299
NJ	Cherry Hily, Trinkle Sls. Inc.	609-795-4200
NJ	Wayne, Sprague Elec. Co.	201-696-8200
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Mamaroneck, Wm. Rutt, Inc.	914-698-8600
NY	Melville, Sprague Elec. Co.	516-549-4141
NY	Syracuse, Sprague Elec. Co.	315-437-7311
NY	Syracuse, Mar-Com Assocs.	315-437-2843
NC	Winston-Salem, Electronic Mktg. Assocs.	919-722-5151
Ohio	Beachwood, Elctrn. Salesmasters Inc.	1-800-362-2616
Ohio	Dayton, Sprague Elec. Co.	513-278-0781
Tex	Richardson, Sprague Elec. Co.	214-235-1256
Va	Lexington, Sprague Elec. Co.	703-463-9161
Wash	Seattle, Sprague Elec. Co.	206-632-7761

SPRAGUE PRODUCTS CO., Dept. EM, 481 Marshall St., No. Adams, Mass. 01247, Tel: 413-664-4481, TWX: 710-369-1363; FSC No.: 56289 p. 1303-1351,3732,3733,4460

Local Sales Offices & Reps.

Ariz	Phoenix, Stitzer -Dodd	602-944-2237
Cal	Burlingame, W. J. Purdy Co.	415-347-7701
Cal	Los Angeles, N. Bevan Assocs.	213-559-0534
Cal	Sacramento, W. J. Purdy Co.	916-422-0128
Cal	San Diego, KCE Corp.	714-278-7640
Colo	Denver, W. J. Purdy Co.	303-777-1411
Fla	Fort Lauderdale, UniRep, Inc.	305-527-1556
Haw	Honolulu, Hawaii Elctrns. Sls.	808-845-8207
Ill	Chicago, D. Dolin Sls. Co.	312-286-6200
Ind	Mulberry, Maish Sls.	317-638-8484
Mass	Waltham, Sprague Prods. Co.	617-899-9840
Minn	Minneapolis, HMR, Inc.	612-920-8200
Mo	Kansas City, Nevco, Inc.	816-421-1751
Mo	St. Louis, Nevco, Inc.	314-843-7406
NJ	Cherry Hill, Trinkle Sls. Inc.	609-795-4200
NJ	Cranford, G. G. Burnett	914-698-8600
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	Mamaroneck, W. Rutt, Inc.	914-698-8600
NY	Syracuse, Paston-Hunter Co.	315-437-2992
NC	Winston-Salem, Elctrns. Mktg. Assocs.	919-722-5151
Ohio	Beachwood, Elctrn. Salesmasters	216-831-9555
SC	Greenville, Elctrn. Mktg. Assoc.	803-268-1125
Tex	Arlington, EMC, Inc.	817-261-8424
Tex	Dallas, Lund & Co.	214-387-4634

Wash	Seattle, Fleehart & Sullivan, Inc.	206-522-1533

SPRAGUE-GOODMAN ELECTRONICS, INC., Dept. EM, 134 Fulton Ave., Garden City Park, N.Y. 11040, Tel: 516-746-1385, Telex: 14-4533; FSC No.: 52769; Empl.: 25

Sales Manager: F. Hersh

Local Sales Offices & Reps.

Ala	Huntsville, Electronic Mktg. Assoc.	205-533-6640
Ariz	Tempe, Sprague Elec. Co.	602-279-5435
Cal	Burlingame, W. J. Purdy Co.	415-347-7701
Cal	Los Angeles, R.F. Assocs. Inc.	213-478-1586
Cal	San Diego, H. King, Inc.	714-566-5252
Colo	Denver, W. J. Purdy Co.	303-777-1411
Conn	Farmington, R. Perron & Co.	203-673-4825
Conn	Trumbull, R. Perron & Co.	203-268-9631
Fla	Clearwater, Dyne-A-Mark Corp.	813-441-4702
Fla	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Ill	Chicago, Croyden Elctrns. Inc.	312-237-2828
Ind	Ft. Wayne, Delesa Sls.	219-483-9537
Ind	Indianapolis, Delesa Sls.	317-894-3778
Iowa	Marion, T & M Assoc.	319-377-6261
Kans	Shawnee Mission, T & M Assoc.	913-432-2131
Md	Pikesville, Imagitron Sls.	301-484-1411
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Jackson, Sprague Elec. Co.	517-787-3934
Minn	Minneapolis, HMR	612-920-8200
Mo	Hazelwood, T&M Assoc.	314-895-4700
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Dover, Richman Salesco-Wenco	201-584-8444
NM	Albuquerque, W. J. Purdy Co.	505-266-7959
NY	, Richman Salesco	516-543-5532
NY	Commack, Richman Salesco	516-543-5532
NY	Pompey, S.F. Foster Co.	315-677-3333
NY	Webster, S.F. Foster Co.	716-265-2072
NC	Winston-Salem, Electronic Mktg. Assoc.	919-722-5151
Ohio	Beachwood, Electronic Salesmasters	216-831-9555
Pa	Landisville, Imagitron Sls.	717-898-7633
SC	Greenville, Elctrn. Mktg. Assoc.	803-268-1125
Tex	Dallas, Bonser-Philhower Sls.	214-234-8438
Tex	Houston, Bonser-Philhower Sls.	713-467-4373
Wash	Seattle, Sprague Elec. Co.	206-632-7761

SPRAY-ON PRODUCTS, Dept. EM, 26300 Fargo Ave., Bedford Hts., Ohio 44146

SPRENGNETHER INSTR. CO., W.F., Dept. EM, 4567 Swan St., St. Louis, Mo. 63110, Tel: 314-535-1682; Empl.: 25

(TM)SPRING KIT - packaged springs & forms - Helix Spring Corp.

(TM)SPRINGTER - sockets - Pylon Co., Inc.

(TM)SPRIOBAND - wire/cables harnesses - Electrovert

(TM)SPRITE - fan - Rotron, Inc.

(TM)SPUTTERGUN - thin film sputtering system - Sloan Technology Corp.

(TM)SPUTTERSPHERE TM - sputtering system - Materials Resch. Corp.

SQUARE D CO., Dept. EM, 4041 N. Richards, Dept. SA-711 Box 472, Milwaukee, Wisc. 53201, Tel: 414-332-2000, Telex: 996472; Empl.: 15000 p. 2403,3613

SRC DIV., MOXON INC., See Moxon Inc.

(TM)SQUARISTOR - square resistors - General Resistance, Inc.

(TM)SQUINT-SKAN - reflective skanner - Skan-A-Matic Corp.

(TM)S.R.M. - sma-type r.f. connectors - Sealectro Corp.

(TM)SRO - music speaker/microphone - Electro-Voice, Inc.

(TM)S-R-4 - strain gages - BLH Elctrns.

S S A C INC., Dept. EM, Box 395, Liverpool, N.Y. 13088, Tel: 315-457-9610; Empl.: 56

Local Sales Offices & Reps.

Cal	N. Hollywood, Crown Elctrns.	213-877-3550
Fla	Jacksonville, Ward Eng. Co.	904-388-7656
Ga	Atlanta, Grady Ducket Sales	404-451-3529
Haw	Kihei, Hawaiian Pacific Assoc.	808-879-1184
Ill	Chicago, Electro-Tech Mktg.	312-588-4535
Ill	Chicago, P/N Indl. Sls.	312-761-7887
Ind	Indianapolis, Bryant Control Inc.	317-788-0761
Mass	W. Springfield, Tectrol Assoc.	314-733-3695
Minn	St. Paul, J. D. Co.	612-454-5552
Mo	Florissant, Miller Assoc.	314-355-1642
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Rochester, Upstate Component Sls.	716-288-1080
NY	Rome, Rome Electronics	315-476-2033
NY	Rye, Charles Avery Assoc.	914-967-7610
NC	Shelby, Dixie Industrial Supply	704-482-5641
Pa	Jenkintown, Arnold Assocs.	215-742-0600
Wisc	Cederburg, TFL Assoc.	414-377-7030
Exp:	New Haven, Maston-Wright Corp.	203-288-1638

(TM)SSB ANALYZERS - spectrum analyzers - Nelson Ross Elctrns.

STA-RITE INDS., Comms. Div., Webster Elec., Dept. EM, 1900 Clark St., Racine, Wisc. 53403, Tel: 414-633-3511, TWX: 910-271-2399; Empl.: 600

STA-WARM ELEC. CO., Dept. EM, 116 N. Chestnut St., Ravenna, Ohio 44266, Tel: 216-296-6461; Empl.: 18

(TM)STABILENE - stable base film - Keuffel & Esser Co.

(TM)STABILINE - automatic voltage regulators - Superior Electric Co.

(TM)STABILIZER 100 - pc board component lead lock-in system* - Hollis Engrg., Inc.

(TM)STABILIZER 150 - pc board fluxing and component lead lock-in system* - Hollis Engrg., Inc.

(TM)STABLE-K - capacitors, fixed, ceramic - Republic Elctrns. Corp.

(TM)STACER - self-extending spiral tube - Ametek, Inc

(TM)STACKBIN - storage container - Stackbin Corp.

STACKBIN CORP., Dept. EM, Box 434, Pawtucket, R.I. 02862, Tel: 401-333-1600; Empl.: 75

Sales Manager: J.J. Patterson

(TM)STACK-N-NEST - containers - LEWISystems

STACKPOLE

STACKPOLE CARBON CO., Carbon Div., Dept. EM, St. Marys, Pa. 15857, Tel: 814-781-1234, TWX: 510-693-4511; FSC No.: 78488

STACKPOLE CARBON CO., Electronic Comps. Div./ Soft Fernites/Special Purpose Resistors, Dept. EM, St. Mary's, Pa. 15857, Tel: 814-781-1234, TWX: 510-693-4511

Refer To: SCC/Elctrn. Comps. Div. - Fixed Comp. Resistors For Sales Office Information

STACKPOLE CARBON CO., Elctrn. Comps. Div.-Fixed Comp. Resistors & Carbon Film Resistors, Dept. EM, Kane, Pa. 16735, Tel: 814-837-7000, TWX: 510-695-8404; FSC No.: 78488 ......p. 2680,2681,3734

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sale	602-994-4587
Cal	Los Gatos, Luscombe Engr. of S.F.	408-353-3289
Cal	Millbrae, F. Auman	415-589-9344
Cal	Pasadena, Luscombe Engr. of L.A.	213-684-2000
Cal	Van Nuys, Wes-K Assoc.	213-989-3070
Colo	Englewood, Checkmate Sls. Inc.	303-773-0666
Conn	Plantsville, R. J. Pisaneschi	203-628-9505
Fla	Maitland, Delmac Sls. Inc.	305-423-7562
Ga	Peachtree City, J.A. Creighton	404-487-8550
Ill	Arlington, J. L. Clingingsmith	312-398-6484
Ill	Des Plaines, Stackpole Carbon Co.	312-297-0270
Ill	Kankakee, R. Burgess	815-939-7385
Ind	Bloomington, R.E. Riggs	812-339-6166
Kans	Overland, Ensco-Rep	913-381-7557
La	Baton Rouge, R.F. Gallagher	504-924-4995
Md	Baltimore, Stemler Assoc., Inc.	301-944-8262
Mass	Lowell, E.F. Delaney,Jr.	617-459-2381
Mich	Birmingham, J.E. Vollmer Jr.	313-644-3571
Minn	Minneapolis, HMR Inc.	716-633-7970
Mo	St. Louis, Ensco-Rep. Inc.	314-567-3935
NJ	Englewood Cliffs, Sprung/Nussbaum	201-947-6767
NY	Buffalo, R.W. Mitscher	716-633-7970
NC	Raleigh, R.W. Mitscher	919-828-0575
Ohio	Dayton, J.B. MacDonald	513-298-8727
Ohio	Hudson, D. J. Mohr	216-653-2255
Ohio	Toledo, J.F. Clark	419-382-1813
Ore	Beaverton, Vantage Corp.	503-646-3466
Pa	Oreland, Brown-Oberlies Inc.	215-887-1325
Pa	Pittsburgh, H.S. Swoyer	412-256-2538
Tenn	Shelbyville, R. W. Mitscher	615-684-4544
Tex	Dallas, M.N. Herbst	214-239-2497
Va	Virginia Bch., R.W. Mitscher	804-481-7200
Wash	Bellevue, Vantage	206-455-3460

STACKPOLE CARBON COMPANY/ PERMANENT CERAMIC MAGNETS & MAGNETIZABLE POWDER, Magnet Div., Dept. EM, Kane, Pa. 16735, Tel: 814-837-7000, TWX: 510-695-8360

STACKPOLE COMPONENTS CO., Dept. EM, Box 14466, Raleigh, N.C. 27610, Tel: 919-828-6201, TWX: 510-928-0520; FSC No.: 78488 p. 3735,3849,4233-4275

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sls.	602-994-4587
Ark	Englewood, Checkmate Sls.	303-773-0666
Cal	Los Gatos, Luscombe Engr. of S.F.	408-353-3289
Cal	Millbrae, F.A. Auman	415-589-9344
Cal	Pasadena, Luscombe Engr. of L.A.	213-684-2000
Cal	Van Nuys, Wes-K Assoc.	213-989-3070
Conn	Plantsville, R.J. Pisaneschi	203-628-9505
Fla	Maitland, Delmac Sls.	305-423-7562
Ga	Peachtree City, J.A. Creighton	404-487-8550
Ill	Arlington Heights, J.L. Clingingsmith	312-398-6484
Ill	Des Plaines, Stackpole Carbon Co.	312-297-0270
Ill	Kankakee, R. Burgess	815-939-7385
Ind	Bloomington, R.E. Riggs	812-339-6166
Kans	Overland Park, Ensco-Rep	913-381-7557
La	Baton Rouge, R.F. Gallagher	504-924-4995
Md	Baltimore, Stemler Assoc.	301-944-8262
Mass	Lowell, E.F. Delaney, Jr.	617-459-2381
Mich	Birmingham, J.E. Vollmer, Jr.	313-644-3571
Minn	Minneapolis, HMR, Inc.	716-633-7970
Mo	St. Louis, Ensco-Rep	314-567-3935
NJ	Englewood Cliffs, Sprung/Nussbaum	201-947-6767
NY	Buffalo, R.W. Mitscher	716-633-7970
NC	Raleigh, R.W. Mitscher	919-828-0575
Ohio	Dayton, J.B. MacDonald	513-298-8727
Ohio	Hudson, D.J. Mohr	216-653-2255
Ohio	Toledo, J.F. Clark	419-382-1813
Ore	Beaverton, Vantage Corp.	503-646-3466
Pa	Oreland, Brown Oberlies	215-887-1325
Pa	Pittsburgh, H.S. Swoyer	412-256-2538
Tenn	Shelbyville, R.W. Mitscher	615-684-4544
Tex	Dallas, M.N. Herbst	214-239-2497
Va	Virginia Beach, R.W. Mitscher	804-481-7200
Wash	Bellevue, Vantage Corp.	206-455-3460

STACKPOLE COMPONENTS CO., Dept. EM, P.O. Box M, Farmville, Va. 23901, Tel: 804-392-4111, TWX: 710-874-3710 .... p. 3848,3849

Refer to Stackpole Carbon Co., Raleigh, N.C. for sales office information

(TM)STACKRACK - storage container holder - Stackbin Corp.

STACO, INC., Dept. EM, 2240 E. 3rd St., Dayton, Ohio 45403, Tel: 513-253-1191, TWX: 288-032 810-459-1798; FSC No.: 83008; Empl.: 135 p. 4466,4467

Sales Manager: D. James

Local Sales Offices & Reps.

Ariz	Phoenix, C. T. Carlberg & Assocs.	602-997-0774
Cal	Costa Mesa, Stacoswitch	714-549-3041
Cal	Santa Clara, Thomas-Hartman Assocs.	408-247-1252
Colo	Denver, R.G. Bowen Co.	303-722-4641
Conn	Brookfield, Hathaway Elctrns.	203-775-4469
Conn	West Hartford, Hathaway Elctrns., Inc.	203-521-4614
Fla	Longwood, Haas/Winfield Co.	305-831-1276
Fla	North Miami, Haas/Winfield Co.	305-945-6544
Fla	Ocala, Haas/Winfield Co.	904-732-9775

Ga	Atlanta, Millar Elctrn. Sls.	404-261-6160
Haw	Honolulu, Elctrns. Sls. & Svc.	808-845-8207
Ill	Skokie, Saffro & Assocs.	312-588-0905
Ind	Indianapolis, Southern Sls. Co.	317-299-2992
Iowa	Des Moines, KSW Assocs.	515-279-9235
La	Metairie, McKinney Sls. Co.	504-733-9583
Md	Hyattsville, Eastern Comps.	301-577-2925
Mass	Lexington, Hathaway Elctrns., Inc.	617-861-7010
Mich	Coopersville, Shalco, Inc.	616-837-6964
Mich	Pleasant Ridge, Shalco, Inc.	313-547-4771
Minn	Minneapolis, SKOR	612-645-6461
Mo	Bridgeton, KSW Assocs.	314-291-6138
Mont	Kansas City, KSW Assocs.	816-358-5240
NJ	Plainfield, Levison Sls. Co.	201-561-3866
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Buffalo, R.F. Lamb Co.	716-874-4900
NY	Rochester, R.F. Lamb Co.	716-544-5580
NY	Schenectady, R.F. Lamb Co.	518-393-4844
NY	Syracuse, R.F. Lamb Co.	315-454-2469
NY	Valley Stream, Levison Sls. Co.	516-561-9698
NC	Raleigh, Millar Elctrns., Inc.	919-787-9564
Ohio	Cleveland, Marlow Assocs.	216-932-0900
Ohio	Dayton, Marlow Assocs.	513-866-4991
Okla	Tulsa, McKinney Sls. Co.	918-622-5511
Ore	Omaha, KSW Assocs.	402-333-2943
Pa	Flourtown, Eastern Comps.	215-836-1616
Pa	York, Eastern Comps.	717-764-3114
Tex	Dallas, McKinney Sls. Co.	214-631-9450
Tex	Houston, McKinney Sls. Co.	713-493-9100
Tex	Sugarland, McKinney Sls. Co.	713-494-7806
Wash	Seattle, R.K. Squibb Co.	206-632-2450
Wisc	Lake Mills, Saffro & Assocs.	414-648-2605

STACO, INC., Dept. EM, 625 S. "G" St., Richmond, Ind 47374, Tel: 317-966-4513; Empl.: 150

Sales Manager: H. Shulman

STACOSWITCH, INC., Dept. EM, 1139 Baker St., Costa Mesa, Cal. 92626, Tel: 714-549-3041, TWX: 910-595-1507; FSC No.: 12522; Empl.: 100

Local Sales Offices & Reps.

Ariz	Phoenix, Camel Elctrns., Inc.	602-959-5635
Cal	Newark, Snyder Sls.	415-792-8323
Colo	Denver, Camel Elctrns., Inc.	303-757-6191
Conn	Marion, Sands Co.	203-628-4363
Fla	Lighthouse Pt., Saber Assocs.	305-943-3076
Ind	Fort Wayne, J & B Engrg. Sls.	219-483-2813
Iowa	Cedar Rapids, H. R. Brown Sls.	319-366-0635
Kans	Olathe, B-C Elctrn. Sls.	913-888-6680
Md	Rockville, Marktron	301-762-6210
Mich	Grand Rapids, R.P. Urban & Assocs.	616-245-0511
Minn	St. Paul, Murnco	612-484-8200
Mo	Hazelwood, B-C Elctrn. Sls.	314-731-1255
NJ	Wayne, G.T. Assocs.	201-694-6040
NY	Syracuse, Lenard Co.	315-379-9191
NC	Raleigh, Saber Assocs.	919-834-3961
Ohio	Dayton, J & B Engrg.,Sls.	513-252-9939
Pa	Media, W. Reeves Assocs.	215-566-6709
Tex	Dallas, R. Matthews Elctrns.	214-233-0363
Va	Charlottesville, Marktron	703-973-5874
Wash	Seattle, Seatronics	206-767-4330

Advertisement

Stacoswitch manufacturers non-lighted and lighted display pushbutton switches and indicators, including single lamp and 4-lamp units. Choice of switch action, 2PDT or 4PDT, 3-5 amp rating, 28VDC/115VAC. QPL and industrial/commercial. Company also manufactures Low Profile Keyboards with or without LED illumination for function identification.

™STACPAC - rectifier, silicon - Semtech Corp.

STAFFALL INC., Dept. EM, 7 Woodland St., Providence, R. I. 02908, Tel: 401-351-8282, TWX: 710-381-6964; Empl.: 25

™STA-FLOW - synthetic plastic resins - Air Prods. & Chems., Inc.

™STA-FLUX - stabilizer and flux combined for use in stabilizer 150 systems - Hollis Engrg., Inc.

STAINLESS, INC., Dept. EM, 3rd St., N. Wales, Pa. 19454, Tel: 215-699-4871, TWX: 510-661-8097; Empl.: 80

™STAIRWAY-TYPE - tower sections - Up-Right Scaffolds

™STAKE FASTENER - panel fastener - Dupree, Inc.

™STA-KON - terminals, tools - T & B/Thomas & Betts

™STA-KON - terminals, tools - T & B/Thomas & Betts

ESSEX STANCOR

STANCOR/ESSEX INTERNATIONAL, INC., Dept. EM, 3501 W. Mktg., Chicago, Ill. 60618, Tel: 312-463-7400, TWX: 910-221-5466; FSC No.: 80089
p. 3488-3513,4358-4407,4644-4667

Local Sales Offices & Reps.

Ariz	Phoenix, W. B. Knight Co.	602-242-3057
Cal	Millbrae, Polach & Bensinger Inc.	415-697-2525
Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Colo	Denver, R.G. Bowen Co.	303-722-4641
Fla	Orlando, Hollingsworth & Still, Inc.	305-834-2356
Ga	Atlanta, Hollingsworth & Still, Inc.	404-394-3270
Ill	Oak Park, G. Petitt Co.	312-261-0342
Iowa	Des Moines, Kathrinus-Kelly & Co.	515-255-4584
Kans	Shawnee Mission, Kathrinus-Kelly Co.	913-722-0000
Md	Rockville, Lienau Assocs.	301-770-6800
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mich	Detroit, Nicon Assocs.	313-341-7688
Minn	Minneapolis, R. Ripley & Assocs.	612-881-8282
Mo	St. Louis, Kathrinus-Kelly & Co.	314-968-3800
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	Buffalo, R.W. Mitscher Co.	716-633-7970
NY	Elmont, F.E. Schmitt Co.	516-437-8150
Ohio	Columbus, McFadden Sls. Co.	614-221-3363
Ohio	Dayton, Kimconics Sls. Co.	513-898-1783
Ore	Beaverton, DMS/Vantage	503-644-6111
Pa	Waterford, Kimconics Sls.	814-796-6556
Tenn	Memphis, Mid-South Sls. Assoc.	901-398-5979
Tex	Dallas, R.E. Nesbitt Co.	214-357-4601
Wash	Bellevue, Vantage Corp.	206-455-3460
Wash	Seattle, DMS/Vantage	206-525-2050

™STANCOTE - plastic insulated wire - Standard Wire & Cable Co.

STANDARD CONDENSER CORP., Dept. EM, 1065 W. Addison St., Chicago, Ill. 60613, Tel: 312-327-5440

Local Sales Offices & Reps.

Colo	Denver, Brown Technical Inc.	303-233-0863
Ga	Stone Mountain, H & H Mktg.	404-296-9830
Ill	Chicago, Rinaldi Inc.	312-763-4848
Mass	Canton, New England Elctrn. Sls.	617-828-4835
Mich	Farmington, Davis-Martensen Co.	313-474-8300
Minn	St. Paul, Cahill & Assoc.	612-646-7217
NY	Syracuse, J.V. Costello	315-472-0322
Pa	Jenkintown, Arnold & Assoc.	215-PI2-0600
Tex	Garland, Whiteside Sls.	214-231-9771

STANDARD CONTROLS, Dept. EM, 2401 S. Bayview St., Seattle, Wash. 98144, Tel: 800-426-0366, TWX: 910-444-2164; FSC No.: 13624; Empl.: 52

Sales Manager: R.E. Helmick

Local Sales Offices & Reps.

Ala	Huntsville, Tech. Sls.	205-881-1750
Cal	Costa Mesa, Scrantom Engrg., Inc.	714-979-6373
Cal	Los Altos, J.C. Meyer & Assocs.	415-964-8844
Ill	Des Plaines, Marsland Assocs.	312-775-1309
Ind	Indianapolis, Marsland Assocs.	317-924-3568
Iowa	Cedar Rapids, G. Fixman Engrg. Co.	319-362-6302
Kans	Overland Park, G. Fixman Engrg. Co.	913-648-7748
Kans	Wichita, G. Fixman Engrg. Co.	316-682-9433
Md	Rockville, Electronic Mktg. Assoc.	301-744-7700
Mass	Peabody, JSR Assoc.	617-532-0348
Mich	Farmington, W. R. Hummon & Assocs., Inc.	313-474-0661
Mo	St. Louis, G. Fixman Engrg. Co.	314-725-5219
NY	Fairport, Naco Elctrns. Corp.	716-223-4490
NY	North Syracuse, NACO Electronics Corp.	315-699-2651
NY	Utica, NACO Elctrns. Corp.	315-732-1801
NC	Charlotte, Ranson, Wallace & Baesel, Inc.	704-334-4244
Ohio	Dayton, Hocker Assocs.	513-298-8638
Ohio	N. Olmsted, Hocker Assocs.	216-734-4433
Pa	King of Prussia, Electronic Mktg. Assoc.	215-265-1600
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Wash	Seattle, Standard Controls	206-723-1705

STANDARD CRYSTAL CORP., Dept. EM, 1 Cupania Circle, Monterey Park, Cal. 91754, Tel: 213-724-5004; Empl.: 36

Local Sales Offices & Reps.

Cal	Costa Mesa, E. Murray Assoc.	714-642-3282
Mich	Grand Rapids, R. P. Urban Assoc.	616-245-0511
Utah	Salt Lake City, SAGE Sls.	801-531-0531

STANDARD ENGINEERING, Dept. EM, 44800 Industrial Dr., Fremont, Cal. 94538, Tel: 415-657-7555; Empl.: 20

STANDARD ENVIRONMENTAL SYSTEMS, INC., Dept. EM, 383 Minnisink Rd., Totowa, N.J. 07512, Tel: 201-256-2200, TWX: 710-988-5722; Empl.: 30

Local Sales Offices & Reps.

NY	Syracuse, Tesco Assocs.	

standard grigsby, inc.

STANDARD GRIGSBY INC., Dept. EM, 920 Rathbone Ave., Aurora, Ill. 60507, Tel: 312-844-4300, TWX: 910-232-3138; Empl.: 350 .... p. 4258,4259

Local Sales Offices & Reps.

Ala	Huntsville, Elctrn. Mktg. Assoc.	205-533-3620
Ariz	Tempe, Argus Sls.	602-966-7442
Cal	Culver City, DeAngelo Rothman & Co.	213-398-6239
Cal	San Diego, DeAngelo Rothman & Co.	714-560-5707
Cal	Santa Clara, Nova-tronix	408-243-9530
Colo	Denver, Electrodyne	303-757-7679
Conn	Milford, Conti-Younger Assoc.	617-890-4582
Fla	Altamonte Springs, WMM Assoc.	305-862-4700
Fla	Clearwater, WMM Assoc.	813-442-3913
Fla	Pompano Beach, WMM Assoc.	305-943-3091
Ill	Hinsdale, Momak Sls.	312-963-6400
Ind	Indianapolis, Southern Sls. Corp.	317-257-7575
Kans	Olathe, Elctrn. Sls. Co.	913-782-2850
Mass	Waltham, Conti-Younger Assoc.	203-929-3294
Mich	Benton Harbor, McNabb & Assoc.	616-925-2166
Minn	St. Paul, Northport Engrg.	612-698-3841
NJ	Mountain Lakes, Comps. For Elctrns.	201-334-2921
NY	Cazenovia, S. T. Woolard Co.	315-655-8145
NY	Rochester, D.L. Eiss	716-889-1919
NC	Winston Salem, Electronic Mktg. Assoc.	919-722-5151
Ohio	Cincinnati, Luebbe Sls.	513-871-4211
Pa	Ft. Washington, Kirk-Sandell	215-643-2100
SC	Greenville, Elctrn. Mktg. Assoc.	803-268-1125
Tex	Hurst, Wheelex	817-268-1812
Utah	Salt Lake City, Electrodyne, Inc.	303-757-7679
Va	Fairfax, W. Troyer Co.	703-280-4781
Wash	Redmond, Quadra Sls.	206-883-3550

STANDARD LOGIC INC., Dept. EM, 2215 S. Standard Ave., Santa Ana, Cal. 92707, Tel: 714-979-4770, TWX: 910-595-1707; Empl.: 60

Sales Manager: R.R. Fried

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak, & Frazier	205-536-5650
Ariz	Phoenix, Tooltronics, Inc.	602-257-0768
Cal	Glendale, Tooltronics, Inc.	213-240-4000
Cal	Orange, Electronic Technology Assocs., Inc.	714-997-1826
Cal	Santa Clara, Lowe Assocs.	408-737-1230
Cal	Santa Clara, Tooltronics, Inc.	408-241-4000
Colo	Parker, Technology Mktg. Assoc.	303-841-3435
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Ill	Palos Heights, Automated Process, Inc.	312-299-3656
Ind	Cumberland, Automated Process, Inc.	317-251-0708
Md	Baltimore, Faion Lott Co., Inc.	301-744-4611
Minn	Minneapolis, Engineering Prod. Assocs., Inc.	612-925-1883

NM Albuquerque, Technology Mktg. Assocs. 505-298-4321
NY Clay, Solder Pot, Inc. 315-699-7188
NY Schenectady, Solder Pot, Inc. 518-355-1829
Ohio Dayton, G.L. Ashby Assocs. 513-252-5627
Ohio Lyndhurst, G.L. Ashby Assocs. 216-461-0826
Tex Dallas, Tooltronics, Inc. 214-661-0700
Utah Murray, Technology Mktg. Assocs. 801-485-9381
Wisc Milwaukee, Automated Process, Inc. 414-354-4370
Exp: N.Y., Bronx, OK Machine and Tool Corp. 212-994-6600

STANDARD MEMORIES,, Dept. EM, 3400 Segerstrom Ave., Santa Ana, Cal. 92704, Tel: 714-540-3605, TWX: 910-595-1596; Empl.: 250

Local Sales Offices & Reps.
NJ Fair Haven, Eastern Regional Office 201-842-3160

STANDARD PNEUMATIC MOTOR CO., Dept. EM, Box 10030, Reno, Nev. 89510, Tel: 702-329-6311, Telex: 354-467; Empl.: 65

Sales Manager: D. Demarzie

Local Sales Offices & Reps.
Nev Reno, Standard Pneumatic Motor Co. 800-648-5055

STANDARD POWER, INC., Dept. EM, 1400 S. Village Way, Santa Ana, Cal. 92705, Tel: 714-558-8512, TWX: 910-595-1760; Empl.: 135 p. 3336,3337

Sales Manager: C.L. Goldsworth

Local Sales Offices & Reps.
Ariz Phoenix, O'Donnell Assocs. 602-993-9740
Cal Palo Alto, O'Donnell Assoc. 415-327-9260
Cal Torrance, O'Donnell Assoc. 213-323-9243
Colo Denver, Parker-Webster Co. 303-770-1972
Conn Meriden, R. Sturgeon Co. 203-237-1112
Fla Altamonte Springs, WMM Assocs. 305-862-4700
Fla Clearwater, WMM Assocs. 813-442-3913
Fla Pompano Beach, WMM Assocs. 305-943-3091
Ill Arlington Hgts., Brainard-Wilson Mktg. 312-437-2700
Ind Ft. Wayne, J & B Engrg Sls. Co. 219-483-2813
Kans Shawnee Mission, Lowell-Kangas & Assoc. 913-631-3515
Md Timonium, Glen White & Assoc. 301-252-6360
Mass Babson Park, P. R. Sturgeon Co. 617-237-3506
Mich Spring Lake, Imtech 616-842-6460
Minn Minneapolis, Arneson & Co. 612-835-2177
Mo St. Louis, Lowell-Kangas & Assoc. 314-821-4050
NJ Ft. Lee, Kenneth E. Hughes Co. 201-944-1600
NY Buffalo, L. D. Allen 716-839-3300
NY N. Syracuse, L. D. Allen 315-458-7470
NC Raleigh, Glen White & Assoc. 919-787-7016
Ohio Cleveland, Imtech 216-826-3400
Ohio Dayton, Imtech 513-278-6507
Pa Bala Cynwd, Vantage Sls. Co. 215-667-0990
Tenn Johnson City, Glen White & Assocs. 615-928-0184
Tex Dallas, Semiconductor Sls. Assocs. 214-231-6181
Tex Houston, Semiconductor Sls. Assocs. 713-661-0681
Utah Salt Lake City, Parker Webster Co. 801-486-3737
Va Lynchburg, Glen White & Assocs. 805-846-4624
Wash Bellevue, W.M. Buehler 206-455-5512
Wisc Milwaukee, Brainard Wilson Mktg. 414-527-1500
Exp: Cal., Los Angeles, Trans World Trade 213-472-0444

Local Distributors
Ariz Phoenix, R.V. Weatherford Co. 602-272-7144
Cal Anaheim, R.V. Weatherord Co. 714-547-0891
Cal Burlingame, Rose Weatherford 415-692-5700
Cal Glendale, R.V. Weatherford Co. 213-849-3451
Cal Palo Alto, R.V. Weatherford Co. 415-493-5373
Colo Englewood, R.V. Weatherford Co. 303-761-5431
Conn Hamden, Arrow Elctns. 203-248-3801
Fla Ft. Lauderdale, Arrow Elctrns. 305-776-7790
Fla Miami, Lykes Elctrns. 305-633-8535
Fla Orlando, Hammond Elctrns. 305-849-6060
Fla Tampa, Lykes Elctrns. 813-886-6621
Ga Norcross, Lykes Elctrns. 404-449-9400
Haw Honolulu, Industrial Elctrns. 808-533-6095
Ill Broadview, LComp-Chicago 312-865-7600
Ill Westmont, Bodelle Company 312-323-9670
Ind East Chicago, Acro Elctrns. 219-397-8681
Ind Ft. Wayne, Ft. Wayne Elctrns. 219-423-3422
Ind Indianapolis, Graham Elctrns. 317-635-5453
La Harvey, Lykes Elctrns. 504-368-3355
La Metairie, Trionics 504-837-9025
La New Orleans, Radio Parts Inc. 504-581-5959
Md Baltimore, Arrow Elctrns. 301-347-5200
Md Beltsville, Treeco Sls. 301-937-8260
Mass Cambridge, Apollo Elctrns. 617-868-3120
Mass Woburn, Arrow Elctrns. 617-933-8130
Mich Grand Rapids, R.S. Elctrns. 616-241-3483
Mich Kentwood, RM Elctrns. 616-531-9300
Mich Livonia, RS Elctrns. 313-525-1155
Minn Bloomington, Arrow Elctrns. 612-888-5522
Minn Minneapolis, Arneson Sls. 612-835-2177
Mo Kansas City, LCOMP-Kansas City Inc. 816-221-2400
Mo St. Louis, Van Sickle Radio Elctrns. 314-621-5000
Mo St. Louis, Lcomp-St. Louis Inc. 314-647-5505
Neb Lincoln, Scott Elctrn. Supply Co. 402-464-8308
NJ Moorestown, Arrow Elctrns. 609-235-1900
NJ Saddlebrook, Arrow Elctrns. 201-797-5800
NJ Totowa, Arrow Elctrns. 201-256-7331
NY Corning, Corning Elctrns. 607-962-0555
NY Farmingdale, Arrows Elctrns. 516-694-6800
NY Farmingdale, Harrison Elctrns. Corp. 516-293-7990
NY Huntington, Standard Power 516-549-5104
NY Mt. Vernon, QAR Ind'l. Sls. 914-699-2224
NY Rochester, Rochester Radio Supply Co. 716-454-7800
NC Greensboro, Hammond Elcrns. 919-275-6391
NC Raleigh, Southeastern Radio Supply 919-828-2311
Ohio Cleveland, Arrow Elctrns. 216-464-2000
Ohio Dayton, Esco, Inc. 513-226-1133
Ohio Dayton, Arrow Elctrns. 513-253-9176
Ohio Toledo, RF Elctrns. 419-531-5544
Okla Oaklahoma City, Radio Inc. 405-235-1551
Okla Tulsa, Radio Inc. 918-587-9123
Pa Pittsburgh, CRM/RPC Ind'l Elctrns. 412-288-2600
SC Greenville, Hammond Elctncs. 803-233-4121
Tex Dallas, Quality Comps. 214-387-4949
Tex Dallas, R.V. Weatherford Co. 214-243-1571
Tex Houston, Quality Comps. 713-789-9320
Tex Houston, R.V. Weatherford Co. 713-688-7406
Utah Salt Lake City, Century Elctrns. 801-487-8551
Wash Seattle, Liberty Elctrns. 206-763-8200
Wash Seattle, R.V. Weatherford Co. 206-243-6340
Wisc Mequon, Taylor Elec. Co. 414-241-4321
For: Can., Calgary, Alb., Paar Ind'l. Elctrns. 403-287-2840
For: Can., Don Mills, Ont., Saynor Elctrns. 416-445-0723
For: Can., Ottawa, Ont., Wackid Radio Television Lab., Ltd. 613-728-1821
For: Can., Quebec City, Que., Select-O-Sonore 418-522-4723
For: Can., Vancouver, B.C., R-A-E Ind'l. Elctrns. Ltd. 604-687-2621

STANDARD WIRE & CABLE CO., Dept. EM, 2345 Alaska Ave., El Segundo, Cal. 90245, Tel: 213-973-2345, TWX: 910-340-6758; FSC No.: 04946; Empl.: 105 p. 4715

Sales Manager: L. Sperber

Local Sales Offices & Reps.
Ala Huntsville, K & E Assocs. Inc. 205-883-9720
Ariz Phoenix, Standard Wire & Cable Co. 602-269-2501
Cal Palo Alto, Standard Wire & Cable Co. 415-328-3082
Conn Woodbridge, Elctrn. Mktg. Co. 203-397-1461
Fla Orlando, Buchanan & Abrams Assoc. 305-898-7444
Md Timonium, L.H. Kolman & Co. 301-752-8756
Mass Attleboro, Standard Wire & Cable Co. 617-226-1500
NJ Cinnaminson, Scott Sls. 609-829-2991
NJ Mountain Lakes, Components for Elctrns. 201-334-2921
NY DeWitt, T. H. Marden 315-446-9280
Ohio Cleveland, K. W. Elctrn. Sls. Inc. 216-831-8292
Wash Vancouver, Standard Wire & Cable Co. 206-696-4645
Wisc Northfield, W.F. Hess 715-673-4342
Exp: Cal., Los Angeles, Standard Wire & Cable Co. 213-973-2345

™STANDCO - Tachometers, Frequency Meters, Elapsed Time Meters - Sticht Co., Inc. Herman H.

Standex Electronics

STANDEX ELECTRONICS, Dept. EM, 4538 Camberwell Rd., Cincinnati, Ohio 45209, Tel: 513-871-3777, TWX: 810 461 2345; Empl.: 60 p. 4261

Local Sales Offices & Reps.
Ala Huntsville, Jack Eberle 205-837-9296
Cal Burlingame, J. Logan & Assocs. 415-697-6100
Cal Los Angeles, El-Com, Inc. 213-223-1351
Conn Milford, Conti-Younger Assoc. 203-929-3294
Ill Palatine, Wood Sls. 312-359-4550
Ind Indianapolis, Morris-Cunningham & Assoc. 317-255-2458
Ky Fern Creek, R.W. Mitscher Co. 502-239-8927
Mass Waltham, Conti-Younger Assoc. 617-890-4582
Minn Bloomington, Faith Sls. Co. 612-881-6558
Mo Kansas City, Nevco, Inc. 816-421-1751
NJ West Orange, E-F Tech. Sls. 201-731-7203
NY Buffalo, R.W. Mitscher Co. 716-633-7970
NY Huntington Station, E-F Tech. Sls. 516-549-1818
NY Jamiaca, S-J Sls. Assocs. 212-291-3232
NY Manlius, R.W. Mitscher Co. 315-682-2855
NY Pittsford, R.W. Mitscher Co. 716-586-4012
NY West Hurley, R.W. Mitscher Co. 914-679-6151
NC Raleigh, R.W. Mitscher Co. 919-828-0575
Ohio Cincinnati, Standex Elctrns. 513-871-3777
Pa Ardmore, W. K. Metz 215-649-3966
Tenn Johnson City, R.W. Mitscher Co. 615-929-1141
Tenn Shelbyville, R.W. Mitscher Co. 615-684-4544
Tex Arlington, Hite Elctrn. Sls. Co. 817-265-2912
Va Virginia Beach, R.W. Mitscher Co. 804-481-7200

™STANFLEX - rubber covered portable cable - Standard Wire & Cable Co.

SAE

STANFORD APPLIED ENGINEERING, Dept. EM, 340 Martin Ave., Santa Clara, Cal. 95050, Tel: 408-243-9200, TWX: 910-338-0132; Empl.: 600 p. 2200-2249,4262-4269

Sales Manager: S. Camperi

Local Sales Offices & Reps.
Ariz Scottsdale, F. Board Assoc. 602-994-1195
Cal Costa Mesa, Stanford Applied Engrg. 714-540-9256
Cal San Diego, SR Elctrns. 714-565-8411
Cal Santa Clara, Stanford Applied Engrg. 408-243-9200
Cal Sherman Oaks, NSR Corp. 213-783-8272
Cal Sunnyvale, Quad Rep. 408-733-7300
Cal Tustin, NSR Corp. 714-832-8118
Colo Boulder, Stanford Applied Engrg. 303-449-9100
Colo Denver, Electrodyne 303-757-7679
Fla Casselberry, EIR, Inc. 305-830-9600
Fla Ft. Lauderdale, EIR, Inc. 305-583-2351
Fla Palm Beach, EIR 305-585-6689
Fla Plantation, EIR 305-791-6390
Ga Stone Mountain, H & H Mktg. 404-296-9830
Haw Honolulu, Adtech, Inc. 808-941-0708
Ill Cedar Rapids, Gassner & Clark Co. 319-393-5763
Ill Downers Grove, Momak Sls. 312-963-6400
Ind Ft. Wayne, J & B Engrg. 219-483-2813
Md Baltimore, Component Sls. 301-484-3647
Mass Burlington, Contact Sls.
Minn Minneapolis, G.E. ARneson 612-835-2177
Mo Raytown, Cadon Tech. Sls. 816-356-7685
Mo St. Louis, Cadon Tech. Sls. 816-991-0262
NH Nashua, Stanford Applied Eng'g 603-889-2866
NY Buffalo, Telesco Assoc. 716-834-1026
NY Manlius, Telesco Assoc. 315-682-7272
NY West Babylon, Stanford Applied Engrg. 516-420-8111
NY Westbury, J Square Mktg. 516-997-6210
NC Raleigh, Component Sls. 919-782-8433
Ohio Stronsville, Jim Finnegan & Co. 216-826-1033
Okla Tulsa, Technical Mktg. 918-622-5984
Pa Oreland, CMS Mktg. 215-885-5106
Tex Dallas, Stanford Applied Eng'g 214-661-9112
Tex Dallas, Technical Mktg. 214-387-3601
Tex Houston, Technecal Mktg. 713-777-9228
Utah Salt Lake City, Electrodyne 801-277-8392

Wash Redmond, Barrett Sls. Northwest 206-885-6991
Local Distributors
Ariz Tempe, G.S. Marshall 602-968-6181
Ark Little Rock, Electro-Entprs 501-664-9207
Cal El Monte, G S Marshall 213-686-0141
Cal Irvine, Terminal Elctrns. 714-549-8611
Cal Sunnyvale, GS Marshall 408-732-1100
Colo Denver, Integrated Elctns. 303-534-6121
Conn N. Branford, G S Marshall 203-484-0488
Fla Miami, Southeast Connectors 305-887-2635
Ill Des Plaines, G S Marshall 312-298-3700
Ill Rosemont, Advent Elctrns. 312-298-4210
Mass Burlington, Schaal Assoc. 617-272-7940
Mass Newton Highland, G S Marshall 617-965-5115
Mich Farmington, Sheridan Sls. 313-477-3800
Minn Edina, G S Marshall 612-831-4904
Mo Florissant, Sheridan Sls. Co. 314-837-5200
NY Buffalo, Summit Dist. 716-884-3650
NY Farmingdale, G S Marshall 516-293-4141
NY Hauppauge, Schaal Assoc. 516-234-4600
Ohio Beachwood, Sheridan Sls. Co. 216-831-0130
Ohio Dayton, G S Marshall 513-898-1105
Okla Tulsa, Component Specialties 918-664-2820
Pa King of Prussia, G S Marshall 215-337-3330
Tex Dallas, G S Marshall 214-233-5200
Tex Houston, Component Specialties 713-771-7237
Wash Bellevue, Bell Inds. 206-747-1515

(TM)STANOMERSE - bright acid immersion tin - Technic, Inc.

STANPAT PRODUCTS INC., Dept. EM, 366 Main St., Port Washington, N.Y. 11050, Tel: 516-883-8400; Empl.: 25

STANTON MAGNETICS, INC., Dept. EM, Terminal Dr., Plainview, N.Y. 11803, Tel: 516-OV1-0200, TWX: 510-221-1845; Empl.: 300
Local Sales Offices & Reps.
Cal Beverly Hills, Trego Sls. Co. 213-274-8351
Cal Redwood City, H & K Sls., 415-637-1400
Colo Aurora, Scowcroft & Assocs. 303-371-5280
Conn Stamford, John B. Anthony Co. 203-322-9202
Conn West Haven, Robert S. Reiss Assocs. 203-933-8542
Fla Hollywood, Third Century Mktg. 305-947-7107
Ga Atlanta, Elmar Assoc. 404-938-2821
Ill Skokie, Irving W. Rose Assocs. 312-674-6790
Kans Overland Park, William Menezes & Assoc. 913-649-2680
Md Bethesda, Gene Rosen & Assocs. 301-530-8448
Mass Marblehead, Willson Sls. Co. 617-631-4016
Minn St. Paul, Smith Engrg. Assocs. 612-646-4851
Ohio Cleveland, F. A. Daugherty Co. 216-Hi9-1122
Ohio Lakewood, Team, Inc. 216-228-2170
Pa McMurray, C. S. Cooper & Assocs. 412-941-6473
Tex Dallas, Charles Lucas Sls. Co. 214-330-8181
Wash Seattle, Henry Joncas Co. 206-363-9200

(TM)STANTROL - temperature & heater controllers - ARI Inds., Inc.

STANTRON DIV., Wyco Metal Products, Dept. EM, 6914 Beck Ave., N. Hollywood, Cal. 91605, Tel: 213-875-0800, TWX: 910-499-2177; FSC No.: 06514; Empl.: 55 p. 1148,1149
Local Sales Offices & Reps.
Ariz Phoenix, Shefler-Kahn Co. 602-257-9015
Ark Hot Springs, Barry Sls. Co. 501-624-3215
Cal Los Angeles, Ed Landa Co. 213-879-0770
Cal Oakland, Moulthrop Sls. Inc. 415-261-7676
Colo Aurora, Robbins & Assocs. 303-399-6618
Fla Tampa, Wallace Elctrn. Sls. 813-961-1036
Ga Jonesboro, Wallace Elctrn. Sls. 404-471-6297
Haw Honolulu, EMC Corp. 808-847-1138
Ill Chicago, Berndt Assocs. 312-283-0813
Ind Carmel, Berndt Assoc. 317-844-0114
Kans Overland Park, Ensco Rep. 913-381-7557
Md Silver Springs, Ara Elctrns., Inc. 301-565-2585
Mass Wakefield, Tekdata
Minn Minneapolis, Berndt Assocs. 612-835-4818
Mo St. Louis, Ensco Rep. 314-567-3935
NJ Wayne, G.T. Assocs. 201-694-6040
NM Albuquerque, Shefler-Kahn Co. 505-265-7077
NY Rochester, Gislason Sls. 716-454-4741
NC Kernersville, Wallace Elctrn. Sls. 919-996-2742
Ohio Cincinnati, J.O. Olsen Co. 513-922-2176
Ohio Cleveland, J.O. Olsen Co. 216-752-5444
Okla Tulsa, Barry Sls. Co. 918-585-6911
Pa Glenside, Ara Elctrns., Inc. 215-887-5250
Pa Pittsburgh, J.O. Olsen Co. 412-341-2550
Tenn Chattanooga, Wallace Elctrn. Sls. 615-875-0786
Tex Houston, Barry Sls. Co. 713-784-5860
Tex Richardson, Barry Sls. Co. 214-234-0255
Utah Salt Lake City, Robins & Assocs.
Va Richmond, ARA Elctrns. 804-285-9309
Wash Seattle, D. Smith Sls. 206-633-3160
Wisc Brookfield, Berndt Assoc. 414-786-6950

(TM)STAPLE-PRUF - audio cable-solid fill - Columbia Elctrn. Cables

(TM)STAR - sequental talking audio response sys. - Cognitronics Corp.

(TM)STAR - camera shutter timer - National Camera Inc.

(TM)STARAN - associative array processor system - Goodyear Aerospace Corp.

(TM)STARBOARD WATCH - personal hand lamps - Teledyne Big Beam

(TM)STARDUSTER - CB base station antenna - Antenna Specialists Co.

(TM)STARLINE - CATV amplifiers - General Instr. of Can. Ltd.

STAR PORCELAIN CO., Dept. EM, 71 Muirhead Ave., Box 1267, Trenton, N.J. 08638, Tel: 609-392-3154; Empl.: 180

STAR TRON CORP., Dept. EM, 58 Curtis St., Providence, R.I. 02909, Tel: 401-274-5090; FSC No.: 32494; Empl.: 30
Local Sales Offices & Reps.
Cal Burlingame, Logan, J. Co. 415-697-6100
Cal Encino, El/Tec 213-538-3206
Cal Thousand Oaks, H. Sadoian 805-498-3349
Ill Elgin, Spectrum Technology Assoc. 312-695-8552
NY Syosset, SGS Sls. & Mktg., Ltd. 516-921-5335
RI Providence, Star-Tron Corp. 401-274-5090

STARTRONICS, INC., Dept. EM, Moulton St., Georgetown, Mass. 01833, Tel: 617-352-6200, TWX: 710-347-0310

(TM)STA-STRAP (R) - cable ties - Panduit Corp.

STATEK CORP., Dept. EM, 512 N. Main St., Orange, Cal. 92668, Tel: 714-639-7810, Telex: 65-5430; FSC No.: 51791; Empl.: 170 p. 2478-2481
Sales Manager: G. Markley

STATHAM INSTR. DIV., GOULD, INC., see Gould Inc., Measurement Sys. Div.

(TM)STATFLEX - dc adjustable speed drive - Allis-Chalmers

(TM)STAT-I-CHART - magnetic panels - Rol-a-chart Div.

STATIC INC., Dept. EM, Box 414, Lee, Mass. 01238
Sales Manager: W.E. Harris
Local Sales Offices & Reps.
Cal La Habra, George A. Peters 714-993-1001
Conn Vernon, Robert Dickerman 203-872-7172
Ill Elk Grove Village, O'Connell & Assocs. 312-640-6970
Md Ellicott, M. W. (Rick) Riker 301-465-9013
Mass Cohasset, Ross Smith 617-267-3300
Mass Lenox, Lenox Trading Co. 413-637-2463
Minn Minneapolis, Production Automation Corp. 612-866-5700
Mo Grandview, Production Automation Corp. 816-763-4155
Mo Hazelwood, Production Automation Corp. 314-731-2331
NH Hampton, Tilco 603-926-6001
NJ Allamuchy, Metron Inc. 201-852-2102
NY Clifton Springs, Hans Belitz 315-462-5202
NC Monroe, McCoy-Ellison, Inc. 704-283-8511
NC Monroe, McCoy-Ellison, Inc. 704-283-8511
Ohio Chagrin Falls, Hill Ind'l. Sls. 216-543-8313
Pa Elwyn, Gil-Tec 215-565-0403
RI Coventry, Toyenco, Inc. 401-822-0350
Tex Dallas, Production Automation Corp. 214-620-0227
Wisc Milwaukee, Pillar Corp. 414-475-7722

(TM)STATOS - electrostatic recorders - Varian Assocs.

(TM)STAT-O-SEAL - fastner seal - Parker Hannifin Corp.

(TM)STATOS SYS. - digital printer/plotter systems - Varian Graphics

(TM)STATUS-INDICATOR - compact, 12-message projection readout - Industrial Elctrn. Engrs.

(TM)STATUS SEEKER - logic test sets - Dataprobe, Inc.

STAVER CO., INC., Dept. EM, 47 N. Saxon Ave., Bay Shore, N.Y. 11706, Tel: 516-666-8000, TWX: 510-227-6142; Empl.: 90 p. 2660,3919
Local Sales Offices & Reps.
Ariz Scottsdale, E.E. Black & Assocs. 602-947-2007
Cal Northridge, R.H. McDonald & Assocs. 213-349-7911
Cal Santa Clara, Nova-Tronix 408-243-9530
Conn Greenwich, Eisenbeis Sls. Co. 203-869-2008
Fla Eustis, R.K. Welter Co. 904-357-7796
Ga Lithonia, Erickson Prods. 404-482-8858
Ill Chicago, McBride Sls. 312-775-1080
Ind Indianapolis, Lat-Tronics 317-846-5788
Mich Grand Rapids, Elliott Sls. 616-949-1451
Minn Lakeville, Dan'l Engrg. Corp. 612-332-4848
NJ Marmora, Kaygar Assocs. 609-398-5229
NY Manlius, Bowser & Sapecky Assocs. 315-682-8885
NY Valley Stream, Levison Sls. Co. 516-LO1-9696
Ore Portland, J.J. Backer Co. 503-297-3776
Tex Garland, G.V. Peck Co. 214-341-8311
Va Portsmouth, F.B.D. Sls. 804-484-3162
Wash Seattle, J.J. Backer Co. 206-285-1300

(TM)STAVOLT - power supplies - Christie Elec.

(TM)STA-VO-TROL - voltage regulator - General Elec. Co.

STEARNS MAGNETICS INC., Sub. Magnetics Int'l., Dept. EM, 6001 S. General Ave., Cudahy, Wisc. 53110, Tel: 414-769-8000; Empl.: 85

(TM)STEDIVOLT - a.c. line voltage regulator - Kelk, George Ltd.

(TM)STEM - deployable tubular booms - Astro Research Corp.

(TM)STENAFAX - electronic stencils - Fitchburg Coated Products

(TM)STEP - sequential television equipment programmer - Chrono-log Corp.

(TM)STEREON - spkr. sys. - Electro-Voice, Inc.

(TM)STEREO-O-MATIC - record changers - V-M Corporation

(TM)STEREOSTAR - stereoscopic microscope - American Optical Corp.

(TM)STEREO-V - phono cartridge - Electro-Voice, Inc.

(TM)STEREO-V - phono cartridge - Electro-Voice, Inc.

(TM)STEREO-4 - 4-channel system - Electro-Voice, Inc.

(TM)STEREO-4 - 4-channel matrix system - Electro-Voice, Inc.

(TM)STERILAIRE - germicidal ultraviolet lamps - Black Light Corp. Amer.

STERLING INSTR., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., NY 11040, Tel: 516-328-3300, TWX: 510-223-0642; Empl.: 150
Local Sales Offices & Reps.
Cal Burlingame, J. Logan & Assocs. 415-697-6100
Cal Chatsworth, Western Component Sls. 213-822-6226
Colo Denver, McSherry 303-238-8361
Conn Windsor, W. Y. Bogle Corp. 203-688-8305
Fla Orlando, Irby & Connolly, Inc. 305-894-8471
Ill Chicago, A. Woods & Assoc. 312-283-7400
Md Pikesville, Imagitron Sls. Co. 301-484-1411
Mass Woburn, R.W. Hatfield 617-933-2324
Mich Lathrup Village, R.C. Nordstrom 313-559-7373
Minn Wayzata, Joe Little Assocs. 612-473-1107
NJ So. Amboy, Addem II 201-721-6449
NY Clarence, Rep-Tech. 716-684-6250
NY Syracuse, Rep. Tech. 315-454-2445
NC Charlotte, Reynolds Cowardin Assoc. 704-523-0324

Ohio	Columbus, Rockford Controls Ohio Inc.	614-231-5890
Ohio	Dayton, Rockford Controls	513-278-7362
Ohio	Euclid, Rockford Controls	216-731-5250
Tenn	Chattanooga, C.H. Cloer & Assocs.	615-877-6783
Tex	Richardson, Zonk Eng. Co.	214-238-9651
Va	Richmond, Reynolds Cowardin Assoc.	703-266-3457
Va	Roanoke, Reynolds Cowardin Assoc.	
Wash	Seattle, Northmar, Inc.	206-524-5170

STERLING MFG. CO., Dept. EM, 1845 E. 30th St., Cleveland, Ohio 44114, Tel: 216-781-7136; Empl.: 175

Local Sales Offices & Reps.

Mass	Waltham, Deveer Sls. & Engr.	617-889-5900
Mich	, O-M Sls.	313-994-6073
NY	Wantagh, Arnold Schuman Co.	516-826-5550
NC	Raleigh, Leigh Sls.	919-787-9090

STERLING TRANSFORMER CORP., Dept. EM, 510 Driggs Ave., Brooklyn, N.Y. 11211, Tel: 212-782-4200; Empl.: 55 .... p. 2760,4461-4465

Sales Manager: P.H. Odessey

Local Sales Offices & Reps.

Cal	Palo Alto, Mauldin Co.	415-326-5291
Cal	Van Nuys, Timco Sls.	213-781-7370
NY	Rockville Centre, Willgold Elec. Sls.	516-RO 4-4022

STERLING, Div. Reichhold Chems., Inc., Dept. EM, Sewickley, Pa. 15143, Tel: 412-766-7600, TWX: 710-668-3877; Empl.: 96

Local Sales Offices & Reps.

Ark	Little Rock, Hisco	501-568-3105
Conn	Northford, D.H. Rausch	203-484-0094
Ill	Oak Brook, Sterling Div.	312-887-0315
Minn	Minneapolis, Bergquist Co.	615-925-2322
NC	Charlotte, R.W. Chapman & Co.	704-525-2421
Ohio	Chagrin Falls, Electrolock, Inc.	216-247-4245
Pa	Sewickley, R.P. Heinick	412-766-7600
Tex	Houston, Hisco	713-683-0311
Wisc	Oconomowoc, D.R. Stackowicz	414-871-7525

STETTNER-TRUSH INC., Dept. EM, 67 Albany St., Cazenovia, N.Y. 13035, Tel: 315-655-8141, TWX: 710-541-1530; Empl.: 20

Local Sales Offices & Reps.

Ala	Huntsville, A.B. Andrews & Co.	205-837-5382
Cal	San Mateo, Melvin Sls. Co.	415-349-7444
Cal	Santa Fe Springs, Comp. Svcs., Inc.	213-921-8445
Colo	Arvada, Sage Sls.	303-841-2487
Conn	North Haven, Kitchen & Kutchin, Inc.	203-239-0212
Fla	Deerfield Beach, STC, Inc.	305-428-0818
Ill	Rosemont, STC, Inc.	312-671-4208
Ind	Bloomington, J. Hershman	812-339-9563
Mass	Lexington, Kitchen & Kutchin, Inc.	617-862-8230
Minn	Minneapolis, Technical Assocs., Inc.	612-929-7274
NJ	Fort Lee, R. Cameron Assocs.	201-487-2595
NY	Cazenovia, St. Woolard Inc.	315-655-8145
NC	Raleigh, A.B. Andrews & Co.	919-833-5565
Pa	Willow Grove, BGR Assocs.	
Tex	Richardson, Semi Conductor Sls. Assoc.	214-231-6181
Utah	Salt Lake City, Sage Sls.	801-531-0531
Wash	Kirkland, Manon Engrg.	206-827-7449

STEVENS-ARNOLD, INC., Dept. EM, 7 Elkins St., So. Boston, Mass. 02127, Tel: 617-268-1170; Empl.: 100 p. 3338,3339

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Stevens-Arnold has Sales Engineering Representatives in principal cities of the United States and Canada. To obtain the name of your nearest representative, call 617-268-1170 collect and ask for Customer Service.

Foreign Representatives in Australia, Belguim, France, India, Israel, Japan, Netherlands, Sweden, Switzerland, and West Germany.

STEVENS, GEO. MFG. CO., Dept. EM, 6001 N. Keystone Ave., Lincolnwood, Ill. 60646, Tel: 312-588-1300, TWX: 910-221-5139; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix, Adv. Elect. Sls.	602-271-0920
Cal	Anaheim, Adv. Elect. Sls.	714-870-0300
Cal	Belmont, Adv. Elect. Sls	415-592-4550
Cal	San Diego, Adv. Elect. Sls.	714-565-4195
Colo	Denver, Adv. Elect. Sls.	313-388-0923
Ind	Indianapolis, Blind & Assocs.	317-251-1249
Mass	Stoneham, Production Devices Corp.	617-438-2772
Mich	Fort Wayne, Blind & Assocs.	219-748-7705
Ore	Portland, Adv. Elect. Sls.	800-426-4400
Wash	Seattle, Adv. Elec. Sls.	206-762-2262

STEVENS PRODS., INC., Dept. EM, 128 N. Park St., E. Orange, N.J. 07019, Tel: 201-672-2140; Empl.: 50

STEWART-WARNER MICROCIRCUITS, Dept. EM, 730 E. Evelyn Ave., Sunnyvale, Cal. 94086, Tel: 408-245-9200, TWX: 910-339-9210; Empl.: 200

(TM)STI - led photoelectric controls - Scientific Technology

STICHT CO., INC. HERMAN H., Dept. EM, 27 Park Pl., New York, N.Y. 10007, Tel: 212-732-8163; Empl.: 35

Local Sales Offices & Reps.

Ill	Westchester, Murphy & Dickey	312-344-5660
Md	Baltimore, W.H. Cooke & Co., Inc.	301-685-1511
Mich	Berkley, G.R. Peters Assocs.	313-564-6325
Mo	St. Louis, C.O. Leaver Co.	314-WO8-1500
NY	Newtonville, T. Carse Sls. Co.	518-785-5844
NY	Solvay, Carleton Representatives	315-635-9164
NC	Matthews, W.K. Hile Co.	704-847-9123
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Shaker Heights, Martin-Rettger, Inc.	216-283-5600
Ore	Portland, J.L. Kearns Co., Inc.	503-236-1165
Pa	King of Prussia, WisTex	215-337-1240
Tex	Bellaire, Brice Co.	713-666-1788
Tex	Dallas, Brice Co.	214-233-9808
Wisc	Wauwatosa, T. R. Bickler Assocs.	414-453-3772

(TM)STICK-A-DIP - rapid fire inserter - Micro Electronic Systems, Inc.

(TM)STICKY FINGERS - self-adhesive FRI/EMI shielding - Instrument Specialties

(TM)STICPAC - xray rectifier - Semtech Corp.

(TM)STIKI-BAK - coated products - Acme Chemical & Insulation Co.

(TM)STIK KLIPS - adhesive backed fastening devices - Daburn Electronics & Cable Corp.

(TM)STIKON - temperature sensor - RDF Corp.

(TM)STIK-ON HEATERS - adhesive backed resistance heaters - Sierracin/Thermal Sys.

(TM)STILAN - wire insulation - Raychem Corp.

STOCK DRIVE PRODS., Div. Designatronics, Inc., Dept. EM, 55 S. Denton Ave., New Hyde Pk., N.Y. 11040, Tel: 516-328-0200, TWX: 510-223-0642; Empl.: 160

Local Sales Offices & Reps.

Ariz	Phoenix, Vari-Tron Sls. Co.	602-997-0774
Cal	Burlingame, J. Logan & Assoc.	415-697-6100
Cal	Chatsworth, SDP West Coast	213-822-6226
Colo	Denver, McSherry & Assoc.	303-238-8361
Conn	Windsor, W. Y. Bogle Corp.	203-688-8305
Fla	Orlando, Irby & Connolly	305-894-8471
Ill	Chicago, A. Woods & Assoc. Inc.	312-283-7400
Md	Pikesville, Imagitron Sls. Co.	301-484-1411
Mass	Woburn, R. W. Hatfield	617-933-2324
Mich	Lathrup Village, R. C. Nordstrom & Co.	313-559-7373
Minn	Wayzata, J. Little Assocs.	612-473-1107
NJ	So. Amboy, Addem II	201-721-6449
NY	Clarence, Rep-Tech Inc.	716-684-6250
NY	New Hyde Park	516-328-3300
NY	Syracuse, Rep-Tech Inc.	315-454-2445
NC	Charlotte, Reynolds Cowardin Assoc.	704-523-0324
Ohio	Columbus, Rockford Controls Ohio Inc.	614-231-5890
Ohio	Dayton, Rockford Controls Ohio Inc.	513-278-7362
Ohio	Euclid, Rockford Controls Ohio Inc.	216-731-5250
Tenn	Chattanooga, C. H. Cloer & Assocs.	615-877-6783
Tex	Richardson, Zonk Eng. Co.	214-238-7651
Va	Richmond, Reynolds Cowardin Assoc.	703-266-3457
Va	Roanoke, Reynolds Cowardin Assoc.	
Wash	Seattle, Northmar, Inc.	206-524-5170

(TM)STODDART - field intensity meters - Singer Instrumentation

STOELTING CO., Dept. EM, 1350 S. Kostner Ave., Chicago, Ill. 60623, Tel: 312-522-4500; Empl.: 50

(TM)STORED-ARC - welder - Nelson Stud Welding TRW Inc.

(TM)STORM-FLEX - silicone flat cable - Storm Products Co.

STORM PRODUCTS CO., Dept. EM, 112 S. Glasgow St., Inglewood, Cal. 90301, Tel: 213-776-8141; Empl.: 225

Local Sales Offices & Reps.

Ariz	Phoenix	602-269-3485
Cal	Inglewood	213-776-8141
Cal	Palo Alto	415-494-6621
Colo	Broomfield	303-466-1991
Tex	Dallas	214-330-1381

STOW LABS., INC., Dept. EM, Kane Ind'l. Dr., Hudson, Mass. 01749, Tel: 617-562-9347, Telex: 94-8330; Empl.: 15

Local Sales Offices & Reps.

Cal	San Carlos, Westronics Assoc.	415-592-1417
Mass	Hingham, R.J. Wilson	617-749-7575
Mich	Detroit, Marsh Equip. Co.	313-869-9200
Mo	St. Louis, Delltron Co.	
NJ	N. Plainfield, Brady Co.	201-753-7988
NY	Albany, T. Carse Sls. Co.	518-785-5844
Va	Springfield, Temsco	703-451-3221
Exp:	N.Y., NY, Multiparts	212-944-4370

(TM)STRAINRITE - ceramic products - Star Porcelain Co.

(TM)STRAPON - temperature sensor - RDF Corp.

(TM)STRAPPING - wire/cables harnesses - Electrovert

(TM)STRATE-BREAKS - prescored ceramic substrates - Coors Porcelain Co.

(TM)STRATO-THERM - splice & terminal - Amp Inc.

(TM)STREAMSEAL - butterfly valves - Allis-Chalmers

(TM)STRIPAC - hi freq hi power transistor package - Microwave Semiconductor Corp.

(TM)STRIPALL - thermal wire stripper - Teledyne Kinetics

(TM)STRIPMASTER - wire strippers - Ideal Industries Inc.

(TM)STRIP PACK - terminal board - Elgin Elctrns., Inc.

(TM)STRIPSWITCH - shell-less P.C. board switch - UID Electronics Div.

(TM)STRIPTROL - self assemble replacement (for side-by-side potentiometers) - CTS Corp.

(TM)STRIPTWEEZ - thermal tweezer - Pace Inc.

(TM)STROBEACON - stroboscopic beacon - Kemlite Labs., Inc.

(TM)STROBETTE - stroboscopes-tachometer - Power Instrs., Inc.

(TM)STROBEX - strobe light - Chadwick-Helmuth Co., Inc.

(TM)STROBOLUMER - electronic stroboscope - Gen Rad

(TM)STROBOSLAVER - strobostopic light source - Gen Rad

(TM)STROBOTAC - electronic stroboscope - Gen Rad

(TM)STROBRITE - high intensity stroboscope - U.S. Scientific Instrs.

(TM)STRONGSET - all purpose solder - Chemetron Corp.

STRUTHERS-DUNN, INC., Dept. EM, Lamb's Rd., Pitman, N.J. 08071, Tel: 609-589-7500, TWX: 510-686-7510; FSC No.: 78290; Empl.: 450; Minimum order: $S.R. Webb

Sales Manager: W.L. Capewell; *Distributor Manager:* S.R. Webb

Local Sales Offices & Reps.

Ala	Huntsville, Rep, Inc.	205-881-9270
Ariz	Scottsdale, DAR-C, Inc.	602-948-2240
Ark	Little Rock, Ransom Sls. Co., Inc.	501-225-7332
Cal	Culver City, DeAngelo, Rothman & Co., Inc.	213-398-6239
Cal	Palo Alto, Held & Mollard, Inc.	415-965-9321
Cal	San Diego, DeAngelo, Rothman & Co., Inc.	714-560-5707
Colo	Denver, D. E. Bond Assocs.	303-756-1234
Fla	Miami, Ludlum Assocs. Co.	305-592-6524
Fla	Orlando, Ludlum Assocs. Co.	305-894-7761
Ga	Tucker, Rep, Inc.	404-938-4358
Ill	Glen Ellyn, Rockford Controls Co.	312-469-6016
Iowa	Bettendorf, White Equipment Co.	319-355-5623
Kans	Wichita, Avionics Engrg. Sls. Co.	316-264-6201
La	Baton Rouge, Automation Specialists, Inc.	504-275-2877
La	Kenner, Automation Specialists, Inc.	504-721-3497
Md	Baltimore, Stemler Assocs., Inc.	301-944-8262
Mass	Sturbridge, Branford Controls Corp.	617-347-7367
Mich	Southfield, L. H. Dickelman Co.	313-353-8210
Minn	Minneapolis, HMR, Inc.	612-920-8200
Mo	Kansas City, E. A. Mais Co.	816-942-6300
Mo	Maryland Heights, Hitt & Assocs.	314-878-5404
NJ	Pitman, Struthers-Dunn, Inc.	609-589-7500
NJ	West Caldwell, Grimm, Siegel Assocs., Inc.	201-575-9300
NY	Buffalo, H. C. Zang Agency	716-877-3677
NY	Rochester, Rush Instrs.	716-271-3170
NC	Charlotte, J. Rudisill Assocs., Inc.	704-377-6901
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Columbus, Rockford Controls Ohio	614-231-5890
Ohio	Euclid, Rockford Controls Ohio	216-731-5250
Okla	Tulsa, Kemp Engrg. Co., Inc.	918-299-2636
Pa	Philadelphia, Struthers-Dunn, Pitman, N.J.	609-589-7500
Pa	Pittsburgh, R. F. Clark Co.	412-242-9500
Tenn	Jefferson City, REP, Inc.	615-475-4105
Tenn	Memphis, Ransom Sls. Co., Inc.	901-332-0036
Tex	Arlington, W. Pat Fralia Co.	817-640-9101
Tex	Houston, Automation Specialists, Inc.	713-784-2745
Tex	Houston, W. Pat Fralia Co., Inc.	713-772-1572
Utah	Fillmore, Control Agcy.	801-743-6821
Utah	Salt Lake City, Control Agency	801-466-8601
Va	Alexandria, Stemler Assocs. Inc.	703-548-7818
Wash	Seattle, Eicher-Richards Co.	206-523-7888

Local Distributors

Ala	Birmingham, M-G Elec. & Equip.	205-328-4525
Ariz	Phoenix, Kierulff Elec.	602-273-7331
Ark	Little Rock, Carlton-Bates	501-562-9100
Cal	Hollywood, Hollywood Radio	213-466-3181
Cal	Palo Alto, Kierulff Elec.	415-968-6292
Colo	Denver, Newark-Denver Elec.	303-757-3351
Conn	Bridgeport, Tower-Olschan	203-367-7401
Fla	Orlando, Brownell Electro	305-843-6770
Ga	Atlanta, Brownell-Electro	404-762-5181
Ill	Chicago, Newark Elec.	312-638-4411
Ill	Peoria, Klaus Radio & Elec.	309-691-4840
Ind	Indianapolis, Graham Elec. Supply	317-634-8202
Iowa	Davenport, Republic Elec.	319-322-6204
Kans	Wichita, Interstate Elec.	316-264-6317
Ky	Louisville, E&H Elec. Supply	502-587-0991
La	Metairie, M-G Elec. & Equip.	504-834-6002
Me	Portland, Stanley J. Leen	207-774-6266
Md	Baltimore, Graybar Elec.	301-342-5500
Mass	Allston, Apparatus Service	617-787-1300
Mich	Grand Rapids, Purchase Elec.	616-458-1476
Minn	Minneapolis, Stark Elec. Supply	612-332-1325
Miss	Jackson, Atlantic Ind.	601-353-0351
Mo	N.K.C., LCOMP	816-221-2400
Mont	Missoula, Montana Mercantile Co.	406-543-5151
Neb	Omaha, Graybar Elec.	402-346-7676
NJ	Hanover, State Elec. Parts	201-887-2550
NJ	S. Plainfield, Brownell-Electro	201-753-4600
NY	New York, Brownell-Electro	212-924-6000
NY	Rochester, Requa Electric	716-442-2020
NC	Charlotte, Brownell-Electro	704-394-4341
Ohio	Cincinnati, Hughes Peters	513-351-2000
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Eugene, Vitus Elec. Supply	503-345-4377
Pa	Philadelphia, Herbach & Rademan	215-426-1700
RI	Pawtucket, New England Electric Supply	401-725-7400
SC	Greenville, Hammond Elec.	803-233-4121
Tenn	Memphis, Brownell-Electro	901-332-9254
Tex	Dallas, Wholesale Elec.	214-824-3001
Va	Richmond, Meridian Elec.	804-353-6648
Wash	Seattle, Eicher-Richards	206-523-7888
WVa	S. Charleston, Allied Controls	304-768-7313
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500

STRUTHERS-DUNN, INC., Sys. Div., Dept. EM, 4140 Utica Ridge Rd., Bettendorf, Iowa 52722, Tel: 319-359-7501, TWX: 910-525-1176; Empl.: 100

Local Sales Offices & Reps.

NY	Henrietta, Rush Instrs.	716-334-0452
Tex	Houston, C.S.C. Instrs. Div. Automation Specialists	713-784-2745

™STRUTSCAT - parabolic reflectors - RF Systems, Inc.

™STUR-D-DIAL CORD - dial cord - Gudebrod Bros. Silk Co., Inc.

STURDILITE ANGLE STEEL DIV., Kewanee Scientific Equip. Corp., Dept. EM, Plainwell, Mich. 49080, Tel: 616-685-5402; Empl.: 140

Sales Manager: L. Draves

™STURDI-STAND - electric soldering iron holder - Hexacon Elec. Co.

™STUR-D-LACE - lacing tape - Gudebrod Bros. Silk Co., Inc.

™STURTEVENT-RICHMOND - torque products - Tool Group Marketing Division

™STYCAST - casting resins - Emerson & Cuming, Inc.

™STYLINE - cctv accessories - Vicon Industries Inc.

™STYRAFIL - fiberglass reinforced polystyrene - Fiberfil Div. Dart Ind.

™STYROFOAM - polystyrene foam - Dow Chemical Co.

™STYRON - polystyrene - Dow Chemical Co.

™SUBBER - signal tracing analyzer-by signal substitution. - Castle Elctrns.

™SUB-MINAX - coaxial connector - Amphenol North America Div.

™SUB-MINAX - coaxial connector - Amphenol North America Div.

™SUB-OUNCER - audio transformer - TRW/UTC Transformers

™SUB-SUB-OUNCER - audio transformer - TRW/UTC Transformers

™SUE - digital computer - Lockheed Elctrns. Co.

SUFFOLK ETCHED PRODS., INC., Dept. EM, 300 Pleasure Dr., Riverhead, N.Y. 11901, Tel: 516-727-8860; Empl.: 6

Local Sales Offices & Reps.

NY	Flushing, Stan Boyes; Boyes Assocs.	212-539-2138
NY	Mineola, R.B. Roth	516-746-0399
NY	New York, R.B. Roth	212-535-2541

™SULFAMEX - nickel plating chems. - Sel-Rex Div. Oxy Metal Industries Corp.

™SULFIL - fiberglass reinforced polysulfone - Fiberfil Div. Dart Ind.

SUMMIT ENGINEERING CORP., Dept. EM, Box 938, Bozeman, Mont. 59715, Tel: 406-587-0636, TWX: 910-975-1950; Empl.: 140

Local Sales Offices & Reps.

Cal	Sherman Oaks	213-789-7277
Cal	Sunnyvale	408-736-5210
Fla	Tampa	813-248-5078
Ga	Atlanta	404-255-8900
Ill	Downers Grove	312-852-6060
Ill	Hinsdale, Summit Engrg. Corp.	312-963-9620
Mass	Auburn	617-757-0010
Mass	Medfield	617-359-2040
Mich	Warren	313-758-5000
Ohio	Cincinnati	513-825-4111
Ohio	Cleveland	216-524-3971
Pa	Mt. Lebanon	412-343-9660
Pa	West Chester	215-692-8040
Tex	Arlington	817-469-7444
Wisc	Wauwatosa	414-475-6661

Local Distributors

Cal	Carson, Hasbach	213-636-0808
Cal	Redwood City, Doot	415-364-7180
Ill	La Grange, Nova	312-354-5525
Ky	Louisville, Advanced Machinery	502-969-3126
Mich	Grosse Point, MCU	313-882-8461
Minn	Minneapolis, Productivity, Inc.	612-544-9154
NH	Keene, Johannson & Odner	603-357-3491
Ohio	Perrysburg, Maumec Valley	419-874-3164
Tex	Houston, Acrotech	713-681-1406
Utah	Salt Lake City, Neway	801-363-8171
Va	Salem, Shenandoah Tool	804-389-8141
Wash	Seattle, Perrine	206-762-0580

SUNBANK ELCTRNS., INC., Dept. EM, 3110 Winona, Box 6669, Burbank, Cal. 91505, Tel: 213-849-1191, TWX: 910-498-2251; FSC No.: 07418

Sales Manager: C.E. Kirk

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assoc.	205-883-7893
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	Burbank, Sunbank Elctrns.	213-849-1191
Cal	Chatsworth, Elcon Elctrns.	213-882-6760
Cal	Los Altos, Elliott Recht Assoc.	415-941-0336
Colo	Englewood, A-G Elctrns.	303-771-8088
Conn	Wethersfield, Underwood Sls.	203-563-3046
Fla	Orlando, Technology Mktg. Assoc.	305-857-3760
Fla	Pompano Bch., Technology Mktg. Assoc.	205-942-0774
Kans	Leawood, Thunderbird Tech. Sls. & Serv.	
Kans	Wichita, Thunderbird Tech. Sls. & Serv.	
Md	Towson, Kraft Elctrn. Sls.	301-828-5838
Mass	Chelmsford, Underwood Sls.	617-256-8191
Mich	Southfield, Luebbe Sls.	313-357-0355
Minn	Bloomington, Aronco Marsh Sls.	612-888-0540
Mo	St. Louis, Thunderbird Tech. Sls.	314-567-6488
NJ	Haddonfield, Mills-Brown Assoc.	609-429-1005
NJ	Pompton Plains, T.A. Adamo Sls.	201-835-5344
NM	Albuquerque, Zeus, Inc.	503-256-9831
NY	East Syracuse, Fountain, Young & Co.	315-437-7733
NY	Kingspark, T.A. Adamo Pdt. Dev.	516-724-2039
Ohio	Cincinnati, Luebbe Sls.	513-871-4211
Ohio	Cleveland, Luebbe Sls.	216-333-0425
Ohio	Dayton, Luebbe Sls.	513-294-0426
Pa	Delmont, Luebbe Sls.	412-468-4019
Tex	Dallas, E.F. Aymond Co.	214-826-7620
Wash	Bellevue, Comtec Mktg. & Sls. Eng.	206-453-1188

SUNDSTRAND DATA CONTROL, INC., Dept. EM, Overlake Ind'l. Pk., Redmond, Wash. 98052, Tel: 206-885-3711, TWX: 910-449-2860; Empl.: 1048

Local Sales Offices & Reps.

Ala	Huntsville, I.S.I.	205-533-6880
Cal	Los Angeles, Sundstrand Svc. Corp.	213-670-0231
Cal	Los Angeles, O. Miller Assoc.	213-937-1300
Cal	Palo Alto, Egbert Engineering	415-326-1387
Cal	San Marino, Dale-Dahl Assocs.	213-682-3417
Cal	Walnut Creek, Dale-Dahl Associates	415-933-9595
Colo	Denver, Shefler-Kahn Co.	303-761-2540
Conn	Glastonbury, Sundstrand Svc. Corp.	203-633-4810
DC	Washington, Sundstrand Svc. Corp.	202-965-4650
Fla	Longwood, Southern Data Assoc.	305-831-3311
Fla	St. Petersburg, Russell Assoc.	813-525-3941
Ga	Atlanta, Russell Assoc.	404-255-8422
Ill	Chicago, Pivan Engrg.	312-539-4838
Ill	Rockford, Russell Assoc.	815-964-5463
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Md	Wheaton, Sales Technology Inc.	301-622-3700
Mass	Needham, Addelco Corp.	617-444-4754
Mass	Waltham, Russell Assoc.	617-899-6500
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Mich	St. Clair, Russell Assoc.	313-329-9081
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	Bogota, Neville & Vespo Corp.	201-487-1505
NJ	Fair Haven, Russell Assoc.	201-747-0600
NM	Albuquerque, Shefler-Kahn Co.	505-296-0749
NY	Bay Shore, Russell Assoc.	516-666-6500
NY	Jamaica, Sundstrand Svc. Corp.	212-656-8606
NY	Williamsville, M. Bennett Assoc.	716-634-2107
Ohio	Cincinnati, Russell Assoc.	513-771-5391
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling Co.	513-298-7573

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Ohio	Dayton, Sundstrand Svc. Corp.	513-258-0141
Pa	Pittsburgh, Comtel-Sterling Co.	412-922-5720
Pa	Radnor, Roberts Eng. Sls. Co.	215-688-6525
Tex	Arlington, Sundstrand Svc. Corp.	817-640-1834
Tex	Houston, C.M. Asfahl Agency	713-526-9669
Utah	Salt Lake City, Shefler-Kahn Co.	801-484-4222
Wash	Bellevue, Sundstrand Svc. Corp.	206-453-1393
Wisc	Brookfield, Pivan Engrg.	414-786-1940

SUNSHINE SCI. INSTRS., INC., Dept. EM, 1810 Grant Ave., Philadelphia, Pa. 19115, Tel: 215-OR 3-5600; Empl.: 30

Local Sales Offices & Reps.

Cal	LaMirada, P. H. DuBois	714-521-1481
Md	Elkridge, Sunshine Scientific	301-796-5600

(TM)SUNSWITCH - photoelectric controls - Ripley Co., Inc.

(TM)SUPER-BAND - 50-270 +5-300 MHZ line of solid state CATV equip - CATV Communications

(TM)SUPER CASTER - spkr. syst. - Electro-Voice, Inc.

(TM)SUPER CHAMP - hand tool - Amp Inc.

(TM)SUPERCON - electrical connectors - Superior Electric Co.

(TM)SUPERCORDX - cord - General Electric Co.

(TM)SUPERCORONOL - rubber insulated cable - General Electric Co.

(TM)SUPER DECK - cassette tape transport - Triple I

(TM)SUPERECTIFIER - over molded glass passivated rectifier - General Instrument Corp.

(TM)SUPER ERECTA SHELF - open wire shelving & trucks - Metropolitan Wire Corp.

SUPEREX ELECTRONICS CORP., Dept. EM, 151 Ludlow St., Yonkers, N.Y. 10705, Tel: 914-965-6906, Telex: 13-1584; Empl.: 112

(TM)SUPERFAST - 30 nanosecond rectifier, silicon - Semtech Corp.

(TM)SUPERFLEX - coaxial cable - Columbia Elctrn. Cables

(TM)SUPER-FOAM - low density foam dielectric coax - Prodelin, Inc.

(TM)SUPER FROST AID - component cooler - Chemtronics, Inc.

SUPERIOR CABLE DIV., Superior Continental Corp., Dept. EM, Box 489, Hickory, N.C. 28601, Tel: 704-328-2171, TWX: 510-934-1204; Empl.: 600

Local Sales Offices & Reps.

Ala	Tuscaloosa, C. Oxford	205-339-4403
Cal	Chico, G. Swithenbank	916-343-4314
Cal	Menlo Park, R. Westwood	415-349-3003
Ga	Atlanta, K. Powley	404-424-6898
Ill	Glen Ellyn, T. Lyons	312-858-2880
NC	Hickory, N.C. Cox	704-328-1682
NC	Hickory, F. Logan	704-256-9361
Tenn	Gallatin, E. Huffman	615-452-7299
Tex	Dallas, B. Pitts	214-328-0343
Tex	Dallas, B. Barbour	214-243-1722
Wash	Enumclaw, P. Armentrout	206-939-0738

SUPERIOR CARBON PRODS., INC., Dept. EM, 9115 George Ave., Cleveland, Ohio 44105, Tel: 216-883-4880; Empl.: 120

Local Sales Offices & Reps.

Cal	Santa Fe Springs, Sierra-Pacific Engrg.	213-921-9634
Conn	Stamford, Engineered Comps.	203-329-0500
Ill	Arlington Hgts., Superior Carbon Prods.	312-259-3936
Ohio	W. Unity, Superior Carbon Prods.	419-924-2121
Pa	Pittsburgh, Superior Carbon Prods.	412-766-1466
Tex	Dallas, Ryco Engrg.	214-368-0135
Tex	Houston, Ryco Engrg.	713-688-1712

(TM)SUPERIOR CONNECTION - #30 flux in small applicator - Superior Flux & Mfg. Co.

SUPERIOR ELECTRIC CO., Dept. EM, 1000 Middle St., Bristol, Conn. 06010, Tel: 203-582-9561, TWX: 710-454-0682; FSC No.: 58474; Empl.: 1000 p. 2251,3108,3109,3397,4468,4469

Local Sales Offices & Reps.

Cal	Redwood City, Superior Elec.	415-369-8203
Cal	Woodland Hills, Superior Elec.	213-999-2150
Colo	Denver, W. J. Purdy Co.	303-777-1411
Fla	Maitland, Hutto, Hawkins, Peregoy, Inc.	305-831-2474
Ill	Glen Ellyn, Superior Elec.	312-858-2960
Ind	Indianapolis, Mktg. Engrs.	317-546-1523
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Md	College Park, Superior Elec.	301-277-3235
Mass	Wellesley Hills, Superior Elec.	617-237-0750
Mich	Detroit, Superior Elec.	313-543-3450
NY	E. Rochester, Superior Elec.	716-381-9210
NY	Tarrytown, Superior Elec.	914-631-8600
NC	Charlotte, Superior Elec.	704-535-5846
Ohio	Medina, Superior Elec.	216-725-8887
Pa	Blue Bell, Superior Electric	215-643-6124
Tex	Dallas, Superior Elec.	214-368-4688
Wash	Seattle, J.J. Backer Co.	206-285-1300

SUPERIOR FLUX & MFG. CO., Dept. EM, 95 Alpha Park, Cleveland, Ohio 44143, Tel: 216-461-3315; Empl.: 9

Local Sales Offices & Reps.

RI	Rumford, J. Doherty	401-434-5945

Local Distributors

Ariz	Phoenix, Scottsdale Tool	602-273-7376
Cal	El Monte, C. Michael, Inc.	213-283-8441
Cal	Irvine, C. Michael, Inc.	714-556-6414
Cal	San Diego, C. Michael, Inc.	714-278-2102
Cal	Santa Clara, Com-Kyl, Inc.	408-249-6220
Cal	Sunnyvale, C. Michael, Inc.	408-739-8720
Colo	Arvada, C. Michael, Inc.	303-423-9670
Fla	Palm Beach Gardens, C. Michael, Inc.	305-523-6464
Ill	Des Plaines, C. Michael, Inc.	312-298-0440
Mass	Newton Highlands, C. Michael, Inc.	617-965-5310
Minn	Edina, C. Michael, Inc.	612-831-7997
NY	Farmingdale, C. Michael, Inc.	516-293-4141
Ohio	Dayton, C. Michael, Inc.	513-898-1100
RI	Providence, Technical Assocs.	401-331-9156
Tex	Dallas, C. Michael, Inc.	214-233-7650
Wash	Bellevue, C. Michael, Inc.	206-883-1084
For:	England, Buckinghamshire, SL8 5SB, Nightingale Chemical Co., Ltd. 53 The Parade	
For:	Israel, Tel Aviv 65 172, A. Bidnei Ltd., 84 Allenby Rd.	
For:	Japan, Osaka Higashi-ku, Matsushita Electric Trading Co., Ltd.	
For:	West Germany, Alsterdorfer Strasse, Detakta 2 Hamburg 39	

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SUPERIOR MFG. & INSTRUMENT CORP., Dept. EM, 19-36 38th St., Long Island City, N.Y. 11105, Tel: 212-932-1800, TWX: 710-582-2626; Empl.: 80

Local Sales Offices & Reps.

Cal	Los Altos, W. Selbach	415-964-1325
Cal	Manhattan Beach, R. Johnson	213-545-4649
NH	Rindge, A.T. Clarke	603-899-6662

(TM)SUPER-K - capacitors, fixed, ceramic - Republic Elctrns. Corp.

(TM)SUPER-LUBE - heavy duty cleaner & lubricant - Elctrn. Chemical Corp.

(TM)SUPERMATEC - solid state controller - Hotpack Corp.

(TM)SUPER MITE - portable potentiometer - Thermo Elec. Co., Inc.

(TM)SUPERNOVA - computers - Data General Corp.

(TM)SUPER-PLAST - moulded rotating components with metal inserts - Stock Drive Prods.

(TM)SUPER Q - varactor tuning diodes - MSI Electronics, Inc.

(TM)SUPER/REG - electronic DC voltage regulators - Trio Labs, Inc.

(TM)SUPERSAFE - #77 supersafe non-corrosive paste flux - Superior Flux & Mfg. Co.

(TM)SUPER SCANNER - CB base station antenna - Antenna Specialists Co.

(TM)SUPER-SONAX - tweeter - Electro-Voice, Inc.

(TM)SUPER SPRAY BATH - cleaner & solvent degreaser - Elctrn. Chemical Corp.

(TM)SUPERSTRATE R - ceramic substrates, ultra-fine grained - Materials Resch. Corp.

(TM)SUPER-STRIP - plug-in breadboard element - A.P. Products

(TM)SUPERSWITCH - keyswitch - solid-state - ITW

(TM)SUPER-SYNCLAMPS - large servo clamps - Timber-Top, Inc.

(TM)SUPER-TORQ - cap screws - Allen Mfg. Co.

(TM)SUPER TUN-O-WASH - concentrated tuner degreaser - Chemtronics, Inc.

(TM)SUPER-TWISTAGUIDE - triple strength twistaguide - Airtron

(TM)SUPER-40 - waveguides & accessories - Airtron

(TM)SUPER 45 - antenna - Shakespeare

(TM)SUPRAMESH - rigimesh w/stainless steel powder sinter-bonded - Pall Trinity Micro Corp.

(TM)SUPRASIL - clear fused quartz - Amersil, Inc.

(TM)SUPRASIL-W - clear fused quartz - Amersil, Inc.

(TM)SURE-TY - cable ties - Gould Inc.

(TM)SURFAMAX - porous stainless steel fiber - Pall Trinity Micro Corp.

(TM)SURFANALYZER - surface measurement systems - Gould, Inc.

(TM)SURGITRON - ac & dc protectors - Joslyn Elctrn. Sys.

™SURMETIC - plastic package (zener diodes) - Motorola Semiconductor Prods.

™SUS-TENSION - film processing hangers - Lektra Labs., Inc.

™SVP - surge voltage arrestor - Siemens Corp.

™SWAGE-BOND - terminations - Bourns, Inc.

SWEDA INT'L., OEM Prods., Dept. EM, 34 Maple Ave., Pine Brook, N.J. 07058, Tel: 201-575-8100; Empl.: 75

Local Sales Offices & Reps.

Cal	Grenada Hills	213-363-7419
Mass	Waltham	617-891-7545

™SWEEP CHANALYST - sweep, marker, generator - VIZ Manufacturing Co.

™SWEMAR - sweep marker generator - Leader Instruments Corp.

™SWIDGET - slide switch - CW Industries

™SWIDGET, JR. - slide switch - CW Industries

™SWIFTACHMENTS - plastic fastener - Dennison Mfg. Co.

™SWING ARC - fume exhauster - Torit Div./Donaldson Co.

™SWING-SEAL - 3-piece ball valves - Jamesbury Corp.

™SWING-WA - switches, panelboards - General Elec. Co.

SWITCHCRAFT, INC., Dept. EM, 5555 N. Elston, Chicago, Ill. 60630, Tel: 312-792-2700, TWX: 910-221-5199; FSC No.: 82389; Empl.: 1000 p. 4270-4303

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, Howe & Howe	602-264-7971
Cal	Los Angeles, Wiley Co.	213-663-8028
Cal	San Carlos, D.H. Ross Co.	415-591-4411
Colo	Denver, G. Moss Elctrns.	303-455-7205
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Haw	Honolulu, Dougherty Entprs.	808-847-4144
Ill	Chicago, B. Burns & Assocs.	312-775-1233
Ind	Indianapolis, Mktg. Engrs.	317-546-1523
Iowa	W. Des Moines, T.L. Dowell & Assocs.	515-225-1620
Kans	Overland Pk., T.L. Dowell & Assocs.	913-236-8200
La	Gretna, Cartwright & Bean	504-362-4649
Mass	Boston, Anderson Sls. Assocs.	617-227-2980
Mich	Detroit, R.C. Merchant & Co.	313-535-6000
Mich	St. Joseph, R. C. Merchant Co.	616-983-7378
Minn	Edina, M. Foster Tech. Sls. Inc.	612-835-2252
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	St. Louis, T.L. Dowell & Assocs.	314-968-4234
NJ	Cherry Hill, Trinkle Sls.	609-795-4200
NJ	No. Caldwell, Masin-Esco, Inc.	201-226-2550
NM	Albuquerque, G. Moss Elctrns., Inc.	505-821-6101
NY	Syosset, Masin-Esco Inc.	516-364-0310
NY	Syracuse, Mar-Com Assocs.	315-437-2843
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Richfield, Bear Mktg.	216-659-3131
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Richardson, J.R. Lavender & Co.	214-231-5040
Wash	Bellevue, Comtec	206-453-1188

™SWITCHING-REGULATOR RATED FERRAMICS - ferrites - Indiana General

™SWIVLTOP - screw drivers - Moody Tools, Inc.

SWS SILICONES CORP., Dept. EM, Box 428, Adrian, Mich. 49221, Tel: 517-263-5711, TWX: 510-450-2606; Empl.: 500

Local Sales Offices & Reps.

Cal	Los Angeles	213-385-5341
Cal	San Francisco	415-544-9645
Ill	Chicago	312-454-5760
NJ	Edison	201-572-4451
Tex	Houston	713-688-9311

™SY-BONDEZE (R) - Magnet Wire - Phelps Dodge Magnet Wire Co.

SYCOR, Dept. EM, 100 Phoenix Dr., Ann Arbor, Mich. 48104, Tel: 313-971-0900, TWX: 810-223-6011; Empl.: 750

™SYDEWYNDER - slide switch - CW Industries

™SYLVANIA - intergrated circuits - McGuirk Electronics Co. Inc.

™SYNCH-LOCK - control systems - Sequential Information Systems

™SYNCHRO-PAC - syn. motors - Electric Machinery Mfg. Co.

SYNCHRO-START PRODUCTS, INC., Dept. EM, Box 147, 8109 N. Lawndale Ave., Skokie, Ill. 60076, Tel: 312-673-7730, Telex: 724-424; Empl.: 125

Local Sales Offices & Reps.

Cal	Santa Rosa, R. Anderson	707-542-8207
Cal	Tustin, M. Johnson Co.	714-832-7282
Mass	Sharon, Adcour	617-784-3996
NY	Forest Hills, J. Miller Co.	212-263-4446
Ohio	Chagrin Falls, Pine Sls. & Engrg. Co.	216-247-6198
Okla	Tulsa, P & P Sls.	918-622-1523
Pa	Devon, Goodall Industritl Equip. Co.	215-353-4120
Tex	Richardson, Woodbury Co.	214-742-7508
Va	Roanoke, Johnson Custom Controls	703-981-0780
Wash	Seattle, Fairman B. Lee Co.	206-244-7262

™SYNCHROSTAT - electrical controls - Electric Machinery Mfg. Co.

™SYNCHRO SWEEP GENERATORS - frequency response sweepers - Nelson Ross Elctrns.

™SYNCHROTEL - self-synchronous motors - Kollsman Instr. Co.

™SYNCLAMPS - servo clamps - Timber-Top, Inc.

™SYNC-LOC - motors - Bristol Saybrook Co.

™SYNCRODRIVE - variable frequency feeder control - Vibra-Metrics, Inc.

™SYNCRON - condenser microphones - Dynalab Corp.

™SYNCRONOMETER - digital time comparator - Gen Rad

™SYNC-TROL - synchronous-motor controls - Electric Machinery Mfg. Co.

™SYNDUCTION - motors - Allis-Chalmers

SYNERGISTIC PRODUCTS, Sub. Cavitron Corp., Dept. EM, 1902 McGraw Ave., Irvine, Cal. 92705, Tel: 714-540-7755, Telex: 655339; Empl.: 200

Local Sales Offices & Reps.

Ariz	Phoenix, Arrowhead Sls. Corp.	602-277-7148
Cal	Santa Clara, Banks Sls.	408-246-6311
Colo	Arvada, Arrowhead Sls Corp.	303-423-5556
Conn	Hartford, Cable Assocs.	203-525-5016
Fla	Lighthouse Pt., Saber Assocs.	305-943-3076
Ill	Itasca, English Sls. Co.	312-773-9449
Md	Silver Springs, ARA Elctrns.	301-565-2584
Mich	Detroit, Electro Ent.	313-521-1500
Minn	Minneapolis, Bican Co.	612-827-4734
NH	Londonderry, Cable Assocs.	603-434-5234
NJ	Wayne, K & J Assocs.	201-694-3334
NY	E. Setauket, K & J Assocs.	516-751-8686
Ohio	Cleveland, Electro Ent.	216-261-7670
Ohio	Dayton, Electro Ent.	513-426-6071
Pa	Bala Cynwyd, Electech	215-667-0973
Pa	Pittsburgh, Electro Ent.	412-371-8497
Tex	Dallas, Crockett Southwest Co.	214-251-1776

SYNERTEK, Dept. EM, 3050 Coronado Dr., Santa Clara, Cal. 95051

SYNTEST CORP., Dept. EM, 169 Millham St., Marlboro, Mass 01752, Tel: 617-481-7827, TWX: 710-390-7659; Empl.: 8

Sales Manager: B. Eldridge

Local Sales Offices & Reps.

Ala	Huntsville, Repcom, Inc.	205-852-0394
Cal	Glendale, Gru Assoc.	213-244-8441
Cal	Los Altos, Stout-Loeswick	415-948-3265
Conn	Hamden, S.D.-Conn.	203-248-9361
Fla	Melbourne, Repcom Inc.	305-254-1877
Haw	Honolulu, Aloha Assoc.	808-941-1574
Kans	Lenexa, S.D.-Midwest	913-362-8700
Mass	Lexington, Lancer Assoc.	617-861-1720
Mich	Northville, Micro Sls.	313-482-1220
Minn	Minneapolis, Scientific Devices - Midwest	612-544-1616
Mo	St. Louis, Scientific-Devices	314-842-2535
NJ	Englewood, Scientific Devices	201-871-3916
NM	Alburquerque, S.D.-Alburquerque	505-293-3494
NY	Schenectady, N.W. Alexander Assoc.	518-377-0581
NC	Charlotte, Repcom, Inc.	
Ohio	Centerville, Micro Sls.	513-433-8171
Ohio	Cleveland, Micro Sls.	216-331-0900
Pa	Newtown Square, SWR Assoc	215-356-8550
Tex	Houston, Comspec, Inc.	713-461-4487
Tex	Richardson, Comspec, Inc.	214-234-4137
Va	Fairfax, Schibley Assoc.	703-591-3008

SYNTHANE TAYLOR CORP., An Alco Standard Corporate Partner, Dept. EM, Box 835, Valley Forge, Pa. 19482, Tel: 215-666-0300, Telex: 846-323; Empl.: 1000

Local Sales Offices & Reps.

Cal	LaVerne	714-593-1341
Cal	Los Angeles	213-966-7461
Cal	San Francisco	415-591-8929
Conn	Avon	203-678-0385
Ga	Atlanta	404-237-0416
Ill	Arlington Heights	312-437-8660
Ill	Chicago	312-569-2838
Ind	Indianapolis	317-923-2102
Md	Baltimore	301-828-9365
Mass	Boston	617-969-5945
Mich	Detroit	313-646-8868
Minn	Minneapolis	612-888-5207
Mo	Kansas City	913-432-3355
Mo	St. Louis	314-721-1300
NJ	Newark	201-447-4597
NY	Binghamton	607-722-7850
NY	Northport	516-757-7171
NY	Rochester	716-586-0413
Ohio	Cleveland	216-371-3775
Ohio	Dayton	513-293-3357
Pa	Pittsburgh	412-391-7230
Tenn	Knoxville	615-525-1991
Tex	Dallas	214-231-9939
Va	Richmond	804-358-3465
Wisc	Milwaukee	414-962-0890

™SYNTHINOL - hook up wire - Consolidated Wire & Assoc. Corps.

™SYNTHITE - varnishes - Dolph, John C. Co.

™SYNTHOLVAR - extruded pvc tubing - Varflex Corp.

syntronic

SYNTRONIC INSTRUMENTS INC., Dept. EM, 100 Industrial Rd., Addison, Ill. 60101, Tel: 312-543-6444, TWX: 910-651-2191; Empl.: 120 p. 1447-1450

Local Sales Offices & Reps.

Cal	Los Altos, Frauman Assocs.	415-941-0660
Cal	Pasadena, A-F Sls. Eng.	213-681-5631
Colo	Wheatridge, Waugaman Assocs.	303-423-1020
Conn	New Canaan, Stan Pierce Inc.	203-966-4630
Fla	Lighthouse Pt., Saber Assoc.	305-943-3076
Md	Hyattsville, Eastern Comps.	301-577-2925
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
NJ	Fairlawn, G.D. Harris Assocs.	201-796-5200
NM	Albuquerque, Waugaman Assoc.	505-294-1436
Pa	Flourtown, Eastern Comps.	215-836-1616
Tex	Irving, Space Elctrns.	214-251-3636
Utah	Salt Lake City, Waugaman Assocs.	801-277-8911
Exp:	N.J., Teaneck, S. Ginsbury Ltd.	201-837-1100

SYRACUSE ELCTRNS. CORP., Dept. EM, Box 566, Syracuse, N.Y. 13201, Tel: 315-488-4911; Empl.: 97

Local Sales Offices & Reps.

Cal	San Rafael, Wells Assocs.	415-454-5730
Cal	Sherman Oaks, Gee Assocs.	213-788-5961
Colo	Boulder, R. A. Mayes Co.	303-444-0782

Conn	Glastonburry, Barton-Caron Assocs.	203-633-9417
Fla	Orlando, Publicover Assocs.	305-898-9361
Ill	Mount Prospect, Automation Equip. Co. Inc.	312-398-7550
Ind	Indianapolis, Southern Sls.	317-257-7575
Kans	Shawnee Mission, Lowell-Kangas & Assocs.	913-631-3515
Mass	Auburndale, Barton-Caron Assocs.	617-332-2021
Mich	Dearborn, Pitcher-Poulin	313-582-5450
Minn	Minneapolis, K. C. Brooks	612-544-3179
Mo	St Louis, Lowell-Kangas & Assocs.	314-821-4051
NM	Albuquerque, R. A. Mayes Co.	505-293-8010
NY	Baldwinsville, Scibetta Reps.	315-622-3993
NY	Bogota, Neville & Vespo	201-487-1505
NC	Greensboro, Motion Control Sys.	919-272-4181
NC	Pine Lake, Hilco Inc.	404-469-8638
Ohio	Cleveland, D. Steffen & Assocs.	216-461-8333
Ore	Portland, Huggins & Assocs.	505-287-2203
Pa	Philadelphia, K. B. Erdman Co.	215-224-1833
Tenn	Memphis, R. Jordan Assocs.	901-452-7441
Tex	Dallas, R.A. Mayes	214-235-3043
Tex	Houston, R.A. Mayes	713-461-5383
Exp:	Can, Toronto, Ont., Renfrew Electric	416-461-3511

Local Distributors

Ark	Little Rock, Carleton Bates	501-562-9100
Ark	Pine Bluff, Carleton Bates	501-535-1354
Cal	Los Angeles, R.B. Clapp, Co.	213-225-2395
Cal	Los Angeles, Andrews Hardware	213-483-8110
Cal	Oakland, Western Electro	415-452-1936
Cal	San Francisco, Stevens Engrg.	415-583-5868
Conn	Fairfield, Allied Electric-Bridg. Div.	203-367-6407
Conn	Hartford, Allied Electric	203-527-6405
Conn	New Haven, United Electric Supply	203-777-6691
Fla	Lakeland, A.A. Electric	813-682-6181
Fla	Tampa, Leader Elctrns.	813-835-1891
Ga	Atlanta, Cleveland Electric	404-696-7700
Ga	Norcross (Georgia), A.A. Electric	404-494-8670
Ill	Chicago, O. Frankenbush	312-647-0455
Ind	Indianapolis, Ra-Dis-Co., Inc.	317-657-5571
Kans	Salina, Kriz-Davis Co.	913-827-4497
Ky	Louisville, Peerless Elctrns.	502-637-7677
Md	Beltsville, Treeko Sls.	301-937-8260
Mass	Medford, Empire Electric	617-395-5000
Mass	Waltham, Standard Electric	617-893-1050
Mich	Jackson, Electric Wholesale	517-782-7121
Minn	Minneapolis, Lakeland Equip. Engrg.	612-544-0321
Mo	St. Louis, Electric Controls	315-645-2400
NJ	Fairlawn, Relay Specialties	201-797-3313
NY	Albany, E.E. Taylor	518-438-4461
NY	Buffalo, Buffalo Electric	716-854-4420
NY	Rochester, Requa Electric	716-442-2020
NY	Woodside, Switches Unlimited	212-651-0935
NC	Greensboro, Motion Controls	919-272-4181
Ohio	Cincinnati, United Radio Inc.	513-761-4030
Ohio	Cleveland, Good Technical Svcs.	216-651-7800
Ohio	Dayton, Esco, Inc.	513-226-1133
Ohio	Medina, REH Elctrns.	216-599-0661
Pa	Erie, Mace Elctrns.	814-838-3511
Pa	Philadelphia, Esco Electrical	215-WA-36050
Pa	Pittsburgh, Cam/RPC	412-782-3770
Pa	Reading, Reliable Electric	212-777-6561
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Tenn	Memphis, Bluff City Dist.	901-725-9500
Tenn	Nashville, Electra Distributors	615-329-3871
Wisc	Cedar Burg, A.A. Electric Co.	414-377-8000
For:	Can, Toronto, Ont., Renfrew Electric Co.	416-461-3511
For:	England, Burgess Hill, Skan-A-Matic	STD-044-06-41688

SYSCON INT'L., INC., Dept. EM, 1239 South Bend Ave., So. Bend, Ind. 46617, Tel: 219-287-5916, Telex: 258-8325; Empl.: 12

Sales Manager: T.W. Eaglesham

SYS-TEC INC., Dept. EM, 877 Third St. S.W., New Brighton, Minn. 55112, Tel: 612-636-6373; Empl.: 20

Local Sales Offices & Reps.

Ala	Huntsville, Technical Sls.	205-881-1750
Cal	Woodland Hills, Cummings & Assocs.	213-340-6035
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Kans	Leawood, Leemark Engrs. Inc.	913-648-0124
Md	Wheaton, Magyar & Assocs.	201-752-4848
Minn	Minneapolis, Electrical Jobbers Eqpt.	612-721-4815

Ⓣ**SYSTEMETRA** - data acquisition, display, alarm & control system - Metra Instruments, Inc.

Ⓣ**SYSTEM III** - wire-wrapping cards - Adcor Electronic Packaging Corp.

Ⓣ**SYSTEM III** - artwork design services - Adcor Electronic Packaging Corp.

Ⓣ**SYSTEM III** - universal PC cards - Adcor Electronic Packaging Corp.

Ⓣ**SYSTEM IV/40** - Remote Intelligent Terminal System - Four-Phase Systems

Ⓣ**SYSTEM IV/70** - Intelligent Terminal System - Four-Phase Systems

SYSTEMS DATA INC., Dept. EM, 1941 W. Market St., Akron, Ohio 44313, Tel: 216-867-2197; Empl.: 12

Local Sales Offices & Reps.

Mich	Detroit, W-K-M Assocs.	313-892-2500
Ohio	Cleveland, W-K-M Assocs.	216-267-0445
Ohio	Dayton, W-K-M Assocs.	513-434-7500
Pa	Pittsburgh, W-K-M Assocs.	412-892-2953

SYSTEMS ENGRG LABS, Dept. EM, 6901 W. Sunrise Blvd., Ft. Lauderdale, Fla. 33313, Tel: 305-587-2900

SYSTEMS ELECTRONICS, INC., Dept. EM, 9727 Inglewood Ave., Inglewood, Cal. 90301

SYSTEMS FURNITURE, Dept. EM, 13900 S. Figueroa St., Los Angeles, Cal. 90061, Tel: 213-327-4000, TWX: 1-910-346-7641; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assoc.	205-534-9771
Ariz	Phoenix, Thorson Co.	602-956-5300
Cal	Gardena, Systems Furniture Co.	213-327-4000
Cal	Mt. View, Thorson Co.	415-964-9300
Colo	Englewood, Hall Co.	303-789-4149
Conn	Hamden, Digital Sls. Assoc.	203-281-6539
Fla	Orlando, Gentry Assoc.	305-894-4401
Ga	Atlanta, Gentry Assoc.	404-448-2365
Ill	Rolling Medows, Lightner, Assoc.	312-398-3000
Kans	Shawnee Mission, Inland, Assoc.	913-362-2366
Md	Silver Springs, Computer Complements	301-593-1559
Md	Towson, Computer Complements	301-828-8928
Mass	Waltham, Datcom	617-891-4600
Mich	Farmington Hills, Anderson Elctrns.	313-476-9161
Minn	Minneapolis, Loonam, Assoc.	612-831-1616
Mo	St. Louis, Inland, Assoc.	314-821-3742
NY	Elmont, Crane & Egert	516-488-2100
NC	Burlington, Gentry Assoc.	919-227-3639
Pa	Bryn Mawr, Hopkins, Assoc.	215-527-1127
Tex	Richardson, Data Applications	214-231-4846
Va	Oakton, Computer Complements	703-620-3736
Wash	Bellevue, Thorson Co.	206-455-9180

SYSTEMS INSTRS. RESCH., INC., Dept. EM, 331 Luckie St., N.W., Atlanta, Ga. 30313, Tel: 404-522-6317; Empl.: 15

Sales Manager: C.R. Romanchuk

SYSTEMS RESEARCH LABS. INC., Dept. EM, 7001 Indian Ripple Rd. , Dayton, Ohio 45440

SYSTEMS INTEGRATION ASSOC., Dept. EM, RD #1 Box 126, Glenmoor, Pa. 19343

Ⓣ**SYSTEM 150** - CAD/D display system - Information Displays, Inc.

Ⓣ**SYSTEM 18/30** - small, general purpose computer - General Automation

Ⓣ**SYSTEM 547** - modular wet processing production system - Chemcut Corp.

Ⓣ**SYSTEM 6** - control & display instruments - Himmelstein & Co., S.

SYSTONICS, INC., Dept. EM, Box 121, Winchester, Mass. 01890, Tel: 617-729-4439; Empl.: 3

Ⓣ**SYSTRAC** - systems - Systron-Donner Inertial Div.

Ⓣ**SYSTROL** - solid state drive systems - Control Systems Research, Inc.

Ⓣ**SYSTRON** - data products - Systron-Donner Inertial Div.

SYSTRON-DONNER

SYSTRON-DONNER CORP., Dept. EM, 10 Systron Dr., Concord, Cal. 94518, Tel: 415-676-5000, TWX: 910-481-9472; FSC No.: 52542; Empl.: 1400

Local Sales Offices & Reps.

Ala	Huntsville, Scientific Devices	205-536-1969
Cal	Los Alamitos, Scientific Devices	213-598-7678
Cal	Mountain View, Scientific Devices	415-964-4230
Cal	San Diego, Scientific Devices	714-279-6642
Colo	Boulder, Scientific Devices	303-449-9466
Conn	Mount Carmel, Scientific Devices	203-248-9361
Fla	Orlando, Scientific Devices	305-841-8180
Fla	Palm Bay, Scientific Devices	305-723-1800
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ill	Des Plaines, Scientific Devices	312-297-5240
Kans	Shawnee Mission, Scientific Devices	913-362-8700
Md	Timonium, Scientific Devices	301-252-8851
Mass	Waltham, Scientific Devices	617-894-5637
Mich	Milford, Scientific Devices	313-685-8912
Minn	Minneapolis, Scientific Devices	612-544-1616
Mo	St. Louis, Scientific Devices	314-842-2535
NJ	Englewood, Scientific Devices	201-871-3916
NM	Albuquerque, Scientific Devices	505-293-3494
NY	Rochester, Scientific Devices	716-334-2445
NC	Raleigh, Scientific Devices	919-872-7066
Ohio	Dayton, Scientific Devices	513-298-9904
Ore	Portland, Scientific Devices	503-643-6878
Pa	Plymouth Meeting, Scientific Devices	215-825-9515
Tex	Houston, Scientific Devices	713-623-4250
Tex	Richardson, Scientific Devices	214-231-8106
Tex	San Antonio, Scientific Devices	512-736-3164
Va	Norfolk, Scientific Devices	804-461-8133
Va	Springfield, Scientific Devices	703-451-6500
Wash	Bellevue, Scientific Devices	206-454-0900

SYSTRON-DONNER, Advanced Components Div., Dept. EM, 735 Palomar Ave., Sunnyvale, Cal. 94086, Tel: 408-735-9660, TWX: 910-339-9309; Empl.: 40

Refer to Systron-Donner Corp. for sales office information.

SYSTRON DONNER, Data Products Div., Dept. EM, 735 Detroit Ave., Concord, Cal. 94518, Tel: 415-798-9900, TWX: 910-481-5780; Empl.: 140

Refer to Systron-Donner Corp. for sales office information

SYSTRON-DONNER INSTR. DIV., Dept. EM, 10 Systron Dr., Concord, Cal. 94518, Tel: 415-676-5000, TWX: 910-481-9479; FSC No.: 52542; Empl.: 650

Refer to Systron-Donner Corp. for sales office information.

SYSTRON-DONNER INERTIAL DIV., Dept. EM, 1090 San Miguel Rd., Concord, Cal. 94518, Tel: 415-682-6161, TWX: 910-481-9478; Empl.: 416

Local Sales Offices & Reps.

Ala	Huntsville, Vesco	205-881-3830
Cal	Alhambra, Applied Technologies Assocs.	213-289-9181
Cal	San Diego, L. L. Stoakes	714-274-6281
Cal	San Francisco, Applied Technologies Assocs.	408-733-4130
Conn	Bloomfield, Zaslow Sls. Co.	203-242-7781
Conn	Milford, Zaslow Sls. Co.	203-878-1094
DC	Washington, VCL	202-628-4380
Fla	Orlando, E. G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E. G. Holmes & Assocs.	404-451-6161
Ill	Chicago, Carlson Elctrns. Sls.	312-774-4812
Mass	Lowell, Zaslow Sls. Co.	617-458-8452
Mass	Northboro, Zaslow Sls. Co.	617-393-8150
NJ	Fort Lee, Technimat	201-461-8685
NY	Copiague, Sencor	516-842-7676
NY	Edicott, Tech-Mark	607-748-7473
NY	Fairport, Tech-Mark	716-223-1252
NY	Pleasant Valley, Tech-Mark	914-635-3436
Ohio	Dayton, Ashby Assocs.	513-252-5627
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Pa	Philadelphia, Sencor	215-698-9661
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Tex	Houston, Kemp Engrg. Co.	713-688-1431

Wash	Seattle, Applied Technologies Assocs.	213-289-9181
Wisc	Milwaukee, Carlson Elctrn. Sls.	414-476-2790

SYSTRON DONNER, CONCORD INSTRUMENT DIV., see Systron Donner Advanced Components

SYSTRON-DONNER MICROWAVE DIV., Dept. EM, 14844 Oxnard St., Van Nuys, Cal. 91409, Tel: 213-786-1760, TWX: 910-495-1786; Empl.: 200

Refer Systron-Donner Corp. for sales office information

SYT CORPORATION, Dept. EM, 1220 Barranca, El Paso, Tex. 79935, Tel: 915-593-1234; Empl.: 40

Sales Manager: L.P. Crum

Local Sales Offices & Reps.

Fla	Sarasota, Enjay Assocs.	813-958-9533
Ill	Chicago, Ashpole Assocs.	312-665-7787
Ind	Indianapolis, Loomis Assocs.	317-299-5644
Md	Fulton, S.A. Jeffries, Inc.	301-792-7452
Mo	Grandview, Moeller-Pickett & Assoc.	816-765-1224
Neb	Omaha, Moeller-Pickett & Assoc.	402-551-5676
NY	Liverpool, C & W Mktg.	315-652-6651
Pa	Narberth, S.A. Jeffries, Inc.	215-664-8500
Tenn	Memphis, Mid South Sls. Assoc.	901-272-1209
Tex	Dallas, Loss, Stewart, & Drykos	214-747-0081
Tex	Dallas, El Wilco	214-242-5321

™S-42 ALLOY - antimony gold plating process - Sel-Rex Div. Oxy Metal Industries Corp.

T&B/ANSLEY CORP., Sub. Thomas & Betts Corp., Dept. EM, 3208 Humboldt St., Los Angeles, Cal. 90031, Tel: 213-223-2331, TWX: 68-6109 910-321-3938; Empl.: 200; Minimum order: $B. Farnum

Distributor Manager: B. Farnum

Local Sales Offices & Reps.

Ariz	Phoenix, Stitzer-Dodd	602-944-2237
Cal	Los Angeles, T&B/Ansley	213-223-2331
Cal	San Jose, T&B/Ansley	408-267-2434
Colo	Littleton, Simpson Assoc.	303-794-8381
Colo	Madison, Jemco Sls.	203-245-1505
Conn	New Milford, T&B/Ansley	203-355-0000
Fla	Ft. Lauderdale, T&B/Ansley	305-772-3279
Ill	Elgin, T&B/Ansley	312-697-5340
Ind	Indianapolis, Technical Reps.	317-849-6454
Iowa	Cedar Rapids, PMA Inc.	319-362-9177
Kans	Overland Park, PMA Inc.	913-381-0004
Kans	Wichita, PMA Inc.	316-264-2662
Md	Columbia, T&B/Ansley	301-997-3680
Mich	Southfield, Representative Elctrn. Prods.	313-559-1080
Minn	Minneapolis, T&B/Ansley	612-822-3226
Mo	Maryland Heights, PMA Inc.	314-569-1220
NH	Merrimack, T&B/Ansley	603-882-8650
NJ	Avenel, T&B/Ansley	201-549-3434
NY	Selden, T&B/Ansley	516-473-8128
NY	Shortsville, T&B/Ansley	716-289-3400
NC	Raleigh, Wolff's Elctrn Sls.	919-781-0164
Ohio	Dublin, T&B/Ansley	614-889-1221
Ore	Beaverton, Vantage Corp.	503-646-3466
Pa	Doylestown, T&B/Ansley	215-345-6641
Utah	Salt Lake City, Simpson Assoc.	801-486-3731
Wash	Bellevue, Vantage Corp.	206-455-3460

T & B/THOMAS & BETTS, Dept. EM, 930 Lee St, Elk Grove, Ill. 60007, Tel: 201-354-4321, TWX: 201-354-6621; FSC No.: 59730; Empl.: 2000

Local Sales Offices & Reps.

Ariz	Phoenix	602-996-4190
Cal	Los Angeles	213-770-4670
Cal	Santa Clara	408-243-9883
Colo	Denver	303-344-5585
Ga	Atlanta	404-355-6260
Ill	Arlington Heights	312-439-3100
Mass	Braintree	617-843-0373
Mich	Keego Harbor	313-682-2711
Minn	Minneapolis	612-333-2419
Mo	St. Louis County	314-731-3338
NJ	Elizabeth	201-352-2265
NJ	Moorestown	609-234-0505
NY	Chittenango	315-687-2051
NC	Charlotte	704-568-6868
Ohio	Cincinnati	513-271-6686
Ohio	Cleveland	216-243-8123
Pa	Philadelphia	215-922-4236
Tenn	Memphis	901-365-4080
Tex	Houston	713-461-0610
Va	Richmond	804-272-1489

T & B/THOMAS & BETTS, Dept. EM, 36 Butler St., Elizabeth, N.J. 07207, Tel: 201-354-4321, Telex: 13-8236; FSC No.: 59730; Empl.: 2000

Sales Manager: N.R. DeWeese, VP Sls.

Local Sales Offices & Reps.

Cal	Carson	213-770-4670
Cal	Santa Clara	408-243-9883
Colo	Aurora	303-344-5585
Ga	Atlanta	404-355-6260
Ill	Elk Grove Village	312-439-2110
Mass	Braintree	617-843-0373
Mich	Detroit	303-682-2711
Minn	Minneapolis	612-333-2419
Mo	Hazelwood	314-731-3338
NJ	Moorestown	609-234-0505
NJ	So. Plainfield	201-561-4700
NY	Chittenango	315-687-7213
NC	Charlotte	704-568-6868
Ohio	Cincinnati	513-271-6686
Tex	Houston	713-461-0610

T-BAR INC., Dept. EM, 141 Danbury Rd., Wilton, Conn. 06897, Tel: 203-762-8351, TWX: 710-479-3216; Empl.: 167 .... p. 3615,4304

Local Sales Offices & Reps.

Ala	Huntsville, REMCO	205-883-9260
Ala	Huntsville, REMCO	205-883-9260
Ariz	Tempe, J. F. Hurlbut Co.	602-968-5962
Cal	Palo Alto, Engineering Assocs.	415-494-7842
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Conn	Madison, A & M Electronic Reps.	203-421-4242
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ill	Skokie, Saffro & Assocs.	312-588-0905
Ind	Fort Wayne, McDonald Sales Co.	219-747-3650
Ind	Indianapolis, McDonald Sls. Co.	317-359-0200
Kans	Shawnee, Lowell-Kangas and Assocs.	913-631-3515
Md	Silver Spring, Carwithen Assocs.	301-589-9040
Mass	Needham, A & M Electronic Reps Inc.	617-444-8170
Minn	Minneapolis, C. E. Bohlig Co.	612-922-7011
Mo	St. Louis, Lowell-Kangas & Assocs.	314-821-4050
NJ	Fort Lee, Tecnimat	201-461-8686
NY	Clark Mills, KLM Assoc.	315-853-6126
NY	N. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assocs.	716-442-0820
Ohio	Aurora, EMA, Inc.	216-562-6104
Ohio	Centerville, EMA Inc.	513-433-2800
Tenn	Jackson, REMCO	901-424-0142
Tex	Dallas, McCoy Assocs. Co.	214-350-9931
Tex	Houston, Unidyne	713-772-3170
Wash	Seattle, D. Smith Sls. Co.	206-633-3160

Local Distributors

Cal	Woodland Hills, Rampart div. Jaco Elctns.	213-887-6400
Ill	Chicago, Newark Elctrns.	312-638-4411
La	Shreveport, Industrial Elctrn. Supply	318-9459
Mass	Boston, Sager Electrical Supply Co.	617-542-2281
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
Tex	Stafford, Southwest Elctrns.	713-494-6021

T-F ELECTRONICS INC., Dept. EM, 9415 Neils Thompson Dr., Austin, Tex. 78759, Tel: 512-444-9674; FSC No.: 50307; Empl.: 13

T-M VACUUM PRODS., Dept. EM, Warrington & Rowland, Riverton, N.J. 08077, Tel: 609-829-2000; Empl.: 30

Local Sales Offices & Reps.

Pa	Fort Washington, Gordon Seiter Assoc.	215-542-1717

TA INSTRUMENT CASE CO., Dept. EM, 4625 Alger St., Los Angeles, Cal 90039, Tel: 213-242-8855, TWX: 910-497-4780; Empl.: 31

Local Sales Offices & Reps.

Ariz	Phoenix, Tri-Fab Sls.	602-265-3341
Cal	Los Angeles, TA Instr. Case Co.	213-242-8855
Cal	Mountain View, Connolly & Co.	415-967-6988
Cal	San Diego, Wm. Gibson	714-223-6120
Colo	Denver, Omega Ltd.	303-758-1508
Conn	Sherman, R. P. Mahan Co.	617-237-1040
Fla	Orlando, Gra-Mar	305-894-3351
Ill	Chicago, LGS Elctrns.	312-456-9616
Md	Rockville, L. G. White & Co.	301-770-6556
NJ	King of Prussia, White-Keystone Inc.	215-265-1817
NJ	Wayne, GT Assocs.	201-694-6040
NY	Syracuse, I. A. Hotze Co.	315-479-6641
Ohio	Cincinnati, F.D. Borchelt	513-851-7586
Utah	Salt Lake City, Omega, Ltd.	801-278-6920
Wash	Renton, D & D Sls.	206-226-4120

TAB BOOKS, Dept. EM, Monterey & Pinola Aves., Blue Ridge Summit, Pa. 17214, Tel: 717-794-2191

TABET MFG. CO., Dept. EM, 1336 Ballentine Blvd., Norfolk, Va. 23516, Tel: 703-857-5311

™TAB-GUN - heat guns - Sigma Sys. Corp.

™TABLOCK - blower wheel - Torin Corp.

™TABL-TOP - completley packaged automatic plating sys. - Sel-Rex Div. Oxy Metal Industries Corp.

™TACHLITE - stroboscopes - Power Instrs., Inc.

™TACH-PAK - tachometer system - Airpax Elctrns.

™TACH-TROL - tachometer system - Airpax Elctrns.

™TACO - T.V. antennas - General Instr. of Can. Ltd.

™TAG-RING - shieled wire termination - Glenair, Inc.

TAIYO DENKI CO., LTD., Dept. EM, 225-3 7-cho Nakamachi, Ohtori, Sakai City, Japan 593, Tel: (SAKAI) 0723-62-8281, Telex: 5374-744; Empl.: 200

™TAIYOHM - fixed composition resistor - Taiyo Denki Co., Ltd.

TAKEDA RIKEN INDUSTRY CO., LTD., 1-32-1 Asahi-cho Nerima-ku, Dept. EM, Tokyo, 176 Japan, Tel: 930-4111, Telex: 272-2140; Empl.: 650

Local Sales Offices & Reps.

Cal	San Francisco, Kanematsu-Gosho (U.S.A.), Inc.	415-788-3800

™TAK-ETTE - digital hand held tachometer - Power Instrs., Inc.

TALLY CORP., Dept. EM, 8301 S. 180th St., Kent, Wash. 98103, Tel: 206-251-5500, Telex: 32-0200; Empl.: 500

Local Sales Offices & Reps.

Cal	Orinda, Tally Corp.	415-254-8350
Cal	Redondo Beach, Tally Corp.	213-378-0805
Cal	San Jose, Tally Corp.	408-247-0897
Cal	Sherman Oaks, Electronic Mktg. Specialists	213-990-4244
Cal	Sunnyvale, Electronic Mktg. Specialists	408-245-9291
Fla	Melbourne Beach, Tally Corp.	305-724-0480
Ill	Arlington Hts., Tally Corp.	312-956-0690
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Mass	Boston, Tally Corp.	617-272-8070
Mich	Madison Heights, WKM Assoc.	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Melville, Tally Corp.	516-694-8444
NY	Rochester, Ossmann Instrs.	716-328-2230
Ohio	Cleveland, WKM Assoc.	216-267-0445
Tex	San Antonio, Tally Corp.	512-735-0614
Wash	Kent, Tally Corp.	206-251-6730
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

™TALAR - microwave landing system - Singer Co.

TALK-A-PHONE CO., Dept. EM, 5013 No. Kedzie Ave., Chicago, Ill. 60625, Tel: 312-539-1100

TAM METAL, Dept. EM, 30 Universal Pl., Carlstadt, N.J. 07072, Tel: 201-933-9333

™TANKARD - digital set timer - Automatic Timing & Controls Co.

™TANKTROL - pressure operated control - Autocon Inds., Inc.

TANN CONTROLS CO., Dept. EM, 20210 Sherwood St., Detroit, Mich. 48234, Tel: 313-366-3370; Empl.: 20

Local Sales Offices & Reps.

Cal	Los Angeles, Electric Switches	213-664-1141
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Indianapolis, Coombs Assocs.	317-251-2757
Mass	Sudbury, Huneck Assoc.	617-443-2780
NJ	Elizabeth, Turtle & Hughes	201-352-1840
NY	New York, Turtle & Hughes	212-925-8260
Ohio	Cincinnati, Beedle Equip. Co.	513-793-0140
Ohio	Cleveland, Wood-Compton	216-587-5200
Ohio	Columbus, Hughes-Peters	513-351-2000
Pa	Lansdale, Moats & Taylor	215-368-1641
Wisc	Greenvale, Coombs Assocs.	414-421-2300

Exp: Mich., Detroit, Tann Controls 313-366-3370

TANSITOR ELCTRNS., Div. Aerotron, Dept. EM, West Rd., Bennington, Vt. 05201, Tel: 802-442-5473, TWX: 710-360-1782; Empl.: 300; Minimum order: $M. Moon

Sales Manager: R.L. Ritchie; *Distributor Manager:* M. Moon

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper Sls. Co.	602-946-4437
Cal	Tustin, Clemick-Neednan & Assoc.	714-547-0966
Fla	Ft. Lauderdale, Dyne-A-Mark Corp.	305-771-6501
Ill	Chicago, Memac Sls. Co.	312-545-1033
Iowa	Cedar Rapids, J.R. Sls. Engrg., Inc.	319-377-8211
Mass	Andover, R. Purinton	617-475-7055
Minn	Minneapolis, Comstrand	612-571-0000
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	Leonia, Bert Kohl	201-944-6488
Ohio	Akron, Augnat Assoc.	216-725-6087
Ohio	Dayton, Augnat Assoc.	513-223-5002
SC	Myrtle Beach, Candor Co.	803-448-8361
Tex	Arlington, W. Pat Fralia Co.	817-649-8981
Tex	Dallas, United Comps.	214-324-1448

Local Distributors

Cal	Carson, Hi-Rel Distributor Sales	213-537-6500
Cal	Glendale, R.V. Weatherford	213-849-3451
Cal	Woodland Hills, Jaco Electronics	213-887-6400
Mass	Billerica, Kierulff Elctrns.	617-667-8331
NY	Hauppauge, Jaco Electronics	516-273-5500
Pa	Ivyland, Century Electronics	215-824-1897

™TANTALEX - tantalum electrolytic capacitors - Sprague Elec. Co.

™TANTALITE - optical lithium tantalate - Crystal Technology

™TANTALYTIC - capacitors - General Elec. Co.

TAPE-ATHON CORP., Dept. EM, 502 S. Isis Ave., Inglewood, Cal 90301, Tel: 213-776-6933; Empl.: 62

™TAPE CABLE - flat flexible cable - Brand-Rex Co.

TAPECON, INC., Dept. EM, 475 River St., Rochester, N.Y. 14612, Tel: 716-621-8400; Empl.: 80

Sales Manager: J. Cucinelli

Local Sales Offices & Reps.

Cal	Anaheim, Advance Elec. Sls.	714-870-0300
Fla	Melbourne, Hanson Assoc.	305-727-7474
Ga	Atlanta, Prehler Inc.	404-451-4266
Ill	Chicago, Prehler Inc.	312-384-6100
Minn	St. Paul, Prehler Inc.	612-776-1541
NJ	Princeton, Krone & Rubin	609-452-1500
Ohio	Cleveland, Prehler Inc.	216-267-2650

™TAPE/FOIL - laminates - Tapecon, Inc.

™TAPELESS TAPE MEASURE - hand held measuring device - ENM

™TAPE PAK - fish tapes - Ideal Industries Inc.

™TAPE-RECO HEAD CLEANER - magnetic head cleaner - Elctrn. Chemical Corp.

™TAPERLOCK - connector for semi-rigid cable - Cablewave Systems Inc.

™TAPESWITCH - longitudinal contact pairs - Tapeswitch Corp. Amer.

TAPESWITCH CORP. AMER., Dept. EM, 100 Schmitt Blvd., Farmingdale, N.Y. 11735, Tel: 516-694-6312, Telex: 14-4611; Empl.: 100 .... p. 4305

Sales Manager: D. Haggerty, Mktg. Mgr.

™TAPIT - miniature pushbutton switches - Chicago Switch, Inc.

™TAP-LITE - switches - Pacific Electricord Co.

™TA'POT - tape potentiometer - Howell Inst. Inc.

™TAPTONE - electronic can tapping inspection device - Benthos, Inc.

™TARGET - antennas - S & A Electronics

™TARNIBAN - (non-chromate anti-tarnish for silver - Technic, Inc.

™TARZAN - fan - Rotron, Inc.

TASKER SYSTEMS, Dept. EM, 20131 Sunburst St., Chatsworth, Cal. 91311, Tel: 213-341-3010, TWX: 910-494-1214; FSC No.: 09017; Empl.: 250

Local Sales Offices & Reps.

NJ	Red Bank, T. Schweers	201-747-5353
Va	Arlington, J. Seelinger	703-528-2231

™TASKOTE - wire - Revere Corp. of America

TAUBER ELECTRONICS, Dept. EM, 3650 Clairemont Dr., Ste. 8, San Diego, Cal. 92117 .... p. 3340

Local Sales Offices & Reps.

Ariz	Phoenix, Tauber Assocs.	602-955-2266
Cal	Los Altos, Tauber Dreyer Corp.	415-948-2635
Cal	Northridge, Tauber Dreyer Corp.	213-993-0048

™TAURUS - ups/inverters/frequency changers - Nova Electric Mfg. Co.

TAU-TRON INC., Dept. EM, 11 Esquire Rd., N. Billerica, Mass. 01862, Tel: 617-667-3874, TWX: 710-347-1570; Empl.: 40

Local Sales Offices & Reps.

Ariz	Tempe, J. F. Hurlbut Co.	602-968-5962
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Golden, J. F. Hurlbut Co.	303-279-7796
Fla	Largo, Synergetic Reps	813-596-5331
Ga	Atlanta, Magaro & Assocs	414-252-6609
Haw	Honolulu, Aloha Assocs.	808-941-1574
Md	Gaithersburg, Wright Co	301-840-1928
Minn	Minneapolis, Waytek	612-933-2133
NJ	Englewood, Scientific Devices-East	201-871-3916
Ohio	Dayton, Ashby Assocs	513-252-5627
Ohio	Lyndhurst, Ashby Assocs	216-461-8026
Pa	Ambler, Data Engrg Co	215-542-9876
Tex	Dallas, Bradenco Corp.	214-358-3278
Wash	Seattle, S. Krake Assocs.	206-763-2755

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INSTRUMENTS AND CIRCUITS FOR ANALOG AND HIGH-SPEED DIGITAL TESTING Communications test and measuring instruments cover the band from DC to 1 GHz and includes Bit-Error-Rate Test Sets, Selective Level Meters, Microwave System Analyzers, and digital and analog signal sources. Systems and Sub-Systems for semiconductor memory test include microprogrammable word and address generators, data transfer and error check systems and hybrid state-of-the-art driver and discriminator pin electronics circuits. Custom and standard designs of the circuits and system components are available.

TAURUS CORP., Dept. EM, Academy Hill, Lambertville, N.J. 08530, Tel: 609-397-2390 .. p. 1684

Local Sales Offices & Reps.

Cal	Los Angeles, R. Sweet	213-477-4517
Cal	Pasadena, Sci. Sls.	213-793-1244
Fla	Clearwater, Brennan Assoc.	813-446-5006
Ind	Ft. Wayne, Hoeming Sls.	219-483-6913
Ohio	Wickliffe, W.J. Brauer	216-943-0601
Pa	Pittsburgh, W.J. Brauer	412-921-3213

™TAYLORCLAD - metal clad laminates - Synthane Taylor Corp.

TAYLOR ELECTRIC, INC., Dept. EM, 2410 Hwy 281 N., Marble Falls, Tex. 78654, Tel: 512-693-3522; Empl.: 30

Local Sales Offices & Reps.

Cal	Woodland Hills, LaGorio Sls. Co.	213-348-9880
Colo	Denver, Mikro Sls., Co.	303-770-2623
Conn	Storrs, R.C. Campbell Co.	203-456-1212
Fla	Coral Springs, Dineen – Assocs.	305-752-1646
Ill	Palatine, Bu-Nell Engrg. Co.	312-358-2300
Iowa	Bettendorf, R. L. Wildauer Co.	319-355-3121
La	Harahan, MacKenroth-Robbins & Assoc.	504-733-7524
Mich	Farmington Hills, R. McBride Co.	313-474-2300
Minn	Minneapolis, R.D. Schwen Engrg. Co.	612-553-1398
Mo	Bridgeton, Timothy Weir Co.	319-355-3121
Mo	Raytown, Arehart-Barnds Sls.	816-356-3488
NJ	Morristown, Waldron Assocs.	201-538-5607
NY	Buffalo, A. C. Schultz Inc.	716-839-1010
NY	Woodbury, Brunner Assocs.	516-921-2052
NC	Matthews, C. C. Niedringhaus Co.	704-847-9288
Ohio	Cincinnati, Phillips Sls	513-791-3926
Ohio	Cleveland, Matthew M. Haley & Sons	216-238-3650
Okla	Tulsa, Andres & Boruch	214-821-3601
Ore	Portland, Syscom Engrg. Co.	503-644-2505
Pa	Penndel, R. May Assocs.	215-757-1581
Pa	West Newton, W.H. Schmitt Assocs.	412-872-5007
Tex	Dallas, Andres & Boruch	214-821-3601
Tex	Houston, McDaniel & Assocs	713-649-8606
Utah	Salt Lake City, Darger Co.	801-355-2873
Va	Richmond, J. H. Thrower Co.	804-794-6819
Wisc	Wauwatosa, Babco, Inc.	414-778-0390

™TAYLOR HOBSON - motion picture lenses - Rank Precision Inds.

™TAYLORITE - vulcanized fibre - Synthane Taylor Corp.

™TAYLORON - laminated plastic - Synthane Taylor Corp.

TAYLOR-WINFIELD CORP., Dept. EM, 1052 Mahoning Ave. NW, Warren, Ohio 44482, Tel: 216-399-8861, Telex: 098-2433; Empl.: 300

Local Sales Offices & Reps.

Cal	Monrovia, Denton & Anderson Co.	213-359-9304
Colo	Denver, Duboc-Lane & Monckton, Inc.	303-623-1261
Fla	Jacksonville, Denton & Anderson Co.	904-721-1451
Ill	La Grange, Denton & Anderson Co.	312-482-8660
Mich	Birmingham, Denton & Anderson Co.	313-647-5520
Ohio	Cleveland, Denton & Anderson Co.	216-831-2010
Ohio	Dayton, Denton & Anderson Co.	216-831-2010
Pa	Cornwell Heights, Denton & Anderson Co.	215-639-8390
Tex	Garland, Denton & Anderson Co.	214-270-7635

™TAYP-AIR - airborne taper pin - Amp Inc.

™TAY-TRONIC - welding controls - Taylor-Winfield Corp.

™TAZ - transient arresting zener - Siemens Corp.

TCS, Dept. EM, 5601 N. Sheridan Rd., Chicago, Ill 60660, Tel: 312-878-2863

™TCXO - temperature compensated crystal oscillator - Damon Corp.

TDK ELECTRONICS CO., LTD., Dept. EM, 14-6 2-Chome, Uchikanda, Chiyoda-ku, Tokyo 101, Japan, Tel: 03-257-2527; Empl.: 4775

Local Sales Offices & Reps.

Cal	El Segundo, TDK Corp. of America	213-644-8625
Ill	Chicago, TDK Corp. of America	312-973-1222
NY	New York, TDK Corp. of America	516-746-0880

T. D. J. CO., Div. Iveron Corp., Dept. EM, 1152 Morena Blvd., San Diego, Cal. 92110, Tel: 714-276-5920

Sales Manager: R. Scherr

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TDJ Co. Div. of IVERON CORP., 1152 Morena Blvd. San Diego 92110. (714)276-5920. Available from stock or 10 days ARO. broad line of handsome, carefully engineered instrument enclosures conforming to std rack dims. Over 100 sizes from 3.5x13 in., 15 & 17 in., 5.25x13 in., 15, 17, 21 in., and 7x17 in. Qtr rack to full width, stackable. Constructed around die cast alum side frames. Vinyl-clad alum covers & steel corner brackets. Front & rear panels optional Compatible with popular rack slides.

™TDI - power supply - Transistor Devices

™TDL - bench model wave soldering system - Hollis Engrg., Inc.

TDL ELECTRONICS, Dept. EM, Route 7, Fayetteville, Ark. 72701, Tel: 501-643-2191

Sales Manager: R. Tipton

Local Sales Offices & Reps.

Cal	North Hollywood, Crown Elctrns.	213-877-3550

™TDM - power supply - Transistor Devices

™TDMD - power supply - Transistor Devices

TEABERRY ELECTRONICS, Dept. EM, 6330 Castleplace Dr., Indianapolis, Ind. 46250, Tel: 317-842-0280, Telex: 27-2296; Empl.: 76

Sales Manager: C. Duke

Local Sales Offices & Reps.

Cal	Oceanside	714-433-9811
Ind	Indianapolis	317-842-0280

™TEACHWARE - educational software - Fabri-Tek, Inc.

TEC, INC., Dept. EM, 2727 N. Fairview, Tuscon, Ariz. 85705, Tel: 602-792-2230, TWX: 910-952-1377; Empl.: 300

Local Sales Offices & Reps.

Ariz	Phoenix, EDS	602-277-7407
Cal	Burlingame, Jack Logan & Assoc.	415-697-6100
Cal	El Segundo, Varigon & Assocs.	213-322-1120
Cal	San Diego, Varigon & Assocs.	714-299-5413
Colo	Sedalia, Jensen Rep. Co.	303-688-4154
Fla	Maitland, Hutto-Hawkins-Peregoy	305-831-2474
Ill	Des Plaines, Lincoln-Hodges	312-297-3810
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Waltham, Conti-Younger & Assoc.	617-890-4582
Mich	Dearborn, Pitcher-Poulin, Inc.	313-582-5450
Minn	Hopkins, Grayden & Flemmer	612-941-1120
Mo	St. Louis, Kebco	314-569-2660
NM	Albuquerque, Data Handling Co.	505-268-4364
NY	Mt. Vernon, Friedman-Smith	914-664-4866
NY	Syracuse, Advanced Comps.	315-699-2671
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Cincinnati, G & H Sls. Co.	513-771-8321
Ohio	Grove City, G & H Sls. Co.	614-878-1128
Pa	Willow Grove, Techparts	215-657-0100
Tex	Dallas, Parvin Sls. Co.	214-661-5374
Va	Lynchburg, Burgin-Kreh Assocs.	804-845-5600
Wisc	Waukesha, Lincoln-Hodges	414-542-3087

Local Distributors

Cal	Hawthorne, Century Aero Corp.	213-772-1166
Cal	Mountain View, Ratel Elctrns.	415-965-2010
Fla	Oakland Park, Peerless Radio Corp. of Fla.	305-566-5966
Ill	Westmont, Bodelle Co.	312-323-9670
Mass	Norwell, Bordewieck Elctrn. Supply Co.	617-659-4915

TECCOR ELECTRONICS, INC., Dept. EM, 1101 Pamela Dr., Box 669, Euless, Tex. 76039, Tel: 817-267-2601, TWX: 910-890-5706; Empl.: 1116; Minimum order: $J. Dempsay

Distributor Manager: J. Dempsay

Local Sales Offices & Reps.

Ala	Huntsville, Cartwright & Bean	205-533-3509
Ariz	Phoenix, O'Donnell Southwest	602-992-9740
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	San Diego, Littlefield & Smith Assocs.	714-455-0055
Cal	Torrance, O'Donnell Assocs.	213-323-9243
Colo	Denver, W. J. Purdy Co.	303-777-1411
Fla	Ft. Lauderdale, Cartwright & Bean	305-791-3989
Fla	Orlando, Cartwright & Bean	305-422-4531
Ga	Atlanta, Cartwright & Bean	404-255-5262
Ill	Elk Grove Village, John G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, John G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J. G . Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
La	Gretna, Cartwright & Bean	504-362-4649
Md	Glen Burnie, Micro-Comp	301-761-4600
Mass	Lexington, KCA Comps., Inc.	617-861-9024
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Minneapolis, Elec. Comp. Sls.	612-933-2594
Miss	Jackson, Cartwright & Bean	601-981-1368
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, W.J. Purdy Co.	502-266-7959
NY	New York City, S & J Assoc.	212-291-3232
NY	Rochester, Ontec	716-464-8636
NC	Charlotte, Cartwright & Bean	704-377-5673
NC	Raleigh, Cartwright & Bean	919-781-6560
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assoc.	216-826-4424
Ore	Portland, Northwest Mktg. Assocs.	503-297-2581
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Pa	Willow Grove, BGR Assocs.	215-657-3301
Tenn	Knoxville, Cartwright & Bean	615-693-7450
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Wash	Bellevue, Northwest Mktg. Assocs.	206-455-5846
Wisc	Wauwatosha, J. G. Twist Co.	414-475-7755

TECH-ETCH/BRAUN, Dept. EM, 45 Aldrin Rd., Plymouth, Mass. 02360, Tel: 617-747-0300; Empl.: 81

Sales Manager: R.H. Robecki

TECH LABS., INC., Dept. EM, Bergen & Edsall Blvds., Palisades Pk., N.J. 07650, Tel: 201-944-2221; Empl.: 65 .... p. 4306,4307

Sales Manager: K.K. Garrison

Local Sales Offices & Reps.

Ariz	Phoenix, Spectrum Assocs.	602-997-6324
Ark	Magnolia, P. Jameson	501-234-3778
Cal	Palo Alto, Held & Mollard, Inc.	415-965-9321
Cal	Sant Ana, Spectrum Assocs.	213-323-0603
Colo	Englewood, Inverness Mktg.	303-770-2300
Conn	Thomaston, NBS Assoc.	203-283-5959
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
Ga	Atlanta, Grady Duckett Sls.	404-451-3529
Ill	Glenview, Crimson Engrg. Co.	312-724-1780
Md	Towson, Habco Elctrns.	301-825-9637
Mich	Jackson, N. Scroggs Co.	517-750-1170
Minn	Minneapolis, Quantum Sls.	612-831-8583
NJ	Fort Lee, Bob Cameron, Inc.	201-461-2595
NJ	Haddonfield, F.W. Churchill	609-429-7871
NY	Commack, L. K. Haner Assoc.	516-864-2220
NY	Rochester, Net Sls.	716-467-4538
Ohio	Cincinnati, A. C. Wahl & Assoc.	513-761-5500
Ohio	Lyndhurst, A. C. Wahl & Assoc.	216-449-1788
Ore	Portland, SPS Elctrns.	503-645-3769
Pa	Pittsburgh, Waggoner-VerHill Assoc.	412-241-5202
Tex	Dallas, Southwest Elctrns.	214-690-9881
Tex	Houston, Southwest Elctrns.	713-729-1670

TECH MATERIALS INC., Dept. EM, 5 Wellington Rd., Lincoln, R.I. 02865, Tel: 401-333-1700, TWX: 710-384-0600; Empl.: 75

Sales Manager: C.B. Harlan

Local Sales Offices & Reps.

Cal	Los Angeles, E. J. Brookes Co.	
Cal	Santa Clara, E. J. Brookes Co.	
Ill	Zion, A. O. Capp Co.	
Ind	Carmel, Larry Woodling Co.	317-844-7365
Ind	Indianapolis, J. C. Butler Sls. & Engrg.	
Mich	Detroit, J. C. Butler Sls.	313-358-1410
Ohio	Milford, J. C. Butler Sls. & Engrg.	

TECH SERV., INC., BRS/LVE Div, Dept. EM, 5301 Holland Dr., Beltsville, Md 20705, Tel: 301-474-3400, TWX: 710-828-0515; Empl.: 110

Sales Manager: J.W. Webster

TECH SPRAY, INC., Dept. EM, Box 949, Amarillo, Tex. 79105, Tel: 806-372-8523; Empl.: 20

Sales Manager: R.G. Russell

Local Sales Offices & Reps.

Cal	Burlingame, Ewing & Foley	415-941-4525
Cal	Van Nuys, Obermann-Renner Sls.	213-997-1124
Colo	Denver, McLoud & Raymond	303-756-1589
Fla	Tampa, Wallace Assoc.	813-961-1037
Ill	Chicago, B. Burns Assocs.	312-775-1233
Ind	Indianapolis, Electronic Reps.	317-897-9326
Mass	Lynn, Keene Sls.	617-595-2300
Mich	Milford, Polyphase Sls.	313-685-3003
Minn	Minneapolis, R.C. Sls.	612-425-5543
Mo	St. Louis, Kathrinus-Kelly & Co.	314-968-3800
NY	N. Bellmore, L. W. Keller Assoc.	516-785-2826
NY	Rochester, Leahy & Thompson	315-685-8122
Ohio	Medina, T. Grant Assoc.	216-725-6528
Ore	Seattle, Minthorne Company	503-246-4556
Pa	Philadelphia, D. Linz Co.	215-379-0734
Tex	Dallas, Crockett Sls. Co.	214-748-8209
Exp:	Miami, Fla., Electronics Int'l.	305-635-8670

™TECH BRAZE - braze paste - Assembly Systems, Inc.

TECHCON SYSTEMS INC., Dept. EM, 16016 So. Figueroa St., Gardena, Cal 90248, Tel: 213-532-9601

Sales Manager: S.L. Morse

Local Sales Offices & Reps.

Ariz	Tempe, West More Co.	602-994-1387
Cal	Los Angeles, Chesleigh & Straley	213-687-6661
Cal	Mt. View, K. R. Anderson Co.	415-961-6007
Colo	Denver, WACO Elctrns.	
Fla	Ft. Lauderdale, Howard Assoc.	800-327-5553
Ill	Oakbrook, MTR Eng. Sys.	312-654-4882
Mich	Detroit, Cummisken & Assoc.	313-885-6635
Minn	Minneapolis, MIT Co.	612-333-8281
Mo	Bridgeton, H. F. Wilson Eng. Co.	314-291-5555
NJ	Cherry Hill, H. S. Bancroft Corp.	609-854-8000
Tex	Grand Prairie, C. P. Waggoner Co.	214-264-1601
Wash	Seattle, Atlas Packing & Rubber Co.	206-623-4697
Wisc	Milwaukee, Ellsworth Co.	414-352-1230

™TECH-CRAFT - sound reinforcement equipment - Bogen Div.

TECHMAR CORP., Dept. EM, 2232 S. Cotner Ave., Los Angeles, Cal. 90064, Tel: 213-478-0046; Empl.: 9 p. 1151

TECHNI·TOOL

TECHNI-TOOL, INC., Total Spectrum, Tool Supplier, Dept. EM, Apollo Road, Plymouth Meeting, Pa. 19462, Tel: 215-825-4990, Telex: 834-763; Empl.: 20 p. 4335

Local Sales Offices & Reps.

Ariz	Phoenix, Camel Elctrns.	602-959-5635
Cal	Costa Mesa, Measurement Assoc.	714-540-7160
Cal	Costa Mesa, Measurement Assoc.	714-540-7160
Cal	Torrance, Tech-Ser, Inc.	213-538-2267
Colo	Denver, Camel Electronics	303-757-6191
Colo	Denver, Camel Elctrns.	303-757-6191
Ill	Mt. Prospect, Earl T. Champion & Assoc.	312-593-1150
Ill	Mt. Prospect, Earl T. Champion & Assoc.	312-593-1150
Md	Cockeysville, Berwanger & Assoc.	301-823-2535
Mass	Hudson, Data Rep	617-481-0333
Ohio	Cincinnati, Modern Industrial Sls. Co.	513-542-6969
Ohio	Cincinnati, Modern Indl. Sls. Co.	513-542-6969
Ohio	Solon, KDF Co.	216-248-8010
Pa	Drexal Hill, J. Mahoney	215-622-7970
Pa	Drexel Hill, J. J. Mahoney	215-622-7970
Pa	Philadelphia, WF Assoc.	215-CA4-4120

TECHNIC, INC., Dept. EM, Box 965, Providence, R.I. 02901, Tel: 401-781-6100, Telex: 927514; Empl.: 100

Sales Manager: A. Artos

Local Sales Offices & Reps.

Cal	Santa Ana, Technic, Inc.	714-547-8077
Ill	Arlington Hgts., Technic, Inc.	312-262-2662
NC	Arden, Technic, Inc.	704-252-8344
Tex	Irving, Technic, Inc.	214-252-6595

TECH. DEVICES CO., Dept. EM, 11250 Playa Ct., Culver City, Calif. 90230, Tel: 213-870-3751; FSC No.: 04772; Empl.: 21

Local Sales Offices & Reps.

Ark	Little Rock, Carlton-Bates	501-562-9100
Cal	Inglewood, Tracker, Inc.	213-645-6060
Cal	Menlo Park, West Engrg. Sls. Co.	415-325-2885
Colo	Denver, Todd-Associates, Inc.	303-744-2313
Fla	Orlando, Buchanan & Abrams Assocs., Inc.	305-423-8995
Fla	Orlando, W. B. Wimberly Co.	305-GA5-3083
Ill	Chicago, F. Tye Sls. Co.	312-283-1227
Ind	Indianapolis, Blind & Assocs., Inc.	317-251-1249
Kans	Lenexa, Smith-Williams Co.	913-TU 8-3995
Md	Phoenix, REBCO Sls.	301-592-8907
Mass	Woburn, R. W. Hatfield Co.	617-933-2324
Mich	Kentwood, The C.A. Geer Co.	616-534-7449
Minn	St. Paul, Sales Service Machine Tool Co.	612-MI 6-8663
NJ	Belle Mead, Equipment Consultants	201-359-4100
NY	Syracuse, J.V. Costello	315-472-0322
Ohio	Cleveland, Electro Entprs., Inc.	216-261-7670
Pa	Lansdowne, W. F. Satterthwaite & Co.	215-623-5100
Tex	Dallas, R. E. Nesbitt Co.	214-FL 7-4601
Tex	Houston, R. E. Nesbitt Co.	713-224-3633
Wash	Seattle, Process Sys.	206-246-0224

TECHNICAL MAT'L., Dept. EM, 700 Fenimore Rd., Mamaroneck, N.Y. 10543, Tel: 914-698-4800, TWX: 710-566-1100; Empl.: 160

Local Sales Offices & Reps.

Ariz	Tempe, T.M.C. Sys.	602-967-7874
Va	Springfield, T.M.C. Sys. & Power	703-354-7400
Exp:	N.Y., Mamaroneck, T.M.C.	914-698-4800

TECHNICAL RESEARCH & MFG., INC., Dept. EM, Kelly Ave. Grenier Field, R.F.D. #3, Manchester, N.H. 03103, Tel: 603-668-0120, TWX: 710-220-6765; Empl.: 25

Local Sales Offices & Reps.

Cal	Los Angeles, R F Assocs.	213-478-1586
Cal	Palo Alto, R F Assocs.	415-494-3331
Mass	Needham Hgts., Reptron	617-449-4141
NY	Tuckahoe, Spectrum Sls.	914-793-1660
Va	Fairfax, Schibley Assoc.	703-591-3008

TECHNICAL WIRE PRODUCTS, INC., Dept. EM, 129 E. Dermody St., Cranford, N.J. 07016, Tel: 201-272-5500, TWX: 710-996-5961; FSC No.: 07700; Empl.: 101

Local Sales Offices & Reps.

Ala	Madison, South Eastern Assocs.	205-775-9616
Ariz	Scottsdale, Williams Assocs., Inc.	602-947-4297
Cal	Glendale, Gru Assoc.	213-244-8441
Cal	Redwood City, Heaton Co., Inc., J.S.	415-369-4671
Cal	Santa Barbara, Technical Wire Products	805-963-1867
Colo	Denver, Williams Assocs., Inc.	303-373-4730
Fla	Maitland, Lawrence Assoc., Inc.	305-647-1188
Ill	Arlington Height, Diethert/Angel	312-593-7600
Ind	Fort Wayne, Scott Electronics, Inc.	219-743-1586
Ind	Indianapolis, Scott Electronics, Inc.	317-897-9976
Md	Baltimore, Bernard White & Co.	301-484-5400
Mich	Detroit, H. Lowell Co.	313-851-7474
Minn	St. Paul, Heyda Co., Bonament	612-484-8531
Mo	Kansas City, Harris-Hanson Co.	816-444-9494
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NM	Albuquerque, Williams Assocs., Inc.	505-255-1638
NY	Guilderland, Electro-Modular Systems	518-456-2665
NY	Rochester, J.E. Welch Assoc.	716-244-1100
Ohio	Columbus, Scott Electronics, Inc.	614-236-8619
Ohio	Dayton, Scott Electronics, Inc.	513-294-0539
Ohio	Dayton, Scott Electronics, Inc.	513-294-0539
Pa	Pittsburgh, Scott Electronics, Inc.	412-781-3112
Tex	Richardson, Corwin Assocs., Inc.	214-424-8333
Wash	Bellevue, Over Sales, Ray	206-454-9187

(TM)TECHNIC CASH REGISTER - gold amperehour meter in dollars - Technic, Inc.

(TM)TECHNIC GOLD SAVER - ion exchange gold recovery units. - Technic, Inc.

(TM)TECHNI-GOLD HS - ultra high speed type II gold - Technic, Inc.

(TM)TECHNI-GOLD 25 - non cyanide bright gold - Technic, Inc.

(TM)TECHNIMATIC - receiver and transmitter sys - Technical Mat'l.

(TM)TECHNI-PLATINUM - bright platinum solution - Technic, Inc.

TECHNIPOWER, INC., Benrus, Dept. EM, 1436 N. Chester Ave., Pasadena, Calif. 91104, Tel: 213-798-8502

TECHNIPOWER, INC., Dept. EM, Benrus Center, Ridgefield, Conn. 06877, Tel: 203-431-1300, TWX: 969627 710-467-0666; FSC No.: 13850; Empl.: 120 p. 3342

Sales Manager: A.R. Saenz

Local Sales Offices & Reps.

Ariz	Pasadena, Technipower	213-798-8502
Colo	Denver, Electrodyne	303-757-7676
Conn	Meriden, A. Allison	203-237-9232
Ill	Chicago, Allen Woods & Assoc.	312-283-7400
Kans	Overland Park, Ensco-Rep	913-381-7557
Md	Rockville, Farrell Assocs.	301-424-9460
Mass	Randolph, Abbott Allison	617-245-0250
Mich	Bloomfield Hills, Enco Marketing Inc.	313-642-0203
Minn	Minneapolis, Electronic Innovators	612-884-7471
Mo	St. Louis, Ensco-Rep, Inc.	314-567-3935
NM	Albuquerque, Rontek	505-299-4124
Ohio	Cleveland, Components Inc.	216-243-9200
Ohio	Dayton, Components Inc.	513-866-0661
Ore	Portland, Topp Engrg. Sls.	503-244-6265
Pa	Pittsburgh, Western Components Inc.	412-833-0828
Tex	Houston, Scientific Sls.	713-666-5318
Tex	Richardson, Scientific Sls.	214-231-6541
Utah	Salt Lake City, Electrodyne	801-277-8392
Wash	Bellevue, Topp Engrg. Sls.	206-747-5400
Exp:	Can., Burlington, Ont., White Radio Ltd.	416-632-6894
Exp:	Can., Montreal, Que., White Radio Ltd.	514-481-0158

TECHNIQUES, INC., Dept. EM, 235 Jackson St., Englewood, N.J. 07631, Tel: 201-569-5900; Empl.: 60

(TM)TECHNI-RHODIUM - bright rhodium solution - Technic, Inc.

(TM)TECHNI-RITE - analog & event recorders - Gulton Inds., Inc.

(TM)TECHNI SILVER CY(-)LESS - non-cyanide silver bath - Technic, Inc.

(TM)TECHNISTRIP AU - strips gold for recovery from defective parts - Technic, Inc.

Technitrol, Inc.

TECHNITROL, INC., Dept. EM, 1952 E. Alleghany, Philadelphia, Pa. 19134, Tel: 215-426-9105, Telex: 834245; FSC No.: 90095; Empl.: 350 p. 2524,2525,4470-4472

Sales Manager: W.A. Chamberlin

Local Sales Offices & Reps.

Ariz	Scottsdale, Q. T. Wiles	602-948-5590
Cal	Novato, Wright Assocs.	415-897-7963
Cal	San Clemente, J.H. Eichert	714-492-4525
Colo	Englewood, Dynatech	303-773-2830
Fla	Orlando, G.F. Bohman Assocs.	305-855-0274
Ill	Wauconda, Cudaly Sls.	312-526-2484
Mass	Newton, Normell Assoc.	617-969-5478
Mich	Mount Clemens, LP Assocs.	313-731-1171
Minn	Minneapolis, Quantum Sls.	612-831-8583
NY	Fairport, TAC Assoc.	716-377-1742
NY	Huntington Station, Addem 1	516-567-5900
NY	Jericho, J. Square Mktg.	516-997-6210
Ohio	Chagrin Falls, LP Assocs.	216-543-5325
Ohio	Fairborn, LP Assocs.	513-223-9975
Pa	Philadelphia, Technitrol	215-426-9105
Tex	Dallas, Southern State Mktg.	214-387-2489
Tex	Houston, Southern State Mktg.	713-665-0991
Wash	Bellevue, R.J. Sales	206-454-5450

TECHNITROL, INC. cont'd

Advertisement

Technitrol has full capability for design, packaging, production of transformers; from stringent MIL-spec varieties to simple unencapsulated units, packaged singly or in multiples. A complete line of lumped parameter delay lines is available featuring new dynamic delay module with its TTL compatibility. The Technitrol Systems Division features Prom Programmers and OEM Engineering and manufacturing services.

TECHNO-COMPS. CORP., Dept. EM, 7803 Lemona, Van Nuys, Cal. 91405, Tel: 213-781-1642, TWX: 910-495-2015; FSC No.: 17826; Empl.: 100

Local Sales Offices & Reps.

Ariz	Tempe, Argus Sls.	602-967-8709
Cal	Los Altos, Oak Inds. Inc.	415-941-1237
Cal	Santa Ana, Oak Inds. Inc.	213-924-6288
Fla	Orlando, Oak Inds. Inc.	305-671-4111
Ill	Crystal Lake, Oak Inds. Inc.	815-459-5000
Kans	Leawood, H.C. Heyde Co.	913-649-8628
Mass	Reading, Oak Inds. Inc.	617-944-0094
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
NJ	Haddonfield, Mills-Brown Inc.	609-429-1005
NJ	Wayne, R. Horne Assoc.	201-835-7400
NY	No. Syracuse, Advanced Comps.	315-699-2671
NC	Raleigh, Oak Inds. Inc.	919-876-7591
Ohio	Cincinnati, Oak Inds. Inc.	513-851-4411
Ore	Portland, Oak Industries	503-292-0878
Tex	Ft. Worth, W. Fralia	817-640-9101
Exp:	Colo., Denver, I. W. Strong	303-292-6900

Local Distributors

Cal	Los Angeles, Radio Products Sls.	213-748-1271
NJ	Wayne, Gordon/Horne	201-835-7400
NY	N. Syracuse, ANDCO	315-699-2660
Ohio	Centerville, I.P.D., Inc.	573-435-2086
Tex	Ft. Worth, Patco Inc.	817-640-9101

(TM)TECH SOLDER - solder paste - Assembly Systems, Inc.

TECHSONICS, Dept. EM, Box 251, El Prado, N.M. 87529, Tel: 505-758-4555; Empl.: 10

(TM)TECH-TIN - alkaline bright immersion tin for gold solderabilt - Technic, Inc.

(TM)TECKSHIELD - custom shielded enclosures - Technical Wire Products, Inc.

(TM)TECKSTIK - shielding & sealing gasket - Technical Wire Products, Inc.

(TM)TECKSTRIP - EMI/RFI gasket - Technical Wire Products, Inc.

(TM)TEC-LITE - indicating devices - Tec, Inc.

TECNETICS, INC., Dept. EM, 1624 Range St. Box 910, Boulder Industrial Park, Boulder, Colo. 80302, Tel: 303-442-3837, TWX: 910-940-3246; Empl.: 85 p. 3341

Sales Manager: V.L. Garrison

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Comps., Inc.	205-539-4411
Ariz	Phoenix, C.T. Carlberg & Assocs.	602-997-0774
Cal	Inglewood, L & M Engrg.	213-674-6850
Cal	San Jose, L & M Engrg., Inc.	408-292-3220
Colo	Denver, Electro-Rep	303-744-2821
Conn	New Canaan, S. Pierce, Inc.	203-966-4630
Fla	Margate, W.A. Brown Comps., Inc.	305-753-1650
Fla	Orlando, W.A. Brown Comps., Inc.	305-425-5863
Ga	Chamblee, W.A. Brown Comps. Inc.	404-455-0405
Ill	Chicago, K.W. Meyers Co.	312-774-6440
Ind	Indianapolis, K.W. Meyers Co.	317-243-6681
Kans	Overland Park, Ensco-Rep, Inc.	913-381-7557
Md	Silver Spring, Eastern Instrumentation Corp.	301-622-4200
Mass	Norwood, S. Pierce, Inc.	617-762-3164
Mich	Royal Oak, Satullo Co.	313-549-3910
Minn	Minneapolis, K.W. Meyers Co.	612-920-7080
Mo	St. Louis, Ensco-Rep, Inc.	314-567-3935
NJ	Bogota, Neville & Vespo Corp.	212-539-1515
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579

NY	Fayetteville, M.P. Andrews, Inc.	315-637-5291
NC	Raleigh, W.A. Brown Comps., Inc.	919-781-9426
Ohio	Cleveland, Satullo Co.	216-486-2800
Pa	Melrose Park, R. Meyers Assocs.	215-224-1663
Tex	Addison, R.R. Thomas Co.	214-233-8235
Wash	Seattle, R.S. Drake Assocs.	206-763-2755
Wisc	Brookfield, K.W. Meyers Co.	414-784-3790

TED CORPORATION, Dept. EM, 11415 Johnson Dr., Shawnee Mission, Kans. 66203, Tel: 913-631-6211; FSC No.: 05209; Empl.: 100

Local Sales Offices & Reps.

Fla	Lighthouse Point, Saber Assocs.	305-943-3076
NY	West Babylon, G. Newman	516-643-2220
Pa	Hatboro, J.G. Oberlies Co.	215-675-4226

TEDFORD CRYSTAL LABS., Dept. EM, 4914 Gray Rd., Cincinnati, Ohio 45232, Tel: 513-542-5555; Empl.: 140

Local Sales Offices & Reps.

Cal	Monrovia, Caltronic Sls.	213-359-2626
Cal	Palo Alto, R.W. Thompson Assocs., Inc.	415-493-7388
Ill	Chicago, Piller & Assocs.	312-286-2880
Ill	Mt. Prospect, Douglas Sls.	312-398-6624
Ind	Greenwood, Valentine-Schillinger & Assocs.	317-888-2260
Ind	South Bend, Valentine-Schillinger & Assocs.	219-291-6258
Md	Kensington, Forti-Austin Assocs.	301-949-1706
Mich	Brighton, Valentine-Schillinger & Assocs.	313-227-7863
Minn	Chanhassen, Douglas Sls.	
NJ	Willingboro, Forti-Austin Associates	609-871-9290
NY	Liverpool, James Semple Assocs.	315-652-8317
NY	Rochester, James Semple Assocs.	716-342-1413
Pa	Fort Washington, Forti-Austin Assocs.	215-825-2325
Va	Richmond, Forti-Austin Assocs.	703-271-4802

TEK-WAVES, INC., See Frequency Elctrns.

(TM)TEE-LOCK - toolholder-insert combinations - General Elec.

(TM)TEK - cart, oscilloscope, wheeled; calcupater - Tektronix, Inc.

TEKA PRODS. INC., Dept. EM, 15-04 130th St., College Point, N.Y. 11356, Tel: 212-939-3030

Sales Manager: B. Freifeld

(TM)TEKARD CASE - PC card case - Des Tek Ind.

(TM)TEKARDS - printed circuit cards - Des Tek Ind.

TEKELEC INC., Dept. EM, 2623 Saddle Dr., Oxnard, Cal. 93030, Tel: 805-485-5445, TWX: 910-336-1280; Empl.: 102

Local Sales Offices & Reps.

Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Arvada, Arrowhead Sls.	303-423-5556
Fla	Orlando, Gra-Mar	305-894-3351
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Indianapolis, Scientific Sls. Corp.	317-253-4606
Kans	Leawood, Leemack Engs., Inc.	913-648-0124
Md	Silver Spring, Q.E.D. Elctrns.	301-588-8134
Mass	Newton Centre, Daner-Hayes	617-969-4650
Mich	Dearborn, Villani-Pitcher	313-271-4600
Minn	Bloomington, Scientific Sls. Corp.	612-881-0668
NJ	Parlin, JMR Engrg. Sls.	201-727-5335
NY	Jamaica, JMR Engrg. Sls.	212-658-8881
Ohio	Cleveland, A.H. Baier Co. & Assoc.	216-461-6161
Ohio	Dayton, A.H. Baier Co. & Assoc.	513-276-4128
Pa	Abington, Bach-Stewart	215-885-1550
Tex	Houston, Environmation	713-526-6872
Utah	Salt Lake City, Arrowhead Sls.	801-487-4716
Wash	Seattle, Underwood & Underwood	206-243-2133
Wash	Seattle, Underwood Jensen & Assocs.	206-575-0123

TEKNEKRON/TRAX, Dept. EM, 2020 Milvia St., Berkeley, Cal. 94704, Tel: 415-843-0606

Sales Manager: D. Gilblom

Local Sales Offices & Reps.

DC	Washington, Teknekron, Inc.	202-320-5600

TEKTRONIX, INC., Dept. EM, Box 500, Beaverton, Ore. 97077, Tel: 503-644-0161, TWX: 910-467-8708; FSC No.: 80009; Empl.: 13,000

Sales Manager: D. Butts

Local Sales Offices & Reps.

Ala	Huntsville	205-881-2912
Ariz	Phoenix	602-244-9795
Cal	Concord	415-254-5353
Cal	Irvine	714-556-8080
Cal	San Diego	714-292-7330
Cal	Santa Clara	408-249-5500
Cal	Woodland Hills	213-999-1711
Colo	Englewood	303-773-1611
Conn	Milford	203-877-1494
Fla	Fort Lauderdale	305-731-1220
Fla	Orlando	305-894-3911
Fla	Pensacola	904-476-1897
Ga	Atlanta	404-451-7241
Ga	Honolulu	EN8072
Haw	Honolulu	808-847-1138
Ill	Rolling Meadows	312-259-7580
Ind	Indianapolis	317-545-2351
Kans	Overland Park	913-341-3344
La	New Orleans	504-837-8454
Md	Lutherville	301-321-7000
Md	Rockville	301-948-7151
Mass	Lexington	617-861-6800
Mich	Farmington Hills	313-478-5200
Minn	St. Paul	612-484-8571
Mo	Hazelwood	314-731-4696
NJ	Springfield	201-379-1670
NM	Albuquerque	505-265-5541
NY	Latham	518-785-3353
NY	North Syracuse	800-962-1095
NY	Poughkeepsie	914-454-7540
NY	Rochester	716-244-2600
NY	Woodbury	516-364-9060
NC	Raleigh	919-782-5624
Ohio	Cleveland	216-884-6558
Ohio	Dayton	513-859-3681
Okla	Oklahoma City	405-848-3361
Ore	Lizard	503-639-7691
Pa	Blue Bell	215-825-6400
Pa	Monroeville	412-373-3250
Tex	Dallas	214-233-7791
Tex	Houston	713-783-1910
Tex	San Antonio	512-434-4334
Utah	Salt Lake City	801-484-8501
Va	Hampton	804-826-4020
Wash	Seattle	206-575-0180

TEL LABS, INC., Dept. EM, 154 Harvey Rd., Londonderry, N.H. 03053, Tel: 603-625-8994, TWX: 710-220-1844; FSC No.: 94322; Empl.: 180
p. 3759-3763

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Sls.	205-881-5031
Ariz	Phoenix, MR Engrg. Sls. Co.	602-959-5150
Fla	Ft. Lauderdale, Beacon Elctrn. Assocs.	305-971-7320
Fla	Maitland, Beacon Elctrn. Assocs.	305-647-3498
Ga	Atlanta, Beacon Elctrn. Assocs.	404-351-3654
Ill	Northfield, Feller Assocs.	312-446-8065
Mass	Wollaston, RFC Assocs.	617-472-4234
NJ	Clifton, Clarfield Assocs.	201-779-5862
NJ	Collingswood, K. Randall Co.	609-854-3323
NY	Buffalo, Ossmann Comp. Sls. Corp.	716-832-4271
NY	Kingston, Ossmann Comp. Sls. Corp.	914-338-5505
NY	Rochester, Ossmann Comp. Sls. Corp.	716-442-3290
NY	Syracuse, Ossmann Comp. Sls. Corp.	315-454-4477
NY	Vestal, Ossmann Comp. Sls. Corp.	607-785-9949
NC	Charlotte, Beacon Elctrn. Sls.	704-525-7412
Ohio	Cleveland, Weschler Elec. Corp.	216-251-4609
Ohio	Dayton, Weschler Elec. Corp.	513-274-6972
Tex	Houston, Unidyne, Inc.	713-772-3170

TELAUTOGRAPH CORP., Dept. EM, 8700 Bellanca Ave., Los Angeles, Cal. 90045, Tel: 213-641-3690, TWX: 910-328-6117; Empl.: 300

Local Sales Offices & Reps.

Cal	Los Angeles	213-776-3556
Cal	San Francisco	
Ga	Atlanta	404-636-3194
Ill	Chicago	312-622-7111
La	New Orleans	504-282-4635
Mich	Detroit	313-275-4220
NJ	Clifton	201-772-2740
Tex	Houston	713-688-9505
Exp:	Cal., Los Angeles	213-641-3690

(TM)TELCAR - thermoplastic elastomers - Goodrich Co. Chemical Div. BF

(TM)TEL/CELL - telecommunications & standby battery - Globe Union, Inc.

(TM)TELCO - antennas & installation accessories - GC Electronics

TELCO PRODUCTS CO., Dept. EM, 44 Sea Cliff, Glen Cove, NY 11542

TELCOM INC., Dept. EM, 8027 Leesburg Pike, Vienna, Va. 22180, Tel: 703-893-7700

(TM)TELCON - metal alloys - Inter-Tech. Grp., Inc.

TELE-DYNAMICS

TELE-DYNAMICS, Div. of AMBAC, Dept. EM, 525 Virginia Dr., Ft. Washington, Pa. 19034, Tel: 215-643-3900, TWX: 510-661-0654; Empl.: 400
p. 3343-3346

Local Sales Offices & Reps.

Cal	Carson, Tele-Dynamics	213-538-4660
Cal	San Diego, Earle Assoc.	714-278-5441
NJ	Parlin, JMR Sls., Inc.	201-727-5335
NY	Jamaica, JMR Sls. Inc.	212-658-8881

Local Distributors

Ala	Huntsville, Cramer/EW Huntsville	205-539-5722
Ariz	Phoenix, Cramer/Ariz	602-267-7321
Ariz	Tempe, Newark Elctrns.	602-968-7441
Cal	El Segundo, T.I. Supply	213-973-2571
Cal	Garden Grove, Allied Elctrns	213-598-8671
Cal	Goleta, RPS	805-964-4764
Cal	Inglewood, Newark Elctrns.	213-678-0441
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	Los Angeles, RPS	213-748-1271
Cal	Orange, Newark Elctrns	714-997-9572
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	San Diego, RPS	714-292-5611
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	San Francisco, Zack Elctrns	415-626-1444
Cal	Sunnyvale, T.I. Supply	408-732-5555
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Denver, Newark Elctrns	303-757-3351
Colo	Denver, Cramer/Denver	303-758-2100
Colo	Denver, T.I. Supply	303-751-1780
Colo	Denver, Electronic Parts Co	303-744-1992
Conn	North Haven, Cramer/Conn.	203-239-5641
Conn	Westport, Newark Electronics	203-226-6921
Conn	Westport, Newark Elctrns.	203-226-6921
Fla	Fort Lauderdale, Newark Electronics	305-587-2372
Fla	Hollywood, Cramer/EW Hollywood	305-923-8181
Fla	Orlando, Cramer/EW Orlando	305-894-1511
Ga	Atlanta, Newark Elctrns.	404-321-0413
Ga	Atlanta, Cramer/Atlanta	404-448-9050
Ill	Arlington Hts., T.I. Supply	312-593-7660
Ill	Chicago, Newark Electronics	312-638-4411
Ill	Elgin, Allied Elctrns	312-697-8200
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Ind	Indianapolis, Newark Elctrns	317-634-7430
Iowa	Cedar Rapids, Newark Electronics	319-362-1171
Kans	Shawnee Mission, Newark Elctrns	913-384-4545
La	Alexandria, Ralph's of Lafayette	318-443-4517
La	Baton Rouge, Ralph's of Lafayette	504-344-8114
La	Lafayette, Ralph's of Lafayette	315-234-4507
La	Lafayette, Ralph's of Lafayette	315-234-4507
La	Lake Charles, Ralph's of Lafayette	318-439-2493
La	Metairie, Newark Elctrns.	504-888-5174
La	Morgan City, Ralph's of Lafayette	504-384-9831
La	New Iberia, Ralph's of Lafayette	318-369-9816
Md	Beltsville, Newark Electronics	301-937-5085
Md	Gaithersburg, Cramer/EW Wash.	301-948-0110
Md	Gaithersburg, Pioneer Standard	301-948-0710
Md	Hanover, Cramer/EW Baltimore	301-796-5790
Md	Rockville, Wilshire Elctrns./Wash.	301-340-7900
Mass	Braintree, Allied Electronics	617-848-4150
Mass	Newton, Cramer/Newton	617-964-4000
Mass	Waltham, T.I. Supply	617-890-0510
Mass	Woburn, Newark Electronics	617-935-8350

Mich	Oak Park, Newark Electronics	313-548-0250
Mich	Wyoming, Newark Elctrns	616-241-6681
Minn	Edina, Cramer/Bonn	612-835-7811
Minn	Minneapolis, Harry Stark's	612-332-1325
Minn	Minneapolis, Newark Elctrncs.	612-331-6350
Miss	Pascagoula, Ralph's of Lafayette	601-769-1672
Mo	Berkely, Newark Elctrns	314-521-7343
Mo	St. Louis, Olive Industrial Elctrns.	314-863-7800
NJ	Cherry Hill, Cramer/Pa.	609-424-5993
NJ	Clark, T.I. Supply	201-382-6400
NJ	Kenilworth, Newark Elctrns.	201-272-8410
NJ	Moonachie, Cramer/N.J.	201-935-5600
NJ	Moorestown, Arrow/Angus	609-235-1900
NM	Albuquerque, Cramer/New Mexico	505-265-5767
NY	Buffalo, Summit Distributors	716-884-3450
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Hauppauge, Cramer/L.I.	516-231-5600
NY	Melville, T. I. Supply	516-293-2660
NY	Rochester, Summit Distributors	716-334-8110
NY	Rochester, Cramer/Rochester	716-215-0300
NY	Rochester, Newark Elctrns.	716-473-6600
NC	Greensboro, Pioneer/Carolina	919-273-4441
NC	Winston-Salem, Cramer/EW Winston-Salem	919-725-8711
Ohio	Cincinnati, Newark Elctrns	513-874-5115
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Cleveland, Newark Elctrns	216-361-4700
Okla	Tulsa, T.I. Supply	918-437-4555
Pa	Horsham, Pioneer/Pa.	215-674-5710
Pa	Philadelphia, Philadelphia Elctrns	215-568-7400
Tex	Austin, Newark Elctrns	512-459-3163
Tex	Beaumont, Ralph's of Lafayette	713-833-9443
Tex	Dallas, T.I. Supply	214-238-6844
Tex	Dallas, Cramer/Texas	214-661-9300
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Garland, Newark Electronics	214-271-2511
Tex	Houston, Ralph's of Lafayette	713-641-0267
Tex	Houston, Newark Elctrns.	713-782-4800
Tex	Houston, T.I. Supply	713-785-4800
Utah	Salt Lake City, Cramer/Utah	801-487-4131
Utah	Salt Lake City, Newark Elctrns.	801-486-1048
Wash	Seattle, Cramer/Seattle	206-762-5755
Wisc	Brookfield, Newark Electronics	312-638-4411
For:	Belgium, Brussels, TISCO	
For:	Can., Downsview, Ont., Cramer Electronics/ Canada	416-661-9222
For:	Denmark, Herley, Texas Instr. A/S	(01)917400
For:	Finland, Helsinki, Texas Instr. OY	441275
For:	France, Le Plessis Robinson, Texas Instrs./ France	6302343
For:	Germany, Freising, TISCO/ Zweigneiderlassungder	08161/7411
For:	Holland, Schiphol Airport, Texas Instrs. Holland	020-173636 or 020-159293
For:	London, Slough, Bucks, Texas Instrs. Ltd.	Slough 33411
For:	Norway, Oslo, Texas Instrs. Norway A/S	02-68-94 87
For:	Sweden, Gothenburg, Texas Instrs. Sweden AB	031/813525

(TM)TELE-BEAM II - large screen tv projector - Kalart Victor Corp.

(TM)TELECOM - telephone transmission comps. & sys. - Sta-Rite Inds.

TELECOMMUNICATIONS DEVICES, Dept. EM, 2320 Wisconsin Ave., Downers Grove, Ill 60515, TWX: 910-695-3222

Local Sales Offices & Reps.

Fla	Orlando, O. E. M. Mktg.	813-393-7970
Ga	Atlanta, Communications Assocs.	404-934-3272
Ill	Downers Grove, Momak Sls.	312-963-6400
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Minneapolis, Quantum Sls.	612-831-8583
NJ	Willingboro, Forti-Austin Assocs.	609-871-9290
NY	Sag Harbor, Obe Co.	516-627-4499
Pa	Philadelphia, Covert-Newman Co.	412-531-2002

TELECOMMUNICATIONS TECHNIQUES CORP., Dept. EM, 112 Frederick Ave., Rockville, Md. 20850, Tel: 301-340-8443; Empl.: 14

Sales Manager: J.A. Sciulli

Local Sales Offices & Reps.

Cal	San Jose, Lencom Assocs.	408-684-0366
Conn	Fairfield, Higgins Inds.	203-259-2113

TELECOMMUNICATIONS TECHNIQUES CORP. cont'd

Advertisement

TELECOMMUNICATIONS TECHNIQUES CORP. (TTC) manufactures: elastic buffers and error monitoring equipment for use in synchronous data transmission networks at rates to 1.544 Mbps via satellite or terrestrial links; test equipment including telephone circuit simulators, variable time delay generators, audio noise generators and balanced step attenuators; voice and data multiplexers.

(TM)TELE-CONNECT - (mobile radio) phone patch equipment - SYT Corporation

TELECTRO SYS. CORP., Dept. EM, 96-18 43rd Ave., Corona, N.Y. 11368, Tel: 212-651-8900; Empl.: 65

TELEDYNE AEROSPACE SYSTEMS, Dept. EM, 1007 E. 10th St., Fairmont, Minn. 56031, Tel: 507-235-3355, TWX: 910-565-2120; FSC No.: 24600; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Repcom	205-534-9959
Cal	Millbrae, Ashby Assocs. of No. Cal.	415-692-4442
Cal	Mission Viejo, California Rep & Assocs.	714-581-6760
Fla	Melbourne, Repcom	305-254-1877
Md	Bethesda, Warren Mount Co.	301-657-9312
Mass	Weston, J. Goode Assoc.	617-235-3900
Minn	Minneapolis, P. Ericson & Assocs.	612-884-1969
NJ	Somerville, J & L Assocs.	201-722-0682
Ohio	Dayton, Ashby Assocs. Inc. of Ohio	513-252-5627
Pa	Jenkintown, Warren Mount Co.	215-886-0383
Tex	Dallas, R. D. Spooner Co.	214-357-6636

TELEDYNE BIG BEAM, Dept. EM, 290 E. Prairie St., Crystal Lake, Ill. 60014, Tel: 815-459-6100, Telex: 72-2460

Sales Manager: C.J. Ortmeyer, V.P.

Local Sales Offices & Reps.

Ala	Birmingham, C. Fedorenchik	205-592-4692
Ariz	Phoenix, N.A.C. Agencies	602-247-8191
Ark	Little Rock, Byron Carson Co.	501-568-3342
Cal	La Mirada, E. L. Steensen Assocs.	213-921-8686
Cal	San Carlos, Lumineering Sales/Service	415-592-3008
Colo	Denver, I. W. Strong & Assocs., Inc.	303-292-6900
Fla	Longwood, Ralston-Lowe-Murray, Inc.	305-831-3127
Fla	St. Petersburg, Ralston-Lowe-Murray, Inc.	813-821-0243
Fla	Wilton Manor, Ralston-Lowe-Murray	305-565-5418
Ga	Atlanta, Whit-Shaw Co., Inc.	404-351-8400
Ill	Lincolnwood, Tilkin & Cagen Associates	312-676-0382
Ind	Indianapolis, Tilkin & Cagen Assocs.	317-925-7776
Iowa	Dubuque, Bill Vahl Lighting Sls.	319-582-6304
Kans	Kansas City, Conrad Co. Inc.	913-621-3021
Ky	Jeffersontown, A.L. Pickens Co.	502-491-4215
La	New Orleans, United Sales Assocs., Inc.	504-733-8711
Md	Catonsville, T. G. Weinstein Co.	301-788-3636
Mass	Needham, A.R. Booth & Co., Inc.	617-444-4880
Mich	Grosse Pointe Park, J. L. Miner Assocs.	313-886-5878
Minn	Minneapolis, P. Ohlin Sls. Co.	612-929-6924
Mo	Overland, A. Haumesser Co.	314-997-1776
NH	Merrimack, Barnard Assocs., Inc.	603-424-2702
NJ	Teaneck, T. G. Weinstein Co.	201-836-1033
NY	Syracuse, Up-State Lighting Fixtures Sls.	315-455-5821
NC	Charlotte, C. M. Furman Co.	704-375-2332
Ohio	Cincinnati, Redmond-Lewis & Assocs.	513-931-5060
Ohio	Cleveland, Miller-Curtis Assocs., Inc.	216-749-0040
Okla	Oklahoma City, C. B. Anderson Electric Co.	405-235-0716
Okla	Tulsa, C. B. Anderson Electric Co.	918-836-4661
Ore	Portland, A. Shaw Co.	503-224-3001
Pa	Jenkintown, T.G. Weinstein Co.	215-884-5524
Pa	Pittsburgh, Gormley Elect.	412-371-4111
Tenn	Memphis, B. Carson Co.	901-396-4553
Tex	Corpus Christi, G & E Sls.	512-855-2606
Tex	Dallas, Adra Electric Prods. Co.	214-748-0444
Tex	Houston, Lighting & Electrical Sls. Co., Inc.	713-923-7781
Tex	San Antonio, G. & Sales	512-342-9459
Wisc	Greendale, R. S. Knoblauch & Assocs.	414-421-2120

TELEDYNE CAMERA SYS., Dept. EM, 131 N. Fifth Ave., Arcadia, Cal. 91006, Tel: 213-359-6691, Telex: 675-423; Empl.: 96

TELEDYNE-CRYSTALONICS, Dept. EM, 147 Sherman St., Cambridge, Mass. 02140, Tel: 617-491-1670, TWX: 710-320-1196; FSC No.: 12498; Empl.: 155

Sales Manager: A. Pauk

Local Sales Offices & Reps.

Ala	Huntsville, E.M.A., Inc.	205-533-6640
Ariz	Scottsdale, Runyon Co.	602-959-6060
Cal	El Toro, Elctrn. Comp. Mktg.	714-830-3939
Cal	Los Alamitos, Westaironics	
Cal	Los Angeles, Elect. Comp. Mktg.	213-649-5374
Cal	Marina Del Ray, Westaironics Inc.	213-821-7958
Cal	Newport Beach, Teledyne Crystalonics	714-557-5372
Cal	San Carlos, Kottmeir Assoc.	415-592-8333
Cal	San Diego, EMC-Spedden Sls.	714-295-6122
Cal	Thousand Oaks, Westaironics	
Colo	Boulder, J. Smith Assocs.	303-442-7100
Fla	Orlando, R. Simmons	305-831-8688
Fla	Plantation, W. Popnick	305-941-5544
Fla	Pompano Beach, V.G. Sls.	305-971-0900
Fla	Winter Park, V.G. Sls.	305-831-8688
Ill	Bellwood, Fiat Eng. Assoc.	312-547-6200
Ill	Palatine, C & C Electronics	312-358-8900
Ill	Westmont, Bodelle Co.	312-323-9670
Ind	Ft. Wayne, T.X. Sls.	219-489-4447
Kans	Leawood, Thunderbird Tech. Sls. & Svcs.	913-642-7220
Kans	Wichita, Thunderbird Tech. Sls. & Svcs.	316-684-3941
Md	Rockville, Mechtronics Sls.	301-340-2130
Mass	Brookline, Technology Prod. Group	617-731-0858
Minn	St. Paul, R.G. Ragon	612-488-0201
Mo	St. Louis, Thunderbird Tech. Sls. & Svcs.	
NJ	Newfoundland, S. Tobol	201-697-4383
NJ	Union, Comp-Tech. Sls.	201-687-2484
NJ	Wallington, Comp-Tech. Sls.	201-935-5454
NM	Albuquerque, Power Entprss.	505-881-8537
NY	Newburgh, Comp-Tech. Sls.	914-564-2361
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
NY	Rochester, J. Semple Assoc.	716-544-8583
NC	Winston-Salem, E.M.A., Inc.	919-722-5151
Ohio	Cleveland, KW Elctrn. Sls.	216-831-8292
Ohio	Dayton, KW Elctrn. Sls.	513-890-2150
Ohio	Dayton, R.P. Calhoun	513-299-6894
Pa	Allison Park, KW Elctrn. Sls.	412-487-4300
Pa	Bala Cynwd, Vantage Sls.	215-667-0990
Pa	Willow Grove, B.G.R. Assoc.	215-657-3301
SC	Greenville, Electronic Mktg. Assoc.	803-268-1125
Tex	Addison, Southland Comps.	214-233-0603
Wash	Bellevue, SD-R²	206-747-9424

TELEDYNE/GEOTECH, Dept. EM, Box 28277, Dallas, Tex. 75228, Tel: 214-271-2561, Telex: 73-2394; FSC No.: 99019; Empl.: 440

TELEDYNE GURLEY, Dept. EM, 514 Fulton St., Troy, N.Y. 12181, Tel: 518-272-6300, TWX: 710-443-8156

Sales Manager: K.E. Wilson, Mktg. Mgr.

TELEDYNE INET, Dept. EM, 711 Knox St., Gardena, Cal. 90247, Tel: 213-327-0913, Telex: 67-7228; Empl.: 300

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	205-536-9990
Cal	Glendale, R.A. Young & Co.	213-242-2171
Fla	Orlando, FM Assocs	305-851-5710
Fla	W. Palm Beach, FM Assocs	305-746-3126
Ill	Franklin Park, Rich	312-678-3100
Md	Bethesda, M.E. Whitney Assocs.	301-654-8634
Mass	Natick, Wayland Energy, Inc.	617-237-4030
Mich	Birmingham, Thibodeau Engrg.	313-642-6620
Minn	St. Paul, Knox Assoc	612-488-5402
NJ	Wayne, G & A Sls.	
NY	New York City, Teledyne Inet	212-243-3194
NC	Greensboro, FM Assocs	919-294-2754
Ohio	Cincinnati, McNay Equip.	513-891-7122
Ohio	Cleveland, Morlan Assocs.	216-235-1689
Ohio	Englewood, Allied Ind'l Svc.	513-837-2204

Pa	Philadelphia, Maris Equip. Co.	215-225-0720
Wash	Bellevue, W.M. Buehler	206-455-5512

TELEDYNE KINETICS, Dept. EM, 410 S. Cedros Ave., Solana Beach, Cal. 92075, Tel: 714-755-1181, TWX: 910-322-1135; Empl.: 80

Local Sales Offices & Reps.

Cal	Burlingame, J. E. Striker Co.	145-342-1425
Colo	Parker, Technology Mktg. Assoc.	303-341-3435
Ill	Deerfield, W. Krueger Assoc.	312-945-3720
Mass	Stoneham, Repco	617-438-3113
NM	Albuquerque, Technology Mktg. Assoc.	505-298-4321
NY	Bayside, R. L. Diamond, Inc.	212-423-7330
Utah	Salt Lake City, Technology Mktg. Assoc.	801-268-0457

TELEDYNE MEC., Dept. EM, 3165 Porter Dr., Palo Alto, Cal. 94304, Tel: 415-493-1770. TWX: 910-373-1746; Empl.: 648

Local Sales Offices & Reps.

Ariz	Phoenix, Thorson Co.	602-956-5300
Colo	Denver, Thorson Co.	303-759-0809
Conn	Stamford, Teledyne MEC	203-325-2535
Fla	Palm Bay, SparTech Assocs.	305-727-8045
Ga	Smyrna, SparTech Assocs.	404-432-3644
Ill	Mount Prospect, Cain & Co.	312-253-3578
Md	Bethesda, Teledyne MEC	301-530-2220
NM	Albuquerque, Thorson Co.	505-265-5655
Ohio	Dayton, Teledyne MEC	513-253-8144
Pa	Huntingdon Valley, Rabal Assocs.	215-947-4825
Tex	Dallas, Thorson Co.	214-233-5744
Tex	Houston, Thorson Co.	713-771-3504

TELEDYNE MECCA, Dept. EM, Box 36393, Houston, Tex. 77036, Tel: 713-772-2811; Empl.: 50

TELEDYNE MICRONETICS, Dept. EM, 7155 Mission Gorge Rd., San Diego, Calif. 92120, Tel: 714-583-3525, TWX: 910-335-2085; Empl.: 54

Local Sales Offices & Reps.

Colo	Parker, Technology Mktg.	303-841-3435
DC	Arlington, E. T. Phillips	703-979-5084
Fla	Clearwater, Brennan Assocs.	813-446-5006
Kans	Wichita, Dy-Tronix	316-943-6221
Mass	Burlington, Tritek	617-272-4550
Mo	Hazelwood, Dy-Tronix	314-731-5799
NM	Albuquerque, Technology Mktg.	505-298-4321

TELEDYNE MICROWAVE, Dept. EM, 1290 Terra Bella Ave., Mountain View, Cal. 94040, Tel: 415-968-2211, TWX: 910-379-6939; FSC No.: 24402; Empl.: 140

Local Sales Offices & Reps.

Cal	Los Altos, Cain White Co.	415-948-6533
Cal	Los Angeles, Cain Technology	213-476-2251
Fla	Clearwater, Brennan Assoc.	813-446-5006
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Md	Columbia, N. Deoul Assoc.	301-997-4353
Mass	Burlington, Tritek	617-272-4550
NJ	Fort Lee, Technical Mktg. Assocs.	201-224-6911
NY	Fayetteville, G. Sherman	315-637-9861
Ohio	Lancaster, Cain & Co.	614-654-4800
Tex	Ft. Worth, Carey-Wolf Assoc.	817-738-1996

TELEDYNE PENN-UNION ELEC., Dept. EM, Box 723, Edinboro, Pa. 16412, Tel: 814-734-1631, Telex: 914-490; Empl.: 500

Local Sales Offices & Reps.

Ala	Birmingham, C.S. Phillips & Son	205-870-0640
Alas	Anchorage, B.L. Owens & Assoc.	907-272-2613
Ariz	Phoenix, E.S. Condon Co.	602-279-3549
Cal	Los Angeles, E.S. Condon Co.	213-726-7926
Cal	San Francisco, F.M. Nicholas Co.	415-467-6220
Colo	Denver, Electrical Agencies Co.	303-623-8245
Conn	Avon, Electrical Agencies	203-673-9296
Conn	New Canaan, R. Zucco Co.	203-966-0233
Conn	West Haven, Electrical Agencies	203-933-2985
Fla	Jacksonville, Arnold-Bryant	904-737-5116
Fla	Miami, Arnold-Bryant	305-661-0715
Fla	St. Petersburg, Arnold-Bryant	813-343-6959
Ga	Atlanta, I.A. Hoge Assoc.	404-758-6815
Haw	Honolulu, D.R. Schwab	808-537-1658
Ill	Elk Grove Village, Hanke Co.	312-593-8500
Ind	Indianapolis, Roth-Mooney Elec. Agency	317-545-1288
Iowa	Cedar Rapids, A. Sell & Assoc.	319-393-4225
Iowa	Davenport, A. Sell & Assoc.	319-285-9413
Iowa	Des Moines, A. Sell & Assoc.	515-274-4633
Kans	Overland Park, T & W Sls.	913-649-4411
La	Bossier City, Jeanes Enterprises	318-746-8033
La	Metairie, Jeanes Enterprises	504-721-6221
Me	S. Berwick, Electrical Agencies	207-384-5321
Mass	S. Boston, Electrical Agencies	617-268-9300
Mich	Dearborn, D.P. Seyfried Co.	313-274-4900
Minn	Edina, W.L. Ruth & Assoc.	612-941-6350
Miss	Jackson, Jeanes Enterprises	601-956-7462
Mo	St. Louis, R.E. Kennedy Co.	314-965-7650
Neb	Omaha, A. Sell & Assoc.	402-391-4068
NM	Albuquerque, T. Deskin & Assoc.	505-242-3581
NY	Jamaica, Warshaw Electric	212-525-8150
NY	Loudenville, Mills, Talbot Co.	518-458-1297
NY	Rochester, Mills, Talbot Co.	716-244-1311
NC	Cary, F. Woods Agency	919-467-6366
Ohio	Cincinnati, J.G. Gates Co.	513-521-4335
Ohio	Cleveland, K.R. Dodge Co.	216-461-6482
Okla	Oklahoma City, And Power Sls.	405-751-5861
Ore	Portland, Northwest Agencies	503-227-5004
Pa	Drexel Hill, W.B. Siegfried Assoc.	215-353-2000
Pa	Pittsburgh, H.E. Ransford Co.	412-884-3425
SC	Lexington, F. Woods Agency	803-356-3738
Tenn	Memphis, Jeanes Enterprises	901-386-7850
Tex	Arlington, F.A. Roso Co.	817-461-7903
Tex	Houston, J.M. Johnson Co.	713-688-2236
Utah	Salt Lake City, Melville Sls. Co.	801-363-3363
Va	Ashland, Campbell & Assoc.	804-798-4743
Va	Roanoke, Campbell & Assoc.	703-343-6452
Wash	Seattle, Northwest Agencies	206-623-8882
WVa	Charleston, H.E. Ransford Co.	304-342-3203
Wisc	Milwaukee, A.W. Schwind Co.	414-276-9988

TELEDYNE PHILBRICK, Dept. EM, 17 Allied Dr. Rte 128, Dedham, Mass. 02026, Tel: 617-329-1600, TWX: 710-348-6726; Empl.: 250

Local Sales Offices & Reps.

Ala	Huntsville, Col-Ins-Co	800-327-6600
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Del Mar, T. Louis Snitzer Co.	714-454-2191
Cal	Los Angeles, T. Louis Snitzer Co.	213-836-6170
Colo	Denver, PLS Assocs.	303-773-1218
Conn	E. Hartford, Tekdata, Inc.	203-525-7647
Conn	Greenwich, Crane & Egert	203-622-9191
Fla	Orlando, Col-Ins-Co.	305-423-7615
Ga	Clarkston, Col-Ins-Co	800-327-6600
Haw	Kailua, Lanikai Elctrns.	808-262-6286
Ill	Chicago, Data Elctrns. Co.	312-283-0303
Ind	Indianapolis, Data Elctrns. Co.	317-784-6360
Iowa	Cedar Rapids, BC Elctrncs Sls.	319-364-7253
Kans	Olathe, BC Elctrncs Sls.	913-888-6680
Md	Kensington, Elctrn. Mktg. Assocs.	301-881-5300
Mass	Burlington, Tek Data	617-273-0198
Mich	Farmington, Carter, McCormick & Peirce	313-477-7700
Minn	Minneapolis, Elctrn Innovators	612-884-7471
Mo	Hazelwood, BC Elctrns Sls.	314-731-1255
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Elmont, Crane & Egert	516-488-2100
NY	No. Syracuse, KLM Assocs.	315-458-6214
NY	N. Syracuse, KLM Assocs.	315-458-6214
NY	Rochester, KLM Assoc	716-442-0820
NY	Rochester, KLM Assocs.	716-442-0820
NY	Utica, KLM Assocs.	315-735-8525
NC	Winston-Salem, Col-Ins-Co.	800-327-6600
Ohio	Cleveland, Carter, McCormick & Peirce	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Okla	Norman, Data Mktg.	405-364-8320
Pa	King of Prussia, Elctrn. Mktg. Assocs.	215-265-1600
Pa	Monroeville, Carter, McCormick & Peirce	412-372-4415
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Wash	Buckley, Halbar Assocs.	206-829-1750

TELEDYNE RELAYS, Dept. EM, 3155 W. El Segundo Blvd., Hawthorne, Cal 90250, Tel: 213-973-4545, TWX: 910-325-6600 .... p. 3616-3625

Local Sales Offices & Reps.

Ariz	Scottsdale, Sls. Engrg. Inc.	602-994-3230
Cal	San Mateo, Teledyne Relays NORCAL	415-574-1915
Colo	Englewood, Todd Assoc. Inc.	303-761-7801
Conn	Stratford, G. Rosen Co.	203-375-5456
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Ill	Glen Ellyn, Teledyne Relays, MWRO	312-858-1090
Ind	Indianapolis, Ihrig Assocs.	317-783-7630
Kans	Overland Pk., Ensco Rep.	913-381-7557
Md	Timonium, Heller Sls.	301-252-4780
Mass	Framingham, G. Rosen Co.	617-879-5505
Mich	Birmingham, J.C. Hofstetter Co.	313-646-3635
Mich	Grand Rapids, J.C. Hofstetter Co.	616-942-0650
Minn	Minneapolis, S. Clothier Co.	612-888-4666
Mo	St. Louis, Ensco-Rep.	314-567-3935
NJ	Eatontown, Teledyne Relays	201-542-6884
NM	Albuquerque, A.Q. Elctrns.	505-883-1003
NY	Mount Vernon, Friedman-Smith Elctrns.	914-664-4866
NY	Syracuse, I.A. Hotze Co.	315-479-6641
NC	Cary, Montgomery Mktg.	919-467-6319
Ohio	Dayton, J.C. Hofstetter Co.	513-296-1010
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Pa	Bala Cynwyd, Vantage Sls. Co.	215-667-0990
Tex	Houston, Vista Assocs.	713-661-0119
Tex	Richardson, Vista Assocs.	214-235-4547
Utah	W. Bountiful, B5 Inc.	801-292-8991
Wash	Bellevue, W.M. Buehler Co.	206-455-5512

Local Distributors

Ariz	Phoenix, Kierulff Elctrns.	602-273-7331
Ariz	Phoenix, Liberty Elctrns.	602-257-1272
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Los Angeles, Liberty Elctrns.	213-322-8100
Cal	Mt. View, Elmar Elctrns.	415-961-3611
Cal	Palo Alto, Kierulff Elctrns.	415-968-6292
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	San Diego, Liberty Elctrns.	714-565-9171
Colo	Denver, Kierulff Elctrns.	303-371-6500
Colo	Wheatridge, Century Elctrns.	303-424-1985
Conn	Norwalk, Revere Elctrns.	203-847-3888
Conn	Orange, Milgray	203-795-0711
Fla	Orlando, Pioneer	305-859-3600
Fla	Winter Park, Milgray	305-647-5747
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Indianapolis, Pioneer/Indianapolis	317-849-7300
Iowa	Cedar Rapids, Advent Elctrns.	319-393-8811
Kans	Overland Park, Milgray/Kansas City Inc.	913-236-8800
Md	Gaithersburg, Pioneer/Maryland	301-948-0710
Md	Hyattsville, Milgray/Washington	301-864-1111
Mass	Burlington, Milgray/New England	617-272-6800
Mass	Framingham, Future Elctrns.	617-879-0860
Mich	Farmington, Advent Elctrns.	313-477-1650
Mich	Livonia, Pioneer/Michigan	313-525-1800
Minn	Minneapolis, Stark Elctrns.	612-332-1325
NJ	Cherry Hill, Milgray/Delaware Valley	609-424-1300
NM	Albuquerque, Century Elctrns.	505-292-2700
NY	Buffalo, Summit Dist.	716-884-3450
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Rochester, Summit Distributors	716-334-8110
NC	Greensboro, Pioneer	919-273-4441
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Cleveland, Milgray/Cleveland	216-881-8800
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Okla	Tulsa, Comp Specialties	918-664-2820
Pa	Horsham, Pioneer/Delaware Valley	215-674-5710
Pa	Pittsburgh, Pioneer/Pittsburgh	412-782-2300
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Houston, Solid State Elctrns.	713-785-5436
Utah	Salt Lake City, Century Elctrns.	801-466-6000
Wash	Seattle, Kierulff Elctrns.	206-763-1550
Wash	Seattle, Liberty Elctrns. N.W.	206-763-8200

TELEDYNE ROTOLITE, Dept. EEM, Dept. EM, 328 Essex St., Stirling, N.J. 07980, Tel: 201-647-1040, TWX: 710-986-3017

TELEDYNE SEMICONDUCTOR, Dept. EM, 1300 Terra Bella Ave., Mountain View, Cal. 94040, Tel: 415-968-9241, TWX: 910-379-6494; FSC No.: 15818; Empl.: 2000

Local Sales Offices & Reps.

Ala	Huntsville, Electronic Mfrs. Agents	205-533-6640
Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	Escondido, Cirolia Elctrn. Sls.	714-743-3015
Cal	Los Angeles, Teledyne Semiconductor	213-826-6639
Cal	Mountain View, Teledyne Semiconductor	415-965-1455
Cal	Redwood City, J.S. Heaton Co.	415-369-4671
Cal	Santa Ana, Rical Assocs.	714-557-6543
Colo	Wheatridge, Waugaman Assoc.	303-423-1020
Fla	Maitland, H.H. Peregoy	305-831-2474
Fla	Pompano Beach, H.H. Peregoy	305-943-9593
Ill	Des Plaines, Teledyne Semiconductor	312-299-6196
Ill	Westchester, Gassner & Clark Co.	312-345-4245
Ind	Fort Wayne, Given Corp.	219-432-5585
Iowa	Cedar Rapids, PMA Corp.	319-362-9177
Kans	Overland Park, PMA Corp.	913-381-0004
Kans	Wichita, PMA Corp.	316-264-2662
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Waltham, Dynasel Assoc.	617-890-6777
Mich	Ann Arbor, A.P. Assocs.	313-971-8870
Minn	Minneapolis, Marsh Sls. Co.	612-888-0540
Mo	Hazelwood, PMA Corp.	314-731-4334
NH	Salem, Teledyne Semiconductor	603-893-9551

NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NM	Albuquerque, Thorson Co.	505-265-5655
NY	Buffalo, Bowser & Sapecky Assocs.	716-839-4170
NY	Manlius, Bowser & Sapecky Assocs.	315-682-8885
NY	Mount Vernon, Friedman-Smith Elec. Sls.	914-664-4866
NY	Stony Brook, Teledyne Semiconductor	516-751-5640
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Ohio	Richfield, N. Bear Corp.-Bear Mktg.	216-659-3131
Tex	Dallas, Evans-McDowell Assocs.	214-238-7157
Tex	Houston, Evans-McDowell Assocs.	713-783-2900
Utah	Salt Lake City, Waugaman Assoc.	801-277-8911
Va	Lynchburg, Burgin-Kreh Assocs.	804-845-5600
Wash	Bellevue, SD. R2	206-747-9424

TELEDYNE SEMICONDUCTOR, Dept. EM, 6600 N. Mannheim Rd., Des Plaines, Ill 60018

TELEDYNE TABER, Dept. EM, 455 Bryant St., No. Tonawanda, N.Y. 14120, Tel: 716-694-4000, TWX: 710-262-1264; Empl.: 128

TELEDYNE WESTERN WIRE & CABLE, Dept. EM, 2425 E. 30th St., Los Angeles, Cal. 90051, Tel: 213-587-7103; Empl.: 250

TELEFUNKEN, See AEG Telefunken

TELEMATIC DIV., UXL Corp., Dept. EM, 2862 Fulton St., Brooklyn, NY 11207

TELEMET CO., Dept. EM, 185 Dixon Ave., Amityville, N.Y. 11701, Tel: 516-842-2300, TWX: 510-227-9850; Empl.: 80

Local Sales Offices & Reps.

Cal	Walnut Creek	415-938-8887
Ga	Atlanta	404-633-3097
NY	Brewster	914-279-3231
Ohio	Cleveland Heights	216-321-7523
Tex	Dallas	214-241-0928
Exp:	Amityville, N.Y.	516-842-2300

(TM)**TELE-PAC** - telephone connector; 25 pair press-fit - Elfab Corp.

(TM)**TELEPEN** - handwriting transmission systems - Telautograph Corp.

TELEPHONICS CORP., Dept. EM, 770 Park Ave., Huntington, N.Y. 11743, Tel: 516-549-6000, TWX: 510-226-6983; Empl.: 500

(TM)**TELE-POWER POLES** - divided, vertical multioutlet assemblies - Wiremold Co.

(TM)**TELEPRODUCTS** - communication products - Atlantic Research Corp.

(TM)**TELEQUIPMENT** - low-priced oscilloscopes - Tektronix, Inc.

(TM)**TELESCAN** - complete telemetry systems - Autocon Inds., Inc.

(TM)**TELESCRIBER** - handwriting transmission systems - Telautograph Corp.

TELESIS LABORATORY, Dept. EM, Box 387, 41 1/2 S. Paint St., Chillocothe, Ohio 45601, Tel: 614-773-1414; Empl.: 18

(TM)**TELESPONDER** - Tracking Radar Devices - Vega Precision Labs.

(TM)**TELESTEP** - remote control systems - Autocon Inds., Inc.

(TM)**TELETALE** - intrusion detection systems - Sta-Rite Inds.

(TM)**TELETALK** - all prods. - Sta-Rite Inds.

TELETERMINAL CORP., Dept. EM, 12 Cambridge St., Burlington, Mass. 01803, Tel: 617-272-8504, TWX: 710-332-6365; Empl.: 13

Local Sales Offices & Reps.

Cal	Copertino, Eakins Assocs.	408-255-6494
Cal	Irvine, Adco Elctrn.	714-833-1528
Colo	Englewood, Hall Co.	303-789-4149
Conn	Hamden, J & J Assocs.	203-624-7800
Mass	Burlington, J & J Assocs.	
Pa	Bryn Mawr, Hopkins Assocs.	215-527-1127
Tex	Dallas, Salcor	214-234-8072
Utah	Salt Lake City, Hall Co.	801-582-1888

(TM)**TELETICKTER** - automatic airline tickets - Terminal Systems Inc.

(TM)**TELE-TORQUE** - torque-wrenches, dual-scale - Owatonna Tool Co.

(TM)**TELETROL** - complete telemetry systems - Autocon Inds., Inc.

TELETYPE CORP., Dept. EM, 5555 Touhy Ave., Skokie, Ill. 60076, Tel: 312-982-2000, TWX: 910-223-3611; Empl.: 5,000

Local Sales Offices & Reps.

Cal	City of Commerce	213-724-6040
NJ	Fairfield	201-575-8240

(TM)**TELEVAC** - vacuum measuring instrumentation - Fredericks Co.

(TM)**TELEVEX** - 45 RPM adaptors and playback styli - Aldshir Mfg.

TELEVISION EQUIP. ASSOCS., Dept. EM, Box 260, South Salem, N.Y. 10590, Tel: 914-763-8893, TWX: 710-763-8893

Local Sales Offices & Reps.

Cal	Los Angeles, Tri Tronics	213-877-9912
Colo	Evergreen, Didier/Denver	303-674-6000
Md	Rockville, Wiltronix	301-460-1454
Mich	Farmington Hills, H M Dyer	313-478-2157
NC	Charlotte, L. White	704-554-8419
Tex	Carrollton, G. Sudduth	214-242-2690
Wash	Seattle, J. Nutting	206-364-9911

TELEVISION MICROTIME, INC., Dept. EM, 1280 Blue Hills Ave., Bloomfield, Conn. 06002, Tel: 203-242-0761, TWX: 710-425-2390; Empl.: 80

(TM)**TELEVISION TUBE CADDY–TV** - servicemans' case - Argos Products Co., Inc.

TELEX COMMUNICATIONS, INC., Dept. EM, 9600 Aldrich Ave., So., Minneapolis, Minn. 55420, Tel: 612-884-4051, Telex: 29-7053; Empl.: 1200

Local Sales Offices & Reps.

Ark	Little Rock, J.Y. Schoonmaker	501-375-2168
Cal	Burbank, Koessler Sls., Inc.	213-849-5716
Cal	Oakland, Moulthrop Sls.	415-261-7676
Cal	West Covina, J.F. Northcutt Co.	213-331-2447
Colo	Denver, McLoud & Raymond Co.	303-756-1589
Fla	Miami, World Wide Prods.	305-754-5475
Ga	Chamblee, Techn. Sys.	404-457-0426
Ga	Marietta, T. Koran	404-971-8171
Ill	Lincolnwood, Wm. M. Linz Co.	312-677-2000
Ind	Indianapolis, Sukup & Cox, Inc.	317-253-1215
Ind	Michigan City, H.C. Kawoters	219-872-3059
Iowa	Atlantic, Kimian Sls. Co.	712-243-1626
Kans	Prairie Village, Roach, Spencer & Assocs.	913-432-3700
Md	Baltimore, D. Brothers Co.	301-764-7189
Mass	Wellesley Hills, M. Scott Co.	617-235-0102
Mich	Detroit, Riley & Petchell Sls., Inc.	313-838-9100
Mo	Chesterfield, Roach, Spencer & Assoc.	
NY	Flushing, Bettan Sls., Inc.	212-969-7600
NY	Woodhaven, Alan Sarfaty	212-846-1952
Ohio	Cleveland, Imtech	216-826-3400
Okla	Tulsa, J.Y. Schoonmaker	918-936-1432
Pa	Newtown Square, G.M. Conneen Co.	215-353-2241
Tex	Dallas, J.Y. Schoonmaker	214-357-8481
Tex	Houston, J.Y. Schoonmaker	713-926-9510
Wash	Seattle, Fleehart & Sullivan	206-522-1533

(TM)**TEL-EYE** - solid state alarm sensor - Autocon Inds., Inc.

TELLITE CORP., Dept. EM, 17 Lenox Rd., Summit, N.J. 07901, Tel: 201-273-0641; Empl.: 10

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-945-3281
Cal	Los Angeles, MCA Repco	213-889-5553

Local Distributors

Ariz	Scottsdale, Frylo	602-945-3281
Cal	Los Angeles, MCA Repco	213-889-5553
For:	Can., Toronto, Ont., AnBak Sls.	416-625-1061

TELMAR, INC., Dept. EM, 1150 W. Third Ave., Columbus, Ohio 43212, Tel: 614-299-2165; Empl.: 30

TELONIC ALTAIR, Dept. EM, Box 277, Laguna Beach, Calif. 92652, Tel: 714-494-9401 800-854-2436, TWX: 910-596-1320; FSC No.: 04423; Empl.: 120 .. p. 3059

Sales Manager: R. Aaron

Local Sales Offices & Reps.

Cal	Cupertino, T. L. Snitzer Co.	408-257-8333
Cal	Del Mar, T. L. Snitzer Co.	714-454-2191
Cal	Los Angeles, T. L. Snitzer Co.	213-836-6170
Md	Silver Spring, Gawlger-Knoop	301-589-4406

TELREX LABS., Dept. EM, Asbury Park, N.J. 07712, Tel: 201-775-7252; Empl.: 20

TELSTAR ELECTRONICS CORP., Dept. EM, 700 Hummel Ave., Southold, N.Y. 11971, Tel: 516-765-9292; Empl.: 15

Local Sales Offices & Reps.

Md	Bethesda, Emp Industries	301-229-2500
NY	Great Neck, Industrial Science Supply	516-487-1173
Exp:	Bethesda, Emp Industries	301-229-2500

TELTRON, INC., Dept. EM, 940 Willow St., Pottstown, Pa. 19464, Tel: 215-582-2711, TWX: 510-651-4499; Empl.: 22

Local Sales Offices & Reps.

Cal	Pasadena, A-F Sls. Engrg.	213-681-5631
Cal	Redwood City, H. Bogardus	415-365-0800
Colo	Denver, Scientific Sys.	303-623-6447
Ill	Platine, J. Clark Co.	312-358-5095
Md	Gaithersburg, Wright Co.	301-840-1928
NJ	Plainfield, EMCEE Video Sls.	201-561-6876
Ohio	Columbus, Weller Elctrn. Sls.	614-885-7819
Pa	Reading, Beil-Whitaker	215-779-2610
Wash	Seattle, Nucom Assocs.	206-364-9911
Exp:	Ind., Michigan City, Sound Word Assocs.	219-879-7753

Local Distributors

Ark	El Dorado, Ind. Elctrn.	501-862-4901
Cal	Culver City, JSH Elctrns.	213-837-0177
Conn	Rockville, Denson Elctrns.	203-875-5198
Del	Dover, Elctrnc. Surveillance	302-284-9421
La	Kenner, MAR Elctrns.	504-729-4524
Me	Auburn, Audio Serv.	207-783-8801
Mich	Detroit, R. P. Hermes Co.	313-886-4566
NJ	Elizabeth, Thor Elec. Corp.	201-354-2420
NJ	Elizabeth, Unity Elctrns.	201-351-4200
NM	Albuquerque, Integrated Sys.	505-255-8127
NY	Ossining, Dodd Elctrns.	914-762-4200
NY	Rosedale, Temtron Elctrns.	212-978-5896
Ohio	Dayton, Dayton Communications	513-278-7937
Pa	Reading, Beil-Whitaker, Inc.	215-779-2610
Va	Arlington, Concord Communications	703-525-5777

TELVAC INSTR. CO., Dept. EM, 7534 Atoll Ave. F, N. Hollywood, Cal. 91605, Tel: 213-994-9471; Empl.: 3

Local Sales Offices & Reps.

Ill	Hinsdale, Hill-Gray Assocs.	
Md	Baltimore, Milan Assoc., Inc.	
Mass	Babson Park, P.R. Sturgeon Co., Inc.	
NY	Mineola, L.I., Willco Sls.	

(TM)**TEMARS** - transportation environment measuring and recording system - Endevco

(TM)**TEMFLEX** - tapes & tabings - 3M Co.

(TM)**TEM/GUIDE** - coaxial/waveguide components - UTE Microwave

(TM)**TEMP-ALERT** - temp. monitor - East Controls Co.

(TM)**TEMPCAL** - thermocouple/thermal switch tester - Howell Inst. Inc.

(TM)**TEMPEREX** - gold electroplating process for high temp applications. - Sel-Rex Div. Oxy Metal Industries Corp.

(TM)**TEMPGARD** - temperature alarm system - Tenney Engrg., Inc.

(TM)**TEMPILABELS** - temperature indicating labels - Tempil Div.

(TM)**TEMPILAQ** - coatings - Tempil Div.

TEMPIL DIV., Big Three Inds, Dept. EM, Hamilton Blvd., So. Plainfield, N.J. 07080, Tel: 201-757-8300, Telex: 138-662; Empl.: 30; Minimum order: $M. Olesin

Sales Manager: M. Olesin; *Distributor Manager:* M. Olesin

(TM)**TEMPIL PELLETS** - pellets - Tempil Div.

(TM)**TEMPILSTIK** - crayons - Tempil Div.

(TM)**TEMPKEY** - temperature measurement - Zi-Tech Div.

TEMPKEY INC., Dept. EM, 2155 Park Blvd., Palo Alto, Cal. 94306, Tel: 415-324-8798, Telex: 334447

Local Sales Offices & Reps.

Ariz	Phoenix, Industrial Prods. Corp.	602-246-8487
Cal	Costa Mesa, Robinson Technical Assocs.	714-557-1622
Cal	San Francisco, Pacific Signal	415-397-5995
Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Md	Baltimore, Al Rogers Co.	301-744-4162
Minn	Minneapolis, Bican Co.	612-827-4734
NM	Albuquerque, Industrial Prods. Corp.	505-256-3561
Pa	Bristol, Al Rogers Co.	215-788-5071
Tex	Houston, Component Sls.	713-521-9771
Wash	Edmonds, Whitco Sls.	206-776-1970

(TM)**TEMP-LACE** - lacing tape - Gudebrod Bros. Silk Co., Inc.

TEMPLEMAN, D.R. CO., Dept. EM, 8 Park St., Plainville, Conn. 06062, Tel: 203-747-2709; Empl.: 30

Sales Manager: O.W. Bray

TEMPO INSTRUMENT, INC., Dept. EM, 51 E. Bethpage Rd., Plainview, N.Y. 11803, Tel: 516-694-4400, TWX: 510-224-6421; FSC No.: 07031; Empl.: 120

Local Sales Offices & Reps.

Industrial Prods. Group.

Cal	Gardena, Bidwell Sls. Assoc.	213-770-0300
Ill	River Forest, F. I. Tourtlet Co.	312-771-6300
NJ	Hohokus, Alto	201-447-1770
NY	Rochester, H.C. Johnson	716-482-3000
Pa	Audubon, Daner-Hayes	215-666-5005

Military Prods. Group.

Conn	N. Haven, Forsberg Sls.	203-239-5111
Fla	North Pinellas Park, Russell Assocs.	813-526-1134
Md	Baltimore, Stemler	301-944-8262
Mass	Brockton, Forsberg Sls.	617-522-6300
Mich	Southfield, Luebbe Sls. Co.	313-357-0355
Mo	Kansas City, PEM Sls. Co.	816-333-6012
Mo	St. Louis, PEM Sls. Co.	314-434-4425
NJ	Cherry Hill, Stemler Assoc.	609-966-4070
NJ	Clifton, Avionics Equip. Inc.	201-772-1956
NY	Bayshore, Russell Assocs.	516-666-6500
NY	Buffalo, Russell Assocs.	716-634-3377
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Tex	Arlington, Cal-Tex Ind.	817-461-0303
Va	Alexandria, Stemler	703-548-7818
Wash	Bellevue, M. Poggi Co.	206-454-2323
Exp:	NYC, Aero-Spectrum Inc.	212-752-4770

TEMPOSONICS INC., Dept. EM, 53 E. Bethpage Rd., Plainview, N.Y. 11803, Tel: 516-694-4400, TWX: 510-224-6421

Sales Manager: W. Brenner

(TM)**TEMP-PLATE** - temperature indicating decals - Wahl, Wm. Corp.

(TM)**TEMP-R-GLAS** - teflon coated fiberglas - Connecticut Hard Rubber Co.

(TM)**TEMP-R-TAPE** - teflon tape - Connecticut Hard Rubber Co.

(TM)**TEMPRUF** - temperature compensated spring - Chatillon John & Sons

(TM)**TEMPSCRIBE** - recording thermometer - Bacharach Instrument Co.

(TM)**TEMPSTAT** - standard controller - Hotpack Corp.

(TM)**TEMP-TERMS** - hi-temperature terminal - ITT Cannon/ETC Terminal Products

TEMPTRONIC CORPORATION, Dept. EM, 40 Glen Ave., Newton, Mass. 02159, Tel: 617-965-3420, Telex: 92-2526; Empl.: 25

Sales Manager: H.P. Mierop

Local Sales Offices & Reps.

Ariz	Scottsdale, Allen Assocs.	602-994-1305
Cal	Palo Alto, Coherent Mktg. Assocs.	415-327-2217
Fla	Longwood, Lenz Engrg. Co.	305-831-9797
Ill	Chicago, Electronic Inst. Assoc.	312-271-3774
Ind	Indianapolis, Electronic Inst. Assoc.	317-257-7231
Md	Rockville, Research Technology	301-881-5780
Mass	Newton Center, Temptronic Corp.	617-965-3420
NY	Elmont, Crane & Egert Corp.	516-488-2100
NC	Greensboro, Lenz Engrg. Co.	919-299-7879
Tex	Austin, Comspec, Inc.	512-837-3881
Tex	Dallas, Comspec, Inc.	214-234-4137
Tex	Houston, Comspec, Inc.	713-461-4487
Utah	Salt Lake City, Specialty Sls. Co.	801-262-2979

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Mass	Burlington, Scientific Sys. Sls. Corp.	617-273-1660
NY	Port Chester, Radiation Elctrns., Inc.	914-937-2300
NY	Syosset, Scientific Sys. Sls. Corp.	516-921-3737
Ohio	Westerville, Contemporary Science, Inc.	614-882-6908
Tenn	Knoxville, Pulcir, Inc.	615-693-3641
Tex	Dallas, Technical Instr. Co.	214-387-0606

TENNEY ENGRG., INC., Dept. EM, 109 Springfield Rd., Union, N.J. 07083, Tel: 201-686-7870, TWX: 710-985-4725; Empl.: 175 .... p. 2684

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Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
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Md	Lutherville, Cunningham & Assoc.	301-296-4306
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NY	Larchmont, Hingston-Walsh Assocs.	303-771-1482
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Ohio	Dayton, Imtech	513-278-6507
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Ohio	Cleveland, Micro Sls.	216-331-0900
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Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Barrington, Janus	312-381-4479
Ind	Greenwood, Valentine Schillinger & Assocs.	317-888-2260
Ind	South Bend, Valentine Schillinger & Assocs.	219-291-6258
Kans	Olathe, Rush & West Assocs.	913-764-2700
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Mass	Needham Hts., Todino Engrg. Sls.	617-444-7925
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Mo	Ballwin, Rush & West Assocs.	314-394-7271
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	West Caldwell, Grimm & Siegel Assoc.	201-575-9300
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NY	Pittsford, Noeth-Honsinger Assoc.	716-461-4750
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Cal	Irvine, Cramer/Los Angeles	213-771-8300
Cal	Palo Alto, R.V. Weatherford Co.	415-493-5373
Cal	Palo Alto, Kierulff Elctrns.	415-968-6292
Cal	Pomona, R.V. Weatherford Co.	714-623-1261
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	San Diego, R.V. Weatherford Co.	714-278-7400
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Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Cal	Sunnyvale, T.I. Supply Co.	408-732-5555
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Md	Hyattsville, Milgray Elctrns.	301-864-1111
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Minn	Minneapolis, Semiconductor Specialists	612-331-6350
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NJ	Clark, T.I. Supply Co.	201-382-6400
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Tex	Dallas, R.V. Weatherford Co.	214-243-1571
Tex	Dallas, Solid State Elec. Co. of Tex.	214-352-2601
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Tex	Houston, R.V. Weatherford Co.	
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For:	Can., Toronto, Ont., Cesco Elctrns. Ltd.	416-661-0220
For:	Can., Vancouver, B.C., RAE Elctrns.	604-687-2621
For:	Can., Willow Dale, Ont., Electrosonic Indl. Sls.	
For:	Can., Vancouver, B.C., Varah's Ltd.	604-873-3211
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Sales Manager: B. Haun

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Cal	Sunnyvale	408-732-1840
Ill	Glenview	312-729-5710
Ind	Fort Wayne	219-424-5174
Ind	Indianapolis	317-248-8555
Ky	Louisville	502-451-2920
Md	Timonium	301-252-5070
Md	Towson	301-296-8961
Mass	Attleboro	617-222-2800
Mich	Kalamazoo	616-327-6877
Mich	Southfield	313-353-0830
Minn	Minneapolis	612-835-6733
Mo	St. Louis	314-569-0801
NJ	Clark	201-574-9800
NY	East Syracuse	315-463-9291
NC	Charlotte	704-527-0930
Ohio	Cleveland	216-464-2990
Ohio	Dayton	513-253-3126
Tenn	Brentwood	615-373-5190
Tex	Dallas	214-238-6901
Wisc	Wauwatosa	414-771-7210

TEXAS INST., Dept. EM, P.O. Box 508, DeSoto, Tex. 75115

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TEXAS INSTRS. INC., Dig. Sys. Div., Dept. EM, Box 1444, Mls 784, Houston, Tex. 77001, Tel: 713-494-5115

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Cal	Costa Mesa	714-540-7311
Cal	Sacramento	916-446-6886
Cal	San Diego	714-232-1566
Cal	Sunnyvale	408-732-1840
Colo	Denver	303-751-1780
Conn	Hamden	203-281-0074
Fla	Cocoa	305-632-3766
Fla	Ft. Lauderdale	305-842-4784
Fla	Ft. Walton Beach	904-243-7215
Fla	Jacksonville	904-356-6110
Fla	St. Petersburg	813-821-7891
Fla	Winter Park	305-644-3535
Ga	Atlanta	404-458-7791
Ill	Schiller Park	312-671-1540
La	New Orleans	504-887-3227
Md	Baltimore	301-752-1200
Mass	Waltham	617-890-7400
Mich	Southfield	313-353-0830
Minn	Edina	612-835-5711
Mo	St. Louis	314-993-4546
NJ	Clark	201-574-9800
NM	Albuquerque	505-265-8491
NY	Albany	518-274-2445
NY.	New York	212-541-9540
NY	Rochester	716-461-1800
NC	Raleigh	919-833-7771
Ohio	Cleveland	216-464-1981
Ohio	Dayton	513-253-6128
Ore	Portland	503-648-4128
Pa	Philadelphia	215-279-2121
SC	Columbia	803-254-3319
Tenn	Knoxville	615-523-5255
Tex	Austin	512-258-5121
Tex	Dallas	214-238-3881
Tex	El Paso	915-544-0499
Tex	Houston	713-494-5115
Utah	Salt Lake City	801-363-3887
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Wisc	Wauwatosa	312-671-1540

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Sales Manager: R. Shevlot

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Ariz	Phoenix, Cleveland	602-944-4679
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Cal	Palo Alto, R.F. Assocs.	415-494-3331
Colo	Aurora, Cleveland Colo.	303-751-3252
Fla	Orlando, Truex Assoc.	305-859-2160
Ga	Atlanta, Spartech	404-432-3644
Haw	Honolulu, Aloha Assoc.	808-941-1574
Ill	North Brook, E.I.A.	312-271-3774
Ind	Indianapolis, E.I.A.	317-257-7231
Iowa	Cedar Rapids, Tech. Reps Inc.	319-363-2489
Md	Baltimore, Sci-Rep	301-256-8144
Mass	South Chelmsford, Independent Mktg. Reps	617-256-8251
Mich	Detroit, Micro Sls.	313-482-1229
Mo	Hazelwood, Techn. Reps Inc.	314-731-5200
Mo	Independence, Techn. Reps Inc.	816-737-1414
NJ	Hazlet, Mer-Mon Elctrns.	201-229-3172
NM	Albuquerque, Cleveland Assoc.	505-266-5594
NY	Bayside, R. Diamond	212-423-7330
NY	Syracuse, Labtronics	315-454-9314
Ohio	Cleveland, Micro Sls.	216-734-7452
Ohio	Dayton, Micro Sls.	513-433-8171
Pa	Phila, Sci-Rep	609-482-0059
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Va	Falls Church, Sci-Rep	703-573-8787
Wash	Seattle, Jon Jolly	206-938-4166

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Sales Manager: R. Shevlot

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Cal	Palo Alto, RF Assocs.	415-494-3331
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Fla	Orlando, Truex Assocs.	305-859-2160
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Cal Van Nuys, Sonic Wire Sls. 213-781-3490
Colo Denver, West Mark Assocs. 303-433-7181
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NY Coram, F & F Assocs. 516-928-9666
Pa Philadelphia, Magyar & Assocs. 215-763-5044
Tex Houston, Southland Engrg. & Sls.
713-772-3170
Vt Bennington, Magyar Assocs. 802-442-5858
Wash Seattle, Don Smith Sls. Co. 206-633-3160
Exp: France, Antony Cedex, Eurotron........668-10-59

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THERMOTRON CORP., Dept. EM, Kollen Park Dr., Holland, Mich 49423, Tel: 616-392-1492, TWX: 810-292-6164

™THERMOTRONIC - thermocouple thermometers, thermoelectric cooling equip. - Bailey Instrs., Inc.

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™THE SWITCHER SOURCE - switching power supplies - Trio Labs, Inc.

THETA-COM CATV, Div. Theta-Com of Calif., Dept. EM, Box 9728, Phoenix, Ariz 85020, Tel: 602-944-4411, TWX: 910-957-1601; Empl.: 350

™THETA-GATE FIRING - SCR design - National Electronics

THETA INSTR. CORP., Dept. EM, 24 Dwight Pl., Fairfield, N.J. 07006, Tel: 201-227-1700, Telex: 13-8621; Empl.: 85

Sales Manager: R. Kemp

Local Sales Offices & Reps.
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DC Washington, Powell-Pendergraph 301-656-4535
Ill Des Plaines, Theta Onstr. Corp. 312-297-3525
NJ Hillsdale, C. B. Assocs. 201-664-6230
Pa Willow Grove, Powell-Pendergraph Inc.
215-657-0330
Va Glen Allen, Powell-Pendergraph 804-264-2341

THETA-J RELAYS, INC., Dept. EM, 1 De Angelo Drive, Bedford, Mass 01730, Tel: 617-275-2575; Empl.: 5

Sales Manager: A. Mowatt

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Ariz	Scottsdale, Fryco, Inc.	602-945-3281
Cal	Los Angeles, Corcoran Assocs.	213-823-2425
Cal	Redwood City, Parks & Pruitt Assoc.	415-364-1640
Cal	San Diego, Earle Assoc.	714-278-5441
Colo	Denver, Mike Duffy Assocs.	303-934-7392
Conn	Madison, A&M Electrn. Reps.	203-421-4242
Fla	Jupiter, Cherry Assoc.	305-746-4591
Ill	Barrington, Janus, Inc.	312-381-4479
Kans	Overland Park, Reese & Assocs.	913-648-7748
Mass	Needham, A&M Electrn. Reps.	617-444-8170
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Minneapolis, Technical Assoc.	612-929-6721
Mo	St. Louis, Reese & Assocs.	314-725-5219
NJ	Cherry Hill, Snyder & Stefkovic Assoc.	609-667-6110
NY	Endicott, Tech Mark, Inc.	607-748-7473
NY	Fairport, Tech Mark, Inc.	716-223-1252
NY	Huntington, C.R. Mayer Co.	516-921-7876
NY	Liverpool, Tech Mark, Inc.	315-652-6229
NC	High Point, Engrg. Devices	919-869-7200
Pa	Media, Snyder & Stefkovic Assoc.	215-566-5400
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Tex	Houston, Gordon V. Peck Co.	713-780-2220
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(TM)THE VIP - antenna - Shakespeare

(TM)THE VOICE OF THE THEATRE - speaker systems - Altec Div.

THIN FILM SERVICES, Dept. EM, Box 188, Gile, Wisc. 54525, Tel: 715-561-2031; Empl.: 3

THINCO DIV. HULL CORP., Dept. EM, Davisville Rd., Hatboro, Pa. 19040, Tel: 215-675-5000, TWX: 510-665-6822; Empl.: 20

Sales Manager: H.A. DePalma

(TM)THIN-HEET - etched foil heating element - Safeway Products

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(TM)THIN-TRIMS - variable ceramic trimmers - Johanson Mfg. Corp.

(TM)THINVERTER - miniature power converters - Arnold Magnetics Corp.

(TM)THINWALL - pre-impregnated tubing - Precision Paper Tube Co.

THIOKOL CHEMICAL DIV., Dept. EM, 780 N. Clinton Ave., Trenton, N.J. 08607, Tel: 609-396-4001, TWX: 510-685-9590; Empl.: 850

THOMAS & BETTS CO., See T & B/Thomas & Betts Co.

(TM)THIRSTY FOAM WIRE - hi-absorbent urethane foam wiper - Clean Room Prods.

THOMAS ELCTRNS., INC., Dept. EM, 100 Riverview Dr., Wayne, N.J. 07470, Tel: 201-696-5200, TWX: 710-988-5836; Empl.: 265

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Cal	Pasadena, A-F Sls. Engrg., Inc.	213-681-5631
Colo	Wheatridge, Waugaman Assocs., Inc.	303-423-1020
Fla	Lighthouse, Saber Assocs.	305-943-3076
Md	Hyattsville, Eastern Comps.	301-577-2925
Mass	Norwood, Stan Pierce, Inc.	617-762-3164
NC	Raleigh, Saber Assocs.	919-834-3961
Ore	Portland, Components West	503-643-5588
Pa	Flourtown, Eastern Comps.	215-836-1616
Tex	Irving, Space Elctrns.	214-251-3636
Wash	Seattle, Components West	206-243-2133
Exp:	Fairfield, N.J., Pantronics, Inc.	201-575-1177
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Exp:	Teaneck, N.J., Sylvan Ginsbury	201-837-1100

THOMAS & SKINNER, INC., Dept. EM, Box 150-B, 1120 E. 23rd St., Indianapolis, Ind. 46206, Tel: 317-923-2501, Telex: 02-7335; Empl.: 200

Local Sales Offices & Reps.

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Cal	Mt. View, Melchior Assocs.	415-964-2321
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THORDARSON MEISSNER, Electronic Ctr., Dept. EM, Mt. Carmel, Ill. 62863, Tel: 618-262-5121, TWX: 510-525-2254; FSC No.: 96256; Empl.: 600
p. 4474-4485

3M CO., see listing under letter "M"

(TM)THORKOM - miniature polycarbonate connector - Viking Inds., Inc.

(TM)THORN - cathode raytubes - Inter-Tech. Grp., Inc.

(TM)THORN-BRIMAR - cathode raytubes - Inter-Tech. Grp., Inc.

(TM)THREDSEAL - fastener seal - Parker Hannifin Corp.

(TM)THRULINE - rf wattmeters - Bird Electronic Corp.

(TM)THUMB MITE - miniature size thumbwheel switch - Tech Labs., Inc.

(TM)THUNDERSTICK - antenna - Shakespeare

(TM)THUNDERTWINS - antenna - Shakespeare

THWING-ALBERT INSTR. CO., Dept. EM, 10960 Dutton Rd., Philadelphia, Pa. 19154, Tel: 215-NE 7-0100, TWX: 710 670 1763; Empl.: 50

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Minn	St. Paul, Sabco, Inc.	612-483-1102
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Sales Manager: E.E. Uecker, V.P. Mktg.

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(TM)TIMEMARK - electrosensitive recording paper - Fitchburg Coated Products

(TM)TIME-O-LITE - photographic timers - Industrial Timer Esterline Co.

TIME SHARE PERIPHERALS CORP., Dept. EM, Route 6, Bethel, Conn. 06801, Tel: 203-743-7624

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Cal	Irvine, Edwards Assoc.	714-552-7850
Cal	Palos Verdes, Edwards Assoc.	213-377-0975
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Ill	Addison, R. E. Stemm	312-279-2440
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Minn	Minneapolis, R. E. Stemm	612-922-3643
Tex	Houston, Hendricks Svcs.	713-667-2946
Tex	Irving, Noakes Data Sys.	214-255-1151

TIMES WIRE & CABLE, Sub. Insilco Corp., Dept. EM, 358 Hall Ave., Wallingford, Conn. 06492, Tel: 203-265-2361, TWX: 710-476-0763; Empl.: 325

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Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep-North	408-984-0350
DC	Washington, D.C., Engineering Svc. Assocs.	202-659-8800
Ga	Douglasville, 20th Century Mktg.	404-458-0374
Ill	Chicago, Balhorn & Roeser Inc.	312-449-3900
Kans	Overland Park, PMA Corp.	913-381-0004
Md	Lutherville, Engrg. Svc. Assocs.	301-296-6021
Mass	Clinton, F.J. Coleman Co.	617-368-0116
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
Minn	Edina, Wagner Consultants, Corp.	612-721-2411
Mo	Hazelwood, PMA Corp.	314-569-1220
NM	Albuquerque, Lindberg Co.	505-881-1006
NC	Winston-Salem, D.G.W., Inc.	991-768-7166
Ohio	Cincinnati, Giesting Assocs.	513-051-7800
Okla	Oklahoma City, Ammon & Rizos	405-373-2748
Tex	Dallas, Ammon & Rizos	214-233-5591
Tex	Houston, Ammon & Rizos	713-781-6240
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Va	Virginia Beach, Engrg. Srvc. Assoc.	804-464-6437
Wash	Seattle, Seatronics, Inc.	206-767-4330
Exp:	N.Y., Mammroneck, Sealectro Corp.	914-698-5600

Local Distributors

Ariz	Phoenix, Storm Products Co.	602-269-3485
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Cal	Mountain View, Terminal Elctrns.	415-969-9240
Cal	San Diego, Intercon Sls. Co.	714-292-5901

Cal	San Leandro, Anixter-San Francisco	415-352-3100
Cal	Santa Anna, Anixter-Los Angeles	714-556-4600
Colo	Broomfield, Storm Prods. Co.	303-466-1991
Colo	Denver, Dixon Electric Supply	303-757-7453
Conn	Wallingford, All Wire Prods.	203-265-0955
Fla	Cocoa, Sunset Wire & Cable	305-632-3511
Fla	Miami, South East Connectors Inc.	305-887-2311
Fla	Oakland Park, KSM Elctrns.	305-739-5880
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Kans	Wichita, Interstate Electric Supply	316-264-3500
Kans	Wichita, Radio Supply Co.	316-267-5216
Md	Gaithersburg, Pioneer Washington	301-948-0710
Mass	Lexington, Harvey R & D Elctrns.	617-861-9200
Mass	No. Bellerice, Pacer Elctrns.	617-862-3300
Mass	Waltham, Q.P.L. Elctrncs	617-891-0460
NJ	Fairfield, Electro Spec. Inc.	201-575-7370
NY	Brooklyn, M. Benjamin Electric Co.	212-624-5187
NY	Buffalo, Summit Distributors, Inc.	716-884-3450
NY	Elmford, Anixter N.Y.	914-592-8800
NY	Farmingdale, Vertex Elctrns.	516-234-8040
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NY	Port Washington, Restart Elctrn.	516-883-3500
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NC	Winston Salem, Kirkman Elctrns.	919-722-9131
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Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
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(TM)TINY TRIM - variable trimmer delay line - Kappa Networks

(TM)TISAN - programmer - Artisan Elctrns. Corp.

(TM)TITAL - titanium-aluminum (master alloy) - Kawecki Beryico Inds., Inc.

TITAN TOOL SUPPLY CO., INC., Dept. EM, 68 Comet, Buffalo, N.Y. 14216, Tel: 716-873-9907; Empl.: 8

TITCHENER, E.H. & CO., Dept. EM, 1 Titchener Pl., Binghamton, N.Y. 13902, Tel: 607-772-1161, TWX: 510-252-1985; Empl.: 235

Local Sales Offices & Reps.

Cal	Huntington Beach, ASC Sls. Co.	714-847-7515
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Mass	Hudson, R.C. Morgan	617-935-6279
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NJ	Cedar Grove, G.E. Lewis	201-773-1460
NY	Binghamton, F.J. Grashof	607-772-1161
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Pa	Bluebell, J.J. Protevi	215-272-3325

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(TM)TITE-BITE - connectors - T & B/Thomas & Betts

(TM)TKASSY - coaxial cable assembly - Times Wire & Cable

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(TM)TLC - transmission line cable connecter - Berg Electronics

(TM)T-LITE - bi-pin indicator light - GTE Sylvania Inc.

TMC SYSTEMS (ARIZ.), INC., Dept. EM, 930 West 23rd St., Tempe, Ariz. 85282, Tel: 602-967-7874, TWX: 910-950-1943; FSC No.: 22929; Empl.: 65

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Tex	Dallas, Blackburn Assoc.	214-692-8885

(TM)TMI - digital instrumentation - Tau-Tron Inc.

TOA ELECTRONICS, INC., Dept. EM, 1023 Grandview Dr., So. San Francisco, Cal. 94080, Tel: 415-588-2538, Telex: 33-1332; Empl.: 6

Sales Manager: D. Speegle

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Cal	Anaheim, J. G. Humble	714-991-1964
Colo	Denver, B & B Elctrns.	303-773-6700
Ga	Atlanta, Secom Sys.	404-434-8101
Ill	Chicago, T. Pappas & Assoc.	312-685-2338
Kans	Overland Park, W. Menezes & Assoc.	913-649-2680
Md	Baltimore, Assoc. Sls. Rep.	301-661-2888
Mass	Needham, Piper Assoc.	617-449-1144
Mich	Detroit, Shalco	313-347-4771
Minn	Minneapolis, Kodo Assoc., Inc.	612-881-1255
NY	Flushing, Bettan Sales, Inc.	212-591-7600
NY	Syracuse, Paston-Hunter Co.	315-437-2992
Ohio	Columbus, Mandabach-Lehner Co.	614-235-0265
Pa	Pittsburgh, Control Assembly	412-279-2264
Tex	Houston, Wyborny Sls. Co.	713-772-0961
Wash	Seattle, Vector	206-322-4343

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Ala	Huntsville, Gentry Assocs.	205-534-9771
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Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
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NJ	Woodcliff Lake, F&F Assocs.	201-778-6767
NY	Commack, F&F Assocs.	516-928-9666
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Dayton, DATA-TRON	513-223-8421
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Tex	Houston, C. Wolf & Assoc.	713-721-2442

TODD SYSTEMS, Dept. EM, 4 Radford Pl., Yonkers, N.Y. 10701, Tel: 914-963-3400; Empl.: 45 p. 4486-4489

Sales Manager: S. Edward

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Cal	Los Angeles, Graybar Elec.	213-263-7282
Cal	San Francisco, Delray Distr.	415-397-5855
Cal	San Jose, Quement Elctrns.	408-998-5900
Conn	Danbury, Pilgrim Elctrns.	203-743-4617
DC	Washington, American Intl.	202-293-4296
Fla	Miami, Electronic Equip.	305-871-3500
Ga	Atlanta, Specialty Supply	404-873-2521
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Tex	Richardson, Collins Radio Supply	214-235-9511
Utah	Salt Lake City, Kimball Elctrns.	801-328-2075
Va	Richmond, Meridian Elctrns.	703-355-6521
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(TM)TOGGLE-DIP - DPDT front panel dip switch - Grayhill Inc.

(TM)TOG-L-LOK - clamping tool - Channellock, Inc.

(TM)TOHO - paper tape perforator - Uchida of America Corp.

TOHOKU METAL INDS., LTD., Dept. EM, No 13-10, 7-chome, Ginza, Chou-ku, Tokyo, Japan, Tel: Tokyo 542-6171, TWX: 025 22117 TOKIN J; Empl.: 2000

(TM)TOKIN - all products - Tohoku Metal Inds., Ltd.

TOKO INC., Dept. EM, 1-17 2-chome Higashi-Yukagaya, Ohta-Ku, Tokyo, Japan

TOKYO ELECTRIC CO. LTD., Dept. EM, 14-10, 1-chome, Uchi-Kanda, Japan

TOLEDO SCALE, Div. Reliance Elect. Co., Dept. EM, 350 W. Wilson Bridge Rd., Worthington, Ohio 43085, Tel: 614-438-4812, Telex: 245-365

(TM)TOMOCAMERA - gamma ray tomographic scintillation camera - Searle Analytic Inc. & Searle Radiographics Inc.

(TM)TOMO CAT - computerized tomography system - Artronix, Inc.

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™TONE-O-MATIC LOUDNESS - loudness control - V-M Corporation

™TONG TEST - clamp on ammeter - Columbia Electric Mfg. Co.

™TONOTRON - direct view storage tube - Hughes Aircraft Co.

TOOL GROUP MARKETING DIVISION, Dresser Industries, Inc., Dept. EM, 3201 N. Wolf Rd., Franklin Park, Ill. 60131, Tel: 312-455-8210

TOPAZ
ELECTRONICS

TOPAZ ELECTRONICS, Dept. EM, 3855 Ruffin Rd., San Diego, Cal. 92123, Tel: 714-279-0831, TWX: 910-355-1526; Empl.: 150 .... p. 2761,3398-3401

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Los Angeles, Topaz Elctrns.	714-279-0831
Cal	San Diego, Topaz Elctrns.	714-279-0831
Cal	San Francisco, Topaz Elctrns.	408-732-2030
Colo	Boulder, J. Smith & Assocs.	303-442-7100
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assoc.	404-448-2365
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Iowa	Cedar Rapids, Carter Elctrns.	314-569-1406
Kans	Overland Park, Carter Elctrns.	913-649-6996
Md	Bethesda, Dyna Rep	301-256-8300
Mass	Natick, Wayland Engrg.	617-655-6080
Mass	Wayland, Wayland Engrg. Sls.	617-655-6080
Mich	Detroit, Carter, McCormic & Peirce	313-477-7700
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	913-649-6996
NJ	Cherry Hill, Dyna Rep.	609-454-1060
NJ	Englewood Cliffs, Power Conversion & Control	201-569-0015
NM	Albuquerque, J. Smith & Assocs.	505-265-3406
NY	Binghamton, Elcom Sls.	607-723-9270
NY	Rochester, Elcom Sls.	716-385-1400
NY	Whitesboro, Elcom Sls.	315-732-6445
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Dayton, Carter, McCormic & Peirce	513-278-5873
Ohio	Richfield, Carter, McCormic & Peirce	216-333-5650
Pa	Doylestown, T.O.E. Sls.	201-568-5747
Pa	Monroeville, Carter, McCormic & Peirce	412-372-4415
Tex	Dallas, Allied Comps. Inc.	214-238-0408
Tex	Houston, Allied Comps. Inc.	713-691-3691
Va	Alexandria, Dyna Rep.	703-354-1222
Wash	Seattle, Underwood & Assocs.	206-575-0123

™TOP BRASS - microphone - Electro-Voice, Inc.

TOPFLIGHT CORP., Dept. EM, 160 East 9th Ave., York, Pa. 17404, Tel: 717-843-9901, TWX: 510-657-4849; Empl.: 250

™TOPHEL - thermocouple alloy - GTE Sylvania Inc.

™TOPHET - heating element alloy - GTE Sylvania Inc.

™TOPICS - digital process control sys. - General Automation

TOR CORPORATION, Dept. EM, 14715 Arminta St., Van Nuys, Cal. 91402, Tel: 213-786-6524; FSC No.: 15957; Empl.: 30

Local Sales Offices & Reps.

Ariz	Phoenix, GND Sls.	602-971-9758
Cal	Sunnyvale, Cutlass Elctrns. North	408-733-5885
Cal	Torrance, Cutlass Elctrns.	213-324-7360
Colo	Arvada, Sage Sls.	303-841-2487
Fla	Miami, Ludlum Assocs. Co.	305-592-6523
Ga	Atlanta, G. S. O'Hara	404-451-9020
Ill	Chicago, Berndt Assocs., Inc.	312-283-0713
Ind	Indianapolis, Advanced Comp. Sls.	317-545-6441
Mass	Tewksbury, M & V Inds.	617-851-4214
NY	Fayetteville, M.P. Andrews, Inc.	315-637-3144
NY	Huntington, C.R. Mayer Co.	516-921-7876
Ohio	Chagrin Falls, Crest Comp. Sls.	216-543-9808
Utah	Salt Lake City, Sage Sls.	801-531-0531
Va	Reston, Boyle Assocs.	703-620-9558

TORELCO INC., Dept. EM, 14 Paine Ave., Irvington, N.J. 07111, Tel: 201-374-8641; Empl.: 25

Local Sales Offices & Reps.

Mass	Reading, Charles E. Godfrey Co.	617-944-2230

™TOR HEAT SINKS - aluminum heat sinks-transistor mounting pads - TOR Corporation

TORIN CORP., Dept. EM, Kennedy Dr., Torrington, Conn. 06790, Tel: 203-482-4422, TWX: 710-439-2343; Empl.: 2000 .... p. 2714,2715

Local Sales Offices & Reps.

Ariz	Scottsdale, Fred Board Assocs.	602-994-9388
Cal	Cupertino, Serra Assocs.	408-738-1117
Cal	Irvine, Celtec Co.	714-752-6111
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Santa Clara, Torin Corp.	408-246-8585
Cal	Sherman Oaks, Celtec Co.	213-990-3440
Cal	Van Nuys, Torin Corp.	213-892-0741
Colo	Denver, Electrodyne Inc.	303-757-7679
Conn	New Haven, Comp-Rep	203-239-9762
Conn	West Hartford, Torin Corp.	203-568-3790
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Ill	Bloomingdale, Torin Corp.	312-893-1307
Ill	Elgin, Cole Dynamics	312-742-3000
Ind	Rochester, Torin Corp.	219-223-3181
Iowa	Cedar Rapids, Torin Corp.	319-393-5612
Ky	Louisville, Torin Corp.	502-896-4363
Md	Rockville, Marktron, Inc.	301-762-6210
Mass	Needham Heights, Comp-Rep Assocs.	617-444-2484
Mich	Howell, Torin Corp.	517-546-6311
Minn	Minneapolis, G.E. Arneson	612-835-2177
Minn	St. Paul, Hultgren & Strutzel	612-645-9121
NY	E. Syracuse, Torin Corp.	315-437-4674
NY	Rochester, Torin Corp.	716-586-8750
Ohio	Cleveland, Torin Corp.	216-464-2161
Ohio	Dayton, Torin Corp.	513-434-1255
Okla	Tulsa, Blair Engrg.	918-747-3100
Ore	Beaverton, R & J Sls.	508-644-2550
Pa	Doylestown, Torin Corp.	215-348-5917
Tex	Dallas, Blair Engrg.	214-352-8411
Tex	Dallas, Torin Corp.	214-942-8822
Tex	Houston, Blair Engrg.	713-776-0011
Utah	Salt Lake City, Electrodyne Inc.	801-277-8392
Wash	Bellevue, R & J Sls.	206-454-5450

Local Distributors

Ariz	Tempe, G.S. Marshall Co.	602-968-6181
Cal	El Monte, G.S. Marshall Co.	213-686-0141
Cal	Irvine, G.S. Marshall Co.	714-556-6400
Cal	San Diego, G.S. Marshall Co.	714-278-6350
Cal	Sunnyvale, G.S. Marshall Co.	408-732-1100
Colo	Arvada, G.S. Marshall Co.	303-423-9670
Conn	N. Branford, G.S. Marshall Co.	203-484-0488
Fla	Orlando, G.S. Marshall Co.	305-859-1620
Ill	Des Plaines, G.S. Marshall Co.	312-298-3700
Mass	Newton, G.S. Marshall Co.	617-965-5115
Minn	Edina, G.S. Marshall Co.	612-831-4904
NY	Farmingdale, G.S. Marshall Co.	516-293-4141
Ohio	Dayton, G.S. Marshall Co.	513-898-1100
Okla	Tulsa, Component Specialties Inc.	713-771-7237
Pa	King of Prussia, G.S. Marshall	215-337-3330
Tex	Dallas, G.S. Marshall Co.	214-233-5200
Tex	Dallas, Component Specialties	214-357-4576
Tex	Houston, G.S. Marshall	713-777-0358
Tex	Houston, Component Specialties Inc.	713-771-7237
Wash	Bellevue, G.S. Marshall Co.	206-883-1084

TORIT DIV./DONALDSON CO., Dept. EM, 1133 Rankin St. (Box 3217), St. Paul, Minn. 55165, Tel: 612-698-0391, Telex: 29-7400; Empl.: 180

™TORK PAK - torque wrench - Raymond Engrg. Inc.

™TORMAX - stepper motors and control elec. - IMC Magnetics Corp.

TOROTRON CORP.

TOROTEL INC., Dept. EM, 13402 S. 71 Hwy., Grandview, Mo. 64030, Tel: 816-761-6314, TWX: 910-777-7037; Empl.: 275 p. 1452-1457,2483,4491-4493

Sales Manager: H. Foland

Local Sales Offices & Reps.

Cal	Campbell, Torotel West	408-374-6611
Cal	Redondo Beach, J.J. Riley Assocs.	213-374-3468
Fla	Pompano Beach, V.G. Sales, Co.	305-971-0900
Fla	Winter Park, V.G. Sales, Co.	305-831-8688
Ill	Chicago, Gassner & Clark	312-345-4245
Md	Rockville, Mechtronics Sls.	301-340-2130
Mass	Weston, J.J. Goode Assocs.	617-235-3900
Minn	St. Paul, H. A. Cullen & Assocs.	612-646-7371
Mo	Grandview, Torotel	816-761-6314
NY	Manhasset, Win-Cor Elec. Sls.	516-627-9474
NY	Syracuse, T-Squared Elctrns. Co.	315-463-8592
Pa	Birchrunville, Jadelectronic Assocs.	215-647-5151
Tex	Dallas, Oeler & Menelaides	214-234-6334
Tex	Houston, Oeler & Menelaides	713-772-0730
Wash	Bellevue, Western Tech. Sls.	206-641-3900

TOROTEL
INC.

TOROTRON, Dept. EM, 255 Washington St., Mt. Vernon, N.Y. 10553, Tel: 914-664-2050; Empl.: 6 .... p. 2942

™TOROYD - coil winding machine - Universal Mfg. Co., Inc.

TORQ ENGINEERED PRODUCTS, INC., Dept. EM, 32 W. Monroe St., Bedford, Ohio 44146, Tel: 216-232-4100; Empl.: 135

™TORQLINER - coil forms for electrical windings - Cambridge Thermionic Corp.

™TORQOMETER - direct-reading dial torque measuring tools - Snap-On-Tools

™TORQ SWITCH - centrifugal switches - Torq Engineered Products, Inc.

™TORQSYN REMOTE POSITIONER - direct drive servomechanism - Vernitron Corp.

™TORQUE COMMANDER - screw driver sets - Vaco Products Co.

™TORQUE PACK - torque wrench - Raymond Engrg. Inc.

™TORQUE-PEAK - clutch assembly - Standard Pneumatic Motor Co.

™TORQUE-RITE - air tool torque control system - Himmelstein & Co., S.

TORQUE SYSTEMS, SUB. ROTRON/EG & G CO., Dept. EM, P.O. Box 588, 225-E. Crescent St., Waltham, Mass. 02154, Tel: 617-891-0230, Telex: 923-424; Empl.: 55 .... p. 3126

Sales Manager: B. Hainey

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	San Jose, J. T. McFarland Assoc.	408-286-9333
Fla	Orlando, MacKay, Smith & Assoc.	305-277-1513
Ga	Atlanta, MacKay, Smith & Assoc.	404-449-7444
Ill	Northbrook, Traco Engineering Co.	312-564-2288
Mich	Troy, Xanthus, Inc.	313-391-3235
NY	Rochester, Sweetco Assocs.	716-225-2383
NC	Charlotte, MacKay, Smith & Assoc.	704-527-0240
Ohio	Cincinnati, Drivex Corp.	513-742-2000
Ohio	Cleveland, Drivex North	216-486-1600
Va	Roanoke, Johnson Custom Controls Co.	703-774-5550

™TORQUE WATCH - torque watch gauge - Waters Mfg., Inc.

™TORREX SERIES - x-ray inspection system - Torr Labs.

TORRINGTON CO., Dept. EM, 59 Field St., Torrington, Conn. 06790, Tel: 203-482-9511

TORR
LABORATORIES, INC.

TORR LABS., Dept. EM, 6837 Havenhurst Ave., Van Nuys, Cal. 91406, Tel: 213-787-7420; Empl.: 35 p. 3626,3627

Local Sales Offices & Reps.

NJ	Haddonfield, M & S Assocs.	609-429-7055

™TORR SEAL - high vacuum sealer - Varian Assocs.

TORWICO
ELECTRONICS INC.

TORWICO ELCTRNS., INC., Dept. EM, Rte. 70, Lakewood, N.J. 08701, Tel: 201-364-1800, TWX: 201-363-1611; Empl.: 240 p. 4494,4495

Local Sales Offices & Reps.

Ariz	Phoenix, KCE Corporation	602-267-0061
Cal	Encino, KCE Corp.	213-990-0511
Cal	San Deigo, KCE Corporation	714-278-7640
Conn	North Haven, Northeast Reps.	203-239-2507
Fla	Orlando, Gra-Mar, Inc.	305-894-3351
Md	Baltimore, W.S. Warrington & Assoc.	301-823-8759
Mass	Needham Hgts., N.E. Reps., Inc.	617-449-3034
Mo	St. Charles, Buse Sls.	314-946-6430
NY	Fayetteville, H.C. Johnson	315-NE 7-9383
NY	Great Neck, Trionic	516-466-2300
NY	Rochester, H.C. Johnson	716-482-3000
NY	Williamsville, H.C. Johnson	716-632-7880
Ohio	Cincinnati, A.C. Wahl & Assocs.	513-821-3270
Ohio	Kent, Eljay Assoc.	216-666-3774
Pa	Ft. Washington, BGR Assocs.	215-643-4111
Pa	Glenshaw, H.C. Johnson Agencies	412-961-0414

™TORX - fastener drive system - Camcar

™T-O-T - sealant & pipe thread compound - Lake Chemical Co.

™TOUCH MOS - touch control technology - American Microsystems, Inc.

™TOX-EX - combustible & toxic gas alarms & indicators - Erdco Engrg. Corp.

TOYO COMM. EQUIP. CO. LTD., Dept. EM, 484 3 Chome Tsukakoshi, Kawasaki, Kanagawa, Japan, Tel: Tokyo 406-3355, TWX: 2423001 TOYOCO J; Empl.: 1800

™T-PADS - semiconductor pads - Transcon Mfg. Co.

TPL COMMUNICATIONS CO., Dept. EM, P.O. Box 1415, Gardena, Cal. 90247, Tel: 213-679-0131; Empl.: 35

Local Sales Offices & Reps.

Cal	Cupertino, Wallace & Wallace	408-996-2224
Cal	Los Angeles, Wallace & Wallace	213-747-0401
Colo	Denver, Connors Inc.	303-934-5829
Ga	Smyrna, B-C Elctrns. Sls.	404-436-5169
Ill	Chicago, Ellinger Sls.	312-763-1570
Kans	Shawnee Mission, Maury-Bettis Co.	913-362-0772
Mass	Bedford, Chamberlin & Murray	617-274-0044
Mich	Rochester, Cartwright Comm.	313-375-0420
Minn	St. Paul, Skor	612-645-6461
NJ	Fair Lawn, Moses & Kline	201-791-8538
NY	Liverpool, Lewis-Dunnigan Co.	315-622-2133
Ohio	Cincinnati, Cartwright Comm.	513-825-4202
Pa	Levitown, Sher Sls.	215-946-6200
Tex	Dallas, Maynard & Gunn Sls.	214-528-9090
Wash	Seattle, Fleehart & Sullivan	206-522-1533
Exp:	Hallandale, Fla., EMEC, Inc.	

™TP-100 - degreaser fluid - Barco Chem. Prods. Inc.

TRA-CON, INC., Dept. EM, 55 North St., Medford, Mass. 02155, Tel: 617-391-5550; Empl.: 35

Local Sales Offices & Reps.

Cal	Mountain View, K. Anderson Co.	415-961-6007
Colo	Denver, Cristee-Meade Co.	303-455-1084
Tex	Houston, Puffer Supp. Co.	713-668-9457

™TRA-BOND - adhesives - Tra-Con, Inc.

™TRA-CAST - potting compounds - Tra-Con, Inc.

™TRACER-FLO - hermetic leak tester - Trio-Tech, Inc. of Calif.

™TRACER-TECH - inspection penetrants - Shannon Luminous Mat'ls.

TRACEWELL ENCLOSURES, Dept. EM, 200 Montrose Way, Columbus, Ohio 43214

™TRACKER - servicemen's battery-operated portable leak detector - General Electric Co.

TRACOR, INC., Dept. EM, 6500 Tracor La., Austin, Tex. 78721, Tel: 512-926-2800, Telex: 776-414; Empl.: 3,250

Local Sales Offices & Reps.

Analytical Instrs.

Cal	Los Gatos, Tracor Instrs.	408-354-8187
Ga	Oakwood, Southern Analytical Co.	404-967-3331
Haw	Kaneohe, W.L. Yauger, Inc.	808-239-7187
Ill	Bensenville, Tracor Instrs.	312-595-2420
Ind	Indianapolis, Tech. Sls. & Mktg.	317-356-3658
NJ	Union, Tracor, Inc.	201-964-1631
Ohio	West Carrollton, P.J. Navin	513-434-8940
Tex	Austin, Targa, Inc.	512-476-1599
Tex	Austin, Tracor Instrs.	512-926-2800

Ind'l Instrs. Time & Frequency

Ala	Huntsville, BCS Assocs.	205-881-6220
Cal	Calabasas, M. Shovlowsky	213-348-3402
Fla	Ft. Lauderdale, BCS Assocs.	
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Midwest Microwave	312-283-4900
Md	Rockville, T E Corp.	301-340-0303
Mass	Waltham, Technical Entprs.	617-890-5300
NC	Greensboro, BCS Assocs.	919-273-1918
Pa	Melrose Park, R. Meyers Assoc.	
Wash	Seattle, Showalter-Judd, Inc.	206-624-9020

Ind'l Instrs. TV

Ala	Huntsville, BCS Assocs.	205-881-6220
Cal	Anaheim, Broadcast Comms. Devices	714-528-9505
Colo	Evergreen, Didier Denver	303-674-6000
Fla	Ft. Lauderdale, BCS Assocs., Inc.	
Fla	Orlando, BCS Assocs.	305-896-4881
Md	Rockville, T E Corp.	301-340-0303
Mass	Waltham, Technical Entprs.	517-890-5300
Mich	Milford, H.M. Dyer Elctrns.	313-685-2560
NC	Greensboro, BCS Assocs.	919-273-1918

Medical Instrs.

Cal	Fullerton, Electro Medical Instrumentation	714-526-7256
Cal	Oakland, J. Taylor & Assocs.	415-832-4056
Colo	Denver, Tracoustics	303-751-8681
Fla	Titusville, Tele-Acoustics	305-267-1600
Ga	Atlanta, Tracor, Inc.	404-633-9571
Ga	Austell, Telemetrics	404-252-1030
Ill	Chicago, Audiological Svc. & Supply Co.	312-281-1531
Md	Silver Spring, Creighton Assoc.	301-588-8528
Mass	Lawrence, Medical Engrg. Assoc.	617-683-8711
Minn	Minneapolis, Electro-Medic, Inc.	612-920-4777
Mont	Billings, Montana Precision Meas.	406-245-3296
NJ	Staten Island, Medacoustics, Inc.	212-979-4262
NY	New York, J.W. Manny	212-682-7955
NC	Chapel Hill, Monitor Inc.	919-967-2228
NC	Greenville, Carolina Acoustics	919-752-1436
Ohio	Cincinnati, S.K. Foster Assoc.	513-531-7020
Ohio	Cleveland, Environmental Technology Corp.	216-248-2250
Okla	Tulsa, Matrix	918-622-2602
Ore	Portland, Sanderson Safety Supply Co.	503-238-5700
SC	Greenville, Safeco Equip. Co.	803-233-2586
Tenn	Kingsport, Safeco Equip. Co.	615-246-4164
Tex	Austin, Tracoustics	512-444-1961
Wash	Seattle, Safety & Supply Co.	206-762-8500

Navigation

Cal	Sausalito, B.H. Ballard Co.	415-332-0105
Fla	Tampa, Promar	813-876-7677
La	Gretna, Maricon Instrs.	504-366-1842
Md	Rockville, T E Corp.	301-340-0303
Mass	Sudbury, Commercial Mktg. Assoc.	

™TRACTION BOOSTER - tractor draft control system - Allis-Chalmers

™TRACTORADIO - Applicable to Tractor radios - ATR Electronics, Inc.

™TRA-DUCT - conductive adhesives - Tra-Con, Inc.

™TRAILFLEX - cv-curved mining cables - CCS Hatfield Wire & Cable Group

™TRAKFET - tracking field effect transistor - Analog Devices

TRAK MICROWAVE CORPORATION, Dept. EM, 4726 E Eisenhower Blvd., Tampa, Fla. 33614, Tel: 813-884-1411, Telex: 52827; FSC No.: 12855; Empl.: 130 p. 2484,2485

Sales Manager: T.L. Roberts

Local Sales Offices & Reps.

Cal	Cupertino, Weil & Disman Assocs.	408-736-8232
Cal	Los Angeles, McDougall/McLaughlin Co.	213-477-8556
Colo	Denver, Omega Ltd.	303-758-1508
Fla	Pompano Beach, Cole-Tek Assocs.	305-781-8110
Ind	Ft. Wayne, TX Sales, Inc.	219-489-4447
Iowa	Cedar Rapids, J. R. Sales Engineering, Inc.	319-393-2232
Mass	Andover, Bawer-Bee Assocs.	617-475-2124
Mo	Hazelwood, Dy-Tronix, Inc.	314-731-5799
NY	Liverpool, R & D Assocs.	315-622-2350
NY	Tuckahoe, Asco Elctrns., Inc.	914-779-8110
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Cain & Co.	214-233-6809
Utah	Salt Lake City, Monarch Distributing & Representing	801-226-9617
Va	Woodbridge, M. Lader Co.	703-494-3321
Wash	Seattle, Datacom Assocs.	206-285-2525
Exp:	Stamford, Conn., Dage Corp.	203-324-3123

TRAK SYSTEMS, Div. TRAK Microwave Corp., Dept. EM, 4722E Eisenhower Blvd., Tampa, Fla. 33614, Tel: 813-884-1411, Telex: 52-827; FSC No.: 11165; Empl.: 42 p. 1686-1689

Sales Manager: Tom Roberts

Local Sales Offices & Reps.

Cal	Los Angeles, Mac Dougall/McLaughlin Co.	213-477-8556
Cal	Mountain View, Weil & Disman	415-965-4300
Fla	Largo, Synergetic Reps.	813-596-5331
Ga	Atlanta, Magarow & Assocs.	404-252-6609
Ill	Mt. Prospect, Cain & Co.	312-253-3578
Mo	Hazelwood, Dy-Tronix Inc.	314-731-5799
Mont	Independence, Dy-Tronix Inc.	816-737-1100
NJ	North Plainfield, Brady Co.	201-753-7988
NY	Liverpool, R & D Assocs.	315-622-2350
Ohio	Lancaster, Cain & Co.	614-654-4800
Pa	Lafayette Hill, M. Lader Co.	215-825-3177
Tex	Dallas, Cain & Co.	214-233-6809
Va	Woodbridge, M. Lader Co.	703-494-4731
Exp:	Stamford, Conn., Dage Corp.	203-324-3123

™TRAK-4 - continuous play tape transport - Tape-Athon Corp.

TRAM CORP., Dept. EM, Box 187, Winnisquam, N.H. 03289, Tel: 603-524-0622, TWX: 510-298-1125; Empl.: 170

Sales Manager: R. O'Callaghan

Local Sales Offices & Reps.

Ala	Birmingham, Mid-South Assocs.	205-854-2887
Cal	Redwood City, Sinai-Johnson	415-365-6263
Cal	Van Nuys, M. Roth Sls.	213-989-3738
Colo	Colorado Springs, Norris & Co.	303-576-3324
Fla	Tampa, J. Flanders & Assocs.	813-870-0521
Ill	Skokie, M. Berman Sls.	312-675-3740
Ind	Indianapolis, L. M. Devoe Co.	317-257-1227
Mass	N. Scituate, W. A. Hendrickson Co.	617-545-0652
Mich	Pleasant Ridge, Shalco	313-547-4771
Minn	Minneapolis, Kodo Assocs.	612-881-1255
Neb	Lincoln, Marketing Assocs.	402-464-5244
NY	Grand Island, L. J. McTaggart Assoc.	716-773-9222
Ohio	Medina, T. Grant	216-723-3696
Pa	Mt. Gretna, GWB Assocs.	717-272-3446
Tex	Houston, Ranger Elctrns.	713-529-2812
Wash	Bellevue, R. Merritt	206-746-7337

TRAN SPECTRA INC., Dept. EM, Box 9, Airport Rd., Greenfield, Tenn. 38230, Tel: 901-235-2218; Empl.: 150

Sales Manager: T.M. Smith

Local Sales Offices & Reps.

Ariz	Phoenix, H. Premil Sls. Co.	602-939-6787
Cal	Los Altos, Schwenin Assocs.	415-941-3737
Cal	San Diego, Van Gott & Assocs.	714-273-4797
Cal	San Gabriel, Van Gott & Assocs.	213-285-2148
Conn	Thomaston, Electro Prods. Sls.	203-235-4040

Fla	Palm Beach Gardens, Brosey Ents.	305-622-6045
Ga	Roswell, Electro-Services, Inc.	404-993-0389
Ill	Palatine, Ray E. Berg Jr.	312-991-3081
Ind	Indianapolis, L. M. DeVoe Co.	317-257-1227
Mass	Waltham, Electro Prods. Sls.	617-899-1570
Minn	Bloomington, Electronic Sls. Agcy., Inc.	612-884-8291
Mo	Lake Lotawana, Lotronics	816-578-4498
NJ	Clifton, A. Clarfield	212-757-6454
NY	Fairport, RBG Sls.	716-377-1390
Ohio	Cleveland, Electro-Com	216-886-2404
Ohio	Dayton, Electro-Com	513-898-5140
Ore	Portland, Electronic Comp. Sls.	503-244-4688
Pa	Paoli, Tyler Griffin Co.	215-647-1550
Tenn	Nashville, Electro-Svcs., Inc.	615-373-9362
Tex	Dallas, West & Assocs., Inc.	214-661-9400

TRANEX INC., Dept. EM, 1599 Stierlin Rd., Mountain View, Cal. 94043, Tel: 415-968-9292; FSC No.: 17474; Empl.: 130

Local Sales Offices & Reps.

Cal	Santa Ana	714-835-8684
Colo	Colorado Springs	303-392-3432

TRANS-MET ENGRG., Dept. EM, 601 S. Palm St., La Habra, Cal. 90631, Tel: 213-691-2266; Empl.: 15

Local Sales Offices & Reps.

Ala	Huntsville, Burmette Techno-Metrics	205-837-5860
Cal	Laguna Beach, I.N.S.S.	714-497-1815
Cal	Redwood City, Marchi Assocs.	415-364-3411
Colo	Denver, Tessco	303-744-1119
Conn	Westport, A. J. Abrams	203-226-3010
Fla	Maitland, Wade H. Boggs Sls. Eng. Rep	305-647-2226
Haw	Mililani Town, H.C. Burgess & Assocs.	808-623-3118
Ill	Chicago, Thermo/Cense	312-792-2760
Iowa	Des Moines, H.E. Ferris Co.	515-255-1757
Minn	Minneapolis, Arjay Sls.	612-854-4972
NJ	Cinnaminson, Control Equip.	609-829-1447
NJ	Springfield, R.J.M. Sls. Co.	201-467-1210
NY	East Rochester, Thermal Systems	716-377-1970
NC	Matthews, W.K. Hile Co.	704-847-9125
Ohio	Brecksville, D & B Engr	216-526-6320
Ohio	Cincinnati, G. Drysdale & Assoc	513-528-2200
Pa	Pittsburgh, Process Eng	412-561-5050
Tenn	Knoxville, Hile Controls	615-573-0700
Tex	Pasadena, Askco	713-472-3688
Va	Chester, Hile Controls	804-737-1721
Exp:	Conn., New Haven, Masten-Wright Corp	203-288-1638

TRANS-SONICS, INC., Dept. EM, P.O. Box 326, Lexington, Mass. 02173, Tel: 617-272-1000, TWX: 710-332-1635; Empl.: 93

TRAN-TEC CORPORATION, Dept. EM, Box 1022, Columbus, Neb. 68601, Tel: 402-564-2748; Empl.: 30

Local Sales Offices & Reps.

Cal	Redwood City, Woodworth Co.	415-365-0252
Cal	Santa Fe Springs, Sierra-Pacific Engrg. Co.	213-921-9634
Colo	Aurora, Robbins & Assocs.	303-343-7728
Fla	Pinellas Park, Russell Assocs.	813-526-1134
Ga	Atlanta, Russell Assocs.	404-225-8422
Ind	Indianapolis, Scott Elctrns, Inc.	317-897-9976
Iowa	Cedar Rapids, J. VRBIK Co.	319-366-8733
Md	Bel Air, Russell Assocs.	301-879-9180
Mass	Wakefield, H.C. Jappe Co.	617-245-9359
Mich	Milford, Polyphase	313-685-3003
NJ	Fair Haven, Russell Assocs.	201-747-0600
NY	Bay Shore, Russell Assocs.	516-666-6500
NY	Syracuse, Naylor Electric Co.	315-656-2251
Ohio	Cleveland, D. Steffen & Assocs.	216-461-8333
Tex	Dallas, Russell Assocs.	214-369-3173
Wash	Bellevue, Russell Assocs.	206-455-3694
Exp:	Schenectady, N.Y., EMB Elctrns. Corp.	518-372-5841

TRANS AMERICAN TRANSFORMER, Dept. EM, 142 Peconic Ave., Medford, N.Y. 11763, Tel: 516-654-1880

Sales Manager: W. Kolb

TRANS-TECH, Dept. EM, 12 Meem Ave., Gaithersburg, Md. 20760, Tel: 301-948-3800, TWX: 89-8303 710-828-0549; FSC No.: 14591; Empl.: 45; Minimum order: $E.T. Fleming

Sales Manager: E.T. Fleming; *Distributor Manager:* E.T. Fleming

Local Sales Offices & Reps.

Cal	Orange, J.E. Hachten Co.	714-998-6020
Cal	Palo Alto, J.E. Hachten Co.	415-326-1252
Exp:	Md, Gaithersburg, Trans. Tech. International Sls. Corp.	301-948-3800

TRANS-TEK, INC., Dept. EM, Rte. 83, Ellington, Conn. 06029, Tel: 203-872-8351, Telex: 99207; FSC No.: 27109; Empl.: 26

™TRAN BAL - inverter ballast - Bodine Co.

™TRANSACTIVE DPIS - compact DPIs with added circuit functions - Analogic Corp.

™TRANS-BOX - plastic boxes - Vichék Plastics Co.

™TRANSCALE - crane load indicator - Trans-Sonics, Inc.

™TRANSCAP - hi capacitance ceramic capacitors - Erie Technological Products

TRANSCO PRODS., INC., Dept. EM, 4241 Glencoe Ave., Venice, Cal. 90291, Tel: 213-821-7911, TWX: 910-343-6469; Empl.: 358

Local Sales Offices & Reps.

Cal	San Jose, B. F. Helms	408-268-2325
Fla	Clearwater, Southeastern Comp. Sls.	813-447-1911
Md	Ellicott City, VPI, Inc.	301-465-4060
NH	Concord, R. C. Bishop	617-891-1683
NY	Bayside, R. L. Diamond Inc.	212-423-7330
Ohio	Middletown, W. Tudor Morris	513-423-0332
Tex	Richardson, W. C. Cloyd	214-231-0597

TRANSCOM ELECTRONICS, INC., Dept. EM, Box 9, La Mesa, Cal. 92041, Tel: 714-460-4181, TWX: 910-322-1345; Empl.: 10

TRANSCON MFG. CO., Dept. EM, 2655 Perth St., Box 20825, Dallas, Tex. 75220, Tel: 214-357-8301; Empl.: 16

Sales Manager: T. Seybert

TRANSDATA INC., Dept. EM, P.O. Box 518, Dublin, Ohio 43017, Tel: 614-885-9891, Telex: 246-686; Empl.: 35

Local Sales Offices & Reps.

Ark	Little Rock, C. H. Stout	501-374-8201
Cal	Oakland, W. Nott Co.	415-654-3747
Conn	Ridgefield, Bell Controls	203-438-7808
Fla	Maitland, Rowe Engrg. Sls.	305-834-2700
Fla	St. Petersburg, Rowe Engrg. Sls.	813-522-6317
Ill	Glen Ellyn, J. T. Becker Assoc.	312-858-1911
Ind	Indianapolis, Utility & Indl. Prods.	317-924-3607
La	New Orleans, C. H. Stout of La.	504-486-3707
La	Shreveport, C. H. Stout of Shreveport	318-425-5485
Miss	Clinton, C. H. Stout of Mississippi	601-924-7611
Mo	St. Louis, Electrorep	314-872-7300
NH	Nashua, Bell Controls	603-882-6984
Ohio	Cleveland, Weschler Elec. Co.	216-251-4609
Ohio	Dayton, Mohawk Intronics	513-434-8873
Pa	Media, Systems Control Assoc.	215-565-2077
Pa	Pittsburgh, Muller, Harper & Assoc.	412-931-6460
Tenn	Memphis, C. H. Stout of Tenn.	901-362-1616
Tex	Houston, Gettys-Eads-Adair	713-781-3005

TRANSDUCERS, INC., Dept. EM, 12140 E. Rivera Rd., Whittier, Ca. 90606, Tel: 213-945-3741, TWX: 910-586-1899; FSC No.: 23796; Empl.: 103

Local Sales Offices & Reps.

Ala	Huntsville, Int'l. Scientific Instrs.	205-533-6880
Alas	Anchorage, Cessco	907-277-5923
Ariz	Scottsdale, Inter-Mountain Engrg. Co.	602-947-7379
Cal	Mountain View, Manco	415-964-7281
Cal	San Diego, L.L. Stoakes, Inc.	714-274-6281
Colo	Arvada, Figaro-Klebba Assocs.	303-424-0108
DC	Washington, Wright Co., Inc.	202-296-0979
Fla	Orlando, R. J. Cheney & Assocs.	305-894-7371
Ill	Chicago, SEA, Inc.	312-282-6694
Ind	Carmel, SEA, Inc.	317-846-2593
Iowa	Cedar Rapids, Tech. Representatives	319-396-5662
Kans	Olathe, Tech Representatives, Inc.	913-782-1177
La	Baton Rouge, Rise, Inc.	504-766-4645
La	Harvey, Rise, Inc.	504-362-4405
La	Lafayette, Rise, Inc.	318-234-0178
Md	Gaithersburg, Wright Co., Inc.	301-840-1928
Mass	Norwood, Hoder-Rogers, Inc.	617-762-6564
Mich	Farmington, Carter McCormic & Peirce, Inc.	313-477-7700
Minn	Minneapolis, SEA, Inc.	612-425-4455
Miss	Jackson, Rise, Inc.	601-354-2163
Mo	Hazelwood, Tech Representatives	314-731-5200
NM	Albuquerque, IMEC Co.	505-883-9010
NY	Depew, Labtronics, Inc.	716-685-4111
NY	Syracuse, Labtronics, Inc.	315-454-9314
NY	Ulster Park, Labtronics, Inc.	315-454-9314
NC	Charlotte, General Elctrns. of Charlotte	704-392-3586
Ohio	Cleveland, Carter, McCormic & Peirce, Inc.	216-333-5650
Ohio	Dayton, Carter, McCormic & Peirce, Inc.	513-278-5873
Ore	Portland, Brett Associates, Inc.	503-232-4184
Pa	Abington, Bach-Stewart Assocs.	215-885-1550
Pa	Monroeville, Carter, McCormic & Perice	412-372-4415
RI	Rumford, R. J. Hoder	401-438-2726
Tex	Dallas, R. Martin Associates	214-361-8584
Tex	Houston, R. Martin Assoc.	713-444-2944
Va	Roanoke, Process Specialties	703-345-5683
Va	Rockville, Virgina Meter & Controls Co.	804-285-4228
Wash	Seattle, Brett Associates, Inc.	206-935-8054
Wisc	Waukesha, SEA, Inc.	414-547-6637

™TRANSELECTRIC - telephone apparatus - Encom Prods. Co., Inc.

™TRANSFILTER - ceramic filters - Vernitron Piezoelectric Div.

TRANSFORMER TECHNICIANS, INC., Dept. EM, 4447 W. Armitage Ave., Chicago, Ill. 60639, Tel: 312-276-3110; Empl.: 92

TRANSICOIL, INC., Dept. EM, Worcester, Pa. 19490, Tel: 215-277-1300, TWX: 510-660-0132; Empl.: 175

Sales Manager: P. Schoenacher Off & Govt.

Local Sales Offices & Reps.

Ariz	Scottsdale, Runyon Co.	602-959-6060
Cal	Altadena, Don Murray Entprs.	213-681-5031
Fla	Palm Beach Gardens, Reynolds & Assocs.	305-622-4336
Fla	Satellite Beach, Reynolds & Assocs.	305-773-4700
Fla	St. Petersburg, Reynolds & Assocs.	813-360-1484
Ill	Rosemont, P D S Sls.	312-299-2284
Kans	Overland Park, ENSCO-REP, Inc.	913-381-7557
Md	Baltimore, Stemler Assocs., Inc.	301-944-8262
Mass	Wakefield, M.E.C.O.	617-245-4870
Mo	St. Louis, ENSCO-REP, Inc.	314-567-3935
NJ	Cherry Hill, Stemler Assocs., Inc.	609-966-4070
NJ	Clifton, Avionics Engrg. Sales, Inc.	201-772-1956
NY	Buffalo, Bowser & Sapecky Assocs., Inc.	716-839-4170
NY	Manlius, Bowser & Sapecky Assocs., Inc.	315-682-8885
Pa	Warminster, Stemler Assocs.	215-441-0433
Va	Alexandria, Stemler Assoc.	703-548-7818
Wash	Bellevue, W.M. Buehler Co.	206-455-5512
Exp:	Pa., Worcester, Transicoil	215-277-1300

™TRANSISTAR - chemicals - Mallinckrodt, Inc.

TRANSISTOR DEVICES, Dept. EM, 85 Horsehill Rd., Cedar Knolls, N.J. 07927, Tel: 201-267-1900; Empl.: 240

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assocs.	205-883-7893
Cal	Costa Mesa, FLW Inc.	714-751-7512
Cal	Cupertino, E. Reid Miller	408-257-6927
Fla	Orlando, Technology Mktg Assocs.	305-857-3760
Fla	Pompano Beach, Technology Mktg. Assoc.	305-942-0774
Ill	Elmhurst, Scott Assocs.	312-279-5681
Md	Ellicott City, Dyna-Rep Co.	301-992-4350
Mass	Lexington, E.F. Delfino, Inc.	617-862-1118
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NY	Vestal, Systems Hardware Reps.	607-729-6339
Ohio	Medina, McShane Inc.	216-725-4568
Pa	Fort Washington, GCM Inc.	215-646-7535
Tex	Lewisville, J. Hughes Co.	817-430-1683
Va	Alexandria, Dyna-Rep Co.	703-354-1222
Exp:	New York, N.Y., Singer Products	212-432-1400

TRANSISTOR SPECIALTYS, Dept. EM, 484 Lowell St., Peabody, Mass. 01960, Tel: 617-535-1533; FSC No.: 54485; Empl.: 15

Sales Manager: T. Parsons

Local Sales Offices & Reps.

Cal	El Toro, Elctrn. Component Mktg.	714-830-3939
Cal	San Diego, Elctrn. Component Mktg.	714-295-6122
Cal	Woodland Hills, Elctrn. Component Mktg.	213-340-1745
Ind	Fort Wayne, T. X. Sls.	219-489-4447
Md	Glen Burnie, Micro Comp.	301-761-4600
Mass	Burlington, Dynamic Sls. New England	617-272-5676
NJ	Wallington, Comp-Tech Sls.	201-935-5454
NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
Ohio	Chagrin Falls, Midwest Mktg. Assocs.	216-247-6655
Ohio	Dayton, Midwest Mktg. Assocs.	513-433-2511

TRANSITRON ELCTRN. CORP., Dept. EM, 168 Albion St., Wakefield, Mass. 01880, Tel: 617-245-4500, TWX: 710-643-6718; Empl.: 4200

Local Sales Offices & Reps.

Ala	Huntsville, A. B. Andrews	205-837-5382
Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	Norwalk, Bertrand & Zoolalian	213-921-9791
Cal	San Diego, Hadden Assocs.	714-565-9444
Cal	Santa Clara, I² Inc.	408-985-0400
Colo	Boulder, R. G. Entprs.	303-447-9211
Conn	Orange, CPS Corp.	516-741-8966
Fla	Ft. Lauderdale, Semtronic Assocs.	305-771-0010
Ill	Park Ridge, R. F. Specialists	312-835-1006
Ind	Ft. Wayne, R. F. Specialists	219-485-8982 S0110
Kans	Lenexa, Palatine Sls.	913-492-7020
Md	Fairplay, Matrix Sls. Assocs.	301-582-3332
Mass	Methuen, Matrix SLs.	617-682-5576
Mich	Farmington Hills, W. R. Hummon Assocs.	313-474-0661
Minn	Minneapolis, Elctrn. Innovators	612-884-7472
Mo	St. Louis, Palatine Sls.	314-426-7055
NJ	Moorestown, Brindley Assocs.	609-235-1628
NY	Fayetteville, Graydon-Sherman	315-637-0861
NY	Garden City, Comtronic Assocs.	516-741-8966
NC	Raleigh, A. B. Andrews	919-833-5567
Ohio	Dayton, Buckeye Comps.	513-278-4279
Ohio	Dayton, Electro Com	513-898-5140
Wash	Seattle, Earl & Brown Co.	209-284-1121
Exp:	W. Germany, Munich, Transitron Elctrn. G.M.B.H.	

™TRANSLCON - —transistor socket - Molex Inc.

TRANSMAGNETICS, INC., Dept. EM, 210 Adams Blvd., Farmingdale, N.Y. 11735, Tel: 516-293-3100, TWX: 510-224-6420; FSC No.: 17755; Empl.: 28 p. 1685

Local Sales Offices & Reps.

Cal	Campbell, Sedillo Co.	408-374-5220

TRANSMED SCIENTIFIC, see Biocom, Inc.

™TRANS–O–MATIC - automatic transfer switch - Lakeshore Electric Corp.

TRANSPARENT CONDUCTORS INC., Dept. EM, 26 Coromar Dr., Box 549, Goleta, Cal. 93017, Tel: 805-968-3561, TWX: 910-334-1180; Empl.: 10

Sales Manager: D. Feldman

Local Sales Offices & Reps.

Nev	Las Vegas, Signalite Corp.	702-384-3330

Advertisement

Manufacturer of Liquid Crystal Displays featuring Hermetically sealed large area displays for applications such as Changeable Signs, Clocks, Visual Paging Systems, Scoreboards, Remote Readouts and other displays requiring Long Distance and/or Large Audience and/or High Ambient Light Viewing. Quotations for Custom LCD Requirements are invited.

™TRANS-START - electrical controls - Electric Machinery Mfg. Co.

TRANSTECTOR SYSTEMS, Dept. EM, 532 Monterey Pass Rd., Monterey Park, Cal. 91754, Tel: 213-283-9278, Telex: 698-353; FSC No.: 30992; Empl.: 27; Minimum order: $R. Odenberg

Sales Manager: F. Honorof; *Distributor Manager:* R. Odenberg

™TRANSVOLT - standard voltage - Guildline Instrs., Inc.

™TRANSZORB - silicon transient suppressor - General Semiconductor Industries, Inc.

™TRAVEL-TRON - campor TV antenna - ACA

™TREASURETRON - metal detector - Gardiner Elctrns.

TRENDAR, Dept. EM, 630 Clyde Ave., Mountain View, Cal. 94040, Tel: 415-965-0350, TWX: 910-379-6573; FSC No.: 53431; Empl.: 50

Sales Manager: D. Harter

Local Sales Offices & Reps.

Ala	Huntsville, BSC Assoc.	205-881-6220
Ariz	Scottsdale, Barnhill 3	602-947-7841
Cal	Burbank, Instrument Specialists	213-849-7181
Cal	San Diego, Instrument Specialists	714-278-7752
Cal	Santa Clara, Instrument Specialists	408-244-1505
Colo	Denver, Barnhill 3	303-750-1222
Conn	Glastonbury, Instrument Rep	203-633-0777
Fla	Orlando, BCS Assoc.	305-896-4881
Ill	Des Plaines, CCI Sls. Group	312-298-3600
Ind	Indianapolis, CCI Sls. Group	317-244-2456
Md	Kensington, Mid-Atlantic Sls. Group	301-881-3370
Mass	Lexington, Instrument Rep	617-861-8620
Mich	Madison Heights, WKM Assoc.	313-588-2300
Minn	Minneapolis, CCI Sls. Group	612-884-4336
Mo	Kansas City, CCI Sls. Group	816-454-5836
Mo	St. Louis, CCI Sls. Group	314-423-1234
NJ	Clifton, SBM Assoc.	201-778-4040
NM	Albuquerque, Barnhill 3	505-299-7658
NY	Pleasantville, SBM Assoc.	914-769-1811
NY	Rochester, SBM Assoc.	716-226-1400
NC	Greensboro, BCS Assoc.	919-273-1918
Ohio	Cleveland, WKM Assoc.	216-267-0445
Ohio	Dayton, WKM Assoc.	513-434-7500
Ore	Beaverton, Showalter Instrs.	503-646-5196
Pa	King of Prussia, CCI Sls. Group	215-265-4040
Pa	Pittsburgh, WKM Assoc.	412-892-2953
Tex	Austin, Barnhill 2	512-444-2377
Tex	Houston, Barnhill 2	713-688-9971
Tex	Richardson, Barnhill 2	214-231-2573
Wash	Bellevue, Showalter Instrs.	206-455-4922

™TRENDSCAN - data acquisition system - Leeds & Northrup Co.

™TRENDTRAK - curve follower program control unit - Leeds & Northrup Co.

™TREVAR - alloy - Hamilton Technology, Inc.

™TREVAR-PS - alloy - Hamilton Technology, Inc.

TRG,, Div. of Alpha Inds., Dept. EM, 20 Sylvan Rd, Woburn, Mass. 01801, Tel: 617-935-5150, TWX: 710-393-1236; FSC No.: 53536; Empl.: 50

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs., Inc.	205-534-9771
Cal	Cupertino, Dura Electronic Sales	408-255-2084
Cal	Los Angeles, Cain Technology	213-476-2251
Fla	Orlando, Gentry Assocs., Inc.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Elk Grove Village, L. F. Green & Assocs.	312-593-0282
Ind	Indianapolis, L. F. Green & Assocs.	317-293-9827
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000
Md	Glen Burnie, Microcomp	
Mass	Lexington, Lancer Assoc.	617-861-1720
Mich	Detroit, Comtel-Sterling	313-255-1970
Minn	Minneapolis, L. F. Green & Assocs.	612-781-1611
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
NY	Huntington, CDB Entprs., Inc.	516-692-5200
NC	Burlington, Gentry Assocs., Inc.	919-227-3639
Ohio	Cleveland, Comtel-Sterling	216-442-8080
Pa	Pittsburgh, Comtel-Sterling	412-922-5720
Tex	Garland, Vector Sls.	214-276-4518
Wash	Renton, S. Wilson Co.	206-226-0650

TRI-COM, INC., Dept. EM, 12216 Parklawn Dr., Rockville, Md. 20852, Tel: 301-770-5585; Empl.: 35

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier	205-536-5650
Ariz	Tucson, G. Moore Assocs.	602-795-3176
Cal	Los Alamitos, Scientific Devices	213-598-7678
Colo	Boulder, Grady Moore Associates	303-494-0398
Md	Greenbelt, F. Riffe Assocs.	301-474-8600
Mass	Wayland, Wayland Engrg. Sls.	617-655-6080
NM	Albuquerque, G. Moore Assocs.	505-292-3322
NY	Melville, Astrorep Inc.	516-423-2266
Tex	Arlington, John T. Houston Associates	817-265-2931

TRI CORP., Dept. EM, 505 W. Olive Ave., Sunnyvale, Cal. 94086

TRI-DATA CORP., Dept. EM, 800 Maude Ave., Mountain View, Cal. 94043, Tel: 415-969-3700, TWX: 910-379-6978; Empl.: 173

Local Sales Offices & Reps.

Fla	Orlando, E.G. Holmes & Assocs.	305-894-8901
Ga	Chamblee, E.G. Holmes & Assocs.	404-451-6161
Kans	Mission, Inland Assocs.	913-362-2366
Mo	Glencoe, Inland Assocs.	314-938-4992
NJ	Cherry Hill, Williams Assocs.	609-424-4110
NJ	Fort Lee, Tri-Data Corp.	201-947-2092
Va	Virginia Beach, E.G. Holmes & Assocs.	804-481-6556

TRI-EX TOWER CORP., Dept. EM, 7182 Rasmussen Ave., Visalia, Cal. 93277, Tel: 209-732-8383; Empl.: 31

Sales Manager: C.C. Blyleven

Local Sales Offices & Reps.

Cal	Los Angeles, Wallace & Wallace	213-747-0401
Cal	Redwood City, Logan Sls.	415-369-6726
Colo	Denver, K–C Marketers	303-733-5561
Conn	Wallingford, Adams-McGregor	203-269-5816
Ga	Atlanta, J.E. Joyner & Assoc.	404-691-1776
Iowa	W. Des Moines, Irvine Assocs.	515-225-7900
Mass	Scituate, Adams-McGregor	617-545-2213
Mich	Rochester, Webster Comms.	313-375-0420
NY	Flushing, Bettan Sls.	212-591-7600
RI	Lincoln, Adams-McGregor	401-726-1300
Tex	Dallas, I. Harrison Co.	214-239-2479
Va	Springfield, G. Sly Assocs.	703-569-1200
Wash	Seattle, Fleehart & Sullivan	206-522-1533

TRI-SAGE INC., Dept. EM, 1212 Pittsford-Victor Rd., Pittsford, NY 14534, Tel: 716-381-2220, TWX: 510-253-1532; FSC No.: 52992; Empl.: 100

Local Sales Offices & Reps.

Ala	Gadsden, Nickerson Co.	205-547-7718
Ariz	Tempe, Sedco Sls.	602-968-7791
Cal	Lafayette, Phillips Assocs.	415-284-2579
Cal	Newport Beach, W. B. Knight Co.	714-883-8250
Conn	Milford, Todino Engrg. & Sls. co.	203-874-6643
Fla	Oldsmar, Nickerson Co.	813-855-4209
Kans	Shawnee Mission, Technical Sls. Assocs.	913-888-3330
Md	Baltimore, B. White & Co.	301-484-5400
Mass	Needham Hgts., Todino Engrg. & Sls. Co.	617-444-7925
Minn	Minneapolis, D. G. Perry & Co.	612-920-3212
Mo	St. Louis, Technical Sls. Assocs.	314-725-5361
NJ	Englewood Cliffs, E. Glass Assocs.	212-586-8440
NC	Franklin, Nickerson Co.	704-524-6363
NC	Kannapolis, Nickerson Co.	704-932-6772
Ohio	Vandalia, W. J. Brauer & Assoc.	513-898-1224
Ohio	Wichliffe, W. J. Brauer & Assoc.	216-943-0601
Okla	Bixby, E. B. Robertson Co.	918-369-5688
Pa	Ardmore, W.K. Metz	215-649-3966
Pa	Pittsburgh, W. J. Brauer & Assoc.	412-921-3213
Tex	Dallas, E. B. Robertson Co.	214-942-2716
Tex	Houston, E. B. Robertson Co.	713-785-6800
Wash	Seattle, Underwood & Underwood	206-243-2133

TRI-TRONICS CO. INC., Dept. EM, 619 Enterprise Drive, Dept. EE, Oak Brook, Ill. 60521, Tel: 312-654-3255; Empl.: 20

Local Sales Offices & Reps.

Ark	North Little Rock, Jordan/Marlar/Hale, Inc.	501-378-0421
Colo	Golden, J.F. Hurlbut Co.	303-279-7796
Conn	West Hartford, A. Hatton Assoc.	203-233-3613
Fla	Clearwater, J.J. Galleher Co.	813-461-7707
Ga	Atlanta, Kennon-Frazier Co.	404-351-4063
Ill	Aurora, Dwight Smith & Assoc.	312-896-0828
Iowa	Davenport, Volco Co.	319-326-5233
Iowa	Des Moines, Volco Co.	515-283-1650
Kans	Shawnee Mission, Walter Hickman Co.	913-362-8066
Md	Glen Burnie, Faber-Renoff, Inc.	301-768-4554
Mass	Norwell, Bordewieck Eng. Sls. Co.	617-659-4915
Minn	Minneapolis, Volco Co.	612-933-6631
Mo	St. Louis, Pem Sls. Co.	314-427-7200
Neb	Omaha, Volco Co.	402-393-5141
NJ	Clifton, Faber Assocs.	201-773-8900

NY Rochester, T.F. Humnicky Assocs. 716-254-3640
NC Charlotte, L.P. Spoon Co. 704-372-3290
Ohio Columbus, Rockford Controls Ohio Inc. 614-231-5890
Ohio Dayton, Rockford Controls Ohio Inc. 513-898-5452
Ohio Euclid, Rockford Controls Ohio Inc. 216-731-5250
Pa Abington, Back-Stewart Assocs. 215-885-1550
Tenn Memphis, Jordan/Marlar/Hale, Inc. 901-452-7441
Tenn Nashville, Jordan/Marlar/Hale, Inc. 615-361-3006
Tex Bellaire, Cactus Engrg. Co. 713-665-2723
Tex Dallas, Dwayne Clement & Assoc. 214-341-5860
Utah Salt Lake City, J. F. Hurlbut Co. 801-229-4034
Va Richmond, Virginia Tech. Assoc. 703-266-9654
Wash Seattle, H. M. Denny Co. 206-282-7200
Exp: Conn., Cheshire, Techmark Corp. 203-272-3559

TRIAC ELECTRONICS, Dept. EM, 200 Park Ave., Ste. 303E, New York, N.Y. 10017, Tel: 212-687-0620; Empl.: 24

(TM) TRIAC KOOLER - heat dissipator - UNITRACK Div.

TRIAD-UTRAD, Distributor Svcs., Dept. EM, 305 N. Briant St., Huntington, Ind. 46750, Tel: 219-356-6500, TWX: 810-333-1532; Empl.: 450 p. 4497-4502

Local Sales Offices & Reps.
Ala Birmingham, Henry W. Phillips Co. 205-967-5248
Alas Anchorage, H.J. Lang & Assocs. 907-279-5741
Ariz Phoenix, Shefler-Kahn Co. 602-257-9015
Ark El Dorado, D. Bellew Sls. Co. 501-863-8325
Cal No. Hollywood, J. Carter 213-980-3450
Cal Redwood City, Logan Sls. Co. 415-369-6726
Colo Denver, McLoud & Raymond Co. 303-756-1589
Conn Madison, A&M Elctrn. Reps. 203-421-4242
Fla Bradenton, Hutton-Haskins-Peregoy 813-755-4015
Fla Maitland, Hutto-Hawkins-Peregoy 305-831-2474
Fla Pompany Beach, Hutto-Hawkins-Peregoy 305-831-2474
Ga Rosewll, H. W. Phillips Co. 404-992-3070
Haw Honolulu, Hawaii Elctrn. Svc. 808-845-8207
Ill Wilmette, J. Wasserman Assocs. 312-256-3566
Ind Indianapolis, New/Era Sls. 317-299-3400
Iowa Des Moines, T. L. Dowell, Inc. 515-225-1620
Kans Overland Park, T.L. Dowell, Inc. 913-236-8200
La Kenner, D. Bellew Sls. Co. Inc. 504-443-3237
Md Catonsville, Pecore Assocs. 301-744-4434
Mass Needham, A&M Elctrn. Reps. 617-444-8170
Mich St. Clair Shores, J.M. Thorpe Co. 313-779-6363
Minn Minneapolis, C.R. Gibb Co. 612-377-1200
Mo St. Louis, T.L. Dowell, Inc. 314-968-4234
NM Albuquerque, Shefler-Kahn Co. Inc. 505-296-0749
NY Rochester, Marsey Sls. 716-442-9700
NY Rockville Centre, Willgold Elctrn. Sls. Corp. 516-764-4022
NC Charlotte, H. W. Phillips Co. 704-394-5544
Ohio Cincinnati, F.E. Kahsar Sls. 513-471-9011
Ohio Hudson, F.E. Kahsar Sls. 216-653-6808
Okla Tulsa, J.Y. Schoonmaker 918-936-1423
Ore Portland, J.J. Backer Co. 503-297-3776
Ore Salem, J. J. Backer Co. 503-362-0717
Pa Abington, Mid-Atlantic Sls. Co. 215-657-2815
Pa Pittsburgh, Trymax Co. 412-823-8400
Tenn Memphis, D. Bellew Sls. Co. 901-365-9437
Tex Dallas, J. Y. Schoonmaker Co. 214-357-8481
Tex Houston, J. Y. Schoonmaker Co. 713-926-9510
Va Norfolk, Pecore Assocs. 804-420-1332
Wash Seattle, J.J. Backer Co. 206-285-1300
Exp: Westbury, N.Y., Minthorne Int'l. 516-334-3303

TRIANGLE PWC, Dept. EM, Box 711, New Brunswick, N.J. 08903, Tel: 201-745-5500, TWX: 844 426, 710-480-6240

Sales Manager: S. Fishman

Local Sales Offices & Reps.
Ala Birmingham, J. Gasque & Assoc. 205-879-4167
Cal Los Angeles, H. Kemp 213-723-3687
Cal San Francisco, R. Wallace 415-824-8701
Colo Denver, R. Glover 303-934-6550
Conn New Haven, R. Paynter Co. 203-624-5161
Fla Brandon, Swanson & Co. 813-685-4864
Ga Atlanta, Berry-Elsberry 404-355-9296
Ill Elk Grove Village, Electri-Agency 312-439-5030
Ind Indianapolis, Lester Sls. 317-783-9251
Iowa Cedar Rapids, Bertsch Elec. Sls. 319-366-7719
Kans Shawnee Mission, Stover & Assoc. 913-649-6600
La Harahan, Mackenroth & Robbins 504-733-7524
Md Baltimore, Downie Turner Buress 301-889-3470
Mass Waltham, Cornwall Assoc. 617-891-8030
Mich Oak Park, Electrical Matls. 313-541-1650
Minn Minneapolis, Dunn Sls. 612-831-4887
Mo Kirkwood, Martin Elec. Sls. 314-966-8659
NJ Milltown, W.F. O'Connor 201-828-5454
NY New Hartford, W. Laver 315-724-2304
NY Port Chester, Leary Assoc. 212-597-2250
NY Rochester, E. Cook 716-865-0179
NC Charlotte, J. Cushman 704-523-3312
Ohio Cincinnati, Goldschmidt Sls. 513-586-0080
Ohio Cleveland, G. Stofer 216-333-0733
Ore Portland, Shaffer & Nelson 503-234-7437
Pa Upper Darby, McDevitt Iuliucci 215-449-8100
Tenn Memphis, J. Billingsley 901-767-3945
Tex Dallas, J. Tuite 214-381-2103
Tex Houston, C. Menger 713-688-9839
Utah Salt Lake city, Shaffer & Nelson 801-484-3362
Wash Seattle, Shaffer & Nelson 206-523-0664
Wisc Milwaukee, Cantrell Elec. Sls. 414-355-5574
Exp: N.J., New Brunswick, S. Fishman 201-745-5500

(TM) TRI-BAND - 3-band antenna - Telrex Labs.

(TM) TRI-BEAM - u.v. ray generators - Western Coil & Elec. Co.

(TM) TRI-BREAK - circuit breakers - General Elec. Co.

(TM) TRI/CLAD - motors, generators, frequency converters - General Elec. Co.

(TM) TRICOLOR - color temp. meter - Photo Research Corp.

TRIDAIR INDS., Rexnord Co., Dept. EM, 3000 W. Lomita Blvd., Torrance, Calif. 90505, Tel: 213-530-2200, Telex: 67-7490; Empl.: 300

TRIDAK, INC., Dept. EM, Del Mar Dr., Brookfield, Conn. 06804, Tel: 203-744-3060

(TM) TRIGAC - trigonometric analog converters - Singer Co.

(TM) TRIGARD - 3 electrode spark gap - Joslyn Elctrn. Sys.

(TM) TRIG-R-HEAT - soldering gun - Wall-Lenk Mfg. Co.

(TM) TRIMATRON - dimmer control - Leviton Mfg. Co., Inc.

(TM) TRIMIT - potentiometer - Bourns, Inc.

(TM) TRIM KITTM - capacitor kit - American Technical Ceramics

(TM) TRIMLINE - PC mounting variable delay line - ESC Elctrns. Corp.

TRIMM, INC., Dept. EM, 400 W. Lake, Box 489, Libertyville, Ill. 60048, Tel: 312-362-3700; Empl.: 90; Minimum order: $R. Best p. 2281

Sales Manager: P. Bottorff; *Distributor Manager:* R. Best

Local Sales Offices & Reps.
Cal Palo Alto, JM Assocs. 415-327-1260
Cal Van Nuys, RF Specialists 213-785-0503
Md Kensington, Forti-Austin Assocs. 301-949-1706
NJ Willingboro, Forti-Austin Assocs. 609-871-9290

(TM) TRIMPOT - potentiometer - Bourns, Inc.

(TM) TRIM-STEP - encoder, shaft angle, optical - Gould/Trump-Ross

TRIO LABS, INC., Dept. EM, 80 Dupont St., Plainview, N.Y. 11803, Tel: 516-681-0400, TWX: 510-221-1861; Empl.: 155 p. 3347

Sales Manager: P.A. Bauer, V.P., Mktg.

Local Sales Offices & Reps.
Ala Huntsville, Reynolds & Assoc. 205-536-1941
Cal Mountain View, Weil & Disman Assoc. 415-965-4300
Cal Pasadena, AF Sls. Eng. Inc. 213-681-5631
Fla Satellite Beach, Reynolds & Assoc., Inc. 305-773-4700
Ga Atlanta, Reynolds & Assoc., Inc. 404-252-5360
Ill Bensonville, J & R Assoc. 312-595-3420
Md Lanham, Brimberg Sls., Inc. 301-552-2200
Mass Natick, Wayland Engrg. Sls. 617-655-6080
Minn Minneapolis, Siedare Assoc. 612-545-5663
Minn St. Paul, Don Nedved Assoc. 612-645-2945
NY Horseheads, Canavan-Scanlon Assoc. 607-739-0810
NY Jericho, Electro-Rep, Inc. 516-938-0540
NY Rochester, Canavan-Scanlon Assoc. 716-442-0720
NY Syracuse, Canavan-Scanlon Assoc. 315-437-1271
NC Winston-Salem, Reynolds & Assoc., Inc. 919-725-6196
Ohio Cleveland, KRW Sls. 216-741-4711
Ohio Dayton, KRW Sls. 513-885-3330
Pa Oakmont, KRW Sls. 412-243-2284
Pa West Chester, January-Mktg & Sls. 215-793-2265
Pa West Chester, January Mktg. and Sls. 215-793-2265
Tex Houston, Barry Sls. Co. 713-784-5860
Tex Richardson, Barry Sls. Co. 214-234-0255
Utah Salt Lake City, Straube Assoc., Inc. 801-943-5650
Wash Bellevue, TASCO 206-453-1414
Exp: (Israel), N.Y., N.Y., E.I. Export Sls. 212-234-6334

(TM) TR-IOTA - encoder, shaft angle, optical - Gould/Trump-Ross

TRIO-TECH, INC. OF CALIF., Trio-Tech Int., Dept. EM, 2435 N. Naomi St., Burbank, Calif. 91504, Tel: 213-846-9200, TWX: 910-498-2709; Empl.: 103

Local Sales Offices & Reps.
Ariz Scottsdale, Topping Assocs. 602-994-9669
Cal Cupertino, MB Assoc. 408-996-8388
Cal Marina del Rey, Relcom 213-822-1187
Fla Ft. Lauderdale, Semquip 305-772-3002
Ill Des Plaines, Process Specialties 312-299-8570
Kans Baxter Springs, Production Automation 316-856-3600
Md Timonium, G. White Assoc. 301-252-6360
Minn Minneapolis, Production Automation 612-866-5700
Mo Grandview, Production Automation 816-763-4155
Mo Hazelwood, Production Automation 314-731-2331
NY Chappaqua, Micrel Assoc. 914-238-4961
NY Lewistown, Watmet, Inc. 716-285-3595
Ohio Chagrin Falls, Crest Comp. Sls. 216-543-9808
Pa Colmar, E. L. Assocs. 215-822-2510
Tex Dallas, Production Automation 214-620-0227
Tex Dallas, Stu Hamilton Assocs. 214-350-4344

(TM) TRI—PHASIC CONVERSION - autozeroing integration technique - Data Precision Corporation

(TM) TRIPLATE - patented semiconductor process - Alpha Industries Inc.

(TM) TRIPLEGARD - lightning & electrical surge protector - Joslyn Elctrn. Sys.

TRIPLE I, Div. Economy Co., Dept. EM, 1901 N. Walnut, Oklahoma City, Okla. 73105, Tel: 405-521-9000; Empl.: 250

Local Sales Offices & Reps.
Cal Costa Mesa, Feeger Lucas Wolfe, Inc. 213-751-7512
Colo Denver, W.C. McClure & Assocs. 303-534-2586
Conn Vernon, G/M Assocs. 203-646-4443
Fla Lakeland, Dixie Elctrn. Assocs. 813-682-6624
Ga Jonesboro, Dixie Elctrn. Assocs. 404-478-0603
Ill Chicago, J. Golten Co. 312-725-7570
Iowa Cedar Rapids, Tech. Rep 319-396-5662
Kans Olathe, RG Sls. 913-782-1177
Kans Wichita, Tech. Rep. 316-681-0011
Md Towson, Wyncote Instrumentation Co. 301-821-5422
Mass Andover, G/M Assocs. 617-475-3298
Mass Framingham, G/M Assocs. 617-872-4871
Mich Detroit, Riley & Petchell Sls. 313-937-3000
Minn Minneapolis, R.W. Marshall Co. 612-929-0457
Miss Jackson, Dixie Elctrn. Assocs. 601-956-1399
Mo Hazelwood, Tech. Rep. 314-731-5200
NJ S. Orange, S. Simberkoff Assocs. 201-763-7900
NM Albuquerque, Rustco Entprs. 505-296-6474
Ohio Dayton, Shamrock Elctrn. Sls., Inc. 513-258-1227
Ore Mt. Penn, Wyncote Instr. Co. 215-779-1640
Ore Portland, Topp Engrg. Sls. Corp. 503-636-0811
Pa Butler, Shamrock Elctrnc. Sls. 412-282-1660
Pa Glenside, Wyncote Instrumentation Co. 215-643-2440
Tenn Gallatin, Dixie Elctrns. Assocs. 615-452-5850
Wash Bellevue, Topp Engrg. Sls. Corp. 206-747-5400

(TM)TRIPLE MATE - soldering tips for above - Edsyn, Inc.

(TM)TRIPLEMATIC - mixing, metering, dispensing machinery - Hardman Inc.

TRIPLETT CORP., Dept. EM, 286 Harmon Rd., Bluffton, Ohio 45817, Tel: 419-358-5015, TWX: 810-490-2400 .... p. 2932-2941

Sales Manager: J. Weldy

Local Sales Offices & Reps.

Ariz	Phoenix, Shefler-Kahn Co.	602-257-9015
Cal	Inglewood, J. Berman Co., Inc.	213-649-6111
Cal	Millbrae, Polach & Bensinger	415-697-2525
Colo	Denver, Shefler-Kahn	303-623-1567
Conn	Wallingford, Adams-McGregor	203-269-5816
Fla	Maitland, Hutto-Hawkins-Peregoy, Inc.	305-831-2474
Fla	Pompano Beach, Hutto-Hawkins-Peregoy, Inc.	305-943-9593
Ga	Atlanta, Millar Elctrns.	404-261-6160
Haw	Honolulu, Kems, Inc.	808-847-1395
Ill	Oak Park, G. Petitt Co.	312-369-8940
Ind	Ft. Wayne, W. Bieberich Inc.	219-432-2537
Ind	New Albany, W. Bieberich Inc.	812-945-3187
Kans	Overland Park, T. Dowell Inc.	913-236-8200
Md	Reisterstown, Massey Assoc.	301-833-2039
Mass	Boston, Adams-McGregor	617-542-3773
Mich	Grosse Point Woods, Elko Sls. Corp.	313-884-1955
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	St. Louis, T.L. Dowell, Inc.	314-968-4234
NJ	North Caldwell, Masin Esco Inc.	201-226-2550
NY	Rochester, Marchese & Marsey Assoc., Inc.	716-544-4300
NY	Syosset, Masin Esco Inc.	516-364-0310
NC	Raleigh, Millar Elctrns.	919-787-9564
Ohio	Centerville, Dolfuss-Root	513-433-6776
Ohio	Rocky River, Dolfuss-Root	216-333-7504
Ore	Portland, J.J. Backer Co.	503-297-3776
Pa	Media, Snyder & Sterfkovic	215-566-5400
Pa	Pittsburgh, Dolfuss-Root	412-561-4125
RI	Lincoln, Adams-McGregor	401-726-1300
Tex	Dallas, Lund & Co.	214-387-4634
Wash	Seattle, J.J. Backer Co.	206-285-1300

Local Distributors

Ala	MObile, Inst. & Control Div., Brownell-Electro	205-479-5405
Ariz	Phoenix, Metermaster Div.	602-243-4111
Cal	Glendale, Croft Weatherford Instr. Div.	213-246-4861
Cal	Los Angeles, E.I.L. Instrs.	213-685-7020
Cal	Los Angeles, Metermaster Div.	213-685-4340
Cal	Palo Alto, Metermaster Div.	415-968-0313
Cal	Santa Clara, Dynametron	408-246-6535
Cal	Sonoma, Schmidt Elec.	707-938-8416
Colo	Denver, Meter-master	303-722-5766
Conn	Middletown, Mancib Co.	203-346-6646
Fla	Orlando, Instr. & Control Div., Brownell-Electro	305-843-6775
Ga	Atlanta, Instr. & Control, Div., Brownell-Electro	404-762-5181
Haw	Honolulu, Kems, Inc.	808-847-1395
Ill	Elk Grove, Vil. Metermaster	312-593-8650
Ill	Elk Grove, Vil. Meter-makers	312-439-5050
Ill	Oak Park, Pacific Indicator	312-261-1330
Kans	Overland Park, Brooks Elec.	913-648-3131
La	Harahan, Industrial Inst. Works	504-733-8355
Md	Elkridge, Sunshine Sc.	301-796-5600
Md	Savage, Pyttronic	301-792-0780
Md	Timonium, E.I.L.	301-252-1260
Mass	Burlington, Mancib Co.	617-272-9450
Mich	Ferndale, Ram Meter, Inc.	313-398-6767
Minn	Minneapolis, Instr. Control	612-336-7744
Mo	St. Louis, Ind. Serv.	314-535-5760
NJ	Belleville, Marshall Inst.	201-751-1190
NJ	N. Caldwell, Hosica Labs	201-256-7724
NY	Clarence, Trott Elctrns.	716-634-8500
NY	L.I.C., Metermod Inst.	212-726-4850
NC	Charlotte, Instr. & Control, Div. Brownell-Electro	704-394-4341
NC	Raleigh, Speed Instr. Div. Owen-Barbot	919-876-4919
Ohio	Cleveland, Weschler Elec.	216-251-4609
Ohio	Cleveland, Pioneer/Std.	216-587-3600
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Okla	Tulsa, Tri-State Inst.	918-838-8883
Pa	Phila., Sunshine Sc.	215-673-5600
Pa	Pittsburgh, E.I.L.	412-731-5230
Pa	Pittsburgh, CAM/RPC	412-782-3770
Tenn	Memphis, Instr. & Control, Div. Brownell-Electro	901-332-9254
Tenn	Nashville, Inst. & Control, Div. Brownell-Electro	615-889-8230
Tex	Beaumont, Straughn Elec.	713-838-4563
Tex	Dallas, Ultra Inst.	214-357-0297
Tex	Garland, Metermaster	214-271-5671
Tex	Houston, Quality Inst.	713-524-0528
Tex	Houston, Meters & Instrs. Corp.	713-644-1631
Tex	Odessa, Whitlock Inst.	915-337-3412
Va	Richmond, I.T.R.	804-288-7198
Wash	Seattle, Eicher-Richards	206-523-7888
Wisc	Milwaukee, Electro-Mechano	414-272-4050

TRIPP-LITE, Dept. EM, 133 N. Jefferson, Chicago, Ill. 60606, Tel: 312-346-3040

TRIRIDGE CORP., Dept. EM, P. O. Box 519, Goleta, CA. 93017, Tel: 805-968-1068, TWX: 910-334-1164; FSC No.: 31951; Empl.: 50

Local Sales Offices & Reps.

Ariz	Scottsdale, Fred Board Assocs.	602-994-9388
Cal	San Diego, Van Gott & Assocs.	714-273-4797
Cal	San Gabriel, V. Gott & Assocs.	213-285-2148
Colo	Denver, Omega, Ltd.	303-758-1508
Fla	Clearwater, Lynch-Gentry Assocs.	813-443-2697
Ill	Glendale Hts., Trend-Tronics	312-963-2210
Ind	Ft. Wayne, McDonald Sls. Co.	219-747-3650
Mass	Reading, C.E. Godfrey Co.	617-944-2230
Mich	Dearborn, Pitcher-Poulin, Inc.	313-582-5450
Minn	Minneapolis, Elctrn. Innovators	612-888-5000
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Camillus, Noeth Honsinger Assocs.	315-487-2861
NY	Camillus, Noeth Honsinger Assocs.	315-672-3988
NY	E. Syracuse, Noeth Honsinger Assocs.	315-463-5718
NY	Manhasset, Win-Cor Elctrn. Sls. Corp.	516-627-9474
NY	Pittsford, Noeth Honsinger Assocs.	716-461-4750
Ohio	Centerville, N. Case Assocs.	513-425-1301
Ohio	Fairview Park, N. Case Assocs.	216-333-4120
Tex	Garland, Ray-May Assocs.	214-276-5214
Wash	Seattle, R & R Assocs.	206-762-7664

(TM)TRI-SHARE - read/write memories - National Semiconductor Corp.

(TM)TRI-STAR - CB-AM/FM power antenna - Antenna Specialists Co.

(TM)TRI-STATE - three stage output ICS - National Semiconductor Corp.

(TM)TRI-TORQUE - meter mechanisms - Montevideo Technology Inc.

TRIVEX, Dept. EM, 3180 Redhill Ave., Costa Mesa, Cal. 92626, Tel: 714-546-7781; Empl.: 100

Local Sales Offices & Reps.

NJ	Fort Lee	201-461-4712

(TM)TROL AID - control cleaner - Chemtronics, Inc.

(TM)TROL-A-TEMP - heating & cooling controls - EWC, Inc.

(TM)TROLEX - selector switch - CTS Corp.

TROMPETER ELECTRONICS, INC., Dept. EM, 8936 Comanche, Chatsworth, Cal. 91311, Tel: 213-882-1020, TWX: 910-494-1210; FSC No.: 14949; Empl.: 95

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier, Inc.	205-536-5650
Cal	Los Angeles, Trompeter Elctrns., Inc.	213-882-1020
Cal	Menlo Park, Long & Assocs.	415-327-1300
Colo	Littleton, Aztec Entprs.	303-795-0250
Conn	Milford, Todino Engrg. Sls.	203-874-6643
Fla	Orlando, Currie, Peak & Frazier, Inc.	305-855-0843
Ill	Chicago, Ropek Cahill Inc.	312-631-0070
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Md	Silver Spring, Sel-Tronics, Inc.	301-589-3391
Mass	Needham Heights, Todino Engrg. Sls., Inc.	617-444-7925
Minn	Minneapolis, Engrg. Prods. Assocs.	612-925-1883
Mo	St. Louis, Engineering Svcs. Co.	314-997-1515
NJ	Saddlebrook, L & M Assocs.	201-843-8700
NM	Albuquerque, Aztec Entprs.	505-255-2440
NY	Brentwood, L & M Assocs.	516-231-8363
NY	New York, L & M Assocs.	212-675-7486
NC	Greensboro, Currie, Peak & Frazier, Inc.	919-273-3040
Ohio	Berea, Geotronix Mktg. Assoc.	216-243-8520
Ohio	Columbus, Geotronix Mktg. Assoc.	614-457-8472
Pa	Andalusia, L & M Assocs.	215-639-3100
Tex	Austin, Martin, Ziekosky, Browne & Assoc.	512-454-4371
Tex	Dallas, Martin, Ziekosky, Browne & Assoc.	214-233-5535
Tex	Houston, Martin, Ziekosky, Browne & Assoc.	713-523-7333
Wash	Seattle, Seatronics, Inc.	206-767-4330

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(TM)TRON - fuses & fuseholders & fuse clips - Bussmann Manufacturing

TRONIC CORP., Dept. EM, Box 247-E, Belmont, Cal. 94002, Tel: 415-593-1487, Telex: 34-8457; Empl.: 200

Local Sales Offices & Reps.

Cal	Belmont, C. B. Process	415-592-4545
Cal	Long Beach, Viets Engrg.	213-426-2107
Cal	San Diego, Cal-Chem Sls.	714-299-9434
Colo	Broomfield, F. J. Leonard Co.	303-466-2307
Fla	Hollywood, Victor Metal Finishing	305-981-1969
Haw	Honolulu, C & F Machinery	808-524-1033
Ind	Noblesville, F. W. Gill & Assocs.	317-773-8605
Iowa	Cedar Falls, Euchner Tool Co.	319-266-2701
Iowa	Oskaloosa, Grady Co.	515-673-3130
Kans	Mission, Grady Co.	913-262-1231
Ky	Georgetown, Kentucky Metalworking Sys.	502-863-4353
Mich	Southfield, American Envivosales	313-559-6145
Mo	St. Louis, Grady Co.	314-429-4521
NY	Lyons, Finishing Sys.	315-946-6661
NC	Statesville, Brown Equip.	704-872-3669
Ohio	Akron, Friess Vacublast	216-836-9011
Ohio	Cincinnati, Unistrut-Cincinnati	513-321-2502
Okla	Oklahoma City, Tri-Mech Co.	405-478-2558
Ore	Portland, Precision Chemical	503-244-7636
Pa	York, Finishing Sys. Co.	717-854-7814
Tex	Dallas, Allied Machinery & Supply	214-358-1401
Tex	El Paso, Bellanca Sls. Co.	915-532-5964
Tex	Houston, Allied Machinery & Supply	214-358-1401
Utah	Salt Lake City, F.J. Leonard Co.	801-268-6900
Va	Chesapeake, H. Norton & Co.	804-482-3734
Wisc	Menomonee Falls, Fritz Engrg.	414-251-6590

(TM)TROUBLESHOOTER - in-circuit inspection test system - ZEHNTEL, Inc.

(TM)TROUBLESHOOTER - extension & emergency spotlights - Teledyne Big Beam

(TM)TR-SERIES - total reliability - PASO Sound Products Inc.

(TM)TRUARC - rings, tools & gages - Waldes Kohinoor, Inc.

(TM)TRUCOTE - flux coated silver rod - Chemetron Corp.

(TM)TRUE BLUE - ball & cross roller slides - PIC Design Div.

TRUE DATA CORP., Dept. EM, 17092 Pullman St. #B, Irvine, Cal. 92714, Tel: 714-979-4842; Empl.: 32

Local Sales Offices & Reps.

Pa	Norristown, True Data, Eastern Regional Sales	215-277-8479

TRUMP-ROSS IND'L. CONTROLS, see Gould/Trump-Ross

(TM)TRUFLEX - thermostat metals - Texas Instruments Control Prods. Div.

™TRU-LEVEL - vibration absorbing felt mounts - GAF Corporation

™TRU-MITE - encoder, shaft angle, optical - Gould/Trump-Ross

™TRU-ROTA - encoder, shaft angle, optical - Gould/Trump-Ross

™TRU-TAC - encoder, shaft angle, optical - Gould/Trump-Ross

TRUTONE ELCTRNS., INC., Dept. EM, 7315 Fulton Ave., No. Hollywood, Cal. 91605, Tel: 213-875-0423; Empl.: 25

Local Sales Offices & Reps.

Ala	Birmingham, Adams & Assocs.	205-979-2459
Ariz	Phoenix, J.R. Morgan Agency	602-252-3089
Cal	Santa Clara, Wayne Wainwright	408-247-2310
Colo	Littleton, J.E. Gray	303-988-5396
Conn	West Hartford, R. Smith Co.	203-523-0512
Fla	Miami, World Wide Prods.	305-754-5475
Ga	Decatur, Adams & Assocs.	404-973-0853
Ill	Skokie, M. Bermann Sls.	312-675-3740
Md	Olney, D. Buckley	301-774-9338
Mich	Pontiac, T.A. Sls.	313-335-4285
Minn	Moorhead, Northland Assocs.	218-233-4616
Miss	Michigan City, J. Fisher Sls.	601-224-6470
Mo	Kansas City, Nevco Inc.	816-421-1751
NY	Jamaica, G.E. Miller Assocs.	516-433-5590
NY	Phelps, LSM Assocs.	315-548-4891
NC	Greensboro, Adams & Assocs.	919-272-6838
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Ore	Lake Oswego, McMillan Elctrns.	503-636-6257
Tenn	Memphis, L.E. Jones	901-683-7616
Tex	Dallas, Techno Assocs.	214-357-9213

TRW AUTO E

TRW AUTO-E, Dept. EM, Davis & Copewood Sts., Camden, N.J. 08103, Tel: 609-365-5500, TWX: 710-891-7087

Local Sales Offices & Reps.

Ala	Huntsville, TRW Sales Off.	205-772-9656
Ariz	Scottsdale, Q. T. Wiles & Assoc.	602-948-5590
Cal	Los Angeles, Q. T. Wiles & Assoc.	213-478-0183
Cal	Menlo Park, Straube Assoc.	415-321-9050
Cal	Tustin, Q. T. Wiles & Assoc.	714-832-4952
Cal	Woodland Hills, TRW Sls.	213-883-9033
Colo	Denver, Straube Assoc.	303-426-0890
Conn	Orange, Comtronics	203-795-3515
Conn	Rowayton, TRW Sls. Off.	203-853-4466
Fla	Fort Lauderdale, TRW Sales Off.	305-721-1700
Fla	Orlando, TRW Sls. Off.	303-857-3650
Ill	Elk Grove Village, J. G. Twist Co.	312-593-0200
Ind	Ft. Wayne, R. O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R. O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R. O. Whitesell & Assoc.	317-453-3592
Iowa	Cedar Rapids, J. G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R. O. Whitesell & Assoc.	502-897-1569
Mass	Waltham, TRW Sls. Off.	617-890-3232
Mich	Grand Rapids, R. O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R. O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
Minn	Edina, TRW Sls. Off.	612-835-5454
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assoc.	505-265-7759
NY	Melville, Comtronics	516-249-0505
NY	Rochester, TRW Sls. Off.	716-461-3070
NC	Charlotte, TRW Sls.	704-507-1344
Ohio	Cincinnati, R. O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R. O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R. O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburgh Heights, R. O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Sls. Off.	215-667-3400
Pa	Pittsburgh, R. O. Whitesell & Assoc.	412-344-7277
Tenn	Greenville, R. O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW Sls. Off.	512-451-2959
Tex	Dallas, TRW Sls. Off.	214-387-3030
Tex	Houston, TRW Sls. Off.	713-772-5541
Utah	Salt Lake City, Straube Assoc.	801-943-5650
Wash	Bellevue, N. R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755

TRW, Distributor Div., Dept. EM, P.O. Box 12867, Philadelphia, Pa. 19108, Tel: 215-923-8230

TRW CAPACITORS

TRW CAPACITORS, Dept. EM, 301 West 'O' Str., Ogallala, Neb. 69153, Tel: 308-284-3611, TWX: 910-620-0321 .... Inside Back Cover

Local Sales Offices & Reps.

Ala	Huntsville, TRW Elctrns.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assocs.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	San Diego, Q.T. Wiles & Assocs.	714-565-6895
Cal	Tustin, Q.T. Wiles & Assocs.	714-832-4952
Cal	Woodland Hills, TRW Elctrns.	213-883-9033
Colo	Denver, Straube Assocs.	303-426-0890
Conn	Rowayton, TRW Elctrns.	203-853-4466
Fla	Ft. Lauderdale, TRW Elctrns.	305-721-1700
Fla	Orlando, TRW Elctrns.	305-857-3650
Ill	Elk Grove, J.G. Twist Co.	312-593-0200
Ind	Ft. Wayne, R.O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Ky	Louisville, R.O. Whitesell & Assoc.	502-897-1569
Mass	Waltham, TRW Elctrns.	617-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	Minneapolis, TRW Elctrns.	612-835-5454
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Rochester, TRW Electrns.	716-461-3070
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Hgts., R. O. Whitesell & Assocs.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Narberth, TRW Elctrns.	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tex	Dallas, TRW Elctrns.	214-387-3030
Tex	Houston, TRW Elctrns.	713-772-5541
Utah	Salt Lake City, Straube Assocs.	801-943-5650
Va	Richmond, TRW Elctrns.	804-288-8334
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755

Local Distributors

Ala	Huntsville, Hall Mark Elctrns. Corp.	205-837-8700
Ariz	Phoenix, R. V. Weatherford Co.	602-272-7144
Cal	Glendale, R. V. Weatherford	213-849-3451
Cal	Palo Alto, R. V. Weatherford Co.	415-493-5373
Cal	San Diego, Cramer Elctrns. Inc.	714-565-1881
Cal	Sunnyvale, Bell Inds.	408-734-8570
Colo	Denver, Cramer Elctrn.	303-758-2100
Conn	North Haven, Cramer Elctrn.	203-239-5641
Fla	Orlando, Cramer-Ew	305-894-1511
Ga	Atlanta, Cramer-Atlanta	404-448-9050
Ill	Elk Grove, Hall-Mark Elctrn.	312-437-8800
Kans	Shawnee Mission, Hall-Mark Elctrn. Corp.	913-888-4747
Md	Gaithersburg, Cramer-Washington Inc.	301-948-0110
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Newton Centre, Cramer Elctrns. Inc.	617-969-7700
Minn	Bloomington, Hall Mark Elctrns. Corp.	612-884-9056
Mo	Earth City, Hall-Mark Elctrn.	314-291-5350
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Moonachie, Cramer Elctrn.	201-935-5600
NM	Albuquerque, Cramer Elctrn.	505-265-5767
NY	Binghamton, Harvey Elctrns.	607-748-8211
NY	Hauppauge, Cramer Elctrn.	516-231-5600
NY	Lynbrook, Peerless Radio	516-593-2121
NY	Rome, Rome Elctrns. Inc.	315-735-2249
NC	Winston Salem, Cramer-Ew	919-725-8711
Ohio	Columbus, Elctrn. Mktg.	614-299-4161
Okla	Tulsa, Hall-Mark Elctrn.	918-835-8458
Pa	Huntingdon Valley, Hall Mark Elctrns. Corp.	215-355-7300
Tex	Dallas, Hall-Mark Elctrn.	214-231-6111
Tex	Houston, Hall Mark Elctrns. Corp.	713-781-6100
Va	Charlottesville, Virginia Radio Supply Co., Inc.	703-296-4184
Wash	Seattle, R. V. Weatherford Co.	206-243-6340
Wisc	West Allis, Hall Mark Midwest	414-476-1270

TRW CINCH CONNECTORS

TRW/CINCH CONNECTORS, Electronic Comp. Div. of TRW Inc., Dept. EM, 1501 Morse Ave., Elk Grove Village, Ill. 60007, Tel: 312-439-8800, TWX: 910-222-1796 .... Inside Back Cover

Sales Manager: B. Walthall; *Distributor Manager:* A. Coumont

Local Sales Offices & Reps.

Ala	Huntsville, TRW ECD	205-772-9656
Ariz	Scottsdale, TRW ECD	602-994-0441
Cal	Cerritos, TRW ECD	213-924-5711
Cal	Mountain View, TRW ECD	415-969-2252
Cal	Tustin, TRW ECD	714-544-8751
Colo	Westminster, Straube Assoc.	303-426-0890
Conn	Orange, CPS Corp.	203-795-3515
Conn	Rowayton, TRW ECD	203-853-4466
Conn	Rowayton, TRW/ECD	203-853-4466
Fla	Ft. Lauderdale, TRW ECD	305-721-1700
Fla	Orlando, TRW ECD	305-857-3650
Ill	Chicago, TRW/ECD	312-693-7730
Ill	Elk Grove Village, John G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, John G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
Md	Baltimore, TRW ECD	301-254-1736
Mass	Waltham, Eastern Region Distr. Sls.	617-890-3212
Mass	Waltham, TRW/ECD	617-890-3232
Mich	Cedar Rapids, G. Twist Co.	319-393-8703
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Minneapolis, TRW/ECD	612-835-5454
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Rochester, TRW/ECD	716-461-3070
NC	Charlotte, TRW ECD	704-527-1344
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Heights, R.O. Whitesell & Assocs.	216-826-4424
Pa	Bala Cynwyd, TRW/ECD	215-667-3400
Pa	Narberth, TRW/ECD	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Greeneville, R.O. Whitesell & Assocs.	615-639-6154
Tex	Dallas, TRW ECD	214-387-3030
Tex	Houston, TRW ECD	713-772-5541
Utah	Salt Lake City, Straube Assoc.	801-943-5650
Va	Richmond, TRW Cinch Divs.	804-288-8334
Wash	Seattle, D. Smith Sls.	206-633-3160
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755

Local Distributors

Ala	Birmingham, M. G. Elctrns.	205-328-4525
Alas	Anchorage, Intercoastal, Inc.	907-277-1497
Alas	Fairbanks, Yukon Radio Supp. Corp.	907-452-1011
Ariz	Phoenix, Kierulff Elctrns.	602-273-7331
Ariz	Phoenix, Cramer Elctrns. Inc.	602-267-7321
Ariz	Phoenix, R. V. Weatherford Co.	602-272-7144
Ariz	Phoenix, Sterling Elctrns.	602-258-4531
Ariz	Tempe, Marshall Industries	602-968-6181
Ark	Fort Smith, Carlton Bates Co.	501-646-8201
Ark	Little Rock, Carlton Bates Co.	501-562-9100
Cal	Anaheim, R. V. Weatherford Co.	714-633-9633
Cal	El Monte, Marshall Industries	213-686-0141
Cal	Fresno, J. C. Arbuckle	209-264-6554
Cal	Glendale, R. V. Weatherford Co.	213-849-3451
Cal	Hayward, Dunlap Elctrns.	415-352-1933
Cal	Hollywood, Yale Radio Elec. Co.	213-465-3186
Cal	Irvine, Marshall Industries	714-556-6400
Cal	Los Angeles, Kierulff Elctrns.	213-685-5511
Cal	Mt. View, Elmar Elctrns.	415-961-3611
Cal	Palo Alto, Kierulff Elctrn.	415-968-6292
Cal	Palo Alto, R. V. Weatherford Co.	415-493-5373
Cal	Pomona, R. V. Weatherford Co.	714-623-1261
Cal	Riverside, Elctrn. Supp.	714-683-7300
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	San Diego, R. V. Weatherford Co.	714-278-7400
Cal	San Diego, Kierulff Elctrns.	714-278-2112
Cal	San Diego, Marshall Industries	714-278-6350
Cal	San Francisco, Zack Radio Supp. Corp.	415-626-1444
Cal	Santa Barbara, Channel Radio Supp. Co.	805-965-8551
Cal	Sunnyvale, Marshall Industries	408-732-1100
Cal	Sun Valley, Sterling Elctrns.	213-767-5030
Colo	Arvada, Marshall Industries	303-423-9670
Colo	Commerce City, Elmar Elctrn.	303-287-9611
Colo	Denver, Elctrn. Parts Co.	303-744-1992
Colo	Denver, Newark Elctrns.	303-757-3351
Colo	Englewood, R. V. Weatherford Co.	303-761-5432
Conn	East Haven, J. V. Elctrns.	203-469-2321
Conn	Hamden, Wilshire Elctrns./Conn.	203-281-1166
Conn	North Bradford, Marshall Industries	203-484-0488
Conn	Waterbury, Bond Radio Elctrns.	203-753-1184
Fla	Ft. Lauderdale, Arrow Elctrns.	305-776-7790
Fla	Hollywood, Cramer/E. W.	305-923-8181
Fla	Jacksonville, Southeast Elctrns.	904-356-3007
Fla	Miami, Elctrn. Equip. Co.	305-871-3500
Fla	Orlando, Cramer/E. W.	305-894-1511
Fla	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
Fla	Orlando, Hammond Elctrns.	305-849-6060
Fla	Orlando, Marshall Industries	305-859-1620
Fla	Pensacola, Grice Elctrns.	904-434-2481
Fla	Tampa, Lykes Elctrns.	813-886-6621
Ga	Atlanta, Lykes Elctrns. Corp.	404-355-2223
Ga	Atlanta, Cramer/E. W. Atlanta	404-448-9050
Ga	Atlanta, Specialty Dist.	404-873-2521
Haw	Honolulu, Honolulu Elctrns.	808-949-5564
Haw	Honolulu, Precision Radio Ltd.	808-537-5291
Idaho	Idaho Falls, Schwendimans Wholesale Dist.	208-522-2492
Idaho	Twin Falls, United Elctrn. Wholesalers	208-733-7324
Ill	Arlington Hts., Tex. Instr. Supp.	312-593-7660
Ill	Champaign, Klaus Radio, Inc.	217-356-1896
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Chicago, Elctrn. Dist.	312-283-4800
Ill	Des Plaines, Marshall Industries	312-298-3700
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Elk Grove Vill., Lakeland Elctrns., Inc.	312-595-1000
Ill	La Salle, Klaus Radio, Inc.	815-223-7400
Ill	Mt. Prospect, Cramer/Chgo.	
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Ill	Palatine, Ohm Elctrns. Inc.	312-359-5500
Ill	Peoria, Klaus Radio, Inc.	309-691-4840
Ill	Quincy, Klaus Radio, Inc.	217-223-7560
Ill	Rockford, J & M Elctrns.	815-963-6445
Ill	Skokie, Bell Elctrns.	312-965-7500
Ill	Villa Park, Melvin Elctrns.	312-279-5015
Ind	Evansville, Ohio Valley Sound Svc.	812-425-6173
Ind	Evansville, Hutch & Son Inc.	812-425-7201
Ind	Fort Wayne, Fort Wayne Elctrn.	219-423-3422
Ind	Indianapolis, Pioneer/Ind.	317-849-7300
Ind	Indianapolis, Ra-Dis-Co.	317-637-5571
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Ind	South Bend, Radio Dist. Co.	219-287-2911
Iowa	Cedar Rapids, DEECO, Inc.	319-365-7551
Iowa	Davenport, Warren Radio Co.	319-323-8051
Iowa	Davenport, Klaus Radio	319-323-9761
Iowa	Des Moines, Radio Trade Supp. Co.	515-288-7237
Kans	Topeka, Acme Radio, Inc.	913-235-1363
Kans	Wichita, Radio Supp. Co.	316-267-5216
Ky	Louisville, P. I. Burks Co.	502-583-2871
La	Lafayette, Ralph's of Lafayette	318-234-4507
La	New Orleans, Lykes Elctrns.	504-368-3355
La	New Orleans, Radio Parts, Inc.	504-581-5959
La	New Orleans, Southern Radio Supp. Co.	504-524-2343
La	Shreveport, Ind'l. Elctrn. Supp.	318-222-9459
Md	Baltimore, Radio Elec. Svc.	301-823-0070
Md	Baltimore, Arrow Elctrn.	202-737-1700
Md	Bethesda, Empire Elctrn. Supp. Co.	301-656-3300
Md	Gaithersburg, Kierulff Elctrns.	301-948-0250
Md	Gaithersburg, Pioneer/Washington	301-948-0710
Md	Hagerstown, Stoddard Supp.	301-733-3390
Md	Hyattsville, Milgray/Washington Inc.	301-864-1111
Fla	Ft. Lauderdale, Hallmark Elctrns. Corp.	305-855-4020
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Md	Rockville, Pioneer/Washington	301-424-3300
Mass	Boston, Sager Elec. Supp.	617-542-2281
Mass	Burlington, Wilshire Elctrns./New England	617-272-8200
Mass	Dedham, Gerber Radio Supp.	617-329-2400
Mass	Newton, Greene Shaw Co.	617-969-8900
Mass	Newton Centre, Cramer Elctrns.	617-969-7700
Mass	Newton Highland, Marshall Industries	617-965-5115
Mass	No. Wilbraham, Ind'l. Components Corp.	413-596-3854
Mass	Springfield, T. F. Cushing Co.	413-788-7341
Mass	Watertown, Sterling Elctrns.	617-926-9720
Mass	West Newton, A. W. Mayer Co.	617-965-1111
Mass	Woburn, Arrow Elctrns.	617-933-8130
Mass	Worcester, R. M. Elctrns.	413-756-8311
Mich	Ann Arbor, Wedemeyer Elec. Supp.	313-665-8611
Mich	Detroit, R. S. Elctrns.	313-491-1000
Mich	Flint, Shand Elctrns. Inc.	313-743-8940
Mich	Lansing, Fulton Radio Supp.	517-489-6519
Mich	Livonia, Pioneer/Michigan	313-525-1800
Mich	Marquette, N. W. R. Elctrns. Corp.	906-228-9660
Mich	Muskegon, Fitzpatrick Elec.	616-722-6621
Mich	Oak Park, Newark Elctrns.	313-548-0250
Mich	Wyoming, Newark Elctrns.	616-241-6681
Minn	Bloomington, Arrow Elctrns.	612-888-5522
Minn	Edina, Marshall Industries	612-831-4904
Minn	Minneapolis, Stark Elec. Supp.	612-332-1325
Minn	Minneapolis, Newark Elctrns.	612-331-6350
Minn	St. Paul, Gopher Elctrns.	612-645-0241
Miss	Jackson, Ellington Elctrn. Supp.	601-355-0561
Mo	Joplin, Four State Radio & Supp.	417-624-0368
Mo	Kansas City, Burstein-Applebee Co.	816-561-5460
Mo	St. Louis, Olive Ind'l. Elctrns.	314-863-7800
Mo	St. Louis, Interstate Ind'l. Elec.	314-481-6110
Mo	St. Louis, Van Sickle Radio Elctrns.	314-621-5000
Mont	Billings, Elctrn. Supp. Co.	406-252-2197
Neb	Lincoln, Scott Elctrn. Supp.	402-434-8308
Neb	Omaha, Radio Equip. Co.	402-341-7700
Nev	Las Vegas, Metcalf Elctrns.	702-384-2151
Nev	Reno, Dunlap Elctrns.	702-329-1308
NH	Concord, Evans Radio, Inc.	603-224-9961
NJ	Camden, General Radio Supp. Co.	609-964-8560
NJ	Cinnaminson, Wilshire Electronics/Philadelphia	609-786-8990
NJ	Clark, Tex. Instrs. Supp.	201-382-6400
NJ	Hanover, State Elec. Parts Corp.	201-887-2550
NJ	Kenilworth, Newark Elctrns.	201-272-8410
NJ	Pennsauken, Radio Elec. Svc. Co.	609-662-4000
NJ	Rahway, Valley Elctrn. Supp.	201-381-5404
NJ	Saddlebrook, Arrow Elctrns.	201-797-5800
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	Albany, E. E. Taylor Co.	518-489-5600
NY	Binghamton, Harvey Elctrns.	607-748-8211
NY	Binghamton, ASI Elctrns.	607-723-6326
NY	Buffalo, Summit Dist.	716-884-3450
NY	Commack, Conco Elctrns. Corp.	516-543-8300
NY	Elmira, Brady Supp. Corp.	607-733-6591
NY	Farmingdale, Marshall Industries	516-293-4141
NY	Farmingdale, Harrison Elctrns. Corp.	516-293-7990
NY	Farmingdale, Arrow Elctrns.	516-694-6800
NY	Glens Falls, Ray Supp.	518-792-5848
NY	Hauppauge, Rampart Components	516-273-1111
NY	Johnson City, Wilshire Elctrns.	607-797-1236
NY	Lynbrook, Peerless Radio Corp.	516-593-2121
NY	Poughkeepsie, Higgins-Sheer Elec. Dist.	914-471-3510
NY	Rochester, Cramer Elctrns.	716-275-0300
NY	Rochester, Simcona Elctrns. Corp.	716-328-3230
NY	Rochester, Rochester Radio Supp.	716-454-7800
NY	Rome, Rome Elctrns.	315-337-5400
NY	White Plaines, Westchester Elctrns.	914-949-2400
NY	Woodbury, Harvey Elctrns.	516-921-8700
NC	Charlotte, Dixie Radio Supply	704-377-5413
NC	Greensboro, Hammond Elec. of Carolina	919-275-6391
NC	Raleigh, Southeastern Radio Supp.	919-828-2311
NC	Winston Salem, Cramer/E. W.	919-725-8711
Ohio	Akron, Akron Elctrns. Supp.	216-762-8818
Ohio	Cincinnati, Hughes Peters, Inc.	513-351-2000
Ohio	Cincinnati, Newark Elctrns.	513-874-5115
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Cleveland, W. M. Pattison Supp. Co.	216-441-3000
Ohio	Columbus, Hughes Peters, Inc.	614-294-5351
Ohio	Columbus, Elctrns. Mktg. Corp.	614-299-4161
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Ohio	Dayton, Marshall Industries	513-898-1105
Ohio	Dayton, ESCO, Inc.	513-226-1133
Ohio	Toledo, Warren Radio Co.	419-248-3364
Ohio	Warren, REM Elctrn. Supp.	216-399-2777
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Okla	Tulsa, Hall-Mark Elctrns. Corp.	918-835-8458
Okla	Tulsa, Radio, Inc.	918-587-9123
Okla	Tulsa, Oil Capitol Elctrns.	918-836-2541
Ore	Eugene, Vitus Elec. Supp. Co.	503-345-4377
Ore	Medford, Verl G. Walker Co.	503-773-7557
Ore	Portland, Portland Radio Supp.	503-228-8647
Ore	Portland, United Radio Supp.	503-233-7151
Ore	Portland, Central Dist.	503-234-0711
Ore	Salem, Double "O" Elctrns.	503-363-2371
Pa	Allentown, A. A. Peters, Inc.	215-434-5237
Pa	Devon, Peak Elctrns.	215-687-9822
Pa	Drexel Hill, Kass Elctrns. Dist.	215-449-2300
Pa	Erie, Warren Radio	814-454-5285
Pa	McKeesport, Barno Radio Corp.	412-751-5966
Pa	Philadelphia, Herbach-Rademan, Inc.	215-426-1700
Pa	Philadelphia, Philadelphia Elctrns.	215-588-7400
Pa	Philadelphia, Almo Elctrns. Corp.	215-698-4000
Pa	Pittsburgh, McCullough Elec. Co.	412-261-2420
Pa	Pittsburgh, CAM/RPC	412-782-3770
Pa	Reading, The George Barbey Co.	215-376-7451
Pa	Scranton, Pursell Elctrns.	717-346-2011
Pa	St. Mary, B & R Elctrns.	814-834-2814
Pa	York, Rosen Elctrns.	717-843-3875
RI	Providence, Wm. Dandreta & Co.	401-861-2800
RI	Warwick, W. H. Edwards Co., Inc.	410-781-8000
SC	Charleston, Wholesale Radio Supp.	803-747-9672
SC	Columbia, Dixie Radio Supply	803-253-5333
SC	Greenville, Hammond Elctrns.	803-233-4121
SC	Greenville, Dixie Radio Supply	803-232-5357
Tenn	Kingsport, Radio Elec. Supp.	615-247-8111
Tenn	Knoxville, Bondurant Bros Co.	615-577-0473
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Tenn	Memphis, Bluff City Dist. Co.	901-725-9500
Tenn	Nashville, Electra Dist. Co.	615-329-3971
Tex	Abilene, R & R Elctrns. Supp.	915-677-2974
Tex	Amarillo, R & R Elctrns. Supp.	806-374-2866
Tex	Corpus Christi, Wicks Radio Equip. Co.	512-884-8285
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Dallas, Summers Southland Supply	214-748-6533
Tex	Dallas, Tex. Instr. Supp.	214-238-6821
Tex	Dallas, Marshall Industries	214-233-5200
Tex	El Paso, Midland Specialties Co.	915-533-9555
Tex	Ft. Worth, Allied Elctrns.	817-336-5401
Tex	Ft. Worth, Swieco, Inc.	817-335-6521
Tex	Garland, Newark Elctrns.	214-271-2511
Tex	Houston, Harrison Equip. Co.	713-224-9131
Tex	Houston, Sterling Elctrns.	713-627-9800
Tex	Lubbock, R & R Elctrns. Supp.	806-765-7727
Tex	McAllen, Rio Radio Supp.	512-682-5224
Tex	San Antonio, Electrotex	512-735-9271
Utah	Salt Lake City, Standard Supp. Co.	801-355-2971
Va	Arlington, Arlington Elctrn. Wholesalers	703-524-2412
Va	Charlottesville, Virginia Radio Supp.	804-296-4184
Va	Norfolk, Priest Elctrns.	703-855-0141
Va	Richmond, Meridan Elctrn. Equip. Co.	804-353-6648
Va	Roanoke, Peoples Radio & TV Supply Co.	703-342-8933
Wash	Bellevue, Marshall Industries	206-883-1084
Wash	Bellingham, Advanced Elctrn.	206-734-3400

Wash Seattle, Liberty Elctrns. 206-763-8200
Wash Seattle, Western Elctrns. Co. 206-284-0200
Wash Seattle, Almac/Stroum Elctrns... 206-763-2300
Wash Seattle, Interface Elctrns 206-285-3500
Wash Seattle, R. V. Weatherford Co. .. 206-243-6340
Wash Spokane, Northwest Elctrns. 509-535-7652
Wash Tacoma, Wible Radio Supp. Co. 206-474-9471
Wash Walla Walla, Inland Elctrns. Supp. 509-529-2241
Wash Yakima, Lay & Nord 509-453-5596
WVa Huntington, Elctrn. Supp. Inc....... 304-523-6443
Wisc Madison, Satterfield Elctrns. 608-257-4801
Wisc Milwaukee, Part Mart Corp. 414-276-4160
Wisc Milwaukee, Elctrn. Expeditors, Inc. 414-228-8100
Wisc West Allis, Marsh Elctrns. 414-545-6500

TRW CINCH-GRAPHIK

TRW/CINCH-GRAPHIK, ELCTRN. COMPS., Div. TRW INC., Dept. EM, 200 S. Turnbull Canyon Rd., City of Industry, Cal. 91744, Tel: 213-333-1201, TWX: 910-584-1861

(Refer to TRW/Cinch Connectors for Sales Office Information)

TRW/CINCH-MONADNOCK

TRW/CINCH-MONADNOCK, AN ELCTRN. COMPS., Div. TRW Inc., Dept. EM, 18301 E. Arenth Ave., Box 1222, City of Industry, Cal. 91749, Tel: 213-964-6581, TWX: 910-584-1303; Empl.: 45

Local Sales Offices & Reps.

Kans Wichita.. 316-685-5451
NJ Maple Shade 609-667-5200
NY Plainview 516-694-0990
Tex Ft. Worth... 817-335-1448

TRW CRESCENT WIRE & CABLE, Div. of TRW Inc., Dept. EM, Box 855, Trenton, NJ 08605, Tel: 609-396-9111, Telex: 84-3428; Empl.: 525

Local Sales Offices & Reps.

Industrial Wire & Power Cable

Ala Birmingham, Morrison & Stewart 205-942-8576
Ark Little Rock, Porter Arkansas 501-372-7467
Cal La Mirada, E.L. Steensen Assocs. 714-994-0380
Cal S. San Francisco, Westarep 415-873-8343
Colo Englewood, J & B Sls. 303-761-9181
DC D.C., Electrical Sls. Assoc. 800-638-1021
Fla Ft. Lauderdale, Fox-Rowden-Smith 305-971-1800
Fla Tampa, Fox-Rowden-Smith 813-247-4546
Ga Norcross, Fox-Rowden-Smith, Inc. 404-448-1886
Ind Indianapolis, Buchanan Elec. Sls. Co. 317-248-0353
Kans Mission, C & O Electric Sls. Co. 913-236-5222
Ky Louisville, Buchanan Elec. Sls. Co. 502-491-9600
La New Orleans, J. R. Cahall & Assoc. 504-861-9586
Me Beddeford, CC Pierce................. 207-282-5705
Md Glen Burnie, Electrical Sls. Assoc. 301-761-0071
Mass Boston, C. C. Pierce Co. 617-268-8816
Mich Detroit, Hemphill & Co................ 313-868-6258
Mich Grand Rapids, Hemphill & Co. .. 616-361-0667
Minn Wayzata, LESCO 612-475-2219
Miss Jackson, J. R. Cahall & Assoc... 601-372-1904
Mo St. Louis, Cooper Electrical Sls. 314-638-3434
NJ South Plainfield, Nash & Cornell 201-756-2400
NY Buffalo, R. W. Mitscher Co. 716-633-7970
NC Charlotte, Fox-Rowden-Smith, Inc. 704-364-7377
Ohio Cincinnati, Buchanan Elec. Sls. Co. 513-671-2150
Ohio Columbus, Buchanan Elec. Sls. Co. 614-451-8041
Ohio Lyndhurst, Buchanan Elec. Sls. Co. 216-381-4415
Ore Portland, B. Emmett Co............... 503-235-2151
Pa Harrisburg, Low Assocs............... 717-564-7924
Pa Morrisville, Low Assocs. 215-295-1626
Pa Pittsburgh, W. H. Stewart Assocs. 412-243-1890
SC Columbia, Fox-Rowden-Smith, Inc. 803-772-9003
Tenn Knoxville, Fox-Rowden-Smith, Inc. 615-693-3903
Tex Dallas, Eads Co. 214-350-8991
Tex Houston, Ampsco, Inc. 713-869-6181
Utah Salt Lake City, Bruce Emmett.... 801-486-3878
Utah Salt Lake City, B. Emmett Co. .. 801-467-2663
Wash Seattle, B. Emmett Co................ 206-623-6841
Wash Spokane, B. Emmett Co. 509-624-7250
Wisc Fox Point, Lawless Electrical Sls. 414-352-4850
Wisc Green Bay, Lawless Electrical Sls. 414-494-2745

Instrument & Control Prods.

Ala Grand Bay, Moody-Price, Inc. 205-438-2466
Ariz Phoenix, Bews & Wallace Co..... 602-267-1171
Cal Irvine, Southern California Instrumentation 213-921-8381
Cal San Francisco, Pacific Signal 415-397-5995
Colo Denver, JMC Instrs..................... 303-777-8833
Conn Glastonbury, Components Controls CN 203-633-8846
Fla Orlando, M. D. Duncan & Assocs. 305-295-2432
Ga Atlanta, Stallings, Inc. 404-448-7084
Ill Glenwood, Stallings & Co. 312-756-1470
Ind Indianapolis, G. E. Booth Co....... 317-248-9261
La Baton Rouge, Moody-Price, Inc. 504-344-0511
La Belle Chase, Moody-Price, Inc. .. 504-393-0220
La Lake Charles, Moody-Price, Inc. 318-436-4323
Md Baltimore, Adcons 301-655-5542
Mass Natick, Timross Co..................... 617-237-4305
Mich Detroit, Michigan Valve & Fitting Co. 313-884-9415
Minn Eden Prairie, G. Speaker Co. 612-941-5730
Mo St. Louis, Promac, Inc. 314-966-8250
NJ Clifton, Components & Controls, Inc. 201-778-3141
NM Albuquerque, J. S. Kone & Co. .. 505-842-0213
NY Buffalo, R. W. Mitscher Co. 716-633-7970
NC Charlotte, MacGuire, Crawford & Barnes, Inc. 704-366-3454
Ohio Cincinnati, J. R. Douglass Co. 513-931-4986
Ohio Willoughby, A.F. Brock & Co. 216-951-5959
Okla Tulsa, H. E. Engineered Equip. Co. 918-587-2411
Ore Portland, Brett-Ross, Inc. 503-232-4184
Pa Blue Bell, W.A. Gregory & Co. .. 215-643-4702
Pa Murrysville, Bock Engrg. Co. 412-327-3700
Tex Amarillo, J. S. Kone & Co.......... 806-376-5678
Tex Beaumont, Rawson & Co. 713-838-0393
Tex Corpos Christi, Rawson & Co..... 512-854-1417
Tex Houston, Rawson & Co............. 713-524-8331
Tex Odessa, J. S. Kone & Co. 915-337-8341
Tex Plano, Whitson Engrg................. 214-423-5255
Tex Texas City, Rawson & Co........... 713-948-3446
Va South Charleston, Appalachian Controls Co. 304-744-5324
Wash Seattle, Brett-Ross, Inc. 206-935-8054
Wisc Appleton, Guy Speaker Co......... 414-739-6066
Wisc Milwaukee, Guy Speaker Co. 414-258-2325
Ill Chicago, Peter Vrame Assocs. .. 312-569-2016

TRW GLOBE MOTORS

TRW/GLOBE MOTORS, Dept. EM, 2275 Stanley Ave., Dayton, Ohio 45404, Tel: 513-228-3171, TWX: 810-459-1642; Empl.: 550; Minimum order: $T. Coyle Inside Back Cover

Sales Manager: J. Bourque; *Distributor Manager:* T. Coyle

Local Sales Offices & Reps.

Ala Huntsville, TRW Elctrns. 205-772-9656
Ariz Scottsdale, O.T. Wiles & Assocs. 602-948-5590
Cal Los Angeles, Q.T. Wiles & Assocs. 213-478-0183
Cal Menlo Park, Straube Assocs. 415-321-9050
Cal San Diego, Q.T. Wiles & Assocs. 714-565-6895
Cal Tustin, Q.T. Wiles & Assocs. 714-832-4952
Cal Woodland Hills, TRW Elctrns. 213-883-9033
Colo Denver, Westminister Straube Assoc. 303-426-0890
Conn Orange, CPS Corp...................... 203-795-3515
Conn Rowayton, TRW/ECD................. 203-853-4466
Fla Ft. Lauderdale, TRW Elctrns....... 305-721-1700
Fla Orlando, TRW Elctrns................. 305-857-3650
Ill Elk Grove Village, J.G. Twist Co. 312-593-0200
Ind Fort Wayne, R.O. Whitesell & Assocs. 219-432-5591
Ind Indianapolis, R.O. Whitesell & Assocs. 317-359-9283
Ind Kokomo, R.O. Whitesell & Assocs. 317-453-3592
Iowa Cedar Rapids, J.G. Twist Co. 319-393-8703
Kans Prairie Village, J.G. Twist Co. 913-236-4646
Ky Louisville, R.O. Whitesell & Assocs. 502-897-1569
Mass Waltham, TRW Elctrns................ 617-890-3232
Mich Grand Rapids, R.O. Whitesell & Assocs. 616-942-5420
Mich Southfield, R.O. Whitesell & Assocs. 313-559-5454
Mich St. Joseph, R.O. Whitesell & Assocs. 616-983-7337
Minn Minneapolis, TRW/ECD 612-835-5454
Mo St. Louis, J.G. Twist Co............. 314-432-2830
NM Albuquerque, Straube Assocs. .. 505-292-0295
NY Rochester, TRW/ECD 716-461-3070
Ohio Cincinnati, R.O. Whitesell & Assocs. 513-521-2290
Ohio Columbus, R.O. Whitesell & Assoc. 614-888-9396
Ohio Dayton, R.O. Whitesell & Assoc. 513-298-9546
Ohio Middleburg Heights, R.O. Whitesell & Assocs. 216-826-4424
Ore Beaverton, N.R. Schultz Co. 503-643-1644
Pa Narberth, TRW Elctrns 215-667-3400
Pa Pittsburgh, R.O. Whitesell Assocs. 412-344-7277
Tenn Greeneville, R. O. Whitesell & Assocs. 615-639-6154
Tex Dallas, TRW/ECD 214-387-3030
Tex Houston, TRW/ECD 713-772-5541
Utah Salt Lake City, Straube Assocs. 801-943-5650
Va Richmond, TRW Elctrns............... 804-288-8334
Wash Bellevue, N.R. Schultz Co.......... 206-454-0300
Wisc Wauwatosa, J.G. Twist Co. 414-475-7755
Exp: Port Credit, Ont., Leonard Elec. Ltd. 416-274-3454

Local Distributors

Ala Huntsville, Hall-Mark Elctrns. Corp. 205-837-8700
Ala Huntsville, Hamilton/Avnet Elctrns. 205-533-1170
Ariz Phoenix, Hamilton/Avnet Elctrns. 602-275-7851
Cal Costa Mesa, Avnet Elctrns. 714-754-6111
Cal Mountain View, Hamilton/Avnet Elctrns. 415-961-7000
Cal San Diego, Hamilton/Avnet Elctrns. 714-279-2421
Cal Woodland Hills, Ramparts Comp. Div./Jaco Elec....................... 213-887-7260, 800-382-3321
Colo Denver, Hamilton/Avnet Elctrns. 303-534-1212
Fla Dunedin Beach, Rampart Comp. 813-736-3107
Fla Ft. Lauderdale, Hamilton/Avnet Ekctrns. 305-971-2900
Fla Ft. Lauderdale, Hall-Mark Elctrns. Corp. 305-971-9280
Fla Orlando, Hall-Mark Elctrns. Corp.305-855-4020
Ga Lawrenceville, Hall-Mark Elctrns. 404-963-9728
Ga Norcross, Hamilton/Avnet Elctnrs. 404-448-0800
Ill EIK Grove Village, Hall-Mark Elctrns. Corp. 312-437-8800
Ill Schiller Park, Hamilton/Avnet Elctrns. 312-678-6310
Ind Ft. Wayne, Rampart Comps. 219-489-3345
Ind Kokomo, Robert O. Whitesell & Assoc. 317-453-3592
Kans Lenexa, Hall-Mark Elctrns. 913-888-4747
Md Baltimore, Hamilton/Avnet Elctrns. 301-796-5000
Md Baltimore, Hall-Mark Elctrns. Corp. 301-796-9300
Md Rockville, Rampart Comps. 301-340-2130
Mass Randolph, Rampart Comps......... 617-961-4120
Mass Woburn, Hamilton/Avnet Elctrns. 617-933-8020
Mich Livonia, Hamilton/Avnet Elctrns. 313-522-4700
Minn Bloomington, Hall-mark Elctrns. Corp. 612-884-9056
Minn Minneapolis, Rampart Comps..... 612-884-7471
Minn S. Edina, Hamilton/Avnet Elctrns. 612-941-3801
Mo Earth City, Hall-Mark Elctrns. Corp. 314-291-5350
Mo St. Charles, Rampart Comps. 314-724-6690
Mo St. Louis, Hamilton/Avnet Elctrns. Corp. 314-731-1144
NJ Cedar Grove, Hamilton/Avnet Elctrns. 201-239-0800
NM Albuquerque, Hamilton/Avnet Elctrns. 505-765-1500
NY E. Syracuse, Hamilton/Avnet Elctrns. 315-437-2641
NY Hauppauge, Rampart Comps. 516-273-1111
NY Rochester, Rampart Comps. 716-244-1100
NY Westbury, Hamilton/Avnet Elctrns. 516-333-5800
NC Greensboro, Rampart Comps..... 919-292-3201

NC	Raleigh, Hall-Mark Elctrns. Corp.	919-832-4465
Ohio	Cleveland, Hamilton/Avnet Corp.	216-461-1400
Ohio	Dayton, Hall-Mark Elctrns. Corp.	513-294-0437
Ohio	Dayton, Hamilton/Avnet Elctrns.	513-443-0610
Okla	Tulsa, Hall-Mark Elctrns. Corp.	918-835-8458
Pa	Doylestown, Rampart Comps.	215-345-6614
Pa	Huntington Valley, Hall-Mark Electrns. Corp.	215-355-7300
Tex	Austin, Hall-Mark Elctrns. Corp.	512-837-2814
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Dallas, Hamilton/Avnet Elctrns.	214-661-8661
Tex	Houston, Hall-Mark Elctrns. Corp.	713-781-6100
Tex	Houston, Hamilton/Avnet Elctrns.	713-780-1771
Utah	Salt Lake City, Hamilton/Avnet Elctrns.	801-262-8451
Wash	Bellevue, Hamilton/Avnet Elctrns.	206-746-8750
Wisc	West Allis, Hall-Mark Elctrns. Corp.	414-476-1270
For:	Can., Mississauga, Ont., Hamilton/Avnet Elctrns.	416-677-7432
For:	Can., Mississauga, Ont., Rampart Comps.	416-274-1269
For:	Can., Montreal, Que., Hamilton/Avnet Elctrns.	514-331-6443
For:	Can., Ottawa, Ont., Hamilton/Avnet Elctnrs.	613-226-1700

TRW HOLYOKE WIRE & CABLE

TRW/HOLYOKE WIRE & CABLE, Dept. EM, 775 New Ludlow Rd., South Hadley, Mass. 01075, Tel: 413-533-3961, TWX: 710-351-6636; Empl.: 410 Inside Back Cover

Local Sales Offices & Reps.

Ala	Huntsville, TRW Sls. Off.	205-772-9656
Ariz	Scottsdale, Q. T. Wiles & Assoc.	602-948-5590
Cal	Los Angles, Q. T. Wiles & Assoc.	213-478-0183
Cal	Menlo Park, Straube & Assoc.	415-321-9050
Cal	Tustin, Q. T. Wiles & Assoc.	714-832-4952
Cal	Woodland Hills, TRW Sls. Off.	213-883-9033
Colo	Denver, Straube & Assoc.	303-426-0890
Conn	Orange, Comtronics Assoc.	203-795-3515
Conn	Rowayton, TRW Sls. Off.	203-853-4466
Fla	Fort Lauderdale, TRW Sls. Off.	305-721-1700
Fla	Orlando, TRW Sls. Off.	305-857-3650
Ill	Elk Grove Village, Twist & Co.	312-593-0200
Ind	Fort Wayne, R. O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R. O. Whitesell Assoc.	317-359-9283
Ind	Kokomo, R. O. Whitesell & Assoc.	317-453-3592
Iowa	Cedar Rapids, J. G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R. O. Whitesell	502-897-1569
Mass	Waltham, TRW Sls. Off.	617-890-3232
Mich	Grand Rapids, R. O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R. O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
Minn	Edina, TRW Sls. Off.	612-835-5454
Mo	St. Louis, Twist & Co.	314-432-2820
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Melville, Comtronics	516-249-0505
NY	Rochester, R. O. Whitesell & Assoc.	716-461-3070
NC	Charlotte, TRW Sls. Off.	704-507-1344
Ohio	Cincinnati, R. O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R. O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburg Heights, R. O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Sls. Office	215-667-3400
Pa	Pittsburgh, R. O. Whitesell & Assoc.	412-344-7277
Tenn	Greenville, R. O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW Sls. Off.	512-451-2959
Tex	Dallas, TRW Sls. Off.	214-387-3030
Tex	Houston, TRW Sls. Office	713-772-5541
Utah	Salt Lake City, Straube Assoc.	801-943-5650
Va	Richmond, TRW Sls. Off.	804-288-8334
Wash	Bellevue, N. R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755

TRW IRC NETWORKS

TRW/IRC NETWORKS, Dept. EM, 4222 S. Staples St., Corpus Christi, Tex. 78411, Tel: 512-854-4872 Inside Back Cover,

Sales Manager: B. Wagner

TRW/IRC RESISTORS, Dept. EM, 2850 Mt. Pleasant St., Burlington, Iowa 52601 Inside Back Cover,

Local Sales Offices & Reps.

Ala	Huntsville, TRW	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assocs.	213-478-0183
Cal	San Diego, Q.T. Wiles & Assocs.	714-565-6897
Cal	Tustin, Q.T. Wiles & Assocs.	714-832-4952
Cal	Woodland Hills, TRW	213-883-9033
Colo	Denver, Straube Assocs.	303-426-0890
Conn	Orange, Comtronics Assoc.	203-795-3515
Conn	Rowayton, TRW	203-853-4466
Fla	Ft. Lauderdale, TRW	305-721-1700
Fla	Orlando, TRW	305-857-3650
Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Ft. Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-453-3592
Ind	Kokomo, R.O. Whitesell & Assocs.	317-452-6065
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J.G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
Mass	Waltham, TRW	617-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Edina, TRW	612-835-5454
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Melville, Comtronics Assocs.	516-249-0505
NY	Rochester, TRW	716-461-3070
NC	Charlotte, TRW	704-507-1344
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburgh Heights, R.O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Greenville, R.O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW	512-451-2959
Tex	Dallas, TRW	214-387-3030
Tex	Houston, TRW	713-772-5541
Utah	Salt Lake City, Straube Assocs.	801-943-5650
Va	Richmond, TRW	804-288-8334
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Waukesha, J.G. Twist Co.	414-475-7755

TRW/IRC RESISTORS, Dept. EM, Greenway Rd., Boone, N.C. 28607, Tel: 704-264-8861, TWX: 510-936-3241 Inside Back Cover

Local Sales Offices & Reps.

Ala	Huntsville, TRW Sls. Offi.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assoc.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assoc.	213-478-0183
Cal	Menlo Park, Straube Assoc.	415-321-9050
Cal	Tustin, Q.T. Wiles & Assoc.	714-832-4952
Cal	Woodland Hills, TRW Sls. Off.	213-883-9033
Colo	Denver, Staube Assoc.	303-426-0890
Conn	Orange, Comtronics Assoc.	203-795-3515
Conn	Rowayton, TRW Sls. Off.	203-853-4466
Fla	Fort Lauderdale, TRW Sls. Off.	305-721-1700
Fla	Orlando, TRW Sls. Off.	305-857-3650
Ill	Elk Grove Village, J.G. Twist & Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell Assoc.	317-359-9283
Ind	Kokomo, R.O. Whitesell Assoc.	317-453-3592
Iowa	Cedar Rapids, J.G. Twist & Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J.G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell Assoc.	502-897-1569
Mass	Waltham, TRW Sls. Off.	627-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assoc.	616-983-7337
Minn	Edina, TRW Sls. Office	612-835-5454
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assoc.	505-265-7759
NY	Melville, Comtronics	516-249-0505
NY	Rochester, TRW Elect. Comps.	716-461-3070
NC	Charlotte, TRW Sales Off.	704-507-1344
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburgh Heights, R.O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Sls. Office	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277
Tenn	Greenville, R.O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW Sls. Off.	512-451-2959
Tex	Dallas, TRW Sls. Off.	214-387-3030
Tex	Houston, TRW Sls. Off.	713-772-5541
Utah	Salt Lake City, Straube Assoc.	801-943-5650
Va	Richmond, TRW Sls. Off.	804-288-8334
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755

TRW IRC RESISTORS

TRW/IRC RESISTORS, Dept. EM, 401 N. Broad St., Philadelphia, Pa. 19108, Tel: 215-923-8230, TWX: 710-670-1392; Empl.: 600 .. Inside Back Cover

Local Sales Offices & Reps.

Ala	Huntsville, TRW Sls. Off.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assoc.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assoc.	213-478-0183
Cal	Menlo Park, Straube & Assoc.	415-321-9050
Cal	Tuslin, Q.T. Wiles & Assoc.	714-832-4952
Cal	Woodland Hills, TRW Sls. Office	213-883-9033
Colo	Denver, Straube & Assoc.	303-426-0890
Conn	Orange, Comtronics Assoc.	203-795-3515
Conn	Rowayton, TRW Sls. Office	203-853-4466
Fla	Fort Lauderdale, TRW Sls. Office	305-721-1700
Fla	Orlando, TRW Sls. Off.	305-857-3650
Ill	Elk Grove Village, Twist & Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell Assoc.	219-432-5591
Ind	Indianapolis, R.O. Whitesell	317-359-9283
Ind	Kokomo, R.O. Whitesell Assoc.	317-453-3592
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J. G. Twist & Co.	913-236-4646
Kans	Wichita, J.G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell Assoc.	502-897-1569
Mass	Waltham, TRW Sls. Off.	617-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R.O. Whitesell	313-559-5454
Mich	St. Joseph, R.O. Whitesell Assoc.	616-983-7337
Minn	Edina, TRW Sls. Off.	612-835-5454
Mo	St. Louis, Twist & Co.	314-432-2830
NM	Albuquerque, Straube Assocs.	505-265-7759
NY	Garden City, Comtronics	516-741-8966
NY	Rochester, TRW Sls. Off.	716-461-3070
NC	Charlotte, TRW	704-501-1344
Ohio	Cincinnati, R.O. Whitesell & Assoc.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R.O. Whitesell	513-298-9546
Ohio	Middleburgh Heights, R. O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Sls. Off.	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assoc.	412-344-7277

Tenn	Greenville, R. O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW Sls. Off.	512-451-2959
Tex	Dallas, TRW Sls. Off.	214-387-3030
Tex	Houston, TRW Sls. Office	713-772-5541
Utah	Salt Lake City, Straube Assoc./Mountain States	801-943-5650
Va	Richmond, TRW Sls. Off.	804-288-8334
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755
Exp:	Pa., Philadelphia	215-922-8900

TRW/IRC POTENTIOMETERS

TRW/IRC POTENTIOMETERS, Dept. EM, 2801 72nd St. N., Box 11628, St. Petersburg, Fla. 33733, Tel: 813-347-2181, TWX: 810-863-0357; Empl.: 550 Inside Back Cover

Local Sales Offices & Reps.

Ala	Huntsville, TRW Elctrn. Comps.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, 213-478-0183	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	Tustin, Q. T. Wiles & Assoc.	714-832-4952
Cal	Woodland Hills, TRW Sls.	213-883-9033
Colo	Denver, Straube Assocs/Mountain States	303-426-0890
Conn	Orange, Comtronics	203-795-3515
Conn	Rowayton, TRW Elctrn. Comps.	203-853-4466
Fla	Ft. Lauerdale, TRW Sls.	305-721-1700
Fla	Orlando, TRW Elctrn. Comps.	305-857-3650
Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist	316-686-6685
Ky	Louisville, R.O. Whitesell & Assocs.	502-897-1569
Mass	Waltham, TRW Elctrn. Comps.	617-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Edina, TRW Elctrns.	612-835-5454
Mo	St. Louis, J. G. Twist	314-432-2830
NM	Albuquerque, Straube Assocs/Mountain States	505-265-7759
NY	Melville, Comtronics	516-249-0505
NY	Rochester, TRW Elctrn. Comps.	716-461-3070
NC	Charlotte, TRW	704-507-1344
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburgh Hgts., R.O. Whitesell & Assocs.	216-826-4424
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Elctrn. Comps.	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Greenville, R.O. Whitesell & Assocs.	615-639-6154
Tex	Austin, TRW Elctrn. Comps.	512-451-2959
Tex	Dallas, TRW Elctrn. Comps.	214-387-3030
Tex	Houston, TRW Elctrn. Comps.	713-772-5541
Utah	Salt Lake City, Straube Assocs./Mountain States	801-943-5650
Va	Richmond, TRW Elctrn. Comps.	804-288-8334
Wash	Bellevue, N. R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J. G. Twist Co.	414-475-7755

TRW POWER SEMICONDUCTORS, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260, Tel: 213-679-4561, TWX: 910-325-6206 Inside Back Cover, Vol. 2

Sales Manager: M. Queen

Refer to TRW RF Semiconductors for sales office information.

TRW RF SEMICONDUCTORS, Dept. EM, 14520 Aviation Blvd., Lawndale, Cal. 90260, Tel: 213-679-4561, TWX: 910-325-6206; FSC No.: 01281; Empl.: 1055 Inside Back Cover

Sales Manager: J. Frazier

Local Sales Offices & Reps.

Ala	Huntsville, TRW Elctrn. Comps.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assocs.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	Tustin, Q.T. Wiles & Assocs.	714-832-4952
Cal	Woodland Hills, T.R.W. Elctrn. Comps.	213-883-9033
Colo	Westminister, Straube Assocs.	303-426-0890
Conn	Orange, C.P.S. Corp.	203-795-3515
Conn	Rowayton, TRW Elctrn. Comps.	203-853-4466
Fla	Ft. Lauderdale, TRW Electr. Comps.	305-721-1700
Fla	Orlando, TRW Elctrn. Comps.	305-857-3650
Ill	Elk Grove, J.G. Twist Co.	312-593-0200
Ind	Fort Wayne, R.O. Whitesell & Assocs.	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	317-359-9283
Ind	Kokomo, R.O. Whitesell & Assocs.	317-453-3592
Iowa	Cedar Rapids, J.G. Twist Co.	319-393-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R.O. Whitesell Assocs.	502-879-1569
Mass	Waltham, TRW Elctrn. Comps.	617-890-3232
Mich	Grand Rapids, R.O. Whitesell & Assocs.	616-942-5420
Mich	Southfield, R.O. Whitesell & Assocs.	313-559-5454
Mich	St. Joseph, R.O. Whitesell & Assocs.	616-983-7337
Minn	Edina, TRW Elctrn. Comps.	612-835-5454
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Rochester, TRW Elctrn. Comps.	716-461-3070
NC	Charlotte, TRW Elctrn. Comps.	704-507-1344
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assocs.	614-888-9396
Ohio	Dayton, R.O. Whitesell & Assocs.	513-298-9546
Ohio	Middleburg Hts., R.O. Whitesell & Assocs.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Elctrn. Comps.	215-667-3400
Pa	Pittsburgh, R.O. Whitesell & Assocs.	412-344-7277
Tenn	Greenville, R.O. Whitesell & Assoc.	615-639-6154
Tex	Dallas, TRW Elctrns. Comps.	214-387-3030
Tex	Houston, TRW Elctrn. Comps.	713-772-5541
Utah	Salt Lake City, Straube Assocs.	801-533-0125
Va	Richomnd, TRW Elctrn. Comps.	804-288-8334
Wash	Bellevue, N.R. Schultz Co.	206-454-0300
Wisc	Wauwatosa, J.G. Twist Co.	414-475-7755

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns.	205-837-8700
Ariz	Phoenix, R.V. Weatherford Co.	602-272-7144
Ariz	Phoenix, Cramer/Ariz.	602-267-7321
Cal	Anaheim, R.V. Weatherford Co.	714-547-0891
Cal	Chatsworth, Westates Elctrn. Corp.	213-341-4411
Cal	Gardena, Bell Inds.	213-321-5802
Cal	Glendale, R.V. Weatherford Co.	213-849-3451
Cal	Irvine, Cramer/Los Angeles	714-979-3000
Cal	Palo Alto, R.V. Weatherford Co.	415-493-5373
Cal	Pomona, R.V. Weatherford Co.	714-623-1261
Cal	San Diego, R.V. Weatherford Co.	714-278-7400
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	Sunnyvale, Bell Inds.	408-734-8570
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Cal	Woodland Hills, Semiconductor Concepts	213-884-4560
Colo	Denver, Cramer/Denver	303-758-2100
Colo	Englewood, R.V. Weatherford Co.	303-761-5432
Conn	North Haven, Cramer/Conn.	203-239-5641
Fla	Ft. Lauderdale, Hall-Mark Elctrns. Corp.	305-971-9280
Fla	Hollywood, Cramer/EW Hollywood	305-923-8181
Fla	Orlando, Cramer/EW Orlando	305-894-1511
Fla	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
Fla	Tampa, Lykes Elctrns.	813-886-6621
Ga	Norcross, Cramer/EW Atlanta	404-448-9050
Ill	Elk Grove Village, Hall-Mark Elctrns. Corp.	312-437-8800
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Kans	Shawnee Mission, Hall-Mark Elctrns. Corp.	913-888-4747
Md	Baltimore, Hall-Mark Elctrns. Corp.	301-796-9300
Md	Gaithersburg, Cramer/EW Wash.	301-948-0110
Md	Hanover, Cramer/EW Baltimore	301-796-5790
Md	Rockville, Wilshire Elctns.	301-340-7900
Md	Savage, Pyttronic Inds.	301-792-0780
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Newton, Cramer Elctrns.	617-969-7700
Minn	Bloomington, Hall-Mark Elctrns. Corp.	612-884-9056
Minn	Edina, Cramer/Bonn	612-835-7811
Mo	Earth City, Hall-Mark Elctrns. Corp.	314-291-5350
NJ	Cherry Hill, Cramer/Pa.	215-923-5950
NJ	Cinnaminson, Wilshire Elctrns.	609-786-8990
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Moonachie, Cramer/N.J.	201-935-5600
NM	Albuquerque, R.V. Weatherford Co.	505-842-0868
NM	Albuquerque, Cramer/N.M.	505-265-5767
NY	Buffalo, Summit Distr.	716-884-3450
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	Farmingdale, Wilshire Elctrns.	516-293-5775
NY	Hauppauge, Cramer/L.I.	516-231-5600
NY	Hauppauge, Semiconductor Concepts	516-273-1234
NY	Johnson City, Wilshire Electrns.	607-797-1236
NY	Rochester, Rochester Radio	716-454-7800
NY	Rochester, Cramer/Rochester	716-275-0300
NY	Rochester, Summit Distr.	716-334-8110
NC	Raleigh, Hall-Mark Elctrns. Corp.	919-832-4465
NC	Raleigh, Pyttronic Inds.	919-782-6370
NC	Winston-Salem, Cramer/EW Winston-Salem	919-725-8711
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Columbus, Electronic Mktg. Corp.	614-299-4161
Ohio	Dayton, Electrnic Mktg. Corp.	513-294-0434
Okla	Tulsa, Hall-Mark Elctrns. Corp.	918-835-8458
Okla	Tulsa, Radio Inc.	918-587-9123
Pa	Harrisburg, Pyttronic Inds.	717-233-6591
Pa	Huntingdon Valley, Hall-Mark Elctrns. Corp.	215-355-7300
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Pa	Philadelphia, Almo Elctrns.	215-698-4000
Pa	Pittsburgh, Pyttronic Inds.	412-276-6722
Tex	Austin, Hall-Mark Elctrns. Corp.	512-837-2814
Tex	Dallas, Cramer/Tex.	214-661-9300
Tex	Dallas, R.V. Weatherford Co.	214-243-1571
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Houston, R.V. Weatherford Co.	713-688-7406
Tex	Houston, Hall-Mark Elctrns. Corp.	713-781-6100
Utah	Salt Lake City, Calron Elctrns.	801-487-7451
Wash	Seattle, R.V. Weatherford Co.	206-243-6340
Wisc	West Allis, Hall-Mark Electrns. Corp.	414-476-1270

TRW UTC TRANSFORMERS

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Local Sales Offices & Reps.

Ala	Huntsville, TRW Ectrn. Comps.	205-772-9656
Ariz	Scottsdale, Q.T. Wiles & Assocs.	602-948-5590
Cal	Los Angeles, Q.T. Wiles & Assocs.	213-478-0183
Cal	Menlo Park, Straube Assocs.	415-321-9050
Cal	Tustin, Q.T. Wiles & Assocs.	714-832-4952
Cal	Woodland Hills, TRW Sls. Off.	213-883-9033
Colo	Denver, Straube Assocs.	303-426-0890
Conn	Orange, Comtronics	203-795-3515
Conn	Rowayton, TRW Elctrns. Comps.	203-853-4466
Fla	Fort Lauderdale, TRW Elctrns. Comps.	305-721-1700
Fla	Orlando, TRW Ectrn. Comps.	305-857-3650
Ill	Elk Grove Village, J. G. Twist Co.	312-593-0200
Ind	Fort Wayne, R. O. Whitesell & Assoc.	219-432-5591
Ind	Indianapolis, R. O. Whitesell & Assoc.	317-359-9283
Ind	Kokomo, R. O. Whitesell & Assoc.	317-453-3592
Iowa	Cedar Rapids, J. G. Twist Co.	319-393-8703

Kans	Prairie Village, J. G. Twist Co.....	913-236-4646
Kans	Wichita, J. G. Twist Co.	316-686-6685
Ky	Louisville, R. O. Whitesell & Assoc.	502-897-1569
Mass	Waltham, TRW Elctrn. Comps. ..	617-890-3232
Mich	Grand Rapids, R. O. Whitesell & Assoc.	616-942-5420
Mich	Southfield, R. O. Whitesell & Assoc.	313-559-5454
Mich	St. Joseph, R. O. Whitesell & Assoc.	616-983-7337
Minn	Edina, TRW Elctrns.	612-835-5454
Mo	St. Louis, J. G. Twist Co.	314-432-2830
NM	Albuquerque, Straube Assocs/Mtn. States	505-265-7759
NY	Melville, Comtronic Assocs.	516-249-0505
NY	Rochester, TRW Elctrns. Comps.	716-461-3070
NC	Charlotte, TRW	704-507-1344
Ohio	Cincinnati, R.O. Whitesell & Assocs.	513-521-2290
Ohio	Columbus, R.O. Whitesell & Assoc.	614-888-9396
Ohio	Dayton, R. O. Whitesell & Assoc.	513-298-9546
Ohio	Middleburgh Heights, R. O. Whitesell & Assoc.	216-826-4424
Ore	Beaverton, N.R. Schultz Co.	503-643-1644
Pa	Bala Cynwyd, TRW Elctrn. Comps.	215-667-3400
Pa	Pittsburgh, R. O. Whitesell & Assocs.	412-344-7277
Tenn	Greenville, R. O. Whitesell & Assoc.	615-639-6154
Tex	Austin, TRW Elctrn.	512-451-2959
Tex	Dallas, TRW Ectrn. Comps.	214-387-3030
Tex	Houston, TRW Elctrns.	713-772-5541
Utah	Salt Lake City, Straube Assocs./Mtn. States	801-328-4513
Va	Richmond, TRW Elctrns...............	804-288-8334
Wash	Bellevue, N.R. Schultz	206-454-0300
Wisc	Wauwatosa, J. G. Twist Co.........	414-475-7755

TRYGON ELECTRONICS, See Systron Donner, Instr. Div.

™T-SCREEN - insulated tape-shield dividing - Superior Cable Div.

TT ELCTRNS., INC., Dept. EM, 2214 S. Barry Ave., Los Angeles, Cal. 90064, Tel: 213-478-8224; FSC No.: 07766 .... p. 2766-2768

Local Sales Offices & Reps.

Cal	Culver City, Sodaro......................	213-478-7733

™TT-JAX - miniature telephone jack - Switchcraft, Inc.

™TT-PLUG - miniature telephone plug - Switchcraft, Inc.

TTS, Dept. EM, 2928 Nebraska Ave., Santa Monica, Cal. 90404, Tel: 213-829-2611, Telex: 65-2428; Empl.: 10

Sales Manager: L. Winters

™TUBE O'GEL - thixotropic gelling agent - Beckman Instrs., (AISSD)

™TUBE-PAC - solid state silicon vacuum tube replacement - Semtech Corp.

™TUCHSWITCH - solid state limit switch - Denison, R.B., Inc.

TUCKER ELECTRONICS CO., Dept. EM, 1717 So. Jupiter Rd., Garland, Tex. 75040, Tel: 800-527-4642; Empl.: 75

™TUFCON - ribbon for insulation displacement connector - Gore, W.L. & Assocs., Inc.

™TUFF LINE - potentiometers and transducers - Computer Instrs.

™TUFF-TAINER - plastic boxes - Vichek Plastics Co.

™TUF-TEST - lacing tape - Gudebrod Bros. Silk Co., Inc.

™TUF-TIES - wire & cable ties - Transcon Mfg. Co.

™TUF-TIES - wire & cable ties - Amrad Corp.

™TULOX - cellulose acetate butyrate tubing - Blum, Julius & Co., Inc.

™TUNER-TONIC - tuner cleaner & lubricant - Elctrn. Chemical Corp.

™TUNGAR - rectifying apparatus - General Elec. Co.

™TUN-O-BRITE - heavy duty tuner cleaner - Chemtronics, Inc.

™TUN-O-FOAM - tuner cleaner/lubricant - Chemtronics, Inc.

™TUN-O-LUBE - tuner cleaner - Chemtronics, Inc.

™TUN-O-POWER - tuner cleaner-polish-lubricant - Chemtronics, Inc.

™TUN-O-WASH - tuner degreaser - Chemtronics, Inc.

™TURBO - Varnished Cotton Sleeving - Brand-Rex Co.

™TURBOCRYL - Acrylic Coated Glass Sleeving - Brand-Rex Co.

™TURBOGLAS - Varnished Cotton Sleeving - Brand-Rex Co.

™TURBOLEX - General Purpose Vinyl Tubing - Brand-Rex Co.

™TURBO-PROBE - turbine flow transducer - Flow Technology, Inc.

™TURBOSIL - Silicone Coated Glass Sleeving - Brand-Rex Co.

™TURBOTHERM - High Temperature Vinyl Tubing - Brand-Rex Co.

™TURBOTORR TM - turbo-molecular pumping units - Sargent Welch Sci. Co.

™TURBOTUF - Vinyl Coated Glass Sleeving - Brand-Rex Co.

™TURBOZONE - Low Temperature Vinyl Tubing - Brand-Rex Co.

™TURBO 117 - Silicone Rubber Coated Glass Sleeving - Brand-Rex Co.

TURNER DIV., Conrac Corp., Dept. EM, 716 Oakland Rd. N.E., Cedar Rapids, Iowa 52402, Tel: 319-366-8311, Telex: 46-4437; Empl.: 700

Local Sales Offices & Reps.

Ala	Birmingham, M.F. Taylor Co.	205-853-0336
Cal	Culver City, W. Alderson Co., Inc.	213-837-1398
Cal	Redwood City, Sinai-Johnson	415-365-6263
Colo	Colorado Springs, Norris & Co...	303-635-9319
Colo	Denver, Mountain Reps.	303-988-6430
Fla	Casselberry, M.F. Taylor Co.......	305-838-0821
Ill	Des Plaines, Ashpole Assocs.	312-296-0971
Ind	Indianapolis, Kingston-Sharkey Assoc.	317-353-9406
Iowa	Des Moines, K-S-W Assocs.	515-279-9235
La	Lacombe, S. Ormsby & Assocs.	504-882-7248
Md	Catonsville, M.F. Taylor Co.........	301-747-5718
Md	Silver Springs, M.F. Taylor Co. ..	301-946-3569
Mass	Needham, Piper Assocs.	617-449-1144
Mass	Plymouth, Piper Assocs...............	617-746-6522
Mich	Rochester, R.A. Albrecht Co.	313-652-2520
Minn	Minneapolis, Jensen Sls.	612-941-7181
Mo	Kansas City, K-S-W Assocs.	816-358-5240
Mo	St. Louis, K-S-W Assocs.	314-781-6111
NY	Buffalo, R.W. Mitscher Co...........	716-633-7970
NY	Rockville Centre, Willgold Elctrn. Sls. Corp.	516-764-4022
NC	Charlotte, M.F. Taylor Co.	704-523-7932
Ohio	Columbus, Weller Elctrns. Sls., Inc.	614-885-7819
Ore	Salem, Pacnor Mktg.....................	503-363-6445
Pa	Philadelphia, M.F. Taylor Co.......	215-676-5332
Tex	Addison, Parvin Sls. Co..............	214-239-9148
Tex	Dallas, E.L. Wilks Co.	214-242-5321
Wash	Seattle, Pacnor Mktg.	206-284-8020
Wisc	Brookfield, Steffen Sls.................	414-781-7596

™TURN-LOC - captive screw - Deutsch Fastener Corp.

™TUTORETTE - audiocard readers - Audiotronics

™TV-PAC - high voltage multiplier - Semtech Corp.

™TVS - torque verification system - Himmelstein & Co., S.

™TWBODYNE - portable mine rectifier - Payne Engrg. Co.

™TWENTY/TWENTY - epoxy adhesive - Allaco Prods Div.

™TWINDUCER - gear drives, two motors - Allis-Chalmers

™TWIN HAWKS - antenna - Shakespeare

™TWIN LIGHT - circuit indicator light - GTE Sylvania Inc.

™TWIP - soldering & desoldering supply holder - Edsyn, Inc.

™TWISTAGUIDE - twistable flexible waveguide - Airtron

™TWIST-LITE - lighted pushbutton switch - Master Specialties Co.

™TWIST "N" FLAT - twist/flat planar cable - Spectra-Strip Corp.

™TWYSTRON - microwave amplifier tubes - Varian Palo Alto Microwave Tube Div.

™TWYSTRON - microwave amplifier tubes - Varian Electron Device Grp.

™TY-CLAMP - cable clamps - Tyton Corp.

TYCO CRYSTAL PRODUCTS DIV., Dept. EM, 3940 W. Montecido, Phoenix, Ariz. 85019, Tel: 816-842-9731, TWX: 910-771-2181; Empl.: 600

Sales Manager: R. Gundy

TYCO FILTERS DIV., Dept. EM, 3940 W. Montecito St., Phoenix, Ariz. 85019

Local Sales Offices & Reps.

Ariz	Phoenix, Lange Assocs.	602-942-0724
Cal	Mt. View, Nor-Cal Assocs.	415-961-8121
Cal	Placentia, K'SON Corp.	714-524-1700
Colo	Denver, Omega Ltd.	303-758-1508
Fla	Orlando, G.F. Bohman Assocs. ..	305-855-0274
Ill	Franklin Park, Dekotech, Inc.	312-455-5100
Ind	Fort Wayne, TYCO	219-432-5591
Ind	Indianapolis, R.O. Whitesell & Assocs.	
Ind	Kokomo, TYCO	317-453-6868
Ky	Louisville, TYCO	502-893-7303
Md	Millerville, Tomco Sls. Co.	301-987-1650
Mass	Needham, A & M Elctrn. Reps. ..	617-444-8172
Mich	Southfield, TYCO..........................	313-358-2020
Mich	St. Joseph, TYCO	616-983-7337
Minn	Minneapolis, Stan Clothier Co. ..	612-869-3231
Mo	Kansas City, Admack Sls. Co.	
NJ	Cherry Hill, J. N. Barrett Assocs.	609-429-1551
NY	Dewitt, Tri-Tech Elctrns.	315-446-2881
Ohio	Cincinnati, TYCO	513-521-2290
Ohio	Cleveland, TYCO...........................	216-333-2585
Ohio	Columbus, TYCO	
Ohio	Dayton, TYCO	513-298-9546
Pa	Pittsburgh, TYCO..........................	412-242-0100
Tenn	Bristol, TYCO	615-968-4195
Tex	Richardson, Air Quip Sls. Company	214-239-8991

TYCO INSTRUMENT DIV., Tyco Laboratories, Inc., Dept. EM, 4 Hartwell Pl., Lexington, Mass. 02173, Tel: 617-861-7450, TWX: 710-326-0672; Empl.: 84

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs., Inc.	205-837-4304
Cal	San Carlos, Elctrn. Engrg. Assocs.	415-593-2189
Cal	South Pasadena, Deniston & JDA	213-254-7755
Colo	Boulder, H. Bass Assocs.............	303-499-7509
Fla	Fort Lauderdale, W.A. Brown Comps., Inc.	305-776-4800
Fla	Orlando, W.A. Brown Comps., Inc.	305-425-5505
Ill	South Holland, Raeco, Inc...........	312-331-6001
Kans	Prairie Village, Engineering Svcs. Co.	913-649-4000
Mass	Natick, A. Peskin Corp.................	617-653-3919
Mich	Southfield, Stress Analysis Svcs.	313-356-6686
NC	Winston Salem, W.A. Brown Comps., Inc.	919-725-5384
Ohio	Medina, Stress Analysis Svcs.....	216-225-7535
Pa	Valley Forge, Tyco Regional Office	215-933-9139
Tex	Dallas, Griffin Sls. Co..................	214-234-5013

Va Fairfax, Nine Assocs., Inc. 703-273-1830
Wash Bellevue, Hickey Eng. Sls. Co. 206-454-0460

(TM)TYGON - polyvinyl chloride tubing - Blum, Julius & Co., Inc.

(TM)TYGRIP - markers - Tyton Corp.

TYLAN CORP., Dept. EM, 19220 So. Normandie, Torrance, Cal. 90502, Tel: 213-532-3420, TWX: 910-346-7647; Empl.: 95

Local Sales Offices & Reps.
Cal Cupertino, Tylan Corp. 408-248-8718
Cal Torrance, Tylan Corp. 213-532-3420
Fla Fort Lauderdale, Semquip Inc. 305-772-3002
Mass Peabody, Tylan Corp. 617-532-1228
NJ McAfee, Tylan Corp. 201-827-6584
NC Matthews, W.K. Hile Co. 704-847-9125
Pa Bath, Tylan Corp. 215-837-1962
Tex Richardson, Tylan Corp. 214-234-8184

(TM)TY-NEE TUMBLER - small abrasive tumbler - Aubin, A.E. Co.

(TM)TYPOTRON - direct view storage tube - Hughes Aircraft Co.

(TM)TY-RAP - cable ties, clamps, & tools & accessories - T & B/Thomas & Betts

(TM)TY-RAP - cable ties, clamps, & tools & accessories - T & B/Thomas & Betts

(TM)TYTEX - batteries - Exide Power Sys. Div.

TYTON CORP., Dept. EM, 2300 W. Florist Ave., Milwaukee, Wisc. 53209, Tel: 414-228-8210, TWX: 910-262-3094; FSC No.: 53421; Empl.: 35

Local Sales Offices & Reps.
Cal La Palma, Tyton Corp. 714-968-5338
Colo Englewood, Mikro Sls. Co. 303-770-2300
Ill Lisle, Tyton Corp. 312-964-6223
NY Woodbury, Brunner Assocs. 516-921-2052
Ohio Cleveland, Industrial Sls. Assocs. 216-721-7500
Pa Yardley, Tyton Corp. 215-493-2342
Tex Richardson, Tyton Corp. 214-231-2776

(TM)TYTON TIES - wire & cable ties - Tyton Corp.

(TM)T-1 MILITARY INDICATOR LIGHT - indicator light - GTE Sylvania Inc.

(TM)UAR/T - universal asynchronous receiver/transmitter - General Instr. Corp.

UBER GRAFIC INSTRS., Dept. EM, Box 4, Palo Alto, Cal. 94302, Tel: 415-327-4732; Empl.: 2

(TM)UBIQUITOUS - real-time spectrum analyzers - Nicolet Scientific Corp.

(TM)UCCAP - circuit analysis program - University Computing Co.

UCE, INC., Dept. EM, 20 N. Main St., Norwalk, Conn. 06854, Tel: 203-838-7509; Empl.: 12

(TM)UCHIDA - fuse, electronic computer & related system - Uchida of America Corp.

UCHIDA OF AMERICA CORP., Dept. EM, 69-34 51st Ave., Woodside, N.Y. 11377, Tel: 212-779-0400; Empl.: 7

Local Sales Offices & Reps.
Ala Birmingham, P. Hayden Assoc.
Cal Sausalito, R. Colen Sls. 415-332-6181
Cal Van Nuys, C.H. Mitchell Co. 213-994-9466
Fla Orlando, P. Hayden Assocs.
Ga East Point, P. Hayden Assocs. 404-766-0261
Ill Skokie, M. Bermann Sls. 312-675-3740
Ind Indianapolis, Mktg. Engr. 312-546-1523
Iowa Atlantic, Kimian Sls. Inc. 712-243-1626
Mass Sharon, A. Appell Assoc. 617-784-3439
Mo Independence, Kimian Sls. 816-796-4026
NY Bayside, Newhope Corp. 212-428-2000
NY Phelps, L S M Assocs. 315-548-4891
NC Greensboro, P. Hayden Assocs.
Ore Portland, R. M. Minthorne Co. 503-246-4556
Pa Willow Grove, R. Lewis Sls. 215-659-0704
Tex Houston, Ranger Elctrns., Co. 713-626-1432
Exp: Fla., Miami, West Indies Sls. Co. 305-592-8188
Exp: N.Y., New York, Uchida of America Corp. 212-779-0400

(TM)UCON - refrigerants; lubricants - Union Carbide, Chemicals & Plastics

UDEL MANUFACTURING, Dept. EM, Box 2028, Covina, Cal. 91722, Tel: 213-331-5680; Empl.: 6

Local Sales Offices & Reps.
Ariz Tempe, Gassner & Clark 602-968-9037
Ill Mt. Prospect, E. T. Champion & Assocs. 312-593-1150
Mass Newton Highlands, Marshall Inds. 617-965-5115
NY Northport, Production Sls. Assocs. 516-757-0336
Ohio Cincinnati, J. O. Olsen Co. 513-922-2176
Ohio Cleveland, J. O. Olsen Co. 216-752-5444
Pa Pittsburgh, J. O. Olsen Co. 412-279-2550
Tex Dallas, Marshall Inds. 214-233-5200
Wash Bellevue, Marshall Inds. 206-883-1084

(TM)U-D-F - unidirectional flow inductors - Ajax Magnethermic Corp.

UFAD CORP., Dept. EM, 700 36th St. S.E., Grand Rapids, Mich. 49508, Tel: 616-241-6000; Empl.: 15 p. 2943

Sales Manager: A.D. Heibel

Local Sales Offices & Reps.
Conn Hamden, Scientific Devices 203-248-9361
Md Greenbelt, J.E. Cuesta & Co. 301-552-1200
Mass Waltham, Scientific Devices 617-894-5637
Pa Valley Forge, J.E. Cuesta & Co. 215-265-5800

(TM)UFLEX - uf & nmc types - CCS Hatfield Wire & Cable Group

(TM)UGLY - power supplies - Elexon Power Sys.

(TM)UHX - high performance antennas - Andrew Antenna Co. Ltd.

(TM)UHX - ultra high performance antennas - Andrew Corp.

(TM)UIC-600 - ultrasound image computer - Princeton Elctrn. Prods.

UID ELECTRONICS DIV., AMF Inc., Dept. EM, 4105 Pembroke Rd., Hollywood, Fla. 33021, Tel: 305-981-1211, TWX: 510-954-9810 p. 4308

Local Sales Offices & Reps.
Ala Huntsville, 20th Century Mktg. 205-772-9237
Ariz Scottsdale, Arcom Sls. Co. 602-947-5745
Cal El Segundo, Varigon Assocs. 213-322-1120
Cal Menlo Park, G.R. McKnight Co. 415-325-2844
Cal San Diego, Varigon Assocs. 714-299-5413
Colo Denver, B-5 303-426-0222
Conn Vernon, G-M Assoc. 203-646-4443
Fla Maitland, Hutto-Hawkins-Peregoy 305-831-2474
Fla Pompano Beach, Hutto-Hawkins-Peregoy 305-943-9593
Ill Elk Grove Village, J.G. Twist Co. 312-593-0200
Ind Ft. Wayne, R.O. Whitesell & Assoc. 219-432-5591
Ind Indianapolis, R.O. Whitesell & Assoc. 317-359-9283
Ind Kokomo, R.O. Whitesell & Assocs. 317-453-3592
Iowa Cedar Rapids, J.G. Twist Co. 319-393-8703
Kans Prairie Village, J.G. Twist Co. 913-236-4646
Kans Wichita, J. G. Twist Co. 316-686-6685
Ky Louisville, R.O. Whitesell & Assoc. 502-897-1569
Md Lanham, L. D. Lowery, Inc. 301-459-1556
Md Lutherville, L.D. Lowery 301-823-2172
Mass Framingham, G-M Assocs. 617-872-4871
Mich Grand Rapids, R.O. Whitesell & Assoc. 616-942-5420
Mich Southfield, R.O. Whitesell & Assoc. 313-559-5454
Mich St. Joseph, R.O. Whitesell & Assoc. 616-983-7337
Minn Minneapolis, R-J, Inc. 612-922-1425
Mo St. Louis, J.G. Twist Co. 314-432-2830
NH Dover, G-M Assoc.
NJ Delran, L. D. Lowery
NM Albuquerque, Arcom Sls. Co. 505-296-0606
NY Buffalo, Ossmann Comp. Sls. Corp. 716-832-4271
NY Jamaica, S-J Sls. Assocs. 212-291-3232
NY Kingston, Ossmann Comp. Sls. Corp. 914-338-5505
NY Rochester, Ossmann Comp. Sls. Corp. 716-442-3290
NY Syracuse, Ossmann Comp. Sls. Corp. 315-454-4477
NY Vestal, Ossmann Comp. Sls. Corp. 607-785-9949
Ohio Cincinnati, R.O. Whitesell & Assoc. 513-521-2290
Ohio Columbus, R. O. Whitesell & Assoc. 614-888-9396
Ohio Dayton, R. O. Whitesell & Assoc. 513-298-9546
Ohio Middleburg Heights, R. O. Whitesell & Assoc. 216-826-4424
Okla Tulsa, Allied Comps. 918-492-7771
Pa Broomall, L. D. Lowery, Inc. 215-356-5300
Pa Camp Hill, Beil & Whitaker 717-233-1254
Pa Harrisburg, Beil & Whitaker 717-652-0184
Pa Orefield, Beil & Whitaker 215-395-0150
Pa Pittsburgh, R. O. Whitesell & Assoc. 412-344-7277
Pa Reading, Beil & Whitaker 215-779-2610
RI Narragansett, G-M Assocs.
SC Greenville, Powertronics 803-288-0270
Tenn Greeneville, R. O. Whitesell & Assoc. 615-639-6154
Tenn Greeneville, 20th Century Mktg. 615-638-4021
Tex Austin, Allied Comps. 512-459-0761
Tex Dallas, Allied Comps. 214-238-0408
Tex Houston, Allied Comps. 713-960-1962
Utah West Bountiful, B-5 Inc. 801-292-8991
Va Charlottesville, L. D. Lowery, Inc. 804-973-6672
Wash Seattle, Northmar 206-524-5170
Wisc Wauwatosa, J.G. Twist 414-475-7755

Local Distributors
Ala Huntsville, Powell Elctrns. 205-539-2731
Cal Hawthorne, Electro-Sonic Compts. 213-679-9881
Cal Lakeside, Mouser Electrical Corp. 714-449-2220
Cal Los Angeles, Elec. Switches 213-660-1310
Fla Sarasota, Workman Elec. Prod. 813-955-4242
Fla W. Palm Beach, Nurmi Elctrns. Supply 305-686-8553
Ill Rockford, G.C. Elctrns. 815-968-9661
Mass Bellingham, Dowiak Assoc. 617-966-0404
Minn Minneapolis, R-J-I 612-922-1425
NJ Little Falls, I.P.C. Corp. 201-785-1830
NY Jamaica, EBY Sls. 212-291-3232
NY Rochester, Ossmann Comp. Sls. Corp. 716-442-3290

(TM)U-LOK - terminal clamp - Camcar

(TM)ULTA-SOLV - cleaning solvents - Udel Manufacturing

(TM)ULTIPOR - filter medium - Pall Corp.

(TM)ULTIPOR - filter media - Pall Trinity Micro Corp.

ULTRA CARBON CORP., Dept. EM, Box 747, Bay City, Mich. 48706, Tel: 517-894-2911; Empl.: 150

ULTRA-VIOLET PRODS., INC., Dept. EM, 5100 Walnut Grove Ave., San Gabriel, Cal. 91778, Tel: 213-285-3123; Empl.: 65

Sales Manager: S. Parnas

Local Sales Offices & Reps.
Md Severna Park 301-647-7333

(TM)ULTRA CELL - fast response-silicon photocell - Sensor Technology

(TM)ULTRA-CLEAN - pc board degreaser (mobile) - Hollis Engrg., Inc.

(TM)ULTRA COMPACT - industrial audio transformer - TRW/UTC Transformers

(TM)ULTRA-CRAFT - catalog - Workman Electronic Prods., Inc.

(TM)ULTRA F - graphite purification process - Ultra Carbon Corp.

(TM)ULTRAFLEX - adjustable speed drives & controllers - Cutler-Hammer, Inc.

(TM)ULTRA-FLUX - flux - Engelhard Minerals & Chem.

(TM)ULTRA-GLOW - illuminated push button, slide & rocker switches - UID Electronics Div.

(TM)ULTRA-KAP - high capacitance disc - Centralab/USCC

(TM)ULTRALLOY - plating on coaxial connectors (non-tarnish) - Arco Electronics Inc.

™ULTRAMATIC - alarm system - Eastcraft Security Systems Corp.

™ULTRA-ONE - variable resistor - Centralab

™ULTRAPAK - wave soldering sys - Electrovert

™ULTRAPLATE - plating on p.c. connectors (gold substitute) - Arco Electronics Inc.

™ULTRAPURE - bar solder - Kester Solder Div.

™ULTRA-SEAL - solderable, protective coatings - Kenco Alloy & Chemical Co., Inc.

™ULTRASIL - clear fused quartz - Amersil, Inc.

™ULTRA-SOL - solvent cleaners - Kenco Alloy & Chemical Co., Inc.

ULTRASONIC CORP., Dept. EM, Box 672, Pipestone, Minn. 56164, Tel: 507-825-5441; Empl.: 10

ULTRASONIC INSTRS. INT'L., INC., Dept. EM, 165 EM Marine St., Farmingdale, N.Y. 11735, Tel: 516-293-5577; Empl.: 15

Local Distributors

Ga	Decatur, Atlanta Clock & Watch	404-377-6909
La	Lafayette, Stuller Settings, Inc. ..	318-233-7723
Me	Woburn, Lufkin	617-933-6611
Minn	Edina, Megasonics	612-933-4385
Minn	Marguette, N.W.R. Elctrns.	906-226-7578
NJ	Arlington, Tool Specialists	201-991-2412
NY	Kingston, Canfield Supply	914-331-6700
NY	Syracuse, Harding Indl.	315-463-6651

™ULTRA-STRATES - substrates .025" with a 2m" B/S - Accumet Engineering Corp.

™ULTRA-TEMP - high temperature adhesive - Aremco Prods., Inc.

™ULTRAVERTER - uhf lo vhf converter - Blonder-Tongue Labs., Inc.

™ULTRAVOX - portable sound column - PASO Sound Products Inc.

™ULTREX - 100 ultra high purity chemicals - Baker, J.T. Chemical Co.

™ULTROHM - resistors - Ultronix, Inc.

™ULTROL - cross-linked polyethylene cable - Brand-Rex Co.

ULTRONIX, INC., Dept. EM, P.O. Box 1090, Grand Junction, Col. 81501, Tel: 303-242-0810, TWX: 910-929-6965; Empl.: 200

Local Sales Offices & Reps.

Ala	Huntsville, Comprehensive Conslt. Co.	205-772-3746
Ariz	Phoenix, Southwest Engrg.	602-993-0250
Cal	Redwood City, Parks and Pruit Assocs.	415-364-1640
Cal	San Diego, V. Gott & Assoc.	714-272-8452
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Conn	Hamden, Impact Sls. Co.	203-281-1331
Fla	Maitland, Ellis & Assocs.	305-645-1101
Ill	Park Ridge, Metcom Assoc.	312-696-1490
Kans	Shawnee Mission, Fiorence & Meyer, Inc.	913-722-5210
Mass	Newton, Impact Sls. Co.	617-964-7740
Mich	Warren, DEM Elctrn. Sls.	313-575-9444
Minn	Minneapolis, S. Clothier Co.	612-944-3456
NJ	Cherry Hills, Danco Corp.	609-424-5590
NY	Melville, Comtronic Assoc.	516-249-0505
NC	Greensboro, L & D Inc.	919-292-3201
Ohio	Cincinnati, J.O. Olsen Co.	513-922-2589
Ohio	Cleveland, J.O. Olsen Co.	216-752-5444
Ore	Beaverton, R & R Assoc.	503-643-5754
Pa	Fairview Village, Danco Corp.	609-424-5590
Pa	Pittsburgh, J. O. Olsen	412-279-2550
Tex	Dallas, J.B. Guenther, Inc.	214-691-8500
Tex	Houston, J.B. Guenther, Inc.	713-468-0232
Wash	Seattle, R & R Assoc.	206-762-7664
Exp:	Stamford, Conn., Dage Corp.	203-324-3123

ULVAC NORTH AMERICA, Dept. EM, Colchester Plaza, Colchester, VT 05446, Tel: 802-879-6325, TWX: 510-299-0007; Empl.: 600

UNARCO-ROHN, Div. Unarco Inds., Dept. EM, Box 2000, Peoria, Ill. 61601, Tel: 309-697-4400, TWX: 910-652-0646; Empl.: 290

Local Sales Offices & Reps.

Alas	Anchorage, Far North Reps.	907-337-1221
Cal	Burlingame, William J. Purdy Co.	415-347-7701
Colo	Denver, R.G. Bowen Co.	303-722-4641
Fla	Coral Gables, Mart Haller	305-444-4617
Fla	Lakeland, Dixie Elctrn. Assoc.	813-682-6624
Iowa	Des Moines, B.E.A.M.S.	515-255-1148
Mass	N. Scituate, W.A. Hendrickson Co.	617-545-0652
Minn	Minneapolis, S. Olsen & Assoc.	612-929-6121
NJ	Teaneck, S. Fisher Elctrn. Assoc.	201-837-1200
NM	Albuquerque, C.T. Carlberg & Assoc.	505-265-1579
NY	Syracuse, Leonard D. Allen Inc.	315-458-7470
NY	Tuckahoe, L-C-A Sls. Co.	914-961-4700
Ohio	St. Marys, T. Shelby & Co.	419-394-3377
Tex	Dallas, B. Townsend	214-243-6703
Wash	Seattle, DMS/Vantage	206-525-2050

UNDERWRITERS SAFETY DEVICE, An Eltra Co., Dept. EM, 7300 W. Wilson Ave., Chicago, Ill. 60656, Tel: 312-867-4600, TWX: 910-221-3474; Empl.: 145

Local Distributors

Ariz	Phoenix, Brown Wholesale Electric Co.	602-275-8521
Cal	Carson, Royal Wholesale Elec. Co.	213-979-9700
Cal	San Leandro, Electro Comps.	415-352-5210
Cal	Van Nuys, Amfac Electrical Supply Co.	213-997-8505
Colo	Denver, CEC	303-399-6931
Conn	Hartford, Allied Electric Supply ..	203-527-6405
Fla	Lakeland, A-A Electric Supply	813-682-6181
Ga	Atlanta, Electric Sls. & Svc.	404-355-7034
Ga	Norcross, A-A Electric, Inc.	404-449-8670
Ill	Arlington Heights, S & R Corp. ..	312-593-2545
Ill	Chicago, Revere Electric Supply	312-738-3636
Ill	Chicago, Steiner Electric Supply	312-685-7000
Ill	Rockford, Muntz Electric Supply	815-968-8866
Iowa	West Des Moines, Ramco	515-225-6933
Md	Bladensburg, Prince George Electric Supply	301-779-1000
Mass	Boston, Controller Svc. & Sls.	617-269-1300
Mass	Lowell, C & I Electrical Supply Co.	617-458-3364
Mich	Adrian, Electric Wholesale Supply	313-265-5148
Mich	Ann Arbor, Madison Electric	313-665-6131
Mich	Detroit, Madison Electric	313-875-1560
Mich	Jackson, Electric Wholesale Supply	517-782-7121
Mich	Pontiac, Standard Electric	313-332-9261
Minn	Minneapolis, Sterling Electric	612-332-4571
Mo	St. Louis, National Electric	314-241-4600
NJ	Cherry Hill, Fromm Electric Supply	609-662-8300
NJ	Dover, Kahant Electrical Supply	201-366-2966
NY	Buffalo, Lang Electric	716-854-2770
NY	Syracuse, Baldwin Hall	315-463-9251
NC	Matthews, Carolina Tech. Reps.	704-847-4494
Okla	Claremore, Besco Electric Supply	918-341-5724
RI	Providence, Controller Svc. & Sls.	401-781-7100
Tex	Dallas, Fuses, Inc.	214-387-3301
Va	Lynchburg, Mid-State Electric Supply	804-846-6555
Va	Richmond, Dixie Electric Supply Corp.	804-355-8003
Wash	Seattle, Coast Warehouse, c/o Temco Northwest	206-935-3200
Wisc	Cedarburg, A-A Electric Supply	414-377-8000
Wisc	Milwaukee, Standard Electric Supply	414-272-8100
Wyo	Casper, CEC Inc.	307-266-1278
For:	Can., Toronto, Ontario, Great Lakes Electrical Ltd.	416-255-8161

UNGAR, DIV., Eldon Inds., Inc., Dept. EM, 233 E. Manville St., Compton, Cal.,90220, Tel: 213-774-5950, Telex: 691-575

Sales Manager: T.H. Naylor, V.P. Mktg.

Local Sales Offices & Reps.

Ala	Birmingham, M.F. Taylor Co.	205-853-3181
Cal	Burlingame, Elvey-Proctor Co.	415-347-2994
Cal	Inglewood, Ungar Sls. Assocs. ..	213-649-6238
Colo	Denver, K-C Marketers	303-733-5561
Fla	Casselberry, M.F. Taylor Co.	305-339-0821
Ill	Chicago, G. McL. Cole Co.	312-774-3535
Ind	Indianapolis, F. J. McSweeney & Assocs.	317-849-5726
Iowa	Des Moines, KSW Assocs.	515-279-9235
Kans	Baxter Springs, P M I Sls.	316-856-3660
La	New Orleans, Texport Co.	504-486-6073
Md	Catonsville, M.F. Taylor Co.	301-747-5718
Md	Silver Spring, M.F. Taylor Co.	301-589-4002
Mass	Needham, Mullin Tech. Sls. Co.	617-444-4780
Mich	Southfield, R. Milsk Co.	313-354-3310
Minn	Minneapolis, Heimann Co.	612-861-6051
Mo	Kansas City, KSW Assocs.	816-358-5240
NY	Guilderland, Solder Pot, Inc.	518-355-1829
NY	Oceanside, Bittan Assocs.	516-678-6222
NC	Charlotte, M.F Taylor Co.	704-537-7201
Ohio	Lakewood, Baehr, Greenleaf & Assocs.	216-221-9030
Okla	Tulsa, Texport Co.	918-939-1727
Pa	Philadelphia, M.F. Taylor Co.	215-698-9757
Tenn	Memphis, Texport Co.	901-683-0880
Tex	Carrollton, E-Tron Sls.	214-245-6633
Tex	Richardson, Texport Co.	214-238-7117
Wash	Seattle, Andrew Sproul Assocs.	206-789-3300
Wisc	Milwaukee, G. McL. Cole Co.	414-545-6083

™UNGARMATIC - temp. controlled soldering stations & irons - UNGAR, Div.

UNHOLTZ-DICKIE CORP., Dept. EM, 3000 Whitney Ave., Hamden, Conn. 06518, Tel: 203-288-3358, Telex: 128285; Empl.: 49 .... p. 2686

Local Sales Offices & Reps.

Ala	Huntsville, W. Brown	205-539-4411
Cal	Redondo Beach, Unholtz-Dickie Corp.	213-378-9418
Conn	Hamden, W.W. Jarowey Co.	203-288-3010
Fla	Margate, W. Brown	305-753-1650
Fla	Orlando, W. Brown	305-425-5863
Ga	Chamblee, W A Brown Comps.	404-455-0405
Ill	Northfield, Torkelson Assocs.	312-446-9085
Ind	Indianapolis, Torkelson Assocs...	317-244-7867
Kans	Wichita, Aero-Hill Sls.	316-943-6371
Mich	Farmington, Anderson Elctrns.	313-476-9161
Minn	Minneapolis, Torkelson Assocs.	612-835-2414
NY	No. Merrick, Space-Tronics	516-868-1800
NC	Raleigh, W. Brown	919-781-9426
Ohio	Cleveland, Dietrich & Assocs.	216-781-1855
Ohio	Dayton, Dietrich & Assocs.	513-223-6042
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
Tex	Houston, Mott Assocs.	713-777-5773

™UNIBASE - silicon power transistors - Motorola Semiconductor Prods.

™UNIBLOC - plastic package (transistors) - Motorola Semiconductor Prods.

™UNI-BUS - bus ducts & distribution systems - Cutler-Hammer, Inc.

™UNIBUS - PDP-11 bus structure - Digital Equipment Corporation

™UNICARD - plug-in circuit card - A.P. Products

™UNICERAM - fixed ceramic capacitors - JFD Electronics Components Corp.

™UNICOAT - insulation coating - Bacon Inds.

UNICO, INC., Dept. EM, 3725 Nicholson Rd., Franksville, Wisc. 53126, Tel: 414-632-6121, TWX: 910-271-2385; Empl.: 100

Sales Manager: M.E. Grant

Local Sales Offices & Reps.

Mich	Detroit, Unico, Inc.	313-363-3432
Ore	Beaverton, Unico, Inc.	503-644-3195
Pa	Pittsburgh, Unico, Inc.	412-486-3883

™UNICOM - CATV trunk amplifier - Delta-Benco-Cascade LTD.

™UNI-CORE - acid filled core solder - Alpha Metals, Inc.

UNICORP

UNICORP, Dept. EM, 534 Mitchell St., Orange, N.J. 07050, Tel: 201-674-1700 .... p. 2779-2783

Sales Manager: P. Smial

Local Sales Offices & Reps.

Ariz	Phoenix, H. Premil Co.	602-939-6787
Cal	Los Angeles, El-Com Sls.	213-223-1351

Cal	San Jose, Reaction Sls.	408-263-9211
Colo	Englewood, Mikro Sls.	303-770-2300
Fla	Fort Lauderdale, Tropi-Tec. Co.	305-463-0988
Ill	Palatine, Claeson Assocs.	312-359-7230
Md	Baltimore, Callas Elctrns.	301-744-7711
Mass	Norwood, JMG, Inc.	617-762-5333
NY	Huntington Station, Addem	516-567-5900
NY	Red Creek, Net Sls.	315-754-8138
NY	Rochester, Net Sls.	716-467-4538
Ohio	Dayton, INH Comps. Sls.	513-434-8808
Tex	Dallas, J & R Assocs.	214-348-5752
Wash	Bellevue, H. Paulman Sls. Co.	206-455-3311

™UNI-CURVE - R-T, curve-matched, interchangable thermistors - Fenwal Elctrns.

™UNIDAPTOR - special 45 RPM adaptor - Aldshir Mfg.

™UNIDEX - encoded DC & stepper drives - Aerotech, Inc.

™UNIDEX - rotary switches - Oak Inds. Inc.

™UNIDYNE - unidirectional microphone - Shure Brothers, Inc.

UNIFORM TUBES INC., MicroDelay Division, Dept. EM, Collegeville, Pa. 19426, Tel: 215-539-0700, Telex: 84-6428; FSC No.: 93306; Empl.: 400 .. p. 3060,3061

Local Sales Offices & Reps.

Ariz	Tempe, Jarko Assoc.	602-966-3020
Cal	Los Altos, Marketek, Inc.	415-941-0882
Cal	Newport Bch., Uniform Tubes	714-642-5950
Cal	Van Nuys, C.W. Swift & Assoc.	213-989-1133
Colo	Denver, Industrial Hardware Co.	303-426-1443
Fla	Winter Park, Floritronics Inc.	305-886-4818
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ill	Schiller Pk., Uniform Tubes	312-671-2717
Ind	Indianapolis, Coombs Assocs.	317-251-2757
Mass	Wakefield, J. Murphy	617-761-7153
Mich	Milford, T. Mulligan & Assocs.	313-363-5575
Mo	Grandview, Beneke & McCaul, Inc.	816-765-2998
Mo	St. Louis, Beneke & McCaul	314-434-6242
NY	Mt. Vernon, Friedman-Smith Elctrn. Sls.	914-664-4866
NY	Syracuse, A. Scott Baregard	315-479-6641
Ohio	Columbus, T. Mulligan & Assocs.	614-457-2242
Pa	Feasterville, PSA, Inc.	215-355-6244
Tex	Richardson, Vector Sls. Co.	214-234-4291
Wash	Redmond, Barrett Sls. Nothwest Ltd.	206-885-6991
Wisc	Milwaukee, Coombs Assoc.	414-671-1945
Exp:	N.Y., New York, Ad. Auriema, Inc.	212-466-2500

Local Distributors

Cal	Los Altos, Marketek, Inc.	415-941-0882
Cal	Van Nuys, C. W. Swift Assocs.	213-989-1133
Mass	Medford, Blake Assocs.	617-391-7890
NY	Mt. Vernon, Friedman-Smith Co.	914-664-4866
For:	Can., Montreal, Que., Braydon Electro Ltd.	514-332-5650

™UNI-LASER - small, one-piece pulsed laser - Laser Inc.

™UNILINE - sound columns - University Sound

Unimax Switch
CORPORATION

UNIMAX SWITCH CORP., Sub. Unimax Group, Inc., Dept. EM, Ives Rd., Wallingford, Conn. 06492, Tel: 203-269-8701, TWX: 710-476-1397; FSC No.: 80207; Empl.: 300 .... p. 4309

Sales Manager: W. Pogmore

Local Sales Offices & Reps.

Ala	Huntsville, Rep., Inc.	205-881-9270
Ariz	Scottsdale, DeAngelo, Rothman & Cheever, Inc.	602-948-2240
Cal	LA, M.A. Stolaroff	213-295-7781
Cal	Los Altos, Ewing-Foley	415-941-4525
Colo	Englewood, Todd	303-761-7801
Conn	Bloomfield, Zaslow Sls.	203-242-7781
Fla	Oviedo, Conley & Assoc.	305-365-3283
Ga	Tucker, Rep., Inc.	404-938-4358
Ill	Chicago, Wasson-Gallagher	312-261-7517
Ill	Westchester, Wasson-Gallagher	312-884-0690
Ind	Marion, O.H. Bromberg	317-664-5384
Iowa	West Des Moines, Greg Newell Inc.	515-274-0386
Ky	Louisville, O. H. Bromberg	502-245-8916
Md	Rockville, L.G. White	301-770-6556
Mass	Northboro, Zaslow Sls.	617-393-8150
Mich	Grosse Pointe Park, Greiner Assoc.	313-499-0188
Minn	Mpls., Jos-Co. Sls. Engrg.	612-854-4270
Mo	St. Louis, Hill & Co.	314-621-1818
NJ	West Caldwell, Grimm, Siegel Assoc.	201-575-9300
NY	Rochester, Canavan-Scanlon Assoc.	716-442-0720
NY	Syracuse, Canavan-Scanlon Assoc.	315-437-1271
NC	Winston-Salem, L.G. White	919-725-3612
Ohio	Cincinnati, O.H. Bromberg	513-771-9333
Ohio	Medina, J. Hofstetter	216-241-4880
Pa	Broomall, White-Keystone	215-353-6347
Tex	Dallas, Glidden Electro. Equip.	214-341-0610
Tex	Houston, Glidden Electro Equip.	713-681-1415
Wash	Mercer Island, J. H. Andersen	206-232-0484

Local Distributors

Ala	Decatur, Forbes Distributing Co.	205-353-4762
Ala	Montgomery, Southern Controls	205-277-5030
Ariz	Phoenix, Electro Comps.	602-258-2665
Cal	Los Angeles, Minarik Elec. Co.	213-624-3161
Cal	Los Angeles, Fisher/Brownell	213-532-2170
Cal	Santa Clara, Fisher/Brownell	408-244-6182
Colo	Denver, Fistell's Elec. Supply	303-244-4691
Conn	Danbury, Greene Elec. Sup.	203-748-5648
Conn	Fairfield, Utronics	203-255-4521
Conn	Orange, Milgray Elctrns.	203-795-0712
Conn	W. Hartford, Atlantic Switch Controls	203-523-5259
Fla	Hialeah, Switch Controls	305-820-0892
Fla	Miami, Elctrn. Equip.	305-871-3500
Fla	Winter Park, Milgray Elctrns.	305-647-5747
Ill	Arlington Hgts., LoDan Elctrns.	312-956-6700
Ill	Chicago, Newark Elctrns.	312-638-4411
Ill	Westmont, Bodelle Co.	312-323-9670
Ill	Wheaton, Connectrix	312-653-1460
Ky	Louisville, Marine Elect. Apparatus	502-587-6511
Me	Portland, J. Leen Co.	207-774-6266
Md	Lanham, Milgray Elctrns.	301-793-3993
Md	Rockville, Capitol Radio	301-881-2270
Mass	Bellinglam, Dowiak Assoc.	617-966-0404
Mass	Boston, Sager Elec. Supply	617-542-2281
Mass	Burlington, Milgray Elctrns.	617-272-6800
Mo	Kansas City, Electro Sls.	816-221-0303
Nev	Reno, Electronic Distr. Co. of Nevada	702-323-2766
NJ	Cherry Hill, Milgray Elctrns.	609-424-1300
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hempstead, Elctrn. Equip.	516-538-5510
NY	Rochester, Summit Elctrns.	716-334-8110
NY	Sodus, AED Distrs.	315-483-6561
NY	W. Nyack, Douglaston Elect.	914-358-6966
NY	Woodside, Switches Unlimited	212-651-0935
NC	Winston-Salem, Kirkman Elect.	919-724-0541
Ohio	Cincinnati, Midwest Equip. Co.	513-793-4060
Ohio	Cleveland, Milgray Elctrns.	216-881-8800
Ohio	Dayton, Duellman Elec.	513-461-5010
Pa	Philadelphia, Herbach & Rademan	215-426-1700
Tex	Dallas, Texaswitch, Inc.	214-357-1768
Tex	Dallas, Ind. Equip. Co.	214-271-5494
Tex	Odessa, Superior Elect.	915-332-0276
Va	Alexandria, Technical Distrs.	703-971-8979
Wash	Seattle, Zepher Elctrns.	206-575-0922
Wisc	Mequon, Taylor Electric Co.	414-241-4321
For:	Can., Burlington, Ont., Motion Control Devices, Ltd.	416-637-9369
For:	Can., Vancouver, B.C., Canadian Dynamics Ltd.	604-325-3201

UNIMETRICS CORP., Mektron Div., Dept. EM, 1853 Raymond Ave., Anaheim, Cal. 92801, Tel: 714-879-3777

Sales Manager: D.F. Cantu, Jr.

™UNIMORPH - piezoelectric ceramics - Vernitron Piezoelectric Div.

UNION CARBIDE CORP., Battery Products Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017, Tel: 212-551-3763 .... p. 3349

Local Sales Offices & Reps.

Ill	Chicago	312-454-2000

UNION CARBIDE, CHEMICALS & PLASTICS, Dept. EM, 270 Park Ave., New York, N.Y. 10017, Tel: 212-551-3763

Local Sales Offices & Reps.

Cal	Long Beach	213-435-3721
Cal	San Francisco, Union Carbide, Chemicals & Plastics	800-421-3724
Ga	Atlanta	404-633-6161
Ill	Chicago	312-454-2000
Ind	Indianapolis	Enterprise 2226
Ky	Louisville	Enterprise 2226
Md	Baltimore	301-944-8211
Mass	Needham Heights	617-444-5400
Mich	Detroit	313-354-0800
Mich	Southfield	313-354-0800
Minn	Minneapolis	800-621-2510
Mo	Kansas City	800-621-8236
Mo	St. Louis	314-726-0324
NJ	Hackensack	201-646-1111
NJ	Moorestown	609-235-6200
NY	New York	212-695-5054
NC	Charlotte	704-364-1400
Ohio	Cincinnati	513-272-0206
Ohio	Cleveland	216-621-4200
Pa	Philadelphia	215-923-3200
Pa	Pittsburgh	412-922-5700
Tex	Dallas	800-631-0010

UNION CARBIDE CORP., Components Dept., Dept. EM, Box 5928, Greenville, S.C. 29606, Tel: 803-963-6300, Telex: 57-0496; FSC No.: 31433; Empl.: 2000 .... p. 1356

Local Sales Offices & Reps.

Ariz	Phoenix, Union Carbide-Comps. Dept.	602-264-7332
Cal	Marina Del Rey, Union Carbide-Comps. Dept.	213-821-8824
Cal	Mt. View, Union Carbide-Comps. Dept.	415-969-9390
Cal	San Diego, Union Carbide Comps.	714-679-4500
Colo	Denver, Parker-Webster Co.	303-751-2600
Fla	Clearwater, G. F. Bohman Assocs.	813-442-5606
Fla	Fort Lauderdale, G.F. Bohman Assocs.	305-564-3081
Fla	Orlando, G.F. Bohman Assocs.	305-855-0274
Ill	Schaumburg, Union Carbide-Comps. Dept.	312-843-1030
Ind	Indianapolis, L. M. DeVoe Co.	317-257-1227
Iowa	Cedar Rapids, Seltec Sls. Corp.	319-393-1114
Kans	Andover, Palatine Engineering Sls.	316-788-0621
Kans	Lenexa, Palatine Engrg. Sls.	913-492-7020
Mass	Needham Heights, Union Carbide-Comps. Dept.	617-444-5400
Mich	Birmingham, Union Carbide-Comps. Dept.	313-642-9800
Minn	Minneapolis, S. Clothier Co.	612-944-3456
Mo	St. Louis, Palatine Engrg. Sls., Inc.	314-426-7055
NY	East Syracuse, Hamilton/Avnet Elctrns.	
NY	Liverpool, Union Carbide-Comps. Dept.	315-451-0720
NY	Tarrytown, Union Carbide-Comps. Dept.	914-345-2047
Ohio	Worthington, Union Carbide Comps	614-436-1510
Pa	Frazer, Union Carbide-Comps. Dept.	215-644-8864
SC	Greenville, Union Carbide-Comps. Dept.	803-963-6606
Tenn	Sewanee, Union Carbide-Comps. Dept.	615-598-5809
Tex	Dallas, Union Carbide-Comps. Dept.	214-387-3970
Tex	Houston, Union Carbide-Comps. Dept.	713-621-1000
Utah	Salt Lake City, Parker-Webster Co.	801-261-1058
Exp:	S.C., Greenville, Union Carbide-Comps. Dept.	803-963-6300

Local Distributors

Ala	Huntsville, Hall-Mark Elctrns. Corp.	205-837-8700
Ala	Huntsville, Hamilton/Avnet Elctrns.	205-533-1170
Ariz	Phoenix, Hamilton/Avnet Elctrns.	602-275-7851
Cal	Costa Mesa, Avnet Elctrns.	714-754-6071
Cal	Costa Mesa, Schweber Elctrns.	714-556-3880
Cal	Culver City, Hamilton Electro Sls.	213-558-2131
Cal	Mountain View, Hamilton/Avnet Elctrns.	415-961-7000
Cal	San Diego, Hamilton/Avnet Elctrns.	714-279-2421
Cal	Sunnyvale, Bell Elctrns. Corp.	408-734-8570
Cal	Woodland Hills, JACO Elctrns.	213-887-6400
Colo	Denver, Hamilton/Avnet Elctrns.	303-534-1212
Conn	Danbury, Schweber Elctrns.	203-792-3500
Conn	Georgetown, Hamilton/Avnet Elctrns.	203-762-0361

Conn	Hamden, Wilshire Elctrns.	203-281-1166
Fla	Fort Lauderdale, Hall-Mark Elctrns. Corp.	305-971-9280
Fla	Ft. Lauderdale, Hamilton/Avnet Elctrns.	305-971-2900
Fla	Hollywood, Schweber Elctrns.	305-927-0511
Fla	Orlando, Hall-Mark Elctrns. Corp.	305-855-4020
Ga	Atlanta, Schweber Elctrns.	404-449-9170
Ga	Atlanta, Hamilton/Avnet Elctrns.	404-448-0800
Ill	Elk Grove Village, Schweber Elctrns.	312-593-2740
Ill	Elk Grove Village, Hall-Mark Elctrns. Corp.	312-437-8800
Ill	Schiller Park, Hamilton/Avnet Elctrns.	312-678-6310
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Kans	Lenexa, Hamilton/Avnet Elctrns.	913-888-8900
Kans	Lenexa, Hall-Mark Elctrns. Corp.	913-888-4747
Md	Baltimore, Technico, Inc.	301-461-2200
Md	Baltimore, Hamilt/Avnet Elctrns.	301-796-5000
Md	Baltimore, Hall-Mark Elctrns. Corp.	301-796-9300
Md	Rockville, Schweber Elctrns.	301-881-2970
Mass	Burlington, Wilshire Elctrns.	617-272-8200
Mass	Burlington, Hamilton/Avnet Elctrns.	617-933-8000
Mass	Lexington, Harvey Elctrns. Supply	617-861-9200
Mass	Waltham, Schweber Elctrns.	617-890-8484
Mich	Livonia, Hamilton/Avnet Elctrns.	313-522-4700
Mich	Troy, Schweber Elctrns.	313-583-9242
Minn	Bloomington, Hall-Mark Elctrns. Corp.	612-884-9056
Minn	Edina, Schweber Elctrns.	612-941-5280
Minn	Edina, Hamilton/Avnet Elctrns.	612-941-3801
Mo	Earth City, Hall-Mark Elctrns. Corp.	314-291-5350
Mo	Hazelwood, Hamilton/Avnet Elctrns.	314-731-1144
Mo	Kansas City, LCOMP Kansas City	816-221-2400
NJ	Cedar Grove, Hamilton/Avnet Elctrns.	201-239-0800
NJ	Clifton, Wilshire Elctrns.	201-340-1900
NJ	Mt. Laurel, Hamilton/Avnet Elctrns.	609-234-2133
NJ	Somerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet Elctrns.	505-765-1500
NY	Buffalo, Summit Distrs.	716-884-3450
NY	E. Syracuse, Hamilton/Avnet Electronics	315-437-2642
NY	Hauppauge, Hall-Mark Elctrns. Corp.	516-273-0030
NY	Hauppauge, JACO Elctrns.	516-273-5500
NY	Johnson City, Wilshire Electronics	607-797-1236
NY	Rochester, Schweber Elctrns.	716-461-4000
NY	Rochester, Hamilton/Avnet Elctrns.	716-442-7820
NY	Rochester, Summit Distrs.	716-334-8110
NY	Westbury, Hamilton/Avnet Elctrns.	516-333-5800
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Raleigh, Hall-Mark Elctrns. Corp.	919-832-4465
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Beachwood, Schweber Elctrns.	216-464-2970
Ohio	Cleveland, Hamilton/Avnet Elctrns.	216-461-1400
Ohio	Dayton, Hamilton/avnet Elctrns.	513-433-0610
Ohio	Dayton, Pioneer/Dayton Elctrns.	513-236-9900
Okla	Tulsa, Hall-Mark Elctrns. Corp.	918-835-8458
Pa	Huntington Valley, Hall-Mark Elctrns.	215-355-7300
Tex	Austin, Hall-Mark Elctrns. Corp.	512-837-2814
Tex	Dallas, Hamilton/Avnet Elctrns.	214-661-8661
Tex	Dallas, Schweber Elctrns.	214-661-5010
Tex	Dallas, Hall-Mark Elctrns. Corp.	214-231-6111
Tex	Houston, Schweber Elctrns.	713-784-3600
Tex	Houston, Hamilton/Avnet Elctrns.	713-526-4661
Tex	Houston, Hall-Mark Elctrns.	713-781-6100
Utah	Salt Lake City, Hamilton/Avnet Elctrns.	801-262-8451
Wash	Seattle, Hamilton/Avnet Elctrns.	206-746-8750
Exp:	Can., Montreal, Que., Hamilton/Avnet Elctrns.	514-331-6443
For:	Can., Mississuaga, Ont., Schweber Elctrns.	416-678-9050
For:	Can., Mississuaga, Ont., Hamilton/Avnet Elctrns.	416-677-7432
For:	Can., Ottawa, Ont., Hamilton/Avnet Elctrns.	613-226-1700

UNION CARBIDE CORP., Crystal Prods. Dept., Dept. EM, 8888 Balboa Ave., San Diego, Cal. 92123, Tel: 714-279-4500, Telex: 695-465; Empl.: 160

Sales Manager: J.J. Beeman

Local Sales Offices & Reps.

Cal	Marina Del Rey	213-822-0441
Cal	Mountain View	415-965-2128
Cal	San Diego	714-279-4500
Mass	Needham Hgts.	617-444-5400
NJ	Bound Brook	201-356-8000

UNION CARBIDE CORP., Linde Div., Dept. EM, 270 Park Ave., New York, N.Y. 10017, Tel: 212-551-3763

Local Sales Offices & Reps.

Ala	Birmingham	205-879-4681
Cal	Long Beach	213-435-3721
Cal	San Francisco	415-765-1000
Colo	Denver	303-722-4621
Ga	Atlanta	404-633-6161
Ill	Chicago	312-454-2000
Kans	Shawnee Mission	913-362-2200
Mass	Needham Heights	617-444-5400
Mich	Farmington	313-478-1500
Mo	Creve Coeur	314-567-4455
NJ	Moorestown	609-235-6200
NY	Buffalo	716-854-1616
Ohio	Cleveland	216-621-4200
Okla	Tulsa	918-622-8822
Pa	Pittsburgh	412-922-5700
Tex	Dallas	214-631-0010
Tex	Houston	713-621-1000

UNION CARBIDE, Parylene, Dept. EM, 270 Park Ave., New York, N.Y. 10017, Tel: 212-551-3763

Local Sales Offices & Reps.

Cal	Long Beach	213-435-3721
NJ	Bound Brook	201-356-8000
NY	New York	212-551-6071

™**UNI-PAC** - integrated circuit socket - Methode Elctrns., Inc.

™**UNIPLY** - automatic multirange supply - Power Designs, Inc.

™**UNIRING** - one piece compression termination - Burndy Corporation

™**UNI-ROTOR** - pumps - Astro Dynamics

UNIROYAL, INC., Dept. EM, 1230 Ave. of Americas, New York, N.Y. 10020, Tel: 212-489-4000; Empl.: 55,600

Local Sales Offices & Reps.

Cal	Santa Ana	714-545-5551
Cal	South San Francisco	415-873-5880
Cal	Vernon	213-581-7281
Colo	Denver	303-388-2481
Ga	Atlanta	404-366-4650
Ill	Chicago	312-890-2969
Ill	Elk Grove	312-595-7180
Kans	Lenexa	913-888-1207
Md	Baltimore	301-485-8904
Mass	Dedham	617-329-2060
Mass	Springfield	413-781-8620
Minn	St. Louis Park	612-546-2528
Mo	St. Louis	314-429-6908
NJ	Jersey City	201-432-4222
NY	Buffalo	716-668-0404
NC	Charlotte	704-334-0893
Ohio	Akron	419-732-2151
Ohio	Cincinnati	513-242-5807
Ohio	Port Clinton	419-732-2151
Ore	Milwaukie	503-659-7277
Pa	McKees Rocks	412-771-3500
Pa	Philadelphia	215-742-7010
Tenn	Memphis	901-794-7440
Tex	Dallas	214-631-2404
Tex	Houston	713-462-0004
Wash	Seattle	206-767-7066

™**UNISEAL** - for microphones - Electro-Voice, Inc.

™**UNISEC** - optical angle reading device - Teledyne Gurley

™**UNISET** - epoxy compounds - Amicon Corp.

™**UNISPHERE** - unidirectional microphone - Shure Brothers, Inc.

™**UNI-STRAND** - bunch standed conductor, tinned to unify - Belden Corp.

UNIT INDUSTRIES, INC., Dept. EM, 529 S. Raymond Ave., Fullerton, Cal. 92631, Tel: 213-569-7181; Empl.: 14

UNITED CHEMICON INC., Dept. EM, 731 James St., Ste. 306, Syracuse, N.Y. 13203, Tel: 315-474-2954, TWX: 710-541-0453

Local Sales Offices & Reps.

Ariz	Scottsdale, DeAngelo, Rothman, & Cheever, Inc.	602-948-2240
Cal	Culver City, DeAngelo, Rothman Co.	213-398-6239
Cal	Menlo Park, Straube Assocs.	415-323-2476
Colo	Denver, Straube Assocs.	303-426-0890
Ill	Chicago, M. Gottlieb Assocs.	312-775-1151
Ind	Indianapolis, Lattronics	317-846-5788
Kans	Overland Park, Ensco-Rep. Inc.	913-381-7551
Md	Reistertown, F.B.D. Sls. Corp.	301-356-9449
Mass	Lexington, Circuit Sls. Co.	607-861-0567
Mich	Farmington, Hummon & Assocs.	313-474-0661
Minn	Minneapolis, Heimann Co.	612-861-6051
Miss	Meridian, Herron Assocs.	601-483-9306
Mo	St. Louis, Ensco-Rep. Inc.	314-567-3935
NM	Albuquerque, Straube Assocs.	505-292-0295
NY	Fairport, F. Hall	716-223-5102
NY	New Hartford, H. Lessman	315-737-5038
NY	Syracuse, Franklin Sls. Corp.	315-472-5273
NC	Cary, F.B.D. Sls.	919-467-7595
Ohio	Cincinnati, G.L. Herrick Co.	513-351-4441
Ohio	Rocky River, Geo. L. Herrick Co.	216-333-0333
Ore	Aloha, Underwood & Underwood	503-649-5681
Pa	Abington, R.T. Pearson Sls.	215-887-0186
Tex	Fort Worth, W.P. Fralia Co.	817-738-2394
Tex	Houston, W.P. Fralia Co.	713-772-1572
Tex	Richardson, W.P. Fralia Co.	817-429-3141
Utah	Salt Lake City, Straube Assocs.	801-328-4513
Va	Portsmouth, F.B.D. Sls. Corp.	804-484-3162
Wash	Seattle, Underwood & Underwood	206-243-2133

UNITED DETECTOR TECH., Dept. EM, 2644 30th St., Santa Monica, Cal. 90405, Tel: 396-3181, Telex: 65-2413; Empl.: 90

Local Sales Offices & Reps.

Ariz	Scottsdale, Measurement Consultants	602-994-9519
Cal	Los Angeles, CH Scientific	213-476-7341
Colo	Lafayette, Grady Moore Assoc.	303-494-3351
Fla	Orlando, Physimetrics, Inc.	305-894-8081
Ill	Des Plaines, B. Ellis Assocs.	312-298-7626
Md	Randallstown, Beacon North	301-922-1248
Mass	Marblehead, Northeast	617-631-9500
NM	Albuquerque, Grady Moore Assoc.	505-292-3322
NY	North Lindenhurst, Sigma Communications	516-226-1880
NY	Rochester, Irondequoit Inds.	716-544-6257
Ohio	Berea, B. Ellis Assocs.	216-826-0559
Pa	Willow Grove, H. Nash Assocs.	215-657-2213
Tex	Richardson, Yarbrough Southwest Co.	214-690-0800
Utah	Murray, Measurement Consultants	801-268-3181
Va	Falls Church, Beacon North	703-534-7200
Wash	Bellevue, TASCO	206-453-1414

UNITED ELEC. CONTROLS CO., Dept. EM, 85A School St., Watertown, Mass. 02172, Tel: 617-WA 6-1000, TWX: 617-092-2445; Empl.: 350

Local Sales Offices & Reps.

Ill	Rolling Meadows	312-259-6700
NJ	Edison	201-738-1900

™**UNITED ELECTRON** - tubes - United Page Inc.

UNITED MICROTRONICS, INC., Dept. EM, 5-15 48th Ave., Long Island City, N.Y. 11101, Tel: 212-ST 6-0478; Empl.: 15

Local Sales Offices & Reps.

Cal	Los Angeles, RF Assocs.	213-476-5430
Cal	Redwood City, Woodworth Co.	415-365-0252
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Mass	Wakefield, Nerem Assocs.	617-245-4426
NM	Albuquerque, R. A. Mayes Co.	505-293-8010
NY	New York, United Microtronics	212-ST6-0478
Tex	Dallas, R. A. Mayes Co.	214-276-2006
Tex	Houston, R. A. Mayes Co.	713-493-2803
Exp:	N.J., Cresskill, Lars Microwave	201-871-0024

UNITED MINERAL & CHEM. CORP., Dept. EM, 129 Hudson St., New York, N.Y. 10013, Tel: 212-966-4330, TWX: 232685 710-581-5799; Empl.: 78

Local Sales Offices & Reps.

CHEMICAL DEPARTMENT

Cal	Mountain View, Tech Ser. Inc.	415-969-9020
Cal	Torrance, Tech Ser. Inc.	213-538-2267

Conn	West Hartford, R.S. Pettigrew & Co. Inc.	203-233-8533
Mass	W. Newton, R. S. Pettigrew & Co.	617-969-5770
Minn	St. Louis Park, Xylem, Inc.	612-920-9626
NY	Syracuse, Rep Tech Inc.	315-437-2845
Tex	Richardson, Ralph Marston	214-235-3577

ELECTRONIC COMPONENTS

Cal	Inglewood, Ungar Sales Assocs.	213-649-6238
Fla	Orlando, Irby & Connolly	305-894-8471
Ill	Skokie, Saffro & Assocs.	312-588-0905
Ind	Indianapolis, Schroeder-Loomis, Inc.	317-251-4571
Mass	New Bedford, R. E. Crabbe	617-998-1250
Mich	Ferndale, Hilltronics, Inc.	313-398-5556
NY	Syracuse, N.J. Matchuk Co.	315-487-6951
Ohio	Cleveland, Greenleaf & Assocs.	216-333-5480
Pa	Philadelphia, H.A. Goodman Co.	215-247-7116
Tex	Richardson, Thornton Sls.	214-231-6891

UNITED PAGE INC., Dept. EM, 481 Getty Ave., Paterson, N.J. 07503, Tel: 201-279-7500; Empl.: 60

Local Sales Offices & Reps.

Cal	Encino, United-Page	213-881-0300
Colo	Denver, Elctrn. Sls.	303-771-6300
Ill	Park Ridge, Metcom Assocs.	312-696-1490
Mo	Hazelwood, Dy-Tronix	314-731-5799
NJ	Paterson, United-Page	201-279-7500
NJ	Westwood, R.C. Assocs.	201-664-1241
NY	East Meadow, Stanley Shapiro Assocs.	516-483-4185
Pa	Glenside, Koebert, R.F.	215-887-2310
Tex	Dallas, Southland Components	214-233-0603

UNITED PRODS. CO., See Automatic Coil

UNITED REFINING & SMELTING CO., Dept. EM, 3700 N. Runge Ave., Franklin Park, Ill. 60131, Tel: 312-455-8800; Empl.: 32

UNITED SENSOR & CONTROL CO., Dept. EM, 85 School St., Watertown, Mass. 02172, Tel: 617-926-1000, TWX: 617-092-2445; Empl.: 25

Local Sales Offices & Reps.

Cal	Anaheim, United Electric Controls Co.	714-635-3730
Ill	Rolling Meadows, United Elec. Controls Co.	312-259-6700
NJ	Edison, United Electric Controls Co.	201-738-1900
Ohio	Cleveland, United Electric Controls Co.	216-261-8141

UNITED STATES CRYSTAL CORP., Dept. EM, 3605 McCart St., Ft. Worth, Tex. 76110, Tel: 817-921-3014; Empl.: 55

Local Sales Offices & Reps.

Cal	Los Altos, P & M Sls.	415-941-4444
Cal	Orange, I. Green Mktg.	714-637-1313
Colo	Denver, William J. Purdy	303-777-1411
Fla	Fort Lauderdale, Uni-Rep	305-527-1556
Ga	Atlanta, Cavendish Sls.	404-394-2642
Ill	Arlington Heights, Brainard-Wilson Mktg.	312-437-2700
Ind	Mulberry, Maish Sls.	317-296-2322
Md	Seabrook, Taylor Mktg.	301-864-4011
Mass	Northboro, Pray Sls.	617-393-3434
Mich	Pontiac, T.A. Elctrn. Sls.	313-335-4285
Minn	Minneapolis, Kodo Assocs.	612-881-7188
Mo	Kansas City, K.S.W. Assoc.	816-358-5240
NY	Skaneateles, Leahy & Thomson	315-685-8122
NY	Tuckahoe, LCA Sls. Co.	914-961-4700
Tex	Dallas, Roman Sls.	214-358-2152

UNITED SYSTEMS, Dept. EM, 918 Woodley Rd., Dayton, Ohio 45403, Tel: 513-254-6251, TWX: 810-459-1728; FSC No.: 16152; Empl.: 135 p. 2944,2945

Local Sales Offices & Reps.

Ala	Huntsville, J.L. Highsmith & Co.	205-881-3294
Cal	Long Beach, Saber Entprs.	213-595-5646
Cal	Mountain View, IFM, Inc.	415-961-2828
Colo	Denver, Fry-Gates Co.	303-756-9886
Conn	Newtown, R.J. Sickles Assoc.	203-426-3339
Fla	Lake Park, J.L. Highsmith & Co.	305-844-2013
Fla	Orlando, J.L. Highsmith & Co.	305-293-5202
Ill	Des Plaines, Marsland Assocs.	312-298-2620
Ind	Indianapolis, Marsland Assocs.	317-924-3568
Kans	Overland Park, Carter Elctrns.	913-649-6996
Mass	Burlington, R. J. Sickles Assocs.	617-272-7285
Mich	Detroit, Comtel-Instr. Co.	313-255-1970
Minn	Minneapolis, Marsland Assocs.	612-545-4481
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Cherry Hill, Scientific Representatives	609-482-0059
NM	Albuquerque, F. Gates Co.	505-298-1875
NY	Fayetteville, M.P. Andrews, Inc.	315-637-3144
NY	Tuckahoe, Spectrum Sls.	914-793-1660
NC	Charlotte, J.L. Highsmith & Co.	704-333-7743
Ohio	Cleveland, Comtel-Instr. Co.	216-442-8080
Ohio	Dayton, Comtel-Instr. Co.	513-298-7573
Pa	Pittsburgh, Comtel-Instr. Co.	412-922-5720
Tex	Austin, MZB & Assocs.	512-454-4457
Tex	Dallas, MZB & Assocs.	214-233-5535
Tex	Houston, MZB & Assocs.	713-523-7333
Va	Falls Church, Scientific Assocs. Inc.	703-573-8787
Va	Richmond, J.L. Highsmith ad Co.	804-272-5888
Wash	Bellevue, Topp Engrg. Sls. Corp.	206-747-5401

UNITED
Wiring and Manufacturing Co.

UNITED WIRING & MFG. CO., Dept. EM, 2616 Electonic La. #404, Dallas, Tex. 75220, Tel: 214-350-4978; Empl.: 40 p. 1400-1402

Local Sales Offices & Reps.

Cal	Santa Ana, Electronic Contract Svcs. Corp.	714-549-8447
Minn	St. Paul, Datagraph	612-636-1011
NY	Guilderland, Solder-Pot	518-355-1829
Ohio	Cleveland, C.S.A.	216-333-2088
Tex	Dallas, J.B. Gunther Co.	214-691-8500

Local Distributors

Cal	Garden Grove, Allied Elctrns.	714-894-7581
Cal	Santa Ana, Electronic Contract Svc. Corp.	714-549-8447
Cal	Santa Clara, Allied Elctrns.	408-985-2323
Ill	Elgin, Allied Elctrns.	312-697-8200
Md	Landover, Allied Elctrns.	301-773-6556
Mass	Wilmington, Allied Elctrns.	617-942-0150
Tex	Dallas, United Wiring & Mfg.	214-350-4978
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Garland, Solder-Rap of Dallas	214-271-2586
Tex	Longview, United Wiring & Mfg.	214-757-3045

ⓉⓂ UNITIZED - electric motors - General Elec. Co.

ⓉⓂ UNITRACK - circuit card guides (plastic and metal) - UNITRACK Div.

UNITRACK DIV., Calabro Plastics, Inc., Dept. EM, 8738 W. Chester Pike, Upper Darby, Pa. 19082, Tel: 215-789-3820, TWX: 510-662-6066; Empl.: 25 p. 1152,1153

Local Sales Offices & Reps.

Cal	Los Angeles, Porter A. W.	213-748-8555
Cal	San Francisco, FENSCO	415-362-4930
Colo	Broomfield, CMR	303-466-1573
Ill	Des Plaines, Lincoln Hodges & Assoc.	312-297-3810
Md	Hyattsville, Eastern Comps. Inc.	301-577-2925
Mass	Northboro, Henik Assoc.	617-393-3127
Minn	St. Paul, Countrymen Assoc. Co.	612-645-9151
NJ	Lebanon, Churchill Assocs.	201-236-6055
Ohio	Dayton, Compass Assocs.	513-252-9939
Ohio	Mansfield, Benchmark Sys.	419-756-9211
Pa	West Chester, January Mktg. & Sls.	215-793-2265
Tex	Dallas, Ion Assoc.	214-357-9441
Wash	Tukwila, General Elctrns.	206-243-5141

Local Distributors

Cal	Los Angeles, El-Com, Inc.	213-223-1351
Cal	Sunnyvale, Ruby Stok Co.	408-739-5333
Colo	Denver, Integrated Elctrns. Co.	303-534-6121
Mass	Waltham, Henik Assoc.	617-891-5660
Mass	Woburn, Rush Industries	617-935-2400
Mich	Farmington, CMP Distributor Div.	313-477-7700
NC	Winston-Salem, Kirkman Elctrns., Inc	919-724-0541
Ohio	Dayton, ESCO, Inc.	513-226-1133
Pa	Philadelphia, Philadelphia Elctrns., Inc.	215-568-7400
Tenn	Nashville, Electra Distributing Co.	615-329-3971

UNITRODE CORP., Dept. EM, 580 Pleasant St., Watertown, Mass. 02172, Tel: 617-926-0404, TWX: 922-414 710-327-1296; Empl.: 1000

Sales Manager: K. Floyd, Dom.

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg.	205-772-9237
Ariz	Scottsdale, F. Board Assocs.	602-994-9388
Cal	Burlingame, Brooks Tech. Group	415-328-3232
Cal	San Diego, S. R. Elctrns.	714-565-8411
Cal	Sherman Oaks, Unitrode Corp.	213-783-1301
Colo	Littleton, Simpson Assocs.	303-794-8381
Conn	Newtown, Kanan Assocs.	203-426-8157
Fla	Boca Raton, Conley & Assocs.	305-395-6108
Fla	Oviedo, Conley & Assocs.	305-365-3283
Fla	Tampa, Conley & Assocs.	813-933-3183
Ill	Elk Grove Village, Carlson Elctrn. Sls. Co.	312-956-8240
Ind	Ft. Wayne, Baehr, Greenleaf & Assocs.	219-447-1608
Ind	Indianapolis, Carlson Elctrn. Sls. Co.	317-253-5610
Md	Glen Burnie, New Era Sls. Inc.	301-768-6666
Mass	Reading, Kanan Assocs.	617-944-8484
Mich	Farmington, Miltimore Sls.	313-476-2446
Mo	Raytown, Cadon Tech. Sls.	816-356-7685
Mo	St. Louis, Cadon Tech. Sls.	314-991-0262
NJ	Wayne, Lorac Sls.	201-696-8875
NY	Albany, Reagan/Compar Albany	518-489-7408
NY	Endwell, Reagan/Compar Albany	607-723-8743
NY	Fairport, Reagan/Compar Albany	716-271-2230
NY	Melville, Lorac Sls.	516-293-2970
NY	New Hartford, Reagan/Compar Albany	315-732-3775
NC	Burlington, P.J. Nahser	919-226-8053
Ohio	Cincinnati, Baehr, Greenleaf & Assoc.	513-891-3826
Ohio	Cleveland, Baehr, Greenleaf & Assoc.	216-221-9030
Ohio	Columbus, Baehr, Greenleaf & Assoc.	614-486-4046
Ohio	Dayton, Baehr, Greenleaf & Assoc.	513-293-1102
Ohio	West Carrollton, Unitrode Corp.	513-859-5872
Pa	Ft. Washington, GCM Assocs.	215-646-7535
Pa	Ft. Washington, Unitrode Corp.	215-542-9112
Pa	Waterford, Bacon Elctrn. Sls.	814-796-6556
Tenn	Greeneville, 20th Century Mktg.	615-638-4021
Tex	Austin, Semiconductor Sls. Assocs.	512-454-6553
Tex	Houston, Semiconductor Sls. Assoc.	713-661-0681
Tex	Richardson, Semiconductor Sls. Assocs.	214-231-6181
Utah	Salt Lake City, Simpson Assocs.	801-486-3731
Wash	Bellevue, SD-R²	206-747-9424
Wisc	Milwaukee, Carlson Elctrn. Sls. Co.	414-476-2790
Exp:	Can., Downsview, Ont., Kaytronics Ltd.	416-638-5511
Exp:	Can., Ville St. Pierre, P.Q., Kaytronics Ltd.	514-487-3434

ⓉⓂ UNITRON - gamma radiography machines - Automation Inds.

Unitron
INCORPORATED

UNITRON INC., Dept. EM, 2826 W. Kingsley Rd., Box 2159, Garland, Tex. 75041, Tel: 214-271-4531, Telex: 73-0644; Empl.: 75 p. 3402-3404

Sales Manager: D. Nixon

UNITRON INDS. CORP., Dept. EM, 61-1 NanKing West Rd., Taipei, Taiwan, Republic of China

UNITRON SCIENTIFIC, INC., Dept. EM, 66 Needham St., Newton Highlands, Mass. 02161, Tel: 617-969-8600, TWX: 710-335-1684; Empl.: 200

ⓉⓂ UNITWIST - coupling - Jan Hardware Mfg. Co.

ⓉⓂ UNIVERSAL - Clips - Mueller Electric Co.

UNIVERSAL AD-YU ELCTRNS., INC., Dept. EM, 2517 E. Norwich St., Milwaukee, Wisc. 53207, Tel: 414-482-4100; FSC No.: 90101; Empl.: 10

Local Sales Offices & Reps.

Cal	Burbank, R. Olander & Co.	213-843-5200
Kans	Leawood, G. Vasen	913-649-0679
Mass	Acton, E.E. Specialists	617-259-9200
Mo	St. Louis, G. Fixman Engrg.	314-725-5219
NM	Albuquerque, Elctrn. Entprs.	505-256-3561
NM	Las Cruces, Elctrn. Entprs.	505-524-0126
Ohio	Dayton, Micro Sls. Corp.	513-298-3033
Pa	Philadelphia, E.C.I.	215-836-1616
Wash	Seattle, Dewar & Assoc.	206-763-2233

UNIVERSAL ELCTRNS. CORP., Dept. EM, 20747 Dearborn St., Chatsworth, Cal. 91311, Tel: 213-998-7712; Empl.: 20 p. 3350,3351

Sales Manager: N. Strid, Sls. Mgr.

UNIVERSAL INSTRUMENTS CORP., Dept. EM, 137 E. Frederick St., Binghamton, N.Y. 13902, Tel: 607-772-7522, TWX: 510-252-1990; Empl.: 820

Local Sales Offices & Reps.

Colo	Denver, Universal Instrs. Corp.	303-798-6505
Colo	Littleton, Universal Instrs. Corp.	
Conn	Trumbull, Universal Instrs. Corp.	203-378-5613
Fla	St. Petersburg, Universal Instrs. Corp.	813-392-5265
Ill	Chicago, Solid State Elctrns. of Ill.	312-889-8033
Ill	Palatine, Universal Instrs. Corp.	312-358-4831
Ind	Cedar Lake, Universal Instrs. Corp.	219-374-9555
Mich	Ann Arbor, Universal Instrs. Corp.	313-761-9166
NH	Manchester, Universal Instrs. Corp.	603-669-6500
NY	Binghamton, Universal Instrs. Corp.	607-772-7414
NC	Raleigh, Universal Instrs. Corp.	919-782-1436
Pa	Levittown, Universal Instrs. Corp.	215-943-9244
Tex	Dallas, Universal Instrs. Corp.	214-339-5121
Exp:	N.Y., N.Y., Extron Entprs. Inc.	212-752-4278

UNIVERSAL MFG. CO., INC., Dept. EM, 1168 Grove St., Irvington, N.J. 07111, Tel: 201-374-9800, TWX: 710-995-4647; Empl.: 75

Sales Manager: M. Mayer

Local Sales Offices & Reps.

Cal	Los Altos, Westec Elctrns. North	415-948-8885
Minn	Minnetonka, Baillie Sls. & Engrg. Co.	612-938-1830

™UNIVERSAL PILOT HOUSING - pilot lamp socket - GTE Sylvania Inc.

UNIVERSAL PRODUCTS ENGRG., Dept. EM, 1230 Racine St., Racine, Wisc. 53403, Tel: 414-637-9789; Empl.: 20

UNIVERSAL RELAY CORP., Dept. EM, 42 White St., New York, N.Y. 10013, Tel: 212-925-6900, TWX: 710-581-4461; Empl.: 30

UNIVERSAL SECURITY INSTRS., Dept. EM, 3369 Hollinsferry Rd, Baltimore, Md. 21227, Tel: 301-355-9000; Empl.: 75

Local Sales Offices & Reps.

Cal	Culver City, W. Alderson Co.	213-837-1398
Cal	San Francisco, Featherstone Sls. Co.	415-467-3133
Fla	Miami, Sochin Sls. Co.	305-235-6048
Ill	Chicago, B. Burns & Assoc.	312-775-1233
Ind	Indianapolis, Sukup & Cox	317-253-5501
Md	Baltimore, J. Fournier	301-355-9000
Mass	Framingham, M. Fried & Assocs.	617-877-3183
Mass	Framingham, Northeast Rep., Inc.	617-879-2300
Mich	Southfield, Aztec Sls. Corp.	313-642-0777
Mo	Grandview, Moeller/Pickett & Assoc.	816-765-1224
NY	Rosedale, E. M. Goldberg	212-527-2538
Ohio	Richfield, Bear Mktg. Co.	216-659-3131
Pa	Willow Grove, R. Lewis Sls.	215-659-0704
Tenn	Memphis, Mid South Sls. Assoc.	901-276-4442
Tex	Dallas, AFCO Elctn. Sls. Co.	214-363-3925
Wash	Tukwila, J. Stroum, Co.	206-575-0175

UNIVERSAL SHIELDING CORP., Dept. EM, 45 S. Service Rd., Plainview, N.Y. 11803, Tel: 516-420-9538; Empl.: 15

Local Sales Offices & Reps.

Md	Baltimore, B. White & Co.	301-484-5400
Mass	Waltham, Measurement Conslts. Corp.	617-890-4400

™UNIVERSAL TIME CAPSULE - AC or DC timer from 1 to 1000 seconds - Artisan Elctrns. Corp.

UNIVERSAL TUNER TABS MFG., Dept. EM, 12400 Minnetonka Blvd., Hopkins, Minn 55343

UNIVERSAL VOLTRONICS CORP., Dept. EM, 27 Radio Circle Dr., Mt. Kisco, N.Y. 10549, Tel: 914-241-1300, TWX: 710-571-2142; Empl.: 200
p. 3352,3353

Sales Manager: B. Ressler

Local Sales Offices & Reps.

Cal	Encino, King Way Assocs.	213-788-4124
Cal	Redwood City, Pruitt-Parks	415-364-1640
Colo	Denver, Fry Gates Co.	503-756-9886
Fla	Winter Park, McMahan Assocs.	305-645-0463
Mass	Waltham, Waitt Tech. Sls.	617-891-8195
Mich	Southfield, Electroquitment Sls.	313-569-4497
Minn	Mpls., R.J. Sls.	612-922-1425
NM	Albuquerque, Fry Gates Co.	505-298-1875
Ohio	Chesterland, Electroquitment Sls.	216-729-2222
Ohio	Dayton, Electroquitment Sls.	513-434-8993

UNIVERSITY COMPUTING CO., Dept. EM, 7720 N. Stemmons Frwy. Box 4791, Dallas, Tex. 75247, Tel: 214-637-5010, TWX: 910-861-4990; Empl.: 1200

Local Sales Offices & Reps.

Cal	Campbell	408-377-1775
Cal	El Segundo	213-322-3093
Fla	St. Petersburg	813-576-7373
Ill	Chicago	312-368-0995
Mass	Burlington	617-272-6350
Mich	Troy	313-879-9300
NJ	East Brunswick	201-828-3900
NY	New York	212-421-8850
Okla	Tulsa	918-582-0975
Tex	Dallas	214-655-8887
Tex	Houston	713-790-1200

UNIVERSITY SOUND, Altec Corp., Dept. EM, 1515 S. Manchester, Anaheim, Cal. 92803, Tel: 714-774-2900, Telex: 655415; Empl.: 1000

Local Sales Offices & Reps.

Cal	Anaheim	714-774-0251
Cal	Carson, Bidwell Sales Assocs.	213-770-0300
Cal	Redwood City, Warren & Hickey	415-368-3849
Colo	Arvada, C. B. Elctrn. Mktg.	303-422-0561
Fla	Miami Beach, Seaman Sls. Inc.	305-271-5728
Ga	Atlanta, H. Phillips	404-992-3070
Ill	Chicago, Lassers & Co.	312-539-4722
Ind	Indianapolis, F. McSweeney	317-849-5726
Md	Kensington, Forti-Austin	301-949-1706
Mass	Norwood, Rudolph & MacInnis	617-769-5450
Mich	Detroit, Burcaw Co. & Assocs.	313-533-7700
Minn	Minneapolis, Kodo Assocs.	612-881-1255
Mo	Kansas City, Nevco, Inc.	816-421-1751
NJ	Elizabeth	201-289-7200
NY	Phelps, LSM Assocs.	315-548-4891
Ohio	North Olmsted, Avcom, Inc.	216-777-5001
Pa	Enon Valley, Nebco Assocs. Inc.	216-457-2333
Tex	Dallas, Miller & Assocs.	214-661-5002
Wash	Seattle, Vector Corp.	206-322-4343
Exp:	Anaheim, Cal., Altec	714-774-2900

Local Distributors

Ala	Birmingham, Sound Engrg. Serv. Co.
Alas	Anchorage, Systems Co.
Ariz	Phoenix, Dalis Elect. Supply
Ark	Texarkana, Lavender Distributing
Cal	Los Angeles, Radio Prods.
Cal	Riverside, Electronic Supply
Cal	San Francisco, Zack Elctrns.
Cal	San Jose, Alco Paramount
Colo	Arvada, Electro Media of Colo.
Conn	New Haven, Hatry of New Haven
Del	Wilmington, Radio Electric Svc.
DC	Wash., Shrader Sound
Fla	Orlando, Hammond Elctrns.
Ga	Atlanta, Specialty Distributing
Haw	Honolulu, Precision Radio
Idaho	Boise, Aatronics Inc.
Ill	Chicago, Newark Elctrns.
Ill	Niles, Joseph Elctrns.
Ind	Indianapolis, Graham Elctrns.
Iowa	Des Moines, Mid-State Dist.
Kans	Wichita, Radio Supply
Ky	Louisville, Peerless Electric
La	New Orleans, Southern Radio Supply
Me	Auburn, Radio Supply Co.
Md	Rockville, Capitol Radio Wholesalers
Mass	Boston, Keystone Sound
Mass	New Bedford, Burns Electric
Mich	Detroit, R.S. Elctrns.
Mich	Grand Rapids, Electronic Sound Equip.
Minn	Minneapolis, Team Central
Miss	Jackson, Sound & Communications
Mo	St. Louis, Sound Sys.
Mont	Missoula, Northwest Distrs.
Neb	Omaha, Radio Equip. Co.
Nev	Las Vegas, Hurley Elctrns.
NH	Concort, Evans Radio
NJ	Hillside, Leader Elect.
NJ	Springfield, Disco Elctrns.
NM	Albuquerque, Electronics Parts Co.
NY	Albany, Ft. Orange Elect.
NY	Buffalo, Radio Equip. Co.
NY	N. White Plains, Sound Equip. Corp.
NY	Rochester, Rochester Radio Supply
NC	Greensboro, Southeastern Radio Supply
ND	Fargo, Sound, Inc.
Ohio	Cleveland, Winteradio
Ohio	Dayton, Srepco
Okla	Oklahoma City, Trice Wholesale
Ore	Portland, Central Distrs.
Pa	Pittsburgh, Radio Parts Co.
RI	Providence, W. Dandreta & Co.
SC	Columbia, Dixie Radio Supply Co.
SD	Sioux Falls, Sioux Sound Co.
Tenn	Memphis, Lavender Dist. Co.
Tex	Dallas, Miller & Assocs.
Tex	Houston, Sterling & Elctrns.
Utah	Salt Lake City, General Communications
Vt	Essex Junction, IES Elctrns.
Va	Richmond, Avec Elctrns.
Wash	Seattle, Vector Corp.
WVa	Charleston, Electronic Specialists
Wisc	Milwaukee, Sound Sys. Co.
Wyo	Cheyenne, Wycomco
Exp:	Cal., Anaheim, Altec International
For:	Can., N. Vancouver, B.C., C. L. Thompson, Ltd.
For:	Can., Scarborough, Ontario, J. R. Tilton, Ltd.

UNIVERSITY SOUND, Dept. EM, 9500 W. Reno, Oklahoma City, Okla. 73126, Tel: 405-354-5311, Telex: 748-510

™UNIWATT - plastic package (transistors) - Motorola Semiconductor Prods.

™UNIWELD - unique construction of coils, applied specifically to our line of buzzers - Endicott Coil Co.

™UNREEL - reel-less wire & cable package - Belden Corp.

UP-RIGHT SCAFFOLDS, Div. Up-Right, Inc., Dept. EM, 1013 Pardee St., Berkeley, Calif. 94710, Tel: 415-843-0770, TWX: 415-891-9272; Empl.: 130

Sales Manager: Hugo C. Kapelke

Local Sales Offices & Reps.

Cal	Berkeley	415-843-0770
Cal	Los Angeles	213-255-5282
Cal	San Diego	714-295-8042
Cal	San Francisco, Up-Right Scaffolds	415-843-0770
Colo	Denver	303-892-1345
Conn	West Granby, Up-Right Scaffolds	201-487-6464
DC	Washington	202-393-7165
Fla	Orlando, Up-Right Scaffolds	305-898-3095
Ga	Atlanta	404-523-2263
Ill	Chicago	312-631-3380
La	New Orleans	504-523-7965
Mass	Somerville	617-666-2880
Mich	Detroit	313-962-6100
Minn	Minneapolis	612-336-1898
Mo	Kansas City	816-842-5260
Mo	St. Louis	314-241-4350
NJ	Teterboro	201-487-6464
NY	Syracuse	315-437-7845
NC	Charlotte	704-333-4638
Ohio	Cincinnati	513-621-3758
Ohio	Cleveland	216-241-7109
Pa	Philadelphia	215-564-0943
Pa	Pittsburgh	412-261-4696
Tenn	Memphis	901-525-3136
Tex	Dallas	214-946-2373
Tex	Houston	713-528-1187
Tex	San Antonio, Up-Right Scaffolds	512-226-4804
Wash	Seattle	206-682-0855
Wisc	Milwaukee, Up-Right Scaffolds	414-933-1404

UPI SEMICONDUCTOR DIV., United Page Inc., Dept. EM, 481 Getty Ave., Patterson, N.J. 07503, Tel: 201-279-7500, TWX: 710-988-5917; Empl.: 80

Local Sales Offices & Reps.

Ariz	Phoenix, Toribre Enterprises	602-257-0727
Cal	Encino, UPI Semiconductor	213-881-0300
Cal	Valencia, Vale Electronics	213-367-1954
NJ	Paterson, United Page	201-279-7500
NJ	Westwood, R. C. Assocs.	201-664-1241
Ohio	Cleveland, KRW Sls.	216-741-4711
Pa	Glenside, Koebert, R. F.	215-887-2310

™URAFIL - fiberglass reinforced polyurethane - Fiberfil Div. Dart Ind.

™URESOLVE - stripping solvent - Amicon Corp.

USECO DIV., Litton Inds, Dept. EM, 13536 Saticoy St, Van Nuys, Cal. 91409, Tel: 213-786-9388, TWX: 910-495-1700; Empl.: 100

Local Sales Offices & Reps.

Ariz	Scottsdale, Biedler & Biedler	602-947-5773
Cal	N. Hollywood, Los Angeles District Off.	213-985-8985
Colo	Englewood, Inverness Mktg.	303-770-2300
Fla	Orlanda, Useco, Div.	305-298-6507
Ga	Atlanta, Cartwright & Bean	404-255-5262

Ill	Chicago, L-Tec, Inc.	312-286-1500
Ind	Ft. Wayne, J & B Engrg.	219-483-2813
Mass	Waltham, Boston District Off.	617-890-2207
Minn	Minneapolis, Litton Precision Prods., Inc.	612-789-8951
Mo	St. Charles, Buse Sls.	314-946-6430
NY	Bayshore, Useco, Div.	516-666-1422
NY	E. Syracuse, Fountain, Young & Co.	
NC	Charlotte, Cartwright & Bean	704-333-6457
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Pa	Langhorne, Useco, Div.	215-757-3697
Tenn	Memphis, Cartwright & Bean	901-276-4442
Tex	Dallas, BESCO	214-423-8923
Wash	Seattle, Almac Stroum Elctrns.	206-763-2300

U.S. COMPONENTS INC., Dept. EM, 1320 Zerega Ave., Bronx, N.Y. 10462, Tel: 212-824-1600, TWX: 710-593-2141; FSC No.: 97954; Empl.: 85

Local Sales Offices & Reps.

Ala	Huntsville, Reynolds & Assocs.	
Ariz	Phoenix, Chaparral-Dorton	602-263-0414
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-9030
Cal	Santa Clara, Westrep	408-265-0312
Fla	Hollywood, Reynolds & Assocs.	305-987-6720
Fla	Sattelite Beach, Reynolds & Assocs.	305-773-4700
Fla	St. Petersburg, Reynolds & Assocs.	813-360-1484
Ga	Atlanta, Reynolds & Assocs.	404-252-5360
Haw	Honolulu, B. Kolans & Co.	
Ill	Chicago, Phoenix Co.	312-237-2828
Ind	Huntington, Phoenix Co.	219-422-2311
Kans	Shawnee Mission, Thomas & Modrcin Assocs.	913-HE2-2131
Md	Ellicott City, R.F. Assocs.	301-465-5944
Mass	Clinton, F.J. Coleman & Co.	617-368-0116
Mich	Birmingham, Forand Sls. Co.	313-644-0087
Minn	Minnetonka, K.L. Tannehill	612-935-0353
Mo	Hazelwood, Thomas & Modrcin Assocs.	314-838-6446
NJ	Madison, Livera-Polk Assocs.	201-FR7-3220
NY	Fayetteville, R.W. Jackson Co.	315-637-3851
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
NC	Greensboro, L & D Inc.	919-292-3201
Ohio	Vandalia, W.J. Brauer Assocs.	216-943-0601
Pa	Philadelphia, C.H. Newson & Assocs.	215-248-3377
Pa	Pittsburgh, W.J. Brauer Assocs.	412-921-3213
Tex	Dallas, Elcom	214-EM8-3578
Wash	Seattle, Blum & Assocs.	206-285-2590

U.S. ELCTRNS., Dept. EM, 500 Long Branch Ave., Long Branch, N.J. 07740, Tel: 201-870-9500; Empl.: 48

Sales Manager: R. Brockner

Local Sales Offices & Reps.

NJ	Livingston, Thaw Sls.	201-992-2711

U.S. INSTR. RENTALS, INC., Dept. EM, 951 Industrial Rd., San Carlos, Cal. 94070, Tel: 415-592-9225; Empl.: 55

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-1220
Cal	Burbank, U.S. Instr. Rentals	213-849-5861
Cal	Newport Beach, U.S. Instr. Rentals	714-752-6851
Cal	San Carlos, U.S. Instr. Rentals	415-592-9230
Colo	Denver, U.S. Instr. Rentals	303-779-0523
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Fla	Melbourne, U.S. Instr. Rentals	305-259-3004
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, Pivan Engrg.	312-539-4838
Ill	Des Plaines, U.S. Instr. Rentals	312-296-5050
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Md	Rockville, Electronic Mktg. Assocs.	301-881-5300
Md	Rockville, U.S. Instr. Rentals	301-340-1353
Mass	Wakefield, U.S. Instr. Rentals	617-246-1515
Mich	Livonia, Pioneer/Mich.	313-525-1800
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	Rahway, U.S. Instr. Rentals	201-381-3500
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Cleveland, U.S. Instr. Rentals	216-475-6647
Ohio	Dayton, Pioneer/Dayton	513-236-9900
Pa	King of Prussia, Electronic Mktg. Assocs.	215-265-1600
Tex	Richardson, U.S. Instr. Rentals	214-234-3392
Wisc	Brookfield, Pivan Engrg.	414-786-1940

U.S. SCIENTIFIC INSTRS., Dept. EM, 61 North Beacon St., Boston, Mass. 02134, Tel: 617-787-2411; Empl.: 50

Local Sales Offices & Reps.

NJ	Leonia, B. Kohl	201-944-6488

(TM)USE - magnetic comps. - U.S. Elctrns.

USM CORP., "POP" Rivet & Eyelet Divs., Dept. EM, 510 River Rd., Shelton, Conn. 06484, Tel: 203-735-9341, TWX: 710-451-3734; Empl.: 375

U.S. TERMINALS INC.

U.S. TERMINALS, Dept. EM, 7502 Camargo Rd., Cincinnati, Ohio 45243, Tel: 513-561-8145, TWX: 810-461-2290; FSC No.: 12615

Sales Manager: G.L. Stepp

Local Sales Offices & Reps.

Ariz	Phoenix, Gramer & Co.	602-279-1231
Ill	Chicago, L-Tec, Inc.	312-286-1500
Iowa	Cedar Rapids, J.R. Sls. Engrg., Inc.	319-393-2232
Mass	Needham, A & M Elctrn. Rep.	617-444-8170

Advertisement

- ●Slip lock Teflon terminals
- ●Press type Teflon terminals
- ●Printed circuit terminals
- ●Sockets test point & jacks
- ●Grounding terminals
- ●Binding posts--Teflon--install fast
- ●Miniature high voltage connectors
- ●DIP/DIL/IC & transistor sockets
- ●Miniature patch cords & receptacles
- ●Automatic installation equipment

(TM)US-2 - low profile solder sockets - Scanbe Canoga Industries

UTAH ELECTRONIC DIV., Utah-American Corp., Dept. EM, 1124 E. Franklin St., Huntington, Ind. 46750, Tel: 219-356-5800; Empl.: 1000

Local Sales Offices & Reps.

Cal	Culver City, Marshank Sls. Co.	213-559-2591
Cal	San Francisco, Featherstone Sls. Co.	415-467-3133
Colo	Colorado Springs, Norris & Co.	303-635-9319
Haw	Honolulu, Pegart Int'l.	808-538-7818
Ill	Chicago, W.J. Doyle Co.	312-274-6685
Ind	Indianapolis, New/Era Sls.	317-257-7333
Kans	Leawood, W. Menezes & Assoc.	913-649-2680
La	Lacombe, S. Ormsby Sls.	504-882-7248
Mass	Wellesley, L. Cole, Inc.	617-237-1260
Mich	Rochester, R.A. Albrecht & Co.	313-651-7081
Minn	Minneapolis, C.R. Gibb Co.	612-377-1200
NJ	Newark, Fisher Elctrns.	201-836-1200
NY	Grand Island, L.J. McTaggart Assoc.	716-773-9222
NC	Greensboro, Adams & Assocs.	919-272-6838
Ohio	Cleveland, F.A. Daugherty Co.	216-449-1122
Ore	Portland, D.G. Weber Co.	503-234-7671
Pa	Easton, E-K-P Assocs.	215-258-6477
Pa	McMurray, C.S. Cooper & Assoc.	412-941-6473
Tex	Houston, Spivey-LeBoeuf Assoc.	713-649-1221
Exp:	Plainview, N.Y., Empire Exporters, Inc.	516-293-5582

UTE MICROWAVE, Dept. EM, 3500 Sunset Ave., Asbury Park, N.J. 07712, Tel: 201-922-1009, Telex: 13-2461; FSC No.: 26231; Empl.: 15

Local Sales Offices & Reps.

Ariz	Scottsdale, Fryco	602-495-3821
Cal	Cupertino, Allis Assocs.	408-252-2883
Cal	N. Hollywood, Crown Elctrns.	213-877-3550
Mo	Florissant, Sheridan Assoc.	314-837-5200
NJ	Dover, Richman Sls.	201-584-8444
NJ	Long Branch, Mer-Mon Sls.	201-229-3172
NM	Albuquerque, A.L.S. Elec.	505-298-2575
NY	Commack, Richman Sls.	516-543-5532
NY	Utica, B.D. Hummel Co.	315-736-7821
Pa	Hatboro, Mer-Mon Sls.	215-672-5565
Va	Baileys Crossroads, Q.T. Elctrn.	703-671-4357
Exp:	Conn., Stamford, Microwave Int'l	203-322-6911

UTHE TECHNOLOGY INT'L., Dept. EM, 325 N. Mathilda Ave., Sunnyvale, Cal. 94086, Tel: 408-738-3301, TWX: 910-339-9289; Empl.: 100

(TM)U-TILE-MU - shielding tiles - Amuneal Mfg. Corp.

(TM)UTILI-SPLICE - connectors - Amp Inc.

(TM)UTILI-TAP - power cable - Amp Inc.

(TM)UTILI-TENSHUN - connectors - Amp Inc.

(TM)UVEX - weatherable plastic sheet - Eastman Chem. Prods.

(TM)UVTRON - Ultraviolet radiation detector - Hamamatsu TV Co., Ltd.

V-M CORPORATION, Dept. EM, Box 1247, Benton Harbor, Mich 49022, Tel: 616-925-8841, TWX: 810-270-3104; Empl.: 400

Sales Manager: C.J. Stevens

Local Sales Offices & Reps.

Cal	LaHabra, Audio Merchandise & Assoc.	213-914-6703
Colo	Denver, Central West Mktg. Co.	303-771-9397
Minn	Minneapolis, Jensen-Olsen Sls. Co.	612-941-7181
NJ	Moorestown, Di Vincent & Legato Assoc.	609-235-8299
NJ	Teaneck, Fisher Elctrns. Assoc.	201-837-1200
NY	Ballston Lake, Dworkin, Gene	518-877-8586
NY	Grand Island, Mc Taggart Assoc., L. 5.	716-773-9222
Ohio	Dayton, Shamrock Sls.	513-258-1227
Ore	Portland, Earl & Brown Co.	503-245-2283
Pa	Churchville, Kunz & Assoc., Don	215-357-5020
Tex	Garland, Lawson, Lex	214-278-2219
Wash	Seattle, Earl & Brown Co.	206-284-1121

(TM)VACION - pumps - Varian Assocs.

(TM)VACOMBO - kits - Vaco Products Co.

(TM)VACONNECTORS - tap connectors - Vaco Products Co.

VACO PRODUCTS CO., Dept. EM, 510 No. Dearborn St., Chicago, Ill. 60610, Tel: 312-467-0123, TWX: 910-221-2231; Empl.: 300

Local Sales Offices & Reps.

Cal	Gardena, Vaco/West Distribution Center	213-324-4934
Cal	Gardena, Bidwell Sls. Assocs.	
Cal	Inglewood, J. Berman Co.	213-678-1281
Cal	S. El Monte, Federated Sls. Co.	213-CU3-8374
Ga	Atlanta, Hollingsworth & Still	404-394-3270
Ill	Lincolnwood, B. Stein Co.	312-WA2-6559
Ind	Indianapolis, New/Era Sls.	317-257-7333
Mass	Needham, Mullin Tech. Sls. Co.	617-444-4780
Mich	Pontiac, T. A. Elctrn. Sls.	313-335-4285
Minn	Minneapolis, H. B. A. Witta & Sons	612-922-6910
Mo	Kansas City, J. A. Rosenham	816-333-2528
Mo	St. Louis, Kathrinus, Kelly & Co.	314-968-3800
NJ	Cherry Hill, Trinkle Sls.	
NY	Yonkers, J. Brown Elctrn. Sls. Reps.	914-779-7330
Ohio	Beachwood, Elctrn. Salesmasters	216-831-9555
Ohio	Columbus, C. R. Seidel	614-263-8442
Tenn	Memphis, J. C. Agneta	901-MU5-1310
Tex	San Antonio, W. R. Retzloff	512-533-7839
Utah	Ogden, A. Johnson Co.	303-244-7008
Wisc	Milwaukee, Arnold Ols	414-545-0832

(TM)VACPAC - vacuum equipt - Hull Corp.

(TM)VAC-SEAL - epoxy resin - Perkin-Elmer Ultek Inc.

(TM)VAC SORB - vacuum forepump - Varian Assocs.

(TM)VACSORB - pumps - Varian Assocs.

VACTEC, INC., Dept. EM, 2423 Northline Blvd., Maryland Heights, Mo. 63043, Tel: 314-872-8300, TWX: 910-764-0811; Empl.: 310 .... p. 3152,3153

Local Sales Offices & Reps.

Ariz	Phoenix, Arrowhead Sls. Corp.	602-277-7148
Cal	Encino, King-Way Assocs.	213-788-4124
Cal	Los Altos, Schwerin Assocs.	415-941-3737
Colo	Arvada, Arrowhead Sls. Corp.	303-423-5556
Conn	Madison, A & M Elctrn. Reps.	203-421-4242
Fla	Orlando, Buchanan & Abrams Assocs.	305-898-7444
Ill	Chicago, T.B. Hunter Assocs.	312-777-2500
Ind	Fort Wayne, Scott Elctrns., Inc.	219-743-1586
Ind	Indianapolis, Scott Elctrns., Inc.	317-897-9977
Kans	Prairie Village, Engrg. Svcs. Co.	913-649-4000

Md	Baltimore, R.L. Wilkinson, Inc.	301-377-7800
Mass	Needham, A & M Elctrn. Reps.	617-444-8170
Mich	Detroit, H.D. Mysing	313-537-5460
Minn	Edina, M. Foster Co.	612-835-2252
Mo	St. Louis, Engrg. Svcs. Co.	314-997-1515
NY	Syracuse, C.W. Beach Co.	315-446-9587
Ohio	Cincinnati, Scott Elctrns.	513-791-2513
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Columbus, Scott Elctrns., Inc.	614-236-8619
Ohio	Dayton, Scott Elctrns., Inc.	513-294-0539
Okla	Tulsa, Allied Comps.	918-492-7771
Pa	Pittsburgh, Scott Elctrns.	412-828-1073
Pa	Willow Grove, Techparts	215-659-6900
Tex	Austin, Allied Comps.	512-459-0761
Tex	Dallas, Allied Comps.	214-238-0408
Tex	Houston, Allied Comps.	713-960-1962
Wash	Seattle, B. Hirsh Co.	206-783-3423
Exp:	Chicago, Ill., J.D. Marshall Int'l., Inc.	312-583-6060

Local Distributors

Cal	Encino, King Way West	213-788-4124
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Colo	Denver, Integrated Elctrns. Co.	303-534-6121
Ill	Chicago, Newark Elctrns.	312-638-4411
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	Newton, A.W. Mayer	617-965-1111
Mo	St. Louis, Interstate Ind'l Elctrn.	314-481-5110
Mo	St. Louis, Olive Ind'l Elec.	314-863-7800
Exp:	Canada, Vancouver, B.C., R-A-E Indl. Elctrns. Ltd.	687-2621

™VACTROL - optical couplers (or) isolators - Vactec, Inc.

VACTRONIC LAB. EQUIP., INC., Dept. EM, 65 Brightside Ave., E. Northport, N.Y. 11731, Tel: 516-AN 1-2660; Empl.: 10

™VACULOY - oxide free bar solder - Alpha Metals, Inc.

™VAC-U-SEL - current rectifiers - General Elec. Co.

VACUUM PRODS., INC., Dept. EM, 25 Dock St., Mt. Vernon, N.Y. 10550, Tel: 914-664-7330; FSC No.: 23322; Empl.: 5

VACUUM RESCH. MFG., Dept. EM, 3100 Crow Canyon Rd., San Ramon, Cal. 94583, Tel: 415-837-7241; Empl.: 24

Local Sales Offices & Reps.

Ariz	Scottsdale, Portis & Assocs.	602-947-4379
Cal	Palos Verdes Penin., C-T Prod. Co.	213-377-9983
Cal	Pleasanton, Jolliff Engrg. Co.	415-846-2667
Colo	Denver, O'Brien Sls. Agency	303-477-4713
Ga	Atlanta, W. L. Schoonover, Inc.	404-255-0761
Ill	Chicago, Clarkson Engrg. Co.	312-286-2314
Ill	Des Plaines, B. Ellis Assocs.	312-298-7626
Mass	Boston, Industrial Equip. & Sls. Corp.	617-426-4406
NY	Commack, Electrolab Equip. Co.	516-775-5562
NY	Delhi, Electrolab Equip. Co.	607-746-3939
Pa	Paoli, T. Griffin Co.	215-644-7710
Pa	Pittsburgh, K. J. Lesker Co.	412-892-2996
Wash	Seattle, Penryn, Inc.	206-783-4334

™VADAC - voice analyzer converter - E-Systems Inc.

™VAL-AN - Military Cases - Zero Corp.

VALHALLA SCIENTIFIC, INC., Dept. EM, 7707 Convoy Ct., San Diego, Cal. 92111, Tel: 714-277-2732; Empl.: 15

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier, Inc.	205-536-5650
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Mountain View, MANCO	415-964-7281
Cal	San Diego, Mesa Engrg.	714-278-8021
Cal	Torrance, Cutlass	213-324-7360
Colo	Parker, Technology Mktg. Assocs.	303-841-3435
Fla	Orlando, Currie, Peak, & Frazier, Inc.	305-855-0843
Haw	Honolulu, E.M.C. Corp.	808-847-1138
Ill	Arlington Heights, Dytec/Central	312-394-3380
Ill	Chicago, EIA, Inc.	312-271-3774
Ind	Indianapolis, Elctrn. Instr. Assocs.	317-257-7231
Kans	Overland Park, Dytec/South	913-384-2710
Md	Silver Spring, Sel-Tronics	301-589-3391
Mass	Needham, Addelco Corp.	617-444-4754
Minn	St. Paul, Dytec/North	612-645-5816
Mo	St. Louis, Dytec/South	314-423-9595
NJ	Parlin, Triple E	201-727-6454
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	Rochester, Scientific Devices	716-334-2445
NC	Greensboro, Currie, Peak & Frazier, Inc.	919-273-3040
Ohio	Cleveland, DESCO	216-252-3151
Okla	Tulsa, Martin, Zienkosky, Browne & Assocs.	214-233-5535
Pa	Melrose Park, R.A. Meyers Assocs.	215-224-1663
Tex	Austin, Martin, Zienkosky, Browne & Assoc.	512-454-4457
Tex	Dallas, Martin, Zienkosky, Browne & Assoc.	214-233-5535
Tex	Houston, Martin, Zienkosky, Browne & Assoc.	713-523-7333
Wash	Seattle, J.B. Jolly, Inc.	206-938-4166

™VALLEY - paper mill equipment - Allis-Chalmers

VALLEY DESIGN, Dept. EM, 60 Merrimac St., Amesbury, Mass. 01913, Tel: 617-388-0210

VALPEY CORP., A VALTEC CO., See Optical Coating Div., Valtec Corp.

™VALOX - thermoplastic polyester - General Elec.

™VALUELINE - motor control - Allis-Chalmers

™VALUE VIAL - vials - Beckman Instrs., (AISSD)

™VALVEMASTER - electronic work stations - Advance Engrg. Systems

™VAM - air variable capacitors - JFD Electronics Components Corp.

VAN NORMAN MOLDING CO., Dept. EM, 9599 S. 76th Ave., Bridgeview, Ill. 60455, Tel: 312-284-0118; Empl.: 80

Sales Manager: R.I. Andre, Gen. Mgr.

VANCO-CHICAGO INC., Dept. EM, 970 N. Shore Dr., Lake Bluff, Ill 60044

™VAN DE GRAAFF - electrostatic generators - High Voltage Engrg. Corp.

VANGUARD RELAY CORP., Dept. EM, 225 Cortland St., Lindenhurst, N.Y. 11757, Tel: 516-226-5000

Sales Manager: B.S. Gilman

Local Sales Offices & Reps.

NJ	W. Caldwell, Peterson-Rudmick Assoc.	201-CA 6-4363
NY	New York, Peterson-Rudmick Assoc.	212-671-1923

Advertisement

VANGUARD manufactures an extensive line of general purpose relays and hybrid Time Delay Relays covering a broad range of industrial applications. Relay types from 1 to 4 poles and 2 to 20 amps. Models include open, plug-in, enclosed, printed circuit use, antenna, sensitive and contactor with many models listed by U/L. Time delay relays are plug-in and panel mounted units having solid state circuitry and relay output. VANGUARD offers you quality products, competitive pricing, responsive service and dependable deliveries. Full literature available upon request.

VANTAGE RESEARCH, Dept. EM, 777 W. Middlefield #53, Mountain View, Cal 94043, Tel: 415-941-4434

™VAPALLOY - alloy - Hamilton Technology, Inc.

™VAPORFLO - humidification system - Tenney Engrg., Inc.

VARADYNE INDUSTRIES, INC., Dept. EM, 1520 Cloverfield Blvd., Santa Monica, Cal. 90404, Tel: 213-829-2984, TWX: 910-343-6856; FSC No.: 26654; Empl.: 180; Minimum order: $P. Miller .. p. 1381-1383

Sales Manager: W. Devine; *Distributor Manager:* P. Miller

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assoc.	205-883-7893
Ariz	Scottsdale, Fred Board Assocs.	602-994-9388
Cal	Irvine, Celtec Co.	714-752-6111
Cal	Redwood City, J. S. Heaton Co.	415-367-9000
Cal	San Diego, Celtec Co.	714-279-7961
Cal	Sherman Oaks, Celtec Co.	213-990-3440
Colo	Parker, J. S. Heaton Co.	303-841-3651
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	Orlando, Technology Mktg. Assocs.	305-857-3760
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Elk Grove Village, Sieger Assocs.	312-956-0963
Ind	Bloomington, Giesting & Assocs.	812-336-0391
Iowa	Cedar Rapids, Dy-Tronix	319-377-8275
Kans	Wichita, Dy-Tronix	316-943-6221
Md	Baltimore, Coulbourn-DeGreif	301-247-4646
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Livonia, Giesting & Assoc.	313-477-6060
Minn	Minneapolis, Thomas Mktg.	612-823-4880
Mo	Hazelwood, Dy-Tronix	314-731-5799
Mo	Independence, Dy-Tronix	816-737-1100
NJ	East Orange, M. Gallagher	201-678-5071
NY	Cazenovia, D.L. Eiss Assocs.	315-655-8145
NY	Rochester, D.L. Eiss Assocs.	716-889-1919
NC	Raleigh, Component Sls.	919-782-8433
Ohio	Cincinnati, Giesting & Assocs.	513-851-7800
Ohio	Dayton, Giesting & Assocs.	513-293-4044
Ohio	Galion, Giesting & Assocs.	419-468-3737
Ore	Beaverton, R & R Elctrns.	503-643-5754
Pa	Fort Washington, GCM Assocs.	215-646-7535
Tex	Dallas, M. Kruvand Assocs.	214-691-4592
Tex	Houston, M. Kruvand Assocs.	713-780-9710
Wash	Seattle, R & R Elctrncs. Assoc.	206-762-7664
Exp:	New York, N.Y. (S. Africa), NPNTelex 12325	212-541-9056

Local Distributors

Ariz	Phoenix, Mirco Elctrncs.	602-997-5931
Ark	El Monte, Marshall Inds.	213-686-0141
Ark	Tempe, Marshall Inds.	602-968-6181
Cal	Arvada, Marshall Inds.	303-423-9670
Cal	Belmont, Eric Elctrns.	415-593-8284
Cal	Garden Grove, National Elctrncs. Supply	714-892-7749
Cal	Mountain View, Capacitor Sls.	415-964-8880
Cal	Palo Alto, Eric Elctrncs.	415-969-4500
Cal	San Diego, Mock III Sls. Co.	714-560-0515
Cal	San Diego, Marshall Elctrns.	714-278-6350
Cal	Sunnyvale, Marshall Inds.	408-732-1100
Cal	Van Nuys, Edmar Elctrns.	213-782-9020
Colo	Denver, Integrated Elctrns.	303-534-6121
Conn	North Brandford, Marshall Inds.	203-484-0488
Fla	Clearwater, Diplomat/Southland, Inc.	813-443-4514
Fla	Orlando, Marshall Inds.	315-859-1620
Ill	Des Plaines, Edmar Elctrns.	312-298-8580
Ill	Des Plaines, Marshall Inds.	312-298-3700
Mass	Chicopee, Diplomat/I.P.C. Corp.	413-592-9441
Mass	Newton, Greene-Shaw Co.	617-969-8900
Mass	Newton, Marshall Inds.	617-965-5115
Mich	Farmington Hills, Sheridan Sls. Co.	313-477-3800
Minn	Minneapolis, Stark Elctrns.	612-332-1325
Minn	Plymouth, Marshall Inds.	612-559-2211
NJ	Little Falls, Diplomat/IPC Corp.	201-524-0169
NY	Farmingdale, Marshall Inds.	516-293-4141
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Ohio	Dayton, Marshall Inds.	513-898-1105
Pa	Huntington Valley, Hallmark Elctrncs.	215-355-7300
Pa	Ivyland, Century Elctrncs. Comps.	215-968-6843
Pa	King of Prussia, Marshall Inds.	215-337-3330
Tex	Dallas, Marshall Inds.	214-233-5200
Tex	Houston, Marshall Inds.	713-777-0358
Wash	Bellevue, Marshall Inds.	206-883-1084
Wash	Seattle, Shannon Ltd.	206-763-0545

™VARAX - line voltage regulator - Tele-Dynamics

™VARFIL - flexible sleeving - Varflex Corp.

VARFLEX CORP., Dept. EM, 514 W. Court St., Rome, N.Y. 13440, Tel: 315-336-4400; FSC No.: 79074; Empl.: 120 .... p. 2977

Local Sales Offices & Reps.

Ariz	Phoenix, Elec. Specialty	602-275-5736
Ark	Little Rock, Hisco	501-568-3105
Cal	Anaheim, Electrical Specialty Co.	714-630-7050
Cal	Los Angeles, Electrical Spec. Co.	213-724-9600
Cal	San Diego, Elec. Specialty Co.	714-239-1345
Cal	So. San Francisco, Electrical Spec. Co.	415-589-9611
Colo	Denver, Elec. Specialty	303-321-0226
Ga	Atlanta, Prehler Elec. Insulation	404-449-8156
Ill	Chicago, Prehler Elec. Insulation	312-384-6100
Ky	Louisville, E & H Elec. Supply	502-587-0991
Me	York, F.H. Hart	207-363-3679
Minn	St. Paul, Prehler Elec. Insulation	612-452-2470

Mo	University City, E.P. Gund	314-862-1650
NY	Carle Pl., W. R. Murphy	516-333-6122
NY	Liverpool, W.T. Elliott	315-652-3690
NC	High Point, Prehler Elec. Insulation	919-887-1413
Ohio	Cleveland, Prehler Elec. Insulation	216-267-2650
Ore	Portland, Elec. Specialty	503-227-3601
Pa	Ardmore, Martin Assocs.	215-649-6332
Pa	Pittsburgh, E.B. Beach Co.	412-242-0400
Tex	Garland, Hisco	214-272-5411
Tex	Houston, Hisco	713-683-0311
Tex	San Antonio, Hisco	512-657-4110
Utah	Salt Lake City, Elec. Specialty	801-487-9805
Wash	Seattle, Elec. Specialty	206-682-3434

Local Distributors

Ariz	Phoenix, Electrical Specialty	602-275-5736
Ark	Little Rock, Hisco	501-568-3105
Cal	Anaheim, Electrical Specialty	714-630-7050
Cal	Los Angeles, Electrical Specialty	213-724-9600
Cal	San Diego, Electrical Specialty	714-239-1345
Cal	So. San Francisco, Electrical Specialty	415-589-9611
Colo	Denver, Electrical Specialty	303-321-0226
Ga	Atlanta, Prehler Electrical Insulation	404-449-8156
Ill	Chicago, Prehler Electrical Insulation	312-384-6100
Ky	Louisville, E & H Electric Supply	502-587-0991
Minn	St. Paul, Prehler Electrical Insulation	612-452-2470
NC	High Point, Prehler Electrical Insulation	919-887-1413
Ohio	Cleveland, Prehler Electrical Insulation	216-267-2650
Ore	Portland, Electrical Specialty	503-227-3601
Pa	Pittsburgh, E.B. Beach Co.	412-242-0400
Tex	Garland, Hisco	214-272-5411
Tex	Houston, Hisco	713-683-0311
Tex	San Antonio, Hisco	512-657-4110
Utah	Salt Lake City, Electrical Specialty	801-487-9805
Wash	Seattle, Electrical Specialty	206-682-3434
Exp:	Canada, Mississauga, Ont., Electric Insulation & Fibre Co.	416-624-0700

™VARFLO - flexible sleeving - Varflex Corp.

™VARGLAS - flexible sleeving - Varflex Corp.

VARI-L CO., Dept. EM, 3883 Monaco Pkwy., Denver, Colo. 80207, Tel: 303-321-1511, TWX: 910-931-0590; FSC No.: 05375; Empl.: 60

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Santa Ana, C.E.M.	714-835-2702
Cal	Woodland Hills, C.E.M.	213-884-7867
Colo	Arvada, Eggeman Assocs.	303-423-3707
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Chicago, EIA, Inc.	312-271-3774
Ind	Indianapolis, EIA, Inc.	317-257-7231
Iowa	Cedar Rapids, H. R. Brown Sls.	319-366-0635
Kans	Leawood, H.C. Heyde Co.	913-649-8628
Md	Ellicott City, Applied Engrg. Consits.	301-465-1272
Mass	Burlington, Tritek Inc.	617-272-4550
NY	Fayetteville, Graydon-Sherman Inc.	315-637-9861
NY	Tuchahoe, Associated Elctrns.	914-779-8110
NC	Burlington, Gentry Assocs.	919-227-3639
Tex	Garland, Vector Sls.	214-276-4518

VARI-LIGHT CORP., Sub. Polacoat Inc., Dept. EM, 9770 Conklin Rd., Cincinnati, Ohio 45242, Tel: 513-791-6330

™VARIABLE-D - microphone - Electro-Voice, Inc.

™VARIAC - adjustable autotransformer - Gen Rad

VARIAN, EIMAC DIV., Dept. EM, 301 Industrial Way, San Carlos, Calif. 94070, Tel: 415-592-1221, TWX: 910-376-4893

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-5461
Cal	Los Altos	415-968-7630
Cal	Santa Monica	213-828-5588
Fla	Clearwater	813-446-8513
Ga	Atlanta	404-955-1397
Ill	Park Ridge	312-825-6686
Md	Cheverly	301-773-7010
Mass	Waltham	617-890-4560
NJ	Mt. Laurel	609-235-6800
NJ	Springfield	201-376-6600
NY	Syracuse	315-437-2568
Ohio	Dayton	513-258-3930
Tex	Richardson	214-235-2385

VARIAN ASSOCS., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-493-4000, TWX: 910-373-1731; Empl.: 8800

VARIAN ASSOCS., Industrial Equip. Grp., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-493-4000, TWX: 910-373-1731; Empl.: 550

Local Sales Offices & Reps.

Cal	Downey	213-927-2601
Cal	Los Altos	415-968-4936
Fla	Clearwater	813-446-8513
Ill	Park Ridge	312-825-3103
Md	Cheverly	301-772-7433
Mass	Waltham	617-890-5750
NJ	Springfield	201-376-6610
NY	Syracuse	315-437-3307
Ohio	Euclid	216-261-2115
Tenn	Knoxville	615-690-3252
Tex	Richardson	214-235-4586
Wash	Bellevue	206-454-3432

VARIAN ASSOCS., Instrument Div., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-493-8100, TWX: 910-373-1731

Local Sales Offices & Reps.

Cal	Downey	213-927-3415
Cal	Los Altos	415-968-8141
Colo	Wheatridge	303-425-0413
Ga	Atlanta	404-955-1392
Ill	Park Ridge	312-825-7772
Ky	Louisville	502-897-0171
Md	Cheverly	301-772-3683
Mass	Waltham	617-890-8430
NJ	Florham Park	201-822-3700
NY	Syracuse	315-437-6464
Ohio	Euclid	216-261-2115
Tex	Houston	713-783-1800
Wash	Seattle	206-454-2910

VARIAN/BEVERLY DIV., Dept. EM, Salem Rd., Beverly, Mass. 01915, Tel: 617-922-6000, Telex: 94-0795

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-5461
Cal	Los Altos	415-968-7630
Cal	Santa Monica	213-828-5588
Fla	Clearwater	813-446-8513
Ga	Atlanta	404-955-1397
Ill	Park Ridge	312-825-6686
Md	Cheverly	301-773-7010
Mass	Waltham	617-890-4560
NJ	Mt. Laurel	609-235-6800
NJ	Springfield	201-376-6600
NY	Syracuse	315-437-2568
Ohio	Dayton	513-258-3930
Tex	Richardson	214-235-2385

VARIAN DATA MACHINES, Dept. EM, Box C-19504, Irvine, Cal. 92713, Tel: 714-833-2400, TWX: 910-596-1358; Empl.: 800

Local Sales Offices & Reps.

Cal	Garden Grove	714-897-9515
Cal	San Diego	714-276-9462
Cal	San Francisco	415-543-0364
Cal	Sherman Oaks	213-990-6042
Cal	Sunnyvale	408-736-5630
Colo	Denver	303-770-2151
Conn	Hartford	203-346-8118
Fla	Orlando	305-299-1592
Ill	Park Ridge	312-692-7184
Md	Cheverly	301-773-6770
Mass	Waltham	617-890-6072
Mich	Southfield	313-645-9950
Mo	St. Louis	314-739-6433
NJ	Englewood Cliffs	201-569-2323
NY	New York City	212-826-1010
NY	Rochester	716-586-3273
Ohio	Dayton	513-258-1458
Ohio	Strongsville	216-238-6960
Pa	Philadelphia	215-643-2355
Tex	Dallas	214-231-5145
Tex	Houston	713-781-0105
Wash	Seattle	206-641-4500

VARIAN DATA MACHINES, PALO ALTO, CAL., See Varian Graphics

VARIAN ELECTRON DEVICE GRP., Dept. EM, 611 Hansen Way, Palo Alto, CA 94303, Tel: 415-591-1710, TWX: 910-376-4893

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-5461
Cal	Los Altos	415-968-7630
Cal	Santa Monica	213-828-5588
Fla	Clearwater	813-446-8513
Ga	Atlanta	404-955-1397
Ill	Park Ridge	312-825-6686
Md	Cheverly	301-773-7010
Mass	Waltham	617-890-4560
NJ	Mt. Laurel	609-235-6800
NJ	Springfield	201-376-6600
NY	Syracuse	315-437-2568
Ohio	Dayton	513-258-3930
Tex	Richardson	214-235-2385
Exp:	Palo Alto, Cal.	415-493-4000

VARIAN GRAPHICS, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-494-3004, TWX: 910-373-1731; Empl.: 125

Sales Manager: R. Altieri

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	Palo Alto, Varian Graphics	415-494-3004
Colo	Denver, PLS Associates	303-773-1218
Conn	Wallingford, IMF Sls. Assocs.	203-265-0215
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Doraville, Gentry Assoc.	404-448-2365
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
Mass	Wakefield, IMF Sls. Assocs.	617-245-8900
Mich	Centerline, Dietrich & Assocs.	313-754-6450
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Florham Park, Varian Graphics	201-822-3700
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Plainview, Trac Assocs.	516-938-7664
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Dayton, Dietrich & Assocs.	513-223-6042
Pa	Pittsburgh, Dietrich & Assocs.	412-892-2992
Utah	Salt Lake City, PLS Assocs.	0-Zenith-615
Va	Alexandria, Dyna Rep Co.	703-354-1222
Wash	Bellevue, Brennan	206-454-9332
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

VARIAN PALO ALTO MICROWAVE TUBE DIV., Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-493-4000, TWX: 910-373-1731

Refer to Varian Electron Device Grp. for sales office information.

VARIAN, SOLID STATE EAST BEVERLY DIV., See Varian/Beverly Div.

VARIAN, SOLID STATE WEST DIVISION, Dept. EM, 611 Hansen Way, Palo Alto, Cal. 94303, Tel: 415-493-4000, TWX: 910-373-1731

Local Sales Offices & Reps.

Ariz	Scottsdale	602-947-5461
Cal	Los Altos	415-968-7630
Cal	Santa Monica	213-828-5588
Fla	Clearwater	813-446-8513
Ga	Atlanta	404-955-1397
Ill	Park Ridge	312-825-6686
Md	Cheverly	301-773-7010
Mass	Waltham	617-890-4560
NJ	Mt. Laurel	609-235-6800
NJ	Springfield	201-376-6600
NY	Syracuse	315-437-2568
Ohio	Dayton	513-258-3930
Tex	Richardson	214-235-2385

VARO, INC., ELECTROKINETICS DIV., see Electro Kinetics Corp., Sub. HTL Inds. Inc.

™VARICON - electrical contact - Elco Corp.

™VARIDAC - converters - Perkin-Elmer Corp.

™VARI-HERTZ - solid-state frequency inverter - Welco Inds. Inc.

™VARILOK - electrical contact - Elco Corp.

™VARIPAK - printed circuit card cage - Elco Corp.

™VARIPLATE - interconnecting system - Elco Corp.

™VARI-TEX - speed changers - Allis-Chalmers

™VARI-THIN - low profile ceramic trimmer capacitors - Erie Technological Products

™VARITRIM - capacitors - Voltronics Corp.

™VARI-VAC - metering valve - Vactronic Lab. Equip., Inc.

VARO ELECTRON DEVICES, INC., Dept. EM, 2203 W. Walnut St., Garland, Tex. 75040, Tel: 214-272-3561, TWX: 910-860-5093; FSC No.: 27777; Empl.: 250

Local Sales Offices & Reps.

NJ	Eatontown	201-229-1400
Ohio	Dayton	513-253-8935
Va	Arlington	703-920-4500

VARO SEMICONDUCTOR, INC., Dept. EM, 1000 N. Shiloh Rd., Garland, Tex. 75040, Tel: 214-272-4551, TWX: 910-860-5178; Empl.: 1500 .... p. 3931-3945

Local Sales Offices & Reps.

Ala	Huntsville, 20th Century Mktg. Inc.	205-772-9237
Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	Los Altos, W.W. Posey Co.	415-948-7771
Cal	Los Angeles, Corcoran Assoc.	213-823-4589
Cal	Westminster, Corcoran Assoc.	714-893-4670
Colo	Parker, Technology Mktg.	303-841-3435
Conn	North Haven, Comp Rep Assocs.	203-239-9762
Fla	Orlando, OEM Mktg. Corp.	305-299-1000
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ill	Elk Grove Village, Varo Semiconductor	312-593-8860
Ind	Indianapolis, Tech. Reps, Inc.	317-849-6454
Ind	New Albany, Technical Reps.	812-944-6735
Kans	Overland Park, Kebco	913-649-1051
Md	Ellicott City, Tom Davis Marketers	301-461-2209
Mass	Needham, Comp Rep Assocs.	617-444-2484
Mich	Farmington, Davis-Martensen Co.	313-474-8300
Minn	Minneapolis, Nortec Sls.	612-835-7414
Mo	St. Louis, Kebco	314-569-2660
NY	Great Neck, Cooper-Simon & Co.	516-487-1142
NY	Ithaca, B. Dean, Inc.	607-272-2187
NC	High Point, Engineering Devices Corp.	919-869-7200
Ohio	Dayton, J.C. Hofstetter Co.	513-296-1010
Ohio	Medina, J.C. Hofstetter Co.	216-241-4880
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Tex	Addison, Parvin Sls. Co.	214-661-5374
Utah	Salt Lake City, Technology Mktg. Assoc.	801-485-9381
Va	Fairfax, Tom Davis Marketers	703-591-7390
Wash	Seattle, C.K. Shanks & Assoc.	206-632-4290
Wisc	Brookfield, Varo Semiconductor	414-782-7590

Local Distributors

Ariz	Phoenix, Cramer-Ariz.	602-267-7321
Cal	Chatsworth, Westates Elctrns.	213-341-4411
Cal	Garden Grove, Allied Elctrns.	714-894-7581
Cal	Irvine, Cramer-L.A.	714-979-3000
Cal	San Diego, Cramer-San Diego	714-565-1881
Cal	Sepulveda, Milgray-Cal.	213-894-4011
Cal	Sunnyvale, Bell Ind's.	408-734-8570
Cal	Sunnyvale, Cramer-San Francisco	408-739-3011
Colo	Denver, Cramer-Denver	303-758-2100
Conn	North Haven, Cramer-Conn.	203-239-5641
Fla	Hollywood, Cramer-Hollywood	305-923-8181
Fla	Orlando, Cramer-Orlando	305-894-1511
Fla	Orlando, Milgray-Fla.	305-647-5747
Ga	Norcross, Cramer-Atlanta	404-448-9050
Ill	Elgin, Allied Elctrns.	312-697-8200
Ill	Mt. Prospect, Cramer-Chicago	312-593-8230
Ill	Peoria, Klaus Radio	309-691-4840
Ill	Skokie, Bell Elctrns.	312-965-7500
Ind	Ft. Wayne, Ft. Wayne Elctrns.	219-423-3422
Ind	Indianapolis, Graham Elctrns.	317-634-8202
Iowa	Cedar Rapids, Deeco Inc.	319-365-7551
Md	Gaithersburg, Cramer-Wash.	301-948-0110
Md	Lanham, Milgray-Wash.	301-459-2222
Mass	Burlington, Milgray-New England	617-272-6800
Mass	Newton, Cramer Elctrns.	617-969-7700
Mich	Kentwood, R.M. Elctrns.	616-531-9300
Minn	Edina, Cramer-Bonn	612-835-7811
NJ	Cherry Hill, Cramer/Pennsylvania	609-424-5593
NJ	Cherry Hill, Milgray-Del. Valley	609-424-1300
NJ	Moonachie, Cramer-N.J.	201-935-5600
NM	Albuquerque, Cramer-N.M.	505-265-5767
NY	E. Syracuse, Cramer-Syracuse	315-437-5571
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Cramer-L.I.	516-231-5600
NY	Rochester, Cramer-Rochester	716-275-0300
NC	Winston- Salem, Cramer/Winston-Salem	919-725-8711
Ohio	Cleveland, Cramer-Cleveland	216-248-8400
Ohio	Cleveland, Milgray-Cleveland	216-881-8800
Tex	Dallas, Cramer-Texas	214-661-9300
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Houston, Altair Co.	713-462-3029
Tex	Richardson, Altair Co.	214-231-5166
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Wash	Bellevue, Bell Ind's.	206-747-1515
Wash	Tukwila, Cramer-Seattle	206-575-0907
Wisc	Milwaukee, Marsh Elec.	414-475-6000
For:	Can., Downsview, Ont., Cramer-Can.	416-661-9222
For:	Can., Montreal, Que. P.Q., Prelco Elctrns.	
For:	Can., Vancouver, B.C., R.A.E. Ind.	604-687-2621
For:	Can., Willowdale, Ont., Electro Sonic, Ind'l. Sls. Ltd.	416-494-1666

™VAROTAL - television lenses - Rank Precision Inds.

™VAST - versatile avionics shop test system (computer-controlled ATE) - Harris Corp.

™V BALL - precision rubber balls - Vernay Laboratories, Inc.

™VCAP - video cassette automatic programmer - Video Automation Systems Inc.

™VCXO - voltage controlled crystal oscillator - Damon Corp.

™VDE GUARD - anti-reflective/abrasive coating - Panelgraphic Corp.

™VECOR - accessories - Vidaire Electronics Mfg.

™VECO VAMP - meter protector - Victory Engrg. Corp.

™VECTOR-AMP FAST BIPOLAR - 8μs, 250w./channel - Digital Graphics

™VECTOR-AMP UNIPOLAR - 8μs, 250w./channel - Digital Graphics

VECTOR ASSOCS., Dept. EM, 685 Station Rd., Bellport, N.Y. 11713, Tel: 516-286-9000, TWX: 510-228-2650; Empl.: 50

Sales Manager: S. Bienstock

Local Sales Offices & Reps.

Cal	Los Angeles, T. Louis Smitzer Co.	213-836-6170
Md	Germantown, Sales Tech.	301-340-0015
Mich	Southfield, Electroquipment Sls.	313-569-4497
NJ	Englewood, Eastern Instr.	201-567-9505
Ohio	Chesterland, Electroquipment Sls.	216-729-2222
Tex	Houston, Data Aids Assocs.	713-862-6685
Wash	Seattle, Hayes Tech.	206-763-2210

™VECTORBORD - Perforated Insulating Board - Vector Electronic Co., Inc.

VECTOR ELECTRONIC CO., INC., Dept. EM, 12460 Gladstone Ave., Dept. EP, Box 4336, Sylmar, Cal. 91342, Tel: 213-365-9661, TWX: 910-496-1539; FSC No.: 82893; Empl.: 98 p. 1154-1158,1406-1412,2364,2365

Local Distributors

Ala	Birmingham, J.W. Clary Co.	205-322-2486
Ala	Huntsville, Cramer Elctrns.	205-539-5722
Ariz	Phoenix, Dalis Radio/T.V. Supply	602-258-8151
Cal	Inglewood, Newark Elctrns. Co.	213-678-0441
Cal	Irvine, Terminal Elctrns.	714-549-8611
Cal	Los Angeles, RPS, Inc.	213-748-1271
Cal	Mountain View, Abacus Elctrns. Co.	415-961-1500
Cal	Oakland, Brill Elctrns.	415-834-5888
Cal	Palo Alto, Zack Elctrns.	415-326-5432
Cal	Pasadena, Dow Radio	213-793-1195
Cal	Pasadena, Empire Elctrns. Distr.	213-681-2711
Cal	Pomona, R. V. Weatherford Co.	714-623-1261
Cal	Riverside, Electronic Supply Riverside	714-683-8110
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	San Diego, Shanks & Wright	714-239-0176
Cal	San Diego, RPS Elctrns.	714-292-5611
Cal	San Francisco, Zack Elctrns.	415-626-1444
Cal	San Jose, Quement Elctrns.	408-998-5900
Colo	Denver, Electronic Parts	303-744-1992
Colo	Denver, Newark-Denver Elctrn. Supply Co.	303-757-3351
Fla	Orlando, Powell-Florida Elctrns.	305-859-1450
Haw	Honolulu, Honolulu Elctrns.	808-949-5564
Haw	Honolulu, Precision Radio	808-537-5291
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Elgin, Allied Elctrn. Corp.	312-697-8200
Ill	Niles, Joseph Elctrns.	312-297-4200
Ill	Palatine, Ohm/Elctrns.	312-359-5500
Ill	Peoria, Klaus Radio	309-691-4840
Ind	Indianapolis, RA-DIS-CO	317-637-5571
Ind	Indianapolis, Graham Elctrn. Supply	317-634-8202
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Ky	Louisville, P.I. Burks Co.	502-589-3960
Md	Baltimore, A S I Elctrns.	301-265-5100
Md	Beltsville, Powell Elctrns.-Wash.	301-474-1030
Md	Rockville, Capitol Radio Wholesalers	301-942-7505
Mass	Boston, Sager Electrical Supply Co.	617-542-2281
Mass	Boston, Land Elctrn. Supply	617-592-2220
Mass	Boston, Gerber Elctrns.	617-329-2400
Mass	Boston, Cramer Elctrns.	617-969-7700
Mich	Ann Arbor, Wedemeyer Elctrn. Supply Co.	313-665-8611
Mich	Detroit, RS Elctrns.	313-491-1000
Mich	Detroit, Newark - Detroit Elctrns.	313-548-0250
Minn	St. Paul, Gopher Elctrns. Co.	612-645-0241
Mo	St. Charles, Lectronix	314-946-6426
Mo	St. Louis, Olive Industrial Elctrns.	314-863-7800
Neb	Lincoln, Scott Elctrn. Supply Corp.	402-464-8308
NJ	Camden, General Radio Supply Co.	609-964-8560
NJ	E. Hanover, State Elctrn. Parts Corp.	201-887-2550
NJ	Pennsauken, RESCO Elctrns. Div. ASTREX	609-662-4000
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Rochester, Simcona Elctrns.	716-328-3230
NY	Rockville Centre, Midway Industrial Elctrns.	516-764-2400
NY	Woodbury, Harvey Radio	516-921-8700
NC	Greensboro, Pioneer/Carolina	919-273-4441
NC	Raleigh, Southeastern Radio Supply Co.	919-828-2311
NC	Winston-Salem, Cramer	919-725-8711
Ohio	Akron, Akron Elctrns. Supply	216-762-8818
Ohio	Cleveland, Pioneer/Cleveland	216-587-3600
Ohio	Columbus, Hughes Peters Co.	614-294-5351
Ohio	Columbus, Thompson Elctrn. Supply	614-228-6191
Ohio	Dayton, Stotts Friedman Co.	513-298-5555
Okla	Oklahoma City, Trice Wholesale Elctrns.	405-524-4411
Okla	Tulsa, Radio, Inc.	918-587-9123
Ore	Portland, Almac-Stroum	503-292-3534
Ore	Portland, United Radio Supply	503-233-5346
Pa	Drexel Hill, Kass Elctrn. Distr.	215-449-2300
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Pa	Pittsburgh, CAM/RPC	412-782-3770
RI	Providence, Wm. Dandreta & Co.	401-861-2800
Tenn	Memphis, Bluff City Distributing Co.	901-276-4501
Tex	Dallas, Wholesale Elctrn. Supply	214-824-3001
Tex	El Paso, Midland Specialty Co.	915-533-9555
Tex	Fort Worth, Wholesale Elctrn. Supply	817-336-0561
Tex	Fort Worth, Allied Elctrns.	817-336-5401
Tex	Garland, Newark-Dallas Elctrns. Corp.	214-271-2511
Tex	Houston, Harrison Equip. Co.	713-652-4700
Utah	Salt Lake City, Ballard Supply Co.	
Va	Richmond, AVEC Elctrns. Corp.	804-359-6071
Wash	Seattle, Radar Electric Co.	206-282-2511
Wash	Seattle, Almac/Stroum	206-763-2300
Wisc	Milwaukee, Parts Mart Corp.	414-276-4160
Wisc	Milwaukee, Marsh Elctrns.	414-545-6500
Exp:	Cal., Los Angeles, Trans-World Trade	
For:	Cal., Santa Monica, Trans-World Trade	
For:	Can., Downsview, Ont., CESCO Elctrns., Ltd.	416-661-0220
For:	Can., Montreal, Que., CESCO Elctrns. Ltd.	514-735-5511
For:	Can., Ottawa, Ont., CESCO Elctrns. Ltd.	613-729-5118
For:	Can., Scarborough, Ont., Lake Engrg.	416-751-5980
For:	Can., Vancouver, B.C., R-A-E Ind'l. Elctrns. Ltd.	604-687-2621
For:	Can., Willowdale, Ont., Electro Sonic	416-494-1666

™VECTOR-PAK - enclosures - Vector Electronic Co., Inc.

™VECTROL - power sys. - Vectrol, Inc.

VECTROL, INC., Dept. EM, 1010 Westmore Ave., Rockville, Md. 20850, Tel: 301-424-6900; Empl.: 56

Local Sales Offices & Reps.

Cal	San Francisco, Artwell Elec. Co.	415-467-1880
Cal	Santa Ana, Westronix	714-979-8472
Ga	Doraville, PAR Assocs.	404-393-0018

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Ill	Chicago, Markson Assocs.	312-267-1905
Kans	Overland Park, G & E Instrs.	913-649-0121
Md	Mount Airy, Strayton Associates	301-831-7007
Mass	Needham, Eastronix, Inc.	617-449-1550
Mich	Dearborn, Industrial Temperature Control Co.	313-278-2210
NJ	Ridgewood, Ballou Inc.	201-444-6990
NY	Lancaster, Lawrence Industrial Sls.	716-685-1993
Ohio	Cleveland, Drivex-North Inc.	216-521-5211
Ohio	Dayton, Mohawk Intronics	513-434-8873
Ore	Portland, D. Hand & Assocs.	503-254-5519
Pa	Pittsburgh, G. Glass & Assocs.	412-366-6664
Pa	Valley Forge, Gil-Tronics	215-933-8525
Tex	Dallas, Titan Reps.	214-661-5350
Wisc	Milwaukee, E.A. Dickinson & Assocs.	414-264-1080

VECTRON LABS., INC., Dept. EM, 166 Glover Ave., Norwalk, Conn. 06850, Tel: 203-853-4433, TWX: 710-468-3796; FSC No.: 27802; Empl.: 100 p. 2486-2488

Local Sales Offices & Reps.

Ala	Huntsville, FM Assocs.	205-536-9990
Cal	Los Angeles, Fetty/Schoenduve	213-651-4050
Cal	Palo Alto, Fetty/Schoenduve	415-321-7041
Cal	San Diego, F. Schoenduve	714-292-5136
Colo	Parker, Technical Mktg. Assocs.	303-841-3435
Fla	Jupiter, FM Assocs.	305-746-2996
Fla	Orlando, FM Assocs.	305-851-5710
Ga	Atlanta, FM Assocs.	404-634-7830
Ill	Skokie, Heth Inc.	312-282-8737
Ind	Indianapolis, Ihrig Assocs.	317-783-7630
Kans	Overland Park, Ensco-Rep., Inc.	913-381-7557
Mich	Detroit, R.P. Urban Assocs.	313-535-2355
Mich	Grand Rapids, R. P. Urban Assocs.	616-245-0511
Minn	Burnsville, Heth, Inc.	612-333-8494
Mo	St. Louis, Ensco-Rep	314-567-3935
NJ	Woodcliff Lake, F & F Assoc.	201-778-6767
NM	Albuquerque, Technical Mktg. Assocs	505-298-4321
NY	Flushing, F & F Assoc	516-928-9666
NY	Syracuse, Rep Tech	315-437-2845
NC	Greensboro, FM Assocs.	919-294-2754
Ohio	Brecksville, A. Nace Co.	216-526-4323
Ohio	Englewood, A. Nace Co.	513-836-0931
Pa	Newtown Sq., SWR Assocs.	215-356-8550
Pa	Pittsburgh, A. Nace Co.	412-922-7225
Tex	Dallas, Texas Avionics	214-363-6324
Utah	Salt Lake City, Technical Mktg. Assocs.	801-268-0457
Va	Springfield, Temsco	703-569-2700
Wash	Seattle, Datacom	206-285-2525

VEEDER-ROOT, Dept. EM, 70 Sargeant St., Hartford, Conn. 06102, Tel: 203-527-7201, Telex: 9-9219; Empl.: 1200

Local Sales Offices & Reps.

Cal	Burlingame	415-697-6830
Cal	Glendale	213-245-8421
Conn	Hartford	203-247-0133
Ill	Des Plaines	312-824-0188
Md	Baltimore	301-296-2177
Mich	Detroit	313-886-4485
Minn	Minneapolis	612-831-1711
NJ	Ridgewood	201-445-2401
NY	Rochester	716-586-1779
NC	Charlotte	704-364-3653
Ohio	Cincinnati	513-271-6200
Ohio	Cleveland	216-229-2634
Pa	Willow Grove	215-887-0708
SC	Greenville	803-288-2133
Tex	Arlington	214-252-3360

VEETRONIX, Dept. EM, Box 209, 136 W. 7th St., Cozad, Neb. 69130, Tel: 308-784-4000; Empl.: 25 .... p. 4310

Local Distributors

Cal	San Gabriel, Van Gott Assoc.	213-285-2148
Cal	Santa Clara, Ruby Sls. Co.	408-739-5333
Colo	Denver, G. Moss Elect. Sls.	303-985-8815
Conn	Bethany, Representatives Corp.	203-393-0024
Iowa	Marion, Thomas & Modrcin Assoc.	319-377-6261
Kans	Shawnee Mission, Thomas & Modrcin Assoc.	913-432-2131
Mass	Wellesly, Representatives Corp.	617-237-1786
Mo	Hazelwood, Thomas & Modrcin Assoc.	314-895-4700
NY	Plainview, R. Smith Assocs.	516-681-3155
NY	Spring Valley, R. Smith Assocs.	914-352-1067
NY	Syracuse, Lenard Co.	315-479-9191
Ohio	Akron, Shamrock Elctns.	216-666-1400
Ohio	Dayton, Shamrock Elctns.	513-298-3052
Pa	Paoli, Stitzer Assocs.	215-644-5500
Exp:	Ill., Chicago, Magnus & Assocs.	312-334-1503

For:	Can., Ajax, Ontario, R.D. Assocs.	416-294-6796

VEGA PRECISION LABS., Dept. EM, 800 Follin La., Vienna, Va. 22180, Tel: 703-938-6300, Telex: 89-2521; Empl.: 275 .... p. 2995

Local Sales Offices & Reps.

Cal	El Cajon	714-448-3240
Fla	Panama City	904-763-9666

™VELCOR - hue shift corrector - Television Microtime, Inc.

™VELOMETER - air-velocity instrument - Alnor Instrument Co.

VELONEX, INSTRUMENT DIV., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050, Tel: 408-244-7370, TWX: 910-338-0114; Empl.: 60

Local Sales Offices & Reps.

Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Cal	Oakland, Advanced Technology	415-452-1401
Colo	Boulder, R.A. Mayes Co.	303-444-0782
Conn	Hamden, Instrument Consultants	203-288-5246
DC	Washington , Gans-Frying	703-527-3262
Fla	Orlando, E.G. Holmes, Assocs.	305-894-8901
Ga	Chamblee, E.G. Holmes, Assocs.	404-451-6161
Ill	Chicago, K.W. Meyers Co.	312-774-6440
Ind	Indianapolis, K.W. Meyers Co.	317-243-6681
Md	Fulton, Gans-Fryling, Inc.	301-837-6311
Mass	Waban, Instrument Consultants	617-969-9881
Mich	Detroit, Hocker Assocs.	313-549-3910
Minn	Minneapolis, K.W. Meyers Co.	612-920-7080
NM	Albuquerque, R.A. Mayes & Co.	505-292-2330
NY	Plainview, Eastern Metro Assocs.	516-931-1414
NY	Rochester, Scientific Devices	716-334-2445
Ohio	Cleveland, Hocker Assocs.	216-235-6504
Ohio	Dayton, Hocker Assocs.	513-298-8638
Pa	Melrose Park, R. Meyers Assocs.	215-224-1663
Tex	Houston, R.A. Mayes Co.	713-461-5385
Tex	Richardson, R.A. Mayes Co.	214-235-3043
Va	Arlington, Gans-Fryling, Inc.	703-527-3262
Va	Virginia Beach, E.G. Holmes & Assocs.	804-481-6556

VELONEX, DISPLAY PRODS., Dept. EM, 560 Robert Ave., Santa Clara, Cal. 95050, Tel: 408-244-7370, TWX: 910-338-0114; Empl.: 60

Local Sales Offices & Reps.

Ala	Huntsville, BCS Assocs.	205-881-6220
Ariz	Phoenix, R.A. Mayes Co.	602-279-5243
Cal	Garden Grove, Impact Elect.	714-893-8551
Cal	Los Altos, Hoeke-Reeser	415-941-4080
Colo	Broomfield, R.A. Mayes Co.	303-444-0782
Conn	Hamden, Instrument Consultants	203-288-5246
Fla	Orlando, BCS Assocs.	305-896-4881
Ill	Chicago, K.W. Meyers Co.	312-774-6440
Ind	Indianapolis, K.W. Meyers Co.	317-243-6681
Md	Fulton, Gans-Fryling, Inc.	301-837-6311
Mass	Waban, Instrument Consultants	617-969-9881
Minn	Minneapolis, K.W. Meyers Co.	612-920-7080
NM	Albuquerque, R.A. Mayes Co.	505-292-2330
NY	Syracuse, Lenard Co.	315-479-9191
NC	Greensboro, BCS Assocs.	919-273-1918
Ohio	Medina, McShane, Inc.	216-725-4568
Pa	King of Prussia, Rivco	215-265-5211
Tex	Dallas, R.A. Mayes Co.	214-235-3043
Tex	Houston, R.A. Mayes Co.	713-461-5385
Va	Arlington, Gans-Frying, Inc.	703-527-3262
Wash	Bellevue, Desco Northwest	206-455-9325

™VELOSTAT BRAND - conductive plastic - 3M Co.

VEMALINE PRODS. DIV., Ostbys & Barton Co., Dept. EM, 455 W. Main St., Wyckoff, N.J. 07481, Tel: 201-891-3200; FSC No.: 08730; Empl.: 42; Minimum order: $C.J. Dawkins

Sales Manager: C.J. Dawkins; *Distributor Manager:* C.J. Dawkins

Local Sales Offices & Reps.

Ala	Madison, B-C Elec. Sls.	205-837-5778
Ariz	Phoenix, Mr Engr. Co.	602-959-5150
Cal	San Gabriel, Van Gott & Assoc.	213-285-2148
Cal	Santa Clara, Ruby Sls. Corp.	408-739-5333
Conn	Meriden, Electro Prods. Sls.	203-235-4040
Fla	Cocoa, Electro Comp.	305-452-9568
Fla	Ft. Lauderdale, Electro Comp.	305-564-8571
Ga	Smyrna, B-C Elec. Sls.	404-436-5169
Ill	Chicago, Ropek-Cahill	312-287-7292
Mass	Waltham, Electro Prods. Sls.	617-899-1570
Mich	Grand Rapids, R. P. Urban Assoc.	616-245-0511
Mo	St. Louis, Cadon Technical Sls.	314-991-0262
NY	Huntington, Andrews & Andrews, Inc.	516-692-8686
Ohio	Cincinnati, Loesch Assoc.	606-331-4332
Ohio	Cleveland, Loesch Assoc.	216-241-4581
Pa	Abington, IMS Co.	215-659-0444
Tex	Dallas, Blackburn Assoc.	214-351-9991
Wash	Seattle, Rhodes & Assoc.	206-244-1982
Exp:	N. Y. New Rochelle, Montclair Elctrns.	914-576-1400

Local Distributors

Cal	Encino, Rush Inds.	213-986-8533
Cal	Sunnyvale, Ruby Stok Co.	408-739-5333
Conn	Norwalk, Park Distributors	203-853-2011
Fla	Miami, Electronic Equip.	301-871-3500
Mass	Woburn, Rush Inds.	617-935-2400
Mich	Augusta, Great Lakes Elctrns.	616-731-4156
Minn	Minneapolis, Cassidy Elctrns.	612-835-7747
NJ	Green Brook, Green Brook Elctrns.	201-968-3500
NJ	Springfield, Federated Purchaser	201-376-8900
NY	Bohemia, Car-Lac Elex.	516-567-4200
NY	Buffalo, Summite Elex.	716-884-3450
NY	Farmingdale, Broadline Elex.	516-420-8320
NY	Rockville Centre, Midway Industrial Elex.	516-764-2400
NC	Kinston, Southeastern Radio & Supply	
Okla	Tulsa, Radio, Inc.	918-587-9123
Pa	Altoona, Allegheny Elex.	814-946-0871
SC	Columbia, Dixie Radio	803-253-5333
Tex	Ft. Worth, Industry Elctrns.	817-531-2961
Tex	Richardson, Altair Inc.	214-263-8783
Va	Charlottesville, Virginia Radio Supply	703-296-4184
Exp:	N.Y., New Rochelle, Montclair Elex.	914-576-1400

VENT-RAK, DIV., General Devices Co., Inc., Dept. EM, P.O. Box 19188, Indianapolis, Ind. 46219, Tel: 317-897-7000, Telex: 27-2169; Empl.: 125 p. 1132,1133

Sales Manager: J. Bradford

Local Sales Offices & Reps.

Ariz	Scottsdale, F. Schoeffler Assoc.	602-948-3470
Cal	Los Angeles, M. A. Stolaroff Co.	213-295-7781
Cal	Mt. View, G. C. Woempner Co.	415-964-5454
Cal	San Diego, M. A. Stolaroff Co.	714-234-6905
Cal	Van Nuys, J. R. Thomas	213-782-3820
Colo	Sedalia, Jensen Representatives	303-688-4154
Conn	Cheshire, Coakley, Boyd & Abbett, Inc.	203-272-2261
Fla	North Miami, J. Krutek & Assoc.	305-941-6544
Ill	Rolling Meadows, Lightner Assocs., Inc.	312-398-3000
Ind	Indianapolis, Marketing Engineers	317-546-1523
Kans	Shawnee Mission, Lowell Kangas & Assoc.	913-631-3515
Md	Bethesda, G. Rosen & Assocs., Inc.	301-530-8448
Mass	Needham, Coakley, Boyd & Abbett, Inc.	617-444-5470
Minn	St. Paul, Northport Engrg., Inc.	612-698-3841
Mo	St. Louis, Lowell-Kangas & Assoc.	314-821-4050
NY	Fayetteville, H.G. Richter, Inc.	315-637-6713
NY	Manhasset, Kaelber & Mack	516-627-6620
Ohio	Cincinnati, Components	513-721-2997
Ohio	Cleveland, Components	216-842-2737
Tex	Dallas, R. Martin Assocs.	214-361-8584
Tex	Houston, R. Martin Assocs.	713-462-4077
Wash	Olympia, Bergford Assoc.	206-866-2001
Exp:	Ind., Indianapolis, General Devices Co.	317-359-5407

™VENT-TRAK - cabinets, chassis & accessories - General Devices Co., Inc.

VENTURE DEVELOPMENT CORP., Dept. EM, One Washington St., Wellesley, Mass. 02181, Tel: 617-237-5080

Sales Manager: P. Blake

VENUS SCIENTIFIC, INC., Dept. EM, 399 Smith St., Farmingdale, N.Y. 11735, Tel: 516-293-4100, TWX: 510-224-6492; Empl.: 130; Minimum order: $F. Farrace, Mktg. Mgr. .... p. 3355

Sales Manager: T. Krilovitch; *Distributor Manager:* F. Farrace, Mktg. Mgr.

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne, Inc.	602-946-4437
Cal	Los Altos, Westec Elctrns./North	415-948-8880
Cal	No. Hollywood, O'Halluran Assoc.	213-877-0173
Fla	Lighthouse Point, Saber Assocs.	305-943-3076
Ill	Park Ridge, R. F. Specialists	312-698-2044
Ind	Ft. Wayne, J&B Engrg. Sls. Co.	219-484-2813

Mass	Norwood, S. Pierce, Inc.	617-762-3164
Minn	St. Paul, Cullen Assocs.	612-646-7371
Mo	Ferguson, Kinrick Co.	314-521-4877
NY	Plainview, E.R.A. Inc.	516-822-9890
NY	Syracuse, Nycom Inc.	315-437-8343
Ohio	Chagrin Falls, Crest Component Sls.	216-543-9808
Ore	Portland, Components West	503-643-5588
Tex	Richardson, P.J. Scanlon Co.	214-231-4661
Va	Alexandria, Vanguard Engrg. Sls.	703-768-1660

™VERBATIM - magnetic storage media - Information Terminals

™VERILUX - digital indication - Toledo Scale

VERITAS ELCTRNS. CORP., Dept. EM, 22 Grand Ave., Farmingdale, N.Y. 11735

VERMONT PRECISION RESISTOR CO., Dept. EM, Box 1170, Stowe, Vt. 05672, Tel: 802-253-8567; Empl.: 15

Local Sales Offices & Reps.

NH	Nashua, Bell Controls	603-882-6984

VERNAY LABORATORIES, INC., Dept. EM, S. College St., Yellow Springs, Ohio 45387, Tel: 513-767-7261; Empl.: 500

Local Sales Offices & Reps.

Fla	Pompano Beach, Veri-Tech., Inc.	305-946-6373

™VERNISTAT - a.c. potentiometer - Perkin-Elmer Corp.

VERNITECH, Div. of Vernitron Corp., Dept. EM, 300 Marcus Blvd., Deer Pk., N.Y. 11729, Tel: 516-586-5100, TWX: 510-227-6079; Empl.: 150 p. 1690,1691,2404,2405,3128,3129

Sales Manager: S. Wexler

Local Sales Offices & Reps.

Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Cal	Sherman Oaks, Ray Neubauer	213-986-1101
Colo	Parker, Technology Mktg. Assoc.	303-841-3435
Conn	Meriden, Selmark Assocs.	203-238-0282
Fla	Clearwater, Tech. Comp. & Insts.	813-584-1122
Fla	Cocoa, Electrocomp Assoc.	305-452-9568
Fla	Ft. Lauderdale, Electrocomp Assoc.	305-564-8571
Fla	St. Petersburg, Electrocomp	813-822-9677
Ill	Chicago, Electro-Tech Mktg. Assoc.	312-588-4535
Ill	Lansing, Van Meter Insts.	312-474-3580
Iowa	Cedar Rapids, Palatine Sls.	319-365-8071
Kans	Andover, Palatine Sls.	316-683-7512
Kans	Derby, Palatine Sls.	316-788-0621
Kans	Lenexa, Palatine Sls.	913-492-7020
Kans	Wichita, Palatine Sls.	316-788-0621
Kans	Wichita, Dy-Tronix, Inc.	316-943-6221
Md	Baltimore, R.P. Luce & Co.	301-752-8200
Md	Baltimore, Callas Elctrns.	301-744-7711
Mass	Millis, Selmark Assocs.	617-376-2914
Mass	Norwell, Bordewieck Eng. Sls.	617-659-4915
Mich	Lathrup Village, RC Nordstrom & Co.	313-559-7373
Minn	Minneapolis, R-J Inc.	612-922-1425
Mo	St. Louis, Palatine Sls.	314-426-7055
NH	Manchester, Selmark Assocs.	603-623-5774
NJ	Berkeley Heights, R.P. Luce & Co.	201-464-6440
NJ	Cherry Hill, Lanson Assocs.	609-424-4670
NM	Albuquerque, Technology Mktg.	505-298-4321
NY	Endicott, Tech-Mark, Inc.	607-748-7473
NY	New Hyde Park, R.P. Luce & Co.	516-437-4550
NY	Penfield, A & D Devices	716-586-8033
NY	Red Creek, Net Sls. Co.	315-754-8138
NY	Rochester, Net Sls. Co.	716-467-4538
NY	Scotia, A & D Devices	518-399-9621
NY	Syracuse, Net Sls. Co.	315-469-0839
NY	Westbury, Tech-Rep Eng. Sls.	516-997-7946
Ohio	Dayton, George Lessis	513-294-1551
Ohio	Dayton, Rixan Assocs.	513-278-4216
Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
Ohio	Medina, J. C. Hofstetter Co.	216-241-4880
Okla	Tulsa, Pan Tech.	918-747-2494
Pa	Philadelphia, R.P. Luce & Co.	215-884-8365
Tex	Arlington, Pan Tech.	817-640-3232
Tex	Dallas, J.B. Guenther	214-691-8500
Tex	Houston, J. B. Guenther, Inc.	713-468-0232
Tex	Houston, Pan Tech.	713-623-0640
Utah	Salt Lake City, TMA	801-268-0457
Va	Richmond, R.P. Luce & Co.	804-276-2903
Wash	Buckley, Halbar Assocs.	206-829-1750

™VERNITORQ - brushless DC torque motor - Vernitron Corp.

VERNITRON CORP., Control Components Div., Dept. EM, 2440 W. Carson St., Torrance, Cal. 90501, Tel: 213-328-2504, TWX: 910-349-6250 ...... p. 2406,3127

Sales Manager: S.W. Silverman

Local Sales Offices & Reps.

Cal	Los Angeles, Halbar Assocs.	213-387-8283
Cal	San Mateo, Halbar Assocs.	415-349-4700
Conn	North Haven, Kitchen & Kutchin	203-239-0212
Fla	St. Petersburg, Electrocomp Assocs.	813-822-9677
Md	Baltimore, Callas Elctrns.	301-744-7711
Mass	Lexington, Kitchen & Kutchin	617-862-8230
Mich	Lathrup Village, R.C. Nordstrom Co.	313-559-7373
Minn	Eden Prairie, Techco Ltd.	612-941-3919
Mo	Hazelwood, Dy-Tronix	314-731-5799
NJ	Cherry Hill, Lanson Assocs.	609-424-4670
NJ	Harrington Park, Metro Tech. Sls.	201-768-8495
NY	Endicott, Tech Mark, Inc.	214-748-7473
NY	Jericho, Metro Tech. Sls.	516-935-3330
Ohio	Dayton, Rixan Assocs.	513-222-0011
Tex	Dallas, M. Kruvand Co.	214-827-8043
Wash	Buckley, Halbar Assocs.	206-829-1531

VERNITRON ELEC. COMPS., Beau Prods., Dept. EM, Box 10, Laconia, N.H. 03246, Tel: 603-524-5101, TWX: 710-364-1843; Empl.: 100 .... p. 2366-2368

Local Sales Offices & Reps.

Cal	Santa Ana, RMS Assocs.	714-541-3295
Cal	Santa Clara, Nova-Tronix Elec. Sls.	408-243-9530
Cal	Tustin, R.J.M. Assoc.	714-832-7635
Cal	Tustin, R.J.M. Assoc.	714-832-7635
Colo	Denver, R.G. Bowen Co.	303-722-4641
Fla	Orlando, Cartwright & Bean, Inc.	305-422-4531
Ga	Atlanta, Cartwright & Bean, Inc.	404-255-5262
Ill	Westchester, Wasson-Gallagher	312-344-0690
Ind	Indianapolis, Scott Elctrns., Inc.	317-897-9976
Mass	Norwood, R. Perron & Co.	617-762-8114
Mich	Lathrup Village, R.C. Nordstrom Co.	313-559-7373
Minn	Minneapolis, Heimann Co.	612-861-6051
Miss	Jackson, Cartwright & Bean, Inc.	601-981-1368
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
NH	Dover, R. Perron & Co.	603-742-2321
NJ	Lowery, ME & Assoc.	609-667-6110
NJ	West Caldwell, Grimm, Siegel Assoc.	201-575-9300
NM	Albuquerque, C.T. Carlberg & Assoc.	505-265-1579
NC	Charlotte, Cartwright & Bean, Inc.	704-337-5674
Ohio	Cleveland, Scott Elctrns., Inc.	216-291-2600
Pa	Broomall, L.D. Lowery	215-356-5300
Pa	Pittsburgh, Scott Elctrns., Inc.	412-781-311
Tenn	Memphis, Cartwright & Bean, Inc.	901-276-4442
Tex	Houston, Wheelex Inc.	817-268-1812
Wash	Seattle, R.K. Squibb Inc.	206-632-2450

VERNITRON PIEZOELECTRIC DIV., Dept. EM, 232 Forbes Rd., Bedford, Ohio 44146, Tel: 216-232-8600, TWX: 810-427-2274; Empl.: 130 .... p. 2772,2773

Local Sales Offices & Reps.

Ariz	Phoenix, Gassner & Clark Co.	602-968-9037
Cal	Los Angeles, E. Mintz	213-670-5410
Cal	Palo Alto, Fetty/Schoenduve, Inc.	415-321-7041
Fla	Winter Park, S. E. Assocs., Inc.	305-644-3896
Kans	Mission, Admack Sls. Co.	913-432-5550
NY	Fairport, TAC Assocs.	716-377-1742
NY	New York, Metro-Long Island Corp.	212-873-5710
Ohio	Bedford, Vernitron Piezoelectric Div.	216-232-8600
Tex	Houston, Oeler & Menelaides	713-772-0730
Tex	Richardson, Oeler & Menelaides	214-234-6334
Va	Springfield, Temsco	703-569-2700
Wash	Seattle, Northmar, Inc.	206-524-5170

™VEROBOARD - P.C. board - Vero Electronics

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VERO ELECTRONICS, Dept. EM, 171 Bridge Rd., Hauppauge, N.Y. 11787, Tel: 516-234-0400, TWX: 510-227-8890; Empl.: 25; Minimum order: $J. Schrader .... p. 1404,1405

Distributor Manager: J. Schrader

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns.	205-881-5031
Cal	Los Angeles, Dyna Sls. Co.	213-268-1175
Colo	Englewood, A-G Elctrns.	303-771-8088
Conn	Milford, Todino Engrg.	203-874-6643
Fla	Ft. Lauderdale, Beacon Elctrns.	305-491-4211
Fla	Maitland, Beacon Elctrns.	305-647-3498
Fla	Palm Beach Gardens, Beacon Elctrns.	305-622-2770
Ga	Atlanta, Beacon Elctrns.	404-351-3654
Ill	Des Plaines, Marsland Assoc.	312-298-2620
Ind	Ft. Wayne, McDonald Sls.	219-747-3650
Ind	Indianapolis, Marsland Assoc.	317-359-0200
Md	Pikesville, L & M Assoc.	301-484-7970
Mass	Needham Heights, Todino Engrg.	617-444-7925
Minn	Minneapolis, Marsland Assoc.	612-545-4481
Mo	Kansas City, Marsland Assoc.	816-966-8400
NY	Fairport, Tech-Mark	716-223-1252
NY	Hauppauge, Vero Elect.	516-234-0400
NY	Liverpool, Tech-Mark	315-652-6229
NC	Greensboro, Beacon Elctrns.	919-674-9432
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Ore	Portland, SPS Elctrns.	503-297-3862
Pa	Jenkintown, Stein Instrumentation	215-885-2370
SC	Spartanburg, Beacon Elctrns.	803-582-4613
Tenn	Oak Ridge, Beacon Elctrns.	615-482-2409
Tex	Garland, G.V. Peck Co.	214-341-8311
Tex	Houston, G.V. Peck Co.	713-789-7111
Va	Lynchburg, Habco Elctrns.	804-384-5236
Wash	Kirkland, SPS Elctrns.	206-827-6000
Wash	Spokane, SPS Elctrns.	509-535-7447

Local Distributors

DC	Beltsville, R.E.S.C.O./Wash.	301-937-5890
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NY	Farmingdale, S.A.I.	516-293-2710
NY	Hempstead, Davis Elctrns.	516-483-9200
NY	New York, Argil Elctrns.	212-691-8111
Ore	Portland, Dunn Elctrns.	503-285-0214
Pa	Frazer, Personal Computer Corp.	215-647-8460
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Tex	Houston, City Elctrns.	713-621-1060
Wash	Seattle, Radar Elect.	206-282-2511

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™VERSAKRIMP - brazed terminal - ITT Cannon/ETC Terminal Products

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™VERSAMOUNT BRACKETS - card guides brackets (plastic and metal) - UNITRACK Div.

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™VERSA-PROX - proximity switch - Electro Corp.

™VERSA-RANGE - refrigerated test chambers - Blue M Electric Co.

™VERSATAP - matv tap offs - Blonder-Tongue Labs., Inc.

VERSATEC INC., Dept. EM, 2805 Bowers Ave., Santa Clara, Cal. 95051

(TM)VERSATOL - rubber insulated cable - General Electric Co.

(TM)VERSA-TRAN - temperature controllers - Honeywell

(TM)VERSA-TRAP - roughing pump accessories - Perkin-Elmer Ultek Inc.

(TM)VERSATYME® - programmable controller - Applied Materials Inc.

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(TM)V-GUARD - stylus assembly - Stanton Magnetics, Inc.

VHF ENGRG, Div. of Brownian Elctrns. Corp., Dept. EM, 320 Water St., Binghamton, N.Y. 13902, Tel: 607-723-9574; Empl.: 40

Sales Manager: M. Druskoff

VIABLE SYSTEMS INC., Dept. EM, Box 438, 299 Second Ave., Needham, Mass. 02192, Tel: 617-449-4570; Empl.: 15

Local Sales Offices & Reps.

Ala	Huntsville, Comprehensive Consultant Co.	205-837-6404
Ohio	Dayton, P.J. Bockestedt & Assocs.	513-233-0849

VIBRA-METRICS, INC., Dept. EM, 150 Bradley St., E. Haven, Conn. 06512, Tel: 203-467-6335, TWX: 710-465-0887; Empl.: 16

Local Sales Offices & Reps.

Ala	Huntsville, F. Gardolf & Assoc. ..	504-834-0128
Cal	Palo Alto, Gado Intr. Sls.	415-961-2222
Conn	Easton, JBL Assoc.	203-281-3161
Fla	Jupiter, Jupiter Eng. Co.	305-746-3984
Ill	Urbana, Dynamic Sls.	217-344-3551
Md	Timonium, Scientific Devices-D.C.	301-252-8851
Mo	St. Louis, Adelphi	314-821-1232
NM	Albuquerque, A-Tek Co.	505-265-8325
NY	Fayetteville, Magyar Assoc.	802-442-5858
Ohio	Chesterland, Electroquipment Sls.	216-729-2222
Tex	Houston, Scientific Sls. Co.	713-666-5318
Tex	Richardson, Scientific Sls. Co.	214-231-6541
Va	Norfolk, Scientific Devices-D.C. ..	703-499-8133
Va	Springfield, Scientific Devices-D.C.	703-451-6500
Wash	Bellevue, Topp Eng. Sls.	206-747-5400

VIBRAC CORP., Dept. EM, 11 Alpha Rd., Chelmsford, Mass. 01824, Tel: 617-256-6581; Empl.: 35

Sales Manager: B. Chrzne

Local Sales Offices & Reps.

Cal	Burlingame, Engrg. Reps.	415-692-2581
Cal	Los Angeles, Kirby Assoc.	213-879-9045
Conn	Newtown, Daner-Hayes	203-426-9094
Fla	Satellite Beach, Reynolds & Assoc.	305-773-4700
Md	Gaithersburg, Wright Co.	301-948-5151
Mass	Newton Center, Daner-Hayes	617-969-4650
Mich	Northville, PMR Assoc.	313-348-2460
Minn	Minnetonka, R. Dickman	612-474-2755
NJ	So. Orange, Daner-Hayes	201-763-1771
NY	Port Washington, Daner-Hayes ..	516-883-4576
NY	Rochester, Daner-Hayes	716-467-5100
Pa	Audubon, Daner-Hayes	215-666-5005
Tex	Bellaire, Brice Co.	713-666-1788
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Exp:	Mass., Weston, Maridyne International	617-899-3510

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VIBRATION INSTRS. CO., Dept. EM, 1614 Orangethorpe Way, Anaheim, Cal. 92801, Tel: 714-879-6085; FSC No.: 32102; Empl.: 15

Sales Manager: T. Harper

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Ala	Huntsville, Lee Assocs., Inc.	205-533-5896
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Colo	Boulder, Grady-Moore Assoc.	303-494-3351
Conn	Hamden, Instr. Consultants, Inc.	203-288-5246
Fla	Ft. Lauderdale, Lee Assocs.	305-491-7220
Fla	Winter Haven, Lee Assocs., Inc.	813-294-5815
Ga	Buford, Lee Assocs., Inc.	404-945-4222
Ill	Chicago, Pivan Engr. Co.	312-539-4838
Ind	Indianapolis, Pivan Engrg. Co.	317-253-1681
Iowa	Cedar Rapids, Pivan Engrg. Co.	313-377-9434
Kans	Shawnee Mission, Pivan Engrg. Co.	913-722-1030
Mass	Waban, Instr. Consultants, Inc. ..	617-969-9881
Mich	Detroit, Comtel Instr. Co.	313-255-1970
Minn	Minneapolis, Pivan Engrg. Co.	612-537-4501
Mo	St. Louis, Pivan Engrg. Co.	314-567-3636
NM	Albuquerque, Grady-Moore Assoc.	505-292-3322
NY	Liverpool, Rayelco Elctrns.	315-652-5272
NC	Raleigh, Lee Assocs., Inc.	919-787-5818
Ohio	Cleveland, Comtel Instr. Co.	216-442-8080
Ohio	Dayton, Comtel Instrs. Co.	513-289-7573
Pa	Pittsburgh, Comtel Instr. Co.	412-922-5720
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(TM)VIBRODE - capacitor modulators - Beckman Instrs., (AISSD)

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Sales Manager: D.R. Butler

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Cal	Belmont, Littrell Western Sls.	415-592-3346
Cal	Los Angeles, Littrell Western Sls.	213-261-0164
Ill	Glen Ellyn, H. Hulseberg Co.	312-766-3200
Mass	Belmont, R. C. Cutting Co.	617-489-1137
NJ	Edison, Affiliated Sls. Co.	201-572-0777
Ohio	Parma, R. Setteur	216-843-6649

VICLAN INC., Dept. EM, Box 81403, 7373A Engineer Rd., San Diego, Cal. 92138, Tel: 714-292-1411, TWX: 910-335-1264; FSC No.: 51959

Sales Manager: B. Weiner

Local Sales Offices & Reps.

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Cal	Irvine, Mission Mktg. Grp.	714-833-1802
Cal	Redwood City, Parks & Pruitt Assocs.	415-364-1640
Cal	San Diego, Hadden Assocs.	714-565-9444
Conn	Newtown, Kanan Assocs.	203-426-8157
Fla	Hollywood, LectroMech	305-920-2291
Ill	Glenview, Crimson Engrg. Co.	312-724-1780
Kans	Overland Park, Advanced Tech. Sls.	913-492-4333
Mass	Reading, Kanan Assocs.	617-944-8484
Mich	Southfield, Representative Elctrn. Prods.	313-559-1080
Minn	Bloomington, Peterson Elctrns. ..	612-884-3483
NJ	Clifton, Compar New York	201-546-3660
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NY	Pittsford, T-Squared Elctrns. Co.	716-381-2551
NY	Syracuse, T-Squared Elctrns. Co.	315-463-8592
Okla	Tulsa, Technical Mktg.	918-622-5984
Tex	Dallas, Technical Mktg.	214-387-3601
Tex	Houston, Technical Mktg.	713-777-9228
Va	Fairfax, Schibley Assocs.	703-591-3008
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Fla	N. Miami, Haas Winfield	305-945-6544
Ga	Atlanta, Leonard Elliott Co.	404-875-9701
Ill	Oak Park, Denco Sls. Co.	312-848-4244
Md	Baltimore, Dave Brothers	301-764-7189
Mass	Needham, Piper Assocs.	617-449-1144
Mich	Detroit, Burcaw Co. & Assocs. ..	313-533-7700
Minn	St. Paul, Skor	612-645-6461
Mo	Raytown, Pacer Corp.	816-358-6638
NM	Albuquerque, C.T. Carlberg & Assocs.	505-265-1579
NY	New City, I. Langbaum & Assoc.	914-634-1141
Ohio	Columbus, Weller Elctrn. Sls.	614-885-7819
Tenn	Tullahoma, Lester Vihon	615-455-5767
Tex	Dallas, Techno Assocs.	214-357-9213
Wash	Kirkland, Cable Market Spec., Inc.	206-822-4113

Local Distributors

Cal	Hayward, Vicon San Francisco ..	415-785-4531
Cal	N. Hollywood, Vicon Los Angeles	213-341-4035
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Sales Manager: N. Brill

Local Sales Offices & Reps.

Cal	Mountain View, Cindel Sls.	415-965-2630
Cal	Northridge, R.L. Assocs.	213-782-7826
Colo	Denver, R.W. Masterson Co.	303-771-1482
Conn	New London, Sel-Tronics Corp.	203-442-2514
Fla	Ft. Lauderdale, Electro Comp. Assocs.	305-564-8571
Fla	St. Petersburg, Electro Comp. Assocs.	813-894-0687
Ga	Roswell, Electro Srvcs.	404-993-0389
Ill	Chicago, M. Gottlieb Assocs.	312-775-1151

Ill	Elk Grove Village, J.G. Twist Co.	312-593-0200
Ind	Indianapolis, M. Gottlieb Assocs.	317-846-5788
Iowa	Cedar Rapids, J.G. Twist Co.	319-383-8703
Kans	Prairie Village, J.G. Twist Co.	913-236-4646
Ky	Louisville, Waddle & Marquart, Inc.	502-897-6419
Md	Reisterstown, F.B.D. Sls. Corp.	301-833-9444
Mass	Shrewsbury, Sel-Tronics Corp.	617-844-6127
Mich	Detroit, Rathsburg Assocs.	313-882-1717
Minn	Minneapolis, Carl A. Listug Sls. Co.	612-537-6740
Mo	St. Louis, J.G. Twist Co.	314-432-2830
NJ	Haworth, Kay Sls Assocs. Co.	201-384-3261
NY	Fairport, W.A. Franklin Sls. Corp.	716-223-5102
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NY	New Hartford, W.A. Franklin Sls. Corp.	315-737-5038
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Tex	Dallas, Hale & Assocs.	214-350-8791
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Wisc	Mequon, Wm. R. Bolles & Assocs.	414-241-3320

VICTOR WIRE & CABLE CORP., Dept. EM, 3601 Holdrege Ave., Los Angeles, Cal. 90016, Tel: 213-870-9933; Empl.: 30

VICTOREEN INSTRUMENT DIV., Dept. EM, 10101 Woodland Ave., Cleveland, Ohio 44104, Tel: 800-321-9990, TWX: 810-421-8287; Empl.: 300
p. 3764-3769,4521

Sales Manager: C.A. Lockert

Local Sales Offices & Reps.

Ga	Atlanta, Victoreen Inst. Div.	404-577-2736
Ill	Chicago, Victoreen Instr. Div.	312-541-0540
Mass	Canton, Victoreen Instr. Div.	617-227-6724
NJ	Trenton, Victoreen Instr. Div.	212-744-7646
Ohio	Cleveland, Victoreen Instr. Div.	216-795-8200
Tex	Richmond, Victoreen Instr. Div.	713-342-3018
Va	Newport News, Victoreen Instr. Div.	703-548-8446

VICTORY ENGRG. CORP., Dept. EM, Victory Rd., Springfield, N.J. 07081, Tel: 201-379-5900, TWX: 710-983-4430; Empl.: 300

Sales Manager: S. Iovin

Local Sales Offices & Reps.

Ala	Huntsville	205-881-9270
Ariz	Phoenix	602-279-1221
Cal	Los Angeles	213-651-4050
Cal	Palo Alto	415-321-7041
Colo	Denver	303-222-5645
Conn	Hamden	203-281-1331
Fla	Clearwater	813-531-5513
Fla	Miami	305-624-5832
Fla	Orlando	305-275-1132
Ga	Atlanta	404-876-1591
Ill	Chicago	312-286-1500
Ind	Fort Wayne	219-743-1586
Ind	Indianapolis	317-635-8951
Md	Towson	301-825-9637
Mass	Waltham	617-893-2850
Mich	Farmington	313-474-8300
Minn	Minneapolis	612-881-6683
NJ	Bergenfield	201-384-3643
NJ	Cherry Hill	609-429-1551
NY	Rochester	716-586-0468
Ohio	Cincinnati	513-791-2513
Ohio	Cleveland	216-291-2600
Ohio	Columbus	614-236-8619
Ohio	Dayton	513-223-2652
Pa	Pittsburgh	412-781-3112
Tex	Dallas	214-363-1671
Tex	Houston	713-621-3760
Wash	Seattle	206-783-3423
Exp:	New York, N.Y.	212-679-1300

™VIDAIRE - accessories - Vidaire Electronics Mfg.

VIDAIRE ELECTRONICS MFG., Dept. EM, 150 Buffalo Ave., Freeport, N.Y. 11520, Tel: 516-623-6696; Empl.: 20

Local Sales Offices & Reps.

Ala	Birmingham, H.W. Phillips Co.	205-871-8287
Cal	Burbank, Michael Ross Assoc.	213-842-2104
Cal	Van Nuys, Art Szerlip Sls Co.	213-782-1765
DC	Washington, Lienau Assoc.	301-229-7333
Fla	Ft. Lauderdale, Sproch Sls.	305-587-3792
Ga	Atlanta, H. W. Phillips Co.	404-237-7564
Ill	Chicago, Ellinger Sls. Corp.	
Ind	Indianapolis, P. Stone Sls. Co.	317-257-9777
La	New Orleans, Crockett Sls. Co.	
Md	Mitchellville, Lienau Assoc.	301-262-1709
Md	Rockville, Lienau Assoc.	301-770-6800
Mass	Woburn, W & D Mktg.	617-935-5610
Mich	Bloomfield, S. F. McMechan	313-852-4308
Minn	Minneapolis, Jensen Sls. Co.	612-941-7181
Mo	Raytown, M. Taraski	816-358-1442
NY	W. Seneca, D. Evans	716-675-7288
NC	Charlotte, H. W. Phillips Co.	704-394-5544
Ohio	St. Mary's, REPP Co.	419-392-4724
Pa	Bethlehem, Les Benner	215-865-3014
Pa	Broomall, Lienau Assoc.	215-356-4210
Pa	Pittsburgh, Tanner Co.	412-561-4687
Tenn	Memphis, Crockett Sls. Co.	901-388-5410
Tex	Dallas, Crockett Sls. Co.	214-748-8209
Va	Charlottesville, Lienau Assoc.	703-295-5234
Va	Great Falls, Lienau Assoc.	703-759-3128
Va	Winchester, Lienau Assoc.	703-662-6467
Exp:	New York, NY, Singer Prods. Co.	212-432-1400

VIDAR AUTODATA INC., Dept. EM, 325 Middlefield Rd., Mt. View, Cal. 94043, Tel: 415-965-3050; Empl.: 65

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assoc.	205-534-9771
Ariz	Tempe, Trembly Assoc.	602-996-4428
Cal	Costa Mesa, Measurement Assoc.	714-540-7160
Cal	Los Altos, Jay Stone & Assoc.	415-948-4563
Colo	Arvada, Figaro-Klebba Assoc.	303-424-0108
Conn	Manchester, Victor Assoc.	203-646-6448
Fla	Orlando, Gentry Assoc.	305-894-4401
Ga	Atlanta, Gentry Assoc.	404-448-2365
Ga	Atlanta, Vidar Corp. District Off.	404-455-7222
Ill	Chicago, Pivan Engrg.	312-539-4838
Ind	Indianapolis, Pivan Engrg.	317-253-1681
Kans	Shawnee Mission, Pivan Engrg.	913-722-1030
Md	Rockville, Mesa, Inc.	301-881-8430
Mass	Framingham, Victor Assoc.	617-879-5710
Mich	Southfield, Data-tron	313-354-6421
Minn	Minneapolis, Pivan Engrg.	612-537-4501
Mo	St. Louis, Pivan Engrg.	314-567-3636
NJ	Bogota, Nevine & Vespo	201-487-1505
NJ	Cinnaminson, Mesa, Inc.	609-786-0284
NM	Albuquerque, Trembly Assoc.	505-293-4444
NY	East Syracuse, Ossman Instrs.	315-437-6666
NY	Rochester, Ossman Instrs.	716-328-2230
NY	Vestal, Ossman Instrs.	607-785-9947
NC	Burlington, Gentry Assoc.	919-227-3639
Ohio	Dayton, Data-tron	513-223-8421
Ohio	Wickliffe, Data-Tron	216-585-8421
Pa	Monroeville, Data-tron	412-243-8421
Pa	Randnor, Roberts Engrg. Sls.	215-688-6525
Tex	Austin, Crockett Southwest Co.	512-451-8269
Tex	Dallas, Crockett Southwest Co.	214-251-1776
Tex	Needville, Crockett Southwest	713-342-2176
Wash	Seattle, Lunderwood Assoc.	206-575-0123
Wisc	Brookfield, Pivan Engrg.	414-786-1940

VIDCO, INC., Dept. EM, P.O. Box 25452, Portland, Ore. 97225, Tel: 503-292-4104; Empl.: 4

Sales Manager: G.E. Edens

Local Sales Offices & Reps.

Cal	Palo Alto, Gado Instrument Sls.	415-961-2222
Cal	Torrance, Cutlass Elctrns.	714-549-9358
Ind	Indianapolis, K. W. Meyers Co.	317-243-6681
Md	Rockville, Mesa	301-881-8430
Mich	Southfield, Electro Sls. Assocs.	313-424-9075
Minn	St. Louis Park, K. W. Meyers Co.	612-920-7080
NJ	Cinnaminson, Mesa	609-786-0284
Ohio	Cleveland, Electro Sls. Assocs.	216-261-5440
Ohio	Dayton, Electro Sls. Assocs.	513-426-5551
Pa	Pittsburgh, Electro Sls. Assocs.	412-371-9449
Wash	Seattle, Underwood Assocs.	206-242-7200

VIDEO AUTOMATION SYSTEMS INC., Dept. EM, Rte 1—Box 21A, Pound Ridge, N.Y. 10576, Tel: 914-764-4613

Local Sales Offices & Reps.

Ill	Danville, S. Autor	217-442-1391

™VIDEOCRON - lenses - Cosmicar Lens Div.

™VIDEOFAX - high speed document transmission - Datalog Div., Litton Sys.

™VIDEO/FILTER - filters for crt's - Panelgraphic Corp.

™VIDEOLINK - cctv accessories - Vicon Industries Inc.

VIDEO RESEARCH CORPORATION, Dept. EM, 6985 Garden Rd., Riviera Beach, Fla. 33404, Tel: 305-842-2867; Empl.: 140

VIDEO SCIENCES INTERNATIONAL, Dept. EM, 6319 E. DeSoto Ave., Woodland Hills, Cal. 91364, Tel: 213-346-4440; FSC No.: 5M540; Empl.: 16

™VIDICUE - Model 5050 Video Tape Editing System - Datatron, Inc.

™VIDIFONT - character generator - CBS Laboratories

™VIGILTROL - safety switch-high level alarm - Autocon Inds., Inc.

™VII - cctv accessories - Vicon Industries Inc.

™VII - television test equipment - Visual Information Institute Inc.

™VIKING - tape equipment - Telex Communications, Inc.

VIKING ELECTRONICS, Dept. EM, 406 2nd St., Hudson, Wisc. 54016, Tel: 715-386-5188; Empl.: 10

VIKING INDS., INC., Dept. EM, 9324 Topanga Cyn Blvd., Chatsworth, Cal. 91311, Tel: 213-882-6275, TWX: 910-494-2094; Empl.: 550

Sales Manager: B. Richards, Special Prod. Div.

Local Sales Offices & Reps.

Ariz	Scottsdale, Summit Sls.	602-994-4587
Cal	San Carlos, Lo Dan	415-592-4600
Colo	Brighton, Intermountain Agency Sls.	303-468-0232
Conn	No. Haven, Forsberg Sls.	203-239-5111
Fla	Altamonte Springs, V.G. Sls.	305-831-8688
Fla	Pompano Beach, V.G. Sales	305-941-5544
Ga	Cumming, Technical Comps.	404-394-9401
Ill	Westchester, Wasson-Gallagher Co.	312-261-7517
Md	Columbia, Rep-Tron, Inc.	301-953-7580
Mass	Brockton, Forsberg Sls.	617-522-6300
Mass	Wakefield, Viking Inds.	617-245-4110
Mich	Dearborn, Pitcher-Poulin	313-582-5450
Minn	Minneapolis, Industrial Comps.	612-831-2666
Mo	Kansas City, Harris-Hanson Co.	816-763-1384
Mo	St. Louis, Harris-Hanson Co.	314-432-3611
NJ	Keasbey, ADDEM 2	516-567-5900
NY	Deer Park, Aines Sls. Corp.	516-586-2788
NY	Huntington Station, ADDEM 1	516-567-5900
NY	Rochester, Electra Sls.	716-436-4030
NY	Syracuse, Electra Sls. Corp.	315-455-5783
NC	Winston-Salem, Dula Assocs.	919-768-7166
Ohio	Cincinnati, R. Makin Assocs.	513-232-5588
Ore	Beaverton, N. R. Schultz Co.	503-643-1644
Tex	Dallas, J. B. Guenthere	214-691-8500
Tex	Houston, J. B. Guenthere	713-468-0232
Utah	Salt Lake City, Elcom, Inc.	801-532-7940
Wash	Bellevue, N. R. Schultz Co.	206-454-0300

VIKING MODULES, Div. of Keltron Corp., Dept. EM, 223 Cresent St., Waltham, Mass. 02154, Tel: 617-894-0525; Empl.: 30

Sales Manager: T. Chadurjian

Local Sales Offices & Reps.

Pa	Audubon, Holmes Assocs.	215-666-0636

VIKING WIRE CO., INC., Dept. EM, Shelter Rock Rd., Box 187, Danbury, Conn. 06810, Tel: 203-744-4600, TWX: 710-456-1217; FSC No.: 51777; Empl.: 175

Sales Manager: W. Mueller

Local Sales Offices & Reps.

Cal	Chatsworth, Magnet Wire Supply Co.	213-882-7620

™VIKON - burn resistant vidicon surface - Teltron, Inc.

™VINYL GLASS - vinyl coated fiberglass sleeving - Natvar Corp.

™VINYLINK - vinyl insulated splice - Burndy Corporation

™VINYL STIX - pressure sensitive vinyl stock - Topflight Corp.

™VINYLUG - vinyl insulated terminal - Burndy Corporation

™VIP - Aluminum Instrument Enclosures - Zero Corp.

™VIP - programmable controllers - Struthers-Dunn, Inc.

VIRGINIA PANEL CORP., Dept. EM, Box 1106, 1400 New Hope Rd., Waynesboro, Va. 22980, Tel: 703-942-8376, TWX: 710-839-0406; Empl.: 60 p. 2363,

Local Sales Offices & Reps.

Cal	West Lake Village, J. E. Taylor Jr.	213-889-0748
Md	Silver Spring, M.L. Councell	301-587-1755
NJ	Ridgewood, Hansen Assocs.	201-652-7055
NY	Huntington, L.I., Hansen Assocs.	516-692-4688
Va	Norfolk, M.L.Councell Assoc.	703-583-0522
Va	Richmond, M.L.Councell Assoc.	703-282-6533

VIRTIS CO., Dept. EM, Rte. 208, Gardiner, N.Y. 12525, Tel: 914-255-5000; Empl.: 105

(TM)VIRTRONICS - thermistor temperature indicators & controllers - VirTis Co.

VISIDYNE INC., Dept. EM, 19 Third Ave., Northwest Industrial Park, Burlington, Ma. 01803, Tel: 617-273-2820; Empl.: 32

Local Sales Offices & Reps.

Ala	Huntsville, Clark Assocs.	205-536-6366
Cal	Santa Clara, Applied Microfilm	408-249-1364
Ill	Evanston, Microsystems Inc.	312-864-1454
Md	Silver Spring, Vitro Laboratories	301-871-2291
Mass	Burlington, Visidyne	617-273-2820
Mass	Cambridge, General Microfilm	617-864-2820
Mass	Cambridge, Applied Microfilm	617-491-0830
Neb	Omaha, Standard Blueprint Co.	402-341-7890
NJ	Paramus, Datamation Sys.	201-343-2411
NJ	Turnersville, Microfilm Analysts Co.	609-227-3366
Ohio	Mansfield, D. Barr	419-884-2031
Va	Norfolk, Micro Labs	703-627-8906
Wisc	La Crosse, Northern Micrographics	608-782-4180

VISHAY RESISTIVE SYSTEMS GRP., Vishay Intertechnology Inc., Dept. EM, 63 Lincoln Hwy., Malvern, Pa. 19355, Tel: 215-644-1300, TWX: 510-668-8944; Empl.: 500 .... p. 3770,3771

Sales Manager: A. Troianello

Local Sales Offices & Reps.

Ala	Huntsville, F M Assoc. Ltd.	205-536-7912
Ariz	Scottsdale, Runyon Co., Inc.	602-959-6060
Cal	Pico Rivera, Westrep	213-949-2551
Cal	San Diego, Westrep	714-276-0751
Cal	Santa Clara, Westrep	408-984-0350
Colo	Denver, Duffy Assoc.	303-934-7392
Conn	North Haven, Comp Rep Assoc.	203-239-9762
Fla	Boca Raton, Conley Assocs. Inc.	305-395-6108
Fla	Oviedo, Conley Assocs. Inc.	305-365-3283
Fla	Tampa, Conley Assocs. Inc.	813-933-1759
Ill	Rolling Meadows, Lightner Assocs.	312-398-3000
Iowa	Cedar Rapids, Comstrand	319-377-1575
Kans	Shawnee Mission, Techn. Sls.	913-888-3330
Md	Lutherville, J.A. Dougherty Sls.	301-321-7890
Mass	Needham, Comp Rep	617-444-2484
Mich	Jackson, N. Scroggs	517-750-1170
Mich	Oak Park, G. Chaulk	313-967-0808
Minn	Mpls., Comstrand, Inc.	612-571-0000
Mo	Ferguson, Technical Sls. Assoc.	314-725-5361
NJ	Flanders, K & R Engrg. Sls. Co.	201-584-5235
NM	Albuquerque, Data Handling	505-268-4364
NY	Buffalo, Robert F. Lamb	716-874-4900
NY	Rochester, Robert F. Lamb	716-544-5580
NY	Schenectady, Robert F. Lamb	518-393-4844
NY	Syracuse, Robert F. Lamb	315-455-2469
Ohio	Cleveland, A. H. Baier	216-461-6161
Ohio	Dayton, A H Baier Co. & Assoc.	513-276-4128
Ore	Portland, F. Jackson Assoc.	503-228-1655
Pa	Westchester, D. Curley Assocs.	215-692-4470
SC	Spartanburg, H. Cook Assoc.	803-576-8594
Tex	Dallas, Stolle Hamilton	214-243-5377
Tex	Seabrook, Stolle Hamilton	713-488-3707
Wash	Seattle, F. Jackson	206-523-6300

Local Distributors

Cal	Pico Rivera, Westrep	213-949-2551
NJ	Flanders, K & R Engrg. Sls. Co.	
Ohio	Cleveland, RD Elctrns.	216-461-9090

(TM)VISICORDER - graphic recorders - Honeywell, Inc.

(TM)VISI-DIAL - dial assy. - Theta Instr. Corp.

(TM)VISIFLOAT - variable area flowmeter - Dwyer Instrs

(TM)VISI-GUARD - lightning & electrical surge protector - Joslyn Elctrn. Sys.

(TM)VISOMET - optical inspection equipment - Zi-Tech Div.

(TM)VISTAL - transluscent polycrystaline Al2O3 ceramic - Coors Porcelain Co.

VISUAL INFORMATION INSTITUTE INC., Dept. EM, Box 33, Xenia, Ohio 45385, Tel: 513-372-8637; FSC No.: 27432; Empl.: 18

Local Sales Offices & Reps.

Cal	Millbrae, Ashby Assocs. of N. Cal.	415-692-4442

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Specializing in test instrumentation for all television scan rates, interlace ratios, and formats including RGB, sequential, and encoded color as well as high resolution monochrome. Standard products offered for both display evaluation and signal transmission testing. Customer requirements for modified or special instruments met economically and with short delivery cycles.

(TM)VITACOTE - soldering iron tips - ESICO, Inc.

(TM)VITA DRIVE - rubber drive wheel-cleaner - Friend's Mfg.

(TM)VITEL - telecommunicatoions solder connector - Viking Inds., Inc.

VITRAMON INC., Dept. EM, 25 Carmen Rd, Milford, Conn 06460, Tel: 203-268-6261

(TM)VITREOSIL - fused silica & fused quartz - Thermal Amer. Fused Quartz

(TM)VITROHM - vitreous enamel wire-wound resistors - Ward Leonard Elec. Co. Inc.

(TM)VITROLAIN - ceramic products - Star Porcelain Co.

VITRONIC, INC., Dept. EM, 311 N. Lindbergh Blvd., St. Louis, Mo 63141

(TM)VIVISUN 20/20 - sunlight readable switches - Aerospace Optics Inc.

VIZ MANUFACTURING CO., Dept. EM, 335 E. Price St., Phila, Pa. 19144, Tel: 215-844-2626 .... p. 2946

Local Sales Offices & Reps.

Fla	Ft. Lauderdale, Unirep, Inc.	305-527-1556
Ga	Roswell, Henry W. Phillips Co.	404-992-3070
Ind	Indianapolis, Technical Reps., Inc.	317-849-6454
Kans	Wichita, Forristal-Young Sls. Co.	316-838-7226
Md	Baltimore, Par-Nell Sls. Co.	301-655-2944
Mass	Natick, Larry Cole Co.	617-237-1260
Mo	Kansas City, Forristal-Young Sls. Co.	816-358-6771
Mo	St. Louis, Forristal-Young Sls. Co.	314-645-2360
Neb	Omaha, Forristal-Young Sls. Co.	402-333-0800
NJ	Fort Lee, TMC Sls., Corp.	201-944-8340
NY	Skaneateles, Leahy & Thompson	315-685-8122
Ohio	Cincinnati, John O. Olson Co.	513-922-2176
Ohio	Cincinnati, John O. Olson Co.	513-825-0678
Ohio	Cleveland, John O. Olson Co.	216-752-5444
Pa	Holland, Par-Nell Sls. Co.	215-355-9330
Pa	Pittsburg, John O. Olson Co.	412-279-2550
Pa	Pittsburg, John O. Olson Co.	412-341-8391
Tex	Dallas, Crockett Sls. Co.	214-748-8209

(TM)VN-TC - Power & Control Cable - Brand-Rex Co.

(TM)VOCAL MASTER - sound system - Shure Brothers, Inc.

(TM)VOICE DIRECTOR - portable p.a. system - Argos Products Co., Inc.

VOICE IDENTIFICATION INC., Dept. EM, Box 714, Somerville, N.J. 08876, Tel: 201-526-3408; Empl.: 6

VOLTARC TUBES, Dept. EM, 102 Linwood Ave., Fairfield, Conn. 06430, Tel: 203-255-2633, Telex: 96-4337; Empl.: 85

(TM)VOLTAUT - taut-band suspension sys. - Kratos

VOLTEK INC., Dept. EM, 407 N. Maple Dr., Beverly Hills, Cal. 90210, Tel: 213-272-7991; Empl.: 8

Local Sales Offices & Reps.

Ariz	Phoenix, C.W. Fowler Co.	602-274-5537
Cal	Chula Vista, C.W. Fowler Co.	714-422-5408
Cal	Inglewood, C.W. Fowler Co.	213-678-5211
Cal	Menlo Park, C.W. Fowler Co.	415-322-5374
Colo	Denver, C.W. Fowler Co.	303-744-9595
Ind	Ft. Wayne, Scott Elctrns.	219-743-1586
Ind	Indianapolis, Scott Elctrns.	317-897-9976
Ky	Louisville, Scott Elctrns.	502-583-3220
Mass	Burlington, Lancer Assocs.	617-272-6445
Mich	Plymouth, Scott Elctrns.	313-455-2440
Minn	Minneapolis, A.J. Warner Co.	612-729-7371
NM	Albuquerque, C.W. Fowler Co.	505-299-7676
Ohio	Cincinnati, Scott Elctrns.	513-791-2513
Ohio	Cleveland, Scott Elctrns.	216-291-2600
Ohio	Columbus, Scott Elctrns.	614-236-8610
Ohio	Dayton, Scott Elctrns.	513-294-0539
Okla	Tulsa, T.J. Ray Co.	918-627-1515
Pa	Camp Hill, Beil & Whitaker	717-233-1254
Pa	Harrisburg, Beil & Whitaker	717-652-1084
Pa	Orefield, Beil & Whitaker	215-395-0150
Pa	Pittsburgh, Scott Elctrns.	412-781-3112
Pa	Reading, Beil & Whitaker	215-779-2610
Va	Alexandria, Potomac Elctrns.	703-836-1630
Wash	Bellevue, C.W. Fowler Co.	206-454-8600

VOLTEX CO., INC., Dept. EM, 115 Marine St., Farmingdale, N.Y. 11735, Tel: 516-CH 9-2336; Empl.: 25

Local Distributors

Cal	Costa Mesa, Cen-Tec Sls.	714-645-9157
Mass	Reading, Champagne Assocs.	617-944-3011
Minn	New Brighton, Dalska Sls.	612-631-2941

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(TM)VOLTPROBE - voltage testers - Amprobe Instrument

(TM)VOLTRIP - limit detection & control - Kratos

VOLTRONICS CORP., Dept. EM, West St., E. Hanover, N.J. 07936, Tel: 201-887-1517, TWX: 710-986-8253; FSC No.: 18736; Empl.: 60

Sales Manager: Metro Sirko

Local Sales Offices & Reps.

Ala	Huntsville, Remco	205-883-9260
Ariz	Tempe, Sedco Sales	602-968-7791
Cal	Downey, Trimarko/Wright	213-861-8244
Cal	Los Altos, Wright Engrg.	415-941-4405
Cal	Santa Monica, F. Shelley Elctrns.	213-392-3913
Colo	Denver, Camel Elctrns.	303-757-6191
Conn	Milford, Wayland Engrg. Sls.	203-878-3755
DC	Washington, M. Lader Co.	202-296-2497
Fla	St. Petersburg, Kirkwood & Associates	813-894-8240
Ill	Westchester, Gassner & Clark	312-345-4245
Iowa	Hiawatha, Gassner & Clark Co.	319-393-5763
Kans	Shawnee Mission, Florence & Meyer, Inc.	913-722-5210
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Minn	St. Paul, Countryman Associates	612-645-9151
Mo	Kirkwood, Florence & Meyer	314-822-2629
NJ	Wallington, Comp-Tech Sls.	201-935-5454

NY	New Hyde Park, Comp-Tech Sls.	516-593-2628
NC	Raleigh, Remco	919-834-5820
Ohio	Cincinnati, F.J. Campisano Co.	513-662-1616
Pa	Jenkintown, Arnold Associates	215-887-7870
Tenn	Jackson, Remco	901-424-0142
Tex	Plano, Zeus Engrg. Assocs.	214-423-2027
Va	Woodbridge, M. Lader Co.	703-494-4731

Local Distributors

Cal	Santa Monica, F. Shelley Elctrns.	213-392-3913
Cal	Van Nuys, Patane Avionics	213-988-4455

™VOLTSENSOR - voltage level monitor module - Calex Mfg. Co., Inc.

™VOLUMAX - controller peak - CBS Laboratories

™VOL-U-METER - flow calibrator - Brooks Instr. Div.

™VOLUMETRIC - diaphragum - Electro-Voice, Inc.

VORNE INDS., INC., Dept. EM, 5023 W. Belmont Ave., Chicago, Ill. 60641, Tel: 312-725-3077; Empl.: 20

Local Sales Offices & Reps.

Cal	S. San Francisco, Steven Engrg.	415-583-5868
Colo	Littleton, Eissler Sales & Srvc.	303-794-1779
Md	Sykesville, C.A. Briggs Co.	301-781-4863
NY	Buffalo, Good Comps.	716-634-4400
NC	Greensboro, Motion Control Sys.	919-272-4181
Pa	Glenside, C. A. Briggs Co.	215-885-2244
Wisc	Milwaukee, Star Engrg. Sls. Co.	414-645-3680

™VORTEX & VORTEX II - operating systems - Varian Data Machines

™VOYAGER II - portable microfiche reader - Visidyne Inc.

™V-PAC POWER SOURCES - DC-DC converters - Reliability Inc.

™VPR - metal film resistors - Vermont Precision Resistor Co.

™V-PYROL - solvent - GAF Corporation

™V-Q - vacuum interrupters - Electric Machinery Mfg. Co.

™VRC - valves, gaskets & seals - Vacuum Resch. Mfg.

™VRC - valves, vacuum - Vacuum Resch. Mfg.

™VSMF - visual search microfilm files - Information Handling Services

™VTAM - telecommunications access method - Varian Data Machines

™V TIP - rubber tipped armatures - Vernay Laboratories, Inc.

VTM MICROWAVE, Dept. EM, 3225 Prairie Ave., Boulder, Colo. 80301, Tel: 303-449-6200; Empl.: 15

™VU-BREAK - circuit breakers - General Elec. Co.

VU-DATA CORP., Dept. EM, 7170 Convoy Ct., San Diego, Cal. 92111, Tel: 714-279-6572, TWX: 910-335-1586; FSC No.: 24160; Empl.: 31

Sales Manager: H. Wardein

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instr.	205-883-8660
Ariz	Phoenix, Zeus, Inc.	602-253-6104
Cal	Los Alamitos, Scientific Devices-Cal.	213-598-7678
Cal	Mountain View, Scientific Devices-Cal.	415-964-4230
Cal	San Diego, Scientific Devices-Cal.	714-279-6642
Colo	Denver, Zeus, Inc.	303-770-5666
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Fla	Fort Lauderdale, W.A. Brown Instrs.	305-776-4800
Fla	Indialantic, W.A. Brown Instrs.	305-723-0766
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W.A. Brown Instrs.	904-678-7932
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674
Ill	Arlington Hts., Dytec Central	312-394-3380
Kans	Overland Park, Dytec South	913-384-2710
La	Mandeville, W.A. Brown Instrs.	504-626-9701
Md	Silver Spring, Sel-Tronics	301-589-3391
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	St. Paul, Dytec North	612-645-5816
Mo	St. Louis, Dytec South	314-423-9595
NJ	Paramus, SDM Reps., Inc.	201-368-0123
NM	Albuquerque, Zeus, Inc.	505-268-3941
NY	Rochester, SDM Reps., Inc.	716-544-8080
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Norman, Data Mktg. Assocs.	405-364-8320
Ore	Lake Oswego, Wilson Applied Instrs.	503-636-0965
Pa	Philadelphia, Eastern Instr. Phil.	215-927-7777
Pa	Pittsburgh, WKM Assocs.	412-892-2953
SC	Columbia, W.A. Brown Instrs.	803-798-3297
Tenn	Oak Ridge, W.A. Brown Instrs.	615-482-5761
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assocs.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Wash	Bellevue, Wilson Applied Instrs.	206-641-6444
Exp:	Cal., San Diego, Vu-Data Corp.	714-279-6572

™VULCAN - solder irons & solder pots - Contact, Inc.

™VULCAN - soldering irons melting pots - Precision Elec. Co.

™VULCANIZED XECON - composite EMI/RFI shielding - Metex Corp.

™VULCOID - vulcanized fibre - Budd Co.

™VULKAFLEX - cross-linked polyolefin cords & leads - General Electric Co.

™VULKENE - cross-linked polyethlene insulated wires - General Electric Co.

™VUMATIK - miniature pneumatic instrumentation - Honeywell

™VUTRONIK - miniature electric instrumentation - Honeywell

™V V C - voltage variable semiconductor capacitor - Codi Corporation

™VX SUPER REFRACTORY - crucibles, boats - GTE Sylvania Inc.

™VYLINK - Irradiated Vinyl Insulated Wire - Brand-Rex Co.

™VYNA-KOTE - PVC bonding adhesive - Spectra-Strip Corp.

™V-2 - transducers - Westinghouse Elec. Corp.

™V-53 - resistors - Vishay Resistive Systems Grp.

™V72, V73, V75, V76 - digital computers - Varian Data Machines

™V77 FAMILY V77-200, V77-400, V77-600 - compatible multi-level computers - Varian Data Machines

W-F PRODUCTS, Dept. EM, 8506 E. Lehigh Ave., Denver, Colo. 80237

W & M MFG., Dept. EM, 187 Lafayette St., New York, N.Y. 10013, Tel: 212-925-2252 .... p. 2379

Sales Manager: P. Machtinger

W.V. INDUSTRIES INC., Dept. EM, Box 1, Franklin Lakes, N.J. 07417, Tel: 201-891-3300; Empl.: 40

WABASH METAL PRODS., Dept. EM, 1569 Morris St., Wabash, Ind. 46992, Tel: 219-563-1184, Telex: 23-2451; Empl.: 55

Local Sales Offices & Reps.

Ala	Decatur, P.D.C. Equip.	205-350-9544
Ariz	Scottsdale, R. A. Dean	602-948-5080
Cal	Aneheim, J. Farley Sls.	714-992-4603
Cal	Claremont, J. Farley	714-624-2755
Cal	San Mateo, Tom Rugg	415-349-3914
Colo	Denver, Applied Machine Tool Co.	303-426-1105
Ga	Atlanta, Phoenix Plastic Machinery Co.	404-458-2839
Ill	Palos Hills, B. Hogan	312-422-0909
Ind	Michigan City, Howard A. Mondientz	219-872-3050
Iowa	Clear Lake, W.M. Bachmann Associates	515-357-4664
Mass	Westboro, Detenber Sls. Co.	617-890-1767
Mich	Southfield, Murray A. Percival Co.	313-356-5710
Minn	Minneapolis, K.F. Wennik Co.	612-835-4373
NJ	Roselle, Vicor Plastic Equip.	201-241-3475
Ohio	Akron, L. Hunter	216-644-7774
Ohio	Dayton, Hunter Press Sls. Co.	513-433-1470
Pa	Pittsburgh, Plastic Machinery Sys.	412-563-5111
Tex	Dallas, Mercer Engrs.	214-233-5472
Tex	Houston, Mercer Engrs.	713-529-6121
Va	Alexandria, Chemical Etching Equip. & Supply Co.	703-971-2646
Wash	Hoodsport, Gordon Earsley Co.	206-877-9707
Wisc	Menomonee Falls, F. S. Carver	414-255-2540

wabash

WABASH RELAY & ELCTRNS., Dept. EM, Box 708, Wabash, Ind. 46992, Tel: 219-563-2191, TWX: 810-290-2722; Empl.: 200 .... p. 3628-3631

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assoc.	205-883-7893
Ariz	Phoenix, Mr. Engrg. Sls. Co.	602-959-5150
Cal	Los Angeles, Halbar	213-387-8283
Cal	San Mateo, Halbar	415-349-4700
Colo	Denver, Walter Engrg.	303-777-5585
Fla	Ormond Beach, Tech. Mktg. Assoc.	904-672-2314
Fla	Pompano Beach, Tech. Mktg. Assoc.	305-942-0774
Ill	Palatine, M.J. Petersen Assocs.	312-358-8855
Md	Baltimore, Burgin-Kreh Assoc.	301-788-5200
Minn	St. Paul, Skor	612-645-6461
Mo	Raytown, CenTech, Inc.	816-358-8100
NJ	Clark, Dolan Assocs.	201-382-2797
NY	Rochester, Upstate Comp. Sls.	716-288-1080
NC	Winston-Salem, Burgin Kreh Assoc.	919-768-4174
Tex	Dallas, Stevens Sales Co.	214-350-2476
Va	Lynchburg, Burgin-Kreh Assoc.	804-845-5600
Wash	Buckley, Halbar Assoc.	206-939-2080

WABASH TAPE, Dept. EM, 2700 Des Plaines Ave., #112, Des Plaines, Ill 60018, Tel: 312-298-8585

Sales Manager: K. Bacus

WABASH TRANSFORMER CORP., Dept. EM, 1375 Swan St., Huntington, Ind. 46750, Tel: 219-356-8300, TWX: 810-333-1533; Empl.: 400

Local Sales Offices & Reps.

Ala	Huntsville, Technology Mktg. Assocs.	205-883-7893
Ariz	Phoenix, MR Engrg. Sls.	
Cal	Los Angeles, Halbar Assocs.	213-387-8283
Fla	Pompano Beach, Technology Mktg. Assocs.	305-942-0774
Ill	Palatine, M. J. Petersen & Assocs.	312-358-8855
Ind	Wabash, Wabash Transformer	219-563-3111
Md	Baltimore, Burgin-Kreh Assocs.	301-788-5200
Mass	Waltham, Dynasel Assocs.	617-890-6777
Minn	St. Paul, SKOR	612-645-6461
Mo	Raytown, Centech, Inc.	816-358-8100
NJ	Clark, Dolan Assocs.	201-382-2797
NY	Rochester, Upstate Component Sls.	716-288-1080
NC	Winston-Salem, Burgin-Kreh Assocs.	919-768-4174
Tex	Dallas, Stevens Sls. Corp.	214-350-2476
Wash	Buckely, Halbar Assocs.	206-939-2080

WABCO AEROSPACE DEPT., Dept. EM, Swissvale P.O., Pittsburgh, PA. 15218, Tel: 412-242-5000, TWX: 710-664-2096; Empl.: 250

Local Sales Offices & Reps.

Ariz	Phoenix, Southwestelm Engrg., Inc.	602-993-0250
Cal	Newport Beach, W. Bert Knight Co.	714-833-8250
Cal	Santa Clara, Nova-Tronix	408-243-9530
Colo	Denver, Franklin Sls. Co.	303-922-3623
Conn	Wethersfield, Underwood Sls. Corp.	203-563-3046
Fla	Ft. Lauderdale, Tech-Rep. Assocs.	305-792-0962
Fla	Indian Rocks Beach, Tech-Rep.Assocs.	813-595-2834
Ga	Atlanta, Tech-Rep. Assocs.	404-252-9288
Ill	Des Plaines, Lincoln, Hodges & Assoc.	312-297-3810

Kans	Shawnee Mission, M.E. Bettis Co.	913-362-0722
Kans	Wichita, M.E. Bettis Co.	316-685-7441
Md	Baltimore, Chesapeake Mktg. Assoc.	301-486-3345
Mass	Chelmsford, Underwood Sls. Corp.	617-256-8191
Minn	Minneapolis, F.B. Hill Co.	612-941-5270
Mo	St. Louis, M.E. Bettis Co.	314-429-2099
NJ	Haddonfield, Sunday-O'Brien	609-429-4013
NJ	Keasby, Addem Group	516-567-5900
NY	Huntington Station, Addem Group	516-567-5900
Ohio	Cleveland, A.H. Baier Co.	216-461-6161
Ohio	Dayton, A.H. Baier Co.	513-576-4128
Tex	Dallas, Scott Tech. Sls.	214-352-7698
Wisc	Milwaukee, Lincoln, Hodges & Assoc.	414-542-3087
Exp:	Pittsburgh, Pa., WABCO	412-242-5000

WABER ELECTRIC, See SGL Waber Electric.

WADSWORTH ELECTRIC MFG. CO., Dept. EM, 20 W. 11th St., Covington, Ky. 41011, Tel: 606-431-0900

Local Sales Offices & Reps.

Cal	Los Angeles, Michel Bros.	213-749-7587
Cal	San Francisco, Black & Egbert Assocs.	415-282-0840
Colo	Denver, Empire Electrical Sls. Co.	303-986-1838
Fla	Clearwater, J.F. Graff	813-442-1734
Ga	Atlanta, J. C. White	404-938-0433
Ill	Chicago, Wadsworth Elec. Mfg. Co.	312-467-1245
Ind	Indianapolis, A.L. Clifford & Co.	317-639-5248
Kans	Overland Park, H.R. Stein	913-381-4303
Ky	Covington, W. D. Fleck	606-431-0900
La	New Orleans, S.M. Redmann, Inc.	504-486-5421
Mass	Boston, Pierce Co.	617-268-8816
Mich	Detroit, Wadsworth Elec. Mfg. Co.	313-872-0277
Minn	Minneapolis, Dunn & Assoc.	612-831-4887
NJ	Fair Lawn, J.R. Barker	201-797-6354
NY	New Hartford, F. Walter Laver & Son, Inc.	315-724-0184
NC	Greensboro, A.W. Cheek	919-288-2213
Ohio	South Euclid, H. I. Covitt	216-382-4473
Okla	Jenks, W.G. Parker Co.	918-299-5449
Ore	Portland, M.S.T. Pacific	503-235-4137
Pa	Bethel Park, D.W. Phillips	412-833-5155
Pa	Philadelphia, Wadsworth Elec. Mfg. Co.	215-627-4691
Tenn	Powell, D. L. Holbert	615-922-8320
Tex	Irving, J.D. Martin Co.	214-259-7511
Utah	Salt Lake City, Bruce-Emmett	801-467-2663
Wisc	Brown Deer, Ele'l. Sales	414-355-5550

™WAFERCON - P.C. board wafer connectors - Molex Inc.

™WAFER-SPHERE - butterfly valves - Jamesbury Corp.

™WAFERTRAC - automatic wafer processing - GCA/ Sunnyvale Div.

WAGNER ELEC., Tung-Sol Div., Dept. EM, 100 Misty La., Parsippany, N.J. 07054, Tel: 201-WY2-1100, TWX: 710-994-4865

Local Sales Offices & Reps.

Ariz	Scottsdale, Inter-Mountain Engrg.	602-947-7379
Cal	El Segundo, Wagner Elec. Corp. Tung-Sol Div.	213-322-0708
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	Tustin, Orion Sls.	714-823-9687
Colo	Denver, Walter Engrg.	303-777-5585
Fla	Altamonte Springs, Semtronic Assocs.	305-831-8233
Fla	North Miami, A.J. Giammanco & Assoc.	305-891-7794
Ill	Elk Grove Village, Wagner Elec. Corp. Tung-Sol Div.	312-439-1810
Kans	Overland Park, T.L. Dowell & Assocs.	913-236-8200
Md	Baltimore, R. A. Wafer Assocs.	301-744-1133
Mass	Needham Heights, Todino Engrg.	617-444-7925
NM	Albuquerque, IMEC	505-883-9010
NC	Raleigh, A.B. Andrews & Co.	919-833-5565
Ohio	Akron, Augnat Assocs.	216-725-6087
Ore	Portland, C.K. Shanks & Assocs.	503-292-5656
Tex	Addison, Parvin Sls. Co.	214-239-9148
Tex	Houston, Paruin Sls. Co.	713-784-9900
Wash	Seattle, Underwood & Underwood	206-243-2133

WAHL CLIPPER CORP., Dept. EM, 2902 Locust St., Sterling, Ill. 61081, Tel: 815-625-6525; Empl.: 150

Local Sales Offices & Reps.

Ariz	Phoenix, R. Fissell Co.	602-264-4031
Cal	Alhambra, D. Nielson Co.	213-283-0435
Cal	Los Altos, Ewing-Foley, Inc.	415-941-4525
Colo	Denver, Mountain Reps	303-988-6430
Fla	Fort Lauderdale, Unirep	305-527-1556
Ga	Atlanta, Elmar Assocs.	404-938-2821
Haw	Honolulu, G. Piety Factors, Inc.	808-839-9051
Ill	Bolingbrook, G. Sangwin Co.	312-739-7966
Ind	Indianapolis, Electronic Reps.	317-894-1414
Md	Catonsville, Pecore Assocs.	301-744-7427
Mass	Natick, L. Cole, Inc.	617-235-3197
Mass	West Springfield, L. Cole, Inc.	413-781-3040
Mich	Rochester, R.A. Albrecht & Co.	313-652-2520
Minn	Minneapolis, Norcentronics	612-854-8494
Mo	Raytown, Pacer Corp. Co.	816-358-6638
NY	E. Syracuse, Lewis-Dunnigan Co.	315-446-5522
NY	No. Bellmore, L. W. Keller & Assocs., Inc.	516-785-2826
NY	Pamona, L. W. Keller & Assocs.,	516-785-2826
NY	Scarsdale, L.W. Keller & Assocs.,	516-785-2826
Ohio	St. Marys, T. Shelby & Co., Inc.	419-394-3377
Pa	Ashton, Kaiser Assocs.	215-459-4517
Pa	Easton, Kaiser Assocs.	215-258-6477
Tex	Dallas, Maynard & Gunn	214-528-9090
Tex	Houston, Maynard & Gunn	713-497-0544
Wash	Seattle, D. Smith Sls. Co.	206-633-3160

WAHL, WM. CORP., Dept. EM, 12908 Panama St., Los Angeles, Cal. 90066, Tel: 213-822-6144, TWX: 910-343-6867; Empl.: 48

Local Sales Offices & Reps.

Ala	Odenville, L. M. Crowe Co.	
Alas	Anchorage, Alaska Expediters	907-279-1923
Ariz	Scottsdale, Inter-Mountain Engrg.	602-947-7379
Colo	Littleton, Radco Elctrns.	303-794-4279
Fla	St. Petersburg, L. M. Crowe Co.	813-894-0249
Ga	Atlanta, L. M. Crowe Co.	
Ill	South Holland, RAECO, Inc.	312-331-6001
Iowa	Cedar Rapids, Mueller Sls. Corp.	319-365-1196
Kans	Lenexa, J. Shurtleff Co.	913-492-7188
Mass	Peabody, JSR Assocs.	617-532-0348
Mich	Detroit, Comtel-Sterling Co.	313-255-1970
Minn	Golden Valley, Mueller Sls. Corp.	612-544-8888
NY	Buffalo, Seelbach & Schmitt	716-839-2300
NY	Westbury, Tech-Rep Engrg. Co.	516-997-7946
NC	Greensboro, Associated Agents	919-292-6508
Ohio	Cleveland, Comtel-Sterling Co.	216-442-8080
Ohio	Dayton, Comtel-Sterling Co.	513-298-7573
Okla	Tulsa, J. Shurtleff Co.	918-936-7269
Pa	King of Prussia, Wistex	215-337-1240
Pa	Pittsburgh, L. H. Boleky Co.	412-761-8994
Tenn	Knoxville, L. M. Crowe Co.	615-693-4226
Tex	Houston, Allesco	713-771-0115

WALDES KOHINOOR, INC., Dept. EM; 47-16 Austel Pl., Long Island City, N.Y. 11101, Tel: 212-392-3100, Telex: 126-829; Empl.: 500

Local Sales Offices & Reps.

Cal	Anaheim, R. P. Winship	213-749-8271
Ga	Atlanta, D. C. Fillingame	404-394-0366
Ill	Bolingbrook, G. P. Watkins	312-739-6329
Ind	Noblesville, Davis/Haslam, Inc.	317-773-6311
Iowa	Bettendorf, F. J. Bradley	319-355-3100
Kans	Shawnee, Benson Engrg. Co.	913-631-4113
Ky	Louisville, Petrie-Ingram Co.	502-459-0280
Mass	Worcester, D. Kelleher	617-757-3929
Mich	Southfield, Armstrong, Doran	313-559-4828
NY	Fayetteville, V.D. Bodie	315-637-6350
NY	Floral Park, A. Bernstein	212-343-3339
NY	Mount Vernon, H. D. Hartman	914-664-2020
Ohio	Cleveland, Petrie-Ingram Co.	216-442-5530
Ohio	Kettering, Petrie-Ingram Co.	513-434-6332
Pa	St. Davids, J.C. Botta	215-688-3006
Tex	Dallas, Benson Engrg. Co.	214-352-7541
Wisc	Brookfield, R. V. Petershack	414-784-0385

WALDMAN CORP., Dept. EM, 3 Eastmans Rd, Parsippany, NJ 07054, Tel: 212-964-8622; Empl.: 75

Sales Manager: H. Zilliox

Local Sales Offices & Reps.

Cal	Menlo Park, Straube Assocs.	415-321-9050

waldom

WALDOM ELECTRONICS, INC., Dept. EM, 4633 W 53rd St, Chicago, Ill. 60632, Tel: 312-585-1212, Telex: 25-4604; FSC No.: 92219 .... p. 2370-2377,2784-2788

Sales Manager: M. Halley

Local Sales Offices & Reps.

Cal	Anaheim, Cen-Tec Sls.	714-991-4440
Cal	Burlingame, W.J. Purdy Co.	415-347-7701
Cal	Inglewood, Ungar Sls. Assocs.	213-649-6238
Cal	Sacramento, W. J. Purdy Co.	916-422-0128
Cal	San Francisco, Tech. Sls. Assocs.	415-467-1434
Colo	Denver, W.J. Purdy Co.	303-777-1411
Fla	Pembroke Pines, Wallace Elctrn. Sls.	305-961-6640
Fla	Tampa, Wallace Elctrn. Sls.	813-961-1037
Ga	Roswell, H.W. Phillips Co.	404-992-3070
Ill	Chicago, Ellinger Sls. Corp.	312-763-1570
Ind	Indianapolis, Elctrn. Reps.	317-894-1414
La	Chalmette, Ohmtronics	504-271-1976
Md	Catonsville, Pecore Assocs.	301-744-4434
Mass	Norwood, Rudolph & Mac Innis	617-769-5450
Mich	Drayton Plains, Polyphase Sls. Co.	313-673-0700
Minn	Maple Crove, R.C. Sls.	612-425-5543
Minn	St. Paul, MURNCO	612-484-8200
Mo	Kansas City, Nevco, Inc.	816-421-1751
Mo	St. Louis, Nevco, Inc.	314- 843-7406
NJ	Boonton, Total Mktg. Action	201-263-2946
NM	Albuquerque, W.J. Purdy Co.	505-266-7959
NY	North Bellmore, Louis W. Keller Assocs.	516-785-2826
NY	Port Washington, Total Mktg. Action	516-883-2432
NY	Rochester, Net Sls.	716-467-4538
Ohio	St. Marys, T. Shelby & Assocs.	419-394-3377
Pa	Abington, Mid-Atlantic Sls. Co.	215-657-2815
Tex	Dallas, Erickson Sls.	214-243-6611

Local Distributors

Ala	Huntsville, Powell Elctrns.	205-539-2731
Ala	South Birmingham, Forbes Distributing	205-251-4104
Ariz	Tucson, Inland Elctrns.	602-889-5301
Ark	Little Rock, Carleton-Bates Co.	501-562-9100
Cal	Costa Mesa, Component Center	714-979-0433
Cal	Mountain View, Powell Elctrns.	415-964-0820
Cal	Mountain View, Abacus Elctrns.	415-961-1500
Cal	Sacramento, Dunlap Elctrns.	916-444-8070
Cal	San Diego, Shanks & Wright	714-239-0176
Cal	Sepulveda, Coast Air, Inc.	213-893-7881
Cal	Sunnyvale, Ratel Elctrns.	408-739-9220
Colo	Denver, Integrated Elctrns.	303-534-6121
Colo	Denver, Electronic Parts Co.	303-744-1992
Colo	Lakewood, Acacia Sls.	303-232-2882
Conn	Hartford, Hatry of Hartford	203-527-1881
Fla	Miami, Electronic Equip.	305-871-3500
Fla	Miami, Electro-Standards Lab	305-633-6973
Fla	Miami Springs, Powell Elctrns.	305-592-3260
Fla	Orlando, Hammond Elctrns.	305-849-6060
Fla	Pensacola, Grice Elctrns.	904-434-2481
Ga	Norcross, Lykes Elctrns.	404-449-9400
Haw	Honolulu, Precision Radio Ltd.	808-537-5291
Ill	Champaign, Klaus Radio	217-356-1896
Ill	Elk Grove Village, GBL Elctrns.	312-593-3220
Ill	Palatine, OHM Elctrns.	312-359-5500
Ill	Peoria, Klaus Radio/Peoria	309-691-4840
Ill	Rosemont, Advent Elctrns.	312-298-4210
Ind	Evansville, Ohio Valley Sound	812-425-6173
Ind	Evansville, Hutch & Son	812-425-7201
Ind	Indianapolis, RA-DIS-CO	317-637-5571
Ind	South Bend, Radio Dist.	219-287-2911
Iowa	Cedar Rapids, Deeco, Inc.	319-365-7551
Kans	Wichita, Radio Supply Co.	316-267-5216
Ky	Louisville, P. I. Burks Co.	502-589-3960
La	Lafayette, Ralph's	318-234-4507
La	New Orleans, Lykes Elctrns.	504-486-7441
La	New Orleans, Southern Radio Supply	504-524-2343
La	New Orleans, Wm. B. Allen Supply Co.	504-525-8222
Md	Beltsville, Powell Elctrns.	301-937-4030
Md	Bethesda, Empire Elctrn. Supply	301-656-3300
Md	Rockville, Capitol Radio Wholesalers	301-881-2270
Mass	Burlington, Heilind Elctrns.	617-272-5610
Mass	Dedham, Gerber Elctrns.	617-329-2400
Mass	Lynn, Land Elctrns.	617-592-2220
Mass	Newton, Cramer Elctrns.	617-969-7700
Mass	North Wilbraham, Industrial Comps.	413-596-3854
Mich	Ann Arbor, Wedemeyer Elctrns.	313-665-8611
Mich	Farmington, Advent Elctrns.	313-477-1650
Minn	St. Paul, Gopher Elctrns.	612-645-0241
Miss	Jackson, Ellington Elctrn. Supply	601-355-0561
Mo	Kansas City, Walters Radio Supply	816-531-7015
Mo	St. Louis, Olive Inds. Elctrns.	314-863-7800
Mo	St. Louis, Van Sickle	314-621-5000

State	Location, Company	Phone
Neb	Lincoln, Scott Elctrn. Supply	402-434-8308
Nev	Reno, Edco	702-323-2766
NH	Hudson, C & H Elctrns.	603-882-4687
NJ	Springfield, Federated Purchaser	201-376-8900
NM	Albuquerque, Walker Radio Co.	505-247-2288
NM	Albuquerque, Elctrn. Parts Co.	505-293-6161
NY	Bohemia, Car-Lac Elctrn. Supply	516-567-4200
NY	Buffalo, Summit Radio Distributing	716-884-3450
NY	Buffalo, Genesee Radio & Parts Co.	716-873-9661
NY	Farmingdale, Broadline Elctrns.	516-420-8320
NY	Lynbrook, Peerless RAdio Corp.	516-593-2121
NY	Mt. Vernon, QAR Industrial Electronics Supply	914-699-2224
NY	New York, Center Ind'l. Elctrns.	212-989-6363
NY	Port Chester, Wise Elctrns.	914-939-8600
NY	Richmond Hill, Anchor Elctrns.	212-846-2420
NY	Rochester, Simcona Elctrns.	716-328-3230
NC	Charlotte, Dixie Radio Supply	704-377-5413
NC	Greensboro, Hammond Elctrns.	919-275-6391
NC	Raleigh, Southeastern Radio Supply	919-828-2311
NC	Winston-Salem, Kirkman Elctrns.	919-722-9131
Ohio	Akron, Sun Radio	216-434-2171
Ohio	Cincinnati, United Radio	513-761-4030
Ohio	Cleveland, Wm. Pattison Supply	216-441-3000
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Ohio	Dayton, ESCO	513-226-1133
Ohio	Lima, Lima Radio Parts	419-223-5075
Ohio	Solon, Repco	216-248-8900
Okla	Tulsa, Oil Capitol Elctrns.	918-622-8520
Pa	Drexel Hill, Kass Elctrns.	215-449-2300
Pa	Erie, Mace Elctrns.	814-838-3517
Pa	Philadelphia, Powell Elctrns.	215-365-1900
Pa	Pittsburgh, CAM/RPC	412-782-3770
RI	Warwick, W. H. Edwards Co.	401-781-8000
SC	Columbia, Dixie Radio Supply	803-779-5332
SC	Greenville, Dixie Radio Supply	803-232-5357
Tenn	Nashville, Electra Distributing Co.	615-329-3971
Tex	Dallas, Wilkinson Brothers	214-747-1571
Tex	El Paso, Midland Specialty	915-533-9555
Tex	Fort Worth, Swieco, Inc.	817-335-6521
Tex	Houston, Geophysical Supply	713-659-2233
Tex	Houston, Newark-Houston	713-782-4800
Tex	San Antonio, Sherman Elctrns.	512-224-1004
Va	Arlington, Arlington Elctrns.	703-524-2412
Va	Norfolk, Priest Elctrns.	804-855-0141
Wisc	Milwaukee, Parts Mart	414-276-1212
Wisc	Milwaukee, Marsh Radio Elctrns.	414-475-6000
Okla	Oklahoma City, Radio Supply	405-737-7641
Pa	Braddock, M. Leff Radio Parts	412-271-2800
SC	Greenville, Hammond Elctrns.	803-233-4121
Tenn	Kingsport, Radio Electric Supply Co.	615-247-8111
Tenn	Knoxville, Industrial Elctrns.	615-573-7135
Tenn	Knoxville, Bondurant Bros.	615-573-9151
Tex	Beaumont, Ralph's Ind'l. Elctrns.	713-833-9443
Tex	Dallas, KA Elctrns. Sls.	214-634-7870
Tex	Dallas, Electrotex	214-234-0433
Tex	Garland, Electralot, Inc.	214-341-3421
Utah	Salt Lake City, Standard Supply Co.	801-486-3371
Va	Salem, Roanoke Elctrns.	703-389-7269
Wash	Seattle, Radar Elect. Co.	206-282-2511
Wash	Seattle, Zepher Elctrns.	206-575-0922
For:	Canada, Calgary, Alta., Smalley's Elctrns., Ltd.	403-253-0331
For:	Canada, Edmonton, Alberta, Smalley's Elctrns., Ltd.	403-484-0001
For:	Canada, Edmonton, Alta., Cardinal Industrial Elctrns.	403-455-4122
For:	Canada, London, Ont., C.M. Peterson Co., Ltd.	519-434-3204
For:	Canada, Montreal, P.Q., Payette Radio Ltd.	514-878-4771
For:	Canada, Montreal, P.Q., Hooker Elctrns. Ltd.	514-487-5151
For:	Canada, Ottawa, Ont., Wackid Radio TV Lab. Ltd.	613-728-1821
For:	Canada, Quebec City, Que., Crobel Ltd.	418-524-5201
For:	Canada, Vancouver, B.C., R.A.E. Ind'l. Elctrns.	604-687-2621

WALKER SCIENTIFIC, INC., Dept. EM, Rockdale St., Worcester, Mass. 01606, Tel: 617-852-3674, Telex: 92-0489; Empl.: 83

Sales Manager: B. Langley

Local Sales Offices & Reps.

State	Location, Company	Phone
NY	Syosett, Scientific Sys. Sls. Corp.	516-921-3737

WALKER SCIENTIFIC INC. cont'd

Advertisement

WALKER/MAGNEMETRICS: Magnetic Measuring Instrumentation

Hysteresisgraphs
Coercivity Meters
Fluxmeters
Gaussmeters (Hall & NMR)
Integrator

WALKER/MAGNION: Laboratory Magnet Systems

Laboratory Magnets (Iron core and Air core)
Laboratory Power Supplies (Regulated and Unregulated)
Susceptibility systems
Magnetic Field Control Instruments
Sweep Instruments

WALL A. T. CO., Dept. EM, 55 Service Ave., Warwick, R.I. 02889, Tel: 401-739-0740, TWX: 710-382-1535; Empl.: 52

Local Sales Offices & Reps.

NJ Cliff Side Park, J. A. Roberge
Exp: Tenafly, Lars Microwave

WALL INDUSTRIES, Dept. EM, 175 Middlesex Tpk., Bedford, Mass. 01730, Tel: 617-275-0708

WALL-LENK MFG. CO., Dept. EM, Box 3349, Dept. EEM-71, Kinston, N.C. 28501, Tel: 919-527-4186; Empl.: 90

Local Sales Offices & Reps.

State	Location, Company	Phone
Cal	Laguna Niguel, English Sls. Assoc.	714-495-6489
DC	Washington, DC, H. Wise & Co.	202-363-9417
Ill	Chicago, Midwest Elctrn. Sls.	312-777-9700
Mich	St. Clair Shores, J. M. Thorpe	313-779-6363
Minn	Minneapolis, Bitronics Sls. Co.	612-835-7744
NJ	Bergenfield, H. Gray Assocs.	201-384-3643
Ohio	Cleveland, Electro Com	216-886-2404
Pa	Doylestown, Buerger Sls.	215-345-9472
RI	Lincoln, Adams McGregor	401-726-1300

WALLACE ELECTRONIC SLS., Dept. EM, P.O. Box 526, 1306 E. Mountain St., Kernersville, N.C. 27284, Tel: 919-996-2742; Empl.: 8

Local Sales Offices & Reps.

State	Location	Phone
Fla	Hollywood	305-961-6640
Fla	Tampa	813-961-1037
Ga	Jonesboro	404-471-6297
NC	Greensboro	919-292-0487
NC	Kernersville	919-996-2742
Tenn	Chattanooga	615-875-0786

WALLER CORP., Dept. EM, PO Box 340, Crystal Lake, Ill. 60014, Tel: 815-459-6510; Empl.: 50

Sales Manager: W. Sherwood

Ⓣ**WALSCO** - tape-phono drives & belts - GC Electronics

WARNECKE ELECTRON TUBES, INC., See Northrop Defense Sys. Dept.

WARNER ELEC. BRAKE & CLUTCH CO., Dept. EM, 449 Gardner St., S. Beloit, Ill. 61080, Tel: 815-389-3771; Empl.: 1200

Local Sales Offices & Reps.

State	Location	Phone
Cal	Newport Beach	714-549-4004
Cal	San Jose	408-688-9507
Conn	Old Lyme	203-646-5337
Ga	Tucker	404-938-2913
Ill	Chicago	312-775-7570
Ind	Indianapolis	317-882-2716
Ind	Speedway	317-299-3101
Iowa	Bettendorf	309-762-0112
Ky	Erlanger	513-891-4813
Md	Cockeysville	301-667-9610
Mass	S. Weymouth	617-326-7100
Mich	Troy	313-689-7515
Mich	Ypsilanti	313-689-3100
Minn	Minneapolis	612-335-7277
Mo	Warrensburg	816-421-8499
NJ	Madison	201-377-4800
NY	Liverpool	315-458-0500
Ohio	Cincinnati	513-891-4813
Ohio	Menton	216-357-3509
Pa	Philadelphia	215-233-1216
RI	Warwick	401-738-0070
Tex	Dallas	214-327-1268
Tex	Houston	713-869-8993
Tex	Richardson	214-327-1268
Wash	Seattle	206-523-2206
Wisc	Milwaukee	414-871-8022

Local Distributors

State	Location, Company	Phone
Ala	Birmingham, Motion Inds.	205-251-3231
Ala	Decatur, Motion Inds.	205-355-0492
Ala	Mobile, Motion Inds.	205-457-9263
Alas	Montgomery, Motion Inds.	205-262-5786
Ariz	Phoenix, Western Bearing	602-273-1641
Ariz	Tuscon, Western Bearing	602-889-3324
Ark	Ft. Smith, Allied Ark. Bearing	501-782-8842
Ark	Little Rock, Allied Ark. Bearing	501-375-4691
Cal	Anderson, Industrial Electric Svc. Co.	916-365-3381
Cal	Bell Gardens, N. A. D'Arcy Co.	213-773-5511
Cal	Los Angeles, L. A. Rubber Co.	213-263-4131
Cal	Oakland, Adam-Hill Co.	415-632-0263
Cal	San Diego, N. A. D'Arcy Co.	714-274-8700
Cal	San Leandro, Republic Supply Co.	415-357-2211
Cal	Santa Clara, Adam-Hill Co.	408-244-3373
Cal	S. San Francisco, Adam-Hill Co.	415-589-9655
Colo	Denver, Distributor Specialist	303-433-8376
Conn	Norwalk, Machine Drives & Controls	203-846-2007
Conn	Wallingford, Transmission Equipment Co.	203-269-8751
Fla	Miami, Miller Bearings of Orlando	305-751-3531
Fla	Orlando, Miller Bearings of Orlando	305-849-6000
Ga	Atlanta, Southern Belting & Transmission	404-875-1651
Ga	Savannah, Bearings & Drives	912-236-1591
Idaho	Twin Falls, C. W. Silver Co.	208-733-0460
Ill	Chicago, Dodge Chicago Industrial Equip.	312-225-8500
Ill	Chicago, Baran Gear & Transmission Supply	312-586-9400
Ill	Peoria, Hendricks Elec. Co.	309-673-9145
Ill	Rockford, Rockford Tool & Transmission	815-962-6011
Ind	Indianapolis, Scherer Elec. Co.	317-635-3466
Ind	South Bend, Koontz-Wagner Elec. Co.	219-232-2051
Iowa	Davenport, Industrial Engrg. Equip. Co.	
Iowa	Des Moines, Donald Corp.	515-243-7623
Kans	Topeka, Industrial Bearing & Transmission	913-233-1381
Kans	Wichita, Industrial Bearing & Transmission	316-267-0353
Ky	Lexington, Kentucky Supply Co.	606-252-1737
Ky	Louisville, Louisville Mill Supply Co.	502-583-3875
La	New Orleans, McLellan Equip. Co.	504-524-3415
La	Shreveport, Colossus-Midland Div.-Burgess Inds.	318-221-4188
Me	Bangor, Advance Bearing & Supply Co.	207-947-6583
Md	Baltimore, Carey Machinery & Supply Co.	301-485-2323
Md	Baltimore, Transmission Engrg. Co.	301-866-5800
Mass	Boston, W. M. Pike Assocs.	617-426-5375
Mass	Fitchburg, Advance Bearing & Supply Co.	617-342-8622
Mass	West Springfield, Standard Industrial Supply Co.	413-739-6981
Mass	Worchester, Advance Bearing & Supply Co.	617-791-6322
Mich	Detroit, Industrial Comp.	313-838-8000
Mich	Grand Rapids, Mackay Industrial Sls. Co.	616-241-1671
Mich	Kalamazoo, Mackay Industrial Sls. Co.	616-343-5511
Mich	Muskegon, Mackay Industrial Sls. Co.	
Minn	Minneapolis, J. E. Braas Co.	612-869-3246
Minn	St. Paul, Industrial Supply Co.	612-222-3696
Miss	Jackson, Motion Inds.	601-948-1896
Mo	Joplin, Industrial Bearing & Transmission	417-781-2112
Mo	Kansas City, Industrial Bearing & Transmission	816-471-6616
Neb	Lincoln, Precision Bearing & Transmission	402-434-8295
Neb	Omaha, Precision Bearing & Transmission	402-341-4050
NH	Berlin, Advance Bearing & Supply Co.	603-756-6001
NH	Dover, Advance Bearing & Supply Co.	603-749-2121
NJ	Berkley Heights, Squier, Schilling & Skiff	201-464-8000

NJ	Carlstadt, Patron Transmission	201-933-7400
NJ	Kenilworth, Wolock & Lott Transmission Equip. Corp.	201-241-4333
NJ	Somerset, Slingman Inds.	201-249-3500
NM	Albuquerque, Western Bearing Co.	505-247-0222
NY	Buffalo, Ross Equipment Co.	716-634-0990
NY	Elmira, Ross Equipment Co.	607-734-1324
NY	Farmingdale, Patron Transmission Co.	516-293-8084
NY	Hicksville, Babco, Inc.	516-681-3636
NY	Maspeth, Patron Transmission Co.	212-326-3050
NY	Maspeth, Babco, Inc.	212-446-5120
NY	New York, Patron Transmission Co.	212-226-1140
NY	Rochester, Ross Equipment Co.	716-271-5660
NC	Charlotte, Mize Co.	704-375-5761
NC	Greensboro, Cross Sls. & Engrg. Co	919-275-6365
Ohio	Cincinnati, Queen City Supply Co.	513-761-4210
Ohio	Cleveland, Wood-Compton Co.	216-587-5200
Ohio	Columbus, Trans-Power, Inc.	614-871-1893
Ohio	Youngstown, Brenner Industrial Sls. & Supply Co.	216-774-2171
Okla	Oklahoma City, Industrial Bearing & Transmission	405-236-2416
Okla	Tulsa, Industrial Bearing & Transmission	918-627-5812
Ore	Portland, Power Transmission & Bearing Prods.	503-227-1271
Ore	Salem, Power Transmission & Bearing Prods.	503-588-0780
Pa	Pittsburgh, Transmission Equip. Co.	412-431-2100
Pa	York, Bush-Miller, Inc.	717-848-1102
RI	Providence, Machine Parts Corp.	401-274-4333
SC	Charleston Heights, Bearings & Drives	803-554-9090
SC	Greenville, B. L. Montague Co., Inc.	803-233-2745
Tenn	Chattanooga, Electric Motor Sls. & Supply Co.	615-267-1804
Tenn	Knoxville, Cross Sls. & Engrg.	615-588-9669
Tex	Arlington, Burgess Inds.	817-640-3333
Tex	Dallas, Burgess Inds.	214-630-7600
Tex	Houston, Burgess Inds.	713-688-5701
Tex	San Antonio, Burgess Inds.	512-342-9501
Utah	Salt Lake City, C. W. Silver Co.	801-355-5373
Vt	North Springfield, Standard Industrial, Inc.	802-886-2251
Va	Richmond, C. A. Weaver Co.	804-282-6501
Va	Roanoke, Cross Sls. & Engrg.	703-362-1821
Wash	Seattle, Washington Belt & Rubber Co.	206-623-5650
Wash	Spokane, Bitco, Inc.	
Wisc	Green Bay, A. C. Supply Co.	414-494-4536
Wisc	Milwaukee, A. C. Supply Co.	414-342-5870

WARREN G-V COMMUNICATIONS, Div. Sola Basic Inds., Dept. EM, 101 Okner Pkwy., Livingston, N.J. 07039, Tel: 201-992-6200, TWX: 710-994-4852; Empl.: 200

Local Sales Offices & Reps.

Cal	Los Angeles, M.A. Stolaroff	213-AX5-7781
Fla	Indian Rocks Beach, Tech-Rep Assocs.	813-594-2834
Mass	Millis, Selmark Assocs.	617-376-2914
Mich	Centerline, Dietrich & Assoc.	313-754-6450
Minn	Minneapolis, HMR, Inc.	612-335-7734
NJ	Englewood Cliffs, Sprung/Nussbaum	201-947-6767
NY	Rochester, R.P. Kennedy Co.	716-271-6322
NC	Charlotte, Electro-Rep Assoc.	704-527-2530
Ohio	Dayton, Dietrich & Assoc.	513-223-6042
Pa	Pittsburg, Dietrich & Assoc.	412-892-2992
Va	Alexandria, Virginia Maryland Assoc.	703-549-0063

WARWICK PRODS CO., Dept. EM, 7909 Rockside Rd., Independence, Ohio 44131, Tel: 216-524-4404; Empl.: 18

Local Sales Offices & Reps.

Mass	Boston, R. Krauth	617-522-8421
NJ	West Caldwell, Peterson-Rudnick Assocs.	201-226-4363
NY	Bronx, Peterson-Rudnick Assocs.	212-671-1923

™**WATCH DOG** - fluorescent starters - General Elec. Company

WATERBURY PRESSED METAL DIV., WPM, Inc., Dept. EM, 407 Brookside Rd., Waterbury, Conn. 06720, Tel: 203-756-8891; Empl.: 85

Sales Manager: R. Minervino, Prod. Sls. Mgr.

Local Sales Offices & Reps.

Ga	Monroe, Waterbury Pressed Metal Div.	404-267-8058

WATERS MFG., INC., Dept. EM, Longfellow Ctr., Wayland, Mass. 01778, Tel: 617-358-2777; Empl.: 95

Sales Manager: D. Russell

Local Sales Offices & Reps.

Ariz	Phoenix, Eltron	602-997-1042
Cal	Buena Park, Sls. Engrs. Ltd.	
Cal	Redwood City, Woodworth Co.	415-365-0252
Colo	Englewood, Dynatech Inc.	303-773-2830
Conn	Trumbull, Sir Assocs.	203-268-2560
Ill	Lagrange Park, Bierhaus Sls	312-354-5100
Mass	Lexington, Sir Assocs	617-862-1812
Mich	Detroit, R.P. Urban & Assocs.	313-535-2355
Mich	Grand Rapids, R.P. Urban & Assocs.	616-245-0511
Minn	Hopkins, F. Peterson Co.	612-941-5400
Mo	St. Louis, Ozark Elctrn. Mktg., Inc.	314-423-7200
NJ	So. Orange, S. Simberkoff Assocs.	201-763-7900
Ohio	Dayton, INH Component Sls.	513-434-8808
Ohio	Dayton, H. Teplitz & Co.	513-277-6531
Wash	Seattle, Avionics Liaison, Inc.	206-767-3870
Wisc	Milwaukee, Bierhaus Sls.	414-332-0900

WATKINS-JOHNSON CO., Dept. EM, 3333 Hillview Ave., Palo Alto, Cal. 94304, Tel: 415-493-4141, TWX: 910-373-1253; FSC No.: 14482; Empl.: 2,000

Local Sales Offices & Reps.

Cal	El Segundo	213-640-1980
Cal	Palo Alto	415-493-4141
Cal	Scotts Valley	408-438-2100
Fla	Altamonte Springs	305-834-8840
Md	Gaithersburg	301-948-7550
Mass	Lexington	617-861-1580
NJ	Red Bank	201-842-2422
Ohio	Fairborn	513-426-8303
Tex	Dallas	214-234-5396

WATKINS-JOHNSON CO., Production Equip., Dept. EM, 440 Mount Hermon Rd., Scotts Valley, Cal. 95060, Tel: 408-438-2100 EXT.217, TWX: 910-598-4403; Empl.: 2,000

Local Sales Offices & Reps.

Ariz	Phoenix, Meas. Consits.	602-994-9519
Cal	Long Beach, Scrantom Engrg.	714-979-6373
Cal	Santa Clara, F.J. Toffey Assoc.	408-377-8817
Colo	Broomfield, Measurement Consultants	303-449-5294
Conn	Bridgeport, Tech. Instr.	203-368-4582
Fla	Sarasota, W. J. Irvine Co.	813-955-9656
Ill	Lake Villa, R.W. Venn Co.	312-395-5353
Mass	Wilmington, Tech. Instr.	617-944-3930
NM	Albuquerque, Meas. Consits.	505-265-6471
NY	Rochester, Upstate Tech. Equip.	716-454-4455
NY	Solvay, Upstate Tech. Equip.	315-488-3101
Ohio	Dayton, Sidnell Co.	513-433-7761
Pa	Warminster, Eastern Elctrn. Assocs.	215-674-1535
Tex	Austin, Crockett Engrg.	512-451-8269
Tex	Dallas, Crockett Engrg.	214-251-1776
Tex	El Paso, Measurement Consits.	505-526-2491

WATLOW ELEC. MFG. CO., Dept. EM, 12001 Lackland Rd., St. Louis, Mo. 63141, Tel: 314-878-4600; Empl.: 230

Local Sales Offices & Reps.

Cal	Foster City, D. Crites	415-574-2883
Cal	Inglewood, Carlin Assocs.	213-673-4711
Ga	Atlanta, R. Starnes	404-458-2068
Ill	Chicago, J. Priest & Assocs.	312-992-1220
Mass	Natick, Electrical Comp.	617-655-2225
Mich	Detroit, D. Martignon	313-651-0500
Mo	Kansas City, R. White	816-587-9270
Mo	St. Louis, S. Siracusa	314-878-4600
NJ	Fair Lawn, Par Assocs.	201-447-3722
NY	Buffalo, H. H. Cardozo	716-834-3377
NY	E. Syracuse, R. H. Nichols	315-437-2813
NY	Rochester, J. F. Serr	716-586-6226
Ohio	Cincinnati, M. Jordahl	513-683-4500
Ohio	Cleveland, S. Bohnenkamp	216-886-1266
Pa	Warrington, G. Baker	215-345-8130
Tex	Dallas, K. Dawson Co.	214-241-3843

™**WATTCHER** - rf monitor/alarm - Bird Electronic Corp.

™**WATTS-ON** - DC-AC inverter - Tech Labs., Inc.

WAVECOM, Dept. EM, 9036 Winnetna Ave., Northridge, Cal. 91324, Tel: 213-882-3010, Telex: 67-4259; FSC No.: 28979

Sales Manager: E.S. Hensperger, VP-Mktg.

Local Sales Offices & Reps.

Ariz	Scottsdale, Territorial Mktg.	602-994-8665
Colo	Denver, Thorson Co.	303-759-0809
Conn	Norwalk, Neal Cokenham	914-937-6298
Fla	Palm Bay, Spartech Assocs.	305-727-8045
Ga	Smyrna, Spartech Assocs.	404-432-3644
Ill	Park Ridge, RF Specialists	312-698-2044
Ind	Fort Wayne, RF Specialists	219-485-8982
Iowa	Cedar Rapids, J. R. Sls. Engrg.	319-393-2232
Kans	Overland Park, Professional Mktg. Assoc.	913-381-0004
Kans	Wichita, Professional Mktg. Assoc.	316-264-2662
Mass	Lexington, Lancer Assocs.	617-861-1720
Mo	Maryland Heights, Professional Mktg. Assoc.	314-569-1220
NY	Greenlawn, Tom Ryan	516-757-5395
NY	Skaneateles, Robtron	315-685-5731
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Tex	Richardson, Leak Assocs.	214-231-5388
Va	Bailey's Crossroads, Q. T. Elctrns. Sls.	703-671-4357
Wash	Bellevue, James Findlay Co.	206-746-5400
Exp:	Cal., Palto Alto, California Int'l. Trade Corp	415-328-1460

WAVELINE, INC., Dept. EM, Box 718, W. Caldwell, N.J. 07006, Tel: 201-226-9100, TWX: 710-734-4324; FSC No.: 00443; Empl.: 95

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrn. Assocs.	205-881-5031
Ariz	Scottsdale, Territorial Mktg.	602-994-8665
Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	Cupertino, Allis Assocs.	408-379-2883
Fla	Ft. Lauderdale, Beacon Elctrn.	305-776-6074
Fla	Maitland, Beacon Elctrn. Assn.	305-647-3498
Ga	Atlanta, Beacon Elctrn.	404-351-3654
Ky	Ft. Mitchel, GW. Thelen Co.	606-341-8181
Md	Glen Arm, Hodgins Assocs.	301-592-7047
Mass	Needham Hgts., Reptron, Inc.	617-449-4141
NJ	W. Caldwell, Waveline, Inc.	201-226-9100
NY	Skaneateles, Robtron, Inc.	315-685-5731
NC	Greenboro, Beacon Electrns.	919-674-9453
Ohio	Stow, GW Thelen Co.	216-688-0915
SC	Spartanburg, Beacon Elctrn. Assoc.	803-582-4613
Tex	Richardson, Palatine Sls.	214-231-9489
Exp:	N.J., Teaneck, Sylvan Ginsbury	201-837-1100

WAVETEK, Dept. EM, 9045 Balboa Ave., San Diego, Cal 92123, Tel: 714-279-2200, TWX: 910-335-2007; Empl.: 470

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instrs.	205-883-8660
Ariz	Scottsdale, BFA Corp.	602-994-5400
Cal	Lawndale, Ward/Davis Assoc.	213-542-7740
Cal	San Diego, Ward/Davis Co.	714-459-3351
Cal	Sunnyvale, Ward/Davis Assoc.	408-245-3700
Colo	Denver, BFA Corp.	303-837-1247
Conn	Hamden, P. Jenks Assocs.	203-281-0810
Fla	Ft. Lauderdale, W.A. Brown Instrs.	305-776-4800
Fla	Indialantic, W.A. Brown Instrs.	305-723-0766
Fla	Orlando, W.A. Brown Instrs.	305-425-5505
Fla	Valparaiso, W.A. Brown Instrs.	904-678-7932
Ga	Atlanta, W.A. Brown Instrs.	404-939-1674
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
La	Mandeville, W.A. Brown Instrs.	504-626-9701
Mass	Wakefield, P. Jenks Assocs.	617-246-1590
Mich	Madison Heights, WKM Assocs.	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NJ	Englewood, Eastern Instrumentation	201-567-9505
NJ	N. Syracuse, NACO Elctrns. Corp.	315-699-2651
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Fairport, Naco Elctrns	716-223-4490
NY	Utica, Naco Elctrns	315-732-1801
NC	Durham, W.A. Brown Instrs.	919-682-2383
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Norman, Data Mktg. Assoc.	405-364-8320

Ore	Lake Oswego, Wilson Applied Instrs.	503-636-0965
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Pa	Pittsburgh, WKM Assocs.	412-892-2953
SC	Columbia, W.A. Brown Instrs.	803-798-3297
Tenn	Knoxville, W.A. Brown Instrs.	615-690-3281
Tex	Austin, Data Mktg. Assoc.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data Mktg. Assocs.	713-780-2511
Tex	San Antonio, Data Mktg. Assocs.	512-828-0937
Utah	Salt Lake City,, BFA Corp	801-466-6522
Va	McLean, Creative Mktg. Assoc.	703-893-6612
Wash	Bellevue, Wilson Applied Instrs.	206-641-6444
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

WAVETEK INDIANA, INC., Dept. EM, 66 N. First Ave., Beech Grove, Ind. 46107, Tel: 317-783-3221, TWX: 810-341-3226; Empl.: 300 .... p. 2947,2948

Local Sales Offices & Reps.

Ala	Huntsville, W.A. Brown Instrs.	205-539-4411
Ariz	Scottsdale, BFA Corp.	602-946-4215
Cal	La Jolla, Ward/Davis Assoc.	714-459-3351
Cal	Lawndale, Ward/Davis Assoc.	213-542-7740
Cal	Sunnyvale, Ward/Davis Assoc.	408-245-3700
Colo	Aurora, BFA Corp.	303-344-3800
Conn	Hamden, P. Jenks Assoc.	203-281-0810
Fla	Ft. Lauderdale, W.A. Brown Instrus.	305-776-4800
Fla	Ft. Walton Beach, W.A. Brown Instrus.	904-243-6424
Fla	Indiatlantic, W.A. Brown Instrs.	305-723-0766
Fla	Orlando, W.A. Brown Instrus.	305-425-5505
Ga	Atlanta, W.A. Brown Instrus.	404-939-1674
Ill	Chicago, Carter Elctrns.	312-585-5485
Ind	Indianapolis, Carter Elctrns.	317-293-0696
Kans	Overland Park, Carter Elctrns.	913-649-6996
La	Gretna, W.A. Brown Instrus.	504-366-5805
Mass	Wakefield, P. Jenks Assoc.	617-246-1590
Mich	Madison Hts., WKM Assocs.	313-588-2300
Minn	Minneapolis, Carter Elctrns.	612-559-1976
Mo	St. Louis, Carter Elctrns.	314-569-1406
NM	Albuquerque, BFA Corp.	505-292-1212
NM	Las Cruces, BFA Corp.	505-523-0601
NY	Fairport, Naco Elctrns.	716-244-4720
NY	Great Neck, L.I., Eastern Instrumentation	516-466-9505
NY	N. Syracuse, Naco Elctrns.	315-699-2651
NY	Utica, Naco Elctrns.	315-732-1801
NC	Durham, W.A. Brown Instrus.	919-682-2383
Ohio	Cleveland, WKM Assocs.	216-267-0445
Ohio	Dayton, WKM Assocs.	513-434-7500
Okla	Norman, Data Mktg. Assoc.	405-364-8320
Pa	Philadelphia, Eastern Instrumentation	215-927-7777
Pa	Pittsburgh, WKM Assocs.	412-892-2953
SC	Columbia, W.A. Brown Instrs.	803-772-7803
Tenn	Knoxville, W.A. Brown Instrs.	615-690-3281
Tex	Austin, Data Mktg. Assocs.	512-451-5174
Tex	Dallas, Data Mktg. Assoc.	214-661-0300
Tex	Houston, Data Mktg. Assoc.	713-686-9627
Tex	San Antonio, Data Mktg. Assoc.	512-828-0937
Utah	Salt Lake City, BFA Corp.	801-466-6522
Va	McLean, Creative Mktg. Assoc.	703-893-6612
Wash	Renton, Wilson Applied Instrs.	206-228-5880
Wisc	Milwaukee, Carter Elctrns.	414-464-5555

WEBBER MANUFACTURING CO., Dept. EM, P.O. Box 217, Indianapolis, Ind. 46206, Tel: 317-357-8681; FSC No.: 6636; Empl.: 40

Sales Manager: P.T. Richardson

WEBER TECH PRODUCTS, Dept. EM, 1340 Monroe Ave. N.W., Grand Rapids, Mich. 49505, Tel: 616-363-7735; Empl.: 36

™**WEDGE EZE** - cable clamping mechanism. - Automatic Connector Inc.

™**WEDGE-EZE, WEDGE-LOCK, ECONOCRIMP** - quick assembling coaxial connectors - Arco Electronics Inc.

™**WEDGE LOCK** - cable clamping mechanism. - Automatic Connector Inc.

™**WEDGELOCK** - T slug construction - Standard Grigsby Inc.

WEI CORP., Dept. EM, 1405 S. Village Way, Santa Ana, Cal. 92705, Tel: 714-834-9333, TWX: 910-595-1709; FSC No.: 51272

Sales Manager: F.J. Whitfield

Local Sales Offices & Reps.

Ariz	Phoenix, Kay Entprs.	602-242-6787
Cal	Redwood City, Warren & Hicky Sls.	415-368-3849
Fla	Lighthouse Point, J. Krutek & Assocs.	305-941-6544
Ill	Arlington Heights, B. Wilson Mktg.	312-437-2700
Mich	Warren, DEM Elctrn. Sls.	313-575-9444
Wash	Seattle, R & R Assocs.	206-762-7664
Wisc	Milwaukee, B. Wilson Mktg.	414-527-1500

WEIDMULLER TERMINATIONS, INC., Dept. EM, 4326 Eubank Rd., Richmond, Va. 23231, Tel: 804-226-2877, Telex: 822-376; Empl.: 11

Local Sales Offices & Reps.

Cal	Emeryville, G. E. Honn Co.	415-653-0737
Cal	Ventura, Interconnect Specialties	805-642-2281
Colo	Brighton, Intermountain Agency Sls.	303-659-2350
Fla	Ft. Lauderdale, KSM Elctrns Inc.	305-739-5880
Ill	Arlington Heights, Martec Assocs.	312-956-8090
Mass	Norwood, JMG, Inc.	617-762-5333
Mich	Southfield, Engles-Klae Co.	313-48075
Minn	Minneapolis, R.D. Schwen Eng. Inc.	612-553-1398
NJ	South Orange, S. Simberkoff Assoc.	201-763-7900
NY	Rochester, Ontec	716-464-8636
Ohio	Cleveland, K. R. Dodge Co.	216-461-6482
Tex	Missouri City, Elliott Co.	713-499-1571
Utah	Salt Lake City, G.T. Sls. Inc.	801-268-2551
Wash	Seattle, Electrical Agents NW, Inc.	

Local Distributors

Ohio	Cleveland, Electrical Equip. Co.	216-461-6482
Tex	Houston, Nelson-Gulf Coast	713-453-0186

WEINSCHEL ENGRG. CO., Dept. EM, One Weinschel La., Gaithersburg, Md. 20760, Tel: 301-948-3434, TWX: 89-8352 710-828-9705; FSC No.: 93459; Empl.: 210

Sales Manager: R. Bastien

Local Sales Offices & Reps.

Ala	Huntsville, Beacon Elctrns. Assoc.	205-881-5031
Ariz	Scottsdale, PLS Assocs.	602-957-9110
Cal	La Jolla, Ward Davis Assoc.	714-459-3351
Cal	Lawndale, Ward Davis Assoc.	213-542-7740
Cal	Sherman Oaks, G. McNamara	213-990-8606
Cal	Sunnyvale, Ward Davis Assoc.	408-245-3700
Colo	Denver, PLS Assocs.	303-773-1218
Fla	Ft. Lauderdale, Beacon Elctrns. Assoc.	305-491-4211
Fla	Maitland, Beacon Elctrns. Assoc.	305-647-3498
Ga	Atlanta, Beacon Elctrns. Assoc.	404-351-3654
Ill	Arlington Heights, Dytec Central Inc.	312-394-3380
Mass	Burlington, R.J. Sickles Assoc.	617-272-7285
Mich	Detroit, Comtel Instr. Co.	313-255-1970
Mo	St. Louis, Dytec South	314-423-9595
NJ	Ft. Lee, Tech. Mktg.	201-244-6911
NM	Albuquerque, PLS Assocs.	505-255-2330
NY	Fairport, Naco Electronics Corporation	716-223-4490
NY	No. Syracuse, Naco Elctrns.	315-699-2651
NY	Utica, Naco Elctrns.	315-732-1801
NC	Greensboro, Beacon Elctrns. Assoc.	919-674-9432
Ohio	Cleveland, Comtel Instr. Co.	216-442-8080
Pa	Philadelphia, Eastern Inst.	215-927-7777
Pa	Pittsburgh, Comtel Instr. Co.	412-922-5720
Tenn	Oak Ridge, Beacon Elctrns. Assoc.	615-482-2409
Tex	Dallas, Cain & Co.	214-233-6809
Tex	San Antonio, Ashcraft Assocs.	512-824-7267
Va	McLean, Creative Mktg. Assocs.	703-893-6612
Wash	Seattle, Rush Drake Assoc.	206-763-2755

WELCH ALLYN, INC., Indl. Prods. Div., Dept. EM, Skaneateles Falls, N.Y. 13153, Tel: 315-685-5788, TWX: 710-545-0203; Empl.: 400

Sales Manager: C. Benoit

Local Sales Offices & Reps.

Ariz	Scottsdale, P. Murphy Assocs.	602-946-2457
Cal	Palo Alto, O'Donnell Assocs. North	415-327-9260
Cal	Torrence, O'Donnell Assocs.	213-323-9243
Colo	Boulder, R. A. Mayes Co.	303-444-0782
Fla	Jupiter, Cherry Assocs.	305-746-4591
Ill	Des Plaines, Coombs Assocs.	312-298-4830
Ind	Indianapolis, Coombs Assocs.	317-251-2757
Mass	Holden, Richard A. Poucin Assocs.	617-829-6948
Mich	Birmingham, Forand Sls. Co.	313-644-0087
Minn	Minneapolis, J. J. Exon Co.	612-571-5340
NJ	Livingston, Graydon-Sherman	201-994-9055
NM	Albuquerque, R. A. Mayes Co.	505-292-2330
NY	Syracuse, W. H. Zimmerman	315-474-4889
Ore	Portland, J. J. Backer Co.	206-285-1300
Pa	Abington, R. Ritter	215-884-6849
Tex	Houston, R. A. Mayes Co.	713-461-5385
Tex	Richardson, R. A. Mayes Co.	214-235-3043
Utah	Centerville, R. A. Mayes Co.	801-292-6781
Wash	Seattle, J. J. Backer Co.	206-285-1300
Wisc	Greendale, Coombs Assocs.	414-421-2300

WELCO INDS. INC., Dept. EM, 9027 Shell Ave., Cincinnati,. Ohio 45236, Tel: 513-891-6600, TWX: 810-461-2574; Empl.: 130

Local Sales Offices & Reps.

Fla	Miami, Ludlum Assoc. Co.	305-885-2514
Ga	Atlanta, H. Homer & Assocs.	404-255-8669
Ill	Park Ridge, L. Fitz Co.	312-631-5488
Mass	Salem, Forbes Engrg. Co.	617-744-1693
Mich	Troy, Xanthus, Inc.	313-391-3235
Minn	St. Paul, Craighead & Assoc.	612-645-0784
Mo	Kansas City, Horsepower Control Sys.	816-471-6363
NJ	Kenilworth, Wolock & Lott Co.	201-241-4333
NY	Rochester, Ross Equip. Co.	716-271-5660
NC	Charlotte, Ind'l. Drives & Controls	704-535-5414
Ohio	Richfield, Wood-Compton Co.	216-659-6126
Pa	Media, H.B. Stallings & Assocs.	215-566-4100
Va	Richmond, S.D. Harmon & Co.	804-285-3168
Wisc	Milwaukee, Dietz Elec. Co.	414-645-3000

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WELLER-XCELITE, THE COOPER GROUP, Dept. EM, Box 728, Apex, NC 27505, Tel: 919-365-7511, Telex: 579497

Sales Manager: J.J. Barrese

™**WELLFLEX** - semi-rigid cable - Cablewave Systems Inc.

WELLS ELECTRONICS, INC., Plastics Div., Dept. EM, 1701 S. Main St., South Bend, Ind. 46613, Tel: 219-287-5941, Telex: 25-8325; Empl.: 145

Local Sales Offices & Reps.

Ariz	Phoenix, K. Jahn Co.	602-956-9060
Cal	Santa Clara, Wells Plastics of Cal.	408-244-5101
Cal	Sunnyvale, Acacia	408-735-0100
Fla	W. Palm Beach, PSA	305-689-0575
Ill	Palatine, Wood Sls.	312-359-4550
Ind	Carmel, L.R. Woodling Co.	317-844-7365
Mass	Lynnfield, Newmar Assoc.	617-245-7960
Minn	Minneapolis, D.G. Perry & Co.	612-835-3313
Mo	St. Louis, Kebco	314-569-2660
NY	Larchmont, Hingston Walsh Assoc.	914-834-5781
NY	Rochester, Ontec, Inc.	716-464-8636
Pa	Bala Cynwyd, Electech, Inc.	215-687-5305
Tex	Dallas, Springer Tech. Sls.	214-234-3273

WELLS ELECTRONICS, INC., Weltek Div., Dept. EM, 1801 S. Main St., South Bend, Ind. 46613, Tel: 219-287-5941, Telex: 25-8325; Empl.: 33

Local Sales Offices & Reps.

Ariz	Phoenix, K. Jahn Co.	602-956-9060
Cal	Hacienda Heights, Wadsworth-Pacific Mfg. Assoc.	213-330-5592
Colo	Denver, b5, Inc.	303-426-0222
Fla	Ft. Lauderdale, Semquip, Inc.	305-772-3002
Ind	Indianapolis, Tech Sales & Mktg.	317-356-3658
Mass	Lowell, T. M. Assoc.	617-686-5536
Mich	Royal Oak, Murray Percival & Co.	313-548-1971
Minn	Minneapolis, D.G. Perry & Co.	612-920-3212
NY	Lindenhurst, Sigma Communications Assocs.	516-226-1880
NY	Liverpool, Feikert Assocs.	315-652-5577
NC	Bethania, Lee Ltd.	919-924-8245
Ohio	Dayton, Electro Entprs., Inc.	513-426-6071
Tex	Dallas, Tech. Processes Co.	214-352-3957
Utah	Salt Lake City, b5, Inc.	801-292-8991
Wash	Seattle, Demarest & Assocs.	206-523-0600
Wisc	Milwaukee, M. W. Entprs.	414-352-9150

WELTRON CO., INC., Dept. EM, 260 Bethpage Spagnoli Rd., Melville, N.Y. 11746, Tel: 516-293-4400, Telex: 229315; Empl.: 20

Sales Manager: H. Greenberg

Local Sales Offices & Reps.

Fla	Lakeland, Dixie Elctrn. Assocs.	813-682-6624
Ind	Indianapolis, Shamrock Elctrn. Sls.	317-251-5527
Mich	Howell, Shamrock Elctrn. Sls.	517-546-7997

NC	Charlotte, DeWitt Austin Co.	704-366-4643
Ohio	Akron, Shamrock Elctrn. Sls.	216-666-1400
Ohio	Dayton, Shamrock Elctrn. Sls.	513-298-3052

WELWYN CANADA DIV., see Dale Electronics Canada Ltd.

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WER INDUSTRIAL, Div. Emerson Elec. Co., Dept. EM, 3036 Alt Blvd., Grand Island, N.Y. 14072, Tel: 716-773-2321, Telex: 91-6459; Empl.: 440; Minimum order: $D. Mitchell

Sales Manager: L. Seaward; *Distributor Manager:* D. Mitchell

Local Sales Offices & Reps.

Cal	Burlingame, Engineering Reps. Co.	415-692-2581
Cal	Fullerton, Devoe Engrg. Co.	714-871-8076
Colo	Littleton, R.L. Palmer Co.	303-779-1624
Conn	Avon, WER Hartford District Office	203-678-0424
Conn	Ridgefield, Himes Co.	203-438-0884
Conn	Unionville, Tor-Axial Drive Comps.	203-673-3592
Fla	Clearwater, Arroyo Process Equip.	813-576-5294
Ga	Atlanta, H. Homer & Assocs.	404-457-5561
Ill	Lake Bluff, Wer Chicago Regional	312-295-1610
Md	Silver Springs, H. A. Cirbee & Assoc.	301-593-5010
Mass	Andover, WER Boston Regional Office	617-686-7306
Mich	Troy, W. Van Leuven & Assoc.	
Minn	Minneapolis, E. E. Rempfer & Assoc.	612-935-9271
Mo	Manchester, Wer St. Louis District Office	314-878-5105
NJ	Kenilworth, Wolock & Lott	201-241-4333
NY	Buffalo, Ross Equip. Co.	716-634-0990
NY	Elmira, Ross Equip. Co.	607-734-1324
NY	Rochester, Ross Equip. Co.	716-271-5660
NY	Syracuse, Ross Equip. Co.	315-463-6691
NC	Charlotte, Wer Charlotte District Office	704-537-4364
Ohio	Cincinnati, Wer Cincinnati Regional Office	513-232-2285
Ohio	Columbiana, WER Penn.-Ohio Regional Office	216-482-9379
Ohio	Cuyahoga Falls, Wer Akron District Office	216-929-9301
Ohio	Seven Hills, WER Cleveland District Office	216-524-2133
Pa	Frazer, Engineered Drives & Controls	215-647-4661
Pa	Frazer, WER Philadelphia District Office	215-648-0272
Tex	Dallas, WER Dallas District Office	214-369-0961
Va	Richmond, Harmon Commonwealth Corp.	804-358-5888
Wash	Kirkland, Garland Affolter Engrg. Corp.	206-822-2275

Local Distributors

Cal	Arcata, Ind. Elec. Svc. Co.	707-822-2485
Cal	Burlington, Engrg. Reps. Co.	415-692-2581
Cal	Fullerton, Devoe Engrg. Co.	714-871-8076
Conn	Ridgefield, Himes Co.	203-438-0884
Fla	Clearwater, Arroyo Process Equip.	813-576-5294
Ga	Atlanta, Hal Homer Assoc.	404-457-5561
Ill	Chicago, Chicago Elect. Co.	312-226-2900
Ind	Fort Wayne, H. J. Schroeder Co.	219-423-3586
Mass	Mansfield, R. T. Engrg. Svc.	617-339-9339
Mich	Detroit, D. P. Brown of Saginaw	313-841-5800
Mich	Saginaw, D. P. Brown of Saginaw	517-799-9400
Minn	Minneapolis, Transmission Sls. Co.	612-935-0254
Minn	South St. Paul, Farwell Indust.	612-451-4222
NJ	Kenilworth, Wolock & Lott	201-241-4333
NY	Buffalo, Ross Equip. Co.	716-634-0990
NY	Elmira, Ross Equip. Co.	607-734-1324
NY	Rochester, Ross Equip. Co.	716-271-5660
NY	Syracuse, Ross Equip. Co.	315-463-6691
NC	Asheville, Mize Co.	704-255-8791
NC	Charlotte, Mize Co.	704-375-5761
Ohio	Akron, Nat'l. Elect. Coil	216-762-9301
Ohio	Chagrin Falls, Automation Svcs. & Consult.	216-543-8146
Ohio	Cincinnati, Cincinnati Armature Works	513-761-3123
Ohio	Youngstown, Youngstown Elect. Svc.	216-743-1128
Pa	Ardmore, Able Ind. Dist.	215-649-4545
Pa	Ellwood City, Elect. Spec.	412-758-5811
Pa	Frazer, Engineered Spec. Prds.	215-647-4661
Pa	Trexlertown, Able Ind. Dist.	215-398-0447
RI	Coventry, Himes Co.	401-828-5028
SC	Columbia, J. W. Vaughn Co.	803-779-2690
SC	Florence, Mize Co., Inc.	803-665-1181
SC	Greenville, J. W. Vaughn Co.	803-232-2421
Tenn	Chattanooga, Richardson Elect.	615-629-2521
Tex	Houston, Ind. Drive Maintenance	713-681-6942
Tex	Houston, Varicraft Power Sys.	713-449-0211
Tex	Richardson, Solid State Drives	214-231-2333
Va	Richmond, Transmission Prod.	804-233-8351
Va	Roanoke, Transmission Prod.	703-344-2093
Wisc	Germantown, Hydro-Electro Equip.	414-255-5555

WERTRONIX CORP., Dept. EM, 3821 Barringer Dr., Charlotte, N.C. 28210, Tel: 704-525-6460, Telex: 57-2444; Empl.: 50 ..... p. 3130

Local Sales Offices & Reps.

Ariz	Tempe, Gassner & Clark	602-968-9037
Cal	Irvine, Comar Assocs.	714-540-1219
Ill	Chicago, Engineered Sales Co.	312-867-8434
Mass	Woburn, Stockwell Tech. Sls. Co.	617-935-5770
Minn	St. Paul, Don Nedved Assocs.	612-645-2945
Mo	Maryland Heights, Hitt Assocs.	314-878-5405
NJ	East Orange, Murray Gallagher	201-678-5071
Ohio	Dayton, Wertronics/Dayton	513-429-3150
Okla	Tulsa, Kemp Engineering Co.	918-299-2636
Va	Richmond, Commonwealth Control	804-358-5700

WESCO ELECTRICAL CO., Dept. EM, 201 Munson St., Greenfield, Mass. 01301, Tel: 413-774-4358; FSC No.: 12673; Empl.: 140 ..... p. 1384-1387

Local Sales Offices & Reps.

Cal	Mountain View, Reptime	415-969-6545
Fla	Casselberry, EIR Inc.	305-830-9600
Ill	Chicago, LGS Elctrns. Corp.	312-456-9616
Ind	Columbus, J.H. Weaver Co.	812-372-3625
Md	Towson, Habco Elctrns., Inc.	301-825-9637
Mich	Dearborn, Pitcher-Poulin, Inc.	313-582-5450
Minn	Bloomington, Electronic Sls. Agcy.	612-884-8291
NJ	Madison, Livera-Polk Assocs.	201-377-3220
NY	Roslyn Heights, Livera-Polk Assocs.	516-484-1276
NC	Knightdale, Leigh Sls.	919-266-0105
Ohio	Vandalia, W. Brauer & Assoc.	513-898-1224
Ohio	Wickliffe, W. Brauer & Assoc.	216-943-0601
Pa	Pittsburgh, W. Brauer & Assoc.	412-921-3213
Tex	Dallas, Blackburn Assocs.	214-692-8885
Wash	Redmond, Desco Northwest	206-445-9325

(TM)**WEST** - temperature controllers - Gulton Inds., Inc.

WEST COAST RESCH. CORP., Dept. EM, Box 25061, Los Angeles, Cal. 90025, Tel: 213-478-8833; FSC No.: 51276; Empl.: 21

Local Sales Offices & Reps.

Ariz	Scottsdale, Williams Assocs.	602-947-4297
Cal	San Francisco, Sara Scientific Sls.	415-421-3172
Colo	Denver, Williams Assocs.	303-373-4730
Fla	Miami, M. B. & Co.	305-274-8538
Ill	Lombard, Quadtron Assocs.	312-627-6800
NM	Albuquerque, Williams Assocs.	505-255-1638
SC	Greenville, Greentron	803-277-3537
Va	Arlington, S & M Assocs.	703-354-1192
Exp:	N.Y., New York, Betadyne	212-964-7700

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Local Sales Offices & Reps.

Cal	San Gabriel, Western Coating Co.	213-283-9331
Fla	Miami, Palmer Supplies Co.	305-633-8007
Ohio	Rocky River, Griff Otte	216-331-4139
Pa	Havertown, Pakoil Co.	215-446-5273
Tex	Dallas, Exchange Tool Supply	214-631-7720

WESTERN COIL & ELEC. CO., Dept. EM, 215 State St., Racine, Wisc. 53403, Tel: 414-632-4741; Empl.: 15

Sales Manager: E.M. Matsen

Local Sales Offices & Reps.

Ill	Crystal Lake, C.B. Bruse	815-459-2230

WESTERN ELECTRONIC PRODS. CO., Dept. EM, 107 Los Molinos, San Clemente, Cal. 92672, Tel: 714-492-4677; FSC No.: 13988

Local Sales Offices & Reps.

Cal	Palo Alto, Engrg. Assocs.	415-494-7842
Cal	Pasadena, P. Nurches Co.	213-681-8957
Ill	Northfield, F. William Castle Co.	312-441-5155
Mass	Wellesley, Sturgeon Co.	617-237-1040
Minn	Minneapolis, Xylem Co.	612-920-9626
NJ	Mountain Lakes, J. P. Dearie Company	201-334-4848
Ohio	Cincinnati, Schlemmer Assocs.	513-522-8340
Tex	Houston, Jordan Equip. Co., Inc.	713-498-6212
Exp:	Torrance, Cal., Unitool Corp.	213-772-0751

WESTERN GEAR CORP., Applied Tech. Div., Dept. EM, Dept. EM, 14724 E. Proctor, City of Industry, Cal. 91744, Tel: 213-968-6525, TWX: 910-584-4856

Sales Manager: W.A. Hartman; *Distributor Manager:* F.W. Grew

Local Sales Offices & Reps.

Cal	Lynwood	213-636-0911
Cal	San Francisco	415-283-1970
Conn	Stamford	203-324-4148
DC	Washington	703-528-5010
Ill	Chicago	312-437-9744
Okla	Tulsa	918-622-1049
Pa	Pittsburgh	412-471-0744
Tex	Houston	713-626-9880
Wash	Seattle	206-259-0922

WESTINGHOUSE CANADA LTD., Dept. EM, Box 510, Hamilton, Ont., Can., Tel: 416-528-8811, Telex: 02-1655

WESTINGHOUSE ELEC., Ind'l. Equip. Div/Process Equip. Dept & Consumables Dept., Dept. EM, Box 300, Sykesville, Md. 21784, Tel: 301-795-2800; Empl.: 300

WESTINGHOUSE, Industrial & Gov't Tube, Dept. EM, Westinghouse Circle, Horseheads, N.Y. 14845

WESTINGHOUSE ELEC., Lamp Div., Dept. EM, Parts Sls., 1 Westghse Plaza, Bloomfield, N. J. 07003, Tel: 201-465-3325

Local Sales Offices & Reps.

Ark	Little Rock	501-375-2471
Cal	Los Angeles	213-482-9660
Cal	San Francisco	415-445-2000
Colo	Denver	303-825-0441
Conn	Hartford	203-249-5792
Fla	Miami	305-634-5461
Ga	Atlanta	404-361-5200
Ill	Chicago	312-461-7200
Ind	Indianapolis	317-632-3301
La	New Orleans	504-486-6141
Md	Baltimore	301-792-7600
Md	Laurel	301-953-2300
Mass	Belmont	617-IV 4-6020
Mich	Southfield, 313-352-9000	617-IV 4-6020
Minn	Minneapolis	612-927-6551
Mo	Kansas City	816-483-4711
Mo	St. Louis	314-421-6911
NJ	East Orange	201-465-2482
NY	New York	212-692-3211
NY	Richmond Hill	212-VI 7-9800
NY	Rochester	716-232-4380
NC	Charlotte	704-377-3471
Ohio	Cincinnati	513-475-7301
Ohio	Cleveland	216-475-7301
Pa	Bala Cynwyd, 215-MO 7-7600	216-475-7301
Pa	Pittsburgh	412-255-3800
Tex	Dallas	214-631-2811
Utah	Salt Lake City	801-486-8751
Va	Richmond	703-649-9061
Wash	Tukwila	206-623-7001

WESTINGHOUSE ELEC. CORP., Relay-Instr. Div., Dept. EM, 95 Orange St., Newark, N.J. 07101, Tel: 201-465-0222; Empl.: 1200

Local Sales Offices & Reps.

Ala	Birmingham	205-871-0366
Ala	Mobile	205-344-4273
Ariz	Phoenix	602-258-7211
Ark	Little Rock	501-376-3462

Cal	Bakersfield	805-327-7633
Cal	Compton	213-638-7781
Cal	Emeryville	415-652-3770
Cal	Fresno	209-233-0576
Cal	Los Angeles	213-482-9660
Cal	Riverside	714-682-6551
Cal	Sacramento	916-922-7071
Cal	San Diego	714-279-0233
Cal	San Francisco	415-445-2000
Cal	Sunnyvale	408-735-2601
Colo	Denver	303-825-0441
Conn	Hartford	203-249-5792
DC	Washington	202-833-5000
Fla	Jacksonville	904-356-5811
Fla	Miami	305-634-5461
Fla	Tampa	813-837-7171
Ga	Albany	912-436-0144
Ga	Atlanta	404-885-5200
Haw	Honolulu	808-839-0311
Idaho	Boise	208-344-2502
Ill	Aurora	312-897-4293
Ill	Chicago	312-461-7200
Ill	Danville	217-442-1901
Ill	Peoria	309-673-0754
Ill	Rockford	815-398-3591
Ind	Evansville	812-425-7146
Ind	Ft. Wayne	219-483-6476
Ind	Hammond	219-844-9400
Ind	Indianapolis	317-632-3301
Ind	So. Bend	219-287-1051
Iowa	Cedar Rapids	319-366-0781
Iowa	Davenport	319-323-2761
Iowa	Des Moines	515-283-2081
Kans	Wichita	316-263-2295
Ky	Louisville	502-459-5440
La	Baton Rouge	504-344-9448
La	New Orleans	504-486-6141
La	Shreveport	318-425-2435
Me	Augusta	207-623-4571
Md	Towson	301-828-5400
Mass	Boston	617-542-0600
Mass	Springfield	413-734-3101
Mass	Worcester	617-853-2680
Mich	Grand Rapids	616-456-1531
Mich	Jackson	517-787-3630
Mich	Saginaw	517-793-8680
Mich	Southfield	313-352-9000
Minn	Duluth	218-727-1541
Minn	Minneapolis	612-927-6551
Miss	Jackson	601-354-2373
Mo	Kansas City	816-421-7122
Mo	St. Louis	314-421-6911
Mont	Butte	406-792-2301
Neb	Omaha	402-397-2820
NJ	E. Orange	201-465-0222
NM	Albuquerque	505-265-6647
NY	Albany	518-459-1820
NY	Buffalo	716-854-3966
NY	New York	212-692-3211
NY	Olean	716-372-0040
NY	Rochester	716-232-4380
NY	Syracuse	315-463-9581
NY	Watertown	315-788-7700
NC	Charlotte	704-377-3471
NC	Greensboro	919-273-5563
NC	Raleigh	919-834-4375
Ohio	Akron	216-376-2171
Ohio	Cincinnati	513-475-7400
Ohio	Cleveland	216-579-2121
Ohio	Columbus	614-272-4000
Ohio	Dayton	513-228-9601
Ohio	Toledo	419-255-2205
Ohio	Youngstown	216-744-8911
Okla	Oklahoma City	405-232-8565
Okla	Tulsa	918-583-3191
Ore	Eugene	503-342-3083
Ore	Portland	503-224-4200
Pa	Allentown	215-433-3296
Pa	Bala Cynwyd	215-667-7600
Pa	Erie	814-453-4381
Pa	Johnstown	814-288-1559
Pa	Pittsburgh	412-255-3800
Pa	Wilkes Barre	717-825-7337
Pa	Williamsport	717-326-4289
SC	Columbia	803-256-1511
SC	Greenville	803-232-5695
Tenn	Chattanooga	615-267-9146
Tenn	Kingsport	615-247-5167
Tenn	Knoxville	615-522-8101
Tenn	Memphis	901-526-8546
Tenn	Nashville	615-327-4911
Tex	Amarillo	806-372-3259
Tex	Beaumont	713-898-1157
Tex	Corpus Christi	512-883-9236
Tex	Dallas	214-631-2811
Tex	El Paso	915-542-1744
Tex	Houston	713-621-9000
Tex	Odessa	915-337-1822
Tex	San Antonio	512-223-9181
Utah	Salt Lake City	801-486-8751
Va	Richmond	703-285-3909
Va	Roanoke	703-342-8925
Wash	Seattle	206-623-7001
Wash	Spokane	509-535-3521
WVa	Bluefield	304-325-3651
WVa	Charleston	304-346-9606
WVa	Fairmont	304-363-0400
WVa	Huntington	304-529-7146
WVa	Wheeling	304-232-4100
Wisc	Appleton	414-739-2313
Wisc	Madison	608-257-4517
Wisc	Milwaukee	414-264-6400

WESTINGHOUSE ELEC. CORP., Semiconductor Div., Dept. EM, Armbrust Rd., Youngwood, Pa. 15697, Tel: 412-925-7272, TWX: 510-468-2840; Empl.: 800 p. 3946

Local Sales Offices & Reps.

Cal	Culver City, Bestronics	213-870-9191
Cal	Los Angeles, Westinghouse	213-572-4849
Cal	Mt. View, Westinghouse Elec.	415-965-0305
Cal	San Diego, Bestronics	714-278-2150
Cal	Santa Clara, Magna Sls.	408-985-1750
Colo	Denver, Lindberg Co.	303-758-9033
Conn	Collinsville, Gerber Sls. Corp.	203-693-2651
Conn	Newtown, Gerber Sls. Corp.	203-426-3440
Fla	Orlando, Lawrence Assoc.	305-592-8600
Ill	Chicago, G.E.C. Assocs	312-887-8922
Ind	Indianapolis, S.A.I. Mktg.	317-844-7196
Iowa	Cedar Rapids, Dy-Tronix Inc.	319-377-8275
Md	Baltimore, Westinghouse Elect.	301-828-5400
Mass	Boston, Westinghouse Elec.	617-237-6950
Mass	E. Longmeadow, Gerber Sls. Corp.	413-525-3059
Mass	Waltham, Gerber Sls. Corp.	617-890-8040
Mich	Brighton, S.A.I. Mktg.	313-227-1786
Mich	Grand Rapids, S.A.I. Mktg.	616-942-2504
Minn	Minneapolis, Comstrand, Inc.	612-571-0000
Mo	St. Louis, Dy-Tronix Inc.	314-731-5799
NJ	Haddonfield, Thomas Assocs.	609-854-3011
NJ	Kingwood, J.L. Sls. Assoc.	201-962-6315
NM	Albuquerque, Lindberg Co.	505-881-1006
NY	Clinton, Advanced Comp. Corp.	315-853-6438
NY	Endicott, Advanced Comp. Corp.	607-785-3191
NY	Hempstead, Westinghouse Elec.	516-489-2200
NY	N. Syracuse, Advanced Comp. Corp.	315-699-2671
NY	Scottsville, Advanced Comp. Corp.	716-889-1429
NY	Syracuse, M.M.I. Sls.	315-455-5919
NC	Charlotte, Westinghouse Elec.	704-377-3471
Ohio	Beachwood, Sheridan Assoc.	216-831-0130
Ohio	Cincinnati, S.A.I. Mktg.	513-761-5432
Ohio	Cleveland, S.A.I. Mktg.	216-292-2982
Ohio	Dayton, S.A.I. Mktg.	513-435-3181
Tex	Dallas, Kruvand Assocs.	214-691-4592
Tex	Houston, Kruvand Assocs.	713-780-9710
Utah	Salt Lake City, Lindberg Co.	801-534-1500
Wash	Seattle, Quadra Sls. Corp.	206-883-3550
Wisc	Milwaukee, Westinghouse Elec.	414-786-0260

Local Distributors

Ala	Birmingham, ACK Semiconduuctors, Inc.	205-322-0588
Ala	Huntsville, Hamilton/Avnet	205-533-1170
Ariz	Phoenix, Hamilton/Avnet of Ariz.	602-275-7851
Cal	Costa Mesa, Avnet Elctrns.	714-754-6111
Cal	Los Angeles, Hamilton Electro Sls.	213-558-2121
Cal	Mountain View, Hamilton/Avnet Elctrns.	415-961-7000
Cal	San Diego, Hamilton/Avnet	714-279-2421
Colo	Denver, Hamilton/Avnet	303-534-1212
Conn	Georgetown, Hamilton/Avnet	203-762-0361
Conn	No. Haven, Cramer	203-239-5641
Fla	Ft. Lauderdale, Hamilton/Avnet	305-971-3491
Fla	Hollywood, Cramer	305-923-8181
Fla	Orlando, Cramer	305-894-1511
Ga	Atlanta, Specialty Distributing	404-873-2521
Ga	Atlanta, Cramer	404-448-9050
Ga	Atlanta, Hamilton/Avnet	404-448-0800
Ga	Augusta, Specialty Distributing	404-722-1526
Ill	Chicago, Hamilton/Avnet	312-678-6310
Ill	Chicago, Semiconductor Specialists, Inc.	312-279-1000
Ill	Chicago, Complete Reading Electric	312-454-1234
Ind	Fort Wayne, Fort Wayne Elctrns. Supply Inc.	219-423-3422
Ind	Indianapolis, RA-DIS-CO	317-637-5571
Kans	Kansas City, Hamilton/Avnet	913-888-8900
Md	Baltimore, Hamilton/Avnet	301-796-5000
Md	Rockville, Cramer	301-948-0110
Mass	Boston, Schweber Elctrns.	617-890-8484
Mass	Boston, Cramer Elctrns.	617-969-7700
Mass	Boston, Hamilton/Avnet	617-933-8020
Mich	Detroit, Semiconductor Specialists, Inc.	313-478-2700
Mich	Detroit, Hamilton/Avnet	313-522-4700
Mich	Detroit, Sheridan Sls. Co.	313-477-3800
Minn	Minneapolis, Semiconductor Specialists, Inc.	612-854-8841
Minn	Minneapolis, Hamilton/Avnet	612-941-3801
Minn	Minneapolis, Schweber Elctrns.	612-941-5280
Mo	Kansas City, Semiconductor Specialists	816-452-3900
Mo	North Kansas City, LComp Kansas City, Inc.	816-221-2400
Mo	St. Louis, Hamilton/Avnet	314-731-1144
Mo	St. Louis, Semiconductor Specialists	314-731-2400
NJ	Cedar Grove, Hamilton/Avnet	201-239-0800
NJ	Cinnaminson, Wilshire Elctrns.	609-786-8990
NJ	Moonachie, Cramer/N.J.	201-935-5600
NJ	Moorestown, Arrow Elctrns.	609-235-1900
NJ	Mt. Laurel, Hamilton/Avnet	609-234-2133
NJ	Summerset, Schweber Elctrns.	201-469-6008
NM	Albuquerque, Hamilton/Avnet	505-765-1500
NY	East Syracuse, Cramer/Syracuse	315-437-6671
NY	E. Syracuse, Hamilton/Avnet	315-437-2642
NY	Hauppauge, Cramer/Systems	516-231-5600
NY	NASCO, NASCO	516-822-9450
NY	Rochester, Hamilton/Avnet	716-442-7820
NY	Rochester, Cramer/Rochester	716-275-0300
NY	Rochester, Schweber Elctns.	716-461-4000
NY	Westbury, Hamilton/Avnet	516-333-5800
NY	Westbury, Schweber Elctrns.	516-334-7474
NC	Winston-Salem, Cramer	919-725-8711
Ohio	Cincinnati, Sheridan Sls. Co.	513-761-5432
Ohio	Cleveland, Hamilton/Avnet	216-461-1400
Ohio	Cleveland, Sheridan Sls. Co.	216-831-0130
Ohio	Columbus, Hughes-Peters, Inc.	614-294-5351
Ohio	Dayton, Hamilton/Avnet	513-433-0610
Pa	Pittsburgh, CAM/RPC	412-782-3770
Tex	Dallas, Altair Co.	214-231-5166
Tex	Dallas, Hamilton/Avnet	214-661-8661
Tex	Houston, Complete Reading Electric	713-224-5731
Tex	Houston, Hamilton/Avnet	713-780-1771
Tex	Houston, Altair Co.	713-462-3029
Utah	Salt Lake Cty, Hamilton/Avnet	801-262-8451
Wash	Seattle, Hamilton/Avnet	206-746-8750
WVa	Charleston, McJunkin Corp.	304-348-4965
Wisc	Milwaukee, Taylor Elctrns.	414-241-4321
Wisc	Milwaukee, Hamilton Avnet	414-784-4510

WESTMORELAND PLASTICS CO., Dept. EM, 135 Gertrude St., Latrobe, Pa. 15650, Tel: 412-539-1612; Empl.: 125

Sales Manager: E.R. Hatfield

Local Sales Offices & Reps.

Ark	Texarkana, Laput Sls. Co.	214-838-4318
Cal	Fremont, Hartfield, Kennan & Freytag	415-863-2200
Cal	Los Angeles, Hartfield, Kennan & Freytag	213-225-1318
Fla	Jacksonville, Southern Overhead Sys.	904-737-9577
Ill	Glen Ellyn, Robert P. Kelly Co.	312-469-6615
Ind	Indianapolis, D. Hilligoss	317-849-1636
Mich	Detroit, F.R. Burczyk Assoc.	313-872-6620
Mo	Kirkwood, Lauber & Assoc.	314-966-4735
NJ	Ringwood, Harvey Assocs.	201-835-1078
Ohio	Columbus, F. W. Sullivan & Assocs.	614-486-7900
Pa	Allentown, S.D. Adams & Co.	215-395-1031
Pa	Emmaus, J.S. Adams & Co.	215-965-2391
Tenn	Hendersonville, B. Lucas Assocs.	615-824-5818
Wash	Vancouver, Hartfield, Kennan & Freytag	503-228-1683

WESTON®

WESTON INSTRS., Div. of Sangamo Weston, Inc., Dept. EM, 614 Frelinghuysen Ave., Newark, N.J. 07114, Tel: 201-242-2600, Telex: 138-145; Empl.: 1100 p. 2949-2959

Sales Manager: J.D. Watson

Local Sales Offices & Reps.

Ala	Huntsville, Kemp Instrs. Co.	205-837-4304
Cal	Monterey Pk., Weston Instrs.	213-268-9271
Fla	Orlando, Col-Ins-Co., Inc.	305-423-7615
Ill	Chicago, Weston Instrs.	312-352-3500
Iowa	Cedar Rapids, Tech. Reps. Inc.	319-363-2489
Kans	Derby, Pallatine Eng. Co.	316-788-0621
Md	Columbia, Tech. Sls. Assoc.	301-730-1400

Mass	Boston, Weston Instrs.	617-246-1800
Mich	Detroit, Nicon Assocs.	313-341-7688
Mo	Kansas City, Tech. Reps. Inc.	913-782-1177
Mo	St. Louis, Tech. Reps. Inc.	314-731-5200
NJ	Fort Lee, Tecnimat	201-461-8686
NJ	Newark, Weston Instrs.	210-242-2600
NY	Syracuse, Weston Instrs.	315-454-3226
Ohio	Cincinnati, Luebbe Sls. Co.	513-871-4211
Ohio	Cleveland, Luebbe Sls. Co.	216-333-0425
Ohio	Dayton, Luebbe Sls. Co.	513-294-0426
Okla	Tulsa, Kemp Engrg. Co.	918-299-2636
Pa	Philadelphia, Weston Instrs.	215-665-8270
Tex	Addison, Kemp Engrg. Co.	214-661-0400
Wash	Mercer Island, S.E.A.	206-232-6550

Local Distributors

Ala	Birmingham, M. G. Elctrns. & Equip. Co.	205-328-4525
Ala	Huntsville, Brownell-Electro	205-536-2451
Ala	Huntsville, Cramer/E. W.-Huntsville	205-539-5722
Ala	Mobile, Brownell-Electro	205-479-5405
Ariz	Phoenix, Cramer/Ariz.	602-263-1112
Ariz	Phoenix, J. E. Redmowd Supply Co.	602-244-0311
Ariz	Phoenix, Metermaster/Phoenix	602-243-4111
Cal	Glendale, R. V. Weatherford Co. Instrument Div.	213-849-3451
Cal	Irvine, Cramer/Los Angeles	213-771-8300
Cal	Los Angeles, Metermaster/Los Angeles	213-685-4340
Cal	Monterey Park, Weston Instrs.	213-268-1795
Cal	Oakland, Western Electro-Mechanical	415-452-1936
Cal	Palo Alto, Metermaster	415-968-6292
Cal	Redwood City, Weston Instrs.	415-365-1700
Cal	San Diego, Arco Sls.	714-282-8115
Cal	San Diego, Metermaster	714-278-2112
Cal	San Diego, Cramer/San Diego	714-565-1881
Cal	Sunnyvale, Cramer/San Francisco	408-739-3011
Colo	Denver, Cramer/Denver	303-758-2100
Colo	Denver, Insco Co.	303-255-7665
Colo	Denver, Ryall Elec.	303-222-7721
Colo	Englewood, Weatherford Inst.	303-761-5432
Conn	Middletown, Mancib Co.	203-346-6646
Conn	North Haven, Cramer/Conn.	203-239-5641
Del	Wilmington, Eng. Sys. & Des.	302-571-1195
Fla	Hollywood, Cramer/EW-Hollywood	305-923-8181
Fla	Miami, Electro-Standard Labs.	305-633-6973
Fla	Orlando, Cramer/EW-Orlando	305-894-1511
Fla	Orlando, Brownell-Electro	305-423-5589
Ga	Atlanta, Brownell-Electro	404-767-8761
Ga	Atlanta, Cramer/EW Atlanta	404-448-9050
Haw	Honolulu, Westinghouse Electric Co. Honolulu Electric Prods. Co.	808-839-7261
Ill	Chicago, Newark Elctrns. Corp.	312-638-4411
Ill	Chicago, Central Scientific Co.	312-277-8300
Ill	Chicago, Weston Instrs.	312-352-3500
Ill	Chicago, W. H. Leary Co.	312-721-3832
Ill	Chicago, McNamara Sply.	312-922-5032
Ill	Mt. Prospect, Cramer/Chicago	312-593-8230
Ill	Oak Park, Pacific Indicator	312-261-1330
Ind	Indianapolis, Graham Elctrns. Supply	
Ind	Indianapolis, Rockwell Engrg. Co.	317-251-9453
Kans	Wichita, Radio Supply Co.	316-267-5214
Ky	Louisville, E & H Electric Supply	502-587-0991
La	Harahan, Industrial Instrt. Works	504-733-8355
La	Kenner, Butler & Land	504-722-6363
La	Lafayette, Ralph's Elctrns.	318-234-4507
La	Shreveport, Ind'l Elctrn. Supply Co.	318-422-9459
Md	Columbia, Weston Instrs.	301-730-1400
Md	Gaithersburg, Cramer/EW-Wash.	301-948-0110
Md	Hanover, Cramer/EW-Baltimore	301-354-0100
Md	Savage, Pyttronic Inds.	301-792-7000
Mass	Billerica, Metermaster	617-667-8346
Mass	Newton, Cramer Elctrns.	617-969-7700
Mich	Detroit, R. S. Elctrns.	313-272-4200
Mich	Ferndale, Ram Meter	313-547-1000
Mich	Livonia, Cramer/Detroit	313-425-7000
Minn	Duluth, Mielke Elec. Wks.	218-727-7411
Minn	Edina, Cramer/Bonn	612-835-7811
Minn	Minneapolis, Instrumentation Svs.	612-544-8916
Minn	Minneapolis, Environ Elctrnc. Labs.	612-888-7795
Mo	Kansas City, Boutros Instrt. Lab.	816-353-0020
Mo	Kansas City, L Comp.	816-221-2400
Mo	St. Louis, Olive Ind'l Elctrns.	314-863-7800
Mo	St. Louis, Scherer Instrs.	314-644-5362
Mo	St. Louis, Ind'l Svc. Labs.	314-535-5760
NJ	*Belleville, Marshall Instrs. Co.	201-751-1190
NJ	Cherry Hill, Cramer/Pennsylvania	609-424-5993
NJ	Moonachie, Cramer/NJ	201-935-5600
NJ	Newark, Weston Instrs.	201-824-4433
NJ	S. Plainfield, Brownell-Elctro	201-753-4600
NY	Albany, E. E. Taylor Co.	518-438-7811
NY	Buffalo, Summit Distrs.	716-884-3450
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Endwell, Cramer/Binghamton	607-754-6661
NY	Great Neck, Scient Leasing	516-487-7800
NY	Hauppauge, Cramer/LI	516-231-5600
NY	Mount Vernon, Electrical Instrt. Svs.	914-699-9717
NY	New York, Brownell-Electro.	212-675-2400
NY	New York, Nilsson Elec. Labs.	212-925-1730
NY	New York, Herman H. Sticht Co.	212-RE-2-8613
NY	Rochester, Cramer/Rochester	716-275-0300
NY	Rochester, Summit Elctrns. of Rochester	
NY	Rockville Centre, A & M Instrs.	516-678-6960
NY	Syracuse, Baldwin Hall Co.	315-463-9251
NY	Syracuse, Cramer/Syracuse	315-437-6671
NC	Charlotte, Brownell Elctro.	704-394-4341
NC	Charlotte, Mill Power Supply Co.	704-527-2800
NC	Raleigh, Cramer/E.W. Raleigh	919-876-2371
NC	Winston Salem, Cramer/EW-Winston-Salem	919-725-8711
Ohio	Cincinnati, Cramer/Tri-States	513-771-6441
Ohio	Cincinnati, Hughes Peters	513-351-2000
Ohio	Cleveland, Pioneer Standard Elctro. Instr. Lab. Div.	216-587-3600
Ohio	Cleveland, Cramer/Cleveland	216-248-8400
Ohio	Cleveland, Christie Laboratories	216-PR-1-0355
Ohio	Columbus, Hughes-Peters	614-294-5351
Ohio	Dayton, Pioneer/Dayton Div. of Pioneer Std. Corp.	513-224-0871
Okla	Okla. Cty., Hunzicken Bros.	405-239-7771
For:	Can., Mississauga, Ont., Weston Instrs. Div. Schulmberger of Can., Ltd.	416-277-3191
For:	Can., St. Laurent, Que., Weston Instrs. Div. Schulmberger of Can. Ltd.	514-636-1750
Okla	Tulsa, Cramer/Tulsa	918-836-3371
Okla	Tulsa, Tri-State Instr. Lab.	918-WE-6-0489
Okla	Tulsa, Butler & Land	918-664-8633
Pa	Harrisburg, Pyttronic Inds	717-233-6591
Pa	Montgomeryville, Pytronic Inds.	215-643-2850
Pa	Philadelphia, Herbach & Rademan	215-426-1700
Pa	Philadelphia, Weston Instrs.	215-665-8270
Pa	Pittsburg, Emmay Co.	412-655-3988
Pa	Pittsburg, Pioneer Std.	412-782-2300
Pa	Pittsburg, Cameradio Co.	717-391-7400
Pa	Pittsburgh, Process Engrg. Co.	412-561-2242
Tenn	Memphis, Brownell Elctro,	901-332-9254
Tenn	Nashville, Elctra Distributing Co.	615-329-3971
Tenn	Nashville, Brownell Elec.	615-889-8230
Tex	Austin, Consol Elec. Dist.	512-477-9407
Tex	Beaumont, Straughn Elctrns.	713-838-4563
Tex	Dallas, Weston Instrs.	214-241-1481
Tex	Dallas, Cramer/Tex	214-350-1355
Tex	Dallas, Dallas Inst. Inc.	214-341-2990
Tex	Dallas, Butler & Land	214-361-6631
Tex	El Paso, Butler & Land	914-544-8222
Tex	Garland, Tucker Elctrns. Co.	214-348-8800
Tex	Houston, Weston Instrs.	713-681-1358
Tex	Houston, Houston Flow Measurement Co.	713-JA-2-5141
Tex	Houston, Butler & Land	713-464-4662
Tex	Houston, Geophysical Supply Co.	713-CA-4-0621
Tex	Texas City, Consol Elec. Dist.	713-948-2508
Utah	Salt Lake City, Cramer/Utah	801-487-3681
Va	Richmond, Inst. Tech. Reps.	804-285-3931
Wash	Seattle, Eicher-Richards Co.	206-LA-3-7888
Wash	Seattle, Branom Instrt. Co.	206-622-7320
Wash	Seattle, Weatherford Inst.	206-243-6340
Wash	Seattle, Cramer/Seattle	206-762-5755
Wash	Seattle, Almac/Stroum Elctrns.	206-763-2300
Wash	Spokane, Ind. Inst. Sply.	509-534-9353
WVa	S. Charleston, Allied Controls Co.	304-768-7313
Wisc	Milwaukee, Electro-Mechano	414-272-4050
Wisc	Milwaukee, Cramer/Wisc.	414-462-8300

WESTON SCHLUMBERGER, see Weston Components & Controls

WESTON COMPONENTS & CONTROLS, Div. Sangamo Weston Inc., Dept. EM, Archbald, Pa. 18403, Tel: 717-876-1500, TWX: 510-656-2902; FSC No.: 94271; Empl.: 783 .... p. 3856,3857

Sales Manager: J. Cousins

Local Sales Offices & Reps.

Ariz	Scottsdale, Piper-Goyne, Inc.	602-949-8424
Cal	San Diego, Wes-K Assocs.	714-271-5048
Cal	Santa Clara, Nova-Tronix	408-243-9530
Cal	Van Nuys, Wes-K Assocs.	213-989-3070
Colo	Englewood, Piper-Goyne, Inc.	303-973-2777
Conn	Hamden, Impact Elctrns.	203-281-1331
Fla	Clearwater, Perrott Assocs.	813-585-3327
Fla	Orlando, Perrott Assocs.	305-275-1132
Ill	Skokie, Marcon Assocs.	312-675-6450
Kans	Overland Park, Ensco-Rep, Inc.	913-381-7557
Md	Baltimore, B. White & Co.	301-484-5400
Mass	Waltham, Impact Sls. Co.	617-893-2850
Mich	Birmingham, J.C. Hofstetter	313-646-3635
Minn	St. Paul, R. G. Ragon, Inc.	612-488-0201
Mo	St. Louis, Ensco-Rep, Inc.	314-567-3935
NY	Albany, Reagan/Compar, Albany, Inc.	518-489-4777
NY	Melville, Addem	516-549-8400
Ohio	Dayton, J. C. Hofstetter Co.	513-296-1010
Ohio	Medina, J. C. Hofstetter Co.	216-241-4880
Pa	Narberth, Electro-Comp Sls.	215-664-3576
Tex	Houston, Vista Assocs.	713-661-0119
Tex	Richardson, Vista Assocs.	214-235-4547
Wash	Bellevue, Comtec	206-453-1188

Local Distributors

Ala	Birmingham, MG Elctrns.	205-328-4525
Ariz	Phoenix, Mirco	602-944-2281
Cal	Carson, Hi Rel Distributor Sls.	213-774-8200
Cal	Costa Mesa, Components Center Inc.	714-979-0433
Cal	Gardena, Bell Industries	213-321-5802
Cal	San Diego, Electronic Distributor	714-274-7242
Cal	San Diego, S. Neumann	814-453-7133
Cal	Sunnyvale, Acacia Sls.	408-735-0100
Cal	Woodland Hills, Rampart	213-887-6400
Conn	Stratford, State Elctrns. Parts	203-375-5961
Fla	Tampa, Impala Elctrns.	813-885-4747
Ill	Elk Grove Village, GBL Elctrns.	312-593-3220
Ill	Skokie, Bell Inds.	312-965-7500
Ind	Indianapolis, Graham Elctrns.	317-634-8486
Kans	Kansas City, Tennant Elctrns.	913-287-2100
Md	Baltimore, Arrow Elctrns.	301-247-5200
Md	Baltimore, Radio Elec. Service Co.	301-823-0070
Md	Beltsville, Treeko Sls.	301-937-8260
Md	Bethesda, Empire Elctrn. Supply	301-OL6-3300
Mass	Waltham, Impact Sls.	617-893-2850
Mich	Detroit, RS Elctrns.	313-491-1012
Minn	St. Paul, Ragon Elctrns.	612-488-0201
Mo	St. Louis, Olive Industrial Elctrns.	314-863-7800
NJ	Fairfield, Electro Spec.	201-575-7370
NJ	Haddonfield, Mid-Atlantic	609-428-8288
NJ	Hanover, State Elctrns.	201-887-2550
NJ	Perth Amboy, Sterling Elctrns.	201-442-8000
NY	Farmingdale, Iris Elctrns.	516-420-8400
NY	Freeport, Milgray Elctrns.	516-546-6000
NY	Hauppauge, Rampart Comps.	516-273-1111
NY	Plainview, Fairmont Elctrn. Sls.	516-694-8200
NY	West Babylon, Delmar Elctrns.	516-420-1234
NY	West Hempstead, March Elctns.	516-486-6511
NY	Woodbury, Tennant Elctrns.	516-364-9070
Ohio	Dayton, Stotts Friedman	513-253-9172
Ohio	Dayton, NASCO, Inc.	513-253-8843
Ohio	Dayton, Arrow Elctrns.	513-253-9172
Ohio	Solon, Repco	216-248-8900
Pa	Devon, Peak Elctrns. Corp.	215-687-9822
Pa	Erie, ADVACOM, Inc.	814-455-8110
Pa	Hatboro, Henwarr	215-675-4104
Pa	Huntingdon Valley, Shap Elctrns.	215-698-9550
Pa	Montgomeryville, Pyttronic Inds.	215-643-2850
Tex	Dallas, Solid State Elctrns.	214-352-2601
Tex	Dallas, Tex-Tronics	817-335-8111
Tex	Fort Worth, Tex-Tronics	817-335-8111
Tex	Houston, Solid State of Tex.	713-785-5436
Va	Charlottesville, Virginia Radio	804-296-4184
Wash	Seattle, Zepher Elctrns. Sls.	206-242-2517

Ⓣⓜ WHISPER - fan - Rotron, Inc.

WHITE INSTRS., INC., Dept. EM, Box 698, Austin, Tex. 78767, Tel: 512-892-0752; FSC No.: 03945; Empl.: 35

WHITMOR WIRE & CABLE, Dept. EM, 13161 Sherman Way Bldg. B, No. Hollywood, Cal. 91605, Tel: 213-764-6296; FSC No.: 15851; Empl.: 23 .... p. 4722

Local Distributors

Ill	No. Hollywood, Wirenetics Co.	213-765-5041

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Electrical wire & cable manufactured to your individual needs and specifications. No minimum quantity. Most quotations given over first telephone call. Cables manufactured from customer furnished wire or ours. Many deliveries from stock. Complete mill capabilities and flexibility permit short delivery time in days if necessary.

WHITSO, INC., Dept. EM, 9326 Byron St., Schiller Park, Ill. 60176, Tel: 312-678-5200; Empl.: 200

Sales Manager: G.J. Zilligen

Local Sales Offices & Reps.

Cal	El Segundo, C.W. Saxon & Assocs.	213-EA2-2111
Okla	Oklahoma City, R.E. Chappell	405-751-0097
Pa	Narberth, S.A. Jeffries, Inc.	215-MO4-8500

WIDE BAND ENGRG. CO. INC., Dept. EM, Box 21652, Phoenix, Ariz. 85036, Tel: 602-254-1570; Empl.: 6

Local Sales Offices & Reps.

Colo	Boulder, H. Bass Assocs.	303-499-7509
Mass	Wakefield, Nerem	617-245-4426

Ⓣⓜ**WIDEBETA** - radioactivity detection sys. - Beckman Instrs., (AISSD)

WIDE RANGE ELECTRONICS CORP., Dept. EM, 2119 Schultz Rd., St. Louis, Mo. 63141, Tel: 314-567-5366, Telex: 44-2560; Empl.: 13

Sales Manager: A.S. Russell

Local Sales Offices & Reps.

Cal	Hollywood, Wide Range Elctrns. Corp.	213-463-7311

WILBRECHT ELECTRONICS, INC., Dept. EM, 240 Plato Blvd., St. Paul, Minn. 55107, Tel: 612-222-2791, Telex: 29-7428; Empl.: 250 .... p. 2642,2643

Local Sales Offices & Reps.

Ariz	, Toward Engrg.	602-955-3193
Ill	, Memac Sls.	312-545-1033

WILCOXON RESEARCH, Dept. EM, 12526 Parklawn Dr., Rockville, Md. 20852, Tel: 301-229-4432, Telex: 898-342; Empl.: 13

Sales Manager: M. Kisiel

WILD ROVER, See Refac Elctrns./Wild Rover.

WILDER ENGRG. PRODS, INC., Dept. EM, 4445 N. Ravenswood Ave., Chicago, Ill. 60640, Tel: 312-769-4110; Empl.: 30

WILKINSON CO., Dept. EM, 31011 Agoura Rd., Westlake Village, Cal. 91361, Tel: 213-889-0050; Empl.: 26

Sales Manager: R.L. Haynes

Ⓣⓜ**WILLARD** - charge-retaining batteries - Wisco Div.

WILLIAMS PRECIOUS METAL DIV., Williams Gold Refining, Dept. EM, 2978 Main St., Buffalo, N.Y. 14214, Tel: 716-837-1000; Empl.: 150

Sales Manager: G. Keller

Local Sales Offices & Reps.

Ariz	Scottsdale, Hill & Co.	602-948-8452
Cal	Fullerton, N. Nesbitt Co.	714-993-6330
Cal	Mountain View, Charter Ind'l. Sls. Co.	415-961-5514
Ill	Zion, A.O. Capp Co.	312-872-8311
Ind	Indianapolis, J.C. Butler Sls. & Engr. Corp.	317-253-5143
Kans	Mission, Mid America Elctrns. Mktg. Inc.	913-236-4800
Mass	Attleboro, E.J. Hughes Assocs.	617-226-0050
Mass	Beverly, E.J. Hughes Assocs.	617-927-7171
NJ	Wyckoff, Component Parts Unlimited	201-445-6242
NY	Penfield, J. Lazor Assocs.	716-385-3300
Pa	Broomall, A.M. Tech. Sls. Co.	215-356-0574
Tex	Richardson, R. Marston Co.	214-235-3824

WILMAD GLASS CO., INC., Dept. EM, Buena, N.J. 08310, Tel: 609-697-3000, TWX: 510-687-8911; Empl.: 100

WILMAR ELCTRNS. INC., Dept. EM, 2430 Amsler St., Torrance, Cal. 90505, Tel: 213-326-6668; FSC No.: 25248; Empl.: 22

Local Sales Offices & Reps.

Cal	San Francisco, Davis & Gregory Co.	415-989-4137
Minn	Golden Valley, Beta Engineering Corp.	612-546-2215
Neb	Omaha, Bert Gurney & Assocs.	402-342-8445
Ohio	Dayton, Bek Assocs.	513-278-1343
Pa	Oreland, Tech. Instr. Sls. Co.	215-885-6571
Wash	Seattle, Seatronics, Inc.	206-767-4330

Advertisement

WILMAR ELECTRONICS, INC. is a manufacturer of Protective Relays, Power Monitors and Solid State Sensors. Over/undervoltage relays, over/underfrequency relays, reverse power relays, phase failure & phase sequence relays; current, differential, paralleling, overload relays. Power factor relays, monitors & Test Equipment.

WILMORE ELCTRNS. CO., Dept. EM, Box 2973, W. Durham Sta., Durham, N.C. 27705, Tel: 919-489-3318; Empl.: 40 .... p. 3356,3357

Sales Manager: J.L. Harris

WILSON ELECTRONICS, Dept. EM, 4288 S. Polaris Ave., PO Box 19000, Las Vegas, Nev 89119, Tel: 702-739-1931; Empl.: 175

Local Sales Offices & Reps.

Ala	Birmingham, Mid-South Assocs.	205-324-1243
Ala	Montgomery, Mid-South Assoc.	205-264-1585
Ala	Tinson, Mid-South Assoc.	205-681-2704
Ariz	Tempe, Berrett & Assocs.	602-839-4234
Cal	Glendora, Don Forth Assoc.	213-335-3926
Cal	Glendora, Don Forth Assoc.	213-335-3926
Cal	Half Moon Bay, Wilkins-Mason Assoc.	415-726-9263
Cal	National City, Don Forth Assoc.	714-477-5239
Cal	Novato, Wilkins-Mason Assoc.	415-883-6593
Cal	Oakland, Wilkins-Mason Assoc.	415-428-1100
Cal	Petaluma, Wilkins-Mason Assoc.	707-763-1897
Cal	Redwood City, Wilkins-Mason Assoc.	415-368-3652
Cal	Sacramento, Wilkins-Mason Assoc.	916-488-6315
Cal	West Covina, Don Forth Assoc.	213-967-2893
Colo	Denver, Rasmussen & Assoc.	303-320-1993
Del	Newark, Divincent Assoc.	302-731-1475
Fla	Lakeland, Dixie Elctrns. Assocs.	813-682-6624
Fla	Tampa, J. Flanders Assoc.	813-870-0521
Ga	Atlanta, Mid-South Assoc.	404-636-1612
Ill	Chicago, Ted Pappas & Assoc.	312-685-2338
Ill	Chicago, Theodore Pappas & Assocs.	312-784-1878
Ind	Boise, Rasmussen & Assoc.	208-377-2344
Ind	Hobart, Ted Pappas & Assoc.	219-942-6457
Kans	Lenexa, Palatine Sls.	913-492-7020
Mass	Northboro, Commercial Mktg. Assoc.	617-393-2411
Mass	Sudbury, Commercial Mktg. Assocs.	703-549-4955
Minn	Edina, Aylward Corp.	612-941-5513
Minn	Minneapolis, Aylward Corp.	612-333-5832
Mo	St. Louis, Palatine Sls.	314-434-1974
Nev	Omaha, Palatine Sls.	402-493-0901
NJ	Magnolia, Divincent Assoc.	
NJ	Moorestown, Divincent Assoc.	609-235-8299
NM	Albuquerque, Comm-Rep	505-296-1956
NY	Middle Village, BCD Sls.	212-894-1331
Ohio	Medina, T. Grant Assocs.	216-723-3696
Ohio	Reynoldsburg, Tom Grant Assoc.	614-861-8849
Ohio	Reynoldsburg, Tom Grant Assoc.	614-861-2070
Ohio	Westfield Center, Tom Grant Assoc.	216-887-5302
Ore	Portland, R. Merritt Co.	503-223-3042
Pa	Folsom, Divincent Assoc.	215-544-6719
Pa	McMurray, Tom Grant Assoc.	412-941-5426
Pa	Newton Square, Divincent Assoc.	215-356-5776
Tenn	Memphis, Mid-South Assoc.	901-332-1380
Tex	Dallas, Techno Assoc.	214-357-0905
Tex	Dallas, Techno Assocs.	214-357-9212
Tex	Dallas, Techno Assoc.	214-352-5813
Tex	Irving, Techno Assoc.	214-255-5850
Tex	Louisville, Techno Assoc.	214-370-0969
Utah	Salt Lake City, Rasmussen & Assoc.	801-467-6615
Utah	Salt Lake City, Rasmussen & Assoc.	801-467-6615
Va	Warrenton, Divincent Assoc.	703-347-9589
Wash	Bellevue, R. Merritt Co.	206-746-7337
Wash	Bellevue, R. Merritt Co.	206-455-1386
Wash	Seattle, R. Merritt Co.	206-364-1847
Exp:	N.Y., Westbury, Minthorne Int'l. Co.	516-334-3303

H. F. WILSON ENGRG. CO., Dept. EM, 21W173 Hill Ave., Box 589, Glen Ellyn, Ill. 60137, Tel: 312-469-8473, Telex: 72-1438

Sales Manager: H. Wilson; *Distributor Manager:* R. Carroll

Local Sales Offices & Reps.

Cal	Anaheim, R. J. Grace & Co.	714-974-1370
Fla	Indialantic, M & M Assocs.	305-733-2701
Mass	Hudson, EPE Corp.	617-562-9123
Mich	Traverse City, M. Langan & Assocs.	616-947-2226
Minn	St. Paul, G. Klossner & Assocs.	612-483-8862
Mo	Bridgeton, H. F. Wilson Engrg. Co.	314-291-5556
NJ	Bayonne, Selstar Prods. Co.	201-437-1220
Ohio	Springfield, J. Kueker & Assocs.	513-325-6631
Ore	Portland, V. Voorhees & Assocs.	503-292-9313
Tex	Richardson, W. Rice Co.	214-691-6495
Va	Manassas, J. A. Dingran & Assocs.	703-361-2928
Wisc	Milwaukee, W. A. Klinger & Son	414-351-1775

WILSON CO., H. M., Dept. EM, 11501 Chimney Rock Rd., Houston, Tex. 77035, Tel: 713-729-1183; Empl.: 5

Local Sales Offices & Reps.

Tex	Dallas, Carey-Wolf Assocs.	817-738-1996
Tex	Houston, Carey-Wolf Assocs.	713-721-2442

WILTRON CO., Dept. EM, 930 E. Meadow Dr., Palo Alto, Cal 94303, Tel: 415-494-6666, TWX: 910-373-1156; FSC No.: 20944; Empl.: 130

Sales Manager: W.L. Baxter

Local Sales Offices & Reps.

Ala	Huntsville, Currie, Peak & Frazier	205-536-5650
Ariz	Tempe, Trembly Assocs.	602-966-4428
Cal	Anaheim, Blair Assocs.	714-635-1350
Cal	San Jose, MCH Assocs.	408-246-7330
Cal	San Jose, MCH Assocs.	408-246-7330
Colo	Boulder, H. Bass Assocs.	303-499-7509
Fla	Orlando, Currie, Peak & Frazier	305-855-0843
Ill	Chicago, Scientific Sls. Corp.	312-775-7594
Ind	Indianapolis, Scientific Sls. Corp.	317-253-4606
Md	Baltimore, Sci-Rep	301-321-1411
Mass	Waltham, McBar Assocs.	617-890-0233
Minn	Bloomington, Scientific Sls. Corp.	612-881-3300
NJ	Haworth, Central Assocs.	201-568-0808
NJ	Pennsauken, Himmelstein Assoc.	609-662-3081
NM	Albuquerque, Trembly Assocs.	505-266-8616
NY	East Syracuse, Ossmann Instrs.	315-437-6666
NY	Plainview, Central Assocs.	516-433-0808
NY	Rochester, Ossman Instrs.	716-328-2230
NY	Vestal, Ossman Instrs.	607-785-9947
NC	Greensboro, Currie, Peak & Frazier	919-273-3040
Tex	Richardson, Lear Assocs.	214-231-5388
Va	Falls Church, Sci-Rep	703-573-8787
Wash	Seattle, Delcom Sls. Co.	206-248-0090

Ⓣⓜ**WINCHESTER RELAYS** - reed relays - Elctrn. Instr. & Specialty

WIRE CLOTH ENTERPRISES, INC., Dept. EM, 130-132 Gamma Dr., R.I.D.C., Pittsburgh, Pa. 15238, Tel: 412-781-1390; Empl.: 8

WIRE RESEARCH CORP., Dept. EM, 1228 S. Village Way, Santa Ana, Cal. 92705, Tel: 714-547-6456, TWX: 910-595-2521; Empl.: 8

Sales Manager: J. Lillibridge

WIREFLEX INCORPORATED, Dept. EM, 502 Old Route 30 East, Bourbon, Ind. 46504, Tel: 219-342-5315, TWX: 810-297-2662; Empl.: 62

Sales Manager: P. Herndon

WIREMOLD CO., Dept. EM, West Hartford, Conn. 06110, Tel: 203-233-6251, TWX: 710-425-6281; Empl.: 800

Local Sales Offices & Reps.

Cal	Danville, J.R. Griffin	415-433-5744
Cal	Los Angeles, Airey-Thompson	213-264-1533
Colo	Denver, R.B. Schumann	303-534-1058
Conn	Farmington, E.W. Selnau	203-673-4979
Conn	Hartford, Home Office	203-233-6251
DC	Washington, T.J. Pugh	301-868-6437
Fla	Tampa, J.D. Whetsell	813-988-5860
Ga	Decatur, R.L. Pace	404-981-4385
Ill	Lombard, J.E. Reisch	312-297-3240
Ill	Palatine, R. E. Horn Reisch	312-297-3240
Iowa	Harlan, W.J. Kelley	402-344-2656
La	New Orleans, United Sls. Assoc.	504-733-8711
Md	Baltimore, A.B. French	301-825-1305
Mass	Boston, R.T. Bennett	617-246-1131
Mich	Livonia, R. Frazier	313-227-9599
Minn	Minneapolis, H.G. Schendel	612-920-6886
Mo	Kansas City, V.A. Meier	816-452-9076
Mo	St. Louis, A.F. Tubbesing	314-842-2455
NJ	Englishtown, John E. Finley	212-233-3328
NJ	Jersey City, P.F. McGovern	201-963-3280
NY	Babylon, A.C. Bradbury	516-587-2318
NY	North Syracuse, A. Simone	315-451-0400
NY	Rochester, D. R. Bowman	716-544-8581
NC	Charlotte, H.M. Short	704-334-7060
Ohio	Cincinnati, C.J. Wirtz	513-821-3254
Ohio	Cleveland, Larry L. Owen	216-781-5135
Okla	Oklahoma City, R. Diachenko	405-751-1080
Ore	Portland, D.A. King	503-228-1990
Pa	Glenmoore, W.A. Gibson	215-469-6453
Pa	Philadelphia, R.B. French	215-887-0964
Pa	Pittsburgh, W. Simon	412-421-9491
Tex	Dallas, W.R. Moseley	214-637-6432
Tex	Houston, R. LeMaster	713-523-1316
Utah	Salt Lake City, D.E. Blomquist	801-533-9303
Wash	Seattle, Strohecker, Inc.	206-623-0357
Wash	Spokane, W.D. Beach	509-624-2518
Wisc	Milwaukee, E. J. Szopinski	414-251-4020

WOLFF ELECTRONICS, Box 121, Dept. EM, 43-07 Fox Run Dr., Plainsboro, N.J. 08536, Tel: 609-799-2887

WOLVERINE PENTRONIX, see Pentronix Div.

(TM)WOOD ELECTRIC - circuit breakers - Potter & Brumfield

WORKMAN ELECTRONIC PRODS., INC., Dept. EM, Box 3828, Sarasota, Fla. 33578, Tel: 313-371-4242, TWX: 810-864-0401; Empl.: 150

Sales Manager: J.M. Price

Local Sales Offices & Reps.

Cal	Redwood City, Sinai-Johnson Inc.	415-365-6263
Cal	W. Covina, Bidwell Sls. Assoc.	213-532-7303
Colo	Colorado Springs, Norris & Co.	303-576-3324
Fla	Miami, Raulson & Co.	305-264-6003
Ga	Jonesboro, Dixie Elect. Assocs.	404-478-0603
Ill	Bolingbrook, G. Sangwin	312-736-7966-67
Ind	Carmel, Mid-Central Sls.	
Iowa	Des Moines, Lectro Reps	515-276-6387
Kans	Edwardsville, Lectro Reps, Inc.	913-441-3661
Ky	Fern Creek, Mid-Central Sls.	502-239-5614
Md	Baltimore, Pecore Assoc.	301-744-4434
Mass	Wellesley, Larry Cole Inc.	617-237-1260
Mass	W. Springfield, Larry Cole Inc.	413-781-3040
Mich	Detroit, Burcaw Co. & Assoc.	313-533-7700
Minn	St. Paul, E.W. Oszman	612-488-1811
Miss	Jackson, Dixie Elect. Assocs.	601-956-1399
Mo	Liberty, Lectro Reps, Inc.	816-781-2522
Mo	St. Charles, Lectro Reps, Inc.	314-723-8736
NJ	Englewood, S. Axelrod Assoc.	201-871-0600
NY	Camillus, Callahan-Ferguson Co.	315-487-3870
NY	Manilus, Callahan-Ferguson Co.	315-682-9301
NC	Burlington, E.P. Ester & Co.	919-584-1568
Ohio	Cleveland, H. Miller Sls. Co.	216-321-3900
Ohio	Jamestown, H. Miller Sls. Co.	513-675-2059
Ohio	Wickliffe, H. Miller Sls. Co.	216-585-3278
Pa	Allentown, EKP Assocs.	215-264-4637
Pa	Aston, EKP Assocs.	214-459-4517
Pa	Easton, Kaiser Assoc.	215-258-6484
Pa	Monroeville, H. Miller Sls.	412-327-7766
Tenn	Gallatin, Dixie Elect. Assocs.	615-452-9850
Tex	Dallas, Techno Assocs.	214-357-9213
Wash	Seattle, D. Smith Sls. Co.	206-633-3160
Wisc	Brookfield, G. Sangwin	414-782-3240
Exp:	Cal., San Francisco (Hawaii), Tech. Sls. Assocs.	415-467-1434
Exp:	Fla., Miami Lakes, West Indies Sls.	305-592-8188

WOVEN ELCTRNS., Southern Weaving Co., Dept. EM, Box 189, Mauldin, S. C. 29662, Tel: 803-963-5131, TWX: 810-287-2091; Empl.: 100 .... p. 4716,4717

Local Sales Offices & Reps.

Ariz	Phoenix, Interconnect Sls.	602-252-8254
Cal	Anaheim, Solomon Tech. Sls.	714-634-2081
Cal	Redwood City, Solomon Tech. Sls.	415-367-0835
Fla	Pompano Beach, V. G. Sls.	305-971-0900
Ill	Chicago, Electrical Cable & Access.	312-266-0102
Kans	Shawnee, Zinsmaster & Assocs.	913-362-5512
Md	Bethesda, Warren Mount Co.	301-657-9312
Minn	Minneapolis, P. Ericson & Assoc.	612-884-1969
NH	Hampton Falls, R. C. Thuet Co.	603-778-0760
NY	Manlius, Marden-Taylor Assoc.	315-446-9280
NC	Greensboro, E. Logan Tontz Co.	919-299-3641
Ohio	Cincinnati, SAI, Mktg. Corp.	513-761-5432
Ore	Portland, Elctrn. Comp. Sls.	503-245-2342
Pa	Jenkintown, Warren Mount Co.	215-886-0383
Pa	York, Warren Mount Co.	717-757-5823

WROUGHT WASHER MFG., INC., Dept. EM, 2252 S. Bay St., Milwaukee, Wisc. 53207, Tel: 414-744-0771, TWX: 910-262-3101; Empl.: 250

WYLE COMPUTER PRODS., Dept. EM, 3200 Magruder Blvd., Hampton, Va 23666, Tel: 804-838-0122, TWX: 710-882-0086; Empl.: 25

Local Sales Offices & Reps.

Colo	Denver, Fry-Gates Co.	303-756-9886
NM	Albuquerque, Fry-Gates Co.	505-298-1875
Utah	Salt Lake City, Fry-Gates Co.	801-277-0523

X-ACTO, A UNIT OF CBS, Dept. EM, 45-35 Van Dam St., Long Island City, N.Y. 11101, Tel: 212-392-3333, Telex: Fetage; Empl.: 200

Sales Manager: A. Luonoo

(TM)XECAULK - caulking compound for EMI/RFI shielding - Metex Corp.

(TM)XECON - conductive elastomer for EMI/RFI shielding - Metex Corp.

(TM)XECON POLASTRIP - EMI/RFI shielding elastomer gasket - Metex Corp.

(TM)XECOTE - liquid EMI/RFI shielding compound - Metex Corp.

(TM)XEMENT - compound for EMI/RFI shielding - Metex Corp.

(TM)XENOLITE - arc lamp sys - Christie Elec.

XENTEK, INC., Dept. EM, 279 S. Pacific St., San Marcos, Calif. 92069, Tel: 714-744-3346, TWX: 910-322-1155; FSC No.: 53279; Empl.: 80

Local Sales Offices & Reps.

Cal	San Diego, Mesa Engr.	714-278-8021
Cal	Sunnyvale, RDP Inst.	408-735-9040
Fla	Tampa, Reptronics	813-879-8730
Ill	Chicago, E. Joyner Co.	312-968-8383
Md	Randalstown, Beacon North Inc.	301-922-1248
Mass	Natick, Wayland Engrg. Sls.	617-655-6080
Mich	Southfield, Fred Gehrke & Assoc.	
Mo	St. Louis, Gordon Fixman Engrg.	314-725-5219
NY	Pompey, S. F. Foster Co.	315-677-3333
NY	Webster, S. F. Foster Co.	716-265-2072
Ohio	Dayton, The Dynel Co.	513-434-6467
Okla	Tulsa, Allied Comps. Inc.	918-492-7771
Tex	Austin, Allied Comp. Inc.	512-459-0761
Tex	Dallas, Allied Components Inc.	214-238-0408
Tex	Houston, Allied Components Inc.	713-691-3961
Va	Falls Church, Beacon North Inc.	703-534-7200
Wash	Seattle, Underwood/Jensen & Assoc.	206-575-0123
WVa	Lynchburg, Beacon North Inc.	804-237-4740

(TM)X-L - power supply - Transistor Devices

(TM)XLS - soldering pencils - Wall-Lenk Mfg. Co.

(TM)XL-TC - power and control cable - Brand-Rex Co.

(TM)X-OLENE - cross linked polyethylene cable - Okonite Co.

(TM)XR2 SERIES - 2-way catv amplifiers - Theta-Com CATV

(TM)X SERIES - exit auxiliary lights - Teledyne Big Beam

(TM)XTRADUR - soldering tips - Hexacon Elec. Co.

(TM)X-WAY STIC - X-ray high voltage rectifier - Semtech Corp.

Y-L PRODUCTS CO., INC., Dept. EM, Box 188, Yeadon, Pa. 19050, Tel: 215-LU3-2800

Sales Manager: W.R. Law

Local Sales Offices & Reps.

Cal	San Francisco, Sara Scientific Sls.	415-421-3172
Fla	Pompano Beach, Cole-Tek Assoc.	305-781-8110
NJ	Metuchen, Motion Control Devices	201-494-6161

(TM)YELLOW HANDLE - crimping tools - Amp Inc.

YELLOW SPRINGS INSTRUMENT CO., Dept. EM, Box 279, Yellow Springs, Ohio 45387, Tel: 513-767-7241, Telex: 205437; Empl.: 300; Minimum order: $R. Heggemann

Sales Manager: J. Gerdes; *Distributor Manager:* R. Heggemann

Local Sales Offices & Reps.

Ariz	Tucson, Grady Moore & Assocs.	602-795-3176
Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4504
Colo	Lafayette, Grady Moore & Assocs.	303-494-3351
Fla	Orlando, Datarep, Inc.	305-843-5224
Ga	Atlanta, Craft Assoc.	404-256-0420
Ill	Chicago, Liz Industrial Sls.	312-943-5122
Mass	Norwell, Bordewieck Engrg. Sls. Co.	617-659-4915
Mich	Brighton, Cesko Sls. Co.	313-227-5061
NJ	Cinnaminson, Control Equip., Inc.	609-829-1447
NJ	Springfield, RJM Sls.	201-467-1210
NM	Albuquerque, Grady Moore & Assocs.	505-292-3322
NC	Charlotte, Sloan Assoc., Inc.	704-523-2122
Ohio	Dayton, RDP Assocs.	513-253-6175
Ohio	Richfield, RDP Assoc.	216-526-5260
Pa	Pittsburgh, RDP Assoc.	412-242-2844
Tex	Austin, MZB & Assoc.	512-454-4371
Tex	Dallas, MZB & Assoc.	214-233-5535
Va	Richmond, Sloan Assoc., Inc.	804-359-6051

Local Distributors

Cal	Pasadena, RDX Corp.	213-792-4041
Cal	Sunnyvale, RDX Corp.	408-734-4504
Fla	Orlando, Datarep Inc.	305-843-5224
Ill	Chicago, Newark Elec. Corp	312-638-4411
Ill	Chicago, Liz Ind'l Sls.	312-943-5122
La	Harvey, Gordon Instr. Co.	504-368-6152
Mass	Norwell, Bordewieck Engr.	617-659-4915
Mich	Brighton, Cesko Sls. Co.	313-227-5061
Minn	Minneapolis, Pilot Ind. Corp.	612-941-7400
NJ	Cinnaminson, Control Equip. Inc.	609-829-1447
NJ	Springfield, RJM Sls.	201-467-1210
NY	E. Rochester, Thermal Sys. Inc.	716-377-1970
NY	Syracuse, Thermal Sys.	315-458-5202
NC	Charlotte, Sloan Assoc.	704-523-2122
Ohio	Dayton, Whelan Corp.	513-434-7551
Tenn	Chattanooga, Coleman Assoc.	615-821-0235
Tex	Ft. Worth, Southwest Controls	817-268-1569
Va	Richmond, Sloan Assocs.	804-359-6051

YEWTEC CORP., See Yokogawa Corp. of America

(TM)YEW - electrical measuring & recording - Yokogawa Corp. of America

YOKOGAWA CORP. OF AMERICA, Dept. EM, 5 Westchester Plaza, Elmsford, N.Y. 10523, Tel: 914-592-6767, TWX: 714-567-1256; Empl.: 10 p. 2961,2973

Sales Manager: J.V. Stegenga

Local Sales Offices & Reps.

Ala	Huntsville, Technical Sls.	205-881-1750
Ariz	Tempee, J. Smith & Assoc.	602-968-7025
Cal	Palo Alto, Held & Mollard	415-965-9321
Cal	Santa Ana, L. Brooks Co.	714-544-8900
Colo	Denver, J. Smith & Assoc.	303-442-7100
Conn	Hamden, Applied Measurements	203-288-5288
Del	Wilmington, Spring Assoc.	302-656-0999
Fla	Orlando, RJC Assoc.	305-894-7371
Ill	Arlington Heights, Dytec/Central	312-394-3380
Kans	Overland Park, Dytec/South	913-384-2710
Mass	Acton, Applied Measurements	617-263-2766
Minn	Minneapolis, Volco Co.	612-933-6631
Mo	St. Louis, Dytec/South	314-423-9595
Neb	Omaha, Volco Co.	402-393-5141
NM	Albuquerque, J. Smith & Assoc., Inc.	505-265-3406
NY	Liverpool, Rayelco Elctrns.	315-652-5272
NY	Port Chester, Radiation Elctrns.	914-937-2300
Ohio	Columbus, Measurement Instrs.	614-274-1144
Pa	Endenheim, Tech. Instr. Sls.	215-885-6571
Tex	Houston, EV Smith Sls. Co.	713-649-5756
Va	Richmond, Meter Metric	804-285-3932
Wash	Seattle, S J I Corp.	206-624-9020

Local Distributors

Ala	Mobile, Brownell Electro	205-479-8581
Ariz	Phoenix, Metermaster	910-244-9441
Cal	Gardena, E.I.L.	213-321-5891
Cal	Glendale, Western Elctrn.	213-245-1226
Cal	Los Angeles, Metermaster	213-685-4340
Cal	Oakland, Western Electro	415-452-1936
Cal	Palo Alto, Metermaster	415-968-0313
Cal	San Diego, Metermaster	714-560-4841
Conn	Middletown, Mancib	203-346-6646
Fla	Miami, Electro Standard Lab	305-633-6973
Fla	Orlando, Brownell Electro	305-843-6775
Ga	Atlanta, Brownell Electro	404-762-5181
Ill	Bridgeview, E.I.L.	312-430-2292
Ill	Chicago, W.H. Leary	312-721-3832
Ill	Elk Grove Village, Meter Makers	312-439-5050
Ill	Elk Grove Village, Metermaster	312-593-8650
Ill	Oak Park, Pacific Indicator	312-261-1330
Ill	Rockford, Rockford Instrt. Lab	815-397-1004
Ind	Indianapolis, Rockwell Engrg.	317-251-9453
Ind	Indianapolis, EIL	317-545-1373
Ky	Bowling Green, Electrical Sls. Engrg.	502-842-6728
La	New Orleans, Industrial Instrs. Works	504-733-8355
Md	Savage, Pyttronic Inds.	301-792-7000
Md	Timonium, E.I.L.	301-252-1260
Mass	Billerica, Metermaster	617-667-8346
Mass	Burlington, The Mancib Co.	617-272-9450
Mich	Ferndale, Ram Meter	313-547-1000
Minn	Minneapolis, Instrumentation Svcs.	612-544-8916
Mo	St. Louis, Industrial Svc. Lab	314-535-5760
Mo	St. Louis, Scherrer Instrs.	314-644-5362
NJ	Totowa, Ampower Elctrn. Instr.	201-742-3215
NY	Clarence, Trott Elctrns.	716-634-8500
NY	Long Island City, Meter Mod Instrs.	212-726-4850
NY	Mount Vernon, Electrical Instr. Svc.	914-699-9717
NY	New York, Nilsson Electric Lab.	212-925-1730
NC	Charlotte, Brownell Electro	704-394-4341
Ohio	Cleveland, Cam/Ohio	216-461-4700
Ohio	Cleveland, Christie Lab.	216-651-4100
Ohio	Dayton, E.I.L.	513-435-2134
Ore	Portland, Westcom	503-285-6629
Pa	Philadelphia, Sunshine Scientific Instr.	215-673-6600

Pa	Philadelphia, Herbach & Rademan	215-426-1700
Pa	Philadelphia, Rumsey Elect.	215-456-2500
Pa	Pittsburgh, E.I.L.	412-731-5230
Pa	Pittsburgh, CAM RPC	412-288-2600
RI	North Kingston, E.I.L.	401-885-1773
Tenn	Memphis, Brownell Electro	901-332-9258
Tenn	Nashville, Brownell Electro	615-889-8230
Tex	Beaumont, Straughn Elctrns.	713-838-4653
Tex	Garland, Metermaster	214-271-5671
Tex	Houston, Meter & Instrs	713-644-1631
Tex	Houston, Nunn Electric Supply Corp.	713-676-0100
Va	Alexandria, E.I.L.	703-354-4330
Va	Richmond, I.T.R.	804-288-7198
Wisc	Milwaukee, Electro Mechano Co.	414-272-4050

ZEHNTEL, INC., Dept. EM, 2440 Stanwell Dr., Concord, Cal. 94520, Tel: 415-676-4200, TWX: 910-481-9471; Empl.: 85

Sales Manager: J. Denning

Local Sales Offices & Reps.

Ala	Huntsville, Gentry Assocs.	205-534-9771
Cal	Concord, GPA	415-798-6344
Cal	Costa Mesa, Measurement Assocs.	714-540-7160
Conn	Hamden, Equipment Sls. Co.	203-248-5581
Fla	Orlando, Gentry Assocs.	305-894-4401
Ga	Atlanta, Gentry Assocs.	404-448-2365
Ill	Chicago, Solid State Elctrns.	312-889-8033
Ill	Crystal Lake, Zehntel, Inc.	815-455-2082
Mass	Chelmsford, Equipment Sls. Co.	617-256-8547
Minn	Minneapolis, Engrg. Prods. Assocs.	612-925-1883
Mo	Springfield, Del-Tech Assocs.	417-881-3667
NJ	Cinnaminson, Stern & Stout Assoc.	609-829-2289
NJ	Wayne, K & J Assocs.	201-694-3334
NY	De Witt, D-B Assocs.	315-446-0220
NY	East Setauket, K & J Assocs.	516-751-8686
NC	Burlington, Gentry Assocs.	919-227-3639
Ohio	Dayton, Ames Corp.	513-435-9730
Tex	Dallas, Metron-Central	214-234-1411
Wash	Lynwood, Systems Specialists	206-652-8617
Exp:	N.Y. New York, BFI Elctrns.	212-757-9130

ZEISS, INC. CARL, Dept. EM, 444 5th Ave., New York, N.Y. 10018, Tel: 212-730-4400; Empl.: 200

Local Sales Offices & Reps.

Ariz	Phoenix, H. Koczinski	602-992-7062
Cal	Burbank, C. Zeiss	213-849-2121
Cal	Carlmichael, I.A. Burba	916-961-6154
Cal	San Leandro, C. Zeiss	415-352-3800
Colo	Englewood, R.W. Grover	303-771-2517
Conn	Manchester, R. Critz	203-646-5009
Fla	Plantation, C. Kuritzky	305-581-7179
Ga	Atlanta, C. Zeiss	404-451-0166
Ill	Oakbrook, C. Zeiss	312-654-0376
Mass	Wellesley, C. Zeiss	617-237-4640
Minn	Eagan, J. Feist	612-452-3795
Mo	Independence, M. Fenimore	816-373-6146
NY	Lakeview, C.E. Knight	716-627-5524
NY	Round Top, A. B. Schaefer	518-622-3396
NC	Apex, J. Nelles	919-362-8767
Ohio	Columbus, C. Zeiss	614-846-1800
Ohio	University Heights, J. Marcarello	216-932-1012
Pa	Lansdale, P.E. Neuschwander	215-855-9450
Pa	Springfield, R. Harbison	215-543-6913
Tex	Houston, C. Zeiss	713-629-0730
Va	Falls Church, C. Zeiss	703-821-1288
Wash	Bellevue, H. Schrader	206-454-2314

ZENITH CONTROLS INC., Dept. EM, 830 West 40th St., Chicago, Ill. 60609, Tel: 312-247-6400, Telex: 25-3703; Empl.: 125

Sales Manager: V. Helford

Local Sales Offices & Reps.

Ariz	Phoenix, A. Norton Co.	602-278-6481
Cal	Cerritos, Dennis Don & Assoc.	213-587-7125
Cal	El Cerrito, Saletta Sls.	415-236-9191
Colo	Englewood, L.S. Reed & Co.	303-761-6154
Conn	Bridgeport, M. A. Selmon Co.	203-366-3651
Fla	Brandon, J. Meeks & Assoc.	813-689-6137
Ga	Atlanta, Holman-Lobsinger Co. Inc.	404-256-9120
Ill	Westchester, Wasson-Gallagher Inc.	312-344-0690
Ind	Indianapolis, Indiana Electrical Sls.	317-849-3880
La	New Orleans, A. Levin & Assoc. Inc.	504-524-8489
Md	Bladensburg, D. Ewing & Assoc	301-779-1555
Mich	Livonia, A.J. Riopelle Co.	313-427-9114
Minn	Minneapolis, A.M. Johnson Co.	612-927-8741
Mo	St. Louis, L.E. Brunson Co.	314-522-6006
Neb	Omaha, Electric Equip. Sls. Co.	402-556-4198
NJ	Parlin, Martech	201-721-2200
NY	New York, NEPA Inc.	212-867-0340
NC	Charlotte, L.P. Spoon Inc.	704-372-3290
Ohio	Cleveland, Loesch Assoc. Inc.	216-241-4581
Pa	Fort Washington, Variable Elec. Prod. Co.	215-927-4200
Tenn	Memphis, Vincent Sls. Agency	901-682-4187
Tex	Dallas, Andres & Boruch Co.	214-621-3601
Va	Richmond, Marchant & Field Sls.	804-262-7333
Wash	Seattle, Clair Stebbins Co.	206-CH 6-1170
Wisc	Milwaukee, E.M.E. Assoc.	414-255-3010

ZENRAD CONTROLS CO., Dept. EM, 529 E. Gutierrez St., Santa Barbara, Ca. 93103, Tel: 805-965-4996; FSC No.: 33180; Empl.: 10

Local Sales Offices & Reps.

Cal	Newark, Buck Sls. Co.	415-651-4411

ZERO CORP., Dept. EM, 777 Front St., Burbank, Cal. 91502, Tel: 213-846-4191; Empl.: 1260 p. 1160,1161

Local Sales Offices & Reps.

Ala	Huntsville, D & B Sls. Co.	205-852-6347
Ariz	Phoenix, Howe & Howe Sls., Inc.	602-264-7971
Cal	Burbank, Zero-West Div.	213-846-4191
Cal	Palo Alto, Northern Cal. Sls. Off.	415-964-7700
Cal	San Diego, Clark & Co.	714-296-6351
Colo	Denver, Fry-Gates Co.	303-722-4674
Fla	Cape Coral, F. Field Sls.	813-542-7172
Fla	St. Petersburg, Jim Angelos	813-531-8991
Ill	Elk Grove Village, Carlson Elctrns. Sls.	312-956-8420
Ind	Indianapolis, L.M. DeVoe Co.	317-257-1227
La	New Orleans, Davies Assocs.	504-522-9027
Md	Baltimore, R. P. Luce & Co.	301-752-8200
Mass	Monson, Zero-East Div.	413-267-5561
Mich	Bloomfield Hills, Enco Mktg.	313-642-0203
Minn	Bloomington, Electronic Sls. Agcy. Inc.	612-884-8291
Mo	St. Louis, Cadon Technical Sls.	314-991-0262
NJ	Berkeley Heights, R.P. Luce & Co.	201-464-6440
NM	Albuquerque, Fry-Gates	505-298-1875
NY	Buffalo, Rudell Assoc.	716-634-4300
NY	East Syracuse, Fountain Young & Co.	315-437-7733
NY	New Hyde Park, R.P. Luce & Co.	516-437-4550
Ohio	Richfield, N. Bear Corp.	216-659-3131
Pa	Philadelphia, R.P. Luce Co.	215-884-8365
Tex	Dallas, J. Gibbs & Assocs.	817-430-1861
Tex	Fort Worth, J. Gibbs & Assocs.	817-237-1455
Tex	Houston, Electra Sls.	713-748-8235
Wash	Bellevue, Ruggles Tech. Sls.	206-455-2778
Exp:	Can., Mississauga, Ont., Pipe/Thompson, Ltd.	416-274-1269.

Local Distributors

Cal	Glendale, R.V. Weatherford Co.	213-849-3451
Md	Beltsville, Treeko Sls., Inc.	301-937-8260
Mass	Woburn, Rush Industries, Inc.	617-935-2400
Mich	Farmington, Diplomat/Northland	
Mich	Kentwood, R.M. Elctrns.	
NY	Binghamton, ASI Distributors	
NY	Bohemia, CAR-LAC Elctrn. Industries Sls.	516-567-4200
Ohio	Cincinnati, Hughes-Peters, Inc.	513-351-2000
Ohio	Cleveland, CMP Distributor	216-333-5650
Ohio	Columbus, Hughes-Peters Inc.	
Wash	Seattle, Zepher Elctrn. Sls. Corp.	206-575-0922

™ZERO CENTURION - Carrying Cases - Zero Corp.

ZERO-EAST DIV., Dept. EM, 288 Main St., Monson, Mass. 01057 p. 1160,1161

™ZERO-HALLIBURTON - Aluminum Luggage & Camera Cases - Zero Corp.

™ZEROMATIC - ph measuring instrs. - Beckman Instrs., (AISSD)

™ZERO-PLY - Sandwich Construction Modular Cases - Zero Corp.

™ZERO QUIP - Work Stations - Zero Corp.

ZERO-SOUTH DIV., Dept. EM, Box 6275, Clearwater, Fla. 33518, Tel: 813-531-8991, TWX: 810-863-0322; Empl.: 130

Local Sales Offices & Reps.

Ala	Huntsville, Mara Research & Sls.	205-539-3270
Fla	Lighthouse Point, F. Field	305-427-4873
Ga	Stone Mountain, F. Peters	404-469-1662
Ind	Indianapolis, L. M. DeVoe	317-257-1227
La	New Orleans, Davies & Assocs.	504-522-9027
Md	Baltimore, R.P. Luce & Co.	301-752-8200
NC	Greensboro, M. Adams	919-299-2629
Tex	Ft. Worth, John Gibbs	817-237-1455
Tex	Houston, Carnell & Clarke	713-748-8235
WVa	Richmond, R.P. Luce & Co.	804-276-2903

ZETA LABORATORIES, INC., Dept. EM, 3265 Scott Blvd., Santa Clara, Cal. 95051, Tel: 408-246-6001, TWX: 910-338-7336; FSC No.: 31260

Sales Manager: C.P. Dudley

Local Sales Offices & Reps.

Ariz	Scottsdale, Carter Assocs.	602-947-4355
Cal	Santa Clara, Zeta Labs.	408-246-6001
Cal	Tustin, Zeta Labs.	714-731-2341
Colo	Parker, Technical Mktg. Assocs.	303-841-3435
Fla	Clearwater, Brennan Assocs.	813-446-5006
Md	Lanham, Brimberg Sls.	301-552-2200
NH	Windham, Repco Co.	603-893-9539
NJ	Merchantville, L. Adezio Sls.	609-662-3540
NJ	Woodcliff Lake, F & F Assocs.	201-778-6767
NM	Albuquerque, Technical Mktg. Assocs.	505-298-4321
NY	Coram, F & F Assocs.	516-928-9666
NY	E. Syracuse, Ossmann Instrs.	315-437-6666
Tex	Dallas, Texas Avionics	214-368-3566
Utah	Salt Lake City, Technical Mktg. Assocs.	801-485-9381

ZEUS IND'L. PRODS., Dept. EM, Foot of Thompson St., Raritan, N.J. 08869, Tel: 201-526-0800, TWX: 710-480-9346; Empl.: 38

ZI-TECH DIV., Aikenwood Corp., Dept. EM, Box 26, 2151 Park Blvd., Palo Alto, Cal. 94302, Tel: 415-326-2151, Telex: 334-447; Empl.: 15

Local Sales Offices & Reps.

Cal	Costa Mesa, Robinson Technical Assocs.	714-557-1622
Cal	Mountain View, Energy Comps.	415-969-0330
Cal	San Diego, Mesa Elctrns.	714-278-8021
Conn	Thompson, B.C.S. Co.	203-923-9575
Fla	W. Palm Beach, Production Sls. Assocs.	305-689-0575
Ill	Elk Grove Village, Loren Green Assocs.	312-593-0282
Ind	Indianapolis, DeHaven Engrg.	317-297-1294
Ind	Indianapolis, Loren Green Assocs.	317-293-9827
Md	Baltimore, A. Rogers Co.	301-744-4162
Md	Silver Springs, Gawler Inc.	301-589-4406
Mass	Newton Center, Daner-Mayes Inc.	617-969-4650
Minn	Minneapolis, Loren Green Assocs.	612-781-1611
NJ	Allentown, Disc Sls.	609-259-3056
NY	New York, McIntosh Equip. Corp.	212-349-3288
Ohio	Bedford, Industrial Pump & Equip. Corp.	216-439-2424
Pa	Bristol, A. Rogers Co.	215-788-5071
Pa	Phoenixville, Disc Sls.	215-935-2055
Tex	Houston, Component Sls. Svc.	713-521-9771
Utah	Murray, Measurement Conslts.	801-268-3181

™ZIPEX - cable shielding - Cal-Metex Corp.

™ZIP-EX-2 - EMI/RFI cable shielding - Metex Corp.

ZIPPERTUBING CO., Dept. EM, 13000 S. Broadway, Los Angeles, Cal. 90061, Tel: 213-321-3901, TWX: 910-346-6713; Empl.: 50

Local Sales Offices & Reps.

Ariz	Phoenix	602-967-8888
NJ	Totowa	201-256-4980
Ohio	Cleveland	216-734-3286
Tex	Carrollton	214-245-3112

ZONIC TECHNICAL LABS., Dept. EM, 8927 Rossash Ave., Cincinnati, Ohio 45236, Tel: 513-891-6390, TWX: 810-461-2470; Empl.: 50

Local Sales Offices & Reps.

Cal	Pasadena, RDX Corp.	213-681-3451
Cal	San Diego, RDX Corp.	714-278-6863
Cal	Sunnyvale, RDX Corp.	408-734-4500
Conn	Hamden, Northeast Engrg.	203-248-4481
Md	Silver Springs, K. G. Electrns.	
Mass	Danvers, Northeast Engrg.	617-774-3010
Mo	St. Louis, Adelphi, Inc.	314-821-1232
Pa	Chester Springs, Letronix	215-458-8977
Wash	Bellevue, Topp Engrg. Sls. Corp.	

™Z VOLT - zener voltage reference - General Resistance, Inc.

AMPLIFIER RESEARCH

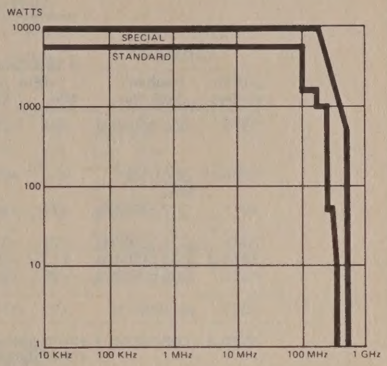
160 School House Road, Souderton, Pa. 18964 • Telephone (215) 723-8181

SERIES L 4-5000 WATTS 10 KHz-350 MHz

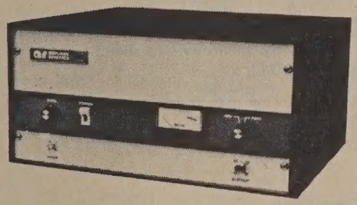
The L Series represents a group of broadband, Class A linear amplifiers. Standard models up to 5,000 watts and special models up to 10,000 watts of RF power with up to five decades of bandwidth in the 10 KHz to 450 MHz frequency range.

Model	RF Power (watts)	Frequency
Solid State		
4L	4	1-350 MHz
6LA	6	3-150 MHz
10L	10	1-300 MHz
10LA	10	1-110 MHz
20L	20	1-250 MHz
30LA	30	1-110 MHz
35L	35	1-300 MHz

Model	RF Power (watts)	Frequency
Solid State/Tubes		
30L	30	1-250 MHz
40L	40	1-240 MHz
60LA	60	4-150 MHz
100L	100	10 KHz - 220 MHz
100LM8	100	1-220 MHz
100LM9	100	1-200 MHz
200L	200	1-200 MHz
500L	500	10 KHz - 220 MHz
500LM8	500	1-220 MHz
500LM9	500	1-200 MHz
1000L	1000	10 KHz - 220 MHz
1000LM8	1000	1-220 MHz
1000LM9	1000	1-200 MHz
1500LA	1500	1-150 MHz
5000LA	5000	1-100 MHz



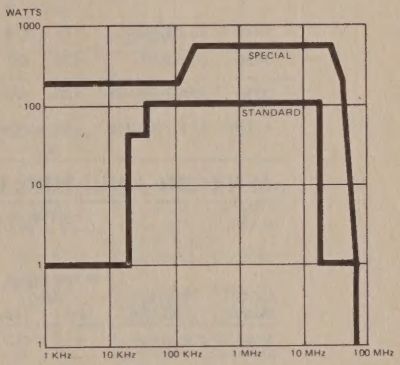
SERIES A 1-100 WATTS 100 Hz-70 MHz



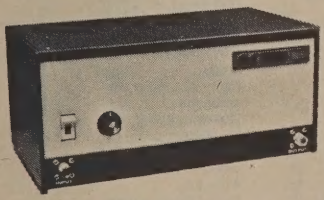
MODEL 100A15

These all solid state linear amplifiers provide low and moderate RF power with up to three decades of bandwidth. Standard models up to 100 watts and special models up to 500 watts from 100 Hz to 70 MHz.

Model	RF Power (watts)	Frequency
1A70	1	100 Hz - 70 MHz
4A15	4	20 KHz - 15 MHz
20A15	20	20 KHz - 15 MHz
40A12	40	20 KHz - 12 MHz
50A15	50	20 KHz - 15 MHz
100A15	100	35 KHz - 15 MHz
700A	700	10 - 250 KHz



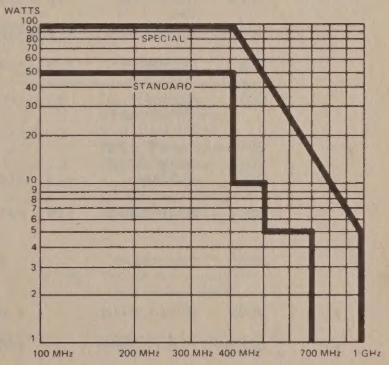
SERIES H 10-50 WATTS 120 MHz-700 MHz



MODEL 6HC

Available in sub-octave bandwidths from 100 to 1,000 MHz, these all solid state, Class C non-linear amplifiers provide moderate RF power in a rugged, economical package. Up to 50 watts with standard models and 100 watts with special models.

Model	RF Power (watts)	Frequency
10HU	10	120-220 MHz
10HA	10	225-410 MHz
50HA	50	225-410 MHz
10HB	10	300-500 MHz
6HC	6	400-700 MHz

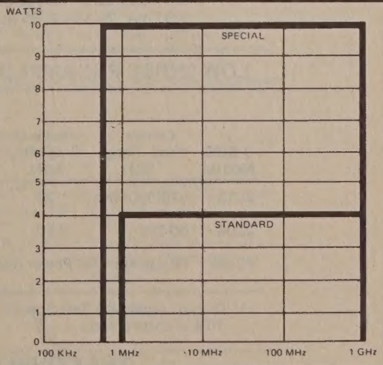


SERIES W 0.3-4 WATTS 1 MHz-1000 MHz

MODEL 1W1000

Our newest series of ultra-wide band, solid state linear amplifiers provide RF power over greater than three decades of bandwidth. Standard models up to four watts and special models up to 10 watts. Units available from 500 KHz to 1 GHz.

Model	RF Power (watts)	Frequency
W1000	0.35	1-1000 MHz
1W1000	1	1-1000 MHz
4W1000	4	1-1000 MHz



For Manufacturers Sales Offices refer to MANUFACTURERS, SALES OFFICES AND TRADE MARKS DIRECTORY

C-COR AMPLIFIERS

C-COR ELECTRONICS, INC.
60 DECIBEL ROAD • STATE COLLEGE, PENNSYLVANIA 16801 • PHONE (814) 238-2461

GENERAL PURPOSE WIDEBAND AMPLIFIERS

C-COR Models	Passband 3 dB Min.	OUTPUT CAPABILITY @ 1dB Comp. dBm Min.	OUTPUT CAPABILITY @ 1dB Comp. dBm Typ.	OUTPUT CAPABILITY Test Spec. (1) Vp-p	OUTPUT CAPABILITY Test Spec. (1) @ ohms	Gain Min. dB	NOISE Broad-band (rms) input (μV)	NOISE NF Typ. dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
3370	.002-900MHz	+20	+23	6.0	50	20	45	9	50:50	+28	300	2¾ x 3 x 5	Dimensions include cooling fins where applicable
3386-D	.0001-700 MHz	+ 8	+10	–	–	30	–	6	50:50	+28	90	1-3/8 x 2 x 4	60 dB reverse isolation
3311	.002-550MHz	+24	+26	10.0	50	26	30	9	50:50	+28	440	2¾ x 3 x 5	VSWR <1.5:1, Matched Output
3312	.002-550MHz	+26	+31	12.5	50	30	30	9	50:50	+28	440	2¾ x 3 x 5	Unmatched output
3374-A	.003-500MHz	+17	+20	12.0	100	20	80	–	1M:50	+28	340	2¾ x 3 x 5	Cin <5 pF
4313	.005-500MHz	+26	+30	14.0	50	40, 30, 20, 10	40	–	50:50	115 Vac 50-60Hz		5¼ x 8¾ x 11	Selectable gain; lab type amplifier
3393	dc-300MHz	+10	+13	1.6	50	20	25	9	50:50	±12	150	1-3/8 x 2 x 3	Inverting
4375-A	.003-300MHz	+30 @ 50MHz +25@300MHz		25.0	75	60, 40 20	30	–	50:50 75:75	115 Vac 50-60Hz		5¼ x 8¾ x 11	Selectable gain and Impedance; lab type amplifier
3362-E	.001-200MHz	+20	+22	6.3	50	20	50	–	50:50	+32	230	1¾ x 3½ x 6	
3364-E	.001-200MHz	+20	+22	6.3	50	40	35	–	50:50	+32	300	1¾ x 3½ x 9	
3366-E	.001-200MHz	+20	+22	6.3	50	60	35	–	50:50	+32	300	1¾ x 3½ x 12	Cin <10 pF; 5% distortion
4376-A	dc-200MHz	+11	+14	1.4	50	40, 20	55	–	1M:50	115 Vac 50-60Hz		5½ x 5¾ x 13	
3350	dc-50MHz	+20	+23	–	–	20	30	10	50:50	±15	150	1-3/8 x 2 x 4	Complementary symmetry push pull
3351	.0002-50MHz	+20	+23	–	–	20	30	10	50:50	+28	150	1-3/8 x 2 x 4	Complementary symmetry push pull
4329E	5Hz-130MHz	+25 to 70MHz		–	–	20	50	–	50:50	115 Vac 50-60Hz		5¼ x 8¾ x 11	

MIN-ECON—MINIATURE LOW-COST AMPLIFIER MODULES

C-COR Models	Passband 3 dB Min.	OUTPUT CAPABILITY @ 1db Comp. dBm Min.	OUTPUT CAPABILITY @ 1db Comp. dBm Typ.	OUTPUT CAPABILITY Test Spec. (1) Vp-p	OUTPUT CAPABILITY Test Spec. (1) @ ohms	Gain Min. dB	NOISE Broad-band (rms) input (μV)	NOISE NF Typ. dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
3596	8-300MHz	+ 4	–	1.0	50	20	35	–	50:50	+15	55	1¼ x 2¼ x 3¼ dimensions for all Min Econs	General purpose wide-band
3502	0.5-325MHz	+20	+23	6.3	50	6	–	–	50:50	+20	175		Linear post-amp, inverting
3580	25kHz-150 MHz	+ 4	+ 8	1.0	50	20	35	–	50:50	+15	55		Flat aligned for CW or pulse
3528	100Hz-100 MHz	+12	+13	2.5	50	20	25	–	50:50	+15	150		Wide dynamic range
3581-E	20Hz-60MHz	+ 4	+10	1.0	50	20	20	–	50:50	+10	30		Very low frequency response
3583	1.5-50MHz	+ 3	+ 4	1.0	50	20	–	4	50:50	+10	30		Wideband HF preamp; 5% distortion
3518	7.5ns RT; - 2% droop @ 2μS	–	–	±1.5Vp	50	20	30	–	50:50	+15	150		Inverting pulse amplifier; wide dynamic range
3596-A	2ns RT; 10% droop @ 1μS	–	–	±0.5Vp	50	20	30	–	50:50	+15	75		Fast risetime pulse amplifier
3567	dc-20MHz	+13	+19	5.0	50	x10	25	–	1k:50	±10	125		Direct coupled video; 5% distortion
3577	20Hz-12MHz	+18	+21	3.0	50	x20	25	–	2.2M:50	+25	90		Very low distortion video 1% @ 2Vp-p, 5% 4Vp-p dc
3593	5Hz-20MHz	–	+ 4	1.0	50	x 1	–	–	75:75	–15	50		Cable Equalization Amp. Tilt-none to +4 @ 10MHz
3595	50Hz-120kHz	–	+ 4	1.0	50	x10	20	–	5k:10	+15	60		Low Distribution Feed-back amp. THD <0.3%
3999WE	10.8-12.2MHz	–	+10	2.0	75	10-17 Var	–	–	75:75	+12	35		Filter Amp. Bandpass 10.8 - 12.2MHz
PS-22B	Power Supply for Min-Econ Amplifiers. Specify voltage and current rating desired. Available: 10 Vdc @ 90 mA, 12 Vdc, @ 90 mA, 15 Vdc @ 90 mA, 22 Vdc @ 90 mA, 24 Vdc @ 85 mA, 28 Vdc @ 80 mA and 36 Vdc @ 40 mA.									115 Vac 60 Hz		4-1/4 x 2-3/8 x 3-1/4	dc output may be positive or negative. Ripple 10 mV max. @ maximum load

LOW NOISE PREAMPLIFIERS

C-COR Models	Center Freq. Range MHz	Passband 3 db Min. MHz	OUTPUT CAPABILITY @ 1dB Comp. dBm Minimum	OUTPUT CAPABILITY dBm Saturation	Gain Min. dB	NF Typical dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
2212	470-890MHz	20	+ 4	–	28-20	3-4	75:75	+15	20	2 x 3½ x 3½	Type F Connector, UHF TV Preamp
2208	50-300	6-10	+10	–	20-26	3-5	75:75	+15	20	2-1/2 x 3-5/8 x 6½	FET VHF TV Preamp, Type F Connector
PS-25	Companion AC Power Supply for Preamps above									2-1/2 x 3-5/8 x 6½	Will power 2 preamps @ +15 Vdc

(1) Output capability Test Spec is the test limit for a given percent distortion: listed in the Remarks column where applicable, or typically 10% if unspecified.

THE COMPLETE LINE OF LOW COST "OFF THE SHELF" AMPLIFIERS

C-COR ELECTRONICS, INC.
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C-COR AMPLIFIERS

FAST RISE TIME PULSE AMPLIFIERS

C-Cor Models	RISETIME nanosec. Typ.	RISETIME nanosec. Max.	Droop %	Droop @ PW	LINEAR OUTPUT Min. Vp	@ Ohms	LINEAR OUTPUT Typical Vp	@ Ohms	Gain Min. dB	NOISE Broadband (rms) input(μV)	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
3370-P	0.6	0.7	1	1μS	±2	50	±3	50	20	40	50:50	+28	300	2¾ x 3 x 5	
3310	0.95	1.1	<1	1.0μS	±8	50	±9	50	30	30	50:50	+28	440	2¾ x 3 x 5	Output unmatched
4313-P	1.0	1.2	10	1μS	±6	50	±6.5	50	40,30, 20,10	35	50:50	115Vac 50-60Hz		5¼ x 8¾ x 11	Selectable gain; lab type amplifier
3374-P	1.1	1.3	1	1μS	±3	50	±4	50	20	65	1M:50	+28	340	2¾ x 3 x 5	Cin <5 pF
4375-B	1.7	2.0	10	1μS	±6	50	±8	50	60, 40 20	30	50:50 75:75	115 Vac 50-60Hz		5¼ x 8¾ x 11	Selectable gain and impedance; lab type amplifier
4376-P	2.0	3.0	None		±1	50	±2	50	40, 20	55	1M:50	115 Vac 50-60Hz		5½ x 5¾ x 13	Selectable gain; lab amplifier; Cin ≤10 pF
3362-F	2.0	3.0	10	3.0μS	±3	50	—	—	20	50	50:50	+32	230	1¾ x 3½ x6	-G Model available with
3364-F	2.0	3,0	10	3.0μS	±3	50	—	—	40	35	50:50	+32	300	1¾ x 3½ x 9	-6Vp output capability
3366-F	2.0	3.0	10	1.0μS	±3	50	—	—	60	35	50:50	+32	300	1¾ x 3½ x 12	into 50 ohms

WIDEBAND POWER AMPLIFIERS

C-COR Models	Passband 3 dB Minimum	POWER OUTPUT @1dBComp. dBm Min.	POWER OUTPUT dBm Maximum	Gain Minimum dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
1012-D	100kHz-250MHz	+36	+40	0-40	50:50	115 Vac 50-60Hz		8¾ x 19 x 12½	Solid-state driver, tube output
1028	30-300MHz	+35	+37	30	50:50	115 Vac 50-60Hz		8¾ x 19 x 12½	
3314	.005-500MHz	+27	+30	30	50:50	+28	495	3¾ x 3 x 5	Push-pull

VIDEO AMPLIFIERS

C-COR Models	Passband 3 dB Minimum	OUTPUT CAPABILITY @ 1dB Comp. dBm Min.	@ 1dB Comp. dBm Typ.	Test Spec. (1) Vp-p	Test Spec. (1) @ Ohms	Gain Min. dB	NOISE Broadband (rms) input (μV)	NF Typ. dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
4333-C	dc-20MHz	+20	+22	±4Vp	50	20, 26	25	—	50:50	115 Vac 50-60Hz		3¾ x 8¼ x 9¼	Gain, single ended: Diff. output; 5% dis.;;diff. input and output
4392	dc-20MHz	+30	+ 32	30	50	6-20	25	—	50:5	50-60Hz		3¾ x 8¼ x 9¼	5% distortion @ 1 MHz
3334	Variable dc-20MHz	+20	+ 21	5	50	in Steps x 1 to x 100	20	—	50:50	±12	250	8¾ x 2.7 x 9¾	NIM package, bandwidth dc-0.5, -1, -2, -5, -10 and -20MHz
3453	5Hz-20MHz	+10	+ 16	4.0	75	0-8	125		40k:75	32	140	3½ x 2½ x 9	Four (4) outputs; gain continuously adjustable 5% distortion

SPECIAL PURPOSE AMPLIFIERS

C-COR Models	Passband 3 dB Minimum	OUTPUT CAPABILITY @ 1dB Comp. dBm Min.	@ 1dB Comp. dBm Typ.	Test Spec. (1) Vp-p	Test Spec. (1) @ Ohms	Gain Min. dB	NOISE Broadband (rms) input (μV)	NF Typ. dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
3693-A	10kHz-500MHz	±3	± 10	1	50	x 9	3	—	1M:50	+28	30	1-3/8 x 2 x 3	High Impedance Probe, CW aligned
3693-P	1.0 ns RT	—	—	±0.5Vp	50	—	85	—	1M:50	+28	30	1-3/8 x 2 x 3	High Impedance Probe, Pulse aligned
3386-A -B	1kHz-600MHz	+12	+13	2.8	50	15	—	12	50:50	+28	180	1-3/8 x 2 x 3	100 dB isolation, input to output
4375-C	3kHz-300MHz	+25 12 channel Cross Mod. -60 dB @ + 50 dBmV output (40dB gain)	+ 30	—	—	20, 40 60 dB	30	—	75:75	115 Vac 50-60Hz		5-1/4 x 8¾ x 11	CATV laboratory Post Amplifier, type F conn.
I-434-1M-K	40-300MHz	12 channel Cross Mod. -57 db @ + 50 dBmV output, for 12 ch. flat				41	—	10	75:75	115/230 Vac 50-60Hz		3½ x 5-7/8 x 11	TV/CATV Indoor Distribution Amplifier

TWO-WAY COAXIAL CABLE DATA SYSTEMS

C-COR designs, engineers and installs specialized coaxial cable data transmission systems using both standard and specially designed CATV components and techniques.

Mid-band split and sub-split two-way system are standard as are various super trunk concepts. Consult factory for further information.

MULTICOUPLERS

C-COR Models	Passband 3 dB Minimum	OUTPUT CAPABILITY @ 1dB Comp. dBm Min.	@ 1dB Comp. dBm Typ.	Test Spec. (1) Vp-p	Test Spec. (1) @ Ohms	Gain Min. dB	NOISE Broadband (rms) input (μV)	NF Typ. dB	Z In:Out Ohms	Power Required Vdc	Power Required mA	Dimensions H x W x L Inches	REMARKS
3407	100Hz-60MHz	—	+20	5.5	50	5.5	100	—	50:50	+25	1.4A	2 x 4 x 10	Eight (8) outputs
1884-A	dc-20MHz	+22	+24	8	50	0-20	40	—	50:50	115 Vac		3½ x 19 x 18	Two (2) outputs; more available; >60 dB isolation
1801	50-300	12 channel Cross Mod. –84 dB @ +40 dBmV output		—	—	–6 to +6	—	20	75:75	115 Vac 50-60Hz		5¼ x 19 x 8¾	Type F conn. 4 outputs

Inquiries for your specific multicoupler requirements invited. C-COR's modular approach will provide an economic answer for your applications.

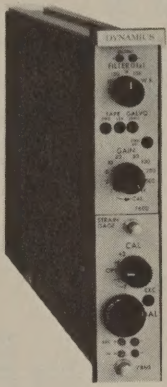
DYNAMICS

DYNAMICS ELECTRONIC PRODUCTS INC. • 9001 FULLBRIGHT AVE., CHATSWORTH, CALIF. 91311 (213) 998-0121

For over a decade Dynamics has been the acknowledged leader in the design and manufacture of instrumentation amplifiers for aerospace, laboratory and industrial applications. A complete range of differential, single-ended and charge amplifiers with various options and extra performance features, such as selectable filters, separate input and output zero controls and strain gauge power supply, are available. Many models have dual isolation 100mA outputs, full scale zero offset controls, galvanometer matching networks and switched or fixed current limiting provisions.

MODEL 7306
CHARGE AMPLIFIER GROUNDED TRANSDUCERS DO NOT CREATE GROUND LOOP

Suited to operate with all types of piezoelectric transducers. Up to 500 kHz bandwidth; low internal noise, excellent for all measurements.
Outstanding features: integral power supply, charge gain of .05 mV/pC to 5000 mV/pC, direct reading charge gain and capability to use Dynamics Model 7819 remote charge converter. Uses a double-shielded power supply to provide power line isolation of 1000 mΩ shunted by less than 0.1pF.



MODEL 7600
UNIVERSAL AMPLIFIER SIGNAL CONDITIONING SYSTEM

Choice of 10 front panel plug-in Signal Conditioning Modules. Amplifier features: gains to 2500; 120 dB CMRR at ±20 Volts; 125 kHz bandwidth; filter; offset control; output level controls; tape; galvo and VCO outputs; and integrated circuits. Ten Signal Conditioning Modules: isolated strain-gage power supply; autobridge balance; built-in reference junction and linearization for thermocouples; linear 2, 3, or 4 wire system for RTD's; Servo; Pot; Piezo Resistive; EMF; Carrier Amp; Charge Amp; and Designer's Card for universal system operation.

MODEL 7521
50 Volt Common-Mode/Wide Band DC Amplifier

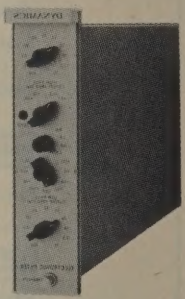
Designed for use in data acquisition systems having common-mode voltage levels up to ±50V. The unit utilizes integrated circuits. Twelve options are offered. Complete compatibility with Dynamics 7514, 7520 and 7525 amplifier line.

MODEL 7525
Wide Band (DC to 2 MHz) Differential DC Amplifier

Designed to provide maximum speed, performance, and reliability in high speed data acquisition systems. Compatible with all tape recorders for direct recording.

MODEL 6364A
Precision "Active" Electronic Filters

Phase matching to within 1° is possible in the Linear Phase mode. Terminal Slopes of 36 dB/Octave are standard with Butterworth and/or Linear Phase characteristics. Four different low-pass frequency multipliers cover the frequency band DC to 1MHz.



MODEL	GAIN RANGE	ACCURACY	OUTPUT	COMMON MODE	FREQUENCY RESPONSE	SLEWING RATE	NOISE	ZERO STABILITY
7202	0.10 to 330 7 steps	±0.1%	±10V,±100mA	—	—3dB above 50kHz	2.0V/μs	1.0mV/RTO	±200μVplus ±5.0μV/°C RTI
7511	1.0 to 1000 7 steps	±0.1%	±10V,±100mA	120dB ±10V	—3dB above 100kHz	2.0V/μs	5.0μV/RTI	±5μV plus ±1.0μV/°C RTI
7521	0.01 to 3300 16 steps	±0.1%	±10V,±100mA	120dB ±50V	—3dB above 75kHz	1.5V/μs	4.0μV/RTI	±2μV/plus ±0.4μV/°C RTI
7522	0.01 to 3300 16 steps	±0.1%	±10V,±100mA	120dB ±300V	—3dB above 75kHz	1.5V/μs	6.0μV/RTI	±2μV plus ±0.5μV/°C RTI
7525	1.0 to 1000 10 steps	±0.1%	±10V,±100mA	120dB ±20V	—3dB above 2mHz	2 0V/μs	1.5μV/RTI	±3μV 'plus ±1.2μV/°C RTI
7306	0.5 to 5000 mV/pC	±1.5%	±10V,±100mA	5mV/V ±50V	—3dB 0.5Hz-125kHz	1.5V/μs	.01pC-20kHz	—

Dynamics Electronic Products is represented throughout the United States and the world. Please see our representative listings in the index.

Power Amplifiers

ENI
A-300 RF POWER AMPLIFIER
MODEL 1140L POWER AMPLIFIER
NORTH AMERICA
NORTH ATLANTIC OCEAN
SOUTH AMERICA
UNION OF SOVIET SOCIALIST REPUBLICS
INDIAN

Using solid-state technology to replace bulky tube-type equipment, ENI's broadband amplifiers are tomorrow ideas available today. ENI's Class A power amplifiers already cover the frequency spectrum of 10 kHz to 1 GHz, with power outputs ranging from 300 milliwatts to over 4000 watts. And we're still climbing. Driven by any signal generator, frequency synthesizer or sweeper, ENI's compact portable amplifiers are completely broadband and untuned. Amplifying inputs of AM, FM, SSB, TV and pulse modulations with minimum distortion, these rugged units are versatile power sources for general laboratory work, RFI/EMI testing, signal distribution, RF transmission, laser modulation, data transmission, NMR, ultrasonics and more.

Designed to be unconditionally stable and failsafe (impervious to severe load conditions including open or short circuit loads), ENI power amplifiers will deliver their rated power to any load, regardless of match.

For information write: ENI, 3000 Winton Rd. So., Rochester, New York 14623. Call 716-473-6900. TELEX 97-8283 ENI ROC.

ENI

World's Leader in Power Amplifiers

Tomorrow ideas

A-300 RF POWER AMPLIFIER

1.4 KILOWATT/1140L
- 9 kHz to 250 kHz
- All Solid State
- Weighs less than 45 lbs.
- Works from 115 Volt Outlet

A revolutionary development in high power solid state amplifiers, the 1140L is designed for high power RF heating, ultrasonics and laboratory applications. Optional matching transformers will deliver full power to any load impedance from 3 ohms to 800 ohms balanced or unbalanced.

150 WATT/240L
- 20 kHz to 10 MHz Coverage
- Up to 150 Watts Output
- 40 Watts Linear Class A Power
- Works into any Load Impedance

Extraordinary performance in a wide range of transducer drive applications. Delivers up to 150 watts into any load regardless of its impedance. Compatible with all signal and function generators, the 240L is a high quality laboratory instrument for ultrasonics, biological research and electro-optic modulation.

100 WATT/3100L
- 250 kHz to 105 MHz
- Up to 180 Watts Pulse
- Driven by any Signal Generator
- Extremely Rugged

Designed to replace bulkier tube amplifiers, the model 3100L provides reliable and maintenance-free operation for NMR, ultrasonics and communications applications.

300 WATT/A300
- 300 kHz to 35 MHz
- Up to 500 Watts Pulse and CW
- 55 dB ± 1 dB Gain
- Portable

Highest power in a portable package. Top quality signal transmission in AM, SSB and pulse communication systems. Cannot be damaged by mistuned antenna.

3 WATT/400AP
- 150 kHz to 300 MHz
- 100 kHz to 320 MHz Usable Coverage
- For use in Hostile Environments
- Requires +22 Vdc at 1.3 A

Primarily intended for use in hostile operational environments and in OEM applications. All-welded aluminum enclosure provides rugged protective housing. External DC power is fed through integral RFI/EMI filter.

10 WATT/411LA
- Flat 150 kHz to 300 MHz
- 10 Watts Linear Output
- No Bandswitching
- Works into any Load

An ultra-linear Class A design, the ENI 411LA will "boost" the output of any signal source by a flat 40 dB and provide its full forward output power into any load impedance. High quality laboratory unit for TV signal distribution and high power sweeper output.

40 WATT/440LA
- 150 kHz to 300 MHz
- 40 Watts Class A Linear
- State-of-the-Art
- Up to 75 Watts CW and Pulse

The widest band solid-state power amplifier available at its 40 watt power level, the ENI 440LA is truly a state-of-the-art instrument. As a drive source for high resolution acousto-optic modulators and deflectors, the model 440LA is invaluable.

10 WATT/510L
- Flat 1.7 to 500 MHz
- 1.3 to 515 MHz Usable Coverage
- 9.5 Watts Linear Output
- Microelectronic Construction

An ultra-linear Class A design, the 510L provides faithful reproduction of the input waveform for AM, FM, SSB, CATV, pulse and other complex modulations. The use of microwave transistors on thin film substrates, microstrip circuitry, and plug-in modules make this unit reliable and easy to service.

0.15 WATT/600L
- 0.8 to 1020 MHz
- 150 Milliwatts of Linear Power
- Flat 24 dB Gain
- Up to 300 Milliwatts Saturated

150 Milliwatts of power 0.8 to 1020 MHz when driven by any laboratory signal generator. Exceptional as a general purpose laboratory instrument and for wideband pulse systems.

from the world's leader.

THE COMPANY.

ENI amplifiers and RF products are manufactured in its modern 25,000 square foot plant located in Rochester, N.Y. Formed in 1969, ENI's dedication to engineering excellence has resulted in a growing list of more than 4,000 customers. To provide unequaled service and applications assistance, ENI maintains a network of 55 representative field offices, located throughout the world. Engineering assistance and consultation is always available, without obligation, from our field representatives as well as from factory offices in the U.S. and the United Kingdom.

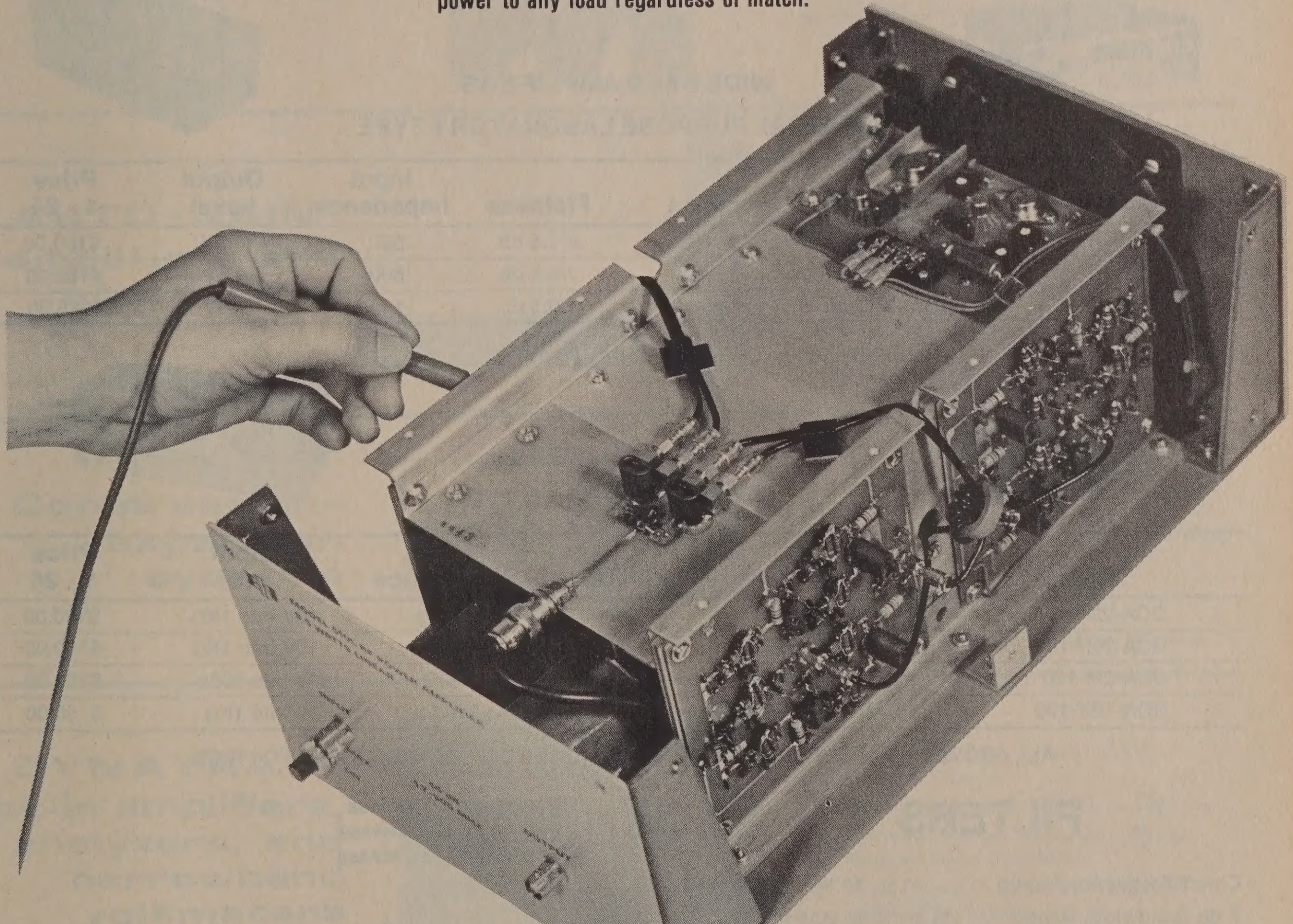
THE PRODUCTS.

Covering the widest frequency spectrum, ENI offers a full line of solid-state power amplifiers, power multicouplers and matching transformers with outputs ranging from milliwatts to kilowatts. Capable of being driven by virtually any signal source, ENI amplifiers are versatile and flexible sources of power. Completely broadband and untuned, these highly linear units will amplify inputs of AM, FM, SSB, TV and pulse modulations with minimum distortion. Although all power amplifiers will deliver rated power to a matched load, **only ENI amplifiers will deliver their rated power to any load regardless of match.**

THE GUARANTEE.

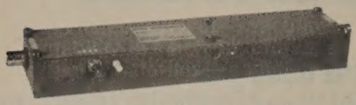
ENI offers a Free 10-Day evaluation of all products. A 1-Year Warranty, including all parts and labor. Authorized factory service (which is available in the U.S.A., Europe and Asia). 100 percent inspection. And, 100 percent burn-in of all completed units.

ENI



Now that you have seen a few of our units, perhaps you
would like to receive the new and informative catalog of our full line
of amplifiers and multicouplers. If so, please write:
ENI, 3000 Winton Rd. So., Rochester, New York 14623.
Call 716-473-6900. TELEX 97-8283 ENI ROC.

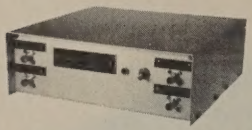
HOPE ELECTRONICS



AMPLIFIERS

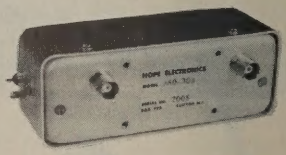
WIDE BAND — I F — PULSE

Model	Bandwidth	Gain	Flatness	VSWR	Noise Figure	Output Level	Price 1 - 24
PA200-20	1 to 200 MHZ	20 db	±.5 db	<1.5:1	<8 db	.5V	$195.00
PA200-40	1 to 200 MHZ	40 db	±.5 db	<1.5:1	<8 db	.5V	$295.00
A300-30	100 KHZ to 300 MHZ	30 db	±.75 db	<1.5:1	<12 db	.5V	$275.00
A30-6-30E	27 to 33 MHZ	30 db		<1.3:1	<4 db	.1V	$145.00
A60-10-25E	55 to 65 MHZ	25 db		<1.3:1	<4 db	.1V	$145.00



WIDE BAND AMPLIFIERS
GENERAL PURPOSE LABORATORY TYPE

Model	Bandwidth	Gain	Flatness	Input Impedance	Output Level	Price 1 - 24
A60-20A	500 KHZ-60 MHZ	20 db	±0.5 db	50Ω	1.5V	$150.00
A60-20B	1 KHZ-60 MHZ	20 db	±0.5 db	50Ω	1.5V	$165.00
A20-20	1 KHZ-20 MHZ	20 db	±0.5 db	1 meg	1.5V	$185.00



D C AMPLIFIERS
MODULAR AND LAB TYPE

Model	Bandwidth	Gain	Input Impedance	Output Level	Price 1 - 24
DCA-20H-100	DC to 20 HZ	X100	1 meg	10V into 1KΩ	$100.00
DCA-20K-100	DC to 20 KHZ	X100	1 meg	10V into 1KΩ	$150.00
DCA-2M-100	DC to 2 MHZ	X100	100K	5V into 600Ω	$100.00
DCA-10K-100	DC to 10 KHZ	X100	100K	1V into 1KΩ	$ 50.00

ALL ABOVE AVAILABLE WITH CABINET AND POWER SUPPLY. ADD $50.00 TO PRICE.

FILTERS

MODEL FLP — LOWPASS
MODEL FHP — HIGHPASS
MODEL FBP — BANDPASS

Cutoff Frequency Range .... 10 HZ — 300 MHZ
3 db Bandwidth Range . . . 5% to 10% Model FBP Only
VSWR .... Less than 1.5:1
Nominal Impedance .... 50Ω, 75Ω, 600Ω, or 10 K

Send Us Your Filter Specification

Hope Electronics would welcome the opportunity to design and build a filter custom fit to your needs.

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HOPE ELECTRONICS 20 NEWARK POMPTON TURNPIKE, WAYNE N.J. 07470 (201) 777-3522

ITHACO Versatility in AC instrumentation

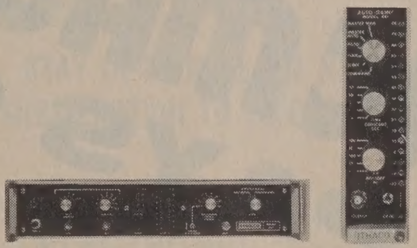
Low noise AC preamplifiers

- Preamps for High and Low Impedance Sources
- Frequency Range 0.1 Hz to 1 MHz
- Gains to 10^3 (60 dB)
- Premium Noise Performance with Minimal Power Drain
- Voltage, Charge and Current Inputs

Instrumentation amplifiers

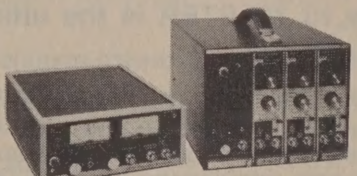
- Amplifiers for Voltage, Charge, and Strain Gage Inputs
- Single–Ended and Differential; Rack and Case Mountable
- Selectable Frequency Response
- Gains to 90 dB; Frequency Range 1 Hz to 100 kHz

AUTO-GAIN® amplifiers and accessories



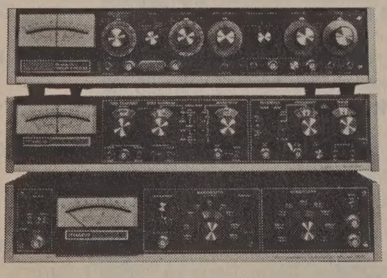
- Computer, Automatic, and Manual Gain Control
- Selectable Frequency Response
- Single–Ended and Differential; Rack Mountable
- Gain Range –12 dB to +78 dB
- Frequency Range 1 Hz to 100 kHz
- Mux/Demux available for recording status of up to 32 amplifiers on a single tape channel

Compression-expansion systems



- Record and Recover Wide Dynamic Range Data
- 100 dB Dynamic Range
- Manual, Remote, Computer Controlled Gain
- Compression, Expansion, Normalization
- Frequency Range 1 Hz to 100 kHz

DYNATRAC® lock-in amplifiers, analyzers, and narrowband voltmeters



- Sensitivity from 100nV to 1V rms Full Scale
- Bandwidths from 100 Hz to .001 Hz
- Optional Noise, Ratio and Phase Measurement Capability
- High Dynamic Reserve Heterodyne Signal Processing

ITHACO also manufactures Precision Variable Electronic Filters. See Section 2700.

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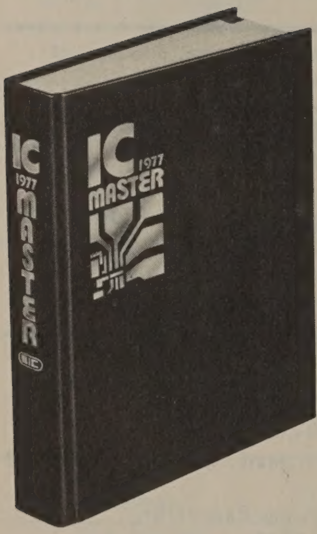
ITHACO

WHEN THE CHIPS ARE DOWN...

THE NEW 1977 IC MASTER PAYS OFF!



The new IC MASTER is the ultimate IC source book.

It lists virtually every IC device manufactured in the United States.

The IC MASTER is the easy, sensible means of narrowing down your IC choices quickly, accurately and systematically. All information is cross-referenced and indexed for rapid problem solving and device selection. And, additionally, the MASTER is updated three times yearly by accumulative supplements.

THE FORMAT OUTLINED:

- **FIVE MASTER SELECTION GUIDES** — 84 companies' IC's organized by type, function, key parameters
- **OVER 1,000 PAGES OF TECHNICAL INFORMATION** — Provided directly by manufacturers covering 17,000 IC's
- **ALTERNATE SOURCE DIRECTORY** — The only industry-wide, pin-for-pin version available
- **MILITARY PARTS INDEX AND CROSS REFERENCE CHART** — Identifies all IC's with JAN qualification
- **MILITARY DEVICE TESTING TABLE** — List companies that screen to Mil. Std. 883
- **MILITARY PARTS INDEX** — The first functional guide to JAN qualified parts
- **PART NUMBER INDEX** — Parts from 84 manufacturers, in numerical sequence
- **APPLICATION NOTE DIRECTORY** — Digest of currently active application note material
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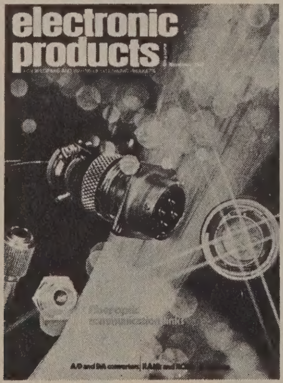

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PRESTON

FLOATING DIFFERENTIAL
Highest Performance with

8300 XWB Series Floating Differential Instrumentation Amplifiers.

Preston's amplifiers deliver precision many times better than any other amplifier! Our "Balanced Precision" 8300 XWB Series have greatly improved performance to overcome the FOUR major sources of instrumentation amplifier errors!

COMMON MODE REJECTION—Preston's CMR of 150 db at DC and 130 db at 60 Hz reduces errors by a factor of 3 to 10 times over the "next best" amplifier!

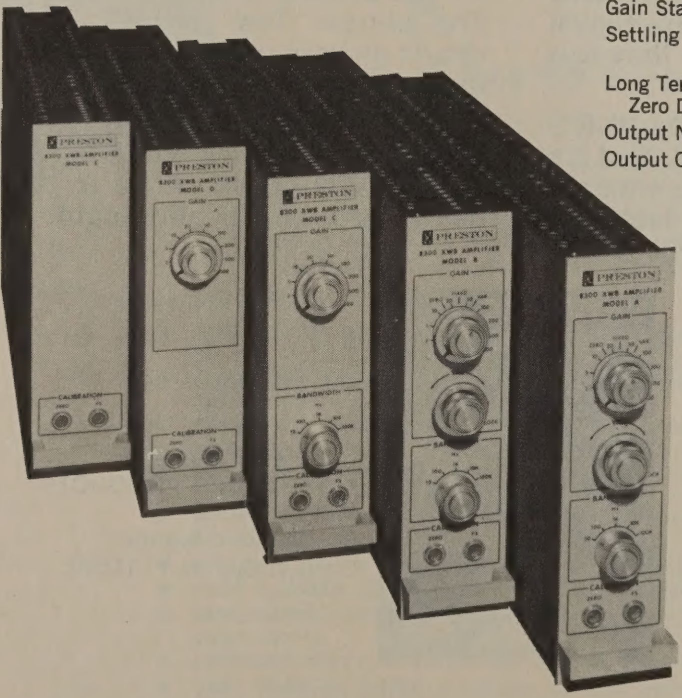
TEMPERATURE STABILITY—Preston is 2 to 5 times better with a Gain TC of only 10 ppm/°C and Zero Shift of less than 0.1uV/°C RTI!

PUMPOUT CURRENT—10 times better! Stays under ½ nanoamp over the entire temperature operating range!

OVERLOAD RECOVERY—10 times as fast! Recovers to within 0.01% in 30 usec!

The 8300 XWB Series gives you many combinations of ACCURACY, LINEARITY and BANDWIDTH from which to choose, and every model has its own integral power supply and mounts in standard RETMA racks.

For complete information on the entire line of Preston instrumentation amplifiers, request your copies of our technical literature and our 12 page "Balanced Precision" brochure that shows how to determine the true performance of your instrumentation system.



Five basic models provide versatility to meet every need—

MODEL	A	B	C	D	E
Gain	Ten Steps plus Variable to 2500 X		Ten Steps Fixed to 1000 X		Fixed 1X to 2000 X
Gain Accuracy	±0.01%		±0.1%		±0.01%
Gain Linearity	±0.005%	±0.01%			
Drift (μV/°C)	0.1 μV RTI ±20 μV RTO	0.3 μV RTI ±100 μV RTO			
Bandwidth	Selectable to 100 kHz			Preset up to 100 kHz (max)	

And every model meets all of these performance specifications:

Input Impedance	100 Megohms shunted by less than 0.001 μfd at DC
Input Noise	3 μV (100 kHz bandwidth)
Pumpout Current	Less than 0.2 nanoamps at constant temperature and less than 0.01 nanoamps change/°C
Common Mode Rejection	150 db at DC, 130 db at 60 Hz, 110 db at 400 Hz
Common Mode Voltage	350 Volts maximum peak AC or DC
Bandwidth	DC to 100 kHz
Gain Stability	0.01% (six month term)
Settling Time	30 μsec to within 0.01% of input signal
Long Term Zero Drift	±5 μV RTI, ±1 mV RTO (six month term)
Output Noise	0.2 millivolts peak
Output Capability	±10 volts at 100 ma.

Many system interfacing features are also available as options:

- Programmable Gain and Bandwidth.
- Low Pass Filter.
- Four Pole Bessel Low-Pass Filter.
- Dual and Triple Outputs.
- Binary Gain Steps.
- Output Coding of Gain and Bandwidth.
- Calibrate Relay.
- 110 Volt Input Overload Protection.
- Multiplexer Switch.
- Full Scale Offset Control.

For complete information, ask for our 'Amplifier Options' brochure.

INSTRUMENTATION AMPLIFIERS

Many Data System Features

PRESTON

DX and MX Series Instrumentation Amplifiers

with big amplifier performance in a new, smaller panel-mounted chassis.

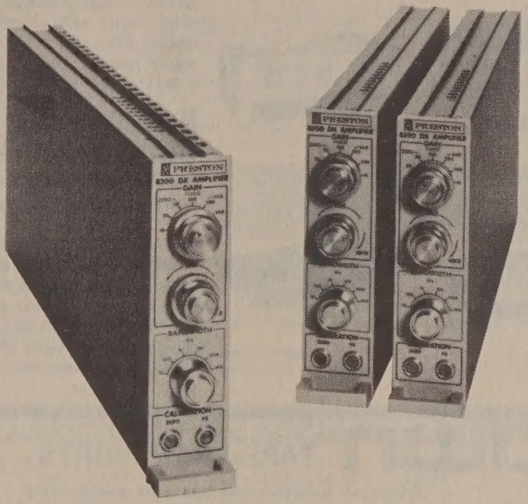
DX Series — Models "A1", "A2", "A3" and "HDX"

Developed to deliver high accuracy at a unit price under $300, the specifications for these compact instrumentation amplifiers include—

6 Selectable Bandwidths	1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz and 40 kHz.
7 Selectable Gains (*)	10, 20, 50, 100, 200, 500 and 1000, plus variable gain.
Gain Accuracy	0.05%
Gain Linearity	0.005%
Settling Time	50 microseconds to within 0.01%.
Pumpout Current	Less than 1 nanoamp @ 25°C and Less than 10 nanoamps @ 50°C.
Common Mode Rejection (*)	130 db @ DC, 108 db @ 60 Hz (@ K=1000)
Common Mode Voltage (*)	10 volts peak.
Input Impedance	100 Megohms.
Input Noise (1 σ)	Less than 3 microvolts @ 40 kHz and .2 microvolts @ 10 Hz.
Output Noise (1 σ)	Less than 200 microvolts.
Output Level	±5 or ±10 volts full scale at 100 milliamps.

(*) Models "A3" and "HDX" have 10 gains from 1 to 1000 plus increased CMR and CMV.

Ten of these new amplifiers fit into a 7 inch high, 19 inch wide rack, and all include a full complement of front panel controls.



MX Series — Model "B"

Now you can get all of Preston's "Balanced Precision" performance in the new 'compact' size!

5 Selectable Bandwidths	10 Hz, 100 Hz, 1 kHz, 10 kHz, and WB.
Maximum Bandwidth	80 kHz at 10 volts peak-peak.
10 Selectable Gains	1, 2, 5, 10, 20, 100, 200, 500, 1000, plus variable gain.
Gain Accuracy	±0.01% full scale.
Gain Linearity	±0.01% full scale.
Common Mode Rejection	150 db @ DC, 120 db @ 60 Hz, 110 db @ 400 Hz.
Common Mode Voltage	350 Volts pk-pk AC or DC.

—plus all of the gain stability, zero stability, and output capability specifications of Preston's 8300 XWB Series Amplifiers!

Preston is the Leader in High Accuracy Analog-to-Digital Conversion Systems, too!

With the widest range of resolutions, conversion speeds, analog front-end amplifier/multiplexers and computer interface capabilities, Preston's ADCs are right for every data acquisition system.

For a complete description of Preston's ADC Systems, see Pages 1680 and 1681 in this volume of **eem.**

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805 East Cerritos Avenue,
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Telephone: (714) 776-6400
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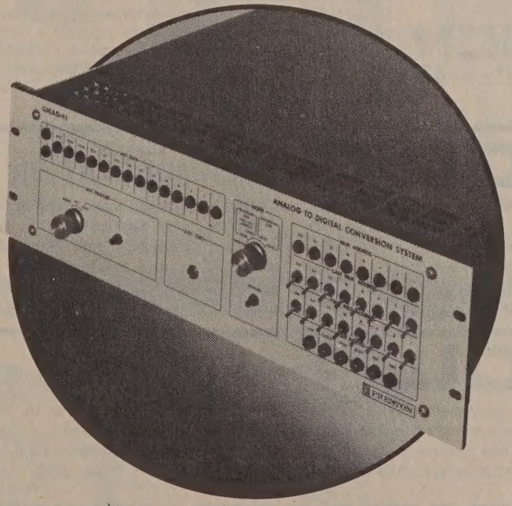
PRESTON

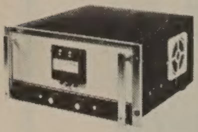


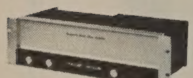
crown WIDEBAND POWER AMPLIFIERS

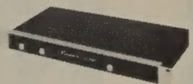
M2000 SINGLE-CHANNEL AMPLIFIER

(not shown, equals two M600 units)

Power Bandwidth: +1 −0dB, DC-15KHz at 2,000 VA into 8 ohms. Other specifications similar to model M600. **Weight:** 200 lbs. **Dimensions:** 19″ w x 17½″ h x 19″ d. **Price:** $3,590 rack mount.







M600 SINGLE-CHANNEL AMPLIFIER

Power Bandwidth: +1 −0dB, DC-15KHz at 1,000 VA into 4 ohms, DC-20KHz, 600 VA, 8 ohms, maximum power at 2.5 ohms. **IM Distortion:** Under 0.05% from 0.01 VA to 600 VA. **Frequency Response:** ±1dB DC-100 KHz at 1 VA into 8 ohms. **Phase Response:** +0° −15° DC-20KHz. **Hum and Noise:** 120dB below full output (20Hz-20KHz). **Slewing Rate:** 16 volts per microsecond. **Output Indicator:** Calibrated peak voltage output meter with adjustable hi-lo indicator lights. **Inputs:** Wide choice of input configurations using plug-in modules. **Weight:** 92 lbs. **Dimensions:** 19″ w x 19″ d x 8¾″ h. **Price:** $1,795 rack mount.

DC300A DUAL-CHANNEL AMPLIFIER

Power Bandwidth: +1dB −0dB, DC-20KHz at 155 VA each channel, 8 ohms. **Bridge Output:** +1dB DC-20KHz at 310 VA, 16 ohms. **IM Distortion:** Under 0.05%, .25 VA to 155 VA, 8 ohms. **Frequency Response:** ±1dB, DC-100KHz 1 VA. **Phase Response:** +0°, −15° DC to 20KHz at 1 VA. **Hum and Noise:** 110dB below 155 VA. **Output Impedance:** Less than 7 milliohms in series with less than 3 microhenries. **Slewing Rate:** 8V per microsecond. **DC Drift:** Under 3mv to 55°C. **Weight:** 55 lbs. **Dimensions:** 19″ w x 9¾″ d x 7″ h. **Price:** $849 rack mount.

crown

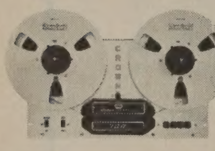
D150A DUAL-CHANNEL AMPLIFIER

Power Bandwidth: +1dB −0dB, DC-20KHz at 80 VA, 8 ohms. **Bridge Output:** +1dB −0dB, DC-20KHz at 160 VA, 16 ohms. **IM Distortion:** Under 0.05%, .25 VA to 80 VA, 8 ohms. **Frequency Response:** ±1dB, DC-100KHz 1 VA. **Phase Response:** +0°, −15° DC to 20KHz at 1 VA. **Hum and Noise:** 110dB below 80 VA. **Output Impedance:** Less than 15 milliohms in series with less than 3 microhenries. **Slewing Rate:** 6V per microsecond. **DC Drift:** Under 3mv to 55°C. **Weight:** 24 lbs. **Dimensions:** 17″ w x 9″ d x 5¼″ h. **Price:** $499 rack mount.

D60 DUAL-CHANNEL AMPLIFIER

Power Bandwidth: +1dB −0dB, 35Hz-15KHz at 30 VA, 8 ohms. **Bridge Output:** +1dB −0dB, 20Hz-15KHz at 60 VA, 16 ohms. **IM Distortion:** Under 0.05%, .25 VA to 30 VA, 8 ohms. **Frequency Response:** ±1.2dB 5Hz-100KHz at 1 VA into 8 ohms. **Phase Response:** +10°, −15°, 20Hz-20KHz at 1 VA. **Hum and Noise:** 106dB below 30 VA. **Output Impedance:** Less than 15 milliohms in series with 3 microhenries. **Slewing Rate:** 6V per microsecond. **Voltage Gain:** 20.6dB. **Weight:** 10 lbs. **Dimensions:** 19″ w x 9¾″ d x 7″ h. **Price:** $299 rack mount.

crown TAPE TRANSPORTS

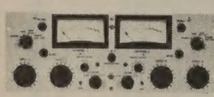


Crown ¼″ magnetic tape transports provide many years of high quality playback and recording for analog recording and test instrumentation. Crown tape machines are three-motor design, and most components are plug-in for easy replacement. Custom design for OEM applications is available. Optional accessories are available for variable speed drive, remote control, servo control. 19″ rack mount. Optional walnut cabinets available. Wow and flutter 0.06% at 15 ips, 0.09% at 7½ ips, 0.18% at 3¾ ips.

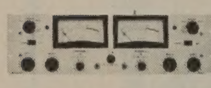
SP-700 TRANSPORT
Mechanical interlock mode control • Automatic shut-off in play mode • Hysteresis-synchronous capstan motor • Electro-magnetic braking • 3¾, 7½ ips standard (15 ips optional) • Accepts 10″ NAB reels or 5″ or 7″ EIA reels. **Price:** $695.

SP-800 TRANSPORT
Computer Logic Control for mode selection • Computer controllable • Photocell automatic shut-off in all modes • Hysteresis-synchronous capstan motor • Electro-magnetic braking • 3¾, 7½, 15 ips standard • Accepts 10″ reels or 5″ or 7″ EIA reels. **Price:** $1,095.

crown RECORDER ELECTRONICS



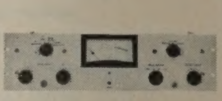
CX SERIES, 2 OR 4 CHANNEL
Plug-in modules for all functions • Built-in remote record for no thumps on tape at beginning or end of record mode • Echo controls built in • Front panel bias adjustment • 3-speed equalization • Treble and bass controls with "flat" detents • Available with 600 or 250 ohms balanced XLR cannon inputs and outputs as an accessory. 19″ rack mount. **Price:** $995, 2-channel; $1,995, 4-channel.



SX SERIES, 2 OR 4 CHANNEL
All circuit functions on four permanently mounted printed circuit cards • Record mode interlock • Rear panel bias adjust • Two speed equalization • Simplified circuitry • External balancing transformers available as accessories • 19″ rack mount • **Price:** $595, 2-channel, $1,495, 4-channel.

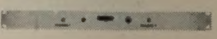
SX MONO

Same as SX • Bridging or 250 ohm balanced rear panel mixing mic inputs • 2 unbalanced mixing line inputs • Balanced and unbalanced line outputs • Headphone output jack • 19″ rack mount. **Price:** $495.



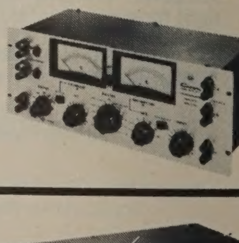
SP PLAYBACK

SX Type of construction • Play only electronics • 3-speed equalization • Front panel level adjustments • Unbalanced low impedance output • 600 ohm balanced output • 19″ rack mount. **Price:** $100, 2-channel; $200, 4-channel.



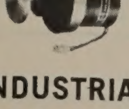
crown INTERMODULATION DISTORTION ANALYZER

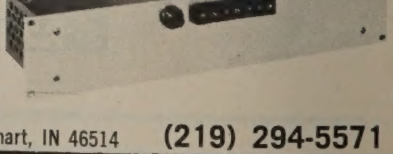
Residual IM: Guaranteed under 0.005%, and within 5% of full scale. **Circuitry:** FET solid state. **IM Ranges:** 0.1, 0.3, 1, 3, 10, 30, 100% full scale on separate IM meter. **Sensitivity:** 17mv sensitivity for testing low-level devices; metered, variable LF/HF ratio; internal oscillators 60Hz and 7KHz (SMPTE); provision for external oscillators from 10-150Hz (LF) and 2.5K-20KHz (HF) ranges; constant output impedance. **Plotting:** Master "tracking" attenuator, acting on input and output, permits rapid IM plots of the test device — over a 45dB output range in 5dB steps. **Price:** $675 rack mount, optional walnut cabinet available.



crown VARIABLE SPEED DRIVE

Crown VSD-5A attachment provides pushbutton control for tape transports of 15, 7½, 3¾, 1⅞ and 15/16 ips. Includes variable control to adjust each speed selection +50%, −25%. Adds to series 700 or 800 transports. Includes 19″ rack mount controls with forced air cooling, plus servo-controlled drive system to replace drive motor of transport. **Price:** $850.





crown INTERNATIONAL — INDUSTRIAL
Dept. EM, 1718 West Mishawaka Road, Box 1000, Elkhart, IN 46514 (219) 294-5571

iem®

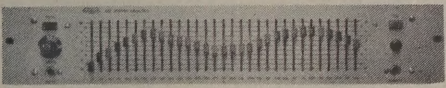
INTERNATIONAL ELECTRO MAGNETICS, INC.

ERIC DRIVE AND CORNELL AVENUE, PALATINE, ILLINOIS 60067 (312) 358-4622

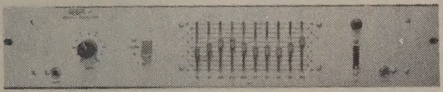
PROFESSIONAL AUDIO EQUIPMENT

iem® OPTRO

GRAPHIC EQUALIZERS



MODEL 231 —
THIRTY ONE ⅓ OCTAVE

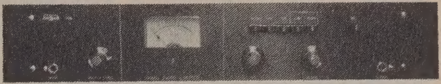


MODEL 213 —
TEN OCTAVE

Both cover the entire audio spectrum and permit complete control of spectral balance. Both models are normally used with unity gain, input to output.

The Optro Model 213 offers 10 in-line, linear controls to control boost or cut-off for each octave. A filter in/out key enables a preset equalization to be switched in or out for specific program requirements. An input level control effects overall gain.

In the Model 231 thirty one in-line slide controls control boost or cut of each ⅓rd octave. A filter in/out key enables preset equalization to be switched in or out for particular programs. The Model 231 is probably the most flexible graphic equalizer — providing detailed emphasis or de-emphasis of even small sound spectrum segments.



The Dual Band Limiter-Compressor operates over two independent bands, one below and the other above 300 Hz. The independent release times in each band prevent high level low frequency signals modulating the audio level in the other band.

A long release time is provided in the low band to prevent signal distortion whilst it is possible to maintain a shorter release time in the high band.

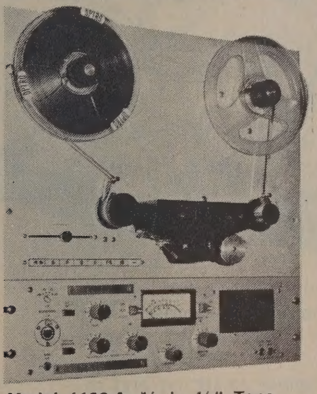
This system ensures a more balanced sound whilst maintaining a constant high level of modulation.

The Model 740 Audio Processor combines a microphone amplifier, a limiter compressor, an audio gate, a graphic equalizer and a line drive amplifier in one compact rack package.

Taking only 3½″ of rack space, the Audio Processor is one of the most versatile and useful units to become available to the professional audio engineer.

Overall frequency response is 30 - 15 kHz. ±0.5 dB. The unit contains its own regulated power supplies with overcurrent protection.

MULTI-CHANNEL MAGNETIC TAPE RECORDERS

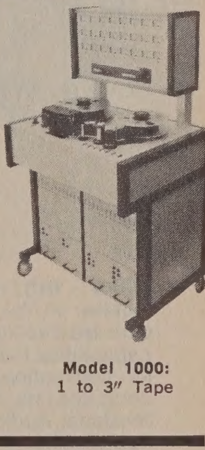


Model 1100-A: ¼ to ½″ Tape
Model 1100-B: ½ to 1″ Tape

With configurations ranging from 1 to 32 track, the 1000 & 1100 Series handles ½, ¼, 1, 2, & 3 tape on spools of up to 14″ diameter. The basic layout consists of a console or rack mounted tape transport with power supplies and track amplifiers. The tape transport itself consists of a precision machined aluminum plate on which all components, including the solid state control box, are mounted. Servo control of the spooling motors provides constant tape tension from start to finish of the reel, smooth tape handling being assured by a direction sensed dynamic braking system. Disc brakes are provided as holding brakes when the transport is stationary. The servo capstan motor is crystal-locked, providing absolutely steady tape drive. Headblocks are plug in and quickly interchangeable, and incorporate all equalization components, enabling instant change of head format and equalization. Record bias frequency is crystal-locked. Although push button selectable 3 speeds (7½, 15 and 30 i.p.s.) are standard, an inbuilt vari-speed facility permits continuous variation from 7½ to 30 i.p.s.

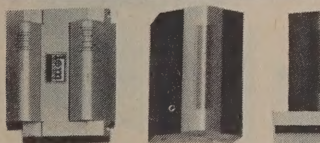
These decks are a professional user's dream; they are robust, reliable and efficient. Designed for heavy duty, continuous use, they are typical of the New Era range being marketed by IEM.

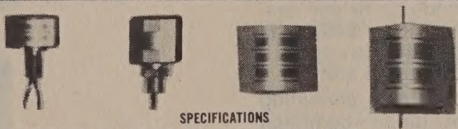
- **Tape Speed:** 7.5, 15, or 30 i.p.s. Also vari-speed from 7.5 to 30 i.p.s.
- **Replay response** (at 15 i.p.s.): ±1 dB 30 Hz to 15 kHz.
- **Overall response** (at 15 i.p.s.): ±2 dB 30 Hz to 15 kHz.
- **Noise:** Better than 68 dB below peak record level.
- **Distortion:** Less than 2.5% T.H.D. at peak record level. (Peak record level is equivalent to 54 mM/mm track width.)
- **Distortion:** Less than 1% T.H.D. at normal record level.
- Crosstalk: Better than 50 dB between adjacent tracks.
- **Wow and flutter:** Less than 0.07% R.M.S. in the band 0.5 Hz to 250 Hz.
- **Input impedance:** 10K ohm balanced.
- **Input level range:** +2 dBm to +24 dBm for peak level on tape.
- **Output impedance:** Less than 100 ohms in the band 30 Hz to 15 kHz.
- **Output level:** +24 dBm maximum into 600 ohms.
- **Power requirements:** 220-250 V.A.C. 50 Hz.

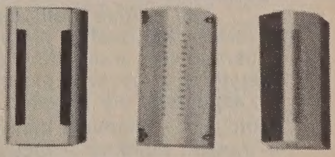


Model 1000:
1 to 3″ Tape

PRECISION MAGNETIC HEADS







SPECIFICATIONS

AUDIO — IRIG — ANALOG

Type Designation	Application	No. of Tracks	Track Width	Track Spacing	Inductance @ 1KC	Bias	Output	Tape Speed IPS
R4N5	Record	4	.080	.130	10 mh	3.5 ma @ 100KC	—	15/30
P4N5	Playback	4	.080	.130	700 mh	—	1KC 20KC 5.5 mv 12 mv	15/30
E8N1	Erase	8	.080	.130	1.5 mh	30 ma @ 100KC	—	15/30
R8N1	Record	8	.070	.130	15 mh	3.5 ma @ 100KC	—	15/30
P8N1	Playback	8	.070	1.30	1.2 henry	—	1KC 5 mv	15/30
R16L2	Record	16	.070	.127	3.5/15 mh	6./2 ma @ 150KC	—	15/30
P16L2	Playback	16	.070	.127	3.8/900 mh	—	0.4/6.0 mv 1K	15/30
E16L2	Erase	16	.080	.127	0.6/1.2 mh	75/50 ma @ 150KC	—	15/30
E24L2	Erase	24	.050	.085	100 uh	200 ma @ 60KC	—	15/30
R24L2	Record	24	.040	.085	3.5 mh	7 ma @ 120KC	—	15/30
P24L2	Playback	24	.040	.085	800 mh	—	1KC 15KC 3 mv 8 mv	15/30

FERRITE HI-SPEED DUPLICATION

FERRITE Head Type	IEM Type	No.	Inductance @ 1 KHz	Gap Size	Biac Current At 1MHz Wavelength .003 ma	Biac Current At 1MHz Wavelength rms .0007	Bias Current At 2 MHz	Audio Current	Cross Talk
Full Track ¼″	RF1L2	393-5	700 uh	.0003	6.2	4.7	—	.0005	NA
Half Track ¼″	RF1/2L2	394-3	—	—	5.5	4.2	—	.0005	NA
Two Track ¼″	RF2L2	395-5	—	—	5.6	4.1	—	.0005	−56 DB
4-Track Stereo ¼″	RF2/4L2	858-1	—	—	4.5	3.5	13.0	.0012	−58 DB
Quadraphonic ¼″	RF4L2	871-1	700 uh	—	4.5	3.5	—	.0005	−50 DB
8-Track ¼″	RF2/8L2	324W	1.0 mh	.0003	3.8	3.0	—	.0005	−58 DB
8-Track Quad ¼″	RF4/8L2	852-3	450 uh	.00015	6.2	4.7	9.0	.0006	−55 DB
2-Track 150	RF2L15	863-1	700 uh	—	4.6	3.6	—	.0005	−48 DB
2-Track Stereo 150	RF2/4L15	441-17	700 uh	—	4.6	3.8	—	.0005	−35 DB
Half Track 150	RF1/2L15	468-5	700 uh	.00015	4.5	3.6	—	.0005	NA

DIGITAL COMPUTER

Application	No. of Tracks	Track Width	Track Spacing	Inductance @ 1KC	Bit Density BPI	Read Output MV p/P	Saturation Current NRTZ	Tape Speed IPS
Hi Density Read	20	.020	.049	3 mh	900	10 mv	—	150
Hi Density Write	20	.027	.049	150 uh	900	—	100 ma	150
Med. Density Read	7	.030	.070	12 mh	556	40 mv	—	120
Med. Density Write	7	.048	.070	150 uh	556	—	50 ma	120
Hi Density Read/Write	30	.012	.042	80 mh	800	4.5 mv	3.0 ma	7½
Hi Density Read/Write	4	.025	.026	50 mh	5000	4.0 mv	1.8 ma	7½
Read/Write	9	.040	.055	12 mh	1000	40 mv	—	120
Read	9	.042	.055	300 uh	1000	—	100 ma	120

HEAD RECONDITIONING

IEM has established a complete servicing department for the reconditioning of magnetic heads and assemblies. Featuring a rapid turnaround time (within 24 hours in most cases), your heads will be lapped, ultrasonically cleaned, checked electrically, and microscopically inspected. If the heads are sent on assemblies, the assemblies will be taken apart, cleaned, reassembled and optically aligned. Flutter rollers will be resurfaced if they are grooved.

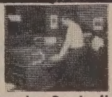
MANUFACTURING AND DESIGN CAPABILITIES

IEM, since 1958, with exceptional personnel stability plus ultra modern, total facilities, has become one of the most dependable suppliers of mass produced and special magnetic heads as well as OEM recording systems.

SEND FOR BULLETINS

Jig Bore Oriented Shop

Complete Machine Shop



Computer Controlled Production

NBS Traceable Testing

Microscope Equipment Lines

Micro Inch Measuring Lab

LIPPS..INC
magnetic recording heads

LIPPS . . INC. is the oldest independent head manufacturer in the United States. We are a production-oriented facility with engineering and development capabilities that enable us to produce long life as well as conventional heads. **LIPPS . . INC.** produces a complete line of high quality recording heads for Professional Audio, Analog, Digital and special purpose applications.

Our unique methods have always enabled us to furnish top quality, precision products to our customers at very competitive prices. **LIPPS . . INC.** does everything in-house to assure the quality and scheduling aspects of our product. Some of which are: photolab — chemical milling — hydrogen annealing — transfer molding — vacuum depositing — complete capability to machine, profile, slice and lap ferrite and ceramic materials—complete in-house machine shop.

PRE-ALIGNED HEAD ASSEMBLIES

LIPPS . . INC. offers a variety of precision-made head assemblies, complete and ready to mount on your transport. Renew your existing equipment for finer reproduction quality, or update older equipment to accommodate the newer multi-channel recording techniques.

REFURBISHMENT REPLACEMENT SERVICE AUDIO • ANALOG • DIGITAL • For the End User

Enjoy maximum usage for a fraction of the original cost. Utilize our reconditioning service to obtain maximum use of existing heads.

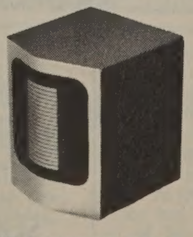
We will be pleased to furnish prices for special assemblies, including AUDIO, ANALOG and DIGITAL. Most assemblies are serviced in three to five working days.

LIPPS . . INC. manufactures a complete line of monaural, stereo and multichannel heads for replacement of original heads in name-brand recorders. Our heads are guaranteed to equal or exceed the requirements of original equipment.

We also maintain a complete relapping and replacement service for Ampex and RCA Video Tape Recorder Audio Heads, and some loaners are available.

EXTENDED LIFE HEAD

FERRITE CERAMIC CONSTRUCTION

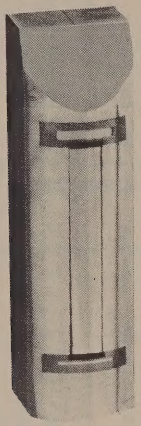


20 TRACKS IN LINE, ½"

SPECIALIZED PRECISION MAGNETIC RECORDING HEADS

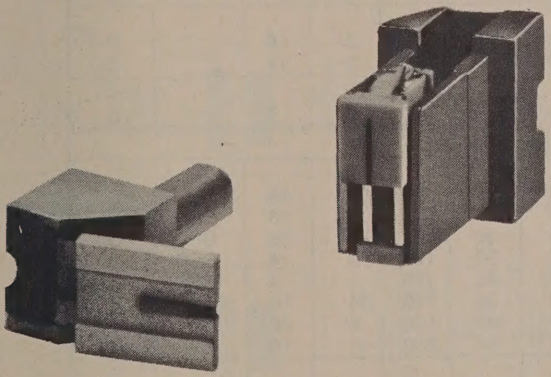
When you require more channels on narrower tape widths, **LIPPS . . INC.** is the one to contact. Our more than 30 years of head manufacturing and our unique manufacturing methods has enabled us to produce more tracks in less space than any other head manufacturer.

PROFESSIONAL AUDIO AND FILM RECORDING HEADS



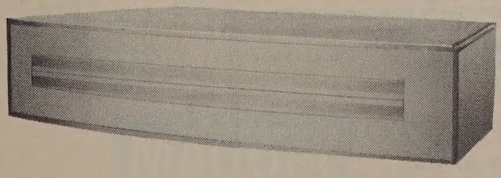
TYPICAL AUDIO STACK FOR RCA TYPE VIDEO TAPE RECORDER

COMMERCIAL AND MILITARY TYPE FLYING HEADS, FOR DRUM AND DISC APPLICATIONS



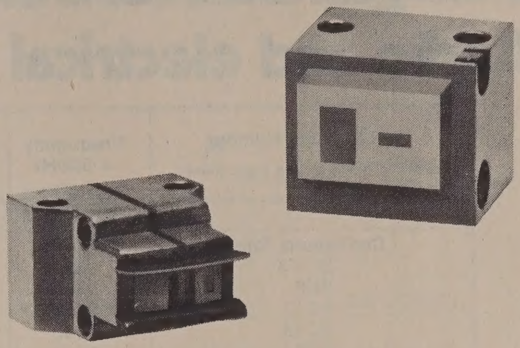
Fixed and flying drum heads for read and write operations, low and high frequency. Designed specifically for new and direct replacement requirements for drums of four inch to eighteen inch diameter and typical rotational speeds of 1800 RPM and higher.

MEDICAL HEADS



Slow speed (1/8 IPS) reproduce head for cardiac recorder. Extremely well shielded against hum pick-up. Very high output. Inductances up to 200 Henries.

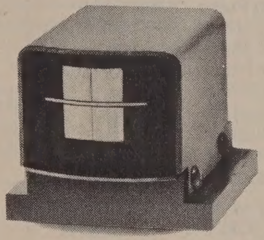
DIGITAL READ/WRITE HEADS FOR CASSETTE AND CARTRIDGE



LIPPS . . INC. manufactures a complete line of digital read/write heads for cassette and cartridge application. With single and multichannel configuration for .150 and ¼ inch format.

Data rates range to 3200 FRPI at tape speeds of up to 120 IPS.

CREDIT CARD AND MICR READ/WRITE HEADS



Magnetic stripe card and ticket read and read/write heads with specifications which meet IATA, ABA and Thrift requirements. These single and multi-track magnetic heads have proven themselves in millions of hours of actual operation. The life factor ranks as one of the highest in practical use today. Our conventional heads average 300K passes. Our long life versions offer over a million passes. Typical data rates are above 400 FRPI at 15 IPS card speed. We also manufacture a complete line of MICR heads.

We are basically a manufacturer of custom heads designed to individual requirements. Your specifications will receive immediate attention when sent to us for quotation, and our engineering staff is always available to assist in any way.

We look forward to having the opportunity to manufacture a product built to your exacting requirements at a competitive price.

If you're having problems in your current head program contact us, we may have the answer.

Robert J. Cross
Executive Vice President

OUR 30th YEAR 1947-1977

LIPPS..INC
magnetic recording heads

1630 euclid street, santa monica, calif. 90404
(213) 393-0449 / 871-0777

Sonalert® electronic audible signals

Audio and electrical specifications

Part & Model Number (All Part Numbers Are Stock Items)	Frequency ± 500Hz	Minimum Sound Level dB(A) At Two Feet		Operating Voltage Min	Operating Voltage Max	Typical Operating Current MA		Notes	Case Style Code
D.C. Only									
Continuous Tone									
SC1.5	3500	60 @ 1.5V		1	4	4 @ 1.5V			A
SC6	3500	70 @ 6V		4	8	12 @ 6V			A
SC12	3500	70 @ 12V		8	15	14 @ 12V			A
SC18	3500	70 @ 18V		14	22	16 @ 18V			A
SC24	3500	70 @ 24V		20	30	16 @ 24V			A
		At Min V	At Max V			At Min V	At Max V		
SNP428	2900	64	78	4	28	1.8	14		B
SNP428F	2900	55	70	4	28	.5	3		B
SC616N	2900	80	95	6	16	4	16		C
SC628	2900	68	80	6	28	3	14		C
SC628D	1900	60	75	6	28	3	14		C
SC628E	1900	55	68	6	28	3	8		C
SC628F	2900	55	70	6	28	.5	3		C
SC628H	4500	68	80	6	28	3	14		C
SC628L	2900	68	80	6	28	3	14		C-3
SC648	2900	68	80	10	48	3	14		C
SC648D	1900	60	75	10	48	3	14		C
SC648H	4500	68	80	10	48	3	14		C
Fast Pulse **Slow Pulse**									
SC616NP SC616NJ	2900	80	95	6	16	4	16		C
SC616P SC616J	2900	68	78	6	16	1	4		C-1
SC616P-1 SC616J-1	2900	68	78	6	16	1	4		C-2
SC628P SC628J	2900	68	80	6	28	3	14	A	D
SC628DP SC628DJ	1900	60	75	6	28	3	14		D
SC628EP SC628EJ	1900	55	68	6	28	3	8		D
SC628FP SC628FJ	2900	55	70	6	28	3	14	A	D
SC628HP SC628HJ	4500	68	80	6	28	3	14		D
Fast Warble **Slow Warble**									
SC628W SC628JW	2900	68	80	6	28	3	16		D-1
SC628FW SC628FJW	2900	55	70	6	28	3	14		D-1
Repeating Chime									
SC616CP	2900	68	80	6	16	3	8		D
AC/DC (Non-Polar)									
Continuous Tone									
SC628A	2900	68	80	6	28	4	16		D
SC110	2900	68	80	30	120	4	16	C	D
SC110D	1900	60	75	30	120	4	16	BCD	D
SC110E	1900	55	65	30	120	3	14	BCD	D
SC110F	2900	55	70	30	120	1	4	BCD	D
SC110H	4500	68	80	30	120	4	16	BCD	D
SC110N	2900	80	95	30	120	8	28	BC	D
SC250	2900	68	80	60	250	4	16		D
Fast Pulse **Slow Pulse**									
SC628AP SC628AJ	2900	68	80	6	28	4	16		E
SC110P SC110J	2900	68	80	30	120	4	16	A CD	E
SC110DP SC110DJ	1900	60	75	30	120	4	16	BCD	E
SC110EP SC110EJ	1900	55	68	30	120	3	14	B D	E
SC110FP SC110FJ	2900	55	70	30	120	4	16	AB D	E
SC110HP SC110HJ	4500	68	80	30	120	4	16	BCD	E
SC110NP SC110NJ	2900	80	95	30	120	8	28	BC	E

Fast Pulse Models turn on and off at 2 to 9Hz depending upon voltage at 50% duty cycle.
Slow Pulse Models turn on and off at .5 to 2Hz depending upon voltage at 50% duty cycle.
Warble Models are to be used with SC628D, SC628E, SC628H to produce two tones alternately.
Note A — Short Pulse Models turn on and off at .5 to 1.5Hz depending upon voltage at 10% duty cycle, substitute K in place of P or J in part number. Example: SC110K
Note B — For 6-28V AC/DC operation substitute 628A for 110 in part number. Example: SC628AHP
Note C — For 10-48 AC/DC operation substitute 648A for 110 in part number. Example: SC648AHP
Note D — For 60-250V AC/DC operation substitute 250 for 110 in part number. Example: SC250HP

MALLORY

MALLORY CAPACITOR COMPANY
a division of P. R. MALLORY & CO. INC.
3029 E. Washington St., Indianapolis, Indiana 46206
(317) 636-5353

Electrical and Electronic Components • Timing Devices and Motors • Metallurgical Products

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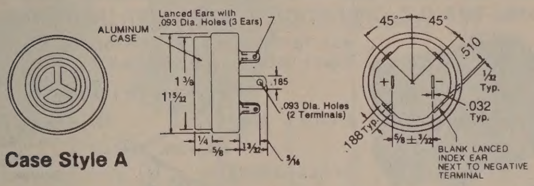
Sonalert® electronic audible signals

Case styles

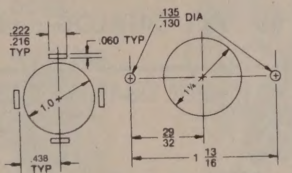
OUTLINE DIMENSIONS
FRACTIONS ±1/32 DECIMALS ±.01


ALUMINUM CASE
Lanced Ears with .093 Dia. Holes (3 Ears)
1 3/8
1 15/32
.185
.093 Dia. Holes (2 Terminals)
1/4
5/8
13/32
5/16
45°
45°
.510
1/32 Typ.
.032 Typ.
.188 Typ.
5/8 ± 3/32
BLANK LANCED INDEX EAR NEXT TO NEGATIVE TERMINAL

Case Style A

Terminals—.032 steel, tin plated with .093 dia. wire hole, will accept standard 3/16'' quick disconnect.

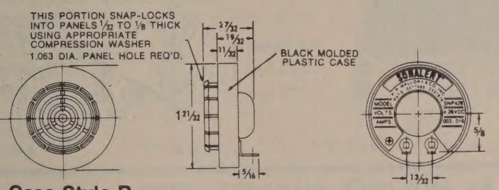
BP6 BAKELITE MOUNTING WAFER


.222
.216
TYP
.060 TYP
1.0
.438 TYP
.135
.130 DIA
1 1/4
29/32
1 13/16

CHASSIS CUT OUT FOR DIRECT MOUNTING

CHASSIS CUT OUT FOR MOUNTING USING MOUNTING WAFER MP6 OR BP6

Mounting—Four lanced twist mount ears per EIA std. RS395 are provided for mounting. Terminals are electrically isolated from case and mounting ears. Also may be mounted using mounting wafer number MP6 for uninsulated mounting or mounting wafer number BP6 to insulate case from chassis.

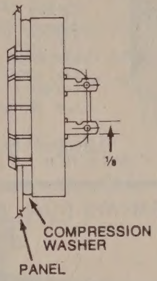

THIS PORTION SNAP-LOCKS INTO PANELS 1/32 TO 1/8 THICK USING APPROPRIATE COMPRESSION WASHER
1.063 DIA. PANEL HOLE REQ'D.
27/32
19/32
11/32
BLACK MOLDED PLASTIC CASE
1 21/32
5/16
SONALERT
MODEL
VOLTS
AMPS
5/8
13/32

Case Style B

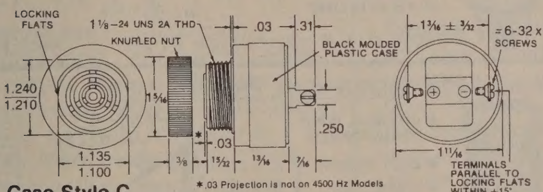
Terminals—.016 brass, hot tin finish with .076 wire hole. Terminal will accept standard 1/8'' quick disconnect.

Mounting—Panel hole 1.063 ± .005 diameter should be punched from the back side so that locking fingers enter on the slightly rounded edge of the hole. Assemble proper compression washer and press into panel hole until locking fingers snap over hole edge. Installation pressure should be applied only at the circumference of the device.

PANEL THICKNESS	COMPRESSION WASHER NO.
11-12 GA. (.125-.109)	PW1
13-17 GA. (.093-.056)	PW2
18-22 GA. (.050-.031)	PW3

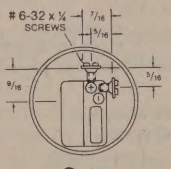

1/8
COMPRESSION WASHER
PANEL

TYPICAL PANEL INSTALLATION

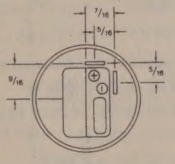

LOCKING FLATS
1 1/8–24 UNS 2A THD
KNURLED NUT
.03
.31
BLACK MOLDED PLASTIC CASE
1.240
1.210
1 5/16
.250
.03
1.135
1.100
3/8
15/32
13/16
7/16
1 3/16 ± 3/32
= 6-32 x 1/4 SCREWS
1 11/16
TERMINALS PARALLEL TO LOCKING FLATS WITHIN ±15°

* .03 Projection is not on 4500 Hz Models

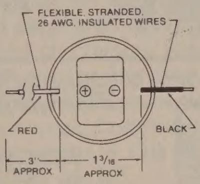
Case Style C


# 6-32 x 1/4 SCREWS
7/16
5/16
9/16
5/16

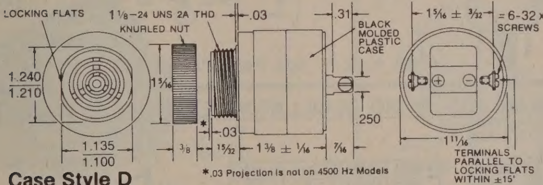
Case Style C-1


7/16
5/16
9/16
5/16

Case Style C-2

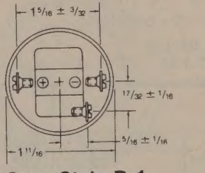

FLEXIBLE, STRANDED, 26 AWG, INSULATED WIRES
RED
BLACK
3'' APPROX
1 3/16 APPROX

Case Style C-3


LOCKING FLATS
1 1/8–24 UNS 2A THD
KNURLED NUT
.03
.31
BLACK MOLDED PLASTIC CASE
1.240
1.210
1 5/16
.250
.03
1.135
1.100
3/8
15/32
1 3/8 ± 1/16
7/16
1 5/16 ± 3/32
= 6-32 x 1/4 SCREWS
1 11/16
TERMINALS PARALLEL TO LOCKING FLATS WITHIN ±15°

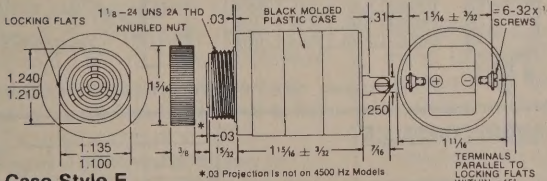
* .03 Projection is not on 4500 Hz Models

Case Style D


1 5/16 ± 3/32
17/32 ± 1/16
5/16 ± 1/16
1 11/16

Case Style D-1

Terminals—.032 brass, tin plated, tapped for #6-32 screw. Two #6-32 cadmium or zinc plated steel screws included. Will accept standard 1/4'' quick disconnect.


LOCKING FLATS
1 1/8–24 UNS 2A THD
KNURLED NUT
.03
BLACK MOLDED PLASTIC CASE
.31
1.240
1.210
1 5/16
.250
.03
1.135
1.100
3/8
15/32
1 15/16 ± 3/32
7/16
1 5/16 ± 3/32
= 6-32 x 1/4 SCREWS
1 11/16
TERMINALS PARALLEL TO LOCKING FLATS WITHIN ±15°

* .03 Projection is not on 4500 Hz Models

Case Style E

Mounting—Remove black plastic nut and insert threaded front through 1.25'' hole punched in panel. If orientation is needed, note locking flats on drawing. Screw nut back on. Do not overtighten. To substitute natural finished aluminum nut add C to catalog number. To substitute black anodized aluminum nut add B to catalog number. Example: — SC628B.

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(317) 636-5353

Electrical and Electronic Components • Timing Devices and Motors • Metallurgical Products

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AMPLIFIERS – OSCILLATORS
POWER SUPPLIES – AUDIO CONSOLES

F.O.B. LOS ANGELES, CA.

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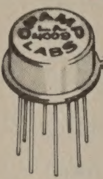
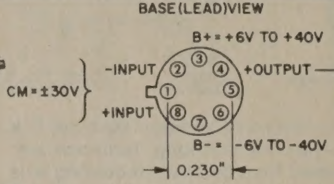
OPAMP LABS INC.

1033 N. SYCAMORE AVENUE
LOS ANGELES, CA. 90038
(213) 934-3566

MODEL 4009 MEDIUM VOLTAGE D.C. OPERATIONAL AMPLIFIER


OPAMP
L.A.
4009
LABS

BASE (LEAD) VIEW


B+ = +6V TO +40V
CM = ±30V
-INPUT
+INPUT
+OUTPUT
B- = -6V TO -40V
0.230"
1
2
3
4
5
6
7
8

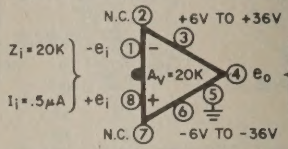
@ B± = ±36V
Z_o = 2.5K
e_o = ±30V/50K
$C_L \leq 0.1\mu F$
SLEW RATE = 10V/µS
A_V = 800
NOISE = 2µV

SIZE: TO-5 8-LEAD WT: 0.1 OZ. PRICE: $10.00/EA

MODEL 423 D.C. OPERATIONAL AMPLIFIER (REPAIRABLE)

- D.C. TO 150KC
- ± 20mV OFFSET
- ±10µV/°C DRIFT
- 2µV (-115dbm) NOISE
- 0.1% T.H.D.

OCTAL PLUG-IN


N.C. 2
+6V TO +36V
3
Z_i = 20K
I_i = .5µA
$-e_i$ 1
$+e_i$ 8
A_V = 20K
4 e_o
5
6
N.C. 7
-6V TO -36V

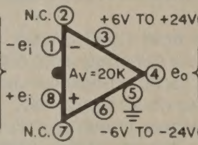
B± = ±24V (NOM.)
±18V/8Ω
12W RMS
40W PK (AUDIO)

SIZE: 1-1/2" x 3-1/4" x 2-1/2" H. WT: 7 OZ. PRICE: $ 35.00/EA

MODEL 425 D.C. OPERATIONAL AMPLIFIER

OPAMP
LABS
L.A. CALIF.
D.C. Operational
Amplifier
Model 425

Z_i = 20K
±20mV OFFSET
I_i = 0.5µA
±20µV/°C
CM: ±20V
NOISE: 1µV (-120dbm)

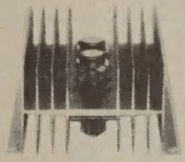

N.C. 2
+6V TO +24V (NOM.)
3
$-e_i$ 1
$+e_i$ 8
A_V = 20K
4 e_o
5
6
N.C. 7
-6V TO -24V (NOM.)

±20V/1K/D.C.-100KC
+24dbm/D.C.-50KC
0.05% T.H.D.

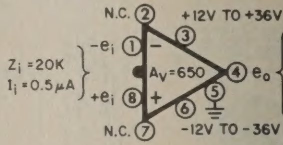
OCTAL PLUG-IN

SIZE: 1" DIA x 1-5/8" H WT: 2 OZ PRICE: $ 25.00/EA.

MODEL 440 50W. D.C. THRU AUDIO OPERATIONAL POWER AMPLIFIER



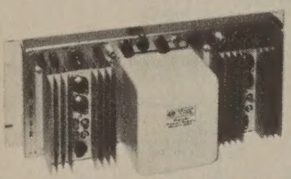
OCTAL PLUG-IN


N.C. 2
+12V TO +36V
3
Z_i = 20K
I_i = 0.5µA
$-e_i$ 1
$+e_i$ 8
A_V = 650
4 e_o
5
6
N.C. 7
-12V TO -36V

@ B± = 36V
±30V/8Ω
100W PK
50W RMS

SIZE: 4-3/4" x 5-1/2" x 2-5/8" H WT: 20 OZ PRICE: $ 35.00/KIT, $ 60.00/WIRED

MODEL SM-100 DUAL 50W. OR MONO 100W. D.C. THRU AUDIO OPERATIONAL POWER AMPLIFIER



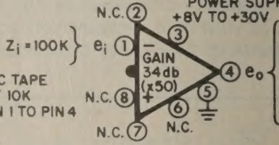
DESCRIPTION: PANEL-CHASSIS WITH HARDWARE, TWO 440KR POWER AMPLIFIER KITS, ONE WIRED AND TESTED 536 POWER SUPPLY, PC-SM 100 CONVERTIBLE STEREO, 50W OR MONO 100W PRINTED CIRCUIT BOARD AND ALL NECESSARY COMPONENTS.

SIZE: 7" H x 19" W x 7" D

WT: 15 LBS PRICE: $ 175.00/KIT, $ 255.00/WIRED

MODEL 34 AMPLIFIER-BIAS OSCILLATOR

20CY TO 20KC (±1db) 0.25% T.H.D. (+18dbm)
50CY TO 10KC (±3db) 1% T.H.D. (8W PK)
SINGLE POLARITY POWER SUPPLY


N.C. 2
+8V TO +30V
3
Z_i = 100K
e_i 1
N.C. 8
GAIN 34db (x50)
4 e_o
5
6
N.C.
N.C. 7

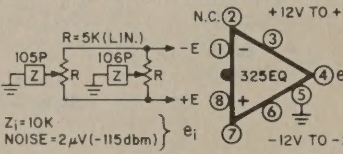
AS 100KC MAGNETIC TAPE BIAS OSC. CONNECT 10K RESISTOR FROM PIN 1 TO PIN 4
e_o = 20V/1K LOAD

+24V (NOM.)
Z_o = 1Ω
$R_L \geq 4\Omega$
SHORT PROOF
$C_L \leq 1\mu F$

OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: $ 20.00/EA

MODEL 325 EQ EQUALIZATION AMPLIFIER

- GAIN ADJ. FROM 0db TO +20db
- 20CY TO 20KC RESPONSE


R = 5K (LIN.)
105P
106P
Z
R
-E
+E
N.C. 2
+12V TO +24V (NOM.)
3
1
8
325EQ
4 e_o
5
6
7
-12V TO -24V (NOM.)
e_i

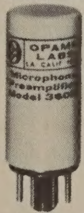
Z_i = 10K
NOISE = 2µV (-115dbm)

±18V/600Ω
+24dbm
OUTPUT IS IN-PHASE WITH INPUT
0.1% T.H.D.

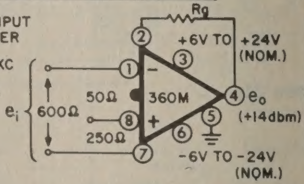
EQ CONTROL KITS: 105P & 106P ($25.00/EA)

OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: $ 30.00/EA

MODEL 360M MICROPHONE PREAMPLIFIER



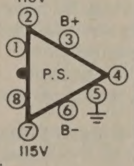
- INTERNAL INPUT TRANSFORMER
- 20CY TO 20KC
- 0.25% T.H.D.
- -125dbm NOISE


Rg
2
+6V TO +24V (NOM.)
3
1
8
e_i
600Ω
50Ω
250Ω
360M
4 e_o
(+14dbm)
5
6
7
-6V TO -24V (NOM.)

GAIN	Rg
60db	NONE
50db	15K
40db	3.3K
30db	1K

OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: $ 30.00/EA

POWER SUPPLIES (REPAIRABLE)

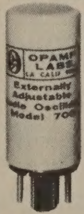

115V
2
B+
3
1
P.S.
4
8
5
6
7
B-
115V

OCTAL PLUG-IN
WITH BOLT-DOWN PROVISIONS

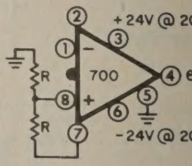
MODEL	DESCRIPTION	SIZE (INCHES)	PR-EA
*515P	± 15V @ ± 50mA	2 x 3 x 2 H	$ 25
522	± 24V @ ± 150mA	2 x 3 x 2 H	25
523	± 24V @ ± 2A	3.25 x 5.25 x 4.25 H	40
*524P	± 24V @ ± 40mA	2 x 3 x 2 H	25
525	± 24V @ ± 1A	3 x 4 x 3.25 H	35
526	± 24V @ ± 4A	5 x 5.50 x 4.25 H	45
536	± 36V @ ± 3A	5 x 5.50 x 4.25 H	45
*523R	± 24V @ ± 1.5A	3.25 x 5.25 x 4.25 H	55
54	+ 24V @ +700mA	3 x 4 x 1.75 H	25

*REGULATED

MODEL 700 AUDIO OSCILLATOR (EXTERNALLY ADJUSTABLE)



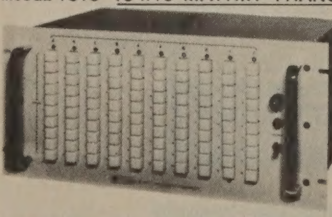
FREQ	R(±5%)	FREQ	R(±5%)
16CY	NONE	1KC	1.6K
50CY	43K	2KC	800Ω
100CY	20K	5KC	320Ω
200CY	9.1K	10KC	160Ω
440CY	3.6K	12KC	130Ω
500CY	3.2K	15KC	100Ω


2
+24V @ 20mA
3
1
R
R
8
700
4 e_o
5
6
7
-24V @ 20mA

3V (+10dbm)
R_L = 600Ω
0.5% T.H.D.

OCTAL PLUG-IN SIZE: 1" DIA x 2" H WT: 2 OZ PRICE: $ 35.00/EA

MODEL 1010 10 x 10 MATRIX-TRANSFORMER ISOLATED INPUTS AND OUTPUTS

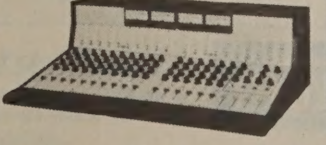


- 10K INPUT IMPEDANCE
- UNITY GAIN
- 24 dbm OUTPUT
- 80 db ISOLATION
- LIGHTED PUSH-ON/OFF SW
- BARRIER TERMINALS ON BACK PANEL
- INTERNALLY REGULATED P.S.

SIZE: 8-3/4" H x 19" W x 14" D

WT: 32 LBS PRICE: $ 2,000.00

AUDIO CONSOLES



1604-TV

MODEL	DESC.	PRICE	
		KIT	WIRED
802-TV	8 IN-2 OUT	$ 3,600	$ 5,600
1204-RS	12 IN-4 OUT	5,400	8,700
1204-TV	12 IN-4 OUT	5,000	8,300
1604-RS	16 IN-4 OUT	6,500	10,600
1604-TV	16 IN-4 OUT	5,900	9,950
2008-RS	20 IN-8 OUT	9,600	15,300

TV = TELEVISION RS = RECORDING STUDIO
KITS: IN STOCK F.O.B. LOS ANGELES, CA.

DATE: JANUARY 1977

WE'RE WARNING YOU...℠

...we have an audio indicator for every need.

Long-life, solid state construction. Eliminates mechanical contacts and RF noise.

X-10 Series Continuous

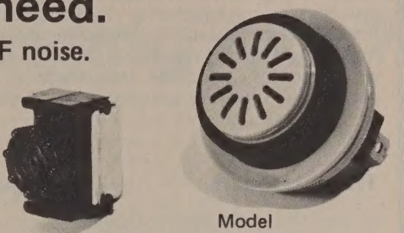
X-11 Series Pulsing

Pulsing or continuous . . . piezo crystal, featuring 35mm diameter sounding element. For computer terminals and remote control warning, fault detection and alarm devices. Six models; 3 to 16 vdc; 85 dbA at 3.3 kHz. Current drain 10 mA. Supplied with 0.187″ (4.7mm) quick-disconnect tabs, wires or three PC mounting pins.

AI-330 Series

No. AI-301 Adapter Ring

Panel mounted . . . for instrument panel warning systems. Supplied with 0.250″ (6.4mm) quick-disconnect tabs. Six models; pleasing continuous or pulsing tone gets attention. Rated to 85 dbA at 800 Hz (special frequencies available on larger orders). Optional adapter ring (AI-301) for larger holes.



Model PM-101

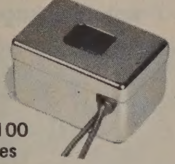
Model AI-310

Plastic panel mounts . . . for AI-100 Series.*

Model PM-101 fits 0.500″ (12.7mm) diameter opening in panels to 0.125″ (3.2mm) thick. Mounts with bezel, screws or adhesive.

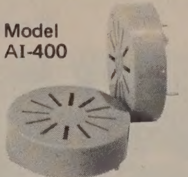
Model AI-310 fits 1.125″ (28.6mm) diameter opening in panels to 0.125″ (3.2mm) thick. Terminals accept 0.250″ (6.4mm) disconnects, screws or solder.

* *(Audio indicator not included. Order separately.)*



AI-100 Series

Miniature size . . . maximum attention-getter. For pocket paging sets, battery alarm clocks, timers, test apparatus, telephones, security systems. Emits 86 dbA tone at 400 Hz. Four models, 3 to 12 vdc; available with collector output.

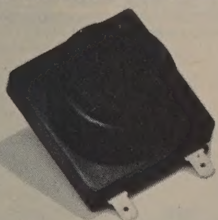


Model AI-400

Two-pin mounting . . . for PC boards and wave soldering. Compact; highly reliable; easily installed. For computer terminals, medical equipment, point-of-sale terminals. Rated to 90 dbA at 2.9 kHz; 5 to 30 vdc; draws 10 mA maximum current.

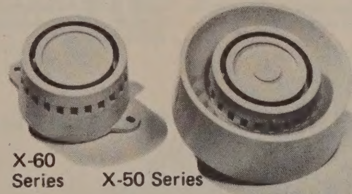
X-40 Series

Piezo crystal panel alarm . . . for home, business and factory warning systems. High quality unit features 50mm diameter sounding element. Supplied with wires. Continuous or slow pulsing models; to 110 dbA at 2.7 kHz; 6 to 32 vdc.



X-20 Series

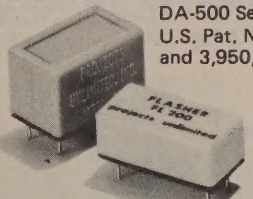
Continuous tone . . . piezo crystal for panel mounting. Fits 1.125″ (28.6mm) diameter opening in panels to 0.125″ (3.2mm) thick. Has 35mm diameter sounding element. Rated to 85 dbA at 3.3 kHz; 6 to 16 vdc. Terminals accept 0.187″ (4.76mm) disconnects, screws or solder. Used for computer terminals and remote control warning, fault detection and alarm devices. Current drain 10 mA.



X-60 Series

X-50 Series

Piezo crystal wall or panel mount unit . . . for fire and burglar alarms. With 50mm diameter sounding element. Choice of nine models; continuous tone, fast or slow pulsing, or all three. Strong white plastic case; excellent in most commercial, industrial and residential environments. Rated to 110 dbA at 2.7 kHz. X-60 (left, without horn) available in selected models.



DA-500 Series
U.S. Pat. Nos. 3,945,000 and 3,950,414

FL-200 Series

Dip-Alarm™ . . . (left) plugs into 16-pin DIP sockets or PC boards. For indoor and outdoor equipment. Pleasing non-directional signal can't be ignored; 76 dbA at 400 Hz. Models for 5 or 12 vdc; 35 mA maximum current.

Dip-Flash® . . . (right) interrupts or pulses loads to 200 mA at 90 cpm. Use with Dip-Alarm or in applications requiring flashing light or audio signaling.

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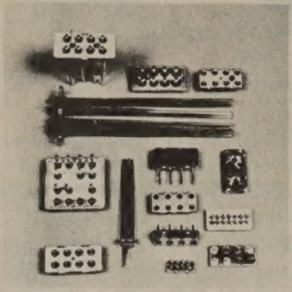
AIRPAX™ Hermetic Seals Glass / Ceramic-to-Metal Seals

■ Combining the most competent, experienced seals engineers with unsurpassed manufacturing facilities, production methods, and in-house plating capability . . . Airpax provides glass/ceramic seals of the highest quality and reliability. The engineering staff maintains close supervision of each order, always with an eye toward conscientious adherence to delivery schedules. The Airpax quality control program meets and exceeds MIL-Q-9858. Government source inspection is offered for military requirements.

For further information on Airpax Glass/Ceramic-to-Metal Seals capability, request Short Form Catalog 4002 and Bulletin 4001, a complete facilities report.

Relay Headers

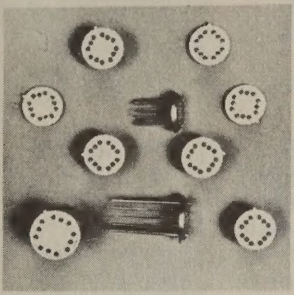


Airpax manufactures compression-type hermetic seals which will withstand extreme conditions of mechanical strain, vibration, thermal shock, and corrosive atmospheres. Bodies and terminals are of selected steels and alloys, and are fused with highly specialized glasses.

Single Pin Terminals

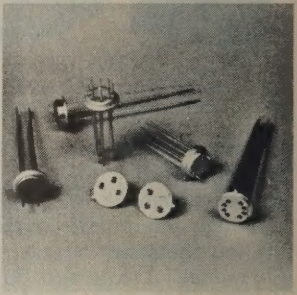
Available with flanged, straight wall (no flange), and threaded bodies. Can be supplied with any flange diameter, flange thickness, body diameter, or body length. Terminals are available in a variety of electrode diameters, lengths, materials, and configurations.

TO-8's



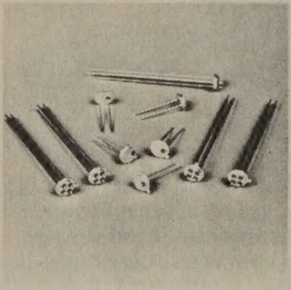
Available in 3-pin to 16-pin configurations, with optional brazed ground pins for special applications. To insure excellent die bonding and solderability, the TO-8 is supplied with Airpax's high purity Gold finish.

TO-5 Headers



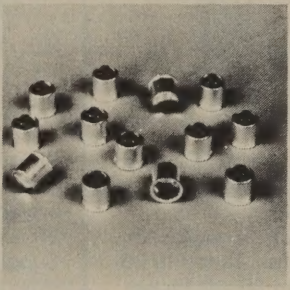
The complete line of Airpax TO-5 transistor bases covers a wide variety of pin lengths, pin quantity, and pin configurations. In addition to the standard TO-5, with all glass construction, Airpax makes an all-metal version with individual insulated leads, brazed or welded ground pins.

TO-46 Headers



TO-46, or light emitting diode headers are available with various lead lengths, number of insulated leads, and with or without butt welded pins. To assure best die bonding, solderability, heat resistance, and weldability, Airpax's high purity Gold is standard finish.

Lens Caps

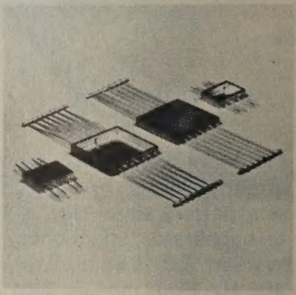


A number of standard design lens cap series are available for a variety of installation conditions. Special window diameters and other configurations of mounting rings, as well as special plating, may be utilized to meet your most stringent requirements.

Ceramic-to-Metal Seals

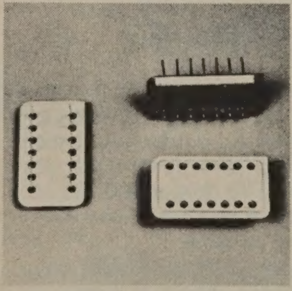
Airpax manufactures a complete line of ceramic-to-metal seals of all configurations. They are excellent electrical insulators, have high thermal dissipation, and operate at high temperatures. They maintain their hermeticity under adverse temperatures, shock, and vibration conditions.

Frame Packages



Airpax offers to the Hybrid micro-circuit manufacturer a significant improvement in flat packaging reliability . . . the all-metal package. Monolithic metal construction imparts high mechanical strength and greater heat dissipation to the Airpax flat pack.

Dual In-Lines

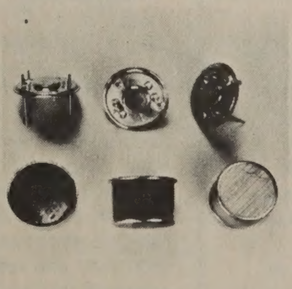


Airpax makes a variety of all-metal plug-in packages. All-metal construction results in extremely high mechanical strength, excellent heat dissipation, and provides maximum cubical content. Available in both Kovar and steel and, for non-magnetic applications, stainless steel.

Actuators

A complete line of Kovar actuators and pushers are available in the standard clear glass version, or can be fabricated in a variety of colors for indentification purposes. Airpax actuators can be produced with a number of compound bends for unlimited design flexibility.

Cold Weld Packages



Airpax manufacturers a complete line of solid copper weld packages. Cold welding prevents contamination that is prevalent in most other manufacturing techniques.

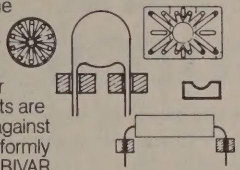
Custom Specials

Airpax engineers will work with your engineers, designing and developing the best hermetic seal for your application. Their intimate knowledge of electronics, metallurgy, glass sealing, ceramic metalizing and brazing can often simplify your problem and reduce your costs.

AIRPAX ELECTRONICS • CAMBRIDGE DIVISION • CAMBRIDGE, MARYLAND 21613
Phone: (301) 228-4600 Telex: 8-7715 TWX: 710-865-9655

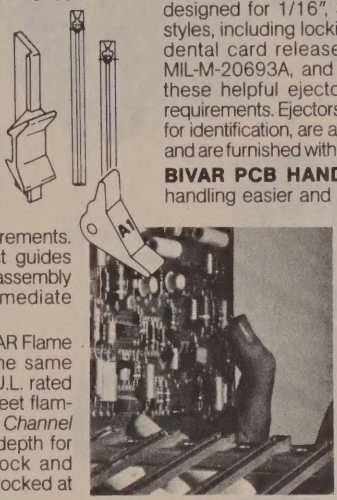
Can you find solutions to your design and cost problems from these standard Bivar Packaging Aids?

Yes. Because someone else probably had a similar problem before you did. In fact, during the past decade BIVAR has introduced *nearly 1,000 standard products,* most designed originally to solve costly Printed Circuit Board packaging or component mounting problems. These have resulted in lower assembly costs, fewer rejects and improved quality of product appearance and performance. Take for example, the advantages of accurately supporting transistors, capacitors and other devices. Components are protected, insulated against heat damage and uniformly positioned by using BIVAR **PERMANENT MOUNTS** and **SPACERS,** made of durable Nylon per MIL-M-20693A. Hundreds of standard styles for virtually any PCB component; low-cost and carried in stock by the thousands. For accurate, uniform component spacing above PCB surfaces, over 400 standard sizes of BIVAR **WASH-AWAY SPACERS** assure proper filleting and heat dissipation, and eliminate lead stresses and strains, washing away in warm or hot running water without a trace of residue. These extremely low-cost devices, designed for exacting application for almost any component, substantially reduce rejects and rework.



BIVAR can mean the difference in cost-savings and *real* PCB packaging design flexibility with the industry's most complete line of **SNAP-IN CARD GUIDES;** lengths from 2½″ through 14″, made of reinforced molded Nylon. Snap them into card cages or sheet metal at *your* spacing requirements. For 1/16″ PCBs, these low-cost guides feature rigidity, card insertion and assembly ease, and are stocked for immediate shipment.

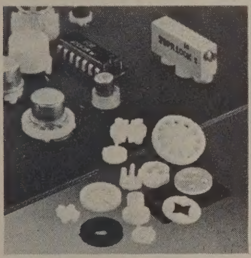
For new, demanding designs, BIVAR Flame Retardant Card Guides offer the same range of sizes made of 94 V-O U.L. rated material; help the designer to meet flammability specifications. New *Deep Channel Card Guides,* with a .200″ slot depth for maximum retention under shock and vibration or for larger PCBs. All stocked at low, cost-savings prices.

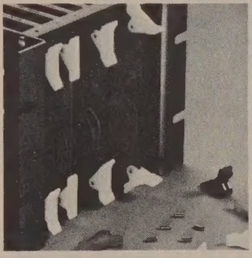


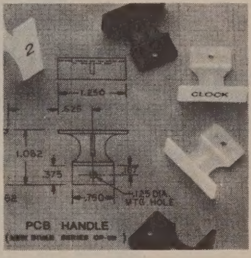
Components, circuitry and cards will be protected from undue stresses, and PCB insertion or removal will be easier with BIVAR **CARD EJECTORS**, designed for 1/16″, 3/32″, and 1/8″ boards; 18 styles, including locking versions to prevent accidental card release. Molded from Nylon per MIL-M-20693A, and U.L. rated 94 V-2 material, these helpful ejectors meet most demanding requirements. Ejectors can be marked permanently for identification, are available in 13 standard colors and are furnished with stainless steel mounting pins.

BIVAR PCB HANDLES make circuit board handling easier and provide an excellent way to to code or identify each board. Made from Natural White Nylon per MIL-M-20693A and U.L. rated 94 V-2 material, they meet demanding packaging specifications; standard colors and markings are available.

Yes, you can find solutions to *your* design and cost problems from this growing family of Packaging Aids. And, if you have special needs they can be answered too.







Whether you are mounting components on PCBs, or packaging completed PCBs, BIVAR can provide answers that will save time, money, and improve your product's appearance. Find out about the BIVAR *"Cost Savers."* Choose from over 900 standard products. BIVAR, INC., 1617 E. Edinger Avenue, Santa Ana, CA 92705. Phone (714) 547-5832.

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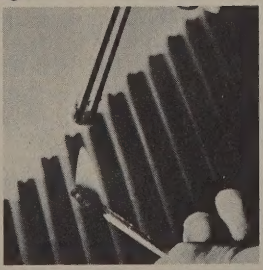
OVER 900 STOCKED PARTS.

BIVAR PACK
products for
PRINTED CIRCUIT BOARDS
and rack packaging
BIVAR PACKAGING DIGEST
CATALOG NO. 576-P



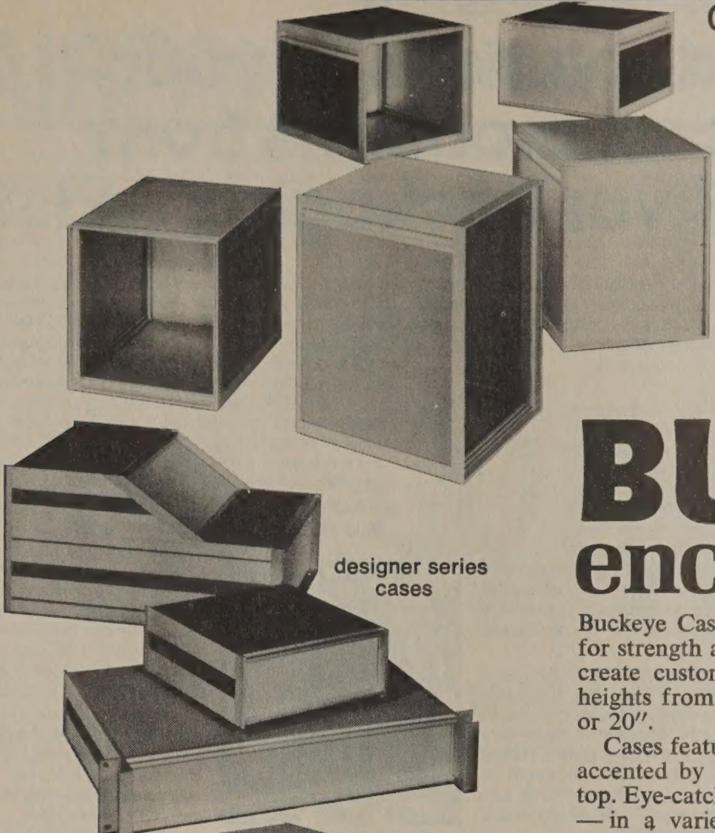
FLAME RETARDANT CARD GUIDES

Snap in easily yet firmly, available in 24 standard lengths from 2½″ through 14″. made of 94 V-O U.L. rated material.

UNIVERSAL SPACERS FOR DISCRETE COMPONENTS

Made from natural nylon, 148 standard sizes are available from stock in four basic I.D./O.D. combinations with thicknesses ranging from .020″ through .380″, in .010″ increments.

PACKAGING PROGRESS
BY **Bivar**



CABINETS

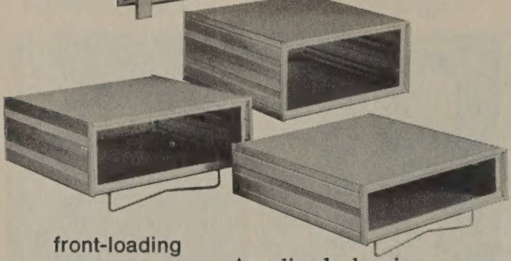
Buckeye Cabinets are formed of anodized aluminum extrusions and suede-finish panels in attractive designer colors. Integral handles conveniently formed from side extrusions. Easy access back panels for simpler maintenance.

Universal 19″ front panel widths with heights in standard increments from 12.25″ to 28″. Two models in ten sizes available from stock: slip-in front panel, or open-front models with nut tracks for screw-in panels to complement instrumentation. All extrusions feature thread-tracks for mounting braces and brackets.

BUCKEYE enclosures and packaging components

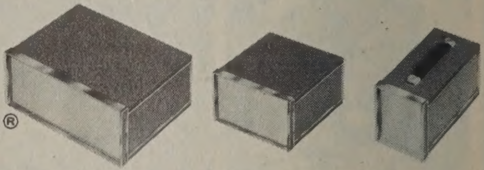
Buckeye Cases have a framework of aluminum extruded shapes for strength and durability. Standard components are combined to create custom case sizes with off-the-shelf prices. All standard heights from 3½″ to 12¼″ are available, with depth either 13″ or 20″.

Cases feature anodized satin finish on extrusions and face plate, accented by colorful suede-finish paint on recessed portions and top. Eye-catching slant front case available for offset control panels — in a variety of sizes. Retractable locking tilt stand; spring-loaded, push button, access top panels; carrying handles and integral rack mounting handles available for most models.



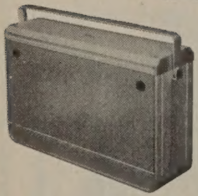
CASES

Anodized aluminum cases trimmed with suede-finish decorator colors. Standard 19″ widths in five stock heights from 5¼″ to 12¼″. All cases available with four nylon feet and retractable, self-locking tilt stand.



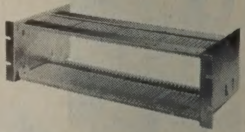
Rugged cases in three popular sizes for packaging integrated modular circuitry. Designed to incorporate 4½″ circuit board card guides. All cases feature recessed satin-anodized front panels, polished aluminum frame trim and durable gray pebble-grain finish. Larger sizes — BPC-1000 and BPC-1500 — feature retractable tilt stands and four nylon feet. Smallest unit — BPC-500 — has handy carrying handle.

BUCK-I-PAK™

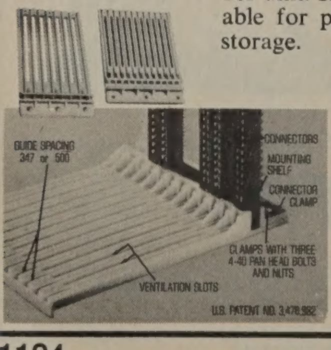


Handy portable instrument case. Made of extruded aluminum shapes with suede-finish colors. Measures 11½″ h. x 18″ w. x 5¼″ d. Chassis is removable for assembly line component installation. Top panel is opened by flush push buttons. Hinged control cover and handle fold neatly under unit. Ideal for battery-power or adaptable for power access with built-in cord storage.

RACKS



Buckeye circuit board racks have aluminum support bars connected to flanged end plates. Ideal for stacking or mounting into stationary systems. Four sizes available: from the 19″ Full Rack which can hold 4 sets of guides, to the ¼ Rack, capable of holding one set of 4½″ or 6″ guides. End plates have adjustment slots for different board widths.



GUIDES — Vented ABS modules, molded in four colors, for speedy packaging of circuitry. Models to accommodate 4½″, 6″ or 9″ board lengths, with tracks spaced either .347 or .500 for maximum card density. Ingenious alignment studs on mounting shelf and clamps allow fast, easy assembly of connectors.

Also see Buckeye quality Matching Instrument Series Knobs and Retractable Tilt Stands in section 2400.

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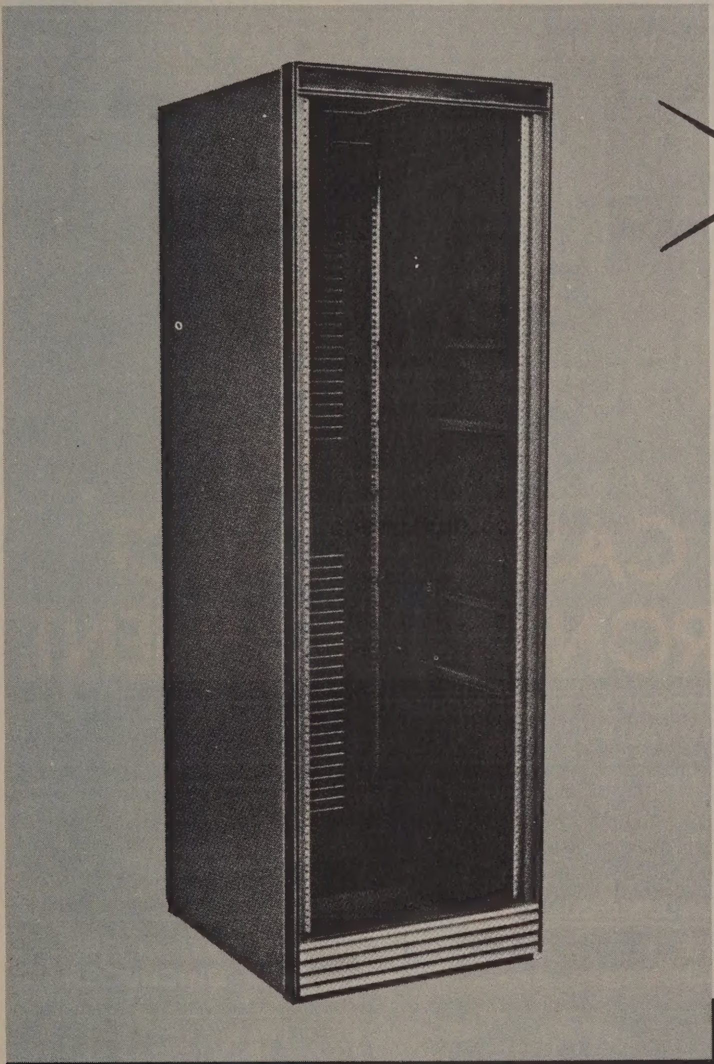
555 Marion Road, Columbus, Ohio 43207
Phone: (614) 445-8433
"QUALITY PRODUCTS SINCE 1902"

CABTRON
SYSTEMS INC.

C SERIES RACK CABINET ASSEMBLIES



shipped in 5 working days

4 SIZES

19″ x 61¼″ Panel Width
25½″ & 30¾″ Deep,

19″ x70″ Panel Width
25½″ & 30¾″ Deep

1 COLOR

WB-200 Sky Blue

24 ASSEMBLIES

in each size

C SERIES

Cabtron Systems C Series Rack Cabinets are the finest in the industry featuring an all 14 ga. steel frame construction, 16 ga. steel doors and side panels, and 11 ga. panel mounting angles.

Add on any of our standard accessories with no delay in delivery.

CALL your order in TODAY
312-498-6090

CABINET NUMBER	PANEL HEIGHT	CABINET DEPTH	PRICE
AFCB-1961-25H	61¼″	25½″	$386.78
AFCB-1970-25H	70″	25½″	$400.28
AFCB-1961-30H	61¼″	30¾″	$415.76
AFCB-1970-30H	70″	30¾″	$430.09

Aluminum Trim With Either Black Or Walnut Vinyl Inserts Available.
. . . Please Specify When Ordering . . .

CABTRON
SYSTEMS INC.

200 Anets Drive, Northbrook, Illinois 60062 (312) 498-6090

ECS transit, carrying, and operating cases provide maximum protection for precision equipment and sensitive instrumentation during transport and field operation. These cases are pressure molded fiberglass, using a technique that maximizes the glass content of the laminate, resulting in exceptional strength and impact resistance. Engineered specifically to withstand rough handling and hostile environments, they will meet all applicable military specifications, afford protection over a −65° F to +160° F temperature range and exceed military requirements for tensile, compressive, and flexural strength. These cases are impervious to moisture, corrosion, and fungus growth.

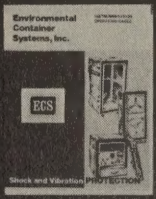
Offered in 1200 case sizes by part number, in a choice of 30 standard colors, ECS cases and cabinets are available to meet your specifications for the transportation and field operation of your equipment. Custom designs are available for special applications.

These enclosures have been proven in the severest environments, successfully protecting such equipment as military calibration systems, offshore instrumentation, flight line equipment, television and other communications equipment, electro-optical equipment, minicomputers and peripherals, time and frequency standards, dental, medical and surgical equipment, precision tools, and electronic test and measurement equipment of all kinds.

TAPE REEL CASES

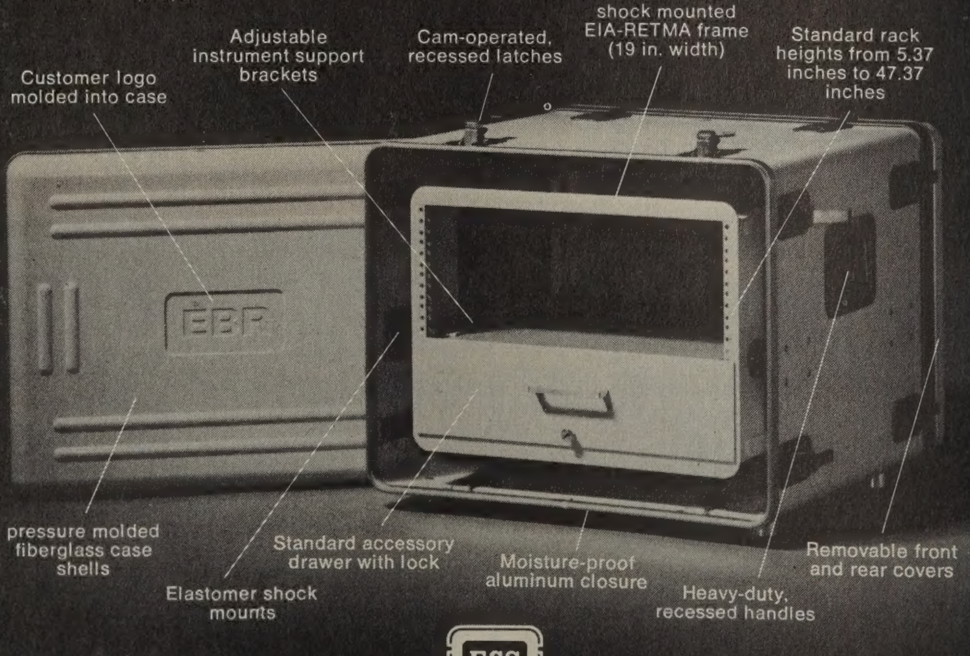
STOCK CASES

STANDARD CASE CATALOG


Environmental Container Systems, Inc.
ECS
Shock and Vibration PROTECTION

IMPENETRABLE CASES PROTECT SENSITIVE ELECTRONIC EQUIPMENT

SPECIAL ECS OPERATING CASE
U.S. PATENT 3,482,895


Customer logo molded into case
Adjustable instrument support brackets
Cam-operated, recessed latches
shock mounted EIA-RETMA frame (19 in. width)
Standard rack heights from 5.37 inches to 47.37 inches
EBR
pressure molded fiberglass case shells
Elastomer shock mounts
Standard accessory drawer with lock
Moisture-proof aluminum closure
Heavy-duty, recessed handles
Removable front and rear covers

ECS

ENVIRONMENTAL CONTAINER SYSTEMS, INC.

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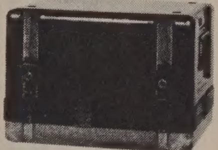
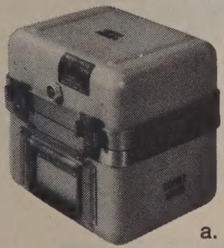
CASES FOR HOSTILE TRANSPORTATION ENVIRONMENTS

Military Transit Cases

Transit cases that meet MIL-C-4150, MIL-T-4734, MIL-T-21200, and MIL-T-28800 specifications are designed and manufactured by E.C.S. Pressure molded fiberglass is the only material able to withstand the rigorous testing required by these specifications without denting, fracturing, or functional damage. Typical configurations are shown in photos a. b. and c.

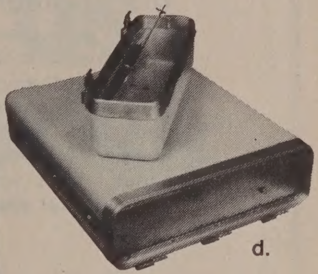

b.


a.

c.

Military Combination Cases

These combination cases meet the same military specifications as the high performance transit cases but are designed for field operation as well. Combination case shown in photo e. includes a cable connector in the rear and is designed for mounting in an instrumentation cabinet. RFI shielded case shown in photo d. is designed for a standard 19″ rack width instrument.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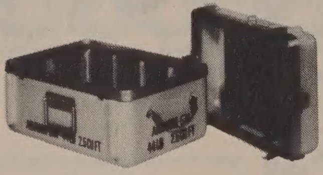
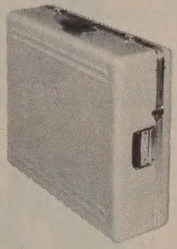

e

Stock Cases

Stock cases are available from a selected series of over 50 mold sizes. These cases are blue-grey (ECS P/N 43000150) in color and utilize a preselected set of latches, handles and extrusions. Stock case designs include:
- Transit cases
- Valise cases
- Panel mount cases

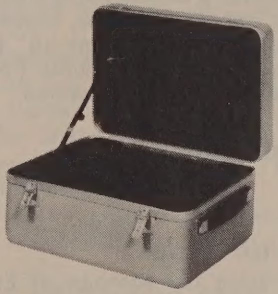
Valise Cases

These cases are generally similar to suitcases in design and are especially useful as service kits, spare parts kits and airline carry-on containers.

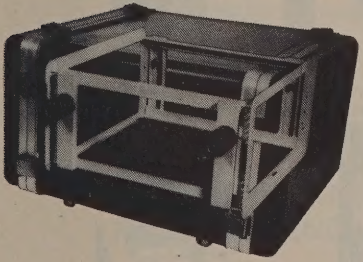


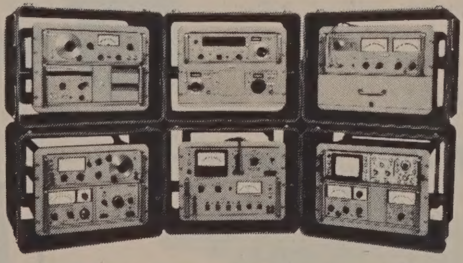
Carrying Cases

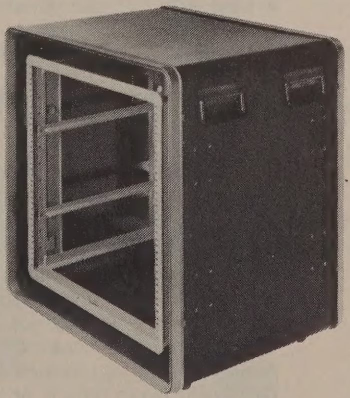
Carrying cases and transit cases are manufactured by ECS for a broad variety of commercial and industrial applications. These cases are frequently equipped with a set of foam cushions for shock and vibration protection for the enclosed equipment. Sizes range from 8x8x8 up to 48x43x43. Cases are custom designed to ideally suit each application.



TRANSPORTABLE CABINETS FOR RACK MOUNT EQUIPMENT







ECS transportable cabinets provide instant portability for your delicate instrumentation.

Simply secure your equipment within this shock-mounted case, and it will be protected from rough handling and environmental hazards. Remove the front and rear covers using camaction latches, and instrumentation is ready to be operated within the case.

These rugged, pressure-molded fiberglass enclosures have performed outstanding service in many severe applications, military and commercial. They have withstood drop tests, shock tests, vibration tests and a variety of environmental tests.

ECS Part Number	Rack Height	Instrument Capacity	
		Minimum	Maximum
39-351-0537	5.375	20 lb.	75 lb.
39-339-0887	8.875	20 lb.	75 lb.
39-338-1062	10.625	30 lb.	130 lb.
39-338-1237	12.375	25 lb.	100 lb.
39-338-1412	14.125	30 lb.	130 lb.
39-338-1587	15.875	30 lb.	130 lb.
39-338-1762	17.625	30 lb.	130 lb.
39-338-1937	19.375	30 lb.	130 lb.
39-350-2112	21.125	50 lb.	250 lb.
39-350-2287	22.875	50 lb.	250 lb.
39-350-2462	24.625	50 lb.	250 lb.
39-350-2637	26.375	50 lb.	250 lb.
39-350-2812	28.125	50 lb.	250 lb.
39-350-2987	29.875	50 lb.	250 lb.
39-350-3162	31.625	50 lb.	250 lb.
39-350-3337	33.375	50 lb.	250 lb.
39-350-4737	47.375	70 lb.	320 lb.

Options

Each transportable cabinet is available with a variety of options including three drawer sizes, power strip, slides, recessed latches and handles, special colors, Military certification and special mounting dimensions.

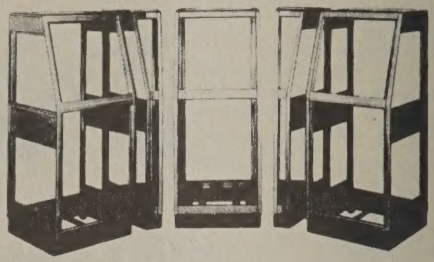
emcor puts it all together

with distinguished modular enclosures

emcor I

the original concept

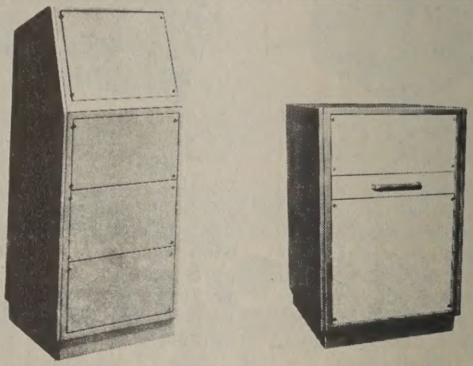
Emcor pioneered the concept of the modular enclosure system for electronic, instrumentation and electro-mechanical applications. The Emcor I series, with hundreds of frames in nine basic configurations, three panel widths, three depths, and literally thousands of components and accessories, offers virtually unlimited design freedom to meet your specific needs at low cost.



emcor II

contemporary classic

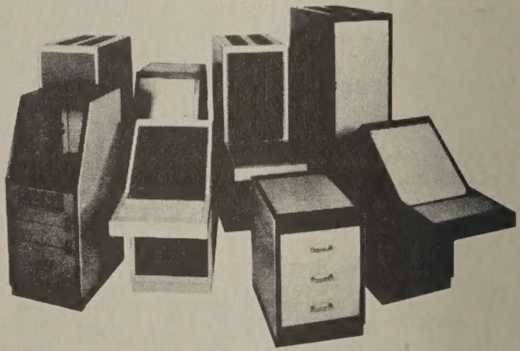
Our top-of-the-line series, with exclusive design and structural features, offers optional modifications to achieve customized individuality. Handsome contemporary styling for the popular square-corner look. Absence of seams in frame construction achieves a picture frame effect. Vertical, corner and instrument frames, including six turret styles with slope fronts from 10° to 80°. And with 11 exciting colors to choose from and combine, custom individuality is assured.



emcor esq

economy with style

Designed to combine the economy of Emcor I with the distinctive styling of Emcor II, the ESQ series is available in nine basic configurations—desk and counter height, extended arm, instrument, turret, and writing top models. Two panel widths — 19″ and 24″; four depths — 18½″, 22″, 25½″ and 30¾″. Hundreds of basic frames and a wide array of components and accessories.



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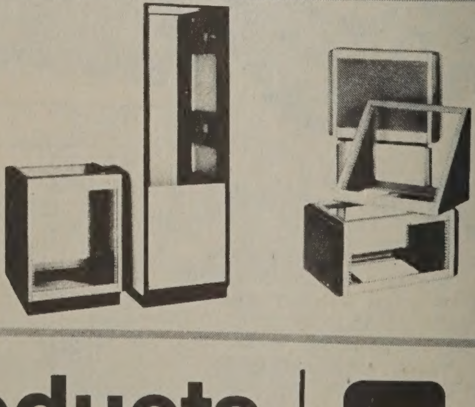

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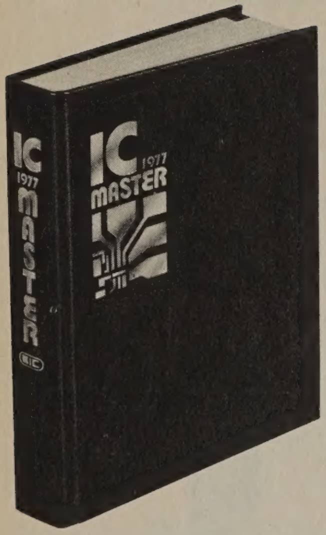

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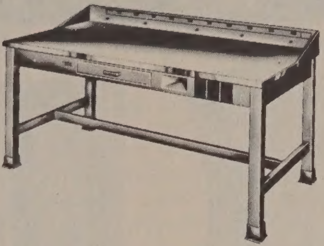
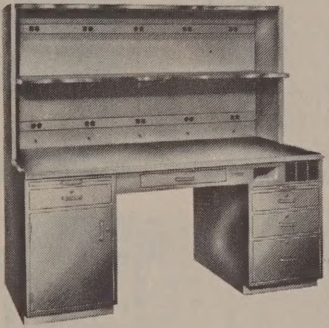
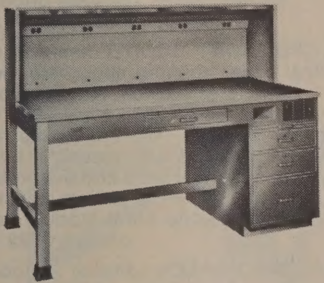
APPLICATIONS







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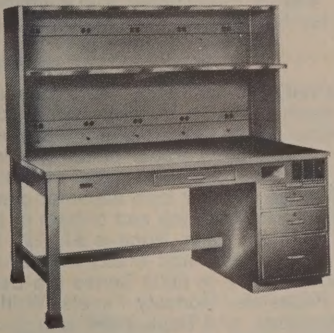
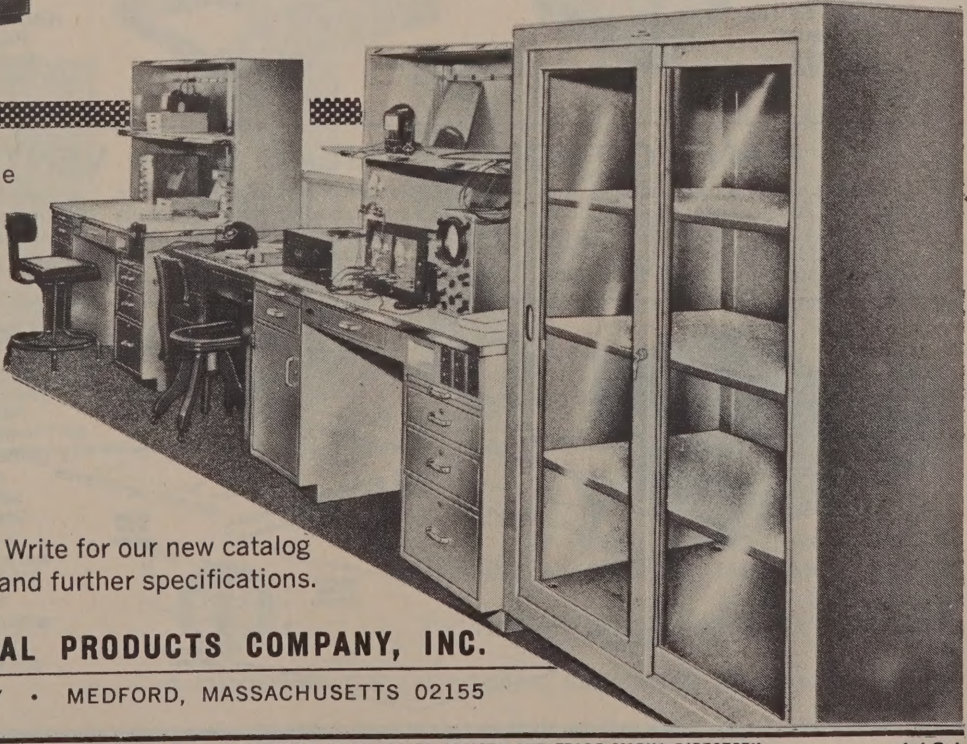
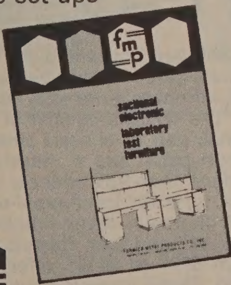




For school purposes, the unusual adaptability of Formica's many specialized turrets and pedestals — whether for single or double set-ups



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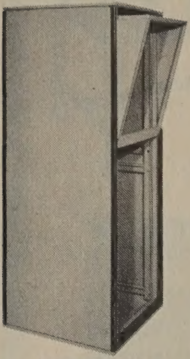
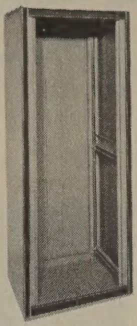


6000 SERIES TURRET MODULES



6000 SERIES BASIC MODULES

BASIC MODULE has heavy-duty heliarc welded frame with hinged and removable side panels for multiple-bay installations. Vertical panel openings are from 17.56″ to 77.06″ in 1.75″ R.E.T.M.A. increments. Overall height is 5⅛″ greater than the vertical panel opening. Overall width is 24″. Choose from 24″ or 30″ depths. Suitable for military, commercial, and OEM applications, standard features include rear door with magnetic closing latch, adjustable rear mounting rails, and modern styling in blue or tan. Custom, factory installed options are available (see below). Competitively priced — single unit base price starts at $332.56.

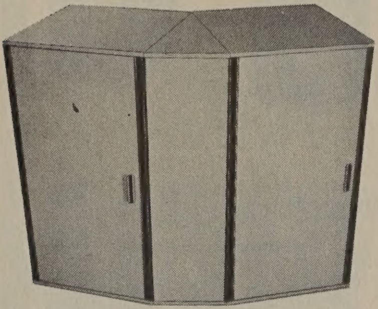
TURRET MODULES come in a choice of three assembly configurations which make sighting of visual readout information convenient from any work position. Turret bolts easily to the basic Cabinet Module at any desired location in the vertical front panel opening. These Turrets can be positioned to face upward or downward. Turret module base price is $52.50

WEDGE MODULES can be used in conjunction with each other to form the console arrangements you desire. The Vent-Rak Wedge Modules make assembly of curved console arrangements stable and attractive. Available in 30° - 45° - 60° configurations, with open sides and removable rear panels for easy entry. The base price for Wedge Modules is $95.50.

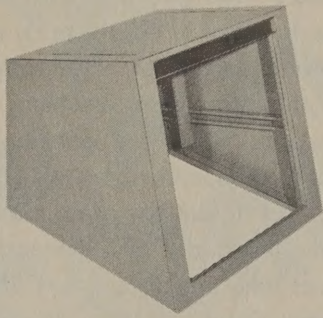
SLOPE FRONT MODULE has a 21.06″ vertical panel opening and comes with a slope or flat top. All units have adjustable 10 gage front and rear mounting angles. The removable rear door has a handle with magnetic latch. Top and sides are fixed and the bottom is open. Optional bottom cover is available. Slope Front Module base price is $122.50.

STANDARD BASES come in 3 models — Stationary, Standard Duty Caster, and Heavy Duty Caster in various depths. Fixed Bases with adjustable levelers. Caster type basis available with 800 Lb capacity or 1200 Lb capacity.

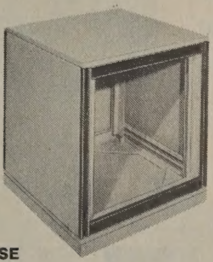
KEYBOARD MODULE has 2 standard depths. The 31.5″ depth has a 5.31″ vertical panel opening and the 37.5 has a 10.56″ vertical panel opening. Modules have fixed panel mounting flanges with .22 inch diameter clearance holes. Both top and bottom of the units are open. Price is $115.25 for 31.5″ and $125.25 for 37.5″. Also available in 6000 Series are Desk Pedestals, Modesty Panels, Writing Surfaces, and Desk Tops, and many other factory options. For full details write for Catalog VR-101-B.



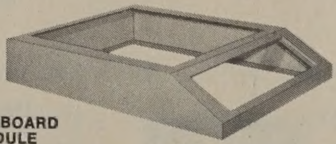
6000 SERIES WEDGE MODULES



6000 SERIES SLOPE FRONT MODULE



6000 SERIES STANDARD STATIONARY BASE



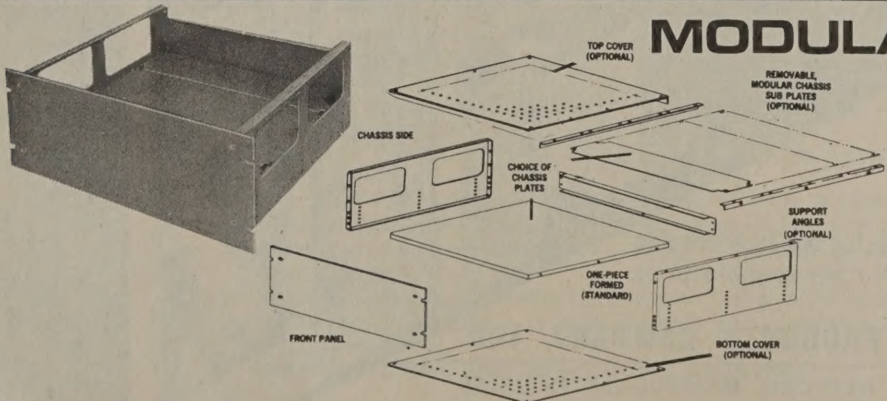
KEYBOARD MODULE

6000 SERIES

MANY OPTIONS AVAILABLE ON VENTRAK CABINETS

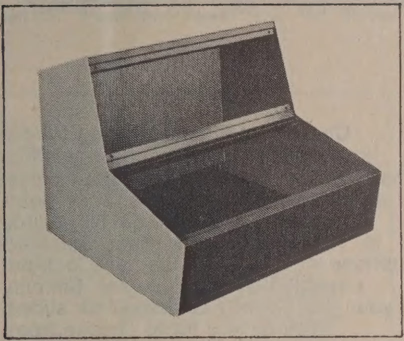
Starting with the basic cabinet, it is possible to add accessories as required for your specific application. Typical available options include: EMI-RFI shielding, front door, airflo distribution panels, louvers, blowers, plug mold, bus bar, cable entry boxes, cutouts, recessed base, caster base, lifting eyes, bezels, removable rear panel, mounting "Z"s, writing surfaces, heavy duty dolly, adjustable rails, special colors, etc. For full details, write for the catalog on the particular series cabinet you are interested in.

MODULAR CHASSIS


TOP COVER (OPTIONAL)
REMOVABLE, MODULAR CHASSIS SUB PLATES (OPTIONAL)
CHASSIS SIDE
CHOICE OF CHASSIS PLATES
SUPPORT ANGLES (OPTIONAL)
ONE-PIECE FORMED (STANDARD)
FRONT PANEL
BOTTOM COVER (OPTIONAL)

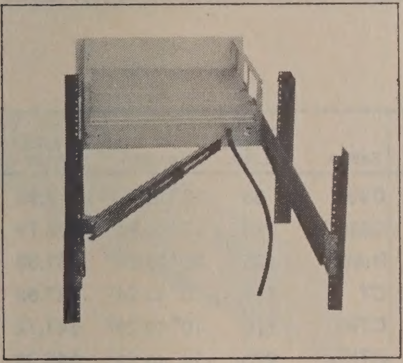
Shipped unassembled, with all required mounting hardware, these modular chassis are easy to put together. The chassis consist of a front panel, pair of chassis sides, rear support panel and a chassis plate. Standard Vent-Rak chassis are 17″ wide, for a 19″ front panel opening width. A choice of seven heights from 3½″ to 14″ and four chassis depths from 8½″ to 21¼″ offer a wide selection. These chassis have a loading capacity of 100 lbs. per sq. ft. prices start at $25.54 in single units. For full details, write for Catalog VR-117-A.

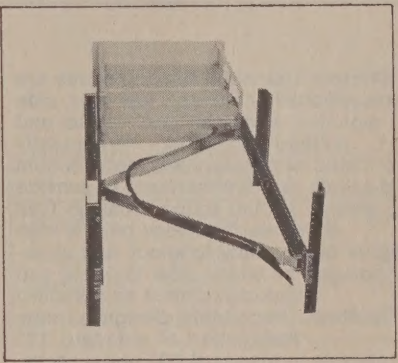
4300 SERIES DESK TOP CONSOLES



The 4300 Series Desk Top Consoles incorporate a fresh appearance. This series is available in three end panel configurations . . . LARGE (Models C-4301 and C-4302), MEDIUM (Models C-4303 and C-4304) and SMALL (Models C-4305, C-4306 and C-4307). LARGE and MEDIUM can be furnished in standard 19″ or 14¼″ (¾ size) panel opening widths SMALL is available in standard 19″, 14¼″ (¾ size) and 9½″ (½ size) panel opening widths. These consoles are constructed of aluminum end panels and steel struts with black finish. Consoles are available in kits or as assembled units. Kit prices range from $49.59 to $74.97 per unit in quantities of 10-24 depending on the model selected. For full details, write for Catalog VR-143-A.

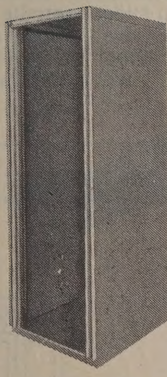
ACCESSORIES



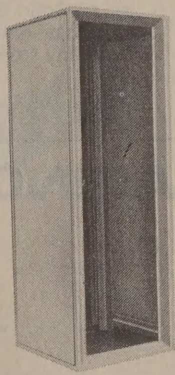


A complete assortment of Cable Retractors and Cable Carriers permit power cables to move easily when chassis is extended and fold and retract out of the way when chassis is returned. Model C-4005 and C-4006 Cable Retractors have a spring loaded, telescoping action, and require only ⅞″ clearance in closed position. Both can be used with a pivoting chassis. C-990 Cable Carrier has a three point mount providing complete support for heavy, cumbersome cables. "V" configuration will extend up to 30″, yet closes to only 1½″ behind the chassis. Prices in quantities of 1 to 9 range from $5.36 for C-4017 (not shown) to $16.30 for C-4006. Write for Catalog VR-133-A.

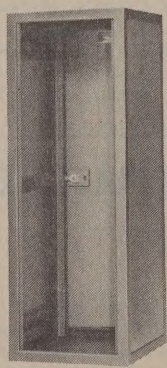
HEAVY, MEDIUM & LIGHT DUTY CABINETS



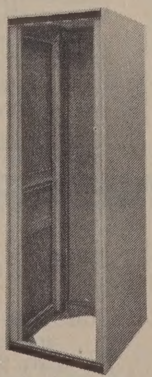
3000 SERIES



1000 SERIES



7000 SERIES



6200 SERIES

Vent-Rak offers Heavy, Medium and Light duty cabinetry. 1000 Series — Heavy duty for all Commercial/Military Applications. Heliarc welded steel or aluminum construction. 7000 Series — Medium duty for Commercial/Military Applications. Heliarc welded frame has removable side panels for Multi-Bay installations. 3000 Series — Light duty for Commercial/Military Applications. Can be specified in Multi-Bay configurations. All Vent-Rak cabinets are in compliance with Federal Standard RS-310, RETMA/EIA measurements and increments. 6200 Series — Economical, Commercial version of 6000 Series.

VENTRAK®

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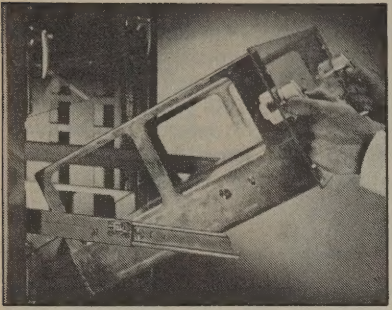
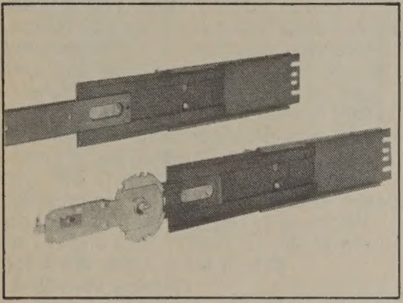
CHASSISTRAK© SOLID BEARING SLIDES



Chassis-Trak has the complete line of slides to meet all of your requirements. When you are specifying slides, consider the factors affecting slide performance: usage, load-bearing capacity, slide length and travel, slide thickness, type of bearing surface, delivery and cost. For the right slide for your specs, go to the single source that carries the complete line . . . Chassis-Trak.

Choose from solid bearing slides, linear ball bearing slides, circulating ball bearing slides, roller bearing slides, and bottom mount slides. Load bearing capacities range from 85 pounds to 1000 pounds per pair. Standard options include tilt, detent, and lock-out capabilities — plus more! Simplify your job. Specify Chassis-Trak slides. You have a lot to choose from.



Chassis-Trak solid bearing slides are exceptionally compact, low cost, side mounted, slides for commercial and military application. Permanently lubricated with Poxylube® molybdenum disulfide dry film lubricant to provide smooth sliding action. Chassis-Trak solid bearing slides offer a high degree of immunity to shock and vibration and all slides offer lock-out and quick-disconnect as standard features. Pencil-thin design permits installation of standard 17″ chassis in standard 19″ panel racks. All solid bearing slides are cold-rolled steel except Model D-600 which is lightweight, hard coated aluminum. Write for Catalog CT104.

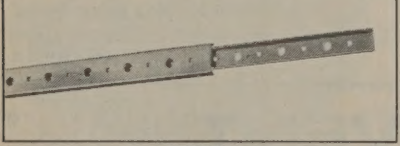
Series	Load Capacity lbs./pr.	Lengths	*Typical Price
C300	85	10″ to 24″	**$ 9.95**
C230	125	12″ to 24″	**$18.79**
D-600	125	10″ to 24″	**$31.33**
CT	175	10″ to 24″	**$27.62**
CTR	175	10″ to 24″	**$41.72**
CTH	275	14″ to 24″	**$46.99**
CTHR	275	14″ to 24″	**$63.47**

HOW TO SELECT CHASSIS-TRAK SOLID BEARING SLIDES

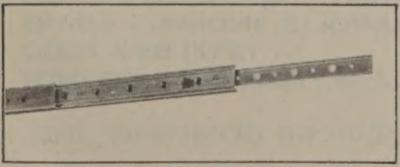
Slides are furnished in pairs, with each right and left slide consisting of a stationary section, a corresponding intermediate section and a chassis section. Most solid bearing slides are available with a choice of three stationary sections (determined by the type of mounting), a single intermediate section (used for all combinations), and a choice of four chassis sections (determined by the need for easy access to chassis for servicing).

A Quick-Disconnect system standard on all Solid Bearing slides, permits the chassis to be removed quickly and easily from the cabinet for servicing when necessary.

LINEAR BALL BEARING SLIDES

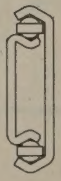


LBS-11

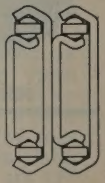


LBS-12

Designed for especially smooth travel and extra long life under maximum loads, these slides are made of cold-rolled steel and operate on carbon steel ball bearings. Available in several models, with optional cabinet mount and/or lock-out. Write for Catalog CT185.



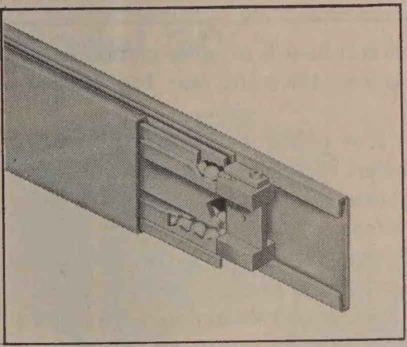
LBS-11



LBS-12

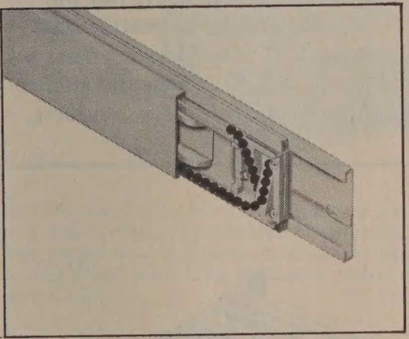
Series	Load Capacity lbs./pr.	Lengths	*Typical Price
LBS-11	100	12″ to 28″	**$ 6.92**
LBS-12	250	12″ to 28″	**$14.74**

CIRCULATING BALL BEARING SLIDES



Chassis-Trak circulating ball bearing slides are designed to support weights up to 500 lbs. per pair over considerable lengths. Slides are side mounted with a bottom mount option. Military applications (Models D-1002 and D-1016) are construced from cold-rolled steel cadmium plated and dipped in irridite. They are furnished with Poxylube finish and stainless steel balls. Commercial versions (D-1506) and D-1507) are cold-rolled steel zinc plated and dipped in irridite. They come with carbon steel balls and utilize "cross-over" end caps which allow minimum thickness of slide to weight ratio. Model D-1507 offers patented, synchronized, two-way travel so load can be moved smoothly in either direction of center. Write for Catalog CT129B.

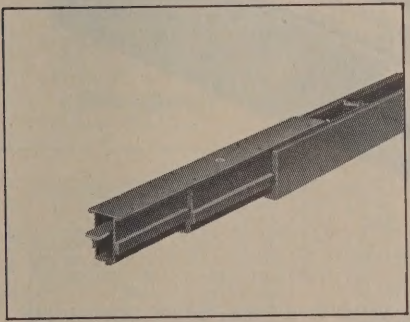
Models D-1002
D-1016



Series	Load Capacity up to 500 lbs.	Lengths	Special Feature	*Typical Price
D-1002	500 lbs.	20″ - 60″ in 4″ incr.	Mil version	**$69.82**
D-1016	500 lbs.	20″ - 60″ in 4″ incr.	Lock-out	**$77.87**
D-1506	500 lbs.	20″ - 30″ in 4″ incr.	Comm. version	**$40.21**
D-1507	500 lbs.	20″ - 30″ in 4″ incr.	2-way-travel	**$47.19**

Models D-1506
D-1507

BOTTOM MOUNT SLIDES



Five different models offer load-carrying capacities from 150 lbs./pr. to 1,000 lbs./pr. These slides are made from cold-rolled steel, cadmium plated and irridite dipped, and are available with solid-bearing surfaces or roller bearing, depending on the model. Slides feature smooth operation, dependability and long life for heavy-duty applications. Write for Catalog CT-107C.

Series	Load Cap. lbs./pr.	Lengths	*Typical Price
B-200 (solid)	50	10″ to 24″	**$ 16.13**
C-938 (roller)	400	12″ to 24″	**$ 24.55**
D-1065 (roller)	600	12″ to 24″	**$ 38.85**
D-1050 (roller)	1000	22″ to 36″	**$117.74**

*TYPICAL PRICE

Typical prices are shown per pair in 50 pair quantities, except for bottom mount slides which are priced for each slide in quantity of 50 pieces. All prices are for non-pivoting models. Mounting hardware is included in prices for solid ball bearing slides and bottom mount slides. Mounting hardware is **not** included for linear ball bearing slides or circulating ball bearing slides.

CHASSISTRAK©

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With INTERLOK, quality comes built-in. Finally, here are cabinets and enclosures that offer your electrical and electronic devices a custom appearance. After all, you are interested in displaying your product in the best possible way, and so is INTERLOK.

INTERLOK enclosures are designed for ease of assembly, versatility and rigidity. They are attractive as well as functional. Selecting the proper enclosures and accessories from the wide variety of standard stock items in the INTERLOK system becomes a pleasure, not an engineering chore.

Then, during assembly many unique design features become apparent. Interlocking aluminum extrusions and panels add a custom look to the enclosures. Outside beauty is enhanced by matching color strips that conceal all hardware after assembly. And, speaking of hardware, our workmanship boasts of drilled and tapped holes for machine screws. Sheet metal screws are not for us.

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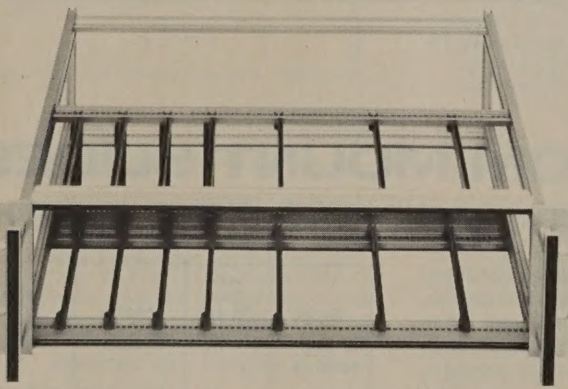
INTERLOK not only offers total versatility and beauty in design, but offers all of our products from stock, and through your local electronics distributor. Availability is just one more service from INTERLOK.

The story doesn't stop here. We also have the newest and most exciting control knob available, the all new COLLET KNOB. No more set screws and no more marred front panels; just perfectly aligned control knobs. Interested? Then turn to the knob section in this catalog for the full story.

See if you don't agree that INTERLOK has the answer and the products to back you up no matter what your packaging requirements. Call now for your own "Seeing is Believing" demonstration. Our sales and applications personnel are delighted to show off our products.

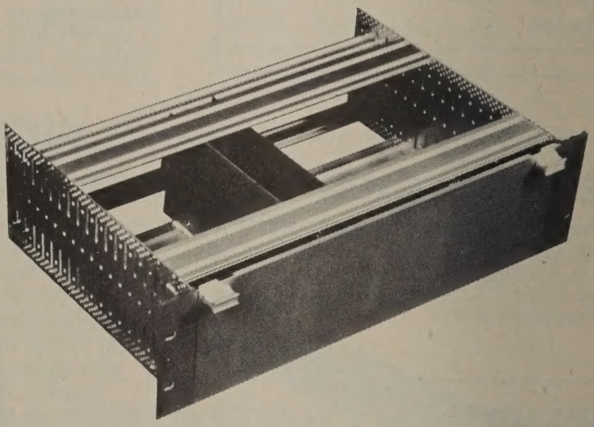
Model 12



INTERLOK Model 12 Lightweight Card Frames have the versatility, strength and customer appeal to satisfy any electrical or electronics packaging requirement. The Model 12 is designed to be used on standard E.I.A. 19-inch racks, and can be stacked, subdivided and ordered in any one of 20 standard sizes. The Model 12 is constructed of extruded, all-aluminum sections and is one of the strongest, most rugged, and most durable card frames available.

Height of Card Frame		PCB Height		Model 12 Order Numbers			
				Card Frame Insertion Depths			
				7.13"	9.50"	11.85"	16.57"
Inches	mm	Inches	mm	181 mm	241 mm	301 mm	421 mm
Without Handles							
3.50	88.0	2.19	55.5	12-021	12-022	12-023	12-025
5.25	132.5	3.94	100.0	12-031	12-032	12-033	12-035
7.00	177.0	5.69	144.5	12-041	12-042	12-043	12-045
8.75	221.5	7.49	189.9	12-051	12-052	12-053	12-055
10.50	266.0	9.15	232,4	12-061	12-062	12-063	12-065
With Handles							
3.50	88.0	2.19	55.5	12-121	12-122	12-123	12-125
5.25	132.5	3.94	100.0	12-131	12-132	12-133	12-135
7.00	177.0	5.69	144.5	12-141	12-142	12-143	12-145
8.75	221.5	7.49	189.9	12-151	12-152	12-153	12-155
10.50	266.0	9.15	232.4	12-161	12-162	12-163	12-165

Model 15



INTERLOK Model 15 Universal Card Frame is fully adjustable to accommodate P.C. boards of up to 4.75" high on single height units, and up to 10" high on double units. It is designed for standard 19-inch E.I.A. racks and to give you 16.80" (426.7 mm) working width. Four card guides are necessary per card and may be placed as close as .20" (5.08 mm) centers. An optional 2-mm thick anodized aluminum front panel is available.

Height of Card Frame		Maximum PCB Height		Model 15 Order Numbers		
				Card Frame Insertion Depths		
				7.03"	9.39"	11.75"
Inches	mm	Inches	mm	178.5 mm	238.5 mm	298.5 mm
Without Handles						
5.25	133.35	4.75	120.65	15-030	15-031	15-032
10.50	266.7	10.00	254	15-060	15-061	15-062
With Handles						
5.25	133.35	4.75	120.65	15-130	15-131	15-132
10.50	266.7	10.00	254	15-160	15-161	15-162

Card Frames and Cases

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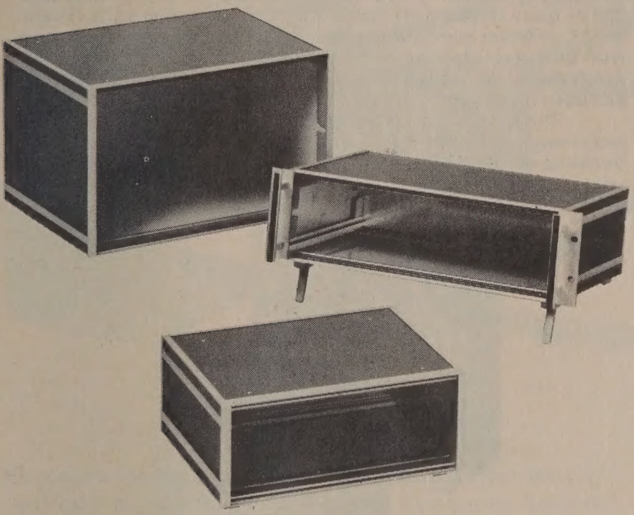
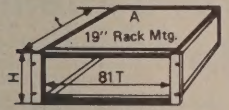
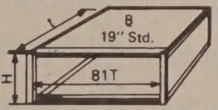
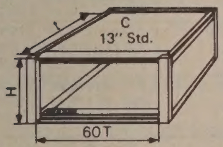
Model 30

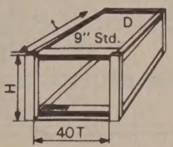


INTERLOK Model 30 Enclosures take the basic card frame idea one step further. The addition of vinyl-clad aluminum covers and side panels give the enclosure a custom appearance. Once the unit is assembled, there is no visible hardware, nothing but clean elegant lines.







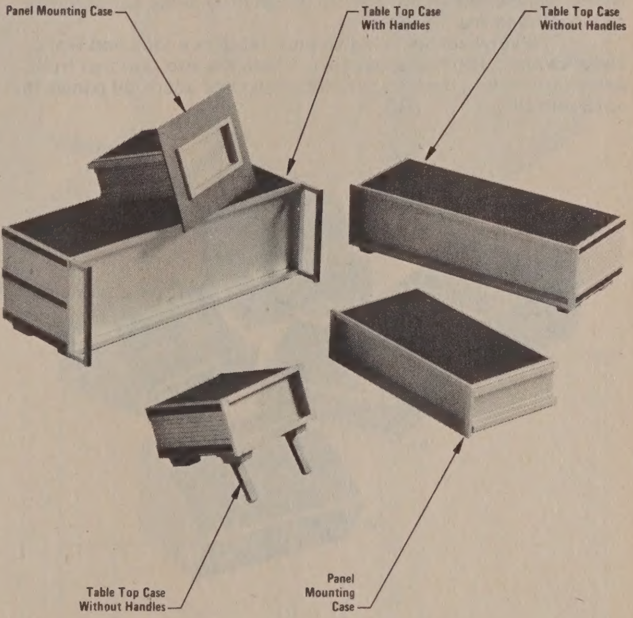


MODEL 30 ORDER NUMBERS

W	H	Without Handles *t mm 172.8 6.80″	*t mm 232.8 9.16″	*t mm 292.8 11.52″	*t mm 412.8 16.25″	With Handles *t mm 172.8 6.80″	*t mm 232.8 9.16″	*t mm 292.8 11.52″	*t mm 412.8 16.25″	PCB Sizes mm	Inches
A 81T	2E	30-021	30-022	30-023	30-025	30-121	30-122	30-123	30-125	55.5	2.19
	3E	30-031	30-032	30-033	30-035	30-131	30-132	30-133	30-135	100	3.94
	4E		30-042	30-043	30-045		30-142	30-143	30-145	144.5	5.69
	5E		30-052	30-053	30-055		30-152	30-153	30-155	188.9	7.48
	6E		30-062	30-063	30-065		30-162	30-163	30-165	232.4	9.15
B 81T	2E	30-221	30-222	30-223	30-225	30-321	30-322	30-323		55.5	2.19
	3E	30-231	30-232	30-233	30-235	30-331	30-332	30-333	30-335	100	3.94
	4E		30-242	30-243	30-245		30-342	30-343	30-345	144.5	5.69
	5E		30-252	30-253	30-255		30-352	30-353	30-355	188.9	7.48
	6E		30-262	30-263	30-265		30-362	30-363	30-365	232.4	9.15
C 60T	2E	30-421	30-422	30-423	30-425	30-521	30-522	30-523		55.5	2.19
	3E	30-431	30-432	30-433	30-435	30-531	30-532	30-533	30-535	100	3.94
	4E		30-442	30-443	30-445		30-542	30-543	30-545	144.5	5.69
	5E		30-452	30-453	30-455		30-552	30-553	30-555	188.9	7.48
	6E		30-462	30-463	30-465		30-562	30-563	30-565	232.4	9.15
D 40T	2E	30-621	30-622	30-623	30-625	30-721	30-722	30-723		55.5	2.19
	3E	30-631	30-632	30-633	30-635	30-731	30-732	30-733		100	3.94
	4E		30-642	30-643	30-645		30-742	30-743		144.5	5.69
	5E		30-652	30-653	30-655		30-752	30-753		188.9	7.48
	6E		30-662	30-663	30-665		30-762	30-763		232.4	9.15

*Card Frame Insertion Depth
E is the standard E.I.A. mounting spaces and is equal to 44.45 mm (1.75″)
T is a pitch used for the width and is equal to 5.08 mm (0.2″)
t stands for Insertion Depth
W stands for Inside Width

Model 36


Panel Mounting Case
Table Top Case With Handles
Table Top Case Without Handles
Table Top Case Without Handles
Panel Mounting Case

INTERLOK Model 36 Enclosures are designed to be used in any number of applications — for bench top or portable instruments, or as a subassembly in a larger unit. The entire assembly is made of lightweight, sturdy, anodized aluminum and the top and bottom panels are blue vinyl-clad aluminum which add that custom look to your product.

Front Panel Dimensions Height x Width Inches	mm	Order Numbers for Various Depths 5.75″ 146 mm	10.47″ 266 mm	12.84″ 326 mm
Panel Mounting Case				
2.83 x 5.67	72 x 144	36-011	36-013	36-014
2.83 x 11.34	72 x 288	36-021	36-023	36-024
2.83 x 17.00	72 x 432	36-031	36-033	36-034
3.78 x 3.78	96 x 96	36-041	36-043	36-044
3.78 x 7.56	96 x 192	36-051	36-053	36-054
3.78 x 15.12	96 x 384	36-061	36-063	36-064
5.67 x 5.67	144 x 144	36-071	36-073	36-074
5.67 x 11.34	144 x 288	36-081	36-083	36-084
5.67 x 17.00	144 x 432	36-091	36-093	36-094
Table Top Case Without Handles				
2.83 x 5.67	72 x 144	36-111	36-113	36-114
2.83 x 11.34	72 x 288	36-121	36-123	36-124
2.83 x 17.00	72 x 432	36-131	36-133	36-134
3.78 x 7.56	96 x 192	36-151	36-153	36-154
3.78 x 15.12	96 x 384	36-161	36-163	36-164
5.67 x 5.67	144 x 144	36-171	36-173	36-174
5.67 x 11.34	144 x 288	36-181	36-183	36-184
5.67 x 17.00	144 x 432	36-191	36-193	36-194
Table Top Case With Handles				
3.78 x 7.56	96 x 192	36-251	36-253	36-254
3.78 x 15.12	96 x 384	36-261	36-263	36-264
5.67 x 5.67	144 x 144	36-271	36-273	36-274
5.67 x 11.34	144 x 288	36-281	36-283	36-284
5.67 x 17.00	144 x 432	36-291	36-293	36-294

Enclosures and Cabinets

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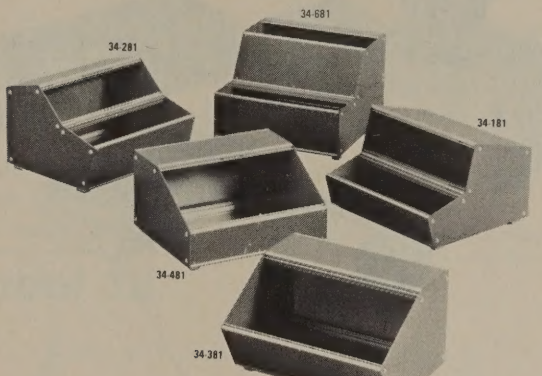
Model 34

INTERLOK Model 34 Sloped-Top Table Consoles are the perfect answer to your table-top console requirements. They are available in five different styles, each giving you that custom look. The Model 34 is designed to give you the maximum amount of interior room. The aluminum profiles are designed to allow access to the top, front and rear of the unit.

The vinyl-clad panels give your product a look and feel of elegance and customer acceptance. There are also optional front panels available. These are satin-finished clear anodized panels that are 3-mm thick.

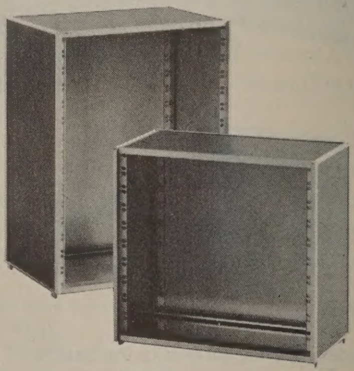


Height		Width (81T)		Depth		Order Number	Optional Aluminum Front Panels
Inches	mm	Inches	mm	Inches	mm		
10.45	265.5	16.2	411.48	15.53	394.5	34-181	21-381 (2 required)
10.67	271.0	16.2	411.48	14.69	373.0	34-281	21-381 (2 required)
9.38	238.2	16.2	411.48	13.64	346.5	34-381	21-581 (1 required)
8.53	216.6	16.2	411.48	13.63	346.2	34-481	21-581 (1 required)
11.09	281.8	16.2	411.48	15.79	401.0	34-681	21-381 (1 required) 21-481 (1 required)

Model 1500

INTERLOK Model 1500 Cabinets are designed to accommodate one or more standard 19-inch E.I.A. rack mounting units. There are 12 different standard configurations available. All units come with blue vinyl-clad top and side panels, and a 3-mm clear satin-finish aluminum rear panel. All structural members are anodized extruded aluminum.

The Model 1500 is ideal for those applications where looks and strength are both important. From the engineering laboratory to the computer operation, INTERLOK has the right answer to your cabinet needs.



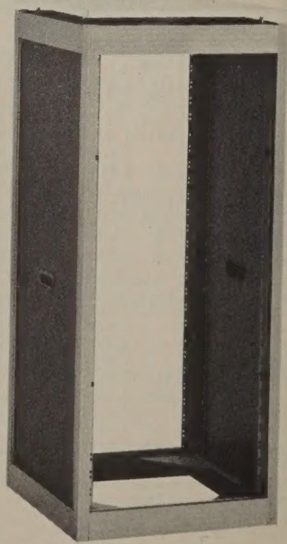
	Acceptance Dimensions		External Dimensions		Order Nos.
	Height h	Depth t	Height H	Depth T	
3E	133.5 mm (5.25″)	235 mm (9.25″) 355 mm (13.97″)	176.5 mm (6.95″)	272 mm (10.70″) 392 mm (15.43″)	1500-50 1500-51
4E	178 mm (7.00″)	235 mm (9.25″) 355 mm (13.97″ 475 mm (18.70″)	221 mm (8.70″)	272 mm (10.70″) 392 mm (15.43″) 512 mm (20.15″)	1500-00 1500-01 1500-02
5E	222.5 mm (8.75″)	235 mm (9.25″) 355 mm (13.97″) 475 mm (18.70″)	265.5 mm (10.45″)	272 mm (10.70″) 392 mm (15.43″) 512 mm (20.15″)	1500-10 1500-11 1500-12
6E	267 mm (10.5″)	235 mm (9.25″) 355 mm (13.97″) 475 mm (18.70″)	310 mm (12.20″)	272 mm (10.70″) 392 mm (15.43″) 512 mm (20.15″)	1500-60 1500-61 1500-62
10E	444.7 mm (17.5″)	235 mm (9.25″) 355 mm (13.97″) 475 mm (18.70″)	488 mm (19.21″)	272 mm (10.70″) 392 mm (15.43″) 512 mm (20.15″)	1500-20 1500-21 1500-22
15E	666.8 mm (26.25″)	235 mm (9.25″) 355 mm (13.97″) 475 mm (18.70″)	709.8 mm (27.94″)	272 mm (10.70″) 392 mm (15.43″) 512 mm (20.15″)	1500-30 1500-31 1500-32

Model 1520

INTERLOK Model 1520 Equipment Racks are designed to house standard 19-inch rack mounting units. What makes it one step above any other equipment rack is the overall design. It has built-in air ventilation by means of an elevated white formica-like top and optional blue vinyl-clad aluminum side panels that quickly slide into place. The side panels convert the equipment rack into a custom cabinet suitable for any office surroundings.

Special side rails and vertical adaptors are available to further subdivide the cabinet. The cabinet is easily accessible from all four sides, making repairs much easier.

Overall Height		Usable Mtg. Height		Std. E.I.A. Mtg. Spaces	Order Number	Optional Vinyl Clad Panels
Inches	mm	Inches	mm			
42.32	1075	35.0	889	20	1520-20	1542-40
52.82	1341.7	45.5	1155.7	26	1520-21	1542-41
63.32	1608.4	56.0	1422.4	32	1520-22	1542-42



Plug-in Modules

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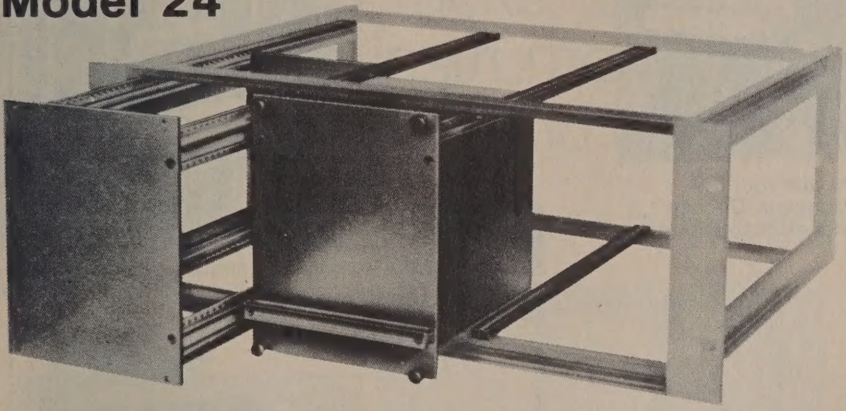
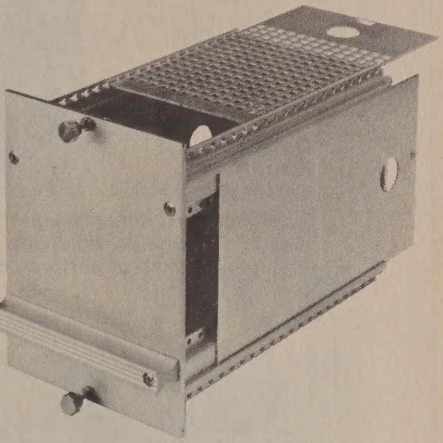
Model 24





Enclosure Model 24 may be used as a compact unit in card rack Models 12 and 13 as well as housing Models 30 and 34 of the INTERLOK 2000 System. Based on the same pitch dimension (5.08 mm or .20″), the enclosure can be mounted as stable and trouble-free as any front panel.

Dimensions

Front Panel Width B:	16T, 20T, 27T, 40T (1T = 5.08 mm or .20″)
Width Dimension b:	B — 18 mm (.71″)
Front Panel Height H:	for 3E - 129 mm (5.08″) for 4E - 173.5 mm (6.83″)
Height Dimension h:	H — 24 mm (.94″)
Depth Dimension t:	157.5 mm (6.2″), 240 mm (9.45″), 300 mm (11.81″)

Materials

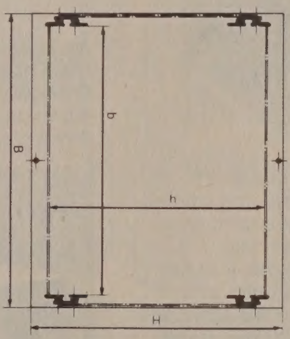
Front Panel:	3 mm aluminum sheet metal, brushed, clear anodized
Rear Panel:	3 mm aluminum sheet metal, Alodine 1000, clear
Depth Profile:	Aluminum alloy, punched, Alodine 1000, clear

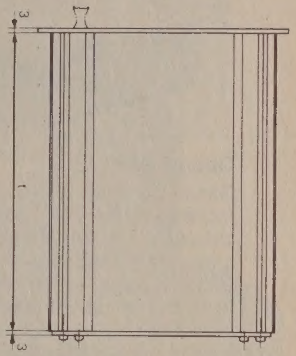
Standard Delivery

Enclosure parts unmounted, consisting of one front panel, one rear panel, four horizontal profiles, including mounting material without cover (top, bottom, side) panels.

Accessories

The following accessories are available from INTERLOK: Cover Panels (set), Handles, Guide Rails, and Mounting Profiles. They are not a standard part of the Model 24 and must be ordered separately.





Model Numbers

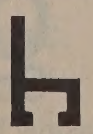
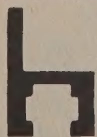
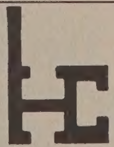
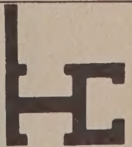
MODEL NUMBERS (including assembly hardware)

		For Height 3E		For Height 4E			
Width	Depth mm	Enclo-sure	Cover Panels (set)	Enclo-sure	Cover Panels (set)	Handle	Guide Rail
16T	157.5	24-320	24-325	24-420	24-425	24-072	66-279-20
	240	24-322	24-327	24-422	24-427		66-279-22
	300	24-323	24-328	24-423	24-428		66-279-23
20T	157.5	24-330	24-335	24-430	24-435	24-073	66-279-20
	240	24-332	24-337	24-432	24-437		66-279-22
	300	24-333	24-338	24-433	24-438		66-279-23
27T	157.5	24-340	24-345	24-440	24-445	24-074	66-279-20
	240	24-342	24-347	24-442	24-447		66-279-22
	300	24-343	24-348	24-443	24-448		66-279-23
40T	157.5	24-350	24-355	24-450	24-455	24-075	66-279-20
	240	24-352	24-357	24-452	24-457		66-279-22
	300	24-353	24-358	24-453	24-458		66-279-23

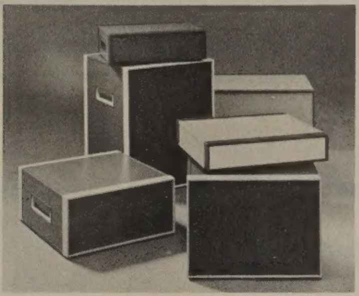
Part Number for Phillips Screws M3 x 8 (100 Pcs) 1910-13

Part Numbers for Mounting Profiles, 1.35 m Long	1-Groove Auxiliary Profile M3	66-166-14
	3-Groove Auxiliary Profile M3	66-164-14
	1-Groove Auxiliary Profile M4	66-163-14
	3-Groove Auxiliary Profile M4	66-165-14

Groove Profiles

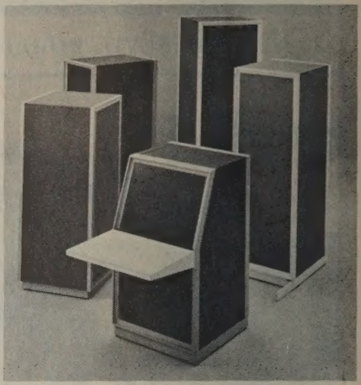
1—Groove Profiles		3—Groove Profiles	
			
M3	M4	M3	M4

Freedom of choice



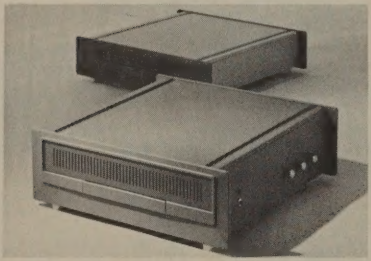
Optima Instrument Cabinets

72 aluminum models designed to house your EIA standard 19 and 24 inch panel instruments. Choose textured, smooth or perforated surfaces at no extra cost.



Optima Racks

59 sizes for EIA standard 19 and 24 inch panel widths. Select any two color combination from an eleven color spectrum of designer colors.

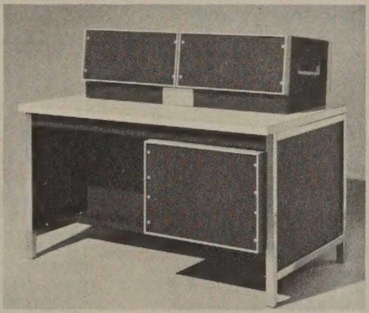


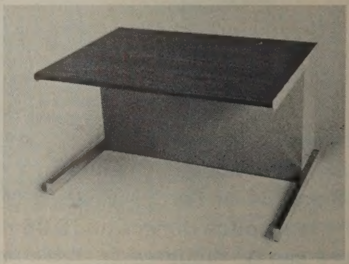
Optima PAK

Structural foam sides provide increased electrical, thermal and sound insulation; will not corrode and have superior strength-to-weight ratio. Chassis-panel assembly slides into the front of the case and is secured with no visible front panel hardware. Choose from 4 panel heights and 19 or 17 inch panel widths.

Optima Consoles

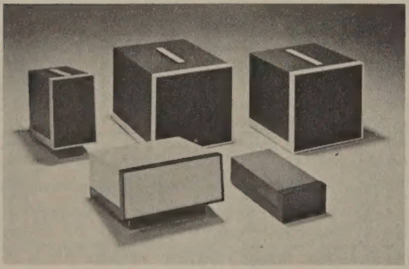
An intelligent system of instrument housings, work and storage space. Precisely crafted in steel, and plastic laminates. Available in one, two and three-bay units.





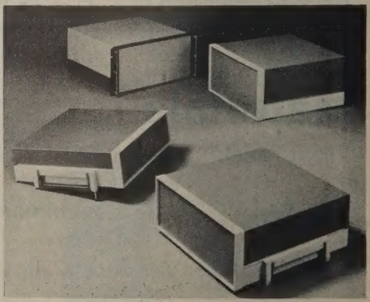
Optima Desk

The professional look in Data Consoles. Built-in storage space and generous leg room. Top design permits routing cables into the pedestal at any point along the back edge. Standard widths are 24", 45" and 66", each in a choice of keyboard or desk heights.



Optima Small Cases

Mobile, versatile and rugged with usable inside space ranging from 133.6 to 1445.4 cubic inches. Feature quick access and a flush, self-retracting handle with trim strip.



Optima 17

A unique combination of chassis and case with simply great access and styling. Available in four panel heights and four configurations—rack adaptable and more.

We make you look better

OPTIMA®

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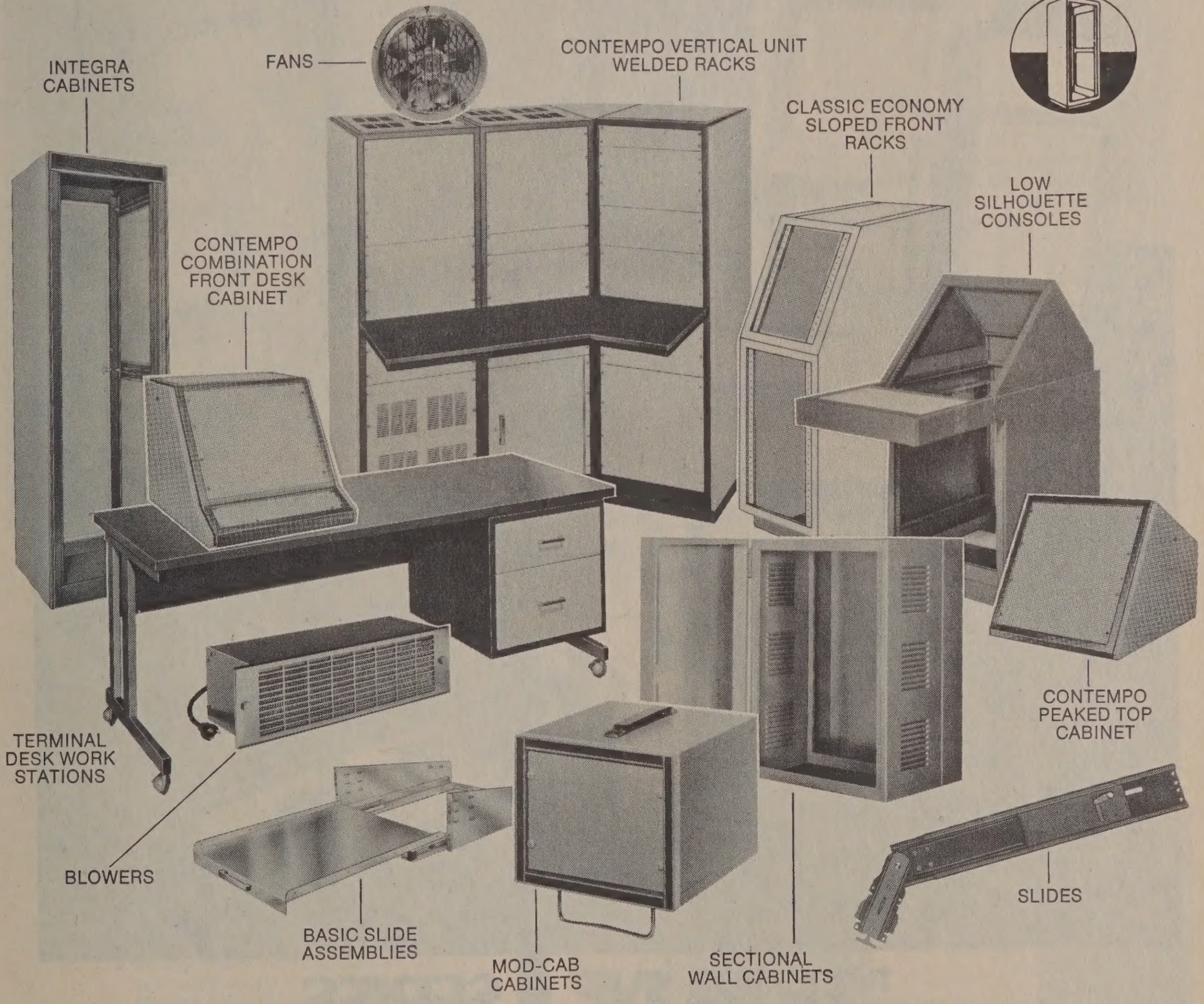
Europe: Macmerry, East Lothian, Scotland EH33 1EX

Par.Metal

electronic packaging systems...

an extensive line of modular cabinets, racks, terminal desk work stations, instrument cabinets, accessories and hardware.


INTEGRA CABINETS
FANS
CONTEMPO VERTICAL UNIT WELDED RACKS
CLASSIC ECONOMY SLOPED FRONT RACKS
LOW SILHOUETTE CONSOLES
CONTEMPO COMBINATION FRONT DESK CABINET
CONTEMPO PEAKED TOP CABINET
TERMINAL DESK WORK STATIONS
SLIDES
BLOWERS
BASIC SLIDE ASSEMBLIES
MOD-CAB CABINETS
SECTIONAL WALL CABINETS

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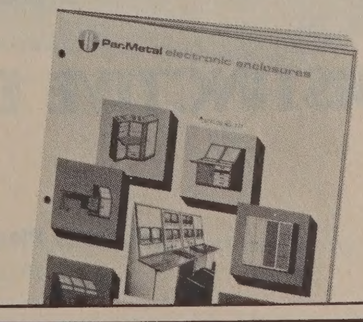

Par.Metal electronic enclosures

PREMIER METAL

Division of Sunshine Mining Company

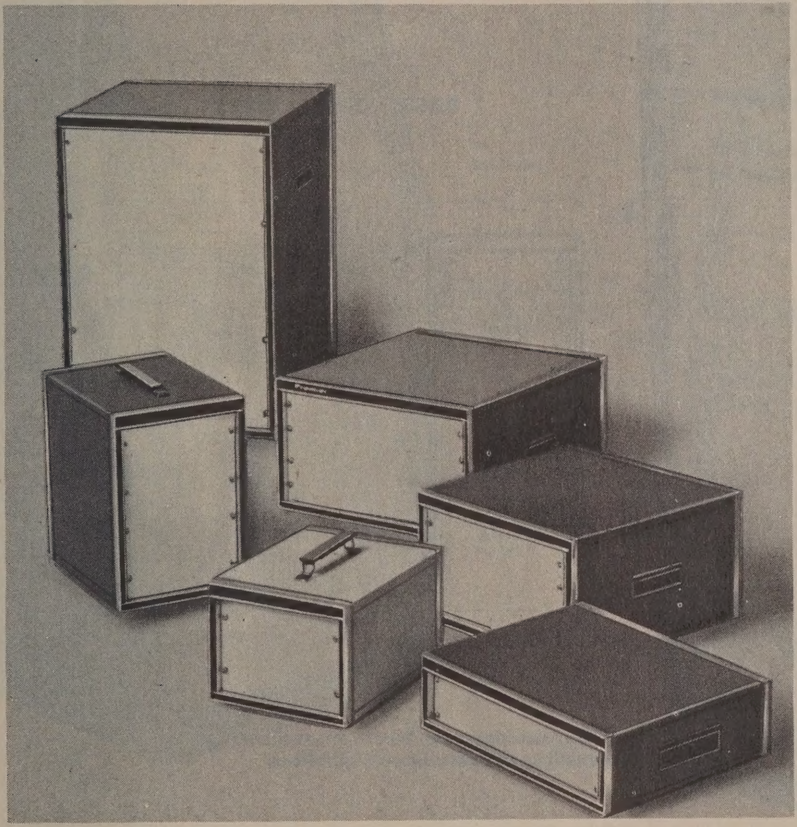
PRODUCTS COMPANY

THE TRIMLINE SERIES

DISTINCTIVE ELECTRONICS ENCLOSURES

381 Canal Place, Bronx, New York 10451 • (212) 993-9200

Trimline TIC Series Instrument Cases



Available in 88 Standard Sizes

11 Panel Heights: 3½, 5¼, 7
8¾, 10½, 12¼, 14, 17½
21, 24½, 28
3 Panel to Panel Depths: 13, 17, 21
3 Panel Widths: 19, 15⅝ *, 9½ **

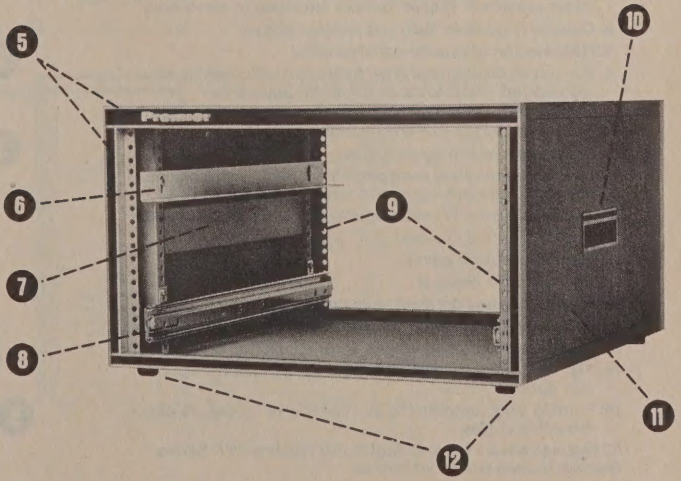
***Special Size:**

A special design size (15⅝″ Panel Width) has been incorporated into the Trimline Instrument Case line which makes the entire case easily adaptable into standard 19″ rack systems.

**9½″ widths are limited to 13″ or 17″ panel to panel depths.

TIC Series Construction Details (front and rear identical)

5. Trim: Extruded, anodized aluminum with black vinyl inlay.
6. Chassis/Shelf Support (accessory TIA Series)
7. Welded stiffener channel and hand grip support
8. Full extention slides with mounting hardware (accessory TFE Series)
9. Recessed panel mounting channels and structural supports (4 per case) Standard EIA & WE hole spacing provide for frontal mounting and internal equipment mounting. Hardware supplied.
10. Carrying Grip
11. Case Body: welded, formed steel (20 ga.) with welded 16 ga. channel gusseting and channel stiffeners.
12. Non-marring feet



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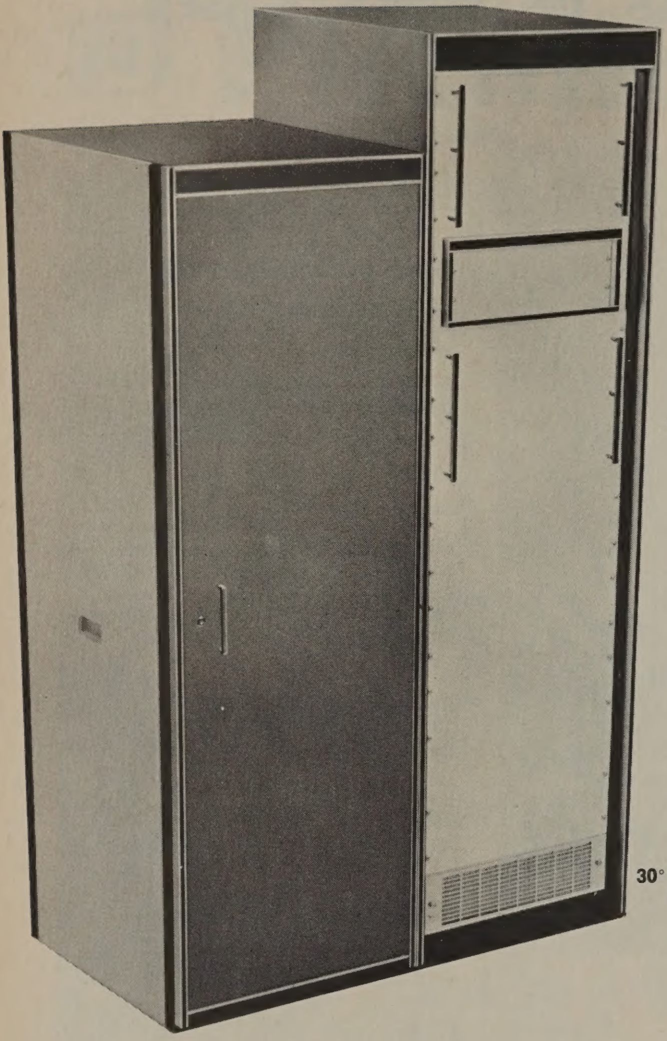
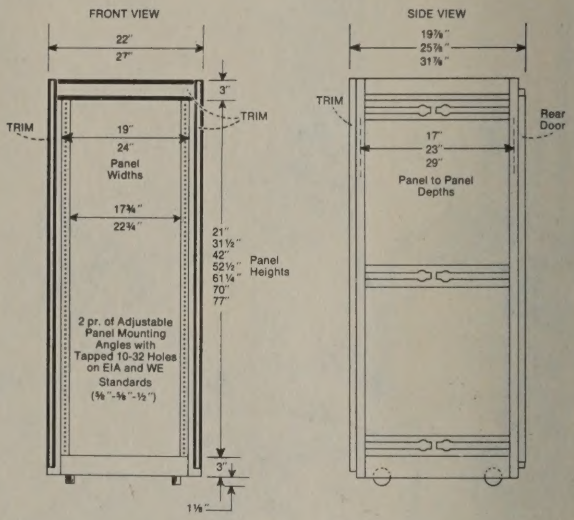
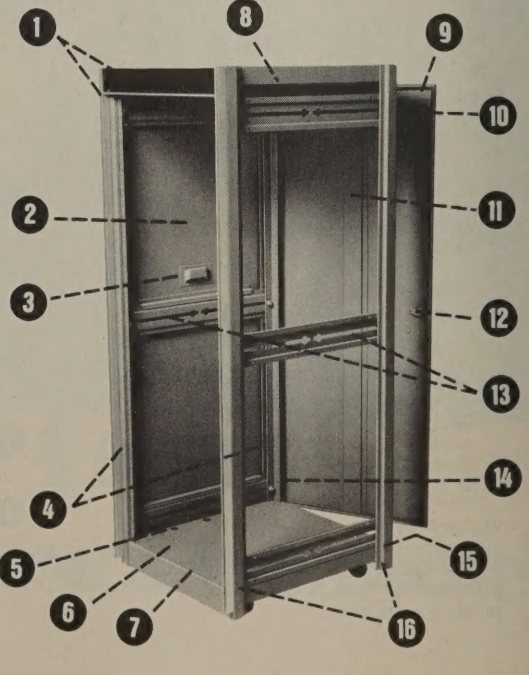


Trimline TVA Series

BASIC NOMINAL SIZES


FRONT VIEW
22"
27"
3"
TRIM
TRIM
19"
24"
Panel Widths
17¾"
22¾"
21"
31½"
42"
52½"
61¼"
70"
77"
Panel Heights
2 pr. of Adjustable Panel Mounting Angles with Tapped 10-32 Holes on EIA and WE Standards (⅝"-⅝"-½")
3"
1⅛"
SIDE VIEW
19⅞"
25⅞"
31⅞"
TRIM
Rear Door
17"
23"
29"
Panel to Panel Depths

30° & 45° matching wedge frames are available for multiple bay console configurations.


1
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13
14
15
16

TVA Series Vertical Assembly—Construction Details
(1 Frame, 2 End Panels, Rear Door)

1. Trim: extruded anodized aluminum with textured vinyl inlays provide 1" recess for door mounting or panel area
2. Outside removable flush end panels (16 ga.)
3. Recessed hand grip for panel removal
4. 2 pr. panel mounting angles, fully adjustable front to rear with tapped 10-32 holes on EIA & WE Standards spacing (12 ga.)
5. 1" dia. holes for cable entry beneath base
6. Recessed caster mounting holes
7. 1 piece formed steel base provides for heavy equipment mounting area and concealed caster mounting (14 ga.)
8. 1 piece solid top for extra rigidity and squareness (14 ga.)
9. Foam gasketing (3 sides)
10. Magnetic closure gasket
11. Door stiffener channel
12. Keyed latch and brushed aluminum pull handle
13. Horizontal cross-brace and panel mounting angle supports
14. Quick release, spring loaded door hinges (top and bottom)
15. 1⅛" dia. knock-outs for rear cable entry underneath rear door
16. Formed steel uprights (14 ga.) provide ½" recess to panel mounting angles

All features shown are standard in the Trimline TVA Series
Welded, formed steel construction

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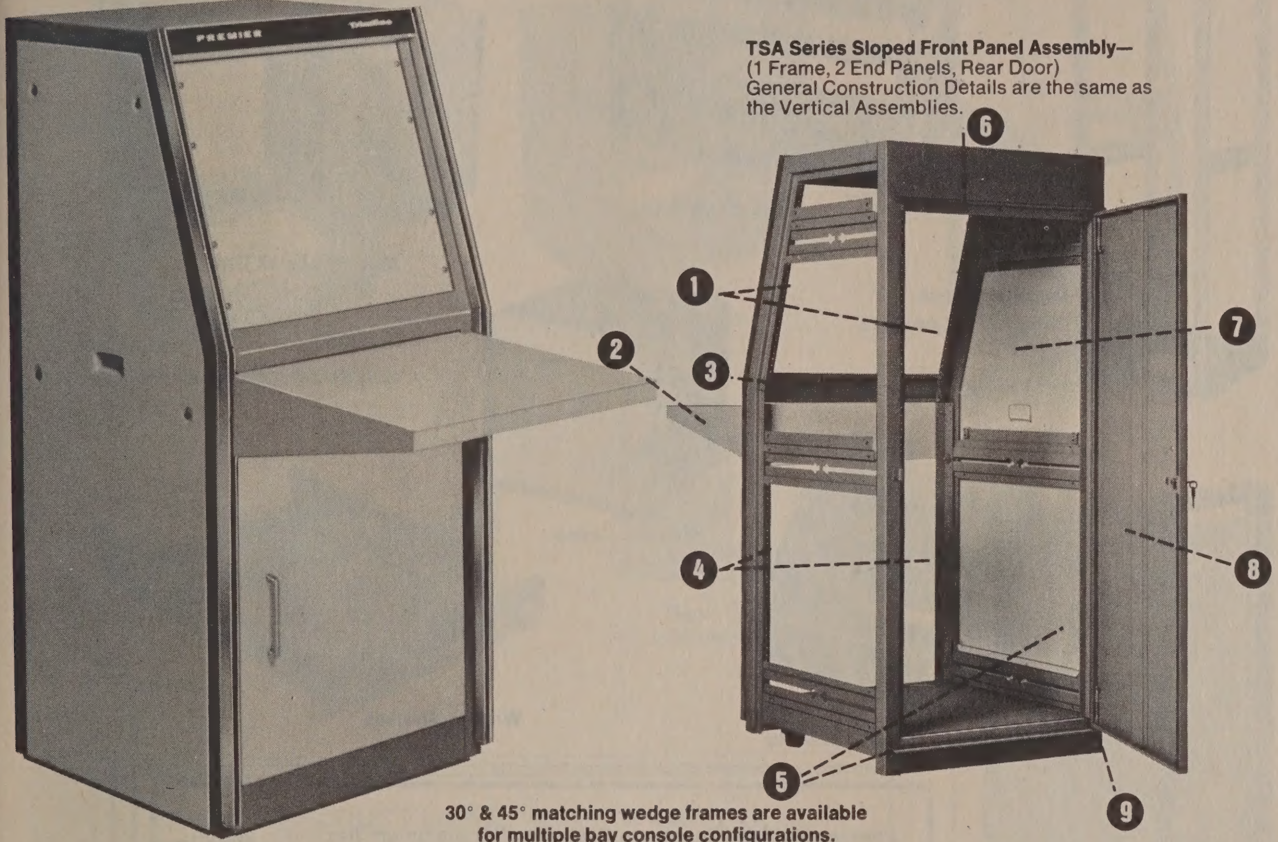
Trimline TSA Series Sloped Front Panel Enclosure


PREMIER
Trimline
1
2
3
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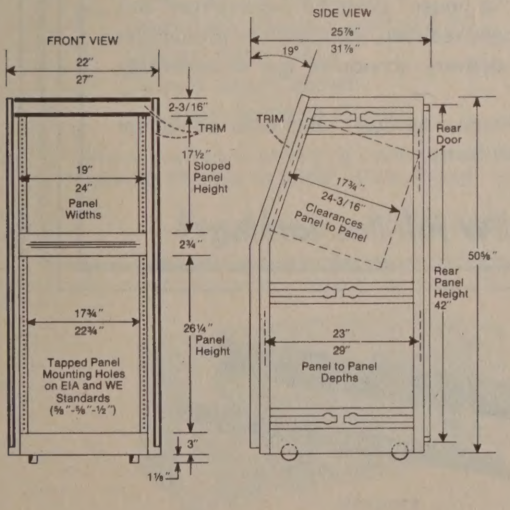
8
9

TSA Series Sloped Front Panel Assembly—
(1 Frame, 2 End Panels, Rear Door)
General Construction Details are the same as the Vertical Assemblies.

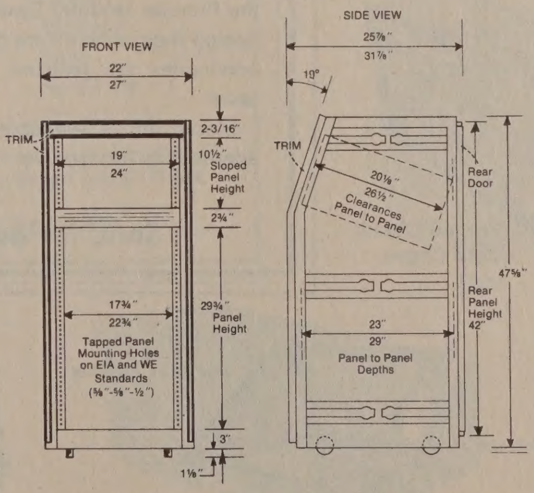
30° & 45° matching wedge frames are available for multiple bay console configurations.

BASIC NOMINAL SIZES

19°—17½″ Sloped Panel


FRONT VIEW
22″
27″
2-3/16″
TRIM
17½″ Sloped Panel Height
19″
24″
Panel Widths
2¾″
17¾″
22¾″
26¼″ Panel Height
Tapped Panel Mounting Holes on EIA and WE Standards (⅝″-⅝″-½″)
3″
1⅛″
SIDE VIEW
25⅞″
31⅞″
19°
TRIM
Rear Door
17¾″
24-3/16″
Clearances Panel to Panel
50⅝″
Rear Panel Height 42″
23″
29″
Panel to Panel Depths

19°—10½″ Sloped Panel


FRONT VIEW
22″
27″
TRIM
2-3/16″
10½″ Sloped Panel Height
19″
24″
2¾″
17¾″
22¾″
29¾″ Panel Height
Tapped Panel Mounting Holes on EIA and WE Standards (⅝″-⅝″-½″)
3″
1⅛″
SIDE VIEW
25⅞″
31⅞″
19°
TRIM
Rear Door
20⅛″
26½″
Clearances Panel to Panel
47⅝″
Rear Panel Height 42″
23″
29″
Panel to Panel Depths

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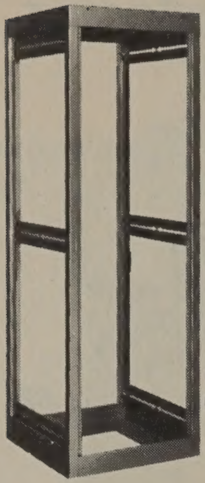
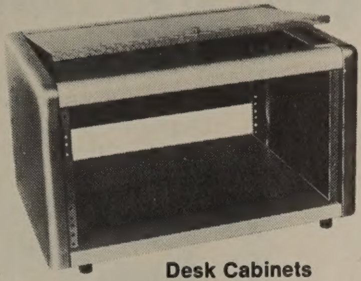
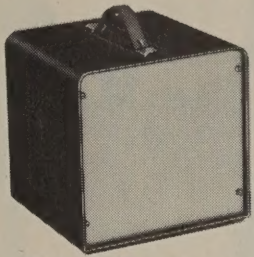


Modular Racks, Cabinets & Consoles

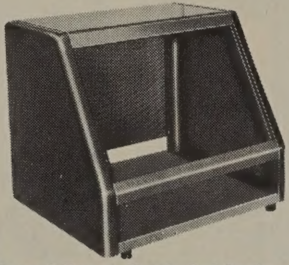


Desk Cabinets

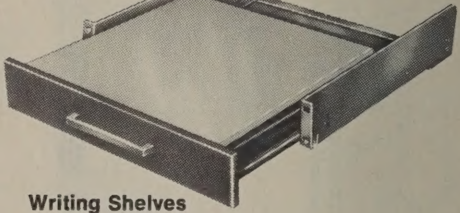
Modular Desk Unit



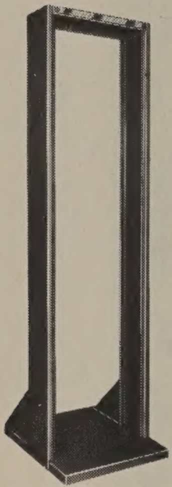
Portable Cases



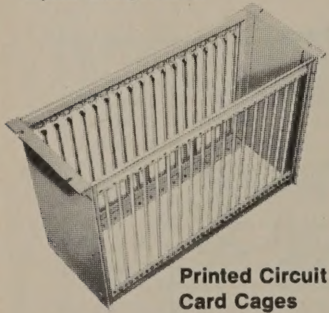
Sloped Front Desk Cabinets



Writing Shelves



Open Relay Racks

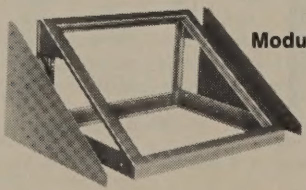


Printed Circuit Card Cages

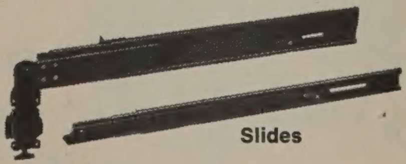
Premier Modular Enclosure Systems offer maximum flexibility, adaptability and esthetic value requirements in the electronic, electrical and electro-mechanical fields. The range of standard units in various widths, depths, heights and shapes available offers a full variety of combinations and configurations necessary to meet the space and human engineering customized requirements for enclosure systems used in modern packaging. There are distinct advantages in using the Premier Modular Systems: "In house" costs for development and design requirements are drastically reduced, standardized production economies are realized, and delivery schedules are considerably faster.

Modifications available for Premier Modular units offer additional adaptability for "special" requirements.

Send for our NEW full line catalog



Modular Turrets



Slides

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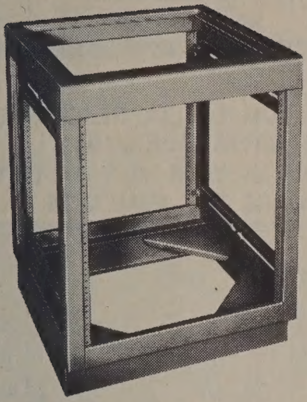
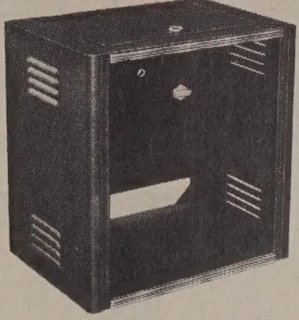
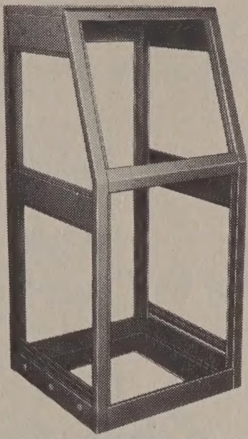


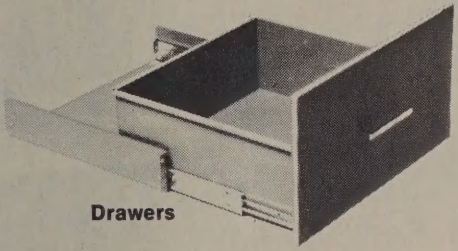
Modular Desk Height Cabinets



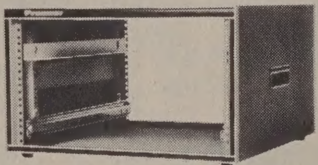
Desk Cabinets



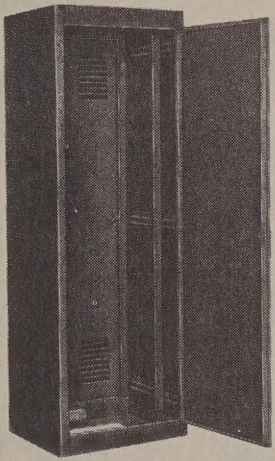
Sloping Panel Cabinets



Drawers



Desk Cabinets
Instrument Cases



Solid Skin Cabinets

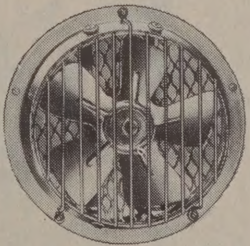
PREMIER PRODUCT LINES Premier manufactures a full line of Standard housings, enclosures and accessories for the Electronics Industry. Modified and special enclosures are also available on quotation.

Modular Enclosures
Sloping Front Consoles
Sloping Instrument Cases
Desk Cabinets, welded & KD
Relay Rack Cabinets, welded & KD
Channel Relay Racks
Cases & Small Cabinets
P.C. Card Holders & Guides

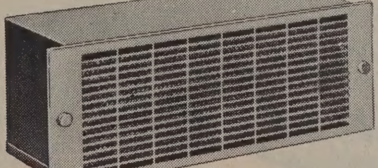
Chassis
Panels
Boxes
Slides
Blowers
Fans
Hardware
Accessories

Premier offers a variety of color coordinated standard textured and smooth finishes to allow "Customized" system design possibilities.

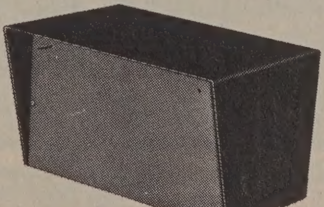
Send for our NEW full line catalog



Fans



Blowers



Small
Instrument Cases

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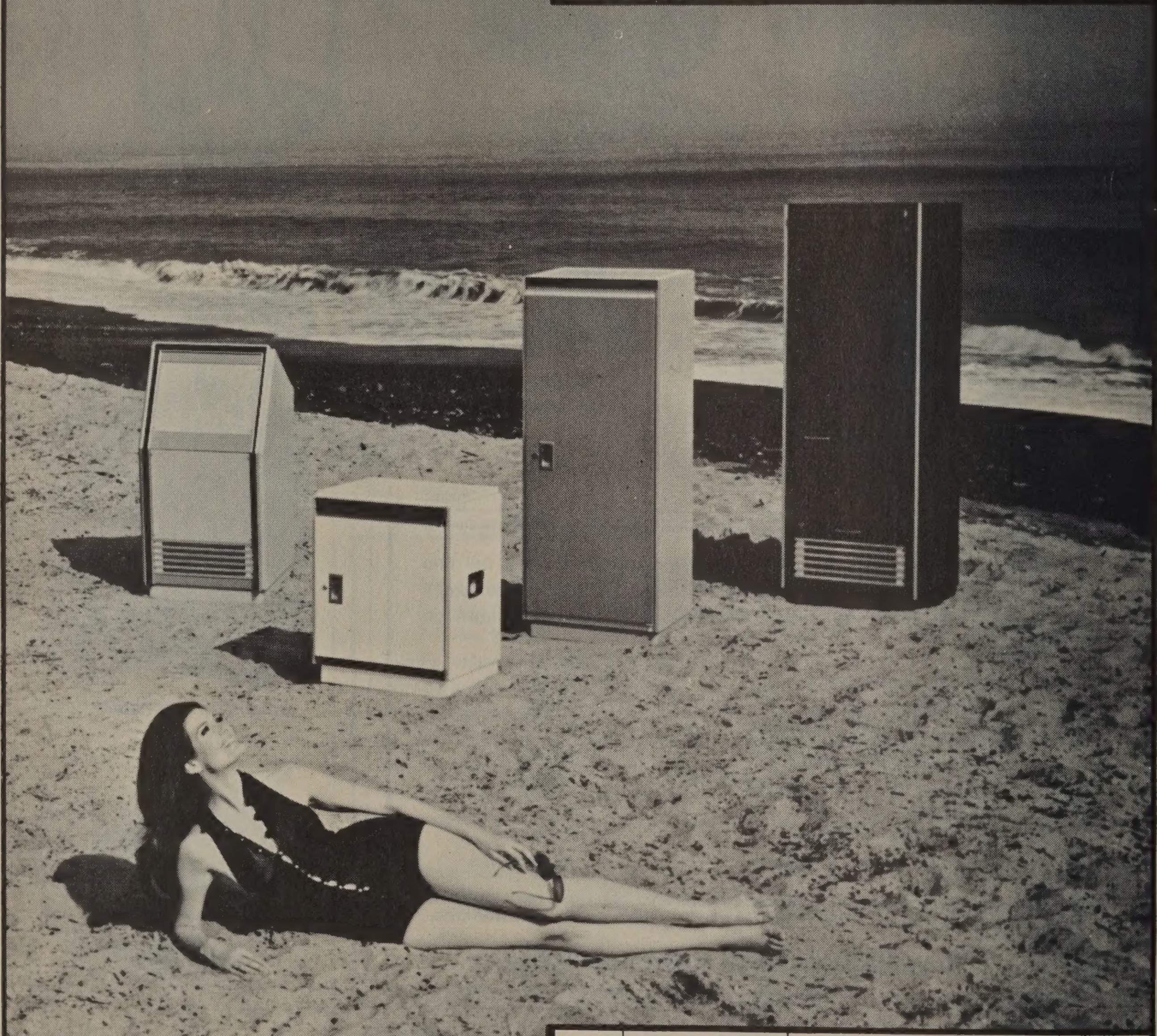
REV.	DATE	DESCRIPTION	APPD.
A	1/1/76	NEW DESIGNS	FNW
B	1/1/76	NEW ACCESSORIES	FNW
C	1/1/76	NEW COLORS	FNW

NOTES:

(1) ABOVE REVISIONS COMPLETELY DESCRIBED IN THE NEW STANTRON CATALOGUE #104.

(2) DETAILED DRAWINGS OF ITEM #2 (ON LIST OF MATERIALS BELOW) ARE NOT AVAILABLE.



ITEM #	PART #	DESCRIPTION	QUANT.
2	37-24-36	BRUNETTE: 5′-6″	1
1	VARIOUS	CABINET ASS'YS	4

LIST OF MATERIALS

STANTRON

DIVISION OF WYCO METAL PRODUCTS
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(213) 875-0800

DRAWN:	GT
CHECKED:	TP
APPROVED:	FNW

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THE BEACH

USED ON:

ITEM: MODULAR ELECTRONIC CABINETS

PART #: WRITE FOR COMPLETE CATALOG

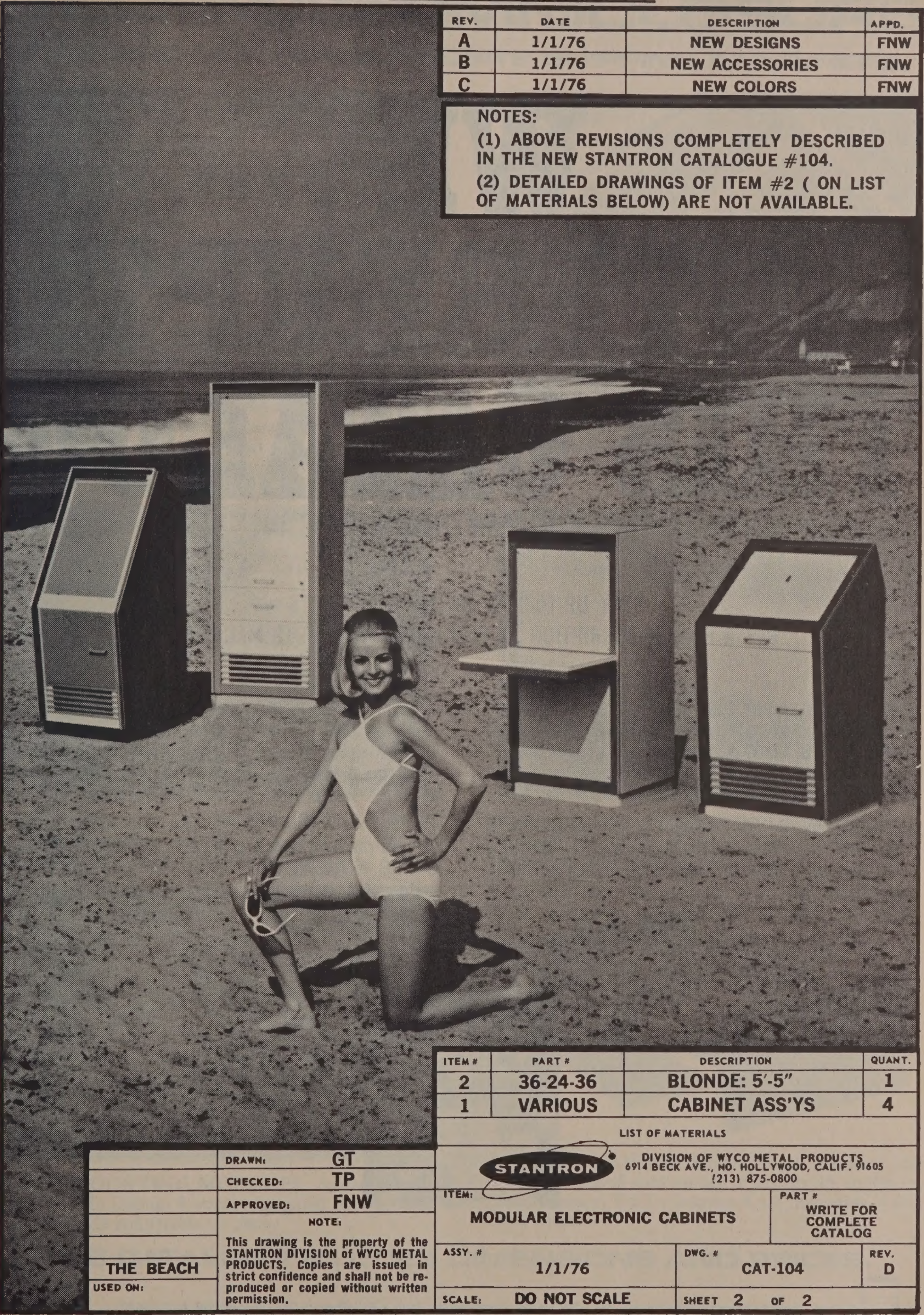
ASSY. #: 1/1/76

DWG. #: CAT-104

REV.: D

SCALE: DO NOT SCALE

SHEET 1 OF 2



REV.	DATE	DESCRIPTION	APPD.
A	1/1/76	NEW DESIGNS	FNW
B	1/1/76	NEW ACCESSORIES	FNW
C	1/1/76	NEW COLORS	FNW

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ITEM #	PART #	DESCRIPTION	QUANT.
2	36-24-36	BLONDE: 5′-5″	1
1	VARIOUS	CABINET ASS'YS	4

LIST OF MATERIALS

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APPROVED:	FNW	

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ITEM: MODULAR ELECTRONIC CABINETS	PART # WRITE FOR COMPLETE CATALOG

ASSY. # 1/1/76	DWG. # CAT-104	REV. D
SCALE: DO NOT SCALE	SHEET 2 OF 2	

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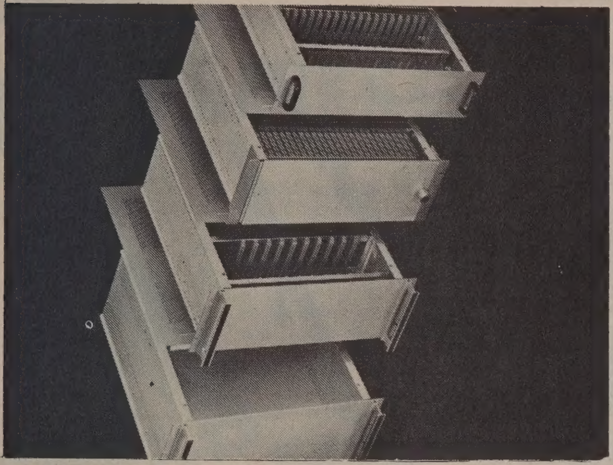
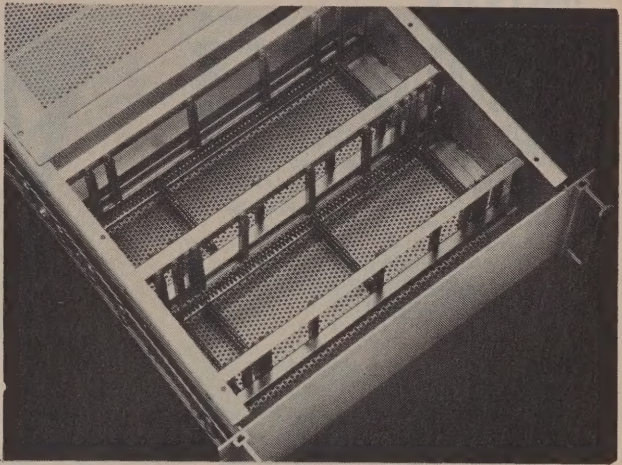
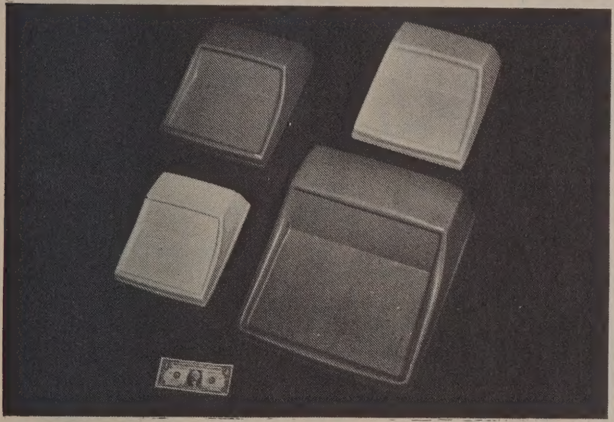


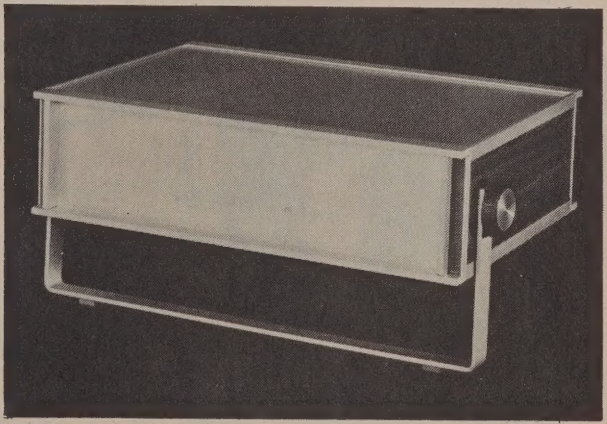
RACK-MOUNTING CHASSIS kits and parts in 7 EIA heights with pre-punched hole patterns for assembling in thousands of configurations; many options and accessories.



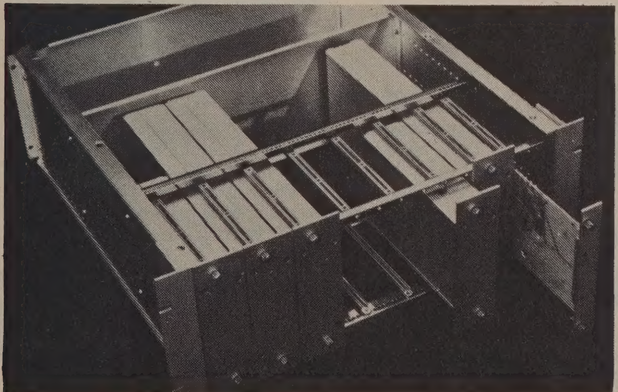
CARD CAGE kits and parts, plated steel guide frames and connector rails, plastic snap-in guides. For assembling in rack-mounting chassis units.



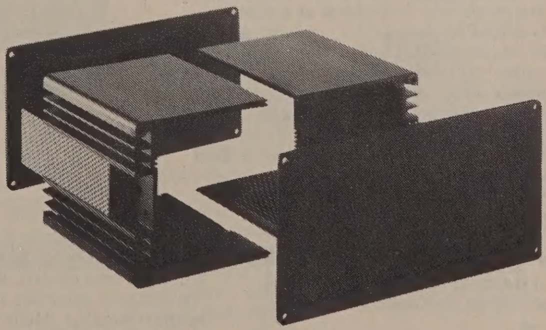
MINI-CONSOLES for enclosing small instruments economically in high style. Textured high-impact thermoplastic. Stocked in various sizes and colors.



PORTABLE INSTRUMENT ENCLOSURE kits in 54 configurations with optional swing handle/tilt stand, PC card capability, choice of 5 vinyl trims.



CAGE-MOUNTING MODULES, deluxe heavy-duty, smooth sliding, 8 sizes, rear panel punched for Cannon© DD connectors or plain.



SUBASSEMBLY HOUSINGS, black anodized aluminum, integral card guides. Parts for 45 configurations in stock, 3 x 3 x 4 to 8 x 8 x 4, including 9 with heat sinks.

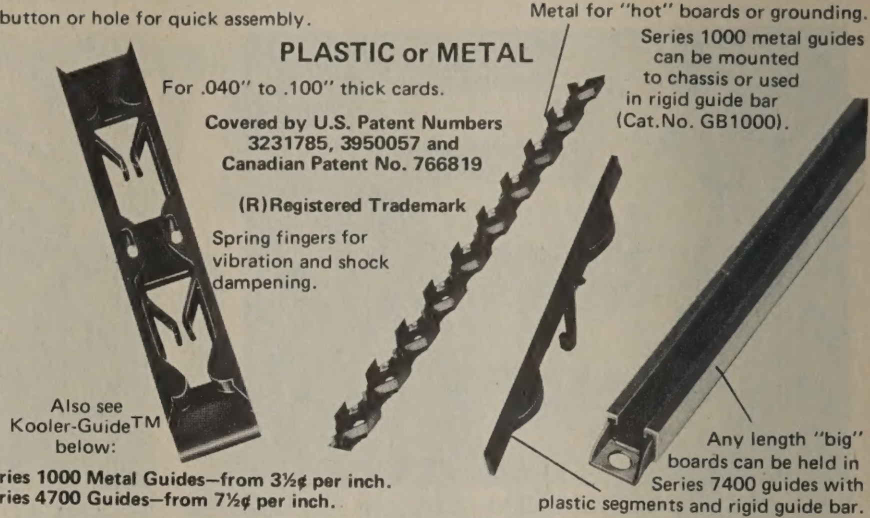
FREE CATALOG INCLUDES DIMENSIONS AND PRICES.

TECHMAR CORPORATION, 2232 SO. COTNER AVE., LOS ANGELES, CA 90064, PHONE (213) 478-0046

UNITRACK CARD GUIDES

Any p.c. card—large, small, "hot" or to be grounded can be held firmly with the patented spring finger action that *only UNITRACK guides offer.* Vibration and shock dampening are features no other guide offers. The cantilever spring action grips cards from .040" to .100" thick, yet they slide smoothly . . . insertion or extraction. UNITRACK guides are available in standard sizes or in long lengths for customer make up of polycarbonate plastic, phosphor bronze, beryllium copper or plastic or metal in an extruded housing. UNITRACK card guides are accepted for military or commercial applications.

Prices: Depending on quantity and size. Standard UNITRACK Guides—14 to 26¢


Snap in button or hole for quick assembly.

PLASTIC or METAL

For .040" to .100" thick cards.

Covered by U.S. Patent Numbers 3231785, 3950057 and Canadian Patent No. 766819

(R)Registered Trademark

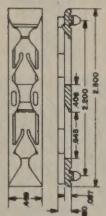
Spring fingers for vibration and shock dampening.

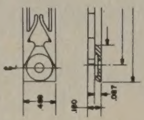
Also see Kooler-Guide™ below:

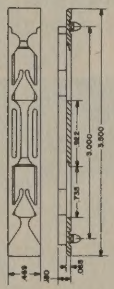
Metal for "hot" boards or grounding. Series 1000 metal guides can be mounted to chassis or used in rigid guide bar (Cat.No. GB1000).

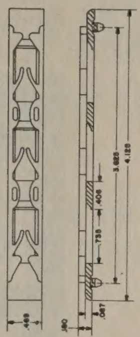
Any length "big" boards can be held in Series 7400 guides with plastic segments and rigid guide bar.

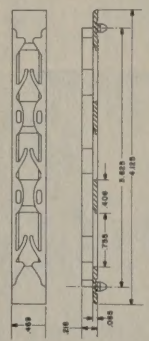
Series 1000 Metal Guides—from 3½¢ per inch.
Series 4700 Guides—from 7½¢ per inch.

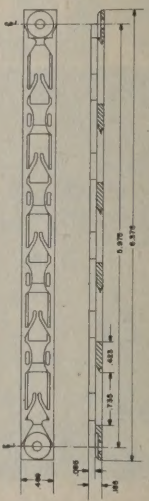

2500-38

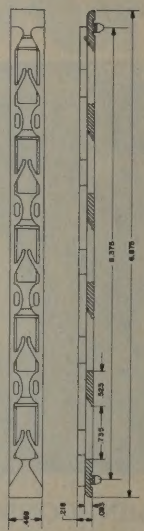

2500-38CB

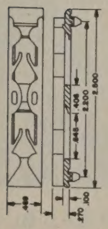

SPC-3000

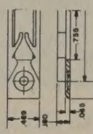

58-30-40

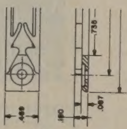

RAD 4125

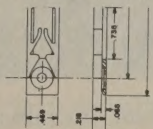

WEL 6375


RAD 6875


2500-38-4

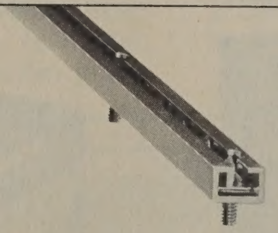

SPC-3000CB

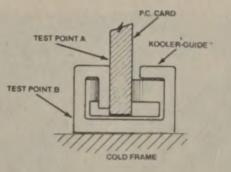

58-30-40CB

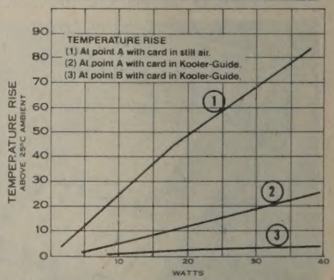

RAD 4125CB

Kooler-Guide™ Patent Applied For

Outstanding heat transfer through the card guide that also serves as a heat sink. Available for both 1/16" or 1/8" boards. Metal (phosphor bronze, beryllium copper, stainless steel) spring loaded fingers press p.c. card into contact with guide over entire length for quick, effective heat transfer.
Also available with mounting studs **(add 5¢ per stud). Cat. No. KG 375**
Price: 13¢ per inch depending on quantity and metal.





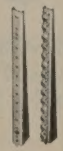


Curve shows 30 watt heat dissipation with Kooler Guide.

VERSAMOUNT® Brackets

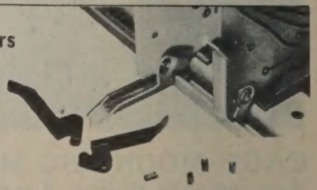
in metal or plastic for mounting p.c. cards, vertically on chassis.

VM 7500


VM 7700

Wherever you need to mount a p.c. card on a chassis, the Versamount provides a firm support bracket. Made in plastic (VM7500) or metal (VM7700) so that grounding can be accomplished. Just drill 2 holes and mount with one screw. **VM7500 Price from 55¢ a pair up. VM7700 Price from $1.60 a pair up**

Kolor-Kode™ Card Extractors



Lightweight, strong, epoxy coated stainless steel ejectors either extract or insert cards easily. Available in 12 electronic colors for circuitry identification.

Cat. No. L1000-6 for 1/16" card
L1000-9 for 3/32" card
L1000-12 for 1/8" card
L1000-15 for 5/32" card

Price 12¢ to 19¢

Use with Extractor Bar, Cat. No. HB1708 (same price as HB1701)

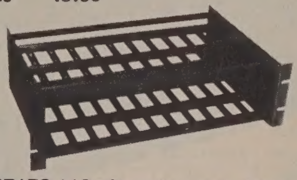
UNITRACK CARD RACKS

Low cost, easy-to-assemble, sturdy, rigid racks built to standard EIA sizes for mounting in 19" cabinetry. These racks can be supplied complete, or the individual parts may be ordered separately. Versacage card racks are available in these standard sizes. Specials are also available.

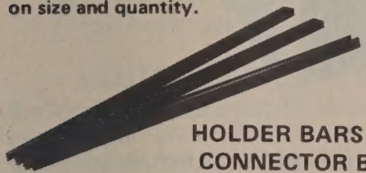
Cat. No.	Card Size	Price
VC-119-450	3½" to 4½" wide, up to 6½" long	$23.00
VC-119-625	4½" to 6¼" wide up to 6½" long	24.00
VC-119-800	6¼" to 8" wide up to 6½" long	25.00
VC-119-975	9¾" wide up to 6½" long	26.00
VC-219-450	3½" to 4½" wide up to 9¼" long	26.50
VC-219-625	4½" to 6¼" wide up to 9¼" long	27.50
VC-219-800	6¼" to 8" wide up to 9¼" long	28.50
VC-219-975	9¾" wide up to 9¼" long	29.50
VC-119-D-450	For two cards 4½" wide up to 6½" long	38.00
VC-219-D-450	For two cards 4½" wide up to 9¼" long	45.00
VC 1700	Single Rack: 6" deep end plates for cards up to 5½" wide	19.00

End Plates

Versacage end plates may be purchased separately. **Prices range from $5.00, depending on size and quantity.**



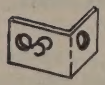
SERIES 119—Sizes for cards 3½" to 8" wide and 6½" long.



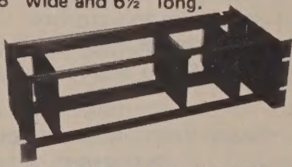
HOLDER BARS AND CONNECTOR BARS

Pre-punched bars of rigid aluminum extrusions are available for three card packaging densities . . . .200", .500" or .750" centers.

Pre-punched bars also available for offset connectors.



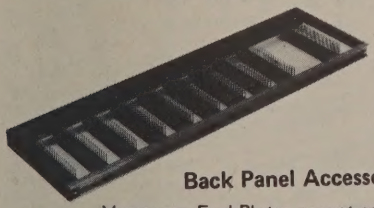
Angle Bracket



SERIES 219—Sizes for cards 3½" to 8" wide and 9¼" long.

Price of Connector Bars (Cat. No. CB1702) —from $1.50 ea.
Price of Holder Bars (Cat. No. HB1701) —from $1.50 ea.
Price of Angle Brackets—25¢ ea.

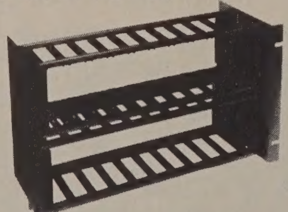
SERIES 119-D—Similar to Series 119 but for two rows of cards.



Back Panel Accessories

Versacage End Plates accept special brackets (Cat. No. UB-) so that back panel may be removed or attached in one piece when using wire wrapping connection techniques. Standard and special sizes available.

Price: from 75c



SERIES 219-D—Similar to Series 219 but for two rows of cards.

UNITRACK®

UNITRACK Div., Calabro Plastics, Inc.
8738 West Chester Pike, Upper Darby, Pa. 19082, Telephone (215)789-3820

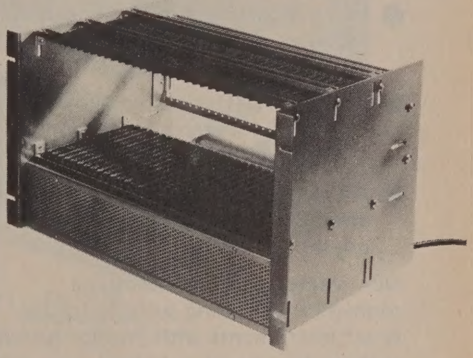
Sales Representatives and Stocking Distributors in major industrial areas.

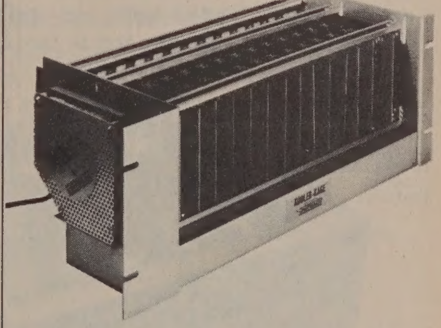
Send for Complete Catalog and Prices.

Kooler-Kage™ (U.S. Pat. No. 3967874)

Card Cages with Integral Blowers.

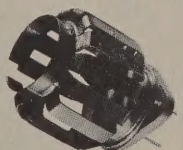
Cool an individual cage full of boards with Series TBKK-119 Series or TBKK-219 Series Kooler-Kages with tangential blowers for maximum cooling (100 cfm). For all standard card sizes shown on left. **Prices from $88.09 to $110.00.**

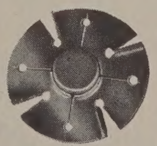




Cat. No. VCKK119-450 incorporates a plenum chamber and centrifugal blower for cooling over entire cage. Compact blower provides 25 cfm. **Price $95.00 complete with guides.**

Kooler-Krown **Kooler—Kollar**





Triac Kooler

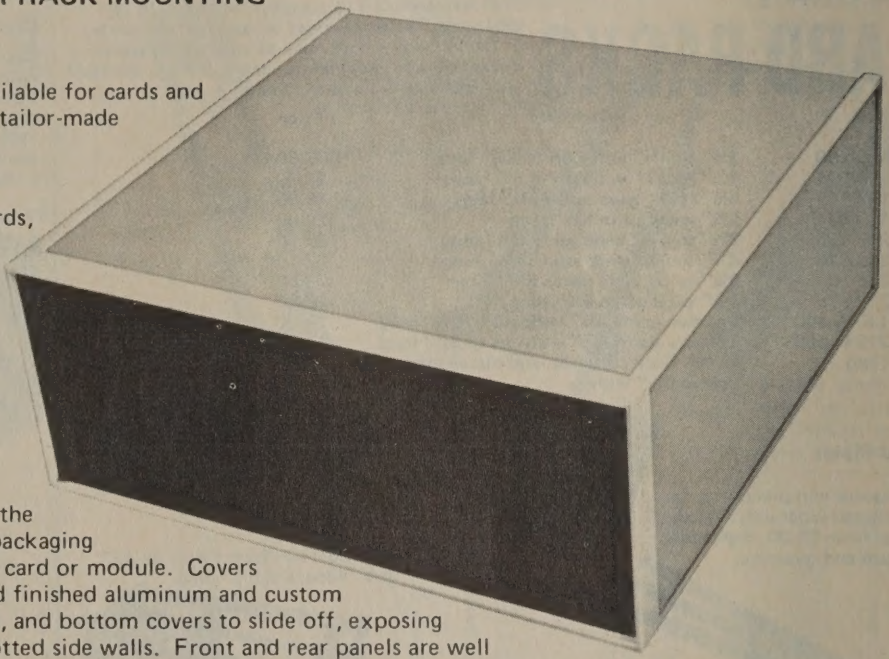
Heat Dissipators

Both Kooler-Krown™ and Kooler-Kollar™ provide effective heat dissipation for heat producing components in standard can packages. Triac-Kooler™ efficiently cools packaged triacs and power tab transistors.

DK-300 (Kooler-Kollar) for TO5—from 7¢
KK-750 (Kooler-Krown) for TO3—from 24¢
KK-300 (Kooler-Krown) for TO5—from 10¢
KK-500 (Kooler-Krown) for TO8 and 66—from 10¢
TR-60 (Triac Kooler) for Triacs—from 17¢

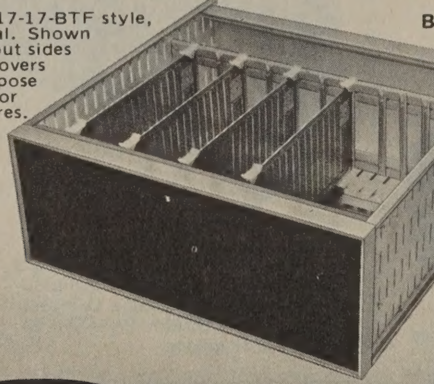
VECTOR-PAK CONTEMPO STYLE ENCLOSURES

FOR FREE STANDING OR RACK MOUNTING APPLICATIONS



- Smart vinyl finishes
- Interior mounting systems available for cards and modules without usual costly tailor-made fabrication.
- Easily assembled interior
- Full supporting line of p.c. cards, modules, guides, connectors, interconnect systems.
- Available in 15 sizes, 11 colors, hundreds of combinations.
- All cases and systems shipped assembled, unless ordered unassembled (U)

New Vector-pak cases combine sophisticated styling suitable for the finest instruments with interior packaging systems for almost any sized p.c. card or module. Covers are made with vinyl and anodized finished aluminum and custom extrusions which allow sides, top, and bottom covers to slide off, exposing the sturdy cross members and slotted side walls. Front and rear panels are well supported, yet easily removable.



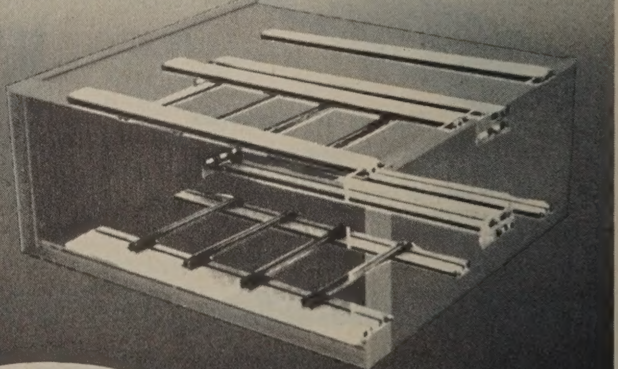
VP9-17-17-BTF style, special. Shown without sides and covers to expose interior features.

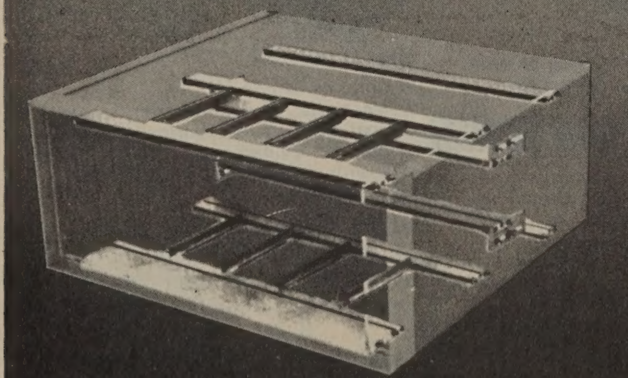
BASIC VECTOR-PAK ENCLOSURES WITHOUT INTERIOR MOUNTING SYSTEMS

Part number	Height	Width	Depth	Finish top & side covers
VP3-17-10-4V	3.76	17.58	10.4	Dark Blue Vinyl
VP3-17-10-3V	3.76	17.58	10.4	Gold Vinyl
VP5-17-13-4V	5.51	17.58	13.4	Dark Blue Vinyl
VP5-17-13-6V	5.51	17.58	13.4	Sky Blue Vinyl
VP5-17-13-1A	5.51	17.58	13.4	Clear Anodized
VP11-17-17-3V	10.75	17.58	17.1	Gold Vinyl
VP7-17-13-4V	7.26	17.58	13.4	Dark Blue Vinyl
VP7-17-13-6V	7.26	17.58	13.4	Light Blue Vinyl
VP11-17-21-4V	10.75	17.58	21.6	Dark Blue Vinyl
VP7-17-13-12V	7.26	17.58	13.4	Walnut Vinyl
VP9-17-21-4V	9.01	17.58	21.6	Dark Blue Vinyl
VP9-17-21-6V	9.01	17.58	21.6	Light Blue Vinyl
VP9-17-21-3V	9.01	17.58	21.6	Gold Vinyl
VP9-17-21-12V	9.01	17.58	21.6	Walnut Vinyl

OTHER COLORS AVAILABLE AT FACTORY

Style MF **Vector-pak case VP5-17-13-MF-4V8** is 17.58″ wide x 13.4.. deep x 5.5″ high, equipped with guides for inserting eight 2″ wide x 6.6″ long EFP modules from front. Has blue vinyl finished top and side covers. Supplied completely assembled. Order modules separately.



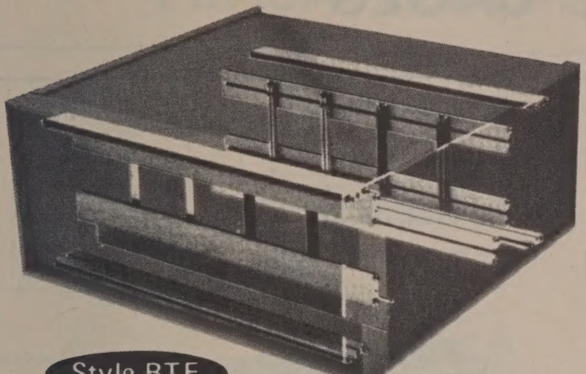


Style CMF **Vector-paks for front panel card mounts.** Cases are 5.5″ high x 17.58″ wide x 13.4″ deep, with dark blue vinyl covers. For mounting ten 1.6″ wide front panel card mounts, order **VP5-17-13-4V CM1.** For eight 2″ wide card mounts, order **VP5-17-3-4V CM2.** Order card mounts separately.

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

VECTOR ELECTRONIC COMPANY, INC., 12460 Gladstone Avenue, Sylmar, CA 91342 Phone (213) 365-9661 TWX 910-496-1539

VECTOR-PAK ENCLOSURES continued

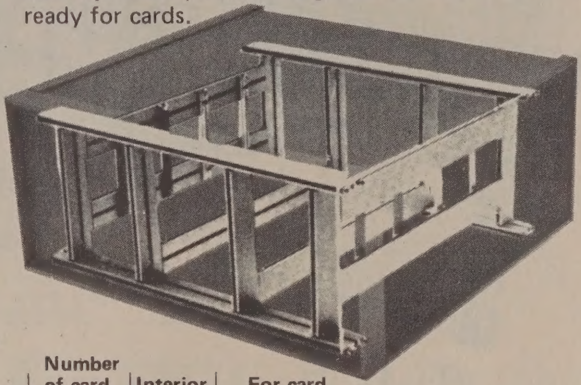


Style BTF

For vertically inserted plugbords BTF style — Cards top inserted with card axis front to back of enclosure;

Style BTS

BTS style — Card top inserted with card axis side to side of enclosure. Connector mounting struts and adjustable plastic card guides are installed, ready for cards.



SUPPLIED COMPLETELY ASSEMBLED

Part number	Height	Width	Depth	Top & sides	Number of card positions	Interior style	For card width x height
VP9-17-21-4VBTF21	9.01	17.58	21.6	blue vinyl	21	BTF	10" x 5.3"
VP9-17-21-4VBTS24	9.01	17.58	21.6	blue vinyl	24	BTS	10" x 5.3"

VECTOR-PAK CONTEMPO MODELS FOR 8800V STYLE, S-100 STANDARD CARDS

(See Vector Plugbord 8800V Series 5.313" high by 10.0" wide). Case, card guide supports and connector or motherboard support are completely assembled in BTF type (top insertion) interior mounting systems. Twelve pairs of card guides, connector, and motherboards are easily mounted without drilling holes on any spacing required, due to Vectorpak's exclusive adjustability. Card guides are supplied with hardware for easy mounting wherever required. As in other Contempo case models, top and sides slide off for fast, easy access to interior. Front and back panels are satin finished aluminum 0.081 inch thick and easily detached. Dark Plexiglass front panels are available. Order separately—Part number M6234-3-14 for 9 inch high cases.

Part number	Height	Width	Depth	Top & side cover finish	Card guide positions	Interior style	For card width x height
VP9-17-17-4VBTFC12	9.01	17.58	17.1	Blue Vinyl	12	BTF	10.0" x 5.3"
VP9-17-17-4VBTSC12	9.01	17.58	17.1	Blue Vinyl	12	BTS	10.0" x 5.3"

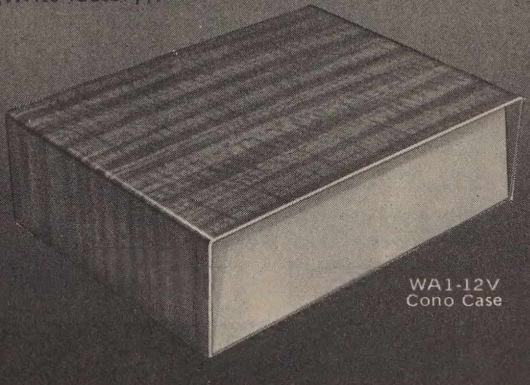
CONO SERIES INSTRUMENT CASES

- PROFESSIONAL APPEARANCE
- LOW COST BUT QUALITY
- QUICK ACCESS
- STURDY 0.062 INCH THICK ALUMINUM CASES WITH VINYL FINISHED COVERS OR OVERALL CLEAR ANODIZED FINISH
- FURNISHED WITHOUT INTERIOR STRUCTURE FOR MAXIMUM FLEXIBILITY

Smartly styled desk top enclosures for electrical and electronic assemblies. Two sets of oval ventilation holes across rear chassis bottom and on upper area of back panel provide excellent convection cooling. Listed accessory dark plastic overlay panel gives smart appearance and is transparent to "LEDs" and indicator lamps. Furnished completely assembled with four ¼ inch high adhesive mounting bump feet. Other colors available are gold, avocado, burnt orange, walnut grain, blue, beige, white, light gray, black. (Write factory).

Cat. No.	Stock Cover Finish	Overall Assembled Dimensions		
		Width	Depth	Height
WA1-4V	Dark Blue Vinyl	11 (279)	8 (203)	4 (102)
WA2-4V	Dark Blue Vinyl	14 (356)	11 (279)	
WA1-12V	Walnut Grain Vinyl	11 (279)	8 (203)	
WA2-12V	Walnut Grain Vinyl	14 (356)	11 (279)	
WA1-1A	Clear Anodized Satin Finish	11 (279)	8 (203)	

Accessory: Plastic overlay panel for WA-1 series M6234-3-1;
For WA2 series M 6234-3-2



WA1-12V
Cono Case

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

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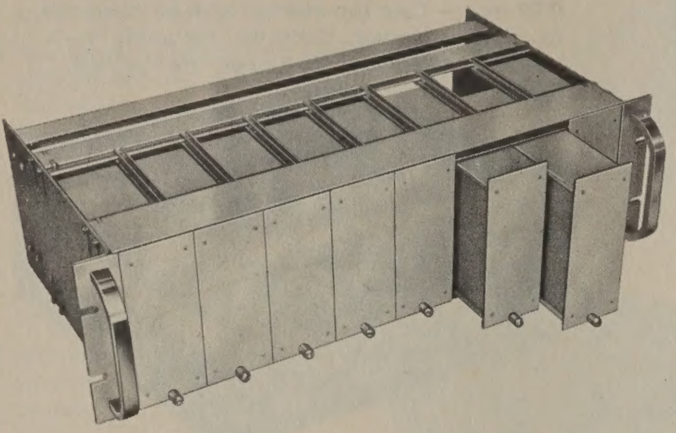
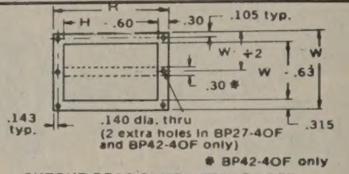
Vector

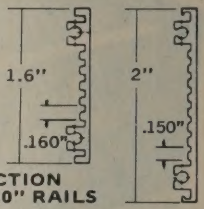
MODULE CAGES



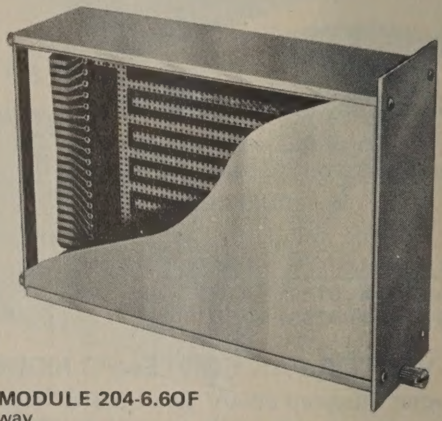
CMA3-20 MODULE CAGE
For EFP204-6.6 Modules Only
(shown with added HA-12 Handles, Filler Panels)



CUTOUT REAR PANEL, STYLE "OF"



CROSS SECTION OF 1.6", 2.0" RAILS



EFP MODULE 204-6.6OF
Cutaway

CAGES SUPPLIED COMPLETELY ASSEMBLED

VECTOR-STRUT MODULE CAGES

These all-aluminum cages for 19 in. rack or table-top mounting with Vector encasements provide sturdy, mechanically excellent housings in which to house electronic assemblies. Units are shipped completely assembled and modules, which are ordered separately, may be plugged in immediately after assembly. Module cages have a finished professional appearance which enhances equipment packaged within. Module guides are preinstalled in the cages for ten 1.6 in. wide, eight 2 in. wide, or five 3 in. wide EFP modules.

Connectors may be mounted to the two rear cross members (T-struts) which come preloaded with required 4/40 steel nuts. Alternately punched metal connector plates may be attached to the rear cross members. In either case the slotted cage side walls and bracket mounts on the cross members provide easy connector position adjustments. All cage parts are satin finished anodized aluminum. Special conductive iridite finish for RFI application available on order. Cages for other size modules and special RFI modules for these cages are available on order

EFP MODULES

EFP Modules for the accompanying Vector-Strut cages are anodized all-aluminum cases supplied in 1.6", 2" or 3" wide sizes. They consist of a blank 0.080 in. thick front panel with attachment hardware, blank or "OF" type 0.080 in. thick back panel for protruding circuit card edge fingers, two rear sliding side covers, plus top and bottom rails with 0.075 in. wide grooved inner surface for circuit cards. Jack screw is provided to facilitate module insertion/withdrawal. Circuit boards or Plugbords are held by the 0.075 in. wide grooves which run the entire length of the top and bottom rails. Lateral card positioning is accomplished with furnished hardware.

Modules are supplied unassembled for user fabrication required, followed by assembly.

55 other Modules are also available in widths including 1" and 4.5" and lengths of 4.5" and 11.5". Fully assembled matching cages are also available. Specials to order -- write factory for additional information.

ORDERING INFORMATION

Module Cage No.	Description	Module Size & Circuit Board Accommodated	No. Modules to Order Per Cage	Module Part No. Open Rear Panel Type	Module Part No. Closed Rear Panel Type†
CMA-3-16	Assembled Module Cage 5¼"Hx19"W x9" Deep with guides installed for 10 EFP Modules 1.6"Wx6.6"L	1.6"Wx6.6"L for 4½"x6½" Card	10	EFP164-6.6OF	EFP164-6.6
CMA-3-20	Assembled Module Cage 5¼"Hx19"W x12" Deep with guides installed for 8 EFP Modules 2"Wx6.6"L	2"Wx6.6"L for 4½"x6½" Card	8	EFP204-6.6OF	EFP204-6.6
CMA-4-20	Assembled Module Cage 5¼"Hx19"W x9" Deep with guides installed for 8 EFP Modules 2"Wx9.7"L	2"Wx9.7"L for 4½"x9.6" Card	8	EFP204-9.7OF	EFP204-9.7
CMA-8-30	Assembled Module Cage 8¾"Hx15" Deep x19"W with guides installed for 5 EFP Modules 3"Wx8"Hx9.7"L	3"Wx9.7"L for 7.99"x9.6" Card	5		EFP308-9.7

ACCESSORIES

Filler Panels For closing gap between side wall and end module position. Supplied 3" wide with rack mounting and handle holes; user cuts to width.

For 5¼" cages	FP52-2
For 8¾" cages	FP87-2

Dummy Module Front Panels for Filling Unused Module Positions in Cages. Supplied with fastening hardware.

- EFPL 204 Filler Panel for 2" w modules in 5¼"H cages
- EFPL 164 Filler Panel for 1.6" w modules in 5¼"H cages
- EFPL 308 Filler Panel for 3.0" w modules in 8¾"H cages

†Extra Module Front and Rear Panels

	1.6" Modules	2" Modules	3" Modules
Front	FP16-52	FP2-52	FP3-87
Rear	BP13-4	BP17-4	BP27-8

SPECIAL DESIGNS – Send for **"Design Your Own Cage"** Form

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

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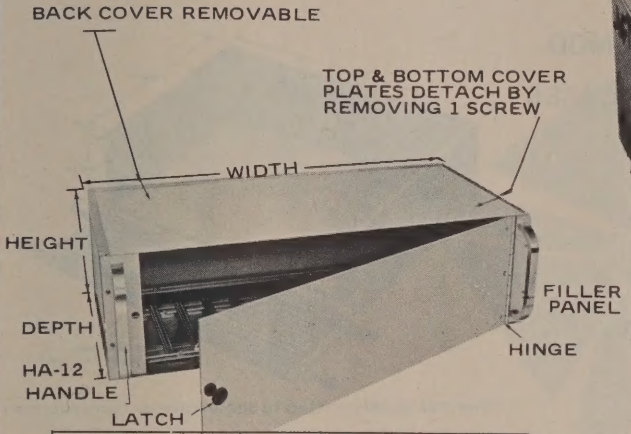
VERSATILE CARD CAGES

Vector

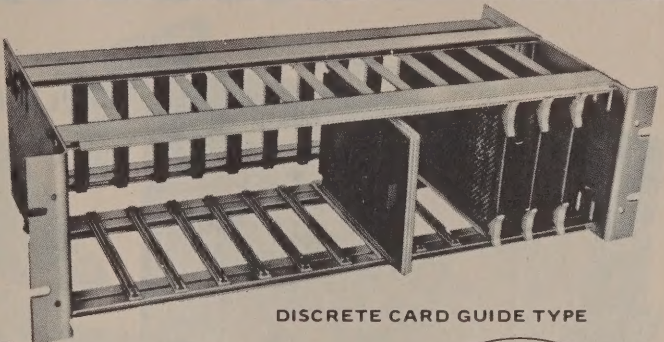


Note: Encasement Shell Equally Useful Without Hinged Front Panel For Modules Or Cards

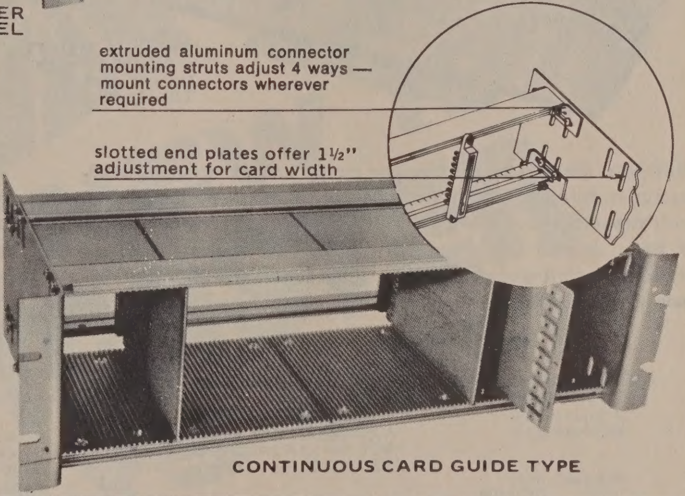
CAGE ENCASEMENT SHELL NO. CE-55-95 WITH CCK-13 CAGE

Plus Hinged Front Panel No. HP52-1 and HA-12 Handles

ALSO SEE VECTOR-PAK ENCLOSURES WITH BUILT-IN GUIDES



DISCRETE CARD GUIDE TYPE


extruded aluminum connector mounting struts adjust 4 ways — mount connectors wherever required
slotted end plates offer 1½" adjustment for card width

CONTINUOUS CARD GUIDE TYPE

NEW AND BEAUTIFUL CAGE ENCASEMENTS

The CE Series Cage Encasement Shells provide the finishing touch needed when a portable table-top unit is desired rather than rack mounting. Good accessibility is provided by easily removable top, bottom and rear covers. In addition, the cage can be quickly removed from the encasement shell by removing the screws from the front panel and the top and bottom covers. Supplied in knock-down form consisting of two assembled side panels, plus top, bottom and rear covers and required screws. The hinged front panel is an optional accessory (see below).

HINGED FRONT PANEL – SIDE HINGED

Hinged Front Panels, for card protection and improved appearance, come in easily assembled kit form which includes the hinged panel with latch, striker plate and two filler panels. Panels are of 1/8 in. thick aluminum with a clear anodized finish. All members (except screws) are clear anodized aluminum. (See ordering information on Card Cages for part numbers and dimensions.)

ASSEMBLED CARD CAGES

Supplied Fully Assembled - Riveted Card Guides
Connectors Are Easily Positioned Without Hole Drilling
Accommodate Most Popular Card Sizes
Adjustable For Different Card Widths
Ruggedly Handsome - Industrial Quality - Anodized Finish

Two connector mounting struts at rear are bracket mounted and furnished with 21 pairs of captive 4/40 nuts which may be positioned anywhere for fast, easy connector mounting. Heavy aluminum side walls have standard hole pattern for rack mounting. Card marker strips are included.

DISCRETE GUIDE TYPE

Cage supplied with riveted aluminum or plastic card guides for 1/16 in. thick cards attached to heavy extruded aluminum cross members.

CONTINUOUS PLATE TYPE

For maximum card density and position flexibility. Extruded aluminum plates with 0.075 in. wide .100 in. deep grooves on 0.150 in. centers are riveted to heavy aluminum cross pieces.

ORDERING INFORMATION

			CARD CAGES											SIDE HINGED FRONT PANELS	CAGE ENCASEMENTS			
Card Size Range			Discrete Guide Type				Continuous Extruded Metal Plate Type			Card Cage Dimensions					Encasement Dimension			
Width Max.	Min.	Length Max.	No.Cd. Posit.	Spacing	Plastic Guides	Metal Guides	No.Cd. Posit.	Spacing	Part No.	O/A Wdth.	O/A Dpth.	O/A Hght.			Part No.	O/A Wdth.	O/A Dpth.	O/A Hght.
4½"	3"	6½"	21	¾"	CCK13P	CCK13	108	.150	CCK3	19"	9"	5¼"		HP52-1	CE55-95	19"	9.5"	5.5"
4½"	3"	4½"	21	¾"	CCK13AP	CCK13A	—	None	—	19"	9"	5¼"		HP52-1	CE55-95	19"	9.5"	5.5"
4½"	3"	9.6"	21	¾"	CCK14P	CCK14	108	.150	CCK4	19"	12"	5¼"		HP52-1	CE55-125	19"	12.5"	5.5"
6¼"	4¾"	9.6"	21	¾"	CCK15P	CCK15	108	.150	CCK5	19"	12"	7"		HP70-1	None			
7.98"	6½"	6½"	21	¾"	CCK16P	CCK16	108	.150	CCK6	19"	9"	8¾"		HP87-1	None			
7.98"	6½"	9.6"	21	¾"	CCK17P	CCK17	108	.150	CCK7	19"	12"	8¾"		HP87-1	CE90-125	19"	12.5"	9.0"

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

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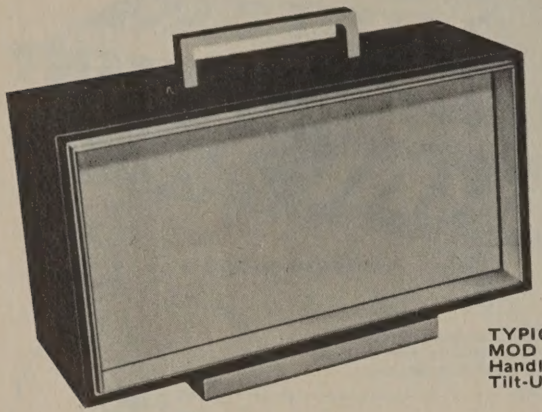
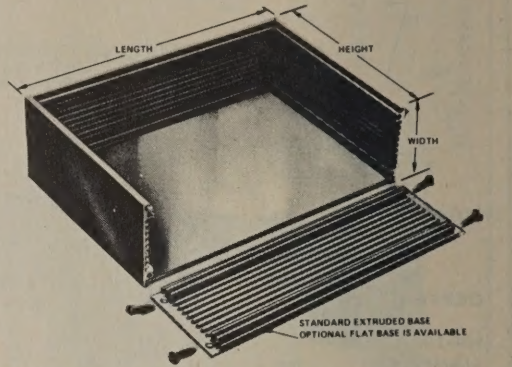
Vector INSTRUMENT CASES & PATCHBOARD SYSTEMS

MULTI-MOD CASES



TYPICAL MULTI-MOD CASE with Handle, Bezels, Tilt-Up Pedestal

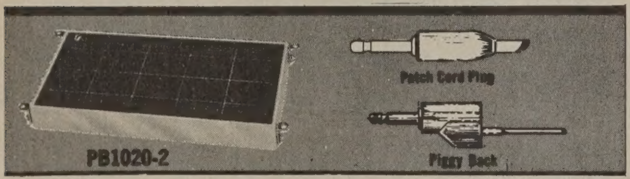


(One side panel omitted to show interior construction)

Multi-Mod cases offer the user the classic simplicity of extruded aluminum formed into an instrument or component case having both strength and functional beauty. Available in a wide variety of sizes, finishes and colors, all models have a clear anodized finish, unless otherwise indicated, and a series of interior 0.075" wide longitudinal grooves which hold circuit boards, mounting plates, and the sliding side covers which provide easy interior access. Removal of only four screws permits removal of the base plate, sliding side covers, and interior circuit card(s). Decorative extruded aluminum bezels are available on some models for an even more finished front panel appearance. Special sizes and finishes are available to order -- write factory.

Clear Anodized Finish Catalog No.	Color Anodized Finish Catalog No.	Frame Color	Panel Color	Width	Length	Height	Circuit Card & Panel Size	Part No. for Interior Fitting Prepunched Epoxy Glass Board w/.042 Holes 0.1x 0.1†
W16-31-31B				1.6	3.10	3.10	2.98x2.98	29P29-062
W20-46-31B	W20-46-31F4PL4	Blue	Blue	2.0	4.61	3.10	4.50x2.98	44P29-062
	W20-46-31F2PL2	Black	Black	2.0	4.61	3.10	4.50x2.98	44P29-062
	W20-46-31-1	Gold	Gold	2.0	4.61	3.10	4.50x2.58	44P29-062
W20-46-46B				2.0	4.61	4.61	4.50x4.50	44P44-062
W20 -66-46B				2.0	6.61	4.61	6.50x4.50	64P44-062
W30-66-46B	W30-66-46F4PL1	Blue	Clear	3.0	6.61	4.61	6.50x4.50	64P44-062
W30-86-46B	W30-86-46F4PL4	Blue	Blue	3.0	8.61	4.61	8.50x4.50	84P44-062
W30-100-46B				3.0	10.0	4.61	9.88x4.50	98P44-062
W45-66-46B				4.5	6.61	4.61	6.50x4.50	64P44-062
W45-86-46B	W45-86-46-2	Black	Blue	4.5	8.61	4.61	8.50x4.50	84P44-062
	W45-86-46F2PL2	Black	Black	4.5	8.61	4.61	8.50x4.50	84P44-062
W45-100-46B				4.5	10.0	4.61	9.88x4.50	98P44-062

†Order Separately



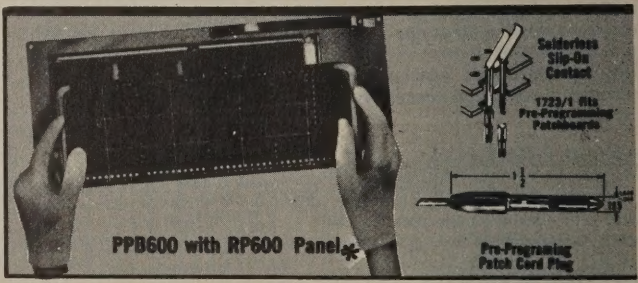
FIXED PANEL PATCHBOARDS

Reliable, low cost programing panels for maximum program flexibility at minimum cost. Available in sizes with 20, 50, 100, 200 and 300 contacts, spaced on .265" grid. Wrap-around beryllium copper nickle gold plated contacts handle up to 5 amps, and are located behind protected entry hole for damage-free years of use. Supplied with standard alpha-numeric markings or custom markings to order. Full line of color coded .090" tip diameter patchcords including piggy backs available.

Cat. No.	Contacts	Outside Dimensions W. H.
PB210-2	20	2.985" x .865"
PB510-2	50	2.985" x 1.660"
PB1010-2	100	2.985" x 2.985"
PB1020-2	200	5.635" x 2.985"
PB1520-2	300	5.635" x 4.310"

Patch Cords †		
Standard	Piggyback	Lgth.
K2.06	K9.06	6"
K2.09	K9.09	9"
K2.15	K9.15	15"
K2.02-1	——	Jumper

† Plugs are attached at each end.


Solderless Slip-On Contact
1723/1 fits Pre-Programming Patchboards
1½
Pre-Programing Patch Cord Plug

PPB600 with RP600 Panel*

VECTOR PRE-PROGRAMING PATCHBOARDS

Vector Pre-Programing Patchboard Systems are made with 204, 300, 600,, and 1200 contacts, Long lived beryllium copper, nickle or gold contacts assure reliability over thousands of cycles. Transverse engagement cycle assures post patching capability. Complete line of color-coded patch cords available. Removable programing panels supplied with standard alpha-numeric markings, blank or customer supplied markings.

*RP600 Series. RP600BLKA is shown.

Recept. Frame Cat. No.	Outside Dimen.		No. of Contacts	Mating Remov. Panels	
	W.	H.		Unmarked Cat. No.	Std. marked Cat. No.
PPB204	10⅜"	6"	204	RP204BLK	RP204BLKA
PPB300	10⅜"	6"	300	RP300BLK	RP300BLKA
PPB450	16"	6"	450	RP450BLK	RP450BLKA
PPB600	16"	6"	600	RP600BLK	RP600BLKA
PPB1200	17"	10¾"	1200	RP1200BLK	RP1200BLKA

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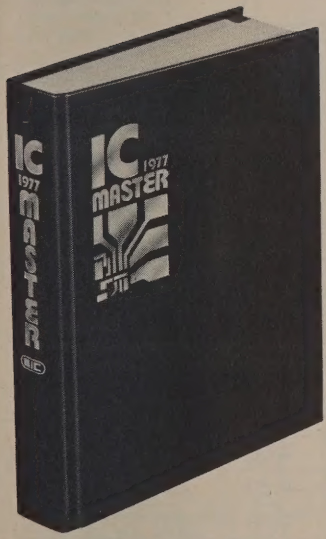
WHEN THE CHIPS ARE DOWN...

THE NEW 1977 IC MASTER PAYS OFF!



The new IC MASTER is the ultimate IC source book.

It lists virtually every IC device manufactured in the United States.

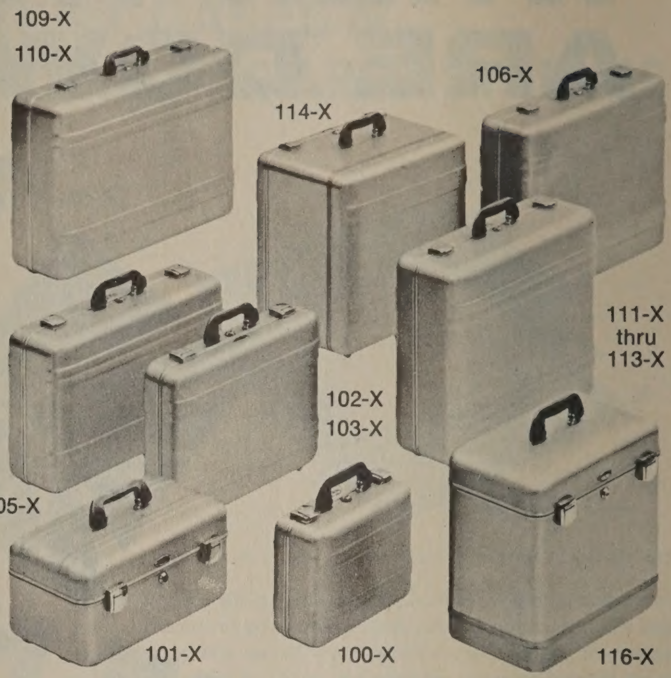
The IC MASTER is the easy, sensible means of narrowing down your IC choices quickly, accurately and systematically. All information is cross-referenced and indexed for rapid problem solving and device selection. And, additionally, the MASTER is updated three times yearly by accumulative supplements.

THE FORMAT OUTLINED:

- **FIVE MASTER SELECTION GUIDES** — 84 companies' IC's organized by type, function, key parameters
- **OVER 1,000 PAGES OF TECHNICAL INFORMATION** — Provided directly by manufacturers covering 17,000 IC's
- **ALTERNATE SOURCE DIRECTORY** — The only industry-wide, pin-for-pin version available
- **MILITARY PARTS INDEX AND CROSS REFERENCE CHART** — Identifies all IC's with JAN qualification
- **MILITARY DEVICE TESTING TABLE** — List companies that screen to Mil. Std. 883
- **MILITARY PARTS INDEX** — The first functional guide to JAN qualified parts
- **PART NUMBER INDEX** — Parts from 84 manufacturers, in numerical sequence
- **APPLICATION NOTE DIRECTORY** — Digest of currently active application note material
- **PRODUCT INDEX** — Provides alphanumeric listing of 84 manufacturers' lines
- **PART NUMBER GUIDE** — Instantly decodes each company's part numbering system
- **MANUFACTURERS AND DISTRIBUTORS DIRECTORY**

United Technical Publications, 645 Stewart Ave., Garden City, NY 11530

ZERO CENTURION® "ELITE" CARRYING CASES



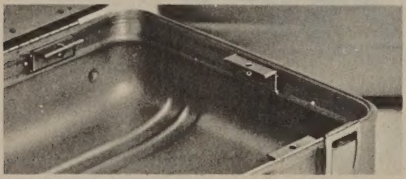
Top-of-the-line protection and appearance for your finest equipment

High strength, light weight, and clean simple lines characterize these distinctive deep drawn cases. Surfaces are seamless and wrinkle-free, while satin buffing and anodizing, standard finish for the line, make the most of aluminum's natural good looks.

Zero Centurion "Elite" cases are dustproof, weather resistant and odorproof; and their strength and durability have been proven in actual use around the world. Each is strong enough to stand on, thanks to specially heat treated case shells; yet even the largest (19.10" x 50.35" x 6.25") weighs only 17 pounds.

FEATURES

Zero continually improves the appearance, reliability and versatility of this line. Positive-locking latches assure secure closing while complimenting the clean styling of each case.



A fully gasketed tongue-and-groove closure extrusion, bonded to case shells, offers not only better sealing and case integrity, but also permits the installation of adjustable panel support brackets (optional) at significant savings over other methods of attaching angles for panel mounted equipment. Blank panels are available on special order.

DELIVERY

Normal delivery for standard cases and panel mounting brackets is two weeks after receipt of your order and will be filled from the Zero facility nearest your location. Allow 4 week delivery for cases with foam packs.

100X SERIES

A new standard of excellence

The 100X Series comes completely equipped, ready for installation of your equipment. Available in 15 standard sizes, the dimensions and weights for this line are shown in Table 1.

Table 1 — Standard Zero Centurion Cases

Model	A Outside Width	B Outside Length	C Inside Height	Upper Shell Height, I.D.	Lower Shell Height, I.D.	Material Thickness	Net Weight Lbs.
100-X	9.00	12.00	5.00	2.00	3.00	.040	3.31
101-X	9.00	16.00	7.75	2.50	5.25	.051	5.00
102-X	13.00	18.00	4.50	2.00	2.50	.040	5.00
103-X	13.00	18.00	6.00	2.50	3.50	.040	5.37
105-X	13.00	21.00	6.50	2.75	3.75	.040	6.12
106-X	17.00	21.00	7.50	3.00	4.50	.051	8.37
109-X	18.00	26.00	8.50	3.75	4.75	.051	10.68
110-X	18.00	26.00	9.00	4.25	4.75	.051	10.81
111-X	18.00	24.00	7.00	3.00	4.00	.051	9.50
112-X	18.00	24.00	8.00	3.50	4.50	.051	10.00
113-X	18.00	24.00	8.50	4.00	4.50	.051	10.00
114-X	17.00	18.00	12.00	2.00	10.00	.040	8.56
116-X	9.00	16.00	14.50	2.50	12.00	.051	7.18
122-X	14.12	49.37	4.37	2.00	2.37	.040	16.81
126-X	19.10	50.35	6.25	2.25	4.00	.051	17.25

Note: Width and length are outside dimensions; height is an inside dimension.
Lower shell of Model 114-X and 116-X complete with spot welded wrap-around riser section.
Measurments shown in inches.

SAMPLE PART NUMBER 103X - P6

Case Number — 103X

Panel Support Brackets and Quantity/Case — P6

ORDERING INFORMATION

(for Standard 100X cases)

Simply order by part number, indicating quantity. If panel support brackets are required, add suffix P and indicate quantity per case.

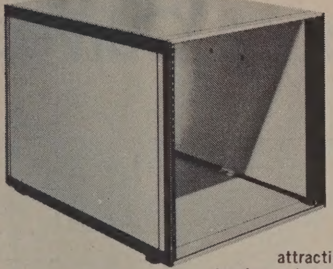
Standard foam packs are also available in 2 pound density blue polyurethane, and can be obtained by adding suffix F to case numbers. (Example: 103X F).

DEPT. EM, 777 FRONT STREET, BURBANK, CA 91503
TELEPHONE (213) 846-4191
TWX 910-498-2237 • CABLE ZEROBOX

ZERO CORPORATION

DEPT. EM, 288 MAIN STREET, MONSON, MA 01057
TELEPHONE (413) 267-5561
TWX 710-354-1450 • CABLE ZEROCAN

VIP the ZERO versatile instrument packaging system



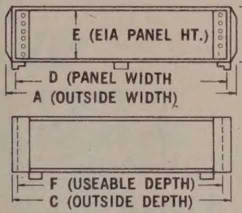
the vip series 19 line

The VIP Series 19 Line provides an attractive alternative to conventional electronic rack mounts, accepting EIA standard 19″ panels totaling 5.25″ to 28″ height (see table). In addition, multiple VIP Series 19 modules can be stacked vertically for temporary instrument groupings, thanks to a positive-nesting foot design. Individual units may be fitted with tilt stands, chassis slides, fold-away cast handles, or (for the 5.25″ unit only) a self-retracting strap handle. And the VIP Series 19 Line standard units come pre-assembled with or without front and/or rear panels, as you require. The VIP Series 19 Line has removable top and bottom panels.

ORDERING INFORMATION

VIP Series 19 Enclosure System

Standard in pre-assembled form. Cost reduced for kit form.



(DIMENSIONS (±0.031″)						Enclosure No.
A	B	C	D	E	F	
20.04	6.03	17.90	19.00	5.25	17.20	190517
20.04	7.78	17.90	19.00	7.00	17.20	190717
20.04	9.53	17.90	19.00	8.75	17.20	190817
20.04	11.28	17.90	19.00	10.50	17.20	191017
20.04	13.03	25.90	19.00	12.25	25.20	191225
20.04	14.78	25.90	19.00	14.00	25.20	191425
20.04	18.28	25.90	19.00	17.50	25.20	191725
20.04	21.78	25.90	19.00	21.00	25.20	192125
20.04	25.28	25.90	19.00	24.50	25.20	192425
20.04	28.78	25.90	19.00	28.00	25.20	192825

VIP ☐☐☐☐☐☐ — ☐☐ — ☐☐☐☐☐

Notes	Configuration	Code
	Plain Side Panels; assembled	1
①	Side Handles; assembled	2
	Kit; Plain Side Panels	3
①	Kit; Side Handles	4

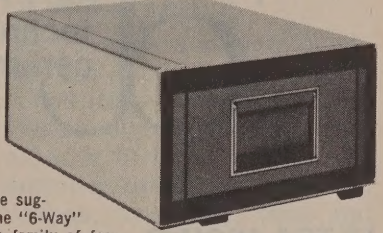
	Color	
②	Blue	1
③	Blue w/Bright Trim	2
②	Brown	3
③	Brown w/Bright Trim	4
⑦	Other (special order only)	5

Notes	Accessories	Code
⑤	Front Panel	F
⑤	Rear Panel	R
④	Chassis Slides (80 lb./pair)	S
	Tilt Stand	T
	Std. Ventilated/Top/ Bottom Panels	X

Example: VIP191225-24-FRT = VIP Series 19 for 12.25″ x 19″ EIA panel; 25.20″ inside depth; fold-away handles; assembled; brown with bright trim; front and rear panels; and tilt stand.

Notes: ¹ 3.50″ and 5.25″ high units employ dual self-retracting strap handles; 7″ high and over employ fold-away cast handles for 2-man carry. ² 2-Week delivery. ³ 4-Week delivery. ⁴ See Zero Catalog P for separable, non-separable and rotational slides, with capacities to 275 lb./pair. ⁵ Front and rear panels are alodined without color finish to permit secondary operations. ⁶ Front and rear covers are identical. For one, designate "C"; for two, designate "CC." ⁷ For special requirements, consult the nearest Zero sales office.

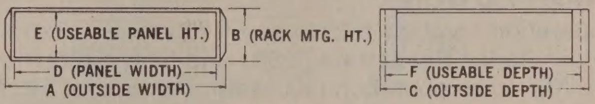
the vip 6-way line



The VIP 6-Way Line, as its name suggests, is more versatile still. The "6-Way" nomenclature derives from this family of features: (1) Vertical Nesting via positive-nesting feet, for temporary groupings; (2) Vertical Interlocking via dove-tail stack-joiner strips and integral grooves, equivalent to rack mounting in less space and without the rack and its limitations; (3) Horizontal Interlocking via dove-tail strips and grooves, for side-by-side mounting of multiple instruments; (4) Rack Mounted via accessory brackets, plus optional chassis or rotation slides, for insertion into the VIP Series 19 units or other EIA Std. racks; (5) Briefcase Portable via cast fold-away handles or self-retracting strap handle plus optional front/rear dust covers; and (6) Tiltable via an accessory tilt stand, for bench and desk-top use without parallax. It is this extraordinary versatility and the strength of castings, extrusions and heavy-gage aluminum that makes the VIP enclosures worthy of your designs. The VIP 6-Way Line has the unique feature of removable top and bottom panels.

VIP 6-Way standard modules come unassembled in both 17″ and 8.50″ outside widths, and are designed for interlocking without gaining width.

ORDERING INFORMATION



VIP 6-Way Enclosure System • Standard in kit form. Extra cost for pre-assembly.

DIMENSIONS (±0.031″)						Enclosure No.
A	B	C	D	E	F	
8.43	3.50	12.70	7.52	3.15	11.07	080312
		16.70	7.52	3.15	15.07	080316
	5.25	12.70	7.52	4.90	11.07	080512
		16.70	7.52	4.90	15.07	080516
16.88	3.50	12.70	15.98	3.15	11.07	170312
		16.70	15.98	3.15	15.07	170316
16.88	5.25	12.70	15.98	4.90	11.07	170512
		16.70	15.98	4.90	15.07	170516
16.88	7.00	12.70	15.98	6.65	11.07	170712
		16.70	15.98	6.65	15.07	170716
16.88	8.75	12.70	15.98	8.40	11.07	170812
		16.70	15.98	8.40	15.07	170816
		22.70	15.98	8.40	21.07	170822
16.88	10.50	16.70	15.98	10.15	15.07	171016
		22.70	15.98	10.15	21.07	171022
16.88	12.25	16.70	15.98	11.90	15.07	171216
		22.70	15.98	11.90	21.07	171222

VIP ☐☐☐☐☐☐ — ☐☐ — ☐☐☐☐

Notes	Configuration	Code
	Chassis (no side panels); kit	0
	Plain Side Panels + Feet; kit	1
①	Side Handles + Feet; kit	2
	Assembled Chassis (no side panels)	3
	Assembled; Plain Side Panels + Feet	4
①	Assembled; Side Handles + Feet	5

	Color	
②	Blue	1
③	Blue w/Bright Trim	2
②	Brown	3
③	Brown w/Bright Trim	4
⑦	Other (special order only)	5

Notes	Accessories	Code
	Rack Mtg. Brackets	B
	Rack Mtg. Brackets + Pull Handles	P
⑥	Front or Rear Protective Cover	C
④	Chassis Slides (80 lb./pair)	S
	Horizontal Joiner Strips (pair)	H
	Vertical Joiner Strips (pair)	V
	Tilt Stand	T
	Std. Ventilated/Top/ Bottom Panels	X

Example: VIP170516-21-CCVT = VIP 6-Way enclosure 17″ x 5.25″ x 16.70″ for bench use; strap handles and feet; kit form; blue; stack-joiner strips; both front and rear covers; and tilt stand.

DEPT. EM, 777 FRONT STREET, BURBANK, CA 91503
TELEPHONE (213) 846-4191
TWX 910-498-2237 • CABLE ZEROBOX

ZERO CORPORATION

DEPT. EM, 288 MAIN STREET, MONSON, MA 01057
TELEPHONE (413) 267-5561
TWX 710-354-1450 • CABLE ZEROCAN

ATC 100 UHF/MICROWAVE CAPACITORS

american
technical
ceramics

Performance Curves

ULTRA HIGH Q

is characteristic of the ATC 100 capacitors through microwave frequencies, even at high ambient temperatures, and under extremely high currents, permitting reliable operation at high power levels. Output power increases of greater than 20% per stage are reported when ATC 100's, with their negligible I^2R losses, are substituted for conventional capacitors. The reduction of losses also produces greater DC-to-RF conversion efficiency, improvements of 35% being reported. Improvements in Noise Figure are also attainable in receiver applications.

HIGH-POWER

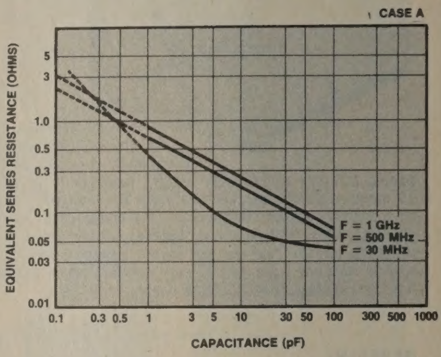
operation through microwave frequencies. Extremely low Equivalent Series Resistance (ESR) and high dielectric strength permit 15 KW pulse operation (900 watts average) at 500 MHz (3000 volts, 17 amps RF) in a 50 ohm system. Other typical applications are 500 watts (CW) at 1 GHz and 1 KW (avg.) at 50 ohms up to 3 GHz.

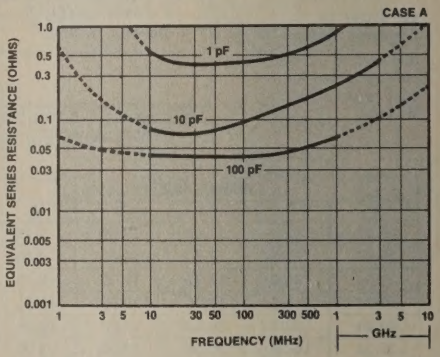
LOW NOISE FIGURE

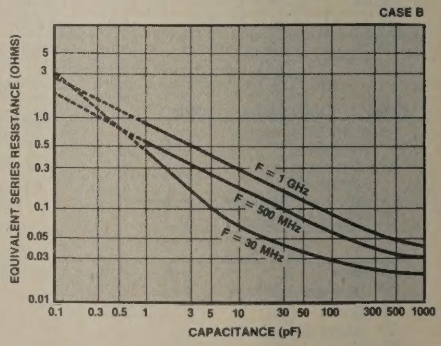
in receiving systems is achieved by the very low equivalent series resistance and extremely high Insulation Resistance (I.R.) of the ATC 100's. In an RF preamplifier, their low ESR helped attain a N.F. of 1.4 dB with a 1.2 dB transistor N.F. at 500 MHz. The high Insulation Resistance (ultra-low leakage) of an ATC 100 used as a calibration capacitor at the input of a charge storage amplifier on an X-Ray Spectrometer made possible a threshold sensitivity of 150 eV.

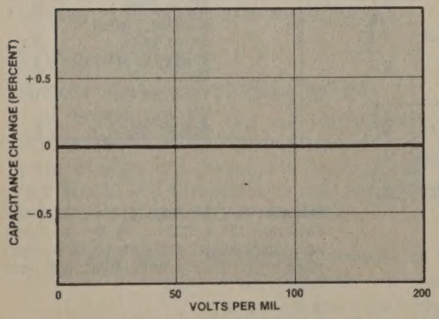
HIGH SELF-RESONANCE

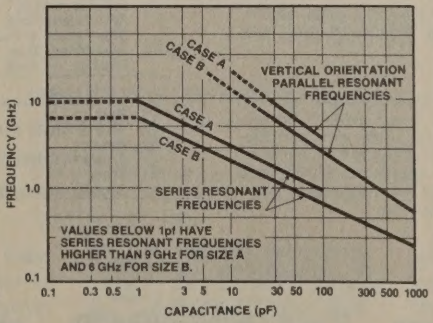
is shown by test data taken on a Hewlett Packard 8542A Network Analyzer covering S-Parameters, VSWR, Reactance, and Insertion Loss over the frequency range of 100 to 3000 MHz. Request **THE RF CAPACITOR HANDBOOK** for actual S-Parameter computer print-outs.

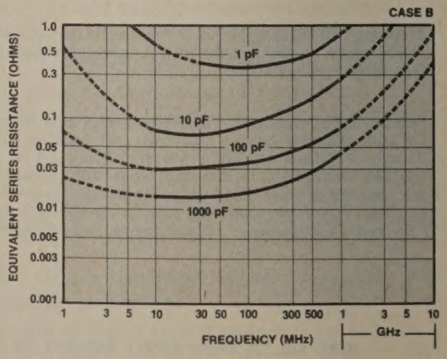












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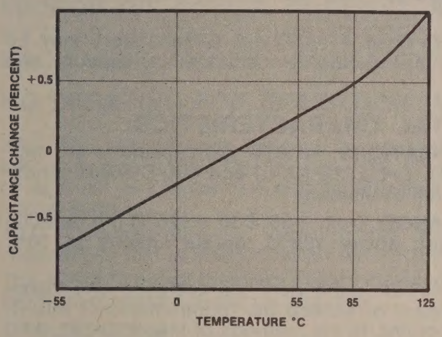
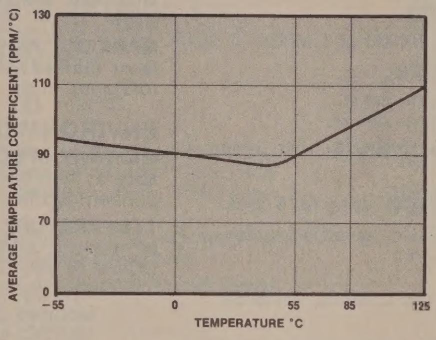
ATC 100 UHF/MICROWAVE CAPACITORS

Stability





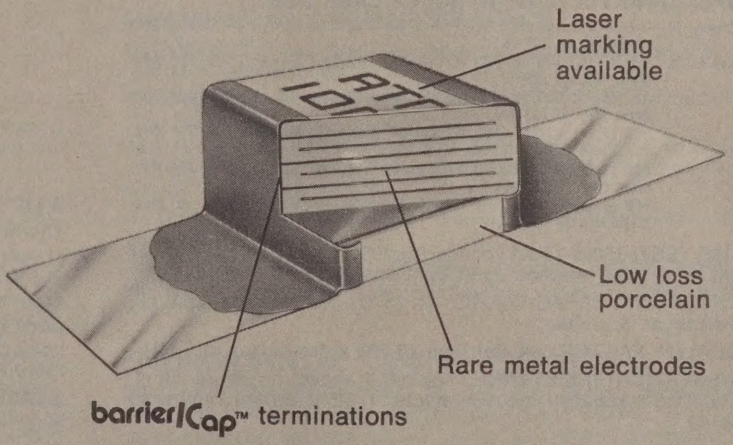
ULTRA-STABLE

performance is assured by the self-encapsulating porcelain construction. ATC 100's provide absolute retrace, no measurable drift, and complete stability under extremes of voltage, frequency, time and temperature. They are ideal for high-power, high-current, tuning, or impedance-matching applications.

Structure

SELF-ENCAPSULATING PORCELAIN CONSTRUCTION

Rare metal internal electrodes are molecularly bonded and sealed in a monolith of non-porous porcelain. The ATC 100 is a hermetic, microminiature, self-encapsulated, high voltage, porcelain chip capacitor matched to the thermal coefficient of expansion of commonly used substrate materials.



RUGGED TERMINATIONS

The ATC **barrier/Cap™** termination is now standard on all pellets and leaded capacitors. The terminations remain intact under the most severe thermal shock, and are not dissolved away even by the most careless soldering. They easily withstand a 5 minute submersion in 375°F solder pot without leaching, while retaining complete solderability. Migration is virtually eliminated and a bond strength greater than 30 lbs. is typical for "B" Case capacitors (110 mils square) with nail head leads.

HERMETIC

The severe thermal shock to which capacitors are subjected by direct soldering during circuit assembly can destroy the integrity of conventional capacitors, permitting flux and solvents to penetrate the dielectric. ATC porcelain capacitors are hermetic and are not degraded by the assembly process.

A simple and easy hermeticity test to simulate the thermal shock of soldering and subsequent absorption of contaminants is to drop the capacitor into boiling salt water. Remove, wash and verify hermeticity by retesting I.R., capacity, and Q. (For details, see ATC SW 100 Boiling Salt Water Test on page 1164.)

RELIABILITY

Reliability after circuit assembly is outstanding due to the rugged and hermetic structure provided by the self-encapsulated porcelain construction. ATC's design of the chip capacitor internal structure and dielectric has resulted in the most reliable porcelain capacitors available proven by extensive testing programs of approximately 2 million component hours per month.

ATC has complete Government approved Hi-Rel testing facilities as well as RF production testing capability through 2.5 GHz.

LASER MARKING

Is available on ATC capacitors for quick and complete identification of capacitor source, value and tolerance. This highly legible and permanent marking results in no degradation of performance or reliability and is impervious to all cleaning solvents.

barrier/Cap™ is a proprietary trademark of American Technical Ceramics

ATC 100

Specifications

ELECTRICAL CHARACTERISTICS:

QUALITY FACTOR: (Qcap): greater than 10,000 at 1 MHz.

CAPACITANCE VALUES AND TOLERANCES:

Case A: standard values and tolerances from 0.1 pF to 100 pF.
Case B: standard values and tolerances from 0.1 pF to 1000 pF.

TEMPERATURE COEFFICIENT OF CAPACITANCE: +90 ±20 PPM/°C (−55°C to 125°C).

DIELECTRIC TEST VOLTAGE: 250% of WVDC rating for 5 secs.

RETRACE: Less than ±0.02% or 0.02 pF, whichever is greater.

AGING EFFECTS: None.

PIEZOELECTRIC EFFECTS: None (No capacitance variation with voltage or pressure).

CAPACITANCE DRIFT: ±0.02% or 0.02 pF, whichever is greater.

CAPACITANCE RANGE, INSULATION RESISTANCE, AND OPERATING VOLTAGE (WVDC) BY CASE SIZE

Case A: 0.1 pF to 100 pF (50 WVDC); 10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
Case B: 0.1 pF to 100 pF (500 WVDC); 10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
110 pF to 200 pF (300 WVDC); 10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
220 pF to 470 pF (200 WVDC); 10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 125°C
510 pF to 620 pF (100 WVDC); 10^5 Megohms Min @ 25°C, 10^4 Megohms Min @ 125°C
680 pF to 1000 pF (50 WVDC); 10^5 Megohms Min @ 25°C, 10^4 Megohms Min @ 125°C

LIFE TEST: 150% rated voltage for 2000 hours at 125°C as per MIL-STD-202C, method 208A (test condition F).

CHANGE IN CAPACITANCE: At 25°C; ±0.02% or 0.02 pF, whichever is greater.

QUALITY FACTOR: greater than 10,000 at frequency of 1 MHz.

INSULATION RESISTANCE: See table above; no degradation. Standard frequency measurements, 1 MHz, unless otherwise noted.

MECHANICAL CHARACTERISTICS:

HERMETICITY: The porcelain dielectric is non-porous and impervious to moisture and commonly used cleaning solvents.

TERMINATION STYLES: available in Case A as chips and pellets; Case B units as chips, pellets, and leaded devices.

TERMINAL STRENGTH: Microstrip, Axial Ribbon, and Radial Ribbon leaded capacitors withstand a lead pull of 5 lbs. for 5 seconds in the axis of the lead per MIL-STD-202, method 211.

OUTLINE DIMENSIONS: See Mechanical Configurations on page 1167.

MARKING: All ATC Case A and Case B capacitors may be laser marked with manufacturer's identification, capacity and tolerance code.

ENVIRONMENTAL CHARACTERISTICS:

MILITARY SPECIFICATIONS: All ATC 100 capacitors are capable of meeting MIL-C-11272C (QPL) and MIL-C-55681. (Independent lab test data available.)

TEMPERATURE RANGE: From −55°C to +125°C (no derating of working voltage); above 125°C, derate linearly to 50% DCWV @ 200°C.

ATC 100 porcelain capacitors are designed and manufactured to meet or exceed the requirements of MIL-C-11272C, according to the methods of MIL-STD-202. ATC 100 series capacitors are available in all CY80D styles. See QPL list of MIL-C-11272C:FSC-5910.

Barometric pressure	(method 105, cond. B)
Shock	(method 213, cond. J)
Vibration	(method 204, cond. B)
Temperature Cycling	(method 102, cond. C)
Immersion	(method 104, cond. B)
Moisture resistance	(method 106)
Solderability	(method 208)
Terminal Strength	(method 211)
Salt Spray	(method 101, cond. B)

ATC SW 100 BOILING SALT WATER TEST:

Thermal Shock and Hermeticity Test

PURPOSE: To provide a non-destructive simulation of the thermal shock and degradation caused by contaminant absorption experienced during normal circuit mounting and cleaning.

PROCEDURE: With plastic tweezers, drop capacitors into a boiling salt water solution. Remove after two hours, wash thoroughly (distilled water), then dry at 150°C for 10 minutes.

MEASURE: I.R., capacity, and Q shall be within published specifications.

Capacity Values

CASE A mini-cube®* capacitors are available only as chips and pellets from 0.1 pF through 100 pF in the values and tolerances listed below; working voltages 50 VDC.

CASE B MAXI-"Q"UBE®* capacitors are available in all values and tolerances at the working voltages shown in the table below. The Case B size may be ordered with a rating of 1000 WVDC, 0.1 pF to 47 pF, or with a rating of 100 WVDC, 680 pF to 1000 pF. To order, specify new WVDC in the ordering code.

CAP CODE	CAP (pF)	TOL	WVDC 125°C
0R1	0.1	B	500
0R2	0.2		
0R3	0.3	BC	500
0R4	0.4		
0R5	0.5	BCD	500
0R6	0.6		
0R7	0.7		
0R8	0.8		
0R9	0.9		
1R0	1.0		
1R1	1.1		
1R2	1.2		
1R3	1.3		
1R4	1.4		
1R5	1.5		
1R6	1.6		
1R7	1.7		
1R8	1.8		
1R9	1.9		
2R0	2.0		
2R1	2.1		
2R2	2.2		
2R4	2.4		
2R7	2.7		
3R0	3.0		
3R3	3.3		
3R6	3.6		
3R9	3.9		
4R3	4.3	BCD	500
4R7	4.7		
5R1	5.1		
5R6	5.6		
6R2	6.2		
6R8	6.8	BCJKM	500
7R5	7.5		
8R2	8.2		
9R1	9.1		
100	10	FGJKM	500
110	11		
120	12		
130	13		
150	15		
160	16		
180	18		
200	20		
220	22		
240	24		
270	27		
300	30		
330	33		
360	36		
390	39		
430	43		
470	47		
510	51		
560	56		
620	62		
680	68	FGJKM	500
750	75		
820	82		
910	91		
101	100		
111	110	FGJKM	300
121	120		
131	130		
151	150		
161	160		
181	180		
201	200		
221	220	FGJKM	200
241	240		
271	270		
301	300		
331	330		
361	360		
391	390		
431	430		
471	470		
511	510	FGJKM	100
561	560		
621	620		
681	680	FGJKM	50
751	750		
821	820		
911	910		
102	1000		

TOLERANCE CODE:

B = ±0.1 pF
C = ±0.25 pF
D = ±0.5 pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%
M = ±20%

*MAXI-"Q"UBE® and mini-cube® are registered trademarks of ATC.

ATC 175 ULTRA HIGH Q PORCELAIN CAPACITORS

ULTRA HIGH "Q's" UP TO 4X HIGHER THAN BEST INDUSTRY STANDARD (ATC 100).

MICROWAVE POWER, CURRENT, AND Q RATINGS SPECIFIED AT UHF/MICROWAVE FREQUENCIES FOR ALL CAPACITANCE VALUES. (CONTACT FACTORY.)

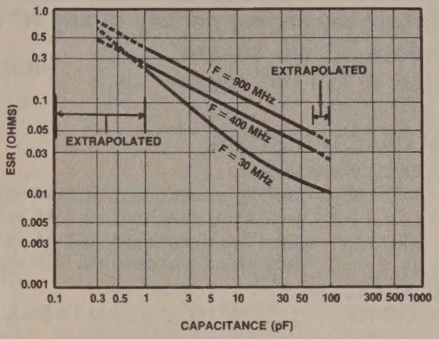
NO DERATING FOR OPERATION UP TO 175°C.

ATC 175 capacitors are designed for use with today's higher power, higher frequency transistors. The low loss ATC 175 capacitors reduce circuit loss by as much as a factor of 4, and permit reliable operation up to 175°C case temperature.

ATC 175 Series utilizes a unique internal construction* while retaining the ruggedness that is inherent in all ATC UHF/Microwave capacitors.

The ATC 175 power handling capability equals or exceeds the power capability of transistors presently available.

*** Patent Pending**



Specifications

ELECTRICAL CHARACTERISTICS:

CAPACITANCE VALUES AND TOLERANCES: Case B-standard values and tolerances from 1.0 pF to 100 pF. See table for standard ATC 175 Capacity Values.

WORKING VOLTAGE: See table of Capacity Values below.

QUALITY FACTOR: See curve entitled, "Equivalent Series Resistance (Ohms) versus Capacitance (pF)".

INSULATION RESISTANCE: 10^6 Megohms Min @ 25°C, 10^5 Megohms Min @ 175°C at rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE: +90 ±30 PPM/°C (−55°C to +175°C).

DIELECTRIC TEST VOLTAGE: 250% of WVDC rating for 5 secs.

RETRACE: Less than ±0.02% or 0.02 pF, whichever is greater.

AGING EFFECTS: None.

PIEZOELECTRIC EFFECTS: None (No capacitance variation with voltage or pressure).

CAPACITANCE DRIFT: ±0.02% or 0.02 pF, whichever is greater.

LIFE TEST:

150% rated voltage for 2000 hours at 175°C as per MIL-STD-202C, method 208A (test condition F).

CHANGE IN CAPACITANCE: At 25°C; less than 0.02% or 0.02 pF, whichever is greater.

QUALITY FACTOR: No degradation.

INSULATION RESISTANCE: No degradation.

Standard frequency of measurements, 1 MHz, unless otherwise noted.

MECHANICAL CHARACTERISTICS:

HERMETICITY: The porcelain dielectric is impervious to moisture and commonly used cleaning solvents.

TERMINATION STYLES: Available as chips, pellets, and microstrip leaded devices.

TERMINAL STRENGTH: Microstrip leaded capacitors withstand a lead pull of 5 lbs. for 5 seconds in the axis of the lead per MIL-STD-202, Method 211.

OUTLINE DIMENSIONS: See Mechanical Configurations on page 1167.

MARKING: All ATC 175 Capacitors are laser marked permanently with manufacturer's identification, capacity code, and tolerance code.

ENVIRONMENTAL CHARACTERISTICS:

MILITARY SPECIFICATIONS: All ATC 175 Series Capacitors meet MIL-C-11272C, MIL-C-55681, and MIL-C-23269.

TEMPERATURE RANGE: From −55°C to +175°C (NO DERATING OF WORKING VOLTAGE).

ATC 175 porcelain capacitors are designed and manufactured to exceed the following requirements of MIL-STD-202:

Barometric pressure	(method 105, cond. B)
Shock	(method 213, cond. J)
Vibration	(method 204, cond. B)
Temperature Cycling	(method 102, cond. C)
Immersion	(method 104, cond. B)
Moisture Resistance	(method 106)
Solderability	(method 208)
Terminal Strength	(method 211)
Salt Spray	(method 101, cond. B)

Capacity Values

CAP CODE	CAP (pF)	TOL	WVDC 175°C
1R0	1.0	BCD	500
1R1	1.1		
1R2	1.2		
1R3	1.3		
1R4	1.4		
1R5	1.5		
1R6	1.6		
1R7	1.7		
1R8	1.8		
1R9	1.9		
2R0	2.0		
2R1	2.1		
2R2	2.2		
2R4	2.4		
2R7	2.7		
3R0	3.0		
3R6	3.6		
3R9	3.9		

CAP CODE	CAP (pF)	TOL	WVDC 175°C
4R3	4.3	BCD	500
4R7	4.7		
5R1	5.1		
5R6	5.6		
6R2	6.2		
6R8	6.8	BCJKM	500
7R5	7.5		
8R2	8.2		
9R1	9.1		
100	10	FGJKM	500
110	11		
120	12		
130	13		
150	15		
160	16		
180	18		
200	20		

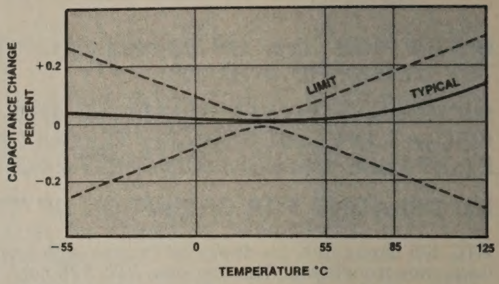
CAP CODE	CAP (pF)	TOL	WVDC 175°C
220	22	FGJKM	500
240	24		
270	27		
300	30		
330	33		
360	36		
390	39		
430	43		
470	47	FGJKM	300
510	51		
560	56		
620	62		
680	68	FGJKM	100
750	75		
820	82		
910	91		
101	100		

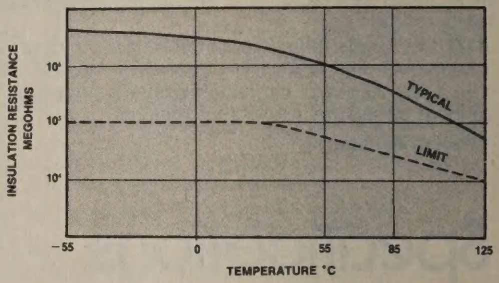
TOLERANCE CODE:

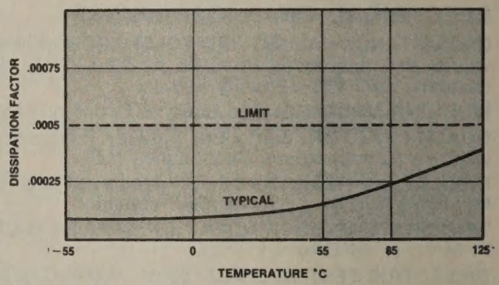
B = ±0.1 pF
C = ±0.25 pF
D = ±0.5 pF
F = ±1%
G = ±2%
J = ±5%
K = ±10%
M = ±20%

ATC 700/710 ULTRA STABLE CERAMIC CAPACITORS

T.C. =0 ±30 PPM/°C (−55°C to +125°C)
No capacitance change with voltage.
Highest packaging density of any NPO capacitors
Case A 55 mil square
Case B 110 mil square
(actual size)







CHARACTERISTICS:

CAPACITY VALUES:

ATC 700 — Case A, all standard RETMA values from 110 pF to 1000 pF.
Case B, all standard RETMA values from 220 pF to 5100 pF.

ATC 710 — Case A, all standard RETMA values from 0.1 pF to 100 pF.
Case B, all standard RETMA values from 0.1 pF to 200 pF.

TOLERANCES:

ATC 700 — F (±1%), G (±2%), J (±5%), K (±10%), and M (±20%).

ATC 710 — B (±0.1 pF), C (±0.25 pF), D (±0.5 pF), F (±1%), G (±2%), J (±5%), K (±10%), and M (±20%).

WORKING VOLTAGE: See table of Capacity Values below.

TEMPERATURE COEFFICIENT OF CAPACITANCE: 0 ±30 PPM/°C (−55°C to +125°C).

DISSIPATION FACTOR: 0.0005 max @ 1 KHz except 0.001 for Case A > 470 pF.

INSULATION RESISTANCE: 10^6 Megohms min @ 25°C; 10^5 Megohms min @ 125°C.

DIELECTRIC TEST VOLTAGE: 300% rated voltage for 5 seconds.

OPERATING TEMPERATURE RANGE: −55°C to +125°C.

MILITARY SPECIFICATIONS: ATC 700/710 capacitors meet applicable portions of MIL-C-55681.

TERMINATION STYLES: Available in Case A as chips and pellets; Case B units as chip, pellets and leaded devices.

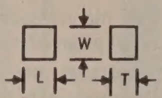
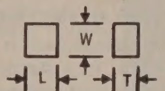
OUTLINE DIMENSIONS: See Mechanical Configurations on page 1167.

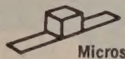
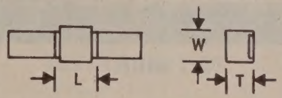
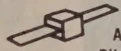
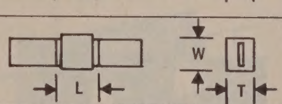
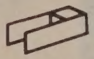
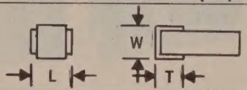
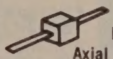
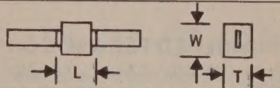
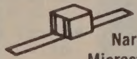
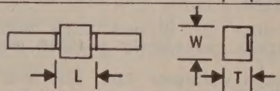
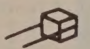
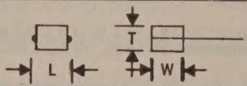
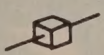
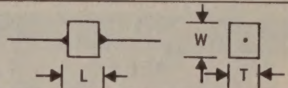
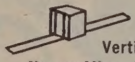
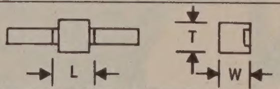
MARKING: All ATC 700/710 Case A and Case B capacitors may be marked with manufacturer's identification, capacity and tolerance code.

Capacity Values

SERIES	CAP CODE	CAP (pF)	TOL	WVDC 125°C CASE A	WVDC 125°C CASE B
710	0R1	0.1	B	50	500
	0R2	0.2			
710	0R3	0.3	BC	50	500
	0R4	0.4			
710	0R5	0.5	BCD	50	500
	0R6	0.6			
	0R7	0.7			
	0R8	0.8			
	0R9	0.9			
	1R0	1.0			
	1R1	1.1			
	1R2	1.2			
	1R3	1.3			
	1R4	1.4			
	1R5	1.5			
	1R6	1.6			
	1R7	1.7			
	1R8	1.8			
	1R9	1.9			
	2R0	2.0			
	2R1	2.1			
	2R2	2.2			
	2R4	2.4			
	2R7	2.7			
	3R0	3.0			
	3R3	3.3			
	3R6	3.6			
	3R9	3.9			
	4R3	4.3			
	4R7	4.7			
	5R1	5.1			
	5R6	5.6			
	6R2	6.2			
710	6R8	6.8	BCJKM	50	500
	7R5	7.5			
	8R2	8.2			
	9R1	9.1			
710	100	10	FGJKM	50	500
	110	11			
	120	12			
	130	13			
	150	15			
	160	16			
	180	18			
	200	20			
	220	22			
	240	24			
	270	27			
	300	30			
	330	33			
	360	36			
	390	39			
	430	43			
	470	47			
	510	51			
	560	56			
	620	62			
	680	68			
	750	75			
	820	82			
	910	91			
710	101	100	FGJKM	50	500
700	111	110		50	—
710	111	110		—	300
700	121	120		50	—
710	121	120		—	300
700	131	130		50	—
710	131	130		—	300
700	151	150		50	—
710	151	150		—	300
700	161	160		50	—
710	161	160		—	300
700	181	180		50	—
710	181	180		—	300
700	201	200	FGJKM	50	—
710	201	200		—	300
700	221	220	FGJKM	50	200
	241	240			
	271	270			
	301	300			
	331	330			
	361	360			
	391	390			
	431	430			
	471	470			
700	511	510	FGJKM	50	100
	561	560			
	621	620			
700	681	680	FGJKM	50	50
	751	750		50	
	821	820		50	
	911	910		50	
	102	1000		50	
	112	1100		—	
	122	1200		—	
	132	1300		—	
	152	1500		—	
	162	1600		—	
	182	1800		—	
	202	2000		—	
	222	2200		—	
	242	2400		—	
	272	2700		—	
	302	3000		—	
	332	3300		—	
	362	3600		—	
	392	3900		—	
	432	4300		—	
	472	4700		—	
	502	5000		—	
	512	5100			

MECHANICAL CONFIGURATIONS

ATC SERIES	ATC CODE	100 SERIES		CASE SIZE	STYLE	OUTLINE AND TERMINATION MATERIAL	BODY DIMENSIONS		
		MIL-C-11272C	MIL-C-55681 TYPE				LENGTH	WIDTH	THICKNESS
100 700 710	C	CY81	CDR 11	A	Chip	barrier/Cap™  W/T IS A TERMINATION SURFACE	±0.010 in. (1.4 ±0.25mm)		0.055 in. max. (1.4mm max.)
100 175 700 710	C	CY83	CDR 13	B	Chip		0.110 ±0.015 in. (2.79 ±0.38mm)		0.100 in. max. (2.54mm max.)
100 700 710	P	CY82	CDR 12	A	Pellet	SOLDER COATED CHIPS (372°F, 179°C)  W/T IS A TERMINATION SURFACE	0.055 ±0.010 in. (1.4 ±0.25mm)	0.055 ±0.010 in. (1.4 ±0.25mm)	0.055 in. max. (1.4mm max.)
100 175 700 710	P	CY84	CDR 14	B	Pellet		0.110 ±0.020 in. (2.79 ±3.0mm)	0.110 ±0.015 in. (2.79 ±0.38mm)	0.100 in. max. (2.54mm max.)

ATC SERIES	ATC CODE	100 SERIES		CASE SIZE	LEAD STYLE	BODY DIMENSIONS			LEAD DIMENSIONS		
		MIL-C-11272C	MIL-C-55681 TYPE			WIDTH (W) 0.110 ±0.015 in. (2.79 ±0.38mm)	THICKNESS (T) 0.100 in. max. (2.54mm max.)	LENGTH (L) 0.120 in. min. (3.05mm min.)	LENGTH	WIDTH	THICKNESS
100 175 700 710	MS	CY85	CDR 21		 Microstrip			0.150 in. max. (3.81mm max.)	0.250 in. min. (6.35mm min.)	0.093 ±0.005 in. (2.36 ±0.13mm)	0.004 ±0.001 in. (0.102 ±0.025mm)
100 700 710	AR	CY86	CDR 22		 Axial Ribbon						
100 700 710	RR	CY88	CDR 24		 Radial Ribbon						
100 700 710	NAR				 Narrow Axial Ribbon			0.155 in. max. (3.94mm max.)	0.250 in. min. (6.35mm min.)	0.050 ±0.005 in. (1.27 ±0.13mm)	0.006 ±0.003 in. (0.153 ±0.076mm)
100 700 710	NMS				 Narrow Microstrip						
100 700 710	RW	CY87	CDR 23		 Radial Wire			0.150 in. max. (3.81mm max.)	0.500 in. min. (12.7mm min.)	#26 AWG, nom. 0.016 in. dia. (nom. 0.375mm dia.)	
100 700 710	AW	CY89	CDR 25		 Axial Wire						
100	VNMS*				 Vertical Narrow Microstrip						

*VNMS improves the resonant frequency performance over that of the standard Microstrip. The first important resonance is approximately twice as high in frequency as with "flat" mounting (NMS). Note that in this configuration, the marking is now on a vertical surface. For details, contact factory.

Silver leads are attached with high temperature solder.

LASER MARKED CAPACITORS with manufacturer's identification, capacity and tolerance code are available for any case size (including chips and pellets). To order, add suffix (X) to code.

Other solders may be applied to pellets on special order. Contact factory with specific requirements.

THE RF CAPACITOR HANDBOOK
american technical ceramics

THE RF CAPACITOR HANDBOOK presents over 250 pages of comprehensive detail for design considerations and uses for miniature chip and leaded RF capacitors. You'll find theoretical and empirical high-frequency circuit design equations, characteristics of capactor dielectrics, especially at high RF power levels and frequencies, actual test data at frequencies from 100 MHz to 3 GHz, and practical design methods for increasing gain and power, DC to RF conversion efficiency, bandwidth, transistor lifetime, circuit MTBF, and low-noise performance. Get your copy of The RF Capacitor Handbook from American Technical Ceramics, One Norden Lane, Huntington Station, New York 11746.

ATC PART NUMBER CODE:

ATC 100 B 910 F AW 500 X

Series
Case Size
Capacitance
Indicates number of zeros following digits of capacitance in picofarads
Capacitance Tolerances
Termination
WVDC
Laser Marking

barrier/Cap™ is a proprietary trademark of American Technical Ceramics.

ATC has made every effort to have this information as accurate as possible. However, no responsibility is assumed by ATC for its use, nor for any infringements of rights of third parties which may result from its use. ATC reserves the right to revise the content or modify its product line without prior notice.

CAPACITORS

INTRODUCTION

The products listed in this catalog briefly describe the extensive line of high quality capacitors and connectors available through Arco Electronics.

All products offered are designed and manufactured to standards which have proven to be of the highest quality to meet and surpass the rigid demands of all areas of the electronic industry.

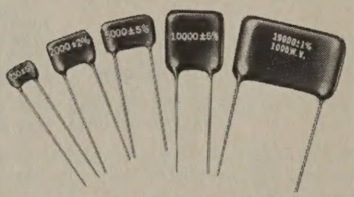
The wide variety of styles, values, voltages, and tolerances offer the electronic design engineer a vast amount of flexibility in the selection of proper components to meet his design parameters. All Arco products are designed to be compatible and interchangeable with competitive devices.

For the past 40 years, Arco's name on products has instilled customer confidence in these products and ease of availability and competent support has been achieved by adequately stocked warehouses on both the East and West coasts as well as an international network of stocking distributors.

The new corporate headquarters are maintained in the expanded Arco subsidiary, Automatic Connector, Inc. at 400 Moreland Road, Commack, N.Y. 11725. It is Arco's continuous goal to provide our customers with reliable products, technical support, and timely deliveries. All products are priced competitively and can be used in every conceivable electronic equipment applications such as military, industrial, consumer communications, computer, automotive, entertainment, etc.

CONNECTOR PRODUCTS ARE LISTED UNDER AUTOMATIC CONNECTOR INC. AND PRECISION CAPACITORS ARE SHOWN UNDER PFC LISTING.

MICA

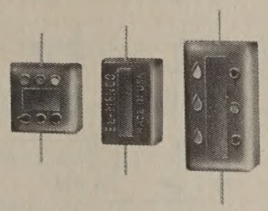


DIPPED PER MIL-C-5D

- Types DM5; DM10; DM15; DM19; DM20; DM30; DM42; DM43, or CM04; CM05; CM06; CM07; CM08;
- Rated voltages: 50, 100, 300 and 500 VDCW plus high voltage types up to 2500 VDCW.
- Capacitance: 1pf to 100,000 pf with tolerances of ±5%, ±2%, ±1%, ±0.5%.
- Available in standard (4CR) units or single coat (SCDM or 1CR) types.

Request Bulletin: Dipped Mica

MICA

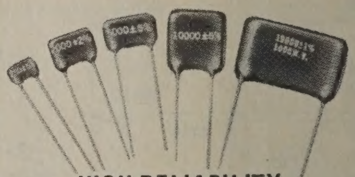


MOLDED PER MIL-C-5

- Types CM15; CM20; CM30; and CM35.
- Similar to dipped Mica features except completely molded design.
- Rated voltages: 100, 300 and 500 VDCW
- Capacitance: 1pf to 15,000 pf with tolerances of ±5%, ±2%, ±1%.

Request Bulletin: Molded Mica

MICA

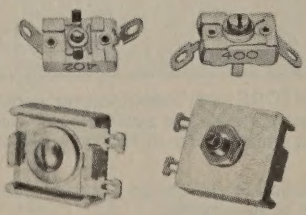


HIGH RELIABILITY PER MIL-C-39001A

- Designed to meet the most critical design requirements.
- Similar to dipped Mica types except designed for reliability levels from L (2%); M (1%); P (0.1%); and R (0.01%) per 1000 hours.
- Types CMR03; 04; 05, 06; 07; and 08.
- Rated voltages: 100, 300, and 500 VDCW.
- Temperature Ranges:
  O = —55°C to +125°C
  P = —55°C to +150°C

Request Bulletin: CMR Mica

MICA

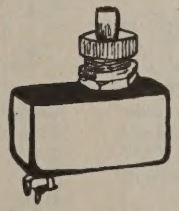


VARIABLE TRIMMERS & PADDERS

- Miniature steatite variable Mica capacitors ideal for stable circuits and communications equipment.
- Capacitances: Up to 3055 pf.
- Voltages: 175 VDCW to 500 VDCW with flash tests to 1000 VDC.
- Special assemblies available (brackets, shafts, solder lug and P.C. types).

Request Bulletin: Trimmer/Padders

MICA

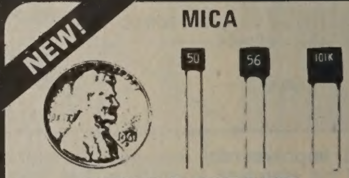


HERMETICALLY SEALED VARIABLE COMPRESSION

- Designed to protect against the effect of moisture, fungus and pressure, small compact size.
- Temperature range: —55°C to +85°C.
- Voltages: Either 250 or 500 VDCW.
- Flash voltage to 1000 VDC.
- Capacitances: 15 pf to 3055 pf.

Request Bulletin: Type HE

MICA



SINGLE PLATE TYPE

Unique new low cost design ideally suited for IF amplification and high frequency circuits, and can be used for bypass and coupling applications to replace some Film and Ceramic capacitors.

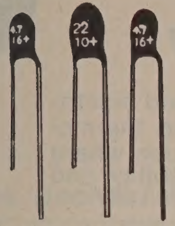
- High-Q rating.
- Voltages available: 50 VDCW or 500 VDCW.
- Capacitance range: 5 pf to 750 pf.
- Controlled temperature coefficients.
- Operating temperature: —30°C to +85°C.
- Miniature size.

Request Bulletin: VFM-FM

ELECTRONIC COMPONENTS FOR INDUSTRY SOLD NATIONALLY THROUGH Arco DISTRIBUTORS

CAPACITORS

DIPPED TANTALUM

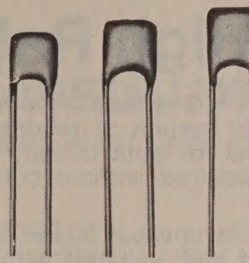


Highly stable miniature units. Low cost suitable for applications in transistorized commercial entertainment automotive, and industrial electronic equipment.

- Capacitance: 0.1 to 470 mfd.
- Tolerances: ±20% or ±10%.
- Temperature Range: —55°C to +85°C.
- Voltage Range: 3 to 50 VDCW.
- Epoxy dipped design.

Request Bulletin: Type ART

MONOLITHIC CERAMICS

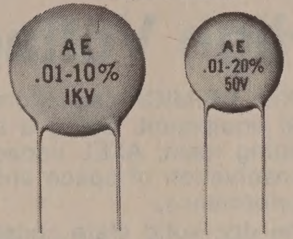


Miniature size for circuits where stability and size are prime importance.

- Voltages: 50 and 100 VDCW.
- Styles: General purpose, NPO, and 15% T.C. Stable.
- Capacitance Range: 2.7 pf thru 4.7 mfd.
- Dipped durez construction for moisture resistance and durability.

Request Bulletin: Monolithics

CERAMIC DISCS

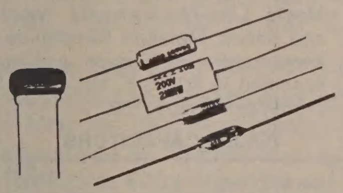


General purpose design for low cost and wide selection of values and voltages for by-pass and coupling applications in IF and RF circuits.

- Voltage ranges: 25, 50, 100, 1000 VDCW.
- Tolerances: ±10%, ±20%, +80%—20%, GMV.
- Capacitance Range: 3.3 pf to 100,000 pf.
- Designed to EIA temperature characteristics.

Request Bulletin: Ceramics

POLYESTER (MYLAR®) FILM AND METALIZED FILM



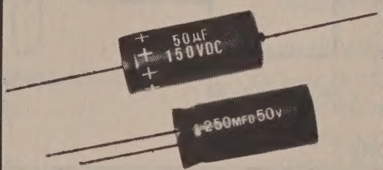
ARCO's wide variety of general purpose film type capacitors consists of:

- Dipped polyester (Mylar®) and Mylar paper types in 100, 200, 400, 600 and 1600 VDC.
- Wrap and fill types 100 to 600 VDC.
- Metalized and Subminiature polypropylene and Mylar polyester types.

®—Trademark E.I. DuPont.

Request Bulletin: General Purpose Film

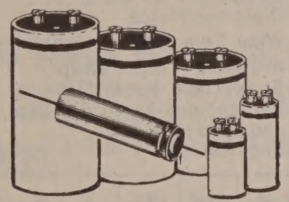
ELECTROLYTICS



- Axial and radial lead miniature designs with proven dependability.
- For use in entertainment or industrial equipment with either transistor or electron tube circuitry.
- Use in filtering, coupling or by-pass applications.
- Available in 6 to 350 VDC.
- Capacitances from 1 mfd to 10,000 mfd

Request Bulletin: Type ME and RME

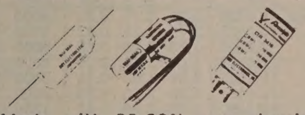
ELECTROLYTICS



- Computer grade capacitors are available in tubular and vertical designs.
- Low ESR, and low leakage currents.
- Long shelf life.
- Designed with pressure-type safety vents.
- Welded terminals on tubular types.
- Large selection of voltages and capacitance ranges.

Request Bulletin: Type ARC and 39A

ARCOLYTIC CAPACITORS
Tubular & Twist Mount Electrolytics



- Made with 99.99% pure aluminum foil.
- Designed for high temperature operation: 85°C. Sealed in aluminum cans.
- Suitable to withstand high surge voltages and ripple currents.
- Built and tested to meet EIA specification RS-154.
- Greater shelf, operating life and dependable performance in TV, Radio and Hi-Fi applications, in single and multiple section units.
- Construction, either hermetically sealed aluminum tube with insulating cardboard sleeves, or double insulated wax filled cardboard tubes. Supplied on tubular units only.

**Request Bulletin:
Type CTM, CTA, Blu-Seals**

A subsidiary of **ASU** *Industries, Inc.*

Arco

ELECTRONICS, INC.

400 Moreland Road, Commack, New York 11725
Tel. (516) 864-7000 • Twx 510-226-0241

9822 Independence Avenue, Chatsworth, Calif. 91311
Tel. (213) 882-8707 • Twx 910-494-1919

DRIMICA CAPACITORS

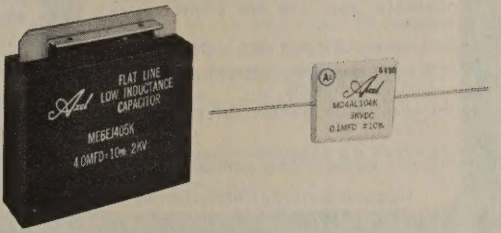
High Voltage & High Reliability

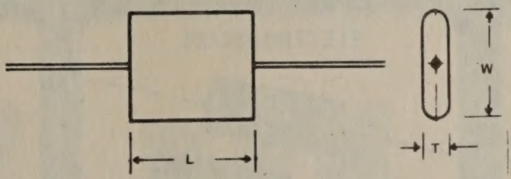
AXEL DRIMICA capacitors are used in high voltage circuits of electronic and electrical equipment. Using a solid dielectric system of reconstituted mica and thermosetting resin, AXEL capacitors are ideal for both military and industrial use where conservation of space and weight is required without compromising reliability and performance.

The dry, solid state construction permits unusual shape factors and extremely low self inductance not usually available at high voltages with oil-filled units.

Features

- High Energy Densities
- High Corona Resistance
- Low Capacitance Change with Temperature and Frequency
- High Radiation Resistance
- Dry Solid State Package — No Leaks
- No Cumbersome High Voltage Bushings
- Compatible for use in Dielectric Fluids
- Wide Temperature Capability
- Available in Mylar Wrap, Epoxy Case, Epoxy Flat Rectangular, Epoxy Flat Disc, and Epoxy Molded Enclosures





Applications

- High Voltage DC
- Low Inductance Energy Discharge
- Pulse Forming Networks
- DC Filtering
- By-Pass
- Coupling-Blocking
- Arc Suppression
- Power Factor Correction

Meets Life requirements, Vibration and Shock, Moisture Resistance and Temperature Immersion cycling as specified in MIL-C-5, MIL-C-25, MIL-C-19978, MIL-N-23182.

DC CAPACITORS

PART NO.	WVDC	MFD	L	W	T
MD4AG254K	**1000**	0.25	2.12	1.82	0.19
MD4AG504K		0.50	2.12	1.82	0.37
MD4AG105K		1.0	2.12	1.82	0.72
MD4AG205K		2.0	2.12	1.82	1.42
MD4AG405K		4.0	3.25	2.07	1.45
MD4AG605K		6.0	3.25	2.07	2.16
MD4AG805K		8.0	3.25	2.07	2.87
MD4AG106K		10.0	3.25	2.07	3.58
MD4AJ104K	**2000**	0.10	2.12	1.40	0.18
MD4AJ254K		0.25	2.12	1.94	0.28
MD4AJ504K		0.50	2.12	1.94	0.53
MD4AJ105K		1.0	2.12	1.94	1.04
MD4AJ205K		2.0	3.25	2.90	0.78
MD4AJ405K		4.0	3.25	2.90	1.54
MD4AJ605K		6.0	3.25	2.90	2.29
MD4AL103K	**3000**	0.010	1.62	0.59	0.13
MD4AL253K		0.025	1.62	0.88	0.19
MD4AL503K		0.050	1.62	0.88	0.38
MD4AL104K		0.10	2.12	1.50	0.24
MD4AL254K		0.25	2.12	2.125	0.42
MD4AL504K		0.50	2.12	2.125	0.83
MD4AL105K		1.0	3.25	2.57	0.75
MD4AL205K		2.0	3.25	2.57	1.48
MD4AL405K		4.0	4.38	2.35	2.23
MD4AM103K	**4000**	0.010	1.62	0.68	0.22
MD4AM253K		0.025	1.62	1.02	0.31
MD4AM503K		0.050	1.62	1.02	0.62
MD4AM104K		0.10	2.12	2.03	0.35
MD4AM254K		0.25	2.12	2.50	0.69
MD4AM504K		0.50	2.12	2.50	1.34
MD4AM105K		1.0	4.38	2.28	1.05
MD4AM205K		2.0	4.38	2.28	2.07
MD4AN103K	**5000**	0.01	2.12	1.25	0.11
MD4AN253K		0.025	2.12	1.44	0.19
MD4AN503K		0.05	2.12	1.93	0.28
MD4AN104K		0.10	2.12	1.93	0.53
MD4AN254K		0.25	3.25	2.30	0.56
MD4AN504K		0.50	3.25	2.30	1.10
MD4AN105K		1.0	3.25	2.30	2.15
MD4AP103K	**6000**	0.01	2.25	1.03	0.17
MD4AP253K		0.025	3.25	1.44	0.19
MD4AP503K		0.05	3.25	1.90	0.26
MD4AP104K		0.10	3.25	1.90	0.48
MD4AP254K		0.25	4.38	2.38	0.62
MD4AP504K		0.50	4.38	2.38	1.21
MD4AP105K		1.0	4.38	2.38	2.39
MD4AR103K	**7500**	0.010	3.75	1.06	0.19
MD4AR253K		0.025	4.38	1.82	0.20
MD4AR503K		0.05	4.38	1.82	0.37
MD4AR104K		0.10	4.38	1.82	0.70
MD4AR254K		0.25	4.38	2.81	0.94
MD4AR504K		0.50	4.38	2.81	1.85
MD4AS103K	**10,000**	0.010	3.62	1.36	0.31
MD4AS253K		0.025	3.62	1.84	0.45
MD4AS503K		0.050	3.62	1.84	0.82
MD4AS104K		0.10	3.62	2.31	1.15
MD4AS254K		0.25	3.62	3.66	1.82
MD4AT502K	**12,500**	0.005	2.50	1.13	0.40
MD4AT103K		0.010	2.50	1.13	0.81
MD4AT253K		0.025	3.62	1.80	0.56
MD4AT503K		0.050	3.62	1.80	1.02
MD4AT104K		0.10	4.38	2.12	1.22
MD4AT254K		0.25	4.62	3.18	1.83
MD4AW252K	**15,000**	0.0025	3.62	0.56	0.41
MD4AW502K		0.0050	3.62	0.56	0.73
MD4AW103K		0.010	3.62	1.40	0.56
MD4AW253K		0.025	3.62	1.90	0.80
MD4AW503K		0.050	3.62	1.90	1.50
MD4AW104K		0.10	3.62	1.90	2.83
MD4AX252K	**20,000**	0.0025	3.62	0.71	0.56
MD4AX502K		0.0050	3.62	0.97	0.74
MD4AX103K		0.010	3.62	1.38	0.91
MD4AX253K		0.025	4.62	1.85	1.07
MD4AX503K		0.050	4.62	1.85	2.00

PULSE CAPACITORS

PART NO.	WVPK	MFD	L	W	T	MAX PRF†	MAX Ip**
MP4AF503K	**600**	0.05	1.88	0.68	0.25	5000	500
MP4AF104K		0.10	1.88	1.00	0.34	5000	350
MP4AF254K		0.25	2.38	1.62	0.34	5000	225
MP4AF504K		0.50	3.38	1.88	0.41	5000	150
MP4AF105K		1.0	3.38	1.88	0.81	3500	135
MP4AF205K		2.0	3.38	1.88	1.61	2300	115
MP4AG103K	**1000**	0.01	2.00	0.53	0.08	5000	700
MP4AG503K		0.05	2.00	0.72	0.25	5000	310
MP4AG104K		0.10	2.00	0.88	0.38	4000	250
MP4AG254K		0.25	2.00	1.43	0.53	2500	200
MP4AG504K		0.50	2.00	1.43	1.03	1500	180
MP4AG105K		1.0	4.00	2.25	0.71	1250	140
MP4AG205K		2.0	4.50	2.75	0.86	1000	110
MP4AL501K	**3000**	0.0005	1.25	0.62	0.15	5000	35
MP4AL102K		0.0010	1.25	0.62	0.15	5000	50
MP4AL152K		0.0015	1.50	0.62	0.15	5000	60
MP4AL252K		0.0025	1.75	0.62	0.18	5000	60
MP4AL502K		0.005	2.00	0.68	0.22	3300	65
MP4AL103K		0.010	2.00	0.68	0.44	2500	75
MP4AL253K		0.025	2.00	1.87	0.58	1500	75
MP4AL503K		0.05	2.50	2.25	0.60	1250	75
MP4AL104K		0.10	4.00	2.25	0.60	1000	75
MP4AL254K		0.25	4.50	2.75	1.00	1000	75
MP4AN501K	**5000**	0.0005	1.25	0.75	0.31	5000	25
MP4AN102K		0.0010	1.25	1.18	0.31	5000	25
MP4AN152K		0.0015	1.50	1.12	0.28	5000	35
MP4AN252K		0.0025	2.00	1.12	0.28	4000	50
MP4AN502K		0.005	2.50	1.50	0.31	3500	60
MP4AN103K		0.010	3.00	2.00	0.25	2500	70
MP4AN253K		0.025	3.00	2.25	0.62	1500	70
MP4AN503K		0.05	4.00	2.25	0.83	1250	70
MP4AN104K		0.10	4.50	2.75	1.10	1000	70
MP4AS501K	**10,000**	0.0005	1.31	1.31	0.62	5000	35
MP4AS102K		0.0010	1.50	1.50	0.62	3500	55
MP4AS152K		0.0015	1.75	1.75	0.62	3000	75
MP4AS252K		0.0025	2.00	1.75	0.62	2000	95
MP4AS502K		0.005	3.50	1.75	0.62	2000	100
MP4AS103K		0.010	4.00	2.12	0.75	1500	100
MP4AS253K		0.025	4.50	2.75	1.25	1000	100
MP4AW501K	**15,000**	0.0005	2.00	1.38	0.56	4000	125
MP4AW102K		0.0010	2.00	1.75	0.70	2000	125
MP4AW152K		0.0015	2.00	1.88	0.88	2000	125
MP4AW252K		0.0025	2.50	2.25	0.75	1500	170
MP4AW502K		0.005	4.00	2.25	0.75	1250	250
MP4AW103K		0.010	4.50	2.75	1.00	1000	250

† in Pulses/sec. based upon operation in still air at 25°C ambient. For higher ambients average power must be reduced accordingly or forced cooling employed.

** in Amperes

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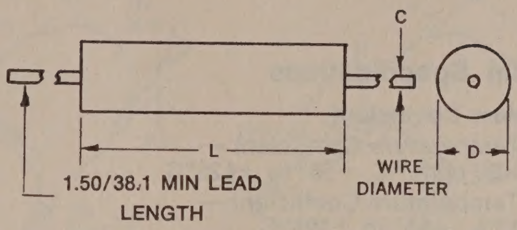
AVX: The Insiders.

GlasGuard®

Glass Cased, Axial Lead Capacitors

Dimensions (Inches/Millimeters)

Style	L Max.	Dia. Max.	Wire Dia. Nom.
GC10	.170/4.32	.100/2.54	.020/.508
GC70	.260/6.60	.100/2.54	.020/.508



Electrical Specifications

Temperature Coefficient

COG: A Temperature Coefficient — 0 ±30 ppm/°C, −55° to +125°C

X7R: C Temperature Coefficient — ±15%, −55° to +125°C

Z5U: E Temperature Coefficient — +22, −56%, +10° to +85°C

Capacitance Test 25°C (MIL-STD-202 Method 305)

COG: Measured at 1 VRMS max at 1KHz (1MHz for 1000 pf or less)

X7R: Measured at 1 VRMS max at 1KHz (1MHz for 100 pf or less)

Z5U : Measured at .5 VRMS max at 1KHz

Dissipation Factor 25°C

COG: .15% max at 1KHz, 1 VRMS max (1MHz for 1000 pf or less)

X7R: 2.5% max at 1KHz, 1 VRMS max (1MHz for 100 pf or less)

Z5U: 3.0% max at 1KHz, .5 VRMS max

Moisture Resistance (MIL-STD-202 Method 106)

COG, X7R, Z5U: Ten cycles with no voltage applied

Insulation Resistance 25°C (MIL-STD-202 Method 302)

COG and X7R: 100K megohms or 1000 megohms-mfd whichever is less

Z5U: 10K megohms or 500 megohms-mfd whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)

COG and X7R: 300% rated voltage for 5 seconds with 50 ma. max charging current

Z5U: 200% rated voltage for 5 seconds with 50 ma. max charging current

Life Test (1000 hrs)

COG and X7R: 200% rated voltage at +125°C

Z5U: 150% rated voltage at +85°C

Temperature Cycling (MIL-STD-202 Method 102, condition D at rated elevated temperature)

COG and X7R: −55° to +125°C

Z5U: −55° to +85°C

Immersion Cycling (MIL-STD-202 Method 104, condition A)

Capacitance Range in pf

	CHAR. A		CHAR. C		CHAR. E	
AVX Style	100 VDC	50 VDC	100 VDC	50 VDC	100 VDC	50 VDC
GC10	10 to 270	10 to 470	560 to 2700	560 to 10,000	3300 to 6800	5600 to 18,000
GC70	22 to 680	22 to 1000	1000 to 10,000	1000 to 33,000	5600 to 15,000	10,000 to 100,000

AVAILABLE CAPACITANCE TOLERANCES

J = ±5% (A, C)
K = ±10% (A, C)
M = ±20% (A, C, E)
Z = +80 −20% (E)
P = GMV (E)

How to Order

GC70 1 C 10 3 K

- K — Capacitance Tolerance Code
- 3 — Multiplier (Number of Zeros)
- 10 — Significant Figures of Capacitance
- C — Temperature Characteristic
- 1 — Voltage: 1 = 100 V; 5 = 50 V
- GC70 — Style

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AVX: The Insiders.

SKYCAP®

Dipped Monolithic, Radial Lead Capacitors

Electrical Specifications

Temperature Coefficient

COG: A Temperature Coefficient —
0 ±30 ppm/°C, −55° to +125°C

X7R: C Temperature Coefficient —
±15%, −55° to +125°C

Z5U: E Temperature Coefficient —
+22, −56%, +10° to +85°C

Capacitance Test 25°C (MIL-STD-202 Method 305)

COG: Measured at 1 VRMS max at 1KHz
(1MHz for 1000 pf or less)

X7R: Measured at 1 VRMS max at 1KHz
(1MHz for 100 pf or less)

Z5U : Measured at .5 VRMS max at 1KHz

Dissipation Factor 25°C

COG: .15% max at 1KHz, 1 VRMS max
(1MHz for 1000 pf or less)

X7R: 2.5% max at 1KHz, 1 VRMS max
(1MHz for 100 pf or less)

Z5U: 3.0% max at 1KHz, .5 VRMS max

Moisture Resistance (MIL-STD-202 Method 106)

COG, X7R, Z5U: Ten cycles with no voltage applied

Insulation Resistance 25°C
(MIL-STD-202 Method 302)

COG and X7R: 100K megohms or 1000 megohms-mfd whichever is less

Z5U: 10K megohms or 500 megohms-mfd whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)

COG and X7R: 300% rated voltage for 5 seconds with 50 ma. max charging current

Z5U: 200% rated voltage for 5 seconds with 50 ma. max charging current

Life Test (1000 hrs)

COG and X7R: 200% rated voltage at +125°C

Z5U: 150% rated voltage at +85°C

Temperature Cycling (MIL-STD-202 Method 102, condition D at rated elevated temperature)

COG and X7R: −55° to +125°C

Z5U: −55° to +85°C

Immersion Cycling (MIL-STD-202 Method 104, condition A)

Capacitance Range in pf

AVX Style	CHAR. A		CHAR. C		CHAR. E	
	100 VDC	50 VDC	100 VDC	50 VDC	100 VDC	50 VDC
3418	4.7 to 330	4.7 to 560	100 to 5600	100 to 15,000	1000 to 8200	1000 to 27,000
3429	180 to 3300	180 to 6800	3900 to 68,000	3900 to 100,000	5600 to 100,000	5600 to 330,000
3430	3300 to 18,000	3300 to 27,000	56,000 to 270,000	56,000 to 680,000	100,000 to 470,000	100,000 to 1.0 mfd
3431	18,000 to 39,000	18,000 to 68,000	180,000 to 470,000	180,000 to 1.0 mfd	330,000 to 1.0 mfd	330,000 to 2.2 mfd
3432	4700 to 68,000	4700 to 100,000	330,000 to 680,000	330,000 to 2.2 mfd	1.0 mfd to 2.2 mfd	1.0 mfd to 4.7 mfd
3439	180 to 3300	180 to 6800	3900 to 68,000	3900 to 100,000	5600 to 100,000	5600 to 330,000
3440	3300 to 18,000	3300 to 22,000	56,000 to 270,000	56,000 to 680,000	100,000 to 470,000	100,000 to 1.0 mfd

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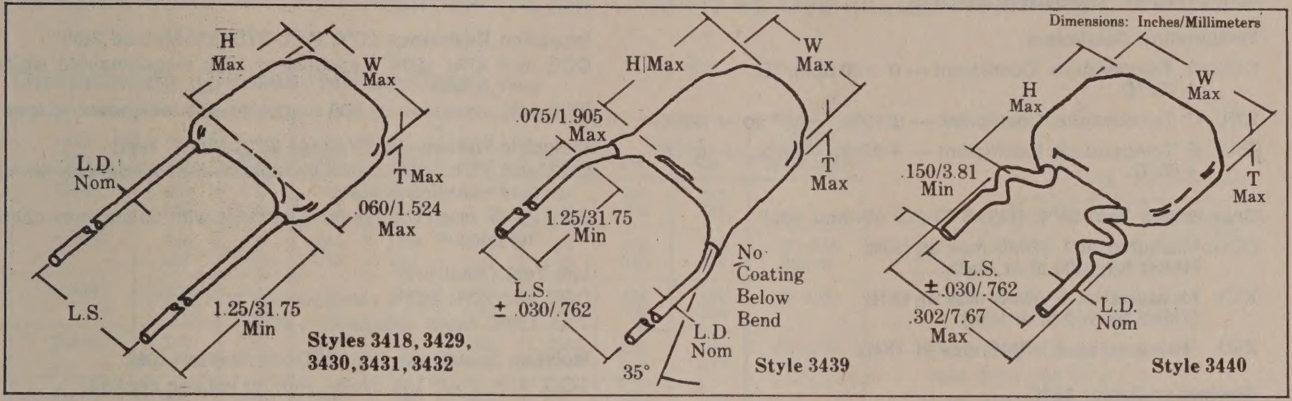
SKYCAP®


Dimensions: Inches/Millimeters
H Max
W Max
T Max
L.D. Nom
.060/1.524 Max
L.S.
1.25/31.75 Min
Styles 3418, 3429, 3430, 3431, 3432
H Max
W Max
T Max
.075/1.905 Max
1.25/31.75 Min
L.S. ± .030/.762
No Coating Below Bend
L.D. Nom
35°
Style 3439
H Max
W Max
T Max
.150/3.81 Min
L.S. ±.030/.762
.302/7.67 Max
L.D. Nom
Style 3440

Dimensions (Inches/Millimeters)

AVX Style	3418	3429	3430	3431	3432	3439	3440
Width	.150 3.81	.200 5.08	.300 7.62	.400 10.16	.500 12.70	.200 5.08	.390 9.906
Height	.150 3.81	.200 5.08	.300 7.62	.400 10.16	.500 12.70	.200 5.08	.400 10.16
Thickness	.100 2.54	.125 3.175	.150 3.81	.150 3.81	.200 5.08	.125 3.175	.160 4.064
Lead Spacing	.100 2.54	.100 2.54	.200 5.08	.200 5.08	.400 10.16	.200 5.08	.250 .635
Lead Diameter	.020 .508	.020 .508	.020 .508	.020 .508	.025 .635	.020 .508	.020 .508

AVAILABLE CAPACITANCE TOLERANCES

D = ±.5 pf (A) Below 10 pf
J = ±5% (A, C)
K = ±10% (A, C)
M = ±20% (A, C, E)
Z = +80 −20% (E)
P = GMV (E)

How to Order

3429 050 E 10 4 Z

- Z — Capacitance Tolerance Code
- 4 — Multiplier (Number of Zeros)
- 10 — Significant Figures of Capacitance
- E — Temperature Characteristic
- 050 — Voltage 050 = 50V, 100 = 100V
- 3429 — Style

THESE PRODUCTS AVAILABLE FROM AVX CERAMICS FRANCHISED DISTRIBUTORS

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AVX Limited, Holder Rd., Aldershot, Hampshire, GU124RG England • Aldershot (0252) 312131 Telex: 858473

AVX: The Insiders.

AVX CERALAM® CHIPS

Ceramic Chip Capacitors
Approved to MIL-C-55681 as Designated

Electrical Specifications

Temperature Coefficient

COG: A Temperature Coefficient — 0 ±30 ppm/°C, −55° to +125°C

X7R: C Temperature Coefficient — ±15%, −55° to +125°C

Z5U: E Temperature Coefficient — +22%, −56%, +10° to +85°C

Capacitance Test 25°C (MIL-STD-202 Method 305)

COG: Measured at 1 VRMS max at 1KHz (1MHz for 1000 pf or less)

X7R: Measured at 1 VRMS max at 1KHz (1MHz for 100 pf or less)

Z5U: Measured at .5 VRMS max at 1KHz

Dissipation Factor 25°C

COG: .1% max at 1KHz, 1 VRMS max (1MHz for 1000 pf or less)

X7R: 2.5% max at 1KHz, 1 VRMS max (1MHz for 100 pf or less)

Z5U: 3.0% max. at 1KHz, .5 VRMS max

Insulation Resistance 25°C (MIL-STD-202 Method 302)

COG and X7R: 100K megohms or 1000 megohms-mfd whichever is less

Z5U: 10K megohms or 500 megohms-mfd whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)

COG and X7R: 300% rated voltage for 5 seconds with 50 ma. max charging current

Z5U: 200% rated voltage for 5 seconds with 50 ma. max charging current

Life Test (1000 hrs)

COG and X7R: 200% rated voltage at +125°C

Z5U: 150% rated voltage at +85°C

Moisture Resistance (MIL-STD-202 Method 106)

COG, X7R, Z5U: Ten cycles with no voltage applied

Temperature Cycling (MIL-STD-202 Method 102, condition D at rated elevated temperature)

COG and X7R: −55° to +125°C

Z5U: −55° to +85°C

Immersion Cycling (MIL-STD-202 Method 104, condition A)

Capacitance Range in pf

AVX Style/ EIA Style/ MIL-C-55681	A Coefficient		C Coefficient			E Coefficient		
	100 VDC	50 VDC	100 VDC	50 VDC	25 VDC	100 VDC	50 VDC	25 VDC
ULA05	1 to 330	1 to 680	100 to 1800	100 to 8200	100 to 15,000	1000 to 6800	1000 to 18,000	1000 to 27,000
ULA10 CC0805 (1) CDR01 (2)	1 to 560	1 to 1200	150 to 3900	150 to 10,000	150 to 22,000	2700 to 10,000	2700 to 33,000	2700 to 56,000
ULA15	1 to 1000	1 to 1800	150 to 5600	150 to 2200	150 to 39,000	2700 to 22,000	2700 to 56,000	2700 to 82,000
ULA75	180 to 1800	180 to 3300	1000 to 10,000	1000 to 39,000	1000 to 82,000	5600 to 33,000	5600 to 100,000	5600 to 150,000
ULA70 CC1805 (1) CDR02 (2)	220 to 2200	220 to 3900	3300 to 12,000	3300 to 47,000	3300 to 100,000	10,000 to 39,000	10,000 to 100,000	10,000 to 180,000
ULA35	330 to 2700	330 to 5600	2700 to 15,000	2700 to 68,000	2700 to 100,000	18,000 to 56,000	18,000 to 180,000	18,000 to 270,000
ULA78 CC1808 (1) CDR03 (2)	330 to 3900	330 to 8200	2700 to 22,000	2700 to 100,000	2700 to 180,000	18,000 to 68,000	18,000 to 220,000	18,000 to 330,000
ULA55 CDR04 (2)	100 to 6800	1000 to 12,000	10,000 to 39,000	10,000 to 150,000	10,000 to 270,000	33,000 to 120,000	33,000 to 390,000	33,000 to 560,000
ULA65 CDR05 (2)	2200 to 15,000	2200 to 27,000	33,000 to 100,000	33,000 to 330,000	33,000 to 680,000	100,000 to 270,000	100,000 to 820,000	100,000 to 1.2 mfd
ULA60 CC2225 (1) CDR06 (2)	3300 to 18,000	3300 to 33,000	33,000 to 100,000	33,000 to 470,000	33,000 to 680,000	100,000 to 330,000	100,000 to 1.0 mfd	100,000 to 1.5 mfd

(1) EIA-RS198 designation
(2) MIL-C-55681 designation

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AVX Limited, Holder Rd., Aldershot, Hampshire, GU124RG England • Aldershot (0252) 312131 Telex: 858473

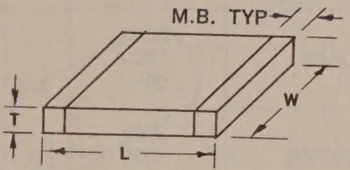
AVX: The Insiders.

AVX CERALAM® CHIPS

Ceramic Chip Capacitors
Approved to MIL-C-55681 as Designated

Dimensions (Inches/Millimeters)

AVX Type	L		W		T		M.B.		Styles EIA-RS198 MIL-C-55681
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
ULA05	.060 1.52	.040 1.01	.060 1.52	.040 1.01	.050 1.27	.020 0.50	.015 .381	.005 .127	
ULA10	.090 2.28	.070 1.77	.060 1.52	.040 1.01	.050 1.27	.020 0.50	.030 .760	.010 .254	CC 0805 CDR 01
ULA15	.105 2.66	.085 2.15	.060 1.52	.040 1.01	.050 1.27	.020 0.50	.030 .760	.010 .254	CC 1055
ULA35	.135 3.42	.115 2.92	.110 2.79	.090 2.28	.060 1.52	.020 0.50	.040 1.01	.010 .254	CC 1210
ULA75	.160 4.06	.140 3.55	.060 1.52	.040 1.01	.060 1.52	.020 0.50	.040 1.01	.010 .254	
ULA55	.185 4.69	.165 4.19	.135 3.42	.115 2.92	.060 1.52	.020 0.50	.040 1.01	.010 .254	CC 1812 CDR 04
ULA65	.195 4.95	.175 4.44	.260 6.60	.240 6.09	.060 1.52	.020 0.50	.040 1.01	.010 .254	CDR 05
ULA70	.195 4.95	.165 4.19	.060 1.52	.040 1.01	.060 1.52	.020 0.50	.040 1.01	.010 .254	CC 1805 CDR 2
ULA78	.195 4.95	.165 4.19	.090 2.28	.070 1.77	.060 1.52	.020 0.50	.040 1.01	.010 .254	CC 1808 CDR 03
ULA60	.235 6.09	.210 5.33	.260 6.60	.235 6.09	.060 1.52	.020 0.50	.040 1.01	.010 .254	CC 2225 CDR 06



For solder coated lands:
Add .015/.381 to L
Add .010/.254 to W and T

VOLTAGE

1 = 100 V
5 = 50 V
2 = 25 V

101 = 100 pf - third digit signifies number of zeros. Values below 10 pf use "R" in place of decimal point (5R6 = 5.6 pf).

AVAILABLE CAPACITANCE TOLERANCES

C = ±.25 pf (A)
D = ±.5 pf (A)
F = ±1% (A)
G = ±2% (A)
H = ±3% (A)
J = ±5% (A, C)
K = ±10% (A, C)
M = ±20% (C, E)
Z = +80 −20% (E)
P = GMV (E)

AVAILABLE TERMINATIONS

1. Palladium Silver (AVX Standard Termination)
2. Palladium Silver Solder Alloy 62-36-2
7. NiGuard®-Silver, Nickel, Gold Plated
8. NiGuard®-Solder Alloy 62-36-2

How to Order

ULA15 5 A 10 1 K 1

1 — Termination
K — Capacitance Tolerance Code
1 — Multiplier (Number of Zeros)
10 — Significant Figures of Capacitance
A — Temperature Characteristic
5 — Voltage
ULA15 — Style

AVX Ceramics, P.O. Box 493, Olean, N.Y. 14760 • Tel: (716) 372-6611 • TWX: 510-245-2815
AVX Ceramics, Dept. EM, P.O. Box 867, Myrtle Beach, S.C. 29577, Tel: (803) 448-3191, TWX: 810-661-2252
AVX Limited, Holder Rd., Aldershot, Hampshire, GU124RG England • Aldershot (0252) 312131 Telex: 858473

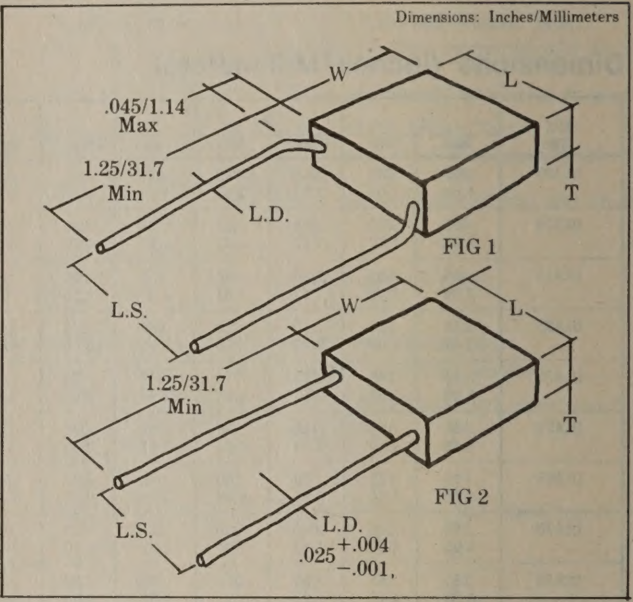
AVX: The Insiders

CERALAM® MOLDED RADIAL LEAD

MIL-C-11015, MIL-C-39014, MIL-C-20

ELECTRICAL CHARACTERISTICS

Style	Voltages	Capacitance Range
CK05, CKR05	200V 100V 50V	10-1000pf 1200-.01mfd .012-.1mfd
CK06	200V 100V 50V	120pf-10,000pf 12,000pf-100,000pf 120,000pf-1.0mfd
CKR06	200V 100V 50V	1200pf-10,000pf 12,000pf-100,000pf 120,000pf-1,000,000pf
CKR08	50V	1.2-2.0mfd
CC05, CC09, CCR05, CCR09	200V 100V 50V	1.0-332pf 348-1780pf 1870-3320pf
CC06, CCR06	200V 100V 50V	390-1800pf 2200-4700pf 5100pf-.018mfd
CC07, CCR07	200V 100V 50V	2200-3300pf 5600pf-.012mfd .015-.1mfd
CC08, CCR08	200V 100V 50V	3900-4700pf .015-.018mfd .056-.068mfd



CROSS REFERENCE: CASE SIZE CHART

AVX		Per Mil-Spec			Case Size (Inches)			
Figure	Style	MIL-C-11015	MIL-C-39014	MIL-C-20	Length	Width	Thickness	Lead Spacing
1	MC50	CK05	CKR05	CCR05/CC05	.190 ± .010	.190 ± .010	.090 ± .010	.200 ± .015
2	MC54	—	—	CCR09/CC09	.190 ± .010	.190 ± .010	.090 ± .010	.100 ± .015
2	MC60 SC60	CK06	CKR06	CCR06/CC06	.290 ± .010	.290 ± .010	.090 ± .010	.200 ± .015
2	SC60	—	CKRO8	—	.290 ± .010	.290 ± .010	.145 ± .015	.200 ± .015
2	MC95	—	—	CCR07/CC07	.480 ± .020	.480 ± .020	.140 ± .010	.400 ± .020
2	PM68	—	—	CCR07/CC07	.480 ± .020	.480 ± .020	.200 Max.	.400 ± .020
2	PM96	—	—	CCR08/CC08	.480 ± .020	.480 ± .020	.240 ± .010	.400 ± .020

HOW TO ORDER: As per appropriate Military Specification

THESE PRODUCTS AVAILABLE FROM AVX CERAMICS FRANCHISED DISTRIBUTORS

AVX Ceramics, P.O. Box 493, Olean, N.Y. 14760 • Tel: (716) 372-6611 • TWX: 510-245-2815
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AVX Limited, Holder Rd., Aldershot, Hampshire, GU124RG England • Aldershot (0252) 312131 Telex 858473

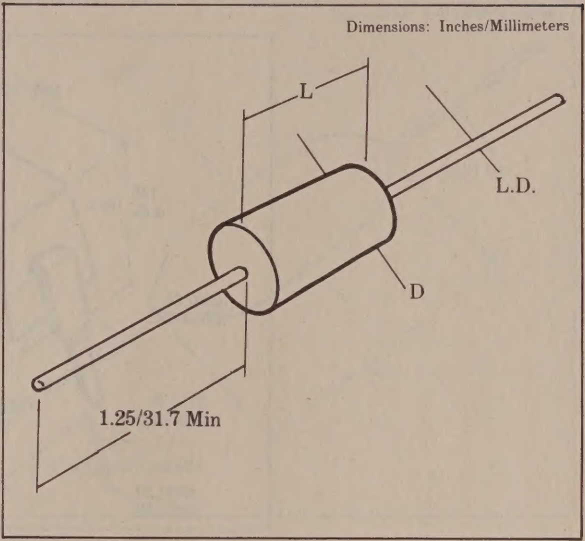
AVX: The Insiders

CERALAM® MOLDED AXIAL LEAD CAPACITORS

MIL-C-11015, MIL-C-39014, MIL-C-20

ELECTRICAL CHARACTERISTICS

Style	Voltages	Capacitance Range
CK12, CKR11	100V 50V	10-4700pf 5600pf-.01mfd
CK13, CKR12	100V 50V	5600pf-.01mfd .012-.047mfd
CK14, CKR14	100V 50V	.012-.1mfd .12-.27mfd
CK15, CKR15	100V 50V	.12-.33mfd .47-1.0mfd
CK16, CKR16	100V 50V	.47-1.0mfd 2.2-3.3mfd
CC75, CCR75	200V 100V 50V	.1-75pf 82-220pf 270-680pf
CC76, CCR76 CCR77	200V 100V 50V	82-120pf 270-390pf 820-1000pf
CC77, CCR77	200V 100V 50V	150-680pf 470-220pf 2700-5600pf
CC78 CCR78	200V 100V 50V	820-3300pf 3900-12,000pf 15,000-27,000pf
CC79 CCR79	200V 100V 50V	3900-10,000pf 15,000-39,000pf 47,000-82,000pf



CROSS REFERENCE: CASE SIZE CHART

AVX	Per Mil-Spec			Case Size (Inches)	
AVX Style	**MIL-C-11015**	**MIL-C-39014**	**MIL-C-20**	**Length**	**Diameter**
MC10	CK12	CKR11	CCR75/CC75	.160 ± .010	.090 ± .010
MC70	CK13	CKR12	CCR76/CC76	.250 ± .010	.090 ± .010
MC20	CK14	CKR14	CCR77/CC77	.390 ± .010	.140 ± .010
MC85	CK15	CKR15	CCR78/CC78	.500 ± .020	.250 ± .015
MC86	—	—	—	.690 ± .020	.250 ± .010
MC87	CK16	CKR16	CCR79/CC79	.690 ± .020	.350 ± .015

HOW TO ORDER: As per appropriate Military Specification

THESE PRODUCTS AVAILABLE FROM AVX CERAMICS FRANCHISED DISTRIBUTORS

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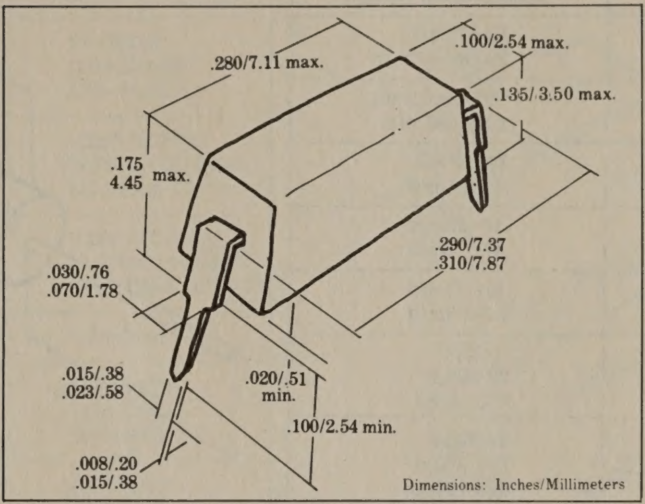
AVX Limited, Holder Rd., Aldershot, Hampshire, GU124RG England • Aldershot (0252) 312131 Telex 858473

AVX: The Insiders

DIPGuard®

Molded Dual-In-Line Capacitors
AVX Style: DG01



ELECTRICAL SPECIFICATIONS

Temperature Coefficient
COG: A Temperature Coefficient — 0±30 ppm/°C, −55° to +125°C
X7R: C Temperature Coefficient — ±15%, −55° to +125°C
Z5U: E Temperature Coefficient — +22, −56%, +10° to 85°C

Capacitance Test 25°C (MIL-STD-202 Method 305)
COG: Measured at 1 VRMS max at 1KHz (1MHz for 1000 pf or less)
X7R: Measured at 1 VRMS max at 1KHz (1MHz for 100 pf or less)
Z5U: Measured at .5 VRMS max at 1KHz

Dissipation Factor 25°C
COG: .15% max at 1KHz, 1 VRMS max (1MHz for 1000 pf or less)
X7R: 2.5% max at 1 KHz, 1 VRMS max (1MHz for 100 pf or less)
Z5U: 3.0% max at 1KHz, .5 VRMS max

Moisture Resistance (MIL-STD-202 Method 106)
COG, X7R, Z5U: Ten cycles with no voltage applied

Insulation Resistance 25°C (MIL-STD-202 Method 302)
COG and X7R: 100K megohms or 1000 megohms-mfd whichever is less
Z5U: 10K megohms or 500 megohms-mfd whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)
COG and X7R: 300% rated voltage for 5 seconds with 50 ma. max charging current
Z5U: 200% rated voltage for 5 seconds with 50 ma. max charging current

Life Test (1000 hrs)
COG and X7R: 200% rated voltage at +125°C
Z5U: 150% rated voltage at +85°C

Temperature Cycling (MIL-STD-202 Method 102, condition D at rated elevated temperature)
COG and X7R: −55° to +125°C
Z5U: −55° to +85°C

Immersion Cycling (MIL-STD-202 Method 104, condition A)

Capacitance Ranges

COG (A)		X7R (C)		Z5U (E)	
100 VDC	50VDC	100VDC	50VDC	100VDC	50VDC
10-2700 pf	10-3900 pf	150 pf - .027 mfd	150 pf - .1 mfd	.01 - .047 mfd	.01 - .22 mfd

How to Order:

DG01 5 E 10 4 Z
Z — Capacitance Tolerance Code
4 — Multiplier (Number of Zeros)
10 — Significant Figures of Capacitance
E — Temperature Characteristic
5 — Voltage: 1 = 100 V; 5 = 50 V
DG01 — Style

AVAILABLE CAPACITANCE TOLERANCES

J = ±5% (A, C)
K = ±10% (A, C)
M = ±20% (A, C, E)
Z = +80 −20% (E)
P = GMV (E)

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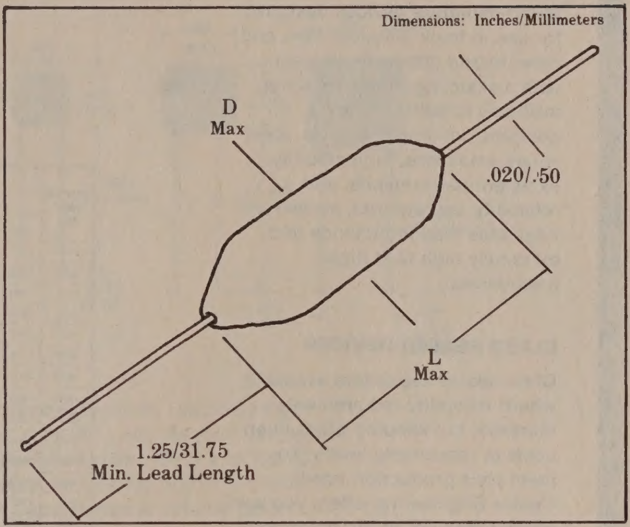
AVX: The Insiders

SpinGuard®

Epoxy Coated, Axial Lead Capacitors



DIMENSIONS (Inches/Millimeters)

AVX Style	SG02	SG03	SG04	SG05
Length	.190/4.83	.290/7.37	.290/7.37	.420/10.66
Diameter	.100/2.54	.100/2.54	.150/3.81	.150/3.81

ELECTRICAL SPECIFICATIONS

Temperature Coefficient
COG: A Temperature Coefficient — 0±30 ppm/°C, −55° to +125°C
X7R: C Temperature Coefficient — ±15%, −55° to +125°C
Z5U: E Temperature Coefficient — +22, −56%, +10° to 85°C
Z5V: V Temperature Coefficient — +22, −82%, +10° to 85°C

Capacitance Test 25°C (MIL-STD-202 Method 305)
COG: Measured at 1 VRMS max at 1KHz (1MHz for 1000 pf or less)
X7R: Measured at 1 VRMS max at 1KHz (1MHz for 100 pf or less)
Z5U and Z5V: Measured at .5 VRMS max at 1KHz

Dissipation Factor 25°C
COG: .15% max at 1KHz, 1 VRMS max (1MHz for 1000 pf or less)
X7R: 2.5% max at 1 KHz, 1 VRMS max (1MHz for 100 pf or less)
Z5U: 3.0% max at 1KHz, .5 VRMS max
Z5V: 4.0% max at 1KHz, .5 VRMS max

Insulation Resistance 25°C (MIL-STD-202 Method 302)
COG and X7R: 100K megohms or 1000 megohms-mfd whichever is less
Z5U and Z5V: 10K megohms or 500 megohms-mfd whichever is less

Dielectric Withstanding Voltage 25°C (Flash Test)
COG and X7R: 300% rated voltage for 5 seconds with 50 ma. max charging current
Z5U and Z5V: 200% rated voltage for 5 seconds with 50 ma. max charging current

Life Test (1000 hrs)
COG and X7R: 200% rated voltage at +125°C
Z5U and Z5V: 150% rated voltage at +85°C

Moisture Resistance (MIL-STD-202 Method 106)
COG, X7R, Z5U, Z5V: Ten cycles with no voltage applied

Temperature Cycling (MIL-STD-202 Method 102, condition D at rated elevated temperature)
COG and X7R: −55° to +125°C
Z5U and Z5V: −55° to +85°C

Immersion Cycling (MIL-STD-202 Method 104, condition A)

Capacitance Range in pf

AVX Style	Char. A		Char. C		Char. E		Char. V	
	100VDC	50VDC	100VDC	50VDC	100VDC	50VDC	100VDC	50VDC
SG02	10 to 330	10 to 470	150 to 5,600	150 to 12,000	6,800 to 15,000	6,800 to 68,000	15,000 to 22,000	15,000 to 82,000
SG03	100 to 680	100 to 1,200	1000 to 15,000	1000 to 47,000	15,000 to 33,000	15,000 to 150,000	15,000 to 39,000	15,000 to 180,000
SG04	470 to 3,900	470 to 4,700	10,000 to 47,000	10,000 to 100,000	33,000 to 150,000	33,000 to 330,000	39,000 to 180,000	39,000 to 470,000
SG05	1,000 to 4,700	1,000 to 6,800	27,000 to 100,000	27,000 to 220,000	68,000 to 180,000	68,000 to 680,000	150,000 to 220,000	150,000 to 820,000

How to Order

SG03 1 A 56 1 J
- J — Capacitance Tolerance Code
- 1 — Multiplier (Number of Zeros)
- 56 — Significant Figures of Capacitance
- A — Temperature Characteristic
- 1 — Voltage: 1 = 100V; 5 = 50V
- SG03 — Style

AVAILABLE CAPACITANCE TOLERANCES

J = ±5% (A, C)
K = ±10% (A, C)
M = ±20% (A, C, E, V)
Z = +80 −20% (E, V)
P = GMV (E, V)

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CENTRE ENGINEERING

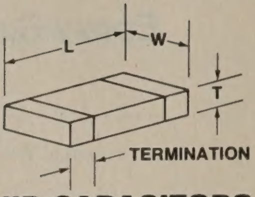
2820 E. COLLEGE AVE., • STATE COLLEGE, PA. 16801 • 814-237-0321 • TWX 510-670-3517

CHIP CAPACITORS

Micro-miniature devices designed for use in thick film, thin film, and other hybrid applications, each with a selection of terminations available to solve the most complex bonding problems. Ideal where small size, high stability, excellent performance, and reliability are required, as well as negligible lead inductance and extremely high Q at high frequencies.

GLASS SEALED DEVICES

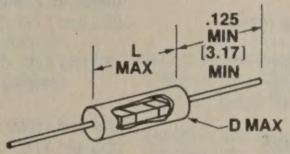
Glass sealed capacitors available where reliability requirements increase, but keeping production costs at reasonable levels. To meet your production needs Centre Engineering offers you our newest member of our growing line of capacitors, the glass sealed multi-layer capacitors in strip form. Small in size and hermetically sealed, these capacitors are rugged, reliable, and ideal for automatic insertion.



CHIP CAPACITORS

CENTRE PART NO.	MAXIMUM CAPACITANCE									SIZES		
	NP0 (pf)			W5R (mfd)			Z5U (mfd)			L	W	T
	50v	100v	200v	50v	100v	200v	50v	100v	200v			
uc01	620	470	270	.02	.01	.0056	.022	.0082	.001	.080 [2.03]	.050 [1.27]	.055 max. [1.40 max.]
uc02	1000	680	420	.027	.015	.0082	.033	.01	.0015	.100 [2.54]	.050 [1.27]	.065 max. [1.65 max.]
uc21	3300	2500	1500	.082	.047	.027	.12	.047	.0082	.125 [3.17]	.095 [2.41]	.065 max. [1.65 max.]
uc31	6800	4700	3900	.2	.12	.082	.27	.1	.018	.180 [4.57]	.120 [3.05]	.065 max. [1.65 max.]
uc33	3900	3300	2200	.1	.068	.042	.2	.082	.012	.180 [4.57]	.080 [2.03]	.065 max. [1.65 max.]
uc34	5600	4200	3000	.15	.1	.056	.22	.1	.015	.160 [4.06]	.130 [3.30]	.065 max. [1.65 max.]
uc35	20000	15000	10000	.47	.33	.2	1.0	.39	.068	.260 [6.60]	.220 [5.59]	.065 max. [1.65 max.]
uc36	15000	12000	8200	.39	.28	.15	.82	.33	.056	.245 [6.22]	.205 [5.21]	.065 max. [1.65 max.]
uc37	12000	10000	6800	.33	.22	.12	.68	.3	.047	.180 [4.57]	.265 [6.73]	.065 max. [1.65 max.]
uc39	33000	33000	22000	.68	.68	.42	2.0	.68	.12	.360 [9.14]	.320 [8.13]	.065 max. [1.65 max.]
uc40	18000	12000	8200	.42	.25	.15	.68	.27	.047	.325 [8.25]	.155 [3.94]	.065 max. [1.65 max.]
uc41	50000	50000	33000	1.5	1.0	.68	3.9	1.2	.22	.460 [11.68]	.420 [10.67]	.065 max. [1.65 max.]
uc43	2200	1800	1000	.05	.033	.018	.082	.033	.0056	.180 [4.57]	.050 [1.27]	.065 max. [1.65 max.]
uc44	20000	15000	10000	.47	.33	.2	.82	.33	.056	.225 [5.71]	.250 [6.35]	.065 max. [1.65 max.]

Note: Tolerance on dimensions-
±.010 for less than .100
[±.25 for less than 2.54]
±.015 for .100 or greater
[±.38 for 2.54 or greater]



GLASS SEALED DEVICES

CENTRE PART NO.	NPO(COG)									
	G1710			G2610			G4015			
L MAX	.170 [4.32]			.260 [6.60]			.400 [10.16]			
D MAX	.100 [2.54]			.100 [2.54]			.150 [3.81]			
Capacitance in pf	WVDC 200	100	50	WVDC 200	100	50	WVDC 200	100	50	Capacitance Code (EIA)
10	■			■						100
12	■			■						120
15	■			■						150
18	■			■						180
22	■	■		■						220
27	■	■		■						270
33	■	■		■						330
39	■	■		■						390
47	■	■		■						470
56	■	■	■	■	■					560
68	■	■	■	■	■					680
82	■	■	■	■	■					820
100	■	■	■	■	■					101
120		■	■	■	■	■	■			121
150		■	■	■	■	■	■			151
180		■	■	■	■	■	■			181
220		■	■	■	■	■	■			221
270		■	■	■	■	■	■			271
330		■	■	■	■	■	■			331
390			■	■	■	■	■	■		391
470			■	■	■	■	■	■		471
560			■	■	■	■	■	■		561
680			■	■	■	■	■	■		681
820					■	■	■	■	■	821
1000					■	■	■	■	■	102
1200					■	■	■	■	■	122
1500						■	■	■	■	152
1800						■	■	■	■	182
2200						■	■	■	■	222
2700							■	■	■	272
3300								■	■	332
3900								■	■	392
4700								■	■	472
5600								■	■	562
6800								■	■	682
8200									■	822
10,000									■	103
12,000										123
15,000										153
18,000										183
22,000										223
27,000										273
33,000										333
39,000										393
47,000										473

CENTRE PART NO.	X7R(W)									
	G1710			G2610			G4015			
L MAX	.170 [4.32]			.260 [6.60]			.400 [10.16]			
D MAX	.100 [2.54]			.100 [2.54]			.150 [3.81]			
Capacitance in pf	WVDC 200	100	50	WVDC 200	100	50	WVDC 200	100	50	Capacitance Code (EIA)
68										680
82										820
100										101
120	■			■						121
150	■			■						151
180	■			■						181
220	■			■						221
270	■			■						271
330	■			■						331
390	■			■						391
470	■			■						471
560	■			■						561
680	■	■		■						681
820	■	■		■						821
1000	■	■	■	■	■					102
1200	■	■	■	■	■					122
1500	■	■	■	■	■					152
1800	■	■	■	■	■					182
2200		■	■	■	■		■			222
2700		■	■	■	■	■	■			272
3300		■	■	■	■	■	■			332
3900		■	■	■	■	■	■			392
4700		■	■		■	■	■			472
5600		■	■		■	■	■			562
6800		■	■		■	■	■			682
8200			■		■	■	■	■		822
10,000			■		■	■	■	■		103
12,000			■		■	■	■	■		123
15,000			■		■	■	■	■		153
18,000						■	■	■		183
22,000						■	■	■	■	223
27,000						■		■	■	273
33,000						■		■	■	333
39,000						■		■	■	393
47,000						■		■	■	473
56,000								■	■	563
68,000								■	■	683
82,000								■	■	823
100,000								■	■	104
120,000									■	124
150,000									■	154
180,000										184
220,000										224
270,000										274
330,000										334

CENTRE PART NO.	Y5V									
	G1710			G2610			G4015			
L MAX	.170 [4.32]			.260 [6.60]			.400 [10.16]			
D MAX	.100 [2.54]			.100 [2.54]			.150 [3.81]			
	WVDC 100	50	25	WVDC 100	50	25	WVDC 100	50	25	Capacitance Code (EIA)
470										471
560										561
680										681
820										821
1000										102
1200										122
1500										152
1800										182
2200										222
2700	■									272
3300	■									332
3900	■									392
4700	■									472
5600	■									562
6800	■			■						682
8200	■			■						822
10,000	■	■		■	■					103
12,000	■	■		■	■					123
15,000		■		■	■		■			153
18,000		■		■	■		■			183
22,000		■		■	■		■			223
27,000		■		■	■		■			273
33,000		■		■	■		■			333
39,000		■	■		■		■			393
47,000		■	■		■	■	■			473
56,000			■		■	■	■	■		563
68,000			■		■	■	■	■		683
82,000					■	■	■	■		823
100,000					■	■	■	■	■	104
120,000						■	■	■	■	124
150,000						■	■	■	■	154
180,000							■	■	■	184
220,000							■	■	■	224
270,000								■	■	274
330,000								■	■	334
390,000								■	■	394
470,000								■	■	474
560,000								■	■	564
680,000									■	684
820,000									■	824
1,000,000									■	105
1,200,000										125
1,500,000										155
1,800,000										185
2,200,000										225

Metric dimensions are shown in brackets.

CENTRE ENGINEERING

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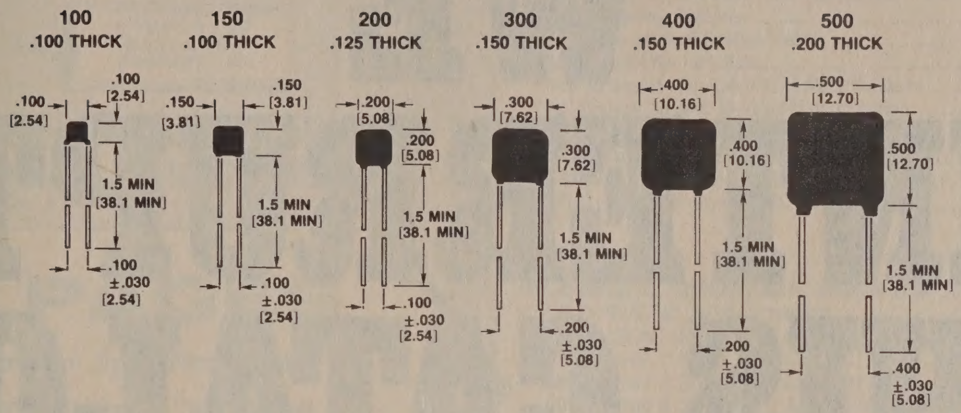

POLYMER COATED LEADED DEVICES

Multi-layer polymer coated leaded devices for applications in circuits requiring high dielectric constant in order to provide maximum capacitance to volume ratio consistent with excellent performance and reliability at temperatures between –55°C and 125° C Single layer construction offers most economical means for by-pass and non-critical coupling applications consistent with extremely high capacitance-to-volume ratio.

POLYMER COATED LEADED DEVICES

ULTRA STABLE 100 Volt -55° C to 125° C		
PART NUMBER	CAP.	TOL.
100-100 NPO 109B	1.	±.1pF
100-100 NPO 129B	1.2	±.1pF
100-100 NPO 159B	1.5	±.1pF
100-100 NPO 189B	1.8	±.1pF
100-100 NPO 229C	2.2	±.25pF
100-100 NPO 279C	2.7	±.25pF
100-100 NPO 339C	3.3	±.25pF
100-100 NPO 479D	4.7	±.5pF
100-100 NPO 569D	5.6	±.5pF
100-100 NPO 689D	6.8	±.5pF
100-100 NPO 829D	8.2	±.5pF
100-100 NPO 100K	10	±10%
150-100 NPO 150K	15	±10%
150-100 NPO 220K	22	±10%
200-100 NPO 330K	33	±10%
200-100 NPO 470K	47	±10%
200-100 NPO 680K	68	±10%
200-100 NPO 101K	100	±10%
200-100 NPO 151K	150	±10%
200-100 NPO 221K	220	±10%
200-100 NPO 331K	330	±10%
200-100 NPO 471K	470	±10%
200-100 NPO 681K	680	±10%
200-100 NPO 102K	1000	±10%
300-100 NPO 152K	1500	±10%
300-100 NPO 222K	2200	±10%
300-100 NPO 332K	3300	±10%
400-100 NPO 472K	4700	±10%
400-100 NPO 682K	6800	±10%
400-100 NPO 103K	.01	±10%

STABLE 100 Volt -55° C to 125° C		
PART NUMBER	CAP.	TOL.
100-100 W5R 151K	150	±10%
100-100 W5R 221K	220	±10%
100-100 W5R 331K	330	±10%
150-100 W5R 471K	470	±10%
150-100 W5R 681K	680	±10%
200-100 W5R 102K	1000	±10%
200-100 W5R 152K	1500	±10%
200-100 W5R 222K	2200	±10%
200-100 W5R 332K	3300	±10%
200-100 W5R 472K	4700	±10%
200-100 W5R 682K	6800	±10%
200-100 W5R 103K	.01	±10%
300-100 W5R 153K	.015	±10%
300-100 W5R 223K	.022	±10%
300-100 W5R 333K	.033	±10%
300-100 W5R 473K	.047	±10%
300-100 W5R 683K	.068	±10%
300-100 W5R 104K	.1	±10%
400-100 W5R 224K	.22	±10%
500-100 W5R 334K	.33	±10%
500-100 W5R 474K	.47	±10%
500-100 W5R 564K	.56	±10%

STABLE 50 Volt		
400-050 W5R 334K	.33	±10%
400-050 W5R 474K	.47	±10%
500-050 W5R 684K	.68	±10%
500-050 W5R 105K	1.0	±10%

GENERAL PURPOSE 100 Volt -55° C to 85° C			GENERAL PURPOSE 50 Volt -55° C to 85° C
PART NUMBER	CAP.	TOL.	PART NUMBER
100-100-601-471M	470	±20%	100-050-601-471M
100-100-601-681M	680	±20%	100-050-601-681M
100-100-601-102M	1000	±20%	100-050-601-102M
100-100-601-152M	1500	±20%	100-050-601-152M
150-100-601-182M	1800	±20%	150-050-601-182M
150-100-601-222M	2200	±20%	150-050-601-222M
150-100-601-272M	2700	±20%	150-050-601-272M
150-100-601-332M	3300	±20%	150-050-601-332M
200-100-601-472M	4700	±20%	200-050-601-472M
200-100-601-682M	6800	±20%	200-050-601-682M
200-100-601-103M	.01	±20%	200-050-601-103M
200-100-601-153M	.015	±20%	200-050-601-153M
200-100-601-223M	.022	±20%	200-050-601-223M
200-100-601-273M	.027	±20%	200-050-601-273M
200-100-601-333M	.033	±20%	200-050-601-333M
200-100-601-473M	.047	±20%	200-050-601-473M
200-100-601-683M	.068	±20%	200-050-601-683M
	.1	±20%	200-050-601-104M
300-100-601-104M	.1	±20%	300-050-601-104M
300-100-601-154M	.15	±20%	200-050-601-154M
300-100-601-224M	.22	±20%	300-050-601-224M
300-100-601-274M	.27	±20%	
300-100-601-334M	.33	±20%	300-050-601-334M
300-100-601-474M	.47	±20%	300-050-601-474M
400-100-601-684M	.68	±20%	300-050-601-684M
400-100-601-105M	1.0	±20%	300-050-601-105M
500-100-601-155M	1.5	±20%	400-050-601-155M
500-100-601-225M	2.2	±20%	400-050-601-225M
	3.3	±20%	500-050-601-335M
	4.7	±20%	500-050-601-475M

These catalog pages contain only a sample of ceramic capacitors available from Centre Engineering. For additional information please write or call for our new catalog.

Metric dimensions are shown in brackets.

WE INTERRUPT THIS CATALOG

TO TELL YOU SOMETHING IMPORTANT!

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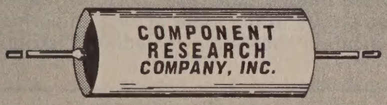
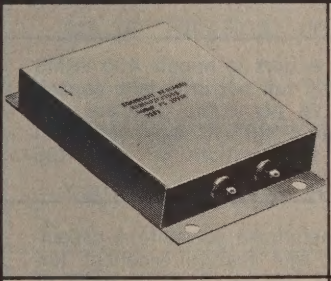


ESTABLISHED RELIABILITY PRECISION FILM CAPACITORS

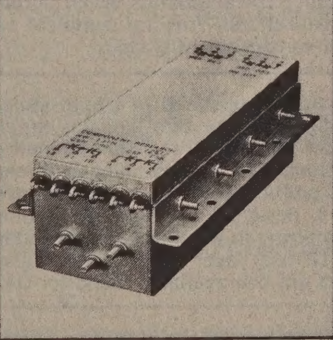
51 PAGES

- ★ *Capacitor Specifications*
- ★ *Reliability and Test Data*
- ★ *AC Voltage and Current Data*
- ★ *Ordering Information*



AT LEFT: Smallest Size, highest IR, 200 uF, polycarbonate capacitor for memory applications, space guidance, and tracking stations.

AT RIGHT: Ultra-high reliability capacitor for AC applications. Has very low equivalent series resistance, is remarkably cool and efficient for its size.



COMPONENT RESEARCH
C12C106BXC
10uF 0.25% 100VDC
60V rms AC @ 400Hz

AT LEFT: CRC AC-DC rated Polycarbonate capacitors are qualified to established reliability specifications, Mil-C-83421/1 and Mil-C-39022/9C.

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COMPONENT RESEARCH CATALOG JB

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CRC HIGH RELIABILITY CAPACITORS	ADVANCE NEW PRODUCT INFORMATION
NEW PRODUCTS	**IMPORTANT! PREVIEW OF NEW PRODUCTS TO APPEAR IN NEXT YEAR'S 1978-1979 eem CATALOG** Since CRC believes these unique new capacitors will effect significant design changes as well as advances in the state of system performance, CRC is preparing complete specification sheets for immediate distribution. Please write or phone for details.
MINIATURE METALLIZED POLYCARBONATE	Type G12 minature, hermetically sealed, metallized polycarbonate capacitors will replace most non-hermetic (usually non-reliable) "wrap and fill" and molded plastic film capacitors due to their reduced physical size. Type G12 capacitors have the same rugged high quality construction as CRC MIL-C-83421/01 qualified metallized polycarbonate types featured in this catalog. Due to their small size, G12 capacitors can now replace unreliable non-hermetic (or hermetic) poor quality capacitors. G12 capacitors are rated from 30 VDC to 100 VDC and 22 VRMS to 60 VRMS, 400 Hz for continuous duty. For G12 capacitors, values up to 0.075 μF, 30 VDC, are 0.185" max. diameter with sleeving by 0.530" max. Case length, with a max. bead to bead length of 0.600". For G12 capacitors which have one lead connected to the case, the lengths are 0.062" shorter.
200 VRMS TO 800 VRMS 400 Hz AC METALLIZED POLYSULFONE	Type QA14 AC-DC rated hermetically sealed, tubular, metallized polysulfone capacitors will soon be featured as a MIL Spec qualified established reliability capacitor for motor run, resonating, and general purpose filtering applications. The unusually rugged low loss CRC electrode terminations provide coolest performance with continuous duty AC operation. All capacitors are corona free at rated RMS voltage conditions and are designed for many years of operation under rugged military or space environmental conditions. Please write for complete QA14 specifications.
160 KHz AC LOW LOSS FOIL POLYPROPYLENE	A space age requirement for small low loss capacitors to handle 400 VRMS at 160 KHz led to the development of Type R55 foil polypropylene capacitors. Capacitors capable of rating up to 5 KVA per cubic inch are now possible due to the low loss and efficient design of CRC AC engineered foil polypropylene capacitors. Write for complete specifications on Type R55 capacitors.
±8 PPM/°C LOW TC METALLIZED POLYSULFONE	Type QA14 specially selected high reliability metallized polysulfone capacitors are virtually zero TC from 0°C to 75°C and feature excellent low loss, high stability characteristics which surpass the best NPO ceramics or other low TC capacitors. Write for complete specifications on QA14 capacitors. Please reference **eem** J Catalog.
DUAL LAYER HIGHER RELIABILITY METALLIZED CAPACITORS	Metallized capacitors operated in a high impedance circuit, where the voltage slowly ramps up from zero and the current is limited, may experience intermittent low insulation resistance when operating under temperature cycling conditions. CRC has developed screening techniques to minimize such possible problems, which may occur with their standard single layer film capacitors, designed for high IR requirements. As further insurance against any problems in worst case ramp voltage temperature cycling operation, Type QA12 dual layer 50 VDC and higher rated metallized polycarbonate capacitors are now available. Send for QA12 specifications.
HIGH ENERGY, HIGH TEMP. FOIL POLYSULFONE	Type R54 foil polysulfone capacitors are designed for high peak current, high repetition rate, AC switching, pulsing, and general filtering applications. Write for complete R54 specifications.
HIGH DENSITY MINIATURE NON-POLAR KEL-FILM	CRC has developed Type QA16 metallized Kelfilm capacitors of subminiature size as a result of development programs for NASA and the air force. 200 volt and higher rated foil tantalum capacitors can now be replaced with a non-polar, non-electrolyte capacitor made from a high dielectric constant film. Typically a 20 μF, 200 VDC capacitor fits a 0.750" diameter x 2.375" tubular metal case. The QA16 capacitors are being used for output filtering in the F-18 and other aircraft programs. Please write for complete QA16 specifications.
±0.05% TRIMMED POLYSTYRENE	Type QA53 polystyrene capacitors can be supplied trimmed to ±0.05% for use as laboratory standards, test equipment internal standards, analog applications, or wherever high accuracy stability, high insulation resistance, and low dielectric absorption capacitors are required at moderate cost. Write for complete QA53 specifications.

SUPPLEMENTARY CAPACITOR-INFORMATION SECTION

CATALOG SUPPLEMENT

CRC has added this section to provide information on new products, unusual capacitor test data, and a compilation of miscellaneous items of interest to designers, component engineers, and reliability personnel. In addition we are planning to manufacture a comprehensive product line of standard and custom feed-through capacitors and EMI filters. We believe these products will be of higher quality and performance than any similar products now available.

Many of our customers now using EMI filters have expressed dissatisfaction with the quality and reliability of the filters presently available, and have urged us to enter this area of interest. Please forward to us any of your requirements for capacitors, networks, and EMI filters, so that we can determine if we can meet your needs.

1655 26th ST., SANTA MONICA, CALIFORNIA 90404

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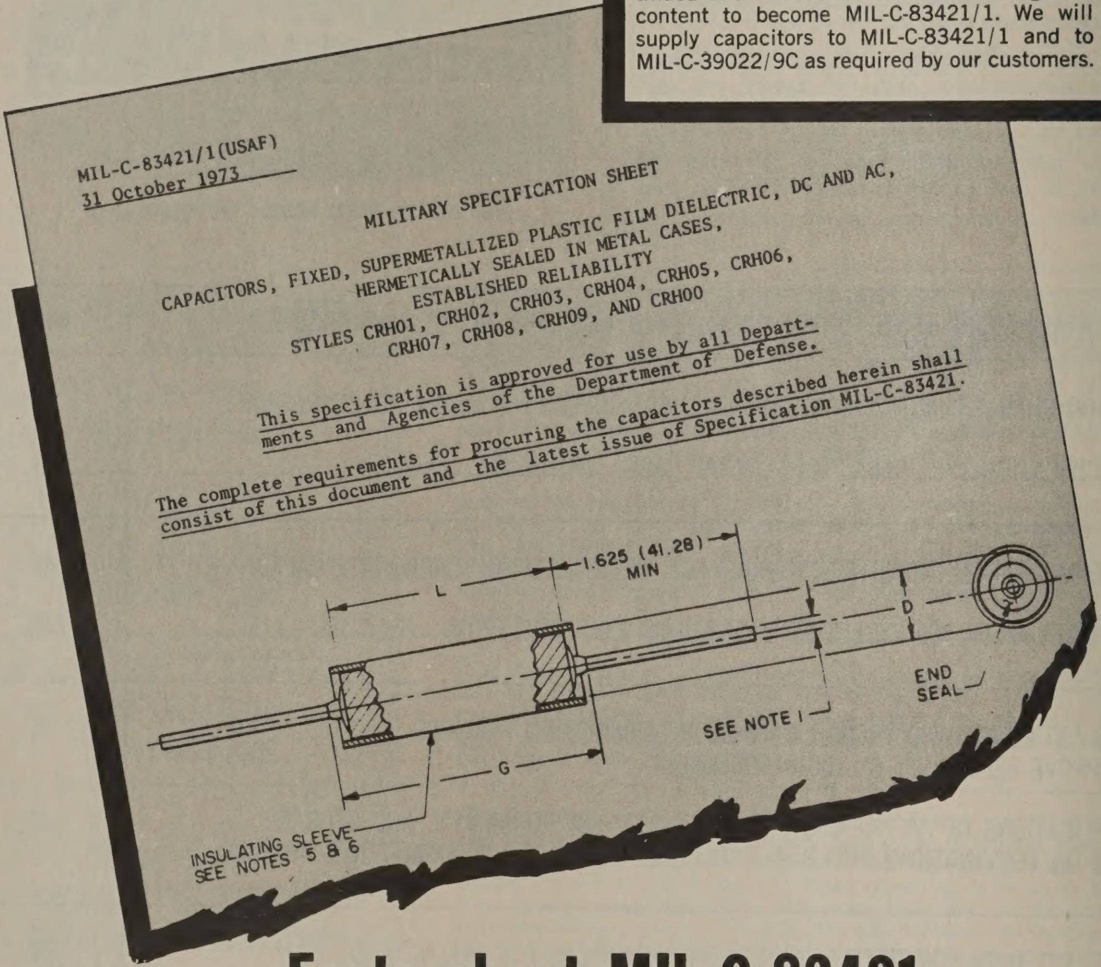
CRC PREMIUM PERFORMANCE ESTABLISHED RELIABILITY FILM CAPACITORS

QUALIFIED TO MIL-C-83421/1 & *MIL-C-39022/9C

* **MIL-C-39022/9B** and **/9C** have been discontinued and re-written with minor changes in content to become MIL-C-83421/1. We will supply capacitors to MIL-C-83421/1 and to MIL-C-39022/9C as required by our customers.



MIL-C-83421/1(USAF)
31 October 1973

MILITARY SPECIFICATION SHEET

CAPACITORS, FIXED, SUPERMETALLIZED PLASTIC FILM DIELECTRIC, DC AND AC, HERMETICALLY SEALED IN METAL CASES, ESTABLISHED RELIABILITY

STYLES CRH01, CRH02, CRH03, CRH04, CRH05, CRH06, CRH07, CRH08, CRH09, AND CRH00

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the capacitors described herein shall consist of this document and the latest issue of Specification MIL-C-83421.

Facts about MIL-C-83421

This catalog covers comprehensive information concerning MIL-C-83421/1 capacitors, including dimensions, specifications, quality assurance, retention of qualification testing and pricing.

Component Research Co. presents this information as part of its effort to improve the reliability and performance of capacitors for aerospace use.

MIL-C-83421 is a new general specification that contains higher quality, reliability and performance, metallized plastic film capacitors than MIL-C-39022/1 to MIL-C-39022/8. MIL-C-83421 will ultimately cover a range of metallized polycarbonate, polysulfone, polystyrene, polypropylene, teflon, and other plastic films. The scope of MIL-C-83421 will be to provide 100% screened, high reliability capacitors suitable for critical aerospace and industrial use.

Special screening tests and tight parameter limits have been incorporated in order to make MIL-C-83421 capacitors superior in reliability, performance, and quality for DC or AC applications.

Additional testing and data covering corona, radiation effects, ESR ratings, and dielectric absorption ratings with temperature and short durations, will ultimately be included.

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CRC HIGH RELIABILITY CAPACITORS

MIL-C-83421/1 SCREENING AND KEY FEATURES

100% GROUP A SCREENING AND INSPECTION MIL-C-83421/1 POLYCARBONATE CAPACITORS

CRC QUALITY LEVEL 1

MIL-C-83421/1 Style	VDC	CRC Capacitor Type
CRH01	30	A12A
CRH02	50	A12B
CRH03	100	A12C
CRH04	200	A12D
CRH05	400	A12E

1. 48 hours Burn-In at 125°C and 140% of rated DC voltage.
2. 10 Cycles of thermal aging from −65°C to +125°C.
3. Gross leak test.
4. Helium leak test. 1 x 10^{-6} atm cm^3/sec max. leak rate.
5. AC dielectric hipot by 100 Hz square wave at a minimum peak to peak voltage of 3 x rated DC voltage (except 800 V P/P for 400 VDC).
6. DC dielectric hipot at 200% rated volts.
7. Insulation resistance at 25°C, 300,000 megohms-uF. 3,000,000 megohms minimum for values 0.1 uF or less.
8. 0.15% max. dissipation factor at 25°C.
9. Capacitance % tolerance at 25°C.
10. 0.1% max. dielectric absorption.
11. Visual inspection for workmanship dimensions, marking and packaging

CRC QUALITY LEVEL 3

MIL-C-83421/1 Style	VDC	CRC Capacitor Type
CRH06	30	K12A
CRH07	50	K12B
CRH08	100	K12C
CRH09	200	K12D
CRH00	400	K12E

1. 5 Cycles of thermal aging from −65°C to +125°C.
2. Gross leak test.
3. Helium leak test. 1 x 10^{-5} atm cm^3/sec max. leak rate.
4. AC dielectric hipot by 100 Hz square wave at a minimum peak to peak voltage of 3 x rated DC voltage (except 800 V P/P for 400 VDC).
5. DC dielectric hipot at 200% rated volts.
6. Insulation resistance at 25°C, 100,000 megohms-uF. 1,000,000 megohms minimum for values 0.1 uF or less.
7. 0.15% max. dissipation factor at 25°C.
8. Capacitance % tolerance at 25°C.
9. 0.1% max. dielectric absorption.
10. Visual inspection for workmanship dimensions, marking and packaging

HIGH INSULATION RESISTANCE

Styles CRH01 to CRH05 exceed 3,000,000 megohms at 25°C for values 0.1 uF or less. CRC polycarbonate capacitors have the highest insulation resistance of any capacitors available for their size. Specially screened capacitors of this type are available with an insulation resistance of 1,000,000 megohms-uF at 25°C and improved IR characteristics at higher temperatures.

AC RATED TO 40 KHz

CRC miniature metallized polycarbonate capacitors have a dissipation factor so low, (generally 0.1% but rated 0.15% max.) that they can handle high current for their size. Their dissipation factor remains low after burn-in, 100% thermal aging, and AC square wave hipot. This quality feature of CRC capacitors makes them mandatory for use in most aerospace programs which require maximum reliability in AC applications under extreme environments.

HIGH STABILITY LOW TEMP. COEFFICIENT

The A12 and K12 capacitors offer a choice of temperature coefficient and stability limits to suit your application requirements. The capacitance vs. temperature slopes from capacitor to capacitor within a lot are very similar. The A12 series differ approximately ±30PPM/°C from unit to unit, within a lot, from −55°C to +125°C.

LOWEST COST HIGHEST RELIABILITY

When ordinary type metallized polycarbonate capacitors are subjected to a form of screening to hopefully produce high reliability capacitors, the results may be costly and uncertain. The savings achieved by the use of CRC capacitors are: **Uniform performance, longer equipment life possible; Improved stability, reduced rejects, and costly failure analysis. The cost for continuous Group B testing for retention of qualification is included in the unit price; there are no extra costs for test samples or testing.**

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CRC CAPACITORS QUALITY CONFORMANCE

PERIODIC TESTING PROGRAM

(FOR RETENTION OF QPL MIL-C-83421/1)

GROUP "B" INSPECTION PER MIL-C-83421, TABLE IV

GROUP B, SUBGROUPS 1, 2 AND 3: In order to maintain qualification, Component Research Company performs Periodic Testing (Quality Conformance Testing). Capacitors are selected from current production lots of CRH01 through CRH00 styles, which have successfully completed 100% "Group A" inspection shown on page 3.

SUBGROUP 1 TESTS

10 Each CRH Style Monthly

- Barometric Pressure
- Insulation Resistance at Max. Rated Temperature
- Temperature Coefficient
- Life (2,000 Hours)

SUBGROUP 2 TESTS

CRH01 Parts Jan., July
CRH02 Parts Feb., Aug.
100 Volt Parts March, Sept.
200 Volt Parts April, Oct.
400 Volt Parts May, Nov.

- AC Conditioning 250 Hours
- Dissipation Factor
- Insulation Resistance
- △ Capacitance

SUBGROUP 3 TESTS

18 Parts Every 6 Months,
Consisting of CRH01,
CRH02, CRH03, CRH04 and CRH05

- Vibration
- Salt Spray
- Immersion
- Solderability
- Shock
- Moisture Resistance
- Terminal Strength
- Resistance to Solvents

DC LIFE TEST PERFORMED MONTHLY

GROUP B, SUBGROUP 1 FOR ALL CRH STYLES COVERING ALL FAILURE RATE LEVELS

Capacitors are DC-Life tested at 100°C and at 140% of the rated D.C. voltage for 2,000 hours. (This is an acceleration factor of 5:1, approximately).

EXAMINATION OR TEST	CONDITIONS	POST TEST LIMITS	
		CRH01, CRH02, CRH03, CRH04, and CRH05	CRH06, CRH07, CRH08, CRH09, and CRH00
Barometric Pressure	Per MIL-C-83421	No breakdowns	No breakdowns
Insulation Resistance	@ Rated voltage @ 125°C	2,000 Megs-uF need not exceed 20,000 Megs	1,000 Megs-uF need not exceed 10,000 Megs
Temperature Coefficient	△ Cap. at −55°C Retrace at 25°C △ Cap. at +125°C	−1.5% to 0.5% max. ±0.1% max. +0.8% to −0.5% max.	−2.0% to −0.5% max. ±0.25% max. ±2.0% max.

POST LIFE TEST LIMITS AFTER 2,000 HOURS LIFE

		CRH01, CRH02, CRH03, CRH04, and CRH05	CRH06, CRH07, CRH08, CRH09, and CRH00
Insulation Resistance at Rated Voltage and 25°C	Insulation Sleeves	10,000 Megs min.	10,000 Megs min.
	Terminal to Terminal	100,000 Meg-uF need not exceed 1,000,000 Megs	33,333 Megs-uF need not exceed 333,333 Megs
	Terminals to Case	10,000 Megs min.	10,000 Megs min.
△ Capacitance % change with life	At 1 KHz and 25°C	±2% max. of initial value	±4% max. of initial value
% Dissipation Factor	At 1 KHz and 25°C	0.25% max.	0.35% max.

AC-SINUSOIDAL LIFE TEST PERFORMED MONTHLY

Capacitors are AC life tested for 250 hours at 100°C and at 140% of the rated RMS voltage at the applicable test frequency as shown in Table V. This test is performed monthly in order to verify the AC RMS voltage and current ratings.

POST AC TEST LIMITS

Insulation Resistance at Rated Voltage and 25°C	100,000 Megs-uF, need not exceed 1,000,000 Megs
Capacitance % Change at 1 KHz and 25°C	2% max. of initial value
% Dissipation Factor at 25°C	0.25% max.

TABLE V AC-LIFE TEST PARAMETERS PER MIL-C-83421/1

CRH Style	Equiv. CRC Type	DC Volts Rating	400 Hz AC RMS Volts Rating	250 Hours at 100°C Life Test Conditions	
				AC RMS Volts	Frequency In Hertz
01	A12A	30	22	30	4,000
02	A12B	50	36	50	4,000
03	A12C	100	60	84	4,000
04	A12D	200	120	168	400
05	A12E	400	240	336	400

CRC HIGH RELIABILITY CAPACITORS

AC-DC LIFE TEST DATA

MIL-C-83421/1 POLYCARBONATE CAPACITORS

DC LIFE TEST

Data shown is typical of continuous DC life testing performed monthly with samples from current production lots. Samples are tested monthly to maintain failure rate R (0.01%/1,000 hrs.).

AC LIFE TEST

Each month capacitors of assorted values selected from Table I of MIL-C-83421/1 and of the voltage rating specified in paragraph 4.6.2.1.1 (b) of MIL-C-83421, are submitted to 250 hours life at the test voltage and frequency specified in Table V of MIL-C-83421/1.

The excellent low loss and high quality of CRC polycarbonate capacitors enables them to withstand this severe testing without failure. Under these test conditions a 3.9 uF, 50 VDC capacitor is handling 5 AMPS RMS. This can be considered outstanding with a case size as small as 0.562 x 1.375. A 3.9 uF, 50 VDC capacitor is normally rated at 3.6 AMPS RMS AC MAX, as shown in Table I of MIL-C-83421/1.

DC LIFE TEST DATA

PER MIL-C-83421 PARA. 3.27, 4.7.23.2.1 TEST REPORT 74TR35 CRH01 Through CRH00

TEST RESULTS FOR 280 POLYCARBONATE CAPACITORS TESTED FOR 2000 HOURS AT 100°C WITH 140% RATED VOLTAGE APPLIED.

THERE WERE NO FAILURES FOR THIS TEST.

List of Capacitors Life Tested				Insulation Resistance In Megohms at 25°C			% Capacitance Change With Life			% Dissipation Factor At 25°C		
MIL Type	CRC Type	uF Value	Quan. Tested	Post Test Limits (Min. IR)	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
					Low	High		Low	High		Low	High
CRH01	A12A	.47	30	2.1 x 10^5	1 x 10^6	2.3 x 10^6	±2%	−.06%	+.31%	.25%	.07%	.08%
CRH01	A12A	.10	30	1 x 10^6	1.2 x 10^6	1 x 10^7	±2%	+.01%	+.21%	.25%	.07%	.08%
CRH01	A12A	.056	30	1 x 10^6	1.7 x 10^7	3 x 10^7	±2%	+.15%	+.34%	.25%	.07%	.12%
CRH06	K12A	.15	5	2.2 x 10^5	1.3 x 10^6	2 x 10^6	±5%	−.50%	−2.1%	.35%	.11%	.14%
CRH06	K12A	.039	5	3.3 x 10^5	7.5 x 10^6	1.5 x 10^7	±5%	−.02%	−1.4%	.35%	.13%	.18%
CRH06	K12A	.082	5	3.3 x 10^5	1 x 10^7	1.5 x 10^7	±5%	+.31%	+.41%	.35%	.07%	.08%
CRH02	A12B	.12	10	8.3 x 10^6	1.7 x 10^7	5 x 10^7	±2%	−.08%	+.42%	.25%	.07%	.08%
CRH02	A12B	.05	10	1 x 10^6	5 x 10^7	5 x 10^7	±2%	+.01%	+.02%	.25%	.07%	.08%
CRH02	A12B	.012	10	1 x 10^6	5 x 10^7	5 x 10^7	±2%	−.01%	+.39%	.25%	.05%	.07%
CRH07	K12B	.15	5	2.2 x 10^5	1.7 x 10^7	2.5 x 10^7	±5%	+.05%	+.12%	.35%	.07%	.08%
CRH07	K12B	.039	5	3.3 x 10^5	2 x 10^6	1.7 x 10^7	±5%	−.28%	−1.0%	.35%	.07%	.10%
CRH07	K12B	.01	5	3.3 x 10^5	2.5 x 10^7	5 x 10^7	±5%	+.28%	−.40%	.35%	.06%	.07%
CRH03	A12C	.022	10	1 x 10^6	1.4 x 10^7	5 x 10^7	±2%	+.01%	−.15%	.25%	.07%	.08%
CRH03	A12C	.018	5	1 x 10^6	2.5 x 10^7	3 x 10^7	±2%	+.04%	+.22%	.25%	.06%	.07%
CRH03	A12C	.01	10	1 x 10^6	2 x 10^7	5 x 10^7	±2%	+1.14%	−1.19%	.25%	.05%	.10%
CRH08	K12C	.047	5	3.3 x 10^5	2.5 x 10^7	3 x 10^7	±5%	+.10%	+.19%	.35%	.07%	.08%
CRH08	K12C	.05	5	3.3 x 10^5	2 x 10^7	2.5 x 10^7	±5%	+.01%	+.14%	.35%	.07%	.08%
CRH08	K12C	.012	5	3.3 x 10^5	1.6 x 10^7	3 x 10^7	±5%	+2.6%	+3.4%	.35%	.08%	.10%
CRH04	A12D	.039	10	1 x 10^6	1.5 x 10^6	4 x 10^7	±2%	−.05%	+.12%	.25%	.07%	.07%
CRH04	A12D	.027	10	1 x 10^6	2.9 x 10^7	4 x 10^7	±2%	−.03%	+.21%	.25%	.07%	.07%
CRH04	A12D	.1	10	1 x 10^6	7 x 10^6	9 x 10^6	±2%	−.02%	+.22%	.25%	.07%	.08%
CRH09	K12D	.50	5	6.6 x 10^4	3 x 10^6	4 x 10^6	±5%	+.08%	+.14%	.35%	.07%	.09%
CRH09	K12D	.033	5	3.3 x 10^5	2.5 x 10^7	4 x 10^7	±5%	+.07%	+.14%	.35%	.06%	.07%
CRH09	K12D	.039	5	3.3 x 10^5	2 x 10^7	4 x 10^7	±5%	+.08%	+.25%	.35%	.07%	.08%
CRH05	A12E	.022	10	1 x 10^6	4 x 10^6	2.5 x 10^7	±2%	+.03%	−1.2%	.25%	.06%	.07%
CRH05	A12E	.05	10	1 x 10^6	8 x 10^6	2 x 10^7	±2%	−.03%	+.32%	.25%	.06%	.07%
CRH05	A12E	.047	10	1 x 10^6	1.7 x 10^7	2 x 10^7	±2%	+.06%	+.24%	.25%	.07%	.15%
CRH00	K12D	.068	5	3.3 x 10^5	7 x 10^5	8 x 10^6	±5%	−.08%	+.21%	.35%	.08%	.08%
CRH00	K12D	.027	5	3.3 x 10^5	8 x 10^6	3 x 10^7	±5%	+.30%	−.36%	.35%	.07%	.08%
CRH00	K12D	.039	5	3.3 x 10^5	3 x 10^6	3 x 10^7	±5%	−.10%	+.11%	.35%	.06%	.07%

AC LIFE TEST DATA

74TR35 PER MIL-C-83421 PARA. 3.28, 4.7.24

88 30 VDC CAPACITORS WERE SUBJECTED TO 30 VRMS AC AT 4000 HZ, 100°C FOR 250 HOURS. NO FAILURES OCCURRED.

67 50 VDC CAPACITORS WERE SUBJECTED TO 50 VRMS AC AT 4000 HZ, 100°C FOR 250 HOURS. NO FAILURES OCCURRED.

List of Capacitors Life Tested				Insulation Resistance In Megohms at 25°C			% Capacitance Change With Life			% Dissipation Factor At 25°C		
MIL Type	CRC Type	uF Value	Quan. Tested	Post Test Limits (Min. IR)	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
					Low	High		Low	High		Low	High
CRH01	A12A	.22	22	4.5 x 10^5	2.7 x 10^6	6 x 10^6	±2%	+.06%	+.14%	.25%	.06%	.08%
CRH01	A12A	4.0	12	2.5 x 10^4	1.2 x 10^5	5 x 10^5	±2%	−.02%	+.42%	.25%	.04%	.07%
CRH01	A12A	.068	12	1 x 10^6	1.5 x 10^6	5 x 10^6	±2%	+.01%	+.29%	.25%	.06%	.07%
CRH01	A12A	.022	12	1 x 10^6	7.5 x 10^6	1.5 x 10^7	±2%	+.03%	−.57%	.25%	.06%	.07%
CRH01	A12A	1.5	6	6 x 10^4	3 x 10^5	6.2 x 10^5	±2%	−.08%	−.12%	.25%	.07%	.08%
CRH01	A12A	.82	6	1.2 x 10^5	1.1 x 10^6	1.2 x 10^6	±2%	+.05%	−.06%	.25%	.08%	.11%
CRH01	A12A	.39	6	2.5 x 10^5	1.6 x 10^6	1.8 x 10^6	±2%	+.04%	−.05%	.25%	.08%	.09%
CRH01	A12A	.47	6	2.1 x 10^5	1.7 x 10^6	1.8 x 10^6	±2%	−.01%	+.02%	.25%	.06%	.07%
CRH01	A12A	.33	6	3.0 x 10^5	1.7 x 10^6	1.8 x 10^6	±2%	+.01%	−.02%	.25%	.07%	.08%
CRH02	A12B	.1	22	1 x 10^6	3 x 10^6	7.5 x 10^6	±2%	+.06%	+.19%	.25%	.06%	.08%
CRH02	A12B	3.0	15	3.3 x 10^4	2.1 x 10^5	5 x 10^5	±2%	+.07%	+.81%	.25%	.04%	.04%
CRH02	A12B	.5	10	2 x 10^5	8.3 x 10^5	1.3 x 10^6	±2%	+.01%	+.07%	.25%	.06%	.07%
CRH02	A12B	1.0	10	1 x 10^5	4.4 x 10^5	8.3 x 10^5	±2%	+.08%	+.18%	.25%	.06%	.08%
CRH02	A12B	.1	10	1 x 10^6	3 x 10^6	4.2 x 10^6	±2%	+.09%	−.11%	.25%	.07%	.08%

CRC HIGH RELIABILITY CAPACITORS

HOW TO SELECT AND SPECIFY MIL-C-83421/1 CAPACITOR PART NUMBERS

SELECTION INFORMATION

MIL-C-83421/1 covers 30 volt to 400 volt DC rated capacitors for applications requiring a tight capacitance tolerance, excellent capacitance stability, very high insulation resistance and low loss factors. This specification applies in addition where the AC component of voltage is large with respect to the applied DC voltage, and where momentary breakdowns cannot be tolerated.

MIL-C-83421/1 offers the users two quality level styles. Each style includes 30 VDC, 50 VDC, 100 VDC, 200 VDC and 400 VDC rated capacitors, with 0.25%, 0.5%, 1%, 2%, 5% and 10% capacitance tolerances to select from.

A study of catalog page 3 provides a comparison of screening steps and key features that are unique with capacitors qualified to MIL-C-83421/1. If any doubt exists as to the use of these capacitors for high energy AC conditions not covered in the AC ratings of Table 1, a complete description of current and voltage conditions, including waveforms, should be forwarded to us for review and recommendations.

CONSTRUCTION INFORMATION

All CRH capacitors are tubular, metal cased, with both wire lead terminals isolated from the case. All the capacitors are provided with a plastic heat shrink-fit sleeve to insulate the metal case. The lead wires are #22 AWG for 0.312 or less case diameters and #20 AWG for 0.400 and 0.500 diameters. The lead wires are normally tinned copper clad steel per type "W" of MIL-STD-1276. Capacitors with gold plated nickel leads per N2 of MIL-STD-1276 can also be provided at additional cost. For 0.562" and larger diameters, #18 AWG tinned copper, OFHC, leads are used.

Unless you specifically request a lead material type for 0.500" and smaller diameters, Component Research will supply the material currently in production at time of order.

AC RATINGS

AC ratings at 400 Hz; 4000 Hz; and 40,000 Hz RMS AC voltage (sinusoidal), with current limits from −55°C to +100°C, are listed for each individual capacitance value and DC voltage rated style in Table 1. When operating above 100°C, derate all voltages linearly from full rated voltage at 100°C to 50% of rating at 125°C.

Although CRC capacitors have a low dissipation factor of 0.15% max. at 25°C, their dissipation factor is lower yet at temperatures from 75°C to 125°C.

This results in lower watts-loss and heat rise at elevated temperatures — with, of course, improved reliability for AC or DC applications.

APPLICATION NOTES

Make certain that the sum of any instantaneous peak AC voltages plus any superimposed DC voltages do not exceed the capacitor's rated DC voltage.

Effective heat sinking will permit operation at higher current levels than listed in Table 1. However, our CRC application engineers should be advised prior to use in any application where non-sinusoidal operating conditions are encountered, or when higher RMS currents are involved.

Component Research Co. can supply special AC capacitors with greater current handling capability and reduced heat rise.

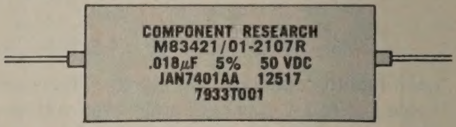
FAILURE RATE LETTERS

Component Research is presently qualified to failure rate "R" and intends to maintain this level continuously. Because MIL-C-83421/1 has such stringent post test limits, an "R" failure rate is indicative of higher quality than a higher letter such as "S" in other film capacitor specifications with looser post test limits.

HOW TO SPECIFY MIL-C-83421/1 PART NUMBERS

For ordering and marking purposes only, MIL-C-83421/1 capacitors must be identified as M83421/01 ....

An example of MIL-Spec marking is shown below. The sample shown is a 0.018μF, 5%, 50 volt, Style CRH02 capacitor.



COMPONENT RESEARCH
Manufacturer's name, may be abbreviated when space is limited.

M83421/01
Basic military specification number (for marking only).

-2
Indicates CRH02 style which covers 50 VDC rating and higher quality screened type. (CRH07 is a 50 VDC style with reduced screening and performance. See page 3.)

107
Dash No. of required μF value and % tolerance selected from Table 1 of MIL-C-834212/1.

R
(R is failure rate letter.)

JAN
Jan marking.

7401
Weekly date code per MIL-STD-1285.

AA
Unique sub lot or batch code for traceability.

12517
CRC federal code number.

***7983T**
Unique batch test number.

***001**
Unique serial number.

**This marking found on CRC capacitors is not required by MIL-C-83421/1 but is standard marking identification used by CRC to permit maximum traceability for Level 1 parts such as CRH01 to CRH05 styles.*

ADDITIONAL MARKING EXAMPLE:

A 0.0015 μF, 1%, 100 VDC, CRH03 capacitor selected from Table 1 below would be identified as M83421/01-3015R.

MIL-C-83421/1 TABLE 1 (SECTION SHOWN OF 100 VDC STYLES)

Capacitance value (nom) (in μF)	Dimensions 1/ (in inches with mm in parentheses) L ±.030(.76)	D +.020(.51) -.000	G, max	Dash number 2/ Capacitance tolerance value (in %) ±0.25	±0.5	±1.0	±2.0	±5.0	±10.0	AC ratings (for sinusoidal operation from -65° to +100°C) 3/ 0 to .4 KHz Volts	0 to .4 KHz Current (in A)	At 4 KHz Volts	At 4 KHz Current (in A)	At 40 KHz Volts	At 40 KHz Current (in A)
0.001	0.500(12.70)	0.170(4.32)	0.700(17.78)	-001-	-002-	-003-	-004-	-005-	-006-	60.0	.001	60.0	.002	60.0	.015
0.0012	↑	↑	↑	-007-	-008-	-009-	-010-	-011-	-012-	↑	↑	↑	.002	↑	.018
0.0015				-013-	-014-	-015-	-016-	-017-	-018-				.002		.022
0.0018				-019-	-020-	-021-	-022-	-023-	-024-				.003		.027

CRC HIGH RELIABILITY CAPACITORS

MIL-C-83421/1 AC RATED CAPACITORS RELIABILITY QUESTIONS AND ANSWERS

What are the limiting factors restricting the use of metallized polycarbonate capacitors for AC applications?

A properly manufactured and screened capacitor can handle considerable RMS and peak currents from −55°C to +125°C without significant case temperature heat rise. The dissipation factor of capacitors to be used in AC applications must be uniformly low to limit the watts loss incurred usually by capacitors with a high (ESR) equivalent series resistance.

We recommend a maximum dissipation factor of 0.15% at 1 KHz as the acceptance test limit. All capacitors should be subjected to temperature cycling prior to final measurement of DF to observe if they remain less than 0.15%. This test eliminates problems which may occur in use, after storage, or operation at extreme temperatures, leading to higher DF and operational failure.

CRC catalog page 9 contains the maximum RMS current and voltage ratings for sinusoidal conditions, continuous duty cycle, at 400 Hz and 40 KHz. For conditions other than shown, send to our sales office a sketch of the current and voltage waveforms under worst case and normal operating conditions. Include all other information necessary for quotation purposes.

Is polycarbonate better than other dielectrics for AC applications?

If size, weight, cost, or operating temperatures were not important considerations, then other dielectric style capacitors are superior to polycarbonate.

As an example, CRC can supply polystyrene, teflon, or polypropylene AC capacitors with approximately ten times lower loss than the series 12 polycarbonate capacitors.

Polysulfone introduced as a new product on pages 38 and 39, is slightly better than polycarbonate for AC applications below 100°C, and can be used above 125°C (the limit for polycarbonate), to 150°C with proper voltage derating.

CRC considers mylar and paper dielectric styles too lossy for AC applications and therefore does not recommend this type for such requirements. Additional information on AC capacitors appears on other pages of this catalog.

What type of screening test will assure that the polycarbonate capacitors are reliable for AC applications?

Once it has been determined that your application requirements can be met by CRC standard polycarbonate series 12 capacitors, the screening test used by CRC and incorporated into MIL-C-83421/1 will be sufficient to provide the quality assurance needed.

As an example 100% of the capacitors are temperature cycled then are subjected to a square wave voltage at 100 Hz at 300% of rated DC voltage for peak to peak amplitude.

During this test the capacitors must handle approximately 35 microsecond wide current pulses for one minute at a rate of 200 per second.

A routine examination of the current and voltage waveforms during square wave hipot of 10 uF, 50 VDC type CRH capacitors, shows that with 150 volts peak to peak voltage at 100 Hz applied, the peak current is 85 amps. This is equivalent to operation with a half sine wave peak current pulse of 8.5 amps/uF at a 200 PPS rate. SEE WAVEFORMS AT RIGHT.

Following the square wave voltage stress test the capacitors must meet 0.15% max. dissipation factor limits.

As shown on catalog page 5, life testing of CRC metallized polycarbonate capacitors at 400 Hz and 4000 Hz is performed continuously as retention of qualification to MIL-C-83421/1.

Are the new CRC series 12 AC rated polycarbonate capacitors higher in cost than their earlier type PL and PG capacitors supplied since 1965?

A study of series 12 polycarbonate prices, shows that with few exceptions price reductions (particularly for closer tolerances and larger uF values) are the rule. An examination of the series 12 specifications shows higher guaranteed performance and continuous retention of qualification testing. This in itself represents a substantial price decrease in terms of value adding without increased cost.

Why are CRC low dissipation factor polycarbonate capacitors replacing commonly manufactured capacitors in AC applications?

There is a risk that the dissipation factor of such capacitors will increase with use and result in hot spots at the terminations. Field failures of such capacitors have been reported where the capacitors have exploded and caused fire damage.

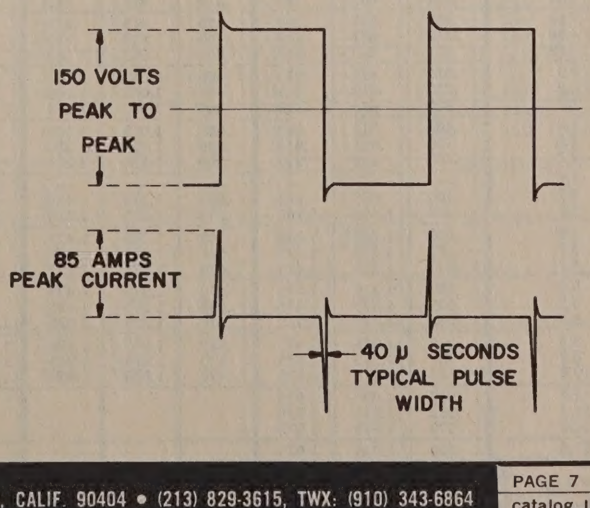
It may be possible to use ordinary higher DF capacitors without noticeable problems at 400 Hz provided that RMS voltage is sufficiently low such that the RMS current is limited. Heat sinking will also help prevent excess heat rise due to poor quality terminations.

Interestingly enough CRC polycarbonate capacitors have a lower dissipation factor at temperatures from 75°C to 125°C than at 25°C which lowers their effective heat rise at higher temperatures. Where the current source is limited, higher DF capacitors may not heat sufficiently to short, but may gradually suffer from increasing DF to the point where they are effectively open.

What is the maximum current that can be applied to MIL-C-83421/1 capacitors?

The 40 KHz current and voltage ratings listed in Table I of the Mil-Spec and also shown on page 9 of this catalog are based upon continuous operation under sinusoidal conditions. It is essential that any use under conditions exceeding these limits be discussed further with our applications engineers for elimination of failures. Under certain conditions, the capacitors can be used at higher frequencies and in square wave filtering applications. For good reliability it is best to study these special applications on an individual basis. CRC plans to provide data tables showing allowable working conditions during higher frequency sinusoidal, pulsed, and non-sinusoidal conditions.

TYPICAL VOLTAGE AND PEAK CURRENT WAVEFORMS SHOWN FOR A12B106, 10 uF, 50 V, METALLIZED POLYCARBONATE CAPACITOR DURING THE ONE MINUTE AC SQUARE WAVE SCREENING AT 100 Hz.



CRC HIGH RELIABILITY CAPACITORS

MIL-C-83421/1 A12, K12 CASE SIZES

SERIES
12

SERIES A12, K12 POLYCARBONATE CAPACITORS

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- LIFE TEST DATA 5
- DETAILED SPECIFICATIONS 10, 11
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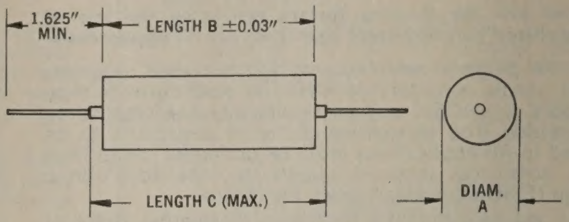


CASE DIMENSION	TOLERANCE LIMITS
"A" Diameter	±0.010" Without Sleeving
	−0.00" +0.02" With Mylar Sleeving
"B" Case Length	±0.03" With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the solder bead. CRC "C" dimensions for A12 and K12 capacitors are 0.1" less than Mil-C-83421/1 requires.

uF	12A	30VDC		12B	50VDC		12C	100VDC		12D	200VDC		12E	400VDC	
	Diam. A	Length B	Length C	Diam. A	Length B	Length C	Diam. A	Length B	Length C	Diam. A	Length B	Length C	Diam. A	Length B	Length C
.001	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.0012	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.0015	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.0018	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.002	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.0022	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.193	.562	.662
.0027	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.0033	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.0039	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.0047	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.005	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.0056	.170	.500	.600	.170	.500	.600	.170	.500	.600	.170	.562	.662	.235	.562	.662
.0068	.170	.500	.600	.170	.500	.600	.170	.562	.662	.170	.562	.662	.235	.687	.787
.0082	.170	.500	.600	.170	.562	.662	.170	.562	.662	.193	.562	.662	.235	.687	.787
.01	.170	.500	.600	.170	.562	.662	.170	.687	.787	.193	.562	.662	.235	.687	.787
.012	.170	.500	.600	.170	.562	.662	.170	.687	.787	.193	.562	.662	.235	.687	.787
.015	.170	.500	.600	.170	.562	.662	.170	.687	.787	.235	.562	.662	.235	.813	.913
.018	.170	.500	.600	.193	.562	.662	.193	.687	.787	.235	.687	.787	.312	.813	.913
.02	.170	.500	.600	.193	.562	.662	.193	.687	.787	.235	.687	.787	.312	.813	.913
.022	.170	.500	.600	.193	.562	.662	.193	.687	.787	.235	.687	.787	.312	.813	.913
.027	.170	.562	.662	.193	.562	.662	.193	.687	.787	.312	.687	.787	.312	.813	.913
.033	.170	.562	.662	.193	.562	.662	.193	.687	.787	.312	.687	.787	.312	.813	.913
.039	.170	.562	.662	.170	.687	.787	.235	.687	.787	.312	.687	.787	.312	.813	.913
.047	.170	.562	.662	.170	.687	.787	.235	.687	.787	.312	.687	.787	.400	.813	.913
.05	.170	.562	.662	.170	.687	.787	.235	.687	.787	.312	.687	.787	.400	.813	.913
.056	.170	.562	.662	.193	.687	.787	.235	.687	.787	.312	.813	.913	.400	.813	.913
.068	.170	.687	.787	.193	.687	.787	.235	.813	.913	.312	.813	.913	.400	.813	.913
.082	.170	.687	.787	.193	.813	.913	.312	.687	.787	.312	.813	.913	.400	1.063	1.163
.1	.193	.687	.787	.193	.813	.913	.312	.687	.787	.312	.813	.913	.400	1.063	1.163
.12	.193	.687	.787	.235	.687	.787	.312	.687	.787	.312	.813	.913	.400	1.063	1.163
.15	.235	.562	.662	.235	.687	.787	.312	.813	.913	.400	1.063	1.163	.400	1.375	1.475
.18	.235	.687	.787	.235	.813	.913	.312	.813	.913	.400	1.375	1.475	.500	1.375	1.475
.20	.235	.687	.787	.235	.813	.913	.312	.813	.913	.400	1.375	1.475	.500	1.375	1.475
.22	.235	.687	.787	.235	.813	.913	.312	.813	.913	.400	1.375	1.475	.500	1.375	1.475
.27	.235	.687	.787	.312	.687	.787	.312	1.063	1.163	.500	1.375	1.475	.562	1.375	1.475
.33	.235	.687	.787	.312	.687	.787	.312	1.063	1.163	.500	1.375	1.475	.562	1.375	1.475
.39	.235	.687	.787	.312	.813	.913	.400	1.063	1.163	.500	1.375	1.475	.562	1.875	1.975
.47	.312	.687	.787	.312	.813	.913	.400	1.063	1.163	.500	1.375	1.475	.562	1.875	1.975
.50	.312	.687	.787	.312	.813	.913	.400	1.063	1.163	.500	1.375	1.475	.562	1.875	1.975
.56	.312	.687	.787	.400	.813	.913	.400	1.063	1.163	.500	1.375	1.475	.562	1.875	1.975
.68	.312	.687	.787	.400	.813	.913	.500	1.125	1.225	.562	1.375	1.475	.750	1.875	1.975
.82	.312	.813	.913	.400	1.063	1.163	.500	1.125	1.225	.562	1.875	1.975	.750	1.875	1.975
1.0	.312	.813	.913	.400	1.063	1.163	.562	1.125	1.225	.562	1.875	1.975	.750	1.875	1.975
1.2	.312	.813	.913	.400	1.063	1.163	.562	1.125	1.225	.562	1.875	1.975	1.0	1.875	1.975
1.5	.400	.813	.913	.400	1.063	1.163	.562	1.375	1.475	.670	1.875	1.975	1.0	2.375	2.475
1.8	.400	.813	.913	.400	1.063	1.163	—	—	—	.750	1.875	1.975	1.0	2.375	2.475
2.0	.400	.813	.913	.500	1.125	1.225	.670	1.375	1.475	.750	1.875	1.975	1.0	2.375	2.475
2.2	.400	.813	.913	.500	1.125	1.225	.670	1.375	1.475	.750	1.875	1.975			
2.5	—	—	—	—	—	—	—	—	—	.750	1.875	1.975			
2.7	.400	.813	.913	.500	1.375	1.475	.670	1.875	1.975	.750	1.875	1.975			
3.0	.400	1.063	1.163	.500	1.375	1.475	.670	1.875	1.975	1.0	1.875	1.975			
3.3	.400	1.063	1.163	.500	1.375	1.475	.670	1.875	1.975	1.0	1.875	1.975			
3.9	.400	1.375	1.475	.562	1.375	1.475	.750	1.875	1.975	1.0	2.375	2.475			
4.7	.500	1.375	1.475	.670	1.375	1.475	.750	1.875	1.975						
5.0	.500	1.375	1.475	.670	1.375	1.475	.750	1.875	1.975						
5.6	.500	1.375	1.475	.670	1.375	1.475	.750	1.875	1.975						
6.8	.562	1.375	1.475	.670	1.875	1.975	1.0	2.375	2.475						
8.0	.562	1.375	1.475	.670	1.875	1.975	1.0	2.375	2.475						
8.2	.562	1.375	1.475	.670	1.875	1.975	1.0	2.375	2.475						
10.0	.562	1.375	1.475	.670	1.875	1.975	1.0	2.375	2.475						
12.0	.562	1.875	1.975												
15.0	.562	1.875	1.975												
20.0	.670	1.875	1.975												
22.0	.670	1.875	1.975												

CRC HIGH RELIABILITY CAPACITORS

SERIES 12 POLYCARBONATE

AC RATINGS 400 Hz TO 40,000 Hz COVERS MIL-C-83421/1 AND MIL-C-39022/9C CAPACITORS

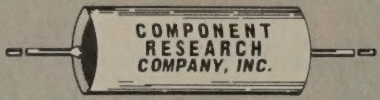
Component Research Co. has over 150 KVA of specialized AC generating equipment operating from 400 Hz to 100,000 Hz, sinusoidal conditions, for burn-in, life testing, and continuous research and development. In addition, square wave and pulse generators capable of simulating massive energy stress or sharp rise times enables Component Research engineers to sample test standard production type capacitors to ascertain their capability under higher stress operating conditions. Custom designed capacitors for critical space, military, and commercial applications are thoroughly screened and evaluated to eliminate excess heating or any other cause for failure. The AC ratings of MIL-C-83421/1 were developed as a result of tests conducted on CRC polycarbonate capacitors from 400 Hz to 40,000 Hz. Following is data similar to that found in MIL-C-83421/1.

AC Ratings: AC ratings are for sinusoidal conditions from −55°C to +100°C. Derate linearly to 50% of AC rated RMS voltage at 125°C.

uF	12A 30VDC			12B 50VDC			12C 100VDC			12D 200VDC			12E 400VDC		
	AC RATINGS			AC RATINGS			AC RATINGS			AC RATINGS			AC RATINGS		
	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps
.001	22.0	22.0	.006	36.0	36.0	.009	60.0	60.0	.015	120.0	80.0	.020	240.0	100.0	.025
.0012	22.0	22.0	.007	36.0	36.0	.011	60.0	60.0	.018	120.0	80.0	.024	240.0	100.0	.030
.0015	22.0	22.0	.008	36.0	36.0	.013	60.0	60.0	.022	120.0	80.0	.030	240.0	100.0	.037
.0018	22.0	22.0	.010	36.0	36.0	.016	60.0	60.0	.027	120.0	80.0	.036	240.0	100.0	.045
.002	22.0	22.0	.011	36.0	36.0	.018	60.0	60.0	.030	120.0	80.0	.040	240.0	100.0	.050
.0022	22.0	22.0	.012	36.0	36.0	.020	60.0	60.0	.033	120.0	80.0	.044	240.0	100.0	.055
.0027	22.0	22.0	.015	36.0	36.0	.024	60.0	60.0	.041	120.0	80.0	.054	240.0	100.0	.068
.0033	22.0	22.0	.018	36.0	36.0	.030	60.0	60.0	.050	120.0	80.0	.066	240.0	100.0	.083
.0039	22.0	22.0	.021	36.0	36.0	.035	60.0	60.0	.058	120.0	80.0	.078	240.0	100.0	.097
.0047	22.0	22.0	.026	36.0	36.0	.042	60.0	60.0	.071	120.0	80.0	.094	240.0	100.0	.12
.005	22.0	22.0	.028	36.0	36.0	.045	60.0	60.0	.075	120.0	80.0	.10	240.0	100.0	.13
.0056	22.0	22.0	.031	36.0	36.0	.050	60.0	60.0	.084	120.0	80.0	.11	240.0	100.0	.14
.0068	22.0	22.0	.037	36.0	36.0	.061	60.0	60.0	.10	120.0	80.0	.14	240.0	100.0	.17
.0082	22.0	22.0	.045	36.0	36.0	.074	60.0	60.0	.12	120.0	80.0	.16	240.0	100.0	.21
.01	22.0	22.0	.055	36.0	36.0	.090	60.0	60.0	.15	120.0	80.0	.20	240.0	100.0	.25
.012	22.0	22.0	.066	36.0	36.0	.11	60.0	59.0	.18	120.0	78.0	.23	240.0	100.0	.30
.015	22.0	22.0	.082	36.0	36.0	.14	60.0	58.0	.22	120.0	76.0	.29	240.0	94.0	.35
.018	22.0	22.0	.100	36.0	36.0	.16	60.0	57.0	.26	120.0	74.0	.33	240.0	90.0	.41
.02	22.0	22.0	.11	36.0	36.0	.18	60.0	55.0	.28	120.0	71.0	.36	240.0	88.0	.44
.022	22.0	22.0	.12	36.0	36.0	.20	60.0	53.0	.29	120.0	68.0	.37	240.0	85.0	.47
.027	22.0	22.0	.15	36.0	36.0	.24	60.0	51.0	.34	120.0	65.0	.44	240.0	81.0	.55
.033	22.0	22.0	.18	36.0	36.0	.30	60.0	50.0	.41	120.0	62.0	.51	240.0	78.0	.65
.039	22.0	22.0	.22	36.0	36.0	.35	60.0	48.0	.47	120.0	60.0	.59	240.0	75.0	.73
.047	22.0	22.0	.26	36.0	36.0	.42	60.0	47.0	.55	120.0	57.0	.67	240.0	71.0	.83
.05	22.0	22.0	.28	36.0	36.0	.45	60.0	46.0	.58	120.0	56.0	.70	240.0	70.0	.88
.056	22.0	22.0	.31	36.0	36.0	.50	60.0	46.0	.64	120.0	56.0	.78	240.0	67.5	.95
.068	22.0	22.0	.37	36.0	34.0	.58	60.0	42.0	.71	120.0	50.0	.85	240.0	60.0	1.02
.082	22.0	22.0	.45	36.0	32.0	.66	60.0	38.0	.78	120.0	44.0	.90	240.0	50.0	1.03
.1	22.0	22.0	.55	36.0	30.0	.75	60.0	36.0	.90	120.0	42.0	1.10	240.0	46.0	1.20
.12	22.0	22.0	.66	36.0	30.0	.90	60.0	35.0	1.05	120.0	40.0	1.20	240.0	44.5	1.34
.15	22.0	22.0	.83	36.0	26.0	.98	60.0	33.0	1.24	120.0	36.0	1.34	240.0	40.0	1.50
.18	22.0	22.0	1.00	36.0	25.0	1.13	60.0	31.0	1.40	120.0	34.0	1.54	240.0	38.0	1.70
.20	22.0	20.0	1.00	36.0	24.0	1.20	60.0	30.0	1.50	120.0	33.0	1.65	240.0	37.0	1.85
.22	22.0	18.5	1.02	36.0	23.0	1.27	60.0	27.0	1.50	120.0	32.0	1.76	240.0	35.0	1.93
.27	22.0	17.0	1.15	36.0	19.0	1.28	60.0	24.0	1.62	120.0	29.0	1.96	240.0	33.0	2.24
.33	22.0	16.0	1.32	36.0	18.0	1.48	60.0	23.0	1.90	120.0	28.0	2.31	240.0	32.0	2.65
.39	22.0	15.0	1.46	36.0	17.0	1.66	60.0	22.0	2.15	120.0	27.0	2.63	240.0	32.0	3.14
.47	22.0	14.0	1.65	36.0	15.7	1.85	60.0	21.0	2.47	120.0	26.0	3.06	240.0	31.0	3.64
.50	22.0	13.5	1.69	36.0	15.2	1.90	60.0	20.0	2.50	120.0	25.0	3.13	240.0	30.0	3.75
.56	22.0	12.9	1.81	36.0	14.4	2.01	60.0	19.0	2.64	120.0	23.0	3.17	240.0	29.0	4.05
.68	22.0	12.0	2.04	36.0	14.0	2.38	60.0	16.0	2.72	120.0	20.0	3.40	240.0	26.0	4.50
.82	22.0	10.0	2.05	36.0	12.0	2.46	60.0	14.0	2.87	120.0	18.0	3.70	240.0	23.4	4.80
1.0	22.0	8.4	2.10	36.0	10.0	2.50	60.0	12.0	3.00	120.0	15.0	3.75	240.0	20.8	5.20
1.2	22.0	7.2	2.15	36.0	9.1	2.73	60.0	11.0	3.25	120.0	13.5	4.05	240.0	18.3	5.50
1.5	22.0	5.8	2.17	36.0	7.7	2.90	60.0	10.0	3.75	120.0	12.0	4.50	240.0	16.0	6.00
1.8	22.0	4.8	2.2	36.0	6.6	3.00	—	—	—	120.0	11.0	5.00	240.0	15.0	6.80
2.0	22.0	4.4	2.2	36.0	6.2	3.10	60.0	8.1	4.10	120.0	10.0	5.00	240.0	14.0	7.00
2.2	22.0	4.0	2.2	36.0	5.8	3.20	60.0	7.5	4.12	120.0	9.1	5.00			
2.5	—	—	—	—	—	—	—	—	—	120.0	8.0	5.00			
2.7	22.0	3.3	2.2	36.0	5.0	3.34	60.0	6.5	4.40	120.0	7.7	5.20			
3.0	22.0	2.9	2.2	36.0	4.5	3.40	60.0	6.0	4.51	120.0	7.0	5.27			
3.3	22.0	2.7	2.2	36.0	4.2	3.5	60.0	5.5	4.55	120.0	6.5	5.36			
3.9	22.0	2.3	2.2	36.0	3.7	3.6	60.0	5.0	4.90	120.0	5.5	5.40			
4.7	22.0	1.9	2.2	36.0	3.1	3.6	60.0	4.3	5.00						
5.0	22.0	1.8	2.2	36.0	2.9	3.6	60.0	4.0	5.00						
5.6	22.0	1.6	2.2	36.0	2.6	3.6	60.0	3.6	5.00						
6.8	22.0	1.3	2.2	36.0	2.1	3.6	60.0	3.0	5.00						
8.0	22.0	1.1	2.2	36.0	1.8	3.6	60.0	2.5	5.00						
8.2	22.0	1.1	2.2	36.0	1.8	3.6	60.0	2.4	5.00						
10.0	22.0	.88	2.2	36.0	1.4	3.6	60.0	2.0	5.00						
12.0	22.0	.73	2.2												
15.0	22.0	.59	2.2												
20.0	22.0	.44	2.2												
22.0	22.0	.40	2.2												

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

MIL-C-83421/1 POLYCARBONATE AC TESTED CAPACITORS



MIL STYLE	DC VOLTS	400 Hz AC VOLTS	CRC BASIC P/N
CRH01	30	22 VRMS	A12A
CRH02	50	36 VRMS	A12B
CRH03	100	60 VRMS	A12C
CRH04	200	120 VRMS	A12D
CRH05	400	240 VRMS	A12E

SERIES A12 QUALITY ASSURANCE

ALL CAPACITORS ARE 100% SCREENED AND TESTED AS FOLLOWS:

1 48 hours Burn-in at 125°C and 140% of the rated DC voltage.

2 Thermal aging. 10 temperature cycles from −65°C to 125°C.

3 Helium Leak Test. 1×10^{-6} atm/cm³/sec max. leak rate.

4 DC dielectric strength. Apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.

5 AC dielectric strength. Apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC Voltage for one minute (except 800V peak to peak for 400 VDC styles).

6 Insulation Resistance. At rated voltage and 25°C, 300,000 megs — uF minimum, but need not exceed 3,000,000 Megohms.

7 Capacitance. % Tolerance at 1 KHz and 25°C.

8 Dissipation Factor. At 1 KHz and 25°C, 0.15% maximum.

9 Temperature Coefficient. Measured from −55°C to 125°C at a minimum of 5 temperature points. (Performed on monthly lot sampling basis).

10 0.1% max. dielectric absorption.

11 Visual inspection. Check dimensions, marking and packaging.

12 Traceability to production and test records by permanent marking of parts with lot control number.

13 Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790, Reliability Assurance Program.

14 Capacitors are serialized and packaged with certified test data to accompany each shipment.

CONSTRUCTION: Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C" or type "W"

A12 ADDITIONAL INFORMATION	PAGES
• Part Number System	6, 18
• Case Dimensions	8
• AC Current and Voltage Ratings	9
• Life Test Data	5
• Reliability	7
• Patent Information	21

CRC SERIES A12 QUALITY LEVEL 1

SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

CAPACITANCE CHANGE WITH TEMPERATURE (25°C REFERENCE)

−55°C	−0.5% to −1.5%
25°C	0.1% Max. Hysteresis
+125°C	−0.5% to +0.8%

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.03% Max.
−65°C to 125°C	0.2% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	3,000,000	2,000,000	1,000,000	300,000	20,000
Greater than 0.1 uF (in Megohms—uF)	300,000	200,000	100,000	30,000	2,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.
Example: A 4 uF capacitor is 75,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.1% Max. at 25°C.

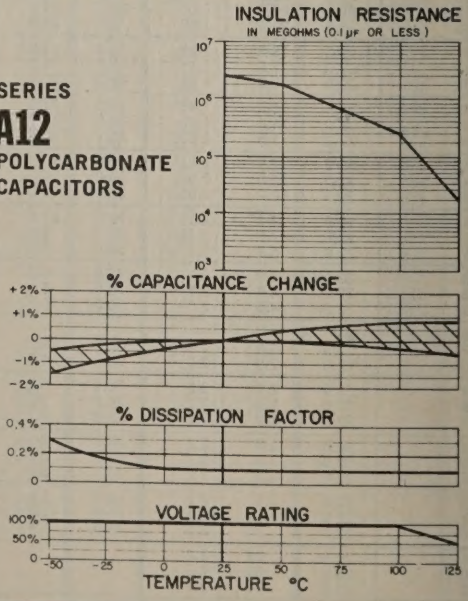
DISSIPATION FACTOR: 0.15% Max. at 1 KHz and 25°C. Values greater than 1 uF measure at 0.1 KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

SEAL TEST: 1×10^{-6} atm/cm³/sec Max. leak rate.

ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421/1.

SERIES
A12
POLYCARBONATE CAPACITORS



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MIL-C-83421/1 POLYCARBONATE AC TESTED CAPACITORS

COMPONENT
RESEARCH
COMPANY, INC.

MIL STYLE	DC VOLTS	400 Hz AC VOLTS	CRC BASIC P/N
CRH06	30	22 VRMS	K12A
CRH07	50	36 VRMS	K12B
CRH08	100	60 VRMS	K12C
CRH09	200	120 VRMS	K12D
CRH00	400	240 VRMS	K12E

SERIES K12 QUALITY ASSURANCE

ALL CAPACITORS ARE 100% SCREENED AND TESTED AS FOLLOWS:

1 Thermal aging. 5 temperature cycles from −65°C to 125°C.

2 Helium Leak Test. 1 x 10^{-5} atm/cm^3/sec max. leak rate.

3 DC dielectric strength. Apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.

4 AC dielectric strength. Apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC Voltage for one minute (except 800V peak to peak for 400 VDC styles).

5 Insulation Resistance. At rated voltage and 25°C, 100,000 megs — uF minimum, but need not exceed 1,000,000 Megohms.

6 Capacitance. % Tolerance at 1 KHz and 25°C.

7 Dissipation Factor. At 1 KHz and 25°C, 0.15% maximum.

8 Temperature Coefficient. Measured from −55°C to 125°C at a minimum of 5 temperature points. (Performed on monthly lot sampling basis).

9 0.1% max. dielectric absorption.

10 Visual inspection. Check dimensions, marking and packaging.

11 Traceability to production and test records by permanent marking of parts with lot control number.

12 Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790, Reliability Assurance Program.

CONSTRUCTION: Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C" or type "W"

K12 ADDITIONAL INFORMATION	PAGES
• Part Number System	6, 18
• Case Dimensions	8
• AC Current and Voltage Ratings	9
• Life Test Data	5
• Reliability	7
• Patent Information	21

CRC SERIES K12 QUALITY LEVEL 3

SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

CAPACITANCE CHANGE WITH TEMPERATURE (25°C REFERENCE)

−55°C	−0.5% to −2.0%
25°C	0.25% Max. Hysteresis
+125°C	±2%

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.05% Max.
−65°C to 125°C	0.25% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	1,000,000	500,000	100,000	50,000	10,000
Greater than 0.1 uF (in Megohms — uF)	100,000	50,000	10,000	5,000	1,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min. IR.

Example: A 10 uF capacitor is 10,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.1% Max. at 25°C.

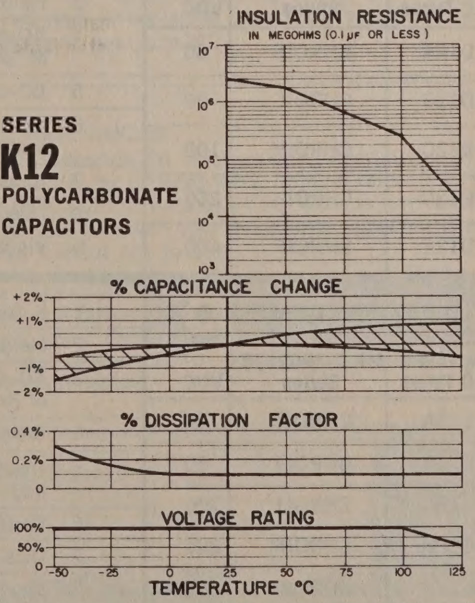
DISSIPATION FACTOR: 0.15% Max. at 1 KHz and 25°C. Values greater than 1 uF measure at 0.1 KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

SEAL TEST: 1 x 10^{-5} atm/cm^3/ sec Max. leak rate.

ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421/1.

SERIES K12 POLYCARBONATE CAPACITORS



CRC HIGH RELIABILITY CAPACITORS

100% Group A Screening & Inspection

***MIL-C-39022/9 POLYCARBONATE CAPACITORS**

* MIL-C-83421/1 HAS REPLACED MIL-C-39022/9C FOR NEW DESIGN. CRC WILL CONTINUE TO SUPPLY BOTH TYPES AS REQUIRED. SEE PAGES 2-11.

HIGH INSULATION RESISTANCE

CHROIA, D, G, K and N styles exceed 3,000,000 megohms at 25°C for values 0.1 uF or less. CRC polycarbonate capacitors have the highest insulation resistance of any capacitors available for their size. Special CRC capacitors are available with higher limits.

AC RATED TO 40KHz

CRC miniature polycarbonate capacitors, have a dissipation factor so low, (generally 0.1% but rated 0.15% max.) that they can handle extremely high RMS or peak current. See page 9 for further information.

HIGH STABILITY - LOW TEMPERATURE COEFFICIENT

Three quality levels are available with a choice of drift and TC limits suitable for most temperature sensitive applications. Long term drift data on file indicates 0.5% max. capacitance shelf drift for five years, with current production showing improved stability.

FREE FROM MOMENTARY BREAKDOWNS

CRC capacitors are engineered to be completely free from breakdowns, intermittents or noise. All CRC capacitors must pass rigorous testing with sensitive equipment capable of detecting changes of several picoamps.

HIGHEST QUALITY AT LOWEST COST

Year after year CRC capacitor quality is upgraded. CRC specifications become more exacting, yet CRC manages to maintain or lower capacitor prices. Furthermore, there are no additional charges for MIL-C-39022/9 Retention of Qualification Testing, when purchasing CHROI capacitors from CRC (See page 4 for Retention of Qualification Testing.)

QUALITY LEVEL ①

Equivalent CRC Types	Mil-C-39022/9 Styles	VDC
C12A	CHROIA	30
C12B	CHROID	50
C12C	CHROIG	100
C12D	CHROIK	200
C12E	CHROIN	400

1 48 hours Burn-In at 125°C and 140% of the rated DC voltage
2 10 Temperature Cycles from −65°C to 125°C
3 Helium Leak Test, 1×10^{-6} atm/cm^3/sec max.
4 AC-dielectric Strength at 100 Hz square wave at a minimum peak to peak voltage of 3x rated DC voltage (except 800V peak to peak for 400VDC styles).
5 DC-dielectric Strength at 200% of the rated DC voltage
6 Insulation Resistance at the rated voltage and 25°C, 300,000 megs — uF min., and 3,000,000 megs min. for 0.1 uF or less.
7 Capacitance % Tolerance at 1KHz and 25°C
8 Dissipation Factor at 1KHz and 25°C, 0.15% maximum
9 Visual Inspection for dimensions, marking and packaging

QUALITY LEVEL ②

Equivalent CRC Types	Mil-C-39022/9 Styles	VDC
D12A	CHROIB	30
D12B	CHROIE	50
D12C	CHROIH	100
D12D	CHROIL	200
D12E	CHROIP	400

1 16 hours Burn-In at 25°C and 140% of the rated DC voltage
2 10 Temperature Cycles from −65°C to 125°C
3 Helium Leak Test, 1×10^{-6} atm/cm^3/sec max.
4 AC-dielectric Strength at 100 Hz square wave at a minimum peak to peak voltage of 3x rated DC voltage (except 800V peak to peak for 400VDC styles).
5 DC-dielectric Strength at 200% of the rated DC voltage
6 Insulation Resistance at the rated voltage and 25°C, 200,000 megs — uF min., and 2,000,000 megs min. for 0.1 uF or less.
7 Capacitance % Tolerance at 1KHz and 25°C
8 Dissipation Factor at 1KHz and 25°C, 0.15% maximum
9 Visual Inspection for dimensions, marking and packaging

QUALITY LEVEL ③

Equivalent CRC Types	Mil-C-39022/9 Styles	VDC
E12A	CHROIC	30
E12B	CHROIF	50
E12C	CHROIJ	100
E12D	CHROIM	200
E12E	CHROIR	400

1 5 Temperature Cycles from −65°C to 125°C
2 Helium Leak Test, 1×10^{-5} atm/cm^3/sec max.
3 AC-dielectric Strength at 100 Hz square wave at a minimum peak to peak voltage of 3x rated DC voltage (except 800V peak to peak for 400VDC styles).
4 DC-dielectric Strength at 200% of the rated DC voltage
5 Insulation Resistance at the rated voltage and 25°C, 100,000 megs — uF min., and 1,000,000 megs min. for 0.1 uF or less.
6 Capacitance % Tolerance at 1KHz and 25°C
7 Dissipation Factor at 1KHz and 25°C, 0.15% maximum
8 Visual Inspection for dimensions, marking and packaging

PAGE 12
catalog JB

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615 TWX: (910) 343-6864

CRC HIGH RELIABILITY CAPACITORS

HOW TO SELECT & SPECIFY

*MIL-C-39022/9 CAPACITOR PART NUMBERS

* MIL-C-83421/1 HAS REPLACED MIL-C-39022/9C FOR NEW DESIGN. CRC WILL CONTINUE TO SUPPLY BOTH TYPES AS REQUIRED. SEE PAGES 2-11.

SELECTION INFORMATION

MIL-C-39022/9 covers 30 volt to 400 volt DC rated capacitors for applications requiring a tight capacitance tolerance, excellent capacitance stability, very high insulation resistance and low loss factors. This specification applies in addition where the AC component of voltage is large with respect to the applied DC voltage, and where momentary breakdowns cannot be tolerated.

Table II of MIL-C-39022/9 describes in part, three quality levels and their respective performance and test criteria.

CRC has clarified the data shown in table II and all additional specifications requirements, by presenting this information in test plan form on page 12 of CRC catalog J.

A study of life test data on Page 5 will indicate the excellent characteristics of polycarbonate capacitors manufactured by Component Research Co. to MIL-C-39022/9 latest revision.

HOW TO SPECIFY MILITARY PART NUMBERS

Select the style required, then place the dash number after M39022/9. As an example: A 0.001 uF 1% 50VDC CHROIE capacitor as shown in table 1 would be identified as M39022/9-E003R. **R indicates our failure rate as of 1976. See section dealing with failure rates on this page.**

SLEEVING

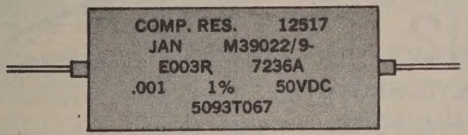
All CHROI capacitors are mylar shrink-fit sleeved.

LEADS

All CHROI capacitors are supplied with #22 AWG tinned copper clad steel leads for 0.312″ or less case diameters. #20 AWG leads are supplied for 0.400″ and .500″ diameter capacitors. Gold plated nickel leads are still being used where specifically requested, but are not recommended for new designs. #18 AWG tinned copper, OFHC leads are used for 0.562″ and larger diameter capacitors.

Unless you specifically request a lead material choice for the 0.500″ diameter and smaller cases, Component Research will supply the material currently in production at time of order.

MARKING EXPLANATION (TYPICAL EXAMPLE)



COMP. RES.	ABBREVIATION FOR COMPONENT RESEARCH CO. (WHEN SPACE IS LIMITED).
12517	CRC VENDOR CODE NO.
JAN M39022/9-	BASIC MILITARY MARKING
E003	DASH NO. SELECTED FROM TABLE 1.
R	(R IS FAILURE RATE LETTER)
7236A	WEEKLY DATE CODE PER MIL STD 1285
*5093T	REPRESENTS UNIQUE CRC TEST NUMBER.
067	UNIQUE SERIAL NUMBER

*This marking is not required by MIL-C-39022/9. This is standard CRC marking for CHRO1A, D, G, K and N styles only.

AC RATINGS

AC ratings at 400Hz; 4000Hz; and 40,000Hz RMS AC voltage (sinusoidal), with current limits from −55°C to +100°C, are listed for each individual capacitance value and DC voltage rated style in table 1. When operating above 100°C, derate all voltages linearly from full rated voltage at 100°C to 50% of rating at 125°C.

CRC qualified polycarbonate capacitors, with a 0.15% max. dissipation factor, will in a still-air environment, and at maximum rated operating conditions rise no more than 20°C. With conventional heat sinking methods, the capacitor heat rise will be considerably less than 20°C.

Although CRC capacitors have a low dissipation factor of 0.15% max. at 25°C, their dissipation factor is lower yet at temperatures from 75°C to 125°C.

This results in lower watts-loss and heat rise at elevated temperatures — with, of course, improved reliability for AC or DC applications.

APPLICATION NOTES

Make certain that the sum of any instantaneous peak AC voltages plus any superimposed DC voltages do not exceed the capacitor's rated DC voltage.

Effective heat sinking will permit operation at higher current levels than listed in table 1. However our CRC application engineers should be advised prior to use in any application where non-sinusoidal operating conditions are encountered, or when higher RMS currents are involved.

Our engineers will be pleased to study your needs and advise you if the capacitors will operate reliably under your special operating conditions.

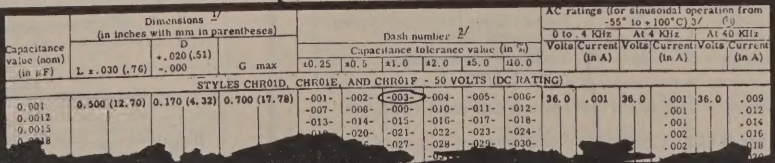
Component Research Co. can supply special AC capacitors with greater current handling capability and reduced heat rise, in the same case sizes as shown for MIL-C-39022/9. **See page 35.**

FAILURE RATE LEVELS

Component Research Co. is conducting continuous lot testing in order to achieve lower failure rates. Upon periodic review of this data by DESC, lower failure rates will be granted based on total number of capacitor life test hours without any failure.

Because MIL-C-39022/9 has such stringent post test limits the failure rate levels in MIL-C-39022/9 are effectively lower than the same failure rate levels in conventional film capacitor specifications and other military specifications.

MIL-C-39022/9
TABLE 1
(SECTION SHOWN OF 30VDC STYLES)



Capacitance value (nom) (in µF)	Dimensions 1/ (in inches with mm in parentheses)			Dash number 2/						AC ratings (for sinusoidal operation from -55° to +100°C) 3/					
	L ±.030 (.76)	D +.020 (.51) -.000	G max	Capacitance tolerance value (in %)						0 to .4 KHz		At 4 KHz		At 40 KHz	
				±0.25	±0.5	±1.0	±2.0	±5.0	±10.0	Volts	Current (in A)	Volts	Current (in A)	Volts	Current (in A)
STYLES CHR01D, CHR01E, AND CHR01F - 50 VOLTS (DC RATING)															
0.001	0.500 (12.70)	0.170 (4.32)	0.700 (17.78)	-001-	-002-	-003-	-004-	-005-	-006-	36.0	.001	36.0	.001	36.0	.009
0.0012				-007-	-008-	-009-	-010-	-011-	-012-				.001		.012
0.0015				-013-	-014-	-015-	-016-	-017-	-018-				.001		.014
[illegible]				[illegible]	-020-	-021-	-022-	-023-	-024-				.002		.016
					[illegible]	-027-	-028-	-029-	-030-				.002		[illegible]

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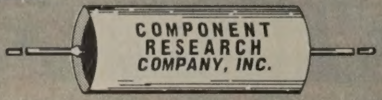
SERIES
C12

POLYCARBONATE

AC TESTED CAPACITORS



- **QUALIFIED TO MIL-C-39022/9C**
- **100% SCREENED (QUALITY LEVEL 1)**
- **3,000,000 MEGOHMS IR (0.1 uF or less)**
- **0.15% MAX. DISSIPATION FACTOR**
- **STANDARD TOLERANCES ±0.25% TO ±10%**

MIL STYLE	CRC STYLE	DC VOLTS	OLD P/N
CHROIA	C12A	30VDC	03 PV
CHROID	C12B	50VDC	05 PK
CHROIG	C12C	100VDC	1 PK
CHROIK	C12D	200VDC	2 PK
CHROIN	C12E	400VDC	4 PK

• PART NUMBER SYSTEM:	PAGES 13, 18
• LIFE TEST DATA:	PAGE 5
• CASE DIMENSIONS:	PAGE 17
• AC VOLTS AND CURRENT RATINGS:	PAGE 9
• SPECIAL AC CAPACITORS:	PAGE 35

C12 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

−0.75% ±0.25% at −55°C	+0.05% ±0.1% at 55°C
−0.35% ±0.15% at −25°C	+0.15% ±0.15% at 85°C
−0.25% ±0.15% at −10°C	+0.25% ±0.25% at 125°C
−0.15% ±0.1% at 0°C	

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.03% Max.
−65°C to 125°C	0.2% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	3,000,000	2,000,000	1,000,000	300,000	20,000
Greater than 0.1 uF (in Megohms — uF)	300,000	200,000	100,000	30,000	2,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.

Example: A 4 uF capacitor is 75,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.1% Max. at 25°C.

DISSIPATION FACTOR: 0.15% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C"

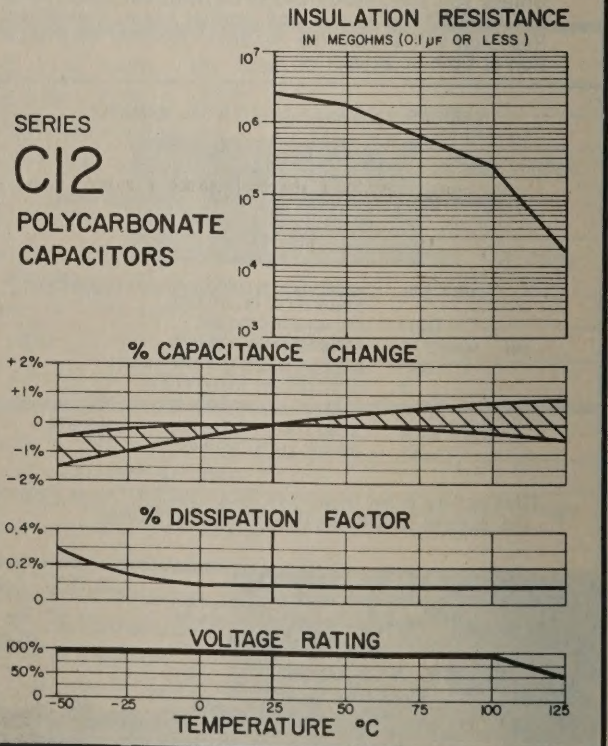
SEAL TEST: 1 x 10^{-6} atm/cm³/sec max. leak rate.

ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-39022/9C.

C12 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 48 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10^{-6} atm/cm³/sec max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. AC dielectric strength apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute (except 800V peak to peak for 400VDC styles).
6. Insulation Resistance at the rated voltage and 25°C, 300,000 megs — uF minimum, but need not exceed 3,000,000 Megohms.
7. Capacitance % Tolerance at 1KHz and 25°C.
8. Dissipation Factor at 1KHz and 25°C, 0.15% maximum.
9. Temperature Coefficient measured from −55°C to 125°C at a minimum of 5 temperature points. (Performed on lot sampling monthly basis.)
10. Visual Inspection for dimensions, marking and packaging.
11. Traceability to production and test records by permanent marking of parts with lot control number.
12. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790, Reliability Assurance Program.
13. Capacitors are serialized and packaged with certified test data to accompany each shipment.



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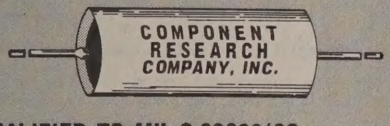
SERIES
D12

POLYCARBONATE
AC TESTED CAPACITORS



- **QUALIFIED TO MIL-C-39022/9C**
- **100% SCREENED (QUALITY LEVEL 2)**
- **2,000,000 MEGOHMS IR (0.1 uF or less)**
- **0.15% MAX. DISSIPATION FACTOR**
- **STANDARD TOLERANCES ±0.25% TO ±10%**

MIL STYLE	CRC STYLE	DC VOLTS	OLD P/N
CHROIB	D12A	30VDC	03 PL
CHROIE	D12B	50VDC	05 PL
CHROIH	D12C	100VDC	1 PL
CHROIL	D12D	200VDC	2 PL
CHROIP	D12E	400VDC	4 PL

- PART NUMBER SYSTEM: PAGES 13, 18
- LIFE TEST DATA: PAGE 5
- CASE DIMENSIONS: PAGE 17
- AC VOLTS AND CURRENT RATINGS: PAGE 9
- SPECIAL AC CAPACITORS: PAGE 35

D12 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

−1.5% Max. at −55°C	+0.2% Max. at 55°C
−0.5% Max. at −25°C	+0.5% Max. at 85°C
−0.35% Max. at −10°C	+1.0% Max. at 125°C
−0.25% Max. at 0°C	

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.05% Max.
−65°C to 125°C	0.25% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	2,000,000	1,000,000	500,000	200,000	10,000
Greater than 0.1 uF (in Megohms—uF)	200,000	100,000	50,000	20,000	1,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.

Example: A 6.8 uF capacitor is 30,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.1% Max. at 25°C.

DISSIPATION FACTOR: 0.15% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C"

SEAL TEST: 1 x 10^{-6} atm/cm³/sec max. leak rate.

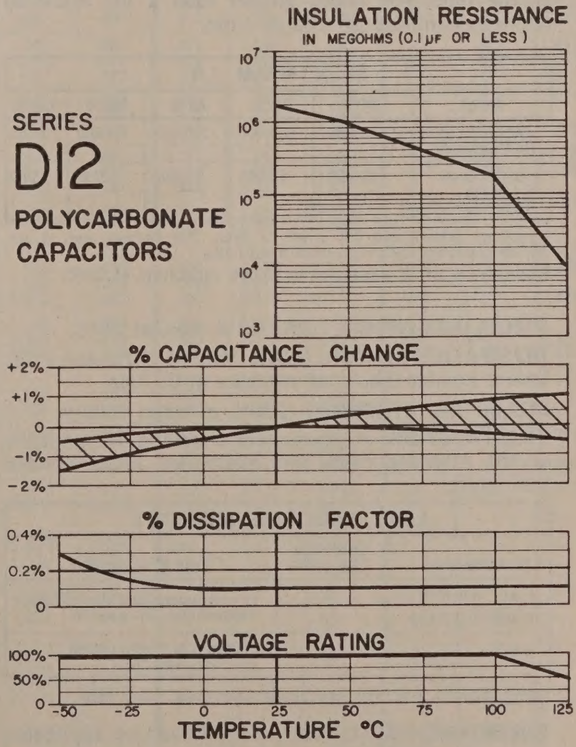
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-39022/9C.

D12 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

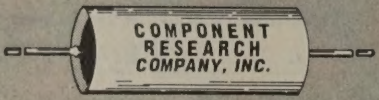
1. 16 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10^{-6} atm/cm³/sec max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. AC dielectric strength apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute (except 800V peak to peak for 400VDC styles).
6. Insulation Resistance at the rated voltage and 25°C, 200,000 megs — uF minimum, but need not exceed 2,000,000 Megohms.
7. Capacitance % Tolerance at 1KHz and 25°C.
8. Dissipation Factor at 1KHz and 25°C, 0.15% maximum.
9. Visual Inspection for dimensions, marking and packaging.
10. Traceability to production and test records by permanent marking of parts with lot control number.
11. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards, and MIL-STD-790 Reliability Assurance Program.

SERIES
D12
POLYCARBONATE
CAPACITORS



SERIES
E12

POLYCARBONATE
AC TESTED CAPACITORS



- **QUALIFIED TO MIL-C-39022/9C**
- **100% SCREENED (QUALITY LEVEL 3)**
- **1,000,000 MEGOHMS IR (0.1 uF or less)**
- **0.15% MAX. DISSIPATION FACTOR**
- **STANDARD TOLERANCES ±0.25% TO ±10%**

MIL STYLE	CRC STYLE	DC VOLTS	OLD P/N
CHROIC	E12A	30VDC	03 PG
CHROIF	E12B	50VDC	05 PG
CHROIJ	E12C	100VDC	1 PG
CHROIM	E12D	200VDC	2 PG
CHROIR	E12E	400VDC	4 PG

- PART NUMBER SYSTEM: PAGES 13,18
- LIFE TEST DATA: PAGE 5
- CASE DIMENSIONS: PAGE 17
- AC VOLTS AND CURRENT RATINGS: PAGE 9
- SPECIAL AC CAPACITORS: PAGE 35

E12 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 100°C at full rated voltage. Derate linearly from 100°C to 50% of rated voltage at 125°C.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

±2%	Max.	−55°C to 125°C
±1%	Max.	−25°C to 85°C
±0.5%	Max.	0°C to 55°C

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.25% Max.
−65°C to 125°C	0.50% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR					
Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	1,000,000	500,000	100,000	50,000	10,000
Greater than 0.1 uF (in Megohms—uF)	100,000	50,000	10,000	5,000	1,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.
Example: A 10 uF capacitor is 10,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.1% Max. at 25°C.

DISSIPATION FACTOR: 0.15% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Polycarbonate dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE		
Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C"

SEAL TEST: 1 x 10^{-5} atm/cm³/sec max. leak rate.

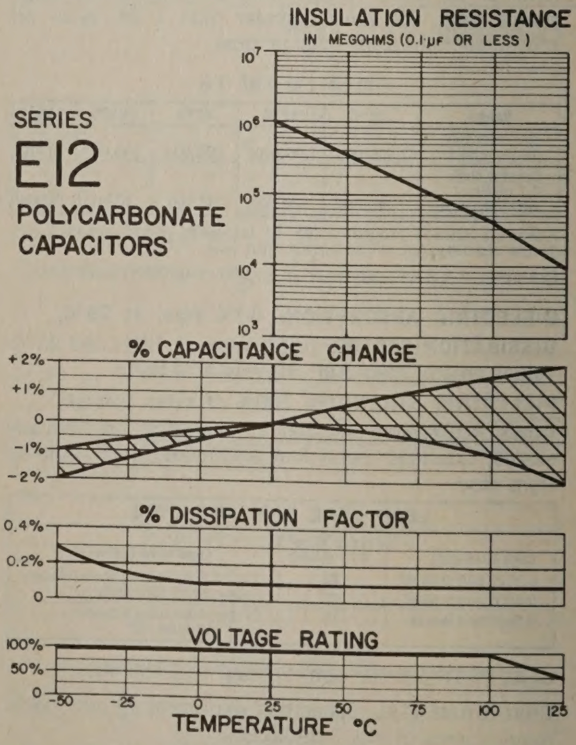
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-39022/9C.

E12 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 5 Temperature Cycles from −65°C to 125°C.
2. Helium Leak Test. 1 x 10^{-5} atm/cm³/sec max. leak rate.
3. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
4. AC dielectric strength apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute (except 800V peak to peak for 400VDC styles).
5. Insulation Resistance at the rated voltage and 25°C, 100,000 megs — uF minimum, but need not exceed 1,000,000 Megohms.
6. Capacitance % Tolerance at 1KHz and 25°C.
7. Dissipation Factor at 1KHz and 25°C, 0.15% maximum.
8. Visual Inspection for dimensions, marking and packaging.
9. Traceability to production and test records by permanent marking of parts with lot control number.
10. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.

SERIES
E12
POLYCARBONATE CAPACITORS



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CRC HIGH RELIABILITY CAPACITORS

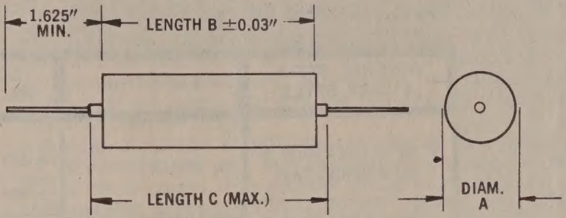
MIL-C-39022/9 POLYCARBONATE C12, D12, E12, CASE SIZES

SERIES 12

MIL-C-39022/9C VS MIL-C-83421/1

MIL-C-39022/9C Polycarbonate capacitor specifications have been replaced by MIL-C-83421/1 as explained in CRC catalog pages 2-11. MIL-C-83421/1 screening steps are not basically different than those of MIL-C-39022/9C but re-writing of the documents has resulted in a more clearly understood specification for our Metallized Polycarbonate capacitors. Several case dimensions were changed in going to MIL-C-83421/1, and minor corrections were made in current and voltage ratings, and several capacitance values were added and deleted. CRC will continue to supply both types as long as required by our customers. All "C" max dimensions for Series A12 and K12 capacitors shown on page 8 of catalog J, are 0.1" shorter than for MIL-C-39022/9C capacitors listed below.

All capacitor values and dimensions which differ from MIL-C-83421/1 or from CRC A12, K12 specifications are shown in bold face type below.



CASE DIMENSION	TOLERANCE LIMITS
"A" Diameter	±0.010" Without Sleeving −0.00" +0.02" With Mylar Sleeving
"B" Case Length	±0.03" With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the solder bead.

uF	12A 30VDC Diam. A	12A 30VDC Length B	12A 30VDC Length C	12B 50VDC Diam. A	12B 50VDC Length B	12B 50VDC Length C	12C 100VDC Diam. A	12C 100VDC Length B	12C 100VDC Length C	12D 200VDC Diam. A	12D 200VDC Length B	12D 200VDC Length C	12E 400VDC Diam. A	12E 400VDC Length B	12E 400VDC Length C
.001	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**	.193	.562	**.762**
.0012	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.0015	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.0018	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.002	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**	.193	.562	**.762**
.0022	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.0027	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.0033	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.0039										.170	.562	**.762**			
.0047	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**			
.005	.170	.500	**.700**	.170	.500	**.700**	.170	.500	**.700**	.170	.562	**.762**	.235	**.687**	**.887**
.0056										.170	.562	**.762**			
.0068	.170	.500	**.700**	.170	.500	**.700**	.170	**.687**	**.887**	.170	.562	**.762**			
.0082	.170	.500	**.700**	.170	.562	**.762**	.170	**.687**	**.887**	**.170**	.562	**.762**			
.01	.170	.500	**.700**	.170	.562	**.762**	.170	.687	**.887**	.193	.562	**.762**	.235	.687	**.887**
.012	.170	.500	**.700**	.170	.562	**.762**	.170	.687	**.887**	.193	.562	**.762**			
.015	.170	.500	**.700**	.170	.562	**.762**	.170	.687	**.887**	.235	.562	**.762**	.235	.813	**1.013**
.018	.170	.500	**.700**	.193	.562	**.762**	.193	.687	**.887**	.235	.687	**.887**			
.02	.170	.500	**.700**	.193	.562	**.762**	.193	.687	**.887**	.235	.687	**.887**			
.022	.170	.500	**.700**	.193	.562	**.762**	.193	.687	**.887**	.235	.687	**.887**	.312	.813	**1.013**
.027	.170	.562	**.762**	.193	.562	**.762**	.193	.687	**.887**	.312	.687	**.887**	.312	.813	**1.013**
.033	.170	.562	**.762**	.193	.562	**.762**	.193	.687	**.887**	.312	.687	**.887**	.312	.813	**1.013**
.039	.170	.562	**.762**	.170	.687	**.887**	.235	.687	**.887**	.312	.687	**.887**	.312	.813	**1.013**
.047	.170	.562	**.762**	.170	.687	**.887**	.235	.687	**.887**	.312	.687	**.887**	.400	.813	**1.013**
.05	.170	.562	**.762**	.170	.687	**.887**	.235	.687	**.887**	.312	**.813**	**1.013**	.400	.813	**1.013**
.056	.170	.562	**.762**	.193	.687	**.887**	.235	.687	**.887**	.312	.813	**1.013**			
.068	.170	.687	**.887**	.193	.687	**.887**	.235	.813	**1.013**	.312	.813	**1.013**	.400	.813	**1.013**
.082	.170	.687	**.887**	.193	.813	**1.013**	.312	.687	**.887**	.312	.813	**1.013**	.400	1.063	**1.263**
.1	.193	.687	**.887**	.193	.813	**1.013**	.312	.687	**.887**	.312	.813	**1.013**	.400	1.063	**1.263**
.12	.193	.687	**.887**	.235	.687	**.887**	.312	.687	**.887**	.312	.813	**1.013**			
.15	.235	.562	.762	.235	.687	**.887**	.312	.813	**1.013**	.400	1.063	**1.263**	.400	1.375	**1.575**
.18										.400	1.375	**1.575**			
.20	.235	.687	**.887**	.235	.813	**1.013**	.312	.813	**1.013**						
.22	.235	.687	**.887**	.235	.813	**1.013**	.312	.813	**1.013**	.400	1.375	**1.575**	.500	1.375	**1.575**
.27	.235	.687	**.887**	.312	.687	**.887**	.312	1.063	**1.263**	.500	1.375	**1.575**			
.33	.235	.687	**.887**	.312	.687	**.887**	.312	1.063	**1.263**	.500	1.375	**1.575**	.562	1.375	**1.575**
.39	.235	.687	**.887**	.312	.813	**1.013**	.400	1.063	**1.263**	.500	1.375	**1.575**			
.47	.312	.687	**.887**	.312	.813	**1.013**	.400	1.063	**1.263**	.500	1.375	**1.575**	.562	1.875	**2.075**
.50	.312	.687	**.887**	**.400**	.813	**1.013**	.400	1.063	**1.263**	.500	1.375	**1.575**	.562	1.875	**2.075**
.56										.500	1.375	**1.575**			
.68	.312	.687	**.887**	.400	.813	**1.013**	.500	1.125	**1.325**	.562	1.375	**1.575**			
.82	.312	.813	**1.013**	.400	1.063	**1.263**	.500	1.125	**1.325**	.562	1.875	**2.075**			
1.0	.312	.813	**1.013**	.400	1.063	**1.263**	.562	1.125	**1.325**	.562	1.875	**2.075**	.750	1.875	**2.075**
1.25										.562	1.875	**2.075**			
1.5	.400	.813	**1.013**	.400	1.063	**1.263**	.562	1.375	**1.575**	.670	1.875	**2.075**	1.00	2.375	**2.575**
2.0	.400	.813	**1.013**	.500	1.125	**1.325**	.670	1.375	**1.575**	.750	1.875	**2.075**	1.00	2.375	**2.575**
2.2	.400	.813	**1.013**	.500	1.125	**1.325**	.670	1.375	**1.575**						
2.5										.750	1.875	**2.075**			
3.0	.400	1.063	**1.263**	.500	1.375	**1.575**	.670	1.875	**2.075**	1.00	1.875	**2.075**			
3.3	.400	1.063	**1.263**	.500	1.375	**1.575**	.670	1.875	**2.075**						
4.0	.400	1.375	**1.575**	.562	1.375	**1.575**	.750	1.875	**2.075**	1.00	2.375	**2.575**			
4.7	.500	1.375	**1.575**	.670	1.375	**1.575**	.750	1.875	**2.075**						
5.0	.500	1.375	**1.575**	.670	1.375	**1.575**	.750	1.875	**2.075**						
5.6															
6.8	.562	1.375	**1.575**	.670	1.875	**2.075**	1.0	2.375	**2.575**						
8.0	.562	1.375	**1.575**	.670	1.875	**2.075**	1.0	2.375	**2.575**						
10.0	.562	1.375	**1.575**	.670	1.875	**2.075**	1.0	2.375	**2.575**						
15.0	.562	1.875	**2.075**												
20.0	.670	1.875	**2.075**												
22.0	.670	1.875	**2.075**												

CRC HIGH RELIABILITY CAPACITORS

HOW TO SPECIFY
COMPONENT RESEARCH PART NUMBERS

WINDING STYLE & CASE STYLE

1. METALLIZED FILM & UNGROUNDED CASE
2. METALLIZED FILM & GROUNDED CASE
3. METALLIZED FILM & UNGROUNDED CASE (CORDWOOD)
4. METALLIZED FILM & GROUNDED CASE (CORDWOOD)
5. METAL FOIL & UNGROUNDED CASE
6. METAL FOIL & GROUNDED CASE

DIELECTRIC

1. TEFLON
2. POLYCARBONATE
3. POLYSTYRENE
4. POLYSULFONE
5. POLYPROPYLENE

DC VOLTS

- A 30V
- B 50V
- C 100V
- D 200V
- E 400V
- F 600V
- G 1000V
- H 1500V
- J 2000V
- K 3000V
- L 4000V
- M 5000V

CAPACITANCE (IN PICOFARADS)

10 INDICATES THE SIGNIFICANT DIGITS. 4 INDICATES THE NUMBER OF ZEROS TO BE ADDED TO 10.

EXAMPLES:

102=1000PF=.001 uF
103=10,000PF=.01 uF
104=100,000PF=.1 uF
105=1,000,000PF=1 uF
393=39,000PF=.039 uF

% CAP. TOLERANCE

- A 0.1%
- B 0.25%
- D 0.5%
- F 1%
- G 2%
- J 5%
- K 10%

MYLAR SLEEVING

(S) SPECIFY **"S"** WHEN SLEEVING IS REQUIRED

(X) SPECIFY **"X"** WHEN NO SLEEVING IS REQUIRED

WIRE LEADS

(W) TINNED COPPER CLAD STEEL (COPPERWELD)

(C) OXYGEN FREE TINNED COPPER MIL-STD-1276 TYPE C

(N) GOLD PLATED NICKEL MIL-STD-1276 TYPE N2

(A) NO MATERIAL SPECIFIED. MUST BE SOLDERABLE

A 1 2 A 104 F S W

PART NUMBER EXAMPLE **A12A104FSW** ALSO APPEARS ON PAGE 19.

SCREENING CODE SYMBOL	SCREENING CONDITIONS							CAPACITOR TYPES COVERED BY SCREENING				
	BURN-IN				THERMAL AGING							
	HOURS	RATED VOLTS	VOLTAGE	TEMPERATURE	NO. OF CYCLES	LOW TEMP.	HIGH TEMP.	QUALITY LEVEL	DIELECTRIC	MIL SPEC TYPE	CRC TYPE	SEE PAGE
A	48	140%	DC	125°C	10	−65°C	+125°C	1	Polycarbonate	MIL-C-83421/1 CRH01 to 05	A12	10
B	48	140%	DC	125°C	20	−65°C	+125°C	1	Teflon	—	B11	24
C	48	140%	DC	125°C	10	−65°C	+125°C	1	Teflon Polycarbonate	— MIL-C-39022/9C	C11 C12	25 14
D	16	140%	DC	125°C	10	−65°C	+125°C	2 2 2	Polycarbonate Teflon Teflon	MIL-C-39022/9C — —	D12 D11 D51	15 26 29
E	—	—	—	—	5	−65°C	+125°C	3 3	Teflon Polycarbonate	— MIL-C-39022/9C	E11 E12	27 16
G	48	140%	DC	150°C	10	−65°C	+125°C	1	Polysulfone	—	G14	37
H	16	140%	DC	150°C	10	−65°C	+125°C	2	Polysulfone	—	H14	38
J	96	140%	DC	125°C	10	−65°C	+125°C	1 1	Teflon Polycarbonate	— —	J11 J12	37 37
K	—	—	—	—	5	−65°C	+125°C	3	Polycarbonate	MIL-C-83421/1 CRH06 to 00	K12	11
L	16	100%	DC	105°C	5	−65°C	+85°C	1	Polystyrene	—	L53	34, 37
N	—	—	—	—	5	−65°C	+85°C	3	Polystyrene	—	N53	32
R	16	140%	RMS AC 400 Hz	100°C	5	−65°C	+125°C	2	Polycarbonate	—	R12	37
X	SPECIAL SCREENING TO CUSTOMER REQUIREMENTS											19, 37

PAGE 18
catalog JB

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

CRC HIGH RELIABILITY CAPACITORS

CAPACITOR IDENTIFICATION & CROSS REFERENCE TABLE

Component Research Co. has been manufacturing precision film capacitors since 1959. As a result of introducing new, improved products, our part numbers have changed and a few older types are now considered obsolete. CRC will continue to supply obsolete types if you cannot find a substitute item, and we are able to obtain the required film materials. Following is a guide to the old and new part number types which are similar. Due to possible differences in screening, dimensions, and performance, it is best to contact our applications department when you plan to retrofit or use our new part numbers to replace the old. Old catalogs describing obsolete part numbers are available if required.

IDENTIFICATION FOR SPECIAL REQUIREMENTS

CRC believes that there is a sufficient choice of capacitors in this catalog to satisfy virtually all applications. In the event you have any requirement involving a modification of our specifications the following special identification will be used.

Example: X11B154BW588 (typical special part number). "X" preceding the part number indicates a special customer requirement. The number group at the end of the part number is assigned as a unique identification of the special manufacturing and inspection instructions.

In the example shown above "588" is a typical unique identification number.

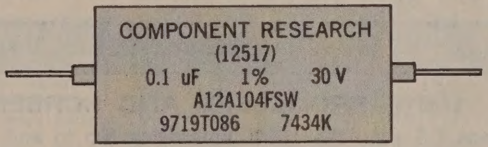
PART NUMBER EXAMPLES

Example 1 A12A104FSW shown to the right and in the marking example on Page 18, is a metallized polycarbonate, 0.1 uF, 1%, 30 VDC, ungrounded case, capacitor. The capacitor has sleeving, tinned copper-clad steel leads, 48 hours burn-in, and 10 thermal aging cycles. It is made to quality level 1.

Example 2 C11B183FXW is a "C" screened metallized teflon level 1 capacitor, 0.018 uF, 1% tol., 50 VDC. No sleeving is required. It has an ungrounded case and tinned copper clad steel leads.

Example 3 E22D15993BSC is "E" screened, metallized polycarbonate, 1.599 uF, 0.25%, 200 VDC. The capacitor has a grounded case with mylar sleeving and OFHC leads. 15993 in the part number is derived by adding three zeros to 1599 to make 1,599,000 picofarads, which is 1.599 uF. Example 3 is considered a nonstandard part because of the grounded case and the uF value.

MARKING EXAMPLE — Standard Types



UNIQUE TEST & SERIAL NO. — All level 1 capacitors are permanently identified with a test number followed by a serial number for traceability to test records. 9719T is a typical test number, 086 is the capacitor serial number.

LOT CONTROL NO. — All level 1, 2, and 3 capacitors are traceable to process records and materials used, by means of the weekly date code. The individual lot letter K, indicates the tenth lot made in the 34th week of 1972.

NOTE: ONLY LEVEL 1 CAPACITORS ARE SERIALIZED

CROSS-REFERENCE GUIDE - OLD AND NEW PART NUMBERS

POLYCARBONATE STYLES

FORMER TYPES		DC VOLTS	MIL-C-83421/1 EQUIVALENT	NEW TYPE	QUALITY LEVEL
03PV	C12A	30	CRH01	A12A	1
05PK	C12B	50	CRH02	A12B	1
1PK	C12C	100	CRH03	A12C	1
2PK	C12D	200	CRH04	A12D	1
4PK	C12E	400	CRH05	A12E	1
03PG	E12A	30	CRH06	K12A	3
05PG	E12B	50	CRH07	K12B	3
1PG	E12C	100	CRH08	K12C	3
2PG	E12D	200	CRH09	K12D	3
4PG	E12E	400	CRH00	K12E	3

MIL-C-39022/9C TYPES	DC VOLTS	MIL-C-83421/1 EQUIVALENT	NEW TYPE	QUALITY LEVEL
CHR01A	30	CRH01	A12A	1
CHR01B	30	None	D12A	2
CHR01C	30	CRH06	K12A	3
CHR01D	50	CRH02	A12B	1
CHR01E	50	None	D12B	2
CHR01F	50	CRH07	K12B	3
CHR01G	100	CRH03	A12C	1
CHR01H	100	None	D12C	2
CHR01J	100	CRH08	K12D	3
CHR01K	200	CRH04	A12D	1
CHR01L	200	None	D12D	2
CHR01M	200	CRH09	K12D	3
CHR01N	400	CRH05	A12E	1
CHR01P	400	None	D12E	2
CHR01R	400	CRH00	K12E	3

FORMER TYPES	DC VOLTS	REPLACED BY		QUALITY LEVEL
03PQ	30	E32A		3
05PQ	50	E32B		3

TEFLON STYLES

FORMER TYPES	DC VOLTS	NEW TYPE	QUALITY LEVEL
05TJ	50	B11B	1
1TJ	100	B11C	1
2TJ	200	B11D	1
05TC	50	C11B	1
1TC	100	C11C	1
2TC	200	C11D	1
05TA	50	D11B	2
1TA	100	D11C	2
2TA	200	D11D	2
05TL	50	E11B	3
1TL	100	E11C	3
2TL	200	E11D	3
1TU	100	D51C	2
2TU	200	D15D	2
1TF	100	None	3
05TQ	50	D31B	3

POLYSTYRENE

05PA	50	N53B	3
1PA	100	N53C	3

POLYSULFONE

05MP	50	H14B	2
1MP	100	H14C	2
2MP	200	H14D	2
4MP	400	H14E	2

MYLAR STYLES

		REPLACE WITH
1MA	100	K12C Polycarbonate
2MM	200	K12D Polycarbonate

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CRC HIGH RELIABILITY CAPACITORS

MANUFACTURING & INSPECTION FLOW PLAN

MIL-C-83421 • MIL-C-39022/9C • STANDARD CAPACITORS

100% INSPECTION PER MIL-C-83421

The high reliability capacitor screening plans developed by Component Research Co. have been adopted by space and military contractors throughout the world for critical programs. The new general specification MIL-C-83421 incorporates much of the screening features shown below at an attempt to provide a "state of the art" capacitor specification for general industrial and aerospace use.

Our flow plan for manufacturing and inspection shown below covers the steps used to process and screen all of our polycarbonate, teflon, polystyrene and polysulfone film capacitors. The individual specifications shown in the catalog list the actual screening performed for each style. A choice of three quality levels provides different degrees of intensive screening to assure the highest possible quality at lowest cost. Special screening plans are available which include tests such as 100% corona inception inspection, 40 KHz AC burn-in at 100°C, high impedance monitoring for intermittent conditions at low voltage during temperature cycling, ESR inspection at 100 KHz, dielectric absorption effects with rapid switching rates and varying temperature, and many other sensitive measurement phenomena.

*MANUFACTURING AND INSPECTION FLOW PLAN

100% PROCESSED AND SCREENED

Steps 1-6 show the 100% processing (up to and including hermetic sealing), of MIL-C-39022/9 and MIL-C-83421/1 qualified polycarbonate and CRC standard capacitors — Polycarbonate, Teflon, Polystyrene and Polysulfone. The quality level selected will be determined by the individual capacitor specification.

*SPECIAL MIL-C-83421/1 SCREENING IS SHOWN ON PAGE 3

PROCESSING STEPS

1. CAPACITOR MATERIAL INSPECTION
2. IDENTIFY PROCESS PAPERWORK WITH MATERIAL LOT NUMBERS
3. CAPACITOR SUB-ASSEMBLY INSPECTION
4. SPECIAL VACUUM PROCESSING
5. HERMETIC SEAL AFTER NITROGEN BACK-FILL
6. INITIAL INSPECTION OF COMPLETED CAPACITOR (7X POWER)

QUALITY LEVEL ①

7. BURN-IN
8. TEMPERATURE CYCLING
9. HELIUM LEAK TEST AND GROSS LEAK TEST
10. AC-DIELECTRIC STRENGTH
11. DC-DIELECTRIC STRENGTH
12. INSULATION RESISTANCE
13. % CAPACITANCE TOLERANCE
14. % DISSIPATION FACTOR
15. SELECTION FOR PERFORMANCE GRADES
16. SERIALIZATION OF LEVEL 1 CAPACITORS
17. REPEAT ELECTRICAL MEASUREMENTS AND RECORD DATA AS REQUIRED
18. CONDUCT SPECIAL MEASUREMENTS WHEN REQUIRED BY CUSTOMER
19. FINAL VISUAL INSPECTION OF WORKMANSHIP, MARKING, PAPERWORK AND PACKAGING
20. SHIP DATA AND CERTIFICATE OF COMPLIANCE WITH PARTS

Highest reliability capacitors with standard or special screening for Apollo, Viking, and other space programs. Also used in military and ultra high quality industrial applications.

Qualified for space, critical applications, F15 aircraft, and other programs.

QUALITY LEVEL ②

7. BURN-IN
8. TEMPERATURE CYCLING
9. HELIUM LEAK TEST AND GROSS LEAK TEST
10. AC-DIELECTRIC STRENGTH
11. DC-DIELECTRIC STRENGTH
12. INSULATION RESISTANCE
13. % CAPACITANCE TOLERANCE
14. % DISSIPATION FACTOR
15. FINAL VISUAL INSPECTION OF WORKMANSHIP, MARKING, PAPERWORK, AND PACKAGING
16. SHIP C OF C WITH PARTS

High reliability capacitors screened for space, missile and industrial applications. Qualified for many programs such as The Tow Missile, The Lance Missile and F15 aircraft.

QUALITY LEVEL ③

7. TEMPERATURE CYCLING
8. HELIUM LEAK TEST AND GROSS LEAK TEST
9. AC-DIELECTRIC STRENGTH
10. DC-DIELECTRIC STRENGTH
11. INSULATION RESISTANCE
12. % CAPACITANCE TOLERANCE
13. % DISSIPATION FACTOR
14. FINAL VISUAL INSPECTION OF WORKMANSHIP, MARKING, PAPERWORK AND PACKAGING
15. SHIP C OF C WITH PARTS

High reliability capacitors with reduced screening and performance levels for lower cost high volume programs, such as missiles, aircraft and telephone equipment applications.

Random samples from completed production lots of all quality levels are periodically tested.

These tests may consist of Insulation Resistance at high temperature, Dielectric Absorption, Temperature Coefficient and AC stress analysis tests.

In addition, samples are life tested for retention of qualification.

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

CRC HIGH RELIABILITY CAPACITORS

GENERAL PRODUCT INFORMATION

ORDERING INFORMATION — Terms: Our terms are net 30 days to customers approved by our credit department. All shipments are F.O.B., Santa Monica, Calif. **Delivery:** Most items listed are available from stock or within 10 weeks for quantities up to 1000 pieces. **Minimum Order:** Minimum billing per order is $30.00. **Complete Part Number:** Please make certain that you have complete part number to avoid any errors or delays. Please check part number instructions in individual specification pages and part number information shown on page 18.

PATENT INFORMATION — CRC capacitors are exclusively manufactured under one or more of the following patents and additional patents pending: 3,238,428; 3,260,906; 3,292,063; 3,506,895; 3,539,886; 3,603,849; 3,626,362.

CONSTRUCTION INFORMATION — All standard capacitors listed are hermetically sealed after vacuum process and both gross leak and helium leak tested for true hermeticity. Unless otherwise specified all parts listed are metal cased, tubular, with both wire terminals isolated from the metal case.

PART NUMBER OBSOLESCENCE — Due to changes in military specifications for which we are qualified, upgrading of our catalog specifications, or size reduction, part numbers formerly used may now be obsolete. We urge our customers to change their existing drawings to indicate the new part numbers for old and new design, wherever possible. If you are unable to make this change, CRC will continue to supply and mark parts indefinitely to the old specifications. See page 19.

INSTALLATION INSTRUCTIONS — To prevent damage to the hermetic seal joint, use a tweezer type heat sink between the soldering iron and solder beads when soldering within ¼″ of beads. Prior to lead bending or twisting, protect glass seals and solder joints by gripping with a small pliers, area of leads near solder beads.

Contaminating films on the glass seal surfaces may occur during customer handling and installation of capacitors. To preserve the high insulation resistance inherent in CRC capacitors, clean the glass seal surfaces thoroughly with acetone or chlorinated hydrocarbon fluid.

CAPACITOR MEASUREMENT INFORMATION — The high quality of CRC capacitors may be difficult to evaluate unless sufficiently sensitive and accurate equipment is utilized in conjunction with proper measurement techniques.

Capacitance bridges equal to the General Radio 1620A are recommended for best accuracy of capacitance. This bridge is satisfactory for dissipation factor measurement of capacitors up to 1 uF. CRC has developed a special bridge capable of accurately measuring dissipation factor of capacitors up to 100 uF or more at frequencies up to 1KHz. For inspection of DF of larger than 1 uF capacitors it is suggested that you use samples correlated by our measurement laboratory.

Insulation resistance measurement is performed by Component Research Co. using leakage current methods which are repeatable to 1 picoamp for capacitors less than 0.1 uF. Larger values require adequate charge time to minimize dielectric absorption effects. Guard boxes are used to perform leakage current and dielectric absorption measurements.

SPECIAL MATCHING — We can assort capacitors into sets of two or more capacitors matched for capacitance value within ±0.1% of each other at nominal cost. Where capacitors must track with temperature, they can be supplied in matched sets as closely at ±0.1% over their temperature range. Capacitors of opposing temperature coefficient slopes can be supplied to obtain lower temperature coefficients than for standard types.

SPECIAL CAPACITOR VALUES — If your application requires odd values such as 0.10015 uF ±0.1% or 0.9999 uF ±0.25%, such requirements are readily met from our large stock of standard and non-standard values. Individual capacitors can be permanently marked or tagged with discrete values accurate to six places if required.

SPECIAL VOLTAGE RATINGS — Problems of size may occur when replacement of a poor quality capacitor is required. Under certain conditions such as restricting the operating temperature, or limiting DC hipot to 150% of rated volts, a substantial size reduction is possible. Check with our applications engineering department for our recommendations in such cases.

SPECIAL PART NUMBER IDENTIFICATION — CRC believes that there is a sufficient choice of capacitors in this catalog to satisfy virtually all applications. In the event you have any requirement involving a modification of our specifications, the following special identification will be used.

Example: X11B154BW588 (typical special part number). "X" preceding the part number indicates a special customer requirement. The number group at the end of the part number is assigned as a unique identification of the special manufacturing and inspection instructions. In example shown, "588" is a typical unique identification number.

STANDARD CRC CASE SIZES & WEIGHTS

CRC No. Case	CASE DIMENSIONS IN INCHES			Typical* Weight ±20% Accuracy (ounces)
	A Diam.	B Length	C Length	
CF329-1	.170	.500	.700	.0353
CF329-2	.170	.562	.762	.0424
CF329-3	.170	.687	.887	.0459
CF329-4	.193	.562	.762	.0459
CF329-5	.193	.687	.887	.0459
CF329-6	.193	.813	1.013	.0494
CF329-7	.235	.562	.762	.0494
CF329-8	.235	.687	.887	.0565
CF329-9	.235	.813	1.013	.0635
CF329-10	.312	.687	.887	.0883
CF329-11	.312	.813	1.013	.0953
CF329-12	.312	1.063	1.263	.1059
CF329-13	.400	.813	1.013	.1412
CF329-14	.400	1.063	1.263	.2118
CF329-15	.400	1.375	1.575	.2118
CF329-16	.500	1.125	1.325	.2824
CF329-17	.500	1.375	1.575	.3177
CF329-18	.562	1.125	1.325	.4059
CF329-19	.562	1.375	1.575	.4589
CF329-20	.562	1.875	2.075	.6072
CF329-21	.670	1.375	1.575	.6354
CF329-22	.670	1.875	2.075	.7589
CF329-23	.750	1.875	2.075	.9884
CF329-24	1.00	1.875	2.075	1.6061
CF329-25	1.00	2.375	2.575	1.9768
CF329-26	1.00	2.625	2.825	2.2945

CRC No. Case	CASE DIMENSIONS IN MILLIMETERS			Typical* Weight ±20% Accuracy (grams)
	A Diam.	B Length	C Length	
CF329-1	4.32	12.70	17.78	1.0
CF329-2	4.32	14.28	19.36	1.2
CF329-3	4.32	17.45	22.53	1.3
CF329-4	4.90	14.28	19.36	1.3
CF329-5	4.90	17.45	22.53	1.3
CF329-6	4.90	20.65	25.73	1.4
CF329-7	5.97	14.28	19.36	1.4
CF329-8	5.97	17.45	22.53	1.6
CF329-9	5.97	20.65	25.73	1.8
CF329-10	7.93	17.45	22.53	2.5
CF329-11	7.93	20.65	25.73	2.7
CF329-12	7.93	27.00	32.08	3.0
CF329-13	10.16	20.65	25.73	4.0
CF329-14	10.16	27.00	32.08	6.0
CF329-15	10.16	34.93	40.01	6.0
CF329-16	12.70	28.58	33.66	8.0
CF329-17	12.70	34.93	40.01	9.0
CF329-18	14.28	28.58	33.66	11.5
CF329-19	14.28	34.93	40.01	13.0
CF329-20	14.28	47.63	52.71	17.2
CF329-21	17.02	34.93	40.01	18.0
CF329-22	17.02	47.63	52.71	21.5
CF329-23	19.05	47.63	52.71	28.0
CF329-24	25.40	47.63	52.71	45.5
CF329-25	25.40	60.33	65.41	56.0
CF329-26	25.40	71.63	76.71	65.0

*The typical weights shown above apply to all capacitor types listed in our catalog. The ±20% weight tolerance covers variations in density for a given case size part made from teflon or any other listed dielectric. The weight tolerance also makes allowance for foil or metallized construction.

Please contact us if more accurate weight information is required for any given series of capacitors.

CRC HIGH RELIABILITY CAPACITORS	KEY CAPACITOR FEATURES
UNIQUE CONSTRUCTION	CRC capacitor windings are firmly supported within their hermetic enclosures to withstand high frequency shock and vibration levels per MIL-C-39022/9, and MIL-C-83421. The capacitors are uniquely constructed to provide winding support for the thinnest dielectric films, and have as well, stress free lead terminations that can withstand extended temperature cycling. CRC capacitors are exclusively manufactured under one or more of the following patents and additional patents pending: 3,238,428; 3,260,906; 3,292,063; 3,506,895; 3,539,886; 3,603,849; 3,626,362.
HIGH INSULATION RESISTANCE	Standard stock capacitors, 0.1 uF and less are rated up to 10,000,000 megohms for teflon, 5,000,000 megohms for polystyrene, and 3,000,000 megohms for polycarbonate and polysulfone types. If required, capacitors can be supplied with higher ratings for extremely critical applications. Thousands of such special teflon capacitors are in use in the attitude controls for the Boeing 747. Tests by the user during which the capacitors were left on charge for several years, indicate a capacitor self-time constant that exceeds 100 years.
LOW DIELECTRIC ABSORPTION	Special CRC equipment can perform this sensitive test at fast switching rates to determine how CRC capacitors will operate in critical sample and hold circuits. Recent tests on 1 uF capacitors using 10 milliseconds charge time, 1 millisecond discharge, and 100 milliseconds recovery time, indicate readings as low as 0.0035% for teflon and 0.007% for polystyrene capacitors.
LOW DISSIPATION FACTOR	A measure of the reliability and quality of the electrode terminations is determined by capacitor heat rise during 4 KHz to 40 KHz power measurements performed by CRC. Tests prove that the superior terminations of the CRC capacitors can be verified by their low 1 KHz and 10 KHz dissipation factor readings. The permanence of this quality has been further demonstrated by maintenance of low dissipation factor after temperature cycling, DC Life, AC Life, and all other environmental conditions. SEE PAGE 5, 7, 37
HIGH STABILITY LOW TEMPERATURE COEFFICIENT	The combined effects of CRC unique winding construction, temperature cycling and burn-in result in maximum stability, uniform TC linearity, and reproduceability. Capacitors can be supplied with virtually zero TC over limited temperature spans. SEE SPECIAL MATCHING PAGE 21.
HIGH RELIABILITY SCREENING	In addition to DC burn-in and 400 Hz RMS AC burn-in, CRC performs special burn-in at frequencies up to 40 KHz. 100% temperature cycling follows each burn-in sequence. In special AC applications, we provide 100% corona inception inspection at 150% to 200% of rated RMS AC volts. SEE PAGES 7, 18, 37.

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CRC HIGH RELIABILITY CAPACITORS

A COMPARISON OF CAPACITOR TYPES

A PARTIAL LISTING OF TYPES AVAILABLE IN CATALOG "JB"

DIELECTRIC	Type	Quality Level	Typical Temperature Coefficient Limits Max. % Capacitance Change Relative to 25°C							Typical Leakage Current In Nanoamps for 1 MFD Capacitors Measured at 30VDC (1 Microamp= 1000 Nanoamps)				% Max. Drift 5 Cycles −25°C to +85°C	% Max. Dissipation Factor 25°C	% Max. Diel. Absorption 25°C
			−50°C	−25°C	0°C	50°C	75°C	100°C	125°C	25°C	75°C	100°C	125°C			
SERIES 11 TEFLON	B11	①	+0.4	+0.25	+0.1	−0.15	−0.2	−0.3	−0.4	0.06	0.15	0.3	1.2	0.01	0.03	0.01
	C11	①	+0.7	+0.5	+0.25	−0.25	−0.4	−0.5	−0.6	0.06	0.15	0.3	1.2	0.02	0.03	0.01
	D11	②	+0.6	+0.4	+0.2	−0.25	−0.4	−0.5	−0.6	0.06	0.15	0.3	1.2	0.02	0.03	0.01
	E11	③	+1.0	+0.7	+0.3	−0.4	−0.6	−0.8	−1.0	0.3	0.75	2.3	3	0.05	0.10	0.02
SERIES 31 TEFLON (Cordwood)	C31	①	+0.8	+0.6	+0.3	−0.35	−0.5	−0.6	−0.7	0.12	0.3	0.6	1.8	0.02	0.05	0.02
	D31	②	+0.7	+0.5	+0.25	−0.25	−0.4	−0.5	−0.6	0.12	0.3	0.6	1.8	0.02	0.05	0.02
SERIES 51 TEFLON	C51	①	+0.8	+0.6	+0.2	−0.2	−0.5	−0.6	−0.8	0.03	0.06	0.18	1.2	0.02	0.01	0.01
	D51	②	+0.8	+0.6	+0.2	−0.2	−0.5	−0.6	−0.8	0.03	0.06	0.18	1.2	0.05	0.01	0.01
	E51	③	+1.2	+0.8	+0.4	−0.3	−0.6	−0.8	−1.2	0.1	0.15	0.6	3	0.1	0.02	0.02
SERIES 12 POLY-CARBONATE	C12	①	−1.2	−0.5	−0.20	±0.15	±0.3	±0.4	±0.5	0.05	0.15	0.6	6	0.03	0.15	0.10
	D12	②	−1.5	−0.5	−0.25	±0.25	±0.4	±0.6	±1	0.1	0.3	1	18	0.05	0.15	0.10
	E12	③	−2	−1	−0.35	±0.35	±0.6	±1	±2	0.3	3	6	18	0.25	0.15	0.10
	F12	④	−2	−1	−0.35	±0.35	±0.6	±1	±2	0.3	3	6	18	0.25	0.25	0.20
SERIES 53 POLYSTYRENE	M53	②	+0.8	+0.5	+0.25	−0.25	−0.5	(85°C Max.)		0.03	0.2	—	—	0.02	0.01	0.02
	N53	③	+0.8	+0.5	+0.25	−0.25	−0.5	(85°C Max.)		0.03	0.2	—	—	0.03	0.01	0.02
SERIES 14 POLYSULFONE	G14	①	−0.5	−0.2	−0.05	±0.05	±0.1	±0.25	±0.4	0.1	1	2	10	0.03	0.15	0.20
	H14	②	−0.6	−0.3	−0.1	±0.1	±0.25	±0.4	±0.6	0.2	2	4	12	0.05	0.15	0.20

QUALIFICATION INFORMATION

Component Research Co. capacitor products appear on the preferred parts lists and qualified products lists of many agencies and defense contractors. Following is a partial list of approvals.

MIL-C-83421/1 qualification information appears on pages 2-11.

FULLY QUALIFIED FOR CRITICAL APPLICATIONS

PROGRAM	SPECIFICATION	CRC QUALIFIED CAPACITORS Former Part No.	New (Equiv.) Part No.
F-15	MIL-C-39022/9	PV, PK, PL and PG Polycarbonate	C12, D12 and E12 Series
A-7D	218-37669	PK, Polycarbonate	C12 Series
Astronaut Life Support System	195-102, 195-103	PV, PK, Polycarbonate	C12 Series
Nimbus Satellite	51865	PV, Polycarbonate	C12 Series
Apollo 8	SCD 26158	PL, Polycarbonate	D12 Series
Tow Light Source	MISI3707/1	PL, Polycarbonate	D12 Series
DC-10, B747	ED 746343	PL, Polycarbonate	D12 Series
POSEIDON	2621674	PL, Polycarbonate	D12 Series
Mark 48 Torpedo	2589355	PG, Polycarbonate	E12 Series
F-15	4001818	TJ, Teflon	B11 Series
MRSA	S30409	TC, Teflon	C11 Series
Lance	MISI3263	TA, Teflon	D11 Series
Lunar Orbiter	27-30100	TU, Teflon Foil	D51 Series
Mark 48 Torpedo	2501070, 2500774	Pa, Polystyrene	N53 Series

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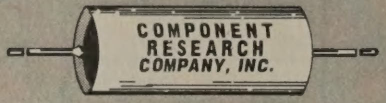
SERIES
B11

TEFLON

HIGH STABILITY CAPACITORS



- QUALIFIED FOR SPACE
- 100% SCREENED (QUALITY LEVEL 1)
- 5,000,000 MEGOHMS IR (0.1 uF or less)
- 100% SERIALIZED FOR DATA RECORDING
- STANDARD TOLERANCES ±0.25% TO ±10%

CRC STYLE	DC VOLTS	OLD P/N
B11B	50VDC	05 TJ
B11C	100VDC	1 TJ
B11D	200VDC	2 TJ

- PART NUMBER SYSTEM PAGE 18
- MFG. & INSPECTION FLOW PLAN PAGE 20
- QPL PROGRAM APPROVALS PAGE 23
- CASE DIMENSIONS PAGE 28
- LIFE TEST DATA PAGE 30

B11 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

+0.4% Max. at −55°C
+0.25% Max. at −25°C
+0.2% Max. at −10°C
+0.1% Max. at 0°C

−0.15% Max. at 55°C
−0.25% Max. at 85°C
−0.4% Max. at 125°C

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.01% Max.
−65°C to 125°C	0.05% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR					
Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 uF (in Megohms—uF)	500,000	500,000	200,000	100,000	25,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.

Example: A 2 uF capacitor is 250,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.01% Max. at 25°C.

DISSIPATION FACTOR: 0.03% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE		
Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and larger	20	

SEAL TEST: 1 x 10-⁶ atm/cm³/sec. max. leak rate.

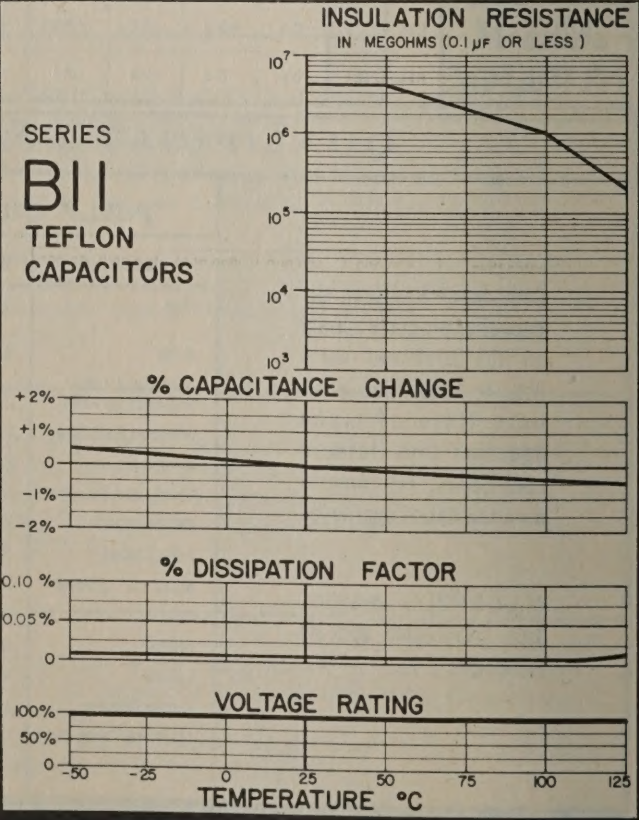
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.

B11 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 48 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 20 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10-⁶ atm/cm³/sec. max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. Insulation Resistance at the rated voltage and 25°C, 500,000 megs — uF minimum, but need not exceed 5,000,000 Megohms.
6. Capacitance % Tolerance at 1KHz and 25°C.
7. Dissipation Factor at 1KHz and 25°C, 0.03% maximum.
8. Temperature Coefficient measured from −55°C to 125°C at a minimum of 5 temperature points.
9. Visual Inspection for dimensions, marking and packaging.
10. Traceability to production and test records by permanent marking of parts with lot control number.
11. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.
12. Capacitors are serialized and packaged with certified test data to accompany each shipment.

SERIES
B11
TEFLON
CAPACITORS



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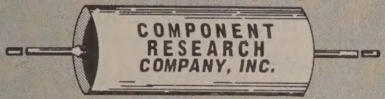
SERIES
C11

TEFLON

HIGH STABILITY CAPACITORS



- **QUALIFIED FOR SPACE**
- **100% SCREENED (QUALITY LEVEL 1)**
- **5,000,000 MEGOHMS IR (0.1 uF or less)**
- **100% SERIALIZED FOR DATA RECORDING**
- **STANDARD TOLERANCES ±0.25% TO ±10%**

CRC STYLE	DC VOLTS	OLD P/N
C11B	50VDC	05 TC
C11C	100VDC	1 TC
C11D	200VDC	2 TC

- PART NUMBER SYSTEM PAGE 18
- MFG. & INSPECTION FLOW PLAN PAGE 20
- QPL PROGRAM APPROVALS PAGE 23
- CASE DIMENSIONS PAGE 28
- LIFE TEST DATA PAGE 30

C11 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

+0.7% Max. at −55°C	−0.25% Max. at 55°C
+0.5% Max. at −25°C	−0.50% Max. at 85°C
+0.3% Max. at −10°C	−0.60% Max. at 125°C
+0.25% Max. at 0°C	

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.02% Max.
−65°C to 125°C	0.1% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 uF (in Megohms—uF)	500,000	500,000	200,000	100,000	25,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.
Example: A 2 uF capacitor is 250,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.01% Max. at 25°C.

DISSIPATION FACTOR: 0.03% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and larger	20	

SEAL TEST: 1 x 10^{-6} atm/cm^3/sec. Max. leak rate.

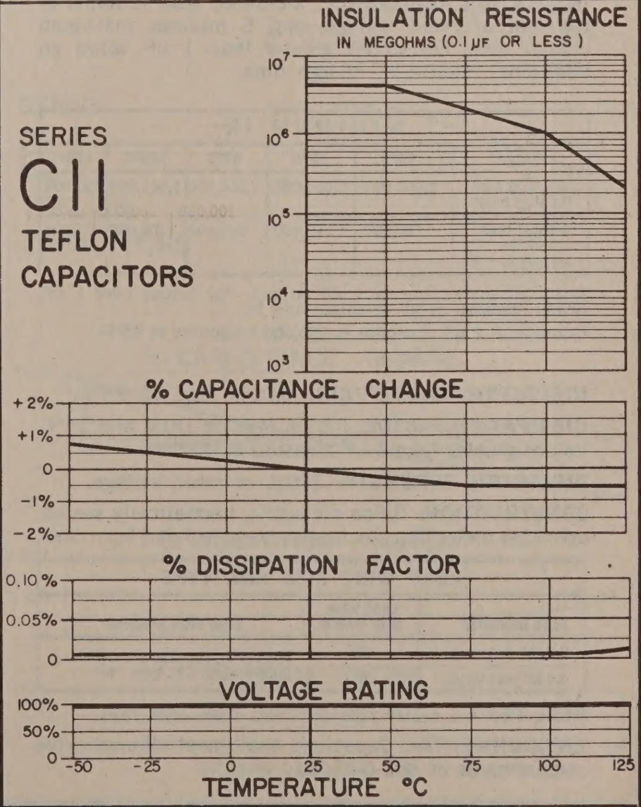
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.

C11 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 48 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10^{-6} atm/cm^3/sec. max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. Insulation Resistance at the rated voltage and 25°C, 500,000 megs — uF minimum, but need not exceed 5,000,000 Megohms.
6. Capacitance % Tolerance at 1KHz and 25°C.
7. Dissipation Factor at 1KHz and 25°C, 0.03% maximum.
8. Capacitors are 100% tested for 0.1% maximum drift with five cycles from −65°C to 125°C.
9. Visual Inspection for dimensions, marking and packaging.
10. Traceability to production and test records by permanent marking of parts with lot control number.
11. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.
12. Capacitors are serialized and packaged with certified test data to accompany each shipment.

SERIES
C11
TEFLON
CAPACITORS



COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

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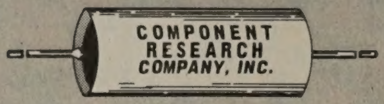
catalog JB

SERIES
D11

TEFLON
HIGH STABILITY CAPACITORS



- **QUALIFIED FOR SPACE**
- **100% SCREENED (QUALITY LEVEL 2)**
- **5,000,000 MEGOHMS IR (0.1 uF or less)**
- **STANDARD TOLERANCES ±0.25% TO ±10%**

CRC STYLE	DC VOLTS	OLD P/N
D11B	50VDC	05 TA
D11C	100VDC	1 TA
D11D	200VDC	2 TA

• PART NUMBER SYSTEM PAGE 18
• MFG. & INSPECTION FLOW PLAN PAGE 20
• QPL PROGRAM APPROVALS PAGE 23
• CASE DIMENSIONS PAGE 28
• LIFE TEST DATA PAGE 30

D11 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

+0.7% Max. at −55°C   −0.25% Max. at 55°C
+0.5% Max. at −25°C   −0.5% Max. at 85°C
+0.3% Max. at −10°C   −0.6% Max. at 125°C
+0.25% Max. at 0°C

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.02% Max.
−65°C to 125°C	0.1% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	5,000,000	5,000,000	2,000,000	1,000,000	250,000
Greater than 0.1 uF (in Megohms—uF)	500,000	500,000	200,000	100,000	25,000

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.

Example: A 2 uF capacitor is 250,000 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.01% Max. at 25°C.

DISSIPATION FACTOR: 0.03% Max. at 1KHz and 25°C. Values greater than 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and larger	20	

SEAL TEST: 1 x 10-6 atm/cm³/sec. max. leak rate.

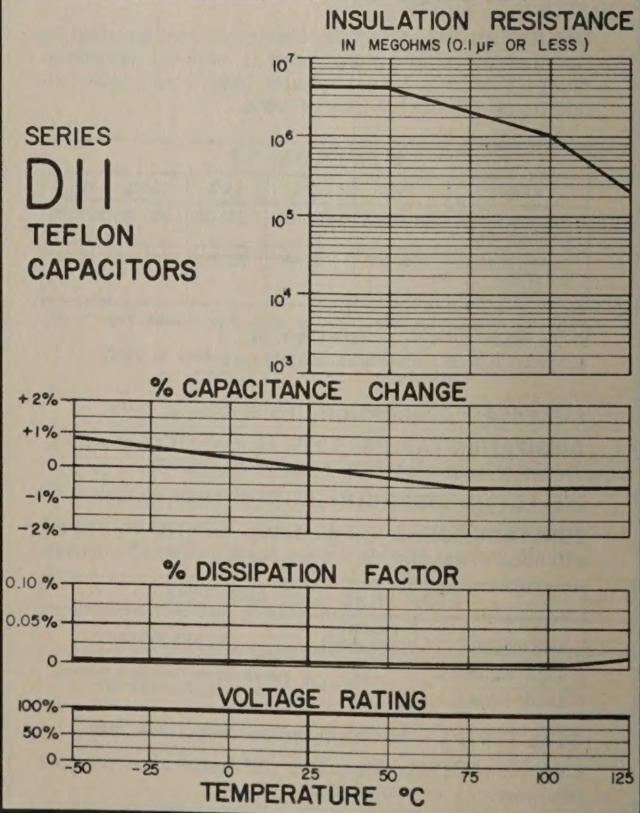
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.

D11 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 16 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10-6 atm/cm³/sec. max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. Insulation Resistance at the rated voltage and 25°C, 500,000 megs — uF minimum, but need not exceed 5,000,000 Megohms.
6. Capacitance % Tolerance at 1KHz and 25°C.
7. Dissipation Factor at 1KHz and 25°C, 0.03% maximum.
8. Visual Inspection for dimensions, marking and packaging.
9. Traceability to production and test records by permanent marking of parts with lot control number.
10. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.

SERIES
D11
TEFLON
CAPACITORS

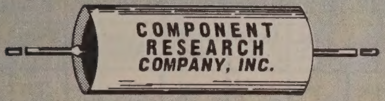


SERIES

E11

TEFLON

HIGH STABILITY CAPACITORS



- RECOMMENDED FOR INDUSTRIAL AND COMPUTER DC APPLICATIONS
- 100% SCREENED (QUALITY LEVEL 3)
- 1,000,000 MEGOHMS IR (0.1 uF or less)
- STANDARD TOLERANCES ±0.25% TO ±10%

CRC STYLE	DC VOLTS	OLD P/N
E11B	50VDC	05 TL
E11C	100VDC	1 TL
E11D	200VDC	2 TL

- PART NUMBER SYSTEM PAGE 18
- MFG. & INSPECTION FLOW PLAN PAGE 20
- CASE DIMENSIONS PAGE 28
- LIFE TEST DATA PAGE 30

E11 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE: (25°C Reference).

±1% Max. −55°C to 125°C

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to 85°C	0.05% Max.
−65°C to 125°C	0.25% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	1,000,000	1,000,000	500,000	250,000	100,000
Greater than 0.1 uF (in Megohms—uF)	100,000	100,000	50,000	25,000	10,000

DIELECTRIC ABSORPTION: .02% Max. at 25°C.

DISSIPATION FACTOR: 0.1% Max. at 1KHz and 25°C. Values over 1 uF measure at 0.1KHz.

DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Teflon dielectric, hermetically sealed, extended metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	E11 Lead material will be either gold plated nickel or tinned copperweld as available.
0.400″ and larger	20	

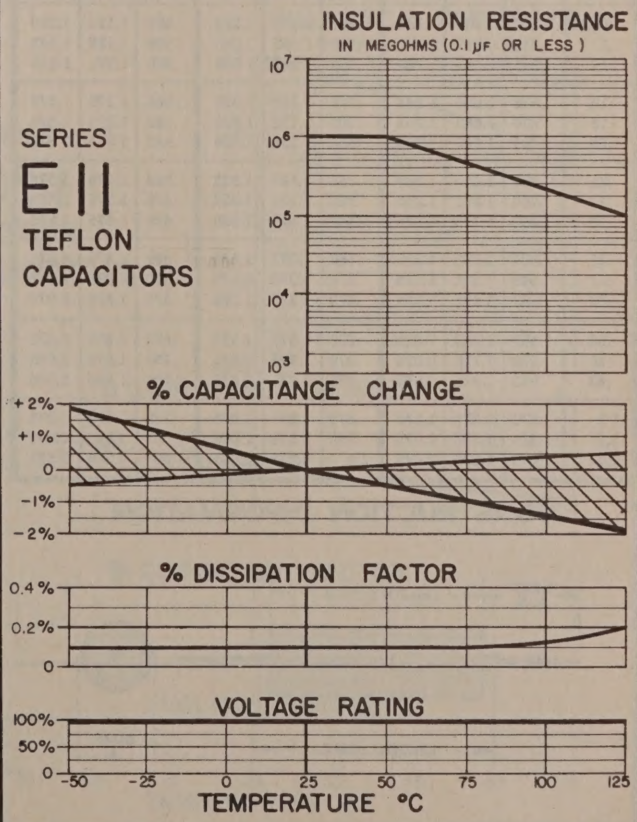
Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.
Example: A 10 uF, 100 volt capacitor at 25°C is 1,000,000/10 megs = 100,000 megohms.

SEAL TEST: 1 x 10^{-5} atm/cm³/sec. max. leak rate.

E11 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 5 Temperature Cycles from −65°C to 125°C.
2. Helium Leak Test. 1 x 10^{-5} atm/cm³/sec. max. leak rate.
3. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
4. Insulation Resistance at the rated voltage and 25°C, 100,000 megs — uF minimum, but need not exceed 1,000,000 Megohms.
5. Capacitance % Tolerance at 1KHz and 25°C.
6. Dissipation Factor at 1KHz and 25°C, 0.1% maximum.
7. Visual Inspection for dimensions, marking and packaging.



SERIES 11 TEFLON

CASE DIMENSIONS

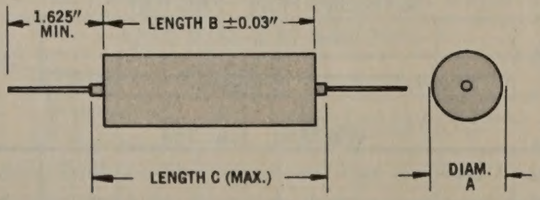
uF	11B 50VDC			11C 100 VDC			11D 200 VDC		
	Diam. A	Length B	Length C	Diam. A	Length B	Length C	Diam. A	Length B	Length C
.001	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0012	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0015	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0018	.235	.687	.887	.235	.687	.887	.235	.687	.887
.002	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0022	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0027	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0033	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0039	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0047	.235	.687	.887	.235	.687	.887	.235	.687	.887
.005	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0056	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0068	.235	.687	.887	.235	.687	.887	.235	.687	.887
.0082	.235	.687	.887	.235	.687	.887	.235	.687	.887
.01	.235	.687	.887	.235	.687	.887	.235	.687	.887
.012	.235	.687	.887	.235	.687	.887	.235	.687	.887
.015	.312	.687	.887	.312	.687	.887	.312	.687	.887
.018	.312	.687	.887	.312	.687	.887	.312	.813	1.013
.02	.312	.687	.887	.312	.687	.887	.312	.813	1.013
.022	.312	.687	.887	.312	.687	.887	.312	.813	1.013
.027	.312	.687	.887	.312	.813	1.013	.312	.813	1.013
.033	.312	.687	.887	.312	.813	1.013	.400	.813	1.013
.039	.312	.687	.887	.400	.813	1.013	.400	1.063	1.263
.047	.312	.687	.887	.400	.813	1.013	.400	1.063	1.263
.05	.312	.687	.887	.400	.813	1.013	.400	1.063	1.263
.056	.312	.813	1.013	.400	.813	1.013	.400	1.063	1.263
.068	.312	.813	1.013	.400	.813	1.013	.400	1.063	1.263
.082	.312	.937	1.137	.400	1.063	1.263	.500	1.125	1.325
.1	.312	.937	1.137	.400	1.063	1.263	.500	1.125	1.325
.12	.312	1.063	1.263	.500	1.125	1.325	.500	1.375	1.575
.15	.312	1.063	1.263	.500	1.125	1.325	.562	1.375	1.575
.18	.400	1.063	1.263	.500	1.125	1.325	.562	1.375	1.575
.20	.400	1.063	1.263	.562	1.125	1.325	.562	1.375	1.575
.22	.400	1.063	1.263	.562	1.125	1.325	.562	1.375	1.575
.27	.400	1.063	1.263	.562	1.125	1.325	.670	1.375	1.575
.33	.500	1.125	1.325	.562	1.125	1.325	.670	1.375	1.575
.39	.500	1.125	1.325	.562	1.375	1.575	.562	1.875	2.075
.47	.562	1.125	1.325	.670	1.375	1.575	.670	1.875	2.075
.50	.562	1.125	1.325	.670	1.375	1.575	.670	1.875	2.075
.56	.562	1.125	1.325	.670	1.375	1.575	.670	1.875	2.075
.68	.562	1.125	1.325	.670	1.875	2.075	.750	1.875	2.075
.82	.562	1.375	1.575	.670	1.875	2.075	.750	1.875	2.075
1.0	.670	1.375	1.575	.670	1.875	2.075	.750	1.875	2.075
1.5	.670	1.875	2.075	.750	1.875	2.075	1.00	1.875	2.075
2.0	.670	1.875	2.075	1.0	1.875	2.075	1.00	2.375	2.575

TYPE D51 TEFLON

CASE DIMENSIONS

uF	D51C TEFLON 100 VDC				D51D TEFLON 200 VDC			
	BASIC PART NO.	Diam. A	Length B	Length C	BASIC PART NO.	Diam. A	Length B	Length C
.001	D51C102	.235	.687	.887	D51D102	.235	.687	.887
.0012	D51C122	.235	.687	.887	D51D122	.235	.687	.887
.0015	D51C152	.235	.687	.887	D51D152	.235	.687	.887
.0018	D51C182	.235	.687	.887	D51D182	.235	.687	.887
.002	D51C202	.235	.687	.887	D51D202	.235	.687	.887
.0022	D51C222	.235	.687	.887	D51D222	.235	.687	.887
.0027	D51C272	.235	.687	.887	D51D272	.235	.687	.887
.0033	D51C332	.235	.687	.887	D51D332	.235	.687	.887
.0039	D51C392	.235	.687	.887	D51D392	.235	.687	.887
.0047	D51C472	.235	.687	.887	D51D472	.235	.687	.887
.005	D51C502	.235	.687	.887	D51D502	.235	.687	.887
.0056	D51C562	.235	.687	.887	D51D562	.235	.687	.887
.0068	D51C682	.235	.687	.887	D51D682	.235	.687	.887
.0082	D51C822	.235	.687	.887	D51D822	.235	.687	.887
.01	D51C103	.235	.687	.887	D51D103	.235	.687	.887
.012	D51C123	.235	.687	.887	D51D123	.235	.687	.887
.015	D51C153	.312	.687	.887	D51D153	.312	.687	.887
.018	D51C183	.312	.687	.887	D51D183	.400	.813	1.013
.02	D51C203	.312	.687	.887	D51D203	.400	.813	1.013
.022	D51C223	.312	.687	.887	D51D223	.400	.813	1.013
.027	D51C273	.400	.813	1.013	D51D273	.400	1.063	1.263
.033	D51C333	.400	.813	1.013	D51D333	.400	1.063	1.263
.039	D51C393	.400	1.063	1.263	D51D393	.400	1.063	1.263
.047	D51C473	.400	1.063	1.263	D51D473	.400	1.063	1.263
.05	D51C503	.400	1.063	1.263	D51D503	.400	1.063	1.263
.056	D51C563	.400	1.063	1.263	D51D563	.400	1.063	1.263
.068	D51C683	.400	1.063	1.263	D51D683	.400	1.063	1.263
.082	D51C823	.562	1.125	1.325	D51D823	.562	1.125	1.325
.1	D51C104	.562	1.125	1.325	D51D104	.562	1.125	1.325
.12	D51C124	.562	1.125	1.325	D51D124	.562	1.375	1.575
.15	D51C154	.562	1.375	1.575	D51D154	.562	1.875	2.075
.18	D51C184	.562	1.875	2.075	D51D184	.670	1.875	2.075
.20	D51C204	.562	1.875	2.075	D51D204	.670	1.875	2.075
.22	D51C224	.562	1.875	2.075	D51D224	.670	1.875	2.075
.27	D51C274	.670	1.875	2.075	D51D274	.670	1.875	2.075
.33	D51C334	.670	1.875	2.075	D51D334	.750	1.875	2.075
.39	D51C394	.750	1.875	2.075	D51D394	.750	1.875	2.075
.47	D51C474	.750	1.875	2.075	D51D474	1.00	2.375	2.575
.50	D51C504	.750	1.875	2.075	D51D504	1.00	2.375	2.575
.56	D51C564	.750	1.875	2.075	D51D564	1.00	2.375	2.575
.68	D51C684	1.00	1.875	2.075	D51D684	1.00	2.375	2.575
.82	D51C824	1.00	2.375	2.575	D51D824	1.00	2.625	2.825
1.0	D51C105	1.00	2.375	2.575	D51D105	1.00	2.625	2.825

CONSTRUCTION INFORMATION



LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312" and smaller	22	Tinned Copper Clad Steel (Tinned Copper-weld) CRC type "W"
0.400" and larger	20	

CASE DIMENSIONS	TOLERANCE LIMITS
"A" Diameter	±0.010" Without Sleeving
	−0.00" +0.02" With Mylar Sleeving
"B" Case Length	±0.03" With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the distance between solder beads.

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catalog JB

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

CRC HIGH RELIABILITY CAPACITORS

TEFLON SPECIFICATIONS AND CASE SIZES

TYPE
D51

D51 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage.

TEMPERATURE COEFFICIENT OF CAPACITANCE (25°C Reference).

+0.8% Max. at −50°C	−0.3% Max. at + 50°C
+0.6% Max. at −25°C	−0.5% Max. at + 75°C
+0.3% Max. at 0°C	−0.6% Max. at +100°C
	−0.8% Max. at +125°C

STABILITY WITH 5 TEMPERATURE CYCLES:

0.05% Max. Drift	−25°C to + 85°C
0.25% Max. Drift	−65°C to +125°C

INSULATION RESISTANCE measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 mfd, allow an additional minute/mfd charge time.

MINIMUM IR					
Range	25°C	55°C	85°C	100°C	125°C
.001 to 0.1 uF (in Megohms)	10,000,000	5,000,000	3,000,000	1,500,000	300,000
Greater than 0.1 uF (in Megohms — uF)	1,000,000	500,000	300,000	150,000	30,000

DIELECTRIC ABSORPTION: 0.01% Max. at 25°C.

DISSIPATION FACTOR: 0.01% Max. at 1 KHz and 25°C.

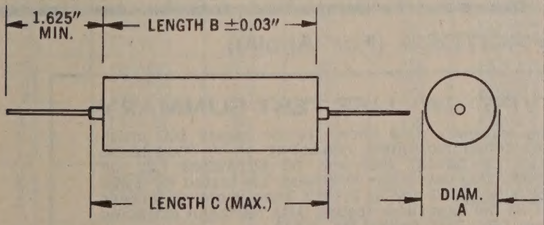
DIELECTRIC STRENGTH: 200% of rated voltage.

CONSTRUCTION: Teflon dielectric, hermetically sealed, extended metal foil or special metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE		
Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and larger	20	

SEAL TEST: 1 x 10^{-6} atm/cm³/sec. max. leak rate.

ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.



CASE DIMENSION	TOLERANCE LIMITS
"A" Diameter	±0.010″ Without Sleeving
	−0.00″ +0.02″ With Mylar Sleeving
"B" Case Length	±0.03″ With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the distance between solder beads.

- PART NUMBER SYSTEM PAGE 18
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- CASE DIMENSIONS PAGE 28
- LIFE TEST DATA PAGE 30

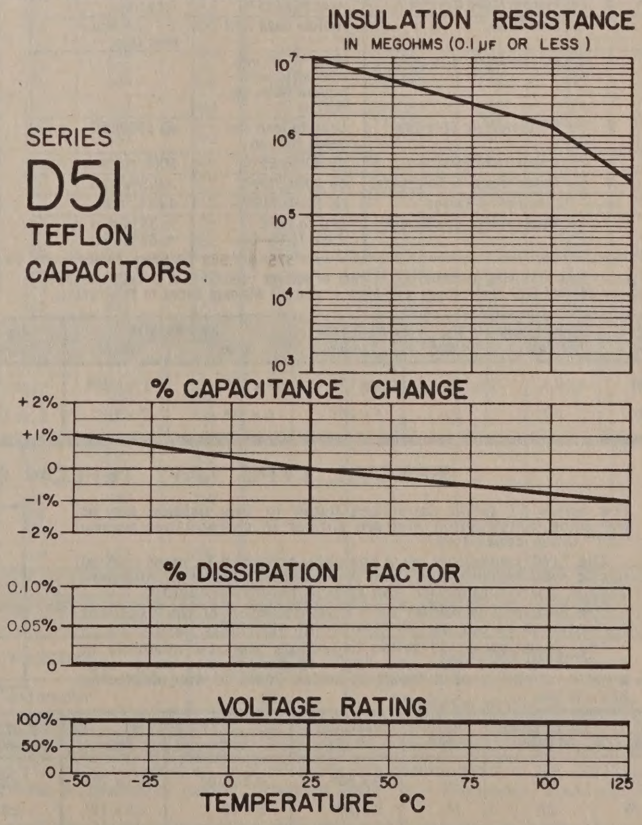
- STANDARD TOLERANCES ±0.25% to ±10%

D51 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 16 hours Burn-In at 125°C and 140% of the rated DC voltage.
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10^{-6} atm/cm³/sec. max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and from leads to case for one minute.
5. Insulation Resistance at the rated voltage and 25°C, 1,000,000 megs — uF minimum, but need not exceed 10,000,000 Megohms.
6. Capacitance % Tolerance at 1KHz and 25°C.
7. Dissipation Factor at 1KHz and 25°C, 0.005% maximum.
8. Visual inspection for dimensions, marking and packaging.
9. Traceability to production and test records by permanent marking of of parts with lot control number.
10. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.

SERIES
D51
TEFLON
CAPACITORS



CRC HIGH RELIABILITY CAPACITORS

LIFE TEST DATA

TYPE B11B TEFLON • TYPE X51 TEFLON • TYPE "JW" TEFLON

TYPE B11B TEFLON CAPACITORS (Formerly 05TJ)

Test reports covering high reliability metallized teflon capacitors manufactured by Component Research Co. since 1962 show that these capacitors are still unequalled for low loss, stability and reliability.

The test data listed below is typical of the performance characteristics of CRC type B11B or C11B teflon capacitors, shown on pages 24 and 25 of this catalog.

Additional test data is on file which has been accumulated from qualification testing since 1963 for critical programs such as Apollo, Lunar Orbitor, Discoverer, etc.

If your application demands highest possible insulation resistance up to 125°C, and extreme low loss characteristics, we suggest series 11 teflon capacitors. For high RMS AC current applications see series 51 teflon or contact a CRC applications engineer at the address shown at bottom of page for further details.

TYPE B11B LIFE TEST SUMMARY

Summary data shown below covers 85 precision teflon 50VDC capacitors, life tested for 1000 hours at 125°C, with 70VDC applied. There were no failures for all capacitors tested. Data has been extracted from CRC test reports 70TR12, 71TR18, 71TR19, 71TR20 and 71TR21.

List of Capacitors Life Tested			Insulation Resistance In Megohms at 25°C			% Capacitance Change With Life			% Dissipation Factor at 25°C		
CRC Type	Capacitance µF Value	No. Tested	Post Test Limits	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
				Low	High		Low	High		Low	High
05 TJ	.04667	7	2.2×10^5	1.5×10^7	4.5×10^7	0.5%	−.07%	−.27%	0.1%	.01%	.02%
05 TJ	.047	5	2.2×10^5	4×10^6	4.5×10^7	0.5%	−.08%	−.47%	0.1%	.01%	.02%
05 TJ	.05	9	2.2×10^5	2×10^6	4.5×10^7	0.5%	−.18%	−.34%	0.1%	.01%	.01%
05 TJ	.068	5	2.2×10^5	9×10^6	1.5×10^7	0.5%	−.09%	−.33%	0.1%	.01%	.05%
05 TJ	.10	11	2.2×10^5	3×10^5	4.5×10^7	0.5%	−.06%	−.37%	0.1%	.01%	.09%
05 TJ	.15	4	2.2×10^5	3×10^5	4.5×10^7	0.5%	−.09%	−.16%	0.1%	.01%	.03%
05 TJ	.1942	8	2.2×10^5	5×10^5	4.5×10^7	0.5%	−.02%	−.20%	0.1%	.01%	.04%
05 TJ	.33	5	2.2×10^5	7×10^5	1.5×10^7	0.5%	−.07%	−.16%	0.1%	.01%	.01%
05 TJ	.47	8	2.2×10^5	1.1×10^6	4.5×10^7	0.5%	−.08%	−.28%	0.1%	.01%	.08%
05 TJ	.5	6	2.2×10^5	1.5×10^6	4.5×10^7	0.5%	−.08%	−.22%	0.1%	.02%	.06%
05 TJ	2.0	17	1.1×10^5	1.3×10^5	2.2×10^7	0.5%	+.02%	−.10%	0.1%	.01%	.01%

TYPE X51 SPECIAL TEFLON CAPACITORS (Similar to New D51 Series)

Test Item No.	Examination or Test	Conditions	Limits
1	Burn-In	@ 85°C, 96 hrs. @ 750VDC	
2	Temperature Cycling	−62°C/125°C	5 cycles
3	Seal Test	Helium Leak Test	1×10^{-6} max. leak rate
4	AC-Dielectric Strength	@25°C, 30 min. 400 volts peak square wave @ 500 Hz	
5	DC-Dielectric Strength	Lead to lead and leads to case	@ 1000VDC
6	Insulation Resistance	@ 500V, 25°C	5000 picoamps max.
7	Capacitance % Tolerance	@ 1 KHz, 25°C	±0.5% max.
8	Dissipation Factor	@ 1 KHz, 25°C	0.01% max.
9	Temperature Coefficient	0°C to 25°C 25°C to 85°C	±.35% max. ±.65% max.

In applications involving abnormal AC current or voltage conditions it is recommended that you contact CRC applications engineers or consult AC data pages in this catalog.

The X51 500 volt teflon capacitors were specially designed to provide low loss high frequency AC characteristics in small package size. Our customer was having difficulty with catastrophic failure, drift and overheating using ordinary capacitors but the CRC X51 capacitors solved these problems and improved circuit performance considerably.

Table at left is part of X51 screening and processing performed on a 100% basis.

TYPE X51 LIFE TEST SUMMARY

Data shown below covers 48 teflon-foil capacitors life tested at 750VDC at 85°C for 1000 hours. There were no failures in this test. This data has been extracted from CRC test reports 70TR09, 70TR15, 71TR22 and 71TR23.

CRC Type	Capacitance µF Value	No. Tested	Post Test Limits	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
				Low	High		Low	High		Low	High
X51	0.1	24	1×10^5	5×10^6	1.6×10^8	±1%	0.00%	+.16%	0.01%	.01%	.01%
X51	0.2	24	1×10^5	6×10^6	2×10^7	±1%	0.00%	−.16%	0.01%	.01%	.01%

SPECIAL TYPE "JW" TEFLON CAPACITORS (For Apollo)

The series 11 teflon capacitors listed in this catalog are of the same construction and are similar in performance to the "JW" teflon capacitors.

The "JW" capacitors were specially screened to meet critical Apollo requirements and were an important factor in maintenance of precise guidance and control for Apollo flights.

Life test data is shown as a demonstration of the excellent performance of our earlier teflon high reliability capacitors.

The newer series 11 teflon capacitors are now available at much lower cost than the "JW" capacitors and have even greater reliability as a result of added years of manufacturing experience.

TYPE "JW" LIFE TEST SUMMARY

The summary data shown below covers 100 precision teflon capacitors consisting of 50 05JW2233G (0.22 uF 50VDC 2%) and 50 05JW224G (.22 uF 50VDC 2%) capacitors that were life tested for 2,000 hours at 125°C and at 75VDC. There were no failures for all the capacitors tested. Data has been extracted from CRC Test Report No. 5-534.

CRC Type	Capacitance µF Value	No. Tested	Post Test Limits	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
				Low	High		Low	High		Low	High
05 JW	.022	50	9×10^4	4.5×10^6	4.5×10^7	±3%	−.11%	−.95%	0.05%	.01%	.03%
05 JW	.22	50	9×10^4	5×10^6	1.5×10^7	±3%	−.09%	−.75%	0.05%	.01%	.04%

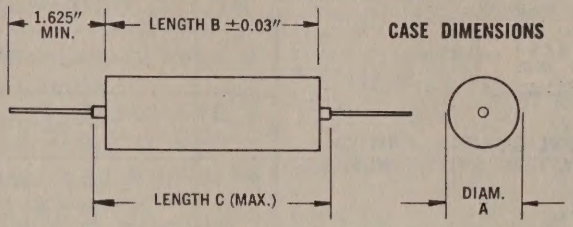
CRC HIGH RELIABILITY CAPACITORS

CORDWOOD (Reduced Length) CASE SIZES

SERIES E32 CORDWOOD POLYCARBONATE

- Specifications same as series E12 except for dimensions and AC ratings. See page 16.
- See page 18 for part number system.

SERIES E32 & D31



CASE DIMENSION	TOLERANCE LIMITS
"A" Diameter	±0.010″ Without Sleeving
	−0.00″ +0.02″ With Mylar Sleeving
"B" Case Length	±0.03″ With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the solder beads.

SERIES D31 CORDWOOD TEFLON

- See page 26 for D11 Teflon specifications which apply to D31B cordwood capacitors (except for temperature coefficient which is approximately 25% greater than D11 capacitors).
- See page 18 for complete details concerning the part number system.

	E32A 30VDC POLYCARBONATE				E32B 50VDC POLYCARBONATE					D31B 50VDC TEFLON			
uF	Basic Part No.	Diam. A	Length B	Length C	Basic Part No.	Diam. A	Length B	Length C	uF	Basic Part No.	Diam. A	Length B	Length C
.001	E32A102	.170	.500	.600	E32B102	.170	.500	.600	.001	D31B102	.193	.562	.600
.0012	E32A122	.170	.500	.600	E32B122	.170	.500	.600	.0012	D31B122	.193	.562	.600
.0015	E32A152	.170	.500	.600	E32B152	.170	.500	.600	.0015	D31B152	.193	.562	.600
.0018	E32A182	.170	.500	.600	E32B182	.170	.500	.600	.0018	D31B182	.193	.562	.600
.002	E32A202	.170	.500	.600	E32B202	.170	.500	.600	.002	D31B202	.193	.562	.600
.0022	E32A222	.170	.500	.600	E32B222	.170	.500	.600	.0022	D31B222	.193	.562	.600
.0027	E32A272	.170	.500	.600	E32B272	.170	.500	.600	.0027	D31B272	.193	.562	.600
.0033	E32A332	.170	.500	.600	E32B332	.170	.500	.600	.0033	D31B332	.193	.562	.600
.0039	E32A392	.170	.500	.600	E32B392	.170	.500	.600	.0039	D31B392	.235	.562	.600
.0047	E32A472	.170	.500	.600	E32B472	.170	.500	.600	.0047	D31B472	.235	.562	.600
.005	E32A502	.170	.500	.600	E32B502	.170	.500	.600	.005	D31B502	.235	.562	.600
.0056	E32A562	.170	.500	.600	E32B562	.170	.500	.600	.0056	D31B562	.235	.562	.600
.0068	E32A682	.170	.500	.600	E32B682	.170	.500	.600	.0068	D31B682	.235	.562	.600
.0082	E32A822	.170	.500	.600	E32B822	.170	.500	.600	.0082	D31B822	.235	.562	.600
.01	E32A103	.170	.500	.600	E32B103	.170	.500	.600	.01	D31B103	.235	.562	.600
.012	E32A123	.170	.500	.600	E32B123	.170	.500	.600	.012	D31B123	.235	.562	.600
.015	E32A153	.170	.500	.600	E32B153	.170	.500	.600	.015	D31B153	.235	.625	.670
.018	E32A183	.170	.500	.600	E32B183	.170	.500	.600	.018	D31B183	.235	.625	.670
.02	E32A203	.170	.500	.600	E32B203	.193	.562	.600	.02	D31B203	.235	.625	.670
.022	E32A223	.170	.500	.600	E32B223	.193	.562	.600	.022	D31B223	.235	.625	.670
.027	E32A273	.170	.500	.600	E32B273	.193	.562	.600	.027	D31B273	.235	.625	.670
.033	E32A333	.170	.500	.600	E32B333	.193	.562	.600	.033	D31B333	.312	.625	.670
.039	E32A393	.170	.500	.600	E32B393	.193	.625	.670	.039	D31B393	.312	.625	.670
.047	E32A473	.170	.500	.600	E32B473	.193	.625	.670	.047	D31B473	.312	.625	.670
.05	E32A503	.170	.500	.600	E32B503	.193	.625	.670	.05	D31B503	.312	.625	.670
.056	E32A563	.170	.562	.600	E32B563	.193	.625	.670	.056	D31B563	.312	.625	.670
.068	E32A683	.170	.562	.600	E32B683	.235	.625	.670	.068	D31B683	.312	.625	.670
.082	E32A823	.193	.562	.600	E32B823	.235	.625	.670	.082	D31B823	.312	.625	.670
.1	E32A104	.193	.562	.600	E32B104	.235	.625	.670	.1	D31B104	.312	.625	.670
.12	E32A124	.193	.687	.750	E32B124	.235	.625	.670	.12	D31B124	.312	.937	1.00
.15	E32A154	.193	.687	.750	E32B154	.312	.625	.670	.15	D31B154	.312	.937	1.00
.18	E32A184	.193	.687	.750	E32B184	.312	.625	.670	.18	D31B184	.400	.937	1.00
.20	E32A204	.193	.687	.750	E32B204	.312	.625	.670	.2	D31B204	.400	.937	1.00
.22	E32A224	.193	.687	.750	E32B224	.312	.625	.670	.22	D31B224	.400	.937	1.00
.27	E32A274	.235	.687	.750	E32B274	.312	.625	.670					
.33	E32A334	.235	.687	.750	E32B334	.312	.687	.750					
.39	E32A394	.235	.687	.750	E32B394	.312	.687	.750					
.47	E32A474	.235	.687	.750	E32B474	.312	.687	.750					
.50	E32A504	.235	.687	.750	E32B504	.312	.687	.750					
.56	E32A564	.312	.687	.750	E32B564	.400	.687	.750					
.68	E32A684	.312	.687	.750	E32B684	.400	.687	.750					
.82	E32A824	.312	.687	.750	E32B824	.400	.687	.750					
1.0	E32A105	.312	.687	.750	E32B105	.400	.687	.750					
1.2	E32A125	.312	.813	.900									
1.5	E32A155	.312	.937	1.00									
2.0	E32A205	.312	1.063	1.10									
2.2	E32A225	.312	1.063	1.10									
2.7	E32A275	.400	.937	1.00									
3.0	E32A305	.400	.937	1.00									
3.3	E32A335	.400	.937	1.00									
4.0	E32A405	.400	1.063	1.10									
4.7	E32A475	.400	1.375	1.45									
5.0	E32A505	.400	1.375	1.45									
5.6	E32A565	.500	1.375	1.45									
6.8	E32A685	.500	1.375	1.45									
8.0	E32A805	.500	1.375	1.45									
10.0	E32A106	.500	1.375	1.45									

SERIES E32 & D31 LEAD WIRE SIZE & TYPE

CASE DIAMETER	Lead Wire Size #AWG	LEAD WIRE MATERIAL
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	

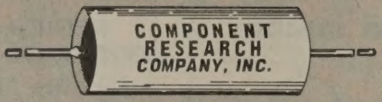
ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.
CONSTRUCTION: Hermetically sealed, extended metal film electrodes, leads isolated from case.

SERIES

N53

POLYSTYRENE-FOIL

HIGH INSULATION RESISTANCE AND LONG TERM STABILITY



- **QUALIFIED FOR SPACE APPLICATIONS, CRITICAL OPERATIONAL AMPLIFIER SYSTEMS AND NETWORKS**
- **100% SCREENED (LEVEL 3)**
- **5,000,000 MEGOHMS IR (0.1 MFD OR LESS)**

DC VOLTS	CRC TYPE	OLD P/N
50 VDC	N53B	05 PA
100 VDC	N53C	1 PA
200 VDC	N53D	2 PA

- PART NUMBER SYSTEM: PAGE 18
- CASE DIMENSIONS: PAGE 33
- APPLICATION NOTES: PAGE 34
- STANDARD TOLERANCES: ±0.1% to ±10%
- SERIES L53 Capacitors with burn-in and high reliability screening can also be supplied. For advance information on a new high temperature polystyrene capacitor see pages 34, 37.

N53 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 85°C at full rated volts.

TEMPERATURE COEFFICIENT: (See special notes below*)

Values		
Values 0.001 MFD to 0.0082 MFD	−80 ±50PPM/°C
0.01 MFD to 2.0 MFD	−60 ±50PPM/°C

*NOTES: Special Polystyrene Capacitors can be supplied with a negative coefficient of −20 to −100 PPM/°C that is linear to ±30 PPM/°C, ±20 PPM/°C and ±10 PPM/°C. A WIDE SELECTION is available of larger MFD values in bathtub and custom cases.

STABILITY: .03% maximum drift with 5 cycles from −25°C to 85°C.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C	55°C	85°C
0.001 to 0.2 uF (in Megohms)	5,000,000 Megohms	2,500,000 Megohms	500,000 Megohms
0.22 to 1.0 uF (in Megohms)	1,000,000 Megohms	500,000 Megohms	100,000 Megohms
Above 1.0 uF (in Megohms - uF)	†1,000,000 Megohms-uF	† 500,000 Megohms-uF	†100,000 Megohms-uF

† For capacitor values over 1 uF, divide by uF value to obtain minimum IR limits.
EXAMPLE: A 2 uF capacitor at 25°C is 500,000 megohms

DIELECTRIC ABSORPTION: 0.02% Max. at 25°C.

DISSIPATION FACTOR: 0.02% Max. at 1 KHz and 25°C. Values above 1 uF measured at 0.1 KHz.

DIELECTRIC STRENGTH: 200% of rated volts.

CONSTRUCTION: Polystyrene dielectric, hermetically sealed, extended metal foil or special metal film electrodes, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C"

SEAL TEST: 1 x 10-6 atm/cm³/sec max. leak rate.

ENVIRONMENTAL: Capacitors shall be capable of meeting all applicable requirements of MIL-C-83421 including high frequency vibration.

N53 QUALITY ASSURANCE

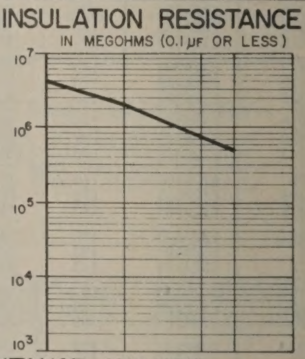
All capacitors are 100% screened and tested as follows:

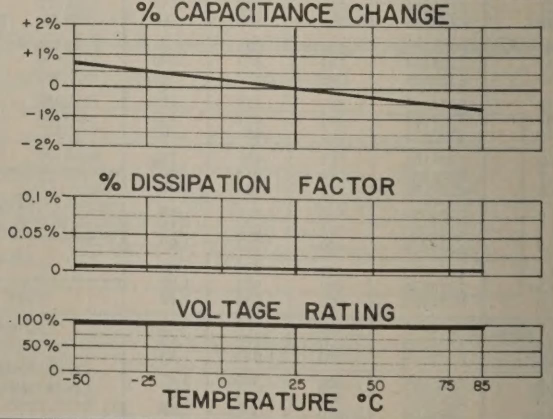
1. 5 Temperature Cycles from −65°C to 85°C.
2. Helium Leak Test. 1 x 10-6 atm/cm³/sec. max. leak rate.
3. DC dielectric strength at 200% of the rated DC voltage.
4. Insulation Resistance at the rated voltage and 25°C, 1,000,000 megs — uF minimum. See minimum IR table in specifications.
5. Capacitance % Tolerance at 1 KHz and 25°C.
6. Dissipation Factor at 1 KHz and 25°C, 0.02% maximum.
7. Visual inspection (External) for dimensions, marking and packaging.
8. Traceability to production and test records by permanent marking of parts with lot control number.
9. Process and inspection data is maintained on file per NPC-200-3, Mil-Q-9858 quality control standards and MIL-STD-790 Reliability Assurance Program.

SERIES

N53

POLYSTYRENE CAPACITORS





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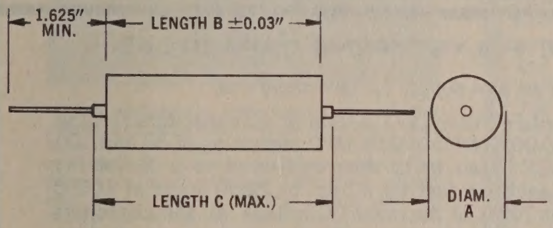
catalog JB

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

CRC SERIES N53 POLYSTYRENE CAPACITOR DIMENSIONS

Series N53 Polystyrene Capacitors are widely used in instrumentation applications requiring high insulation resistance, low dielectric absorption, excellent stability, and linear temperature coefficient of capacitance. Larger capacitance values and higher voltage ratings are available and will be added to our N53 specifications in our next catalog issue. Contact our sales office for special requirements.



CASE DIMENSION	TOLERANCE LIMITS
"A" Diameter	±0.010″ Without Sleeving
	−0.00″ +0.02″ With Mylar Sleeving
"B" Case Length	±0.03″ With or Without Sleeving
"C" Bead to Bead Length	The lengths shown in tables are maximum and include the solder beads

uF	BASIC PART NO.	N53B 50 VDC			BASIC PART NO.	N53C 100 VDC		
		Diam. A	Length B	Length C		Diam. A	Length B	Length C
.001	N53B102	.193	.687	.887	N53C102	.193	.687	.887
.0012	N53B122	.193	.687	.887	N53C122	.193	.687	.887
.0015	N53B152	.193	.687	.887	N53C152	.193	.687	.887
.0018	N53B182	.193	.687	.887	N53C182	.193	.687	.887
.002	N53B202	.193	.687	.887	N53C202	.193	.687	.887
.0022	N53B222	.193	.687	.887	N53C222	.193	.687	.887
.0027	N53B272	.193	.687	.887	N53C272	.193	.687	.887
.0033	N53B332	.193	.687	.887	N53C332	.193	.687	.887
.0039	N53B392	.193	.687	.887	N53C392	.193	.687	.887
.0047	N53B472	.193	.687	.887	N53C472	.193	.687	.887
.005	N53B502	.193	.687	.887	N53C502	.193	.687	.887
.0056	N53B562	.193	.687	.887	N53C562	.193	.687	.887
.0068	N53B682	.193	.687	.887	N53C682	.193	.687	.887
.0082	N53B822	.193	.813	1.013	N53C822	.193	.813	1.013
.01	N53B103	.193	.813	1.013	N53C103	.193	.813	1.013
.012	N53B123	.235	.813	1.013	N53C123	.235	.813	1.013
.015	N53B153	.235	.813	1.013	N53C153	.235	.813	1.013
.018	N53B183	.312	.813	1.013	N53C183	.312	.813	1.013
.02	N53B203	.312	.813	1.013	N53C203	.312	.813	1.013
.022	N53B223	.312	.813	1.013	N53C223	.312	.813	1.013
.027	N53B273	.312	.813	1.013	N53C273	.312	.813	1.013
.033	N53B333	.312	.813	1.013	N53C333	.312	.813	1.013
.039	N53B393	.312	.813	1.013	N53C393	.400	.813	1.013
.047	N53B473	.312	.813	1.013	N53C473	.400	.813	1.013
.05	N53B503	.312	.813	1.013	N53C503	.400	.813	1.013
.056	N53B563	.312	.813	1.013	N53C563	.400	.813	1.013
.068	N53B683	.400	.813	1.013	N53C683	.400	1.063	1.263
.082	N53B823	.400	1.063	1.263	N53C823	.400	1.063	1.263
.1	N53B104	.400	1.063	1.263	N53C104	.400	1.375	1.575
.12	N53B124	.400	1.063	1.263	N53C124	.400	1.375	1.575
.15	N53B154	.400	1.375	1.575	N53C154	.400	1.375	1.575
.18	N53B184	.500	1.375	1.575	N53C184	.500	1.375	1.575
.20	N53B204	.500	1.375	1.575	N53C204	.500	1.375	1.575
.22	N53B224	.500	1.375	1.575	N53C224	.562	1.375	1.575
.27	N53B274	.562	1.375	1.575	N53C274	.562	1.875	2.075
.33	N53B334	.562	1.375	1.575	N53C334	.562	1.875	2.075
.39	N53B394	.562	1.875	2.075	N53C394	.670	1.875	2.075
.47	N53B474	.562	1.875	2.075	N53C474	.670	1.875	2.075
.50	N53B504	.562	1.875	2.075	N53C504	.670	1.875	2.075
.56	N53B564	.562	1.875	2.075	N53C564	.670	1.875	2.075
.68	N53B684	.670	1.875	2.075	N53C684	.750	1.875	2.075
.82	N53B824	.750	1.875	2.075	N53C824	1.00	1.875	2.075
1.0	N53B105	.750	1.875	2.075	N53C105	1.00	1.875	2.075
1.5	N53B155	1.0	1.875	2.075	N53C155	1.00	2.375	2.575
2.0	N53B205	1.0	2.375	2.575				

SPECIAL MINIATURE SERIES N13 POLYSTYRENE CAPACITORS

Component Research Co. has developed a new product line of special Metallized Polystyrene Capacitors, Type N13, which are approximately 50% smaller in size than the N53 Series. The N13 capacitors have the same high quality, high performance features as Series 53 and will ultimately be qualified to established reliability specification MIL-C-83421. The unique patented construction and process features of CRC capacitors have been incorporated into the N13 Series which makes them the most reliable and miniature Polystyrene capacitors available for aerospace or industrial applications. The N13 Series has a low dissipation factor of 0.02% maximum and can be fully operated to 85°C reliably without voltage derating.

We believe the N13 Series will be useful in airborne applications where the N53 Series are too large in size and weight or where the Series 12 Polycarbonate have too high a dielectric absorption or too low an insulation resistance. Please contact our sales office for further information.

CRC HIGH RELIABILITY CAPACITORS

N53 POLYSTYRENE CAPACITORS
SPECIAL TYPE L53 POLYSTYRENE CAPACITORS

N53 POLYSTYRENE APPLICATION NOTES

Medical Research Laboratories, Industrial Research Institutes and Instrumentation Manufacturers find our N53 polystyrene capacitors are their favorite choice for integrating and other memory applications.

The N53B105KXC 1 uF, 50VDC capacitor shown below is, 0.750″ x 1.875″ hermetically sealed, and helium leak tested to maintain its low loss characteristics for long term use.

Typically, this capacitor exhibits less than 0.01 nanoamps leakage current at 25°C ±20°C with 10VDC applied. The low dielectric absorption, low dissipation factor and excellent capacitance stability with time, makes this capacitor ideal for laboratory and critical industrial applications.

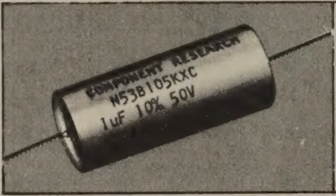
N53 polystyrene capacitors are available in bathtub cases and custom designed metal cases where capacitance values above the standard values listed on catalog page 33 are needed.

Capacitors up to 100 uF of extremely high quality can be supplied to meet individual customer requirements.

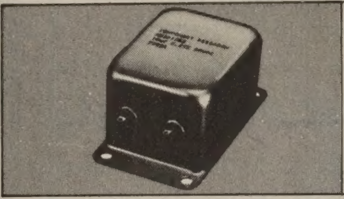
The N53B106B 10 uF, 50VDC polystyrene capacitor shown below is approximately 2.25″ x 2.88″ x 2″ high, plus the ⅜″ wide mounting flanges. Leakage current at 10VDC and at 25°C is less than 0.1 nanoamps.

A 10 uF 10% 50VDC, N53B106K capacitor domestic price is approximately $40.00 in quantities from 1-10 pieces.

Special polystyrene capacitors for high AC power resonating use, are also available with very low loss frequency characteristics and heavy duty terminations.



STANDARD TUBULAR P/N N53B105KXC



SPECIAL BATHTUB P/N N53B106B

SPECIAL "L53" TYPE HIGH TEMPERATURE POLYSTYRENE CAPACITORS

CRC has developed miniature polystyrene capacitors that can safely be stored above 85°C. This has been made possible by the use of a combination of the CRC patented winding and termination construction, and special metal film electrodes which support the polystyrene dielectric in a stress-free manner at temperatures above 85°C (CRC patent pending.)

Although CRC is confident that operation is possible at temperatures up to 105°C, (some lots have been operated at 125°C) we recommend that the normal operating temperature range be limited from −65°C to 85°C. This recommendation is not based upon any reliability problems at 105°C, but is rather due to a slight capacitance offset (called TC Hysteresis) that occurs when operated or stored above 85°C. The L53 polystyrene capacitors have an unusually linear temperature coefficient slope from −55°C to 85°C. Their retrace is superb and we believe this type will be excellent for low cost standards which we now supply for laboratory use.

As of February 1971 a total of 40 capacitors ranging from 0.0022 MFD to 0.01 MFD consisting of 50 and 100 volts DC rated units were subjected to a Reliability Demonstration test for a total of 2,000 hours at 105°C and at 100% of the rated DC voltage. All the capacitors also received a total of 75 temperature cycles from −62°C to +85°C in order to further stress the terminations of these capacitors. The capacitors were then visually inspected, seal tested and electrically inspected.

The capacitors indicated no significant Δ% capacitance, % DF and IR changes and there were no opens or shorts as indicated by the measurements shown in the table below. CRC will be conducting further testing on larger quantities of capacitors covering wider microfarad and voltage ranges in order to determine the proper ratings for these unusually reliable high temperature polystyrene capacitors. See page 37.

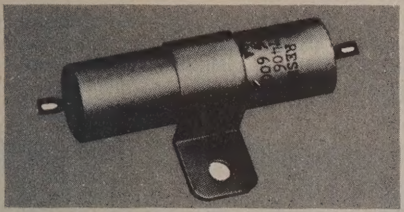
L53 POLYSTYRENE DC LIFE TEST DATA AT 105°C

TEST REPORT CRC XT398

	LIST OF CAPACITORS LIFE TESTED			INSULATION RESISTANCE IN MEGOHMS AT 25°C		% CAPACITANCE CHANGE WITH LIFE		% DISSIPATION FACTOR AT 25°C	
				Test Results		Test Results		Test Results	
	CRC Type	MFD Value	No. Tested	Low	High	Low	High	Low	High
Test results for 26 50VDC polystyrene capacitors life tested for 2,000 hours at 105°C with 50VDC applied. There were no failures for this group.	L53	.0022	5	5.6×10^5	4.5×10^7	+.05	+.80	.01	.01
	L53	.005	5	4.5×10^7	4.5×10^7	−.03	+.34	.01	.01
	L53	.01	14	3.4×10^5	4.5×10^7	0.00	+.30	.01	.01
	L53	.068	2	2.2×10^7	4.5×10^7	0.00	+.70	.01	.01
Test results for 14 100VDC polystyrene capacitors life tested for 2,000 hours at 105°C with 100VDC applied. There were no failures for this group.	L53	.005	14	2×10^5	4.5×10^7	+.01	+.50	.01	.01

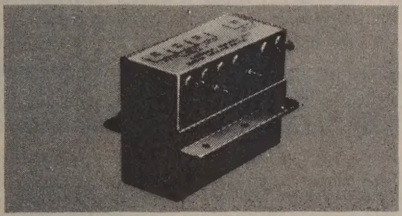
SPECIAL CAPACITOR APPLICATION SECTION

POWER RESONATING • SCR COMMUTATING • PULSE FORMING • AC ORDERING INFORMATION



The 0.033 uF, 2%, 600VDC, polystyrene capacitor shown is .562″ x 1.875″ size and is rated at 1.5 AMPS RMS AC. The capacitor is designed to handle 300V RMS AC at frequencies up to 25,000 Hz and to simultaneously withstand rugged environmental testing for a high reliability underseas application.

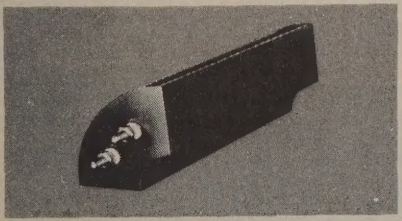
During operation and extreme environmental conditions the capacitor must not exhibit microphonics, noise, or corona and the short or long term capacitance drift must be maintained to very close limits. In many applications, burn-in under AC conditions similar to customer use can be performed as a 100% screening procedure.



In this application, high quality foil polypropylene and polystyrene capacitors were used to provide precise three phase motor control of a critical underwater guidance system. The capacitors must withstand transient voltage and current spikes during severe environmental stress without affecting reliability.

The highest quality materials are used including RTV silicone rubber potting compounds which are carefully lot controlled and processed to provide excellent electrical properties and extended life.

Typically the capacitors operate at 180V RMS from 400 Hz to 1200 Hz and must also withstand transients of 500 volts per millisecond under pulse peak to peak conditions of 800 volts.



As an example of CRC design of special purpose capacitors, four, quarter round capacitors were assembled to form a coaxial capacitor with a 2″ I.D. hole. Through this hole a copper pipe is passed with a circulating coolant to remove the heat generated due to the watts-loss of the capacitors.

In this application all parts were custom designed to provide low loss including special terminals capable of handling 100 AMPS RMS with minimum heating.

Special capacitors can be supplied to handle peak currents ranging into thousands of amperes for short periods in the microsecond region.

CRC patented capacitor designs provide the lowest possible loss, the highest reliability, consistent with minimum package size and reasonable cost.

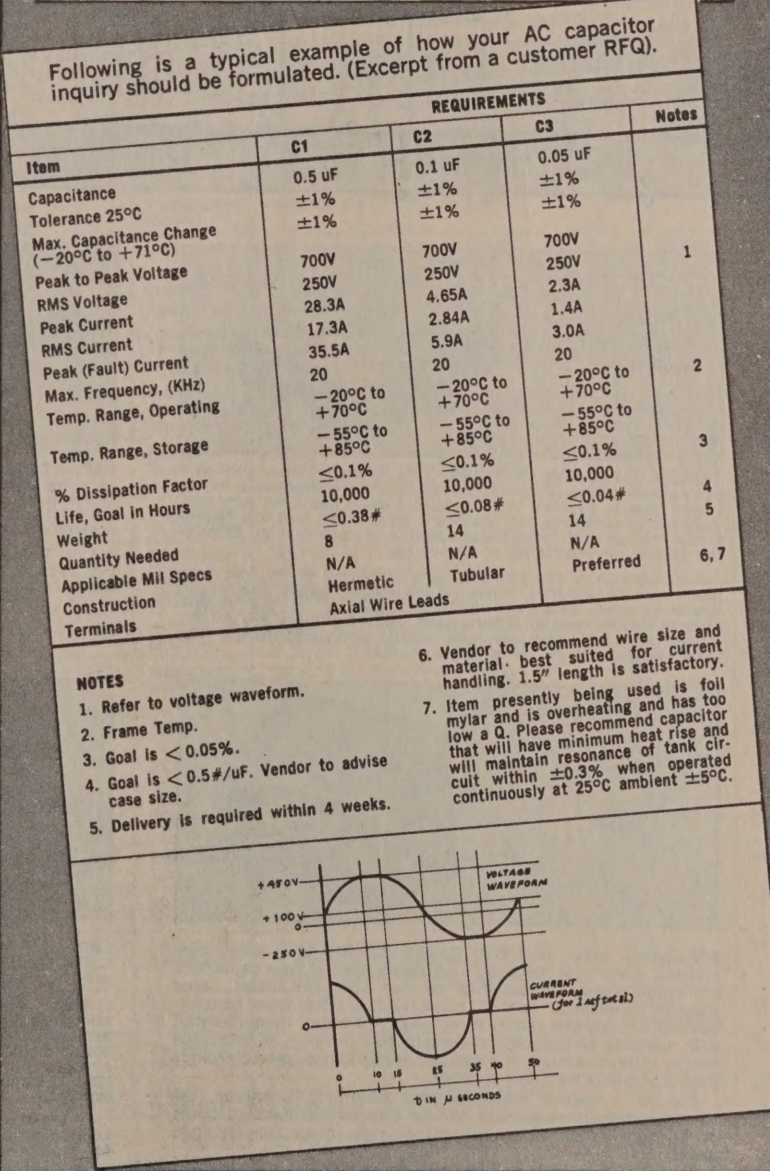
CRC has over 150 KVA of AC power generators in constant use for power burn-in and life test of capacitors from 400 Hz to 40 KHz. Our present plans are to double this power generating capability with a view to CRC becoming a world leader in the development and manufacture of finest quality AC capacitors as well as CRC standard precision capacitors.

STUDYING YOUR AC CAPACITOR REQUIREMENTS

It is important to provide detailed information concerning all normal and worst case conditions, space availability, quantity, delivery required, and if possible any problems previously encountered with capacitors used.

In the example below the customer has presented his requirements in detail including the current and voltage waveforms.

Please provide us with similar information when making inquiries for special AC capacitors so that we can make recommendations or quotations with minimum delay.



Following is a typical example of how your AC capacitor inquiry should be formulated. (Excerpt from a customer RFQ).

	REQUIREMENTS			
Item	C1	C2	C3	Notes
Capacitance	0.5 uF	0.1 uF	0.05 uF	
Tolerance 25°C	±1%	±1%	±1%	
Max. Capacitance Change (−20°C to +71°C)	±1%	±1%	±1%	
Peak to Peak Voltage	700V	700V	700V	1
RMS Voltage	250V	250V	250V	
Peak Current	28.3A	4.65A	2.3A	
RMS Current	17.3A	2.84A	1.4A	
Peak (Fault) Current	35.5A	5.9A	3.0A	
Max. Frequency, (KHz)	20	20	20	
Temp. Range, Operating	−20°C to +70°C	−20°C to +70°C	−20°C to +70°C	2
Temp. Range, Storage	−55°C to +85°C	−55°C to +85°C	−55°C to +85°C	
% Dissipation Factor	≤0.1%	≤0.1%	≤0.1%	3
Life, Goal in Hours	10,000	10,000	10,000	
Weight	≤0.38#	≤0.08#	≤0.04#	4
Quantity Needed	8	14	14	5
Applicable Mil Specs	N/A	N/A	N/A	
Construction	Hermetic	Tubular	Preferred	6, 7
Terminals	Axial Wire Leads			

NOTES

1. Refer to voltage waveform.
2. Frame Temp.
3. Goal is < 0.05%.
4. Goal is < 0.5#/uF. Vendor to advise case size.
5. Delivery is required within 4 weeks.
6. Vendor to recommend wire size and material· best suited for current handling. 1.5″ length is satisfactory.
7. Item presently being used is foil mylar and is overheating and has too low a Q. Please recommend capacitor that will have minimum heat rise and will maintain resonance of tank circuit within ±0.3% when operated continuously at 25°C ambient ±5°C.

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

PAGE 35
catalog JB

LIFE TEST DATA Series 14 Polysulfone Capacitors

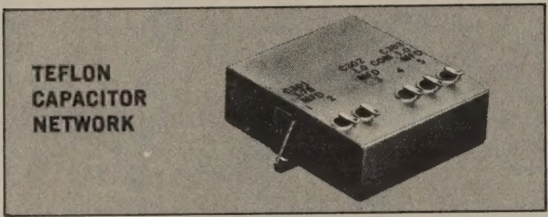
Polysulfone, one of our newer dielectric materials, has many advantages to offer in terms of extended temperature range, and low temperature coefficient of capacitance.

In accordance with the CRC established policy of introducing new products with conservative ratings, life testing has been conducted at 125°C and at ratings that we believe will provide reliable, high quality polysulfone capacitors. Our new series 14 polysulfone specifications are in line with this policy, and are based upon the manufacture and test of thousands of polysulfone capacitors since 1970.

In addition to AC life tests, DC life at higher temperatures and voltage levels are in process. Future catalog issues will undoubtedly contain additional polysulfone specifications and life test data at extended conditions.

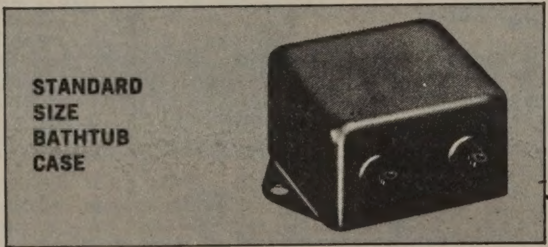
DC LIFE TEST DATA	LIST OF CAPACITORS LIFE TESTED			INSULATION RESISTANCE IN MEGOHMS AT 25°C			% CAPACITANCE WITH LIFE			% DISSIPATION FACTOR AT 25°C		
	CRC* Type	MFD Value	No. Tested	Post Test Limits (Min. IR)	Test Results		Post Test Limits	Test Results		Post Test Limits	Test Results	
					Low	High		Low	High		Low	High
TEST REPORTS CRC XT520, XT542, XT544 AND XT547 TEST RESULTS FOR 101 50VDC POLYSULFONE CAPACITORS LIFE TESTED FOR 2,000 HOURS AT 125°C WITH 53VDC APPLIED. THERE WERE NO FAILURES FOR THIS GROUP.	*05 MP	.0068	9	6.4 x 10^5	1.5 x 10^7	4.5 x 10^7	±4%	−.02%	+.89%	0.25%	.05%	.08%
	*05 MP	.22	10	2.8 x 10^5	3 x 10^6	9 x 10^6	±4%	+.01%	+.30%	0.25%	.07%	.08%
	*05 MP	1.5	40	4.5 x 10^4	8 x 10^5	3 x 10^6	±4%	+.01%	+.48%	0.25%	.03%	.06%
	*05 MP	2.0	42	3 x 10^4	2.2 x 10^5	4.5 x 10^6	±4%	+.02%	+.46%	0.25%	.03%	.05%
TEST REPORTS CRC XT518, XT539, XT540 AND XT541 TEST RESULTS FOR 128 100VDC POLYSULFONE CAPACITORS LIFE TESTED FOR 2,000 HOURS AT 125°C WITH 105VDC APPLIED. THERE WERE NO FAILURES FOR THIS GROUP.	*FORMER TYPE MP POLYSULFONE IS SIMILAR TO H14 SERIES											
	*1 MP	.01	10	6.5 x 10^5	5 x 10^6	4.5 x 10^7	±4%	−.01%	−.37%	0.25%	.05%	.07%
	*1 MP	.015	36	6.5 x 10^5	1.7 x 10^6	4.5 x 10^7	±4%	+.01%	+.93%	0.25%	.05%	.09%
	*1 MP	.068	37	6.5 x 10^5	1.3 x 10^7	9 x 10^7	±4%	+.15%	+1.21%	0.25%	.06%	.09%
	*1 MP	.12	45	5.3 x 10^5	1 x 10^6	3 x 10^7	±4%	−.01%	−.37%	0.25%	.04%	.07%

SPECIAL CAPACITOR TYPES High Energy AC Ultra High IR DC



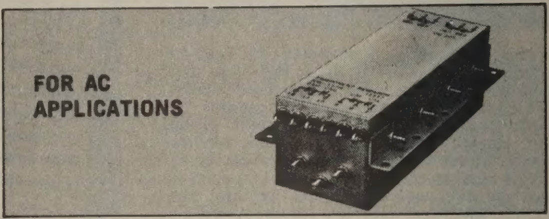
TEFLON CAPACITOR NETWORK: This teflon memory and computing network is one of the most critical components in the Lance Missile System. The capacitors must maintain very high insulation resistance, low dielectric absorption, and low capacitance change with temperature during storage and all through the severe environments of launching.

The capacitors are also specially designed to be free from mechanically induced noise which could affect the highly advanced and sensitive electronics control of the missile guidance. Testimonial letters from our customers are on file attesting to the unusually high quality and performance they have experienced in using our products.



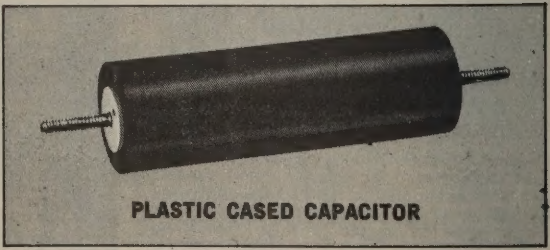
STANDARD SIZE BATHTUB CASES provide a quicker, convenient, lower cost method of providing special type capacitors for applications not satisfied by our standard metal cased tubular capacitors. Special capacitors of this type can frequently be shipped within three weeks of order, manufactured with a choice of dielectric materials, construction, % tolerance range, voltage ratings, and special performance characteristics that is virtually limitless in scope.

Due to a special matching and trimming technique, extremely accurate capacitors can be provided in bathtub cases at lower cost than an equivalent accuracy in our tubular style capacitors.



CAPACITORS DESIGNED FOR AC APPLICATIONS by CRC have very low equivalent series resistance and are remarkably cool and efficient for their size. The capacitor shown contains eight 1.2 MFD sections that operate up to 25 KHz at 170 volts AC RMS maximum with 25 amps at 25% duty cycle for each capacitor.

CRC was selected as the manufacturer to produce this special capacitor because of the extreme reliability required for a weapons program.



CRC IS NOW CUSTOM MANUFACTURING PLASTIC CASED CAPACITORS of extremely low loss and minimum heat rise for very high current, high energy applications.

These capacitors are available in ratings from DC to 50 KHz and voltages of up to 5000 volts RMS AC. The capacitors are available with brass threaded terminals or a variety of high conductivity copper lugs for low inductance and effective heat sinking. All plastic cased capacitors are thoroughly sealed against atmospheric effects by a special vacuum encapsulation process.

A standard product line offering a range of case sizes, voltage ratings, and performance styles will soon be available for prompt delivery.

CRC HIGH RELIABILITY CAPACITORS

Component Research capacitors are used in critical applications where their reliability and performance can affect the success of an entire program involving years of preparation and billions of dollars of program cost. For over a decade, aerospace programs from Apollo to Viking have used CRC capacitors for timing circuits and other control circuits, essential for controlling spacecraft millions of miles from earth, after years of space travel.

You can depend upon CRC to provide the most reliable capacitor and screening plan for your critical applications. Following are typical screening plans for standard and special applications.

VIKING QUALIFIED POLYSULFONE

G14 Polysulfone capacitors are the H14 series listed on pages 38 and 39 with 48 hours burn-in at 150°C followed by 10 thermal aging cycles from −65°C to +125°C. A specially screened G14 type has been supplied for the Viking space program which must withstand 135°C sterilization temperatures for 600 hours, very high levels of shock and vibration, and then perform in a very high impedance circuit at low voltage levels without intermittent conditions developing. During such tests some capacitors have been observed to develop problems at low temperature and special screening methods are used in this super-critical application to 100% monitor for breakdowns during temperature cycling.

400 HZ AC BURN-IN

R12 Polycarbonate capacitors are the same as the series 12 capacitors listed in the catalog except for 100% AC burn-in at 140% of rated RMS volts at 400 Hz for 16 hours at 100°C. The 400 Hz AC testing is becoming popular as a means of achieving high reliability in aircraft programs where a faulty capacitor could lead to serious consequences. The R12 type of screening will ultimately become a standard burn-in method of testing AC capacitors for MIL-C-83421. 100% recorded readings of capacitance, dissipation factor, and insulation resistance, can be provided, before and after burn-in.

40 KHZ BURN-IN & CORONA SCREENING

Type BF51 teflon foil capacitors are being used in a high frequency switching application with a rise time of less than 1 microsecond, in a limited space. Typically a 0.025 uF, 400 VDC rated teflon foil, oil impregnated capacitor operates with; 200 volt peak to peak, 10 KHz square wave voltage conditions, a rise and fall time of 100 nanoseconds, in a 0.312 x 1.063 case. Under these conditions this teflon capacitor is relatively cool with peak current of 30 amps developed at a 20 KHz repetition rate.

Following is the 100% screening used for this AC application.

1. **Burn-in** for 48 hours at 125°C. Apply 180 VRMS at 40 KHz ±5%.
2. **Thermal aging** temperature cycle 5 times −65°C to +125°C. Per MIL-C-83421.
3. **Seal Test** Bake for 4 hours at 125°C. Check for oil leakage or visual damage.
4. **Corona Test** Apply 400 VRMS at 60 Hz and check for evidence of corona inception.
5. **AC Stress Test** Apply 100 Hz square wave voltage, terminal to terminal, for 1 minute, per MIL-C-83421/1, at 1000 volts peak to peak.
6. **DC Hipot** Apply 800 VDC terminal to terminal and to case at 25°C for 1 minute, per MIL-C-83421.
7. **Insulation Resistance** when measured wtih 400 VDC at 25°C, 1,000,000 megohms minimum.
8. **% Capacitance** at 1 KHz.
9. **% Dissipation factor** at 10 KHz, 0.01% maximum.
10. **Final visual** and mechanical inspection.

SPECIAL SCREENING FOR CRITICAL APPLICATIONS

40 KHZ AC BURN-IN

Special 40 KHz burn-in for type 12 polycarbonate capacitors is available at maximum rated conditions of the RMS AC voltage conditions of Table I of MIL-C-83421/1. Typically, a 0.1 uF, 30 VDC rated type C12A104 or A12A104 is receiving 22 volts RMS AC at 40 KHz, at 85°C, for 168 hours, a special screening for the Trident program.

SCREENING FOR SPACE APPLICATIONS

Type J11 teflon and J12 polycarbonate capacitors receive 96 hours burn-in and other screening conditions as required by JPL for their space applications. If you have a JPL or similar space agency subcontract, we will be happy to coordinate capacitor specification preparation to facilitate procurement with minimum delay and effort.

105°C SCREENED POLYSTYRENE CAPACITORS

Series L53 105°C screened polystyrene capacitors are one of the many unique Component Research capacitor products which demonstrate CRC superior performance and outstanding quality. The following screening plan for a space application is typical of the many custom screening procedures we have available for the most critical and sophisticated applications.

L53 SCREENING PER TP619

Test Step	Test	Conditions	Limits	Record Readings
1	Burn-in	At 140% of rated voltage at 105°C for 16 hours.	No opens or shorts	NO
2	Temperature Cycling	5 cycles from −65°C to +85°C.	N/A	NO
3	Gross Leak	Helium bomb for 1 hour at 75 PSI. Place in alcohol and check for bubbles.	No bubbles	NO
4	Fine Leak Test	Place in helium leak detector and evacuate and check for leakage.	1 x 10^{-6} atm/cm^3/sec. max. leakage rate	NO
5	AC Dielectric Strength	Apply 100 Hz square wave from lead to lead at min. peak voltage of 3X rated DC voltage for 1 min. minimum.	No opens or shorts	NO
6	DC Dielectric Strength	Apply 2X rated DC voltage, lead to lead and lead to case for 1 minute minimum.	No opens or shorts	NO
7	Insulation Resistance	At 25°C at rated voltage. Charge time 1 minute.Allow 1 minute additional charge time/uF for values above 1 uF.	Ref. MIL-C-83421	YES
8	Capacitance % Tolerance	At 1 KHz at 25°C.	Ref. MIL-C-83421	YES
9	Dissipation Factor	At 1 KHz at 25°C. Above 1 uF measure at .1 KHz.	.02%	YES
10	Serialize parts that pass above screening tests.			
11	DC Dielectric Strength	Apply 2X rated DC voltage, lead to lead and lead to case for 1 minute minimum.	No opens or shorts	NO
12	Insulation Resistance	At 25°C at rated voltage. Charge time 1 minute. Allow 1 minute additional charge time/uF for values above 1 uF.	Ref. MIL-C-83421	YES
13	Capacitance % Tolerance	At 1 KHz at 25°C.	Ref. MIL-C-83421	YES
14	Dissipation Factor	At 1 KHz at 25°C. Above 1 uF measure at .1 KHz.	.02%	YES
15	Burn-In	At 140% of rated DC voltage at 85°C for 100 hours.	No opens or shorts	NO
16	Temperature Cycling	5 cycles from −65°C to +85°C.	N/A	NO
17	DC Dielectric Strength	Apply 2X rated DC voltage, lead to lead and lead to case for 1 minute minimum.	No opens or shorts	NO
18	Insulation Resistance	At 25°C at rated voltage. Charge time 1 minute. Allow 1 minute additional charge time/uF for values above 1 uF.	Ref. MIL-C-83421	YES
19	Capacitance % Tolerance	At 1 KHz at 25°C.	Ref. MIL-C-83421	YES
20	Dissipation Factor	At 1 KHz at 25°C. Above 1 uF measure at .1 KHz.	.02%	YES
21	Visual Inspection	Inspect condition of leads, case and marking per CRC Method 875.	N/A	NO

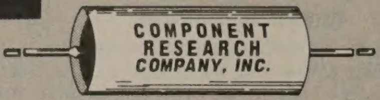
FURTHER L53 POLYSTYRENE INFORMATION APPEARS ON PAGE 34.

SERIES

H14

POLYSULFONE

HIGH TEMPERATURE FILM CAPACITORS



- -65°C TO +150°C OPERATING TEMPERATURE
- VERY LOW TEMPERATURE COEFFICIENT
- 100% SCREENED AND TESTED
- MEETS APPLICABLE REQUIREMENTS OF MIL-C-83421

DC VOLTS	CRC TYPE	OLD P/N
50VDC	H14B	05 MP
100VDC	H14C	1 MP
200VDC	H14D	2 MP
400VDC	H14E	4 MP

• PART NUMBER SYSTEM:	PAGE 18
• CASE DIMENSIONS:	PAGE 39
• LIFE TEST DATA:	PAGE 36
• AC RATINGS:	PAGE 39

- STANDARD TOLERANCES: ±0.25% to ±10%

H14 SPECIFICATIONS

OPERATING TEMPERATURE: −65°C to 125°C at full rated voltage. Derate linearly from 125°C to 50% of rated voltage at 150°C.

TEMPERATURE COEFFICIENT: 25°C reference

−0.5% ±0.2% at −50°C	0.00% ±0.2% at +75°C
−0.2% ±0.15% at −25°C	+0.10% ±0.3% at +100°C
0.0% ±0.1% at 0°C	+0.30% ±0.5% at +125°C
0.0% ±0.1% at +50°C	+0.50% ±0.7% at +150°C

STABILITY: Capacitance values measured at any two corresponding temperature points taken in five successive temperature cycles shall be as follows:

RANGE	RETRACE
−25°C to +85°C	.05% Max.
−65°C to +150°C	0.2% Max.

INSULATION RESISTANCE: Measured from terminal to terminal at rated voltage, and 5 minutes maximum charge time. For values greater than 1 uF, allow an additional minute/uF charge time.

MINIMUM IR

Range	25°C/50°C	75°C	100°C	125°C	150°C
.001 to 0.1 uF (in Megohms)	3,000,000	1,000,000	100,000	20,000	5,000
Greater than 0.1 uF (in Megohms — uF)	300,000	100,000	10,000	2,000	500

Readings shown are for 1 uF or less. For values over 1 uF, divide readings by uF to obtain min IR.

Example: An 8 uF capacitor is 37,500 megohms at 25°C.

DIELECTRIC ABSORPTION: 0.2% Max. at 25°C.

DISSIPATION FACTOR: 0.15% Max. at 1 KHz and 25°C. Values greater than 1 uF measure at 0.1 KHz.

DIELECTRIC STRENGTH: 200% of rated DC volts.

CONSTRUCTION: Polysulfone Dielectric, extended metal film electrodes, hermetically sealed metal tubular case, leads isolated from case.

LEAD WIRE SIZE AND TYPE

Case Diameter	Lead Wire Size #AWG	Lead Wire Material
0.312″ and smaller	22	Tinned Copper Clad Steel (Tinned Copperweld) CRC type "W"
0.400″ and 0.500″	20	
0.562″ and larger	18	Oxygen free tinned copper wire CRC type "C"

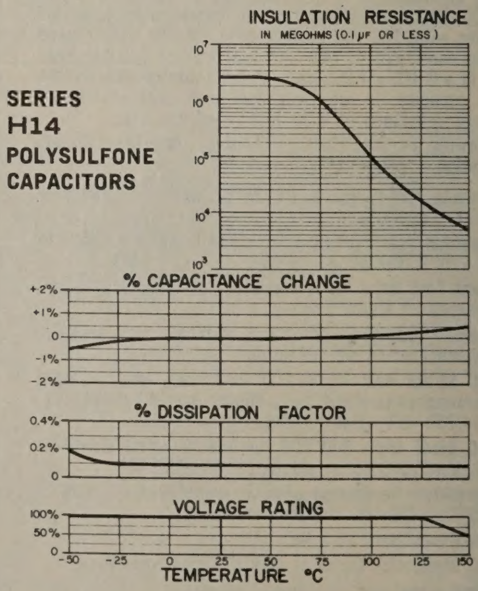
SEAL TEST: 1 x 10⁻⁶ atm/cm³/sec max. leak rate.

ENVIRONMENTAL: Capacitors shall meet all applicable requirements of MIL-C-83421.

H14 QUALITY ASSURANCE

All capacitors are 100% screened and tested as follows:

1. 16 hours Burn-In at 150°C and 140% of the rated DC voltage. (Allow for 50% derating).
2. 10 Temperature Cycles from −65°C to 125°C.
3. Helium Leak Test. 1 x 10^{-6} atm/cm³/sec max. leak rate.
4. DC dielectric strength apply 200% of rated DC voltage from lead to lead and leads to case for one minute.
5. AC dielectric strength apply 100 Hz square wave from lead to lead at a minimum peak to peak voltage of 3 x rated DC voltage for one minute, (except 800V peak to peak for 400VDC styles).
6. Insulation Resistance at rated voltage and 25°C, 300,000 megs — uF minimum but need not exceed 3,000,000 megohms.
7. Capacitance % Tolerance at 1 KHz and 25°C.
8. Dissipation Factor at 1 KHz and 25°C, 0.15% maximum.
9. Visual Inspection for dimensions, marking and packaging.
10. Traceability to production and test records by permanent marking of parts with lot control number.
11. Process and inspection data is maintained on file per NPC-200-3, MIL-Q-9858 quality control standards, and MIL-STD-790 Reliability Assurance Program.



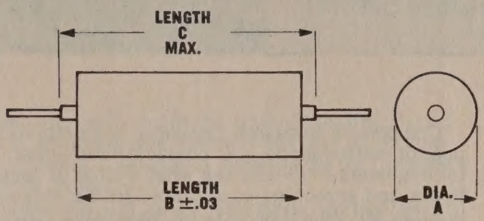
CRC HIGH RELIABILITY CAPACITORS

SERIES 14 POLYSULFONE

CAPACITOR DIMENSIONS • AC RATINGS

Series H14 Polysulfone capacitors are being supplied for many applications where the temperature range exceeds 125°C and reaches 150°C, and where the temperature coefficient must be lower than for our Polycarbonate capacitors.

For general information on Series 14 Polysulfone capacitors, see "Advanced New Product Information" page following CRC index. Complete specification sheets on Series 14 Polysulfone capacitors are available upon request.



NOTES:

1) "A" dimensions listed are for unsleeved cases.
2) "C" dimension is 0.2" Max. more than "B" dimensions in table.

	H14B 50VDC					H14C 100VDC					H14D 200VDC					H14E 400VDC				
	SIZE		AC RATINGS			SIZE		AC RATINGS			SIZE		AC RATINGS			SIZE		AC RATINGS		
uF	Diam. A	Length B	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps.	Diam. A	Length B	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps.	Diam. A	Length B	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps.	Diam. A	Length B	RMS Volts 400 Hz	RMS Volts 40 KHz	Max. RMS Amps.
.001	.170	.500	36.0	36.0	.009	.170	.500	60.0	60.0	.015	.170	.562	120.0	80.0	.020	.193	.562	240.0	100.0	.025
.0012	.170	.500	36.0	36.0	.012	.170	.500	60.0	60.0	.018	.170	.562	120.0	80.0	.024	.193	.562	240.0	100.0	.030
.0015	.170	.500	36.0	36.0	.014	.170	.500	60.0	60.0	.022	.170	.562	120.0	80.0	.029	.193	.562	240.0	100.0	.034
.0018	.170	.500	36.0	36.0	.016	.170	.500	60.0	60.0	.027	.170	.562	120.0	80.0	.036	.193	.562	240.0	100.0	.040
.002	.170	.500	36.0	36.0	.018	.170	.500	60.0	60.0	.030	.170	.562	120.0	80.0	.040	.193	.562	240.0	100.0	.050
.0022	.170	.500	36.0	36.0	.020	.170	.500	60.0	60.0	.033	.170	.562	120.0	80.0	.044	.193	.562	240.0	100.0	.058
.0027	.170	.500	36.0	36.0	.020	.170	.500	60.0	60.0	.041	.170	.562	120.0	80.0	.054	.235	.687	240.0	100.0	.068
.0033	.170	.500	36.0	36.0	.030	.170	.500	60.0	60.0	.050	.170	.562	120.0	80.0	.066	.235	.687	240.0	100.0	.083
.0039	.170	.500	36.0	36.0	.040	.170	.500	60.0	60.0	.062	.170	.562	120.0	80.0	.070	.235	.687	240.0	100.0	.10
.0047	.170	.500	36.0	36.0	.042	.170	.500	60.0	60.0	.071	.170	.562	120.0	80.0	.094	.235	.687	240.0	100.0	.12
.005	.170	.500	36.0	36.0	.045	.170	.500	60.0	60.0	.075	.170	.562	120.0	80.0	.10	.235	.687	240.0	100.0	.13
.0056	.170	.500	36.0	36.0	.050	.170	.500	60.0	60.0	.083	.170	.562	120.0	80.0	.11	.235	.687	240.0	100.0	.14
.0068	.170	.500	36.0	36.0	.061	.170	.687	60.0	60.0	.11	.170	.562	120.0	80.0	.14	.235	.687	240.0	100.0	.17
.0082	.170	.562	36.0	36.0	.074	.170	.687	60.0	60.0	.13	.170	.562	120.0	80.0	.17	.235	.687	240.0	100.0	.21
.01	.170	.562	36.0	36.0	.090	.170	.687	60.0	60.0	.15	.193	.562	120.0	80.0	.20	.235	.687	240.0	100.0	.25
.012	.170	.562	36.0	36.0	.11	.170	.687	60.0	59.0	.18	.193	.562	120.0	78.0	.24	.235	.687	240.0	96.0	.28
.015	.170	.562	36.0	36.0	.14	.170	.687	60.0	58.0	.22	.235	.562	120.0	76.0	.29	.235	.813	240.0	94.0	.35
.018	.193	.562	36.0	36.0	.16	.193	.687	60.0	57.0	.26	.235	.687	120.0	74.0	.33	.312	.813	240.0	90.0	.40
.02	.193	.562	36.0	36.0	.18	.193	.687	60.0	55.0	.28	.235	.687	120.0	71.0	.36	.312	.813	240.0	88.0	.44
.022	.193	.562	36.0	36.0	.20	.193	.687	60.0	53.0	.30	.235	.687	120.0	68.0	.38	.312	.813	240.0	85.0	.47
.027	.193	.562	36.0	36.0	.25	.193	.687	60.0	51.0	.35	.312	.687	120.0	65.0	.44	.312	.813	240.0	81.0	.55
.033	.193	.562	36.0	36.0	.30	.193	.687	60.0	50.0	.42	.312	.687	120.0	62.0	.52	.312	.813	240.0	78.0	.65
.039	.170	.687	36.0	36.0	.35	.235	.687	60.0	48.0	.47	.312	.687	120.0	60.0	.59	.312	.813	240.0	75.0	.73
.047	.170	.687	36.0	36.0	.43	.235	.687	60.0	47.0	.56	.312	.687	120.0	57.0	.67	.400	.813	240.0	71.0	.83
.05	.170	.687	36.0	36.0	.45	.235	.687	60.0	46.0	.58	.312	.813	120.0	56.0	.70	.400	.813	240.0	70.0	.88
.056	.193	.687	36.0	36.0	.50	.235	.687	60.0	46.0	.65	.312	.813	120.0	56.0	.79	.400	.813	240.0	65.0	.91
.068	.193	.687	36.0	34.0	.58	.235	.813	60.0	42.0	.72	.312	.813	120.0	50.0	.85	.400	.813	240.0	60.0	1.0
.082	.193	.813	36.0	32.0	.66	.312	.687	60.0	38.0	.78	.312	.813	120.0	44.0	1.0	.400	1.063	240.0	50.0	1.1
.1	.193	.813	36.0	30.0	.75	.312	.687	60.0	36.0	.90	.312	.813	120.0	42.0	1.1	.400	1.063	240.0	46.0	1.2
.12	.235	.687	36.0	30.0	.90	.312	.687	60.0	35.0	1.1	.312	.813	120.0	40.0	1.2	.400	1.063	240.0	43.0	1.3
.15	.235	.687	36.0	26.0	.97	.312	.813	60.0	31.0	1.2	.400	1.063	120.0	36.0	1.4	.400	1.375	240.0	40.0	1.5
.18	.235	.813	36.0	25.0	1.0	.312	.813	60.0	30.0	1.4	.400	1.375	120.0	34.0	1.7	.500	1.375	240.0	38.0	1.7
.20	.235	.813	36.0	24.0	1.1	.312	.813	60.0	29.0	1.5	.400	1.375	120.0	33.0	1.7	.500	1.375	240.0	36.0	1.8
.22	.235	.813	36.0	20.0	1.2	.312	.813	60.0	25.0	1.5	.400	1.375	120.0	32.0	1.8	.500	1.375	240.0	35.0	1.9
.27	.312	.687	36.0	19.0	1.3	.312	1.063	60.0	24.0	1.6	.500	1.375	120.0	29.0	2.0	.562	1.375	240.0	33.0	2.1
.33	.312	.687	36.0	18.0	1.5	.312	1.063	60.0	23.0	1.9	.500	1.375	120.0	28.0	2.3	.562	1.375	240.0	32.0	2.7
.39	.312	.813	36.0	17.0	1.7	.400	1.063	60.0	22.0	2.2	.500	1.375	120.0	27.0	2.6	.562	1.875	240.0	31.5	3.2
.47	.312	.813	36.0	16.0	1.8	.400	1.063	60.0	21.0	2.4	.500	1.375	120.0	26.0	3.1	.562	1.875	240.0	31.0	3.6
.50	.400	.813	36.0	15.0	1.9	.400	1.063	60.0	20.0	2.5	.500	1.375	120.0	25.0	3.1	.562	1.875	240.0	30.0	3.8
.56	.400	.813	36.0	14.5	2.1	.400	1.063	60.0	18.0	2.5	.500	1.375	120.0	23.0	3.2	.562	1.875	240.0	28.0	4.0
.68	.400	.813	36.0	14.0	2.4	.500	1.125	60.0	16.0	2.7	.562	1.375	120.0	20.0	3.4	.750	1.875	240.0	26.0	4.4
.82	.400	1.063	36.0	12.0	2.5	.500	1.125	60.0	14.0	2.9	.562	1.875	120.0	19.0	3.8	.750	1.875	240.0	22.0	4.5
1.0	.400	1.063	36.0	10.0	2.5	.562	1.125	60.0	12.0	3.0	.562	1.875	120.0	15.0	3.9	.750	1.875	240.0	19.0	4.8
1.2	.400	1.063	36.0	9.0	2.7	.562	1.125	60.0	11.0	3.5	.562	1.875	120.0	13.5	4.0	1.00	1.875	240.0	18.0	5.4
1.5	.400	1.063	36.0	8.0	2.9	.562	1.375	60.0	10.0	3.8	.670	1.875	120.0	12.0	4.5	1.00	2.375	240.0	16.0	6.0
2.0	.500	1.125	36.0	6.0	3.0	.670	1.375	60.0	8.1	4.1	.750	1.875	120.0	10.0	5.0	1.00	2.375	240.0	14.0	7.0
2.2	.500	1.125	36.0	5.8	3.2	.670	1.375	60.0	7.5	4.2	.750	1.875	120.0	9.0	5.0	1.00	2.375	240.0	12.6	7.0
2.7	.500	1.375	36.0	5.0	3.0	.670	1.875	60.0	7.0	4.4	.750	1.875	120.0	8.0	5.1	1.00	2.625	240.0	10.3	7.0
3.0	.500	1.375	36.0	4.5	3.4	.670	1.875	60.0	6.0	4.5	1.00	1.875	120.0	7.0	5.2	1.00	2.625	240.0	9.3	7.0
3.3	.500	1.375	36.0	4.1	3.4	.670	1.875	60.0	5.5	4.6	1.00	1.875	120.0	6.0	5.3					
4.0	.562	1.375	36.0	3.6	3.6	.750	1.875	60.0	4.8	4.8	1.00	[illegible].375	120.0	5.4	5.4					
4.7	.670	1.375	36.0	3.2	3.6	.750	1.875	60.0	4.3	5.0										
5.0	.670	1.375	36.0	3.0	3.6	.750	1.875	60.0	4.0	5.0										
5.6	.670	1.375	36.0	2.6	3.6	.750	1.875	60.0	3.5	5.0										
6.8	.670	1.875	36.0	2.2	3.6	1.0	2.375	60.0	3.0	5.0										
8.0	.670	1.875	36.0	1.8	3.6	1.0	2.375	60.0	2.4	5.0										
10.0	.670	1.875	36.0	1.5	3.6	1.0	2.375	60.0	2.0	5.0										

CRC
CATALOG SUPPLEMENT

COMPARISON CHART FOR MIL-SPECIFICATION TYPE METALLIZED POLYCARBONATE CAPACITORS

Component Research Company has prepared this capacitor performance and characteristics chart in order for engineers to clearly see what choice in specification limits and screening is available in the established reliability Mil-Specifications for Metallized Polycarbonate Capacitors.

Due to possible ambiguity in specification wording, both manufacturer and user may not be following the specifications faithfully in carrying out the intent of the military requirements.

500 cycles of thermal shock from −65°C to 125°C have been completed for the Space Shuttle Program, on a range of metallized Polycarbonate capacitors. Test results have been excellent and are available upon request.

CHARACTERISTIC	MIL-C-39022/9C		
	STYLE CHR01A, D, G, K, N	STYLE CHR01B, E, H, L, P	STYLE CHR01C, F, J, M R
CONSTRUCTION: METAL CASED, HERMETICALLY SEALED, TUBULAR AXIAL LEADS	Yes	Yes	Yes
OPERATING TEMPERATURE	−65°C to +100°C Derate AC-DC Voltage by 50% @ 125°C		
DC VOLTAGE RATINGS	30VDC, 50VDC, 100VDC, 200VDC, 400VDC		
AC VOLTAGE RATINGS		From 0 to 40KHz	
CAPACITANCE TOLERANCES AVAILABLE	0.25%, 0.5%, 1%, 2%, 5%, 10%	0.25%, 0.5%, 1%, 2%, 5%, 10%	0.25%, 0.5%, 1%, 2%, 5%, 10%
MAXIMUM DF @ 25°C	0.15% Max.	0.2% Max.	0.25% Max.
MAXIMUM DF @ 85°C	0.15% Max.	0.2% Max.	0.25% Max.
MAXIMUM DF @ 125°C	0.15% Max.	0.2% Max.	0.25% Max.
MAXIMUM DF AFTER LIFE @ 25°C	0.25% Max.	0.25%Max.	0.35% Max.
MAXIMUM CAPACITANCE CHANGE	−1.5% to −0.5% @ −55°C +0.8% to −0.5% @ +125°C	−1.7% to −0.5% @ −55°C +1.2% to −0.7% @ +125°C	−2.0% to −0.5% @ −55°C ±2.0% @ +125°C
MINIMUM I.R. FOR 0.1μF OR LESS @ RATED VOLTAGE @ +25°C	3,000,000 Megohms Min.	2,000,000 Megohms Min.	1,000,000 Megohms Min.
MINIMUM I.R. MEGS - μF	300,000 Megs - μF Need Not Exceed 3,000,000 Megohms	200,000 Megs - μF Need Not Exceed 2,000,000 Megohms	100,000 Megs - μF Need Not Exceed 1,000,000 Megohms
DIELECTRIC ABSORPTION	Not Specified	Not Specified	Not Specified
VIBRATION LEVEL	10-2000 Hz 20g's	10-2000 Hz 20g's	10-2000 Hz 20g's
SHOCK LEVEL	100g's 6 MS.	100g's 6 MS.	100g's 6 MS.
100% DC BURN-IN	Yes (48 hrs.)	Yes (16 hrs.)	No
100% THERMAL CYCLING	Yes	Yes	Yes
100% SEAL TEST (GROSS LEAK)	Yes	Yes	Yes
100% SEAL TEST (HELIUM LEAK)	Yes 1 x 10^{-6} atm CM^3/S Max. Leak Rate	Yes 1 x 10^{-6} atm CM^3/S Max. Leak Rate	Yes 1 x 10^{-5} atm CM^3/S Max. Leak Rate
100% AC SQUARE WAVE	Yes	Yes	Yes
100% DC HI-POT	Yes	Yes	Yes
100% INSULATION RESISTANCE	Yes	Yes	Yes
100% CAPACITANCE	Yes	Yes	Yes
100% DISSIPATION FACTOR	*Yes	*Yes	*Yes
100% DIELECTRIC ABSORPTION	No	No	No

*COMPONENT RESEARCH COMPANY CERTIFIES THAT IT WILL NOT SHIP ANY CAPACITORS EXCEEDING 0.15% DISSIPATION FACTOR.

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catalog JB

COMPONENT RESEARCH CO., INC. • 1655 26th ST. • SANTA MONICA, CALIF. 90404 • (213) 829-3615 • TWX 910-343-6864

COMPARISON CHART FOR MIL-SPECIFICATION TYPE METALLIZED POLYCARBONATE CAPACITORS

CRC
CATALOG SUPPLEMENT

A study of the dissipation factor limits and the AC ratings shows that only the MIL-C-83421/1 and MIL-C-39022/9C can be reliably used for AC applications, if we consider dissipation factor critical.

Although the dissipation factor limits for MIL-C-39022/9C styles CHR01B, E, H, L, P, C, F, J, M and R are listed as greater than 0.15% every M39022/9C shipped by Component Research Company is certified to be less than 0.15%, because we feel any value higher than this will result in unreliable life in AC applications, and possibly intermittent life in DC applications. Catalog supplement sections go into greater detail on this matter.

Please note that the 100% screening performed by Component Research Company using 0.15% maximum % dissipation factor, is an additional assurance of high termination quality, which established reliability Mil-Specifications do not always assure.

MIL-C-83421/1		MIL-C-39022/7	MIL-C-39022/10
STYLE CRH01 - CRH05	**STYLE CRH06 - CRH00**	**STYLE CHR49**	**STYLE CHR10**
Yes	Yes	Yes	Yes
−65°C to +100°C Derate AC-DC Voltage by 50% @ 125°C		−55°C to 85°C	−55°C to 85°C Derate DC Voltage by 60% @ 125°C
30VDC, 50VDC, 100VDC, 200VDC, 400VDC		None	50VDC, 100VDC, 200VDC, 400VDC, 600VDC
From 0 to 40 KHz		@ 0.4 KHz	None
0.25%, 0.5%, 1%, 2%, 5%, 10%	0.25%, 0.5%, 1%, 2%, 5%, 10%	5%, 10%	1%, 2%, 5%, 10%
0.15% Max.	0.15% Max.	0.3 Max.	0.25% Max.
0.15% Max.	0.15% Max.	0.6% Max.	0.40% Max.
0.15% Max.	0.15% Max.	Not Specified	0.60% Max.
0.25% Max.	0.35% Max.	0.75% Max.	0.5% Max.
−1.5% to −0.5% @ −55°C +0.8% to −0.5% @ +125°C	−2.0% to −.05% @ −55°C ±2.0% @ +125°C	−3.0% to 0% @ −55°C −3.0% to 0% @ +85°C	−2.0% to 0% @ −55°C ±1% @ +85°C ±2% @ +125°C
3,000,000 Megohms Min.	1,000,000 Megohms Min.	50,000 Megohms Min.	250,000 Megohms Min.
300,000 Megohms - µF Need Not Exceed 3,000,000 Megohms	100,000 Megs - µF Need Not Exceed 1,000,000 Megohms	25,000 Megs - µF Need Not Exceed 50,000 Megohms	100,000 Megs - µF Need Not Exceed 250,000 Megohms
0.1% Max.	0.1% Max.	Not Specified	Not Specified
10-2000 Hz 50g's	10-2000 Hz 50g's	10-2000 Hz 15g's	10-2000 Hz 20g's
100g's 6 MS.	100g's 6 MS.	100g's 6 MS.	100g's 6 MS.
Yes (48 hrs.)	No	No	Yes (48 hrs.)
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
Yes 1 x 10^{-6} atm CM^3/S Max. Leak Rate	Yes 1 x 10^{-5} atm CM^3/S Max. Leak Rate	No	No
Yes	Yes	No	Yes
Yes	Yes	AC Hi-Pot Instead of DC	Yes
Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes
*Yes	*Yes	Yes	Yes
Yes	Yes	No	No

*COMPONENT RESEARCH COMPANY CERTIFIES THAT IT WILL NOT SHIP ANY CAPACITORS EXCEEDING 0.15% DISSIPATION FACTOR.

CATALOG SUPPLEMENT

LONG TERM THERMAL AGING TEST REPORT
DATA COVERS 400 TEMPERATURE CYCLES

Thirty series C12A, 30VDC, Metallized Polycarbonate Capacitors were selected from current production and submitted to thermal aging PER MIL-C-83421/1 to determine the effects of continuous temperature cycling for 1000 cycles on dissipation factor, capacitance, and insulation resistance. As of publication date, parts completed 400 cycles from −65°C to +125°C with no evidence of visual damage, catastrophic failure, or any intermittent type measurement indication.

We have completed for the Space Shuttle Program, on a range of metallized Polycarbonate capacitors, 500 cycles of thermal shock from −65°C to 125°C. Test results have been excellent and are available upon request.

% CAPACITANCE DRIFT

				% Shift from Initial with Temperature Cycling				
Serial No.	**Part No.**	**Initial Capacitance in μF**	**20 Cycles**	**50 Cycles**	**100 Cycles**	**200 Cycles**	**300 Cycles**	**400 Cycles**
001	C12A102	.000998	+.02%	+.07%	+.09%	.00%	+.02%	−.01%
002	C12A102	.000997	0.00%	−.04%	+.02%	−.03%	−.03%	−.05%
003	C12A102	.000998	+.02%	0.0%	+.05%	+.01%	−.02%	−.04%
004	C12A102	.000997	+.11%	+.06%	+.13%	+.05%	+.01%	−.04%
005	C12A102	.000998	−.03%	−.03%	+.04%	−.03%	−.06%	−.12%
006	C12A102	.000998	+.05%	+.05%	+.15%	+.14%	+.13%	+.13%
007	C12A103	.010003	+.02%	+.02%	+.01%	+.31%	+.26%	+.25%
008	C12A103	.010006	+.07%	+.07%	+.05%	−.03%	−.04%	−.06%
009	C12A103	.010002	+.05%	+.06%	+.02%	−.06%	−.11%	−.11%
010	C12A103	.010010	+.05%	+.05%	−.01%	−.12%	−.16%	−.17%
011	C12A103	.010006	+.04%	+.05%	−.01%	−.14%	−.15%	−.11%
012	C12A103	.010002	+.05%	+.05%	+.01%	−.09%	−.13%	−.13%
013	C12A104	.094914	+.05%	+.06%	+.12%	+.06%	+.04%	+.03%
014	C12A104	.094869	+.05%	+.07%	+.12%	+.06%	+.04%	+.04%
015	C12A104	.094928	+.04%	+.05%	+.10%	+.02%	−.01%	−.01%
016	C12A104	.095203	+.06%	+.05%	+.11%	+.04%	+.03%	+.04%
017	C12A104	.091920	+.04%	+.04%	+.08%	+.05%	+.14%	+.18%
018	C12A104	.094990	+.05%	+.06%	+.13%	+.05%	+.03%	+.03%
019	C12A105	.997860	+.04%	+.05%	+.11%	+.04%	+.04%	+.04%
020	C12A105	.997900	+.04%	+.06%	+.13%	+.05%	+.05%	+.05%
021	C12A105	.999010	+.05%	+.07%	+.14%	+.09%	+.09%	+.09%
022	C12A105	.997800	+.04%	+.07%	+.12%	+.05%	+.06%	+.05%
023	C12A105	.998650	+.05%	+.06%	+.12%	+.05%	+.05%	+.05%
024	C12A105	.998430	+.04%	+.05%	+.12%	+.04%	+.04%	+.04%
025	C12A106	9.9504	−.01%	+.06%	+.13%	+.07%	−.01%	+.12%
026	C12A106	9.9584	+.01%	+.08%	+.16%	+.09%	+.02%	+.14%
027	C12A106	9.9623	−.01%	+.06%	+.11%	+.05%	−.04%	+.09%
028	C12A106	10.1033	−.01%	+.07%	+.13%	+.06%	−.03%	+.11%
029	C12A106	10.0928	−.01%	+.08%	+.15%	+.10%	+.01%	+.15%
030	C12A106	10.1013	−.01%	+.05%	+.12%	+.06%	+.04%	−.10%

INSULATION RESISTANCE @ RATED VOLTAGE (IN MEGOHMS)

Serial No.	Part No.	Initial Value	20 Cycles	50 Cycles	100 Cycles	200 Cycles	300 Cycles	400 Cycles
001	C12A102	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
002	C12A102	15,000,000	15,000,000	10,000,000	10,000,000	15,000,000	15,000,000	15,000,000
003	C12A102	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
004	C12A102	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
005	C12A102	15,000,000	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000
006	C12A102	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000	15,000,000
007	C12A103	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
008	C12A103	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
009	C12A103	15,000,000	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000
010	C12A103	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
011	C12A103	15,000,000	10,000,000	7,500,000	15,000,000	15,000,000	15,000,000	15,000,000
012	C12A103	15,000,000	15,000,000	10,000,000	15,000,000	15,000,000	15,000,000	15,000,000
013	C12A104	6,000,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	6,000,000
014	C12A104	6,000,000	7,500,000	7,500,000	7,500,000	10,000,000	7,500,000	5,000,000
015	C12A104	6,000,000	7,500,000	6,000,000	6,000,000	6,000,000	6,000,000	5,000,000
016	C12A104	6,000,000	7,500,000	7,500,000	6,000,000	6,000,000	6,000,000	6,000,000
017	C12A104	7,500,000	10,000,000	7,500,000	7,500,000	7,500,000	7,500,000	6,000,000
018	C12A104	10,000,000	10,000,000	7,500,000	7,500,000	7,500,000	7,500,000	6,000,000
019	C12A105	750,000	750,000	680,000	625,000	680,000	660,000	680,000
020	C12A105	790,000	730,000	790,000	625,000	650,000	789,000	1,500,000
021	C12A105	790,000	750,000	650,000	670,000	680,000	714,000	1,570,000
027	C12A105	1,300,000	1,070,000	1,360,000	680,000	680,000	1,000,000	1,420,000
023	C12A105	850,000	790,000	750,000	680,000	680,000	830,000	790,000
024	C12A105	830,000	770,000	680,000	680,000	690,000	910,000	1,500,000
025	C12A106	300,000	170,000	65,200	136,000	187,000	187,000	270,000
026	C12A106	270,000	230,000	79,000	166,000	230,000	200,000	270,000
027	C12A106	270,000	230,000	71,400	157,000	214,000	200,000	270,000
028	C12A106	270,000	230,000	125,000	157,000	230,000	214,000	250,000
029	C12A106	270,000	250,000	120,000	150,000	230,000	214,000	250,000
030	C12A106	270,000	250,000	110,000	200,000	200,000	200,000	270,000

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LONG TERM THERMAL AGING TEST REPORT DATA COVERS 400 TEMPERATURE CYCLES

CATALOG SUPPLEMENT

A SUMMARY OF TEST RESULTS INDICATES THE FOLLOWING

Capacitance Value	Capacitance Drift Minimum	Capacitance Drift Maximum	% Dissipation Factor Freq.	% Dissipation Factor Maximum	Insulation Resistance Minimum IR in Megohms
.001μF	−.01%	+.13%	1 KHz 10 KHz	.07% .07%	15,000,000
.01μF	−.06%	+.26%	1 KHz 10 KHz	.07% .17%	15,000,000
.1μF	−.01%	+.18%	1 KHz 10 KHz	.08% .29%	5,000,000
1.0μF	+.04%	+.09%	1 KHz 10 KHz	.10% .46%	680,000
10μF	+.04%	+.15%	.1 KHz 1 KHz	.06% .27%	250 000 (Equivalent to 2,500,000 Megs-μF)

The capacitors tested are identical in construction with series A12A and K12A supplied to MIL-C-83421/1 and C12A, E12A, supplied to MIL-C-39022/9C. The only differences that exist are in screening and conditioning. This results in better stability for types with more extensive conditioning.

% DISSIPATION FACTOR @ LOW FREQUENCY

@ 1 KHz FOR VALUES 1μF OR LESS
@ 0.1 KHz FOR VALUES GREATER THAN 1μF

Serial No.	Part No.	Freq.	Initial Value	20 Cycles	50 Cycles	100 Cycles	200 Cycles	300 Cycles	400 Cycles
001	C12A102	1 KHz	.06%	.06%	.06%	.05%	.06%	.06%	.06%
002	C12A102	1 KHz	.07%	.07%	.07%	.06%	.06%	.07%	.07%
003	C12A102	1 KHz	.06%	.06%	.06%	.05%	.06%	.05%	.05%
004	C12A102	1 KHz	.06%	.06%	.06%	.05%	.06%	.05%	.05%
005	C12A102	1 KHz	.06%	.06%	.06%	.06%	.06%	.05%	.06%
006	C12A102	1 KHz	.06%	.06%	.06%	.05%	.06%	.05%	.05%
007	C12A103	1 KHz	.05%	.06%	.07%	.08%	.08%	.08%	.07%
008	C12A103	1 KHz	.05%	.06%	.07%	.07%	.07%	.07%	.07%
009	C12A103	1 KHz	.05%	.06%	.07%	.07%	.07%	.07%	.07%
010	C12A103	1 KHz	.05%	.07%	.07%	.07%	.07%	.07%	.07%
011	C12A103	1 KHz	.05%	.06%	.07%	.07%	.07%	.07%	.07%
012	C12A103	1 KHz	.06%	.06%	.07%	.07%	.07%	.07%	.07%
013	C12A104	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
014	C12A104	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
015	C12A104	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.07%
016	C12A104	1 KHz	.07%	.07%	.08%	.08%	.08%	.08%	.07%
017	C12A104	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
018	C12A104	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
019	C12A105	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
020	C12A105	1 KHz	.08%	.09%	.09%	.09%	.09%	.10%	.10%
021	C12A105	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.07%
022	C12A105	1 KHz	.07%	.08%	.08%	.08%	.08%	.08%	.08%
023	C12A105	1 KHz	.08%	.09%	.09%	.09%	.09%	.09%	.10%
024	C12A105	1 KHz	.08%	.09%	.09%	.09%	.09%	.10%	.10%
025	C12A106	.1 KHz	.05%	.05%	.05%	.05%	.04%	.05%	.03%
026	C12A106	.1 KHz	.04%	.04%	.04%	.04%	.04%	.06%	.03%
027	C12A106	.1 KHz	.04%	.05%	.05%	.05%	.04%	.05%	.03%
028	C12A106	.1 KHz	.04%	.04%	.04%	.04%	.04%	.05%	.03%
029	C12A106	.1 KHz	.04%	.04%	.04%	.04%	.04%	.05%	.03%
030	C12A106	.1 KHz	.04%	.04%	.04%	.04%	.04%	.05%	.03%

% DISSIPATION FACTOR @ HIGH FREQUENCY

@ 10 KHz FOR VALUES 1μF OR LESS
@ 1 KHz FOR VALUES GREATER THAN 1μF

Serial No.	Part No.	Freq.	Initial Value	20 Cycles	50 Cycles	100 Cycles	200 Cycles	300 Cycles	400 Cycles
001	C12A102	10 KHz	.06%	.07%	.07%	.06%	.07%	.07%	.07%
002	C12A102	10 KHz	.06%	.06%	.06%	.06%	.06%	.07%	.07%
003	C12A102	10 KHz	.07%	.06%	.06%	.06%	.06%	.07%	.07%
004	C12A102	10 KHz	.07%	.06%	.06%	.06%	.06%	.07%	.06%
005	C12A102	10 KHz	.07%	.06%	.06%	.06%	.06%	.06%	.07%
006	C12A102	10 KHz	.07%	.06%	.06%	.06%	.06%	.07%	.07%
007	C12A103	10 KHz	.16%	.18%	.18%	.18%	.18%	.19%	.17%
008	C12A103	10 KHz	.17%	.17%	.17%	.18%	.17%	.18%	.14%
009	C12A103	10 KHz	.17%	.17%	.17%	.17%	.17%	.18%	.13%
010	C12A103	10 KHz	.17%	.17%	.17%	.18%	.17%	.17%	.13%
011	C12A103	10 KHz	.17%	.17%	.17%	.17%	.17%	.16%	.13%
012	C12A103	10 KHz	.17%	.07%	.07%	.17%	.17%	.17%	.13%
013	C12A104	10 KHz	.21%	.21%	.21%	.21%	.23%	.25%	.23%
014	C12A104	10 KHz	.21%	.22%	.22%	.22%	.26%	.30%	.29%
015	C12A104	10 KHz	.22%	.22%	.22%	.21%	.22%	.24%	.20%
016	C12A104	10 KHz	.21%	.21%	.21%	.20%	.20%	.21%	.18%
017	C12A104	10 KHz	.21%	.21%	.21%	.20%	.25%	.22%	.21%
018	C12A104	10 KHz	.23%	.24%	.24%	.23%	.24%	.32%	.24%
019	C12A105	10 KHz	.29%	.27%	.27%	.21%	.20%	.30%	.22%
020	C12A105	10 KHz	.44%	.41%	.41%	.34%	.38%	.43%	.38%
020	C12A105	10 KHz	.27%	.25%	.25%	.21%	.19%	.27%	.15%
022	C12A105	10 KHz	.30%	.28%	.28%	.24%	.23%	.29%	.23%
023	C12A105	10 KHz	.46%	.42%	.42%	.36%	.37%	.43%	.46%
024	C12A105	10 KHz	.44%	.42%	.42%	.38%	.38%	.47%	.38%
025	C12A106	1 KHz	.20%	.12%	.11%	.13%	.13%	.12%	.24%
026	C12A106	1 KHz	.11%	.12%	.10%	.11%	.13%	.13%	.22%
027	C12A106	1 KHz	.12%	.12%	.10%	.12%	.12%	.12%	.25%
028	C12A106	1 KHz	.13%	.12%	.10%	.12%	.13%	.12%	.27%
029	C12A106	1 KHz	.12%	.12%	.11%	.12%	.12%	.10%	.25%
030	C12A106	1 KHz	.12%	.12%	.10%	.11%	.11%	.10%	.25%

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catalog JB

CRC
CATALOG SUPPLEMENT

HOW TO ANTICIPATE FAILURES & IMPROVE CAPACITOR RELIABILITY BY 100% SCREENING

Plastic film dielectric type capacitors can provide remarkably good electrical characteristics and high reliability but it takes a combination of sound construction, suitable film quality, exacting process control, and 100% testing to achieve this.

We are listing below some pitfalls to avoid because we are concerned with a proliferation of marginal quality capacitors frequently used in high reliability level Aerospace and industrial applications. Additional information appears on pages 7 and 37 of catalog "JB".

MIS-APPLICATION OF CAPACITORS IN AC CIRCUITS

To begin with, the highest quality capacitor will fail if you are exceeding its ratings by subjecting it to excessive voltage and current stresses. In sinusoidal applications metallized capacitors that warm up over 20°C after several hours of operation are considered a borderline case, and you may be applying too high an RMS voltage or frequency. Consult the AC ratings in MIL-C-83421/1 for metallized polycarbonate capacitors as a guide to typical limits.

If the capacitors you are using have higher than normal dissipation factor readings, this may be a sign of high series resistance caused by poor terminations on the capacitor section. The square wave AC screening for one minute covered in MIL-C-83421/1 is a good way of eliminating capacitors with gross dissipation factor quality.

Unfortunately, if dissipation factor limits are set too high as post test requirements, suspect capacitors will pass the square wave test, in fact may have been damaged by this test, but are permitted to pass what we consider are abnormally high DF limits.

A termination that is poor at room temperature generally should be worse at higher temperature and increased heating caused by power loss at the terminations may cause ultimate degeneration and possible explosion.

We consider 100% AC burn-in at elevated temperature an excellent method of checking for good terminations. Burn-in should be followed by 100% dissipation factor examination. See page 37 for special AC screening information.

In SCR commutation and transistor switching type applications, heat rise of a metallized capacitor is not always a good means of determining if the capacitor can handle the non-sinusoidal current pulses usually encountered if the capacitor is subjected to relatively high peak currents at a low duty cycle; it may suddenly open after hours, possibly months of operation and never may have shown more than a few degrees warm-up during operation.

A recent example of operating beyond specified limits resulting in ultimate failure is shown by the following experiment performed on three 0.033μF, 30VDC, Type E12A333, metallized polycarbonate capacitors. Each capacitor has nominal case dimensions of 0.170″ diameter by 0.562″ length and #22 AWG wire leads.

The capacitors were placed in parallel to form a 0.1μF load into the output of a CRC designed power generator supplying a 60 volt peak to peak square wave at a 20KHz repetition rate.

An examination of the current pulses developed indicated that the capacitors were handling a peak current of 8.4 amps with a cosine type waveshape having a 1.2μ second width at the base.

The capacitors were operated for 100 hours at 25°C with less than 2°C heat rise. If we compare the MIL-C-83421/1 rated current at 40KHz of 0.18A rms maximum for a 0.033μF 30VDC capacitors, with the

HOW TO ANTICIPATE FAILURES & IMPROVE CAPACITOR RELIABILITY BY 100% SCREENING

peak current of 2.8 amps during this test, it appears that these capacitors can handle this level.

A more conservative level which we intend to verify by long term testing is 1.8 amps maximum peak current based on a peak current not to exceed ten times the 40KHz rms rated current of 0.18A for this capacitor. After increasing the square wave voltage to 80 volts peak to peak, the capacitors opened up.

The peak current during this test period was approximately 3.8 amps which is more than twenty times the RMS rated current of 0.18 amps. This is an example of how much higher in peak current CRC capacitors can be stressed, but certainly we do not recommend that you go to extremes in using these capacitors.

We recommend that you send us your oscilloscope current and voltage waveforms for analysis if you have non-sinusoidal applications. (See page 35, Catalog "J".) We are currently undergoing a test program to confirm that it is safe to operate our metallized polycarbonate capacitors under non-sinusoidal conditions of a 1μ second current pulse width at a 10KHz repetition rate providing the peak currents do not exceed ten times their maximum AC ratings at 40KHz.

As an example a 0.1μF 100VDC rated E12C104 or K12C104 capacitor maximum rated at 0.9A rms could be operated with 9 amps of peak current provided you did not exceed a 10KHz repetition rate.

Component Research Company bases the above as a result of many other tests and customer usage. We will of course continue to increase our test scope covering non-sinusoidal operation and publish operating specifications for such conditions.

CAPACITOR OPENS & INTERMITTENTS AFTER ENVIRONMENTAL TESTING OR LONG TERM STORAGE

CRC has frequently been requested to replace "Brand X" metallized capacitors (which may have cost 50% less). Problems began to plague production lines long after being qualified for the application and long after passing initial breadboard and preproduction tests.

Unfortunately many specifications and programs do not take time into consideration. Capacitor terminations may withstand DC burn-in, DC life, and even AC life but may start to break down as a result of expansion and contraction of all the metal and plastic materials involved in the construction of a capacitor.

The extreme differences in dimensional change between plastic and metal materials as a result of temperature cycling may result in microscopic ruptures of termination joints, possible electrode oxidation and generally unstable termination series resistance.

Component Research Company patented stress free termination design and precise quality control eliminates the above problems. This is the reason we recommend 100% temperature cycling or thermal aging followed by screening as described above.

Our goal is to continue to provide increasing amounts of detailed information and data of this type. In this manner the reliability and safety of electronic equipment needed for military and commercial transportation or general usage equipment will be enhanced and maintained.

Please contact us if you have any suggestions how to further this goal.

CATALOG SUPPLEMENT

DC LIFE TEST DATA FOR METALLIZED TEFLON VIBRATION REPORT FOR METALLIZED POLYCARBONATE

TEST REPORT No. XT907

In this test, thirty metallized Teflon Capacitors, part number D11B504, 0.5μF, 50VDC, in a 0.562" x 1.125" case size were subjected to DC life testing at 140% of rated voltage at 125°C. At the conclusion of 7300 hours of test the capacitors changed less than 0.5% in capacitance. There was an increase in dissipation factor to 0.12% maximum for serial number 017. Twenty-one other units remained within 0.05% dissipation factor. The dissipation factor increase is not significant for DC applications where there is a relatively small AC current content. We do not recommend this type of Teflon Capacitor for high current handling AC applications. We can supply very stable, Teflon Foil Capacitors which are capable of handling over 100 AMPS RMS per microfarad and several thousand peak amperes, if required.

The insulation resistance measured from 500,000 MEGS-μF to 12,000,000 MEGS-μF, and this we consider superb performance. As can be seen it is now possible to supply high reliability, high insulation resistance, low capacitance drift Teflon capacitors to specification limits far beyond the scope of present specifications if a program requires such performance.

DC LIFE TEST DATA FOR METALLIZED TEFLON CAPACITORS

Serial No.	Part No.	% Capacitance Drift After 7300 Hrs. Life	Insulation Resistance In Megohms After 7300 Hrs. Life	% Dissipation Factor @ 1 KHz After 7300 Hrs. Life
001	D11B504	−0.27%	10,000,000	.04%
002	D11B504	−0.11%	3,500,000	.05%
003	D11B504	−0.29%	2,300,000	.04%
004	D11B504	−0.10%	4,100,000	.11%
005	D11B504	−0.36%	1,100,000	.02%
006	D11B504	−0.18%	2,200,000	.04%
007	D11B504	−0.11%	3,300,000	.05%
008	D11B504	−0.07%	6,200,000	.06%
009	D11B504	−0.15%	2,900,000	.08%
010	D11B504	−0.05%	3,500,000	.04%
011	D11B504	−0.11%	4,500,000	.05%
012	D11B504	−0.01%	12,500,000	.05%
013	D11B504	−0.09%	12,500,000	.05%
014	D11B504	−0.06%	16,600,000	.02%
015	D11B504	−0.23%	12,500,000	.06%
016	D11B504	−0.01%	12,500,000	.08%
017	D11B504	−0.15%	7,100,000	.12%
018	D11B504	+0.02%	5,500,000	.02%
019	D11B504	−0.05%	6,200,000	.08%
020	D11B504	−0.03%	5,000,000	.04%
021	D11B504	−0.33%	12,500,000	.02%
022	D11B504	−0.43%	12,500,000	.03%
023	D11B504	−0.60%	16,600,000	.02%
024	D11B504	−0.41%	25,000,000	.05%
025	D11B504	−0.38%	12,500,000	.03%
026	D11B504	−0.42%	16,600,000	.05%
027	D11B504	−0.41%	10,000,000	.02%
028	D11B504	−0.35%	25,000,000	.02%
029	D11B504	−0.42%	25,000,000	.02%
030	D11B504	−0.46%	25,000,000	.06%

HIGH LEVEL VIBRATION TEST REPORT #644-1-74-152 FOR SPECIAL C12 POLYCARBONATE CAPACITORS

Component Research Company became involved in the development of C12A Metallized Polycarbonate capacitors capable of handling very high vibration levels, as a consequence of capacitor failures in the Atlas Centaur Program.

In this application we replaced other capacitors. Thus CRC provided far superior electrical performance, as well as rugged construction. And all this within a minimum of lead time.

During this test three samples of each case size covering the range of capacitor values to be qualified, while using random vibration, were subjected to a level of 35 grms and 70 grms. These levels were performed from 100 Hz to 1000 Hz by the contractor and no failures occurred.

TEST PERFORMED & A LIST OF THE CASE SIZES USED

Quan.	Diam.	Length	μF	VDC	Remarks
3	.170	.687	.082	30	Standard C12 Construction
3	.193	.813	.1	50	Standard C12 Construction
3	.235	.813	.22	50	Standard C12 Construction
3	.312	1.063	.27	100	Special C12 Construction
3	.400	1.375	4.0	30	Special C12 Construction
3	.400	1.375	.1	400	Special C12 Construction
3	.500	1.375	3.0	50	Special C12 Construction
3	.562	1.875	.5	400	Special C12 Construction
3	.670	1.875	6.8	50	Special C12 Construction
3	.750	1.875	5.0	100	Special C12 Construction
3	1.00	2.625	9.3	200	Special C12 Construction

Electrical measurements below were performed by the contractor and indicated that these capacitors are fully qualified to operate for the intended use.

CRC READINGS FOR THESE CAPACITORS

Serial No.	Initial Measurements		Post Vibration Measurements	
	Capacitance In μF	% Dissipation Factor	Capacitance In μF	% Dissipation Factor
XT914-1B001	.0987	.07%	.1000	.07%
XT914-1B002	.0989	.07%	.0999	.08%
XT914-1B003	.0989	.07%	.0996	.08%
XT914-1C001	2.960	.110%	2.960	.14%
XT914-1C002	2.960	.090%	2.960	.10%
XT914-1C003	2.980	.060%	2.970	.09%
XT914-1D001	.4921	.090%	.493	.11%
XT914-1D002	.4933	.096%	.494	.13%
XT914-1D003	.4906	.089%	.491	.11%
XT914-1E002	6.780	.080%	6.79	.08%
XT914-1H003	9.980	.070%	10.00	.08%
XT914-1H004	9.990	.070%	10.00	.07%
XT914-1F001	5.080	.160%	5.080	.18%
XT914-1F002	5.030	.170%	5.040	.18%
XT914-1F003	5.090	.160%	5.100	.17%
XT914-1G001	8.850	.100%	8.850	.12%
XT914-1G002	8.900	.110%	8.910	.12%
XT914-1G003	8.990	.110%	8.990	.12%

COMPONENT RESEARCH CO., INC. • 1655 26TH STREET • SANTA MONICA, CALIF. 90404 • (213) 829-3615, TWX: (910) 343-6864

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catalog JB

VIKING ULTRA HIGH RELIABILITY TEFLON CAPACITOR SPECIFICATIONS

CATALOG SUPPLEMENT

Component Research Co. is proud to have been selected for Viking sole source procurement of extremely accurate, high quality teflon capacitors similar to the B11B and B11C series shown on pages 24 and 25 of catalog JB.

Critical weight limitations prevent the use of redundant circuits. The capacitors must maintain their excellent performance with 600 hours of spacecraft sterilization, severe shock and vibration levels at launching and five to ten years of space travel. A single capacitor failure may mean a major setback to one of the most important and complex space ventures known to man.

Component Research Co. accepts this challenge with a confidence based upon over a decade of experience in the manufacture of high quality, high reliability film capacitors.

100% GROUP "A" ACCEPTANCE TESTS

	EXAMINATION OR TEST	MIL-C-39022C PARAGRAPH AND AS MODIFIED BY MIL-C-39022/9B	SV90DM39022 PARAGRAPH	TEST REQUIREMENTS
1	VOLTAGE CONDITIONING		4.9	FOR 100 HOURS AT 135°C AND 140% OF RATED VDC
2	TEMPERATURE CYCLING	3.7, 4.7.3		10 CYCLES MIN. FROM −62°C to +125°C
3	SEAL		4.10	IN WATER AT 25°C
4	DC-DIELECTRIC STRENGTH	3.9, 4.7.5		AT 200% OF THE RATED VOLTAGE FOR ONE MINUTE MIN.
5	INSULATION RESISTANCE (TERMINAL TO TERMINAL ONLY)	3.10, 4.7.6	Table III	AT RATED VOLTAGE Megs x MFD Min. / Neet Not Exceed Megohms At 25°C: 5×10^5 / 5×10^6 At 100°C: 1×10^5 / 1×10^6 At 125°C: 2.5×10^4 / 2.5×10^5
6	CAPACITANCE % TOLERANCE	3.11, 4.7.7		WITHIN SPECIFIED TOLERANCE MEASURED AT 1 KHz AND 25°C
7	% DISSIPATION FACTOR	3.12, 4.7.8		0.03% MAX. AT 1 KHz AND 25°C FOR VALUES OVER 1 MFD MEASURE AT 0.1 KHz
8	TEMPERATURE COEFFICIENT	3.21, 4.7.17	Table III	AT −55°C, +0.4% MAX. AT +25°C (RETRACE), ±.02% AT +125°C, −0.4% MAX.
9	VISUAL AND MECHANICAL INSPECTION			EXTERNAL ONLY FOR DIMENSIONS, WORKMANSHIP AND MARKING
10	RADIOGRAPHIC	3.6, 4.7.2	3.2, 4.7	X-RAYED IN TWO PLANES AT 90 DEGREE ROTATION, PERPENDICULAR TO THEIR LONGITUDINAL AXES.

VIKING QUALIFICATION INSPECTION PER TABLE V OF SV90DM39022 & MIL-C-39022/9B.
74 GROUP "A" CAPACITORS WERE RANDOMLY SELECTED AND TESTED AS SHOWN.

GROUP II, 12 UNITS

- 600 hours sterilization at 135°C
- Shock (PYRO) - 1,880G, 0.4ms half sine pulse
- Shock (Landing) - 80G, 22ms duration
- Vibration (Sine) - 75G, 10 to 2,000 Hz
- Vibration (Random) - 36.6G for 3 minutes min.

POST ELECTRICAL TESTS

- △ Capacitance (% Change)
- % Dissipation Factor
- Insulation Resistance

GROUP III, 12 UNITS

- Solderability
- Low Temperature and Capacitance Change with Temp.
- Resistance to Soldering Heat
- Terminal Strength

POST ELECTRICAL TESTS

- △ Capacitance (% Change)
- % Dissipation Factor
- Insulation Resistance

GROUP IV, 50 UNITS

- Life (accelerated) for 2,000 hours min. at 125°C and 140% of rated DC voltage

POST ELECTRICAL TESTS

- △ Capacitance (% Change)
- % Dissipation Factor
- Insulation Resistance

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catalog JB

OPTIONS AVAILABLE FOR STANDARD CAPACITORS

CRC can supply the standard capacitors listed in this catalog with more closely specified limits and with special characteristics by additional processing, screening, and selection. Following is a list of some options and characteristics available when you are required to meet special design or operating conditions.

LINEAR TC SLOPE FOR RESISTOR MATCHING

CRC series N53 polystyrene capacitors provide the closest approximation to a straight line plot for capacitance vs temperature over the range of −50°C to +85°C, with less than 150PPM/°C in negative slope. Larger capacitor values appear to have lower TC than smaller capacitor values. Typically values ranging 0.01uF average −100PPM/°C and 1.0uF range −40 PPM/°C. The normal worst case limits in non-linearity of TC slope are ±50PPM/°C for all N53 polystyrene capacitors. Slopes are available as low as ±10PPM/°C for the full temperature range of −50° to +85°C. This slope is a permanent characteristic and will remain constant with temperature cycling and time.

CRC series N55 metallized polypropylene capacitors have a more negative slope, generally −300PPM/°C with linearity limits of ± 50 PPM/°C. CRC foil polypropylene capacitors which are not oil impregnated generally have a TC slope of −225 PPM/°C. Foil capacitors also have a greater dielectric hysteresis than metallized types which evidences itself by a capacitance shift at 25°C when a capacitor is alternately cycled from cold to hot temperatures.

Typically this offset is from 0.01% to 0.15% for metallized capacitors when measured at 25° after exposure to −50°C and +125°C. Foil capacitors usually have an offset of 0.05% to 0.25% under the same conditions. Operation over a more limited temperature range results in a reduced offset.

CRC can provide capacitors with minimum offset and specific linearities and slopes by 100% screening and selection.

±10 PPM/°C TRACKING MATCHED CAPACITORS

In some applications it is desirable to have several capacitors of the same value track together over a specified temperature range.

Frequently good linearity is not mandatory provided all capacitors although non-linear, follow the same pattern of varying in capacitance with temperature. In other applications a set of different capacitors must track within a defined ratio limit of each other as temperature changes.

From its large stock of 100% screened and batch controlled high reliability capacitors, CRC can furnish many combinations of desired matched capacitors in a minimum of time.

MATCHED SETS TO ± 0.05% ACCURACY

CRC can provide matched sets of two or more capacitors with readings of ±0.05% of each other although the purchase tolerance is as high as ±1%. This is more economical than purchasing individual capacitors to ±0.1% or ±.25% tolerances.

0.003% DIELECTRIC ABSORPTION CAPACITORS

Special teflon capacitors having less than 0.003% dielectric absorption are available for minimum offset error in sample and hold type applications.

In one special application 1uF teflon capacitors are 100% screened by viewing their individual slopes of recovery voltage on an oscilloscope. These capacitors receive a 10 volt peak pulse, ten milliseconds wide, with a 1 millisecond discharge time. The oscilloscope indicates the recovery voltage for an additional 100 milliseconds. This test method more closely approximates fast switching application conditions than the dielectric absorption test methods covered in military specifications.

ZERO TEMPERATURE COEFFICIENT BY TC MATCHED PAIRS

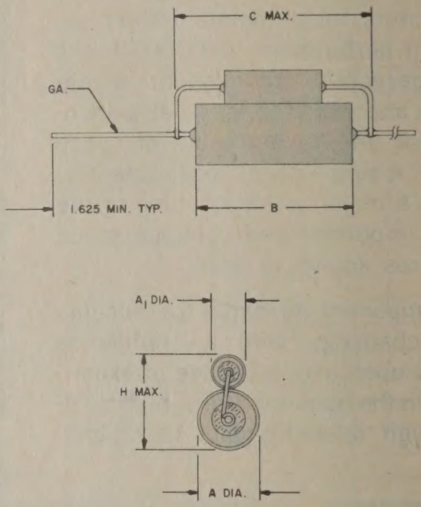
It is difficult to obtain zero TC over a wide temperature range but over a more limited range CRC can provide a TC as low as zero ± 5PPM/°C by pairing two capacitors with opposing slopes. Typically an N53 polystyrene capacitor matched with the same value C12 polycarbonate capacitor will match to zero ± 30PPM/°C from −10°C to +85°C, as off the shelf purchased items.

If lower TC than this is required, we can 100% measure and match for closer temperature coefficient.

"PIGGYBACK" PERMANENTLY CONNECTED MATCHED CAPACITORS

Customers sometimes prefer the matched capacitors connected together as one to prevent their separation prior to installation. CRC standards are made by "piggyback" connection of trimmers which can provide accuracies to ±0.05%.

Shown below is a figure of a "piggyback" connected matched capacitor.



50,000,000 MEGOHMS INSULATION RESISTANCE

This may seem incredible but CRC is supplying special 1uF teflon capacitors which measure up to 5,000,000 megohms at 100°C, and up to 50,000,000 megohms at temperatures from 25°C to −40°C.

CRC is developing new methods of measuring to higher levels of insulation resistance and believes it will be able to verify that specially selected smaller values such as 0.1uF can be supplied to meet a specification of 500,000,000 megohms. When you use capacitors in such sensitive applications certain errors and disturbances not normally observed become visible. Some of these are described below.

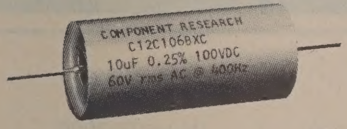
LOW "PIEZO ELECTRIC LIKE" VOLTAGE GENERATION CAPACITORS

When capacitors are subjected to a temperature change they generate a voltage which may vary from capacitor to capacitor in a lot and from one style of capacitor to another. Voltages up to ten millivolts per °C have been observed and the voltage output generally does not increase linearly with temperature. In some cases there actually will be voltage reversal during a temperature run in a given direction.

If the capacitor is not connected to a high impedance measurement device during the tests this voltage output may not be seen as it will be discharging through the low resistance input of ordinary voltmeters if these are being used for measurement. CRC supplies specially selected 0.5uF, 50VDC teflon capacitors similar to the D11B504 style to meet a requirement of 0.5 millivolts maximum/°C voltage generation, for a critical application.

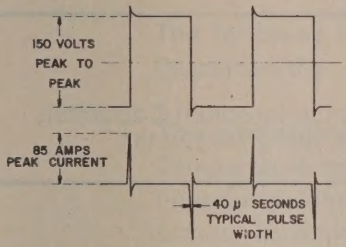
COMPONENT RESEARCH CO.

HIGH RELIABILITY PRECISION FILM CAPACITORS • KEY CAPACITOR FEATURES AND PRODUCTS



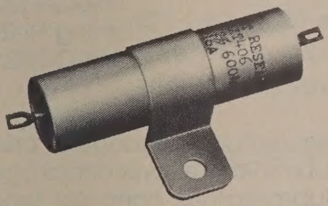
MIL-C-83421/1 QUALIFIED (SUPERMETALLIZED)

40 KHz AC rated, metallized polycarbonate capacitors qualified to MIL-C-83421/1 and MIL-C-39022/9C are available from stock. Because of superior performance they are titled "SUPERMETALLIZED." They are 100% reliability screened. For the Trident program, 30 VDC rated capacitors receive 168 hours of AC burn-in at 22 Vrms, 40 KHz, and 100°C.

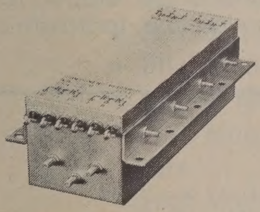


Component Research Company developed this AC dielectric withstanding test for use in MIL-C-39022/9 which was then superseded by MIL-C-83421/1. This test assists in early detection of abnormally high dissipation factor and high ESR. The voltage square wave when applied to each capacitor proves the ability of the terminations to withstand relatively high peak and RMS current.

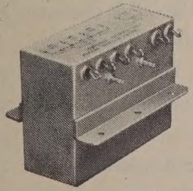
Typical voltage and peak current waveforms shown at left for A12B106, 10 μF, 50 V, metallized polycarbonate capacitor during the one minute AC square wave screening at 100 Hz.



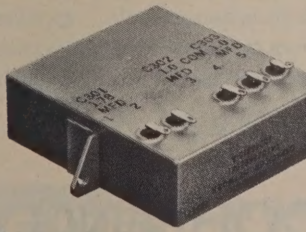
The .033 μF polystyrene capacitor shown can handle 300 Vrms at 25 KHz and fits in a 0.562" x 1.875" metal case. The capacitor features: high Q, tight capacitance tolerance and drift, and low controlled temperature coefficient. Additional configurations are available which are smaller in size and have higher AC current ratings.



This polystyrene capacitor network contains 8 precisely matched 1.2 μF sections. Each capacitor section is capable of operating with 170 Vrms applied at 25 KHz, with low heat rise. This network is one of many critical components supplied by Component Research Company for major weapons systems.



Component Research Company foil-polypropylene capacitors are used for various AC applications. This capacitor network is used in a weapons system where utmost reliability is required. Lower cost types can also be supplied for industrial applications with complete AC rating information.



In 1965 Component Research Company developed this precision metallized capacitor network for very accurate guidance and control of a sophisticated missile system. These networks are still being purchased annually due to their superb proven performance in field use. Their unique characteristics are: high insulation resistance, low dielectric absorption, low temperature coefficient, and low noise during environmental exposure.

COMPONENT RESEARCH CO., INC. • 1655 26th St. • Santa Monica, Calif. 90404 • (213) 829-3615

CORNING® CAPACITORS

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CK31, CK32	MIL-C-11015/25
CKR31, CKR32	MIL-C-39014/21
CAC02, CAC03, CAC04, CAC05	Spinseal™ Z5U, X7R, C0G

Glass Capacitors

CY10, 15, 20, 30	MIL-C-11272
CY06, 07, 08	MIL-C-11272
CYFR10, 15, 20, 30	Corning Hi-Rel
CYR10, 15, 20, 30	MIL-C-23269

Tantalum Capacitors

Minitan® Modular	Subminiature, rectangular case
Minitan Cordwood	Subminiature, cylindrical case
Minitan Nonpolar	Subminiature, nonpolar series
Minidip	Subminiature, dipped radials
MC Series	Subminiature, tantalum chips

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CORNING

QUALITY SETS STANDARDS

The following is a selection of the more advanced Aluminum Electrolytic Capacitors that meet today's stringent electronic and environmental demands.

This partial listing on pages 1238-1244 offers you a wide choice of extended Temperature range units for special electric/electronic requirements — (Low impedance, High frequency, Low ESR, Low DC Leakage, Maximum Ripple Limits, Extended Capacitance, and High Vibration and Shock Resistance).

On pages 1236 and 1237, a selector guide lists all standard Extended Temperature Range, Computer Grade, and Industrial Grade capacitors available from Industrial Distributors.

Write for complete details on:

- Mil Spec and Industrial Dipped Mica Capacitors.
- Standard and Special EMI Filters.
- Film Dielectric Capacitors.
- Electro-Mechanical Relays.
- A.C. Motor Run and Motor Start, SCR Commutating and Lighting Capacitors.
- High Voltage and Energy Storage D.C. Capacitors.
- Tantalum Foil and Wet Anode Electrolytic Capacitors.
- Power Factor Correction Capacitors.

THE MARK OF QUALITY IS ON EVERYTHING WE MAKE

CDE

CORNELL-DUBILIER ELECTRIC CORPORATION
SUBSIDIARY OF FEDERAL PACIFIC ELECTRIC COMPANY
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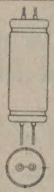
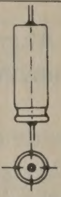
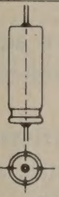
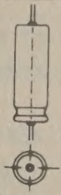
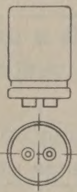
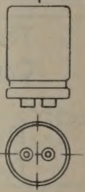
Electrolytic Capacitors, Aluminum

CDE CORNELL-DUBILIER

SELECTOR GUIDE

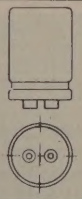
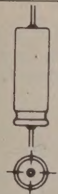
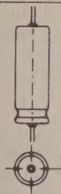
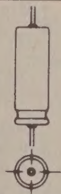
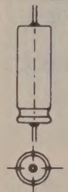
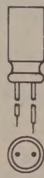
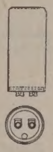
		Extended Temperature Range				Computer Grade	
FORM FACTOR								
CDE CATALOG DESIGNATION		UFT/UFTA	UHH	UHL	HNLH	UFH	FAH/FAL	FAHM/FALM
OPERATING TEMP. RANGE	**LOW**	−55°C	−55°C	−55°C	−80°C	−55°C	−40°C	−40°C
	HIGH	+105°C	+105°C	+125°C	+110°C	+105°C	+85°C	+85°C
VOLTAGE all DC except where otherwise noted		5 to 200	5 to 200	5 to 200	3 to 150	5 to 200	3 to 450	3 to 100
CAPACITANCE	**Range, Mfd**	50 to 16,000	16 to 13,000	3.3 to 1,000	1 to 600	190 to 310,000	70 to 1,000,000	900 to 1,000,000
	+ **Standard Tolerance**	+75%	+75%	+75%	+75%	5 to 50V: +100% >50V: +75%	3 to 50V: +100% 51 to 350V: +75% >350V: +50%	3 to 50V: +100% >50V: +75%
	−	−10%	−10%	−10%	−10%	−10%	−10%	−10%
% MINIMUM CAPACITANCE @ lowest rated temperature depending on voltage		70% to 90%	65% to 90%	70% to 90%	50% to 75%	60% to 65%	40% to 50%	40% to 50%
DISSIPATION FACTOR, Max. 120Hz @ 25°C		$\% \text{ D.F.} = \frac{ESRXC}{13.26}$ ESR Range .022 to 2.6 ohms	$\% \text{ D.F.} = \frac{ESRXC}{13.26}$ ESR Range .04 to 8.7 ohms	≦30V: 20% >30V: 10%	≦15V: 20% 16-50V: 15% >50V: 10%	$\% \text{ D.F.} = \frac{ESRXC}{13.26}$ ESR Range .010 to .68 ohms	$\% \text{ D.F.} = \frac{ESRXC}{13.26}$ ESR Range .01 to 1.7 ohms	$\% \text{ D.F.} = \frac{ESRXC}{13.26}$ ESR Range .01 to .38 ohms
LEAKAGE milliamp., unless otherwise stated or shown @ 25°C		$0.5\sqrt{CV}$ μ amps	$0.5\sqrt{CV}$ μ amps	2.0 to 10.0 μ amps depending on rating	1.0 to 13.5 μ amps	$.0015\sqrt{CV}$	$.006\sqrt{CV}$	$.006\sqrt{CV}$
RIPPLE CURRENT milliamp. @ 120Hz and max. rated temp.		100 to 3,000	100 to 3,000	80 to 1900	10 to 316	700 to 17,000	660 to 30,600	1700 to 30,600
LIFE	**Operating @ max. rated tem.**	2,000 hours	2,000 hours	2,000 hours	2,000 hours	2,000 hours	2,000 hours	2,000 hours
	Shelf	2 years	2 years	2 years	1 year @ 40°C	2 years	2 years	2 years
CASE MATERIAL		Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
TERMINALS		Four leads	Axial lead	Axial lead	Axial lead	Screw	Screw	Screw
MOUNTINGS		Lead	Lead	Lead	Lead	Ring	Ring	Ring
DIMENSIONS Inches		.785 x 1.843 to 1.035 x 3.843	.660 x 1.187 to 1.035 x 3.687	.281 x .937 to .375 x 2.687	.25 x .625 to .375 x 1.5	1.375 x 2.125 to 3.0 x 8.625	1.375 x 2.125 to 3.0 x 8.625	1.375 x 2.125 to 3.0 x 8.625
CDE CATALOG, CLASS NO.		**201.68**	**201.63**	**201.62**	**201.17**	**201.65**	**201.87**	**201.47**

*Type WNP is non-polarized version of WBR.
NA = Not Applicable

CDE CORNELL-DUBILIER

Electrolytic Capacitors, Aluminum

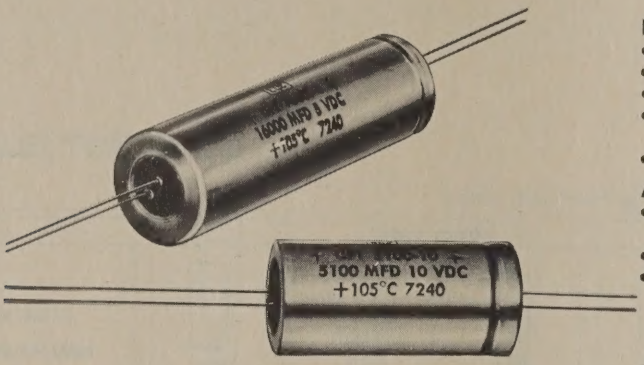
SELECTOR GUIDE (Cont'd)

Computer Grade			Industrial Grade				
							**FORM FACTOR**
FAM	**NLW**	**WHB**	**WNP*, WBR**	**LMT**	**PC**	**ETW**	**CDE CATALOG DESIGNATION**
−40°C	−40°C	−40°C	−40°C	−40°C	−40°C	+25°C	**OPERATING TEMP. RANGE LOW**
+85°C	+105°C	+85°C	<450V: +85°C >450V: +65°C	+85°C	+85°C	+65°C	**HIGH**
3 to 100	3 to 150	2.5 to 450	3 to 700	3 to 150	6 to 100	110 to 330 VAC	**VOLTAGE** All DC except where otherwise noted.
600 to 600,000	1 to 1500	1 to 18,000	1 to 45,000	1 to 100	1 to 1,000	14 to 765	**Range, Mfd**
+100%	75%	2.5 to 75V: +75% >75V: +50%	3 to 50V: +150% 51 to 350V: +100% >350V: +75%	+100%	+150%	+10%	**CAPACITANCE + Standard Tolerance**
−10%	−10%	−10%	−10%	−10%	−15%	−10%	+
50%	50% to 60% depending on voltage	40% to 60%	35% to 55% depending on voltage	60%	0-10V: 40% >10V: 50%	N.A.	**% MINIMUM CAPACITANCE** @ lowest rated temperature depending on voltage
% D.F. = $\frac{ESRXC}{13.26}$ ESR Range .003 to .091 ohms	% D.F. = $\frac{ESRXC}{13.26}$ ESR Range .31 to 200 ohms	% D.F. = $\frac{ESRXC}{13.26}$ ESR Range .06 to 205 ohms	% D.F. = $\frac{ESRXC}{13.26}$ ESR Range .038 to 250 ohms	% D.F. = $\frac{ESRXC}{13.26}$ ESR Range 3.3 to 340 ohms	20% to 40% depending on voltage rating	10% Power Factor	**DISSIPATION FACTOR, MAX. 120 Hz @ 25°C**
.006 $\sqrt{CV}$	1.0 to 53.0 μ amps depending on rating	.002 $\sqrt{CV}$	.006 $\sqrt{CV}$	5.0 to 50.0 μ amps depending on rating	8 to 230 micro amps	N.A.	**LEAKAGE milliamp., unless otherwise stated or shown @ 25°C**
3.0 to 40.0	20 to 1100	20 to 3650	10 to 7800	12 to 150	10 to 200	N.A.	**RIPPLE CURRENT milliamp. @ 120 Hz and max. rated temp.**
2,000 hours	2,500 hours	2,000 hours	2,000 hours	2,000 hours	500 hours	50,000 starts @ 65°C	**LIFE Operating @ max. rated temp.**
2 years	2 years	2 years	2 years	1 year @ 40°C	1 year @ 40°C	1 year @ 25°C	**Shelf**
Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Phenolic	**CASE MATERIAL**
Screw	Axial lead	Axial lead	Axial lead	Axial lead	PC	Lug	**TERMINALS**
Ring	Lead	Lead	Lead	Lead	Lead	Bracket or ring	**MOUNTINGS**
1.375 x 2.125 to 3.0 x 8.625	.260 x .562 to .385 x 2.250	.510 x 1.161 to 1.010 x 3.661	.260 x .562 to 1.385 x 4.161	.260 x .562 to .385 x 1.312	.312 x .50 to .50 x 1.0	1.437 x 2.75 to 2.562 x 4.375	**DIMENSIONS (Inches)**
201.24	**201.13**	**201.38**	**201.26**	**201.06**	**201.10**	**209.01**	**CDE CATALOG, CLASS NO.**

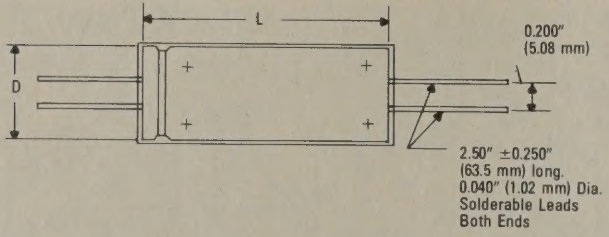
Electrolytic Capacitors, Aluminum

CDE CORNELL-DUBILIER

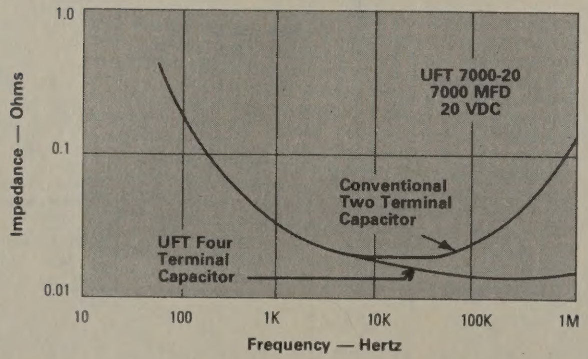
EXTENDED TEMPERATURE RANGE, LOW IMPEDANCE, HIGH FREQUENCY (−55°C to +105°C)



Outline Drawing



Typical Impedance vs. Frequency Curve



CAPACITANCE CHANGE WITH TEMPERATURE:

The maximum capacitance changes from measured +25°C values are:

VOLTAGE RANGE	TEMPERATURE						
	−55°C	−40°C	−30°C	−20°C	0°C	+85°C	+105°C
5 to 50 VDC	−25%	−20%	−15%	−10%	−6%	+15%	+25%
over 50 VDC	−20%	−15%	−10%	− 8%	−5%	+15%	+25%

Table 1

FEATURES

- Ultra low impedance above 10KHz
- Broad temperature range
- Low ESR (Equivalent Series Resistance)
- Shock and high frequency vibration resistant
- UFT* has No. 18 AWG and UFTA* No. 16 AWG leads

APPLICATIONS

- Designed for switching regulator power supplies
- High gain amplifiers
- Critical circuits where operation at high frequency is necessary yet still have a high degree of reliability and low failure rate under adverse environmental conditions.

The unique four terminal construction and internal assembly techniques dramatically reduce the inductance to approximately one nanohenry. As a result, the impedance does not increase at frequencies above 10KHz, but actually decreases to a value approximately equal to the ESR and then remains essentially flat as shown in the impedance-frequency curve. These capacitors also provide effective isolation of the load from the power source.

In a typical switching regulator power supply, UFT and UFTA capacitors perform the following functions:

1. Adequately filter the fundamental frequency ripple current.

2. Localize and filter the high frequency megahertz ripple.

3. Prevent high frequency noise from feeding back into the power line.

The UFT and UFTA are designed for continuous duty operation over the temperature range of −55°C to +105°C (−67°F to +221°F). They are shock and vibration resistant and unaffected by chlorinated cleaning solvents.

Capacitance ratings available are 50 to 16,000 Mfd. Voltage ratings available are 5 to 200 VDC at 105°C. The maximum capacitance change from the 25°C value over the temperature range of −55°C to +105°C is ±25%.

Unlike conventional axial lead capacitors, the DC current flows through the aluminum rods located in the center of the capacitors. Under certain conditions, up to 45 amperes DC load current can be handled. This current is limited by the temperature rise due to the DC load current and ripple current, the ambient temperature, and external loads.

The capacitors are capable of withstanding a minimum of 2000 hours life test at rated DC voltage and ripple current at 105°C.

*Patent pending

(Continued on next page)

CDE CORNELL-DUBILIER

Electrolytic Capacitors, Aluminum

EXTENDED TEMPERATURE RANGE, LOW IMPEDANCE, (cont'd)

Standard Ratings - (not normally stocked but readily available)

CAP (MFD)	TYPE† UFT or UFTA	Insulated Case Size D X L* (Inches)	Max. Impedance 25°C (OHMS)	RMS Ripple Current for 10°C Rise
			10KHz-1MHz	10KHz-1MHz (Amperes)
5 VDC RATED — 7 VDC SURGE				
2400	2400-5	0.785 x 1.843	0.110	1.50
3300	3300-5	0.785 x 2.343	0.080	1.80
3700	3700-5	0.910 x 1.843	0.071	1.90
4400	4400-5	0.785 x 2.843	0.060	2.50
5000	5000-5	0.910 x 2.343	0.053	2.50
5700	5700-5	0.785 x 3.343	0.047	3.10
6700	6700-5	0.910 x 2.843	0.039	3.20
7200	7200-5	1.035 x 2.343	0.037	3.50
8800	8800-5	0.910 x 3.343	0.030	4.00
10000	10000-5	1.035 x 2.843	0.026	4.60
13000	13000-5	1.035 x 3.343	0.020	5.60
16000	16000-5	1.035 x 3.843	0.017	7.00
7.5 VDC RATED — 10 VDC SURGE				
2000	2000-7.5	0.785 x 1.843	0.130	1.40
3000	3000-7.5	0.910 x 1.843	0.087	1.80
3800	3800-7.5	0.785 x 2.843	0.070	2.40
4400	4400-7.5	0.910 x 2.343	0.059	2.40
4800	4800-7.5	1.035 x 1.843	0.055	2.40
5000	5000-7.5	0.785 x 3.343	0.053	3.00
5800	5800-7.5	0.910 x 2.843	0.046	3.10
6200	6200-7.5	1.035 x 2.343	0.043	3.30
7500	7500-7.5	0.910 x 3.343	0.035	3.80
9000	9000-7.5	1.035 x 2.843	0.029	4.40
11000	11000-7.5	1.035 x 3.343	0.024	5.30
14000	14000-7.5	1.035 x 3.843	0.019	6.60
10 VDC RATED — 15 VDC SURGE				
1700	1700-10	0.785 x 1.843	0.144	1.30
2300	2300-10	0.785 x 2.343	0.107	1.70
2600	2600-10	0.910 x 1.843	0.094	1.70
3000	3000-10	0.785 x 2.843	0.082	2.20
3600	3600-10	0.910 x 2.343	0.068	2.20
4100	4100-10	0.785 x 3.343	0.060	2.80
4800	4800-10	0.910 x 2.843	0.051	2.90
5100	5100-10	1.035 x 2.343	0.048	3.20
6300	6300-10	0.910 x 3.343	0.039	3.60
7500	7500-10	1.035 x 2.843	0.033	4.10
9700	9700-10	1.035 x 3.343	0.025	5.00
12000	12000-10	1.035 x 3.843	0.021	6.20
16 VDC RATED — 20 VDC SURGE				
1400	1400-16	0.785 x 1.843	0.149	1.20
1900	1900-16	0.785 x 2.343	0.110	1.60
2100	2100-16	0.910 x 1.843	0.100	1.60
2700	2700-16	0.910 x 2.343	0.077	2.00
3400	3400-16	0.785 x 3.343	0.061	2.60
4200	4200-16	1.035 x 2.343	0.050	2.90
5200	5200-16	0.910 x 3.343	0.041	3.30
6100	6100-16	1.035 x 2.843	0.035	3.90
6400	6400-16	0.910 x 3.843	0.033	4.10
8000	8000-16	1.035 x 3.343	0.026	4.70
10000	10000-16	1.035 x 3.843	0.021	5.90
20 VDC RATED — 25 VDC SURGE				
1200	1200-20	0.785 x 1.843	0.170	1.20
1800	1800-20	0.910 x 1.843	0.011	1.50
2200	2200-20	0.785 x 2.843	0.092	2.00
2400	2400-20	0.910 x 2.343	0.084	1.90
2900	2900-20	0.785 x 3.343	0.070	2.50
3400	3400-20	0.910 x 2.843	0.060	2.60
3700	3700-20	1.035 x 2.343	0.055	2.70
4500	4500-20	0.910 x 3.343	0.045	3.30
5300	5300-20	1.035 x 2.843	0.039	3.50
7000	7000-20	1.035 x 3.343	0.030	4.50
8600	8600-20	1.035 x 3.843	0.024	5.50
25 VDC RATED — 30 VDC SURGE				
900	900-25	0.785 x 1.843	0.224	1.05
1200	1200-25	0.785 x 2.343	0.168	1.40
1600	1600-25	0.785 x 2.843	0.126	1.75
2000	2000-25	0.910 x 2.343	0.102	1.90
2500	2500-25	1.035 x 2.343	0.081	2.40
2800	2800-25	0.910 x 2.843	0.072	3.00
3600	3600-25	1.035 x 2.843	0.056	3.25
4700	4700-25	1.035 x 3.343	0.043	4.00
5700	5700-25	1.035 x 3.843	0.036	4.65

CAP (MFD)	TYPE† UFT or UFTA	Insulated Case Size D X L* (Inches)	Max. Impedance 25°C (OHMS)	RMS Ripple Current for 10°C Rise
			10KHz-1MHz	10KHz-1MHz (Amperes)
30 VDC RATED — 40 VDC SURGE				
700	700-30	0.785 x 1.843	0.262	1.00
900	900-30	0.785 x 2.343	0.204	1.25
1300	1300-30	0.785 x 2.843	0.141	1.70
1600	1600-30	0.910 x 2.343	0.114	1.75
2000	2000-30	1.035 x 2.343	0.092	2.25
2200	2200-30	0.910 x 2.843	0.083	2.35
2800	2800-30	1.035 x 2.843	0.066	3.00
3000	3000-30	0.910 x 3.343	0.061	2.90
3600	3600-30	1.035 x 3.343	0.051	3.60
4500	4500-30	1.035 x 3.843	0.041	4.40
40 VDC RATED — 50 VDC SURGE				
550	550-40	0.785 x 1.843	0.322	0.90
700	700-40	0.785 x 2.343	0.255	1.15
900	900-40	0.910 x 1.843	0.197	1.20
1200	1200-40	0.910 x 2.343	0.147	1.55
1500	1500-40	1.035 x 2.343	0.117	2.05
1700	1700-40	0.910 x 2.843	0.104	2.15
2300	2300-40	0.910 x 3.343	0.077	2.60
2900	2900-40	1.035 x 3.343	0.061	3.40
3600	3600-40	1.035 x 3.843	0.050	4.10
50 VDC RATED — 75 VDC SURGE				
300	300-50	0.785 x 1.843	0.280	0.93
400	400-50	0.785 x 2.343	0.212	1.15
530	530-50	0.910 x 1.843	0.160	1.25
700	700-50	0.910 x 2.343	0.120	1.60
870	870-50	1.035 x 2.343	0.098	2.10
1000	1000-50	0.910 x 2.843	0.085	2.15
1200	1200-50	1.035 x 2.843	0.070	2.80
1600	1600-50	1.035 x 3.343	0.053	3.40
2000	2000-50	1.035 x 3.843	0.042	4.25
75 VDC RATED — 100 VDC SURGE				
200	200-75	0.785 x 1.843	0.384	0.78
260	260-75	0.785 x 2.343	0.295	1.00
350	350-75	0.910 x 1.843	0.218	1.10
450	450-75	0.910 x 2.343	0.171	1.40
570	570-75	1.035 x 2.343	0.136	1.85
650	650-75	0.910 x 2.843	0.118	1.95
850	850-75	0.910 x 3.343	0.090	2.25
1000	1000-75	1.035 x 3.343	0.077	2.95
1300	1300-75	1.035 x 3.843	0.059	3.55
100 VDC RATED — 125 VDC SURGE				
130	130-100	0.785 x 1.843	0.530	0.70
170	170-100	0.785 x 2.343	0.405	0.90
230	230-100	0.910 x 1.843	0.300	0.93
300	300-100	0.910 x 2.343	0.230	1.20
380	380-100	1.035 x 2.343	0.180	1.55
430	430-100	0.910 x 2.843	0.159	1.60
550	550-100	1.035 x 2.843	0.125	2.10
700	700-100	1.035 x 3.343	0.098	2.65
850	850-100	1.035 x 3.843	0.080	3.15
150 VDC RATED — 200 VDC SURGE				
70	70-150	0.785 x 1.843	0.780	0.65
90	90-150	0.785 x 2.343	0.610	0.80
120	120-150	0.910 x 1.843	0.455	0.83
150	150-150	1.035 x 1.843	0.362	1.10
200	200-150	1.035 x 2.343	0.273	1.40
300	300-150	0.910 x 3.343	0.181	1.80
380	380-150	1.035 x 3.343	0.143	2.35
470	470-150	1.035 x 3.843	0.095	2.85
200 VDC RATED — 250 VDC SURGE				
50	50-200	0.785 x 1.843	0.780	0.60
85	85-200	0.910 x 1.843	0.460	0.75
100	100-200	0.910 x 2.343	0.390	0.95
150	150-200	0.910 x 2.843	0.259	1.25
200	200-200	1.035 x 2.843	0.195	1.67
250	250-200	0.910 x 3.843	0.156	1.90
320	320-200	1.035 x 3.843	0.122	2.50

CAPACITANCE TOLERANCE −10% +75%

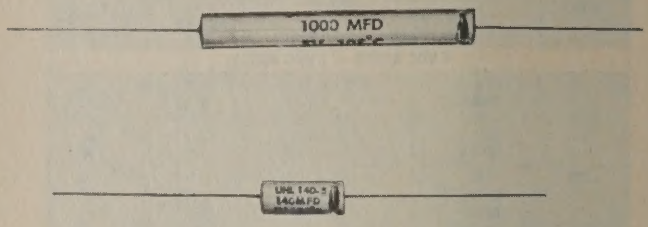
*Dimensions include insulating sleeve and epoxy coated seals for protection from cleaning solvents.
†Order by complete type number; e.g. UFT2400-5 or UFTA2400-5.

Electrolytic Capacitors, Aluminum

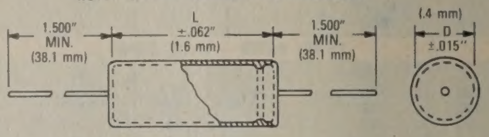
CDE CORNELL-DUBILIER

EXTENDED TEMPERATURE RANGE (−55°C to +125°C)

The all-welded type UHL units are polarized, etched-foil aluminum electrolytic capacitors which operate over the broad temperature range of −55°C to +125°C (−67°F to +257°F), without derating. The all-aluminum construction offers minimum capacitor weight, suitable for airborne and space applications. UHL capacitors are dual voltage rated, allowing higher voltage operation at the lower ambient temperature of +85°C (+185°F). Maximum capacitance change at −55°C (−67°F) is −30% and +25% at +125°C (+257°F). Mil Style CU 12, CU 13 capacitors to Mil-C-39018/1A are available.



NOTE: D AND L = UNINSULATED DIMENSIONS



LEADS: #20 AWG. (.032″ (.8 mm) DIA.)

Standard Stock Ratings

CAP. MFD.	CDE TYPE NO.	▪CASE SIZE (IN.) D x L	MAXIMUM DC LEAKAGE (μA) 25°C	MAXIMUM DC LEAKAGE (μA) 85°C & 125°C	MAX. IMP. AT −55°C, 120 Hz (IN OHMS)
5 VDCW – 7 V SURGE @ 125°C / / 7 VDCW – 10 V SURGE @ 85°C					
100	UHL100-5	.281 x .937	2	5	38
140	UHL140-5	.375 x .812	2	5	21
220	UHL220-5	.375 x .937	3	8	20
270	UHL270-5	.375 x 1.125	3	8	17
390	UHL390-5	.375 x 1.375	4	10	22
560	UHL560-5	.375 x 1.625	5	15	8
820	UHL820-5	.375 x 2.187	7	20	5.5
1000	UHL1000-5	.375 x 2.687	10	30	4.5
7 VDCW – 10 V SURGE @ 125°C / / 10 VDCW – 15 V SURGE @ 85°C					
100	UHL100-7	.375 x .812	2	5	45
180	UHL180-7	.375 x .937	3	8	25
220	UHL220-7	.375 x 1.125	3	8	20
330	UHL330-7	.375 x 1.375	4	10	14
470	UHL470-7	.375 x 1.625	5	15	9.6
680	UHL680-7	.375 x 2.187	7	20	6.6
820	UHL820-7	.375 x 2.687	10	30	5.5
10 VDCW – 15 V SURGE @ 125°C / / 15 VDCW – 20 V SURGE @ 85°C					
68	UHL68-10	.281 x .937	2	5	66
82	UHL82-10	.281 x .937	2	5	55
95	UHL95-10	.375 x .812	2	5	30
150	UHL150-10	.375 x .937	3	8	30
180	UHL180-10	.375 x 1.125	3	8	25
270	UHL270-10	.375 x 1.375	4	10	17
390	UHL390-10	.375 x 1.625	5	15	12
560	UHL560-10	.375 x 2.187	7	20	8
680	UHL680-10	.375 x 2.687	10	30	6.6
20 VDCW – 30 V SURGE @ 125°C / / 30 VDCW – 40 V SURGE @ 85°C					
33	UHL33-20	.281 x .937	2	5	91
47	UHL47-20	.281 x .937	2	5	64
50	UHL50-20	.375 x .812	2	5	45
82	UHL82-20	.375 x .937	3	8	36
100	UHL100-20	.375 x 1.125	3	8	30
120	UHL120-20	.375 x 1.375	4	10	25
150	UHL150-20	.375 x 1.375	4	10	20
220	UHL220-20	.375 x 1.625	5	15	14
330	UHL330-20	.375 x 2.187	7	20	9.1
390	UHL390-20	.375 x 2.687	10	30	7.7
40 VDCW – 50 V SURGE @ 125°C / / 50 VDCW – 60 V SURGE @ 85°C					
22	UHL22-40	.281 x .937	2	5	140
20	UHL20-40	.375 x .812	2	5	90
33	UHL33-40	.375 x .937	3	8	91
47	UHL47-40	.375 x 1.125	3	8	64
56	UHL56-40	.375 x 1.375	4	10	54
68	UHL68-40	.375 x 1.375	4	10	44
100	UHL100-40	.375 x 1.625	5	15	30
150	UHL150-40	.375 x 2.187	7	20	20

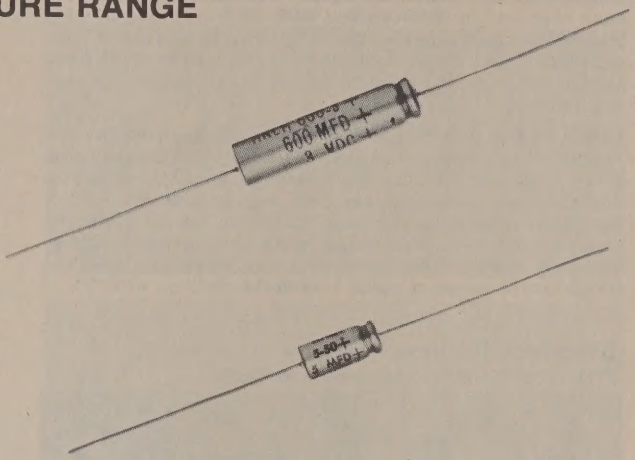
CAP. MFD.	CDE TYPE NO.	▪CASE SIZE (IN.) DxL	MAXIMUM DC LEAKAGE (μA) 25°C	MAXIMUM DC LEAKAGE (μA) 85°C & 125°C	MAX. IMP. AT −55°C, 120 Hz (IN OHMS)
40 VDCW – 50 V SURGE @ 125°C / / 50 VDCW – 60 V SURGE @ 85°C					
180	UHL 180-40	.375 x 2.687	10	30	17
60 VDCW – 75 V SURGE @ 125°C / / 75 VDCW – 90 V SURGE @ 85°C					
12	UHL12-60	.281 x .937	2	5	250
15	UHL15-60	.375 x .812	2	5	140
22	UHL22-60	.375 x .937	3	8	140
33	UHL33-60	.375 x 1.125	3	8	91
47	UHL47-60	.375 x 1.375	4	10	64
68	UHL68-60	.375 x 1.625	5	15	44
100	UHL100-60	.375 x 2.187	7	20	30
120	UHL120-60	.375 x 2.687	10	30	25
75 VDCW – 100 V SURGE @ 125°C / / 100 VDCW – 125 V SURGE @ 85°C					
8.2	UHL8.2-75	.281 x .937	2	5	360
8	UHL8-75	.375 x .812	2	5	265
12	UHL12-75	.375 x .937	3	8	250
15	UHL15-75	.375 x 1.125	3	8	200
22	UHL22-75	.375 x 1.375	4	10	140
33	UHL33-75	.375 x 1.625	5	15	91
47	UHL47-75	.375 x 2.187	7	20	64
68	UHL68-75	.375 x 2.687	10	30	44
100 VDCW – 125 V SURGE @ 125°C / / 150 VDCW – 175 V SURGE @ 85°C					
4.7	UHL4.7-100	.281 x .937	2	5	640
5.6	UHL5.6-100	.281 x .937	2	5	540
6	UHL6-100	.375 x .812	2	5	330
8.2	UHL8.2-100	.375 x .937	3	8	330
12	UHL12-100	.375 x 1.125	3	8	250
18	UHL18-100	.375 x 1.375	4	10	170
22	UHL22-100	.375 x 1.625	5	15	140
33	UHL33-100	.375 x 2.187	7	20	91
56	UHL56-100	.375 x 2.687	10	30	54
150 VDCW – 175 V SURGE @ 125°C / / 200 VDCW – 225 V SURGE @ 85°C					
3.9	UHL3.9-150	.281 x .937	2	5	500
4	UHL4-150	.375 x .812	2	5	500
6	UHL6-150	.375 x .937	3	8	310
8	UHL8-150	.375 x 1.125	3	8	235
13	UHL13-150	.375 x 1.375	4	10	155
17	UHL17-150	.375 x 1.625	5	15	120
26	UHL26-150	.375 x 2.187	7	20	77
39	UHL39-150	.375 x 2.687	10	30	77
200 VDCW – 225 V SURGE @ 125°C / / 250 VDCW – 275 V SURGE @ 85°C					
3.3	UHL3.3-200	.375 x .812	2	5	910
5.6	UHL5.6-200	.375 x .937	3	8	540
6.8	UHL6.8-200	.375 x 1.125	3	8	440
10	UHL10-200	.375 x 1.375	4	10	300
12	UHL12-200	.375 x 1.625	5	15	250
22	UHL22-200	.375 x 2.187	7	20	140
27	UHL27-200	.375 x 2.687	10	30	110

▪Standard unit supplied with plastic sleeve. For overall dimensions, add .031″ (.8mm) to diameter and .093″ (2.4 mm) to length.
CAPACITANCE TOLERANCE: +75% −10%.

CDE CORNELL-DUBILIER

Electrolytic Capacitors, Aluminum

MINIATURE EXTENDED TEMPERATURE RANGE (−80°C to +110°C)

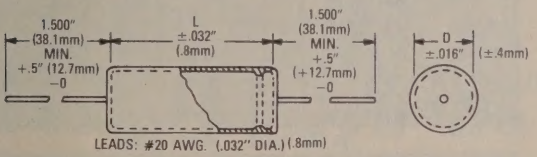


The all-welded type HNLH is a broad temperature range, low inductance, high reliability electrolytic capacitor featuring extremely low ESR and capacitance stability across the entire operating temperature range of −80°C to +110°C. (−112°F to +230°F). Sealed in a drawn aluminum case, these units are constructed with the highest purity etched cathodes and anodes, and the CDE exclusive cold-weld construction.

The HNLH is an ideal selection for input filters on computer cards, translator assemblies, memory decoders, as well as communication and instrumentation equipment.

Standard HNLH units are supplied with a polyester insulating sleeve and #20 AWG leads.

NOTE: D AND L = UNINSULATED DIMENSIONS



LEADS: #20 AWG. (.032″ DIA.) (.8mm)

Case Size Code■

LETTER CODE	CASE SIZE D x L	
	INCHES	MILLIMETERS
B2	.25 x .625	6.4 x 15.9
C2	.312 x .625	7.9 x 15.9
D2	.375 x .625	7.9 x 15.9
D3	.375 x .75	9.5 x 19.1
D4	.375 x .875	9.5 x 22.2
D6	.375 x 1.25	9.5 x 31.8
D7	.375 x 1.50	9.5 x 38.1

Standard Stock Ratings

CAP. MFD.	3V DCW		6V DCW		12V DCW		15V DCW		25V DCW		50V DCW		100V DCW		150V DCW	
	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*	† Type HNLH-	*
1	1-50	B2	1-50	B2	1-50	B2	1-50	B2	1-50	B2	1-50	B2	1-150	B2	1-150	B2
2	2-50	B2	2-50	B2	2-50	B2	2-50	B2	2-50	B2	2-50	B2	2-150	C2	2-150	C2
3	3-50	B2	3-50	B2	3-50	B2	3-50	B2	3-50	B2	3-50	B2	3-150	D2	3-150	D2
4	4-50	B2	4-50	B2	4-50	B2	4-50	B2	4-50	B2	4-50	B2	4-150	D3	4-150	D3
5	5-50	B2	5-50	B2	5-50	B2	5-50	B2	5-50	B2	5-50	B2	5-150	D4	5-150	D4
6	6-25	B2	6-25	B2	6-25	B2	6-25	B2	6-25	B2	6-50	C2	6-100	D3	6-150	D4
8	8-25	B2	8-25	B2	8-25	B2	8-25	B2	8-25	B2	8-50	C2	8-100	D4	8-150	D6
10	10-25	B2	10-25	B2	10-25	B2	10-25	B2	10-25	B2	10-50	D2	10-100	D4	10-150	D6
15	15-15	B2	15-15	B2	15-15	B2	15-15	B2	15-25	C2	15-50	D2	15-100	D6	15-150	D7
20	20-12	B2	20-12	B2	20-12	B2	20-15	C2	20-25	D2	20-50	D3	20-100	D7		
25	25-15	C2	25-15	C2	25-15	C2	25-15	C2	25-25	D2	25-50	D4				
30	30-50	D4	30-50	D4	30-50	D4	30-50	D4	30-50	D4	30-50	D4				
35	35-3	B2	35-12	C2	35-12	C2	35-15	D2	35-25	D3	50-50	D6				
50	50-6	C2	50-6	C2	50-15	D2	50-15	D2	50-25	D3	75-50	D7				
75	75-3	C2	75-6	D2	75-15	D4	75-15	D4	75-25	D6						
100	100-3	D2	100-6	D3	100-15	D4	100-15	D4	100-25	D6						
150	150-3	D3	150-12	D4	150-12	D4	150-15	D6	150-25	D7						
200	200-3	D3	200-15	D6	200-15	D6	200-15	D6								
250	250-3	D4	250-6	D6	250-15	D7	250-15	D7								
300	300-6	D6	300-6	D6	300-12	D7										
400	400-3	D6	400-6	D7												
500	500-3	D7														
600	600-3	D7														

†Order by complete type number; e.g., HNLH35-3.
*Case size code; see table above.
■For insulated case, add .031″ (.8 mm) to diameter and .062″ (1.6 mm) to length.
CAPACITANCE TOLERANCE: −10% +75%

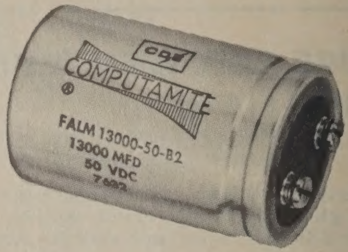
Electrolytic Capacitors, Aluminum

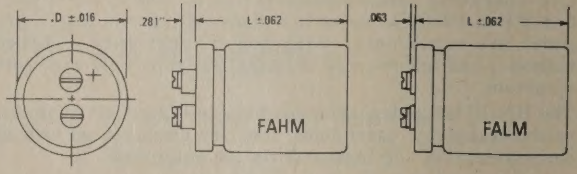
CDE CORNELL-DUBILIER

COMPUTER GRADE, SCREW TERMINAL, EXTENDED CAPACITANCE, COMPUTAMITE® (−40° to +85°C)

The ratings shown are the highest nominal capacitance for each case size in the standard line. Intermediate, unlisted values are also available. The FAHM has "high screw" terminals, the FALM has "low screw" terminals, and both have tapped terminals to accept 10-32 screws furnished with each capacitor.

CDE's FAHM and FALM "Computamite" electrolytics are extended capacitance units with ratings which exceed those of the FAH and FAL. They are reliable, long-life capacitors designed for power supply filtering, industrial control equipment, energy storage, and other applications where the smallest size with high mfd x volts are important. These units are designed for continuous duty operation over the temperature range of −40°C to +85°C (−40°F to +185°F).





Standard Ratings

(Not normally stocked but readily available)

CAP. MFD.	Types† FAHM or FALM	Uninsulated Case Size* (Inches) D x L	Max. ESR +25°C 120 Hz (Ohms)	Maximum Ripple 120 Hz (AMPS)	
				+85°C	+65°C
3 VDC RATED — 4 VDC SURGE					
25000	25000-3-A1	1.375 x 2.125	0.150	2.8	3.9
39000	39000-3-A2	1.375 x 3.125	0.087	4.2	5.9
56000	56000-3-A3	1.375 x 4.125	0.060	5.7	7.9
80000	80000-3-A6	1.375 x 5.625	0.051	7.0	9.8
100000	100000-3-E3	1.75 x 4.125	0.037	8.4	11.7
92000	92000-3-B2	2.0 x 3.125	0.046	7.3	10.2
130000	130000-3-B3	2.0 x 4.125	0.030	10.1	14.1
190000	190000-3-B6	2.0 x 5.625	0.021	13.8	19.3
220000	220000-3-C3	2.5 x 4.125	0.017	15.4	21.5
310000	310000-3-C6	2.5 x 5.625	0.010	22.7	31.7
295000	295000-3-D3	3.0 x 4.125	0.016	17.7	24.7
420000	420000-3-D6	3.0 x 5.625	0.012	23.1	32.3
1000000	1000000-3-D9	3.0 x 8.625	0.010	30.2	40.0
6 VDC RATED — 8 VDC SURGE					
22000	22000-6-A1	1.375 x 2.125	0.150	2.8	3.9
34000	34000-6-A2	1.375 x 3.125	0.087	4.2	5.8
53000	53000-6-A3	1.375 x 4.125	0.060	5.7	7.9
76000	76000-6-A6	1.375 x 5.625	0.052	6.9	9.6
82000	82000-6-E3	1.75 x 4.125	0.037	8.4	11.7
75000	75000-6-B2	2.0 x 3.125	0.047	7.2	10.0
115000	115000-6-B3	2.0 x 4.125	0.030	10.1	14.1
165000	165000-6-B6	2.0 x 5.625	0.022	13.4	18.7
180000	180000-6-C3	2.5 x 4.125	0.018	14.9	20.8
255000	255000-6-C6	2.5 x 5.625	0.016	18.0	25.2
280000	280000-6-D3	3.0 x 4.125	0.017	17.2	24.1
400000	400000-6-D6	3.0 x 5.625	0.013	22.2	31.1
565000	565000-6-D9	3.0 x 8.625	0.010	30.2	40.0
10 VDC RATED — 12 VDC SURGE					
15000	15000-10-A1	1.375 x 2.125	0.160	2.7	3.7
27000	27000-10-A2	1.375 x 3.125	0.092	4.1	5.7
39000	39000-10-A3	1.375 x 4.125	0.064	5.5	7.7
60000	60000-10-A6	1.375 x 5.625	0.050	7.0	9.8
69000	69000-10-E3	1.75 x 4.125	0.040	8.1	11.3
59000	59000-10-B2	2.0 x 3.125	0.049	7.1	9.9
92000	92000-10-B3	2.0 x 4.125	0.030	10.2	14.1
130000	130000-10-B6	2.0 x 5.625	0.023	13.1	18.3
150000	150000-10-C3	2.5 x 4.125	0.018	14.9	20.8
215000	215000-10-C6	2.5 x 5.625	0.017	17.4	24.3
205000	205000-10-D3	3.0 x 4.125	0.017	17.2	24.0
290000	290000-10-D6	3.0 x 5.625	0.013	22.2	31.0
480000	480000-10-D9	3.0 x 8.625	0.010	30.2	40.0
15 VDC RATED — 18 VDC SURGE					
13000	13000-15-A1	1.375 x 2.125	0.170	2.6	3.6
19000	19000-15-A2	1.375 x 3.125	0.095	4.0	5.6
30000	30000-15-A3	1.375 x 4.125	0.066	5.4	7.5
46000	46000-15-A6	1.375 x 5.625	0.052	6.9	9.6
49000	49000-15-E3	1.75 x 4.125	0.041	8.0	11.2
45000	45000-15-B2	2.0 x 3.125	0.051	6.9	9.6
65000	65000-15-B3	2.0 x 4.125	0.034	9.5	13.3
100000	100000-15-B6	2.0 x 5.625	0.023	13.1	18.3
115000	115000-15-C3	2.5 x 4.125	0.020	14.2	19.9
165000	165000-15-C6	2.5 x 5.625	0.018	17.0	23.8
170000	170000-15-D3	3.0 x 4.125	0.018	16.7	23.4
240000	240000-15-D6	3.0 x 5.625	0.013	22.0	30.8
345000	345000-15-D9	3.0 x 8.625	0.010	30.2	40.0
20 VDC RATED — 25 VDC SURGE					
8200	8200-20-A1	1.375 x 2.125	0.180	2.5	3.5
13500	13500-20-A2	1.375 x 3.125	0.110	3.7	5.1
19500	19500-20-A3	1.375 x 4.125	0.071	5.2	7.2
28000	28000-20-A6	1.375 x 5.625	0.062	6.3	8.8
35000	35000-20-E3	1.75 x 4.125	0.045	7.6	10.6
32000	32000-20-B2	2.0 x 3.125	0.055	6.7	9.3
46000	46000-20-B3	2.0 x 4.125	0.034	9.5	13.3
66000	66000-20-B6	2.0 x 5.625	0.024	12.8	17.9
76000	76000-20-C3	2.5 x 4.125	0.020	14.2	19.8
115000	115000-20-C6	2.5 x 5.625	0.019	16.5	23.1
110000	110000-20-D3	3.0 x 4.125	0.018	16.8	23.5
160000	160000-20-D6	3.0 x 5.625	0.014	21.4	29.9
240000	240000-20-D9	3.0 x 8.625	0.010	30.2	40.0
25 VDC RATED — 30 VDC SURGE					
7200	7200-25-A1	1.375 x 2.125	0.190	2.4	3.3
11500	11500-25-A2	1.375 x 3.125	0.100	3.9	5.4
18000	18000-25-A3	1.375 x 4.125	0.074	5.1	7.1
26000	26000-25-A6	1.375 x 5.625	0.058	6.5	9.1
30000	30000-25-E3	1.75 x 4.125	0.048	7.3	10.2
27000	27000-25-B2	2.0 x 3.125	0.058	6.5	9.1
42000	42000-25-B3	2.0 x 4.125	0.035	9.3	13.0
61000	61000-25-B6	2.0 x 5.625	0.026	12.3	17.2
70000	70000-25-C3	2.5 x 4.125	0.021	13.8	19.3
105000	105000-25-C6	2.5 x 5.625	0.020	16.1	22.5
100000	100000-25-D3	3.0 x 4.125	0.019	16.3	22.8
145000	145000-25-D6	3.0 x 5.625	0.014	21.4	29.9
225000	225000-25-D6	3.0 x 8.625	0.010	30.2	40.0
30 VDC RATED — 40 VDC SURGE					
5000	5000-30-A1	1.375 x 2.125	0.230	2.2	3.0
9000	9000-30-A2	1.375 x 3.125	0.130	3.4	4.7
13000	13000-30-A3	1.375 x 4.125	0.080	4.9	6.8
18500	18500-30-A6	1.375 x 5.625	0.057	6.6	9.2
24000	24000-30-E3	1.75 x 4.125	0.051	7.1	9.9
22000	22000-30-B2	2.0 x 3.125	0.062	6.3	8.8
32000	32000-30-B3	2.0 x 4.125	0.040	8.7	12.1
45000	45000-30-B6	2.0 x 5.625	0.029	11.7	16.4
50000	50000-30-C3	2.5 x 4.125	0.030	11.5	16.1
72000	72000-30-C6	2.5 x 5.625	0.021	15.7	21.9
71000	71000-30-D3	3.0 x 4.125	0.026	13.9	19.4
100000	100000-30-D6	3.0 x 5.625	0.018	18.9	26.4
165000	165000-30-D9	3.0 x 8.625	0.011	28.8	40.0
40 VDC RATED — 50 VDC SURGE					
3800	3800-40-A1	1.375 x 2.125	0.210	2.3	3.2
6900	6900-40-A2	1.375 x 3.125	0.120	3.6	5.0
10000	10000-40-A3	1.375 x 4.125	0.080	3.8	5.3
15000	15000-40-A6	1.375 x 5.625	0.058	6.5	9.1
18000	18000-40-E3	1.75 x 4.125	0.055	6.9	9.6
17000	17000-40-B2	2.0 x 3.125	0.066	6.1	8.5
24000	24000-40-B3	2.0 x 4.125	0.040	8.7	12.1
35000	35000-40-B6	2.0 x 5.625	0.028	11.9	16.6
39000	39000-40-C3	2.5 x 4.125	0.024	12.9	18.0
55000	55000-40-C6	2.5 x 5.625	0.022	15.3	21.4
55000	55000-40-D3	3.0 x 4.125	0.021	15.5	21.7
78000	78000-40-D6	3.0 x 5.625	0.015	20.7	29.0
125000	125000-40-D9	3.0 x 8.625	0.011	28.8	40.0

(Continued on next page)

CDE CORNELL-DUBILIER

Electrolytic Capacitors, Aluminum

Types FAHM/FALM | Class 201.47

COMPUTER GRADE SCREW TERMINAL, EXTENDED CAPACITANCE (Cont'd.)

CAP. MFD.	Types† FAHM or FALM	Uninsulated Case Size* (Inches) D x L	Max. ESR +25°C 120 Hz (Ohms)	Maximum Ripple 120 Hz (AMPS) +85°C	Maximum Ripple 120 Hz (AMPS) +65°C
50 VDC RATED — 65 VDC SURGE					
3000	3000-50-A1	1.375 x 2.125	0.250	2.1	2.9
5500	5500-50-A2	1.375 x 3.125	0.130	3.4	4.7
7900	7900-50-A3	1.375 x 4.125	0.087	4.7	6.5
11500	11500-50-A6	1.375 x 5.625	0.061	6.3	8.8
14500	14500-50-E3	1.75 x 4.125	0.064	6.3	8.8
13000	13000-50-B2	2.0 x 3.125	0.072	5.8	8.1
19000	19000-50-B3	2.0 x 4.125	0.045	8.2	11.4
27000	27000-50-B6	2.0 x 5.625	0.033	10.9	15.2
30000	30000-50-C3	2.5 x 4.125	0.030	11.6	16.2
44000	44000-50-C6	2.5 x 5.625	0.024	14.6	20.4
43000	43000-50-D3	3.0 x 4.125	0.022	15.2	21.3
61000	61000-50-D6	3.0 x 5.625	0.016	20.0	28.0
100000	100000-50-D9	3.0 x 8.625	0.012	27.6	38.6
60 VDC RATED — 75 VDC SURGE					
2200	2200-60-A1	1.375 x 2.125	0.310	1.9	2.6
3900	3900-60-A2	1.375 x 3.125	0.180	2.9	4.0
5600	5600-60-A3	1.375 x 4.125	0.120	4.0	5.6
8000	8000-60-A6	1.375 x 5.625	0.090	5.2	7.2
10000	10000-60-E3	1.75 x 4.125	0.067	6.2	8.6
9500	9500-60-B2	2.0 x 3.125	0.082	5.4	7.5
14000	14000-60-B3	2.0 x 4.125	0.049	7.9	11.0
20000	20000-60-B6	2.0 x 5.625	0.034	10.8	15.1
23000	23000-60-C3	2.5 x 4.125	0.037	10.4	14.5
33000	33000-60-C6	2.5 x 5.625	0.026	14.1	19.7
33000	30000-60-D3	3.0 x 4.125	0.031	12.7	17.7
47000	47000-60-D6	3.0 x 5.625	0.021	17.5	24.5
77000	77000-60-D9	3.0 x 8.625	0.013	26.5	37.1

CAP. MFD.	Types† FAHM or FALM	Uninsulated Case Size* (Inches) D x L	Max. ESR +25°C 120 Hz (Ohms)	Maximum Ripple 120 Hz (AMPS) +85°C	Maximum Ripple 120 Hz (AMPS) +65°C
75 VDC RATED — 95 VDC SURGE					
1700	1700-75-A1	1.375 x 2.125	0.280	2.0	2.8
3000	3000-75-A2	1.375 x 3.125	0.160	3.1	4.3
4500	4500-75-A3	1.375 x 4.125	0.100	4.4	6.1
6700	6700-75-A6	1.375 x 5.625	0.067	6.1	8.5
7900	7900-75-E3	1.75 x 4.125	0.080	5.7	7.9
7600	7600-75-B2	2.0 x 3.125	0.088	4.2	5.8
11000	11000-75-B3	2.0 x 4.125	0.049	7.9	11.0
16000	16000-75-B6	2.0 x 5.625	0.036	10.4	14.5
18000	18000-75-C3	2.5 x 4.125	0.040	10.0	14.0
26000	26000-75-C6	2.5 x 5.625	0.028	13.6	19.0
26000	26000-75-D3	3.0 x 4.125	0.032	12.5	17.5
36000	36000-75-D6	3.0 x 5.625	0.023	16.6	23.2
61000	61000-75-D9	3.0 x 8.625	0.014	25.5	35.7
100 VDC RATED — 125 VDC SURGE					
900	900-100-A1	1.375 x 2.125	0.380	1.7	2.3
1700	1700-100-A2	1.375 x 3.125	0.210	2.7	3.7
2600	2600-100-A3	1.375 x 4.125	0.140	3.7	5.1
3800	3800-100-A6	1.375 x 5.625	0.092	5.2	7.2
4300	4300-100-E3	1.75 x 4.125	0.094	6.2	8.6
4200	4200-100-B2	2.0 x 3.125	0.110	4.7	6.5
6100	6100-100-B3	2.0 x 4.125	0.068	6.7	9.3
8700	8700-100-B6	2.0 x 5.625	0.047	9.2	12.8
9800	9800-100-C3	2.5 x 4.125	0.045	9.4	13.1
14000	14000-100-C6	2.5 x 5.625	0.033	12.5	17.5
14000	14000-100-D3	3.0 x 4.125	0.036	11.8	16.5
20000	20000-100-D6	3.0 x 5.625	0.025	16.0	22.4
33000	33000-100-D9	3.0 x 8.625	0.016	23.9	33.5

†Order by complete type number, e.g. FAHM3000-50-A1 or FALM3000-50-A1.

*Dimensions are uninsulated. Standard units are supplied with plastic insulating sleeves. Add 0.031" ±0.031" to diameter and 0.031" ±0.062" to length for insulated dimensions.

CAPACITANCE TOLERANCE: 3-50 VDC: −10% +100%
51-100VDC: −10% + 75%

Type FAM | Class 210.24

COMPUTER GRADE, SCREW TERMINAL, LOW IMPEDANCE (−40°C to +85°C)

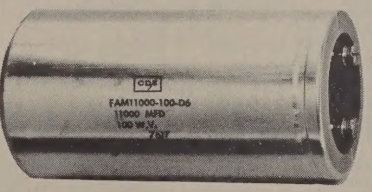
Developments by CDE in low resistance electrolytes and paper separators, combined with increased quantity of multiple anode and cathode tabs welded to the terminals, have resulted in very low ESR capacitors.

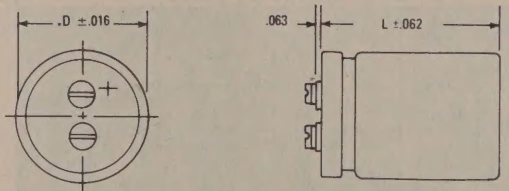
Another advantage of the design of the FAM is lower impedance at high frequencies, which is important for high ripple current applications such as switching power supply filtering.

The "low screw" terminals are tapped to accept 10-32 screws furnished with each capacitor.

The operating temperature range of this capacitor is from −40°C to +85°C (−40°F to +185°F)

The ratings shown are the highest nominal capacitance for each case size in the standard FAM line. Intermediate, unlisted values are also available.





Standard Ratings (Not normally stocked but readily available)

CAP. MFD.	Type† FAM	Uninsulated Case Size• (Inches) D x L	Impedance ± 50% 20 KHz (Ohms)	Maximum Ripple RMS Amps @ 85°C 120 Hz	Maximum Ripple RMS Amps @ 85°C 20 KHz
3 VDC RATED — 4 VDC SURGE					
11500	11500-3-A1	1.375 x 2.125	0.0123	5.0	7.0
23000	23000-3-A2	1.375 x 3.125	0.0073	8.0	10.0
30000	30000-3-A3	1.375 x 4.125	0.0063	10.0	11.0
40000	40000-3-A6	1.375 x 5.625	0.0049	12.0	14.0
50000	50000-3-B2	2.0 x 3.125	0.0037	12.0	14.0
75000	75000-3-B3	2.0 x 4.125	0.0035	21.0	24.0
100000	100000-3-B6	2.0 x 5.625	0.0026	28.0	32.0
125000	125000-3-C3	2.5 x 4.125	0.0029	31.0	36.0
175000	175000-3-C6	2.5 x 5.625	0.0021	31.0	36.0
200000	200000-3-D3	3.0 x 4.125	0.0027	40.0	40.0
290000	290000-3-D6	3.0 x 5.625	0.0027	40.0	40.0
600000	600000-3-D9	3.0 x 8.625	0.0027	40.0	40.0

CAP. MFD.	Type† FAM	Uninsulated Case Size• (Inches) D x L	Impedance ± 50% 20 KHz (Ohms)	Maximum Ripple RMS Amps @ 85°C 120 Hz	Maximum Ripple RMS Amps @ 85°C 20 KHz
6.5 VDC RATED — 8 VDC SURGE					
10000	10000-6.5-A1	1.375 x 2.125	0.0121	5.0	6.0
17000	17000-6.5-A2	1.375 x 3.125	0.0083	8.0	9.0
26000	26000-6.5-A3	1.375 x 4.125	0.0062	10.0	11.0
39000	39000-6.5-A6	1.375 x 5.625	0.0043	12.0	15.0
43000	43000-6.5-B2	2.0 x 3.125	0.0050	12.0	14.0
68000	68000-6.5-B3	2.0 x 4.125	0.0032	22.0	26.0
95000	95000-6.5-B6	2.0 x 5.625	0.0023	30.0	35.0
110000	110000-6.5-C3	2.5 x 4.125	0.0026	30.0	35.0
165000	165000-6.5-C6	2.5 x 5.625	0.0020	32.0	37.0
185000	185000-6.5-D3	3.0 x 4.125	0.0026	38.0	40.0
265000	265000-6.5-D6	3.0 x 5.625	0.0026	40.0	40.0
425000	425000-6.5-D9	3.0 x 8.625	0.0026	40.0	40.0

†Order by complete type number; e.g. FAM 11500-3 A1, which indicates Type—Capacitance—Working Voltage—Case Code.

•Dimensions are uninsulated. Standard unit is supplied with plastic insulating sleeve. Add .031" ±.031" to diameter and .031" ±.062" to length for insulated dimensions.

CAPACITANCE TOLERANCE: −10% +100%

(Continued on next page)

Electrolytic Capacitors, Aluminum

CDE CORNELL-DUBILIER

Type FAM | Class 210.24

COMPUTER GRADE, SCREW TERMINAL LOW IMPEDANCE (−40°C to +85°C) Cont'd.

Standard Ratings (Continued)

CAP. MFD.	Type† FAM	Uninsulated Case Size• (Inches) D x L	Impedance ± 50% 20 KHz (Ohms)	Maximum Ripple RMS Amps @ 85°C	
				120 Hz	20 KHz
10 VDC RATED — 12 VDC SURGE					
7100	7100-10-A1	1.375 x 2.125	0.0117	5.0	6.0
12000	12000-10-A2	1.375 x 3.125	0.0080	8.0	9.0
18500	18500-10-A3	1.375 x 4.125	0.0060	11.0	12.0
26000	26000-10-A6	1.375 x 5.625	0.0047	12.0	14.0
28000	28000-10-B2	2.0 x 3.125	0.0056	12.0	14.0
48000	48000-10-B3	2.0 x 4.125	0.0032	21.0	25.0
68000	68000-10-B6	2.0 x 5.625	0.0022	30.0	35.0
79000	79000-10-C3	2.5 x 4.125	0.0026	30.0	35.0
110000	110000-10-C6	2.5 x 5.625	0.0020	32.0	37.0
130000	130000-10-D3	3.0 x 4.125	0.0026	37.0	40.0
190000	190000-10-D6	3.0 x 5.625	0.0026	40.0	40.0
300000	300000-10-D9	3.0 x 8.625	0.0026	40.0	40.0
15 VDC RATED — 20 VDC SURGE					
5400	5400-15-A1	1.375 x 2.125	0.0205	4.0	5.0
10000	10000-15-A2	1.375 x 3.125	0.0125	6.0	7.0
15000	15000-15-A3	1.375 x 4.125	0.0104	8.0	10.0
17000	17000-15-A6	1.375 x 5.625	0.0091	8.0	9.0
23000	23000-15-B2	2.0 x 3.125	0.0085	9.0	11.0
37000	37000-15-B3	2.0 x 4.125	0.0054	17.0	21.0
52000	52000-15-B6	2.0 x 5.625	0.0038	22.0	26.0
60000	60000-15-C3	2.5 x 4.125	0.0041	22.0	26.0
88000	88000-15-C6	2.5 x 5.625	0.0029	26.0	31.0
97000	97000-15-D3	3.0 x 4.125	0.0038	30.0	36.0
145000	145000-15-D6	3.0 x 5.625	0.0026	40.0	40.0
230000	230000-15-D9	3.0 x 8.625	0.0026	40.0	40.0
20 VDC RATED — 25 VDC SURGE					
3800	3800-20-A1	1.375 x 2.125	0.0186	4.0	5.0
6300	6300-20-A2	1.375 x 3.125	0.0130	6.0	7.0
10000	10000-20-A3	1.375 x 4.125	0.0105	8.0	10.0
15000	15000-20-A6	1.375 x 5.625	0.0068	9.0	11.0
21000	21000-20-B2	2.0 x 3.125	0.0060	11.0	13.0
26000	26000-20-B3	2.0 x 4.125	0.0053	16.0	20.0
37000	37000-20-B6	2.0 x 5.625	0.0035	23.0	27.0
44000	44000-20-C3	2.5 x 4.125	0.0038	23.0	27.0
60000	60000-20-C6	2.5 x 5.625	0.0028	26.0	31.0
70000	70000-20-D3	3.0 x 4.125	0.0037	31.0	37.0
97000	97000-20-D6	3.0 x 5.625	0.0026	40.0	40.0
160000	160000-20-D9	3.0 x 8.625	0.0025	40.0	40.0
25 VDC RATED — 30 VDC SURGE					
2700	2700-25-A1	1.375 x 2.125	0.0222	4.0	5.0
4200	4200-25-A2	1.375 x 3.125	0.0163	5.0	6.0
7700	7700-25-A3	1.375 x 4.125	0.0114	8.0	10.0
8500	8500-25-A6	1.375 x 5.625	0.0102	8.0	10.0
10000	10000-25-B2	2.0 x 3.125	0.0076	8.0	10.0
16500	16500-25-B3	2.0 x 4.125	0.0065	14.0	17.0
24000	24000-25-B6	2.0 x 5.625	0.0045	20.0	25.0
28000	28000-25-C3	2.5 x 4.125	0.0040	21.0	26.0
42000	42000-25-C6	2.5 x 5.625	0.0027	24.0	30.0
46000	46000-25-D3	3.0 x 4.125	0.0045	28.0	34.0
65000	65000-25-D6	3.0 x 5.625	0.0033	37.0	40.0
125000	125000-25-D9	3.0 x 8.625	0.0024	40.0	40.0
30 VDC RATED — 40 VDC SURGE					
2100	2100-30-A1	1.375 x 2.125	0.0245	3.0	4.0
3400	3400-30-A2	1.375 x 3.125	0.0173	5.0	6.0
5600	5600-30-A3	1.375 x 4.125	0.0131	7.0	9.0
7000	7000-30-A6	1.375 x 5.625	0.0108	7.0	9.0
9500	9500-30-B2	2.0 x 3.125	0.0077	8.0	10.0
14000	14000-30-B3	2.0 x 4.125	0.0067	14.0	17.0
17500	17500-30-B6	2.0 x 5.625	0.0049	18.0	22.0
23000	23000-30-C3	2.5 x 4.125	0.0052	21.0	26.0
35000	35000-30-C6	2.5 x 5.625	0.0034	23.0	29.0
33000	33000-30-D3	3.0 x 4.125	0.0046	27.0	34.0
51000	51000-30-D6	3.0 x 5.625	0.0035	37.0	40.0
78000	78000-30-D9	3.0 x 8.625	0.0024	40.0	40.0

CAP. MFD.	Type† FAM	Uninsulated Case Size• (Inches) D x L	Impedance ± 50% 20 KHz (Ohms)	Maximum Ripple RMS Amps @ 85°C	
				120 Hz	20 KHz
40 VDC RATED — 50 VDC SURGE					
1800	1800-40-A1	1.375 x 2.125	0.0235	3.0	4.0
3000	3000-40-A2	1.375 x 3.125	0.0168	5.0	6.0
4400	4400-40-A3	1.375 x 4.125	0.0143	6.0	8.0
6500	6500-40-A6	1.375 x 5.625	0.0097	7.0	9.0
8400	8400-40-B2	2.0 x 3.125	0.0070	8.0	10.0
10000	10000-40-B3	2.0 x 4.125	0.0066	12.0	16.0
14000	14000-40-B6	2.0 x 5.625	0.0059	17.0	22.0
16000	16000-40-C3	2.5 x 4.125	0.0066	18.0	23.0
28000	28000-40-C6	2.5 x 5.625	0.0038	21.0	27.0
31000	31000-40-D3	3.0 x 4.125	0.0052	25.0	33.0
47000	47000-40-D6	3.0 x 5.625	0.0035	36.0	40.0
63000	63000-40-D9	3.0 x 8.625	0.0025	40.0	40.0
50 VDC RATED — 65 VDC SURGE					
1100	1100-50-A1	1.375 x 2.125	0.0281	3.0	4.0
2100	2100-50-A2	1.375 x 3.125	0.0202	4.0	5.0
3100	3100-50-A3	1.375 x 4.125	0.0170	5.0	7.0
4200	4200-50-A6	1.375 x 5.625	0.0124	6.0	8.0
4900	4900-50-B2	2.0 x 3.125	0.0100	6.0	8.0
6600	6600-50-B3	2.0 x 4.125	0.0091	10.0	13.0
9500	9500-50-B6	2.0 x 5.625	0.0071	14.0	18.0
14000	14000-50-C3	2.5 x 4.125	0.0069	17.0	23.0
17500	17500-50-C6	2.5 x 5.625	0.0054	18.0	24.0
18000	18000-50-D3	3.0 x 4.125	0.0076	20.0	27.0
31000	31000-50-D6	3.0 x 5.625	0.0044	30.0	40.0
47000	47000-50-D9	3.0 x 8.625	0.0029	40.0	40.0
60 VDC RATED — 75 VDC SURGE					
1000	1000-60-A1	1.375 x 2.125	0.0287	3.0	4.0
1750	1750-60-A2	1.375 x 3.125	0.0189	4.0	5.0
2600	2600-60-A3	1.375 x 4.125	0.0160	5.0	7.0
3300	3300-60-A6	1.375 x 5.625	0.0127	6.0	8.0
4700	4700-60-B2	2.0 x 3.125	0.0083	6.0	8.0
6200	6200-60-B3	2.0 x 4.125	0.0076	12.0	16.0
8200	8200-60-B6	2.0 x 5.625	0.0070	13.0	18.0
9700	9700-60-C3	2.5 x 4.125	0.0043	15.0	21.0
12500	12500-60-C6	2.5 x 5.625	0.0058	17.0	23.0
15500	15500-60-D3	3.0 x 4.125	0.0071	21.0	28.0
22000	22000-60-D6	3.0 x 5.625	0.0052	28.0	38.0
36000	36000-60-D9	3.0 x 8.625	0.0032	40.0	40.0
75 VDC RATED — 95 VDC SURGE					
800	800-75-A1	1.375 x 2.125	0.0264	3.0	4.0
1350	1350-75-A2	1.375 x 3.125	0.0172	4.0	6.0
2100	2100-75-A3	1.375 x 4.125	0.0139	5.0	7.0
3000	3000-75-A6	1.375 x 5.625	0.0096	6.0	8.0
3200	3200-75-B2	2.0 x 3.125	0.0092	6.0	8.0
5000	5000-75-B3	2.0 x 4.125	0.0083	10.0	14.0
7000	7000-75-B6	2.0 x 5.625	0.0060	13.0	19.0
8200	8200-75-C3	2.5 x 4.125	0.0070	15.0	21.0
11500	11500-75-C6	2.5 x 5.625	0.0051	16.0	23.0
13500	13500-75-D3	3.0 x 5.625	0.0048	36.0	29.0
19000	19000-75-D6	3.0 x 5.625	0.0048	36.0	40.0
31000	31000-75-D9	3.0 x 8.625	0.0029	40.0	40.0
100 VDC RATED — 125 VDC SURGE					
600	600-100-A1	1.375 x 2.125	0.0180	3.0	4.0
875	875-100-A2	1.375 x 3.125	0.0128	4.0	6.0
1300	1300-100-A3	1.375 x 4.125	0.0104	5.0	7.0
1600	1600-100-A6	1.375 x 5.625	0.0090	5.0	7.0
1950	1950-100-B2	2.0 x 3.125	0.0083	6.0	9.0
3200	3200-100-B3	2.0 x 4.125	0.0069	9.0	12.0
4300	4300-100-B6	2.0 x 5.625	0.0053	12.0	17.0
5000	5000-100-C3	2.5 x 4.125	0.0070	13.0	18.0
7000	7000-100-C6	2.5 x 5.625	0.0050	14.0	20.0
7500	7500-100-D3	3.0 x 4.125	0.0073	19.0	26.0
11000	11000-100-D6	3.0 x 5.625	0.0053	30.0	40.0
18000	18000-100-D9	3.0 x 8.625	0.0032	38.0	40.0

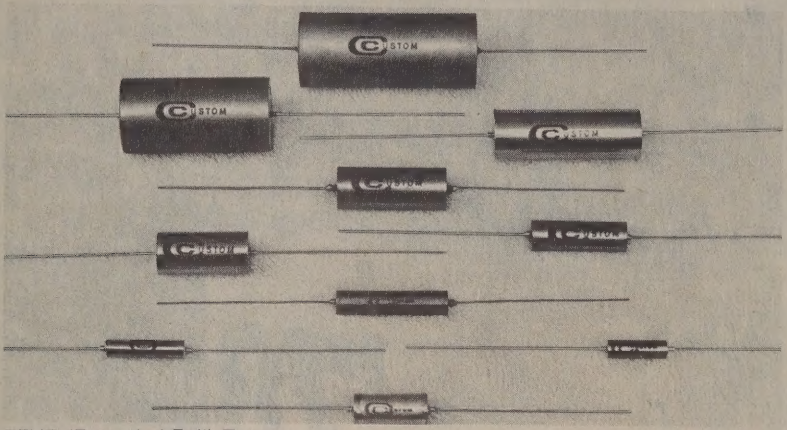
†Order by complete type number; e.g. FAM 2100-30-A1, which indicates Type—Capacitance—Working Voltage—Case Code.

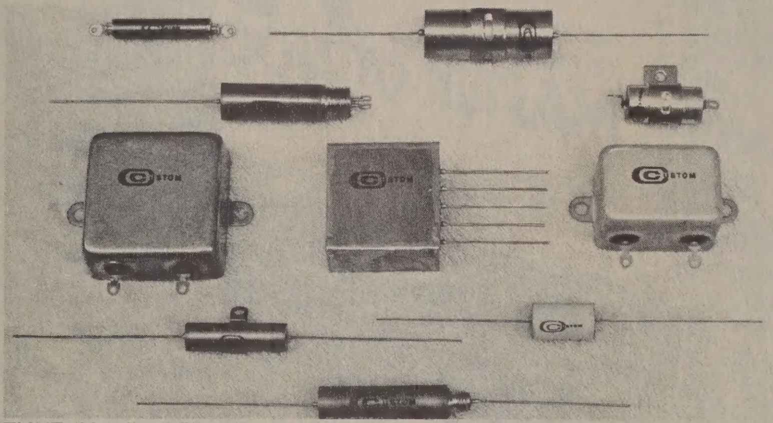
•Dimensions are uninsulated. Standard unit is supplied with plastic insulating sleeve. Add .031" ±.031" to diameter and .031" ±.062" to length for insulated dimensions.

CAPACITANCE TOLERANCE: −10% +100%

CUSTOM Balco

for DEPENDABLE FILM CAPACITORS


TFHT (Extended Foil) Type


TMHT (Metalized Film) Type

Electrical Ratings

Capacitance Range: 0.0001μf to 4.0μf
Capacitance Tolerance: ±0.25 to ±20%
Voltage Range: 50 WVDC to 600 WVDC
Temperature Coefficent: -90 ±40ppm/°C — Metalized Film
-100 ±100ppm/°C — Extended Foil
Dissipation Factor: 0.10% max.@25°C — Metalized Film
0.02% max.@25°C — Extended Foil

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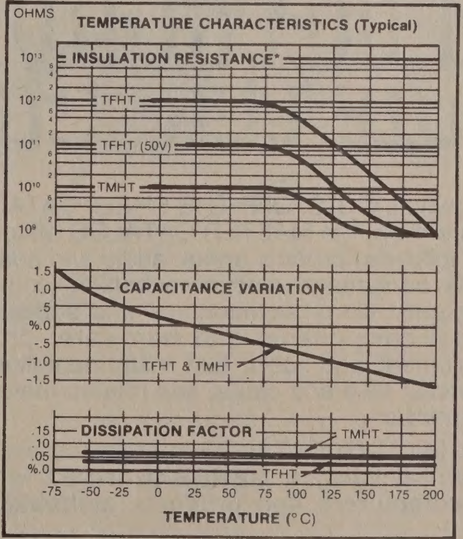

*(Approx. Min. values shown, in ohms to 1.0 MFD: ohms, MFD above 1.0 MFD)

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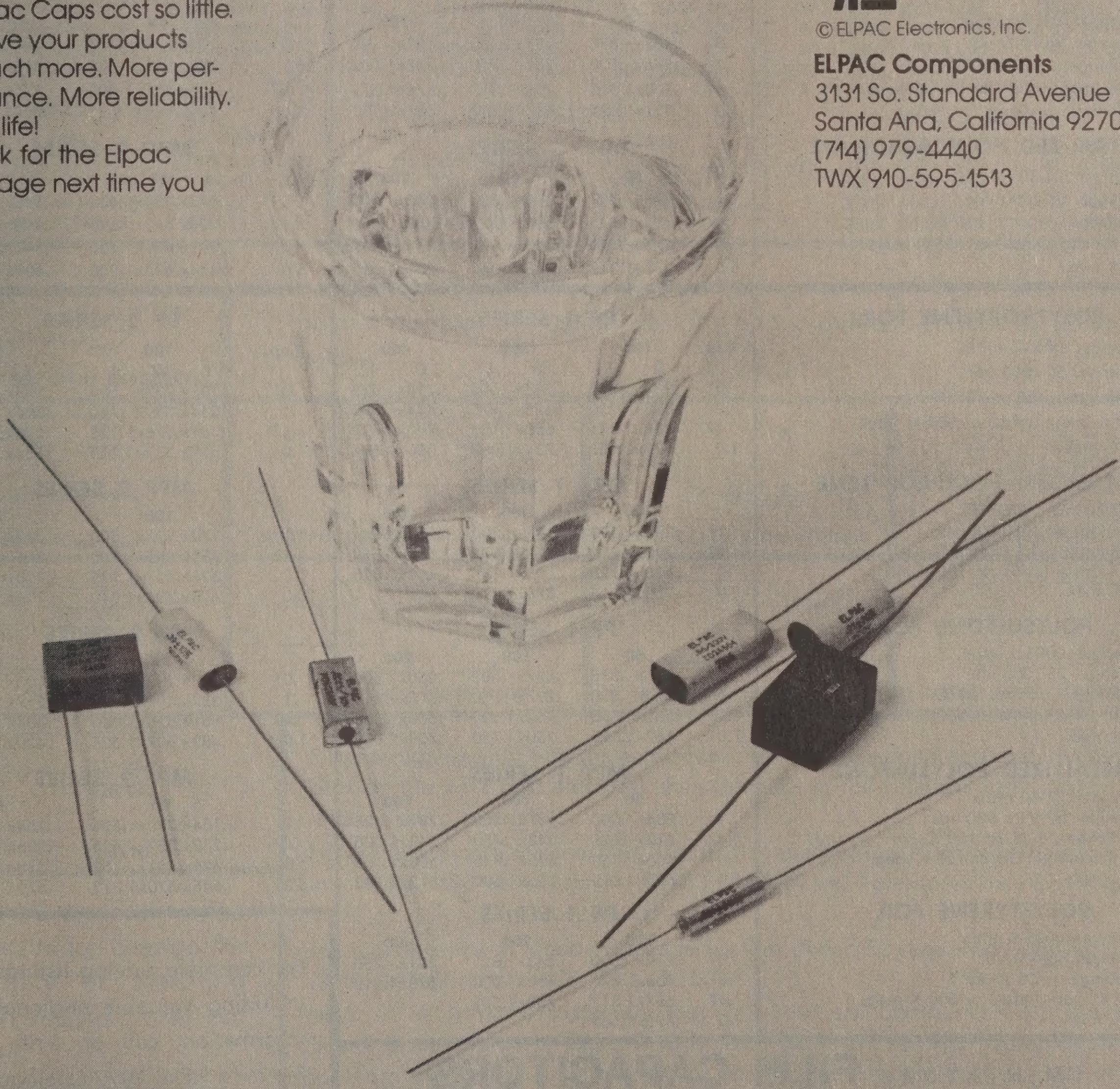

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Listed is a sampling from F-Dyne's large assortment of film dielectric capacitors.

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Cap. Range: .0003-10 mfds
Volt. Range: 50-2000 vdc
Temp. Range: −55 to 125°C
IR: 50 K (meg) (mfds) or 100 K megs
DF: .75% max.

METALLIZED POLYESTER

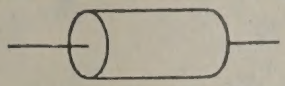
Cap. Range: .01-50 mfds
Volt. Range: 50 vdc-10 kvdc
Temp. Range: −55 to 125°C
IR: 25 k (meg) (mfds) or 50 K megs
DF: 1% max.

POLYCARBONATE FOIL

Cap. Range: .0003-5 mfds
Volt. Range: 25-1000 vdc
Temp. Range: −55 to 125°C
IR: 75 K (meg) (mfds) or 500 K megs
DF: .3% max.

METALLIZED POLYCARBONATE

Cap. Range: .01-50 mfds
Volt. Range: 50-1000 vdc
Temp. Range: −55 to 125°C
IR: 30 K (meg) (mfds) or 150 K megs
DF: .3% max.



WRAP AND FILL — ROUND

PE 1 SERIES

Cap.	80	100	200
	D L	D L	D L
.01	.156x .375	.187x .375	.187x .500
.1	.281x .500	.281x .500	.281x .750
.47	.312x1.187	.375x1.125	.484x1.312
1.0	.468x1.187	.562x1.187	.562x1.687

MPE 1 SERIES

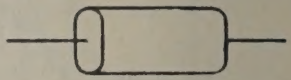
	50	150	200·
.1	.218x .437	.218x .500	.265x .500
.47	.250x .625	.375x .625	.343x .875
1.0	.312x .625	.421x .875	.421x1.187
5.0	.531x1.000	.687x1.562	.750x1.562

PC 1 SERIES

	50	100	200
.01	.187x .375	.187x .500	.187x .500
.1	.296x .500	.281x .750	.343x1.062
.47	.500x1.000	.484x1.312	.578x1.312
1.0	.531x1.625	.687x1.750	.687x2.000

MPC 1 SERIES

	80	150	200
.1	.218x .437	.218x .500	.265x .500
.47	.312x .625	.390x .625	.359x .875
1.0	.375x .750	.437x .875	.437x1.187
5.0	.578x1.312	.718x1.562	.781x1.562



WRAP AND FILL — FLAT

PE 2 SERIES

Cap.	100	200
	T W L	T W L
.001	.109x.218x .375	.125x.218x .375
.022	.109x.218x .375	.140x.250x .500
.1	.171x.281x .500	.203x.328x .500
.15	.203x.312x .500	.250x.375x .750

MPE 2 SERIES

	80	150
.1	.140x.234x .500	.140x.250x .500
.47	.234x.343x .625	.281x.421x .625
1.0	.281x.421x .750	.328x.468x .875
5.0	.484x.625x1.312	.578x.718x1.562

PC 2 SERIES

	50	100
.01	.109x.218x .375	.125x.218x .500
.1	.171x.281x .625	.218x.312x .750
.47	.406x.531x1.000	.375x.531x1.250
1.0	.435x.560x1.625	.594x.734x1.750

MPC 2 SERIES

	80	150
1.	.140x.234x .437	.140x.250x .500
.47	.234x.343x .625	.296x.437x .625
1.0	.281x.421x .750	.343x.484x .875
5.0	.484x.625x1.250	.609x.750x1.500

POLYPROPYLENE FOIL

Cap. Range: .0003-5 mfds
Volt. Range: 50-1000 vdc
Temp. Range: −55 to 105°C
IR: 100 K (meg) (mfds) or 500 K megs
DF: .1% max.

METALLIZED POLYPROPYLENE

Cap. Range: .01-50 mfds
Volt. Range: 50 V-10,000 vdc
Temp. Range: −55 to 105°C
IR: 50 K (meg) (mfds) or 100 K megs
DF: .2% max.

POLYSULFONE FOIL

Cap. Range: .0003-5 mfds
Volt. Range: 25-1000 vdc
Temp. Range: −55 to 150°C
IR: 75 K (meg) (mfds) or 500 K megs
DF: .3% max.

METALLIZED POLYSULFONE

Cap. Range: .01-50 mfds
Volt. Range: 50 V to 600 vdc
Temp. Range: −55 to 150°C
IR: 30 K (meg) (mfds) or 150 K megs
DF: .3% max.

POLYSTYRENE FOIL

Cap. Range: .0005-5 mfds
Volt. Range: 50-600 vdc
Temp. Range: −55 to 85°C
IR: 100 K (meg) (mfds) or 500 K megs
DF: .1% max.

PP 1 SERIES

Cap.	100	200	400
	D L	D L	D L
.01	.234x .375	.203x .500	.218x .625
.1	.328x .750	.375x .875	.484x .875
.47	.468x1.125	.656x1.125	.750x1.437
1.0	.671x1.125	.734x1.687	1.000x1.687

MPP 1 SERIES

	100	200	400
.1	.250x .500	.312x .500	.375x1.061
.47	.390x .750	.421x .875	.562x1.562
1.0	.406x1.125	.500x1.187	.750x1.875
5.0	.750x1.813	.875x1.875	

PF 1 SERIES

	50	100	200
.01	.187x .375	.187x .500	.250x .500
.1	.265x .500	.297x .750	.375x .812
.47	.531x1.000	.484x1.250	.500x1.562
1.0	.562x1.625	.750x1.750	.750x2.000

MPF 1 SERIES

	50	100	200
.1	.234x .500	.187x .500	.281x .625
.47	.312x .625	.343x .750	.343x1.000
1.0	.406x .750	.375x .875	.500x1.106
5.0	.625x1.312	.625x1.500	.812x1.562

PS 1 SERIES

	100	200	400
.01	.219x .500	.243x .625	.281x .750
.1	.406x .875	.468x1.000	.578x1.312
.47	.687x1.312	.750x1.562	
1.0	.875x1.562		

PP 2 SERIES

Cap.	100	200
	T W L	T W L
.01	.107x.232x .500	.123x.248x .500
.1	.264x.389x .750	.295x.420x .875
.47	.451x.576x1.125	.576x.701x1.125
1.0	.607x.732x1.125	.654x.779x1.687

MPP 2 SERIES

	100	200
.1	.170x.295x .500	.232x.357x .500
.47	.310x.435x .750	.341x.466x .875
1.0	.326x.451x1.125	.420x.545x1.875
5.0	.670x.795x1.810	.795x.920x1.875

PF 2 SERIES

	50	100
.01	.107x.232x .375	.107x.232x .500
.1	.232x.357x .500	.217x.342x .750
.47	.451x.576x1.000	.404x.529x1.250
1.0	.482x.607x1.625	.670x.795x1.750

MPF 2 SERIES

	80	150
.1	.154x.279x .500	.154x.279x .500
.47	.232x.357x .625	.326x.451x .625
1.0	.326x.451x .750	.388x.513x .875
5.0	.545x.670x1.312	.670x.795x1.562

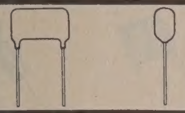
For complete catalog listings — including valuable engineering information, call or write for F-Dyne's NEW 1977 catalogue.

MINIATURE **FILM CAPACITORS**
F-DYNE ELECTRONICS CO. • BRIDGEPORT, CONN. 06605

MINIATURE FILM DIELECTRIC CAPACITORS

F-DYNE ELECTRONICS CO.

(203) 367-6431 or TWX 710-453-0087. **449 HOWARD AVE., BRIDGEPORT, CONN. 06605**



DIP COATED — RADIAL

PED 2 SERIES

Cap.	T H L	T H L
	100	200
.01	.250x.350x .700	.250x.580x .800
.1	.400x.550x .700	.370x.710x .800
.47	.600x.860x .800	.500x.830x1.250
1.0	.720x.980x1.250	

MPED 2 SERIES

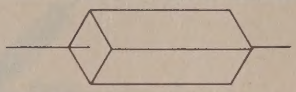
	100	250
.1	.157x.354x .492	.236x.433x .492
.47	.256x.453x .689	.295x.492x .886
1.0	.276x.472x .886	.374x.571x1.180
5.0	.500x.812x1.180	

PCD 2 SERIES

	100	200
.01	.171x.296x .375	.171x.296x .500
.1	.296x.406x .750	.328x.468x1.062
.22	.343x.484x1.062	.390x.578x1.312
.47	.468x.609x1.312	.562x.703x1.312

MPCD 2 SERIES

	400	600
.01	.157x.354x .492	.157x.354x .492
.1	.276x.472x .689	.295x.492x .886
.22	.295x.492x .886	.374x.571x1.18
.47	.374x.571x1.18	.472x.787x1.18



MOLDED — RECTANGULAR

PE 4 SERIES

Cap.	100	200
	T W L	T W L
.01	.160x.240x .420	.170x.290x .500
.1	.280x.420x .650	.290x.420x .820
.47	.390x.540x .950	.560x.720x1.250
1.0	.560x.720x1.250	.560x.720x1.950

MPE 4 SERIES

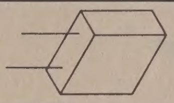
	100	200
.1	.170x.290x .570	.290x.420x .570
.47	.290x.420x .670	.390x.540x .820
1.0	.390x.540x .825	.390x.540x1.190
2.0	.390x.540x1.040	.560x.720x1.750

PC 4 SERIES

	50	100
.01	.160x.240x .420	.170x.290x .550
.1	.185x.465x .680	.290x.420x .820
.47	.390x.540x1.040	.390x.540x1.250
1.0	.560x.720x1.500	.560x.720x1.950

MPC 4 SERIES

	100	200
01	.160x.240x .420	.160x.240x .550
.1	.290x.420x .570	.290x.420x .820
.47	.390x.540x1.040	.560x.720x1.240
1.0	.390x.540x1.240	.560x.720x1.750



MOLDED — RECTANGULAR —

PE 5 SERIES

Cap.	100	200
	T H L	T H L
.01	.095x .265x .375	.125x .275x .375
.1	.165x .525x .585	.195x .585x .885
.47	.250x .825x .985	.295x1.100x1.250
1.0	.295x1.000x1.500	.295x1.000x1.750

MPE 5 SERIES

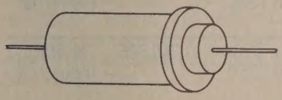
	100	200
.01	.100x .330x .330	.100x .330x .330
.1	.150x .500x .500	.150x .500x .500
.47	.250x .500x .675	.250x .500x .875
1.0	.250x .500x .875	.312x .750x1.000

PC 5 SERIES

	50	100
.01	.095x .325x .375	.180x .330x .550
.1	.150x .500x .600	.250x .500x .675
.47	.500x .750x1.000	.750x .750x1.250
1.0	.750x .750x1.250	.570x .740x1.750

MPC 5 SERIES

	100	200
.01	.100x .330x .330	.100x .395x .395
.1	.150x .500x .500	.150x .500x .600
.47	.250x .500x .675	.250x .750x1.000
1.0	.250x .500x1.000	.750x .750x1.250



FEED THRU ASSEMBLY

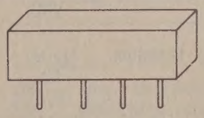
In addition to the above standard line capacitors, F-Dyne also manufactures a number of custom designs and provides services as illustrated below.

NEW Product

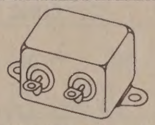
Dip Coated

R/C Networks

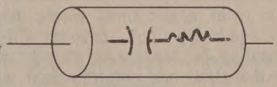
(For arc Suppression)



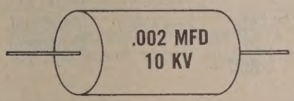
MULTIPLE CAPACITOR ASSEMBLIES



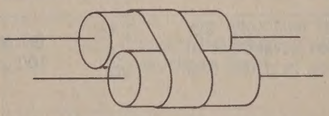
METAL CASED RECTANGULAR



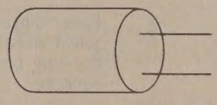
R/C NETWORKS



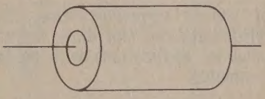
HIGH VOLTAGE



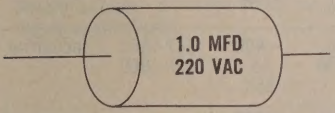
MATCHED CAPACITORS



PC TYPE — TUBULAR



METAL CASED TUBULAR



AC DESIGNS

"0" TC and controlled capacitance change for stability or matching with resistors and pot cores.

TEMPERATURE COMPENSATING

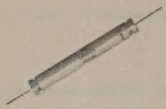
F-Dyne high quality film dielectric capacitors are designed and manufactured to provide the very best electrical characteristics in the smallest size constant with reliable performance.

F-Dyne precision film capacitors are readily available in 10 pf capacitance increments, i.e., 430 pf, 440 pf or .18763, .18764, etc. Tolerances may be as low as .25% or .1% with matched pairs.

For fast delivery of standard or special film dielectric capacitors, call F-Dyne — (203) 367-6431 or TWX 710-453-0087

NEW — West Coast customers may call Southern Electronics Co., 726 South Flower Street, Burbank, Calif. 91502, (213) 845-2458 for information or service. Southern Electronics is wholly owned by F-Dyne Electronics (see Page 1301).

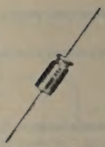
CAPACITORS



29F

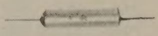
29F
(Rectangular)

16K



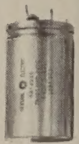
69F, 69F2000
69F3000, 69F4000

69F
(Rectangular)



62F, 69F900

TA



86F, 88F, 92F

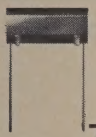
84F

Application	Catalog Type	Description	Voltage Range	UF Range	Temperature Range	Bulletin Reference	Market Usage
For polar and nonpolar coupling, filtering, decoupling, bypass, energy storage and timing in military and high-performance industrial amplifiers, transmitters, receivers, servo systems, and navigation systems.	29F	Standard and high-voltage tantalum foil: MIL-C-3965: CL20, CL21, CL22, CL23, CL24, CL25, CL26, CL27, CL30, CL31, CL32, CL33, CL34, CL35, CL36, CL37, CL51, CL52, CL53, CL54, CL70, CL71, CL72, CL73. Tubular and rectangular	Up to 450 VDC	0.15 to 3500 µf	−55C to 85C or 125C	GEP-1812	Military, Industrial
High-reliability type for military or aerospace use where hermetic seal and extreme reliability are prime factors.	16K	Hermetic seal tantalum foil; MIL-C-39006: CLR25, CLR27, CLR35, CLR37.	Up to 200 VDC	0.15 to 580 µf	−55C to 125C	GEP-1858	Military
For polar applications where no reverse voltage is expected—coupling, decoupling, filtering, bypass, energy storage and timing in military and high-performance industrial amplifiers, transmitters, receivers, servo systems, and navigation systems.	69F	Tantalum porous anode; MIL-C-3965: CL64, CL65, CL55 Tubular and rectangular	Up to 125 VDC	1.7 to 2400 µf	−55C to 125C	GEP-1814	Military, Industrial
	69F2000	Extended capacitance tantalum porous anode. Tubular only.	Up to 125 VDC	22 to 1800 µf	−55C to 125C	GEP-1842	Military Industrial
For polar applications where no reverse voltage is expected—coupling, decoupling, filtering, bypass, energy storage and timing in military and high-performance industrial equipment for severe environmental conditions requiring hermetic seal.	69F3000	Glass-to-metal hermetic seal tantalum porous anode; MIL-C-3965: CL66, CL67.	Up to 125 VDC	1.7 to 560 µf	−55C to 125C	GEP-1846	Military Industrial
	69F4000	Glass-to-tantalum hermetic seal tantalum porous anode; MIL-C-39006: CLR65.	Up to 125 VDC	1.7 to 560 µf	−55C to 125C	GEP-1857	Military
For polar applications where no reverse voltage is expected—coupling, filtering, decoupling, bypass, energy storage and timing in industrial and entertainment amplifiers, transmitters, receivers, servo systems, and navigation systems, within temperature capabilities.	62F	Porous anode subminiature tantalum.	Up to 60 VDC	0.1 to 325 µf	−55C to 85C	GEC-1840	Industrial
	69F900	Subminiature tantalum porous anode	Up to 60 VDC	3.3 to 450 µf	−55C to 85C	GEP-1841	Industrial
For use in communications, computers, instrumentation, and other industrial and consumer applications with moderate environments.	TA	Epoxy dipped, radial lead solid tantalum which provides advantages of dry slug construction in a low cost package.	3 to 50 VDC	0.1 to 100 µf	−55C to +85C	GEP-1862	Industrial, Consumer
For bulk filtering and energy storage in military and high-performance or standard industrial power supplies, including computer usage and welding equipment.	86F	High performance, high volumetric efficiency	Up to 450 VDC	75 to 790,000 µf	−40C to 85C	GEC-1813	Industrial
	88F 92F	Long life, high ripple current	Up to 150 VDC	170 to 590,000 µf	−40C to 85C	GEP-1861 GEP-1860	Industrial
For filtering, bypass, decoupling, and coupling in entertainment-type radio, TV, high-fidelity systems, and in industrial instruments and test equipment.	84F	Tubular aluminum electrolytic	Up to 450 VDC	2 to 18,000 µf	−40C to 85C	GEP-1859	Industrial, Entertainment

For complete information contact your nearby GE Sales Office or write to
General Electric Co., Section 998-34. Dept. EM, Schenectady, N.Y. 12345.

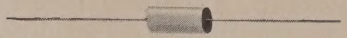
GENERAL ELECTRIC

CAPACITORS

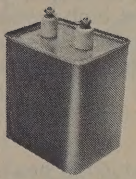

75F

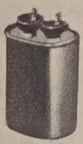
65F

61F, 63F, 74F51, AE


BA, 74F01

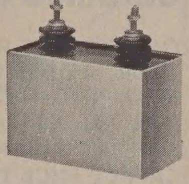
26F


26F


26F

21L

30F


30F

Application	Catalog Type	Description	Voltage Range	UF Range	Temperature Range	Bulletin Reference	Market Usage
For circuits in test, measurement, control, and communications equipment of all types, where high-quality film-foil units are an economic choice.	75F	Polyester film-foil. Epoxy-encapsulated. Welded radial leads. Units have mounting feet and precise dimensions, for high-density packaging.	50 to 600V	.0010 to 1 µf	−55C to 125C	GEP-1816	Industrial
For low-voltage printed-circuit board applications where board space is at a premium.	65F	Polyester film and aluminum foil roll, compressed and packaged in a rectgular epoxy case with radial leads.	50V only	.0010 to 1.5 µf	−55C to 85C	GEC-1834	Industrial
For use where size, weight, cost, and reliability give advantage over metal-clad tubulars, molded, or ceramic case units.	61F 63F AE	Polyester film-foil roll, wrap and -pot, with axial leads. 63F meets performance requirements of MIL-C-27287.	Up to 300V	.0010 to 1 µf	−55C to 125C	GEC-1833 GEP-1853 GEC-1819	Industrial, Military
	74F51	Same as 61F except with polycarbonate film dielectric	100 or 200V	.0010 to 1 µf	−55C to 125C	GEP-1854	Industrial
For manufacturing and test equipment, electronic timers and control, communications equipment, and other forms of industrial electronic equipment where small size is required.	BA	Metallized polyester film roll, wrap-and-pot, with axial leads.	100 or 200V	0.1 to 10 µf	−55C to 125C	GEC-1815	Industrial
	74F01	Same as BA except with metallized polycarbonate film.	100 or 200V	0.1 to 10 µf	−55C to 125C	GEP-1855	Industrial
General-purpose d-c capacitors for filtering, blocking, bypass, and arc-suppression in power supplies, control circuits, and other d-c circuit functions.	26F	Non-PCB impregnated capacitors in oval aluminum cases.	400 to 2,500 VDC	0.1 to 35 µf	−55C to 85C	CPD-104	Industrial
Specially designed for such SCR applications as phase control, frequency multipliers and changers, power supply filters, time ratio controls, inverters, and rectifier spike suppression.	26F 97F	Film, film/paper and metallized film dielectrics impregnated with non-PCB liquid. Designed for high current applications.	250 to 1500 VDC	0.25 to 150 µf	−55C to 75C	CPD-105 CPD-106 CPD-109	Industrial
General-purpose a-c capacitors for motor run and power supply applications.	21L	Paper/Dielektrol[T] capacitors in oval aluminum cases.	330 to 440 VAC	0.5 to 55 µf	−55C to 70C	CPD-102	Industrial
General-purpose a-c capacitors for power supply applications.	26F	Film/paper capacitors in oval aluminum cases.	660 VAC	0.5 to 30 µf	−55C to 70C	CPD-103	Industrial
For high-voltage d-c rectifier power supply filters, and high-voltage blocking and bypass in communications, radar and other high-voltage circuits.	30F	Paper/Film oil impregnated in all-welded steel rectangular case of leak-proof construction.	5000 to 20,000 VDC	0.67 to 150 µf	−40C to 105C	GEP-1752	Industrial
For light-duty energy storage-discharge duty, such as photoflash applications.	30F	Paper/Oil in fabricated steel cases.	1000 to 10,000 VDC	12.5 to 640 µf	0 to 40C	GEP-1751	Industrial

[T] Trademark of the General Electric Company.

For complete information contact your nearby GE Sales Office or write to
General Electric Co., Section 998-34. Dept. EM, Schenectady, N.Y. 12345.

GENERAL ELECTRIC

HIGH ENERGY CORP

DEPT. EM, LOWER VALLEY ROAD
PARKESBURG, PENNSYLVANIA 19365
PHONE: 215-593-2424
TWX 510-663-0322

CERAMIC CAPACITORS

CAPACITANCE RANGE: 3pf to .001mf. Tested at 0.5 to 5.0 volts RMS, 1 MHz (NPO, N750, N3300 units), 1 kHz (EIA code X5T, X5U units), +25°C and 70% maximum relative humidity.

CAPACITANCE TOLERANCE: ±10% or ±20% as listed.

WORKING VOLTAGE: 5000, 7500, 15000 or 20000 volts DC as listed.

DIELECTRIC STRENGTH: 150% of rated Working Voltage.

INSULATION RESISTANCE: Initial, 10,000 megohms minimum. After humidity test, 1000 megohms minimum. Tested at 1000 volts DC maximum.

TEMPERATURE CHARACTERISTIC: NPO, N750, N3300, X5T or X5U as listed.

OPERATING TEMPERATURE RANGE: −55°C to +85°C.

HUMIDITY PROTECTION: Silicone coated.

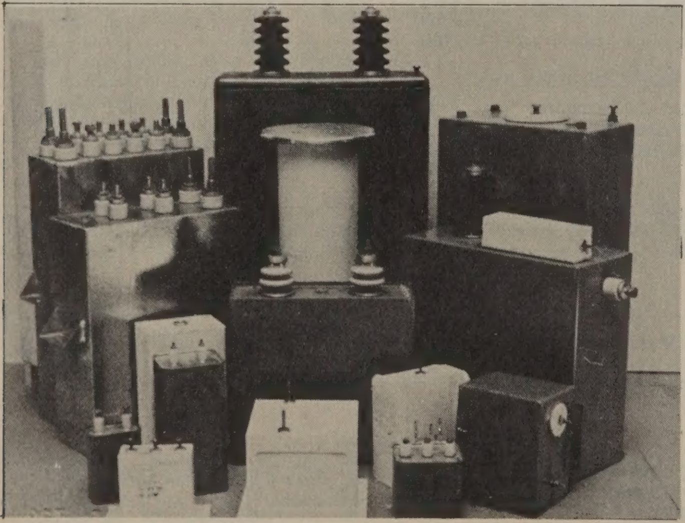
LEADS: Tinned wire.

TERMINALS: Silver plated.

MARKING: Trademark, catalog number, capacitance, tolerance, voltage and temperature coefficient or EIA temperature characteristic code.

High Energy RF rated, ceramic transmitting capacitors are designed primarily for use in applications where very high R.F. currents, high KVA ratings and high working voltages exist. Special capacitor design reduces terminal self-inductance to permit higher frequency operation. A humidity resistant silicone coating and long flashover path assures safe, high voltage operation in free air. Units also feature stable temperature-capacitance characteristics and rugged mechanical construction for maximum reliability.

These capacitors are extensively used in transmitters, antennas, induction heaters, X-ray, diathermy and electronic welding equipment.



OIL FILLED CAPACITORS

High Energy encases the oil filled capacitors in heavy gauge steel which is heliarc welded to insure maximum strength. In addition, High Energy also uses a unique virtually indestructable high impact thermoplastic housing eliminating the need for insulators and allowing for considerable versatility in mounting. The plastic is inert gas welded designed to operate in high voltage dielectric gases including SF^6. The terminals are flush mounted female threaded inserts. High Energy also designs and manufactures many custom oil filled configurations. Consult the factory for information.

DC Capacitors • AC Capacitors • Pulse Capacitors • Laser Discharge Capacitors • Corona-free Capacitors • Magnum Capacitors • Energy Discharge Capacitors • High Power Capacitors • Plastic Capacitors • Water-Cooled Capacitors • Low Loss Capacitors • High Frequency Capacitors • Corona Rings • High Voltage Power Supplies • Multi-Section Capacitors • High Energy Density Capacitors • Marx Generator Capacitors • Xenon Lamp Discharge Capacitors • Photo Copy Capacitors • Filter Capacitors • Tuning Capacitors • High Voltage Dividers • Capacitor Systems • Ultrasonic Generator Capacitors • Pulse Forming Networks • Special High Voltage Bushings • X-ray Capacitors • Commutation Capacitors • Capacitors for Line Modulators • Special Capacitor Applications • Water-Cooled Ceramic Capacitors • Air-Cooled Ceramic Capacitors • By Pass Ceramics • Power Disc Capacitors • Slug Capacitors • Grid By Pass Ceramics • RF Transmitting Capacitors.

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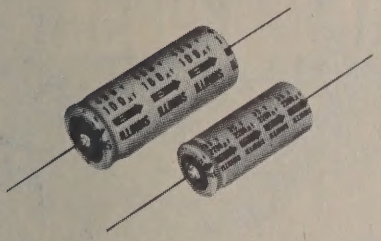
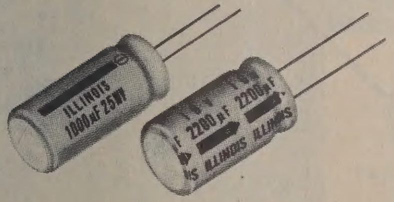
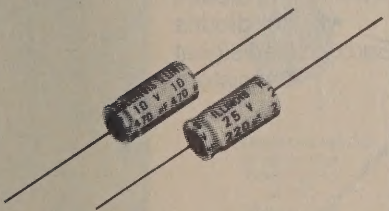


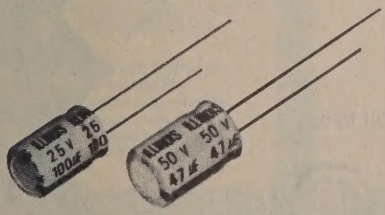
TYPE TTA COMMERCIAL/INDUSTRIAL ELECTROLYTIC CAPACITORS
0.47 MFD TO 22,000 MFD
6.3 WVDC TO 500 WVDC
-40°C +85°C MINIMUM
2000 HOUR OPERATION



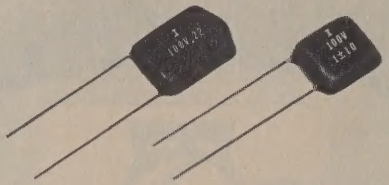
TYPE RAR COMMERCIAL/INDUSTRIAL ELECTROLYTIC CAPACITORS
0.47 MFD TO 10,000 MFD
6.3 WVDC TO 450 WVDC
-40°C +85°C MINIMUM
2000 HOUR OPERATION



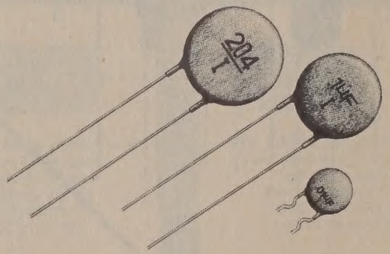
TYPE EXA CONSUMER/COMMERCIAL ELECTROLYTIC CAPACITORS
0.47 MFD TO 500 MFD
6.3 WVDC TO 50 WVDC
-40°C +85°C MINIMUM
1000 HOUR OPERATION



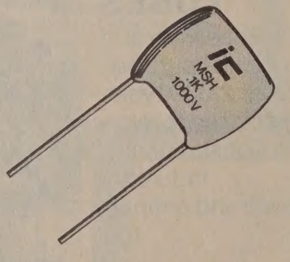
TYPE PCR CONSUMER/COMMERCIAL ELECTROLYTIC CAPACITORS
0.47 MFD TO 250 MFD
6.3 WVDC TO 50 WVDC
-40°C +85°C MINIMUM
1000 HOUR OPERATION



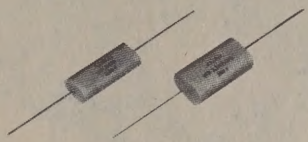
TYPE UMR POLYESTER FILM CAPACITORS
INDUCTIVE WINDING
.001 MFD TO .47 MFD
100 WVDC OPERATION
±10% AND ±5% CAPACITY TOLERANCES



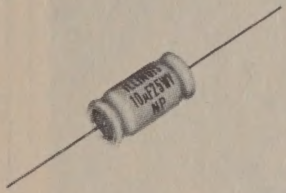
CERAMIC CAPACITORS
TYPE BCR TEMPERATURE STABLE
TYPE GCR AND TYPE GQR
GENERAL PURPOSE



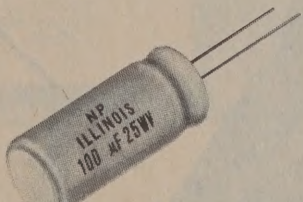
TYPE MSR METALLIZED MYLAR CAPACITORS
NON-INDUCTIVE WINDING
250 WVDC TO 1000 WVDC
.01 MFD TO 2.2 MFD
±10% AND ±5% CAPACITY TOLERANCE



TYPE MWF-MWR METALLIZED MYLAR CAPACITORS
WRAP AND FILLED CONSTRUCTION
NON-INDUCTIVE WINDING
250 WVDC TO 1600 WVDC
.01 MFD TO 10 MFD
±10% AND ±5% CAPACITY TOLERANCE



TYPE BPA NON-POLARIZED ELECTROLYTIC CAPACITORS
0.47 MFD TO 1000 MFD
16 WVDC TO 50 WVDC
-25°C +85°C MINIMUM
1000 HOUR OPERATION



TYPE BPR NON-POLARIZED ELECTROLYTIC CAPACITORS
0.47 MFD TO 470 MFD
16 WVDC TO 50 WVDC
-25°C +85°C MINIMUM
1000 HOUR OPERATION

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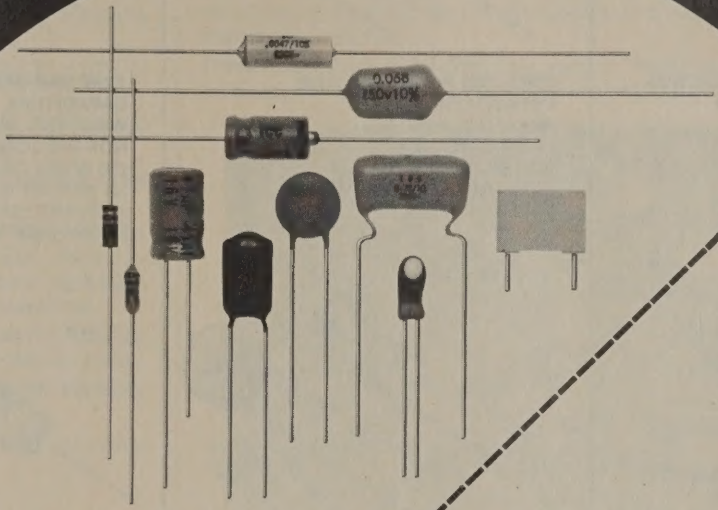

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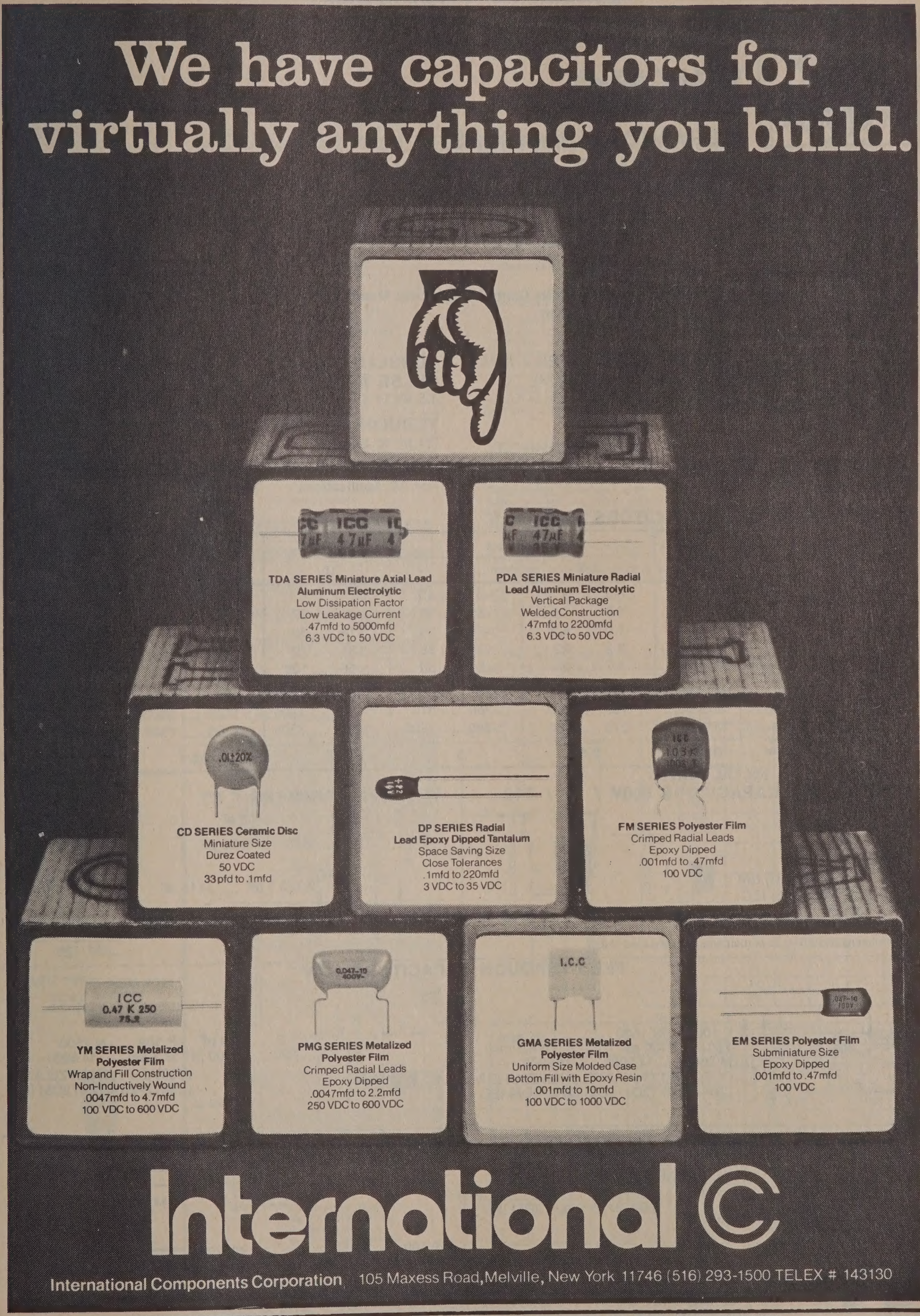

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Low Dissipation Factor
Low Leakage Current
.47mfd to 5000mfd
6.3 VDC to 50 VDC

PDA SERIES Miniature Radial Lead Aluminum Electrolytic
Vertical Package
Welded Construction
.47mfd to 2200mfd
6.3 VDC to 50 VDC

CD SERIES Ceramic Disc
Miniature Size
Durez Coated
50 VDC
33pfd to .1mfd

DP SERIES Radial Lead Epoxy Dipped Tantalum
Space Saving Size
Close Tolerances
.1mfd to 220mfd
3 VDC to 35 VDC

FM SERIES Polyester Film
Crimped Radial Leads
Epoxy Dipped
.001mfd to .47mfd
100 VDC

YM SERIES Metalized Polyester Film
Wrap and Fill Construction
Non-Inductively Wound
.0047mfd to 4.7mfd
100 VDC to 600 VDC

PMG SERIES Metalized Polyester Film
Crimped Radial Leads
Epoxy Dipped
.0047mfd to 2.2mfd
250 VDC to 600 VDC

GMA SERIES Metalized Polyester Film
Uniform Size Molded Case
Bottom Fill with Epoxy Resin
.001mfd to 10mfd
100 VDC to 1000 VDC

EM SERIES Polyester Film
Subminiature Size
Epoxy Dipped
.001mfd to .47mfd
100 VDC

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- Ceramic Caps. Discs, Feed Thru
- Ferrites
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DISC — WAFER — TRAPEZOIDAL — TUBULAR — FEED-THROUGH

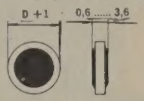
△ **Exceptionally High Quality Control on Ceramic Materials**
△ **Complete (100%) Testing**
△ **Longer Shelf Life**

DISC CAPACITORS HIGH VOLTAGE TYPES / KV1

From 1 kV to 8 kV — EIA Types (Y5P/25P) (Y5U/25U)

BUTTON DISC CAPACITORS 500V / K2P

EIA Types (Y5P/Z5P) (Y5U/Z5U)



WAFER CAPACITORS 50V / P1

Range 4700 to 4700 pF

TUBULAR CAPACITORS, HIGH VOLTAGE PULSE TYPE / CIM

1.5 kV to 4 kV

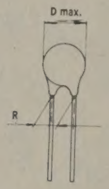
TUBULAR CAPACITORS 500V / C1

0,1 pF to 30,000 pF

SAFETY TYPE DISC CAPACITORS / KZ

For AC Applications

SUBMINIATURE DISC CAPACITORS 500V / K1



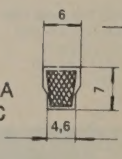
Tolerances Available: ±1% to −20 and +80%

△ Engineering Note: Type No.'s (I.E. D10) also specifies nominal diameter of the part.

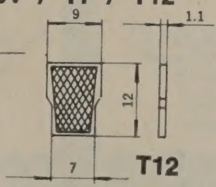
	C (pF)				
D (mm)	5,5	7	10	14	18
P 100 NP 0 N 150 N 750 N 1500	0,5 ...... 3 1,0 ...... 7,5 1,0 ...... 8,2 2,2 ...... 22 4,7 24	>3 ...... 4,7 >55 ...... 15 >75 ...... 16 >22 ...... 33 >24 56	>4,7 ...... 9,1 >15 ...... 27 >16 ...... 33 >33 ...... 62 >56 100	>9,1 ...... 18 >27 ...... 51 >33 ...... 62 >62 ...... 120 >100 220	>120 ...... 160 >220 300
M 2000 M 3000 M 6000	47 ...... 330 150 ...... 360 270 680	>330 ...... 510 >360 ...... 510 >680 1200	>510 ...... 1200 >820 ...... 1800 >1200 3300	>1200 ...... 2200 >1800 ...... 3600 >3300 7500	>7500 10000
R (mm)	2,5	5	5	7,5	7,5

NICKEL PLATED TRAPEZOIDAL CAPACITORS 500V / T7 / T12

1 ...... 56 pF
P 100 ...... N 1500
150 ...... 3600 pF
M 2000 ...... M 6000
(Y5P/Z5P) (Y5U/Z5U) EIA
(2B4/2A5) (2E4/2D5) IEC
4,7 ...... 91 pF
330 ...... 560 pF



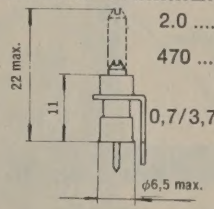
T7



T12

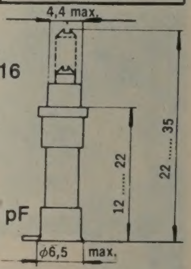
△ All dimensions given in millimeters — tolerances ±0.5.

TUBULAR TRIMMERS / CT



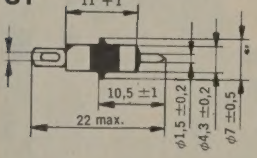
2.0 ...... 62 pF
470 ...... 1200 pF
0,7/3,7 pF ...... 4/13 pF

8 16
0,4/2 pF ...... 1/9 pF



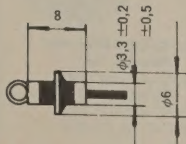
FEED-THROUGH CAPACITORS 500V

S1



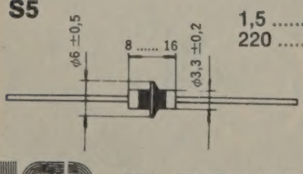
1 ...... 68 pF
P 100 ...... N 1500
180 ...... 2400 pF
M 2000 ...... M 3000 ...... M 6000
(Y5P/Z5P) (Y5T/Z5T) (Y5U/Z5U) EIA
(2B4/2A5) (2D4/2C5) (2E4/2D5) IEC

S2



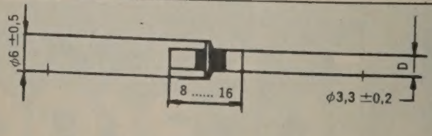
1,5 ...... 270 pF P 100 ...... N 1500
220 ...... 8200 pF M 2000 ...... M 6000
(Y5P/Z5P) (Y5U/Z5U) EIA
(2B4/2A5) (2E4/2D5) IEC

S5



1,5 ...... 100 pF P 100 ...... N 1500
220 ...... 2700 pF M 2000 ...... M 6000
(Y5P/Z5P) (Y5U/Z5U) EIA
(2B4/2A5) (2E4/2D5) IEC

S21



P 100 ...... N 1500
M 2000 ...... M 6000
(Y5P/Z5P)
(2B4/2A5)
(Y5U/Z5U) EIA
(2E4/2D5) IEC

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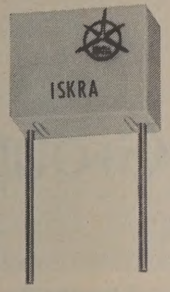
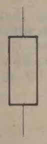
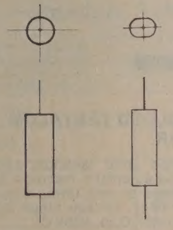


KEU 1711
Molded

Other Configurations Available

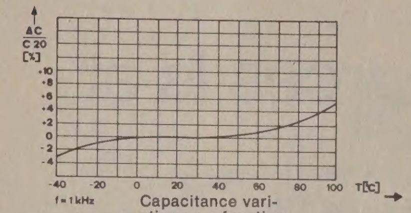


KEU 2710
Molded

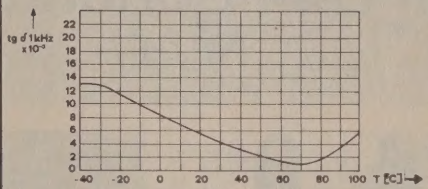


KEU 1012 **KEU 1011**
Wrap and Fill

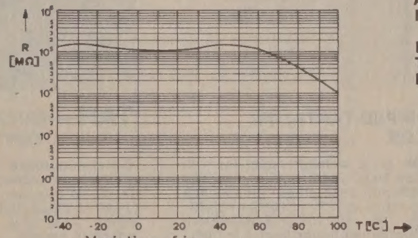
KEU 1010
Low Cost
Epoxy Coated



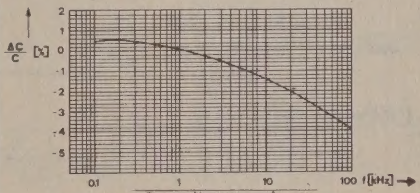
Capacitance variation as a function of the temperature.



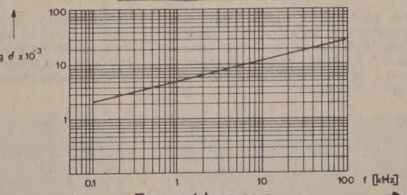
Tangent loss as a function of the temperature.



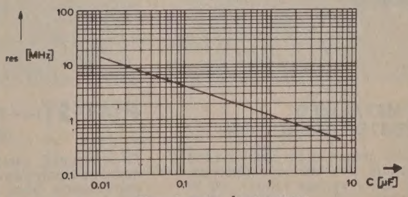
Variation of insulation resistance as a function of the temperature.



Capacitance variation as a function of the frequency.



Tangent loss as a function of the frequency.



Resonance frequency as a function of the capacitance at a terminal lead length of 6 mm.

FEATURES:

△ High insulation resistance
△ Low dielectric loss
△ Wide temperature range
△ High humidity resistance
△ Very small dimensions
△ Self-healing properties

CONSTRUCTION:

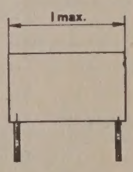
△ Metallized polyester foil with excellent electrical characteristics.
△ Plastic coating permits operation under exceptionally humid climatic conditions.
△ Contact surface applied by high pressure spraying and connecting wires are soldered reducing possibility of failures or unsatisfactory contact during operation.
△ Self-healing properties guarantee greater than usual operating efficiency.
△ Flammability per UL 492.

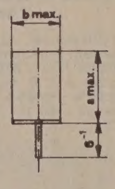
TECHNICAL DATA:

Temperature Range: —40°C . . . +85°C
Humidity test: Per EIA specifications RS 376
Capacitance tolerance: ±5%, ±10%, ±20%
Rated voltage Vn: 100V-, 250V-, 400V-, 630V-, 1000V-
Allowable ac voltage to 60 Hz: 63V∽, 160V∽, 200V∽, 220V∽, 250V∽
Dielectric loss tg at 20°C: $\leq 80 \times 10^{-4}$ at 1 kHz
$\leq 200 \times 10^{-4}$ at 10 kHz
Inductance: <20nH measured at terminal length of 6mm.
Test voltage (2s): 1.6 × Vn
Insulation resistance at 20°C and 100V-:

$C \leq 0.33\ \mu F$	$C > 0.33\ \mu F$
$V_n \leq 100$ V—	$V_n \leq 100$ V—
$R = 15 \times 10^3\ M\Omega$	$R \times C = 5 \times 10^3 s$
$V_n > 100$ V —	$V_n > 100$ V —
$R = 30 \times 10^3\ M\Omega$	$R \times C = 10^4 s$

The capacitors can be used to a temperature of 100°C, by which the working voltage at a temperature above 85°C is less than the rated voltage by 1.25% for every °C.





CAPACITANCE VALUES	AVAILABLE HOUSING SIZES				
	100V	250V	400V	630V	1000V
0.01	1	1	1	2	4
0.015	1	1	1	3	5
0.022	1	1	1	3	5
0.033	1	1	2	4	7
0.047	1	1	3	5	7
0.068	1	2	4	6	9
0.1	1	3	5	8	10
0.15	2	4	5	9	11
0.22	3	5	7	9	12
0.33	4	6	8	11	
0.47	4	7	10	12	
0.68	5	8	11		
1	6	10	12		
1.5	8	11			
2.2	9	12			
3.3	10				
4.7	11				
6.8	12				

SIZE OF HOUSING	l (LENGTH)		a (HEIGHT)		b (WIDTH)		Lead Spacing ±0.5 ±0.02		Lead Dia. ±0.5 ±0.002	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
1	0.512	13	0.413	10.5	0.177	4.5	0.40	10	0.024	0.6
2	0.512	13	0.453	11.5	0.217	5.5	0.40	10	0.024	0.6
3	0.512	13	0.492	12.5	0.256	6.5	0.40	10	0.024	0.6
4	0.709	18	0.472	12	0.236	6	0.60	15	0.031	0.8
5	0.709	18	0.531	13.5	0.295	7.5	0.60	15	0.031	0.8
6	0.709	18	0.610	15.5	0.374	9.5	0.60	15	0.031	0.8
7	1.063	27	0.630	16	0.276	7	0.90	22.5	0.031	0.8
8	1.063	27	0.650	16.5	0.295	7.5	0.90	22.5	0.031	0.8
9	1.063	27	0.728	18.5	0.354	9.0	0.90	22.5	0.031	0.8
10	1.063	27	0.787	20	0.433	11	0.90	22.5	0.031	0.8
11	1.260	32	0.827	21	0.472	12	1.10	27.5	0.031	0.8
12	1.260	32	0.925	23.5	0.551	14	1.10	27.5	0.031	0.8

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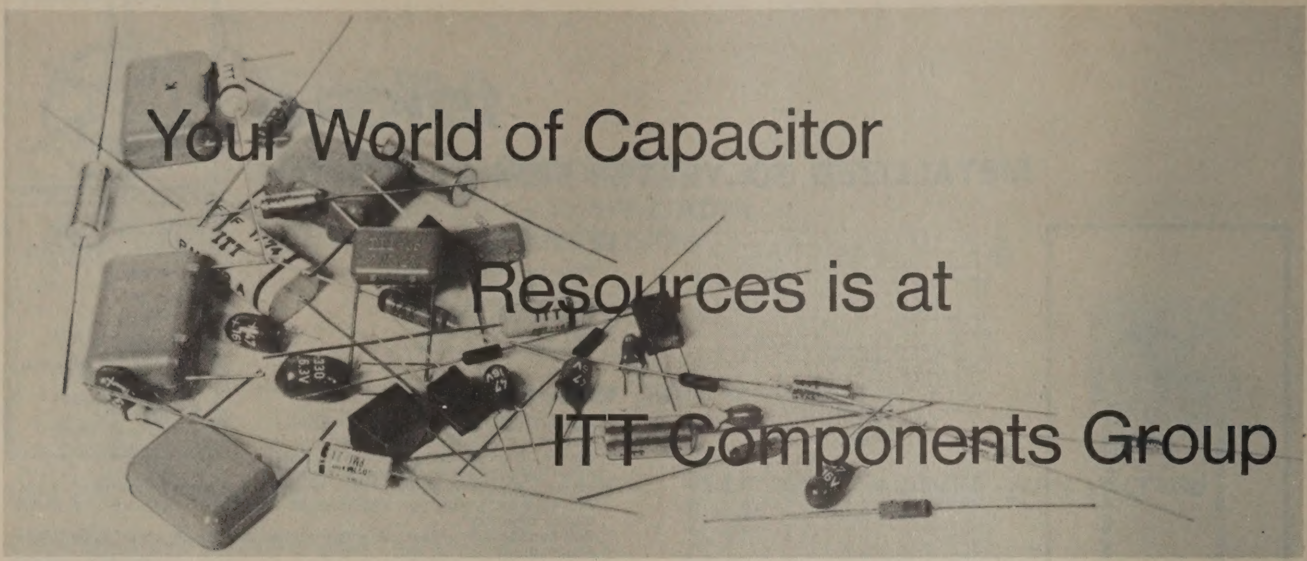
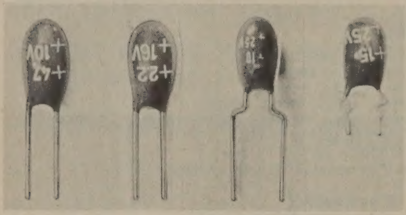
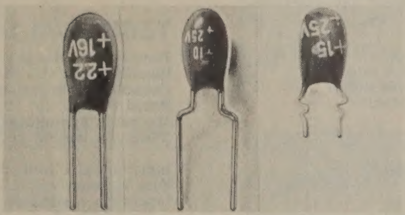




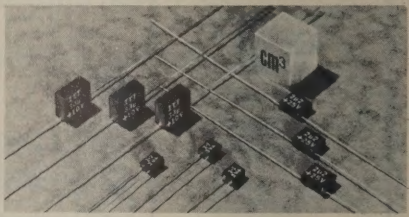
TAG—EPOXY DIPPED TANTALUM CAPACITOR

Economical radial leaded solid tantalum capacitor with an extremely stable oxide layer allows: Low leakage current, small size, 15 different case sizes, capacitance 0.1—680uF, tolerance range ±20% (±10%), voltage 3—6.3—10—16—20—25—35—50 volts. Temperature range —55 to +85°C. Four different lead crimps.



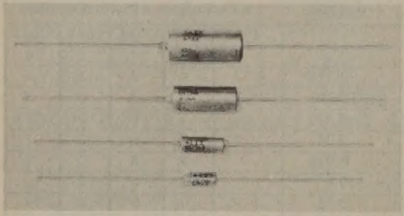
TAP—EPOXY DIPPED TANTALUM CAPACITOR

Professional radial leader solid tantalum capacitor with an extremely stable oxide layer: Extremely low leakage current, small size, 6 different case sizes, capacitance 0.1 to 330uF. Tolerance range ±20% (±10%). Voltage 3—6—10—15—20—25—35—50 volts. Temperature range —55 to +85°C. Dissipation factor from 4 to 10%, high reliability data, high surge voltage.



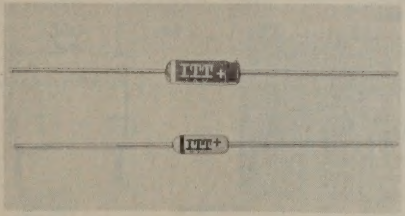
TAH—MINIATURE RECTANGULAR SOLID TANTALUM CAPACITORS

General purpose miniature solid tantalum capacitors with anode encased in resin with either axial or radial leads, in five standard case sizes. Capacitance range: .0047 to 150μF, voltage range: 4 to 35 volts, temperature range: —55° C to 125° C. Ideal for applications where space is limited.



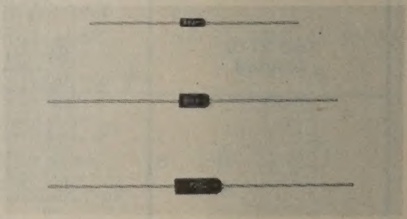
TAA—METAL ENCASED TANTALUM CAPACITOR

Popular military style, axial leaded solid tantalum capacitor, hermetically sealed, four standard case sizes, capacitance range: .01 to 330μF, voltage range: 6 to 75 volts, temperature range: —80° C to 125° C.



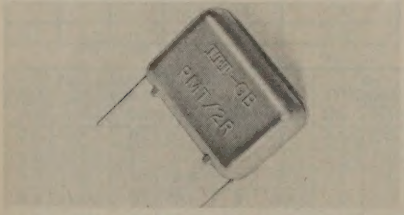
TAX—GLASS ENCAPSULATED TANTALUM CAPACITOR

Professional, axial leaded, hermetically sealed—100% tested: solid tantalum capacitor with an extremely stable oxide layer. Extremely low leakage current, two case sizes A & B, capacitance 0.1 to 47uF, tolerance range ±20% (±10%). Voltage 6.3 to 50 VDC. Temperature range —80 to +125°. High reliability.



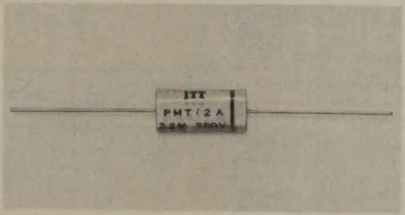
TAR—EPOXY MOLDED TANTALUM CAPACITOR

Subminiature, axial leaded solid tantalum capacitor, ideal for use in high speed automatic insertion applications, extremely low leakage current, three case sizes, capacitance range 0.1 to 68μF, voltage range 6.3 to 35 volts, temperature range —55° C to +85° C.



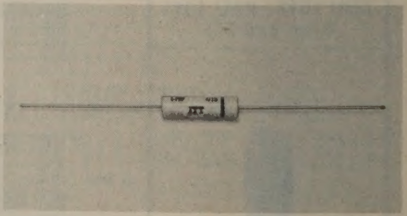
PMT-2R—MOLDED METALIZED POLYESTER CAPACITOR

Resin molded, radial leaded metalized polyester capacitor, rugged construction, non-flammable, self-healing properties, capacitance range: .01 to 4.7μF; voltage range: 100 to 630 volts, temperature range: —55° C to 100° C (without derating), high reliability.



PMT-2A—FLAT METALIZED POLYESTER CAPACITOR

Film wrapped, resin end fill construction, axial leaded metalized polyester capacitors. Self-healing properties, capacitance range .01 to 22μF, voltage range: 100 to 630 volts, temperature range: —55°C to 125°C. High reliability.



PMT-2T—TUBULAR METALIZED POLYESTER CAPACITOR

Film wrapped, resin end fill construction, axial leaded metalized polyester capacitors, self-healing properties, capacitance range: .01 to 10μF, voltage range: 100 to 630 volts, temperature range: —55° C to 125° C. High reliability.

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DIPPED TANTALUM CAPACITORS

TAG—Standard Ratings

Working Voltage (V) →	3	6.3	10	16	20	25	35	50
Surge Voltage (V) →	3.6	7.6	12	19.2	24	30	42	60
Capacitance (μf) ↓	Case size/Max. leakage current (μA)							
0.1							1/2	1/2
0.15							1/2	1/2
0.22							1/2	1/2
0.33							1/2	2/2
0.47							1/2	2/2
0.68							1/2	3/2
1.0							1/2	4/2
1.5						1/2	2/2	5/4
2.2				1/2		2/3	3/4	6/5
3.3			1/2	2/2		3/4	4/6	7/8
4.7		1/2	2/2	3/4		4/6	5/8	8/12
6.8	1/2	2/2	3/3	4/5		5/9	6/12	8/17

Working Voltage (V) →	3	6.3	10	16	20	25	35	50
Surge Voltage (V) →	3.6	7.6	12	19.2	24	30	42	60
Capacitance (μf) ↓	Case size/Max. leakage current (μA)							
10.0	1/2	3/3	4/5	5/8		6/13	7/17	11/20
15.0	2/2	4/5	5/7	6/12	7/15	8/19	9/20	
22.0	3/3	5/7	6/11	7/18	8/20	9/20	11/20	
33.0	4/5	6/10	7/17	9/20	9/20	10/20	12/20	
47.0	5/7	7/15	8/20	10/20	11/20	12/20	14/20	
68.0	6/10	8/20	9/20	11/20	12/20	13/20		
100.0	7/15	9/20	11/20	13/20	14/20			
150.0	8/20	11/20	13/20	15/20				
220.0	9/20	12/20	14/20					
330.0	11/20	14/20						
470.0	13/20							
680.0	14/20							

TAP—Standard Ratings

Working Voltage (V) →	4	6	10	15	20	25	35	50
Surge Voltage (V) →	5.3	8	13	20	26	32	46	65
Capacitance (μf) ↓	Case size/Max. leakage current (μA)							
0.1							1/1	1/1
0.15							1/1	1/1
0.22							1/1	1/1
0.33							1/1	1/1
0.47							1/1	2/1
0.68							1/1	2/1
1.0						1/1	1/1	3/1
1.5				1/1		2/1	2/1	3/2
2.2			1/1	2/1		2/1	3/1	4/2
3.3		1/1	2/1	2/1	3/1	3/1	3/2	4/3
4.7		2/1	2/1	3/2	3/2	3/2	4/2	5/3
6.8		2/1	3/2	3/2	3/2	3/3	4/3	5/4

Working Voltage (V) →	4	6	10	15	20	25	35	50
Surge Voltage (V) →	5.3	8	13	20	26	32	46	65
Capacitance (μf) ↓	Case size/Max. leakage current (μA)							
10.0	3/1	3/2	3/2	3/2	4/3	4/4	4/5	5/6
15.0	3/2	3/2	3/2	4/3	4/4	4/5	5/5	
22.0	3/2	3/2	4/3	4/5	5/5	5/10	5/10	
33.0	4/3	4/3	4/5	5/5	5/10	5/10	6/10	
47.0	4/4	4/4	5/5	5/10	5/15	6/15	6/10	
68.0	4/5	4/5	5/10	5/10	6/15	6/15		
100.0	5/10	5/10	5/15	6/15	6/15			
150.0	5/10	5/10	6/20	6/20				
220.0	6/15	6/15	6/20					
330.0	6/20	6/20						
470.0								
680.0								

TAH—Standard Ratings

Working Voltage (V) →	4	6.3	10	16	20	25	35
Surge Voltage (V) →	5	8	13	20	26	33	46
Capacitance (μf)	Case size/Max. leakage current (μA)						
0.0047							G/0.5
0.0068							G/0.5
0.01							G/0.5
0.015							G/0.5
0.022							G/0.5
0.033							G/0.5
0.047							G/0.5
0.068							G/0.5
0.10							G/0.5
0.15							G/0.5
0.22							G/0.5
0.33							G/0.5
0.47							G/0.5
0.68						G/0.5	H/1.0

Working Voltage (V) →	4	6.3	10	16	20	25	35
Surge Voltage (V) →	5	8	13	20	26	33	46
Capacitance (μf)	Case size/Max. leakage current (μA)						
1.0					G/0.5		H/1.0
1.5				G/0.5			H/1.0
2.2			G/0.5			H/1.0	J/3.0
3.3		G/0.5			H/1.0		J/3.0
4.7	G/0.5			H/1.0			J/3.0
6.8			H/1.0			J/3.0	K/3.0
10		H/1.0			J/3.0	K/3.0	L/9.0
15	H/1.0			J/3.0	K/3.0	K/3.0	L/9.0
22			J/3.0	K/3.0			L/9.0
33		J/3.0	K/3.0			L/9.0	
47	J/3.0	K/3.0			L/9.0		
68	K/3.0			L/9.0			
100			L/9.0				
150		L/9.0					

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AXIAL LEADED SOLID TANTALUM CAPACITORS

TAA—Standard Ratings

Working Voltage (V) →	6	10	15	20	25	35	50	60	75
Surge Voltage (V) →	8	13	20	26	33	46	65	84	98
Capacitance (µf)	Case size/ Max. leakage current (µA)								
.01						A/0.1	A/0.1	A/0.5	A/0.5
.012						A/0.1	A/0.1	A/0.5	A/0.5
.015						A/0.1	A/0.1	A/0.5	A/0.5
.018						A/0.1	A/0.1	A/0.5	A/0.5
.022						A/0.1	A/0.1	A/0.5	A/0.5
.027						A/0.1	A/0.1	A/0.5	A/0.5
.033						A/0.1	A/0.1	A/0.5	A/0.5
.039						A/0.1	A/0.1	A/0.5	A/0.5
.047				A/0.1		A/0.1	A/0.1	A/0.5	A/0.5
.056				A/0.1		A/0.1	A/0.1	A/0.5	A/0.5
.068				A/0.1		A/0.1	A/0.1	A/0.5	A/0.5
.082				A/0.1		A/0.1	A/0.1	A/0.5	A/0.5
.1				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.12				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.15				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.18				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.22				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.27				A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.33			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.39			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.47			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.56			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.68			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5
.82			A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	B/0.5	B/0.5
1.0		A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	A/0.5	B/0.5	B/0.5
1.2		A/0.5	A/0.5	A/0.5	A/0.5	B/0.5	B/0.5	B/0.5	B/0.5
1.5		A/0.5	A/0.5	A/0.5	A/0.5	B/0.5	B/0.5	B/0.5	B/1.0

Working Voltage (V) →	6	10	15	20	25	35	50	60	75
Surge Voltage (V) →	8	13	20	26	33	46	65	84	98
Capacitance (µf)	Case size/ Max. leakage current (µA)								
1.8		A/0.5	A/0.5	A/0.5	B/0.5	B/0.5	B/0.5	B/0.5	B/1.0
2.2	A/0.5	A/0.5	A/0.5	A/0.5	B/0.5	B/1.0	B/1.0	B/1.0	B/1.5
2.7	A/0.5	A/0.5	A/0.5	B/0.5	B/0.5	B/1.0	B/1.0	B/1.0	B/1.5
3.3	A/0.5	A/0.5	A/0.5	B/1.0	B/1.0	B/1.0	B/2.0	B/2.0	B/2.0
3.9	A/0.5	A/0.5	B/0.5	B/1.0	B/1.0	B/1.0	B/2.0	B/2.0	B/2.0
4.7	A/0.5	A/0.5	B/1.0	B/1.0	B/1.0	B/1.0	B/3.0	C/3.0	C/6.0
5.6	A/0.5	B/0.5	B/1.0	B/1.0	B/1.0	B/1.0	C/3.0	C/3.0	C/6.0
6.8	A/0.5	B/1.0	B/1.0	B/1.0	B/1.0	B/2.0	C/3.0	C/4.0	C/10.0
8.2	B/0.5	B/1.0	B/1.0	B/1.0	B/1.0	C/3.0	C/3.0	C/5.0	C/10.0
10.0	B/0.5	B/1.0	B/1.0	B/1.0	B/1.0	C/3.0	C/3.0	C/6.0	C/10.0
12	B/0.5	B/1.0	B/1.0	B/1.0	C/1.0	C/3.0	C/3.0	C/6.0	D/10.0
15	B/1.0	B/1.0	B/2.0	B/2.0	C/2.0	C/3.0	C/6.0	D/9.0	D/14.0
18	B/1.0	B/1.0	B/2.0	C/3.0	C/3.0	C/3.0	C/6.0	D/10.0	
22	B/1.0	B/2.0	B/3.0	C/3.0	C/3.0	C/6.0	D/6.0	D/12.0	
27	B/1.0	B/2.0	C/3.0	C/3.0	C/3.0	D/6.0			
33	B/1.0	B/2.0	C/3.0	C/3.0	C/3.0	D/6.0			
39	B/1.0	B/2.0	C/3.0	C/3.0	C/3.0	D/6.0			
47	B/2.0	C/3.0	C/6.0	C/6.0	D/6.0	D/10.0			
56	B/2.0	C/3.0	C/6.0	D/6.0	D/10.0				
68	C/3.0	C/3.0	D/6.0	D/6.0					
82	C/3.0	C/3.0	C/6.0	D/6.0					
100	C/3.0	C/6.0	D/6.0	D/10.0					
120	C/3.0	C/6.0	D/6.0						
150	C/6.0	D/10.0	D/10.0						
180	C/6.0	D/10.0							
220	D/6.0	D/10.0							
270	D/6.0								
330	D/10.0								

TAX—Standard Ratings

Working Voltage (V) →	6.5	10	16	20	25	35	50
Surge Voltage (V) →	8	13	20	26	32	46	65
Capacitance (µf)	Case size/Max. leakage current (µA)						
0.1	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
0.15	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
0.22	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
0.33	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
0.47	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
0.68	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
1.0	⟶	⟶	⟶	⟶	⟶	A/0.5	A/0.5
1.5	⟶	⟶	⟶	⟶	A/0.5	B/0.5	A/0.5
2.2	⟶	⟶	⟶	A/0.5	B/0.5	B/1.0	A/1.0
3.3	⟶	⟶	A/0.5	⟶	B/1.0	B/1.0	B/2.0
4.7	⟶	A/0.5	⟶	⟶	B/1.0	B/1.0	B/3.0
6.8	A/0.5	⟶	B/1.0	⟶	B/1.0	B/2.0	
10.0	⟶	B/1.0	⟶	⟶	B/1.0		
15.0	B/1.0	⟶	⟶	B/2.0			
22.0	⟶	⟶	B/3.0				
33.0	⟶	B/2.0					
47.0	B/2.0						

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METALIZED MYLAR CAPACITORS

PMT-2R—Standard Ratings

Working Voltage (V) →	100	250	400	630
	Dimensions X x Y x Z (inches)			
Capacitance (μf)	Case size/Max. leakage current (μA)			
0.010			0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236
.015			0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236
.022			0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236
.033		0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276
.047		0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276
.068	0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276	0.749 x 0.591 x 0.354
.10	0.532 x 0.354 x 0.197	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276	1.024 x 0.788 x 0.394
.15	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276	0.749 x 0.591 x 0.354	1.024 x 0.788 x 0.394
.22	0.532 x 0.434 x 0.236	0.749 x 0.473 x 0.276	1.024 x 0.788 x 0.394	1.024 x 0.788 x 0.394
.33	0.749 x 0.473 x 0.276	0.749 x 0.591 x 0.354	1.024 x 0.788 x 0.394	1.026 x 0.906 x 0.512
.47	0.749 x 0.473 x 0.276	0.749 x 0.591 x 0.354	1.024 x 0.788 x 0.394	1.026 x 0.906 x 0.512
.68	0.749 x 0.591 x 0.354	1.024 x 0.788 x 0.394	1.26 x 0.906 x 0.512	
1.0	0.749 x 0.591 x 0.354	1.024 x 0.788 x 0.394	1.26 x 0.906 x 0.512	
1.5	1.024 x 0.788 x 0.394	1.26 x 0.906 x 0.512		
2.2	1.024 x 0.788 x 0.394	1.26 x 0.906 x 0.512		
3.3	1.26 x 0.906 x 0.512			
4.7	1.26 x 0.906 x 0.512			

PMT-2T—Standard Ratings

Working voltage (V) →	100	250	400	630
	Dimensions D x L (inches)			
Capacitance (μf)	Case size/Max. leakage current (μA)			
0.01				.236 x .551
0.015			.236 x .551	.276 x .551
0.022			.276 x .551	.315 x .551
0.033		.236 x .551	.276 x .630	.256 x .748
0.047		256 x .551	.315 x .630	.295 x .748
0.068		.256 x .630	.315 x .748	.354 x .748
0.1	.236 x .551	.295 x .630	.374 x .748	.413 x .748
0.15	.276 x .551	.295 x .748	.433 x .748	.394 x 1.043
0.22 •	.335 x .551	.335 x .748	.394 x 1.043	.453 x 1.043
0.33	.276 x .748	.354 x .827	.492 x 1.043	.551 x 1.043
0.47	.315 x .748	.413 x .827	.492 x 1.240	.571 x 1.240
0.68	.374 x .748	.413 x 1.043	.591 x 1.240	.591 x 1.772
1.	.433 x .748	.492 x 1.043	.709 x 1.240	.669 x 1.772
1.5	.394 x 1.043	.531 x 1.240	.709 x 1.772	
2.2	.472 x 1.043	.630 x 1.240	.866 x 1.772	
3.3	.512 x 1.240	.768 x 1.240	1.024 x 1.772	
4.7	.591 x 1.240	.748 x 1.772		
6.8	.709 x 1.240	.886 x 1.772		
10	.846 x 1.240	1.063 x 1.772		

PMT-2A—Standard Ratings

Working Voltage (V) →	100	250	400	630
	Dimensions A x B x C x D (inches)			
Capacitance (μf)	Case size/Max. leakage current (μA)			
0.01				.120 x .320 x .510 x .028
0.015				.160 x .350 x .510 x .028
0.022			.120 x .240 x .510 x .028	.220 x .390 x .510 x .031
0.033			.160 x .280 x .510 x .028	.160 x .350 x .710 x .031
0.047		.120 x .280 x .510 x .028	.140 x .260 x .170 x .028	.200 x .390 x .710 x .031
0.068		.160 x .320 x .510 x .028	.180 x .300 x .170 x .031	.260 x .430 x .710 x .031
0.1		.120 x .280 x .710 x .028	.240 x .350 x .710 x .031	.200 x .480 x 1.020 x .031
0.15	.160 x .280 x .510 x .028	.180 x .320 x .710 x .031	.280 x .430 x .710 x .031	.280 x .510 x 1.020 x .031
0.22	.200 x .320 x .510 x .031	.240 x .350 x .710 x .031	.200 x .470 x 1.020 x .031	.350 x .590 x 1.020 x .031
0.33	.160 x .280 x .170 x .028	.280 x .390 x .710 x .031	.260 x .510 x 1.020 x .031	.400 x .630 x 1.220 x .031
0.47	.200 x .320 x .710 x .031	.200 x .470 x 1.020 x .031	.350 x .590 x 1.020 x .031	.470 x .710 x 1.220 x .031
0.68	.240 x .350 x .710 x .031	.240 x .510 x 1.020 x .031	.350 x .590 x 1.220 x .031	
1	.320 x .430 x .710 x .031	.320 x .590 x 1.020 x .031	.470 x .750 x 1.220 x .031	
1.5	.240 x .470 x 1.020 x .031	.350 x .630 x 1.220 x .031	.470 x .870 x 1.220 x .031	
2.2	.280 x .510 x 1.020 x .031	.430 x .710 x 1.220 x 0.31	.470 x .870 x 1.650 x .031	
3.3	.350 x .630 x 1.020 x .031	.470 x .910 x 1.220 x .031	.430 x .980 x 2.130 x .031	
4.7	.370 x .670 x 1.220 x .031	.470 x .910 x 1.650 x .031	.470 x 1.060 x 2.130 x .031	
6.8	.450 x .790 x 1.220 x .031	.470 x .910 x 2.130 x .031		
10	.450 x .870 x 1.650 x .031	.550 x 1.140 x 2.130 x .031		
15	.510 x .950 x 1.650 x .031			
22	.510 x .980 x 2.130 x .031			

TAR—Standard Ratings

Working Voltage (V) →	6.3	10	16	20	25	35
Surge Voltage (V) →	8	13	20	26	33	46
Capacitance (μF)		Case size/Max. leakage current (μA)				
0.1						A/1.0
0.12						A/1.0
0.15						A/1.0
0.18						A/1.0
0.22						A/1.0
0.27						A/1.0
0.33						A/1.0
0.39						A/1.0
0.47						A/1.0
0.56						A/1.0
0.68						A/1.0
0.82						A/1.0
1.0						A/1.0
1.2						B/1.0
1.5					R/1.0	B/1.0
1.8					R/1.0	B/1.0
2.2					R/1.0	B/1.0
2.7				R/1.0	S/1.0	B/1.0
3.3			R/1.0	S/1.0	S/1.0	B/1.0
3.9			R/1.0	S/1.0	S/1.0	B/2.0
4.7		R/1.0	S/1.0	S/1.0	S/1.0	B/2.0
5.6		R/1.0	S/1.0	S/1.0	S/2.0	C/3.0
6.8		R/1.0	S/1.0	S/1.0	S/2.0	C/3.0
8.2	R/1.0	S/1.0	S/1.0	S/2.0	T/3.0	C/4.0
10	R/1.0	S/1.0	S/1.0	S/2.0	T/3.0	C/4.0
12	R/1.0	S/1.0	S/2.0	T/3.0	T/4.0	
15	S/1.0	S/1.0	S/2.0	T/3.0	T/4.0	
18	S/1.0	S/1.0	T/3.0	T/4.0		
22	S/1.0	S/2.0	T/3.0	T/4.0		
27	S/2.0	T/3.0	T/4.0			
33	S/2.0	T/3.0	T/4.0			
39	T/3.0	T/4.0				
47	T/3.0	T/4.0				
56	T/4.0					
68	T/4.0					

Note: All capacitors are supplied in the highest voltage available at a given capacitance value and case size.

Components ITT

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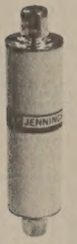
vacuum capacitors

ITT Jennings offers the broadest available line of high voltage capacitors for radio frequency applications. Units are available in glass and ceramic envelopes with working voltage ratings of 2 kv to 40 kv, at capacitance values to 5000 pfd, with current ranges to 250 Amps RMS (air-cooled) and 750 Amps RMS (water-cooled), depending upon capacity, frequency, and working voltage. The design of ITT Jennings Vacuum and Gas capacitors allows a number of electrical, mechanical and environmental advantages which include:

1) HIGH VOLTAGE—The high dielectric strength allows maximum voltage levels for a given capacitance rating.
2) HIGH CURRENT—Extremely low losses occur because of the dielectric, low loss glass and ceramic envelopes, and heavy copper construction. ITT Jennings capacitors are able to handle large currents at high RF frequencies that would destroy other types of capacitors.
3) COMPACT DESIGN—Units are quite small for their power handling capabilities.
4) HIGH Maximum to Minimum CAPACITY RATIO—Capacity change ratios are available to 150:1, making them desirable for wide tuning ranges.
5) SELF-HEALING—The design construction permits moderate overloads that would damage other materials.
6) HIGH ALTITUDE OPERATION—Vacuum capacitors are free from internal degradation due to extreme environmental conditions.



VOLTS
JENNINGS

VACUUM FIXED CAPACITORS

Peak Voltage Kilovolts		Type*	Capacity pF	Continuous RMS Amperes[2] (Max.)	Nominal Dimensions[3] (Inches)	
Test 60 Hz	RF Working[1] (Peak)				Length	Diameter
5	3	G JCSL	1000, 1500, 2000	75	4.0	2.9
5	3	JSLF	5000	120	2.9	4.1
15	9	JCSF	25, 40, 50, 80, 120, 150	40	1.7	1.7
15	9	JCS	250, 400, 500	90	4.0	3.1
15	9	G MCI	500, 750, 1000	120	4.1	4.1
12	7	C CFDS	1000	95	4.6	3.6
15	9	G MMC	1500, 2000, 5000	220	13.0	9.3
15	9	G MMCI	2000	200	4.9	6.1
15	9	C CFDS	2000	200	3.3	5.6
20	12	MC	500, 750, 1000	150	8.4	5.0
30	18	G MLC	500, 750, 1000	200	9.3	4.5
30	18	CY	1, 2, 3, 4, 5	12	3.3	0.8
35	25	CLF1	6, 12, 25, 50, 75, 100	85	6.5	2.3
30	20	CLF1	150, 200, 250	90	6.5	2.6
20	12	C CFED	150, 300	120	3.6	3.4
20	12	CFED	500, 750, 1000	160	3.8	4.6
35	21	CFFP	2000	215	5.8	8.2
55	33	MMHC	450	210	9.3	6.1
45	27	G MMHC	1000	310	13.0	9.3
60	36	CFHD	12, 25, 50, 100	145	5.2	3.4
60	36	CFHD	200, 300	240	5.4	4.6
55	33	C CFHP	450	300	5.5	5.6
50	30	CFHP	1000	350	6.2	7.2
50	30	CFTB	1000	420	7.4	10.7

GAS FIXED CAPACITORS

VOLTS
CGF1-1000-0018

Peak Voltage Kilovolts		RF Working	Type*	Capacity pF	Continuous RMS Amperes[2] (Max.)	Nominal Dimensions[3] (Inches)	
Test 60 Hz	RF+DC					Length	Diameter
20	18	12	C CGF1	1000	215	3.5	4.8
35	30	21	CGF2	1000	270	4.0	6.0
50	40	25	CGF2-450	450	270	5.5	5.7
50	40	25	CGF2-500	500	290	5.5	5.7

* G = Glass; C = Ceramic

[1] RF working voltage is the maximum RF voltage that can be applied to the capacitor over the 2-32 MHz frequency range, provided the RF current rating is not exceeded.

[2] RF current rating is dependent upon capacity, frequency and working voltage. Write for complete applications data.

[3] Dimensions of largest unit in a series.

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DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

vacuum variable capacitors

Peak Voltage Kilovolts		Type*	Capacity pF	Continuous RMS Amperes[2] (Max.)	Nominal Dimensions[3] (Inches)	
Test 60 Hz	RF Working[1] (Peak)				Length	Diameter
5	3	G UCSL	4-250	35	4.1	2.2
5	3	USLS	5-465, 5-500, shorting	40	5.7	2.3
5	3	USL	5-500	35	5.8	2.4
5	3	UCSL	5-750, 7-1000, 10-1500, 20-2000	60	8.3	3.1
3	2	UCSL	50-3000, 100-5000	55	8.8	4.1
5	3	C CSV1	5-500	45	5.8	2.4
5	5	CMV2	6-500	38	3.6	1.8
5	5	CMV1	8-650	40	4.3	1.7
5	3	CVCE	10-750	80	7.1	3.4
3	3	CMV1	8-1000	40	4.3	1.7
5	3	CSV1	10-1000	70	5.0	3.1
5	3	CVCD	10-1500, 20-2000, 50-3000	100	8.3	4.6
5	5	CMV2	20-2000	45	5.3	3.8
5	5	CMV1	25-4000	70	6.5	3.3
15	9	CADD	3-30	20	4.1	1.3
15	9	G UCSB	5-100	40	4.9	2.4
15	9	UCS	5-200, 10-400, 25-500	60	9.0	3.1
15	9	UCSXF	12-1000, 15-1200	70	10.0	4.3
15	9	UCSX	25-1000	70	9.8	3.7
15	9	VMMC	50-1000, 100-2000	200	15.6	6.1
12	7	UCSXF	20-1500, 50-2300	70	10.0	5.1
12	7	C CVDP	35-1500, 50-2300	100	9.8	5.6
15	9	G VMMC	100-5000	200	21.3	9.2
15	9	C CADC	3-30	30	4.6	1.3
15	9	CVDD	6.5-50, 10-100	65	6.6	2.4
15	9	CVDD	10-300, 20-500	95	7.5	3.4
20	12	CVEP	25-500, 50-1000, 100-1500	210	10.2	7.2
15	9	CVDD	25-1000	150	8.0	4.6
15	9	CVEP	100-2000	200	10.2	7.2
60	36	G UHC	10-75	75	11.4	5.0
55	33	C CVHP	10-250, 25-450, 30-650	240	11.9	7.2
40	24	CVFP	15-250, 25-450	170	9.6	5.6
50	30	CWV2	20-250, 25-450, 30-650 (water cooled)	800	17.9	7.6
55	33	CVHE	25-650 (air cooled)	250	12.5	7.2
40	24	CVFP	20-750, 35-1000	225	11.7	7.2
50	30	CVHP	60-1000	250	14.5	8.0
45	27	CAV1	60-1000 (air cooled)	190	14.5	8.6
50	30	CWV1	100-1000 (water cooled)	800	21.6	8.6
40	24	CVHC	100-1600 (air cooled)	250	17.8	8.0
60	36	CWV1	100-1600 (water cooled)	750	23.0	12.5
40	24	CWV2	100-1600 (water cooled)	800	25.0	8.6
35	21	CVFP	100-2000	220	14.5	8.2

7,500 VOLTS
JENNINGS

5,000 VOLTS
JENNINGS
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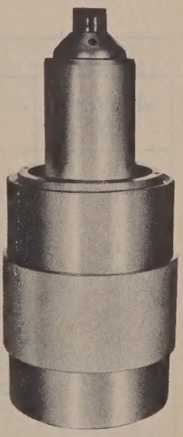
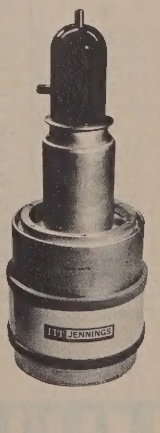


GAS VARIABLE CAPACITORS

Peak Voltage Kilovolts		Type*	Capacity pF	Continuous RMS Amperes[2] (Max.)	Nominal Dimensions[3] (Inches)	
Test 60 Hz	RF Working[1]				Length	Diameter
5	3	CHV1	1.5-45	15	2.9	0.9
15	9	CHV1	2.5-50	25	6.4	1.4
7	5	CHV1	12-200	45	7.3	3.8



* G = Glass; C = Ceramic

[1] RF working voltage is the maximum RF voltage that can be applied to the capacitor over the 2-32 MHz frequency range, provided the RF current rating is not exceeded.

[2] RF current rating is dependent upon capacity, frequency and working voltage. Write for complete applications data.

[3] Dimensions of largest unit in a series.

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DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

vacuum capacitors

CTV SERIES TRIMMABLE-FIXED† VACUUM CAPACITORS FOR POWER APPLICATIONS — THE FIXED CAPACITOR YOU CAN TRIM

- Adjustment from 5% to 30% of nominal capacitance
- From 18 to 1377 pF in discrete steps
- Peak 60 Hz test voltages to 50 KV
- High current ratings — to 150 A rms
- Compact — 5.5″ long x 4.5″ dia.

These new devices offer designers a new means of achieving the exact capacitance required in high power circuits. Incorporating in one package a trimmer in parallel with a large fixed capacitance, they eliminate the need to use large, fully variable capacitors or the use of multiple fixed capacitors in many applications. They are ideal solutions for filter circuits, antenna phasing and matching networks in high power communications gear and for dielectric heaters and other high power RF equipment.

With ceramic envelope construction, they have fixed, concentric capacitor plates, in the core of which is a set of plates attached to a small sealed bellows which is adjusted by a screw. Because the trimmable section conducts only a small portion of the total current, these units have a very large current rating for their size.

ITT JENNINGS
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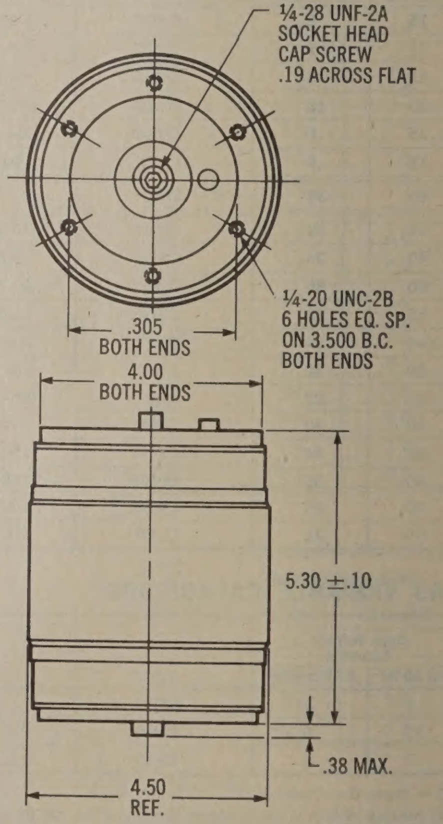
SPECIFICATIONS

60 Hz Test Voltage KV, Pk	Model	Capacity Range - pF	Working Voltage KV, Pk	Maximum Current Rating* Amps - RMS
10	CTV3-356-0010	338 - 374	6	150*
10	CTV3-441-0010	419 - 463	6	125*
10	CTV3-480-0010	456 - 504	6	150*
10	CTV3-596-0010	566 - 626	6	125*
10	CTV3-655-0010	622 - 688	6	150*
10	CTV3-789-0010	749 - 829	6	125*
10	CTV3-914-0010	868 - 960	6	150*
10	CTV3-1048-0010	995 - 1100	6	125*
10	CTV3-1195-0010	1135 - 1255	6	150*
10	CTV3-1312-0010	1247 - 1377	6	125*
20	CTV1-86-0020	76 - 96	12	125*
20	CTV1-149-0020	137 - 159	12	125*
20	CTV1-234-0020	220 - 248	12	125*
20	CTV3-247-0020	234 - 260	12	150*
20	CTV1-326-0020	306 - 346	12	125*
50	CTV2-26-0050	18 - 34	35	85
50	CTV2-35-0050	32 - 38	35	125*
50	CTV2-41-0050	34 - 48	35	85
50	CTV2-52-0050	39 - 65	35	85
50	CTV2-80-0050	65 - 95	35	85
50	CTV2-122-0050	107 - 137	35	85

* Current can be increased with forced air cooling, consult factory.
† Patents pending

DIMENSIONAL DRAWING


¼-28 UNF-2A SOCKET HEAD CAP SCREW .19 ACROSS FLAT
¼-20 UNC-2B 6 HOLES EQ. SP. ON 3.500 B.C. BOTH ENDS
.305 BOTH ENDS
4.00 BOTH ENDS
5.30 ±.10
.38 MAX.
4.50 REF.

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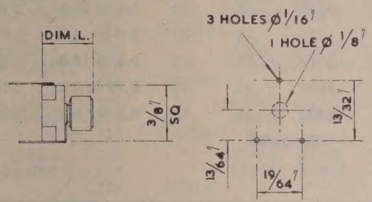
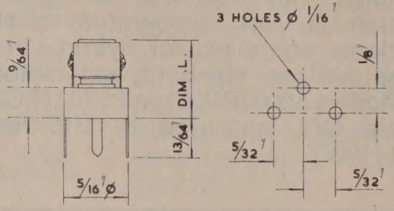
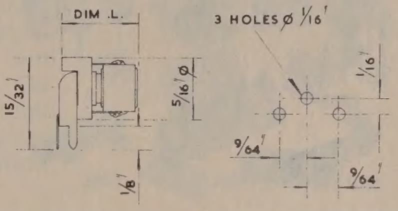


PART No	MAX CAP.	MIN CAP.	DIM.L. MAX CAP.	DIM.L. MIN CAP.	TEMP COEFF PPM/°C
5640/PCT	10 pF	<2pF	23/64"	1/2"	+200 ±200
5646	25pF	<2pF	15/32"	23/32"	+200 ±200

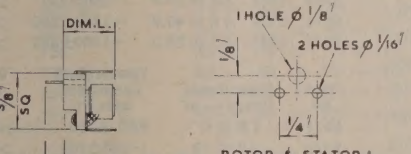


PART No	MAX CAP.	MIN CAP.	DIM.L. MAX CAP.	DIM.L. MIN CAP.	TEMP COEFF PPM/°C
6060/VPC	5pF	<2pF	5/16"	13/32"	+250 ± 200
5750/VPC	10pF	<2pF	13/32"	35/64"	+250 ± 200
5890/VPC	15pF	<2pF	7/16"	5/8"	+250 ±200
6030/VPC	20pF	<2pF	9/16"	7/8"	0 ±100



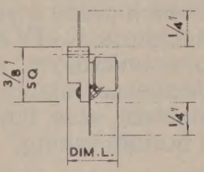
PART No	MAX CAP.	MIN CAP.	DIM.L. MAX.CAP.	DIM.L. MIN.CAP.	TEMP COEFF PPM/°C
6060/HPC	5 pF	<2pF	5/16"	13/32"	+250 ±200
5750/HPC	10pF	<2pF	13/32"	35/64"	+250 ±200
5890/HPC	15pF	<2pF	7/16"	5/8"	+250 ±200
6030/HPC	20pF	<2pF	9/16"	7/8"	0 ±100

Trimming



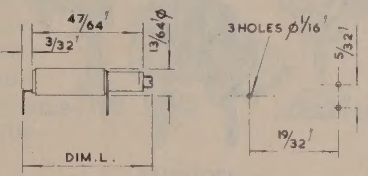
ROTOR & STATOR CONNECTIONS ABOVE P.C. BOARD.

PART No	MAX CAP.	MIN CAP.	DIM.L. MAX CAP.	DIM.L. MIN CAP.	TEMP COEFF PPM/°C
5640/PM	10pF	<2pF	23/64"	1/2"	+200 ±200



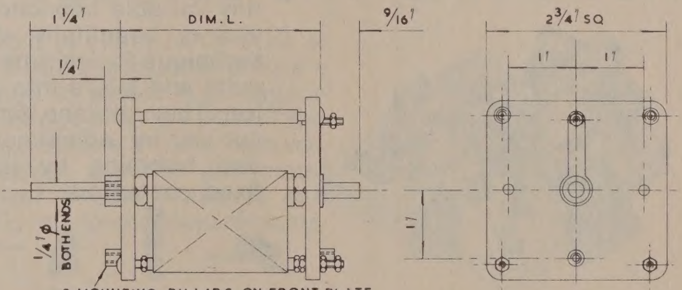
MOUNTING ON
2 CLEARANCE HOLES
ø 5/64" ON 1/4" CRS.

PART No	MAX CAP.	MIN. CAP.	DIM.L. MAX CAP.	DIM.L. MIN CAP.	TEMP COEFF PPM/°C
5640	10pF	<2pF	23/64"	1/2"	+200 ±200



PART No	MAX CAP.	MIN CAP.	DIM.L. MAX.CAP.	DIM.L. MIN.CAP.	TEMP COEFF. PPM/°C
4462/HPC	8 pF	0·25pF	29/32"	17/32"	-50 ±150

Transmitting



3 MOUNTING PILLARS ON FRONT PLATE
& 1 ON BACK PLATE ALL TAPPED 6-32 UNC.

PART No.	DIM. L.	MAX	MIN	VANE THICKNESS	AIR GAP.	TEST VOLTS.
		CAPACITY IN pF.				
5720 / 14	8 3/8"	950	32	·036"	·050"	3 KV
5720 / 13	6 5/16"	650	23	·036"	·050"	3 KV
5720 / 12	4 25/32"	450	20	·036"	·050"	3 KV
5720 / 11	3 39/64"	300	14	·036"	·050"	3 KV
5720 / 10	8 3/8"	1500	35	·036"	·036"	2 KV
5720 / 9	4 11/16"	75	14	·064"	·128"	6 KV
5720 / 8	6 5/16"	100	18	·064"	·128"	6 KV
5720 / 7	8 3/8"	150	26	·064"	·128"	6 KV
5720 / 6	3 39/64"	150	12	·064"	·064"	4 KV
5720 / 5	4 25/32"	250	20	·064"	·064"	4 KV
5720 / 4	6 5/16"	350	25	·064"	·064"	4 KV
5720 / 3	8 3/8"	500	33	·064"	·064"	4 KV
5720 / 2	6 5/16"	1000	25	·036"	·036"	2 KV
5720 / 1	3 39/64"	500	15	·036"	·036"	2 KV

PART No.	DIM. L.	MAX	MIN	VANE THICKNESS.	AIR GAP.	TEST VOLTS.
		CAPACITY IN pF.				
5720/8/SS	6 5/16"	50	15	·064"	·128"	6 KV
5720/7/SS	8 3/8"	75	18	·064"	·128"	6 KV
5720/6/SS	3 39/64"	75	11	·064"	·064"	4 KV
5720/5/SS	6 5/16"	125	15	·064"	·064"	4 KV
5720/4/SS	6 5/16"	150	16	·064"	·064"	4 KV
5720/3/SS	8 3/8"	250	26	·064"	·064"	4 KV
5720/2/SS	6 5/16"	500	23	·036"	·036"	2 KV
5720/1/SS	3 39/64"	250	14	·036"	·036"	2 KV

VARIABLE CAPACITORS

Listed above, on this page, is a selection of our highly successful P.T.F.E. dielectric miniature *multi-turn* Trimmer Capacitors. These are widely used in VHF and UHF applications.

We have also listed, on the right, some of our high voltage air dielectric Variable Capacitors for Transmitter work.

Together these represent a small selection from our comprehensive range of Variable Capacitors, Drive Mechanisms, Stand-Off Insulators and Displacement Transducers.

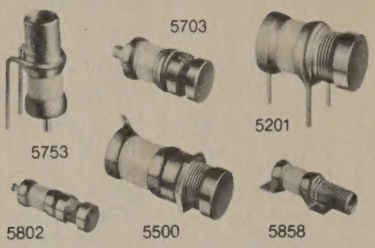
Full details can be obtained from:

SWEDGAL ELECTRONICS INC.,
258 BROADWAY, NEW YORK, N.Y. 10007, U.S.A.
TEL. NO: (212) 962-5485.

ENGLAND: Jackson Brothers (London) Limited
Kingsway, Waddon, Croydon CR9 4DG. Tel: 01-681 2754

Johanson® VARIABLE CAPACITORS

HIGH Q AIR CAPACITORS

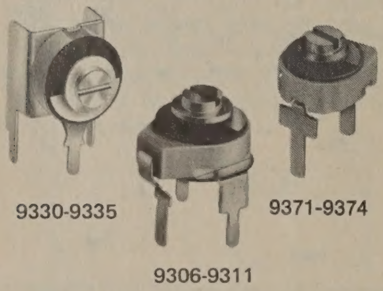


Air capacitors are beautiful for microwave, VHF, and UHF applications. They offer fine tuning, ultra high Q, low temperature coefficients and sizes for hybrid circuit as well as standard applications. Models 5200 (PC25) and 5201 (PC26) are QPL approved to MIL Spec 14409C.

Part No.	Length	Dia.	Capacitance Range — pf	Q @ 100 MHz
5200	.48	.28	0.8 to 10.0	>5000
5500*	.75	.28	1.0 to 20.0	>1500
5700	.48	.22	0.6 to 6.0	>10,000
5750	.51	.22	0.8 to 10.0	>7500
5800	.48	.15	0.35 to 3.5	>10,000
5850	.51	.15	0.5 to 5.0	>7500

*Illustrated

CERAMIC TRIMMER CAPACITORS

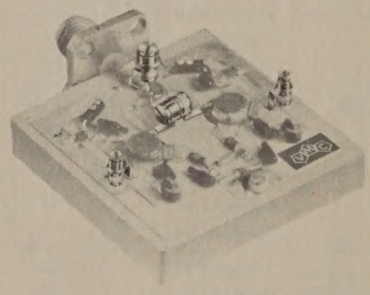


Ceramic trimmer capacitors are designed for broadband applications from audio to 200 MHz, where a negative temperature characteristic and ease of adjustment is important. Typical applications include crystal filters, crystal oscillators, CATV amplifiers, and communications and test equipment. Models available for top tuning (illustrated), side tuning (illustrated) and bottom tuning.

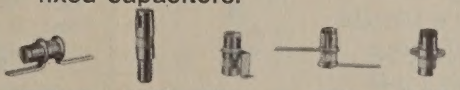
Part No.	Part No.	Capacitance Range — pf	Temperature Coefficient ppm/°C	Q @ 10 MHz
9306	9330	1.7 to 6.0	NPO ±250	>500
9307	9331	1.7 to 10.0	NPO ±250	>500
9308	9332	2.3 to 20.0	−450±250	>500
9309	9333	3.8 to 30.0	−550±250	>300
9310	9334	4.0 to 40.0	−1400±800	>200
9311	9335	4.5 to 50.0	−1400±800	>200

Part No.	Capacitance Range — pf	Temperature Coefficient ppm/°C	Q @ 100 MHz
9371	1.5 to 4	NPO ±250	>300
9372	3.0 to 10	−600±300	>300
9373	3.5 to 18	−800±300	>300
9374	5.0 to 25	−1400±700	>300

GIGA-TRIM® CAPACITORS

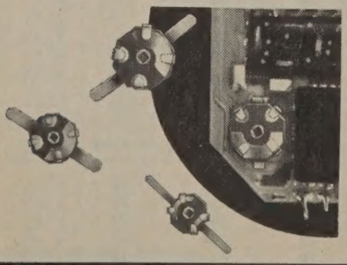


Giga-Trim (gigahertz-trimmers) are tiny variable capacitors which provide a beautifully straightforward technique to fine tune RF hybrid circuits and MIC's into proper behavior. They replace time consuming cut-and-try adjustment techniques and trimming by interchange of fixed capacitors.

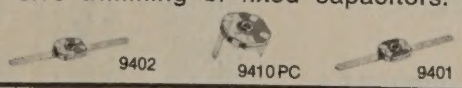


Part No.	Length	Dia.	Capacitance Range — pf	Q @ 250 MHz
7200	.55	.07	0.1 to 1.3	>250
7240	.55	.07	0.2 to 2.0	>2000
7260	.21	.07	0.3 to 1.2	>4000
7270	.31	.12	0.6 t 4.5	>2000
7280	.21	.12	0.4 o 2.5	>3000
7290	.56	.12	0.8 to 8.0	>1000

THIN-TRIM® CAPACITORS



Thin-Trim capacitors are a new development in tiny variable capacitors for demanding applications from quartz crystal watches to phased array MIC's. They provide the hybrid and microwave design engineer a reliable means of adjusting capacitance rather than abrasive trimming of fixed capacitors.



Part No.	Capacitance Range — pf	Temperature Coefficient	Q @ 100 MHz
9401-2	0.5 to 2.0	−200±200/°C	>1000
9401-4	1.0 to 4.0	−700±300/°C	>1000
9402-4	3.0 to 12.0	−700±300/°C	>750
9410-2	4.0 to 18.0	−200±200/°C	>900
9410-3	6.0 to 35.0	−750±200/°C	>500
9410-4	7.0 to 40.0	−1000±300/°C	>500

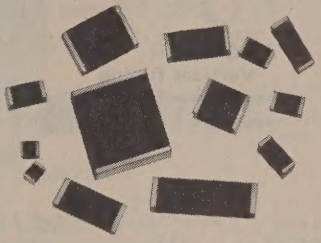
JOHANSON MANUFACTURING CORPORATION
DEPT. EM, BOONTON, NEW JERSEY 07005
TELEPHONE (201) 334-2676 TWX 710-987-8367

CERAMIC CHIP CAPACITORS

Johanson
Dielectrics Inc.

STANDARD CHIP CAPACITORS

Fourteen configurations are available in four basic dielectrics: NPO/COG, BX/X7R, Z5U, and Y5V characteristics, to meet MIL-C-55681A and EIA 198B specifications. Capacitors feature high volume efficiency of capacitance, and ideal for hybrid circuit applications.

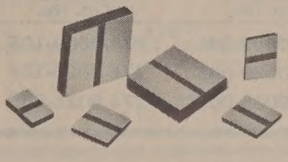


Maximum Capacitance Available in Popular Sizes

JDI Size	Dielec-tric	VDCW 12	25	50	100	200
R11 (.050 x .040 x .040T)	COG		560pf	560pf	560pf	470pf
	X7R		.012mfd	.01mfd	3300mfd	1500mfd
	Y5V	.056mfd				
R15 (.080 x .050 x .050T)	COG		1500pf	1500pf	1500pf	1200pf
	X7R		.039mfd	.027mfd	.013mfd	5600mfd
	Y5V	.150mfd				
R29 (.180 x .080 x .065T)	COG		.012mfd	.012mfd	.012mfd	8200pf
	X7R		.270mfd	.180mfd	.120mfd	.047mfd
	Y5X	1.20mfd				
S41 (.125 x .095 x .065T)	COG		.01mfd	.01mfd	.01mfd	8200pf
	X7R		.22mfd	.15mfd	.082mfd	.039mfd
	Y5V	1.5mfd				

SPLIT-CHIP CAPACITORS

The SPLIT-CHIP capacitor is a new concept in chip design which eliminates the need for an end termination. Featured are lower cost, typically 15% less than equivalent conventional chips, easy to solder or epoxy bond and availability in five dielectric materials.

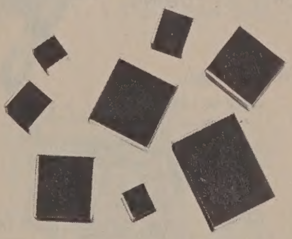


Dielectric	Capacitance Ranges — pf*
High Q	.10 — 0.70 to 1.5 — 15
NPO	.30 — 2.9 to 5.6 — 56
P3K	.68 — 6.8 to 15 — 150
X7R	6.8 — 68 to 150 — 1500
Z5U	68 — 250 to 470 — 4700
Y5V	100 — 390 to 560 — 8200

*In 5 size ranges of .040″ L x .030″ W x .015″ T to .130″ L x .090″ W x .015″ T

HIGH VOLTAGE CHIP CAPACITORS

Available in either NPO/COG or BX/X7R dielectric, these units are designed to obtain high capacitance values to 4000 VDCW. Typical applications include high voltage power supplies and meter multiplier circuits. Built to suit specific customer requirements.



Maximum Capacitance Available with Voltage Applied

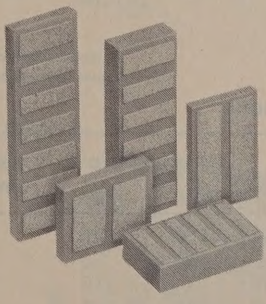
JDI Size	VDCW 1000	2000	3000	4000
HV42	6800pf	1800pf	6800pf	330pf
HV46	.015mfd	3900pf	1500pf	680pf
HV50	.033mfd	8200pf	3300pf	1500pf
HV60	.056mfd	.015mfd	4700pf	2200pf
HV65	.082mfd	.022mfd	8200pf	4700pf

Part No.	Dimensions (L x W x T)		
HV42	.15	.15	.12
HV46	.19	.19	.12
HV50	.33	.33	.12
HV60	.40	.40	.12
HV65	.54	.40	.12

MULTIPLE CAPACITOR ARRAYS

Capacitor savings are made possible with Johanson Dielectrics' Multiple Capacitor Arrays, custom-designed, single-plate, multiple capacitance elements. Rugged, precise, with high mechanical and dielectric strength, these devices are compact capacitance arrays ideally suited for multiple circuit coupling, filtering, by-pass and high-voltage meter multiplier circuits.

Units serve as practical replacements for arrays of individually bonded chips in hybrid circuits. Built in a variety of dielectric characteristics, they are available to meet specific requirements.

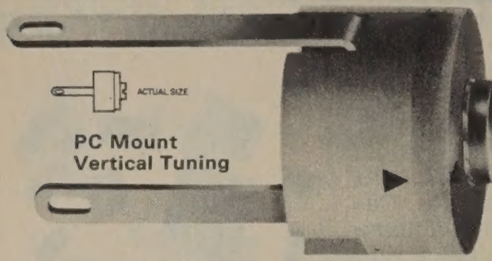


JOHANSON DIELECTRICS, INC.
DEPT. EM, P.O. BOX 6456, BURBANK, CALIFORNIA 91510
TELEPHONE (213) 848-4465 TWX 910-498-2735

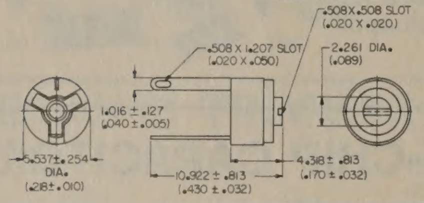
JOHNSON ®
E. F. JOHNSON COMPANY, WASECA, MINNESOTA 56093

Sub-Miniature Ceramic Disc Trimmers

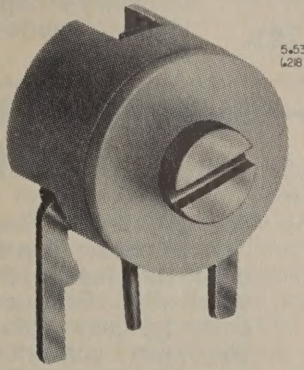
100 SERIES. This sub-miniature ceramic disc trimmer exhibits extreme environmental stability and long life due to the encapsulation of the rotor plate in titanate. Diameter is .218" on PC Mount Vertical tuning and Horizontal tuning. The stator is high alumina for lower loss and higher strength — a necessity for extreme environmental conditions. Smooth linear tuning is realized by precision lapping of bearing surfaces. Designed to meet or exceed performance criteria of MIL-C-81B. Operating range is −55° to 125° C. NPO temperature characteristics, Type A. Working voltage 100 VDC up to 85°C, 50 VDC up to 125°C. Peak withstanding voltage is greater than twice the working voltage.

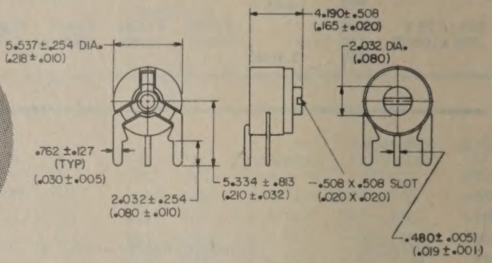

ACTUAL SIZE

PC Mount Vertical Tuning

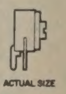

.508X.508 SLOT
(.020 X .020)
.508 X 1.207 SLOT
(.020 X .050)
2.261 DIA.
(.089)
1.016 ± .127
(.040 ± .005)
5.537±.254
DIA.
(.218±.010)
10.922 ± .813
(.430 ± .032)
4.318± .813
(.170 ± .032)

PC Vertical Cat. No.	PC Horizonal Cat. No.	Nominal Capacity (pF) Max.	Min.
274-0009-005	274-0009-105	9.0	2.5
274-0020-005	274-0020-105	20.0	3.5
274-0025-005	274-0025-105	25.0	5.0



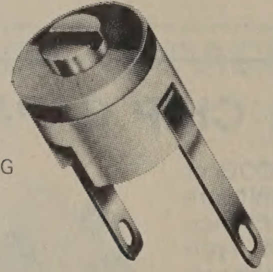

4.190± .508
(.165 ±.020)
5.537±.254 DIA.
(.218± .010)
2.032 DIA.
(.080)
.762 ±.127
(TYP)
(.030±.005)
2.032±.254
(.080 ±.010)
5.334 ± .813
(.210 ±.032)
.508 X .508 SLOT
(.020 X .020)
.480± .005)
(.019 ±.001)

PC Mount Horizontal Tuning


ACTUAL SIZE

Micro J.® #90 Series Trimmer Capacitors

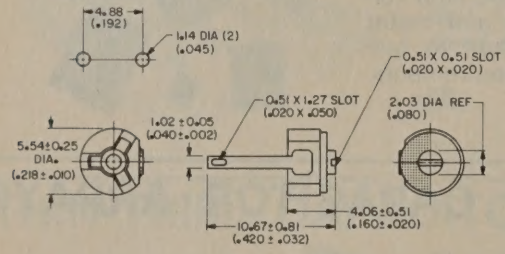
This new low cost sub-miniature ceramic disc trimmer with non-encapsulated rotor plate occupies less than .007 cubic inches and has a diameter of only .218". The stator is high alumina for lower loss and higher strength — a necessity for extreme environmental conditions. Lapped bearing surfaces produce smooth tuning. Peak withstanding voltage is greater than twice the working voltage. Operating range is −55°C to 125°C. Working voltage 100 VDC up to 85°C, 50 VDC to 125°C.



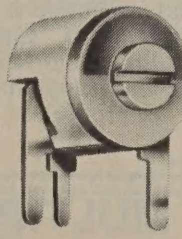
PC MOUNT
VERTICAL TUNING

VERTICAL TUNING

MOUNTING LAYOUT


4.88
(.192)
1.14 DIA (2)
(.045)
0.51 X 0.51 SLOT
(.020 X .020)
0.51 X 1.27 SLOT
(.020 X .050)
2.03 DIA REF
(.080)
1.02 ±0.05
(.040±.002)
5.54±0.25
DIA.
(.218±.010)
4.06±0.51
(.160±.020)
10.67±0.81
(.420 ± .032)

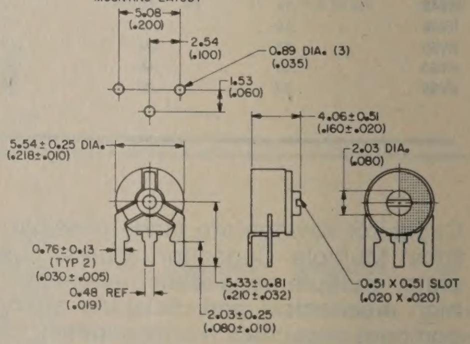
Upper dimensions in mm;
lower dimensions () in inches.



PC MOUNT
HORIZONTAL TUNING

HORIZONTAL TUNING

MOUNTING LAYOUT


5.08
(.200)
2.54
(.100)
0.89 DIA. (3)
(.035)
1.53
(.060)
4.06±0.51
(.160±.020)
5.54± 0.25 DIA.
(.218±.010)
2.03 DIA.
(.080)
0.76±0.13
(TYP 2)
(.030± .005)
0.48 REF
(.019)
5.33±0.81
(.210±.032)
2.03±0.25
(.080±.010)
0.51 X 0.51 SLOT
(.020 X .020)

SPECIFICATIONS

Part Number	Capacitance (pF) Min.	Max.	Temperature Characteristics
274-1003-005	1.5	3.0	A
274-1003-105	1.5	3.0	A
274-1009-005	3.0	9.0	A
274-1009-105	3.0	9.0	A
274-1015-005	4.5	15.0	C
274-1015-105	4.5	15.0	C
274-1022-005	7.0	22.0	G
274-1022-105	7.0	22.0	G

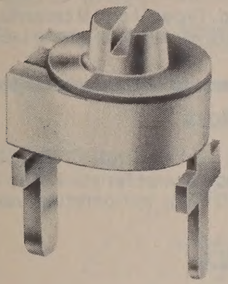
TEMPERATURE CHARACTERISTICS
(Percent Change from 25°C)

Dielectric Code	-55°C Min.	Max.	85°C Min.	Max.	125°C Min.	Max.
A	-6.25	+2.0	-2.5	+2.0	-4.2	+3.4
C	-1.0	+6.5	-4.0	-1.0	-6.7	-1.7
G	0.0	+14.0	-8.0	-3.0	-14.0	-5.0

JOHNSON®

E. F. JOHNSON COMPANY, WASECA, MINNESOTA 56093

Sub-Miniature Ceramic Disc Trimmers



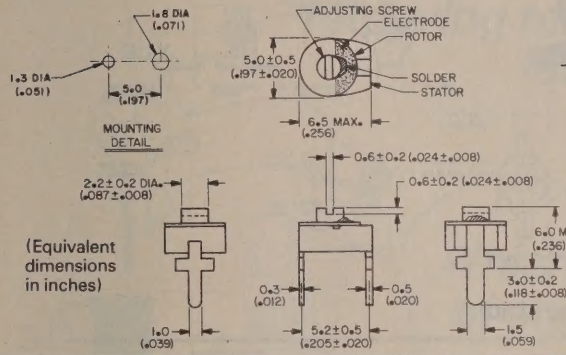
PRINTED CIRCUIT MOUNTING

This 5mm size ceramic trimmer is designed to preclude metal particle migration by utilizing tin plating of the stator plate rather than silver, and providing polarity orientation by means of terminal size.

Titinate rotor is precision lapped to minimize capacitance aging.

Q is 500 minimum at 1 MHz. Working voltage is 50 VDC up to +85°C. Temperature range, −25°C to +85°C.

Dielectric strength 150 VDC for 5 seconds. Insulation resistance 10,000 megohms at 50 VDC. Starting and running torque .415 to 2.08 oz.-in. (30 to 150 gram-centimeters).



ELECTRICAL CHARACTERISTICS

Part No.	Temperature Characteristics	Temperature Coefficient (X10⁻⁶/°C)	Nominal Capacitance (PF) Min.	Max.	Rated Voltage (VDC)
278-0103-005	A	NPO	1.0	3.0	50
278-0105-005	A	NPO	2.0	5.0	50
278-0410-005	D	N750	4.0	10.0	50
278-0420-005	D	N750	8.0	20.0	50

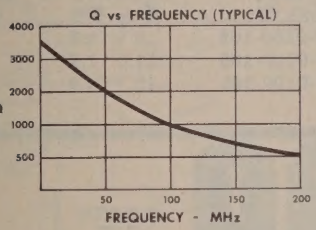
TEMPERATURE CHARACTERISTICS

Characteristics	−25°C Min(%)	−25°C Max(%)	+85°C Min(%)	+85°C Max(%)
A	−3.1	+1.4	−2.5	+2.0
D	−0.7	+5.0	−8.0	−1.5

Micro-T™ Capacitors

This new Micro-T series provides all the advantages of machined plate construction in a substantially size reduced form. PC mount versions mount interchangeably with our Micro-J ceramic trimmers and competitive equivalents.

Metal parts are silver plated and Iridited for excellent conductivity and ease in soldering. Ceramic is 95% high aluminum Grade L-624 or better. Temperature coefficient is a low +45 ±45 ppm/°C. Torque of .5 to 3.5 oz/inches holds rotor securely under vibration.



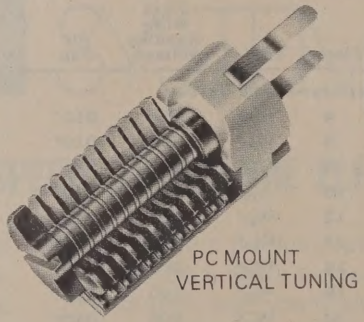
SPECIFICATIONS

Vertical Tuning Cat. No.	Horizontal Tuning Cat. No.	Nominal Capacity (pF) Max.	Min.	Length
PC MOUNT				
186-0603-005	186-0603-105	3.0	1.0	.29
186-0607-005	186-0607-105	6.5	1.2	.37
186-0613-005	186-0613-105	12.7	1.5	.54
186-0419-005	186-0419-105	19.0	1.6	.50

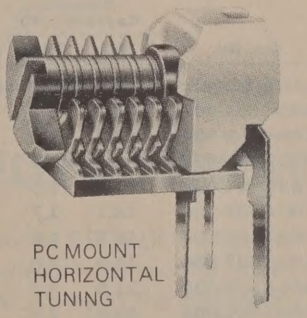
Vertical Tuning Cat. No.	Horizontal Tuning Cat. No.	Nominal Capacity (pF) Max.	Min.	Length
STRIPLINE MOUNT				
186-0603-175	186-0603-165	3.0	1.0	.29
186-0607-175	186-0607-165	6.5	1.2	.37
186-0613-175	186-0613-165	12.7	1.5	.54
186-0419-175	186-0419-165	19.0	1.6	.50

NOTE: **Peak Withstanding Voltage**

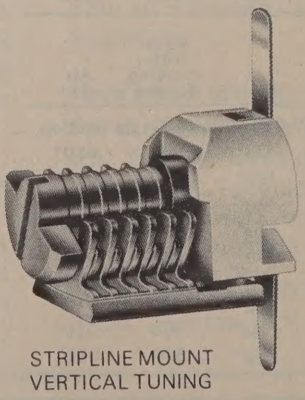
186-0600 Series	**150V**
186-0400 Series	**100V**



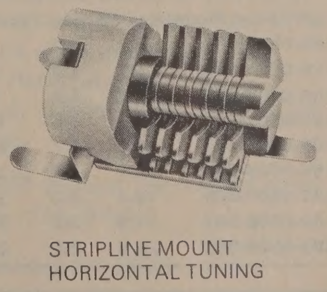
PC MOUNT VERTICAL TUNING



PC MOUNT HORIZONTAL TUNING



STRIPLINE MOUNT VERTICAL TUNING



STRIPLINE MOUNT HORIZONTAL TUNING

JOHNSON®

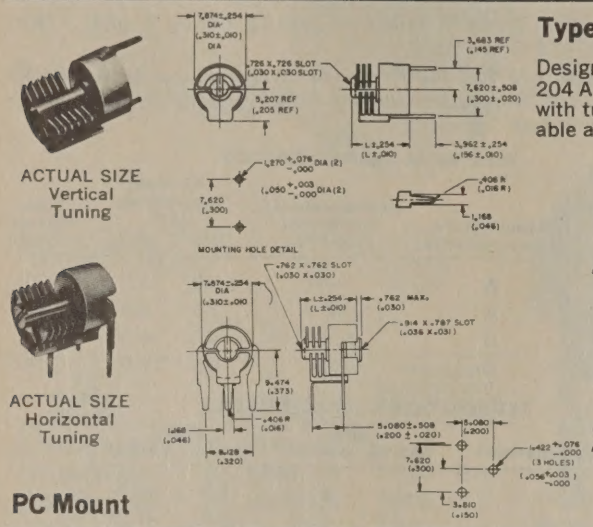
E. F. JOHNSON COMPANY, WASECA, MINNESOTA 56093

Air Variable Capacitors

Johnson sub-miniature air variable capacitors are available in a variety of sizes, mounting configurations and section types. Rotors and stators are precision machined from one piece of solid brass for outstanding stability, uniformity and freedom from moisture entrapment. They offer high "Q" . . . typically 2000 @ 150 MH$_2$ and exceptionally low temperature coefficient: Type T plus 30± 15 ppm/°C; Type U plus 45± 15 ppm/°C. Metal parts are silver-plated. Types U and V ceramic are steatite grade L-423 or better. Type T ceramic is 95% Alumina grade L-624 or better.

Type "T" Air Variable Capacitors

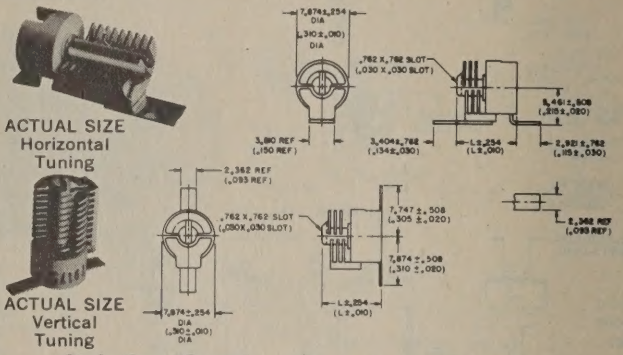
Designed to meet or exceed E1A-RS 204 and MIL-STD-202C methods 204 A and 201 A. Offer excellent retrace characteristics. Can be supplied with tuning slot on both ends of rotor. High temperature versions available as specials.


7,874±.254 DIA (.310±.010) DIA
.726 X .726 SLOT (.030 X .030 SLOT)
3,683 REF (.145 REF)
7,620±.508 (.300±.020)
5,207 REF (.205 REF)
L±.254 (L±.010)
3,962±.254 (.156±.010)
.406 R (.016 R)
1,168 (.046)
7,620 (.300)
MOUNTING HOLE DETAIL
.762 X .762 SLOT (.030 X .030)
L±.254 (L±.010)
.762 MAX. (.030)
.914 X .787 SLOT (.036 X .031)
9,474 (.373)
.406 R (.016)
1,168 (.046)
8,129 (.320)
5,080±.508 (.200±.020)
5,080 (.200)
(3 HOLES)
7,620 (.300)
3,810 (.150)

ACTUAL SIZE Vertical Tuning

ACTUAL SIZE Horizontal Tuning

PC Mount


7,874±.254 DIA (.310±.010) DIA
.762 X .762 SLOT (.030 X .030 SLOT)
5,461±.508 (.215±.020)
3,810 REF (.150 REF)
3,404±.762 (.134±.030)
L±.254 (L±.010)
2,921±.762 (.115±.030)
2,362 REF (.093 REF)
.762 X .762 SLOT (.030X .030 SLOT)
7,747±.508 (.305±.020)
7,874±.508 (.310±.020)
2,362 REF (.093 REF)
L±.254 (L±.010)
7,874±.254 DIA (.310±.010) DIA

ACTUAL SIZE Horizontal Tuning

ACTUAL SIZE Vertical Tuning

Stripline Mount

Vert. Tuning Cat. No.	Horiz. Tuning Cat. No.	Nominal Capacity (pF) Max.	Min.	Length (In.)
187-0103-005	187-0303-105	5.4	1.3	.36
187-0106-005	187-0306-105	11.0	1.7	.47
187-0109-005	187-0309-105	15.7	1.9	.58

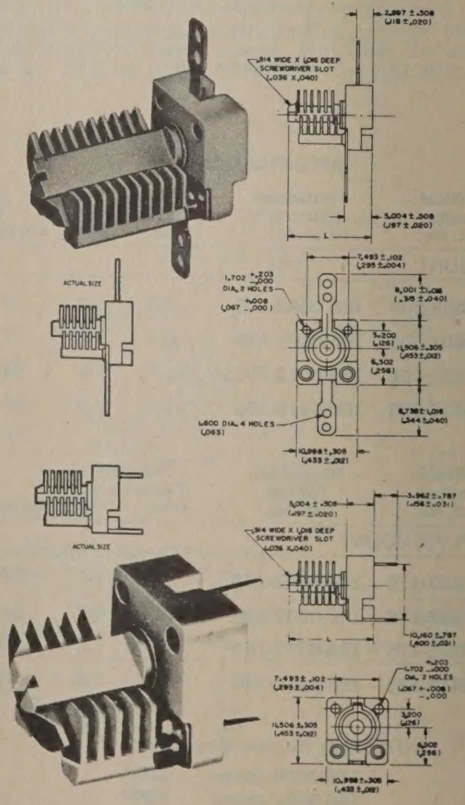
Vert. Tuning Cat. No.	Horiz. Tuning Cat. No.	Nominal Capacity (pF) Max.	Min.	Length (In.)
187-0103-175	187-0103-165	5.4	1.3	.36
187-0106-175	187-0106-165	11.0	1.7	.47
187-0109-175	187-0109-165	15.7	1.9	.58

Also available as specials with minimum of 4 plates to maximum of 20 plates.

Type "U" Capacitors

Cat. No.	Nominal Capacity (pF) Max.	Min.	Plates	L±1/32"	Peak With-standing Voltage	Air Gap
Two-Hole Mounting / Type "U" Capacitors—Single Section						
189-0501-004	4.2	1.2	4	27/64"	650	.010"
189-0502-004	6.7	1.3	6	15/32"	650	.010"
189-0503-004	9.2	1.4	8	33/64"	650	.010"
189-0504-004	11.6	1.5	10	9/16"	650	.010"
189-0505-004	14.1	1.7	12	39/64"	650	.010"
189-0506-004	16.7	1.8	14	43/64"	650	.010"
189-0507-004	19.3	2.0	16	23/32"	500	.010"
189-0508-004	21.9	2.2	18	49/64"	500	.010"
189-0509-004	24.5	2.4	20	13/16"	500	.010"

Cat. No.	Nominal Capacity (pF) Max.	Min.	Plates	L±1/32"	Peak With-standing Voltage	Air Gap
Printed Circuit Mounting / Vertical Type "U" Capacitors—Single Section						
189-0501-005	4.2	1.2	4	27/64"	650	.010"
189-0502-005	6.7	1.3	6	15/32"	650	.010"
189-0503-005	9.2	1.4	8	33/64"	650	.010"
189-0504-005	11.6	1.5	10	9/16"	650	.010"
189-0505-005	14.1	1.7	12	39/64"	650	.010"
189-0506-005	16.7	1.8	14	43/64"	650	.010"
189-0507-005	19.3	2.0	16	23/32"	500	.010"
189-0508-005	21.9	2.2	18	49/64"	500	.010"
189-0509-005	24.5	2.4	20	13/16"	500	.010"


2,997±.508 (.118±.020)
.914 WIDE X 1,016 DEEP SCREWDRIVER SLOT (.036 X .040)
5,004±.508 (.197±.020)
L
7,493±.102 (.295±.004)
ACTUAL SIZE
1,702 DIA, 2 HOLES
8,001±1,016 (.315±.040)
3,200 (.126)
11,506±.305 (.453±.012)
6,502 (.256)
8,738±1,016 (.344±.040)
1,600 DIA, 4 HOLES (.063)
10,998±.305 (.433±.012)
3,962±.787 (.156±.031)
5,004±.508 (.197±.020)
ACTUAL SIZE
.914 WIDE X 1,016 DEEP SCREWDRIVER SLOT (.036 X.040)
L
10,160±.787 (.400±.031)
7,493±.102 (.295±.004)
1,702 DIA, 2 HOLES
11,506±.305 (.453±.012)
3,200 (.126)
6,502 (.256)
10,998±.305 (.433±.012)

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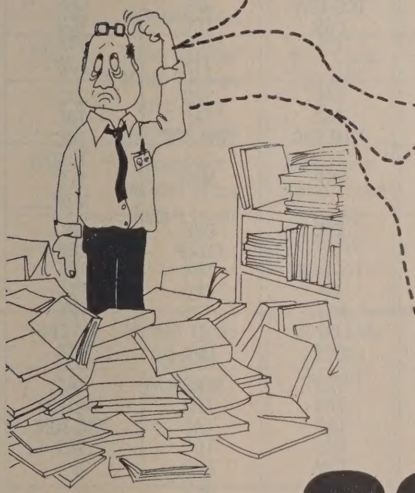

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CAPACITOR SELECTOR GUIDE

Capacitor types are grouped by application and dielectric. Within each group, capacitors are ranked in descending order of performance.

	PERFORMANCE CHARACTERISTICS							
APPLICATION BY TYPE OF CAPACITOR	CV PRODUCT	HIGH TEMP. °C	LOW TEMP. °C	DC LEAKAGE	ESR	HIGH FREQ. IMPEDANCE	RIPPLE	LIFE
POWER SUPPLIES Aluminum Electrolytic	CGX CGS CG SFC FP TCG-TCX TT-VPR	TCX-VPR CG-SFC CGS-TCG CGX TT-FP	TT-TCX-VPR CG-SFC CGS-TCG CGX FP	TT-VPR TCG-TCX CG-SFC CGS-CGX FP	SFC TCX-VPR CGS CG CGX FP TT-TCG	SFC TT-VPR TCG-TCX FP CGS CG CGX	SFC CGS CG CGX FP TCX-VPR TCG-TT	CG SFC CGS-CGX TCX-VPR TCG TT-FP
Tantalum Electrolytic	TL XT TLS-CTL TAS-THF	XT TL TAS-THF TLS-CTL	THF TAS TLS TL XT CTL	TLS-CTL TAS-THF XT TL	THF TAS TL XT TLS CTL	THF TAS TL TLS XT CTL	THF TAS XT TL TLS CTL	TAS THF XT TL TLS-CTL
COMMUNICATIONS Aluminum Electrolytic	CGS CG TCW TCG TTX	CG TTX CGS-TCG TCW	TTX CG CGS-TCG TCW	TTX TCG-TCW CG CGS	CGS CG TTX TCG-TCW	TTX TCG-TCW CGS CG	CGS CG TCG TCW TTX	CG CGS TCG TTX TCW
Tantalum Electrolytic	TLS MTP TAS TDC-TDM TAC TRM	TAC TAS TLS TDC-TDM MTP	TAS TAC TDM-TDC TLS MTP	MTP TLS TAS TAC TDM-TDC	TAS TAC TDM-TDC TLS MTP	TAS TAC TDM-TDC TLS MTP	TAS TAC TDM-TDC TLS MTP	TAS TAC TDC TDM TLS MTP
EDP AND INSTRUMENTATION Aluminum Electrolytic	CGS CG FP TCG-TCX TT TTX MTA	TCX CG TTX CGS-TCG FP-TT MTA	TCX TT-TTX CG CGS-TCG FP MTA	TTX TT TCG-TCX CG CGS FP MTA	CGS CG-FP TCX TTX TT TCG MTA	TTX TT TCG-TCX FP MTA CG CGS	CGS CG-FP TCX TCG TTX TT MTA	CG CGS TCX TCG TTX FP-TT MTA
Tantalum Electrolytic	TLS TDC TAS TIM TDM TAC	TAC-TIM TAS TLS TDC-TDM	TAS TAC TIM TDC TDM TLS	TAS TAC TIM TDC TDM TLS	TAS TIM TAC TDC TDM TLS	TAS TIM TAC TDC TDM TLS	TAS TIM TAC TDC TDM TLS	TAS TAC-TIM TDC-TDM TLS
HIGH RELIABILITY Aluminum Electrolytic	CGS CG PG TCG-TCX TPG VPG-VPR	TCX-VPR CG-PG TPG-VPG CGS-TCG	TCX-VPR CG-PG TPG-VPG CGS-TCG	TPG-VPG-VPR TCG-TCX PG-CG CGS	CGS CG-PG VPR TPG-VPG TCG-TCX	VPR CGS CG-PG TPG-VPG TCG-TCX	CGS CG-PG TCX-VPR TPG-VPG TCG	CG-PG CGS TCX-VPR TPG-VPG TCG
Tantalum Electrolytic	XT TLX MTP TER TIM HAT	XT TLX TIM TER HAT MTP	TER TRM HAT TLX XT MTP	MTP TLX XT TER HAT TIM	TER TIM HAT XT TLX MTP	TER TIM HAT TLX MTP XT	TER XT TIM TLX MTP HAT	TER TIM HAT XT TLX MTP
GENERAL PURPOSE Aluminum Electrolytic	FP TCW TT VTT MCT	TT-VTT FP TCW MCT	TT-VTT FP TCW MCT	TT-VTT TCW FP MCT	FP TCW TT-VTT MCT	TT-VTT FP TCW MCT	FP TCW TT-VTT MCT	FP TT-VTT TCW MCT
Tantalum Electrolytic	CTL TAS TDC CMT TDM	TAS TDC-TDM CTL CMT	TAS TDC-TDM CTL CMT	CMT CTL TAS TDC TDM	TAS TDC-TDM CTL CMT	TAS TDC-TDM CTL CMT	TAS TDC-TDM CTL CMT	TAS TDC-TDM CTL CMT
AC MOTOR Aluminum Electrolytic	P	P	P	P	P	P	P	P
Oil	CR CRN	CR CRN	CRN CR	CR CRN	CR CRN			CR CRN

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Electrical and Electronic Components • Timing Devices and Motors • Metallurgical Products

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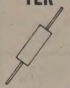
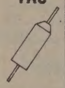
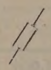
MALLORY

TANTALUM SOLID ELECTROLYTE CAPACITORS

TYPE	DESCRIPTION	TERMINALS	TEMP. RANGE (°C)	VOLT. RANGE (WVDC)	CAP. RANGE (μF)	STD. TOL. (% μF)	CASE SIZES DIA. x LGTH. (Inches) H x W x D (Inches)	FEATURES	TIB
TAS	Metal Tubular, Axial Lead Hermetic Seal	Wire Leads 22 AWG 24 AWG	−80 to +125	6 to 75	.0047 to 1000	±5 ±10 ±20	.125 x .250 .175 x .438 .279 x .650 .341 x .750	Low DC Leakage Temperature Stable High Capacity Long Shelf Life	4-801
TAE	Metal Tubular, Epoxy Fill Axial Lead	Wire Leads 22 AWG 24 AWG	−55 to +85	6 to 75	.0047 to 1000	±10 ±20	.126 x .265 .175 x .325 .175 x .452 .279 x .650 .341 x .750	High Shock & Vibration Capability	4-85
TER 	Mylar Sleeved Metal Tubular, Axial Lead Hermetic Seal	Wire Leads 22 AWG 24 AWG	−55 to +125	6 to 50	.0047 to 330	±5 ±10 ±20	.135 x .286 .185 x .474 .289 x .686 .351 x .786	MIL-C-39003D CSR13, 23, 33 High Reliability	4-813
THF	Mylar Sleeved Metal Tubular, Axial Lead Hermetic Seal	Wire Leads 22 AWG	−80 to +125	6 to 50	5.6 to 330	±10 ±20	.289 x .686 .351 x .786	4.5 Amps Ripple Capability, Low ESR at High Freq. from 1kHz-100kHz	4-83
TIM	Rectangular Molded Epoxy Radial Lead	Wire Leads Single Ended 22 AWG 24 AWG	−55 to +125	3 to 50	.082 to 220	±10 ±20	.340 x .228 x .105 .225 x .285 x .170 .335 x .360 x .170 .375 x .600 x .195	Low Cost, High Density Mounting, Automatic Insertion Capability	4-806
TAC 	Molded Epoxy Tubular, Axial Lead	Wire Leads 22 AWG 24 AWG	−55 to +125	3 to 50	.082 to 330	±10 ±20	.105 x .300 .148 x .350 .180 x .350 .200 x .540 .310 x .720 .375 x .885	Low Cost, Automatic Insertion Capability	4-806
TDM	Epoxy Dipped, Rectangular Radial Lead	Wire Leads Single Ended 24 AWG	−55 to +85	6 to 50	.10 to 330	±10 ±20	.27 x .27 x .18 .33 x .32 x .21 .37 x .40 x .22 .40 x .40 x .25 .46 x .48 x .32 .56 x .58 x .32	Low Profile Low Cost High Volumetric Efficiency	4-814
TDC	Epoxy Dipped, Radial Lead	Wire Leads Single Ended 22 AWG 24 AWG Spacing .10-.25	−55 to +85	6 to 50	.10 to 680	±10 ±20	.18 x .28 .20 x .30 .18 x .35 .26 x .36 .34 x .40 .25 x .50 .40 x .56 .35 x .65 .44 x .68 .40 x .75	Low Cost Temp. Stable Long Storage Life Low Profile Plug-in	4-810
HAT 	Plastic Filled Metal Tubular, Axial Lead	Wire Leads	−55 to +85	6 to 100	.027 to 47	±10 ±20	.07 x .12 .07 x .17 .10 x .25 .14 x .25	Subminiature High Volumetric Efficiency	4-812

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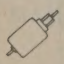
MALLORY

TANTALUM WET SLUG CAPACITORS

TYPE	DESCRIPTION	TERMINALS	TEMP. RANGE (°C)	VOLT. RANGE (WVDC)	CAP. RANGE (μF)	STD. TOL. (% μF)	CASE SIZES DIA. x LGTH. (Inches) H x W x D (Inches)	FEATURES	TIB
TLX	Silver Tubular, Axial Lead, Hermetic Seal Mylar Sleeve	Wire Leads 22 AWG	−55 to +125	6 to 125	1.7 to 2200	±5 ±10 −15 +20 −15 +30 −15 +50	.219 x .515 .312 x .703 .406 x .828 .406 x 1.12	MIL-C-39006 CLR65 & CLR69 High CV Long Life High Reliability	4-607
TLS	Silver Tubular, Axial Lead Elastomer Seal	Wire Leads 22 AWG	−55 to +125	6 to 125	1.7 to 2200	±5 ±10 −15 +20 −15 +30 −15 +50	.188 x .453 .281 x .644 .375 x .766 .375 x 1.06	MIL-C-3965 Styles CL64 & CL65, Low DCL Wide Temp. Range	4-71
CTL	Copper Alloy Tubular, Axial Lead, Elastomer Seal	Wire Leads 22 AWG	−55 to +125	6 to 125	3.6 to 1200	±10 −15 +20 −15 +30 −15 +50	.188 x .453 .281 x .644 .375 x .766 .375 x 1.06	Low Cost Low DCL Wide Temp. Range	4-610
CMT	Copper Alloy Tubular, Red Plastic, Case Insulated	Wire Leads 24 AWG	−55 to +85	6 to 60	1 to 450	±20	.115 x .300 .115 x .403 .145 x .600 .225 x .778	Low Cost, High Cap, Miniature Size	4-609
MTP	Silver Tubular, Red Plastic, Axial Lead Case Insulated	Wire Leads 24 AWG	−55 to +85	6 to 60	3.3 to 470	±20	.115 x .300 .115 x .403 .145 x .600 .225 x .778	High Cap, Miniature Size	4-606
TAP	Silver Tubular, Black Plastic, Axial Lead Case Insulated	Wire Leads 24 AWG	−55 to +85	6 to 90	2 to 330	−15 +75 −15 +50 −15 +20 −10 +20 ±10	.226 x .504 .226 x .560 .226 x .847	Low ESR, Miniature Size	4-52
TNT	Silver Tubular, Yellow Plastic, Axial Lead Case Insulated	Wire Leads 24 AWG	−55 to +85	3 to 50	2 to 80	−15 +75	.163 x .347 .163 x .472	Low DCL, Miniature Size	4-38
TAH	Silver Tubular, Green Plastic, Axial Lead Case Insulated	Wire Leads 24 AWG	−55 to +125	4 to 60	2 to 330	−15 +75 ±10 −10 +20 −15 +20 −15 +50	.238 x .470 .238 x .600 .238 x .810	Miniature Size, Wide Temp. Range, Low DCL	4-57
XTM XTK XTH XTL XTV 	Metal Can, Single or Dual Ended, Hermetic Seal	Wire Leads, Screw, Stud, Solder Lug, Turret	−55 to 200°C	20 to 900	2 to 2200	−15 +75 −15 +50 ±20	1.062x1.275x.690 1.375x1.275x.690 1.625x1.275x.690 2.000x1.275x.690 2.500x1.275x.690	MIL-C-39006 CLR10, 14 & 17 High Reliability Rugged Construction Very High Temp. High Cap & Voltage	4-84
TL	Metal Case Rectangular, Glass to Metal Seal	Solder Lugs	−55 to +125	15 to 150	70 to 2400	±20	1.062x1.275x.690 1.375x1.275x.690 1.625x1.275x.690 2.000x1.275x.690 2.500x1.275x.690	MIL-C-3965 Style CL55, Low DCL, Wide Temp. Range	4-901

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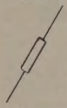
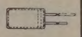
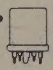
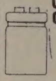
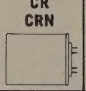
ALUMINUM ELECTROLYTIC CAPACITORS

TYPE	DESCRIPTION	TERMINALS	TEMP. RANGE (°C)	VOLT. RANGE (WVDC)	CAP. RANGE (μF)	STD. TOL. (% μF)	CASE SIZES DIA. x LGTH. (Inches) H x W x D (Inches)	FEATURES	TIB
TT TTX 	Aluminum Tubular, Axial Lead	Wire Leads	−40 to +85 −55 to +85	3 to 150 3 to 150	1 to 4600 1 to 2500	−10 +100 −10 +50	.26 x .62 to .75 .37 x .62 to 1.50 .44 x 1.00 to 2.00 .50 x 1.00 to 2.00 .62 x 1.00 to 1.50	Miniature, All Welded Construction Low DCL, Low ESR	4-104 4-105
TCW 	Aluminum Tubular, Axial Lead	Wire Leads	−20 to +85	3 to 450	2 to 36,000	−10 +100	.50 x 1.12 to 2.12 .62 x 1.12 to 2.62 .75 x 1.12 to 2.75 .87 x 1.37 to 3.12 1.00 x 1.37 to 3.89	All Welded Construction	4-103
TC 	Aluminum Tubular, Axial Lead or Single Ended	Wire Leads, Solder Lugs, PC Lugs	−40 to +85 −30 to +85	50 to 300 301 to 450	10 to 2250 10 to 130	−10 +100 −10 +50	.50 x 1.06 to 1.31 .62 x 1.06 to 1.81 .75 x 1.06 to 2.69 .87 x 1.31 to 2.69 1.00 x 1.31 to 3.81	Single or Dual Section, Rugged, Choice of Terminals	4-102
TCX 	Aluminum Tubular, Axial Lead	Wire Leads	−55 to +105	3 to 150	10 to 26,000	−10 +100 −10 +50	.50 x 1.12 to 2.12 .62 x 1.12 to 2.62 .75 x 1.12 to 2.62 .87 x 1.12 to 3.12 1.00 x 1.12 to 3.62	High Temperature Computer Grade Low DCL, Low ESR All Welded Construction	0-311
TCG TPG 	Aluminum Tubular, Axial Lead	Wire Leads	−40 to +85 −40 to +85	3 to 450 3 to 450	2 to 36,000 2 to 17,000	−10 +75 −10 +50 −10 +100	.50 x 1.12 to 2.12 .62 x 1.12 to 2.62 .75 x 1.12 to 2.62 .87 x 1.12 to 3.12 1.00 x 1.12 to 3.62	Computer Grade High Cap, Low DCL, Low ESR, All Welded Construction, TPG High Reliability, Premium Grade	4-307 4-67
VTT VPG VPR 	Aluminum Can, Vertical Mount Single Ended	Wire Leads, Plug-in	−20 to +85 −40 to +85 −55 to +105	3 to 50 3 to 150 3 to 150	27 to 3300 22 to 25,000 22 to 19,000	−10 +100 −10 +50	.40 x .577 to .702 .437 x .100 .50 x 1.00 to 1.62 .625 x 1.00 1.00 x 1.12 x 3.62	Miniature, All Welded Low DCL, Low ESR VTT—Industrial VPG—Hi Rel VPR—Hi Temp	4-202 4-306
FP PFP 	Aluminum Can, Twist-Tab or PC Vertical Mount	Solder Lugs, Wire Wrap, PC Lugs	−30 to +85	6 to 500	20 to 44,000	−10 +150 −10 +100 −10 +50	.75 x 1.50 to 3.00 1.00 x 1.50 to 4.00 1.37 x 1.75 to 5.00 1.37 x 1.50 x 5.00	Single or Multi-Section	4-101
CGS CGX CG PG  	Aluminum Can, Bracket Mount or Chassis Mount	Solder Lugs, Screw, Turret	−40 to +85	3 to 450	10 to 920,000 10 to 990,000 10 to 630,000 10 to 370,000	−10 +75 −10 +50	1.00 x 1.50 to 4.25 1.37 x 2.00 to 5.62 1.75 x 2.12 to 5.62 2.00 x 2.12 to 5.62 2.50 x 3.12 to 5.62 3.00 x 3.62 to 8.62	Computer Grade Low DCL, Low ESR CGS—Hi Perform CGX—Hi Cap CG—Long Life PG—Hi Rel	4-303 4-312 4-304 4-56
SFC 	Aluminum Can, Bracket or Buss-Bar Mount	Buss-Bar Screw	−40 to +85	6 to 50	6800 to 100,000	−0 +100	3.00 x 4.12 to 5.62	Computer Grade Low DCL, Ultra-Low ESR, Ultra-High Ripple Capability	4-310
MCT 	Molded Plastic Tubular, Single Ended	Flex Wire Leads	−30 to +85	3 to 100	3 to 9000	−10 +100 −10 +50	.87 x 1.50 to 2.50	Low Cost, All Welded Construction	4-201
HC NP 	Bakelite Case, Single Ended	Screw	−40 to +85	3 to 450 3 to 450NP	65 to 40,000 30 to 32,000	−10 +150 −10 +100 −10 +50 ±25%	1.44 x 2.75 to 2.06 x 4.37	Rugged Hi-Pot Case, Versatile Mounting, NP—Non-Polar	4-46

MOTOR START & MOTOR RUN CAPACITORS

TYPE	DESCRIPTION	TERMINALS	TEMP. RANGE (°C)	VOLT. RANGE (WVDC)	CAP. RANGE (μF)	STD. TOL. (% μF)	CASE SIZES DIA. x LGTH. (Inches) H x W x D (Inches)	FEATURES	TIB
P 	Bakelite Case, Round Single Ended	Screw, Solder Lugs, Quick Connect	−40 to +85	AC Volts 110 to 330	21 to 1326	−0 +20	1.44 x 2.75 to 4.37 1.81 x 3.37 to 4.37 2.06 x 3.37 to 4.37 2.56 x 4.37	Motor Start, Intermittent AC Duty	4-22 & Supl.
CR CRN 	Aluminum or Terne Plate Steel Can, Round Oval & Rectangular, Single Ended	Quick Connect, Solder Lugs	CR −30 to +70 CRN −55 to +70 (PCB Free)	AC Volts 165 to 660	1 to 65	±10% ±6%	1.69 x 2.16 x 1.31 to 9.50 x 3.66 x 1.97	Motor Run, Continuous AC Duty	4-402

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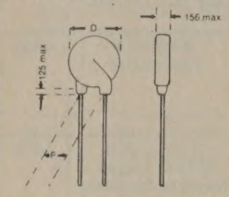
ceramic capacitors

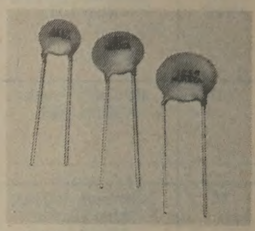
Super-Cap™ to 100V ±10%



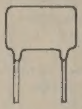
TYPE	DIMENSIONS D (MAX)	DIMENSIONS F	16 VOLTS MAX CAP	16 VOLTS IR (MEGΩ)	25 VOLTS MAX CAP	25 VOLTS IR (MEGΩ)	50 VOLTS MAX CAP	50 VOLTS IR (MEGΩ)	100 VOLTS MAX CAP	100 VOLTS IR (MEGΩ)
DD350	.237	.250	.015	350	.01	500	.01	500	—	—
DD360	.290	.250	.022	250	.015	350	.015	350	.01	500
DD380	.350	.250	.05	110	.022	250	.022	250	.015	350
DD310	.430	.250	.068	75	.05	110	.05	110	.022	250
DD312	.540	.375	.1	50	.068	75	.068	75	.05	110
DD314	.600	.375	.15	40	.1	50	.1	50	.068	75
DD316	.690	.375	.18	35	.12	38	.12	38	.1	50

Standard Capacitance tolerance: ±10%(K), ±20%(M), +80%, −20% (Z) 12V units also available

TC-Y5P



monolithic



EPOXY COATED RECTANGULARS

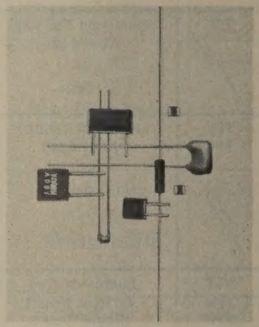
- NPO, X7F, X7R, Z5U Materials
- 25, 50, 100 VDC
- 1 PF to 4.7 MF
- ±5, ±10, ±20 and +80, −20% Tolerances

CHIPS

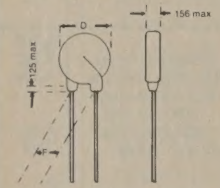
- NPO, X7F, X7R, Z5U Materials
- 25, 50 and 100 VDC
- 1 PF to 680,000 PF
- ±5, ±10, ±20 and +80, −20% Tolerances

MOLDED RECTANGULARS

- NPO, X7R and Z5U Materials
- 25 and 50 VDC
- 10 to 470,000 PF
- ±10, ±20 and +80, −20% Tolerances



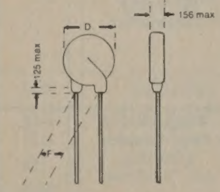
temperature compensating 500 VDC



TYPE	DIMENS. D MAX	DIMENS. F ±.06	NPO	N030	N080	N150	N220	N330	N470	N750	N1500	N2200
DD57	.275	.252	2-16	2-16	3-18	4-20	4-24	5-39	5-39	8-47	22-68	27-82
DD60	.296	.250	12-20	12-20	14-24	15-27	16-31	18-47	18-47	41-62	50-100	60-125
DD61	.375	.250	20-36	20-36	20-39	22-43	27-47	33-82	33-82	51-110	75-150	91-180
DD62-2	.434	.250	36-56	36-56	39-62	43-75	47-82	82-130	82-130	110-150	150-240	180-270
DD62-3	.500	.375	56-82	56-82	62-91	75-110	82-130	130-200	130-200	150-240	240-360	270-470
DD62-0	.591	.375	82-120	82-120	91-130	110-150	130-160	200-270	200-270	240-360	360-470	470-560
DD63-2	.670	.375	120-160	120-160	130-180	150-180	160-200	270-390	270-390	360-470	470-620	560-820
DD63-0	.749	.375	160-200	160-200	180-240	180-270	200-330	390-470	390-470	470-620	620-1100	820-1300

Standard Capacitance Tolerance: ±5%(J), ±10%(K), ±20%(M)

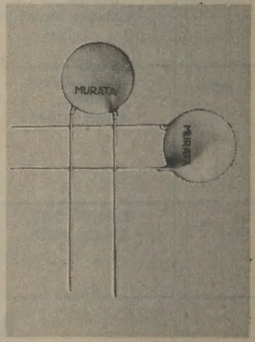
general purpose 500 VDC



TYPE	DIMENSIONS D (MAX)	DIMENSIONS F	CAPACITANCE (pf) X5F	CAPACITANCE (pf) Y5P Z5F Z5P X5R	CAPACITANCE (pf) Y5U	CAPACITANCE (pf) Z5U
DD57-0	.275	.250	100 120 150 180 220 270 330 390 470 560	100 120 150 180 220 270 330 390 470 560 680 820	1000	1000, 1500 1800 2000
DD60	.296	.250	680, 820	1000, 1200	1200, 1500	2200, 2700
DD61	.375	.250	1000, 1200	1500, 2200	2000, 3900	3300, 5600
DD62-2	.434	.250	1500	3300	4700, 5600	6800, 8200
DD62-3	.500	.375	1800, 2200, 2700	3900, 4700	6800, 8200	10000
DD62-0	.591	.375	3300, 3900	5600, 6800	10000, 12000	12000, 18000
DD63-2	.670	.375	4700	7500, 10000	15000, 18000	20000, 22000
DD63-0	.749	.375	5600	12000	20000, 22000	27000, 33000

Standard Capacitance Tolerances Y5F, Y5P, Z5F, Z5P: ±10%, ±20%(K,M).
Y5U, Z5U: +80, −20%(Z). Other tolerances available on special order.

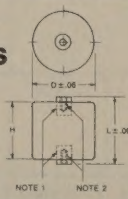
NOTE: For higher capacitance, units are available with two disc elements upon special request. 1000 VDCW capacitors are also available on special request.



high voltage, 40 KVDC Z5V temp. characteristics

NOTE 1:
This terminal may extend up to 0.100 above insulated surface.

NOTE 2:
No. 8-32 NC-2B Tapped holes.



Working KVDC	Capacitance Max-pF	Dimensions (inches)* Max. Cap. D	L	H
10 KV	9,300	2.36	.74	.66
15 KV	6,500	2.36	.90	.82
20 KV	4,800	2.36	1.02	.94
30 KV	3,600	2.36	1.33	1.25
40 KV	2,700	2.36	1.61	1.53

* Smaller capacities have proportionately smaller "D" dimensions. "L" and "H" remain the same.

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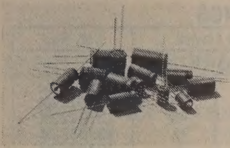
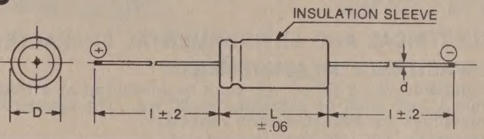
miniature aluminum electrolytic capacitors



CE02W - SERIES

DIMENSIONS



D	d	l
.20 — .32	.02	1.37
.40 - .51 .63 - .88 .98	.025 .032 .04	1.57
1.18	.04	1.57

SPECIFICATIONS

Construction: Aluminum case, tubular, insulating sleeve

Capacitance Tolerance: To 4.7μF — +75%, −10%
Over 4.7μF — +50%, −10%

Operating Temperature Range: −40°C to +85°C
(450V units, .63 D. & greater, −25°C to +70°C)

Leakage Current: 6.3 to 80WVDC — I = 0.02CV +4μA
100 to 430WVDC — I = 0.02CV +100μA

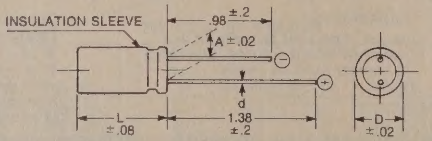
Capacitance (μF)	6.3V			10V			16V			25V			50V			100V			160V			250V			450V		
	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L
0.47	→			→			→			→			1HR47	.20	.49	2AR47	.20	.49									
1	→			→			→			→			1H010	.20	.49	2A010B	.25	.49	2C010	.25	.63	→			2W010A	.40	.79
2.2	→			→			→			→			1H2R2	.20	.49	2A2R2B	.25	.49	2C2R2B	.32	.63	2E2R2A	.32	.79	2W2R2B	.40	.98
3.3	→			→			→			→			1H3R3A	.20	.49	→			2C3R3	.32	.79	→			2W3R3B	.40	1.24
4.7	→			→			→			→			1H4R7B	.25	.49	2A4R7A	.32	.63	2C4R7A	.32	.79	2E4R7B	.40	.79	2W4R7A	.51	1.24
10	→			→			1C100A	.20	.49	→			1H100B	.25	.63	2A100B	.32	.79	2C100B	.40	.98	2E100B	.40	1.24	2W100B	.63	1.58
16	→			→			1C160	.20	.49	1E160	.25	.49	→			2A160	.40	.79	2C160	.51	.98	2E160	.51	1.24	2W160	.71	1.58
22	→			1A220B	.25	.49	→			1E220C	.25	.49	1H220C	.32	.63	2A220B	.40	.79	2C220A	.51	1.24	2E220A	.63	1.24	2W220B	.88	1.58
33	→			→			1C330C	.25	.49	1E330B	.32	.63	1H330B	.32	.79	2A330B	.40	1.24	2C330	.51	1.24	2E330A	.63	1.58	2W330B	.88	1.97
47	→			1A470B	.25	.49	1C470C	.25	.63	1E470E	.32	.63	1H470B	.40	.79	2A470A	.51	1.24	2C470A	.63	1.58	2E470A	.71	1.58	2W470B	.98	1.97
68	0J680	.25	.49	1A680	.25	.63	→			1E680	.32	.63	1H680	.40	.79	2A680	.51	1.24	2C680	.71	1.24	2E680	.88	1.58	2W680	.98	2.49
100	0J101A	.25	.63	→			1C101C	.32	.79	→			1H101E	.40	.98	2A221B	.63	1.24	2C101B	.71	1.58	2E101B	.88	1.97			
150	0J151	.32	.63	1A151	.32	.79	1C151	.40	.79	→			1H151	.40	1.24	2A151	.63	1.58	2C151	.88	1.58						
220	0J221A	.32	.79	→			1C221B	.40	.79	1E221C	.40	.98	1H221E	.51	1.24	2A221B	.71	1.58	2C221B	.98	1.97						
330	→			1A331B	.40	.79	1C331E	.40	.98	→			1H331C	.63	1.24	2A331B	.88	1.97									
470	0J471B	.40	.79	1A471B	.40	.98	1C471G	.40	1.24	1E471C	.51	1.24	1H471E	.63	1.58	2A471B	.98	1.97									
1000	→			1A102B	.51	1.24	1C102E	.63	1.24	1E102F	.63	1.58	1H102F	.88	1.97	2A102	1.18	1.97									
2200	0J222A	.63	1.24	1A222B	.63	1.58	1C222C	.71	1.58	→			1H222	.98	2.49												
3300	0J332A	.63	1.58	1A332B	.71	1.58	1C332A	.88	1.58	1E332B	.98	1.97	1H332	1.18	1.97												
4700	0J472A	.71	1.58	1A472A	.88	1.97	1C472A	.88	1.97	1E472A	.98	2.49	1H472	1.18	2.49												
6800	→			1A682	.88	1.97	1C682	.98	2.49	1E682	1.18	1.97															
10000	0J103A	.88	1.98	1A103	.98	1.97	1C103	1.18	1.97	1E103	1.18	2.49															
15000	0J153	.98	2.49	1A153	1.18	1.97	1C153	1.18	2.49																		
22000	0J223	1.18	1.97	1A223	1.18	2.49																					

Case size in the chart above is Dia. x Length (in.). Part Numbering: CE02W-XXXXXX Type Number from Table.

Note: 35, 73, 80, & 350 volt units also available.

CE04W - SERIES

DIMENSIONS



D	d	A
.20 .25 .32	.02	.079 .098 .138
.40 .51 .63	.025	.197 .197 .295
.71	.032	.295

SPECIFICATIONS

Construction: Aluminum case, tubular, insulating sleeve

Capacitance Tolerance: To 4.7μF — +75%, −10%
Over 4.7μF — +50%, −10%

Operating Temperature Range: −40°C to +85°C

Leakage Current: 6.3 to 80WVDC — I = 0.02CV +4μA
100 to 430WVDC — I = 0.02CV +100μA

Capacitance (μF)	6.3V			10V			16V			25V			50V			100V			160V			250V			450V		
	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L	Type	D	L
0.47	→			→			→			→			1HR47	.20	.39	2AR47B	.20	.49									
1	→			→			→			→			1H010	.20	.39	2A010B	.25	.49	2C010B	.25	.49	2E010B	.32	.49	2W010B	.40	.63
2.2	→			→			→			→			1H2R2B	.20	.39	2A2R2B	.25	.49	2C2R2B	.32	.49	2E2R2B	.32	.63	2W2R2A	.51	.79
3.3	→			→			→			→			1H3R3B	.20	.39	2A3R3A	.32	.63	2C3R3A	.32	.63	2E3R3B	.40	.63	2W3R3A	.51	.98
4.7	→			→			→			→			1H4R7	.25	.49	2A4R7B	.40	.49	2C4R7C	.40	.63	2E4R7B	.40	.79	2W4R7A	.63	.98
10	→			→			1C100F	.20	.39	→			1H100	.32	.49	2A100B	.40	.79	2C100B	.40	.79	2E100A	.51	.98	2W100B	.63	1.24
16	→			→			→			1E160	.25	.49	1H160	.40	.49	2A160	.40	.79	2C160	.51	.98	2E160	.63	.98	2W160	.63	1.58
22	→			1A160	.20	.39	1C220	.25	.49	→			1H220A	.40	.49	2A220B	.40	.79	2C220A	.51	.98	2E220B	.63	.98	2W220	.71	1.58
33	→			1A220B	.20	.49	1C330C	.25	.49	1E330E	.32	.49	1H330E	.40	.63	2A330B	.51	.79	2C330B	.63	.98	2E330	.63	1.24			
47	→			→			1C470B	.32	.49	1E470C	.40	.49	1H470B	.40	.63	2A470B	.51	.98	2C470A	.63	1.24	2E470	.71	1.58			
68	0J680	.25	.49	1A470B	.25	.49	1C680	.32	.49	1E680	.40	.63	1H680	.51	.79	2A680	.63	.98	2C680	.71	1.58						
100	→			1A680	.32	.49	1C101F	.40	.49	1E101C	.40	.63	1H101B	.51	.79	2A101B	.63	.98	2C101B	.71	1.58						
150	0J151A	.32	.49	1A101A	.32	.49	1C151	.40	.63	1E151A	.40	.79	1H151	.51	.98	2A151	.63	1.40									
220	0J221B	.40	.49	1A151A	.40	.63	1C221E	.40	.79	1E221C	.51	.79	1H221C	.63	.98	2A221B	.71	1.58									
330	0J331A	.40	.63	1A221E	.40	.63	1C331B	.51	.79	1E331C	.51	.98	1H331E	.63	1.24												
470	0J471C	.40	.79	1A331E	.40	.79	1C471E	.51	.79	1E471E	.63	.98	1H471C	.63	1.40												
1000	→			1A471A	.51	.79	1C102B	.63	.98	1E102C	.63	1.40															
2200	0J222B	.63	.98	1A102B	.51	.98	1C222G	.71	1.40																		
3300	0J332C	.63	1.40	1A222C	.63	1.24																					
4700	0J472B	.71	1.58	1A332B	.71	1.58																					

Case size in the chart above is Dia. x Length (in.). Part Numbering: CE04W-XXXXXX Type Number from Table.

Note: 35, 73, 80, & 350 volt units also available.

muRata
CORPORATION
OF AMERICA

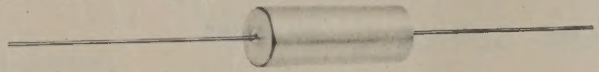
DEPT. EM, 1148 FRANKLIN ROAD, S.E.
MARIETTA, GEORGIA 30067
PHONE: (404) 422-9777

TELEX: 54-2329
TWX: 810-763-4723

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

POLYESTER FILM CAPACITORS

POLYESTER FILM CAPACITORS EXTENDED FOIL/FILM WRAP/EPOXY END FILL STYLE 107 −55°C TO +125°C



ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

CAPACITANCE MEASUREMENTS

Capacitors of 1.0 µF or less shall be measured at a frequency of 1000 Hz. Capacitors greater than 1.0 µF shall be measured at 60 Hz. The standard capacitance tolerance is 20%. Other tolerances are available upon request.

Reference: MIL-STD-202, Method 305.

TEMPERATURE CHARACTERISTICS

The maximum change in capacitance from the measured value at +25°C shall be −6% at −55°C, and +15% at +125°C.

DISSIPATION FACTOR

When measured as specified in Paragraph 1, the dissipation factor at +25°C shall not exceed 0.6% for values up to 1.0 µF and shall not exceed 1.0% for greater capacitance values.

INSULATION RESISTANCE

When measured at +25°C, and rated voltage (or 500 VDC, whichever is less), the insulation resistance shall be a minimum of 50,000 megohm-microfarads, but need not exceed 100,000 megohms. The period of electrification shall not exceed two minutes.

Reference: MIL-STD-202, Method 302.

VOLTAGE DERATING

The capacitors may be operated at full rated voltage from −55°C to +85°C, or with linear derating to 50% of rated voltage above +85°C with a maximum temperature of +125°C.

VOLTAGE TEST

When tested at +25°C, the capacitors shall withstand the indicated DC test voltages for a period of one minute:

Terminal to terminal	200% of DC rating
Terminal to case (less than .235 diameter)	200% of DC rating
Terminal to case (greater than .235 diameter)	400% of DC rating or 2,000 VDC, whichever is less

Reference: MIL-STD-202, Method 301.

LIFE TESTING

When tested for 1000 hours at 150% of the appropriate rated voltage for the test temperature, the capacitors shall exhibit no more than one failure in twelve pieces tested. Alternatively, an accelerated +125°C test may be performed at the +85°C voltage rating for a period of 250 hours. A failure is defined as:

a) A capacitance change of more than 10% of its initial value;
b) A dissipation factor greater than that specified in Paragraph 3;
c) An insulation resistance less than ⅓ that specified in Paragraph 4; or
d) A permanent open or short.

VIBRATION

The capacitors will meet or exceed in the vibration requirements of MIL-STD-202, Method 201.

NYTRONICS CATALOG NUMBERING SYSTEM

107 B 103 M

Nytronics Style — 107

D.C. Voltage Rating — B
B = 100V
C = 200V
E = 400V
F = 600V

Capacitance — 103
In µµf. The first two digits are the significant figures, the third is the number of zeros.

Capacitance Tolerance — M
F = ±1%
P = ±2%
J = ±5%
K = ±10%
M = ±20%

Note: Special capacitance values, voltage ratings and sizes available to customer requirements.

PHYSICAL SIZE TOLERANCES

	100 Volts DC & 200 Volts DC		400 Volts DC	
DIAMETER	Up to .158	+.032 −.000	Up to .218	±.032
	.159 to .200	+.040 −.000	.219 to .500	±.046
	Over .200	+.050 −.000	Over .500	±.062
LENGTH		+1/16 −0		+3/32 −1/16

TINNED COPPERWELD LEADS

No. 22 AWG. (.025) for cases up to .325 Dia.
No. 20 AWG. (.032) for cases .326 thru 1.0 Dia.
No. 18 AWG. (.040) for cases above 1.0 Dia.

Lead Length: 1⅝″ Min.

Also available are the following styles with characteristics similar to Type 107.

STYLE 103
Flat Press with Axial Leads
Extended Foil Construction
Polyester Film Dielectric
Film Wrap-Epoxy Endfill
−55°C to +125°C Operation

STYLE 118
Round Body with Axial Leads
Extended Foil Construction
Polyester Film Dielectric
Polyethylene Case-Epoxy Endfill
−55°C to +100°C Operation

STANDARD RATINGS

Capacitance µf	Dia. x Length		Cat. No.
100 VOLTS DC WORKING			
.001	.138	⅜	107B102M
.0015	.138	⅜	107B152M
.0022	.138	⅜	107B222M
.0033	.138	⅜	107B332M
.0047	.138	⅜	107B472M
.0068	.138	⅜	107B682M
.0082	.138	⅜	107B822M
.01	.158	⅜	107B103M
.015	.158	21/32	107B153M
.022	.158	21/32	107B223M
.027	.158	21/32	107B273M
.033	.158	21/32	107B333M
.047	.190	21/32	107B473M
.068	.220	21/32	107B683M
.082	.265	21/32	107B823M
.1	.265	11/16	107B104M
.12	.300	¾	107B124M
.15	.330	¾	107B154M
.22	.350	15/16	107B224M
.27	.350	1 1/16	107B274M
.33	.385	1 1/16	107B334M
.39	.415	1 1/16	107B394M
.47	.450	1 1/16	107B474M
.56	.490	1 1/16	107B564M
.68	.540	1 1/16	107B684M
.82	.570	1 1/16	107B824M
1.	.590	1 3/16	107B105M
1.5	.670	1 5/16	107B155M
1.8	.730	1 5/16	107B185M
2.0	.700	1½	107B205M
200 VOLTS DC WORKING			
.001	.138	⅜	107C102M
.0015	.138	⅜	107C152M
.0022	.138	⅜	107C222M
.0033	.138	⅜	107C332M
.0047	.138	⅜	107C472M
.0068	.138	⅜	107C682M
.0082	.138	⅜	107C822M
.01	.158	⅜	107C103M
.015	.158	21/32	107C153M
.022	.158	21/32	107C223M
.027	.158	21/32	107C273M
.033	.158	21/32	107C333M
.047	.190	21/32	107C473M
.068	.220	21/32	107C683M
.082	.265	21/32	107C823M
.1	.265	11/16	107C104M
.12	.285	13/16	107C124M
.15	.315	13/16	107C224M
.22	.325	1 1/16	107C224M
.27	.330	1 3/16	107C274M
.33	.360	1 3/16	107C334M
.39	.395	1 3/16	107C394M
.47	.430	1 3/16	107C474M
.56	.465	1 3/16	107C564M
.68	.510	1 3/16	107C684M
.82	.580	1 3/16	107C824M
1.	.590	1 5/16	107C105M
1.5	.680	1 7/16	107C155M
1.8	.740	1 7/16	107C185M
2.0	.750	1 9/16	107C205M
400 VOLTS DC WORKING			
.001	.156	⅝	107E102M
.0015	.156	⅝	107E152M
.0022	.156	⅝	107E222M
.0033	.156	⅝	107E332M
.0047	.187	⅝	107E472M
.0068	.218	⅝	107E682M
.0082	.234	⅝	107E822M
.01	.250	⅝	107E103M
.015	.296	⅝	107E153M
.022	.312	¾	107E223M
.027	.281	⅞	107E273M
.033	.312	⅞	107E333M
.047	.343	⅞	107E473M
.068	.375	1	107E683M
.082	.406	1	107E823M
.1	.421	1	107E104M
.12	.468	1	107E124M
.15	.468	1¼	107E154M
.22	.546	1⅜	107E224M
.27	.609	1⅜	107E274M
.33	.593	1⅝	107E334M
.39	.625	1⅝	107E394M
.47	.671	1⅝	107E474M
.56	.718	1¾	107E564M
.68	.796	1¾	107E684M
.82	.812	1⅞	107E824M
1.	.812	2	107E105M
1.5	.921	2¼	107E155M
1.8	1.015	2¼	107E185M
2.0	1.093	2¼	107E205M

Special capacitance values, tolerances and sizes are available on request.

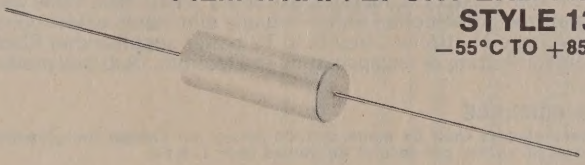
Nytronics Components Group, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

POLYSTYRENE CAPACITORS

POLYSTYRENE CAPACITORS

EXTENDED FOIL
FILM WRAP/EPOXY END-FILL
STYLE 133
—55°C TO +85°C



ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

CAPACITANCE MEASUREMENTS

Capacitors of 1.0 μF or less shall be measured at a frequency of 1000 Hz.

Capacitors greater than 1.0 μF shall be measured at 60 Hz.

The standard capacitance tolerance is 20%. Other tolerances are available upon request.

Reference: MIL-STD-202. Method 305.

TEMPERATURE CHARACTERISTICS AND STABILITY

When measured over the full operating range, the Temperature Coefficient shall be —120ppm/°C ±30ppm/°C.

There shall be less than 0.1% change per year in capacitance when operated between +20°C and +50°C.

After cycling from —55°C to +75°C, the capacitance shall not vary more than 0.2% from its initial measurement at +25°C.

DISSIPATION FACTOR

When measured as specified in Paragraph 1, the dissipation factor at +25°C shall not exceed 0.1%.

INSULATION RESISTANCE

When measured at +25°C, and rated voltage (or 500 VDC, whichever is less), the insulation resistance shall be a minimum of 200,000 megohm-microfarads, but need not exceed 500,000 megohms. The period of electrification shall not exceed two minutes.

Reference: MIL-STD-202, Method 302.

VOLTAGE DERATING

The capacitors may be operated at full rated voltage from —55°C to +65°C, or with linear derating to 60% of rated voltage above +65°C to the maximum operating temperature of +85°C.

VOLTAGE TEST

When tested at +25°C, the capacitors shall withstand the indicated DC test voltages for a period of one minute:

Terminal to terminal	200% of DC rating
Terminal to case (less than .235 diameter)	200% of DC rating
Terminal to case (greater than .235 diameter)	400% of DC rating or 2,000 VDC, whichever is less

Reference: MIL-STD-202, Method 301.

LIFE TESTING

When tested at 85°C for 250 hours at full 65°C rated voltage, the capacitors shall exhibit no more than one failure in twelve pieces tested. A failure is defined as:

a) A capacitance change of more than 6% of its initial value;
b) A dissipation factor greater than that specified in Paragraph 3;
c) An insulation resistance less than 60% that specified in Paragraph 4; or
d) A permanent open or short.

VIBRATION

The capacitors will meet or exceed the vibration requirements of MIL-STD-202, Method 201.

NYTRONICS CATALOG NUMBERING SYSTEM

133 B 103 M

Nytronics Style

DC Rated Voltage
A = 50V
B = 100V
C = 200V
E = 400V
F = 600V

Capacitance
In μμf. The first two digits are the significant figures, the third is the number of zeroes.

Capacitance Tolerance
F = ± 1%
P = ± 2%
J = ± 5%
K = ±10%
M = ±20%

Note: Special capacitance values, voltage ratings and sizes available to customer requirement.

Intermediate value available.

STANDARD RATINGS AT 85°C

50 VOLTS DC WORKING

Capacitance MFD	Diameter	Length	Cat. No.
.001	.218	.625	133A102M
.0015	.218	.625	133A152M
.0022	.218	.625	133A222M
.0033	.218	.625	133A332M
.0039	.218	.625	133A392M
.0047	.218	.625	133A472M
.0068	.218	.625	133A682M
.0082	.218	.625	133A822M
.01	.218	.625	133A103M
.015	.260	.625	133A153M
.022	.260	.750	133A223M
.027	.290	.750	133A273M
.033	.325	.750	133A333M
.039	.350	.812	133A393M
.047	.375	.812	133A473M
.068	.390	.937	133A683M
.082	.420	.937	133A823M
.1	.420	.937	133A104M
.12	.460	1.000	133A124M
.15	.460	1.125	133A154M
.18	.500	1.125	133A184M
.22	.600	1.125	133A224M
.27	.655	1.437	133A274M
.39	.703	1.437	133A394M
.47	.734	1.562	133A474M

100 VOLTS DC WORKING

Capacitance μf	Diameter	Length	Cat. No.
.001	.218	.750	133B102M
.0015	.218	.750	133B152M
.0022	.218	.750	133B222M
.0033	.218	.750	133B332M
.0039	.218	.750	133B392M
.0047	.218	.750	133B472M
.0068	.234	.750	133B682M
.0082	.234	.750	133B822M
.01	.296	.750	133B103M
.012	.296	.750	133B123M
.015	.296	.750	133B153M
.022	.318	.875	133B223M
.027	.328	.875	133B273M
.033	.343	.875	133B333M
.039	.359	.875	133B393M
.047	.375	.875	133B473M
.068	.406	1.000	133B683M
.082	.460	1.000	133B823M
.1	.460	1.000	133B104M
.15	.460	1.125	133B154M
.18	.500	1.125	133B184M
.22	.600	1.125	133B224M
.27	.655	1.437	133B274M
.39	.703	1.437	133B394M
.47	.734	1.562	133B474M

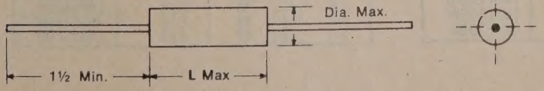
200 VOLTS DC WORKING

Capacitance μf	Diameter	Length	Cat. No.
.001	.218	.750	133C102M
.0015	.218	.750	133C152M
.0022	.218	.750	133C222M
.0033	.218	.750	133C332M
.0039	.218	.750	133C392M
.0047	.218	.750	133C472M
.0068	.234	.750	133C682M
.0082	.234	.750	133C822M
.01	.296	1.000	133C103M
.012	.296	1.000	133C123M
.015	.296	1.000	133C153M
.022	.318	1.000	133C223M
.027	.375	1.000	133C273M
.033	.375	1.000	133C333M
.039	.437	1.125	133C393M
.047	.437	1.125	133C473M
.068	.500	1.125	133C683M
.082	.562	1.375	133C823M
.1	.500	1.375	133C104M
.15	.625	1.375	133C154M
.18	.687	1.375	133C184M
.22	.687	1.812	133C224M
.27	.687	1.812	133C274M
.39	.875	1.812	133C394M
.47	1.000	1.812	133C474M

400 VOLTS DC WORKING

Capacitance μf	Diameter	Length	Cat. No.
.001	.218	.750	133E102M
.0015	.218	.750	133E152M
.0022	.218	.750	133E222M
.0033	.218	.750	133E332M
.0039	.218	.750	133E392M
.0047	.218	.750	133E472M
.0068	.234	.750	133E682M
.0082	.234	.750	133E822M
.01	.320	1.000	133E103M
.012	.320	1.000	133E123M
.015	.400	1.000	133E153M
.022	.400	1.000	133E223M
.027	.450	1.125	133E273M
.033	.450	1.125	133E333M
.039	.515	1.125	133E393M
.047	.515	1.125	133E473M
.068	.562	1.125	133E683M
.082	.562	1.375	133E823M
.1	.640	1.375	133E104M
.15	.640	1.812	133E154M
.18	.700	1.812	133E184M
.22	.750	1.812	133E224M
.27	.750	1.812	133E274M
.39	1.000	1.812	133E474M
.47	1.000	1.812	133E474M

CONFIGURATIONS



LEAD WIRE SIZE

No. 22 AWG. (.025) for cases up to .325 Dia.
No. 20 AWG. (.032) for cases .326 thru 1.0 Dia.
No. 18 AWG. (.040) for cases above 1.0 Dia.

Nytronics Components Group, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

POLYESTER CAPACITORS

METALLIZED POLYESTER CAPACITORS TYPE 188 FILM WRAP / EPOXY END FILL −55°C TO +125°C

Type 188 Capacitors features extremely small size, light weight and self clearing metallized construction which virtually eliminates catastrophic failures. Well suited for Voltage Multiplier Circuits in TV power supplies and Electrostatic copiers. Also ideal for Potting or encapsulating in Electronic Sub assemblies, Power supplies, etc.

CAPACITANCE

Measurements shall be made at 1000 cycles per second for capacitance values thru 1. MFD and at 60 cycles per second for values over 1. MFD.

CAPACITANCE TOLERANCE

Standard capacitance tolerance is ±20% (M). Closer tolerances available upon request.

DISSIPATION FACTOR

The dissipation factor shall not exceed 1% when measured at 25°C. Measurements shall be made at 1000 Hz for capacitance values thru 1. MF and at 60 Hz for higher values.

TEST VOLTAGE

Capacitors shall withstand 200% of rated DC voltage for one minute at 25°, with the charging and discharge current limited to a maximum of 1. Ampere.

OPERATING TEMPERATURES

−55°C to +125°C.

LIFE TEST

Capacitors shall withstand a life test of 250 hours at 125°C, with 140% of the 125°C rated DC voltage applied. A resistance of one ohm per volt of applied voltage shall be inserted in series with the capacitor.

VOLTAGE DERATING

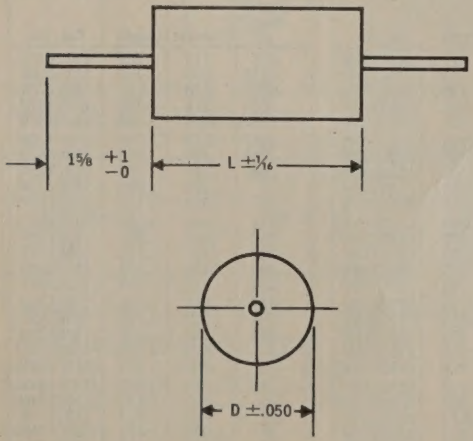
These capacitors will operate as full DC voltage ratings at 85°C. For operation at temperatures above 85°C, see Figure 4.

VIBRATION

Capacitors shall withstand a vibration test per Method 204, Test condition B of MIL-STD-202B as modified by MIL-C-27287. After test, the I.R. will be equal to or greater than 1/3 of the initial requirement.

HUMIDITY TEST

These capacitors shall meet the humidity test requirements of MIL-STD-202 Method 103B, test condition B. After testing the I.R. will be equal to or greater than 1/3 of the initial requirement.



Lead Sizes
.160 dia. — .250 = .020
.251 dia. — .500 = .025
.501 dia. & over = .032

Capacitance	Diameter	Length	Cat. No.
600 VOLTS DC WORKING			
.010	.20	.53	188F103M
.012	.18	.65	188F123M
.015	.20	.65	188F153M
.018	.22	.65	188F183M
.022	.23	.65	188F223M
.027	.25	.65	188F273M
.033	.28	.65	188F333M
.039	.26	.78	188F393M
.047	.28	.78	188F473M
.056	.30	.78	188F563M
.068	.32	.78	188F683M
.082	.35	.78	188F823M
.10	.33	.97	188F104M
.12	.35	.97	188F124M
.15	.39	.97	188F154M
.18	.44	.97	188F184M
.22	.42	1.17	188F224M
.27	.45	1.17	188F274M
.33	.50	1.17	188F334M
.39	.55	1.17	188F394M
.47	.54	1.45	188F474M
.56	.58	1.45	188F564M
.68	.63	1.45	188F684M
.82	.63	1.68	188F824M
1.0	.69	1.68	188F105M
1.2	.75	1.68	188F125M
1.5	.84	1.68	188F155M
2.0	.83	2.25	188F205M
2.5	.92	2.25	188F255M
3.0	1.00	2.25	188F305M

Capacitance	Diameter	Length	Cat. No.
100 VOLTS DC WORKING			
.010	.16	.40	188B103M
.012	.16	.40	188B123M
.015	.16	.40	188B153M
.018	.16	.40	188B183M
.022	.16	.40	188B223M
.027	.16	.40	188B273M
.033	.16	.40	188B333M
.039	.18	.40	188B393M
.047	.20	.40	188B473M
.056	.16	.53	188B563M
.068	.16	.53	188B683M
.082	.17	.53	188B823M
.10	.19	.53	188B104M
.12	.20	.53	188B124M
.15	.19	.65	188B154M
.18	.21	.65	188B184M
.22	.23	.65	188B224M
.27	.25	.65	188B274M
.33	.27	.65	188B334M
.39	.29	.65	188B394M
.47	.26	.78	188B474M
.56	.28	.78	188B564M
.68	.30	.78	188B684M
.82	.33	.78	188B824M
1.0	.36	.78	188B105M
1.2	.34	.97	188B125M
1.5	.37	.97	188B155M
2.0	.42	.97	188B205M
2.5	.42	1.17	188B255M
3.0	.45	1.17	188B305M
3.5	.49	1.17	188B355M
4.0	.52	1.17	188B405M
4.5	.49	1.45	188B455M
5.0	.52	1.45	188B505M
200 VOLTS DC WORKING			
.010	.16	.40	188C103M
.012	.17	.40	188B123M
.015	.19	.40	188C153M
.018	.21	.40	188C183M
.022	.16	.53	188C223M
.027	.17	.53	188C273M
.033	.19	.53	188C333M
.039	.20	.53	188C393M
.047	.18	.65	188C473M
.056	.20	.65	188C563M
.068	.21	.65	188C683M
.082	.23	.65	188C823M
.10	.25	.65	188C104M
.12	.27	.65	188C124M
.15	.30	.65	188C154M
.18	.27	.78	188C184M
.22	.30	.78	188C224M
.27	.32	.78	188C274M
.33	.35	.78	188C334M
.39	.33	.97	188C394M
.47	.35	.97	188C474M
.56	.38	.97	188C564M
.68	.42	.97	188C684M
.82	.46	.97	188C824M
1.0	.45	1.17	188C105M
1.2	.49	1.17	188C125M
1.5	.54	1.17	188C155M
2.0	.56	1.45	188C205M
2.5	.61	1.45	188C255M
3.0	.67	1.45	188C305M
3.5	.65	1.68	188C355M
4.0	.69	1.68	188C405M
4.5	.73	1.68	188C455M
5.0	.77	1.68	188C505M
400 VOLTS DC WORKING			
.010	.20	.40	188E103M
.012	.16	.53	188E123M
.015	.17	.53	188E153M
.018	.19	.53	188E183M
.022	.20	.53	188E223M
.027	.18	.65	188E273M
.033	.20	.65	188E333M
.039	.21	.65	188E393M
.047	.23	.65	188E473M
.056	.25	.65	188E563M
.068	.27	.65	188E683M
.082	.25	.78	188E823M
.10	.27	.78	188E104M
.12	.29	.78	188E124M
.15	.32	.78	188E154M
.18	.35	.78	188E184M
.22	.33	.97	188E224M
.27	.36	.97	188E274M
.33	.39	.97	188E334M
.39	.42	.97	188E394M
.47	.46	.97	188E474M
.56	.44	1.17	188E564M
.68	.48	1.17	188E684M
.82	.54	1.17	188E824M
1.0	.53	1.45	188E105M
1.2	.57	1.45	188E125M
1.5	.63	1.45	188E155M
2.0	.65	1.68	188E205M
2.5	.73	1.68	188E255M
3.0	.79	1.68	188E305M
3.5	.85	1.68	188E355M
4.0	.78	2.25	188E405M
4.5	.83	2.25	188E455M
5.0	.87	2.25	188E505M

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

POLYESTER CAPACITORS

METALLIZED POLYESTER CAPACITORS TYPE 189 FILM WRAP / EPOXY END FILL −55°C TO +125°C

Type 189 Capacitors features extremely small size, light weight and self clearing metallized construction which virtually eliminates catastrophic failures. Well suited for Voltage Multiplier Circuits in TV power supplies and Electrostatic copiers. Also ideal for Potting or encapsulating in Electronic Sub assemblies, Power supplies, etc.

CAPACITANCE

Measurements shall be made at 1000 cycles per second for capacitance values thru 1. MFD and at 60 cycles per second for values over 1. MFD.

CAPACITANCE TOLERANCE

Standard capacitance tolerance is ±20% (M). Closer tolerances available upon request.

DISSIPATION FACTOR

The dissipation factor shall not exceed 1% when measured at 25°C. Measurements shall be made at 1000 Hz for capacitance values thru 1. MF and at 60 Hz for higher values.

TEST VOLTAGE

Capacitors shall withstand 200% of rated DC voltage for one minute at 25°, with the charging and discharge current limited to a maximum of 1. Ampere.

OPERATING TEMPERATURES

−55°C to +125°C.

LIFE TEST

Capacitors shall withstand a life test of 250 hours at 125°C, with 140% of the 125°C rated DC voltage applied. A resistance of one ohm per volt of applied voltage shall be inserted in series with the capacitor.

VOLTAGE DERATING

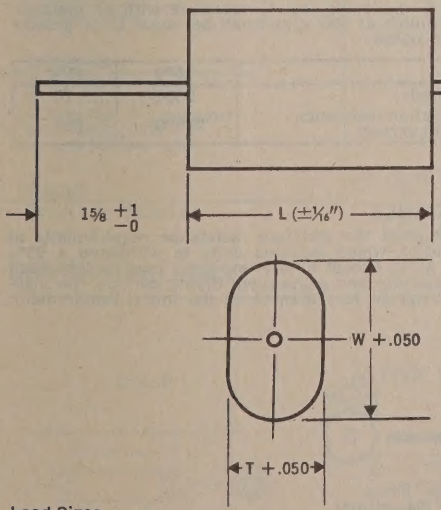
These capacitors will operate as full DC voltage ratings at 85°C. For operation at temperatures above 85°C, see Figure 4.

VIBRATION

Capacitors shall withstand a vibration test per Method 204, Test condition B of MIL-STD-202B as modified by MIL-C-27287.

HUMIDITY TEST

These capacitors shall meet the humidity test requirements of MIL-STD-202 Method 103B, test condition B. After testing the I.R. will be equal to or greater than ⅓ of the initial requirement.



Lead Sizes

Nom. Body Length	Lead Dia.
Thru .530	.020
.650 thru .970	.025
Above .970	.032

Capacitance	Thickness	Width	Length	Cat. No.
100 VOLTS DC WORKING				
.010	.10	.20	.40	189B103M
.012	.10	.20	.40	189B123M
.015	.10	.20	.40	189B153M
.018	.10	.20	.40	189B183M
.022	.10	.20	.40	189B223M
.027	.10	.20	.40	189B273M
.033	.10	.20	.40	189B333M
.039	.10	.20	.40	189B393M
.047	.10	.22	.40	189B473M
.056	.11	.24	.40	189B563M
.068	.10	.20	.53	189B683M
.082	.10	.20	.53	189B823M
.10	.10	.20	.53	189B104M
.12	.10	.23	.53	189B124M
.15	.12	.25	.53	189B154M
.18	.14	.27	.53	189B184M
.22	.17	.30	.53	189B224M
.27	.19	.32	.53	189B274M
.33	.21	.34	.53	189B334M
.39	.24	.37	.53	189B394M
.47	.21	.34	.65	189B474M
.56	.23	.36	.65	189B564M
.68	.27	.40	.65	189B684M
.82	.24	.37	.78	189B824M
1.0	.26	.42	.78	189B105M
1.2	.29	.45	.78	189B125M
1.5	.33	.49	.78	189B155M
2.0	.32	.48	.97	189B205M
2.5	.36	.52	.97	189B255M
3.0	.35	.51	1.17	189B305M
3.5	.38	.54	1.17	189B355M
4.0	.41	.57	1.17	189B405M
4.5	.44	.60	1.17	189B455M
5.0	.47	.63	1.17	189B505M
6.0	.52	.68	1.17	189B605M
8.0	.46	.62	1.68	189B805M
10.0	.53	.69	1.68	189B106M
200 VOLTS DC WORKING				
.010	.10	.20	.40	189C103M
.012	.10	.20	.40	189C123M
.012	.10	.20	.40	189C153M
.018	.13	.23	.40	189B183M
.022	.13	.26	.40	189C223M
.027	.10	.20	.53	189C273M
.033	.12	.22	.53	189C333M
.039	.12	.25	.53	189C393M
.047	.13	.26	.53	189C473M
.056	.14	.27	.53	189C563M
.068	.16	.29	.53	189C683M
.082	.18	.31	.53	189C823M
.10	.20	.33	.53	189C104M
.12	.22	.35	.53	189C124M
.15	.26	.39	.53	189C154M
.18	.24	.37	.65	189C184M
.22	.26	.39	.65	189C224M
.27	.24	.37	.78	189C274M
.33	.27	.40	.78	189C334M
.39	.30	.43	.78	189C394M
.47	.33	.46	.78	189C474M
.56	.37	.50	.78	189C564M
.68	.32	.48	.97	189C684M
.82	.35	.51	.97	189C824M
1.0	.35	.51	1.17	189C105M
1.2	.38	.54	1.17	189C125M
1.5	.43	.59	1.17	189C155M
2.0	.52	.68	1.17	189C205M
2.5	.46	.62	1.68	189C255M
3.0	.49	.65	1.68	189C305M
3.5	.54	.70	1.68	189C355M
4.0	.58	.74	1.68	189C405M
4.5	.62	.78	1.68	189C455M
5.0	.64	.84	1.68	189C505M
6.0	.70	.90	1.68	189C605M
8.0	.84	1.04	1.68	189C805M
10.0	.75	.95	2.25	189C106M
400 VOLTS DC WORKING				
.010	.14	.24	.40	189E103M
.012	.10	.23	.53	189E123M
.015	.11	.21	.53	189E153M
.018	.12	.22	.53	189E183M
.022	.12	.25	.53	189E223M
.027	.13	.26	.53	189E273M
.033	.15	.28	.53	189E333M
.039	.17	.30	.53	189E393M
.047	.19	.32	.53	189E473M
.056	.21	.34	.53	189E563M
.068	.23	.36	.53	189E683M
.082	.26	.39	.53	189E823M
.10	.23	.36	.65	189E104M
.12	.25	.38	.65	189E124M
.15	.24	.37	.78	189E154M
.18	.26	.39	.78	189E184M
.22	.30	.43	.78	189E224M
.27	.33	.46	.78	189E274M
.33	.36	.52	.78	189E334M
.39	.33	.49	.97	189E394M
.47	.33	.53	.97	189E474M
.56	.34	.50	1.17	189E564M
.68	.38	.54	1.17	189E684M
.82	.43	.59	1.17	189E824M
1.0	.48	.64	1.17	189E105M
1.2	.54	.70	1.17	189E125M
1.5	.46	.62	1.68	189E155M
2.0	.54	.70	1.68	189E205M
2.5	.60	.80	1.68	189E255M
3.0	.67	.87	1.68	189E305M
3.5	.73	.93	1.68	189E355M
4.0	.78	.98	1.68	189E405M
4.5	.69	.89	2.25	189E455M
5.0	.75	.95	2.25	189E505M

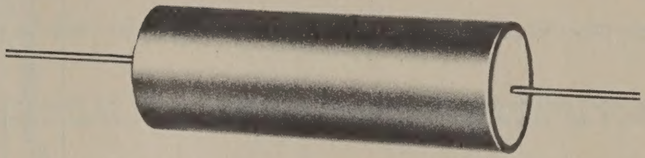
Capacitance	Thickness	Width	Length	Cat. No.
600 VOLTS DC WORKING				
.010	.12	.25	.53	189F103M
.012	.13	.26	.53	189F123M
.015	.15	.28	.53	189F153M
.018	.17	.30	.53	189F183M
.022	.19	.32	.53	189F223M
.027	.21	.34	.53	189F273M
.033	.24	.37	.53	189F333M
.039	.21	.34	.65	189F393M
.047	.24	.37	.65	189F473M
.056	.22	.35	.78	189F563M
.068	.25	.38	.78	189F683M
.082	.27	.40	.78	189F823M
.10	.30	.43	.78	189F104M
.12	.32	.48	.78	189F124M
.15	.36	.52	.78	189F154M
.18	.33	.49	.97	189F184M
.22	.37	.53	.97	189F224M
.27	.36	.52	1.17	189F274M
.33	.40	.56	1.17	189F334M
.39	.44	.60	1.17	189F394M
.47	.49	.65	1.17	189F474M
.56	.41	.57	1.68	189F564M
.68	.45	.61	1.68	189F684M
.82	.51	.67	1.68	189F824M
1.0	.58	.74	1.68	189F105M
1.2	.64	.80	1.68	189F125M
1.5	.73	.89	1.68	189F155M
2.0	.69	.89	2.25	189F205M
2.5	.80	1.00	2.25	189F225M
3.0	.87	1.07	2.25	189F305M

INTERMEDIATE VALUES AVAILABLE.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

TUBULAR CAPACITORS

HIGH VOLTAGE TUBULAR CAPACITORS DUAL DIELECTRIC/OIL IMPREGNATED PHENOLIC CASED/EPOXY END FILL/TYPE 161



RECOMMENDED APPLICATIONS

Nytronics Type 161 Capacitors are well-suited for use in Oscilloscopes, Electronic Air Cleaners, Power Supplies of industrial devices, and related equipment. The design of these capacitors employs a Paper/Polyester Film Section, oil impregnated, incased in a phenolic tube designed specifically for high voltage application. A unique epoxy endfill process precludes oil seepage which occasionally occurs in similar designs.

TYPICAL RATINGS

CAP/MFD	3000 VDC	5000 VDC	8000 VDC	10,000 VDC
.005	½ x 1½	9⁄16 x 1⅞	¾ x 2	¾ x 2½
.01	9⁄16 x 1⅞	¾ x 1⅞	¾ x 2¼	⅞ x 2½
.05	¾ x 2 1⁄16	1 x 2½	1 x 4¼	1½ x 3⅛

NOTE: Other Ratings can be designed to your specifications.

OPERATING TEMPERATURE

−55°C to +85°C at full rated voltage.

DISSIPATION FACTOR

Will not exceed 1% at 25°C.

MEASUREMENTS

Capacitance up to 1 microfarad are measured at a frequency of 1000 cycles per second and capacitances over 1 microfarad at 60 cps.

DIELECTRIC STRENGTH TEST

Units will withstand a potential of 150% of rated voltage applied for one minute at 25°C.

STANDARD TOLERANCE

±20%. Other tolerances available on request.

STANDARD MARKING

Nytronics, Part No., Capacitance, Voltage, and Date Code.

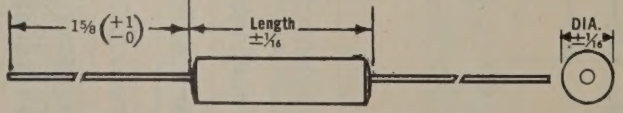
INSULATION RESISTANCE

When measured at the applicable test temperature with an electrification time of two minutes at 500 volts shall be equal to or greater than the values listed below:

Test Temperature	25°C	85°C
Megohms X Microfarads	2000	10
except that the insulation resistance in megohms need not exceed	25000	250

MOISTURE RESISTANCE

These capacitors will meet the moisture resistance requirements of EIA Specification RS-164, which requires units to withstand a 95% Relative Humidity at 40°C, except time of exposure may be increased to 500 hours. After exposure and subsequent drying periods, the insulation resistance will not be less than ⅓ of the initial requirement.



Tinned Copperweld Leads #20 AWG (.032) for sizes to ⅝″ Dia.
#18 AWG (.040) for sizes ⅝″ Dia. and over.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

POLYSTYRENE FILM CAPACITORS

POLYSTYRENE FILM CAPACITORS HERMETICALLY SEALED TYPE 231 −65°C to +85°C

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS

1. CAPACITANCE MEASUREMENTS

Capacitors of 1.0 μF or less shall be measured at a frequency of 1000 Hz. Capacitors greater than 1.0 μF measured at 60 Hz.

Tolerances of ±20%, ±10%, ±5%, ±2%, ±1% are standard. Tolerances closer than ±1% are available upon request.

Reference: MIL-STD-202, Method 305.

2. TEMPERATURE/CHARACTERISTICS AND STABILITY

When measured over the full operating range, the Temperature Coefficient shall be −120 ppm/°C ±30 ppm/°C.

There shall be less than 0.1% change per year in capacitance when operated between +20°C and +50°C. When cycled from −55°C to +75°C, the capacitance shall not vary more than 0.2% from its initial measurement.

3. DISSIPATION FACTOR

When measured as specified in Paragraph 1, the dissipation factor at +25°C shall not exceed 0.1%.

4. INSULATION RESISTANCE

When measured at +25°C, and rated voltage (or 500 VDC, whichever is less), the insulation resistance shall be a minimum of 200,000 megohm-microfarads, but need not exceed 500,000 megohms. The period of electrification shall not exceed two minutes.

Reference: MIL-STD-202, Method 302.

5. VOLTAGE DERATING

The capacitors may be operated at full rated voltage from −55°C to +85°C.

6. VOLTAGE TEST

When tested at +25°C, the capacitors shall withstand the indicated DC test voltages for a period of one minute:

Terminal to terminal	200% of DC rating
Terminal to case	200% of DC rating

Reference: MIL-STD-202, Method 301.

7. LIFE TESTING

When tested at 85°C for 250 hours at 140% of the rated voltage, the capacitors shall exhibit no more than one failure in twelve pieces tested. A failure is defined as:

a) A capacitance change of more than 6% of its initial value;
b) A dissipation factor greater than that specified in Paragraph 3;
c) An insulation resistance less than 60% that specified in Paragraph 4; or
d) A permanent open or short.

8. VIBRATION

The capacitors will meet or exceed the vibration requirements of MIL-STD-202, METHOD 201.

NYTRONICS CATALOG NUMBERING SYSTEM

231 A 3 E 104 M 2

STYLE

NYTRONICS TYPE
231 Polystyrene

CAPACITANCE TOLERANCE
M = ±20%
K = ±10%
J = ±5%
G = ±2%
F = ±1%

TERMINALS
Wire Leads
No. 22 AWG. (.025)
for case Dia. .312 and under
No. 20 AWG. (.032)
for case Dia. over .312

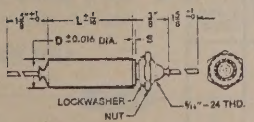
CAPACITANCE
In uuf. The first two digits are the significant figures, the third is the number of zeroes.

CIRCUIT
Circuit 1 Circuit 3

DC RATED VOLTAGE
B = 100
C = 200
E = 400
F = 600

CONFIGURATIONS

Circuit 1



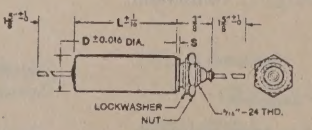
STYLE 3

D	S
.400	.020
.562 and up	.031

Minimum D=.400″

Circuit 3

Deduct 1/16 from L



STANDARD RATINGS

Nytronics Part No.	Capacitance μf	Dia. ±.016	Length ±1/16
100 VOLTS DC WORKING			
231A1B822K	.0082	.235	15/16
231A1B103K	.01	.235	15/16
231A1B123K	.012	.235	15/16
231A1B153K	.015	.235	15/16
231A1B183K	.018	.312	15/16
231A1B223K	.022	.312	15/16
231A1B273K	.027	.312	15/16
231A1B333K	.033	.312	15/16
231A1B393K	.039	.312	15/16
231A1B473K	.047	.400	15/16
231A1B563K	.056	.400	15/16
231A1B683K	.068	.400	15/16
231A1B823K	.082	.562	15/16
231A1B104K	.10	.562	15/16
231A1B124K	.12	.562	15/16
231A1B154K	.15	.562	15/16
231A1B184K	.18	.562	1 5/16
231A1B224K	.22	.562	1 5/16
231A1B274K	.27	.670	1 5/16
231A1B334K	.33	.670	1 5/16
231A1B394K	.39	.670	1 11/16
231A1B474K	.47	.670	1 11/16
231A1B564K	.56	.670	1 11/16
231A1B684K	.68	.750	1 11/16
231A1B824K	.82	1.000	1 11/16
231A1B105K	1.0	1.000	1 11/16
231A1B125K	1.2	1.000	1 11/16
200 VOLTS DC WORKING			
231A1C472K	.0047	.235	15/16
231A1C562K	.0056	.235	15/16
231A1C682K	.0068	.235	15/16
231A1C822K	.0082	.312	15/16
231A1C103K	.01	.312	15/16
231A1C123K	.012	.312	15/16
231A1C153K	.015	.312	15/16
231A1C183K	.018	.312	15/16
231A1C223K	.022	.400	15/16
231A1C273K	.027	.400	15/16
231A1C333K	.033	.400	15/16
231A1C393K	.039	.400	15/16
231A1C473K	.047	.562	15/16
231A1C563K	.056	.562	15/16
231A1C683K	.068	.562	15/16
231A1C823K	.082	.562	15/16
231A1C104K	.10	.562	1 5/16
231A1C124K	.12	.562	1 5/16
231A1C154K	.15	.670	1 5/16
231A1C184K	.18	.670	1 5/16
231A1C224K	.22	.670	1 11/16
231A1C274K	.27	.670	1 11/16
231A1C334K	.33	.750	1 11/16
231A1C394K	.39	1.000	1 11/16
231A1C474K	.47	1.000	1 11/16
231A1C564K	.56	1.000	1 11/16
400 VOLTS DC WORKING			
231A1E222K	.0022	.235	15/16
231A1E272K	.0027	.235	15/16
231A1E332K	.0033	.235	15/16
231A1E392K	.0039	.235	15/16
231A1E472K	.0047	.312	15/16
231A1E562K	.0056	.312	15/16
231A1E682K	.0068	.312	15/16
231A1E822K	.0082	.312	15/16
231A1E103K	.01	.312	15/16
231A1E123K	.012	.312	15/16
231A1E153K	.015	.400	15/16
231A1E183K	.018	.400	15/16
231A1E223K	.022	.400	15/16
231A1E273K	.027	.562	15/16
231A1E333K	.033	.562	15/16
231A1E393K	.039	.562	15/16
231A1E473K	.047	.562	15/16
231A1E563K	.056	.562	15/16
231A1E683K	.068	.562	1 5/16
231A1E823K	.082	.670	1 5/16
231A1E104K	.10	.670	1 5/16
231A1E124K	.12	.562	1 11/16
231A1E154K	.15	.670	1 11/16
231A1E184K	.18	.670	1 11/16
231A1E224K	.22	.750	1 11/16
231A1E274K	.27	.750	1 11/16
231A1E334K	.33	1.000	1 11/16
231A1E394K	.39	1.000	1 11/16
231A1E474K	.47	1.000	1 11/16
600 VOLTS DC WORKING			
231A1F102K	.001	.235	15/16
231A1F122K	.0012	.235	15/16
231A1F152K	.0015	.235	15/16
231A1F182K	.0018	.235	15/16
231A1F222K	.0022	.312	15/16
231A1F272K	.0027	.312	15/16
231A1F332K	.0033	.312	15/16
231A1F392K	.0039	.312	15/16
231A1F472K	.0047	.312	15/16
231A1F562K	.0056	.312	15/16
231A1F682K	.0068	.312	15/16
231A1F822K	.0082	.312	15/16
231A1F103K	.01	.400	15/16
231A1F123K	.012	.400	15/16
231A1F153K	.015	.562	15/16
231A1F183K	.018	.562	15/16
231A1F223K	.022	.562	15/16
231A1F273K	.027	.562	15/16
231A1F333K	.033	.562	1 5/16
231A1F393K	.039	.562	1 5/16
231A1F473K	.047	.670	1 5/16
231A1F563K	.056	.670	1 5/16
231A1F683K	.068	.562	1 11/16
231A1F823K	.082	.670	1 11/16
231A1F104K	.10	.670	1 11/16
231A1F124K	.12	.750	1 11/16
231A1F154K	.15	1.000	1 11/16
231A1F184K	.18	1.000	1 11/16
231A1F224K	.22	1.000	1 11/16

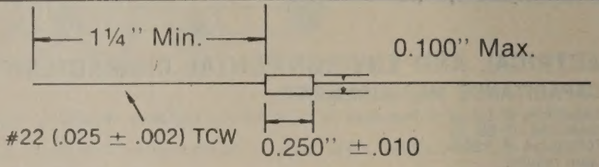
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

CERAMIC CAPACITORS

The DECI-CAP

4.7 pF to 27,000 pF in 49 Standard Values.
Available from stock for Immediate Delivery.
Epoxy molded for highest performance and reliability.
High density cordwood packaging facilitated by single size.
(.100 diameter x .250 length for entire range.)

DECI-CAPS offer the design engineer unique epoxy-molded reliability and a new high standard in performance. These subminiature ceramic capacitors feature low power factor and exhibit outstanding stability over the entire —55° to +125°C operating range. Rugged epoxy molded envelope and high quality ceramic dielectric is designed to meet the environmental requirements of MIL-C-11015.



Electrical Characteristics	Deci-Cap
Capacitance Range, pF	4.7 to 27,000
Working Voltage 4.7 to 470 pF 560-27000	 200 VDC 100 VDC
Standard Tolerance	±10%
Dissipation Factor	.025 Max.
I.R., Megohms	20,000 Min.
Max. Charge from 25°C Capacitance, —55 to +125°C	± 15%

Cap., pF	Deci-Cap Cat. No.
4.7	DC-047
5.6	DC-056
6.8	DC-068
8.2	DC-082
10	DC-100
12	DC-120
15	DC-150
18	DC-180
22	DC-220
27	DC-270
33	DC-330
39	DC-390
47	DC-470
56	DC-560
68	DC-680
82	DC-820
100	DC-101
120	DC-121
150	DC-151
180	DC-181
220	DC-221
270	DC-271
330	DC-331
390	DC-391
470	DC-471
560	DC-561
680	DC-681
820	DC-821
1000	DC-102
1200	DC-122
1500	DC-152
1800	DC-182
2200	DC-222
2700	DC-272
3300	DC-332
3900	DC-392
4700	DC-472
5600	DC-562
6800	DC-682
8200	DC-822
10000	DC-103
12000	DC-123
15000	DC-153
18000	DC-183
22000	DC-223
27000	DC-273

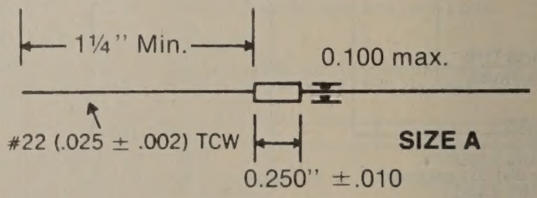
Add K to Cat. No. for ±10% Tol, J for ±5%, M for ±20%

The NYT-CAP

NPO SERIES

Ultra High Stability —0 ± 25 ppm/°C Temperature Coefficient.
Transfer Molded Epoxy Case for high component density.
New extended range to 10,000 pF.
Available from stock.

A new development from Nytronics' ceramic research laboratory now makes possible the manufacture of an extremely stable ceramic capacitor in a miniature package size. Now you can have the capacitor stability long desired for use in oscillators, filters, and other critical circuitry.



ELECTRICAL CHARACTERISTICS

Capacitance Range: 4.7 pF to 220 pF.

Capacitance Tolerance: ±10% Standard; others available.

Working Voltage: 200 Volts D.C.

Temperature Coefficient: ±25 ppm/°C over temperature range of −55°C to +125°C.

Dissipation Factor: Less than 0.001 at 25°C.

Insulation Resistance: 100,000 Megohms at 25°C. (Minimum)

Nytronics Part No.	Capacity (pF)	Case Size
NC-047	4.7	A
NC-056	5.6	A
NC-068	6.8	A
NC-082	8.2	A
NC-100	10	A
NC-120	12	A
NC-150	15	A
NC-180	18	A
NC-220	22	A
NC-270	27	A
NC-330	33	A
NC-390	39	A
NC-470	47	A
NC-560	56	A
NC-680	68	A
NC-820	82	A
NC-101	100	A
NC-121	120	A
NC-151	150	A
NC-181	180	A
NC-221	220	A

Note: Hybrid Manufacturers — Also available from stock as monolithic (unencapsulated) chips for micro-circuit applications. "A" chip size is .170 X .065 X .070; "B" is .280 X .195 X .070. Other specs same as above. To order use part No. prefix NCU in place of NC.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

HERMETICALLY SEALED CAPACITORS

HERMETICALLY SEALED CAPACITORS CP04 THRU CP09 TO MIL-C-25

INSERTED TAB CAPACITORS

µF	WVDC	TYPE CP04A1* Plain Metal Case Char. K −55°C to +125°C	Size* D. x L.
.001	600	CP04A1KF102K3	.235 x ¾
.0015	600	CP04A1KF152K3	.235 x ¾
.0022	600	CP04A1KF222K3	.235 x ¾
.0033	600	CP04A1KF332K3	.235 x ¾
.0047	600	CP04A1KF472K3	.235 x ¾
.0068	600	CP04A1KF682K3	.235 x ¾
.01	400	CP04A1KE103K3	.235 x ¾
	600	CP04A1KF103K3	.312 x ⅞
.015	200	CP04A1KC153K3	.235 x ¾
	600	CP04A1KF153K3	.312 x ⅞
.022	200	CP04A1KF223K3	.235 x ¾
	600	CP04A1KF223K3	.312 x ⅞
.033	100	CP04A1KB333K3	.235 x ¾
	400	CP04A1KE333K3	.312 x ⅞
	600	CP04A1KF333K3	.400 x ⅞
.047	200	CP04A1KC473K3	.312 x ⅞
	400	CP04A1KE473K3	.400 x ⅞
	600	CP04A1KF473K3	.400 x 1⅛
.068	200	CP04A1KC683K3	.312 x ⅞
	400	CP04A1KE683K3	.400 x 1⅛
	600	CP04A1KF683K3	.400 x 1⅜
.1	100	CP04A1KB104K3	.312 x ⅞
	200	CP04A1KC104K3	.400 x ⅞
	400	CP04A1KE104K3	.400 x 1⅜
	600	CP04A1KF104K3	.562 x 1⅛
.15	100	CP04A1KB154K3	.400 x ⅞
	200	CP04A1KC154K3	.400 x 1⅛
	400	CP04A1KE154K3	.562 x 1⅛
	600	CP04A1KF154K3	.562 x 1⅜
.22	100	CP04A1KB224K3	.400 x 1⅜
	200	CP04A1KC224K3	.400 x 1⅜
	400	CP04A1KE224K3	.562 x 1⅜
	600	CP04A1KF224K3	.562 x 1⅞
.33	100	CP04A1KB334K3	.400 x 1⅜
	200	CP04A1KC334K3	.562 x 1⅛
	400	CP04A1KE334K3	.562 x 1⅞
	600	CP04A1KF334K3	.670 x 1⅞
.47	100	CP04A1KB474K3	.562 x 1⅛
	200	CP04A1KC474K3	.562 x 1⅜
	400	CP04A1KE474K3	.670 x 1⅞
	600	CP04A1KF474K3	.750 x 2⅛
.68	100	CP04A1KB684K3	.562 x 1⅜
	200	CP04A1KC684K3	.562 x 1⅞
	400	CP04A1KE684K3	.750 x 2⅛
	600	CP04A1KF684K3	1.0 x 1⅞
1.0	100	CP04A1KB105K3	.562 x 1⅞
	200	CP04A1KC105K3	.670 x 1⅞
	400	CP04A1KE105K3	1.0 x 1⅞

µF	WVDC	TYPE CP08A1 Plain Metal Case Char. K −55°C to +125°C	Size* D. x L.
.001	600	CP08A1KF102K3	.235 x ¾
.0015	600	CP08A1KF152K3	.235 x ¾
.0022	600	CP08A1KF222K3	.235 x ¾
.0033	400	CP08A1KE332K3	.235 x ¾
	600	CP08A1KF332K3	.312 x ⅞
.0047	200	CP08A1KC472K3	.235 x ¾
	600	CP08A1KF472K3	.312 x ⅞
.0068	200	CP08A1KC682K3	.235 x ¾
	600	CP08A1KF682K3	.312 x ⅞
.01	100	CP08A1KB103K3	.235 x ¾
	600	CP08A1KF103K3	.312 x ⅞
.015	100	CP08A1KB153K3	.235 x ¾
	400	CP08A1KE153K3	.312 x ⅞
	600	CP08A1KF153K3	.400 x ⅞
.022	200	CP08A1KC223K3	.312 x ⅞
	600	CP08A1KF223K3	.400 x ⅞
.033	200	CP08A1KC333K3	.312 x ⅞
	400	CP08A1KE333K3	.400 x ⅞
	600	CP08A1KF333K3	.400 x 1⅛
.047	100	CP08A1KB473K3	.312 x ⅞
	200	CP08A1KC473K3	.400 x ⅞
	400	CP08A1KE473K3	.400 x 1⅛
	600	CP08A1KF473K3	.400 x 1⅜
.068	200	CP08A1KC683K3	.400 x ⅞
	400	CP08A1KE683K3	.400 x 1⅜
	600	CP08A1KF683K3	.562 x ⅛
.1	100	CP08A7KB104K3	.400 x ⅞
	200	CP08A1KC104K3	.400 x 1⅛
	400	CP08A1KE104K3	.562 x 1⅛
	600	CP08A1KF104K3	.562 x 1⅜
.15	100	CP08A1KB154K3	.400 x 1⅛
	200	CP08A1KC154K3	.400 x 1⅜
	400	CP08A1KE154K3	.562 x 1⅜
	600	CP08A1KF154K3	.562 x 1⅝
.22	100	CP08A1KB224K3	.400 x 1⅜
	200	CP08A1KC224K3	.562 x 1⅛
	400	CP08A1KE224K3	.562 x 1⅝
	600	CP08A1KF224K3	.670 x 1⅝
.33	100	CP08A1KB334K3	.562 x 1⅛
	200	CP08A1KC334K3	.562 x 1⅜
	400	CP08A1KE334K3	.670 x 1⅝
	600	CP08A1KF334K3	.750 x 2⅛
.47	100	CP08A1KB474K3	.562 x 1⅜
	200	CP08A1KC474K3	.562 x 1⅝
	400	CP08A1KE474K3	.750 x 2⅛
	600	CP08A1KF474K3	.750 x 2⅜
.68	100	CP08A1KB684K3	.562 x 1⅝
	200	CP08A1KC684K3	.670 x 1⅝
1.0	100	CP08A1KB105K3	.670 x 1⅝
	200	CP08A1KC105K3	.750 x 2⅛

NOTE: The capacitors listed in this table have a capacitance tolerance of ±10%.
* For case grounded reduce L dimension by 1/16". Above listing are ratings listed in Mil-C-25C. Other values are available in Nytronics Commercial Equivalents.
** For CP05 and CP09 add .0625 to Diameter and 1/16" to Length.

NYTRONICS CATALOG NUMBERING SYSTEM

CP 04 A 1 K B 273 K 1

MILITARY TYPE
CAPACITORS
Fixed,
Paper dielectric,
Direct current,
Hermetically sealed in
metallic cases

SUBMINIATURE CAPACITORS
CP05
CP10
CP11

TERMINALS
A = axial leads

CIRCUIT
1 =
3 =

CHARACTERISTIC
K = −55°C to +125°C

DC VOLTAGE RATING

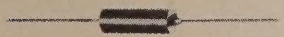
CAPACITANCE
In uuf. The first two digits are the significant figures, the third is the number of zeros.

CAPACITANCE TOLERANCE
K = ±10%

VIBRATION GRADE
1 = 10 to 55 cps
3 = 10 to 2000 cps

RATED VOLTAGE DESIGNATIONS
(DC working at 40°C, except for characteristic K which is 85°C)
B = 100 C = 200 E = 400 F = 600 G = 1000

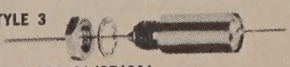
BASIC STYLE



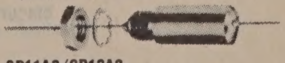
CP04A1/CP08A1
CIRCUIT 1 — Case Floating

CP04A3/CP08A3
CIRCUIT 3 — Case Grounded

STYLE 3

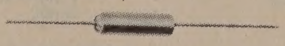


CP11A1/CP13A1
CIRCUIT 1 — Case Floating

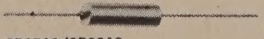


CP11A3/CP13A3
CIRCUIT 3 — Case Grounded

STYLE V (Insulated)

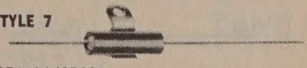


CP05A1/CP09A1
CIRCUIT 1 — Case Floating

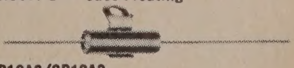


CP05A3/CP09A3
CIRCUIT 3 — Case Grounded

STYLE 7



CP10A1/CP12A1
CIRCUIT 1 — Case Floating



CP10A3/CP12A3
CIRCUIT 3 — Case Grounded

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(803) 393-5421 — TWX 810-665-2182

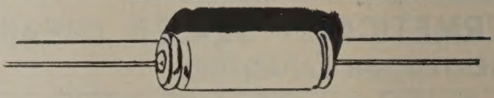
MIL TYPE CP25 - CP29
MIL-C-25

MIL-C-25 (LATEST REVISION) CP25 TO CP29

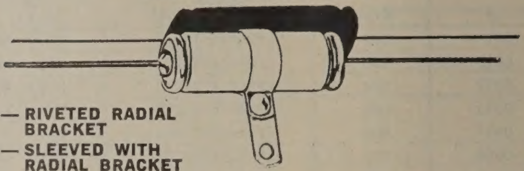
Available in capacitances from .003 thru 0.1 mf and voltages of 1500 VDC.

Type Designation[1]	Rated Voltage	Capacitance µf
CP2-A-EC104-	200	.1
CP2-A-EC254-	200	.25
CP2-A-EC504-	200	.5
CP2-A-EF302-	600	.003
CP2-A-EF602-	600	.006
CP2-A-EF103-	600	.01
CP2-A-EF203-	600	.02
CP2-A-EF503-	600	.05
CP2-A-EF104-	600	.1
CP2-A-EF254-	600	.25
CP2-A-EF504-	600	.5
CP2-A-EG302-	1,000	.003
CP2-A-EG602-	1,000	.006
CP2-A-EG103-	1,000	.01
CP2-A-EG203-	1,000	.02
CP2-A-EG503-	1,000	.05
CP2-A-EG104-	1,000	.1
CP2-A-EG254-	1,000	.25
CP2-A-EH302-	1,500	.003
CP2-A-EH602-	1,500	.006
CP2-A-EH103-	1,500	.01
CP2-A-EH203-	1,500	.02
CP2-A-EH503-	1,500	.05
CP2-A-EH104-	1,500	.1

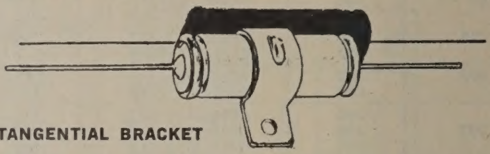
[1] Complete type designation will include additional symbols to complete style designation and to indicate circuit and capacitance tolerance.



CP25 — UNINSULATED BODY
CP26 — INSULATED BODY



CP27 — RIVETED RADIAL BRACKET
CP28 — SLEEVED WITH RADIAL BRACKET



CP29 — TANGENTIAL BRACKET

TYPE - DESIGNATION EXAMPLE (CP25A1EC104K)

CP25 — STYLE
A — TERMINAL
1 — CIRCUIT (1, 2 or 3)
E — CHARACTERISTIC
C — VOLTAGE C = 200 V F = 600 V H = 1500 V
104 — CAPACITANCE
K — CAPACITANCE TOLERANCE K = 10%
3 — VIBRATION GRADE

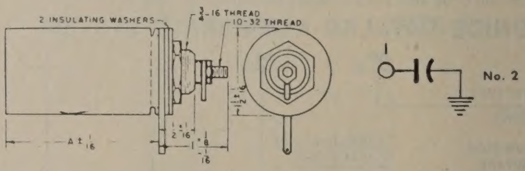
CP40, CP41 (TYPES PCM, PCIM)

Available in capacitances from .25 mf thru 4.0 mf and voltages of 600 VDC thru 1500 VDC.

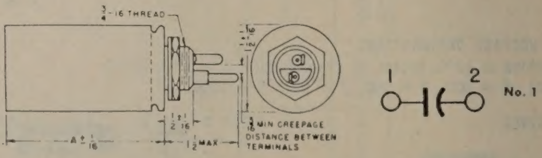
Type Designation 1/	DC Voltage Rating (see fig. 2) Volts	Capacitance µf
CP4 - - - - F105K1	600	1
CP4 - - - - F205K1	600	2
CP4 - - - - F405K1	600	4
CP4 - - - - G105K1	1,000	1
CP4 - - - - G205K1	1,000	2
CP4 - - - - H254K1	1,500 3/	0.25
CP4 - - - - H504K1	1,500	0.5
CP4 - - - - H105K1	1,500	1

TYPE - DESIGNATION EXAMPLE (CP40B1EF105K)

CP40 — STYLE (40 or 41)
B — TERMINAL (B or C)
1 — CIRCUIT (1 or 2)
E — CHARACTERISTIC
F — VOLTAGE (F, G or H) F = 600 V G = 1000 V H = 1500 V
105 — CAPACITANCE
K — TOLERANCE
1 — VIBRATION GRADE



CIRCUIT DIAGRAM — CP40
Available with (C) or (B) Terminals



CIRCUIT DIAGRAM — CP41
Available only with (B) Terminal

Nytronics Components Group, Inc.

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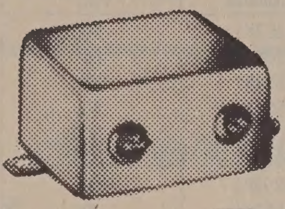
MIL TYPE
CP53, CP54, CP55
MIL-C-25

CAPACITORS MIL TYPE CP53, CP54, CP55


CP53

Section assembled in hermetically sealed tin-coated drawn-shell container. Mineral-oil impregnated and filled. Lug-type terminal seals. Meets requirements of MIL-C-25.

Temperature Rating: −55°C to +85°C.

Standard Tolerance: −10% to +20%.

PDM VARIATIONS

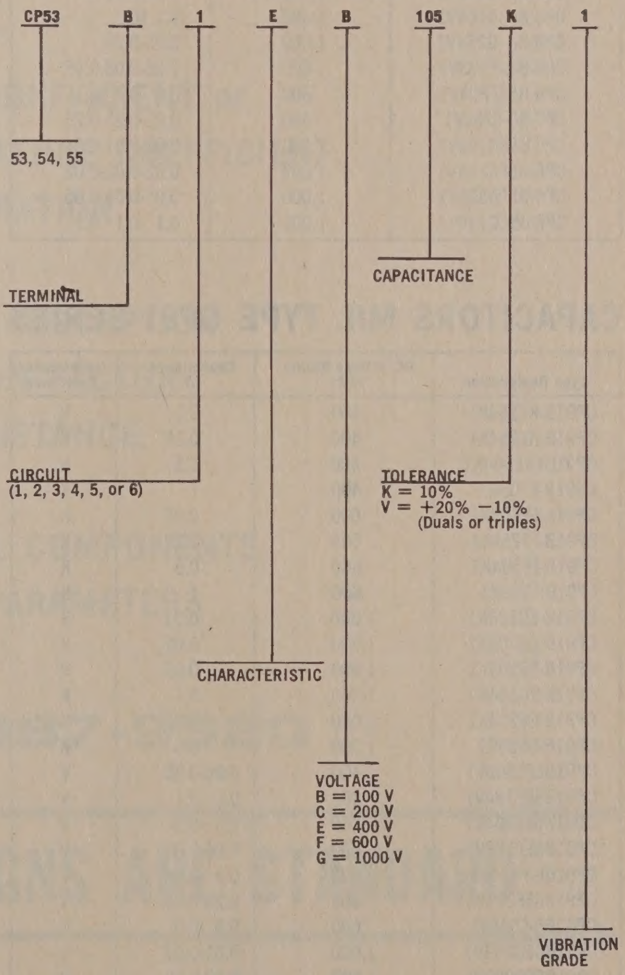
MIL Type CP53, with terminals on side.

PDMT (CP54) With terminals on top.

PDMB (CP55) With terminals on the bottom.

Type Designation	DC Voltage Rating Volts	Capacitance µf
CP5-B- - B105K1	100	1
CP5-B-EB205K1	100	2
CP5-B- - B405K1	100	4
CP5-B-FB805K1	100	8
CP5-B-FB106K1	100	10
CP5-B-FC504K1	200	0.5
CP5-B-EC105K1	200	1
CP5-B-EC205K1	200	2
CP5-B-EF254K1	600	0.25
CP5-B- - F504K1	600	0.5
CP5-B- - F105K1	600	1
CP5-B-EF205K1	600	2
CP5-B-EG503K1	1,000	0.05
CP5-B-EG104K1	1,000	0.1
CP5-B- - G254K1	1,000	0.25
CP5-B-EG504K1	1,000	0.5
CP5-B-EG105K1	1,000	1
CP5-B-EF503V1	600	0.05-0.05
CP5-B-EF104V1	600	0.1 -0.1
CP5-B- - F254V1	600	0.25-0.25
CP5-B- - F504V1	600	0.5 -0.5
CP5-B-EF105V1	600	1 -1
CP5-B-EG503V1	1,000	0.05-0.05
CP5-B- - G104V1	1,000	0.1 -0.1
CP5-B-EG254V1	1,000	0.25-0.25
CP5-B-EG504V1	1,000	0.5 -0.5
CP5-B5-E504V1	400	0.5 -0.5 -0.5
CP5-B5-F104V1	600	0.1 -0.1 -0.1
CP5-B5EF254V1	600	0.25-0.25-0.25
CP5-B5EF504V1	600	0.5 -0.5 -0.5
CP5-B5EG503V1	1,000	0.05-0.05-0.05
CP5-B5EG104V1	1,000	0.1 -0.1 -0.1
CP5-B5EG254V1	1,000	0.25-0.25-0.25

TYPE-DESIGNATION EXAMPLE (CP53B1EB105K1)


CP53
B
1
E
B
105
K
1
53, 54, 55
TERMINAL
CAPACITANCE
CIRCUIT
(1, 2, 3, 4, 5, or 6)
TOLERANCE
K = 10%
V = +20% −10%
(Duals or triples)
CHARACTERISTIC
VOLTAGE
B = 100 V
C = 200 V
E = 400 V
F = 600 V
G = 1000 V
VIBRATION
GRADE

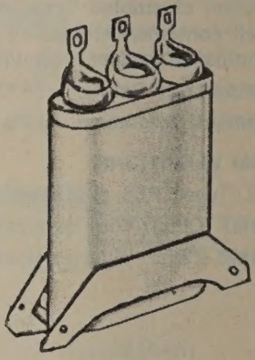
Nytronics Components Group, Inc.

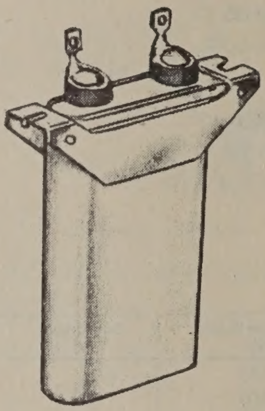
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

MIL TYPE
CP69, CP67, CP91
MIL-C-25

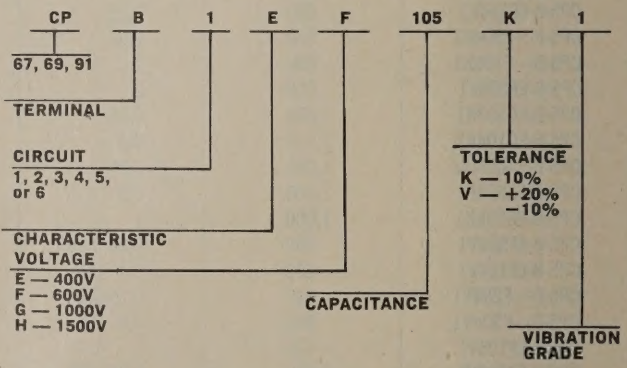
CAPACITORS MIL TYPE CP67, CP69

Type Designation	DC Voltage Rating Volts	Capacitance µf
CP6-B-EF503K1	600	0.05
CP6-B-EF104K1	600	0.1
CP6-B-EF254K1	600	0.25
CP6-B-EF504K1	600	0.5
CP6-B- - F105K1	600	1
CP6-B-EG103K1	1,000	0.01
CP6-B-EG203K1	1,000	0.02
CP6-B-EG503K1	1,000	0.05
CP6-B- - G104K1	1,000	0.1
CP6-B-EG254K1	1,000	0.25
CP6-B- - G504K1	1,000	0.5
CP6-B-EF503V1	600	0.05-0.05
CP6-B-EF104V1	600	0.1 -0.1
CP6-B-EF254V1	600	0.25-0.25
CP6-B- - F504K1	600	0.5 -0.5
CP6-B-EG103V1	1,000	0.01-0.01
CP6-B-EG203V1	1,000	0.02-0.02
CP6-B- - G503V1	1,000	0.05-0.05
CP6-B- - G104V1	1,000	0.1 -0.1
CP6-B- - G254V1	1,000	0.25-0.25
CP6-B-5-F503V1	600	0.05-0.05-0.05
CP6-B5EFP04V1	600	0.1 -0.1 -0.1
CP6-B5-F254V1	600	0.25-0.25-0.25
CP6-B5EG103V1	1,000	0.01-0.01-0.01
CP6-B5EG203V1	1,000	0.02-0.02-0.02
CP6-B5EG503V1	1,000	0.05-0.05-0.05
CP6-B5EG104V1	1,000	0.1 -0.1 -0.1


CP67

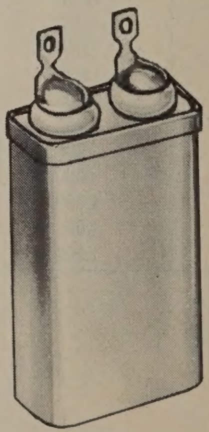

CP69

TYPE DESIGNATION EXAMPLE



CAPACITORS MIL TYPE CP91 SERIES

Type Designation	DC Voltage Rating Volts	Capacitance µf	Capacitance Tolerance
CP91B-KE104K1	400	0.1	K
CP91B-KE254K1	400	0.25	K
CP91B1KE504K1	400	0.5	K
CP91B-E105K1	400	1	K
CP91B-EF503K1	600	0.05	K
CP91B-EF254K1	600	0.25	K
CP91B-EF504K1	600	0.5	K
CP91B-F105K1	600	1	K
CP91B-EG103K1	1,000	0.01	K
CP91B-EG203K1	1,000	0.02	K
CP91B-EG503K1	1,000	0.05	K
CP91B-EG104K1	1,000	0.1	K
CP91B-EG254K1	1,000	0.25	K
CP91B-G504K1	1,000	0.5	K
CP91B6EE503V1	400	0.05-0.05	V
CP91B6EE104V1	400	0.1 -0.1	V
CP91B6EE504V1	400	0.5 -0.5	V
CP91B6EF503V1	600	0.05-0.05	V
CP91B6-F104V1	600	0.1 -01	V
CP91B6EF254V1	600	0.25-0.25	V
CP91B6-F504V1	600	0.5 -0.5	V
CP91B6EG103V1	1,000	0.01-0.01	V
CP91B6EG203V1	1,000	0.02-0.02	V
CP91B6EG503V1	1,000	0.05-0.05	V
CP91B6-G104V1	1,000	0.1 -0.1	V
CP91B6-G254V1	1,000	0.25-0.25	V
CP91B6EH103V1	1,500	0.01-0.01	V
CP91B6EH503V1	1,500	0.05-0.05	V


CP91

NOTE: AVAILABLE WITH SPADE-LUG OR FOOTED BRACKET

pfc PRECISION FILM CAPACITORS

pfc has spent 17 years developing the solution to your PRECISION CAPACITOR and RC NETWORK problems.

If you need:

- LONG TERM STABILITY
- ZERO TEMPERATURE COEFFICIENT or
- CONTROLLED TEMPERATURE COEFFICIENT
- CORONA-FREE AC OPERATION
- TIGHT TOLERANCE
- MINIMUM DIELECTRIC ABSORPTION
- ULTRA-LOW DISSIPATION FACTOR
- HIGH INSULATION RESISTANCE
- SPECIAL PACKAGING
- TRACKING OF SEVERAL COMPONENTS
- OTHER CONTROLLED PARAMETERS

call pfc at (516) 487-9320

WHERE CUSTOM DESIGNS ARE STANDARD

DEPT. EM, COMMUNITY DRIVE, GREAT NECK, NEW YORK 11022, (516) 487-9320

ASU Industries — Arco Electronics, Inc., pfc Precision Film Capacitors, Inc., Automatic Connector, Inc.

pfc PRECISION FILM CAPACITORS

WHY pfc FILM CAPACITORS ARE UNIQUE

- Conventional pigtails replaced by solid disc termination to achieve minimum inductance, noise, dissipation factor, dielectric absorption and max. strength.
- Core wound to maintain winding integrity.
- Fused at temperatures in excess of maximum operating temperature for ultimate stability and temperature coefficient uniformity.
- Insulation resistance tested 100% at 3 times rated voltage at 85°C.
- Dielectric strength tested 100% at 3 times rated voltage at 85°C for 16 hours.
- Temperature coefficient checked 100% on all zero TC and controlled TC capacitors.

ALL PFC SPECIFICATIONS ARE GUARANTEED LIMITS, NOT "TYPICAL," "AVERAGE" OR "REPRESENTATIVE."

HOW TO SELECT PFC CAPACITORS

PFC capacitor types are identified by a two (2) letter symbol. The first letter signifies the dielectric and the electrical characteristics of the capacitors. The second letter designates the enclosures.

To simplify the selection of the most suitable capacitor for any application the following table is provided showing relative merits of the most pertinent parameters as they apply to capacitors produced by PFC using special designs and techniques.

TEMPERATURE CHARACTERISTICS

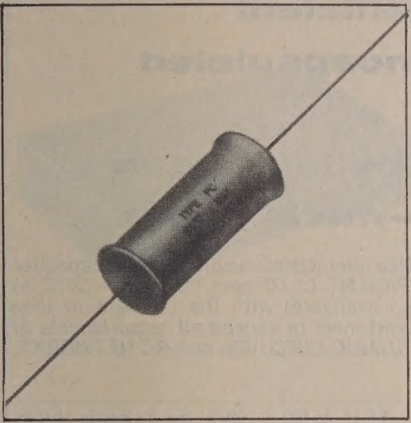
TABLE II COMPARISON OF PFC CAPACITORS

		Constancy of Capac. with Temp. Change Superior = ±0.03% Fair = 1.0%	Linearity of Temp. Characteristic Superior = ±1 ppm Fair = 100 ppm	Uniformity of Temp. Coefficient Superior = ±5 ppm Fair = 30 ppm	Stability (Long Term) Superior = 0.05% Fair = 0.25%	Insulation Resistance Superior = $10^{14}\Omega$ Fair = $10^{12}\Omega$	Dissipation Factor Superior = 0.0001 Fair = 0.002	Dielectric Absorption Superior = 0.05% Fair = 1.0%
P Standard Polystyrene	Superior Excellent Good Fair	Temperature Stability	T.C. Linearity	T.C. Uniformity	Stability	I.R.	Dissipation	Dielectric Absorption
S Super Stable Polystyrene	Superior Excellent Good Fair	Temperature Stability	T.C. Linearity	T.C. Uniformity	Stability	I.R.	Dissipation	Dielectric Absorption
H Temperature Stable Modified Polystyrene	Superior Excellent Good Fair	Temperature Stability	T.C. Linearity	T.C. Uniformity	Stability	I.R.	Dissipation	Dielectric Absorption
K Zero Temp. Coefficient Multiple Dielectric	Superior Excellent Good Fair	Temperature Stability	T.C. Linearity	T.C. Uniformity	Stability	I.R.	Dissipation	Dielectric Absorption
N Moderate Temp. Stability Multiple Dielectric	Superior Excellent Good Fair	Temperature Stability	T.C. Linearity	T.C. Uniformity	Stability	I.R.	Dissipation	Dielectric Absorption

A subsidiary of **ASU** *Industries, Inc.* **DEPT. EM, COMMUNITY DRIVE, GREAT NECK, NEW YORK 11022, (516) 487-9320**

Add Dept. EM to address to tell them you saw it in eem

pfc PRECISION FILM CAPACITORS

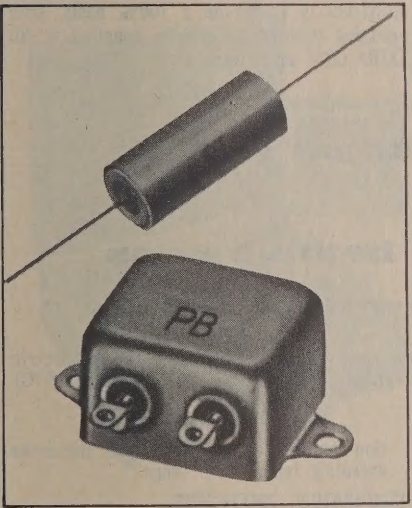


superior environmental protection at low cost—small size

type PC: Irradiated polyolefin jacket—tubular axial leads

type PJ: Fused polystyrene jacket—tubular axial leads

Excellent for precision filters, delay lines and precision timing circuits and other applications where small size, excellent performance and low cost are mandatory.



for military applications and hostile environments

type PT, and ST tubular

type PB, and SB rectangular bathtub cans

hermetically sealed—metal cases

These units exceed all requirements of MIL-C-19978 and optimize performance characteristics of polystyrene film. Excellent for critical applications where high IR, Q, exceptional stability, low DF and absorption are mandatory. Intended primarily for analog and digital computers, calculators, high Q tuned circuits, integrators, precision filter circuits, pulse networks, servo systems and reference capacitors.

specifications

DISSIPATION FACTOR:
When measured at or referred to 1 kHz dissipation factor shall not exceed the following: .0001 at 23°C and .0002 at 85°C.

INSULATION RESISTANCE:
When measured at applicable test temperature shall equal or exceed the following values:

	23°C	85°C	
megohm x mfd	10^6	1.5×10^5	
except the insulation resistance in megohms need not exceed	2×10^6 10^8	3×10^5 10^6	PC, PJ PB, PT, SB, ST

DIELECTRIC ABSORPTION:
When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 0.05% over the entire operating temperature range.

STABILITY:
Long term (1 year) capacitance drift under maximum operating conditions shall not exceed the following limits for types shown.
Types PC, PJ, PT, PB: ±0.1%
Types SC, SJ, ST, SB: ±0.05%

TEMPERATURE COEFFICIENT:
TC of all PFC capacitors listed is negative 120 ±15 PPM/°C.

VOLTAGE:
All listed units are available to 1000 VDC.

TOLERANCES:
±0.1%, ±.25%, ±.50%, ±1%, ±2%, ±3%, ±5%, ±10%.

CAPACITANCE:
.001 MFD to 0.5 MFD: Types PC, PJ.
0.1 MFD to 5.0 MFD: Types PB, SB, PT, ST

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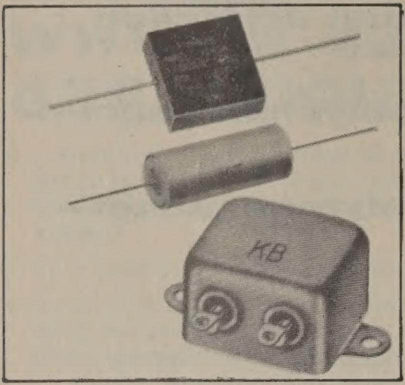
PRECISION FILM CAPACITORS



zero temperature coefficient
type KE flat epoxy encapsulated
type KT tubular
type KB rectangular bathtub cans
hermetically sealed—metal cases

A unique combination of Polystyrene and Mica dielectrics resulting in a capacitor offering a truly ZERO TEMPERATURE COEFFICIENT (±10 ppm/°C from −55°C to +85°C standard production ±5 ppm/°C also available) with the ultimate in long term STABILITY. Type KT and KB capacitors will meet or exceed all requirements of MIL-C-19978, for PRECISION-OSCILLATORS, TIMING CIRCUITS, and RC NETWORKS.

specifications

INSULATION RESISTANCE:
Insulation resistance when measured at the applicable test temperature, shall equal or exceed the following values:

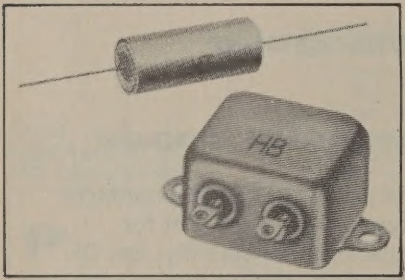
	23°C	85°C
megohm x mfd	10^5	10^3
except the insulation resistance in megohms need not exceed	10^6	10^4

DISSIPATION FACTOR:
When measured at or referred to 1 kHz the dissipation factor shall not exceed .001 at 23°C.

STABILITY:
Long term (1 year) capacitance drift under maximum operating conditions shall not exceed ±0.05%.

DIELECTRIC ABSORPTION:
When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 1.0% over the entire operating temperature range.

THE TEMPERATURE COEFFICIENT OF THESE CAPACITORS is **tested on a 100% basis.** Data verifying these tests can be supplied at NO EXTRA COST as requested.



temperature-stable small size
type HT tubular
type HB rectangular bathtub cans
hermetically sealed—metal cases

An exclusive PFC design modifying the temperature characteristics of the dielectric film to provide capacitors insensitive to temperature changes (±0.1% change to 85°C).

specifications

INSULATION RESISTANCE:
Insulation resistance when measured at the applicable test temperature, shall equal or exceed the following values:

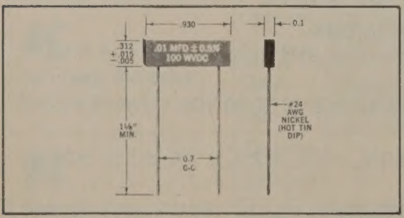
	23°C	85°C
megohm x mfd	10^6	1.5×10^5
except the insulation resistance in megohms need not exceed	10^8	10^6

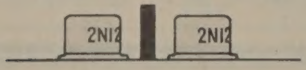
DISSIPATION FACTOR:
When measured at or referred to 1 kHz the dissipation factor shall not exceed 0.002 at 23°C.

STABILITY:
Long term (1 year) capacitance drift under maximum operating conditions shall not exceed ±0.1%.

DIELECTRIC ABSORPTION:
When tested in accordance with paragraph 4.6.15 of MIL-C-19978, the dielectric absorption shall not exceed 0.05% over the entire operating temperature range.

TEMPERATURE COEFFICIENT:
Types HT and HB capacitors is controlled so that the variation of capacitance from room temperature to 85°C is less than ±0.1%; from room temperature to −55°C variation is less than ±0.25%. Tighter control is available to special order (±0.05% from 10°C to 50°C).





WELDABLE LEADS
Nickel "A"
(solderable, too)
0.7" spacing

SPACE SAVERS
10 capacitors
per inch
.312" high
Flush mount

type PE 0.1" thickness

Uniform lead spacing for p-c use. Uniform size and flush mounting. Both weldable and solderable leads. Rugged, moisture proof construction.

specifications

CAPACITANCE RANGE: .001 to .01 mfd (lower values are available upon request).

TOLERANCE: ±5%, ±2%, ±1%, ±½%, ±¼%, ±0.1%.

VOLTAGE RATING: 100 VDCW.

INSULATION RESISTANCE: 10^{13} ohms minimum at 25°C — 10^{12} ohms at 85°C.

DISSIPATION FACTOR: 0.01% maximum at 25°C —0.02 maximum at 85°C.

DIELECTRIC ABSORPTION: 0.05% maximum at all temperatures.

TEMP. COEFFICIENT: Negative 190 ±30 ppm/°C.

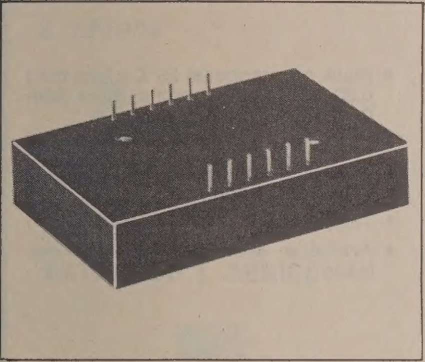
LONG TERM OPERATING STABILITY: ±0.1% maximum drift under fixed or variable operating conditions within specified maximum limits.

In addition to the physical advantages of this design, the electrical excellence of PFC polystyrenes has been retained. High long term stability under maximum operating conditions, low dissipation factor and dielectric absorption, extremely high insulation resistance, close tolerance are featured. And also important is the PFC control of quality which results in close uniformity not only from unit to unit, but from production lot to production lot as well.

The Nickel "A" leads of PFC Type PE capacitors are welded directly to the capacitor section. The strength and permanence of electrical contact is thereby entirely independent of encapsulation.

All PFC Type PE capacitors are "debugged" 100% prior to shipment by accelerated life test at stress levels exceeding ratings to eliminate potential early failures. Extensive data on reliability of PFC polystyrene capacitors is available for documentation.

pfc PRECISION FILM CAPACITORS



precision RC networks

the ultimate in temperature coefficient control of RC product.

linear TC of ±5 ppm/°C over temperature range of −55°C to +85°C.

PFC's ability to produce capacitors with specific and uniform characteristics has facilitated the design of highly precise RC networks. By matching zero temperature coefficient resistors and capacitors, or by balancing temperature coefficient to obtain a zero (or other specified) TC on the RC products, networks which have long term stability independent of temperature are obtained. At the same time RC products of better than ±0.05% accuracy can be supplied. Testing is performed on a 100% basis on both resistors and capacitors with temperature coefficient data recorded at both temperature extremes.

COMPLETE SETS OF PRECISION STANDARDS

STANDARD CAPACITOR
.1 mfd.

laboratory precision capacitor standards

Stabilized silvered mica standard capacitors available in values to .1 mfd and in polystyrene/mica above .1 mfd. Standards are designed for applications as calibration standards, breadboard components, circuit simulation devices, or as precision components in stable frequency or timing networks. 37 units provide values from .0001 to 1.0 mfd with accuracy of ±0.1% to 0.5 mmf at 1000 Hz and 23°C.

specifications

ACCURACY:
±0.1% +0.5 mmf at 1000 KC at 23°C.

STABILITY:
±0.05% +0.1 mmf.

VOLTAGE:
.0001 to 0.04 mfd: 500 volts peak.
.05 to 1.0 mfd: 300 volts peak.

4-position adapter combines standards from four decades to provide a ±0.1% standard to any special value. For example: 0.5921 mfd ±0.1%.

KIT #SS-32

Complete Set of 32 Precision Standards ranging from .0001 to .5 mfd as listed. Dimensions: 11⅜W x 9⅜H x 3⅝D plus 4 POSITION ADAPTER. Including handsome, durable carrying case.

Part No.	Cap. Mfd	Max. Diss. Factor	Min. Leak. Resist. Megohms	Case Size L x W x H
SS-101	.0001	.0015	50,000	1 9/16 x 15/16 x 1 5/16
SS-201	.0002	.0015	50,000	1 9/16 x 15/16 x 1 5/16
SS-301	.0003	.0015	50,000	1 9/16 x 15/16 x 1 5/16
SS-401	.0004	.0015	50,000	1 9/16 x 15/16 x 1 5/16
SS-501	.0005	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-601	.0006	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-701	.0007	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-801	.0008	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-901	.0009	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-102	.001	.001	50,000	1 9/16 x 15/16 x 1 5/16
SS-202	.002	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-302	.003	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-402	.004	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-502	.005	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-602	.006	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-702	.007	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-802	.008	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-902	.009	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-103	.01	.0005	50,000	1 9/16 x 15/16 x 1 5/16
SS-203	.02	.0005	50,000	1 9/16 x 15/16 x 2 7/32

Part No.	Cap. Mfd	Max. Diss. Factor	Min. Leak. Resist. Megohms	Case Size L x W x H
SS-303	.03	.0005	50,000	1 9/16 x 15/16 x 2 7/32
SS-403	.04	.0005	50,000	1 9/16 x 15/16 x 2 7/32
SS-503	.05	.0005	50,000	1 9/16 x 15/16 x 2 7/32
SS-603	.06	.0005	50,000	1 9/16 x 15/16 x 2 15/16
SS-703	.07	.0005	50,000	1 9/16 x 15/16 x 2 15/16
SS-803	.08	.0005	50,000	1 9/16 x 15/16 x 2 15/16
SS-903	.09	.0005	50,000	1 9/16 x 15/16 x 2 15/16
SS-104	.1	.0005	50,000	1 9/16 x 15/16 x 2 15/16
SS-204	.2	.0005	100,000	1 9/16 x 15/16 x 2 15/16
SS-304	.3	.0005	100,000	1 9/16 x 15/16 x 2 15/16
SS-404	.4	.0005	100,000	1 9/16 x 15/16 x 2 15/16
SS-504	.5	.0005	100,000	1 9/16 x 15/16 x 2 15/16
SS-604	.6	.0005	100,000	1 9/16 x 1 11/16 x 2 15/16
SS-704	.7	.0005	100,000	1 9/16 x 1 11/16 x 2 15/16
SS-804	.8	.0005	100,000	1 9/16 x 1 11/16 x 2 15/16
SS-904	.9	.0005	100,000	1 9/16 x 1 11/16 x 2 15/16
SS-105	1.0	.0005	100,000	1 9/16 x 1 11/16 x 2 15/16

NOTE: Height Dimensions Excludes Banana Plugs. Plug Spacing ¾″.

A subsidiary of **ASU** *Industries, Inc.* **DEPT. EM, COMMUNITY DRIVE, GREAT NECK, NEW YORK 11022, (516) 487-9320**

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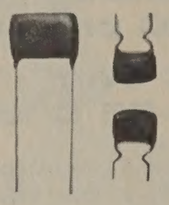
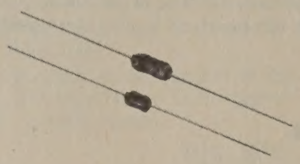
POLYESTER CAPACITORS

TYPE ECQ-M (Radial lead — durez resin coated)



- Rated voltages/capacitances:
  50 VDC
  50 VDC miniature — from 0.47 to 0.001
  100 VDC — from 0.47 to 0.001
  200 VDC — from 0.47 to 0.001
  400 VDC — from 0.47 to 0.001
  600 VDC — from 0.1 to 0.001
- Capacitance tol.: ±5% (J), ±10% (K), ±20% (M)
- Insul. resistance (at 25°C): less than 0.33μF≥9000 megohms; more than 0.33μF≥3000 megohms x μF
- Dissipation factor: ≤1.0% @ 1 kHz
- Withstand voltage: rated voltage x 250% (for 1 sec.)
- Temp. range: −40°C to +85°C
- Available with straight or crimp leads

TYPE ECQ-Z (Axial leads — with epoxy coating)

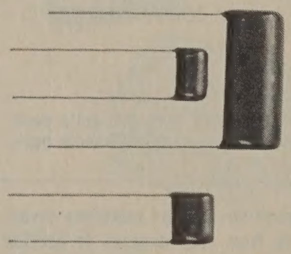


Ideal for automatic insertion equipment.

- Rated voltages: 50, 100 & 200 VDC
- Withstand voltage: Rated voltage x 250% for (1 sec.)
- Insul. resistance: ≥25,000 megohms @ 25°C
- Dissipation factor: ≥1.0% @ 1 kHz
- Temp. range: −40°C to +85°C
- Tape and reel packaging

METALLIZED POLYESTER CAPACITORS

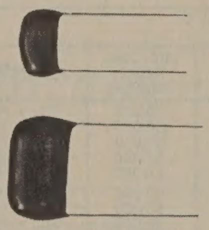
TYPE ECQ-E (Radial leads — covered with epoxy resin)



For general purpose use.

- Rated voltages/capacitances:
  100 VDC — from 0.10 to 10.0 μF
  250 VDC — from 0.047 to 2.2 μF
  400 VDC — from 0.047 to 2.2 μF
  630 VDC — from 0.015 to 1.5 μF
  1000 VDC — from 0.001 to 0.1 μF
- Capacitance tol.: ±5% (J), ±10% (K), ±20% (M)
- Insul. resistance: Less than 0.33 μF, ≥9000 megohms; 0.33 μF or more, ≥3000 megohms x μF
- Dissipation factor: ≤1.0% @ 1 kHz
- Withstand voltage: rated voltage x 1.5 (1 min.)
- Operating temp.: −40°C ~ +85°C
- Noncombustible, noninductive
- Available with straight or crimp-leads

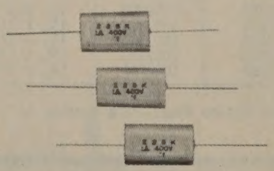
TYPE ECQ-UD (UL listed — Radial lead covered with epoxy resin)



For across-the-line bypass and antenna coupling.

- Rated voltage: 125 VAC
- Capacitance tol.: ±10% (K), ±20% (M)
- Insul. resistance: ≥10,000 megohms @ 25°C
- Dissipation factor: ≤1.0% @ 1 kHz
- Withstand voltage: 1000 VAC (1 min.)
- Operating temp.: −25°C ~ +85°C
- Noncombustible, noninductive
- Available with straight or crimp-leads

TYPE ECQ-T (Axial leads)



For general communications equipment.

- Rated voltage/capacitances:
  250 VDC — from 0.15 to 10.0 μF
  400 VDC — from 0.068 to 3.3 μF
  630 VDC — from 0.033 to 2.2 μF
- Capacitance tol.: ±5% (J), ±10% (K) ±20% (M)
- Insul. resistance: ≥3000 megohms x μF @ 25°C
- Dissipation factor: ≤1.0% @ 1 kHz
- Withstand voltage: Rated voltage x 1.5 (1 min.)
- Operating temp.: −40°C ~ +85°C

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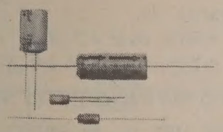
ALUMINUM ELECTROLYTIC CAPACITORS

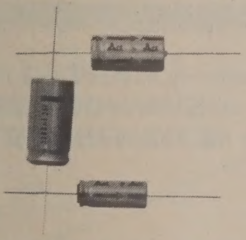
L SERIES



A complete range over 200 standard electrolytics for commercial, industrial and entertainment use — in both radial and axial designs.

- Rated working voltage range: 6.3 to 100 VDC
- Rated capacitance range: 0.47 to 2200 μF (@ 120 Hz and +25°C)
- Capacitance tol.: Over 4.7 μF, −10 to +50%; 4.7 μF or less, −10 to +75%
- Operating temp.: −40°C to +85°C
- Load life: 1000 hr. @+85°C
- Lead forming available

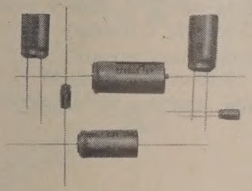
EXTENDED L SERIES



Compact sizes, with low voltage and high capacitance ratings. Radial and axial leads available.

- Rated working voltage range: 6.3 to 100 VDC
- Rated capacitance range: 220 to 10,000 μF
- Capacitance tol.: −10 to +50%
- Operating temp.: −40°C to +85°C
- Load life: 1000 hr. @ +85°C

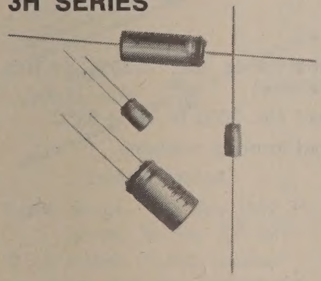
Z SERIES



For wide variety of applications requiring low leakage and low impedance, in both radial and axial lead types.

- Working voltage range: 6.3 to 50 VDC
- Capacitance range: 0.1 to 2200 μF
- Capacitance tol.: ±20%
- Operating temp.: −40°C to +85°C
- Leakage current: 0.002 CV +1 μA max.
- Load life: 2000 hr. at +85°C
- Lead forming available

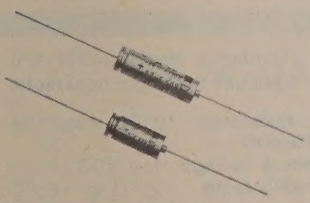
3H SERIES



Very wide temperature range and excellent low temperature stability characteristics, while meeting most stringent environmental characteristics — in both radial and axial lead types.

- Rated working voltage range: 16 to 63 VDC
- Rated capacitance range: 1 to 470 μF
- Capacitance tol.: ±20%
- Operating temp.: −40°C to +125°C
- Leakage current: 0.002 CV or 2 μA, whichever is greater
- Load life: 2000 hr. @ +105°C or 1000 hr. @ +125°C

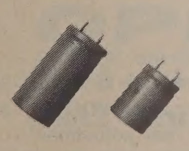
4H SERIES



Characteristics similar to those of solid tantalum types. Operate over wide temperature range. Axial lead types only.

- Rated working voltage range: 16 to 63 VDC
- Rated capacitance range: 1 to 220 μF
- Capacitance tol.: ±20%
- Operating temp.: −70°C to +155°C
- Leakage current: 0.002 CV μA max. (2 μA min.)
- Load life: 2000 hr. @+155°C

TS SERIES



Self-mounting for PCB

- Rated DC working voltage range: 16 to 200 VDC
- Rated capacitance range: 220 to 10,000 μF
- Capacitance tol.: −10 to +50%
- Operating temp.: −40°C to +85°C (−25°C to +85°C for 160 VDC and above)
- Load life: 1000 hr. @ +85°C

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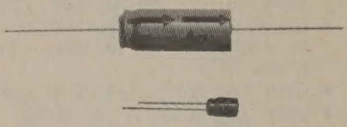
ALUMINUM ELECTROLYTIC CAPACITORS

HIGH VOLTAGE SERIES



- Rated working voltage range:
  160 to 450 VDC (radial lead type)
  160 to 500 VDC (axial lead type)
- Rated capacitance range:
  1 to 100 μF (radial)
  1 to 220 μF (axial)
- Capacitance tol.:
  −10 to +50% over 4.7 μF
  −10 to +75% less than 4.7 μF
- Operating temp.: −25°C to +85°C
- Load life: 1000 hr. @ +85°C

NON-POLAR SERIES

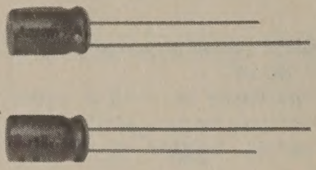
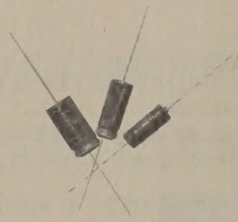


Exhibit extremely stable characteristics when used in DC circuits exposed to reversing current or AC. Radial lead types only.

- Rated working voltage range: 16 to 50 VDC
- Rated capacitance range: 1 to 1000 μF
- Capacitance tol.: −10 to +100%
- Operating temp.: −25°C to +85°C
- Load life: 1000 hr. @ +85°C

CROSSOVER NETWORK SERIES (Bi-Polar)

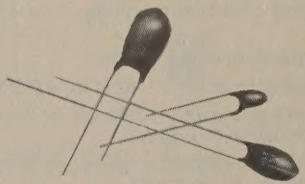


Specially designed for use in crossover networks for 2, 3 and 4-way high-fidelity speaker systems. Available in axial or radial leads.

- Rated working voltages: 25 and 50 VDC
- Rated capacitance: 1 to 100 μF
- Capacitance tol.: ±20%
- Operating temp.:
  −40°C to +85°C (axial)
  −25°C to +85°C (radial)
- Tan. δ: 0.06 max. (axial)
  0.10 max. (radial)
- Load life: 1000 hr. @ +85°C

SOLID TANTALUM ELECTROLYTIC CAPACITORS

SQ SERIES

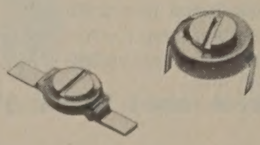


Resin dipped. Nonflammable.

- Rated working voltage range: 3.15 to 50 VDC
- Rated capacitance range: 0.1 to 220 μF
- Operating temp.: −55°C to +85°C
- Capacitance tol.: ±20% (±10% available)
- Load life: 2000 hr. @ +85°C
- Lead forming available

CERAMIC TRIMMER CAPACITORS

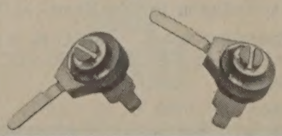
NW & NX SERIES (THIN TYPE) (3.5 & 5.0mm dia.)



The ECV-INW and ECV-INX Series are microminiature, thin-type, rotary ceramic trimmers. Ideal for slow-fast adjustment of electronic wrist watches and other devices, such as portable wireless, medical and other microelectronic equipment, that require minute impedance level control and precise adjustment of time constants.

- Insul. resistance: 10,000 megohms at 100 VDC
- Withstand voltage: 110 VDC
- Operating temp.: −25°C to +85°C
- Working volt.: 50 WVDC @ +85°C

ZW SERIES (5, 7 & 8mm dia.)



For time constant and impedance adjustments.

- Insul. resistance: 10,000 megohms min. @ 250 VDC
- Withstand voltage: 500 VDC
- Operating temp.: −25°C to +85°C
- Working volt.: 250 WVDC @ +85°C
- Top, side or rear adjustment

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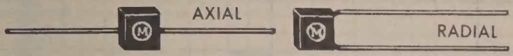
MUCON® SUBminiature CERAMIC CAPACITORS

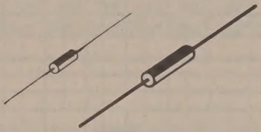
ULTRA-STABLE NPO MU-CAPS®

MOST STABLE MINIATURE CAPACITOR MADE

T.C.--ZERO ±30 PPM/°C

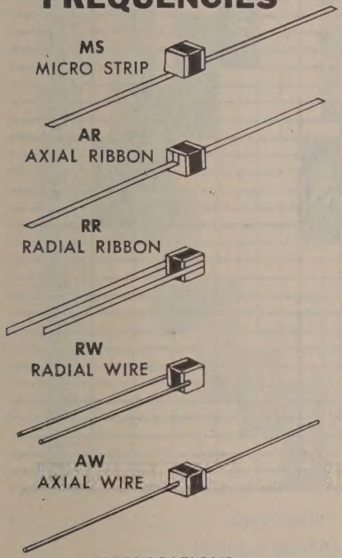


SQUARE ... from 1 PF. to .22 MF.



TUBULAR ... from 1 PF. to .22 MF.

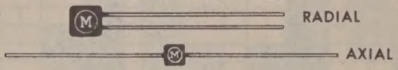
ULTRA Q MICROWAVE FREQUENCIES



SPECIFICATIONS

Capac. Range: .1 Pf thru 1000 Pf
WVDC: 50 thru 500 VDC
Q @ 1 MHZ: 10,000 minimum
Temp. Coeff.: +90 ±20ppm/°C

THINLINE



Mucon's Thinline Capacitors are made of the following 16 different ceramic bodies for a broad choice of size and electrical properties:

Temperature-Compensating Materials:	NPO	N080	N150
	N220	N330	N450
	N750	N1400	N2400
	N3300	N4700	N5600

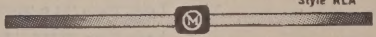
General Purpose Materials: LOW-VAR, STABLE-K, HIGH-K & SUPER-K for wide range of stability and capacitance.

SPECIFICATIONS

Capacitance:
Range: TEMP.-COMP. BODIES
1/2 pf - 2200 pf
GEN. PURPOSE BODIES
50 pf - 150,000 pf
Voltages: 25 WVDC, 50WVDC, 200 WVDC and 500 WVDC
Leads: Tinned Copper, Nickel or Dumet to MIL Spec.
Shapes: Square, rectangular, single or multiple element.

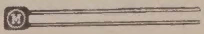
RIBBON LEADS

Style RLA



Size and specifications same as "Thinline" capacitors shown above, except radial and axial tinned copper ribbon leads, approximately .006" thick x 3/32" wide for units with max. size of .150" and up; .045" wide for smaller units.

M-CAPS



M-CAPS are monolithic capacitors with maximum capacitance/volume ratio in a choice of 3 dielectrics to cover all requirements. From .100" square to .300" square.

CHIPS SINGLE LAYER

Sizes: .030" Sq. and up

Capacitance:	SUPER-K Ceramic	150 PF. to10,000 PF.
	HIGH-K "	100 PF. to 5,000 PF.
	STABLE-K "	50 PF. to 2,700 PF.
	LOW-VAR "	20 PF. to 1,000 PF.
	TEMP. COMP. "	1 PF. to 330 PF.

Electrodes: Normally silver. Other precious metals on request
Voltage: 50 WVDC

CHIPS MONOLITHIC MULTILAYER

Sizes: From .050" x .050" x .050" to .610" x .310" x .080"
Capacitance: STABLE-K Ceramic 10 PF. to 2 MF.
NPO " 1 PF. to .027 MF.
Electrodes: Normally silver. Other precious metals on request
Voltage: 50 WVDC

WRITE FOR FREE CATALOG LISTING COMPLETE DETAILED SPECIFICATIONS FOR ALL MUCON SUB-MINIATURE CERAMIC CAPACITORS, & CHIPS

QPL's
CK05 and CK06
CK12 thru CK16

MILITARY CAPACITANCE RANGE IN PF (MIL-C-20-NPO)

STYLE	CAP. RANGE	VOLTAGE
CC75/CCR75	1.0 - 68	200
CC75/CCR75	82 - 220	200
CC75/CCR75	330 - 680	50
CC76/CCR76	82 - 120	200
CC76/CCR76	270 - 390	100
CC76/CCR76	820 - 1,000	50
CC77/CCR77	150 - 680	200
CC77/CCR77	470 - 2.200	100
CC77/CCR77	2,700 - 5,600	50
CC78/CCR78	820 - 3,300	200
CC78/CCR78	3,900 - 12,000	100
CC78/CCR78	15,000 - 27,000	50
CC79/CCR79	3,900 - 10,000	200
CC79/CCR79	15,000 - 39,000	100
CC79/CCR79	47,000 - 82,000	50

REPUBLIC ELECTRONICS CORP.

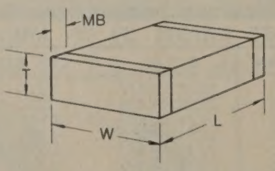
176 E. 7th St., PATERSON, N. J. 07524
201-279-0300 TWX 510-234-5908

SEMTECH NPO MONO-CHIPS HIGH VOLTAGE CERAMIC CAPACITORS

	1 kV					2 kV					3 kV					4 kV					5 kV					
SIZE	SCMC 2520	SCMC 3530	SCMC 4540	SCMC 5550	SCMC 6560	SCMC 2520	SCMC 3530	SCMC 4540	SCMC 5550	SCMC 6560	SCMC 2520	SCMC 3530	SCMC 4540	SCMC 5550	SCMC 6560	SCMC 2520	SCMC 3530	SCMC 4540	SCMC 5550	SCMC 6560	SCMC 2520	SCMC 3530	SCMC 4540	SCMC 5550	SCMC 6560	
L	.25"	.35"	.45"	.55"	.65"	.25"	.35"	.45"	.55"	.65"	.25"	.35"	.45"	.55"	.65"	.25"	.35"	.45"	.55"	.65"	.25"	.35"	.45"	.55"	.65"	
W	.20"	.30"	.40"	.50"	.60"	.20"	.30"	.40"	.50"	.60"	.20"	.30"	.40"	.50"	.60"	.20"	.30"	.40"	.50"	.60"	.20"	.30"	.40"	.50"	.60"	
T (MAX.)	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.15"	.20"	.20"	.20"	.20"	.20"	.25"	.25"	.25"	.25"	.25"	
MB (MAX.)	.030"	.040"	.040"	.040"	.040"	.030"	.040"	.040"	.040"	.040"	.030"	.040"	.040"	.040"	.040"	.030"	.040"	.040"	.040"	.040"	.030"	.040"	.040"	.040"	.040"	
CAPACITANCE																										EIA CODE
10 pF																										100
12 pF																										120
15 pF																										150
18 pF																					■					180
22 pF											■					■					■					220
27 pF						■					■					■					■					270
33 pF	■					■					■					■					■					330
39 pF	■					■					■					■					■					390
47 pF	■					■					■					■					■					470
56 pF	■					■					■					■					■					560
68 pF	■					■					■					■					■					680
82 pF	■					■					■					■					■					820
100 pF	■					■					■					■					■					101
120 pF	■					■					■					■					■					121
150 pF	■					■					■					■					■	■				151
180 pF	■					■					■					■	■				■	■				181
220 pF	■					■					■	■				■	■				■	■				221
270 pF	■					■					■	■				■	■					■				271
330 pF	■					■					■	■					■					■	■			331
390 pF	■					■						■					■	■				■	■			391
470 pF	■					■	■					■					■	■				■	■			471
560 pF	■					■	■					■	■				■	■					■			561
680 pF	■					■	■					■	■					■					■	■		681
820 pF	■						■					■	■					■	■				■	■		821
1000 pF	■						■						■	■				■	■				■	■		102
1200 pF	■						■	■					■	■				■	■	■				■	■	122
1500 pF	■						■	■					■	■					■	■				■	■	152
1800 pF	■	■					■	■						■	■				■	■				■	■	182
2200 pF	■	■						■	■					■	■					■					■	222
2700 pF	■	■						■	■					■	■					■					■	272
3300 pF		■						■	■						■					■						332
3900 pF		■							■	■					■											392
4700 pF		■	■						■	■																472
5600 pF		■	■						■	■																562
6800 pF		■	■							■																682
8200 pF			■	■						■																822
.01 μFd			■	■																						103
.012 μFd			■	■																						123
.015 μFd				■	■																					153
.018 μFd				■	■																					183
.022 μFd				■	■																					223
.027 μFd					■																					273
.033 μFd					■																					333
.039 μFd					■																					393
.047 μFd																										473

DIELECTRIC TYPE (K) .... NPO Also available: X7R DIELECTRIC
TEMPERATURE COEFFICIENT (T.C.) .... Less than 30 ppm/°C; −55°C to +125°C
DISSIPATION FACTOR (D.F.) .... Less than .0015 (.15%) @ 1 KHZ, 1 VAC, 25°C
INSULATION RESISTANCE (I.R.) .... 100 K meg Ω or 1000 meg Ω-microfarads, whichever is less (25°C, 500 VDC)
AGING 0
DIELECTRIC WITHSTANDING VOLTAGE .... 1.2 Times Rated Voltage* @ 25°C
VOLTAGE COEFFICIENT (V.C.) 0
DIMENSIONAL TOLERANCE .... ± .010 or ± 5%, whichever is greater

*Dielectric Withstanding Voltage Test on Monolithic Chips is conducted with charging current limited to 10 mA and the discharge current limited to 5 A.



ORDERING INSTRUCTIONS:

SCMC 6560	NPO	822	K	A	2
PART SIZE	DIELECTRIC MATERIAL	CAPACITANCE (EIA CODE)	CAPACITANCE TOLERANCE	TERMINATION	VOLTAGE RATING
SCMC 2520 SCMC 3530 SCMC 4540 SCMC 5550 SCMC 6560	NPO	Last digit indicates number of zeroes following the first two digits. Ex: 822=8200 pF	J=5% K=10% M=20%	A=Silver D=Palladium Silver	1 KV 2 KV 3 KV 4 KV 5 KV

SEMTECH
CORPORATION

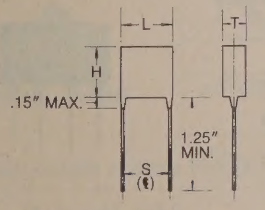
652 Mitchell Road, Newbury Park, California 91320
(805) 498-2111, (213) 628-5392 / TWX: 910-336-1264

SEMTECH "GOLD-CAP" X7R RADIALS
HIGH VOLTAGE CERAMIC CAPACITORS

	1 kV					2 kV					3 kV					4 kV					5 kV					
SIZE	SCMC 2520E	SCMC 3530E	SCMC 4540E	SCMC 5550E	SCMC 6560E	SCMC 2520E	SCMC 3530E	SCMC 4540E	SCMC 5550E	SCMC 6560E	SCMC 2520E	SCMC 3530E	SCMC 4540E	SCMC 5550E	SCMC 6560E	SCMC 2520E	SCMC 3530E	SCMC 4540E	SCMC 5550E	SCMC 6560E	SCMC 2520E	SCMC 3530E	SCMC 4540E	SCMC 5550E	SCMC 6560E	
L (MAX.)	.40"	.50"	.60"	.70"	.80"	.40"	.50"	.60"	.70"	.80"	.40"	.50"	.60"	.70"	.80"	.40"	.50"	.60"	.70"	.80"	.40"	.50"	.60"	.70"	.80"	
H (MAX.)	.35"	.45"	.55"	.65"	.75"	.35"	.45"	.55"	.65"	.75"	.35"	.45"	.55"	.65"	.75"	.35"	.45"	.55"	.65"	.75"	.35"	.45"	.55"	.65"	.75"	
T (MAX.)	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.25"	.30"	.30"	.30"	.30"	.30"	.35"	.35"	.35"	.35"	.35"	
S ± .030"	.280"	.380"	.480"	.580"	.680"	.280"	.380"	.480"	.580"	.680"	.280"	.380"	.480"	.580"	.680"	.280"	.380"	.480"	.580"	.680"	.280"	.380"	.480"	.580"	.680"	
CAPACITANCE																										EIA CODE
82 pF																										820
100 pF																										101
120 pF																										121
150 pF																										151
180 pF																■					■					181
220 pF																■					■					221
270 pF											■					■					■					271
330 pF											■					■					■					331
390 pF						■					■					■					■					391
470 pF						■					■					■					■					471
560 pF						■					■					■					■					561
680 pF	■					■					■					■					■	■				681
820 pF	■					■					■					■					■	■				821
1000 pF	■					■					■					■					■	■				102
1200 pF	■					■					■					■	■					■				122
1500 pF	■					■					■					■	■					■	■			152
1800 pF	■					■					■	■				■	■					■	■			182
2200 pF	■					■					■	■					■					■	■			222
2700 pF	■					■					■	■					■						■			272
3300 pF	■					■						■					■	■					■	■		332
3900 pF	■					■						■					■	■					■	■		392
4700 pF	■					■	■					■	■				■	■						■		472
5600 pF	■					■	■					■	■					■	■					■	■	562
6800 pF	■					■	■					■	■					■	■					■	■	682
8200 pF	■						■						■					■	■	■				■	■	822
.01 µFd	■						■						■	■					■	■					■	103
.012 µFd	■						■	■					■	■					■	■					■	123
.015 µFd	■						■	■					■	■					■	■						153
.018 µFd	■	■						■	■					■	■					■						183
.022 µFd	■	■						■	■					■	■					■						223
.027 µFd	■	■						■	■					■	■											273
.033 µFd		■						■	■						■											333
.039 µFd		■							■						■											393
.047 µFd		■							■	■																473
.056 µFd		■	■						■	■																563
.068 µFd			■						■	■																683
.082 µFd			■							■																823
.100 µFd			■	■						■																104
.12 µFd			■	■																						124
.15 µFd			■	■	■																					154
.18 µFd				■	■																					184
.22 µFd				■	■																					224
.27 µFd					■																					274
.33 µFd					■																					334
.39 µFd					■																					394

DIELECTRIC TYPE (K)	X7R Also available: NPO DIELECTRIC
TEMPERATURE COEFFICIENT (T.C.)	± 15% −55 to +125°C
DISSIPATION FACTOR (D.F.)	2.5% max 1 KHZ 1 VAC 25°C
INSULATION RESISTANCE (I.R.)	100 K meg Ω or 1000 meg Ω-microfarads, whichever is less (25°C, 500 VDC)
AGING	1% per decade
DIELECTRIC WITHSTANDING VOLTAGE	1.2 Times Rated Voltage* @ 25°C
VOLTAGE COEFFICIENT (V.C.)	Less than 10% at 50V per mil.
DIMENSIONAL TOLERANCE	± .010 or ± 5%, whichever is greater

*Dielectric Withstanding Voltage Test on Gold-Caps is conducted with charging current limited to 10 mA and the discharge current limited to 5 A.



LEADS .031 ± .003
TINNED COPPER

ORDERING INSTRUCTIONS:

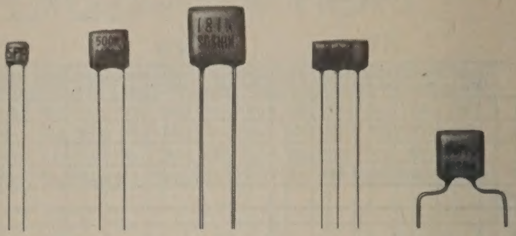
SCMC 3530E	X7R	822	K	A	2
PART SIZE	DIELECTRIC MATERIAL	CAPACITANCE (EIA CODE)	CAPACITANCE TOLERANCE	TERMINATION	VOLTAGE RATING
SCMC 2520E SCMC 3530E SCMC 4540E SCMC 5550E SCMC 6560E	X7R	Last digit indicates number of zeroes following the first two digits. Ex: 822=8200 pF	K=10% M=20% V=+100%−0% Z=+80%−20%	A=Silver D=Palladium Silver	1 KV 2 KV 3 KV 4 KV 5 KV

SEMTECH
CORPORATION
652 Mitchell Road, Newbury Park, California 91320
(805) 498-2111, (213) 628-5392 / TWX: 910-336-1264

SOSHIN MICA CAPACITORS

FMCON

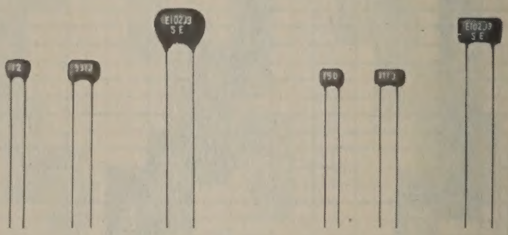
A new silver-coated mica capacitor for radio, TV applications. Low temperature coefficient, small, economical. FMCON for 50WV. V-FMCON for transistor circuit.



Type		Capacitance Range (pF)		tolerance	Sizes (mm)						Leads (mm)			
					W.H (MAX)		T (MAX)		S (±1)		ℓ (MIN)		φ (±0.1)	
500WV	50WV	500WV	50WV		500WV	50WV	500WV	50WV	500WV	50WV	500WV	50WV	500WV	50WV
FM05	V-FM05	1～33	1～50	G.J.K	7.0	7.0	3.5	3.5	2.5	2.5	20.0	20.0	0.4	0.4
FM07	V-FM07	34～75	51～120	G.J.K	8.0	8.0	3.5	3.5	4.0	4.0	20.0	20.0	0.4	0.4
FM09	V-FM09	76～120	121～220	G.J.K	10.0	10.0	3.5	3.5	5.0	5.0	20.0	20.0	0.5	0.5
FM11	V-FM11	121～220	221～330	G.J.K	12.0	12.0	4.5	4.5	7.5	7.5	20.0	20.0	0.5	0.5
FM13	V-FM13	221～330	331～470	G.J.K	14.0	14.0	4.5	4.5	7.5	7.5	20.0	20.0	0.5	0.5
FM15	—	331～470	—	G.J.K	16.0	—	4.5	—	10.0	—	20.0	20.0	0.6	—

DIPPED MICA CAPACITORS

Temperature tests prove superiority: These dipped mica capacitors withstand 2000 hrs at 40°C, 90% to 95% humidity. Usable temperature range −55°C to +150°C.
Miniature type, DM05, also available.
All types meet MIL-C-5D specifications.



Type	Maximum allowable capacitance (pF)			tolerance	Sizes (mm)																				
					ONE COAT type									STANDARD type									Leads (mm)		
					500WV			300WV			100WV			500WV			300WV			100WV			ONE COAT STANDARD		
STANDARD type	100 WV	300 WV	500 WV		W MAX	H MAX	T MAX	W MAX	H MAX	T MAX	W MAX	H MAX	T MAX	W MAX	H MAX	T MAX	W MAX	H MAX	T MAX	W MAX	H MAX	T MAX	A ±0.04	D AWG	C MIN
DM05	200	120	—	D.F.G.J.K	—	—	—	6.3	5.3	4.3	6.3	5.3	4.3	—	—	—	6.8	6.3	4.8	6.8	6.3	4.8	3.0	0.4	32.0
DM10	470	360	250	D.F.G.J.K	7.8	5.8	3.5	7.8	6.0	3.8	7.8	6.0	3.8	9.9	9.6	5.5	10.1	9.9	5.8	10.1	9.9	5.8	3.5	0.4	32.0
DM15	1,600	1,200	750	D.F.G.J.K	10.6	7.6	4.5	10.6	7.6	4.5	10.6	7.6	4.5	12.7	10.9	6.3	12.7	10.9	6.3	12.7	10.9	6.3	5.9	0.64	32.0
DM19	8,200	6,800	5,100	D.F.G.J.K	16.7	12.7	8.1	16.2	12.4	6.9	16.5	12.4	7.6	18.0	14.9	9.3	17.5	14.4	8.3	17.7	14.7	8.8	8.7	0.8	32.0
DM20	18,000	12,300	10,000	D.F.G.J.K	19.3	13.4	10.1	19.0	12.9	9.1	19.3	13.2	9.3	20.8	16.0	11.4	20.5	15.2	10.1	20.8	15.7	11.1	11.0	0.8	32.0
DM30	40,000	30,000	22,000	D.F.G.J.K	—	—	—	—	—	—	—	—	—	21.3	23.6	12.1	21.0	23.3	11.6	21.3	23.3	11.9	11.0	1.0	32.0
DM40	25,000	20,000	15,000	D.F.G.J.K	—	—	—	—	—	—	—	—	—	25.6	19.0	9.9	25.8	19.2	10.4	25.6	19.0	9.9	15.0	1.0	32.0
DM42	100,000	69,000	51,000	D.F.G.J.K	—	—	—	—	—	—	—	—	—	37.5	23.3	12.0	37.5	23.6	12.1	38.1	23.9	12.5	26.9	1.0	32.0

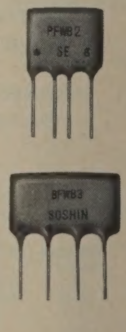
PRINTED FILTERS

Small, revolutionary new coils FM radio antenna coupling use bandpass filter.

- Used in antenna circuit to pass only FM broadcast band and reject unwanted signals without adjustment.
- Monolithic construction minimizes variation.
- Fewer assembly stage bring costs way down.
- Input 75Ω unbalance type and 300Ω balance type (BFWB3).

Item	Rating
Dimensions	BFWB3 20×13×4 PFWB2 15×13×4
Passband	87.5—108 MHz Under 3 dB Manufactured to frequency bands in each country.
In-band ripple	1 dB max.
Stop band	Over 20 dB at 55 MHz Over 20 dB at 150 MHz

Applications: Circuit connection use for both common emitter and common base.



SOSHIN SOSHIN ELECTRIC CO., LTD.
1-18-18 Nakamagome, Ohta-ku, Tokyo, Japan. TELEX: 246-6377

SOUTHERN ELECTRONICS COMPANY

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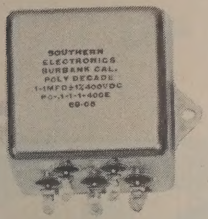
F-DYNE ELECTRONICS COMPANY

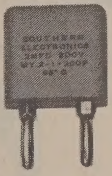


DECADE

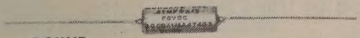
SOUTHERN
ELECTRONICS
BURBANK CAL
1MFD±10%
200VDC
PC105K2AE
69-40

BATHTUB

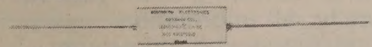
ADJUSTABLE



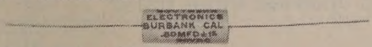
PLUG-IN



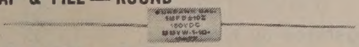
H.S. — ROUND



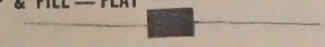
H.S. — RECTANGULAR



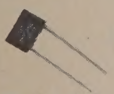
WRAP & FILL — ROUND



WRAP & FILL — FLAT



RECTANGULAR — AXIAL



RECTANGULAR — RADIAL

DIP COATED — RADIAL

PROMPT SERVICE ON SPECIAL AND STANDARD CAPACITORS AND FILTERS

Capacitors and filters are available from Southern Electronics to meet your special application requirements. Non-standard values, tolerances and case configurations can be supplied from stock or with quick delivery.

A full line of standard film and Kraft-film dielectric capacitors is also available from stock or with a short delivery cycle.

POLYESTER (MYLAR) FOIL	GENERAL LIMITS	METALLIZED POLYESTER
.0001 — 10 mfds	Cap. Range	.01 — 50 mfds
25 — 2000VDC	Volt Range	50 — 15000VDC
−55 to +125°C	Temp. Range	−55 to +125°C
50K (meg) (mfds) or 100K megs	IR	25K (meg) (mfds) or 50K megs
.75%	PF	1% max.

POLYCARBONATE FOIL		METALLIZED POLYCARBONATE
.0001 — 5 mfds	Cap. Range	.01 — 50 mfds
25 — 1000VDC	Volt Range	50 — 1000VDC
−55 to +125°C	Temp. Range	−55 to +125°C
75K (meg) (mfds) or 500K megs	IR	30K (meg) (mfds) or 150K megs
.3% max.	PF	.3% max.

POLYPROPYLENE FOIL		METALLIZED POLYPROPYLENE
.0001 — 5 mfds	Cap. Range	.01 — 50 mfds
50 — 1000VDC	Volt Range	50 — 10000VDC
−55 to +105°C	Temp. Range	−55 to +125°C
100K (meg) (mfds) or 100K megs	IR	50K (meg) (mfds) or 100K megs
.2% max.	PF	.2%

POLYSULFONE FOIL		METALLIZED POLYSULFONE
.0001 — 5 mfds	Cap. Range	.01 — 50 mfds
25 — 1000VDC	Volt Range	50 — 600VDC
−55 to +150°C	Temp. Range	−55 to +150°C
75K (meg) (mfds) or 500K megs	IR	30K (meg) (mfds) or 150K megs
.3% max.	PF	.3% max.

POLYSTYRENE FOIL		METALLIZED POLYSTYRENE
.0001 — 5 mfds	Cap. Range	Available on special request
50 — 1000VDC	Volt Range	
−55 to +85°C	Temp. Range	
100K (meg) (mfds) or 500K megs	IR	
.1% max.	PF	

TEFLON FOIL		METALLIZED TEFLON
.001 — 5 mfds	Cap. Range	.001 — 20 mfds
50 — 600VDC	Volt Range	50 — 600 VDC
−55 to +160°C	Temp. Range	−55 to +140°C
1000K (meg) (mfds) or 2000K megs	IR	500K (meg) (mfd) or 1000K megs
.01%	PF	.2%

For related products available through S.E.C. or F-Dyne see EEM Pages 1248, 1249

WEST — (213) 845-2458
SOUTHERN ELECTRONICS COMPANY
726 S. FLOWER ST., BURBANK, CALIF. 91502

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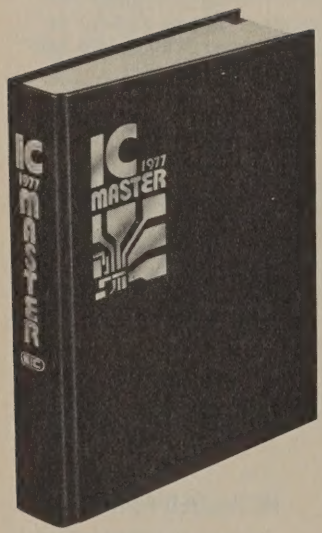
449 HOWARD AVE., BRIDGEPORT, CONN. 06605

WHEN THE CHIPS ARE DOWN...

THE NEW 1977 IC MASTER PAYS OFF!



The new IC MASTER is the ultimate IC source book.

It lists virtually every IC device manufactured in the United States.

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- **FIVE MASTER SELECTION GUIDES** — 84 companies' IC's organized by type, function, key parameters
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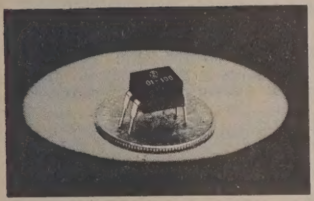
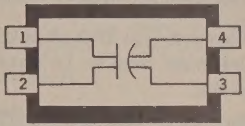
SPRAGUE CAPACITORS

DIP MONOLYTHIC® CERAMIC CAPACITORS

LOW PROFILE FOR AUTOMATIC INSERTION





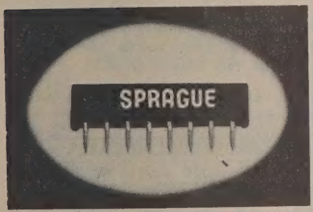
.250″W. x .200″H. x .190″L.

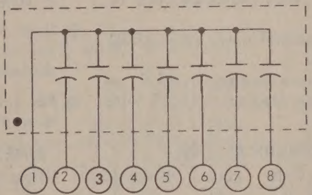
μF	Catalog Number*	Freq. Range for 1 Ω Max. Imp. (Four-Term. Measurement)
0.010	935C103X0SP	20 to 50MHz
0.022	935C223X0SP	13 to 50MHz
0.047	935C473X0SP	6 to 50MHz
0.10	935C104X0SP	3 to 50MHz

*All capacitance ratings shown are ±20% capacitance tolerance. To specify ±10% capacitors, change the digit after the "X" from "0" to "9".

- Designed for use in high freqeuncy data and signal-processing applications.
- Four-lead capacitors feature low inductance and low impedance with very high self-resonant frequency.
- Typical inductance of less than 4nH when used in four-terminal mode.
- Low impedance over wide frequency ranges. Guaranteed range for a 1 Ω maximum impedance is as wide as 3 to 50 MHz.
- Molded DIP package offers superior mechanical protection and reliability under severe environmental conditions.
- Monolythic® construction . . . alternate layers of metallic electrodes and ceramic dielectric are fired into a homogenous block.
- Rated at 100 WVDC over the operating temperature range of −55 C to +85 C.
- For complete technical data, refer to latest issue of Engineering Bulletin 6242.3.

MOLDED SINGLE IN-LINE PACKAGE MONOLYTHIC® CERAMIC CAPACITOR NETWORKS





.135″W. x .180″H. x .850″L.

- For vertical installation on high-density printed wiring boards.
- Intended for use in signal and data processing equipment where repetitive capacitor values and patterns are required.
- Molded single-ended configuration results in rugged device with smallest possible dimensions.
- Proven layer-built construction.
- 7 capacitor sections in each 8-lead package.
- Rated at 100 WVDC over the temperature range of −55 C to +85 C.
- For complete technical data, refer to latest issue of Engineering Bulletin 6243.

	Catalog Number	
pF	±20% Tol.	±10% Tol.
18		460CH180X9PD
22	460CH220X0PD	460CH220X9PD
27		460CH270X9PD
33	460CH330X0PD	460CH330X9PD
39		460CH390X9PD
47	460CH470X0PD	460CH470X9PD
56		460CH560X9PD
68	460CH680X0PD	460CH680X9PD
82		460CH820X9PD
100	460CH101X0PD	460CH101X9PD
120		460CH121X9PD
150	460CH151X0PD	460CH151X9PD
180		460CH181X9PD
220	460CH221X0PD	460CH221X9PD
270		460CH271X9PD
330	460CH331X0PD	460CH331X9PD
390		460CH391X9PD
470	460CH471X0PD	460CH471X9PD
560		460CH561X9PD
680	460CH681X0PD	460CH681X9PD
820		460CH821X9PD
1000	460CH102X0PD	460CH102X9PD
1200		460CH122X9PD
1500	460CH152X0PD	460CH152X9PD
1800		460CH182X9PD
2200	460CH222X0PD	460CH222X9PD
2700		460CH272X9PD
3300	460CH332X0PD	460CH332X9PD
3900		460CH392X9PD
4700	460CH472X0PD	460CH472X9PD
5600		460CH562X9PD
6800	460CH682X0PD	460CH682X9PD
8200		460CH822X9PD
0.01 μF	460CH103X0PD	460CH103X9PD

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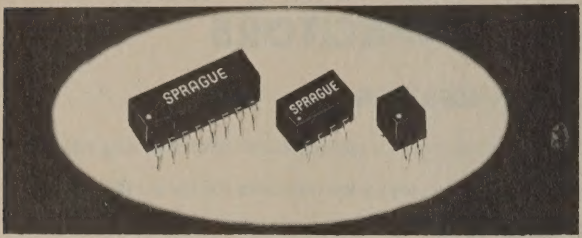
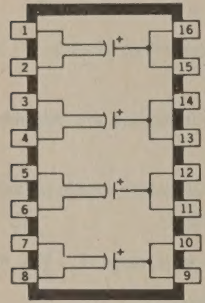
SPRAGUE CAPACITORS

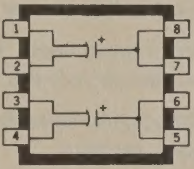
DIP TANTALEX® SOLID-TANTALUM CAPACITORS



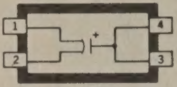
- Compatible with popular microcircuits in similar molded packages.
- For noise bypass and signal coupling in high frequency signal or data processing applications.
- Molded dual in-line package offers superior mechanical protection during installation, plus excellent reliability under severe environmental conditions.
- 4-terminal Type 935D offers low impedance over side frequency ranges. Guaranteed range for 1Ω maximum impedance is as wide as 10 kHz to 50 MHz.
- Multi-section Type 936D and 939D save time and space.
- Standard capacitance tolerance, ±20%.
- Operating Temperature range, −55 C to +85 C.
- For complete technical data, refer to latest issue of Engineering Bulletins 3542 and 3542.3.



TYPE 936D
.260″W. x .275″H.
x .850″L.



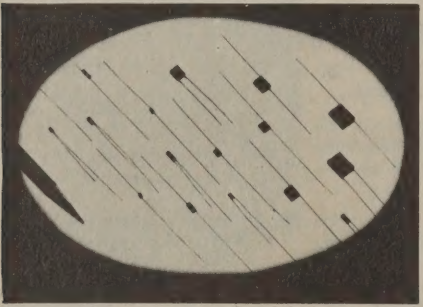
TYPE 939D
.260″W. x .275″H.
x .450″L.



TYPE 935D
.260″W. x .240″H.
x .200″L.

μF	WVDC	SURGE VDC	Catalog Number 1 Cap. Sect.	2 Cap. Sect.	4 Cap. Sect.
6.8	35	46	935D685X0035SQ	939D685X0035SQ	936D685X0035SQ
15	20	26	935D156X0020SQ	939D156X0020SQ	936D156X0020SQ
22	15	20	935D226X0015SQ	939D226X0015SQ	936D226X0015SQ
33	10	13	935D336X0010SQ	939D336X0010SQ	936D336X0010SQ

TYPE 182D/183D ULTRA-SMALL SOLID TANTALEX® CAPACITORS



- Capacitor elements housed in polyester-film sleeving with epoxy resin end seals. Higher volumetric efficiency than metal-encased or molded designs.
- Type 182D has cylindrical case, Type 183D has rectangular case.
- Operating temperature range, −55 C to +85 C. May be operated to +125 C with voltage derating.
- Capacitance tolerance indicated by 9th and 10th characters in Cat. No. D4 = +40, −20%; X0 = ±20%.
- Units listed below are single-ended design. For capacitors with axial leads, change 5th character in Cat. No. from R to A.
- For complete technical data, refer to latest issue of Engineering Bulletin 3517.

DIMENSIONS, CYLINDRICAL CASE*

Code	Dia.	Height	Code	Dia.	Height
G	.070	.125	K	.100	.225
H	.070	.160	L	.150	.250
J	.080	.200			

DIMENSIONS, RECTANGULAR CASE*

Code	Height	Width	Thick.	Code	Height	Width	Thick.
A	.125	.070	.040	D	.290	.220	.110
B	.165	.120	.070	E	.310	.230	.130
C	.225	.185	.075	F	.475	.375	.150

*See last character in Cat. No. for size code.

μF	Cat. No. (Cyl.)	Cat. No. (Rect.)
	2 WVDC	
2.2	182DR225D4002G	183DR225D4002A
4.7	182DR475D4002H	
10	182DR106X0002J	183DR106X0002B
22	182DR226X0002K	183DR226X0002C
	3 WVDC	
1.5	182DR155D4003G	183DR155D4003A
3.3	182DR335D4003H	
6.8	182DR685X0003J	183DR685X0003B
15	182DR156X0003K	
22		183DR226X0003C
47	182DR476X0003L	
220		183DR227X0003F
	4 WVDC	
1.0	182DR105D4004G	183DR105D4004A
2.2	182DR225D4004H	
4.7	182DR475X0004J	183DR475X0004B
10	182DR106X0004K	
15		183DR156X0004C
33	182DR336X0004L	
47		183DR476X0004D
68		183DR686X0004E
	6 WVDC	
0.68	182DR684D4006G	183DR684D4006A
1.5	182DR155D4006H	
3.3	182DR335X0006J	183DR335X0006B
6.8	182DR685X0006K	
10		183DR106X0006C
22	182DR226X0006L	
33		183DR336X0006D
47		183DR476X0006E
150		183DR157X0006F
	10 WVDC	
0.47	182DR474D4010G	183DR474D4010A
1.0	182DR105D4010H	
2.2	182DR225X0010J	183DR225X0010B
4.7	182DR475X0010K	
6.8		183DR685X0010C
15	182DR156X0010L	
22		183DR226X0010D
33		183DR336X0010E
100		183DR107X0010F
	15 WVDC	
0.33	182DR334D4015G	183DR334D4015A
0.68	182DR684D4015H	
1.5	182DR155X0015J	183DR155X0015B
3.3	182DR335X0015K	
10	182DR106X0015L	
15		183DR156X0015D
22		183DR226X0015E
68		183DR686X0015F
	20 WVDC	
0.0010	182DR102D4020G	183DR102D4020A
0.0015	182DR152D4020G	183DR152D4020A
0.0022	182DR222D4020G	183DR222D4020A
0.0033	182DR332D4020G	183DR332D4020A
0.0047	182DR472D4020G	183DR472D4020A
0.0068	182DR682D4020G	183DR682D4020A
	20 WVDC (Cont.)	
0.010	182DR103D4020G	183DR103D4020A
0.015	182DR153D4020G	183DR153D4020A
0.022	182DR223D4020G	183DR223D4020A
0.033	182DR333D4020G	183DR333D4020A
0.047	182DR473D4020G	183DR473D4020A
0.068	182DR683D4020G	183DR683D4020A
0.10	182DR104D4020G	183DR104D4020A
0.15	182DR154D4020G	183DR154D4020A
0.22	182DR224D4020G	183DR224D4020A
0.33	182DR334D4020H	
0.47	182DR474D4020H	
0.68	182DR684X0020J	
1.0	182DR105X0020J	183DR105X0020B
1.5	182DR155X0020K	
2.2	182DR225X0020K	
3.3	182DR335X0020L	183DR335X0020C
4.7	182DR475X0020L	183DR475X0020C
6.8	182DR685X0020L	
10		183DR106X0020D
15		183DR156X0020E
47		183DR476X0020F
	25 WVDC	
0.68		183DR684X0025B
2.2		183DR225X0025C
6.8		183DR685X0025D
10		183DR106X0025E
33		183DR336X0025F
	35 WVDC	
0.0047		183DR472X0035B
0.0068		183DR682X0035B
	35 WVDC (Cont.)	
0.010		183DR103X0035B
0.015	182DR153D4035H	183DR153X0035B
0.022	182DR223D4035H	183DR223X0035B
0.033	182DR333D4035H	183DR333X0035B
0.047	182DR473D4035H	183DR473X0035B
0.068	182DR683D4035H	183DR683X0035B
0.10	182DR104D4035H	183DR104X0035B
0.15	182DR154D4035H	183DR154X0035B
0.22	182DR224D4035H	183DR224X0035B
0.33	182DR334X0035J	183DR334X0035B
0.47	182DR474X0035J	183DR474X0035B
0.68	182DR684X0035K	183DR684X0035C
1.0	182DR105X0035K	183DR105X0035C
1.5	182DR155X0035L	183DR155X0035C
2.2	182DR225X0035L	183DR225X0035D
3.3		183DR335X0035D
4.7		183DR475X0035D
6.8		183DR685X0035E
10		183DR106X0035F
15		183DR156X0035F
22		183DR226X0035F
	50 WVDC	
0.0010	182DR102D4050H	
0.0015	182DR152D4050H	
0.0022	182DR222D4050H	
0.0033	182DR332D4050H	
0.0047	182DR472D4050H	
0.0068	182DR682D4050H	
0.010	182DR103D4050H	

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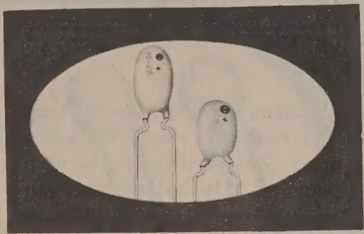
SPRAGUE CAPACITORS

TYPE 196D DIPPED TANTALEX® SOLID-TANTALUM CAPACITORS

NOTE: See next page for low-profile Type 196D Capacitors.

- Epoxy-Dipped Coating Economically Provides Good Electrical and Mechanical Protection.
- High Stability, Very Little Capacitance Change, Even at Outer Limits of Operating Temperature Range (−55C to +85C).
- Low Dissipation Factor Permits Higher Ripples.
- Radial Leads For Mounting on Printed Boards.
- Capacitance Tolerance, ±10%. Capacitors With Asterisk (*) Are Also Available With Tolerance of ±20%. For ±20% Tolerance, Change 9th Character in Cat. No. from 9 to 0.
- Capacitors Listed Here Have Long Leads. Catalog Numbers Ending with A1 Have Straight Leads with .125″ Spacing. Numbers Ending with E4 Have "Hockeystick" Leads with .250″ Spacing (See Unit 1). For Short "Hockeystick" Pin Leads (.187″ L., .250″ Spacing) Change A1 or E4 to E3. (See Unit 2.)
- For Complete Technical Data, Refer to Latest Issue of Engineering Bulletin 3545.



4 WVDC, 5.3 V SURGE

µF	Dia. x Height	Cat. No.
10	.175 x .375	196D106X9004HA1*
12	.175 x .375	196D126X9004HA1
15	See 15 WVDC Listing	
18	See 15 WVDC Listing	
22	See 10 WVDC Listing	
27	See 10 WVDC Listing	
33	See 6 WVDC Listing	
39	See 6 WVDC Listing	
47	See 6 WVDC Listing	
56	.225 x .425	196D566X9004JA1
68	See 6 WVDC Listing	
82	.225 x .450	196D826X9004KA1
100	.225 x .450	196D107X9004KA1*
120	See 6 WVDC Listing	
150	See 6 WVDC Listing	
180	.350 x .650	196D18/X9004PE4
180	.450 x .500	★196D18/X9004LA3
220	.350 x .650	196D227X9004PE4*
270	See 6 WVDC Listing	
330	See 6 WVDC Listing	

6 WVDC, 8 V SURGE

µF	Dia. x Height	Cat. No.
6.8	.175 x .375	196D685X9006HA1*
8.2	.1/5 x .3/5	196D825X9006HA1
10	See 20 WVDC Listing	
12	See 20 WVDC Listing	
15	See 15 WVDC Listing	
18	See 15 WVDC Listing	
22	See 10 WVDC Listing	
27	See 10 WVDC Listing	
33	.225 x .425	196D336X9006JA1*
39	.225 x .425	196D396X9006JA1
47	.225 x .425	196D476X9006JA1*
56	.225 x .450	196D566X9006KA1
68	.225 x .450	196D686X9006KA1*
82	See 10 WVDC Listing	
100	See 10 WVDC Listing	
120	.350 x .650	196D127X9006PE4
150	.350 x .650	196D157X9006PE4*
180	See 10 WVDC Listing	
220	See 10 WVDC Listing	
270	.400 x .750	196D277X9006TE4
330	.400 x .750	196D337X9006TE4*

10 WVDC, 13 V SURGE

µF	Dia. x Height	Cat. No.
4.7	.175 x .375	196D475X9010HA1*
5.6	.175 x .375	196D565X9010HA1
6.8	See 25 WVDC Listing	
8.2	See 25 WVDC Listing	
10	See 20 WVDC Listing	
12	See 20 WVDC Listing	
15	See 15 WVDC Listing	
18	See 15 WVDC Listing	
22	.225 x .425	196D226X9010JA1*
27	.225 x .425	196D276X9010JA1
33	.225 x .450	196D336X9010KA1*
39	.225 x .450	196D396X9010KA1
47	See 20 WVDC Listing	
56	See 15 WVDC Listing	
68	See 15 WVDC Listing	
82	.350 x .650	196D826X9010PE4
82	.450 x .500	★196D826X9010LA3
100	.350 x .650	196D107X9010PE4*
120	See 15 WVDC Listing	
150	See 15 WVDC Listing	
180	.400 x .750	196D187X9010TE4
220	.400 x ./50	196D227X9010TE4*

15 WVDC, 20 V SURGE

µF	Dia. x Height	Cat. No.
3.3	.175 x .375	196D335X9015HA1*
3.9	.175 x .375	196D395X9015HA1
4.7	See 35 WVDC Listing	
5.6	See 25 WVDC Listing	
6.8	See 25 WVDC Listing	
8.2	See 25 WVDC Listing	
10	See 20 WVDC Listing	
12	See 20 WVDC Listing	
15	.225 x .425	196D156X9015JA1*
18	.225 x .425	196D186X9015JA1
22	.225 x .450	196D226X9015KA1*
27	See 25 WVDC Listing	
33	See 25 WVDC Listing	
39	See 20 WVDC Listing	
47	See 20 WVDC Listing	
56	.350 x .650	196D566X9015PE4
68	.350 x .650	196D686X9015PE4*
82	See 20 WVDC Listing	
100	See 20 WVDC Listing	
120	.400 x .750	196D127X9015TE4
150	.400 x .750	196D157X9015TE4*

20 WVDC, 26 V SURGE

µF	Dia. x Height	Cat. No.
2.7	.175 x .375	196D275X9020HA1
3.3	See 35 WVDC Listing	
3.9	See 35 WVDC Listing	
4.7	See 35 WVDC Listing	
5.6	See 25 WVDC Listing	
6.8	See 25 WVDC Listing	
8.2	See 25 WVDC Listing	
10	.225 x .425	196D106X9020JA1*
12	.225 x .425	196D126X9020JA1
15	.225 x .450	196D156X9020KA1*
18	.225 x .450	196D186X9020KA1
22	See 35 WVDC Listing	
27	See 25 WVDC Listing	
33	See 25 WVDC Listing	
39	.350 x .650	196D396X9020PE4
47	.350 x .650	196D476X9020PE4*
56	See 25 WVDC Listing	
68	See 25 WVDC Listing	
82	.400 x .750	196D826X9020TE4
82	.600 x .800	★196D826X9020MA3
100	.400 x .750	196D107X9020TE4*

25 WVDC, 32 V SURGE

µF	Dia. x Height	Cat. No.
1.2	.175 x .375	196D125X9025HA1
1.5	.1/5 x .3/5	196D155X9025HA1*
1.8	.1/5 x .375	196D185X9025HA1
2.2	.175 x .3/5	196D225X9025HA1*
2.7	See 35 WVDC Listing	
3.3	See 35 WVDC Listing	
3.9	See 35 WVDC Listing	
4.7	See 35 WVDC Listing	
5.6	.225 x .425	196D565X9025JA1
6.8	.225 x .425	196D685X9025JA1*
8.2	.225 x .425	196D825X9025JA1
10	.225 x .450	196D106X9025KA1*
12	.225 x .450	196D126X9025KA1
15	See 35 WVDC Listing	
18	See 35 WVDC Listing	
22	See 35 WVDC Listing	
27	.350 x .650	196D276X9025PE4
33	.350 x .650	196D336X9025PE4*
39	See 35 WVDC Listing	
47	See 35 WVDC Listing	
56	.400 x .750	196D566X9025TE4
68	.400 x .750	196D686X9025TE4*

35 WVDC, 46 V SURGE

µF	Dia. x Height	Cat. No.
0.10	.175 x .375	196D104X9035HA1*
0.12	.175 x .375	196D124X9035HA1
0.15	.175 x .375	196D154X9035HA1*
0.18	.175 x .375	196D184X9035HA1
0.22	.175 x .375	196D224X9035HA1*
0.27	.175 x .375	196D274X9035HA1
0.33	.175 x .375	196D334X9035HA1*
0.39	.175 x .375	196D394X9035HA1
0.47	.175 x .375	196D474X9035HA1*
0.56	.175 x .375	196D564X9035HA1
0.68	.175 x .375	196D684X9035HA1*
0.82	.175 x .375	196D824X9035HA1
1.0	.175 x .375	196D105X9035HA1*
1.2	.225 x .425	196D125X9035JA1
1.5	.225 x .425	196D155X9035JA1*
1.8	.225 x .425	196D185X9035JA1
2.2	.225 x .425	196D225X9035JA1*
2.7	.225 x .425	196D275X9035JA1
3.3	.225 x .425	196D335X9035JA1*
3.9	.225 x .425	196D395X9035JA1
4.7	.225 x .425	196D475X9035JA1*
5.6	.225 x .450	196D565X9035KA1
6.8	.225 x .450	196D685X9035KA1*
8.2	.350 x .650	196D825X9035PE4
10	.350 x .650	196D106X9035PE4*
12	.350 x .650	196D126X9035PE4
12	.450 x .500	★196D126X9035LA3
15	.350 x .650	196D156X9035PE4*
18	.350 x .650	196D186X9035PE4
18	.600 x .800	★196D186X9035MA3
22	.350 x .650	196D226X9035PE4*
27	.400 x .750	196D276X9035TE4
33	.400 x .750	196D336X9035TE4*
39	.400 x .750	196D396X9035TE4
47	.400 x .750	196D476X9035TE4*

50 WVDC, 65 V SURGE

µF	Dia. x Height	Cat. No.
0.10	.175 x .375	196D104X9050HA1*
0.12	.175 x .375	196D124X9050HA1
0.15	.175 x .375	196D154X9050HA1*
0.18	.175 x .375	196D184X9050HA1
0.22	.175 x .375	196D224X9050HA1*
0.27	.175 x .375	196D274X9050HA1
0.33	.175 x .375	196D334X9050HA1*
0.39	.175 x .375	196D394X9050HA1
0.47	.175 x .375	196D474X9050HA1*
0.56	.175 x .375	196D564X9050HA1
0.68	.175 x .375	196D684X9050HA1*
0.82	.175 x .375	196D824X9050HA1
1.0	.175 x .375	196D105X9050HA1*
1.2	.225 x .425	196D125X9050JA1
1.5	.225 x .425	196D155X9050JA1*
1.8	.225 x .425	196D185X9050JA1
2.2	.225 x .425	196D225X9050JA1*
2.7	.225 x .425	196D275X9050JA1
3.3	.225 x .425	196D335X9050JA1*
3.9	.225 x .450	196D395X9050KA1
4.7	.225 x .450	196D4/5X9050KA1*
5.6	.350 x .650	196D565X9050PE4
6.8	.350 x .650	196D685X9050PE4*
8.2	.350 x .650	196D825X9050PE4
10	.350 x .650	196D106X9050PE4*
12	.350 x .650	196D126X9050PE4
15	.350 x .650	196D156X9050PE4*
18	.400 x .750	196D186X9050TE4
22	.400 x .750	196D226X9050TE4*

★DISC ANODE—NOT RECOMMENDED FOR NEW EQUIPMENT DESIGNS; AVAILABLE UNTIL PRESENT STOCKS ARE EXHAUSTED.

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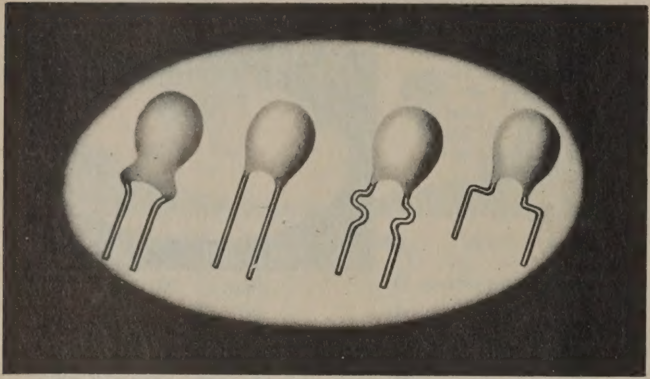
SPRAGUE CAPACITORS

TYPE 199D TANTALEX® RESIN-COATED SOLID-TANTALUM CAPACITORS



Capacitors available in 4 lead configurations. Numbers ending with B1 have hairpin leads with .100″ lead spacing (see first unit on left in photo). Numbers ending with A1 and A2 have straight leads with .100″ and .200″ lead spacing, respectively (second unit on left). For units with formed lock-in leads and .200″ lead spacing (third unit from left), change last letter and last digit in cat. no. to "G2." For outside hockeystick leads (unit on right) with .200″ lead spacing, end cat. no. with "E2." For hockeystick leads with .250″ lead spacing, end cat. no. with "E3."

- Best cost/performance in entertainment and commercial electronic equipment.
- Four lead configurations for easy plug-in mounting on printed wiring boards.
- Priced competitively with any other capacitor of this type, domestic or offshore.
- Maximum impedance in ohms @ 10 kHz guaranteed for every capacitor.
- Lower d-c leakage currents, lower dissipation factor.
- Superior, flame-retardant, moisture-resistant epoxy encapsulant will not crack or chip under temperature extremes.
- Available in all of the popular 20% decade values between 0.1 μF and 680 μF.

μF	Dia. x Ht.	Cat. No.*
3 VOLTS D-C. 3.6 VDC SURGE		
4.7	.180 x .350	199D475X0003AB1
6.8	.180 x .350	199D685X0003AB1
10	.200 x .350	199D106X0003BB1
15	.200 x .350	199D156X0003BB1
22	.200 x .350	199D226X0003BB1
33	.250 x .425	199D336X0003CB1
47	.250 x .425	199D476X0003CB1
68	.250 x .450	199D686X0003DB1
100	.250 x .450	199D107X0003DB1
150	.250 x .450	199D157X0003DB1
220	.400 x .560	199D227X0003EA2
330	.400 x .560	199D337X0003EA2
470	.440 x .680	199D477X0003FA2
680	.440 x .680	199D687X0003FA2
6.3 VOLTS D-C, 8 VDC SURGE		
3.3	.180 x .350	199D335X06R3AB1
4.7	.180 x .350	199D475X06R3AB1
6.8	.200 x .350	199D685X06R3BB1
10	.200 x .350	199D106X06R3BB1
15	.200 x .350	199D156X06R3BB1
22	.250 x .425	199D226X06R3CB1
33	.250 x .425	199D336X06R3CB1
47	.250 x .450	199D476X06R3DB1
68	.250 x .450	199D686X06R3DB1
100	.250 x .450	199D107X06R3DB1
150	.400 x .560	199D157X06R3EA2
220	.400 x .560	199D227X06R3EA2
330	.440 x .680	199D337X06R3FA2
10 VOLTS D-C, 12 VDC SURGE		
2.2	.180 x .350	199D225X0010AB1
3.3	.180 x .350	199D335X0010AB1
4.7	.200 x .350	199D475X0010BB1
6.8	.200 x .350	199D685X0010BB1
10	.200 x .350	199D106X0010BB1
15	.250 x .425	199D156X0010CB1
22	.250 x .425	199D226X0010CB1
33	.250 x .450	199D336X0010DB1
47	.250 x .450	199D476X0010DB1
68	.250 x .450	199D686X0010DB1
100	.400 x .560	199D107X0010EA2
150	.400 x .560	199D157X0010EA2
220	.440 x .680	199D227X0010FA2
16 VOLTS D-C, 19 VDC SURGE		
1.5	.180 x .350	199D155X0016AB1
2.2	.180 x .350	199D225X0016AB1
3.3	.200 x .350	199D335X0016BB1
4.7	.200 x .350	199D475X0016BB1
6.8	.200 x .350	199D685X0016BB1
10	.250 x .425	199D106X0016CB1
15	.250 x .425	199D156X0016CB1
22	.250 x .450	199D226X0016DB1
33	.250 x .450	199D336X0016DB1
47	.400 x .560	199D476X0016EA2
68	.400 x .560	199D686X0016EA2
100	.440 x .680	199D107X0016FA2
150	.440 x .680	199D157X0016FA2
25 VOLTS D-C, 30 VDC SURGE		
1.0	.180 x .350	199D105X0025AB1
1.5	.180 x .350	199D155X0025AB1
2.2	.200 x .350	199D225X0025BB1
3.3	.200 x .350	199D335X0025BB1
4.7	.250 x .425	199D475X0025CB1
6.8	.250 x .425	199D685X0025CB1
10	.250 x .425	199D106X0025CB1
15	.250 x .450	199D156X0025DB1
22	.250 x .450	199D226X0025DB1
33	.400 x .560	199D336X0025EA2
47	.400 x .560	199D476X0025EA2
68	.440 x .680	199D686X0025FA2
35 VOLTS D-C, 42 VDC SURGE		
0.10	.180 x .350	199D104X0035AB1
0.15	.180 x .350	199D154X0035AB1
0.22	.180 x .350	199D224X0035AB1
0.33	.180 x .350	199D334X0035AB1
0.47	.180 x .350	199D474X0035AB1
0.68	.180 x .350	199D684X0035AB1
1.0	.200 x .350	199D105X0035BB1
1.5	.200 x .350	199D155X0035BB1
2.2	.250 x .425	199D225X0035CB1
3.3	.250 x .425	199D335X0035CB1
4.7	.250 x .450	199D475X0035DB1
6.8	.250 x .450	199D685X0035DB1
10	.250 x .450	199D106X0035DB1
15	.400 x .560	199D156X0035EA2
22	.400 x .560	199D226X0035EA2
33	.440 x .680	199D336X0035FA2
47	.440 x .680	199D476X0035FA2
50 VOLTS D-C, 60 VDC SURGE		
0.10	.180 x .350	199D104X0050AB1
0.15	.180 x .350	199D154X0050AB1
0.22	.180 x .350	199D224X0050AB1
0.33	.180 x .350	199D334X0050AB1
0.47	.200 x .350	199D474X0050BB1
0.68	.200 x .350	199D684X0050BB1
1.0	.250 x .425	199D105X0050CB1
1.5	.250 x .425	199D155X0050CB1
2.2	.250 x .450	199D225X0050DB1
3.3	.250 x .450	199D335X0050DB1
4.7	.250 x .450	199D475X0050DB1
6.8	.440 x .680	199D685X0050FA2
10	.440 x .680	199D106X0050FA2

*Catalog numbers shown here are for units with capacitance tolerance of ±20%. For units with capacitance tolerance of ±10%, change "X0" in cat. no. to "X9." Catalog numbers shown are for either hairpin or straight leads. For complete ordering information on leads, see paragraph under photograph.

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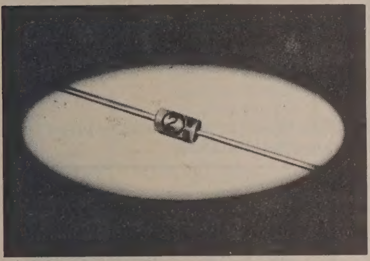
EEM-96-EIAA

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 162D RED TOP® SOLID-TANTALUM CAPACITORS



- Miniature commercial/industrial capacitors, intended for use in compactly designed equipment.
- Metal cases with resin end seals.
- Priced competitively with molded-case capacitors.
- Operating temperature range, −55 C to +85 C.
- Listed units have capacitance tolerance of ±10%. Capacitors with asterisk (*) also available with tolerance of ±20%. When ordering ±20% capacitors, change 9th character of cat. no. from 9 to 0.
- Listed capacitors have heat-shrunk polyester film insulating sleeve. For bare metal case, change last character of cat. no. from 2 to 0, and subtract .005″ from diam. and .010″ from length.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3536.

μF	Dia. x Length	Cat. No.
2 WVDC		
8.2	.095 x .260	162D825X9002BC2
10	.095 x .260	162D106X9002BC2*
12	.110 x .290	162D126X9002CD2
15	.110 x .290	162D156X9002CD2*
18	.110 x .290	162D186X9002CD2
22	.110 x .290	162D226X9002CD2*
27	.110 x .290	162D276X9002CD2
33	.110 x .290	162D336X9002CD2*
39	.180 x .345	162D396X9002DD2
47	.180 x .345	162D476X9002DD2*
56	.180 x .345	162D566X9002DD2
68	.180 x .345	162D686X9002DD2*
4 WVDC		
5.6	.095 x .260	162D565X9004BC2
6.8	.095 x .260	162D685X9004BC2*
8.2	.110 x .290	162D825X9004CD2
10	.110 x .290	162D106X9004CD2*
12	.110 x .290	162D126X9004CD2
15	.110 x .290	162D156X9004CD2*
18	.110 x .290	162D186X9004CD2
22	.110 x .290	162D226X9004CD2*
27	.180 x .345	162D276X9004DD2
33	.180 x .345	162D336X9004DD2*
39	.180 x .345	162D396X9004DD2
47	.180 x .345	162D476X9004DD2*
56	.180 x .420	162D566X9004EE2
68	.180 x .420	162D686X9004EE2*
6 WVDC		
3.9	.095 x .260	162D395X9006BC2
4.7	.095 x .260	162D475X9006BC2*
5.6	.110 x .290	162D565X9006CD2
6.8	.110 x .290	162D685X9006CD2*
8.2	.110 x .290	162D825X9006CD2
10	.110 x .290	162D106X9006CD2*
12	.110 x .290	162D126X9006CD2
15	.110 x .290	162D156X9006CD2*
18	.180 x .345	162D186X9006DD2
22	.180 x .345	162D226X9006DD2*
27	.180 x .345	162D276X9006DD2
33	.180 x .345	162D336X9006DD2*
39	.180 x .420	162D396X9006EE2
47	.180 x .420	162D476X9006EE2*
56	.180 x .420	162D566X9006EE2
10 WVDC		
2.7	.095 x .260	162D275X9010BC2
3.3	.095 x .260	162D335X9010BC2*
3.9	.110 x .290	162D395X9010CD2
4.7	.110 x .290	162D475X9010CD2*
5.6	.110 x .290	162D565X9010CD2
6.8	.110 x .290	162D685X9010CD2*
8.2	.110 x .290	162D825X9010CD2
10	.110 x .290	162D106X9010CD2*
12	.180 x .345	162D126X9010DD2
15	.180 x .345	162D156X9010DD2*
18	.180 x .345	162D186X9010DD2
22	.180 x .345	162D226X9010DD2*
27	.180 x .420	162D276X9010EE2
33	.180 x .420	162D336X9010EE2*
39	.180 x .420	162D396X9010EE2
15 WVDC		
1.8	.095 x .260	162D185X9015BC2
2.2	.095 x .260	162D225X9015BC2*
2.7	.110 x .290	162D275X9015CD2
3.3	.110 x .290	162D335X9015CD2*
3.9	.110 x .290	162D395X9015CD2
4.7	.110 x .290	162D475X9015CD2*
5.6	.110 x .290	162D565X9015CD2
6.8	.110 x .290	162D685X9015CD2*
8.2	.180 x .345	162D825X9015DD2
10	.180 x .345	162D106X9015DD2*
12	.180 x .345	162D126X9015DD2
15	.180 x .345	162D156X9015DD2*
18	.180 x .420	162D186X9015EE2
22	.180 x .420	162D226X9015EE2*
20 WVDC		
1.2	.095 x .260	162D125X9020BC2
1.5	.095 x .260	162D155X9020BC2*
1.8	.110 x .290	162D185X9020CD2
2.2	.110 x .290	162D225X9020CD2*
2.7	.110 x .290	162D275X9020CD2
3.3	.110 x .290	162D335X9020CD2*
3.9	.110 x .290	162D395X9020CD2
4.7	.110 x .290	162D475X9020CD2*
5.6	.180 x .345	162D565X9020DD2
6.8	.180 x .345	162D685X9020DD2*
8.2	.180 x .345	162D825X9020DD2
10	.180 x .345	162D106X9020DD2*
12	.180 x .420	162D126X9020EE2
15	.180 x .420	162D156X9020EE2*
25 WVDC		
0.56	.095 x .260	162D564X9025BC2
0.68	.095 x .260	162D684X9025BC2*
0.82	.095 x .260	162D824X9025BC2
1.0	.095 x .260	162D105X9025BC2*
1.2	.110 x .290	162D125X9025CD2
1.5	.110 x .290	162D155X9025CD2*
1.8	.110 x .290	162D185X9025CD2
2.2	.110 x .290	162D225X9025CD2*
2.7	.110 x .290	162D275X9025CD2
3.3	.110 x .290	162D335X9025CD2*
3.9	.180 x .345	162D395X9025DD2
4.7	.180 x .345	162D475X9025DD2*
5.6	.180 x .345	162D565X9025DD2
6.8	.180 x .345	162D685X9025DD2*
8.2	.180 x .345	162D825X9025DD2
10	.180 x .345	162D106X9025DD2*
35 WVDC		
0.0047	.095 x .260	162D472X9035BC2*
0.0056	.095 x .260	162D562X9035BC2
0.0068	.095 x .260	162D682X9035BC2*
0.0082	.095 x .260	162D822X9035BC2
0.010	.095 x .260	162D103X9035BC2*
0.012	.095 x .260	162D123X9035BC2
0.015	.095 x .260	162D153X9035BC2*
0.018	.095 x .260	162D183X9035BC2
0.022	.095 x .260	162D223X9035BC2*
0.027	.095 x .260	162D273X9035BC2
0.033	.095 x .260	162D333X9035BC2*
0.039	.095 x .260	162D393X9035BC2
0.047	.095 x .260	162D473X9035BC2*
0.056	.095 x .260	162D563X9035BC2
0.068	.095 x .260	162D683X9035BC2*
0.082	.095 x .260	162D823X9035BC2
0.10	.095 x .260	162D104X9035BC2*
0.12	.095 x .260	162D124X9035BC2
0.15	.095 x .260	162D154X9035BC2*
0.18	.095 x .260	162D184X9035BC2
0.22	.095 x .260	162D224X9035BC2*
0.27	.095 x .260	162D274X9035BC2
0.33	.095 x .260	162D334X9035BC2*
0.39	.095 x .260	162D394X9035BC2
0.47	.095 x .260	162D474X9035BC2*
0.56	.110 x .290	162D564X9035CD2
0.68	.110 x .290	162D684X9035CD2*
0.82	.110 x .290	162D824X9035CD2
1.0	.110 x .290	162D105X9035CD2*
1.2	.110 x .290	162D125X9035CD2
1.5	.110 x .290	162D155X9035CD2*
1.8	.180 x .345	162D185X9035DD2
2.2	.180 x .345	162D225X9035DD2*
2.7	.180 x .345	162D275X9035DD2
3.3	.180 x .345	162D335X9035DD2*
3.9	.180 x .345	162D395X9035DD2
4.7	.180 x .345	162D475X9035DD2*
5.6	.180 x .420	162D565X9035EE2
6.8	.180 x .420	162D685X9035EE2*
50 WVDC		
0.0047	.095 x .260	162D472X9050BC2*
0.0056	.095 x .260	162D562X9050BC2
0.0068	.095 x .260	162D682X9050BC2*
0.0082	.095 x .260	162D822X9050BC2
0.010	.095 x .260	162D103X9050BC2*
0.012	.095 x .260	162D123X9050BC2
0.015	.095 x .260	162D153X9050BC2*
0.018	.095 x .260	162D183X9050BC2
0.022	.095 x .260	162D223X9050BC2*
0.027	.095 x .260	162D273X9050BC2
0.033	.095 x .260	162D333X9050BC2*
0.039	.095 x .260	162D393X9050BC2
0.047	.095 x .260	162D473X9050BC2*
0.056	.095 x .260	162D563X9050BC2
0.068	.095 x .260	162D683X9050BC2*
0.082	.095 x .260	162D823X9050BC2
0.10	.095 x .260	162D104X9050BC2*
0.12	.095 x .260	162D124X9050BC2
0.15	.095 x .260	162D154X9050BC2*
0.18	.095 x .260	162D184X9050BC2
0.22	.095 x .260	162D224X9050BC2*
0.27	.095 x .260	162D274X9050BC2
0.33	.110 x .290	162D334X9050CD2*
0.39	.110 x .290	162D394X9050CD2
0.47	.110 x .290	162D474X9050CD2*
0.56	.110 x .290	162D564X9050CD2
0.68	.110 x .290	162D684X9050CD2*
0.82	.110 x .290	162D824X9050CD2
1.0	.110 x .290	162D105X9050CD2*
1.2	.180 x .345	162D125X9050DD2
1.5	.180 x .345	162D155X9050DD2*
1.8	.180 x .345	162D185X9050DD2
2.2	.180 x .345	162D225X9050DD2*
2.7	.180 x .420	162D275X9050EE2
3.3	.180 x .420	162D335X9050EE2*
3.9	.180 x .420	162D395X9050EE2
4.7	.180 x .420	162D475X9050EE2*

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IND-REM-2A-EBAP

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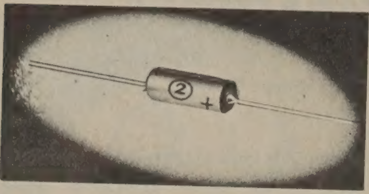
SPRAGUE CAPACITORS

TYPE 150D TANTALEX® SOLID-TANTALUM CAPACITORS



- Hermetically sealed metal case.
- Exhibit stable capacitance and low dissipation factor over temperature range of −80 C to +85 C. With appropriate voltage derating, may be operated to +125 C.
- Listed units have plastic sleeves. For bare case, end Cat. No. in "0" instead of "2."
- Also available as non-polarized capacitors. See Type 151D in Catalog C-563.
- Listed units have capacitance tolerance of ±10%. Capacitors with asterisk (*) are also available with capacitance tolerance of ±20%. For ±20% tolerance, change 9th character in catalog number from 9 to 0.
- For complete technical data, refer to latest issue of Engineering Bulletin 3520.

μF	Size Code	Cat. No.
6 WVDC — 8 VDC SURGE		
.22	A	150D224X9006A2*
.27	A	150D274X9006A2
.33	A	150D334X9006A2*
.39	A	150D394X9006A2
.47	A	150D474X9006A2*
.56	A	150D564X9006A2
.68	A	150D684X9006A2*
.82	A	150D824X9006A2
1.0	A	150D105X9006A2*
1.2	A	150D125X9006A2
1.5	A	150D155X9006A2*
1.8	A	150D185X9006A2
2.2	A	150D225X9006A2*
2.7	A	150D275X9006A2
3.3	A	150D335X9006A2*
3.9	A	150D395X9006A2
4.7	A	150D475X9006A2*
5.6	A	150D565X9006A2
6.8	A	150D685X9006A2*
8.2	B	150D825X9006B2
10	B	150D106X9006B2*
12	B	150D126X9006B2
15	B	150D156X9006B2
18	B	150D186X9006B2
22	B	150D226X9006B2*
27	B	150D276X9006B2
33	B	150D336X9006B2*
39	B	150D396X9006B2
47	B	150D476X9006B2*
56	B	150D566X9006B2
60	B	150D606X9006B2*
68	R	150D686X9006R2*
82	R	150D826X9006R2
100	R	150D107X9006R2*
120	R	150D127X9006R2*
150	R	150D157X9006R2*
180	R	150D187X9006R2*
220	S	150D227X9006S2*
270	S	150D277X9006S2*
330	S	150D337X9006S2*
10 WVDC — 13 VDC SURGE		
.22	A	150D224X9010A2*
.27	A	150D274X9010A2
.33	A	150D334X9010A2*
.39	A	150D394X9010A2
.47	A	150D474X9010A2*
.56	A	150D564X9010A2
.68	A	150D684X9010A2*
.82	A	150D824X9010A2
1.0	A	150D105X9010A2*
1.2	A	150D125X9010A2
1.5	A	150D155X9010A2*
1.8	A	150D185X9010A2
2.2	A	150D225X9010A2*
2.7	A	150D275X9010A2
3.3	A	150D335X9010A2*
3.9	A	150D395X9010A2
4.7	A	150D475X9010A2*
5.6	B	150D565X9010B2
6.8	B	150D685X9010B2
8.2	B	150D825X9010B2
10	B	150D106X9010B2
12	B	150D126X9010B2
15	B	150D156X9010B2*
18	B	150D186X9010B2
22	B	150D226X9010B2*
27	B	150D276X9010B2
33	B	150D336X9010B2*
39	B	150D396X9010B2
40	B	150D406X9010B2*
47	R	150D476X9010R2*
56	R	150D566X9010R2
68	R	150D686X9010R2*
82	R	150D826X9010R2
100	R	150D107X9010R2*
120	R	150D127X9010R2*
150	S	150D157X9010S2*
180	S	150D187X9010S2
220	S	150D227X9010S2*
15 WVDC — 18 VDC SURGE		
.22	A	150D224X9015A2*
.27	A	150D274X9015A2
.33	A	150D334X9015A2*
.39	A	150D394X9015A2
.47	A	150D474X9015A2*
.56	A	150D564X9015A2
.68	A	150D684X9015A2*
.82	A	150D824X9015A2
1.0	A	150D105X9015A2*
1.2	A	150D125X9015A2
1.5	A	150D155X9015A2*
1.8	A	150D185X9015A2
2.2	A	150D225X9015A2*
2.7	A	150D275X9015A2
3.3	A	150D335X9015A2*
3.9	B	150D395X9015B2
4.7	B	150D475X9015B2*
5.6	B	150D565X9015B2
6.8	B	150D685X9015B2
8.2	B	150D825X9015B2
10	B	150D106X9015B2*
12	B	150D126X9015B2
15	B	150D156X9015B2*
18	B	150D186X9015B2
22	B	150D226X9015B2*
27	R	150D276X9015R2
33	R	150D336X9015R2*
39	R	150D396X9015R2
47	R	150D476X9015R2*
56	R	150D566X9015R2
68	R	150D686X9015R2*
82	S	150D826X9015S2
100	S	150D107X9015S2*
120	S	150D127X90152S
150	S	150D157X9015S2*
20 WVDC — 23 VDC SURGE		
.0047	A	150D472X9020A2*
.0056	A	150D562X9020A2
.0068	A	150D682X9020A2*
.0082	A	150D822X9020A2
.01	A	150D103X9020A2*
.012	A	150D123X9020A2
.015	A	150D153X9020A2*
.018	A	150D183X9020A2
.022	A	150D223X9020A2*
.027	A	150D273X9020A2
.033	A	150D333X9020A2*
.039	A	150D393X9020A2
.047	A	150D473X9020A2*
.056	A	150D563X9020A2
.068	A	150D683X9020A2*
.082	A	150D823X9020A2
.10	A	150D104X9020A2*
.12	A	150D124X9020A2
.15	A	150D154X9020A2*
.18	A	150D184X9020A2
.22	A	150D224X9020A2*
.27	A	150D274X9020A2
.33	A	150D334X9020A2*
.39	A	150D394X9020A2
.47	A	150D474X9020A2*
.56	A	150D564X9020A2
.68	A	150D684X9020A2*
.82	A	150D824X9020A2
1.0	A	150D105X9020A2*
1.2	A	150D125X9020A2
1.5	A	150D155X9020A2*
1.8	A	150D185X9020A2
2.2	A	150D225X9020A2*
2.7	B	150D275X9020B2
3.3	B	150D335X9020B2*
3.9	B	150D395X9020B2
4.7	B	150D475X9020B2
5.6	B	150D565X9020B2
6.8	B	150D685X9020B2*
8.2	B	150D825X9020B2
10	B	150D106X9020B2*
12	B	150D126X9020B2
15	B	150D156X9020B2*
18	R	150D186X9020R2
22	R	150D226X9020R2*
27	R	150D276X9020R2
33	R	150D336X9020R2*
39	R	150D396X9020R2
47	R	150D476X9020R2*
56	S	150D566X9020S2
68	S	150D686X9020S2*
82	S	150D826X9020S2
100	S	150D107X9020S2*
35 WVDC — 40 VDC SURGE		
.0047	A	150D472X9035A2*
.0056	A	150D562X9035A2
.0068	A	150D682X9035A2*
.0082	A	150D822X9035A2
.01	A	150D103X9035A2*
.012	A	150D123X9035A2
.015	A	150D153X9035A2*
.018	A	150D183X9035A2
.022	A	150D223X9035A2*
.027	A	150D273X9035A2
.033	A	150D333X9035A2*
.039	A	150D393X9035A2
.047	A	150D473X9035A2*
.056	A	150D563X9035A2
.068	A	150D683X9035A2*
.082	A	150D823X9035A2
.10	A	150D104X9035A2*
.12	A	150D124X9035A2
.15	A	150D154X9035A2*
.18	A	150D184X9035A2
.22	A	150D224X9035A2*
.27	A	150D274X9035A2
.33	A	150D334X9035A2*
.39	A	150D394X9035A2
.47	A	150D474X9035A2*
.56	A	150D564X9035A2
.68	A	150D684X9035A2*
.82	A	150D824X9035A2
1.0	A	150D105X9035A2*
1.2	B	150D125X9035B2
1.5	B	150D155X9035B2*
1.8	B	150D185X9035B2
2.2	B	150D225X9035B2*
2.7	B	150D275X9035B2
3.3	B	150D335X9035B2*
3.9	B	150D395X9035B2
4.7	B	150D475X9035B2*
5.6	B	150D565X9035B2
6.8	B	150D685X9035B2*
8.2	R	150D825X9035R2
10	R	150D106X9035R2*
12	R	150D126X9035R2
15	R	150D156X9035R2*
18	R	150D186X9035R2
22	R	150D226X9035R2*
27	S	150D276X9035S2
33	S	150D336X9035S2*
39	S	150D396X9035S2
47	S	150D476X9035S2*
50 WVDC — 65 VDC SURGE		
.0047	A	150D472X9050A2*
.0056	A	150D562X9050A2
.0068	A	150D682X9050A2*
.0082	A	150D822X9050A2
.01	A	150D103X9050A2*
.012	A	150D123X9050A2
.015	A	150D153X9050A2*
.018	A	150D183X9050A2
.022	A	150D223X9050A2*
.027	A	150D273X9050A2
.033	A	150D333X9050A2*
.039	A	150D393X9050A2
.047	A	150D473X9050A2*
.056	A	150D563X9050A2
.068	A	150D683X9050A2*
.082	A	150D823X9050A2
.1	A	150D104X9050A2*
.12	A	150D124X9050A2
.15	A	150D154X9050A2*
.18	A	150D184X9050A2
.22	A	150D224X9050A2*
.27	A	150D274X9050A2
.33	A	150D334X9050A2*
.39	A	150D394X9050A2
.47	A	150D474X9050A2*

DIMENSIONS

Code	D. x L.
A	.135″ x .286″
B	.185″ x .474″
R	.289″ x .686″
S	.351″ x .786″

Sizes subject to change without notice.

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IND-EEM-1-EFAI

SPRAGUE CAPACITORS

TYPE 150D SOLID-ELECTROLYTE TANTALEX® CAPACITORS (Cont.)

µF	Size Code	Cat. No.
.56	A	150D564X9050A2
.68	A	150D684X9050A2*
.82	A	150D824X9050A2
1.0	A	150D105X9050A2*
1.2	B	150D125X9050B2
1.5	B	150D155X9050B2*
1.8	B	150D185X9050B2
2.2	B	150D225X9050B2*
2.7	B	150D275X9050B2
3.3	B	150D335X9050B2*
3.9	B	150D395X9050B2
4.7	B	150D475X9050B2*
5.6	R	150D565X9050R2
6.8	R	150D685X9050R2*
8.2	R	150D825X9050R2
10	R	150D106X9050R2*
12	R	150D126X9050R2
15	R	150D156X9050R2*
18	R	150D186X9050R2
22	S	150D226X9050S2*

60 WVDC — 78 VDC SURGE

µF	Size Code	Cat. No.
.0047	A	150D472X9060A2*
.0056	A	150D562X9060A2
.0068	A	150D682X9060A2*
.0082	A	150D822X9060A2
.01	A	150D103X9060A2*
.012	A	150D123X9060A2
.015	A	150D153X9060A2*
.018	A	150D183X9060A2
.022	A	150D223X9060A2*
.027	A	150D273X9060A2
.033	A	150D333X9060A2*
.039	A	150D393X9060A2
.047	A	150D473X9060A2*
.056	A	150D563X9060A2
.068	A	150D683X9060A2*
.082	A	150D823X9060A2
.1	A	150D104X9060A2*
.12	A	150D124X9060A2
.15	A	150D154X9060A2*
.18	A	150D184X9060A2
.22	A	150D224X9060A2*
.27	A	150D274X9060A2
.33	A	150D334X9060A2*
.39	A	150D394X9060A2
.47	A	150D474X9060A2*

µF	Size Code	Cat. No.
.56	A	150D564X9060A2
.68	A	150D684X9060A2*
.82	B	150D824X9060B2
1.0	B	150D105X9060B2*
1.2	B	150D125X9060B2
1.5	B	150D155X9060B2*
1.8	B	150D185X9060B2
2.2	B	150D225X9060B2*
2.7	B	150D275X9060B2
3.3	B	150D335X9060B2*
3.9	B	150D395X9060B2
4.7	R	150D475X9060R2*
5.6	R	150D565X9060R2
6.8	R	150D685X9060R2*
8.2	R	150D825X9060R2
10	R	150D106X9060R2*
12	S	150D126X9060S2
15	S	150D156X9060S2*
18	S	150D186X9060S2
22	S	150D226X9060S2*

75 WVDC 97 VDC SURGE

µF	Size Code	Cat. No.
.0047	A	150D472X9075A2*
.0056	A	150D562X9075A2
.0068	A	150D682X9075A2*
.0082	A	150D822X9075A2
.01	A	150D103X9075A2*
.012	A	150D123X9075A2
.015	A	150D153X9075A2*
.018	A	150D183X9075A2
.022	A	150D223X9075A2*
.027	A	150D273X9075A2
.033	A	150D333X9075A2*
.039	A	150D393X9075A2
.047	A	150D473X9075A2*
.056	A	150D563X9075A2
.068	A	150D683X9075A2*
.082	A	150D823X9075A2
.1	A	150D104X9075A2*
.12	A	150D124X9075A2
.15	A	150D154X9075A2*
.18	A	150D184X9075A2
.22	A	150D224X9075A2*
.27	A	150D274X9075A2
.33	A	150D334X9075A2*
.39	A	150D394X9075A2
.47	A	150D474X9075A2*

µF	Size Code	Cat. No.
.56	A	150D564X9075A2
.68	A	150D684X9075A2*
.82	B	150D824X9075B2
1.0	B	150D105X9075B2*
1.2	B	150D125X9075B2
1.5	B	150D155X9075B2*
1.8	B	150D185X9075B2
2.2	B	150D225X9075B2*
2.7	B	150D275X9075B2
3.3	B	150D335X9075B2*
3.9	B	150D395X9075B2
4.7	R	150D475X9075R2*
5.6	R	150D565X9075R2
6.8	R	150D685X9075R2*
8.2	R	150D825X9075R2
10.0	R	150D106X9075R2*
12.0	S	150D126X9075S2
15.0	S	150D156X9075S2*

100 WVDC 115 VDC SURGE

µF	Size Code	Cat. No.
.0047	A	150D472X9100A2*
.0056	A	150D562X9100A2
.0068	A	150D682X9100A2*
.0082	A	150D822X9100A2
.01	A	150D103X9100A2*
.012	A	150D123X9100A2
.015	A	150D153X9100A2*
.018	A	150D183X9100A2
.022	A	150D223X9100A2*
.027	A	150D273X9100A2
.033	A	150D333X9100A2*
.039	A	150D393X9100A2
.047	A	150D473X9100A2*
.056	A	150D563X9100A2
.068	A	150D683X9100A2*
.082	A	150D823X9100A2
.1	A	150D104X9100A2*
.12	A	150D124X9100A2
.15	A	150D154X9100A2*
.18	A	150D184X9100A2
.22	A	150D224X9100A2*
.27	A	150D274X9100A2
.33	A	150D334X9100A2*
.39	A	150D394X9100A2
.47	A	150D474X9100A2*
.56	A	150D564X9100A2
.68	B	150D684X9100B2*

µF	Size Code	Cat. No.
.82	B	150D824X9100B2
1.0	B	150D105X9100B2*
1.2	B	150D125X9100B2
1.5	B	150D155X9100B2*
1.8	B	150D185X9100B2
2.2	B	150D225X9100B2*
2.7	B	150D275X9100B2
3.3	R	150D335X9100R2*
3.9	R	150D395X9100R2
4.7	R	150D475X9100R2*
5.6	R	150D565X9100R2
6.8	R	150D685X9100R2*

125 WVDC 140 VDC SURGE

µF	Size Code	Cat. No.
.0047	A	150D472X9125A2*
.0056	A	150D562X9125A2
.0068	A	150D682X9125A2*
.0082	A	150D822X9125A2
.01	A	150D103X9125A2*
.012	A	150D123X9125A2
.015	A	150D153X9125A2*
.018	A	150D183X9125A2
.022	A	150D223X9125A2*
.027	A	150D273X9125A2
.033	A	150D333X9125A2*
.039	A	150D393X9125A2
.047	A	150D473X9125A2*
.056	A	150D563X9125A2
.068	A	150D683X9125A2*
.082	A	150D823X9125A2
.1	A	150D104X9125A2*
.12	A	150D124X9125A2
.15	A	150D154X9125A2*
.18	A	150D184X9125A2
.22	A	150D224X9125A2*
.27	A	150D274X9125A2
.33	A	150D334X9125A2*
.39	A	150D394X9125A2
.47	A	150D474X9125A2*
.56	B	150D564X9125B2
.68	B	150D684X9125B2*
.82	B	150D824X9125B2
1.0	B	150D105X9125B2*
1.2	B	150D125X9125B2
1.5	B	150D155X9125B2*
1.8	B	150D185X9125B2
2.2	B	150D225X9125B2*

EXTENDED-RANGE TYPE 150D TANTALEX® CAPACITORS®

- Extended capacitance ratings (higher capacitance values in smaller case sizes) required in some new equipment designs.
- Available at premium prices.

6 WVDC 8 VDC SURGE

µF	Size Code	Cat. No.
10	A	150D106X9006A2*
12	A	150D126X9006A2
15	A	150D156X9006A2*
68	B	150D686X9006B2*
82	B	150D826X9006B2
100	B	150D107X9006B2*
330	R	150D337X9006R2*
390	R	150D397X9006R2
470	R	150D477X9006R2*
560	S	150D567X9006S2
680	S	150D687X9006S2*
820	S	150D827X9006S2
1000	S	150D108X9006S2*

10 WVDC 13 VDC SURGE

µF	Size Code	Cat. No.
5.6	A	150D565X9010A2
6.8	A	150D685X9010A2*
8.2	A	150D825X9010A2
10	A	150D106X9010A2*
47	B	150D476X9010B2*
56	B	150D566X9010B2
68	B	150D686X9010B2*
82	B	150D826X9010B2
150	R	150D157X9010R2*
180	R	150D187X9010R2*
220	R	150D227X9010R2*
270	R	150D277X9010R2
330	S	150D337X9010S2*
390	S	150D397X9010S2
470	S	150D477X9010S2*
560	S	150D567X9010S2

15 WVDC 18 VDC SURGE

µF	Size Code	Cat. No.
3.9	A	150D395X9015A2
4.7	A	150D475X9015A2*
5.6	A	150D565X9015A2
6.8	A	150D685X9015A2*
27	B	150D276X9015B2
33	B	150D336X9015B2*
39	B	150D396X9015B2
82	R	150D826X9015R2
100	R	150D107X9015R2
120	R	150D127X9015R2
150	R	150D157X9015R2*
180	R	150D187X9015R2
220	S	150D227X9015S2*
270	S	150D277X9015S2
330	S	150D337X9015S2*

20 WVDC 23 VDC SURGE

µF	Size Code	Cat. No.
2.7	A	150D275X9020A2
3.3	A	150D335X9020A2*
3.9	A	150D395X9020A2
4.7	A	150D475X9020A2*
18	B	150D186X9020B2
22	B	150D226X9020B2*
27	B	150D276X9020B2
56	R	150D566X9020R2
68	R	150D686X9020R2*
82	R	150D826X9020R2
100	R	150D107X9020R2*
120	R	150D127X9020R2
150	S	150D157X9020S2*
180	S	150D187X9020S2
220	S	150D227X9020S2*

30 WVDC 34 VDC SURGE

µF	Size Code	Cat. No.
2.2	A	150D225X9030A2*
2.7	A	150D275X9030A2
12	B	150D126X9030B2
15	B	150D156X9030B2*
18	B	150D186X9030B2
56	R	150D566X9030R2
68	R	150D686X9030R2*
82	S	150D826X9030S2
100	S	150D107X9030S2*

35 WVDC 40 VDC SURGE

µF	Size Code	Cat. No.
1.2	A	150D125X9035A2
1.5	A	150D155X9035A2*
1.8	A	150D185X9035A2
8.2	B	150D825X9035B2
10	B	150D106X9035B2*
27	R	150D276X9035R2
33	R	150D336X9035R2*
39	R	150D396X9035R2
47	R	150D476X9035R2*
56	S	150D566X9035S2
68	S	150D686X9035S2*

50 WVDC 65 VDC SURGE

µF	Size Code	Cat. No.
1.2	A	150D125X9050A2
1.5	A	150D155X9050A2*
5.6	B	150D565X9050B2
6.8	B	150D685X9050B2*
22	R	150D226X9050R2*
27	R	150D276X9050R2
33	S	150D336X9050S2*
39	S	150D396X9050S2

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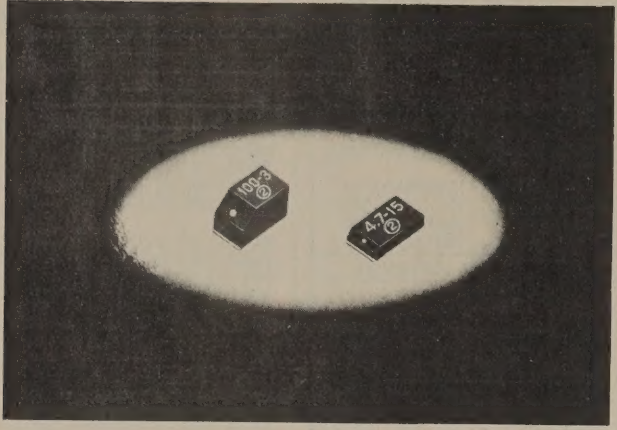
IND-EEM-1D-EFAI

Sizes subject to change without notice.

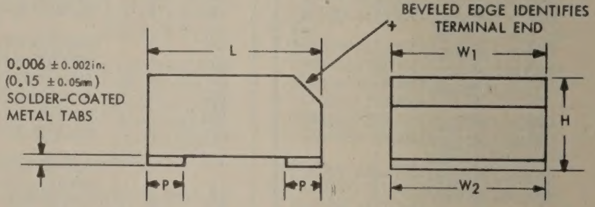
SPRAGUE CAPACITORS

TYPE 193D DOMINO® SOLID-TANTALUM CAPACITORS WITH FLUSH SOLDERABLE PAD TERMINALS*



- Designed for hybrid circuit and low-profile printed wiring board applications.
- Fully-molded construction. Epoxy case provides superior mechanical protection during handling and mounting as well as excellent stability in severe operating and storage environments.
- Leadless design minimizes inductance and saves space. Exposed terminal surfaces on bottom of capacitor. Can be attached to substrates or circuit boards by dip-soldering, welding, re-flow soldering, or other conventional methods.
- Compatible with automatic assembly equipment.
- Low-profile configuration makes Domino Capacitors ideal for use in molded assemblies such as dual in-line (DIP) packages.
- Low d-c leakage, low dissipation factor.
- Capacitance tolerance, ±10%.
- Operating range −55C to +85C. May be operated up to +125C when derated to two-thirds of rated working voltage.
- For complete technical data, refer to latest issue of Engineering Bulletin 3532.

Case Code	DIMENSIONS (in inches)				
	L ±.005	W_1 ±.01 (Case)	$W_2 {}^{+.01}_{-.005}$ (Pads)	H ±.005	P ±.01
A	.180	.100	.090	.070	.030
B	.180	.100	.090	.100	.030
C	.320	.180	.170	.070	.050
D	.320	.180	.170	.100	.050
E	.320	.180	.170	.195	.050



★Other ratings and extended tab terminals available on special order.

μF	Case Code	Catalog Number*
3 WVDC, 4 VDC SURGE		
100.0	E	193D107X9003E2
6 WVDC, 8 VDC SURGE		
3.3	B	193D335X9006B2
33.0	D	193D336X9006D2
68.0	E	193D686X9006E2
10 WVDC, 13 VDC SURGE		
1.0	A	193D105X9010A2
2.2	B	193D225X9010B2
6.8	C	193D685X9010C2
47.0	E	193D476X9010E2

μF	Case Code	Catalog Number*
15 WVDC, 20 VDC SURGE		
4.7	C	193D475X9015C2
10.0	D	193D106X9015D2
20 WVDC, 26 VDC SURGE		
0.47	A	193D474X9020A2
1.0	B	193D105X9020B2
3.3	C	193D335X9020C2
6.8	D	193D685X9020D2
22.0	E	193D226X9020E2
35 WVDC, 46 VDC SURGE		
0.1	A	193D104X9035A2
0.22	A	193D224X9035A2
1.5	C	193D155X9035C2
3.9	D	193D395X9035D2
10.0	E	193D106X9035E2

*Capacitors listed here have a capacitance tolerance of ±10%. These units are also available with a capacitance tolerance of ±5% on special order. To specify ±5% capacitors, change the 8th and 9th characters in the catalog number from "X9" to "X5."

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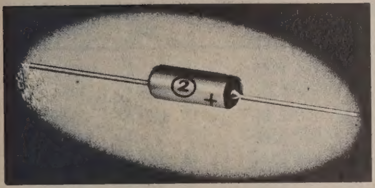
IND-EEM-27-EFAI

Sizes subject to change without notice.

SPRAGUE CAPACITORS

ESTABLISHED RELIABILITY STYLE CSR13 SOLID TANTALUM CAPACITORS to MIL-C-39003



- Solid-electrolyte tantalum type. Glass-to-metal hermetic seal. 125 C operation.
- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- For complete technical data, refer to latest issue of Engineering Bulletin 3520.2.

SIZE CODE

A = .135″D.x286″L.
C = .289″D.x686″L.
B = .185″D.x474″L.
D = .351″D.x786″L.

MIL PART NUMBER M39003/01-

μF	WVDC	Size Code	MIL Type Designation*	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		Failure Rate S (0.001%)	
				Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
5.6	6	A	CSR13B565K-	—	2001	—	2241	—	2481	—	2721	—	2961
6.8	6	A	CSR13B685--	2003	2002	2243	2242	2483	2482	2723	2722	2963	2962
47	6	B	CSR13B476--	2005	2004	2245	2244	2485	2484	2725	2724	2965	2964
56	6	B	CSR13B566K-	—	2006	—	2246	—	2486	—	2726	—	2966
150	6	C	CSR13B157--	2008	2007	2248	2247	2488	2487	2728	2727	2968	2967
180	6	C	CSR13B187K-	—	2009	—	2249	—	2489	—	2729	—	2969
270	6	D	CSR13B277K-	—	2010	—	2250	—	2490	—	2730	—	2970
330	6	D	CSR13B337--	2012	2011	2252	2251	2492	2491	2732	2731	2972	2971
3.9	10	A	CSR13C395K-	—	2013	—	2253	—	2493	—	2733	—	2973
4.7	10	A	CSR13C475--	2015	2014	2255	2254	2495	2494	2735	2734	2975	2974
27	10	B	CSR13C276K-	—	2016	—	2256	—	2496	—	2736	—	2976
33	10	B	CSR13C336--	2018	2017	2258	2257	2498	2497	2738	2737	2978	2977
39	10	B	CSR13C396K-	—	2019	—	2259	—	2499	—	2739	—	2979
82	10	C	CSR13C826K-	—	2020	—	2260	—	2500	—	2740	—	2980
100	10	C	CSR13C107--	2022	2021	2262	2261	2502	2501	2742	2741	2982	2981
120	10	C	CSR13C127K-	—	2023	—	2263	—	2503	—	2743	—	2983
180	10	D	CSR13C187K-	—	2024	—	2264	—	2504	—	2744	—	2984
220	10	D	CSR13C227--	2026	2025	2266	2265	2506	2505	2746	2745	2986	2985
2.7	15	A	CSR13D275K-	—	2027	—	2267	—	2507	—	2747	—	2987
3.3	15	A	CSR13D335--	2029	2028	2269	2268	2509	2508	2749	2748	2989	2988
18	15	B	CSR13D186K-	—	2030	—	2270	—	2510	—	2750	—	2990
22	15	B	CSR13D226--	2032	2031	2272	2271	2512	2511	2752	2751	2992	2991
56	15	C	CSR13D556K-	—	2033	—	2273	—	2513	—	2753	—	2993
68	15	C	CSR13D686--	2035	2034	2275	2274	2515	2514	2755	2754	2995	2994
120	15	D	CSR13D127K-	—	2036	—	2276	—	2516	—	2756	—	2996
150	15	D	CSR13D157--	2038	2037	2278	2277	2518	2517	2758	2757	2998	2997
1.2	20	A	CSR13E125K-	—	2039	—	2279	—	2519	—	2759	—	2999
1.5	20	A	CSR13E155--	2041	2040	2281	2280	2521	2520	2761	2760	3001	3000
1.8	20	A	CSR13E185K-	—	2042	—	2282	—	2522	—	2762	—	3002
2.2	20	A	CSR13E225--	2044	2043	2284	2283	2524	2523	2764	2763	3004	3003
8.2	20	B	CSR13E825K-	—	2045	—	2285	—	2525	—	2765	—	3005
10	20	B	CSR13E106--	2047	2046	2287	2286	2527	2526	2767	2766	3007	3006
12	20	B	CSR13E126K-	—	2048	—	2288	—	2528	—	2768	—	3008
15	20	B	CSR13E156--	2050	2049	2290	2289	2530	2529	2770	2769	3010	3009
27	20	C	CSR13E276K-	—	2051	—	2291	—	2531	—	2771	—	3011
33	20	C	CSR13E336--	2053	2052	2293	2292	2533	2532	2773	2772	3013	3012
39	20	C	CSR13E396K-	—	2054	—	2294	—	2534	—	2774	—	3014
47	20	C	CSR13E476--	2056	2055	2296	2295	2536	2535	2776	2775	3016	3015
56	20	D	CSR13E566K-	—	2057	—	2297	—	2537	—	2777	—	3017
68	20	D	CSR13E686--	2059	2058	2299	2298	2539	2538	2779	2778	3019	3018
82	20	D	CSR13E826K-	—	2060	—	2300	—	2540	—	2780	—	3020
100	20	D	CSR13E107--	2062	2061	2302	2301	2542	2541	2782	2781	3022	3021

*Type Nos. shown are incomplete. Capacitance Tolerance and/or Failure Rate must be added at end of number. Where 10th character (cap. tol.) is blank, insert "K" for ±10%, "M" for ±20%. A last character must be added to denote Failure Rate. Insert "L" for 2%, "M" for 1%, "P" for 0.1%, "R" for 0.01%, "S" for 0.001%.

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Sizes subject to change without notice.

SPRAGUE CAPACITORS

STYLE CSR13 SOLID TANTALUMS - (continued)

µF	WVDC	Size Code	MIL Type Designation*	MIL PART NUMBER M39003/01--									
				Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		Failure Rate S (0.001%)	
				Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
5.6	35	B	CSR13F565K-	—	2063	—	2303	—	2543	—	2783	—	3023
6.8	35	B	CSR13F685--	2065	2064	2305	2304	2545	2544	2785	2784	3025	3024
22	35	C	CSR13F226--	2067	2066	2307	2306	2547	2746	2787	2786	3027	3026
27	35	D	CSR13F276K-	—	2068	—	2308	—	2548	—	2788	—	3028
33	35	D	CSR13F336--	2070	2069	2310	2309	2550	2549	2790	2789	3030	3029
39	35	D	CSR13F396K-	—	2071	—	2311	—	2551	—	2791	—	3031
47	35	D	CSR13F476--	2073	2072	2313	2312	2553	2552	2793	2792	3033	3032
.0047	50	A	CSR13G472--	2075	2074	2315	2314	2555	2554	2795	2794	3035	3034
.0056	50	A	CSR13G562K-	—	2076	—	2316	—	2556	—	2796	—	3036
.0068	50	A	CSR13G682--	2078	2077	2318	2317	2558	2557	2798	2797	3038	3037
.0082	50	A	CSR13G822K-	—	2079	—	2319	—	2559	—	2799	—	3039
.01	50	A	CSR13G103--	2081	2080	2321	2320	2561	2560	2801	2800	3041	3040
.012	50	A	CSR13G123K-	—	2082	—	2322	—	2562	—	2802	—	3042
.015	50	A	CSR13G153--	2084	2083	2324	2323	2564	2563	2804	2803	3044	3043
.018	50	A	CSR13G183K-	—	2085	—	2325	—	2565	—	2805	—	3045
.022	50	A	CSR13G223--	2087	2086	2327	2326	2567	2566	2807	2806	3047	3046
.027	50	A	CSR13G273K-	—	2088	—	2328	—	2568	—	2808	—	3048
.033	50	A	CSR13G333--	2090	2089	2330	2329	2570	2569	2810	2809	3050	3049
.039	50	A	CSR13G393K-	—	2091	—	2331	—	2571	—	2811	—	3051
.047	50	A	CSR13G473--	2093	2092	2333	2332	2573	2572	2813	2812	3053	3052
.056	50	A	CSR13G563K-	—	2094	—	2334	—	2574	—	2814	—	3054
.068	50	A	CSR13G683--	2096	2095	2336	2335	2576	2575	2816	2815	3056	3055
.082	50	A	CSR13G823K-	—	2097	—	2337	—	2577	—	2817	—	3057
.1	50	A	CSR13G104--	2099	2098	2339	2338	2579	2578	2819	2818	3059	3058
.12	50	A	CSR13G124K-	—	2100	—	2340	—	2580	—	2820	—	3060
.15	50	A	CSR13G154--	2102	2101	2342	2341	2582	2581	2822	2821	3062	3061
.18	50	A	CSR13G184K-	—	2103	—	2343	—	2583	—	2823	—	3063
.22	50	A	CSR13G224--	2105	2104	2345	2344	2585	2584	2825	2824	3065	3064
.27	50	A	CSR13G274K-	—	2106	—	2346	—	2586	—	2826	—	3066
.33	50	A	CSR13G334--	2108	2107	2348	2347	2588	2587	2828	2827	3068	3067
.39	50	A	CSR13G394K-	—	2109	—	2349	—	2589	—	2829	—	3069
.47	50	A	CSR13G474--	2111	2110	2351	2350	2591	2590	2831	2830	3071	3070
.56	50	A	CSR13G564K-	—	2112	—	2352	—	2592	—	2832	—	3072
.68	50	A	CSR13G684--	2114	2113	2354	2353	2594	2593	2834	2833	3074	3073
.82	50	A	CSR13G824K-	—	2115	—	2355	—	2595	—	2835	—	3075
1.0	50	A	CSR13G105--	2117	2116	2357	2356	2597	2596	2837	2836	3077	3076
1.2	50	B	CSR13G125K-	—	2118	—	2358	—	2598	—	2838	—	3078
1.5	50	B	CSR13G155--	2120	2119	2360	2359	2600	2599	2840	2839	3080	3079
1.8	50	B	CSR13G185K-	—	2121	—	2361	—	2601	—	2841	—	3081
2.2	50	B	CSR13G225--	2123	2122	2363	2362	2603	2602	2843	2842	3083	3082
2.7	50	B	CSR13G275K-	—	2124	—	2364	—	2604	—	2844	—	3084
3.3	50	B	CSR13G335--	2126	2125	2366	2365	2606	2605	2846	2845	3086	3085
3.9	50	B	CSR13G395K-	—	2127	—	2367	—	2607	—	2847	—	3087
4.7	50	B	CSR13G475--	2129	2128	2369	2368	2609	2608	2849	2848	3089	3088
5.6	50	C	CSR13G565K-	—	2130	—	2370	—	2610	—	2850	—	3090
6.8	50	C	CSR13G685--	2132	2131	2372	2371	2612	2611	2852	2851	3092	3091
8.2	50	C	CSR13G825K-	—	2133	—	2373	—	2613	—	2853	—	3093
10	50	C	CSR13G106--	2135	2134	2375	2374	2615	2614	2855	2854	3095	3094
12	50	C	CSR13G126K-	—	2136	—	2376	—	2616	—	2856	—	3096
15	50	C	CSR13G156--	2138	2137	2378	2377	2618	2617	2858	2857	3098	3097
18	50	C	CSR13G186K-	—	2139	—	2379	—	2619	—	2859	—	3099
22	50	D	CSR13G226--	2141	2140	2381	2380	2621	2620	2861	2860	3101	3100
.1	75	A	CSR13H104--	2143	2142	2383	2382	2723	2622	2863	2862	3103	3102
.12	75	A	CSR13H124K-	—	2144	—	2384	—	2624	—	2864	—	3104
.15	75	A	CSR13H154--	2146	2145	2386	2385	2626	2625	2866	2865	3106	3105
.18	75	A	CSR13H184K-	—	2147	—	2387	—	2627	—	2867	—	3107

*Type Nos. shown are incomplete. Capacitance Tolerance and/or Failure Rate must be added at end of number. Where 10th character (cap. tol.) is blank, insert "K" for ±10%, "M" for ±20%. A last character must be added to denote Failure Rate. Insert "L" for 2%, "M" for 1%, "P" for 0.1%, "R" for 0.01%, "S" for 0.001%.

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SPRAGUE CAPACITORS

STYLE CSR13 SOLID TANTALUMS - (continued)

				MIL PART NUMBER M39003/01--									
				Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		Failure Rate S (0.001%)	
µF	WVDC	Size Code	MIL Type Designation*	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
.22	75	A	CSR13H224--	2149	2148	2389	2388	2629	2628	2869	2868	3109	3108
.27	75	A	CSR13H274K-	—	2150	—	2390	—	2630	—	2870	—	3110
.33	75	A	CSR13H334--	2152	2151	2392	2391	2632	2631	2872	2871	3112	3111
.39	75	A	CSR13H394K-	—	2153	—	2393	—	2633	—	2873	—	3113
.47	75	A	CSR13H474--	2155	2154	2395	2394	2635	2634	2875	2874	3115	3114
.56	75	A	CSR13H564K-	—	2156	—	2396	—	2636	—	2876	—	3116
.68	75	A	CSR13H684--	2158	2157	2398	2397	2638	2637	2878	2877	3118	3117
.82	75	B	CSR13H824K-	—	2159	—	2399	—	2639	—	2879	—	3119
1.0	75	B	CSR13H105--	2161	2160	2401	2400	2641	2640	2881	2880	3121	3120
1.2	75	B	CSR13H125K-	—	2162	—	2402	—	2642	—	2882	—	3122
1.5	75	B	CSR13H155--	2164	2163	2404	2403	2644	2643	2884	2883	3124	3123
1.8	75	B	CSR13H185K-	—	2165	—	2405	—	2645	—	2885	—	3125
2.2	75	B	CSR13H225--	2167	2166	2407	2406	2647	2646	2887	2886	3127	3126
2.7	75	B	CSR13H275K-	—	2168	—	2408	—	2648	—	2888	—	3128
3.3	75	B	CSR13H335--	2170	2169	2410	2409	2650	2649	2890	2889	3130	3129
3.9	75	B	CSR13H395K-	—	2171	—	2411	—	2651	—	2891	—	3131
4.7	75	C	CSR13H475--	2173	2172	2413	2412	2653	2652	2893	2892	3133	3132
5.6	75	C	CSR13H565K-	—	2174	—	2414	—	2654	—	2894	—	3134
6.8	75	C	CSR13H685--	2176	2175	2416	2415	2656	2655	2896	2895	3136	3135
8.2	75	C	CSR13H825K-	—	2177	—	2417	—	2657	—	2897	—	3137
10	75	C	CSR13H106--	2179	2178	2419	2418	2659	2658	2899	2898	3139	3138
12	75	D	CSR13H126K-	—	2180	—	2420	—	2660	—	2900	—	3140
15	75	D	CSR13H156--	2182	2181	2422	2421	2662	2661	2902	2901	3142	3141
.0047	100	A	CSR13J472--	2184	2183	2424	2423	2664	2663	2904	2903	3144	3143
.0056	100	A	CSR13J562K-	—	2185	—	2425	—	2665	—	2905	—	3145
.0068	100	A	CSR13J682--	2187	2186	2427	2426	2667	2666	2907	2906	3147	3146
.0082	100	A	CSR13J822K-	—	2188	—	2428	—	2668	—	2908	—	3148
.01	100	A	CSR13J103--	2190	2189	2430	2429	2670	2669	2910	2909	3150	3149
.012	100	A	CSR13J123K-	—	2191	—	2431	—	2671	—	2911	—	3151
.015	100	A	CSR13J153--	2193	2192	2433	2432	2673	2672	2913	2912	3153	3152
.018	100	A	CSR13J183K-	—	2194	—	2434	—	2674	—	2914	—	3154
.022	100	A	CSR13J223--	2196	2195	2436	2435	2676	2675	2916	2915	3156	3155
.027	100	A	CSR13J273K-	—	2197	—	2437	—	2677	—	2917	—	3157
.033	100	A	CSR13J333--	2199	2198	2439	2438	2679	2678	2919	2918	3159	3158
.039	100	A	CSR13J393K-	—	2200	—	2440	—	2680	—	2920	—	3160
.047	100	A	CSR13J473--	2202	2201	2442	2441	2682	2681	2922	2921	3162	3161
.056	100	A	CSR13J563K-	—	2203	—	2443	—	2683	—	2923	—	3163
.068	100	A	CSR13J683--	2205	2204	2445	2444	2685	2684	2925	2924	3165	3164
.082	100	A	CSR13J823K-	—	2206	—	2446	—	2686	—	2926	—	3166
.1	100	A	CSR13J104--	2208	2207	2448	2447	2688	2687	2928	2927	3168	3167
.12	100	A	CSR13J124K-	—	2209	—	2449	—	2689	—	2929	—	3169
.15	100	A	CSR13J154--	2211	2210	2451	2450	2691	2690	2931	2930	3171	3170
.18	100	A	CSR13J184K-	—	2212	—	2452	—	2692	—	2932	—	3172
.22	100	A	CSR13J224--	2214	2213	2454	2453	2694	2693	2934	2933	3174	3173
.27	100	A	CSR13J274K-	—	2215	—	2455	—	2695	—	2935	—	3175
.33	100	A	CSR13J334--	2217	2216	2457	2456	2697	2696	2937	2936	3177	3176
.39	100	A	CSR13J394K-	—	2218	—	2458	—	2698	—	2938	—	3178
.47	100	A	CSR13J474--	2220	2219	2460	2459	2700	2699	2940	2939	3180	3179
.56	100	A	CSR13J564K-	—	2221	—	2461	—	2701	—	2941	—	3181
.68	100	B	CSR13J684--	2223	2222	2463	2462	2703	2702	2943	2942	3183	3182
.82	100	B	CSR13J824K-	—	2224	—	2464	—	2704	—	2944	—	3184
1.0	100	B	CSR13J105--	2226	2225	2466	2465	2706	2705	2946	2945	3186	3185
1.2	100	B	CSR13J125K-	—	2227	—	2467	—	2707	—	2947	—	3187
1.5	100	B	CSR13J155--	2229	2228	2469	2468	2709	2708	2949	2948	3189	3188
1.8	100	B	CSR13J185K-	—	2230	—	2470	—	2710	—	2950	—	3190
2.2	100	B	CSR13J225--	2232	2231	2472	2471	2712	2711	2952	2951	3192	3191
2.7	100	B	CSR13J275K-	—	2233	—	2473	—	2713	—	2953	—	3193
3.3	100	R	CSR13J335--	—	—	5158	5157	5358	5357	5558	5557	5758	5757
3.9	100	R	CSR13J395K-	—	—	—	5160	—	5360	—	5560	—	5760
4.7	100	R	CSR13J475--	—	—	5163	5162	5363	5362	5563	5562	5763	5762
5.6	100	R	CSR13J565K-	—	—	—	5165	—	5365	—	5565	—	5765
6.8	100	R	CSR13J685--	—	—	5168	5167	5368	5367	5568	5567	5768	5767

*Type Nos. shown are incomplete. Capacitance Tolerance and/or Failure Rate must be added at end of number. Where 10th character (cap. tol.) is blank, insert "K" for ±10%, "M" for ±20%. A last character must be added to denote Failure Rate. Insert "L" for 2%, "M" for 1%, "P" for 0.1%, "R" for 0.01%, "S" for 0.001%.

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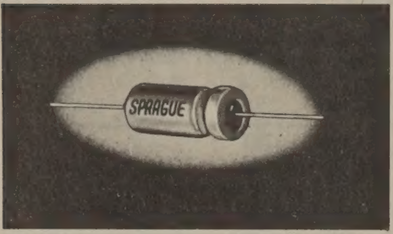
SPRAGUE CAPACITORS

TYPE 109D SINTERED-ANODE TANTALEX® CAPACITORS



- Reliable, superior quality capacitors dual-rated for 125 C and 85 C operation.
- Especially suited for military and critical industrial equipment. Meet 2000 cycle MIL missile vibration requirements.
- Capacitors listed below have plastic-film insulation. For bare metal case, change last digit of Cat. No. from "2" to "0" and subtract .016" from diameter and .063" from length.
- Capacitors listed below have capacitance tolerance of ±10%. For ±20% units, change X9 in cat. no. to X0.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletins 3700 and 3700.2.

SIZE CODE

C = .203"D. x .515"L.
F = .296"D. x .703"L.
T = .390"D. x .828"L.
K = .390"D. x 1.125"L.
W = .390"D. x 1.312"L.

PREFERRED RATINGS

µF	Size Code	Cat. No.
6 WVDC @ 85C, 4 WVDC @ 125C		
200	C	109D207X9006C2
820	F	109D827X9006F2
1500	T	109D158X9006T2
2200	K	109D228X9006K2
8 WVDC @ 85C, 5 WVDC @ 125C		
180	C	109D187X9008C2
680	F	109D687X9008F2
1400	T	109D148X9008T2
1800	K	109D188X9008K2
10 WVDC @ 85C, 7 WVDC @ 125C		
120	C	109D127X9010C2
150	C	109D157X9010C2
470	F	109D477X9010F2
560	F	109D567X9010F2
1000	T	109D108X9010T2
1200	T	109D128X9010T2
1200	K	109D128X9010K2
1500	K	109D158X9010K2
15 WVDC @ 85C, 10 WVDC @ 125C		
82	C	109D826X9015C2
100	C	109D107X9015C2
330	F	109D337X9015F2
390	F	109D397X9015F2
680	T	109D687X9015T2
820	T	109D827X9015T2
820	K	109D827X9015K2
1000	K	109D108X9015K2
25 WVDC @ 85C, 15 WVDC @ 125C		
68	C	109D686X9025C2
270	F	109D277X9025F2
560	T	109D567X9025T2
680	K	109D687X9025K2
30 WVDC @ 85C, 20 WVDC @ 125C		
39	C	109D396X9030C2
47	C	109D476X9030C2
56	C	109D566X9030C2
150	F	109D157X9030F2
180	F	109D187X9030F2
220	F	109D227X9030F2
330	T	109D337X9030T2
390	T	109D397X9030T2
470	T	109D477X9030T2
470	K	109D477X9030K2
560	K	109D567X9030K2
50 WVDC @ 85C, 30 WVDC @ 125C		
33	C	109D336X9050C2
120	F	109D127X9050F2
270	T	109D277X9050T2
330	K	109D337X9050K2
60 WVDC @ 85C, 40 WVDC @ 125C		
27	C	109D276X9060C2
68	F	109D686X9060F2
100	F	109D107X9060F2
140	T	109D147X9060T2
220	T	109D227X9060T2
270	K	109D277X9060K2
75 WVDC @ 85C, 50 WVDC @ 125C		
12	C	109D126X9075C2
15	C	109D156X9075C2
22	C	109D226X9075C2
47	F	109D476X9075F2
56	F	109D566X9075F2
82	F	109D826X9075F2
82	T	109D826X9075T2
110	T	109D117X9075T2
180	T	109D187X9075T2
180	K	109D187X9075K2
220	K	109D227X9075K2
100 WVDC @ 85C, 70 WVDC @ 125C		
8.2	C	109D825X9100C2
10	C	109D106X9100C2
33	F	109D336X9100F2
39	F	109D396X9100F2
56	T	109D566X9100T2
68	T	109D686X9100T2
86	K	109D866X9100K2
125 WVDC @ 85C, 85 WVDC @ 125C		
6.8	C	109D685X9125C2
27	F	109D276X9125F2
47	T	109D476X9125T2
56	K	109D566X9125K2
150 WVDC @ 85C, 100 WVDC @ 125C		
1.7	C	109D175X9150C2
3.0	C	109D305X9150C2
5.6	C	109D565X9150C2
6.8	F	109D685X9150F2
11	F	109D116X9150F2
22	F	109D226X9150F2
39	T	109D396X9150T2

ORIGINAL STANDARD RATINGS

µF	Size Code	Cat. No.
6 WVDC @ 85C, 4 WVDC @ 125C		
27	C	109D276X9006C2
30	C	109D306X9006C2
68	C	109D686X9006C2
120	F	109D127X9006F2
140	F	109D147X9006F2
270	F	109D277X9006F2
290	T	109D297X9006T2
330	T	109D337X9006T2
560	T	109D567X9006T2
1200	K	109D128X9006K2*
8 WVDC @ 85C, 5 WVDC @ 125C		
22	C	109D226X9008C2
25	C	109D256X9008C2
56	C	109D566X9008C2
100	F	109D107X9008F2
120	F	109D127X9008F2
220	F	109D227X9008F2
260	T	109D267X9008T2
290	T	109D297X9008T2
430	T	109D437X9008T2
850	K	109D857X9008K2*
10 WVDC @ 85C, 7 WVDC @ 125C		
18	C	109D186X9010C2
20	C	109D206X9010C2
47	C	109D476X9010C2
85	F	109D856X9010F2
100	F	109D107X9010F2
180	F	109D187X9010F2
220	T	109D227X9010T2
250	T	109D257X9010T2
390	T	109D397X9010T2
750	K	109D757X9010K2*
15 WVDC @ 85C, 10 WVDC @ 125C		
13	C	109D136X9015C2
15	C	109D156X9015C2
33	C	109D336X9015C2
55	F	109D556X9015F2
70	F	109D706X9015F2
120	F	109D127X9015F2
150	T	109D157X9015T2
170	T	109D177X9015T2
270	T	109D277X9015T2
540	K	109D547X9015K2*
25 WVDC @ 85C, 15 WVDC @ 125C		
9	C	109D905X9025C2
10	C	109D106X9025C2
22	C	109D226X9025C2
45	F	109D456X9025F2
50	F	109D506X9025F2
100	F	109D107X9025F2
100	T	109D107X9025T2
110	T	109D117X9025T2
180	T	109D187X9025T2
350	K	109D357X9025K2*
30 WVDC @ 85C, 20 WVDC @ 125C		
7	C	109D705X9030C2
8	C	109D805X9030C2
15	C	109D156X9030C2
35	F	109D356X9030F2
40	F	109D406X9030F2
68	F	109D686X9030F2
80	T	109D806X9030T2
100	T	109D107X9030T2
150	T	109D157X9030T2
300	K	109D307X9030K2*
50 WVDC @ 85C, 30 WVDC @ 125C		
4.5	C	109D455X9050C2
5	C	109D505X9050C2
10	C	109D106X9050C2
22	F	109D226X9050F2
25	F	109D256X9050F2
47	F	109D476X9050F2
55	T	109D556X9050T2
60	T	109D606X9050T2
82	T	109D826X9050T2
160	K	109D167X9050K2*
60 WVDC @ 85C, 40 WVDC @ 125C		
3.6	C	109C365X9060C2
4	C	109D405X9060C2
8.2	C	109D825X9060C2
18	F	109D186X9060F2
20	F	109D206X9060F2
39	F	109D396X9060F2
45	T	109D456X9060T2
50	T	109D506X9060T2
68	T	109D686X9060T2
140	K	109D147X9060K2*
75 WVDC @ 85C, 50 WVDC @ 125C		
3	C	109D305X9075C2
3.5	C	109D355X9075C2
6.8	C	109D685X9075C2
13	F	109D136X9075F2
15	F	109D156X9075F2
33	F	109D336X9075F2
35	T	109D356X9075T2
40	T	109D406X9075T2
56	T	109D566X9075T2
110	K	109D117X9075K2*
100 WVDC @ 85C, 70 WVDC @ 125C		
2.5	C	109D255X9100C2
4.7	C	109D475X9100C2
10	F	109D106X9100F2
11	F	109D116X9100F2
22	F	109D226X9100F2
27	T	109D276X9100T2
30	T	109D306X9100T2
43	T	109D436X9100T2
125 WVDC @ 85C, 85 WVDC @ 125C		
1.7	C	109D175X9125C2
3.6	C	109D365X9125C2
9	F	109D905X9125F2
14	F	109D146X9125F2
18	T	109D186X9125T2
25	T	109D256X9125T2
150 WVDC @ 85C, 100 WVDC @ 125C		
14	T	109D146X9150T2
22	T	109D226X9150T2

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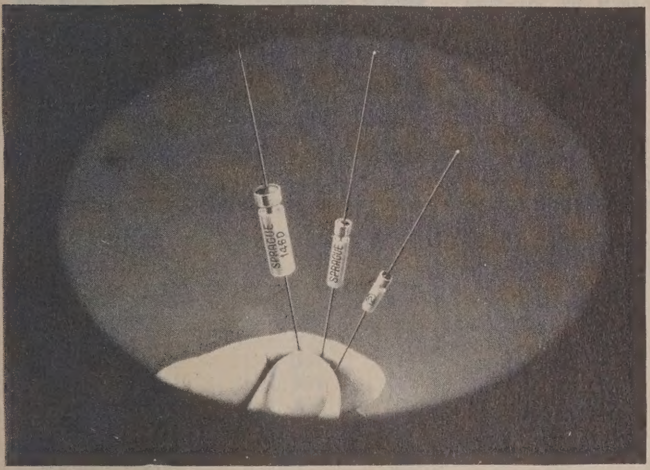
*Previously furnished in "W" case size.

IND-EEM-19A-EFAI

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 146D SINTERED-ANODE TANTALEX® CAPACITORS



- Miniature commercial/industrial tantalum capacitors with reliable elastomer seal for use on printed wiring boards, in packaged circuit modules, and other applications where space is at a premium.
- TFE-fluorocarbon elastomer high-temperature seal with thermo-setting epoxy resin end-fill provides improved mechanical strength.
- Designed for continuous operation over temperature range of −55 C to +85 C.
- Special construction offers outstanding resistance to temperature cycling and provides trouble-free application when flow-soldering to printed wiring boards.
- Excellent stability of all electrical parameters, even after severe high temperature testing (85 C for 1000 hours at rated voltage).
- Metal-encased, with outer plastic-film insulation.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3751.

		Catalog Number	
μF	Dia. x Length	±20% Cap. Tol.	±10% Cap. Tol.
		6 WVDC	
47	.110 x .400	146D476X0006G2	146D476X9006G2
150	.140 x .600	146D157X0006H2	146D157X9006H2
470	.220 x .775	146D477X0006J2	146D477X9006J2
		10 WVDC	
33	.110 x .400	146D336X0010G2	146D336X9010G2
100	.140 x .600	146D107X0010H2	146D107X9010H2
120	.140 x .600	146D127X0010H2	146D127X9010H2
330	.220 x .775	146D337X0010J2	146D337X9010J2
		15 WVDC	
22	.110 x .400	146D226X0015G2	146D226X9015G2
82	.140 x .600	146D826X0015H2	146D826X9015H2
220	.220 x .775	146D227X0015J2	146D227X9015J2
		20 WVDC	
15	.110 x .400	146D156X0020G2	146D156X9020G2
56	.140 x .600	146D566X0020H2	146D566X9020H2
180	.220 x .775	146D187X0020J2	146D187X9020J2
		30 WVDC	
10	.110 x .400	146D106X0030G2	146D106X9030G2
47	.140 x .600	146D476X0030H2	146D476X9030H2
		30 WVDC - (cont.)	
100	.220 x .775	146D107X0030J2	146D107X9030J2
120	.220 x .775	146D127X0030J2	146D127X9030J2
		50 WVDC	
6.8	.110 x .400	146D685X0050G2	146D685X9050G2
27	.140 x .600	146D276X0050H2	146D276X9050H2
82	.220 x .775	146D826X0050J2	146D826X9050J2
		60 WVDC	
1.0	.110 x .400	146D105X0060G2	146D105X9060G2
1.2	.110 x .400	146D125X0060G2	146D125X9060G2
1.5	.110 x .400	146D155X0060G2	146D155X9060G2
1.8	.110 x .400	146D185X0060G2	146D185X9060G2
2.2	.110 x .400	146D225X0060G2	146D225X9060G2
2.7	.110 x .400	146D275X0060G2	146D275X9060G2
3.3	.110 x .400	146D335X0060G2	146D335X9060G2
3.9	.110 x .400	146D395X0060G2	146D395X9060G2
4.7	.110 x .400	146D475X0060G2	146D475X9060G2
5.6	.110 x .400	146D565X0060G2	146D565X9060G2
22	.140 x .600	146D226X0060H2	146D226X9060H2
56	.220 x .775	146D566X0060J2	146D566X9060J2

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IND-EEM-53-EFAI

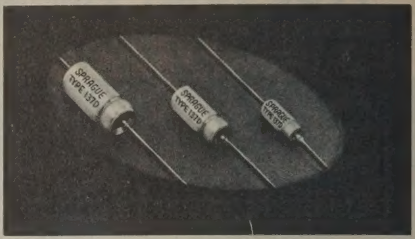
Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 137D HERMETICALLY-SEALED GELLED-ELECTROLYTE SINTERED-ANODE TANTALEX® CAPACITORS

- Glass-to-metal Hermetic Seal Makes Type 137D Capacitors Especially Well Suited For Use in Satellites and Other Space Equipment.
- Gelled-electrolyte For Optimum Performance Characteristics
- High Volumetric Efficiency Results in Space Savings
- Operating Temperature Range of —55C to +175C
- Available in Voltage Ratings From 6 WVDC Through 150 WVDC At 85C With Appropriate Derating For Higher Temperature Operation
- Capacitors Listed Below Have Outer Plastic Insulating Sleeve. For Units with Bare Case, End Catalog Number in 0 Instead of 2
- For Complete Technical Data, See Latest Issue of Sprague Engineering Bulletin Number 3703

Call Your Sprague Industrial Distributor
For Current Quantity Prices



µF	Case Size	Catalog Number*
6 WVDC		
68	C	137D686X0006C2
140	C	137D147X0006C2
270	F	137D277X0006F2
560	F	137D567X0006F2
560	A	137D567X0006A2
560	T	137D567X0006T2
1000	T	137D108X0006T2
1200	W	137D128X0006W2
8 WVDC		
56	C	137D566X0008C2
120	C	137D127X0008C2
220	F	137D227X0008F2
470	F	137D477X0008F2
470	A	137D477X0008A2
470	T	137D477X0008T2
850	T	137D857X0008T2
1000	W	137D108X0008W2
10 WVDC		
39	C	137D396X0010C2
47	C	137D476X0010C2
82	C	137D826X0010C2
100	C	137D107X0010C2
150	F	137D157X0010F2
180	F	137D187X0010F2
330	F	137D337X0010F2
330	A	137D337X0010A2
330	T	137D337X0010T2
390	F	137D397X0010F2
390	A	137D397X0010A2
390	T	137D397X0010T2
600	T	137D607X0010T2
680	W	137D687X0010W2
750	T	137D757X0010T2
820	W	137D827X0010W2
15 WVDC		
33	C	137D336X0015C2
68	C	137D686X0015C2
120	F	137D127X0015F2
270	F	137D277X0015F2
270	A	137D277X0015A2
270	T	137D277X0015T2
540	T	137D547X0015T2
560	W	137D567X0015W2
20 WVDC		
27	C	137D276X0020C2
56	C	137D566X0020C2
100	F	137D107X0020F2
220	F	137D227X0020F2
220	A	137D227X0020A2
220	T	137D227X0020T2
390	T	137D397X0020T2
470	W	137D477X0020W2
25 WVDC		
22	C	137D226X0025C2
47	C	137D476X0025C2
100	F	137D107X0025F2
180	F	137D187X0025F2
180	A	137D187X0025A2
180	T	137D187X0025T2
350	T	137D357X0025T2
390	W	137D397X0025W2
30 WVDC		
18	C	137D186X0030C2
39	C	137D396X0030C2
82	F	137D826X0030F2
150	F	137D157X0030F2
150	A	137D157X0030A2
150	T	137D157X0030T2
300	T	137D307X0030T2
330	W	137D337X0030W2
35 WVDC		
12	C	137D126X0035C2
15	C	137D156X0035C2
27	C	137D276X0035C2
33	C	137D336X0035C2
56	F	137D566X0035F2
68	F	137D686X0035F2
100	F	137D107X0035F2
100	A	137D107X0035A2
100	T	137D107X0035T2
120	F	137D127X0035F2
120	A	137D127X0035A2
120	T	137D127X0035T2
180	T	137D187X0035T2
220	T	137D227X0035T2
220	W	137D227X0035W2
270	W	137D277X0035W2
50 WVDC		
10	C	137D106X0050C2
22	C	137D226X0050C2
47	F	137D476X0050F2
82	F	137D826X0050F2
82	A	137D826X0050A2
82	T	137D826X0050T2
160	T	137D167X0050T2
180	W	137D187X0050W2
60 WVDC		
8.2	C	137D825X0060C2
18	C	137D186X0060C2
39	F	137D396X0060F2
68	F	137D686X0060F2
68	A	137D686X0060A2
68	T	137D686X0060T2
140	T	137D147X0060T2
150	W	137D157X0060W2
75 WVDC		
5.6	C	137D565X0075C2
6.8	C	137D685X0075C2
12	C	137D126X0075C2
15	C	137D156X0075C2
27	F	137D276X0075F2
33	F	137D336X0075F2
47	F	137D476X0075F2
47	A	137D476X0075A2
47	T	137D476X0075T2
56	F	137D566X0075F2
56	A	137D566X0075A2
56	T	137D566X0075T2
82	T	137D826X0075T2
100	W	137D107X0075W2
110	T	137D117X0075T2
120	W	137D127X0075W2
100 WVDC		
3.9	C	137D395X0100C2
4.7	C	137D475X0100C2
15	F	137D156X0100F2
18	F	137D186X0100F2
22	F	137D226X0100F2
33	A	137D336X0100A2
33	T	137D336X0100T2
43	A	137D436X0100A2
43	T	137D436X0100T2
68	W	137D686X0100W2
86	W	137D866X0100W2
125 WVDC		
3.6	C	137D365X0125C2
9.0	F	137D905X0125F2
14	F	137D146X0125F2
18	T	137D186X0125T2
25	T	137D256X0125T2
28	A	137D286X0125A2
56	W	137D566X0125W2
150 WVDC		
1.7	C	137D175X0150C2
3.0	C	137D305X0150C2
6.8	F	137D685X0150F2
11	F	137D116X0150F2
14	T	137D146X0150T2
22	T	137D226X0150T2
22	A	137D226X0150A2
47	W	137D476X0150W2

DIMENSIONS

Case Code	Diam. x Length
C	0.219 x 0.515
F	0.312 x 0.704
A	0.312 x 1.095
T	0.406 x 0.828
W	0.406 x 1.312

*Catalog numbers listed above are for ±20% tolerance capacitors. For units with capacitance tolerance of +20%, —15%, change X0 in middle of catalog number to C2; for +75, —15%, change digits to C7; for ±10%, change digits to X9.

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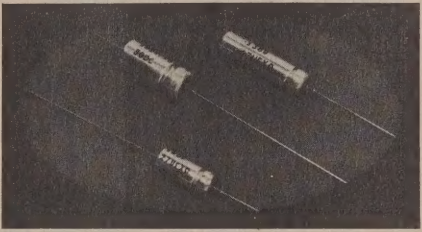
IND-EEM-6A-PRAR

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 138D HERMETICALLY-SEALED GELLED-ELECTROLYTE SINTERED-ANODE TANTALEX® CAPACITORS

- Improved reliability through use of a glass-to-tantalum true hermetic anode seal.
- New construction eliminates all internal lead welds while retaining the strength of conventional internal lead-welded parts.
- Capacitor construction also offers outstanding resistance to extensive temperature cycling.
- Designed to meet or exceed environmental and life test requirements of MIL-C-39006.
- Gelled-electrolyte gives premium performance for all capacitor parameters with respect to frequency and temperature variations.
- Capacitance values ranging from up to 1200 μF at 6 WVDC to 47 μF at 150 WVDC.
- Standard capacitance tolerances, ±20% and ±10%. See (†).
- Rated for 85 C operation, and can be operated up to 125 C with appropriate voltage derating.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3704.



μF	D. x L.	Catalog Number* †
	6 WVDC	
30	.219 x .515	138D306X0006C2
68	.219 x .515	138D686X0006C2
140	.312 x .704	138D147X0006F2
270	.312 x .704	138D277X0006F2
330	.406 x .828	138D337X0006T2
560	.406 x .828	138D567X0006T2
1200	.406 x 1.126	138D128X0006K2
	8 WVDC	
25	.219 x .515	138D256X0008C2
56	.219 x .515	138D566X0008C2
220	.312 x .704	138D227X0008F2
430	.406 x .828	138D437X0008T2
850	.406 x 1.126	138D857X0008K2
	10 WVDC	
20	.219 x .515	138D206X0010C2
47	.219 x .515	138D476X0010C2
100	.312 x .704	138D107X0010F2
180	.312 x .704	138D187X0010F2
250	.406 x .828	138D257X0010T2
390	.406 x .828	138D397X0010T2
750	.406 x 1.126	138D757X0010K2
	15 WVDC	
15	.291 x .515	138D156X0015C2
33	.219 x .515	138D336X0015C2
70	.312 x .704	138D706X0015F2
120	.312 x .704	138D127X0015F2
170	.406 x .828	138D177X0015T2
270	.406 x .828	138D277X0015T2
540	.406 x 1.126	138D547X0015K2
	25 WVDC	
10	.219 x .515	138D106X0025C2
22	.219 x .515	138D226X0025C2
100	.312 x .704	138D107X0025F2
180	.406 x .828	138D187X0025T2
350	.406 x 1.126	138D357X0025K2
	30 WVDC	
8.0	.219 x .515	138D805X0030C2
15	.219 x .515	138D156X0030C2
40	.312 x .704	138D406X0030F2
68	.312 x .704	138D686X0030F2
100	.406 x .828	138D107X0030T2
150	.406 x .828	138D157X0030T2
300	.406 x 1.126	138D307X0030K2

μF	D. x L.	Catalog Number* †
	50 WVDC	
5.0	.219 x .515	138D505X0050C2
10	.219 x .515	138D106X0050C2
25	.312 x .704	138D256X0050F2
47	.312 x .704	138D476X0050F2
60	.406 x .828	138D606X0050T2
82	.406 x .828	138D826X0050T2
160	.406 x 1.126	138D167X0050K2
	60 WVDC	
4.0	.219 x .515	138D405X0060C2
8.2	.219 x .515	138D825X0060C2
20	.312 x .704	138D206X0060F2
39	.312 x .704	138D396X0060F2
50	.406 x .828	138D506X0060T2
68	.406 x .828	138D686X0060T2
140	.406 x 1.126	138D147X0060K2
	75 WVDC	
3.5	.219 x .515	138D355X0075C2
6.8	.219 x .515	138D685X0075C2
15	.312 x .704	138D156X0075F2
33	.312 x .704	138D336X0075F2
40	.406 x .828	138D406X0075T2
56	.406 x .828	138D566X0075T2
110	.406 x 1.126	138D117X0075K2
	100 WVDC	
2.5	.219 x .515	138D255X0100C2
4.7	.219 x .515	138D475X0100C2
11	.312 x .704	138D116X0100F2
22	.312 x .704	138D226X0100F2
30	.406 x .828	138D306X0100T2
43	.406 x .828	138D436X0100T2
86	.406 x 1.126	138D866X0100K2
	125 WVDC	
1.7	.219 x .515	138D175X0125C2
3.6	.219 x .515	138D365X0125C2
9.0	.312 x .704	138D905X0125F2
14	.312 x .704	138D146X0125F2
18	.406 x .828	138D186X0125T2
25	.406 x .828	138D256X0125T2
56	.406 x 1.126	138D566X0125K2
	150 WVDC	
1.7	.219 x .515	138D175X0150C2
3.0	.219 x .515	138D305X0150C2
6.8	.312 x .704	138D685X0150F2
11	.312 x .704	138D116X0150F2
14	.406 x .828	138D146X0150T2
22	.406 x .828	138D226X0150T2
47	.406 x 1.126	138D476X0150K2

*Catalog numbers listed above are for units with outer plastic-film insulating sleeve. For bare case units, change last digit of Cat. No. from "2" to "0" and subtract .032" from diameter and .063" from length. †Capacitors listed above have capacitance tolerance of ±20%. For ±10% units, change "X0" in center of cat. no. to "X9".

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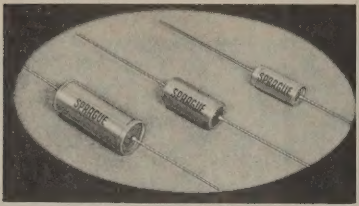
EEM-IND-70-EFAI

Sizes subject to change without notice.

SPRAGUE CAPACITORS

ESTABLISHED RELIABILITY MIL-C-39006
STYLE CLR65 SINTERED-ANODE TANTALUM CAPACITORS



- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- Rated for operation to 85 C (to 125 C with voltage derating.)

SIZE CODE	
A	.188″ D. x .453″ L.
B	.281″ D. x .641″ L.
C	.375″ D. x .766″ L.
D	.375″ D. x 1.062″ L.
E	.375″ D. x 1.250″ L.

ELASTOMER-SEALED CAPACITORS TO MIL-C-39006/9B

			MIL Part No. M39006/09-							
			Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)	
µF	WVDC	Size Code	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
30	6	A	1621	1622	1826	1827	2652	2653	2857	2858
68	6	A	1624	1625	1829	1830	2655	2656	2860	2861
140	6	B	1627	1628	1832	1833	2658	2659	2863	2864
270	6	B	1630	1631	1835	1836	2661	2662	2866	2867
330	6	C	1633	1634	1838	1839	2664	2665	2869	2870
560	6	C	1636	1637	1841	1842	2667	2668	2872	2873
1200	6	D	1639	1640	1844	1845	2670	2671	2875	2876
25	8	A	1641	1642	1846	1847	2672	2673	2877	2878
56	8	A	1644	1645	1849	1850	2675	2676	2880	2881
220	8	B	1647	1648	1852	1853	2678	2679	2883	2884
430	8	C	1650	1651	1855	1856	2681	2682	2886	2887
850	8	D	1653	1654	1858	1859	2684	2685	2889	2890
20	10	A	1655	1656	1860	1861	2686	2687	2891	2892
47	10	A	1658	1659	1863	1864	2689	2690	2894	2895
100	10	B	1661	1662	1866	1867	2692	2693	2897	2898
180	10	B	1664	1665	1869	1870	2695	2696	2900	2901
250	10	C	1667	1668	1872	1873	2698	2699	2903	2904
390	10	C	1670	1671	1875	1876	2701	2702	2906	2907
750	10	D	1673	1674	1878	1879	2704	2705	2909	2910
15	15	A	1675	1676	1880	1881	2706	2707	2911	2912
33	15	A	1678	1679	1883	1884	2709	2710	2914	2915
70	15	B	1681	1682	1886	1887	2712	2713	2917	2918
120	15	B	1684	1685	1889	1890	2715	2716	2920	2921
170	15	C	1687	1688	1892	1893	2718	2719	2923	2924
270	15	C	1690	1691	1895	1896	2721	2722	2926	2927
540	15	D	1693	1694	1898	1899	2724	2725	2929	2930
10	25	A	1695	1696	1900	1901	2726	2727	2931	2932
22	25	A	1698	1699	1903	1904	2729	2730	2934	2935
100	25	B	1701	1702	1906	1907	2732	2733	2937	2938
180	25	C	1704	1705	1909	1910	2735	2736	2940	2941
350	25	D	1707	1708	1912	1913	2738	2739	2943	2944
8	30	A	1709	1710	1914	1915	2740	2741	2945	2946
15	30	A	1712	1713	1917	1918	2743	2744	2948	2949
40	30	B	1715	1716	1920	1921	2746	2747	2951	2952
68	30	B	1718	1719	1923	1924	2749	2750	2954	2955
100	30	C	1721	1722	1926	1927	2752	2753	2957	2958
150	30	C	1724	1725	1929	1930	2755	2756	2960	2961
300	30	D	1727	1728	1932	1933	2758	2759	2963	2964
5	50	A	1729	1730	1934	1935	2760	2761	2965	2966
10	50	A	1732	1733	1937	1938	2763	2764	2968	2969
25	50	B	1735	1736	1940	1941	2766	2767	2971	2972
47	50	B	1738	1739	1943	1944	2769	2770	2974	2975
60	50	C	1741	1742	1946	1947	2772	2773	2977	2978
82	50	C	1744	1745	1949	1950	2775	2776	2980	2981
160	50	D	1747	1748	1952	1953	2778	2779	2983	2984
4	60	A	1749	1750	1954	1955	2780	2781	2985	2986
8.2	60	A	1752	1753	1957	1958	2783	2784	2988	2989
20	60	B	1755	1756	1960	1961	2786	2787	2991	2992
39	60	B	1758	1759	1963	1964	2789	2790	2994	2995
50	60	C	1761	1762	1966	1967	2792	2793	2997	2998
68	60	C	1764	1765	1969	1970	2795	2796	3000	3001
140	60	D	1767	1768	1972	1973	2798	2799	3003	3004
3.5	75	A	1769	1770	1974	1975	2800	2801	3005	3006
6.8	75	A	1772	1773	1977	1978	2803	2804	3008	3009
15	75	B	1775	1776	1980	1981	2806	2807	3011	3012
33	75	B	1778	1779	1983	1984	2809	2810	3014	3015
40	75	C	1781	1782	1986	1987	2812	2813	3017	3018
56	75	C	1784	1785	1989	1990	2815	2816	3020	3021
110	75	D	1787	1788	1992	1993	2818	2819	3023	3024
2.5	100	A	1789	1790	1994	1995	2820	2821	3025	3026
4.7	100	A	1792	1793	1997	1998	2823	2824	3028	3029
11	100	B	1795	1796	2621	2622	2826	2827	3031	3032
22	100	B	1798	1799	2624	2625	2829	2830	3034	3035
30	100	C	1801	1802	2627	2628	2832	2833	3037	3038
43	100	C	1804	1805	2630	2631	2835	2836	3040	3041
86	100	D	1807	1808	2633	2634	2838	2839	3043	3044
1.7	125	A	1809	1810	2635	2636	2840	2841	3045	3046
3.6	125	A	1812	1813	2638	2639	2843	2844	3048	3049
9	125	B	1815	1816	2641	2642	2846	2847	3051	3052
14	125	B	1818	1819	2644	2645	2849	2850	3054	3055
18	125	C	3267	3268	3270	3271	3273	3274	3276	3277
25	125	C	1821	1822	2647	2648	2852	2853	3057	3058
56	125	D	1824	1825	2650	2651	2855	2856	3060	3061

HERMETICALLY-SEALED CAPACITORS TO MIL-C-39006/9B

			MIL Part No. M39006/09-							
			Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)	
µF	WVDC	Size Code	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
30	6	A	4001	4002	4206	4207	4411	4412	4616	4617
68	6	A	4004	4005	4209	4210	4414	4415	4619	4620
140	6	B	4007	4008	4212	4213	4417	4418	4622	4623
270	6	B	4010	4011	4215	4216	4420	4421	4625	4626
330	6	C	4013	4014	4218	4219	4423	4424	4628	4629
560	6	C	4016	4017	4221	4222	4426	4427	4631	4632
1200	6	E	4019	4020	4224	4225	4429	4430	4634	4635
25	8	A	4021	4022	4226	4227	4431	4432	4636	4637
56	8	A	4024	4025	4229	4230	4434	4435	4639	4640
220	8	B	4027	4028	4232	4233	4437	4438	4642	4643
430	8	C	4030	4031	4235	4236	4440	4441	4645	4646
850	8	E	4033	4034	4238	4239	4443	4444	4648	4649
20	10	A	4035	4036	4240	4241	4445	4446	4650	4651
47	10	A	4038	4039	4243	4244	4448	4449	4653	4654
100	10	B	4041	4042	4246	4247	4451	4452	4656	4657
180	10	B	4044	4045	4249	4250	4454	4455	4659	4660
250	10	C	4047	4048	4252	4253	4457	4458	4662	4663
390	10	C	4050	4051	4255	4256	4460	4461	4665	4666
750	10	E	4053	4054	4258	4259	4463	4464	4668	4669
15	15	A	4055	4056	4260	4261	4465	4466	4670	4671
33	15	A	4058	4059	4263	4264	4468	4469	4673	4674
70	15	B	4061	4062	4266	4267	4471	4472	4676	4677
120	15	B	4064	4065	4269	4270	4474	4475	4679	4680
170	15	C	4067	4068	4272	4273	4477	4478	4682	4683

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IND-EEM-75-EPOA

All sizes subject to change without notice

SPRAGUE CAPACITORS

STYLE CLR65 TANTALUM CAPACITORS, continued

MIL Part No. M39006/09-

µF	WVDC	Size Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)	
			Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
270	15	C	4070	4071	4275	4276	4480	4481	4685	4686
540	15	E	4073	4074	4278	4279	4483	4484	4688	4689
10	25	A	4075	4076	4280	4281	4485	4486	4690	4691
22	25	A	4078	4079	4283	4284	4488	4489	4693	4694
100	25	B	4081	4082	4286	4287	4491	4492	4696	4697
180	25	C	4084	4085	4289	4290	4494	4495	4699	4700
350	25	E	4087	4088	4292	4293	4497	4498	4702	4703
8	30	A	4089	4090	4294	4295	4499	4500	4704	4705
15	30	A	4092	4093	4297	4298	4502	4503	4707	4708
40	30	B	4095	4096	4300	4301	4505	4506	4710	4711
68	30	B	4098	4099	4303	4304	4508	4509	4713	4714
100	30	C	4101	4102	4306	4307	4511	4512	4716	4717
150	30	C	4104	4105	4309	4310	4514	4515	4719	4720
300	30	E	4107	4108	4312	4313	4517	4518	4722	4723
5	50	A	4109	4110	4314	4315	4519	4520	4724	4725
10	50	A	4112	4113	4317	4318	4522	4523	4727	4728
25	50	B	4115	4116	4320	4321	4525	4526	4730	4731
47	50	B	4118	4119	4323	4324	4528	4529	4733	4734
60	50	C	4121	4122	4326	4327	4531	4532	4736	4737
82	50	C	4124	4125	4329	4330	4534	4535	4739	4740
160	50	E	4127	4128	4332	4333	4537	4538	4742	4743
4	60	A	4129	4130	4334	4335	4539	4540	4744	4745
8.2	60	A	4132	4133	4337	4338	4542	4543	4747	4748
20	60	B	4135	4136	4340	4341	4545	4546	4750	4751
39	60	B	4138	4139	4343	4344	4548	4549	4753	4754
50	60	C	4141	4142	4346	4347	4551	4552	4756	4757
68	60	C	4144	4145	4349	4350	4554	4555	4759	4760
140	60	E	4147	4148	4352	4353	4557	4558	4762	4763
3.5	75	A	4149	4150	4354	4355	4559	4560	4764	4765
6.8	75	A	4152	4153	4357	4358	4562	4563	4767	4768
15	75	B	4155	4156	4360	4361	4565	4566	4770	4771
33	75	B	4158	4159	4363	4364	4568	4569	4773	4774
40	75	C	4161	4162	4366	4367	4571	4572	4776	4777
56	75	C	4164	4165	4369	4370	4574	4575	4779	4780
110	75	E	4167	4168	4372	4373	4577	4578	4782	4783
2.5	100	A	4169	4170	4374	4375	4579	4580	4784	4785
4.7	100	A	4172	4173	4377	4378	4582	4583	4787	4788
11	100	B	4175	4176	4380	4381	4585	4586	4790	4791
22	100	B	4178	4179	4383	4384	4588	4589	4793	4794
30	100	C	4181	4182	4386	4387	4591	4592	4796	4797
43	100	C	4184	4185	4389	4390	4594	4595	4799	4800
86	100	E	4187	4188	4392	4393	4597	4598	4802	4803
1.7	125	A	4189	4190	4394	4395	4599	4600	4804	4805
3.6	125	A	4192	4193	4397	4398	4602	4603	4807	4808
9	125	B	4195	4196	4400	4401	4605	4606	4810	4811
14	125	B	4198	4199	4403	4404	4608	4609	4813	4814
18	125	C	5026	5027	5029	5030	5032	5033	5035	5036
25	125	C	4201	4202	4406	4407	4611	4612	4816	4817
56	125	E	4204	4205	4409	4410	4614	4615	4819	4820

HERMETICALLY-SEALED CAPACITORS TO MIL-C-39006/9C

MIL Part No. M39006/09-

µF	WVDC	Size Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)	
			Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%	Cap. Tol. ±20%	Cap. Tol. ±10%
30	6	A	6001	6002	6206	6207	6411	6412
68	6	A	6004	6005	6209	6210	6414	6415
140	6	B	6007	6008	6212	6213	6417	6418
270	6	B	6010	6011	6215	6216	6420	6421
330	6	C	6013	6014	6218	6219	6423	6424
560	6	C	6016	6017	6221	6222	6426	6427
1200	6	E	6019	6020	6224	6225	6429	6430
25	8	A	6021	6022	6226	6227	6431	6432
56	8	A	6024	6025	6229	6230	6434	6435
220	8	B	6027	6028	6232	6233	6437	6438
430	8	C	6030	6031	6235	6236	6440	6441
850	8	E	6033	6034	6238	6239	6443	6444
20	10	A	6035	6036	6240	6241	6445	6446
47	10	A	6038	6039	6243	6244	6448	6449
100	10	B	6041	6042	6246	6247	6451	6452
180	10	B	6044	6045	6249	6250	6454	6455
250	10	C	6047	6048	6252	6253	6457	6458
390	10	C	6050	6051	6255	6256	6460	6461
750	10	E	6053	6054	6258	6259	6463	6464
15	15	A	6055	6056	6260	6261	6465	6466
33	15	A	6058	6059	6263	6264	6468	6469
70	15	B	6061	6062	6266	6267	6471	6472
120	15	B	6064	6065	6269	6270	6474	6475
170	15	C	6067	6068	6272	6273	6477	6478
270	15	C	6070	6071	6275	6276	6480	6481
540	15	E	6073	6074	6278	6279	6483	6484
10	25	A	6075	6076	6280	6281	6485	6486
22	25	A	6078	6079	6283	6284	6488	6489
100	25	B	6081	6082	6286	6287	6491	6492
180	25	C	6084	6085	6289	6290	6494	6495
350	25	E	6087	6088	6292	6293	6497	6498
8	30	A	6089	6090	6294	6295	6499	6500
15	30	A	6092	6093	6297	6298	6502	6503
40	30	B	6095	6096	6300	6301	6505	6506
68	30	B	6098	6099	6303	6304	6508	6509
100	30	C	6101	6102	6306	6307	6511	6512
150	30	C	6104	6105	6309	6310	6514	6515
300	30	E	6107	6108	6312	6313	6517	6518
5	50	A	6109	6110	6314	6315	6519	6520
10	50	A	6112	6113	6317	6318	6522	6523
25	50	B	6115	6116	6320	6321	6525	6526
47	50	B	6118	6119	6323	6324	6528	6529
60	50	C	6121	6122	6326	6327	6531	6532
82	50	C	6124	6125	6329	6330	6534	6535
160	50	E	6127	6128	6332	6333	6537	6538
4	60	A	6129	6130	6334	6335	6539	6540
8.2	60	A	6132	6133	6337	6338	6542	6543
20	60	B	6135	6136	6340	6341	6545	6546
39	60	B	6138	6139	6343	6344	6548	6549
50	60	C	6141	6142	6346	6347	6551	6552
68	60	C	6144	6145	6349	6350	6554	6555
140	60	E	6147	6148	6352	6353	6557	6558
3.5	75	A	6149	6150	6354	6355	6559	6560
6.8	75	A	6152	6153	6357	6358	6562	6563
15	75	B	6155	6156	6360	6361	6565	6566
33	75	B	6158	6159	6363	6364	6568	6569
40	75	C	6161	6162	6366	6367	6571	6572
56	75	C	6164	6165	6369	6370	6574	6575
110	75	E	6167	6168	6372	6373	6577	6578
2.5	100	A	6169	6170	6374	6375	6579	6580
4.7	100	A	6172	6173	6377	6378	6582	6583
11	100	B	6175	6176	6380	6381	6585	6586
22	100	B	6178	6179	6383	6384	6588	6589
30	100	C	6181	6182	6386	6387	6591	6592
43	100	C	6184	6185	6389	6390	6594	6595
86	100	E	6187	6188	6392	6393	6597	6598
1.7	125	A	6189	6190	6394	6395	6599	6600
3.6	125	A	6192	6193	6397	6398	6602	6603
9	125	B	6195	6196	6400	6401	6605	6606
14	125	B	6198	6199	6403	6404	6608	6609
18	125	C	6201	6202	6406	6407	6611	6612
25	125	C	6204	6205	6409	6410	6614	6615
56	125	E	7027	7028	7030	7031	7033	7034

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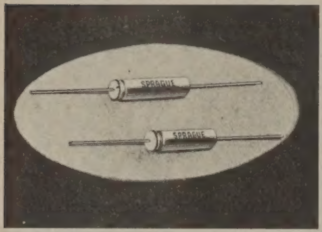
. IND-EEM-76-EPAO

All sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE TE LITTL-LYTIC® ELECTROLYTICS



- Compare! These ultra-small capacitors will withstand a 2000 hr. life test at rated voltage and maximum operating temperature of 105 C.
- Extremely low d-c leakage current, low dissipation factor, high capacitance stability, even after severe high temperature shelf testing.
- Proven dependable performance in industrial as well as entertainment equipment with either transistor or modified electron-tube circuits.
- All terminal connections are welded, eliminating possibility of "open" or intermittent contacts occasionally found in pressure joints of conventional capacitors.
- Ultra-low leakage current
- Metal-encased, with clear plastic outer insulating sleeves.
- For complete technical data, see latest issue of Sprague Engineering Bulletin 3150.

µF	D. x L.	Sprague Products Cat. No.	Sprague O.E.M. Part. No.
		3 WVDC	
1	.260 x .536	TE-1050	30D105G003BA9
2	.260 x .536	TE-1051	30D205G003BA9
3	.260 x .536	TE-1052	30D305G003BA9
4	.260 x .536	TE-1052.1	30D405G003BA9
5	.260 x .536	TE-1052.2	30D505G003BA9
6	.260 x .536	TE-1052.3	30D605G003BA9
8	.260 x .536	TE-1052.5	30D805G003BA9
10	.260 x .536	TE-1053	30D106G003BA9
15	.260 x .536	TE-1053.5	30D156G003BA9
20	.260 x .536	TE-1054	30D206G003BA9
25	.260 x .536	TE-1055	30D256G003BA9
30	.260 x .536	TE-1055.5	30D306G003BA9
50	.260 x .723	TE-1058	30D506G003BB9
65	.260 x .723	TE-1058.5	30D656G003BB9
75	.322 x .723	TE-1059	30D756G003CB9
100	.322 x .723	TE-1059.5	30D107G003CB9
130	.322 x .723	TE-1060.1	30D137G003CB9
150	.322 x .848	TE-1061	30D157G003CC9
200	.322 x .848	TE-1064	30D207G003CC9
250	.385 x .848	TE-1065	30D257G003DC9
300	.385 x .848	TE-1066	30D307G003DC9
400	.385 x .973	TE-1067	30D407G003DD9
500	.385 x 1.286	TE-1068	30D507G003DF9
600	.385 x 1.286	TE-1069.1	30D607G003DF9
800	.385 x 1.536	TE-1070.1	30D807G003DH9
		6 WVDC	
1	.260 x .536	TE-1080	30D105G006BA9
2	.260 x .536	TE-1081	30D205G006BA9
3	.260 x .536	TE-1082	30D305G006BA9
4	.260 x .536	TE-1083	30D405G006BA9
5	.260 x .536	TE-1084	30D505G006BA9
6	.260 x .536	TE-1085	30D605G006BA9
8	.260 x .536	TE-1086	30D805G006BA9
10	.260 x .536	TE-1087	30D106G006BA9
15	.260 x .536	TE-1089	30D156G006BA9
20	.260 x .536	TE-1090	30D206G006BA9
25	.260 x .723	TE-1091	30D256G006BB9
35	.260 x .723	TE-1093	30D356G006BB9
50	.260 x .723	TE-1100	30D506G006BB9
75	.322 x .723	TE-1101.5	30D756G006CB9
90	.322 x .723	TE-1101.7	30D906G006CB9
100	.322 x .848	TE-1102	30D107G006CC9
140	.322 x .848	TE-1102.5	30D147G006CC9
150	.385 x .848	TE-1103	30D157G006DC9
200	.385 x .848	TE-1104	30D207G006DC9
250	.385 x .973	TE-1105	30D257G006DD9
300	.385 x .973	TE-1106	30D307G006DD9
400	.385 x 1.286	TE-1107	30D407G006DF9
500	.385 x 1.536	TE-1107.5	30D507G006DH9
600	.385 x 1.536	TE-1108.5	30D607G006DH9

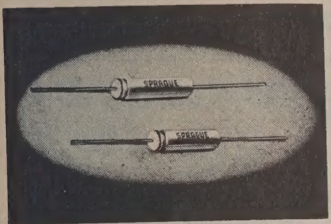
µF	D. x L.	Sprague Products Cat. No.	Sprague O.E.M. Part. No.
		12 WVDC	
1	.260 x .536	TE-1120	30D105G012BA9
2	.260 x .536	TE-1121	30D205G012BA9
3	.260 x .536	TE-1122	30D305G012BA9
4	.260 x .536	TE-1123	30D405G012BA9
5	.260 x .536	TE-1127	30D505G012BA9
6	.260 x .536	TE-1127.1	30D605G012BA9
8	.260 x .536	TE-1127.3	30D805G012BA9
10	.260 x .536	TE-1128	30D106G012BA9
15	.260 x .536	TE-1129	30D156G012BA9
20	.260 x .723	TE-1130	30D206G012BB9
25	.260 x .723	TE-1131	30D256G012BB9
30	.260 x .723	TE-1132.1	30D306G012BB9
50	.322 x .723	TE-1133	30D506G012CB9
60	.322 x .723	TE-1133.5	30D606G012CB9
75	.322 x .848	TE-1134	30D756G012CC9
90	.385 x .723	TE-1134.5	30D906G012DB9
100	.322 x .848	TE-1135	30D107G012CC9
140	.385 x .848	TE-1135.5	30D147G012DC9
150	.385 x .973	TE-1136	30D157G012DD9
190	.385 x .973	TE-1136.5	30D197G012DD9
200	.385 x 1.286	TE-1137	30D207G012DF9
250	.385 x 1.286	TE-1138	30D257G012DF9
290	.385 x 1.286	TE-1139	30D297G012DF9
390	.385 x 1.536	TE-1140	30D397G012DH9
		16 WVDC	
1	.260 x .536	TE-1148	30D105G016BA9
2	.260 x .536	TE-1149	30D205G016BA9
3	.260 x .536	TE-1150	30D305G016BA9
4	.260 x .536	TE-1151	30D405G016BA9
5	.260 x .536	TE-1152	30D505G016BA9
6	.260 x .536	TE-1153	30D605G016BA9
8	.260 x .536	TE-1154	30D805G016BA9
10	.260 x .536	TE-1155	30D106G016BA9
15	.260 x .723	TE-1156	30D156G016BB9
20	.260 x .723	TE-1157	30D206G016BB9
25	.260 x .723	TE-1157.1	30D256G016BB9
30	.322 x .723	TE-1158	30D306G016CB9
35	.322 x .723	TE-1159	30D356G016CB9
50	.322 x .723	TE-1160	30D506G016CB9
75	.322 x .848	TE-1161	30D756G016CC9
85	.385 x .723	TE-1161.5	30D856G016DB9
90	.322 x .848	TE-1161.7	30D906G016CC9
100	.385 x .848	TE-1162	30D107G016DC9
130	.385 x .848	TE-1162.5	30D137G016DC9
150	.385 x .973	TE-1163	30D157G016DD9
180	.385 x .973	TE-1163.7	30D187G016DD9
200	.385 x 1.286	TE-1164	30D207G016DF9
250	.385 x 1.286	TE-1164.5	30D257G016DF9
300	.385 x 1.536	TE-1165.5	30D307G016DH9
350	.385 x 1.536	TE-1166	30D357G016DH9

µF	D. x L.	Sprague Products Cat. No.	Sprague O.E.M. Part. No.
		25 WVDC	
1	.260 x .536	TE-1200	30D105G025BA9
2	.260 x .536	TE-1201	30D205G025BA9
3	.260 x .536	TE-1201.1	30D305G025BA9
4	.260 x .536	TE-1201.2	30D405G025BA9
5	.260 x .536	TE-1202	30D505G025BA9
6	.260 x .536	TE-1203	30D605G025BA9
8	.260 x .536	TE-1203.5	30D805G025BA9
10	.260 x .723	TE-1204	30D106G025BB9
15	.260 x .723	TE-1205	30D156G025BB9
20	.322 x .723	TE-1206	30D206G025CB9
25	.322 x .723	TE-1207	30D256G025CB9
30	.322 x .723	TE-1207.5	30D306G025CB9
35	.322 x .723	TE-1208	30D356G025CB9
50	.322 x .848	TE-1209	30D506G025CC9
75	.385 x .848	TE-1210	30D756G025DC9
100	.385 x .973	TE-1211	30D107G025DD9
150	.385 x 1.286	TE-1212	30D157G025DF9
200	.385 x 1.536	TE-1213	30D207G025DH9
		50 WVDC	
1	.260 x .536	TE-1300	30D105G050BA9
2	.260 x .536	TE-1301	30D205G050BA9
3	.260 x .536	TE-1302	30D305G050BA9
4	.260 x .536	TE-1302.1	30D405G050BA9
5	.260 x .723	TE-1303	30D505G050BB9
6	.260 x .723	TE-1303.1	30D605G050BB9
8	.260 x .723	TE-1303.3	30D805G050BB9
10	.322 x .723	TE-1304	30D106G050CB9
15	.322 x .723	TE-1304.2	30D156G050CB9
20	.322 x .848	TE-1305	30D206G050CC9
25	.322 x .848	TE-1305.5	30D256G050CC9
35	.385 x .848	TE-1306	30D356G050DC9
50	.385 x .973	TE-1307	30D506G050DD9
75	.385 x 1.286	TE-1308	30D756G050DF9
100	.385 x 1.536	TE-1309	30D107G050DH9
		100 WVDC	
1	.260 x .536	TE-1400	30D105F100BA9
2	.260 x .723	TE-1401	30D205F100BB9
3	.322 x .723	TE-1402	30D305F100CB9
4	.322 x .723	TE-1403	30D405F100CB9
5	.322 x .848	TE-1404	30D505F100CC9
6	.322 x .848	TE-1405	30D605F100CC9
8	.385 x .848	TE-1406	30D805F100DC9
10	.385 x .848	TE-1407	30D106F100DC9
15	.385 x .973	TE-1408	30D156F100DD9
20	.385 x 1.286	TE-1409	30D206F100DF9
25	.385 x 1.536	TE-1410	30D256F100DH9
30	.385 x 1.536	TE-1411	30D306F100DH9
		150 WVDC	
1	.260 x .536	TE-1500	30D105F150BA9
2	.260 x .723	TE-1501	30D205F150BB9
3	.322 x .723	TE-1502	30D305F150CB9
4	.322 x .848	TE-1503	30D405F150CC9
5	.322 x .848	TE-1504	30D505F150CC9
6	.385 x .848	TE-1505	30D605F150DC9
7	.385 x .848	TE-1505.5	30D705F150DC9
8	.385 x .848	TE-1506	30D805F150DC9
10	.385 x .973	TE-1507	30D106F150DD9
15	.385 x 1.286	TE-1508.1	30D156F150DF9
20	.385 x 1.536	TE-1509	30D206F150DH9

CALL YOUR SPRAGUE INDUSTRIAL DISTRIBUTOR FOR CURRENT QUANTITY PRICES

SPRAGUE CAPACITORS

TYPE 500D MINIATURE METAL-CASE ALUMINUM 'LYTICS



- Industrial quality at moderate prices.
- Excellent low Temperature operation
- All-welded construction – no pressure joints to cause open or intermittent circuits.
- Withstand high surge voltages
- Long shelf life, extremely low leakage current
- Will withstand 1000 hr. life test at rated voltage and 85 C.
- High capacitance in ultra-small physical size
- Furnished with plastic outer insulating sleeves
- For complete technical data, see latest issue of Sprague Engineering Bulletin 3149.

0-3 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G003BA7
2	.260 x .536	500D205G003BA7
3	.260 x .536	500D305G003BA7
4	.260 x .536	500D405G003BA7
5	.260 x .536	500D505G003BA7
6	.260 x .536	500D605G003BA7
8	.260 x .536	500D805G003BA7
10	.260 x .536	500D106G003BA7
15	.260 x .536	500D156G003BA7
20	.260 x .536	500D206G003BA7
25	.260 x .536	500D256G003BA7
30	.260 x .536	500D306G003BA7
50	.260 x .723	500D506G003BB7
65	.260 x .723	500D656G003BB7
75	.322 x .723	500D756G003CB7
100	.322 x .723	500D107G003CB7
130	.322 x .723	500D137G003CB7
150	.322 x .848	500D157G003CC7
200	.322 x .848	500D207G003CC7
250	.385 x .848	500D257G003DC7
300	.385 x .848	500D307G003DC7
400	.385 x .973	500D407G003DD7
500	.385 x 1.286	500D507G003DF7
600	.385 x 1.286	500D607G003DF7
800	.385 x 1.536	500D807G003DH7
900	.448 x 1.286	500D907G003EF7
1000	.448 x 1.536	500D108G003EH7
1200	.448 x 1.536	500D128G003EH7
1500	.500 x 1.547	500D158G003FH7
1800	.500 x 1.547	500D188G003FH7
2000	.500 x 1.547	500D208G003FH7
2200	.500 x 1.797	500D228G003FK7
2500	.500 x 1.797	500D258G003FK7

0-6 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G006BA7
2	.260 x .536	500D205G006BA7
3	.260 x .536	500D305G006BA7
4	.260 x .536	500D405G006BA7
5	.260 x .536	500D505G006BA7
6	.260 x .536	500D605G006BA7
8	.260 x .536	500D805G006BA7
10	.260 x .536	500D106G006BA7
15	.260 x .536	500D156G006BA7
20	.260 x .536	500D206G006BA7
25	.260 x .723	500D256G006BB7
35	.260 x .723	500D356G006BB7
50	.260 x .723	500D506G006BB7
68	.260 x .723	500D686H006BB7
75	.322 x .723	500D756G006CB7
90	.322 x .723	500D906G006CB7
100	.322 x .848	500D107G006CC7
100	See 0-16 WVDC Listing	
140	.322 x .848	500D147G006CC7
150	.385 x .848	500D157G006DC7
150	.322 x .723	500D157H006CB7
200	.385 x .848	500D207G006DC7
220	.322 x .848	500D227H006CC7
250	.385 x .973	500D257G006DD7
300	.385 x .973	500D307G006DD7
330	.385 x .848	500D337H006DC7
400	.385 x 1.286	500D407G006DF7
470	.385 x .973	500D477H006DD7
500	.385 x 1.536	500D507G006DH7
600	.385 x 1.536	500D607G006DH7
680	.385 x 1.286	500D687H006DF7
700	.448 x 1.286	500D707G006EF7
800	.448 x 1.536	500D807G006EH7
950	.448 x 1.536	500D957G006EH7
1000	.500 x 1.297	500D108G006FF7
1000	.385 x 1.536	500D108H006DH7
1200	.500 x 1.547	500D128G006FH7
1500	.500 x 1.547	500D158G006FH7
1500	.448 x 1.536	500D158H006EH7
1800	.500 x 1.797	500D188G006FK7
2000	.500 x 1.797	500D208G006FK7
2200	.500 x 1.797	500D228H006FK7

0-12 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G012BA7
2	.260 x .536	500D205G012BA7
3	.260 x .536	500D305G012BA7
4	.260 x .536	500D405G012BA7
5	.260 x .536	500D505G012BA7
6	.260 x .536	500D605G012BA7
8	.260 x .536	500D805G012BA7
10	.260 x .536	500D106G012BA7
15	.260 x .536	500D156G012BA7
20	.260 x .723	500D206G012BB7
25	.260 x .723	500D256G012BB7
30	.260 x .723	500D306G012BB7
50	.322 x .723	500D506G012CB7
60	.322 x .723	500D606G012CB7
75	.322 x .848	500D756G012CC7
90	.385 x .723	500D906G012DB7
100	.322 x .848	500D107G012CC7
140	.385 x .848	500D147G012DC7
150	.385 x .973	500D157G012DD7
150	See 0-16 WVDC Listing	
190	.385 x .973	500D197G012DD7
200	.385 x 1.286	500D207G012DF7
220	See 0-16 WVDC Listing	
250	.385 x 1.286	500D257G012DF7
290	.385 x 1.286	500D297G012DF7
390	.385 x 1.536	500D397G012DH7
400	.448 x 1.286	500D407G012EF7
450	.448 x 1.286	500D457G012EF7
500	.448 x 1.536	500D507G012EH7
600	.448 x 1.536	500D607G012EH7
680	See 0-16 WVDC Listing	
800	.500 x 1.547	500D807G012FH7
1000	.500 x 1.797	500D108G012FK7
1000	See 0-16 WVDC Listing	
1200	.500 x 1.797	500D128G012FK7

0-16 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G016BA7
2	.260 x .536	500D205G016BA7
3	.260 x .536	500D305G016BA7
4	.260 x .536	500D405G016BA7
5	.260 x .536	500D505G016BA7
6	.260 x .536	500D605G016BA7
8	.260 x .536	500D805G016BA7
10	.260 x .536	500D106G016BA7
15	.260 x .723	500D156G016BB7
20	.260 x .723	500D206G016BB7
22	.260 x .536	500D226H016BA7
25	.260 x .723	500D256G016BB7
30	.322 x .723	500D306G016CB7
35	.322 x .723	500D356G016CB7
47	.260 x .723	500D476H016BB7
50	.322 x .723	500D506G016CB7
75	.322 x .848	500D756G016CC7
85	.385 x .723	500D856G016DB7
90	.322 x .848	500D906G016CC7
100	.385 x .848	500D107G016DC7
100	.322 x .723	500D107H016CB7
130	.385 x .848	500D137G016DC7
150	.385 x .973	500D157G016DD7
150	.322 x .848	500D157H016CC7
180	.385 x .973	500D187G016DD7
200	.385 x 1.286	500D207G016DF7
220	.385 x .848	500D227H016DC7
250	.385 x 1.286	500D257G016DF7
300	.385 x 1.536	500D307G016DH7
330	.385 x .973	500D337H016DD7
350	.385 x 1.536	500D357G016DH7
400	.448 x 1.286	500D407G016EF7
450	.448 x 1.536	500D457G016EH7
470	.385 x 1.286	500D477H016DF7
500	.448 x 1.536	500D507G016EH7
600	.448 x 1.536	500D607G016EH7
680	.385 x 1.536	500D687H016DH7
800	.500 x 1.547	500D807G016FH7
1000	.500 x 1.797	500D108G016FK7
1000	.448 x 1.536	500D108H016EH7
1200	.500 x 1.547	500D128G016FK7
1500	.500 x 1.547	500D158H016FK7

0-25 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G025BA7
2	.260 x .536	500D205G025BA7
3	.260 x .536	500D305G025BA7
4	.260 x .536	500D405G025BA7
5	.260 x .536	500D505G025BA7
6	.260 x .536	500D605G025BA7
8	.260 x .536	500D805G025BA7
10	.260 x .723	500D106G025BB7
15	.260 x .723	500D156G025BB7
15	.260 x .536	500D156H025BA7
20	.322 x .723	500D206G025CB7
25	.322 x .723	500D256G025CB7
30	.322 x .723	500D306G025CB7
33	.260 x .723	500D336H025BB7
35	.322 x .723	500D356G025CB7
50	.322 x .848	500D506G025CC7
68	.322 x .723	500D686H025CB7
75	.385 x .848	500D756G025DC7
100	.385 x .973	500D107G025DD7
100	.322 x .848	500D107H025CC7
150	.385 x 1.286	500D157G025DF7
150	.385 x .848	500D157H025DC7
200	.385 x 1.536	500D207G025DH7
220	.385 x .973	500D227H025DD7
250	.448 x 1.286	500D257G025EF7
300	.448 x 1.536	500D307G025EH7
330	.385 x 1.286	500D337H025DF7
350	.448 x 1.536	500D357G025EH7
400	.500 x 1.286	500D407G025FF7
450	.500 x 1.547	500D457G025FH7
470	See 0-35 WVDC Listing	
500	.500 x 1.547	500D507G025FH7
600	.500 x 1.547	500D607G025FK7
680	.448 x 1.536	500D687H025EH7
1000	.500 x 1.547	500D108H025FK7

0-35 WVDC

µF	D. x L.	Cat. No.
10	.260 x .536	500D106H035BA7
22	.260 x .723	500D226H035BB7
47	.322 x .723	500D476H035CB7
68	.322 x .848	500D686H035CC7
150	.385 x .973	500D157H035DD7
220	.385 x 1.286	500D227H035DF7
330	See 0-50 WVDC Listing	
470	.448 x 1.536	500D477H035EH7
680	.500 x 1.547	500D687H035FK7

0-50 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105G050BA7
2	.260 x .536	500D205G050BA7
3	.260 x .536	500D305G050BA7
3.3	.260 x .536	500D335H050BA7
4	.260 x .536	500D405G050BA7
4.7	.260 x .536	500D475H050BA7
5	.260 x .723	500D505G050BB7
6	.260 x .723	500D605G050BB7
6.8	.260 x .536	500D685H050BA7
8	.260 x .723	500D805G050BB7
10	.322 x .723	500D106G050CB7
10	.260 x .723	500D106H050BB7
15	.322 x .723	500D156G050CB7
15	.260 x .723	500D156H050BB7
20	.322 x .848	500D206G050CC7
22	.322 x .723	500D226H050CB7
25	.322 x .848	500D256G050CC7
33	.322 x .848	500D336H050CC7
35	.385 x .848	500D356G050DC7
47	.322 x .848	500D476H050CC7
50	.385 x .973	500D506G050DD7
68	.385 x .848	500D686H050DC7
75	.385 x 1.286	500D756G050DF7
100	.385 x 1.536	500D107G050DH7
100	.385 x .973	500D107H050DD7
120	.448 x 1.286	500D127G050EF7
150	.448 x 1.536	500D157G050EH7
150	.385 x 1.286	500D157H050DF7
200	.500 x 1.297	500D207G050FF7
220	.385 x 1.536	500D227H050DH7
250	.500 x 1.297	500D257G050FF7
300	.500 x 1.536	500D307G050FH7
330	.448 x 1.536	500D337H050EH7
350	.500 x 1.547	500D357G050FK7
400	.500 x 1.547	500D407G050FK7
470	.500 x 1.547	500D477H050FK7

0-63 WVDC

µF	D. x L.	Cat. No.
1.0	.260 x .536	500D105H063BA7
1.5	.260 x .536	500D155H063BA7
2.2	.260 x .536	500D225H063BA7
3.3	.260 x .723	500D335H063BB7
4.7	.260 x .723	500D475H063BB7
6.8	.260 x .723	500D685H063BB7
10	.322 x .723	500D106H063CB7
15	.322 x .723	500D156H063CB7
22	.322 x .848	500D226H063CC7
33	.322 x .848	500D336H063CC7
47	.385 x .848	500D476H063DC7
68	.385 x 1.286	500D686H063DF7
100	.385 x 1.536	500D107H063DH7
150	.448 x 1.286	500D157H063EF7
220	.500 x 1.547	500D227H063FH7
330	.500 x 1.797	500D337H063FK7

0-100 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105F100BA7
2	.260 x .723	500D205F100BB7
3	.322 x .723	500D305F100CB7
4	.322 x .723	500D405F100CB7
5	.322 x .848	500D505F100CC7
6	.322 x .848	500D605F100CC7
8	.385 x .848	500D805F100DC7
10	.385 x .848	500D106F100DC7
15	.385 x .973	500D156F100DD7
20	.385 x 1.286	500D206F100DF7
25	.385 x 1.536	500D256F100DH7
30	.385 x 1.536	500D306F100DH7
40	.448 x 1.536	500D406F100EH7
50	.500 x 1.547	500D506F100FH7
60	.500 x 1.547	500D606F100FH7
75	.500 x 1.797	500D756F100FK7

0-150 WVDC

µF	D. x L.	Cat. No.
1	.260 x .536	500D105F150BA7
2	.260 x .723	500D205F150BB7
3	.322 x .723	500D305F150CB7
4	.322 x .848	500D405F150CC7
5	.322 x .848	500D505F150CC7
6	.385 x .848	500D605F150DC7
7	.385 x .848	500D705F150DC7

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IND-EEM-14B-EIAT

All sizes subject to change without notice.

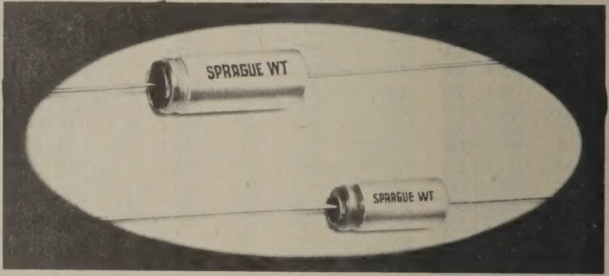
SPRAGUE CAPACITORS

TYPE 500D ALUMINUM ELECTROLYTICS, continued

µF	D. x L.	Cat. No.
8	.385 x .848	500D805F150DC7
10	.385 x .973	500D106F150DD7
15	.385 x 1.286	500D156F150DF7
20	.385 x 1.536	500D206F150DH7
25	.448 x 1.286	500D256F150EF7
30	.448 x 1.536	500D306F150EH7
35	.500 x 1.547	500D356F150FH7
40	.500 x 1.547	500D406F150FH7
50	.500 x 1.797	500D506F150FK7
	0-200 WVDC	
1	.260 x .723	500D105F200BB7
2	.322 x .723	500D205F200CB7
3	.322 x .848	500D305F200CC7
4	.385 x .848	500D405F200DC7
5	.385 x .848	500D505F200DC7
6	.385 x .973	500D605F200DD7
8	.385 x 1.286	500D805F200DF7
10	.385 x 1.286	500D106F200DF7
15	.448 x 1.286	500D156F200EF7
20	.448 x 1.536	500D206F200EH7
25	.500 x 1.547	500D256F200FH7
30	.500 x 1.797	500D306F200FK7
	0-250 WVDC	
1	.322 x .723	500D105F250CB7
2	.385 x .723	500D205F250DB7
3	.385 x .848	500D305F250DC7
4	.385 x .973	500D405F250DD7
5	.385 x 1.286	500D505F250DF7
6	.385 x 1.286	500D605F250DF7
8	.385 x 1.536	500D805F250DH7
10	.448 x 1.286	500D106F250EF7
12	.448 x 1.536	500D126F250EH7
15	.500 x 1.547	500D156F250FH7
20	.500 x 1.797	500D206F250FK7
	0-300 WVDC	
1	.322 x .723	500D105F300CB7
2	.385 x .848	500D205F300DC7
3	.385 x .973	500D305F300DD7
4	.385 x 1.286	500D405F300DF7
5	.385 x 1.286	500D505F300DF7
6	.385 x 1.536	500D605F300DH7
8	.448 x 1.536	500D805F300EH7
10	.448 x 1.536	500D106F300EH7
12	.500 x 1.547	500D126F300FH7
15	.500 x 1.547	500D156F300FH7
20	.500 x 1.797	500D206F300FK7
	0-350 WVDC	
1	.322 x .848	500D105F350CC7
2	.385 x .848	500D205F350DC7
3	.385 x .973	500D305F350DD7
4	.385 x 1.286	500D405F350DF7
5	.385 x 1.536	500D505F350DH7
6	.385 x 1.536	500D605F350DH7
8	.448 x 1.536	500D805F350EH7
10	.500 x 1.547	500D106F350FH7
12	.500 x 1.547	500D126F350FH7
15	.500 x 1.797	500D156F350FK7
	0-400 WVDC	
1	.385 x .848	500D105F400DC7
2	.385 x 1.286	500D205F400DF7
3	.385 x 1.536	500D305F400DH7
4	.448 x 1.286	500D405F400EF7
5	.448 x 1.536	500D505F400EH7
6	.500 x 1.286	500D605F400FF7
8	.500 x 1.547	500D805F400FH7
10	.500 x 1.797	500D106F400FK7
12	.500 x 1.797	500D126F400FK7
	0-450 WVDC	
1	.385 x .848	500D105F450DC7
2	.385 x 1.286	500D205F450DF7
3	.448 x 1.286	500D305F450EF7
4	.448 x 1.536	500D405F450EH7
5	.500 x 1.286	500D505F450FF7
6	.500 x 1.547	500D605F450FH7
8	.500 x 1.797	500D805F450FK7
10	.500 x 1.797	500D106F450FK7

TYPE WH11D AXIAL-LEAD ECONOMY ELECTROLYTICS

- Made in Hong Kong by Sprague World Trade Corp.
- Operating temperature range, −20 C to +85 C.
- All-welded construction – no pressure joints to cause open or intermittent circuits.
- Low leakage current – means minimum drain and longer battery life in bypass circuits.
- Also excelient as coupling capacitors.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3148.



µF	D. x L.	Cat. No.
	3 WVDC, 4 V SURGE	
25	.260 x .536	WH11D256G003Y
65	.260 x .723	WH11D656G003A
100	.322 x .723	WH11D107G003X
120	.322 x .723	WH11D127G003X
150	.385 x .723	WH11D157G003C
200	.385 x .723	WH11D207G003C
350	.385 x .973	WH11D357G003E
400	.385 x .973	WH11D407G003E
500	.385 x 1.286	WH11D507G003F
600	.385 x 1.286	WH11D607G003F
800	.385 x 1.536	WH11D807G003G
1000	.465 x 1.286	WH11D108G003K
1300	.465 x 1.536	WH11D138G003M
2000	.510 x 1.536	WH11D208G003R
2500	.510 x 1.786	WH11D258G003S
	6 WVDC, 8 V SURGE	
20	.260 x .536	WH11D206G006Y
50	.260 x .723	WH11D506G006A
75	.322 x .723	WH11D756G006X
120	.385 x .723	WH11D127G006C
250	.385 x .973	WH11D257G006E
300	.385 x .973	WH11D307G006E
350	.385 x 1.286	WH11D357G006F
400	.385 x 1.286	WH11D407G006F
500	.385 x 1.536	WH11D507G006G
600	.385 x 1.536	WH11D607G006G
700	.465 x 1.286	WH11D707G006K
800	.465 x 1.536	WH11D807G006M
950	.465 x 1.536	WH11D957G006M
1000	.510 x 1.286	WH11D108G006P
1500	.510 x 1.536	WH11D158G006R
2000	.510 x 1.786	WH11D208G006S
	12 WVDC, 15 V SURGE	
15	.260 x .536	WH11D156G012Y
35	.260 x .723	WH11D356G012A
65	.322 x .723	WH11D656G012X
100	.385 x .723	WH11D107G012C
200	.385 x .973	WH11D207G012E
300	.385 x 1.286	WH11D307G012F
400	.385 x 1.536	WH11D407G012G
500	.465 x 1.286	WH11D507G012K
650	.465 x 1.536	WH11D657G012M
700	.510 x 1.286	WH11D707G012P
800	.510 x 1.536	WH11D807G012R
1200	.510 x 1.786	WH11D128G012S
	16 WVDC, 18 V SURGE	
10	.260 x .536	WH11D106G016Y
20	.260 x .723	WH11D206G016A
25	.260 x .723	WH11D256G016A
50	.322 x .723	WH11D506G016X
65	.385 x .723	WH11D656G016C
75	.385 x .723	WH11D756G016C
120	.385 x .973	WH11D127G016E
150	.385 x .973	WH11D157G016E
200	.385 x 1.286	WH11D207G016F
250	.385 x 1.286	WH11D257G016F
300	.385 x 1.536	WH11D307G016G
350	.385 x 1.536	WH11D357G016G
400	.465 x 1.286	WH11D407G016K
450	.465 x 1.286	WH11D457G016K
500	.465 x 1.536	WH11D507G016M
600	.465 x 1.536	WH11D607G016M
650	.510 x 1.286	WH11D657G016P
800	.510 x 1.536	WH11D807G016R
1000	.510 x 1.786	WH11D108G016S
	25 WVDC, 35 V SURGE	
1	.260 x .536	WH11D105G025Y
2	.260 x .536	WH11D205G025Y
3	.260 x .536	WH11D305G025Y
4	.260 x .536	WH11D405G025Y
5	.260 x .536	WH11D505G025Y
6	.260 x .536	WH11D605G025Y
8	.260 x .536	WH11D805G025Y
10	.260 x .723	WH11D106G025A
15	.260 x .723	WH11D156G025A
20	.322 x .723	WH11D206G025X
25	.322 x .723	WH11D256G025X
35	.322 x .723	WH11D356G025X
50	.385 x .723	WH11D506G025C
65	.385 x .973	WH11D656G025E
75	.385 x .973	WH11D756G025E
100	.385 x .973	WH11D107G025E
120	.385 x 1.286	WH11D127G025F
150	.385 x 1.286	WH11D157G025F
200	.385 x 1.536	WH11D207G025G
250	.465 x 1.286	WH11D257G025K
300	.465 x 1.536	WH11D307G025M
350	.465 x 1.536	WH11D357G025M
400	.510 x 1.286	WH11D407G025P
450	.510 x 1.536	WH11D457G025R
500	.510 x 1.536	WH11D507G025R
600	.510 x 1.786	WH11D607G025S
	50 WVDC, 65 V SURGE	
1	.260 x .536	WH11D105G050Y
2	.260 x .536	WH11D205G050Y
3	.260 x .536	WH11D305G050Y
4	.260 x .536	WH11D405G050Y
5	.260 x .723	WH11D505G050A
6	.260 x .723	WH11D605G050A
8	.260 x .723	WH11D805G050A
10	.322 x .723	WH11D106G050X
15	.322 x .723	WH11D156G050X
20	.385 x .723	WH11D206G050C
25	.385 x .723	WH11D256G050C
35	.385 x .973	WH11D356G050E
50	.385 x .973	WH11D506G050E
65	.385 x 1.286	WH11D656G050F
75	.385 x 1.286	WH11D756G050F
100	.385 x 1.536	WH11D107G050G
120	.465 x 1.286	WH11D127G050K
150	.465 x 1.536	WH11D157G050M
200	.510 x 1.286	WH11D207G050P
250	.510 x 1.286	WH11D257G050P
300	.510 x 1.536	WH11D307G050R
350	.510 x 1.786	WH11D357G050S
400	.510 x 1.786	WH11D407G050S
	100 WVDC, 125 V SURGE	
1	.260 x .536	WH11D105F100Y
2	.260 x .723	WH11D205F100A
3	.322 x .723	WH11D305F100X
4	.322 x .723	WH11D405F100X
5	.385 x .723	WH11D505F100C
6	.385 x .723	WH11D605F100C
8	.385 x .973	WH11D805F100E
10	.385 x .973	WH11D106F100E
15	.385 x .973	WH11D156F100E
20	.385 x 1.286	WH11D206F100F
25	.385 x 1.536	WH11D256F100G
35	.465 x 1.536	WH11D356F100M
50	.510 x 1.536	WH11D506F100R
65	.510 x 1.786	WH11D656F100S
75	.510 x 1.786	WH11D756F100S
	150 WVDC, 175 V SURGE	
1	.260 x .536	WH11D105F150Y
2	.322 x .723	WH11D205F150X
3	.385 x .723	WH11D305F150C
4	.385 x .723	WH11D405F150C
5	.385 x .723	WH11D505F150C
6	.385 x .973	WH11D605F150E
8	.385 x .973	WH11D805F150E
10	.385 x 1.286	WH11D106F150F
15	.385 x 1.286	WH11D156F150F
20	.385 x 1.536	WH11D206F150G
25	.465 x 1.536	WH11D256F150M
35	.510 x 1.536	WH11D356F150R
50	.510 x 1.786	WH11D506F150S

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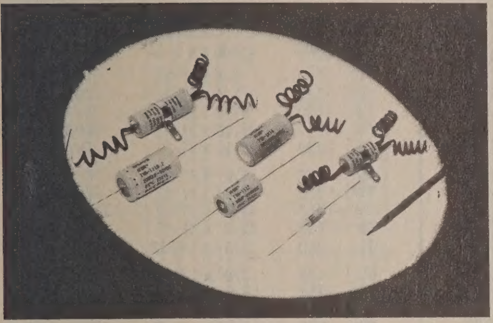
IND-EEM-14D-EIAT

All sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE TVA ATOM® ELECTROLYTICS



- The smallest dependable standard tubular — capacitors to 475V operate up to 85°C (185°F). Higher voltage units designed for 65°C operation.
- Whether for TV sets, ac/dc sets, auto radios, home radio-phono combinations, or other electronic equipment servicing, the Sprague ATOM line will handle all your replacement requirements — no dual inventory problems.
- Low leakage currents, long shelf life.
- Will withstand high temperatures, high ripple currents, high surge voltages.
- Metal case construction with thermoplastic outer insulating sleeve except as noted by † sign.
- Catalog numbers with TVAN prefix are non-polarized, and are ideal for speaker crossover networks. (See listings on 2nd following page.)

NOTE: For the complete line of almost 800 Type TVA Atom Electrolytic Capacitors, including dual, triple, and quadruple-section units, see latest issue of Sprague Catalog C-621 or Sprague Catalog C-563.

µF	WVDC	Dia. x Length	Cat. No.
SINGLE UNITS (Polar)*			
1000	1	⅝ x 2⅛	TVA-1080
1	3	1/4 x 17/32	TVA-1081
2	3	1/4 x 17/32	TVA-1081.1
3	3	1/4 x 17/32	TVA-1081.2
4	3	1/4 x 17/32	TVA-1081.3
5	3	1/4 x 17/32	TVA-1081.4
6	3	1/4 x 17/32	TVA-1081.5
8	3	1/4 x 17/32	TVA-1081.6
10	3	1/4 x 17/32	TVA-1082
15	3	1/4 x 17/32	TVA-1082.5
20	3	1/4 x 17/32	TVA-1083
25	3	1/4 x 17/32	TVA-1084
30	3	1/4 x 17/32	TVA-1084.5
50	3	1/4 x 23/32	TVA-1085
65	3	1/4 x 23/32	TVA-1085.5
75	3	5/16 x 23/32	TVA-1088
100	3	5/16 x 23/32	TVA-1089
130	3	5/16 x 23/32	TVA-1089.5
150	3	5/16 x 27/32	TVA-1090
200	3	5/16 x 27/32	TVA-1091
250	3	3/8 x 27/32	TVA-1091.5
300	3	3/8 x 27/32	TVA-1092
400	3	3/8 x 31/32	TVA-1093
500	3	3/8 x 1 9/32	TVA-1094
600	3	3/8 x 1 9/32	TVA-1095
750	3	3/8 x 1 17/32	TVA-1097
800	3	3/8 x 1 17/32	TVA-1097.1
900	3	7/16 x 1 9/32	TVA-1097.2
1000	3	7/16 x 1 17/32	TVA-1097.3
1200	3	7/16 x 1 17/32	TVA-1097.4
1500	3	1/2 x 1 17/32	TVA-1097.5
1800	3	1/2 x 1 17/32	TVA-1097.6
2000	3	1/2 x 1 17/32	TVA-1097.7
2200	3	1/2 x 1 13/16	TVA-1097.8
2500	3	1/2 x 1 13/16	TVA-1097.9
3000	3	3/4 x 1 21/32	TVA-1098
4000	3	3/4 x 1 21/32	TVA-1099
5000	3	3/4 x 1 29/32	TVA-1099.1
10000	3	7/8 x 2 5/32	TVA-1099.6
1	6	1/4 x 17/32	TVA-1099.80
2	6	1/4 x 17/32	TVA-1099.81
3	6	1/4 x 17/32	TVA-1099.82
4	6	1/4 x 17/32	TVA-1099.83
5	6	1/4 x 17/32	TVA-1099.84
6	6	1/4 x 17/32	TVA-1099.85
8	6	1/4 x 17/32	TVA-1099.86
10	6	1/4 x 17/32	TVA-1099.87
15	6	1/4 x 17/32	TVA-1099.89
20	6	1/4 x 17/32	TVA-1099.90
25	6	1/4 x 23/32	TVA-1099.91
35	6	1/4 x 23/32	TVA-1099.93
50	6	1/4 x 23/32	TVA-1100
75	6	5/16 x 23/32	TVA-1100.5
90	6	5/16 x 23/32	TVA-1100.6
100	6	5/16 x 27/32	TVA-1101
140	6	5/16 x 27/32	TVA-1101.2
150	6	3/8 x 27/32	TVA-1101.5
200	6	3/8 x 27/32	TVA-1101.7
250	6	3/8 x 31/32	TVA-1102
300	6	3/8 x 31/32	TVA-1102.1
400	6	3/8 x 1 9/32	TVA-1102.3
500	6	3/8 x 1 17/32	TVA-1103
600	6	3/8 x 1 17/32	TVA-1103.2
700	6	7/16 x 1 9/32	TVA-1103.4
800	6	7/16 x 1 17/32	TVA-1103.8
950	6	7/16 x 1 17/32	TVA-1103.9
1000	6	1/2 x 1 9/32	TVA-1104
1200	6	1/2 x 1 17/32	TVA-1104.1
1500	6	1/2 x 1 17/32	TVA-1105
1800	6	1/2 x 1 25/32	TVA-1105.1
2000	6	1/2 x 1 25/32	TVA-1106
2500	6	3/4 x 1 21/32	TVA-1106.5
3000	6	3/4 x 1 29/32	TVA-1107
4000	6	7/8 x 1 29/32	TVA-1108
5000	6	7/8 x 1 29/32	TVA-1109
10000	6	1 x 2 13/32	TVA-1115
1000	10	1/2 x 1 13/16	TVA-1128
3000	10	7/8 x 1 21/32	TVA-1129.2
4000	10	7/8 x 1 29/32	TVA-1129.4
5000	10	1 x 2 5/32	TVA-1129.5
10000	10	1 1/8 x 2 11/16	TVA-1129.8
1	12	1/4 x 17/32	TVA-1129.80
2	12	1/4 x 17/32	TVA-1129.81
3	12	1/4 x 17/32	TVA-1129.82
4	12	1/4 x 17/32	TVA-1129.83
5	12	1/4 x 17/32	TVA-1129.84
6	12	1/4 x 17/32	TVA-1129.85
8	12	1/4 x 17/32	TVA-1129.86
10	12	1/4 x 17/32	TVA-1129.87
15	12	1/4 x 17/32	TVA-1129.89
20	12	1/4 x 23/32	TVA-1129.90
25	12	1/4 x 23/32	TVA-1129.91
30	12	1/4 x 23/32	TVA-1129.92
50	12	5/16 x 23/32	TVA-1129.94
60	12	5/16 x 23/32	TVA-1129.95
75	12	5/16 x 27/32	TVA-1129.96
90	12	3/8 x 23/32	TVA-1129.97
100	12	5/16 x 27/32	TVA-1130
140	12	3/8 x 27/32	TVA-1130.2
150	12	3/8 x 31/32	TVA-1130.3
190	12	3/8 x 31/32	TVA-1130.5
200	12	3/8 x 1 9/32	TVA-1130.6
250	12	3/8 x 1 9/32	TVA-1131
290	12	3/8 x 1 9/32	TVA-1131.1
390	12	3/8 x 1 17/32	TVA-1131.2
400	12	7/16 x 1 9/32	TVA-1131.3
450	12	7/16 x 1 9/32	TVA-1131.5
500	12	7/16 x 1 17/32	TVA-1132
600	12	7/16 x 1 17/32	TVA-1132.2
800	12	1/2 x 1 9/16	TVA-1132.4
900	12	1/2 x 1 13/16	TVA-1132.5
1000	12	1/2 x 1 13/16	TVA-1133
1200	12	1/2 x 1 13/16	TVA-1133.4
1500	12	3/4 x 1 21/32	TVA-1133.5
2000	12	7/8 x 1 21/32	TVA-1134
2500	12	7/8 x 1 21/32	TVA-1134.5
3000	12	7/8 x 1 21/32	TVA-1135
4000	12	7/8 x 2 5/32	TVA-1136
5000	12	1 x 2 13/32	TVA-1136.1
10000	12	1 1/4 x 2 11/16	TVA-1137
1	16	1/4 x 17/32	TVA-1140
2	16	1/4 x 17/32	TVA-1141
3	16	1/4 x 17/32	TVA-1142
4	16	1/4 x 17/32	TVA-1143
5	16	1/4 x 17/32	TVA-1144
6	16	1/4 x 17/32	TVA-1144.1

*For non-polarized single units, see catalog numbers with TVAN prefix on 2nd following page.

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IND-REM-4A-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE TVA ATOM® ELECTROLYTICS - Continued

SINGLE UNITS - Continued

μF	WVDC	Dia. x Length	Cat. No.
8	16	1/4 x 17/32	TVA-1144.2
10	16	1/4 x 17/32	TVA-1145
15	16	1/4 x 23/32	TVA-1146
20	16	1/4 x 23/32	TVA-1147
25	16	1/4 x 23/32	TVA-1148
30	16	5/16 x 23/32	TVA-1149
35	16	5/16 x 23/32	TVA-1149.1
50	16	5/16 x 23/32	TVA-1150
75	16	5/16 x 27/32	TVA-1151
85	16	3/8 x 23/32	TVA-1152
90	16	5/16 x 27/32	TVA-1153
100	16	3/8 x 27/32	TVA-1160
130	16	3/8 x 27/32	TVA-1160.2
150	16	3/8 x 31/32	TVA-1160.3
175	16	3/8 x 31/32	TVA-1160.4
180	16	3/8 x 31/32	TVA-1160.5
200	16	3/8 x 1 9/32	TVA-1160.6
250	16	3/8 x 1 9/32	TVA-1161
300	16	3/8 x 1 17/32	TVA-1161.1
350	16	3/8 x 1 17/32	TVA-1161.2
400	16	7/16 x 1 9/32	TVA-1161.5
450	16	7/16 x 1 17/32	TVA-1161.6
500	16	7/16 x 1 17/32	TVA-1162
600	16	7/16 x 1 17/32	TVA-1162.2
800	16	1/2 x 1 9/16	TVA-1162.3
1000	16	1/2 x 1 13/16	TVA-1163
1200	16	1/2 x 1 13/16	TVA-1164
1500	16	3/4 x 1 21/32	TVA-1175.2
2000	16	3/4 x 1 21/32	★TVA-1170
2500	16	7/8 x 1 29/32	TVA-1175.3
3000	16	7/8 x 1 29/32	TVA-1175
4000	16	7/8 x 2 5/32	TVA-1175.4
5000	16	1 x 2 5/32	TVA-1175.5
6000	16	1 1/8 x 2 5/32	TVA-1175.6
8000	16	1 1/8 x 2 11/16	TVA-1175.7
10000	16	1 1/4 x 2 11/16	TVA-1175.8
15000	16	1 1/4 x 3 11/16	TVA-1175.11
20000	16	1 3/8 x 4 5/32	TVA-1175.13
150	20	3/8 x 31/32	TVA-1180
1500	20	7/8 x 1 21/32	TVA-1190
2300	20	1 x 1 21/32	TVA-1194
1	25	1/4 x 17/32	TVA-1200
2	25	1/4 x 17/32	TVA-1201
3	25	1/4 x 17/32	TVA-1201.1
4	25	1/4 x 17/32	TVA-1202
5	25	1/4 x 17/32	TVA-1203
6	25	1/4 x 17/32	TVA-1203.1
8	25	1/4 x 17/32	TVA-1203.3
10	25	1/4 x 23/32	TVA-1204
15	25	1/4 x 23/32	TVA-1204.2
20	25	5/16 x 23/32	TVA-1204.5
25	25	5/16 x 23/32	TVA-1205.
30	25	5/16 x 23/32	TVA-1205.1
35	25	5/16 x 23/32	TVA-1205.2
40	25	5/16 x 27/32	TVA-1205.7
50	25	5/16 x 27/32	TVA-1206
75	25	3/8 x 27/32	TVA-1206.1
100	25	3/8 x 31/32	TVA-1207
150	25	3/8 x 1 9/32	TVA-1207.5
200	25	3/8 x 1 17/32	TVA-1207.7
250	25	7/16 x 1 9/32	TVA-1208
300	25	7/16 x 1 17/32	TVA-1208.5
350	25	7/16 x 1 17/32	TVA-1208.6
400	25	1/2 x 1 5/16	TVA-1208.7
450	25	1/2 x 1 9/16	TVA-1208.8
500	25	1/2 x 1 9/16	TVA-1209
600	25	1/2 x 1 13/16	TVA-1209.2
800	25	3/4 x 1 21/32	TVA-1209.4
1000	25	3/4 x 1 21/32	TVA-1211
1500	25	7/8 x 1 29/32	TVA-1212
2000	25	1 x 1 29/32	TVA-1213
2500	25	1 x 1 29/32	TVA-1213.5
*3000	25	1 x 2 5/32	TVA-1214
4000	25	1 1/8 x 2 11/16	TVA-1214.2
5000	25	1 1/8 x 2 11/16	TVA-1214.5
8000	25	1 1/4 x 3 11/16	TVA-1214.8
10000	25	1 3/8 x 3 11/16	TVA-1214.10
*900	30	7/8 x 1 21/32	TVA-1222
1000	30	7/8 x 1 29/32	TVA-1222.1
200	35	7/16 x 1 17/32	TVA-1223
300	35	1/2 x 1 9/16	TVA-1225
500	35	1/2 x 1 13/16	TVA-1227
5500	35	1 x 3 13/32	TVA-1229
1	50	1/4 x 17/32	TVA-1300
2	50	1/4 x 17/32	TVA-1301
3	50	1/4 x 17/32	TVA-1302
4	50	1/4 x 17/32	TVA-1302.7
5	50	1/4 x 23/32	TVA-1303
6	50	1/4 x 23/32	TVA-1303.1
8	50	1/4 x 23/32	TVA-1303.2
10	50	5/16 x 23/32	TVA-1304
15	50	5/16 x 23/32	TVA-1305
20	50	5/16 x 27/32	TVA-1305.5
25	50	5/16 x 27/32	TVA-1306
35	50	3/8 x 27/32	TVA-1306.2
40	50	3/8 x 31/32	TVA-1306.5
50	50	3/8 x 31/32	TVA-1308
60	50	3/8 x 1 9/32	TVA-1309.3
75	50	3/8 x 1 9/32	TVA-1309.4
100	50	3/8 x 1 17/32	TVA-1310
120	50	7/16 x 1 9/32	TVA-1310.1
125	50	7/16 x 1 17/32	TVA-1310.2
150	50	7/16 x 1 17/32	TVA-1311
200	50	1/2 x 1 5/16	TVA-1311.5
250	50	1/2 x 1 5/16	TVA-1312
300	50	1/2 x 1 9/16	TVA-1312.1
350	50	1/2 x 1 13/16	TVA-1312.2
400	50	1/2 x 1 13/16	TVA-1313
500	50	3/4 x 1 21/32	TVA-1315
600	50	3/4 x 1 21/32	TVA-1315.2
800	50	7/8 x 1 21/32	TVA-1315.4
1000	50	7/8 x 1 29/32	TVA-1316
1500	50	7/8 x 2 5/32	TVA-1318
2000	50	1 1/8 x 2 5/32	TVA-1318.2
2500	50	1 1/8 x 2 11/16	TVA-1318.3
3000	50	1 1/4 x 2 11/16	TVA-1318.4
4000	50	1 1/4 x 3 5/32	TVA-1318.5
5000	50	1 3/8 x 3 1/8	TVA-1318.7
8000	50	1 3/8 x 4 5/32	TVA-1318.10
250	60	1/2 x 1 9/16	TVA-1319
500	75	1 x 2 21/32	TVA-1319.5
1000	75	1 x 2 21/32	TVA-1319.7
*1500	75	1 x 3 21/32	TVA-1319.8
2000	75	1 3/8 x 2 3/8	TVA-1319.9
10	90	3/8 x 27/32	TVA-1320
16	90	3/8 x 31/32	TVA-1321
1	100	1/4 x 17/32	TVA-1330
2	100	1/4 x 23/32	TVA-1331
3	100	5/16 x 23/32	TVA-1332
4	100	5/16 x 23/32	TVA-1333
5	100	5/16 x 27/32	TVA-1334
6	100	5/16 x 27/32	TVA-1335
8	100	3/8 x 27/32	TVA-1336
10	100	3/8 x 27/32	TVA-1337
15	100	3/8 x 31/32	TVA-1338
20	100	3/8 x 1 9/32	TVA-1339
25	100	3/8 x 1 17/32	TVA-1340
30	100	3/8 x 1 17/32	TVA-1341
40	100	7/16 x 1 17/32	TVA-1342
50	100	1/2 x 1 9/16	TVA-1343
60	100	1/2 x 1 9/16	TVA-1344
75	100	1/2 x 1 13/16	TVA-1345
85	100	3/4 x 1 13/32	TVA-1345.2
100	100	3/4 x 1 13/32	TVA-1346
150	100	3/4 x 1 21/32	TVA-1347
200	100	7/8 x 1 29/32	TVA-1348
250	100	7/8 x 1 29/32	TVA-1349
300	100	1 x 1 29/32	TVA-1350
400	100	1 x 2 5/32	TVA-1375
500	100	1 1/8 x 2 5/32	TVA-1376
600	100	1 1/8 x 2 11/16	TVA-1377
800	100	1 1/8 x 2 11/16	TVA-1379
1000	100	1 1/4 x 2 11/16	TVA-1380
1500	100	1 1/4 x 3 11/16	TVA-1382
2000	100	1 3/8 x 4 5/32	TVA-1384
1	150	1/4 x 17/32	TVA-1400
2	150	1/4 x 23/32	TVA-1400.1
3	150	5/16 x 23/32	TVA-1400.2
4	150	5/16 x 27/32	TVA-1402
5	150	5/16 x 27/32	TVA-1403
6	150	3/8 x 27/32	TVA-1403.1
7	150	3/8 x 27/32	TVA-1403.2
8	150	3/8 x 27/32	TVA-1405
10	150	3/8 x 31/32	TVA-1406
12	150	3/8 x 1 9/32	TVA-1407
15	150	3/8 x 1 9/32	TVA-1408
16	150	3/8 x 1 17/32	TVA-1409
20	150	3/8 x 1 17/32	TVA-1410
25	150	7/16 x 1 9/32	TVA-1411
30	150	7/16 x 1 17/32	TVA-1412
35	150	1/2 x 1 17/32	TVA-1412.1
40	150	1/2 x 1 17/32	TVA-1413
50	150	1/2 x 1 13/16	TVA-1414
60	150	3/4 x 1 13/32	TVA-1415
75	150	7/8 x 1 13/32	TVA-1416
80	150	7/8 x 1 13/32	TVA-1418
85	150	7/8 x 1 21/32	TVA-1418.1
100	150	7/8 x 1 21/32	TVA-1420
150	150	7/8 x 2 5/32	TVA-1422
160	150	1 x 1 29/32	TVA-1422.5
200	150	1 x 2 5/32	TVA-1423
*250	150	1 1/8 x 2 5/32	★TVA-1424
300	150	1 1/8 x 2 11/16	TVA-1425
350	150	1 x 2 21/32	TVA-1426
400	150	1 1/4 x 2 11/16	TVA-1426.1
500	150	1 1/4 x 3 5/32	TVA-1428
1000	150	1 3/8 x 4 5/32	TVA-1429
80	175	3/4 x 1 29/32	TVA-1430
1	200	1/4 x 23/32	TVA-1434
2	200	5/16 x 23/32	TVA-1435
3	200	5/16 x 27/32	TVA-1436
4	200	3/8 x 27/32	TVA-1437
5	200	3/8 x 27/32	TVA-1438
6	200	3/8 x 31/32	TVA-1439
8	200	3/8 x 1 9/32	TVA-1440
10	200	3/8 x 1 9/32	TVA-1441
15	200	7/16 x 1 9/32	TVA-1442
20	200	7/16 x 1 17/32	TVA-1442.1
25	200	1/2 x 1 35/64	TVA-1442.2
30	200	1/2 x 1 13/16	TVA-1442.3
40	200	3/4 x 1 13/32	TVA-1442.5
50	200	3/4 x 1 21/32	TVA-1443
60	200	7/8 x 1 21/32	TVA-1443.1
75	200	7/8 x 2 5/32	TVA-1444
85	200	7/8 x 1 29/32	TVA-1444.2
100	200	7/8 x 2 5/32	TVA-1445
120	200	1 x 1 29/32	TVA-1446
*150	200	1 x 2 5/32	★TVA-1447
*200	200	1 1/8 x 2 11/16	★TVA-1480
500	200	1 1/4 x 3 11/16	TVA-1484
1	250	5/16 x 23/32	TVA-1500
2	250	3/8 x 23/32	TVA-1500.1
3	250	3/8 x 27/32	TVA-1500.2
4	250	3/8 x 31/32	TVA-1501
5	250	3/8 x 1 9/32	TVA-1502
6	250	3/8 x 1 9/32	TVA-1502.1
8	250	3/8 x 1 17/32	TVA-1503
10	250	7/16 x 1 9/32	TVA-1504
12	250	7/16 x 1 17/32	TVA-1505
15	250	1/2 x 1 9/16	TVA-1506
16	250	1/2 x 1 9/16	TVA-1507
20	250	1/2 x 1 13/16	TVA-1508
25	250	3/4 x 1 13/32	TVA-1509
30	250	3/4 x 1 13/32	TVA-1510
40	250	7/8 x 1 13/32	TVA-1511
50	250	7/8 x 1 13/32	TVA-1512
60	250	7/8 x 1 21/32	TVA-1513
70	250	7/8 x 1 29/32	TVA-1515
75	250	7/8 x 2 5/32	TVA-1520
85	250	7/8 x 2 5/32	TVA-1521

★Mounting Strap Attached.

*Single-ended with 8-inch flexible leads.

IND-SERV-EEM-5-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE TVA ATOM® ELECTROLYTICS - Continued

SINGLE UNITS - Continued

µF	WVDC	Dia. x Length	Cat. No.
100	250	1 x 1 29/32	TVA-1522
125	250	7/8 x 2 5/8	TVA-1524
150	250	1 1/8 x 2 5/32	TVA-1525
160	250	1 x 2 5/32	TVA-1526
*200	250	1 1/4 x 2 11/16	TVA-1528
225	250	1 1/4 x 2 45/64	TVA-1528.2
250	250	1 1/4 x 2 45/64	TVA-1528.3
300	250	1 1/4 x 3 5/32	TVA-1528.5
400	250	1 1/4 x 3 11/16	TVA-1528.7
450	250	1 3/8 x 3 11/16	TVA-1528.8
500	250	1 3/8 x 3 11/16	TVA-1528.9
600	250	1 3/8 x 4 5/32	TVA-1529
6	275	3/8 x 1 17/32	TVA-1530
1	300	5/16 x 23/32	TVA-1540
2	300	3/8 x 27/32	TVA-1541
3	300	3/8 x 31/32	TVA-1542
4	300	3/8 x 1 9/32	TVA-1543
5	300	3/8 x 1 9/32	TVA-1544
6	300	3/8 x 1 17/32	TVA-1545
8	300	7/16 x 1 17/32	TVA-1546
10	300	7/16 x 1 17/32	TVA-1547
12	300	1/2 x 1 9/16	TVA-1548
15	300	1/2 x 1 9/16	TVA-1549
20	300	1/2 x 1 13/16	TVA-1550
25	300	3/4 x 1 21/32	TVA-1551
30	300	3/4 x 1 29/32	TVA-1552
40	300	3/4 x 1 29/32	TVA-1553
50	300	7/8 x 1 29/32	TVA-1570
60	300	7/8 x 2 5/32	TVA-1570.1
75	300	1 x 2 5/32	TVA-1571
85	300	1 x 2 13/32	TVA-1571.2
100	300	1 1/8 x 2 5/32	TVA-1573
*140	300	1 x 3 5/32	★TVA-1575
*150	300	1 1/4 x 2 11/16	TVA-1576
*200	300	1 1/4 x 3 5/32	TVA-1578
300	300	1 3/8 x 3 11/16	TVA-1580
400	300	1 3/8 x 4 5/32	TVA-1582
1	350	5/16 x 27/32	TVA-1599
2	350	3/8 x 27/32	TVA-1600
3	350	3/8 x 31/32	TVA-1600.1
4	350	3/8 x 1 9/32	TVA-1601
5	350	3/8 x 1 17/32	TVA-1602.5
6	350	3/8 x 1 17/32	TVA-1602.6
8	350	7/16 x 1 17/32	TVA-1603
10	350	1/2 x 1 9/16	TVA-1604
12	350	1/2 x 1 9/16	TVA-1605
15	350	1/2 x 1 13/16	TVA-1607
16	350	3/4 x 1 13/32	TVA-1607.1
20	350	3/4 x 1 21/32	TVA-1608
25	350	3/4 x 1 29/32	TVA-1609
30	350	7/8 x 1 21/32	TVA-1610
40	350	7/8 x 1 29/32	TVA-1611
50	350	7/8 x 2 5/32	TVA-1612
60	350	7/8 x 2 5/32	TVA-1613
75	350	1 x 2 13/32	TVA-1614
85	350	1 1/8 x 2 5/32	TVA-1615
100	350	1 x 2 21/32	TVA-1620
*150	350	1 1/8 x 2 45/64	TVA-1622
160	350	1 1/8 x 2 45/64	TVA-1623
*200	350	1 1/4 x 3 5/32	TVA-1624
250	350	1 3/8 x 3 11/16	TVA-1627
*300	350	1 1/4 x 3 45/64	TVA-1628
1	385	3/8 x 27/32	TVA-1640
2	385	3/8 x 1 9/32	TVA-1641
4	385	7/16 x 1 9/32	TVA-1643
1	400	3/8 x 27/32	TVA-1645
2	400	3/8 x 1 9/32	TVA-1646
3	400	3/8 x 1 17/32	TVA-1647
4	400	7/16 x 1 9/32	TVA-1648
5	400	7/16 x 1 17/32	TVA-1649
6	400	1/2 x 1 5/16	TVA-1650
8	400	1/2 x 1 9/16	TVA-1651
10	400	1/2 x 1 13/16	TVA-1652
12	400	1/2 x 1 13/16	TVA-1653
15	400	3/4 x 1 21/32	TVA-1654
16	400	3/4 x 1 21/32	TVA-1655
20	400	3/4 x 1 29/32	TVA-1656
25	400	7/8 x 1 21/32	TVA-1657
30	400	7/8 x 1 21/32	TVA-1658
40	400	7/8 x 1 29/32	TVA-1659
50	400	1 x 2 5/32	TVA-1660
60	400	1 x 2 13/32	TVA-1661
75	400	1 1/8 x 2 5/32	TVA-1662
85	400	1 1/8 x 2 11/16	TVA-1663
100	400	1 1/4 x 2 11/16	TVA-1664
150	400	1 1/4 x 3 5/32	TVA-1665
200	400	1 1/4 x 3 11/16	TVA-1666
250	400	1 3/8 x 4 5/32	TVA-1667
1	450	3/8 x 27/32	TVA-1700
2	450	3/8 x 1 9/32	TVA-1701
3	450	7/16 x 1 9/32	TVA-1701.1
4	450	7/16 x 1 17/32	TVA-1702
5	450	1/2 x 1 5/16	TVA-1703
6	450	1/2 x 1 9/16	TVA-1703.1
8	450	1/2 x 1 13/16	TVA-1704
10	450	1/2 x 1 13/16	TVA-1705
12	450	3/4 x 1 21/32	TVA-1706
15	450	3/4 x 1 29/32	TVA-1707
16	450	7/8 x 1 21/32	TVA-1708
20	450	13/16 x 2 5/32	TVA-1709
25	450	7/8 x 1 29/32	TVA-1710
30	450	1 x 1 29/32	TVA-1711
40	450	7/8 x 2 5/32	TVA-1712
50	450	1 1/8 x 2 5/32	TVA-1713
60	450	1 1/8 x 2 5/32	TVA-1714
75	450	1 1/4 x 2 11/16	TVA-1715
80	450	1 x 2 21/32	TVA-1716
85	450	1 1/4 x 2 11/16	TVA-1717
100	450	1 1/4 x 3 5/32	TVA-1718
120	450	1 1/4 x 3 11/16	TVA-1718.3
*150	450	1 3/8 x 3 11/16	TVA-1719
160	450	1 3/8 x 3 11/16	TVA-1719.2
*200	450	1 3/8 x 4 5/32	TVA-1720
1	475	1/2 x 1 13/32	TVA-1790
2	475	5/8 x 1 5/32	TVA-1791
3	475	5/8 x 1 13/32	TVA-1792
4	475	5/8 x 1 21/32	TVA-1800
5	475	5/8 x 1 21/32	TVA-1800.1
6	475	5/8 x 1 21/32	TVA-1800.2
8	475	3/4 x 1 13/32	TVA-1801
10	475	3/4 x 1 21/32	TVA-1802
12	475	3/4 x 1 29/32	TVA-1802.1
15	475	3/4 x 1 29/32	TVA-1803
16	475	7/8 x 1 21/32	TVA-1803.1
20	475	7/8 x 2 5/32	TVA-1804
1	500	1/2 x 1 5/32	TVA-1890
3	500	5/8 x 1 13/32	TVA-1895
5	500	3/4 x 1 5/32	TVA-1901
8	500	3/4 x 1 21/32	TVA-1902
10	500	3/4 x 1 21/32	TVA-1903
12	500	7/8 x 1 29/32	TVA-1904
16	500	7/8 x 2 5/32	TVA-1905
20	500	7/8 x 2 5/32	TVA-1906
30	500	1 x 1 29/32	TVA-1907
40	500	1 x 2 13/32	TVA-1908
60	500	1 x 3 13/32	TVA-1910
15	525	7/8 x 2 5/32	TVA-1920
2	550	5/8 x 1 5/32	TVA-1930
4	600	13/16 x 2 3/8	TVA-1960
8	600	1 1/16 x 2 7/8	TVA-1962
10	600	1 1/16 x 3 3/16	TVA-1963
16	600	1 1/16 x 4 3/16	TVA-1965
20	600	1 1/16 x 3 7/8	TVA-1966

SINGLE UNITS (Non-Polarized)

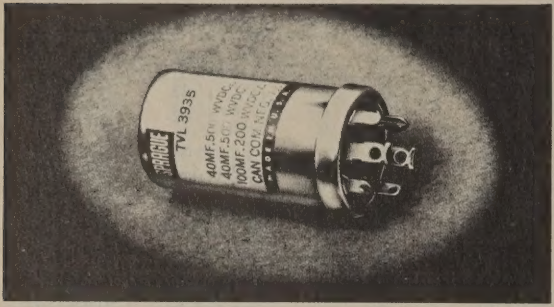
µF	Volts	Dia. x Length	Cat. No.
500	3	3/8 x 1 17/32	TVAN-1095
50	6	3/8 x 23/32	TVAN-1100.1
125	6	3/8 x 31/32	TVAN-1101.5
500	6	1/2 x 1 9/16	TVAN-1103.1
2	10	1/4 x 17/32	TVAN-1109
5	10	1/4 x 17/32	TVAN-1110
6	10	1/4 x 17/32	TVAN-1111
8	10	1/4 x 17/32	TVAN-1112
10	10	1/4 x 23/32	TVAN-1112.4
30	10	5/16 x 27/32	TVAN-1115
50	10	3/8 x 23/32	TVAN-1117
160	10	3/8 x 1 9/32	TVAN-1120
170	10	3/8 x 1 9/32	TVAN-1121
450	10	5/8 x 1 21/32	TVAN-1125
500	10	5/8 x 1 21/32	TVAN-1126
2000	10	7/8 x 2 5/32	TVAN-1129
500	12	5/8 x 2 1/8	TVAN-1132.1
4	15	1/4 x 17/32	TVAN-1150
10	15	1/4 x 23/32	TVAN-1155
500	15	5/8 x 2 1/8	TVAN-1162.1
1000	15	3/4 x 2 1/8	TVAN-1163.1
2.5	20	1/4 x 17/32	TVAN-1176
1	25	1/4 x 23/32	TVAN-1200
2	25	1/4 x 17/32	TVAN-1202
4	25	1/4 x 23/32	★TVAN-1202.2
5	25	1/4 x 23/32	TVAN-1203.1
8	25	5/16 x 23/32	★TVAN-1203.8
10	25	5/16 x 23/32	TVAN-1204.1
16	25	5/16 x 27/32	TVAN-1204.3
20	25	3/8 x 27/32	TVAN-1204.6
25	25	3/8 x 23/32	TVAN-1205.1
35	25	3/8 x 27/32	TVAN-1205.5
50	25	3/8 x 31/32	TVAN-1206.1
100	25	3/8 x 1 17/32	TVAN-1207.1
3	30	1/4 x 23/32	TVAN-1215
20	30	3/8 x 27/32	TVAN-1220
10	40	5/16 x 27/32	TVAN-1230
20	40	3/8 x 31/32	TVAN-1232
2	50	1/4 x 23/32	TVAN-1301.1
3	50	1/4 x 23/32	TVAN-1302.1
4	50	1/4 x 23/32	★TVAN-1302.5
5	50	5/16 x 23/32	TVAN-1303.1
10	50	5/16 x 27/32	TVAN-1304.1
25	50	3/8 x 1 9/32	TVAN-1306.1
30	50	3/8 x 1 9/32	TVAN-1306.2
50	50	7/16 x 1 9/32	TVAN-1308.1
60	50	7/16 x 1 17/32	TVAN-1309.2
100	50	1/2 x 1 9/16	TVAN-1310.1
10	100	1/2 x 1 5/8	TVAN-1333
20	100	5/8 x 1 21/32	TVAN-1335
40	100	3/4 x 1 21/32	TVAN-1340
4	150	9/16 x 1 21/32	TVAN-1402.1
10	150	3/4 x 1 13/32	TVAN-1406.1
40	150	3/4 x 2 1/8	TVAN-1413.1
2	200	1/2 x 1 13/32	TVAN-1435.1
4	200	1 x 1 29/32	TVAN-1436
60	200	1 x 2 21/32	TVAN-1440
1	300	1/2 x 1 13/32	TVAN-1560
20	300	7/8 x 1 29/32	TVAN-1568
5	350	3/4 x 1 21/32	TVAN-1602
10	350	1 x 1 29/32	TVAN-1604.1
20	350	1 x 2 5/32	TVAN-1608.1
10	400	7/8 x 1 29/32	★TVAN-1650
20	400	1 x 2 5/32	TVAN-1652
10	450	1 x 1 29/32	TVAN-1705.1

NOTE: For the complete line of almost 800 Type TVA Atom Electrolytic Capacitors, including dual, triple, and quadruple-section units, see latest issue of Sprague Catalog C-621 or Sprague Catalog C-563.

★Mounting Strap Attached. *Single-ended with 8-inch flexible leads. †Kraftboard Case Construction. IND-SERV-EEM-6-EIAT Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE TVL TWIST-LOK® ELECTROLYTICS



- Capacitors to 475V Operate up to 85 C (185 F). Higher Voltage Units Designed for 65 C
- Withstand High Surge Voltages
- Etched Cathode Construction. Ideal for High Ripple Selenium Rectifier Circuits
- Can be Mounted "Above Ground" Using Phenolic Mounting Plate and Insulating Tube
- Units Noted by † Sign are Exact Replacements for Color TV
- Catalog numbers with a TVLP Prefix Indicate Units with a Positive Case.

For a more complete line of over 600 Type TVL Capacitors, refer to Sprague Catalog C-563.

SINGLE UNITS

µF	WVDC	D. x L.	Cat. No.
†1000	15	1 x 1½	TVL-1165
2000	15	1⅜ x 2	TVL-1168
3000	15	1⅜ x 2	TVL-1170
4000	15	1⅜ x 2	TVL-1173
500	25	1 x 1½	TVL-1220
1000	25	1⅜ x 2	TVL-1230
†2000	25	1⅜ x 1¾	TVL-1242
†400	35	1 x 1¾	TVL-1256
†3000	35	1⅜ x 2½	TVL-1269
100	50	¾ x 2	TVL-1317
250	50	1 x 2	TVL-1324
†500	50	1⅜ x 2	TVL-1330
†500	50	1 x 1¾	TVL-1330.1
†1000	50	1⅜ x 2½	TVL-1338
†1500	50	1⅜ x 2½	TVL-1341
2000	50	1⅜ x 2½	TVLP-1342
†50	150	1 x 1½	TVL-1415
100	150	1 x 1½	TVL-1423
120	150	1 x 2	TVL-1425
140	150	1 x 2½	TVL-1428
150	150	1 x 2	TVL-1429
150	150	1⅜ x 2	TVL-1430
200	150	1⅜ x 2	TVL-1431
200	150	1 x 3	TVL-1431.1
300	150	1⅜ x 2	TVL-1434
†500	150	1⅜ x 3½	TVL-1439.5
†120	200	1⅜ x 2	TVL-1469
125	200	1 x 2½	TVL-1470
150	200	1 x 3	TVL-1741
†150	200	1⅜ x 2	TVL-1471.1
160	200	1⅜ x 2	TVL-1473
†200	200	1⅜ x 2	TVL-1475
†200	200	1 x 3½	TVL-1475.1
†220	200	1 x 3½	TVL-1476
†300	200	1⅜ x 4	TVL-1480
†400	200	1⅜ x 3½	TVL-1485
†500	200	1⅜ x 4	TVL-1490
20	250	1 x 1½	TVL-1509
40	250	1 x 2	TVL-1519
80	250	1 x 2	TVL-1530
100	250	1 x 3	TVL-1535
150	250	1 x 2½	TVL-1539
150	250	1⅜ x 2	TVL-1540
†160	250	1⅜ x 2½	TVL-1541
†160	250	1 x 3½	TVL-1541.1
†200	250	1⅜ x 2½	TVL-1547
†250	250	1⅜ x 4	TVL-1548
†300	250	1⅜ x 2½	TVL-1550
†80	300	1 x 2½	TVL-1573
100	300	2 x 2½	TVL-1578
150	300	1⅜ x 3½	TVL-1584
160	300	1⅜ x 2½	TVL-1585
†200	300	1⅜ x 3	TVL-1586
†250	300	1⅜ x 3	TVL-1590
40	350	1 x 2	TVL-1621
50	350	1 x 2	TVL-1622
80	350	1⅜ x 2	TVL-1630
†100	350	1⅜ x 2	TVL-1635
125	350	1⅜ x 2½	TVL-1638
†150	350	1⅜ x 2½	TVL-1642
†200	350	1⅜ x 3½	TVL-1643
†250	350	1⅜ x 3½	TVL-1644.2
†320	350	1⅜ x 4	TVL-1645
10	450	1 x 1½	TVL-1705
20	450	1 x 2	TVL-1714
30	450	1 x 2½	TVL-1720
40	450	1 x 2½	TVL-1725
†50	450	1 x 2½	TVL-1728
†70	450	1⅜ x 3	TVL-1734
†80	450	1⅜ x 2½	TVL-1735
100	450	1⅜ x 2½	TVL-1750
125	450	1⅜ x 3	TVL-1760
†150	450	1⅜ x 3½	TVL-1770
160	450	1⅜ x 4	TVL-1772
†90	475	1⅜ x 3½	TVL-1850
30	500	1 x 2½	TVL-1947
40	500	1 x 2½	TVL-1950
†80	500	1⅜ x 2½	TVL-1958
†90	500	1⅜ x 2½	TVL-1960
†100	500	1⅜ x 3	TVL-1962

DUAL UNITS

µF	WVDC	D. x L.	Cat. No.
†1000-1000	15-15	1⅜ x 2½	TVL-2161
†500-500	25-25	1⅜ x 2	TVL-2233
1000-500	25-25	1⅜ x 2	TVL-2239
†500-500	35-35	1⅜ x 2	TVL-2245.5
100-100	50-50	1 x 1½	TVL-2326
†1000-1000	50-50	1⅜ x 2½	TVL-2335.4
40-40	150-150	1 x 1½	TVL-2428
50-30	150-150	1 x 1½	TVL-2432
†50-50	150-150	1 x 1½	TVL-2435
70-30	150-150	1 x 2	TVL-2439
80-50	150-150	1 x 2	TVL-2442.1
200-200	150-150	1⅜ x 2½	TVL-2447
†50-250	175-175	1⅜ x 2	TVL-2449.5
60-60	200-200	1 x 1¾	TVL-2461
100-100	200-200	1⅜ x 3	TVL-2464
†250-100	200-200	1⅜ x 3	TVL-2475
300-300	200-200	1⅜ x 4	TVL-2475.5
20-20	250-250	1 x 1½	TVL-2515
40-40	250-250	1 x 1¾	TVL-2520
†150-150	250-250	1⅜ x 2½	TVL-2535
†200-200	250-250	1⅜ x 4	TVL-2538
150-250	300-150	1⅜ x 3	TVL-2560.7
150-100	300-300	1⅜ x 3	TVL-2591
200-100	300-300	1⅜ x 4	TVL-2595
20-20	350-350	1 x 2	TVL-2626
30-30	350-350	1 x 2½	TVL-2628
†50-10	350-350	1 x 3	TVL-2629
†50-30	350-350	1⅜ x 2	TVL-2630
80-40	350-350	1⅜ x 2½	TVL-2634
†80-80	350-350	1⅜ x 2½	TVL-2635
†100-40	350-350	1⅜ x 3	TVL-2638
100-60	350-350	1⅜ x 2½	TVL-2639
†100-100	350-350	1⅜ x 3	TVL-2641
†150-100	350-350	1⅜ x 3½	TVL-2642.4
†150-150	350-350	1⅜ x 4	TVL-2642.5
160-10	350-350	1⅜ x 3	TVL-2643
†200-200	350-350	1⅜ x 4½	TVL-2645.5
†300-20	350-350	1⅜ x 4	TVL-2645.7
80-80	400-200	1⅜ x 3½	TVL-2656
†100-80	400-350	1⅜ x 4	TVL-2657.16
†60-60	400-400	1⅜ x 3	TVL-2668
†100-100	400-400	1⅜ x 4	TVL-2678.5
†80-40	450-200	1⅜ x 3	TVL-2720
†20-160	450-250	1⅜ x 2½	TVL-2722.7
†80-200	450-250	1⅜ x 4½	TVL-2722.8
†90-200	450-250	1⅜ x 4	TVL-2723
†10-50	450-350	1⅜ x 2	TVL-2726
†80-2	450-350	1⅜ x 2½	TVL-2738.5
†10-10	450-450	1 x 2	TVL-2750
†20-20	450-450	1 x 2½	TVL-2755
†30-10	450-450	1 x 2½	TVL-2757
30-30	450-450	1⅜ x 2	TVL-2759
†40-20	450-450	1⅜ x 2	TVL-2762
†40-40	450-450	1⅜ x 2½	TVL-2764
†50-50	450-450	1⅜ x 3	TVL-2767
60-20	450-450	1⅜ x 3	TVL-2768
†60-60	450-450	1⅜ x 3	TVL-2772
80-10	450-450	1⅜ x 3	TVL-2776
80-20	450-450	1⅜ x 2½	TVL-2776.5
†80-40	450-450	1⅜ x 3½	TVL-2778
†80-50	450-450	1⅜ x 3½	TVL-2778.5
†80-80	450-450	1⅜ x 3½	TVL-2779
†100-40	450-450	1⅜ x 3½	TVL-2780
†100-60	450-450	1⅜ x 4	TVL-2782
†100-100	450-450	1⅜ x 4	TVL-2782.5
†120-20	450-450	1⅜ x 3½	TVL-2783
†80-80	475-250	1⅜ x 3½	TVL-2807.8
†80-160	475-250	1⅜ x 4½	TVL-2808
20-20	500-500	1⅜ x 2	TVL-2935
30-30	500-500	1⅜ x 2	TVL-2937
40-40	500-500	1⅜ x 2½	TVL-2940
60-40	500-500	1⅜ x 3½	TVL-2944

TRIPLE UNITS

µF	WVDC	D. x L.	Cat. No.
850-400-4	16-16-11.5	1 x 2½	TVL-3021
†600-400-100	100-100-100	1⅜ x 4	TVL-3402.6
40-30-20	150-150-150	1 x 2	TVL-3438
40-40-40	150-150-150	1 x 1¾	TVL-3440
50-50-50	150-150-150	1 x 2	TVL-3442
60-40-20	150-150-150	1 x 1¾	TVL-3443
80-40-20	150-150-150	1 x 2	TVL-3444
†250-200-50	150-150-150	1⅜ x 3½	TVL-3453.8
†250-200-50	175-175-175	1⅜ x 4	TVL-3454.12
200-200-40	200-150-150	1⅜ x 3	TVL-3461.7
250-200-50	200-150-150	1⅜ x 3½	TVL-3461.8
200-150-150	200-200-200	1⅜ x 4	TVL-3489.3
250-100-5	200-200-200	1⅜ x 3	TVL-3489.5
250-200-10	200-200-200	1⅜ x 4	TVL-3490
†250-200-50	200-200-200	1⅜ x 3½	TVL-3491
†4-80-10	300-175-150	1 x 2	TVL-3560.21
80-10-200	300-300-200	1⅜ x 3	TVL-3577.9
80-40-40	300-300-300	1⅜ x 2½	TVL-3583
200-100-2	300-300-300	1⅜ x 4	TVL-3588
150-100-100	350-350-50	1⅜ x 4½	TVL-3628.5
100-150-200	350-350-25	1⅜ x 3½	TVL-3637.10
†250-3-200	350-350-25	1⅜ x 4	TVL-3636.18
150-5-100	350-350-50	1⅜ x 2½	TVL-3637.3

SPRAGUE CAPACITORS

TVL TWIST-LOK ELECTROLYTICS, continued

μF	WVDC	D. x L.	Cat. No.
†50-50-50	350-350-350	1⅜ x 3½	TVL-3639.9
60-40-20	350-350-350	1⅜ x 2½	TVL-3640
80-60-60	350-350-350	1⅜ x 3½	TVL-3642
†100-100-40	350-350-350	1⅜ x 4	TVL-3646.5
140-140-20	350-350-350	1⅜ x 4	TVL-3648
†200-300-4	350-350-350	1⅜ x 3½	TVL-3648.5
†200-80-120	350-350-350	1⅜ x 4½	TVL-3648.6
†160-100-60	350-350-350	1⅜ x 4½	TVL-3648.7
†400-40-25	350-350-350	1⅜ x 4½	TVL-3648.9
80-80-200	400-200-25	1⅜ x 3	TVL-3651.8
80-80-100	400-200-50	1⅜ x 3	TVL-3652
10-4-20	400-350-25	1 x 2	TVL-3668
80-40-100	400-400-50	1⅜ x 3	TVL-3683
80-40-150	400-400-50	1⅜ x 4	TVL-3684
100-10-80	400-400-350	1⅜ x 3½	TVL-3689.3
†100-30-20	400-400-400	1⅜ x 4	TVL-3697
†50-160-50	450-250-50	1⅜ x 4	TVL-3711.2
†20-160-40	450-250-150	1⅜ x 3½	TVL-3711.3
†50-10-160	450-350-250	1⅜ x 4½	TVL-3719.4
†80-2-25	450-350-25	1⅜ x 2½	TVL-3719.10
†80-50-100	450-350-200	1⅜ x 3½	TVL-3723.7
†20-20-20	450-350-350	1 x 3½	TVL-3724.12
†150-50-10	250-450-400	1⅜ x 4	TVL-3725.11
10-10-20	450-450-25	1 x 2	TVL-3731
20-20-20	450-450-25	1 x 3	TVL-3739
†80-65-50	450-450-50	1⅜ x 3½	TVL-3754.9
†80-20-100	450-450-50	1⅜ x 3	TVL-3757
†80-50-50	450-450-50	1⅜ x 4	TVL-3757.1
†50-80-250	450-450-50	1⅜ x 4	TVL-3757.4
†50-5-50	450-450-350	1⅜ x 3	TVL-3774.5
†50-20-4	450-450-350	1 x 3½	TVL-3774.6
†10-80-80	450-450-450	1⅜ x 4	TVL-3775.7
†80-80-20	450-450-400	1⅜ x 3½	TVL-3775.9
10-10-10	450-450-450	1 x 2	TVL-3776
15-15-15	450-450-450	1 x 2½	TVL-3778.2
†20-20-20	450-450-450	1⅜ x 2	TVL-3780
†30-20-20	450-450-450	1⅜ x 2½	TVL-3781
30-30-30	450-450-450	1⅜ x 3	TVL-3782
†40-10-10	450-450-450	1⅜ x 2	TVL-3783
40-30-20	450-450-450	1⅜ x 2½	TVL-3784
40-40-10	450-450-450	1⅜ x 2½	TVL-3785
40-40-20	450-450-450	1⅜ x 2½	TVL-3786
40-40-40	450-450-450	1⅜ x 3	TVL-3787
†50-20-4	450-450-450	1 x 3½	TVL-3787.5
†60-20-20	450-450-450	1⅜ x 3	TVL-3789
60-40-20	450-450-450	1⅜ x 3	TVL-3791
†60-50-30	450-450-450	1⅜ x 3½	TVL-3791.3
†60-60-20	450-450-450	1⅜ x 3½	TVL-3791.4
†80-30-20	450-450-450	1⅜ x 3½	TVL-3791.8
†80-40-20	450-450-450	1⅜ x 3	TVL-3793
†80-50-30	450-450-450	1⅜ x 4	TVL-3793.3
†80-50-20	450-450-450	1⅜ x 3½	TVL-3793.4
†100-50-20	450-450-450	1⅜ x 4½	TVL-3793.8
40-80-10	475-450-4[illegible]	1⅜ x 3½	TVL-3816
†50-40-40	475-475-25	1⅜ x 3½	TVL-3816.11
†50-18-40	475-475-25	1⅜ x 2½	TVL-3816.12
†18-10-40	475-475-25	1⅜ x 2	TVL-3816.13
†80-10-18	475-475-475	1⅜ x 3½	TVL-3875
†80-30-10	475-475-475	1⅜ x 3	TVL-3877
30-20-20	500-500-500	1⅜ x 2½	TVL-3956

QUADRUPLE UNITS

μF	WVDC	D. x L.	Cat. No.
†200-500-500-500	125-100-60-35	1⅜ x 3½	TVL-4358
†200-200-100-10	150-150-150-75	1⅜ x 2½	TVL-4440.3
250-200-10-10	175-175-150-150	1⅜ x 3½	TVL-4449
300-200-20-20	175-175-150-150	1⅜ x 4½	TVL-4449.2
200-200-60-30	175-175-175-175	1⅜ x 3½	TVL-4450
†200-200-200-30	175-175-175-175	1⅜ x 4½	TVL-4451
250-400-50-5	200-175-175-175	1⅜ x 4½	TVL-4468
†80-450-150-5	200-200-175-175	1⅜ x 4½	TVL-4469.5
240-240-160-5	200-200-200-200	1⅜ x 4½	TVL-4479.4
240-180-160-5	200-200-200-200	1⅜ x 4½	TVL-4479.8
250-200-40-10	200-200-200-200	1⅜ x 3½	TVL-4479.10
250-200-20-10	200-200-200-200	1⅜ x 3½	TVL-4479.11
160-450-60-5	200-200-200-200	1⅜ x 4½	TVL-4479.14
250-200-10-10	250-250-250-250	1⅜ x 4	TVL-4541
250-200-40-10	250-250-250-250	1⅜ x 4	TVL-4542
40-40-20-10	300-300-300-300	1⅜ x 2	TVL-4579
†50-500-500-200	350-50-25-25	1⅜ x 2½	TVL-4596
†100-500-500-200	350-50-25-25	1⅜ x 3	TVL-4599
†200-40-100-20	350-50-50-50	1⅜ x 3½	TVL-4599.4
100-150-5-100	350-200-150-50	1⅜ x 3	TVL-4603.7
†10-20-10-50	350-200-200-50	1⅜ x 2	TVL-4603.13
†5-100-20-100	350-200-200-25	1⅜ x 2	TVL-4603.15
†120-100-100-100	350-300-150-75	1⅜ x 4	TVL-4604.15
†180-80-150-100	350-200-200-200	1⅜ x 4½	TVL-4604.17
150-20-200-120	350-350-175-175	1⅜ x 4	TVL-4608.10
†100-50-100-100	350-350-200-50	1⅜ x 3½	TVL-4608.11
†5-20-100-100	350-350-200-50	1⅜ x 2	TVL-4608.12
100-60-10-100	350-350-200-150	1⅜ x 4½	TVL-4609.4
†40-100-200-250	350-350-200-350	1⅜ x 5	TVL-4634.25
150-100-20-100	350-350-350-25	1⅜ x 4½	TVL-4622.9
†250-20-20-50	350-350-350-25	1⅜ x 4½	TVL-4622.11
†150-100-10-60	350-350-350-50	1⅜ x 4½	TVL-4624.8
150-100-10-100	350-350-350-50	1⅜ x 4	TVL-4633.8
†20-20-20-20	350-350-350-350	1⅜ x 2½	TVL-4634.13
†40-40-40-40	350-350-350-350	1⅜ x 4	TVL-4635.3
80-60-40-20	350-350-350-350	1⅜ x 3½	TVL-4635.7
100-100-50-50	350-350-350-350	1⅜ x 4	TVL-4635.15
†100-150-20-20	350-350-350-350	1⅜ x 4½	TVL-4635.23
†100-250-100-25	350-350-350-350	1⅜ x 4½	TVL-4635.27
80-80-4-100	400-200-150-50	1⅜ x 3½	TVL-4636.3
10-4-4-20	400-350-150-25	1⅜ x 2	TVL-4651.5
40-80-100-25	400-350-200-50	1⅜ x 3	TVL-4654
80-40-100-40	400-400-50-25	1⅜ x 3	TVL-4663.3
80-40-100-20	400-400-50-25	1⅜ x 3	TVL-4663.4
100-10-30-20	400-400-50-50	1⅜ x 2½	TVL-4663.5
†80-10-80-100	400-400-250-50	1⅜ x 3	TVL-4664.8
100-10-20-20	400-400-350-50	1⅜ x 3	TVL-4666.2
80-40-10-100	400-400-400-200	1⅜ x 3½	TVL-4671.2
†80-40-30-4	400-400-400-350	1⅜ x 3	TVL-4672
100-80-10-10	400-400-400-400	1⅜ x 3½	TVL-4683
†100-80-30-10	400-400-400-400	1⅜ x 4½	TVL-4683.8
†100-100-40-10	400-400-400-400	1⅜ x 4½	TVL-4684
†20-160-50-50	450-250-75-50	1⅜ x 4	TVL-4701.3
†80-2-100-25	450-350-25-25	1⅜ x 3	TVL-4705.3
10-140-100-20	450-350-300-300	1⅜ x 4	TVL-4705.9
†50-20-4-40	450-450-150-25	1⅜ x 2½	TVL-4712.9
†50-40-4-40	450-450-150-25	1⅜ x 2½	TVL-4712.10
†80-30-20-50	450-450-250-50	1⅜ x 3½	TVL-4714.2
†30-20-160-40	450-450-250-150	1⅜ x 4	TVL-4714.4
†30-50-100-250	450-450-250-50	1⅜ x 4½	TVL-4714.5
†80-50-20-50	450-450-250-50	1⅜ x 4	TVL-4714.6
†30-20-160-10	450-450-250-250	1⅜ x 4	TVL-4714.10
†80-50-20-150	450-450-250-25	1⅜ x 4	TVL-4714.11
†100-30-20-50	450-450-350-50	1⅜ x 4	TVL-4716.3
†30-20-4-200	450-450-350-250	1⅜ x 4	TVL-4716.4
†80-30-40-40	450-450-350-150	1⅜ x 4	TVL-4716.7
†100-30-20-50	450-450-350-75	1⅜ x 3½	TVL-4716.8
†10-10-10-20	450-450-450-25	1⅜ x 2	TVL-4723
20-20-20-20	450-450-450-25	1⅜ x 2	TVL-4724.2
40-40-40-40	450-450-450-25	1⅜ x 3	TVL-4739
†80-50-10-20	450-450-450-25	1⅜ x 4	TVL-4739.9
†80-30-20-40	450-450-450-150	1⅜ x 4	TVL-4754
†80-80-20-2	450-450-250-450	1⅜ x 4½	TVL-4757.7
†30-20-10-20	450-450-450-350	1⅜ x 2½	TVL-4757.12
†10-10-10-10	450-450-450-450	1⅜ x 2	TVL-4760
20-10-10-10	450-450-450-450	1⅜ x 2	TVL-4761
†20-20-20-20	450-450-450-450	1⅜ x 2½	TVL-4763
30-30-20-20	450-450-450-450	1⅜ x 3	TVL-4769.4
†40-20-20-20	450-450-450-450	1⅜ x 2½	TVL-4771.7
†40-40-20-20	450-450-450-450	1⅜ x 2½	TVL-4773
40-40-30-30	450-450-450-450	1⅜ x 4	TVL-4774
40-40-40-40	450-450-450-450	1⅜ x 3½	TVL-4775
†60-20-20-20	450-450-450-450	1⅜ x 3	TVL-4778
†70-25-5-5	450-450-450-450	1⅜ x 2½	TVL-4781
†80-40-20-20	450-450-450-450	1⅜ x 3½	TVL-4784.1
10-80-40-100	475-400-400-50	1⅜ x 4	TVL-4805.2
†80-4-4-200	475-450-450-25	1⅜ x 4	TVL-4813.2
†80-40-30-10	475-450-450-450	1⅜ x 3½	TVL-4814.4
†50-18-4-40	475-475-150-25	1⅜ x 2½	TVL-4814.7
†30-4-4-200	475-475-475-25	1⅜ x 2	TVL-4818.4
†100-4-4-200	475-475-475-25	1⅜ x 4	TVL-4818.5
†80-4-4-4	475-450-450-450	1⅜ x 3	TVL-4820.3
†50-40-4-40	475-475-150-25	1⅜ x 3½	TVL-4820.4
†80-80-4-4	475-475-450-450	1⅜ x 4½	TVL-4820.5
†80-4-4-200	475-475-475-25	1⅜ x 3½	TVL-4823
20-20-20-20	475-475-475-475	1⅜ x 2½	TVL-4834
40-20-10-10	475-475-475-475	1⅜ x 2½	TVL-4840
†80-4-30-4	475-475-475-475	1⅜ x 3½	TVL-4845

For a more complete line of over 600 Type TVL Capacitors, refer to Sprague Catalog C-563.

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EEM-23-IEIAT

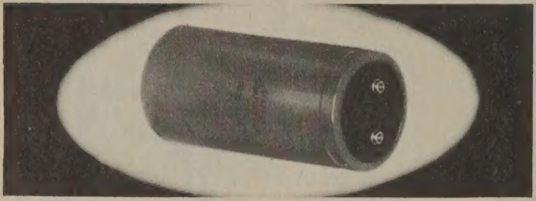
†Exact replacement for Color TV

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 32DR COMPULYTIC® ALUMINUM ELECTROLYTICS

MINIMUM ESR - - HIGH RIPPLE CURRENT CAPABILITY



- Designed for long, trouble-free power supply filtering applications in digital computers and allied equipment.
- Low ESR, low impedance . . . as little as ⅓ the ESR of standard capacitors of this type . . . ideally suited for use on the output of a power supply.
- Will safely handle up to 24 amperes of ripple current at 85 C and 120 Hz.
- Superior seal . . . beaded aluminum can is crimped onto rubber gasket recessed in rigid molded cover.
- Case cover has reliable rubber pressure-type safety vent.
- Operating temperature range: −40 C to +85 C.
- Capacitance tolerance: 7.5 thru 50V . . . +75, −10%, 60 thru 100V . . . +50, −10%.
- For complete technical data, including ripple current limits for each rating, refer to latest issue of Engineering Bulletin 3441.

DIMENSIONS

Code	D. x L.	Code	D. x L.	Code	D. x L.
AA	1.453 x 2.250	BB	2.078 x 3.250	CF	2.578 x 5.750
AB	1.453 x 3.250	BC	2.078 x 4.250	DC	3.078 x 4.250
AC	1.453 x 4.250	BF	2.078 x 5.750	DF	3.078 x 5.750
AF	1.453 x 5.750	CC	2.578 x 4.250	DJ	3.078 x 8.750

µF	Case Code	Catalog No.*
7.5 WVDC, 10V SURGE		
8600	AA	32DR862G7R5AA2A
16000	AB	32DR163G7R5AB2A
22000	AC	32DR223G7R5AC2A
33000	AF	32DR333G7R5AF2A
37000	BB	32DR373G7R5BB2A
53000	BC	32DR533G7R5BC2A
78000	BF	32DR783G7R5BF2A
92000	CC	32DR923G7R5CC2A
130000	CF	32DR134G7R5CF2A
140000	DC	32DR144G7R5DC2A
200000	DF	32DR204G7R5DF2A
310000	DJ	32DR314G7R5DJ2A
10 WVDC, 15V SURGE		
6900	AA	32DR692G010AA2A
12000	AB	32DR123G010AB2A
18000	AC	32DR183G010AC2A
26000	AF	32DR263G010AF2A
30000	BB	32DR303G010BB2A
43000	BC	32DR433G010BC2A
63000	BF	32DR633G010BF2A
74000	CC	32DR743G010CC2A
110000	CF	32DR114G010CF2A
110000	DC	32DR114G010DC2A
160000	DF	32DR164G010DF2A
250000	DJ	32DR254G010DJ2A
15 WVDC, 20V SURGE		
	AA	32DR552G015AA2A
	AB	32DR992G015AB2A
	AC	32DR143G015AC2A
	AF	32DR213G015AF2A
	BB	32DR243G015BB2A
	BC	32DR343G015BC2A
	BF	32DR503G015BF2A
	CC	32DR593G015CC2A
	CF	32DR863G015CF2A
87000	DC	32DR873G015DC2A
130000	DF	32DR134G015DF2A
200000	DJ	32DR204G015DJ2A
20 WVDC, 30V SURGE		
3900	AA	32DR392G020AA2A
7000	AB	32DR702G020AB2A
10000	AC	32DR103G020AC2A
15000	AF	32DR153G020AF2A
17000	BB	32DR173G020BB2A
24000	BC	32DR243G020BC2A
35000	BF	32DR353G020BF2A
41000	CC	32DR413G020CC2A
60000	CF	32DR603G020CF2A
61000	DC	32DR613G020DC2A
90000	DF	32DR903G020DF2A
140000	DJ	32DR144G020DJ2A
25 WVDC, 40V SURGE		
3300	AA	32DR332G025AA2A
6000	AB	32DR602G025AB2A
8700	AC	32DR872G025AC2A
13000	AF	32DR133G025AF2A
14000	BB	32DR143G025BB2A
21000	BC	32DR213G025BC2A
30000	BF	32DR303G025BF2A
36000	CC	32DR363G025CC2A
52000	CF	32DR523G025CF2A
53000	DC	32DR533G025DC2A
77000	DF	32DR773G025DF2A
120000	DJ	32DR124G025DJ2A
30 WVDC, 45V SURGE		
2800	AA	32DR282G030AA2A
5100	AB	32DR512G030AB2A
7400	AC	32DR742G030AC2A
11000	AF	32DR113G030AF2A
12000	BB	32DR123G030BB2A
18000	BC	32DR183G030BC2A
26000	BF	32DR263G030BF2A
30000	CC	32DR303G030CC2A
44000	CF	32DR443G030CF2A
45000	DC	32DR453G030DC2A
66000	DF	32DR663G030DF2A
100000	DJ	32DR104G030DJ2A
40 WVDC, 55V SURGE		
2300	AA	32DR232G040AA2A
4200	AB	32DR422G040AB2A
6000	AC	32DR602G040AC2A
8900	AF	32DR892G040AF2A
10000	BB	32DR103G040BB2A
14000	BC	32DR143G040BC2A
21000	BF	32DR213G040BF2A
25000	CC	32DR253G040CC2A
36000	CF	32DR363G040CF2A
37000	DC	32DR373G040DC2A
54000	DF	32DR543G040DF2A
85000	DJ	32DR853G040DJ2A
50 WVDC, 75V SURGE		
1400	AA	32DR142G050AA2A
2700	AB	32DR272G050AB2A
3900	AC	32DR392G050AC2A
5700	AF	32DR572G050AF2A
6300	BB	32DR632G050BB2A
9200	BC	32DR922G050BC2A
13000	BF	32DR133G050BF2A
16000	CC	32DR163G050CC2A
23000	CF	32DR233G050CF2A
23000	DC	32DR233G050DC2A
34000	DF	32DR343G050DF2A
53000	DJ	32DR533G050DJ2A
60 WVDC, 85V SURGE		
1200	AA	32DR122F060AA2A
2300	AB	32DR232F060AB2A
3300	AC	32DR332F060AC2A
4800	AF	32DR482F060AF2A
5300	BB	32DR532F060BB2A
7700	BC	32DR772F060BC2A
11000	BF	32DR113F060BF2A
13000	CC	32DR133F060CC2A
19000	CF	32DR193F060CF2A
19000	DC	32DR193F060DC2A
28000	DF	32DR283F060DF2A
45000	DJ	32DR453F060DJ2A
75 WVDC, 100V SURGE		
820	AA	32DR821F075AA2A
1600	AB	32DR162F075AB2A
2300	AC	32DR232F075AC2A
3300	AF	32DR332F075AF2A
3700	BB	32DR372F075BB2A
5400	BC	32DR542F075BC2A
7900	BF	32DR792F075BF2A
9200	CC	32DR922F075CC2A
14000	CF	32DR143F075CF2A
14000	DC	32DR143F075DC2A
20000	DF	32DR203F075DF2A
31000	DJ	32DR313F075DJ2A
100 WVDC, 150V SURGE		
410	AA	32DR411F100AA2A
810	AB	32DR811F100AB2A
1200	AC	32DR122F100AC2A
1700	AF	32DR172F100AF2A
1900	BB	32DR192F100BB2A
2800	BC	32DR282F100BC2A
4100	BF	32DR412F100BF2A
4800	CC	32DR482F100CC2A
7000	CF	32DR702F100CF2A
7000	DC	32DR702F100DC2A
10000	DF	32DR103F100DF2A
16000	DJ	32DR163F100DJ2A

*Capacitors listed have outer plastic-film insulation. For bare case, change 13th character of cat. no. from "2" to "0" and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For "special" high-insert or solder-lug terminals, change last character of cat. no. from "A" to "B" or "C," respectively.

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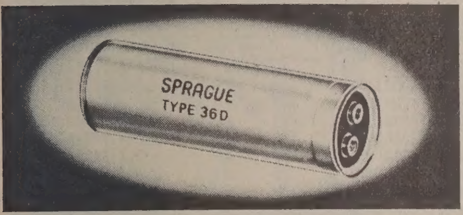
IND-93-EFAI

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 36D POWERLYTIC® ALUMINUM ELECTROLYTICS



RECOMMENDED FOR REPLACEMENT APPLICATIONS

- Excellent space economy at operating temperatures to 85 C.
- Uses most reliable seal developed by Sprague for aluminum 'lytic capacitors.
- Low ESR, low leakage currents.
- Pressure-type safety vents employing silicone rubber are used on all cases.
- Extremely long shelf life.
- For technical data, refer to Sprague Engineering Bulletin 3431.

μF	Size Code	Catalog Number*
3 WVDC, 4 VDC SURGE		
10000	AA	36D103G003AA2A
20000	AB	36D203G003AB2A
30000	AC	36D303G003AC2A
36000	AD	36D363G003AD2A
41000	AE	36D413G003AE2A
46000	AF	36D463G003AF2A
47000	BB	36D473G003BB2A
70000	BC	36D703G003BC2A
80000	CB	36D803G003CB2A
82000	BD	36D823G003BD2A
94000	BE	36D943G003BE2A
100000	BF	36D104G003BF2A
120000	CC	36D124G003CC2A
140000	CD	36D144G003CD2A
160000	CE	36D164G003CE2A
170000	DC	36D174G003DC2A
180000	CF	36D184G003CF2A
200000	DD	36D204G003DD2A
230000	DE	36D234G003DE2A
270000	DF	36D274G003DF2A
6 WVDC, 8 VDC SURGE		
7000	AA	36D702G006AA2A
14000	AB	36D143G006AB2A
21000	AC	36D213G006AC2A
25000	AD	36D253G006AD2A
29000	AE	36D293G006AE2A
32000	AF	36D323G006AF2A
33000	BB	36D333G006BB2A
50000	BC	36D503G006BC2A
57000	CB	36D573G006CB2A
58000	BD	36D583G006BD2A
66000	BE	36D663G006BE2A
75000	BF	36D753G006BF2A
86000	CC	36D863G006CC2A
100000	CD	36D104G006CD2A
110000	CE	36D114G006CE2A
120000	DC	36D124G006DC2A
140000	DD	36D144G006DD2A
160000	DE	36D164G006DE2A
190000	DF	36D194G006DF2A
10 WVDC, 12 VDC SURGE		
6000	AA	36D602G010AA2A
12000	AB	36D123G010AB2A
18000	AC	36D183G010AC2A
21000	AD	36D213G010AD2A
24000	AE	36D243G010AE2A
27000	AF	36D273G010AF2A
28000	BB	36D283G010BB2A
42000	BC	36D423G010BC2A
48000	CB	36D483G010CB2A
49000	BD	36D493G010BD2A
56000	BE	36D563G010BE2A
63000	BF	36D633G010BF2A
72000	CC	36D723G010CC2A
84000	CD	36D843G010CD2A
96000	CE	36D963G010CE2A
100000	CF	36D104G010CF2A
100000	DC	36D104G010DC2A
120000	DD	36D124G010DD2A
140000	DE	36D144G010DE2A
160000	DF	36D164G010DF2A
15 WVDC, 18 VDC SURGE		
4600	AA	36D462G015AA2A
9200	AB	36D922G015AB2A
13000	AC	36D133G015AC2A
16000	AD	36D163G015AD2A
18000	AE	36D183G015AE2A
20000	AF	36D203G015AF2A
21000	BB	36D213G015BB2A
31000	BC	36D313G015BC2A
36000	CB	36D363G015CB2A
37000	BD	36D373G015BD2A
42000	BE	36D423G015BE2A
47000	BF	36D473G015BF2A
54000	CC	36D543G015CC2A
63000	CD	36D633G015CD2A
72000	CE	36D723G015CE2A
80000	DC	36D803G015DC2A
81000	CF	36D813G015CF2A
93000	DD	36D933G015DD2A
100000	DE	36D104G015DE2A
120000	DF	36D124G015DF2A
25 WVDC, 30 VDC SURGE		
2700	AA	36D272G025AA2A
5500	AB	36D552G025AB2A
8200	AC	36D822G025AC2A
9600	AD	36D962G025AD2A
11000	AE	36D113G025AE2A
12000	AF	36D123G025AF2A
18000	BC	36D183G025BC2A
21000	CB	36D213G025CB2A
22000	BD	36D223G025BD2A
25000	BE	36D253G025BE2A
28000	BF	36D283G025BF2A
32000	CC	36D323G025CC2A
38000	CD	36D383G025CD2A
43000	CE	36D433G025CE2A
47000	DC	36D473G025DC2A
48000	CF	36D483G025CF2A
55000	DD	36D553G025DD2A
63000	DE	36D633G025DE2A
71000	DF	36D713G025DF2A
30 WVDC, 40 VDC SURGE		
2000	AA	36D202G030AA2A
4000	AB	36D402G030AB2A
6000	AC	36D602G030AC2A
7200	AD	36D722G030AD2A
8300	AE	36D832G030AE2A
9300	AF	36D932G030AF2A
9500	BB	36D952G030BB2A
14000	BC	36D143G030BC2A
16000	BD	36D163G030BD2A
19000	BE	36D193G030BE2A
21000	BF	36D213G030BF2A
24000	CC	36D243G030CC2A
28000	CD	36D283G030CD2A
32000	CE	36D323G030CE2A
36000	DC	36D363G030DC2A
37000	CF	36D373G030CF2A
42000	DD	36D423G030DD2A
48000	DE	36D483G030DE2A
54000	DF	36D543G030DF2A
40 WVDC, 50 VDC SURGE		
1800	AA	36D182G040AA2A
3600	AB	36D362G040AB2A
5500	AC	36D552G040AC2A
6400	AD	36D642G040AD2A
7300	AE	36D732G040AE2A
8300	AF	36D832G040AF2A
8400	BB	36D842G040BB2A
12000	BC	36D123G040BC2A
14000	BD	36D143G040BD2A
16000	BE	36D163G040BE2A
19000	BF	36D193G040BF2A
21000	CC	36D213G040CC2A
25000	CD	36D253G040CD2A
28000	CE	36D283G040CE2A
31000	DC	36D313G040DC2A
32000	CF	36D323G040CF2A
37000	DD	36D373G040DD2A
42000	DE	36D423G040DE2A
48000	DF	36D483G040DF2A
50 WVDC, 65 VDC SURGE		
1300	AA	36D132G050AA2A
2600	AB	36D262G050AB2A
3900	AC	36D392G050AC2A
4600	AD	36D462G050AD2A
5200	AE	36D522G050AE2A
5900	AF	36D592G050AF2A
6000	BB	36D602G050BB2A
9000	BC	36D902G050BC2A
10000	BD	36D103G050BD2A
12000	BE	36D123G050BE2A
13000	BF	36D133G050BF2A
15000	CC	36D153G050CC2A
18000	CD	36D183G050CD2A
20000	CE	36D203G050CE2A
22000	DC	36D223G050DC2A
23000	CF	36D233G050CF2A
26000	DD	36D263G050DD2A
30000	DE	36D303G050DE2A
34000	DF	36D343G050DF2A
75 WVDC, 95 VDC SURGE		
850	AA	36D851G075AA2A
1700	AB	36D172G075AB2A
2500	AC	36D252G075AC2A
3000	AD	36D302G075AD2A
3400	AE	36D342G075AE2A
3800	AF	36D382G075AF2A
3900	BB	36D392G075BB2A
5900	BC	35D592G075BC2A
6700	CB	36D672G075CB2A
6900	BD	36D692G075BD2A
7800	BE	36D782G075BE2A
8800	BF	36D882G075BF2A
10000	CC	36D103G075CC2A
11000	CD	36D113G075CD2A
13000	CE	36D133G075CE2A
14000	DC	36D143G075DC2A
15000	CF	36D153G075CF2A
17000	DD	36D173G075DD2A
20000	DE	36D203G075DE2A
22000	DF	36D223G075DF2A
100 WVDC, 125 VDC SURGE		
450	AA	36D451G100AA2A
900	AB	36D901G100AB2A
1300	AC	36D132G100AC2A
1500	AD	36D152G100AD2A
1800	AE	36D182G100AE2A
2000	AF	36D202G100AF2A
3000	BC	36D302G100BC2A
3500	CB	36D352G100CB2A
3600	BD	36D362G100BD2A
4000	BE	36D402G100BE2A
4500	BF	36D452G100BF2A
5300	CC	36D532G100CC2A
6100	CD	36D612G100CD2A
7000	CE	36D702G100CE2A
7800	CF	36D782G100CF2A
7800	DC	36D782G100DC2A
9100	DD	37D912G100DD2A
10000	DE	36D103G100DE2A
11000	DF	36D113G100DF2A
150 WVDC, 175 VDC SURGE		
300	AA	36D301F150AA2A
600	AB	36D601F150AB2A
900	AC	36D901F150AC2A
1100	AD	36D112F150AD2A
1200	AE	36D122F150AE2A
1300	AF	36D132F150AF2A
1400	BB	36D142F150BB2A
2100	BC	36D212F150BC2A
2400	BD	36D242F150BD2A
2700	BE	36D272F150BE2A
3100	BF	36D312F150BF2A
3600	CC	36D362F150CC2A
4200	CD	36D422F150CD2A
4700	CE	36D472F150CE2A
5300	CF	36D532F150CF2A
5300	DC	36D532F150DC2A
6200	DD	36D622F150DD2A
7000	DE	36D702F150DE2A
7800	DF	36D782F150DF2A
200 WVDC, 250 VDC SURGE		
250	AA	36D251F200AA2A
430	AB	36D431F200AB2A
640	AC	36D641F200AC2A
770	AD	36D771F200AD2A
850	AE	36D851F200AE2A
950	AF	36D951F200AF2A
1400	BC	36D142F200BC2A
1600	CB	36D162F200CB2A
1700	BD	36D172F200BD2A
1900	BE	36D192F200BE2A
2100	BF	36D212F200BF2A
2500	CC	36D252F200CC2A
2900	CD	36D292F200CD2A
3300	CE	36D332F200CE2A
3700	CF	36D372F200CF2A
3700	DC	36D372F200DC2A
4300	DD	36D432F200DD2A
4800	DE	36D482F200DE2A
5500	DF	36D552F200DF2A
250 WVDC, 300 VDC SURGE		
170	AA	36D171F250AA2A
350	AB	36D351F250AB2A
530	AC	36D531F250AC2A
630	AD	36D631F250AD2A
700	AE	36D701F250AE2A
780	AF	36D781F250AF2A
800	BB	36D801F250BB2A
1200	BC	36D122F250BC2A
1300	CB	36D132F250CB2A
1400	BD	36D142F250BD2A
1500	BE	36D152F250BE2A
1700	BF	36D172F250BF2A
2000	CC	36D202F250CC2A
2400	CD	36D242F250DC2A

DIMENSIONS

Code	D. x L.	Code	D. x L.	Code	D. x L.	Code	D. x L.
AA	1.453 x 2.250	AF	1.453 x 5.750	BF	2.078 x 5.750	CF	2.578 x 5.750
AB	1.453 x 3.250	BB	2.078 x 3.250	CB	2.578 x 3.250	DC	3.078 x 4.250
AC	1.453 x 4.250	BC	2.078 x 4.250	CC	2.578 x 4.250	DD	3.078 x 4.750
AD	1.453 x 4.750	BD	2.078 x 4.750	CD	2.578 x 4.750	DE	3.078 x 5.250
AE	1.453 x 5.250	BE	2.078 x 5.250	CE	2.578 x 5.250	DF	3.078 x 5.750
						DJ	3.078 x 8.750

*Capacitors listed have outer plastic-film insulation. For bare case, change 13th character of cat. no. from "2" to "0" and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For high-insert or solder-lug terminals, change last character of cat. no. from "A" to "B" or "C," respectively.

Sizes subject to change without notice.

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IND-EE

SPRAGUE CAPACITORS

TYPE 36D POWERLYTIC® ELECTROLYTICS, continued

µF	Size Code	Catalog Number*
250 WVDC, 300 VDC SURGE (cont.)		
2700	CE	36D272F250CE2A
3000	CF	36D302F250CF2A
3000	DC	36D302F250DC2A
3500	DD	36D352F250DD2A
4000	DE	36D402F250DE2A
4500	DF	36D452F250DF2A
300 WVDC, 350 VDC SURGE		
120	AA	36D121F300AA2A
240	AB	36D241F300AB2A
370	AC	36D371F300AC2A
450	AD	36D451F300AD2A
500	AE	36D501F300AE2A
550	AF	36D551F300AF2A
820	BC	36D821F300BC2A
950	BD	36D951F300BD2A
1100	BE	36D112F300BE2A
1200	BF	36D122F300BF2A
1400	CC	36D142F300CC2A
1600	CD	36D162F300CD2A
1800	CE	36D182F300CE2A
2100	CF	36D212F300CF2A
2100	DC	36D212F300DC2A
300 WVDC, 350 VDC SURGE (cont.)		
2400	DD	36D242F300DD2A
2700	DE	36D272F300DE2A
3100	DF	36D312F300DF2A
350 WVDC, 400 VDC SURGE		
95	AA	36D950F350AA2A
190	AB	36D191F350AB2A
290	AC	36D291F350AC2A
360	AD	36D361F350AD2A
390	AE	36D391F350AE2A
420	BB	36D421F350BB2A
440	AF	36D441F350AF2A
650	BC	36D651F350BC2A
750	CB	36D751F350CB2A
780	BD	36D781F350BD2A
880	BE	36D881F350BE2A
1000	BF	36D102F350BF2A
1100	CC	36D112F350CC2A
1300	CD	36D132F350CD2A
1500	CE	36D152F350CE2A
1600	DC	36D162F350DC2A
1700	CF	36D172F350CF2A
1900	DD	36D192F350DD2A
350 WVDC, 400 VDC SURGE (cont.)		
2200	DE	36D222F350DE2A
2500	DF	36D252F350DF2A
400 WVDC, 475 VDC SURGE		
65	AA	36D650F400AA2A
120	AB	36D121F400AB2A
190	AC	36D191F400AC2A
230	AD	36D231F400AD2A
270	AE	36D271F400AE2A
290	BB	36D291F400BB2A
300	AF	36D301F400AF2A
420	BC	36D421F400BC2A
490	CB	36D491F400CB2A
530	BD	36D531F400BD2A
610	BE	36D611F400BE2A
680	BF	36D681F400BF2A
790	CC	36D791F400CC2A
910	CD	36D911F400CD2A
1000	CE	36D102F400CE2A
1000	DC	36D102F400DC2A
1100	CF	36D112F400CF2A
1200	DD	36D122F400DD2A
1400	DE	36D142F400DE2A
400 WVDC, 475 VDC SURGE (cont.)		
1600	DF	36D162F400DF2A
450 WVDC, 525 VDC SURGE		
50	AA	36D500F450AA2A
100	AB	36D101F450AB2A
140	AC	36D141F450AC2A
170	AD	36D171F450AD2A
190	AE	36D191F450AE2A
210	AF	36D211F450AF2A
220	BB	36D221F450BB2A
330	BC	36D331F450BC2A
380	CB	36D381F450CB2A
390	BD	36D391F450BD2A
440	BE	36D441F450BE2A
490	BF	36D491F450BF2A
570	CC	36D571F450CC2A
660	CD	36D661F450CD2A
760	CE	36D761F450CE2A
850	CF	36D851F450CF2A
860	DC	36D861F450DC2A
1000	DD	36D102F450DD2A
1100	DE	36D112F450DE2A
1200	DF	36D122F450DF2A

*Capacitors listed have outer plastic-film insulation. For bare case, change 13th character of cat. no. from "2" to "0" and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For "special" high-insert or solder-lug terminals, change last character of cat. no. from "A" to "B" or "C," respectively.

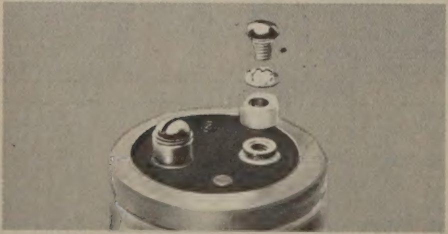
TYPE 36DX POWERLYTIC® ALUMINUM ELECTROLYTICS

RECOMMENDED FOR NEW EQUIPMENT DESIGNS

- Have extended capacitance ratings (higher capacitance, smaller cases) required in new designs.
- Capacitors listed have outer plastic-film insulation. For bare case, change 14th digit of Cat. No. from "2" to "0". Capacitors listed have low-insert terminals. For high-insert or solder-lug terminals, change last letter from "A" to "B" or "C" respectively.

µF	Size Code	Catalog Number
10 WVDC, 12 VDC SURGE		
9000	AA	36DX902G010AA2A
18000	AB	36DX183G010AB2A
27000	AC	36DX273G010AC2A
41000	AF	36DX413G010AF2A
58000	BC	36DX583G010BC2A
88000	BF	36DX883G010BF2A
100000	CC	36DX104G010CC2A
150000	CF	36DX154G010CF2A
150000	DC	36DX154G010DC2A
230000	DF	36DX234G010DF2A
390000	DJ	36DX394G010DJ2A
15 WVDC, 18 VDC SURGE		
7500	AA	36DX752G015AA2A
15000	AB	36DX153G015AB2A
22000	AC	36DX223G015AC2A
34000	AF	36DX343G015AF2A
50000	BC	36DX503G015BC2A
75000	BF	36DX753G015BF2A
83000	CC	36DX833G015CC2A
120000	CF	36DX124G015CF2A
120000	DC	36DX124G015DC2A
180000	DF	36DX184G015DF2A
300000	DJ	36DX304G015DJ2A
25 WVDC, 30 VDC SURGE		
4500	AA	36DX452G025AA2A
9000	AB	36DX902G025AB2A
13000	AC	36DX133G025AC2A
20000	AF	36DX203G025AF2A
30000	BC	36DX303G025BC2A
45000	BF	36DX453G025BF2A
50000	CC	36DX503G025CC2A
75000	CF	36DX753G025CF2A
75000	DC	36DX753G025DC2A
110000	DF	36DX114G025DF2A
190000	DJ	36DX194G025DJ2A
30 WVDC, 40 VDC SURGE		
4000	AA	36DX402G030AA2A
8000	AB	36DX802G030AB2A
12000	AC	36DX123G030AC2A
18000	AF	36DX183G030AF2A
26000	BC	36DX263G030BC2A
39000	BF	36DX393G030BF2A
44000	CC	36DX443G030CC2A
66000	CF	36DX663G030CF2A
66000	DC	36DX663G030DC2A
97000	DF	36DX973G030DF2A
160000	DJ	36DX164G030DJ2A
40 WVDC, 50 VDC SURGE		
2900	AA	36DX292G040AA2A
5800	AB	36DX582G040AB2A
8700	AC	36DX872G040AC2A
13000	AF	36DX133G040AF2A
20000	BC	36DX203G040BC2A
30000	BF	36DX303G040BF2A
34000	CC	36DX343G040CC2A
51000	CF	36DX513G040CF2A
51000	DC	36DX513G040DC2A
76000	DF	36DX763G040DF2A
120000	DJ	36DX124G040DJ2A
50 WVDC, 65 VDC SURGE		
2400	AA	36DX242G050AA2A
4800	AB	36DX482G050AB2A
7200	AC	36DX722G050AC2A
11000	AF	36DX113G050AF2A
16000	BC	36DX163G050BC2A
24000	BF	36DX243G050BF2A
27000	CC	36DX273G050CC2A
40000	CF	36DX403G050CF2A
41000	DC	36DX413G050DC2A
61000	DF	36DX613G050DF2A
100000	DJ	36DX104G050DJ2A
75 WVDC, 95 VDC SURGE		
1400	AA	36DX142G075AA2A
2800	AB	36DX282G075AB2A
4200	AC	36DX422G075AC2A
6300	AF	36DX632G075AF2A
10000	BC	36DX103G075BC2A
15000	BF	36DX153G075BF2A
17000	CC	36DX173G075CC2A
25000	CF	36DX253G075CF2A
25000	DC	36DX253G075DC2A
37000	DF	36DX373G075DF2A
60000	DJ	36DX603G075DJ2A
100 WVDC, 125 VDC SURGE		
850	AA	36DX851G100AA2A
1700	AB	36DX172G100AB2A
2600	AC	36DX262G100AC2A
3800	AF	36DX382G100AF2A
5800	BC	36DX582G100BC2A
8700	BF	36DX872G100BF2A
9800	CC	36DX982G100CC2A
15000	CF	36DX153G100CF2A
15000	DC	36DX153G100DC2A
21000	DF	36DX213G100DF2A
36000	DJ	36DX363G100DJ2A
200 WVDC, 250 VDC SURGE		
300	AA	36DX301F200AA2A
590	AB	36DX591F200AB2A
850	AC	36DX851F200AC2A
1200	AF	36DX122F200AF2A
1400	BB	36DX142F200BB2A
2000	BC	36DX202F200BC2A
2900	BF	36DX292F200BF2A
3400	CC	36DX342F200CC2A
4900	CF	36DX492F200CF2A
7400	DF	36DX742F200DF2A
12000	DJ	36DX123F200DJ2A
250 WVDC, 300 VDC SURGE		
250	AA	36DX251F250AA2A
500	AB	36DX501F250AB2A
740	AC	36DX741F250AC2A
1100	AF	36DX112F250AF2A
1200	BB	36DX122F250BB2A
1700	BC	36DX172F250BC2A
2500	BF	36DX252F250BF2A
2900	CC	36DX292F250CC2A
4200	CF	36DX422F250CF2A
6300	DF	36DX632F250DF2A
10000	DJ	36DX103F250DJ2A
350 WVDC, 400 VDC SURGE		
130	AA	36DX131F350AA2A
260	AB	36DX261F350AB2A
380	AC	36DX381F350AC2A
580	AF	36DX581F350AF2A
610	BB	36DX611F350BB2A
880	BC	36DX881F350BC2A
1300	BF	36DX132F350BF2A
1500	CC	36DX152F350CC2A
2200	CF	36DX222F350CF2A
3300	DF	36DX332F350DF2A
5100	DJ	36DX512F350DJ2A
450 WVDC, 525 VDC SURGE		
80	AA	36DX800F450AA2A
160	AB	36DX161F45CAB2A
230	AC	36DX231F450AC2A
350	AF	36DX351F450AF2A
380	BB	36DX381F450BB2A
540	BC	36DX541F450BC2A
800	BF	36DX801F450BF2A
930	CC	36DX931F450CC2A
1300	CF	36DX132F450CF2A
2000	DF	36DX202F450DF2A
3100	DJ	36DX312F450DJ2A

TERMINAL BUSHING FOR POWER-SUPPLY ELECTROLYTIC CAPACITORS



- Converts low screw-insert terminals to high screw-insert terminals on power-supply 'lytic capacitors.
- Made from aluminum and especially tooled to close tolerance dimensions, assuring proper electrical connection between terminal and adapter, eliminating resistance between these two elements.
- The additional 3/16" length on terminals is often required on bus-board applications.
- Packaged 2 to an envelope, complete with washers and screws.

For use with Sprague Capacitor Types:	Dia.	Cat. No.
36D/36DX, 32DR, 602D	Restricted to 1⅜" and 2" only on Type 602D units	75-327

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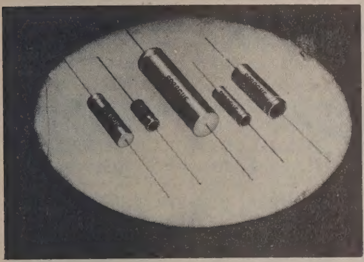
IND-EEM-REM-16E-EIAA

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 39D POWERLYTIC® ELECTROLYTIC CAPACITORS



Designed for applications which require the greatest possible capacitance in small physical case sizes.

- Type 39D capacitors supplement the original Type 36D Can-type Powerlytic line by offering high-capacitance units in axial-lead tubular configuration.
- Welds at all critical anode and cathode terminals eliminate riveted or pressure connections to assure freedom from open circuit even during operation in the microvolt or millivolt signal range.
- Improved molded phenolic end seals.
- Furnished with outer plastic insulating sleeve.
- Operating temperature range, — 20 C to +85 C.
- These capacitors are provided with a pressure-sensitive safety vent.
- Low ESR, low leakage currents.
- Service life, 10 yrs. or more in normal circuit applications.
- For complete technical data, see latest issue of Sprague Engineering Bulletin 3415.

CALL YOUR SPRAGUE INDUSTRIAL DISTRIBUTOR FOR CURRENT QUALITY PRICES

µF	Diam.xLength	Catalog Number*
	3 WVDC, 4 VDC SURGE	
400	.562x1.250	39D407G003EE4
900	.562x1.750	39D907G003EJ4
1300	.562x2.250	39D138G003EL4
1400	.812x1.250	39D148G003GE4
1800	.687x1.750	39D188G003FJ4
2100	.937x1.250	39D218G003HE4
2700	.687x2.250	39D278G003FL4
2900	.812x1.750	39D298G003GJ4
3000	1.062x1.250	39D308G003JE4
3600	.687x2.750	39D368G003FP4
4200	.937x1.750	39D428G003HJ4
4300	.812x2.250	39D438G003GL4
5700	.812x2.750	39D578G003GP4
6000	1.062x1.750	39D608G003JJ4
8500	.937x2.750	39D858G003HP4
9000	1.062x2.250	39D908G003JL4
10000	.937x3.250	39D109G003HS4
12000	1.062x2.750	39D129G003JP4
15000	1.062x3.250	39D159G003JS4
18000	1.062x3.750	39D189G003JT4
	6 WVDC, 8 VDC SURGE	
300	.562x1.250	39D307G006EE4
600	.562x1.750	39D607G006EJ4
900	.562x2.250	39D907G006EL4
1000	.812x1.250	39D108G006GE4
1200	.687x1.750	39D128G006FJ4
1500	.937x1.250	39D158G006HE4
1900	.687x2.250	39D198G006FL4
2000	.687x2.250	39D208G006GJ4
2100	1.062x1.250	39D218G006JE4
2500	.687x2.750	39D258G006FP4
3000	.812x2.250	39D308G006GL4
4000	.812x2.750	39D408G006GP4
4200	1.062x1.750	39D428G006JJ4
6000	.937x2.750	39D608G006HP4
6300	1.062x2.250	39D638G006JL4
7500	.937x3.250	39D758G006HS4
8500	1.062x2.750	39D858G006JP4
10000	1.062x3.250	39D109G006JS4
12000	1.062x3.750	39D129G006JT4

µF	Diam.xLength	Catalog Number*
	10 WVDC, 12 VDC SURGE	
250	.562x1.250	39D257G010EE4
500	.562x1.750	39D507G010EJ4
800	.562x2.250	39D807G010EL4
850	.812x1.250	39D857G010GE4
1000	.687x1.750	39D108G010FJ4
1200	.937x1.250	39D128G010HE4
1600	.687x2.250	39D168G010FL4
1700	.812x1.750	39D178G010GJ4
2100	.687x2.750	39D218G010FP4
2500	.812x2.250	39D258G010GL4
3400	.812x2.750	39D348G010GP4
3500	1.062x1.250	39D358G010JJ4
5000	.937x2.750	39D508G010HP4
5200	1.062x2.250	39D528G010JL4
6300	.937x3.250	39D638G010HS4
7100	1.062x2.750	39D718G010JP4
8800	1.062x3.250	39D888G010JS4
10000	1.062x3.750	39D109G010JT4
	15 WVDC, 18 VDC SURGE	
200	.562x1.250	39D207G015EE4
400	.562x1.750	39D407G015EJ4
600	.562x2.250	39D607G015EL4
800	.687x1.750	39D807G015FJ4
950	.937x1.250	39D957G015HE4
1200	.687x2.250	39D128G015FL4
1300	.812x1.750	39D138G015GJ4
1600	.687x2.750	39D168G015FP4
1900	.812x2.250	39D198G015GL4
2500	.812x2.750	39D258G015GP4
2600	1.062x1.750	39D268G015JJ4
3800	.937x2.750	39D388G015HP4
4000	1.062x2.250	39D408G015JL4
4700	.937x3.250	39D478G015HS4
5300	1.062x2.750	39D538G015JP4
6600	1.062x3.250	39D668G015JS4
8000	1.062x3.750	39D808G015JT4

µF	Diam.xLength	Catalog Number*
	25 WVDC, 30 VDC SURGE	
100	.562x1.250	39D107G025EE4
200	.562x1.750	39D207G025EJ4
350	.562x2.250	39D357G025EL4
450	.687x1.750	39D457G025FJ4
500	.937x1.250	39D507G025HE4
700	.687x2.250	39D707G025FL4
750	.812x1.750	39D757G025GJ4
800	1.062x1.250	39D807G025JE4
950	.687x2.750	39D957G025FP4
1000	.812x2.250	39D108G025GL4
1100	.937x1.750	39D118G025HJ4
1500	.812x2.750	39D158G025GP4
1600	1.062x1.750	39D168G025JJ4
1700	.937x2.250	39D178G025HL4
2200	.937x2.750	39D228G025HP4
2400	1.062x2.250	39D248G025JL4
2800	.937x3.250	39D288G025HS4
3200	1.062x2.750	39D328G025JP4
4000	1.062x3.250	39D408G025JS4
4700	1.062x3.750	39D478G025JT4
	30 WVDC, 40 VDC SURGE	
75	.562x1.250	39D756G030EE4
150	.562x1.750	39D157G030EJ4
250	.562x2.250	39D257G030EL4
350	.687x1.750	39D357G030FJ4
400	.937x1.250	39D407G030HE4
500	.687x2.250	39D507G030FL4
600	1.062x1.250	39D607G030JE4
700	.687x2.750	39D707G030FP4
850	.812x2.250	39D857G030GL4
1100	.812x2.750	39D118G030GP4
1200	.937x2.250	39D128G030HL4
1700	.937x2.750	39D178G030HP4
1800	1.062x2.250	39D188G030JL4
2100	.937x3.250	39D218G030HS4
2400	1.062x2.750	39D248G030JP4
3000	1.062x3.250	39D308G030JS4
3600	1.062x3.750	39D368G030JT4

*These capacitors have outer insulation. For units with bare case, change last character in catalog number from 4 to 0, and subtract .062" from diameter and .125" from length.

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IND-EEM-16B-EFAF

Sizes subject to change without notice

SPRAGUE CAPACITORS

TYPE 39D POWERLYTIC® ELECTROLYTICS, continued

40 WVDC, 50 VDC SURGE

μF	Diam. x Length	Catalog Number*
75	.562x1.250	39D756G040EE4
150	.562x1.750	39D157G040EJ4
200	.562x2.250	39D207G040EL4
250	.812x1.250	39D257G040GE4
300	.687x1.750	39D307G040FJ4
350	.937x1.250	39D357G040HE4
450	.687x2.250	39D457G040FL4
500	.812x1.750	39D507G004GJ4
600	.687x2.750	39D607G040FP4
750	.812x2.250	39D757G040GL4
1000	.812x2.750	39D108G040GP4
1100	.937x2.250	39D118G040HL4
1500	.937x2.750	39D158G040HP4
1600	1.062x2.250	39D168G040JL4
1900	.937x3.250	39D198G040HS4
2100	1.062x2.750	39D218G040JP4
2600	1.062x3.250	39D268G040JS4
3200	1.062x3.750	39D328G040JT4

50 WVDC, 65 VDC SURGE

μF	Diam. x Length	Catalog Number*
50	.562x1.250	39D506G050EE4
100	.562x1.750	39D107G050EJ4
150	.562x2.250	39D157G050EL4
200	.687x1.750	39D207G050FJ4
250	.937x1.250	39D257G050HE4
350	.687x2.250	39D357G050FL4
450	.687x2.750	39D457G050FP4
500	.812x2.250	39D507G050GL4
700	.812x2.750	39D707G050GP4
750	1.062x1.750	39D757G050JJ4
800	.937x2.250	39D807G050HL4
1100	.937x2.750	39D118G050HP4
1300	.937x3.250	39D138G050HS4
1500	1.062x2.750	39D158G050JP4
1900	1.062x3.250	39D198G050JS4
2300	1.062x3.750	39D238G050JT4

75 WVDC, 95 VDC SURGE

μF	Diam. x Length	Catalog Number*
30	.562x1.250	39D306G075EE4
75	.562x1.750	39D756G075EJ4
100	.562x2.250	39D107G075EL4
150	.687x1.750	39D157G075FJ4
200	.687x2.250	39D207G075FL4
250	1.062x1.250	39D257G075JE4
300	.687x2.750	39D307G075FP4
350	.812x2.250	39D357G075GL4
450	.812x2.750	39D457G075GP4
500	.937x2.250	39D507G075HL4
700	.937x2.750	39D707G075HP4
750	1.062x2.250	39D757G075JL4
850	.937x3.250	39D857G075HS4
1000	1.062x2.750	39D108G075JP4
1200	1.062x3.250	39D128G075JS4
1500	1.062x3.750	39D158G075JT4

100 WVDC, 125 VDC SURGE

μF	Diam. x Length	Catalog Number*
15	.562x1.250	39D156F100EE4
35	.562x1.750	39D356F100EJ4
55	.562x2.250	39D556F100EL4
60	.812x1.250	39D606F100GE4
75	.687x1.750	39D756F100FJ4
90	.937x1.250	39D906F100HE4
110	.687x2.250	39D117F100FL4
120	.812x1.750	39D127F100GJ4
130	1.062x1.250	39D137F100JE4

100 WVDC, 125 VDC (cont.)

μF	Diam. x Length	Catalog Number*
150	.687x2.750	39D157F100FP4
180	.937x1.750	39D187F100HJ4
190	.812x2.250	39D197F100GL4
250	.812x2.750	39D257F100GP4
260	1.062x1.750	39D267F100JJ4
280	.937x2.250	39D287F100HL4
370	.937x2.750	39D377F100HP4
390	1.062x2.250	39D397F100JL4
460	.937x3.250	39D467F100HS4
520	1.062x2.750	39D527F100JP4
650	1.062x3.250	39D657F100JS4
780	1.062x3.750	39D787F100JT4

150 WVDC, 175 VDC SURGE

μF	Diam. x Length	Catalog Number*
10	.562x1.250	39D106F150EE4
25	.562x1.750	39D256F150EJ4
40	.562x2.250	39D406F150EL4
50	.687x1.750	39D506F150FJ4
60	.937x1.250	39D606F150HE4
80	.687x2.250	39D806F150FL4
85	.812x1.750	39D856F150GJ4
88	1.062x1.250	39D886F150JE4
100	.687x2.750	39D107F150FP4
120	.812x2.250	39D127F150GL4
170	.812x2.750	39D177F150GP4
190	.937x2.250	39D197F150HL4
250	.937x2.750	39D257F150HP4
260	1.062x2.250	39D267F150JL4
310	.937x3.250	39D317F150HS4
350	1.062x2.750	39D357F150JP4
440	1.062x3.250	39D447F150JS4
530	1.062x3.750	39D537F150JT4

200 WVDC, 250 VDC SURGE

μF	Diam. x Length	Catalog Number*
9	.562 x 1.250	39D905F200EE4
15	.562 x 1.750	39D156F200EJ4
25	.562 x 2.250	39D256F200EL4
30	.812 x 1.250	39D306F200GE4
35	.687 x 1.750	39D356F200FJ4
40	.937 x 1.250	39D406F200HE4
55	.687 x 2.250	39D556F200FL4
60	.812 x 1.750	39D606F200GJ4
75	.687 x 2.750	39D756F200FP4
80	.937 x 1.750	39D806F200HJ4
90	.812 x 2.250	39D906F200GL4
120	.812 x 2.750	39D127F200GP4
130	.937 x 2.750	39D137F200HL4
170	.937 x 2.750	39D177F200HP4
180	1.062 x 2.250	39D187F200JL4
220	.937 x 3.250	39D227F200HS4
250	1.062 x 2.750	39D257F200JP4
310	1.062 x 3.250	39D317F200JS4
370	1.062 x 3.750	39D377F200JT4

250 WVDC, 300 VDC SURGE

μF	Diam. x Length	Catalog Number*
7	.562x1.250	39D705F250EE4
15	.562x1.750	39D156F250EJ4
20	.562x2.250	39D206F250EL4
30	.687x1.750	39D306F250FJ4
35	.937x1.250	39D356F250HE4
45	.687x2.250	39D456F250FL4
50	1.062x1.250	39D506F250JE4
60	.687x2.750	39D606F250FP4
70	.812x2.250	39D706F250GL4
95	.812x2.750	39D956F250GP4
100	.937x2.250	39D107F250HL4

250 WVDC, 300 VDC SURGE (cont.)

μF	Diam. x Length	Catalog Number*
140	.937x2.750	39D147F250HP4
150	1.062x2.250	39D157F250JL4
180	.937x3.250	39D187F250HS4
200	1.062x2.750	39D207F250JP4
250	1.062x3.250	39D257F250JS4
300	1.062x3.750	39D307F250JT4

300 WVDC, 350 VDC SURGE

μF	Diam. x Length	Catalog Number*
5	.562x1.250	39D505F300EE4
10	.562x1.750	39D106F300EJ4
15	.562x2.250	39D156F300EL4
20	.687x1.750	39D206F300FJ4
25	.937x1.250	39D256F300HE4
30	.687x2.250	39D306F300FL4
40	.687x2.750	39D406F300FP4
50	.812x2.250	39D506F300GL4
65	.812x2.750	39D656F300GP4
75	.937x2.250	39D756F300HL4
100	.937x2.750	39D107F300HP4
120	.937x3.250	39D127F300HS4
130	1.062x2.750	39D137F300JP4
170	1.062x3.250	39D177F300JS4
200	1.062x3.750	39D207F300JT4

350 WVDC, 400 VDC SURGE

μF	Diam. x Length	Catalog Number*
4	.562x1.250	39D405F350EE4
8	.562x1.750	39D805F350EJ4
12	.562x2.250	39D126F350EL4
15	.687x1.750	39D156F350FJ4
20	.687x2.250	39D206F350FL4
25	.812x1.750	39D256F350GJ4
30	.687x2.750	39D306F350FP4
40	.812x2.250	39D406F350GL4
50	.812x2.750	39D506F350GP4
60	.937x2.250	39D606F350HL4
80	.937x2.750	39D806F350HP4
100	.937x3.250	39D107F350HS4
110	1.062x2.750	39D117F350JP4
130	1.062x3.250	39D137F350JS4
160	1.062x3.750	39D167F350JT4

400 WVDC, 475 VDC SURGE

μF	Diam. x Length	Catalog Number*
2	.562x1.250	39D205F400EE4
5	.562x1.750	39D505F400EJ4
10	.687x1.750	39D106F400FJ4
15	.687x2.250	39D156F400FL4
20	.687x2.750	39D206F400FP4
25	.812x2.250	39D256F400GL4
35	.812x2.750	39D356F400GP4
40	.937x2.250	39D406F400HL4
55	.937x2.750	39D556F400HP4
65	.937x3.250	39D656F400HS4
75	1.062x2.750	39D756F400JP4
90	1.062x3.250	39D906F400JS4
110	1.062x3.750	39D117F400JT4

450 WVDC, 525 VDC SURGE

μF	Diam. x Length	Catalog Number*
1	.562x1.250	39D105F450EE4
3	.562x1.750	39D305F450EJ4
5	.562x2.250	39D505F450EL4
10	.687x2.250	39D106F450FL4
15	.687x2.750	39D156F450FP4
20	.812x2.250	39D206F450GL4
25	.812x2.750	39D256F450GP4
35	.937x2.750	39D356F450HP4
45	.937x3.250	39D456F450HS4
50	1.062x2.750	39D506F450JP4
65	1.062x3.250	39D656F450JS4
75	1.062x3.750	39D756F450JT4

*These capacitors have outer insulation. For units with bare case, change last character in catalog number from 4 to 0, and subtract .062" from diameter and .125" from length.

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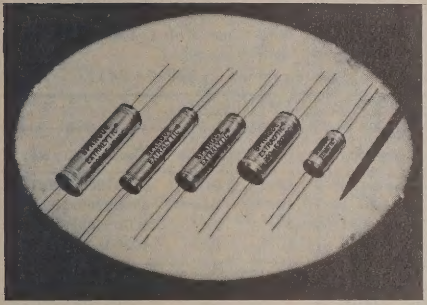
IND-EEM-16C-PRAR

Sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 604D 4-TERMINAL EXTRALYTIC® ALUMINUM ELECTROLYTIC CAPACITORS



- Premium-grade capacitors with true four-terminal construction, specifically designed for use in switching regulators and other high frequency applications.
- Low equivalent series resistance, low inductance, low impedance.
- Operating temperature range, −55 C to +105 C.
- Guaranteed inductance limit of 2 nH, with typical values of less than 1nH when used in the four-terminal mode.
- Impedance limits at 10 kHz are as low as 17 mΩ.
- Capacitance tolerance: 5- through 50-volt capacitors, −10 +50%. Above 50 volts, −10 +75%.
- Outer plastic film insulation with polymer-coated end seals which permit degreasing in halogenated solvents.
- For complete technical data, refer to latest issue of Engineering Bulletin 3458.

μF	Dia. x Length	Catalog Number
	5 WVDC	
2400	.812 x 1.843	604D242G005GJ6
3300	.812 x 2.343	604D332G005GL6
3700	.937 x 1.843	604D372G005HJ6
4400	.812 x 2.843	604D442G005GP6
5000	.937 x 2.343	604D502G005HL6
5700	.812 x 3.343	604D572G005GS6
6200	.937 x 2.843	604D622G005HP6
7200	1.062 x 2.343	604D722G005JL6
8800	.937 x 3.343	604D882G005HS6
10000	1.062 x 2.843	604D103G005JP6
13000	1.062 x 3.343	604D133G005JS6
16000	1.062 x 3.843	604D163G005JT6
	7.5 WVDC	
2000	.812 x 1.843	604D202G7R5GJ6
3000	.937 x 1.843	604D302G7R5HJ6
3800	.812 x 2.843	604D382G7R5GP6
4400	.937 x 2.343	604D442G7R5HL6
4800	1.062 x 1.843	604D482G7R5JJ6
5000	.812 x 3.343	604D502G7R5GS6
5800	.937 x 2.843	604D582G7R5HP6
6200	1.062 x 2.343	604D622G7R5JL6
7500	.937 x 3.343	604D752G7R5HS6
9000	1.062 x 2.843	604D902G7R5JP6
11000	1.062 x 3.343	604D113G7R5JS6
14000	1.062 x 3.843	604D143G7R5JT6
	10 WVDC	
1700	.812 x 1.843	604D172G010GJ6
2300	.812 x 2.343	604D232G010GL6
2600	.937 x 1.843	604D262G010HJ6
3000	.812 x 2.843	604D302G010GP6
3600	.937 x 2.343	604D362G010HL6
4100	.812 x 3.343	604D412G010GS6
4800	.937 x 2.843	604D482G010HP6
5100	1.062 x 2.343	604D512G010JL6
6300	.937 x 3.343	604D632G010HS6
7500	1.062 x 2.843	604D752G010JP6
9700	1.062 x 3.343	604D972G010JS6
12000	1.062 x 3.843	604D123G010JT6
	16 WVDC	
1400	.812 x 1.843	604D142G016GJ6
1900	.812 x 2.343	604D192G016GL6
2100	.937 x 1.843	604D212G016HJ6
2700	.937 x 2.343	604D272G016HL6
3400	.812 x 3.343	604D342G016GS6
4200	1.062 x 2.343	604D422G016JL6
5200	.937 x 3.343	604D522G016HS6
6100	1.062 x 2.843	604D612G016JP6
6400	.937 x 3.843	604D642G016HT6
8000	1.062 x 3.343	604D802G016JS6
10000	1.062 x 3.843	604D103G016JT6
	20 WVDC	
1200	.812 x 1.843	604D122G020GJ6
1800	.937 x 1.843	604D182G020HJ6
2200	.812 x 2.843	604D222G020GP6
2400	.937 x 2.343	604D242G020HL6
2900	.812 x 3.343	604D292G020GS6
3400	.937 x 2.843	604D342G020HP6
3700	1.062 x 2.343	604D372G020JL6
4500	.937 x 3.343	604D452G020HS6
5300	1.062 x 2.843	604D532G020JP6
7000	1.062 x 3.343	604D702G020JS6
8600	1.062 x 3.843	604D862G020JT6
	25 WVDC	
900	.812 x 1.843	604D901G025GJ6
1200	.812 x 2.343	604D122G025GL6
1600	.812 x 2.843	604D162G025GP6
2000	.937 x 2.343	604D202G025HL6
2500	1.062 x 2.343	604D252G025JL6
2800	.937 x 2.843	604D282G025HP6
3600	1.062 x 2.843	604D362G025JP6
4700	1.062 x 3.343	604D472G025JS6
5700	1.062 x 3.843	604D572G025JT6
	30 WVDC	
700	.812 x 1.843	604D701G030GJ6
900	.812 x 2.343	604D901G030GL6
1300	.812 x 2.843	604D132G030GP6
1600	.937 x 2.343	604D162G030HL6
2000	1.062 x 2.343	604D202G030JL6
2200	.937 x 2.843	604D222G030HP6
2800	1.062 x 2.843	604D282G030JP6
3000	.937 x 3.343	604D302G030HS6
3600	1.062 x 3.343	604D362G030JS6
4500	1.062 x 3.843	604D452G030JT6
	40 WVDC	
550	.812 x 1.843	604D551G040GJ6
700	.812 x 2.343	604D701G040GL6
900	.937 x 1.843	604D901G040HJ6
1200	.937 x 2.343	604D122G040HL6
1500	1.062 x 2.343	604D152G040JL6
1700	.937 x 2.843	604D172G040HP6
2300	.937 x 3.343	604D232G040HS6
2900	1.062 x 3.343	604D292G040JS6
3600	1.062 x 3.843	604D362G040JT6
	50 WVDC	
300	.812 x 1.843	604D301G050GJ6
400	.812 x 2.343	604D401G050GL6
530	.937 x 1.843	604D531G050HJ6
700	.937 x 2.343	604D701G050HL6
870	1.062 x 2.343	604D871G050JL6
1000	.937 x 2.843	604D102G050HP6
1200	1.062 x 2.843	604D122G050JP6
1600	1.062 x 3.343	604D162G050JS6
2000	1.062 x 3.843	604D202G050JT6
	75 WVDC	
200	.812 x 1.843	604D201F075GJ6
260	.812 x 2.343	604D261F075GL6
350	.937 x 1.843	604D351F075HJ6
450	.937 x 2.343	604D451F075HL6
570	1.062 x 2.343	604D571F075JL6
650	.937 x 2.843	604D651F075HP6
850	.937 x 3.343	604D851F075HS6
1000	1.062 x 3.343	604D102F075JS6
1300	1.062 x 3.843	604D132F075JT6
	100 WVDC	
130	.812 x 1.843	604D131F100GJ6
170	.812 x 2.343	604D171F100GL6
230	.937 x 1.843	604D231F100HJ6
300	.937 x 2.343	604D301F100HL6
380	1.062 x 2.343	604D381F100JL6
430	.937 x 2.843	604D431F100HP6
550	1.062 x 2.843	604D551F100JP6
700	1.062 x 3.343	604D701F100JS6
850	1.062 x 3.843	604D851F100JT6
	200 WVDC	
50	.812 x 1.843	604D500F200GJ6
85	.937 x 1.843	604D850F200HJ6
100	.937 x 2.343	604D101F200HL6
150	.937 x 2.843	604D151F200HP6
200	1.062 x 2.843	604D201F200JP6
250	.937 x 3.843	604D251F200HT6
320	1.062 x 3.843	604D321F200JT6

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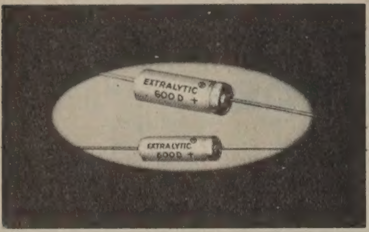
IND-EEM-55-EFAI

Sizes subject to change without notice.

SPRAGUE CAPACITORS



TYPE 600D EXTRALYTIC® ALUMINUM ELECTROLYTIC CAPACITORS

- Extended Operating Temperature Range From —55C to +125C
- Industrial version of CU12 and CU13 units
- Dual Rating Makes Possible Operation At Either 85C or 125C
- Voltage Ratings Up to 250 Volts D-C
- Improved Oxide Systems, Etching Techniques, and End Seals; a New Electrolyte Makes The Type 600D Equivalent to Or Better Than Comparable Foil Tantalum Capacitors.
- Lower Cost and One Third The Weight of Comparable Foil Tantalums

For Complete Technical Data, See Latest Issue of Sprague Engineering Bulletin 3455.

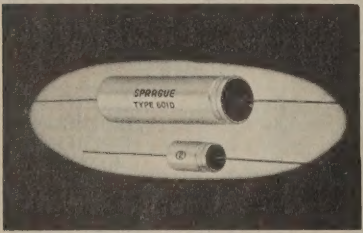
CALL YOUR SPRAGUE INDUSTRIAL DISTRIBUTOR FOR CURRENT QUANTITY PRICES

μF	Case Code	Catalog Number†
7 WVDC @ 85C, 5 WVDC @ 125C		
120	KD	600D127G007KD4
220	DD	600D227G007DD4
270	DE	600D277G007DE4
390	DG	600D397G007DG4
560	DJ	600D567G007DJ4
820	DL	600D827G007DL4
1000	DX	600D108G007DX4
10 WVDC @ 85C, 7 WVDC @ 125C		
100	KD	600D107G010KD4
180	DD	600D187G010DD4
220	DE	600D227G010DE4
330	DG	600D337G010DG4
470	DJ	600D447G010DJ4
680	DL	600D687G010DL4
820	DX	600D827G010DX4
15 WVDC @ 85C, 10 WVDC @ 125C		
68	KD	600D686G015KD4
82	KD	600D826G015KD4
150	DD	600D157G015DD4
180	DE	600D187G015DE4
270	DG	600D277G015DG4
390	DJ	600D397G015DJ4
560	DL	600D567G015DL4
680	DX	600D687G015DX4
20 WVDC @ 85C, 15 WVDC @ 125C		
68	KD	600D686G020KD4
100	DD	600D107G020DD4
140	DE	600D147G020DE4
220	DG	600D227G020DG4
290	DJ	600D297G020DJ4
440	DL	600D447G020DL4
600	DX	600D607G020DX4
30 WVDC @ 85C, 20 WVDC @ 125C		
33	KD	600D336G030KD4
47	KD	600D476G030KD4
82	DD	600D826G030DD4
100	DE	600D107G030DE4
120	DG	600D127G030DG4
150	DG	600D157G030DG4
220	DJ	600D227G030DJ4
330	DL	600D337G030DL4
390	DX	600D397G030DX4
40 WVDC @ 85C, 30 WVDC @ 125C		
30	KD	600D306G040KD4
50	DD	600D506G040DD4
70	DE	600D706G040DE4
100	DG	600D107G040DG4
140	DJ	600D147G040DJ4
210	DL	600D217G040DL4
280	DX	600D287G040DX4
50 WVDC @ 85C, 40 WVDC @ 125C		
22	KD	600D226G050KD4
33	DD	600D336G050DD4
47	DE	600D476G050DE4
56	DG	600D566G050DG4
68	DG	600D686G050DG4
100	DJ	600D107G050DJ4
150	DL	600D157G050DL4
180	DX	600D187G050DX4
60 WVDC @ 85C, 50 WVDC @ 125C		
17	KD	600D176G060KD4
25	DD	600D256G060DD4
40	DE	600D406G060DE4
60	DG	600D606G060DG4
80	DJ	600D806G060DJ4
120	DL	600D127G060DL4
160	DX	600D167G060DX4
75 WVDC @ 85C, 60 WVDC @ 125C		
12	KD	600D126F075KD4
22	DD	600D226F075DD4
33	DE	600D336F075DE4
47	DG	600D476F075DG4
68	DJ	600D686F075DJ4
100	DL	600D107F075DL4
120	DX	600D127F075DX4
100 WVDC @ 85C, 75 WVDC @ 125C		
8.2	KD	600D825F100KD4
12	DD	600D126F100DD4
15	DE	600D156F100DE4
22	DG	600D226F100DG4
33	DJ	600D336F100DJ4
47	DL	600D476F100DL4
68	DX	600D686F100DX4
150 WVDC @ 85C, 100 WVDC @ 125C		
4.7	KD	600D475F150KD4
5.6	KD	600D565F150KD4
8.2	DD	600D825F150DD4
12	DE	600D126F150DE4
18	DG	600D186F150DG4
22	DJ	600D226F150DJ4
33	DL	600D336F150DL4
56	DX	600D566F150DX4
200 WVDC @ 85C, 150 WVDC @ 125C		
4	KD	600D405F200KD4
6	DD	600D605F200DD4
8	DE	600D805F200DE4
13	DG	600D136F200DG4
17	DJ	600D176F200DJ4
26	DL	600D266F200DL4
39	DX	600D396F200DX4
250 WVDC @ 85C, 200 WVDC @ 125C		
3.3	KD	600D335F250KD4
5.6	DD	600D565F250DD4
6.8	DE	600D685F250DE4
10	DG	600D106F250DG4
12	DJ	600D126F250DJ4
22	DL	600D226F250DL4
27	DX	600D276F250DX4

TABLE OF DIMENSIONS

Case Code	With Outer Insulation D x L
KD	.296 x 1.000
DD	.390 x 1.000
DE	.390 x 1.187
DG	.390 x 1.437
DJ	.390 x 1.687
DL	.390 x 2.249
DX	.390 x 2:749

†Catalog numbers listed are for capacitors with Outer Insulation. For units with bare can substitute "0" for "4" at the end of the catalog number, and subtract 1/64" from diameter and 1/16" from length.



TYPE 601D EXTRALYTIC® ALUMINUM ELECTROLYTIC CAPACITORS

- Supplement 600D With Higher Capacitance
- Industrial version of CU16 and CU17 units
- Pressure-sensitive Safety Vent
- Designed to Operate at a Temperature Range of —55C to +85C
- Unique New Electrolyte, High-gain Etched Foil, Improved Oxide System Provide Long Life With Superior Electrical Characteristics
- For Complete Technical Data, See Latest Issue of Sprague Engineering Bulletin 3456

Call Your Sprague Industrial Distributor For Current Quantity Prices

μF	D. x L.	Catalog Number*
5 WVDC, 7 WDV SURGE		
750	.687 x 1.250	601D757G005FE4
1200	.812 x 1.250	601D128G005GE4
1500	.687 x 1.750	601D158G005FJ4
1700	.937 x 1.250	601D178G005HE4
2300	.687 x 2.250	601D238G005FL4
2400	.812 x 1.750	601D248G005GJ4
2700	.687 x 2.750	601D278G005FP4
3500	.687 x 3.250	601D358G005FS4
3600	.812 x 2.250	601D368G005GL4
4200	.687 x 3.750	601D428G005FT4
4300	.812 x 2.750	601D438G005GP4
4700	1.062 x 1.750	601D478G005JJ4
5200	.937 x 2.250	601D528G005HL4
5500	.812 x 3.250	601D558G005GS4
6100	.937 x 2.750	601D618G005HP4
6700	.812 x 3.750	601D678G005GT4
7100	1.062 x 2.250	601D718G005JL4
7900	.937 x 3.250	601D798G005HS4
8300	1.062 x 2.750	601D838G005JP4
9600	.937 x 3.750	601D968G005HT4
10000	1.062 x 3.250	601D109G005JS4
13000	1.062 x 3.750	601D139G005JT4
7.5 WVDC, 10 VDC SURGE		
650	.687 x 1.250	601D657G7R5FE4
1000	.812 x 1.250	601D108G7R5GE4
1300	.687 x 1.750	601D138G7R5FJ4
1400	.937 x 1.250	601D148G7R5HE4
1900	.687 x 2.250	601D198G7R5FL4
2000	.812 x 1.750	601D208G7R5GJ4
2200	.687 x 2.750	601D228G7R5FP4
2900	.687 x 3.250	601D298G7R5FS4
3000	.812 x 2.250	601D308G7R5GL4
3500	.687 x 3.750	601D358G7R5FT4

*Catalog numbers listed are for capacitors with outer insulation. For bare case change "4" to "0" at end of catalog number and subtract .062" from diameter and .125" from length.

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IND-EEM-17-PPAR

All sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 601D EXTRALYTIC® ALUMINUM ELECTROLYTIC CAPACITORS, Continued

µF	D. x L.	Catalog Number*
3600	.812 x 2.750	601D368G7R5GP4
4000	1.062 x 1.750	601D408G7R5JJ4
4400	.937 x 2.250	601D448G7R5HL4
4600	.812 x 3.250	601D468G7R5GS4
5100	.937 x 2.750	601D518G7R5HP4
5600	.812 x 3.750	601D568G7R5GT4
6000	1.062 x 2.250	601D608G7R5JL4
6600	.937 x 3.250	601D668G7R5HS4
7000	1.062 x 2.750	601D708G7R5JP4
8100	.937 x 3.750	601D818G7R5HT4
9000	1.062 x 3.250	601D908G7R5JS4
11000	1.062 x 3.750	601D119G7R5JT4

10 WVDC, 15 VDC SURGE

µF	D. x L.	Catalog Number*
540	.687 x 1.250	601D547G010FE4
850	.812 x 1.250	601D857G010GE4
1000	.687 x 1.750	601D108G010FJ4
1200	.937 x 1.250	601D128G010HE4
1600	.687 x 2.250	601D168G010FL4
1700	.812 x 1.750	601D178G010GJ4
1800	.687 x 2.750	601D188G010FP4
2400	.687 x 3.250	601D248G010FS4
2500	.812 x 2.250	601D258G010GL4
2900	.687 x 3.750	601D298G010FT4
3000	.812 x 2.750	601D308G010GP4
3300	1.062 x 1.750	601D338G010JJ4
3600	.937 x 2.250	601D368G010HL4
3800	.812 x 3.250	601D388G010GS4
4200	.937 x 2.750	601D428G010HP4
4700	.812 x 3.750	601D478G010GT4
5000	1.062 x 2.250	601D508G010JL4
5500	.937 x 3.250	601D558G010HS4
5800	1.062 x 2.750	601D588G010JP4
6700	.937 x 3.750	601D678G010HT4
7500	1.062 x 3.250	601D758G010JS4
9100	1.062 x 3.750	601D918G010JT4

15 WVDC, 20 VDC SURGE

µF	D. x L.	Catalog Number*
400	.687 x 1.250	601D407G015FE4
650	.812 x 1.250	601D657G015GE4
800	.687 x 1.750	601D807G015FJ4
930	.937 x 1.250	601D937G015HE4
1200	.687 x 2.250	601D128G015FL4
1300	.812 x 1.750	601D138G015GJ4
1400	.687 x 2.750	601D148G015FP4
1800	.687 x 3.250	601D188G015FS4
1900	.812 x 2.250	601D198G015GL4
2200	.687 x 3.750	601D228G015FT4
2500	1.062 x 1.750	601D258G015JJ4
2700	.937 x 2.250	601D278G015HL4
2900	.812 x 3.250	601D298G015GS4
3200	.937 x 2.750	601D328G015HP4
3500	.812 x 3.750	601D358G015GT4
3800	1.062 x 2.250	601D388G015JL4
4200	.937 x 3.250	601D428G015HS4
4400	1.062 x 2.750	601D448G015JP4
5100	.937 x 3.750	601D518G015HT4
5700	1.062 x 3.250	601D578G015JS4
6900	1.062 x 3.750	601D698G015JT4

20 WVDC, 30 VDC SURGE

µF	D. x L.	Catalog Number*
290	.687 x 1.250	601D297G020FE4
460	.812 x 1.250	601D467G020GE4
580	.687 x 1.750	601D587G020FJ4
660	.937 x 1.250	601D667G020HE4
900	.812 x 1.750	601D907G020GJ4
1000	.687 x 2.750	601D108G020FP4
1300	.687 x 3.250	601D138G020FS4
1600	.687 x 3.750	601D168G020FT4
1800	1.062 x 1.750	601D188G020JJ4
1900	.937 x 2.250	601D198G020HL4
2000	.812 x 3.250	601D208G020GS4
2300	.937 x 2.750	601D238G020HP4
2500	.812 x 3.750	601D258G020GT4
2700	1.062 x 2.250	601D278G020JL4
2900	.937 x 3.250	601D298G020HS4
3100	1.062 x 2.750	601D318G020JP4
3600	.937 x 3.750	601D368G020HT4
4000	1.062 x 3.250	601D408G020JS4
4900	1.062 x 3.750	601D498G020JT4

25 WVDC, 40 VDC SURGE

µF	D. x L.	Catalog Number*
220	.687 x 1.250	601D227G025FE4
350	.812 x 1.250	601D357G025GE4
440	.687 x 1.750	601D447G025FJ4
500	.937 x 1.250	601D507G025HE4
660	.687 x 2.250	601D667G025FL4
680	.812 x 1.250	601D687G025JE4
700	.812 x 1.750	601D707G025GJ4
770	.687 x 2.750	601D777G025FP4
990	.687 x 3.250	601D997G025FS4
1000	.812 x 2.250	601D108G025GL4
1200	687 x 3.750	601D128G025FT4
1300	1.062 x 1.750	601D138G025JJ4
1500	.812 x 3.250	601D158G025GS4
1700	.937 x 2.750	601D178G025HP4
1900	.812 x 3.750	601D198G025GT4
2000	1.062 x 2.250	601D208G025JL4
2200	.937 x 3.250	601D228G025HS4
2300	1.062 x 2.750	601D238G025JP4
2700	.937 x 3.750	601D278G025HT4
3000	1.062 x 3.250	601D308G025JS4
3700	1.062 x 3.750	601D378G025JT4

30 WVDC, 45 VDC SURGE

µF	D. x L.	Catalog Number*
190	.687 x 1.250	601D197G030FE4
310	.812 x 1.250	601D317G030GE4
390	.687 x 1.750	601D397G030FJ4
440	.937 x 1.250	601D447G030HE4
580	.687 x 2.250	601D587G030FL4
600	1.062 x 1.250	601D607G030JE4
620	.812 x 1.750	601D627G030GJ4
680	.687 x 2.750	601D687G030FP4
870	.687 x 3.250	601D877G030FS4
880	.937 x 1.750	601D887G030HJ4
930	.812 x 2.250	601D937G030GL4
1000	.687 x 3.750	601D108G030FT4
1200	1.062 x 1.750	601D128G030JJ4
1400	.812 x 3.250	601D148G030GS4
1500	.937 x 2.750	601D158G030HP4
1700	.812 x 3.750	601D178G030GT4
1800	1.062 x 2.250	601D188G030JL4
2000	.937 x 3.250	601D208G030HS4
2100	1.062 x 2.750	601D218G030JP4
2400	.937 x 3.750	601D248G030HT4
2700	1.062 x 3.250	601D278G030JS4
3300	1.062 x 3.750	601D338G030JT4

40 WVDC, 60 VDC SURGE

µF	D. x L.	Catalog Number*
140	.687 x 1.250	601D147G040FE4
220	.812 x 1.250	601D227G040GE4
270	.687 x 1.750	601D277G040FJ4
300	.937 x 1.250	601D307G040HE4
400	.687 x 2.250	601D407G040FL4
430	1.062 x 1.250	601D437G040JE4
440	.812 x 1.750	601D447G040GJ4
480	.687 x 2.750	601D487G040FP4
620	.687 x 3.250	601D627G040FS4
630	.937 x 1.750	601D637G040HJ4
660	.812 x 2.250	601D667G040GL4
760	.687 x 3.750	601D767G040FT4
770	.812 x 2.750	601D777G040GP4
860	1.062 x 1.750	601D867G040JJ4
950	.937 x 2.250	601D957G040HL4
1000	.812 x 3.250	601D108G040GS4
1100	.937 x 2.750	601D118G040HP4
1200	.812 x 3.750	601D128G040GT4
1400	.937 x 3.250	601D148G040HS4
1500	1.062 x 2.750	601D158G040JP4
1700	.937 x 3.750	601D178G040HT4
1900	1.062 x 3.250	601D198G040JS4
2300	1.062 x 3.750	601D238G040JT4

50 WVDC, 75 VDC SURGE

µF	D. x L.	Catalog Number*
110	.687 x 1.250	601D117G050FE4
170	.812 x 1.250	601D177G050GE4
220	.687 x 1.750	601D227G050FJ4
250	.937 x 1.250	601D257G050HE4
330	.687 x 2.250	601D337G050FL4
340	1.062 x 1.250	601D347G050JE4
350	.812 x 1.750	601D357G050GJ4
380	.687 x 2.750	601D387G050FP4
500	.687 x 3.250	601D507G050FS4
600	.687 x 3.750	601D607G050FT4
680	1.062 x 1.750	601D687G050JJ4
750	.937 x 2.250	601D757G050HL4
790	.812 x 3.250	601D797G050GS4
870	.937 x 2.750	601D877G050HP4
950	.812 x 3.750	601D957G050GT4
1000	1.062 x 2.250	601D108G050JL4
1100	.937 x 3.250	601D118G050HS4
1500	1.062 x 3.250	601D158G050JS4
1800	1.062 x 3.750	601D188G050JT4

75 WVDC, 100 VDC SURGE

µF	D. x L.	Catalog Number*
45	.687 x 1.250	601D456F075FE4
75	.812 x 1.250	601D756F075GE4
95	.687 x 1.750	601D956F075FJ4
100	.937 x 1.250	601D107F075HE4
140	.687 x 2.250	601D147F075FL4
150	.812 x 1.750	601D157F075GJ4
160	.687 x 2.750	601D167F075FP4
210	.687 x 3.250	601D217F075FS4
220	.812 x 2.250	601D227F075GL4
260	.687 x 3.750	601D267F075FT4
290	1.062 x 1.750	601D297F075JJ4
320	.937 x 2.250	601D327F075HL4
340	.812 x 3.250	601D347F075GS4
380	.937 x 2.750	601D387F075HP4
400	.812 x 3.750	601D407F075GT4
440	1.062 x 2.250	601D447F075JL4
490	.937 x 3.250	601D497F075HS4
500	1.062 x 2.750	601D507F075JP4
600	.937 x 3.750	601D607F075HT4
660	1.062 x 3.250	601D667F075JS4
800	1.062 x 3.750	601D807F075JT4

100 WVDC, 150 VDC SURGE

µF	D. x L.	Catalog Number*
25	.687 x 1.250	601D256F100FE4
45	.812 x 1.250	601D456F100GE4
55	.687 x 1.750	601D556F100FJ4
65	.937 x 1.250	601D656F100HE4
80	.687 x 2.250	601D806F100FL4
90	.812 x 1.750	601D906F100GJ4
95	.687 x 2.750	601D956F100FP4
120	.687 x 3.250	601D127F100FS4
130	.812 x 2.250	601D137F100GL4
150	.687 x 3.750	601D157F100FT4
180	1.062 x 1.750	601D187F100JJ4
200	.812 x 3.250	601D207F100GS4
230	.937 x 2.750	601D237F100HP4
250	.812 x 3.750	601D257F100GT4
280	1.062 x 2.250	601D287F100JL4
300	.937 x 3.250	601D307F100HS4
320	1.062 x 2.750	601D327F100JP4
370	.937 x 3.750	601D377F100HT4
420	1.062 x 3.250	601D427F100JS4
500	1.062 x 3.750	601D507F100JT4

150 WVDC, 200 VDC SURGE

µF	D. x L.	Catalog Number*
18	.687 x 1.250	601D186F150FE4
30	.812 x 1.250	601D306F150GE4
35	.687 x 1.750	601D356F150FJ4
45	.937 x 1.250	601D456F150HE4
55	.687 x 2.250	601D556F150FL4
60	.812 x 1.750	601D606F150GJ4
65	.687 x 2.750	601D656F150FP4
85	.687 x 3.250	601D856F150FS4
90	.937 x 1.750	601D906F150HJ4
95	.812 x 2.250	601D956F150GL4
100	.687 x 3.750	601D107F150FT4
130	1.062 x 1.750	601D137F150JJ4
140	.812 x 3.250	601D147F150GS4
160	.937 x 2.750	601D167F150HP4
170	.812 x 3.750	601D177F150GT4
190	1.062 x 2.250	601D197F150JL4
210	.937 x 3.250	601D217F150HS4
230	1.062 x 2.750	601D237F150JP4
260	.937 x 3.750	601D267F150HT4
290	1.062 x 3.250	601D297F150JS4
360	1.062 x 3.750	601D367F150JT4

200 WVDC, 250 VDC SURGE

µF	D. x L.	Catalog Number*
16	.687 x 1.250	601D166F200FE4
25	.812 x 1.250	601D256F200GE4
30	.687 x 1.750	601D306F200FJ4
35	.937 x 1.250	601D356F200HE4
45	.687 x 2.750	601D456F200FL4
50	.812 x 1.750	601D506F200GJ4
55	.687 x 2.750	601D556F200FP4
70	.687 x 3.250	601D706F200FS4
75	.812 x 2.250	601D756F200GL4
85	.687 x 3.750	601D856F200FT4
90	.812 x 2.750	601D906F200GP4
100	.812 x 3.250	601D107F200GS4
110	.937 x 2.250	601D117F200HL4
130	.937 x 2.750	601D137F200HP4
140	.812 x 3.750	601D147F200GT4
160	1.062 x 2.250	601D167F200JL4
170	.937 x 3.250	601D177F200HS4
180	1.062 x 2.750	601D187F200JP4
210	.937 x 3.750	601D217F200HT4
240	1.062 x 3.250	601D247F200JS4
290	1.062 x 3.750	601D297F200JT4

*Catalog numbers listed are for capacitors with outer insulation. For bare case change "4" to "0" at end of cat. no. and subtract .062" from D, and .125" from L.

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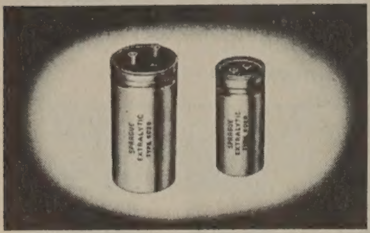
IND-EEM-17A-EBAP

All sizes subject to change without notice.

SPRAGUE CAPACITORS



TYPE 602D EXTRALYTIC® ALUMINUM ELECTROLYTIC CAPACITORS

- Large Cylindrical Power Supply Filter Capacitors With Exceptional Performance Over Long and Trouble-free life
- High Ripple Current Capability
- Designed For Continuous Operation Over Temperature Range of —55 C to +85 C
- Extremely Useful on Input of Power Supply Filters, as They Will Safely Carry as Much as 10 amps of Ripple Current at 120 Hz
- Superior Humidity Seal
- For Complete Technical Data, See Latest Issue of Sprague Engineering Bulletin 3457

5 WVDC, 7 V SURGE

μF	Size Code	Cat. No.*
8,000	AA	602D802G005AA2A
17,000	AB	602D173G005AB2A
25,000	AC	602D253G005AC2A
29,000	AD	602D293G005AD2A
34,000	AE	602D343G005AE2A
37,000	AF	602D373G005AF2A
40,000	BB	602D403G005BB2A
60,000	BC	602D603G005BC2A
67,000	CB	602D673G005CB2D
70,000	BD	602D703G005BD2D
80,000	BE	602D803G005BE2A
90,000	BF	602D903G005BF2A
100,000	CC	602D104G005CC2D
110,000	CD	602D114G005CD2D
130,000	CE	602D134G005CE2D
150,000	CF	602D154G005CF2D
150,000	DC	602D154G005DC2D
170,000	DD	602D174G005DD2D
200,000	DE	602D204G005DE2D
220,000	DF	602D224G005DF2D

10 WVDC, 15 V SURGE

μF	Size Code	Cat. No.*
5,000	AA	602D502G010AA2A
10,000	AB	602D103G010AB2A
15,000	AC	602D153G010AC2A
17,000	AD	602D173G010AD2A
20,000	AE	602D203G010AE2A
22,000	AF	602D223G010AF2A
24,000	BB	602D243G010BB2A
37,000	BC	602D373G010BC2A
42,000	CB	602D423G010CB2D
43,000	BD	602D433G010BD2A
48,000	BE	602D483G010BE2A
55,000	BF	602D553G010BF2A
64,000	CC	602D643G010CC2D
75,000	CD	602D753G010CD2D
86,000	CE	602D863G010CE2D
94,000	DC	602D943G010DC2D
96,000	CF	602D963G010CF2D
110,000	DD	602D114G010DD2D
120,000	DE	602D124G010DE2D
140,000	DF	602D144G010DF2D

15 WVDC, 20 V SURGE

μF	Size Code	Cat. No.*
4,000	AA	602D402G015AA2A
8,000	AB	602D802G015AB2A
12,000	AC	602D123G015AC2A
14,000	AD	602D143G015AD2A
16,000	AE	602D163G015AE2A
18,000	AF	602D183G015AF2A
20,000	BB	602D203G015BB2A
30,000	BC	602D303G015BC2A
35,000	BD	602D353G015BD2A
40,000	BE	602D403G015BE2A
42,000	CB	602D423G015CB2D
45,000	BF	602D453G015BF2A
51,000	CC	602D513G015CC2D
59,000	CD	602D593G015CD2D
68,000	CE	602D683G015CE2D
76,000	CF	602D763G015CF2D
76,000	DC	602D763G015DC2D
89,000	DD	602D893G015DD2D
100,000	DE	602D104G015DE2D
110,000	DF	602D114G015DF2D

20 WVDC, 30 V SURGE

μF	Size Code	Cat. No.*
2,800	AA	602D282G020AA2A
5,100	AB	602D512G020AB2A
8,600	AC	602D862G020AC2A
10,000	AD	602D103G020AD2A
11,000	AE	602D113G020AE2A
13,000	AF	602D133G020AF2A
20,000	BC	602D203G020BC2A
23,000	BD	602D233G020BD2A
24,000	CB	602D243G020CB2D
26,000	BE	602D263G020BE2A
30,000	BF	602D303G020BF2A
37,000	CC	602D373G020CC2D
43,000	CD	602D433G020CD2D
47,000	CE	602D473G020CE2D
54,000	DC	602D543G020DC2D
55,000	CF	602D553G020CF2D
63,000	DD	602D633G020DD2D
73,000	DE	602D733G020DE2D
82,000	DF	602D823G020DF2D

25 WVDC, 40 V SURGE

μF	Size Code	Cat. No.*
2,500	AA	602D252G025AA2A
5,000	AB	602D502G025AB2A
7,500	AC	602D752G025AC2A
8,700	AD	602D872G025AD2A
10,000	AE	602D103G025AE2A
11,000	AF	602D113G025AF2A
17,000	BC	602D173G025BC2A
20,000	BD	602D203G025BD2A
20,000	CB	602D203G025CB2D
23,000	BE	602D233G025BE2A
25,000	BF	602D253G025BF2A
30,000	CC	602D303G025CC2D
35,000	CD	602D353G025CD2D
40,000	CE	602D403G025CE2D
44,000	DC	602D443G025DC2D
45,000	CF	602D453G025CF2D
52,000	DD	602D523G025DD2D
60,000	DE	602D603G025DE2D
67,000	DF	602D673G025DF2D

30 WVDC, 40 V SURGE

μF	Size Code	Cat. No.*
2,200	AA	602D222G030AA2A
4,400	AB	602D442G030AB2A
6,600	AC	602D662G030AC2A
7,700	AD	602D772G030AD2A
8,800	AE	602D882G030AE2A
9,900	AF	602D992G030AF2A
10,000	BB	602D103G030BB2A
15,000	BC	602D153G030BC2A
17,000	BD	602D173G030BD2A
18,000	CB	602D183G030CB2D
20,000	BE	602D203G030BE2A
22,000	BF	602D223G030BF2A
26,000	CC	602D263G030CC2D
30,000	CD	602D303G030CD2D
34,000	CE	602D343G030CE2D
38,000	DC	602D383G030DC2D
39,000	CF	602D393G030CF2D
45,000	DD	602D453G030DD2D
52,000	DE	602D523G030DE2D
58,000	DF	602D583G030DF2D

40 WVDC, 55 V SURGE

μF	Size Code	Cat. No.*
1,800	AA	602D182G040AA2A
3,700	AB	602D372G040AB2A
5,500	AC	602D552G040AC2A
6,400	AD	602D642G040AD2A
7,400	AE	602D742G040AE2A
8,200	AF	602D822G040AF2A
9,000	BB	602D902G040BB2A
13,000	BC	602D133G040BC2A
15,000	BD	602D153G040BD2A
15,000	CB	602D153G040CB2A
18,000	BE	602D183G040BE2A
19,000	BF	602D193G040BF2A
22,000	CC	602D223G040CC2D
25,000	CD	602D253G040CD2D
28,000	CE	602D283G040CE2D
32,000	DC	602D323G040DC2D
33,000	CF	602D333G040CF2D
37,000	DD	602D373G040DD2D
43,000	DE	602D433G040DE2D
48,000	DF	602D483G040DF2D

50 WVDC, 75 V SURGE

μF	Size Code	Cat. No.*
1,400	AA	602D142G050AA2A
2,900	AB	602D292G050AB2A
4,400	AC	602D442G050AC2A
5,100	AD	602D512G050AD2A
5,800	AE	602D582G050AE2A
6,600	AF	602D662G050AF2A
9,000	BC	602D902G050BC2A
10,000	BC	602D103G050BC2A
11,000	BD	602D113G050BD2A
12,000	CB	602D123G050CB2D
13,000	BE	602D133G050BE2A
15,000	BF	602D153G050BF2A
17,000	CC	602D173G050CC2D
20,000	CD	602D203G050CD2D
22,000	CE	602D223G050CE2D
25,000	CF	602D253G050CF2D
25,000	DC	602D253G050DC2D
30,000	DD	602D303G050DD2D
34,000	DE	602D343G050DE2D
39,000	DF	602D393G050DF2D

75 WVDC, 100 V SURGE

μF	Size Code	Cat. No.*
530	AA	602D531F075AA2A
1,000	AB	602D102F075AB2A
1,600	AC	602D162F075AC2A
1,800	AD	602D182F075AD2A
2,000	AE	602D202F075AE2A
2,400	AF	602D242F075AF2A
2,600	BB	602D262F075BB2A
3,900	BC	602D392F075BC2A
4,400	CB	602D442F075CB2D
4,500	BD	602D452F075BD2A
5,000	BE	602D502F075BE2A
5,800	BF	602D582F075BF2A
6,600	CC	602D662F075CC2D
7,700	CD	602D772F075CD2D
8,800	CE	602D882F075CE2D
9,500	DC	602D952F075DC2D
9,900	CF	602D992F075CF2D
11,000	DD	602D113F075DD2D
13,000	DE	602D133F075DE2D
14,000	DF	602D143F075DF2D

100 WVDC, 150 V SURGE

μF	Size Code	Cat. No.*
250	AA	602D251F100AA2A
500	AB	602D501F100AB2A
800	AC	602D801F100AC2A
900	AD	602D901F100AD2A
1,000	AE	602D102F100AE2A
1,100	AF	602D112F100AF2A
1,200	BB	602D122F100BB2A
1,800	BC	602D182F100BC2A
2,100	BD	602D212F100BD2A
2,100	CB	602D212F100CB2D
2,400	BE	602D242F100BE2A
2,600	BF	602D262F100BF2A
3,100	CC	602D312F100CC2D
3,600	CD	602D362F100CD2D
4,100	CE	602D412F100CE2D
4,500	CF	602D452F100CF2D
4,600	DC	602D462F100DC2D
5,500	DD	602D552F100DD2D
6,000	DE	602D602F100DE2D
6,700	DF	602D672F100DF2D

SIZE CODE

Code	D. x L.	Code	D. x L.
AA	1.438 x 2.188	BF	2.062 x 5.688
AB	1.438 x 3.188	CB	2.578 x 3.250
AC	1.438 x 4.188	CC	2.578 x 4.250
AD	1.438 x 4.688	CD	2.578 x 4.750
AE	1.438 x 5.188	CE	2.578 x 5.250
AF	1.438 x 5.688	CF	2.578 x 5.750
BB	2.062 x 3.188	DC	3.078 x 4.250
BC	2.062 x 4.188	DD	3.078 x 4.750
BD	2.062 x 4.688	DE	3.078 x 5.250
BE	2.062 x 5.188	DF	3.078 x 5.750

*Catalog numbers listed are for capacitors with outer insulation. For bare case, change 14th character of cat. no. from "2" to "0" and subtract .063" from both diameter and length. Capacitors listed have low-screw insert terminals. For high-screw insert terminals, change last character of cat. no. from "A" to "B".

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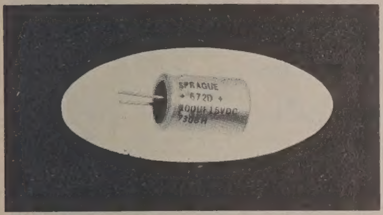
All sizes subject to change without notice.

SPRAGUE CAPACITORS

TYPE 672D EXTRALYTIC® ALUMINUM ELECTROLYTICS

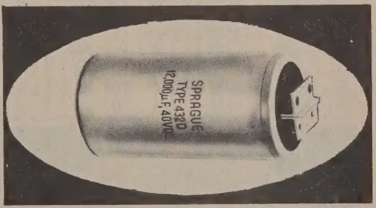


- Specifically designed for use in switching regulators and other high frequency applications.
- Miniature single-ended 'lytics feature low equivalent series resistance, inductance, and impedance.
- High capacitance values combined with low inductance and low ESR limits makes these capacitors very useful for bus bar decoupling in data processing applications.
- Premium-grade capacitors offer guaranteed inductance limit of 20nH with typical values of less than 10nH.
- Furnished with outer plastic-film insulation with supplementary polymer coated end-seal.
- Capacitance tolerance, −10, +100%.
- Operating temperature range, −55 C to +105 C.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3452.

µF	Dia. x Length	Catalog Number	µF	Dia. x Length	Catalog Number	µF	Dia. x Length	Catalog Number
6.3 WVDC			**20 WVDC**			**50 WVDC**		
68	.336 x .630	672D686H6R3BB5C	33	.336 x .630	672D336H020BB5C	12	.336 x .630	672D126H050BB5C
120	.413 x .677	672D127H6R3CC5C	56	.413 x .677	672D566H020CC5C	18	.413 x .677	672D186H050CC5C
180	.413 x .740	672D187H6R3CD5C	82	.413 x .740	672D826H020CD5C	22	.413 x .740	672D226H050CD5C
220	.413 x .927	672D227H6R3CG5C	100	.413 x .927	672D107H020CG5C	27	.413 x .927	672D276H050CG5C
680	.500 x 1.165	672D687H6R3DM5C	330	.500 x 1.165	672D337H020DM5C	82	.500 x 1.165	672D826H050DM5C
820	.500 x 1.462	672D827H6R3DT5C	390	.500 x 1.462	672D397H020DT5C	120	.500 x 1.462	672D127H050DT5C
1200	.500 x 1.790	672D128H6R3DS5C	560	.500 x 1.790	672D567H020DS5C	180	.500 x 1.790	672D187H050DS5C
12 WVDC			**25 WVDC**			**60 WVDC**		
56	.336 x .630	672D566H012BB5C	27	.336 x .630	672D276H025BB5C			
100	.413 x .677	672D107H012CC5C	47	.413 x .677	672D476H025CC5C	12	.413 x .677	672D126H060CC5C
120	.413 x .740	672D127H012CD5C	68	.413 x .740	672D686H025CD5C	18	.413 x .740	672D186H060CD5C
180	.413 x .927	672D187H012CG5C	82	.413 x .927	672D826H025CG5C	22	.413 x .927	672D226H060CG5C
470	.500 x 1.165	672D477H012DM5C	270	.500 x 1.165	672D277H025DM5C	68	.500 x 1.165	672D686H060DM5C
680	.500 x 1.462	672D687H012DT5C	330	.500 x 1.462	672D337H025DT5C	82	.500 x 1.462	672D826H060DT5C
1000	.500 x 1.790	672D108H012DS5C	470	.500 x 1.790	672D477H025DS5C	120	.500 x 1.790	672D127H060DS5C
15 WVDC			**40 WVDC**			**100 WVDC**		
47	.336 x .630	672D476H015BB5C	18	.336 x .630	672D186H040BB5C			
82	.413 x .677	672D826H015CC5C	39	.413 x .677	672D396H040CC5C	4.7	.413 x .677	672D475H100CC5C
100	.413 x .740	672D107H015CD5C	47	.413 x .740	672D476H040CD5C	6.8	.413 x .740	672D685H100CD5C
150	.413 x .927	672D157H015CG5C	56	.413 x .927	672D566H040CG5C	8.2	.413 x .927	672D825H100CG5C
390	.500 x 1.165	672D397H015DM5C	180	.500 x 1.165	672D187H040DM5C	27	.500 x 1.165	672D276H100DM5C
560	.500 x 1.462	672D567H015DT5C	270	.500 x 1.462	672D277H040DT5C	39	.500 x 1.462	672D396H100DT5C
820	.500 x 1.790	672D827H015DS5C	390	.500 x 1.790	672D397H040DS5C	47	.500 x 1.790	672D476H100DS5C

TYPE 432D COMPULYTIC® ALUMINUM ELECTROLYTICS

- Revolutionary electrolytic capacitors for ultra-low-impedance applications.
- Impedance limits at 10 kHz are as low as .001 ohm, with typical values of only half the specified limits.
- Special strip-line terminals are ideal for use with laminated-bus power distribution systems found in modern EDP equipment.
- Stacked-foil construction allows capacitance values to 100,000 µF with extremely low ESR of typically less than .001 ohm and inductance of only 1 nH.
- Operating temperature range, −40 C to +85 C.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 3443.



µF	Dia. x Length	Catalog Number	µF	Dia. x Length	Catalog Number	µF	Dia. x Length	Catalog Number
6 WVDC			**15 WVDC**			**30 WVDC**		
3,900	1.453 x 2.250	432D392006AA2	1,800	1.453 x 2.250	432D182015AA2	820	1.453 x 2.250	432D821030AA2
10,000	1.453 x 4.250	432D103006AC2	4,700	1.453 x 4.250	432D472015AC2	2,200	1.453 x 4.250	432D222030AC2
56,000	3.078 x 4.250	432D563006DC2	27,000	3.078 x 4.250	432D273015DC2	12,000	3.078 x 4.250	432D123030DC2
100,000	3.078 x 5.750	432D104006DF2	39,000	3.078 x 5.750	432D393015DF2	18,000	3.078 x 5.750	432D183030DF2
7.5 WVDC			**20 WVDC**			**40 WVDC**		
2,700	1.453 x 2.250	432D2727R5AA2	1,200	1.453 x 2.250	432D122020AA2	560	1.453 x 2.250	432D561040AA2
6,800	1.453 x 4.250	432D6827R5AC2	3,300	1.453 x 4.250	432D332020AC2	1,500	1.453 x 4.250	432D152040AC2
47,000	3.078 x 4.250	432D4737R5DC2	18,000	3.078 x 4.250	432D183020DC2	8,200	3.078 x 4.250	432D822040DC2
68,000	3.078 x 5.750	432D6837R5DF2	27,000	3.078 x 5.750	432D273020DF2	12,000	3.078 x 5.750	432D123040DF2
10 WVDC			**25 WVDC**			**50 WVDC**		
2,200	1.453 x 2.250	432D222010AA2	1,000	1.453 x 2.250	432D102025AA2	470	1.453 x 2.250	432D471050AA2
5,600	1.453 x 4.250	432D562010AC2	2,700	1.453 x 4.250	432D272025AC2	1,000	1.453 x 4.250	432D102050AC2
33,000	3.078 x 4.250	432D333010DC2	15,000	3.078 x 4.250	432D153025DC2	6,800	3.078 x 4.250	432D682050DC2
56,000	3.078 x 5.750	432D563010DF2	22,000	3.078 x 5.750	432D223025DF2	10,000	3.078 x 5.750	432D103050DF2

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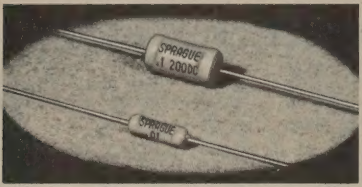
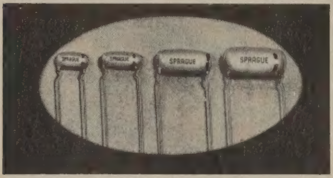
SPRAGUE CAPACITORS



TYPE 192P PACER® FILMITE® 'E' CAPACITORS

- Completely New Construction — Extended Foil Film Sections Terminate in End Caps with Wire Leads Assuring Best Possible Non-inductive Section.
- Controlled Dimensions Permit Use of Automatic Insertion Equipment for Installing Pacer Capacitors on Printed Wiring Boards.
- Entire Assembly Protected by Orange Heat Shrinkable Mylar Sleeve.
- Pacers are Wound with Ultra-thin Polyester Film Dielectric and Thin Gage Foil under Controlled Atmospheric Conditions.
- Rated for Operation from −55 C to +85 C (−67 F to +185 F).
- Capacitance Tolerance: ±10%.
- For complete data, see Engineering Bulletin 2066.

μF	D. x L.	Cat. No.
80 WVDC		
.0022	9/64 x 5/16	192P2229R8
.0027	9/64 x 5/16	192P2729R8
.0033	9/64 x 5/16	192P3329R8
.0039	9/64 x 5/16	192P3929R8
.0047	9/64 x 5/16	192P4729R8
.0056	11/64 x 3/8	192P5629R8
.0068	11/64 x 3/8	192P6829R8
.0082	11/64 x 3/8	192P8229R8
.01	11/64 x 3/8	192P1039R8
.012	11/64 x 7/16	192P1239R8
.015	11/64 x 7/16	192P1539R8
.018	11/64 x 1/2	192P1839R8
.022	11/64 x 1/2	192P2239R8
.027	7/32 x 7/16	192P2739R8
.033	7/32 x 7/16	192P3339R8
.039	7/32 x 9/16	192P3939R8
.047	7/32 x 9/16	192P4739R8
.056	15/64 x 9/16	192P5639R8
.068	15/64 x 9/16	192P6839R8
.082	19/64 x 1/2	192P8239R8
.1	19/64 x 1/2	192P1049R8
.12	19/64 x 5/8	192P1249R8
.15	19/64 x 5/8	192P1549R8
.18	21/64 x 5/8	192P1849R8
.22	21/64 x 5/8	192P2249R8
.27	21/64 x 7/8	192P2749R8
.33	21/64 x 1 3/16	192P3349R8
.39	21/64 x 1 3/16	192P3949R8
200 WVDC		
.0001	9/64 x 5/16	192P10192
.00012	9/64 x 5/16	192P12192
.00015	9/64 x 5/16	192P15192
.00018	9/64 x 5/16	192P18192
.00022	9/64 x 5/16	192P22192
.00027	9/64 x 5/16	192P27192
.00033	9/64 x 5/16	192P33192
.00039	9/64 x 5/16	192P39192
.00047	9/64 x 5/16	192P47192
.00056	9/64 x 5/16	192P56192
.00068	9/64 x 5/16	192P68192
.00082	9/64 x 5/16	192P82192
.001	9/64 x 5/16	192P10292
.0012	9/64 x 5/16	192P12292
.0015	9/64 x 5/16	192P15292
.0018	11/64 x 5/16	192P18292
.0022	11/64 x 5/16	192P22292
.0027	11/64 x 5/16	192P27292
.0033	11/64 x 5/16	192P33292
.0039	11/64 x 7/16	192P39292
.0047	11/64 x 7/16	192P47292
.0056	11/64 x 7/16	192P56292
.0068	11/64 x 7/16	192P68292
.0082	11/64 x 1/2	192P82292
.01	11/64 x 1/2	192P10392
.012	7/32 x 7/16	192P12392
.015	7/32 x 7/16	192P15392
.018	7/32 x 9/16	192P18392
.022	7/32 x 9/16	192P22392
.027	15/64 x 9/16	192P27392
.033	15/64 x 9/16	192P33392
.039	19/64 x 1/2	192P39392
.047	19/64 x 1/2	192P47392
.056	19/64 x 5/8	192P56392
.068	19/64 x 5/8	192P68392
.082	21/64 x 5/8	192P82392
.1	21/64 x 5/8	192P10492
.12	21/64 x 7/8	192P12492
.15	21/64 x 7/8	192P15492
.18	21/64 x 1 3/16	192P18492
.22	21/64 x 1 3/16	192P22492
400 WVDC		
.00047	11/64 x 3/8	192P47194
.00056	11/64 x 3/8	192P56194
.00068	11/64 x 3/8	192P68194
.00082	11/64 x 3/8	192P82194
.001	11/64 x 3/8	192P10294
.0012	11/64 x 3/8	192P12294
.0015	11/64 x 3/8	192P15294
.0018	11/64 x 7/16	192P18294
.0022	11/64 x 7/16	192P22294
.0027	7/32 x 7/16	192P27294
.0033	7/32 x 7/16	192P33294
.0039	7/32 x 7/16	192P39294
.0047	7/32 x 7/16	192P47294
.0056	15/64 x 9/16	192P56294
.0068	15/64 x 9/16	192P68294
.0082	15/64 x 9/16	192P82294
.01	15/64 x 9/16	192P10394
.012	19/64 x 1/2	192P12394
.015	19/64 x 1/2	192P15394
.018	19/64 x 5/8	192P18394
.022	19/64 x 5/8	192P22394
.027	21/64 x 5/8	192P27394
.033	21/64 x 5/8	192P33394
.039	21/64 x 7/8	192P39394
.047	21/64 x 7/8	192P47394
.056	21/64 x 1 3/16	192P56394
.068	21/64 x 1 3/16	192P68394



TYPE DF METALLIZED FILM ORANGE DROP® CAPACITORS

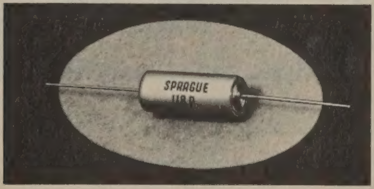
- Fit Easily into Tight Spots Because They're Smaller Than Other Types of Comparably-Rated Capacitors
- Extremely High Insulation Resistance Insures Peak Performance At Temperatures Up to +85C (185F)
- Radial Leads Are Extra Long For Point-to-Point Wiring and Crimped For Printed Board Insertion
- Double Dipped in Orange Epoxy Resin For Protection Against Heat And Humidity
- Capacitance Tolerance: ±10% • Same as Sprague O.E.M. Type 277P
- For Complete Data, See Latest Issue of Sprague Engineering Bulletin 2040.

100 WVDC

μF	H. x T. x L.	Cat. No.
.15	15/32 x 1/4 x 13/16	1DF-P15
.22	1/2 x 1/4 x 13/16	1DF-P22
.33	17/32 x 5/16 x 13/16	1DF-P33
.47	5/8 x 13/32 x 13/16	1DF-P47
.68	9/16 x 11/32 x 1 1/4	1DF-P68
1.0	5/8 x 13/32 x 1 1/4	1DF-M1
1.5	11/16 x 15/32 x 1 1/4	1DF-M1.5
2.0	25/32 x 9/16 x 1 1/4	1DF-M2
2.5	13/16 x 19/32 x 1 1/4	1DF-M2.5
3.0	25/32 x 9/16 x 1 5/8	1DF-M3
3.5	13/16 x 19/32 x 1 5/8	1DF-M3.5
4.0	27/32 x 5/8 x 1 5/8	1DF-M4
4.5	7/8 x 21/32 x 1 5/8	1DF-M4.5
5.0	29/32 x 11/16 x 1 5/8	1DF-M5
5.5	15/16 x 23/32 x 1 5/8	1DF-M5.5

200 WVDC

μF	H. x T. x L.	Cat. No.
.15	9/16 x 3/8 x 3/16	2DF-P15
.22	5/8 x 7/16 x 13/16	2DF-P22
.33	11/16 x 1/2 x 13/16	2DF-P33
.47	13/16 x 9/16 x 13/16	2DF-P47
.68	3/4 x 1/2 x 1 1/4	2DF-P68
1.0	13/16 x 9/16 x 1 1/4	2DF-M1
1.5	7/8 x 5/8 x 1 1/4	2DF-M1.5
2.0	15/16 x 11/16 x 1 1/4	2DF-M2
2.5	1 1/16 x 13/16 x 1 1/4	2DF-M2.5
3.0	15/16 x 11/16 x 1 5/8	2DF-M3
3.5	1 x 3/4 x 1 5/8	2DF-M3.5
4.0	1 1/16 x 13/16 x 1 5/8	2DF-M4
4.5	1 1/8 x 7/8 x 1 5/8	2DF-M4.5
5.0	1 1/8 x 7/8 x 1 5/8	2DF-M5
5.5	1 3/16 x 15/16 x 1 5/8	2DF-M5.5



118P DIFILM® METALLIZED CAPACITORS

- Best of their type possible to produce at the present state of the art
- Rated for operation at 125°C WITHOUT VOLTAGE DERATING.
- Unique dual dielectric – a combination of metallized paper and of polyester film, impregnated with high-temperature mineral wax.
- May be used at extremely low voltages where metallized paper construction has previously been unsatisfactory.
- Capacitors listed below are ungrounded case (insulated section) units without outer insulating sleeves. For information on other styles consult your Sprague Industrial Distributor.
- For units with insulating sleeves, change last digit from "2" to "4."
- Cap. Tolerance ±10%. For ±20% units change 8th digit from "9" to "0."
- For complete data, see latest issue of Engineering Bulletin 2211.

μF	D. x L.	Cat. No.
200 WVDC		
.01	.175 x .749	118P10392S2
.015	.195 x .749	118P15392S2
.022	.235 x .749	118P22392S2
.033	,235 x .749	118P33392S2
.047	.312 x .874	118P47392S2
.068	.312 x .874	118P68392S2
.082	.312 x .874	118P82392S2
.1	.312 x .874	118P10492S2
.15	.312 x 1.124	118P15492S2
.22	.400 x .874	118P22492S2
.27	.400 x 1.124	118P27492S2
.33	.400 x 1.124	118P33492S2
.47	.500 x 1.124	118P47492S2
.56	.500 x 1.124	118P56492S2
.68	.500 x 1.124	118P68492S2
.82	.562 x 1.124	118P82492S2
1.0	.562 x 1.124	118P10592S2
1.5	.562 x 1.624	118P15592S2
2.0	.670 x 1.624	118P20592S2
3.0	.670 x 1.874	118P30592S2
4.0	.750 x 1.874	118P40592S2
5.0	1.000 x 1.874	118P50592S2
6.0	1.000 x 1.874	118P60592S2
8.0	1.000 x 1.874	118P80592S2
10.0	1.000 x 2.374	118P10692S2
12.0	1.000 x 2.624	118P12692S2
400 WVDC		
.15	.500 x 1.124	118P15494S2
1.0	.750 x 1.874	118P10594S2
2.0	1.000 x 1.874	118P20594S2
3.0	1.000 x 2.624	118P30594S2
600 WVDC		
.01	.312 x .874	118P10396S2
.047	.400 x 1.124	118P47396S2
.1	.500 x 1.124	118P10496S2
.15	.562 x 1.124	118P15496S2
.22	.562 x 1.374	118P22496S2
.33	.562 x 1.624	118P33496S2
.47	.670 x 1.624	118P47496S2
1.0	1.000 x 1.874	118P10596S2
2.0	1.000 x 2.124	118P20596S2
2.5	1.000 x 2.624	118P25596S2

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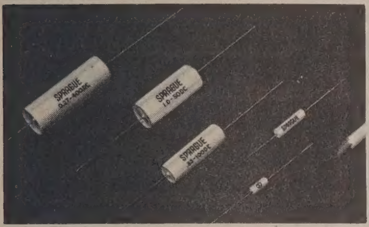
SPRAGUE CAPACITORS

TYPE 416P YELLOW JACKET® FILMITE® 'E' CAPACITORS

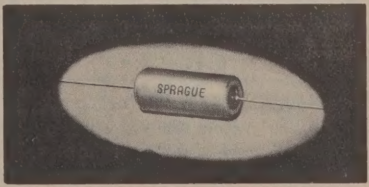


- Economy-priced for commercial applications. Made in Taiwan by Taiwan Sprague Corp.
- Extended-foil construction.
- Protected against moisture by outer wrap of polyester film and plastic resin end seals.
- Light-weight capacitors of minimum size.
- Rated for −55 C to +85 C operation (to +105 C with voltage derating).
- High insulation resistance.
- For complete technical data, refer to latest issue of Engineering Bulletin 2063C.

μF	D. x L.	Cat. No.
	50 WVDC	
0.012	.190 x 0.531	416P1239R5
0.015	.190 x 0.531	416P1539R5
0.018	.200 x 0.594	416P1839R5
0.022	.200 x 0.594	416P2239R5
0.027	.210 x 0.656	416P2739R5
0.033	.210 x 0.656	416P3339R5
0.039	See 100 WVDC Listing	
0.047	See 100 WVDC Listing	
0.056	.250 x 0.718	416P5639R5
0.068	.250 x 0.718	416P6839R5
0.082	.290 x 0.750	416P8239R5
0.1	.290 x 0.750	416P1049R5
0.12	.315 x 0.812	416P1249R5
0.15	.315 x 0.812	416P1549R5
0.18	.315 x 1.062	416P1849R5
0.22	.315 x 1.062	416P2249R5
0.27	.375 x 1.062	416P2749R5
0.33	.375 x 1.062	416P3349R5
0.39	.430 x 1.062	416P3949R5
0.47	.430 x 1.062	416P4749R5
0.56	.450 x 1.375	416P5649R5
0.68	.450 x 1.375	416P6849R5
0.82	.500 x 1.375	416P8249R5
1.0	.500 x 1.375	416P1059R5
	100 WVDC	
0.001	See 200 WVDC Listing	
0.0012	See 200 WVDC Listing	
0.0015	See 200 WVDC Listing	
0.0018	See 200 WVDC Listing	
0.0022	See 200 WVDC Listing	
0.0027	See 200 WVDC Listing	
0.0033	See 200 WVDC Listing	
0.0039	See 200 WVDC Listing	
0.0047	See 200 WVDC Listing	
0.0056	.190 x 0.450	416P56291
0.0068	.190 x 0.450	416P68291
0.0082	.190 x 0.450	416P82291
0.01	.190 x 0.450	416P10391
0.012	See 200 WVDC Listing	
0.015	See 200 WVDC Listing	
0.018	See 200 WVDC Listing	
0.022	See 200 WVDC Listing	
0.027	.190 x 0.718	416P27391
0.033	.190 x 0.718	416P33391
0.039	.215 x 0.718	416P39391
0.047	.215 x 0.718	416P47391
0.056	.215 x 0.844	416P56391
0.068	.215 x 0.844	416P68391
0.082	.245 x 0.844	416P82391
0.1	.245 x 0.844	416P10491
0.12	.285 x 0.844	416P12491
0.15	.285 x 0.844	416P15491
0.18	.290 x 1.250	416P18491
0.22	.290 x 1.250	416P22491
0.27	.325 x 1.250	416P27491
0.33	.325 x 1.250	416P33491
0.39	.380 x 1.250	416P39491
0.47	.380 x 1.250	416P47491
0.56	.455 x 1.562	416P56491
0.68	.455 x 1.562	416P68491
0.82	.535 x 1.562	416P82491
1.0	.535 x 1.562	416P10591
	200 WVDC	
0.001	.190 x 0.450	416P10292
0.0012	.190 x 0.450	416P12292
0.0015	.190 x 0.450	416P15292
0.0018	.190 x 0.450	416P18292
0.0022	.190 x 0.450	416P22292
0.0027	.190 x 0.450	416P27292
0.0033	.190 x 0.450	416P33292
0.0039	.190 x 0.450	416P39292
0.0047	.190 x 0.450	416P47292
0.0056	.190 x 0.718	416P56292
0.0068	.190 x 0.718	416P68292
0.0082	.190 x 0.718	416P82292
0.01	.190 x 0.718	416P10392
0.012	.190 x 0.718	416P12392
0.015	.190 x 0.718	416P15392
0.018	.190 x 0.718	416P18392
0.022	.190 x 0.718	416P22392
0.027	.190 x 0.844	416P27392
0.033	.190 x 0.844	416P33392
0.039	.210 x 0.844	416P39392
0.047	.210 x 0.844	416P47392
0.056	.240 x 0.844	416P56392
0.068	.240 x 0.844	416P68392
0.082	.275 x 0.969	416P82392
0.1	.275 x 0.969	416P10492
0.12	.345 x 1.000	416P12492
0.15	.345 x 1.000	416P15492
0.18	.355 x 1.250	416P18492
0.22	.355 x 1.250	416P22492
0.27	.425 x 1.250	416P27492
0.33	.425 x 1.250	416P33492
0.39	.440 x 1.562	416P39492
0.47	.440 x 1.562	416P47492
0.56	.610 x 1.750	416P56492
0.68	.610 x 1.750	416P68492
0.82	.710 x 1.875	416P82492
1.0	.710 x 1.875	416P10592
	400 WVDC	
0.0027	.190 x 0.718	416P27294
0.0033	.190 x 0.718	416P33294
0.0039	.190 x 0.718	416P39294
0.0047	.190 x 0.718	416P47294
0.0056	.200 x 0.718	416P56294
0.0068	.200 x 0.718	416P68294
0.0082	.210 x 0.844	416P82294
0.01	.210 x 0.844	416P10394
0.012	.230 x 0.844	416P12394
0.015	.230 x 0.844	416P15394
0.018	.265 x 0.844	416P18394
0.022	.265 x 0.844	416P22394
0.027	.315 x 0.875	416P27394
0.033	.315 x 0.875	416P33394
0.039	.325 x 1.000	416P39394
0.047	.325 x 1.000	416P47394
0.056	.340 x 1.250	416P56394
0.068	.340 x 1.250	416P68394
0.082	.400 x 1.250	416P82394
0.1	.400 x 1.250	416P10494
0.12	.405 x 1.562	416P12494
0.15	.405 x 1.562	416P15494
0.18	.480 x 1.562	416P18494
0.22	.480 x 1.562	416P22494
0.27	.650 x 1.750	416P27494
0.33	.650 x 1.750	416P33494
0.39	.725 x 1.937	416P39494
0.47	.725 x 1.937	416P47494
	600 WVDC	
0.001	.190 x 0.718	416P10296
0.0012	.190 x 0.718	416P12296
0.0015	.190 x 0.718	416P15296
0.0018	.190 x 0.718	416P18296
0.0022	.190 x 0.718	416P22296
0.0027	.205 x 0.718	416P27296
0.0033	.205 x 0.718	416P33296
0.0039	.235 x 0.718	416P39296
0.0047	.235 x 0.718	416P47296
0.0056	.240 x 0.844	416P56296
0.0068	.240 x 0.844	416P68296
0.0082	.270 x 0.844	416P82296
0.01	.270 x 0.844	416P10396
0.012	.315 x 0.875	416P12396
0.015	.315 x 0.875	416P15396
0.018	.375 x 0.875	416P18396
0.022	.375 x 0.875	416P22396
0.027	.395 x 1.000	416P27396
0.033	.395 x 1.000	416P33396
0.039	.400 x 1.250	416P39396
0.047	.400 x 1.250	416P47396
0.056	.455 x 1.250	416P56396
0.068	.455 x 1.250	416P68396
0.082	.470 x 1.562	416P82396
0.1	.470 x 1.562	416P10496
0.12	.545 x 1.562	416P12496
0.15	.545 x 1.562	416P15496
0.18	.590 x 1.937	416P18496
0.22	.590 x 1.937	416P22496
0.27	.800 x 1.937	416P27496
0.33	.800 x 1.937	416P33496
0.39	.890 x 2.125	416P39496
0.47	.890 x 2.125	416P47496

TYPE 260P METALLIZED FILMITE® 'K' CAPACITORS

- Designed for applications such as low-frequency tuned circuits, analog computer reference capacitors and precision timing and integrated circuits.
- High insulation resistance, high stability, minimum capacitance change with temperature, low dielectric absorption, low dissipation factor.
- Capacitor sections are of non-inductive construction.
- Will operate at full rated voltage over the temperature range of −55 C to +105 C.
- Capacitance tolerance, ±5%.
- Voltage rating, 200 WVDC.
- For complete technical data, refer to latest issue of Engineering Bulletin 2705.



μF	D. x L.	Cat. No.
.01	.175 x 3/4	260P10352S4
.015	.195 x 3/4	260P15352S4
.022	.235 x 3/4	260P22352S4
.033	.235 x 3/4	260P33352S4
.047	.312 x 7/8	260P47352S4
.056	.312 x 7/8	260P56352S4
.068	.312 x 7/8	260P68352S4
.1	.312 x 7/8	260P10452S4
.15	.312 x 1 1/8	260P15452S4
.22	.400 x 7/8	260P22452S4
.33	.400 x 1 1/8	260P33452S4
.47	.400 x 1 3/8	260P47452S4
.68	.562 x 1 1/8	260P68452S4
1.0	.562 x 1 3/8	260P10552S4
2.0	.670 x 1 5/8	260P20552S4
3.0	.750 x 1 7/8	260P30552S4
4.0	.750 x 2 1/8	260P40552S4
5.0	.750 x 2 3/8	260P50552S4
7.0	1.000 x 1 7/8	260P70552S4
8.0	1.000 x 2 1/8	260P80552S4
10.0	1.000 x 2 5/8	260P10652S4

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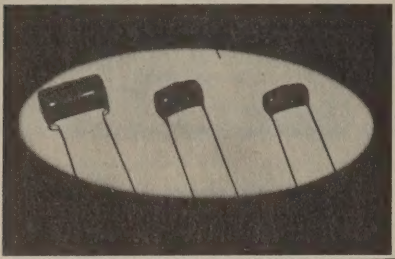
SPRAGUE CAPACITORS

TYPE 225P FILMITE® 'E' ORANGE DROP® CAPACITORS

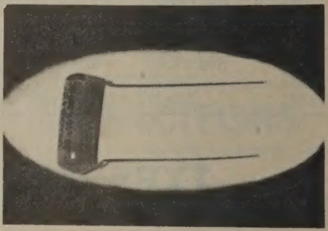


- Designed specifically for printed wiring board applications and are furnished with radial leads to facilitate insertion on boards.
- Find wide application in television receivers, radio sets, and commercial electronic equipment.
- Designed for operation at temperatures to 85 C.
- Capacitor sections are wound from polyester film and thin-gage foil under carefully controlled atmospheric conditions.
- Protected against moisture by a wax-free conformal coating of epoxy.
- Capacitance tolerance, ±10%.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 2062.
- May be operated to 125 C with voltage derating.

µF	H. x T. x L.	Cat. No.
	100 WVDC	
.001	5/16 x 13/64 x 45/64	225P10291WD3
.0012	5/16 x 13/64 x 45/64	225P12291WD3
.0015	5/16 x 13/64 x 45/64	225P15291WD3
.0018	5/16 x 13/64 x 45/64	225P18291WD3
.0022	5/16 x 13/64 x 45/64	225P22291WD3
.0027	5/16 x 13/64 x 45/64	225P27291WD3
.0033	5/16 x 13/64 x 45/64	225P33291WD3
.0039	5/16 x 13/64 x 45/64	225P39291WD3
.0047	5/16 x 13/64 x 45/64	225P47291WD3
.0056	5/16 x 13/64 x 45/64	225P56291WD3
.0068	5/16 x 13/64 x 45/64	225P68291WD3
.0082	5/16 x 13/64 x 45/64	225P82291WD3
.01	5/16 x 13/64 x 45/64	225P10391WD3
.012	5/16 x 13/64 x 45/64	225P12391WD3
.015	5/16 x 13/64 x 45/64	225P15391WD3
.018	5/16 x 13/64 x 45/64	225P18391WD3
.022	5/16 x 13/64 x 45/64	225P22391WD3
.027	21/64 x 15/64 x 45/64	225P27391WD3
.033	21/64 x 15/64 x 45/64	225P33391WD3
.039	11/32 x 1/4 x 45/64	225P39391WD3
.047	11/32 x 1/4 x 45/64	225P47391WD3
.056	3/8 x 9/32 x 45/64	225P56391WD3
.068	3/8 x 9/32 x 45/64	225P68391WD3
.082	17/32 x 21/64 x 45/64	225P82391WD3
.1	17/32 x 21/64 x 45/64	225P10491WD3
.12	19/32 x 3/8 x 13/16	225P12491XD3
.15	5/8 x 13/32 x 13/16	225P15491XD3
.18	11/16 x 7/16 x 13/16	225P18491XD3
.22	23/32 x 15/32 x 13/16	225P22491XD3
.27	3/4 x 1/2 x 13/16	225P27491XD3
.33	25/32 x 17/32 x 13/16	225P33491XD3
.39	13/16 x 9/16 x 13/16	225P39491XD3
.47	7/8 x 5/8 x 13/16	225P47491XD3
.56	57/64 x 9/16 x 1 3/16	225P56491YD3
.68	29/32 x 19/32 x 1 3/16	225P68491YD3
.82	61/64 x 21/32 x 1 3/16	225P82491YD3
1.0	63/64 x 47/64 x 1 3/16	225P10591YD3
	200 WVDC	
.001	9/16 x 15/64 x 13/16	225P10292XD3
.0015	9/16 x 15/64 x 13/16	225P15292XD3
.0022	9/16 x 15/64 x 13/16	225P22292XD3
.0033	9/16 x 15/64 x 13/16	225P33292XD3
.0047	9/16 x 15/64 x 13/16	225P47292XD3
.0068	19/32 x 1/4 x 13/16	225P68292XD3
.01	19/32 x 1/4 x 13/16	225P10392XD3
.015	19/32 x 1/4 x 13/16	225P15392XD3
.022	19/32 x 1/4 x 13/16	225P22392XD3
.033	5/8 x 9/32 x 13/16	225P33392XD3
.047	5/8 x 9/32 x 13/16	225P47392XD3
.068	41/64 x 5/16 x 13/16	225P68392XD3
.1	23/32 x 3/8 x 13/16	225P10492XD3
.15	3/4 x 27/64 x 13/16	225P15492XD3
.22	25/32 x 15/32 x 13/16	225P22492XD3
.33	23/32 x 27/64 x 1-3/16	225P33492YD3
.47	27/32 x 1/2 x 1-3/16	225P47492YD3
.68	1 9/64 x 27/32 x 1-3/16	225P68492YD3
	400 WVDC	
.001	9/16 x 15/64 x 13/16	225P10294XD3
.0015	9/16 x 15/64 x 13/16	225P15294XD3
.0022	9/16 x 15/64 x 13/16	225P22294XD3
.0033	9/16 x 15/64 x 13/16	225P33294XD3
.0047	9/16 x 15/64 x 13/16	225P47294XD3
.0068	19/32 x 1/4 x 13/16	225P68294XD3
.01	19/32 x 1/4 x 13/16	225P10394XD3
.015	19/32 x 9/32 x 13/16	225P15394XD3
.022	19/32 x 5/16 x 13/16	225P22394XD3
.033	21/32 x 11/32 x 13/16	225P33394XD3
.047	21/32 x 27/64 x 13/16	225P47394XD3
.068	13/16 x 31/64 x 13/16	225P68394XD3
.1	27/32 x 17/32 x 13/16	225P10494XD3
.15	13/16 x 31/64 x 1-3/16	225P15494YD3
.22	57/64 x 9/16 x 1-3/16	225P22494YD3
.33	1 x 47/64 x 1-3/16	225P33494YD3
.47	1 9/64 x 27/32 x 1-3/16	225P47494YD3

TYPE 418P ORANGE DROP® FILMITE® 'E' CAPACITORS

- Widely used in TV, radio, and allied commercial equipment.
- Combine excellent electrical characteristics, compactness, and low cost.
- "Hockeystick" crimped radial-lead design for easy insertion on printed wiring boards.
- Wound with polyester film and thin gage foil under carefully controlled atmospheric conditions.
- Protected against moisture by wax-free conformal coating of epoxy.
- Designed for operation at temperatures to 85 C.
- May be operated to 125 C with voltage derating.
- Capacitance tolerance, ±10%.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletin 2062.



µF	D. x L.	Cat. No.
	100 WVDC	
.033	.400 x .700	418P33391JD3
.039	.400 x .700	418P39391JD3
.047	.400 x .700	418P47391JD3
.056	.400 x .700	418P56391JD3
.068	.400 x .700	418P68391JD3
.082	.400 x .900	418P82391KD3
.10	.400 x .900	418P10491KD3
.12	.450 x .900	418P12491KD3
.15	.450 x .900	418P15491KD3
.18	.450 x 1.200	418P18491LD3
.22	.450 x 1.200	418P22491LD3
.27	.500 x 1.200	418P27491LD3
.33	.500 x 1.200	418P33491LD3
.39	.550 x 1.600	418P39491MD3
.47	.550 x 1.600	418P47491MD3
.56	.650 x 1.600	418P56491MD3
.68	.650 x 1.600	418P68491MD3
.82	.700 x 1.600	418P82491MD3
1.0	.700 x 1.600	418P10591MD3
	200 WVDC	
.018	.400 x .700	418P18392JD3
.022	.400 x .700	418P22392JD3
.027	.400 x .700	418P27392JD3
.033	.400 x .900	418P33392KD3
.039	.400 x .900	418P39392KD3
.047	.400 x .900	418P47392KD3
.056	.400 x 1.200	418P56392LD3
.068	.400 x 1.200	418P68392LD3
.082	.450 x 1.200	418P82392LD3
.10	.450 x 1.200	418P10492LD3
.12	.500 x 1.200	418P12492LD3
.15	.500 x 1.200	418P15492LD3
.18	.550 x 1.200	418P18492LD3
.22	.550 x 1.200	418P22492LD3
.27	.500 x 1.600	418P27492MD3
.33	.500 x 1.600	418P33492MD3
.39	.550 x 1.600	418P39492MD3

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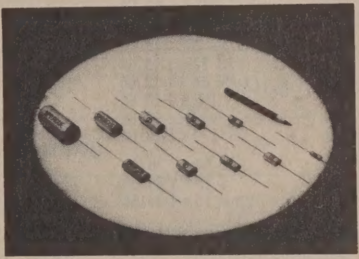
SPRAGUE CAPACITORS

TYPE 418P ORANGE DROP CAPACITORS, continued

µF	D. x L.	Cat. No.
.47	.550 x 1.600	418P47492MD3
	400 WVDC	
.0082	.350 x .700	418P82294JD3
.010	.350 x .700	418P10394JD3
.012	.380 x .700	418P12394JD3
.015	.380 x .700	418P15394JD3
.018	.380 x .900	418P18394KD3
.022	.380 x .900	418P22394KD3
.027	.400 x .900	418P27394KD3
.033	.400 x .900	418P33394KD3
.039	.400 x 1.200	418P39394LD3
.047	.400 x 1.200	418P47394LD3
.056	.450 x 1.200	418P56394LD3
.068	.500 x 1.200	418P68394LD3
.082	.520 x 1.200	418P82394LD3
.10	.520 x 1.200	418P10494LD3
.12	.570 x 1.200	418P12494LD3
.15	.570 x 1.200	418P15494LD3
.18	.600 x 1.600	418P18494MD3
.22	.600 x 1.600	418P22494MD3
.27	.650 x 1.600	418P27494MD3
.33	.650 x 1.600	418P33494MD3
.39	.720 x 1.600	418P39494MD3
.47	.720 x 1.600	418P47494MD3
	600 WVDC	
.0010	.300 x .700	418P10296JD3
.0012	.330 x .700	418P12296JD3
.0015	.330 x .700	418P15296JD3
.0018	.330 x .700	418P18296JD3
.0022	.330 x .700	418P22296JD3
.0027	.350 x .700	418P27296JD3
.0033	.350 x .700	418P33296JD3
.0039	.380 x .700	418P39296JD3
.0047	.380 x .700	418P47296JD3
.0056	.400 x .700	418P56296JD3
.0068	.400 x .700	418P68296JD3
.0082	.400 x .900	418P82296KD3
.010	.400 x .900	418P10396KD3
.012	.400 x .900	418P12396KD3
.015	.400 x .900	418P15396KD3
.018	.450 x .900	418P18396KD3
.022	.450 x .900	418P22396KD3
.027	.450 x 1.200	418P27396LD3
.033	.450 x 1.200	418P33396LD3
.039	.550 x 1.200	418P39396LD3
.047	.550 x 1.200	418P47396LD3
.056	.600 x 1.200	418P56396LD3
.068	.600 x 1.200	418P68396LD3
.082	.650 x 1.200	418P82396LD3
.10	.650 x 1.200	418P10496LD3
.12	.700 x 1.600	418P12496MD3
.15	.700 x 1.600	418P15496MD3
.18	.800 x 1.600	418P18496MD3
.22	.800 x 1.600	418P22496MD3

TYPE 431P METFILM® 'E' CAPACITORS

- **Unique Construction Gives Definite Space Advantages Over Metal-Encased, Molded, or Wax-Coated Cardboard-Case Tubulars of Comparable Ratings.**
- **Axial-Lead Polyester-Film Capacitor Section Protected Against Moisture By An Outer Wrap of Polyester-Film Tape.**
- **An Improved End Seal of a Plastic Resin Which Bonds With the Film Wrap and the Tinned Leads Provides Superior Humidity Resistance.**
- **Because of Their Small Size, These Capacitors Are Particularly Well-Suited For Potting or Encapsulating in Electronic Sub-Assemblies.**
- **For Complete Technical Data, Refer to The Latest Issue of Sprague Engineering Bulletin 2445.**
- **Call Your Sprague Industrial Distributor For Current Quantity Prices.**



µF	T. x W. x L.	Cat. No.
	50 WVDC	
.047	3/32 x 3/16 x 5/8	431P4739R5
.068	1/8 x 7/32 x 5/8	431P6839R5
.10	5/32 x 7/32 x 5/8	431P1049R5
.15	3/16 x 1/4 x 5/8	431P1549R5
.22	5/32 x 9/32 x 3/4	431P2249R5
.33	3/16 x 5/16 x 3/4	431P3349R5
.47	3/16 x 5/16 x 1	431P4749R5
.68	3/16 x 3/8 x 1	431P6849R5
1.0	1/4 x 13/32 x 1	431P1059R5
1.5	9/32 x 1/2 x 1	431P1559R5
2.0	3/8 x 9/16 x 1	431P2059R5
2.5	11/32 x 17/32 x 1-1/4	431P2559R5
3.0	3/8 x 19/32 x 1-1/4	431P3059R5
4.0	3/8 x 19/32 x 1-1/2	431P4059R5
5.0	13/32 x 19/32 x 1-3/4	431P5059R5
6.0	15/32 x 11/16 x 1-1/2	431P6059R5
7.0	15/32 x 11/16 x 1-3/4	431P7059R5
10.0	9/16 x 25/32 x 1-3/4	431P1069R5
12.0	1/2 x 13/16 x 2-1/4	431P1269R5
	200 WVDC	
.015	3/32 x 3/16 x 5/8	431P15392
.022	1/8 x 3/16 x 5/8	431P22392
.033	1/8 x 7/32 x 5/8	431P33392
.047	5/32 x 1/4 x 5/8	431P47392
.068	5/32 x 9/32 x 3/4	431P68392
.1	3/16 x 5/16 x 3/4	431P10492
.15	7/32 x 11/32 x 3/4	431P15492
.22	1/4 x 13/32 x 3/4	431P22492
.33	7/32 x 13/32 x 1	431P33492
.47	7/32 x 13/32 x 1-1/4	431P47492
.68	5/16 x 17/32 x 1	431P68492
1.0	5/16 x 17/32 x 1-1/4	431P10592
1.5	11/32 x 9/16 x 1-1/2	431P15592
2.0	3/8 x 9/16 x 1-3/4	431P20592
2.5	15/32 x 21/32 x 1-1/2	431P25592
3.0	15/32 x 21/32 x 1-3/4	431P30592
4.0	17/32 x 3/4 x 1-3/4	431P40592
5.0	15/32 x 3/4 x 2-1/4	431P50592
6.0	15/32 x 25/32 x 2-1/2	431P60592
7.0	3/4 x 15/16 x 1-3/4	431P70592
10.0	23/32 x 1 x 2-1/4	431P10692
12.0	23/32 x 1 x 2-1/2	431P12692
	400 WVDC	
.0033	3/32 x 3/16 x 5/8	431P33294
.0047	1/8 x 3/16 x 5/8	431P47294
.0068	5/32 x 7/32 x 5/8	431P68294
.01	3/16 x 1/4 x 5/8	431P10394
.015	5/32 x 9/32 x 3/4	431P15394
.022	3/16 x 5/16 x 3/4	431P22394
.033	7/32 x 11/32 x 3/4	431P33394
.047	1/4 x 13/32 x 3/4	431P47394
.068	7/32 x 3/8 x 1	431P68394
.1	9/32 x 7/16 x 1	431P10494
.15	5/16 x 17/32 x 1	431P15494
.22	13/32 x 19/32 x 1	431P22494
.33	11/32 x 9/16 x 1-1/2	431P33494
.47	3/8 x 9/16 x 1-3/4	431P47494
.68	15/32 x 21/32 x 1-3/4	431P68494
1.0	1/2 x 23/32 x 2	431P10594
1.5	1/2 x 25/32 x 2-1/2	431P15594
	600 WVDC	
.0015	3/32 x 3/16 x 5/8	431P15296
.0022	1/8 x 3/16 x 5/8	431P22296
.0033	5/32 x 7/32 x 5/8	431P33296
.0047	1/8 x 1/4 x 3/4	431P47296
.0068	5/32 x 9/32 x 3/4	431P68296
.01	3/16 x 5/16 x 3/4	431P10396
.015	3/16 x 3/8 x 3/4	431P15396
.022	1/4 x 13/32 x 3/4	431P22396
.033	7/32 x 3/8 x 1	431P33396
.047	7/32 x 3/8 x 1-1/4	431P47396
.068	5/16 x 1/2 x 1	431P68396
.1	3/8 x 19/32 x 1	431P10496
.15	3/8 x 19/32 x 1-1/4	431P15496
.22	11/32 x 9/16 x 1-3/4	431P22496
.33	7/16 x 21/32 x 1-3/4	431P33496
.47	9/16 x 3/4 x 1-3/4	431P47496
.68	15/32 x 25/32 x 2-1/2	431P68496
1.0	3/4 x 31/32 x 2	431P10596
1.5	3/4 x 1-1/16 x 2-1/2	431P15596

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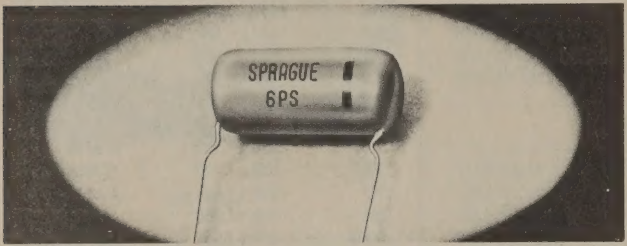
SPRAGUE CAPACITORS

TYPE PS ORANGE DROP® DIPPED TUBULARS



- Widely Used in TV, Radio and Allied Commercial Equipment
- Crimped Wire Leads for Correct Spacing When Mounted On Printed Wiring Boards.
- Outside Foil on All Units Identified by Black Striping
- Double Dipped in Bright Orange Epoxy Resin—Beats Heat and Humidity
- Won't Leak or Drip
- Capacitance Tolerance, ±10%

µF	D. x L.	Cat. No.
200 WVDC		
.02	11/32 x 45/64	2PS-S20
.022	11/32 x 45/64	2PS-S22
.047	25/64 x 29/32	2PS-S47
.05	25/64 x 29/32	2PS-S50
.1	13/32 x 1 13/64	2PS-P10
.15	29/64 x 1 13/64	2PS-P15
.2	1/2 x 1 13/64	2PS-P20
.22	1/2 x 1 13/64	2PS-P22
.25	1/2 x 1 13/64	2PS-P25
.33	31/64 x 1 39/64	2PS-P33
.47	9/16 x 1 39/64	2PS-P47
.5	9/16 x 1 39/64	2PS-P50
400 WVDC		
.01	23/64 x 45/64	4PS-S10
.015	35/64 x 45/64	4PS-S15
.02	25/64 x 29/32	4PS-S20
.022	25/64 x 29/32	4PS-S22
.025	25/64 x 29/32	4PS-S25
.03	13/32 x 29/32	4PS-S30
.033	13/32 x 29/32	4PS-S33
.04	13/32 x 1 13/64	4PS-S40
.047	13/32 x 1 13/64	4PS-S47
.05	13/32 x 1 13/64	4PS-S50
.056	29/64 x 1 13/64	4PS-S56
.068	29/64 x 1 13/64	4PS-S68
.075	29/64 x 1 13/64	4PS-S75
.1	17/32 x 1 13/64	4PS-P10
.15	37/64 x 1 13/64	4PS-P15
.2	39/64 x 1 39/64	4PS-P20
.22	39/64 x 1 39/64	4PS-P22
.25	39/64 x 1 39/64	4PS-P25
600 WVDC		
.001	5/16 x 45/64	6PS-D10
.0012	11/32 x 45/64	6PS-D12
.0015	11/32 x 45/64	6PS-D15
.0018	11/32 x 45/64	6PS-D18
.002	11/32 x 45/64	6PS-D20
.0022	11/32 x 45/64	6PS-D22
.0025	11/32 x 45/64	6PS-D25
.0027	23/64 x 45/64	6PS-D27
.003	23/64 x 45/64	6PS-D30
.0033	23/64 x 45/64	6PS-D33
.0039	25/64 x 45/64	6PS-D39
.004	25/64 x 45/64	6PS-D40
.0047	25/64 x 45/64	6PS-D47
.005	25/64 x 45/64	6PS-D50
.0056	13/32 x 45/64	6PS-D56
.006	13/32 x 45/64	6PS-D60
.0068	13/32 x 45/64	6PS-D68
.0075	13/32 x 45/64	6PS-D75
.008	13/32 x 29/32	6PS-D80
.0082	13/32 x 29/32	6PS-D82
.01	13/32 x 29/32	6PS-S10
.012	13/32 x 29/32	6PS-S12
.015	13/32 x 29/32	6PS-S15
.02	29/64 x 29/32	6PS-S20
.022	29/64 x 29/32	6PS-S22
.025	29/64 x 29/32	6PS-S25
.027	29/64 x 1 13/64	6PS-S27
.03	29/64 x 1 13/64	6PS-S30
.033	29/64 x 1 13/64	6PS-S33
.035	29/64 x 1 13/64	6PS-S35
.039	9/16 x 1 13/64	6PS-S39
.04	9/16 x 1 13/64	6PS-S40
.047	9/16 x 1 13/64	6PS-S47
.05	9/16 x 1 13/64	6PS-S50
.056	39/64 x 1 13/64	6PS-S56
.06	39/64 x 1 13/64	6PS-S60
.068	39/64 x 1 13/64	6PS-S68
.075	39/64 x 1 13/64	6PS-S75
.082	21/32 x 1 13/64	6PS-S82
.1	21/32 x 1 13/64	6PS-P10
.15	45/64 x 1 39/64	6PS-P15
.2	13/16 x 1 39/64	6PS-P20
.22	13/16 x 1 39/64	6PS-P22
.25	53/64 x 1 13/16	6PS-P25
.33	57/64 x 1 13/16	6PS-P33
.47	57/64 x 1 5/8	6PS-P47
1000 WVDC		
.001	5/16 x 45/64	10PS-D10
.0015	21/64 x 45/64	10PS-D15
.002	23/64 x 45/64	10PS-D20
.0022	23/64 x 45/64	10PS-D22
.003	23/64 x 29/32	10PS-D30
.0033	23/64 x 29/32	10PS-D33
.004	13/32 x 29/32	10PS-D40
.0047	13/32 x 29/32	10PS-D47
.005	13/32 x 29/32	10PS-D50
.0068	7/16 x 29/32	10PS-D68
.01	31/64 x 29/32	10PS-S10
.015	31/64 x 1 13/64	10PS-S15
.022	37/64 x 1 39/64	10PS-S22
.033	21/32 x 1 39/64	10PS-S33
.039	21/32 x 1 39/64	10PS-S39
.047	21/32 x 1 39/64	10PS-S47
.056	3/4 x 1 39/64	10PS-S56
.068	3/4 x 1 39/64	10PS-S68
.082	55/64 x 1 39/64	10PS-S82
.1	55/64 x 1 39/64	10PS-P10
1600 WVDC		
.001	1/2 x 1 5/16	16PS-D10
.0015	1/2 x 1 5/16	16PS-D15
.002	1/2 x 1 5/16	16PS-D20
.0022	1/2 x 1 5/16	16PS-D22
.003	1/2 x 1 5/16	16PS-D30
.0033	1/2 x 1 5/16	16PS-D33
.0039	1/2 x 1 5/16	16PS-D39
.004	1/2 x 1 5/16	16PS-D40
.0047	1/2 x 1 5/16	16PS-D47
.005	1/2 x 1 5/16	16PS-D50
.006	9/16 x 1 5/16	16PS-D60
.0068	9/16 x 1 5/16	16PS-D68
.007	9/16 x 1 5/16	16PS-D70
.0075	9/16 x 1 5/16	16PS-D75
.008	39/64 x 1 5/16	16PS-D80
.01	39/64 x 1 5/16	16PS-S10
.015	21/32 x 1 5/16	16PS-S15
.018	21/32 x 1 45/64	16PS-S18
.02	21/32 x 1 45/64	16PS-S20
.022	21/32 x 1 45/64	16PS-S22
.03	3/4 x 1 45/64	16PS-S30
.033	3/4 x 1 45/64	16PS-S33
.04	55/64 x 1 45/64	16PS-S40
.047	55/64 x 1 45/64	16PS-S47
.05	55/64 x 1 45/64	16PS-S50
2000 WVDC		
.001	1/2 x 1 5/16	20PS-D10
.0015	1/2 x 1 5/16	20PS-D15
.0022	1/2 x 1 5/16	20PS-D22
.0033	9/16 x 1 5/16	20PS-D33
.0047	39/64 x 1 5/16	20PS-D47
.0056	21/32 x 1 5/16	20PS-D56
.0068	21/32 x 1 5/16	20PS-D68
.0082	45/64 x 1 5/16	20PS-D82
.027	61/64 x 1 45/64	20PS-S27

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IND-EEM-43-EIAT

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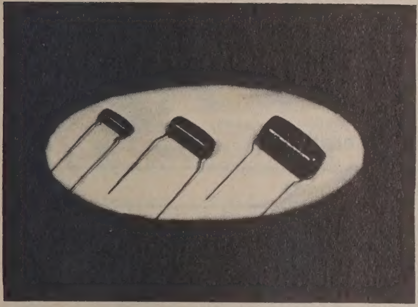
SPRAGUE CAPACITORS

TYPE 715P FILMITE® 'L' ORANGE DROP® DIPPED TUBULARS



- Polypropylene film capacitors similar to polystyrene units with their high a-c current-carrying capability, but have added advantage of operating temperatures to 105 C and extremely low dissipation factor.
- Ideal for applications where high a-c current flow is found, as in certain solid-state TV vertical circuits, r-f generators, and pulse-forming networks.
- Exhibit capacitance change of less than 3% over entire operating temperature range.
- Temperature coefficient is negative and virtually linear at 180 ppm/°C over the temperature range of +25 C to +105 C, making capacitors suitable for matching with positive TC resistors and inductors to maintain circuit stability.
- Conformally coated with flame-retardant epoxy which also provides protection from humidity and mechanical damage.
- Capacitance tolerance, ±5%.
- Furnished with 1.250" long "hockeystick" crimped leads.
- For complete technical data, refer to latest issue of Engineering Bulletin 2090.

µF	Dia. x Length	Catalog Number
400 WVDC		
.01	.400 x .750	715P10354JD3
.015	.450 x .750	715P15354JD3
.033	.500 x .950	715P33354KD3
.15	.650 x 1.300	715P15454LD3
.22	.700 x 1.700	715P22454MD3
.33	.800 x 1.700	715P33454MD3
.47	.900 x 1.700	715P47454MD3
600 WVDC		
.001	.400 x .750	715P10256JD3
.0015	.400 x .750	715P15256JD3
.0022	.400 x .750	715P22256JD3
.0033	.400 x .750	715P33256JD3
.0047	.450 x .750	715P47256JD3
.0068	.450 x .750	715P68256JD3
.01	.450 x .950	715P10356KD3
.015	.500 x .950	715P15356KD3
.022	.550 x .950	715P22356KD3
.047	.600 x 1.300	715P47356LD3
.068	.650 x 1.300	715P68356LD3
.1	.750 x 1.300	715P10456LD3
.15	.750 x 1.700	715P15456MD3
.22	.850 x 1.700	715P22456MD3

µF	Dia. x Length	Catalog Number
800 WVDC		
.015	.550 x 1.300	715P15358LD3
.022	.600 x 1.300	715P22358LD3
.033	.700 x 1.300	715P33358LD3
.068	.800 x 1.700	715P68358MD3
.1	.900 x 1.700	715P10458MD3
1200 WVDC		
.015	.650 x 1.300	715P153512LD3
.047	.850 x 1.700	715P473512MD3
1600 WVDC		
.0022	.500 x 1.300	715P222516LD3
.0033	.550 x 1.300	715P332516LD3
.0047	.600 x 1.300	715P472516LD3
.0068	.650 x 1.300	715P682516LD3
.01	.700 x 1.300	715P103516LD3
.015	.750 x 1.700	715P153516MD3
.022	.850 x 1.700	715P223516MD3
.033	.950 x 1.700	715P333516MD3

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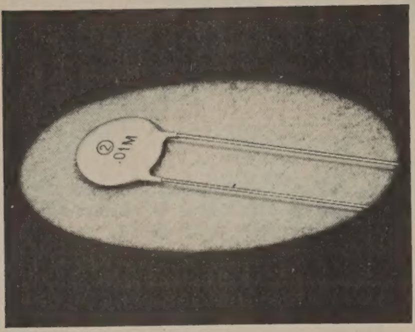
SPRAGUE CAPACITORS

CERA-MITE® CERAMIC CAPACITORS



- Tiny, Tough, Dependable In Every Application
- Low Self-Inductance Of Silvered Flat-plate Design Means Very High By-pass Efficiency In All TV Circuits
- Flat-plate Construction Permits Higher Self-resonant Frequency Than Tubular Ceramic Or Molded Mica Capacitors
- Tough Moisture-proof Coating Protects Against Short-circuiting And Assures Good Performance Under Severe Conditions Of Humidity And Vibration
- Cera-mite Capacitors Easily Fit Into Tight Spaces, Even Across Subminiature Tube Sockets
- Designed For 85C (185F) Continuous Operation

Call your Sprague Industrial Distributor for Current Quantity Prices

GENERAL APPLICATION TYPES

- Excellent Where Temperature Coefficient Is Not Important, Such As By-pass and Coupling Applications in IF and RF Circuits
- EIA Designation: Z5U, except 75GA = Y5R
- Low Cost, Smallest Size I kV General Application Type Available
- Same Characteristics Available In High Voltage Ratings At Low Cost

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
1000 WVDC ±20% Tol.			
5.0	5GA-V50	C023B102E5R0M	19/64 x 5/32
6.8	5GA-V68	C023B102E6R8M	19/64 x 5/32
7.5	5GA-V75	C023B102E7R5M	19/64 x 5/32
8.2	5GA-V82	C023B102E8R2M	19/64 x 5/32
10	5GA-Q10	C023B102E100M	19/64 x 5/32
12	5GA-Q12	C023B102E120M	19/64 x 5/32
15	5GA-Q15	C023B102E150M	19/64 x 5/32
18	5GA-Q18	C023B102E180M	19/64 x 5/32
20	5GA-Q20	C023B102E200M	19/64 x 5/32
22	5GA-Q22	C023B102E220M	19/64 x 5/32
25	5GA-Q25	C023B102E250M	19/64 x 5/32
27	5GA-Q27	C023B102E270M	19/64 x 5/32
30	5GA-Q30	C023B102E300M	19/64 x 5/32
33	5GA-Q33	C023B102E330M	19/64 x 5/32
39	5GA-Q39	C023B102E390M	19/64 x 5/32
47	5GA-Q47	C023B102E470M	19/64 x 5/32
50	5GA-Q50	C023B102E500M	19/64 x 5/32
56	5GA-Q56	C023B102E560M	19/64 x 5/32
68	5GA-Q68	C023B102E680M	19/64 x 5/32
75	5GA-Q75	C023B102E750M	19/64 x 5/32
82	5GA-Q82	C023B102E820M	19/64 x 5/32
100	5GA-T10	C023B102E101M	19/64 x 5/32
120	5GA-T12	C023B102E121M	19/64 x 5/32
150	5GA-T15	C023B102E151M	19/64 x 5/32
180	5GA-T18	C023B102E181M	19/64 x 5/32
200	5GA-T20	C023B102E201M	19/64 x 5/32
220	5GA-T22	C023B102E221M	19/64 x 5/32
250	5GA-T25	C023B102E251M	19/64 x 5/32
270	5GA-T27	C023B102E271M	19/64 x 5/32
300	5GA-T30	C023B102E301M	19/64 x 5/32
330	5GA-T33	C023B102E331M	19/64 x 5/32
360	5GA-T36	C023B102E361M	19/64 x 5/32
390	5GA-T39	C023B102E391M	19/64 x 5/32
470	5GA-T47	C023B102E471M	19/64 x 5/32

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
1000 WVDC (cont.)			
500	5GA-T50	C023B102E501M	19/64 x 5/32
560	5GA-T56	C023B102E561M	19/64 x 5/32
680	5GA-T68	C023B102E681M	19/64 x 5/32
750	5GA-T75	C023B102E751M	19/64 x 5/32
800	5GA-T80	C023B102E801M	19/64 x 5/32
820	5GA-T82	C023B102E821M	19/64 x 5/32
.001 μF	5GA-D10	C023B102E102M	19/64 x 5/32
.0012	5GA-D12	C023B102E122M	19/64 x 5/32
.0015	5GA-D15	C023B102E152M	19/64 x 5/32
.0018	5GA-D18	C023B102E182M	19/64 x 5/32
.002	5GA-D20	C023B102E202M	19/64 x 5/32
.0022	5GA-D22	C023B102E222M	19/64 x 5/32
.0025	5GA-D25	C023B102F252M	23/64 x 5/32
.0027	5GA-D27	C023B102F272M	23/64 x 5/32
.003	5GA-D30	C023B102F302M	23/64 x 5/32
.0033	5GA-D33	C023B102F332M	23/64 x 5/32
.0039	5GA-D39	C023B102F392M	23/64 x 5/32
.004	5GA-D40	C023B102G402M	13/32 x 5/32
.0047	5GA-D47	C023B102G472M	13/32 x 5/32
.005	5GA-D50	C023B102G502M	13/32 x 5/32
.0068	5GA-D68	C023B102H682M	31/64 x 5/32
.0082	5GA-D82	C023B102H822M	31/64 x 5/32
.01	5GA-S10	C023A102J103M	9/16 x 5/32
.015	5GA-S15	C023A102L153M	43/64 x 5/32
.02	5GA-S20	C023A102M203M	3/4 x 5/32
500 WVDC ±20% Tol.			
.01 μF	5GAS-S10	C023B501G103M	13/32 x 5/32
.02	5GAS-S20	C023A501J203M	9/16 x 5/32
.025	5GA-S25	C023A501K253M	39/64 x 5/32
.04	5GA-S40	C023A501P403M	7/8 x 5/32
.05	5GA-S50	C023A501P503M	7/8 x 5/32
.1	5GA-P10	C023B501Y104M	29/32 x 3/16

μF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
3000 WVDC ±20% Tol.			
1.5	30GA-V15	C023A302E1R5M	23/64 x 9/32
3.3	30GA-V33	C023A302E3R3M	23/64 x 9/32
4.7	30GA-V47	C023A302E4R7M	23/64 x 9/32
5.0	30GA-V50	C023A302E5R0M	23/64 x 9/32
6.0	30GA-V60	C023A302E6R0M	23/64 x 9/32
6.8	30GA-V68	C023A302E6R8M	23/64 x 9/32
7.5	30GA-V75	C023A302E7R5M	23/64 x 9/32
8.2	30GA-V82	C023A302E8R2M	23/64 x 9/32
10	30GA-Q10	C023A302E100M	23/64 x 9/32
12	30GA-Q12	C023A302E120M	23/64 x 9/32
15	30GA-Q15	C023A302E150M	23/64 x 9/32
18	30GA-Q18	C023A302E180M	23/64 x 9/32
20	30GA-Q20	C023A302E200M	23/64 x 9/32
22	30GA-Q22	C023A302E220M	23/64 x 9/32
25	30GA-Q25	C023A302E250M	23/64 x 9/32
27	30GA-Q27	C023A302E270M	23/64 x 9/32
30	30GA-Q30	C023A302E300M	23/64 x 9/32
33	30GA-Q33	C023A302E330M	23/64 x 9/32
39	30GA-Q39	C023A302E390M	23/64 x 9/32
47	30GA-Q47	C023A302E470M	23/64 x 9/32
50	30GA-Q50	C023A302E500M	23/64 x 9/32
56	30GA-Q56	C023A302E560M	23/64 x 9/32
60	30GA-Q60	C023A302E600M	23/64 x 9/32
62	30GA-Q62	C023A302E620M	23/64 x 9/32
68	30GA-Q68	C023A302E680M	23/64 x 9/32
75	30GA-Q75	C023A302E750M	23/64 x 9/32
82	30GA-Q82	C023A302E820M	23/64 x 9/32
100	30GA-T10	C023A302E101M	23/64 x 9/32
120	30GA-T12	C023A302E121M	23/64 x 9/32
150	30GA-T15	C023A302E151M	23/64 x 9/32
180	30GA-T18	C023A302E181M	23/64 x 9/32
200	30GA-T20	C023A302E201M	23/64 x 9/32

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IND-EEM-49-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

CERA-MITE® CERAMIC CAPACITORS, continued

3000 WVDC (cont.)

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
220	30GA-T22	C023A302E221M	23/64 x 9/32
250	30GA-T25	C023A302E251M	23/64 x 9/32
270	30GA-T27	C023A302E271M	23/64 x 9/32
300	30GA-T30	C023A302E301M	23/64 x 9/32
330	30GA-T33	C023A302E331M	23/64 x 9/32
390	30GA-T39	C023A302E391M	23/64 x 9/32
400	30GA-T40	C023A302E401M	23/64 x 9/32
470	30GA-T47	C023A302E471M	23/64 x 9/32
500	30GA-T50	C023A302E501M	23/64 x 9/32
560	30GA-T56	C023A302E561M	32/64 x 9/32
680	30GA-T68	C023A302E681M	23/64 x 9/32
750	30GA-T75	C023A302E751M	23/64 x 9/32
820	30GA-T82	C023A302F821M	13/32 x 9/32
.001 µF	30GA-D10	C023A302F102M	13/32 x 9/32
.0012	30GA-D12	C023A302F122M	13/32 x 9/32
.0015	30GA-D15	C023A302G152M	15/32 x 9/32
.002	30GA-D20	C023A302G202M	15/32 x 9/32
.0022	30GA-D22	C023A302G222M	15/32 x 9/32
.0025	30GA-D25	C023A302H252M	17/32 x 9/32
.0027	30GA-D27	C023A302H272M	17/32 x 9/32
.003	30GA-D30	C023A302H302M	17/32 x 9/32
.0033	30GA-D33	C023A302J332M	5/8 x 9/32
.0039	30GA-D39	C023A302J392M	5/8 x 9/32
.004	30GA-D40	C023A302J402M	5/8 x 9/32
.0047	30GA-D47	C023A302K472M	11/16 x 9/32
.005	30GA-D50	C023A302K502M	11/16 x 9/32
.006	30GA-D60	C023A302L602M	23/32 x 9/32
.0068	30GA-D68	C023A302L682M	23/32 x 9/32
.008	30GA-D80	C023A302M802M	51/64 x 9/32
.0082	30GA-D82	C023A302M822M	51/64 x 9/32
.01	30GA-S10	C023A302P103M	15/16 x 9/32

6000 WVDC ±20% Tol.

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
1.5	60GA-V15	C023A602J1R5D	5/8 x 3/8
4.7	60GA-V47	C023A602J4R7M	5/8 x 3/8
6.8	60GA-V68	C023A602J6R8M	5/8 x 3/8
8.2	60GA-V82	C023A602J8R2M	5/8 x 3/8
10	60GA-Q10	C023A602J100M	5/8 x 3/8
12	60GA-Q12	C023A602J120M	5/8 x 3/8
15	60GA-Q15	C023A602J150M	5/8 x 3/8
18	60GA-Q18	C023A602J180M	5/8 x 3/8
20	60GA-Q20	C023A602J200M	5/8 x 3/8
22	60GA-Q22	C023A602J220M	5/8 x 3/8
25	60GA-Q25	C023A602J250M	5/8 x 3/8
27	60GA-Q27	C023A602J270M	5/8 x 3/8
30	60GA-Q30	C023A602J300M	5/8 x 3/8
33	60GA-Q33	C023A602J330M	5/8 x 3/8
39	60GA-Q39	C023A602J390M	5/8 x 3/8
47	60GA-Q47	C023A602J470M	5/8 x 3/8
50	60GA-Q50	C023A602J500M	5/8 x 3/8
56	60GA-Q56	C023A602J560M	5/8 x 3/8
60	60GA-Q60	C023A602J600M	5/8 x 3/8
68	60GA-Q68	C023A602J680M	5/8 x 3/8
75	60GA-Q75	C023A602J750M	5/8 x 3/8
82	60GA-Q82	C023A602J820M	5/8 x 3/8
100	60GA-T10	C023A602J101M	5/8 x 3/8
120	60GA-T12	C023A602J121M	5/8 x 3/8
150	60GA-T15	C023A602J151M	5/8 x 3/8
180	60GA-T18	C023A602J181M	5/8 x 3/8
200	60GA-T20	C023A602J201M	5/8 x 3/8
220	60GA-T22	C023A602J221M	5/8 x 3/8

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6000 WVDC (cont.)

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
250	60GA-T25	C023A602J251M	5/8 x 3/8
270	60GA-T27	C023A602J271M	5/8 x 3/8
300	60GA-T30	C023A602J301M	5/8 x 3/8
330	60GA-T33	C023A602J331M	5/8 x 3/8
390	60GA-T39	C023A602J391M	5/8 x 3/8
400	60GA-T40	C023A602J401M	5/8 x 3/8
470	60GA-T47	C023A602J471M	5/8 x 3/8
500	60GA-T50	C023A602J501M	5/8 x 3/8
560	60GA-T56	C023A602J561M	5/8 x 3/8
680	60GA-T68	C023A602J681M	5/8 x 3/8
750	60GA-T75	C023A602J751M	5/8 x 3/8
820	60GA-T82	C023A602J821M	5/8 x 3/8
.001 µF	60GA-D10	C023A602J102M	5/8 x 3/8
.0012	60GA-D12	C023A602K122M	11/16 x 3/8
.0015	60GA-D15	C023A602L152M	23/32 x 3/8
.0022	60GA-D22	C023A602P222M	15/16 x 3/8
.0025	60GA-D25	C023A602P252M	15/16 x 3/8
.0027	60GA-D27	C023A602P272M	15/16 x 3/8
.003	60GA-D30	C023A602P302M	15/16 x 3/8
.0033	60GA-D33	C023A602P332M	15/16 x 3/8
.0039	60GA-D39	C023A602P392M	15/16 x 3/8
.0047	60GA-D47	C023A602P472M	15/16 x 3/8

7500 WVDC ±20% Tol.

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
4.7	75GA-V47	C066A752J4R7M	5/8 x 3/8
8.2	75GA-V82	C066A752J8R2M	5/8 x 3/8
10	75GA-Q10	C066A752J100M	5/8 x 3/8
12	75GA-Q12	C066A752J120M	5/8 x 3/8
15	75GA-Q15	C066A752J150M	5/8 x 3/8
18	75GA-Q18	C066A752J180M	5/8 x 3/8
20	75GA-Q20	C066A752J200M	5/8 x 3/8
22	75GA-Q22	C066A752J220M	5/8 x 3/8
30	75GA-Q30	C066A752J300M	5/8 x 3/8
33	75GA-Q33	C066A752J330M	5/8 x 3/8
47	75GA-Q47	C066A752J470M	5/8 x 3/8
56	75GA-Q56	C066A752J560M	5/8 x 3/8
100	75GA-T10	C066A752J101M	5/8 x 3/8
220	75GA-T22	C066A752J221M	5/8 x 3/8
470	75GA-T47	C066A752J471M	5/8 x 3/8
500	75GA-T50	C066A752J501M	5/8 x 3/8
560	75GA-T56	C066A752J561M	5/8 x 3/8
680	75GA-T68	C066A752J681M	5/8 x 3/8
750	75GA-T75	C066A752J751M	5/8 x 3/8
820	75GA-T82	C066A752J821M	5/8 x 3/8
.001 µF	75GA-D10	C066A752K102M	11/16 x 3/8
.0012	75GA-D12	C066A752L122M	23/32 x 3/8
.0015	75GA-D15	C066A752P152M	15/16 x 3/8
.0018	75GA-D18	C066A752P182M	15/16 x 3/8
.002	75GA-D20	C066A752P202M	15/16 x 3/8
.0022	75GA-D22	C066A752P222M	15/16 x 3/8
.0025	75GA-D25	C066A752P252M	15/16 x 3/8

HIGH-K TYPES

- Designed for By-Pass and Coupling Applications Where Additional Capacitance Will Not Affect Circuit Operation
- Smallest Physical Size
- EIA Designation: 5HK=Z5U
- 5HKS-S10 thru 5HK-P10, **500 WVDC,** Capacitance Tolerance: +80 —20%
- All Other 5HK are **1000 WVDC,** Capacitance Tolerance: GMV

SINGLE UNITS

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
.001	5HK-D10	C023B102E102P	19/64 x 5/32
.0015	5HK-D15	C023B102E152P	19/64 x 5/32
.002	5HK-D20	C023B102F202P	23/64 x 5/32
.0022	5HK-D22	C023B102F222P	23/64 x 5/32
.0033	5HK-D33	C023B102G332P	13/32 x 5/32
.0039	5HK-D39	C023B102G392P	13/32 x 5/32
.0047	5HK-D47	C023B102H472P	31/64 x 5/32
.005	5HK-D50	C023B102H502P	31/64 x 5/32
.0068	5HK-D68	C023B102H682P	31/64 x 5/32
.0082	5HK-D82	C023A102J822P	9/16 x 5/32
.01	5HK-S10	C023A102K103P	39/64 x 5/32
.01	5HKS-S10	C023B501G103Z	13/32 x 5/32
.015	5HK-S15	C023A501J153Z	9/16 x 5/32

SINGLE UNITS (cont.)

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
.02	5HK-S20	C023A501J203Z	9/16 x 5/32
.025	5HK-S25	C023A501K253Z	39/64 x 5/32
.04	5HK-S40	C023B501U403Z	41/64 x 3/16
.05	5HK-S50	C023B501W503Z	45/64 x 3/16
.1	5HK-P10	C023B501Y104Z	29/32 x 3/16

DUAL UNITS

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
2 x .001	5HK-2D10	20C253	13/32 x 5/32
2 x .0015	5HK-2D15	55C67	31/64 x 5/32
2 x .002	5HK-2D20	29C175	9/16 x 5/32
2 x .0022	5HK-2D22	29C27	9/16 x 5/32
2 x .0047	5HK-2D47	36C330	3/4 x 5/32
2 x .01	5HK-2S10	41C238	7/8 x 5/32
2 x .02	5HK-2S20	41C219	29/32 x 3/16

MINIATURIZED DISC CERAMIC CAPACITORS FOR TRANSISTORIZED CIRCUITRY

- Intended for Coupling and By-Pass Applications

Type TG Standard Tolerance ±20%

µF	Volts	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T
.005	100	TG-D50	C023B101E502M	19/64 x 1/8
.01	100	TG-S10	C023B101F103M	23/64 x 1/8
.02	100	TG-S20	C023B101H203M	41/64 x 1/8
.025	100	TG-S25	C023B101J253M	9/16 x 1/8
.03	100	TG-S30	C023B101J303M	9/16 x 1/8
.05	100	TG-S50	C023B101R503M	33/64 x 5/32
.1	100	TG-P10	C023B101W104M	45/64 x 5/32
.05	100	TGL-S50	C023B101L503M	43/64 x 1/8

IND-EEM-50-EIAT

Sizes subject to change without nofice.

SPRAGUE CAPACITORS

CERA-MITE® CERAMIC CAPACITORS, continued

TEMPERATURE-STABLE TYPES

- Used Where Minimum Capacitance Change With Temperature Is An Important Consideration
- EIA Designation: 10TS=X5E
- Standard Capacitance Tolerance: ±10%
- Rated at **1000 WVDC**

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
3.3	10TS-V33	C072B102E3R3D	19/64 x 5/32
5.0	10TS-V50	C072B102E5R0K	19/64 x 5/32
6.8	10TS-V68	C072B102E6R8K	19/64 x 5/32
7.5	10TS-V75	C072B102E7R5K	19/64 x 5/32
8.2	10TS-V82	C072B102E8R2K	19/64 x 5/32
10	10TS-Q10	C072B102E100K	19/64 x 5/32
12	10TS-Q12	C072B102E120K	19/64 x 5/32
15	10TS-Q15	C072B102E150K	19/64 x 5/32
18	10TS-Q18	C072B102E180K	19/64 x 5/32
20	10TS-Q20	C072B102E200K	19/64 x 5/32
22	10TS-Q22	C072B102E220K	19/64 x 5/32
25	10TS-Q25	C072B102E250K	19/64 x 5/32
27	10TS-Q27	C072B102E270K	19/64 x 5/32
30	10TS-Q30	C072B102E300K	19/64 x 5/32
33	10TS-Q33	C072B102E330K	19/64 x 5/32
39	10TS-Q39	C072B102E390K	19/64 x 5/32
47	10TS-Q47	C072B102E470K	19/64 x 5/32
50	10TS-Q50	C072B102E500K	19/64 x 5/32
56	10TS-Q56	C072B102E560K	19/64 x 5/32
68	10TS-Q68	C072B102E680K	19/64 x 5/32

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
75	10TS-Q75	C072B102E750K	19/64 x 5/32
82	10TS-Q82	C072B102E820K	19/64 x 5/32
91	10TS-Q91	C072B102E910K	19/64 x 5/32
100	10TS-T10	C072B102E101K	19/64 x 5/32
120	10TS-T12	C072B102E121K	19/64 x 5/32
150	10TS-T15	C072B102E151K	19/64 x 5/32
180	10TS-T18	C072B102E181K	19/64 x 5/32
200	10TS-T20	C072B102E201K	19/64 x 5/32
220	10TS-T22	C072B102E221K	19/64 x 5/32
250	10TS-T25	C072B102E251K	19/64 x 5/32
270	10TS-T27	C072B102E271K	19/64 x 5/32
300	10TS-T30	C072B102E301K	19/64 x 5/32
330	10TS-T33	C072B102E331K	19/64 x 5/32
390	10TS-T39	C072B102E391K	19/64 x 5/32
470	10TS-T47	C072B102E471K	19/64 x 5/32
500	10TS-T50	C072B102E501K	19/64 x 5/32
560	10TS-T56	C072B102F561K	11/32 x 5/32
680	10TS-T68	C072B102F681K	11/32 x 5/32
750	10TS-T75	C072B102F751K	11/32 x 5/32
820	10TS-T82	C072B102F821K	11/32 x 5/32

µF	Sprague Products Cat. No.	Sprague O.E.M. Part. No.	Size D. x T.
.001	10TS-D10	C072B102G102K	13/32 x 5/32
.0012	10TS-D12	C072B102G122K	13/32 x 5/32
.0015	10TS-D15	C072B102H152K	31/64 x 5/64
.0018	10TS-D18	C072A102J182K	9/16 x 5/32
.0020	10TS-D20	C072A102J202K	9/16 x 5/32
.0022	10TS-D22	C072A102J222K	9/16 x 5/32
.0025	10TS-D25	C072A102K252K	39/64 x 5/32
.0027	10TS-D27	C072A102K272K	39/64 x 5/32
.0030	10TS-D30	C072A102L302K	43/64 x 5/32
.0033	10TS-D33	C072A102L332K	43/64 x 5/32
.0039	10TS-D39	C072A102M392K	3/4 x 5/32
.0040	10TS-D40	C072A102M402K	3/4 x 5/32
.0047	10TS-D47	C072A102P472K	7/8 x 5/32
.0050	10TS-D50	C072A102P502K	7/8 x 5/32
.0056	10TS-D56	C072A102P562K	7/8 x 5/32
.0068	10TS-D68	C072A102P682K	7/8 x 5/32
.0075	10TS-D75	C072B102W752K	45/64 x 3/16
.0082	10TS-D82	C072B102X822K	49/64 x 3/16
.01	10TS-S10	C072B102Y103K	29/32 x 3/16

DISC CERAMICS FOR AC APPLICATIONS

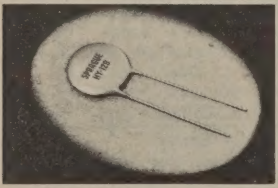
- Rated at 125 VAC 60 Hz or 1400 VDC
- For AC Line Bypass Application
- Standard Tolerance ±20%
- Heavy Duty for Long Life

µF	Sprague Products Catalog No.	Sprague O.E.M. Part No.	D. x T.
.001	125L-D10	19C251	25/64 x 3/16
.0015	125L-D15	19C252	25/64 x 3/16
.002	125L-D20	19C253	25/64 x 3/16
.0047	125L-D47	29C145	37/64 x 3/16
.005	125L-D50	29C145A	37/64 x 3/16
.01	125L-S10	36C218	25/32 x 3/16
.02	125L-S20	36C220	53/64 x 15/64
2 x .005	125L-2D50	29C147	11/16 x 15/64
2 x .01	125L-2S10	36C219	55/64 x 15/64

DISC CERAMICS FOR BUFFER APPLICATIONS

- Rated at 2000 WVDC
- Standard Tolerance ±20%

µF	Sprague Products Catalog No.	Sprague O.E.M. Part No.	D. x T.
.001	BL-D10	29C162	37/64 x 3/16
.002	BL-D20	29C163	37/64 x 3/16
.003	BL-D30	29C164	37/64 x 3/16
.004	BL-D40	29C165	37/64 x 3/16
.005	BL-D50	29C251	37/64 x 3/16
.006	BL-D60	44C126	41/64 x 3/16
.007	BL-D70	33C82	45/64 x 3/16
.0075	BL-D75	33C81	45/64 x 3/16
.008	BL-D80	33C84	25/32 x 3/16
.01	BL-S10	36C151	25/32 x 3/16



HYPERCON® CERAMIC DISCS

- Superior to electrolytic capacitors of similar capacitance values due to very low power factor.
- Ultra-miniature . . . ideal for use in transistorized circuitry.
- For bypass and coupling, but particularly well-suited for any low-voltage use where high capacitance and low power factor are important.
- For complete technical data, see latest issue of Engineering Bulletin 6141.

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	D. x T.
12 WVDC, Cap. Tol. +50 −20%			
.022	HY-340	C092B120E223Y	19/64 x 5/32
.033	HY-345	C092B120F333Y	11/32 x 5/32
.047	HY-350	C092B120G473Y	13/32 x 5/32
.068	HY-355	C092B120G683Y	13/32 x 5/32
.1	HY-360	C092B120H104Y	31/64 x 5/32
.15	HY-365	C092A120K154Y	39/64 x 5/32
.22	HY-370	C092A120L224Y	43/64 x 5/32
.33	HY-375	C092A120P334Y	7/8 x 5/32
.47	HY-380	C092B120W474Y	45/64 x 3/16

*Capacitance Tolerance, ±20%.

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	D. x T.
16 WVDC, Cap. Tol. +80 −20%			
.01	HY-420	C092B160C103Z	1/4 x 5/32
.022	HY-425	C092B160E223Z	19/64 x 5/32
.033	HY-430	C092B160F333Z	11/32 x 5/32
.047	HY-435	C092B160G473Z	13/32 x 5/32
.068	HY-440	C092B160G683Z	13/32 x 5/32
.1	HY-450	C092B160H104Z	31/64 x 5/32
.2	HY-470	C092A160L204Z	43/64 x 5/32
16 WVDC, Cap. Tol. +50 −20%			
.022	HY-625	C092B160E223Y	19/64 x 5/32
.033	HY-630	C092B160F333Y	11/32 x 5/32
.047	HY-635	C092B160G473Y	13/32 x 5/32
.068	HY-640	C092B160G683Y	13/32 x 5/32
.1	HY-650	C092B160H104Y	31/64 x 5/32
.15	HY-665	C092A160K154Y	39/64 x 5/32
.22	HY-670	C092A160L224Y	43/64 x 5/32
.33	HY-675	C092A160P334Y	7/8 x 5/32

µF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	D. x T.
25 WVDC, Cap. Tol. +80 −20%			
.0047	HY-510*	C092A250C472Z	19/64 x 1/8
.01	HY-520	C092B250C103Z	1/4 x 5/32
.022	HY-525	C092B250E223Z	19/64 x 5/32
.033	HY-530	C092B250F333Z	11/32 x 5/32
.047	HY-535	C092B250G473Z	13/32 x 5/32
.068	HY-540	C092B250G683Z	13/32 x 5/32
.1	HY-550	C092B250H104Z	31/64 x 5/32
25 WVDC, Cap. Tol. +50 −20%			
.015	HY-720	C092B250C153Y	1/4 x 5/32
.022	HY-725	C092B250E223Y	19/64 x 5/32
.033	HY-730	C092B250F333Y	11/32 x 5/32
.047	HY-735	C092B250G473Y	13/32 x 5/32
.068	HY-740	C092B250G683Y	13/32 x 5/32
.1	HY-750	C092B250H104Y	31/64 x 5/32
.15	HY-765	C092A250K154Y	39/64 x 5/32
.22	HY-770	C092A250L224Y	43/64 x 5/32

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IND-EEM-50A-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

CERA-MITE® CERAMIC CAPACITORS, continued

TEMPERATURE-COMPENSATING AND NPO TYPES

- Zero Temperature-coefficient Capacitors used Where Capacitance Change with Temperature is Undesirable
- Superior to Silvered-mica Types in Stability, High "Q", and IR
- Eliminate oscillator drift in TV, FM, VHF and AM receivers
- Negative Temperature Coefficient is 30 ppm/°C for N030 types, 80 ppm/°C for N080 types, 150 ppm/°C for N150 types, 220 ppm/°C for N220 types, 330 ppm/°C for N330 types, 470 ppm/°C for N470 types, 750 ppm/°C for N750 types, 1500 ppm/°C for N1500 types and 2200 ppm/°C for N2200 types.
- Capacitance Tolerance: 12 pF & up, ±5%; 10 pF & below, ±0.5 pF
- Rated at **1000 WVDC**
- For use in Tuned Circuits
- Temp-compensating Types Have a Linear Negative Coefficient Curve
- Available in Standard 5% Decade Values.

pF	Sprague Products Cat. No.	Sprague O.E.M. Part No.	Size D. x T.
		NPO	
1.0	10TCC-V10	C030B102S1R0D	23/64 x 15/64
1.2	10TCC-V12	C030B102S1R2D	23/64 x 15/64
1.5	10TCC-V15	C030B102S1R5D	23/64 x 15/64
1.8	10TCC-V18	C030B102E1R8D	19/64 x 5/32
2.2	10TCC-V22	C030B102E2R2D	19/64 x 5/32
2.7	10TCC-V27	C030B102E2R7D	19/64 x 5/32
3.0	10TCC-V30	C030B102E3R0D	19/64 x 5/32
3.3	10TCC-V33	C030B102E3R3D	19/64 x 5/32
3.9	10TCC-V39	C030B102E3R9D	19/64 x 5/32
4.7	10TCC-V47	C030B102E4R7D	19/64 x 5/32
5.0	10TCC-V50	C030B102E5R0D	19/64 x 5/32
5.6	10TCC-V56	C030B102E5R6D	19/64 x 5/32
6.8	10TCC-V68	C030B102E6R8D	19/64 x 5/32
8.2	10TCC-V82	C030B102E8R2D	19/64 x 5/32
10	10TCC-Q10	C030B102E100D	19/64 x 5/32
12	10TCC-Q12	C030B102E120J	19/64 x 5/32
15	10TCC-Q15	C030B102E150J	19/64 x 5/32
18	10TCC-Q18	C030B102E180J	19/64 x 5/32
20	10TCC-Q20	C030B102E200J	19/64 x 5/32
22	10TCC-Q22	C030B102E220J	19/64 x 5/32
25	10TCC-Q25	C030B102E250J	11/32 x 5/32
27	10TCC-Q27	C030B102E270J	11/32 x 5/32
30	10TCC-Q30	C030B102E300J	11/32 x 5/32
33	10TCC-Q33	C030B102E330J	11/32 x 5/32
39	10TCC-Q39	C030B102F390J	11/32 x 5/32
47	10TCC-Q47	C030B102G470J	13/32 x 5/32
50	10TCC-Q50	C030B102G500J	13/32 x 5/32
56	10TCC-Q56	C030B102G560J	13/32 x 5/32
68	10TCC-Q68	C030B102H680J	31/64 x 5/32
75	10TCC-Q75	C030B102H750J	31/64 x 5/32
82	10TCC-Q82	C030B102H820J	31/64 x 5/32
100	10TCC-T10	C030A102J101J	9/16 x 5/32
120	10TCC-T12	C030A102J121J	9/16 x 5/32
150	10TCC-T15	C030A102K151J	39/64 x 5/32
180	10TCC-T18	C030A102L181J	43/64 x 5/32
200	10TCC-T20	C030A102M201J	3/4 x 5/32
220	10TCC-T22	C030A102M221J	3/4 x 5/32
270	10TCC-T27	C030A102P271J	7/8 x 5/32
300	10TCC-T30	C030A102P301J	7/8 x 5/32
330	10TCC-T33	C030B102W331J	45/64 x 3/16
390	10TCC-T39	C030B102X391J	49/64 x 3/16
		N470	
3.0	10TCT-V30	C035B102S3R0D	23/64 x 15/64
3.3	10TCT-V33	C035B102S3R3D	23/64 x 15/64
3.9	10TCT-V39	C035B102S3R9D	23/64 x 15/64
4.7	10TCT-V47	C035B102S4R7D	23/64 x 15/64
5.0	10TCT-V50	C035B102S5R0D	23/64 x 15/64
5.6	10TCT-V56	C035B102S5R6D	23/64 x 15/64
6.8	10TCT-V68	C035B102E6R8D	19/64 x 5/32
8.2	10TCT-V82	C035B102E8R2D	19/64 x 5/32
10	10TCT-Q10	C035B102E100D	19/64 x 5/32
12	10TCT-Q12	C035B102E120J	19/64 x 5/32
15	10TCT-Q15	C035B102E150J	19/64 x 5/32
		N470 (cont.)	
18	10TCT-Q18	C035B102E180J	19/64 x 5/32
20	10TCT-Q20	C035B102E200J	19/64 x 5/32
22	10TCT-Q22	C035B102E220J	19/64 x 5/32
25	10TCT-Q25	C035B102E250J	19/64 x 5/32
27	10TCT-Q27	C035B102F270J	11/32 x 5/32
30	10TCT-Q30	C035B102F300J	11/32 x 5/32
33	10TCT-Q33	C035B102F330J	11/32 x 5/32
39	10TCT-Q39	C035B102F390J	11/32 x 5/32
47	10TCT-Q47	C035B102F470J	11/32 x 5/32
50	10TCT-Q50	C035B102G500J	13/32 x 5/32
56	10TCT-Q56	C035B102G560J	13/32 x 5/32
68	10TCT-Q68	C035B102G680J	13/32 x 5/32
75	10TCT-Q75	C035B102H750J	31/64 x 5/32
82	10TCT-Q82	C035B102H820J	31/64 x 5/32
100	10TCT-T10	C035B102H101J	31/64 x 5/32
120	10TCT-T12	C035A102J121J	9/16 x 5/32
150	10TCT-T15	C035A102K151J	39/64 x 5/32
180	10TCT-T18	C035A102K181J	39/64 x 5/32
200	10TCT-T20	C035A102L201J	43/64 x 5/32
220	10TCT-T22	C035A102L221J	43/64 x 5/32
270	10TCT-T27	C035A102P271J	7/8 x 5/32
300	10TCT-T30	C035A102P301J	7/8 x 5/32
330	10TCT-T33	C035A102P331J	7/8 x 5/32
390	10TCT-T39	C035A102P391J	7/8 x 5/32
470	10TCT-T47	C035B102X471J	49/64 x 3/16
560	10TCT-T56	C035B102Y561J	29/32 x 3/16
680	10TCT-T68	C035B102Y681J	29/32 x 3/16
750	10TCT-T75	C035B102Y751J	29/32 x 3/16
		N750	
4.7	10TCU-V47	C036B102S4R7D	23/64 x 15/64
5.0	10TCU-V50	C036B102S5R0D	23/64 x 15/64
5.6	10TCU-V56	C036B102S5R6D	23/64 x 15/64
6.8	10TCU-V68	C036B102E6R8D	23/64 x 5/32
8.2	10TCU-V82	C036B102E8R2D	23/64 x 5/32
10	10TCU-Q10	C036B102E100D	23/64 x 5/32
12	10TCU-Q12	C036B102E120J	23/64 x 5/32
15	10TCU-Q15	C036B102E150J	23/64 x 5/32
18	10TCU-Q18	C026B102E180J	23/64 x 5/32
20	10TCU-Q20	C036B102E200J	23/64 x 5/32
22	10TCU-Q22	C036B102E220J	23/64 x 5/32
25	10TCU-Q25	C036B102E250J	23/64 x 5/32
27	10TCU-Q27	C036B102E270J	23/64 x 5/32
30	10TCU-Q30	C036B102E300J	23/64 x 5/32
33	10TCU-Q33	C036B102E330J	23/64 x 5/32
39	10TCU-Q39	C036B102F390J	11/32 x 5/32
47	10TCU-Q47	C036B102F470J	11/32 x 5/32
50	10TCU-Q50	C036B102F500J	11/32 x 5/32
56	10TCU-Q56	C036B102F560J	11/32 x 5/32
68	10TCU-Q68	C036B102G680J	13/32 x 5/32
75	10TCU-Q75	C036B102G750J	13/32 x 5/32
82	10TCU-Q82	C036B102G820J	13/32 x 5/32
		N750, cont.	
100	10TCU-T10	C036B102H101J	31/64 x 5/32
120	10TCU-T12	C036B102H121J	31/64 x 5/32
150	10TCU-T15	C036A102J151J	9/16 x 5/32
180	10TCU-T18	C036A102J181J	9/16 x 5/32
200	10TCU-T20	C036A102K201J	39/64 x 5/32
220	10TCU-T22	C036A102K221J	39/64 x 5/32
270	10TCU-T27	C036A102K271J	3/4 x 5/32
300	10TCU-T30	C036A102M301J	3/4 x 5/32
330	10TCU-T33	C036A102M331J	3/4 x 5/32
390	10TCU-T39	C036A102P391J	7/8 x 5/32
470	10TCU-T47	C036A102P471J	7/8 x 5/32
560	10TCU-T56	C036B102X561J	49/64 x 3/16
680	10TCU-T68	C036B102X681J	49/64 x 3/16
750	10TCU-T75	C036B102Y751J	29/32 x 3/16
820	10TCU-T82	C036B102Y821J	29/32 x 3/16
1000	10TCU-D10	C036B102Y102J	29/32 x 3/16
		N2200	
10	10TCY-Q10	C041B102S100D	23/64 x 15/64
12	10TCY-Q12	C041B102S120J	23/64 x 15/64
15	10TCY-Q15	C041B102S150J	23/64 x 15/64
18	10TCY-Q18	C041B102S180J	23/64 x 15/64
20	10TCY-Q20	C041B102E200J	19/64 x 5/32
22	10TCY-Q22	C041B102E220J	19/64 x 5/32
25	10TCY-Q25	C041B102E250J	19/64 x 5/32
27	10TCY-Q27	C041B102E270J	19/64 x 5/32
30	10TCY-Q30	C041B102E300J	19/64 x 5/32
33	10TCY-Q33	C041B102E330J	19/64 x 5/32
39	10TCY-Q39	C041B102E390J	19/64 x 5/32
47	10TCY-Q47	C041B102E470J	19/64 x 5/32
50	10TCY-Q50	C041B102E500J	19/64 x 5/32
56	10TCY-Q56	C041B102E560J	19/64 x 5/32
68	10TCY-Q68	C041B102E680J	19/64 x 5/32
75	10TCY-Q75	C041B102E750J	19/64 x 5/32
82	10TCY-Q82	C041B102F820J	11/32 x 5/32
100	10TCY-T10	C041B102F101J	11/32 x 5/32
120	10TCY-T12	C041B102F121J	11/32 x 5/32
150	10TCY-T15	C041B102G151J	13/32 x 5/32
180	10TCY-T18	C041B102G181J	13/32 x 5/32
200	10TCY-T20	C041B102G201J	13/32 x 5/32
220	10TCY-T22	C041B102H221J	31/64 x 5/32
270	10TCY-T27	C041B102H271J	31/64 x 5/32
300	10TCY-T30	C041A102J301J	9/16 x 5/32
330	10TCY-T33	C041A102J331J	9/16 x 5/32
390	10TCY-T39	C041A102J391J	9/16 x 5/32
470	10TCY-T47	C041A102K471J	39/64 x 5/32
560	10TCY-T56	C041A102L561J	43/64 x 5/32
680	10TCY-T68	C041A102M681J	3/4 x 5/32
750	10TCY-T75	C041A102M751J	3/4 x 5/32
820	10TCY-T82	C041A102P821J	7/8 x 5/32
1000	10TCY-D10	C041A102P102J	7/8 x 5/32
1200	10TCY-D12	C041B102W122J	45/64 x 3/16
1500	10TCY-D15	C041B102X152J	49/64 x 3/16
1800	10TCY-D18	C041B102Y182J	29/32 x 3/16
2000	10TCY-D20	C041B102Y202J	29/32 x 3/16
2200	10TCY-D22	C041B102Y222J	29/32 x 3/16

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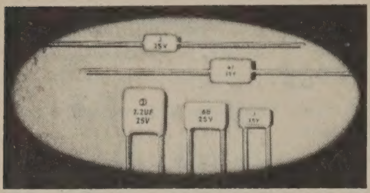
EEM-87-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

1C, 2C, 3C, 4C, and 5C MONOLYTHIC® CERAMIC CAPACITORS



- Formulation X7R and C0G Capacitors Are Rated at 100 WVDC; Formulation Z5U at 50 WVDC.
- Proven Reliable in Wide Usage Over Many Years of Exacting Service.
- Available in a Variety of Body Formulations, Capacitance Values, and Sizes.
- Made By Spraying Alternate Layers of Ceramic Dielectric Material and Metallic Electrodes, then Firing Into a Single, All But Indestructible Homogeneous Block.
- Protected Against Mechanical Damage and Moisture by a Tough Resin Coating.
- For Complete Technical Data, See Latest Issue of Engineering Bulletin 6201.

Call Your Sprague Industrial Distributor
For Current Quantity Prices

NOTE: Capacitors listed in this section have radial leads. For axial-lead units, change "C4" or "C5" at end of Cat. No. to "B1."

TEMPERATURE CHARACTERISTICS

Formulation	Temp. Range	Max. Change over Temp. Range
C0G	—55° C to + 125° C	NPO ± 30 ppm/° C
X7R	—55° C to + 125° C	±15%
Z5U	+10° C to + 85° C	+ 22, —56%

GENERAL-APPLICATION FORMULATION Z5U

μF	Size Code	Cat. No.*
TYPE 1C—50 WVDC		
.01	A	1CZ5U103X0050C4
.015	A	1CZ5U153X0050C4
.022	A	1CZ5U223X0050C4
.033	A	1CZ5U333X0050C4
.047	A	1CZ5U473X0050C4
.068	A	1CZ5U683X0050C4
.10	B	1CZ5U104X0050C4
TYPE 2C—50 WVDC		
.01	C	2CZ5U103X0050C4
.015	C	2CZ5U153X0050C4
.022	C	2CZ5U223X0050C4
.033	C	2CZ5U333X0050C4
.047	C	2CZ5U473X0050C4
.068	C	2CZ5U683X0050C4
.10	C	2CZ5U104X0050C4
.15	D	2CZ5U154X0050C4
.22	D	2CZ5U224X0050C4
.33	F	2CZ5U334X0050C4
.47	F	2CZ5U474X0050C4
.68	F	2CZ5U684X0050C4
TYPE 3C—50 WVDC		
.01	H	3CZ5U103X0050C5
.015	H	3CZ5U153X0050C5
.022	H	3CZ5U223X0050C5
.033	H	3CZ5U333X0050C5
.047	H	3CZ5U473X0050C5
.068	H	3CZ5U683X0050C5
.10	H	3CZ5U104X0050C5
.15	H	3CZ5U154X0050C5
.22	H	3CZ5U224X0050C5
.33	I	3CZ5U334X0050C5
.47	I	3CZ5U474X0050C5
.68	M	3CZ5U684X0050C5
1.0	M	3CZ5U105X0050C5
TYPE 5C—50 WVDC		
.10	N	5CZ5U104X0050C5
.15	N	5CZ5U154X0050C5
.22	N	5CZ5U224X0050C5
.33	N	5CZ5U334X0050C5
.47	O	5CZ5U474X0050C5
.68	O	5CZ5U684X0050C5
1.0	Q	5CZ5U105X0050C5
1.5	S	5CZ5U155X0050C5
2.2	U	5CZ5U225X0050C5
3.3	W	5CZ5U335X0050C5
†*TYPE 2C—25 WVDC		
.01	E	2C023103X0250A3
.015	E	2C023153X0250A3
.022	E	2C023223X0250A3
.033	E	2C023333X0250A3
.047	E	2C023473X0250A3
.068	E	2C023683X0250A3
.15	E	2C023154X0250A3
.22	E	2C023224X0250A3
.33	G	2C023334X0250A3
.47	G	2C023474X0250A3
†*TYPE 3C—25 WVDC		
.01	H	3C023103X0250A3
.015	H	3C023153X0250A3
.022	H	3C023223X0250A3
.033	H	3C023333X0250A3
.047	H	3C023473X0250A3
.15	J	3C023154X0250A3
.22	J	3C023224X0250A3
.33	K	3C023334X0250A3
.47	K	3C023474X0250A3
†*TYPE 4C—25 WVDC		
.15	X	4C023154X0250A3
.22	X	4C023224X0250A3
.33	X	4C023334X0250A3
.47	X	4C023474X0250A3
.68	Y	4C023684X0250A3
1.5	Z	4C023155X0250A3
†*TYPE 5C—25 WVDC		
.1	T	5C023104X0250B3
.15	T	5C023154X0250B3
.22	T	5C023224X0250B3
.47	T	5C023474X0250B3
.68	T	5C023684X0250B3
1.0	V	5C023105X0250B3

*Available until present stocks are exhausted.

†Available with radial leads only

*Capacitors listed have cap. tol. of ±20%. For +80, –20% tolerance, change X0 in Catalog Number to D8.

DIMENSIONS (in inches)

Size Code	Radial-Lead L.	Radial-Lead W.	Radial-Lead T.	Axial-Lead L.	Axial-Lead W.	Axial-Lead T.
A	.200	.200	.125	.200	.200	.156
B	.200	.200	.150	.200	.200	.156
C	.300	.200	.125	.300	.200	.156
D	.300	.200	.150	.300	.200	.156
E	.300	.300	.125	—	—	—
F	.300	.300	.150	.300	.300	.156
G	.300	.300	.238	—	—	—
H	.390	.200	.125	.390	.200	.156
I	.390	.200	.150	.390	.200	.156
J	.390	.200	.156	—	—	—
K	.390	.200	.238	—	—	—
L	.400	.400	.125	.390	.400	.156
M	.400	.400	.150	.390	.400	.156
N	.500	.200	.125	.500	.200	.156
O	.500	.200	.150	.500	.200	.156
P	.500	.296	.125	.500	.296	.156
Q	.500	.296	.150	.500	.296	.156
R	.500	.400	.125	.500	.400	.156
S	.500	.400	.150	.500	.400	.156
T	.500	.500	.125	.500	.500	.156
U	.500	.500	.150	.500	.200	.156
V	.500	.500	.156	—	—	—
W	.500	.500	.238	.500	.500	.156
X	.515	.296	.125	—	—	—
Y	.515	.296	.156	.515	.296	.156
Z	.515	.296	.238	—	—	—

TEMPERATURE-STABLE FORMULATION X7R

μF	Size Code	Cat. No.**
TYPE 1C—50 WVDC∆		
.001	A	1CX7R102X0100C4
.0012	A	1CX7R122X0100C4
.0015	A	1CX7R152X0100C4
.0022	A	1CX7R222X0100C4
.0027	A	1CX7R272X0100C4
.0033	A	1CX7R332X0100C4
.0039	A	1CX7R392X0100C4
.0047	A	1CX7R472X0100C4
.0056	A	1CX7R562X0100C4
.0068	A	1CX7R682X0100C4
.0082	A	1CX7R822X0100C4
.010	A	1CX7R103X0100C4
.012	A	1CX7R123X0100C4
.015	A	1CX7R153X0100C4
.018	A	1CX7R183X0100C4
.022	A	1CX7R223X0100C4
.027	A	1CX7R273X0100C4
.033	A	1CX7R333X0100C4
TYPE 2C 50 WVDC∆		
.010	C	2CX7R103X0100C4
.012	C	2CX7R123X0100C4
.015	C	2CX7R153X0100C4
.018	C	2CX7R183X0100C4
.022	C	2CX7R223X0100C4
.033	C	2CX7R333X0100C4
.039	C	2CX7R393X0100C4
.047	E	2CX7R473X0100C4
.056	F	2CX7R563X0100C4
.068	E	2CX7R683X0100C4
.082	E	2CX7R823X0100C4
.10	E	2CX7R104X0100C4
TYPE 3C 50 WVDC∆		
.010	H	3CX7R103X0100C5
.012	H	3CX7R123X0100C5
.015	H	3CX7R153X0100C5
.018	H	3CX7R183X0100C5
.022	H	3CX7R223X0100C5
.027	H	3CX7R273X0100C5
.033	H	3CX7R333X0100C5
.039	H	3CX7R393X0100C5
.047	H	3CX7R473X0100C5
.056	H	3CX7R563X0100C5
.068	H	3CX7R683X0100C5
.082	H	3CX7R823X0100C5
.10	H	3CX7R104X0100C5
.12	M	3CX7R124X0100C5
.15	M	3CX7R154X0100C5
.18	M	3CX7R184X0100C5
.22	M	3CX7R224X0100C5
.27	M	3CX7R274X0100C5
.33	M	3CX7R334X0100C5
TYPE 5C 50 WVDC∆		
.10	N	5CX7R104X0100C5
.12	N	5CX7R124X0100C5
.15	N	5CX7R154X0100C5
.18	N	5CX7R184X0100C5
.22	P	5CX7R224X0100C5
.27	P	5CX7R274X0100C5
.33	S	5CX7R334X0100C5
.39	S	5CX7R394X0100C5
.47	U	5CX7R474X0100C5
.56	W	5CX7R564X0100C5
.68	W	5CX7R684X0100C5

**Capacitors listed above have cap. tol. of ±20%. For ±10% capacitors, change X0 in Cat. No. to X9. ∆May be operated at 100 WVDC by derating to 85 C.

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IND-EEM-47-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

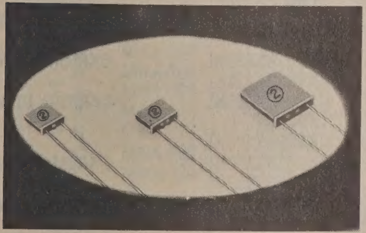
TYPES 1C, 2C, 3C, 5C MONOLYTHIC® CAPACITORS, continued

TEMPERATURE-COMPENSATING FORMULATION C0G (100 WVDC @ 85°C, 50 WVDC @ 125°C)

pF	Size Code	Cat. No.*
TYPE 1C		
10	A	1CC0G100X9100C4
11	A	1CC0G110X9100C4
12	A	1CC0G120X9100C4
13	A	1CC0G130X9100C4
15	A	1CC0G150X9100C4
18	A	1CC0G180X9100C4
20	A	1CC0G200X9100C4
22	A	1CC0G220X9100C4
24	A	1CC0G240X9100C4
27	A	1CC0G270X9100C4
30	A	1CC0G300X9100C4
33	A	1CC0G330X9100C4
36	A	1CC0G360X9100C4
39	A	1CC0G390X9100C4
43	A	1CC0G430X9100C4
47	A	1CC0G470X9100C4
51	A	1CC0G510X9100C4
56	A	1CC0G560X9100C4
62	A	1CC0G620X9100C4
68	A	1CC0G680X9100C4
75	A	1CC0G750X9100C4
82	A	1CC0G820X9100C4
91	A	1CC0G910X9100C4
100	A	1CC0G101X9100C4
110	A	1CC0G111X9100C4
120	A	1CC0G121X9100C4
130	A	1CC0G131X9100C4
150	A	1CC0G151X9100C4
160	A	1CC0G161X9100C4
180	A	1CC0G181X9100C4
200	A	1CC0G201X9100C4
220	A	1CC0G221X9100C4
240	A	1CC0G241X9100C4
270	A	1CC0G271X9100C4
300	A	1CC0G301X9100C4
330	A	1CC0G331X9100C4
360	A	1CC0G361X9100C4
390	A	1CC0G391X9100C4
430	A	1CC0G431X9100C4
470	A	1CC0G471X9100C4
510	A	1CC0G511X9100C4
560	A	1CC0G561X9100C4
TYPE 2C		
51	C	2CC0G510X9100C4
56	C	2CC0G560X9100C4
62	C	2CC0G620X9100C4
68	C	2CC0G680X9100C4
75	C	2CC0G750X9100C4
82	C	2CC0G820X9100C4
91	C	2CC0G910X9100C4
100	C	2CC0G101X9100C4
110	C	2CC0G111X9100C4
120	C	2CC0G121X9100C4
130	C	2CC0G131X9100C4
150	C	2CC0G151X9100C4
160	C	2CC0G161X9100C4
180	C	2CC0G181X9100C4
200	C	2CC0G201X9100C4
220	C	2CC0G221X9100C4
240	C	2CC0G241X9100C4
270	C	2CC0G271X9100C4
300	C	2CC0G301X9100C4
330	C	2CC0G331X9100C4
360	C	2CC0G361X9100C4
390	C	2CC0G391X9100C4
430	C	2CC0G431X9100C4
510	C	2CC0G511X9100C4
560	C	2CC0G561X9100C4
620	C	2CC0G621X9100C4
680	C	2CC0G681X9100C4
750	C	2CC0G751X9100C4
820	C	2CC0G821X9100C4
910	C	2CC0G911X9100C4
1000	C	2CC0G102X9100C4
1100	C	2CC0G112X9100C4
1200	C	2CC0G122X9100C4
1300	C	2CC0G132X9100C4
1500	C	2CC0G152X9100C4
1600	C	2CC0G162X9100C4
1800	C	2CC0G182X9100C4
2000	C	2CC0G202X9100C4
2200	E	2CC0G222X9100C4
2400	E	2CC0G242X9100C4
2700	E	2CC0G272X9100C4
TYPE 3C		
51	H	3CC0G510X9100C5
56	H	3CC0G560X9100C5
62	H	3CC0G620X9100C5
68	H	3CC0G680X9100C5
75	H	3CC0G750X9100C5
82	H	3CC0G820X9100C5
91	H	3CC0G910X9100C5
100	H	3CC0G101X9100C5
110	H	3CC0G111X9100C5
120	H	3CC0G121X9100C5
130	H	3CC0G131X9100C5
150	H	3CC0G151X9100C5
160	H	3CC0G161X9100C5
180	H	3CC0G181X9100C5
200	H	3CC0G201X9100C5
220	H	3CC0G221X9100C5
240	H	3CC0G241X9100C5
270	H	3CC0G271X9100C5
300	H	3CC0G301X9100C5
330	H	3CC0G331X9100C5
360	H	3CC0G361X9100C5
390	H	3CC0G391X9100C5
430	H	3CC0G431X9100C5
470	H	3CC0G471X9100C5
510	H	3CC0G511X9100C5
560	H	3CC0G561X9100C5
620	H	3CC0G621X9100C5
680	H	3CC0G681X9100C5
750	H	3CC0G751X9100C5
820	H	3CC0G821X9100C5
910	H	3CC0G911X9100C5
1000	H	3CC0G102X9100C5
1100	H	3CC0G112X9100C5
1200	H	3CC0G122X9100C5
1300	H	3CC0G132X9100C5
1500	H	3CC0G152X9100C5
1600	H	3CC0G162X9100C5
1800	I	3CC0G182X9100C5
2000	I	3CC0G202X9100C5
2200	I	3CC0G222X9100C5
2400	I	3CC0G242X9100C5
2700	L	3CC0G272X9100C5
3000	L	3CC0G302X9100C5
3300	L	3CC0G332X9100C5
3600	L	3CC0G362X9100C5
3900	L	3CC0G392X9100C5
4300	L	3CC0G432X9100C5
4700	L	3CC0G472X9100C5
5100	L	3CC0G512X9100C5
5600	M	3CC0G562X9100C5
6200	M	3CC0G622X9100C5
TYPE 5C		
680	N	5CC0G681X9100C5
750	N	5CC0G751X9100C5
820	N	5CC0G821X9100C5
910	N	5CC0G911X9100C5
1000	N	5CC0G102X9100C5
1100	N	5CC0G112X9100C5
1200	N	5CC0G122X9100C5
1300	N	5CC0G132X9100C5
1500	N	5CC0G152X9100C5
1600	N	5CC0G162X9100C5
1800	N	5CC0G182X9100C5
2000	N	5CC0G202X9100C5
2200	N	5CC0G222X9100C5
2400	N	5CC0G242X9100C5
2700	N	5CC0G272X9100C5
3000	O	5CC0G302X9100C5
3300	O	5CC0G332X9100C5
3600	P	5CC0G362X9100C5
3900	P	5CC0G392X9100C5
4300	P	5CC0G432X9100C5
4700	P	5CC0G472X9100C5
5100	P	5CC0G512X9100C5
5600	R	5CC0G562X9100C5
6200	R	5CC0G622X9100C5
6800	R	5CC0G682X9100C5
7500	R	5CC0G752X9100C5
8200	T	5CC0G822X9100C5
9100	T	5CC0G912X9100C5
.01µF	T	5CC0G103X9100C5

*Capacitance tolerance, ±10%. For ±20% capacitors, change X9 in Cat. No. to X0.

TYPE 7C MONOLYTHIC® CERAMIC CAPACITORS



- Formulation X7R and C0G Capacitors Are Rated at 100WVDC; Formulation Z5U at 50WVDC.
- New Phenolic Terminal Base With Stand-Off "Feet" Provides these Advantages: No Resin Run-Down on Leads; Uniform Lead Spacing; No Dirt and Moisture Entrapment; Degreasing Fluid Flows Freely Between Capacitors and Board.
- Made by Spraying Alternate Layers of Ceramic Dielectric Material and Metallic Electrodes, Firing into a Homogeneous block, then Coating with a Tough Phenolic Resin.
- For Complete Technical Data, See Latest Issue of Engineering Bulletin 6202.

DIMENSIONS

Case Code	L.	W.	T.	Lead Spacing
D1	.400	.250	.160	.250
D2	.400	.400	.160	.250
E1	.500	.250	.160	.375
E2	.500	.300	.160	.375
E3	.500	.375	.160	.375
E4	.500	.500	.160	.375
E5	.625	.625	.160	.375

µF	Size Code	Cat. No.*
GENERAL-APP. FORMULATION Z5U (50 WVDC @ 85°C)*		
.010	D1	7CZ5U103X0050D1
.015	D1	7CZ5U153X0050D1
.022	D1	7CZ5U223X0050D1
.033	D1	7CZ5U333X0050D1
.047	D1	7CZ5U473X0050D1
.068	D1	7CZ5U683X0050D1
.10	D1	7CZ5U104X0050D1
.15	D1	7CZ5U154X0050D1
.22	D1	7CZ5U224X0050D1
.33	E1	7CZ5U334X0050E1
.47	E1	7CZ5U474X0050E1
.68	E2	7CZ5U684X0050E2
1.0	E2	7CZ5U105X0050E2
1.5	E2	7CZ5U155X0050E2
2.2	E2	7CZ5U225X0050E2
3.3	F1	7CZ5U335X0050F1
4.7	F1	7CZ5U475X0050F1
TEMP.-STABLE FORMULATION X7R (100 WVDC @ 85°C, 50 WVDC @ 125°C)†		
.001	D1	7CX7R102X0100D1
.0012	D1	7CX7R122X0100D1
.0015	D1	7CX7R152X0100D1
.0022	D1	7CX7R222X0100D1
.0027	D1	7CX7R272X0100D1
.0033	D1	7CX7R332X0100D1
.0039	D1	7CX7R392X0100D1
.0047	D1	7CX7R472X0100D1
.0056	D1	7CX7R562X0100D1
.0068	D1	7CX7R682X0100D1
.0082	D1	7CX7R822X0100D1
.010	D1	7CX7R103X0100D1
.012	D1	7CX7R123X0100D1
.015	D1	7CX7R153X0100D1
.022	D1	7CX7R223X0100D1
.027	D1	7CX7R273X0100D1
.033	D1	7CX7R333X0100D1
.039	D1	7CX7R393X0100D1
.047	D1	7CX7R473X0100D1
.056	D1	7CX7R563X0100D1
.068	D1	7CX7R683X0100D1
.082	D1	7CX7R823X0100D1
.10	D1	7CX7R104X0100D1
.12	D2	7CX7R124X0100D2
.15	D2	7CX7R154X0100D2
.22	D2	7CX7R224X0100D2
.27	D2	7CX7R274X0100D2
.33	D2	7CX7R334X0100D2
.39	E3	7CX7R394X0100E3
.47	E4	7CX7R474X0100E4
.56	E4	7CX7R564X0100E4
.68	E4	7CX7R684X0100E4
.82	E5	7CX7R824X0100E5
1.0	E5	7CX7R105X0100E5
TEMP.-COMP. FORMULATION C0G (100 WVDC @ 85°C, 50 WVDC @ 125°C)★		
51pF	D1	7CC0G510X9100D1
56	D1	7CC0G560X9100D1
62	D1	7CC0G620X9100D1
68	D1	7CC0G680X9100D1
75	D1	7CC0G750X9100D1
82	D1	7CC0G820X9100D1
91	D1	7CC0G910X9100D1
100	D1	7CC0G101X9100D1
110	D1	7CC0G111X9100D1
120	D1	7CC0G121X9100D1
130	D1	7CC0G131X9100D1
150	D1	7CC0G151X9100D1
160	D1	7CC0G161X9100D1
pF	Size Code	Cat. No.*
180	D1	7CC0G181X9100D1
200	D1	7CC0G201X9100D1
220	D1	7CC0G221X9100D1
240	D1	7CC0G241X9100D1
270	D1	7CC0G271X9100D1
300	D1	7CC0G301X9100D1
330	D1	7CC0G331X9100D1
360	D1	7CC0G361X9100D1
390	D1	7CC0G391X9100D1
430	D1	7CC0G431X9100D1
470	D1	7CC0G471X9100D1
510	D1	7CC0G511X9100D1
560	D1	7CC0G561X9100D1
620	D1	7CC0G621X9100D1
680	D1	7CC0G681X9100D1
750	D1	7CC0G751X9100D1
820	D1	7CC0G821X9100D1
910	D1	7CC0G911X9100D1
.001µF	D1	7CC0G102X9100D1
.0011	D1	7CC0G112X9100D1
.0012	D1	7CC0G122X9100D1
.0013	D1	7CC0G132X9100D1
.0015	D1	7CC0G152X9100D1
.0016	D1	7CC0G162X9100D1
.0018	D1	7CC0G182X9100D1
µF	Size Code	Cat. No.*
.0020	D1	7CC0G202X9100D1
.0022	D1	7CC0G222X9100D1
.0024	D1	7CC0G242X9100D1
.0027	D2	7CC0G272X9100D2
.0030	D2	7CC0G302X9100D2
.0033	D2	7CC0G332X9100D2
.0036	D2	7CC0G362X9100D2
.0039	D2	7CC0G392X9100D2
.0043	D2	7CC0G432X9100D2
.0047	D2	7CC0G472X9100D2
.0051	D2	7CC0G512X9100D2
.0056	E3	7CC0G562X9100E3
.0062	E3	7CC0G622X9100E3
.0068	E3	7CC0G682X9100E3
.0075	E3	7CC0G752X9100E3
.0082	E4	7CC0G822X9100E4
.0091	E4	7CC0G912X9100E4
.010	E4	7CC0G103X9100E4
.011	E5	7CC0G113X9100E5
.012	E5	7CC0G123X9100E5
.013	E5	7CC0G133X9100E5
.015	E5	7CC0G153X9100E5
.018	E5	7CC0G183X9100E5
.020	E5	7CC0G203X9100E5
.022	E5	7CC0G223X9100E5

*Capacitance tolerance, ±20%. For +80%, −20% capacitors, change X0 in Cat. No. to D8.
†Capacitance tolerance, ±20%. For ±10% capacitors, change X0 in Cat. No. to X9.
★Capacitance tolerance, ±10%. For ±20% capacitors, change X9 in Cat. No. to X0.

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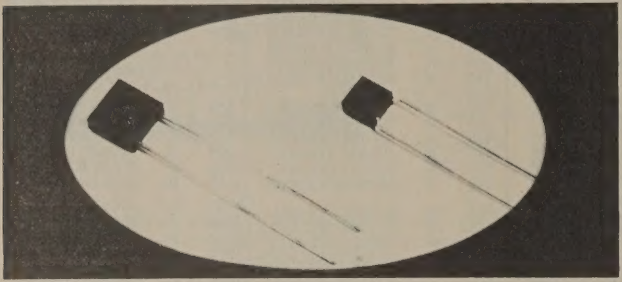
IND-EEM-48-EIAT

Sizes subject to change without notice.

SPRAGUE CAPACITORS

ESTABLISHED RELIABILITY MIL-C-39014

STYLE CKR05 and CKR06 MOLDED CERAMIC CAPACITORS



- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.

- Ceramic dielectric, molded case. Operating temperature range, −55 C to +125 C.
- General purpose – for use in applications where appreciable variations in capacitance with respect to temperature, voltage, frequency, and life can be tolerated.
- EIA temperature characteristic X7R, MIL characteristic BX.
- Case insulation will withstand 150% of d-c rated voltage.
- Lead spacing, .200″.
- "L" failure rate (2%).
- For complete technical data, refer to latest issue of Engineering Bulletin 6251.7.

STYLE CKR05 (.190″ wide x .190″ high x .090″ thick)

		MIL Type No.	
pF	WVDC	Cap. Tol. ±10%	Cap. Tol. ±20%
10	200	CKR05BX100KL	CKR05BX100ML
12	200	CKR05BX120KL	—
15	200	CKR05BX150KL	CKR05BX150ML
18	200	CKR05BX180KL	—
22	200	CKR05BX220KL	CKR05BX220ML
27	200	CKR05BX270KL	—
33	200	CKR05BX330KL	CKR05BX330ML
39	200	CKR05BX390KL	—
47	200	CKR05BX470KL	CKR05BX470ML
56	200	CKR05BX560KL	—
68	200	CKR05BX680KL	CKR05BX680ML
82	200	CKR05BX820KL	—
100	200	CKR05BX101KL	CKR05BX101ML
120	200	CKR05BX121KL	—
150	200	CKR05BX151KL	CKR05BX151ML
180	200	CKR05BX181KL	—
220	200	CKR05BX221KL	CKR05BX221ML
270	200	CKR05BX271KL	—
330	200	CKR05BX331KL	CKR05BX331ML
390	200	CKR05BX391KL	—
470	200	CKR05BX471KL	CKR05BX471ML
560	200	CKR05BX561KL	—
680	200	CKR05BX681KL	CKR05BX681ML
820	200	CKR05BX821KL	—
1000	200	CKR05BX102KL	CKR05BX102ML
1200	100	CKR05BX122KL	—
1500	100	CKR05BX152KL	CKR05BX152ML
1800	100	CKR05BX182KL	—
2200	100	CKR05BX222KL	CKR05BX222ML
2700	100	CKR05BX272KL	—
3300	100	CKR05BX332KL	CKR05BX332ML
3900	100	CKR05BX392KL	—
4700	100	CKR05BX472KL	CKR05BX472ML
5600	100	CKR05BX562KL	—
6800	100	CKR05BX682KL	CKR05BX682ML
8200	100	CKR05BX822KL	—
10000	100	CKR05BX103KL	CKR05BX103ML
12000	50	CKR05BX123KL	—
15000	50	CKR05BX153KL	CKR05BX153ML
18000	50	CKR05BX183KL	—
22000	50	CKR05BX223KL	CKR05BX223ML
27000	50	CKR05BX273KL	—
33000	50	CKR05BX333KL	CKR05BX333ML
39000	50	CKR05BX393KL	—
47000	50	CKR05BX473KL	CKR05BX473ML
56000	50	CKR05BX563KL	—
68000	50	CKR05BX683KL	CKR05BX683ML
82000	50	CKR05BX823KL	—
100000	50	CKR05BX104KL	CKR05BX104ML

STYLE CKR06 (.290″ wide x .290″ high x .090″ thick)

		MIL Type No.	
pF	WVDC	Cap. Tol. ±10%	Cap. Tol. ±20%
1200	200	CKR06BX122KL	—
1500	200	CKR06BX152KL	CKR06BX152ML
1800	200	CKR06BX182KL	—
2200	200	CKR06BX222KL	CKR06BX222ML
2700	200	CKR06BX272KL	—
3300	200	CKR06BX332KL	CKR06BX332ML
3900	200	CKR06BX392KL	—
4700	200	CKR06BX472KL	CKR06BX472ML
5600	200	CKR06BX562KL	—
6800	200	CKR06BX682KL	CKR06BX682ML
8200	200	CKR06BX822KL	—
10000	200	CKR06BX103KL	CKR06BX103ML
12000	100	CKR06BX123KL	—
15000	100	CKR06BX153KL	—
18000	100	CKR06BX183KL	—
22000	100	CKR06BX223KL	—
27000	100	CKR06BX273KL	—
33000	100	CKR06BX333KL	—
39000	100	CKR06BX393KL	—
47000	100	CKR06BX473KL	—
56000	100	CKR06BX563KL	—
68000	100	CKR06BX683KL	—
82000	100	CKR06BX823KL	—
100000	100	CKR06BX104KL	—
120000	50	CKR06BX124KL	—
150000	50	CKR06BX154KL	—
180000	50	CKR06BX184KL	—
220000	50	CKR06BX224KL	—

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IND-EEM-20-EFAI

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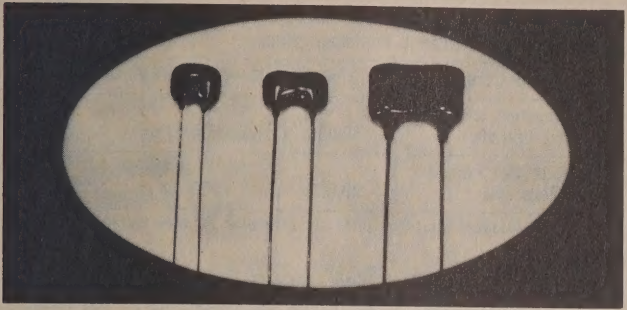
SPRAGUE CAPACITORS

TYPE MW and CM04/5/6 DIPPED MICA CAPACITORS



- Multiple dipped coatings of phenolic and epoxy resins for high moisture resistance.
- Rated for operation at voltages to 500 WVDC.
- Capacitance tolerance: thru 10pF, ±½pF; 12 pF and above, ±5%.

- Excellent electrical characteristics at low cost.
- For applications such as timing circuits and tuning circuits, where good capacitance stability and retrace are required.
- Operating temperature range: −55 C to +125 C.

DIMENSIONS (in inches)

Code	L	W	T	Code	L	W	T	Code	L	W	T	Code	L	W	T
A	.360	.330	.190	M	.450	.360	.180	Y	.650	.510	.200	KK	.670	.530	.240
B	.370	.330	.190	N	.460	.360	.180	Z	.650	.510	.200	LL	.670	.530	.250
C	.370	.340	.190	O	.460	.370	.180	AA	.650	.510	.210	MM	.670	.540	.260
D	.370	.340	.200	P	.460	.370	.190	BB	.650	.510	.210	NN	.680	.540	.270
E	.370	.350	.200	Q	.460	.380	.190	CC	.650	.510	.210	OO	.680	.550	.280
F	.380	.350	.200	R	.460	.380	.200	DD	.650	.520	.220	PP	.680	.550	.290
G	.380	.360	.200	S	.470	.390	.210	EE	.650	.520	.220	QQ	.680	.560	.300
H	.380	.360	.210	T	.470	.400	.220	FF	.660	.520	.220	RR	.690	.560	.310
I	.390	.370	.210	U	.480	.400	.230	GG	.660	.520	.220	SS	.690	.570	.330
J	.390	.380	.220	V	.480	.410	.230	HH	.660	.520	.230	TT	.700	.580	.350
K	.390	.380	.230	W	.490	.420	.240	II	.660	.530	.230	UU	.710	.590	.370
L	.450	.360	.170	X	.640	.510	.200	JJ	.670	.530	.240				

TYPE MWA and CM04 (Lead Spacing, 0.140")

pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.
1	A	MWA-010	CM04CD010D03	36	C	MWA-360	CM04ED360J03	150	H	MWA-151	CM04FD151J03
5	A	MWA-050	CM04CD050D03	39	C	MWA-390	CM04ED390J03	160	H	MWA-161	CM04FD161J03
6	A	MWA-060	CM04CD060D03	43	C	MWA-430	CM04ED430J03	180	I	MWA-181	CM04FD181J03
7	A	MWA-070	CM04CD070D03	47	C	MWA-470	CM04ED470J03	200	J	MWA-201	CM04FD201J03
8	A	MWA-080	CM04CD080D03	51	C	MWA-510	CM04ED510J03	220	J	MWA-221	CM04FD221J03
10	A	MWA-100	CM04CD100D03	56	C	MWA-560	CM04ED560J03	240	J	MWA-241	CM04FD241J03
12	A	MWA-120	CM04CD120J03	62	C	MWA-620	CM04ED620J03	300	J	MWA-301	—
15	A	MWA-150	CM04CD150J03	68	C	MWA-680	CM04ED680J03	330	J	MWA-331	—
18	A	MWA-180	CM04CD180J03	75	C	MWA-750	CM04ED750J03	360	J	MWA-361	—
20	A	MWA-200	CM04ED200J03	82	D	MWA-820	CM04ED820J03	390	J	MWA-391	—
22	A	MWA-220	CM04ED220J03	91	E	MWA-910	CM04FD910J03	430	K	MWA-431	—
24	A	MWA-240	CM04ED240J03	100	E	MWA-101	CM04FD101J03	470	K	MWA-471	—
27	B	MWA-270	CM04ED270J03	110	F	MWA-111	CM04FD111J03	510	K	MWA-511	—
30	C	MWA-300	CM04ED300J03	120	F	MWA-121	CM04FD121J03				
33	C	MWA-330	CM04ED330J03	130	G	MWA-131	CM04FD131J03				

TYPE MWB and CM05 (Lead Spacing, 0.234")

pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.
1	L	MWB-010	CM05CD010D03	36	L	MWB-360	CM05ED360J03	150	P	MWB-151	CM05FD151J03
5	L	MWB-050	CM05CD050D03	39	L	MWB-390	CM05ED390J03	160	P	MWB-161	CM05FD161J03
6	L	MWB-060	CM05CD060D03	43	L	MWB-430	CM05ED430J03	180	P	MWB-181	CM05FD181J03
7	L	MWB-070	CM05CD070D03	47	L	MWB-470	CM05ED470J03	200	Q	MWB-201	CM05FD201J03
8	L	MWB-080	CM05CD080D03	51	L	MWB-510	CM05ED510J03	220	R	MWB-221	CM05FD221J03
10	L	MWB-100	CM05CD100D03	56	L	MWB-560	CM05ED560J03	240	R	MWB-241	CM05FD241J03
12	L	MWB-120	CM05CD120J03	62	L	MWB-620	CM05ED620J03	270	S	MWB-271	CM05FD271J03
15	L	MWB-150	CM05CD150J03	68	M	MWB-680	CM05ED680J03	300	S	MWB-301	CM05FD301J03
18	L	MWB-180	CM05CD180J03	75	M	MWB-750	CM05ED750J03	330	S	MWB-331	CM05FD331J03
20	L	MWB-200	CM05ED200J03	82	M	MWB-820	CM05ED820J03	360	T	MWB-361	CM05FD361J03
22	L	MWB-220	CM05ED220J03	91	N	MWB-910	CM05FD910J03	390	T	MWB-391	CM05FD391J03
24	L	MWB-240	CM05ED240J03	100	N	MWB-101	CM05FD101J03	430	U	MWB-431	—
27	L	MWB-270	CM05ED270J03	110	O	MWB-111	CM05FD111J03	470	V	MWB-471	—
30	L	MWB-300	CM05ED300J03	120	O	MWB-121	CM05FD121J03	510	W	MWB-511	—
33	L	MWB-330	CM05ED330J03	130	O	MWB-131	CM05FD131J03				

TYPE MWC and CM06 (Lead Spacing, 0.343")

pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.	pF	Size Code	Industrial/ Commercial Cat. No.	MIL-C-5 Part No.
430	X	MWC-431	CM06FD431J03	1000	DD	MWC-102	CM06FD102J03	2400	MM	MWC-242	CM06FD242J03
470	X	MWC-471	CM06FD471J03	1100	EE	MWC-112	CM06FD112J03	2700	NN	MWC-272	CM06FD272J03
510	Y	MWC-511	CM06FD511J03	1200	FF	MWC-122	CM06FD122J03	3000	OO	MWC-302	CM06FD302J03
560	Y	MWC-561	CM06FD561J03	1300	GG	MWC-132	CM06FD132J03	3300	PP	MWC-332	CM06FD332J03
620	Z	MWC-621	CM06FD621J03	1500	HH	MWC-152	CM06FD152J03	3600	QQ	MWC-362	CM06FD362J03
680	AA	MWC-681	CM06FD681J03	1600	II	MWC-162	CM06FD162J03	3900	RR	MWC-392	CM06FD392J03
750	BB	MWC-751	CM06FD751J03	1800	JJ	MWC-182	CM06FD182J03	4300	SS	MWC-432	CM06FD432J03
820	BB	MWC-821	CM06FD821J03	2000	KK	MWC-202	CM06FD202J03	4700	TT	MWC-472	CM06FD472J03
910	CC	MWC-911	CM06FD911J03	2200	LL	MWC-222	CM06FD222J03	5100	UU	MWC-512	—

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EEM-IND-82-EIAT

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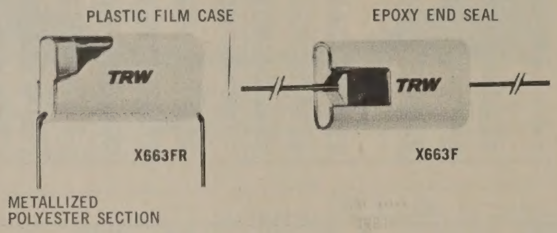
TRW CAPACITORS

METALLIZED POLYESTER

Type X663F-X663FR

DESIGN HIGHLIGHTS

- **Ultra-miniature, lightweight**
- **Convenient lead configurations**
- **High insulation resistance**
- **Instrument quality**
- **Self-healing • Long stable life**
- **Capacitance values to 10.0 mfd.**



Types X663F and X663FR greatly improve flexibility in fitting capacitors into crowded chassis layouts. Choice between axial or radial leads plus thin oval designs often permits saving of valuable chassis area.

The basic reliability of metallized Polyester as a capacitor dielectric is borne out by its widespread use in capacitors for long-life telephone equipment and microwave systems.

SPECIFICATIONS

Insulation Resistance.........Table 1, minimum values.

Temperature	+25°C	+85°C	+125°C
Megohms X Microfarads	30,000	3,000	50
Need Not Exceed (Megohms)	30,000	3,000	50

Measured after 2 minutes electrification at rated voltage.

Dissipation Factor................Less than 1.0%, when measured at or referred to 1,000 ± 20 Hz, for cap. values up to and including 1.0 mfd at 25 ± 5°C. Except for units having a T. Dim. of .171 or less the D.F. shall not exceed 1.5%. Cap. values greater than 1.0 mfd measured at 60 ± 6 Hz.

Temperature Range.................—55°C to 100°C; to +125°C with 50% derating; 50 volt capacitors full rated to 125°C.

Humidity Resistance.........These designs comply with test requirements as outlined in MIL-STD-202, method 103, Condition B. IR no less than ⅓ minimum values listed in Table I.

Dielectric Strength............Twice rated voltage for one minute through a limiting resistance of 100 ohms/volt.

Life Test...........250 hours at +100°C and 125% of rated voltage. No more than 1 failure in 12 units tested.

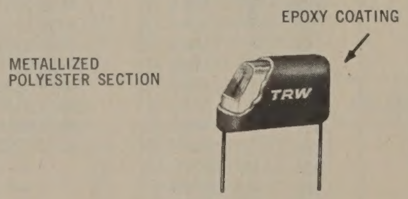
METALLIZED POLYESTER

Type X601PE-X601CPE

Dipped Epoxy Coating

DESIGN HIGHLIGHTS

- **Ultra miniature, lightweight**
- **Tough, Rugged Case**
- **Styled for maximum packaging efficiency**
- **Capacitance values to 10 mfd.**
- **Tolerances to ±5%**



CUT-AWAY SHOWS CONSTRUCTION

The X601PE was designed for quality capacitor applications utilizing the advance technology of TRW. It is ideally designed for "Space Age" applications requiring the best the industry has to offer in minimum size and weight, consistent with maximum reliability.

The X601PE line is now available in a full range of values from .01 to 10.0 mfd in 100 and 200 VDC. The unit is excellent in electrical and environmental performance throughout this range.

SPECIFICATIONS

Insulation Resistance.........Table 1, minimum values.

Temperature	+25°C	+85°C	+125°C
Megohms X Microfarads	20,000	2,000	20
Need Not Exceed (Megohms)	30,000	5,000	50

Measured after 2 minutes electrification at rated voltage.

Dissipation Factor................Less than 1.0% when measured at or referred to 1000 ± 20 Hz for capacitance values up to and including 1.0 mfd. at 25°C ± 5°C. Capacitance values greater than 1.0 mfd. measured at 60 ± 6 Hz.

Dielectric Strength............Twice rated voltage for 1 minute through 100 ohms per volt limiting resistance.

Humidity Resistance.........Tested as outlined in MIL-STD-202, Method 103, Condition B, no voltage applied. After final conditioning, IR no less than ⅓ minimum values listed in Table I.

Life Test...........500 hours at +100°C and 125% of rated volts.

Temperature Range.................—55°C to 100°C, to 125°C with 50% derating.

Construction......Metallized Polyester, non-inductive winding.

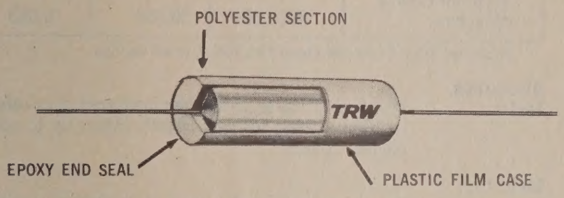
TRW CAPACITORS

POLYESTER DIELECTRIC

Type 663UW

DESIGN HIGHLIGHTS

- For Maximum space saving
- "Instrument" quality
- Tough, moisture resisting case
- Conservatively rated
- Tolerances to ±1%



CUT-AWAY SHOWS CONSTRUCTION

Type 663UW capacitors are compatible in size with other subminiature transistor components. In addition, they are conservatively designed and rated for long life and reliable service in high quality equipment and instrument applications. The Polyester winding is covered with a thin, tough plastic case adding less than 1/64" to the body diameter. The dense thermo-setting epoxy endfill bonds securely to the lead and case. This line is designed and rated for long life and reliable service.

SPECIFICATIONS

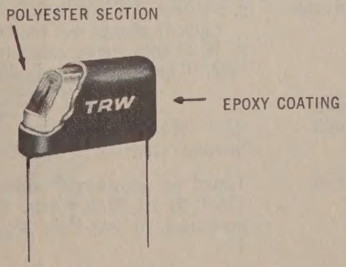
Insulation Resistance	Greater than 70,000 megohms-microfarads at 25° C, but the IR need not exceed 140,000 megohms.
Dissipation Factor	Less than 1.0% when measured at or referred to 1000 ± 20 Hz for capacitance values up to and including 1.0 mfd. at 25°C. ± 5°C. Capacitance values greater than 1.0 mfd. measured at 60 ± 6 Hz.
Lead Pull Test	Steady force of 4 lbs. applied axially for 60 sec. on diameters up to .359—8 lbs. on dia. over .359.
Life Test	250 hours at 85°C and 125% of Rated Voltage. No more than one failure allowed of 18 units tested.
Dielectric Strength	2 times rated voltage for one minute through a limiting resistance of 100 ohms/volt.
Humidity Resistance	Will meet or exceed requirements of MIL-C-27287, Paragraph 3.12, when tested in accordance with MIL-Std.-202, Method 103, Condition B. One failure allowed of 18 units tested.
Temperature Range	May be operated at rated voltage from —55°C. to +85°C and to +125°C with 50% derating.
Winding Design	Extended foil construction.

POLYESTER DIELECTRIC

Type 601PE-601CPE
Dipped Epoxy Coating

DESIGN HIGHLIGHTS

- Styled for "High Density" packaging
- Extremely stable
- Ideal replacement for ceramic discs
- High insulation resistance
- Full range of values
- Tolerances to ±5%



Now available in the full range from 35V to 600 V and .001 to 1.0 mfd, the "slim" 601 series is even more valuable in high density applications. Thin, modular packaging provides maximum capacitance for minimum chassis area. It is engineered to replace ceramic discs where stability with temperature change is important.

SPECIFICATIONS

Insulation Resistance .... Minimum values according to Table 1. (Refer to graph for IR at other temperatures).

Temperature	+25°C	+85°C	+125°C
Megohms X Microfarads	50,000	2,000	20
Need Not Exceed (Megohms)	100,000	5,000	100

Measured after 2 minutes electrification at 100 VDC or rated voltage, whichever is greater.

Dissipation Factor	Less than 1.0% when measured at or referred to 1000 ±20 Hz for capacitance values up to and including 1.0 mfd. at 25°C ±5°C. Capacitance values greater than 1.0 mfd. measured at 60 ±6 Hz.
Dielectric Strength	Twice rated voltage for 1 minute through 100 ohms per volt limiting resistance.
Humidity Resistance	These designs comply with test requirements per MIL-STD-202, method 103, Condition B, no voltage applied. Minimum resistance after test, 15,000 megohms.
Life Test	1000 hrs. @ +85°C and 125% of rated voltage. No more than one failure allowed of 24 units tested.
Temperature Cycling	MIL-STD-202 method 102, condition D, no voltage applied. Minimum insulation resistance after test 25,000 megohms. Less than 1% change in capacitance.
Capacitance Tolerance	Within specified tolerance when measured at 1000 ±20 Hz, 25 ± 5°C (standard is 20%).
Temperature Range	May be operated at rated voltage from —55°C to +85°C. Derate to 50% when operating at 125°C.

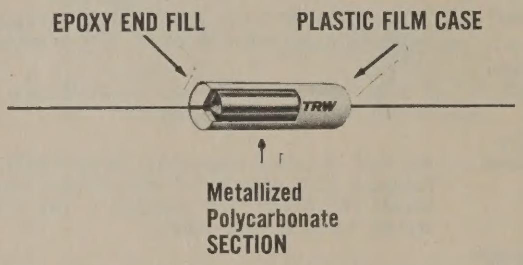
TRW CAPACITORS

METALLIZED POLYCARBONATE

Type X463UW

DESIGN HIGHLIGHTS

- Small Size—Lightweight
- Very Low Temperature Coefficient
- Fully Rated from —55°C to +125°C
- High Insulation Resistance
- Excellent Retrace
- Tolerances to ±1%



The increasing demand for reduction in size and weight coupled with requirements for enhanced circuit performance, requires capacitors which incorporate the latest developments in component technology. TRW has now introduced a capacitor which combines the improved electrical performance of polycarbonate and the size and weight reductions associated with a metallized dielectric.

SPECIFICATIONS

Insulation Resistance......... Table 1, minimum values.

Temperature	+25°C	+85°C	+125°C
Megohms X Microfarads	60,000	6,000	600
Need Not Exceed (Megohms)	200,000	50,000	5,000

Measured after 2 minutes electrification at rated voltage.

Dissipation Factor................. Less than 0.3% at 25°C when measured at or referred to 1000 ±20Hz for capacitance values up to and including 10 mfd.

Dielectric Strength............. Twice rated voltage for one minute through a limiting resistance of 100 ohms/volt.

Life Test .... 250 hours at 125°C and 140% rated voltage with no more than 1 failure out of 12 units tested.

Temperature Range................. —55°C to +125°C with no voltage derating.

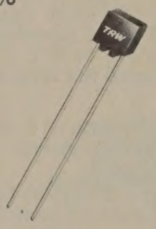
Humidity Resistance .... No more than one failure allowed of 12 units tested when tested as outlined in MIL-STD-202, Method 103, Condition B, with 100 volts or rated voltage applied, whichever is less.

METALLIZED DIELECTRIC

Type X440

DESIGN HIGHLIGHTS

- Minimum Possible Size—Lightweight
- Very Low Temperature Coefficient
- Fully Rated from —55°C to +125°C
- High Insulation Resistance
- Tolerances to ±1%



The X440 has been specifically designed to be a real help in the ever increasing problem of fitting components in todays miniaturized designs. Its absolute minimum size, precision dimensions, and the close tolerance lead spacing permit space savings impossible before. Additionally, the highly impossible electrical properties of polycarbonate are of immense value in modern high performance circuitry.

Standoffs on the bottom of the premolded case provide for rigid, secure mounting and facilitate cleaning of the printed circuit boards. Leads are uniformly and accurately spaced on .200" centers.

SPECIFICATIONS

Voltage Rating................ 50 VDC from —55°C to +125°C.

Insulation Resistance.......... Greater than 500,000 megohms @ 25°C.

Dissipation Factor................. Less than .3% at 1K Hz @ 25°C.

Capacitance Change with Temperature....... a. Between 0°C and 125°C, as referenced to 25°C, capacity change will not exceed +½ —1½%.
b. TC of capacitance characteristic is 0 +50 —150 PPM/°C between 0°C and 125°C.

Dielectric Strength .... 200% of rated voltage applied for 2 minutes through limiting resistance of 100 ohm/volt.

Life Test .... Tested in accordance with Mil-C-27287, 250 hrs., 125°C @ 1.4 RV.IR greater than 70% of original requirement, DF less than .3%, cap. change less than 1%.

Humidity Resistance......... Tested in accordance with Mil-C-27287, 40°C, 95% RH, 240 hours. IR greater than 10 gigaohms @ 25°C. DF less than .3%.

Lead Pull Test ... 5 lbs. in any direction.

Construction ..... Metallized polycarbonate dielectric, non-inductive winding. Epoxy case with standoffs.

Leads................. 24 gauge tinned solid wire on .2" centers.

TRW CAPACITORS • 301 WEST O ST. OGALLALA, NEBRASKA 69153 • PHONE: 308-284-3611 • TWX: 910-620-0321

TRW CAPACITORS

SOLID STATE OPERATION

TRW Molded Diodes

GENERAL CHARACTERISTICS

- Molded Encasement
- Uniform Sizes—Ideal for Auto-insertion
- Available in 1.0, 1.5, 2.5, 5.0 Watt Ratings

JEDEC types 1N4728 thru 1N4764
1N5923 thru 1N5956
1N5018 thru 1N5051
1N5344 thru 1N5388

TRW zeners are designed to operate in applications where high steady state power dissipation and or large zener surge currents may be encountered. They provide an economical and reliable solution to circuit problems where stud-mounted devices have previously been used.

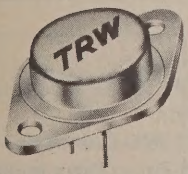
TRW Transient Voltage Suppressor

GENERAL CHARACTERISTICS

- Molded Encasement
- Full Voltage Range
- Storage Temp. Range . . . −65°C to 175°C.
- t clamping (0 volts to BV min) . . . 1 x 10^{-12} sec.
- 8.2 V thru 200 Volts
- Available in Three Ratings
  - 500 watts (0.5 Joules)
  - 1000 watts (1.0 Joules)
  - 1500 watts (1.5 Joules)

The TRW Transient Voltage Suppressor is an extension of the TRW Zener technology. It utilizes the devices' capability to rapidly change impedance value from a very high standby value to a very low conducting value when subjected to high energy transients. The Transient Voltage Suppressor effectively shunts potentially damaging effects to sensitive systems, equipment or components by clamping the voltage at some predetermined level.

TRW HIGH POWER NPN SILICON TRANSISTOR



Available in Std. Types Like . . .

2N3771	2N6258
2N3772	2N6570
2N3773	2N6571
2N6259	

TRW BRT-60 (60 Amp.)

A high current, high power mesa transistor made by the single diffusion process. Extremely rugged and capable of handling large amounts of current, it is designed to be used in applications requiring high power dissipations.

The device is supplied in the TO-3 case. Typical applications are shunt regulators, high power amplifiers, power switching circuits, AC-DC converters, hammer drivers and various other applications.

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UNION CARBIDE

KEMET® CAPACITORS

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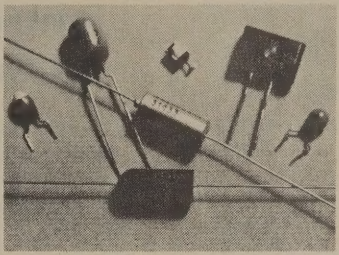
SOLID TANTALUM

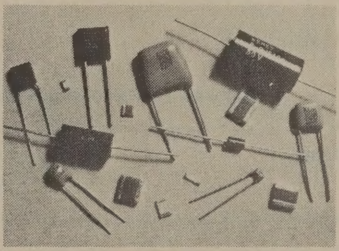
KEMET is the world's largest producer of solid tantalum capacitors. The product line includes metal case, hermetic seal, molded, epoxy dipped and plastic case styles in radial lead, axial lead, and chips for military, industrial, commercial, and consumer electronic circuit applications.



- Polar & Non-Polar
- CSR09, CSR13, CSR23, CSR33 & CSR91
- Extended Range
- Miniature & Sub-Miniature
- .0047-1000 uF, 6-125VDC
- Excellent Performance Characteristics

MONOLITHIC CERAMIC

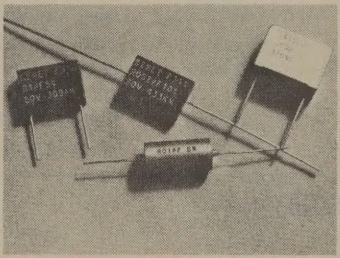
KEMET Monolithic Ceramic Capacitors are manufactured in a new plant designed from initial concept to build in product reliability. A wide range of sizes in radial lead, axial lead, and chip configurations in NPO, X7R and Z5U dielectrics are available.



- MIL-C-11015D CK05-CK06, CK12 through CK16
- MIL-C-39014 CKR05-CKR06, CKR11 through CKR16
- 1pF to 4.7 uF
- Economical Dipped
- MIL-C-20 & MIL-C-55681

PRECISION FILM

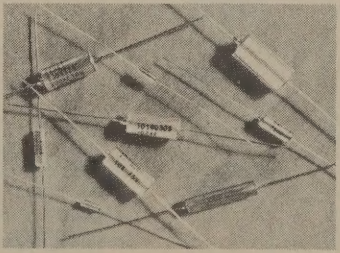
KEMET Flat Kap Parylene and metallized Polycarbonate Thin-Film capacitors combine small size with outstanding electrical characteristics. They are widely used in circuits where close tolerance, repeatable temperature coefficient, capacitance stability and compact size are essential.



- 0 ± 50PPM/°c TCC (Parylene)
- Tolerances to ± 1%
- .001 to 1.0 uF-50VDC (Parylene)
- .001 to 22 uF-400VDC (Polycarbonate)
- Radial or Axial Leads
- Hermetic Seal
- Style CFR04 per MIL-C-55514 (Parylene)
- Style CRH per MIL-C-83421 and CHR per MIL-C-39022 (Polycarbonate)

HIGH RELIABILITY

State-of-the-art components have become an essential part of today's electronic circuits where the ultimate in reliability is demanded. Kemet has been a leader in producing capacitors capable of meeting the requirements of the most demanding space, medical, undersea communications and other critical circuit applications.



- KEMET GR 500 Graded Reliability Specification
- 65°C to ± 125°C Operation
- Polar, Non-Polar, Ultra-miniature, extended range
- To 0.001%/1000 hrs.
- .0047 to 1000, uF, 6-125VDC

UNION CARBIDE

Request Product Catalogs From:
Union Carbide Corporation • Components Dept.
P. O. Box 5928, Greenville, S. C. 29606 • Tel. (803) 963-6300 • TWX 810-287-2536 • Telex 57-0496

disc ceramic capacitors

CENTRALAB

ULTRA-KAP I

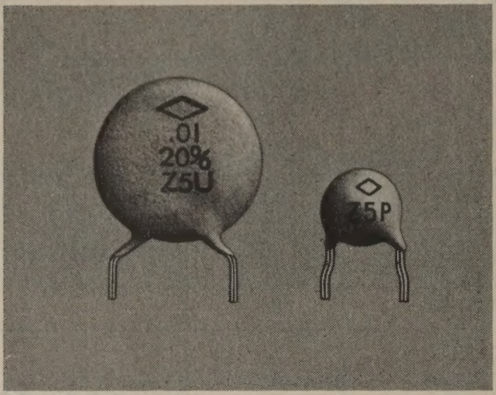
WORKING VOLTAGE DC	CAPACITANCE µF	MINIMUM INSULATION RESISTANCE AT RATED VOLTAGE	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NUMBER	DISTRIBUTOR EQUIVALENT
3V	.100	40,000 ohms	.220(5,59)	68	UK-SERIES
	.150	20,000 ohms	.290(7,37)	60	
	.470	8,000 ohms	.405(10,29)	66	
	1.000	4,000 ohms	.590(14,99)	62	
	2.200	2,000 ohms	.820(20,83)	64	
12V	.050	2.0 megohms	.290(7,37)	60	UK10-SERIES OR UK12-SERIES
	.068	1.0 megohms	.390(9,91)	61	
	.100	1.0 megohms	.405(10,29)	66	
	.150	0.6 megohms	.485(12,32)	69	
	.220	0.4 megohms	.590(14,99)	62	
	.300	0.3 megohms	.690(17,53)	63	
	.470	0.2 megohms	.820(20,83)	64	
16V	.033	3.0 megohms	.290(7,37)	60	UK16-SERIES
	.050	2.0 megohms	.390(9,91)	61	
	.068	1.5 megohms	.405(10,29)	66	
	.100	1.0 megohms	.485(12,32)	69	
	.120	0.8 megohms	.515(13,08)	70	
	.150	0.6 megohms	.590(14,99)	62	
	.220	0.4 megohms	.690(17,53)	63	
	.330	0.3 megohms	.820(20,83)	64	
25V	.022	45.0 megohms	.290(7,37)	60	UK20-SERIES OR UK25-SERIES
	.033	30.0 megohms	.390(9,91)	61	
	.050	20.0 megohms	.405(10,29)	66	
	.068	15.0 megohms	.485(12,32)	69	
	.082	10.0 megohms	.515(13,08)	70	
	.100	10.0 megohms	.590(14,99)	62	
	.150	6.0 megohms	.690(17,53)	63	
	.220	4.0 megohms	.820(20,83)	64	
50V	.010	1000 megohms	.290(7,37)	60	UK50-SERIES
	.015	1000 megohms	.390(9,91)	61	
	.018	1000 megohms	.405(10,29)	66	
	.022	1000 megohms	.485(12,32)	69	
	.033	1000 megohms	.515(13,08)	70	
	.050	1000 megohms	.590(14,99)	62	
	.068	1000 megohms	.690(17,53)	63	

ULTRA-KAP II

WORKING VOLTAGE DC	CAPACITANCE µF	MINIMUM INSULATION RESISTANCE AT RATED VOLTAGE	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NUMBER	DISTRIBUTOR EQUIVALENT
12V	.050	10 megohms	.290(7,37)	60	UKZ12-SERIES
	.100	5 megohms	.405(10,29)	66	
	.220	2 megohms	.590(14,99)	62	
50V	.020	1000 megohms	.290(7,37)	60	UKZ50-SERIES
	.050	1000 megohms	.405(10,29)	66	
	.100	1000 megohms	.590(14,99)	62	
75V	.010	5000 megohms	.290(7,37)	60	UKZ75-SERIES
	.018	5000 megohms	.405(10,29)	66	
	.050	5000 megohms	.590(14,99)	62	
	.100	5000 megohms	.690(17,53)	63	

general purpose — temperature stable

type
2ddh & 2ddd



SPECIFICATIONS
CLASS 2, EIA RS-198

Capacitance Range: 100 pF to .1 μF.

Capacitance Tolerance: ±10%, ±20%, +80 −20% or +100 −0% (GMV).

Working Voltage: 500 volts DC.

Dielectric Strength: 250% of rated working voltage.

Dissipation Factor: Tested at 0.5 to 5.0 volts RMS, 1kHz and +25°C.
X5P, Y5E and X5F: 1.5% maximum.
Z5P and Z5V: 2.5% maximum.
X5U and Z5U: 2.0% maximum.

Insulation Resistance: 10,000 megohms minimum at rated working voltage.

Temperature Characteristic: X5P, Y5E, X5F, Z5P, X5U, Z5U and Z5V as listed.

Operating Temperature: −55°C to +85°C.

Encapsulation: Phenolic coated, wax impregnated.

Lead Configuration: SLL, SLC, OKC, IKC, SKC, or HSA. See pages 14 and 15 for dimensions.

Maximum Thickness:
Diameters .690(17,53) and under: .156(3,96).
Diameters over .690(17,53): .250(6,35).

Marking: Capacitance value, tolerance or EIA code letter, temperature characteristic, working voltage if other than 500/600 volts DC and Centralab diamond.

MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NO.	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NO.
▨ .220 (5,59)	68	▥ .690 (17,53)	63
▒ .290 (7,37)	60	▤ .820 (20,83)	64
▧ .390 (9,91)	61	▦ .920 (23,37)	65
░ .405 (10,29)	66	*.718 (18,24)	63
▚ .485 (12,32)	69	**.875 (22,22)	64
▩ .590 (14,99)	62	***.975 (24,76)	65

DISTRIBUTOR EQUIVALENT			
T.C.	X5F	Z5P	Z5U
SERIES	CE	CF	DD

Centralab's general purpose-temperature stable disc capacitors offer excellent capacitance stability over wide temperature extremes. A variety of high dielectric constant ceramic formulations is available including Y5E, X5F, X5P, Z5P, X5U, Z5U and Z5V.

A complete line of general purpose-temperature stable capacitors is available from your Centralab Distributor.

CAPACITANCE	TEMPERATURE CHARACTERISTIC						
	X5P	Y5E	X5F	Z5P	X5U	Z5U	Z5V
100pF	▒			▒	▒	▒	▒
120	▒		▨	▒	▒	▒	▒
150	▒	▨	▨	▒	▒	▒	▒
180	▒	▨	▨	▒	▒	▒	▒
200	▒	▨	▒	▒	▒	▒	▒
270	▧	▨	▒	▒	▒	▒	▒
330	▧	▒	▒	▒	▒	▒	▒
390	▧	▒	▒	▒	▒	▒	▒
470	▧	▒	▒	▒	▒	▒	▒
560	░	▒	▒	▒	▒	▒	▒
680	▚	▒	▒	▒	▒	▒	▒
750	▚	▒	▒	▒	▒	▒	▒
820	▩	▧	▒	▒	▒	▒	▒
910	▩	▧	▒	▒	▒	▒	▒
.001μF	▩	▧	▒	▒	▒	▒	▒
.0012	▩	▧	▧	▧	▒	▒	▒
.0015	▥	▧	▧	▧	▒	▒	▒
.0018		░	▧	▧	▧	▒	▒
.002		▚	░	▧	▧	▒	▒
.0022		▚	░	▧	▧	▒	▒
.0027		▩	▚	░	▧	▒	▒
.003		▩	▚	▚	▧	▧	▒
.0033		▩	▩	▚	░	▧	▒
.0039		▥	▩	▩	▚	▧	▒
.004		▥	▩	▩	▚	▧	▒
.0047		▥	▩	▩	▚	▧	▧
.005		▥	▥	▩	▚	▧	▧
.0056			▥	▩	▩		▧
.0068				▥	▩	▚	▧
.0075				▥	▩	▚	▧
.0082					▥	▚	░
.01					▥	▩	▚
.015						▩	▩
.02						▥	▩
.03						*Dual Disc	▥
.04						*Dual Disc	▤
.05						**Dual Disc	▦
.1							***Dual Disc

CENTRALAB
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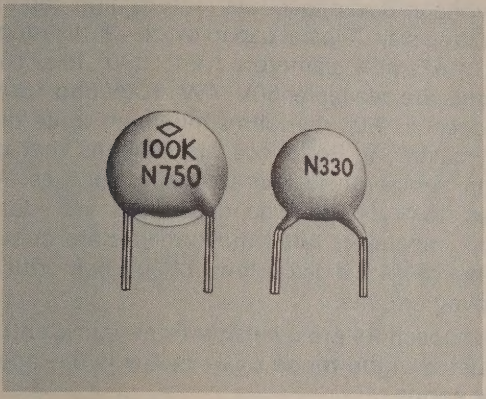
temperature compensating

type 2ddt



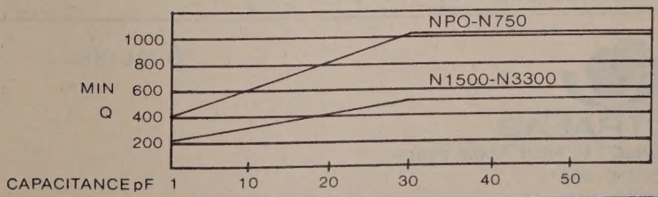
Centralab's temperature compensating disc capacitors offer drift free performance. Variations in operating temperature cause a predictable linear capacitance change. This change is called temperature coefficient of capacitance and is expressed in parts-per-million-per-degree C (ppm/°C). Maximum dissipation is 0.2% with insulation resistance rated at 20,000 megohms minimum. Temperature coefficients include NPO, N080, N150, N330, N470, N750, N1500 and N3300. Typical applications are tuned circuits and RC networks.

A complete line of temperature compensating disc capacitors is available from your Centralab Distributor.

CAPACITANCE pF	TEMPERATURE COEFFICIENT NPO	N080	N150	N330	N470	N750	N1500	N3300
1.5	▨	▨	▨					
2.2	▨	▨	▨					
3.3	▒	▒	▒	▨	▨			
3.9	▒	▒	▒	▨	▨	▨		
4.7	▒	▒	▒	▨	▨	▨		
5.6	▒	▒	▒	▒	▨	▨		
6.8	▒	▒	▒	▒	▨	▨		
8.2	▒	▒	▒	▒	▒	▒		
10	▒	▒	▒	▒	▒	▒	▨	
12	▒	▒	▒	▒	▒	▒	▨	
15	▒	▒	▒	▒	▒	▒	▒	
18	▒	▒	▒	▒	▒	▒	▒	
20	▒	▒	▒	▒	▒	▒	▒	
27	▧	▒	▒	▒	▒	▒	▒	▨
33	▧	▧	▧	▒	▒	▒	▒	▨
39	▧	▧	▧	▧	▒	▒	▒	▨
47	░	▧	▧	▧	▧	▒	▒	▨
56	▓	░	▧	▧	▧	▧	▒	▒
68	▓	▓	░	▧	▧	▧	▧	▒
75	▩	▓	▓	░	▧	▧	▧	▒
82	▩	▓	▓	░	▧	▧	▧	▒
91	▩	▩	▓	▓	░	▧	▧	▒
100	▩	▩	▩	▓	░	▧	▧	▒
120	▥	▩	▩	▩	▓	░	▧	▒
150		▥	▥	▩	▩	▓	░	▧
180			▥	▩	▩	▩	▓	▧
200			▥	▥	▩	▩	▩	▧
270					▥	▥	▩	░
330						▥	▥	▓
390							▥	▩
470								▩
560								▩
680								▥
750								▥
820								▥

NOTE: Other temperature coefficients and capacitance values available upon request.

MINIMUM Q VS CAPACITANCE



SPECIFICATIONS
CLASS 1, EIA RS-198

Capacitance Range: 1.5 pF to 820 pF.

Capacitance Tolerance:
NPO-N750
10 pF or less: ±.5 pF.
Over 10 pF: ±5%.
N1500 and N3300
Over 10 pF: ±10% or ±20%.

Working Voltage: 500 volts DC.

Dielectric Strength: 250% of rated working voltage.

Dissipation Factor and Q: Tested at 0.5 to 5.0 volts RMS, 1MHz and +25°C. See graph below.

Insulation Resistance: 20,000 megohms minimum at rated working voltage.

Temperature Coefficient: NPO, N080, N150, N330, N470, N750, N1500 and N3300.

Operating Temperature: −55°C to +85°C.

Encapsulation: Phenolic coated, wax impregnated.

Lead Configuration: SLL, SLC, OKC, IKC, SKC or HSA. See pages 14 and 15 for dimensions.

Maximum Thickness: .156 (3,96).

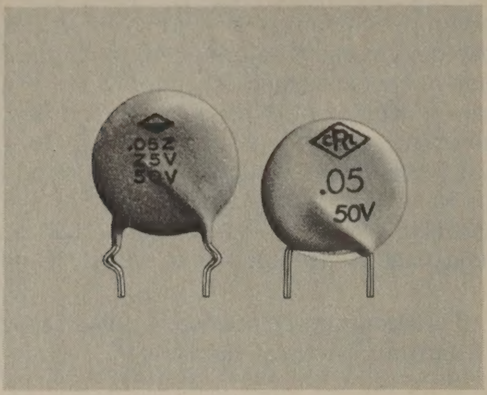
Marking: Capacitance value, capacitance tolerance or EIA code letter, temperature coefficient, working voltage if other than 500/600 volts DC and Centralab diamond.

	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NUMBER
▨	.220 (5,59)	68
▒	.290 (7,37)	60
▧	.390 (9,91)	61
░	.405 (10,29)	66
▓	.485 (12,32)	69
▩	.590 (14,99)	62
▥	.690 (17,53)	63

DISTRIBUTOR EQUIVALENT

T.C.	NPO	N750	N1500
SERIES	DTZ	DTN	DTX

general purpose—low voltage



Centralab's low voltage disc capacitors feature high capacitance density for their size. Typical capacitance values range from .005 μF to .1 μF with diameters from .390" to .718". Four voltage ratings are available: 50V, 75V, 100V and 150V. Insulation resistance is 7500 megohms minimum while dissipation is 2.5% maximum. For those applications that do not require a tight temperature characteristic, such as the Ultra-Kap® series, low voltage disc capacitors are ideal. These economical capacitors fulfill most solid state circuit requirements. Applications include low voltage non-critical bypass and coupling circuits.

Low voltage disc capacitors are available from your Centralab Distributor. Listed in the range chart below is the equivalent distributor series.

SPECIFICATIONS — CLASS 2, EIA RS-198

Capacitance Range: .005 μF to .100 μF.

Capacitance Tolerance: ±20%, +80−20%, +80−30% or +60−40%.

Working Voltage: 50, 75, 100 or 150 volts DC as listed.

Dielectric Strength: 250% of rated working voltage.

Dissipation Factor: Tested at 0.5 to 5.0 volts RMS, 1kHz and +25°C. 2.5% maximum.

Insulation Resistance: 7500 megohms minimum at rated working voltage.

Temperature Characteristic: Z5V except for .005 μF which is Z5U.

Operating Temperature: −55°C to +85°C.

Encapsulation: Phenolic coated, wax impregnated.

Lead Configuration: SLL, BBC, SLC, OKC, IKC, SKC or HSA. See pages 14 and 15 for dimensions.

Maximum Thickness: .156 (3,96).

Marking: Capacitance value, capacitance tolerance or EIA code letter, temperature characteristic, working voltage and Centralab diamond.

WORKING VOLTAGE DC	CAPACITANCE μF	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® SIZE NUMBER	DISTRIBUTOR EQUIVALENT
50V	.005	.390 (9,91)	61	**CK-SERIES**
	.010	.390 (9,91)	61	
	.020	.590 (14,99)	62	
	.025	.590 (14,99)	62	
	.030	.590 (14,99)	62	
	.050	.690 (17,53)	63	
	.100	.718 (18,24)	63*	
75V	.050	.690 (17,53)	63	**DDA-SERIES**
	.100	.718 (18,24)	63*	
100V	.005	.390 (9,91)	61	**DC-SERIES**
	.010	.390 (9,91)	61	
	.020	.590 (14,99)	62	
	.025	.590 (14,99)	62	
	.030	.590 (14,99)	62	
	.050	.690 (17,53)	63	
	.100	.718 (18,24)	63*	
150V	.005	.390 (9,91)	61	**DDM-SERIES**
	.010	.390 (9,91)	61	
	.020	.406 (10,31)	61*	

*DUAL DISC.

CENTRALAB
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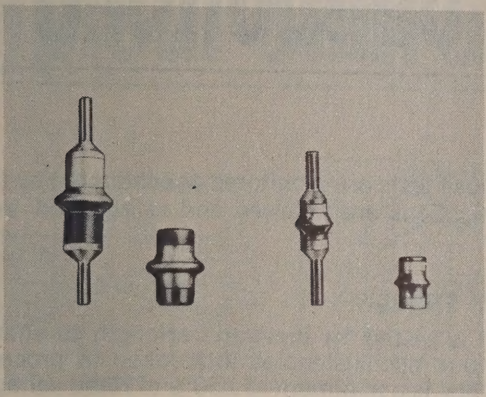
feed-thru

type
2dfh & 2dft



Centralab's Feed-Thru capacitors are available in two sizes: .300" diameter standard and .200" diameter miniature. They are designed to meet the requirements for high frequency and bypass applications in VHF and UHF tuners. Both the standard and miniature size feed-thrus are offered with or without center leads. A range of capacitance values may be specified from 10 pF to 1000 pF. Centralab feed-thrus provide the rugged construction, mechanical strength and breakage resistance necessary to meet new and demanding applications.

Centralab Distributors carry a line of feed-thru capacitors. The equivalent distributor series is listed in the chart below.

SPECIFICATIONS — CLASS 1 & 2, EIA RS-198

Capacitance Range: 10 pF to .001 μF.

Capacitance Tolerance: ±10%, ±20% or +100 —0% (GMV) as listed.

Working Voltage: 300 or 500 volts DC as listed.

Dielectric Strength:
- 300V: 250% of rated working voltage.
- 500V: 200% of rated working voltage.

Dissipation Factor:
- 300V: Tested at 0.5 to 5.0 volts RMS, 1kHz and +25°C. 2.5% maximum.
- 500V: Tested at 0.5 to 5.0 volts RMS, 1MHz and +25°C. 0.6% maximum.
  Tested at 0.5 to 5.0 volts RMS, 1kHz and +25°C. 2.5% maximum.

Insulation Resistance: 7500 megohms minimum at rated working voltage.

Operating Temperature: −55°C to +85°C.

Tube Length:
- 300V: .250 (6,35).
- 500V: .440 (11,18) standard, .375 (9,52) available.

Leads: Available with or without center lead.

Marking (Maximum Available):
- 300V: 1 color* band or 4 alpha/numeric characters (EIA capacitance and tolerance code) each end.
- 500V: 2 color* bands or 4 alpha/numeric characters (EIA capacitance and tolerance code) each end.

*EIA colors available: Black, brown, red, orange, yellow, green, blue, violet, gray or white.

WORKING VOLTAGE DC	CAPACITANCE & TOLERANCE	MAXIMUM DISSIPATION FACTOR	MAXIMUM DIAMETER INCH (MILLIMETER)	CRL® STYLE ‡ NUMBER		DISTRIBUTOR EQUIVALENT
500V	10pF ± 10%	0.6% @ 1MHz	.300 (7,62)	40	41	**SFT† SERIES**
	22pF ± 10%	0.6% @ 1MHz	.300 (7,62)	40	41	
	39pF ± 10%	0.6% @ 1MHz	.300 (7,62)	40	41	
	50pF ± 10%	0.6% @ 1MHz	.300 (7,62)	40	41	
	100pF ± 10%	0.6% @ 1MHz	.300 (7,62)	40	41	
	220pF ± 20%	2.5% @ 1kHz	.300 (7,62)	40	41	
	500pF ± 20%	2.5% @ 1kHz	.300 (7,62)	40	41	
	.001μF +100-0%	2.5% @ 1kHz	.300 (7,62)	40	41	

NOTE: Other feed-thru styles are available. Please contact Centralab for information.

‡Style numbers 80 and 40 are without a center lead. Style numbers 81 and 41 are with a center lead.

†Distributor equivalents are with a center lead.

CENTRALAB
7158 MERCHANT AVENUE EL PASO, TEXAS 79915
(915) 779-3961

monolithic ceramic capacitors

testing during manufacture

The following tests are conducted by USCC on all dielectric lots. These tests are monitored or conducted by the Quality Assurance Department to insure that appropriate specifications are followed and established test limits are satisfied.

CAPACITANCE

The capacitance of each unit is checked on a 100% basis for most tolerances and by AQL sample for broad tolerances to assure high yelds and final component stability. Test conditions are 1 VRMS ±.25 VRMS for COG, X7R, "J" and "S" dielectrics, .1 VRMS for Z5U, Y5V and "R" dielectrics. USCC offers tolerances from ±0.5 pF to GMV, depending upon dielectric.

DISSIPATION FACTOR

Whenever capacitance is checked, dissipation factor is monitored to assure that a maximum limit of .1% for "J", .15% for COG, 2.5% for X7R, Z5U, Y5V, "R" and "S" dielectrics are not exceeded. Test conditions are 1 VRMS for COG, X7R and "J"; .1 VRMS for Z5U. Y5V. "S" and "R" dielectrics. At 1 VRMS, "S" dielectric will meet 3.5% maximum.

DIELECTRIC STRENGTH

Each unit is tested for dielectric strength to eliminate random inconsistencies introduced in processing. The test is a minimum of 250% of rated voltage for COG, X7R, "J" and "S" dielectrics and 200% of rated voltage for Z5U, Y5V and "R" dielectrics, the charging current is limited to less than 50 ma.

INSULATION RESISTANCE

An AQL sample is tested to qualify production lots. This test insures that the insulation resistance exceeds the lesser of 100,000 megohms of 500 megohm-microfarads for X7R, Z5U, Y5V, "J", "S" and "R" dielectrics and 100,000 megohms or 100 megohm-microfarads for COG dielectric. Measurements are made with a megohm-meter (General Radio 1862C - typical), allowing a two minute maximum charging time. Capacitors are tested at their rated voltage.

hi-reliability testing

Although the parts listed in this catalog are recommended for high volume usage, they are manufactured on the same production line as all USCC high-reliability capacitors. USCC performs high-reliability screening on a significant number of all orders shipped. This screening ranges from Group A, B and C testing in accordance with MIL-C-39014 or MIL-C-11015, to specialized customer test requirements. The following test sequence is available on all USCC capacitors and chips at very little additional cost. To order, simply add the prefix letter "R" to the standard part number; e.g., RC40C103K. All parts ordered with this prefix will automatically receive the screening tests listed below.

Test	MIL-STD-202 Method	Condition	Test Conditions	Requirements
Thermal Shock	107	B	Exposure at Temperature Extremes shall be 30 minutes.	No mechanical damage.
Burn-in (Voltage Conditioning)	108	A	200% of rated voltage at +125°C for COG, X7R, J and S dielectrics, 150% of rated voltage at +85°C for Z5U, Y5V and R dielectrics; for 96 hours.	N/A — Screening tests removed all defective parts.
Dielectric (Withstanding Voltage)	301	—	COG, X7R, J and S dielectrics — 250% of rated voltage with 50 ma maximum charging current. Z5U, Y5V and R dielectrics — 200% of rated voltage with 50 ma maximum charging current.	No evidence of arcing or breakdown.
Insulation Resistance	302	—	Rated voltage applied for 2.0 minutes maximum.	X7R, Z5U, Y5V, J, S and R dielectrics — 100,000 megohms or 500 megohm-microfarads. COG dielectric — 100,000 megohms or 100 megohm-microfarads whichever is less at +25°C.
Capacitance	305	—	COG, X7R, J and S dielectrics — 1.0 VRMS ±.25 VRMS and 1 kHz; Z5U, Y5V, R and S dielectrics — 1 VRMS and 1 kHz.	Within purchase tolerance.
Dissipation Factor	305	—	COG, X7R and J dielectrics — 1.0 VRMS ±.25 VRMS and 1 kHz; Z5U, Y5V and R dielectrics — .1 VRMS and 1 kHz.	Within purchase specifications.

Screening of this type is an extremely effective means of eliminating infant mortalities. Summary data is provided for all tests. Due to its relative simplicity, the cost of this testing is quite low.

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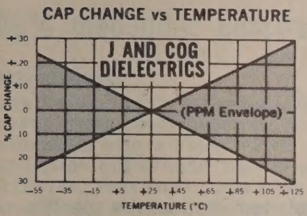
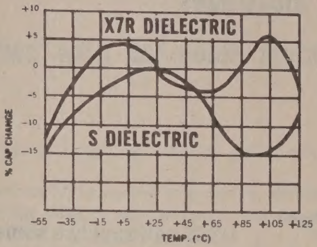
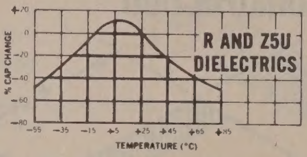
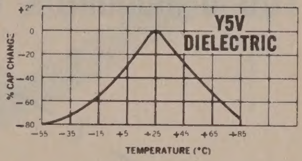
typical characteristic curves

cap change vs temperature

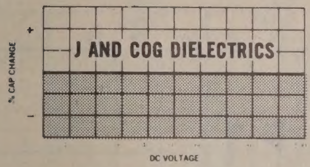


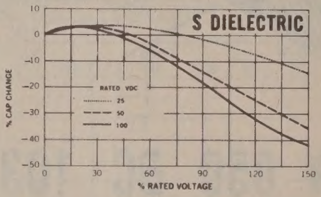


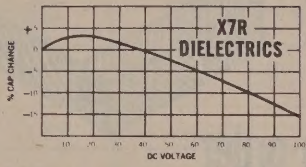




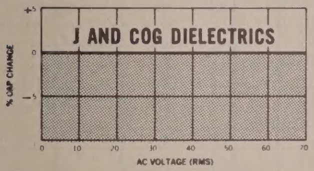
cap change vs rated dc voltage

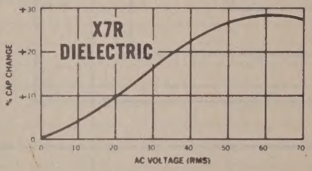


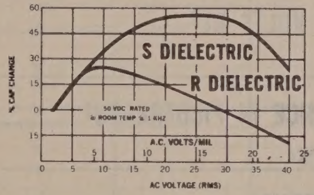




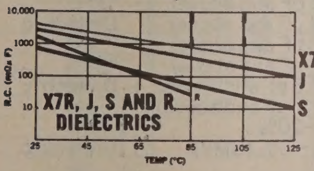
cap change vs ac voltage (rms)



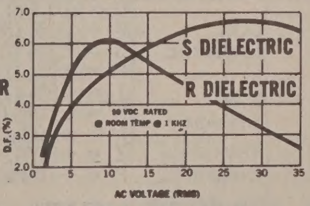




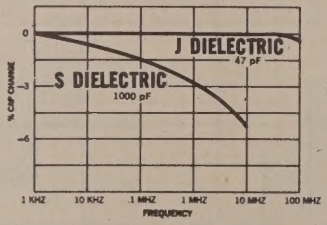
IR vs temperature



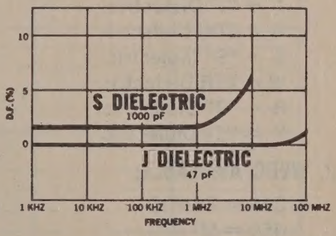
D.F.% vs a.c. voltage



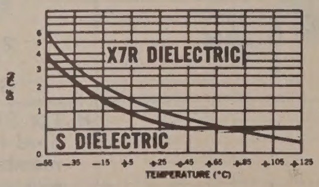
cap change vs frequency



dissipation factor vs frequency



dissipation factor vs temperature



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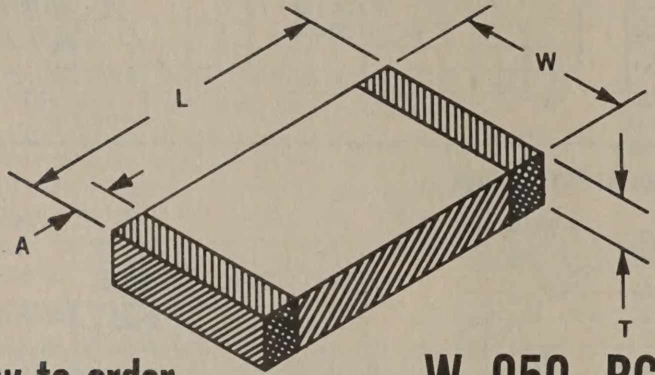
ceramolithic® chip capacitors

available with precious metal or non-noble metal electrodes

100% monolithic construction



USCC will supply a **solderable** termination. If a specific termination material is required, see note "5" in ordering information. If solder coated parts are ordered, add .015 to the maximum part length and .010 to the maximum part width and thickness.

how to order

W 050 BC 103 M P 1

DIELECTRIC CHARACTERISTIC[1]
WORKING VOLTS DC[2]
TYPE
CAPACITANCE IN PICOFARADS[3]
TOLERANCE[4]
TERMINATIONS[5]

1. DIELECTRIC CHARACTERISTIC CODES:

J = "J" Dielectric
N = COG Dielectric
S = "S" Dielectric
W = X7R Dielectric
R = "R" Dielectric
Y — Y5V Dielectric

2. WVDC AVAILABLE:

025 = 25 VDC
050 = 50 VDC
100 = 100 VDC
200 = 200 VDC

3. CAPACITANCE IN PICOFARADS:

102 = 1,000 pF (.001 μF); i.e., third digit signifies number of zeros. For values below 10 pF, use "R" in place of decimal point (1R5 = 1.5 pF)

4. MINIMUM AVAILABLE CAPACITANCE TOLERANCES:

Standard Types		BME™ Types
COG Dielectric	D = ±0.5 pF (1 pF to 10 pF)	"J" Dielectric
	F = ±1% (56 pF and above)	
	G = ±2% (27 pF and above)	
	H = ±3% (18 pF and above)	
X7R Dielectric	J = ±5% (10 pF and above)	"S" Dielectric
	K = ±10% (5.6 pF and above)	
	M = ±20% (2.7 pF and above)	"R" Dielectric
Y5V Dielectric	Z = +80%, −20%	
	P = +100%, −0% (GMV)	

5. TERMINATIONS AVAILABLE:

A. For Precious Metal Chip Capacitors:
P = Palladium Silver only
A = Silver only
1 = 604AG Solder Coat (Not Available in BB size)
604AG is 60% tin, 36% lead, 4% silver
2 = 955AG Solder Coat (Not Available in BB size)
955AG is 95% tin, 5% silver
G = Gold

B. For BME-Chip™ Capacitors, "N" suffix is for standard nickel alloy, solderable termination. The leach resistant characteristics of this termination are considered the best available.
For solder coating, use the "1" or "2" suffix when ordering.

NOTES: BB chips available in J, K and M tolerances only.

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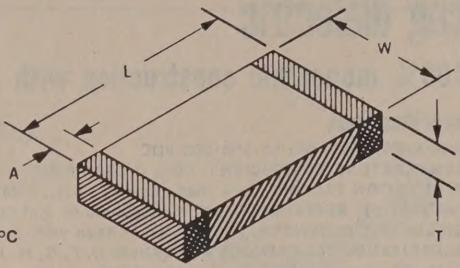
bme-chip™ ceramic capacitors

"j" dielectric

100% monolithic construction with non-noble metal electrodes



specifications:

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: 0 ±30 PPM/°C, −55°C to +125°C (COG); see graph
MINIMUM Q: 1000 at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, F, G, H, J, K, M

Type	BC			BF			FH			BI			HJ			DJ			LL			ND		
A Min./Max.	.010/.030			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.015/.040			.015/.040		
L	.080 ±.010			.100 ±.010			.125 ±.010			.150 ±.010			.175 ±.015			.180 ±.015			.225 ±.015			.270 ±.015		
W	.050 ±.010			.050 ±.010			.095 ±.010			.050 ±.010			.125 ±.015			.080 ±.015			.210 ±.015			.080 ±.015		
T Max.	.050			.060			.075			.060			.075			.075			.075			.075		
	WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
1.0pF	▨	▨	▨	▨	▨	▨																		
1.2	▨	▨	▨	▨	▨	▨																		
1.5	▨	▨	▨	▨	▨	▨																		
1.8	▨	▨	▨	▨	▨	▨																		
2.2	▨	▨	▨	▨	▨	▨																		
2.7	▨	▨	▨	▨	▨	▨																		
3.3	▨	▨	▨	▨	▨	▨																		
3.9	▨	▨	▨	▨	▨	▨																		
4.7	▨	▨	▨	▨	▨	▨																		
5.6	▨	▨	▨	▨	▨	▨																		
6.8	▨	▨	▨	▨	▨	▨																		
8.2	▨	▨	▨	▨	▨	▨																		
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82	▨	▨	▨	▨	▨	▨																		
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120	▨	▨	▨	▨	▨	▨																		
150	▨	▨		▨	▨	▨						▨												
180	▨	▨		▨	▨	▨						▨												
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470				▨				⊡	▨	▨	⊡						⊡	▨						
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680							▨	▨	▨	▨						▨	▨	▨						
820							▨	▨	▨	▨						▨	▨	▨						
1000							⊡	⊡	▨							⊡	⊡	▨						
1200							▨	▨							▨	▨	▨	▨						▨
1500							▨	▨							▨	▨	▨							▨
1800							▨							▨		▨	▨				▨		▨	▨
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5600																			▨	▨				
6800																			▨	▨				
8200																			▨					
.01µF																			▨					

⊡PREFERRED VALUES

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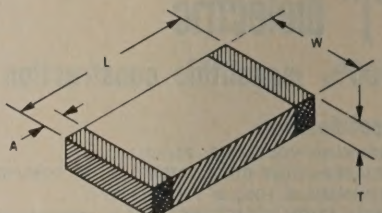
ceramic chip capacitors

cog dielectric

100% monolithic construction with precious metal electrodes



specifications:

WORKING VOLTAGE: 50/100/200 VDC
TEMPERATURE COEFFICIENT: COG, 0 ±30 PPM/°C, −55°C to +125°C; see graph
DISSIPATION FACTOR: .15% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 100 megohm-microfarads, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, F, G, H, J, K, M
Note: BB chips available in J, K and M only.

Type	BB			BC			BF			FH			BI			BJ			HJ			DJ			MJ			LL			FP		
A Min./Max.	.005/.015			.010/.030			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.015/.040			.010/.035		
L	.050 ±.006			.080 ±.010			.100 ±.010			.125 ±.010			.150 ±.010			.180 ±.015			.175 ±.015			.180 ±.015			.180 ±.015			.225 ±.015			.350 ±.015		
W	.050 ±.006			.050 ±.010			.050 ±.010			.095 ±.010			.050 ±.010			.050 ±.015			.125 ±.015			.080 ±.015			.250 ±.015			.210 ±.015			.095 ±.010		
T Max.	.040			.050			.060			.065			.065			.065			.065			.065			.065			.065			.070		
Cap.	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200	WVDC 50	100	200
1.0pF				■	■	■	■	■	■																								
1.2				■	■	■	■	■	■																								
1.5				■	■	■	■	■	■																								
1.8				■	■	■	■	■	■																								
2.2				■	■	■	■	■	■																								
2.7				■	■	■	■	■	■																								
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82	■	■		■	▨	■	■	■	■				■	■	■																		
100	■	■		■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■															
120pF	■	■		■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■															
150	■			■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■															
180	■			■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■															
220	■			■	▨		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				■	■	■						
270				■	■		■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■				■	■	■						
330				■	■		■	▨	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
390				■			■	▨		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
470				■			■	▨		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
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1800										■	■		■			■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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.01µF																									■	■		■	■		■		
.012																									■			■	■				
.015																									■			■					
.018																												■					

▨DISTRIBUTOR
PRODUCT ITEMS

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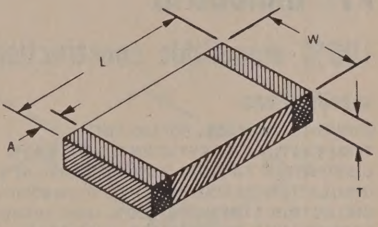
bme-chip™ ceramic capacitors

"s" dielectric

100% monolithic construction with non-noble metal electrodes



specifications:

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: ±22%, −55°C to +125°C (X7S)

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: K, M, Z, P

Type	BC			BF			FH			BI			HJ			DJ			LL			ND		
A Min./Max.	.010/.030			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.015/.040			.015/.040		
L	.080 ±.010			.100 ±.010			.125 ±.010			.150 ±.010			.175 ±.015			.180 ±.015			.225 ±.015			.270 ±.015		
W	.050 ±.010			.050 ±.010			.095 ±.010			.050 ±.010			.125 ±.015			.080 ±.015			.210 ±.015			.080 ±.015		
T Max.	.050			.060			.075			.060			.075			.075			.075			.075		
	WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
120pF	▨	▨	▨	▨	▨	▨																		
150	▨	▨	▨	▨	▨	▨																		
180	▨	▨	▨	▨	▨	▨																		
220	▨	▨	▨	▨	▨	▨																		
270	▨	▨	▨	▨	▨	▨																		
330	▨	▨	▨	▨	▨	▨																		
390	▨	▨	▨	▨	▨	▨																		
470	▨	▨	▨	▨	▨	▨																		
560	▨	▨	▨	▨	▨	▨																		
680	▨	▨	▨	▨	▨	▨																		
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1200	▨	▨	▨	▨	▨	▨																		
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1800	▨	▨	▨	▨	▨	▨																		
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2700	▨	▨	▨	▨	▨	▨																		
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3900	▨	▨	▨	▨	▨	▨																		
4700	▨	▨	▨	▨	▨	▨																		
5600	▨	▨	▨	▨	▨	▨																		
6800	▨	▨	▨	▨	▨	▨						▨												
8200	▨	▨		▨	▨	▨						▨												
.01μF	▨	⊡		▨	⊡	▨			▨			▨												
.012	▨	▨		▨	▨				▨			▨												
.015	▨			▨	▨				▨		▨	▨												
.018	▨			▨	▨				▨		▨							▨						
.022	⊡			⊡				▨	▨		⊡							▨						
.027				▨				▨	▨	▨	▨							▨						
.033				▨				▨	▨	▨	▨							▨						
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.047							⊡	⊡	▨	▨							⊡	▨						
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.22													⊡							▨	▨	⊡	▨	
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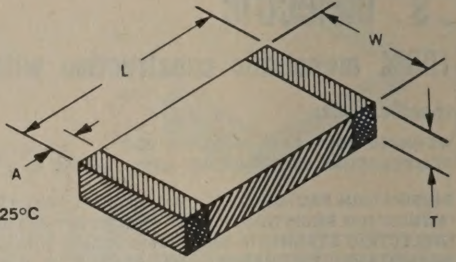
⊡PREFERRED VALUES

CENTRALAB/USCC Electronics • GLOBE-UNION INC.
4561 Colorado Boulevard • Los Angeles, Ca. 90039 • (213) 240-4880

ceramic chip capacitors

x7r dielectric

100% monolithic construction with precious metal electrodes



specifications:

WORKING VOLTAGE: 50/100 VDC
TEMPERATURE COEFFICIENT: X7R, ±15% TC, −55°C to +125°C; see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarads, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: J, K, M

Type	BB		BC		BF		FH		BI		BJ		HJ		DJ		MJ		LL		FP	
A Min./Max.	.005/.015		.010/.030		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.015/.040		.010/.035	
L	.050 ±.006		.080 ±.010		.100 ±.010		.125 ±.010		.150 ±.010		.180 ±.015		.175 ±.015		.180 ±.015		.180 ±.015		.225 ±.015		.350 ±.015	
W	.050 ±.006		.050 ±.010		.050 ±.010		.095 ±.010		.050 ±.010		.050 ±.015		.125 ±.015		.080 ±.015		.250 ±.015		.210 ±.015		.095 ±.010	
T Max.	.040		.050		.060		.065		.065		.065		.065		.065		.065		.065		.070	
	WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100
120pF	▒	▒	▒	▨	▒	▒																
150	▒	▒	▒	▨	▒	▒																
180	▒	▒	▒	▨	▒	▒																
220	▒	▒	▒	▨	▒	▒																
270	▒	▒	▒	▨	▒	▒			▒	▒												
330	▒	▒	▒	▨	▒	▒			▒	▒												
390	▒	▒	▒	▨	▒	▒			▒	▒												
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560	▒	▒	▒	▨	▒	▒			▒	▒												
680	▒	▒	▒	▨	▒	▒			▒	▒												
820	▒	▒	▒	▨	▒	▒			▒	▒												
1000	▒	▒	▒	▨	▒	▒			▒	▒	▒	▒										
1200	▒	▒	▒	▨	▒	▒			▒	▒	▒	▒										
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1800	▒	▒	▒	▨	▒	▒			▒	▒	▒	▒										
2200	▒	▒	▒	▨	▒	▒			▒	▒	▒	▒										
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4700pF	▒		▒	▨	▒	▒	▒	▒	▒	▒	▒	▒										
5600	▒		▒	▨	▒	▒	▒	▒	▒	▒	▒	▒					▒	▒				
6800	▒		▒	▨	▒	▨	▒	▒	▒	▒	▒	▒			▒	▒	▒	▒				
8200			▒		▒	▨	▒	▒	▒	▒	▒	▒			▒	▒	▒	▒				
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.012			▒		▒		▒	▒	▨	▒	▒	▒	▒	▒	▒	▒	▒	▒				
.015			▒		▒		▒	▒	▨	▒	▒	▒	▒	▒	▒	▒	▒	▒				
.018					▒		▒	▒	▨	▒	▒		▒	▒	▒	▒	▒	▒			▒	▒
.022					▒		▒	▒	▒		▒		▒	▒	▒	▨	▒	▒			▒	▒
.027							▒	▒	▒		▒		▒	▒	▒	▨	▒	▒			▒	▒
.033							▒	▒	▒		▒		▒	▒	▒	▨	▒	▒	▒	▒	▒	▒
.039							▒		▒		▒		▒	▒	▒	▨	▒	▒	▒	▒	▒	▒
.047							▒		▒				▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
.056							▒						▒	▒	▒		▒	▒	▒	▒	▒	▒
.068							▒						▒	▒	▒		▒	▒	▒	▒	▒	▒
.082							▒						▒	▒	▒		▒	▒	▒	▒	▒	▒
.10							▒						▒		▒		▒	▒	▒	▒	▒	▒
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.18													▒				▒	▒	▒	▒	▒	
.22																	▒		▒	▒	▒	
.27																	▒		▒			
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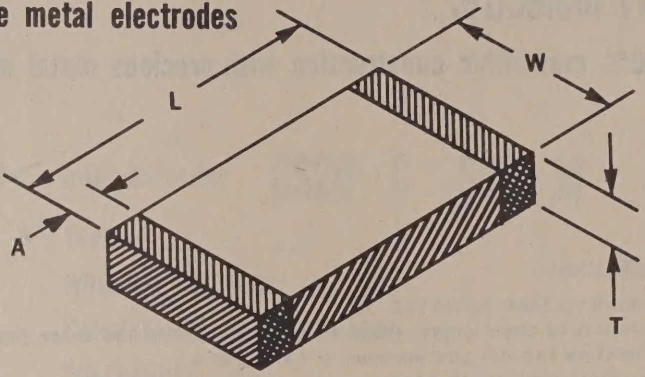
▨DISTRIBUTOR PRODUCT ITEMS

CENTRALAB/USCC Electronics • GLOBE-UNION INC.
4561 Colorado Boulevard • Los Angeles, Ca. 90039 • (213) 240-4880

bme-chip™ ceramic capacitors

"r" dielectric

100% monolithic construction with non-noble metal electrodes



specifications:

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: +22% −56%, +10°C to +85°C (Z5U); see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: M, Z, P

Type	BC			BF			FH			BI			HJ			DJ			LL			ND		
A Min./Max.	.010/.030			.010/.035			.010/.035			.010/.035			.010/.035			.010/.035			.015/.040			.015/.040		
L	.080 ±.010			.100 ±.010			.125 ±.010			.150 ±.010			.175 ±.015			.180 ±.015			.225 ±.015			.270 ±.015		
W	.050 ±.010			.050 ±.010			.095 ±.010			.050 ±.010			.125 ±.015			.080 ±.015			.210 ±.015			.080 ±.015		
T Max.	.050			.060			.075			.060			.075			.075			.075			.075		
	WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
.01µF	▒	▒	▒	▒	▒																			
.012	▒	▒	▒	▒	▒																			
.015	▒	▒		▒	▒				▒			▒												
.018	▒	▒		▒	▒				▒			▒												
.022	▒	▒		▒	▒			▒	▒			▒												
.027	▒	▒		▒	▒			▒	▒			▒						▒						
.033	▒	▒		▒	▒			▒	▒			▒						▒						
.039	▒	▒		▒	▒			▒	▒									▒						
.047	▩	▩		▩	▩		▒	▒	▒									▒						
.056	▒			▒	▒		▒	▒			▒							▒						
.068	▒			▒	▒		▒	▒			▒							▒						
.082				▒			▒	▒		▒	▒						▒	▒						
.10				▩			▩	▩		▩	▒					▒	▩	▒						
.12							▒	▒		▒						▒	▒	▒						
.15							▒	▒		▒					▒	▒	▒	▒						▒
.18							▒	▒							▒	▒	▒							▒
.22							▒	▒							▒	▩	▒							▩
.27							▒							▒	▒	▒	▒							▒
.33							▒							▒		▒	▒				▒			
.39													▒	▒		▒	▒				▒		▒	
.47													▩			▩				▒	▒		▒	
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1.2																			▒					
1.5																			▒					

▩ PREFERRED VALUES

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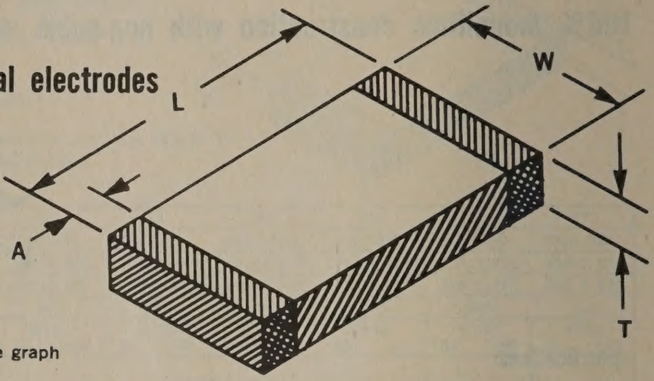
ceramic chip capacitors

y5v dielectric

100% monolithic construction with precious metal electrodes



specifications:

WORKING VOLTAGE: 50/100 VDC
TEMPERATURE COEFFICIENT: +22%, −82% from −30°C to +85°C; see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarads, whichever is less at +25°C
DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: Z, P

Type	BB		BC		BF		FH		BI		BJ		HJ		DJ		MJ		LL		FP	
A Min./Max.	.005/.015		.010/.030		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.010/.035		.015/.040		.010/.035	
L	.050 ±.006		.080 ±.010		.100 ±.010		.125 ±.010		.150 ±.010		.180 ±.015		.175 ±.015		.180 ±.015		.180 ±.015		.225 ±.015		.350-±.015	
W	.050 ±.006		.050 ±.010		.050 ±.010		.095 ±.010		.050 ±.010		.050 ±.015		.125 ±.015		.080 ±.015		.250 ±.015		.210 ±.015		.095 ±.010	
T Max.	.040		.050		.060		.065		.065		.065		.065		.065		.065		.065		.070	
	WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100
4700pF	▨	▨																				
5600	▨	▨																				
6800	▨	▨																				
8200	▨	▨																				
.01μF	▨	▨	▨	▨																		
.012	▨		▨	▨																		
.015	▨		▨	▨																		
.018	▨		▨	▨																		
.022	▨		▨	▨	▨	▨																
.027			▨		▨	▨																
.033			▨		▨	▨																
.039			▨		▨	▨																
.047			▨		▨	▨			▨	▨	▨	▨										
.056					▨				▨	▨	▨	▨										
.068					▨				▨	▨	▨	▨										
.082					▨				▨		▨											
.10					▨		▨	▨	▨		▨				▨	▨						
.12							▨	▨	▨		▨				▨	▨						
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.68																	▨	▨	▨	▨	▨	
.82																	▨	▨	▨	▨		
1.0																	▨		▨			
1.2																			▨			

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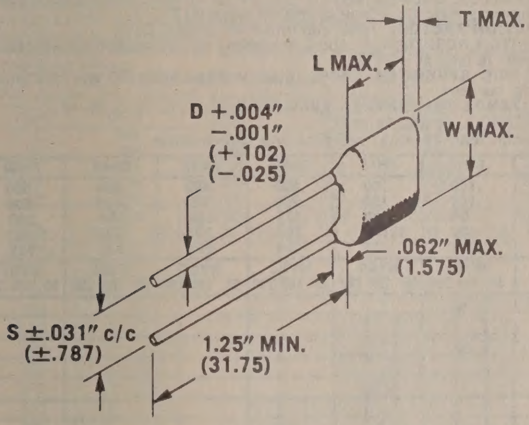
radial™ leaded, epoxy coated

100% monolithic construction

Mono-Kap® with precious metal electrodes
BME-Radial™ with non-metal electrodes



Dimensions in parenthesis = millimeters

mechanical specifications

CASE: Epoxy coated

LEAD MATERIAL: Solder coated, copper clad steel

TERMINAL STRENGTH: Method 211, MIL-STD-202, test condition A (5 pounds)

MARKING: As size permits, the following markings will be used (listed in order of preference)

Capacitance
Tolerance
Mfg. Identification
Temperature Characteristic
Voltage

NOTE: Where size is prohibitive, only capacitance will be indicated. Marking one side only.

environmental specifications

BAROMETRIC PRESSURE: Method 105, MIL-STD-202, test condition E (150,000 feet) 100% of rated voltage applied for 5 seconds, current limited to 50 ma.

VIBRATION: Method 204, MIL-STD-202, test condition B (10-2,000 cps; 15 G).

SHOCK: Method 205, MIL-STD-202, test condition C (50 G; 11 ms).

THERMAL SHOCK: Method 107, MIL-STD-202, −55°C to +125°C for "J", "S", COG and X7R dielectrics; −55°C to +85°C for "R", Z5U and Y5V dielectrics.

IMMERSION CYCLING: Method 104, MIL-STD-202, test condition A (15 minutes in tap water).

MOISTURE RESISTANCE: Method 106, MIL-STD-202, 10 cycles without loading voltage applied.

LIFE: 200% of rated voltage for COG and X7R dielectrics at +125°C; 150% of rated voltage for "J" and "S" dielectrics at +125°C for 1,000 hours; 150% of rated voltage for "R", Z5U and Y5V dielectrics at +85°C; for 1,000 hours.

how to order CS20 C 683 M C

TYPE — CS20
WORKING VOLTS DC[1] — C
CAPACITANCE IN PICOFARADS[2] — 683
TOLERANCE[3] — M
LEAD OPTIONS[4] — C

1. **WVDC AVAILABLE:**
   D = 25 VDC
   C = 50 VDC
   A = 100 VDC
   B = 200 VDC
2. 683 = 68,000 pF (.068 μF); i.e., third digit signifies number of zeros. For values below 10 pF, use "R" in place of decimal point (4R7 = 4.7 pF).
3. **MINIMUM AVAILABLE CAPACITANCE TOLERANCES:**
   D = ±0.5 pF (4.7 pF to 10 pF)
   F = ±1% (56 pF and above)
   G = ±2%(27 pF and above)
   H = ±3% (18 pF and above)
   J — ±5% (10 pF and above)
   K = ±10% (5.6 pF and above)
   M = ±20% (4.7 pF and above)
   Z = +80%, −20% (4.7 pF and above)
   P = +100%, −0% (GMV — all values)
4. **SPECIAL LEAD OPTIONS AVAILABLE:**
   To order suffix the standard part number with the corresponding letter:

	Dimension		Suffix
	D	S	Letter
SIZE C-15	.016	.100	A
	.020	.200*	B
SIZE C-20	.020	.200*	C
	.020	.250	D
	.020	.300	E
	.020	.375	F
	.025	.200	G
SIZE C-30	.025	.200*	H
	.025	.375	J

* Preferred alternate

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bme-radial™

CERAMIC CAPACITORS

featuring non-noble metal electrodes

"j" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: 0 ±30 PPM/°C, −55°C to +125°C (COG); see graph on page 318
MINIMUM Q: 1000 at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, F, G, H, J, K, M
For special lead options, see ordering information

Type	CJ15			CJ20			CJ30			CJ40			CJ50		
L	.150			.200			.300			.400			.500		
W	.150			.200			.300			.400			.500		
T	.100			.100			.150			.150			.200		
S	.100			.100			.200			.200			.400		
D	.020			.020			.020			.020			.025		
	WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
4.7pF	▒	▒	▒												
5.6	▒	▒	▒												
6.8	▒	▒	▒												
8.2	▒	▒	▒												
10	▒	▒	▒												
12	▒	▒	▒												
15	▒	▒	▒												
18	▒	▒	▒												
22	▒	▒	▒												
27	▒	▒	▒												
33	▒	▒	▒												
39	▒	▒	▒												
47	▒	▒	▒												
56	▒	▒	▒												
68	▒	▒	▒												
82	▒	▒	▒												
100	▒	⊡	▒												
120	▒	▒	▒												
150	▒	▒	▒												
180	▒	▒	▒			▒									
220	▒	⊡				▒									
270	▒	▒				▒									
330	▒				▒	▒									
390	▒				▒	▒									
470				⊡	⊡	▒									
560				▒	▒	▒									
680				▒	▒	▒									
820				▒	▒	▒									
1000				⊡	⊡	▒									
1200				▒	▒				▒						
1500				▒	▒				▒						
1800				▒				▒	▒						
2200							▒	⊡	▒						
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3300							▒	▒	▒						
3900							▒	▒	▒						
4700							▒	⊡	▒						
5600							▒	▒				▒			
6800							▒	▒				▒			
8200							▒				▒	▒			
.01μF							⊡				⊡	▒			
.012										▒	▒				▒
.015										▒				▒	▒
.018													▒	▒	▒
.022													▒	▒	
.027													▒	▒	
.033													▒		

⊡ PREFERRED VALUES

mono-kap®

CERAMIC CAPACITORS

with precious metal electrodes

cog dielectric specifications

WORKING VOLTAGE: 50/100/200 VDC
TEMPERATURE COEFFICIENT: 0 ±30 PPM/°C from −55°C to +125°C (EIA Characteristic COG) see graph on page 318
DISSIPATION FACTOR: .15% maximum at 1 kHz, 25°C
INSULATION RESISTANCE: 100K megohms or 100 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, F, G, H, J, K, M
NOTE: CN10 J, K, and M only
For special lead options, see ordering information

Type	CN10			CN15			CN20			CN30			CN40			CN50		
L	.100			.150			.200			.300			.400			.500		
W	.100			.150			.200			.300			.400			.500		
T	.100			.100			.125			.150			.150			.200		
S	.100			.100			.100			.200			.200			.400		
D	.016			.016			.020			.020			.020			.025		
	WVDV			WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
4.5pF	▒	▧	▒															
5.6	▒	▒	▒	▒	▒	▒												
6.8	▒	▧	▒	▒	▒	▒												
8.2	▒	▒	▒	▒	▒	▒												
10	▒	▒	▒	▒	▧	▒												
12	▒	▒	▒	▒	▒	▒	▒	▒	▒									
15	▒	▒	▒	▒	▧	▒	▒	▒	▒									
18	▒	▒	▒	▒	▒	▒	▒	▒	▒									
22	▒	▒	▒	▒	▧	▒	▒	▒	▒									
27	▒	▒	▒	▒	▒	▒	▒	▒	▒									
33	▒	▒	▒	▒	▧	▒	▒	▒	▒									
39	▒	▒	▒	▒	▒	▒	▒	▒	▒									
47	▒	▒	▒	▒	▧	▒	▒	▒	▒									
56	▒	▒	▒	▒	▒		▒	▒	▒									
68pF	▒	▒	▒	▒	▧		▒	▒	▒									
82	▒			▒	▒		▒	▒	▒									
100	▒			▒	▧		▒	▒	▒									
120	▒			▒	▒		▒	▒	▒									
150	▒			▒	▧		▒	▒	▒									
180	▒			▒	▒		▒	▒	▒									
220	▒			▒	▧		▒	▒	▒									
270				▒			▒	▒	▒									
330				▒			▒	▧	▒									
390				▒			▒	▒	▒									
470				▒			▒	▧	▒									
560				▒			▒	▒	▒									
680							▒	▧	▒									
820							▒	▒		▒	▒	▒						
1000							▒	▧		▒	▒	▒						
1200							▒	▒		▒	▒	▒						
1500							▒	▧		▒	▒	▒						
1800							▒			▒	▒	▒						
2200							▒			▒	▧	▒						
2700							▒			▒	▒							
3300							▒			▒	▧		▒	▒	▒			
3900										▒	▒		▒	▒	▒			
4700										▒	▧		▒	▒	▒			
5600										▒	▒		▒	▒	▒			
6800										▒	▧		▒	▒	▒			
8200										▒			▒	▒		▒	▒	▒
.01μF										▒			▒	▧		▒	▒	▒
.012													▒			▒	▒	▒
.015													▒			▒	▒	▒
.018													▒			▒	▒	▒
.022													▒			▒	▒	▒
.027																▒	▒	
.033																▒	▒	
.039																▒		
.047																▒		

▧ DISTRIBUTOR PRODUCT ITEMS

CENTRALAB/USCC Electronics • GLOBE-UNION INC
4561 Colorado Boulevard • Los Angeles, Ca. 90039 • (213) 240-4880

bme-radial™

CERAMIC CAPACITORS

featuring non-noble metal electrodes

"s" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: ±22%, −55°C to +125°C (X7S) see graph on page 318
DISSIPATION FACTOR: 2.5% maximum at 1kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: K, M, Z, P
For special lead options, see ordering information

Type	CS15			CS20			CS30			CS40			CS50		
L	.150			.200			.300			.400			.500		
W	.150			.200			.300			.400			.500		
T	.100			.100			.150			.150			.200		
S	.100			.100			.200			.200			.400		
D	.020			.020			.020			.020			.025		
	WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
68pF	▒	▒	▒												
82	▒	▒	▒												
100	▒	▒	▒												
120	▒	▒	▒												
150	▒	▒	▒												
180	▒	▒	▒												
220	▒	▒	▒												
270	▒	▒	▒												
330	▒	▒	▒												
390	▒	▒	▒												
470	▒	▒	▒												
560	▒	▒	▒												
680	▒	▒	▒												
820	▒	▒	▒												
1000	▒	▒	▒												
1200	▒	▒	▒												
1500	▒	▒	▒												
1800	▒	▒	▒												
2200	▒	▒	▒												
2700	▒	▒	▒												
3300	▒	▒	▒												
3900	▒	▒	▒												
4700	▒	▒	▒												
5600	▒	▒	▒												
6800	▒	▒	▒												
8200	▒	▒				▒									
.01µF	▒	▦				▒									
.012	▒	▒				▒									
.015	▒	▒				▒									
.018	▒	▒				▒									
.022	▦	▦				▒									
.027	▒				▒	▒									
.033				▒	▒	▒									
.039				▒	▒	▒									
.047				▒	▒	▒									
.056				▒	▒	▒									
.068				▒	▒				▒						
.082				▒	▒				▒						
.10				▦	▦				▒						
.12				▒				▒	▒						
.15							▒	▒	▒						
.18							▒	▒	▒						
.22							▦	▦	▒						
.27							▒	▒	▒						
.33							▒	▒				▒			
.39							▒	▒				▒			
.47							▦	▦				▒			
.56							▒					▒			
.68											▒				▒
.82										▒	▒				▒
1.0										▦				▒	▒
1.2													▒	▒	▒
1.5													▒	▒	
1.8													▒	▦	
2.2													▒		

▦PREFERRED VALUES

mono-kap®

CERAMIC CAPACITORS

with precious metal electrodes

x7r dielectric specifications

WORKING VOLTAGE: 50/100 VDC (Contact the factory for available capacitance values in 200 VDC units)
TEMPERATURE COEFFICIENT: ±15% from −55°C to +125°C, (EIA Characteristic X7R) see graph on page 318
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, 25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: K, M, Z, P
For special lead options, see ordering information

Type	CW10		CW15		CW20		CW30		CW40		CW50	
L	.100		.150		.200		.300		.400		.500	
W	.100		.150		.200		.300		.400		.500	
T	.100		.100		.125		.150		.150		.200	
S	.100		.100		.100		.200		.200		.400	
D	.016		.016		.020		.020		.020		.025	
	WVDV		WVDC		WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100	50	100	50	100
68pF	▒	▒	▒	▒								
82	▒	▒	▒	▒								
100	▒	▒	▒	▒								
120	▒	▒	▒	▒								
150	▒	▒	▧	▧								
180	▒	▒	▧	▧								
220	▒	▒	▧	▧								
270	▒	▒	▧	▧								
330	▒	▒	▧	▧								
390	▒	▒	▧	▧								
470	▒	▒	▧	▧								
560	▒	▒	▧	▧	▒	▒						
680	▒	▒	▧	▧	▒	▒						
820	▒	▒	▧	▧	▒	▒						
1000	▒	▒	▧	▧	▒	▒						
1200	▒	▒	▧	▧	▒	▒						
1500	▒	▒	▧	▧	▒	▒						
1800	▒	▒	▧	▧	▒	▒						
2200	▒		▧	▧	▒	▒						
2700	▒		▧	▧	▒	▒						
3300	▒		▧	▧	▒	▒						
3900	▒		▧	▧	▒	▒						
4700	▒		▧	▧	▒	▒						
5600	▒		▧	▧	▒	▒						
6800			▧		▒	▧						
8200			▧		▒	▧						
.01µF			▧		▒	▧						
.012			▧		▒	▧	▒	▒				
.015			▧		▒	▧	▒	▒				
.018					▧	▧	▒	▒				
.022					▧	▧	▒	▒				
.027					▧	▧	▒	▒				
.033					▧	▧	▒	▒				
.039					▧		▒	▧				
.047					▧		▒	▧				
.056					▧		▒	▧	▒	▒		
.068					▧		▒	▧	▒	▒		
.082					▧		▒	▧	▒	▒		
.10					▒		▧	▧	▒	▒		
.12					▒		▒	▒	▒	▒	▒	▒
.15							▧	▒	▒	▧	▒	▒
.18							▒		▒	▒	▒	▒
.22							▧		▒	▧	▒	▒
.27							▒		▒	▒	▒	▒
.33							▒		▒	▒	▒	▧
.39									▒		▒	▒
.47									▒		▒	▧
.56									▒		▒	▧
.68									▒		▒	
.82											▒	
1.0											▒	

▧DISTRIBUTOR PRODUCT ITEMS

CENTRALAB/USCC Electronics • GLOBE-UNION INC.
4561 Colorado Boulevard • Los Angeles, Ca. 90039 • (213) 240-4880

bme-radial™

CERAMIC CAPACITORS

featuring non-noble metal electrodes

"r" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC

TEMPERATURE COEFFICIENT: +22% −56%, +10°C to +85°C (Z5U); see graph on page 318

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C

INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C

DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current

CAPACITANCE TOLERANCES AVAILABLE: M, Z, P

For special lead options, see ordering information

Type	CR15			CR20			CR30			CR40			CR50		
L	.150			.200			.300			.400			.500		
W	.150			.200			.300			.400			.500		
T	.100			.100			.150			.150			.200		
S	.100			.100			.200			.200			.400		
D	.020			.020			.020			.020			.025		
	WVDC			WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100	25	50	100
270pF	▨	▨	▨												
330	▨	▨	▨												
470	▨	▨	▨												
680	▨	▨	▨												
1000	▨	▨	▨												
1500	▨	▨	▨												
1800	▨	▨	▨												
2200	▨	▨	▨												
2700	▨	▨	▨												
3300	▨	▨	▨												
4700	▨	▨	▨												
6800	▨	▨	▨												
.01µF	▨	▨	▨												
.015	▨	▨	▨												
.022	▨	▨				▨									
.027	▨	▨				▨									
.033	▨	▨				▨									
.047	⊡	⊡				▨									
.068	▨				▨	▨									
.1				⊡	⊡	▨									
.15				▨	▨	▨									
.22				⊡	▨				▨						
.27				▨	▨				▨						
.33				▨				▨	▨						
.47							⊡	▨	▨						
.68							▨	▨				▨			
1.0							⊡	⊡				▨			
1.5										▨	▨				▨
2.2										⊡			▨	▨	▨
3.3													▨	▨	▨
4.7													▨	▨	
6.8													▨		
10.0													▨		

⊡ PREFERRED VALUES

mono-kap®

CERAMIC CAPACITORS

with precious metal electrodes

z5u dielectric specifications

WORKING VOLTAGE: 50/100 VDC (Contact the factory for available capacitance values in 200 VDC units.)

TEMPERATURE COEFFICIENT: +22%, −56% from +10°C to +85°C (EIA Characteristic Z5U) see graph on page 318

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C

INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C

DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current

CAPACITANCE TOLERANCES AVAILABLE: M, Z, P

For special lead options, see ordering information

Type	CZ10		CZ15		CZ20		CZ30		CZ40		CZ50	
L	.100		.150		.200		.300		.400		.500	
W	.100		.150		.200		.300		.400		.500	
T	.100		.100		.125		.150		.150		.200	
S	.100		.100		.100		.200		.200		.400	
D	.016		.016		.020		.020		.020		.025	
	WVDV		WVDC		WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100	50	100	50	100
1000pF	▨	▨										
1200	▨	▨										
1500	▨	▨	▨	▨								
1800	▨	▨	▨	▨								
2200	▨	▨	▨	▨								
3300	▨	▨	▨	▨								
3900	▨	▨	▨	▨								
4700	▨	▨	▨	▨								
5600	▨	▨	▨	▨								
6800	▨	▨	▨	▨								
8200	▨		▨	▨								
.01µF	▨		▨	▨								
.012	▨		▨	▨								
.015			▨	▨								
.018			▨	▨								
.022			▨		▨	▨						
.033			▨		▨	▨	▨	▨				
.039			▨		▨	▨	▨	▨				
.047					▨	▨	▨	▨				
.056					▨	▨	▨	▨				
.068					▨	▨	▨	▨				
.082					▨	▨	▨	▨				
.100					▨	▨	▨	▨				
.12					▨	▨	▨	▨				
.15					▨	▨	▨	▨				
.18					▨		▨	▨				
.22					▨		▨	▨				
.33							▨	▨				
.39							▨	▨				
.47							▨	▨				
.56							▨	▨				
.68							▨		▨	▨		
.82							▨		▨	▨		
1.0							▨		▨	▨	▨	▨
1.2							▨		▨	▨	▨	▨
1.5									▨		▨	▨
1.8									▨		▨	▨
2.2									▨		▨	▨
3.3											▨	
3.9											▨	
4.7											▨	

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mono-kap®

CERAMIC CAPACITORS

with precious metal electrodes

y5v dielectric specifications

WORKING VOLTAGE: 50/100 VDC (Contact the factory for available capacitance values in 200 VDC units.)

TEMPERATURE COEFFICIENT: +22%, −82% from −30° to +85°C (EIA Characteristic Y5V) see graph on page 318

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, 25°C

INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C

DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current

CAPACITANCE TOLERANCES AVAILABLE: Z, P

For special lead options, see ordering information

Type	CY10		CY15		CY20		CY30		CY40		CY50	
L	.100		.150		.200		.300		.400		.500	
W	.100		.150		.200		.300		.400		.500	
T	.100		.100		.125		.150		.150		.200	
S	.100		.100		.100		.200		.200		.400	
D	.016		.016		.020		.020		.020		.025	
	WVDV		WVDC		WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100	50	100	50	100
270pF	░	░	░	░								
330	░	░	░	░								
470	░	░	▨	░								
680	░	░	▨	░								
1000	░	░	▨	░								
1500	░	░	▨	░								
1800	░	░	░	░								
2200	░	░	▨	░								
2700	░	░	░	░								
3300	░	░	▨	░	░	░						
4700	░	░	▨	░	░	░						
6800	░	░	▨	▨	░	░						
.01µF	░	░	▨	▨	░	░						
.015	░		▨	▨	░	░						
.022	░		▨	▨	░	░						
.027			░	░	░	░	░	░				
.033			▨	▨	░	░	░	░				
.047			▨		░	▨	░	░				
.068			▨		░	▨	░	░				
.1					▨	▨	░	░				
.15					▨	▨	░	░	░	░		
.22					▨	▨	░	░	░	░		
.27					░		░	░	░	░	░	░
.33					▨		░	▨	░	░	░	░
.47					▨		░	▨	░	░	░	░
.68							▨	▨	░	░	░	░
1.0							▨	▨	░	░	░	░
1.5							▨		░	▨	░	░
2.2							▨		░	▨	░	░
3.3									▨		░	░
4.7											░	
6.8											░	
10.0											░	

▨ DISTRIBUTOR PRODUCT ITEMS

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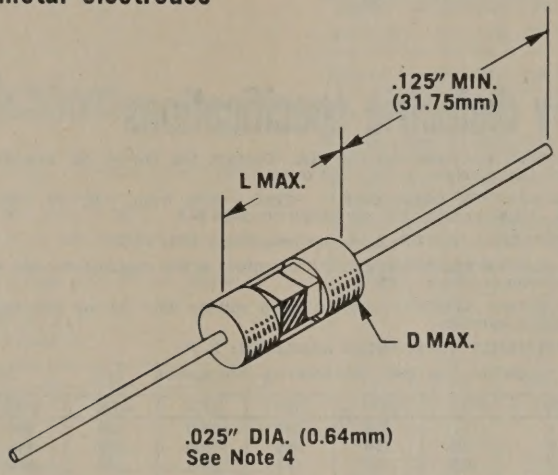
axial leaded, glass encapsulated

Mono-Glass™ with precious metal electrodes
BME-Axial™ with non-noble metal electrodes



mechanical specifications

CASE: Glass to metal seal

LEAD MATERIAL: .025″ dia. solderable lead (standard)

MARKING: Parts will be marked with the following:

Parts will be marked with the following:
"USCC"
Capacitance
Tolerance Letter Designation
Voltage

NOTE: When space permits, the dielectric will be indicated.

environmental specifications

BAROMETRIC PRESSURE: Method 105, MIL-STD-202, test condition E (150,000 feet) 100% of rated voltage applied for 5 seconds, current limited to 50 ma.

VIBRATION: Method 204, MIL-STD-202, test condition B (10-2,000 cps; 15 G).

SHOCK: Method 205, MIL-STD-202, test condition C (50 G; 11 ms).

THERMAL SHOCK: Method 107, MIL-STD-202, −55°C to +125°C for "J", "S", COG and X7R dielectrics; −55°C to +85°C for "R", Z5U and Y5V dielectrics.

IMMERSION CYCLING: Method 104, MIL-STD-202, test condition A (15 minutes in tap water).

MOISTURE RESISTANCE: Method 106, MIL-STD-202, 10 cycles without loading voltage applied.

LIFE: 200% of rated voltage for COG and X7R dielectrics at +125°C; 150% of rated voltage for "J" and "S" dielectrics at +125°C for 1,000 hours; 150% of rated voltage for "R", Z5U and Y5V dielectrics at +85°C; for 1,000 hours.

how to order C50 C 102 K 2

SERIES — C50
WORKING VOLTS DC[1] — C
CAPACITANCE IN PICOFARADS (pF)[2] — 102
TOLERANCE[3] — K
LEAD OPTION[4] — 2

1. **WVDC AVAILABLE:**
   D = 25 VDC
   C = 50 VDC
   A = 100 VDC
2. 103 = 10,000 pF (.01 μF); i.e., the third digit signifies number of zeros. For values below 10 pF use "R" in place of decimal point (4R7 — 4.7 pF)
3. **MINIMUM AVAILABLE CAPACITANCE TOLERANCES:**
   D — ±0.5 pF (1-10 pF)
   J — ±5% (10 pF and above)
   K = ±10% (5.6 pF and above)
   M = ±20% (2.7 pF and above)
   Z = +80%, −20% (all values)
   P = +100%, −0% (GMV — all values)
4. .025″ dia. standard on all four sizes. .020″ dia. optional for sizes .200 x .100 and .250 x .100. To order option suffix standard part number with "2".

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bme-axial™

CERAMIC CAPACITORS

C50 SERIES 100% MONOLITHIC CONSTRUCTION

featuring non-noble metal electrodes

"j" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: 0 ±30 PPM/°C, −55°C to +125°C (COG); see graph
MINIMUM Q: 1000 at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, F, G, H, J, K, M

L Max. D Max.	.200 .100			.250 .100			.300 .150			.400 .150		
Cap.	WVDC 25	50	100	WVDC 25	50	100	WVDC 25	50	100	WVDC 25	50	100
1.0pF	▨	▨	▨									
1.2	▨	▨	▨									
1.5	▨	▨	▨									
1.8	▨	▨	▨									
2.2	▨	▨	▨									
2.7	▨	▨	▨									
3.3	▨	▨	▨									
3.9	▨	▨	▨									
4.7	▨	▨	▨									
5.6	▨	▨	▨									
6.8	▨	▨	▨									
8.2	▨	▨	▨									
10	▨	▨	▨									
12	▨	▨	▨									
15	▨	▨	▨									
18	▨	▨	▨									
22	▨	▨	▨									
27	▨	▨	▨									
33	▨	▨	▨									
39	▨	▨	▨									
47	▨	▨	▨									
56	▨	▨	▨									
68	▨	▨	▨									
82	▨	▨	▨									
100	▨	⊡	▨									
120	▨	▨	▨									
150	▨	▨				▨						
180	▨	▨				▨						
220	▨	⊡				▨						
270	▨				▨				▨			
330	▨				▨				▨			
390				▨				▨	▨			
470				⊡				⊡	▨			
560							▨	▨	▨			
680							▨	▨	▨			
820							▨	▨	▨			
1000							▨	⊡	▨			
1200							▨	▨				▨
1500							▨	▨				▨
1800							▨			▨	▨	
2200							⊡			▨	⊡	
2700										▨		
3300										▨		
3900												
4700												
5600												
6800												
8200												
.01µF												

⊡ PREFERRED VALUES

mono-glass™

CERAMIC CAPACITORS

C40 SERIES 100% MONOLITHIC CONSTRUCTION

with precious metal electrodes

cog dielectric specifications

WORKING VOLTAGE: 50/100 VDC
TEMPERATURE COEFFICIENT: 0 ±30 PPM/°C, −55°C to +125°C (EIA Characteristic COG); see graph
DISSIPATION FACTOR: .15% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100K megohms or 100 megohm-microfarad, whichever is less at +25°C, at rated voltage
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: D, J, K, M

L Max. D Max.	.200 .100		.250 .100		.300 .150		.400 .150	
Cap.	WVDC 50	100	WVDC 50	100	WVDC 50	100	WVDC 50	100
1.0pF	▨	▨						
1.2	▨	▨						
1.5	▨	▨						
1.8	▨	▨						
2.2	▨	▨						
2.7	▨	▨						
3.3	▨	▨						
3.9	▨	▨						
4.7	▨	▨						
5.6	▨	▨						
6.8	▨	▨						
8.2	▨	▨						
10	▨	▨						
12	▨	▨						
15	▨	▨						
18	▨	▨						
22	▨	▨						
27	▨	▨						
33	▨	▨						
39	▨	▨						
47	▨	▨						
56	▨	▨						
68	▨	▨						
82	▨	▨						
100pF	▨	▨						
120	▨	▨						
150	▨	▨						
180	▨	▨						
220	▨	▨						
270	▨	▨						
330	▨	▨						
390	▨			▨				
470	▨			▨				
560			▨	▨				
680			▨	▨				
820			▨			▨		
1000			▨			▨		
1200					▨	▨		
1500					▨	▨		
1800					▨	▨		
2200					▨	▨		
2700					▨	▨		
3300					▨	▨		
3900					▨	▨		
4700					▨			▨
5600					▨			▨
6800							▨	▨
8200							▨	
.01µF							▨	

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CERAMIC CAPACITORS

C51 SERIES 100% MONOLITHIC CONSTRUCTION
featuring non-noble metal electrodes

"s" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC
TEMPERATURE COEFFICIENT: ±22%, −55°C to +125°C (X7S) see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: K, M, Z, P

L Max. D Max.	.200 .100			.250 .100			.300 .150			.400 .150		
	WVDC			WVDC			WVDC			WVDC		
Cap.	25	50	100	25	50	100	25	50	100	25	50	100
100pF	░	░	░									
120	░	░	░									
150	░	░	░									
180	░	░	░									
220	░	░	░									
270	░	░	░									
330	░	░	░									
390	░	░	░									
470	░	░	░									
560	░	░	░									
680	░	░	░									
820	░	░	░									
1000	░	░	░									
1200	░	░	░									
1500	░	░	░									
1800	░	░	░									
2200	░	░	░									
2700	░	░	░									
3300	░	░	░									
3900	░	░	░									
4700	░	░	░									
5600	░	░	░									
6800	░	░	░									
8200	░	░	░									
.01µF	▨	▨				░						
.012	░	░				░						
.015	░	░							░			
.018	░				░				░			
.022	▨				▨				░			
.027				░				░	░			
.033				░				░	░			
.039							░	░	░			
.047							▨	▨	░			
.056							░	░	░			
.068							░	░	░			
.082							░	░				░
.10							▨	▨				░
.12							░				░	
.15							░				░	
.18										░		
.22										▨		

▨PREFERRED VALUES

mono-glass™

CERAMIC CAPACITORS

C41 SERIES 100% MONOLITHIC CONSTRUCTION
with precious metal electrodes

x7r dielectric specifications

WORKING VOLTAGE: 50/100 VDC
TEMPERATURE COEFFICIENT: ±15% from −55°C to +125°C (EIA Characteristics X7R) see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, 25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C, at rated voltage
DIELECTRIC STRENGTH: 250% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: K, M, Z, P

L Max. D Max.	.200 .100		.250 .100		.300 .150		.400 .150	
	WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100
100pF								
120								
150								
180								
220								
270								
330								
390								
470								
560								
680								
820								
1000								
1200								
1500								
1800								
2200								
2700								
3300								
3900								
4700								
5600								
6800								
8200								
.01µF								
.012								
.015								
.018								
.022								
.027								
.033								
.039								
.047								
.056								
.068								
.082								
.10								
.12								
.15								
.18								

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CERAMIC CAPACITORS

C53 SERIES 100% MONOLITHIC CONSTRUCTION

featuring non-noble metal electrodes

"r" dielectric specifications

WORKING VOLTAGES: 25/50/100 VDC

TEMPERATURE COEFFICIENT: +22% −56%, +10°C to +85°C (Z5U); see graph

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C

INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C

DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current

CAPACITANCE TOLERANCES AVAILABLE: M, Z, P

L Max. D Max.	.200 .100			.250 .100			.300 .150			.400 .150			.500 .160		
Cap.	WVDC 25	50	100	WVDC 25	50	100	WVDC 25	50	100	WVDC 25	50	100	WVDC 25	50	100
1000pF	▒	▒	▒												
1200	▒	▒	▒												
1500	▒	▒	▒												
1800	▒	▒	▒												
2200	▒	▒	▒												
2700	▒	▒	▒												
3300	▒	▒	▒												
3900	▒	▒	▒												
4700	▒	▒	▒												
5600	▒	▒	▒												
6800	▒	▒	▒												
8200	▒	▒	▒												
.01µF	▒	▒	▒												
.012	▒	▒	▒												
.015	▒	▒	▒												
.018	▒	▒				▒									
.022	▒	▒				▒									
.027	▒	▒							▒						
.033	▒	▒							▒						
.039	▒	▒							▒						
.047	⊡				⊡				▒						
.056	▒				▒				▒						
.068				▒				▒	▒						
.082				▒				▒	▒						
.10				⊡				⊡	▒						
.12							▒	▒	▒						
.15							▒	▒				▒			
.18							▒	▒				▒			
.22							⊡	▒							▒
.27							▒	▒							▒
.33							▒				▒				
.39							▒				▒				
.47										▒	▒			▒	
.56										▒				▒	
.68										▒					
.82													▒		
1.0													⊡		

⊡ PREFERRED VALUES

mono-glass™

CERAMIC CAPACITORS

C43 SERIES 100% MONOLITHIC CONSTRUCTION

with precious metal electrodes

z5u dielectric specifications

WORKING VOLTAGE: 50/100 VDC

TEMPERATURE COEFFICIENT: +22%, −56% from +10°C to +85°C (EIA Characteristic Z5U) see graph

DISSIPATION FACTOR: 2.5% maximum at 1 kHz, +25°C

INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C

DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current

CAPACITANCE TOLERANCES AVAILABLE: M, Z, P

L Max. D Max.	.200 .100		.250 .100		.300 .150		.400 .150	
Cap.	WVDC 50	100	WVDC 50	100	WVDC 50	100	WVDC 50	100
560pF	▒	▒						
680	▒	▒						
820	▒	▒						
1000	▒	▒						
1200	▒	▒						
1500	▒	▒						
1800	▒	▒						
2200	▒	▒						
2700	▒	▒						
3300	▒	▒						
3900	▒	▒						
4700	▒	▒						
5600	▒			▒				
6800	▒			▒				
8200	▒			▒				
.01µF	▒			▒				
.012	▒					▒		
.015	▒					▒		
.018	▒					▒		
.022	▒					▒		
.027			▒			▒		
.033			▒			▒		
.039			▒			▒		
.047			▒			▒		
.056			▒			▒		
.068			▒			▒		
.082			▒			▒		
.10			▒			▒		
.12					▒	▒		
.15					▒			▒
.18					▒			▒
.22					▒			▒
.27					▒			
.33					▒			
.39							▒	
.47							▒	
.56							▒	
.68							▒	

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CERAMIC CAPACITORS

C42 SERIES 100% MONOLITHIC CONSTRUCTION

with precious metal electrodes

y5v dielectric specifications

WORKING VOLTAGE: 50/100 VDC
TEMPERATURE COEFFICIENT: +22%, −82% from −30°C to +85°C (EIA Characteristic Y5V) see graph
DISSIPATION FACTOR: 2.5% maximum at 1 kHz, 25°C
INSULATION RESISTANCE: 100 K megohms or 500 megohm-microfarad, whichever is less at +25°C, at rated voltage
DIELECTRIC STRENGTH: 200% rated voltage with 50 ma maximum charging current
CAPACITANCE TOLERANCES AVAILABLE: Z, P

L Max. D Max.	.200 .100		.250 .100		.300 .150		.400 .150	
	WVDC		WVDC		WVDC		WVDC	
Cap.	50	100	50	100	50	100	50	100
1000	▨	▨						
1200	▨	▨						
1500	▨	▨						
1800	▨	▨						
2200	▨	▨						
2700	▨	▨						
3300	▨	▨						
3900	▨	▨						
4700	▨	▨						
5600	▨	▨						
6800	▨	▨						
8200	▨	▨						
.01μF	▨	▨						
.012	▨			▨				
.015	▨			▨				
.018	▨			▨				
.022	▨			▨				
.027	▨					▨		
.033	▨					▨		
.039	▨					▨		
.047	▨					▨		
.056			▨			▨		
.068			▨			▨		
.082			▨			▨		
.10			▨			▨		
.12					▨	▨		
.15					▨	▨		
.18					▨	▨		
.22					▨	▨		
.27					▨			▨
.33					▨			▨
.39					▨			▨
.47					▨			▨
.56							▨	
.68							▨	
.82							▨	
1.0							▨	

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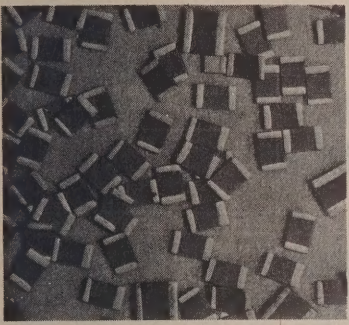
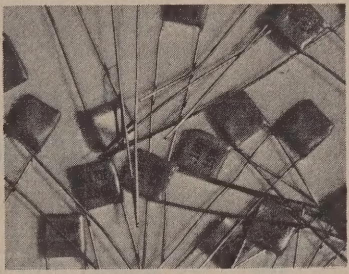
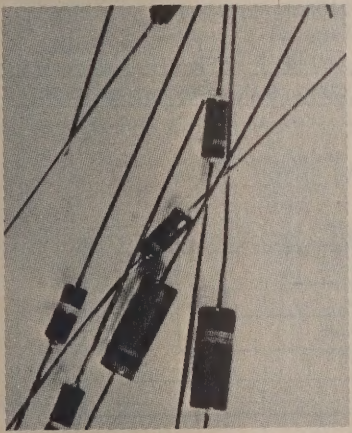
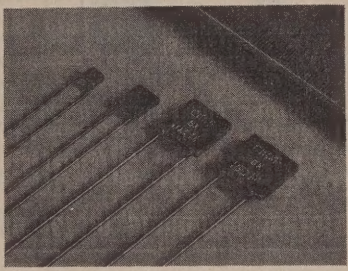
Varadyne

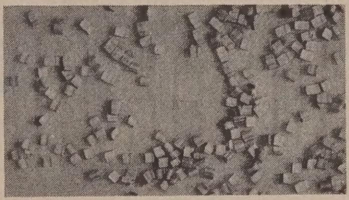
Varadyne Industries, Inc. 1520 Cloverfield Blvd. Santa Monica, California 90404
(213) 829-2984 — TWX (910) 343-6856









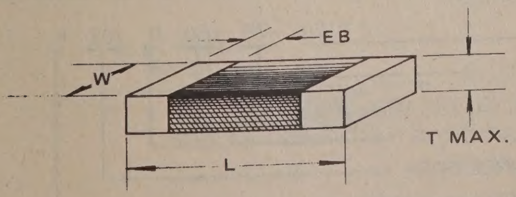


MONOLITHIC CERAMIC CHIP CAPACITORS

CAPACITANCE RANGE

SIZE	DIMENSIONS		DIELECTRIC TYPE (EIA CODE) See Dielectric Chart.		
	L x W x T	EB	BP (COG)	BR (X7R)	GU (Z5U)
1	.050 x .050 x .050	.005/.020	1pF - 390pF	120pF - .01mFd	1000pF - .022mFd
2	.080 x .050 x .050	.010/.030	1pF - 680pF	120pF - .015mFd	2200pF - .039mFd
3	.095 x .050 x .060	.010/.030	10pF - 1200pF	120pF - .027mFd	3900pF - .056mFd
4	.150 x .050 x .060	.010/.030	10pF - 2200pF	120pF - .047mFd	8200pF - .1mFd
5	.120 x .095 x .065	.010/.030	10pF - 4700pF	270pF - .1mFd	.015mFd - .22mFd
6	.170 x .070 x .070	.010/.035	12pF - 3300pF	220pF - .068mFd	.01mFd - .18mFd
18	.195 x .125 x .070	.020/.045	100pF - .01mFd	2200pF - .33mFd	.047mFd - .56mFd
10	.220 x .230 x .070	.020/.050	100pF - .027mFd	4700pF - .56mFd	.1mFd - 1.8mFd
14	.245 x .225 x .080	.020/.050	470pF - .039mFd	5600pF - 1.mFd	.47mFd - 2.2mFd
AVAILABLE TOLERANCES			±5%; ±10%; ±20%	±5%; ±10%; ±20%	±20%; +80%, –20%; +100%, –0%

Meets or exceeds applicable requirements of MIL-C-55681. Also available: CDR style chip capacitors per MIL-C-55681.



HOW TO ORDER:

3 BP 050 S 101 J

SIZE — 3
DIELECTRIC — BP
DC WORKING VOLTAGE — 050
CHIP CAPACITOR — S
CAPACITANCE CODE — 101
TOLERANCE — J

Varadyne

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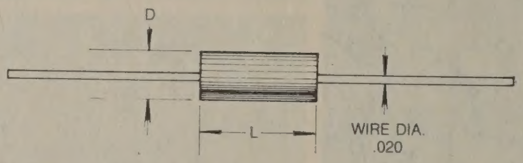
GREEN GODDESS
AXIAL LEADED GLASS ENCAPSULATED MONOLITHIC CERAMIC CAPACITORS

CAPACITANCE RANGE

SIZE	DIMENSIONS L x D	DIELECTRIC TYPE (EIA CODE) See Dielectric Chart.		
		COG	X7R	Z5U
1801	.160 x .100	10pF - 680pF	120pF - .015mFd	2200pF - .039mFd
1802	.260 x .100	820pF - 1800pF	.018mFd - .039mFd	.056mFd - .12mFd
1803	.400 x .155	2200pF - .01mFd	.047mFd - .33mFd	.15mFd - 1.0mFd
AVAILABLE TOLERANCES		±5%; ±10%; ±20%	±10%; ±20%	±20%; +80%, –20%; +100%, –0%

Meets or exceeds applicable requirements of MIL-C-11015 and MIL-C-39014.



HOW TO ORDER:

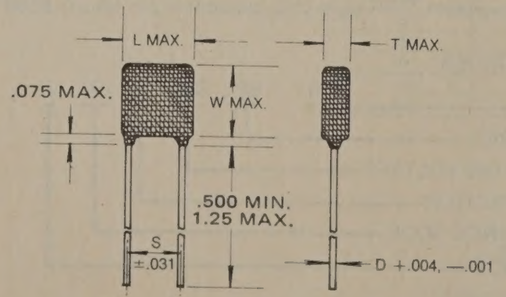
1801 COG 050 A 681 J

SIZE
DIELECTRIC
DC WORKING VOLTAGE
AXIAL CAPACITOR
CAPACITANCE CODE
TOLERANCE

CLOVER CAPS
RADIAL LEADED — EPOXY DIPPED MONOLITHIC CERAMIC CAPACITORS

CAPACITANCE RANGE

SIZE	DIMENSIONS		DIELECTRIC TYPE (EIA CODE) See Dielectric Chart.		
	L x W x T	S x D	COG	X7R	Z5U
2112	.120 x .120 x .100	.100 x .016	5.6pF - 12pF	100pF - 330pF	2200pF - 6800pF
2115	.150 x .150 x .100	.100 x .016	15pF - 330pF	390pF - .015mFd	8200pF - .056mFd
2120	.200 x .200 x .125	100 x .020	390pF - 4700pF	.01mFd - .1mFd	.027mFd - .22mFd
2130	.300 x .300 x .150	.200 x .020	5600pF - .01mFd	.1mFd - .39mFd	.1mFd - 1mFd
2140	.400 x .400 x .150	.200 x .020	.01mFd - .022mFd	.47mFd - 1mFd	1mFd - 2.2mFd
2150	.500 x .500 x .200	.400 x .025	.027mFd - .047mFd	1mFd - 2mFd	2.7mFd - 4.7mFd
AVAILABLE TOLERANCES			±5%; ±10%; ±20%;	±5%; ±10%; ±20%	±20%; +80%; –20%; +100%, –0%



HOW TO ORDER:

2120 X7R 050 R 103 K

SIZE
DIELECTRIC
DC WORKING VOLTAGE
RADIAL CAPACITOR
CAPACITANCE CODE
TOLERANCE

CONSULT FACTORY FOR ALTERNATE LEAD CONFIGURATIONS

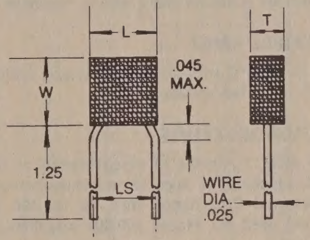
Varadyne

Varadyne Industries, Inc. 1520 Cloverfield Blvd. Santa Monica, California 90404
(213) 829-2984 — TWX (910) 343-6856

CK05/CK06 RADIAL LEADED MONOLITHIC CERAMIC CAPACITORS

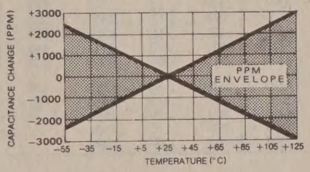
CAPACITANCE RANGE FOR STANDARD MIL VALUES

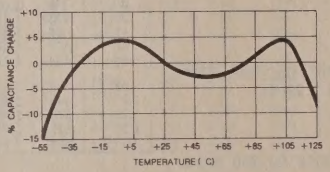
STYLE	CAPACITANCE	L	W	T	LS
CK05	10pF - .1mFd	.190	.190	.090	.200
CK06	1200pF - 1mFd	.290	.290	.090	.200

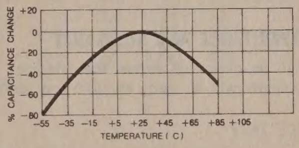


Meets or exceeds requirements of MIL-C-11015. Order by Military Type designation.

TYPICAL DIELECTRIC CHARACTERISTICS



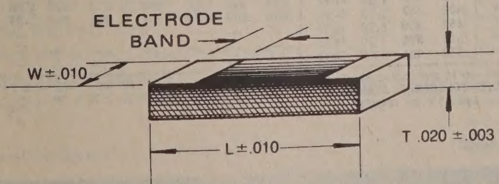




E.I.A. CODE	COG	X7R*	Z5U**
CAPACITANCE CHANGE:	0±30ppm/°C	±15%	+22, −56% (+10° to 85° C)
WORKING TEMPERATURE RANGE:	−55° C to +125° C	−55° C to +125° C	−55° C to +85° C
DF:	.1% max	2.5% max	3.5% max
IR @ 25° C:	100K megohms or 1000 megohms — mFd, whichever is less	100K megohms or 1000 megohms —mFd, whichever is less	10K megohms or 1000 megohms —mFd, whichever is less
DWV:	2.5 x Rated	2.5 x Rated	2.5 x Rated
TOLERANCE CODE	J(± 5%); K(± 10%); M(± 20%); Z(+80%, −20%); P(+100%, −0%)		

THICK-FILM CHIP RESISTORS

STYLE	LENGTH	WIDTH	ELECTRODE BAND	POWER RATING	RESISTANCE RANGE
1	.050	.050	.005/.020	75 mw	10 ohm to 450K ohm
2	.075	.050	.010/.030	100 mw	40 ohm to 820K ohm
3	.100	.050	.010/.030	150 mw	60 ohm to 1.2 M ohm
4	.150	.050	.010/.030	300 mw	100 ohm to 5.0M ohm
AVAILABLE TOLERANCES	±1%; ±2%: ±5%; ±10%; ±20%.				



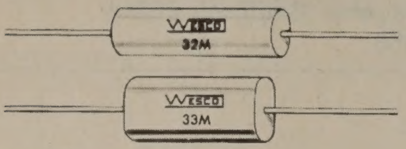
HOW TO ORDER:

3 C 122 K

SIZE
CERMET CHIP
RESISTANCE VALUE IN OHMS
TOLERANCE

®WESCO

MYLAR* FILM-FOIL CAPACITORS



SPECIFICATIONS

DIELECTRIC WITHSTANDING VOLTAGE

200% of rated voltage applied through a minimum limiting resistance of 100 Ohms/Volt. Duration of voltage stress shall be 15 seconds minimum and 1 minute maximum at 25°C.

TEMPERATURE RANGE

−55°C to +85°C with full rated voltage applied. To +125°C with 50% of rated voltage.

INSULATION RESISTANCE

At 25°C after 2 minutes of electrification at rated voltage or 500 VDC, whichever is less, the minimum product of Insulation Resistance and Capacitance shall be 100,000 megohms-microfarads, but need not exceed 100,000 megohms.

DISSIPATION FACTOR

Shall not exceed 0.75% when measured at 25°C and 1000 Hz, ±20 Hz. See characteristic curves for D.F. ratings at other temperatures.

CAPACITANCE AND TOLERANCE

Shall be measured within the tolerance limits specified. Measurements will be made at 25°C and 1000 Hz ±20 Hz.

LIFE TEST

Shall withstand 140% of rated voltage at 85°C for 250 hours. One failure in twelve shall be permitted.

CAPACITANCE STABILITY (DRIFT)

Less than 0.50% when measured in the following manner: three capacitance readings at 25°C, each made prior to and after temperature cycling from room to 80°C, and room to −55°C. The mathematical difference between the two extremes, divided by the intermediate value, and then multiplied by 100, yields the stability expressed in percent.

HUMIDITY RESISTANCE

Meets requirements of Mil-C-27287,, Para. 3.12 when tested in accordance with Mil-STD.-202C, Method 103 B, Condition B.

LEAD PULL AND BEND TEST

Steady pull of 5 pounds applied axially to leads for one minute. Bend test shall consist of one bend from the point of egress, first 90° in one direction, back to the original axial position, and then 90° in the opposite direction with no evidence of breakage.

FEATURES

Wrap and fill construction.
Tubular or oval configuration for optimum space savings.
Extended foil design.
Quality control procedures per Mil-Q-9858.
Will meet or exceed Mil-C-27287.

APPLICATIONS

Computers
Data Processing Equipment
Peripheral Equipment
Aircraft and Missile Systems
Industrial Instrumentation
Navigation and Distance Measuring Equipment
Communications Equipment
Filters

TYPE 32M RATINGS AND DIMENSIONS

Capacity in Mfds.	100 VOLTS			200 VOLTS			400 VOLTS			600 VOLTS		
	D	L	Cat. No. 32M — K-1	D	L	Cat. No. 32M — K-2	D	L	Cat. No. 32M — K-4	D	L	Cat. No. 32M — K-6
.001	.187	.40	1001	.187	.40	1001	.187	.53	1001	.187	.53	1001
.0012	.187	.40	1201	.187	.40	1201	.187	.53	1201	.187	.53	1201
.0015	.187	.40	1501	.187	.40	1501	.187	.53	1501	.187	.53	1501
.0018	.187	.40	1801	.187	.40	1801	.187	.53	1801	.187	.53	1801
.0022	.187	.40	2201	.187	.40	2201	.187	.53	2201	.187	.53	2201
.0027	.187	.40	2701	.187	.40	2701	.187	.53	2701	.203	.53	2701
.0033	.187	.40	3301	.187	.40	3301	.187	.53	3301	.218	.53	3301
.0039	.187	.40	3901	.187	.40	3901	.187	.53	3901	.218	.53	3901
.0047	.187	.40	4701	.187	.40	4701	.187	.53	4701	.187	.65	4701
.0056	.187	.40	5601	.187	.40	5601	.187	.53	5601	.203	.65	5601
.0068	.187	.40	6801	.187	.40	6801	.187	.53	6801	.203	.65	6801
.0082	.187	.40	8201	.187	.40	8201	.203	.53	8201	.218	.65	8201
.01	.187	.40	1002	.203	.40	1002	.218	.53	1002	.234	.65	1002
.012	.187	.40	1202	.234	.40	1202	.234	.53	1202	.265	.65	1202
.015	.203	.40	1502	.250	.40	1502	.265	.53	1502	.281	.65	1502
.018	.218	.40	1802	.203	.53	1802	.218	.65	1802	.265	.78	1802
.022	.234	.40	2202	.218	.53	2202	.250	.65	2202	.281	.78	2202
.027	.265	.40	2702	.234	.53	2702	.234	.78	2702	.312	.78	2702
.033	.218	.53	3302	.218	.65	3302	.265	.78	3302	.296	.90	3302
.039	.187	.65	3902	.234	.65	3902	.281	.78	3902	.328	.90	3902
.047	.203	.65	4702	.250	.65	4702	.312	.78	4702	.359	.90	4702
.056	.218	.65	5602	.281	.65	5602	.296	.90	5602	.375	.90	5602
.068	.250	.65	6802	.312	.65	6802	.328	.90	6802	.421	.90	6802
.082	.265	.65	8202	.296	.78	8202	.343	.90	8202	.375	1.18	8202
.1	.265	.78	1003	.328	.78	1003	.390	.90	1003	.421	1.18	1003
.12	.281	.78	1203	.328	.90	1203	.359	1.18	1203	.453	1.18	1203
.15	.312	.78	1503	.359	.90	1503	.390	1.18	1503	.500	1.18	1503
.18	.312	.90	1803	.359	1.03	1803	.437	1.32	1803	.515	1.32	1803
.22	.343	.90	2203	.390	1.03	2203	.484	1.32	2203	.562	1.32	2203
.27	.343	1.03	2703	.406	1.18	2703	.468	1.56	2703	.562	1.56	2703
.33	.375	1.03	3303	.437	1.18	3303	.515	1.56	3303	.578	1.70	3303
.39	.375	1.18	3903	.468	1.18	3903	.562	1.56	3903	.625	1.70	3903
.47	.406	1.18	4703	.515	1.18	4703	.609	1.56	4703	.687	1.70	4703
.56	.437	1.18	5603	.531	1.32	5603	.640	1.70	5603	.750	1.70	5603
.68	.484	1.18	6803	.515	1.56	6803	.703	1.70	6803	.796	1.82	6803
.82	.531	1.18	8203	.578	1.56	8203	.734	1.82	8203	.828	1.94	8203
1.0	.546	1.32	1004	.593	1.70	1004	.781	1.94	1004	.921	1.94	1004
1.25	.578	1.45	1254	.671	1.70	1254	—	—	—	—	—	—
1.50	.625	1.45	1504	.734	1.70	1504	—	—	—	—	—	—
2.0	.687	1.56	2004	.812	1.82	2004	—	—	—	—	—	—

TYPE 33M RATINGS AND DIMENSIONS

Capacity in Mfds.	100 VOLTS				200 VOLTS				400 VOLTS				600 VOLTS			
	T	W	L	Cat. No. 33M — K1	T	W	L	Cat. No. 33M — K2	T	W	L	Cat. No. 33M — K4	T	W	L	Cat. No. 33M — K6
.001	.125	.234	.40	1001	.125	.234	.40	1001	.109	.203	.53	1001	.109	.203	.53	1001
.0012	.125	.234	.40	1201	.125	.234	.40	1201	.109	.203	.53	1201	.109	.203	.53	1201
.0015	.125	.234	.40	1501	.125	.234	.40	1501	.125	.234	.53	1501	.125	.234	.53	1501
.0018	.125	.234	.40	1801	.125	.234	.40	1801	.125	.234	.53	1801	.125	.234	.53	1801
.0022	.125	.234	.40	2201	.125	.234	.40	2201	.125	.234	.53	2201	.125	.234	.53	2201
.0027	.125	.234	.40	2701	.125	.234	.40	2701	.125	.234	.53	2701	.125	.234	.53	2701
.0033	.125	.234	.40	3301	.125	.234	.40	3301	.125	.234	.53	3301	.140	.281	.53	3301
.0039	.125	.234	.40	3901	.125	.234	.40	3901	.125	.234	.53	3901	.140	.265	.53	3901
.0047	.125	.234	.40	4701	.125	.234	.40	4701	.125	.234	.53	4701	.125	.265	.65	4701
.0056	.125	.234	.40	5601	.125	.234	.40	5601	.125	.234	.53	5601	.125	.250	.65	5601
.0068	.125	.234	.40	6801	.125	.234	.40	6801	.125	.234	.53	6801	.125	.250	.65	6801
.0082	.125	.234	.40	8201	.125	.234	.40	8201	.140	.234	.53	8201	.140	.265	.65	8201
.01	.125	.234	.40	1002	.140	.250	.40	1002	.156	.250	.53	1002	.156	.281	.65	1002
.012	.125	.234	.40	1202	.171	.265	.40	1202	.171	.265	.53	1202	.171	.312	.65	1202
.015	.140	.234	.40	1502	.187	.281	.40	1502	.187	.312	.53	1502	.203	.328	.65	1502
.018	.156	.250	.40	1802	.140	.234	.53	1802	.140	.281	.65	1802	.171	.312	.78	1802
.022	.171	.281	.40	2202	.156	.250	.53	2202	.171	.296	.65	2202	.203	.343	.78	2202
.027	.203	.296	.40	2702	.171	.281	.53	2702	.156	.281	.78	2702	.234	.359	.78	2702
.033	.140	.250	.53	3302	.156	.250	.65	3302	.171	.312	.78	3302	.218	.343	.90	3302
.039	.125	.234	.65	3902	.171	.265	.65	3902	.203	.328	.78	3902	.250	.375	.90	3902
.047	.140	.250	.65	4702	.171	.312	.65	4702	.203	.375	.78	4702	.281	.406	.90	4702
.056	.156	.265	.65	5602	.203	.328	.65	5602	.187	.359	.90	5602	.281	.453	.90	5602
.068	.187	.281	.65	6802	.218	.359	.65	6802	.218	.390	.90	6802	.312	.500	.90	6802
.082	.187	.312	.65	8202	.218	.343	.78	8202	.250	.421	.90	8202	.281	.453	1.18	8202
.1	.187	.312	.78	1003	.234	.375	.78	1003	.281	.453	.90	1003	.312	.500	1.18	1003
.12	.203	.328	.78	1203	.218	.390	.90	1203	.250	.421	1.18	1203	.343	.515	1.18	1203
.15	.234	.359	.78	1503	.250	.421	.90	1503	.281	.484	1.18	1503	.390	.578	1.18	1503
.18	.218	.328	.90	1803	.234	.437	1.03	1803	.312	.515	1.32	1803	.406	.578	1.32	1803
.22	.250	.359	.90	2203	.265	.468	1.03	2203	.359	.562	1.32	2203	.468	.640	1.32	2203
.27	.234	.406	1.03	2703	.281	.484	1.18	2703	.343	.546	1.56	2703	.437	.640	1.56	2703
.33	.265	.437	1.03	3303	.328	.515	1.18	3303	.390	.593	1.56	3303	.468	.671	1.70	3309
.39	.265	.453	1.18	3903	.359	.562	1.18	3903	.437	.640	1.56	3903	.500	.703	1.70	3903
.47	.296	.500	1.18	4703	.406	593	1.18	4703	.484	.687	1.56	4703	.562	.765	1.70	4703
.56	.328	.531	1.18	5603	.406	609	1.32	5603	.515	.718	1.70	5603	.625	.828	1.70	5603
.68	.375	.562	1.18	6803	.406	.609	1.56	6803	.578	.781	1.70	6803	.656	.875	1.82	6803
.82	.421	.609	1.18	8203	.453	.656	1.56	8203	.609	.812	1.82	8203	.703	.906	1.94	8203
1.0	.437	.625	1.32	1004	.484	.687	1.70	1004	.656	.859	1.94	1004	.781	.984	1.94	1004
1.25	.453	.656	1.45	1254	.453	.859	1.70	1254	—	—	—	—	—	—	—	—
1.50	.515	.718	1.45	1504	.515	.906	1.70	1504	—	—	—	—	—	—	—	—
2.0	.468	.875	1.56	2004	.578	.984	1.82	2004	—	—	—	—	—	—	—	—

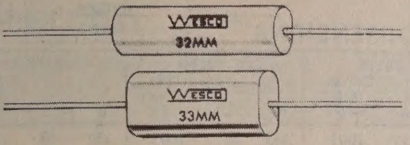
STANDARD LEAD SIZES: #24 AWG TCW: up to and including .203″ Dia., #22 AWG TCW: from .204″ thru .312″ Dia., #20 AWG TCW : /313″ Dia. and over. **CAPACITY TOLERANCE: STANDARD** . . . ±10% / OTHER . . . from ±20% to ±1%. Other values as well as voltage ratings are available on request.

*DuPONT REGISTERED TRADEMARK

WESCO® ELECTRICAL COMPANY
DEPT. EM, 201C MUNSON ST. • GREENFIELD, MASS. 01301 • PHONE: (413) 774-4358

®WESCO

WESCO® METALIZED MYLAR* CAPACITORS



SPECIFICATIONS

DIELECTRIC WITHSTANDING VOLTAGE

200% of rated voltage applied through a minimum limiting resistance of 100 Ohms/Volt. Duration of voltage stress shall be 15 seconds minimum and 1 minute maximum at 25°C.

TEMPERATURE RANGE

−55°C to +85°C with full rated voltage applied. To +125°C with 50% of rated voltage.

INSULATION RESISTANCE

At 25°C after 2 minutes of electrification at rated voltage or 500 VDC, whichever is less, the minimum product of Insulation Resistance and Capacitance shall be 30,000 megohms-microfarads, but need not exceed 30,000 megohms.

DISSIPATION FACTOR

Shall not exceed 1.0% when measured at 25°C and 1000 Hz, ±20 Hz. See characteristic curves for D.F. ratings at other temperatures.

CAPACITANCE AND TOLERANCE

Shall be measured within the tolerance limits specified. Measurements will be made at 25°C and 1000 Hz, ±20 Hz.

LIFE TEST

Shall withstand 140% of rated voltage at 85°C for 250 hours. One failure in twelve shall be permitted.

CAPACITANCE STABILITY (DRIFT)

Less than 0.3% when measured in the following manner: three capacitance readings at 25°C, each made prior to and after temperature cycling from room to 85°C, and room to −55°C. The mathematical difference between the two extremes, divided by the intermediate value, and then multiplied by 100, yields the stability expressed in percent.

HUMIDITY RESISTANCE

Meets requirements of Mil-C-27287, Para. 3.12 when tested in accordance with Mil-STD.-202C, Method 103 B, Condition B.

LEAD PULL AND BEND TEST

Steady pull of 5 pounds applied axially to leads for one minute. Bend test shall consist of one bend from the point of egress, first 90° in one direction, back to the original axial position, and then 90° in the opposite direction with no evidence of breakage.

FEATURES

- Wrap and fill construction
- Tubular and oval configuration for optimum space savings
- Extended foil design
- Miniature size — lightweight
- Low dissipation factor
- Excellent stability
- Quality control procedures per Mil-Q-9858

APPLICATIONS

- Data Processing Equipment
- Aircraft and Missile Systems
- Industrial Instrumentation
- Navigation and Distance Measuring Equipment
- Communications Equipment
- Tachometers
- Filters
- Peripheral Equipment

TYPE 32MM RATINGS AND DIMENSIONS

Capacity in Mfds.	100 VOLTS			200 VOLTS			400 VOLTS			600 VOLTS		
	D	L	Cat. No. 32MM — K-1	D	L	Cat. No. 32MM — K-2	D	L	Cat. No. 32MM — K-4	D	L	Cat. No. 32MM — K-6
.0068	—	—	—	—	—	—	.218	.53	6801	.312	.53	6801
.0082	—	—	—	—	—	—	.234	.53	8201	.171	.65	8201
.01	—	—	—	—	—	—	.265	.53	1002	.250	.65	1002
.012	—	—	—	—	—	—	.203	.65	1202	.265	.65	1202
.015	—	—	—	—	—	—	.218	.65	1502	.296	.65	1502
.018	—	—	—	.203	.40	1802	.234	.65	1802	.328	.65	1802
.022	—	—	—	.218	.40	2202	.250	.65	2202	.375	.65	2202
.027	.171	.40	2702	.234	.40	2702	.265	.65	2702	.390	.65	2702
.033	.187	.40	3302	.265	.40	3302	.296	.65	3302	.437	.65	3302
.039	.187	.40	3902	.203	.53	3902	.234	.90	3902	.328	.90	3902
.047	.203	.40	4702	.218	.53	4702	.265	.90	4702	.375	.90	4702
.056	.218	.40	5602	.234	.53	5602	.265	.90	5602	.390	.90	5602
.068	.250	.40	6802	.250	.53	6802	.296	.90	6802	.437	.90	6802
.082	.187	.53	8202	.265	.53	8202	.328	.90	8202	.468	.90	8202
.1	.203	.53	1003	.281	.53	1003	.343	.90	1003	.515	.90	1003
.12	.218	.53	1203	.312	.53	1203	.328	1.18	1203	.453	1.18	1203
.15	.234	.53	1503	.343	.53	1503	.343	1.18	1503	.515	1.18	1503
.18	.250	.53	1803	.296	.65	1803	.375	1.18	1803	.562	1.18	1803
.22	.234	.65	2203	.328	.65	2203	.406	1.18	2203	.625	1.18	2203
.27	.250	.65	2703	.359	.65	2703	.453	1.18	2703	.687	1.18	2703
.33	.265	.65	3303	.406	.65	3303	.437	1.45	3303	.656	1.45	3303
.39	.281	.65	3903	.437	.65	3903	.468	1.45	3903	.703	1.45	3903
.47	.312	.65	4703	.468	.65	4703	.515	1.45	4703	.781	1.45	4703
.56	.343	.65	5603	.406	.90	5603	.546	1.45	5603	.843	1.45	5603
.68	.375	.65	6803	.437	.90	6803	.609	1.45	6803	.921	1.45	6803
.82	.359	.78	8203	.406	1.18	8203	.593	1.70	8203	.906	1.70	8203
1.0	.390	.78	1004	.437	1.18	1004	.656	1.70	1004	1.000	1.70	1004
1.25	.421	.78	1254	.500	1.18	1254	.734	1.70	1254	1.171	1.70	1254
1.50	.421	.90	1504	.531	1.18	1504	.796	1.70	1504	1.265	1.70	1504
1.80	.453	.90	1804	.593	1.18	1804	.875	1.70	1804	1.375	1.70	1804
2.0	.484	.90	2004	.625	1.18	2004	.921	1.70	2004	1.406	1.70	2004
3.0	.484	1.18	3004	.656	1.45	3004	—	—	—	—	—	—
4.0	.562	1.18	4004	.750	1.45	4004	—	—	—	—	—	—
5.0	.625	1.18	5004	.765	1.70	5004	—	—	—	—	—	—
8.0	.703	1.45	8004	.828	2.06	8004	—	—	—	—	—	—
10.0	.781	1.45	1005	.921	2.06	1005	—	—	—	—	—	—

TYPE 33MM RATINGS & DIMENSIONS

Capacity in Mfds.	100 VOLTS				200 VOLTS				400 VOLTS				600 VOLTS			
	T	W	L	Cat. No. 33MM — K1	T	W	L	Cat. No. 33MM — K2	T	W	L	Cat. No. 33MM — K4	T	W	L	Cat. No. 33MM — K6
.0068	—	—	—	—	—	—	—	—	.140	.281	.53	6801	.234	.359	.53	6801
.0082	—	—	—	—	—	—	—	—	.156	.296	.53	8201	.078	.218	.65	8201
.01	—	—	—	—	—	—	—	—	.187	.312	.53	1002	.171	.296	.65	1002
.012	—	—	—	—	—	—	—	—	.125	.250	.65	1202	.140	.281	.65	1202
.015	—	—	—	—	—	—	—	—	.140	.265	.65	1502	.203	.343	.65	1502
.018	—	—	—	—	—	—	—	—	.156	.281	.65	1802	.218	.421	.65	1802
.022	—	—	—	—	.140	.281	.40	2202	.171	.312	.65	2202	.250	.437	.65	2202
.027	.109	.203	.40	2702	.156	.296	.40	2702	.203	.328	.65	2702	.281	.484	.65	2702
.033	.125	.218	.40	3302	.187	.312	.40	3302	.218	.359	.65	3302	.312	.531	.65	3302
.039	.125	.234	.40	3902	.125	.250	.53	3902	.156	.296	.90	3902	.218	.421	.90	3902
.047	.140	.250	.40	4702	.140	.265	.53	4702	.171	.312	.90	4702	.250	.437	.90	4702
.056	.156	.265	.40	5602	.156	.281	.53	5602	.187	.328	.90	5602	.265	.468	.90	5602
.068	.187	.281	.40	6802	.171	.296	.53	6802	.218	.343	.90	6802	.312	.515	.90	6802
.082	.109	.234	.53	8202	.187	.312	.53	8202	.218	.390	.90	8202	.343	.562	.90	8202
.1	.125	.250	.53	1003	.203	.343	.53	1003	.250	.421	.90	1003	.390	.593	.90	1003
.12	.140	.265	.53	1203	.234	.359	.53	1203	.218	.390	1.18	1203	.343	.546	1.18	1203
.15	.156	.281	.53	1503	.265	.390	.53	1503	.250	.421	1.18	1503	.390	.596	1.18	1503
.18	.187	.312	.53	1803	.234	.359	.65	1803	.281	.453	1.18	1803	.437	.640	1.18	1803
.22	.156	.281	.65	2203	.250	.390	.65	2203	.296	.500	1.18	2203	.500	.687	1.18	2203
.27	.171	.296	.65	2703	.281	.406	.65	2703	.343	.531	1.18	2703	.562	.765	1.18	2703
.33	.187	.312	.65	3303	.281	.484	.65	3303	.312	.515	1.45	3303	.531	.734	1.45	3303
.39	.218	.343	.65	3903	.312	.515	.65	3903	.343	.546	1.45	3903	.578	.781	1.45	3903
.47	.234	.359	.65	4703	.359	.562	.65	4703	.390	.578	1.45	4703	.640	.843	1.45	4703
.56	.250	.406	.65	5603	.281	.484	.90	5603	.437	.625	1.45	5603	.718	.921	1.45	5603
.68	.281	.437	.65	6803	.328	.515	.90	6803	.484	.687	1.45	6803	.796	1.000	1.45	6803
.82	.250	.421	.78	8203	.296	.484	1.18	8203	.468	.671	1.70	8203	.781	.984	1.70	8203
1.0	.281	.453	.78	1004	.328	.531	1.18	1004	.531	.734	1.70	1004	.857	1.078	1.70	1004
1.25	.312	.515	.78	1254	.375	.578	1.18	1254	.609	.812	1.70	1254	1.062	1.265	1.70	1254
1.50	.296	.500	.90	1504	.421	.625	1.18	1504	.671	.875	1.70	1504	1.156	1.359	1.70	1504
1.80	.328	.515	.90	1804	.406	.687	1.18	1804	.750	.953	1.70	1804	1.265	1.484	1.70	1804
2.0	.359	.562	.90	2004	.421	.718	1.18	2004	.796	1.000	1.70	2004	1.281	1.484	1.70	2004
3.0	.375	.578	1.18	3004	.406	.812	1.45	3004	—	—	—	—	—	—	—	—
4.0	.406	.703	1.18	4004	.625	.828	1.45	4004	—	—	—	—	—	—	—	—
5.0	.453	.750	1.18	5004	.640	.828	1.70	5004	—	—	—	—	—	—	—	—
8.0	.531	.828	1.45	8004	.656	.953	2.06	8004	—	—	—	—	—	—	—	—
10.0	.609	.906	1.45	1005	.750	1.046	2.06	1005	—	—	—	—	—	—	—	—

STANDARD LEAD SIZES: #24 AWG TCW: up to and including, 203″ Dia., #22 AWG TCW: from .204″ thru .312″ Dia., #20 AWG TCW: .313″ Dia. and over. **CAPACITY TOLERANCE:** STANDARD . . . ±10% / OTHER . . . from ±20% to ±2%. Other values as well as voltage ratings are available on request.

*DuPONT REGISTERED TRADEMARK

WESCO® ELECTRICAL COMPANY
DEPT. EM, 201C MUNSON ST. • GREENFIELD, MASS. 01301 • PHONE: (413) 774-4358

WESCO®

WESCO® POLYSTYRENE CAPACITORS

SPECIFICATIONS

DIELECTRIC WITHSTANDING VOLTAGE

200% of rated voltage applied through a minimum limiting resistance of 100 Ohms/Volt. Duration of voltage stress shall be 15 seconds minimum and 1 minute maximum at 25°C.

INSULATION RESISTANCE

At 25°C after 2 minutes of electrification at rated voltage or 500 VDC, whichever is less, the minimum product of Insulation Resistance and Capacitance shall be 500,000 megohms-microfarads, but need not exceed 500,000 megohms.

DISSIPATION FACTOR

Shall not exceed .05% when measured at 25°C and 1000 Hz, ± Hz. See characteristic curves for D.F. ratings at other temperatures.

CAPACITANCE AND TOLERANCE

Shall be measured within the tolerance limits specified. Measurements will be made at 25°C and 1000 Hz, ±20 Hz.

LIFE TEST

Shall withstand 140% of rated voltage at 85°C for 250 hours. One failure in twelve shall be permitted.

TEMPERATURE COEFFICIENT

Capacitance shall change linearly over operating temperature range at rate of −105, ±30 parts per million/°C.

CAPACITANCE STABILITY (DRIFT)

Less than .05% when measured in the following manner: three capacitance readings at 25°C, each made prior to and after temperature cycling from room to 85°C, and room to −55°C. The mathematical difference between the two extremes, divided by the intermediate value, and then multiplied by 100, yields the stability expressed in percent.

HUMIDITY RESISTANCE

Meets requirements of Mil-C-27287, Para. 3.12 when tested in accordance with Mil-STD.-202C, Method 103 B, Condition B.

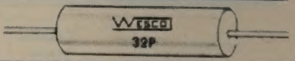
LEAD PULL AND BEND TEST

Steady pull of 5 pounds applied axially to leads for one minute. Bend test shall consist of one bend from the point of egress, first 90° in one direction, back to the original axial position, and then 90° in the opposite direction with no evidence of breakage.

TEMPERATURE RANGE

−55°C to +85°C with full rated voltage applied.

TYPE 32P
RATINGS & DIMENSIONS



Capacity in Mfds.	100 VOLTS D	L	Cat. No. 32P — J-1	200 VOLTS D	L	32P Cat. No. — J-2	400 VOLTS D	L	Cat. No. 32P — J-4
.001	.187	.53	1001	.187	.53	1001	.187	.53	1001
.0012	.187	.53	1201	.187	.53	1201	.187	.53	1201
.0015	.187	.53	1501	.187	.53	1501	.187	.53	1501
.0018	.187	.65	1801	.187	.65	1801	.187	.65	1801
.0022	.187	.65	2201	.187	.65	2201	.187	.65	2201
.0027	.187	.65	2701	.187	.65	2701	.187	.65	2701
.0033	.187	.65	3301	.187	.65	3301	.187	.65	3301
.0039	.187	.65	3901	.187	.65	3901	.187	.65	3901
.0047	.187	.65	4701	.187	.65	4701	.234	.65	4701
.0056	.187	.65	5601	.187	.65	5601	.250	.65	5601
.0068	.187	.65	6801	.187	.65	6801	.234	.78	6801
.0082	.187	.65	8201	.203	.65	8201	.250	.78	8201
.01	.203	.65	1002	.234	.65	1002	.265	.78	1002
.012	.218	.65	1202	.218	.78	1202	.296	.78	1202
.015	.234	.65	1502	.250	.78	1502	.328	.78	1502
.018	.234	.78	1802	.265	.78	1802	.359	.78	1802
.022	.250	.78	2202	.281	.78	2202	.343	.90	2202
.027	.265	.78	2702	.312	.78	2702	.375	.90	2702
.033	.296	.78	3302	.343	.78	3302	.406	.90	3302
.039	.328	.78	3902	.375	.78	3902	.453	.90	3902
.047	.343	.78	4702	.359	.90	4702	437	1.03	4702
.056	.375	.78	5602	.390	.90	5602	.484	1.03	5602
.068	.375	.90	6802	.421	.90	6802	.484	1.18	6802
.082	.406	.90	8202	.421	1.03	8202	.531	1.18	8202
.1	.453	.90	1003	.468	1.03	1003	.578	1.18	1003
.12	.484	.90	1203	.515	1.03	1203	.625	1.18	1203
.15	.500	1.03	1503	.531	1.18	1503	.656	1.32	1503
.18	.531	1.03	1803	.578	1.18	1803	.671	1.45	1803
.22	.546	1.18	2203	.640	1.18	2203	.671	1.70	2203
.27	.609	1.18	2703	.656	1.32	2703	.734	1.70	2703
.33	.625	1.32	3303	.687	1.45	3303	.812	1.70	3303
.39	.671	1.32	3903	.750	1.45	3903	—	—	—
.47	.703	1.45	4703	.734	1.70	4703	—	—	—

STANDARD LEAD SIZES: #24 AWG TCW: up to and including .203″ Dia.
#22 AWG TCW: from .204″ thru .312″ Dia.
#20 AWG TCW: .313″ Dia.and over

CAPACITY TOLERANCE: STANDARD . . . ±5% / OTHER . . . from ±20% to ±1%
Other values as well as voltage ratings are available upon request.

METALIZED POLYCARBONATE CAPACITORS

SPECIFICATIONS

DIELECTRIC WITHSTANDING VOLTAGE

200% of rated voltage applied through a minimum limiting resistance of 100 Ohms/Volt. Duration of voltage stress shall be 15 seconds minimum and 1 minute maximum at 25°C.

TEMPERATURE RANGE

−55°C to +85°C with full rated voltage applied. To +125°C with 50% of rated voltage.

INSULATION RESISTANCE

At 25°C after 2 minutes of electrification at rated voltage or 500 VDC, whichever is less, the minimum product of Insulation Resistance and Capacitance shall be 50,000 megohms-microfarads, but need not exceed 50,000 megohms.

DISSIPATION FACTOR

Shall not exceed 0.3% when measured at 25°C and 1000 Hz, ±20 Hz. See characteristic curves for D.F. ratings at other temperatures.

CAPACITANCE AND TOLERANCE

Shall be measured within the tolerance limits specified. Measurements will be made at 25°C and 1000 Hz, ±20 Hz.

LIFE TEST

Shall withstand 140% of rated voltage at 85°C for 250 hours. One failure in twelve shall be permitted.

CAPACITANCE STABILITY (DRIFT)

Less than 0.3% when measured in the following manner: three capacitance readings at 25°C, each made prior to and after temperature cycling from room to 85°C, and room to −55°C. The mathematical difference between the two extremes, divided by the intermediate value, and then multiplied by 100, yields the stability expressed in percent.

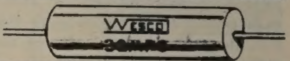
HUMIDITY RESISTANCE

Meets requirements of Mil-C-27,287, Para. 3.12 when tested in accordance with Mil-STD.-202C, Method 103B, Condition B.

LEAD PULL AND BEND TEST

Steady pull of 5 pounds applied axially to leads for one minute. Bend test shall consist of one bend from the point of egress, first 90° in one direction, back to the original axial position, and then 90 ° in the opposite direction with no evidence of breakage.

TYPE 32MPC
RATINGS & DIMENSIONS



Capacity in Mfds.	50 VOLTS D	L	Cat. No. 32MPC — K-05	100 VOLTS D	L	Cat. No. 32MPC — K-1	200 VOLTS D	L	Cat. No. 32MPC — K-2
.012	—	—	—	—	—	—	.171	.40	1202
.015	—	—	—	—	—	—	.187	.40	1502
.018	—	—	—	—	—	—	.203	.40	1802
.022	—	—	—	.156	.40	2202	.218	.40	2202
.027	—	—	—	.171	.40	2702	.234	.40	2702
.033	—	—	—	.171	.40	3302	.250	.40	3302
.039	—	—	—	.187	.40	3902	.187	.53	3902
.047	—	—	—	.203	.40	4702	.203	.53	4702
.056	—	—	—	.218	.40	5602	.218	.53	5602
.068	—	—	—	.234	.40	6802	.234	.53	6802
.082	.156	.40	8202	.187	.53	8202	.265	.53	8202
.1	.171	.40	1003	.203	.53	1003	.234	.65	1003
.12	.187	.40	1203	.218	.53	1203	.250	.65	1203
.15	.203	.40	1503	.234	.53	1503	281	.65	1503
.18	.218	.40	1803	.250	.53	1803	.296	.65	1803
.22	.171	.53	2203	.265	.53	2203	.328	.65	2203
.27	.187	.53	2703	.250	.65	2703	.312	.78	2703
.33	.203	.53	3303	.265	.65	3303	.343	.78	3303
.39	.203	.53	3903	.281	.65	3903	.359	.78	3903
.47	.218	.53	4703	.312	.65	4703	.406	.78	4703
.56	.250	53	5603	.328	.65	5603	.390	.90	5603
.68	.218	.65	6803	.328	.78	6803	.421	.90	6803
.82	.234	.65	8203	.343	.78	8203	.468	.90	8203
1.0	.265	.65	1004	.375	.78	1004	.515	.90	1004
1.25	.296	.65	1254	.421	.78	1254	.484	1.18	1254
1.50	.312	.65	1504	.453	.78	1504	.531	1.18	1504
1.80	.328	.78	1804	.453	.90	1804	.578	1.18	1804
2.0	.343	.78	2004	.468	.90	2004	.609	1.18	2004
3.0	.390	.78	3004	.484	1.18	3004	.656	1.45	3004
4.0	.437	.78	4004	.546	1.18	4004	.750	1.45	4004
5.0	.437	.90	5004	.531	1.45	5004	.734	1.78	5004
8.0	.468	1.18	8004	.593	1.78	8004	.859	2.06	8004
10.0	.515	1.18	1005	.656	1.78	1005	.953	2.06	1005

STANDARD LEAD SIZES: #24 AWG TCW: up to and including .203″ Dia.
#22 AWG TCW: from .204″ thru .312″ Dia.
#20 AWG TCW: .313″ Dia.and over

CAPACITY TOLERANCE: STANDARD . . . ±10% / OTHER . . . from ±20% to ±2%
Other values as well as voltage ratings are available upon request.

WESCO® ELECTRICAL COMPANY
DEPT. EM, 201C MUNSON ST. • GREENFIELD, MASS. 01301 • PHONE: (413) 774-4358

®WESCO

POLYPROPYLENE CAPACITORS

SPECIFICATIONS

DIELECTRIC WITHSTANDING VOLTAGE

200% of rated voltage applied through a minimum limiting resistance of 100 Ohms/Volt. Duration of voltage stress shall be 15 seconds minimum and 1 minute maximum at 25°C.

INSULATION RESISTANCE

At 25°C after 2 minutes of electrification at rated voltage or 500 VDC, whichever is less, the minimum product of Insulation Resistance and Capacitance shall be 250,000 megohms-microfarads, but need not exceed 250,000 megohms.

DISSIPATION FACTOR

Shall not exceed .05% when measured at 25°C and 1000 Hz, ±20 Hz. See characteristic curves for D.F. ratings at other temperatures.

CAPACITANCE AND TOLERANCE

Shall be measured within the tolerance limits specified. Measurements will be made at 25°C and 1000 Hz, ±20 Hz.

LIFE TEST

Shall withstand 140% of rated voltage at 105°C for 250 hours. One failure in twelve shall be permitted.

TEMPERATURE COEFFICIENT

Capacitance shall change linearly over operating temperature range of −55°C to +85°C at rate of −290, ±75 parts per million/°C.

CAPACITANCE STABILITY (DRIFT)

Less than .2% when measured in the following manner: three capacitance readings at 25°C, each made prior to and after temperature cycling from room to 105°C, and room to −55°C. The mathematical difference between the two extremes, divided by the intermediate value, and then multiplied by 100, yields the stability expressed in percent.

HUMIDITY RESISTANCE

Meets requirements of Mil-C-27287, Para 3.12 when tested in accordance with Mil-STD.-202C, Method 103 B, Condition B.

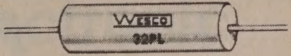
LEAD PULL AND BEND TEST

Steady pull of 5 pounds applied axially to leads for one minute. Bend test shall consist of one bend from the point of egress, first 90° in one direction, back to the original axial position, and then 90° in the opposite direction with no evidence of breakage.

TEMPERATURE RANGE

−55°C to +105°C with full rated voltage applied.

TYPE 32PL
RATINGS & DIMENSIONS



Capacity in Mfds.	100 VOLTS D	100 VOLTS L	100 VOLTS Cat. No. 32PL — K-1	200 VOLTS D	200 VOLTS L	200 VOLTS Cat. No. 32PL — K-2	400 VOLTS D	400 VOLTS L	400 VOLTS Cat. No. 32PL — K-4
.0010	.187	.406	1001	.187	.406	1001	.187	.406	1001
.0015	.187	.406	1501	.187	.406	1501	.203	.406	1501
.0022	.187	.406	2201	.187	.406	2201	.234	.406	2201
.0033	.187	.406	3301	.187	.406	3301	.187	.531	3301
.0039	.187	.406	3901	.203	.406	3901	.187	.531	3901
.0047	.187	.406	4701	.187	.531	4701	.203	.531	4701
.0056	.187	.406	5601	.187	.531	5601	.218	.531	5601
.0068	.187	.406	6801	.187	.531	6801	.234	.531	6801
.0082	.187	.406	8201	.187	.531	8201	.203	.656	8201
.0100	.203	.406	1002	.203	.531	1002	.218	.656	1002
.015	.219	.531	1502	.203	.656	1502	.265	.656	1502
.022	.250	.531	2202	.234	.656	2202	.312	.656	2202
.027	.265	.531	2702	.265	.656	2702	.328	.656	2702
.033	.234	.656	3302	.281	.656	3302	.328	.781	3302
.039	.250	.656	3902	.312	.656	3902	.359	.781	3902
.047	.281	.656	4702	.296	.781	4702	.390	.781	4702
.056	.281	.656	5602	.312	.781	5602	.421	.781	5602
.068	.296	.656	6802	.343	.781	6802	.406	.906	6802
.082	.312	.781	8202	.375	.781	8202	.437	.906	8202
.10	.344	.781	1003	.375	.906	1003	.484	.906	1003
.12	.375	.781	1203	.406	.906	1203	.453	1.156	1203
.15	.375	.906	1503	.453	.906	1503	.500	1.156	1503
.18	.406	.906	1803	.484	.906	1803	.546	1.156	1803
.22	.437	.906	2203	.484	1.031	2203	.687	1.156	2203
.27	.437	1.031	2703	.531	1.031	2703	.578	1.406	2703
.33	.500	1.031	3303	.593	1.031	3303	.640	1.406	3303
.39	.531	1.031	3903	.593	1.156	3903	.687	1.406	3903
.47	.531	1.156	4703	.656	1.156	4703	.750	1.406	4703
.56	.578	1.156	5603	.625	1.406	5603	.825	1.406	5603
.68	.625	1.156	6803	.687	1.406	6803	.825	1.656	6803
.82	.625	1.406	8203	.687	1.656	8203	.906	1.656	8203
1.0	.687	1.406	1004	.734	1.656	1004	1.000	1.656	1004

STANDARD LEAD SIZES: #24 AWG TCW: up to and including .203″ Dia.
#22 AWG TCW: from .204″ thru .312″ Dia.
#20 AWG TCW: .313″ Dia.and over

CAPACITY TOLERANCE: STANDARD . . . ±10% / OTHER . . . from 20% to ±1%
Other values as well as voltage ratings are available upon request.

FEATURES

32P

- Wrap and fill construction
- Excellent long-term stability
- Superior "Q" for tuned circuits
- High insulation resistance
- Linear temperature coefficient
- Quality control procedures per Mil-Q-9858
- Extended foil design

32MPC

- Wrap and fill construction
- Micro-miniature — lightweight
- Low dissipation factor
- Zero TC ±50 ppm/°C from +25°C to +55°C
- Extended foil design
- Excellent stability
- Quality control procedures per Mil-Q-9858

32PL

- Wrap and fill construction
- Excellent long-term stability
- Superior "Q" for tuned circuits
- High insulation resistance
- Linear temperature coefficient (−55°C to +85°C)
- Quality control procedures per Mil-Q-9858
- Extended foil design

APPLICATIONS

32P & 32PL

- Computers
- Data Processing Equipment
- Aircraft and Missile Systems
- Industrial Instrumentation
- Navigation and Distance Measuring Equipment
- Communications Equipment
- Timing and Retrace Circuits
- Integrating Networks
- High "Q" Low Loss Filters
- Peripheral Equipment

32MPC

- Data Processing Equipment
- Aircraft and Missile Systems
- Industrial Instrumentation
- Navigation and Distance Measuring Equipment
- Communications Equipment
- Tachometers
- Filters
- Peripheral Equipment

EXPLANATION OF CATALOG NUMBER

32 M 1002 K - 1

32	Round, Wrap and Fill, with epoxy seals.
M	Mylar-Foil, Axial Leads*
1002	In Picofarads — first three digits are significant. Last digit specifies number of zeros, i.e., 1002 = 10,000 pfd. or 0.01 mfd.
K	Capacity Tolerance: K = ±10% H = ±3% F = ±1% M = ±20% J = ±5% G = ±2%
1	DC Voltage Rating: 05 = 50 VDC 2 = 200 VDC 6 = 600 VDC 1 = 100 VDC 4 = 400 VDC etc.
*	For Radial Leads, add letter "R" at end of part number.

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SPECIFY GC ELECTRONICS

For all your Chemical, Tool & Hardware Needs!

GC
ZERO-MIST
CIRCUIT COOLER
RELAY-KLEEN
Contact Cleaner
SPRA KLEEN
DRY-KLEEN
BIG BATH

GC offers the most complete line available. Chemicals in a variety of sizes and containers—bottles, tubes, aerosol cans, drums. Tools and hardware for all applications. For the finest quality and service, specify GC Electronics.

GC ELECTRONICS
CATALOG

WRITE FOR CATALOG
GC-OOCG-0538

DRY KLEEN
Clean contacts, relays and other electronic devices. Leaves absolutely no deposits. Excellent degreaser for inks and gummy deposits on all electrical or mechanical apparatus. Non-flammable.

8669	16 oz. aerosol	$2.53

RELAY KLEEN
Cleans relays, contacts and other electronic devices where no oily, residual deposits are desired. Excellent degreaser and general solvent for gummy deposits on all electrical or mechanical equipment. Non-flammable; contains no carbon terachloride.

8682	6 oz. aerosol	$2.08
8682-16	16 oz. aerosol	$3.84

SPRA KLEEN
Eliminates noise due to dust, dirt and corrosion on electrical contacts. Cleans and lubricates contacts, controls, relays, switches and other sliding contact devices in one fast operation.

8666	6 oz. aerosol	$1.26
8666-16	16 oz. aerosol	$2.40

NO—OX
Electronic contact cleaner dissolves corrosion quickly without harsh solvents. Lubricants and protects slide contacts long after application. Recommended for maintenance of volume and tone controls, attenuators, relay contacts, patchboard jacks and similar equipment.

100-02	2 oz. bottle	$1.38
100-06	6 oz. aerosol	$2.48

BIG BATH
Cleans and degreases tuners like no other product can. Lossens and blasts away all dust, grime and foreign matter. Safe for plastics and will not detune. Economical 24 oz. aerosol can.

10-903	24 oz. aerosol	$4.10

DE-OX-ID
The most powerful all-purpose TV-radio cleaner! Consists of active ingredients in a light oil base. Use on volume and tone controls, audio mixers, relays--restores noise free operation instantaneously. Highly concentrated--protects for months.

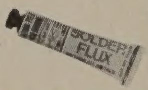
19-2	2 oz. bottle	$1.38
19-6	6 oz. aerosol	$2.48
19-16	16 oz. bottle	$8.80

SODER-WICK
Desolder any connection in seconds. Soder-Wick absorbs molten solder instantly. Eliminates component damaging heat build-up.

SODER-WICK
SIZE #2
5 FT.
CAT. # 684
GC ELECTRONICS

NO/COLOR	CAT. NO.	WIDTH	APPLICATION	
#1 White	40-15	.025	.060 & Smaller Pads	$1.64
#2 Yellow	40-25	.050	.060 to .125 Pads	1.64
#3 Green	40-35	.075	.125 to .190 Pads	1.64
#4 Blue	40-45	.100	.190 & Larger Pads	1.86
#5 Brown	40-55	.130	Connectors & Terminals	1.86
#6 Orange	40-62	.190	Large Connectors & Terminals	1.64

SOLDER FLUX
Cleans and prepares all metal surfaces for soldering. Ideal for aluminum. Allows solder to flow evenly for smoother, stronger joint. Contains no rosin.



10-200	1 oz. tube	$1.00

SILI-SPRA
High quality silicone lubricant! Handy aerosol features exclusive 3-way valve that applies a light lubricating film that lasts and won't leave a residue build-up. Ideal for home, office or workshop.

10-600	6 oz. aerosol	$1.80

STRIP-XXX
Liquid stripping compound for removal of enamel insulation from high temperature magnet wire. Recommended for use on thin or stranded wire where mechanical (abrasive) or burning removal may weaken copper strands. Leaves metal clean and oxidation-free for easy soldering.

10-904	2 oz. bottle	$1.47

SOLDER FLUX REMOVER
Fast flux removal in a convenient aerosol spray. Excellent for spot flux removal or for removing all types of organic flux. Ideal for prototype work or for on the job use--limits down time. Avoids recontamination of bath method. Safe for use on most circuitry materials. Non-flammable. Low toxicity level.

22-270	16 oz. aerosol	$4.10

CONDUCTIVE PAINT
Silver-nickel allow conductive paint in acrylic lacquer base. Provides an economical way to draw or repair printed circuits. Possesses good metallic lustre, high conductive and excellent stability in corrsive environments. Also adheres well to glass. Air dries to a hard film. Brush applicator cap.

22-241	¼ oz. bottle	$2.30
22-242	½ oz. bottle	$4.60

EXTRA DRY SUPER FREEZE MIST
Cools circuits 3 times faster! Locates bad capacitors, transistors and oxidized joints by instantly cooling components. Non-toxic, odor free, leaves no liquid residue on parts.

10-702	15 oz. aerosol	$2.75

ZERO MIST CIRCUIT COOLER
Locates "intermittence" in electronic equipment caused by overheating of components. Cools components instantly pinpointing faulty capacitors, transsistors, oxidized junctions.

8667	16 oz. aerosol	$2.63

RE-TIP
Cleans soldering iron tips instantly. Simply insert hot iron tip into RE-TIP and then withdraw—all contaminants are instantly removed. Uniformly cleans tips up to ¼" dia.—prevents contaminated solder joints. Prolongs life tip; tips solder faster, longer. With base for use in shop, or hand held for portable use and tool box.

9482	RE-TIP base & cartridge	$6.25
9483	Portable RE-TIP (Refill Cartridge Only; Bubble Carded).	$2.65
9484	Refill Cartridge only (Boxed)	$2.65

CONECUT...MAKES CHASSIS PUNCHES OBSOLETE!

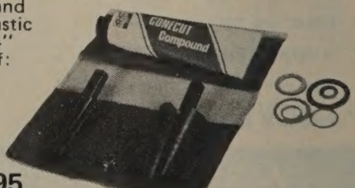
Drill a burr-free hole in seconds in sheet or tube. Saves time—no center punch hole—no pilot hole. Any number of diameter holes can be drilled—the tool advances, the larger the hole.

CONECUT SIZES:

3400	Drills holes from 1/4"— 13/16"	$12.95
3405	Drills holes from 5/8" — 1-3/16"	$19.95
3425	Cutting Compound (1 oz. tube)	$ 2.50

Set of two Conecut burr-free drills and cutting compound in convenient plastic carrying pouch. Hole size range: 1/4" to 1-3/16". Kit contains one each of:

3400 No. 1 Drill
3405 No. 2 Drill
3425 Cutting Compound



3420 CONECUT KIT **$34.95**

HARDMAN

The Hardman Selector Guide for Electronical/Electronic Epoxy Compounds

	ELECTRICAL PROPERTIES @ 25°C			PHYSICAL PROPERTIES @ 25°C			THERMAL PROPERTIES		
Product Number	Volume Resistivity ohms — cm	Dielectric Constant @ 100 kHz	Dissipation Factor @ 100 kHz	Hardness Shore D	Linear Shrinkage in/in	7 Day Water Absorption %	Heat Distortion Temperature °C	Thermal Conductivity cal x cm/sec x cm^2 x °C x 10^{-4}	Coefficient of Linear Expansion in/in/°C x 10^{-6}
TWO COMPONENT — ROOM TEMPERATURE CURING SYSTEMS									
EP 2220 TC	4 x 10^{13}	4.2	.020	95	.004	.20	86	8.2	43
EP 2225 MV	3 x 10^{15}	4.3	.020	96	.003	.12	116	N/A	44
EP 2230 TS	4 x 10^{15}	3.6	.021	88	.010	.84	51	5.1	152
EP 2305 LK	3 x 10^{15}	4.0	.001	88	.003	.75	67	6.9	44
EP 2306 LK	5 x 10^{15}	3.8	.018	90	.005	.74	85	5.2	107
EP 2400 TC	4 x 10^{14}	4.2	.030	96	.004	.19	78	10.3	78
EP 2404 GE	6 x 10^{14}	4.2	.027	97	.004	.10	84	7.2	68
EP 2405 FR	2 x 10^{15}	4.2	.010	95	.002	.17	77	12.0	62
EP 2408 TS	4 x 10^{15}	4.0	.050	53	.008	2.0	N/A	N/A	N/A
EP 2415 TC	1 x 10^{12}	5.2	.036	90	.001	.60	60	10.3	115
EP 2420 TC	2 x 10^{14}	5.4	.020	86	.002	.50	44	13.6	135
TWO COMPONENT — ELEVATED TEMPERATURE CURING SYSTEMS									
EP 2740 HT	7 x 10^{15}	3.8	.008	93	.011	.13	100	6.8	62
EP 2770 TC	1 x 10^{15}	3.7	.012	98	.012	.16	103	7.3	50
EP 2800 GU	3 x 10^{15}	3.5	.020	91	.026	.36	79	N/A	97
EP 2805 TC	6 x 10^{14}	3.8	.020	98	.004	.20	87	8.8	51
EP 2810 TS	9 x 10^{15}	2.9	.004	82	.008	.24	N/A	N/A	156
EP 2820 TS	6 x 10^{12}	4.4	.063	A85	.018	.11	N/A	4.0	N/A
EP 2825 TS	1 x 10^{11}	4.2	.054	26	.021	.82	N/A	3.8	N/A
EP 2840 TS	8 x 10^{14}	3.3	.029	67	.017	.50	N/A	3.8	N/A
DC 2900 HW	1 x 10^{15}	3.4	.010	90	.014	.16	N/A	8.9	147
ONE COMPONENT — ELEVATED TEMPERATURE CURING SYSTEMS									
EP 1760 LV	6 x 10^{15}	2.8	.006	88	.028	.2	N/A	N/A	140
EP 1765 TS	1 x 10^{15}	4.3	.026	90	.016	.2	64	7.8	105

N/A — NOT APPLICABLE

Epoxies

- Electrical/Electronic compounds
- High strength structural adhesives
- Double-Bubble® job-size packaged epoxy

Elastomers

- EPOLAST® Elastomer and epoxy technology combined for thermal and physical shock resistance in electrical/electronic and adhesive applications.
- DPR® Liquid natural rubber
- ISOLENE® Liquid synthetic rubber
- KALENE® Liquid butyl rubber
- Flexible mold compounds (RTV)
- Wire and cable sealants

Triplematic® Automatic Dispensing Equipment

- Continuous pour machines
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- Portable mixing heads
- Motionless mixers
- Dynamic mixers
- Automatic and hand portable extruders

Packaging

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- Custom packaging of Semco® cartridges
- Metal and plastic tube filling

Complete data available on these and other compounds

HARDMAN

HARDMAN INCORPORATED

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HUMISEAL COATINGS
GENERAL CHART

Listed in this General Chart of Properties are ten of the most frequently used HumiSeal Protective Coatings and their principal properties. These have been tabulated in order to facilitate comparison of their characteristics and selection of the most suitable type for a specific application. In addition to these HumiSeal types we manufacture a variety of coatings for special purposes, including high temperature applications. Should none of the coatings listed in this chart fulfill your requirements, we suggest that you contact us for recommendations.

	PROPERTIES OF LIQUID HumiSeal										THERMAL PROPERTIES		
HumiSeal Type[1]	Specific Weight (lbs. per gallon)[2]	Solids Content (% by weight)[3]	Viscosity, with catalyst when applicable (centipoises)[4]	Flash Point (°F)[5]	Drying Time for Handling[6]	Recommended Curing Conditions	Time Required to Reach Optimum Properties	Pot Life, at Room Temperature	Shelf Life, at Room Temperature	Coverage per gallon (in sq. ft.) After One Dip	Continuous Use Temperature Range (°F)	Thermal Shock Test[7]	Solderability[8]
1B12	7.3	20	30	40	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	1 year	1 year	550	−75°F to +280°F	Passes	Good
1B15	7.6	35	470	30	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	1 year	1 year	450	−75°F to +270°F	Passes	Good
1B31	7.6	35	160	30	10 min.	24 hrs. at room temp. or 30 min. at 170°F	24 hrs.	6 mos.	6 mos.	450	−75°F to +270°F	Passes	Good
1A20	8.5	50	120	60	60 min.	24 hrs. at room temp.	1 week	6 mos.	6 mos.	375	−70°F to +250°F	Passes	Excellent
1A27	8.0	50	5000	100	15 min.	24 hrs. at room temp.	1 week	1 year	1 year	450	−90°F to +250°F	Passes	Excellent
1A33	7.7	44	160	30	15 min.	24 hrs. at room temp.	1 week	6 mos.	6 mos.	300	−90°F to +250°F	Passes	Excellent
2A64	8.9	55	80	85	4-5 hrs.	3 hrs. at 170°F	1 week	6 hrs.	6 mos.	475	−70°F to +250°F	Passes	Excellent
2B13	7.5	42	50	40	30 min.	90 min. at 200°F	1 week	24 hrs.	1 year	480	−70°F to +270°F	Passes	Poor
2A51	9.2	100	6000	non flammable	2 hrs.	24 hrs. at room temp. or 2 hrs. at 200°F	1 week	6 hrs.	6 mos.	200	−70°F to +250°F	Passes	Poor
2A53	7.8	54	300	70	30 min.	2 hrs. at 200°F	1 week	24 hrs.	6 mos.	400	−70°F to +250°F	Passes	Poor

HumiSeal TYPES LISTED IN BOLD PRINT COMPLY WITH THE REQUIREMENTS OF MIL-I-46058C

All technical data in this bulletin are based on test results using the stated standards and are believed to be correct. However, since the end use of HumiSeal materials (and the manner of storing and handling them) is beyond our control, we make no warranty — expressed or implied — as to the fitness of use, results to be obtained from or effects of use with respect to these materials. Their use shall be solely by the judgment of and at the risk of the end-user notwithstanding any statement contained in this bulletin.

1. The first digit in the type number specifies whether the product is a one-, or a two-component system.
2. Fed-Std 141a, Method 4184.
3. Fed-Std 141a, Method 4044.
4. Fed.Std 141a, Method 4287.
5. Fed-Std 141a, Method 4291.
6. Fed-Std 141a, Method 4061.
7. Mil-I-46058C.
8. Visual evaluation for ease of soldering with an 85 watt iron through a 2 mil film.
9. Fluorescent dye may be added if required.
10. Fed-Std 141a, Method 2121.
11. Fed-Std 406, Method 7031, Procedure A.
12. Fed-Std 141a, Method 6303.
13. ASTM-D150-65T, at 1 MHz and 25°C.
14. Mil-I-46058C Insulation resistance during 10th cycle, at 65°C and 98% RH.

FOR ELECTRONICS

OF PROPERTIES

HumiSeal Protective Coatings are available in one-quart or one-gallon cans, five-gallon pails, or fifty-five gallon drums. HumiSeal types 1B15 and 1A27 are also available in 16-ounce aerosol containers. All HumiSeal types listed in this chart may be applied by dip, brush or spray. Literature on recommended techniques for the proper application of coatings and preparation of the substrate is available upon request.

PROPERTIES OF CURED HumiSeal COATING

PHYSICAL PROPERTIES							ELECTRICAL PROPERTIES					CHEMICAL PROPERTIES			
Color[9]	Specific Gravity	Average Build After One Dip (mils)[10]	Water Absorption (%)[11]	Flexibility[7]	Adhesion[12]	Mar Resistance[12]	Dielectric Constant[13]	Dissipation Factor[13]	Dielectric Strength (volts)[7]	Insulation Resistance (teraohms)[7]	Moisture Resistance (gigaohms)[14]	Main Constituent	Fungus Resistance[7]	Resistance to Solvents	HumiSeal Type[1]
Water Clear	1.05	0.5	.18	Very Good	Excellent	Very Good	2.8	.010	6000	250	30	Acrylic	Excellent	Very Good	1B12
Water Clear	1.05	2	.20	Fair	Excellent	Fair	2.3	.010	8000	350	40	Acrylic	Excellent	Fair	1B15
Water Clear	1.06	2	.20	Excellent	Excellent	Very Good	2.5	.010	7500	800	60	Acrylic	Excellent	Good	**1B31**
Light Straw	1.05	2	.30	Excellent	Very Good	Excellent	3.5	.028	8000	300	48	Polyurethane	Excellent	Excellent	**1A20**
Green Tinge	1.05	5	.31	Excellent	Excellent	Fair	3.6	.020	7500	200	12	Polyurethane	Fair	Good	1A27
Yellow Tinge	1.05	2	.31	Excellent	Excellent	Fair	3.6	.030	7500	200	16	Polyurethane	Excellent	Good	**1A33**
Light Straw	1.10	1	.30	Excellent	Excellent	Good	3.5	.024	3400	250	54	Polyurethane	Excellent	Excellent	**2A64**
Yellow Tinge	1.06	2	.20	Excellent	Excellent	Excellent	3.0	.030	8000	300	33	Epoxy	Excellent	Excellent	2B13
Yellow Tinge	1.10	15	.31	Fair	Good	Good	3.0	.030	6000	400	6	Epoxy	Excellent	Good	2A51
Yellow Tinge	0.95	1	.30	Excellent	Excellent	Excellent	3.0	.030	8000	200	28	Epoxy	Excellent	Excellent	**2A53**

HumiSeal

HumiSeal Division
Columbia Chase Corporation
26-60 Brooklyn-Queens Expressway, W.
Woodside, New York 11377
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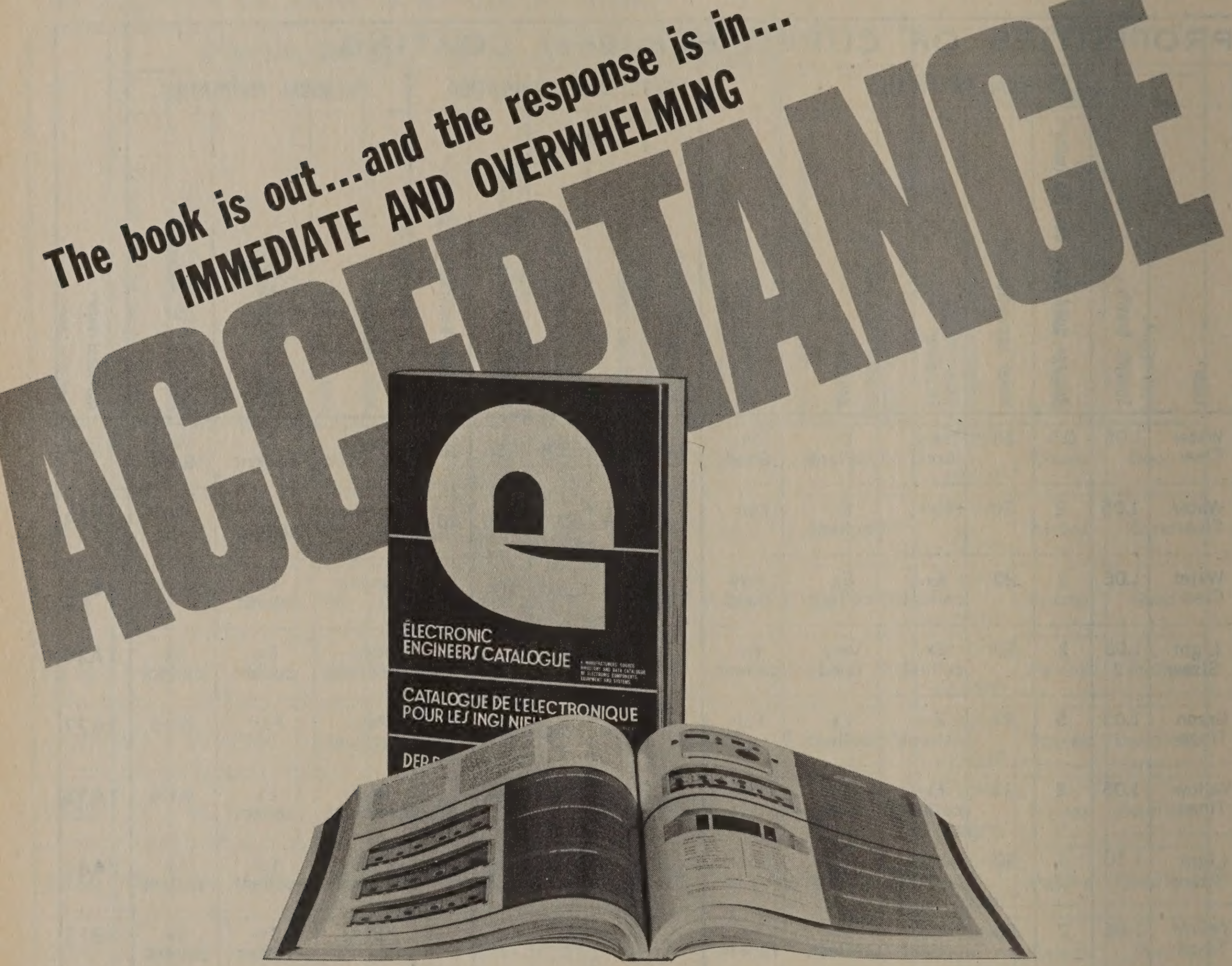
CATALOGUE DE L'ELECTRONIQUE POUR LES INGENIEURS
DER PRODUKTKATALOG FÜR ELEKTRONIKER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ACCEPTANCE
ELECTRONIC ENGINEERS CATALOGUE
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We are manufacturers of quality printed circuit boards with many years of experience, and our service has satisfied numerous customers from Coast to Coast.

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Whether you have a requirement for prototypes or production quantities, or wish further information, call or write. We are willing and able to serve you.

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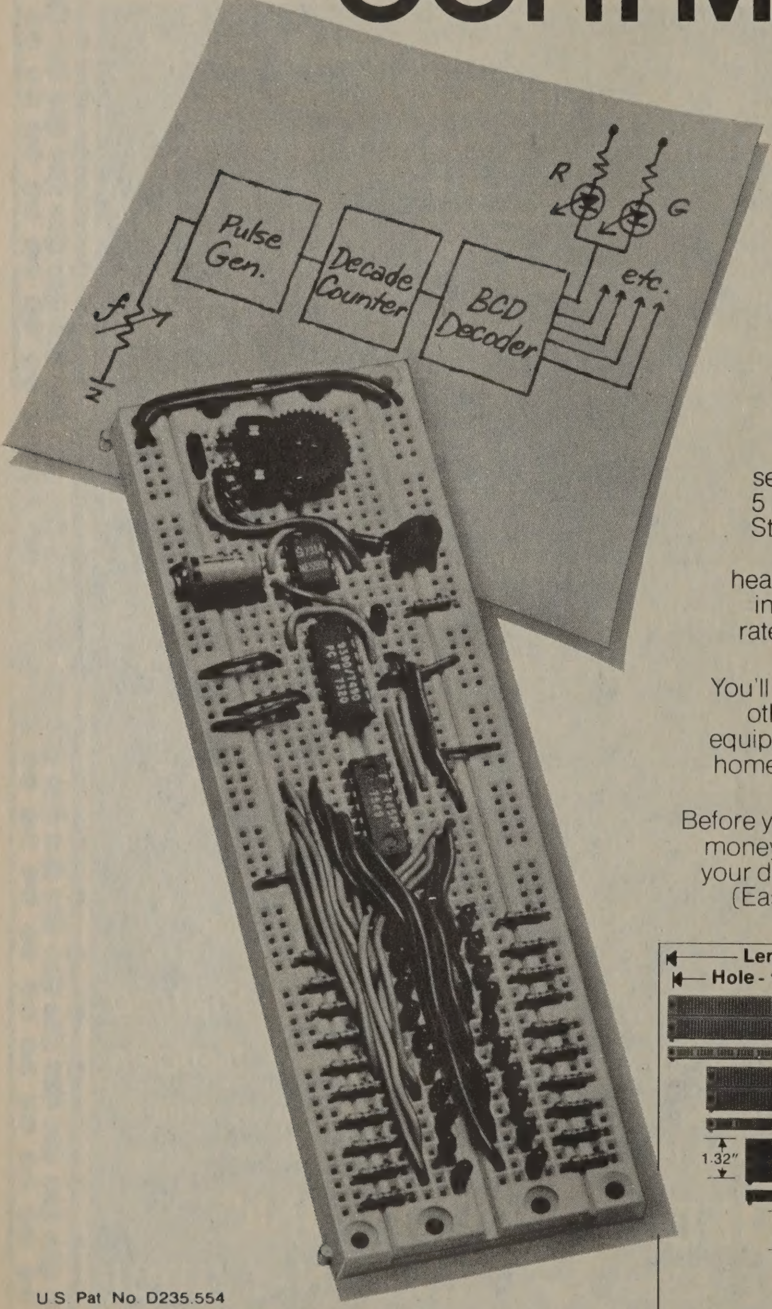
ONCE YOU'VE GOT IT DESIGNED, YOU'VE GOT IT MADE.



It's that easy when you use CSC's QT solderless breadboarding Sockets and Bus Strips. Working directly from logic or block diagrams, you plug in IC's, transistors, resistors, capacitors, LED's — virtually any component — and optimize circuits stage-by-stage, literally as fast as you can think. (No special jumpers required, either — just ordinary #22-30 solid hookup wire.)

When you're done, you've got a highly-visible working layout that someone else can reduce to schematic, while you get other projects underway.

Available for as little as $3.00,* QT units snap together into larger breadboards, and mount securely wherever you need them. Sockets have 5 interconnecting tie points per terminal and Bus Strips feature 2 separate rows of interconnecting terminals. And all QT models are built to last: heavy-duty prestressed nickel-silver contacts, vinyl insulated backing and glass-filled plastic sockets rated at better than 100°C insure optimum day-in, day-out performance.

You'll find QT Sockets and Bus Strips useful in lots of other ways, too. Mounted on power supplies, test equipment, bench or plug in cards, they're equally at home in lab, on production lines, in QC test jigs or in the field, for on-the-spot emergencies.

Before you start your next project, start saving time and money with QT Sockets. Pick up your phone and call your dealer — or order direct by dialing 203-624-3103 (East Coast) or 415-421-8872 (West Coast).

Length Hole-to-Hole	Length	Hole-to-Hole	Terminals	Unit Price $*
QT-59S	6.5"	6.2"	118	12.50
QT-59B	6.5"	6.2"	20	2.50
QT-47S	5.3"	5.0"	94	10.00
QT-47B	5.3"	5.0"	16	2.25
1.32" QT-35S	4.1"	3.8"	70	8.50
QT-35B	4.1"	3.8"	12	2.00
.7" QT-18S	2.4"	2.1"	36	4.75
QT-12S	1.8"	1.5"	24	3.75
QT-8S	1.4"	1.1"	16	3.25
QT-7S	1.3"	1.0"	14	3.00

All QT units are .33" thick.

See your CSC dealer or call 203-624-3103 (East Coast) or 415-421-8872 (West Coast)

U.S. Pat. No. D235,554

CONTINENTAL SPECIALTIES CORPORATION

CSC

44 Kendall Street, Box 1942 New Haven, CT 06509
203-624-3103 TWX 710-465-1227
West Coast office: Box 7809, San Francisco, CA 94119
415-421-8872 TWX 910-372-7992

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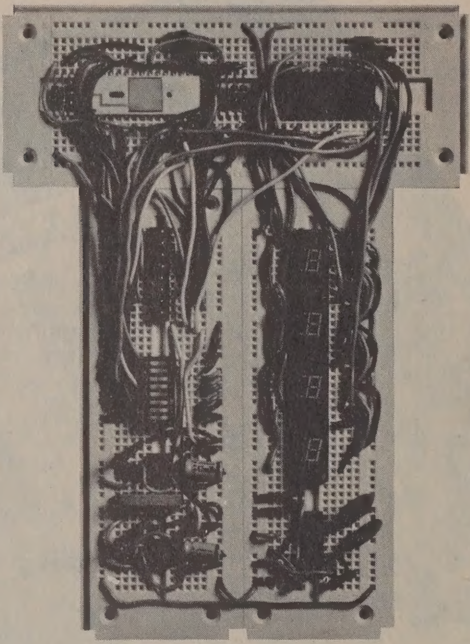
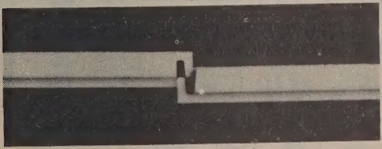
*Manufacturer's suggested list
Prices and specifications subject to change without notice

ANNOUNCING THREE NEW BREAKTHROUGHS IN SOLDERLESS BREADBOARDING.



Whether you design or build circuits for fun or for profit, you owe it to yourself to discover how fast and easy CSC solderless breadboarding can be. Now, more than ever. Because of three new breakthroughs in breadboard design. And our new EXPERIMENTOR™ sockets** that make the most of them.

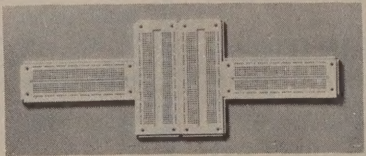
1. Price Who says a quality breadboard has to be expensive? For as little as $9.95, CSC's EXPERIMENTOR sockets let you design, assemble and modify circuits as fast as you can push in—or pull out—component leads. On a rugged one-piece socket with 550 solderless tie-points (94 five-point terminals *and* two 40-point bus strips).



Sockets lock together, snap apart to handle any size circuit with ease.

But don't let the low price fool you: EXPERIMENTOR sockets are precision-molded of durable, abrasion-resistant material, and feature CSC's non-corrosive, prestressed nickel-silver contacts for positive connections and longer life. All contacts are identified, too…with molded-in designations for easier circuit assembly and diagramming.

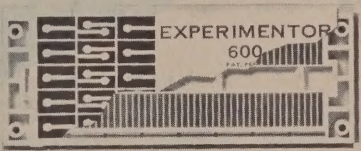
2. Compatibility CSC EXPERIMENTOR sockets end the "big-chip blues." They're the only ones with full fan-out capabilities for microprocessors and other larger DIP's, as well as 4-16-pin units. EXPERIMENTOR 600's 6/10″ center is ideal for microprocessor's, clock chips, RAM's, ROM's, PROM's, etc. While EXPERIMENTOR 300's smaller 3/10″ center is perfect for smaller DIP's. Both units, of course, accept transistors, LED's, resistors, capacitors, pot's—virtually all types of components with plug-in ease. As well as #22-30 solid hook-up wire for interconnections. Eliminating heat and lead damage to expensive components. And saving you more money, on parts.



Mix or match both models; arrange them vertically or horizontally.

3. Flexibility With CSC EXPERIMENTOR sockets, you can arrange your breadboard to suit your circuit…instead of vice versa. An exclusive snap-together interlocking system lets you instantly connect them. Vertically or horizontally. So you can mix or match 3/10 and 6/10″ centers…expanding or contracting to meet your requirements.

CSC EXPERIMENTOR sockets can be used alone, or mounted on any convenient flat surface, thanks to molded-in mounting holes and vinyl insulation backing that prevents shorts. You can mount them with 4-40 flat-head screws from the front, or 6-32 self-tapping screws, from the rear. But however you use them, EXPERIMENTOR sockets are an unbeatable way to build and test twice the projects in half the time.



Both models feature 94 five-point terminals (vertical lines) and two 48-point bus strips (one strip shown).

WHY WAIT? CSC EXPERIMENTOR sockets are available now from your CSC dealer, or by phone from CSC, at $9.95* for the 300 and $10.95* for the 600. Call 203-624-3103 (East Coast) or 415-421-8872 (West Coast)

*Manufacturer's suggested list price.
Prices subject to change without notice.
U.S. Pat. No. D235.554

CONTINENTAL SPECIALTIES CORPORATION

CSC

44 Kendall Street, Box 1942, New Haven, Ct 06509
203-624-3103/TWX: 710-465-1227
West Coast office: Box 7809, San Francisco, CA 94119
415-421-8872/TWX: 910-372-7992

IF YOU'RE NOT DESIGNING WITH A CSC PROTO-BOARD®, LOOK AT ALL YOU'RE MISSING.

Accessibility—All parts are instantly and easily accessible, for quick signal tracing, circuit modifications, etc.

Utility—Models are available with or without built-in regulated power supplies (fixed or adjustable).

Variety—A wide variety of models are available with capacities ranging from 630 to 3060 solderless tie-points (6 to 32 14-pin DIP's), to fit every technical and budget requirement.

Economy—Eliminate heat and mechanical damage to expensive parts. Save money by re-using components.

Versatility—Use with virtually all types of parts, including resistors, capacitors, transistors, DIP's, TO-5's, LED's, transformers, relays, pots, etc. Most plug in directly, in seconds.

Durability—All Proto-Board models are carefully constructed of premium materials, designed and tested for long, trouble-free service.

Expandability—Proto-Board units can be instantly inter-connected for greater capacity.

Visibility—All parts are instantly and easily visible, for quick circuit analysis and diagramming.

Speed—Assemble, test and modify circuits as fast as you can push in or pull out a lead. Save hours on every project.

POWER ON
Proto-Board no.203A
+5Vat 1.0 AMP
+15Vat 0.5 AMP
−15Vat 0.5 AMP
Continental Specialties Corporation, 44 Kendall St. New Haven, Connecticut 06511

Whatever type of electronic circuits you work with, you can do more in less time with CSC's solderless Proto-Board systems. As fast and easy as pushing in or pulling out a lead, you can design, test and modify circuits at will. Components plug into rugged 5-point terminals, and jumpers, where needed, are lengths of #22 AWG solid wire. In the same time you took to read this ad, you could be well on your way to assembling a new circuit.

Adaptability—Use in design, packaging, inspection, QC, etc. Works with most types of circuits, in many, many applications.

Flexibility—Use independently, or in conjunction with other accessories, such as scopes, counters, CSC Proto-Clip™ connectors, Design Mate™ test equipment, etc. One Proto-Board unit can serve a thousand applications.

CSC PROTO-BOARD SOLDERLESS BREADBOARDS

MODEL NUMBER	NO. OF SOLDERLESS TIE-POINTS	IC CAPACITY (14-PIN DIP'S)	MANUFACTURER'S SUGG LIST	OTHER FEATURES
PB-6	630	6	$15.95	Kit—10-minute assembly
PB-100	760	10	19.95	Kit—with larger capacity
PB-101	940	10	29.95	8 distribution buses, higher capacity
PB-102	1240	12	39.95	Large capacity, moderate price
PB-103	2250	24	59.95	Even larger capacity; only 2.7¢ per tie-point
PB-104	3060	32	79.95	Largest capacity; lowest price per tie-point
PB-203	2250	24	75.00	Built-in 1%-regulated 5V, 1A low-ripple power supply
PB-203A	2250	24	120.00	As above plus separate ½-amp +15V and −15V internally adjustable regulated power supplies

CONTINENTAL SPECIALTIES CORPORATION

CSC

EASY DOES IT

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New Haven, CT 06509 • 203-624-3103 TWX: 710-465-1227
West Coast office: Box 7809, San Francisco, CA
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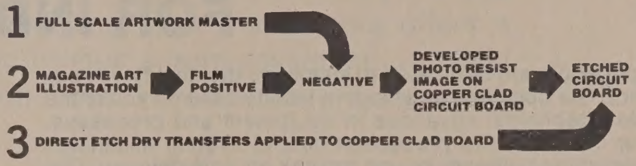
printed circuit kits••• DATAK

new photo etch kit......... *Makes printed circuits THREE WAYS*

Duplicate industrial techniques to make one or hundreds of identical printed circuits. Remarkable **POS-NEG**tm (pat. pend.) system will photocopy 1:1 art directly from a magazine page. Make 1:1 artwork masters, negatives, positives. Sensitize ordinary copper clad circuit boards: use your negative to expose; then develop and etch the final circuit. **No camera. No darkroom.** No tracing, pasting or film cutting. All materials supplied except photoflood bulb available at any camera store.


1 FULL SCALE ARTWORK MASTER
2 MAGAZINE ART ILLUSTRATION
FILM POSITIVE
NEGATIVE
DEVELOPED PHOTO RESIST IMAGE ON COPPER CLAD CIRCUIT BOARD
ETCHED CIRCUIT BOARD
3 DIRECT ETCH DRY TRANSFERS APPLIED TO COPPER CLAD BOARD

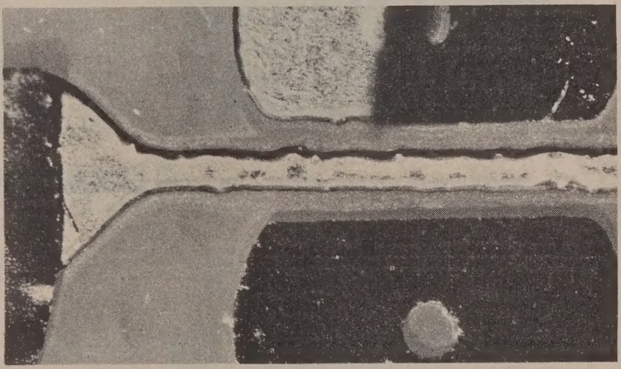
KIT CONTAINS: 5″x6″ steel printing frame with plate glass and backboard, 4 sheets 5″x6″ photocopy film, yellow filter, chemicals for 1 pint film developer and 1 pint film fixer, 5″x6″ copper clad board, spray can photo etch resist, 1 pint resist developer, 2 sheets 8½″x11″ layout film, 1 roll 1/16″ and 1 roll 1/32″ printed circuit tape, 8 sheets dry transfer direct etch PC patterns including pads, transistors, round can and flat pack ICs, DIP ICs, edge card connectors, lines, circles, jogs, etc., ¼ lb. anhydrous ferric chloride to make 1 pint etchant, instructions.

ER-4 COMPLETE PHOTO ETCH KIT $26.95

direct etch printed circuit kit

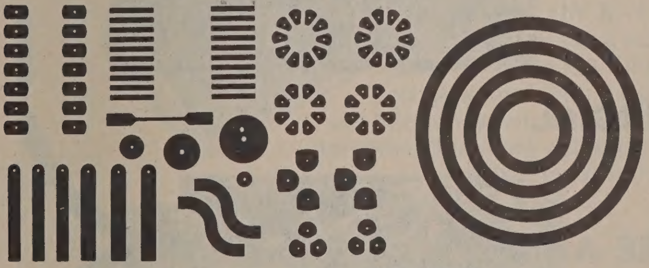
This one step kit uses a unique dry transfer resist that etches razor-sharp patterns. Lay out circuits directly on the copper board by rubbing down dry transfer patterns and lines. Connect with resist tape or leave unconnected for breadboards. Blow-up illustration shows 2 oz. copper circuit board **made only with materials in kit.** Black dry transfer resist is partly removed to show etched copper. Pattern is .015″ squeeze-through wire transferred between 2 DIP pads. Pad edges are spaced .030″ apart.

KIT CONTAINS: two 3″x4½″ and two 2¼″x3″ copper clad boards, 8 sheets direct etch PC patterns, 2 rolls PC resist tape (see ER-2 for description of patterns and tape), ¼ lb. anhydrous ferric chloride (makes 1 pint), combination storage box and etch tray, instructions.



ER-1 COMPLETE DIRECT ETCH KIT $6.95

photo etch and direct etch refill kits



DIRECT ETCH RESIST PATTERNS

8 sheets 3″x5″ 1:1 patterns include lines, circles, jogs, squeeze-throughs, TO-3 & TO-18 transistors, TO-99, TO-100, DIP & flatpack ICs, donut pads, roll of 1/16″ and 1/32″ resist tape. Withstands ferric chloride, ammonium persulfate, peroxide and other etch systems.

ER-2 DIRECT ETCH RESIST PATTERNS $3.95

DRY CONCENTRATED ETCHANT

¼ lb. anhydrous ferric chloride in vapor tight package makes 1 pint etchant, enough for 200 sq. in. of copper board. Costs less than liquid etch solutions.

ER-3 DRY CONCENTRATED ETCHANT $1.49

POS-NEGtm PHOTOCOPY FILM

Polyester base film makes negatives or positives directly from opaque or translucent art in one step. Handle in subdued light. Expose with #2 photoflood.

ER-5 SIX SHEETS 5″x6″ POS-NEG FILM $3.95

FILM PROCESS CHEMICALS

3 chemical packets make 1 pint litho film developer and 1 pint acid fixer. Handles 15 sheets copy film.

ER-6 FILM PROCESS CHEMICALS $1.95

PHOTO RESIST SPRAY

Photosensitive PC board coating. Unexposed coat is dissolved by resist developer. Exposed areas remain to act as an etch resist. Coats up to 400 sq. in.

ER-7 PHOTO RESIST SPRAY (2.5 oz. net wt.) $2.95

PHOTO RESIST DEVELOPER

Solvent blend develops exposed photoresist. Use with ER-7 spray resist.

ER-8 RESIST DEVELOPER (16 fl. oz.) $2.95

the DATAK corporation • 65 71st Street • Guttenberg, N.J. 07093

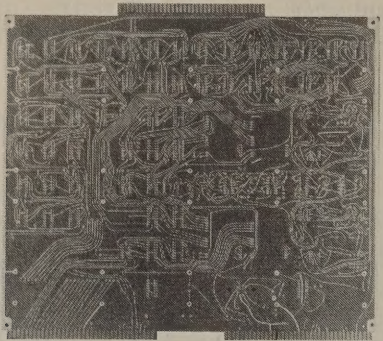
DEFIANCE CIRCUIT CORPORATION

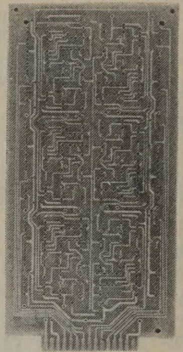
A SUBSIDIARY OF HiG INC.

PRINTED CIRCUIT BOARDS FOR INDUSTRY

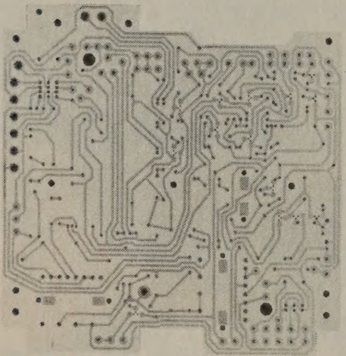
Our people are dedicated to supplying the quality you expect. Our complete and modern facility assures you of the latest technical advances in equipment and processes. Our computerized production control system eliminates production bottlenecks and insures on-time delivery. Our modern photo lab and chemical lab give us the tools and analysis without relying on outside sources. Our complete die tooling facility reduces both lead time and cost. Whatever your board requirements are, Defiance will respond with a prompt and competitive quotation.

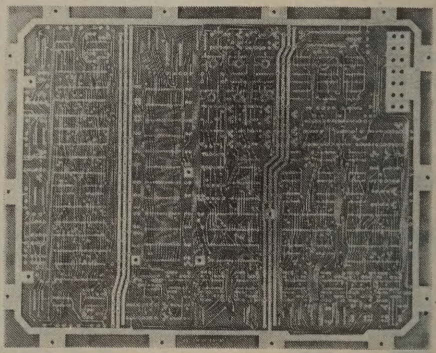
DATA PROCESSING



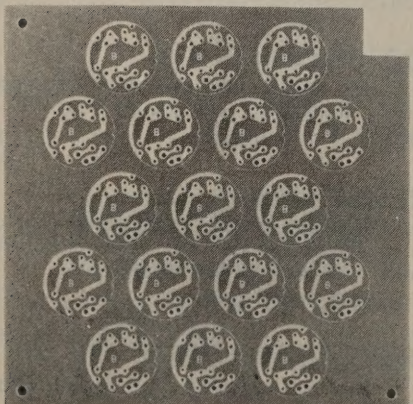


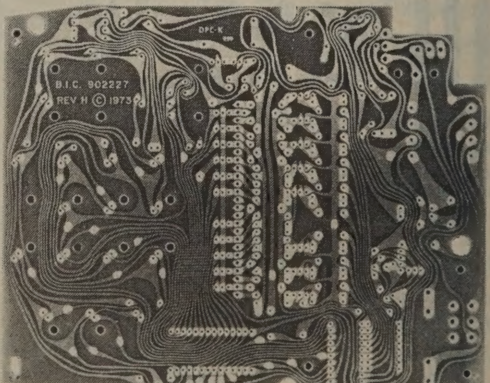
COMMUNICATIONS





COMMERCIAL





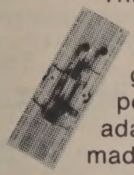
DEFIANCE CIRCUIT CORPORATION

12 SHEPARD ST., LAWRENCE, MASS. 01843
TEL: (617) 688-1856

Solder is for sissies.

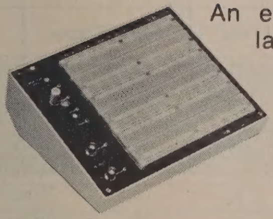
Are you still designing circuits the old fashioned way? Soldering and unsoldering? Burning up valuable IC's? If so, it's time you made a switch to solderless breadboarding. E&L Instruments offers a complete line of breadboarding products from sockets to the most complete systems for professional use. Here are five ways you can go solderless . . .

SK-10 Socket



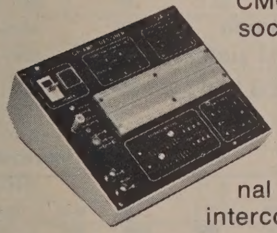
This precision solderless breadboarding socket will pay for itself in one afternoon. Integrated circuits and discrete components insert directly, without adapters. All interconnections are made with 20 to 26 gage solid conductor wire. $17.75.

Breadbox III



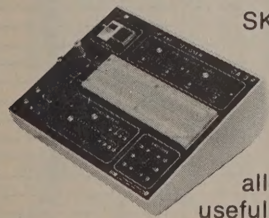
An economical approach to a large breadboarding area. Three SK-10 sockets, four 5-way binding posts, two BNC connectors, six BP-22 solderless breadboarding pins. $72.25

Op-Amp Designer #OA-2K



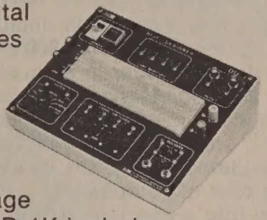
Powerful design tool for linear work and CMOS digital circuitry. SK-10 socket. Heavy current capacities on all three power supplies [+/– 15V & +5V DC]. Sensitive null detector and a full function generator with external frequency adjustment. All interconnections are solderless. $120.00 in kit form.

Op-Amp Designer #OA-3K



SK-10 socket. Plus and minus variable supplies (1 to 15V). This adjustable feature makes the unit exceptionally flexible, allowing it to be more useful for odd voltage requirements. The fixed 5 volt supply allows interfacing with TTL circuitry. $102.50 in kit form.

Digi-Designer #DD-1K



A must for every student, engineer or technician doing digital circuit design. Handles both IC and discrete components without soldering. Connections to the SK-10 socket are made using any solid 22 gage insulated wire. The DD-1K includes a clock, power supply, logic lights, pulsers, logic level switches and much more. All circuitry is now in one circuit board. $77.75 in kit form.

OEM and educational discounts available. All prices shown are suggested resale U.S.A.

E&L INSTRUMENTS, INC.
61 First Street, Derby, Conn. 06418
(203) 735-8774 Telex No. 96 3536

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2612 Electronic Lane, Dallas, Texas 75220
(214) 350-4978

Manufacturing
P. O. Box 8368, Longview, Texas 75601
(214) 757-3045

Solder-Wrap® SOLDER-WRAP® is a new process for high density electrical interconnect systems developed and patented by United Wiring and Manufacturing Company. With SOLDER-WRAP®, interconnect costs have been brought back in line with semiconductor costs. This unique electronic system forms interconnects at speeds two to three times faster than conventional Wirewrap* methods. Routing speeds, including soldering time, range from 300 electrical connections per hour in manual operation to 2400 connections per hour on automatic equipment. The SOLDER-WRAP® process consists of routing a fine, insulated wire to the various protruding pins of components previously inserted into a specially patterned PC board. The individual wires and component leads are then soldered to the PC pads by a soldering probe which simultaneously thermal strips away the wire insulation at the soldering area. SOLDER-WRAP® should be considered for:

- Replacement of Wirewrap* boards
- Replacement of stitchweld boards
- Front end designs for two-sided boards
- High volume production when using the fan-fold SOLDER-WRAP® package

Advantages for SOLDER-WRAP® users include high surface and cubic density, fast engineering turn-around, low front-end tooling and testing costs and ease in changeability. As an example, the front end cost for 40 IC boards would run $308, including coding, keypunching and computer run. Compare SOLDER-WRAP® with other processes in Figure 1. SOLDER-WRAP® advantages can mean substantial savings for your operation in both time and money.

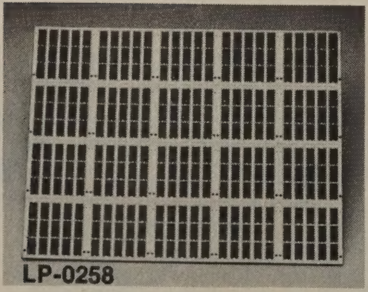
Some of the companies now using SOLDER-WRAP® are: McDonnel Douglas • N.A.S.A. • Bell Labs • Texas Instruments • Westinghouse • L.T.V. Systems • Honeywell • Collins Radio • Univac • Control Data • Hughes Aircraft • I.B.M. • Bendix.

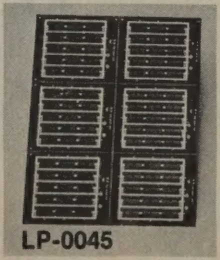
UNITED WIRING AND MANUFACTURING CO. SOLDER-WRAP INTERCONNECT PROCESS COMPARISON CHART

PROCESS	REQUIRES ARTWORK	ENGINEER DESIGN	ENGINEER CHANGES	DENSITY	PRODUCTION COST	FIELD CHANGEABLE	COLD FLOW PROBLEM	PROTOTYPE PROCESS	SCHOTTKY LOGIC
TWO SIDED BOARDS	YES	6-10 WKS. LONG	ARTWORK CHANGES	LOW	LOW	POOR	NO	VERY POOR	POOR
MULTI-LAYER BOARDS	YES	10-12 WKS. LONG	ARTWORK CHANGES	HIGH	HIGH	VERY POOR	NO	VERY POOR	GOOD
WIRE-WRAP	NO	2-4 WKS. SHORT	NO ARTWORK	HIGH	HIGH	GOOD	YES	GOOD	FAIR
STITCH-WELD	NO	2-4 WKS. SHORT	NO ARTWORK	HIGH	MEDIUM TO HIGH	FAIR	YES	GOOD	FAIR
SINGLE SIDED SOLDER-WRAP	NO	2-4 WKS. SHORT	NO ARTWORK	HIGH	LOW	GOOD	NO	GOOD	FAIR
TWO SIDED SOLDER-WRAP	NO	2-4 WKS. SHORT	NO ARTWORK	HIGH	LOW TO MEDIUM	GOOD	NO	GOOD	GOOD

SOLDER-WRAP® High Density Dual-in-Line Packaging Panels

- Universal I.C. packaging boards
- Panels accept 14 through 40 pin devices
- No artwork generation
- Wiring repeatability and changeability
- Easy I.C. insertion
- High cubic and surface density
- Low cost wiring interconnects


LP-0258

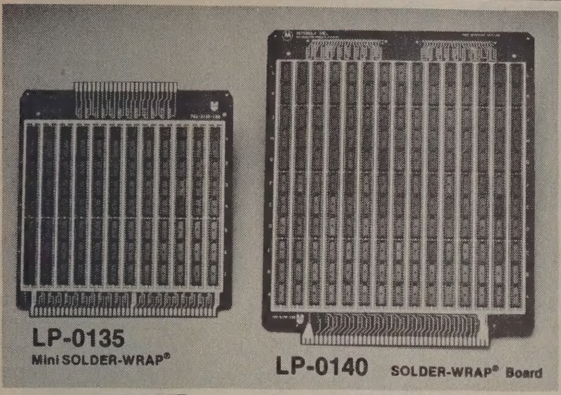

LP-0045

HOW TO ORDER BREADBOARDS

Part No.	W x L Moduler Sections	Total # 16 Pin devices	Total # 24 Pin Devices	Length	Width	BOARD PRICE SCHEDULE 1-4	5-9	10-24	25-49	100-300
LP-0258-00	4 x 5	300	120	15.5"	13.6"	$396	$356	$317	$277	$198
LP-0258-01	4 x 4	240	96	12.4"	13.6"	317	285	254	222	159
LP-0258-02	4 x 3	180	72	9.3"	13.6"	238	214	190	167	119
LP-0258-03	4 x 2	120	48	6.2"	13.6"	158	142	126	111	79
LP-0258-04	4 x 1	60	24	3.1"	13.6"	79	71	63	55	40
LP-0258-05	3 x 5	225	90	15.5"	10.2"	297	267	238	208	149
LP-0258-06	3 x 4	180	72	12.4"	10.2"	238	214	190	167	119
LP-0258-07	3 x 3	135	54	9.3"	10.2"	178	160	142	125	89
LP-0258-08	3 x 2	90	36	6.2"	10.2"	119	107	95	83	60
LP-0258-09	3 x 1	45	18	3.1"	10.2"	59	53	47	41	30
LP-0258-10	2 x 5	150	60	15.5"	6.8"	198	178	158	138	99
LP-0258-11	2 x 4	120	48	12.4"	6.8"	158	142	126	111	79
LP-0258-12	2 x 3	90	36	9.3"	6.8"	119	107	95	83	60
LP-0258-13	2 x 2	60	24	6.2"	6.8"	79	71	63	55	40
LP-0258-14	2 x 1	30	12	3.1"	6.8"	40	36	32	28	20
LP-0258-15	1 x 5	75	30	15.5"	3.4"	99	89	79	69	50
LP-0258-16	1 x 4	60	24	12.4"	3.4"	79	71	63	55	40
LP-0258-17	1 x 3	45	18	9.3"	3.4"	59	53	47	41	30
LP-0258-18	1 x 2	30	12	6.2"	3.4"	40	36	32	28	20
LP-0258-19	1 x 1	15	6	3.1"	3.4"	20	18	16	14	10
LP-0045-00	2 x 3	90	36	8"	10.8"	119	107	95	83	60
LP-0045-01	2 x 2	45	18	8"	7.2"	79	71	63	55	40
LP-0045-02	2 x 1	30	12	8"	3.6"	40	36	32	28	20
LP-0045-03	1 x 3	45	28	4"	10.8"	59	53	47	41	30
LP-0045-04	1 x 2	30	12	4"	7.2"	40	36	32	28	20
LP-0045-05	1 x 1	15	6	4.0"	3.6"	20	18	16	14	10

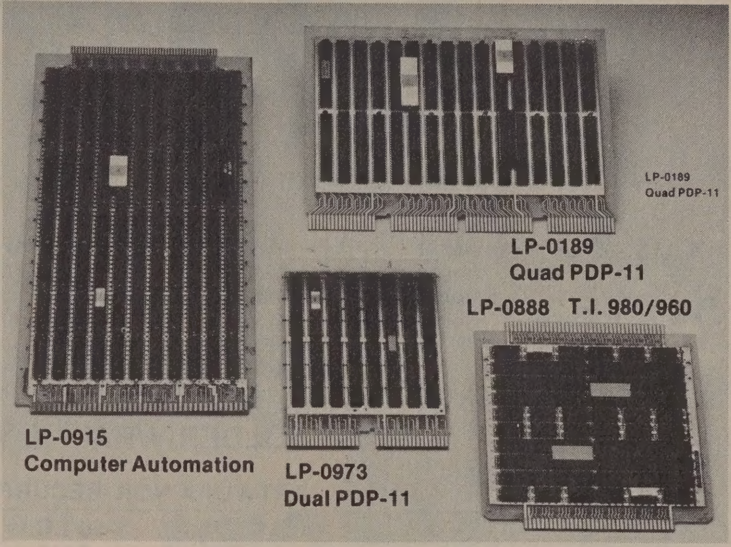
To order breadboards without sockets use prefix NS before six digit board number

Fxample: NS-0258-00.



HEWLETT-PACKARD

MOTOROLA EXERCISOR



LP-0189
Quad PDP-11

LP-0888 T.I. 980/960

LP-0915
Computer Automation

LP-0973
Dual PDP-11

ORDERING INFORMATION
SOLDER-WRAP™ BOARDS

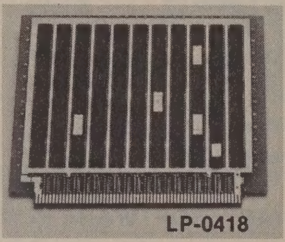
The following is a breakdown on how to order SOLDER-WRAP™ boards.

XX — XXXX — XX
A B C

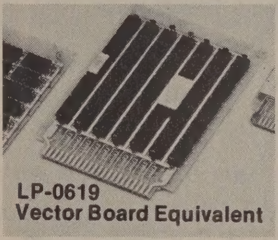
A - These two digits are to define series SOLDER-WRAP™ boards.
PB = Augat socket pin in board. Mil grade
LP = Low profile socket commercial grade
NS = SOLDER-WRAP™ board without sockets

B - These four digits define SOLDER-WRAP™ board base number.

C - These two digits define SOLDER-WRAP™ back covers
00 = No SOLDER-WRAP™ back cover
01 = SOLDER-WRAP™ back cover FR4 - material



LP-0418



LP-0619
Vector Board Equivalent

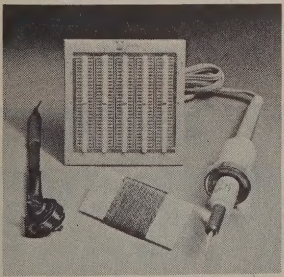
SOLDER-WRAP® BOARD SPECIFICATIONS

PRICE SCHEDULE

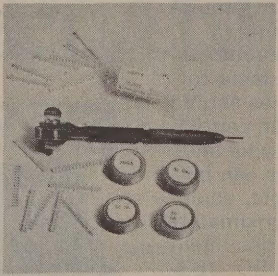
Part Number	16 Pin Devices	Total # 24 Pin Devices	Total # Connector Spacing	Board to Board Spacing	Length	Width	1-4	5-9	10-24	25-49	100-300
LP-0135	84	34	.156	.600 Mils	8.68"	7.75"	107.	102.	96.	91.	80.
NS-0135	84	34	.156	.500 Mils	8.68"	7.75"	80.	76.	72.	68.	60.
LP-0140	165	32	.156	.600 Mils	11.8"	9.75"	191.	181.	172.	162.	143.
NS-0140	165	32	.156	.500 Mils	11.8"	9.75"	138.	131.	124.	117.	104.
LP-0619	35	6	.156	.600 Mils	4.50"	6.50"	$ 50.	$ 48.	$ 45.	$ 43.	$ 38.
NS-0619	35	12	.156	.500 Mils	4.50"	6.50"	31.	29.	28.	26.	23.
LP-0189	96	20	.125	.600 Mils	8.43"	10.46"	133.	126.	120.	113.	100.
NS-0189	96	20	.125	.500 Mils	8.43"	10.46"	82.	78.	74.	70.	62.
LP-0888	60	16	.125	.600 Mils	7.91"	7.00"	92.	87.	83.	78.	69.
NS-0888	60	26	.125	.500 Mils	7.91"	7.00"	60.	57.	54.	51.	45.
LP-0915	165	14	.100(.156)	.600 Mils	16.89"	7.48"	233.	221.	210.	198.	175.
NS-0915	165	56	.100(.156)	.500 Mils	16.89"	7.48"	146.	139.	131.	124.	110.
LP-0973	48	N.A.	.125	.600 Mils	8.43"	5.19"	67.	64.	60.	57.	50.
NS-0973	48	N.A.	.125	.500 Mils	8.43"	5.19"	42.	40.	38.	36.	32.
LP-0418	66	N.A.	.100	.600 Mils	7.50"	7.70"	97.	92.	87.	82.	73.
NS-0418	66	14	.100	.500 Mils	7.50"	7.70"	62.	59.	56.	53.	47.

Prototype Kits

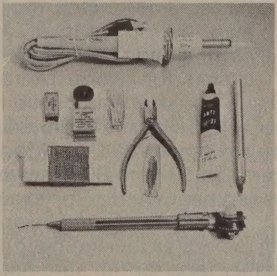
For Wiring Service and Automatic Wiring Equipment see e.e.m. Section 4100.



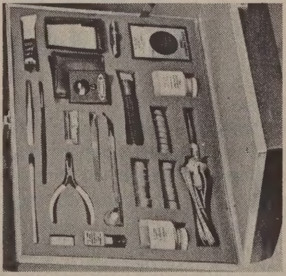
SOLDER-WRAP® STARTER KIT
U.W.M. Part Number 150-0100-001
Designed for experimentation with the SOLDER-WRAP™ process.
Price: **69.50**



SOLDER-WRAP® VECTOR BOARD & E.C.O. KIT
U.W.M. Part Number 150-0105-001
Designed for Vector & Varo type P.C. boards. It can also be used to make engineering changes on two-sided P.C. boards.
Price: **69.50**



SOLDER-WRAP® SPECIAL TOOL KIT
U.W.M. Part Number 150-0110-001
Kit contains all special tools required for SOLDER-WRAP™ prototype interconnect process.
Kit Price: **$175.00**



INDUSTRIAL SOLDER-WRAP® PROTOTYPE KIT
U.W.M. Part Number 150-0115-001
Our most complete prototype kit. The handsome attache case provides portability and contains an abundant supply of wire cartridges and other equipment for industrial applications.
Price: **$300.**

UNITED
Wiring and Manufacturing Co.

National Sales
2612 Electronic Lane, Dallas, Texas 75222
(214) 350-4978

Manufacturing
P. O. Box 8368, Longview, Texas 75601
(214) 757-3045

Wiring Services

UNITED WIRING & MFG. CO. is involved in every phase of the interconnect business — including in-house automatic SOLDER-WRAP® wiring services. Our automatic equipment can make 2400 connections per hour with accuracy constantly checked by sophisticated monitoring equipment. In case of a missed pin, stripped wire error or broken wire, a signal tells the micro-processor to halt the quipment until corrective action can be taken. Savings at a United Wiring Service Center range from 20% to 30% over other methods.* For example, on a minimum run of four boards (same logic type) wiring costs are 8¢ per wire. United Wiring also offers logic testing of boards on a service basis with costs running from 15 to 30 cents an IC location, depending on quantity.

NEW SOLDER-WRAP® BOARD DESIGNS

ARTWORK NON-RECURRING COST

	1-50 I.C.'s	51-100 I.C.'s	100-300 I.C.'s
Artwork Generation	$350.	$500.	$700.
P.C. Board Tooling	80.	110.	170.
Drill Tape	80.	160.	225.
Total Non-Recurring Cost	$610.	$770.	$1095.

Minimum Board Order on Special Design: 25 SOLDER-WRAP® Boards.

SOLDER-WRAP® SOFTWARE NON-RECURRING COST

1. Populating I.C.'s for two-sided board layout. Incl. 2, 3 & 4 . . . . Cost per I.C. $12.00
2. Coding Schematic, Keypunch, 2 Computer runs and documentation package. . . . . Cost per I.C. $ 7.70
3. Keypunch, computer runs and documentation package only . . . . Cost per I.C. $ 4.50
4. Computer runs & documentation package only . . . . Cost per I.C. $ 3.22

SOLDER-WRAP® Centers
SOLDER-WRAP® of Dallas
Dallas, Texas
United Wiring & Mfg. Co.
Longview, Texas

Planned SOLDER-WRAP® Centers
Southern California
Massachusetts
Minnesota
Pennsylvania
Houston, Texas
Northern California
Ohio
Florida
Illinois
New York
New Jersey

SOLDER-WRAP® WIRING SERVICES

CONTRACT WIRING SERVICES — 12 MONTHS USAGE

100K to 200K wires — 7 cents per wire
201K to 300K wires — 6 cents per wire.
301K to 500K wires — 5.5 cents per wire.
501K to 1MM wires — 5 cents per wire.
1MM to 2MM wires — 4.5 cents per wire.
2MM to 5MM wires — 4 cents per wire.
5MM to 10MM wires — 3.5 cents per wire.

LOW VOLUME PRODUCTION

One SOLDER-WRAP® Board. 14 cents per wire.
Two SOLDER-WRAP® Boards. 12 cents per wire.
Three SOLDER-WRAP® Boards. 10 cents per wire.
Four SOLDER-WRAP® Boards. 8 cents per wire.

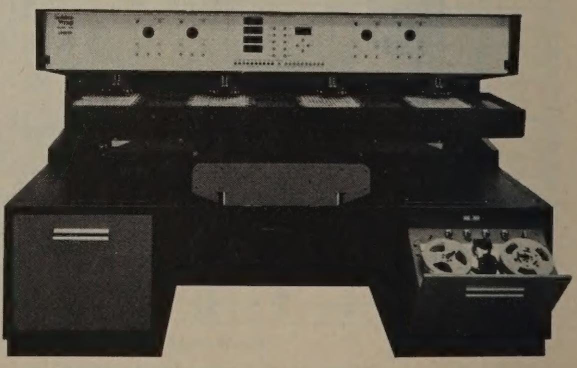
Equipment Sales & Leasing

AUTOMATIC SOLDER-WRAP® interconnect equipment may be leased or purchased from United Wiring & Mfg. Co., Inc. This equipment performs all wire routing, cutting and soldering functions and checks for errors. The decision to lease, purchase or use United's in-house wiring capabilities should be based on your needs. If your volume is small, United can perform your wiring services for you at a savings of 20% to 30%. If your shop deals in medium to large volume, a 50% to 60% savings can be effected with leased or purchased equipment. For example, equipment wiring costs in a single shift operation would be approximately 3¢ per wire. A computer system generates the engineering documentation package and a disc or paper tape for the automatic SOLDER-WRAP® equipment. An operator, with one to two weeks training, can effectively man the SOLDER-WRAP® equipment. Additional training is required to operate the engineering documentation package for the software system. Either way — United's in-house service or using SOLDER-WRAP® equipment in your own shop — means total reliability plus a 30% to 60% cost savings for you!

For complete circuit board information see Section 1700.

Equipment Model	Stringing Conn/Hr.	Solder Cutting Conn/Hr	Avg. Conn. Per Hour	Cost/Wire One Shift	Cost/Wire Two Shifts	Cost/Wire Three Shifts
200	2400	2400	1200	$.0395	$.0263	$.022
300	3600	3600	1800	$.0307	$.020	$.016
400	4800	4800	2400	$.0252	$.0165	$.013

Assumption:
- SOLDER-WRAP® boards to meet United specifications.
- Average wire length 4".
- United's Tooling used on automatic equipment.
- Set up times not included. (Off Line)



*Registered trademark of Gardner-Denver Company.

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'78 THE MASTER CATALOG
THE ELECTRONIC DISTRIBUTORS
'78
MASTER CATALOG
FORMERLY: OFF-THE-SHELF CATALOG
THE ONLY NATIONAL CATALOG OF ELECTRONIC PARTS, INSTRUMENTS AND EQUIPMENT DESIGNED EXCLUSIVELY FOR DISTRIBUTORS AND THEIR CUSTOMERS.
YESTERDAY'S
RADIO MASTER
IS TODAY'S

ELECTRONIC DISTRIBUTORS MASTER CATALOG

Known as O-T-S, OFF-THE-SHELF CATALOG until this edition, the MASTER CATALOG encompasses the following product areas: audio and communications equipment; electromechanical components; electronic circuit components and subassemblies; panel components and hardware; production equipment and tools; test instrumentation; power sources; wire and cable; and related materials and chemicals.

The MASTER CATALOG is broken down into four basic sections. **A GENERAL INDEX** which lists manufacturers and products alphabetically. **A MANUFACTURERS' CATALOG SECTION** which displays their respective product pages and lists their addresses and phone numbers. **A MANUFACTURERS' DIRECTORY,** where participating manufacturers, again listed alphabetically with addresses and phone numbers, highlight their distributors. And a **GEOGRAPHIC DISTRIBUTORS' DIRECTORY** which includes the names, addresses and phone numbers of the local distributors nationwide which stock the products of manufacturers whose data appears in the "Manufacturers' Catalog Section."

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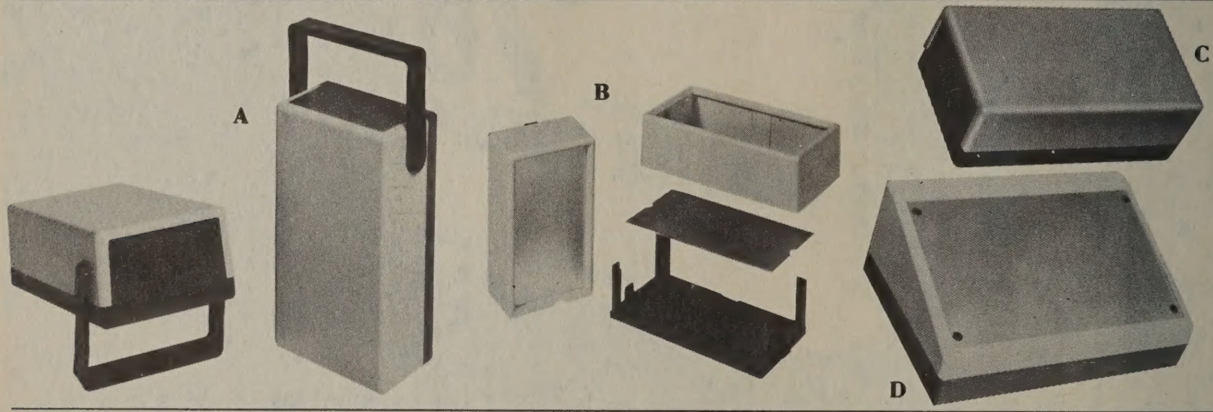
verobox®

Quality, High Impact Enclosures

The Verobox System affords the designer or engineer a wide range of tough, durable and attractively styled package enclosures for a multitude of applications. The hi-impact polystyrene and ABS cases are available in a variety of sizes, shapes, colors and configurations. Punching, stamping, engraving or drilling of either face plate or case gives the greatest flexibility for designer requirements. Verobox Systems have been successfully used for meter, control and instrument enclosures in "one-off" and production runs. In addition to the styles shown here, we have other configurations plus a complete, economical custom molding capability for special applications. For further information including technical and engineering details, contact your local VERO representative or call us at our corporate headquarters in Hauppauge, New York.



These rectangular boxes are similar to the two-tone gray plastic boxes shown below, but have the added feature of a handle that locks in two positions. When in the raised position, the handle is used for carrying and when folded back, it ideally positions the box for benchtop use. Available in three sizes.

New Part No.	Old Part No.	Width	Height	Length	
65-2759J	90-30-187	3.150"	1.969"	5.906"	
65-2760D	90-40-187	4.331"	2.362"	7.402"	A
65-2760D	90-41-187	4.331"	3.800"	7.402"	

This newly developed box incorporates an aluminum panel into the design of the rectangular boxes. The panel mounts on the lower portion of the box allowing the top cover to be removed without disturbing the circuitry. Prior to wiring, the aluminum panel may be taken out of the case for ease of punching, drilling, silk screening, etc.

New Part No.	Old Part No.	Width	Height	Length	
65-3851A	95-20-087	2.529"	1.575"	4.724"	B
65-2753F	95-40-087	4.92"	2.76"	8.27"	

FOR A COMPLETE PARTS LISTING OR CUSTOM APPLICATIONS, CALL VERO AT (516) 234-0400

These two-tone gray plastic boxes are accurately molded from hi-impact polystyrene. Four threaded inserts are molded into the lower section of each box and the tongue and grooved sections provide tight closure.

Rectangular Boxes

	New Part No.	Old Part No.	Width	Height	Length
	65-2514F	90-10-087	1.969"	.984"	3.937"
	65-2516G	90-11-087	1.969"	1.575"	3.937"
C	65-2518H	90-20-087	2.529"	1.575"	4.724"
	65-2520J	90-30-087	3.150"	1.969"	5.906"
	65-2522K	90-40-087	4.331"	2.362"	7.402"

Sloping Units

	New Part No.	Old Part No.	Width	Height	Length
D	65-2524L	90-80-087*	6.141"	3.939"	8.661"
	65-2523E	90-81-087**	6.141"	3.939"	8.661"

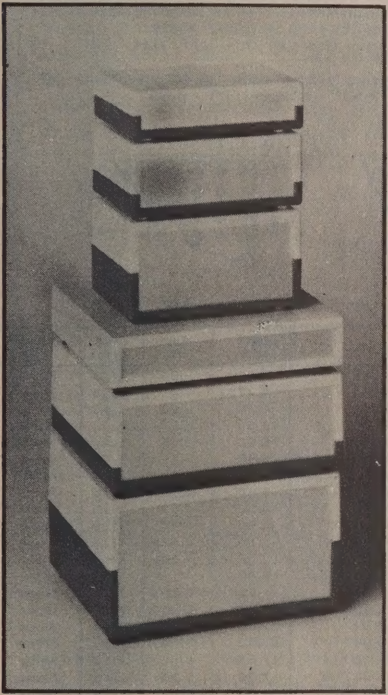
*With anodized aluminum front plate.
**With plastic grill.

vero

Vero Electronics, Inc.

171 Bridge Road, Hauppauge, N.Y. 11787

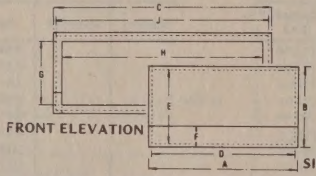
Tel.: 516-234-0400 TWX: 510-227-8890



These boxes consist of top and bottom sections which include fixing points for horizontally mounting P.C. boards or chassis plates. In Mark I boxes, the two sections are held together by four screws which enter through the base and are concealed by plastic feet through which they pass.

Mark II boxes have a unique clip together design, so that no screws are required. Four rubber stick-on feet are therefore used. Front and rear panels on both styles are automatically retained in position when the two halves of the box are put together. P.C. boards can also be mounted vertically in the same plane as the front panels in moulded-in guide slots.

These plastic Verobox enclosures moulded in light and dark grey high impact ABS provide a range of six attractive and durable enclosures incorporating anodized aluminum panels at front and rear. They require no further finishing operations and can be readily blanked, engraved or silk screened.

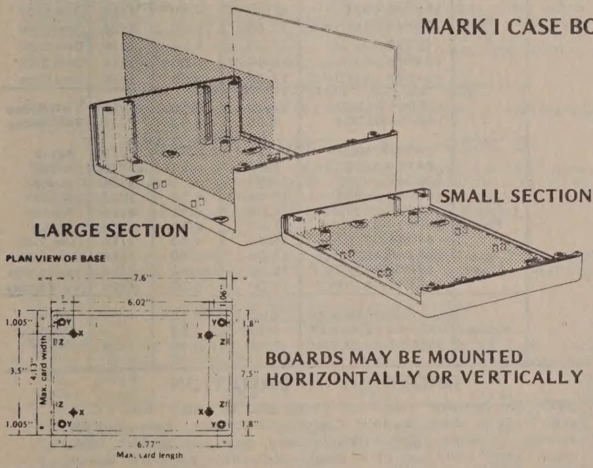


SPECIFICATION:

Casing - High impact ABS Plastic
Color - Light grey top, dark grey base
Front & Rear Panels - 16 s.w.g. anodized aluminum
Temperature Range - 40° C to +65°C

Type	Order Code	DIMENSIONS									Dimensions of Vertically Mounted Boards
		A	B	C	D	E	F	G	H	J	
Mark I	75-1410J	5.51"	1.57"	8.07"	5.28"	1.39"	.79"	.94"	7.44"	7.83"	1" x 7.83"
	75-1411D	5.51"	2.95"	8.07"	5.28"	2.72"	.79"	2.33"	7.44"	7.83"	2.83" x 7.83"
	75-1412K	5.51"	4.33"	8.07"	5.28"	4.09"	2.17"	3.70"	7.44"	7.83"	3.76" x 7.83"
	75-1237J	3.35"	1.57"	6.06"	3.04"	1.39"	.79"	.94"	5.43"	5.82"	1" x 5.82"
Mark II	75-1238D	3.35"	2.36"	6.06"	3.04"	2.13"	.79"	1.73"	5.43"	5.82"	1.8" x 5.82"
	75-1239K	3.35"	3.15"	6.06"	3.04"	2.91"	1.57"	2.52"	5.43"	5.82"	2.58" x 5.82"

MARK I CASE BOX



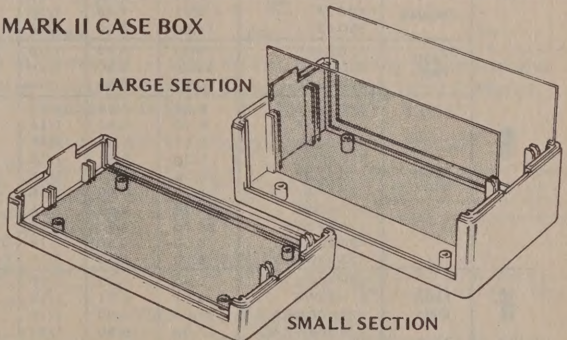
BOARDS MAY BE MOUNTED HORIZONTALLY OR VERTICALLY

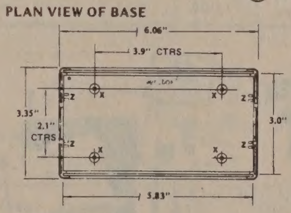
KEY:

X - .118" inserts for horizontally mounted board
Y - Full height corner pillars
Z - Integrally molded guide slots for vertically mounted boards.

NOTE: Horizontal fixing points are designed to accept a standard 3.94" x 6.3" European sized card. Compatible Vero D.I.P. Board - Order Part No. 10-1042D

MARK II CASE BOX





BOARDS MAY BE MOUNTED HORIZONTALLY OR VERTICALLY

KEY:

X-Board-mounting pillars for self-tapping screws (included with box).
Z-Integrally molded guide slots for vertically mounted boards.

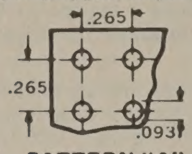
Vector

VECTORBORD®—MICRO-VECTORBORD® PHOTO SENSITIZED BOARD

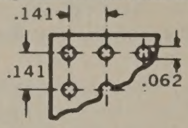
Vectorbord® and Micro-Vectorbord® prepunched terminal boards are time, work and money saving materials used throughout the electronic industry. Fire retardant material is precision punched in a wide variety of sizes, hole patterns, and thicknesses for later installation of terminals and components. Vector terminals in solder and wrapped wire models are available to fit all hole sizes. Pattern "A" or "AA" is good for experimental or other work where space is not critical. Pattern "B" is useful for work with small components such as resistors and capacitors. Pattern "G" is particularly useful for transistor usage. Patterns "H" and "P" are specially designed for use with integrated circuits and devices packaged with leads on 0.1 in. multiples.

Phenolic: MIL Spec PBE-P per MIL-P-3115 NEMA grade FR2. Copperclad phenolic meets NEMA FR2 and is 1 oz.
Paper Epoxy: MIL Spec P-22324 type PEE NEMA grade FR3. Copperclad FL-PX per MIL-P-13949E NEMA grade FR3.
Epoxy Glass: For 'P' pattern boards with 'WE' in suffix - Unclad: MIL Spec MIL-P181776 type GEE NEMA FR4 and G-10. Copperclad: MIL Spec 13949E type FL-GF NEMA grade FR4 and G-10. Color: green. Best mechanical characteristics. **For all other glass epoxy boards** - FR-4 type, max. temp. 130°C (266°F); color, blue; best hole quality in epoxy glass; can plate through holes in clad material.

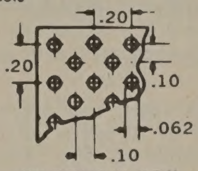
Special sizes and hole layouts can be made to order if one of the standard catalog items does not meet requirements. When ordering special size boards the following MAXIMUM BOARD WIDTHS apply:
Pattern "A" in phenolic & epoxy paper or glass laminates: 20"
Pattern "B" all materials: 6"
Pattern "G" in phenolic & epoxy paper: 20". In epoxy glass: 16"
Pattern "H" in epoxy glass: 8.51" Pattern "P": 8.50"



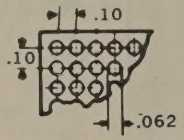
PATTERN "A"



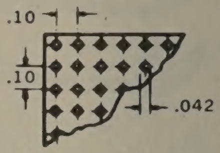
PATTERN "B"



PATTERN "G"



PATTERN "H"

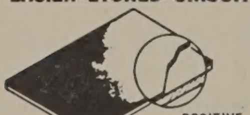


PATTERN "P"

Pattern	Material	Catalog No.	Length Inches	Width Inches	Thick. Inches	Copper Clad
A	Phenolic	18A18	4.80	4.80	1/16	None
		32A17	8.50	4.50	1/16	None
		32A18	8.51	4.80	1/16	None
		64A18	16.99	4.80	1/16	None
		72A32	19.11	8.51	1/16	None
		32AA9	8.51	2.41	3/32	None
		32AA18	8.51	4.80	3/32	None
		64AA18	16.99	4.80	3/32	None
		64AA32	16.99	8.51	3/32	None
		64AA132	35.01	16.99	3/32	None
	Epoxy Paper	32A17EP	8.50	4.50	1/16	None
		64A18EP	16.99	4.80	1/16	None
		32AA18EP	8.51	4.80	3/32	None
		64AA18EP	16.99	4.80	3/32	None
		64AA32EP	16.99	8.51	3/32	None
	Epoxy Glass	32A18WE	8.51	4.80	1/16	None
		64A18WE	16.99	4.80	1/16	None
B	Phenolic	45B30	8.51	5.69	1/16	None
		90B30	16.97	5.69	1/16	None
G	Phenolic	42G22	8.50	4.50	1/16	None
		42G24	8.51	4.80	1/16	None
		95G43	19.00	8.60	1/16	None
	Epoxy Paper	+2G24EP	8.51	4.80	1/16	None
		85G24EP	16.99	4.80	1/16	None
		85G42EP	16.99	8.51	1/16	None
	Epoxy Glass	32G22WE	6.50	4.50	1/16	None
		42G22WE	8.50	4.50	1/16	None
		42G24WE	8.51	4.80	1/16	None
		42G42WE	8.51	8.51	1/16	None
		85G22WE	16.99	4.50	1/16	None
		85G24WE	16.99	4.80	1/16	None
		85G42WE	16.99	8.51	1/16	None
		175G22WE	35.00	4.50	1/16	None
		42G22WEC1	8.50	4.50	1/16	One Side
		42G22WEC2	8.50	4.50	1/16	Two Sides
H	Epoxy Glass	85H48WE	8.50	4.80	1/16	None
		85H85WE	8.51	8.51	1/16	None
		170H48WE	17.00	4.80	1/16	None
		170H48WE-032	17.00	4.80	1/32	None
		170H85WE	17.00	8.51	1/16	None

Pattern	Material	Catalog No.	Length Inches	Width Inches	Thick. Inches	Copper Clad
P	Epoxy Glass	29P29-062	3.00	3.00	1/16	None
		43P43-062	4.475	4.475	1/16	None
		44P29-062	4.50	3.00	1/16	None
		59P19-032	6.00	2.00	1/32	None
		59P44-032	6.00	4.50	1/32	None
		64P44-032	6.50	4.50	1/32	None
		64P44-062	6.50	4.50	1/16	None
		64P44-062WE	6.50	4.50	1/16	None
		84P44-062	8.50	4.50	1/16	None
		84P44-062WE	8.50	4.50	1/16	None
		95P44-062	9.60	4.475	1/16	None
		169P44-062	17.00	4.50	1/16	None
		169P44-062WE	17.00	4.50	1/16	None
		169P59-016	17.00	6.00	1/64	None
		169P59-032	17.00	6.00	1/32	None
		169P59-047	17.00	6.00	3/64	None
		169P79-062	17.00	8.00	1/16	None
		169P84-062	17.00	8.50	1/16	None
		169P84-062WE	17.00	8.50	1/16	None
		349 P44-062 \	35.00	4.50	1/16	None
		349 P84-062	35.00	8.50	1/16	None
		169P44-062C1	17.00	4.50	1/16	One Side
		169P44-062C1WE	17.00	4.50	1/16	One Side
		169P59-032C1	17.00	6.00	1/32	One Side
		169P84-062C1	17.00	8.50	1/16	One Side
		169P84-062C1WE	17.00	8.50	1/16	One Side
	Epoxy Paper	169P44-062C2	17.00	4.50	1/16	Two Sides
		169P84-062C2	17.00	8.50	1/16	Two Sides
		64P44-062EP	6.50	4.50	1/16	None
		84P44-062EP	8.50	4.50	1/16	None
		138P42-062EP	13.90	4.50	1/16	None
		169P44-062EP	17.00	4.50	1/16	None
		169P47-062EP	17.00	4.80	1/16	None
		169P84-062EP	17.00	8.50	1/16	None
		64P44-062EPC1	6.50	4.50	1/16	One Side
		169P44-062EPC1	17.00	4.50	1/16	One Side
		64P44-062EPC2	6.50	4.50	1/16	Two Sides
		169P44-062EPC2	17.00	4.50	1/16	Two Sides
	Phenolic	54P44-062XXXP	6.50	4.50	1/16	None
		169P44-062XXXP	17.00	4.50	1/16	None
		169P59-062XXXP	17.00	6.00	1/16	None

NEW — POSITIVE ACTING PHOTO SENSITIZED COPPER CLAD BOARD FOR FASTER, EASIER ETCHED CIRCUITS



POSITIVE
PHOTO SENSITIZED
COPPER-CLAD BOARD

32X–1 POSITIVE PHOTO RESIST KIT

New Vector positive acting coated photosensitized board speeds etched circuit manufacture because boards are coated with positive acting resist. Positive artwork is used for the circuit master pattern making use of readily available positive drafting aids. No reversing step required. A finished etched circuit can be made in less than an hour and boards etch in any common etchant. Vector postive acting developer must be used after exposure of the boards under U.V. light source such as a photo flood lamp or sunlight.

Kits 32X–1, 32XA-1 are recommended for trial evaluations of the system; later, purchase only boards and developer.

ORDERING INFORMATION

32X-1 Kit contains 1 bare and 1 sensitized 4½" x6½" I oz. c.c. 1 side 1/16 in. thick phenolic board, etching tray, ferric chloride etchant, developer, glass exposure plate, mask cutting film, tape, brush, razor knife, set of 4 sheets rub/transfer art work, layout paper, instruction sheets.

32XA-1 Kit has total of 7-1 oz. copper clad phenolic boards: 3 boards sensitized one side: 1-4½" x6½", 1-8.0" x5.1", 1-4.5" x 2.73"; 2 boards sensitized 2 sides: 1-4½" x6½", 1-4.5" x2.73"; 2 bare boards: 1-4½" x6½", 1-4.5" x2.7" plus larger assortment of rub/transfer art work, etching chemical, developer, and other materials described in 32X-1 kit above.

1/16" THICK POSITIVE ACTING PHOTOSENSITIZED BOARDS

Catalog No.	Description			C. C Coating	Pkg. Quan.
	Length	Width	Material		
CU90/80-1R	9	7.99	Phenolic	1 side	5
CU65/45-2R	6.5	4.5	Phenolic	2 sides	5
CU65/45-1R	6.5	4.5	Phenolic	1 side	5
CU45/27-1R	4.5	2.73	Phenolic	1 side	5
CU45/30WE-1R	4.5	3.0	Epoxy Glass	1 side	3
CU65/27WE-1R	6.5	2.73	Epoxy Glass	1 side	3
CU159/80WE-1R	15.85	7.98	Epoxy Glass	1 side	2

POSITIVE ACTING DEVELOPER

0088-21-15	1.25 oz. bottle
0088-21-45	6 oz. bottle

In the interest of improved design & performance, Vector reserves the right to make changes in its specifications without prior notice.

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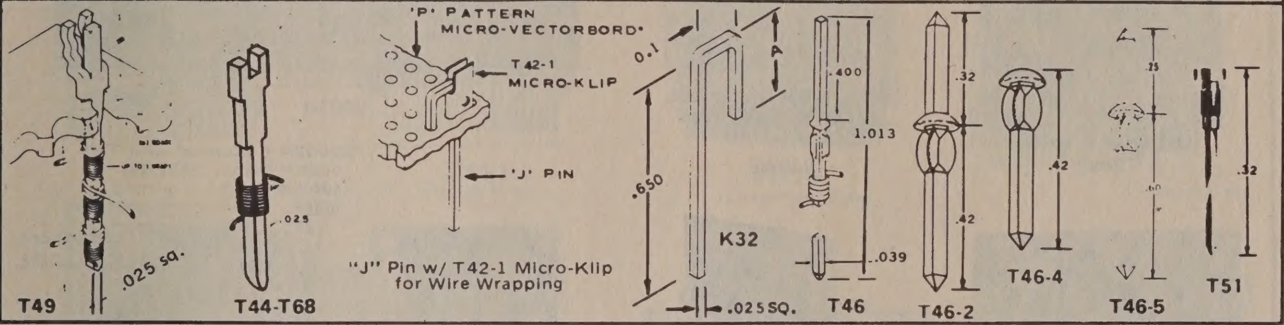
Vector WIRE WRAPPABLE – SOLDERABLE TERMINALS

WIRE WRAPPABLE TERMINALS AND PINS

Vector "wrap-post" terminals are stamped from high grade copper alloy and have sharp corners (maximum radius .003") for "gas-tight" connections when properly wrapped with Vector P160-4R Power Wrapper or other wrapping equipment. Like many other Vector terminals, wrap-post terminals may be installed in Vectorbord® with inexpensive hand tools. New gang insertion tools permit installing some models at rates up to 1200 per hour—write factory. **As a result of their unique board holding design, when properly installed, terminals hold tightly to meet all production requirements.** Wrap-post terminals may be installed wherever required without high cost machines. They are ideal for building sub-assembly production boards for later incorporation in larger assemblies Those with knurled or "stepped" shank designs may be used in plated-through holes.



T49 TRIFURCATED KLIP-WRAP

Unique three-fingered clip on upper end makes this a time-saving terminal for production or experimental uses. The spring clip holds leads from 0.018" to 0.025", 0.032" or 0.040" until soldered. Hand Insertion Tool P156 is adequate for installing a few at a time, but Spring Impact Tool P158 and D-8 Die Point are recommended for larger quantity installation due to the speed and ease of use.

T44-T68 MINIWRAP FOR 0.042 HOLES

Low profile wire wrappable terminals have slotted upper end for soldered wires. Ideal for miniature assemblies

K32 "J" PIN FOR 0.042 HOLES

Lowest cost wrappable terminal. May be used alone in circuit board hole by inserting into two adjacent 0.028" to 0.042" dia. holes and bending shorter leg over for retention. Hooked end can also be embedded in encapsulated assemblies and wraps made on protruding tail. Illustration also shows terminal being used to provide wire wrappable extension tail to T42-1, a solderable Micro-Klip terminal.

T46 MINIWRAP - 0.028" SQ.

Sturdy double ended terminal fits 0.042" dia. holes. Has flanged midsection.

STAR SERIES T46-2, -3, -4, -5 - 0.025" SQ.

This 0.025" sq. double ended terminal stands rigid in 0.042" holes without wobble due to four protrusions on the terminal corners in the terminal midsection. It is ideal for printed circuit applications because the seating flange creates a natural solder fillet bonding point.

T51 SERIES

Lowest profile rounded head is low enough to fit beneath installed DIP packages. Head diameter is .072" and may be used as a solder point for wave or "tack" soldering.

ORDERING INFORMATION

Supplied in Pkg. 100 or 1000

Part No./Plating Tin	Gold	Tail Lgth. Below 1/16" Bd.	Hand Insertion Tool	P158 Tool w/ Die Point:	Install in Hole Dia.
T49	T49A	.560	P156	D-8	.042
T49-1	T49A-1	.388	P156	D-8	.042

Catalog No. Tin	Nickel/Gold	Overall Hght	Slot Width	Slot Depth	Hand Install Tool
T44	T44-1	.690	.021	.055	A13
T68	T68-1	.800	.032	.090	A13-1
T68A	T68A-1	.630	.032	.090	A13-1

Part No.	Dimension "A"	Insertion Tool	For Staking-- P158 Tool Plus:	Install in Hole Dia.
K32	.250"	Not Required	Not Applicable	.028" min.
K32-2	.170"		D-14 Die; A-14 Anvil	.028" min.
K32-3	.140"		D-14 Die; A-14 Anvil	.028" min.

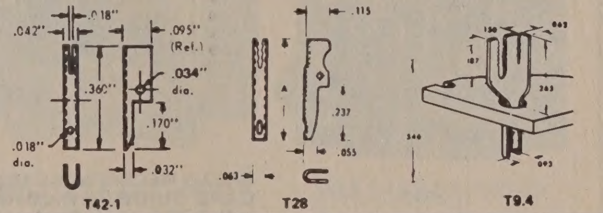
Part No./Plating Tin	Gold	O/A Lgth.	Hgt. Above Board	Lgth. Below 1/16" Board
T46	T46-1	1.013	.40	.950
T46-2	T46-2A	.74	.32	.358
T46-3	T46-3A	1.02	.42	.538
T46-4	T46-4A	.42	.03	.358
T46-5	T46-5A	.85	.25	.540

For 146-1: Order P158 Tool w/D7-1 Die Pt. or P133A Hand Tool. For T46-2, -3, -5 order P133B Hand Tool (for T46-4: D10 Die Pt.) or P133B Hand Tool.

Part No.	Material	For Hole Dia.	O/A Lgth.	Hgt. Above Board	Lgth. Below 1/16" Board
T51	Phosphor Bronze	0.042"	.32	.03	.228

SOLDERABLE TERMINALS AND PINS

Suitable for PC Board Production, Prototyping and Experimenting



Push-In Terminals -- Hold WITHOUT Staking -- Inexpensive
Faster to Install -- Hold Component Leads Until Soldered
Popular Hole Sizes -- 0.042", 0.062", 0.093"

T42-1 MINIATURIZED COMPACT PUSH-IN

Fits 0.042" dia. holes such as in "P" Pattern Micro-Vectorbord® and can be mounted on 0.1 in. centers side to-side. Tintillate plated. Ideal for IC work because leads can be laid in slots or pass through terminal vertically. By addition of soldered K32 "J" pin series terminal, converts to wire wrappable type.

T28 SERIES

Compact push-in fits 0.062" dia. holes in printed circuit boards and Vectorbord® Patterns B,F,G and H. Tintillate or silver plated, copper alloy material.

T9.4 AND T9.6 SERIES

Push-in type fits 0.093" dia. holes in printed circuit boards or Vectorbord® "A" and "AA" Patterns. Serrated teeth (on all except T9.4A type) hold leads 0.032" to 0.040" in slots until soldered. Supplied with tintillate plating for easy soldering. T9.6 type has more "spring" action in slots and shank.

ORDERING INFORMATION

Supplied in Pkg. 100 or 1000

Part No.	Material	For Hole Dia.	O/A Lgth.	Hght.Above Board	Lgth.Below 1/16"Bd.
T42-1	Copper Alloy brite tin plated	0.042"	.360"	.190"	.107"

Part No.	Plating	Tab End Style	For Hole Dia.	O/A Lgth.	Ht.Above Board	Lgth.Below 1/16"Bd.
T28	Tintillate	Hole	0.062"	.437"	.200"	.175"
T28S	Silver	Hole	0.062"	.437"	.200"	.175"
T28-1	Tin	No Hole	0.062"	.325"	.200"	.063"
T28S-1	Silver	No Hole	0.062"	.325"	.200"	.063"

Part No.	Material	Main Slot Style	For Hole Dia.	O/A Lgth.	Ht.Above Board	Lgth.Below 1/16"Bd.
T9.4	Copper Alloy	Serrated	0.093"	.562"	.203"	.296"
T9.4A		Smooth	0.093"	.562"	.203"	.296"
T9.6		Serrated	0.093"	.605"	.324"	.218"

P122B Insertion Tool installs both T9.4 and T9.6 types

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

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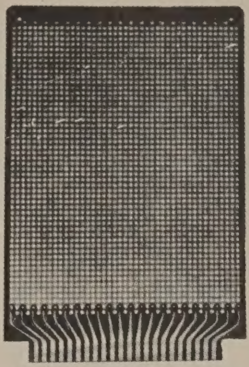
Vector PLUGBORDS SAVE TIME – MONEY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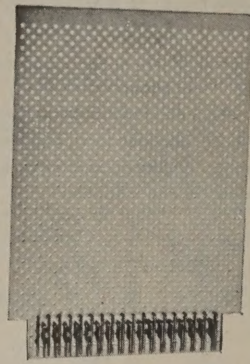
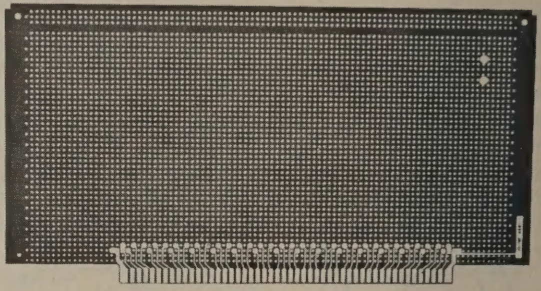
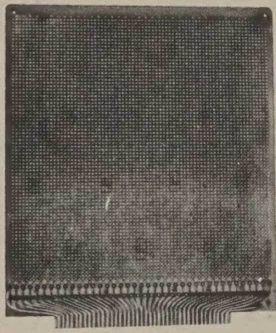

848WE


8801-1

3662A-6 supplied with copper plane; 3662A supplied without ground plane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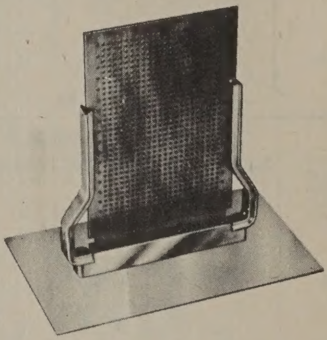
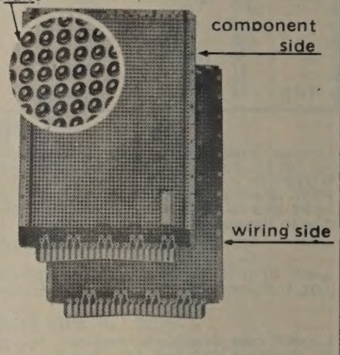

BR27-3 RECEPTACLE MOUNTED CARD GUIDE (on R630 Receptacle with 2.73 in. wide Plugbord)

4312



3662A & 3662A-6

PLUGBORDS FOR GENERAL USE WITH CONTACTS
But Without Matrix or Circuit Patterns

Use for building prototype, test and short run plug-in circuits because almost any component from DIPs to large resistors can be mounted anywhere on the boards. Boards have an overall grid of prepunched holes: 0.042 in. dia. on 0.1 in. centers (Pattern "P"); 0.062 in. diameter on alternate 0.1 in. centers (Pattern "G"); or .062 in. dia. holes on 0.1 in. centers (Pattern "H"). Boards are available with varied connector arrangements and mating connectors are listed. Back to back contacts on each etched side terminated in independent hole pads. Most boards have holes for attaching card ejectors.

CONTACT SPECIFICATIONS. Etched contacts:
Epoxy glass Plugbords - 2 oz. copper .00005" nickel plate, gold flash.

Quality flame-retardant 1/16" thick board materials are the same as those used for Vectorbord® and Micro-Vectorbord®, see preceding page. Terminals to fit.

Pattern	Board Size	Epoxy Paper	Epoxy Glass	Contacts No.	Contacts Style	Contacts Spacing	Contacts Plating	Mating Connectors Solder Tail	Mating Connectors Wrapped Tail
G	4.5"x6.5"	812	812WE	16	ElcoVar	.2	Gold	R616-1	----
G	3"x4.5"	837	837WE	12	ElcoVar	.2	Gold	R612-1	----
G	4.5"x6.5"	838 †	838WE †	44	Etched	.156	Tinned	R644	R644-3
G	4.5"x6.5"	838-1		44	Etched	.156	Tinned	R644	R644-3
G	4.5"x6.5"	838A †	838AWE †	22	Etched	.156	Tinned	R644	R644-3
G	4.5"x6.5"	----	838WE-1GN	44	Etched	.156	NPGF	R644	R644-3
G	4.5"x6.5"	----	848WE	35	ElcoVar	.10	Gold	R635	----
P	3"x4.5"	----	837PWE	12	ElcoVar	.2	Gold	R612-1	----
P	2.73"x4.5"	----	3795	44	Etched	.1	NPGF	----	R644-2
P	2.73"x4.5"	----	3797	30	Etched	.156	NPGF	R630	----
P	4.5"x6.5"	----	3719-1	72	Etched	.1	Tinned	R636-2	R636-1
P	4.5"x9.6"	----	3719-4	72	Etched	.1	NPGF	R636-2	R636-1
P	4.5"x4.5"	----	3719-5	72	Etched	.10	NPGF	R636-2	R636-1
P	4.5"x6.5"	----	3662	44	Etched	.156	NPGF	R644	R644-3
P	4.5"x9.6"	----	3662-2	44	Etched	.156	Tinned	R644	R644-3
P	4.5"x4.5"	----	3662-4*	44	Etched	.156	NPGF	R644	R644-3
P	4.5"x4.5"	----	3662-5	44	Etched	.156	NPGF	R644	R644-3
P	4.5"x6.5"	----	3662A	44	Etched	.156	NPGF	R644	R644-3
P	4.5"x6.5"	----	3662A-6*	44	Etched	.156	NPGF	R644	R644-3
P	7.98"x9.6"	----	3673	80	Etched	.125	NPGF	----	R680
H	4.5"x6.5"	----	4312	72	Etched	.1	NPGF	R636-2	R636-1
P	5.3"x10.1"	----	8801-1	100	Etched	.125	NPGF	R681-3	R681-1

* Has 2 oz. tinned copper ground plane on back side w/etched clearance holes.
ElcoVar=Elco Varicon NPGF=Nickel Plated Gold Flashed

†Boards keyed with .1 offset on plug-in portion.

RECOMMENDED CARD CAGES
For above Plugbords: 4.5"x6.5" -CCK-13 or CCK-13P; 4.5"x4.5"- CCK13A or CCK13AP; 7.98"x9.6" - CCK17; 4.5"x9.6" - CCK4, CCK14 or CCK14P.

RECEPTACLE MOUNTED CARD GUIDES

The BR27 Series Card Guides provide rugged support for 1/16 in. freestanding circuit boards and sure guidance while engaging board and receptacle. This arrangement is commonly found on "mother boards" and in units where space is at a premium. Package quantity all catalog numbers: 2 guides; 2 screws, 4/40, Pan Hd., 3/4 in. long; 2 flat washers; 2 lock washers; 2 hex nuts, 4/40. In bulk quantities (more than 50 prs.) fasteners packaged separately from guides. Material is aluminum alloy, clear anodized.

ORDERING INFORMATION

Guide No.	Connector	For Plugbord Types:
BR27	R644, R644-3 (0.156")	4.5" wide Plugbords with centered contacts, such as Vector 838-1, 3474, 3677, 3682 and 3662 Series.
BR27-1	R636-1 (0.1")	4.5" wide Plugbords with centered contacts, such as Vector 3719 Series.
BR27-3	R630 (0.156")	2.73" wide Plugbords with centered contacts, such as Vector 3796 and 3797 Series.
BR27-4	R644-2 (0.1")	2.73" wide Plugbords with centered contacts, such as Vector 3795.

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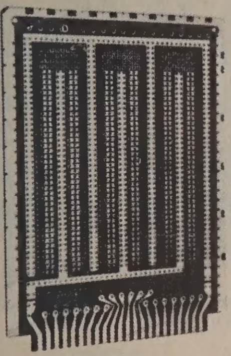
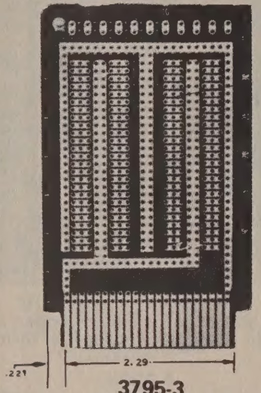
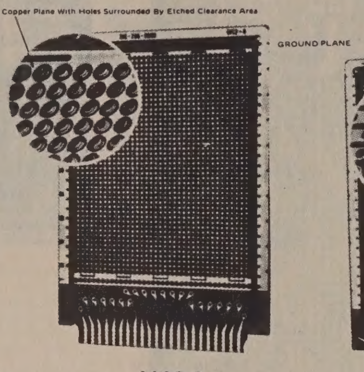
Vector PLUGBORDS FOR FLEXIBILITY

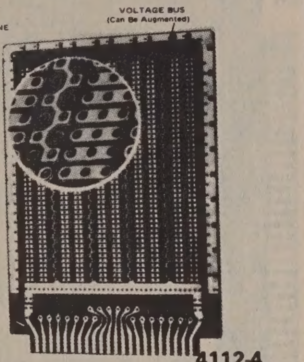

3677-2



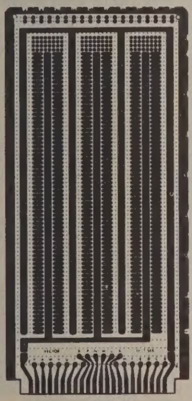
3795-3
(Wiring Side)



4112-4
(Component Side)



4112-4
(Wiring Side)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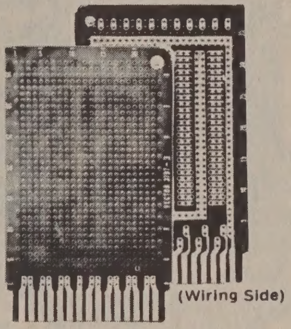
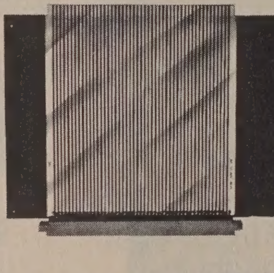
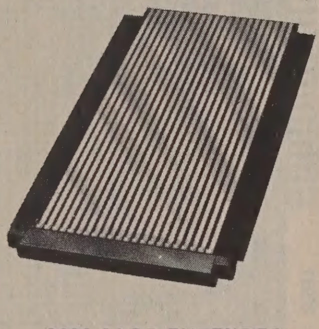

(Wiring Side)
(Component Side)
3797-3


3690-12 CARD EXTENDER


3690 CARD EXTENDER

PLUGBORDS WITH ETCHED TINNED PADS AND BUSES

Use for prototype, test, and short run plug-in circuits. All boards have an overall hole grid of 0.042 in. holes on 0.1 in. centers (Pattern "P"). All etched circuitry above contact area is tinned for easy soldering. Boards are available with varied contact arrangements and mating connectors are listed. Back to back contacts on each etched side terminate in independent hole pads. Terminals to fit.

3677, 3797 and 3795 SERIES

These Plugbords have etched tinned buses, interleaved between pad areas. All models have tinned 3-hole pad groups for easy component mounting and interconnection. DIPs or components may be soldered directly to pads, or terminals installed in pads. Socket tabs may also be attached to the pads to facilitate making component changes. The heavy etched and tinned interleaved ground and voltage buses make complicated circuit construction quite easy, while providing great flexibility. The 3677 series has 96 individual pads for mounting T0-5 and T0-18 transistors or round case integrated circuits.

4112 SERIES

These Plugbords have groups of 3-hole pads, interleaved "zig-zag" voltage bus, plus an overall etched ground plane on opposite side. The "zig-zag" design permits installed pins to connect or bypass the bus as desired. Reduced impedance and noise can be achieved with addition of Vector's double overhead trolley bus. DIPs or components may be soldered directly to pads, or terminals installed in pads. Socket tabs may also be attached to the pads.

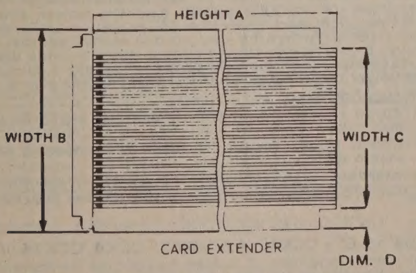
For above Plugbords: **RECOMMENDED CARD CAGES**

4.5"x6.5" -- CCK-13 or CCK-13P 4.5"x4.5" -- CCK13A or CCK13AP
7.98"x9.6" -- CCK17 4.5"x9.6" -- CCK4, CCK14 or CCK14P

		No. DIPs Accom.		Contacts - Etched			Mating Connectors	
Board Size	Part No.	14 p.	16 p.	No.	Spacing	Plating	Solder Tail	Wrapped Tail
2.73"x4.5"	3795-1	6	4	44	.1	NPGF	----	R644-2
2.73"x4.5"	3797-2	6	4	30	.156	NPGF	R630	R630-5
4.5"x9.6"	3677	24	21	44	.156	NPGF	R644	R644-3
4.5"x6.5"	3677-2	15	12	44	.156	NPGF	R644	R644-3
4.5"x6.5"	4112-4	25	25	44	.156	NPGF	R644	R644-3
4.5"x4.5"	4112-5	15	10	44	.156	NPGF	R644	R644-3

NPGF=Nickel Plated Gold Flashed

CONTACT SPECIFICATIONS. Etched contacts:
Epoxy glass Plugbords -- 2 oz. copper .00005" nickel plate, gold flash. Quality flame-retardant 1/16" thick board materials are the same as those used for Vectorbord® and Micro-Vectorbord®, see preceding page.



3690 SERIES CARD EXTENDERS

Card Extenders allow extension of operating cards beyond cages for tests. Quality epoxy glass with nickel plated gold flashed plug tips and high quality top connector where indicated.

Extender	Dimensions					Receptacles	Plugbord Series
Catalog No.	A	B	C	D	Contact Strip	Supplies	Used With
3690	6.5"	4.5"	3.6"	.46"	22 ea side,.156"ctrs.	R644	838.3474,3662, 3677,3682,4050 4112,4494
3690-1	6.5"	4.5"	3.6"	.46"	22 ea side,.156"ctrs.	None	
3690-6	11.0"	4.5"	3.6"	.46"	22 ea side,.156"ctrs.	R644	
3690-2	11.0"	4.5"	3.7"	.40"	36 ea side,0.10"ctrs.	R636	4493,3719 4066,4312
3690-3	11.0"	4.5"	3.7"	.40"	36 ea side,0.10"ctrs.	None	
3690-4	7.5"	4.5"	3.7"	.40"	36 ea side,0.10"ctrs.	R636	
3690-8	5.5"	2.73"	2.3"	.22"	22 ea.side, 156"ctrs.	R644-2	3795
3690-10	5.5"	2.73"	2.5"	.12"	15 ea side,.156"ctrs.	R630	3797
3690-12	7.5"	9.99"	6.37"	1.49"	50 ea side,.125"ctrs.	R681	8800
3690-13	7.5"	9.99"	6.37"	1.49"	50 ea side,.125"ctrs.	None	
3690-14	11.0"	6.99"	5.11"	.94"	40 ea side,.125"ctrs.	R680	3673,4350
3690-15	11.0"	6.99"	5.11"	.94"	40 ea side,.125"ctrs.	None	

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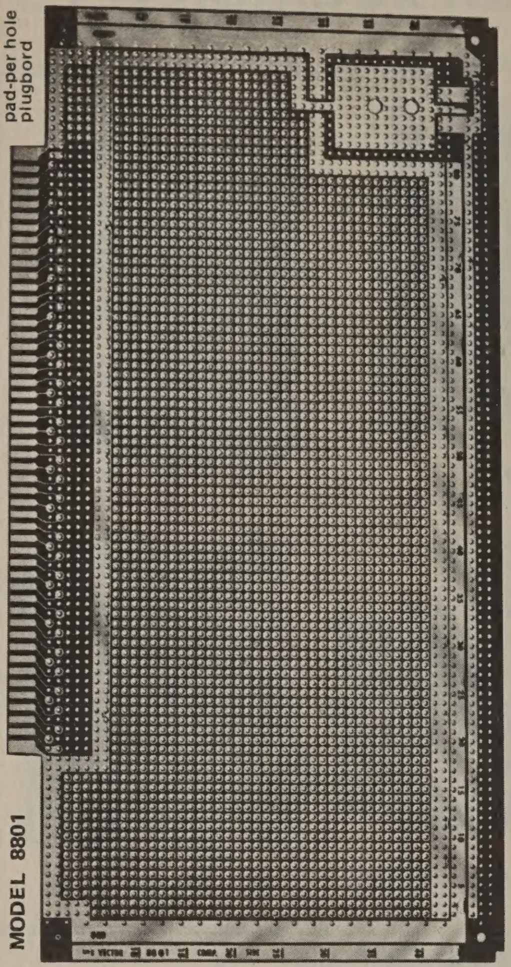
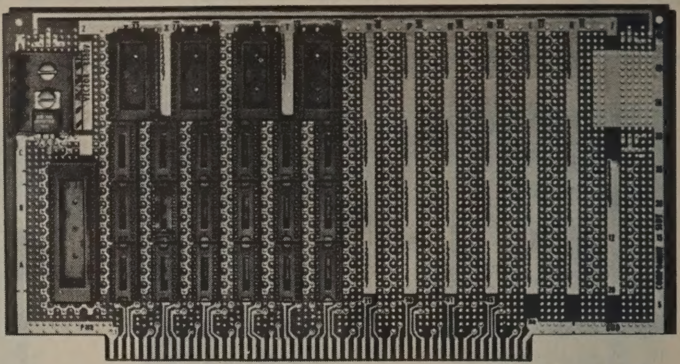
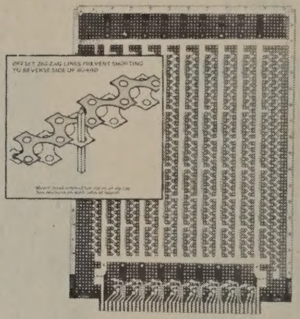
VECTOR MICROPROCESSOR PLUGBORDS

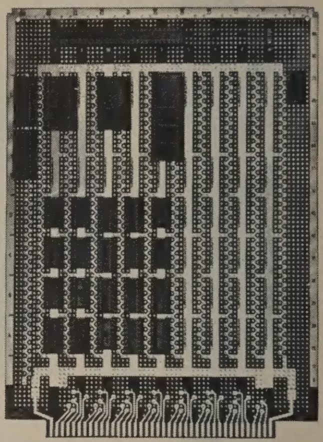




8800V
(Component side with added sockets. Available to order with sockets & terminals installed)



4350
(Wiring Side w/ Insert Showing Zig-Zag Bus)



4350
(Component Side w/ Added Sockets)

MICROPROCESSOR PLUGBORDS

With Vector Universal Microprocessor Plugbords, users can readily install any DIP device and quickly make the necessary interconnections to build peripheral interface equipment, expand memory capacity, or I.O. circuitry. Above FR-4 epoxy glass boards are furnished with an overall grid of 0.042 in. dia. holes on 0.1 in. centers, heavy tinned buses, plus nickel plated gold flashed contacts. Low in cost, the boards are planned for user installation and interconnection of wrap-post sockets wherever required. Large copper-free areas are provided for installation of flat cable I.O. connectors or large bodied discrete devices.

MODEL 8801 PAD-PER HOLE PLUGBORD

This plugbord measuring 5.313 in. high x 10.0 in. wide has 100 contacts (total two sides) spaced 0.125 in. centers and an overall pattern of 0.042 in. diameter holes spaced on 0.1 centers. Almost any device can be located anywhere on the board. Heavy tinned power and ground buses are provided on the board periphery and the one regulator position provided has prewired power, and ground connections. Tinned "donut" pads on both board sides with intervening clear areas surround all the individual holes within the peripheral buses. These pads provide solderable anchors for attaching almost any component or socket at any desired location. At the boards top edge, a copper free area approximately ¼ in. wide with 2 rows of holes is available for mounting I.O. connectors or other devices. Row and column markings, plus ejecter mounting holes are also provided. Board material is epoxy glass with hot tinned buses, nickel plated and gold flashed contacts. Mating Receptacles: R681 w/DIP solder tails fits Altair Motherboards; R681-1 - 3 level 0.025 in. square wrap post tail; R681-2 - 1 level 0.025 in. square wrap post tails fits IMSAI motherboards.

8800V — 10 in. wide by 5.313 in. high, has 100 (50 each side) contacts on 0.125 in. centers. Compatible with Altair 8800 and the IMSAI equivalent, the board can hold two 40-pin DIPs, eight 24-pin DIPs, and thirty-six 14- or 16-pin DIPs. Alternatively, it can hold fifty-two 14- or 16-pin DIPs, or ten 40-pin DIPs and eight 24-pin DIPs, or any combination in-between. Power is distributed to each DIP location by heavy copper tinned power and ground planes on opposite board sides for low impedance. Has two heat sink provisions, and one heat sink supplied with each board. For wiring ease, boards are identified by DIP zones as well as column and row hole designations.

Mating Connectors For 8800V

R681 — 50/100 contacts on 0.125 in. centers w/ soldertails
R681-1 — Same as R681 except w/ 0.025 in. sq. wrap-post tails

4350 — 7 in. wide by 9.6 in. long, has 80 (40 each side) contacts on 0.125 in. centers. Compatible with TI 980 series computer, the board will hold sixty-three 14- or 16-pin DIPs over the power and ground buses, or six 24-pin DIPs plus forty-five 14- or 16-pin DIPs, or 40-pin microprocessor DIPs anywhere by cutting one etched jumper lead per location. Heavy, back-to-back tinned copper buses provide distributed decoupling capacitance. For user convenience, an extra plus or minus voltage zig-zag power bus is supplied on each side of the board.

Mating Connectors For 4350, 3673

R680-1 — 40/80 contacts on 0.125 in. centers; 0.025 in. sq. wrap post tails
R680 — Lower priced version of R680-1; numbering does not match 4350

Quality flame-retardant 1/16" thick board materials are the same as those used for Vectorbord® and Micro-Vectorbord®, see preceding page.

RECOMMENDED CARD CAGES

For Plugbords: 4.5"x6.5"- CCK3, CCK13 or CCK13P; 4.5"x4.5" - CCK13A or CCK13AP; 7.98"x9.6" - CCK17; 4.5"x9.6" - CCK4, CCK14 or CCK14P.

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

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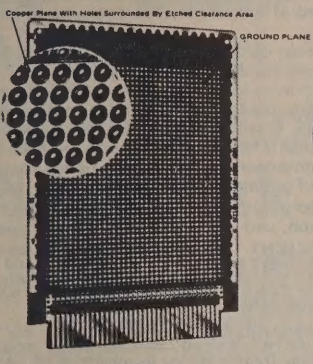
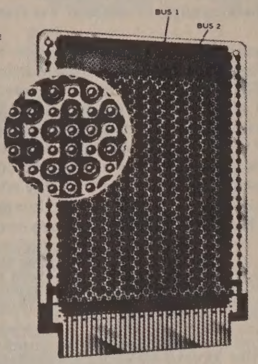
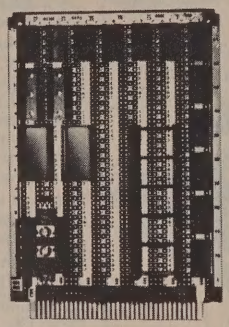
Vector WIRE WRAPPABLE PLUGBORDS



4066-4
(Component Side)

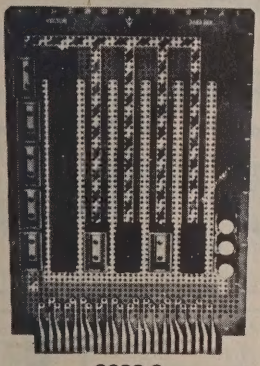


4066-4
(Wiring Side)

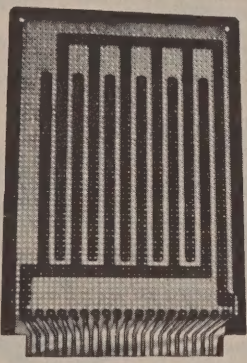


4493
(Component Side)

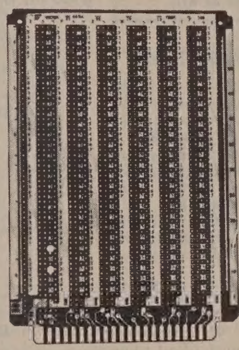
4493 wiring side is identical to 4494 except for 36-contact configuration.



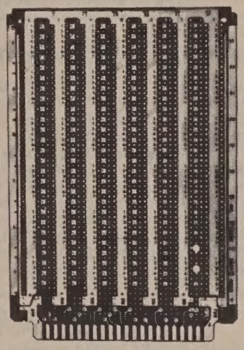
3682-2
(Component Side)



3682-2
(Wiring Side)



4494
(Component Side)



4494
(Wiring Side)

WIRE WRAPPABLE PLUGBORDS

Vector wire wrappable Plugbords are furnished with an overall grid of 0.042 in. holes on 0.1 in. centers, tinned interleaved buses, and ground planes on one side of some models. DIP sockets and wire wrappable terminals or socket pins may be installed wherever required and connected however required. "Free" board areas without buses are provided on all models for mounting discretes or other large components. All boards are flame-retardant epoxy glass and furnished with the most popular edge connectors, nickel plated and gold flashed. Ejector holes are provided on all models, and a full line of supporting compatible card and module cages is available from Vector. "Special" features on the 4066 series are:

GROUND PLANES – A heavy overall 2 oz. tinned copper area on one board side can be used to reduce noise and transients, and to provide low impedance when used with buses on opposite side. A copper-free area surrounds each hole in the ground plane so installed terminals may be connected as required to one, or both, board side(s) as required.

ZIG-ZAG BUSES (on 4066 Series) -- Two uniquely configured independent bus paths accommodate terminal tails for connections as required. Use of high capacitance Vector double overhead trolley bus series with zig-zag bus lowers impedance for high frequency circuits, such as encountered in ECL 10,000 series logic.

CONTACT SPECIFICATIONS. Etched contacts:
–2 oz. copper .00005" nickel plate, gold flash.

Board Size	Part No.	No Cont	Spacing	No. 14-p DIPs Accom.	No. Independ. Buses Wiring Side	No. Independ. Buses Component Side	Mating Connectors Solder Tail	Mating Connectors Wrapped Tail
4.5"x9.6"	3682	44	.156	54	2	---	R644	R644-3
4.5"x6.5"	3682-2	44	.156	30	2	---	R644	R644-3
4.5"x6.5"	3682-4	44	.156	30	2	1	R644	R644-3
4.5"x6.5"	4066-4	72	.100	34	2	1	----	R636-1
4.5"x4.5"	4066-5	72	.100	18	2	1	----	R636-1

ANY-DIP PLUGBORDS

These plugbords have an overall pattern of .042 holes and accept all DIP sockets with lead spacings of 0.1 inch by 0.3, 0.4, 0.6 and 0.9, and with up to 64 pins. W.W. sockets and Vector's Slit-N-Wrap tool are ideal for fast hookup. A corner of the DIP area can be used for mounting a low profile heat sink (one heat sink and mounting hardware furnished), or two regulators in TO-220 packages. Leads on one regulator position are prewired to raw power input, ground input and plane, and regulated power plane. The other regulator position is uncommitted. Boards have a full ground plane network on the component side, and a similar but interdigitated power plane network is provided on the other side (for either raw or regulated power). These planes provide low impedance and high distributed capacity for power buses, versatility in DIP positioning, and place power supply sources less than one quarter inch away from any DIP lead. Board material is epoxy glass with 2 oz. tinned copper circuit patterns, and nickel plated gold flashed contacts.

DIP Mounting Capacity:
4½"x6½" models: forty-two 14- or 16-pin, or sixteen 22- or 24-pin, or eight 40-pin, or five 64-pin.
4½"x9.6" models: sixty-three 14- or 16-pin, twenty-four 22- or 24-pin, twelve 40-pin, six 64-pin.

Model No.	Size	No. Contacts	Spacing	Mating Connector Solder Tail	Mating Connector W.W. Tail-.025 sq.
4493	4½x6½	72	0.1	R636-2	R636-1
4493-1	4½X9.6	72	0.1	R636-2	R636-1
4494	4½x6½	44	0.1	R644	R644-3
4494-1	4½x9.6	44	0.1	R644	R644-3

Quality flame-retardant 1/16" thick board materials are the same as those used for Vectorbord® and Micro-Vectorbord®, see preceding page.

RECOMMENDED CARD CAGES

For Plugbords: 4.5"x6.5"- CCK3, CCK13 or CCK13P; 4.5"x4.5" - CCK13A or CCK13AP; 7.98"x9.6" - CCK17; 4.5"x9.6" - CCK4, CCK14 or CCK14P.

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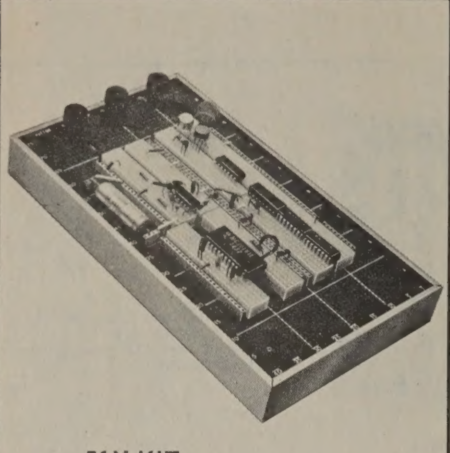
KLIP-BLOK/STRIP BREADBOARDING SYSTEM



51X KIT

(Circuit elements not included in kit)

51X KLIP-BLOK KIT - Assembled

Accepts up to 12 DIPs, has 970 tie points. Consists of big 4½"x8"x1/16" glass epoxy premarked Micro-Vectorbord® base, panel mounted on 1" high aluminum frame with eight 24-quad (T66-96) Klip-Bloks and four 48-contact Klip-Buses installed, ready for plugging in up to 12 DIPs and associated circuitry. Three 5-way binding posts are installed at one end. The Micro-Vectorbord panel provides space and facility for mounting extra large components. Kit includes stick-on MS9A and MS10A DIP contact Marker Strips, and special T49-1 Adapter Pins for plugging large components into Klip-Bloks/Strips.

No Soldering **Use With DIPs. Other I.C.s and Discrete Components** **No Wrapping**

Build circuits quickly with Klip-Bloks, Klip-Strips and Klip-Buses. Simply insert components into these spring clip units and make interconnections with ordinary wire. Designing, modifying and testing the circuit is easily accomplished without the need of special patch cords or risk of damaging components.

Klip-Bloks, Strips and Buses consist of spring clips with four connected tie points or 'quads.' Klip-Strips and Buses utilize the quads in strips of various lengths, from 4 to 48 tie points with insulated casings, while Klip-Bloks have these quads encased in nylon shells, either 8 (T66-32) or 24 (T66-96) quads each. All Klip-Bloks, Strips and Buses are spaced on 0.1" grids for optimum I.C. breadboarding. Klip-Bloks, Strips and Buses accept leads from 0.015" to 0.032" dia. Ordinary 22 ga. wire (0.0253" dia.) is ideal for strapping. Components may be inserted into the clips from either top or bottom. The Bloks serve as sockets for components with extra tie points for interconnections. Accompanying Klip-Buses make voltage and ground readily accessible.

Contacts used in Klip-Bloks and Strips are tin lead coated beryllium copper for thousands of reliable connections. Plastic housings on Klip-Bloks are nylon, and insulated brass shells are used on Klip-Strips and Buses.

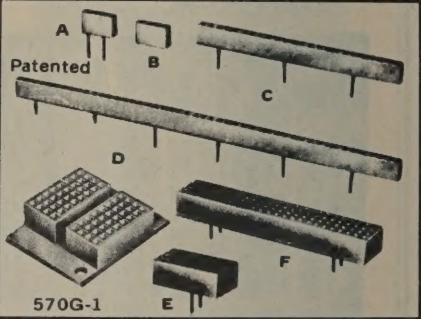
VERSATILE. Klip-Bloks, Strips and Buses fit "P" Pattern Micro-Vectorbord (0.042" dia. holes on 0.1" grid). Thus units may be "moved around" as needed with NO WASTED TIE POINTS. Plus, there is extra SPACE on the Vectorbord base to mount switches, pots, transformers--OR extra Klip units.

REUSABLE. Low-cost Klips and chassis panels may be used over and over again. Klips are good for thousands of insertions and may also be removed and replaced as desired.

Fig.	Part No.	Description	Pkg.Qty.
A	T45-4	Klip-Strip w/mtg. pins	16, 100
B	T45A-4	Patch-Klip - no mtg. pins	16, 100
--	T45-8	Klip-Strip - two quads	2, 10
C	T45-24	Klip-Bus	2, 10
D	T45-48	Klip-Bus	2, 10
–	P154-1	Insertion/Removal Tool for above Klip units	1
E	T66-32	Klip-Blok (8-quad)	4, 16
F	T66-96	Klip-Blok (24-quad)	2, 8
--	P92B	Removal Prod for Bloks	1
--	T49-1	Adapter Pins for leads to .050"	100
--	570G-1	Solderless Breadbd. Socket (2 8-qd. Klip-Bloks mounted on nylon base)-for 14-or 16-pin DIP. Stick-or screw-on.	1

EFFICIENT USE OF SPACE. Since components may be mounted on both top and bottom of the Vectorbord base, space is fully utilized. T49-1 Adapter Pins for leads to 0.050" dia. are available.

EXPANDABLE BREADBOARDS. 4½"x8" modules may be coupled together or mounted in larger frames for up to multiples of 144 sq. inches of breadboarding area.



PLUG-IN CASES For Building Modular Plug-In Circuits

ROUND CASES listed consist of a mica filled phenolic tube base type plug, either standard 7-pin miniature, 9-pin noval, or 8-pin octal type, and cover. Some listed models have interior wiring structures for mounting components. Covers attach with furnished screws. Other sizes and "specials" to order -- write factory.

Base Plug Type	Part No.	Dia.	Lgth.*	Furnished Internal Structure
7-pin Min.	G2.2-8	5/8"	2"	Center Screw + Insul. Spacer
9-pin Min.	G2.1-8	3/4"	2"	Center Screw + Insul. Spacer
7-pin Min.	G2.2-8 F	5/8"	2"	None
9-pin Min.	G2.1-8 F	3/4"	2"	None
7-pin Min.	G2.2-8-4	5/8"	2"	Terminal Wall Strip w/ Terminals
9-pin Min.	G2.1-8-4	3/4"	2"	Terminal Wall Strip w/ Terminals
8-pin Octal	G2-10	1¼"	2½"	None
8-pin Octal	G2-10-4	1¼"	2½"	Terminal Wall Strip w/ Terminals

*Does not include plug pins.

SQUARE CASES with retainer ring mounted mica filled phenolic plugs. Models listed have 8-pin octal type plugs retainer-ring-mounted in bases to which covers attach with 3 furnished side screws.

Base Plug Type	Part No.	Size (Lgth. Less Plug Pins)	Furnished Internal Structure
8-pin Octal	B-8	1-3/8"sq. x 2" long	None
8-pin Octal	B-10	1-3/8"sq. x 2½" long	None
8-pin Octal	B-10T	1-3/8"sq. x 2½" long	Turret w/ 12 Lugs
8-pin Octal	C-10	2" sq. x 2½" long	None
8-pin Octal	C-12T	2" sq. x 3" long	Turret w/ 12 Lugs

2" SQ. CASES WITH CRIMPED 8-PIN BAKELITE OCTAL PLUGS

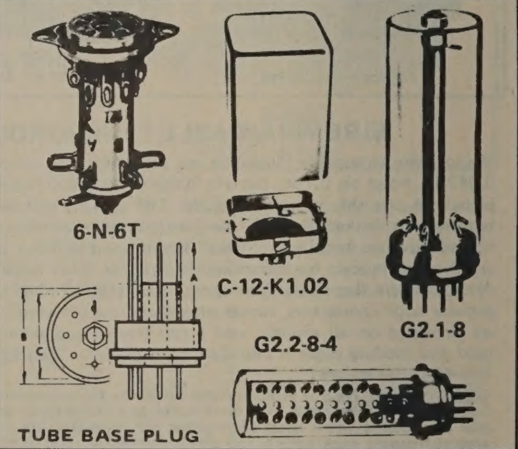
Available Terminal Cards w/ O/A Hole Pattern & Mtd. Brackets

Part No.	O/A Lgth.	Large Holes (.093) Spaced .265x.265 Phenolic Material	Small Holes (.062) Spaced .1 x .2 Epoxy Glass Mat'l	Micro Holes (.042) Spaced .1 x .1 Epoxy Glass Mat'l
C-10-K1.02	2½"	None	None	None
C-12-K1.02	3"	511	514	514-1P

TUBE BASE PLUGS

Mica filled phenolic or white glass filled polyimide material for building miniature plug-in units. Plugs match standard tube base sockets and have tinned phosphor bronze pins for soldering components on upper end. Flange on plug body serves as "stop" and bonding point for covers if used. Pins on plug-in side are 17/64" long. Models with recessed knurled nuts are available -- write factory. *Plugs listed below do not have center post.*

No. Pins	Mica Filled Phenolic	Polyimide	Type	Key Way	Dimensions A	B	C
7	K1.313	——	7-pin Min. Straight Pins	No	3/16	.620	.575
7	K1.302	——	7-pin Min. Straight Pins	Yes	17/32	.620	.575
7	K1.334	——	7-pin Min. Hooked Pins	Yes	3/16	.620	.575
9	K1.413	K1.413B	9-pin Straight Pins	No	3/16	.750	.700
9	K1.402	——	9-pin Straight Pins	Yes	17/32	.750	.700
9	K1.434	——	9-pin Hooked Pins	Yes	3/16	.750	.700



TURRETS

Post and Socket Types

Compact wiring structures are ideal for mounting discrete components on minimum chassis space. Socket type has ½" dia. phenolic post attached to socket, and one or two rings of tinned lugs for soldering components. Post type mounts with 6-32 screw into recessed knurl nut inside turret, or with protruding 6-32 screw. Many other sizes and types available -- write factory.

Part No.	Mounting Style	Turret Height	No. Term.	No. Rings	Spacing Betw. Rings
8-0-9T	Octal Socket	2"	9	2	1"
10-0-9T	Octal Socket	2½"	9	2	1-3/8"
6-M-6T	7-pin Min. Skt.	1½"	6	1	——
8-M-9T	7-pin Min. Skt.	2"	9	2	1"
6-N-6T	9-pin Min. Skt.	1½"	6	1	——
8-N-9T	9-pin Min. Skt.	2"	9	2	1"
8-12	6-32 Screw/Nut	1-27/32"	12	2	1"
10-12	6-32 Screw/Nut	2½"	12	2	1-3/8"
6-H-12	6-32 Knurl Nut	1½"	12	2	7/8"
8-H-12	6-32 Knurl Nut	2"	12	2	1-3/8"

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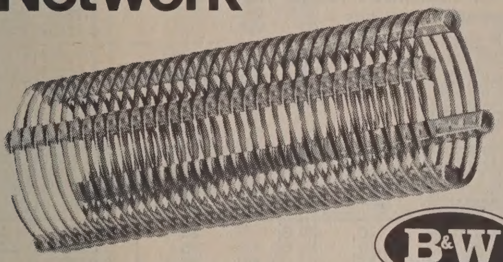
INDUCTORS

Air wound...Rotary... Band Switching Pi-Network



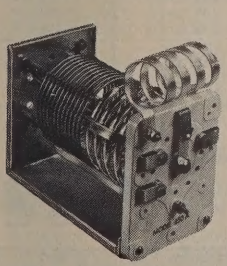
The B&W **Miniductor** line of rugged precision air-wound inductors gives you a large selection of standard diameters, wire gauges, and turn spacing to let you select the optimum coil for your power, Q, and size requirements. You can order standard coils from the listing at the right, or write for a quotation on your custom design in OEM quantities.

For medium and high frequency communications equipment, B&W rotary and band-switching pi-network inductors give the RF designer rugged, high-quality components for the medium power (to 1 kW AM) final amplifier and antenna tuner. Write for specifications.

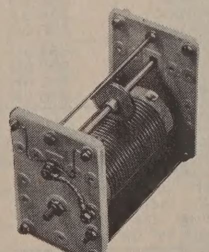
Also from Barker & Williamson:

RFI and TVI filters, plate and filament chokes, dummy loads, RF and audio test equipment, coaxial switches and relays, antenna accessories, RF power meters, and custom manufacturing services.

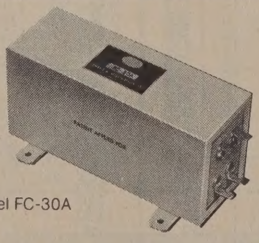
Part No.	Coil Dia.	Turns per Inch	Coil Length	Wire Size	Inductance (μH)
3001	1/2"	4	2"	18	0.18
3036		6		18	0.40
3002		8		18	0.72
3037		10		18	1.10
3003		16		20	3.0
3038		24		22	6.75
3004		32		24	12.0
3005	5/8"	4		16	0.275
3039		6		18	0.620
3006		8		18	1.10
3040		10		18	1.70
3007		16		20	4.50
3041		24		22	10.0
3008		32		24	18.0
3009	3/4"	4	3"	16	0.620
3042		6		18	1.40
3010		8		18	2.50
3043		10		18	3.90
3011		16		20	10.0
3044		24		22	23.0
3012		32		24	40.0
3013	1"	4		16	1.0
3045		6		18	2.40
3014		8		18	4.10
3046		10		18	6.60
3015		16		20	17.0
3047		24		22	38.0
3016		32		24	68.0
3017	1-1/4"	4	4"	14	2.30
3048		6		14	5.0
3018		8		16	9.0
3049		10		18	14.0
3019		16		18	36.0
3050		24		22	81.0
3020		32		24	145.0
3051	1-1/2"	4		14	3.10
3052		6		14	7.0
3053		8		16	12.5
3054		10		18	20.0
3055		16		20	50.5
3056		24		22	110.0
3057		32	10"	24	200.0
3021	1-3/4"	4	4"	14	4.20
3058		6		14	9.40
3022		8		14	16.50
3059		10		16	26.0
3023		16		18	67.0
3060		24		22	150.0
3024		32		24	270.0
3061	2"	4	10"	12	15.0
3025		6		12	33.0
3026/3900		8		14	59.0
3027/3907-1		10		16	92.0
3062		16		16	238.0
3063	2-1/2"	4		12	22.5
3029/3905-1		6		12	51.0
3030/3906-1		8		14	90.0
3031		10		16	140.0
3064	3"	4		12	32.0
3033		6		12	71.0
3034		8		14	125.0
3035		10		16	198.0



Model 851

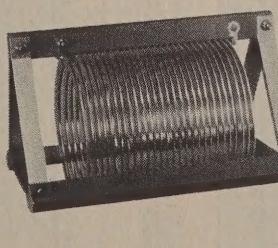


Model 3852



Model FC-30A

Model 800 RF Plate Choke



3800/3810 Series Coils

Professional quality since 1932

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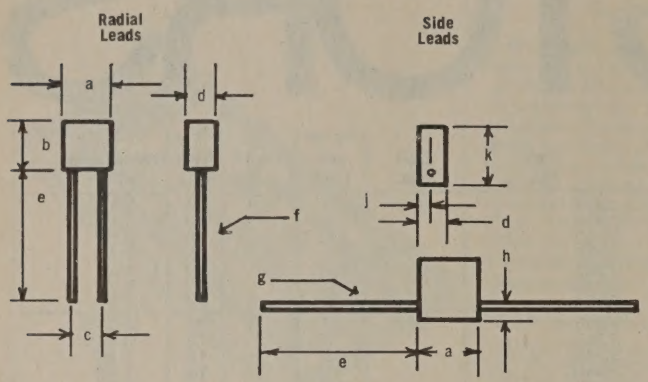
BARKER & WILLIAMSON, INC. • Canal Street • Bristol, PA 19007

Encapsulated Subminiature and Miniature Toroidal Inductors



Features

- Applications: printed circuits and modules
- Environmental: designed to meet MIL-C-15305, Grade 1, Class B (−55°C to +125°C)
- Moisture and shock resistant, immersion proof
- Powdered iron toroidal core, low external magnetic field
- Identification: part number and inductance value printed in contrasting color

General Specifications (All Series)

Maximum operating temperature: 125°C
Rated temperature rise (at 90°C): 35°C
Dielectric withstanding voltage: 700 v rms
Terminal pull: 5 pounds
Altitude rating: 70,000 feet
Overload current: 1.4 times the rated current
Add Suffix -S to P/N for side leads configuration

T1 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test Freq., MHz	Max. DC Resist., Ohms	Rated DC Current mA
100066	0.01	60	150	0.02	3000
100067	0.012	60	150	0.02	3000
100068	0.015	60	150	0.02	3000
100069	0.018	60	150	0.02	3000
100070	0.022	60	100	0.02	3000
100071	0.027	60	100	0.02	3000
100072	0.033	60	100	0.02	3000
100073	0.039	60	100	0.02	3000
100074	0.047	60	100	0.02	3000
100075	0.056	60	100	0.02	3000
100076	0.068	60	100	0.03	2500
100077	0.082	60	100	0.04	2200
100078	0.10	80	50	0.04	2200
100079	0.12	80	50	0.05	2000
100080	0.15	80	50	0.06	1800
100081	0.18	80	50	0.07	1600
100082	0.22	80	50	0.08	1500
100083	0.27	80	50	0.10	1400
100084	0.33	80	50	0.12	1300
100085	0.39	80	50	0.15	1150
100086	0.47	80	50	0.20	1000
100087	0.56	70	50	0.25	900
100088	0.68	70	50	0.30	800
100089	0.82	70	50	0.35	750
100090	1.0	70	50	0.40	700

a	b	c	d	e	f	g	h	j	k
.2	.2	.1	.1	1.0	#24	#26	.05	.05	.26

Inductance Tolerances: 0.01 to 0.082 uH, ±20%; 0.10 to 1.0 uH, ±10%

T2 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test Freq., MHz	Max. DC Resist., Ohms	Rated DC Current mA
100092	0.10	55	25	0.04	2200
100093	0.12	60	25	0.05	2000
100094	0.15	60	25	0.06	1800
100095	0.18	60	25	0.07	1600
100096	0.22	65	25	0.08	1500
100097	0.27	65	25	0.10	1400
100098	0.33	65	25	0.11	1300
100099	0.39	65	25	0.14	1200
100100	0.47	65	25	0.17	1100
100101	0.56	70	25	0.22	1000
100102	0.68	70	25	0.27	900
100103	0.82	70	25	0.30	800
100104	1.0	70	25	0.35	750
100105	1.2	60	7.9	0.40	700
100106	1.5	60	7.9	0.50	630
100107	1.8	60	7.9	0.70	530
100108	2.2	60	7.9	0.90	470
100109	2.7	60	7.9	1.1	420
100110	3.3	60	7.9	1.3	390
100111	3.9	60	7.9	1.5	360
100112	4.7	60	7.9	1.8	330
100113	5.6	60	7.9	2.0	310
100114	6.8	60	7.9	2.2	300
100115	8.2	60	7.9	2.4	290
100116	10	60	7.9	2.6	280

a	b	c	d	e	f	g	h	j	k
.2	.2	.1	.1	1.0	#24	#26	.05	.05	.26

Inductance Tolerances: 0.10 to 0.82 uH, ±10%; 1.0 to 10 uH, ±5%.

T3 SERIES

Part Number	Apparent Induc., uH	Min. Q	Test Freq., MHz	Max. DC Resist., Ohms	Rated DC Current mA
100117	10	75	2.5	1.1	550
100118	12	75	2.5	1.3	500
100119	15	75	2.5	1.5	450
100120	18	80	2.5	1.9	410
100121	22	80	2.5	2.3	380
100122	27	80	2.5	2.7	350
100123	33	80	2.5	3.3	320
100124	39	80	2.5	3.9	290
100125	47	80	2.5	4.7	260
100126	56	80	2.5	5.6	240
100127	68	80	2.5	6.8	220
100128	82	80	2.5	8.1	200
100129	100	80	2.5	9.7	180
100130	120	45	0.79	12	160
100131	150	45	0.79	14	150
100132	180	45	0.79	17	140
100133	220	50	0.79	20	130
100134	270	55	0.79	24	120
100135	330	55	0.79	19	130
100136	390	55	0.79	22	120
100137	470	55	0.79	27	110
100138	560	55	0.79	32	100
100139	680	55	0.79	19	130
100140	820	50	0.79	23	120
100141	1000	50	0.79	27	110

a	b	c	d	e	f	g	h	j	k
.27	.27	.2	.15	1.0	#22	#24	.05	.075	.33

Inductance Tolerance: ±5%; closer tolerances on request.

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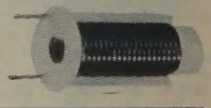
HIGH Q MOLDED ADJUSTABLE COILS

The 48A Series of coils listed below may easily be tapped at 1/8, 1/4, 3/8, 5/8, 3/4, 7/8 turn if desired.

Frequency Range: 30 MHz to 250 MHz
Wire Size: 20 AWG tinned copper
Form Length: .73 inches
Coil OD: .310 inches
Lead Spacing: .408 inches
Core: 10-32 x 3/8″ Carbonyl J

Miller Part No.	Minimum Inductance	Maximum Inductance	D.C. Current
48A518mpc	.046 uH	.055 uH	2A
48A778mpc	.071 uH	.082 uH	2A
48A117mpc	.099 uH	.122 uH	2A
48A147mpc	.118 uH	.157 uH	2A
48A187mpc	.150 uH	.207 uH	2A
48A227mpc	.181 uH	.278 uH	2A
48A257mpc	.209 uH	.283 uH	2A
48A287mpc	.241 uH	.316 uH	2A
48A317mpc	.270 uH	.351 uH	2A

49A SERIES



Frequency Range: 10 MHz to 250 MHz
Wire Size: 22 AWG single polyurethane coated with tinned leads
Form Length: .87 inches except 49A146MPC
Coil OD: .285 inches
Lead Spacing: .324 inches
Core: 10-32 x 3/8″ Carbonyl J

Miller Part No.	Minimum Inductance	Maximum Inductance	D.C. Current
49A678mpc	.060 uH	.074 uH	1.5A
49A127mpc	.100 uH	.132 uH	1.5A
49A167mpc	.134 uH	.194 uH	1.5A
49A217mpc	.170 uH	.258 uH	1.5A
49A347mpc	.250 uH	.415 uH	1.5A
49A537mpc	.393 uH	.657 uH	1.5A
49A757mpc	.600 uH	.900 uH	1.5A
49A997mpc	.810 uH	1.160 uH	1.5A
49A126mpc	.960 uH	1.340 uH	1.5A
49A146mpc*	1.180 uH	1.530 uH	1.5A

* Form Length 1.09 inches

MOLDED SHIELDED MINIATURE RF CHOKES

An extremely useful series of chokes where extraneous coupling presents problems in dense packaging. Electromagnetic shielding limits coupling to less than 3% when two units are placed side by side.

Part Number	MS Type	Induct. Micro-henries ±10%	D.C. Resistance Max.	Milli-amp Rating Max.
9250-101	90537-1	0.10	.025	2900
9250-121	90537-2	.12	.034	2800
9250-151	90537-3	.15	.037	2750
9250-181	90537-4	.18	.047	2200
9250-221	90537-5	.22	.067	1700
9250-271	90537-6	.27	.11	1500
9250-331	90537-7	.33	.13	1300
9250-391	90537-8	.39	.18	1100
9250-471	90537-9	.47	.25	1000
9250-561	90537-10	.56	.33	900
9250-681	90537-11	.68	.45	750
9250-821	90537-12	.82	.59	600
9250-102	90537-13	1.00	.07	1900
9250-122	90537-14	1.20	.093	1600
9250-152	90537-15	1.50	.12	1300
9250-182	90537-16	1.80	.14	1200
9250-222	90537-17	2.20	.19	1100
9250-272	90537-18	2.70	.28	950
9250-332	90537-19	3.30	.35	800
9250-392	90537-20	3.90	.40	750
9250-472	90537-21	4.70	.55	650
9250-562	90537-22	5.60	.72	550
9250-682	90537-23	6.80	1.02	500
9250-822	90537-24	8.20	1.32	475
9250-103	90537-25	10.0	1.62	450
9250-123	90537-26	12.0	2.00	400
9250-153	90537-27	15.0	.80	620
9250-183	90537-28	18.0	.89	610
9250-223	90537-29	22.0	.96	600
9250-273	90537-30	27.0	1.19	500
9250-333	90537-31	33.0	1.37	490
9250-393	90537-32	39.0	1.93	410
9250-473	90537-33	47.0	2.11	400
9250-563	90537-34	56.0	2.23	380
9250-683	90537-35	68.0	2.70	370
9250-823	90537-36	82.0	2.44	360
9250-104	90537-37	100.0	3.12	325
9250-124	90537-38	120.0	3.60	290
9250-154	90537-39	150.0	4.10	275
9250-184	90537-40	180.0	4.40	260
9250-224	90537-41	220.0	5.00	250
9250-274	90537-42	270.0	5.80	240
9250-334	90537-43	330.0	6.40	225
9250-394	90537-44	390.0	7.40	200
9250-474	90537-45	470.0	9.50	180
9250-564	90537-46	560.0	10.5	174
9250-684	90537-47	680.0	11.8	168
9250-824	90537-48	820.0	13.0	152
9250-105	90537-49	1,000.0	17.5	135
9250-125	90537-50	1,200.0	22.1	115
9250-155	90537-51	1,500.0	26.5	110
9250-185	90537-52	1,800.0	29.9	105
9250-225	90537-53	2,200.0	33.8	99
9250-275	90537-54	2,700.0	47.3	83
9250-335	90537-55	3,300.0	53.0	80
9250-395	90537-56	3,900.0	73.8	67
9250-475	90537-57	4,700.0	81.6	63
9250-565	90537-58	5,600.0	98.9	56
9250-685	90537-59	6,800.0	111.0	54
9250-825	90537-60	8,200.0	119.0	52
9250-106	90537-61	10,000.0	137.0	49
9250-126	90537-62	12,000.0	143.0	46
9250-156	90537-63	15,000.0	157.0	45
9250-186	90537-64	18,000.0	175.0	41
9250-226	90537-65	22,000.0	274.0	33
9250-276	90537-66	27,000.0	308.0	31
9250-336	90537-67	33,000.0	343.0	30
9250-396	90537-68	39,000.0	376.0	27
9250-476	90537-69	47,000.0	473.0	26
9250-566	90537-70	56,000.0	512.0	25
9250-686	90537-71	68,000.0	580,0	24
9250-826	90537-72	82,000.0	618.0	23
9250-107	90537-73	100,000.0	678.0	22
9250-127	——	120,000.0	540.0	23
9250-157	——	150,000.0	750.0	20
9250-187	——	180,000.0	880.0	18

0.10 thru 0.82 uh — Phenolic Core

1.00 thru 12 uh — Iron Core

15 + uh — Ferrite Core

Size: .157 ±.010 diameter; .395 ±.020 length
Leads AWG #22TCW; 1.438 ±.188 length

MICRO MITE MOLDED RF CHOKES

Nicknamed the "Micro-Mite", these rugged coils exhibit high Q and very low distributed capacity, all concentrated into an amazingly small package. Size reduction ranges up to 80% of equivalent standard molded chokes. The construction of these coils permits miniaturization without the use of ferrite materials, thus maintaining temperature stability.

Miller Part Number	MS Type	Induct. Micro-henries ±5%	D.C. Resist. Max.	Milli-amp Rating Max.	Mold Size
9210-54	90538-01	36	2.50	180	D
9210-56	90538-02	39	2.60	176	D
9210-58	90538-03	43	2.70	172	D
9210-60	90538-04	47	2.75	170	D
9210-62	90538-05	51	2.85	167	D
9210-64	90538-06	56	3.00	164	D
9210-66	90538-07	62	3.15	160	D
9210-68	90538-08	68	3.30	156	D
9210-70	90538-09	75	3.70	147	D
9210-72	90538-10	82	3.90	143	D
9210-74	90538-11	91	4.30	136	D
9210-76	90538-12	100	4.50	133	D
9210-78	90538-13	110	4.90	128	D
9210-80	90538-14	120	5.20	124	D
9210-82	90538-15	130	5.45	121	D
9210-84	90538-16	150	6.05	114	D
9210-86	90538-17	160	6.40	111	D
9210-88	90538-18	180	6.75	108	D
9210-90	90538-19	200	7.10	106	D
9210-92	90538-20	220	7.45	103	D
9210-94	90538-21	240	7.80	101	D
9220-00	90539-01	270	8.2	110	A
9220-02	90539-02	300	8.7	107	A
9220-04	90539-03	330	9.1	105	A
9220-06	90539-04	360	9.6	102	A
9220-08	90539-05	390	10.0	100	A
9220-10	90539-06	430	10.6	97	A
9220-12	90539-07	470	11.1	95	A
9220-14	—	500	11.6	93	A
9220-15	90539-08	510	11.6	92	A
9220-16	90539-09	560	12.3	91	A
9220-18	90539-10	620	13.0	88	A
9220-20	90539-11	680	13.7	85	A
9220-22	90539-12	750	14.4	83	A
9220-24	90539-13	820	15.1	81	A
9220-26	90539-14	910	15.8	79	A
9220-28	90539-15	1000	16.5	78	A
9220-30	90540-01	1100	21.0	78	B
9220-32	90540-02	1200	22.0	76	B
9220-34	90540-03	1300	23.0	75	B
9220-36	90540-04	1500	25.0	72	B
9220-38	90540-05	1600	26.0	70	B
9220-40	90540-06	1800	28.0	68	B
9220-42	90540-07	2000	29.0	67	B
9220-44	90540-08	2200	30.0	66	B
9220-46	90540-09	2400	31.0	64	B
9220-48	90540-10	2700	33.0	62	B
9220-50	90540-11	3000	35.0	61	B
9220-52	90540-12	3300	38.0	58	B
9220-54	90540-13	3600	40.0	57	B
9220-56	90541-01	3900	44.0	61	C
9220-58	90541-02	4300	46.0	59	C
9220-60	90541-03	4700	48.0	58	C
9220-62	90541-04	5000	50.0	57	C
9220-64	90541-05	5600	53.0	56	C
9220-66	90541-06	6200	56.0	54	C
9220-68	90541-07	6800	59.0	52	C
9220-70	90541-08	7500	62.0	51	C
9220-72	90541-09	8200	65.0	50	C
9220-74	90541-10	9100	68.0	49	C
9220-76	90541-11	10000	72.0	47	C

Mold Size	Mold Diameter	Mold Length	Lead Size	Lead Length
A	.190±.010	.440±.010	AWG #22	1.44±.188
B	.215±.010	.560±.010	AWG #21	1.44±.188
C	.240±.010	.740±.010	AWG #20	1.44±.188
D	.155±.010	.375±.010	AWG #22	1.44±.188

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MOLDED RF CHOKES

Miller Part Number	MS Type	Induct. Micro-henries*	D.C. Re-sist. Max.	Milli-amp Rating Max.
9310-00	18130-1	.15*	.03	2450
9310-02	18130-2	.22*	.055	1900
9310-04	18130-3	.33*	.09	1400
9310-06	18130-4	.47*	.12	1225
9310-07	18130-5	.56	.135	1220
9310-08	18130-6	.68	.15	1100
9310-10	18130-7	.82	.22	900
9310-12	18130-8	1.00	.29	830
9310-14	18130-9	1.20	.42	650
9310-16	18130-10	1.50	.50	600
9310-18	18130-11	1.80	.65	525
9310-20	18130-12	2.20	.95	435
9310-22	18130-13	2.70	1.20	385
9310-24	18130-14	3.30	2.00	300
9310-26	18130-15	3.90	2.30	280
9310-28	18130-16	4.70	2.60	260
9310-30	18130-17	5.60	.32	750
9310-32	18130-18	6.80	.50	600
9310-34	18130-19	8.20	.60	545
9310-36	18130-20	10.0	.90	445
9310-38	18130-21	12.0	1.10	404
9310-40	18130-22	15.0	1.40	370
9310-42	18130-23	18.0	2.25	280
9310-44	18130-24	22.0	2.50	265
9310-46	—	24.0	2.50	265
9310-48	18130-25	27.0	2.60	260
9310-50	—	30.0	2.80	255
9310-52	18130-26	33.0	3.00	250

Mold Size: .156±.010 Diameter; .375±.010 Lgth. Leads: AWG #22 TCW; 1.437±.188 Lgth.

9320-00	75008-21	.15*	.030	3000
9320-02	75008-22	.22*	.035	2800
9320-04	75008-23	.33*	.065	2000
9320-06	75008-24	.47*	.085	1700
9320-07	75008-25	.56	.125	1450
9320-08	75008-26	.68	.150	1300
9320-09	75008-27	.82	.205	1100
9320-10	75008-28	1.00	.290	930
9320-11	75008-29	1.20	.400	785
9320-12	75008-30	1.50	.485	700
9320-13	75008-31	1.80	.740	580
9320-14	75008-32	2.20	.970	505
9320-16	75008-33	2.70	1.20	460
9320-18	75008-34	3.30	.140	1350
9320-20	75008-35	3.90	.155	1250
9320-22	75008-36	4.70	.210	1100
9320-24	75008-37	5.60	.280	935
9320-26	75008-38	6.80	.375	810
9320-28	75008-39	8.20	.440	750
9320-30	75008-40	10.0	.605	640
9320-32	75008-41	12.0	1.05	490
9320-34	75008-42	15.0	1.20	460
9320-35	75008-43	18.0	1.95	360
9320-36	75008-44	22.0	2.20	335
9320-38	75008-45	27.0	2.75	300

Mold Size: .188±.031 Diameter; 0.437±.031 Lgth. Leads: AWG #22 TCW; 1.437±.188 Lgth.

9330-00	90542-01	.47	.06	1970
9330-01	90542-02	.56	.08	1850
9330-02	90542-03	.68	.08	1700
9330-03	90542-04	.82	.11	1520
9330-04	90542-05	1.00	.14	1290
9330-05	90542-06	1.20	.19	1120
9330-06	90542-07	1.50	.28	925
9330-07	90542-08	1.80	.37	790
9330-08	90542-09	2.20	.50	680
9330-10	90542-10	2.70	.65	600
9330-12	90542-11	3.30	1.00	480
9330-14	90542-12	3.90	1.20	440
9330-16	90542-13	4.70	1.80	360
9330-18	90542-14	5.60	.13	1340
9330-20	90542-15	6.80	.20	1080
9330-22	90542-16	8.20	.22	1030
9330-24	90542-17	10.0	.26	950
9330-26	90542-18	12.0	.45	720
9330-28	90542-19	15.0	.52	670
9330-30	90542-20	18.0	.70	580
9330-32	90542-21	22.0	1.00	480
9330-34	90542-22	27.0	1.30	420
9330-36	90542-23	33.0	1.50	390
9330-38	90542-24	39.0	2.00	340

Mold Size: .22±.03 Diameter; 0.560±.010 Lgth. Leads: AWG #22 TCW; 1.437 ±.19 Lgth.
*Inductance Tolerance: ±20%.
All Others 10%.

SUB-MINIATURE RF CHOKES

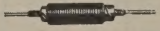
An extremely versatile series of iron core RF chokes designed to meet the industries' demand for high reliability, ultra-miniature components. The coils are ideally suited to network and filter design, delay lines, and computer applications. The coils are impregnated with a moisture resistant lacquer and on special order they can be fungus-proofed per JAN-T-152 using varnish per MIL-V-173A. They can also be encapsulated in epoxy resin to conform to Grade 1, Class B of MIL-C-15305.

Miller Part No.	Inductance Nominal*	D.C. Resistance Max.	Milliamp Rating Max.	Max. Winding Diam.	Form Length ±1/32
70F107AP	.10 uh★	.013	3922	.156	5/16
70F157AP	.15 uh★	.025	2828	.141	5/16
70F227AP	.22 uh★	.038	2294	.141	5/16
70F337AP	.33 uh★	.070	1690	.125	5/16
70F477AP	.47 uh★	.125	1264	.125	5/16
70F687AP	.68 uh★	.200	1000	.125	5/16
70F757AP	.75 uh★	.264	870	.125	5/16
70F827AP	.82 uh★	.290	830	.125	5/16
70F106AI	1.0 uh	.048	2041	.165	1/4
70F126AI	1.2 uh	.072	1666	.160	1/4
70F156AI	1.5 uh	.096	1443	.160	1/4
70F186AI	1.8 uh	.096	1443	.160	1/4
70F226AI	2.2 uh	.156	1132	.160	1/4
70F276AI	2.7 uh	.168	1091	.160	1/4
70F336AI	3.3 uh	.240	912	.150	1/4
70F396AI	3.9 uh	.264	870	.150	1/4
70F476AI	4.7 uh	.457	661	.150	1/4
70F566AI	5.6 uh	.492	637	.150	1/4
70F686AI	6.8 uh	.624	566	.150	1/4
70F756AI	7.5 uh	.624	566	.150	1/4
70F826AI	8.2 uh	.744	518	.150	1/4
70F916AI	9.1 uh	1.44	288	.160	1/4
70F105AI	10 uh	1.56	277	.160	1/4
70F125AI	12 uh	1.68	267	.160	1/4
70F155AI	15 uh	1.92	250	.165	1/4
70F185AI	18 uh	2.28	229	.165	1/4
70F225AI	22 uh	2.28	229	.165	1/4
70F255AI	25 uh	2.64	213	.170	1/4
70F275AI	27 uh	2.64	213	.170	1/4
70F335AI	33 uh	2.76	208	.170	1/4
70F395AI	39 uh	3.36	188	.175	1/4
70F475AI	47 uh	3.36	188	.175	1/4
70F565AI	56 uh	3.84	176	.180	1/4
70F685AI	68 uh	4.20	169	.180	1/4
70F755AI	75 uh	4.56	162	.185	1/4
70F825AI	82 uh	4.80	158	.185	1/4
70F915AI	91 uh	4.92	156	.185	1/4
70F104AI	100 uh	7.68	139	.165	1/4
70F124AI	120 uh	8.16	135	.165	1/4
70F154AI	150 uh	8.16	135	.165	1/4
70F184AI	180 uh	8.16	135	.170	1/4
70F204AI	200 uh	10.3	120	.170	1/4
70F224AI	220 uh	11.5	114	.170	1/4
70F254AI	250 uh	12.1	111	.170	1/4

Miller Part No.	Inductance Nominal*	D.C. Resistance Max.	Milliamp Rating Max.	Max. Winding Diam.	Form Length ±1/32
70F274AI	270 uh	13.2	106	.175	1/4
70F304AI	300 uh	13.2	106	.175	1/4
70F334AI	330 uh	13.9	103	.175	1/4
70F354AI	350 uh	14.4	102	.180	1/4
70F394AI	390 uh	15.8	97	.180	1/4
70F474AI	470 uh	16.3	95	.185	1/4
70F504AI	500 uh	18.0	91	.195	1/4
70F564AI	560 uh	19.2	88	.195	1/4
70F684AI	680 uh	19.8	87	.200	1/4
70F754AI	750 uh	22.9	80	.210	1/4
70F824AI	820 uh	22.9	80	.210	1/4
70F914AI	910 uh	24.0	79	.220	1/4
70F103AI	1.00 mh	24.0	79	.225	1/4
70F123AI	1.20 mh	33.6	66	.220	1/4
70F153AI	1.50 mh	37.2	63	.225	1/4
70F183AI	1.80 mh	42.0	59	.235	1/4
70F223AI	2.20 mh	45.6	57	.240	1/4
70F253AI	2.50 mh	45.6	57	.260	3/8
70F273AI	2.70 mh	45.6	57	.260	3/8
70F333AI	3.30 mh	51.6	53	.260	3/8
70F393AI	3.90 mh	57.6	51	.275	3/8
70F473AI	4.70 mh	64.8	48	.285	3/8
70F563AI	5.60 mh	69.6	46	.300	3/8
70F683AI	6.80 mh	78.0	43	.310	3/8
70F753AI	7.50 mh	85.2	41	.310	3/8
70F823AI	8.20 mh	92.4	40	.330	3/8
70F913AI	9.10 mh	98.4	39	.330	3/8
70F102AI	10.0 mh	101	38	.335	3/8
70F122AI	12 mh	100	50	.300	1/2
70F152AI	15 mh	113	47	.300	1/2
70F182AI	18 mh	128	44	.325	1/2
70F222AI	22 mh	144	41	.330	1/2
70F252AF	25 mh	115	46	.300	5/8
70F272AF	27 mh	120	45	.313	5/8
70F332AF	33 mh	134	43	.313	5/8
70F392AF	39 mh	147	41	.330	5/8
70F472AF	47 mh	168	38	.344	5/8
70F502AF	50 mh	175	37	.360	5/8
70F562AF	56 mh	189	36	.360	5/8
70F682AF	68 mh	215	34	.375	5/8
70F752AF	75 mh	222	33	.390	5/8
70F822AF	82 mh	238	32	.390	5/8
70F912AF	91 mh	250	31	.390	5/8
70F101AF	100 mh	278	29	.406	5/8

*Tolerance 0.1 to 1.0 uh ±20%, 1.1 to 15 uh ±10%, over 15 uh ±5% ★Measured with leads 1/4" long from Q Meter binding posts

PHENOLIC CORE SINGLE LAYER WINDINGS



Dimensions of core: 3/16" diameter x 3/4" long. Leads are 1½" long.

Miller Part Number	Inductance Nominal*	D. C. Resistance Maximum	Milliamp Rating Maximum	Diameter over Winding
4602	1.0 uh	.050	2000	.270
4604	1.5 uh	.093	1800	.270
4606	2.4 uh	.190	1500	.270
4608	3.9 uh	.450	1000	.270
4609	5.5 uh	.670	850	.270
4610	6.2 uh	.830	700	.270
4611	8.2 uh	1.20	600	.270
4612	10.0 uh	1.50	500	.270

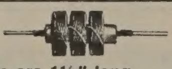
*Tolerance 1.0 uh ±20%, 1.1 to 10 uh ±10%

IRON CORE SINGLE LAYER WINDINGS

Dimensions of core: 7/32" diameter x 7/8" long. Leads are 1½" long.

4622	10 uh ±5%	.11	1500	.29
4624	15 uh ±5%	.17	1000	.29
4626	24 uh ±5%	.34	800	.29
4628	39 uh ±5%	.65	600	.29
4629	55 uh ±5%	1.0	500	.29
4630	62 uh ±5%	1.2	475	.29
4631	82 uh ±5%	1.9	450	.29
4632	100 uh ±5%	3.0	400	.29

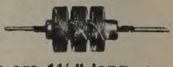
PHENOLIC CORE 3-SECTION WINDINGS



Dimensions of core: 3/16" diameter x 3/4" long. Leads are 1½" long.

4642	.10 mh ±5%	5.4	160	.406
4644	.15 mh ±5%	6.5	160	.406
4646	.24 mh ±5%	8.5	160	.438
4648	.39 mh ±5%	11	160	.500
4649	.55 mh ±5%	13	160	.500
4650	.62 mh ±5%	15	160	.531
4651	.75 mh ±5%	16	160	.531
4652	1.0 mh ±5%	19	160	.563

IRON CORE 3-SECTION WINDINGS



Dimensions of core: 7/32" diameter x 7/8" long. Leads are 1½" long.

Miller Part Number	Inductance @ 1000 Hertz	D. C. Resistance Maximum	Milliamp Rating Maximum	Diameter over Winding
4662	1.0 mh ±5%	8.6	160	.469
4664	1.5 mh ±5%	11	160	.469
4666	2.4 mh ±5%	15	160	.531
4668	3.9 mh ±5%	20	160	.563
4669	5.5 mh ±5%	25	160	.594
4670	6.2 mh ±5%	37	100	.531
4671	8.2 mh ±5%	46	100	.563
4672	10 mh ±5%	50	100	.594

FERRITE CORE 3-SECTION WINDINGS

Dimensions of core: 1/4" diameter x 7/8" long. Leads are 1½" long.

6302	2.5 mh ±5%	9.0	160	.469
6304	5.0 mh ±5%	14	160	.531
6306	10 mh ±5%	31	100	.531
6308	25 mh ±5%	82	65	.531
6310	50 mh ±5%	127	65	.625

SINGLE LAYER COLOR CODED RF CHOKES

The following solenoid wound R.F. Chokes are impregnated with a thermosetting varnish and are color coded to EIA standards. Form Dimensions .156 x ½".

Part No.	L*	R Ohms Max.	I Ma. Max.
74F106AP	1.0 uh	.20	1000
74F126AP	1.2 uh	.22	950
74F156AP	1.5 uh	.25	900
74F186AP	1.8 uh	.28	850
74F226AP	2.2 uh	.30	800
74F276AP	2.7 uh	.50	700
74F336AP	3.3 uh	.70	600
74F396AP	3.9 uh	.80	500
74F476AP	4.7 uh	1.00	400
74F566AP	5.6 uh	1.80	350
74F686AP	6.8 uh	1.85	300
74F826AP	8.2 uh	1.90	275
74F105AP	10 uh	3.00	250

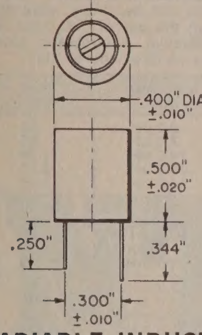
Part No.	L*	R Ohms Max.	I Ma. Max.
74F125AP	12 uh	3.60	200
74F155AP	15 uh	6.00	150
74F185AP	18 uh	7.50	100
74F225AI	22 uh	2.00	500
74F275AI	27 uh	1.85	450
74F335AI	33 uh	2.00	450
74F395AI	39 uh	2.60	400
74F475AI	47 uh	3.50	350
74F565AI	56 uh	3.75	300
74F685AI	68 uh	4.00	250
74F825AI	82 uh	5.10	200
74F104AI	100 uh	6.00	150

* Tolerance 1.0 to 2.2 uh, ±20%, 2.7 to 100 uh, ±10%

J. W. MILLER DIVISION, BELL INDUSTRIES / 19070 Reyes Ave., Compton, CA 90221 / (213) 537-5200

VL SERIES VARIABLE INDUCTORS

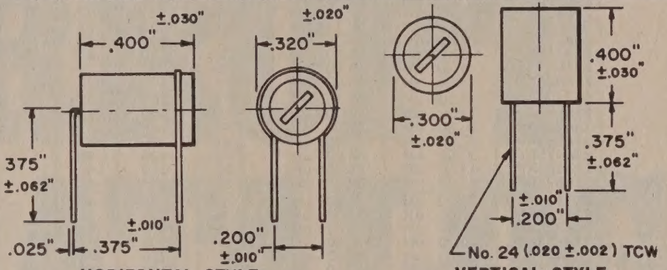
Vertical Mount: Printed Circuit — Mil-C-15305
Tunable Range: .10 uH ±10%, .15-.22 uH ±15%, .33-4700 uH ±20%
Operating Temperature: −55°C to +125°C
Leads: No. 22 TCW



Part No.	L nom. uH	Max. DCR at 25°C Ohms	Part No.	L nom. uH	Max. DCR at 25°C Ohms
VL-R10	0.10	0.02	VL-330	33.0	3.6
VL-R15	0.15	0.035	VL-470	47.0	4.5
VL-R22	0.22	0.04	VL-680	68.0	5.5
VL-R33	0.33	0.04	VL-101	100.0	6.7
VL-R47	0.47	0.05	VL-151	150.0	11.0
VL-R68	0.68	0.07	VL-221	220.0	13.0
VL-1R0	1.00	0.13	VL-331	330.0	16.0
VL-1R5	1.50	0.24	VL-471	470.0	18.0
VL-2R2	2.20	0.30	VL-681	680.0	21.0
VL-3R3	3.30	0.45	VL-102	1000.0	38.0
VL-4R7	4.70	0.80	VL-152	1500.0	54.0
VL-6R8	6.80	1.1	VL-222	2200.0	66.0
VL-100	10.0	1.9	VL-332	3300.0	85.0
VL-150	15.0	3.2	VL-472	4700.0	99.0
VL-220	22.0	3.4			

VLS SERIES VARIABLE INDUCTORS (SHIELDED)

May be mounted either Vertically or Horizontally
Printed Circuit: Mil-C-15305
Tunable Range: .10 uH .12 uH ±5% — All others ±10%
Operating Temperature: −55°C to +125°C
Leads: No. 24 TCW



HORIZONTAL STYLE **VERTICAL STYLE**

Part No.	Nom. Inductance	DCR 25°C, Max. Ohms	Max. I mA
VLSR10	.10 uH	0.030	2500
VLSR12	.12 uH	0.030	2500
VLSR15	.15 uH	0.030	2500
VLSR18	.18 uH	0.035	2400
VLSR22	.22 uH	0.038	2300
VLSR27	.27 uH	0.040	2200
VLSR33	.33 uH	0.040	2200
VLSR39	.39 uH	0.045	2100
VLSR47	.47 uH	0.045	2100
VLSR56	.56 uH	0.050	2000
VLSR68	.68 uH	0.055	1900
VLSR82	.82 uH	0.060	1800
VLS1R0	1.00 uH	0.070	1700
VLS1R2	1.20 uH	0.085	1670
VLS1R5	1.50 uH	0.100	1540
VLS1R8	1.80 uH	0.110	1470
VLS2R2	2.20 uH	0.120	1410
VLS2R7	2.70 uH	0.125	1380
VLS3R3	3.30 uH	0.165	1200
VLS3R9	3.90 uH	0.180	1135
VLS4R7	4.70 uH	0.245	985
VLS5R6	5.60 uH	0.265	950
VLS6R8	6.80 uH	0.330	853
VLS8R2	8.20 uH	0.460	720
VLS100	10.00 uH	0.640	620
VLS120	12.00 uH	0.800	545
VLS150	15.00 uH	0.865	520
VLS180	18.00 uH	0.940	504
VLS220	22.00 uH	1.03	460
VLS270	27.00 uH	1.18	418
VLS330	33.00 uH	1.30	398
VLS390	39.00 uH	1.41	385
VLS470	47.00 uH	1.61	350
VLS560	56.00 uH	2.08	330
VLS680	68.00 uH	2.20	320
VLS820	82.00 uH	2.42	300
VLS101	100.00 uH	2.15	333

Part No.	Nom. Inductance	DCR 25°C, Max. Ohms	Max. I mA
VLS121	120.00 uH	2.38	316
VLS151	150.00 uH	2.52	306
VLS181	180.00 uH	2.88	288
VLS221	220.00 uH	3.18	273
VLS271	270.00 uH	3.50	260
VLS331	330.00 uH	4.80	222
VLS391	390.00 uH	5.44	209
VLS471	470.00 uH	5.90	201
VLS561	560.00 uH	6.30	194
VLS681	680.00 uH	7.20	181
VLS821	820.00 uH	8.00	172
VLS102	1,000.00 uH	12.00	141
VLS122	1,200.00 uH	13.50	132
VLS152	1,500.00 uH	16.50	119
VLS182	1,800.00 uH	18.00	114
VLS222	2,200.00 uH	20.50	107
VLS272	2,700.00 uH	22.50	102
VLS332	3,300.00 uH	42.00	76
VLS392	3,900.00 uH	47.50	71
VLS472	4,700.00 uH	53.00	67
VLS562	5,600.00 uH	62.50	65
VLS682	6,800.00 uH	69.50	58
VLS822	8,200.00 uH	75.00	56
VLS103	10,000.00 uH	100.00	49
VLS123	12,000.00 uH	64.00	60
VLS153	15,000.00 uH	84.00	52
VLS183	18,000.00 uH	93.00	50
VLS223	22,000.00 uH	104.00	45
VLS273	27,000.00 uH	173.00	35
VLS333	33,000.00 uH	187.00	32
VLS393	39,000.00 uH	220.00	30
VLS473	47,000.00 uH	253.00	28
VLS563	56,000.00 uH	285.00	26
VLS683	68,000.00 uH	311.00	24
VLS823	82,000.00 uH	385.00	22
VLS104	100,000.00 uH	420.00	20

9100 SERIES SHIELDED ADJUSTABLE R.F. COILS

These ultra compact adjustable coils offer a good inductance range with relatively small changes in Q. Tuning is accessible from either top or bottom of the assembly. Magnetic shielding is achieved by the use of cup cores while the copper shield offers effective electrostatic shielding. Printed circuit terminals on base and shield.

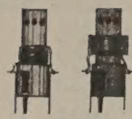
See General Catalog for Complete Off The Shelf Coverage
Custom Windings A Specialty — Let Us Quote On Your Requirements

Dimensions: .440″ Sq. x .550″ High. Applications between 10 kHz and 200 MHz.

Part No.	L Min.	L Max.	Max. DC Resist. Ohms	Max. Current
9101	.099 uH	.134 uH	0.01	4.85 A
9102	.129 uH	.192 uH	0.01	4.43 A
9103	.165 uH	.258 uH	0.02	3.97 A
9104	.246 uH	.418 uH	0.02	3.83 A
9105	.366 uH	.627 uH	0.02	3.43 A
9106	.588 uH	.950 uH	0.90	516.00 mA
9107	.830 uH	1.54 uH	1.02	485.00 mA
9108	1.44 uH	2.94 uH	1.38	417.00 mA
9109	2.52 uH	5.70 uH	1.76	368.00 mA
9110	5.35 uH	13.49 uH	2.92	286.00 mA
9111	12.50 uH	29.45 uH	4.72	225.00 mA
9112	26.25 uH	71.25 uH	6.97	185.00 mA
9113	64.57 uH	163.00 uH	9.98	155.00 mA
9114	147.00 uH	430.00 uH	16.32	121.00 mA
9115	422.00 uH	1.10 mH	27.84	92.00 mA
9116	1.05 mH	3.74 mH	41.06	76.00 mA
9117	3.36 mH	11.12 mH	78.92	55.00 mA

J. W. MILLER DIVISION, BELL INDUSTRIES / 19070 Reyes Ave., Compton, CA 90221 / (213) 537-5200

VERTICAL MOUNTED PRINTED CIRCUIT VELVETORK ADJUSTABLE RF COILS

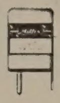


Dimensions (form only) Over Collar ⅜″ Dia. x ¾″ long.

The coil form is Polyester impregnated Alpha Cellulose tubing with internally bonded resilient ribs which provide both thread and torque control. Coils may be adjusted from either end of form.

Miller Part No.	Inductance Min.	Inductance Max.	R Ohms Max.	Max. Current Ma.	Dia. over Winding
23A107RPC	.095 uH	.125 uH	.02	4100	.40
23A157RPC	.130 uH	.170 uH	.02	1600	.37
23A227RPC	.185 uH	.265 uH	.02	1600	.37
23A337RPC	.285 uH	.410 uH	.03	1000	.37
23A477RPC	.420 uH	.580 uH	.03	2500	.37
23A687RPC	.540 uH	.850 uH	.03	1600	.37
23A827RPC	.640 uH	1.00 uH	.03	1600	.37
23A106RPC	.760 uH	1.25 uH	.04	1600	.37
23A156RPC	1.20 uH	1.87 uH	.06	1000	.37
23A226RPC	1.65 uH	2.75 uH	.14	400	.37
23A336RPC	2.40 uH	4.10 uH	.17	400	.37
23A476RPC	3.40 uH	5.80 uH	.24	400	.37
23A686RPC	4.60 uH	8.50 uH	.39	250	.37
23A826RPC	5.60 uH	10.00 uH	.64	160	.37
23A105RPC	7.10 uH	12.50 uH	.77	160	.37
23A155RPC	10.00 uH	18.70 uH	1.68	100	.37
23A225RPC	14.80 uH	27.50 uH	1.91	100	.37
23A335RPC	22.00 uH	41.00 uH	2.34	100	.37
23A475RPC	31.00 uH	58.00 uH	2.72	100	.40
23A685RPC	43.50 uH	85.00 uH	3.30	100	.40
23A825RPC	61.00 uH	100.00 uH	3.89	100	.40
23A104RPC	76.00 uH	125.00 uH	4.39	100	.40
23A154RPC	105.00 uH	187.00 uH	5.46	100	.40
23A224RPC	160.00 uH	275.00 uH	6.70	100	.44
23A334RPC	240.00 uH	410.00 uH	8.30	100	.44
23A474RPC	360.00 uH	580.00 uH	10.50	100	.48
23A684RPC	530.00 uH	850.00 uH	12.90	100	.48
23A824RPC	700.00 uH	1.00 mH	14.90	100	.53
23A103RPC	910.00 uH	1.25 mH	17.10	100	.58
23A153RPC	990.00 uH	1.87 mH	28.20	65	.45
23A223RPC	1.60 mH	2.75 mH	34.80	65	.45
23A333RPC	2.40 mH	4.10 mH	42.90	65	.48
23A473RPC	3.40 mH	5.80 mH	51.60	65	.48
23A683RPC	5.15 mH	8.50 mH	63.60	65	.55
23A823RPC	7.40 mH	10.00 mH	75.60	65	.55
23A102RPC	9.80 mH	12.50 mH	87.30	65	.55
23A152RPC	12.00 mH	18.70 mH	111.00	65	.60
23A222RPC	12.10 mH	27.50 mH	197.00	33	.60
23A332RPC	18.20 mH	41.00 mH	244.00	33	.60
23A472RPC	27.50 mH	58.00 mH	302.00	33	.60
23A682RPC	40.00 mH	85.00 mH	378.00	33	.58
23A822RPC	50.00 mH	100.00 mH	423.00	33	.58
23A101RPC	62.00 mH	125.00 mH	468.00	33	.60

SHIELDED SUBMINIATURE ADJUSTABLE RF COILS



Dimensions: ½″ sq., x ⅝″ high.

These compact adjustable coils offer a minimum two-to-one inductance range with relatively small changes in Q. The tuning adjustment is accessible from either the top or bottom of the coil assembly. Magnetic shielding is achieved through the use of cup cores while the metal shield offers effective electrostatic shielding. Printed circuit terminals on base and shield.

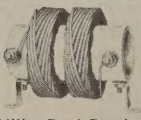
Miller Part No.	Inductance Min.	Inductance Max.	R Ohms Max.	Max. Current Ma.
9050	1.5 uH	3.0 uH	.66	80
9051	3.0 uH	7.0 uH	.85	125
9052	7.0 uH	14.0 uH	1.38	80
9053	14.0 uH	28.0 uH	2.10	80
9054	28.0 uH	60.0 uH	3.00	100
9055	60.0 uH	120.0 uH	4.00	100
9056	120.0 uH	280.0 uH	5.75	80
9057	280.0 uH	650.0 uH	12.00	80
9058	650.0 uH	1.3 mH	15.00	100
9059	1.3 mH	3.0 mH	23.00	100
9059-1	1.8 mH	2.2 mH	10.00	141
9060	3.0 mH	10.0 mH	76.00	30
9061	8.0 mH	20.0 mH	110.00	30
9062	15.0 mH	40.0 mH	150.00	30
9063	20.0 mH	60.0 mH	175.00	25

ADJUSTABLE WIDE RANGE INDUCTORS

Dimensions: Max. dia. ⅞″ x 2¼″ long. Mtg. hole 5/16″.

Due to the wide range of these coils they will find immediate application in many prototype designs where the exact value of the required inductance is not known.

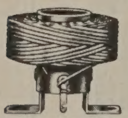
Miller Part No.	Inductance Min.	Inductance Max.	R Ohms Max.	Max. Current Ma.
9001	40.00 mH	.24 mH	2.04	250
9002	.18 mH	.80 mH	4.08	250
9003	.57 mH	2.80 mH	8.52	250
9004	2.10 mH	8.00 mH	15.40	250
9005	6.00 mH	16.00 mH	33.60	200
9006	12.00 mH	40.00 mH	91.20	125
9007	30.00 mH	105.00 mH	148.00	75
9008	78.00 mH	240.00 mH	264.00	75
9009	180.00 mH	750.00 mH	620.00	50



DUAL LINE FILTER CHOKES

Miller Dual Duo-Lateral Line Filter Chokes are wound with two coils on one form, giving the advantage of small physical size in cases where space requirements are stringent and two single coils would occupy too much area. Identical in specifications, except for dimensions, to our single type Duo-Lateral chokes. They are wound on white ceramic forms 2″ in diameter by 4½″ long.

Cat. No.	Amps.	Ohms	uH	Dimensions
D-7826	5	.28	570	4½″ x 4″
D-7827	10	.15	370	4½″ x 4″
D-7828	15	.085	200	4½″ x 4″
D-7829	20	.05	135	4½″ x 4″



LIGHT DUTY DUO-LATERAL LINE FILTER CHOKES

Single Line Filter Chokes
Dimensions: 1⅞″ x 1¾″.

Cat. No.	Amps.	Ohms	uH
7825	2	.7	600
7825-3	3	.25	250
7825-5	5	.1	100
7825-8	8	.05	50

DUAL LINE FILTER CHOKES

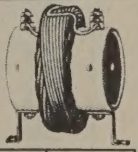
Dimensions: 3¼″ x 2⅛″.

Cat. No.	Amps.	Ohms	uH
D-7825	2	.7	600
D-7825-3	3	.25	250
D-7825-5	5	.1	100
D-7825-8	8	.05	50

HEAVY DUTY HASH CHOKES

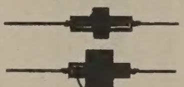
Part No.	uH ±20%	Ohms Max.	Amps.	Dimensions
5218	3.35	.010	20	17/32″ x 1 5/16″
5219	4.90	.016	15	½″ x 1¼″
5220	8.80	.021	10	½″ x 1¼″
5230	4.00	.012	8	5/16″ x 29/32″
5240	40.00	.082	3	9/16″ x 1¼″
5248	68.00	.054	5	17/32″ x 1¼″
5250	100.00	.216	2	5/16″ x 1¼″
5252	125.00	.080	3.5	½″ x 1¼″
5254	250.00	.170	2.5	7/16″ x 1¼″
5256	500.00	.260	2.0	9/16″ x 1¼″
5258	1000.00	.550	1.0	½″ x 1¼″

MEDIUM DUTY DUO-LATERAL LINE FILTER CHOKES



Cat. No.	Amps.	Ohms	Induc.	Dimensions
7826	5	.28	570 uH	2½″ x 4″
7827	10	.15	370 uH	2½″ x 4″
7828	15	.085	200 uH	2½″ x 4″
7829	20	.05	135 uH	2½″ x 4″

SINGLE PI FERRITE CORE RF CHOKES



This series of single pi RF Chokes affords maximum Q with minimum resistance through the use of ferrite core material. The coils are impregnated in a fungus resistant lacquer. Form Dimensions .187″ x ⅝″.

Part No.	L ±5%	Max. R Ohms	Max. Ma.
73F104AF	100.0 uH	2.0	250
73F124AF	120.0 uH	2.2	250
73F154AF	150.0 uH	2.5	250
73F184AF	180.0 uH	2.9	250
73F224AF	220.0 uH	3.2	250
73F274AF	270.0 uH	3.6	250
73F334AF	330.0 uH	3.8	250
73F394AF	390.0 uH	4.2	225
73F474AF	470.0 uH	4.8	200
73F564AF	560.0 uH	5.3	200
73F684AF	680.0 uH	6.0	200
73F824AF	820.0 uH	6.8	200
73F103AF	1.0 mH	7.5	150
73F123AF	1.2 mH	7.8	150
73F153AF	1.5 mH	8.8	150
73F183AF	1.8 mH	11.0	150
73F223AF	2.2 mH	12.0	150
73F273AF	2.7 mH	13.5	125
73F333AF	3.3 mH	15.1	125
73F393AF	3.9 mH	18.0	125
73F473AF	4.7 mH	21.5	100
73F563AF	5.6 mH	25.0	80
73F683AF	6.8 mH	29.0	80
73F823AF	8.2 mH	30.0	80
73F102AF	10.0 mH	34.0	80

See General Catalog For Complete Off The Shelf Coverage

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Let Us Quote On Your Requirements

MICRO-MINIATURE MOLDED RF CHOKES

We are pleased to offer the following series of molded RF chokes. They represent what we believe to be the smallest package for the current rating specified. Color Coding is per MIL-C-15305.

Miller Part No.	MS Type	Inductance Micro-henries ±10%	Max. D.C. Resis-tance	Milli-amp Rating Max.
9230-94	75083-1	.10	.07	1100
9230-96	75083-2	.12	.08	1100
9230-00	75083-3	.15	.10	1100
9230-02	75083-4	.18	.12	1010
9230-04	75083-5	.22	.14	935
9230-06	75083-6	.27	.16	875
9230-08	75083-7	.33	.20	780
9230-10	75083-8	.39	.30	640
9230-12	75083-9	.47	.35	590
9230-14	75083-10	.56	.50	495
9230-16	75083-11	.68	.60	450
9230-18	75083-12	.82	.85	380
9230-20	75083-13	1.00	1.00	350
9230-22	75084-1	1.20	.18	825
9230-24	75084-2	1.50	.22	745
9230-26	75084-3	1.80	.30	640
9230-28	75084-4	2.20	.40	550
9230-30	75084-5	2.70	.50	495
9230-32	75084-6	3.30	.85	380
9230-34	75084-7	3.90	1.00	350
9230-36	75084-8	4.70	1.20	320
9230-38	75084-9	5.60	1.80	260
9230-40	75084-10	6.80	2.00	245
9230-42	75084-11	8.20	2.70	210
9230-44	75084-12	10.00	3.70	180
9230-46	75084-13	12.00	2.70	210
9230-48	75084-14	15.00	2.80	205
9230-50	75084-15	18.00	3.10	195
9230-52	75084-16	22.00	3.30	190
9230-54	75084-17	27.00	3.50	185
9230-56	75085-1	33.00	3.40	187
9230-58	75085-2	39.00	3.60	180
9230-60	75085-3	47.00	4.50	165
9230-62	75085-4	56.00	5.70	145
9230-64	75085-5	68.00	6.70	135
9230-66	75085-6	82.00	7.30	130
9230-68	75085-7	100.00	8.00	125
9230-70	75085-8	120.00	13.00	97
9230-72	75085-9	150.00	15.00	85
9230-74	75085-10	180.00	17.00	79
9230-76	75085-11	220.00	21.00	73
9230-78	75085-12	270.00	25.00	65
9230-80	75085-13	330.00	28.00	62
9230-82	75085-14	390.00	35.00	55
9230-84	75085-15	470.00	42.00	50
9230-86	75085-16	560.00	46.00	48
9230-88	75085-17	680.00	60.00	42
9230-90	75085-18	820.00	65.00	40
9230-92	75085-19	1000.00	72.00	38

Mold Size: .095 ±.010 Diameter; .250 ±.010 Length.
Leads: AWG #24 TCW; 1.500 ±.188 Length.

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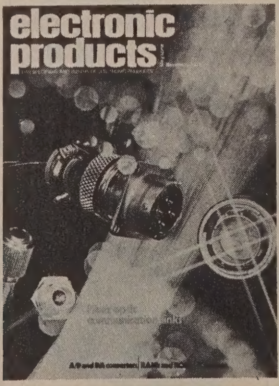

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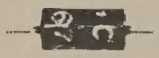
SHIELDED CHOKES

TYPES 6375, 6376

1 uH 5 mH • 10% Tolerance
156 Dia x 375 L

Stock No.	Induct. Micro-henries	Q	SRF MHz	DCR Ohms	Wire Size AWG
6375-1	1	65	250	05	34
6375-2	2 5	55	145	08	34
6375-3	5	45	105	12	34
6375-4	10	78	70	42	39
6375-5	25	64	45	66	39
6375-6	50	70	33	1.25	40
6375-7	100	85	25	2.84 1	40
6376-1	100	58	8	530	36
6376-2	250	62	3 5	800	36
6376-3	500	62	2 5	1 70	38
63-76-4	1000	58	1 1	3 90	40
6376-5	2500	62	700	6 30	40
6376-6	5000	55	610	14 0	42

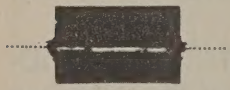
TYPE 1670



25 mH-100 mH • 10% Tolerance
250 Dia x 500 L

Stock No.	Induct-ance Milli-henries	Min. Q	A.C. Test Volts	Max. D.C. Res. Ohms	Cur-rent Rating MA	Wire Size AWG
1670-1	25	3 0	007	22	800	28
1670-2	50	3 0	014	40	500	30
1670-3	1 0	3 0	028	75	315	32
1670-4	2 5	3 5	07	2 2	250	33
1670-5	5 0	3 5	14	3 9	200	34
1670-6	10 0	3 5	15	7 0	125	36
1670-7	25 0	3 5	30	18	125	36
1670-8	50 0	4 0	40	35	75	38
1670-9	100 0	4 0	24	60	50	40

TYPE 1662



5 mH - 1000 mH
10% Tolerance
500 Dia x 750 L

Stock No.	Induct-ance Milli-henries	Min. Q	A.C. Test Volts	Max. D.C. Res. Ohms	Cur-rent Rating MA	Wire Size AWG
1662 1	5 0	10 0	14	75	800	28
1662 2	10 0	10 0	16	2 2	500	30
1662 3	25 0	10 0	32	4 0	315	32
1662-4	50 0	10 0	42	9 5	200	34
1662 5	100 0	10 0	24	26	125	36
1662-6	250 0	10 0	40	50	75	38
1662-7	500 0	10 0	46	150	50	40
1662 8	1000 0	10 0	25	220	30	42

FERRITE POT CORE INDUCTORS & TRANSFORMERS

Caddell-Burns has complete facilities for winding and assembling all types of pot core assemblies, both fixed and variable. Write or telephone with your specifications.

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- TO HIGHER, INTERMEDIATE, OR LOWER INDUCTANCES
- ENCAPSULATED OR WITH SPECIAL COATINGS

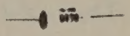
HIGH-Q VARIABLE INDUCTORS

Epoxy Encapsulated High Stability
Variable ± 5%
Type 6690—.688 Dia. x .488 H
Type 6691—.695 Sq. x .395 Dp.

Dash No.	L* Nom.	Peak Q @ Test Freq.	DCR Ω	Temp. Coeff. PPM/°C
-1	1.0 µH	120 @ 10 MHz	.044	−96 to +96
-2	1.5 µH	120 @ 9 MHz	.052	−96 to +96
-3	2.2 µH	140 @ 8 MHz	.062	−96 to +96
-4	3.3 µH	130 @ 7 MHz	.070	−96 to +96
-5	4.7 µH	145 @ 4 MHz	.170	−96 to +96
-6	6.8 µH	145 @ 3.4 MHz	.205	−96 to +96
-7	10 µH	150 @ 2.6 MHz	.264	−96 to +96
-8	15 µH	155 @ 2.2 MHz	.280	−96 to +96
-9	22 µH	165 @ 1.8 MHz	.352	−96 to +96
-10	33 µH	175 @ 1.4 MHz	.440	−96 to +96
-11	47 µH	185 @ 1.2 MHz	.530	−96 to +96
-12	68 µH	200 @ 950 KHz	.630	−96 to +96
-13	100 µH	260 @ 800 KHz	.610	+25 to +75
-14	150 µH	270 @ 700 KHz	.775	+25 to +75
-15	220 µH	280 @ 550 KHz	.945	+25 to +75
-16	330 µH	270 @ 450 KHz	1.47	+25 to +75
-17	470 µH	240 @ 430 KHz	2.70	+25 to +75
-18	680 µH	210 @ 400 KHz	4.55	+25 to +75
-19	1.0 mH	280 @ 260 KHz	3.40	−38 to +38
-20	1.5 mH	300 @ 240 KHz	4.35	−38 to +38
-21	2.2 mH	310 @ 230 KHz	5.30	−38 to +38
-22	3.3 mH	310 @ 200 KHz	6.75	−38 to +38
-23	4.7 mH	330 @ 130 KHz	6.84	−38 to +38
-24	6.8 mH	260 @ 110 KHz	11.3	−38 to +38
-25	10 mH	270 @ 90 KHz	14.2	−38 to +38
-26	15 mH	205 @ 60 KHz	14.3	−38 to +38
-27	22 mH	190 @ 60 KHz	26.6	−38 to +38
-28	33 mH	190 @ 55 KHz	33.2	−38 to +38
-29	47 mH	140 @ 55 KHz	67.6	−38 to +38
-30	68 mH	135 @ 50 KHz	77.5	−38 to +38
-31	100 mH	110 @ 50 KHz	115	−38 to +38

*Intermediate Values are also available

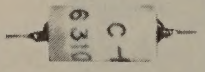
TYPE 6470



Ferrite Choke—10% Tolerance
Low D.C. Resistance
Size 230 Dia x ½" Long

Stock No.	Inductance Microhenries	Nominal Q	Nominal D.C. Res. Ohms	Wire Size AWG
6470-1	4	14	02	24
6470-2	6	12	04	26
6470-3	8	12	04	26
6470-4	10	30	04	26
6470-5	15	27	05	26
6470-6	20	26	06	26
6470-7	25	27	07	26
6470-8	50	23	13	28
6470-9	75	18	14	28
6470-10	100	27	18	28
6470-11	250	34	7	32
6470-12	500	20	9	32
6470-13	750	15	1 2	32
6470-14	1000	67	2 4	34
6470-15	2500	35	4 0	34
6470-16	5000	47	9 2	37
6470-17	7500	28	10 8	37
6470-18	10000	19	12 2	37

TYPE 6310



Ferrite Choke—10% Tolerance
Low D.C. Resistance
Size 7/16" D x 3/4" L

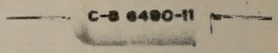
Stock No.	Nominal Inductance Microhenries	Nominal Q	Nominal D.C. Res. Ohms	Self Res. MHz	Current Rating Amps
6310-1	6 8	17	013	30 0	5 0
6310-2	10	72	021	21 0	3 2
6310-3	15	64	028	16 7	3 2
6310-4	22	55	032	11 0	3 2
6310-5	33	38	039	6 6	3 2
6310-6	50	32	065	5 2	2 0
6310-7	75	20	072	3 7	2 0
6310-8	100	58	103	2 8	2 0
6310-9	250	28	228	1 7	1.3
6310-10	500	-28	485	1 45	0 8
6310-11	750	22	576	0 76	0 8
6310-12	1000	32	944	0 51	0 6

HIGH-CURRENT CHOKES

TYPE 6150

HIGH CURRENT, VINYL JACKETED CHOKE
375 Dia x 1 00 L
FERRITE FORM
10 uH - 100 uH • 10% Tolerance

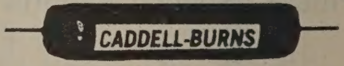
Stock No.	Induct-ance Micro-henries	Max. D.C. Res. Ohms	Current Rating Amps	Min. Q	Wire Size AWG
6150-1	10 0	0 020	10 0	32	18
6150-2	20 0	0 035	6 0	25	20
6150-3	30 0	0 060	4 0	28	22
6150-4	40 0	0 105	2 5	30	24
6150-5	50 0	0 110	2 5	20	24
6150-6	75 0	0 180	1 5	25	26
6150-7	100 0	0 360	1 0	30	28



TYPE 6490

High Current Choke. Vinyl Covered
Ferrite Form 437 Dia x 1 25 L
10 uH - 1000 uH • 10% Tolerance

Stock No.	Inductance Microhenries at 1 kHz	Max. D.C. Res. Ohms	Current Rating Amps
6490-1	10	008	20
6490-2	20	015	13
6490-3	30	. 027	8
6490-4	40	042	5
6490-5	50	065	4
6490-6	75	12	2 5
6490-7	100	05	8
6490-8	250	12	5
6490-9	500	26	3 2
6490-10	750	48	2
6490-11	1000	70	1 6



TYPE 6400

Hi-Current Chokes
Low D.C. Resistance
Vinyl Jacket
Ferrite Form ½" O D x 2¾" Long
#16 Leads 1½" Long
10% Tolerance

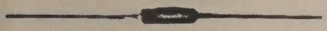
Stock No.	Inductance Millihenries*	Rating Amps+	Approx. D.C. Res.	Wire Size
6400-1	08	13	03	16
6400-2	13	8	06	18
6400-3	22	5	12	20
6400-4	35	3 2	23	22
6400-5	56	2	42	24
6400-6	78	1 3	8	26
6400-7	1 4	8	1 7	28
6400-8	2	5	3 2	30

*Chokes can be made to any intermediate inductance
+Current ratings are conservative

SEND FOR CATALOG AND PRICE LIST

CADDELL-BURNS

MINIATURE CHOKES



TYPE 660

Miniature Choke, Single Layer—10% Tol.
Phenolic Form .095" D. x 5/16" L

Stock No.	Inductance Microhenries	Q	Self Res. M.C.	DC Res. Ohms	Wire Size AWG
660-1	0.1	65		03	26
660-2	0.2	60		03	28
660-3	0.3	55		06	30
660-4	0.4	55	>400	06	30
660-5	0.5	55	360	13	32
660-6	0.75	50	300	22	34
660-7	1.0	30	260	37	36
660-8	1.5	30	210	72	38
660-9	2.0	30	180	95	38

TYPE 620

Microminiature Ferrite Chokes—10% Tol.
Form Size .075" D x 11/32" D. L.

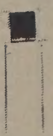
Stock No.	Inductance Microhenries	Q	Self Res. M.C.	DC Res. Ohms	Wire Size AWG
620-1	1	40	235	12	36
620-2	2.5	40	150	19	36
620-3	5	40	100	26	36
620-4	7.5	40	90	33	36
620-5	10	45	75	38	36
620-6	15	60	60	66	38
620-7	20	55	53	80	38
620-8	25	50	49	93	38
620-9	50	90	34	2.85	42
620-10	75	90	28	5.80	44
620-11	100	90	23	7.50	44

TYPE 659

Sub-Miniature Ferrite Chokes—10% Tol.
Form Size 107" D x 330" L

Stock No.	Inductance Microhenries	Q	Self Res. M.C.	DC Res. Ohms	Wire Size AWG
659-1	250	50	3	1.8	36
659-2	500	45	2	3.5	38
659-3	1000	60		10	40
659-4	2500	55		30	42
659-5	5000	50		40	44
659-6	10000	45		68	44

PRINTED CIRCUIT CHOKES



P.C. CHOKES

TYPE 6550

P.C. Choke—10% Tolerance
FERRITE FORM
300 Mounting Centers
100 Wide x 375 L x 250 H

Stock No.	Induct. Micro-Henries	Q	SRF MHz	DCR Ohms
6550-1	1.0	100	215	02
6550-2	2.5	70	135	03
6550-3	5.0	75	115	06
6550-4	7.5	80	87	10
6550-5	10	90	82	17
6550-6	25	100	42	50
6550-7	50	90	14	1.0
6550-8	75	75	8.5	1.1
6550-9	100	100	4.6	1.4
6550-10	250	90	2.7	2.3
6550-11	500	65	1.9	3.3
6550-12	750	40	1.6	4.2
6550-13	1000	100	1.6	16
6550-14	2500	100	1.0	16
6550-15	5000	70	0.6	28
6550-16	7500	50	0.4	42
6550-17	10000	60	0.4	60

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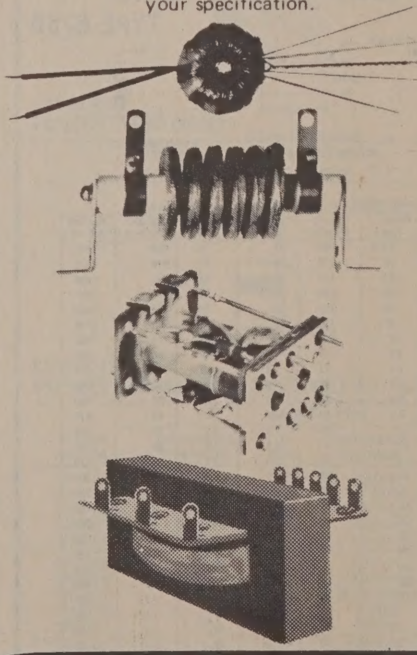
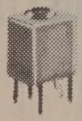


MINIATURE SHIELDED VARIABLE INDUCTORS

TYPE 6319-6320



6319 **6320**

420 Sq. x .575 L.

VERTICAL MOUNT

HORIZONTAL MOUNT

Electrical Specifications for Both Types are Identical

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Wire Size AWG
6320-1	.25	.65	90	50	26
6320-2	.5	1.2	87	68	30
6320-3	.9	2.3	90	63	32
6320-4	2.0	5.3	68	70	36
6320-5	4.4	10	56	102	7/44
6320-6	8	16	48	100	7/44
6320-7	13	29	70	97	7/44
6320-8	23	54	58	80	7/44
6320-9	45	95	60	70	7/44
6320-10	77	155	35	65	39
6320-11	125	290	41	60	39
6320-12	230	520	42	54	39
6320-13	420	860	41	47	39
6320-14	700	1200	39	52	39

TYPE 435

Subminiature Variable Coil
Printed Circuit—Nylon Form

Shield 420 sq x 575 h

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Wire Size AWG
435-1	0.25	0.5	90	60	26
435-2	0.48	1.0	85	60	30
435-3	0.9	2.1	85	60	32
435-4	1.7	3.9	55	65	36
435-5	3.5	8.5	60	50	38
435-6	7.5	17.0	60	50	38
435-7	16.5	35.0	55	60	7/44
435-8	33.0	70.0	50	50	7/44
	Use #2102 Tuning Tool				

TYPE 434

Miniature Variable Coil

Printed Circuit—Nylon Form—
Aluminum Shield 550 sq x 580 h

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Wire Size AWG
434-1	0.55	0.9	105	95	28
434-2	0.9	1.45	100	80	30
434-3	1.4	2.4	70	85	32
434-4	2.2	4.1	70	90	36
434-5	3.9	7.7	65	70	36
434-6	7.5	11.0	45	85	7/44
434-7	11.0	17.5	65	90	7/44
434-8	17.5	27.5	65	90	7/44
434-9	27.0	42.0	65	85	7/44
434-10	42.0	64.0	65	85	7/44
	Use #2102 Tuning Tool				

MODIFIED STOCK COILS

Any of the coils shown on these pages can be wound to intermediate inductance values, or modified to meet customer requirements, often at no additional cost.

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QUALITY COILS SINCE 1946

CB CADDELL-BURNS

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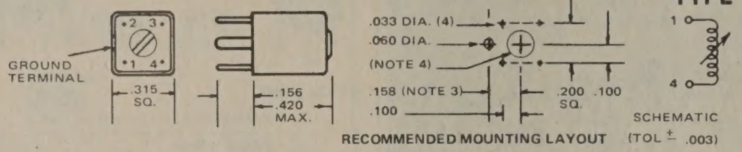
SUBMINIATURE SHIELDED VARIABLE INDUCTORS

TYPE 6740



NOTES:

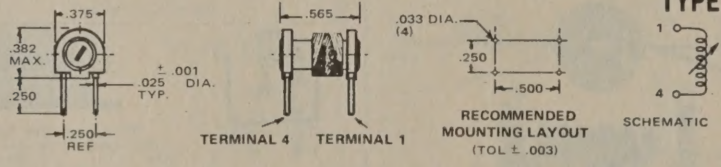
1. Effective inductance and Q measured on Boonton 260A Q-meter in accordance with MIL-C-15305.
2. Self-resonant frequencies are measured at nominal inductance.
3. Ground terminal may be bent as required to fit existing layouts.
4. Provide .156 DIA. hole if bottom access to tuning core is desired. Tuning range on −38 thru −61 may be extended by allowing core to extend 1/16" below mounting surface (when Lmin ≈ ½Lnom).
5. Current rating is based on ¼ watt power dissipation.
6. MATERIALS—
   - Terminals: tin plated copper.
   - Terminal Base: molded phenolic.
   - Coil Form: polyester fiberglass.
   - Core: moisture-proofed powdered iron or ferrite.
   - Shield Can: tin plated copper.
   - Impregnation: varnish per MIL-V-173.

STANDARD VALUES (INTERMEDIATE AND SPÉCIAL VALUES AVAILABLE ON SPECIAL ORDER)

Dash No.	Nominal Inductance	Minimum Range LMIN	LMAX	Min Q @ LNOM	Test Freq. M HZ	Max DCR OHMS	Min SRF M HZ Note 2	Max IDC mA Note 5
−01	.10uH	.08uH	.12uH	80	25	.02	250	3500
−03	.15	.12	.18	85	25	.03	250	2800
−05	.22	.18	.27	85	25	.04	250	2500
−07	.33	.27	.39	90	25	.05	250	2200
−09	.47	.39	.56	90	25	.13	230	1350
−11	.68	.56	.82	90	25	.17	200	1200
−13	1.0	.82	1.2	90	25	.31	160	850
−15	1.5	1.0	1.8	60	7.9	.33	125	850
−17	2.2	1.5	2.7	65	7.9	.72	110	550
−19	3.3	2.2	3.9	65	7.9	1.3	95	425
−21	4.7	3.3	5.6	60	7.9	1.5	80	400
−23	6.8	4.7	8.2	60	7.9	1.8	62	350
−25	10	6.8	1.2	60	7.9	2.2	45	325
−27	15	10	18	72	2.5	1.5	12	400
−29	22	15	27	67	2.5	1.8	9.5	350
−31	33	22	39	65	2.5	2.1	7.8	325
−33	47	33	56	57	2.5	2.6	6.6	300
−35	68	47	82	47	2.5	3.0	5.3	275
−37	100	68	120	45	2.5	3.5	5.0	250
−39	150	100	180	70	.79	3.6	3.4	250
−41	220	150	270	65	.79	6.0	2.8	200
−43	330	220	390	60	.79	7.9	2.3	150
−45	470	330	560	40	.79	11	1.9	125
−47	680	470	820	35	.79	13	1.7	125
−49	1.0mH	.68mH	1.2mH	32	.79	17	1.5	100
−51	1.5	1.0	1.8	37	.25	32	.86	85
−53	2.2	1.5	2.7	37	.25	41	.72	75
−55	3.3	2.2	3.9	40	.25	51	.69	65
−57	4.7	3.3	5.6	27	.25	80	.47	55
−59	6.8	4.7	8.2	25	.25	90	.39	50
−61	10	6.8	12	25	.25	110	.37	45

HORIZONTAL MOUNT VARIABLE INDUCTORS

TYPE 6750

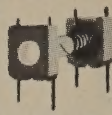


STANDARD VALUES (INTERMEDIATE AND SPECIAL VALUES AVAILABLE ON SPECIAL ORDER)

Dash No.	Nominal Inductance	Minimum Range LMIN	LMAX	Min. Q @LNOM	Test Freq. M HZ	Max DCR OHMS	Min SRF M HZ Note 2	Max IDC mA Note 3
−01	.10uH	.08uH	.12uH	100	25	.015	600	4000
−03	.15	.12	.18	110	25	.02	510	3500
−05	.22	.18	.27	115	25	.03	430	2800
−07	.33	.27	.39	115	25	.04	360	2500
−09	.47	.33	.56	110	25	.06	320	2000
−11	.68	.47	.82	110	25	.08	270	1750
−13	1.0	.68	1.2	115	25	.09	230	1650
−15	1.5	1.0	1.8	87	7.9	.18	180	1150
−17	2.2	1.5	2.7	83	7.9	.33	155	850
−19	3.3	2.2	3.9	85	7.9	.63	120	600
−21	4.7	3.3	5.6	85	7.9	1.2	105	450
−23	6.8	4.7	8.2	85	7.9	2.4	85	320
−25	10	6.8	12	85	7.9	3.0	74	280
−27	15	12	18	83	2.5	1.8	38	370
−29	22	18	27	85	2.5	2.2	31	330
−31	33	27	39	100	2.5	2.7	26	300
−33	47	39	56	100	2.5	3.2	21	270
−35	68	56	82	80	2.5	3.4	9.0	260
−37	100	82	120	77	2.5	4.3	7.6	240
−39	150	120	180	85	.79	6.2	4.2	200
−41	220	180	270	87	.79	8.0	3.4	175
−43	330	270	390	87	.79	9.6	3.0	160
−45	470	390	560	90	.79	12	2.7	140
−47	680	560	820	85	.79	15	2.2	125
−49	1.0mH	.82mH	1.2mH	75	.79	27	2.0	95
−51	1.5	1.0	1.8	70	.25	25	1.6	100
−53	2.2	1.5	2.7	70	.25	32	1.4	85
−55	3.3	2.2	3.9	60	.25	66	1.0	60
−57	4.7	3.3	5.6	63	.25	80	.90	55
−59	6.8	4.7	8.2	65	.25	100	.75	50
−61	10	6.8	12	68	.25	121	.67	45

NOTES:

1. Effective inductance and Q measured on Boonton 260A Q-meter in accordance with MIL-C-15305.
2. Self-resonant frequencies are measured at nominal inductances.
3. Current rating is based on ¼ watt power dissipation.
4. MATERIALS—
   - Terminals: tin plated copper.
   - Terminal Collars: epoxy-fiberglass per MIL-P-18177.
   - Coil Form: polyester-fiberglass.
   - Core: moisture-proofed powdered iron.
   - Impregnation: varnish per MIL-V-173.


6460

6461

6462

LOW-COST PRINTED-CIRCUIT VARIABLE INDUCTORS

TYPE 6460

Variable R.F. Inductors
Four Printed Circuit Terminals, Mounting—.5" x .8" Centers
Size 5/8" x 5/8" x .985 Long
Polyester Cellulose Coil Form

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Nom. D.C. Res. Ohms	Wire Size AWG
6460-1	.06	.09	80	105	.008	22
6460-2	.09	.16	100	130	.010	22
6460-3	.15	.29	120	140	.011	22
6460-4	.19	.40	130	145	.012	22
6460-5	.32	.68	80	105	.08	20/44
6460-6	.60	1.35	80	125	.11	20/44
6460-7	1.14	2.5	90	135	.15	20/44
6460-8	2.0	4.0	100	140	.21	20/44
6460-9	3.1	5.6	110	120	.26	20/44
6460-10	4.5	8.1	48	85	.29	20/44
6460-11	7.0	11.4	43	150	.37	20/44
6460-12	9.7	16.4	80	140	.47	20/44
6460-13	15.6	26.2	90	155	.61	20/44
6460-14	19.2	44	80	110	1.80	7/44
6460-15	41	95	80	90	2.56	7/44
6460-16	70	183	65	100	3.24	7/44
6460-17	180	525	90	98	5.76	7/44
6460-18	445	1040	94	105	9.32	7/44

Note: Inductance & Q at various frequencies can be altered by changing type of core used (see parts section for cores available). Dash No. 1 thru 15 uses Powdered Iron Core 302—250—6R. Dash No. 16 thru 18 uses Ferrite Core 303—250—6R.

TYPE 6461

Variable R.F. Coil Series
Size 5/8" x 5/8" x .625 Long
0.5" P.C. Mounting

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Nom. D.C. Res. Ohms	Wire Size AWG
6461-1	.09	.12	58	66	.007	22
6461-2	.1	.14	102	128	.009	22
6461-3	.14	.22	128	150	.01	22
6461-4	.18	.33	134	155	.011	22
6461-5	.23	.44	140	154	.013	22
6461-6	.37	.68	87	105	.102	7/41
6461-7	.58	1.1	87	100	.136	7/41
6461-8	1.1	2.2	72	115	.2	7/41
6461-9	2	4.4	80	112	.29	7/41
6461-10	3.3	8	96	140	.77	7/44
6461-11	7	13.6	70	130	1.02	7/44
6461-12	12.4	25.5	85	134	1.42	7/44
6461-13	22.5	49	90	127	1.93	7/44
6461-14	47	100	86	97	2.8	7/44
6461-15	99	174	75	142	4.2	7/44
6461-16	170	332	95	146	6.0	7/44
6461-17	322	570	102	140	8.5	7/44
6461-18	525	910	97	125	10.4	7/44

TYPE 6462

Variable R.F. Coil
with Powdered Iron Shield
Size 5/8" x 5/8" x .730 Long
0.5" P.C. Mounting

Stock No.	Inductance Range Microhenries Min.	Max.	Q'	Q''	Nom. D.C. Res. Ohms	Wire Size AWG
6462-1	.08	.10	84	89	.007	22
6462-2	.4	.8	82	100	.11	7/41
6462-3	.6	1.3	85	105	.14	7/41
6462-4	1.1	2.6	71	115	.20	7/41
6462-5	2.1	5.1	85	145	.55	7/44
6462-6	3.4	8.6	96	145	.75	7/44
6462-7	8.0	16.9	70	150	1.14	7/44
6462-8	16.2	39.5	94	142	1.52	7/44
6462-9	34	84	86	110	2.21	7/44
6462-10	57	124	80	145	2.74	7/44
6462-11	67	141	80	148	3.16	7/44

CRAMER COIL DIV.

Division of Digital Magnetics, Inc.

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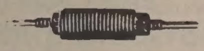


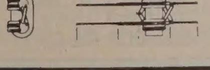
MINIATURE SOLENOID CHOKES ON .095″ x ¼″ LONG COIL FORM

Cramer Part No.	Inductance ±10%	Q	SRF MHz	DCR Ohms
CCM.68T	.68uh	47	308	.15
CCM.82T	.82uh	46	279	.20
CCM1.0T	1.0uh	30	253	.33
CCM1.2T	1.2uh	30	234	.42
CCM1.5T	1.5uh	31	208	.58
CCM1.8T	1.8uh	31	187	.68
CCM2.2T	2.2uh	32	169	1.17
CCM2.7T	2.7uh	32	153	1.4
CCM3.3T	3.3uh	32	137	2.6
CCM3.9T	3.9uh	33	126	2.9
CCM4.7T	4.7uh	34	114	3.4
CCM5.6T	5.6uh	33	106	3.9
CCM6.8T	6.8uh	43	54	.43
CCM8.2T	8.2uh	41	49	.56
CCM10T	10.0uh	39	48	.72
CCM12T	12.0uh	62	40	1.1
CCM15T	15.0uh	65	36	1.4
CCM22T	22.0uh	63	29	3.1
CCM27T	27.0uh	65	27	3.5
CCM33T	33.0uh	64	24	3.9

VELVETORK ADJUSTABLE COIL 368″ PIN CIRCLE x ¾″ LONG

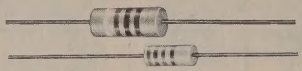
Cramer Part No.	L Min.	Q Min.	L Max.	Q Min.	Test Freq.
CCA107	.095uh	77	.125uh	77	25MHz
CCA157	.130uh	68	.170uh	92	25MHz
CCA227	.185uh	88	.265uh	100	25MHz
CCA337	.285uh	88	.410uh	93	25MHz
CCA477	.420uh	100	.580uh	80	25MHz
CCA687	.540uh	101	.850uh	89	25MHz
CCA827	.640uh	101	1.00uh	78	25MHz
CCA106	.760uh	98	1.25uh	70	7.9MHz
CCA156	1.20uh	65	1.87uh	70	7.9MHz
CCA226	1.65uh	61	2.75uh	65	7.9MHz
CCA336	2.40uh	64	4.10uh	60	7.9MHz
CCA476	3.40uh	68	5.8uh	60	7.9MHz
CCA686	4.60uh	64	8.5uh	56	7.9MHz
CCA826	5.6uh	64	10uh	57	2.5MHz
CCA105	7.1uh	68	12.5uh	55	2.5MHz
CCA155	10uh	58	18.7uh	95	2.5MHz
CCA225	14.8uh	61	27.5uh	90	2.5MHz
CCA335	22uh	60	41uh	75	2.5MHz
CCA475	31uh	58	58uh	68	2.5MHz
CCA685	43.5uh	56	85uh	55	2.5MHz
CCA825	61uh	48	100uh	88	790KHz
CCA104	76uh	52	125uh	90	790KHz
CCA154	105uh	57	187uh	92	790KHz
CCA224	160uh	63	275uh	90	790KHz
CCA334	240uh	66	410uh	90	790KHz
CCA474	360uh	68	580uh	81	790KHz
CCA684	530uh	66	850uh	75	790KHz
CCA824	700uh	64	1mh	80	250KHz
CCA103	910uh	66	1.25mh	85	250KHz
CCA153	990uh	35	1.87mh	60	250KHz
CCA223	1.6mh	39	2.75mh	62	250KHz
CCA333	2.4mh	41	4.1mh	60	250KHz
CCA473	3.4mh	42	5.8mh	57	250KHz
CCA683	5.15mh	42	8.5mh	50	250KHz
CCA823	7.4mh	42	10.0mh	50	79KHz
CCA102	9.8mh	40	12.5mh	52	79KHz
CCA152	12mh	39	18.7mh	55	79KHz
CCA222	12.1mh	20	27.5mh	51	79KHz
CCA332	18.2mh	24	41mh	54	79KHz
CCA472	27.5mh	28	58mh	56	79KHz
CCA682	40mh	32	85mh	56	79KHz
CCA822	50mh	34	100mh	58	79KHz
CCA101	62mh	35	125mh	56	79KHz

BALUN COILS



PLUG-IN PRINTED CIRCUIT POWER TRANSFORMERS

Type No.	Secondary Parallel	Secondary Series	Watts
CC6506	6.3V C.T. @ .20A (Single Secondary)		1.5
CC6512	12.6V @ 120A	25.2V C.T. @ .060A	1.5
CC6608	6.32V @ .70A	12.6V C.T. @ .35A	4.5
CC6616	28V @ .156A	56V C.T. @ .078A	4.5
CC6708	6.3V @ 1.2A	12.6V C.T. @ .60A	7.5
CC6712	12.6V @ .6A	25.2V C.T. @ .30A	7.5
CC6716	28V @ .27A	56V C.T. @ .135A	7.5



WR SERIES MOLDED MINIATURE R.F. CHOKES

Series	Inductance	Size
WR-2	.1 thru 1000uh	.1 x .250″
WR-4	.15 thru 240uh	.155 x .375″
WR-5	.1 thru 100,000uh	.162 x .450″
WR-6	270 thru 1000uh	.190 x .440″

CTC SERIES CONVERTER TRANSFORMERS

Input Voltage: 1.5 — 30V DC
Output Voltage: up to 200V DC
Power: up to 3 watts

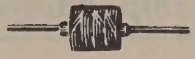
CPT SERIES TRIGGER TRANSFORMERS

Primary L: 200uh to 5000uh
Turns Ratio: 1:1; 1:1:1; 2:1:1; 5:1

CN SERIES SHIELDED SUBMINIATURE ADJUSTABLE R.F. COILS

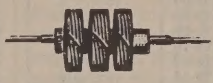
Cramer Part No.	Core Position Inductance Maximum	Q Min.	Inductance Minimum	Q Min.
CN9050	1.5uh	40	3.0uh	41
CN9051	3.0uh	46	7.0uh	45
CN9052	7.0uh	40	14.0uh	62
CN9053	14.0uh	48	28.0uh	66
CN9054	28.0uh	48	60.0uh	45
CN9055	60.0uh	40	120.0uh	69
CN9056	120.0uh	52	280.0uh	68
CN9057	280.0uh	52	650.0uh	62
CN9058	650.0uh	36	1.3mh	68
CN9059	1.3mh	43	3.0mh	53
CN9060	3.0mh	32	10.0mh	32
CN9061	8.0mh	35	20.0mh	38
CN9062	15.0mh	25	40.0mh	40
CN9063	20.0mh	36	60.0mh	60

½″, 7mm and 10mm



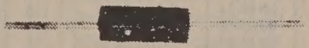
MINIATURE UNIVERSAL CHOKES WOUND ON .095″ x ¼″ LONG COIL FORMS

Cramer Part No.	Inductance ±10%	Q	SRF MHz	DCR Ohms
CMU39	39uh	20	11.2	5.8
CMU47	47uh	18	10.8	6.5
CMU56	56uh	17	10.6	7
CMU68	68uh	17	10.5	8
CMU82	82uh	16	10.4	8.5
CMU100	100uh	16	10.3	9.2
CMU120	120uh	22	9.6	10.7
CMU150	150uh	23	9.0	12
CMU180	180uh	23	7.5	13.7
CMU220	220uh	24	6.6	15
CMU270	270uh	24	5.6	16.8
CMU330	330uh	24	5.0	18.9
CMU390	390uh	24	4.8	20.6
CMU470	470uh	23	4.4	22.6
CMU560	560uh	54	3.2	11.5
CMU680	680uh	49	2.8	12.7
CMU820	820uh	46	2.2	13.9
CMU1000	1000uh	44	2.1	15.5
CMU1500	1500uh	57	1.8	23.9
CMU2200	2200uh	53	1.7	24.7



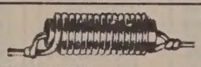
R.F. CHOKE MULTIPLE SECTION WINDING

Cramer Part No.	Inductance ±10%	Q	DCR Ohms
CBP1.0	1.0uh	55	.155
CBP10	10.0uh	28	.64
CBP50	50.0uh	18	3.0
CBP100	100.0uh	16	4.15
CBP500	500.0uh	27	15.
CBP1000	1000.0uh	40	34.
CBP500A	.5mh	17	6.9
CBP1000A	1.0mh	45	19.
CBP2500A	2.5mh	55	40.
CBP5000A	5.0mh	60	94.



FERRITE SHIELDED CHOKES

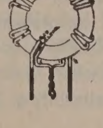
Cramer Part No.	Induct. 15%	Q	DCR Ohms	Size
CFS-500	500uh	62	1.7	.156x⅜L
CFS-1000	1.0mh	58	3.9	.156x⅜
CFS-2500	2.5mh	62	6.3	.156x⅜
CFS-5000	5.0mh	55	14.0	.156x⅜
CFS-10000	10.0mh	3.5	7.0	.250x½
CFS-25000	25.0mh	3.5	18.0	.250x½
CFS-50000	50.0mh	4.0	35.0	.250x½
CFS-100000	100.0mh	4.0	60.0	.250x½
CFS-250000	250.0mh	10.0	50.0	.500x1″
CFS-500000	500.0mh	10.0	150.0	.500x1″
CFS-1000000	1000.0mh	10.0	220.0	.500x1″
CFS-1.5H	1.5Hz	10.0	280.0	.500x1″
CFS-2H	2.0Hz	10.0	360.0	.500x1″



HASH FILTER CHOKES

Cramer Part No.	Inductance ±10%	Max. DCR Ohms
CMHF-3.35	3.35uh	.01
CMHF-8.8	8.8uh	.02
CMHF-40	40uh	.08
CMHF-68	68uh	.05
CMHF-100	100uh	.22

BROADBAND MATCHING TRANSFORMERS



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AMERICAN PRECISION INDUSTRIES INC.

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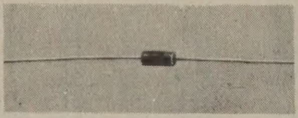
TELEPHONE 716/652-3600 TELEX 91-293
OTHER DIVISIONS INCLUDE: BASCO, DUSTEX, AMERICAN PRECISION INDUSTRIES (U.K.) LTD., DUSTEX OF CANADA INC.

MOLDED RF

SERIES 0819

MILITARY SPECIFICATIONS:
MIL-C-15305 (LT4K & LT10K)

PHYSICAL PARAMETERS —
Length: .200±.010
Diameter: .078±.008
Lead Size: AWG #26 TCW.
Lead Length: 1.5±.12

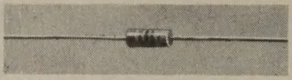


Part Number	Inductance Microhenries	Q Min.
CORE MATERIAL: PHENOLIC		
0819-00	.10±10%	35
0819-02	.12±10%	35
0819-04	.15±10%	35
0819-06	.18±10%	35
0819-08	.22±10%	30
0819-10	.27±10%	30
0819-12	.33±10%	25
0819-14	.39±10%	25
0819-16	.47±10%	25
CORE MATERIAL: IRON		
0819-18	.56±10%	40
0819-20	.68±10%	40
0819-22	.82±10%	40
0819-24	1.0 ±10%	40
0819-26	1.2 ±10%	35
0819-28	1.5 ±10%	40
0819-30	1.8 ±10%	40
0819-32	2.2 ±10%	45
0819-34	2.7 ±10%	45
0819-36	3.3 ±10%	45
0819-38	3.9 ±10%	50
0819-40	4.7 ±10%	55
0819-42	5.6 ±10%	55
0819-44	6.8 ±10%	55
0819-46	8.2 ±10%	55
0819-48	10±10%	55
0819-50	12±10%	40
0819-52	15±10%	40
0819-54	18±10%	40
0819-56	22±10%	45
0819-58	27±10%	45
0819-60	33±10%	45
0819-62	39±10%	45
0819-64	47±10%	45
0819-66	56±10%	45
0819-68	68±10%	45
0819-70	82±10%	45
0819-72	100±10%	45
CORE MATERIAL: FERRITE		
0819-74	120±10%	35
0819-76	150±10%	35
0819-78	180±10%	35
0819-80	220±10%	35
0819-82	270±10%	35
0819-84	330±10%	35
0819-86	390±10%	35
0819-88	470±10%	35
0819-90	560±10%	35
0819-92	680±10%	35
0819-94	820±10%	35
0819-96	1000±10%	35

SERIES 1025

MILITARY SPECIFICATIONS:
MS-75083 (LT4K)
MS-75084 (LT10K)
MS-75085 (LT10K)

PHYSICAL PARAMETERS —
Length: .250±.010
Diameter: .095±.010
Lead Size: AWG #24 TCW.
Lead Length: 1.5±.12

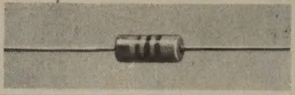


Part Number	Inductance Microhenries	Q Min.
CORE MATERIAL: PHENOLIC		
1025-94	.10±10%	40
1025-96	.12±10%	40
1025-00	.15±10%	38
1025-02	.18±10%	35
1025-04	.22±10%	33
1025-06	.27±10%	33
1025-08	.33±10%	30
1025-10	.39±10%	30
1025-12	.47±10%	30
1025-14	.56±10%	30
1025-16	.68±10%	28
1025-18	.82±10%	28
1025-20	.00±10%	25
CORE MATERIAL: IRON		
1025-22	1.20±10%	25
1025-24	1.50±10%	28
1025-26	1.80±10%	30
1025-28	2.20±10%	30
1025-30	2.70±10%	37
1025-32	3.30±10%	45
1025-34	3.90±10%	45
1025-36	4.70±10%	45
1025-38	5.60±10%	50
1025-40	6.80±10%	50
1025-42	8.20±10%	55
1025-44	10.0±10%	55
1025-46	12.0±10%	45
1025-48	15.0±10%	45
1025-50	18.0±10%	50
1025-52	22.0±10%	50
1025-54	27.0±10%	50
CORE MATERIAL: FERRITE		
1025-56	33.0±10%	45
1025-58	39.0±10%	45
1025-60	47.0±10%	45
1025-62	56.0±10%	45
1025-64	68.0±10%	50
1025-66	82.0±10%	50
1025-68	100.0±10%	50
1025-70	120.0±10%	30
1025-72	150.0±10%	30
1025-74	180.0±10%	30
1025-76	220.0±10%	30
1025-78	270.0±10%	30
1025-80	330.0±10%	30
1025-82	390.0±10%	30
1025-84	470.0±10%	30
1025-86	560.0±10%	30
1025-88	680.0±10%	30
1025-90	820.0±10%	30
1025-92	1000.0±10%	30

SERIES 1537

MILITARY SPECIFICATIONS:
MS-14046 (LT10K)
MS-18130 (LT4K)
MS-90538 (LT10K)

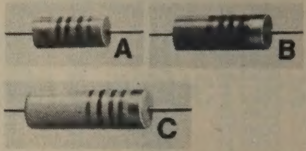
PHYSICAL PARAMETERS —
Length: .375±.010
Diameter: .155±.010
Lead Size: AWG #22 TCW.
Lead Length: 1.44±.12



Part Number	Inductance Microhenries	Q Min.
CORE MATERIAL: PHENOLIC		
1537-00	.15±20%	50
1537-02	.22±20%	50
1537-04	.33±20%	45
1537-06	.47±20%	45
1537-07	.56±10%	50
1537-08	.68±10%	50
1537-10	.82±10%	50
1537-12	1.00±10%	50
1537-14	1.20±10%	33
1537-16	1.50±10%	33
1537-18	1.80±10%	33
1537-20	2.20±10%	33
1537-22	2.70±10%	33
1537-24	3.30±10%	33
1537-26	3.90±10%	33
1537-28	4.70±10%	33
CORE MATERIAL: IRON		
1537-30	5.60±10%	45
1537-32	6.80±10%	50
1537-34	8.20±10%	50
1537-36	10.0±10%	55
1537-38	12.0±10%	65
1537-40	15.0±10%	65
1537-42	18.0±10%	75
1537-44	22.0±10%	75
1537-46	24.0± 5%	60
1537-47	27.0±10%	60
1537-48	27.0± 5%	60
1537-50	30.0± 5%	65
1537-51	33.0±10%	65
1537-52	33.0± 5%	65
1537-54	36.0± 5%	60
1537-56	39.0± 5%	60
1537-58	43.0± 5%	60
1537-60	47.0± 5%	55
1537-62	51.0± 5%	55
1537-64	56.0± 5%	55
1537-66	62.0± 5%	55
1537-68	68.0± 5%	55
1537-70	75.0± 5%	55
1537-72	82.0± 5%	50
1537-74	91.0± 5%	50
1537-76	100.0± 5%	50
1537-78	110.0± 5%	60
1537-80	120.0± 5%	65
1537-82	130.0± 5%	65
1537-84	150.0± 5%	65
1537-86	160.0± 5%	65
1537-88	180.0± 5%	65
1537-90	200.0± 5%	65
1537-92	220.0± 5%	65
1537-94	240.0± 5%	65

SERIES 2500

MILITARY SPECIFICATIONS:
MS-90539 (LT10K)
MS-90540 (LT10K)
MS-90541 (LT10K)



CORE MATERIAL: IRON

Part Number	Inductance Microhenries	Q Min.	Mold Size
2500-00	270±5%	65	A
2500-02	300±5%	65	A
2500-04	330±5%	65	A
2500-06	360±5%	65	A
2500-08	390±5%	65	A
2500-10	430±5%	65	A
2500-12	470±5%	65	A
2500-14	500±5%	65	A
2500-15	510±5%	65	A
2500-16	560±5%	65	A
2500-18	620±5%	60	A
2500-20	680±5%	60	A
2500-22	750±5%	60	A
2500-24	820±5%	60	A
2500-26	910±5%	60	A
2500-28	1000±5%	60	A
2500-30	1100±5%	60	B
2500-32	1200±5%	60	B
2500-34	1300±5%	60	B
2500-36	1500±5%	65	B
2500-38	1600±5%	65	B
2500-40	1800±5%	65	B
2500-42	2000±5%	65	B
2500-44	2200±5%	70	B
2500-46	2400±5%	70	B
2500-48	2700±5%	70	B
2500-50	3000±5%	70	B
2500-52	3300±5%	70	B
2500-54	3600±5%	70	B
2500-56	3900±5%	80	C
2500-58	4300±5%	80	C
2500-60	4700±5%	80	C
2500-62	5000±5%	80	C
2500-63	5100±5%	80	C
2500-64	5600±5%	80	C
2500-66	6200±5%	80	C
2500-68	6800±5%	80	C
2500-70	7500±5%	80	C
2500-72	8200±5%	80	C
2500-74	9100±5%	80	C
2500-76	10000±5%	80	C

PHYSICAL PARAMETERS

Mold Size	Diameter	Length	Lead Size & Type
A	.190±.010	.440±.010	AWG #22 TCW
B	.215±.010	.560±.010	AWG #21 TCW
C	.240±.010	.740±.010	AWG #20 TCW

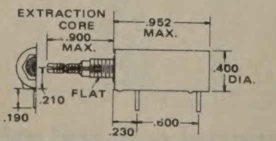
Mold Size	Lead Length	Power Dissipation in Watts 90°C	Max. Weight in Grams
A	1.44±.12	.166	.95
B	1.44±.12	.182	1.5
C	1.44±.12	.213	2.5

Delevan Products are manufactured and tested in accordance with MIL-C-15305 to meet the high levels of performance demanded by today's quality-minded manufacturers. A comprehensive program of Quality Assurance and Environmental Testing insure the reliability of **Delevan** components.

MOLDED VARIABLE RF

SERIES 4000 & 4100

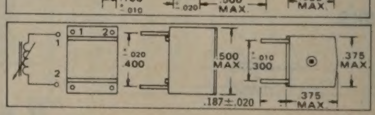
MILITARY SPECIFICATIONS:
MS-90543 (LT12V)
MS-90546 (LT12V)
Values .18uH to 70MH



SERIES 9405 & 9406

Values .08uH to 13MH

MILITARY SPECIFICATIONS:
MIL-C-15305C (LT6V)



coils and inductive components

- Molded RF
- Shielded RF
- Micro-i coils & chip inductors
- Transformers
- Molded variable RF
- Potted coils
- Custom inductors

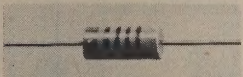
Delevan
Division
AMERICAN PRECISION INDUSTRIES INC.
270 QUAKER RD./EAST AURORA, N.Y. 14052
TELEPHONE 716/652-3600 TELEX 91-293
OTHER DIVISIONS INCLUDE: BASCO, DUSTEX, AMERICAN PRECISION INDUSTRIES (U.K.) LTD., DUSTEX OF CANADA INC.

SHIELDED RF

SERIES 1641

MILITARY SPECIFICATIONS:
MS-75087 (LT10K)
MS-75088 (LT10K)
MS-75089 (LT10K)

PHYSICAL PARAMETERS —
Length: .410±.020
Diameter: .162±.010
Lead Size: AWG #22 TCW.
Lead Length: 1.44±.12

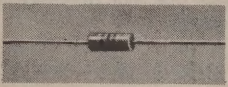


Part Number	Inductance Microhenries	Q Min.
1641-101	.10±10%	50
1641-121	.12±10%	51
1641-151	.15±10%	51
1641-181	.18±10%	50
1641-221	.22±10%	49
1641-271	.27±10%	47
1641-331	.33±10%	46
1641-391	.39±10%	44
1641-471	.47±10%	44
1641-561	.56±10%	43
1641-681	.68±10%	42
1641-821	.82±10%	40
1641-102	1.0±10%	44
1641-122	1.2±10%	44
1641-152	1.5±10%	44
1641-182	1.8±10%	44
1641-222	2.2±10%	44
1641-272	2.7±10%	44
1641-332	3.3±10%	44
1641-392	3.9±10%	44
1641-472	4.7±10%	44
1641-562	5.6±10%	44
1641-682	6.8±10%	50
1641-822	8.2±10%	50
1641-103	10.0±10%	50
1641-123	12.0±10%	55
1641-153	15.0±10%	45
1641-183	18.0±10%	45
1641-223	22.0±10%	45
1641-273	27.0±10%	45
1641-333	33.0±10%	45
1641-393	39.0±10%	50
1641-473	47.0±10%	50
1641-563	56.0±10%	50
1641-683	68.0±10%	50
1641-823	82.0±10%	50
1641-104	100.0±10%	50
1641-124	120.0±10%	55
1641-154	150.0±10%	55
1641-184	180.0±10%	55
1641-224	220.0±10%	55
1641-274	270.0±10%	55
1641-334	330.0±10%	55
1641-394	390.0±10%	60
1641-474	470.0±10%	60
1641-564	560.0±10%	60
1641-684	680.0±10%	60
1641-824	820.0±10%	60
1641-105	1000.0±10%	60
1641-125	1200.0±10%	45
1641-155	1500.0±10%	45
1641-185	1800.0±10%	45
1641-225	2200.0±10%	45
1641-275	2700.0±10%	45
1641-335	3300.0±10%	45
1641-395	3900.0±10%	45
1641-475	4700.0±10%	45
1641-565	5600.0±10%	44
1641-685	6800.0±10%	40
1641-825	8200.0±10%	40
1641-106	10000.0±10%	40

SERIES 0925

NEW APPROVALS
MS-21426
MS-21427

PHYSICAL PARAMETERS —
Length: .250±.010
Diameter: .095±.010
Lead Size: AWG #26 TCW.
Lead Length: 1.5±.12



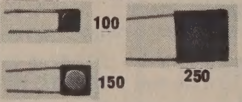
Part Number	Inductance Microhenries	Q Min.
0925-101	.10±10%	54
0925-121	.12±10%	52
0925-151	.15±10%	50
0925-181	.18±10%	49
0925-221	.22±10%	47
0925-271	.27±10%	46
0925-331	.33±10%	44
0925-391	.39±10%	42
0925-471	.47±10%	41
0925-561	.56±10%	41
0925-681	.68±10%	39
0925-821	.82±10%	38
0925-102	1.00±10%	37
0925-122	1.20±10%	40
0925-152	1.50±10%	41
0925-182	1.80±10%	43
0925-222	2.20±10%	45
0925-272	2.70±10%	48
0925-332	3.30±10%	49
0925-392	3.90±10%	50
0925-472	4.70±10%	53
0925-562	5.60±10%	54
0925-682	6.80±10%	55
0925-822	8.2±10%	55
0925-103	10.0±10%	57
0925-123	12.0±10%	36
0925-153	15.0±10%	38
0925-183	18.0±10%	40
0925-223	22.0±10%	40
0925-273	27.0±10%	40
0925-333	33.0±10%	41
0925-393	39.0±10%	42
0925-473	47.0±10%	44
0925-563	56.0±10%	44
0925-683	68.0±10%	45
0925-823	82.0±10%	45
0925-104	100.0±10%	40
0925-124	120.0±10%	31
0925-154	150.0±10%	33
0925-184	180.0±10%	33
0925-224	220.0±10%	35
0925-274	270.0±10%	37
0925-334	330.0±10%	40
0925-394	390.0±10%	38
0925-474	470.0±10%	36
0925-564	560.0±10%	36

MICRO-I® COILS

SERIES 100 150 & 250

MILITARY SPECIFICATIONS:
MS-21367 (LT10K) 100
MS-21368 (LT10K) 150
MS-21369 (LT10K) 250

PHYSICAL PARAMETERS (Max.):
100: .110″ x .065″
150: .160″ x .065″
250: .260″ x .065″



Part Number	Inductance Microhenries	Q Min.
100-150	.015±30%	40
100-220	.022±30%	40
100-330	.033±30%	40
100-470	.047±30%	40
100-680	.068±30%	40
100-101	.100±30%	40
100-121	.12 ±20%	35
100-151	.15 ±20%	40
100-181	.18 ±20%	40
100-221	.22 ±20%	40
100-271	.27 ±20%	40
100-331	.33 ±20%	40
100-391	.39 ±20%	40
100-471	.47 ±20%	40
100-561	.56 ±20%	40
100-681	.68±20%	40
100-821	.82±20%	35
100-102	1.00±20%	35
100-122	1.20±10%	35
100-152	1.50±10%	32
100-182	1.80±10%	32
100-222	2.20±10%	35
100-272	2.70±10%	35
100-332	3.30±10%	37
100-392	3.90±10%	37
100-472	4.70±10%	40
100-562	5.60±10%	40
100-682	6.80±10%	40
100-822	8.20±10%	40
100-103	10.0 ±10%	40
150-123	12.0±10%	45
150-153	15.0±10%	45
150-183	18.0±10%	45
150-223	22.0±10%	45
150-273	27.0±10%	45
150-333	33.0±10%	45
150-393	39.0±10%	45
150-473	47.0±10%	45
150-563	56.0±10%	45
150-683	68.0±10%	45
150-823	82.0±10%	45
150-104	100 ±10%	45
250-124	120±10%	45
250-154	150±10%	45
250-184	180±10%	45
250-224	220±10%	45
250-274	270±10%	45
250-334	330±10%	45
250-394	390±10%	45
250-474	470±10%	40
250-564	560±10%	40
250-684	680±10%	40
250-824	820±10%	40
250-105	1000±10%	35

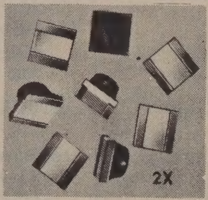
CHIP INDUCTORS

SERIES 103

MILITARY SPECIFICATIONS:
MIL-C-15305 (LT4K)

PHYSICAL PARAMETERS (Max.):
.110″ sq. x .075″ High.
Solder Rails both bottom and sides.

Illustration twice size for clarity.



Part Number	Inductance Microhenries	Q Min.
CORE MATERIAL: PHENOLIC		
103-100M	.010±20%	60
103-150M	.015±20%	55
103-220M	.022±20%	50
103-330M	.033±20%	48
103-470M	.047±20%	42
103-680M	.068±20%	36
103-101M	.100±20%	32
CORE MATERIAL: FERRITE		
103-121M	.12±20%	30
103-151M	.15±20%	25
103-181M	.18±20%	25
103-221K	.22±10%	25
103-271K	.27±10%	25
103-331K	.33±10%	25
103-391K	.39±10%	22
103-471K	.47±10%	22
103-561K	.56±10%	22
103-681K	.68±10%	22
103-821K	.82±10%	22
103-102K	1.0±10%	22
103-122K	1.2±10%	22
103-152K	1.5±10%	22
103-182K	1.8±10%	22
103-222K	2.2±10%	22
103-272K	2.7±10%	24
103-332K	3.3±10%	24
103-392K	3.9±10%	24
103-472K	4.7±10%	24
103-562K	5.6±10%	22
103-682K	6.8±10%	22
103-822K	8.2±10%	22
103-103K	10.0±10%	24
103-123K	12.0±10%	25
103-153K	15.0±10%	25
103-183K	18.0±10%	25
103-223K	22.0±10%	25
103-273K	27.0±10%	25

CUSTOM DESIGN

Delevan designs and manufactures specialized components for a wide variety of particular applications. Let us know your design parameters.

POTTED COILS

SERIES 2534

MILITARY SPECIFICATIONS:
MIL-C-15305 (LT6K)

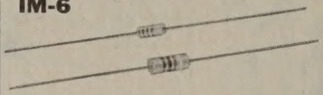
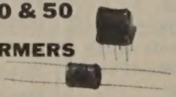
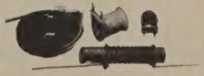
PHYSICAL PARAMETERS —
Height: .345 Max.
Diameter: .25±.010
Lead Size: AWG. #24 TCW.
Lead Length: 1.62±.12
Lead Spacing: .200 +.010—.030

Part Number	Inductance Millihenries	Q Min.
2534-00	.10±10%	80
2534-02	.12±10%	80
2534-04	.15±10%	75
2534-06	.18±10%	70
2534-08	.22±10%	65
2534-10	.27±10%	80
2534-12	.33±10%	75
2534-14	.39±10%	70
2534-16	.47±10%	65
2534-18	.56±10%	65
2534-20	.68±10%	60
2534-22	.82±10%	50
2534-24	1.00±10%	45
2534-26	1.20±10%	70
2534-28	1.50±10%	70
2534-30	1.80±10%	70
2534-32	2.20±10%	70
2534-34	2.70±10%	65
2534-36	3.30±10%	65
2534-38	3.90±10%	65
2534-40	4.70±10%	60
2534-42	5.60±10%	60
2534-44	6.80±10%	55
2534-46	8.20±10%	50
2534-48	10.0 ±10%	45
2534-50	12.0 ±15%	35
2534-52	15.0 ±15%	35
2534-54	18.0 ±15%	35
2534-56	22.0 ±15%	35
2534-58	27.0 ±15%	35
2534-60	33.0 ±15%	30
2534-62	39.0 ±15%	30
2534-64	47.0 ±15%	30
2534-66	56.0 ±15%	25
2534-68	68.0 ±15%	20
2534-70	82.0 ±15%	18
2534-72	100.0 ±15%	15
2534-74	120.0 ±15%	10
2534-76	150.0 ±15%	10

This partial listing of Delevan Inductors is designed to give the Design Engineer a condensed overview of our product line. Our local representatives, distributors and factory sales engineers are available to serve your needs in the application of Delevan Products. They will be happy to provide a complete catalog of all our coils and other inductive components. See the index for the complete listing of the Delevan sales organization.

DALE®

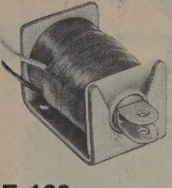
INDUCTIVE COMPONENTS QUICK REFERENCE GUIDE

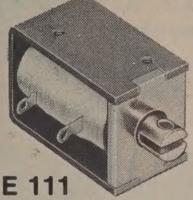
STYLE	DESCRIPTION
IR-2 **IR-4** 	**FLAME RETARDANT EPOXY CONFORMAL COATED CHOKES** designed primarily for commercial applications; combine durability and low cost. **Standard Tolerance:** ±5%, ±10%, ±20%, depending on value **Inductance Range:** .10 μh to 1000 μh
IM-2 **IM-4** **IM-6** 	**FLAME RETARDANT EPOXY-MOLDED CHOKES** designed to meet requirements of MIL-C-15305D, Grade 1, Class A, B. Offer precision performance, reliability and wide inductance range in small package. **Standard Tolerance: IM-2** = ±10% all values. **IM-4** = ±20% .15 thru .47 μh, ±10% .56 thru 33.0 μh and ±5% 36.0 thru 240.0 μh. **IM-6** = ±5% all values. **Inductance Range and Mil Standard: IM-2** = .10 μh to 1000 μh; MS-75083, 84, 85; **IM-4** = .15 μh to 240 μh; MS-18130, MS-90538; **IM-6** = 270 μh to 1000 μh; MS-90539.
IMS-5 	**MOLDED SHIELDED INDUCTORS** designed to meet MIL-C-15305D, Grade 1, Class A. **Standard Tolerance:** ±10% **Inductance Range:** 10 μh to 100,000 μh
IH **HIGH CURRENT CHOKES** 	**HIGH CURRENT FILTER CHOKES** designed to provide noise filtering for switching regulators, power amplifiers, power supplies and SCR or Triac control circuits.
TE **TD** 	**PRECISION TOROIDS**– Encapsulated (TE) and Dipped (TD), high Q and wide selection of Q vs. frequency ranges, plus a broad range of inductance values. TE style designed to meet MIL-T-27C, Type TF5SX20ZZ. **Standard Tolerance:** ±1%, ±2%, depending on value **Inductance Range:** .050 mh to 20 h
PL **LOW POWER TRANSFORMERS** 	**POWER TRANSFORMERS** with laminated construction for low cost industrial applications. Designed to meet U.L. specifications. P.C. mounting. Transformer secondaries may be series or parallel connected. **Input Voltage:** 115V, 60 Hz (PL-22 has dual primary for 115V/230V) **Wattage:** .75, 1.5, 4.5, 10 Various output voltages available from 4 to 230V.
ITC-1052 **CONVERTER TRANSFORMERS** 	**CONVERTER TRANSFORMERS** with high conversion efficiency from DC input to filtered DC output. Miniature size, P.C. board mount, for low power solid state circuits. **Power Rating:** To 3 w **Dimensions:** .40″ H x .75″ D **Input Voltage:** 1.5-30 VDC
PT-10, 20 & 50 **PULSE TRANSFORMERS** 	**TRIGGER TYPE PULSE TRANSFORMERS** designed for low cost trigger source isolation in half and full wave SCR power control circuits. P.C. and bobbin styles. **Primary Inductance Range:** 200 μh to 5,000 μh
CUSTOM COILS 	Dale offers wide custom capability in toroids, bobbins, RF transformers and inductors and variable pitch inductors.

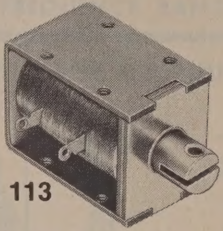
For complete information, contact:

DALE ELECTRONICS, INC., *East Highway 50, Yankton, South Dakota 57078 • Phone 605-665-9301*

SOLENOIDS


E 109


E 111


E 113

- Voltages from 6 V to 230 V AC or DC
- Custom lead lengths and terminal variations
- Special plunger lengths and styles
- Impregnated or encapsulated models

Specifications

	Power Requirement Intermittent/Continuous (25%)	Pull (Continuous Only)
E 109	18 W/4.5 W	8 oz. @ .05" gap
E 111	20 W/5.2 W	20 oz. @ .05" gap
E 113	30 W/8 W	35 oz. @ .05" gap

- All metal parts are zinc plated.
- Staked yoke standard. You may specify conical or flat plungers on production orders.
- Life expectancy at rated load: 5×10^6.

VIBRATORS

E 305

E 301

- Improve distribution and flow of solid or liquid materials
- Long life
- Noiseless
- Adhesive mounting pad
- Easy to install

Specifications

Model: Miniature Vibrator, E 305

Voltage: 115 V AC, continuous duty (other voltages to specification)

Input: 5 watts

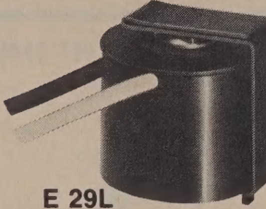
Vibrating Frequency: 120 cps.

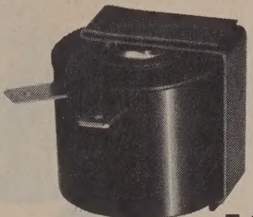
Force: 2.5 g's

Size: 1.50" (3.81 cm) x 1.00" (2.54 cm) x 1.25" (3.18 cm)

Weight: 1.8 oz. (50 gms.)

BUZZERS


E 29L


E 29T

- Produce loud, distinctive sound
- Mount quickly, easily with single screw
- Manufactured with exclusive Uni-Weld® process

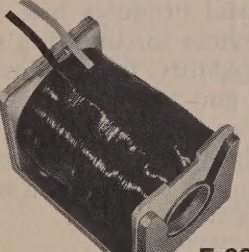
Specifications

Order by number code: E 29 or E 30	Terminals		Leads (5" Length Standard)	
	E 29	E 30	E 29	E 30
6 Volt, 60 Hz.	6E29T	6E30T	6E29L	6E30L
12 Volt, 60 Hz.	12E29T	12E30T	12E29L	12E30L
24 Volt, 60 Hz.	24E29T	24E30T	24E29L	24E30L
120 Volt, 60 Hz.	120E29T	120E30T	120E29L	120E30L

Ask about quantity prices.

Special voltages and terminals available.

CLICKERS


E 8600

- Creates distinctive sound in electronic keyboards
- Reduces chance of error on "silent", "soft-touch" keyboards

Specifications

Duty Cycle: Approx. 15% max.

Coil: 20 ohm

Coil Insulation: 1500 V AC, 60 Hz. to frame. Other voltages to specification. Special windings available to suit other operating conditions.

Recommended Conditions: 20 volt pulse for 5 millisecond duration. (Signal may be varied by changing the duration of applied pulse.)

Termination: 8" leads standard. Terminals available.

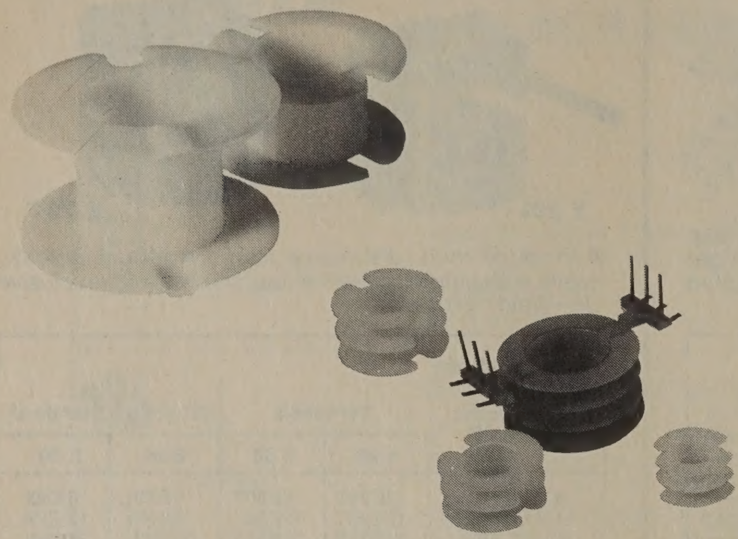
Coil products to your specifications

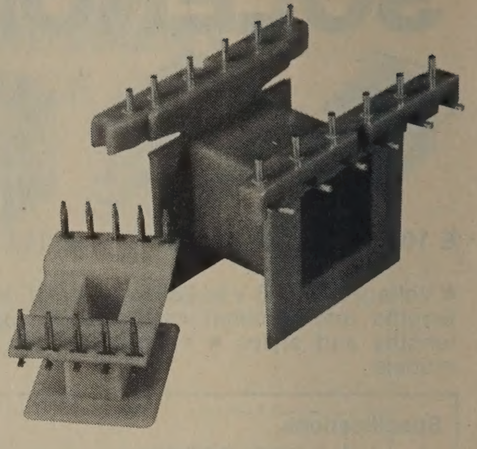
Coils for any application:
solenoids, power converters, relays, printers, reed switches, clocks, motors, clutches, tachometers, controls, transformers, vibrators, buzzers.

Check our capabilities:
random wound bobbin coils, thread interweave coils, coil assemblies, transfer molding, encapsulation, impregnation, fluidized bedcoating, ultrasonic welding.

Endicott Coil Co., Inc.
P. O. Box 67/30 Charlotte St., Binghamton, N.Y. 13905
Phone: 607-797-1263

FROM DESIGN TO DELIVERY...





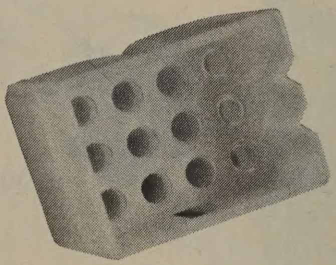
PRECISION INJECTION MOLDED COIL FORMS, BOBBINS, CONNECTOR HOUSINGS, AND COMMUNICATION PRODUCTS.

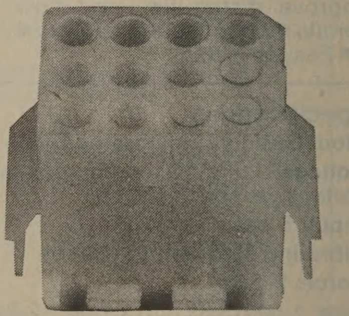
Harbison Industrial Products has complete in-plant facilities and services for injection molded products. Our in-house capability, in tool design, manufacture, part production and terminal insertion, assures the strictest quality for the components we provide. And our unique capability in either insert molding or post molding insertion can provide you with complete coil forms ready for winding.

The newest custom designed equipment and the ability to injection mold with modular family molding techniques — whereby a variety of different parts made from the same material can be produced in a single mold — affords attractive economies in tooling costs, without sacrificing the precision and quality of Harbison components.

We can meet or exceed the customary tolerances for injection molding your electrical and electronic components, and we mold in virtually any granular thermosetting plastic and most of the engineering thermoplastics, including nylon, Zytel 101*, Valox+, Delrin*, Noryl+, phenolics, and probably the material you're using now.

Write for the BR 16-2. It will give you an idea of how we may be able to help you.





*Trademark of E. I. DuPont Company
+Trademark of General Electric Company

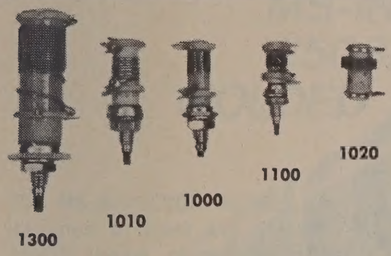
Harbison
INDUSTRIAL PRODUCTS INC.
A SUBSIDIARY OF THE POLYMER CORPORATION

PRECISION MOLDED PLASTICS
7205 HIBBS LANE, LEVITTOWN, PA 19057 · AC 215/943·9000

NORTH HILLS · HIGH-PERFORMANCE COILS, ADJUSTABLE & FIXED

TO COVER ALL FREQUENCY RANGES FROM AUDIO TO 200 MHZ

COILS ON CERAMIC FORMS PER MIL-I-10

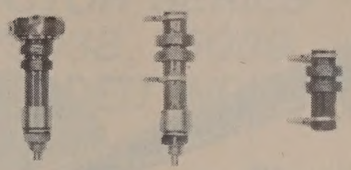


Series No.	Dimensions (Inches) Dia.	Length	Mtg. Hole Dia. (Inches)
1000	.50	.88	.196
1020	.50	.63	.050, .500 Apart
1100	.33	.63	.166
1300	.70	1.80	.252
1010	.43	.88	.196

Miniature 1000 Series

Part No.	Range Microhenries	Average Q
1000-A	1.0- 1.6	70 @ 7.9 MHz
1000-B	1.6- 2.7	80 @ 7.9 MHz
1000-C	2.7- 4.5	85 @ 7.9 MHz
1000-D	4.5- 8.5	85 @ 7.9 MHz
1000-E	8.5-14.5	75 @ 2.5 MHz
1000-F	14.5-22	65 @ 2.5 MHz
1000-G	22-29	65 @ 2.5 MHz
1000-H	29-55	85 @ 2.5 MHz
1000-I	55-110	80 @ 2.5 MHz
1000-J	110-185	85 @ .79 MHz
1000-K	185-305	85 @ .79 MHz
1000-L	305-515	85 @ .79 MHz
1000-M	515-820	85 @ .79 MHz
1000-N	820-1100	75 @ .79 MHz
RF Printed Circuit Coils		
1020-A	0.41- 0.53	75 @ 25 MHz
1020-B	0.85- 1.15	65 @ 7.9 MHz
1020-C	1.87- 2.50	65 @ 7.9 MHz
1020-D	4.0 - 5.4	70 @ 7.9 MHz
1020-E	7.5 -12.5	70 @ 2.5 MHz
1020-F	20 -29	80 @ 2.5 MHz
1020-G	33 -61	80 @ 2.5 MHz
1020-H	80 -120	60 @ 0.79 MHz
1020-I	170 -260	70 @ 0.79 MHz
Subminiature 1100 Series		
1100-A	0.9- 1.4	60 @ 7.9 MHz
1100-B	1.4- 1.9	70 @ 7.9 MHz
1100-C	1.9- 2.6	65 @ 7.9 MHz
1100-D	2.6- 3.7	65 @ 7.9 MHz
1100-E	3.7- 5.5	65 @ 7.9 MHz
1100-F	5.5- 7.4	60 @ 7.9 MHz
1100-G	7.4-12.5	70 @ 7.9 MHz
1100-H	12.5-18.0	65 @ 2.5 MHz
1100-I	18.0-28.0	70 @ 2.5 MHz
1100-J	28.0-38.0	70 @ 2.5 MHz
1100-K	38.0-55.0	70 @ 2.5 MHz
Transmitter 1300 Series		
1300-A	For use from 90-200 MHz	
1300-B	For use from 40-90 MHz	
1300-C	For use from 20-40 MHz	
1300-D	0.7- 1.1	170 @ 25 MHz
1300-E	1.1- 1.7	130 @ 7.9 MHz
1300-F	1.7- 2.7	140 @ 7.9 MHz
1300-G	2.7- 4.5	140 @ 7.9 MHz
1300-H	4.5- 6.8	140 @ 7.9 MHz
1300-I	6.8-10.8	140 @ 7.9 MHz
1300-J	10.8-17.0	110 @ 2.5 MHz
1300-K	17.0-29.0	95 @ 2.5 MHz
1300-L	29.0-45.0	100 @ 2.5 MHz
1300-M	45.0-75.0	100 @ 2.5 MHz
HF Coils, Variable Approx. ±15%		
1010-A	0.118	115 @ 50 MHz
1010-B	0.225	125 @ 25 MHz
1010-C	0.315	130 @ 25 MHz

WIDE ADJUSTMENT RANGE 120 SERIES



120 Series
Mica-filled form

PCS-120 Series
Phenolic form

.75″ O.D. x 1.3″ H.
.196″ dia. mtg. hole

PC-120 Series
Phenolic form
.5″ O.D. x 1.25″ L.
.05″ Pins,
.70″ Apart

Part No.	Range Microhenries	Average Q
120-A	2-3	70 @ 7.9 MHz
120-B	3-5	80 @ 7.9 MHz
120-C	5-9	85 @ 7.9 MHz
120-D	9-18	65 @ 2.5 MHz
120-E	18-36	70 @ 2.5 MHz
120-F	36-64	65 @ 2.5 MHz
120-G	64-105	85 @ 2.5 MHz
120-H	105-200	80 @ .79 MHz
120-I	200-500	75 @ .79 MHz
120-J	500-1000	85 @ .79 MHz
120-K	1000-2000	50 @ .25 MHz

Subminiature 600 Series

- Variable ±10%
- Shielded
- 0.3″ O.D. x 0.4″ H
- .020″ Leads .20″ Apart

Part No.	Nominal Microhenries	Average Q
600U1X0	1.0	120 @ 7.9 MHz
600U1X5	1.5	120 @ 7.9 MHz
600U2X2	2.2	120 @ 7.9 MHz
600U3X3	3.3	130 @ 7.9 MHz
600U4X7	4.7	125 @ 7.9 MHz
600U6X8	6.8	140 @ 7.9 MHz
600U10X	10	135 @ 7.9 MHz
600U15X	15	130 @ 2.5 MHz
600U22X	22	135 @ 2.5 MHz
600U33X	33	130 @ 2.5 MHz
600U47X	47	130 @ 2.5 MHz
600U68X	68	120 @ 2.5 MHz
600MX10	100	100 @ 2.5 MHz
600MX15	150	125 @ .79 MHz
600MX22	220	130 @ .79 MHz
600MX33	330	125 @ .79 MHz
600MX47	470	120 @ .79 MHz
600MX68	680	100 @ .79 MHz
600M1X0	1000	100 @ .79 MHz

High Q RF Coils, Fixed

- .75″ O.D. x .63″ H
- Hermetically sealed
- Complete shielding
- For printed circuitry
- For standard circuitry

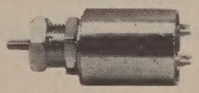
Part No.	Nominal Microhenries	Average Q
1219-A	0.47± 5%	90 @ 20 MHz
1219-B	1.0 ± 5%	100 @ 10 MHz
1219-C	2.2 ± 5%	130 @ 8 MHz
1219-D	4.7 ± 5%	130 @ 5 MHz
1219-E	10 ± 5%	130 @ 3 MHz
1219-F	22 ±3%	185 @ 1.7 MHz
1219-G	47 ±3%	185 @ 1 MHz
1219-H	100 ±3%	200 @ 0.8 MHz
1219-I	220 ±3%	225 @ 0.7 MHz
1219-J	470 ±3%	250 @ 0.6 MHz
1219-K	1000 ±3%	300 @ 0.5 MHz
1219-L	2200 ±3%	300 @ 0.25 MHz

Hi Q 801, 802 Series, Adjustable ±10%

801, 802 Series
1.18″ O.D. x .93″ H

Part No.	Nominal Millihenries	Peak Q
801M1X0	1.0	100 @ 10 kHz
801M1X5	1.5	100 @ 10 kHz
801M2X2	2.2	100 @ 10 kHz
801M3X3	3.3	100 @ 10 kHz
801M4X7	4.7	100 @ 10 kHz
801M6X8	6.8	100 @ 10 kHz
801M10X	10	200 @ 20 kHz
801M15X	15	200 @ 20 kHz
801M22X	22	200 @ 20 kHz
801M33X	33	200 @ 20 kHz
801M47X	47	200 @ 20 kHz
801M68X	68	200 @ 20 kHz
801HX10	100	300 @ 30 kHz
801HX15	150	300 @ 30 kHz
801HX22	220	300 @ 30 kHz
801HX33	330	250 @ 20 kHz
801HX47	470	250 @ 20 kHz
801HX68	680	250 @ 20 kHz
801H1X0	1000	150 @ 15 kHz
802M1X0	1.0	400 @ 100 kHz
802M1X5	1.5	400 @ 100 kHz
802M2X2	2.2	400 @ 100 kHz
802M3X3	3.3	400 @ 100 kHz
802M4X7	4.7	400 @ 100 kHz
802M6X8	6.8	400 @ 100 kHz
802M10X	10	400 @ 70 kHz
802M15X	15	400 @ 70 kHz
802M22X	22	400 @ 70 kHz
802M33X	33	400 @ 70 kHz
802M47X	47	400 @ 40 kHz

SHIELDED COILS



- Shielded
- Encapsulated

- .44″ Diameter **900 Series**

Part No.	Range Microhenries	Average Q
900-A	0.5- 0.8	80 @ 25 MHz
900-B	0.8- 1.3	70 @ 18 MHz
900-C	1.3- 2.0	60 @ 15 MHz
900-D	2.0- 4.0	70 @ 8 MHz
900-E	4.0- 7.0	70 @ 5 MHz
900-F	7.0-12.0	70 @ 4 MHz
900-G	12.0-20.0	70 @ 3 MHz
900-H	20.0-35.0	70 @ 2.5 MHz
900-I	35.0-60.0	70 @ 2.0 MHz
900-J	60.0-100.0	70 @ 1.0 MHz

- .63″ Diameter **1500 Series**

Part No.	Range Millihenries	Average Q
1500-A	.100- .175	80 @ 790 kHz
1500-B	.175- .300	80 @ 790 kHz
1500-C	.300- .500	80 @ 790 kHz
1500-D	.500- .800	75 @ 790 kHz
1500-E	.800-1.15	55 @ 500 kHz
1500-F	1.15-1.50	55 @ 250 kHz
1500-G	1.50-2.30	55 @ 250 kHz
1500-H	2.30-3.50	50 @ 250 kHz
1500-I	3.50-7.50	40 @ 250 kHz

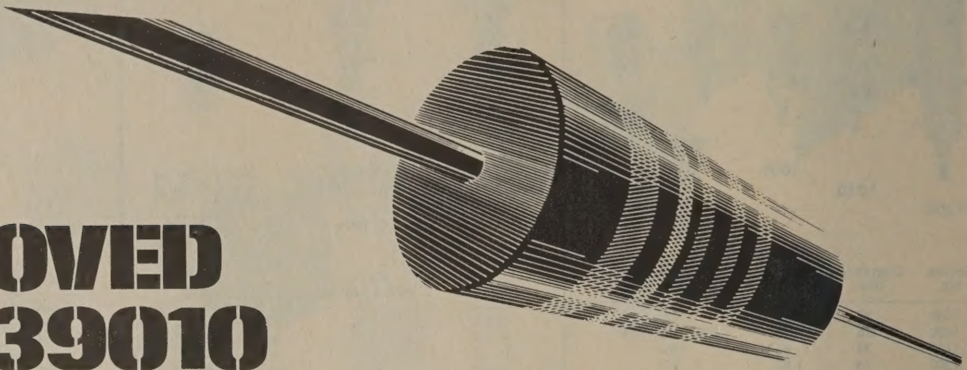
For North Hills Wideband Transformers See Section 5600.

North Hills Electronics, INC. | *GLEN COVE, N.Y. 11542 • 516-671-5700*

Nytronics Components Group, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors.



APPROVED MIL-C-39010

MIL-C-39010/1A - /2A - /3A FAILURE RATE "R" .01%/1000 HRS.
MIL-C-39010/4A - /5A - /6A - /7A FAILURE "R" .01%/1000 HRS.
MIL-C-39010/8A - /9A - /10A FAILURE RATE "M" 1.0%/1000 HRS.

Nytronics' history of technical leadership in inductors has a new chapter. The first company to extend the standard line concept to variable inductors has remained ahead in every subsequent step of refinement and miniaturization.

Today, there's a new place for a familiar group of inductors under highest reliability military specifications—MIL-C-39010 (latest revision). The unique "T" lead construction eliminates fine wire consideration that has previously concerned design engineers on critical circuitry.

With sizes ranging from the world's smallest shielded inductor to the most complex variable inductor . . . shielded, unshielded and variable, in hundreds of off-the-shelf values . . . it makes good sense to check first with Nytronics or your local distributor.

Now tested and approved to highest reliability military specifications.

Nytronics Standard Inductor Part Number	Standard Military Series	New High Reliability Qualification
SWD	MS90537	MIL-C-39010-1A, 2A, + 3A
SWD	MS75087	MIL-C-39010-1A
SWD	MS75088	MIL-C-39010-2A
SWD	MS75089	MIL-C-39010-3A
RFC-S	MS75008	MIL-C-39010-4A
RFC-S	MS75101	MIL-C-39010-5A
RFC-SS	MS18130	MIL-C-39010-6A
RFC-SS	MS14046	MIL-C-39010-7A
MD	MS75083	MIL-C-39010-8A
MD	MS75084	MIL-C-39010-9A
MD	MS75085	MIL-C-39010-10A

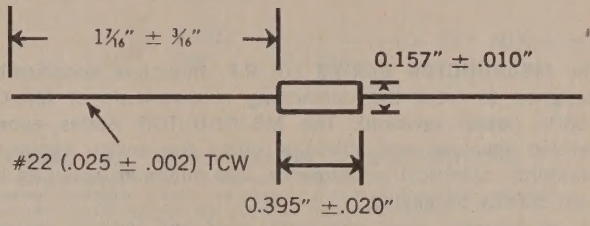
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

MS-INDUCTOR SERIES
75087, 75088, 75089
MOLDED SHIELDED INDUCTOR

Ultra-Reliable Molded Shielded Miniature Inductor.
Inductance Range: 0.1uH to 100,000uH.

The **MS-INDUCTOR SERIES** are R.F. Inductors specifically designed to meet the demanding requirements of MIL-C-15305 (latest revision). The MS-INDUCTOR Series epoxy molded envelope and shielding offers the design engineer reliability, electrical performance, and minimum coupling in high density packaging.



ELECTRICAL CHARACTERISTICS

Inductance Tolerance: ±10% over the entire inductance range.
Dielectric Strength: 700 volts RMS at sea level.
Self-Resonant Frequency: Measured per MIL-C-15305 (latest revision).
Q: Measured on a Q-Meter.
Maximum Current: Based on temperature rise not to exceed 15°C at 90°C ambient.

DENSITY CHARACTERISTICS

Volume: 0.0076 cubic inches **Weight:** 0.75 grams maximum
Shielding: At 1000 cycles two units assembled side by side exhibit less than 3% coupling.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: −55°C to +105°C.

Terminal Strength: Meets five pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).

Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision), Grade 1, Class B. High frequency 10 cps to 2000 cps @ 15G ±10% maximum for 12 logarithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS.

Marking: Color coded per MIL-C-15305 (latest revision).

Material	MS No.	NCG P/N	L	Q min		Min. SRF	Max. DCR	Max. I	Incr.† I
			uH		MHz	MHz	Ω	mA	mA
PHENOLIC	MS75087-1	SWD	0.10	50	25	250	0.025	1790	>2900
	MS75087-2	SWD	0.12	51	25	250	0.034	1530	>2800
	MS75087-3	SWD	0.15	51	25	250	0.037	1470	>2750
	MS75087-4	SWD	0.18	50	25	250	0.047	1300	>2200
	MS75087-5	SWD	0.22	49	25	250	0.067	1100	>1700
	MS75087-6	SWD	0.27	47	25	250	0.11	855	>1500
	MS75087-7	SWD	0.33	46	25	250	0.13	780	>1300
	MS75087-8	SWD	0.39	44	25	250	0.18	670	>1100
	MS75087-9	SWD	0.47	44	25	235	0.25	565	>1000
	MS75087-10	SWD	0.56	43	25	210	0.33	490	> 900
	MS75087-11	SWD	0.68	42	25	190	0.45	420	> 750
	MS75087-12	SWD	0.82	40	25	180	0.59	370	> 600
IRON	MS75088-1	SWD	1.0	44	25	140	0.070	1070	>1900
	MS75088-2	SWD	1.2	44	7.9	130	0.093	895	>1600
	MS75088-3	SWD	1.5	44	7.9	115	0.12	815	>1300
	MS75088-4	SWD	1.8	44	7.9	105	0.14	775	>1200
	MS75088-5	SWD	2.2	44	7.9	100	0.19	650	>1100
	MS75088-6	SWD	2.7	44	7.9	92	0.28	535	> 950
	MS75088-7	SWD	3.3	44	7.9	85	0.35	480	> 800
	MS75088-8	SWD	3.9	44	7.9	75	0.40	450	> 750
	MS75088-9	SWD	4.7	44	7.9	70	0.55	380	> 650
	MS75088-10	SWD	5.6	44	7.9	65	0.72	335	> 550
	MS75088-11	SWD	6.8	50	7.9	55	1.02	280	> 500
	MS75088-12	SWD	8.2	50	7.9	50	1.32	250	> 475
	MS75088-13	SWD	10	50	7.9	46	1.62	220	> 450
	MS75088-14	SWD	12	55	2.5	44	2.00	200	> 400
FERRITE	MS75089-1	SWD	15	44	2.5	49	0.80	315	250
	MS75089-2	SWD	18	45	2.5	45	0.89	300	235
	MS75089-3	SWD	22	46	2.5	41	0.96	290	220
	MS75089-4	SWD	27	49	2.5	38	1.19	260	200
	MS75089-5	SWD	33	45	2.5	34	1.37	240	190
	MS75089-6	SWD	39	53	2.5	29	1.93	205	180
	MS75089-7	SWD	47	52	2.5	27	2.11	195	175
	MS75089-8	SWD	56	49	2.5	25	2.23	190	160
	MS75089-9	SWD	68	51	2.5	21	2.70	170	150
	MS75089-10	SWD	82	45	2.5	10.5	2.44	180	140
FERRITE	MS75089-11	SWD	100	52	2.5	10.0	3.12	160	120
	MS75089-12	SWD	120	57	0.79	9.7	3.60	150	95
	MS75089-13	SWD	150	56	0.79	8.5	4.10	140	90
	MS75089-14	SWD	180	60	0.79	8.0	4.40	135	85
	MS75089-15	SWD	220	58	0.79	7.5	5.00	125	80
	MS75089-16	SWD	270	60	0.79	7.0	5.80	115	70
	MS75089-17	SWD	330	54	0.79	6.5	6.40	110	65
	MS75089-18	SWD	390	67	0.79	6.2	7.40	105	60
	MS75089-19	SWD	470	60	0.79	5.7	9.50	92	58
	MS75089-20	SWD	560	60	0.79	4.7	10.5	90	55
	MS75089-21	SWD	680	60	0.79	4.5	11.8	80	50
	MS75089-22	SWD	820	57	0.79	4.2	13.0	80	45
	MS75089-23	SWD	1000	60	0.79	3.8	17.5	70	40
	MS75089-24	SWD	1200	45	0.25	1.5	22.1	60	35
	MS75089-25	SWD	1500	49	0.25	1.2	26.5	55	33
	MS75089-26	SWD	1800	47	0.25	1.0	29.9	50	30
	MS75089-27	SWD	2200	50	0.25	0.97	33.8	50	27
	MS75089-28	SWD	2700	47	0.25	0.92	47.3	40	25
	MS75089-29	SWD	3300	43	0.25	0.84	53.0	40	22
	MS75089-30	SWD	3900	43	0.25	0.80	73.8	35	20
	MS75089-31	SWD	4700	44	0.25	0.74	81.6	31	19
	MS75089-32	SWD	5600	45	0.25	0.73	98.9	28	17
	MS75089-33	SWD	6800	43	0.25	0.66	111.0	27	16
	MS75089-34	SWD	8200	42	0.25	0.54	119.0	26	15
	MS75089-35	SWD	10,000	39	0.25	0.47	137.0	24	14
	MS75089-36	SWD	12,000	31	0.079	0.33	143.0	23	13
	MS75089-37	SWD	15,000	31	0.079	0.29	157.0	22	12
	MS75089-38	SWD	18,000	31	0.079	0.28	175.0	21	10
	MS75089-39	SWD	22,000	27	0.079	0.25	274.0	17	9
	MS75089-40	SWD	27,000	27	0.079	0.21	308.0	16	8
	MS75089-41	SWD	33,000	27	0.079	0.19	343.0	15	7.5
	MS75089-42	SWD	39,000	27	0.079	0.17	376.0	15	6.0
	MS75089-43	SWD	47,000	23	0.079	0.16	473.0	13	5.5
	MS75089-44	SWD	56,000	23	0.079	0.14	512.0	13	5.0
	MS75089-45	SWD	68,000	23	0.079	0.13	580.0	12	4.0
	MS75089-46	SWD	82,000	21	0.079	0.12	618.0	11	3.5
	MS75089-47	SWD	100,000	18	0.079	0.11	678.0	11	3.0

† INCREMENTAL CURRENT: The D.C. current required to cause a 5% reduction in the nominal inductance value.

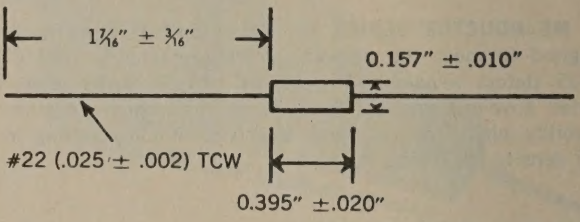
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

MS-INDUCTOR SERIES
90537
MOLDED SHIELDED INDUCTOR
(Manufactured per MS-90537)

Ultra-Reliable Molded Shielded Miniature Inductor.
Inductance Range: 0.1uH to 100,000uH.
Unique "T" design eliminates Fine Wire considerations.

The **MS-INDUCTOR SERIES** are R.F. Inductors specifically designed to meet the demanding requirements of MIL-C-15305 (latest revision). The MS-INDUCTOR Series epoxy molded envelope and shielding offers the design engineer reliability, electrical performance, and minimum coupling in high density packaging.



ELECTRICAL CHARACTERISTICS

Inductance Tolerance: ±10% over the entire inductance range.
Dielectric Strength: 700 volts RMS at sea level.
Self-Resonant Frequency: Measured per MIL-C-15305 (latest revision).
Q: Measured on Q-Meter.
Maximum Current: Based on temperature rise not to exceed 35°C at 90°C ambient.

DENSITY CHARACTERISTICS

Volume: 0.0076 cubic inches **Weight:** 0.75 grams maximum
Shielding: At 1000 cycles two units assembled side by side exhibit less than 3% coupling.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: —55°C to +125°C.

Terminal Strength: Meets five pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).

Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305D, Grade 1, Class B. High frequency 10 cps to 2000 cps @ 15G ±10% maximum for 12 logarithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS.

Marking: Color coded per MIL-C-15305 (latest revision).

Material	MS Catalog No.	NCG P/N	L	Q Min.		Min. SRF	Max. DCR	Max. I	Incr.** I
			μH		MHz	MHz	Ω	mA	mA
PHENOLIC	90537-1	SWD	0.10	50	25	250	0.025	2900	>2900
	90537-2	SWD	0.12	51	25	250	0.034	2800	>2800
	90537-3	SWD	0.15	51	25	250	0.037	2750	>2750
	90537-4	SWD	0.18	50	25	250	0.047	2200	>2200
	90537-5	SWD	0.22	49	25	250	0.067	1700	>1700
	90537-6	SWD	0.27	47	25	250	0.11	1500	>1500
	90537-7	SWD	0.33	46	25	250	0.13	1300	>1300
	90537-8	SWD	0.39	44	25	250	0.18	1100	>1100
	90537-9	SWD	0.47	44	25	235	0.25	1000	>1000
	90537-10	SWD	0.56	43	25	210	0.33	900	>900
	90537-11	SWD	0.68	42	25	190	0.45	750	>750
	90537-12	SWD	0.82	40	25	180	0.59	600	>600
IRON	90537-13	SWD	1.0	47	25	140	0.070	1900	>1900
	90537-14	SWD	1.2	46	7.9	130	0.093	1600	>1600
	90537-15	SWD	1.5	45	7.9	115	0.12	1300	>1300
	90537-16	SWD	1.8	43	7.9	105	0.14	1200	>1200
	90537-17	SWD	2.2	45	7.9	100	0.19	1100	>1100
	90537-18	SWD	2.7	46	7.9	92	0.28	950	>950
	90537-19	SWD	3.3	44	7.9	85	0.35	800	>800
	90537-20	SWD	3.9	44	7.9	75	0.40	750	>750
	90537-21	SWD	4.7	44	7.9	70	0.55	650	>650
	90537-22	SWD	5.6	47	7.9	65	0.72	550	>550
	90537-23	SWD	6.8	50	7.9	55	1.02	500	>500
	90537-24	SWD	8.2	50	7.9	50	1.32	475	>475
	90537-25	SWD	10	49	7.9	46	1.62	450	>450
	90537-26	SWD	12	55	2.5	44	2.00	400	>400
FERRITE	90537-27	SWD	15	44	2.5	49	0.80	620	250
	90537-28	SWD	18	45	2.5	45	0.89	610	235
	90537-29	SWD	22	46	2.5	41	0.96	600	220
	90537-30	SWD	27	49	2.5	38	1.19	500	200
	90537-31	SWD	33	45	2.5	34	1.37	490	190
	90537-32	SWD	39	53	2.5	29	1.93	410	180
	90537-33	SWD	47	52	2.5	27	2.11	400	175
	90537-34	SWD	56	49	2.5	25	2.23	380	160
	90537-35	SWD	68	51	2.5	21	2.70	370	150
	90537-36	SWD	82	45	2.5	10.5	2.44	360	140
FERRITE	90537-37	SWD	100	52	2.5	10.0	3.12	325	120
	90537-38	SWD	120	57	.79	9.7	3.60	290	95
	90537-39	SWD	150	56	.79	8.5	4.10	275	90
	90537-40	SWD	180	60	.70	8.0	4.40	260	85
	90537-41	SWD	220	58	.79	7.5	5.00	250	80
	90537-42	SWD	270	60	.79	7.0	5.80	240	70
	90537-43	SWD	330	54	.79	6.5	6.40	225	65
	90537-44	SWD	390	67	.79	6.2	7.40	200	60
	90537-45	SWD	470	60	.79	5.7	9.50	180	58
	90537-46	SWD	560	60	.79	4.7	10.5	174	55
	90537-47	SWD	680	60	.79	4.5	11.8	168	50
	90537-48	SWD	820	57	.79	4.2	13.0	152	45
	90537-49	SWD	1000	65	.79	3.8	17.5	135	40
	90537-50	SWD	1200	45	.25	1.5	22.1	115	35
	90537-51	SWD	1500	49	.25	1.2	26.5	110	33
	90537-52	SWD	1800	47	.25	1.0	29.9	105	30
	90537-53	SWD	2200	50	.25	0.97	33.8	99	27
	90537-54	SWD	2700	47	.25	0.92	47.3	83	25
	90537-55	SWD	3300	43	.25	0.84	53.0	80	22
	90537-56	SWD	3900	43	.25	0.80	73.8	67	20
	90537-57	SWD	4700	44	.25	0.74	81.6	63	19
	90537-58	SWD	5600	45	.25	0.73	98.9	56	17
	90537-59	SWD	6800	43	.25	0.66	111.0	54	16
	90537-60	SWD	8200	42	.25	0.54	119.0	52	15
	90537-61	SWD	10,000	39	.25	0.47	137.0	49	14
	90537-62	SWD	12,000	31	.079	0.33	143.0	46	13
	90537-63	SWD	15,000	31	.079	0.29	157.0	45	12
	90537-64	SWD	18,000	31	.079	0.28	175.0	41	10
	90537-65	SWD	22,000	27	.079	0.25	274.0	33	9
	90537-66	SWD	27,000	27	.079	0.21	308.0	31	8
	90537-67	SWD	33,000	27	.079	0.19	343.0	30	7.5
	90537-68	SWD	39,000	27	.079	0.17	376.0	27	6.0
	90537-69	SWD	47,000	23	.079	0.16	473.0	26	5.5
	90537-70	SWD	56,000	23	.079	0.14	512.0	25	5.0
	90537-71	SWD	68,000	23	.079	0.13	580.0	24	4.0
	90537-72	SWD	82,000	21	.079	0.12	618.0	23	3.5
	90537-73	SWD	100,000	18	.079	0.11	678.0	22	3.0

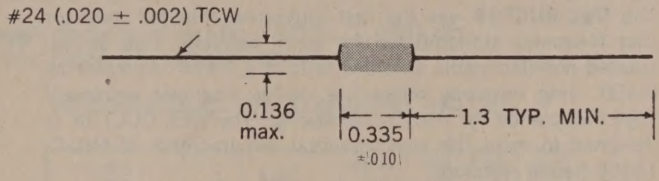
**INCREMENTAL CURRENT — The D.C. current required to cause a 5% reduction in the nominal inductance value.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

SUPER WEE-WEE-DUCTOR

An Ultra-Reliable molded shielded inductor. Subminiature size for high density circuits. Great Inductance-to-size ratio. .10 uH to 10,000 uH. 0.136″ diameter x 0.335″ length. 61 stock values.



The **SUPER WEE-WEE-DUCTOR,** a shielded miniaturized inductor, provides a greater inductance-to-size ratio in a molded epoxy envelope. Use of unique "T" lead construction on all values from .10 uH to 10,000 uH assures exceptional reliability in ranges where fine wire sizes are used. This MS inductor series is designed to meet the stringent requirements of MIL-C-15305 (latest revision). This provides the design engineer with utmost reliability, electrical performance, and minimum coupling in high density packaging.

ELECTRICAL CHARACTERISTICS

Inductance Tolerance: ±10% (Q-Meter).
Dielectric Strength: 700 volts RMS at sea level.
Self-Resonant Frequency: Measured with full length leads on Q-Meter.
Q: Measured on Q-Meter.
Rating: I maximum based on ⅓ watt dissipation.

DENSITY CHARACTERISTICS

Volume: 0.0041 cubic inches.
Weight: 0.50 grams maximum.
Shielding: Less than 3% coupling with two units mounted side by side at 1000 cycles.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: −55°C to + 125°C.
Terminal Strength: Meets five pounds pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).
Moisture, Vibration and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision). High Frequency: 10 cps to 2000 cps @ 15G ±10% maximum for 12 lograithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS.
Marking: Color coded per MIL-C-15305 (latest revision).

SUPER WEE-WEE-DUCTOR STANDARD VALUES

Material		NCG	L	Q min.		min. Fo	approx. Cd	Max. DCR	Max. I	Incr.* I
	MS No.	Part No.	µH		MHz	MHz	Pf	Ω	mA	mA
PHENOLIC	MS21399-1	SW-W- 0.10	0.10	42	25	480	.70	.087	1650	>1650
	MS21399-2	SW-W- 0.12	0.12	42	25	460	.63	.090	1630	>1630
	MS21399-3	SW-W- 0.15	0.15	42	25	400	.66	.098	1550	>1550
	MS21399-4	SW-W- 0.18	0.18	42	25	360	.62	.117	1420	>1420
	MS21399-5	SW-W- 0.22	0.22	42	25	340	.63	.141	1330	>1330
	MS21399-6	SW-W- 0.27	0.27	42	25	320	.59	.157	1230	>1230
	MS21399-7	SW-W- 0.33	0.33	42	25	295	.55	.178	1140	>1140
	MS21399-8	SW-W- 0.39	0.39	42	25	275	.55	.208	1060	>1060
	MS21399-9	SW-W- 0.47	0.47	41	25	250	.56	.257	960	> 960
	MS21399-10	SW-W- 0.56	0.56	39	25	238	.52	.283	915	> 915
	MS21399-11	SW-W- 0.68	0.68	36	25	224	.50	.337	840	> 840
	MS21399-12	SW-W- 0.82	0.82	35	25	205	.50	.470	720	> 720
IRON	MS21400-1	SW-W- 1.0	1.0	38	25	135	.87	.170	1180	>1180
	MS21400-2	SW-W- 1.2	1.2	38	7.9	124	.87	.190	1150	>1150
	MS21400-3	SW-W- 1.5	1.5	38	7.9	114	.87	.212	1050	>1050
	MS21400-4	SW-W- 1.8	1.8	38	7.9	105	.89	.242	990	> 990
	MS21400-5	SW-W- 2.2	2.2	38	7.9	95	.88	.263	950	> 950
	MS21400-6	SW-W- 2.7	2.7	38	7.9	85	.83	.320	880	> 880
	MS21400-7	SW-W- 3.3	3.3	38	7.9	78	.81	.345	820	> 820
	MS21400-8	SW-W- 3.9	3.9	42	7.9	74	.76	.411	755	> 755
	MS21400-9	SW-W- 4.7	4.7	42	7.9	68	.75	.562	650	> 650
	MS21400-10	SW-W- 5.6	5.6	42	7.9	62	.77	.742	565	> 565
	MS21400-11	SW-W- 6.8	6.8	45	7.9	55	.80	1.00	485	> 485
	MS21400-12	SW-W- 8.2	8.2	47	7.9	51	.78	1.20	440	> 440
	MS21400-13	SW-W- 10	10	51	7.9	45	.78	1.84	355	> 335
	MS21400-14	SW-W- 12	12	51	2.5	41	.85	2.60	300	> 300
FERRITE "T" LEAD	MS21401-1	SW-W- 15	15	45	2.5	48	.55	.635	610	200
	MS21401-2	SW-W- 18	18	45	2.5	44	.55	.728	570	175
	MS21401-3	SW-W- 22	22	45	2.5	37	.60	.825	530	160
	MS21401-4	SW-W- 27	27	45	2.5	32	.65	.950	500	155
	MS21401-5	SW-W- 33	33	46	2.5	30	.65	1.26	430	150
	MS21401-6	SW-W- 39	39	46	2.5	27	.66	1.42	405	145
	MS21401-7	SW-W- 47	47	46	2.5	23	.66	1.72	370	140
	MS21401-8	SW-W- 56	56	48	2.5	21	.75	2.03	340	130
	MS21401-9	SW-W- 68	68	48	2.5	18.5	.75	2.29	320	120
	MS21401-10	SW-W- 82	82	46	2.5	17.0	.75	2.55	305	115
	MS21401-11	SW-W- 100	100	46	2.5	15.5	.78	2.92	280	100
	MS21401-12	SW-W- 120	120	53	0.79	14.5	.72	3.30	235	80
	MS21401-13	SW-W- 150	130	53	0.79	13.0	.70	4.30	215	68
	MS21401-14	SW-W- 180	180	53	0.79	11.5	.70	5.40	200	64
	MS21401-15	SW-W- 220	220	55	0.79	10.0	.84	6.65	150	60
	MS21401-16	SW-W- 270	270	57	0.79	9.50	.74	7.60	140	58
	MS21401-17	SW-W- 330	330	57	0.79	8.50	.75	8.50	130	56
	MS21401-18	SW-W- 390	390	57	0.79	8.00	.74	10.0	120	54
	MS21401-19	SW-W- 470	470	57	0.79	7.20	.70	13.5	100	52
	MS21401-20	SW-W- 560	560	61	0.79	6.40	.70	14.5	95	50
	MS21401-21	SW-W- 680	680	61	0.79	5.80	.78	16.0	90	48
	MS21401-22	SW-W- 820	820	58	0.79	5.30	.78	19.0	85	47
	MS21401-23	SW-W- 1000	1000	58	0.79	4.80	.78	21.5	80	45
	MS21401-24	SW-W- 1200	1200	55	0.25	2.90	1.9	23	100	40
	MS21401-25	SW-W- 1500	1500	55	0.25	2.80	1.6	30	90	35
	MS21401-26	SW-W- 1800	1800	55	0.25	2.60	1.5	33	86	32
	MS21401-27	SW-W- 2200	2200	55	0.25	2.55	1.3	40	78	30
	MS21401-28	SW-W- 2700	2700	55	0.25	2.40	1.2	43	74	28
	MS21401-29	SW-W- 3300	3300	55	0.25	2.00	1.1	58	65	26
	MS21401-30	SW-W- 3900	3900	55	0.25	1.95	1.1	76	56	23
	MS21401-31	SW-W- 4700	4700	55	0.25	1.85	1.1	85	53	20
	MS21401-32	SW-W- 5600	5600	55	0.25	1.75	1.0	100	48	18
	MS21401-33	SW-W- 6800	6800	50	0.25	1.58	1.0	127	43	15
	MS21401-34	SW-W- 8200	8200	50	0.25	1.55	1.0	150	40	12
	MS21401-35	SW-W- 10,000	10,000	50	0.25	1.45	1.0	190	37	10

*INCREMENTAL CURRENT — The D.C. current to cause a 5% reduction in the nominal inductance value.

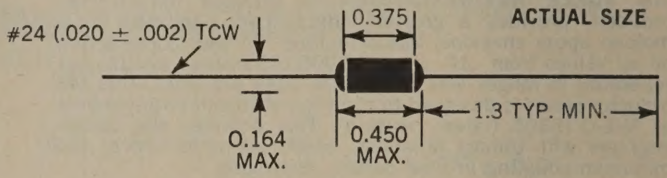
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

WEE-DUCTOR

Miniature Shielded Inductor with high inductance-to-size ratio.
0.10uH to 180,000uH in 76 values
Designed to meet MIL-C-15305C.

The **WEE-DUCTOR** was the first miniature shielded inductor that Nytronics standardized for stock delivery. This encapsulated non-flammable shielded unit in a 0.164" diameter by 0.450" long envelope offers the design engineer extremely high inductance for density packaging. The WEE-DUCTOR is designed to meet the environmental requirements of MIL-C-15305 (latest revision).



ELECTRICAL CHARACTERISTICS

Inductance Tolerance: 0.1 to 22uH ±10% (Q-Meter); 27uH to 1,000 ±5% (1KC Bridge); 1,200uH to 56,000uH ±10% (1KC Bridge) 68,000uH to 180,000uH ±20% (1KC Bridge) measured at point on leads ½ inch from body.

Dielectric Strength: 700 volts RMS at sea level.

Self-Resonant Frequency: Minimum f_0 to be not less than 80% of published data, and measured with full length leads on Q-Meter.

Q: Measured on Q-Meter.

Maximum Current: Based on temperature rise not to exceed 40°C at 85°C ambient.

DENSITY CHARACTERISTICS

Volume: 0.0087 cubic inches **Weight:** 0.75 grams maximum
Shielding: Less than 3% coupling with two units measured side by side at 1000 cycles.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: —55°C to +125°C.
Terminal Strength: Meets five pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).
Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision). Low frequency 10 to 55 cps @ .06" maximum total excursion at rate of 1 linear sweep per minute for 2 hours repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS.
Marking: Printed with pertinent data.

MATERIAL	NCG PART NO.	L	Q min		Approx. SRF	approx. Cd	Max. DCR	Max. I	Incr* I
		µH		MHz	MHz	µµF	Ω	mA	mA
PHENOLIC	WEE- 0.10	0.10	63	25	>500	0.67	0.020	4000	4000
	WEE- 0.12	0.12	61	25	>500	0.67	0.029	3350	3350
	WEE- 0.15	0.15	59	25	>500	0.67	0.032	3000	3000
	WEE- 0.18	0.18	57	25	458	0.67	0.040	2850	2850
	WEE- 0.22	0.22	56	25	414	0.67	0.045	2700	2700
	WEE- 0.27	0.27	50	25	373	0.67	0.08	2000	2000
	WEE- 0.33	0.33	48	25	337	0.67	0.09	1900	1900
	WEE- 0.39	0.39	48	25	310	0.67	0.16	1420	1420
	WEE- 0.47	0.47	48	25	283	0.67	0.17	1400	1400
	WEE- 0.56	0.56	45	25	258	0.67	0.36	960	960
	WEE- 0.68	0.68	45	25	235	0.67	0.37	940	940
	WEE- 0.82	0.82	41	25	214	0.67	0.46	870	870
IRON	WEE- 1.0	1.0	42	7.9	164	0.92	0.062	2300	2300
	WEE- 1.2	1.2	43	7.9	150	0.92	0.067	2200	2200
	WEE- 1.5	1.5	41	7.9	135	0.92	0.16	1420	1420
	WEE- 1.8	1.8	42	7.9	124	0.92	0.17	1370	1370
	WEE- 2.2	2.2	42	7.9	112	0.92	0.19	1300	1300
	WEE- 2.7	2.7	41	7.9	107	0.92	0.20	1270	1270
	WEE- 3.3	3.3	40	7.9	91.5	0.92	0.31	1030	1030
	WEE- 3.9	3.9	40	7.9	84.5	0.92	0.33	1000	1000
	WEE- 4.7	4.7	40	7.9	76.5	0.92	0.58	750	750
	WEE- 5.6	5.6	40	7.9	69.5	0.92	0.64	710	710
	WEE- 6.8	6.8	40	7.9	63.5	0.92	0.68	680	680
	WEE- 8.2	8.2	45	7.9	57.5	0.92	1.3	500	500
	WEE- 10	10	46	2.5	52.5	0.92	1.4	480	480
	WEE- 12	12	47	2.5	47.5	0.92	1.5	460	460
	WEE- 15	15	47	2.5	42.5	0.92	1.7	440	440
FERRITE	WEE- 18	18	45	2.5	53.5	0.49	0.88	610	235
	WEE- 22	22	47	2.5	47.0	0.50	0.95	590	220
	WEE- 27	27	42	2.5	44.0	0.48	1.15	530	200
	WEE- 33	33	43	2.5	40.0	0.48	1.2	520	193
	WEE- 39	39	45	2.5	36.5	0.48	1.6	450	183
	WEE- 47	47	46	2.5	33.0	0.49	1.8	420	177
	WEE- 56	56	40	2.5	30.0	0.49	2.2	390	170
	WEE- 68	68	40	2.5	27.0	0.50	2.3	375	165
	WEE- 82	82	42	2.5	17.5	1.0	2.4	360	160
	WEE- 100	100	63	.79	15.0	1.0	2.6	345	157
	WEE- 120	120	62	.79	14.0	1.0	2.9	330	145
FERRITE	WEE- 150	150	63	.79	12.5	1.0	3.3	315	126
	WEE- 180	180	60	.79	11.5	1.0	3.6	300	110
	WEE- 220	220	57	.79	11.0	0.94	4.1	280	105
	WEE- 270	270	52	.79	10.0	0.92	4.8	260	91
	WEE- 330	330	50	.79	9.0	0.92	5.6	240	87
	WEE- 390	390	43	.79	8.5	0.87	6.2	230	72
	WEE- 470	470	66	.79	8.0	0.83	10.0	180	67
	WEE- 560	560	64	.79	7.5	0.82	11.5	170	65
	WEE- 680	680	71	.79	6.5	0.87	12.0	160	60
	WEE- 820	820	67	.79	6.0	0.87	13.8	150	55
	WEE- 1000	1000	62	.79	5.6	0.87	16.0	140	52
	WEE- 1200	1200	52	.250	1.490	9.0	18.2	135	50
	WEE- 1500	1500	51	.250	1.460	8.0	23.7	118	48
	WEE- 1800	1800	51	.250	1.420	6.5	30.2	105	42
	WEE- 2200	2200	50	.250	1.300	6.8	33.7	99	37
	WEE- 2700	2700	51	.250	1.180	6.8	43.1	87	33
	WEE- 3300	3300	52	.250	1.050	7.0	48.7	82	30
	WEE- 3900	3900	48	.250	.960	7.0	62.7	72	29
	WEE- 4700	4700	48	.250	.840	7.4	70.5	68	28
	WEE- 5600	5600	48	.250	.810	6.8	104	56	24
	WEE- 6800	6800	45	.250	.740	6.8	118	53	20
	WEE- 8200	8200	38	.250	.580	9.2	146	47	18
	WEE- 10,000	10,000	36	.079	.470	11.5	76.6	66	15
	WEE- 12,000	12,000	36	.079	.370	15.0	109	55	14
	WEE- 15,000	15,000	38	.079	.330	15.0	119	52	13
	WEE- 18,000	18,000	38	.079	.305	15.0	138	49	13
	WEE- 22,000	22,000	32	.079	.295	13.0	219	39	12
	WEE- 27,000	27,000	32	.079	.270	13.0	259	35	12
	WEE- 33,000	33,000	32	.079	.250	12.5	296	33	11
	WEE- 39,000	39,000	30	.079	.215	14.0	395	29	10
	WEE- 47,000	47,000	25	.079	.210	12.5	452	27	9
	WEE- 56,000	56,000	25	.079	.195	12.0	499	26	8
	WEE- 68,000	68,000	20	.079	.130	18.4	395	29	1.1
	WEE- 82,000	82,000	20	.079	.125	16.5	452	27	1.1
	WEE-100,000	100,000	20	.079	.115	16.2	499	26	1.1
	WEE-120,000	120,000	20	.070	.105	16.8	540	23	1.1
	WEE-150,000	150,000	20	.060	.098	13.4	750	20	1.0
	WEE-180,000	180,000	20	.050	.094	13.4	880	18	0.8

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Nytronics Components Group, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

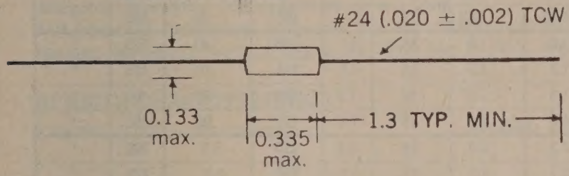
Inductors

WEE-WEE-DUCTOR SERIES

The smallest shielded inductor for high density circuits 0.10 to 1,000 uh 0.133" diameter x 0.335" length. We have 49 stock values.

The **WEE-WEE-DUCTOR** offers the Design Engineer a subminiature shielded inductor to solve special problems in density circuit application. This shielded inductor has great inductance-to-size ratio and is designed to meet the stringent requirements of MIL-C-15305 (latest revision).

0.10 to 10,000uH
0.133" diameter x 0.335" length
49 stock values



ELECTRICAL CHARACTERISTICS

Inductance Tolerance:	±10% (Q-Meter).
Dielectric Strength:	700 volts RMS at sea level.
Self-Resonant Frequency:	Minimum f₀ to be not less than 80% of published data, and measured with full length leads on Q-Meter.
Rating:	I maximum based on ⅓ watt dissipation.

DENSITY CHARACTERISTICS

Volume:	0.0041 cubic inches.
Weight:	0.50 grams maximum.
Shielding:	Less than 3% coupling with two units mounted side by side at 1000 cycles.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature:	−55°C to +125°C.
Terminal Strength:	Meets five pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).
Moisture, Vibration and Shock Resistance:	Meets requirements of MIL-C-15305 (latest revision). High Frequency: 10 cps to 2000 cps @ 15G ±10% maximum for 12 logarithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS.
Marking:	Color coded per MIL-C-15305 (latest revision).

WEE-WEE-DUCTOR STANDARD VALUES

NCG PART NO.	L	Q min.		approx. SRF	Max. DCR	Max. I	Incr.* I
	µH		MHz	MHz	Ω	mA	mA
WEE-WEE- 0.10	0.10	42	25	500	.112	1720	>1720
WEE-WEE- 0.12	0.12	42	25	500	.126	1630	>1630
WEE-WEE- 0.15	0.15	42	25	500	.138	1550	>1550
WEE-WEE- 0.18	0.18	42	25	458	.165	1420	>1420
WEE-WEE- 0.22	0.22	42	25	414	.198	1330	>1330
WEE-WEE- 0.27	0.27	42	25	373	.220	1230	>1230
WEE-WEE- 0.33	0.33	42	25	360	.258	1140	>1140
WEE-WEE- 0.39	0.39	42	25	339	.292	1060	>1060
WEE-WEE- 0.47	0.47	41	25	309	.360	960	> 960
WEE-WEE- 0.56	0.56	39	25	295	.397	915	> 915
WEE-WEE- 0.68	0.68	36	25	270	.472	840	> 840
WEE-WEE- 0.82	0.82	35	25	250	.638	720	> 720
WEE-WEE- 1.0	1.0	42	25	170	.208	1260	>1260
WEE-WEE- 1.2	1.2	38	7.9	150	.225	1210	>1210
WEE-WEE- 1.5	1.5	38	7.9	139	.265	1120	>1120
WEE-WEE- 1.8	1.8	38	7.9	129	.285	1080	>1080
WEE-WEE- 2.2	2.2	36	7.9	118	.330	1000	>1000
WEE-WEE- 2.7	2.7	38	7.9	106	.381	935	> 935
WEE-WEE- 3.3	3.3	38	7.9	98	.432	875	> 875
WEE-WEE- 3.9	3.9	40	7.9	91	.576	755	> 755
WEE-WEE- 4.7	4.7	42	7.9	83	.787	650	> 650
WEE-WEE- 5.6	5.6	42	7.9	77	1.04	565	> 565
WEE-WEE- 6.8	6.8	45	7.9	67	1.40	485	> 485
WEE-WEE- 8.2	8.2	47	7.9	62	1.68	440	> 440
WEE-WEE- 10	10	51	7.9	55	2.58	355	> 355
WEE-WEE- 12	12	51	2.5	49	3.65	300	> 300
WEE-WEE- 15	15	45	2.5	55	.862	620	200
WEE-WEE- 18	18	43	2.5	50	1.02	570	175
WEE-WEE- 22	22	42	2.5	45	1.12	545	160
WEE-WEE- 27	27	37	2.5	41	1.28	510	155
WEE-WEE- 33	33	46	2.5	37	1.70	440	150
WEE-WEE- 39	39	38	2.5	33	1.99	405	145
WEE-WEE- 47	47	42	2.5	29	2.41	370	140
WEE-WEE- 56	56	41	2.5	27	2.85	340	130
WEE-WEE- 68	68	46	2.5	23	3.21	320	120
WEE-WEE- 82	82	46	2.5	21	3.57	305	115
WEE-WEE- 100	100	43	2.5	19	4.10	280	100
WEE-WEE- 120	120	50	0.79	16	5.97	235	80
WEE-WEE- 150	150	49	0.79	15	7.05	215	68
WEE-WEE- 180	180	56	0.79	14	8.12	200	64
WEE-WEE- 220	220	53	0.79	12	14.8	150	60
WEE-WEE- 270	270	57	0.79	11.5	16.8	140	58
WEE-WEE- 330	330	57	0.79	10.5	18.6	130	56
WEE-WEE- 390	390	57	0.79	10.0	21.1	120	54
WEE-WEE- 470	470	50	0.79	8.5	32.2	100	52
WEE-WEE- 560	560	50	0.79	7.5	36.4	95	50
WEE-WEE- 680	680	56	0.79	7.0	41.1	90	48
WEE-WEE- 820	820	49	0.79	6.5	45.0	85	47
WEE-WEE-1000	1000	49	0.79	6.0	52.0	80	45

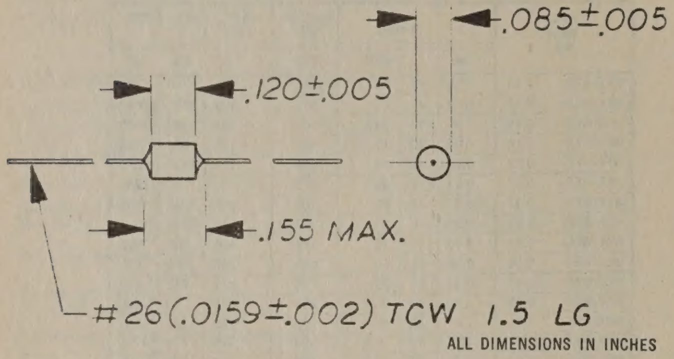
*INCREMENTAL CURRENT — The D.C. current to cause a 5% reduction in the nominal inductance value.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

PEE-WEE SERIES

The amazing **PEE-WEE DUCTOR** represents a 66% size reduction from the smallest magnetically shielded axial leaded inductor series heretofore available anywhere. Furthermore, this size reduction was obtained with negligible loss of electrical performance by employing several unique concepts in RF coil design.



ELECTRICAL CHARACTERISTICS:

Inductance Tolerance:	± 10% (Std).
L,Q,F, values:	Measurements per MIL-C-15305. (latest revision).
Incremental Current:	Incremental current in table is for 5% reduction in inductance value.
Dielectric Strength:	300 Volts RMS @ Sea Level.
Temperature Range:	−20°C to +80°C

DENSITY CHARACTERISTICS:

Volume:	.0007 Cubic Inches
Weight:	0.12 Grams
Shielding:	5% maximum coupling for two units side by side.
Marking:	EIA color coded

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS:

Terminal pull:	3 lbs. minimum.
Environmental:	Designed to meet the requirements of MIL-C-15305 (latest revision).

OPTIONS:

Inductance Values:	Additional Inductance Values from .025 uH up to 10,000 uH available on special order.

PEE-WEE DUCTOR STANDARD VALUES

NCG PART NO.	L µH	Q min. @	MHz	min. SRF MHz	Max. DCR Ω	Max. I mA	Incr. I mA
PW- 0.10	.10	40	25	500	.060	1500	*
PW- 0.12	.12	40	25	480	.070	1400	*
PW- 0.15	.15	40	25	450	.080	1300	*
PW- 0.18	.18	40	25	430	.090	1200	*
PW- 0.22	.22	40	25	390	.11	1100	*
PW- 0.27	.27	40	25	340	.12	1000	*
PW- 0.33	.33	40	25	310	.14	950	*
PW- 0.39	.39	40	25	280	.16	900	*
PW- 0.47	.47	40	25	250	.20	800	*
PW- 0.56	.56	40	25	220	.25	750	*
PW- 0.68	.68	35	25	200	.27	700	*
PW- 0.82	.82	35	25	180	.36	600	*
PW- 1.0	1.0	35	25	165	.40	525	*
PW- 1.2	1.2	35	7.9	150	.70	425	*
PW- 1.5	1.5	35	7.9	130	.80	400	*
PW- 1.8	1.8	35	7.9	120	.90	350	*
PW- 2.2	2.2	35	7.9	110	1.3	320	*
PW- 2.7	2.7	35	7.9	100	1.8	275	*
PW- 3.3	3.3	35	7.9	70	1.7	290	*
PW- 3.9	3.9	35	7.9	65	1.8	275	*
PW- 4.7	4.7	35	7.9	58	2.6	225	*
PW- 5.6	5.6	35	7.9	54	2.9	210	*
PW- 6.8	6.8	35	7.9	50	3.3	200	*
PW- 8.2	8.2	35	7.9	48	4.5	170	*
PW- 10	10	35	7.9	45	4.8	165	*
PW- 12	12	35	2.5	40	2.0	250	230
PW- 15	15	35	2.5	36	2.5	230	180
PW- 18	18	35	2.5	31	3.5	195	150
PW- 22	22	35	2.5	28	4.5	170	135
PW- 27	27	35	2.5	25	5.0	160	115
PW- 33	33	35	2.5	23	5.5	150	105
PW- 39	39	35	2.5	22	7.0	140	100
PW- 47	47	35	2.5	21	7.5	135	95
PW- 56	56	35	2.5	19	8.0	130	90
PW- 68	68	35	2.5	18	9.0	120	83
PW- 82	82	35	2.5	16	14	95	65
PW- 100	100	35	2.5	14	16	90	70
PW- 120	120	35	.79	9.5	10	115	40
PW- 150	150	35	.79	8.8	12	105	35
PW- 180	180	35	.79	8.1	15	90	32
PW- 220	220	35	.79	7.8	20	80	30
PW- 270	270	35	.79	7.3	23	75	27
PW- 330	330	35	.79	6.8	26	70	25
PW- 390	390	35	.79	6.0	35	65	23
PW- 470	470	35	.79	5.6	37	60	21
PW- 560	560	35	.79	5.0	40	58	20
PW- 680	680	35	.79	4.3	48	54	18
PW- 820	820	35	.79	3.8	54	47	17
PW-1000	1000	35	.79	3.5	65	43	15

* GREATER THAN MAX I

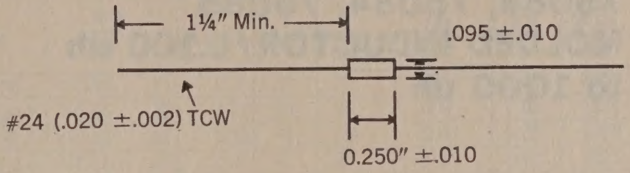
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

DECI-DUCTOR

New Subminiature Inductor 0.10uH to 1000uH Range
0.100″ diameter by 0.250″ length 49 STANDARD VALUES

The **DECI-DUCTOR** offers the design engineer epoxy-molded reliability and uniformity in a subminiature R.F. Inductor. This Nytronics R.F. Inductor line is designed to meet all the environmental specifications of MIL-C-15305 (latest revision).



ELECTRICAL CHARACTERISTICS

Inductance Tolerance: ±10% over entire range.
Dielectric Strength: 700 volts RMS at sea level.
Self-Resonant Frequency: Measured per MIL-C-15305 (latest revision).
Rating: Maximum Current based on 35°C rise in 90°C ambient.

DENSITY CHARACTERISTICS

Volume: 0.002 cubic inches **Weight:** 0.35 grams

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: —55°C to +125°C

Terminal Strength: Meets three pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).

Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision), 10 cps to 2000 cps @ 15 G ±10% maximum for 12 logarithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS (body mounted).

Marking: Color coded per MIL-C-15305 (latest revision).

	NCG Part No.	L	Q Min.		Min. SRF	Max. DCR	Max I.
		uH		MHz	MHz	Ohms	mA
PHENOLIC	DD-0.10	0.10	40	25	690	0.07	2000
	DD-0.12	0.12	40	25	650	0.08	1900
	DD-0.15	0.15	38	25	600	0.09	1750
	DD-0.18	0.18	38	25	550	0.10	1600
	DD-0.22	0.22	35	25	510	0.11	1550
	DD-0.27	0.27	35	25	470	0.15	1350
	DD-0.33	0.33	32	25	410	0.21	1150
	DD-0.39	0.39	32	25	370	0.29	970
	DD-0.47	0.47	32	25	340	0.35	820
	DD-0.56	0.56	32	25	310	0.48	700
	DD-0.68	0.68	33	25	280	0.65	600
	DD-0.82	0.82	30	25	255	0.82	500
	DD-1.00	1.00	30	25	240	1.10	475
IRON	DD-1.20	1.20	30	7.9	155	0.16	1200
	DD-1.50	1.50	32	7.9	140	0.20	1100
	DD-1.80	1.80	35	7.9	130	0.32	900
	DD-2.20	2.20	35	7.9	120	0.37	760
	DD-2.70	2.70	37	7.9	105	0.49	700
	DD-3.30	3.30	45	7.9	95	0.67	575
	DD-3.90	3.90	45	7.9	87	0.95	500
	DD-4.70	4.70	45	7.9	80	1.10	475
	DD-5.60	5.60	52	7.9	75	1.60	380
	DD-6.80	6.80	52	7.9	65	1.80	350
	DD-8.20	8.20	60	7.9	62	2.40	300
	DD-10.0	10.0	60	7.9	52	3.40	265
	DD-12.0	12.0	45	2.5	42	2.40	300
	DD-15.0	15.0	47	2.5	36	2.70	275
	DD-18.0	18.0	50	2.5	32	3.00	260
	DD-22.0	22.0	50	2.5	28	3.30	250
	DD-27.0	27.0	50	2.5	25	3.80	240
FERRITE	DD-33.0	33.0	50	2.5	30	3.80	260
	DD-39.0	39.0	50	2.5	26	4.10	240
	DD-47.0	47.0	50	2.5	24	4.40	210
	DD-56.0	56.0	50	2.5	22	5.70	205
	DD-68.0	68.0	52	2.5	19	6.50	180
	DD-82.0	82.0	52	2.5	17	7.30	175
	DD-100	100	50	2.5	15	8.20	165
	DD-120	120	28	0.79	14	14	110
	DD-150	150	28	0.79	13	16	105
	DD-180	180	28	0.79	12	18	100
	DD-220	220	26	0.79	11	25	90
	DD-270	270	26	0.79	10	33	75
	DD-330	330	26	0.79	9.0	37	70
	DD-390	390	25	0.79	8.0	51	60
	DD-470	470	27	0.79	7.0	56	58
	DD-560	560	27	0.79	6.5	61	55
	DD-680	680	28	0.79	6.0	70	50
	DD-820	820	28	0.79	5.5	91	45
	DD-1000	1000	28	0.79	5.2	102	40

Nytronics Components Group, Inc.

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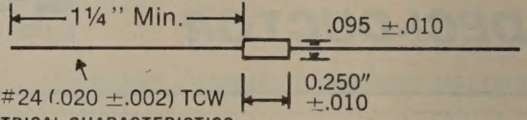
Inductors

Mili-Ductor



—MS INDUCTOR SERIES 75083, 75084, 75085 MOLDED INDUCTOR/0.100 uh to 1000 uh

The MS Inductor Series are RF Inductors specifically designed to meet the demanding requirements of MIL-C-15305 (latest revision). This MS Series is Epoxy Molded enveloped features reliability and uniformity in a Subminiature Inductor.

ELECTRICAL CHARACTERISTICS

Inductance Tolerance: ±10% over entire range.
Dielectric Strength: 1000 volts RMS at sea level.
Self-Resonant Frequency: Measured per MIL-C-15305 (latest revision).
Rating: Maximum current based on; 35°C rise in 90° ambient for phenolic, 15°C rise in 90° ambient for iron, 35°C rise in 70° ambient for ferrite core inductors.

DENSITY CHARACTERISTICS

Volume: 0.002 cubic inches; **Weight** .030 grams.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: —55°C to +125°C phenolic core, —55°C to +105°C iron and ferrite core.
Terminal Strength: Meets five pound pull test; five 360° rotations in alternate directions per MIL-C-15305 (latest revision).
Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision), 10 cps to 2000 cps @ 15G ±10% maximum for 12 logarithmic swings each of 20 minute duration repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS (body mounted).

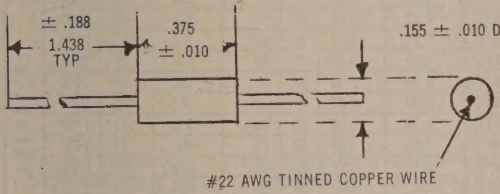
MS No.	NCG Part No.	±10% Inductance	Q Min.	Test Frequency (L & Q)	Self-resonant Frequency, Min.	DC Resistance Max.	Rated DC Current
		uh		MHz	MHz	Ohms	MA
MS75083-01	MD	.10	40	25.0	680	.08	1350
MS75083-02	MD	.12	40	25.0	640	.09	1270
MS75083-03	MD	.15	38	25.0	600	.10	1200
MS75083-04	MD	.18	35	25.0	550	.12	1105
MS75083-05	MD	.22	33	25.0	510	.14	1025
MS75083-06	MD	.27	33	25.0	430	.16	960
MS75083-07	MD	.33	30	25.0	410	.22	815
MS75083-08	MD	.39	30	25.0	365	.30	700
MS75083-09	MD	.47	30	25.0	330	.35	650
MS75083-10	MD	.56	30	25.0	300	.50	545
MS75083-11	MD	.68	28	25.0	275	.60	495
MS75083-12	MD	.82	28	25.0	250	.85	415
MS75083-13	MD	1.00	25	25.0	230	1.00	385
MS75084-01	MD	1.2	25	7.9	150	.18	590
MS75084-02	MD	1.5	28	7.9	140	.22	535
MS75084-03	MD	1.8	30	7.9	125	.30	455
MS75084-04	MD	2.2	30	7.9	115	.40	395
MS75084-05	MD	2.7	37	7.9	100	.55	355
MS75084-06	MD	3.3	45	7.9	90	.85	270
MS75084-07	MD	3.9	45	7.9	80	1.00	250
MS75084-08	MD	4.7	45	7.9	75	1.20	230
MS75084-09	MD	5.6	50	7.9	65	1.80	185
MS75084-10	MD	6.8	50	7.9	60	2.00	175
MS75084-11	MD	8.2	55	7.9	55	2.70	155
MS75084-12	MD	10	55	7.9	50	3.70	130
MS75084-13	MD	12	45	2.5	40	2.70	155
MS75084-14	MD	15	40	2.5	35	2.80	150
MS75084-15	MD	18	50	2.5	30	3.10	145
MS75084-16	MD	22	50	2.5	25	3.30	140
MS75084-17	MD	27	50	2.5	20	3.50	135
MS75085-01	MD	33	45	2.5	24	3.4	130
MS75085-02	MD	39	45	2.5	22	3.6	125
MS75085-03	MD	47	45	2.5	20	4.5	110
MS75085-04	MD	56	45	2.5	18	5.7	100
MS75085-05	MD	68	50	2.5	15	6.7	92
MS75085-06	MD	82	50	2.5	14	7.3	88
MS75085-07	MD	100	50	2.5	13	8	84
MS75085-08	MD	120	30	.79	12	13	66
MS75085-09	MD	150	30	.79	11	15	61
MS75085-10	MD	180	30	.79	10	17	57
MS75085-11	MD	220	30	.79	9	21	52
MS75085-12	MD	270	30	.79	8	25	47
MS75085-13	MD	330	30	.79	7	28	45
MS75085-14	MD	390	30	.79	6.5	35	40
MS75085-15	MD	470	30	.79	6	42	36
MS75085-16	MD	560	30	.79	5	46	35
MS75085-17	MD	680	30	.79	4	60	30
MS75085-18	MD	820	30	.79	3.8	65	29
MS75085-19	MD	1000	30	.79	3.4	72	28

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

RFC-SS SERIES

Molded inductors specifically designed to meet MIL-C-15305 (latest revision). Inductance from 0.15 to 240uH.



ELECTRICAL CHARACTERISTICS

Inductance Tolerance: 0.15 to 33 uH ± 10%
36 to 240 uH ± 5%
Measured on Q meter per MIL-C-15305 (latest revision).

Dielectric Strength: 700 volts RMS @ sea level

Rated Current: Based on max. temp. rise of 35°C (ambient 90°C) for RFC-SS-0.15 to 4.7
15°C (ambient 90°C) for RFC-SS-5.6 to -240

PHYSICAL AND ENVIRONMENTAL· CHARACTERISTICS

Operating Temperature: Max. 125°C for RFC-SS-0.15 thru RFC-SS-33
Max. 105°C for RFC-SS-36 to -240

Terminal Strength: Meets five pound pull test per MIL-C-15305 (latest revision).

Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision), high frequency 10 cps for 12 logarithmic swings, each of 20 minute duration repeated for each of three mutually perpendicular planes.

Printing: Color banded.

MS NO.	NCG PART NO.	L	Q Min.	@	Min. SRF	Max. DCR	Rated DC Cur.
		uH		MHz	MHz	Ω	mA
MS18130-1	RFC-SS- .15	0.15	50	25	525	0.03	2450
MS18130-2	RFC-SS- .22	0.22	50	25	450	0.05	1900
MS18130-3	RFC-SS- .33	0.33	45	25	360	0.09	1400
MS18130-4	RFC-SS- .47	0.47	45	25	310	0.12	1225
MS18130-5	RFC-SS- .56	0.56	50	25	280	0.13	1220
MS18130-6	RFC-SS- .68	0.68	50	25	250	0.15	1100
MS18130-7	RFC-SS- .82	0.82	50	25	220	0.22	900
MS18130-8	RFC-SS- 1.00	1.00	50	25	200	0.29	830
MS18130-9	RFC-SS- 1.20	1.20	33	7.9	180	0.42	650
MS18130-10	RFC-SS- 1.50	1.5	33	7.9	160	0.50	600
MS18130-11	RFC-SS- 1.80	1.8	33	7.9	150	0.65	525
MS18130-12	RFC-SS- 2.2	2.2	33	7.9	135	0.95	435
MS18130-13	RFC-SS- 2.7	2.7	33	7.9	120	1.20	385
MS18130-14	RFC-SS- 3.3	3.3	33	7.9	110	2.00	300
MS18130-15	RFC-SS- 3.9	3.9	33	7.9	100	2.30	280
MS18130-16	RFC-SS- 4.7	4.7	33	7.9	90	2.60	260
MS14046-1	RFC-SS- 5.6	5.6	45	7.9	60	0.32	750
MS14046-2	RFC-SS- 6.8	6.8	50	7.9	55	0.50	600
MS14046-3	RFC-SS- 8.2	8.2	50	7.9	50	0.60	545
MS14046-4	RFC-SS- 10	10.0	55	7.9	45	0.90	445
MS14046-5	RFC-SS- 12	12	65	2.5	42	1.10	404
MS14046-6	RFC-SS- 15	15	65	2.5	40	1.40	370
MS14046-7	RFC-SS- 18	18	75	2.5	34	2.25	280
MS14046-8	RFC-SS- 22	22	75	2.5	30	2.50	265
MS14046-9	RFC-SS- 27	27	60	2.5	25	2.60	260
MS14046-10	RFC-SS- 33	33	65	2.5	19	3.00	250
MS90538-1	RFC-SS- 36	36	60	2.5	15.5	2.50	180
MS90538-2	RFC-SS- 39	39	60	2.5	14.5	2.60	176
MS90538-3	RFC-SS- 43	43	60	2.5	13.7	2.70	172
MS90538-4	RFC-SS- 47	47	55	2.5	13.0	2.75	170
MS90538-5	RFC-SS- 51	51	55	2.5	12.7	2.85	167
MS90538-6	RFC-SS- 56	56	55	2.5	12.0	3.00	164
MS90538-7	RFC-SS- 62	62	55	2.5	11.5	3.15	160
MS90538-8	RFC-SS- 68	68	55	2.5	11.0	3.30	156
MS90538-9	RFC-SS- 75	75	55	2.5	10.5	3.70	147
MS90538-10	RFC-SS- 82	82	50	2.5	10.3	3.9	143
MS90538-11	RFC-SS- 91	91	50	2.5	10.0	4.3	136
MS90538-12	RFC-SS-100	100	50	2.5	9.5	4.5	133
MS90538-13	RFC-SS-110	110	60	0.79	8.9	4.9	128
MS90538-14	RFC-SS-120	120	65	0.79	8.7	5.2	124
MS90538-15	RFC-SS-130	130	65	0.79	8.5	5.45	121
MS90538-16	RFC-SS-150	150	65	0.79	8.0	6.05	114
MS90538-17	RFS-SS-160	160	65	0.79	7.5	6.40	111
MS90538-18	RFC-SS-180	180	65	0.79	7.0	6.75	108
MS90538-19	RFC-SS-200	200	65	0.79	6.5	7.10	106
MS90538-20	RFC-SS-220	220	65	0.79	6.2	7.45	103
MS90538-21	RFC-SS-240	240	65	0.79	5.9	7.8	101

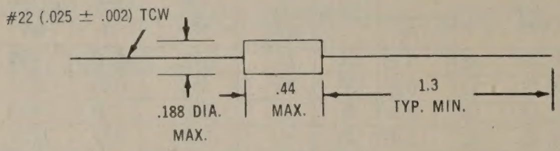
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

RFC-S SERIES

Proven reliability molded inductors specifically designed to meet MIL-C-15305 (latest revision). Inductance 0.1 to 1000uH.

ACTUAL SIZE



ELECTRICAL CHARACTERISTICS

Inductance Tolerance:	0.1 to 22uH ±10% on Q-Meter 27uH to 1000 ±5% 1,000 cps bridge 120uH to 1000 uH ± 5% on Q-Meter
Dielectric Strength:	700 volts RMS at sea level.
Self-Resonant Frequency:	Minimum f_0 to be not less than 80% of published data and measured with full length leads on Grid-Dip Meter.
Q:	Measured on Q-Meter.
Rating:	⅓ watt dissipation for series S

DENSITY CHARACTERISTICS

Volume:	0.012 cu. in.
Weight:	0.90 grams

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature:	−55°C to +125°C.
Terminal Strength:	Meets five pound pull test per MIL-C-15305. (latest revision).
Moisture, Vibration, and Shock Resistance:	Meets requirements of MIL-C-15305 Grade 1, Class B. High frequency 10 cps to 2000 cps @ 15G ± 10% maximum for 12 logarithmic swings, each of 20 minute duration repeated for each of three mutually perpendicular planes. (body mounted)

MS NO.	NCG PART NO.*	L	Q min		approx. SRF	Max. DCR	max. I	MATERIAL
		uH		MHz	MHz	Ω	mA	
MS21389-1	RFC-S- 0.10	0.10	85	50	500	.02	4000	PHENOLIC
MS21389-2	RFC-S- 0.12	0.12	85	50	500	0.25	3500	
MS21389-3	RFC-S- 0.15	0.15	85	50	500	.03	3000	
MS21389-4	RFC-S- 0.18	0.18	75	50	500	.03	3000	
MS21389-5	RFC-S- 0.22	0.22	75	50	500	.03	3000	
MS21389-6	RFC-S- 0.27	0.27	70	45	470	.04	2700	
MS21389-7	RFC-S- 0.33	0.33	70	40	440	.05	2500	
MS21389-8	RFC-S- 0.39	0.39	65	40	400	.08	2000	
MS21389-9	RFC-S- 0.47	0.47	60	25	360	.08	2000	
MS21389-10	RFC-S- 0.56	0.56	55	25	330	.10	1700	
MS21389-11	RFC-S- 0.68	0.68	55	25	300	.12	1500	
MS21389-12	RFC-S- 0.82	0.82	50	25	275	.18	1300	
MS21389-13	RFC-S- 1.0	1.0	50	20	250	.24	1100	
MS21389-14	RFC-S- 1.2	1.2	45	20	220	.35	1000	
MS21389-15	RFC-S- 1.5	1.5	45	15	200	.43	850	
MS21389-16	RFC-S- 1.8	1.8	45	15	180	.65	720	
MS21389-17	RFC-S- 2.2	2.2	45	15	165	.80	610	
MS21390-1	RFC-S- 2.7	2.7	55	10	110	.12	1600	IRON
MS21390-2	RFC-S- 3.3	3.3	55	10	100	.15	1400	
MS21390-3	RFC-S- 3.9	3.9	60	10	95	.23	1200	
MS21390-4	RFC-S- 4.7	4.7	70	7.9	90	.30	1000	
MS21390-5	RFC-S- 5.6	5.6	65	7.9	80	.45	900	
MS21390-6	RFC-S- 6.8	6.8	65	7.9	70	.55	800	
MS21390-7	RFC-S- 8.2	8.2	60	7.9	65	.65	720	
MS21390-8	RFC-S- 10	10	60	5	60	.73	650	
MS21390-9	RFC-S- 12	12	65	5	53	1.1	590	
MS21390-10	RFC-S- 15	15	80	2.5	47	1.4	500	
MS21390-11	RFC-S- 18	18	75	2.5	43	1.6	460	
MS21390-12	RFC-S- 22	22	75	2.5	40	1.8	430	
MS21390-13	RFC-S- 27	27	75	2.5	36	2.7	360	
MS21390-14	RFC-S- 33	33	85	2.5	32	3.5	300	
MS21390-15	RFC-S- 39	39	80	2.5	26	3.8	290	
MS21390-16	RFC-S- 47	47	80	2.5	22	4.0	275	
MS21390-17	RFC-S- 56	56	75	2.5	19	4.4	265	
MS21390-18	RFC-S- 68	68	75	2.5	16	4.7	250	
MS21390-19	RFC-S- 82	82	75	2.5	13	5.3	235	
MS21390-20	RFC-S- 100	100	75	1.5	10	6.0	220	
MS21390-21	RFC-S- 120	120	65	0.79	7.2	5.0	170	
MS21390-22	RFC-S- 150	150	65	0.79	6.7	5.8	164	
MS21390-23	RFC-S- 180	180	65	0.79	6.3	6.6	158	
MS21390-24	RFC-S- 220	220	65	0.79	5.9	7.4	155	
MS21390-25	RFC-S- 270	270	65	0.79	5.6	8.0	150	
MS21390-26	RFC-S- 300	300	65	0.79	5.3	8.6	145	
MS21390-27	RFC-S- 330	330	65	0.79	5.0	8.9	142	
MS21390-28	RFC-S- 360	360	65	0.79	4.7	9.6	137	
MS21390-29	RFC-S- 390	390	65	0.79	4.5	9.9	135	
MS21390-30	RFC-S- 430	430	65	0.79	4.3	10.4	131	
MS21390-31	RFC-S- 470	470	65	0.79	4.0	10.9	128	
MS21390-32	RFC-S- 510	510	65	0.79	3.8	11.6	124	
MS21390-33	RFC-S- 560	560	65	0.79	3.6	11.8	123	
MS21390-34	RFC-S- 620	620	60	0.79	3.5	12.5	120	
MS21390-35	RFC-S- 680	680	60	0.79	3.4	13.5	115	
MS21390-36	RFC-S- 750	750	60	0.79	3.3	14.0	113	
MS21390-37	RFC-S- 820	820	60	0.79	3.1	15.0	110	
MS21390-38	RFC-S- 910	910	60	0.79	3.0	15.5	107	
MS21390-39	RFC-S-1000	1000	60	0.79	2.8	16.5	104	

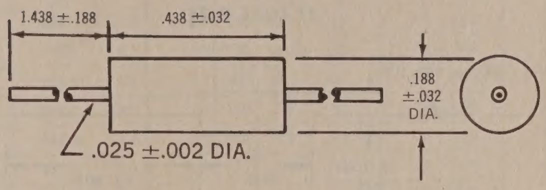
* NCG Part No. cannot be used as the MS Number.

Nytronics Components Group, Inc.

ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

MS-INDUCTOR SERIES
75008-75101
MOLDED INDUCTOR
(Manufactured per MS75008 - MS75101)



ALL DIMENSIONS IN INCHES

Proven reliability molded inductors designed to meet MS75008 and MIL-C-15305 (latest revision). Inductance 0.15 to 27.0 uhy.

ELECTRICAL CHARACTERISTICS

Inductance Tolerance: 0.15 to 0.47 uhy ±20%; 0.56 to 27.0 uhy ±10%
Dielectric Strength: 700 Volts RMS at sea level
Max. Temp. Rise: 35°C

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: —55°C to +125°C.
Terminal Strength: Meets five pound pull test per MIL-C-15305 (latest revision).
Moisture, Vibration, and Shock Resistance: Meets requirements of MIL-C-15305 (latest revision). High frequency 10 cps to 2000 cps @ 15G ±10% maximum for 12 logarithmic swings, each of 20 minute duration repeated for each of three mutually perpendicular planes. (body mounted)
Volume: S Type — 0.012 cu. in.
Weight: S Type — 0.90 grams
Marking: Color banded per MIL-C-15305 (latest revision).

MS No.	NCG PART NO.*	Inductance	Q; Min.	Test Frequency	Self-resonant Frequency, Min.	DC Resistance, Max.	Rated DC Current	Material
		uh		MHz	MHz	Ohms	ma	
MS75008-21	RFC-S	0.15 ±20%	55	25.0	510	0.030	3,000	PHENOLIC
MS75008-22	RFC-S	0.22 ±20%	50	25.0	415	0.035	2,800	
MS75008-23	RFC-S	0.33 ±20%	50	25.0	350	0.065	2,000	
MS75008-24	RFC-S	0.47 ±20%	50	25.0	300	0.085	1,700	
MS75008-25	RFC-S	0.56 ±10%	50	25.0	270	0.125	1,450	
MS75008-26	RFC-S	0.68 ±10%	45	25.0	250	0.150	1,300	
MS75008-27	RFC-S	0.82 ±10%	40	25.0	210	0.205	1,100	
MS75008-28	RFC-S	1.00 ±10%	40	25.0	200	0.290	930	
MS75008-29	RFC-S	1.20 ±10%	30	7.9	180	0.400	785	
MS75008-30	RFC-S	1.50 ±10%	30	7.9	170	0.485	700	
MS75008-31	RFC-S	1.80 ±10%	30	7.9	150	0.740	580	
MS75008-32	RFC-S	2.20 ±10%	30	7.9	140	0.970	505	
MS75008-33	RFC-S	2.70 ±10%	30	7.9	120	1.20	460	IRON
MS75101-1	RFC-S	3.30 ±10%	30	7.9	70	0.140	1,350	
MS75101-2	RFC-S	3.90 ±10%	30	7.9	65	0.155	1,250	
MS75101-3	RFC-S	4.70 ±10%	30	7.9	60	0.210	1,100	
MS75101-4	RFC-S	5.60 ±10%	30	7.9	50	0.280	935	
MS75101-5	RFC-S	6.80 ±10%	30	7.9	50	0.375	810	
MS75101-6	RFC-S	8.20 ±10%	30	7.9	48	0.440	750	
MS75101-7	RFC-S	10.00 ±10%	30	7.9	42	0.605	640	
MS75101-8	RFC-S	12.00 ±10%	50	2.5	36	1.05	490	
MS75101-9	RFC-S	15.00 ±10%	55	2.5	30	1.20	460	
MS75101-10	RFC-S	18.00 ±10%	60	2.5	30	1.95	360	
MS75101-11	RFC-S	22.00 ±10%	60	2.5	24	2.20	335	
MS75101-12	RFC-S	27.00 ±10%	65	2.5	22	2.75	300	

* NCG Part No. cannot be used as the MS Number.

Nytronics Components Group, Inc.

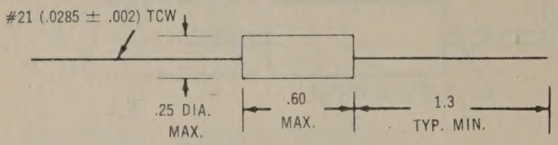
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

RFC-M SERIES

Proven reliability molded inductors specifically designed to meet MIL-C-15305 (latest revision). Inductance 1.0 to 2200uH.

ACTUAL SIZE



ELECTRICAL CHARACTERISTICS

Inductance Tolerance:	1.0 to 22uH ± 10% on Q-Meter 27uH to 2200 ± 5% 1,000 cps bridge
Dielectric Strength:	700 volts RMS at sea level.
Self-Resonant Frequency:	Minimum f_0 to be not less than 80% of published data and measured with full length leads on Grid-Dip Meter.
Q:	Measured on Q-Meter.
Rating:	⅓ watt dissipation for series M

DENSITY CHARACTERISTICS

Volume:	0.029 cu. in.
Weight:	2.00 grams

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature:	−55°C to +125°C.
Terminal Strength:	Meets five pound pull test per MIL-C-15305.
Moisture, Vibration, and Shock Resistance:	Meets requirements of MIL-C-15305 (latest revision). High frequency 10 cps to 2000 cps @ 15G ± 10% maximum for 12 logarithmic swings, each of 20 minute duration repeated for each of three mutually perpendicular planes. (body mounted)

MS NO.	NCG PART NO.*	L	Q Min.		approx. SRF	Max. DCR	Max. I	MATERIAL
		uH		MHz	MHz	Ω	mA	
MS21388-1	RFC-M- 1.0	1.0	100	15	170	.04	2700	IRON
MS21388-2	RFC-M- 1.2	1.2	100	15	155	.04	2700	
MS21388-3	RFC-M- 1.5	1.5	100	10	140	.04	2700	
MS21388-4	RFC-M- 1.8	1.8	95	10	125	.05	2500	
MS21388-5	RFC-M- 2.2	2.2	95	10	110	.05	2500	
MS21388-6	RFC-M- 2.7	2.7	68	7.9	95	.05	2500	
MS21388-7	RFC-M- 3.3	3.3	60	7.9	90	.05	2500	
MS21388-8	RFC-M- 3.9	3.9	60	7.9	87	.07	2100	
MS21388-9	RFC-M- 4.7	4.7	60	7.9	75	.09	1800	
MS21388-10	RFC-M- 5.6	5.6	65	7.9	70	.14	1550	
MS21388-11	RFC-M- 6.8	6.8	70	7.9	65	.17	1300	
MS21388-12	RFC-M- 8.2	8.2	65	7.9	57	.25	1150	
MS21388-13	RFC-M- 10	10	65	5	50	.32	1000	
MS21388-14	RFC-M- 12	12	65	5	45	.47	870	
MS21388-15	RFC-M- 15	15	75	4	40	.62	730	
MS21388-16	RFC-M- 18	18	65	4	37	.72	660	
MS21388-17	RFC-M- 22	22	65	2.5	35	.8	600	
MS21388-18	RFC-M- 27	27	65	2.5	31	1.2	520	
MS21388-19	RFC-M- 33	33	80	2.5	27	1.5	450	
MS21388-20	RFC-M- 39	39	80	2.5	25	2.3	380	
MS21388-21	RFC-M- 47	47	100	2.5	24	3.0	300	
MS21388-22	RFC-M- 56	56	100	2.5	22	4.2	270	
MS21388-23	RFC-M- 68	68	100	2.5	20	5.2	250	
MS21388-24	RFC-M- 82	82	100	2.5	18	6.2	220	
MS21388-25	RFC-M- 100	100	100	1.5	17	7	200	
MS21388-26	RFC-M- 120	120	95	1.5	14	7.5	200	
MS21388-27	RFC-M- 150	150	90	1.0	11	8	190	
MS21388-28	RFC-M- 180	180	85	1.0	9	9	185	
MS21388-29	RFC-M- 220	220	85	1.0	7	10	180	
MS21388-30	RFC-M- 270	270	80	1.0	5.5	11	172	
MS21388-31	RFC-M- 330	330	80	.8	4.5	12	165	
MS21388-32	RFC-M- 390	390	75	.8	4.0	13	157	
MS21388-33	RFC-M- 470	470	75	.8	3.5	14	150	
MS21388-34	RFC-M- 560	560	65	.8	3.1	16	145	
MS21388-35	RFC-M- 680	680	65	.8	2.7	17	140	
MS21388-36	RFC-M- 820	820	65	.8	2.5	19	132	
MS21388-37	RFC-M-1000	1000	70	.5	2.3	21	125	
MS21388-38	RFC-M-1200	1200	60	.25	2.7	22	120	
MS21388-39	RFC-M-2200	2200	70	.25	2.0	30	100	

* NCG Part No. cannot be used as the MS Number.

Nytronics Components Group, Inc.

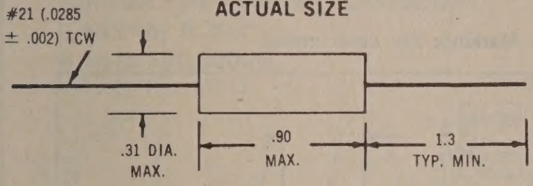
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

RFC-L SERIES

Proven reliability molded inductors specifically designed to meet MIL-C-15305 (latest revision). Inductance 1.0 to 10,000uH.

ACTUAL SIZE



ELECTRICAL CHARACTERISTICS

Inductance Tolerance:	0.1 to 22uH ±10% on Q-Meter 27uH to 10,000 ±5% 1,000 cps bridge
Dielectric Strength:	700 volts RMS at sea level.
Self-Resonant Frequency:	Minimum f_0 to be not less than 80% of published data and measured with full length leads on Grid-Dip Meter.
Q:	Measured on Q-Meter.
Rating:	½ watt dissipation for L series.

DENSITY CHARACTERISTICS

Volume:	0.068 cu. in.
Weight:	4.10 grams

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Operating Temperature:	−55°C to +125°C.
Terminal Strength:	Meets five pound pull test per MIL-C-15305 (latest revision).
Moisture, Vibration, and Shock Resistance:	Meets requirements of MIL-C-15305 (latest revision). High frequency 10 cps to 2000 cps @ 15G ± 10% maximum for 12 logarithmic swings, each of 20 minute duration repeated for each of three mutually perpendicular planes. (body mounted)

MS NO.	NCG PART NO.*	L	Q min		approx. SRF	Max. DCR	max. I	MAT.
		µH		MHz	MHz	Ω	mA	
MS21380-1	RFC-L- 1.0	1.0	130	15	170	.03	4000	IRON
MS21380-2	RFC-L- 1.2	1.2	130	15	155	.03	4000	
MS21380-3	RFC-L- 1.5	1.5	130	10	140	.03	4000	
MS21380-4	RFC-L- 1.8	1.8	130	10	125	.03	4000	
MS21380-5	RFC-L- 2.2	2.2	130	10	115	.04	3500	
MS21380-6	RFC-L- 2.7	2.7	100	10	102	.04	3500	
MS21380-7	RFC-L- 3.3	3.3	100	7.9	90	.04	3500	
MS21380-8	RFC-L- 3.9	3.9	80	7.9	85	.05	3100	
MS21380-9	RFC-L- 4.7	4.7	75	7.9	80	.05	3100	
MS21380-10	RFC-L- 5.6	5.6	65	7.9	72	.06	3000	
MS21380-11	RFC-L- 6.8	6.8	65	7.9	65	.06	3000	
MS21380-12	RFC-L- 8.2	8.2	65	7.9	57	.11	2400	
MS21380-13	RFC-L- 10	10	75	5	50	.15	1800	
MS21380-14	RFC-L- 12	12	75	5	45	.23	1600	
MS21380-15	RFC-L- 15	15	75	5	40	.3	1300	
MS21380-16	RFC-L- 18	18	75	5	36	.4	1150	
MS21380-17	RFC-L- 22	22	75	2.5	32	.5	1000	
MS21380-18	RFC-L- 27	27	70	2.5	30	.6	900	
MS21380-19	RFC-L- 33	33	70	2.5	28	.7	850	
MS21380-20	RFC-L- 39	39	70	2.5	26	1.1	720	
MS21380-21	RFC-L- 47	47	75	2.5	25	1.3	620	
MS21380-22	RFC-L- 56	56	80	2.5	22	1.8	540	
MS21380-23	RFC-L- 68	68	100	2.5	20	2.4	450	
MS21380-24	RFC-L- 82	82	100	2.5	18	2.8	425	
MS21380-25	RFC-L- 100	100	100	1.5	17	3.2	400	
MS21380-26	RFC-L- 120	120	100	1.5	15	4.8	360	
MS21380-27	RFC-L- 150	150	100	1.0	14	6.4	280	
MS21380-28	RFC-L- 180	180	95	1.0	12	9.5	240	
MS21380-29	RFC-L- 220	220	95	1.0	11	12	200	
MS21380-30	RFC-L- 270	270	70	1.0	9	13	195	
MS21380-31	RFC-L- 330	330	65	.79	7.5	14	190	
MS21380-32	RFC-L- 390	390	65	.79	6.5	15.5	180	
MS21380-33	RFC-L- 470	470	60	.79	5.5	17	170	
MS21380-34	RFC-L- 560	560	75	.5	4	18.5	165	
MS21380-35	RFC-L- 680	680	75	.5	3.2	20	155	
MS21380-36	RFC-L- 820	820	75	.5	2.8	22	150	
MS21380-37	RFC-L- 1000	1000	75	.5	2.4	24	145	
MS21380-38	RFC-L- 1200	1200	75	.5	2.1	27	137	
MS21380-39	RFC-L- 1500	1500	75	.4	1.9	29	130	
MS21380-40	RFC-L- 1800	1800	65	.4	1.7	32	125	
MS21380-41	RFC-L- 2200	2200	65	.25	1.5	35	120	
MS21380-42	RFC-L- 2700	2700	65	.25	1.3	40	112	
MS21380-43	RFC-L- 3300	3300	65	.25	1.2	45	105	
MS21380-44	RFC-L- 3900	3900	65	.25	1.05	49	100	
MS21380-45	RFC-L- 4700	4700	65	.25	.95	53	95	
MS21380-46	RFC-L- 5600	5600	65	.25	.85	60	90	
MS21380-47	RFC-L- 6800	6800	65	.25	.75	67	85	
MS21380-48	RFC-L- 8200	8200	65	.25	.65	75	82	
MS21380-49	RFC-L-10000	10000	65	.15	.58	80	80	

* NCG Part No. cannot be used as the MS Number.

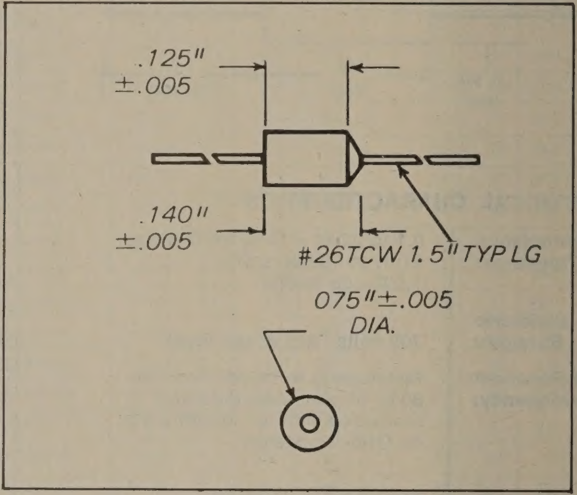
Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

Inductors

Pee Dee Ductor Series

Marking: EIA color coded

The Pee Dee Ductor is a new, microminiature, axial-leaded RF inductor for hybrid circuit applications. It is significantly smaller than any unshielded inductor available anywhere. Designed to meet the requirements of MIL-C-15305 (latest revision), this reliable, high performance inductor has a standard inductance tolerance of ±10%. Values below 0.1 uh and above 1000 uh are available on special order.



ELECTRICAL DATA

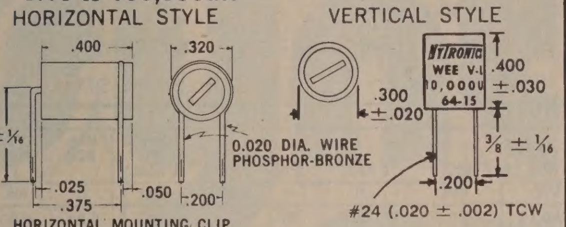
NCG Part No.	L uH	Q (Min.)	Test Freq. MHz	F° Min. MHz	DCR Max. Ohms	Rated Current mA
PD-0.10	0.10	40	25	500	0.2	600
PD-0.12	0.12	40	25	450	0.2	600
PD-0.15	0.15	40	25	400	0.25	575
PD-0.18	0.18	40	25	380	0.25	575
PD-0.22	0.22	40	25	360	0.30	565
PD-0.27	0.27	40	25	300	0.30	565
PD-0.33	0.33	40	25	280	0.35	560
PD-0.39	0.39	40	25	260	0.37	550
PD-0.47	0.47	40	25	250	0.39	535
PD-0.56	0.56	40	25	240	0.40	525
PD-0.68	0.68	35	25	220	0.45	500
PD-0.82	0.82	35	25	180	0.50	480
PD-1.0	1.0	35	25	170	0.60	450
PD-1.2	1.2	35	7.9	150	0.70	425
PD-1.5	1.5	35	7.9	130	0.80	400
PD-1.8	1.8	35	7.9	120	0.90	350
PD-2.2	2.2	35	7.9	110	1.3	320
PD-2.7	2.7	35	7.9	105	1.8	275
PD-3.3	3.3	35	7.9	100	1.1	340
PD-3.9	3.9	35	7.9	90	1.4	310
PD-4.7	4.7	35	7.9	85	1.6	290
PD-5.6	5.6	35	7.9	70	1.8	275
PD-6.8	6.8	35	7.9	65	2.0	250
PD-8.2	8.2	35	7.9	62	2.2	245
PD-10	10	35	7.9	60	3.0	210
PD-12	12	35	2.5	35	2.0	250
PD-15	15	35	2.5	30	2.2	245
PD-18	18	35	2.5	25	2.5	230
PD-22	22	35	2.5	23	2.7	220
PD-27	27	35	2.5	21	3.8	195
PD-33	33	35	2.5	20	4.5	170
PD-39	39	35	2.5	16	6.0	150
PD-47	47	35	2.5	14	6.5	145
PD-56	56	35	2.5	12	7.8	135
PD-68	68	35	2.5	10	8.6	130
PD-82	82	35	2.5	9.0	9.8	120
PD-100	100	35	2.5	8.0	11.5	110
PD-120	120	28	.79	7.0	15.0	90
PD-150	150	28	.79	6.0	16.5	88
PD-180	180	25	.79	5.5	22	75
PD-220	220	24	.79	5.2	31	62
PD-270	270	24	.79	5.0	38	56
PD-330	330	24	.79	4.8	42	53
PD-390	390	24	.79	3.6	58	47
PD-470	470	24	.79	3.4	60	45
PD-560	560	24	.79	3.2	65	43
PD-680	680	22	.79	3.0	90	36
PD-820	820	23	.79	2.5	95	34
PD-1000	1000	21	.79	2.0	130	30

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

VARIABLE INDUCTORS

WEE V-L

NOW MIL APPROVED MIL-C-15305
(latest revision) — MS21381 & MS21402
Subminiature Shielded Adjustable Inductor
High Q Values
Vertical or Horizontal* Mounting
Unitized Epoxy-Molded Construction
0.400″ by 0.300″
0.10 to 100,000uH



HORIZONTAL MOUNTING CLIP
Nytronics Part No. ACS 57
(one required per unit)

ACTUAL SIZE

The **WEE V-L** is designed to accommodate close inductance adjustments in high-density circuits that demand exceptional stability and high "Q" in the smallest size available.
The **WEE V-L** is qualified MIL-C-15305 (latest revision). Printed board mounting is facilitated by 0.200 grid spacing and unit has shield construction to allow maximum density packaging. Standardized in 73 stock values.

ELECTRICAL CHARACTERISTICS

Adjustable Inductance Range:	±10%† over entire range as measured per MIL-C-15305 (latest revision).
Q and f₀ Values:	Minimum not less than 80% of specified value at L nominal.
Dielectric Strength:	840 Volts R.M.S. at sea level.
Working Voltage:	300 Volts D.C.
Maximum Current:	Based on temperature rise not to exceed 15°C at 90°C ambient.
Incremental Current:	Defined as the DC current required to cause a five percent reduction in the nominal inductance value.

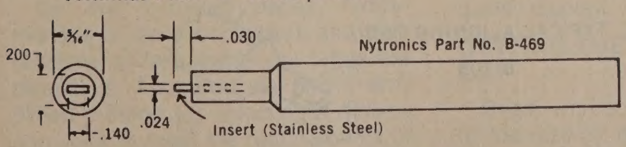
DENSITY CHARACTERISTICS

Weight:	1.5 grams maximum
Volume:	.0346 cubic inches
Shielding:	3% coupling maximum when two units are tested side by side.

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Use Nytronics Tuning Tool No. B-469 or equal.

Torque:	0.75 to 6.0 inch-oz.
Operating Temperature:	−55°C to +105°C.
Moisture, Vibration, and Shock Resistance:	Meet requirements of MIL-C-15305 (latest revision). Low frequency 10 to 55 cps @ .06″ maximum total excursion at rate of 1 linear sweep per minute for 2 hours repeated for each of three mutually perpendicular planes. Shock: 50G, 11 MS. (body mounted)
Marking:	Manufacturer data printed.
Terminal Pull:	Three pounds.



MS No.	NCG Part No.	L nom. uH	f MHz	Q nom.	SRF Nom. MHz	Max. BCR ohms	Max. I m.a.	Incr. I m.a.
MS21381-1	WEE V-L† 0.10	.10	25	70	>250	0.030	2500	2500
MS21831-2	WEE V-L† 0.12	.12	25	70	>250	0.030	2500	2500
MS21381-3	WEE V-L 0.15	.15	25	70	>250	0.030	2500	2500
MS21381-4	WEE V-L 0.18	.18	25	70	>250	0.035	2400	2400
MS21381-5	WEE V-L 0.22	.22	25	70	>250	0.038	2300	2300
MS21381-6	WEE V-L 0.27	.27	25	80	>250	0.040	2200	2200
MS21381-7	WEE V-L 0.33	.33	25	80	>250	0.040	2200	2200
MS21381-8	WEE V-L 0.39	.39	25	80	250	0.045	2100	2100
MS21381-9	WEE V-L 0.47	.47	25	80	230	0.045	2100	2100
MS21381-10	WEE V-L 0.56	.56	25	80	220	0.050	2000	2000
MS21381-11	WEE V-L 0.68	.68	25	80	190	0.055	1900	1900
MS21381-12	WEE V-L 0.82	.82	25	85	180	0.060	1800	1800
MS21381-13	WEE V-L 1.00	1.00	25	85	160	0.070	1700	1700
MS21381-14	WEE V-L 1.2	1.2	7.9	90	170	0.085	1670	1670
MS21381-15	WEE V-L 1.5	1.5	7.9	100	155	0.100	1540	1540
MS21381-16	WEE V-L 1.8	1.8	7.9	115	135	0.110	1470	1470
MS21381-17	WEE V-L 2.2	2.2	7.9	110	120	0.120	1410	1410
MS21381-18	WEE V-L 2.7	2.7	7.9	110	104	0.125	1380	1380
MS21381-19	WEE V-L 3.3	3.3	7.9	90	93.0	0.165	1200	1200
MS21381-20	WEE V-L 3.9	3.9	7.9	90	87.0	0.180	1135	1135
MS21381-21	WEE V-L 4.7	4.7	7.9	95	79.0	0.245	985	985
MS21381-22	WEE V-L 5.6	5.6	7.9	95	72.0	0.265	950	950
MS21381-23	WEE V-L 6.8	6.8	7.9	85	63.0	0.330	853	853
MS21381-24	WEE V-L 8.2	8.2	7.9	95	60.0	0.460	720	720
MS21381-25	WEE V-L 10	10	7.9	90	54.0	0.640	620	620
MS21381-26	WEE V-L 12	12	2.5	120	37.0	0.800	545	545
MS21381-27	WEE V-L 15	15	2.5	120	28.8	0.865	520	520
MS21381-28	WEE V-L 18	18	2.5	115	23.8	0.940	504	504
MS21381-29	WEE V-L 22	22	2.5	125	21.3	1.03	460	460
MS21381-30	WEE V-L 27	27	2.5	115	20.6	1.18	418	418
MS21381-31	WEE V-L 33	33	2.5	120	18.6	1.30	398	398
MS21381-32	WEE V-L 39	39	2.5	120	17.7	1.41	385	385
MS21381-33	WEE V-L 47	47	2.5	110	14.9	1.61	350	350
MS21381-34	WEE V-L 56	56	2.5	115	13.9	2.08	330	330
MS21381-35	WEE V-L 68	68	2.5	105	12.9	2.20	320	320
MS21381-36	WEE V-L 82	82	2.5	105	11.7	2.42	300	300
MS21402-1	WEE V-L 100	100	2.5	95	10.5	2.15	333	333
MS21402-2	WEE V-L 120	120	0.790	95	5.60	2.38	316	190
MS21402-3	WEE V-L 150	150	0.790	90	5.20	2.52	306	175
MS21402-4	WEE V-L 180	180	0.790	95	4.90	2.88	288	150
MS21402-5	WEE V-L 220	220	0.790	95	4.60	3.18	273	125
MS21402-6	WEE V-L 270	270	0.790	100	4.20	3.50	260	120
MS21402-7	WEE V-L 330	330	0.790	100	3.55	4.80	222	110
MS21402-8	WEE V-L 390	390	0.790	100	3.45	5.44	209	105
MS21402-9	WEE V-L 470	470	0.790	100	3.20	5.90	201	100
MS21402-10	WEE V-L 560	560	0.790	95	2.90	6.30	194	90
MS21402-11	WEE V-L 680	680	0.790	100	2.70	7.20	181	80
MS21402-12	WEE V-L 820	820	0.790	90	2.50	8.00	172	70
MS21402-13	WEE V-L 1,000	1,000	0.790	100	2.35	12.0	141	65
MS21402-14	WEE V-L 1,200	1,200	0.250	95	2.20	13.5	132	60
MS21402-15	WEE V-L 1,500	1,500	0.250	90	1.90	16.5	119	55
MS21402-16	WEE V-L 1,800	1,800	0.250	100	1.80	18.0	114	47
MS21402-17	WEE V-L 2,200	2,200	0.250	100	1.70	20.5	107	43
MS21402-18	WEE V-L 2,700	2,700	0.250	95	1.50	22.5	102	39
MS21402-19	WEE V-L 3,300	3,300	0.250	90	1.40	42.0	76	36
MS21402-20	WEE V-L 3,900	3,900	0.250	85	1.27	47.5	71	35
MS21402-21	WEE V-L 4,700	4,700	0.250	85	1.24	53.0	67	34
MS21402-22	WEE V-L 5,600	5,600	0.250	85	0.93	62.5	65	31
MS21402-23	WEE V-L 6,800	6,800	0.250	75	0.79	69.5	58	27
MS21402-24	WEE V-L 8,200	8,200	0.250	80	0.75	75.0	56	26
MS21402-25	WEE V-L 10,000	10,000	0.250	70	0.70	100.0	49	24
MS21402-26	WEE V-L 12,000	12,000	0.079	70	0.50	64	60	40
MS21402-27	WEE V-L 15,000	15,000	0.079	70	0.38	84	52	34
MS21402-28	WEE V-L 18,000	18,000	0.079	70	0.36	93	50	30
MS21402-29	WEE V-L 22,000	22,000	0.079	70	0.32	104	45	28
MS21402-30	WEE V-L 27,000	27,000	0.079	70	0.30	173	35	26
MS21402-31	WEE V-L 33,000	33,000	0.079	70	0.27	187	32	24
MS21402-32	WEE V-L 39,000	39,000	0.079	70	0.26	220	30	22
MS21402-33	WEE V-L 47,000	47,000	0.079	70	0.25	253	28	20
MS21402-34	WEE V-L 56,000	56,000	0.079	70	0.24	285	26	19
MS21402-35	WEE V-L 68,000	68,000	0.079	60	0.20	311	24	18
MS21402-36	WEE V-L 82,000	82,000	0.079	60	0.19	385	22	16
MS21402-37	WEE V-L 100,000	100,000	0.079	60	0.17	420	20	15

*For horizontal mounting use Nytronics mounting clip No. ACS-57 or order with prefix H (i.e. H WEE V-L 0.10).

†Tunable range ±5.0% on 0.10uH & 0.12uH.

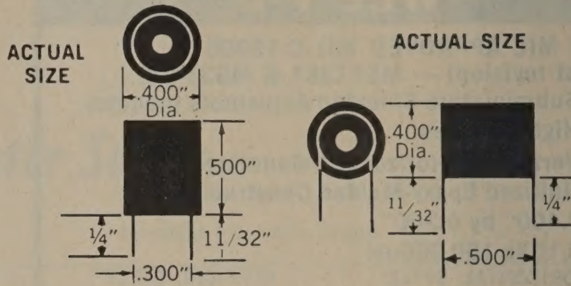
NOTE: Min. Q on MIL version not less than 80% of Q min. of commercial version.

Nytronics Components Group, Inc.
ORANGE STREET, DARLINGTON, S. C. 29532
(803) 393-5421 — TWX 810-665-2182

VARIABLE INDUCTORS

VIV-VIH

Miniature with inductance range of 0.10 to 4700uH in 29 values.
Encapsulated in epoxy resin for reliability.
Designed to meet MIL-C-15305 (latest revision).



Terminal Leads #22 (.025 ± .002) VCW

VERTICAL STYLE HORIZONTAL STYLE

The **VARIABLE INDUCTOR** offers high reliability and exceptional stability over extreme temperature variations. This small lightweight unit is furnished in vertical and horizontal styles to facilitate mounting on printed circuit boards. The unit is designed to meet the requirements of MIL-C-15305 (latest revision).

ELECTRICAL CHARACTERISTICS

Inductance Range:	0.33 to 4700uH Tunable Range ±20% 0.15 to 0.22uH Tunable Range ±15% 0.1 Tunable Range ±10% All measurements at 25°C on Q-Meter using miniature alligator clips mounted 1/32" from body. Q values ±20%
Self-Resonant Frequency:	Minimum f₀ to be not less than 80% of published data as measured with Grid-Dip Meter

DENSITY CHARACTERISTICS

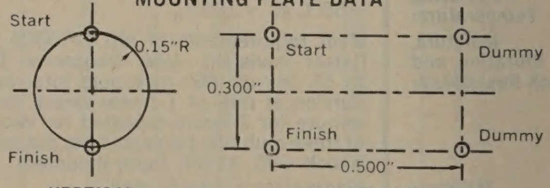
Volume:	0.063 cubic inches
Weight:	2.6 grams

PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS

Torque:	0.75 to 5.0 inch-ounces Use Nytronics Tuning Tool No. B-305 or equal.
Operating Temperature:	−55°C to +125°C
Terminal Strength:	Meets five pound pull tests.
Moisture, Vibration, and Shock Resistance:	Meets requirements of MIL-C-15305 (latest revision). Low frequency 10 cps to 55 cps @ .06" total excursion at rate of 1 linear sweep per minute for 2 hours repeated for each of 3 mutually perpendicular planes. Shock: 50G, 11ms.
Core Material:	Iron
Marking:	Manufacturer data printed.

NCG PART NOS.		L nom.	Q at L Nom.		Approx. SRF, L nom.	Max. DCR	Max. I
VIV	VIH	μH		MHz	MHz	Ω	mA
VIV-0.10	VIH-0.10	0.10	85	25.	>500.	0.02	3500
VIV-0.15	VIH-0.15	0.15	100	25.	>500.	0.035	2600
VIV-0.22	VIH-0.22	0.22	100	25.	>500.	0.04	2500
VIV-0.33	VIH-0.33	0.33	100	25.	334.	0.04	2500
VIV-0.47	VIH-0.47	0.47	100	25.	285.	0.05	2200
VIV-0.68	VIH-0.68	0.68	100	25.	237.	0.07	1850
VIV-1.00	VIH-1.00	1.00	90	25.	205.	0.13	1350
VIV-1.50	VIH-1.50	1.50	70	7.9	168.	0.24	1000
VIV-2.20	VIH-2.20	2.20	73	7.9	135.	0.30	890
VIV-3.30	VIH-3.30	3.30	80	7.9	112.	0.45	730
VIV-4.70	VIH-4.70	4.70	75	7.9	100.0	0.80	550
VIV-6.80	VIH-6.80	6.80	80	7.9	80.0	1.1	460
VIV-10.0	VIH-10.0	10.0	82	7.9	67.0	1.9	355
VIV-15.0	VIH-15.0	15.0	65	2.5	54.2	3.2	270
VIV-22.0	VIH-22.0	22.0	55	2.5	17.5	3.4	265
VIV-33.0	VIH-33.0	33.0	54	2.5	15.0	3.6	255
VIV-47.0	VIH-47.0	47.0	51	2.5	13.2	4.5	230
VIV-68.0	VIH-68.0	68.0	55	2.5	12.0	5.5	210
VIV-100	VIH-100	100.0	50	2.5	10.5	6.7	190
VIV-150	VIH-150	150.	50	.79	3.0	11.0	150
VIV-220	VIH-220	220.	50	.79	2.70	13.0	135
VIV-330	VIH-330	330.	48	.79	2.24	16.0	120
VIV-470	VIH-470	470.	45	.79	1.90	18.0	115
VIV-680	VIH-680	680.	42	.79	1.70	21.0	105
VIV-1000	VIH-1000	1000.	40	.79	1.40	38.0	80
VIV-1500	VIH-1500	1500.	40	.25	1.14	54.0	65
VIV-2200	VIH-2200	2200.	44	.25	0.96	66.0	60
VIV-3300	VIH-3300	3300.	46	.25	0.86	85.0	54
VIV-4700	VIH-4700	4700.	48	.25	0.76	99.0	49

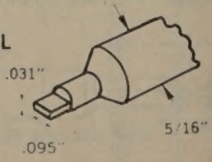
MOUNTING PLATE DATA



VERTICAL HORIZONTAL

TYPICAL ALIGNING TOOL

B-305



syntronic

SYNTRONIC INSTRUMENTS, INC.
100 Industrial Road, Addison, IL 60101
Phone (312) 543-6444

YOKE SELECTION GUIDE

When you have a project calling for the design of a new cathode ray tube (CRT) display system, the challenge is to find the right component parts.

This is when you can rely on deflection yokes and components from Syntronic Instruments. Your confidence in Syntronic Instruments can be based on many facts. Syntronic is a leader in accumulated experience, with many capabilities that are unique in the industry, and with a reputation for specialization in precision electromagnetic devices.

Factor into your decision the fact that key component parts of Syntronic deflection devices are products of in-house manufacturing capabilities. Rigid standards have been placed on all raw materials to assure uniformity and reliability. The design of our own specialized production fixtures is reflected in improved products, delivered on time, and as specified. During production, all deflection yokes are subjected to progressive testing. The precise requirements of our quality controls have called for the design and building of our own test instruments which are proprietary to Syntronic. From concept to the final product Syntronic stands ready to help you with your challenge.

On the following pages, fundamentals of deflection yokes and their relationship to cathode ray tubes are discussed. Also, you will find a simplified method for selecting a deflection yoke to meet the requirements of the display system you are designing.

PUTTING THE YOKE AND CRT TO WORK

CRT displays consist of three essentials:

1. The display format
2. The yoke/CRT unit
3. The deflection circuit

The display format incorporates the size, shape and general make-up of the data to be displayed. The format is fundamental to the system and is defined by the customer. All design objectives are directed toward satisfying the display format requirements.

The yoke/CRT combination must be considered a unit essential to the achievement of the user's display quality.

The deflection circuit to be chosen follows a tentative selection of the yoke/CRT combination and not the other way around. To start with existing electronics might at first appear to be good value engineering but this limits the choices available in yokes and CRT's which can cause the total system to be less than optimum. Most often, the final yoke/CRT unit and the final deflection circuit result from an iteration process having as its principal goal the achievement of a quality display.

GETTING THE BEST FROM YOUR CRT

Begin with a CRT that's applicable to the display objective. Generally, a deflection yoke has no effect on an undeflected beam. A quality Syntronic yoke preserves the initial undeflected spot integrity and optimizes display performance in those areas away from center—particularly near the screen periphery.

POINTERS

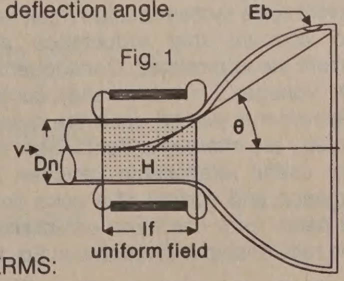
...From the viewpoint of brightness and resolution, operate the CRT with as high an anode and G2 voltage as is consistent with the CRT specifications.

...Deflection spot growth increases with beam current.

...With a greater deflection angle most factors, including spot elongation and defocusing, detract from the resolution.

...Geometric distortion increases with deflection angle.

Fig. 1



TERMS:

H = uniform magnetic field
Eb = beam acceleration in Kilovolts (anode voltage)
If = length of field H
θ = deflection angle
Dn = inside diameter of yoke coils
V = velocity of electron beam

DEFLECTION BASICS

Electron beam deflection is the result of the effect of transverse magnetic fields through which the beam passes in the yoke region on the way to the screen. As a result, an electron beam entering a magnetic field at a high velocity will follow a curved path. These magnetic fields are accomplished by passing current of the desired waveform though a coil or combination of coils surrounding the CRT neck near the funnel (See Fig. 1)

The sine of the deflection angle (theta, Θ, Fig. 1.) of the electron beam is proportional to magnetic field length and strength. Field strength is:

1. Proportional to the current flowing through the coil
2. Proportional to the number of turns of wire
3. Inversely proportional to yoke I.D.
4. A function of the kind of core material and structure

VITAL FACTORS THAT CONTROL YOKE SELECTION

Since the CRT deflection angle and neck diameter determine yoke length and I.D. it follows that the CRT sets the basic yoke form. The yoke can be modified to balance display resolution, geometry, and deflection current for a given coil inductance.

Within a particular yoke design, several essentials determine deflection current. These are:

1. Deflection angle. Deflection current is directly proportional to the sine of the deflection angle (theta, Θ , Fig. 1)
2. Anode voltage. Deflection current is directly proportional to the square root of the anode voltage.
3. Coil inductance. Deflection current is inversely proportional to the square root of inductance

ESTIMATING YOKE INDUCTANCE AND CURRENT

Estimating yoke inductance and current for a system design must take into account that inductance and current are interrelated. Consequently, the voltage (E = Ldi/dt) and current requirements placed upon the driving circuitry are interdependent. There is a very useful relationship between inductance and current of a yoke once the basic form has been established. This relationship is illustrated in Eq. 1.

$$\frac{LI^2}{2} = K \qquad \text{(Eq 1)}$$

where: L = yoke inductance in microhenrys
I = yoke current in amperes required to deflect a beam through an angle (theta Θ) with a specified anode voltage.
K = yoke energy constant in microjoules for deflection angle theta (Θ) at a given anode voltage

This basic energy equation permits a reasonable estimate of yoke inductance and current contingent upon the following identified parameters:

1. CRT neck O.D.
2. Maximum deflection angle
3. CRT Anode voltage
4. The angle corresponding to the half-axis of deflection
5. The time required to deflect through the angle defined in (4) above
6. The maximum applied or induced voltage across the yoke

With these factors known, the maximum allowable inductance can be computed using equation 2A for a linear driving circuit and 2B for a half sine wave flyback circuit.

$$L = \frac{E^2t^2}{2K} \quad \text{For linear deflection} \qquad \text{(Eq. 2A)}$$

$$L = \frac{2E^2t^2}{\pi^2 K} \quad \text{For resonant flyback deflection} \qquad \text{(Eq. 2B)}$$

where: L = maximum inductance in microhenrys
E = maximum voltage across the coil
t = time in microseconds for half-axis deflection angle
K = yoke energy constant in microjoules for the specified deflection angle and anode voltage

NOTE Equations 2A and 2B permit first-order approximations and are intended as a "starter" that shows the basic relationship between voltage, time, inductance and energy constant. The equations ignore circuit and yoke DC resistance.

Table 1 lists energy constants that can be used to estimate inductance and current requirements . These are rounded off and are valid only for yokes having a form factor established by a 70° maximum deflection angle and the listed neck sizes. The K factor is applicable only for a deflection of 20° at 10 KV.

IMPORTANT Significant variations in energy constants from those shown are possible depending upon individual design requirements related to geometry correction, resolution, sensitivity, length, and unique system requirements.

To convert these energy constants to an application other than 20° and 10 KV, use the following equation: (Eq. 3)

$$K(2) = K(1) \times \frac{\sin^2\theta \times E}{\sin^2 20° \times 10} \qquad \text{(Eq. 3)}$$

Where: K(2) = adjusted energy constant in microjoules
K(1) = average energy constant from table
θ = the applicable deflection angle
E = the applied anode voltage in kilovolts

Table of Energy Constants
(Table 1)

Approx. CRT Neck Dia.	Jedec Gauge	Average Energy Constant in Microjoules
22mm (7/8")	123, 128 141, 152	150
29mm (1 1/8")	126, 160	200
38mm (1 1/2")	110, 112 116, 162	250

EXAMPLE CALCULATION OF YOKE INDUCTANCE AND CURRENT:

(Assume a linear driven system)

Given:
1. CRT neck diameter = 22mm
2. Maximum CRT deflection angle = 70° (± 35°)
3. Deflection angle through which maximum rate of change occurs = 28°
4. Anode voltage = 20 KV
5. Time required for 28° change in beam position = 15 microseconds
6. Maximum voltage across the yoke = 50

Let's say that based upon these parameters, the yoke energy constant is 565 microjoules for 28° and 20 KV extrapolated from the table by use of Eq. 3. Yoke inductance can then be estimated using the following equation (2A):

$$L = \frac{(50)^2(15)^2}{(2)(565)} = 498 \text{ microhenrys (For linear driven system)}$$

With inductance computed as described, the current required to deflect 28° at 20 KV is ascertained by applying the basic energy equation (Eq. 1) and solving for I.

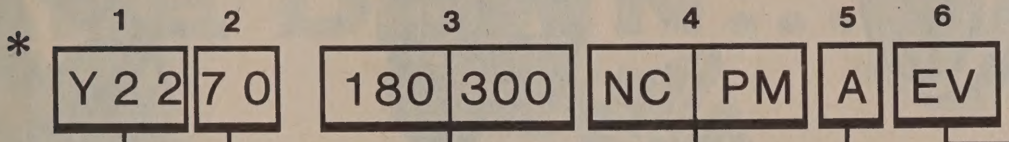
For Example:

Allowing for a manufacturing tolerance of 10% for inductance, let's choose 453 microhenrys as nominal for this calculation.

$$I = \sqrt{\frac{2K}{L}} = \sqrt{\frac{2 \times 565}{453}} = 1.58 \text{ amperes}$$

Now that yoke inductance can be estimated via the simplified method just described, there is an easy step to specifying a yoke "by the numbers" as explained in Chart 1.

HOW TO DESIGNATE A SYNTRONIC DEFLECTION YOKE BY THE NUMBERS



1. Indicate I. D. Series.
   Y22 = 22mm (Jedec gauges 123, 128, 141, 152)
   Y29 = 29mm (Jedec gauges 126, 160)
   Y38 = 38mm (Jedec gauges 110, 112, 116, 162)

2. Indicate the maximum CRT deflection angle.

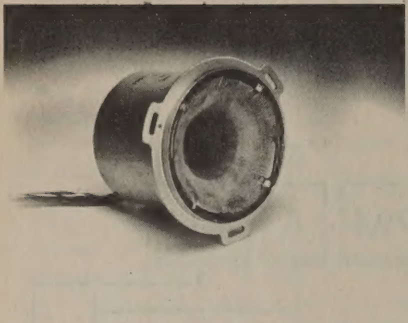
3. Indicate the Horiz (X) and Vert (Y) inductance in microhenrys respectively.

4. Specify basic accessories for pincushion correction and beam centering in that order, for integration with the yoke.
   NC = No correction
   PM = Permanent Magnet Correction
   EM = Electromagnetic Correction

5. Specify yoke resolution class.
   A = Best possible. Optimized.
   B = Excellent resolution. Best balance between sensitivity and resolution. Ideal for top quality displays.
   C = Good resolution. Commercial quality.

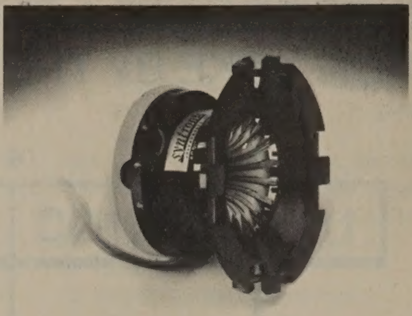
6. Designate basic yoke construction.
   EV = Environmental type. Encapsulated. Immune to environmental factors including altitude, heat, humidity, fungus, shock, vibration. Typical of military applications. Airborne, shipboard, etc.
   IC = Industrial/Commercial = Closed construction. High quality. For most quality applications.
   EC = Economy. Open construction. Good quality. TV monitors, lower cost alphanumeric displays. Medical waveforms.

*Coded yoke description--not a part number.



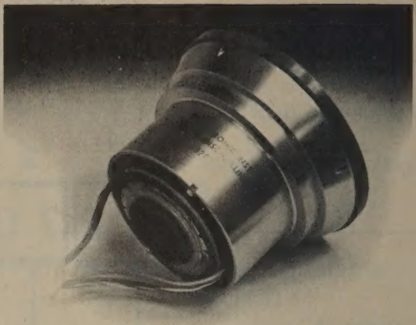
MILITARY/AIRBORNE/SHIPBOARD YOKES

Compact, lightweight, ruggedized yokes designed to withstand the rigors of environmental stresses. Typical applications include TV raster scans, HUD, HDD, alphanumeric, cockpit displays, as well as military ground support and shipboard displays.



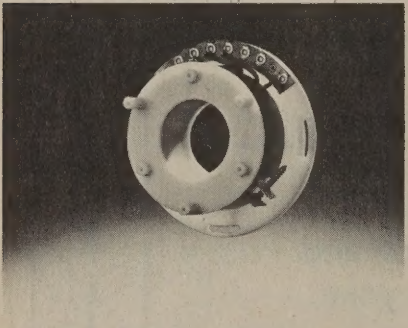
COMMERCIAL YOKES

Extensively tooled for volume production reflecting excellent cost effectiveness. Ideal for all variations of CRT terminals including alphanumeric computer output displays, medical waveform, and video. Can be supplied with built-in geometry correction and beam centering provisions.



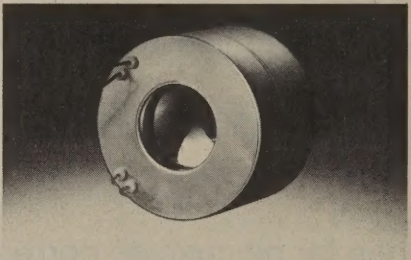
SPECIAL YOKES

Designed to solve unusual problems in unique displays such as phototypesetting, random graphics, vectors, line scan, monochrome or color projection, simulators, and applications demanding accurate beam positioning, superior focus, and zero astigmatism.



Y3802 YOKE
CHARACTER WRITING

Stator Ferrite Core. High frequency yoke provides effective way to produce display characters and symbols independent of main yoke. Mounts directly behind Y38 series of yokes. Low inductances as required.

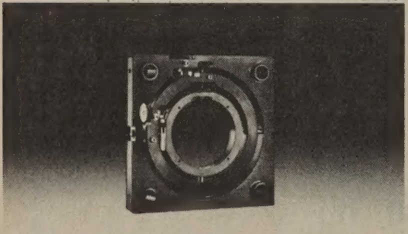


F50/55 FOCUS COILS

Static/Dynamic shielded units designed for electromagnetically focused precision displays where high resolution is required anywhere on the screen. Fits 38 mm (1½″) neck diameter CRT's.

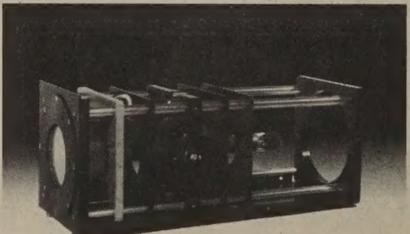
VIDICON

Complete package for ⅔″ Vidicon - Plumbicon. Front or rear loading. Printed circuit deflection coils. Self contained focus and alignment coils . . . also full line of 1″ Vidicon Yokes available.



MODEL D7450/D7675 MICROPOSITIONER COIL/LENS ALIGNER

For yokes and coils. Minimum backlash; fine adjustment of pitch, yaw, horizontal and vertical translation. Positive lock for each function without interaction.
D7450 for 3.5″ O.D. Coils
D7675 for 4.0″ O.D. Coils



CRT MOUNTS

Made for any size CRT. Fitted with micropositioner and magnetic shielding—rugged mount for bench or mobile applications.

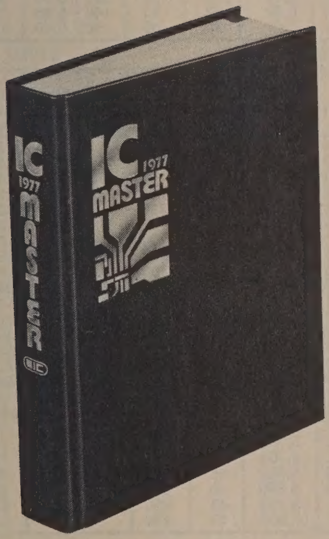
It is impractical to attempt to catalog the variety of deflection yokes Syntronic Instruments, Inc., has designed and produced to satisfy thousands of unique specifications. The three yokes illustrated are symbolic of the basic forms in common use. Any yoke can be tailored to match specific objectives such as resolution, sensitivity, geometry, etc. and can be supplied in any inductance, single ended or push-pull.

PM and EM accessories available for Beam Centering, Pincushion Correction, Astigmatism Correction, to fit basic CRT neck diameters.

SYNTRONIC INSTRUMENTS, INC.
100 Industrial Road
Addison, IL 60101
Phone (312) 543-6444

WHEN THE CHIPS ARE DOWN...

THE NEW 1977 IC MASTER PAYS OFF!



The new IC MASTER is the ultimate IC source book.

It lists virtually every IC device manufactured in the United States.

The IC MASTER is the easy, sensible means of narrowing down your IC choices quickly, accurately and systematically. All information is cross-referenced and indexed for rapid problem solving and device selection. And, additionally, the MASTER is updated three times yearly by accumulative supplements.

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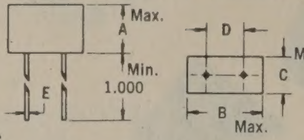
MINI-L ENCAPSULATED R.F. INDUCTORS — TA, TF, TB & TD SERIES



DIMENSIONS

Series	A	B	C	D	E	Max. Power
TA	.225	.210	.110	.100	.020	0.2 Watt
TB	.300	.280	.160	.200	.025	0.33 Watt
TD	.390	.390	.197	.200	.025	0.5 Watt
TF	.225	.210	.110	.100	.020	0.2 Watt

TA SERIES

- MIN. "Q": 60 to 70.
- INDUCTANCE RANGE: .1 uh to 10 uh.
- FREQUENCY RANGE: 1 to 50 MHz.
- INDUCTANCE TOLERANCES: Less than 1.0 uh, ±10%. Greater than or equal to 1.0 uh, ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: +50 PPM/°C maximum.
- MAXIMUM POWER DISSIPATION: 0.2 watt.

TF SERIES

- MIN. "Q": 60 to 80.
- FREQUENCY RANGE: 20 to 300 MHz.
- INDUCTANCE RANGE: .01 to 1 uh.
- INDUCTANCE TOLERANCES: Less than 0.1 uh, ±20%. Greater than or equal to 0.1 uh, ±10%. Closer tolerances available by special request.
- INDUCTANCE TC: +200 PPM/°C maximum.
- MAXIMUM POWER DISSIPATION: 0.2 watt.

TD SERIES

- MIN. "Q": 40 to 80.
- INDUCTANCE RANGE: 100 to 10,000 uh.
- RECOMMENDED FREQUENCY RANGE: 50 kHz to 10 MHz.
- INDUCTANCE TOLERANCE: ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: From +60 PPM/°C, maximum to +300 PPM/°C maximum, depending upon inductance value.
- MAXIMUM POWER DISSIPATION: .50 watt.

TB SERIES

- MIN. "Q": 50 to 80.
- RECOMMENDED FREQUENCY RANGE: 50 kHz to 35 MHz.
- INDUCTANCE RANGE: 10 to 1,000 uh.
- INDUCTANCE TOLERANCE: ±5%. Closer tolerances available by special request.
- INDUCTANCE TC: From +60 PPM/°C maximum to +300 PPM/°C maximum, depending upon inductance value.
- MAXIMUM POWER DISSIPATION: .33 watt.

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-C-15305, GRADE 1, CLASS B (−55°C to +125°C). +125°C).
- DIELECTRIC WITHSTANDING VOLTAGE: 700 volts rms.

TA SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TA- 1	0.10	60	25	450	0.04	2230
TA- 2	0.12	60	25	410	0.05	2000
TA- 3	0.15	65	25	350	0.06	1825
TA- 4	0.18	65	25	325	0.07	1675
TA- 5	0.22	65	25	300	0.08	1550
TA- 6	0.27	65	25	280	0.09	1475
TA- 7	0.33	65	25	260	0.10	1400
TA- 8	0.39	70	25	240	0.11	1325
TA- 9	0.47	70	25	220	0.15	1125
TA-10	0.56	70	25	200	0.20	1000
TA-11	0.68	70	25	180	0.25	900
TA-12	0.82	70	25	165	0.30	810
TA-13	1.0	70	25	150	0.35	750
TA-14	1.2	65	7.9	130	0.25	875
TA-15	1.5	65	7.9	120	0.30	800
TA-16	1.8	65	7.9	110	0.50	600
TA-17	2.2	65	7.9	100	0.75	500
TA-18	2.7	65	7.9	90	0.90	450
TA-19	3.3	65	7.9	70	1.0	425
TA-20	3.9	65	7.9	60	1.2	400
TA-21	4.7	60	7.9	50	1.5	350
TA-22	5.6	60	7.9	45	1.7	325
TA-23	6.8	60	7.9	40	2.0	300
TA-24	8.2	60	7.9	37	2.4	290
TA-25	10.0	60	7.9	35	2.6	280

TB SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TB- 1	10	75	2.5	35	1.1	550
TB- 2	12	75	2.5	31	1.3	500
TB- 3	15	75	2.5	27	1.5	460
TB- 4	18	80	2.5	25	1.9	410
TB- 5	22	80	2.5	22	2.2	380
TB- 6	27	80	2.5	20	2.6	350
TB- 7	33	80	2.5	18	3.3	320
TB- 8	39	80	2.5	16	3.8	290
TB- 9	47	80	2.5	14	4.6	260
TB-10	56	80	2.5	12	5.6	240
TB-11	68	80	2.5	11	6.7	220
TB-12	82	80	2.5	10	8.1	200
TB-13	100	80	2.5	9.1	9.6	180
TB-14	120	50	0.79	8.2	10.0	175
TB-15	150	50	0.79	7.5	11.0	160
TB-16	180	50	0.19	6.5	12.0	155
TB-17	220	50	0.79	5.6	13.0	150
TB-18	270	55	0.79	5.0	17.0	125
TB-19	330	55	0.79	4.5	19.0	130
TB-20	390	55	0.79	4.0	21.0	120
TB-21	470	55	0.79	3.5	22.0	115
TB-22	560	55	0.79	3.0	24.0	110
TB-23	680	55	0.79	2.8	19.0	130
TB-24	820	50	0.79	2.5	23.0	120
TB-25	1,000	50	0.79	2.5	26.0	110

All Items Available in Distributor Stock

- RATED TEMPERATURE RISE: 35°C at an ambient temperature of 90°C.
- LEADS: Tinned Copper. Weldable leads available by special order.

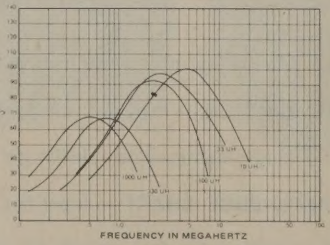
TF SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TF- 1	0.01	60	150	1000	0.02	3100
TF- 2	0.012	60	150	1000	0.02	3100
TF- 3	0.015	60	150	1000	0.02	3100
TF- 4	0.018	60	150	1000	0.02	3100
TF- 5	0.022	60	100	900	0.02	3100
TF- 6	0.027	60	100	800	0.02	3100
TF- 7	0.033	60	100	750	0.02	3100
TF- 8	0.039	60	100	700	0.02	3100
TF- 9	0.047	60	100	650	0.02	3100
TF-10	0.056	60	100	600	0.02	3100
TF-11	0.068	60	100	550	0.03	2500
TF-12	0.082	60	100	500	0.03	2500
TF-13	0.10	80	50	450	0.04	2200
TF-14	0.12	80	50	400	0.05	2000
TF-15	0.15	80	50	350	0.06	1800
TF-16	0.18	80	50	320	0.07	1650
TF-17	0.22	80	50	300	0.08	1500
TF-18	0.27	80	50	280	0.10	1400
TF-19	0.33	80	50	260	0.12	1300
TF-20	0.39	80	50	240	0.15	1150
TF-21	0.47	80	50	220	0.20	1000
TF-22	0.56	70	50	200	0.25	900
TF-23	0.68	70	50	180	0.30	800
TF-24	0.82	70	50	160	0.35	750
TF-25	1.0	70	50	150	0.40	700

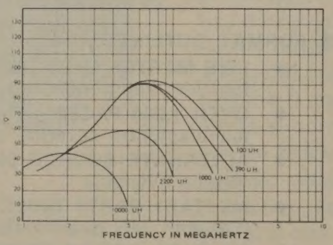
TD SERIES

Part No.	Apparent Inductance (uh)	Min. "Q"	Test Freq. (MHz)	Min. SRF (MHz)	Max. DCR (ohms)	DC Curr. (ma)
TD- 1	100	75	790	8.4	6	280
TD- 2	120	75	790	7.5	7	260
TD- 3	150	75	790	6.8	8	240
TD- 4	180	75	790	6.1	10	220
TD- 5	220	80	790	5.4	12	200
TD- 6	270	80	790	4.7	14	180
TD- 7	330	80	790	4.2	17	165
TD- 8	390	80	790	3.8	20	150
TD- 9	470	75	790	3.4	24	140
TD-10	560	75	790	3.1	28	130
TD-11	680	75	790	2.8	33	120
TD-12	820	75	790	2.5	40	110
TD-13	1,000	75	790	2.2	46	100
TD-14	1,200	45	250	1.9	30	120
TD-15	1,500	45	250	1.6	35	110
TD-16	1,800	50	250	1.4	40	105
TD-17	2,200	50	250	1.3	50	95
TD-18	2.700	50	250	1.2	60	85
TD-19	3,300	50	250	1.1	70	80
TD-20	3,900	50	250	1.0	80	75
TD-21	4,700	50	250	.9	90	70
TD-22	5,600	45	250	.8	100	65
TD-23	6,800	40	250	.7	140	60
TD-24	8,200	40	250	.6	160	55
TD-25	10,000	40	250	.6	175	50

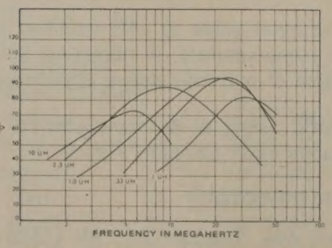
TB TYPICAL "Q" VS FREQUENCY



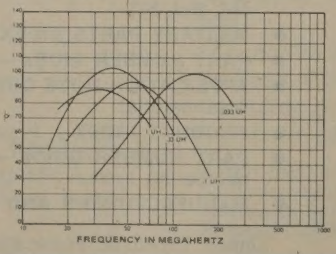
TD TYPICAL "Q" VS FREQUENCY



TA TYPICAL "Q" VS FREQUENCY



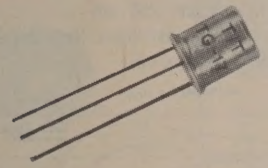
TF TYPICAL "Q" VS FREQUENCY

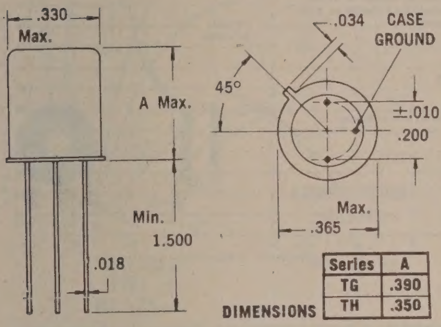


TOROTEL INC.

13402 SOUTH 71 HIGHWAY, GRANDVIEW, MO. 64030
PHONE: (816) 761-6314 TWX 910-777-7037

MINI-L HERMETICALLY SEALED R.F. INDUCTORS — TG, TH SERIES





Series	A
TG	.390
TH	.350

TG SERIES

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-T-27, GRADE 4, CLASS S.
- FREQUENCY RANGE: 10 to 500 kHz.
- INDUCTANCE RANGE: 1 to 500 mH.
- INDUCTANCE TOLERANCES: ±5%.
- INDUCTANCE STABILITY: ±2% (−20°C to +85°C.)

TH SERIES

- DESIGNED TO MEET THE REQUIREMENTS OF MIL-C-150305, GRADE 1, CLASS 0.
- FREQUENCY RANGE: 100 kHz to 10 MHz.
- INDUCTANCE RANGE: 10 uH to 1000 uH.
- INDUCTANCE TOLERANCES: 10 uH through 33 uH ±10%, 39 uH through 130 uH ±5%, greater than and including 150 uH ±3%.
- INDUCTANCE STABILITY: ±2% (−20°C to +85°C.)

TG SERIES

- HERMETICALLY SEALED, HIGH "Q" INDUCTOR IN A T0-5 TRANSISTOR CONFIGURATION.
- LOW EXTERNAL MAGNETIC AND ELECTROSTATIC FIELD.

Part No.	Inductance (mH)	Inductance Test Freq. (kHz)	"Q" Min.	"Q" Test Freq. (kHz)	DCR Max. (ohms)	Min. SRF (MHz)	DC Curr. (ma)
*TG- 1	1.0	10	120	200	3.3	1500	123
TG- 2	1.2	10	120	200	3.6	1300	118
*TG- 3	1.5	10	120	200	4.8	1160	102
TG- 4	1.75	10	120	200	5.2	1080	98
*TG- 5	2.0	10	120	200	5.7	1000	94
TG- 6	2.4	10	120	200	7.9	920	80
*TG- 7	3.0	10	120	150	8.9	820	75
TG- 8	3.6	10	120	150	9.8	730	71
TG- 9	4.3	10	120	150	13.7	660	60
*TG-10	5.0	10	120	150	14.7	600	58
TG-11	6.0	10	120	150	20.0	540	50
TG-12	7.2	10	120	100	21.8	480	48
*TG-13	8.6	10	100	100	24.0	430	45
*TG-14	10.0	10	100	100	32.4	400	39
TG-15	12.0	10	100	100	34.8	360	38
*TG-16	15.0	10	100	100	39.1	320	36
TG-17	17.5	10	85	70	55.0	300	30
*TG-18	20.0	10	85	70	60.0	280	29
TG-19	24.0	10	85	70	64.7	250	28
*TG-20	30.0	10	85	70	86.3	220	24
TG-21	36.0	10	85	70	95.8	195	23
*TG-22	43.0	10	85	70	132	185	19
*TG-23	50.0	10	85	70	143	165	18
*TG-24	60.0	10	75	50	155	145	18
TG-25	72.0	10	75	50	172	130	17
TG-26	86.0	10	75	50	233	125	15
*TG-27	100	10	75	50	252	115	14
TG-28	120	5	75	50	290	105	13
*TG-29	150	5	50	40	323	95	13
TG-30	175	5	50	40	350	85	12
*TG-31	200	5	50	40	477	80	10
TG-32	240	5	50	40	693	71	10
*TG-33	300	5	50	40	735	63	8
*TG-34	360	5	30	30	1005	57	7
TG-35	430	5	30	30	1100	51	6.5
*TG-36	500	5	30	20	1200	48	6.5

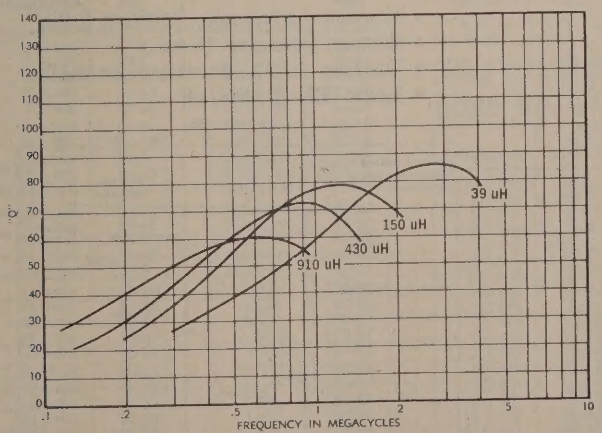
* Distributor Item

TH SERIES

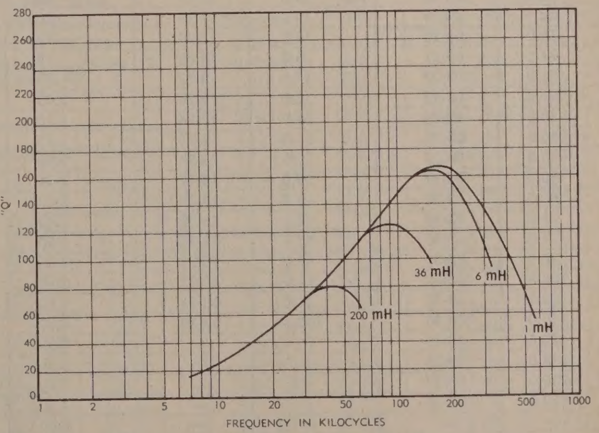
- AMBIENT TEMPERATURE RANGE: −55°C to +130°C.
- DIELECTRIC WITHSTANDING VOLTAGE: 100 volts rms.
- INSULATION RESISTANCE: 10,000 meg. ohms Min.

	Inductance (uH)	Inductance Test Freq. (kHz)	"Q" Min.	"Q" Test Freq. (kHz)	DCR Max. (ohms)	Min. SRF (MHz)	DC Curr. (ma)
TH- 7	10	1000	75	2500	2.4	35.0	102
TH- 8	12	1000	75	2500	2.5	30.0	100
TH- 9	15	1000	75	2500	2.6	25.0	98
TH-10	18	1000	75	2500	2.7	23.0	96
*TH-11	22	1000	75	2500	2.8	20.0	94
TH-12	27	1000	75	2500	2.9	17.0	93
TH-13	33	1000	75	2500	3.0	14.0	91
*TH-14	39	500	70	2500	3.1	11.0	90
TH-15	47	500	70	2500	3.2	10.0	88
*TH-16	56	500	70	2500	3.3	9.5	87
TH-17	68	500	70	2500	3.4	9.0	85
TH-18	82	500	70	2500	4.5	8.0	74
*TH-19	100	500	70	1500	5.1	7.5	70
TH-20	110	500	70	1500	6.0	7.0	64
*TH-21	120	500	70	1500	6.2	6.5	63
TH-22	130	500	70	1500	6.4	6.0	62
*TH-23	150	500	70	1500	6.6	5.5	61
TH-24	160	500	60	790	8.6	5.3	54
TH-25	180	500	60	790	9.0	5.0	52
*TH-26	200	500	60	790	9.5	4.5	51
TH-27	220	250	60	790	10.0	4.0	50
*TH-28	240	250	60	790	10.6	3.8	48
TH-29	270	250	60	790	11.2	3.6	48
*TH-30	300	250	60	790	14.2	3.4	42
TH-31	330	250	60	790	14.6	3.2	41
*TH-32	360	250	60	790	15.0	3.0	41
TH-33	390	250	60	790	15.6	2.9	40
TH-34	430	250	60	790	16.4	2.8	39
TH-35	470	250	60	790	20.4	2.7	35
*TH-36	510	250	60	790	21.8	2.6	34
TH-37	560	250	60	790	23.6	2.5	32
TH-38	620	250	60	790	24.6	2.3	32
*TH-39	680	250	50	790	25.8	2.1	31
TH-40	750	250	50	790	26.8	1.9	31
TH-41	820	250	50	790	38.4	1.7	25
TH-42	910	250	50	790	40.8	1.5	24
TH-43	1000	250	50	790	42.6	1.4	24

TH TYPICAL "Q" VS FREQUENCY



TG TYPICAL "Q" VS FREQUENCY



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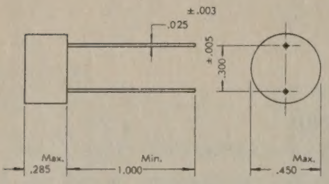
MINIATURE

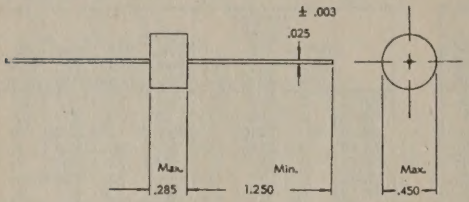
When ordering add the prefix **P, PA** or **M** to the part number for the case type desired.

T/T
1403-1
1.0 MH



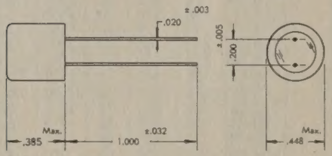
TYPE P

Epoxy Encapsulated
MIL-T-27C, Grade 5, Class 5



TYPE PA

Axial Leads
Epoxy Encapsulated



TYPE M

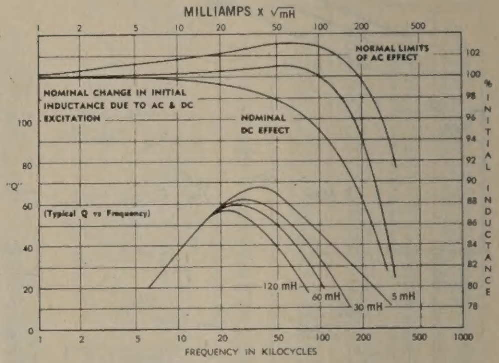
Metal Cased
MIL-T-27C, Grade 4, Class R

CORE NO. 03		CORE NO. 13		CORE NO. 29	
Inductance (mH)	Part Number	Inductance (mH)	Part Number	Inductance (mH)	Part Number
1.0	*03-1	.50	*13-1	.05	29-1
1.25	03-2	.60	13-2	.06	29-2
1.5	03-3	.72	13-3	.072	29-3
1.75	03-4	.86	13-4	.075	29-4
2.0	*03-5	1.0	*13-5	.086	29-5
2.4	*03-6	1.25	13-6	.100	*29-6
2.5	03-7	1.5	13-7	.120	29-7
3.0	*03-8	1.75	13-8	.125	29-8
3.6	03-9	2.0	*13-9	.150	29-9
4.3	03-10	2.4	13-10	.175	29-10
5.0	*03-11	2.5	13-11	.200	*29-11
6.0	03-12	3.0	*13-12	.240	29-12
7.2	03-13	3.6	13-13	.250	29-13
7.5	03-14	4.3	13-14	.300	*29-14
8.0	03-15	5.0	*13-15	.360	29-15
8.6	03-16	6.0	13-16	.400	29-16
10.0	*03-17	7.2	13-17	.430	29-17
12.0	03-18	8.6	13-18	.500	*29-18
12.5	03-19	10.0	*13-19	.600	29-19
15.0	03-20	12.0	13-20	.720	20-20
17.5	03-21	15.0	13-21	.750	29-21
20.0	*03-22	17.5	13-22	.860	29-22
24.0	03-23	20.0	*13-23	1.00	*29-23
30.0	03-24	24.0	13-24	1.20	29-24
36.0	03-25	25.0	13-25	1.25	29-25
43.0	03-26	30.0	13-26	1.50	29-26
50.0	*03-27	36.0	13-27	1.75	29-27
60.0	03-28	40.0	13-28	2.00	*29-28
72.0	03-29	43.0	13-29	2.40	29-29
75.0	03-30	50.0	*13-30	2.50	29-30
86.0	03-31	60.0	13-31	3.00	*29-31
100.0	*03-32	72.0	13-32	3.60	29-32
120.0	03-33	86.0	13-33	4.00	29-33
150.0	*03-34	100.0	13-34	4.30	29-34
175.0	03-35	—	—	5.00	*29-35
178.0	03-36	—	—	6.00	29-36
200.0	*03-37	—	—	7.20	29-37
250.0	03-38	—	—	7.50	29-38
—	—	—	—	8.60	29-39
—	—	—	—	10.0	29-40

* Distributor Item P Series Only

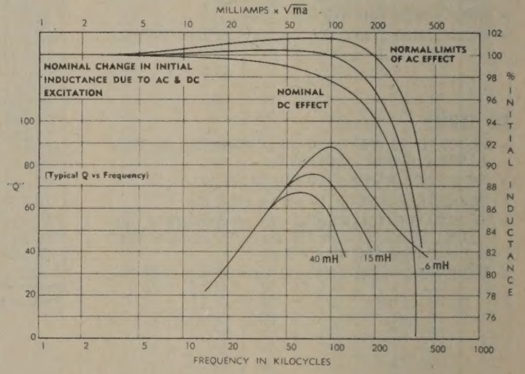
CORE NO. 03

- Recommended Frequency: Up to 50 kHz
- Maximum Inductance: 250 mH
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Typical DCR: 1.5 ohms/mH



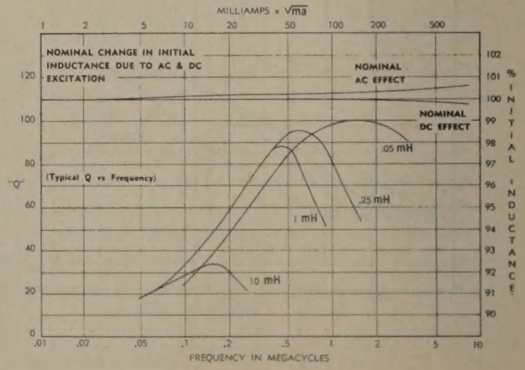
CORE NO. 13

- Recommended Frequency: 10 kHz to 200 kHz
- Maximum Inductance: 100 mH
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Typical DCR: 3 ohms/mH



CORE NO. 29

- Recommended Frequency: 50 kHz to 5 MHz
- Maximum Inductance: 15 mH
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Typical DCR: 20 ohms/mH



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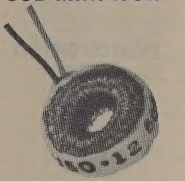
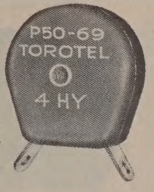
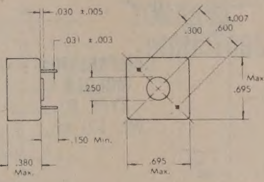
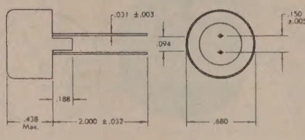
SUB-MINIATURE



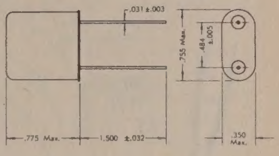

P50-69
TOROTEL
4 HY


.030 ±.005
.031 ±.003
.300
.600
±.007
.250
Max.
.695
.150 Min.
.380 Max.
.695 Max.

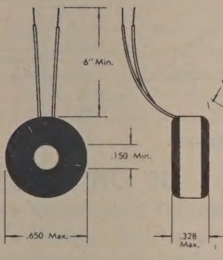
PRINTED CIRCUIT
TYPE S
Wt. .35 oz.


.031 ±.003
.094
.150 ±.005
.188
.438 Max.
2.000 ±.032
.680

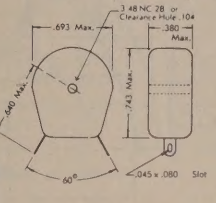
METAL CASED
TYPE M
Wt. .45 oz


.031 ±.003
.755 Max.
.484 ±.005
.775 Max.
1.500 ±.032
.350 Max.

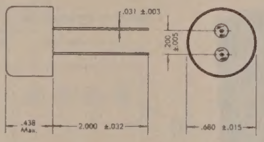
METAL CASED
TYPE MC
Wt. .45 oz


6" Min.
.150 Min.
.650 Max.
.328 Max.

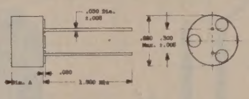
UNCASED
TYPE U
Wt. .25 oz.


3 48 NC 28 or Clearance Hole .104
.693 Max.
.380 Max.
.640 Max.
.743 Max.
60°
.045 x .080 Slot

COMPRESSION MOLDED
TYPE P
Wt. .35 oz.

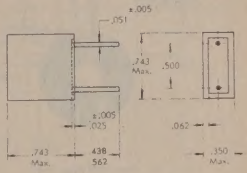

.031 ±.003
.200 ±.005
.438 Max.
2.000 ±.032
.680 ±.015

METAL CASED-GRID SPACING
TYPE MG
Wt. .45 oz


.030 Dia. ±.008
.080
.300 ±.008
Dim. A
1.500 Min.

Style	Dim. A
PS	.435
PST	.390

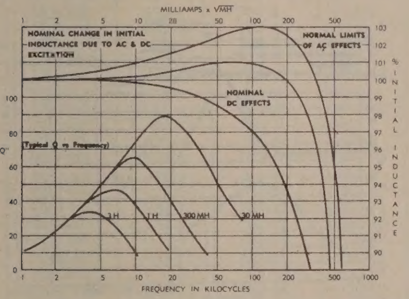
PRINTED CIRCUIT
TYPE PS & PST
Wt. .35 oz.


±.005
.051
.743 Max.
.500
±.005
.025
.062
.743 Max.
438
562
.350 Max.

PRINTED CIRCUIT
TYPE PC
Wt. .35 oz.

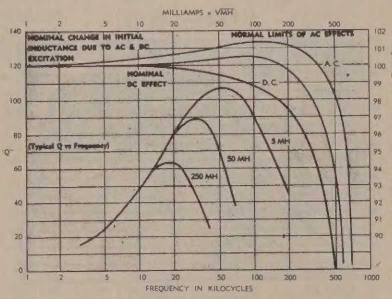
CORE NO. 50

- Recommended Frequency: Up to 20 kHz
- Maximum Inductance: 4.5 H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Stabilization Available: D, L, M, W
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 536 ohms/H



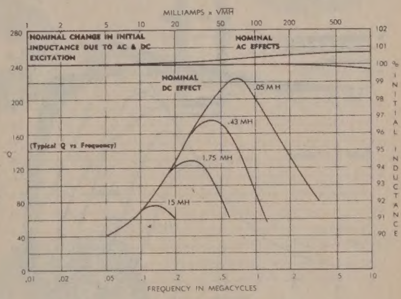
CORE NO. 51

- Recommended Frequency: 10 kHz to 100 kHz
- Maximum Inductance: 1 H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Stabilization Available: D, M, W
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 1.2 ohm/mH



CORE NO. 53

- Recommended Frequency: 50 kHz to 8 MHz
- Maximum Inductance: 20 mH
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Only Core Stabilization Available: H
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 10.1 ohm/mH



STANDARD INDUCTANCE VALUES

CORE NO. 50

Inductance	Part Number	Inductance	Part Number
1.0 mH	50-1	125.0 mH	50-15
2.5 mH	50-2	150.0 mH	50-16
5.0 mH	*50-3	175.0 mH	50-53
6.0 mH	50-40	200.0 mH	*50-17
7.2 mH	50-41	240.0 mH	50-54
7.5 mH	50-4	250.0 mH	50-52
8.6 mH	50-42	300.0 mH	50-18
10.0 mH	*50-5	360.0 mH	50-55
12.0 mH	50-43	400.0 mH	50-19
12.5 mH	50-6	430.0 mH	50-56
15.0 mH	50-7	500.0 mH	*50-20
17.5 mH	50-44	600.0 mH	50-57
20.0 mH	*50-8	720.0 mH	50-58
24.0 mH	50-45	750.0 mH	50-21
25.0 mH	50-9	860.0 mH	50-59
30.0 mH	*50-10	1.0 H	*50-22
36.0 mH	50-46	1.2 H	50-60
40.0 mH	50-11	1.5 H	50-62
43.0 mH	50-47	1.25 H	50-61
50.0 mH	*50-12	1.75 H	50-63
60.0 mH	50-48	2.0 H	*50-64
72.0 mH	50-49	2.4 H	50-67
75.0 mH	50-13	2.5 H	50-66
86.0 mH	50-50	3.0 H	50-65
100.0 mH	*50-14	3.6 H	50-68
120.0 mH	50-51	4.0 H	50-69

U—Uncased	**MG**—Metal Cased-Grid Spacing
P—Compression Molded†	**MC**—Metal Cased
S—Printed Circuit	**PS, PST**—Printed Circuit
M—Metal Cased	**PC**—Printed Circuit

When ordering add case prefix to part number for package type desired. (Example MC-53-43)

CORE NO. 51

Inductance	Part Number	Inductance	Part Number
1.0 mH	51-1	24.0 mH	51-19
1.2 mH	51-2	30.0 mH	51-20
1.5 mH	51-3	36.0 mH	51-21
1.75 mH	51-4	43.0 mH	51-22
2.0 mH	*51-5	50.0 mH	*51-23
2.4 mH	51-6	60.0 mH	51-24
3.0 mH	51-7	72.0 mH	51-25
3.6 mH	51-8	86.0 mH	51-26
4.3 mH	51-9	100.0 mH	*51-27
5.0 mH	*51-10	120.0 mH	51-28
6.0 mH	51-11	150.0 mH	51-29
7.2 mH	51-12	175.0 mH	51-30
8.6 mH	51-13	200.0 mH	*51-31
10.0 mH	*51-14	240.0 mH	51-32
12.0 mH	51-15	300.0 mH	51-33
15.0 mH	51-16	360.0 mH	51-34
17.5 mH	51-17	430.0 mH	51-35
20.0 mH	*51-18	500.0 mH	*51-36

CORE NO. 53

Inductance	Part Number	Inductance	Part Number
0.05 mH	53-1	1.0 mH	*53-23
0.06 mH	53-2	1.2 mH	53-24
0.072 mH	53-3	1.25 mH	53-25
0.075 mH	53-4	1.5 mH	53-26
0.086 mH	53-5	1.75 mH	53-27
0.10 mH	*53-6	2.0 mH	*53-28
0.12 mH	53-7	2.4 mH	53-29
0.125 mH	53-8	2.5 mH	53-30
0.15 mH	53-9	3.0 mH	*53-31
0.175 mH	53-10	3.6 mH	53-32
0.20 mH	53-11	4.0 mH	53-33
0.24 mH	53-12	4.3 mH	53-34
0.25 mH	53-13	5.0 mH	*53-35
0.30 mH	*53-14	6.0 mH	53-36
0.36 mH	53-15	7.2 mH	53-37
0.40 mH	53-16	7.5 mH	53-38
0.43 mH	53-17	8.6 mH	53-39
0.50 mH	*53-18	10.0 mH	*53-40
0.60 mH	53-19	12.0 mH	53-41
0.72 mH	53-20	12.5 mH	53-42
0.75 mH	53-21	15.0 mH	53-43
0.86 mH	53-22		

† Add "C" to part number of molded inductor if clearance hole is desired. * Distributor Item P Series Only.

TOROTEL INC.

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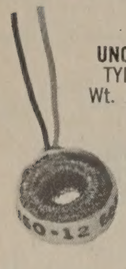
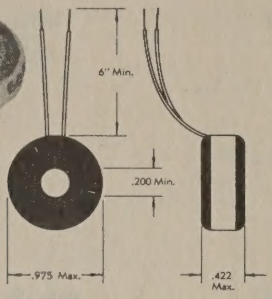
PHONE: (816) 761-6314 TWX 910-777-7037

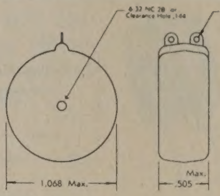
TOROIDAL INDUCTORS



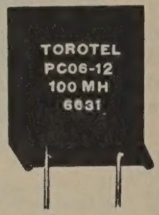
UNCASED
TYPE U
Wt. .55 oz.



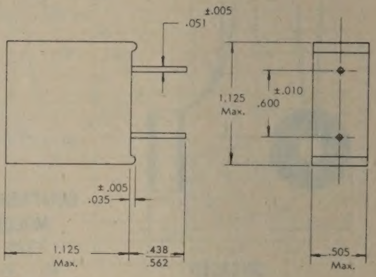
TOROTEL P48-4C
3.6 MH
9161



COMPRESSION MOLDED
TYPE P
Wt. 1.0 oz.

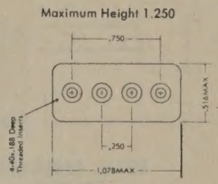


PRINTED CIRCUIT
TYPE PC



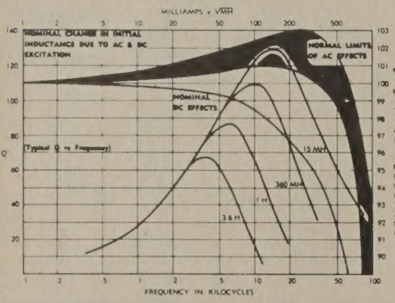
METAL CASED
TYPE M
Wt. 1.5 oz.

TOROTEL
M48-1
2 MH
11/64



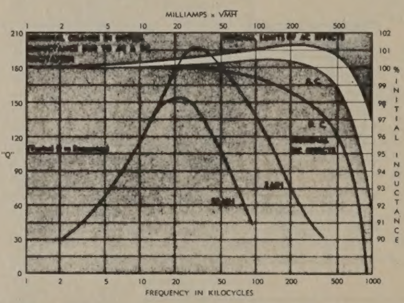
CORE NO. 06

- Recommended Frequency: Up to 20 kHz
- Maximum Inductance: 7.2H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Stabilization Available: B, D, E, G, L, M, W
- Studs are available on the "M" Series on special request
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 2.0 ohms/H



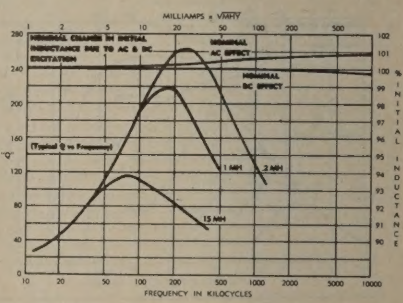
CORE NO. 48

- Recommended Frequency: Up to 100 kHz
- Maximum Inductance: 1 H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Stabilization Available: B, D, E, M, W
- Studs are available on the "M" Series on special request
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 420 ohms/H



CORE NO. 74

- Recommended Frequency: 50 kHz to 1 MHz
- Maximum Inductance: 30 mH
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Only Core Stabilization Available: H
- Studs are available on the "M" Series on special request
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 3080 ohms/H



STANDARD INDUCTANCE VALUES

CORE NO. 06

Inductance	Part Number	Inductance	Part Number
5.0 mH	*06-1	200.0 mH	*06-15
6.0 mH	06-40	240.0 mH	06-54
7.2 mH	06-41	250.0 mH	06-52
7.5 mH	06-2	300.0 mH	06-16
8.6 mH	06-42	360.0 mH	06-55
10.0 mH	*06-3	400.0 mH	06-17
12.0 mH	06-43	430.0 mH	06-56
12.5 mH	06-4	500.0 mH	*06-18
15.0 mH	06-5	600.0 mH	06-57
17.5 mH	06-44	720.0 mH	06-58
20.0 mH	*06-6	750.0 mH	06-19
24.0 mH	06-45	860.0 mH	06-59
25.0 mH	06-7	1.0 H	*06-20
30.0 mH	*06-8	1.2 H	06-60
36.0 mH	06-46	1.25 H	06-21
40.0 mH	06-9	1.5 H	06-22
43.0 mH	06-47	1.75 H	06-61
50.0 mH	*06-10	2.0 H	*06-23
60.0 mH	06-48	2.4 H	06-62
72.0 mH	06-49	2.5 H	06-69
75.0 mH	06-11	3.0 H	*06-24
86.0 mH	06-50	3.6 H	06-70
100.0 mH	*06-12	4.3 H	06-71
120.0 mH	06-51	5.0 H	* 06-72
125.0 mH	06-13	6.0 H	06-73
150.0 mH	06-14	7.2 H	06-74
175.0 mH	06-53		

U—Uncased
P—Compression Molded†
PC—Printed Circuit
M—Metal Cased

When ordering add case prefix to part number for package type desired. (Example P06-1)

CORE NO. 48

Inductance	Part Number	Inductance	Part Number
2.0 mH	48-1	43.0 mH	48-18
2.4 mH	48-2	50.0 mH	*48-19
3.0 mH	*48-3	60.0 mH	48-20
3.6 mH	48-4	72.0 mH	48-21
4.3 mH	48-5	86.0 mH	48-22
5.0 mH	*48-6	100.0 mH	*48-23
6.0 mH	48-7	120.0 mH	48-24
7.2 mH	48-8	150.0 mH	48-25
8.6 mH	48-9	175.0 mH	48-26
10.0 mH	*48-10	200.0 mH	*48-27
12.0 mH	48-11	240.0 mH	48-28
15.0 mH	48-12	300.0 mH	48-29
17.5 mH	48-13	360.0 mH	48-30
20.0 mH	48-14	430.0 mH	48-31
24.0 mH	48-15	500.0 mH	*48-32
30.0 mH	*48-16	600.0 mH	48-33
36.0 mH	48-17		

CORE NO. 74

Inductance	Part Number	Inductance	Part Number
0.1 mH	74-1	1.5 mH	73-21
0.12 mH	74-2	1.75 mH	73-22
0.125 mH	74-3	2.0 mH	73-23
0.15 mH	74-4	2.4 mH	73-24
0.175 mH	74-5	2.5 mH	73-25
0.20 mH	*74-6	3.0 mH	*73-26
0.24 mH	74-7	3.0 mH	73-27
0.25 mH	74-8	4.0 mH	73-28
0.3 mH	74-9	4.3 mH	73-29
0.36 mH	74-10	5.0 mH	*73-30
0.4 mH	74-11	6.0 mH	73-31
0.43 mH	74-12	7.2 mH	73-32
0.5 mH	*74-13	7.5 mH	73-33
0.6 mH	74-14	8.6 mH	73-34
0.72 mH	74-15	10.0 mH	*73-35
0.75 mH	74-16	12.0 mH	73-36
0.86 mH	74-17	12.25 mH	73-37
1.0 mH	*74-18	15.0 mH	*73-38
1.2 mH	74-19	17.5 mH	73-39
1.25 mH	74-20	20.0 mH	73-40

† Add "C" to part number of molded inductor if clearance hole is desired.

* Distributor Item P Series Only.

TOROTEL INC.

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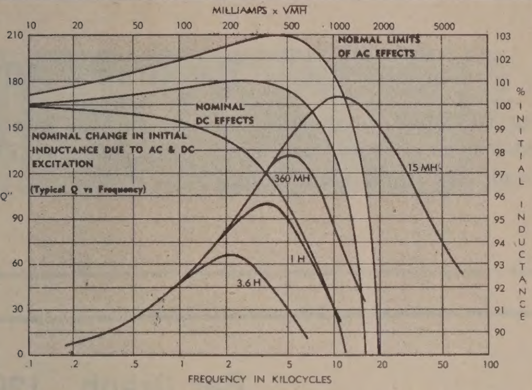
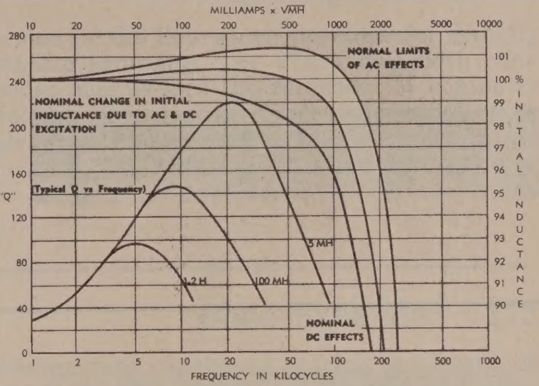
TOROIDAL INDUCTORS





CORE NO. 30

- Recommended Frequency: Up to 20 kHz
- Maximum Inductance: 17.5 H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Sabilization Available: B, D, E, G, L, M, W
- Studs are available on the "M" Series on special request
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 105 ohms/H

CORE NO. 94

- Recommended Frequency: Up to 75 kHz
- Maximum Inductance: 1H
- Tolerance: ±1.0%. Distributor Item ±2.0%
- Special Core Sabilization Available: B, D, M, W
- Studs are available on the "M" Series on special request
- Mechanical Tolerance: ±.015 (,38) unless otherwise indicated
- Typical DCR: 210 ohms/H

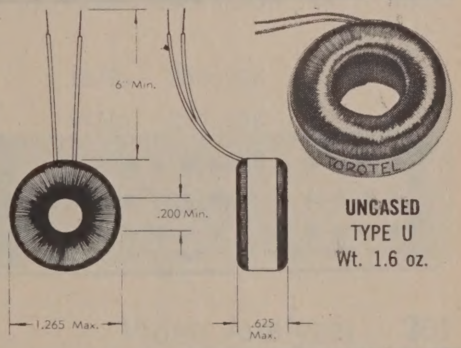
CORE NO. 30

Inductance	Uncased Type	Compression Molded†	Metal Cased	Inductance	Uncased Type	Compression Molded†	Metal Cased
5.0 mH	U30-1	*P30-1	M30-1	360.0 mH	U30-55	P30-55	M30-55
6.0 mH	U30-40	P30-40	M30-40	400.0 mH	U30-17	P30-17	M30-17
7.2 mH	U30-41	P30-41	M30-41	430.0 mH	U30-56	P30-56	M30-56
7.5 mH	U30-2	P30-2	M30-2	500.0 mH	U30-18	*P30-18	M30-18
8.6 mH	U30-42	P30-42	M30-42	600.0 mH	U30-57	P30-57	M30-57
10.0 mH	U30-3	*P30-3	M30-3	720.0 mH	U30-58	P30-58	M30-58
12.0 mH	U30-43	P30-43	M30-43	750.0 mH	U30-19	P30-19	M30-19
12.5 mH	U30-4	P30-4	M30-4	860.0 mH	U30-59	P30-59	M30-59
15.0 mH	U30-5	P30-5	M30-5	1.0 H	U30-20	*P30-20	M30-20
17.5 mH	U30-44	P30-44	M30-44	1.2 H	U30-60	P30-60	M30-60
20.0 mH	U30-6	*P30-6	M30-6	1.25 H	U30-21	P30-21	M30-21
24.0 mH	U30-45	P30-45	M30-45	1.5 H	U30-22	P30-22	M30-22
25.0 mH	U30-7	P30-7	M30-7	1.75 H	U30-61	P30-61	M30-61
30.0 mH	U30-8	P30-8	M30-8	2.0 H	U30-23	P30-23	M30-23
36.0 mH	U30-46	P30-46	M30-46	2.4 H	U30-62	P30-62	M30-62
40.0 mH	U30-9	P30-9	M30-9	2.5 H	U30-69	P30-69	M30-69
43.0 mH	U30-47	P30-47	M30-47	3.0 H	U30-24	*P30-24	M30-24
50.0 mH	U30-10	*P30-10	M30-10	3.6 H	U30-63	P30-63	M30-63
60.0 mH	U30-48	P30-48	M30-48	4.0 H	U30-25	P30-25	M30-25
72.0 mH	U30-49	P30-49	M30-49	4.3 H	U30-64	P30-64	M30-64
75.0 mH	U30-11	P30-11	M30-11	5.0 H	U30-26	*P30-26	M30-26
86.0 mH	U30-50	P30-50	M30-50	6.0 H	U30-65	P30-65	M30-65
100.0 mH	U30-12	*P30-12	M30-12	7.2 H	U30-66	P30-66	M30-66
120.0 mH	U30-51	P30-51	M30-51	7.5 H	U30-27	P30-27	M30-27
125.0 mH	U30-13	P30-13	M30-13	8.6 H	U30-67	P30-67	M30-67
150.0 mH	U30-14	P30-14	M30-14	10.0 H	U30-28	*P30-28	M30-28
175.0 mH	U30-53	P30-53	M30-53	12.0 H	U30-68	P30-68	M30-68
200.0 mH	U30-15	*P30-15	M30-15	12.5 H	U30-29	P30-29	M30-29
240.0 mH	U30-54	P30-54	M30-54	15.0 H	U30-30	P30-30	M30-30
250.0 mH	U30-52	P30-52	M30-52	17.5 H	U30-31	P30-31	M30-31
300.0 mH	U30-16	P30-16	M30-16				

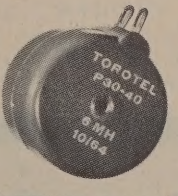
CORE NO. 94

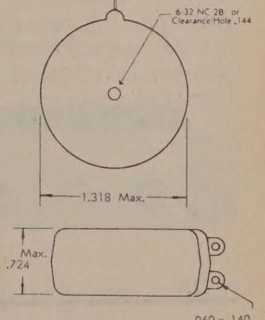
Inductance	Uncased Type	Compression Molded†	Metal Cased	Inductance	Uncased Type	Compression Molded†	Metal Cased
5.0 mH	U94-1	P94-1	M94-1	75.0 mH	U94-21	P94-21	M94-21
6.0 mH	U94-2	P94-2	M94-2	86.0 mH	U94-22	P94-22	M94-22
7.2 mH	U94-3	P94-3	M94-3	100.0 mH	U94-23	*P94-23	M94-23
7.5 mH	U94-4	P94-4	M94.4	120.0 mH	U94-24	P94-24	M94-24
8.6 mH	U94-5	P94-5	M94-5	125.0 mH	U94-25	P94-25	M94-25
10.0 mH	U94-6	*P94-6	M94-6	150.0 mH	U94-26	P94-26	M94-26
12.0 mH	U94-7	P94-7	M94-7	175.0 mH	U94-27	P94-27	M94-27
12.5 mH	U94-8	P94-8	M94-8	200.0 mH	U94-28	*P94-28	M94-28
15.0 mH	U94-9	P94-9	M94-9	240.0 mH	U94-29	P94-29	M94-29
17.5 mH	U94-10	P94-10	M94-10	250.0 mH	U94-30	P94-30	M94-30
20.0 mH	U94-11	P94-11	M94-11	300.0 mH	U94-31	P94-31	M94-31
24.0 mH	U94-12	P94-12	M94-12	360.0 mH	U94-32	P94-32	M94-32
25.0 mH	U94-13	P94-13	M94-13	400.0 mH	U94-33	P94-33	M94-33
30.0 mH	U94-14	*P94-14	M94-14	430.0 mH	U94-34	P94-34	M94-34
36.0 mH	U94-15	P94-15	M94-15	500.0 mH	U94-35	*P94-35	M94-35
40.0 mH	U94-16	P94-16	M94-16	600.0 mH	U94-36	P94-36	M94-36
43.0 mH	U94-17	P94-17	M94-17	720.0 mH	U94-37	P94-37	M94-37
50.0 mH	U94-18	*P94-18	M94-18	750.0 mH	U94-38	P94-38	M94-38
60.0 mH	U94-19	P94-19	M94-19	860.0 mH	U94-39	P94-39	M94-39
72.0 mH	U94-20	P94-20	M94-20				

† Add "C" to part number of molded inductor if clearance hole is desired. * Distributor Item P Series Only.

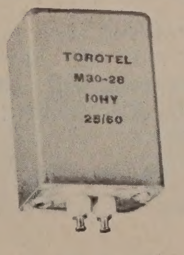


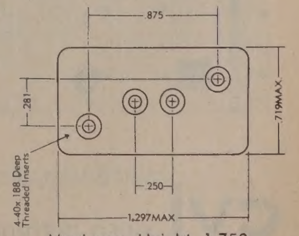
UNCASED
TYPE U
Wt. 1.6 oz.





COMPRESSION MOLDED
TYPE P
Wt. 2.5 oz.





Maximum Height 1.750

METAL CASED
TYPE M
Wt. 3.5 oz.

short form catalog

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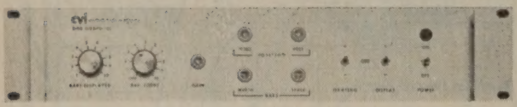
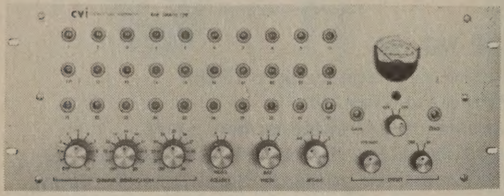
Bar Graph 101



A device accepting 10 signal inputs and converting these into a vertical "Bar" pattern as seen on the screen of a standard TV monitor. Rack mount, 3½" high, solid state.

$1250.

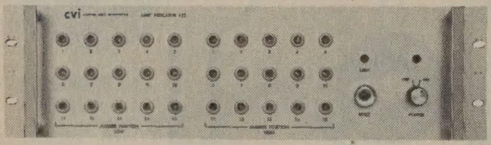
Bar Graph 120



Accepts 30 negative going input signals and produces a horizontal bar display with better than 1% accuracy. Has individual channel markers, zero suppression, decade expansion, and other features. Requires external sync. Rack mount, 7" high, solid state.

$4200.

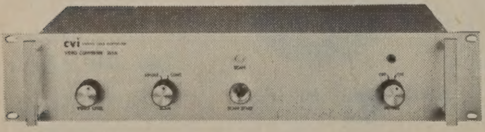
Limit Indicator 122



A device producing 15 separate "high" and 15 separate "low" vertical markers with automatic alarm when video falls outside of predetermined limits. Requires external sync. Rack mount, 5¼" high, solid state.

$3500.

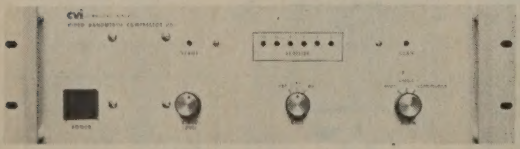
Video Converter 201-A



A unit which accepts a standard "real time" television input signal and uses high speed sampling to produce a "slow-scan TV" output signal for computer data reduction or other forms of video processing. Conversion accuracy is excellent, with negligible grey scale distortion. Rack mount, 3½" high, solid state.

$1950.

Video Compressor 260



This unit accepts standard composite video signals and performs sampling, digitizing, buffering, and slow scan TV conversion operations. Provides outputs for computer use and for direct connection of slow scan signals to voice grade communications circuits. Rack mount, 5¼" high; solid state.

$3000.

cvi VIDEO INSTRUMENTS FOR DATA ACQUISITION — PROCESSING — DISPLAY — TRANSMISSION

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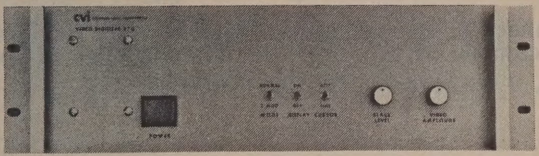
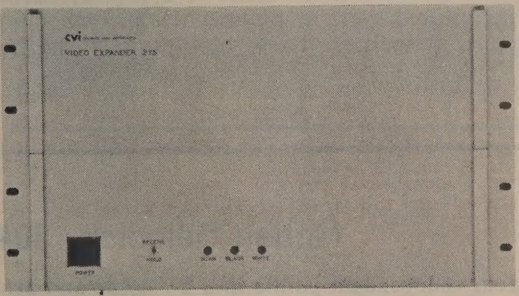
Video Digitizer 270A



An advanced version of the 260 which provides for directly computer addressable sampling. The 270 allows both computer input of video signals and the redisplay of computer processed information on a standard television monitor by means of photographic time exposures. Various options are available. Rack mount, 5¼″ high; solid state card file construction.

$4000.

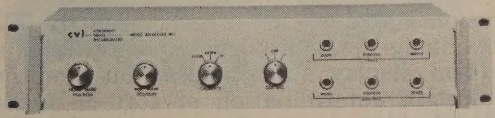
Video Expander 275



A solid state video memory capable of storing one frame of video information. Data may be fed into the 275 at a slow rate and used to build up a continuously refreshed image on a standard television monitor screen. The image buildup process may be continuously observed, and there is no fade-out or image degradation with time in the resulting display. 275 may be used as computer output display device or as slow scan video communications receiver. For communications applications it is a companion unit for CVI Models 260 or 201A Video Compressors. Available in 256x256 or 256x512 element resolution, 6-bit grayscale. Rack mount, 10½″ high.

$9000.	**275A**	1kHz	256x256
9000.	**275A-8**	8kHz	256x256
12000.	**275B**	1kHz	256x512
12000.	**275B-8**	8kHz	256x512

Video Analyzer 301



An instrument displaying "vertically line-selected" TV waveforms directly on the screen of a normal TV monitor. 1/1 waveform/picture ratio simplifies identification of individual picture elements. Display also includes an electronic reference grating and H and V markers. Requires external sync. Rack mount, 3½″ high; solid state.

$875.

Video Analyzer 302

Similar to Model 321, but does not have internal time base or field selection. However, the unit incorporates variable H and V sample widths. Requires external drive pulses. Rack mount, 3½″ high; solid state.

$1950.

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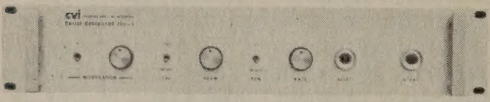
Sync Stripper **302-2**

A utility unit producing sync, horizontal drive, vertical drive, and blanking signals from a standard composite video source. Allows interconnection and synchronization of video devices to camera or tape recorded signals. Size 9½ x 6¾ x 1¾″; solid state; self powered.

$250.

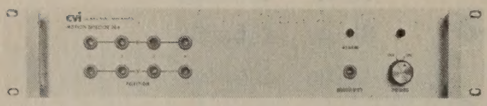
Raster Generator **302-5**



A device containing circuitry to generate very low speed rasters, up to one half hour in duration. Intended for use in recording sampled video information or other low frequency signals in conjunction with a conventional X-Y plotter. Produces pseudo topographical type displays with information vertically deflecting raster lines. Rack mount, 3½″ high; solid state.

$950.

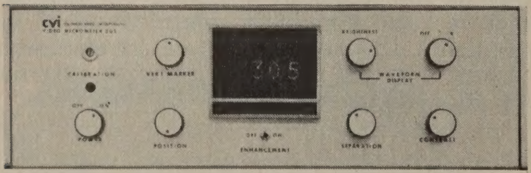
Motion Detector **304**



A device sampling four independent points in a TV scene and producing an alarm when a change in brightness occurs at any of the sampling points. Operates with standard, composite, video signals. Rack mount, 3½″ high, solid state.

$1250.

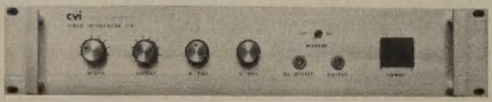
Video Micrometer **305**



Designed for dimensional analysis of objects seen by TV camera. Incorporates image enhancement circuitry and a unique video waveform display superimposed on monitor screen for more objective determination of soft or fuzzy edges. Accepts standard video signals. Solid state; table top mounting; 5¼″ high.

$3150.

Video Integrator **310**



An instrument producing a D.C. voltage directly proportional to the integral of a video signal falling within a selectable "window" area. Requires external drives. Rack mount, 3½″ high; solid state.

$1500.

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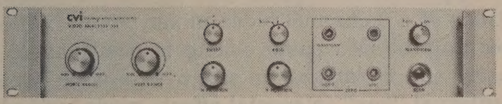
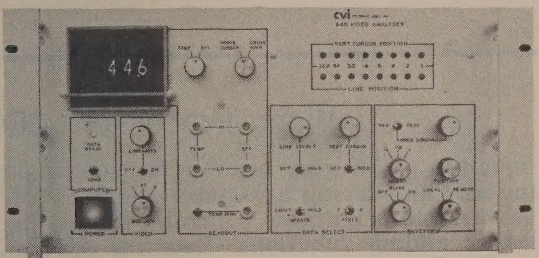
Video Analyzer 321



Laboratory version of the 301. Incorporates additional circuitry to allow chart recording of line selected video waveforms X-Y coordinate indication, noise analysis, computer data input, and other features. Requires external sync. Rack mount, 3½" high, solid state.

$2500.

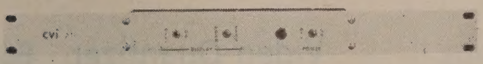
Video Analyzer 340



A sophisticated instrument intended to derive objective data from video signals. Functions include digitization of a selected TV line and processing of derived data. Several patterns are superimposed over input video for simplification of analysis. Solid state; rack mount; 8¾" high.

$14,500.

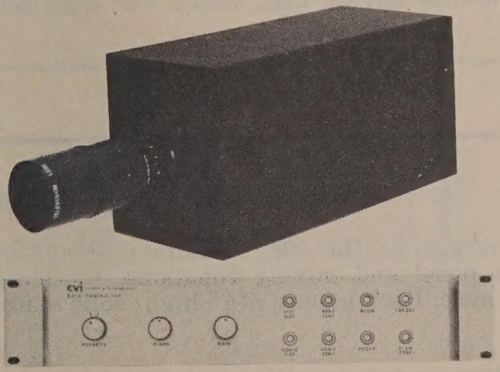
Video Analyzer 350



A low cost instrument for display of TV waveforms directly on a normal monitor screen, eliminating the need for a separate CRT display. Similar to the Model 301 but uses fixed sampling and also features a peak video level detection mode. Rack mount, 1¾" high; solid state.

$400.

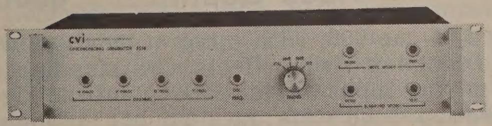
Data Camera 502



A TV camera intended particularly for research or industrial inspection uses. Accepts nearly any 1 inch tube and has various features such as externally controllable sweeps, beam blanking, dynamic gain control, plug-in low pass filters, and very wide range of operating rates. Options include video sampler, shading generator, and digital control of various functions. Camera is three chassis configuration: head, control unit, power supply. Requires external drives, blanking, or deflection voltages.

$4000.

Sync Generator 601-B



A unit intended for laboratory use when either standard or non-standard TV scan rates are required. Uses micrologic binary counters with adjustable feedback paths. Drive and blanking pulses are variable width, but sync is not EIA format. Incorporates dot/bar generator for test purposes. Rack mount, 3½" high, solid state.

$1025.

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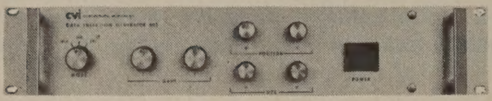
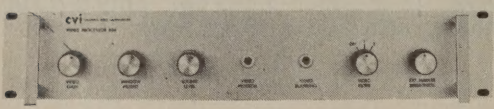
Data Insertion Generator 603



Combines the functions of a 2 channel video mixer, special effects generator, and video pointer. Moveable oblong is positionable to any point in TV raster and is variable in size over a wide range. Oblong acts as the internal "key" in special effects mode, and also generates a white "box" outline or solid square for marking purposes. Requires external sync. Rack mount, 3½" high, solid state.

$1250.

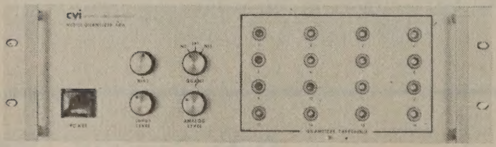
Video Processor 604



An instrument modifying the grey scale of a video input signal by selecting and amplifying a variable width "slice". Also incorporates variable brightness control, sync adding, and external marker adding functions. Requires external sync. Rack mount, 3½" high; solid state.

$950.

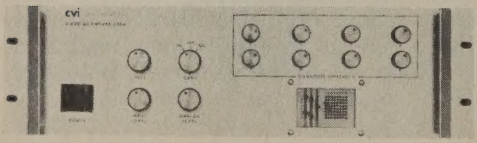
Video Quantizer 606



A device which allows the processing of a video input signal into 16 separate amplitude levels. Operates with tape, camera, or disc inputs and allows radical grey scale alterations or the generation of complex synthetic color signals. Rack mount, 5¼" high, solid state.

$3500.

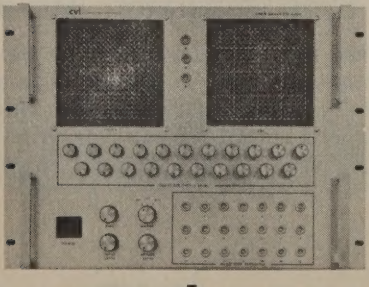
Video Quantizer 606A



An eight-channel version of the 606, containing a built-in color coding patch panel and mixing functions. Produces R-G-B outputs and sync. Rack mount, 5¼" high; solid state.

$2500.

Video Quantizer 606C



A 21-channel version of the 606, with integral patch panel for achieving a wide range of visual effects. Contains linear video amplifier for mixing input digital with quantized signals. Wide band operation. Solid state; rack mount; 14" high.

$5000.

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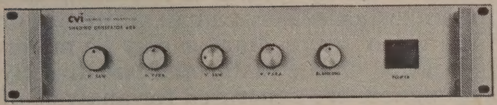
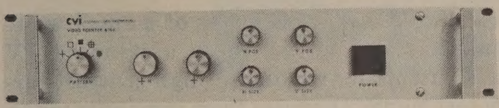
Shading Generator 608



Generates H and V sawtooth and parabolic waveforms of variable amplitude and polarity to provide compensation of brightness errors in video input signals. May also be used to drive external dynamic correction circuitry. Requires external sync. Rack mount, 3½″ high; solid state.

$950.

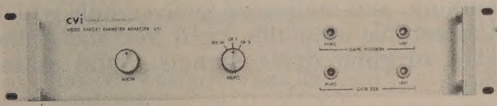
Video Pointer 610E



Generates five different oblong and/or cross patterns which are positionable to any location on the TV screen. Oblongs can be changed in size over a range of 10 to 1. Unit may be used for marking purposes or for positional measurements. Rack mount, 3½″ high; solid state.

$1950.

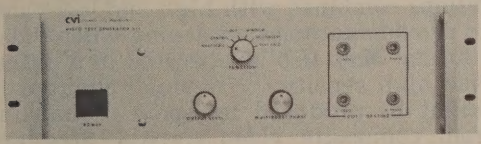
Diameter Analyzer 611



This device contains gating, slicing, and counting circuits to provide automatic measurement of the maximum vertical dimension of a target with moderate to high contrast. Both digital and analog output signals are available. Rack mount, 3½″ high; solid state.

$1950.

Video Generator 615



A test instrument providing grey scale, grating, dot, window, multiburst, and flat field signals. Multiburst is variable in position for monitor resolution checks, and multiburst frequencies to 20 MHz may be ordered. Requires external drive, blanking, and sync. Rack mount, 5¼″ high; solid state.

$2000.

X-Y Indicator 620

Generates white cross hairs superimposed over a video input signal. Allows rapid alignment of subject material with a predetermined location when used in conjunction with a standard TV camera and monitor. Accepts composite video on a terminated input and provides composite video out to a standard TV monitor. Size 11 x 8 x 1.65″. Mounting: Free standing or rack. Self powered.

$400.

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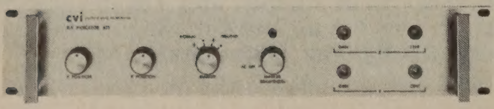
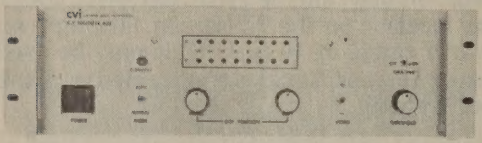
X-Y Indicator 621



An instrument accepting either composite or non-composite video signals and superimposing either a small white dot or set of cross hairs on the video image. Marker may be manually positioned to any location on the raster and two directly proportional DC output signals are generated for analysis of spatial location of subjects. Also contains built-in grating generator for evaluation of input signal quality. Rack mount, 3½″ high; solid state.

$1500.

X-Y Digitizer 622



This unit provides 8 bit digital X-Y coordinates of a small white dot that may be manually located anywhere on a standard TV image. Also incorporates automatic tracking of high contrast targets, and stable grating test signal. Operates from composite video. Rack mount, 5¼″ high; solid state.

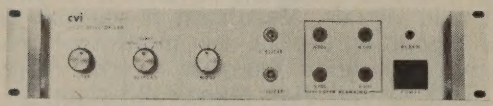
$4500.

Sync Delay 624

Accepts standard format vertical and horizontal drives and generates drives, blanking, and industrial sync signals which may be delayed by selectable amounts, both vertically and horizontally, from the original drive signals. Solid state; rack mount; 3½″ high.

$1250.

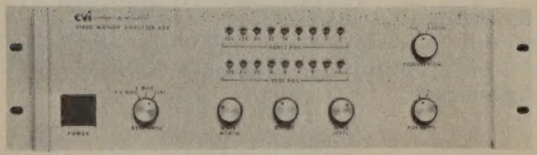
Video Detector 630



Provides gating functions combined with high and low video detection circuitry to provide automatic warning when video levels exceed preset limits. May also be operated in a differential mode to provide high sensitivity to small changes in contrast, such as might be produced by spots or hairline cracks. Operates from composite video signals. Standard rack mount, 3½″ high; solid state.

$1500.

Video Motion Analyzer 633



Accepts composite video signals and measures lateral motion of a high contrast video target in a selectable portion of the TV signal. Operates in two modes: one-line gate superimposed on target image; or variable gate to blank out all but target profile. Solid state; rack mount; 5¼″ high.

$4000.

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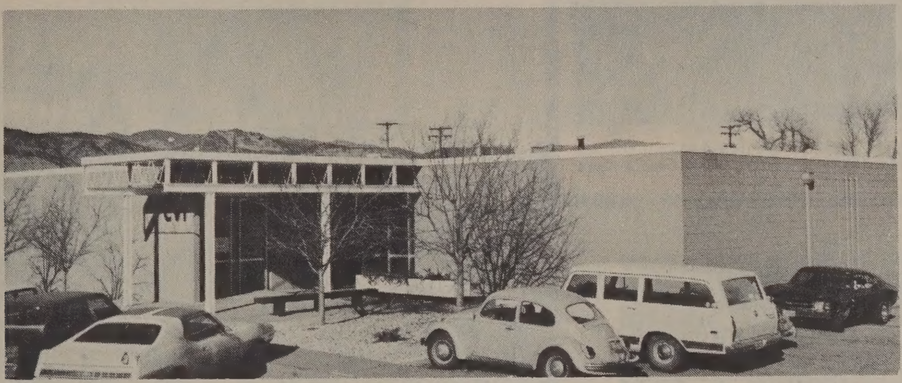
A few words about Colorado Video, Incorporated.

CVI specializes in the design and manufacture of instruments utilizing video technology. Particular areas of interest include research laboratory instrumentation, industrial inspection and control, computer input/output of television signals, video metrology, image alteration and synthesis, electronic art, scan conversion, and communications involving the transmission of TV pictures over audio grade circuits.



Colorado Video, Incorporated—3245 Prairie Avenue, Boulder, Colorado USA

CVI instruments are used throughout the world and are available for operation from 50 to 400 Hertz power sources and at various scanning rates. For technical assistance, please contact any of the following:

CVI—Box 928—Boulder CO 80306 U.S.A.
(303) 444-3972—TWX 910-940-3248 COLO VIDEO BDR

Overseas Representatives

Ciclovision S.R.L.
Marcelo T. de Alvear 849° "A"
Buenos Aires, Argentina
(32-2939)

Hae Nin Commerce Co., Inc.
Room 202 Daehan Building
International P.O. Box 1201
Seoul, Korea
(22-2128)

Integrerad Elektronik AB
Box 43
S-182 51 Djursholm, Sweden
(08/753 03 30)

Jorgen Andersen Ingeniorfirma A.S.
1, Produktionsvej DK-2600 Glostrup
Copenhagen, Denmark
(02/91 88 88)

KGM Electronics Ltd.
Clock Tower Road
Isleworth, Middlesex, England
(01-568 0151)

Ronald J. T. Payne Pty. Ltd.
385 Bridge Road
Richmond, Victoria, Australia 3121
(42-1416)

Protech, Inc.
4-2-3 Chuo, Nakanoku
Tokyo, Japan
(383-1039)

Sintra
294 Rue du President Salvador Allende
92700 Colombes, France
(781-81-51)

CVI Southwest Sales Office—Dallax TX—(214) 233-5497

CVI West Coast Sales Office—Westlake Village CA—
(213) 889-3653

CVI North East Sales Office—Chelmsford MA—
(617) 256-3381

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(212) 246-2490

U.S. Representatives

BCS Associates
Box 6578
Orlando, Florida 32803
(305) 896-4881

BCS
Box 1273
Huntsville, Alabama 35807
(205) 881-6220

BCS
Box 9619
Greensboro, North Carolina 27408
(919) 273-1918

BCS
107 Rich Neck Road
Williamsburg, Virginia 23185
(804) 245-1786

Cropley, Inc.
2275 East Arapahoe #301
Littleton, Colorado 80121
(303) 794-4231

Perspective Measurements
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San Diego, California 92111
(714) 278-8931

Sigma Communications
150 E. Sunrise Highway
N. Lindenhurst, New York 11757
(516) 226-1880

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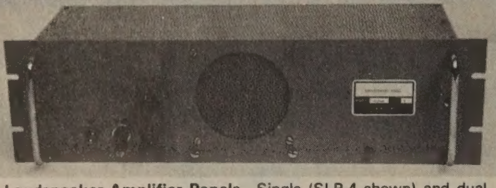
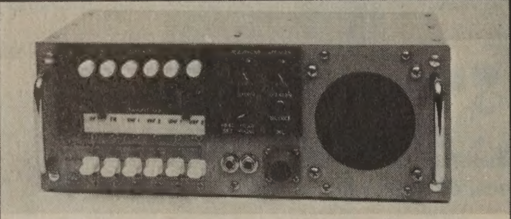
MEDFORD, NEW JERSEY 08055
Phone: 609-267-7950

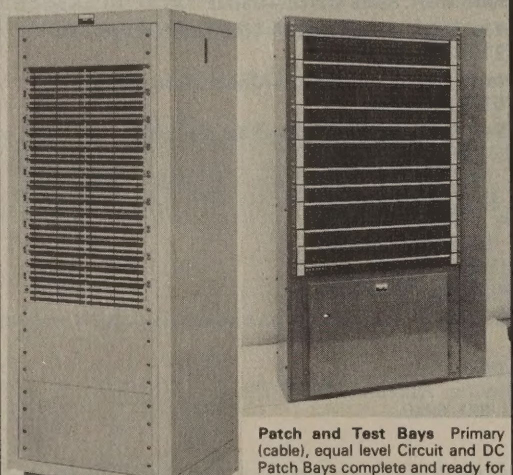


Loudspeaker-Amplifier Panels Single (SLP-4 shown) and dual units available with common or independent AC/DC Integral Power Supplies, or DC inputs. 5-1/4" H X 19" W X 6 " D

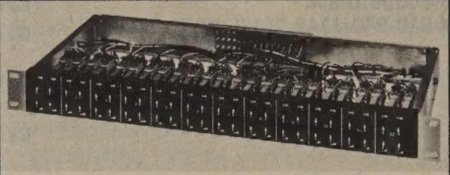


Air Traffic Control Tower Systems•Complete solid state Airport Tower units • FAA, Navy and Air Force approved • Models for 12 VDC, 24 VDC and 48 VDC power • Amplifiers for Tx and Rx circuits.

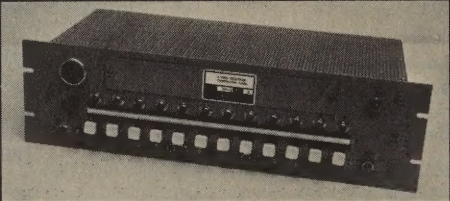
Mobile Air Traffic Control System AN/MRC-131 • Completely self contained • Provides 1 HF, 2 VHF, 2 UHF, 1 FM channels • Three operator positions • Power from motor alternator, 12 V DC battery, and 110/230 VAC rectifier charger • All frequencies in HF, VHF and UHF Air/Ground bands.



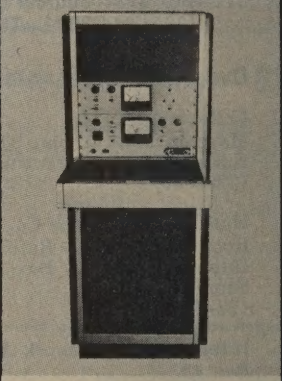
Patch and Test Bays Primary (cable), equal level Circuit and DC Patch Bays complete and ready for installation at site. Also, Patch, Test, Fuse and Distribution bays.



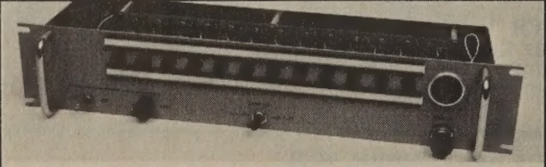
Variable Attenuator Panel - VAP-1230 Provides 12 channels of switchable attenuation from 0 to 30 DB in 2 DB steps, 600 OHMS input and output. 1-3/4" H X 19" W X 9" D. Other impedance and attenuation steps available.



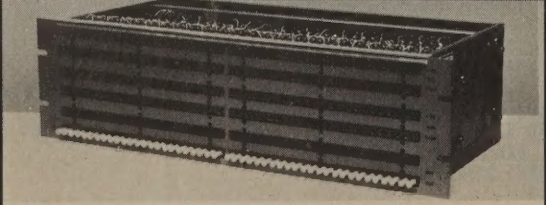
Voice Orderwire Unit TTP-12 • Provides selection 12 channels • Supplied with telephone handset • Adjustable Tx and Rx levels.



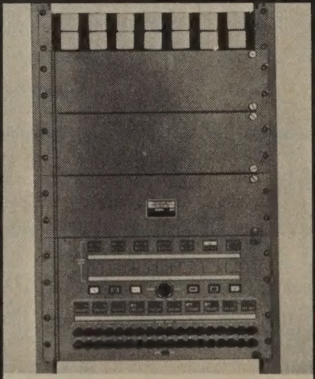
Magnet Charger Model 3 LV • High power for industrial users • 11000 watt seconds peak energy • Automatic 10 operations per minute • Available with Monitor Unit • Variable charging voltage 0-500 volts • Model 1 LV also available.



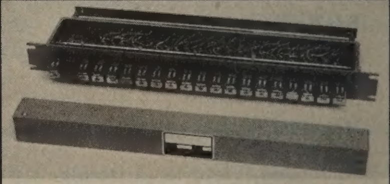
Local Alarm Panel LAP-12 • Model of 12, 24 and 36 points • Red lamp and audible alarm • 110 VAC, 48 VDC and 24 VDC optional power • Solid state construction.



Audio and Digital Patch Panels Miniature and standard telephone jacks in various configurations for telecommunications and computer patch and test facilities available in 2, 4 and 6 wire circuitry for audio; cut key and/or activity indicators for digital.



Supervisory Control, Alarm Systems • Custom designed to your requirements • Up to 256 points control and alarm • Excellent security Double scan with Parity • Computer control and logging available • Single master-multiple remotes • Fully solid state IC construction.



Relay Panel - RP Y-20 20 Plug in relays in 1-3/4" of panel space for various applications in communications and control field. A wide variety of voltage and contact arrangements available.

Fuse and Alarm Panel 40 fuses in 1-3/4" H. Panel with visual alarm and contact outputs for remoting alarm. FP-40A for 6, 48, 60-80, 120-130 VDC. F P -40B for 6, 12, 24 and 48 VDC applications.

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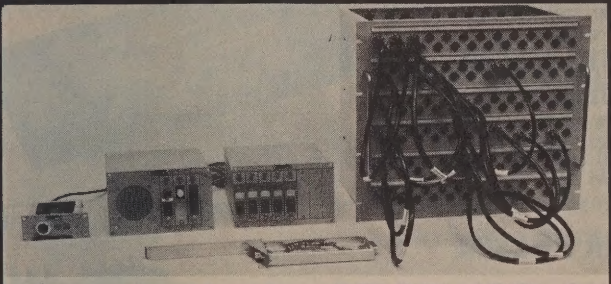
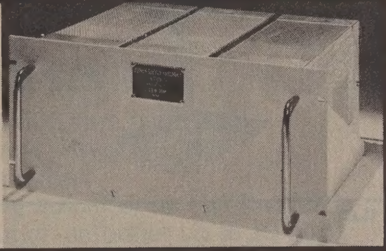
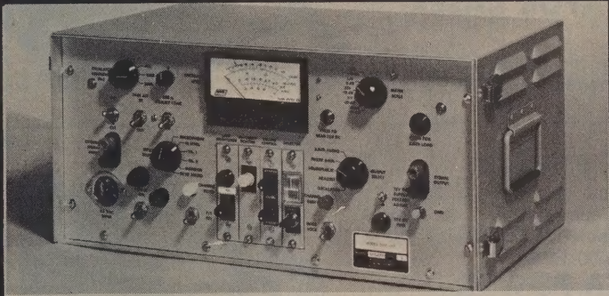
Phone: 609-267-7950



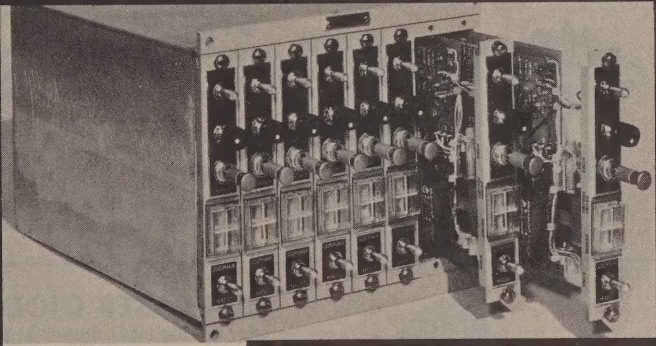
Air Traffic Radio Channel Control Systems 12 VDC, 24 VDC and 48 VDC,—12 and 24 VDC systems include (shown left to right): Jack Unit—audio unit; w/plug-in microphone amplifier/lamp brightner, recorder monitor, and speaker-headphone amplifier modules, — selector unit w/plug-in selector modules — multipin patch panel extender module (foreground). Flight service station selectors, power supply assemblies and supporting test set also shown on this page.



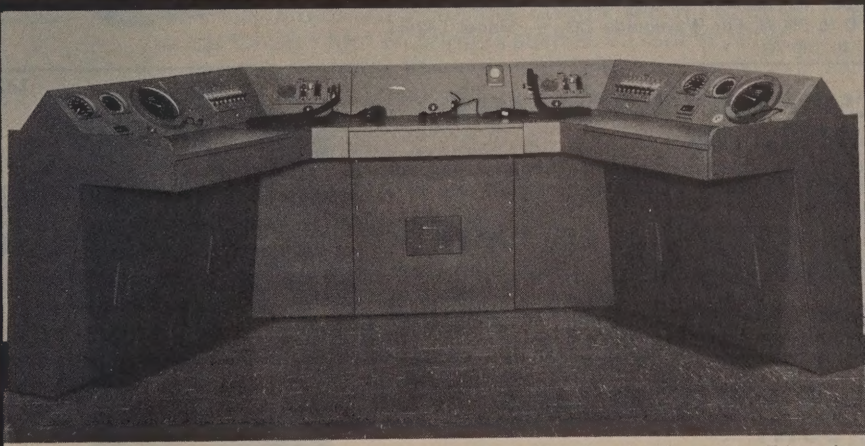
Power Supply Assemblies: Standard models include 12 VDC, 24 VDC and 48 VDC outputs with input @ 115 VAC 50-60 H_z single phase. (Other in/outputs available on request.)



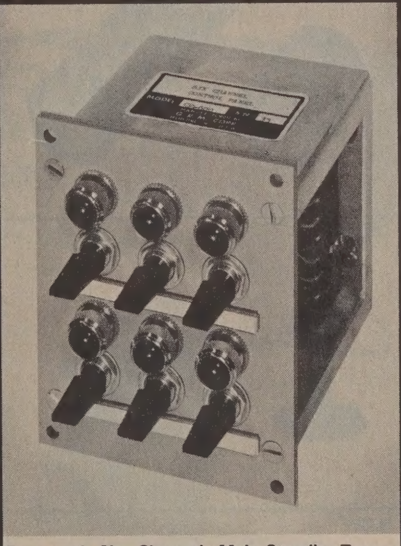
Module Test Sets designed to facilitate organization, direct and depot maintenance levels. The test set provides in/output signals and measurements required to access module performance, used with 12 and 24V radio channel control equipment.



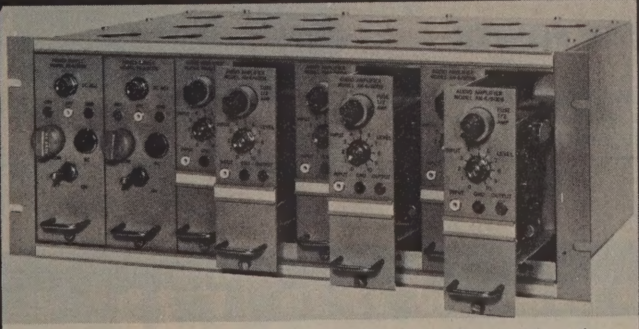
Flight Service Station Selectors provides standard radio channel control functions plus muting and individual volume control features with emergency and locking select and key switch.



Complete Communications Consoles designed to customer specifications, including: air traffic control — flight service stations — police, fire and maintenance dispatcher positions.



Four and Six Channel Main-Standby Transformer Control and Relay Panels — six channel control panel CP-600 shown. Other basic models include RP-600, SSP-400, and RTP-400. These units available in 12, 24 and 48 VDC.



Microphone, Line, Speaker and Mixing Amplifier Assemblies, regulating and non-regulating (6 channel regulating amplifier — AA-6/600B shown)

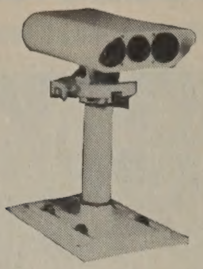
Additional Systems and Equipment:

- Voice frequency signaling and control system (RCAG)
- Voice frequency signaling system (VOR/VORTAC)
- Receiver selector XFMR
- Receiver muting XFMR
- Receiver selector/mixing XFMR
- Radio headset panel
- Receiver selector, 4 channel
- Receiver volume control panel
- Receiver muting panel

G.R.M. CORPORATION - COMPLETE MANUFACTURING SERVICES FOR OEM PROPRIETARY PRODUCTS

LASER POWER SUPPLIES, LASER DIODE PULSERS AND LASER SIMULATORS

LC20



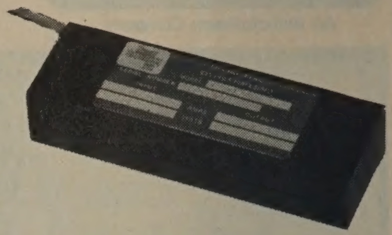
LC20 COMMUNICATION SYSTEM

Private telephone or computer communication. Easy installation. No FCC license required.

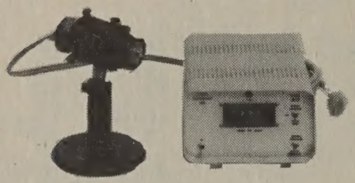
L23, 28, 40 HELIUM NEON LASER POWER SUPPLIES

Very compact highly efficient modular power supplies for portable lasers. Model L23 for 10 to 17V DC input, Model L28 for 24 to 32V DC input, and Model L40 for 117V AC input.

L23



ILCL



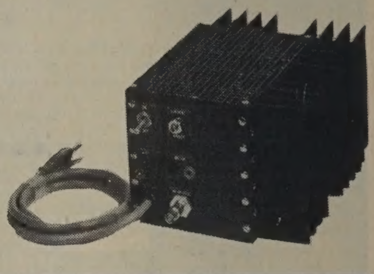
ILCL DIODE LASER PULSER SYSTEM

For driving diode lasers with power ratings of 1 to 100W. Features include a precision synthesized clock with optional rates from 0.1 to 1M PPS. Operates from AC line or batteries.

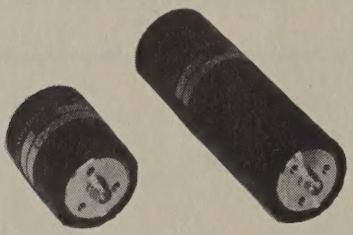
L12, 13 METAL VAPOR LASER POWER SUPPLY

Light weight, high efficiency for Helium Cadmium Laser, 150, 200, and 300W models. 117V AC, 50 to 400Hz input.

L12-13



ILC



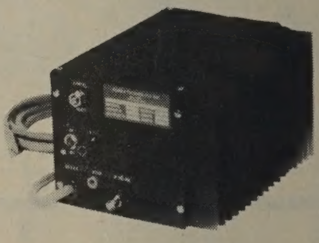
ILC LASER DIODE PULSER

For driving laser diodes at pulse widths of 7 to 200ns. Models available for pulse currents of 1 through 100A. Fast rise and fall times, internal clock for pulse rates of 1 through 10,000 PPS.

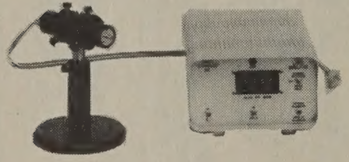
L30-L44 CO_2 LASER POWER SUPPLY

Light weight, high efficiency, low ripple, well regulated. For sealed off CO_2 Lasers — Model L30-32 150 to 300W, For Waveguide CO_2 — Model L42-44, 75 to 150 W.

L30



CS100



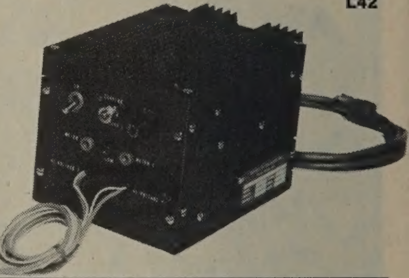
CS100 1.06 MICRON LASER SIMULATOR

Provides an eye safe low-power source which duplicates the pulse width and repetition rate of a Nd-YAG Laser.

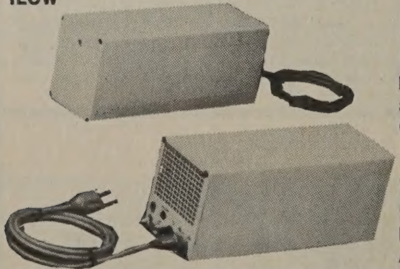
L42 WAVEGUIDE CO_2 LASER POWER SUPPLY

A variety of models are offered for single and double discharge lasers with input power from 35W to 150W. 117V AC and 28V DC models are available.

L42



ILCW



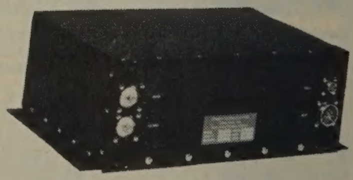
ILCW CW DIODE LASER MOUNT

Provides a power supply, DC to 100MHz modulator, and closed loop temperature control for operating CW Diode Lasers.

L18-L22 CO_2 LASER POWER SUPPLY

Light weight, high efficiency, low ripple, well regulated for flowing gas lasers. Models for 300 to 1500W. Air cooled or liquid cooled models.

L22



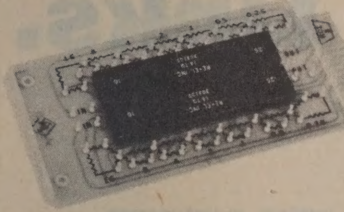
Power Technology Inc.

Power Technology Incorporated

Address correspondence to: Box 4403 Little Rock, Arkansas 72214
Plant location: 7925 Mabelvale Cutoff Mabelvale, Arkansas 72103

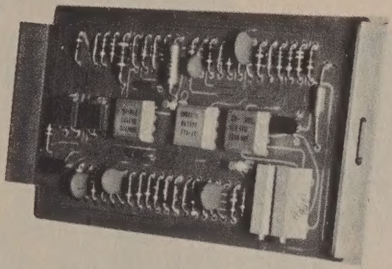
501—568-1995

A COMPLETE LINE OF COMPONENTS FOR DATA COMMUNICATIONS SYSTEMS



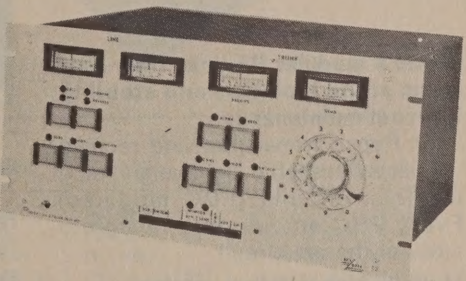
LINE CONDITIONING & INTERFACE DEVICES

C-303	• Dual strappable 0 to 31.75 DB 600 ohm pads
C-311	• 600 ohm in/out 30 DB data grade line amplifier
C-312	• 2W, 600/10K input speaker amplifier
C-314-XX	• Balanced and isolated summing amplifier up to 10 ports
C-315-XX	• Balanced and isolated distribution amplifier up to 10 ports



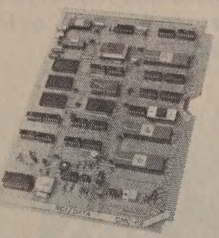
ALARMS—TELETYPE & CARRIER FAULT

C-351	• 45 to 200 Baud distortion/open line alarm
C-353	• Dual carrier detector/alarm
C-354	• Hi/Lo carrier alarm, detects out of tolerance data levels



INTERFACE—TELETYPE

C-362	• EIA to TTY convertor 20 or 60 ma, two to four wire option
C-363	• EIA to polar convertor
C-368	• Automatic Loop current regulator adjustable 15 to 70 ma
C-435	• Digital Filter—Virtually eliminates errors on noisy TTY circuits using "VART" receivers
C-460	• Data Delay Motor Start provides up to 1 second of data storage for slow turn on printers such as T.I. Silent 700®. . . Saves power, extends life.
C-480	• Telex line and trunk test set—test either mechanical or computerized telex exchanges.



NEW! COMPLETE MICRO COMPUTER

CMC-68—Most advanced 6800 type single board computer on the market. Includes: 1K RAM, 32 I/O Ports, ACIA with Telco compatible loop interfaces, DMA Controller, 8 Level priority interrupt control, 4-1KX8 ROM sockets . . . and many more features.

CONTROLS AND SIGNALING

C-324A	• Touch Tone® Receiver—Uses latest digital detector
C-325A	• Touch Tone® to Dial Convertor—Single card
C-326	• Selective Call—Module for C324A responds to 2, 3 or 4 Digit addresses

NEW!

FP68	• Data Link Encrypter—Meets new FED STD FIBS PUB 46
MSC	• Master Slave Clock System—Unlimited remote clocks

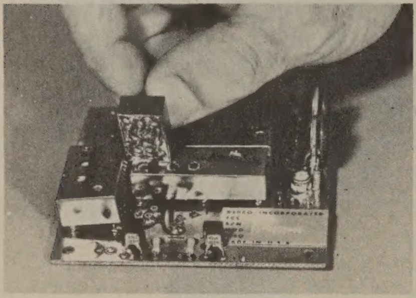
RE-EL CIRCUITS INC.

520 VICTOR STREET, SADDLE BROOK, NEW JERSEY / TELEPHONE (201) 843-3738

PRODUCTS FOR COMMUNICATION

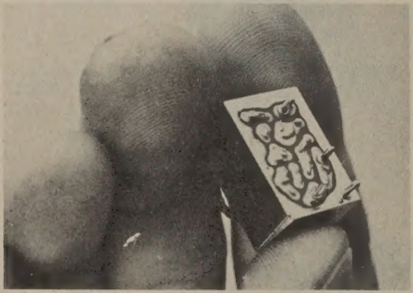
Here's what you gain with Repco's Modular VHF/UHF RF Communication Links.

Modular Design.



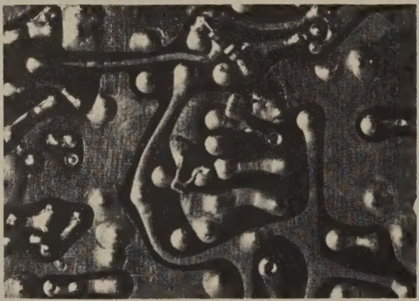
Repco's modular RF links offer maximum stage isolation and stability; low cost maintenance.
Each Repco transmitter and receiver is built with reliable, lightweight, plug-in block circuits (PBC modules). Every PBC module is a complete, state-of-the-art circuit.

Multiple transmission modes.
Repco transmitters and receivers are designed to carry tone, voice, or low-speed digital data.



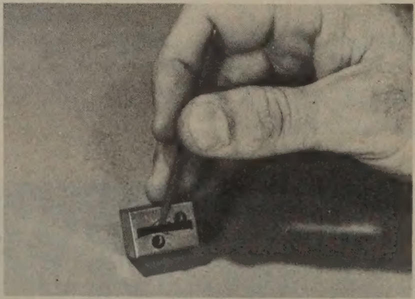
Small size.
PBC modules let us build Repco transmitters and receivers small, to help you meet tight packaging requirements. They measure only 3.32" x 3.32" x 1.00"... and weigh just 3.2 oz. (8 and 25 watt models are slightly larger).

Low current drain.
Repco's RF links were specifically designed for **low current consumption** . . . like 4.6 milliamps on some of our receivers when on standby.



Documented reliability.
Customers report RF systems in use for over two years . . . with no failures.

Design flexibility.
You get choices: low, medium, and high band, VHF or UHF; 12.5 and 15.0 VDC transmitters and receivers; a range of .5 to 25 watt transmitter output; some models capable of continuous-duty operation. Because most systems designers are demanding UHF transmitters and receivers for RF communications links, and maximum freedom in interfacing RF carriers with their present systems, we offer the versatility of our 450-470 Mhz UHF range.



Easy system maintenance.
Service methods are the most simplified available, because the **Modular Design** permits quick module replacement. Low cost PBC modules are available from our large in-stock, off-the-shelf supply.

And still low cost!
Not just because our transmitters, receivers, and crystals cost less . . . but because we save you costly delays. Typical delivery on large orders is eight weeks. (Evaluation units 4 weeks if crystals from Repco stock suit your needs.)

Repco's Quality Control.
We guarantee our assemblies to work. Backing that guarantee is a long history of building RF communication links . . . and nothing else. We work long and hard to deliver the utmost in reliability and design flexibility.

Type Acceptance/Certification.
All our transmitters and receivers have been type accepted or certified in Repco's name where applicable to current FCC Rules and Regulations. Some units offered for sale are for overseas applications. In Canada, our links are D.O.C. accepted.

Call or write today
for complete specifications and pricing information. Ask about our special evaluation offer.

Special Products Department
1940 Lockwood Way
P.O. Box 7065
Orlando, Florida 32804
Phone: 305/843-8498
TWX: 810/850-0120

Repco

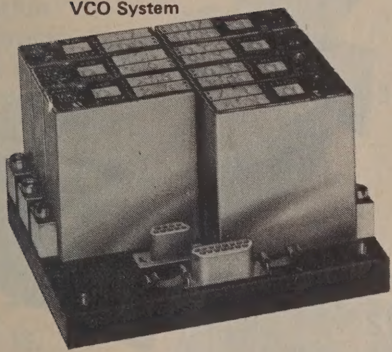
A subsidiary of Scope, Incorporated
World leader in the manufacture of Modular RF Communication Links

Sonex INC.

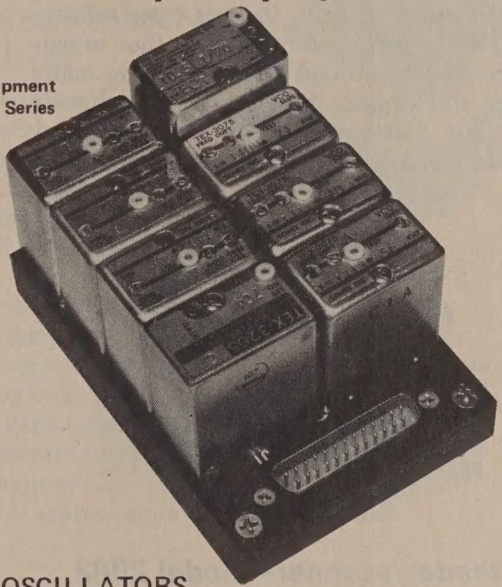
SHORT FORM CATALOG

Airborne and Ground Telemetry Equipment

TEX-3076
VCO System



FM Multiplex Equipment
Standard Series



VOLTAGE CONTROLLED OSCILLATORS

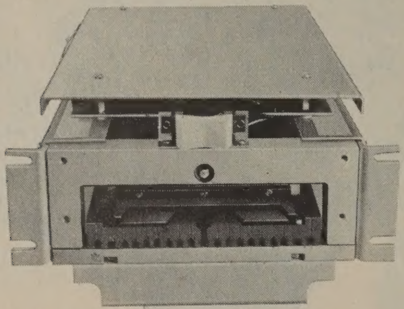
Catalog No.	Input Sensitivity	Input Impedance	Linearity	Common Mode Rejection	Output Voltage	Temperature Stability (-20°C to +85°C)	Size	Special Features
TEX-3007 **TEX-3065** High-Level Isolated Input	0 to + 5 V ±2.5V -5 to 0 V	750 K min for ±7.5% deviation 375 K min for ±15% deviation	0.25% of bandwidth	120 dB min at dc	Adjustable up to 1.4 V P-P into 10K, 8 V P-P open circuit	**Proportional Bandwidth** ±1.5% of BW **Constant Bandwidth** ±2% of BW up to 100 kHz ±3% of BW up to 200 kHz for ±2 kHz deviation	**TEX-3007** 1.58"x1.03"x1.8" **TEX-3065** 1.31"x0.8"x1.98"	The isolated input allows the use of different polarity transducer output voltages without necessity of readjustment.
TEX-3075 High Level	0 to + 5 V ±2.5 V -5 to 0V	750 K min for ±7.5% deviation 375 K min for ± deviation	0.25% of bandwidth	N/A	Adjustable up to 1.4 V P-P into 10 K, 8 V P-P open circuit	±1% of bandwidth or 0.15% of center frequency (whichever is greater)	1.31"x0.8"x1.6"	Excellent Source Impedance Sensitivity
TEX-3075CAA	0 to +5V ±2.5 V -5 to 0V	750 K min for ±7.5% deviation 375 K min for ±15% deviation	0.25% of bandwidth	N/A	Adjustable up to 1.0 V P-P into 100 K ohms	±1.5% of bandwidth	1.31"x0.8"x1.6"	Operates from 6.3 Vdc. 3 mA power source.
TEX-3076 Micro-min High-Level	0 to + 5 V ±2.5 V -5 to 0 V	750 K min for ±7.5% deviation 375K min for ±15% deviation	0.25% of bandwidth	N/A	Adjustable up to 1.4 V P-P into 10K, 8 V P-P open circuit	±1.5% of bandwidth	0.35"x1.00"x1.06"	Hermetically-sealed semi-conducters. Seperate case ground Amplitude and Frequency controls.
TEX-3081 High Frequency	0 to 5V or ±2.5V	50K Min	±0.5% of bandwidth	N/A	Adjustable up to 2.8V P-P into 47 K.	±1.5% of bandwidth	1.8"x1.03"x1.6"	600 kHz ±150 kHz accepts high speed PCM
TEX-3107 **TEX-3105** Low-Level	0 to 20 mV ±10 m V -20 to 0 mV	50K min Standard other impedances available	0.25% of bandwidth	120 dB min at dc	Adjustable up to 1.4 V P-P into 10 K, 8 V P-P open circuit	±2% of bandwidth or ±0.3% of center frequency	**TEX-3107** 1.03"x1.58"x2.0" **TEX-3105** 1.31"x0.8"x1.98"	Isolated Low-Level Differential Input eliminates need for separate DC Amplifiers.

Notes:

1. All VCO's available in standard IRIG proportional bandwidth (±7.5%, ±15%) and constant bandwidth channels (±2 kHz, ±8 kHz). Other frequencies and deviations are available.
2. Output Impedance of all VCO's is a nominal 40 K ohms.
3. Total Harmonic Distortion of all VCO's is less than 1%.
4. Amplitude Modulation of all VCO's is less than 10%.

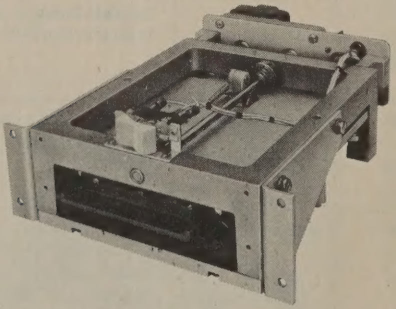
Take a card. Any card. There's an AMP card reader to

Or read it and write on it. Or read it and validate it. Or read it and capture it. No other manufacturer offers so broad a line—with so many features and options to meet your particular needs. No matter how you buy them—as complete, ready-to-use units or as individual components—our wide range of data entry products will give you the excellent performance and reliability for which AMP is noted. Typical applications include industrial control and automation, information systems, remote data collection, access control, military use.



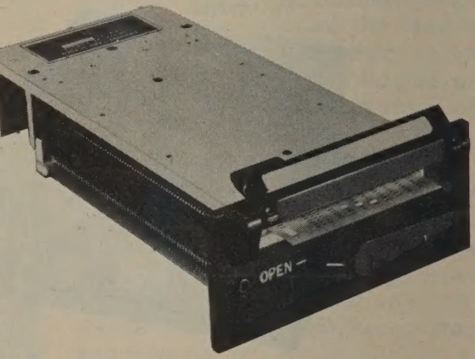
Card reader/scanner—Model 2982

- Senses all 960-hole positions of standard, 80-column card.
- Provides character serial, bit parallel data up to 2000 CPS.
- Offers outputs which are compatible with DTL and TTL.
- Integrated circuitry and solid-state components assure high reliability.



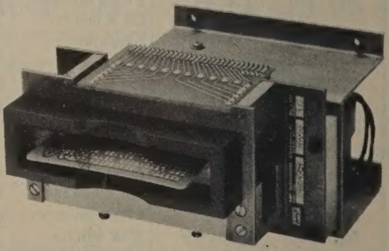
Tab-card reader—Model 2980/81

- Reads standard 80-column punched tab cards.
- Compact design allows positioning in small panel space.
- Available with parallel outputs, matrix and diode-isolated specials.
- Wipe and back-wipe contact operation has high inherent reliability.
- Available in 80-column and 22-column versions—motorized and manually operated.



Military static card reader Model 2972

- Approved for airborne equipment.
- Accepts standard 80-column paper or plastic punched cards.
- Reliable operation in extreme environments assured by extensive qualification program.
- Manual control eliminates need for external power.
- Great flexibility with a variety of electrical interface options. All input and output terminations are pluggable.
- Outputs compatible with TTL and DTL circuitry.



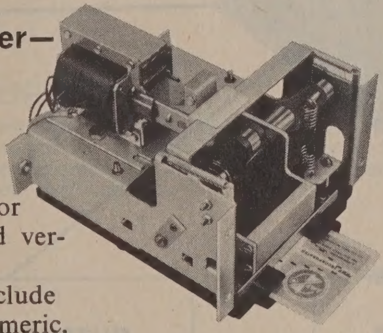
Combination tab-card/ credit-card reader—Model 144

- Accepts standard punched paper 80-column cards and plastic badges.
- Reads numeric or alpha-numeric data up to 12 characters.
- Fully automatic read cycle. Requires no operator control.
- Remote switch design offers reliable operation and long life in industrial environments.
- Completely pluggable interface adapts to "state-of-the-art" wiring techniques.

read it and program from it.

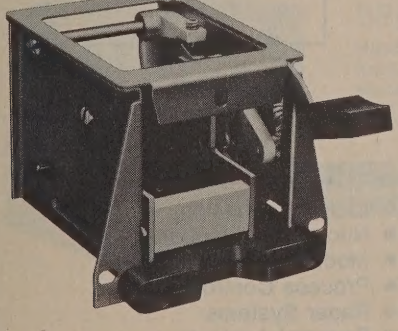
Low-profile magnetic card reader—Model 75

- Reads ABA track at 75 bits/inch.
- No motor required. Mechanical drive eliminates RF generation.
- Low profile. Suitable for use as a stand-alone accessory.
- TTL outputs are compatible with industry standards for design interface.



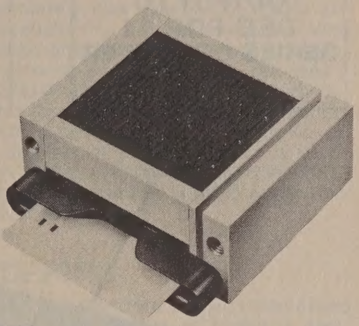
Credit card reader—Model 360/361

- Reads 15, 20 or 22-column credit or badge cards.
- Solenoid powered or manually operated versions available.
- Output options include numeric, alpha numeric, parallel and diode matrix.



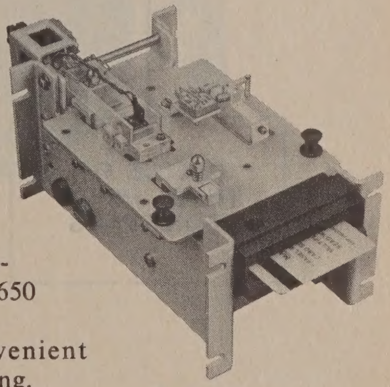
Matrix badge reader—Model 161

- Reads up to 17 columns of a standard badge or credit card.
- Small size and low cost adapt to limited space and budget.
- Output matrix available for numeric or alpha numeric data.



Credit and badge card reader—Model 130

- Maximum reliability, with proven switch design and a minimum of moving parts.
- Compact, rugged construction. Only two major assemblies for long life in severe environments.
- Low-temperature operation. Suitable for outdoor use to —40°F.
- No external power required. Reader operates with card insertion.
- No maintenance required. Designed to operate throughout life without adjustment or preventive maintenance.



Magnetic card reader—Model 210/211

- Slot design ensures proper card orientation.
- Reads and writes at 210 bits per inch, providing as many as 650 bits across the card.
- Designed for convenient behind-panel mounting.
- Card is returned or captured at user's option.
- Adaptable to IATA, ABA and THRIFT track requirements.

You name the card and the application. AMP has the card reader to match. For immediate information, call (717) 367-1105. Or write:
AMP Incorporated, Capitron Division,
Elizabethtown, PA 17022.

AMP
INCORPORATED

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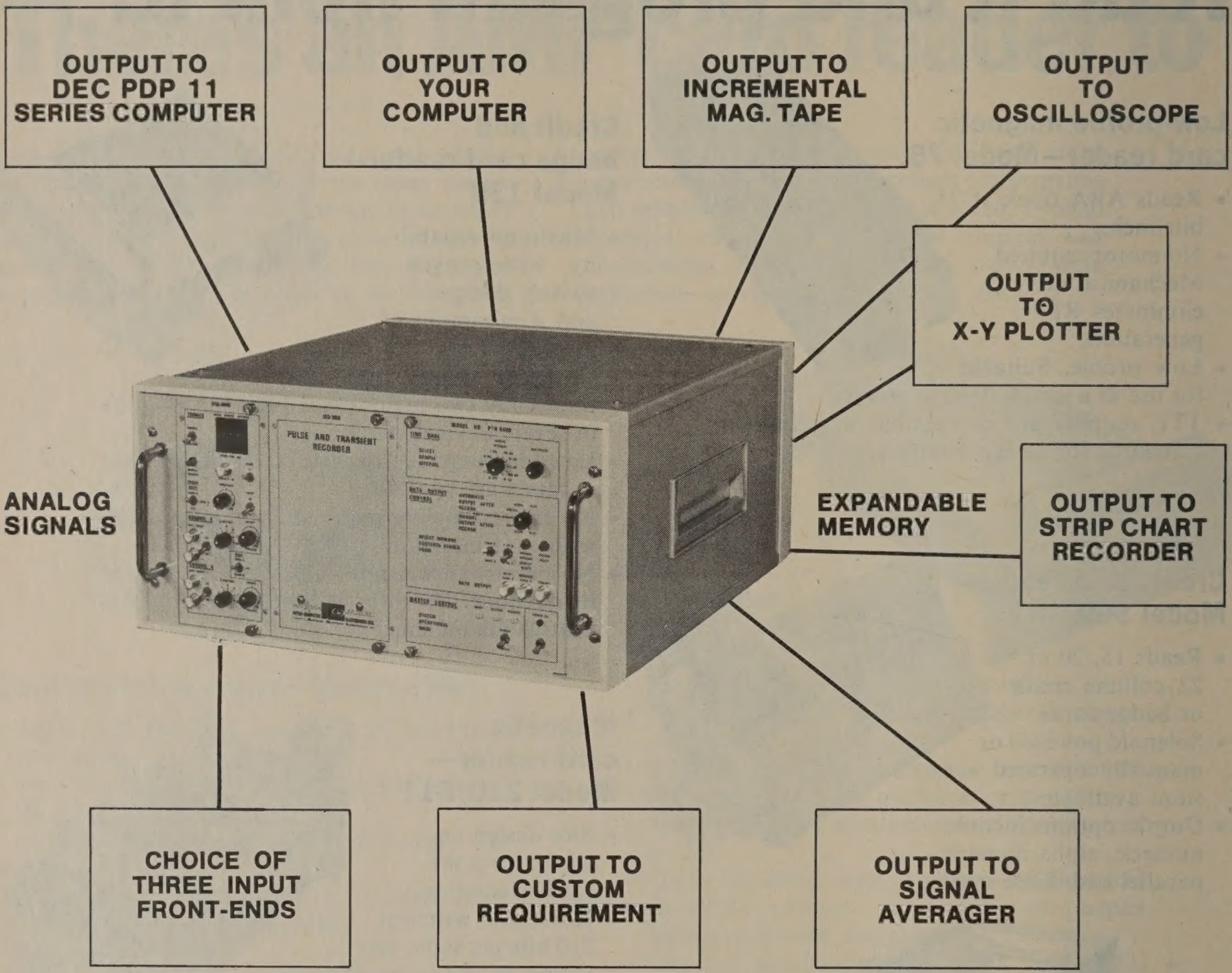
HIGH SPEED
TRANSIENT ANALYZERS & SIGNAL PROCESSING SYSTEMS


OUTPUT TO DEC PDP 11 SERIES COMPUTER
OUTPUT TO YOUR COMPUTER
OUTPUT TO INCREMENTAL MAG. TAPE
OUTPUT TO OSCILLOSCOPE
OUTPUT TO X-Y PLOTTER
ANALOG SIGNALS
PULSE AND TRANSIENT RECORDER
EXPANDABLE MEMORY
OUTPUT TO STRIP CHART RECORDER
CHOICE OF THREE INPUT FRONT-ENDS
OUTPUT TO CUSTOM REQUIREMENT
OUTPUT TO SIGNAL AVERAGER

FEATURES

- Sampling up to 100 MHz with 8-bit resolution
- Interfaces with I/0 of all Computers
- Standard Memory — 2048 words
- Expandable Memory — 8k, 16k and 32k words
- Records transient waveforms and repetitive signals
- Easily interfaced to TTY, printer, or magnetic tapes
- Complete remote of front-panel controls
- Analog output for oscilloscope, plotter and strip chart recorder
- Sampling interval from 10 nanoseconds to 50 seconds
- Split timebase, records two rates per memory record
- X vs Y recording
- Variable pretrigger mode stores data up to total memory capacity for baseline and leading edge of signal analysis

APPLICATIONS

- Laser Processing
- Nuclear Applications
- Medical Applications
- Process Control
- Radar Systems
- Spectral Analysis
- Chemical Analysis
- Electronic and Electrical
- Accelerated Food Processing
- Pollution Monitoring
- X-ray and Gamma Ray Detection
- Alpha, Beta Particle Recording
- Acoustical Analysis

AMERICAN ELECTRONIC LABORATORIES, INC.
DEPT. EM, P.O. BOX 552, LANSDALE, PA. 19446 (215) 822-2929 TWX: 510-661-4976

ANN ARBOR
TERMINALS, INC

DISPLAY TERMINALS

COMPANY

Ann Arbor is a broad-line manufacturer of CRT display and terminal equipment directed toward the OEM market. Ann Arbor was incorporated in Michigan in 1970, and is wholly owned by its employees. It has delivered over 8000 terminals to date, and is currently delivering at a rate of over 300 terminals per month.

PRODUCTS

Ann Arbor utilizes a building-block approach to its product line. Its products are composed of highly-modular, functionally-partitioned PC boards, each of which is generalized and packed to provide a maximum of function and flexibility. This enables the company to offer an extraordinarily broad line of standard products and options at an economical price.

In addition, this approach enables the company to respond well to "custom" needs. Ann Arbor offers an X-MOD service aimed at the customer's low-volume, minor-change-to-standard-product requirements, and a Q-MOD service aimed at his high-volume, special requirements.

X-MOD SERVICE

Ann Arbor offers its X-MOD service where the customer requires a relatively simple modification to a standard unit and where the quantity required does not economically justify PC redesign, development of production and test fixtures, and preparation of formal product documentation. X-MOD's are accomplished by a technician who orders the closest standard unit from production and modifies it to the customer's requirements.

Q-MOD SERVICE

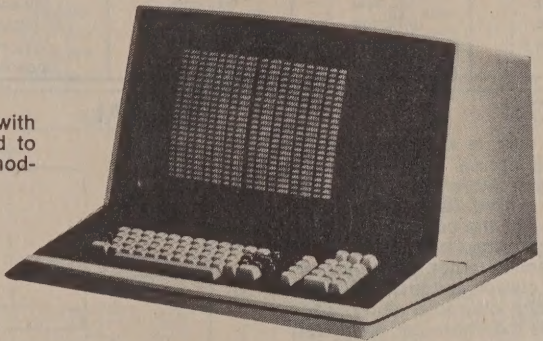
Ann Arbor offers its Q-MOD service where the customer requires major design changes to an existing product, or a completely new design. Q-MOD's are accomplished by a product engineer who develops and documents the product to the customer's specifications, releases it to production, and monitors the early deliveries to assure that the production test and QA procedures are adequate to assure delivery of a reliable, quality product. A non-recurring engineering (NRE) charge is included in Q-MOD quotations to cover these costs.

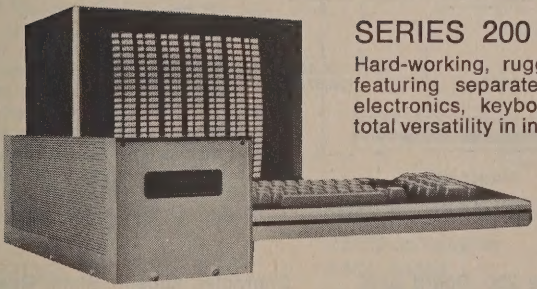
ORDERING

Ann Arbor's standard product line offers an enormous number of possible combinations of products and options and multiple options. Some combinations are not available. They are not technically viable or operationally practical. Others are available only in quantity. Purchase orders should be based on factory quotation only.

DESIGN III

High-performance desktop model with separable matching keyboard, styled to complement the decor of the most modern surroundings.



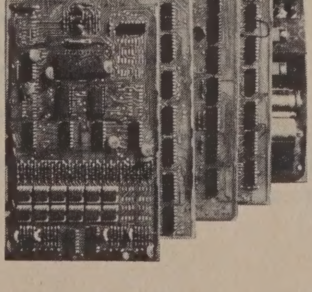


SERIES 200

Hard-working, rugged modular concept featuring separately-packaged display electronics, keyboard, and monitor for total versatility in industrial environments.

BOARD SETS

Pre-engineered memory, timing, cursor, and signal conversion functions in easy-to-use PC module form, for the OEM who prefers to package his own terminal electronics.



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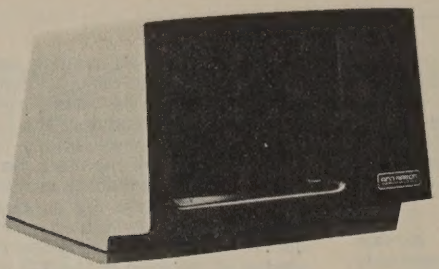
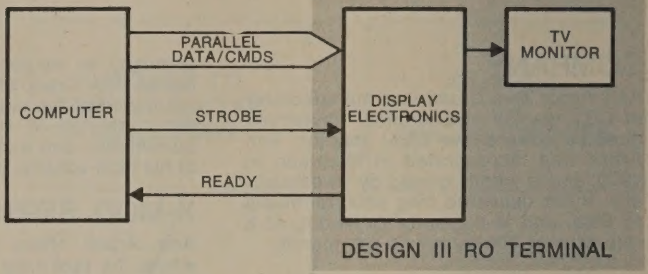
ANN ARBOR
TERMINALS, INC

RO TERMINALS





DESIGN III RO TERMINAL

RO MODEL	R1632D	R2440D	R2050D	R1680D	R2480D	R4080D
DISPLAY						
No. chars.	512	960	1000	1280	1920	3200
Chars. x lines	32x16	40x24	50x20	80x16	80x24	80x40
SCREEN						
Size (diag.)	14″	14″	14″	14″	14″	14″
Phosphor	P4	P4	P4	P4	P4	P39
Viewing area	10″x8″	10″x8″	10″x8″	10″x8″	10″x8″	10″x8″
CHARACTERS						
Char. set	64	64	96	64	64	96
Char. code	ASCII	ASCII	ASCII	ASCII	ASCII	ASCII
Char. case	Upper	Upper	Upper/lower	Upper	Upper	Upper/lower
Dot matrix	5x7 dots	5x7 dots	7x9 dots	5x7 dots	5x7 dots	7x9 dots
Dot field	8x12 dots	8x10 dots	10 x12 dots	8x12 dots	8x10 dots	10x13 dots
Size (nom.)	.18″x.27″	.17″x.23″	.15″x.25″	.09″x.22″	.09″x.22″	.09″x.16″
Cursor	Underline	Underline	Underline	Underline	Underline	Underline

OPERATION

The displayed data is stored in and refreshed from an internal refresh memory. The data remains stored and displayed until changed by the data source. The data is written and the cursor positioned under control of the memory address register. Characters enter at the cursor position. The cursor automatically advances after each character entry. Each entry overwrites the character previously displayed at that position; no other data on the screen is affected. Advance of the cursor past the end of a line automatically advances it to the beginning of the next line. Advance of the cursor past the end of the bottom line advances the cursor to the beginning of the top line (Page display) or all lines move up one, the bottom line clears, and the cursor remains in the bottom line (Roll display).

COMMANDS

Erase screen (clear and home)
Carriage return, line feed
Cursor left, right, up, down, and home
Cursor x-y positioning (absolute cursor address)

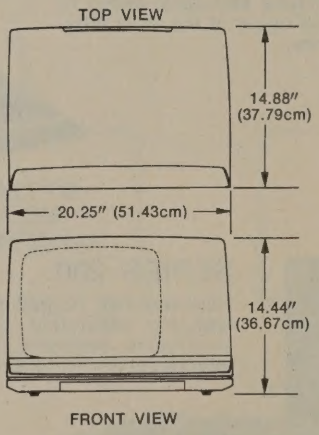
SWITCHES

S1: ROLL/PAGE

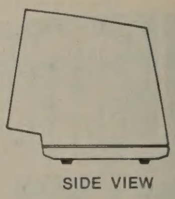
DATA INPUT

7-bit parallel TTL
ASCII-coded
Up to 1600 char/sec asynchronous

PHYSICAL



Weight:
40 lbs. (17.4 kg)
Power:
105-125 VAC, 60 Hz
Temperature:
+10° to +40°C (operating)
−40° to +70°C (storage)
Humidity:
0-95% non-condensing



OPTIONS

Case Options: Series 200, Board Sets

CR/LF Options: Auto LF on CR, New Line, Hold at EOL

Serial Interface: RS232, 20mA, 60mA, TTL Inputs

Baud Rates: 110, 300, 600, 1200, 1800, 2400, 4800, 9600

Baud Controls: Dual, Switched, Keyed, Split

Parity: Even, Odd, Mark, Space

Character Accent: Blink, Dual Intensity, Reverse Video

X-Y Loading

RO Multidrop

Soft-Copy Add-On

External Sync

Export Models

CAUTION: Some combinations of products and options are unavailable. Others are available only in quantity. Orders should be based on factory quotation only.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

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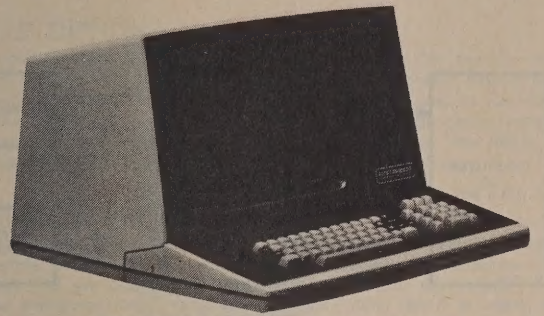
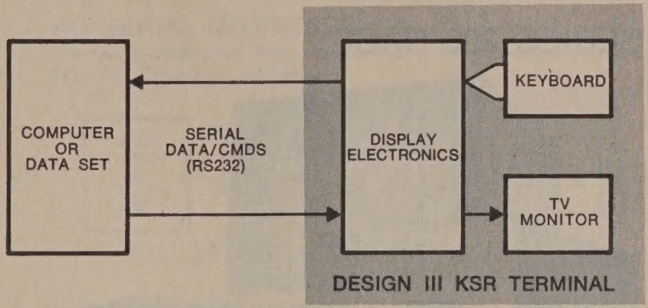
ANN ARBOR TERMINALS, INC

KSR TERMINALS





KSR MODELS	K1632D	K2440D	K2050D	K1680D	K2480D	K4080D
DISPLAY						
No. chars.	512	960	1000	1280	1920	3200
Chars. x lines	32x16	40x24	50x20	80x16	80x24	80x40
SCREEN						
Size (diag.)	14″	14″	14″	14″	14″	14″
Phosphor	P4	P4	P4	P4	P4	P39
Viewing area	10″x8″	10″x8″	10″x8″	10″x8″	10″x8″	10″x8″
CHARACTERS						
Char. set	64	64	96	64	64	96
Char. code	ASCII	ASCII	ASCII	ASCII	ASCII	ASCII
Char. case	Upper	Upper	Upper/lower	Upper	Upper	Upper/lower
Dot matrix	5x7 dots	5x7 dots	7x9 dots	5x7 dots	5x7 dots	7x9 dots
Dot field	8x12 dots	8x10 dots	10 x12 dots	8x12 dots	8x10 dots	10x13 dots
Size (nom.)	.18″x.27″	.17″x.23″	.15″x.25″	.09″x.22″	.09″x.22″	.09″x.16″
Cursor	Underline	Underline	Underline	Underline	Underline	Underline

KEYBOARD

Upper/lower case terminals use the Ann Arbor KB300C Keyboard; upper case only terminals use the KB300B Keyboard. See OPTIONS-KEYBOARDS.

OPERATION

The terminal operates in the same manner as a KSR TTY terminal. As the operator strikes each key, its character code is sent to the computer as an asynchronous serial character at the specified baud rate. If the terminal is set for full-duplex, the computer echoes back the character (or an error message) to the terminal's memory, whereupon it is displayed on the screen. If the computer is not programmed for echo-back, the terminal may be set for half-duplex, whereupon the character is fed back into the terminal's memory as it is transmitted. In either case, the incoming data is stored and displayed as described for the RO terminal.

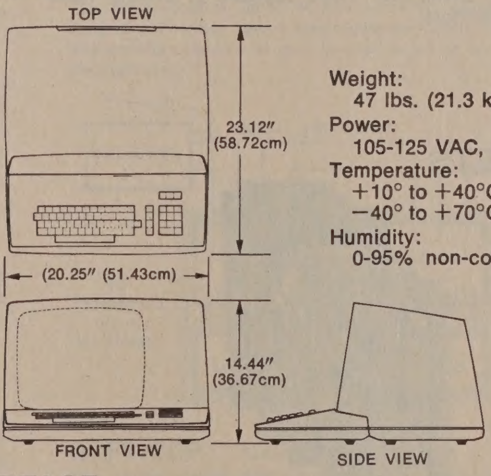
COMMANDS

Erase screen (clear and home)
Carriage return, line feed
Cursor left, right, up, down, and home
Cursor x-y positioning (absolute cursor address)

SWITCHES

S1: ROLL/PAGE
S2: LOCAL/LINE
S3: FULL/HALF DUPLEX

PHYSICAL



Weight:
47 lbs. (21.3 kg)
Power:
105-125 VAC, 60 Hz
Temperature:
+10° to +40°C (operating)
−40° to +70°C (storage)
Humidity:
0-95% non-condensing

DATA INTERFACE

RS232-compatible
ASCII-coded
Up to 9600 baud asynchronous

OPTIONS

Case Options: Series 200, Board Sets
CR/LF Options: Auto LF on CR, Hold at EOL
Interface: RS232, 20mA, 60mA, TTL
Baud Rates: 110, 300, 600, 1200, 1800, 2400, 4800, 9600
Baud Controls: Dual, Switched, Keyed, Split

Parity: Even, Odd, Mark, Space
Character Accent: Blink, Dual Intensity, Reverse Video
Batch Transmit
Protected Data
Printer Output
Export Models

CAUTION: Some combinations of products and options are unavailable. Others are available only in quantity. Orders should be based on factory quotation only.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

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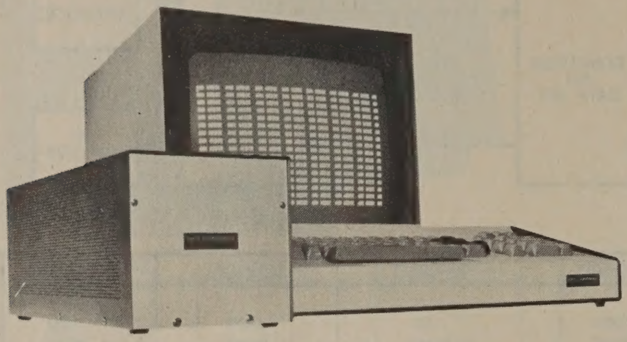
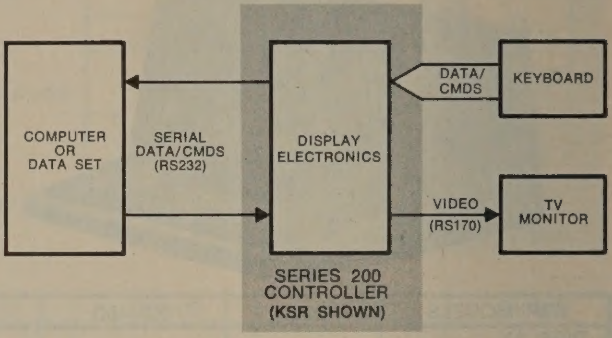
ANN ARBOR TERMINALS, INC

CASE OPTIONS

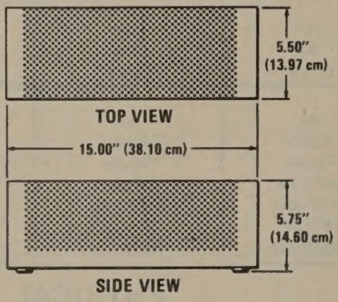
SERIES 200 CASE

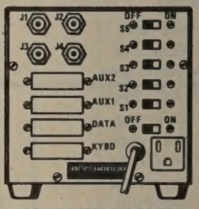



COMPUTER OR DATA SET
SERIAL DATA/CMDS (RS232)
DISPLAY ELECTRONICS
DATA/ CMDS
KEYBOARD
VIDEO (RS170)
TV MONITOR
SERIES 200 CONTROLLER (KSR SHOWN)

All Ann Arbor terminals are available in the Series 200 Controller case. The Series 200 contains the same display electronics as the Design III, packaged for use with free-standing keyboards and monitors. The Series 200 is more rugged and less expensive than the Design III and permits the user greater freedom in tailoring his terminal configuration and monitor size to his specific application. The Series 200 interface is identical to the Design III, except that a keyboard input connector is added to the KSR units and a video output connector to all units. The keyboard input requires 7-bit-parallel ASCII data and a rising-edge strobe at TTL levels. The video output provides RS170-compatible composite video capable of driving most commercial TV monitors.

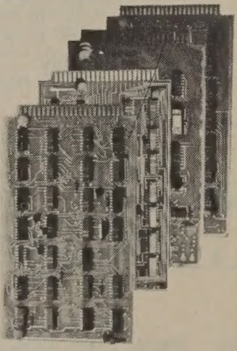
PHYSICAL

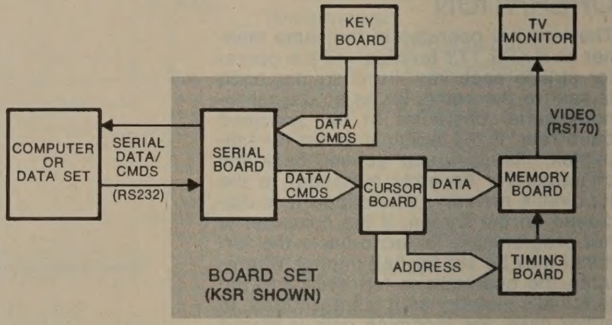

5.50" (13.97 cm)
TOP VIEW
15.00" (38.10 cm)
5.75" (14.60 cm)
SIDE VIEW


J1
J2
J3
J4
OFF
ON
S5
S4
S3
S2
S1
AUX2
AUX1
DATA
KYBD

CONNECTOR PANEL

BOARD SETS




KEY BOARD
TV MONITOR
VIDEO (RS170)
DATA/ CMDS
COMPUTER OR DATA SET
SERIAL DATA/ CMDS (RS232)
SERIAL BOARD
DATA/ CMDS
CURSOR BOARD
DATA
MEMORY BOARD
ADDRESS
TIMING BOARD
BOARD SET (KSR SHOWN)

All Ann Arbor terminals are available to qualified OEM's as board sets. These are the same printed circuit boards used in the Design III. When interconnected and powered according to documentation supplied, they perform all the functions of the applicable Design III specification. Board sets are supplied in groups of 25 sets minimum of a given model. The typical terminal board set consists of 4 boards: Timing, Memory, Cursor, and Serial. The Timing board generates the raster scan and memory timing for the specified character format, generates the timing for character-addressable memory load, generates the cursor video, and provides for asynchronous input control of memory load. The Memory board stores the full screen of data and generates the composite video for display of the data on the TV monitor. The Cursor board buffers incoming data to memory, holds cursor address, and mechanizes the roll/page and command set operations. The Serial board converts incoming serial data to bit-parallel for the Cursor board, converts bit-parallel keyboard data to serial for transmission, and provides gating for local, half-, and full-duplex operation.

PHYSICAL

Size: 4.5" x 8" (11.43 cm x 20.32 cm)
Spacing: 0.5" (1.27 cm), except 1" (2.54 cm) for memory only
Connector: PC edge-card on 4.5" end
Mating: Dual 22-pin, 0.156" (3.962 mm) c-c
Power: ±5 and ±12Vdc, ±2%
Accessories: Power Supply

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ANN ARBOR TERMINALS, INC

OPTIONS

CR/LF OPTIONS

Ann Arbor terminals are factory preset to require both CR- and LF-codes to start a new line before end-of-line, and provide automatic wrap-around to new line at end-of-line. The AUTO LF ON CR option enables automatic line-feed on receipt of the CR-code alone. The NEW LINE option enables automatic carriage-return on receipt of the LF-code alone. The HOLD AT EOL option inhibits the automatic wrap-around at end-of-line.

SERIAL INTERFACE OPTIONS

Ann Arbor serial-data terminals are factory configured with an RS232-compatible interface for use with data sets, couplers, and computer TTY channels that are strapped, or strappable, for RS232. Alternatively, they can be configured for current-loop operation, either 20mA or 60mA, for applications requiring direct TTY replacement and/or high noise immunity. For special applications, the terminals can be provided instead with a TTL-logic-level interface.

BAUD RATE OPTIONS

The terminals are factory preset to one of the following baud rates, specified on order: 110, 300, 600, 1200, 1800, 2400, 4800, 9600 baud. The following baud rates are additionally available on some models: 50, 75, 135, 150, 900, 3600, 7200 baud.

BAUD CONTROL OPTIONS

The baud rate is preset by a jumper on the terminal's Serial board. It can be changed in the field by a qualified technician. The following options are offered for applications requiring easier field-selection. DUAL BAUD provides external-switch-selection between two preset baud rates, specified on order. SWITCHED BAUD provides internal switch selection of all available rates. KEYED BAUD provides keyboard selection of all available rates. SPLIT BAUD is offered for applications that require the terminal to send data at one baud rate and receive at another.

PARITY OPTIONS

The terminals are factory preset to generate either Mark or Even parity on outgoing data, depending on model, and to ignore parity on incoming data. The PARITY option permits specification, on order, of Even, Odd, Mark or Space parity on outgoing data, and parity detection on incoming data with errors displayed as a "?" symbol.

CHARACTER ACCENT

This option enables the characters on Ann Arbor terminals to be displayed with visual accents, to highlight or call attention to them, under command (computer or operator) control. Accents vary on individual models but include blink, dual intensity, and reverse video.

EXTERNAL SYNC

This option enables the video from Ann Arbor terminals to be superimposed on ordinary TV picture video. The terminal takes in either picture video or composite sync from the video source and puts out the same signal with the characters on the screen added to it. Controls are provided to add the full-screen of characters, just the bottom line (window), or none at all. A rotate command allows the successive lines on the screen to be rotated into the window. A manual sync control allows the window to be positioned wherever desired in the program output.

SWITCHABLE 0832

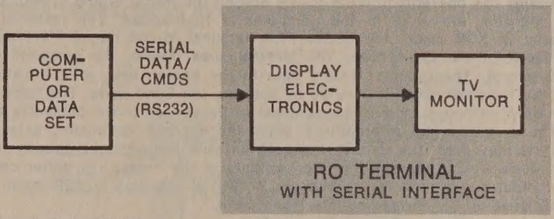
This option enables Ann Arbor 1632 terminals (16 lines x 32 characters) to display, and be operated, as 0832 terminals (8 lines x 32 double-height characters) under command or switch control. The option is particularly applicable to RO's because of the increased viewing range, but can also be applied to KSR's.

EXPORT MODELS

This option enables Ann Arbor terminals to operate to export power and TV standards.

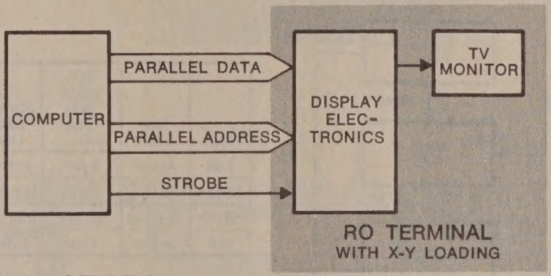
RO SERIAL INTERFACE

This option enables Ann Arbor RO terminals to be written from a bit-serial, instead of bit-parallel, data source.


COMPUTER OR DATA SET
SERIAL DATA/ CMDS
(RS232)
DISPLAY ELECTRONICS
TV MONITOR
RO TERMINAL
WITH SERIAL INTERFACE

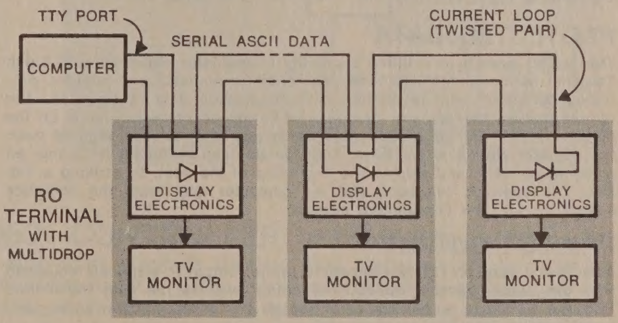
X-Y LOADING

This option enables Ann Arbor RO terminals to be written from a data source that specifies, in parallel, both a character and the x-y position on the screen at which the character is to be displayed.


COMPUTER
PARALLEL DATA
PARALLEL ADDRESS
STROBE
DISPLAY ELECTRONICS
TV MONITOR
RO TERMINAL
WITH X-Y LOADING

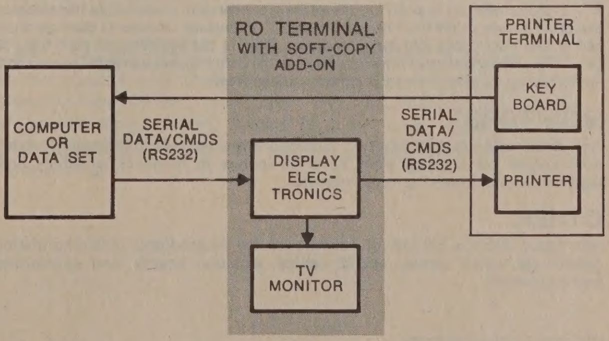
RO MULTIDROP

This option enables up to 64 Ann Arbor RO displays to be remotely addressed and written over a single communications line. The address structure permits selection of one, several, or all of the displays to be written simultaneously.


TTY PORT
COMPUTER
SERIAL ASCII DATA
CURRENT LOOP (TWISTED PAIR)
RO TERMINAL WITH MULTIDROP
DISPLAY ELECTRONICS
TV MONITOR
DISPLAY ELECTRONICS
TV MONITOR
DISPLAY ELECTRONICS
TV MONITOR

SOFT-COPY ADD-ON

This option enables Ann Arbor RO displays to be added to existing computer terminals (TTY's, printer terminals, data-storage terminals, other CRT terminals, etc.) for local, remote, or large-screen viewing of the printout.


RO TERMINAL WITH SOFT-COPY ADD-ON
PRINTER TERMINAL
KEY BOARD
COMPUTER OR DATA SET
SERIAL DATA/CMDS (RS232)
SERIAL DATA/ CMDS (RS232)
DISPLAY ELECTRONICS
PRINTER
TV MONITOR

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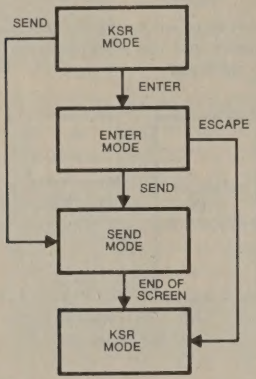
ANN ARBOR
TERMINALS, INC

OPTIONS

BATCH TRANSMIT

This option adds a screen-transmit capability to Ann Arbor KSR terminals. It enables the operator to write to the screen off-line at typing speed, and then transmit the entry to the computer at high-speed. The terminal is normally in KSR mode, full duplex. The terminal is put into ENTER mode on receipt of the Enter code. The terminal goes off-line; the computer can not interrupt. The operator enters data to the screen and, when finished, puts the terminal into SEND mode by entering the Send code. The terminal goes back on-line, transmits the contents of the screen to the computer and returns to KSR mode. Alternatively, when the operator is finished entering data, he may enter the Escape code which puts the terminal directly into KSR mode without transmitting the contents of the screen. In either case, the computer may read (or re-read) the screen at any time in KSR mode by simply sending (or re-sending) the Send code.



Mode	Key-board	Out-going Data Line from	In-coming Data Line
KSR	Active	Kybd	Active
ENTER	Active	Mark	Inactive
SEND	Inactive	Screen	Inactive
KSR	Active	Kybd	Active

EDIT

This option adds an editing capability to terminals equipped with the Batch Transmit option. The following functions are added under command control (operator or computer): Insert character, Delete character, Insert line, Delete line, Erase to end of line, Erase to end of page.

PROTECTED DATA

This option adds a form-filling capability to terminals equipped with Batch Transmit option. It features form generation by operator or computer, protected data-entry with tabulation, and compressed data-transmission. The option enables the operator or computer to set up protected fields on the screen. During ENTER mode, these fields are automatically skipped over; the operator cannot affect them. The operator can terminate entry into an unprotected field, and skip to the beginning of the next, by striking a Tab key. The operator can send and the computer may read, the complete screen or only the unprotected portions.

PRINTER OUTPUT

This option adds an RS232-compatible printer output to terminals equipped with the Batch Transmit option. The option enables the data transmitted from the screen to be steered to either the printer or computer under command control (operator or computer).

TRANSMIT CONTROL OPTIONS

These options are available for use with the Batch Transmit option. They permit the insertion of specified delays and/or control characters into the transmitted data stream. CTS CONTROL enables the start of data transmission to be controlled by a clear-to-send (CTS) input signal. START DELAY enables the start of transmission to be controlled by a preset delay. INSERT STX enables insertion of an STX-code as the first character of each data transmission, and an ETX-code as the last character. INSERT CR enables insertion of carriage return and/or line feed codes into the data transmission at the beginning of each line. CR DELAY enables insertion of a preset delay into the data transmission at the beginning of each line, eg., to allow time for a printer carriage return.

MONITORS

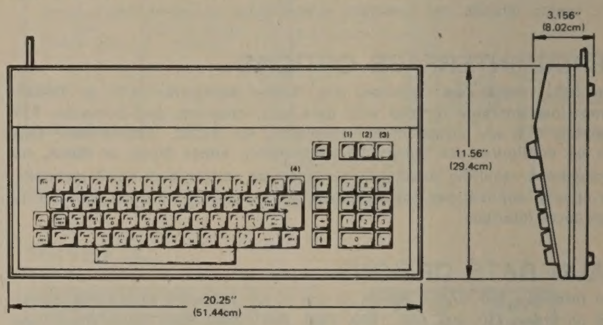
Ann Arbor offers a full line of TV monitors for use with its products. Available screen sizes range from 12 to 23 inches in diagonal to satisfy both near and distant viewing requirements.

OTHER

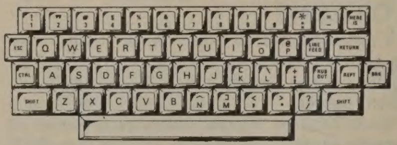
Ann Arbor offers a full line of accessories for its products, including mating connectors, video cables, RS232 cables, extender boards, and specialized test equipment.

KB300 SERIES KEYBOARDS

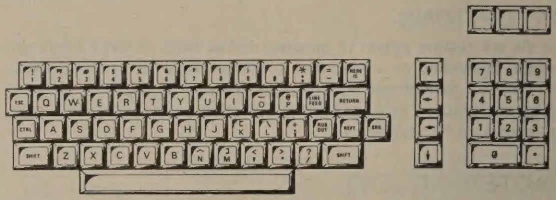
Ann Arbor KB300 Series keyboards are styled to match DESIGN III terminals. They are plug-compatible with both DESIGN III and Series 200 KSR units, and performance-compatible with Ann Arbor KSR controller board sets. Output is TTL-level 7-bit-parallel ASCII with rising edge strobe, via an integral cable and connector.



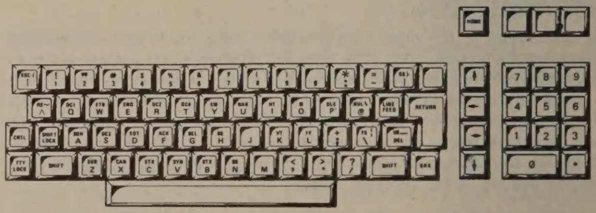
KB300A: 53 key, TTY33 type keyboard. Generates upper case character codes.



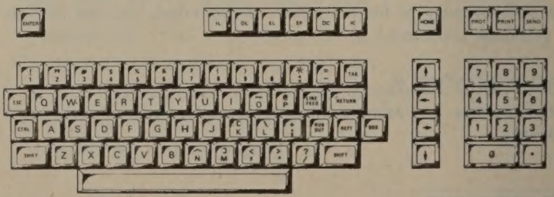
KB300B: 71 key, TTY33 type keyboard plus cursor and numeric pads. Generates upper case character codes.



KB300C: 77 key, TTY37 type keyboard plus cursor and numeric pads. Generates upper and lower case character codes, but special key locks keyboard into TTY33 upper-case-only code set when desired. All keys repeat at 15 char/sec when held down longer than ½ second.



KB300D: For Ann Arbor KSR terminals with batch transmit option. 79 key, TTY33 type keyboard including cursor and numeric pads. Generates upper case character codes.

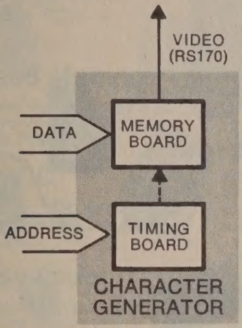


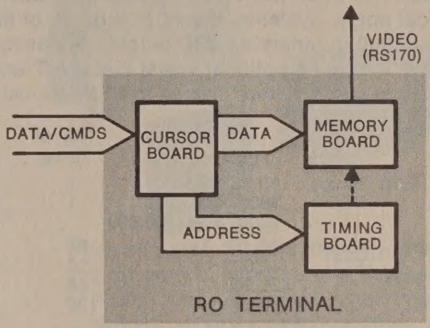
ANN ARBOR
TERMINALS, INC
6107 Jackson Road, Ann Arbor, Michigan 48103 / Tel: (313) 769-0926, TWX: 810-223-6033

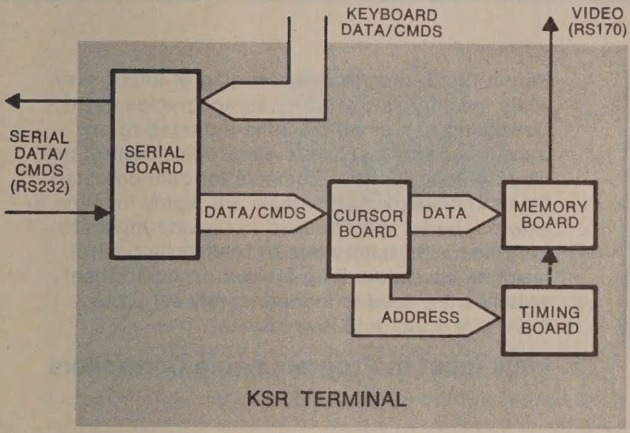
ANN ARBOR
TERMINALS, INC

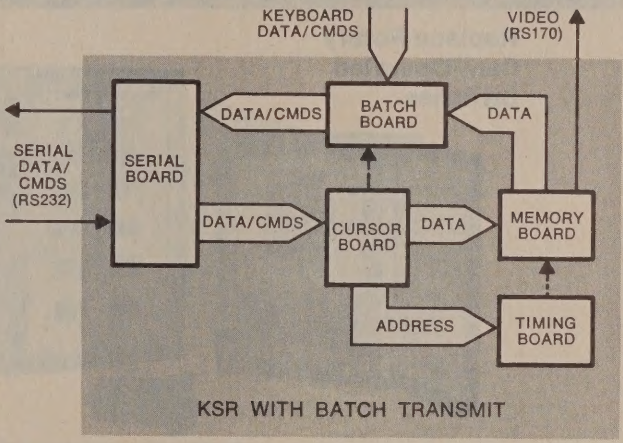
DESIGN MODULARITY

The design modularity of Ann Arbor's product line is illustrated below. It starts with a two-board character generator that displays characters in a specified format on the screen of a TV monitor. With the addition of a Cursor board, the character generator becomes Ann Arbor's standard RO terminal. With the addition of a Serial board (and a keyboard), it becomes Ann Arbor's standard KSR terminal. With the addition of a Batch board, it becomes the top of Ann Arbor's line: a KSR with Batch Transmit. All of the options available at the various stages of progression are the result of alternative strappings and/or stuffings of these PC boards.


VIDEO
(RS170)
DATA
MEMORY BOARD
ADDRESS
TIMING BOARD
CHARACTER GENERATOR


VIDEO
(RS170)
DATA/CMDS
CURSOR BOARD
DATA
MEMORY BOARD
ADDRESS
TIMING BOARD
RO TERMINAL


KEYBOARD
DATA/CMDS
VIDEO
(RS170)
SERIAL
DATA/
CMDS
(RS232)
SERIAL BOARD
DATA/CMDS
CURSOR BOARD
DATA
MEMORY BOARD
ADDRESS
TIMING BOARD
KSR TERMINAL


KEYBOARD
DATA/CMDS
VIDEO
(RS170)
DATA/CMDS
BATCH BOARD
DATA
SERIAL
DATA/
CMDS
(RS232)
SERIAL BOARD
DATA/CMDS
CURSOR BOARD
DATA
MEMORY BOARD
ADDRESS
TIMING BOARD
KSR WITH BATCH TRANSMIT

Q-MOD PRODUCTS

Ann Arbor manufactures a number of products, developed to the requirements of specific customers that have not been generalized to be included in its standard product line. A few representative examples are outlined below. If you have a requirement that involves converting digital data into video, the odds are good that Ann Arbor is currently manufacturing something very close to your requirement.

Q101 CONTROLLER The Q101 Controller provides a burst-loaded RO terminal in a Series 200 case, capable of displaying both alphanumerics and full-graphics in black-and-white or in color. Alphanumerics format is 80 characters x 16 lines. Graphics format is 255 dots horizontal x 192 dots vertical. Data input is bit-parallel TTL, 10 Khz to 1 Mhz asynchronous.

Q102 CONTROLLER The Q102 Controller provides two burst-loaded 80 x 16-character alphanumeric RO terminals in a single Series 200 case.

Q801 CONTROLLER The Q801 Controller provides a strip-chart graphics display, with alphanumeric labelling/annotation capability. The graphics data rolls down through the alphanumeric data, from top to bottom on the screen, at rates up to 60 points per second with 8-bit amplitude resolution.

Q1101 CONTROLLER The Q1101 Controller provides the display electronics for a complete 80x24 character alphanumeric RO terminal on a single PC board.

Q2001 CONTROLLER The Q2001 Controller provides the display and control electronics for up to 32 complete data-entry/data-editing terminals. The electronics are packaged, one terminal per PC board, in a 19″ relay rack. The terminal keyboards and monitors can be located up to 300′ from the Controller.

ANN ARBOR
TERMINALS, INC

FACTORY SALES OFFICE
6107 Jackson Road
Ann Arbor, Michigan 48103
Tel: (313) 769-0926
TWX: 810-223-6033

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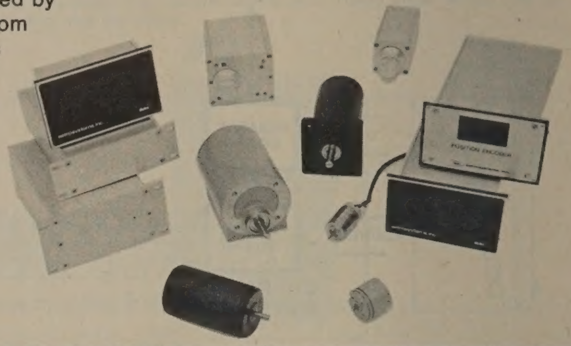
Industrial Controls

ENCODING SYSTEMS (Electromagnetic Absolute)

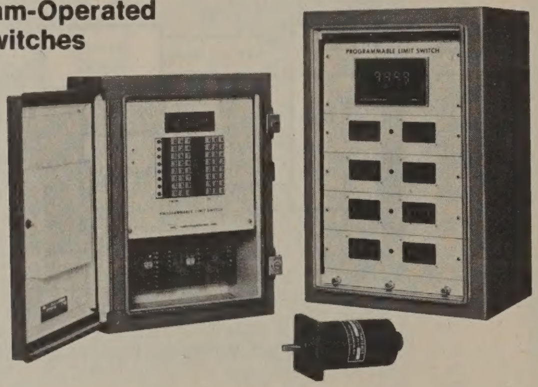
Rugged completely-passive magnetic transducers provide absolute position information, with a unique output for each position. Correct information is retained even when power is removed and readings are not affected by electrical noise. Systems offered in a range of full-scale counts from 360 to 10,000 in binary or BCD outputs. All associated electronics provided, including optional visual display. Transducers available in subminiature size or in NEMA housings.

Type	Code	Full Count	No. of Turns
Single Turn	Binary	10-15 Bits	1
	BCD	360, 1000 2000, 3600, 36,000	1
Multi-turn	Binary	16, 17 Bits	64
	BCD	10,000	10
		36,000	36
		100,000	100



Solid State Limit Switches

Replace Rotary Cam-Operated Switches



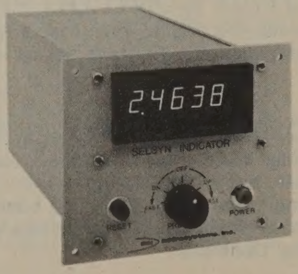
Permit rapid, remote programming of limits, even while machine is operating, to accuracies of 0.1°. Consisting of a small machine-mounted rotary transducer and a separate electronics control box, they are long-life replacements for cam-operated limit switches. Output signals are highly immune to external noise and are used to provide inputs to programmable controllers or to directly control machine operation. Plug-in keys or thumbwheel switches are used to independently set up to 8 pairs of upper and lower limits.

Ideal Input to Programmable Controllers

Solid State Selsyn Indicators

Accumulates and displays selsyn transmitter information

The ASI Solid State Selsyn Indicator is a replacement for electro-mechanical devices (including selsyn receivers, Productimeters and shaft angle encoders) which monitor the position of a selsyn transmitter or transmitter/differential transmitter combination. The highly reliable solid state unit has no moving parts, provides a bright five decade display.



Durapot

Electromagnetic DC-DC angular transducer

Wiperless D.C. potentiometers provide high reliability, very low noise level and low starting torque. Unique variable magnetic coupling produces a smooth, continuous D.C. output proportional to shaft rotation, with a linearity of 0.05% and a deadband of 0.02°. Available in subminiature or heavy-duty NEMA packages. Additional features include: short-circuit proof outputs, up to 20K ohm load and internal or external reference.

asi **astrosystems, inc.**

Dept. EM, 6 Nevada Dr., Lake Success, NY 11040, (516) 328-1725, TWX 510-223-0411

Synchro Instrumentation

Multi-speed multiplexed as well as single channel systems. All inputs, including reference, transformer isolated PCB mounting.

asi astrosystems inc
S/D CONVERTER
model no. MS 4401
asi astrosystems inc
S/D CONVERTER
model no. MS 4600
asi astrosystems inc
CONVERTER
model no. M5000

Single Speed Modules

Synchro-to-Digital Binary outputs of 8, 10, 12 and 14 bits. BCD outputs of 360, 1000 and 3600 counts.

Synchro-to-DC

Provides DC output from synchro input .1% and .1° resolution and accuracy available.

Digital-to-Synchro

Provides synchro outputs from 12 bit binary input.

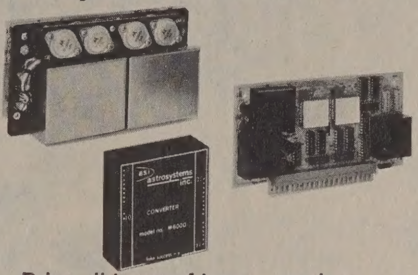
Dual Speed

Standard Module Sets accept dual-speed synchro inputs in the following ratios: 1:8, 1:10, 1:16, 1:20, 1:32, 2:36, and 1:64.

Multiplexing

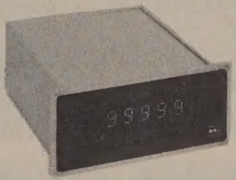
Convert multiple synchro inputs at high conversion rates. Multiplex mixed voltages and frequencies.

High Power Digital to Synchro Converters


asi astrosystems inc
CONVERTER
model no. M6000

Drive all types of torque receivers and/or control transformers. Accepts 12 or 13 bit binary information and convert to synchro or resolver information.

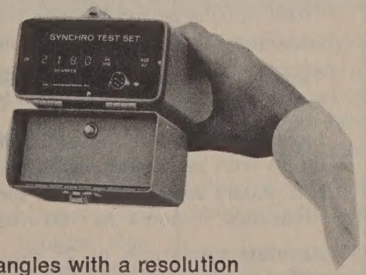
Angle Position Indicators



DIGITAL ANGLE INDICATOR
35999
PWR SYN RES
asi astrosystems, inc.

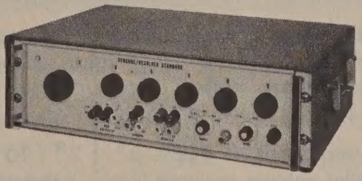
Completely electronic angle position indicators convert and display standard synchros and revolvers. Available in .01° or .01° accuracy and resolution. BCD outputs available. High accuracy C-500 autoranges for all standard voltages and frequencies and automatically compensates for synchro/resolver phase shifts.

Synchro Test Set


SYNCHRO TEST SET
2180
DEGREES

Portable self-contained instrument for rapid inplant testing of synchros and servos.
Displays synchro angles with a resolution of 0.1°. Front panel displays indicate the synchro frequency and voltage as well as the shaft angle.

Standards and Bridges


SYNCHRO/RESOLVER STANDARDS

Standards, Bridges and Decade Ratio Transformers test and simulate synchros, resolvers and servo systems. All units are accurate to 2 arc seconds with resolution from 15° to .0001°

asi astrosystems, inc.

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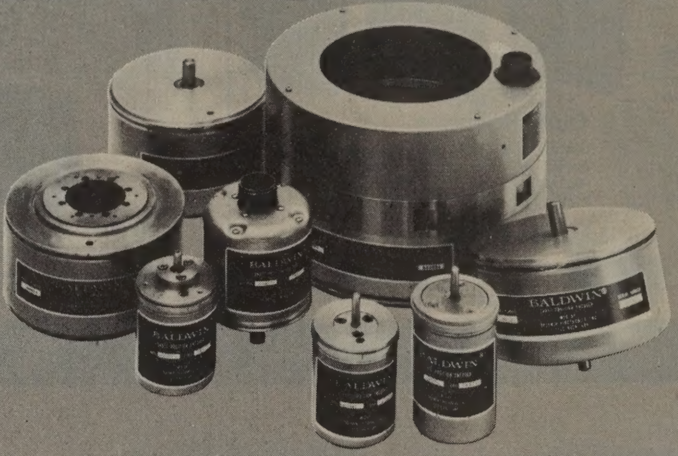
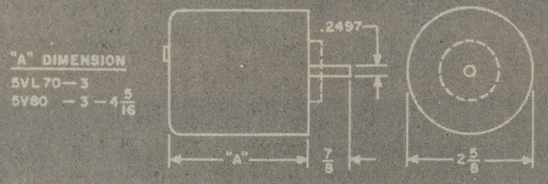
BALDWIN® ENCODERS



A COMPLETE LINE
OF LABORATORY TESTED AND FIELD PROVEN
OPTICAL ANALOG-TO-DIGITAL ENCODERS

5VL70 Series Incremental
5V80 Series Absolute



DOTTED PORTION—LOW TORQUE BEARING ASSEMBLY

Most economical encoders in the Baldwin line.

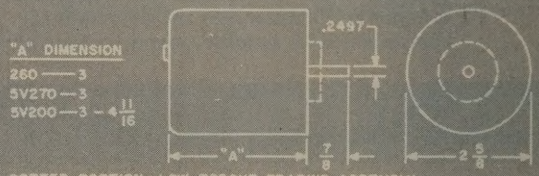
Incremental resolutions to 4096 counts per revolution with zero index available. Quadrature square wave or direction sensed pulsed outputs. Frequency response to 100 Khz. T^2 L compatible.

Absolute resolutions of 0-359, 2^8, 2^9, 10^3 and 2^{10}. Parallel outputs in cyclic binary, natural binary or BCD. Photocell or T^2 L compatible signal levels. Reverse count feature is standard. Gating option for sample and hold applications.

All feature single +5V operation, integrated electronics. 5V80 Series features field replaceable incandescent lamp. 5VL70 Series features long-life LED light source, (factory replaceable).

Options: low torque bearings, low inertia and metalized disks, thru shaft, side-exit cable and wide operating temperature range.

260 Series Tachometer
5V270 Series Incremental
5V200 Series Absolute



DOTTED PORTION—LOW TORQUE BEARING ASSEMBLY

These popular encoders offer high resolutions and a wide range of operating features in a small size.

Tachometer resolutions to 10,000 counts per revolution with zero index available. Frequency to 1 Mhz.

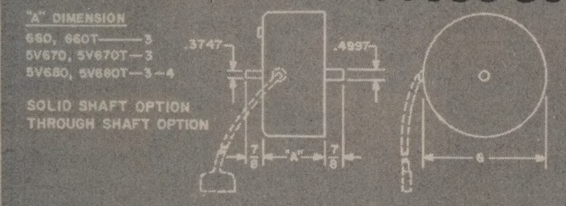
Incremental resolutions to 20,000 counts per revolution with zero index available. Photocell, quadrature square wave or direction sensed pulsed outputs. Frequency response to 100 Khz. T^2L compatible.

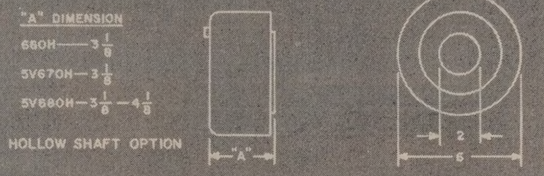
Absolute resolutions of 2^8 thru 2^{14}, 10^3, 0-3599, 10^4. Parallel outputs in cyclic binary, natural binary or BCD. Photocell or T^2L compatible signal levels. Reverse count feature is standard. Gating is optional.

Incremental and absolute encoders feature +5V operation. All have self-contained integrated electronics and easily accessible, single field replaceable lamp.

Options: Ruggedized and low torque bearings, low inertia and metallized disks, side exit cable, wide operating temperature range.

660 Series Tachometer 5V670 Series Incremental 5V680 Series Absolute





Unique in the field of direct reading optical encoders, this group offers a combination of high resolutions, great frequency response and a wide choice of mechanical configurations.

Tachometer resolutions to 24,000 counts per revolution index available. Frequency to 1 Mhz.

Incremental encoders offer resolutions up to 48,000 counts per revolution with or without zero index. Photocell, quadrature square wave or direction sensed pulsed outputs. Frequency response to 100 Khz. T^2L compatible.

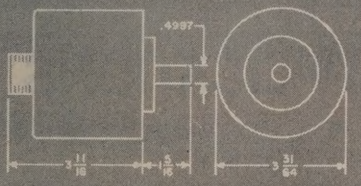
Absolute position encoders have standard resolutions of 2^{14} thru 2^{16}, 10^4 and 0-35999. Cyclic binary formats are offered in photocell or square wave output options. Natural binary or natural BCD outputs are other internal electronics options. Gating option is also available for customer sample and hold applications. Outputs are fully T^2L compatible.

Proprietary circuitry compensates for any changes in photocell levels due to temperature or supply voltage, thereby maintaining original accuracy. Electronic monitor output indicates marginal operation condition or power failure.

Incremental and absolute position encoders in these series feature single +5V operation. All employ integrated circuitry and a field replaceable lamp. Single, thru and hollow shaft designs are standard.

Options: Metallized disks, special bearing designs, serial outputs, wide operating temperature range.

3700 Series Incremental

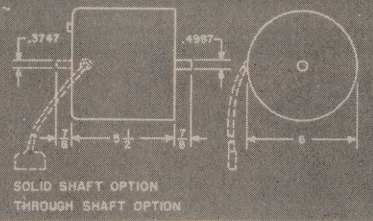


Most rugged encoder offered in the Baldwin line. Designed expressly for industrial applications.

Encoder is completely sealed against hostile environments. Heavy duty bearings, ½ inch shaft with contacting seal. Solid state, vibration immune light source. Internal integrated electronics with quadrature square wave or direction sensed pulsed outputs from noise rejecting differential line drivers.

Resolutions to 12,700 counts per revolution with zero reference option. Dual inch/metric resolution options have electrically selectable outputs. Disk is metallized glass.

690 Series Optical Resolver



This line of Baldwin absolute position encoders uses patented techniques to extend resolutions to 2^{17} thru 2^{20} per revolution while maintaining a 6 inch package diameter.

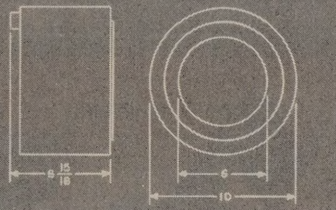
Internal electronics is integrated circuitry. Outputs are T^2L compatible.

Electronic compensation circuitry maintains accuracy for wide changes in temperature or power supply voltages. Dual detection stations cancel effects of bearing errors.

Solid and thru shafts are standard configurations. Lamps are field replaceable.

Options: Serial outputs, CW shaft rotation for increasing count, wide operating temperature range.

1190 Series Optical Resolver

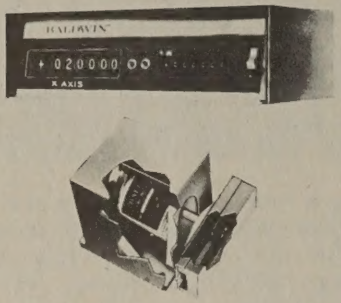


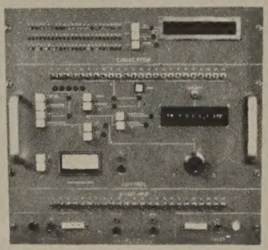
The 1190 Series with a hollow shaft feature complements the 690 Series optical resolvers. Resolutions of 2^{17} thru 2^{20} are standard.

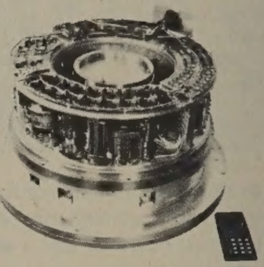
All features of 690 Series are incorporated in this design. Six inch hollow shaft permits passage of large waveguides or slip ring assemblies.

Construction is all stainless steel for strength and integrity.

ENCODER SYSTEMS







RPR SYSTEM

The BEI rack and pinion (RPR) system may be used to upgrade or retrofit mills, lathes, grinders, drills, etc. that would benefit from 1, 2 or 3 axis readout or control.

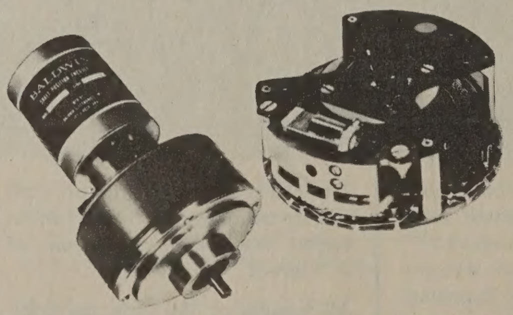
System consists of 3700 Series incremental encoder with precision pinion, housed rack, anti-backlash encoder mount, BC60 display and interfacing hardware and cables.

System resolution is .0005 in. or .01mm. Enclosed rack is supplied pre-assembled and pre-calibrated.

ULTRA-LOC™ SYSTEM

The "Ultra-Loc" System is a new Direct Drive Rate and Position System that features a 20,000-to-one speed range selectable by computer interface, 8421 BCD format, or manually controlled by thumbwheel switches. This direct drive system features slow rate capability 100 times less than sidereal with an error bit update rate over 3,000 Hz, eliminating the usual drive "jitter" or "bearing" noise.

The system is also offered as components consisting of the motor/optical encoder positioner and separate control electronics. Torque ranges from a few in./oz. to over 100 ft./lb. can be specified. Absolute-position information by optical encoder is offered thru 24-bits. The system is available in three standard model ranges of 12-14 bits, 14-16 bits and 17-21 bits and is designed as an OEM Drive System capable of being integrated with an existing Gimbal or Pedestal design.



CUSTOM APPLICATIONS

BEI's technical personnel stand ready to assist in applying encoders in custom configurations.

Unusual linear or non-linear codes, special supply voltages, RFI shielding, output interface buffers and parallel/serial converters.

Direct mounting on torque motor drives or low inertia capstan motors.

Compact designs containing 2^{13} bits in a size 11 servo package, multiturn configurations.

Space and military applications requiring high reliability criteria.

SALES OFFICES

Arnold, Maryland 21012 • Phone (301) 757-5904
El Segundo, California 90245 • Phone (213) 322-0655
Cincinnati, Ohio 45226 Phone (513) 321-1121
Orlando, Florida 32806 • Phone (305) 859-5966
Euless, Texas 76039 • Phone (817) 267-9351

EXCLUSIVE MANUFACTURERS OF THE BALDWIN® ENCODER

BEI

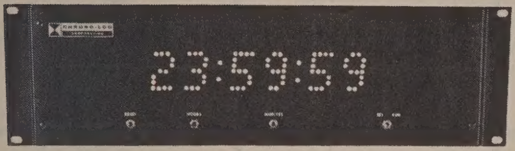
BEI Electronics, Inc.
Controls and Instruments Division

1101 McAlmont Street ■ Post Office Box 3838 ■ Little Rock, Ark. 72203
Phone 501-372-7351 ■ TWX 910-722-7384

CHRONO-LOG CORPORATION

1957-1977
OUR 20th
YEAR

BIG TIME DISPLAY CLOCKS



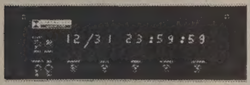
VISIBLE FROM 75 FEET

Features:

- **1½″ LED shaped characters**
- **Rack, panel or shelf mount**
- **24 or 12 hour time**
- **115/230 V., 50/60 Hz**

Options include standby battery, internal oscillator, parallel input, retransmitting Remote Displays, 12 V. DC power.

DIGITAL CLOCK/CALENDARS



SERIES 70,000
LED CLOCK/CALENDAR

- **Internal standby battery feature**
- **Panel or rack mounting**

CHRONO-LOG DIGITAL CLOCKS and CALENDARS are used wherever a digital BCD output of real or elapsed time is required, such as in data logging, data transmission, data processing, telemetry, and digital print-out systems. They can also provide outputs for driving remote digital time displays.

The Clock/Calendars provide buffered parallel and/or character-serial (bit parallel) TTL compatible BCD outputs of time.

- Digital Clocks with NIXIE® front panel displays, extended time ranges, and up/down clock/counters also available.

TIME CODE INSTRUMENTS

SERIES 9,000 TIME CODE READER
TIME CODE GENERATOR/READER

CHRONO-LOG TIME CODE GENERATORS and READERS generate and read serial modulated carrier time codes on analog magnetic tape recorders and transmission lines. DC level shift codes are also generated for oscillographic strip chart recorders.

IRIG and NASA codes are available. Multicode and slow code models as well as Automatic Tape Search Systems can be furnished.

ACCESSORY UNITS

VIDEO CHARACTER GENERATORS — accept up to 16 BCD digits from Chrono-log Instruments or other sources and generate a video signal for displaying the data on a video monitor or inserting the data into a video signal. Fixed alphanumeric characters, stored in a PROM in the Character Generator, can be included as part of the display.

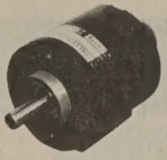
STANDBY POWER PACKS — rechargeable battery units which provide +5 V DC standby power for Chrono-log Digital Clocks and Time Code Generators. Three different capacities are offered: 2.5, 12.5 and 30 amp-hours.

OUTPUT BUFFERS — accept a 21 bit TTL input word (normally hours, minutes, seconds and Power Failure bit) and produce up to ten (10) outputs to drive remote displays and data systems.

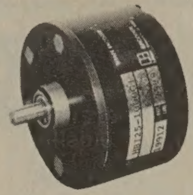
COMMUNICATIONS COUPLERS — accept serial or parallel BCD inputs from Chrono-log Units or similar devices and produce an ASCII Character output, bit serial, in the form of a 20 ma. or 60 ma. current loop, a TTL level shift output or an RS-232C output.

CHRONO-LOG CORPORATION / DEPT. EM, 2 WEST PARK RD., HAVERTOWN, PA. 19083 / PHONE: (215) 853-1130

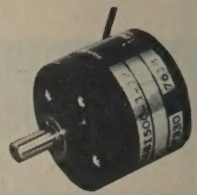
LITTON SHAFT POSITION ENCODERS

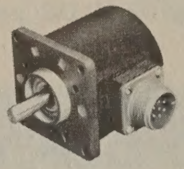

MODEL 70
OPTICAL
INDUSTRIAL
INCREMENTAL

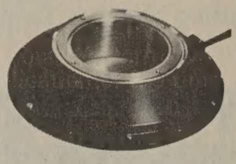
MODEL 71
OPTICAL
MODULAR
INCREMENTAL

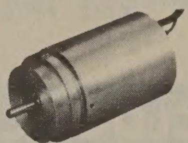

MODEL 72
OPTICAL
SIZE 25,
LOW COST, INCREMENTAL

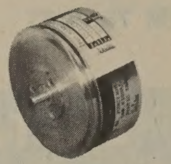
MODEL 73
OPTICAL
INCREMENTAL FOR
MOUNTING TO MOTORS

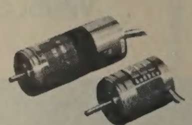

MODEL 74
OPTICAL
SIZE 15,
LOW COST, INCREMENTAL

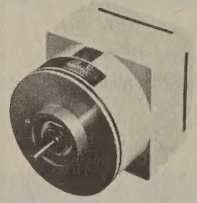

MODEL 76
LOW COST
OPTICAL
ABSOLUTE

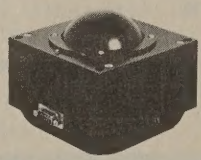

HOLLOW SHAFT
OPTICAL
INCREMENTAL
& ABSOLUTE

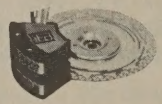

SIZE 25 & 35
ABSOLUTE
OPTICAL COMMERCIAL
& MILITARY

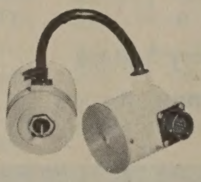

SIZE 25 & 35
INCREMENTAL
OPTICAL COMMERCIAL
& MILITARY

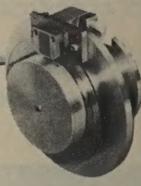

SIZE 11
PIN CONTACTS
ABSOLUTE
& INCREMENTAL


HEAVY DUTY
ABSOLUTE


TRACKBALL


OPTICAL
MODULAR
ABSOLUTE


MILITARY
SPECIALS


OUTER SPACE
APPLICATIONS

BEING THE WORLD LEADER IN OUR FIELD, WE HAVE DESIGNED ENCODERS TO MEET THE FULL SPECTRUM OF USER APPLICATIONS RANGING FROM THE SIMPLEST, LOW COST MODULAR ENCODERS TO THE MOST SOPHISTICATED ENCODERS FOR MILITARY AND NASA REQUIREMENTS.

IF YOU NEED DATA ON OUR PRODUCTS OR ASSISTANCE IN SELECTING THE RIGHT ENCODER FOR YOUR APPLICATION, PLEASE CONTACT:

THE MARKETING DEPARTMENT
LITTON ENCODER DIVISION
20745 NORDHOFF STREET
CHATSWORTH, CALIFORNIA 91311
TELEPHONE: (213) 341-6161 / TWX 910-494-1229

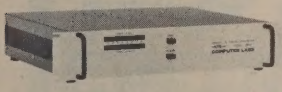
Litton **ENCODER DIVISION**

Data Converters...MHz Rates

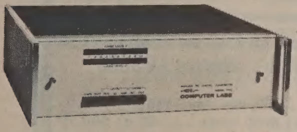
For Digital, Video, Radar, and Other High-Speed Data Acquisition Applications

Instruments

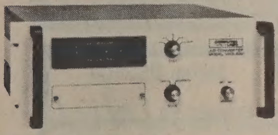
MOD-815/818 A/D
The MOD-815 and MOD-818 A/D's are ideal for TV digitalization at word rates up to 15 MHz and 18 MHz, respectively, at 8-bit resolution. ECL/TTL compatibility, various impedances, coding, and other options are available at no extra cost. Both have less than 30 ps aperture jitter and feature 2-card construction in less than 135 cu. in.



3815/3818 A/D
The 3815 and 3818 A/D's are self-contained 8-bit, 15-MHz and 18-MHz converters, respectively, with power supplies, front panel indicators, and built-in test words. Multiple no-cost options ease interfacing.



5000/7000 Series A/D
These high-speed precision instruments include internal track-and-hold, built-in test words, and power supplies. Bit resolutions of 6 bits through 10 bits at word rates through 10 MHz are available. Multiple no-cost options on input ranges, impedances, coding, and ac power ease system interfacing.



VHS Series A/D
The self-contained VHS Series offers the same features as the 5000/7000 Series at higher word rates: 6-bits at 75 MHz; 7-bits at 20 MHz; and 8-bits at 15 MHz.

TVDA "Deglitched" Series D/A
The TVDA Series of D/A's provide a "glitchless" output at update rates of 15 MHz at 8-bit and 10-bit accuracies. An internal deglitcher suppresses transients in the analog output of the converter, making this series ideal for reconstructing TV or other video signals. The TVDA's lead a broad line of D/A's that complement all of Computer Labs line of high-speed A/D's.

And more!

PDP-11 Compatible Disk Memory Systems. The new Computer Labs M3000 and M4000 Disk Memory Systems provide users of the DEC PDP-11 Minicomputer with a rapid access, mass storage memory system at a fraction of the cost of similar DEC systems. They offer 5 and 10 MBytes per disk system, respectively, with average positioning times as low as 35 milliseconds. In addition, Computer Labs offers a M 300A Bootstrap Loader at half the price of the equivalent DEC Loader.

Special Products. Computer Labs has extensive experience in supplying special products designed for use in various military and commercial programs.

Modules

MATV Video A/D
The MATV Series 8-bit A/D's are designed for direct digitalization of video signals. They are complete subsyitem modular devices which are ideally suited as cost effective television or radar digitizers since they can be used to digitize color TV at 3 times NTSC (dc to 11 MHz). The MATV is available for less than $1000 in quantity.

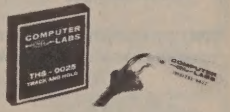
MDD Video "Deglitched" D/A
The MDD Series D/A's offer either 8-bit or 10-bit performance at update word rates from dc to 20 MHz. They have been designed for video reconstruction of digital signals and are ideal for CRT-driving applications. Each compact module contains an internal input register, high-speed D/A, deglitcher, and buffered output. Unit price is less than $400.

COMPUTER LABS
D/A CONVERTER
MDS-1020

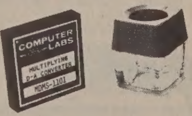
MDS/MDP High-Speed D/A
The MDS and MDP Series Converters are the world's fastest D/A's with settling times as low as 15 ns under worst-case conditions. They lead a broad line of Computer Labs D/A's containing over 50 models. The MDS/MDP Series is available in 8-bit, 10-bit and 12-bit versions with accuracies as good as ±0.01%.

COMPUTER LABS
DEGLITCHER
DGM-1040

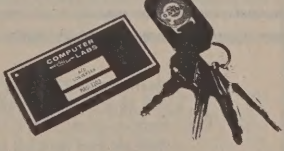
DGM D/A "Deglitcher"
Deglitchers can be used with almost any type of D/A to generate output signals with the extremely high spectral purity used for TV signal reproduction, CRT displays, waveform generation, and automatic test equipment. They can be used with update rates as high as 50 MHz.



THS/THC Track & Hold
These modules offer the broadest variety of track-and-hold (sample-and-hold) units available in the industry. In fact the THS-0025 is fastest track-and-hold in the world with an acquisition time of 15 ns and a bandwidth (3 db) of 60 MHz. These modules have been used to construct 13-bit A/D's with word rates as high as 10 MHz.



MDMS Multiplying D/A
The MDMS D/A's are the world's fastest two-quadrant multiplying D/A's available. Resolutions of 8,10, and 11 bits are available with analog and digital settling times less than 100 ns.



MAS A/D
These A/D's employ the latest high-reliability hybrid techniques to provide the customer with one of the smallest high-speed converters available. They are ideally suited for transient analysis, signal processing, radar, and fast process-control applications. This series is pin compatible with industry-standard A/D's.

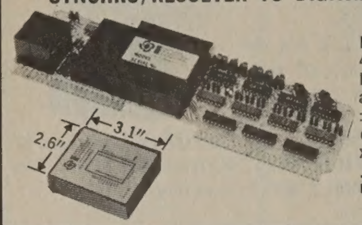
COMPUTER LABS

COMPUTER LABS, INCORPORATED
505 EDWARDIA DR. • GREENSBORO, N. C. 27409 • 919/292-6427

SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

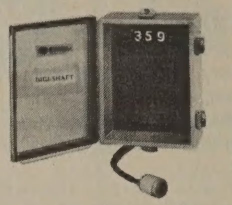
STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

SYNCHRO/RESOLVER TO DIGITAL Series SDC40/60



INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** 16, 14, 12, or 10 Bits parallel binary or BCD. **ACCURACY:** ±2, ±4, ±6 or ±30 minutes of arc. **PACKAGE:** A) 2.6" x 3.1" x .82"h Module B) 2.6" x 9.25" x .9"h or 4½" x 6½" x .75"h repairable PC card.

PROGRAMMABLE LIMIT SWITCHES Series DLS



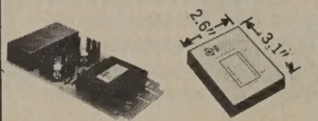
INPUT: Shaft angle position.
LIMITS: (A) Dwell (From-to): 8 per unit
(B) Set Point — 16 per unit
(C) Closure — 16 per unit
OUTPUTS: (A) Logic Levels
(B) Power Transistor
(C) Relay
(D) Display (LED)
ACCURACY: Up to ±.1°
PICKOFF: Resolver (size 15 or 11)
PACKAGE: (A) 19" x 12" x 8.75"h
(B) NEMA 12 — 16" x 12" x 8"

SYNCHRO/RESOLVER TO LINEAR DC Series SLD200

SYNCHRO TO LINEAR DC CONVERTER

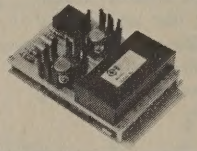
INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115vrms. **OUTPUT:** (A) −10 to +10 vdc linear with angles from −180° to +180° (standard) (B) 0 tc +10V DC linear with angle from 0° to 360° (special) (C) −10 to +10 vdc linear with angles from −90° to +90°. **ACCURACY:** ±6 minutes of arc at input speeds up to 1440°/sec, or ±15, ±30, ±60 minutes of arc. **PACKAGE:** (A) 2.6" x 3.1" x .82" Module; (B) 3.06" x 2.6" x 3.18"H Can; (C) 4.5" x 6.5" x .75"H repairable PC card.

DIGITAL TO SYNCHRO/RESOLVER Series DSC40/60



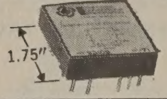
INPUT: 14, 12 or 10 bits parallel binary and 26/115 vrms reference. **OUTPUT:** 11.8/90 vrms. L-L, 60 or 400 Hz capable of driving 1VA, 2VA or 5VA LOADS: (up to 3 T.R.'s). **ACCURACY:** ±4, ±15 or ±30 minutes. **PACKAGE:** A) 2.6" x 3.1" x .82"h Module B) 4½" x 9¼" PC Card with edge connector (5VA units).

DC ANGLE TO SYNCHRO/RESOLVER Series LDS500



INPUT: ±10 vdc or ±100 vdc representing ±180° of angle. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving up to three size 11 T.R.'s (75 ohms L-L). **ACCURACY:** ±15 or ±30 minutes of arc. **PACKAGE:** (2) 4.5" x 9.25" x 2.0"h repairable PC Board with 22 pin edge connector.

SYNCHRO/RESOLVER TO SINE-COSINE DC Series SD100

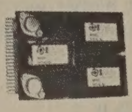


INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc; ±10 cos θ vdc. **ACCURACY:** ±2 or ±4 minutes of arc. **PACKAGE:** 1.75" x 1.75" x .6"h or 3" x 3" x .625"h Module.

INVARIANT SYNCHRO/RESOLVER TO SINE-COSINE Series SD100 I

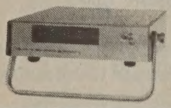
INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** ±10 sin θ vdc, ±10 cos θ vdc. **ACCURACY:** ±4 minutes of arc. **INVARIANCY:** A ±10% change in the input or reference voltage results in a ±.5% change in the individual DC outputs. **PACKAGE:** 3" x 3" x .625"h Module.

DC SIN COS TO SYNCHRO DRIVERS Series DCS400



INPUT: ±10 vdc representing sin θ and cos θ. **OUTPUT:** 11.8/90 vrms L-L, 60 or 400 Hz capable of driving up to three size 11 T.R.'s (75 ohms L-L). **ACCURACY:** ±6, ±15, ±30 minutes of arc. **PACKAGE:** A) 4.5" x 6.5" x .8"h repairable PC Card. B) 4.5" x 9.25" x 1"h PC Card.

SYNCHRO ANGLE INDICATOR Series AI400

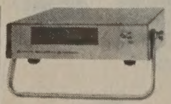


INPUT: 11.8/90 vrms L-L, 60 or 400 Hz. Ref: 26/115 vrms. **OUTPUT:** 5 Digit display and BCD data. **ACCURACY:** ±.03°, ±.05°, or ±.1°. **PACKAGE:** 9.5"w x 1.75"h x 12" Deep — Bench or Rack Mounting.

RECTANGULAR TO POLAR Series RP600

INPUT: R sin θ and R cos θ from 50 mv to 10 vdc. **OUTPUT:** R and θ. **ACCURACY:** θ: ±15 minutes at R = 10, R: ±.1% F.S. **PACKAGE:** 3.2" x 3.4" x 1.8"h Module.

BINARY ANGLE INDICATOR (BINARY TO BCD) Series BAC100



INPUT: Up to 16 bits of parallel binary data, TTL compatable. **OUTPUT:** 5 digit display of angle (0° to 359.99°) OR ANY OTHER SCALE FACTOR DESIRED FROM 0 TO 99999 REPRESENTING ENCODER POSITION, RANGE, PRESSURE, WEIGHT, ETC. **ACCURACY:** ±.01° (±1 lsb). **PACKAGE:** A) 7.0"w x 1.75"h x 8.25" deep — Bench or Rack Mounting B) 4.5" x 6.5" x 1.8"h PC Board requiring +5 vdc at 1 amp C) 2.6" x 3.1" x .82h Module.

ADDITIONAL PRODUCTS

- Hi Speed Multiplexed Syn to Digital
- Multiplexed Syn to Linear DC
- Digital Sin-Cos to Synchro
- Two Speed Digital to Synchro
- Selsyn to Digital/DC
- Azimuth Change Pulse Converters

ALL SYNCHRO INPUT/OUTPUT UNITS

- Available in 0°C to 70°C or −55°C to +85°C temperature range
- TTL compatable output and inputs or CMOS, or LP Shottky
- Operate from ±15 v, or ±15 and +5 vdc
- Transformer isolated inputs/outputs
- Solid State construction — 883 Level B Available
- CAN BE MADE FIELD OR FACTORY REPAIRABLE
- Available hermetically sealed and to MIL SPECS (E-5400)
- Delivery: Stock to 4 weeks (small quantity)

SPECIAL UNITS AND PACKAGES AVAILABLE ON REQUEST

Write or phone for detailed specifications, applications assistance and evaluation units.

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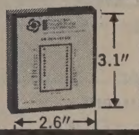
CONVERSIONS DEPT. EM
CORPORATION 6 DUNTON COURT, EAST NORTHPORT, NEW YORK 11731 / (516) 261-3300

SYNCHRO CONVERTERS/DISPLAYS/ENCODERS

STANDARD LOW COST UNITS TO SATISFY ALMOST ANY SYNCHRO/RESOLVER OR SHAFT INTERFACING REQUIREMENT

SYNCHRO/RESOLVER TO BCD Series SBC



INPUT: 11.8/90vrms L-L, 60 or 400 Hz. Ref. 26/115vrms **OUTPUT:** 3 or 4 decade BCD — scaleable unipolar or bipolar. **ACCURACY:** ±30 or ±6 minutes of arc ±1 LSB. **PACKAGE:** 2.6" x 3.1" x .82" H Module. **OPTIONS:** Choice of Scale factors, Zero offset adjustments (±5%).

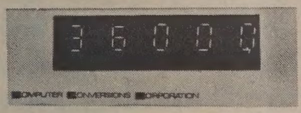
MULTITURN ABSOLUTE ENCODERS Series MDS90

INPUT: MULTI-TURN Shaft angle position. **OUTPUT:** 4, 5, or 6 Digit LED Display + BCD or Binary Data. **ACCURACY:** Up to ±1 pt. in 100,000. **PACKAGE:** Size 23 Pickoff with full or half rack electronics. **OPTIONS:** Zero Offset, NEMA 12 Housings, Presets, power supplies.

TYPICAL UNITS

Multiturn Encoders	Output Code	Resolution Counts/360°	Revolution for Full Count	Data Range
MDS90-DBC-16	Binary	2^{10}	64	2^{16}
MDS90-DBC-10	BCD	1000	10	10,000
MDS90-DBC-100	BCD	1000	100	100,000

LOW COST ANGLE INDICATOR Series AI540

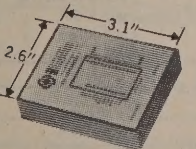


INPUT: 11.8/90vrms L-L, 60 or 400 Hz, Ref: 26/115vrms +115V 60 Hz power: **OUTPUT:** 4 digit or 3 digit, .5"H LED DISPLAY (unipolar or bipolar). **ACCURACY:** ±6 or ±30 minutes of arc ±1 LSB: **PACKAGE:** (A) 5.5"W x 7.5"L x 2.0"H PANEL MOUNT (DC supplies included): (B) 9½"W x 1¾"H, half rack mounting (DC supplies included. **OPTIONS:** Choice of scale factors, Zero offset adjustment (±5°).

MULTIPLEXED SYNCHRO TO DIGITAL Series MSH

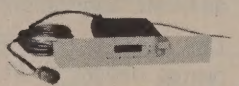
INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115v rms, up to 128 channels; **OUTPUT:** 12 bit parallel binary or 4 decade BCD (unipolar or bipolar: **ACCURACY:** ±6 minutes of arc ±1 LSB: **PACKAGE:** (A) Central converter — 2.6" x 3.1" x .82"H module, (B) Input Module — 1.5" x 2.0" x .6"H, (C) Transformer Module — 1.5" x 13⁄16" x .6"H (Scott "T" — 400 Hz) +1" x 1" x .8"H (Ref.). **OPTIONS:** (A) choice of scale factor on BCD output, (B) Linear DC output, (C) Systems mounted on PC boards and/or racks.

MULTISPEED SYNCHRO TO DIGITAL Series TSD



INPUT: 11.8/90vrms L-L, 60 or 400 Hz., Ref: 26/115 vrms: **SPEEDS:** 8, 16, 32, 9, 18, and 36: **OUTPUTS:** 16 to 19 bits parallel binary: **ACCURACY:** ±.02, ±.01 or ±.005 degrees: **PACKAGE:** Two or Three 2.6" x 3.1" x .82"H modules. **OPTIONS:** (A) Systems packaged on PC Cards or in racks; (B) 5 digit display.

ABSOLUTE ENCODERS Series DS90



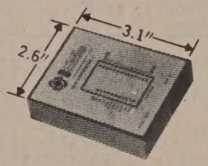
INPUT: Shaft angle position coupled to "DIGI-SHAFT" system: **OUTPUT:** four digit (.5"H) LED display (0 to 9999) +BCD or Parallel binary data (ANY SCALE FACTOR DESIRED): **ACCURACY:** ±1 part in 3600 (single turn) From shaft input to digital output: **PICKOFF:** Resolver (Size 8, 11, or 15): **PACKAGE:** (A) 5.44"W x 7.00" x 1.75"H: (B) Full or half rack: **OPTIONS:** Multichannels, Zero offset, Presets, DC output, Multiturn units with 5 digit (99999) output, NEMA 12 Housings.

TYPICAL UNITS (single Turn)

Pt. No.	Output	Counts/360°
DS90-DB-12	Binary Data	2^{12}
DSR90-36-BC	0-3599 display +BCD data	3600
DSR90-10	0-999 display	1000
DSR90L-25-BC	0 to ±2500 display +BCD data	±2500

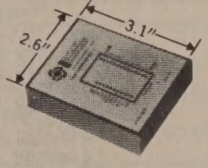
FULL SCALE OUTPUTS OF UP TO 9999 AVAILABLE
MULTITURN UNITS WITH UP TO 999999 FULL SCALE OUPUTS AVAILABLE

SOLID STATE CONTROL TRANSFORMER Series SCT



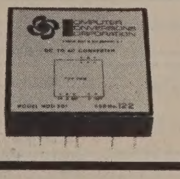
DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO/RESOLVER INPUT ANGLE** (θ): 11.8/90vrms L-L, 60 or 400 Hz. **OUTPUT:** E out=(V ref ±7%) sin (θ-ϕ) Sin wt: **GRADIENT:** .4 or 1vrms/degree. **RANGE:** ±7 or ±12.5 degrees: **ACCURACY:** ±4, ±15, or ±30 minutes of arc. **PACKAGE:** 2.6" x 3.1" x .82"H Module.

SOLID STATE CONTROL DIFFERENTIAL TRANSFORMER Series SCDX



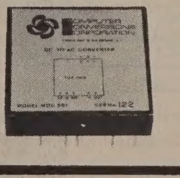
DIGITAL INPUT ANGLE (ϕ): 14, 12, or 10 bits parallel binary. **SYNCHRO/RESOLVER INPUT ANGLE** (θ): 11.8/90vrms L-L, 60 or 400 Hz. **OUTPUT:** (1) 9.2K (ϕ) Sin (θ-ϕ) Sin wt. [7vrms.] (2) 9.2K (ϕ) Cos (θ-ϕ) Sin wt. [7vrms.] **ACCURACY:** ±4, ±15 or ±30 minutes of arc. **PACKAGE:** 2.6" x 3.1" x .82"H.

MODULATORS Series MOD500



INPUT: 0 to ±10 or ±100 VDC and 26V/115Vrms reference: **OUTPUT:** 0 to 7vrms (other voltages available. **ACCURACY:** ±.2% F.S.: **NULL:** ±.1% F.S. **PACKAGE:** 2.6" x 3.1" x .625" Module. **OPTIONS:** Gain+Zero Adjust, external output transformers.

DEMODULATORS Series D400



INPUT: 0 to 5, 10, 25 or 100vrms, 400 to 5000 Hz, 5/26vrms reference. **OUTPUT:** 0 to ±5 or ±10VDC. **ACCURACY:** ±.2, .3 or .5% F.S. **NULL:** ±.1% F.S. **PACKAGE:** (A) 1.75" x 1.75" x .6"H Module. (B) 2.75" x 1.4" x .75"H Module.

COMPUTER
CONVERSIONS
CORPORATION

DEPT. EM
6 DUNTON COURT, EAST NORTHPORT, NEW YORK 11731 / (516) 261-3300

CPS

A/D & D/A SIGNAL CONVERTERS

CPS has an established, performance proven line of medium-to-high resolution, fast settling time signal converter products for data acquisition, instrumentation, process control and other applications where product reliability is a must.

CPS supplies cost-effective off-the-shelf and custom engineered designs to fit OEM industrial and Mil-Spec needs, while meeting on-time delivery schedules. Pin-compatible units also available for replacement of designs supplied by such manufacturers as Datel, Analog Devices and Zeltex.

Standard Series Features

- High resolution
- TTL and CMOS compatible
- Low drift
- Low power
- Process current
- Multiplying D/A's
- Capable of meeting Mil-Spec 883

D/A CONVERTERS

Model	Special Features	Standard Output Range	Settling Time (μsec)	Linearity	Tempco PPM/C°	Case Size (inches) D x W x H	Price 1-9 $
8 BIT BINARY							
CYDAC-430 ③		0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	50	2 x 1.76 x 0.4	$ 31.00
CY2035	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	50	2 x 2 x 0.4	31.00
CYDAC-440 ③		0 to +10V, ±5V, ±10V, pin selectable	2	1/2 LSB	50	2 x 1.76 x 0.4	39.00
CYDAC-198B ②		0 to +10V, ±5V	20	1/2 LSB	50	2 x 2 x 0.4	29.00
CY2037	Low Drift, Fast	0 to +10V, ±5V, ±10V, pin selectable	2	1/2 LSB	40	2 x 2 x 0.4	39.00
CYMOS-DAC-8E	CMOS, Low Power	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	10	1/2 LSB	50	2 x 2 x 0.4	59.00
CY2047	Process Current, High Compliance	1 to 5 mA, 4 to 20 mA, 10 to 50 mA, pin selectable	100	1/2 LSB	40	2 x 4 x 0.4	86.00
CY2018	Multiplying DAC—2 Quadrant	±10V	3	1/2 LSB	5	2 x 2 x 0.4	99.00
CY2019	Multiplying DAC—4 Quadrant	±10V	3	1/2 LSB	5	2 x 2 x 0.4	108.00
10 BIT BINARY							
CYDAC-431 ③		0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	50	2 x 1.76 x 0.4	44.00
CY2135	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	50	2 x 2 x 0.4	41.00
CYDAC-441 ③		0 to +10V, ±5V, ±10V, pin selectable	5	1/2 LSB	50	2 x 1.76 x 0.4	49.00
CYDAC-10Z ①		0 to –10V, ±10V	5	1/2 LSB	30	2 x 2 x 0.4	49.00
CYDAC-4910B ②		0 to +10V, ±5V	5	1/2 LSB	50	2 x 2 x 0.4	48.00
CY2137	Low Drift, Fast	0 to +10V, ±5V, ±10V, pin selectable	5	1/2 LSB	40	2 x 2 x 0.4	49.00
CYMOS-DAC-10E	CMOS, Low Power	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	10	1/2 LSB	50	2 x 2 x 0.4	69.00
CY2147	Process Current, High Compliance	1 to 5 mA, 4 to 20 mA, 10 to 50 mA, pin selectable	100	1/2 LSB	40	2 x 4 x 0.4	106.00
CY2118	Multiplying DAC—2 Quadrant	±10V	4	1/2 LSB	5	2 x 2 x 0.4	119.00
CY2119	Multiplying DAC—4 Quadrant	±10V	4	1/2 LSB	5	2 x 2 x 0.4	127.00
12 BIT BINARY							
CY2235	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	30	2 x 2 x 0.4	55.00
CYDAC-432 ③		0 to +10V, ±5V, ±10V, pin selectable	20	1/2 LSB	20	2 x 1.76 x 0.4	55.00
CYDAC-6912B ②		0 to +10V, ±5V	20	1/2 LSB	50	2 x 2 x 0.4	57.00
CYDAC-6912BI ②		0 to +2.5 mA @ +1.2V nominal	0.30	1/2 LSB	50	2 x 2 x 0.4	57.00
CYDAC-442 ③		0 to +10V, ±5V, ±10V, pin selectable	5	1/2 LSB	20	2 x 1.76 x 0.4	79.00
CYMOS-DAC-12E	CMOS, Low Power	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	10	1/2 LSB	30	2 x 2 x 0.4	79.00
CY2237	Low Drift, Fast	0 to +10V, ±5V, ±10V, pin selectable	5	1/2 LSB	20	2 x 2 x 0.4	79.00
CYDAC-12QZ ①		0 to +5V, 0 to +10V, ±2.5, ±5V, ±10V complementary input code, pin selectable	5	1/2 LSB	30	2 x 2 x 0.4	72.00
CY2247	Process Current, High Compliance	1 to 5 mA, 4 to 20 mA, 10 to 50 mA, pin selectable	100	1/2 LSB	20	2 x 4 x 0.4	116.00
CY2218	Multiplying DAC—2 Quadrant	±10V	5	1/2 LSB	5	2 x 2 x 0.4	147.00
CY2219	Multiplying DAC—4 Quadrant	±10V	5	1/2 LSB	5	2 x 2 x 0.4	159.00
14 BIT BINARY							
CY2335	Industrial Grade	0 to +10V	20	1 LSB	30	2 x 3 x 0.4	124.00
CY2337	Low Drift, Fast	0 to +10V	5	1/2 LSB	20	2 x 3 x 0.4	169.00
16 BIT BINARY							
CYDAC-169-16B ③		Current Output –0 to +2 mA, ±1 mA, pin selectable	0.75	.01% LSB	30	2 x 2 x 0.4	109.00
		Voltage Output –0 to +10V, 0 to –10V, ±5V, pin selectable	30				
2 DIGIT BCD							
CYDAC-429 ③		0 to +10V	20	1/2 LSB	50	2 x 1.76 x 0.4	39.00
CY2535	Industrial Grade	0 to +10V	20	1/2 LSB	80	2 x 2 x 0.4	31.00
CYDAC-198D ②		0 to +10V	20	1/2 LSB	50	2 x 2 x 0.4	29.00
CY2537	Low Drift, Fast	0 to +10V	5	1/2 LSB	50	2 x 2 x 0.4	39.00
CYMOS-DAC-2DE	CMOS, Low Power	0 to +10V, 0 to +5V	10	1/2 LSB	80	2 x 2 x 0.4	59.00
CY2547	Process Current, High Compliance	1 to 5 mA, 4 to 20 mA, 10 to 50 mA, pin selectable	100	1/2 LSB	50	2 x 4 x 0.4	86.00
3 DIGIT BCD							
CYDAC-433 ③		0 to +10V	20	1/2 LSB	50	2 x 1.76 x 0.4	49.00
CY2635	Industrial Grade	0 to +10V	20	1/2 LSB	40	2 x 2 x 0.4	49.00
CYDAC-4912D ②		0 to +10V	5	1/2 LSB	50	2 x 2 x 0.4	49.00
CYMOS-DAC-3DE	CMOS, Low Power	0 to +5V, 0 to +10V, pin selectable	10	1/2 LSB	40	2 x 2 x 0.4	69.00
CY2637	Low Drift, Fast	0 to +10V	5	1/2 LSB	20	2 x 2 x 0.4	75.00
CY2647	Process Current, High Compliance	1 to 5 mA, 4 to 20 mA, 10 to 50 mA, pin selectable	100	1/2 LSB	20	2 x 4 x 0.4	116.00
3½ DIGIT BCD							
CY2638	Over Range Bit	0 to +10V	20	1 LSB	40	2 x 2 x 0.4	59.00

D/A CONVERTERS (Continued)

Model	Special Features	Standard Output Range	Settling Time (μsec)	Linearity	Tempco PPM/C°	Cash Size (inches) D x W x H	Price 1-9 $
4 DIGIT BCD							
CY2735	Industrial Grade	0 to +10V	20	1 LSB	30	2 x 3 x 0.4	77.00
CYDAC-169-16D ②		Current Output –0 to +1.25 mA Voltage Output –0 to +10V, 0 to –10V, pin selectable	0.75 30	1/2 LSB	30	2 x 2 x 0.4	109.00
CY2737	Low Drift, Fast	0 to +10V	5	1/2 LSB	20	2 x 3 x 0.4	129.00
4½ DIGIT BCD							
CY2738	Over Range Bit	0 to +10V	5	1 LSB	20	2 x 3 x 0.4	157.00

A/D CONVERTERS

Model	Special Features	Standard Input Ranges	Conversion Type	Conversion Time (μsec)	Linearity	Tempco PPM/C°	Cash Size (inches) D x W x H	Price 1-9 $
8 BIT BINARY								
CYAD-8S ①		0 to +5V, 0 to +10V, ±5V, ±10V	Digital Ramp	1000	1/2 LSB	60	2 x 3 x 0.4	$ 89.00
CYAD-460 ③		0 to +10V, ±5V, ±10V	Successive Approximation	50	1/2 LSB	50	2 x 3.6 x 0.4	98.00
CYAD-470 ③		0 to +10V, ±5V, ±10V	Successive Approximation	15	1/2 LSB	50	2 x 3.6 x 0.4	118.00
CYAD-8QZ ①		0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	18	1/2 LSB	30	2 x 4 x 0.4	99.00
CY3035	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	100	1/2 LSB	50	2 x 4 x 0.4	98.00
CY3037	Low Drift	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	100	1/2 LSB	40	2 x 4 x 0.4	118.00
CYAD-8QM ①	Low Drift	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	18	1/2 LSB	5	2 x 4 x 0.4	239.00
10 BIT BINARY								
CYAD-461 ③		0 to +10V, ±5V, ±10V	Successive Approximation	100	1/2 LSB	50	2 x 3.6 x 0.4	112.00
CYAD-471 ③		0 to +10V, ±5V, ±10V	Successive Approximation	30	1/2 LSB	50	2 x 3.6 x 0.4	132.00
CYAD-10QZ ①	Fast	0 to +5V, 0 to +10V, ±2.5, ±5V, ±10V, pin selectable	Successive Approximation	22	1/2 LSB	30	2 x 4 x 0.4	109.00
CY3135	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	175	1/2 LSB	50	2 x 4 x 0.4	112.00
CYMOS-AD-10Z	Low Power	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	75	1/2 LSB	30	2 x 4 x 0.4	159.00
CY3137	Low Drift	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	175	1/2 LSB	40	2 x 4 x 0.4	132.00
CYAD-10QM ①	Low Drift, Fast	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	22	1/2 LSB	5	2 x 4 x 0.4	279.00
12 BIT BINARY								
CYAD-462 ③		0 to +10V, ±5V, ±10V	Successive Approximation	200	1/2 LSB	20	2 x 3.6 x 0.4	147.00
CYAD-12QZ ①		0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	40	1/2 LSB	30	2 x 4 x 0.4	139.00
CY3235	Industrial Grade	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	250	1/2 LSB	40	2 x 4 x 0.4	147.00
CY3237	Low Drift	0 to +10V, ±5V, ±10V, pin selectable	Section Up-counting	250	1/2 LSB	20	2 x 4 x 0.4	167.00
CYAD-12QM ①	Low Drift, Fast	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	25	1/2 LSB	5	2 x 4 x 0.4	299.00
CYMOS-AD-12Z	Low Power	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive	100	1/2 LSB	30	2 x 4 x 0.4	179.00
14 BIT BINARY								
CYAD-14QM	Low Drift, Fast	0 to +5V, 0 to +10V, ±2.5V, ±5V, ±10V, pin selectable	Successive Approximation	100	1/2 LSB	20	2 x 4 x 0.4	219.00
2 DIGIT BCD								
CYAD-8SBCD ①		0 to +5V, 0 to +10V	Digital Ramp	1000	1/2 LSB	60	2 x 3 x 0.4	89.00
CY3535	Industrial Grade, Fast	0 to +9.9V	Section Up-counting	50	1/2 LSB	80	2 x 4 x 0.4	108.00
CY3537	Low Drift, Fast	0 to +9.9V	Section Up-counting	50	1/2 LSB	50	2 x 4 x 0.4	128.00
3 DIGIT BCD								
CY3635	Industrial Grade, Fast	0 to +9.99V	Section Up-counting	150	1/2 LSB	40	2 x 4 x 0.4	137.00
CY3637	Low Drift, Fast	0 to +9.99V	Section Up-counting	150	1/2 LSB	20	2 x 4 x 0.4	157.00
3½ DIGIT BCD								
CY3638A	Sign, Diff. Input	0 to ±1.999V	Digital Ramp	20 ms	1/2 LSB	30	2 x 4 x 0.4	99.00
CY3638AF	Sign, Diff. Input, Fast	0 to ±1.999V	Digital Ramp	2 ms	1/2 LSB	30	2 x 4 x 0.4	119.00
CY3638L	Low Power	0 to +19.99V	Digital Ramp	30 ms	1/2 LSB	30	2 x 4 x 0.4	119.00
4 DIGIT BCD								
CY3735	Industrial Grade, Fast	0 to +9.999V	Section Up-counting	1000	1 LSB	30	2 modules 2 x 3 x 0.4	196.00
CY3735B	Sign, Fast	±9.999V	Section Up-counting	1000	1 LSB	30	2 modules 2 x 3 x 0.4	227.00
CY3737B	Low Drift, Sign, Fast	±9.999V	Section Up-counting	1000	1/2 LSB	20	2 modules 2 x 3 x 0.4	247.00

① Analog Devices—Pin Compatible Replacements ② Datel—Pin Compatible Replacements ③ Zeltex—Pin Compatible Replacements

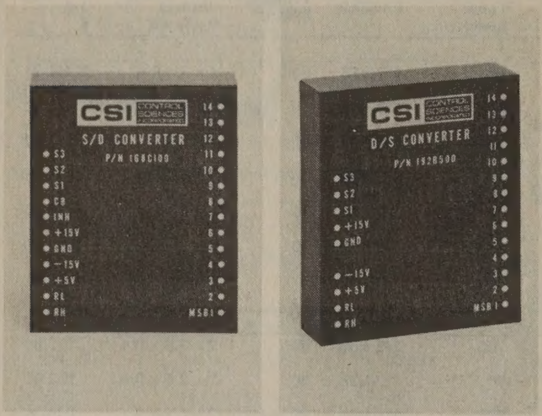
For complete information and applications assistance, contact the A/D & D/A Signal Converter specialists at:

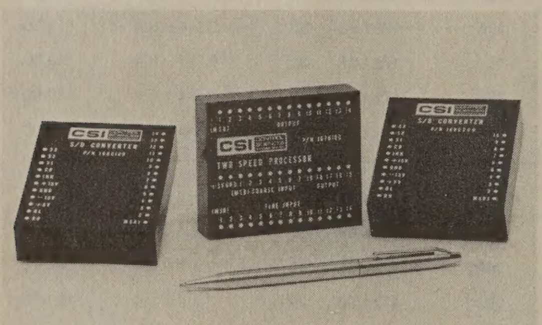
CPS INC.

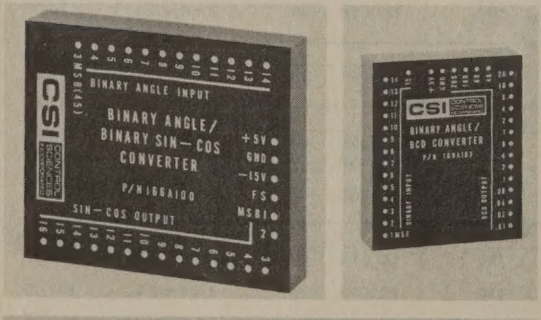
CONVERTER PRODUCTS 722 E. Evelyn Avenue • Sunnyvale, California 94086 • Phone (408) 738-0530 Telex 357-450

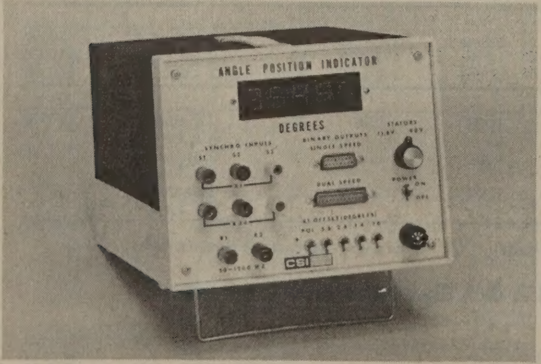
CSI CONTROL SCIENCES INCORPORATED

Synchro Converters









S/D MODULES

The series 168C are a family of miniature high performance "tracking type" synchro/resolver to digital converters. The converters function over the frequency range of 50 to 1200 Hz without need for external transformer modules. All digital input and output data is DTL & TTL compatible.

Series 168C100

14 bit (0.002°) resolution with 4 minute ±.9LSB accuracy and 3600°/sec tracking rate. Single module 3.12"x2.62"x.8".

Series 168C200

10 bit (0.351°) resolution with 30 minute accuracy and 10,800°/sec tracking rate. Single module 3.12"x2.62"x.8".

Series 168C300

1:8, 1:16, 1:32, or 1:64 two speed synchro/resolver input. $\text{Log}_2 N+14$ bits resolution, where N=speed ratio. Two modules 3.12"x2.62"x.8"

Series 168C500

1:36 (or 2:36) two speed synchro/resolver input. 16 bit (0.0055°) resolution with 0.41 minute accuracy and 720° tracking rate. Two modules 3.12"x2.62"x.8".

D/S MODULES

The series 192B are a family of DTL/TTL/CMOS compatible digital to synchro/resolver converters. Fourteen bit natural binary angle data is continuously converted back to analog form . . . either as 3-wire synchro or 4-wire resolver signals capable of driving most control transformers.

Series 192B500

14 bit (0.022°) resolution and 4 minute accuracy capable of driving 100 ohms L-L @ 11.8Vrms and 5K ohms L-L @ 90Vrms. Single module for 400 Hz 2.62"x3.12"x.8", external transformer module required for 60 Hz 4.40"x1.90"x1.50".

MULTIPLEXED S/D CONVERTER

Series 160A

The series 160A multiplexed synchro/resolver to digital converter is a complete system capable of digitizing up to 24 synchro/resolver inputs with multiple voltage and frequency inputs. Each system consists of three types of modules, Central Processor 3.12"x2.62"x.8", Input Module 2.1"x1.62"x.4" and a Reference Processor 2.1"x1.62"x.4". 13 bit (0.044°) resolution with 3.9 minute ±.5LSB accuracy. Sample rate 1/cycle, all channels simultaneously. Conversion time of 100 usec/channel. DTL & TTL compatible.

TWO SPEED PROCESSOR Model 167B100

The model 167B100 Two Speed Processor is for use with synchro to digital converters which receive input from both coarse and fine synchros. It is specifically designed for 36:1, 18:1 and 9:1 gear ratios but other non-binary ratios can be accommodated to special order.

BINARY ANGLE TO BCD CONVERTERS

Series 169A100

The 169A100 series are binary to BCD converters which are scaled to be compatible with binary angle measurement (BAMS) MSB=180°, next=90° etc. Models are available with 3, 4, 5 or 6 decade BCD, 8421 coding. Inputs and outputs are DTL/TTL compatible.

BINARY ANGLE TO BINARY SINE-COSINE CONVERTER Model 166A100

The model 166A100 converts a 12 bit binary digital angle, MSB=45°, to a corresponding 16 bit digital word representing of the sine or cosine of the angle over an input angular range of 90°.

ACP GENERATOR Model 165A100

The model 165A100 ACP Generator accepts 14 bits of parallel binary angle data from a "tracking type" synchro to digital converter and generates 4096 azimuth change pulses per synchro revolution and also generates one azimuth reference pulse corresponding to the synchro electrical zero.

ANGLE POSITION INDICATOR Model 805A100

The model 805A100 Angle Position Indicator is a laboratory instrument intended for use in measuring either single speed or two speed (1x/36x) synchro signals and displaying the angle in degrees on a 5 digit LED readout.

CSI Control Sciences Incorporated 8399 Topanga Canyon Blvd. • Suite 303 • Canoga Park, California 91304 • (213) 887-7344

DATA SPECIALTIES manufacturers a complete line of paper tape peripherals to suit a wide variety of applications. All the products shown are built around the revolutionary MODUPERF™ mechanism which features whisper quiet operation, MYLAR punching capability, long life die block (1,000,000 feet) and field replaceable modules.

The SRP-300 is a paper tape combo that connects, without modification, to any 300 baud teleprinter or CRT terminal thru the RS-232 connector and provides all the features of a conventional ASR.

The units are offered at various speeds with parallel or serial interfaces in table top or rack mounted configurations. In addition, the basic mechanism and interface/driver are available. Consult the chart below for details.

Combos

Add Paper Tape I/O to your Terminal or use as a stand alone Peripheral

Punch Systems

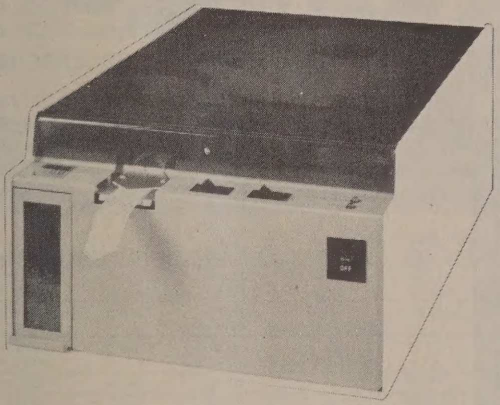
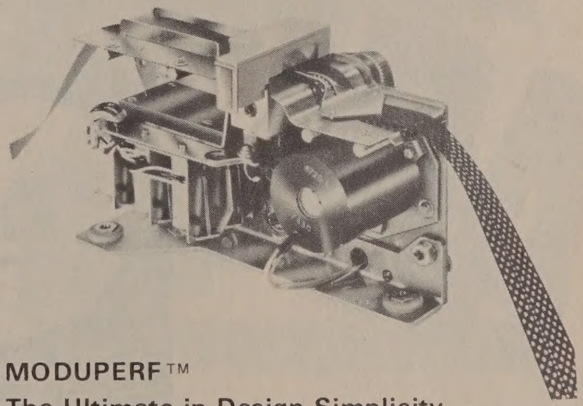


Table Top and Rack Panel Units

Mechanisms



MODUPERF™
The Ultimate in Design Simplicity

MODEL	DESCRIPTION	PUNCH SPEED	READER SPEED	INTERFACE	CONFIGURATION	DSI SPECIFICATION
SRP-300	READER/ PUNCH COMBO	300 BAUD	300 BAUD	SERIAL RS-232	TABLE TOP	3300
SRP-3075		75 c/s	300 c/s	PARALLEL DTL/TTL		3600
SRP-3075S		750 BAUD	3000 BAUD	SERIAL RS-232		3600
SP-75	PUNCH SYSTEM	75 c/s		PARALLEL DTL/TTL	TABLE TOP	3400
SP-75S		750 BAUD		SERIAL RS-232		
RP-75		75 c/s		PARALLEL DTL/TTL	19″ RACK PANEL	3500
RP-75S		750 BAUD		SERIAL RS-232		
M-30	PUNCH MECHANISM	30 c/s		PARALLEL* 24 VOLTS	MECHANISM B or C MOUNT	3100
M-75		75 c/s				

* INTERFACE/DRIVER CIRCUIT BOARD AVAILABLE - DTL/TTL INPUT

dsi

DATA SPECIALTIES INC.
3455 COMMERCIAL AVE.
NORTHBROOK, ILLINOIS 60062
(312) 564-1800

PRODUCT SUMMARY

ELECTRONIC ENGINEERS CATALOGUE
CATALOGUE DE L'ELECTRONIQUE POUR LES INGENIEURS
DER PRODUKTKATALOG FÜR ELEKTRONIKER

The book is out...and the response is in...
IMMEDIATE AND OVERWHELMING
ACCEPTANCE

ELECTRONIC ENGINEERS CATALOGUE
CATALOGUE DE L'ELECTRONIQUE POUR LES INGI NIE

The ELECTRONIC ENGINEERS CATALOGUE is the only comprehensive, trilingual catalogue/source-directory of electronic products available to - and from - Western Europe and the United Kingdom.

It is divided into three distinct sections: 1. **The Product Index and Directory,** which lists more than 3,000 products alphabetically in English with their French and German equivalents. 2. **The Manufacturers' Catalogue Section,** which is a compilation of Manufacturers' Catalogues in alphabetical order. 3. **The Manufacturers' Sales Offices and Trade Marks Directory,** which alphabetically includes country, address, telex or TWX numbers of the Manufacturers' main and local sales offices and/or agents.

The ELECTRONIC ENGINEERS CATALOGUE offers U.S. manufacturers the most cost-efficient method of distributing their catalogue data to **25,000** electronic engineers and buyers throughout Western Europe and the United Kingdom. It represents the carefully conceived application of the time-proven **eem** "cataloging" concept to the elusive European marketplace.

United Technical Publications, Inc., Div. of Cox Broadcasting Corp. 645 Stewart Avenue, Garden City, New York 11530 / 516 222-2500

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DATA TRANSLATION INC
23 Strathmore Rd., Natick MA 01760
(617) 655-5300 Telex 948474

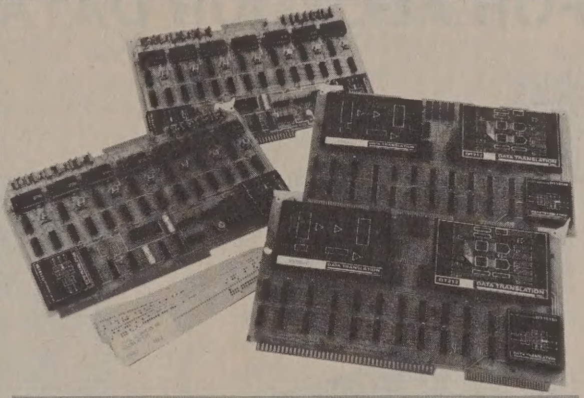
MICROCOMPUTER ANALOG I/O SYSTEMS
DATA ACQUISITION MODULES
DUAL D/A CONVERTER-POINT PLOTTER
DC-DC CONVERTERS

MICROCOMPUTER DATA ACQUISITION

SINGLE BOARD REAL TIME ANALOG I/O SYSTEMS.

These single board systems provide the most cost effective and fastest way to get analog signals into and out of your microcomputer. Just plug in the board and hook-up your analog signals. We've got the broadest selection of input and output capability—10mV to 10V or 4-20mA inputs, up to 64 channels on a single board, line buffered D/A outputs, point plotting, or 4-20mA outputs—all at a cost that says you can't afford to do it yourself. Twenty-two models are offered for:

- DEC LSI-11
- Intel SBC-80 Series & MDS-800(8080A)
- Computer Automation LSI-2 & 3
- Zilog MCB Series (Z-80)
- PCS Superpac



Intel compatible analog I/O system boards contain 9 different models.

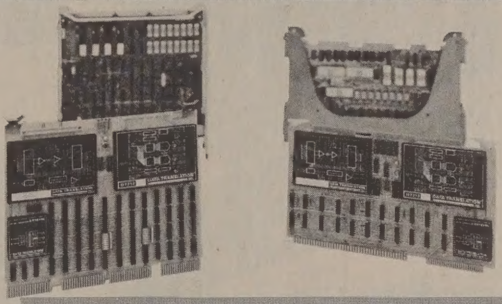
MODULES

DATA ACQUISITION MODULES

The second generation DATAX II data acquisition modules are complete with multiplexer, differential amplifier, sample/hold, 12-bit A/D converter, and all control logic...plus tri-state outputs for direct connection to computer busses.

MODEL	RESOLUTION	ACCURACY	ANALOG INPUTS	THROUGH-PUT RATE	PRICE
DT820/825	8 bits	±0.40%	8, 16	50 KHz	$130/140*
DT830/835	10 bits	±0.10%	8, 16	33 KHz	$140/150*
DT5701	12 bits	±0.03%	16	35 KHz	$175 *
DT57C01		(Low Power Version of DT5701)			$175 *
DT5702	12 bits	10mV to 10V	16	31 KHz	$175 *
DT57C02		(Low Power Version of DT5702)			$195 *
DT5720	12 bits	±0.03%	16	50 KHz	$575
DT5710	12 bits	±0.03%	16	100 KHz	$675
DT5710A	12 bits	±0.03%	16	125 KHz	$750

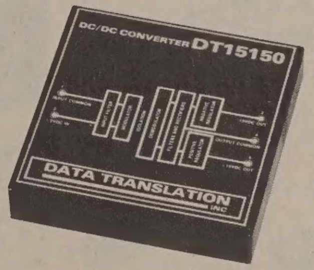
*OEM Price



LSI-11 and SBC-80 analog I/O system boards plug directly in the microcomputer.

DUAL D/A-POINT PLOTTER MODULE

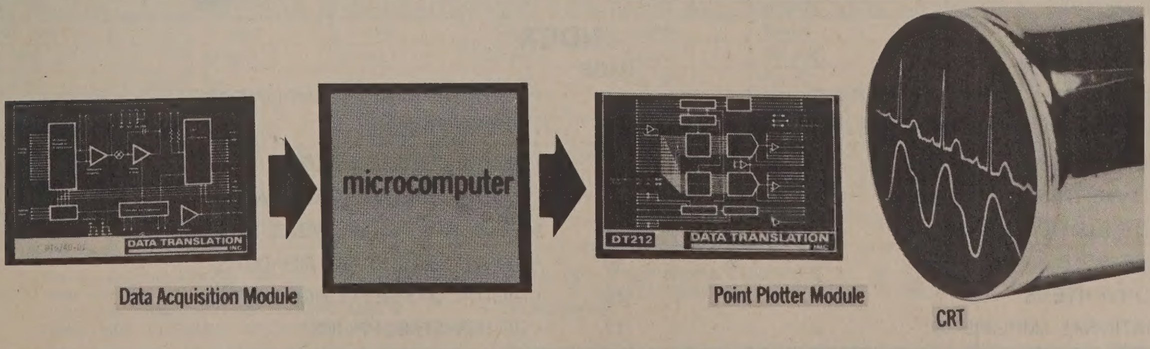
The DT212 Point Plotter is the first standardized modular function for read-out of digital information from microcomputers onto CRT displays and analog recorders. Complete Point Plotter Module - contains Z control, selectable set-up delay, timing functions, X & Y axis D/A converters with power amplifier output and mode control. Low Cost - $245 in 100 quantity.



DC-DC CONVERTERS

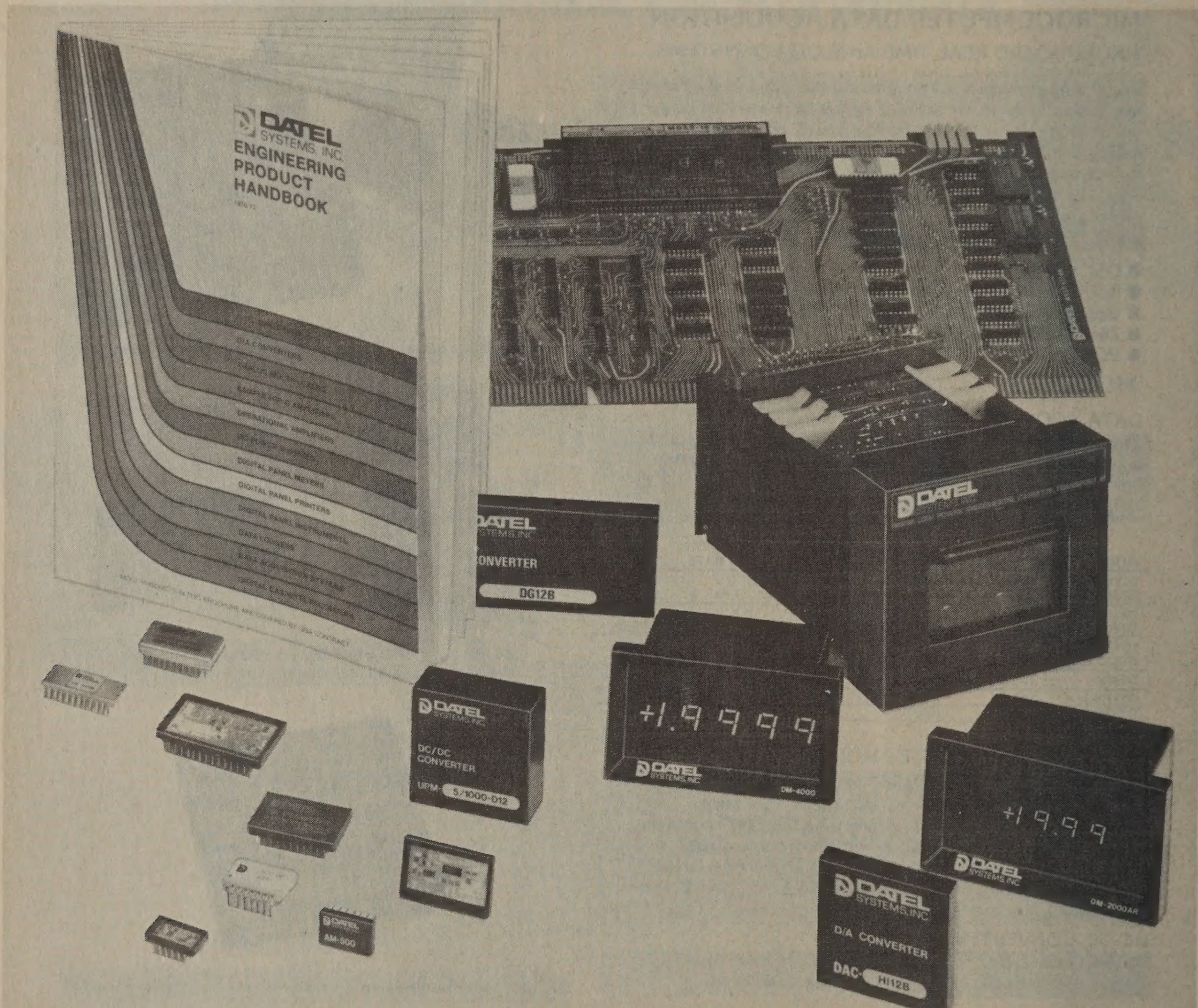
DC-DC Converter, DT15150, provides ±15 volt outputs at 150mA with 65% efficiency from +5 volt power source.

DC-DC converter gives very low noise outputs of less than 1mV.



DATEL

FOR ALL YOUR DATA ACQUISITION NEEDS


DATEL SYSTEMS, INC.
ENGINEERING PRODUCT HANDBOOK
DATEL SYSTEMS, INC
CONVERTER
DG12B
DATEL
DATEL SYSTEMS, INC
DC/DC CONVERTER
UPM-5/1000-D12
+1.9999
DATEL SYSTEMS, INC
DM-4000
+1.999
DATEL SYSTEMS, INC
DM-2000AR
DATEL SYSTEMS, INC
D/A CONVERTER
DAC-HI12B
DATEL
AM-500

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DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

HOT LINE: SOUTHERN CALIFORNIA (213) 933-3613; (714) 835-6519 / NORTHERN CALIFORNIA (408) 733-9703 / MID-ATLANTIC REGION (301) 948-0282 / NORTHEAST REGION (617) 828-6566

DATEL SYSTEMS, INC.

MODULAR DATA ACQUISITION SYSTEMS

DATA ACQUISITION SYSTEMS

DESCRIPTION

This comprehensive line of modern data acquisition systems gives the user a choice of units from low cost hybrid system up to a larger 250 kHz, 16 channel system. All models are complete, including automatic digital sequencing circuitry.

HDAS-16, HDAS-8: These devices are new miniature state-of-the-art hybrid systems featuring a programmable instrumentation amplifier, 16 channel single-ended or 8 channel differential operation, and 12 bits resolution at a 50 kHz rate.

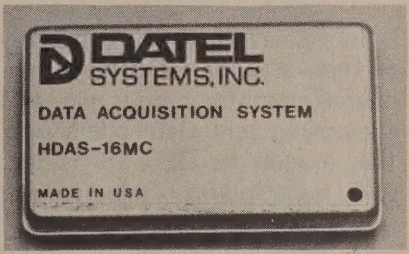
MDAS-16, MDAS-8D: These models are only 4.6 × 2.5 × 0.375 inches in size and cost $295. Features are 5 programmed input ranges, 16 single-ended or 8 differential channels, 12 bit resolution, and 50kHz throughput rate.

DAS-250: This model offers 16 channel capability at 250 kHz throughput rate. Resolution is 12 bits and the unit offers 0 to +10V or ±5V single-ended input ranges. Package size is 5.0 × 4.5 × 1.5 inches.

MDAS-PG-16D, MDAS-PG8D: These new models feature an internal resistor-programmed instrumentation amplifier with gain from 1 to 1,000. They give 16 channel, single-ended or 8 channel differential operation with 12 bits resolution at a 25 kHz rate.

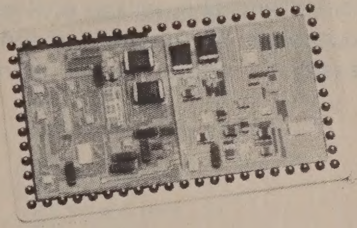
DATA ACQUISITION EXPANDER MODULES MODELS MDXP-32, MDXP-32-1

These modules are companion devices to the MDAS-16, MDAS-8D, MDAS-PG16D, and MDAS-PG8D. Both models contain 32 analog multiplexer channels, permitting expansion of the MDAS models up to 48 single ended for 24 differential channels using single level multiplexing. With double level multiplexing, up to 256 single ended or 128 differential channels can be realized using one MDXP-32 and seven MDXP-32-1's.



The MDXP-32-1 contains a 32 channel multiplexer and address decoder. The MDXP-32 contains, in addition, an address counter and address detector logic.

Prices (1-9):	MDXP-32	**$199.00**
	MDXP-32-1	**$179.00**



	HDAS-16MC[1] Hybrid	HDAS-8MC[1] Hybrid	MDAS-16 Low Cost	MDAS-8D Low Cost	MDAS-PG16D[1] Programmable Gain	MDAS-PG8D[1] Programmable Gain	DAS-250 High Speed
No. Channels	16	8	16	8	16	8	16
Input Type	Single Ended	Differential	Single Ended	Differential	Single Ended	Differential	Single Ended
Input Voltage Ranges, Unipolar	0 to +1V, to +10V	0 to +1V, to +10V	0 to +5V, +10V	0 to +5, +10V	0 to 10mV, to +10V	0 to 10mV, to +10	0 to +10V
Input Voltage Ranges, Bipolar	±1 to ±10V	±1 to ±10V	±2.5, ±5, ±10V	±2.5,±5, ±10V	±10mV to ±10V	±10mV to ±10V	±5V
Input Impedance	100 Meg.	100 Meg.	100 Meg.	100 Meg.	100 Meg.	100 Meg.	100 Meg.
Channel Addressing	4 Bit Code	3 Bit Code	4 Bit Code	3 Bit Code	4 Bit Code	3 Bit Code	4 Bit Code
Address Logic Compatibility	DTL/TTL	DTL/TTL	DTL/TTL	DTL/TTL	DTL/TTL	DTL/TTL	DTL/TTL
Resolution	12 Bits	12 Bits	12 Bits	12 Bits	12 Binary Bits	12 Binary Bits	12 Bits
Nonlinearity, max.	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB
Differential Nonlinearity, max.	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB	½ LSB
Max. Error at maximum throughput	.025%	.025%	.025%	.025%	.025%[5]	.025%[5]	.025%.
Temp. Coefficient, max.	30 ppm/°C	30 ppm/°C	30 ppm/°C	30 ppm/°C	30 ppm/°C	30 ppm/°C	40 ppm/°C
No Missing Codes	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C
Throughput Rate, max.	50 kHz	50 kHz	50 kHz	50 kHz	25 kHz[6]	25 kHz[6]	250 kHz
Acquisition Time	10 μsec.	10 μsec.	6 μsec.	6 μsec.	32 μsec.[6]	32 μsec.[6]	2 μsec.
Conversion Time	10 μsec.	10 μsec.	14 μsec.	14 μsec.	8 μsec.	8 μsec.	2 μsec.
Aperture Time	50 nsec.	50 nsec.	50 nsec.	50 nsec.	50 nsec.	50 nsec.	20 nsec.
Output Coding	Bin	Bin	Bin, 2C	Bin, 2C	Bin, 2C	Bin, 2C	Bin, 2C
Output Logic	Tri-State TTL	Tri-State TTL	Tri-State TTL	Tri-State TTL	Tri-State TTL	Tri-State TTL	Tri-State TTL[4]
Power Requirement	±15V, +5V	±15V, +5V	±15V, +5V	±15V, +5V	±15V, +5V	±15V, +5V	±15V, +5V
Package Size, inches	2.3 × 1.4 ×0.24	2.3 × 1.4 × 0.24	4.6 ×2.5 × 0.375	4.6 × 2.5 × 0.375	4.6 × 2.5 × 0.375	4.6 × 2.5 × 0.375	5.0 × 4.5 × 1.5
Package Size, mm	58 × 36 × 6	58 × 36 × 6	117 × 64 × 10	117 × 64 × 10	117 × 64 × 10	117 × 64 ×10	127 × 114 × 38
Operating Temp. Range	0 to 70°C[2]	0 to 70°C[2]	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C
Price (1-9)	**$295.00**	**$295.00**	**$295.00**	**$295.00**	**$275.00**	**$275.00**	**$595.00**

Notes:

1. Includes programmable gain instrumentation amplifier
2. Models for other temperature ranges:
   HDAS-16MR, HDAS-8MR, −25°C to +85°C, $395.00
   HDAS-16MM, HDAS-8MM, −55°C to +100°C, $695.00
3. Coding: Bin = Straight Binary or Offset Binary
   2C = Two's complement
4. Double Buffered
5. At a Gain of 1. For Gain of 1000, 0.1%
6. At a Gain of 1

DATEL SYSTEMS, INC.

SINETRAC SERIES

A/D-D/A PERIPHERAL BOARDS THAT SLIDE INTO YOUR COMPUTER

Datel's SineTrac Series is a family of slide-in A/D-D/A analog peripheral boards for popular mini- and microcomputers. Datel offers SineTrac models for DEC LSI-11 and PDP11 computers; Data General NOVA and microNOVA models; and for microprocessor-based computers from Intel (SBC-80/10/20 and MDS-800) and Motorola (M6800 EXORciser).

All models feature outstanding performance with A/D throughput periods of 20 microseconds per channel and D/A settling of 4 microseconds. Extraordinary channel density is achieved by using Datel's in-house-manufactured hybrid A/D's, D/A's, and subminiature power supply modules. Most SineTrac models include analog channel address registers and control logic for automatic sequential channel scanning. Depending on the computer type, most models accept interrupt and DMA programming with software control of system mode.

All SineTrac series include a comprehensive diagnostic assembly language program on paper tape. Full systems manuals supplied with each product include a full listing of this program plus much more.

The SineTrac series offers a user relief from typical A/D-D/A interfacing problems such as interface circuit design, digital I/O cabling (only analog signal cabling is required), and a strong head start toward handling problems.

Analog specifications are excellent including 12-bit binary A/D-D/A resolution and accuracy, 100 megohm A/D input impedance, and 50 milliohm D/A output impedance.

Contact Datel for complete individual brochures on the SineTrac Series.

SINETRAC SYSTEMS CHART

MODEL	NO. A/D CHANNELS	NO. D/A CHANNELS	COMPUTER	MFGR.	BUS SIZE	PRICE
ST-800	32S or 16D	—	SBC-80/10/20 MDS-800	Intel	8 Bits	**$ 495**
ST-800DA	—	4 or 8	SBC-80/10/20 MDS-800	Intel	8 Bits	**$ 495**
ST-PDP	64S or 32D	2	PDP-11	DEC	16 Bits	**$ 925**
ST-NOVA	64S or 32D	4	NOVA	Data General	16 Bits	**$1795**
ST-LSI	64S or 32D	2	LSI-11	DEC	16 Bits	**$1045**
ST-MNOVA	32S or 16D	2	microNOVA	Data General	16 Bits	*
ST-MNOVA-DA	—	4 or 8	microNOVA	Data General	16 Bits	*
ST-6800	32S or 16D	2	M6800 EXORciser	Motorola	8 Bits	$335
ST-6800DA	—	4 or 8	M6800 EXORciser	Motorola	8 Bits	$475 $595

*Consult Factory

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SINETRAC SERIES

SPECIFICATIONS COMMON TO ALL SINETRAC MODELS

DATA ACQUISITION SECTION (A/D ANALOG INPUTS)

SPECIFICATIONS
(Typical @ +25°C, dynamic conditions, unless otherwise specified)

ANALOG INPUTS

Number of Channels	Up to 64 channels, depends on model.
Channel Expansion	Up to 256 single-ended or differential channels.
Full Scale Input Voltage Ranges	0 to +5 volts 0 to +10 volts −5 to +5 volts −10 to +10 volts
Common Mode Range	±10 volts maximum
Input Overvoltage	±35 volts maximum sustained (no damage)
Input Impedance	100 megohms differential or to ground.
Input Bias Current	3nA typical, 10nA maximum
Input Capacitance	10pF, OFF channel, 100pF, ON channel to ground.

PERFORMANCE

Accuracy @ +25°C	Within ±0.025% of full scale range.
Resolution	12 Binary Bits (1 part in 4096)
Nonlinearity	±½ LSB maximum
Differential nonlinearity	±½ LSB maximum
Gain error	Adjustable to zero
Offset or Zero Error	Adjustable to zero
Gain Temperature Drift	Within ±30ppm of FSR/°C
Offset or Zero Temperature Drift	Within ±7ppm of FSR/°C
Common Mode Rejection	70dB min., DC to 1kHz, with 1 Kilohm unbalance
Power Supply Rejection	100dB to +5V Bus

DYNAMIC CHARACTERISTICS

Throughput Period	20 Microseconds max.
Acquisition Time	12 Microseconds
A/D Conversion Time	8 Microseconds
Aperture Time	50 nanoseconds
Sample/Hold Switch Feedthrough	0.01% Maximum
MUX Crosstalk from OFF Channels	0.01% @ 1KHz

DIGITAL OUTPUTS

Output Coding	Straight Binary (unipolar) Offset Binary (bipolar) 2's Complement (bipolar)	Jumper Selected

POWER CONSUMPTION

2.5 Amps or less typical @ +5VDC supplied from CPU bus connector. On-board DC/DC converter supplies ±15VDC to linear circuits.

PHYSICAL

Operating Temperature Range	0° to +70°C
Storage Temperature Range	−25°C to +85°C

DATA DISTRIBUTION SECTION (D/A ANALOG OUTPUTS)

ANALOG OUTPUTS

Number of Channels	Up to 8 single-ended or 4 single-ended
Channel Expansion	256 Channels addressable
Full Scale Output Voltage Ranges	0 to +5 volts 0 to +10 volts −2.5 to +2.5 volts −5 to +5 volts −10 to +10 volts
Input Coding	Straight Binary (unipolar) Offset Binary (bipolar) 2's Complement (bipolar)
Output Impedance	50 milliohms
Output Current	±5mA min., short circuit proof to ground.

PERFORMANCE

Nonlinearity	±½ LSB, maximum
Differential nonlinearity	±½ LSB maximum
Gain Error	Adjustable to zero using pot for each channel.
Offset or Zero Error	Adjustable to zero using a pot for each channel.
Scan Period Adjust	1 to 10 milliseconds
Gain Temperature Drift	±30ppm of output/°C
Zero Temperature Drift	(Unipolar output) ±5ppm of FSR/°C
Offset Temperature Drift	(Bipolar output) ±15ppm of FSR/°C
Settling Time	4 microseconds to ±½ LSB
Power Supply Rejection	±0.02% of FSR per 1% variation.

HOT LINE PHONES

Datel has provided Hot Line Phones to give you the fastest, best customer service possible. Use these Hot Line phone numbers—for **your** convenience.

DATEL SYSTEMS, INC.

ST-800 FOR INTEL'S SBC AND MDS MICROCOMPUTERS

Lowest Price
Starting at only $469 (single quantity) for a 16-channel, single-ended A/D input system, including the diagnostic program. Datel offers full systems with the lowest cost per channel.

Simple Channel Expansion and High Channel Density
Only two cards are needed to provide 80 single-ended or 64 differential A/D channels! A/D or D/A expansion simply consists of adding cards. High density CMOS LSI multiplexers offer up to 48 Differential Expander A/D channels per card. D/A's expand in 4 or 8 channel increments.

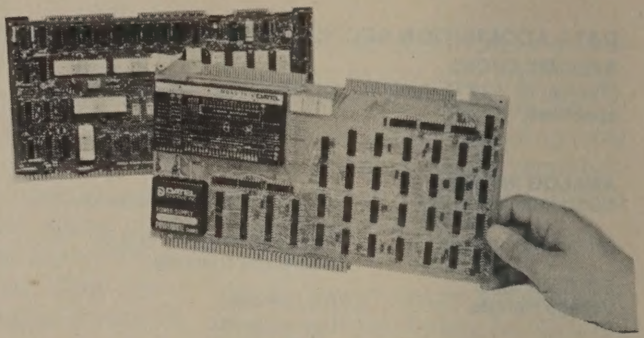
Highest Throughput Speed
A/D conversion and settling takes only 20 microseconds. When DMA is used, data bursts up to 36,000 samples per second may occur. Using Datel's System 256 remote A/D housing, throughput time can be reduced to 4 microseconds.

Jumper-Selected Automatic High-speed DMA
All A/D systems include jumper-selected control of a user-supplied Intel DMA (Direct Memory Access) Control Board. On-board channel address registers and logic automatically scan a program-selected channel group at the highest speed.

Diagnostic Test Programs on Paper Tapes Included

Complete Manuals Included
Programming manuals include sub-routine listings and programming examples.

On-board Start/Final Channel Logic for Lowest CPU Handling
Channel address registers free the CPU from channel counting and scan termination for highest speed and simplest programming.



PRICES (1-9 QUANTITIES)

Model	Description	Price
ST-800-32S	32 Single-ended A/D Channels	$495.
ST-800-16D	16 Differential A/D Channels	$495.
ST-800-16S	16 Single-ended A/D Channels	$469.
ST-800-ADX48D	48 Chan. Differential	$495.
ST-800-DA8	8 D/A Channels requires ext. ±15V @ .32A	$495.

ST-6800 FOR MOTOROLA'S M6800 EXORCISER MICROCOMPUTER

32 A/D and 2 D/A Channels on a single board that slides directly into Motorola's M6800 EXORciser Microcomputer.

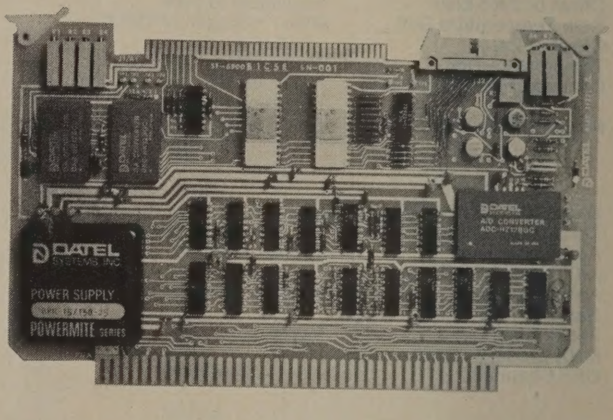
Expandable up to 128 A/D and/or D/A channels.

Prices from $335 (16 A/D chans, no D/A, no DC/DC conv.).

12-Bit Digital output port included on D/A boards.

Directly compatible with EXBUG and 6800 assembly language programs.

Comprehensive Systems Manual and Paper Tape Diagnostic Program included for immediate teletypewriter printout.



PRICES (1-9 QUANTITIES)

Model	Description	Price
ST-6800A2A	16 Single-ended A/D ch., no D/A, no DC/DC PS	$335.
	Add for 16 more A/D chan.	add $45.
	Add for ±15V DC/DC PS	add $60.
	Add for 2 D/A chan.	add $150.
ST-6800DA4	4 D/A chans. incl. DC/DC PS	$475.
ST-6800DA8	8 D/A chans. less DC/DC PS	$595.
ST-6800ADX48D	48 Diff. A/D Exp. Chans.	$495.

DATEL SYSTEMS, INC.

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DATEL SYSTEMS, INC.

SINETRAC SERIES

ST-NOVA FOR DATA GENERAL'S NOVA MINICOMPUTERS

FEATURES

64 A/D and 4 D/A Channels on a single board that slides directly into Data General's NOVA series minicomputers.

Expandable up to 256 A/D and/or D/A channels.

Prices from $1445 (64 A/D chans, no D/A, with DC/DC conv.).

Speeds up to 45,000 A/D samples per second.

12-Bit Digital output port optional on D/A boards.

Choice of program control, interrupt, or DMA.

Directly compatible with NOVA series assembly language programs, NOVA BASIC and FORTRAN.

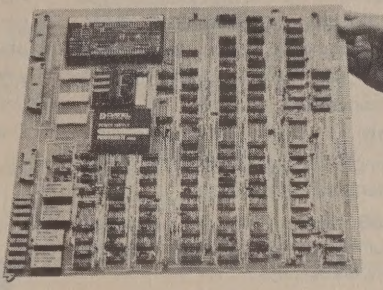
Comprehensive Systems Manual and Paper Tape Diagnostic Program included for immediate teletypewriter printout.

Optional interface to Datel's System 256 remote A/D-D/A housing for special performance.

ST-PDP FOR DEC'S PDP-11 MINICOMPUTERS

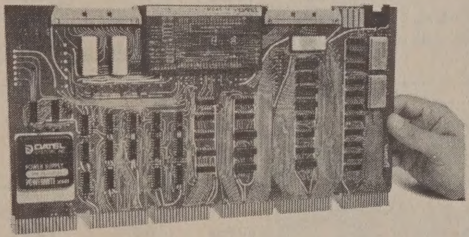
FEATURES

- 64 A/D channels plus 2 D/A channels optional on one slide-in PDP 11 board
- A/D Throughput period 20 microseconds—provides data bursts in DMA mode up to 45,000 samples per second
- Optional external System 256 remote A/D-D/A housing offers special performance, such as:
  1. A/D throughput down to 4 microseconds. Effective I/O rates in DMA of 200,000 samples/second.
  2. A/D resolution up to 14 bits at 60 microseconds throughput period
  3. Relay multiplexer option for 300V RMS common mode voltage with very high isolation.
  4. Up to 32 Simultaneous Sample/Hold amplifiers for fast dynamic events
  5. Minicomputer—style LED/Toggle switch binary front panel
  6. Channel expansion up to 256 channels, single-ended or differential
- Three Scan Start Methods
  1. Program scan start (via interrupt or program instruction)
  2. DMA-board adjustable 74123 integrated circuit scan timer
  3. External start pulse
- Fast Automatic Sequential DMA Addressing, Lowest CPU Overhead. On-board channel address counters and start/final address logic automatically start and terminate analog channel scans. Program control of random/sequential channel addressing
- Complete Systems manuals included. Comprehensive systems manual cover circuits, logic diagrams, programming timing, applications, troubleshooting and diagnostics.
- Paper Tape diagnostic programs included. These assembly language programs provide decimal printouts of preselected A/D scans for accuracy, calibration and troubleshooting. D/A programs offer square wave and saw-tooth oscilloscope outputs.
- Three Programming Methods
  1. Program Control Interface (PCI)
  2. Interrupt Service Interface (ISI)
  3. Direct Memory Access (DMA)



PRICES

Model	Description	Price
ST-NOVA1	64 SE or 32 Diff. A/D Channels 4 D/A Channels	$1795.00
ST-NOVA3	64 SE or 32 Diff. A/D Channels No D/A Channels	$1445.00
System 256 On-Board/Remote Models		
ST-NOVA4	64 SE or 32 Diff. On-board A/D Channels Remote (Sys. 256) D/A Channels	$1445.00
ST-NOVA6	Remote (Sys. 256) A/D and D/A Channels	$1070.00
System 256 (Remote A/D-D/A Housing) must be ordered separately, if used. Contact Datel for a System 256 Brochure.		



PRICES

SineTrac Card Only ST-PDP1X Series

Model	Description	Price (Singles)
ST-PDP1X1C5	64 SE or 32 Diff. A/D Chan., no D/A Chans.	$ 795.00
ST-PDP1X3C	64 SE or 32 Diff. A/D Chan., 2 D/A Chans.	$ 925.00

SineTrac Card plus Connector Block, Cables and Accessory Cards ST-PDP2 Series

Model	Description	Price (Singles)
Program Control Interface		
ST-PDP2P3C	64 SE or 32 Diff. A/D Chan., 2 D/A Chan.	$1935.00
Interrupt Service Interface		
ST-PDP2S3C	64 SE or 32 Diff. A/D Chan., 2 D/A Chan.	$1935.00
Direct Memory Access		
ST-PDP2D3C	64 SE or 32 Diff. A/D Chan., 2 D/A Chan.	$2180.00

Coming Soon:
ST-LSI for DEC's LSI-11 and PDP-11/03
ST-MNOVA for Data General's microNOVA

DATEL SYSTEMS, INC.

MONOLITHIC & HYBRID A/D CONVERTERS

ADC-MC8B: An 8 bit low cost counter-type A/D which requires an external comparator.

ADC-EK SERIES: Series of low cost, monolithic CMOS A/D's using change balancing conversion principle.

ADC-HC12B: 12 bit low power CMOS A/D's featuring single supply operation for portable instrumentation applications.

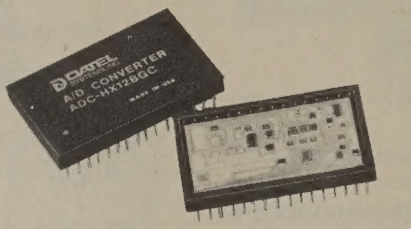
ADC-HF12B: State-of-the-art ultra-high speed 12 bit hybrid A/D converter featuring 2 μsec. conversion time.

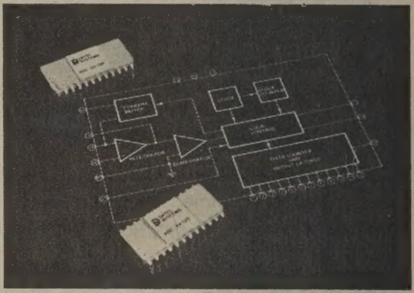
ADC-HS12B: 12 bit, 8 μsec. A/D converter with sample-hold in miniature hybrid package.

ADC-HX12B: Industry standard, low cost 12 bit A/D converter with 20 μsec. conversion time and internal buffer.

ADC-HZ12B: High performance, 12 bit A/D converter with 8 μsec. conversion time and pin-programmable inputs.

ADC-HU3B: A 3 bit expandable, parallel type A/D featuring 20 nsec. conversion time. Decoded binary output.





	Model	Resolution	Accuracy (% FS)	Conversion Time	Output Coding	Input Ranges	Linearity	Temp. Range (°C)	Gain Tempco	Power Requirement	Case Size (Inches)	Price (1-24)
Mono. Counting	ADC-MC8BC (2)	8 Bits	0.2%	500 μsec.	Bin	0 to +5V, +10V	½ LSB	0 to 70		+5V	16-Pin DIP	$ 8.00
Monolithic Integrating	ADC-EK8B	8 Bits	0.2%	1.25 msec.	Bin	0 to +10V, ±5V	½ LSB	0 to 70	40 ppm/°C	±5V	24-Pin DIP	$ 11.50
	ADC-EK10B	10 Bits	0.05%	5 msec.	Bin							$ 26.00
	ADC-EK12B	12 Bits	0.01%	20 msec.	Bin							$ 34.00
	ADC-EK12DC (3)	3 Digits	0.05%	10 msec.	BCD							$ 13.50
Hybrid Low Power CMOS Binary	ADC-HC12BGC	12 Bits	0.01%	300 μsec.	Bin, 2C	0 to +5,+10V ±2.5, ±5, ±10V	½ LSB	0 to 70	20 ppm/°C		32-Pin DIP	$129.00
	ADC-HC12BMC							0 to 70				$139.00
	ADC-HC12BMR							−25 to +85				$179.00
	ADC-HC12BMM							−55 to +125				$219.00
Hybrid Ultra-Fast 12-Bit	ADC-HF12BGC	12 Bits	0.01%	2 μsec.	Bin, 2C	0 to +5, +10V ±2.5, ±5, ±10V	½LSB	0 to 70	25 ppm/°C	±15V, +5V	32-Pin DIP	$229.00
	ADC-HF12BMC							0 to 70				$249.00
	ADC-HF12BMR							−25 to +85				$299.00
	ADC-HF12BMM							−55 to +100				$399.00
Hybrid 12-Bit With Sample-Hold	ADC-HS12BGC	12 Bits	0.01%	8 μsec.	C Bin C 2C	0 to +5, +10 ±2.5, ±5, ±10V	½ LSB	0 to 70	20 ppm/°C	±15V, +5V	32-Pin DIP	$149.00
	ADC-HS12BMC							0 to 70				$159.00
	ADC-HS12BMR							−25 to +85				$199.00
	ADC-HS12BMM							−55 to +100				$239.00
Hybrid Low Cost 12-Bit	ADC-HX12BGC	12 Bits	0.01%	20 μsec.	C Bin C 2C	0 to +5, +10V ±2.5, ±5,±10V	½ LSB	0 to 70	20 ppm/°C	±15V, +5V	32-Pin DIP	$ 82.50
	ADC-HX12BMC							0 to 70				$ 95.00
	ADC-HX12BMR							−25 to +85				$125.00
	ADC-HX12BMM							−55 to +100				$155.00
Hybrid Fast 12-Bit	ADC-HZ12BGC	12 Bits	0.01%	8μsec.	C Bin C 2C	0 to +5, +10V ±2.5, ±5, ±10V	½ LSB	0 to 70	20 ppm/°C	±15V, +5V	32-Pin DIP	$119.00
	ADC-HZ12BMC							0 to 70				$129.00
	ADC-HZ12BMR							−25 to +85				$169.00
	ADC-HZ12BMM							−55 to +100				$195.00
Ultra-Fast 3-Bit Parallel Type	ADC-HU3BGC	3 Bits	6%	20 nsec.	Bin	±2.5V		0 to 70	5 ppm/°C	±5V	32-Pin DIP	$179.00
	ADC-HU3BMC							0 to 70				$189.00
	ADC-HU3BMR							−25 to +85				$239.00
	ADC-HU3BMM							−55 to +100				$289.00

NOTES:

1. Coding: Bin = Straight binary or offset binary
   BCD = Binary coded decimal
   2C = Two's complement
   C Bin = Complementary binary
   C 2C = Complementary two's complement

2. This product is also available with full MIL-Temp. range: −55°C to +125°C: Model ADC-EK12DR, Price $21.00
   Model ADC-MC8BM, Price $14.00

THESE CONVERTERS ARE COVERED BY GSA CONTRACT

Contact nearest Datel sales office for data sheet

3. This product is also available with −25°C to +85°C Temp. range: Model ADC-EK 12 DR, **Price $21.00**

DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

HOT LINE: SOUTHERN CALIFORNIA (213) 933-3613; (714) 835-6519 / NORTHERN CALIFORNIA (408) 733-9703 / MID-ATLANTIC REGION (301) 948-0282 / NORTHEAST REGION (617) 828-6566

DATEL SYSTEMS, INC.

GENERAL PURPOSE MODULAR A/D CONVERTERS

ADC-ECONOVERTER
This lowest cost model is a counting type converter with 6 bit resolution and 50 µsec. conversion time for a full scale conversion.

ADC-89A SERIES
These low cost models are 8 bit binary or 2 digit BCD counting type converters with 200 and 100 µsec. conversion times respectively.

ADC-MA SERIES
These versatile 10 and 12 bit models feature pin programmable operating features with conversion times of 40 and 20 µsec. The ADC-MA12B2A is a pin and performance equivalent of the popular ADC-12QZ model.

ADC-149-14B
This low cost, high resolution converter uses the successive approximation method to achieve 14 bit resolution with a 15 ppm/°C tempco. Conversion time is 50 µsec.

ADC-CM SERIES
These 8, 10, and 12 bit converters use CMOS circuitry to achieve a low power consumption of 140mW for portable and remote instrumentation applications. These units can operate from either a single +12 to +15V supply or from dual ±12 to ±15V supplies.

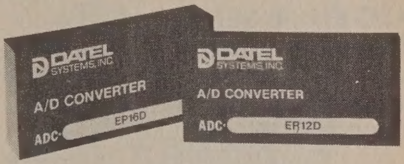
ADC-L SERIES
These high performance successive approximation converters feature 8, 10, and 12 bit conversions in less than 20 µsec. and a low tempco of 10 ppm/°C. Specific input voltage ranges must be ordered by model number.

ADC-E SERIES
These models feature 8, 10, and 12 bit resolution with both binary and BCD coding. Conversion time is from 312 µsec. to 5 msec. depending on the resolution. Coding is sign-magnitude binary or sing-magnitude BCD.

ADC-EP SERIES
These high resolution models feature 14 binary bits or 4 BCD digits with a conversion time of 230 msec. Temperature coefficient is 13 ppm/°C. The analog front end of this converter is electrically floated from digital ground to give ±300V common mode input range with greater than 100 dB CMR. The input is 4 wire ratiometric with a flying capacitor reference input. An auto zeroing circuit stabilizes zero drift to less than 1µV/°C. A crystal controlled clock results in better than 60 dB normal mode rejection to input frequency noise.

ADC-ER SERIES
This series also features 4 wire ratiometric input along with operation from a single +5V supply. The analog input is differential with 70 dB of common mode rejection. The internal clock can be adjusted for synchronism with the power line frequency to give 40 dB of normal mode rejection to this noise. Resolution is 8, 10, and 12 bits with both binary and BCD models.

ALL MODELS
Have operating temperature range of 0°C to 70°C: have DTL/TTL compatible outputs; use DILS-1 or DILS-2 dual-in-line strips for sockets.



	Model	Resolution	Accuracy (% FS)	Conversion Time	Output Coding (2)	Input Ranges	Linearity	Input Impedance	Gain Tempco	Power Requirement	Case Size (Inches)	Price (1-9)
Lowest Cost	ADC-Econov.	6 Bits	0.8%	50 µsec.	Bin	+5, +10, ±2.5, ±5V	½ LSB	4.2K	100 ppm/°C	±15V, +5V	2 × 2 × 0.375	$ 29.95
	ADC-89A8B	8 Bits	0.2%	200 µsec.	Bin	0 to +10V, ±5V	½ LSB	5K	50 ppm/°C	±15V, +5V	3 × 2 × 0.375	$ 69.00
	ADC-89A8D	2 Digits	0.5%	100 µsec.	BCD	0 to +10V						$ 69.00
General Purpose Successive Approximation	ADC-MA10B2A	10 Bits	0.05%	40 µsec.	Bin, 2C	0 to +5V, +10V ±2.5V, ±5V, ±10V	½ LSB	2.5, 5, 10K (1)	30 ppm/°C	±15V, +5V	4 × 2 × 0.4	$ 95.00
	ADC-MA10B2B	10 Bits	0.05%	20 µsec.								$125.00
	ADC-MA12B2A(4)	12 Bits	0.01%	40µsec.								$125.00
	ADC-MA12B2B	12 Bits	0.01%	20 µsec.								$145.00
High Resolution	ADC-149-14B	14 Bits	0.005%	50 µsec.	Bin, 2C	−10, −20, ±5, ±10V	1 LSB	5, 10K	15 ppm/°C	±15V, +5V	4 × 2 × 0.8	$239.00
Low Power CMOS	ADC-CM8B	8 Bits	0.2%	250 µsec.	Bin	−5, −10, ±5, ±10V	½ LSB	25, 50, 100K	30 ppm/°C	+12 to +15V	3 × 2 × 0.8	$149.00
	ADC-CM10B	10 Bits	0.05%	300 µsec.								$159.00
	ADC-CM12B	12 Bits	0.01%	350 µsec.								$169.00
High Performance Successive Approximation	ADC-L8B	8 Bits	0.2%	12 µsec.	Bin, 2C	+5, +10, ±5, ±10V	½ LSB	10K (1)	10 ppm/°C	±15V, +5V	3 × 2 × 0.375	$135.00
	ADC-L10B	10 Bits	0.05%	16 µsec.							4 × 2 × 0.4	$155.00
	ADC-L12B	12 Bits	0.01%	20 µsec.								$175.00
	ADC-L8D	2 Digits	0.5%	12 µsec.	BCD	0 to +5V, +10V						$135.00
	ADC-L12D	3 Digits	0.05%	20 µsec.								$175.00
Fast Dual Slope	ADC-E8B	8 Bits	0.2%	312 µsec.	S.M. Bin	±1, ±5, ±10V	0.01%	100 Meg., 10K	50 ppm/°C	±15V, +5V	4 × 2 × 0.4	$ 79.00
	ADC-E10B	10 Bits	0.05%	1.25 msec.								$ 89.00
	ADC-E12B	12 Bits	0.01%	5.0 msec.								$ 99.00
	ADC-E8D	2 Digits	0.5%	500 µsec.	S.M. BCD	±2, ±5, ±10V						$ 79.00
	ADC-E12D	3 Digits	0.05%	5.0 msec.								$ 99.00
High Resolution Dual Slope	ADC-EP14B	14 Bits	0.01%	230 msec.	S.M. Bin	±2V (3)	0.01%	100 Meg.	13 ppm/°C	±15V, +5V	4 × 2 × 0.8	$179.00
	ADC-EP16D	4 Digits	0.01%	230 msec.	S.M. BCD	±2V (3)						$179.00
Ratiometric Dual Slope	ADC-ER8B	8 Bits	0.2%	43.3 msec.	S.M. Bin	±1V (3)	0.05%	100 Meg.	35 ppm/°C	+5V	4 × 2 × 0.4	$ 79.00
	ADC-ER10B	10 Bits	0.05%	43.3 msec.								$ 89.00
	ADC-ER12B	12 Bits	0.01%	43.3 msec.								$ 99.00
	ADC-ER8D	2 Digits	0.5%	76.7 msec.	S.M. BCD	±2V (3)						$ 79.00
	ADC-ER12D	3 Digits	0.05%	76.7 msec.								$99.00

THESE CONVERTERS ARE COVERED UNDER GSA CONTRACT

NOTES:
1. An optional high impedance buffer amplifier is available on special order to give 1000 megohms input impedance. Add $20.00 to price.
2. Coding: Bin = Straight binary or offset binary
   BCD = Binary coded decimal
   2C = Two's complement
   S.M. Bin = Sign-magnitude binary
   S.M. BCD = Sign-magnitude BCD
3. Has four-wire ratiometric inputs
4. Pin/Performance replacement for ADC-12QZ

Consult nearest Datel sales office for data sheet.

DATEL SYSTEMS, INC.

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DATEL SYSTEMS, INC.

HIGH SPEED MODULAR A/D CONVERTERS

ADC-EH8B SERIES

These 8 bit successive approximation converters feature 4 and 2 μsec. conversion times at low cost. Temperature coefficient is 50 ppm/°C.

ADC-EH10B SERIES

This series of 10 bit converters uses the successive approximation method with 4 and 2 μsec. conversion times and 30 ppm/°C tempco.

ADC-EH12B SERIES

These 12 bit models are also successive approximation types with 8 and 4 μsec. conversion times. Tempco is 30 ppm/°C.

ADC-EH12B3

This 12 bit converter with 2 μsec. conversion time is the fastest 12 bit modular converter in the industry. Unipolar or bipolar operation is achieved by pin connection.

ADC-SH4B

This model is a 4 bit A/D converter with a self-contained sample-hold circuit. Time for both acquisition and conversion is 500 nsec. This device is designed for optical scanning and fast pulse code modulation applications.

ADC-G SERIES

These converters feature conversions of 100 nsec. per bit for 8 and 10 bit conversions with a tempco of 50 ppm/°C.

ADC-VH SERIES

These models use the parallel (or flash) conversion technique to realize a 4 bit conversion in 100 nsec. and 6 or 8 bit conversions in 200 nsec.

ADC-UH SERIES

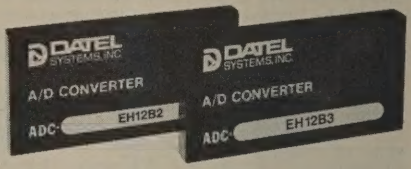
This series is identical with the VH series except for faster conversion speed of 40 nsec. for 4 bits and 100 nsec. for 6 or 8 bits.

ADC-TV8B

This model is made up of hybrid and monolithic components. It performs 8 bit conversions at a 20 MHz rate.

ALL MODELS

Have operating temperature range of 0°C to 70°C; have DTL/TTL compatible outputs (ADC-TV8B has ECL on TTL compatible outputs); use DILS-1 or DILS-2 dual-in-line strips for sockets (ADC-TV8B uses a standard edge connector).



	Model	Resolution	Accuracy (% FS)	Conversion Time	Output Coding (2)	Input Ranges	Linearity	Input Impedance	Gain Tempco	Power Requirement	Case Size (Inches)	Price (1-9)
Fast 8-Bit	ADC-EH8B1	8 Bits	0.2%	4.0 μsec.	Bin, 2C	0 to +10V, ±5V	½ LSB	4.45K	50 ppm/°C	±15V, +5V	2 × 2 × 0.375	$ 85.00
	ADC-EH8B2	8 Bits	0.2%	2.0 μsec.								$129.00
Fast 10-Bit	ADC-EH10B1	10 Bits	0.05%	4.0 μsec.	Bin, 2C	0 to +10V, ±5V	½ LSB	2.3K	30 ppm/°C	±15V, +5V	3 × 2 × 0.375	$149.00
	ADC-EH10B2	10 Bits	0.05%	2.0 μsec.								$189.00
Fast 12-Bit	ADC-EH12B1	12 Bits	0.01%	8.0 μsec.	Bin, 2C	0 to +10V, ±5V	½ LSB	2.3K	30 ppm/°C	±15V, +5V	4 × 2 × 0.375	$169.00
	ADC-EH12B2	12 Bits	0.01%	4.0 μsec.								$209.00
Ultra-Fast 12-Bit	ADC-EH12B3	12 Bits	0.01%	2.0 μsec.	Bin, 2C	0 to +10V, ±5V	½ LSB	1.15K	30 ppm/°C	±15V, +5V	4 × 2 × 0.4	$249.00
4-Bit with S/H	ADC-SH4B	4 Bits	3.0%	500 nsec.	Bin	0 to +1V	2%	50 ohms	200 ppm/°C	±15V, +5V	2 × 2 × 0.375	$ 79.00
100 nsec./Bit	ADC-G8B	8 Bits	0.2%	800 nsec.	Bin, 2C	−5, −10, ±5, ±10V	½ LSB	500, 1K, 2K	10 ppm/°C	±15V, +5V	4 × 2 × 0.4	$239.00
	ADC-G10B	10 Bits	0.05%	1.0 μsec.							4 × 2 × 0.8	$279.00
Ultra-Fast Parallel Type	ADC-VH4B	4 Bits	3.0%	100 nsec.	Bin	0 to −2.56V (1)	½ LSB	100 ohms	50 ppm/°C	±15V, +5V	5 × 3 × 1.15	$695.00
	ADC-VH6B	6 Bits	0.8%	200 nsec.			½ LSB					$745.00
	ADC-VH8B	8 Bits	0.4%	200 nsec.			1 LSB					$795.00
Ultra-Fast Parallel Type	ADC-UH4B	4 Bits	3.0%	40 nsec.	Bin	0 to −2.56V (1)	½ LSB	100 ohms	50 ppm/°C	±15V, +5V	5 × 3 × 1.15	$795.00
	ADC-UH6B	6 Bits	0.8%	100 nsec.			½ LSB					$845.00
	ADC-UH8B	8 Bits	0.4%	100 nsec.			1 LSB					$895.00
8 Bit 20MHz	ADC-TV8B	8 Bits	0.2%	50 nsec.	Bin	±1, ±2, ±5 (3)	½ LSB	50, 75, 93 ohms (3)	60 ppm/°C	±15V, ±5V	7.5 × 4.25 × 0.875	$1995.00

NOTES:

1. Bipolar versions are also available with ±1.28V input. Add $50.00 to price.
2. Coding: Bin = Straight binary or offset binary
   2C = Two's complement
3. Unipolar inputs of 0 to +1V, 0 to +2V and 0 to +5V are also available.

THESE CONVERTERS ARE COVERED BY GSA CONTRACT

Contact nearest Datel sales office for data sheet.

DATEL SYSTEMS, INC.

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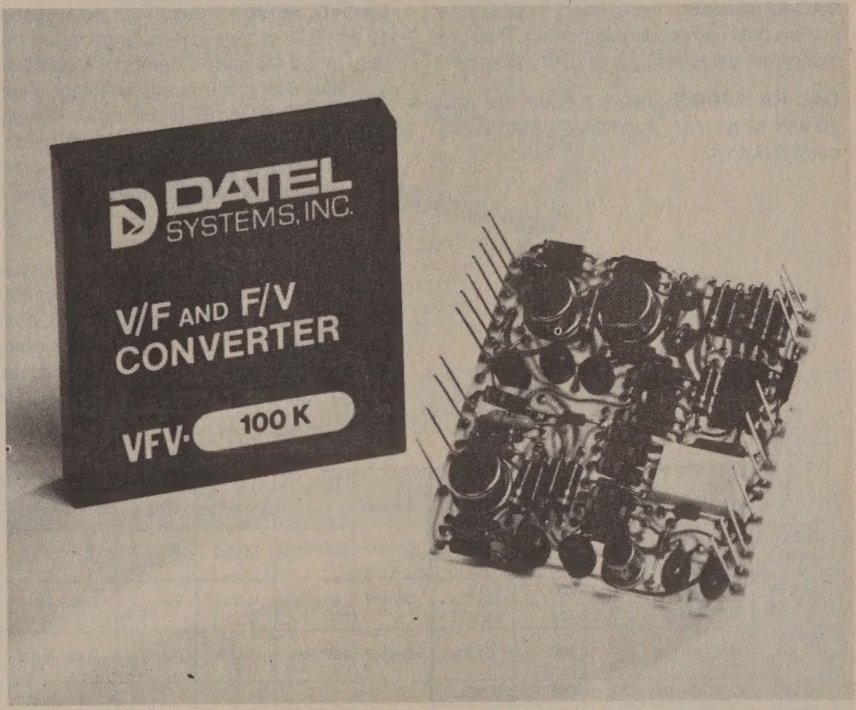
VOLTAGE TO FREQUENCY CONVERTERS

This line of modular and monolithic V/F converters feature 10 kHz and 100 kHz models with excellent linearity and stability characteristics. The VFV series offers the highest performance with a universal design which can be used as V/F or F/V converter by external pin connection. These devices have ±0.005% linearity for 10 kHz and ±0.05% linearity for 100 kHz; temperature stability is ±20 ppm/°C and ±100 ppm/°C maximum, respectively. For less critical applications the low cost, monolithic VFQ-1 is an excellent choice. If features a worst case linearity error of ±0.05% as a 10 kHz converter and can also be connected as an F/V converter. An external reference and several passive components are required with the VFQ-1.



	MODULAR		MONOLITHIC (2)	
MODEL	VFV-10K	VFV-100K	VFQ-1C	VFQ-1R
Voltage Range	0 to +10V	0 to +10V	—	—
Current Range	0 to +1mA	0 to +1mA	0 to +10μA	0 to +10μA
Input Over Range	10%	10%	500%	500%
Input Imped., V_{IN}	10k	10k	—	—
Output Frequency	0 to 10kHz	0 to 100kHz	0 to 10kHz*	0 to 10kHz*
Pulse Width	70 μsec.	7 μsec.	3 μsec.	3 μsec.
Output Drive	12 TTL Loads	12 TTL Loads	5 TTL Loads	5 TTL Loads
Nonlinearity, max.	±0.005%	±0.05%	±0.05%	±0.05%
Gain Tempco, max.	±20 ppm/°C	±100 ppm/°C	±40 ppm/°C	±40 ppm/°C
Zero Drift, max.	±30 μV/°C	±30 μV/°C	±50 μV/°C	±50 μV/°C
Power Supply	±15V @ 25mA	±15V @ 25mA	±5V @ 4mA	±5V @ 4mA
Oper. Temp. Range	0°C to 70°C	0°C to 70°C	0°C to 70°C	−25°C to +85°C
Price (1-9)	**$49.00**	**$69.00**	**$7.50 (1)**	**$12.75 (1)**

Note:
*Can also operate 0 to 100kHz, with ±0.25% max. nonlinearity.
(1) 1-24 Price
(2) Require external reference and several passive components.

DATEL SYSTEMS, INC.

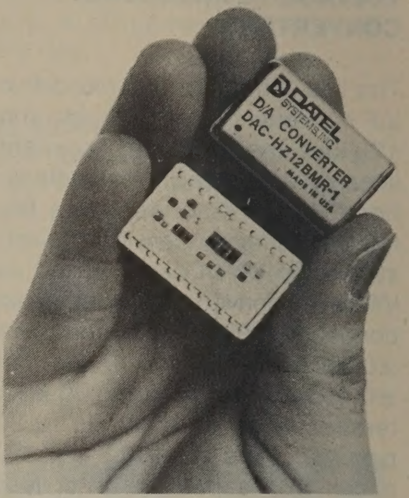
GENERAL PURPOSE MONOLITHIC AND HYBRID D/A CONVERTERS

DAC-IC SERIES: These 8 and 10 bit DAC's are low cost current output models. They are monolithic devices in 16 pin DIP packages.

DAC-HA SERIES: These models are new 10 and 12 bit multiplying CMOS DAC's with current output.

DAC-HZ SERIES: These high performance 12 bit DAC's have pin-programmable outputs and a 20 ppm/°C tempco. Models are available with either complementary binary or complementary BCD coding. A low drift version has a 10 ppm/°C max tempco. The different models in this series operate over 3 different temperature ranges and are in glass or metal cases.

ALL MODELS: Have operating temperature range of 0°C to 70°C except for those models specified otherwise; have DTL/TTL compatible inputs except for DAC-HU4B which is ECL compatible; use DILS-3 24 pin socket except for DAC-IC series and DAC-HA series.



	Model	Resolution	Accuracy (% FS)	Output	Settling Time	Linearity	Input Coding	Output Ranges	Gain Tempco	Temp. Range (°C)	Power Requirement	Case	Price (1-24)
8-Bit Monolithic	DAC-IC8BC	8 Bits	0.2%	Current	300 nsec.	½ LSB	Bin	0 to −2mA	20 ppm/°C	0 to 70	+5V, −15V	16-Pin DIP	$ 8.95
	DAC-IC8BM	8 Bits	0.2%							−55 to +125			$ 12.45
Fast 8-Bit Monolithic	DAC-08BC	8 Bits	0.2%	Current	85 nsec.	½ LSB	Bin	0 to −2mA	10 ppm/°C	0 to 70	±15V	16-Pin DIP	$ 8.00
	DAC-08BM	8 Bits	0.2%							−55 to +125			$ 12.00
10-Bit Monolithic	DAC-IC10BC	10 Bits	0.05%	Current	250 nsec.	1 LSB	Bin	0 to −4mA	20 ppm/°C	0 to 70	+5V, −15V	16-Pin DIP	$ 10.95
10-Bit Multiplying CMOS	DAC-HA10BC	10 Bits	0.05%	Current	500 nsec.	½ LSB	Bin	±1mA	65 ppm/°C	0 to 70	+5V or +15V	16-Pin DIP	$ 29.00
	DAC-HA10BR	10 Bits	0.05%							−25 to +85			$ 39.00
	DAC-HA10BM	10 Bits	0.05%							−55 to +125			$ 69.00
12-Bit Multiplying CMOS (Binary)	DAC-HA12BC	12 Bits	0.01%	Current	500 nsec.	½ LSB	Bin	±1mA	10 ppm/°C	0 to 70	+5V or +15V	18-Pin DIP	$ 49.00
	DAC-HA12BR	12 Bits	0.01%							−25 to +85			$ 69.00
	DAC-HA12BM	12 Bits	0.01%							−55 to +125			$ 99.00
12-Bit Multiplying CMOS (BCD)	DAC-HA12DC	3 Digits	0.05%	Current	500 nsec.	½ LSB	BCD	±1mA	10 ppm/°C	0 to 70	+5V or +15V	18-Pin DIP	$ 49.00
	DAC-HA12DR	3 Digits	0.05%							−25 to +85			$ 69.00
	DAC-HA12DM	3 Digits	0.05%							−55 to +125			$ 99.00
12-Bit Low Cost Hybrid (Binary)	DAC-HZ12BGC	12 Bits	0.01%	Voltage	3 μsec.	½ LSB	C Bin (1)	±2.5, ±5, ±10V 0 to +5, +10V	20 ppm/°C	0 to 70	±15V	24-Pin DIP	$ 39.00
	DAC-HZ12BGR	12 Bits	0.01%						20 ppm/°C	−25 to +85			$ 55.00
	DAC-HZ12BMC	12 Bits	0.01%						20 ppm/°C	0 to 70		24-Pin DIP (Hermetic)	$ 49.00
	DAC-HZ12BMR	12 Bits	0.01%						20 ppm/°C	−25 to +85			$ 69.00
	DAC-HZ12BMM	12 Bits	0.01%						20 ppm/°C	−55 to +125			$119.00
12-Bit Low Cost Hybrid (BCD)	DAC-HZ12DGC	3 Digits	0.05%	Voltage	3 μsec.	¼ LSB	C BCD	0 to +2.5V 0 to +5V 0 to +10V	20 ppm/°C	0 to 70	±15V	24-Pin DIP	$ 28.50
	DAC-HZ12DGR	3 Digits	0.05%						20 ppm/°C	−25 to +85			$ 55.00
	DAC-HZ12DMC	3 Digits	0.05%						20 ppm/°C	0 to 70		24-Pin DIP (Hermetic)	$ 49.00
	DAC-HZ12DMR	3 Digits	0.05%						20 ppm/°C	−25 to +85			$ 69.00
	DAC-HZ12DMM	3 Digits	0.05%						20 ppm/°C	−55 to +125			$119.00
12-Bit Low Drift	DAC-HZ12BMR-1	12 Bits	0.01%	Voltage	3 μsec.	½ LSB	C Bin (1)	+5, +10, ±2.5, ±5, ±10V	10 ppm/°C	−25 to +85	±15V	24-Pin DIP (Hermetic)	$139.00
	DAC-HZ12DMR-1	3 Digits	0.05%				C BCD	0 to +5, +10V					$139.00

NOTES:

1. All models in this series are also available with 3 digit BCD coding. Prices are same as binary. For correct model designation, change "B" to "D" in model number.
2. Coding: Bin = Straight binary or offset binary
   BCD = Binary coded decimal
   C Bin = Complementary binary or comp. offset Bin
   C BCD = Complementary binary coded decimal
   15 line = 8 bit input, no coding

THESE CONVERTERS ARE COVERED BY GSA CONTRACT

DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

HOT LINE: SOUTHERN CALIFORNIA (213) 933-3613; (714) 835-6519 / NORTHERN CALIFORNIA (408) 733-9703 / MID-ATLANTIC REGION (301) 948-0282 / NORTHEAST REGION (617) 828-6566

DATEL SYSTEMS, INC.

HIGH PERFORMANCE HYBRID D/A CONVERTERS

HIGH PERFORMANCE HYBRID D/A CONVERTERS

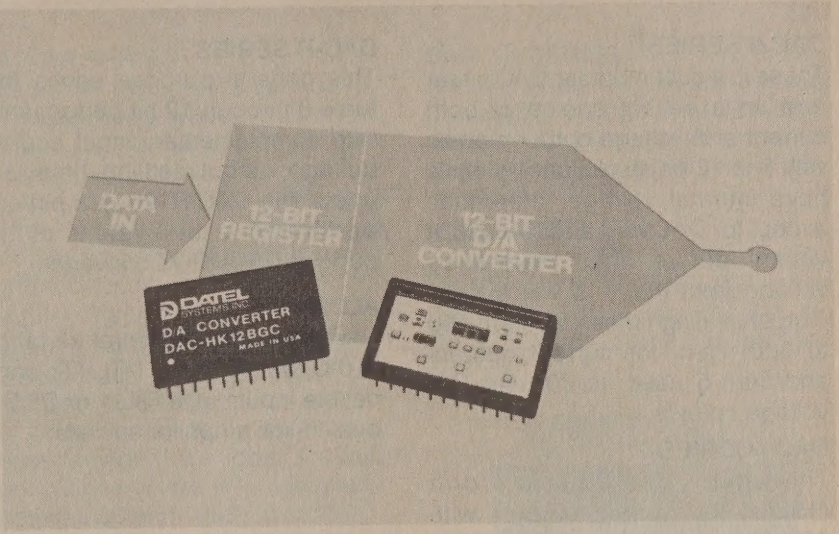
DAC-HA SERIES: These models are new 14-bit multiplying CMOS DAC's with current output.

DAC-HF SERIES: This series of 8, 10, and 12 bit current output models feature a 10 mA full scale output current which settles in 25 nsec. for 8 and 10 bit versions and 50 nsec. for 12-bit versions for high speed applications.

DAC-HK SERIES: These models are identical in performance with the DAC-HZ series except that they have an input digital register.

DAC-HP SERIES: This series consists of a 16 bit comp. binary and a 4 digit BCD model. The two models have voltage outputs and are housed in a ceramic case.

DAC-HU4B: This model is a 4 bit, 15 line ECL input DAC for very fast applications. The 15 mA full scale output current settles in 20 nsec.



	Model	Resolution	Accuracy (% FS)	Output	Settling Time	Linearity	Input Coding	Output Ranges	Gain Tempco	Temp Range (°C)	Power Requirement	Case	Price (1-24)
14-Bit Multiplying CMOS	DAC-HA14BC	14 Bits	0.006%	Current	500 nsec.	1 LSB	Bin	±1mA	10 ppm/°C	0 to 70	+5V or +15V	24-Pin DIP	$69.00
	DAC-HA14BR	14 Bits	0.006%							−25 to +85			$ 99.00
	DAC-HA14BM	14 Bits	0.006%							−55 to +125			$139.00
Ultra-Fast 8-Bit Current Out	DAC-HF8BGC	8 Bits	0.2%	Current	25 nsec.	½ LSB	Bin	0 to +10mA ±5mA	20 ppm/°C	0 to 70	±15V	24-Pin DIP (Hermetic)	$109.00
	DAC-HF8BMC	8 Bits	0.2%							0 to 70			$119.00
	DAC-HF8BMR	8 Bits	0.2%							−25 to +85			$159.00
	DAC-HF8BMM	8 Bits	0.2%							−55 to +100			$189.00
Ultra-Fast 10-Bit Current Out	DAC-HF10BGC	10 Bits	0.05%	Current	25 nsec.	½ LSB	Bin	0 to +10mA ±5mA	20 ppm/°C	0 to 70	+15V	24-Pin DIP (Hermetic)	$129.00
	DAC-HF10BMC	10 Bits	0.05%							0 to 70			$139.00
	DAC-HF10BMR	10 Bits	0.05%							−25 to +85			$179.00
	DAC-HF10BMM	10 Bits	0.05%							−55 to +100			$209.00
Ultra-Fast 12-Bit Current Out	DAC-HF12BGC	12 Bits	0.01%	Current	50 nsec.	½ LSB	Bin	0 to +10mA ±5mA	20 ppm/°C	0 to 70	+15V	24-Pin DIP (Hermetic)	$139.00
	DAC-HF12BMC	12 Bits	0.01%							0 to 70			$149.00
	DAC-HF12BMR	12 Bits	0.01%							−25 to +85			$189.00
	DAC-HF12BMM	12 Bits	0.01%							−55 to +100			$219.00
12-Bit with Input Register (Binary)	DAC-HK12BGC	12 Bits	0.01%	Voltage	3 μsec.	½ LSB	Bin	0 to +5V 0 to +10V ±2.5, ±5, ±10V	20 ppm/°C	0 to 70	+5V, ±15V	24-Pin DIP (Hermetic)	$ 59.00
	DAC-HK12BMC	12 Bits	0.01%							0 to 70			$ 69.00
	DAC-HK12BMR	12 Bits	0.01%							−25 to +85			$ 99.00
	DAC-HK12BMM	12 Bits	0.01%							−55 to +125			$139.00
12-Bit with Input Register (BCD)	DAC-HK12DGC	3 Digits	0.05%	Voltage	3 μsec.	¼ LSB	BCD	0 to +2.5V 0 to +5V 0 to +10V	20 ppm/°C	0 to 70	+5V, ±15V	24-Pin DIP (Hermetic)	$ 59.00
	DAC-HK12DMC	3 Digits	0.05%							0 to 70			$ 69.00
	DAC-HK12DMR	3 Digits	0.05%							−25 to +85			$ 99.00
	DAC-HK12DMM	3 Digits	0.05%							−55 to +125			$139.00
High Resolution 16-Bit Binary	DAC-HP16BMC	16 Bits	0.003%	Voltage	35 μsec.	4 LSB	C Bin	0 to +10V ±5V	15 ppm/°C	0 to 70	±15V	24-Pin DIP (Hermetic)	$119.00
	DAC-HP16BMR	16 Bits	0.003%							−25 to +85			$149.00
	DAC-HP16BMM	16 Bits	0.003%							−55 to +125			$199.00
High Resolution 4-Digit BCD	DAC-HP16DMC	4 Digits	0.005%	Voltage	15 μsec.	½ LSB	C BCD	0 to +10V	15 ppm/°C	0 to 70	±15V	24-Pin DIP (Hermetic)	$119.00
	DAC-HP16DMR	4 Digits	0.005%							−25 to +85			$149.00
	DAC-HP16DMM	4 Digits	0.005%							−55 to +125			$199.00
4-Bit Ultra-Fast Current Out	DAC-HU4BGC	4 Bits	3.0%	Current	20 nsec.	¼ LSB	15 Line	0 to −15mA	40 ppm/°C	0 to 70	−4.4V	32-Pin DIP (Hermetic)	$119.00
	DAC-HU4BMC	4 Bits	3.0%							0 to 70			$129.00
	DAC-HU4BMR	4 Bits	3.0%							−25 to +85			$169.00
	DAC-HU4BMM	4 Bits	3.0%							−55 to +100			$199.00

THESE CONVERTERS ARE COVERED BY GSA CONTRACT

NOTES:

1. Coding:
   - Bin = Straight binary or offset binary
   - C Bin = Comp. binary or comp. offset binary
   - BCD = Binary coded decimal
   - C BCD = Comp. binary coded decimal
   - 15 Line = 8-bit input, no coding

DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

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DATEL SYSTEMS, INC.

GENERAL PURPOSE MODULAR D/A CONVERTERS

DAC-9 SERIES

These low cost modular DAC's feature an excellent choice of both current and voltage output models with 8 to 12 bit resolutions. All units have internal voltage references except for DAC98BI and DAC-98DI which derive their reference voltage from the +15 volt supply. Output settling times vary from 300 to 500 nsec. for current outputs and from 5 μsec. to 20 μsec. for voltage outputs.

DAC-I SERIES

This series features low drift (15ppm/°C) current outputs with 150 nsec. settling time. Resolution is 8 through 12 bits with 2 BCD models.

DAC-R SERIES

This general purpose series features 8 through 12 bit performance with complementary input coding. Voltage output settling time is 5 μsec. The DAC-R12B is a pin and performance equivalent of the popular DAC-12QZ converter.

ALL MODELS

Have operating temperature range of 0°C to 70°C; have DTL/TTL compatible inputs; use DIL-1 or DILS-2 dual-in-line strips for sockets.

DATEL SYSTEMS, INC.
D/A CONVERTER
I SERIES
DAC-I SERIES

	Model	Resolution	Accuracy (% FS)	Output	Settling Time	Linearity	Input Coding (2)	Output Ranges	Gain Tempco	Power Requirement	Case Size (inches)	Price (1-9)
Lowest Cost Current Output	DAC-98BI (1)	8 Bits	0.2%	Current	500 nsec.	½ LSB	Bin	0 to +2.6 mA	100 ppm/°C	+15V	2 × 1 × 0.375	$14.95
	DAC-98DI (1)	2 Digits	0.5%				BCD	0 to +1.6 mA				$14.95
	DAC-98BIR	8 Bits	0.2%				Bin	0 to +2.6 mA				$16.95
	DAC-98DIR	2 Digits	0.5%				BCD	0 to +1.6 mA				$16.95
8 Bit Voltage & Current Output	DAC-198B	8 Bits	0.2%	Voltage	20 μsec.	½ LSB	Bin, 2C	0 to +10V, ±5V	50 ppm/°C	±15V	2 × 2 × 0.375	$29.00
	DAC-198D	2 Digits	0.5%	Voltage	20 μsec.		BCD	0 to +10V				$29.00
	DAC-198BI	8 Bits	0.2%	Current	300 nsec.		Bin	0 to +2.5 mA				$29.00
	DAC-198DI	2 Digits	0.5%	Current	300 nsec.		BCD	0 to +1.54 mA				$29.00
5 μsec. Voltage Output	DAC-298B	8 Bits	0.2%	Voltage	5 μsec.	½ LSB	Bin, 2C	0 to +10V, ±5V	50 ppm/°C	±15V	2 × 2 × 0.375	$39.00
	DAC-298D	2 Digits	0.5%				BCD	0 to +10V				$39.00
10 Bit Voltage & Current Output	DAC-4910B	10 Bits	0.05%	Voltage	5 μsec.	½ LSB	Bin, 2C	0 to +10V, ±5V	50 ppm/°C	±15V	2 × 2 × 0.375	$49.00
	DAC-4910BI	10 Bits	0.05%	Current	300 nsec.		Bin	0 to +2.5 mA				$49.00
	DAC-4912D	3 Digits	0.05%	Voltage	5 μsec.		BCD	0 to +10V				$49.00
	DAC-4912DI	3 Digits	0.05%	Current	300 nsec.		BCD	0 to +1.54 mA				$49.00
12 Bit Voltage & Current Output	DAC-6912B	12 Bits	0.01%	Voltage	20 μsec.	½ LSB	Bin, 2C	0 to +10V, ±5V	50 ppm/°C	±15V	2 × 2 × 0.375	$59.00
	DAC-6912BI	12 Bits	0.01%	Current	300 nsec.		Bin	0 to +2.5 mA				$59.00
Current Output, 150 nsec. Settling	DAC-I8B	8 Bits	0.2%	Current	150 nsec.	½ LSB	Bin	0 to +2, ±1 mA	15 ppm/°C	±15V	2 × 1 × .0375	$69.00
	DAC-I10B	10 Bits	0.05%									$79.00
	DAC-I12B	12 Bits	0.01%									$89.00
	DAC-I8D	2 Digits	0.5%				BCD	0 to +1.25 mA				$69.00
	DAC-I12D	3 Digits	0.05%									$89.00
5 μsec. Voltage Output	DAC-R8B	8 Bits	0.2%	Voltage	5 μsec.	½ LSB	C Bin	±2.5, ±5, ±10V 0 to +5, +10V	30 ppm/°C	±15V, +5V	2 × 2 × 0.375	$69.00
	DAC-R10B	10 Bits	0.05%									$75.00
	DAC-R12B (3)	12 Bits	0.01%									$79.00
	DAC-R8D	2 Digits	0.5%				C BCD	0 to +5, +10V				$69.00
	DAC-R12D	3 Digits	0.05%									$79.00

NOTES;

1. These models derive their reference from the +15V supply.
2. Coding: Bin = Straight binary or offset binary
   BCD = Binary coded decimal 2C = Two's complement
   C Bin = Complementary binary C BCD = Complementary BCD
3. Pin/Performance replacement for DAC-12QZ.

THESE CONVERTERS ARE COVERED BY GSA CONTRACT Contact nearest Datel sales office for data sheet.

DATEL SYSTEMS, INC.

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DATEL SYSTEMS, INC.

HIGH SPEED, HIGH PERFORMANCE MODULAR D/A CONVERTERS

DAC-169 SERIES

These low cost, high resolution DAC's feature 16 bit or 4 BCD digit resolution with .005% linearity and 10 ppm/°C temperature coefficient. By pin connection the output can be configured for either voltage or current output.

DAC-DG SERIES

These devices are 12 bit self-contained deglitched DAC's in a compact 4 × 2 × 0.4 inch module. Output settling is a fast 600 nsec. and glitch amplitude is less than 2 LSB's.

DAC-HI SERIES

These fast current output models feature settling times of 25 or 50 nsec. Resolution is from 8 bits to 12 bits with temperature coefficients 20 or 15 ppm/°C. This series is designed to drive a small value load resistor directly or the summing junction of a fast operational amplifier.

DAC-HR SERIES

This series features 13 through 16 bit resolutions with an ultra-low tempco of only 1.5 ppm/°C. This is achieved by a low T.C. resistor network and an oven controlled zener reference. Linearity is .0015% and these models have current outputs.

DAC-HV-100 SERIES

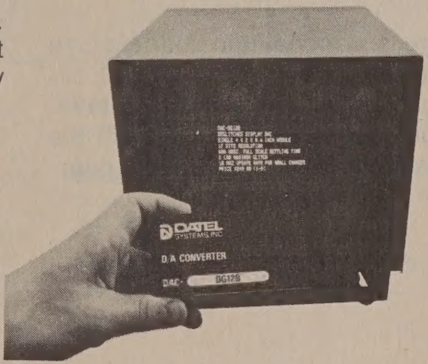
These ultra fast voltage output models have settling times from 100 nsec. to 50 nsec. with an output drive capability up to 100mA. These devices are ideal for fast applications where it is necessary to drive a 50 ohm cable directly.

DAC-TR SERIES

These models feature low tempco (7 ppm/°C) voltage outputs with 5 μsec. settling time. Input coding is complementary binary or complementary BCD.

ALL MODELS

Have operating temperature range of 0°C to 70°C; have DTL/TTL compatible inputs; use DILS-1 or DILS-2 dual-in-line strips for sockets.



	Model	Resolution	Accuracy (% FS)	Output	Settling Time	Linearity	Input Coding (2)	Output Ranges	Gain Tempco	Power Requirement	Case Size (Inches)	Price (1-9)
Low Cost 16 Bits	DAC-169-16B	16 Bits	.005%	Voltage (1)	30 μsec.	4 LSB	Bin	+10V, −10V, ±5V	10 ppm/°C	±15V	2 × 2 × 0.375	$109.00
	DAC-169-16D	4 Digits				½ LSB	BCD	+10V, −10V				$109.00
Deglitched DAC	DAC-DG12B1	12 Bits	.01%	Voltage (3)	600 nsec.	½ LSB	Bin	−10V, ±5, ±10V	35 ppm/°C	±15V, +5V	4 × 2 × 0.4	$249.00
	DAC-DG12B2	12 Bits	.01%				2C	±5V, ±10V				$249.00
25 & 50 nsec. Current Out	DAC-HI8B	8 Bits	0.2%	Current	25 nsec.	½ LSB	Bin	±2.5, +5mA	15 ppm/°C	±15V	2 × 2 × 0.375	$ 99.00
	DAC-HI10B	10 Bits	.05%		25 nsec.				15 ppm/°C			$119.00
	DAC-HI12B	12 Bits	.01%		50 nsec.				20 ppm/°C			$129.00
Ultra Low Drift, 1.5 ppm/°C	DAC-HR13B	13 Bits	.006%	Current	1 μsec.	½ LSB	C Bin	0 to +2mA, ±1mA	1.5 ppm/°C	±15V	4 × 2 × 0.4	$249.00
	DAC-HR14B	14 Bits	.003%			½ LSB						$263.00
	DAC-HR15B	15 Bits	.0015%			½ LSB						$276.00
	DAC-HR16B	16 Bits	.0015%			1 LSB						$299.00
50 & 100 nsec. Voltage Out	DAC-HV6B-100	6 Bits	0.8%	Voltage (4)	50 nsec.	½ LSB	Bin	0 to +5V	60 ppm/°C	±15V	3 × 2 × 0.375	$169.00
	DAC-HV8B-100	8 Bits	0.2%		50 nsec.							$179.00
	DAC-HV10B-100	10 Bits	.05%		100 nsec.							$189.00
Low Drift, 7 ppm/°C	DAC-TR8B	8 Bits	0.2%	Voltage	5 μsec.	½ LSB	C Bin	±2.5, ±5, ±10V 0 to +5, +10V	7 ppm/°C	±15V, +5V	2 × 2 × 0.375	$109.00
	DAC-TR10B	10 Bits	.05%									$119.00
	DAC-TR-12B	12 Bits	.01%									$129.00
	DAC-TR-8D	2 Digits	0.5%				C BCD	0 to +5, +10V				$109.00
	DAC-TR-12D	3 Digits	.05%									$129.00

NOTES:
1. Can also be connected for current output. Current output is 0 to +2mA or ±1mA for binary version and 0 to +1.25mA for BCD version.
2. Coding: Bin = Straight binary or offset binary
   BCD = Binary coded decimal
   C Bin = Complementary binary
   C BCD = Complementary BCD
   2C = Two's complement
3. Glitch amplitude is ± LSB's maximum.
4. Has 100mA output current drive capability.

THESE CONVERTERS ARE COVERED BY GSA CONTRACT

Contact nearest Datel sales office for data sheet.

DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021
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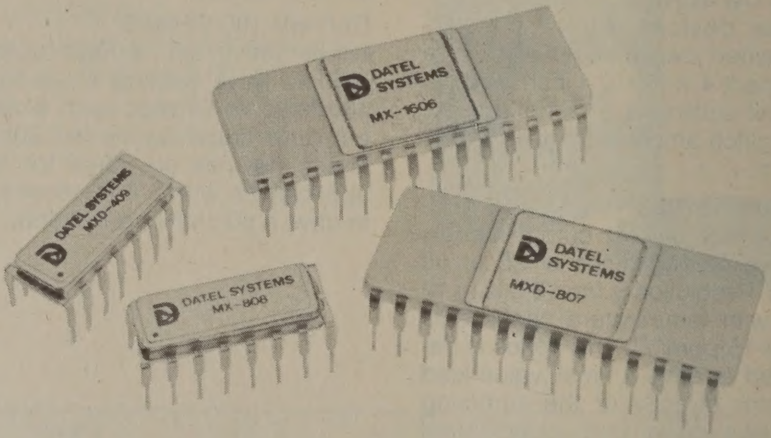
DATEL SYSTEMS, INC.

ANALOG MULTIPLEXERS

This complete line of analog multiplexers offers a choice of operating features and prices for data acquisition system applications. The two modular models offer 8 and 16 channel capability. The MMD-8 is an 8 channel model with differential inputs and output and an internal differential buffer amplifier. The MM-16 features single-ended 16 channel operation and also includes an internal buffer amplifier.

The six monolithic models use dielectrically isolated CMOS circuitry. The analog and digital inputs are protected from both the loss of power and from overvoltages that exceed the power supplies. The CMOS FET analog channel switches have fast settling time, low capacitance, low leakage current, and high OFF resistance. These monolithic devices offer 4, 8, and 16 channel single-ended operation and 8 channel differential operation at economical prices. Channel addressing is done by a 2, 3, or 4 bit binary code, depending on the particular model. There is also an inhibit input which enables or disables the multiplexer.



	Monolithic	Monolithic	Monolithic	Monolithic	Monolithic	Monolithic	Modular	Modular
	MXD-409	MX-808	MXD-807	MX-1606	MVD-807	MV-1606	MMD-8	MM-16
Number of Channels	4	8	8	16	8	16	8	16
Type Input	Differ.	Sing. End.	Differ.	Sing. End.	Differ.	Sing. End.	Differ.	Sing. End.
Input Voltage Range	±15V	±15V	±15V	±15V	±15V	±15V	±10V	±10V
Input Overvoltage, max.	±35V	±35V	±35V	±35V	±17V	±17V	±35V	±35V
Channel ON Resistance	1.5K	1.5K	1.5K	1.5K	270Ω	270Ω	2K	2K
Channel OFF Resistance	200 Meg.	200 Meg.	200 Meg.	200 Meg.	200 Meg.	200 Meg.	200 Meg.	200 Meg.
Channel OFF Leakage	30 pA	30 pA	30 pA	30 pA	30 pA	30 pA	30 pA	30 pA
Channel Addressing	2 bit code	3 bit code	3 bit code	4 bit code	3 bit code	4 bit code	3 bit code	4 bit code
Address Logic Compatibility	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS	DTL/TTL/CMOS
Internal Buffer Amplifier	No	No	No	No	No	No	Yes	Yes
Output Current Drive, max.	—	—	—	—	—	—	±10 mA	±5 mA
Output Settling Time	—	—	—	—	—	—	4 μsec. (1)	3 μsec. (1)
Output Slew Rate	—	—	—	—	—	—	100V/μsec.	120V/μsec.
Output Offset Drift	—	—	—	—	—	—	±60μV/°C	±30μV/°C
Transfer Accuracy	.01%	.01%	.01%	.01%	.01%	.01%	.01%	.01%
Crosstalk	−86 dB	−86 dB	−86 dB	−86 dB	−86 dB	−86 dB	−80 dB	−80 dB
Common Mode Rejection	120 dB	—	120 dB	—	120 dB	—	110 dB	—
Turn ON Time	500 nsec.	500 nsec.	500 nsec.	500 nsec.	300 nsec.	300 nsec.	500 nsec.	500 nsec.
Turn OFF Time	300 nsec.	300 nsec.	300 nsec.	300 nsec.	300 nsec.	300 nsec.	500 nsec.	500 nsec.
Power Requirement	±15V	±15V	±15V	±15V	±15V	±15V	±15V	±15V
Package Size, inches	16 Pin DIP	16 Pin DIP	28 Pin DIP	28 Pin DIP	28 Pin DIP	28 Pin DIP	2 × 2 × 0.375	1.5 × 2 × 0.375
Operating Temp. Range	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C	0 to 70°C
Price (1-24)	$14.00	$14.00	$34.00	$34.00	$16.00	$16.00	$169.00 (2)	$129.00 (2)
MIL-Version (−55 to +125°C)	MXD-409M	MX-808M	MXD-807M	MX-1606M	MVD-807M	MV-1606M	—	—
MIL-Version Price	$39.00	$39.00	$80.00	$80.00	$40.00	$40.00	—	—

NOTES:
1. For 20V step to 0.01%.
2. (1-9) Price.

THESE MULTIPLEXERS ARE COVERED BY GSA CONTRACT

DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

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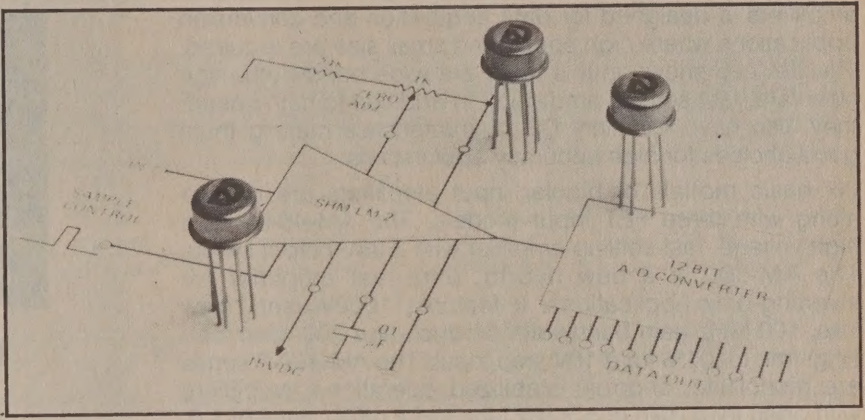
DATEL SYSTEMS, INC.

SAMPLE-HOLDS

This line of sample-hold devices includes modular, hybrid, and monolithic models and is the most comprehensive line in the industry. The models listed here cover a broad range of applications from ultra-fast and high accuracy down to lost cost, moderate performance units.



SHM-1: General purpose, high accuracy model with 5 µsec. acquisition time.

SHM-2, SHM-2E: Very high speed units with open loop circuit to achieve acquisition times as fast as 100 nsec.

SHM-3: A low cost, .005% accuracy model with 50 µsec. acquisition time.

SHM-4: A low cost, .005% sample hold with a faster 7 µsec. acquisition time.

SHM-5: A new ultra-fast sample hold designed for use with fast 10 and 12 bit A/D converters. Acquisition time is 350 nsec. to .01% and 200 nsec. to 0.1%. The SHM-5 also features high input impedance.

SHM-UH, UH3: These ultra-fast models feature acquisition times of 50 and 30 nsec. and are ideal for use with ultra-fast 8 bit A/D converters such as ADC-UH8B.

SHM-IC-1: This monolithic sample-hold offers excellent performance characteristics for .01% accuracy at a low cost.

SHM-LM-2: This monolithic unit also gives excellent performance at even lower cost.

SHM-HU: This hybrid model is specifically designed for ultra-fast video data conversion applications.

SHM-6: This hybrid unit features .01% accuracy with 1 µsec. acquisition time.

	Model	Accuracy	Acquisition Time (2)	Aperture Delay	Voltage Range	Gain	Bandwidth	Hold-Mode Droop	Tempco	Power Requirement	Temperature Range (°C)	Case Size (Inches)	Price (1-24)
Monolithic	SHM-IC-1	0.01%	5 µsec.	50 nsec.	±10V	±1.00 (1)	2 MHz	50 µV/msec.	20 µV/°C	±15V	0 to 70	14-Pin Cer. DIP	$ 19.00
	SHM-IC-1M	0.01%	5 µsec.	50 nsec.	±10V	±1.00 (1)	2 MHz	50 µV/msec.	20 µV/°C	±15V	−55 to +125	14-Pin Cer. DIP	$ 40.00
	SHM-LM-2	0.01%	6 µsec.	100 nsec.	±10V	+1.00	1 MHz	200 µV/msec.	10 mV (3)	±15V	0 to 70	TO-99	$ 7.95
	SHM-LM-2M	0.01%	6 µsec.	100 nsec.	±10V	+1.00	1 MHz	100 µV/msec.	5 mV (3)	±15V	−55 to +125	TO-99	$ 35.00
Hybrid	SHM-HUGC	0.1%	25 nsec.	6 nsec.	±2.5V	+0.975	50 MHz	50 µV/µsec.	50 µV/°C	±15V, ±5V	0 to 70	24-Pin Cer. DIP	$129.00
	SHM-HUMC	0.1%	25 nsec.	6 nsec.	±2.5V	+0.975	50 MHz	50 µV/µsec.	50 µV/°C	±15V, ±5V	0 to 70	24-Pin Cer. DIP	$139.00
	SHM-HUMR	0.1%	25 nsec.	6 nsec.	±2.5V	+0.975	50 MHz	50 µV/µsec.	50 µV/°C	±15V, ±15V	−25 to +85	24-Pin Cer. DIP	$179.00
	SHM-HUMM	0.1%	25 nsec.	6 nsec.	±2.5V	+0.975	50 MHz	50 µV/µsec.	50 µV/°C	±15V, ±5V	−55 to +100	24-Pin Cer. DIP	$209.00
	SHM-6GC	0.01%	1 µsec.	20 nsec.	±10V	±1 to ±10	5 MHz	10 µV/µsec.	100 µV/°C	±15V, +5V	0 to 70	32-Pin Cer. DIP	$129.00
	SHM-6MC	0.01%	1 µsec.	20 nsec.	±10V	±1 to ±10	5 MHz	10 µV/µsec.	100 µV/°C	±15V, +5V	0 to 70	32-Pin Cer. DIP	$139.00
	SHM-6MR	0.01%	1 µsec.	20 nsec.	±10V	±1 to ±10	5 MHz	10 µV/µsec.	100 µV/°C	±15V, +5V	−25 to +85	32-Pin Cer. DIP	$179.00
	SHM-6MM	0.01%	1 µsec.	20 nsec.	±10V	±1 to ±10	5 MHz	10 µV/µsec.	100 µV/°C	±15V, +5V	−55 to +100	32-Pin Cer. DIP	$209.00
Modular	SHM-1	0.025%	5 µsec.	50 nsec.	±10V	+1.00	650 kHz	1 µV/µsec.	20 ppm/°C	+15V, −20V	0 to 70	2 × 1 × 0.375	$ 69.00*
	SHM-2	0.1%	100 nsec.	10 nsec.	±10V	+1.00	10 MHz	50 µV/µsec.	30 ppm/°C	±15V	0 to 70	2 × 1 × 0.375	$ 89.00*
	SHM-2E	0.1%	100 nsec.	10 nsec.	±10V	+1.00	10 MHz	330 µV/µsec.	30 ppm/°C	±15V	0 to 70	2 × 1 × 0.375	$ 95.00*
	SHM-4	0.005%	7 µsec.	40 nsec.	±10V	+1.00	1 MHz	20 µV/msec.	30 µV/°C	±15V	0 to 70	2 × 1.5 × 0.375	$ 59.00*
	SHM-5	0.01%	350 nsec.	20 nsec.	±10V	−1.00	5 MHz	20 µV/µsec.	15 ppm/°C	±15V	0 to 70	2 × 2 × 0.375	$189.00*
	SHM-UH	0.25%	50 nsec.	10 nsec.	±5V	+0.95	35 MHz	50 µV/µsec.	50 µV/°C	±15V, +5V	0 to 70	2 × 2 × 0.375	$169.00*
	SHM-UH3	0.1%	30 nsec.	5 nsec.	±5V	+0.975	35 MHz	50 µV/µsec.	50 µV/°C	±15V, +5V	0 to 70	2 × 2 × 0.375	$179.00*

NOTES:
1. Can be configured for gains greater than ±1.
2. For 10V change.
3. Maximum offset voltage over operating temperature range.

THESE SAMPLE HOLDS ARE COVERED BY GSA CONTRACT

Contact nearest Datel sales office for data sheet.

*Prices are for 1-9 quantity

DATEL SYSTEMS, INC.

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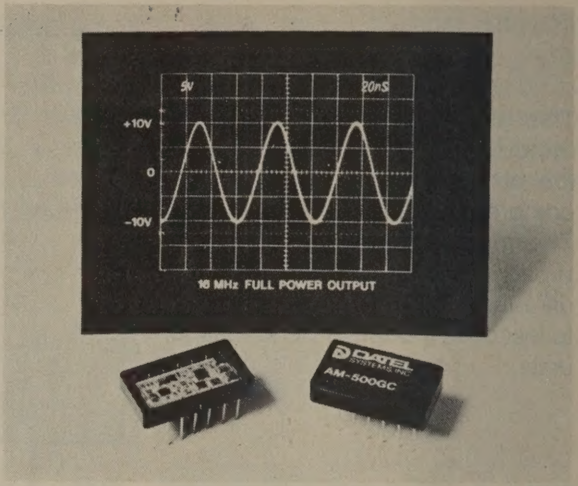
DATEL SYSTEMS, INC.

MONOLITHIC AND HYBRID I.C. OPERATIONAL AMPLIFIERS

This broad line of monolithic and hybrid operational amplifiers is designed for data acquisition and conversion applications where high speed and small size are required. The devices shown in this table are wide bandwidth, high slew rate, fast settling amplifiers. In addition to high speed, they also have excellent DC characteristics making them good choices for high accuracy applications.

Six basic models of bipolar input amplifiers are offered along with three FET input models. The AM-464-2 is a high voltage, fast settling amplifier with ±35V output swing. The AM-500 is a new hybrid, ultra-fast amplifier for inverting-only applications. It features 1000V/µsec. slew rate, 100 MHz gain bandwidth product, and 200 nsec. settling time to .01% for a 10V step input. The AM-490-2 series are monolithic, chopper stabilized operational amplifiers with open loop gain of 5×10^8 and input offset drifts of 1.0, 0.3, and 0.1 µV/°C maximum.



	MONOLITHIC	MONOLITHIC	MONOLITHIC	MONOLITHIC	MONOLITHIC	MONOLITHIC	MONOLITHIC	HYBRID	MONOLITHIC		
SPECIFICATIONS (Typical at 25°C, ±15V)	MOD. SLEW RATE AM-450-2	FAST SETTLING AM-452-2	LOW COST AM-460-2	WIDEBAND AM-462-1/2	FAST SLEW FET AM-405-2	WIDEBAND FET AM-406-2	±35V SWING AM-464-2	ULTRA FAST AM-500GC (3)	CHOPPER STABILIZED AM-490-2		
									A	B	C
DC Open Loop Gain	25K	15K	150K	150K	15K	150K	100K	1×10^6	5×10^8		
Gain Bandwidth Product	12 MHz	20 MHz	12 MHz	100 MHz	20 MHz	100 MHz	4 MHz	130 MHz	3 MHz		
Slew Rate	30V/µsec.	120V/µsec.	7V/µsec.	35V/µsec.	120V/µsec.	35V/µsec.	5V/µsec.	1000V/µsec.	2.5V/µsec.		
Settling Time, 10V to 0.1%	330 nsec.	200 nsec.	1.5 µsec.	1.0 µsec.	400 nsec.	—	—	100 nsec. (1)	—		
Output, min.	±10V @ 10mA	±10V @ 10mA	±10V @ 10mA	±10V @ 10mA	±10V @ 10mA	±10V @ 10mA	±35V @ 10mA	±10V @ 50mA	±10V @ 7mA		
Common Mode Range, min.	±10V	±10V	±11V	±11V	±10V	±10V	±35V	—	±10V		
Common Mode Rejection	90 dB	90 dB	100 dB	100 dB	90 dB	90 dB	74 dB	—	120 dB		
Input Impedance	50 Meg.	100 Meg.	300 Meg.	300 Meg.	10^{12} ohms	10^{12} ohms	200 Meg.	30 Meg.	100 Meg.		
Input Bias Current, max.	250nA	250nA	25nA	25nA	20pA	20pA	30nA	4nA	150pA		
Input Offset Current, max.	50nA	50nA	25nA	25nA	20pA	20pA	30nA	0.5nA	50pA		
Input Offset Voltage, max., adj. to 0	±8mV	±10mV	±5mV	±5mV	±30mV	±15mV	±6mV	±3mV	±20 µV		
Input Offset Voltage Drift	20µV/°C	30µV/°C	10µV/°C	15µV/°C	50µV/°C	50µV/°C	15µV/°C	5µV/°C (2)	1.0 (2)	0.3 (2)	0.1 (2)
Power Requirement	±15V @ 4mA	±15V @ 4mA	±15V @ 3mA	±15V @ 3mA	±15V @ 6mA	±15V @ 4mA	±10V to ±40V @ 3.2mA	±15V @ 22mA	±12V to ±20VDC @ 5mA		
Temperature Range	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C	0°C to 70°C		
Package	TO-99	TO-99	TO-99	TO-116/TO-99	TO-99	TO-99	TO-99	0.76 × 0.45 × 0.15″	TO-99		
Price (1-24)	**$7.50**	**$10.50**	**$6.50**	**$9.00**	**$16.00**	**$13.75**	**$6.75**	**$75.00**	**$29.00**	**$34.00**	**$39.00**
Mil-Version (−55°C to +125°C)	AM-450-2M	AM-452-2M	AM-460-2M	AM-462-IM/2M	AM-405-2M	AM-406-2M	AM-464-2M	AM-500MM (4)	AM-490-2M (5)		
MIL-Version Price	**$10.00**	**$17.00**	**$10.00**	**$12.00**	**$26.00**	**$21.00**	**$24.00**	**$135.00**	**$68.00**		

NOTES:

1. Max. settling time for 10V to 0.01% is 200 nsec.
2. µV/°C maximum.
3. Model **AM-500MC**, 5 µV/°C max. Input Offset Voltage Drift, 0 to 70°C, Metal Case, $85.00
   Model **AM-500MR**, 7 µV/°C max. Input Offset Voltage Drift, −25 to +85°C, Metal Case, $95.00
4. 10 µV/°C max. Input Offset Voltage Drift.
5. 0.6 µV/°C max. Input Offset Voltage Drift.

THESE AMPLIFIERS ARE COVERED BY GSA CONTRACT

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DATEL SYSTEMS, INC.

OPERATIONAL AMPLIFIERS / INSTRUMENTATION AMPLIFIERS

FAST SETTLING FET OPERATIONAL AMPLIFIERS

SPECIFICATIONS (Typical at 25°C, ±15V supplies unless otherwise noted)	FAST SETTLING AM-100			CAPACITIVE LOADS AM-101		FAST FOLLOWER AM-102		FAST SLEWING AM-103		±140V FET AM-303	
	A	B	C	A	B	A	B	A	B	A	B
DC Open Loop Gain	300K			300K		130K		130K		10^6	
Gain Bandwidth Product	13.5 MHz			5.5 MHz		32 MHz		32 MHz		10 MHz	
Slew Rate	45V/μsec.			45V/μsec.		140V/μsec.		400V/μsec.		100V/μsec.	
Settling Time, 10V to .01%	550 nsec. (1)			1.0 μsec. (1)		550 nsec. (2)		350 nsec. (1)		2.5 μsec.	
Output, min.	±10V @ 20mA			±10V @ 20mA		±10V @ 20mA		±10V @ 20mA		±140V @ 20mA	
Common Mode Range, min.	±10V			±10V		±10V		±10V		±140V	
Common Mode Rejection	3,000			45,000		45,000		3,000		100,000	
Input Impedance	10^{12} ohms			10^{12} ohms		10^{12} ohms		10^{12} ohms		10^{12} ohms	
Input Bias Current, pA max.	100	50	20	50	20	50		50		100 pA	
Input Offset Current, max.	10 pA			10 pA		10 pA		10 pA		30 pA	
Input Offset Voltage	Adj. to 0			Adj. to 0		Adj. to 0		Adj. to 0		±1mV	
Input Off. Voltage Drift, μV/°C max.	50	25	10	40	20	40	20	40	20	50	20
Power Requirement	±15V @ 13mA			±15V @ 13mA		±15V @ 18mA		±15V @ 18mA		±15V to ±150V @ 12mA	
Temperature Range	0°C to 70°C			0°C to 70°C		0°C to 70°C		0°C to 70°C		0°C to 70°C	
Package	1.12 × 1.12 × 0.4″			1.12 × 1.12 × 0.4″		1.12 × 1.12 × 0.4″		1.12 × 1.12 × 0.4″		1.8 × 2.4 × .61″	
Socket	MS-6			MS-6		MS-6		MS-6		MS-11	
Price (1-9)	$40	$45	$52	$46	$52	$49	$55	$49	$55	$90	$120

Notes:
(1) Unity gain inverting
(2) Unity gain follower

INSTRUMENTATION AMPLIFIERS

SPECIFICATIONS (Typical, 25°C, ±15V supplies)	MODULAR AM-201			MONOLITHIC AM-435	
	A	B	C	−1C	−1M
Gain Range	1 to 1000			1 to 1000	
Gain Nonlinearity, max.	0.01%			0.1%	0.05%
Gain Equation	200k/RG			RS/RG	
Gain Tempco	±20 ppm/°C max.			±3 ppm/°C typ.	
Gain Equation Accuracy	±.05%			±0.05%	
Input Impedance	10^9 ohms			2 × 10^2 ohms	
Input Bias Current, max.	50 nA	25 nA	25 nA	40 pA	20 pA
Input Offset Current, max.	2.5 nA	1 nA	1 nA	20 pA	10 pA
Input Offset Voltage, max.	Adj. to zero			±30mV	±15mV
Input Off. Volt. Drift, μV/°C max. for G = 1000	±1.0	±0.5	±0.25	±10	
Output Off. Volt. Drift, μV/°C for G = 1	±100 μV/°C			±600 μV/°C	
Input Voltage Range, min.	±10V			±10V	
Output Voltage, min.	±10V			±10V	
Output Current, min.	±5mA			±5mA	
Common Mode Rej., G = 1000	100 dB	106 dB	114 dB	105 dB	115 dB
Bandwidth, G = 1000	45 kHz			7 kHz	
Bandwidth, G = 100	180 kHz			30 kHz	
Slew Rate	1 V/μsec.			1 V/μsec.	
Power Requirement	±15VDC @ 5mA			±15VDC @ 1.5mA	
Temperature Range, oper.	0 to 70°C			0 to 70°C	−55 to +125°C
Package	1.5 × 1.5 × 0.375 inches			16 Pin DIP	
Price (1-9)	$69	$79	$89	$9.00	$21.00

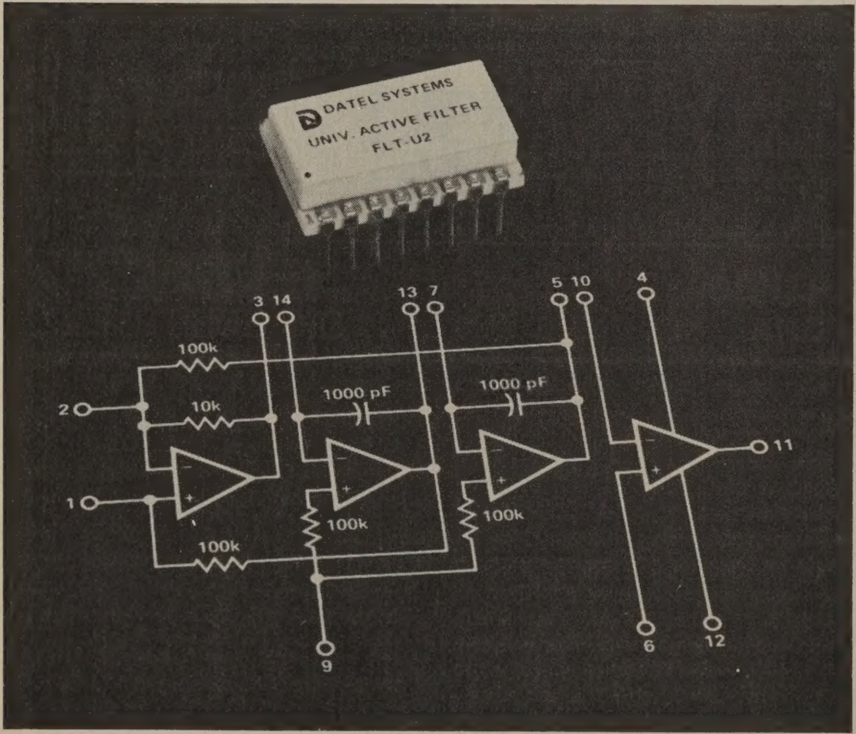
DATEL SYSTEMS, INC.

UNIVERSAL ACTIVE FILTER

DESCRIPTION

Datel Systems' model FLT-U2 is a universal-type active filter manufactured with hybrid technology. It uses the state variable active filter principle implemented with three committed op amps, resistors and capacitors, and a fourth uncommitted op amp which can be used to provide summing, buffering, gain, or an additional pole. The filter provides 2 pole lowpass, highpass, and bandpass functions simultaneously in addition to use in phase correction and notch circuits. The filter is tuned by 4 external resistors which set the gain, center frequency and Q of the circuit.

The Q range is up to 1000 and resonant frequency range is up to 200 kHz. Resonant frequency accuracy is typically ±5% and frequency stability is 100 ppm/°C. The units are packaged in a 16 pin double spaced ceramic DIP.



SPECIFICATIONS (Typical at 25°C, ±15V supplies)

Frequency Range	.001 to 200 kHz
Q Range	0.1 to 1000
f_0 Accuracy	±5%
f_0 Tempco	100 ppm/°C
Voltage Gain	0.1 to 1000
Output Voltage Range	±10V
Output Voltage	±10mA
Amplifier Gain Bandwidth Prod.	3 MHz
Input Offset Voltage	±6mV max.
Amp. Voltage Gain	300,000
Input Offset Current	200 nA max.
Input Bias Current	500 nA max.
Output Slew Rate	1 V/μsec.
Power Supply, rated	±15 VDC
Power Supply Range	±5 to ±18 VDC
Quiescent Current	9mA
Operating Temperature Range	0°C to 70°C
Package	16 pin double DIP
Price (1-9)	$16.00

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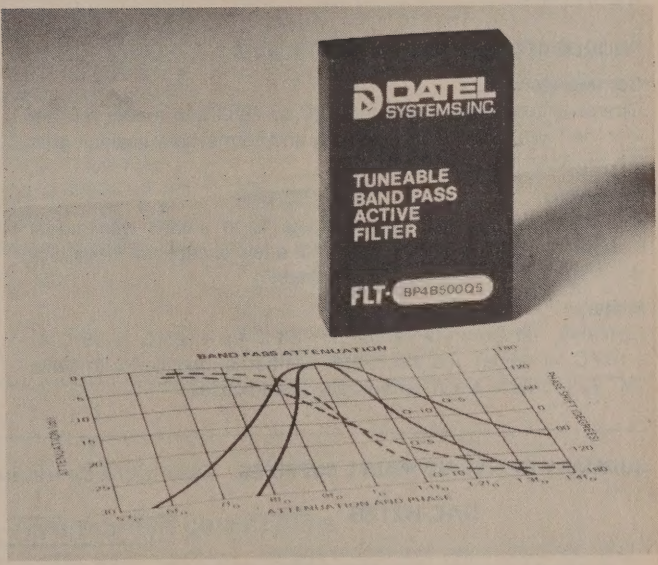
DATEL SYSTEMS, INC.

ACTIVE FILTERS/RESISTOR TUNED

GENERAL SPECIFICATIONS FOR ALL FILTERS:

Accuracy of Center or Cutoff Frequency	±3% (using 1% tuning resistors)
Input Voltage Range	±10V
Offset Voltage (adj. to zero)	±2mV
Output Voltage Range	±10V
Output Current (S.C. prot. to ground)	±2mA
Output Impedance	1 ohm
Temperature Range, Operating	0°C to 70°C
Socket	MS-12 ($5.00 each)



TUNING RESISTOR FORMULA:

$$R = 2\left\{\frac{f_0\,(\text{max.})}{f_0} - 1\right\}$$

R is in kilohms

f_0 is center frequency for Band Pass models or cutoff frequency for Low Pass models.

f_0 (max.) is the maximum specified frequency for the model chosen.

	Model	Frequency (1)	Type	Q	Gain Accuracy (2)	Input Impedance	Frequency Drift	Offset Drift	Power Requirement	Case Size	Price (1-9)
4 POLE BAND PASS	FLT-BP4B50Q5	.05-50 Hz	Butterworth	5	±0.3dB	100K ohms	±.03%/°C	±20μV/°C	±15VDC @ 16mA	2.0″ × 3.0″ × 0.99″	$109.00
	FLT-BP4B50Q10	.05-50 Hz		10						2.0″ × 3.0″ × 0.99″	$109.00
	FLT-BP4B500Q5	0.5-500 Hz		5						2.0″ × 3.0″ × .605″	$ 99.00
	FLT-BP4B500Q10	0.5-500 Hz		10						2.0″ × 3.0″ × .605″	$ 99.00
	FLT-BP4B20KQ5	20-20 kHz		5						2.0″ × 3.0″ × .605″	$109.00
	FLT-BP4B20KQ10	20-20 kHz		10						2.0″ × 3.0″ × .605″	$109.00
4 POLE LOW PASS	FLT-LP4B50	1-50 Hz	Butterworth	—	±.02dB	100K ohms	±.05%/°C	±50μV/°C	±15VDC @ 22mA	1.37″ × 2.87″ × 0.99″	$ 79.00
	FLT-LP4B500	10-500 Hz		—							$ 79.00
	FLT-LP4B5K	100-5 kHz		—							$ 79.00
	FLT-LP4B50K	1 k-50 kHz		—							$ 79.00
	FLT-LP4L50	1-50 Hz	Bessel	—	±.02dB	100K ohms	±.05%/°C	±50μV/°C	±15VDC @ 22mA	1.37″ × 2.87″ × 0.99″	$ 79.00
	FLT-LP4L500	10-500 Hz		—							$ 79.00
	FLT-LP4L5K	100-5 kHz		—							$ 79.00
	FLT-LP4L50K	1 k-50 kHz		—							$ 79.00
6 POLE LOW PASS	FLT-LP6B50	1-50 Hz	Butterworth	—	±.02dB	10⁹ ohms	±.05%/°C	±75μV/°C	±15VDC @ 28mA	2.0″ × 3.0″ × 0.99″	$109.00
	FLT-LP5B500	10-500 Hz		—						1.37″ × 2.87″ × 0.99″	$109.00
	FLT-LP6B5K	100-5 kHz		—						1.37″ × 2.87″ × 0.99″	$109.00
	FLT-LP6B50K	1 k-50 kHz		—						1.37″ × 2.87″ × 0.99″	$109.00
	FLT-LP6L50	1-50 Hz	Bessel	—	±.02dB	10⁹ ohms	±.05%/°C	±75μV/°C	±15VDC @ 28mA	2.0″ × 3.0″ × 0.99″	$109.00
	FLT-LP6L500	10-500 Hz		—						1.37″ × 2.87″ × 0.99″	$109.00
	FLT-LP6L5K	100-5 kHz		—						1.37″ × 2.87″ × 0.99″	$109.00
	FLT-LP6L50K	1 k-50 kHz		—						1.37″ × 2.87″ × 0.99″	$109.00

NOTES:

(1) For Low Pass models the frequency range can be extended another decade on the low frequency side with an increase by a factor of 10 of voltage offset and drift.

(2) For a gain of +1, using no external gain setting resistors.

THESE FILTERS ARE COVERED BY GSA CONTRACT

DATEL
SYSTEMS, INC.

HIGH RELIABILITY HYBRID CIRCUITS

Datel Systems, Inc. maintains a screening program to assure high reliability in its hybrid circuit product line. There are three levels of screening which give the user a choice in the reliability of the device he is purchasing. The higher reliability products are useful not only in military and aerospace systems, but also in such critical requirements as medical monitoring systems, process control systems, and automatic test equipment where a component failure could affect safety or cause expensive down-time of the equipment.

PRODUCT CLASSIFICATION

Commercial

Operating temperature range of 0°C to 70°C with model number identified with suffix "C". Both epoxy and hermetically sealed cases are available in this category.

Industrial

Operating temperature range of −25°C to +85°C with model number identified with suffix "R". With a few exceptions these products are all in hermetically sealed cases.

Military

Operating temperature range is −55°C to +125°C (−55°C to +100°C for some) and the model number is identified with suffix "M". All products are in hermetically sealed cases.

SCREENING LEVELS

Standard Product Screening

Basic screening program for all standard hybrid products. The screening procedure is described in Quality Assurance Procedure QAP-1001.

S-Screening Program

This screening program is considerably broader than the Standard Product Screening for a higher level of reliability. It applies to hermetically sealed devices only and the model is marked with a suffix "S". The screening procedure is described in Quality Assurance Procedure QAP-1002.

QL-Screening Program

This highest level of screening is in accordance with MIL-STD-883, Method 5004, Class B, and applies to hermetically sealed devices only. The model is marked with the suffix "QL". The screening procedure is described in Quality Assurance Procedure QAP-1003.

SUMMARY OF HYBRID MODEL SUFFIXES

Datel hybrid circuits are suffixed in the following manner:

DAC-HZ12B ——— ——— ———

SEAL
G = Epoxy
M = Hermetic

OPERATING TEMP. RANGE
C = 0°C to 70°C
R = −25°C to +85°C
M = −55°C to +125°C*

SCREENING LEVEL
Blank = Standard Product
S = S-Program Product
QL = MIL-STD-883, Class B

*In some cases −55°C to +100°C

DESCRIPTION OF SCREENING STEPS

This is a brief explanation of the purpose of the screening steps described in documents QAP-1001, QAP-1002, QAP-1003.

1. Pre-Cap Visual Inspection
This is a detailed examination under a microscope of the device prior to capping it. The purpose is to detect defective components, poor bonds or metallization, and unsatisfactory workmanship. Devices with the potential for failure under mechanical, electrical, or thermal stress can therefore be eliminated.

2. Stabilization Bake
The product is stored at an elevated temperature, non-operating, in order to stabilize circuit elements such as thin-film resistors. This is an accelerated aging process.

3. Temperature Cycling
The device is submitted alternately to high and low temperatures, non-operating, in order to remove potential failures due to thermal stress on bonds, etc.

4. Constant Acceleration
This test is the Y_1 plane, subjects the product to a constant accleration force in a centrifuge. Devices with weak wire bonds or poor chip bonding are eliminated.

5. Seal-Fine and Gross Leak
This test verifies the hermeticity of the device package and eliminates products which might degrade over a period of time due to the absorption of water vapor or other contaminants.

6. Pre-Burn-In Electrical Tests
Static and dynamic functional tests are performed on the device to determine that it conforms with data sheet parameters.

7. Burn-In
The product is subjected to elevated temperature, with power applied, for an extended period of time. The purpose of this test is to eliminate infant mortality failures.

8. Final Electrical Test
This final test verifies that the product still meets its specified data sheet parameters.

DATEL
SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

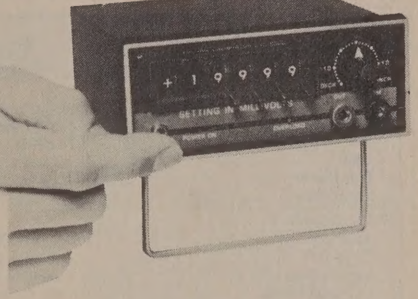
HOT LINE: SOUTHERN CALIFORNIA (213) 933-3613; (714) 835-6519 / NORTHERN CALIFORNIA (408) 733-9703 / MID-ATLANTIC REGION (301) 948-0282 / NORTHEAST REGION (617) 828-6566

DATEL SYSTEMS, INC.

0.005% MINIATURE DIGITAL VOLTAGE CALIBRATOR

FEATURES

- ±19.999 Volts Isolated Bipolar Output @ 25mA
- 1mV Settability With ±1.5mV Continuous Vernier, 100μV Graduations
- Accuracy ±1mV of Setting With Low ±20μV/°C Drift
- Miniature Aluminum Case Includes Bench-Top Stand or Can Be Panel-Mounted
- Low Cost $295.00 (1-9)



GENERAL DESCRIPTION

A digital voltage calibrator small enough for bench-top use or panel-mounting is available from Datel Systems and fulfills many laboratory and portable applications. Datel's model DVC-8500 Calibrator offers full 4½ digit resolution (1mV steps) with a +19.999 Volt bipolar output. Up to 25mA output current may be drawn at the +1mV rated accuracy. This short-circuit proof output may be continuously varied within +1.5mV for precise vernier control. The ±20μV/°C drift specification applies over the 0°C to +50°C operating temperature range.

The DVC-8500 uses easy-to-operate digital lever switches to set the output voltage. Front panel banana jacks simplify the connection to calibration circuits while rear panel sense feedback inputs insure output accuracy.

An overload LED lamp is lit when output loading exceeds 25mA. The rear connector accommodates either standard dual 36-pin gold-plated PC board connectors or solder or crimp lugs using 4-40 hardware. The +10V reference is derived from an oven-stabilized zener diode and is brought out at the rear connector for voltage-tracing of external circuits.

The DVC-8500 is powered by a choice of 100, 115, or 230 VAC +10%, 47 to 440 Hz at 5 watts typical. The black-anodized extruded aluminum housing provides excellent shielding to electrical noise and a regulated power supply provides excellent stability and performance.

MODEL NUMBER DVC-8500

AC POWER SUPPLY
A = 115VAC
E = 230VAC
J = 100VAC
*±10%, 47 to 440Hz

PRICE (1-9)

DVC-8500 .... $350.00
Panel-Mounting Kit, P/N A-3022-1 .$ 10.00
(Consists of (2) U-Straps, rear PC-board connector, and hardware. Rubber feet and tilt-stand bale supplied for bench-top use are screwed to case bottom and must be removed before panel mounting).

SPECIFICATIONS:
(Typical between +20°C to +30°C at steady ambient temperature after 5 minute warm-up)

VOLTAGE OUTPUT

Output Voltage Range	0 to +19.999 Volts DC or 0 to −19.999 Volts DC, lever switch selected.
Output Current Range	0 to ±25mA (source or sink) to rated voltage output accuracy.
Output Overload	Greater than ±25mA (source or sink) will illuminate front panel LED overload lamp. Output is current limited (continuous short-circuit proof) to ±70mA (source or sink) at any voltage up to ±20VDC.
Output Impedance:	Less than 10 milliohms.

PERFORMANCE

Accuracy @ +25°C	Within ±1mV of setting when calibrated (equivalent to ±0.0005% of Full Scale) Due to all effects except temperature drift.
Resolution	±1mV increments and ±1.5mV Vernier with 100-V graduations.
Temperature Drift	Within ±20μV/°C
Operating Temperature Range	0°C to +50°C
Output Noise	25μV p-p, wideband
Reference Source	6.4V oven-stabilized zener diode

FRONT PANEL

Output Selector Switches	Six lever-operated, detented switches
Output Vernier	Rotary potentiometer, range ±1.5mV of selected output. Graduated in 100μV divisions.

INPUT/OUTPUT CONNECTIONS

Front Panel	Voltage output and output common available from two (2) gold plated brass deep banana jacks.
Rear Panel	PCB Connectors sense in VOUT.

POWER SUPPLY

Power Required	Choice of 100, 115, or 230 VAC, ±10% 47 to 440 Hz, 10 watts. 3-prong U.S. captive line cord installed. Ground wire connected to case, but transformer isolated ±300VDC from output common.

MECHANICAL DIMENSIONS

Case	5.56″W × 2.11″H × 5.78″D(141,2 × 53, 6 × 146, 8mm)
Bezel	5.86″W × 2.25″H × 0.50″THK (148,7 × 57.0 × 12,7 mm)
Weight	2.25 pounds (1,0 Kg)

MOUNTING	Choice of bench-top mounting or panel mounting through a cutout measuring 2.16″H × 5.59″W (54,8 × 142,1 mm) and secured by 2 U-Straps. See ordering guide for optional panel-mount kit.

DATEL SYSTEMS, INC.

DIGITAL PANEL METERS

Specifications (at +25°C unless otherwise stated)

DATEL MODEL	DM-350 3½ Digits .43" H Displays AC or +5VDC Portable Display Only	DM-3000 3 Digit, 0 to +1V Input DPM/Counter .43" H Displays +5V Power, $99	DM-2100 3½ Digits ±200mV, ±2V Differential Input, +5V Power, $129
ANALOG INPUT			
Configuration	Single Ended, Unipolar or Bipolar	Single-endedunipolar	Differential Bipolar
Range, Full Scale	0 to +1.999V or ±1.999V	0 to +999mV, (+9.99, +99.9V opt)	±199.9mV or ±1.999V
CMR	70 dB @ DC (AC Models Only)	NA (unipolar)	70dB, DC to 60Hz (See ordering guide)
CMV	±300VDC (AC Models Only)	NA (unipolar)	±2V to logic gnd.
Bias Current	45nA typ, 500nA Max.	100nA typ, 250nA Max.	20nA
Impedance	100 Megohms, Min.	100 Megohms, min (1V), .1mΩ (10,100V)	100 Megohms, min
PERFORMANCE			
Accuracy	Adj. to ±0.05% of F.S. ±1 Count	Adj. to ±0.1% of Reading ±1 Count	Adj. to ±0.05% of Reading ±1 Count
Temp Drift	±100ppm FS/°C typ.	±100ppm FS/°C max.	±50ppm FS/°C max.
Sample Rate	2 Samples Per Sec, Adj.	0 to 250 Samples per Sec.	0 to 200 Samples per Sec.
LED Digit Height	0.43" (11 mm)	0.43" (11 mm)	0.30" (7,6 mm)
BCD Outputs	NONE	Full parallel Std.	Full Parallel Std.
Power Supply	AC Line or +5VDC, 300mA Max.	+5VDC, 800mA Max.	+5VDC, 650mA Max.
NOTES	Low Cost for Displays Only Applications	DM-3000 has count and reset inputs and optional crystal clock so that it can be configured as a 10Mz counter, frequency meter, tachometer or 4-wire slave display.	DM-2100 has true differential bipolar inputs and choice of ±200mV or ±2V input ranges. Another version of the DM-2100 (model DM-1100) has special options available (optoisolation, low input bias, input filter, etc.) Contact Datel for details.
PRICES (1-9 quantity) (contact Datel for quantity discounts and International prices and GSA orders)	DM-350D1 (5V, unipolar) .... $69 DM-350D2 (5V, bipolar) .... $75 DM-350A1 (AC, unipolar) .... $79 DM-350A2 (AC, bipolar) $89	DM-3000RI .... $99 for 10V or 100V inputs .... add $10 for crystal clock .... add $10	DM2100A .... $129 DM2100B $129

ORDERING GUIDE

Datel's products are available both direct and through GSA. If you are connected with a military or federal agency or receive federal funds, you may be entitled to purchase Datel's Digital Panel Meters and other products through the General Services Administration. Datel's DPM's are approved under FSC Group 66-17, Part II, GSA Contract No. GS-00S-27959. Contact Datel for assistance.

DM-350

Power Supply
D=5VDC
A=115 or 230VAC
(User-selected on rear connector)

Input Polarity
1=Unipolar
0 to +1.999V
2=Bipolar
−1.999V to +1.999V

DM-2000AR

Add suffix −2 for optoisolated differential input

(DM-2000AR less optoisolation has a single-ended input to logic ground)

DM-2100

Input Range
A=±199.9mV
B=±1.999V

DM-2115

Power Supply
A=115VAC
E=230VAC
J=100VAC
D=+5VDC
(AC, 47 to 440Hz)

Full Parallel BCD Output
1=without
2=with

DM-3000

500KHz Clock
R=Ceramic Resonator
X=Quartz Crystal

Input Range and Resistance
1=0 to +999mV
100mΩ impedance
2=0 to +9.99V
100KΩ impedance
3=0 to +99.9V
100KΩ impedance

DM-4000

Parallel TTL BCD Output
A=without
B=with

Synch. to AC line frequency of
5=50Hz
6=60Hz

DM-4300

Parallel TTL BCD Output
A=without
B=with

Synch. to AC line frequency of
5=50Hz
6=60Hz

COVERED BY GSA CONTRACT NO. GS-00S-27959

DATEL SYSTEMS, INC.

DIGITAL PANEL METERS

DM-2115 3½ Digits .43" H Displays AC or +5V portable Differential, $159	DM-2000AR 3½ Digit Autoranging ±200mV, 2V, 20V Input Ranges, $169	DM-4000 4½ Digit, ±2V Input Autozeroed Optoisolated Ratiometric, $219	DM-4300 4¾ Digit, ±4V Input Autozeroed Optoisolated Ratiometric, $235
Differential Bipolar 0 to ±1.999 Volts 70dB, DC to 60Hz ±3V to logic gnd. 3nA typ, 2nA max 100 Megohms, min	Single-ended Bipolar floating (opt) 0 to ±199.9mV, ±1.999V, ±19.99V 70dB, DC to 60Hz (optional) ±100V to logic gnd (optional) 2nA 1 Megohm to summing junction	Differential Bipolar floating 0 to ±1.9999 Volts 120dB, DC to 60Hz ±300V to logic gnd 100pA max 100 Megohms, min	Differential Bipolar floating 0 to ±3.9999 Volts 120dB, DC to 60Hz ±300V to logic gnd 100pA max 100 Megohms, min
Adj. to ±0.05% of Reading ±1 count ±50ppm FS/°C max 0 to 40 Samples per Sec 0.43" (11 mm) Full parallel optional AC line or +5VDC, 400mA max	Adj. to ±0.1% of Full Scale ±1 count ±100ppm FS/°C max 0 to 30 Samples per Sec 0.30" (7,6 mm) Full parallel Std. +5VDC, 800mA max	Adj. to ±0.01% of Reading ±1 count ±15ppm/°C of Reading max 0 to 5 Samples per Sec 0.43" (11 mm) Full parallel optional +5VDC, 600mA max	Adj. to ±0.01% of Reading ±1 count ±15ppm/°C of Reading, max 0 to 3.3 Samples per Sec 0.30" (7,6 mm) Full parallel optional +5VDC, 600mA max
DM-2115 may be operated AC or portable with +5VDC, 400mA max power. With blanked display, current drops to 120mA, ideal for "press to read" instruments.	DM-2000AR is a 3-decade autoranging DPM which automatically switches ranges and decimal point over ±0.2V, ±2V, and ±20V Full Scale.	DM-4000 features optoisolated inputs, crystal oscillator counter for 60dB NMR AC line noise rejection and autozeroing to eliminate residual offset errors. DM-4000 includes a 3-wire ratiometric input.	DM-4300 features optoisolated inputs, crystal oscillator counter for 60dB NMR AC line noise rejection and autozeroing to eliminate residual offset errors. DM-4300 includes a 3-wire ratiometric input.
DM-2115 +5V, no BCD .... $129 DM-2115 +5V, with BCD .... $145 DM-2115AC, no BCD .... $159 DM-2115 AC, with BCD $175	DM-2000AR no optoisolation .... $169 DM-2000AR-2 with optoisolation $218	DM-4000A without BCD .... $219 DM-4000B with BCD $239	DM-4300A without BCD .... $235 DM-4300B with BCD $255

NEW!

ULTRA-LOW COST DIGITAL PANEL METERS

DISPLAY	3½ Digit Resolution	4½ Digit Resolution	CASE TYPE
LED DISPLAY	DM-3100N $35 (1-9) $29 (100 +)	DM-4100N $69 (1-9) $59 (100 +)	LOW PROFILE CASE
	DM-3100L $35 (1-9) $29 (100 +)	DM-4100L $69 (1-9) $59 (100 +)	SHORT DEPTH CASE
LIQUID CRYSTAL DISPLAY LOW POWER	DM-3100X $49 (1-9) $41 (100 +)	DM-4100X Coming Soon	

ULTRA-LOW COST DPM's COMMON SPECIFICATIONS

Input Type:	True Differential (3½ digits)
CMR, CMV:	80 dB, ±2V
Input Voltage Range:	±1.999 Vdc (3½ digits) ±1.9999 Vdc (4½ digits)
Displays:	0.5" LED (N, L models) 0.5" LCD (X models)
Autozeroing Accuracy:	0.1% ±1 count (3½ digits) 0.02% ±1 count (4½ digits)
Temp. Range:	0 to +50°C
Power Required:	(3½ digit LED) +5 Vdc @ 190mA (4½ digit LED) +5 Vdc @ 350 mA (3½ digit LCD) +3.5 to +6.5 Vdc @ 6mA typ.
Case Dimensions:	Low-Profile Case 2.53"W × 32.5"D × .94"H Short Depth Case 3.0"W × 2.2"D × 1.8"H

SPECIFICATIONS COMMON TO ALL MODELS

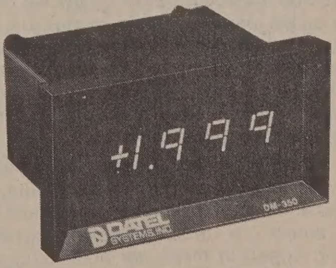
Case Size	3"W × 1.75"H × 2.25"D (76,2 × 44,5 × 57,2 mm)
Case Material	Black Polycarbonate plastic. Impact and Chemical resistant.
Front Panel Cutout & Mounting	Through a 1.812" × 3.062" (46 × 77.8 mm) cutout secured by (4) 4-40 flathead screws
Temperature Ranges	
Operating	0 to +50°C
Storage	−55° to +85°C
Input/Output Connector	Dual 18-pin PC edge-board type, 0.1" centers, Viking 3VH18/1JN-5, or equivalent $4.95.
Displays	All digits are red LED (Light Emitting Diode) 7-segment displays with automatic overflow indication and autopolarity (except unipolar DM-3000)

Digital Controls & Displays

All digital controls and outputs are compatible with TTL logic levels

FEATURING

- INTERNAL START CLOCK
- EXTERNAL START ADJUST
- INTERNAL START GATE
- BCD DATA OUTPUTS
- OVERFLOW
- EOC
- SIGN
- DECIMAL POINTS



DATEL SYSTEMS, INC.

1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021

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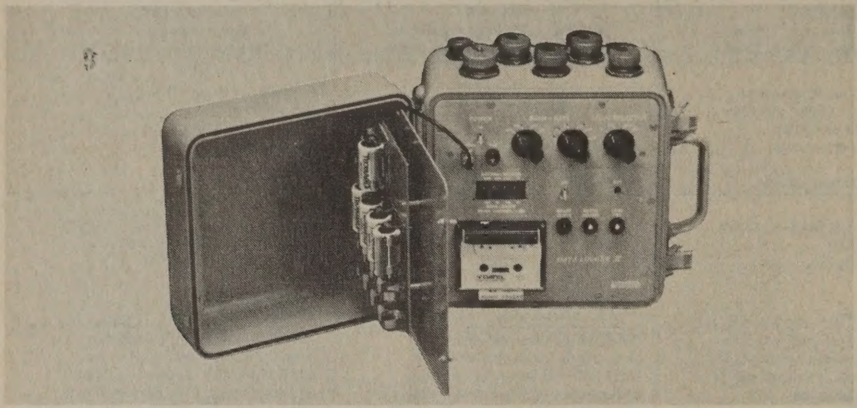
DATA LOGGER 2: A NEW INSTRUMENT FOR FIELD DATA LOGGING



Scientists and industrial researchers have long required a battery-powered, portable multichannel analog recording system for long term unattended data logging of slowly varying signals. The power and long-term requirements have been particularly difficult to achieve in a portable commercial instrument. Many applications in meteorology, pollution monitoring, oceanography, biomedicine, geophysics and natural resource exploration require an instrument which can literally be left in the field to run on its own batteries, recording slowly changing data unattended for up to a year.

SYSTEM DESCRIPTION

Datel System's new Data Logger 2 provides the missing link needed for a remote analog recorder with an output system compatible with most computer systems. Using this system, up to 64 analog inputs derived from physical variables can be displayed or printed out on a computer with the date and time of each measurement. Up to 120,000 separate measurements or samples can be recorded using a single digital magnetic tape cassette. By using a suitable computer program, each input can be displayed—identifying the physical quantity being measured—and properly offset and scaled to the correct engineering units.

In this way the Data Logger 2 system and computer will print out the day, hours, minutes and seconds, and then the actual measurement (i.e. temperature in degrees F, wind speed in miles per hour, etc.). Connected to a set of sensors, the sealed Data Logger 2 makes an ideal weather station, geophysical monitor, or oceanographic buoy data acquisition and recording system.

The complete Data Logger 2 system consists of three separate instruments: the Data Logger, the Tester, and the Reader/Interface. The Logger is the data acquisition and write-only digital cassette recording system. It runs from its own internal battery and makes scans of up to 64 channels at preselected intervals from 1 second to 30 hours. The Logger is housed in a rugged weatherproof metal case and weighs 20 pounds (9,1 Kg). Analog inputs are connected through sealed I/O connectors on the case. A typical data recording system consists of one Tester, one Reader/Interface, and several Loggers deployed for data collection at different locations. The tester is taken to the field to test and calibrate each Logger during set-up; completed digital cassettes are taken back to the laboratory for playback on the Reader/Interface.

DATA LOGGER 2 TESTER

The Tester is used to calibrate the Logger and to test all its functions before it is committed to long-term unattended recording. The tester checks all controls of the Logger, the battery status (voltage and current), Logger power drain, and tape heads. Simulated data generated on the Tester can be recorded on the Logger. The Tester will also display actual data or the simulated data on the Tester's LED readouts. In addition the Tester performs a complete self-check of all its own switches, displays, and batteries. The Tester is housed in a portable weatherproof case identical to that of the Logger.

READER/INTERFACE AND INTERFACE OPTIONS

The Reader/Interface for the Data Logger 2 system is a complete computer front end for playing back the digital cassettes recorded on the Logger. The Reader can be operated from front panel controls or can be remotely controlled on-line by a minicomputer, mainframe processor or other I/O device. Front panel displays allow the operator to manually step through a recording to find a sample on a particular date and time. Front panel binary and decimal LED's will display this date and time in addition to the raw binary data for that sample on a selected channel.

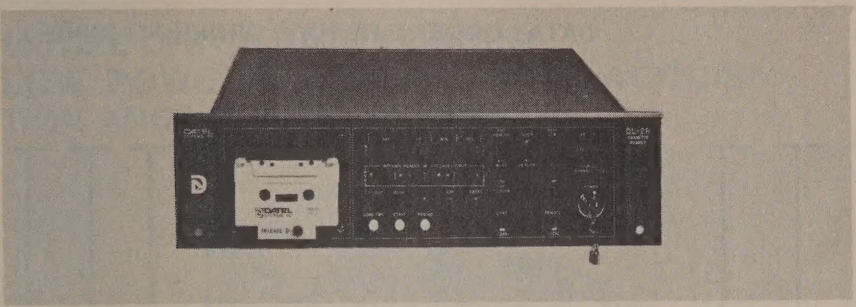
FEATURES

- 64 channel cassette digital tape data acquisition system in a sealed weatherproof, high reliability ruggedized metal case
- One year lithium battery supply
- −20°C to +60°C operating temperature range
- +10mV, ±5mV or ±5V, 0 to +5V Volt input ranges, 100 megohm impedance, 100dB CMR differential configuration
- 6mW standby power CMOS design, 1 watt power while scanning, +12VDC power
- 1 second to 30 hour selectable scan rates
- $3995. single quantity

KEY SPECS: DATA LOGGER 2

No. Channels	Up to 64
Analog Inputs, HI Level	0 to +5V or −5V to +5V (Single Ended)
Analog Inputs, LO Level	0 to +10mV or −5mV to +5mV (Differential)
Input Impedance	100 Megohms
Common Mode Voltage Range	±5V
Common Mode Rejection	110dB
Resolution	12 Bits, Hi Level 8 Bits, Lo Level
Accuracy, HI Level	.04%FS±½ LSB
Temperature Coefficient	±12 ppm/°C
Data Capacity	120,000 samples/300′ Cassette (2000 64 Channel Scans)
Scan Intervals	1 Second to 30 hours
Throughput Rate	5 samples/second
Power Requirement	12VDC (5 Lithium D-Cells) (100mA Recording, 1mA standby)
Operating Temperature Range	−20°C to +60°C
Weight	20 lbs. (9,1 Kg)

DATA LOGGERS/DATA LOGGER 2



DATA LOGGER 2 READER

By suitable computer programming an automatic search for a particular sample can be conducted.

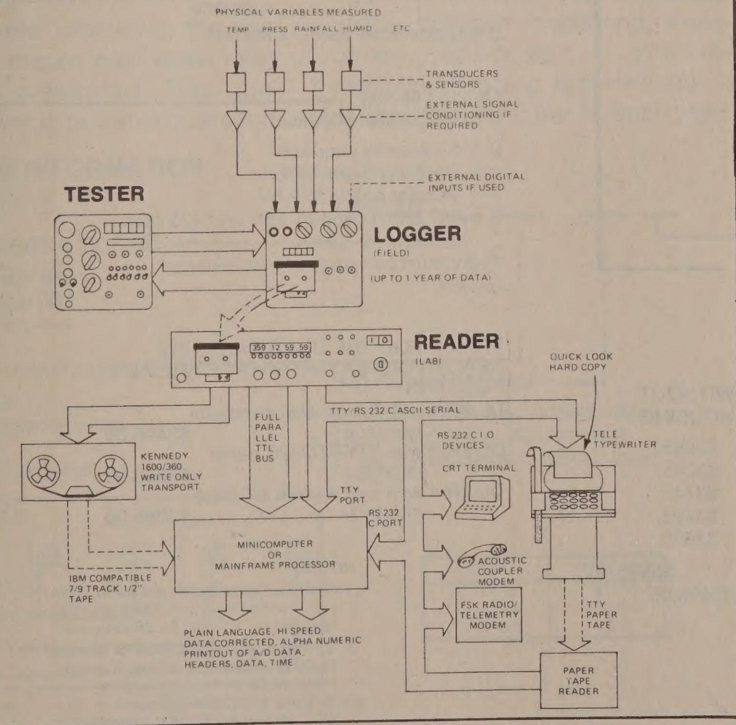
The Reader is available with one of these interface types. A full parallel interface provides buffered TTL binary data at ranges up to 100 samples per second with the cassette tape moving continuously. This interface provides the highest output rate and may be used to load a computer memory in interrupt mode or block transfer (direct memory access).

The second interface is full serial (2 wire) to connect to teletypewriters and RS-232-C I/O devices such as CRT terminals and high speed printers in ASCII format. The teletypewriter (TTY) output provides a simple way to connect to a computer which has a TTY port. The teletypewriter can be used off-line to prepare paper tapes of the raw data and to get a "quick look" at the data. Feeding the paper tape back to the computer on-line will then produce a plain language print out with suitable programming. The RS-232-C outputs may also operate an acoustic coupler modem for telephone transmission or frequency-shift keying of a radio link. The TTY/RS-232-C serial interfaces are programmable from 75 to 9600 baud rates to accommodate different output devices and transmission lines.

The third Reader interface connects to a Kennedy 1600 incremental ½" magnetic tape transport. Tapes prepared using this transport may be played back at high speed on any 7/9-track mainframe processor tape deck. This tape-to-tape interface provides simplified no-wiring data entry to a computer and user retention of the data on a high speed tape medium.

Various user configurations of the Data Logger 2 system are shown in the "Data Logger 2 System Configurations" diagram.

DATA LOGGER 2 SYSTEM CONFIGURATIONS


PHYSICAL VARIABLES MEASURED
TEMP
PRESS
RAINFALL
HUMID
ETC
TRANSDUCERS & SENSORS
EXTERNAL SIGNAL CONDITIONING IF REQUIRED
EXTERNAL DIGITAL INPUTS IF USED
TESTER
LOGGER
(FIELD)
(UP TO 1 YEAR OF DATA)
READER
(LAB)
359 12 59 59
QUICK LOOK HARD COPY
TTY/RS 232 C ASCII SERIAL
FULL PARALLEL TTL BUS
KENNEDY 1600/360 WRITE ONLY TRANSPORT
RS 232 C I O DEVICES
CRT TERMINAL
TELE TYPEWRITER
TTY PORT
RS 232 C PORT
MINICOMPUTER OR MAINFRAME PROCESSOR
IBM COMPATIBLE 7/9 TRACK 1/2" TAPE
ACOUSTIC COUPLER MODEM
FSK RADIO/ TELEMETRY MODEM
TTY PAPER TAPE
PLAIN LANGUAGE, HI SPEED, DATA CORRECTED, ALPHA NUMERIC PRINTOUT OF A/D DATA, HEADERS, DATA, TIME
PAPER TAPE READER

LOGGER OPERATION

The Logger and Reader both employ Datel Systems' low power stepper-motor incremental cassette tape transport. This transport features very fast power turn-on permitting the transport to be normally off except during actual recording. Extensive use of fast turn-on circuits using MOS devices allows the Logger to operate for a year or longer (depending on sample rate) using only 5 D cell Lithium batteries mounted inside the front cover. While recording, the tape transport and data acquisition electronics are powered up for only 11 seconds maximum to record all 64 channels. The system then turns off except for a CMOS crystal-controlled clock circuit which initiates the next scan at the time determined by the manually selected scan rate. During each scan the data and time are automatically recorded on the cassette tape. A battery monitor will record if the battery voltage falls too low.

The Logger is rated for a year or more of operation at moderate sample rates over an operating temperature range of −20°C to +60°C. External inputs may be used to record 36 bit parallel digital data on command or to make an analog scan on external command.

Both high and low level analog inputs are accepted with unipolar, bipolar, or two's complement coding on the 12 bit A/D converter. The high level ranges are −5V to +5V or 0 to +5V; low level ranges are 0 to +10mV or −5mV to +5mV with 8 bit accuracy. The low level inputs are differential with 100 megohm input impedance, ±5V common mode range, and 100dB common mode rejection out to 100 Hz. Basic high level accuracy is ±.04% of full scale ±½ LSB with a temperature coefficient of ±12ppm/°C.

During recording the Logger draws a maximum 100mA of current from its 12V Lithium batteries; between scans only the crystal clock is running, drawing just 1mA maximum. A variety of power options may be used with Data Logger 2 including external AC, or +12VDC. In addition the internal battery holders may be rewired to accept rechargeable D cell nickel cadmium batteries or other types of D cells.

DATEL SYSTEMS, INC.

DATA LOGGERS/DATA LOGGER 2

DATA LOGGER 2 ORDERING GUIDE

AVAILABLE UNDER GSA CONTRACT
NO. GS-00S-29002

DL-2 __ __ __ __

Channel Configuration

A = 32 High Level
B = 32 Low Level
C = 32 High Level and 32 Low Level
D = 64 High Level
E = 64 Low Level

Input Ranges & Coding

Note:
High Level (HL) Inputs are single-ended
Low Level (LL) Inputs are differential

1 = Bipolar (offset binary) (not useable if TTY, RS-232-C output is used)
LL: −5mV to +5mV and/or
HL: −5V to +5V
2 = Bipolar (2's complement)
LL: −5mV to +5mV and/or
HL: −5V to +5V
3 = Unipolar (straight binary)
LL: 0 to +10mV and/or
HL: 0 to +5V
4 = Special Low Level Range (contact factory)

Notes: 1 Coding types 1, 2, & 3 *cannot* be intermixed.
2 Coding must be specified at time of order.
3 High level and low level channels may be ordered in the same unit, but all coding must be the same.
4 Low level 0 to +5mV is not offered.

Internal Power Supplies

A* = (10) internal D-cell battery holders installed and internal 115VAC/60Hz supply
E* = (10) internal D-cell battery holders installed and internal 220 VAC/50Hz supply
J* = (10) internal D-cell battery holders installed and internal 100VAC/60Hz supply
X = External battery connector and (10) internal D-cell holders installed. No internal AC power supply furnished.

HOUSING, CONNECTORS, & BATTERY TRAY

Leave Blank = Included
1 = Not Included

DATA LOGGER 2 PRICES (SINGLE QUANTITY)		WITH HOUSING	WITHOUT HOUSING
DL-2A	(32HL)	$3995.	$2995.
DL-2B	(32LL)	$4245.	$3245.
DL-2C	(32HL & 32LL)	$4745.	$3745.
DL-2D	(64HL)	$4495.	$3495.
DL-2E	(64LL)	$4995.	$3995.

DL-2T1 Tester with 13-bit D/A calibrator	$3995.00
DL-2T2 Tester less D/A calibrator	$3495.00

*Batteries are not included, please order separately below.

Low temperature operation (−40°C to +60°C) available on special order, contact Datel.

DATA LOGGER 2 READER ORDERING GUIDE

DL-2R __ __ __ __ __

Interface Options

1 = Full parallel computer interface
2 = TTY/RS-232C serial interface
4 = 7 or 9 track ½″ incremental mag tape interface

Power Supply

A = 115VAC, 60Hz
E = 230VAC, 50Hz
J = 100VAC, 60Hz
(Power consumption, 65 watts max., either version)

Input Loading
(For full parallel interface)

0 = No parallel interface
1 = 1 TTL load
2 = 1K ohm pullup to +5V
3 = 330 ohm pullup to +5V and 470 ohm pulldown to ground

Baud Rate
(TTY/RS-232 interface)

A	= 75	F	= 1200
B	= 110	G	= 2400
C	= 150	H	= 4800
D	= 300	J	= 9600
E	= 600	X	= No serial interface

(Programmable via PC jumpers)

Output Loading
(For full parallel interface)

0 = No parallel interface
1 = Open collector 7406
2 = 1K ohm pullup to +5V
3 = 330 ohm pullup to +5V and 470 ohm pulldown to ground
*+5V must be supplied from external device

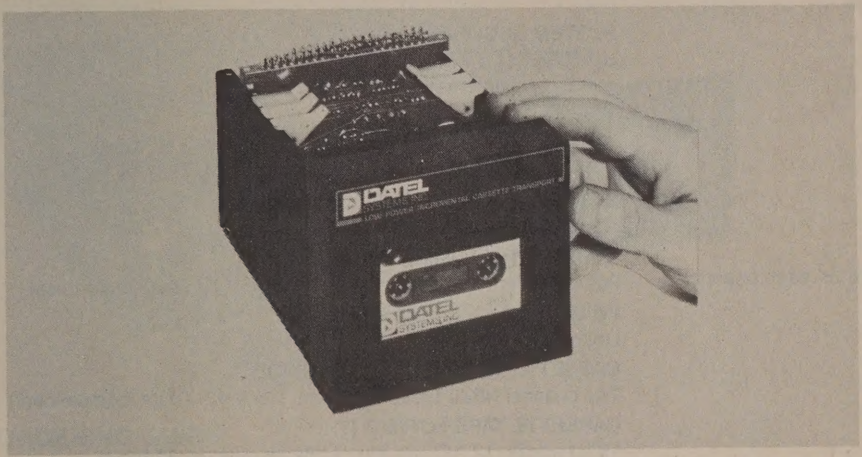
PRICES FOR THE DL-2R CASSETTE READER/DISPLAY/INTERFACE ARE AS FOLLOWS:

DL-2R-1 with full parallel computer interface	$3495.00
DL-2R-2 with TTY/RS232C serial interface	$3895.00
DL-2R-4 with 7 or 9-track ½″ tape interface	$3895.00

NOTES:
1. Both interfaces supplied with option 3 but can be used only one at a time. Can be swapped by removing DL-2R top cover.
2. ½″ Mag tape interface wired for Kennedy 1600/360 incremental, off-line write-only transport. Other transports require customer modification. Playback is 7/9 track, high speed ½″ IBM compatible.

DATEL SYSTEMS, INC.

MODEL LPS-16 DATA LOGGER LOW POWER CASSETTE DATA ACQUISITION AND LOGGING SYSTEM



FEATURES

- Sixteen Channel Analog Input
- Digital Input for Timing Information
- 12 Bit A/D Resolution
- 12VDC Battery Operated
- 900 Milliwatts Maximum Power Consumption
- C/MOS Logic Throughout
- True Incremental Recording
- Certified Phillips Cassette
- 2.2 Million Bit Capacity
- Total Weight 2 Lbs.
- Cassette Reader for Computer Entry

Datel Systems announces a new approach to the Data Logging system, a complete *Data Logging system in a Module*, occupying only 134 cubic inches weighing less than 2 lbs. and operating from a single 12VDC source requiring only 900 milliwatts when recording and microwatts during standby.

In incremental recording, the cassette tape moves only when information is presented. This conserves power in portable operation, and no tape is wasted because data is uniformly recorded in precise tape increments. Further, the length of time a cassette can be left unattended can be accurately predicted from the data rate, the number of bits, and the tape length.

Applications include oceanography, pollution monitoring, meteorology, seismology, or other remote data logging requirements. It is also ideal for other scientific and technical data acquisition uses both in the laboratory and in the field.

A cassette reader is available which allows the user to transcribe the digital data on the cassette to computer compatible media. These readers may be interfaced to produce IBM ½″ tape or to teletype, data terminals, acoustic coupler, or directly into a digital computer.

ORDERING INFORMATION

LPS-16 _ _ _ _

NUMBER OF BITS & CODING

8B = 8 Binary Bits
10B = 10 Binary Bits
12B = 12 Binary Bits

FULL SCALE ANALOG INPUT

1 = 0V to −5V
2 = ±5V, inverted analog
3 = 0 to +5V
4 = ±5V, conventional

A/D OUTPUT FORMAT

A = Straight Binary, Unipolar Input
B = Offset Binary, Bipolar Input
C = 2's Complement, Bipolar Input

FILE LENGTH

00 = None
01 = 1 Word
02 = 2 Words
04 = 4 Words
08 = 8 Words
16 = 16 Words
32 = 32 Words
64 = 64 Words
EX = Externally controlled file length

EXAMPLE:

LPS-16- 12B 4 B 32
12 Binary Bits
±5V Conventional
Offset Binary
32 Words

MODEL	PRICE (1-9)
LPS-16-8B	$1195.
LPS-16-10B	$1245.
LPS-16-12B	$1295.

Tape Cassette	Model 12123-1	$ 9.95
Prerecorded Cassette	Model TC-1R	$35.00

GSA Contracted: Datel's products are available both direct and through the General Services Administration (GSA). If you are connected with a military or federal agency or receive federal funds, you may be entitled to purchase Datel's data loggers and other products through GSA to expedite requisitioning and order processing. Datel's data loggers are covered under FSC Group 66-56, Part II, Section K, Contract GS-00S-29002

DATEL SYSTEMS, INC.

DATA LOGGERS/LPS-16

LPS-16 SYSTEM SPECIFICATIONS

DATA ACQUISITION SECTION

ANALOG INPUTS

NUMBER OF ANALOG INPUTS
16

INPUT CHANNEL CONFIGURATION
Single ended

INPUT VOLTAGE RANGES
0V to −5VFS or ±5VFS, 0 to+5VFS

CHANNEL INPUT IMPEDANCE
100 MegOhms "ON" or "OFF"

NOTE: When the 12VDC system power is turned off each channel has in input impedance of 10K Ohms

CHANNEL INPUT OVERLOAD
±10V (max.)

CHANNEL MODE OF OPERATION
Random or Sequential

CHANNEL INPUT ACQUISITION TIME
100 μsec—includes input setting time

SYSTEM PERFORMANCE:

SYSTEM APERTURE TIME
50 nsec

SYSTEM ACCURACY
±0.025% of FS ±½ LSB

SYSTEM LINEARITY
±½ LSB

A/D RESOLUTION
8, 12 Binary Bits

SYSTEM TEMPERATURE COEFFICIENT
±0.004%/°C

SYSTEM THROUGHPUT RATE
200 msecper 16 bit word (12 bit A/D plus 4 bit channel address)

INPUT CHANNEL SCAN RATE
Up to 5 per second

CASSETTE TAPE STORAGE METHOD
Two channel NRZI: Track #1—Data, Track #2—Data (complement)

CASSETTE TAPE FORMAT (2)
16 bit words (12 A/D bits plus 4 bits for channel address)

CASSETTE TAPE RECORD GAP
Three bit gap separates each 16 bit word

CASSETTE TAPE END-OF-FILE GAP (3)
Twelve bit file gap every 64th word, or per order. See guide.

RECORDER CHARACTERISTICS

STORAGE MEDIA
Standard Phillips certified data cassette 300 foot length

NUMBER OF TRACKS
TWO: *Data* on track one
Data complement on track two

TAPE FORMAT
16 bit words (12 A/D data bits and 4 channel address bits)

RECORD GAP
Three step record gap for every 16 bit word

FILE GAP
Twelve bit file gap every 64th word, or per order. See guide.

TAPE STORAGE CAPACITY
120,000 sixteen bit words including gaps and load forward

WRITE SPEED
90 steps per second/5 sixteen bit words per second (max.)

DATA INPUT/OUTPUT
Serial NRZI or parallel 16-bit thru the A/D Converter connector

MOTOR
Single 1.5° angle stepper coupled to take-up reel by slip clutch mechanism

MOTOR STEP ANGLE
1.5°

TAPE MOTION CONTROL
Single capstan pinch roller drive. Head engages mechanically during write time

ERROR RATE
1 bit in 10^7

OPERATING MODE
Write only

PHYSICAL ENVIRONMENTAL SPECIFICATIONS

INPUT POWER REQUIREMENTS
+12VDC ±8%
80ma when recording (960 mw) 10 μa during standby (120 μw)

NOTE: Includes tape transport plus all electronics

OPERATING TEMPERATURE RANGE
−10°C to +60°C

STORAGE TEMPERATURE RANGE
−35°C to +70°C

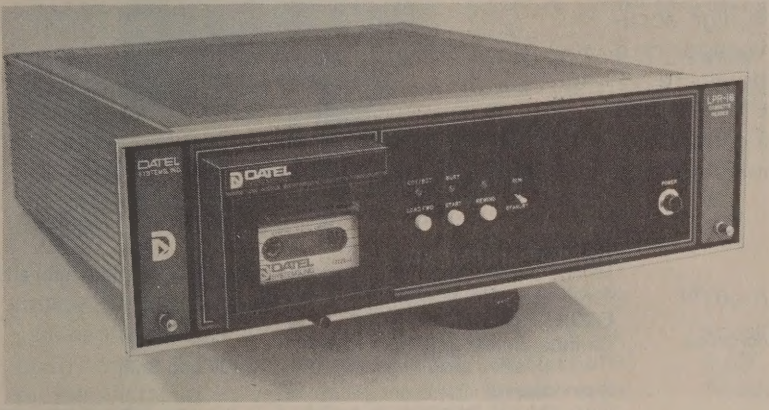
RELATIVE HUMIDITY
10% to 95% w/o condensation

PHYSICAL SIZE W/ELECTRONICS (includes electronics)
4″ high × 4½″ wide × 7½″ deep (6½″ deep behind panel)

ELECTRONICS
Contained on four plug-in PC cards mounted on a removable PC mother board

WEIGHT
2 lbs. includes recorder and electronics

LPR-16 CASSETTE TAPE READER/INTERFACE FOR MODEL LPS-16 DATA LOGGER



FEATURES

- Digital Tape Cassette Reader for the 16-channel battery-powered LPS-16 Data Logger
- Full parallel interface to minicomputer or mainframe processor
- Teletypewriter/RS-232-C serial I/O interface
- Selectable I/O loading and logic coding for complete data buss compatibility
- Complete "handshaking" computer controls and flags for "on-line" external control
- Tape-to-Tape Interface for ½" 7/9 track tape transports
- Open collector parallel interface can be multiplexed with order I/O devices sharing common data buss

ORDERING GUIDE

LPR-16 ___ ___ ___ ___ ___ ___ ___

INTERFACE OPTIONS

1 = Full Parallel TTL Computer Interface
2 = Teletypewriter/RS-232C serial Interface
3 = Options 1 and 2
4 = Incremental ½" 7/9 Track Tape Interface
5 = Options 1 and 4

POWER SUPPLY

A = 115VAC*
E = 230VAC*
J = 100VAC*
*47 to 63 Hz

INPUT LOADING

0 = Parallel Interface not supplied
1 = 1 TTL Load
2 = 1KΩ pullup to +5V
3 = 330Ω pullup to +5V and 470Ω pulldown to gnd.
(Input loading applies to parallel interface only).

OUTPUT LOADING

0 = Parallel Interface not supplied
1 = Open collector 7406
2 = 1KΩ pullup to +5V
3 = 330Ω pullup to +5V and 470Ω pulldown to gnd.
(Output loading applies to parallel interface only)
+5 Volts must be supplied from the external device.

SERIAL INTERFACE TYPE
(For Serial Interface only)

R = RS-232-C
T = Teletypewriter
(This selects an internal jumper which floats the TTY power supply)
B = Both TTY and RS-232-C Interfaces. Power supply will be grounded for both versions.
X = Serial Interface not supplied

NUMBER OF A/D WORDS PER FILE
(For Serial Interface only)

01 = 1　16 = 16
02 = 2　32 = 32
04 = 4　64 = 64
08 = 8　99 = Serial Interface not supplied.
(Programmed by PC jumpers)

BAUD RATE
(For Serial Interface only)

A = 75　F = 1200
B = 110　G = 2400
C = 150　H = 4800
D = 300　J = 9600
E = 600　X = Serial Interface not supplied
(Programmed via PC jumpers)

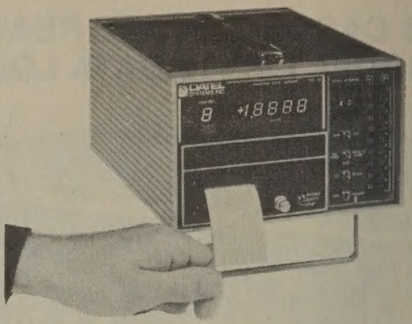
PRICES (Single Quantity)

LPR-16-1 Full Parallel Interface $1695
LPR-16-2 TTY/RS-232-C Interface ...$1995
LPR-16-3 Interfaces 1 and 2 ....$2395
LPR-16-4 Incremental ½" Tape Interface $2395*
LPR-16-5 Interfaces 1 and 4 ....$2795
*Interface only to a user-supplied Kennedy 1600/360 off-line transport.

DATEL SYSTEMS, INC.

DATA LOGGERS/PDL-10

Meeting the demand for a high performance laboratory-grade printing data recorder, Datel's model PDL-10 Printing Data Logger accepts up to 10 floating analog input voltages and automatically prints them out at preselected intervals. The PDL-10 digitizes all selected inputs to 4½ digit accuracy, displays and prints them out as decimal voltages on a very compact inkless thermal printer. Analog inputs are accepted over ±199.99mV, ±1.9999V and ±19.999 Volt front-panel selected voltage ranges and are printed out every second with the channel number at preselected scan intervals.



SPECIFICATIONS

ANALOG INPUT

Number of Channels 10

Configuration
3-Wire differential inputs, transformer-isolated using a mechanical relay multiplexer.

Input Voltage Ranges
Choice of 3 DC ranges:
±.19999V; ±1.9999V; ±19.999V
preselected by ten front panel slide switches for each channel.

Overvoltage
Input is diode-protected for up to ±100V maximum continuous.

Common Mode rejection
108dB, DC to 60Hz with 1000Ω maximum input unbalance.

Common Mode Voltage Range
±20 volts maximum to signal guard. ±300 volts maximum to AC power ground.

Input Impedance (±20V input max)
(Differential) ....500 Megohms minimum.
(To Signal Guard) ....100 Megohms minimum.

Input Bias Current
500pA typ., 8nA maximum

PERFORMANCE

Accuracy @ +25°C
Within ±0.01% when calibrated due to all effects except temperature drift.

Temperature Drift
ZERO: ±1μV/°C GAIN: 20ppm/°C

Operating Temperature Range
0°C to +45°C

Storage Temperature Range
−25°C to +85°C

Sampling Rate
Pre-selected channels are advanced, displayed and printed one channel per second.

Scan Intervals
Intervals from 00 to 99 seconds or minutes

DISPLAYS

Input
A digital panel meter (DPM) displays the analog input voltage.

Channel
A single 0.43" (11 mm) red LED digit indicates channel 0 through 9.

Printing Method
Seven segment digits are formed on thermal paper using a thick-film resistor matrix printhead requiring no ink, hammers or ribbons.

Printer Digits
7-segment 0 to 9 digits 0.155" (4 mm) high. Spacing between printed lines: 0.2 inch (5 mm).

Line Capacity
Approximately 9000 lines.

Printout Format
Printout format is 9± .1.9.9.9.9 with the leading digit indicating channel number. Three lines are skipped between scans.

Printing Paper
Using heat sensitive thermal printing paper, 1.75"W (44,5 mm) and supplied in rolls 150 feet (45 mm) long.

FRONT PANEL CONTROLS

Channel Select and Input Range
(Ten 4-position slide switches) ".2V, 2V, 20V and SKIP".

Scan Interval
(Two decade thumbwheel switch) Sets the time interval between scan starts from 00 to 99 seconds or minutes.

Minutes/Seconds
(2 position toggle switch) Determines whether the Scan is set for minutes or seconds.

No Print/Run/Reset & Start
(Three position toggle switch) In NO PRINT, the instrument scans and displays but does not print. In RUN the instrument scans, displays and prints out.

In RESET & START, the scan timer is reset and starts timing. One scan is printed out one second from switch release.

One Channel/Scan
(Two position toggle switch) The ONE CHANNEL position prevents the multiplexer relay for the selected channel from disconnecting with each scan. In the SCAN position, normal relay cycling, display and printout occur.

Paper quantity
A lever indicates relative quantity of paper remaining.

REAR PANEL INPUT CONNECTIONS

Analog input voltages are connected using screwdriver barrier terminal strips. (30 terminals).

POWER SUPPLY

Choice of 115 or 230 VAC ±5, 10, 15 or 20 volts at 50 or 60 Hz only. Power consumption (all models) 30 watts, typical.

PHYSICAL DIMENSIONS

Mounting
Bench-top mounting with tilt-up stand and mar-proof plastic feet. Users can remove the feet and stand for optional ½-rack mounting.

Outline Dimensions
5.25"H × 8.5"W × 12"D (133 × 216 × 305 mm)

Weight
12 pounds (5,5Kg)

ORDERING GUIDE

MODEL NUMBER PDL—10 __ __

POWER SUPPLY VOLTAGE
A* = 115VAC
E* = 230VAC
J* = 100VAC
*±10%, May be user-rewired to other voltages, see specs.

POWER SUPPLY FREQUENCY
5 = 50Hz
6 = 60Hz
May be user-rewired to either frequency.

PRICES (single quantity)

PDL—10 ....$1395.00

DATEL SYSTEMS, INC.
1020 TURNPIKE STREET / CANTON, MASSACHUSETTS 02021
HOT LINE: SOUTHERN CALIFORNIA (213) 933-3613; (714) 835-6519 / NORTHERN CALIFORNIA (408) 733-9703 / MID-ATLANTIC REGION (301) 948-0282 / NORTHEAST REGION (617) 828-6566

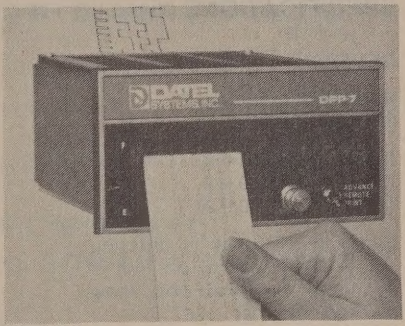
DATEL SYSTEMS, INC.

DIGITAL PANEL PRINTER/DPP-7

7-COLUMN THERMAL PANEL PRINTER

FEATURES

- 3 Lines/Second OEM-Reliable Thermal Printer using only 2 moving parts.
- Includes All Electronics for BCD Inputs with Input Storage Register
- 6 Numeric Columns and Sign
- Selectable Leading Zero Blanking
- Positive or Negative True TTL/DTL Inputs
- +5VDC Power (2.3 lbs) or AC (4.2 lbs)
- $475.00 Single Quantity
- Last Line Visible Immediately After Printing
- 2.3 Lb. Panel-Mounting Featherweight



Imagine a low cost 7-column panel-mounting printer just slightly larger than most digital panel meters. Imagine this lightweight, high-reliability digital panel printer installed in your instrument or system front panel. And imagine an ink-less, non-impact thermal printing method with only two moving parts which will last for years.

This is Datel's miniature 3 line per second DPP-7 thermal panel printer. A no-nonsense, simple to apply, OEM-designed digital output device that weighs in at only 2.3 pounds (1,1 Kg). OEM features are designed in to the DPP-7 such as selectable leading zero blanking, selectable positive or negative true coding inputs and choice of ±5VDC or AC line power. Full parallel TTL input BCD electronics are included as standard.

Other OEM design features include a selection of printout formats, manual print and advance front panel switch, and a low-paper switch output. A unique mounting technique uses an aluminum housing which attaches directly through a front panel cutout. This housing permanently holds the electronics, although the mechanical assembly can be completely removed for paper replacement using a single front panel thumbscrew. As the mechanical assembly is removed, it disconnects from the internal electronics PC board connectors, so that no lethal power voltages are exposed during paper reloading. However, the external PC board connectors at the rear of the case remain connected to the internal electronics.

The housing supports the weight of the mechanical assembly and is mounted on a front panel through a 4.50″ × 2.72″ cutout and secured by four screws. Three DPP-7 panel printers can conveniently be mounted across a 19″ × 3½″ high rack mount panel.

OEM pricing makes the DPP-7 ideal for instrument products. Comparable impact parallel printers with BCD decoding and drive electronics usually list for more than the DDP-7.

Standard 1¾″ wide thermographic papers are used in handy 150 foot rolls giving about 9,000 lines per roll with 5 lines per inch. The 7-segment digits are .155″ high with left-of-digit decimal points selectable at each digit. Seven column printing formats include sign and six digits or 2-channel (ident) digits, sign and 4 data digits. Other 7 column decimal formats are also available.

The DPP-7 Digital Panel Printer extends back 6.2″ from the front surface of the mounting panel (8.62″ for the AC powered versions), including space allowance for the two 30-conductor PC board connectors or AC fuses.

Three universal AC line voltages (100, 115, and 230 VAC) will power the DPP-7 Printer as well as +5VDC at 20 watts average (8 Amps peak).

The DPP-7 is ruggedly built, using a simple, but sophisticated mechanical design which is optimized for heavy duty OEM applications. A proprietary printhead character coating allows the head to be conservatively rated at 3 million lines.

DATEL SYSTEMS, INC.

DIGITAL PANEL PRINTER/DPP-7

SPECIFICATIONS (Typical @ +25°C unless noted)

GENERAL

Number of columns: 7
Formats Available.

Type 1: ±.9.9.9.9.9.9
Type 2: .9.9±.9.9.9.9
Type 3: .9±.9.9.9.9.9

(See other formats in ordering guide. Hexadecimal printout is available but will not allow blanked columns)

Decimal digit format:
7-segment 0 to 9 digits .155″ (4 mm) high with 10° slant and selectable left decimal point.

Printing method:
Thick film thermal print head, black characters on white paper (using 3M Type 161 paper)

Printer paper:
1.75″ wide × 150 feet long, (44,5 mm × 45 m), 3M-type 161 thermal paper roll with the thermal surface facing away from the center of the roll.

Paper advance:
Via linear solenoid and one-direction rotary clutch. Paper tears off cleanly by lifting against the paper slot top edge.

PERFORMANCE:

Max. printing rate: 3 lines per second
Print and paper advance cycle: 330 milliseconds
Line spacing: 0.2 inch (5 mm)
Line density: 5 lines per inch
Line capacity per paper roll: approx. 9,000 lines
Minimum print head life: 3 million lines
Average print pulse on-time 25 mSec. (height varied by temperature feedback)

INPUTS

DTL/TTL compatible, selectable positive or negative true, level sensitive. TTLLS low power Schottky logic used on all inputs.

Logic Levels:

Positive true:	+2.0V≤"1"≤+5.0V 0V≤"0"≤+0.5V	Note TTLLS
Negative true:	0V≤"1"≤+0.5V +2.0V≤"0"≤+5.0V	logic levels

Note:Pullup resistors to +5V may be optionally removed on all inputs and outputs.

Data: (24 lines)
Full parallel BCD (1-2-4-8), selectable positive or negative true, 1 TTLLS load plus 10 K ohm pullup to +5V. May be used with Form A (normally open) or Form B (normally closed) switch closure inputs. Level sensitive (rise-time non-critical). Data is stored (see timing, pg. 8)

Change Data Polarity: (Pin C1-B11)
Selects input polarity of data, decimal points and ±sign simultaneously.
LOW = positive true coding
HIGH = negative true coding
6 TTLLS loads, pus 1 K ohm pullup to +5V, level sensitive

Print and Advance Command: (Pin C1-B14)
Level sensitive for Form A or Form B contact closure, selectable positive or negative true.
1 TTLLS load plus 10K ohm pullup to +5V.

Pulse Width: 1 microsecond to 200 mSec (data must be valid 1 μsec. after leading edge and 500 nSec. before the print command).

Maximum print command rate: 3 per second.

Paper advance automatically occurs after digit printing. Holding print command TRUE longer than the busy output is true (200 to 330 mSec, typ) causes continuous 3 lines/sec. printing.

Change Print Polarity: (Pin C1-B7)
HIGH = negative true coding
LOW = positive true coding
1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive

Leading Zero Suppress: (Pin C1-B4) blanks all leading zero's to the left of decimal point except a zero just left of the decimal point
HIGH = Leading 0's blanked
LOW = full print (no suppression)
2 Low Power TTL loads, plus 10K ohm pullup to +5V, level sensitive.
Note: Will not suppress if any characters are blanks.

Minus Sign: (Pin C1-B1)
Selectable positive or negative true using data level select input.

1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive.

Plus Sign: (Pin C1-A5)
(Selectable positive or negative true using change data polarity input). (Minus sign must also be printed since it is used as the horizontal portion of the plus sign).

1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive.
Note: Printing "plus" sign only results in vertical portion of plus sign. See above. Usable as 100% overrange digit.

Blanked Character:
Created by loading 1-1-1-1 in a given column. Can be hard-wired. Not available for hexadecimal models.

Decimal Points: (6 lines)
1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive

(Selectable positive or negative true using change data polarity inputs).

No-Print Paper Advance: (Pin C1-A3)
Ground this line 70±5 mSec. to advance one line. Hold to ground for continuous advance at 6.7 lines per second.

1 TTLLS load plus 10K ohm pullup to +5V.

No Print Paper Advance:
May also be created by loading the illegal BCD character 1-1-1-1 in all decimal locations, and disabling all decimal points and ± signs, then initiating a print/advance command.

Test: (Pin C2-B6) (Not available on hexadecimal models)
LOW = ±.8.8.8.8.8.8 printout when print/advance command is given.
1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive.

Change Busy Polarity: (Pin C1-A2)
HIGH = positive true busy out
LOW = negative true busy out
1 TTLLS load, plus 10K ohm pullup to +5V, level sensitive.

DIGITAL PANEL PRINTER/DPP-7

SPECIFICATIONS (CONTINUED)

OUTPUTS

DTL/TTL compatible

Positive true: 0V≤"0"≤+0.4V
+2.4V≤"1"≤+5.0V

Negative true: +2.4V≤"0"≤+5.0V
0V≤"1"≤+0.4V

Busy: (Pin C2-B12) (Open collector TTL 7438 with 1K ohm pullup to +5V)
Remains TRUE during print and advance cycle (approximately 200 to 330 milliseconds). Data inputs may be changed 500 nSec. after transition to TRUE. Next print command can be enabled when busy goes FALSE. Selectable positive or negative true. 10 TTL loads.

Out of Paper: (Pin C2-B4) see dwg. pg. 10
Switch opening via mechanical pawl when approx. 6′ (2m) of paper are left on roll.

TEMPERATURE RANGES

Operating: 0 to +40°C (to +50°C at derated speed)

Storage: −25°C to +85°C (Paper darkens above +60°C)

Active printhead temperature sensor is employed to maintain proper print head temperature at all ambient temperatures and during warmup.

POWER SUPPLY—DC VERSION

Model DPP-7D (+5V):
Voltage:
+5 ±.5VDC Printhead Section 10 Amps peak @ 10% to 100% duty cycle depending on line rate and printout. 5 to 20 mS 10 Amp pulses occur several times per second in standby. A regulated power supply is recommended, using 16 gauge wire or larger not to exceed 10 ft. (3m.)

Voltage:
+5 ±.25 VDC Logic Section 300 mA typical, logic spikes 50 mV max. Separate PC board connection.

Model DPP-7Y (+12V):
Voltage:
+12 (−2,+3) VDC @ 2 Amps avg., 10 A pk, several milliseconds during line advance.

Model DPP-7Z (+28V):
Voltage:
+28 ±3 VDC @ 700 mA avg., 3.5 A pk, several milliseconds during line advance.

Connections: Two recessed ¼″ spade terminals.

Fuses: ¼″ dia. × 1¼″ long, SLO-BLO (+5V) 10A, (+12V) 4A, (+28V) 2A

POWER SUPPLY—AC VERSION:

105-125 VAC, 47-440Hz @ 40 watts max (10 watts, typ standby)

Optional:
205-240 VAC, 47-440Hz @ 40 watts max (10 watts, typ standby)

Optional:
90-110 VAC, 47-440Hz @ 40 watts max (10 watts, typ standby)

AC Fuse: ¼″ × 1¼″ Buss MDL or equivalent ½ A, SLO-BLO, 115VAC, ¼A, SLO-BLO, 230VAC.

Note: Case is isolated from 5V ground and AC line. A separate spade terminal is included to ground case.

+5V, 200mA max. logic power out available with AC version.

Optional dual-winding 115/230 VAC model available (see ordering)

WEIGHT (WITH HOUSING AND FULL PAPER ROLL)

5 Volt Version:	2.3 lbs.	(1,1Kg)
AC Version:	4.2 lbs.	(1,9Kg)

DIMENSIONS

Front panel mounting cutout:
4.50″ WIDE × 2.72″ HIGH (115 mm × 69 mm)

Front panel Bezel dimensions:
5.25″ WIDE × 2.82″ HIGH (134 mm × 72 mm)

Depth behind front surface of mounting panel including clearance for rear PC connectors and fuses:

5V Version:	6.2″ (158 mm)
AC 12V, 28V Version:	8.7″ (221 mm)

ORDERING INFORMATION

MODEL NUMBER

DPP-7 _ _ _

POWER SUPPLY

A = 115VAC
E = 230VAC
J = 100VAC
B* = Both 115/230VAC
Dual-winding transformer, shipped as 230VAC. Rewired by user to 115VAC
D = + 5VDC
Y = +12VDC
Z = +28VDC

*Add $15 for the 115/230 VAC version.

PRINTOUT FORMAT

1 = ±.9.9.9.9.9.9
2 = .9.9±.9.9.9.9
3 = .9±.9.9.9.9.9
4 = .9.9.9 .9.9.9
5 = .9.9.9.9 .9.9
6 = .9.9.9.9.9 .9

CHARACTERS

Leave Blank = Decimal Digits

H** = Hexadecimal Digits

**Add $15 for Hexadecimal printout.

PRICES (1-9)

DPP-7 Printer with decimal printout (Includes 2 connectors, roll of paper, and a line cord if an AC model)	$475.00
Add for dual-power transformer, 115/230 VAC	$15.00
Add for hexadecimal printout	$15.00
Model 9114, Box of 10 paper rolls, 150 ft. per roll	$19.95

ORDERING EXAMPLE:

DPP-7B3H Printer with dual-power 115/230 VAC transformer, and hexadecimal .F±.F.F.F.F.F printout . . .$505.00

ULTRA LOW POWER INCREMENTAL DIGITAL CASSETTE RECORDER SYSTEMS ICT-SERIES

TRANSPORT FEATURES

- Simple, reliable capstan/pinch roller stepping motor drive
- Ultra-low power (700 milliwatts while writing) using CMOS electronics
- True standby incremental performance starts writing within 20 milliseconds
- Choice of complementary NRZ or ANSI/ECMA/IOS phase-encoding formats
- High data capacity: Up to 2.2 million bits or 300 foot cassette

RECORDER SYSTEM FEATURES

- Accepts digitized analog, serial or parallel digital inputs
- Ideal for +12VDC battery portable digital data recorders
- ANSI/ECMA/ISO systems automatically record preamble, postamble, CRC, CR, NULL, LF ASCII characters
- Optional A/D converter, 16 channel analog multiplexer, sample/hold and channel sequencer available
- Reader Systems available to interface most computer terminals, RS-232-C CRT displays, modems and teleprinters (TTY)

DATEL
SYSTEMS, INC.
LOW POWER INCREMENTAL CASSETTE TRANSPORT
DATEL
SYSTEMS, INC.

INTRODUCTION

Datel presents its ICT-series digital incremental cassette tape transport systems. These unique data recorders and reader systems offer a new concept to the instrument designer—miniature, removable ultra-low power, digital data storage. Using a Philips data tape cassette, low power incremental stepping motor and CMOS electronics, these recorders are ideal for portable-battery-powered data collection instruments.

Datel's cassette systems form the nucleus of your data recorder. They complement your selection of input transducers, signal conditioners and your computer system. Inputs to the optional A/D converter analog section have been standardized to 5 and 10 Volt levels commonly available from many sensors.

Reader/interface systems which are separate from the data recorder provide several output forms (full parallel, TTY/RS-232-C ASCII, ½" mag. tape) to adapt to different computers and printout devices.

Datel also offers a new concept to the engineer or scientist interested in data recording with tape systems. The ICT series offers a simplified approach with circuit card modules which are specified in terms familiar to circuit designers who know digital logic. Data entry, retrieval and power-up, power-down considerations are simplified to the point of providing and accepting logic levels at the required times. For a complete system design, details of the transport's flux levels and motor drive are transparent to the designer, requiring only a knowledge of ultimate word size, bit rate and data capacity. Yet Datel's transport and individual card modules are fully specified so that customized systems may be created at any level from transports alone up to fully packaged systems.

With very fast power turn-on, the tape moves only when actually recording or creating a gap. At all other times when not recording data, the transport and power-multiplexed electronics remain turned off to save tape and batteries.

The fast turn-on, turn-off feature means that tape is up to writing speed within 10 milliseconds with no coasting when turned off. Data systems such as seismic recorders may be designed to record only when data is actually present, providing a very large data capacity per cassette. Hand-held stock inventory recorders move the tape only when keyboard data has been entered.

MODELS AVAILABLE

Datel offers these cassette recorders and companion readers as complete systems or as general purpose component modules for the widest range of applications. The basic ICT-series transports are available with a family of printed circuit cards, parallel-to-serial/formatter cards, A/D converter, multiplexer and sample/holds for analog inputs. Transport and PC cards may be purchased separately at any time to build complete customized low power digital recording systems.

APPLICATIONS

Complete Cassette Data Logging Systems from Datel are available to record up to 16 or 64 analog channels, both as user-mounted modular systems and as stand-alone, weather-proof automatic data acquisition/logging systems (refer to Datel Models LPS-16 and DL-2). Applications include oceanographic buoys and submersible probes, portable air and water quality environmental monitors, traffic and noise loggers, natural resources exploration, vehicular testing, seismic and geophysical measurements, RF field strength and transmission loggers, unmanned weather stations and biomedical loggers.

DIGITAL CASSETTE TRANSPORT SPECIFICATIONS

(Typical over −20°C to +70°C unless noted)

General

	Model ICT-WA Phase Encoded ANSI/ECMA/ISO Format	Model ICT-WZ Complementary NRZ Format
Recording Medium	Philips magnetic tape cassette, certified for digital operation by using a bit-error check for dropouts. The transport is designed to accept cassettes complying with ANSIX3, 48, ECMA-34 and ISO/DIS3407 specs.	
Number of Tracks	One half-width track	Two half-width tracks, recorded simultaneously
Recording Direction	Two directions by flipping cassette over	One direction only

Tape Motion

	Model ICT-WA	Model ICT-WZ
Motor	4-winding 24 pole, permanent magnet stepping motor	
Equivalent Tape Speed Range	Zero to 0.063 inches per second (1, 59 mm/sec)	Zero to 0.163 inches per second (4, 13 mm/sec)
Nominal Tape Speed	0.063 in./sec. (1, 59 mm/sec) at 100 steps/sec.	0.163 in./sec. (4, 13 mm/sec) at 100 steps/sec.
Bit Density	800 bits per inch (1600 FRPI) 32 bits per mm	615 bits per inch (615 FRPI) 24 bits per mm
Bit Cell Spacing	0.00125 inches per bit 0,0318 mm per bit	0.00163 inches per bit 0,0414 mm per bit
Bit Writing Rate	Zero to 50 bits/second, asynchronous	Zero to 100 bits/second, asynchronous

Stepping Motor Characteristics

	Model ICT-WA	Model ICT-WZ
Tape Drive Capstan Diameter	0.118 inches 3,0 mm	0.1246 inches 3,16 mm
Capstan Rotation Step Angle	0.6°	1.5°
Stepping Rate	Zero to 100 steps per second, asynchronous	Zero to 100 steps per second, asynchronous
Number of Stator Windings	4	
Winding Resistance	450 ohms per winding, ±20%	
Winding Inductance	335 millihenries per winding, ±20%	
Motor Steps per Bit Cell	2	1
Winding Voltage	±10V min. to ±24V max.	
Hub and Capstan Torques and Tape Tension	Suitable for cassettes within ANSI/ECMA/ISO specifications	

Tape Head Characteristics

Tape Saturation Current	5mA typ.
Suggested Write Current	7.5mA typ.
D.C. Resistance	50ohms ±20%
Effective Track Width	0.057 inches (1, 45 mm)
Nominal Space Between Tracks	0.035 inches (0,88 mm) (Tracks are symmetrically spaced)

*Data Characteristics Using Datel's Electronics & Cassettes

	ICT-WA	ICT-WZ
Recording Format	Single track full serial, externally clocked using 8-bit bytes phase-encoded per ANSI/ECMA/ISO standards	2-track serial complementary NRZ 1's on Track 1, 0's on Track 2
Connector Type	Dual-readout 44-pin PC edgeboard fingers (male) to connect to card cage. Mates to a Cinch #251-22-30-160 or Viking 2VH-22/IAN or Datel #ACC-2075060	
Error Rates (Typical)	3 Repeatable errors per cassette 1 Repeatable error in 5 cassettes	
Character Record Length	8-bit bytes	8, 10, 12, 14 or 16 bit characters or words
File or Block Length	Blocks consisting of 2 min. up to 256 max. usable data bytes per block	Files consisting of 1, 2, 4, 8, 16, 32 or 64 characters or words per block or any length
Gaps	0.8″ (20, 3mm) nominal noiseless gap written between each block. No gaps within blocks. One-half gap generated before each data block and the other half after the data block.	2-bit intercharacter, or inter-word gaps added before each character, 12-bit end-of-file gap written after each file.
Gap Stepping Rate	250 steps/sec.	100 steps/sec.
Time to Generate Full Gap Length	5.1 sec.	0.12 sec.
Power Consumption *(Transport & Tapehead only)*	700 mW typ. @ 100 steps/sec. (+12VDC @ 60 mA)	

*ICT-WA incremental idle time between bytes must not exceed 500 msec.

Data Capacity

(Assuming 64 8-bit characters per block or file, plus non-data characters and 282 feet (86 m) usable recording area)

	ICT-WA	ICT-WZ
Block or File Length including Controls and Gaps	1.48 inches (37, 6 mm)	1.06 inches (26, 9 mm)
Block or Files per Cassette	2260 blocks (recording one side)	3200 files
Bit Cells per Block or File (including Gaps and Control Characters)	1200	652
Times per Block or File (not including gaps)	11.2 seconds	6.4 seconds
Time to Fill a Cassette (continuous running at max. step rate)	10.2 hours per side	5.8 hours
Bit Writing Rate	50 bits/sec.	100 bits/sec.
Playback Speed, typical	250 bytes/sec. (2.5 ips) TI 733 ASR) or higher	1700 bits/sec. (LPR-16 Reader, 2.75 ips)
Time to Generate Full Gap Length	5.1 sec. @ 250* steps/sec.	0.12 sec.@ 100 steps/sec.

*2.55 second half-gap generated before and after each data block.

Physical (all models)

Weight	1.25 pounds (0,567 kilogram)
Dimensions	3.91″High × 4.5″ Wide × 4.2″ Deep (99,3 × 114, 3 × 106,7 mm)
Maximum Extension in Front of Mounting Panel (door closed) (door open)	1.40″ (35,6 mm) 2.26″ (57,4 mm)
Maximum Depth Behind Mounting Panel	1.94″ (49,3 mm) from panel front surface with card cage—5.59″ (142,0 mm) from panel front surface
Mounting Method**	Front insertion into a panel cutout, secured by (4) 4-40 bolts inserted from the rear into tapped Helicoil thread inserts, 0.187″ (4,76 mm) deep
Mounting Position	Horizontal or vertical. Recommended with cassette vertical, tapehead at top for easy cassette insertion.
Temperature Range (Operating)	+10°C to +45°C, −20°C to +70°C
Power Consumption (Auxiliary Cards and EOT/BOT Detector)	Phase Board, ANSI Formatter, Block Formatter, and Expander consume approximately 120 microwatts each (+12VDC @ 10 microamps). The EOT/BOT Lamp and detector consume 900 mW (+12VDC @ 75mA).
Relative Humidity	20% to 80%, non-condensing

**Shock or vibration must be negligible while recording

DATEL SYSTEMS, INC.

RECORDER SYSTEMS/ICT SERIES

ICT SERIES SELECTION GUIDE

The model numbering shown has been designed so that a user can select exactly the electronics configuration required by the application. Cost requirements and mounting considerations are an important point to consider when ordering. For example, most users will find the optional card cage ideal for mounting the drive and formatting electronics cards. However, these cards or the entire cage may be separately mounted if a user needs shorter front panel depth. This will require a user-fabricated cable for interconnection scheme; however the cards are small enough (3″ × 4″ × 76,2 × 101, 6 mm) to be self-supporting when mounted in a PC jack.

In particular, users selecting only the Write Step card ICT-WZ2A2Aor ICT-WA2A2A1A1 systems) may have the Write Step card attached directly to the transport without requiring the card cage. (Optional at extra cost, contact Datel.) (The WZ version is Model ICT-WZ1B2A-3942, $475).

SEQUENCE OF CARDS

In general, ICT systems should be selected by filling up the card cage from the transport on back. The mother-board writing on the bottom of the card cage assigns specific cards to particular cage card guides and connector slots. Cards further back from the transport will not work without all the preceding cards. One exception to this is that the ICT-WA Expander can be used without the Block Formatter if the user is willing to count bytes and terminate the block externally.

Users are encouraged to purchase as complete a system as required for the application. Choosing fewer cards or only the transport will generally require user design of electronics equivalent to these offered by Datel. The ICT electronics are proven designs with efficient packaging at reasonable costs. Datel's ICT electronics will save a designer who is not thoroughly familiar with tape electronics the circuit debugging time and expense required of an original design. This is particularly important as the card level approaches the cassette transport. Experienced users or those with custom format are, however, encouraged to purchase only the transport and optional write step card and proceed with their design.

SIMPLIFIED ICT-WA ANSI/ECMA/ISO MODEL SELECTION

Five system configurations should be considered by the user, ranging from transport only to a full system. These systems are summarized below. EOT/BOT is optional at $30.00 more and is required for full ANSI/ECMA/ISO compatibility.

Model Number	Description	Input Type	Price
ICT-WA1 (Transport System)	Transport Mechanism Only	Direct Inputs to writeheads and 4-phase motor windings	$325.00
ICT-WA1B2A1A1 (Unformatted Serial System)	Transport, Cage and Write Step Card	CMOS logic inputs, unformatted, full serial, single channel. The Write Step Card supplies 100 Hz shift clocks to externally shift in data.	$475.00
ICT-WA1B2B2A1 (Parallel ANSI System	Transport, Cage Write Step, Phase Board, and ANSI Formatter Cards	CMOS full parallel 8-bit bytes. User must code bytes and end block.	$745.00
ICT-WA1B2B2B1 (Formatted ANSI System)	Transport, Cage, and 4 cards through Block Formatter	CMOS full parallel 8-bit bytes. Automatic byte count and block termination.	$870.00
ICT-WA1B2B2B2 (5-Byte Parallel ANSI System)	Transport, Cage and 5 cards thru Expander	CMOS full parallel, (5) 8-bit Bytes (40 bit parallel.) Automatic byte count and block termination	$995.00
ICT-WA2A2A1A-3928	Transport with write step on standoffs	CMOS unformatted full serial. Write step supplies 100 Hz shift clocks.	$440.00

SIMPLIFIED ICT-WZ COMPLEMENTARY NRZ MODEL SELECTION

Four systems should be selected ranging from transport to full system.

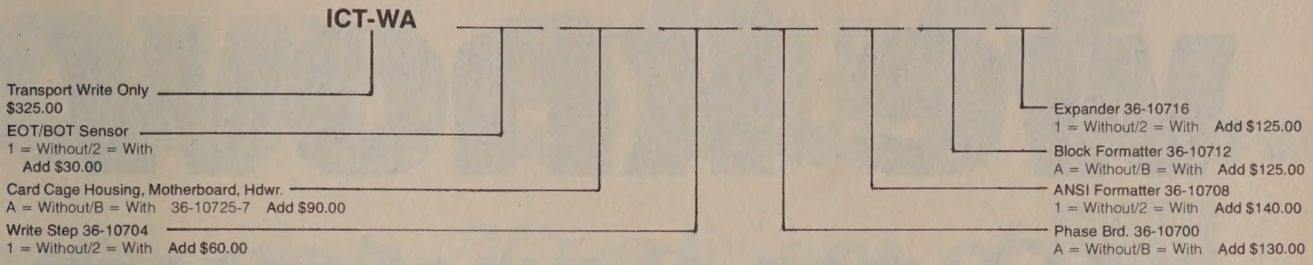
Model Number	Description	Input Type	Price
ICT-WZ1 (Transport System)	Transport Mechanism Only	Direct Input to Write-head windings and 4-phase stepper motor windings.	$325.00
ICT-WZ1B2A (Unformatted Serial System)	Transport, Card Cage. Write Step Card	CMOS logic inputs, unformatted full serial. Write Step requires external write clock timing but codes write-head signals to complementary NRZ coding.	$540.00
ICT-WZ1B2A-3942	Transport less Cage, with Write Step mounted to transport by standoffs.	Same as above.	$475.00
ICT-WZ1B2B (16-Bit Parallel System)	Transport, Card Cage. Write Step and Formatter Cards.	Accepts full parallel or serial 8 to 16 bits CMOS data and formats in files of selectable word length. Parallel inputs are stored. Files are jumper-selected to any length.	$720.00

Contact Datel for optional analog input (A/D Converter) to the ICT-WZ system.

DATEL SYSTEMS, INC.

RECORDER SYSTEMS/ICT SERIES

MODEL NUMBERING AND ORDERING GUIDE

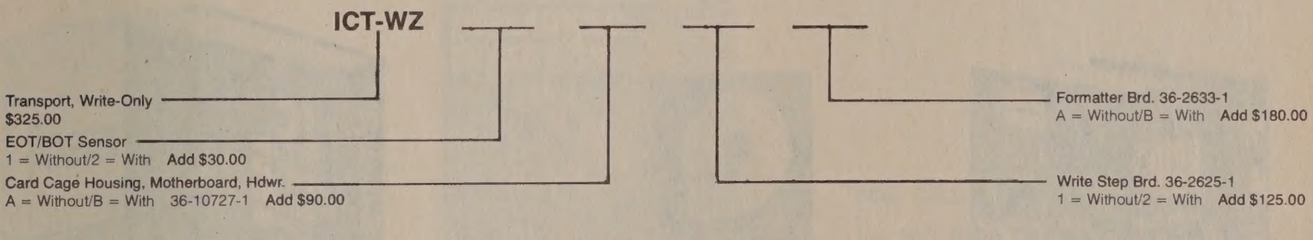

ICT-WA
Transport Write Only $325.00
EOT/BOT Sensor 1 = Without/2 = With Add $30.00
Card Cage Housing, Motherboard, Hdwr. A = Without/B = With 36-10725-7 Add $90.00
Write Step 36-10704 1 = Without/2 = With Add $60.00
Phase Brd. 36-10700 A = Without/B = With Add $130.00
ANSI Formatter 36-10708 1 = Without/2 = With Add $140.00
Block Formatter 36-10712 A = Without/B = With Add $125.00
Expander 36-10716 1 = Without/2 = With Add $125.00

ANSI/ECMA/ISO WRITE-ONLY CASSETTE TRANSPORT SYSTEMS

INDIVIDUAL COMPONENT PRICES (1-9 QUANTITY)

Model ICT-WA1 Transport only, less EOT/BOT sensor*	$325.
Model ICT-WA2 Transport only, with EOT/BOT sensor*	$355.
Card Cage and Hardware, Motherboard for ANSI/ECMA/ISO Systems, with 5 cards slots and connectors, P/N 36-10725-7	$ 90.
Write Step, Motor Clock and Head Drive PC Board, P/N 36-10700	$ 60.
Phase Board, Parallel/Serial Input, Preamble, Postamble, CRC generators, P/N 36-10704	$130.
Formatter Board, Gap Control, EOT/BOT spacing, Block counter full flag, P/N 36-10708	$140.
Block Formatter Board, Generates ASCII CR, LF Chars., Block length short-cycling (stored 8-bit input) P/N 36-10712	$125.
Expander Board, Accepts 16, 24, 32 or 40 bit full parallel inputs for ANSI/ECMA recording, number of bits controlled by 2-bit modified gray code. Both controls and inputs are stored (strobable) P/N 36-10716	$125.
Cassettes (+10°C to +45°C) P/N 12123-3 (with EOT/BOT holes)	$ 9.95 ea.
Connectors, Dual 44-pin, Datel 36-2075060	$ 8.00 ea.

*Note that ANSI/ECMA/ISO compatibility requires EOT/BOT detection to start data within the proper distance from the BOT hole.


ICT-WZ
Transport, Write-Only $325.00
EOT/BOT Sensor 1 = Without/2 = With Add $30.00
Card Cage Housing, Motherboard, Hdwr. A = Without/B = With 36-10727-1 Add $90.00
Write Step Brd. 36-2625-1 1 = Without/2 = With Add $125.00
Formatter Brd. 36-2633-1 A = Without/B = With Add $180.00

COMPLEMENTARY NRZ WRITE-ONLY CASSETTE TRANSPORT SYSTEMS

INDIVIDUAL COMPONENT PRICES (1-9 QUANTITY)

Model ICT-WZ1 Transport only, less EOT/BOT sensor	$325.
Model ICT-WZ2 Transport only, with EOT/BOT sensor	$355.
Card Cage and Hardware, Motherboard for Comp. NRZ systems, P/N 36-10727-1	$ 90.
Write Step PC Board, P/N 36-2625-1	$125.
Formatter PC Board, P/N 36-2633-1	$180.
Cassettes (+10°C to +45°C) P/N 12123-1	$ 9.95 ea.
Connectors, Dual 44-pin, Datel ACC-2075060	$ 8.00 ea.
Jumper Board, PC Plug to Plug, P/N 36-3269 for access to Formatter inputs	$ 19.
Model ICT-WZ1B2A-3942 Transport less EOT/BOT w/Write Step on standoffs (cage not required)	$475.
Model ICT-WZ2B2A-3950 Transport w/EOT/BOT w/Write Step on standoffs (cage not required)	$505.

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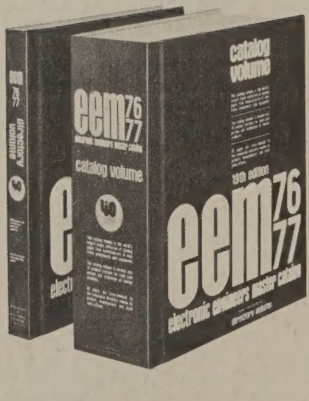
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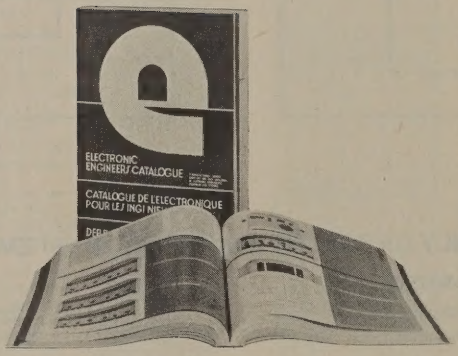
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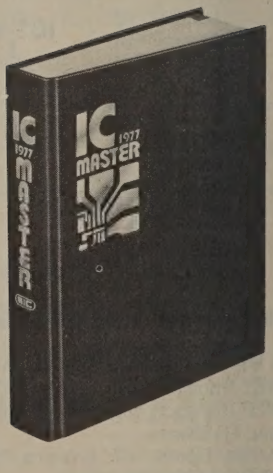
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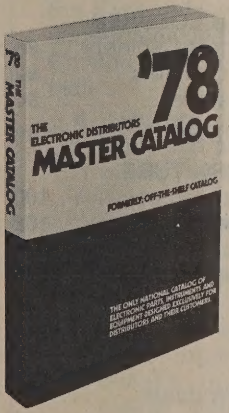
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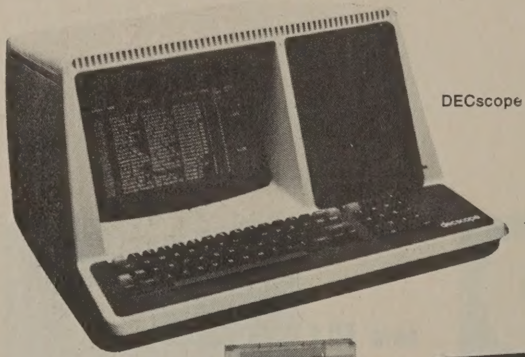
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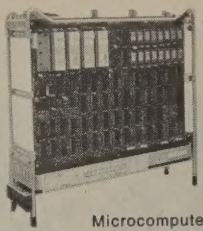
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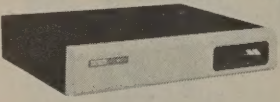

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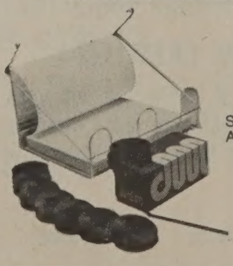
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digital

DIRECT SALES CATALOG

WELCOME . . .

To DIGITAL's Direct Sales Catalog. This is our 3rd edition. The success of the first two has proven that you, the specifiers and buyers of DIGITAL's products, find real value in the *Ultimate Unbundling* concept of our Direct Sales Catalog.

DIGITAL's order-by-mail approach to computer-related products saves you both time — and money. Time, because you can place your order straight from the catalog. You avoid the time consuming hassle of having to go through a third party, and the delays caused by not having literature at hand. Money, because you don't have the cost of warehousing OEM quantities.

How can DIGITAL offer these savings? From our position of leadership as a supplier of small- and medium-scale general purpose computers and peripherals, we have seen these products become simpler to use, reliable to operate, and easier to maintain. The sophisticated computer user is more than competent to buy, install, operate, and maintain them without extensive — and expensive — pre- and post-sales support. Prices, too, have dropped dramatically to the point with some products that it is uneconomical to sell them via traditional computer-industry channels. And, generally, the products are available off-the-shelf. The products are *ready* to be sold by mail. With sale-by-mail, our cost of sales/support is reduced. These significant savings are, in turn, passed on to you!

Why You Should Buy from this Catalog

Not everyone will, or should, buy through our catalog. But if you fall into any of the following categories, you undoubtedly will benefit by buying the Direct Sales Catalog way. You should look seriously at buying by mail. . . .

- If you are already a specifier of DIGITAL's equipment and are adding more units of a type with which you are already thoroughly familiar.
- If you have evaluated the products through traditional methods such as sales calls, training sessions, and field testing and are now ready to place follow-on orders for the same products.
- If you feel confident you can specify and install your own equipment and associated products.
- If your organization cannot earn DIGITAL's large-quantity or OEM discounts because of either overall insufficient quantities or unpredictable delivery scheduling.
- If you can abide by our Terms and Conditions (see pg. 113) and just want to save some money.

Buying by Mail is Easy

The catalog is designed to be easy to use and simple to order from. We have included detailed step-by-step instructions to assist you in placing an accurate, complete order. To simplify your task, we also have preprinted order forms available which you can use for order entry. Shipping Cost and Sales Tax Information Tables are included for your convenience. All this information is covered in the *How to Order* section starting on page 109.

NEW in this edition

Microcomputers:	*LSI-11, PDP-11/03*
Graphic Terminal:	*VT55 DECscope*
High-Speed Printer:	*LS120 DECwriter III*
More Interface Modules:	*For PDP-8, PDP-11*
Acoustic Coupler:	*DFO1*
Paper Tape Reader:	*PRSO1*
Buffered Send Receive:	*For DECwriter II*

If you have any questions, you can call our Direct Sales Catalog Desk toll free from 8:30 am to 5 pm EST. The number is 800-225-9480 (Mass. (617) 481-7400 x 6608).

For those of you who have used our previous editions, you will find this one interestingly different. More technical information. More product illustrations. And — most important — newly cataloged products such as the LSI-11 and PDP-11/03 Microcomputers, the VT55 DECscope with graphic capabilities, LS120 DECwriter III, plus many more Interface Modules.

Excellent Warranty Protection

Our warranty protection is unmatched in the industry, in terms of assured satisfaction with your purchase.

- You have a 10-day, no-cost, any-reason return period. You pay only for the return shipment.
- Plus a product warranty of 90 days. Return any defective unit prepaid and insured to a product repair center within this period and we will repair or replace it without charge if the damage or malfunction is due to DIGITAL's negligence. The repair centers are listed on page 115.

What About Price Protection?

Catalog prices will generally be honored by DIGITAL throughout the full period in which Catalog 1-77 is effective (through June 30, 1978). However, should it become necessary to revise prices on any products, you will be informed of these changes when we process your order. If you are using an out-of-date catalog, you should call the Catalog Sales Desk to check prices and product availability.

What are the Terms and Conditions?

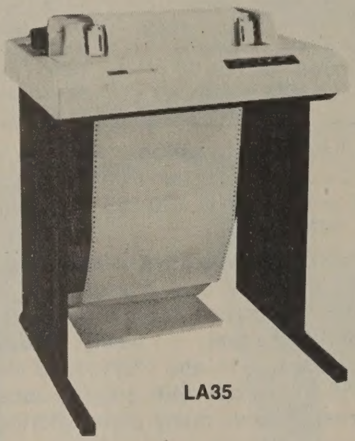
Catalog products are offered subject to the terms and conditions on page 113. (They are also printed on the back of our preprinted order forms.) Briefly, they contain provisions for a no-cost, 10-day acceptance period and a minimum of 90 days of factory warranty. If you are not completely satisfied with your purchase, ask DIGITAL within the 10-day acceptance period for a Return Authorization Shipping Number, then return the purchase prepaid and insured in its original shipping container to DIGITAL's warehouse. Your entire purchase price will be refunded.

The discount policy is up to 9 percent off list price for cash with the order; up to 5 percent for cash within 30 days for approved current Open Account Customers. See page 110 for our definition of an Open Account Customer.

We look forward to doing business with you and are standing by to process your orders quickly — and efficiently.

LA35 & LA36 DECWRITER II

PRINTER TERMINALS 30 CPS



LA35

LA36

- *Office-environment quietness.*
- *True 30-character-per-second printing throughput.*
- *Full 132-character line length.*
- *10 characters per inch standard. 16.5 optional. 6 lines per inch vertically.*
- *Upper and lower case printing plus numerics and symbols.*
- *ANSI typewriter keyboard on LA36. APL characters optional.*
- *Multipart forms up to 6 high.*
- *Form width variable from 3 to 14⅞".*
- *ASCII 128 character set (and keyboard on LA36).*
- *Optional numeric keypad, LA36 only.*
- *Asynchronous data transmission at switch selectable baud rates of 300, 150, and 110.*
- *20 mA current loop interface or EIA RS-232C.*
- *Full-duplex or half-duplex with local copy option.*
- *Buffer memory option for dynamic editing with store and forward capability on LA36.*

DECwriter II is a fast, small, quiet 300-baud interactive hard copy terminal. It functions as an economical, remote or local hard copy input/output device to a host computer. Priced competitively with comparable printer terminals, DECwriter II features improved throughput, reliability, print quality, and forms handling versatility. It is a true 30 characters per second printer — yet is so quiet that it can readily be used in an office environment. Measured exterior noise level is no more than 65 dB at 30 feet.

Two types of terminals are offered here: The LA36 Series which is a full send-receive terminal, and the LA35 Series which is a receive-only printer. Both terminals can accept multipart forms from 3 to 14⅞" wide.

An exciting new option that provides Buffered Send-Receive capabilities for LA36 is now available, see box on page 9. It provides the user local storage of data for editing before transmission, batching for highest-speed (300 baud) "burst" transmission, and storage for later transmission when line charges are lowest. This option can be added to all existing LA36 terminals.

DECwriter II achieves its 30 cps throughput by having a 16-character buffer storage receiving incoming data. This buffer stores characters during printing, carriage return, and line feed. When there is more than one character in the buffer, the terminal automatically switches to a 60 cps catch-up printing operation until all characters are printed. Thus DECwriter II makes full use of a 300-baud communications line.

The full ASCII complement of 96 upper and lower case letters, numbers, and symbol characters are printed by DECwriter II. However, the reduced 64-character ASCII subset can be accommodated by setting the CAPS LOCK key. This reduced set maps the lower case keyboard characters into their upper case equivalents so that only upper case characters are transmitted. The printout format is a full 132 character positions with 6-lines-per-inch vertical spacing. Horizontal character spacing is 10 per inch standard with option of having closer spacing of 16.5 per inch.

LA35 & LA36 DECWRITER II

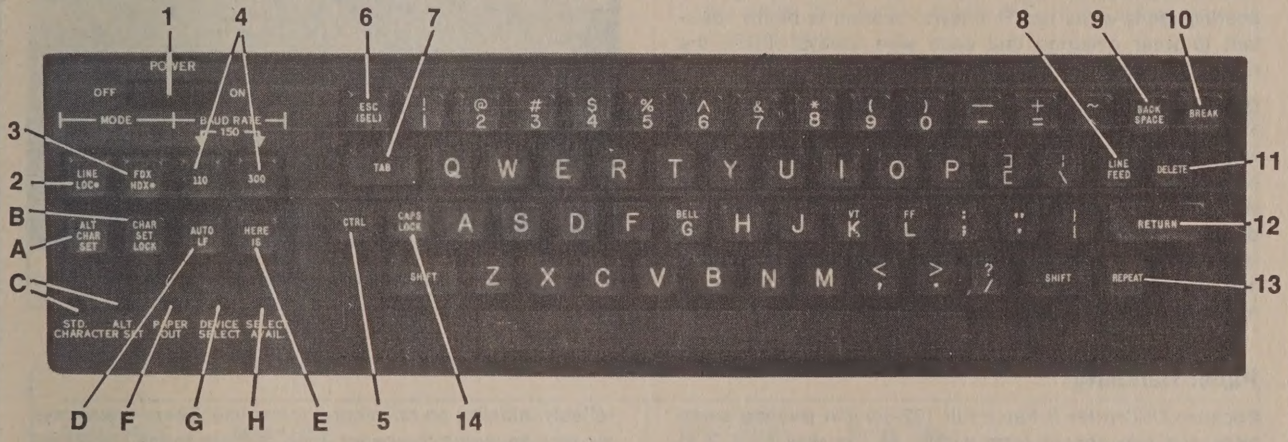
TYPEWRITER KEYBOARD — LA36

The keyboard of the LA36 Series is built to a universally accepted standard — the office typewriter (ANSI standard). The key layout, stroke, and touch are familiar to any typist. This means that training and familiarization time can be kept to a minimum, and maximum throughput can be achieved quickly. DECwriter II's keyboard is user-proven, having undergone vigorous testing since the fall of 1973.

Three-key rollover protection is incorporated in the design to eliminate multiple-keying errors. Up to three keys can be depressed at one time but the input will be correct if one of the first two keys struck is released before the third.

Switches adjacent to the keyboard allow the operator to power-up, select transmission rate, choose on-line or local operation, half- or full-duplex operation, and to activate optional features. In the local mode DECwriter II functions as a typewriting device allowing operators to add information to the printout.

An optional 14-key numeric keypad is available for those applications that require extensive numeric data entry. The keypad fits in the keyboard bezel to the right of the main keys.



STANDARD FEATURES — LA36 KEYBOARD

1. POWER-ON/OFF — Turns power on or off.
2. LINE/LOC — Connects the LA36 to the host computer (LINE) or, when depressed in the locked position, to itself (LOCAL).
3. FDX/HDX — Selects either full-duplex or half-duplex (when depressed, in the locked position) with local copy operation.
4. BAUD RATE — Selects clock frequency for transmission/reception at one of the following rates:

300 (normal)	30 characters/second at 10 bits/character
150	15 characters/second at 10 bits/character
110	10 characters/second at 11 bits/character

For 300 BAUD operation:
Depress and lock only the key labeled 300
For 110 BAUD operation:
Depress and lock only the key labeled 110
For 150 BAUD operation:
Depress and lock both keys

5. CTRL — In combination with other keys, causes some "control" (nonprinting) action to take place at the host computer. See Table I.
6. ESC(SEL) — Directs the host computer to treat the next received character as a command.
7. TAB — Directs the host computer to advance the print head the programmed number of spaces.
8. LINE FEED — Sends a line feed command in the data sent to the host computer.
9. BACK SPACE — Sends a BS code to the host computer. Moves the printed head one space to left in half-duplex mode.
10. BREAK — Causes reception of data from the host computer to be interrupted (in half-duplex operation).
11. DELETE — Transmits a DELETE code to host computer.
12. RETURN — Sends a carriage return command in the data sent to the host computer.
13. REPEAT — Repeats to the host computer any character being pressed simultaneously.
14. CAPS LOCK — Generates all upper-case characters plus numerals and eliminates lower-case alphas.

OPTIONAL FEATURES — LA36 KEYBOARD

A. ALT CHAR SET — When depressed and in the locked position selects the Alternate Character Set to be printed.

B. CHAR SET LOCK — When depressed in the locked position determines whether the operator or a remote device controls changes between ASCII and APL or other alternate character sets.

C. STD/ALT CHARACTER SET — These Light Emitting Diodes light to signify which character set has been selected. Either the one above STD or ALT will be illuminated.

D. AUTO LF — When depressed in the locked position AUTO LF inserts a local line feed after each carriage return whether typed locally or received from the host.

E. HERE IS — When depressed will send up to a 20 character message down the communication line.

F. PAPER OUT — Will light when the terminal is out of paper.

G. DEVICE SELECT — Will light when the terminal has been remotely selected to transmit. SELECT AVAIL will then be extinguished.

H. SELECT AVAIL — Will light when the terminal is available for remote selection.

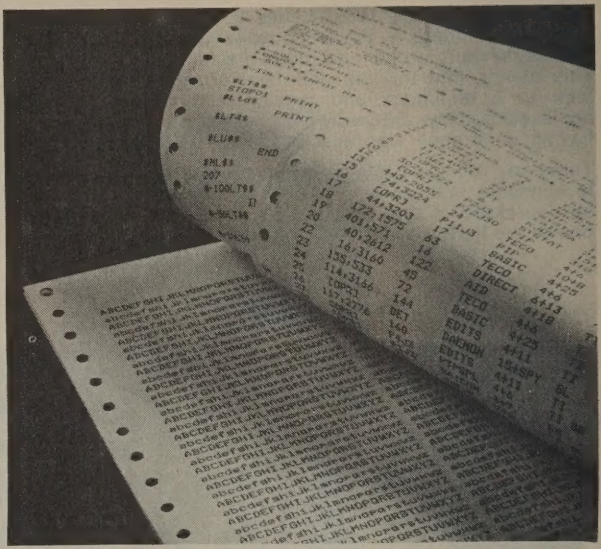
LA35 & LA36 DECWRITER II

Print Quality

The secret of DECwriter II's print quality is the design of the printhead. It comprises a 7 by 7 dot matrix which produces a far more legible image than the more conventional 5 by 5 matrix. The printhead wires are permanently lubricated and their curvature and support mechanism has been developed by computer simulation. The mechanism is protected by a massive heat sink. The results? Long life with minimal wear.

To ensure uniform density of the character impressions the motion of the printhead wires is controlled from a constant-current source. For absolute accuracy in both horizontal and vertical dot placement the printhead has a ruby sapphire bearing guide at its tip. This jewel bearing is highly resistant to wear ensuring that each wire always strikes the ribbon and paper at the proper location.

Dye-based ribbons per a DEC specification are used instead of carbon-based. These latter ribbons tend to unduly wear printhead wires which leads to poor character legibility. The ribbon feed system is also designed to eliminate smudging of the impressions. The ribbon is advanced only during carriage motion and is in fact directly driven by this motion. This eliminates a separate ribbon advance circuit and associated actuators. DECwriter II's mechanical ribbon rewind mechanism is also particularly trouble free.



DECwriter II prints easily read upper and lower case characters formed in a 7 by 7 dot matrix positioned precisely by a proprietary new carriage system.

Paper Handling

Because DECwriter II has a full 132-column printing capability and can accept form widths all the way from 3 to 14⅞″ — including 9½″ teleprinter forms — the same forms can be used on both line printers and keyboard printers, reducing inventory costs and headaches.

To accept different forms widths the right tractor moves horizontally. The left tractor can be adjusted to permit precise horizontal alignment on preprinted forms.

Six-part forms can easily be handled because of the tractor system for forms feeding. This system is the same as that found on high speed computer output line printers. Because a stepping motor drives the two pin-feed tractors the tractors reliably initialize on an integral forms line. There are always six pins engaging the paper, thus multiple forms are pulled with uniform tension without interleaf slippage and misregistration.

As an aid to the terminal operator the top of DECwriter II is beveled and the ribbon is positioned away from the paper. The printed characters are therefore easily visible. The printhead, too, moves four spaces to the right whenever there is a pause in printing lasting over 1,300 millisecs. The printhead returns to its operating position within 100 millisecs once printing commences. Other operator aids are detailed in the Options section.

Interface: Software

The DECwriter II will function with software handlers written for teletypewriters and other hard-copy terminals — in general. But it is important to review the exact interactive relationships in matching DECwriter II to the particular application. The following considerations are key to successful utilization:

1. **Transmission Mode** — Full-duplex or Half-duplex operation is possible. In the full-duplex mode the keyboard is logically separated from the printer. In half-duplex mode, the printer will copy all printable characters typed on the keyboard.
2. **Word Length** — 7-bit data words plus even or no parity. All outgoing characters are transmitted using even-parity protocol (a word is judged correct if it contains an even number of ones). Jumpers can be moved to provide no parity with parity bit marking, or parity bit spacing, and, alternately, odd parity protocol.
3. **Variable Baud Rates** — By switch selection on the terminal 110, 150, or 300 baud transmission rates are possible. Word length varies with the baud rate. At 110 baud, word length is 11 bits while at 150, and 300 it is 10 bits.
4. **Print Format** — Both upper case and lower case printout is possible. The CAPS LOCK feature also allows upper case only printout. Where forms fill-in is frequently called for options such as tab control and forms feed-length selection should be specified. Also if the terminal will be used in programming applications where APL is used, the optional dual ANSI/APL character set option should be specified. Further consideration should be given to the benefits of the compressed font option. This changes the horizontal spacing of the characters from 10 per inch to 16.5 characters per inch allowing the full 132 characters to be printed in only 8″ of space. Thus the printout can be on 8½″ wide paper for easy filing in standard cabinets.

LA35 & LA36 DECWRITER II

Interface: Software (Cont'd)

5. **Command Responses** — How DECwriter II reacts to commands from the host computer is an important consideration. Instructions such as line feed or carriage return cause movement of the printhead. Table II spells out the standard and optional codes in use. The host computer, too, must be programmed to respond to control commands from the keyboard. These are generated by striking the CTRL key followed by another key, see Table I.
6. **Optional Operational Controls** — Other interactive controls are optionally available. For example, a selective addressing option allows a transmitting device such as the host computer or another master terminal to select a single terminal, or a group of terminals, or all terminals on the same communications line to receive the transmitted data. A terminal, too, may identify itself to the network by application of the answerback option. Here on receipt of an ENQ or enquiry code the terminal transmits a 20 character identity. This same message is transmitted by the operator pressing the HERE IS key. An automatic line feed option allows the terminal to transmit both a carriage return signal and a line feed signal each time the carriage return button is depressed. And an automatic paper-out signal can be optionally generated.
7. **Buffered Send Receive** — A 4K, 8K, 12K, or 16K local memory and control option has recently been introduced for LA36. This buffer allows data to be stored prior to transmission.

TABLE I — CONTROL SIGNALS FROM KEYBOARD

(CTRL) (C)	Signifies that the end of text has been reached.
(CTRL) (B)	Signifies that all characters to follow are to be treated as text.
(CTRL) (BEL)	Signifies an alarm condition.
(CTRL) (Space, Y, Z, X, P, Q, S, F, U, V)	Special commands associated with Buffered Send-Receive Option.

TABLE II — COMMAND CODES FROM HOST COMPUTER

Character(s) and Octal Code(s)	Action Taken
BEL (007)	Sounds alarm bell.
BS (010)	Moves printhead back one space to left.
SI (017) and SO (016)	Part of ANSI/APL selection option. When code SI is received, character set to be printed shifts from ANSI to optional APL standard. SO code restores operation to normal.
LF (012)	Advances the paper upwards one line.
CR (015)	Moves printhead to left margin. Can also trigger an automatic LF command as an option.
SP (040)	Space Bar. Moves printhead one position to the right.
(041 to 176)	Prints all printable characters including numerics, punctuation symbols, upper case, and lower case alphas. Moves printhead one space to the right.
NUL (000) and DEL (177)	The terminal does not respond to these characters which are often used with slower electro-mechanical devices as fill or pad characters.
ESC 1 (033 061)	Part of the forms control option. This code sets a horizontal tab in any or all of the 132 character columns. Fill characters, or a time delay, required from host computer.
ESC 2 (033 062)	This code clears all horizontal tabs.
ESC 3 (033 063)	Part of forms control option. This code sets up to 84 vertical tabs. Host computer must provide time delay or fill characters.
ESC 4 (033 064)	This code clears all vertical tabs.
ENQ (005)	Activates answerback option resulting in transmission from terminal of up to 20 character terminal identity.
FF (014)	Part of form feed option. This code causes form to be advanced to top of next form.

Interface: Hardware

The keyboard version LA36 is normally configured for full-duplex operation with the standard 20 mA current loop interface. It can either be passive with the host computer providing the current source or, by a local wiring change, become an active device. In the half-duplex mode, transmission can take place only in one direction at a time. In this mode DECwriter II can also be either active or passive.

The optional EIA Standard RS232C interface is also available. Physically it comprises a customer installed cable and associated module. As a further option the EIA interface can be provided with modem control which includes auto answer, timed disconnect, and half/full duplex logic to provide both the LA35 and LA36 with half-duplex capability.

An integral acoustic coupler kit is an option. Two muffs are mounted on the rear of the terminal and accept a standard telephone handset.

Included are a carrier detector light and a new terminal cover to contain the muffs. The coupler can transmit full- or half-duplex serial, binary, asynchronous data at rates from 0 to 303 bits per second.

LA35 & LA36 DECWRITER II

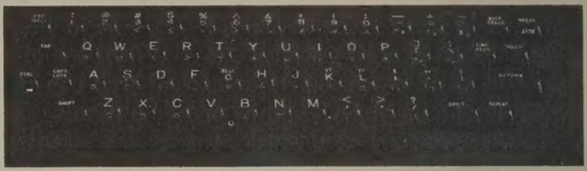
OPTIONS DESCRIPTION

All options described here are to be user installed.

Basic Mounting Kit for Options

Cat. No. LAXX-LB

This option provides the expansion logic and 6 mounting spaces to mount the DECwriter II communications and forms-handling options. This option also contains logic to automatically sense and activate new options as they are added to the DECwriter II.



Optional APL keyboard.

Character Set Options

Cat. No. LAXX-PK

This dual character option allows DECwriter II to be used as an ANSI/APL terminal. With this option installed, the DECwriter II has two character sets and selection of the desired set is possible via the receipt of Shift In (SI) and Shift Out (SO) ASCII control codes or via the ALT character set switch on the operator's control panel. The Character Set Lock switch is used to lock-out either manual control or host computer control of character set selection.

Paper Handling and Printout Options

Cat. No. LAXX-KV — Forms Feed Option

This option consists of a single-width, double-height module, a cable and a forms-control switch unit. The forms-length switch unit mounts inside the top cover on the printer mechanism side plate. It contains an 11-position switch to select the desired forms length and a reset button which, when depressed, defines the present paper position as top-of-form. The receipt of an FF character (can also be generated from the console panel in half-duplex or local mode) causes the form to be advanced to the next top-of-form.

NOTE: The host computer software must send fill characters or provide time delay to use this option.

Cat. No. LAXX-KY — Form Control Option

This option provides all of the features of the LAXX-KV, plus it provides horizontal and vertical tab capability. The horizontal tab uses ESC 1 to set a tab in any column (132 tabs maximum) and an ESC 2 to clear all horizontal tabs. The vertical tab uses ESC 3 to set up to 84 vertical tabs per form and ESC 4 to clear all vertical tabs.

NOTE: The host computer software must send fill characters or provide time delay to use this option.

Cat. No. LAXX-LZ — Paper Out Sensor

This option alerts the operator to a paper-out or paper-jam condition. An LED on the console panel will illuminate when a paper out has occurred. When using a 20mA interface, printing will stop and data will be discarded. When using the LAXX-KG EIA, interface, the ready line will be dropped and a forced disconnect will occur. Use of EIA with modem control allows the user a choice of actions on paper out. (See LAXX-LG)

Cat. No. LAXX-KJ — Compressed Font Option.

This option changes the horizontal spacing from 10 characters per inch to 16.5 characters per inch. This allows 132 columns to be printed in 8″ space. A 40% reduction in paper usage is achieved allowing 132 column reports to be filed in standard file cabinets.

Operator Assist Options

Cat. No. LA36-KK — 14 Key Numeric Pad Option

Comes with new keyboard bezel and cable.

Cat. No. LAXX-LA — Auto Line-Feed Option

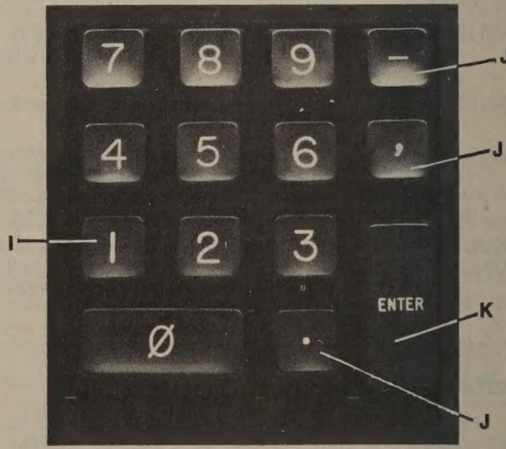
This option allows the operator to depress the auto LF pushbutton on the operator's control panel and in this state cause the DECwriter II to transmit a carriage return and line-feed character each time the carriage return button is depressed on the main keyboard. With the auto LF button up, the DECwriter II reverts back to normal mode of operation. The option also features, as an installer option, the ability to generate an LF automatically upon receipt of a carriage return code from the host computer.

Cat. No. LAXX-KX — Answerback & Auto Line Feed Option

This option provides all of the features of the LAXX-LA, plus a manual and automatic answerback capability. The answerback option allows transmission of a user-determined terminal identification message of up to 20 characters. This feature is activated upon receipt of an inquiry (ENQ) code or by the operator depressing the HERE IS button on the console. Message generation is accomplished by means of 20 7-bit DIP switches on the option board. These switches are easily changeable to alter the Answerback message.

Cat. No. LAXX-NE — Print Window

The Print Window is a clear plastic cover that mounts over the entire carriage system to provide both noise-free operation and protection of the print head and paper from foreign objects.



Optional Keypad Features for LA36

I 0 thru 9
Numerical keys aid in data input.

J . / , / –
Point, comma and minus sign are essential symbols for numeric data.

K ENTER
This instruction functions like CR and other "input data" signals.

LA35 & LA36 DECWRITER II

OPTIONS DESCRIPTION (Cont'd)

Cat. No. LAXX-LN — Print Window, Scale, Pointer

This option consists of the Print Window and three indicators: Column Scale, Line Indicator, and Column Pointer. The Column Scale is a 17.25″ long strip that is marked off in 132 divisions representing the possible column locations. The scale adheres to the bottom lip on the print window. The Line Indicator mounts on the print head and is used to establish two printing locations. One part indicates the baseline of the characters in a particular line. When setting up a form or rolling back to a previously printed line, this indicator is used to exactly align where the next character will print on the line. The other part of this indicator shows where the next character will print with respect to the column position. The Column Pointer is used in conjunction with the Column Scale to indicate the number of the column where the next character will be printed.

Communications Options

Cat. No. LAXX-KG — EIA Interface

This option provides an EIA RS232-C interface. A 9-foot cable with 25-pin data-set-type connector is also supplied.

Cat. No. LAXX-LG — EIA Interface & Modem Control

This option provides an EIA RS232-C interface for the DECwriter II. The option includes auto answer, timed disconnect and half/full duplex logic to provide earlier model DECwriters with half-duplex. A 9-foot cable with 25 pin data-set type connector is also supplied with this option. Straps are available on this option to send timed break (230 ms), 3000 ms long space, forced disconnect, or do nothing (stops printing, discards data) on a paper-out condition. Modem controls are also provided on this option for use with the Selective Address option.

Cat. No. LAXX-KW — Selective Address Option

This option allows the capability of operating in a selection control environment when connected to a multipoint Common Carrier Leased Private Line facility or an equivalent customer-provided communication network. It allows a transmitting device (CPU or controlling terminal) to act as a master and select a single terminal, a group of terminals, or all terminals on the same communications line to receive the transmitted data.

Each terminal connected to the line has the capacity of selecting itself as master once the previous master has relinquished the multi-party line.

Cat. No. LAXX-LM — Integral Acoustic Coupler Kit

The option provides coupling to phone lines with hardware mounted completely within the DECwriter. It comprises two muffs which are mounted to the rear of the terminal cover and are capable of accepting standard telephone handsets. Included with the option are a carrier detector light and a new terminal cover to contain the muffs. The coupler can transmit full- or half-duplex serial, binary, asynchronous data at rates from 0 to 303 bits per second. The coupler may also be set to transmit or ignore BREAK. Signals: Serial, binary, asynchronous 0 to 303 baud maximum transmission rate.

Transmit Frequencies:	Mark 1270 ±10Hz
	Space 1070 ±10Hz
Receive Frequencies:	Mark 2225 ±10Hz
	Space 2025 ±10Hz

BUFFERED SEND RECEIVE OPTION

NEW

Catalog Number — LAXX-NS, -NT, -NU, -NV

The LA36 DECwriter II can be equipped with a solid state buffer option which provides the user local storage of data for batch transmission at rates up to 300 baud. The electronic store and forward capability is an alternative to electromechanical automatic send and receive (ASR) devices using either magnetic or paper tape media. In addition, the electronic buffer's easy-to-use editing capability can minimize communication line charges.

In normal use, savings in line charges will pay for the buffer within four months.

The option consists of one microprocessor-based printed circuit board with an integral power supply and a mounting bracket. The entire assembly is mounted inside the LA36. This option is user installed. The terminal must have an EIA interface for this option.

Other features are:

- *Field installable in any DECwriter II.*
- *110, 150, or 300 baud rate transmission.*
- *Available with 4K, 8K, 12K, or 16K memory.*
- *Parity check on each character and parity selection.*
- *Stand-alone power supply.*
- *CONTROL code operation, see Table I.*
- *Line search capability.*
- *Margins selectable for 72, 80 or 132 characters.*
- *X ON, X OFF and restraint control.*

In the keyboard send/receive (KSR) mode, the LA36 communicates directly with the communication line; the buffer appears transparent. In the buffer mode, the LA36 communicates only with the buffer. The buffer can be set for any of the LA36 communications modes — full- or half-duplex at either 110, 150 or 300 baud.

When the buffer is turned on, by striking the CONTROL key and the SPACE key twice, it immediately asks the operator what line length is wanted. After selection of 72, 80, or 132 character length, the buffer accepts information as it is entered, on a line-by-line basis. If the operator wants to change a line, he enters a FIND command by striking the CONTROL and F keys. The LA36 prints FIND . . . and the operator types in up to 15 characters from the line he wishes to edit. The terminal then finds and prints that line. The operator can delete that line and, if desired, insert one or more lines in its place. The operator can then edit another line or add more material at the end of the text. While entering a line, the operator can use the DECwriter II's DELETE key to correct individual characters. The DELETE key backspaces the print head over the previous character and overstrikes it with a slash. When the correction is typed in, a line feed is generated so the correction may be printed on the following line. This allows the operator to read the corrected copy easily. (The correction is on the original line in the buffer.) Also, the operator can order the buffer to print its entire contents.

When the message is complete to the operator's satisfaction, it can be transmitted. Or, being compatible to X-ON, X-OFF protocol, the message can be remotely transmitted later in the day when line charges are lower. Control codes can be entered in the text by preceeding them with a CONTROL V command. This prevents them being treated as commands to the buffer. When the operator orders the buffer to be emptied, the buffer gives him a second chance, to prevent accidental erasure.

Electrical power for the buffer is provided by its own power supply which is included with the option. The option mounts conveniently within the LA36. Logically the buffer is in series between the LA36 Logic Module and the EIA interface (must be ordered if not present on existing installation).

LA35 & LA36 DECWRITER II

OPERATIONAL SPECIFICATIONS

Printout

Printing Speed: 30 char/sec throughput, serial asynchronous.

Number of Columns: 132.

Printing Characters: 96 or 64 switch selectable ASCII Character set. APL optional.

Control Characters: 32 ASCII Character set.

Keyboard Characters: 128 or 96 switch selectable. APL optional.

Type: Impact 7 by 7 dot matrix.

Character Size: 0.70 by 0.100″.

Vertical Spacing: 6 lines/inch.

Horizontal Spacing: 10 char/inch or 16.5 optional.

Carriage Return: 500 msec maximum.

Line Feed: 33 msec.

Slew Speed: 5 inches/second (30 lines/second).

Paper Handling

Tractor feed, 6 engaging pins, movable tractors for 3 to 14⅞″ forms, manual print gap adjustment for 1-6 part forms, vernier vertical and horizontal adjustment for custom preprinted forms.

Keyboard (LA36)

Standard ANSI typewriter-like layout, mechanical contact with four parallel switches of inlaid rolled gold. APL character designations optional.

COMMUNICATIONS

Rates

110 baud 11 bit, 150 and 300 baud 10 bit; switch selectable at keyboard panel.

Modes of Operation

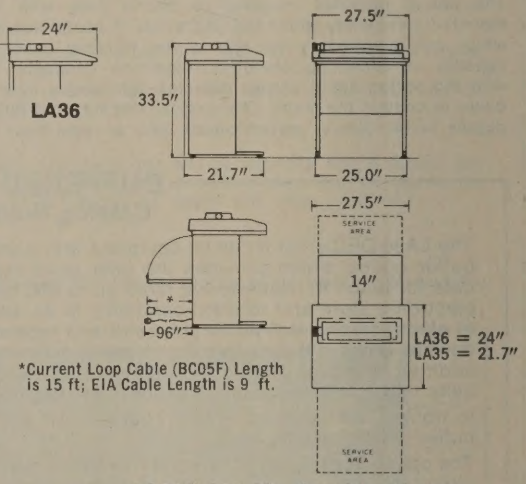
Local or full duplex on-line, switch selectable at keyboard panel.

Parity

No parity, eighth bit marking on transmit; odd or even parity, with or without parity error printout, jumper-selectable.

Interface

Integrated 20 mA current loop, full-duplex passive or active operation (jumper selectable). Connectors are 8 pin Mate-n-Lok™ type.



*Current Loop Cable (BC05F) Length is 15 ft; EIA Cable Length is 9 ft.

LA36/LA35 Site Considerations

MECHANICAL SPECIFICATIONS

Color: Off-white top with flat-black base.

Mounting: 1 free-standing unit.

Height: 33.2″ **Depth:** 24.0″

Width: 27.5″ **Weight:** 102 lbs.

Environment

Temperature: 10°C to 40°C (50°F to 104°F) operating. −40°C to 66°C (−40°F to 151°F) non operating.

Humidity: 10% to 90% (relative, noncondensing) operating. 5% to 95% (relative, noncondensing) nonoperating.

Noise: 65 db at 3 feet.

ELECTRICAL SPECIFICATIONS

Input Current: 115V ac (2A) 60 Hz or 230V ac 50 Hz. Power cord included with grounded plug for wall outlets. LA36 and LA35 are UL listed.

Heat Dissipation: 300 W printing; 160 W nonprinting.

SUPPLIES SPECIFICATIONS

Paper

Single-Part: 15-lb. paper minimum; 0.010″ card stock max.

Multi-Part: 2-6 part (no cards except last copy). Max. Thickness: 0.020″. All parts of multi-part forms must be identical in width.

Note: NCR or 3M paper, up to 6-part. Must use ribbon on top copy. First surface impact paper not recommended.

Continuous-feed, fan-fold business forms with 3- or 4-prong margin crimps on both margins (multi-part). Stapled forms are not recommended and may damage tractors and other areas of the machine. Dot or line glue margins acceptable.

Caution: Do not line glue both margins as air will not be able to escape and poor impressions will result.

Ribbon

Digital-specified nylon fabric, spool assembly 0.5″ wide by 40 yards.

™ Mate-n-Lok is a trademark of Amp, Inc.

LA36 MAINTENANCE MANUAL

A comprehensive manual for the do-it-yourselfer; provides installation, operation, theory, electrical and mechanical servicing information, engineering drawings, and an illustrated parts breakdown.

Cat. No.	Price
EK-1LA36-MM-001	**$70**

?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

LA35 & LA36 DECWRITER II

ORDERING INFORMATION

Basic Models

Cat. No.	Description*	List	Cat.	Cash	Shipping Weight
LA36-DE	DECwriter II with keyboard. 120V, 60 Hz operation. 20 mA current loop.	$2370	$2252	$2157	145 lbs.
LA36-DJ	Same as -DE but 230V, 50 Hz version.	2370	2252	2157	145 lbs.
LA35-DE	Receive-Only DECwriter II. 120V, 60 Hz operation. 20 mA current loop.	2235	2123	2034	145 lbs.
LA35-DJ	Same as -DE but 230V, 50 Hz version.	2235	2123	2034	145 lbs.

*includes 7′ power cord, 15′ current-loop cable, sample sheets, and user's manual.

Options

Cat. No.	Description	Terminal Must Also Have This Option	Includes This Feature	Applicable to		List	Cat.	Cash	Shipping Weight
				LA35	LA36				
LAXX-LB	Option Mounting Kit	—	—	X	X	$110	$105	$100	16 lbs.
LAXX-PK	ANSI/APL Character Set	LB	—	—	X	720	684	655	5 lbs.
LAXX-KY	Forms Control	LB	KV	X	X	315	299	287	5 lbs.
LAXX-KV	Forms Feed	LB	—	X	X	165	157	150	5 lbs.
LAXX-LZ	Paper Out Sensor	—	—	X	X	25	24	23	4 lbs.
LAXX-KJ	Compressed Font	—	—	X	X	55	52	50	2 lbs.
LAXX-KG	EIA Interface	—	—	X	X	65	62	59	4 lbs.
LAXX-LG	EIA Interface with Modem Control	—	KG	X	X	110	105	100	4 lbs.
LAXX-KW	Selective Addressing	LB, LG	—	X	X	130	124	118	5 lbs.
LAXX-KK	Numeric Keypad	—	—	—	X	105	100	96	10 lbs.
LAXX-LA	Auto Line Feed	LB	—	X	X	85	81	77	4 lbs.
LAXX-KX	Auto Line Feed plus Answerback	LB	LA	X	X	210	200	191	3 lbs.
LAXX-LM	Acoustic Coupler	—	—	X	X	475	451	432	10 lbs.
LAXX-NE	Print Window	—	—	X	X	15	14	14	3 lbs.
LAXX-LN	Window, Scale, Pointer	—	NE	X	X	30	29	27	5 lbs.
LAXX-NS	BSR 4K	KG or LG	—	—	X	865	822	787	10 lbs.
LAXX-NT	BSR 8K	KG or LG	—	—	X	1165	1107	1060	10 lbs.
LAXX-NU	BSR 12K	KG or LG	—	—	X	1460	1387	1329	10 lbs.
LAXX-NV	BSR 16K	KG or LG	—	—	X	1745	1658	1588	10 lbs.

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The **Cat** prices are generally about 5% less than **List** price. **Cash** prices are about 4% less than **Cat.** Generally 9% savings — in all! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See page 109 for details.

LA35 & LA36 DECWRITER II

SUPPLIES AND ACCESSORIES

Accessories

To complement DECwriter installations, a range of custom-tailored accessories is available either individually or in combination kits as follows:

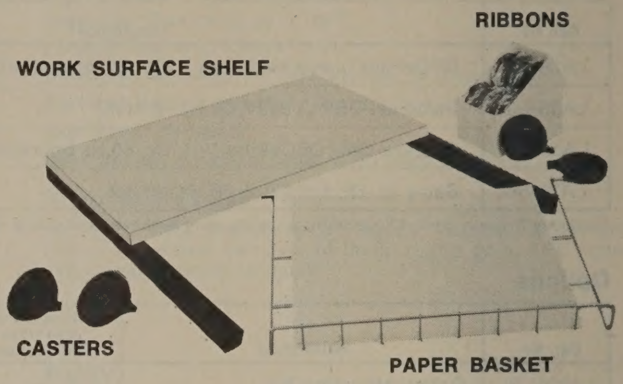
Work Surface Shelf, LAXX-KC — Attaches to either left or right side of terminal. Dimensions: 24L by 15″W.

Wire Shelf, LAXX-KD — Attaches to back of terminal to collect printer paper. Dimensions: 10½L by 18W by 2″H.

Basket, LAXX-NC — Attaches to back of terminal to collect printer paper. It is deeper than the LAXX-KD wire shelf and holds up to one complete box of single or multipart forms. Dimensions: 12L by 16W by 13″H.

Casters, LAXX-KB — Attaches to back legs of terminals so they can easily be moved.

Vinyl Dust Cover, 12-12375 — Protects DECwriter II when not in use. Clear vinyl.



Cat. No.	Description	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash	Shipping Weight
LAXX-KC	Surface Shelf	**$45 each**	**$43 each**	**$43 each**	**$41 each**	14 lbs.
LAXX-KD	Wire Shelf	**25 each**	**24 each**	**24 each**	**23 each**	1 lb.
LAXX-NC	Basket	**25 each**	**24 each**	**24 each**	**23 each**	1 lb.
LAXX-KB	Casters	**15 set**	**14 set**	**14 set**	**14 set**	1 lb.
12-12375	Vinyl Cover	**10 each**	**9 each**	**10 each**	**9 each**	3 oz.

Supplies

Ribbon

½″ by 40 yds., nylon, 12 ribbons per box.
Shipping Weight: 3 lbs. per box.

Cat. No.	Qty. 1-5 Cat.	Qty. 1-5 Cash	Qty. 6-Up Cat.	Qty. 6-Up Cash
36-10558-01	**$50 box**	**$48 box**	**$47 box**	**$45 box**

Paper and Forms

14⅞ by 11″ white, fanfold, lined, single-sheet and multipart forms.

Cat. No.	No. of Parts	Sheets/ Sets Per Box	Qty. 1-5 Cat.	Qty. 1-5 Cash	Qty. 6-Up Cat.	Qty. 6-Up Cash	Shipping Weight
36-09141-00	1	2400	**$32**	**$30**	**$30**	**$29**	40 lbs.
36-09141-01	2	1600	**42**	**40**	**40**	**38**	45 lbs.
36-09141-02	3	1000	**42**	**40**	**40**	**38**	45 lbs.
36-09141-03	4	750	**42**	**40**	**40**	**38**	45 lbs.
36-09141-04	6	500	**45**	**43**	**43**	**41**	45 lbs.

Supply and Accessory Kits for LA35 and LA36

Basic Supply Kit, LA36K-S2

Kit includes: 1 #36-10558-01 Box Ribbons
1 #36-09141-00 Box Paper
1 #12-12375 Vinyl Dust Cover
1 #LAXX-KD Wire Shelf

Extended Supply Kit, LA36K-S1

Kit includes: 2 #36-10558-01 Boxes Ribbons
2 #36-09141-00 Boxes Paper
1 #12-12375 Vinyl Dust Cover
1 #LAXX-KA Accessories Kit (see below)

Accessories Kit, LAXX-KA

Kit includes: 1 #LAXX-KB Caster Set
1 #LAXX-KC Surface Shelf
1 #LAXX-KD Wire Shelf

Cat. No.	Description	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash	Shipping Weight
LA36K-S2	Basic Supply Kit	**$100** each	**$96** each	**$95** each	**$91** each	44 lbs.
LA36K-S1	Extended Supply Kit	**220** each	**211** each	**209** each	**200** each	90 lbs.
LAXX-KA	Accessory Kit	**80** each	**77** each	**76** each	**73** each	6 lbs.

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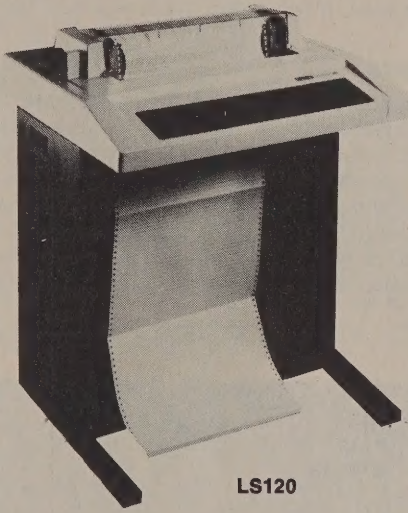
DIRECT SALES CATALOG

LS120 DECWRITER III

PRINTER TERMINALS, HIGH SPEED 180 CPS

Standard Features

- *180 cps printing.*
- *110, 300 or 1200 baud operation plus additional, operator-selectable rates of up to 4800 baud.*
- *Full- or half-duplex operation.*
- *X-ON, X-OFF (DC1, DC3) FDX protocol.*
- *ETX/EOT or reverse channel HDX protocol.*
- *RS232C interface.*
- *Paper-out switch.*
- *Switch-selectable automatic line feed.*
- *Selectable automatic new line.*
- *Auto-answer with time out protection.*
- *132-column printing; 10 characters per inch horizontal; 6 lines per inch vertical spacing.*
- *Fine vertical adjustment for forms alignment.*
- *128-character ASCII upper/lower case set.*
- *ANSI keyboard with multi-key rollover.*
- *Prints 6-part forms.*
- *Handles variable width forms (3 through 14⅞"W).*
- *Self-test mode.*
- *Print window.*
- *Adjustable left and right tractors.*
- *Switchable parity selection and parity error detection.*
- *7 by 7 dot matrix printing.*



LS120

Optional Features

- *Forms package, including length of form, top and bottom of form, horizontal and vertical tab (relative and absolute), left hand and right hand margin setting and direct positioning.*
- *User programmable 20 character Answerback option, which includes additional space for storage of user defined machine set-up parameters.*
- *APL alternate character set.*
- *Front Mounted Parity Switch for operator convenience.*
- *Compressed font (16.5 characters per inch).*
- *14-key numeric pad.*
- *300 baud integral acoustic coupler.*
- *Compatibility with DECwriter II standard accessories and suppiies.*

The LS120 DECwriter III is a low cost, interactive hard copy serial data communications terminal designed for operation at 1200 baud.

DECwriter III draws upon field-proven sub-assemblies used in other DIGITAL terminals. DECwriter III meets high standards of reliability, ease of maintenance and accuracy of DECwriter II and DECprinter.

A microprocessor-based options controller module provides flexibility in the DECwriter III, making it suitable for a wide range of applications. For example, the terminal can utilize half- and full-duplex as well as echoplex protocols. In addition to the terminal's basic 1200 baud rate, other rates from 110 to 4800 baud can be selected.

Further, DIGITAL offers a number of standard options for the machine, allowing the user to tailor terminals to each specific application.

The DECwriter III is equally at home in both communications and interactive computer console applications. Its 180 cps print speed, combined with its integral 1K character buffer provides highly efficient machine throughput. In addition, the DECwriter III incorporates a "smart" look ahead print capability which automatically returns the print head to the first *printing* position of each successive line. Its quiet operation makes it a suitable addition to any office environment.

Field-proven subassemblies used in both the LA36 DECwriter II and the LA180 DECprinter are incorporated in the DECwriter III. These include a 7 by 7 dot matrix print head, ANSI keyboard, logic circuitry and power circuitry. In addition, the DECwriter III contains a microprocessor-based options controller module for additional forms handling and communications capabilities. This module has been designed to allow for future buffered send/receive capabilities and editing features. The LS120 uses a 128-character upper- and lower-case ASCII character set. Optional character set ROMs enable the user to print non-standard characters.

LS120 DECWRITER III

Incoming Buffer Storage

The LS120 incorporates a 1K character FIFO buffer for temporary storage of incoming data. If data is received at a rate faster than DECwriter III can process and print it, the buffer will protect the data stream, against loss. If the buffer becomes full, the terminal can be switched to automatically issue an XOFF (DC3) command to the sending device to stop transmitting data. When the buffer has been emptied, the terminal will issue an XON (DC1) command for resumption of transmission.

Keyboard

The keyboard layout is an ANSI standard typewriter styled keyboard. An optional APL character set option can also be ordered. DECwriter III features a multi-key rollover keyboard, which prevents the operator out-typing the keyboard even at low baud rates. Each key activates a gold-inlaid multi-contact switch capable of generating more than 100 million characters without an error. The keyboard's "CAPS LOCK" key permits the operator to lock the alpha keys in upper case while leaving numerals and special symbols in lower case. Any operator hesitation longer than two seconds moves the print head four spaces to the right. This provides a clear view of the last character printed. Last character visibility can be overridden by the operator. An optional 14-key numeric pad is also available.

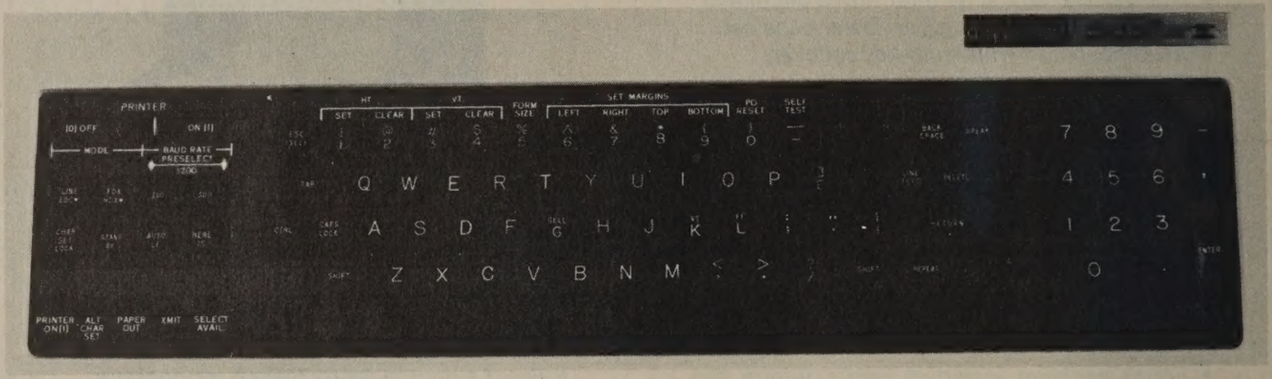


TABLE I — CONTROLS AND INDICATORS

PRINTER ON/OFF	This rocker switch applies or removes ac power to the machine electronics.
LINE/LOC	Connects the terminal to the host computer (LINE). When depressed, a disconnect is issued and the terminal can be used in off-line operations.
HDX/FDX	Selects either full-duplex or half-duplex (when depressed and locked) with local copy operation. (The echoplex feature can be defeated by the user.)
BAUD RATE	The two pushbuttons labeled 110 and 300 determine the line speed at which the DECwriter III sends or receives data. Depressing both buttons selects 1200 baud operation. When both buttons are in the up position, a user pre-determined rate of 2400, 4800 or a split rate of either 75/1200 or 150/1200, can be used.
AUTO LINE FEED	When this pushbutton is in the down position, carriage return and line feed are transmitted whenever the carriage return on the main keyboard is struck. When a carriage return is received from the communications line, a line feed can also be generated.
PRINTER ON INDICATOR	Indicates that ac power is being applied to machine electronics. This light will blink when power is ON, but the terminal is in a NOT READY condition.
ALT CHAR SET INDICATOR	Indicates that the alternate character set is being used, when installed.
PAPER OUT INDICATOR	Indicates that the terminal has run out of paper. This indicator will also come on when the LS120 cover is open.
XMIT INDICATOR	When ON, indicates that the terminal is transmit enabled.
SELECT AVAIL INDICATOR	Reserved for future use.
CHAR SET LOCK	Depression of this button locks the terminal into the selected standard or alternate character set.
STANDBY	Allows keyboard operation in LOCAL mode while holding the communication line.
HERE IS	This button functions only when the answerback option is installed. When pushed, it causes transmission of a user-determined identification message of up to 20 characters.

LS120 DECWRITER III

Print Head

DECwriter III's print head is based on the technology used in DIGITAL's DECprinter and DECwriter II. The wires are permanently lubricated for long life and resistance to wear by paper and ribbon. Wire curvature and support mechanism are designed by computer simulation for minimal wear and fatigue. The use of constant current solenoids and a ruby jewel head bearing insures precise character formation and uniform density of character impression. Field experience with over 60,000 units has proved this 7 by 7 dot matrix design to be extremely reliable.

Carriage System

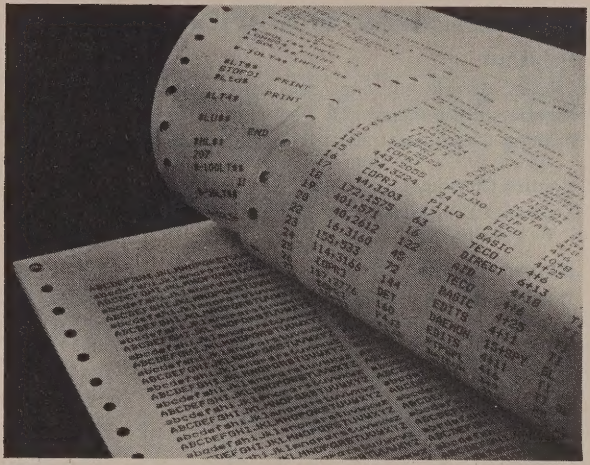
The carriage system smoothly and quietly transports the print head along the horizontal axis, providing accurate character positioning. A precisely adjustable print gap assures clean, clear impressions on a variety of forms sizes of up to six parts. The carriage is controlled by a servo system which assures accurate dot placement. The dc motor operates in the forward direction at up to 18″ per second, and has a maximum carriage return time of 275 milliseconds.

COMMUNICATIONS

The terminal supports half-duplex transmission with both coded character turnaround protocol and reserve channel protocol. For the character turnaround command, the operator may select between ETX or EOT. In addition, the LS120 provides operator-switchable local copy (echoplex) capability for systems where neither the processor nor the modem provides this function.

Many 300 and 1200 baud half- and full-duplex modems are compatible with the LS120. These include the Bell 103 and 202 Series, the Vadic 3400 and the Bell 212A.

The LS120 allows the user a choice of alternatives in the event of a paper out. One condition issues a short break, signaling the host to take appropriate action while holding the communication line. The other condition, for use in unattended operation, issues a DTR disconnect signal.



DECwriter II prints easily read upper and lower case characters formed in a 7 by 7 dot matrix positioned precisely by a proprietary new carriage system.

Parity selection is handled through switches on the options controller module. For operator convenience, an optional parity switch can be installed under the LS120 cover.

If a problem occurs on the system, the operator can utilize a self-test feature in local mode. This initiates a constant ripple pattern, which tells the operator whether the problem is in the terminal or in some other part of the system.

OPTIONS

Cat. No. LAXX-RF — Programmable Answerback Package

The optional answerback package for the DECwriter III features a user programmable 20 character answerback message. The answerback option utilizes a PROM that can be programmed by the user directly from the terminal's keyboard. In addition, separate PROM space is provided for the user to store machine set-up parameters.

Cat. No. LAXX-RB — Read Only Answerback Package

This option performs the same functions as the programmable option except it does not have the capability of blasting PROMS. Therefore, any PROM being used on this option must have been previously blasted on the programmable version.

Cat. No. LAXX-RA — Optional Forms Handling Package

A comprehensive option package for quick and easy handling of single- or multi-part forms can be added to the DECwriter III. Through simple keyboard commands, the operator can set all forms handling parameters. Also, by a direct positioning feature, the print head can be ordered to any horizontal or vertical print position with a single command. Tabbing can be accomplished through either absolute or relative addressing — providing a high degree of flexibility for the user.

Cat. No. LAXX-RC — APL Alternate Character Set

This dual character option allows DECwriter III to be used as an ANSI/APL terminal. With this option installed, the DECwriter III has two character sets and selection of the desired set is possible via receipt of Shift In (SI) and Shift Out (SO) ASCII control codes. Character Set Lock switch, located on the LS120 console panel, is used to either lock-out manual control or host computer control of character set selection.

Cat. No. LAXX-RM — 14 Key Numeric Pad Option

14 Key Numeric Pad Option comes with new keyboard bezel and cable.

Cat. No. LAXX-KJ — Compressed Font Option

This option changes the horizontal spacing from 10 characters per inch to 16.5 characters per inch. This allows 132 columns to be printed in 8″ space. A 40% reduction in paper usage is achieved allowing 132 column reports to be filed in standard file cabinets.

Cat. No. LAXX-LM — Integral Acoustic Coupler Kit

The 300 baud option provides coupling to phone lines with hardware mounted completely within the DECwriter. It comprises two muffs which are mounted to the rear of the terminal cover and are capable of accepting standard telephone handsets. Included with the option are a carrier detector light and a new terminal cover to contain the muffs. The coupler can transmit full- or half-duplex serial, binary, asynchronous data at rates from 0 to 303 bits per second. The coupler may also be set to transmit or ignore BREAK. Signals: Serial, binary, asynchronous 0 to 303 baud maximum transmission rate.

Transmit Freq: Mark 1270 ±10 Hz Space 1070 ±10 Hz
Receive Freq: Mark 2225 ±10 Hz Space 2025 ±10 Hz

Cat. No. LAXX-RN — 20 mA Current Loop Interface

This option provides a 20 mA interface. A 15′ cable is also supplied.

Cat. No. LAXX-RD — Operator Selectable Parity Switch

The option provides a rotary switch which is conveniently located under the LS120 cover. With this option installed, it is not necessary to change parity selection by means of access to the options controller module.

LS120 DECWRITER III

OPERATIONAL SPECIFICATIONS

Printout

Printing Speed: 180 char/sec, serial asynchronous.

Number of Columns: 132

Printing Characters: 96 or 64, switch selectable ASCII Character set. APL optional.

Control Characters: 32 ASCII Character set.

Keyboard Characters: 128 or 96 switch selectable. APL optional.

Type: Impact 7 by 7 dot matrix.

Character Size: 0.75 by 0.100″

Vertical Spacing: 6 lines/inch.

Horizontal Spacing: 10 char/inch or 16.5 char/inch optional.

Carriage Return: 275 msec maximum.

Slew Speed: 7½ inches/second (45 lines/second).

Paper Handling

Tractor feed, 6 engaging pins, movable tractors for 3 to 14⅞″ forms, manual print gap adjustment for 1-6 part forms, vernier vertical and horizontal adjustment for custom preprinted forms.

Keyboard

Standard ANSI typewriter-like layout, mechanical contact with four parallel switches of inlaid rolled gold. APL character designations optional.

COMMUNICATIONS

Rates

110 baud, 11 bit; 300 baud and higher, 10 bits. Four switch selectable rates from console panel: 110, 300, and 1200 are standard user-determined. Fourth rate of 2400, 4800, or a split rate of either 75/1200 or 150/1200, can be used.

Interface

EIA RS232C. Supplied with 9 foot cable and terminated in a standard 25 pin EIA connector. An optional 20 mA current loop interface is also available.

Modes of Operation

Full-duplex, half-duplex, and echoplex modes on-line; or LOCAL switch selectable at keyboard panel. SWITCH SELECTABLE STANDBY MODE places LS120 keyboard into a LOCAL mode while the printer remains ON-LINE.

Parity: Input and output parity ODD, EVEN, and NO parity, bit 8 marking, or NO parity with bit 8 spacing are switchable choices. An output character with improper parity will force a substitute character to be printed.

MECHANICAL SPECIFICATIONS

Color: Off-white top with flat-black base.

Mounting: 1 free-standing unit.

Height: 33.5″

Width: 27.5″

Depth: 24″

Weight: 107 lbs.

Environment

Temp: 10°C to 40°C (50°F to 104°F) operating.
−40°C to 66°C (−40°F to 151°F) nonoperating.

Humidity: 10% to 90% (relative, noncondensing) operating.
5% to 95% (relative, noncondensing) nonoperat.

Noise: 65 dB printing at 3 feet.

ELECTRICAL SPECIFICATIONS

90-132V ac or 180-264V ac, user-selectable; 50 or 60 Hz ±1 Hz. Included w/grounded plug for wall outlets. UL listed.

Heat Dissipation:
400W printing; 100W nonprinting.

SUPPLIES SPECIFICATIONS

Paper

Single-Part: 15 lb. paper min; 0.010″ card stock max.

Multi-Part: 2-6 part (no cards except last copy). Max. thickness 0.020″.

All parts of multi-part forms must be identical in width.

Note

NCR or 3M paper, up to 6-part. Must use ribbon on top copy. First surface impact paper not recommended.

Continuous-feed, fan-fold business forms with 3- or 4-prong margin crimps on both margins (multi-part). Stapled forms are not recommended and may damage tractors and other areas of the machine. Dot or line glue margins acceptable.

Caution

Do not line glue both margins as air will not be able to escape and poor impressions will result.

Ribbon

Digital-specified nylon fabric, spool assembly 0.5″W by 60 yards. Supply Item #36-12153-01

?GOT A QUESTION?

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LS120 DECWRITER III

ORDERING INFORMATION

Basic Models

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
LS120-HE	DECwriter III EIA Interface 120V ac 60 Hz	$3990	$3791	$3631	145 lbs.
LS120-HJ	230V ac 50 Hz Version of -HE	3990	3791	3631	

NOTE:
Includes 7′ Power Cord, 9′ EIA Interface Cable, and Operations Manual.

Options

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
LAXX-RA	Forms Package	$85	$81	$77	
LAXX-RF (Programmable)	Communications Package	*	*	*	
LAXX-RB (Non-Programmable)	Communications Package	*	*	*	
LAXX-RN	20 mA Current Loop Interface	*	*	*	1 lb.
LAXX-RC	APL Character Set	120	114	109	
LAXX-KJ	Compressed Font	55	52	50	
LAXX-RM	Numeric Keypad	105	100	96	
LAXX-LM	300 Baud Acoustic Coupler	475	451	432	
LAXX-RD	Parity Selection Rotary Switch	*	*	*	

*Contact Catalog Sales Desk for pricing.

SUPPLIES AND ACCESSORIES

Accessories

To complement DECwriter III installations, a range of custom tailored accessories are available either individually or in combination kits as follows:

Work Surface Shelf, LAXX-KC — Attaches to either left or right side of terminal. Dimensions: 24L by 15″W.

Wire Shelf, LAXX-KD — Attaches to back of terminal to collect printer paper. Dimensions: 10½L by 10W by 2″H.

Basket, LAXX-NC — Attaches to back of terminal to collect printer paper. It is deeper than the LAXX-KD wire shelf and holds up to one complete box of single or multi-part forms. Dimensions: 12L by 16W by 13″H.

Casters, LAXX-KB — Attaches to back legs of terminals so they can easily be moved.

Vinyl Dust Cover, 12-12375 — Protects DECwriter III when not in use. Clear vinyl.

Cat. No.	Description	Qty. 1-2		Qty. 3-Up		Shipping Weight
		Cat.	Cash	Cat.	Cash	
LAXX-KC	Surface Shelf	$45	$43	$43	$41	14 lbs.
LAXX-KD	Wire Shelf	25	24	24	23	1 lb.
LAXX-NC	Basket	25	24	24	23	1 lb.
LAXX-KB	Casters	15	14	14	13	1 lb.
12-12375	Vinyl Cover	10	9	9	8	1 lb.

Supply and Accessory Kits for LS120

	Cat. No.	Qty. 1-2		Qty. 3-Up		Shipping Weight
		Cat.	Cash	Cat.	Cash	
SUPPLY KIT LA180-S1 Kit includes: 2 #36-12153-01 Boxes Ribbons 2 #36-0941-00 Boxes Paper 1 #LAXX-KB Caster Set 1 #LAXX-NC Paper Basket	LA180-S1	$210	$202	$200	$191	88 lbs.
SUPPLY KIT LA180-S2 Kit includes: 1 #36-12153-01 Box Ribbons 1 #36-09141-00 Box Paper 1 #LAXX-NC Paper Basket	LA180-S2	110	106	105	100	45 lbs.
ACCESSORIES KIT LAXX-KA Kit includes: 1 #LAXX-KB Caster Set 1 #LAXX-KC Surface Shelf 1 #LAXX-KD Wire Shelf	LAXX-KA	80	77	76	73	6 lbs.

Supplies

Ribbon

½″ by 60 yards, nylon. 12 ribbons per box.
Shipping Weight: 3 lbs. per box.

Cat. No.	Qty. 1-5		Qty. 6-Up	
	Cat.	Cash	Cat.	Cash
36-12153-01	$65	$62	$62	$59

Paper and Forms

14⅞ by 11″ white, fan-fold lined single-sheet and multi-part forms.

Cat. No.	No. of Parts	Sheets/ Sets Per Box	Qty. 1-5		Qty. 6-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
36-09141-00	1	2400	$32	$30	$30	$29	4 lbs.
36-09141-01	2	1600	42	40	40	38	4 lbs.
36-09141-02	3	1000	42	40	40	38	4 lbs.
36-09141-03	4	750	42	40	40	38	4 lbs.
36-09141-04	6	500	45	43	43	41	4 lbs.

LA180 DECPRINTER I

HIGH SPEED PRINTER 180 CPS

Features:

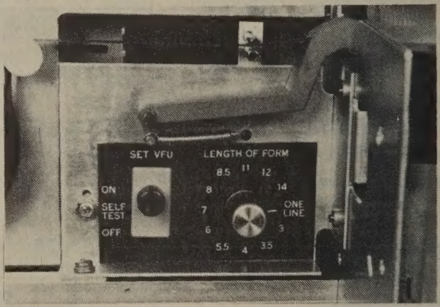
- *180 characters per second.*
- *Parallel interface.*
- *Accommodates 6-part form (0.20 max. thickness).*
- *Handles variable-width forms, 3 through 14⅞"W.*
- *132-column print; 10-characters-per-inch horizontal spacing, 16.5-per-inch optional.*
- *6-lines-per-inch vertical spacing.*
- *128-character ASCII upper/lower case set with control codes and symbols.*
- *7 by 7 dot matrix.*
- *Backspace capability.*
- *Quiet operation.*
- *Excellent character readability.*
- *Fine vertical adjustment for accurate forms placement.*
- *Paper-out switch.*
- *Paper-out override.*
- *Switch-selectable forms length (11 lengths).*
- *Drives 100' cable.*
- *Self test capability.*

DECprinter

High-speed line printer **LA180** has a handsome styling to blend in with office or computer room decor.

The LA180 DECprinter I is a 180-character-per-second, 132-column hard-copy printer. Utilizing a 7 by 7 dot matrix printing technique and a field-proven printhead, the LA180 provides highly legible and reliable printing of the full 128-character ASCII upper and lower case set. Each LA180 is equipped with a standard parallel interface; however, the unit may also be utilized as a serial device by the addition of one of the optional serial line interface kits.

Forms flexibility is provided by the LA180's ability to accommodate up to six-part forms and handles variable width forms from 3 to 14⅞" wide. Forms length is switch settable, see figure, in eleven lengths, from one line to 14", with fine vertical tractor release adjustment for precise location of printing.



Paper feed is tractor-driven by a stepping motor. The tractor design provides four pin paper engagement of the form on a flat bed, ensuring control and positive feeding of multi-part forms. A paper-out sensor and switch is provided as a standard feature.

TABLE I — OPERATOR CONTROLS

POWER ON-OFF	Applies and removes ac power to entire machine.
ON-LINE/OFF-LINE	Enables or disables communications.
HEAD OF FORM	Feeds form to the next top-of-form or single-line, if forms switch is set in single-line position and ON-LINE/OFF-LINE switch is in OFF-LINE position. If the paper-out indicator is set, printing can be continued to the next top-of-form by pressing the Head-of-Form button for each line or holding button in until Head-of-Form is reached.
LENGTH OF FORM (ROTARY SWITCH)	Selects any of 11 form lengths.
SET VFU	Used in conjunction with the Length-of-Form switch to reset forms length.
SELF TEST	Will run a ripple test pattern locally if set in test position with machine in on-line mode.
FORMS THICKNESS ADJUSTMENT	Located on right side of printhead carriage; selects proper gap for 1-through-6-part form. Approximately 1 click for each part.
RIGHT AND LEFT TRACTOR ADJUSTMENT	Thumb screw may be loosened to allow tractor movement for various form widths.
FINE VERTICAL TRACTOR RELEASE	Line-feed knob may be depressed inward and rotated in the appropriate direction for precise location of printing with respect to vertical zones.

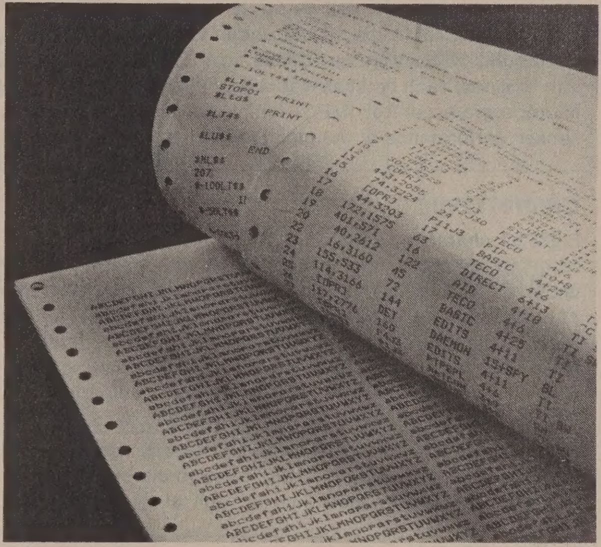
LA180 DECPRINTER I

Print Quality

The secret of LA180's print quality, see figure, is the design of the printhead. It comprises a 7 by 7 dot matrix which produces a far more legible image than the more conventional 5 by 5 matrix. The printhead wires are permanently lubricated and their curvature and support mechanism has been developed by computer simulation. The mechanism is protected by a massive heat sink. The results? Long life and minimal wear by paper or ribbon.

To ensure uniform density of the character impressions, the motion of the printhead wires is controlled from a constant-current source. For absolute accuracy in both horizontal and vertical dot placement, the printhead has a ruby sapphire bearing guide at its tip. This jewel bearing is highly resistant to wear, ensuring that each wire always strikes the ribbon and paper at the proper location. LA180's printhead has a rated life of 100 million characters.

Dye-based ribbons per a DIGITAL specification are used instead of carbon-based. These latter ribbons tend to unduly wear printhead wires which leads to poor character legibility. The ribbon feed system is also designed to eliminate smudging the impressions. The ribbon is advanced only during carriage motion and is in fact directly driven by this motion. This eliminates a separate ribbon advance circuit and associated actuators.



DECwriter II prints easily read upper and lower case characters formed in a 7 by 7 dot matrix positioned precisely by a proprietary new carriage system.

Paper Handling

Because DECprinter I has a full 132-column printing capability and can accept form widths all the way from 3 to 14⅞″ — even 9½″ teleprinter forms — the same forms can be used on both line printers and keyboard printers.

Six-part forms can easily be handled because of the tractor system for forms feeding. A stepping motor drives two pin-feed tractors. Thus the tractors reliably initialize on an integral forms line. There are always six pins engaging the paper; therefore, multiple forms are pulled with uniform tension without interleaf slippage and misregistration.

To accept different forms widths, the right tractor moves horizontally. The left tractor can be adjusted to permit precise horizontal alignment on pre-printed forms.

Character Set and Code

The full, 96-character, upper- and lower-case set is standard with the LA180. Data is interpreted in a read-only memory (ROM). Changing the ROM enables the user to print non-standard characters. The standard ASCII set, shown in Table II, consists of 10 numerics, 26 upper-case alphas, 26 lower-case alphas, and 34 special characters, including DELETE, a nonprinting, nonspacing control code. The total character and control code count is 128.

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As an aid to the terminal operator, the top of LA180 is beveled and the ribbon is positioned away from the paper. The printed characters are therefore easily visible. The printhead, too, moves four spaces to the right whenever there is a pause in printing lasting over 1300 milliseconds. The printhead returns to its operating position within 100 milliseconds.

A compressed font option is available. This option changes the horizontal spacing from 10 characters per inch to 16.5 characters per inch. This allows 132 columns to be printed in 8″ space. A 40% reduction in paper usage is achieved allowing 132-column reports to be filed in standard file cabinets. This option, once installed, must be removed if 132-column printing is again required.

TABLE II — COMMAND CODES FROM HOST COMPUTER

Character(s) and Octal Code(s)	Action
BEL (007)	Sounds audible tone. A separate tone is sounded for each of up to eight BEL codes in succession.
BS (010)	Moves printhead one space to left.
LF (012)	Prints content of line buffer, returns printhead to left margin, and advances paper one line.
FF (014)	Advances paper to top of next form (FORM FEED).
CR (015)	Moves printhead to left margin.
SP (040)	Stores "space character" in memory.
(041 to 177)	All printable characters. Received and stored in memory prior to printing.
DEL (177)	Clears memory.

LA180 DECPRINTER I

Microprogram Control

Functions once performed by printers under hardware control are handled in the LA180 under the control of a 512-instruction microprogram. These instructions are divided into routines, each dedicated to a specific machine function. Microprogram control (MPC) initiates a machine function, senses performance of the function, and, based on that performance, determines which routine is to be performed next. Because the LA180 allows the user to monitor machine functions and operator controls, he can design his software to modify specific routines and to change the printer's responses as desired to meet changing operational requirements.

Control Logic

Eight-bit characters reach the LA180 from the user's interface and are processed through the single-character buffer under MPC, loading the character-buffer RAM with a line of data. From the RAM, characters are presented on a FIFO basis to the character-generator ROM, which generates the firing matrix through which the print head forms the printable characters. The ROM also contains decoding information for the nonprintable command characters.

The carriage servo and printhead subsystems are activated under MPC to move the printhead through the character cell and print the commanded dots in each of the seven rows.

A CR (carriage return) character causes the MPC to move the printhead to the left margin. A BS (back space) character causes the MPC to move the printhead one column to the left. An LF (line feed) character causes the MPC to activate the stepper motor drive and advance the paper one line. An FF (form feed) character advances the paper to the top of the next form.

DECprinter is shipped with no parity. The user can select even parity or odd parity, with parity error printout, by changing jumpers.

Interfacing

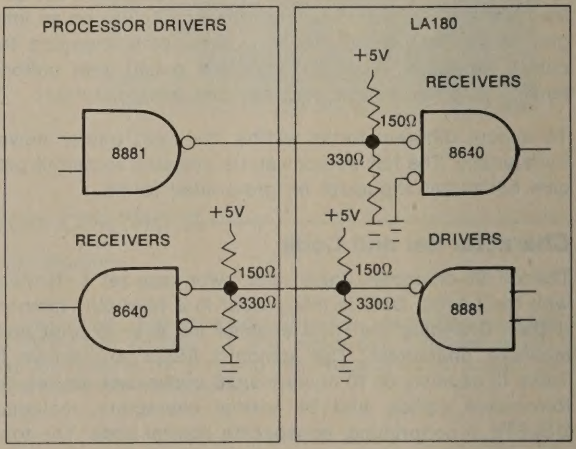
LA180 is generally connected via a local parallel interface to the host computer. Buffered serial interfaces (LAXX-NW for EIA RS232C and LAXX-NX for 20 mA current loop interconnection) are optionally available. They mount directly into LA180 and come complete with interface cabling. The standard parallel interface requires a BC11S-XX cable that plugs into a 40-pin Berg connector on the LA180 logic module. (Interface cable not supplied with terminal.) The cable can be any length up to 100 feet. The interface pin assignments for the host computer are shown in Table III. The diagram associated with Table II shows the recommended drivers and receivers for maximum noise rejection.

TABLE III — INTERFACE CONNECTOR PIN ASSIGNMENTS

Pin No.	Signal	Pin No.	Signal
A	Data Strobe	KK	+5V dc*
M	Data 1	B	Data Strobe Ret
K	Data 2	N	Data 1 Ret
U	Data 3	L	Data 2 Ret
P	Data 4	V	Data 3 Ret
C	Data 5	R	Data 4 Ret
E	Data 6	D	Data 5 Ret
S	Data 7	F	Data 6 Ret
SS	Parity*	T	Data 7 Ret
Y	Demand	TT	Parity Ret
PP	Busy*	Z	Demand Ret
EE	Paper Fault	RR	Busy Ret
HH	On Line	FF	Paper Fault Return
MM	+12V dc*	JJ	On Line Ret
LL	1200 baud*	W	+5V dc*
	DC Ground	UU	−12V dc*
	Chassis Ground		

*Optional signal at interface (jumper must be added).

LA180 Interface Diagram



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LA180 DECPRINTER I

ORDERING INFORMATION

Basic Models

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
LA180-PA	180 cps, 132-column printer Parallel input/output 115V ac 60 Hz operation	$3240	$3078	$2948	145 lbs.
LA180-PD	Same as -PA except 230V ac 50 Hz operation	3240	3078	2948	145 lbs.

Options — User Installed

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
LAXX-NW	EIA RS232C buffered serial interface	$525	$499	$478	5 lbs.
LAXX-NX	20 mA current loop buffered serial interface	525	499	478	5 lbs.
LAXX-KJ	Compressed font option	55	52	50	2 lbs.

OPERATIONAL SPECIFICATIONS

Printing Speed: 180 characters/second.

Number of Columns: 132

Printing Characters: 96-character ASCII set.

Control Characters: 32

Printing

Type: Impact, 7 by 7 dot matrix.

Vertical Spacing: 6 lines/inch.

Horizontal Spacing: 10 characters/inch; 16.5 per inch opt.

Single Line Skip: 32 ms

Slew Speed: 7.5″/second; 45 lines/second.

Carriage Return Time: 275 ms max.

Communications

Parallel transfer standard. Optional serial buffered EIA RS232C or 20 mA current loop.

MECHANICAL SPECIFICATIONS

Mounting: 1 free-standing unit.

Size: 33.2H by 27.5W by 20.0″D

Weight: 102 lbs. approximate.

Color: Off-white top with flat black base.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature: 10°C to 40°C (50°F to 104°F)

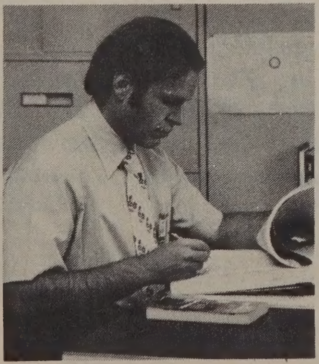
Relative Humidity: 10% to 90% noncondensing; maximum wet bulb 29°C.

Noise: 65 dB at 3 feet.

ELECTRICAL SPECIFICATIONS

Input Voltage and Frequency:
LA180-PA — 115V ac 60 Hz
LA180-PD — 230V ac 50 Hz

Heat Dissipation: 400W printing, 100W nonprinting.



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LA180 DECPRINTER I

SUPPLIES SPECIFICATIONS

Paper

Single-Part: 15-lb. paper min.; 0.010″ card stock max.

Multi-Part:
2-6 part (no cards except last copy). Max. thick. 0.020″. All parts of multi-part must be identical in width.

Note
NCR or 3M paper, up to 6-part, must use ribbon on top copy. First surface impact paper not recommended.

Continuous-feed, fan-fold business forms with 3- or 4-prong margin crimps on both margins (multi-part). Stapled forms are not recommended and may damage tractors and other areas of the machine. Dot or line glue margins acceptable.

Caution
Do not line glue both margins as air will not be able to escape and poor impressions will result.

Ribbon

Digital-specified nylon fabric, spool assembly 0.5″ wide by 60 yards.

SUPPLIES AND ACCESSORIES

To complement the installation, a range of custom tailored accessories is available either individually or in combination kits. A set of casters for the back legs allows the printer to be conveniently moved. To catch the printer paper, a wire frame paper basket is available. It attaches to the back of the printer, see illustration. Printer paper, multi-part forms, and ribbons are listed in the ordering information.

Paper and Forms: White, Fan-fold, Lined 14⅞ by 11″

Cat. No.	No. of Parts	Sheets or Multi-part Sets Per Box	Qty. 1-5		Qty. 6-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
36-09141-00	1	2400	**$32 box**	**$30 box**	**$30 box**	**$29 box**	40 lbs.
36-09141-01	2	1600	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
36-09141-02	3	1000	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
36-09141-03	4	750	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
36-09141-04	6	500	**45 box**	**43 box**	**43 box**	**41 box**	45 lbs.

Ribbon

Cat. No.	Description	Qty. 1-5		Qty. 6-Up		Shipping Weight
		Cat.	Cash	Cat.	Cash	
36-12153-01	½″ by 60 yards nylon. 12 ribbons per box.	**$65 box**	**$62 box**	**$62 box**	**$59 box**	3 lbs.

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LA180 DECPRINTER I

SUPPLIES AND ACCESSORIES (Cont'd)

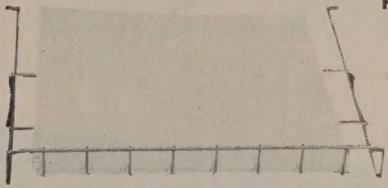
Supply Kit: LA180-S1

Kit includes:

2 #36-12153-01 Boxes Ribbons
2 #36-09141-00 Boxes Paper
1 #LAXX-KB Caster Set
1 #LAXX-NC Paper Basket

Casters

Ribbons



Paper Basket

Supply Kit: LA180-S2

Kit includes:

1 #36-12153-01 Box Ribbons
1 #36-09141-00 Box Paper
1 #LAXX-NC Paper Basket

	Qty. 1-2		Qty. 3-Up		
Cat. No.	Cat.	Cash	Cat.	Cash	Shipping Weight
LA180-S1	$210 each	$202 each	$200 each	$191 each	88 lbs.
LA180-S2	110 each	106 each	105 each	100 each	45 lbs.

Accessories

Casters: LAXX-KB
Set of casters for back legs of LA180 Terminals.

Paper Basket: LAXX-NC
Easily attaches to back of LA180 to collect printer paper. Measures 16W by 13H by 12″L.

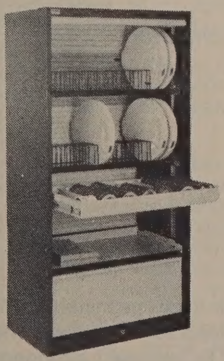
LA180 MAINTENANCE MANUAL

A comprehensive manual for the do-it-your selfer; provides installation, operation, theory, electrical and mechanical servicing information, engineering drawings, and an illustrated parts breakdown.

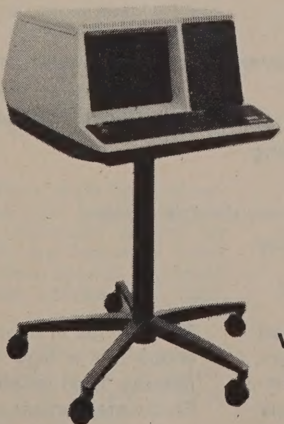
Cat. No.	Price
EK-LA180-MM-001	$17

	Qty. 1-2		Qty. 3-Up		
Cat. No.	Cat.	Cash	Cat.	Cash	Shipping Weight
LAXX-KB	$15 each	$14 each	$14 each	$14 each	1 lb.
LAXX-NC	25 each	24 each	24 each	23 each	1 lb.

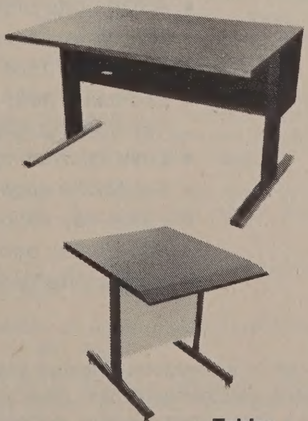
SEE OUR COMPUTER ROOM FURNISHINGS



Media Storage Cabinet
See page 106



Video Terminal Stands
See page 108



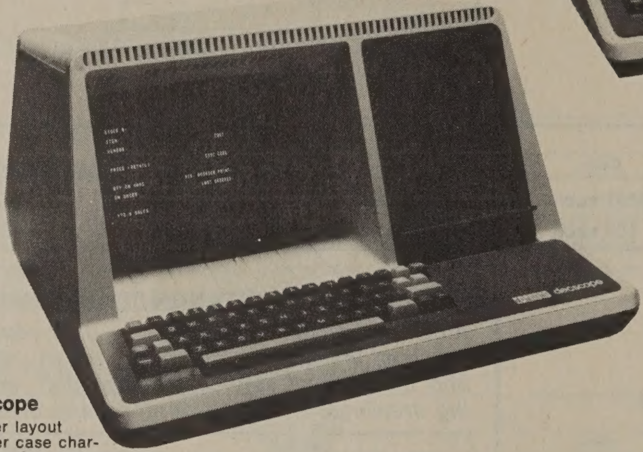
Tables
See page 108

DIGITAL offers an attractive line of media storage cabinets, video terminal stands and tables. Enhance your computer room's appearance and improve operating efficiency.

VT50/ VT52 DECSCOPE

VIDEO TERMINALS

VT52 DECscope has more features than the VT50: Keypad at right, upper and lower case alphabet, and advanced cursor control. Screen display capacity is 1920 characters (24 lines of 80 characters).



VT50 DECscope has a typewriter layout keyboard, upper case character display, and a screen-display capability of 960 characters (12 lines of 80 characters).

Features:

- *Price-competitive with teletypewriters.*
- *1920- or 960-character screen with twenty-four or twelve lines of 80 characters.*
- *Highly reliable keyboard featuring typewriter layout.*
- *Numeric function keyboard, VT52 only.*
- *Asynchronous data communication at individually switch-selected transmit and receive baud rates from 75 to 9600 baud.*
- *ASCII code utilized, plus additional commands through escape sequences.*
- *Extensive cursor controls.*
- *Horizontal tabs.*
- *Exclusive hold-screen mode prevents data loss regardless of host computer transmitting speed.*
- *Easy interfacing with 20-mA current loop or RS232C levels.*
- *Keystroke click for rhythmic typing.*
- *Three-key rollover protection.*
- *Full-duplex and full-duplex-with-local-copy modes.*
- *Printer interface option, VT52 only.*

DECscope is a character-oriented video terminal designed to replace electromechanical devices. Intended for asynchronous data communication systems, DECscope is compatible with most popular computers. DECscope is simple for operators to master, and noiseless for locations requiring silence. DECscope can reduce the high costs, both obvious and subtle, of teletypewriters and other video data terminals.

The savings in operating costs are most meaningful. DECscope has a high throughput compared to teletypewriter devices. High reliability is the key to improved throughput. Electromechanical maintenance is eliminated, and electronic maintenance is minimal. DECscope costs less to keep running, and it keeps running longer.

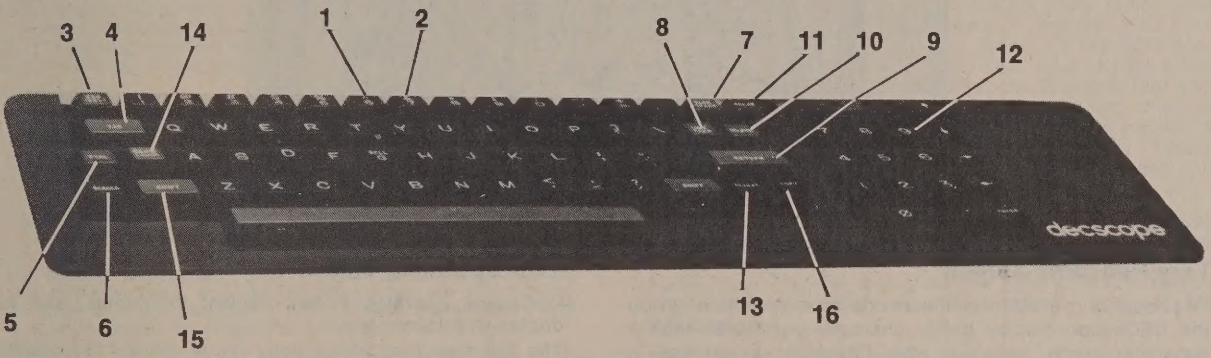
VT50/ VT52 DECSCOPE

TYPEWRITER KEYBOARD

The keyboard is built to a universally accepted standard, the office typewriter (ANSI standard). DECscope's key layout, stroke, and touch are familiar to any typist. See keyboard close-up illustration. Training and familiarization time can be kept to a minimum without sacrificing operating accuracy and speed.

In hospital and other sensitive locations, DECscope can operate in absolute silence. When silence is not required, operator can turn on an audible-response switch to produce a key-stroke click that encourages rhythmic, high-throughput keying, without the annoying noise of a teletypewriter.

DECscope also increases the operator's speed with three-key rollover protection to eliminate multiple-keying errors. Up to three keys can be depressed yet transmission will be correct if one of the first two keys typed is released before the third.

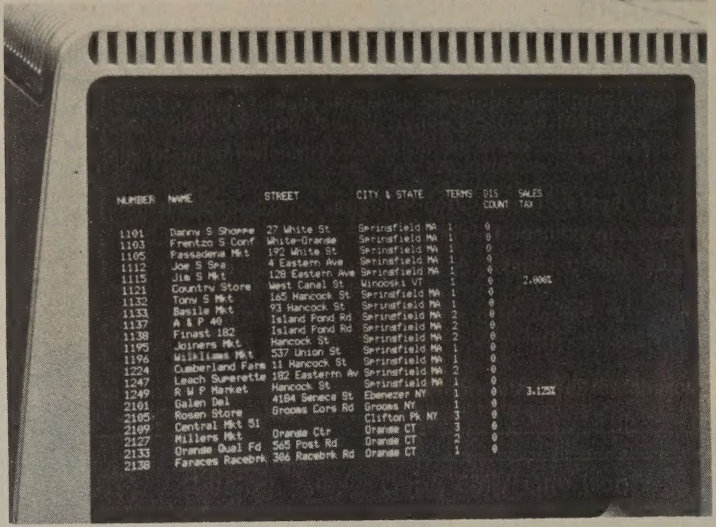


KEY AND CONTROL LOCATIONS AND FUNCTIONS

1. Labels can be placed here to identify 10 user-defined escape sequences called up by individual keys.
2. Ribbed lines cast in cabinet associate displayed escape sequence names with keys selecting them.
3. ESC (SEL) — Transmits the character ESC (escape) which, when received by the terminal from the host, introduces an escape sequence. If the terminal is in the local-copy mode or the host software echoes ESC back to the terminal, the ESC key initiates escape mode, indicating that the next character received is to be interpreted as a command rather than a character. Many software systems also assign a special meaning to the ESC character.
4. TAB — Moves cursor to the next tab stop; stops are positioned every eight spaces through 72nd space, then every space to 80th. No effect when cursor is at 80th.*
5. CTRL — Allows special characters to be transmitted. When control key is held down, the bit two of any character transmitted by the DECscope is sent as zero. These special characters are frequently used by system software, and some have special meanings to the DECscope when the host echoes them back or transmits them.
6. SCROLL — Functions only when DECscope is in hold-screen mode. Allows one new line to be displayed. With SHIFT key down, allows 12 or 24 new lines to be displayed, filling screen with new data.
7. BACK SPACE — Moves cursor one space left.*
8. LINE FEED — Moves cursor down one line. Also scrolls display after 12th or 24th line.*
9. RETURN — Moves cursor to left margin on same line.*
10. DELETE — Transmits a character which the host computer can use to institute a last-character erase sequence.
11. BREAK — Forces an interrupt of incoming messages when used with half-duplex system. Holds transmission line low as long as key is pressed. Included for compatibility with half-duplex systems.
12. NUMERIC KEYPAD (VT52 only) — In alternate-keypad mode (VT52 only), numeral, decimal point, and ENTER keys transmit unique escape sequences, distinguishing them from alphanumeric keys.
13. REPEAT (VT52 only) — Repeats, at rates up to 30 characters a second, any key held down simultaneously.
14. CAPS LOCK (VT52 only) — Generates all upper-case characters, plus numerals.
15. SHIFT — Generates all-upper-case characters, plus upper symbols on key caps.
16. COPY or PRINT (VT52 only) — Functions when external hard copy option installed. Controls printout operation.

*These special functions occur only when character is echoed or transmitted from host computer to DECscope.

VT50/ VT52 DECSCOPE



```
NUMBER  NAME             STREET          CITY & STATE     TERMS  DIS    SALES
                                                                 COUNT  TAX

 1101   Danny S Shoppe   27 White St     Springfield MA   1      0
 1103   Frentzo S Conf   White-Orange    Springfield MA   1      0
 1105   Passadena Mkt    192 White St    Springfield MA   1      0
 1112   Joe S Spa        4 Eastern Ave   Springfield MA   1      0
 1115   Jim S Mkt        128 Eastern Ave Springfield MA   1      0
 1121   Country Store    West Canal St   Winooski VT      1      0      2.000%
 1132   Tony S Mkt       165 Hancock St  Springfield MA   1      0
 1133   Basile Mkt       93 Hancock St   Springfield MA   1      0
 1137   A & P 40         Island Pond Rd  Springfield MA   2      0
 1138   Finast 182       Island Pond Rd  Springfield MA   2      0
 1195   Joiners Mkt      Hancock St      Springfield MA   2      0
 1196   Williams Mkt     537 Union St    Springfield MA   1      0
 1224   Cumberland Farm  11 Hancock St   Springfield MA   1      0
 1247   Leach Superette  182 Easterm Av  Springfield MA   2      0
 1249   R W P Market     Hancock St      Springfield MA   1      0
 2101   Galen Del        4104 Seneca St  Ebenezer NY      1      0      3.125%
 2105   Rosen Store      Grooms Cors Rd  Grooms NY        1      0
 2109   Central Mkt 51                   Clifton Pk NY    3      0
 2127   Millers Mkt      Orange Ctr      Orange CT        3      0
 2133   Orange Qual Fd   565 Post Rd     Orange CT        2      0
 2138   Faraces Racebrk  306 Racebrk Rd  Orange CT        1      0
```

Very Readable Screen

P4 phosphor is used for optimum character definition, giving the DECscope display better character resolution than a consumer-grade television set. Character brightness is operator-adjustable. The screen is recessed and tilted to avoid glare from overhead lighting. Because no filter covers the screen, it can be easily cleaned by the operator. However, for users with special applications, DECscope will accept colored filters.

Screen size is either 12 lines by 80 characters (upper case only plus numerics and punctuation) on the VT50 Series or 24 lines by 80 characters (full 96 ASCII character set) on the VT52 Series. The VT50 has a 5 by 7 dot matrix for character shapes while the VT52's matrix is 7 by 7. Excellent upper and lower case definition is achieved, see illustration.

The screen's 80 character per line format allows the exact display of FORTRAN or COBOL full-card images; thus the DECscope can take the place of a key punch and card reader for program entry.

A wide range of cursor controls is provided, including both incremental and extended-movement commands utilizing escape sequences. Up, down, right, and left movements, see Table I, plus 8-space tabbing are available. Individual characters, lines, or the full screen can be erased using simple commands (ESC J and ESC K).

Use of the extended-movement commands can greatly increase an operator's throughput in form-filling tasks, for example, because the host computer software can interactively position the cursor at the next answer required, based on previous answers.

Two Operating Modes

DECscope operates in two modes: full-duplex, and full-duplex-with-local-copy.

The full-duplex-with-local-copy mode allows the operator to display and verify each character as it is being keyed for transmission. This feature makes DECscope compatible with software written for half-duplex terminals. In the conventional full-duplex mode, the character is keyed to the host computer and can be echoed back for display.

Switch-selectable transmit and receive speeds are set individually to the same or different speeds.

Transmission and reception speeds can be 75, 110, 150, 300, 600, 1200, 2400, 4800, or 9600 baud.

TABLE I
MANUAL CURSOR CONTROL COMMANDS

Cursor Direction*	From VT52 Keypad	From Keyboard	Other Action
Up one line	▲	ESC A	No Scroll
Up one line		ESC I (VT52)	Scrolls down
Down one line	▼	ESC B (VT52)	No Scroll
Down one line		LF	Scrolls up
Right one column	➤	ESC C	No erase
Right one column		Space	Erases
Left one column	◀	ESC D (VT52)	No erase
Left one column		BS	No erase
Home		ESC H	To start of top line

*Where indicated, cursor direction movement is only applicable to VT52.

SCREENFILTERS — FOR VIDEO TERMINAL

Acrylic filters are available for use with DIGITAL's VT52 and VT50 Video Terminals. Filters serve to reduce excessive glare from overhead lighting. Filters are available in three color choices. Shipping Weight: .5 lbs.

Cat. No.	Color	Qty. 1-5		Qty. 6-Up	
		Cat.	Cash	Cat.	Cash
12-13195-00	Gray	$15 each	$14 each	$14 each	$13 each
12-13195-01	Amber				
12-13195-02	Green				

VT50/ VT52 DECSCOPE

Interface: Software

Basically DECscope will operate with software handlers written for teletypewriters or other video terminals. But as with any interactive device the unique operational features of DECscope must be carefully considered for the intended application. The following aspects are key:

1. *Transmission Mode* — Full-duplex or full-duplex with local copy operation. Asynchronous transmission.
2. *Word Length* — 7-bit data words, plus even or no parity. All outgoing characters are generated using even-parity protocol (a word is judged correct if it contains an even number of ones). A slide switch on the bottom of the DECscope enables the operator to select no parity where the usual parity bit is always in a mark condition. Odd parity, and space, can be obtained by moving a jumper wire.
3. *Variable Baud Rates* — By switch selection from 75 to 9600 baud operation is possible. However, word length varies depending on baud rate. At 75, 150 and higher, the word length is 10 bits while at 110 baud the word length is 11 bits.
4. *Character Display Format* — If upper and lower case display is mandatory then the VT52 terminal must be used since the VT50 terminal has upper case capability only (plus numerics and punctuation symbols). Also the VT50 can present 12 lines of characters where as the VT52 has 24 lines. Both have a display width of 80 characters.
5. *Command Responses* — How DECscope reacts to commands generated by the host computer is a fundamental consideration. For example, commands such as control codes, escape sequences, cursor position control, automatic screen erasing, and hold-screen modes are all received from the host computer in ASCII format. Table II and Table III document the respective codes and their actions.

Interface: Hardware

Two interfaces are available for DECscope, the 20 mA current loop and the EIA RS232C standard. The VT50 has, as a standard integral feature, a 20 mA interface. For systems requiring EIA compatibility, an optional, user-installed interface (BN50A-7F) may be ordered. The VT52 can be ordered with either a 20 mA or EIA interface. For later conversion, optional, user-installed interfaces are available to provide both EIA capability for 20 mA-equipped units and 20 mA capability for EIA-equipped units. Refer to DECscope option listings on page 30.

The 20 mA loop is optically coupled and provides sufficient gain for systems requiring more than 20 mA switching capacity. The current loop can be operated off-line to insure that it is functioning properly before system installation. DECscope is passive with this interface in that the host computer supplies the driving current. Generally the DECscope with this interface is used for data input applications where the terminal is located no more than one thousand feet from the host computer. The actual reliable working distance depends on the cable used, the electrical noise present at the installation, and the host computer circuitry. Typical assignments: inventory control, job status, computer console, nursing station, and educational systems.

DECscopes equipped with the EIA interface are commonly used for remote order-entry or order processing from any location that has access to a dial telephone network or leased line. Typical assignments: time-share terminals, credit checking, order entry, reservations, and program development.

TABLE II — COMMANDS FROM HOST COMPUTER

Character(s) and Octal Code(s)	Action Taken
BEL (007)	Sounds the audible alarm.
BS (010)	Moves the cursor left one position, unless it was at the start of a line to begin with.
TAB (011)	Moves the cursor rightward to the next TAB stop, unless the cursor was at the end of a line to begin with. (TAB stops are fixed in columns 9, 17, 25, 33, 41, 49, 57, 65, 73, 74, 75, 76, 77, 78, 79, and 80.)
LF (012)	Moves the cursor down one line — performs an upward scroll if the cursor was on the bottom line.
CR (015)	Moves the cursor to the start of the same line it was on.
ESC (033)	Serves as a signal that the following character is to be interpreted rather than displayed; ESC introduces multicharacter commands called "Escape Sequences."
Displayable Characters (041 to 176)	The character is displayed at the cursor position; then the cursor is moved right one column, unless it was at the end of a line to begin with.
Space (040)	Space (040) blanks the character at the cursor position and moves the cursor right.
NUL (000) and DEL (177)	The terminal does not respond to NUL or DEL, in order to be compatible with slower electromechanical devices that use these characters as filler.

TABLE III — ESCAPE SEQUENCE COMMANDS FROM HOST COMPUTER

Escape Sequences	Effect
ESC = (033 075) VT52 only	Enters alternate-keypad mode. In Alternate-keypad mode, keys on the numeric pad transmit unique Escape Sequences to distinguish them from similar keys on the main keyboard, and to invoke user-defined functions.
ESC (033 076) VT52 only	Exits alternate-keypad mode and returns to Numeric-keypad mode. (Alternate-keypad mode remains in effect until this command disables it.)
ESC A (033 101)	Moves the cursor up one line, unless it was already on the top line — does not perform a scroll.
ESC B (033 102) VT52 only	Moves the cursor down one line, unless it was already on the bottom line — does not perform a scroll.
ESC C (033 103)	Moves the cursor HOME: to the start of the it was already at the end of a line — does not erase the character at the old cursor position.
ESC D (033 104) VT52 only	Moves the cursor left one column, unless it was already at the start of a line — same as BS (010).
ESC H (033 110)	Moves the cursor HOME: to the start of the top line.
ESC I (033 111) VT52 only	Moves the cursor up one line — performs a downward scroll if the cursor was on top line.
ESC J (033 112)	Erases all data from the cursor position to the end of the screen.
ESC K (033 113)	Erases all data from the cursor position rightward on the same line.
ESC Y (033 131) VT52 only	Direct Cursor Addressing feature — moves the cursor to any specified position on the screen, regardless of where it was before. Format is: ESC Y Line Number Column Number Line Number is one character; octal code 040 to refer to the top line, 041 to refer to the second line, . . . 067 to refer to the bottom line. Column Number can legally range from 040 (left-most column) to 157 (right-most column). The cursor is moved to the specified column of the specified line.
ESC Z (033 132)	Requests terminal to identify itself. Terminal will respond with a three-character Escape Sequence unique to its own configuration.
ESC [(033 133)	Enters Hold-screen mode. In Hold-screen mode, data will not be scrolled off screen until operator requests it by striking Scroll key.
ESC (033 134)	Exits Hold-screen mode. (Hold-screen mode remains in effect until this command disables it.)

Printer Option VT52 Only The first three Escape Sequences perform the exact same functions as the COPY key:

ESC]	(033 135)	Print the Screen
ESC Λ	(033 136)	Enter Auto-Print Mode
ESC ___	(033 137)	Exit Auto-Print Mode
ESC V	(033 126)	Print Cursor Line
ESC W	(033 127)	Enter Printer-Controller Mode
ESC X	(033 130)	Exit Printer-Controller Mode

VT50/ VT52 DECSCOPE

Controlled Scrolling

To allow time for reading long messages coming in at high speeds, the operator or host computer can put DECscope into a hold-transmission mode by initiating ESC [(033 133). Cancellation of this mode is achieved by ESC / (033 134).

When the terminal enters the hold-screen mode, the current line or any subsequent line selected by the operator is displayed until a line feed occurs or the 80th character position is reached. When an LF (line feed) is received, it is not immediately processed but stored in the housekeeping portion of the terminal's memory. Receipt of any subsequent character will cause the terminal to transmit X-OFF (023). That character, and any others which may be received between that time and the time at which X-OFF (023) is interpreted by the host and transmission is stopped, will be stored in a 13-position overflow portion of memory.

If the operator, by pressing the SCROLL key, allows another line to be displayed, the line feed is processed, then the overflow characters are processed (displayed) until the next LF is encountered. If the overflow is exhausted without encountering an LF, the terminal transmits X-ON (021).

If the host fails to stop sending and the overflow area fills, the terminal will process the line feed and the characters in the overflow area regardless of hold-screen mode.

The Auxiliary Keypad on VT52

An advanced feature of the VT52 is the auxiliary keypad that operates in one of two modes. Software can place the terminal in a mode in which the keypad as well as the main keyboard's numeral keys can be used for data entry. If it is desired to distinguish between the typing of keys on the keypad and keys on the main keyboard, software can select a mode — Alternate Keypad Mode — in which each key on the keypad transmits a unique Escape Sequence. See Table IV.

Easier manual control of the cursor is facilitated by "arrow keys." If the codes transmitted by the "arrow keys" are echoed back to the terminal, they will cause the cursor to move one position in the direction the arrow points in. The CONTROL, SHIFT, and CAPS LOCK keys do not affect the codes transmitted by the keys on the auxiliary keypad, in either keypad mode.

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ENTER
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TABLE IV
KEYPAD COMMANDS VT52 ONLY

Typing the Key Labeled . . .	In Numeric-Keypad Mode, Transmits the Following Code(s)	In Alternate-Keypad Mode, Transmits the Following Code(s)
0	0	ESC ? p
1	1	ESC ? q
2	2	ESC ? r
3	3	ESC ? s
4	4	ESC ? t
5	5	ESC ? u
6	6	ESC ? v
7	7	ESC ? w
8	8	ESC ? x
9	9	ESC ? y
		ESC ? n
ENTER	CR	ESC ? M
(up arrow)	ESC A	ESC A
(down arrow)	ESC B	ESC B
(right arrow)	ESC C	ESC C
(left arrow)	ESC D	ESC D
(left blank key)	ESC P	ESC P
(center blank key)	ESC Q	ESC Q
(right blank key)	ESC R	ESC R

Printer Interface — VT52 Only

The VT52 Printer Interface Module, VTXX-KA, is a field-installable option available on all new VT52s and certain units already in the field. It provides a data path between the VT52 Video Terminal and a serial or parallel printer such as the LA35 or LA180.

When this option is incorporated, there is a COPY (or PRINT) key at the lower right corner of the main keyboard. Using this key, the operator can make the terminal output text to the printer in one of two ways. The two variations depend on whether the operator holds down the SHIFT key when the COPY key is typed. If the COPY key is pressed without the SHIFT key down, then the terminal will output the entire contents of the screen to the printer. If the COPY key is pressed while the SHIFT key is held down, then the terminal enters Auto-Print Mode. Auto-Print Mode allows a variable number of lines of text to be the output to the printer. Whenever the terminal gets a Line Feed command to move the cursor down one line, the line the cursor was on at the time will be the output to the printer. This will be true for as long as the terminal remains in Auto-Print Mode. To take the terminal out of Auto-Print Mode, the operator types the shifted COPY key a second time. None of these three uses of the COPY key cause any codes to be sent to the host computer.

The three commands which the operator can issue by using the COPY key can also be issued from the computer. To command the terminal to send text to the printer, the host sends the VT52 Escape Sequences ESC], ESC ∧ and ESC ___ (see Table III). There are two additional ways in which the host computer can operate the printer:

- By specifying individual lines to be printed, ESC V.
- By placing the terminal in a mode in which it sends the characters it receives to the printer instead of to the screen (Printer-Controller Mode ESC W, enter mode and ESC X, exit mode).

When the terminal receives ESC V from the host, it will output the entire contents of the line which the cursor is on to the printer.

If the printer has more than 80 columns, the columns to the right of the 80th column will never be used by the line-at-a-time PRINT commands, since it is impossible to construct a line on the screen of the VT52 with more than 80 columns. Many programs, however, will want to control the actions of the printer in more detail, without the "interpretive" activity of the VT52 (trimming blanks and inserting line delimiters). For example, the program may want to be able to print in all 132 columns of the printer, overprint lines, or send control codes to the printer. A program does this by placing the VT52 in Printer-Controller Mode. In Printer-Controller Mode, every character the VT52 receives will be passed directly to the printer without being converted or otherwise acted upon by the VT52. The VT52 becomes essentially a remote printer controller.

VT50/ VT52 DECSCOPE

Printer Interface — VT52 Only (Cont'd)

The characters ESC W, which the host sent to the VT52 to cause it to enter Printer-Controller Mode, are not passed to the printer. When the VT52 receives ESC X, which causes it to exit Printer-Controller Mode, the ESC will already have been sent to the printer. Instead of sending the X to the printer, the VT52 sends the character CAN (whose code is 030) to cancel the effect of the ESC. The action of the printer is not instantaneous and may lag behind data transmission from the host to the terminal. But in situations where information which has been requested to be printed might be destroyed or altered before it can be printed, the terminal will cease processing incoming characters. The terminal begins putting incoming characters in its Silo buffer, and transmits X-OFF to the host. When the necessary printing has been finished, the terminal will begin to process the characters in the Silo. When it has processed all the characters in the Silo, the terminal will send X-ON to the host to indicate that it is ready for more characters.

When the terminal is in Printer-Controller Mode, so that data flows through the terminal and out to the printer as it is received from the host, the terminal will use the Silo, and X-OFF and X-ON signals, to limit the data rate on the transmission line to a rate the printer can keep up with. Therefore, the maximum data rate for output to the printer via Printer-Controller Mode is the minimum of the baud rate between the terminal and the printer, and the baud rate between the terminal and host.

On the interface module itself, there is an 8-position rotary switch. The switch selects which of the interfaces (serial or parallel) will be used and, if the serial interface is selected, which baud rate will be used. Selectable serial baud rates are: 150, 300, 600, 1200, 2400, 4800, and 9600 baud.

The host cannot determine if the terminal operator has pressed the COPY key. Host software MUST support synchronization with X-OFF/X-ON (must suspend its transmission promptly upon receiving X-OFF and resume upon receiving X-ON), or else the Silo may overflow, interfering with the accuracy of the output.

Status Reporting

When VT52s and VT50s are used in the same computer system, software can send each terminal a command (ESC Z) to identify itself. The VT52 will automatically transmit a three-character Escape Sequence which identifies it as a VT52. The host thus determines which features can be used with the terminal presently attached. For example, if a printer option is attached to the VT52, the Escape Sequence ESC / M is transmitted to alert host to the presence of the printer.

The significance of the status reporting feature is that VT50s, VT52s and future VT models can be freely interchanged within a system, with the software responding correctly to each different type of terminal.

OPERATIONAL SPECIFICATIONS

Display	VT50	VT52
Format	12 lines by 80 char.	24 lines by 80 char.
Character matrix	5 by 7	7 by 7
Character size	.08 by .16″	.08 by .16″
Screen size	8.6 by 4.5″	8.6 by 4.5″
Character set	ASCII 64-char. (upper case, numeric, punctuation)	ASCII 96-char. (upper/lower case, numeric, punctuation)
Alphanumeric Keyboard		
Character set	ASCII 64-char. plus 32 control codes	ASCII 96-char. plus 32 control codes
Key layout	ANSI typewriter	ANSI typewriter
CAPS LOCK key	No	Yes
Numeric Keypad	N/A	10 decimal digits, decimal point, ENTER (CR) key, four cursor controls, three user-defined (blank) keys
Communications		
Interface	20 mA current loop, or EIA RS232C	20 mA current loop, or EIA RS232C
Code	USASCII extended by Escape Sequences	USASCII extended by Escape Sequences
Speed — Full-duplex (switch-selectable)	75, 110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud	75, 110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud
Speed — Full-duplex with local copy (switch-selectable)	110, 600, 1200, 2400, 4800, and 9600 baud	75, 110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud
Speed — Full-duplex split speeds (switch-selectable)	Transmission at 75, 150, 300 baud with reception at 600, 1200, 2400, 4800, 9600 baud	Transmission at 75, 150, 300 baud with reception at 600, 1200, 2400, 9600 baud
Cursor		
Type	Blinking underline	Blinking underline
Control	Up or down 1 line, right 1 character, home, tab, erase to line end, erase to screen end	Up or down 1 line, right 1 character, left 1 character, home, tab, erase to line end, erase to screen end, move to host computer commanded position

DESCOPE MAINTENANCE MANUALS

Comprehensive documentation that provides installation, operation, theory, electrical and mechanical servicing, and engineering drawings.

Cat. No.	For Model	Price	Shipping Weight
EKOVT50TM	VT50	**$8.00**	2 lbs.
EKOVT52MM	VT52	**10.00**	3 lbs.

VT50/ VT52 DECSCOPE

COMMON OPERATIONAL SPECIFICATIONS — VT50 and VT52

Audible Signals

Key Click: Switch-controlled.

Bell: Sounds (a) upon receipt of control character BEL.
(b) when keyboard input approaches right margin.

Operator Controls

Power On/Off, Intensity Control, Baud Rate Switch, Terminal Mode Switch, Key-Click On/Off, Even/No Parity.

Hold-Screen Mode

Allows operator to halt transmission from host, preserving data on display. Enabled/disabled by Escape Sequences.

Parity

Even or mark (no parity) switch-selectable. Odd or space possible with rewiring (jumper).

Page Overflow

Upward scroll.

ELECTRICAL SPECIFICATIONS

Line Voltage

100-126V or 191-238V, or 209-260V

Line Frequency

60 ±1 Hz or 50 ±1 Hz

Power Consumption

110 watts

Power Line Hash Filter

Low Leakage Balun Type

Overload Protection

Circuit Breaker

MECHANICAL SPECIFICATIONS

Dimensions

Height: 14.1″

Width: 20.9″

Depth: 27.2″

Minimum Table Depth: 17.7″

Weight: 44 lbs.

Operating Environment

DEC-STD-102
Class B Environment
10°C to 40°C (50°F to 104°F)
Relative Humidity 10% to 90%
Maximum Wet Bulb 28°C (82°F)
Minimum Dew Point 2°C (36°F)

Case Material

Injection-molded Noryl Thermoplastic Screen Phosphor is P4

ORDERING INFORMATION

Cat. No.	Description*	List	Cat.	Cash	Shipping Weight
VT50-AA	VT50 DECscope with 20 mA interface 115V ac 60 Hz operation	**$1450**	**$1378**	**$1320**	56 lbs.
VT50-AB	VT50 DECscope with 20 mA interface 230V ac 50 Hz operation	**1450**	**1378**	**1320**	56 lbs.
VT52-AA	VT52 DECscope with 20 mA interface 115V ac 60 Hz operation	**2200**	**2090**	**2002**	56 lbs.
VT52-AB	VT52 DECscope with 20 mA interface 230V ac 50 Hz operation	**2200**	**2090**	**2002**	56 lbs.
VT52-AE	VT52 DECscope with EIA interface 115V ac 60 Hz operation	**2200**	**2090**	**2002**	56 lbs.
VT52-AF	VT52 DECscope with EIA interface 230V ac 50 Hz operation	**2200**	**2090**	**2002**	56 lbs.

*Power cord and operator's manual provided with basic models.

Options

Cat. No.	For	Description	List	Cat.	Cash	Shipping Weight
VTXX-KA	VT52	Printer interface	**$240**	**$228**	**$218**	5 lbs.
BN50A-7F	VT50	EIA interface, 25′ cable	**72**	**68**	**66**	4 lbs.
BN52A-7F	VT52	EIA interface, 25′ cable	**66**	**63**	**60**	4 lbs.
BN52B-7F	VT52	20 mA interface, 25′ cable	**66**	**63**	**60**	4 lbs.
12-12376	VT50/52	Vinyl dust cover	**10**	**10**	**9**	3 ozs.

DEALING DIRECT
SAVES
YOU $$$

The Cat prices are generally about 5% less than List price. Cash prices are about 4% less than Cat. Generally 9% savings — in all! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See page 109 for details.

PAPER TAPE READER ACOUSTIC COUPLER

SERIAL PAPER TAPE READER — PRS01

The PRS01 is a small, portable paper tape reader that connects into the serial line of a system console or terminal. The reader provides a convenient and inexpensive method of loading paper tapes using the keyboard device codes of the terminal. It is designed primarily for loading maintenance and diagnostic programs. Because the reader produces a 20 mA serial asynchronous signal, it can be interconnected to a console device or terminal, or to any 20 mA current loop input if no console device is available.

A switch on the reader permits selection of either the console keyboard or the PRS01 as the computer input device. This lets the user switch back and forth between devices without having to disconnect the reader once it is installed. Operation is continuous with start and stop functions controlled by a front panel switch. Outside of this, the reader is similar in operation to the low-speed reader on an ASR teleprinter.

The PRS01 reads 8-level tapes with in-line feed hole. Two versions of the reader are available so that transfer rates of 300 baud or 2400 baud can be used. 115V ac or 230V ac models can be ordered, see table.

The entire reader, including a self-contained power supply, is housed in a small 2-piece plastic case. The back cover is removable for easy access to all sub-assemblies which are mounted inside the front cover.

OPERATIONAL SPECIFICATIONS

Feed Hole: In-line.

Tape Level: 8-level.

Transmission Rates:
PRS01-AA, PRS01-AB: 2400 baud (approx. 120 char/sec.).
PRS01-BA, PRS01-BB: 300 baud (approx. 22 char/sec.).

Interface: 20 mA current loop, passive, with Mate-N-Lok connector (12-09378-01).

Data: Data is in the form of a serial pulse string. Each character time consists of one "start" bit, eight "data" bits, and one "stop" bit. The "stop" bit (or "1") is current flowing.

System Connections

The PRS01 reader can easily be connected to computer systems with or without terminals. If the computer does not have a terminal, an adapter cable is normally used to connect the reader cables to the computer's terminal interface. Because the type of adapter cable needed depends on which computer terminal interface is used, it may have to be purchased separately.

If the computer has a terminal, then the standard interface cable supplied with the reader is used to interconnect the components. This interface cable uses a "Y" connection so that it can be inserted between the terminal and its interface.

PRS01

ELECTRICAL SPECIFICATIONS

Power Requirements:
PRS01-AA, PRS01-BA: 1.0A @ 117V ac (±10%), 50/60 Hz
PRS01-AB, PRS01-BB: 0.5A @ 230V ac (±10%), 50 Hz

MECHANICAL SPECIFICATIONS

Operating Temperature: 15°C to 32°C (59°F to 90°F).

Humidity: 20% to 80% (noncondensing).

Dimensions: 12W by 7½H by 5¼″D.

Weight: 6½ lbs.

Cat. No.	Baud Rate	Power Input	List	Cat.	Cash	Shipping Weight
PRS01-AA*	2400	115V ac 60 Hz	$750	$713	$683	9 lbs.
PRS01-AB*	2400	230V ac 50 Hz	750	713	683	9 lbs.
PRS01-BA*	300	115V ac 60 Hz	750	713	683	9 lbs.
PRS01-BB*	300	230V ac 50 Hz	750	713	683	9 lbs.

*Includes "Y" cable 10′ long, male and female loose Mate-N-Lok connectors for computer and terminal.

ACOUSTIC COUPLER — DF01-A

DF01-A Acoustic Coupler can be used to connect DIGITAL and other terminals to remote computing systems via ordinary telephone sets and public switched telephone network. Both 20 mA current loop and EIA RS232C interfaces are standard in the DF01-A.

Through slide switches, the user may choose either full- or half-duplex operation.

"Sound-seal" cushions on the DF01-A hold the telephone handset firmly in position and provide excellent acoustic shielding. Good durability is provided by an injection-molded case made of special impact-resistant material. All electronic circuitry, switches and connectors are mounted on a single printed circuit board.

Operating Modes: Originate only, in half- or full-duplex.

Data Rate: Up to 300 baud.

Receiver Sensitivity: −35 dBM in acoustic mode.

Frequencies:

	Send	Receive
Mark	1270 Hz	2225 Hz
Space	1070 Hz	2025 Hz
Frequency Stability	0.3%	0.4%

Modulation Technique: Audio Freq. — Shift Keyed (AFSK).

Transmit Power Level: −21 dBM ±3 dBM.

Line Coupling: Acoustic coupling to telephone line.

Interface: 20 mA teletype levels or EIA RS232C (both available on the same unit; both outputs can be used simultaneously if desired).

Compatibility: Used with remote terminals (teleprinter, typewriter, CRT display, plotter, card reader) to provide information transfer to/from a Bell 103A2 (or equivalent) dataset. Cannot be used with 230V 50 Hz, nor is it compatible with European modems.

Controls and Indicators: Power ON/OFF. Full-duplex/half-duplex (slide switch). Carrier ON indicator light.

Cables: Supplied w/8′ cable equipped with Mate-N-Lok connector at terminal end for connection to terminals equipped with DEC compatible 20 mA interfaces. A cable should be ordered (DEC No. BC05D-25) to connect the DF01-A to terminals already equipped with EIA interface and cable.

MECHANICAL SPECIFICATIONS

Operating Temperature: 0°C to 60°C (32°F to 140°F).

Size: 7.5W by 3H by 12″L. **Wt:** 6 lbs. **Mounting:** Table case.

ELECTRICAL SPECIFICATIONS

Power Requirement: 115V 60 Hz (less than 10W).

Cat. No.	List	Cat.	Cash	Shipping Weight
DF01-A*	$760	$722	$692	8 lbs.

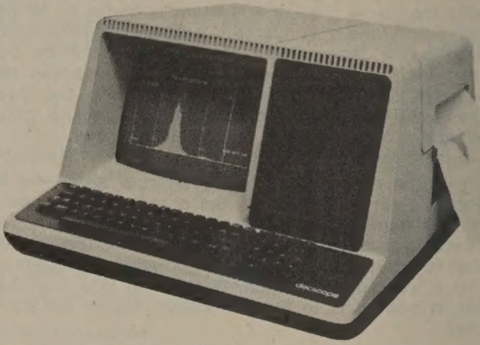
*Operators manual supplied with each unit.

digital
DIRECT SALES CATALOG

VT55 DECGRAPHIC SCOPE

GRAPHIC TERMINAL WITH COPIER OPTION

- *Upper and Lower Case Text.*
- *Switch Selectable Transmission Rate (75 to 9600 baud).*
- *Can Interface to any CPU; Serial ASCII Transmission.*
- *A 19 Button Keypad for Directing Cursor Movement and Numerical Entry Applications.*
- *Upward and Downward Scrolling.*
- *Electrolytic Copier Option.*
- *Hardcopy Output of both Alphanumerics and Graphics.*
- *Universally Accepted Standard Typewriter Keyboard.*
- *Choice of Interface and Cable to Host Device; 20 mA Current Loop, or EIA RS232-C.*
- *Direct Cursor Addressing Capability in Alphanumeric Mode.*
- *Generation of User Defined Codes from the Keyboard.*
- *A Repeat Key on the Keyboard.*
- *25 Seconds per Copy.*
- *Hardcopy can be by Keyboard Button Selection or Under Program Control.*



The VT55 is an on-line interactive CRT terminal that offers waveform graphics — a new and significant capability which meets the needs of a variety of applications. Two graphs of 512 data points each can be displayed with a screen resolution of 512x by 236y. These graphs can be in point-plot or histogram (shaded) format. Graph markers (20-point vertical lines) are available (one per data point) to facilitate data editing and graph generation. In addition, the VT55 allows simultaneous display of any combination of text and graphics. It can hold up to 1920 characters in 24 lines of an 80 characters-per-line matrix. The 24th line of text is positioned below any graphs to facilitate labeling the x axis.

To complete the picture, a user can take a permanent record of a display image with the VT55's optional hard-copy unit. By simply pressing a specified key, the VT55 supplies a hard copy reproduction of the display screen for both characters and graphs.

The display of alphanumeric and graphic data is performed by the raster scan method. Raster scan infers that the beam of the cathode ray tube is swept completely across the phosphor surface of the tube 50 or 60 times (depending on the power line frequency) in a second. Information, generated via the memory, turns the beam on and off, intensifying dots on the phosphor at the proper time to produce characters and graphics on the video screen. This is basically the same method used by consumer television sets.

For most applications, the VT55 will be interfaced to a host computer and operated in the full-duplex communication mode. Data transmitted by the VT55 is received by the host computer. Data received by the VT55 is determined solely by the host computer. ASCII 96-character set plus 32 control codes can be transmitted.

The VT55 is capable of sending and receiving at baud rates from 75 to 9600 bits per second. Data is sent in serial digital format for the 20 mA current loop interface models. The EIA interface models allow the use of the VT55 with RS232-C signals.

Alphanumeric Mode

In the Alphanumeric mode, data received via the serial line input is stored in the alphanumeric memory and printed as characters, numerals, and symbols on the screen if the code represents a printable character.

Received printable symbols are displayed on the video screen in a 24-horizontal line by 80-vertical column format. Each character is displayed as a 7 by 7 dot matrix; the matrix size is approximately 4.0mm by 4.0mm. Character placement on the screen is controlled by the alphanumeric cursor. The cursor is a blinking, underlining line that indicates the screen position in which the next received character is to be placed. When receiving a new character, the cursor automatically increments to the right. The cursor may also be shifted around the screen by receipt of alphanumeric cursor control commands or the auxiliary keypad.

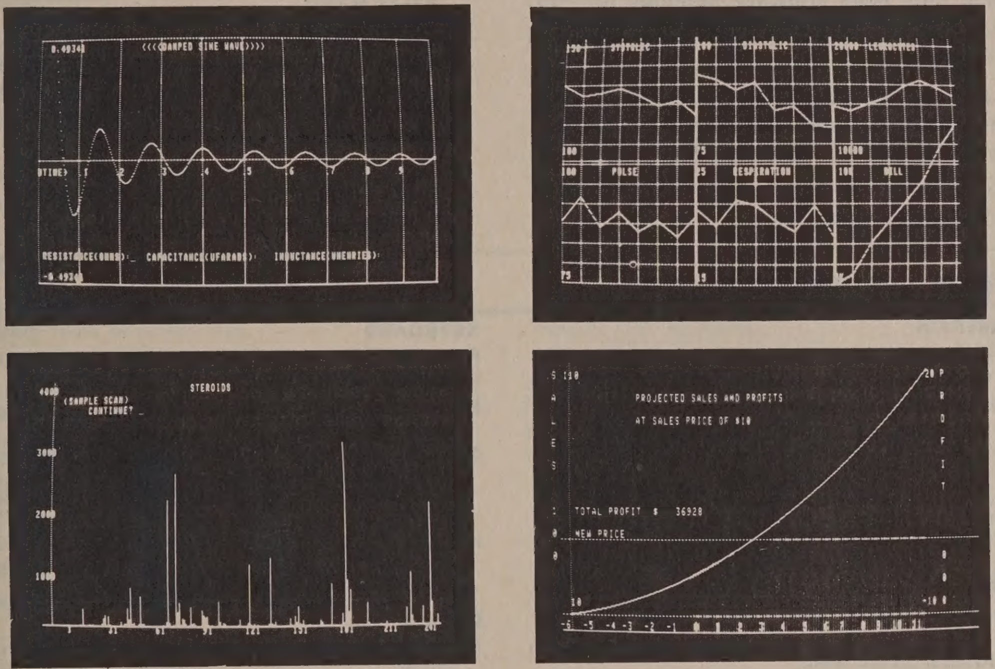
Graphics Mode

Graphics mode performs in essentially the same way as Alphanumeric mode with regard to character font, control codes, etc. The only difference is that the subset of 32 lowercase characters is replaced by a set of 30 special characters to extend the capability of the terminal in printing equations and fractions and plotting line graphs.

When the VT55 is in the Graph Drawing mode, incoming digital data, aside from the control codes, is treated as graph plotting information. This data represents Graph Drawing mode instructions and data points. The VT55 can plot two 512-point graphs, graph 0 and graph 1, each represented as a line graph or histogram. Vertical and horizontal lines that span the viewable screen area may be displayed anywhere in the viewable area of the screen. These lines can be combined to form grids to aid in labeling values on the graphs. The VT55 has graph markers as an additional graph feature. These are short vertical markers useful in defining important features on the graph. All graph features of the VT55 are individually controllable by the programmer. All data is stored in a separate graph memory. Keeping graph information separate from the alphanumeric information storage allows superposition of the alphanumeric and graph information and allows the removal of one type of information without affecting the other. For example, a label could be printed over a graph and then removed without affecting the graph. See figures on p. 33 for some typical graph capabilities.

VT55 DECGRAPHIC SCOPE

SAMPLE DISPLAY GRAPHS*


0.4934
<<<<DAMPED SINE WAVE>>>>
TIME>
1
2
3
4
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RESISTANCE(OHMS): _
CAPACITANCE(UFARADS):
INDUCTANCE(UHENRIES):
-0.4934
150
SYSTOLIC
100
DIASTOLIC
20000
LEUKOCYTES
100
75
10000
100
PULSE
25
RESPIRATION
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BILL
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5
4000
(SAMPLE SCAN)
CONTINUE? _
STEROIDS
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PROJECTED SALES AND PROFITS
AT SALES PRICE OF $10
TOTAL PROFIT $ 36928
NEW PRICE
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-10
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11

*Apparent distortion of close-up photo of CRT is due to curved surface of screen.

Graphics Mode (Cont'd)

The VT55 has an ensemble of nine graph commands which permit loading of individual points on the two graphs and loading and clearing of individual markers, vertical lines, and horizontal lines. The user may choose to blank this data from the screen, but hold the data in the internal graph memory for later viewing. All graph memory may be cleared with one instruction when desired.

Copier

The optional copier allows the user to make a hard copy duplicate of the video screen. The paper copy includes the displayed graphs as well as the alphanumeric characters. The copier is contained within the VT55 cabinet and the paper output emerges from the right side of the terminal. Upon command, the VT55 generates a hard copy of the display on the screen. Using a scanning technique, the terminal generates the image of the display in about 25 seconds. The display image is approximately 3H by 7½"W. As the copier uses rolled paper, many lines of text and graphs may be formatted on a standard letter-size sheet of paper. The roll is 8½"W by 100'L. The copier's scanning technique consists of scanning an electrode across a surface of special recording paper in exactly the same pattern as the raster scan on the VT55 screen. An electrode on the opposite face of the paper receives a voltage from the VT55 microprocessor in conjunction with the image to be recorded. The potential across the two electrodes causes a current to pass through the recording paper and actually plates metal from one of these electrodes onto the paper to form a dark point.

Keyboard

The VT55 keyboard is compatible with ANSI standard typewriter keyboard. This keyboard layout is similar to the layout found on an office typewriter, rather than on a keypunch machine. It contains the keys that generate the 96-character set of ASCII and a control key for the generation of the 32 control codes. Unique VT55 function keys are on the keyboard as well. See Operational Specifications for details of other keyboard features.

?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

VT55 DECGRAPHIC SCOPE

Software

The following high level software facilities are currently available under the following PDP-11 operating systems and languages.

- *RT-11, a high performance, real-time operating system designed for dedicated single-user or foreground/background applications.*
- *VT55 support under RT-11 is available as follows — RT-11/FORTRAN Extensions*
  RT-11 BASIC
  FOCAL/RT-11
- *RSX-11M, a multi-processing real-time system designed for a wide range of applications where many tasks must be monitored and controlled concurrently.*
- *The VT55 is supported by FORTRAN using the same subroutine calls and functions as the RT-11 version.*

OPERATIONAL SPECIFICATIONS

ALPHANUMERICS

Character Lines: 24

Character Columns: 80

Control: Blinking alpha cursor.

Character Set: 96-character upper and lower case ASCII subset plus 32 control characters and special graphic characters.

Special Features: Upward and downward scroll, bell, erase, erase, tabulate, cursor control, character on a line.

Character Format: 7 by 7 dot matrix.

GRAPHICS

Resolution: 512 horizontal by 236 vertical points.

Graphs or Histograms: Two single-valued functions of x, each individually controlled.

Grid: 512 vertical lines and 236 horizontal lines, each individually controlled.

Graphic Marker: 512/graph, total of 1024. Each graphic marker is individually controlled.

Special Features: Individual blanking and unblanking of all graphic features, clear all graphics.

Linearity: ±½ point.

USER CONTROLS

Intensity: Variable to adjust screen brightness.

Parity: Even, odd or non parity switch selectable.

Power/Logic Reset: Turns line voltage on and off and resets unit to Alphanumeric mode.

KEYBOARD

Format: ANSI x 4.14-1971 standard typewriter keyboard.

Keyclick: Audible feedback on each keystroke.

Error Correction: Three-key rollover to reduce errors caused by fast typing.

Special Keys: Extra control keys for special and commonly used control functions include ESC, TAB, SCROLL, BACKSPACE, BREAK, LINE FEED, RETURN, COPY, REPEAT.

Keypad: 19 button keypad efficiently designed for entry of numeric data plus special user defined codes may be generated with special Terminal mode.

COPIER

Image Copied: Display on screen less the alphanumeric cursor.

Time/Print: Approximately 25 seconds/copy.

Copy Size: Approximately 3H by 7½″W.

Paper Roll Size: 120′L by 8½″W.

Character Format: 7 by 7 dot matrix.

Graph Field: 512 points horizontal by 236 points vertical.

User Controls: Variable character width adjustment.

Baud Rate/Interface Mode: Allows choice of baud rate, full-duplex, full-duplex with local copy and local mode with rotary switches.

Hold Screen Mode: Allows interruption of data transmission for extended display viewing.

Terminal Identifier: Terminal will respond with ESC/E when receiving ESC/Z.

COMMUNICATIONS SPECIFICATIONS

INTERFACE

Type: 20 mA current loop or EIA RS2326 interface.

SPEED

Full-Duplex: 75, 110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud.

Full-Duplex with Local Copy: 110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud.

Full-Duplex, Split Speeds: Transmission at 75, 150, 300, or 4800 baud with reception at 110, 600, 1200, 2400, 4800, or 9600 baud.

TRANSMISSION

10-Bit Length: 75, 150, 300, 600, 1200, 2400, 4800, and 9600 baud.

11-Bit Length Parity: 110 baud only. Generated on transmission as even parity or a mark. (No parity is switch-selectable.) Parity is not checked on reception.

SUPPLIED CABLE LENGTH

20 mA Model: 25′ max. length 1000′.

EIA Model: 25′ max. length 50′.

SCREENFILTERS — FOR VIDEO TERMINAL

Acrylic filters are available for use with DIGITAL's VT55 Graphic Terminal. Filters serve to reduce excessive glare from overhead lighting. Filters are available in three color choices.
Shipping Weight: .5 lbs.

Cat. No.	Color	Qty. 1-5		Qty. 6-Up	
		Cat.	Cash	Cat.	Cash
12-13195-00	Gray	$15 each	$14 each	$14 each	$13 each
12-13195-01	Amber				
12-13195-02	Green				

VT55 DECGRAPHIC SCOPE

MECHANICAL SPECIFICATIONS

SYSTEM WEIGHT
With Copier: 57 lbs.
Without Copier: 49 lbs.

CABINET DIMENSIONS
Height: 14.1″
Width: 20.9″
Depth: 27.2″
Minimum Table Depth: 17.7″

VIDEO DISPLAY
Size: 12″ diagonal
Active Screen Size: 8 by 5.0″
Method: Raster scan, roll-free
Phosphor: P4

ELECTRICAL SPECIFICATIONS

POWER REQUIREMENTS
Noncopier Unit: 185W of power max.
Copier Unit: 300W of power max.
INPUT: 115V ac 60 Hz

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE

Operating	
With Copier	15°C to 32°C (59°F to 90°F)
Without Copier	10°C to 40°C (50°F to 104°F)
Nonoperating	−40°C to 66°C (−40°F to 151°F)

HUMIDITY (NONCONDENSING)

Operating	
With Copier	20 to 80%
Without Copier	10 to 90%
Nonoperating	0 to 95%

ORDERING INFORMATION

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
Basic Model (without Copier)					
VT55-EA	Graphic terminal. 20 mA current loop interface. 115V ac 60 Hz	**$2750**	**$2613**	**$2499**	61 lbs.
VT55-EE	Graphic terminal. EIA RS232-C interface. 115V ac 60 Hz	**2750**	**2613**	**2499**	61 lbs.
Models with Copier					
VT55-FA*	Graphic terminal with copier. 20 mA current loop interface. 115V ac 60 Hz	**3995**	**3795**	**3635**	70 lbs.
VT55-FE*	Graphic terminal with copier. EIA RS232-C interface. 115V ac 60 Hz	**3995**	**3795**	**3635**	70 lbs.

*A VT50 Series Copier User's Manual (EK-VT50-0P-001) is supplied with these models.

VT55 COPIER PAPER

Sensitized paper for use with DIGITAL's electrolytic copier. Each roll of white paper is 8½″W by 100′L. A new anode is supplied with each roll of paper. Paper is supplied by the box. Note that the shelf life of the paper is six months. Copier paper remains usable for one month once it is in the copier unit.

		Cat.		Cash		
		Quantity		Quantity		Shipping Weight
Cat. No.	Description	1-11	12-Up	1-11	12-Up	
VT50K-03	3 rolls paper 3 anodes	**$24 box**	**$23 box**	**$23 box**	**$22 box**	4 lbs.
		1-3	4-Up	1-3	4-Up	
VT50-12	12 rolls paper 12 anodes	**$96 box**	**$91 box**	**$92 box**	**$87 box**	16 lbs.

LSI-11 AND PDP-11/03

Large Scale Integration technology, implemented by MOS circuitry, has made it possible to dramatically reduce the size, cost, and weight of computer-based systems. Reliability and maintainability are greatly improved over non-LSI systems.

LSI allowed DIGITAL to package on a single 8.5 by 10″ (quad height) pc board an entire central processor, 4K of dynamic RAM memory and their related input/output control features. Expanded to a complete system which can be supplied as a PDP-11/03 (with options), LSI allows the CPU function plus a memory of 32K by 16-bit words, plus two systems-oriented input/output functions such as a serial line unit or an instrument bus — and a power supply — to be mounted in an enclosure no bigger than 19 by 3.5 by 13″. LSI technology opens up new avenues for imaginative system development. Take advantage of them. . . .

BASIC PROCESSOR-MEMORY CONFIGURATIONS

There are four combinations of RAM memory and LSI central processor functions designated as basic configurations. These are cataloged as KD11-F, KD11-R, PDP-11/03-EA and PDP-11/03-KA. All have the following features:

- 16-bit MOS, LSI central processor
- Parallel I/O bus port
- PDP 11/40 instruction set
- DMA transfer rate of 833K words per sec.
- Power-fail/auto restart
- Vectored interrupt
- Real-time clock input
- Octal debugging routine in microcode
- ASCII console routines in microde
- Microcode bootstrap routine
- Expandable arithmetic capabilities
- Word or byte processing

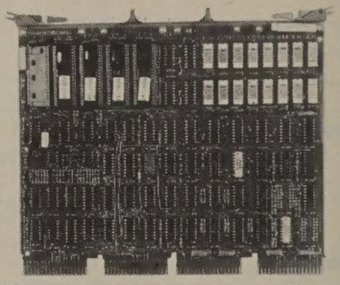
A variety of optional interface modules, expansion memory modules, mounting hardware, power supplies etc. can be ordered to complement the basic configurations. Not all options apply to all configurations and options for one basic configuration may be standard on another. Following are the details of each basic configuration.

KD11-F BASIC PROCESSOR WITH 4K RAM MEMORY

The KD11-F is contained entirely on one 8.5 by 10″ (Quad-height) pc board. The 4K RAM memory is 4096 words by 16 bits implemented by dynamic MOS LSI. A memory register addresses all onboard memory plus expansion memory up to 32K words or 64K bytes.

Memory refresh is executed by microcode. However, where interrupt latency, due to the microcode refresh functions, cannot be tolerated, refresh option REV11-A, or -C should be ordered. This option is described in detail elsewhere in this section.

Power requirements for KD11-F are +5V dc ±5% at 1.8A (2.4A max.) and +12V dc ±3% at 0.8A (1.1A max.). The H780-H supply described elsewhere in this section can provide the necessary power and control functions. Note if H780-H is **not** used, a KPV11 Power Failure/Line Time Clock module (or equivalent) must be used for correct power control for the KD11-F. Temperature Range: 5°C to 50°C (41°F to 122°F). Relative Humidity: 10% to 95% (no condensation). Maximum Air Temperature Rise Across Module: 7°C (12.5°F).



KD11-F

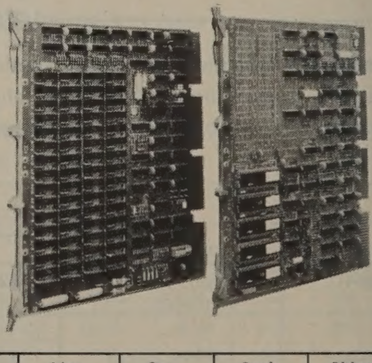
Cat. No.	List	Cat.	Cash	Shipping Weight
KD11-F*	$990	$941	$901	15 lbs.

*Prices shown include a ZJV01-RB literature and diagnostic package.

KD11-R BASIC PROCESSOR WITH 16K RAM MEMORY

The KD11-R has two 8.5 by 10″ (quad-height) pc boards to contain the central processor functions and the MOS LSI dynamic memory chips. Memory size is 16K words by 16-bits. A memory register addresses the KD11-R's internal memory plus expansion memory up to 32K words or 64K bytes. The memory refresh function is not by microcode from the central processor but is an independent function. Thus the refresh capability of Option REV11-A or -C is not applicable to this configuration. Note illustration shows the two boards of this configuration with optional arithmetic expansion IC package KEV11 installed (lower left corner of right-hand board).

Power requirements are +5V dc ±5% at 2.7A (4.1A max.) and +12V dc ±3% at 0.8A (1.2A max.). The H780-H power supply described elsewhere in this section can provide the necessary power and control functions. Note if H780-H is **not** used, a KPV11 Power Fail/Line Time Clock Module (or equivalent) must be used for correct power control for the KD11-R. Temperature Range: 5°C to 50°C (41°F to 122°F). Relative Humidity: 10% to 95% (no condensation). Max. Air Temperature Rise Across Module: 7°C (12.5°F).



Cat. No.	List	Cat.	Cash	Shipping Weight
KD11-R*	$2490	$2366	$2266	16 lbs.

*Prices shown include a ZJV01-RB literature and diagnostic package.

LSI-11 AND PDP-11/03

PDP-11/03 PACKAGED MICROCOMPUTER

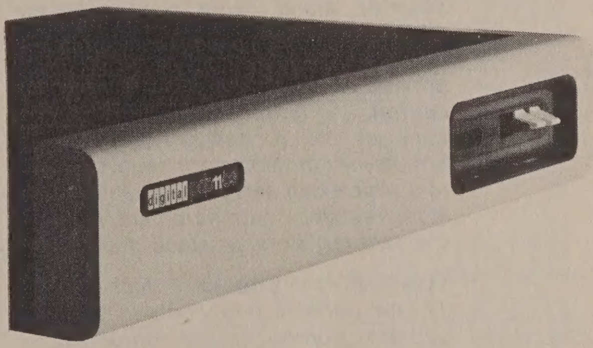
- *PDP-11/03-EA with 4K RAM Memory*
- *PDP-11/03-KA with 16K RAM Memory*

The PDP-11/03 is an enclosed combination of the LSI-11 modules and accessories. It comprises a 19″-rack mountable enclosure measuring 3½ by 19 by 13″, an H9270 backplane and card-guide assembly, plus a central processor and RAM memory. An H780-H power supply, which includes indicators, switches and a dual-fan assembly, is incorporated in the enclosure. Input voltage required is 90-132V ac (47-63 Hz). Max. Power Consumption: 210 watts at full load.

The enclosure has a removable front panel (pop panel). It can be easily removed to allow front access to the modules. The power supply indicator/switch panel (at right) does not detach with the front panel so remains functional during servicing. Temperature Range: 5°C to 50°C (41°F to 122°F). Humidity: 10% to 90% (no condensation).

Two basic congurations of PDP-11/03 can be ordered: **PDP-11/03-EA** which has a 4K RAM memory and the central processor function on one quad-height board. This leaves room in the enclosure for up to six double-height modules. Where interrupt latency cannot be tolerated, an external refresh option REV11-A or -C should be specified (one double-height board).

PDP-11/03-KA which has a 16K RAM memory. The central processor and memory are on two quad-height boards. The enclosure can, therefore, contain up to four more double-height modules. No external refresh option is required with this configuration unless other optional memory requires refresh.



Cat. No.	RAM	List	Cat.	Cash	Shipping Weight
PDP-11/03-EA*	4K	$1995	$1895	$1815	42 lbs.
PDP-11/03-KA*	16K	3495	3320	3180	45 lbs.

*Prices shown include a ZJV01-RB literature and diagnostic package.

MICROCOMPUTER HANDBOOK

The Microcomputer Handbook is our answer to the question, "Where can I find the answers to everything I've always wanted to know about the LSI-11, but didn't know where to look." Included are detailed chapters on the processor, options, installation, software, operating systems, peripheral devices, programming, maintenance and much, much more. The text covers the full range of LSI-11 systems from the LSI-11 board set to the PDP-11/03 microcomputer to the PDP-11V03 disk based microcomputer system. Truly, everything you want **and need** to know about the LSI-11 microcomputer is found between the two covers of this handbook!

LSI-11 AND PDP-11/03

TECHNICAL DESCRIPTION

BASIC PROCESSOR-MEMORY CONFIGURATIONS

The 16-bit central processor functions are contained in four silicon gate, N-channel, metal oxide semiconductor (MOS), large-scale integration (LSI), integrated circuit chips. These chips provide all instructions, decoding, bus control, and arithmetic/logic unit functions of the processor. The central processor contains eight general registers which can serve as accumulators, index registers, autoincrement/autodecrement registers, or stack pointers.

The LSI-11 bus *is a high-speed, 38-line parallel bus containing data, address, control and synchronization lines. Sixteen lines are used for time multiplexing of data and addresses. All data and control lines are bidirectional, asynchronous, open-collector lines capable of providing a maximum parallel data transfer rate of 833K words per second under direct memory access operation.*

The basic instruction set *has more than 400 powerful PDP-11/40 instructions. There are no separate memory, I/O, or accumulator instructions. Thus the user can manipulate data in peripheral device registers as flexibly as in memory registers.*

Extended instruction and floating-point instruction *options provide fixed-point multiplication, division, and multiple shifting in single-precision arithmetic as well as floating-point addition, subtraction, multiplication and division. Order option KEV11, a plug-in chip.*

Single-level, vectored, automatic priority interrupt *provides for user-implementation of a priority-structured I/O interrupt system. Devices electrically closest to the microcomputer module receive highest priority, for either DMA or programmed I/O transfers. (DMA devices have a higher priority than programmed I/O devices). This structure allows nesting of interrupts to as many levels as there are devices connected to the LSI-11 bus. Upon receipt of an interrupt grant, the device directs the processor to an interrupt vector location which contains the starting address of the device interrupt service routine and the new processor status word.*

Real-time clock input signal line *functions as an external interrupt line. When connected to a frequency source, it can serve as a real-time processor. interrupt. A jumper on the microcomputer module enables or disables this highest priority interrupt function.*

Asynchronous operation *of all system modules permits each to function at its highest possible speed.*

Power fail/autostart *provides jumper-selective restart through a power-up vector, a defined location, or an octal debugging technique (ODT) microcode.*

ODT/ASCII console routine/bootstrap *all are resident in microcode to provide automatic entry into the debugging mode, replacement of conventional programmers' panel lights and switches with any terminal device generating standard ASCII codes, and the ability to automatically commence operation through resident bootstrap routines.*

Word or byte processing *provides very efficient handling of 8-bit characters without the need to rotate, swap, or mask.*

RAM semiconductor memories *are dynamic MOS LSI implemented. They require little operating power, allow a fast access time and are refreshed automatically in a manner which is transparent to the system. A core memory option (MMV11-A) is available but is recommended only as an expansion element for existing core-based systems.*

OPERATIONAL OPTIONS — REV11-A, REV11-C

- *Refresh*
- *Diagnostic*
- *Bus Termination*

This external refresh module is used when the dynamic RAM memory refresh implemented in the KD11-F basic microcomputer module or PDP-11/03-KA microcomputer microcode is disabled. This option eliminates an interrupt latency which can exist when operating with the microcode refresh functions. Also included are bootstraps for the resident paper tape absolute loader, and CPU and memory diagnostics. A 120-ohm bus termination is included with Option REV11-A only. REV11-A must not be used in systems where other DMA devices are on the I/O bus. Use REV11-C with TEV11 120-ohm terminator module in these applications.

Option is a double-height (8.5 by 5″) pc board.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
REV11-A	120-ohm Termination	$320	$304	$291	2 lbs.
REV11-C	No Termination	320	304	291	2 lbs.

ARITHMETIC FUNCTION PACKAGE — KEV11

Extended instruction and floating point instruction Option KEV11 provides fixed-point multiplication, division, and multiple shifting in single-precision arithmetic, as well as floating-point addition, subtraction, multiplication, and division. Furnished as an IC package, it plugs into a socket in the basic microcomputer modules and PDP-11/03 microcomputers.

Cat. No.	List	Cat.	Cash	Shipping Weight
KEV11	$190	$181	$173	1 lb.

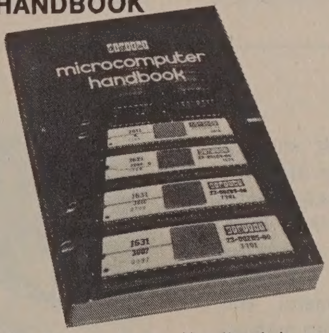
LOGIC HANDBOOK

logic handbook
20

The Logic Handbook, known as the computer industry's "Bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

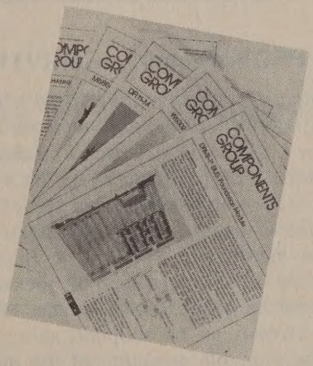
For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook!

MICROCOMPUTER HANDBOOK



The Microcomputer Handbook is our answer to the question, "Where can I find the answers to everything I've always wanted to know about the LSI-11, but didn't know where to look." Included are detailed chapters on the processor, options, installation, software, operating systems, peripheral devices, programming, maintenance and much more. The text covers the full range of LSI-11 systems from the LSI-11 board set to the PDP-11/03 microcomputer to the PDP-11V/03 disk based microcomputer system. Truly, everything you want and need to know of the LSI-11 microcomputer is found between the two covers of this handbook!

DIRECT SALES CATALOG APPLICATION NOTES AND PRODUCT BULLETINS



For the user who requires more complex and technical information on specific products or application ideas, the D.S.C. has a complete line of detailed product bulletins and application notes. These publications will tell you everything you should need to know about the particular product involved.

Over 50 different application notes and product bulletins are available for the asking.

LSI-11 AND PDP-11/03

EXTENSION MEMORY MODULES*

4K RAM MOS Memory Module — MSV11-B

A double-height (8.5 by 5") read/write memory module utilizing dynamic MOS semiconductor memory devices, the module capacity is 4096 words of 16-bits, with memory-select circuitry for operation on 4K address boundaries. Dynamic memory refresh is performed automatically every 1.67 milliseconds by microcode on the basic microcomputer module. If the interrupt latency associated with CPU microcode refresh cycling is undersirable an external refresh option (Cat. No. REV11-A or -C) implemented on an 8.5 by 5" (double-height) board can be ordered. The basic microcomputer module KD11-F or the PDP-11/03-EA micorcomputer can handle up to seven of these MSV11-B memory modules (32K words). The basic microcomputer module KD11-R or the PDP-11/03-KA microcomputer can handle up to four of these memory modules. Power requirements for MSV11-B are +5V ±5% at 0.56A (1.12A max.) and +12V ±3% at 0.26A (0.58A max.). Voltage levels are identical to those for the basic microcomputer modules.

Cat. No.	List	Cat.	Cash	Shipping Weight
MSV11-B	**$625**	**$594**	**$569**	2 lbs.

16K RAM MOS Memory Module — MSV11-CD

A quad-height (8.5 by 10") read/write memory module utilizing dynamic MOS semiconductor memory devices, the module capacity is 16K words of 16 bits with memory-select circuitry for operation on 4K address boundaries. Dynamic memory refresh is performed automatically every 25 microseconds (approximately) by circuitry on the memory module. If the memory is accessed during this refresh cycle, the cycle continues and a delay of 750 nanoseconds (max.) may be encountered before the I/O transaction is completed. Power requirements are +5V ±5% at 1A (2A max.) and +12V ±5% at 0.54A (0.56A max.). Voltage levels are the same as those required by the basic microcomputer modules. Basic processor-memory KD11-F or KD11-R and microcomputers PDP-11/03-EA or -KA can handle only one additional MSV11-CD module to reach the limit of 32K maximum capacity.

Cat. No.	List	Cat.	Cash	Shipping Weight
MSV11-CD	**$1800**	**$1710**	**$1638**	5 lbs.

4K PROM Memory — MRV11-AA

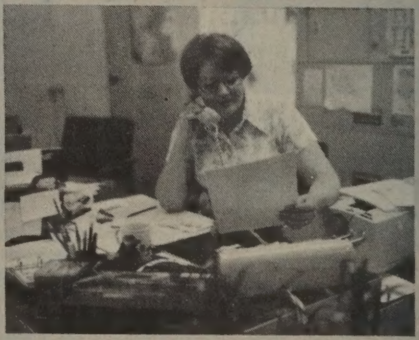
Having a double-height (8.5 by 5") module size, this user programmable, read-only memory utilizes either 256 by 4-bit or 512 by 4-bit fusible-link semiconductor devices (which must be ordered separately). The module's maximum capacity is 2048 or 4096 words of 16-bits (depending upon which device is used), and is expandable in 256 or 512 16-bit word increments (requires 4 chips per increment). This module is configured with 32 sockets for mounting memory IC devices of the user's choice. PROM chips (MRV11-AC, see below) can be supplied as an option. Board-mounted jumpers enable selection of the module's address. Power requirements are +5, ±5% at either 0.2A (0.4A max.) with no memory devices installed or 2.8A (4.1A max.) with 4K implemented.

Cat. No.	List	Cat.	Cash	Shipping Weight
MRV11-AA	**$175**	**$166**	**$159**	2 lbs.

PROM Chip for MRV11-AA Memory

Fusible Link Unprogrammed PROM Chip. 512 by 4-bit array.

Cat. No.	List	Cat.	Cash	Shipping Weight
MRV11-AC	**$40**	**$38**	**$36**	.25 lbs.



?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

*A comprehensive user's manual is provided with each memory option ordered.

DIRECT SALES CATALOG

LSI-11 AND PDP-11/03

4K Core Memory Module — MMV11-A

Included in this catalog to expand existing core-based systems (MOS memories are recommended for new systems), the MMV11-A is a quad-size (8.5 by 10″) double width read/write memory module containing 4096 words of 16-bits, with memory address selection circuitry for starting operation on any 4K boundary. Core memory provides non-volatile read/write storage for applications requiring protection against power losses.

Power requirements are +5V ±5% at 3A (7A max.) and +12V ±3% at 0.2A (0.6A max.). Voltage levels are identical to those required by the basic microcomputer modules.

Cat. No.	List	Cat.	Cash	Shipping Weight
MMV11-A	**$990**	**$941**	**$901**	10 lbs.

PROM-RAM Memory — MRV11-BA

This option is packaged as a double-height (8.5 by 5″) pc board. MRV11-BA comprises a 256-word by 16-bit MOS random access memory (RAM) and a 4K by 16-bit PROM memory implemented via eight sockets designated to hold up to eight 1K by 8-bit PROM chips. The PROM chips can either be industry-standard such as Intel 8708, or DIGITAL MRV11-BC chips (see below) can be ordered. The MRV11-BC chips are erasable by exposure to high intensity ultra-violet light and therefore can be reprogrammed.

The RAM can be used as scratch pad or stack memory by system software. This memory is volatile and is lost when power is removed. The RAM memory is refreshed by local circuitry on the MRV11-BA module. The PROM memory is non-volatile. Both PROM and RAM address space can be independently configured by customer placed jumpers.

Power requirements are +5V dc, ±5% at 0.58A (0.67A max.) and +12V dc ±5% at .34A (0.41A max.) without any PROMs installed. The current values increase to .62A (0.744A max.) and 0.5A (0.6A max.) respectively with eight MRV11-BC PROMs installed. The voltage levels are compatible with the other microcomputer modules. The −5V dc required for the PROMs is derived via a "charge-pump" circuit on the MRV11-BA module.

Software is available to convert absolute loader format programs into listing and paper tapes in PROM content format (see elsewhere in this section).

Cat. No.	List	Cat.	Cash	Shipping Weight
MRV11-BA	**$325**	**$309**	**$296**	3 lbs.

UV PROM Chips — MRV11-BC

These PROM chips plug into sockets on the MRV11-BA memory module. Each MRV11-BC PROM is one IC chip that provides 1024 (1K) words by 8-bits of memory. UV PROM chips are erased by high intensity ultra-violet light focussed through a clear quartz window on each chip. Two chips are required to provide 1K of 16-bit memory, thus eight chips implement a full 4K by 16-bit memory.

Cat. No.	List	Cat.	Cash	Shipping Weight
MRV11-BC	**$100**	**$95**	**$91**	1 lb.

microcomputer
handbook

MICROCOMPUTER HANDBOOK

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LSI-11 AND PDP-11/03

INPUT/OUTPUT INTERFACES

LSI-11 and PDP-11/03 interface options permit interfacing most peripheral devices to the LSI-11 bus with ease. These options include:

- *DRV11 Parallel Line Unit*
- *DRV11-B Direct Memory Access*
- *DRV11-P Interface Foundation Module*
- *DLV11 Serial Line Unit*
- *DLV11-E Serial Line Unit*
- *AAV11-A D/A Converter*
- *ADV11-A A/D Converter*
- *KWV11-A Real-time Clock*
- *IBV11-A Instrument Bus Interface*

Parallel Line Unit — DRV11

This unit is a general-purpose, 16-bit parallel interface between the LSI-11 bus and the user's peripheral device.

Features:

- *16 diode-clamped data input lines.*
- *16 latched output lines.*
- *16-bit word or 8-bit byte data transfers.*
- *Complete device address decoding user-assigned.*
- *LSI-11 bus interface and control logic for interrupt processing and vectored addressing of interrupt service routines.*
- *Interrupt priority determined by electrical position along the LSI-11 bus.*
- *Control/status registers (CSR) compatible with PDP-11 software routines. CSR and receiver data buffer registers directly accessed via processor instructions.*
- *Plug, signal, and program compatible with PDP-11 DR11-C.*
- *Four control lines available to the peripheral device for output data ready, output data accepted, input data ready, and input data accepted logic operations.*
- *Can be used with TTL or DTL logic-compatible devices.*
- *Maximum data transfer rate of 90K words per second under program control.*
- *Maximum drive capability of 25 feet of cable.*
- *Two 40-pin H854 I/O connectors mounted on module.*
- *Board size is double-height (8.5 by 5").*
- *Power requirements are +5V dc ±5% at 0.85A (1.3A max.).*
- *Recommended interface cables are two BC08R, or two BC04Z, or two BC07D. Longest cable permitted is 25 feet.*

Cat. No.	List	Cat.	Cash	Shipping Weight
DRV11	**$210**	**$200**	**$191**	2 lbs.

Serial Line Units — DLV11, DLV11-E

These serial line units are universal asynchronous receiver/transmitter modules. They interface between the LSI-11 bus and serial devices. Two models are available: DLV11, and DLV11-E. DLV11-E differs primarily in that it offers full modem control but is not equipped for 20 mA current loop interfacing.

Common Features, All Models:

- *LSI-11 bus interface and control logic for interrupt processing and vectored addressing of interrupt service routines.*
- *Interrupt priority determined by electrical position along the LSI-11 bus.*
- *Control/status register (CSR) compatible with PDP-11 software routines. CSRs and receiver data buffer registers directly accessed via processor instructions.*
- *Jumper-selectable stop bits and data bits.*
- *A 40-pin H854 I/O connector mounted on module.*
- *Board size is double-height (8.5 by 5").*
- *Power requirements are +5V dc, ±5% at 1A (1.6A max.) and +12V dc ±3% at 150 to 180 mA (250 mA max.).*
- *Recommended interface cable to be used with these modules is BC05M (20 mA) or BC05C (EIA).*

Other Features, DLV11:

- *Either optically isolated 20 mA current loop or EIA interface.*
- *Jumper Selectable Baud Rates: 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600.*
- *Plug, signal, and program compatible with PDP-11 DL11-C.*

Other Features, DLV11-E,

- *Jumper or Program Selectable Crystal-controlled Baud Rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600.*
- *Provisions for user-supplied external clock inputs for baud rate control.*
- *Receiver active sensing bit.*
- *Self-test mode.*
- *Signal, program and peripheral connector plug compatible with the PDP-11 DL11-E asynchronous line interface option.*
- *Parity error checking function.*
- *Full modem control with EIA interface.*

Cat. No.	List	Cat.	Cash	Shipping Weight
DLV11	**$250**	**$238**	**$228**	2 lbs.
DLV11-E	Consult Catalog Sales Desk			

LSI-11 AND PDP-11/03

Direct Memory Access — DRV11-B

The DRV11-B is a general purpose Direct Memory Access (DMA) interface used to transfer data directly between the LSI-11 or PDP-11/03 system memory and an I/O device. The interface is programmed by the processor to move variable length blocks of 16-bit data words to or from specified locations in memory by means of the LSI-11 bus. Once programmed, no processor intervention is required. The DRV11-B can transfer up to 250K, 16-bit words per second and is capable of operating in burst modes, with byte addressing. The control structure also allows read-modify-restore operations.

The interface consists of five registers: Word Count Register (WCR), Bus Address Register (BAR), Control Status Register (CSR), Input Data Buffer Register (IDBR), and Output Data Buffer Register (ODBR). The module also includes bus transceivers and logic for interrupt requests, address control and protocol, and DMA requests.

The DRV11-B contains one switch bank used to assign an appropriate device address to the DMA interface and one switch bank to select an interrupt vector address in the LSI-11 memory where the DMA routine is stored. Two 40-pin connectors, H854, mounted near the edge of the module, facilitate the connection of the I/O device with the DMA, using any two of several cable assemblies available from DIGITAL. The quad-height (8.5 by 10″) module may be inserted into any available slot of the LSI-11 backplane or backplane extenders according to the rules and restrictions as described in the LSI-11 User's Manual supplied free with each order that calls for a basic processor-memory configuration.

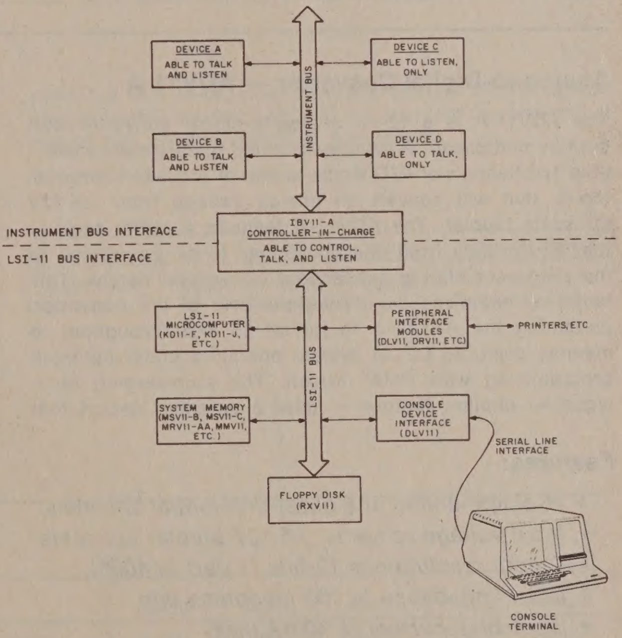
Recommended cables to be used with this module are BC07D, BC08R, or BC04Z. For details of these cables see p. 45.

Power requirements are +5V dc ±5% at 1.9A (nominal).

Cat. No.	List	Cat.	Cash	Shipping Weight
DRV11-B	**$580**	**$551**	**$528**	5 lbs.

Instrument Bus — IBV11-A

The instrument bus is contained on a double-height (8.5 by 5″) pc board, and conforms to the IEEE Standard 488-1975 "Digital Interface for Programmable Instrumentation." IEEE 488 standardizes three primary characteristics associated with interfacing instruments such as DVMs, Programmable Power Supplies, Frequency Generators, etc. to computers. These areas are mechanical (connectors and cables), electrical (driver and receiver circuit parameters), and functional (complete definition of each signal line, exact protocol and timing relationship for message transfer, etc.). The bus may have TALKERS (instruments that transmit data) and LISTENERS (instruments that receive data). The IBV11-A can function as a TALKER or LISTENER and as a CONTROLLER initiating a test system by setting ranges, functions or parameters of instruments. Thus, instruments now conforming to IEEE standards may be purchased "off-the-shelf" and integrated into systems with the IBV11-A. See diagram.


DEVICE A
ABLE TO TALK AND LISTEN
DEVICE B
ABLE TO TALK AND LISTEN
INSTRUMENT BUS
DEVICE C
ABLE TO LISTEN, ONLY
DEVICE D
ABLE TO TALK, ONLY
INSTRUMENT BUS INTERFACE
LSI-11 BUS INTERFACE
IBV11-A
CONTROLLER-IN-CHARGE
ABLE TO CONTROL, TALK, AND LISTEN
LSI-11 MICROCOMPUTER (KD11-F, KD11-J, ETC)
SYSTEM MEMORY (MSV11-B, MSV11-C, MRV11-AA, MMV11, ETC.)
LSI-11 BUS
PERIPHERAL INTERFACE MODULES (DLV11, DRV11, ETC)
PRINTERS, ETC
CONSOLE DEVICE INTERFACE (DLV11)
SERIAL LINE INTERFACE
FLOPPY DISK (RXV11)
CONSOLE TERMINAL

Features:

- *PDP-11 software compatible. RT-11, FORTRAN, and BASIC programming.*
- *LSI-11 bus interface.*
- *Instrument bus compatible with the IEEE 488-1975 standard.*
- *Supports instrument bus cable lengths up to 65.6 feet total.*
- *Fifteen devices (max.) can connect to the instrument bus.*
- *System functions such as: System CONTROLLER, LISTENER (receives data from instruments) and TALKER (transmits data to instruments).*

A 12-foot long interface cable is supplied with each IBV11-A ordered. This cable, BN11A-04, connects the instrument bus option to the first user instrument on the bus. When more than one instrument is to be added to the bus, cable BN01A-04 (12 feet) must be ordered for each additional instrument.

For further details on the instrument bus option request a free copy of the Instrument Bus User's Manual by contacting the Direct Catalog Sales Desk.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
IBV11-A	Instrument Bus*	**$750**	**$713**	**$683**	10 lbs.
BN11A-04	12-ft. Cable to Connect Bus to First Instrument	**125**	**119**	**114**	7 lbs.
BN01A-04	12-ft. Cable to Interconnect Subsequent Instruments on bus	**125**	**119**	**114**	7 lbs.

*Includes one BN11A-04 cable.

INPUT/OUTPUT INTERFACES (Cont'd)

Interface Foundation Module — DRV11-P

The DRV11-P is a versatile wire wrap module that contains the bus interface logic for operation with the LSI-11 or PDP-11/03 system and provides adequate board area for mounting and connecting integrated circuits (IC's) or discrete components. Because the bus interface logic is included, the module can be efficiently configured by the user to satisfy a variety of device interface logic applications.

A 40-pin connector, H854, conveniently mounted at the board edge, facilitates the connection to a device through several cable assembly types available from DIGITAL. See p. 45. Except for the bus interface connections, all signals and voltages are terminated to wire wrap pins for user connections. The bus control logic is provided with wire wrap test points for monitoring the internal signals. The test points are spaced at 0.1 in. between pins to allow a 40-pin connector to be inserted over the wire wrap pins for automated test functions.

Approximately 2/3 of the surface area on the module consists of plated-through holes, each connected to a wire wrap pin. The user can mount three different types of dual-in-line IC's or a variety of discrete components into the holes and connect the proper voltages and signals by wire wrapping leads on the board. The DRV11-P module can be inserted into any one of the available interface option locations of the LSI-11, PDP-11/03 backplane, or PDP-11/03 backplane extender unit. The module is quad-height (8.5 by 10"). Refer to the LSI-11 User's Manual supplied free with each order that calls for a basic processor-memory configuration for detailed installation information.

Recommended cables to be used with this module are BC07D, BC08R, and BC04Z. See p. 45.

Power requirements are +5V dc ±5% at 1A (not including user logic).

Cat. No.	List	Cat.	Cash	Shipping Weight
DRV11-P	**$275**	**$261**	**$250**	3 lbs.

Analog-to-Digital Converter — ADV11-A

The ADV11-A is a 12-bit analog-to-digital converter with built-in multiplexer. A sample-and-hold feature makes available 16 channels of A/D single-ended or 8 quasi-differential inputs that will convert an analog voltage from ±5.12V full-scale bipolar. The ADV11-A features a buffer register that allows data from one conversion to be transferred to the processor after a subsequent conversion begins. This buffering optimizes the throughput rate of the converter, permitting the ADV11-A to run at 25 kHz throughput to memory using an LSI-11 system operating under optimum programming with DMA refresh. The auto-zeroing technique — another feature — uses a patented design that measures the sampled signal with respect to the offset of its own internal circuitry and thus effectively cancels out its own offset error contributions to the measurement. There are also three built-in signals for self-testing. They may be connected through a BC08R-01 maintenance cable (not included) to any channel. A maintenance self-test plug is provided with the option for diagnostic verification. The test signals are two dc levels, and one bipolar triangular waveform. The bipolar triangular wave can be used with diagnostic software to produce a data base for extremely thorough and precise analog linearity testing.

Features:

- *16 single-ended or 8 quasi-differential channels.*
- *Input voltage range is ±5.12V bipolar full scale.*
- *Output resolution is 12-bits (1 part in 4096).*
- *Input impedance is 100 Megohms min.*
- *Input bias current is 40 nA max.*
- *Temperature stability is 5 ppm per °C for gain coefficient and 2 ppm per °C of full scale for offset coefficient.*
- *Power requirements are +5V dc ±5% at 1.75A and +12V dc ±5% at 350 mA.*
- *Quad-height (8.5 by 10") module.*
- *The recommended interface cables are BC04Z, BC08R or BC07D.*

Cat. No.	List	Cat.	Cash	Shipping Weight
ADV11-A	**$1000**	**$950**	**$910**	5 lbs.

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LSI-11 AND PDP-11/03

Digital-to-Analog Converter — AAV11-A

The AAV11-A is a four-channel digital-to-analog converter that allows the user a wide variety of output voltage ranges that are jumper selectable. Each 12-bit D/A converter has its own holding register which can be separately addressed and can be written and read in either word or byte format.

Features:

- *Four mutually exclusive D/A converters.*
- *12-bit digital input per converter.*
- *Input binary-coded for unipolar mode, offset binary for bipolar mode.*
- *Single-buffered, word or byte operable, read/write digital storage.*
- *Bipolar output voltage range is ±2.56V ±5.12V or ±10.24V jumper selectable. Factory set for ±5.12V.*
- *Unipolar output voltage is either 0 to +5.12V or 0 to +10.24V jumper selectable.*
- *Resolution is 12-bits (1 part in 4096).*
- *Gain accuracy is adjustable.*
- *Temperature stability is 10 ppm per °C max. for gain coefficient and 20 ppm per °C max. of full scale for offset coefficient.*
- *Linearity is ±½ LSB.*
- *Output impedance is 1 ohm max.*
- *6 mA per converter drive capability.*
- *5 volts per sec. slew rate.*
- *Power requirements are +5V dc ±5% at 1.5A and +12V dc ±5% at 0.4A.*
- *Quad-height (8.5 by 10") module.*
- *Recommended interface cables are BC04Z, BC08R or BC07D.*

Cat. No.	List	Cat.	Cash	Shipping Weight
AAV11-A	**$900**	**$855**	**$819**	5 lbs.

Real Time Clock — KWV11-A

The KWV11-A is a programmable real-time clock that offers the user several methods for measuring and counting intervals or events from 1 microsecond to 650 seconds. It can also be used to synchronize external equipment. The KWV11-A is a 16-bit clock that will operate in one of four programmable modes and can be selected to operate at one of five crystal-controlled frequencies.

Features:

- *Programmable function modes are: single interval, repeated interval, external event timing, and external event timing from a zero base.*
- *Crystal controlled frequency of 1 MHz, 100 KHz, 10 KHz, 1 KHz, or 100 Hz.*
- *Timing accuracy is .01%.*
- *Power requirements are +5V dc ±5% at 1.75A.*
- *Quad-height (8.5 by 10") module.*

Cat. No.	List	Cat.	Cash	Shipping Weight
KWV11-A	**$600**	**$570**	**$546**	5 lbs.

I/O Interface Cables

Cat. No.	Description	Length	List	Cat.	Cash	Shipping Weight
BC04Z-10	40-conductor cable with 40-pin H856 and open end.	10′	**$53**	**$50**	**$48**	2 lbs.
BC07D-10	Two 20-conductor flat mylar ribbon cables with 4-pin H856 and open end.	10′	**53**	**50**	**48**	5 lbs.
BC07D-15		15′	**58**	**55**	**53**	6 lbs.
BC07D-25		25′	**69**	**66**	**63**	10 lbs.
BC08R-01	Maintenance cable. Connects input to output ports.	1′	**50**	**48**	**46**	1 lb.
BC08R-xx	H856 to H856 connectors. Flat mylar 40-conductor.	For available lengths see cable section (Hardware and Accessories) in this catalog.				
BC05M-02	20 mA loop cable. H856 and 12-0934-00 connectors. Three 2-conductor, round shielded leads.	2′	**44**	**42**	**40**	2 lbs.
BC05C-25	EIA interface. H856 and Cinch #DB25P connectors.	25′	**112**	**106**	**102**	3 lbs.

LSI-11 AND PDP-11/03

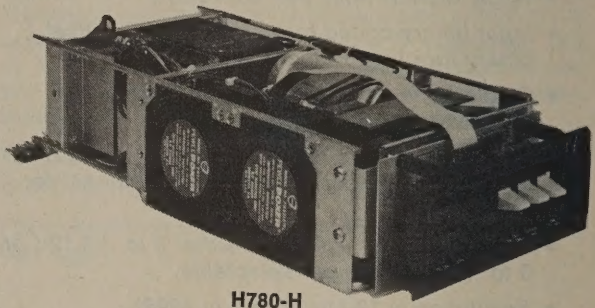
POWER SUPPLIES AND CONTROLLERS

Power Supply — H780-H

The H780-H power supply provides the voltage levels (+5 and +12V dc) required by LSI-11 microcomputer modules. Additionally, control functions such as power fail/restart sequences and line-time clock (LTC) generation are included. These latter functions are essential for the LSI-11 system and if the H780-H power supply is not used then Option KPV11 or equivalent must be incorporated in the system, see p. 47.

The power output of the H780-H is adequate to handle a fully implemented H9270 backplane (or the equivalent). The individual power requirements of each LSI-11 module option included in the system should be totalled to ensure proper operation.

The H780-H includes a 12″ power cable, terminated with a 6-lug connector strip that mates with the H9270 backplane's power terminal block and a 10″ bus signal cable that mates with the backplane's connector pins. A connector block on the rear of the H780-H is provided for connection to a primary power source. A line fuse and On/Off switch on the rear of the option provide overload protection and primary power control, respectively.



H780-H

Features:

- *+5V ±4%, 18A (max.) and +12V ±3%, 3.5A max.); combined dc power must not exceed 120W.*
- *Overcurrent/Short Circuit Protection — Output voltages return to normal after removal of overload or short. Current limited to approximately 1.2 times the required max. rating.*
- *Overvoltage Protection — +5V limited to +6.3V (approximately); +12V limted to +15V (approximately).*
- *Dual Primary Power Configuration — Can be connected for nominal 115V, 60 Hz or 230V, 50 Hz input power.*
- *Line Time Clock — A bus-compatible signal is generated by the power supply for the event (line time clock) interrupt input to the processor. This signal is either 50 or 60 Hz, depending upon primary power line frequency input to the power supply.*
- *Fans — Built-in fans provide cooling for the power supply and LSI-11 modules contained in an adjacent H9270 backplane.*
- *Power Fail/Automatic Restart — Fault detection and status circuits monitor ac and dc voltages and generate bus-compatible BPOK H and BDCOK H signals (respectively) to inform the LSI-11 system modules of power supply status. Automatic power signal sequencing is provided.*
- *Master Console — Console includes three switches (dc ON-OFF, HALT/ENABLE, and LTC ON-OFF) and three indicators (RUN, dc ON, spare).*
- *Backplane signals: BPOK H, BDCOK-H, BEVNT L, BHALT L, SRUN L.*
- *Slave Power Supply Control — H780-H can control a slave power supply.*

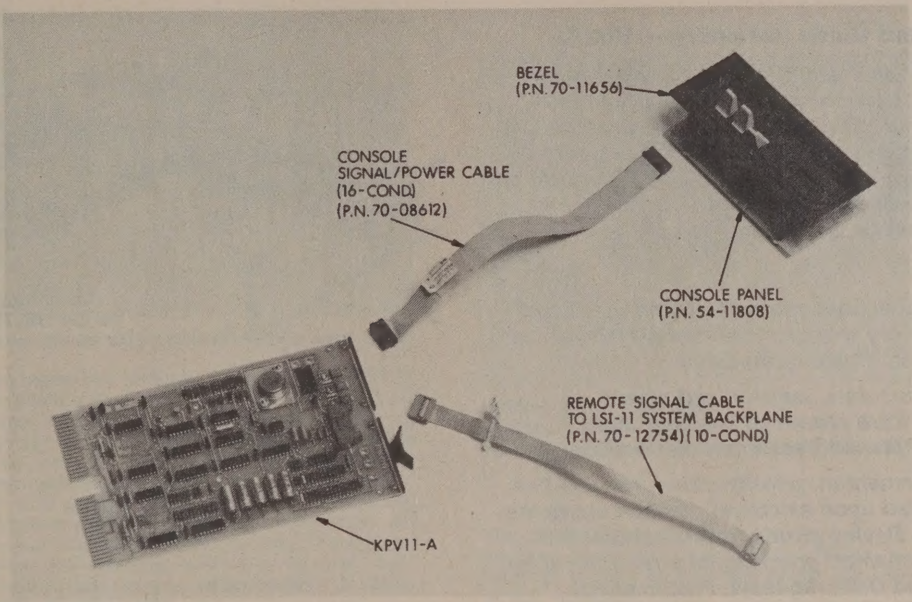
The H780-H measures 5½″ wide by 3½″ high by 14⅝″ long. It can be mounted adjacent to the H9270 backplane card cage assembly.

Cat. No.	List	Cat.	Cash	Shipping Weight
H780-H	$700	$665	$637	15 lbs.

DEALING DIRECT SAVES YOU $$$

The Cat prices are generally about 5% less than List price. Cash prices are about 4% less than Cat. Generally 9% savings in all!! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See p. 109 for details.

Power Controller/Sequencer — KPV11



Unless an H780-H power supply is used, the KPV11 option (or equivalent) must be incorporated in an LSI-11 system to provide proper power fail/restart sequencing and to provide a Line Time Clock (LTC) generator for the system. There are two cataloged models: KPV11-A, and KPV11-B. They differ in that -A has no termination resistors (so cannot be used as an LSI-11 bus terminator) while -B provides 120-ohm termination. Note that the -B module must be mounted in the backplane immediately following the last option module for the termination function to work.

The KPV11-A module can be mounted remote from the backplane and interconnected by an optional 70-12754 cable that plugs into the module and the backplane. No program control of the LTC function is possible with a remote installation, however.

An optional console can be added to the KPV11 to provide indicators and switches. The switches are dc ON/OFF, HALT/ENABLE, LTC ON/OFF. The indicators are RUN, dc ON, and a spare. The console is ordered by three catalog numbers: 54-11808 pc board assembly (includes switches and LED indicators), 70-11656 bezel, and 70-08612 console signal/power cable. Order by all three numbers.

AC power to this option must be provided via a center-tapped transformer, 24V ac user supplied. This ac input provides the dc power for the option, the 50 Hz or 60 Hz reference for the LTC function and is the power fail monitor signal for the power signal sequence circuit. An external clock frequency can be used as the LTC reference if need be. Note that the KPV11 is **not** a power supply. Suitable dc power (+5V and +12V) for the LSI-11 system must be provided by the system user.

The KPV11 module is a double-height (8.5 by 10″) pc board.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
KPV11-A	Controller without Termination Resistors	**$290**	**$276**	**$264**	5 lbs.
KPV11-B*	Controller E/W 120-ohm Terminations	**315**	**299**	**287**	5 lbs.
70-12754	Remote Signal Cable	**13**	**12**	**12**	.5 lbs.
54-11808	Console pc panel	**50**	**48**	**46**	.5 lbs.
70-11656	Console Bezel	**9**	**9**	**8**	.5 lbs.
70-08612	Console Signal/ Power Cable	**10**	**10**	**9**	.5 lbs.

*Contact Catalog Sales Desk for delivery information before ordering.

?GOT A QUESTION?

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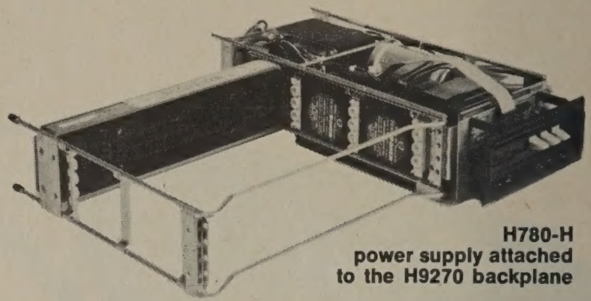
MOUNTING HARDWARE AND ACCESSORIES

Backplane/Card Guide Assembly — H9270

The H9270 backplane/card guide assembly is a prewired LSI-11 structured backplane based on a standard DIGITAL four by four slot configuration. It is designed to be integrated into customer-packaged equipment. For LSI-11 systems that are to be rack mounted, a DDV11-B unit in an H909-C enclosure should be specified — or consider using a PDP-11/03 complete.

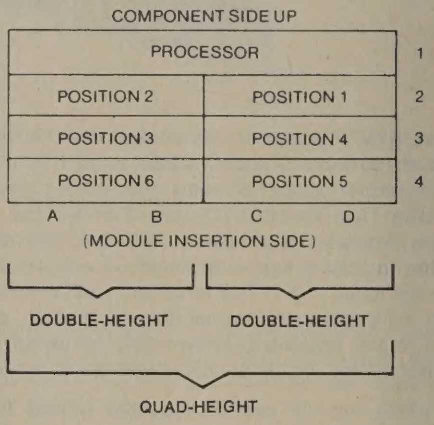


H780-H power supply attached to the H9270 backplane

Features:

- *Designed to accept one KD11-F and up to six I/O or memory modules or one KD11-R and up to four I/O or memory modules.*
- *All LSI-11 bus data, control, and power connections are pre-wired on the printed circuit backplane to each module location.*
- *Easily implemented, priority-structured I/O bus system based upon electrical position along the LSI-11 bus. Device priority levels established by a daisy-chained grant signal arrangement for interrupt and DMA requests. Placement of modules into the backplane automatically passes the bus grant signal to the next lower-priority device.*
- *Backplane integral with card guide assembly.*
- *Mounting capability in all planes for convenient "bolt-in" installation in a variety of customer designed equipment packages.*
- *Backplane size 11.15 by 2.8 by 11.0".*
- *Can be mounted adjacent to H780-H power supply.*

Cat. No.	List	Cat.	Cash	Shipping Weight
H9270	**$190**	**$181**	**$173**	6 lbs.



Module placement in H9270 backplane

Jumper Cable Assemblies

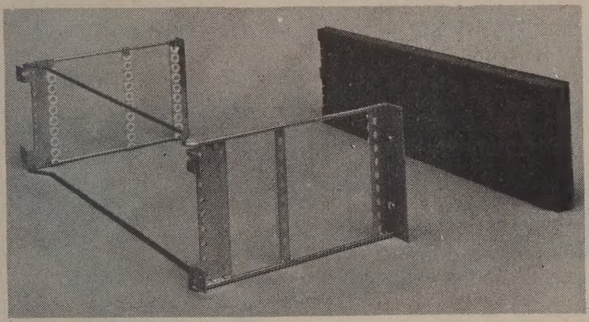
When assembling a two-backplane LSI-11 or PDP-11/03 system, a BCV1B jumper cable assembly and a 120-ohm terminator module TEV11 are necessary. BCV1B comprises two BC05L cables, one M9400-YE, and an M9401 backplane connector. To expand to a third backplane, one BCV1A jumper cable assembly must also be ordered. BCV1A comprises two BC05L cables and two backplane connectors M9400-YD and M9401. At least a 4-foot length difference must be maintained between the BCV1A-XX and BCV1B-XX. Jumper cables are equipped at each end with Berg 40-conductor connectors. Note: If Option REV11-A is part of the system, terminator module TEV11 is not needed.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
BCV1A-XX*	Cable Assembly — 2′, 4′, 6′, or 10′	**$210**	**$200**	**$191**	2 lbs. (2′ only) 3 lbs. (4′-10′)
BCV1B-XX*	Cable Assembly/Terminator Assembly — 2′, 4′, 6′, or 10′	**290**	**276**	**264**	2 lbs. (2′ only) 3 lbs. (4′-10′)
TEV11	Terminator Module 120-ohm — Double-height (8.5 by 5″)	**110**	**105**	**100**	2 lbs.

*Add Suffix 02, 04, 06, or 10 to specify cable length.

LSI-11 AND PDP-11/03

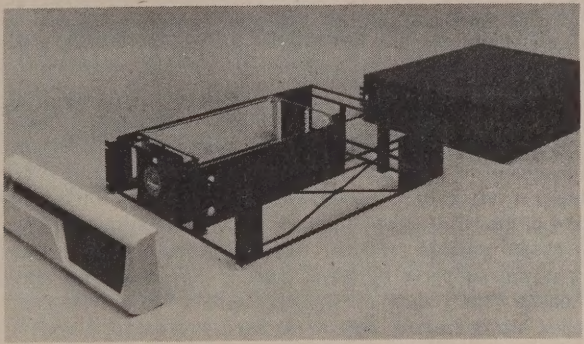
Nine by Six Slot Unit — DDV11-B



DDV11-B backplane shown with optional H0341 card cage.

The DDV11-B is an expanded version of the standard LSI-11 backplane for use when either more dedicated LSI-11 compatible logic space or non-LSI-11 compatible space for various other special purpose logic modules or both is required. A nine by four slot section (36 individual module slots) of this system unit is pre-bused specifically for LSI-11 bus signal, power and ground connections. The remaining nine by two slot section (18 slots) is provided with +5V dc, −12V dc and ground power connections only; this leaves the remaining pins free for use with any special logic modules to be used in conjunction with the LSI-11 family of modules and bus requirements.

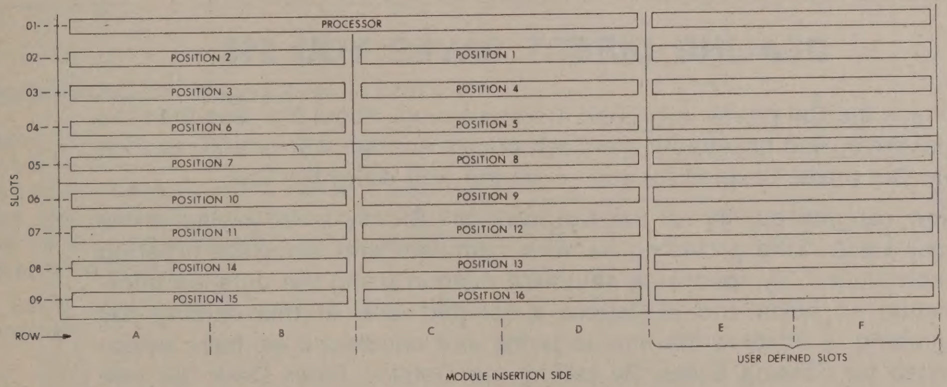
An optional card cage, Type H0341, is also available to provide protection against physical damage to modules and to serve as a logic card guide. This card cage completely surrounds the slot side of the system unit and is shown in the photograph.

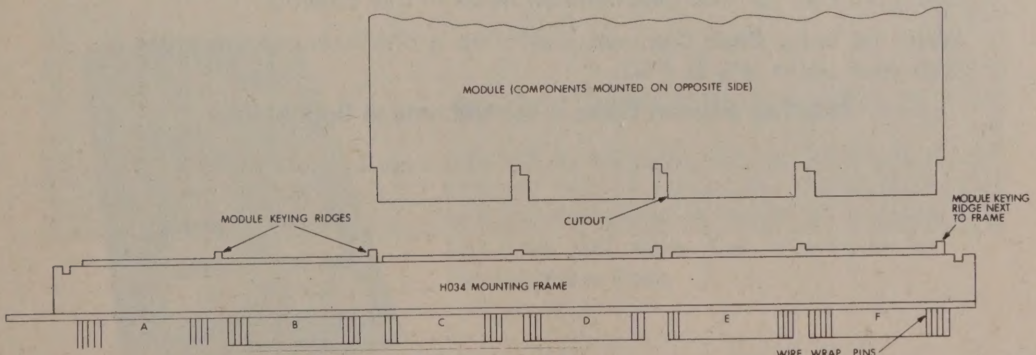


H909-C general purpose enclosure holds one DDV11-B backplane. For details see p. 94 in this catalog.

The DDV11-B without the card cage will fit into an H909-C module enclosure, see photo. H0341 is provided with H909-C. Details of this enclosure are covered elsewhere in this catalog.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
DDV11-B	Backplane	$400	$380	$364	10 lbs.
H0341	Card Cage	39	37	35	3 lbs.


01
02
03
04
05
06
07
08
09
SLOTS
PROCESSOR
POSITION 1
POSITION 2
POSITION 3
POSITION 4
POSITION 5
POSITION 6
POSITION 7
POSITION 8
POSITION 9
POSITION 10
POSITION 11
POSITION 12
POSITION 13
POSITION 14
POSITION 15
POSITION 16
ROW
A
B
C
D
E
F
USER DEFINED SLOTS
MODULE INSERTION SIDE

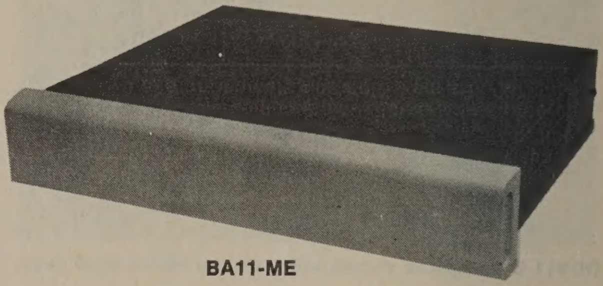

MODULE (COMPONENTS MOUNTED ON OPPOSITE SIDE)
MODULE KEYING RIDGES
CUTOUT
MODULE KEYING RIDGE NEXT TO FRAME
H034 MOUNTING FRAME
A
B
C
D
E
F
WIRE WRAP PINS

Module placement in DDV11-8 backplane

MOUNTING HARDWARE AND ACCESSORIES (Cont'd)

Expansion Boxes — BA11-ME

BA11-ME expansion box provides a most convenient means for expanding existing LSI-11, PDP-11/03, and PDP-11V/03 systems. Each expansion box includes an H9270 backplane, an H780 power supply, (which is capable of supplying sufficient power to all modules contained within the expansion box), and a rack-mountable enclosure. The enclosure is identical in size and design to that of the PDP-11/03. However, the switch/indicator control panel is not included (part of the H780 power supply in PDP-11/03 systems). The BA11-ME requires 115V rms, 50 or 60 Hz input power. Note the power supply is a "slave" unit. The system must have a master supply such as H780-H included. These expansion boxes are, therefore, only to be used to expand a system and not as a primary enclosure.



BA11-ME

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
BA11-ME	115V ac	**$1000**	**$950**	**$910**	40 lbs.

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Want the extra **Cash** discount, too? Pop a check or money order in with your order. 4% is 4%!

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*Follow the steps shown on the Sample Order Form on p. 112 to be sure to give us all the data.

LSI-11 AND PDP-11/03

SOFTWARE

Paper Tape Software Package — QJV10-CB

This package of utility software consists of an Editor, which allows the user to create and modify ASCII source files to be used as input to other system programs; an Assembler, which allows the user to translate assembly language programs into executable machine-coded programs; a Loader, which allows the user to input programs and data from various media into the machine; an On-line Debugging Technique (ODT) Package, which allows the user to debug assembled and linked programs; an Input/Output Executive, which allows the user to control the flow of data to and from devices under program control.

This software package requires 8K of memory and may be loaded using any DIGITAL paper tape reading device by interfacing it to the LSI-11. If you choose to load paper tape using a Teletype, purchase the LT33-DC from DIGITAL. The LT33-DC is a specially modified ASR-33 which is compatible with DIGITAL specifications, and is plug-compatible with the DLV11 serial interface.

Cat. No.	List	Cat.	Cash	Shipping Weight
QJV10-CB	**$110**	**$105**	**$100**	10 lbs.

PROM Formatter Program — QJV11-CB

This paper tape software program is used to facilitate the programming of both fusible link (MRV11-AA) and UV-erasable (MRV11-BA) PROM memory options. Before programming these memory options, a thorough understanding of the descriptions contained in Chapter 7 of the Microcomputer Handbook is advised. The reference manuals accompanying these options should also be studied. Free copies of the handbook are available for the asking by calling the Catalog Sales Desk.

Cat. No.	List	Cat.	Cash	Shipping Weight
QJV11-CB	**$30**	**$29**	**$27**	2 lbs.

LSI-11 Documentation/ Diagnostics — ZJV01-RB

One extensive literature package is included (no charge) with each LSI-11 purchase order that includes a processor. This package includes a user's manual, a processor handbook, a configuration and installation guide, a complete set of module schematics, and a set of diagnostics (tapes and program listings).

Additional LSI-11 documentation packages may be purchased if required.

Cat. No.	List	Cat.	Cash	Shipping Weight
ZJV01-RB	**$120**	**$114**	**$109**	10 lbs.

microcomputer
handbook

MICROCOMPUTER HANDBOOK

Although a comprehensive user's manual is provided with all options for microcomputers, the Microcomputer Handbook is yours free. Over 900 pages. Call or write to the Catalog Sales Desk.

digital MODULES

DIRECT SALES CATALOG

INTRODUCTION

The industry's most extensive line of logic modules now available at low catalog prices.

These are the same modules used in DIGITAL's products and by hundreds of OEM's for computer interfacing, instrumentation, data gathering, and control. If you're in the business of designing, assembling, or testing logic subsystems, then purchasing the components through this catalog makes sense. You probably know what you need, the specification criteria required, and how to implement the design. In other words, you don't need a sales presentation by DIGITAL. We can pass that cost savings directly to you when you order through this catalog.

Featured are DIGITAL's M Series TTL-integrated circuit modules. The M Series line consists of modules ranging from basic and fundamental logic modules to self-contained computer interfacing modules. The impact of advancing technology can be seen in M Series evolution. From the beginning, M Series was TTL-integrated circuit-oriented; the current trend is toward MSI and LSI. The result is more complexity (and more built-in design solutions) per module. Many of the modules in this catalog amount to full-scale digital subsystems. The microcomputer is the latest result of the continuing technological advancements. As the leading supplier of logic modules, DIGITAL applied this micro concept to a family of modules designated LSI-11. See details starting on p. 36 in this catalog.

Also offered through the Direct Sales Catalog are A-Series analog modules and computer interface modules (for both the PDP-8 and PDP-11), computer systems, mounting hardware, power supplies, and cabling. All these support functions provide a total capability for designing, implementing, and assembling a modular system, small or large, at the lowest cost per function in the industry. P. 71 in this catalog explains the physical aspects of DIGITAL's modules.

LOGIC MODULE LOCATOR

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LOGIC HANDBOOK

logic handbook
20

The Logic Handbook, known as the computer industry's "bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook!

DIGITAL MODULES—M SERIES

M SERIES MONOLITHIC MODULES

M Series high-speed monolithic integrated circuit logic modules employ TTL (transistor-transistor logic) circuits which provide high speed, high fanout, large capacitance drive capability, and excellent noise margins.

The M Series include a full digital system complement of basic modules which are designed with sufficient margin for reliable system operation at frequencies up to 6 MHz. Specific modules may be operated at frequencies up to 10 MHz. The integrated circuits are dual-in-line packages.

GATES AND INVERTERS

Cat. No.	Description	Typical Symbol§	Load per Input	Output Drive Capability	Qty. per Module	Inputs	Size	List	Cat.	Cash	Shipping Weight (oz.)
M113	NAND	Fig. 1	1	10	10	2	SSS	$20	$19	$18	See p. 115
M115	NAND	Fig. 1	1	10	8	3	SSS	21	20	19	
M117	NAND	Fig. 1	1	10	6	4	SSS	21	20	19	
M119	NAND	Fig. 1	1	10	3	8	SSS	21	20	19	
M617	Power — NAND	Fig. 1	1	30	6	4	SSS	28	27	25	
M133	High-Speed NAND	Fig. 1	1.3	12	10	2	SSS	26	25	24	
M135	High-Speed NAND	Fig. 1	1.3	12	8	3	SSS	24	23	22	
M137	High-Speed NAND	Fig. 1	1.3	10	6	4	SSS	24	23	22	
M139	High-Speed NAND	Fig. 1	1.3	12	3	8	SSS	26	25	24	
M627	Power, High-Speed NAND	Fig. 1	2.5	30	6	4	SSS	30	29	27	
M1131	Open Collector NAND*	Fig. 1	1	10	10	2	SSS	30	29	27	
M1103	AND	Fig. 2	1	10	10	2	SSS	23	22	21	
M1307	AND	Fig. 2	1.3	12	6	4	SSS	28	27	25	
M112	NOR	Fig. 3	1	10	10	2	SSS	22	21	20	
M116	NOR	Fig. 3	1	10	6	4	SSS	23	22	21	
M141	NAND/OR	Fig. 4	1	7†	2 1 1	8 6 2	SSS	33	31	30	
M121	AND/NOR	Fig. 5	1	10	6	4	SSS	26	25	24	
M1125	EXCLUSIVE OR	Fig. 6	1	10	5	2	SSS	22	21	20	
M111	INVERTER	Fig. 7	1	10	16	1	SSS	26	25	24	
M611	Power, High-Speed INVERTER	Fig. 7	1.25	37	14	1	SSS	37	35	34	
M165	BUFFER	Fig. 8	4	10/10‡	8	1	SSS	38	36	35	

*Use M165 Buffer to convert open-collector output to standard configuration. See below.

†The output of each gate presents 2 unit loads when connected to another output. Thus when the outputs of all the gates on this module are connected together (to form a 16-input gate), the 3 gates present a load of 3 x 2 units to the fourth, totalling 6 units. This leaves 1 unit load capability.

‡BUFFER converts open-collector outputs (see M1131) to inverting and non-inverting standard outputs (10 of each).

§Symbol shown represents typical configuration.

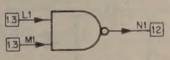


FIG. 1 NAND

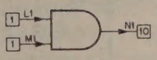


FIG. 2 AND

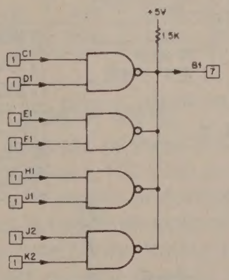


FIG. 4 NAND/OR

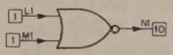


FIG. 3 NOR

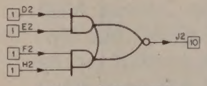


FIG. 5 AND/NOR

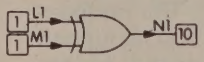


FIG. 6 EXCLUSIVE OR

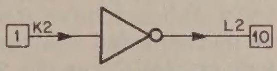


FIG. 7 INVERTER

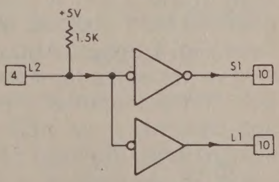


FIG. 8 BUFFER

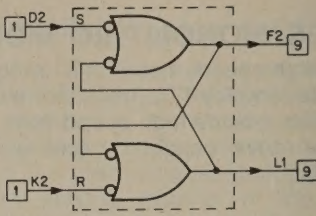
General Characteristics

Power Supply Voltage	+5V dc ±5%
Logic Levels	Input / Output Logical LOW (0): 0.0 to 0.8V / 0.0 to 0.4V Logical HIGH (1): 2.0 to 3.6V / 2.4 to 3.6V Noise Margin — Worst Case: 400 millivolts
Input and Output Loading	The input loading and output drive capability of M Series modules are specified in terms of a specific number of unit loads. Typically, the input loading is one unit; however, certain modules may contain inputs which will present greater than one unit load. The typical M Series module output will supply 10 unit loads of input loading. However, certain module outputs will deviate from a 10-unit-load capability and provide more or less drive. Always refer to the individual module specifications to ascertain actual loading figures.
Unit Load	In the logic 0 state, one unit load requires that the driver be able to sink 1.6 milliamps (maximum) from the load's input circuit while maintaining an output voltage of equal to or less than +0.4V. In the logic 1 state, one unit load requires that the driver supply a leakage current of 40 microamps (maximum) while maintaining an output voltage of equal to or greater than +2.4V.
Timing	M Series pulse sources provide sufficient pulse duration to trigger any M Series flip-flop operating within maximum propagation delay specifications. Detailed timing information appears in the **Logic Handbook.**

DIGITAL MODULES—M SERIES

R/S FLIP-FLOPS

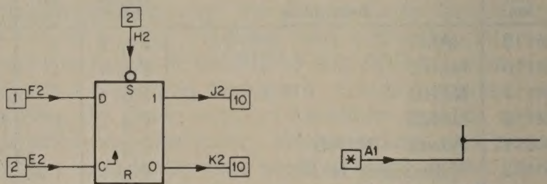
Module M203 is made up of 8 Reset/Set flip-flops. Each flip-flop, see diagram, comprises two 2-input NAND gates with cross-coupled outputs. The load/drive capability is indicated on the diagram.


1 D2
S
F2 9
1 K2
R
L1 9

Cat. No.	Flip-flops per Module	Size	List	Cat.	Cash	Shipping Weight
M203	8	SSS	$27	$26	$25	See p. 115

D-TYPE FLIP-FLOPS

A D-type flip-flop functions to transfer each input (HIGH or LOW) on the D-line to the output when the threshold is reached on the leading (positive-going voltage) edge of the clock pulse (or a level change). Each flip-flop has independently gated data, clock, and dc set inputs. All, except M206, have independent dc resets. M206 has six flip-flops. One group of three has a common jumper-removable dc reset line. The other group has a permanent common dc reset. The load/drive capability is indicated on the diagrams, Fig. 1 or Fig. 2.


2 H2
1 F2 D
S 1
J2 10
2 E2 C
R 0
K2 10
D2 3
* A1

Common reset line M206 only

*3 Unit loads per flip-flop

FIG. 1

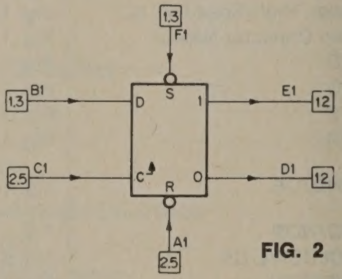

1.3 F1
1.3 B1 D
S 1
E1 12
2.5 C1 C
R 0
D1 12
A1 2.5

FIG. 2

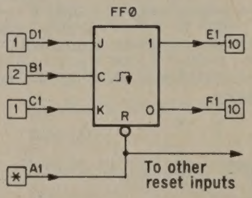
Cat. No.	Description	Flip-Flops per Module	Fig.	List	Cat.	Cash	Shipping Weight
M205	General Purpose	5	1	$24	$23	$22	
M206	General Purpose	6	1	33	31	30	See p. 115
M246	High-speed	5	2	24	23	22	

NOTE: All Sizes are SSS

J-K FLIP-FLOPS

When both J and K inputs are HIGH, the J-K flip-flop, Fig. 1, complements (outputs change state) on the negative-going threshold of the clock pulse. A common reset (CLEAR) line is present on both M207 and M204, although three of the six flip-flops on M207 can be disconnected from the common line by removable jumpers. M202, see Fig. 3, has a 3-input AND gate on each of the J and K inputs. M204 has 2-input AND gates on both J and K inputs on one of the four flip-flops, Fig. 4, 3-input AND gates on both J and K inputs on another of the flip-flops, Fig. 2, and a 2-input AND gate on the J input of a third flip-flop, Fig. 3. One flip-flop does not have input gates, Fig. 1. The arrangement of these flip-flops permits counters to be formed (up to 16 per module) with simple connector wiring.

Load/drive capabilities are indicated on the diagrams, Fig. 1, 2 and 3.


FFØ
1 D1 J 1
E1 10
2 B1 C
1 C1 K R 0
F1 10
* A1
To other reset inputs

*2 unit loads per flip-flop

FIG. 1

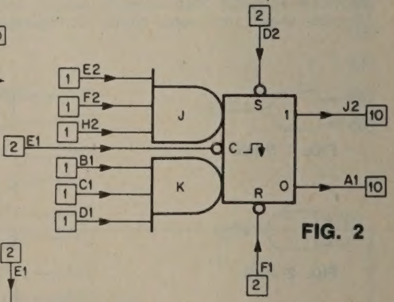

2 D2
1 E2
1 F2
1 H2
J
S 1
J2 10
2 E1 C
1 B1
1 C1
1 D1
K
R 0
A1 10
F1 2

FIG. 2

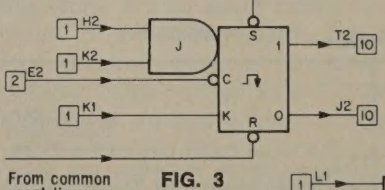

2 E1
1 H2
1 K2
J
S 1
T2 10
2 E2 C
1 K1 K R 0
J2 10
From common reset line

FIG. 3

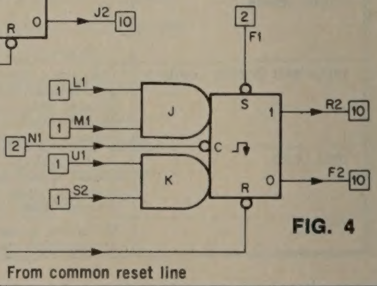

2 F1
1 L1
1 M1
J
S 1
R2 10
2 N1 C
1 U1
1 S2
K
R 0
F2 10
From common reset line

FIG. 4

Cat. No.	Description	Flip-Flops per Module	Fig.	List	Cat.	Cash	Shipping Weight
M207	General Purpose	6	1	$36	$34	$33	
M202	ANDed Inputs	3	2	22	21	20	See p. 115
M204	Buffer/ Counter	4	1,2, 3,4	28	27	25	

NOTE: All Sizes are SSS

DIGITAL MODULES—M SERIES

LOGIC AMPLIFIERS

Solenoid Drivers — M040, M060

These modules are designed to drive inductive loads such as relays and solenoids. (Use M050 for incandescent lamp loads.)

The M040, Fig. 1, contains two identical negative high-voltage driver circuits. Each consists of a 4-input positive NAND gate that controls a PNP transistor switch. The switch is capable of sinking up to 600 mA of current to ground from an external power supply of up to —70 volts. One terminal of the load device (relay, etc.) must be connected to the external voltage, the other to the drive output. The positive terminal of the external supply connects to the module ground.

The M060 module, Fig. 2, consists of four identical positive high-current driver circuits. Each circuit contains an inverting gate that controls an NPN transistor switch. A low level, at any input, will turn on the switch which is capable of driving loads up to 1.2 amps to ground with external power supply voltages of up to +75 volts dc.

Cat. No.	Size	Drivers per Module	List	Cat.	Cash	Shipping Weight
M040	SSS	2	$43	$41	$39	See p. 115
M060	SSS	4	60	57	55	

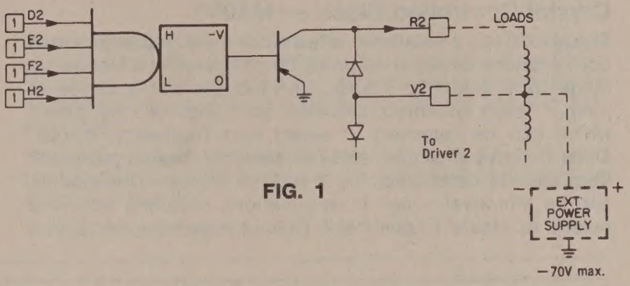


FIG. 1

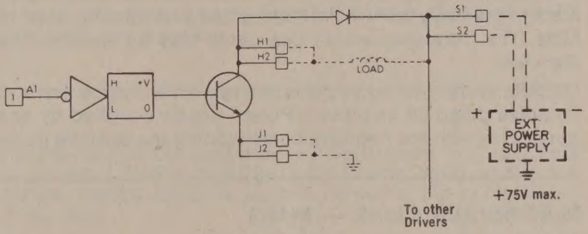
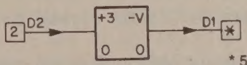


FIG. 2

Incandescent Lamp Driver — M050

The M050 contains twelve transistor inverters that can drive miniature incandescent bulbs such as those on an indicator panel. A LOW level on the input of the driver causes current to flow in the output. Do not use to drive inductive loads (relays, solenoids). Each output is able to drive 50 mA into an external load connected to any voltage up to —30 volts.

Cat. No.	Size	Drivers per Module	List	Cat.	Cash	Shipping Weight
M050	SSS	12	$36	$34	$33	See p. 115

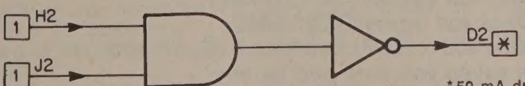


*50 mA, —30V max.

Cable Driver, Positive Level — M660

The M660 Cable Driver consists of three NAND gate circuits each of which will drive a 100-ohm terminated cable with M Series levels or pulses of duration greater than 100 ns. The output is not open-collector. It is a discrete transistor totem pole configuration similar to an IC gate providing high current drive in both the high and low directions. Outputs can sink 50 mA at a logic LOW, and can source 50 mA at a logic HIGH.

Cat. No.	Size	Drivers per Module	List	Cat.	Cash	Shipping Weight
M660	SSS	3	$29	$28	$26	See p. 115



*50 mA drive.

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CLOCK MODULES

Crystal Controlled Clock — M4050

The M4050 is a crystal controlled clock module that provides both positive- or negative-going 80 ns pulses at a frequency range from 5 kHz to 5 MHz. The module has a series of jumper leads mounted between split lugs on the board which can be removed to select four frequency ranges. Once the proper range has been selected, the output clock frequency is determined by a plug-in crystal. The module can be effectively used in applications requiring accurate pulses at stable frequencies. Driving capability is 10 unit loads for the positive going and 9 for the negative going output pulses.

The frequency must be specified by the user and the appropriate jumpers will be removed at DIGITAL for the frequency ranges required.

The M4050 is available in several standard frequencies listed below. Be sure to list the frequency range desired when ordering. Standard frequency ranges available: 1.333 MHz; 2.0 MHz; 5.0 MHz.

Crystal Clock — M405

The M405 employs a crystal oscillator to provide a highly stable, precisely known frequency between 5 kHz and 10 MHz. The frequency within this range may be specified by the user.

Outputs at the two output pins are respectively positive and negative going 50 ns pulses. Pulses are time shifted by one gate delay with the negative pulse leading the positive pulse by a maximum of 20 ns. The output pulse width can be modified by the addition of an external capacitor to increase the output pulse width by approximately 1 ns per 2.5 pF of additional capacitance. Frequency stability is 0.01% of specified value between 0°C and +55°C. Standard stock frequencies are 1.333 MHz, 2 MHz, 5 MHz. Driving capability in unit loads is 10 for the positive going and 9 for the negative going pulses.

Multivibrator Clock — M403

The M403 is an RC Multivibrator Clock which produces standard 10-microsecond timing pulses, positive-going and negative-going, at repetition rates adjustable from 1 kHz to 50 kHz in three ranges. Internal capacitors, selected by jumper pin connection, provide coarse frequency control, while an internal potentiometer provides continuously variable adjustment within each range.

The clock circuit is enabled by a HIGH level at the ENABLE input. If a LOW level is applied, the clock output will time out.

Lower frequencies and wider pulse widths can be derived by adding external capacitance. Driving capability is 10 unit loads and 9 unit loads on positive-going and negative-going, respectively. ENABLE input is one unit load.

Multifrequency Crystal Clock — M404

The M404 clock contains a 2 MHz crystal oscillator and frequency dividers.

A HIGH on the CLEAR input (one unit load) clears the frequency divider and all outputs go LOW except the 2 MHz output, which is not affected. Maximum error from specified output frequency is 0.01% between 0°C and +55°C.

Output frequencies from the divider are 5, 10, 12.5, 50, 100, 125, 250, 500 kHz and 1 and 2 MHz.

Variable Multivibrator Clock — M401

The M401 Variable Clock is a stable RC-coupled multivibrator which produces standard 50 ns (positive or negative going) timing pulses at adjustable repetition rates.

Repetition rate is adjustable from 175 Hz to 10 MHz in five ranges. Internal capacitors, selected by jumper pin connections, provide coarse frequency control. An internal potentiometer provides continuously variable adjustment within each range.

A 0 to 10 volt control voltage will vary the frequency over about 30% of each frequency range.

A two-input OR gating input (each input is one unit load) is provided for start-stop control of the pulse train. A level change from HIGH to LOW with fall time less than 400 ns is required to enable the clock.

Output driving capability is 10 and 9 unit loads for the positive-going and negative-going pulses.

Cat. No.	Size	Description	Circuits per Module	List	Cat.	Cash	Shipping Weight
M405	SSS	Crystal Clock	1	$120	$114	$109	See p. 115
M403	SSS	Multivibrator Clock	1	50	48	46	
M404	SSS	Multifrequency Crystal Clock	1	89	85	81	
M401	SSS	Variable Multivibrator Clock	1	60	57	55	
M4050	ESS	Crystal Clock	1	120	114	109	

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PULSE-SHAPING, DELAYING MODULES

Delay and Stretch — M3020

The M3020 Module contains two independent monostable multivibrators, each of which is activated by the output of its own integral Schmitt Trigger circuit. A low input transition on any one of the three inputs to the Schmitt Trigger circuit produces a positive output pulse after a preset adjustable delay and triggers the multivibrator. Minimum duration of a low pulse is 50 ns. The Schmitt Trigger input provides hysteresis which prevents the multivibrator from being triggered erroneously by noise signals at the input. Each trigger input is three unit loads.

When activated, the multivibrator produces a positive pulse at the output. The width of the pulse is variable from 50 ns to 50 sec and is selected by the external connections to capacitors mounted on the M3020 and by the variable Vcc available.

The delay time is adjustable from 50 ns to 7.5 ms using the internal capacitors and can be extended by adding an external capacitor.

Output drive capability is 10 unit loads.

Pulse Amplifier/Generator — M602

The M602 contains two pulse amplifiers which provide power amplification and transform level changes into pulses. A negative pulse output is produced when the input is triggered by a transition from HIGH to LOW on any one of three (per circuit) inputs to an integral OR gate. Each input is three unit loads. An internal capacitor is brought out to pin connections to permit the standard 50 ns output pulse to be increased to 110 ns (nominal). Drive capability is 30 unit loads per amplifier.

Schmitt Trigger — M501

The M501 is a Schmitt Trigger with variable thresholds and complementary positive logic outputs. Its applications are varied and include use as a: switch filter, pulse shaper, threshold detector.

The input voltage (not to exceed ±20 volts) is compared with the thresholds set on pins UPPER and LOWER, respectively. Output goes to LOW when the input rises above the UPPER THRESHOLD, having been below the LOWER THRESHOLD. Output rises to +3 volts when the input falls below the LOWER THRESHOLD, having been above the UPPER THRESHOLD. A second output is the complement of the first.

An integrator is provided on the input, allowing switches to be connected to the Schmitt Trigger with contact bounce effects eliminated. Two switch time constants are provided: a 7 ms time constant and a 3.5 ms time constant.

Integrating One-shot — M306

The M306 is a zero-recovery-time integrating monostable multivibrator with complementary outputs. The M306 has the ability to respond to an input even while in the active state, so that successive inputs above a preset frequency can postpone the return to the inactive state indefinitely.

An input pulse (2 unit loads) of 30 ns will trigger the M306.

The output pulse width is a minimum of 225 ns with maximum width limited only by capacitor leakage (40 sec is typical max.). Timing is adjusted by externally added capacitors and a multiturn potentiometer as the module. Drive capability is 11, and 12 unit loads on the positive-going and negative-going outputs, respectively.

Delay Line — M310

The M310 consists of a tapped delay line with associated circuitry and two pulse amplifiers. The total delay is 500 ns with taps available at 50 ns intervals. Applications are in timing pulse trains and pulse spacing.

The pulse amplifiers standardize the outputs of the delay line. The output of the pulse amplifier is a positive pulse whose duration is typically 50 to 200 ns. These amplifiers are not intended to be driven by TTL IC logic. Input to the delay line is three unit loads.

Outputs from the delay line must be connected to the input of the pulse amplifiers. Each pulse amplifier can drive 30 unit loads.

Cat. No.	Size	Description	Circuits per Module	List	Cat.	Cash	Shipping Weight
M3020	SSS	Delay/Stretch	2	$44	$42	$40	See p. 115
M602	SSS	Amplifier/Generator	2	33	31	30	
M501	SSS	Schmitt Trigger	1	29	28	26	
M306	SSS	Integrating One-Shot	1	42	40	38	
M310	SSS	Delay Line	1	60	57	55	

MISCELLANEOUS

Logic HIGH Source — M002

To hold unused M Series TTL gate inputs HIGH, the M002 provides 15 outputs at +3 volts (logic HIGH). Up to 10 unused M Series gate inputs may be connected to any one output.

The M002 can also be used as pull-ups for open-collector outputs in a wired-OR situation. If an M002 circuit is driven by a gate, it appears as two TTL unit loads or 3.2 mA at ground.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M002	SSS	$15	$14	$14	See p. 115

MISCELLANEOUS (Cont'd)

Parity Circuit — M162

The M162 contains two parity detector circuits. Each circuit indicates whether the binary data presented to it contains an ODD or EVEN number of ONES by a HIGH level on specific output pins. Each input data line represents 4 unit loads. The ODD parity HIGH output can drive 6 unit loads. The ODD parity LOW output can drive 10 unit loads.

Cat. No.	Size	Circuits per Module	List	Cat.	Cash	Shipping Weight
M162	SSS	2	**$38**	**$36**	**$35**	See p. 115

MSI Module Board — W960

The W960 MSI Module Board is a single-height, standard length module board that can accommodate either two 14- or 16-pin dual-in-line package (DIP) integrated circuits (ICs) or one 24-pin DIP IC, either with or without sockets. All IC pin plated-through hole locations are identified with their associated board contact finger and are all brought out to the board contact fingers via printed circuit etching.

Cat. No.	List	Cat.	Cash	Shipping Weight
W960	**$9**	**$9**	**$8**	See p. 115

Universal Terminator Board — W964

The W964 Universal Terminator Board is a single-height, standard length module. It is an etched and drilled module that can be used for mounting user-selected and user-supplied discrete components to provide a variety of termination or voltage source circuits for up to 28 signal pins. Each signal pin can have two components connected to ground and one component connected to +5 volts. Any discrete component can be mounted on the W964 if the physical size is approximately the size of a ¼-W resistor or disk capacitor.

Cat. No.	List	Cat.	Cash	Shipping Weight
W964	**$11**	**$10**	**$10**	See p. 115

DECODERS AND MULTIPLEXERS

Decoders — M155, M161, M163, M230

The M155 Module decodes the binary value on the four input lines into one of sixteen mutually exclusive outputs when both STROBE inputs are LOW. The de-multiplexing function is performed by using the four input lines to address the output line. When either STROBE input is HIGH, all outputs are HIGH. Any output can drive 10 unit loads. All inputs present one unit load each.

The M163 Module consists of two binary-to-decimal decoder circuits, each of which accepts four inputs and provides 10 mutually exclusive outputs. The most significant 2^3 input can be used as an enable function to allow the circuits to be used as a binary-to-octal decoder. Outputs 0 through 7 will remain HIGH as long as input 2^3 is HIGH. Any output can drive 10 unit loads. Each input presents one unit load.

The M161 is a functional decoding module which can be used as a binary-to-octal or binary-coded decimal (8421 or 2421 codes) to decimal decoder. Three ENABLE inputs are provided for selective enabling of modules in decoders of more than one octal or decimal digit. In the octal mode, the bit 2* input should be connected to ground, which automatically inhibits the 8 and 9 outputs. A HIGH and a LOW version of each output is provided. All outputs can drive 10 unit loads each. Code inputs present one unit load each; ENABLE inputs 2 each.

The M230 converts a binary number to its binary coded decimal equivalent or a binary coded decimal number to its binary equivalent.

The maximum number that can be applied to the BCD input is 4095 which will result in all ones at the binary output. The maximum value of all ones applied to the binary input will result in the value 4095 at the BCD output. This converter utilizes a counting technique where the count frequency is typically 5 MHz. Therefore, the conversion time for the maximum number is typically 0.82 millisecond. The M230 is fully cascadable. All outputs can drive 10 unit loads. Each input presents 1 unit load.

Cat. No.	Size	Decoders per Module	List	Cat.	Cash	Shipping Weight
M155	SSS	1	**$31**	**$29**	**$28**	See p. 115
M163	SSS	2	**30**	**29**	**27**	
M161	SSS	1	**38**	**36**	**35**	
M230	SDS	1	**77**	**73**	**70**	

Multiplexers — M1713, M1701

The M1713 Module is a 1-of-16 data selector/multiplexer. A 4-bit binary code defines which of the 16 data inputs will be connected to the output when STROBE is LOW. All inputs present one unit load. The output can drive 10 unit loads.

The M1701 Data Selector contains two independent dual 4-line to 1-line multiplexers on a single-height module. Each dual multiplexer has two groups of DATA INPUTS, two STROBES, two OUTPUTS and common SELECT inputs (2-bits). An OUTPUT becomes active for a DATA INPUT when the DATA INPUT is addressed by the SELECT lines and the corresponding STROBE brought LOW. All inputs present one unit load each. Outputs can drive 10 unit loads each.

Cat. No.	Size	Description	Muxes per Module	List	Cat.	Cash	Shipping Weight
M1713	SSS	16-to-1	1	**$21**	**$20**	**$19**	See p. 115
M1701	SSS	4-to-1	4	**26**	**25**	**24**	

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DIGITAL MODULES—M SERIES

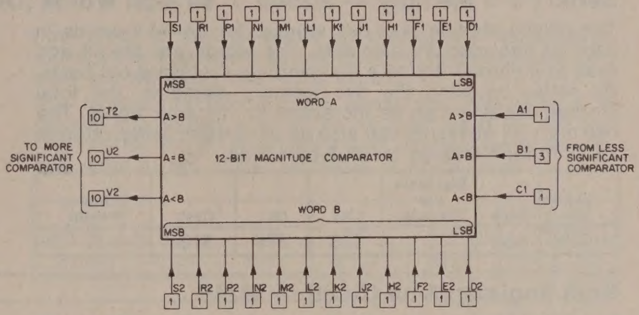
COUNTERS AND ARITHMETIC MODULES

Magnitude Comparator, 12-bit — M168

The M168 12-bit Magnitude Comparator performs magnitude comparison of two 12-bit words. One of the three outputs, A > B, A = B or A < B will be high to indicate the relative magnitude of the two binary input words.

The M168 Comparator may be cascaded to compare longer words. The outputs T2, U2 and V2 should be connected to the corresponding inputs of the next comparator which are A1, B1 and C1 respectively. The inputs of the first comparator must all be made a logical "1."

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M168	SSS	$50	$48	$46	See p. 115



Up/Down Counters — M236, M237, M238

These three up/down counters are fully programmable; that is, the outputs may be preset to any state by entering the desired data at the DATA inputs while the LOAD input is LOW. The output will change to agree with the DATA inputs independently of the COUNT pulses. This feature allows the counters to be used as modulo-N dividers by simply modifying the count length with the preset inputs. These counters were designed to be cascaded without the need for any external circuitry.

The M238 Module consists of two identical 4-bit binary counters. Synchronous operation is provided by having all flip-flops clocked simultaneously so that the outputs change coincidentally with each other.

The outputs are triggered by a LOW to HIGH level transition of either COUNT input. The direction of the counting is determined by which COUNT input is pulsed while the other COUNT input is HIGH. All outputs can drive 10 unit loads. All inputs present one unit load each.

The M236 is a 12-bit synchronous binary up/down counter. It has a single control input that can switch the counting mode from up to down without disturbing the contents of the counter. Counting occurs on a positive transition of the COUNT IN line. This input must remain LOW for at least 50 ns before the count. Time between pulses can be no less than 50 ns. There is no maximum for pulse width or time between pulses. The maximum count frequency is 10 MHz. The ENABLE input permits counting while it is HIGH, and disables counting while it is LOW. All outputs can drive 10 unit loads. ENABLE and COUNT inputs present one unit load. LOAD and UP/DOWN control present three unit loads each. Data inputs present one load each.

The M237 is a 3-digit synchronous BCD up/down counter. It has a single control input that can switch the counting mode from up to down without disturbing the contents of the counter. Counting and ENABLE action is the same as described above for the M236. So, too, are load/drive capabilities.

Cat. No.	Size	Description	Counters per Module	List	Cat.	Cash	Shipping Weight
M238	SSS	4-bit binary	2	$44	$42	$40	See p. 115
M236	SSS	12-bit binary	1	58	55	53	
M237	SSS	3-digit BCD	1	58	55	53	

Counter/Register, 4-bit — M239

The M239 Module consists of three high-speed, four flip-flop stage elements. It provides 12-bit data storage or a serial counter with 12-BCD outputs. All inputs and outputs are TTL or DTL compatible with a drive capability of 10 unit loads (TTL). All inputs present one unit load each. Each of the 12 flip-flops has a data line input, and data information is entered by a COUNT/LOAD signal associated with each 4-bit stage. The output of the flip-flops assumes the logic state of the data inputs when the COUNT/LOAD input signal is HIGH. When the COUNT/LOAD signal is LOW, the data inputs are disabled, provided the clock inputs are inactive.

The Q_A output of each latch within a 4-stage element is connected to the toggle (T) input of the following latch. This allows the module to be used as a high-speed counter or serial-to-BCD converter.

The counters will accept frequencies of 0-50 MHz at the CLOCK 1 input, and the transfer of information to the outputs occurs at the positive-going edge of this clock pulse.

Cat. No.	Size	Registers per Module	List	Cat.	Cash	Shipping Weight
M239	SSS	3	$44	$42	$40	See p. 115

LOGIC HANDBOOK

logic handbook
20

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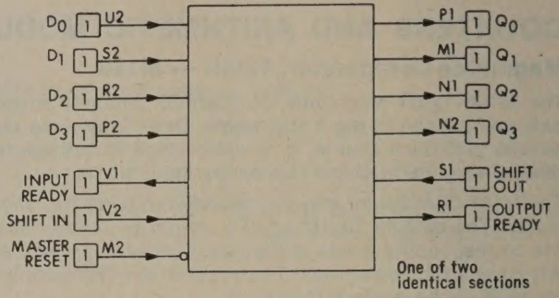
DIGITAL MODULES—M SERIES

MEMORY AND REGISTERS MODULES

Serial FIFO Memory — M2500 / 64 4-bit Words (Dual)

The M2500 Module provides storage for 64 4-bit words in each of two memory elements. The words are stored and read asynchronously on a first-word-in, first-word-out basis. By series coupling the two memory elements, the total storage capacity can be increased to 128 4-bit words. The two memory elements can also be paralleled, using external logic, to form storage for 64 8-bit words.

Cat. No.	Size	Elements per Module	List	Cat.	Cash	Shipping Weight
M2500	SSS	2	**$83**	**$79**	**$76**	See p. 115



One of two identical sections

Shift Register, 4-bit (Dual) — M245

The M245 Module consists of two 4-bit shift registers with both serial and parallel data entry capability. They are shift-right only registers; that is, the output data is shifted from A toward D.

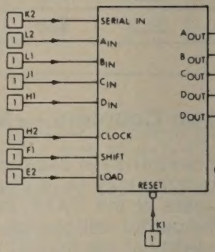
Three control modes are possible: serial shift right, parallel enter mode, and no change or hold mode. These control modes are chosen by inputs at the SHIFT and LOAD lines.

In the serial mode of operation, data present at the SERIAL INput, when the SHIFT input is High, is loaded on the Low-going edge of the CLOCK pulse.

In the parallel entry mode, data present at the data inputs A IN through D IN, when the LOAD line is High, is loaded on the Low-going edge of the CLOCK pulse.

The hold mode is created by holding both the LOAD and SHIFT lines Low. By doing this, the CLOCK pulse will have no effect on the output, regardless of data present at the SERIAL INputs or DATA INputs.

A RESET line has been provided for the registers which will clear the internal flip-flop circuitry.



One of two identical sections

Cat. No.	Size	Registers per Module	List	Cat.	Cash	Shipping Weight
M245	SSS	2	**$31**	**$29**	**$28**	See p. 115

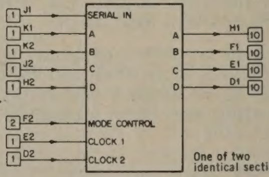
Shift Register, Multipurpose 4-bit (Dual) — M248

The M248 Module consists of two 4-bit Shift registers — multipurpose in the fact that they are capable of either serial or parallel entry, shifting right, or with simple external connections, shifting left.

When a logic LOW is applied to the MODE CONTROL input, a shift right operation is performed by clocking at the CLOCK 1 input. In this mode, serial data is entered at the SERIAL INput. CLOCK 2 and parallel inputs A through D are inhibited.

When a logic HIGH is applied to the MODE CONTROL input, it allows entry of parallel data through inputs A through D and CLOCK 2. This mode permits parallel loading of the register or, with external interconnection, shift left operation. In this mode, shift left can be accomplished by connecting the output of each flip-flop to the parallel input of the previous flip-flop; that is, D output to C input, etc., and serial data is entered at input D.

Two clock inputs are available which permit separate clock sources to be used for the shift right and shift left modes. If both modes can be clocked from the same source, the clock input may be applied to both CLOCK 1 and CLOCK 2. The transfer of information to the output pins occurs when the clock input goes from a logic High to a logic Low.



One of two identical sections

Cat. No.	Size	Registers per Module	List	Cat.	Cash	Shipping Weight
M248	SSS	2	**$28**	**$27**	**$25**	See p. 115

Tri-state Register, 4-bit (Dual) — M2001

The M2001 is a dual, 4-bit register module consisting of D-type flip-flops and input and output gating. It provides a total of eight bits of data storage and outputs to interface directly to system bus. All input and output signals are through edge board connector. Each of the module output contains a tri-state circuit capable of driving low-impedance, high-capacitance loads without the use of pull-up or interface components. The third state of the output is a high-impedance state and is selectable by logic levels to the input of the module. This state effectively disconnects the register outputs from the bus when no information transfer is required. Up to 128 of these outputs can be connected together in a wired-OR configuration. All inputs present one unit load. All outputs can drive 10 unit loads each.

Cat. No.	Size	Registers per Module	List	Cat.	Cash	Shipping Weight
M2001	SSS	2	**$44**	**$42**	**$40**	See p. 115

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DIGITAL MODULES—M SERIES

COMMUNICATIONS

Asynchronous Transceiver — M7390

The M7390 Asynchronous Transceiver Module is a complete serial-line interface for use with data communications equipment. Full-duplex operation, selectable baud rates, parity selection, and programmable word length features provide this module with considerable flexibility. It contains input/output level converters (for 20 mA current loop or EIA RS-232-C signals), parallel-to-serial and serial-to-parallel converters (for transmitting and receiving asynchronous serial data), and a crystal-controlled clock (for frequency stability) and frequency-divider circuitry (for variable transmission and reception rates) on a single module.

The transmitter section of the module accepts parallel data from either a terminal device or a computer, serializes it, formats it by appending selected control and error-detecting bits, and transmits this word serially.

The receiver section accepts serial data, converts it to parallel information, checks the received word for the correct control and error-detecting bits, and presents the parallel word at the output terminals of the module.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M7390	EDS	**$218**	**$207**	**$198**	See p. 115

EIA Level Converter — M594

The M594 Module is used to convert the signal voltage levels between DIGITAL data processing terminal equipment such as the DF11 Modem and data communications equipment such as a Bell data set. The M594 provides circuits to convert a maximum of eight EIA or CCITT signal levels to eight DTL or TTL signals that are compatible with DIGITAL logic, and circuits to convert a maximum of seven DIGITAL, TTL, or DTL logic signal outputs to seven signals compatible with EIA or CCITT signal devices. Refer to EIA Standard RS-232-C for description of the selected signals.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M594	SSS	**$94**	**$89**	**$86**	See p. 115

Optic-coupled 20 mA Loop Interface — M598

The M598 module contains a single-channel transmit and a single-channel receive circuit capable of converting the data signals between a Teletype® or similar current loop device and TTL or DTL compatible logic circuits. The data signals transferred through each of the module circuits are optically-coupled to provide a maximum of 1500V isolation between the current loop and the TTL logic. The transmitter receives serial TTL or DTL compatible levels and controls an output current loop with a maximum current of up to 80 mA.

The M598 module is supplied with jumper leads installed to operate as a passive element providing no current to the current loop device. By rewiring the jumper leads on the transmitter and receiver circuits, the module can be an active element and supply current from a +5V dc or −15V dc source.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M598	ESS	**$77**	**$73**	**$70**	See p. 115

Teletype® Transmitter — M707 / Teletype® Receiver — M706

The M707 Teletype® Transmitter is a parallel-to-serial teletype code converter self-contained on a double height module. This module includes all of the parallel-to-serial conversion, buffering, gating and timing (excluding only an external clock) necessary to transfer information in an asynchronous manner between a parallel binary device and a serial data line or teletype device.

The M706 Teletype® Receiver is a serial-to-parallel teletype code converter self-contained on a double height module. This module includes all of the serial-to-parallel conversion, buffering, gating, and timing (excluding only an external clock) necessary to transfer information in an asynchronous manner between a serial data line or Teletype® device and a parallel binary device.

The M707 and M706 Module include the necessary gating so that they can be used in a half-duplex system with each other. Device selector gating is also provided so that these modules can be used on the positive bus of either the PDP8/I or the PDP8/L.

Cat. No.	Size	Description	List	Cat.	Cash	Shipping Weight
M707	SDS	Transmitter	**$82**	**$78**	**$75**	See p. 115
M706	SDS	Receiver	**82**	**78**	**75**	

Optic Isolators Input/Output — M5864/M6865

The M5864 Optic Isolator Input Module and the M6865 Optic Isolator Output Module are used to electrically isolate and/or convert signal levels between peripheral devices and a TTL-compatible interface of a processor or controller system. The M5864 interconnects with the DR11-L Two-Word Input UNIBUS Interface. M6865 interconnects with the DR11-M Two-Word Output UNIBUS Interface.

Each module contains 20 optically-coupled circuits, each of which provides signal isolation between the input and output of the module. The data signals are optically-coupled to provide a maximum of 1500V isolation between the current loop and the TTL logic. The M5864 Input Module has 18 input circuits that accept levels from current-producing devices and convert these signals to TTL-compatible levels. Each TTL can drive 10 unit loads.

Two **output** circuits accept TTL-compatible levels from the interface and control the conduction of two floating transistor outputs whose outputs are capable of switching 8 mA current each.

Conversely, the M6865 Output Module has 18 output circuits that accept TTL-compatible levels from the interface to control the conduction of the 18 floating transistors in the optic couplers. Each TTL input is 10 unit loads while each of the transistor outputs is capable of switching 1.6 mA of current. As with the M5864, the data signals are optically-coupled to provide a maximum of 1500V isolation between the current loop and the TTL logic. Two **input** circuits receive controlling signals from current-producing devices and convert these signals to TTL-compatible levels.

Cat. No.	Size	Description	List	Cat.	Cash	Shipping Weight
M5864	EDD	Input	**$132**	**$125**	**$120**	See p. 115
M6865	EDS	Output	**116**	**110**	**106**	

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ANALOG MODULES—A SERIES

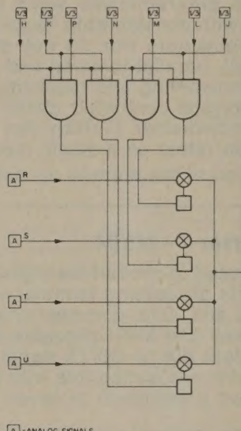
A Series analog modules support the M Series by providing a two-way translation between continually varying real-world voltage measurements and the digital realm of control and computation. The A Series emphasizes 10- and 12-bit performance in a family of mutually compatible functions — multiplexers, operational amplifiers, and A/D converters.

Analog Multiplexer — A123

The A123 Multiplexer provides 4 gated analog switches that are controlled by logic levels of 0V and +3V. The module is equivalent to a single-pole, 4-position switch, since the output terminals of each MOS FET switch are tied together. If all three digital inputs of a gating circuit are at +3V (or not connected), MOS FET switch is "closed." If any digital input is a 0V, the related switch is "open." Two switches should not be on at the same time. The analog switch can handle signals between +10V and −10V, with currents up to 1 mA.

The positive power supply must be between +5V and +15V, and at least equal to or greater than the most positive excursion of the analog signal. The negative power supply must be between −5V and −20V, and at least 10V more negative than the most negative excursion of the analog signal. The voltage difference between the two supplies must not be more than 30V.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
A123	SSS	$68	$65	$62	See p. 115



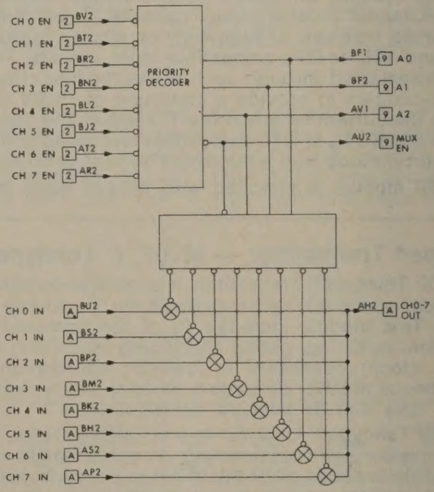
A = ANALOG SIGNALS (DO NOT CONNECT TO LOGIC LEVELS)

Analog Multiplexer, 8-channel — A126

The A126 is an eight-channel, high-impedance multiplexer module with each channel controlled by an associated enable input. The conduction or non-conduction of each channel is controlled by FETs and the channel outputs are connected together to a common terminal. Each channel is capable of switching bipolar (±12V) analog signals and is protected against random switching in the event of over-voltage and power down or loss of power conditions.

The enable inputs, associated with each channel, are priority encoded to ensure that only one channel is connected to the output at a time. Therefore, more than one channel enable input can be asserted at one time. Channel 0 is the highest priority and Channel 7, the lowest priority. The enable signals required are TTL or DTL compatible levels. Three TTL outputs are provided for identifying the selected channel, and one TTL multiplexer enable output indicates that one of the eight channels has been selected. The selected channel number is specified by an octal code on lines A0-A2.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
A126	SDS	$83	$79	$76	See p. 115

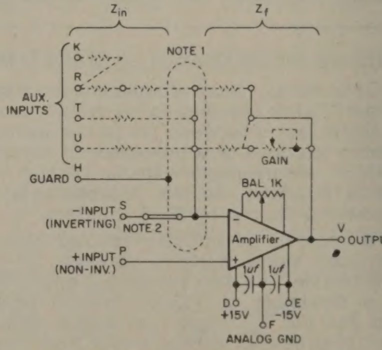


Operational Amplifier — A207

The A207 is an economical Operational Amplifier featuring fast settling time (5 μs to within 10 mV), making it especially suited for use with Analog-to-Digital Converters. The A207 can be used for buffering, scale-changing, offsetting, and other data-conditioning functions required with A/D Converters. All other normal operational amplifier configurations can be achieved with the A207.

The A207 is supplied with a zero balance potentiometer. Provisions are made on the board for the mounting of input and feedback components, including a gain trim potentiometer. The A207 is pin-compatible with the A200 Operational Amplifier. DC open loop gain, 670 ohm load is 15,000 min. and slewing rate is 3.5V μs min. Max. output is ±10V dc at 15 mA. Input voltage range is ±10V dc. Input impedance is 100K ohms min. with an input offset drift vs. temperature of 60 μV/°C. Temperature range is 0°C to 60°C.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
A207	SSS	$57	$54	$52	See p. 115



NOTE 1. Mounting holes are provided on the module so that input and feedback components can be added. Components shown with dashed lines are not included with the module.

NOTE 2. This jumper comes with the module. It may be removed to suit circuit requirements.

ANALOG MODULES—A SERIES

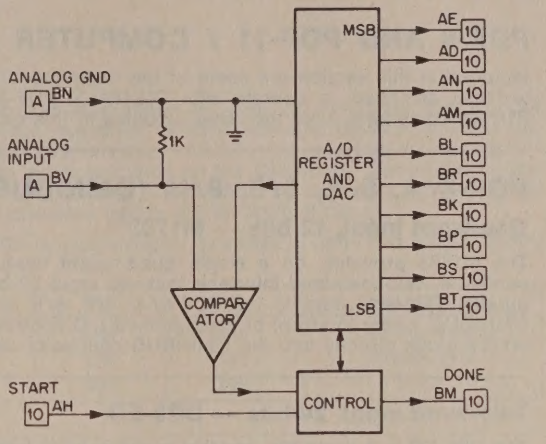
A/D Converter, 10-bit — A811

The A811 is a complete, 10-bit successive approximation, analog to digital converter with a built-in reference supply. Conversion is initiated by raising the Convert input to logic 1 (+4V). The digital result is available at the output within 10 microseconds. An A/D Done Pulse is generated when the result is valid. The A811 uses monolithic integrated circuits for control logic, output register, and comparator.

The input impedance of the A/D converter can be raised to greater than 100 megohms by adding an input amplifier module. A sample and hold amplifier module may also be included. The impedance of the converter with sample and hold is 10,000 ohms. Both options may be included simultaneously if high impedance and narrow aperture are both required.

Output format is parallel binary unipolar and the conversion rate is 100 kHz max. Operating temperature is 0°C to 50°C.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
A811	SDD	$237	$225	$216	See p. 115


ANALOG GND
A BN
1K
ANALOG INPUT
A BV
COMPARATOR
A/D REGISTER AND DAC
MSB
LSB
AE 10
AD 10
AN 10
AM 10
BL 10
BR 10
BK 10
BP 10
BS 10
BT 10
START
10 AH
CONTROL
DONE
BM 10

NOTE: Logic and Analog Grounds must be tied together at some point in the system.

A/D Converter, High Speed, 12-bit Bipolar — A866

The A866 is a 12-bit general purpose analog-to-digital converter module which uses the successive approximation technique. The A866 is designed to accept unipolar or bipolar single-ended analog voltage as input and convert it to a 12-bit TTL-compatible, coded digital output. The coded digital output is parallel data and is available for application to a computer, terminal, display, or other logic device.

The selection of unipolar or bipolar and voltage range of the analog input is determined by jumper leads mounted on the module circuit board. The module has factory-installed jumpers that permit its use with bipolar, 10V full-scale extended-range inputs. By changing the jumper configuration, the user can select bipolar or unipolar, 5V or 10V full scale extended or non-extended input ranges.

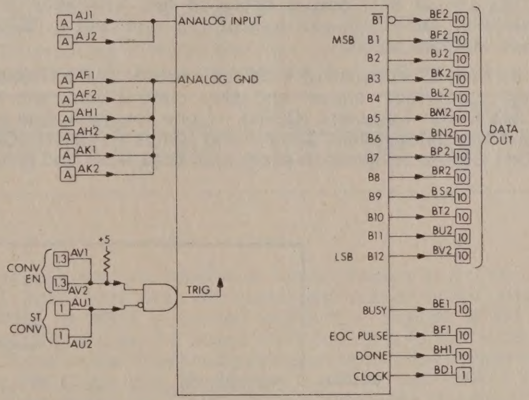
The A866 can be used wherever fast, accurate analog-to-digital conversions are required.

The high input impedance (100 megohms) at the analog inputs minimizes the signal source loading, and the fast conversion time permits an encoding rate at the output of 16,000 conversions per second.

The digital output data, the output control and status signals, and the input control signals are all TTL-compatible.

Three outputs are provided to indicate the status of the conversion process. The BUSY output becomes high and remains high while the conversion process is active. The BUSY output becomes low 50 ns after the data is available at the output and remains low until the next command to start the conversion.

The DONE output is the complement of the BUSY level.


A AJ1
A AJ2
ANALOG INPUT
A AF1
A AF2
A AH1
A AH2
A AK1
A AK2
ANALOG GND
+5
CONV EN
13 AV1
13 AV2
ST CONV
1 AU1
1 AU2
TRIG
MSB
LSB
B̄1
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
BE2 10
BF2 10
BJ2 10
BK2 10
BL2 10
BM2 10
BN2 10
BP2 10
BR2 10
BS2 10
BT2 10
BU2 10
BV2 10
DATA OUT
BUSY
EOC PULSE
DONE
CLOCK
BE1 10
BF1 10
BH1 10
BD1 1

The EOC PULSE output becomes a high level for 450 ±50 ns after the DONE output level goes high.

The CLOCK output is a series of 50 ns pulses (min.) generated when the A866 Module is performing an analog-to-digital conversion.

Detailed information on the module is available on the A866 A/D Converter Module (12-bit, 15-microsecond) data sheet. Contact Catalog Sales Desk for a free copy.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
A866	SDS	$400	$380	$364	See p. 115

logic handbook
20

LOGIC HANDBOOK

The Logic Handbook, known as the computer industry's "bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook. Over 400 pages.

PDP-8 COMPUTER INTERFACE MODULES

PDP-8 AND PDP-11 / COMPUTER INTERFACE MODULES

Included in this section are some of the many modular interfaces designed to operate with DIGITAL's PDP-8 and PDP-11 computers. Like the other modules in this catalog, these interface modules are fully described in the Logic Handbook which is available to you free of charge. Contact Catalog Sales Desk.

PDP-8/A, 8/E, 8/F, 8/M (OMNIBUS) INPUT/OUTPUT MODULES

One-word Input, 12-bits — M1703

The M1703 provides, on a single quad-height module, a complete, self-contained interface that will input 12 bits of parallel TTL-level data to the PDP-8/A, 8/F, 8/E or 8/M OMNIBUS, under interrupt or programmed I/O control. The M1703 plugs directly into the OMNIBUS connector assembly, and the external device plugs into a 40-pin flat cable connector on the module itself. The module includes a device selector, an operation decoder, flags, and all control logic needed to request interrupt and respond to programmed I/O commands on the OMNIBUS.

Two-word Input, 24-bits — DR8-ED

The DR8-ED is a complete, general purpose input interface used to transfer two independent 12-bit, parallel data words from a user's peripheral device to a PDP-8 computer system. It is directly compatible with the OMNIBUS of a PDP-8/A, 8/E, 8/F or 8/M and is designed for installation in any available OMNIBUS slot except 1, 2 and 3 of a PDP-8/A. See diagram below.

The DR8-ED consists of a device selector and IOT decoder logic, interrupt request and skip control, and two 12-bit Data Buffer Registers (DBRs) — one for each data word, and two independent Control and Status Registers (CSRs). One CSR is assigned to each input data word and provides status and control information during word transfers.

The DR8-ED is designed for user application and requires a minimum of external hardware to implement into a PDP-8 system. Two 40-pin connectors are conveniently mounted near the edge of the board to permit either one or two devices to be easily connected using BC08R, BC07D, or BC04Z flat cable assemblies available from DIGITAL. These cables have mating connectors pre-mounted and can be supplied in any required length.

The interface module occupies one slot in the OMNIBUS or expander and is quad-height, extended-length, single-width board.

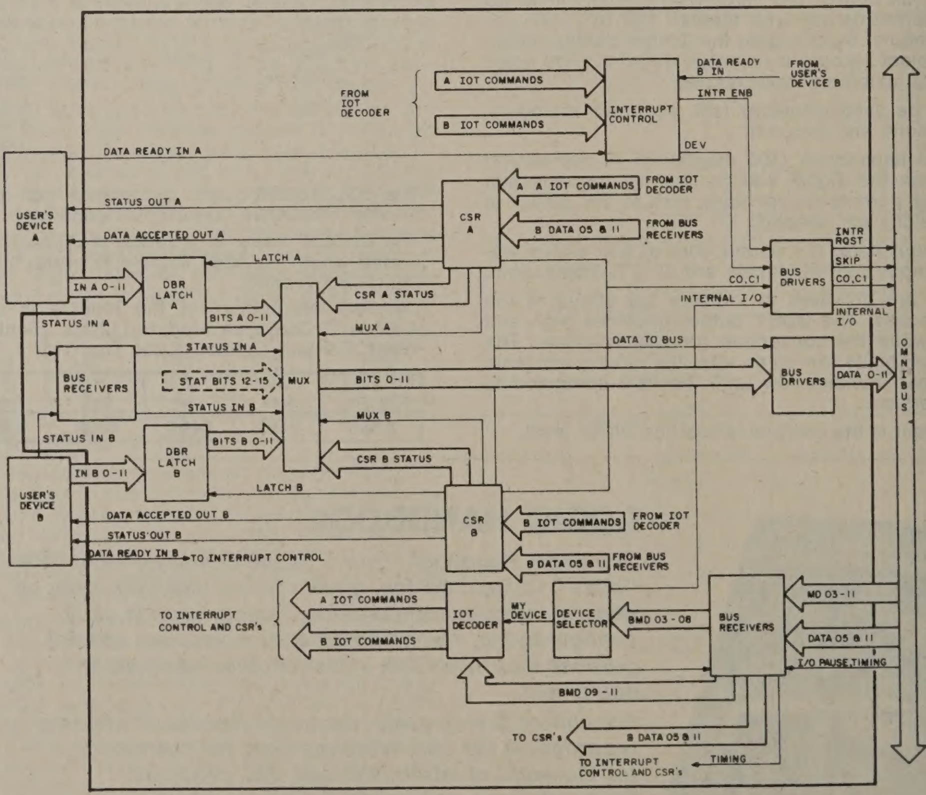

A IOT COMMANDS
FROM IOT DECODER
B IOT COMMANDS
INTERRUPT CONTROL
DATA READY B IN
FROM USER'S DEVICE B
INTR ENB
DEV
DATA READY IN A
USER'S DEVICE A
STATUS OUT A
DATA ACCEPTED OUT A
CSR A
A IOT COMMANDS
FROM IOT DECODER
B DATA 05 & 11
FROM BUS RECEIVERS
LATCH A
IN A 0-11
DBR LATCH A
BITS A 0-11
CSR A STATUS
MUX A
STATUS IN A
BUS RECEIVERS
STAT BITS 12-15
MUX
BITS 0-11
STATUS IN B
MUX B
BITS B 0-11
DBR LATCH B
CSR B STATUS
IN B 0-11
LATCH B
USER'S DEVICE B
DATA ACCEPTED OUT B
STATUS OUT B
DATA READY IN B
TO INTERRUPT CONTROL
CSR B
B IOT COMMANDS
FROM IOT DECODER
B DATA 05 & 11
FROM BUS RECEIVERS
INTR RQST
SKIP
CO,C1
BUS DRIVERS
INTERNAL I/O
DATA TO BUS
BUS DRIVERS
DATA 0-11
OMNIBUS
TO INTERRUPT CONTROL AND CSR's
A IOT COMMANDS
B IOT COMMANDS
IOT DECODER
MY DEVICE
DEVICE SELECTOR
BMD 03 - 08
BUS RECEIVERS
MD 03 - 11
DATA 05 & 11
I/O PAUSE,TIMING
BMD 09 - 11
TO CSR's
B DATA 05 & 11
TO INTERRUPT CONTROL AND CSR's
TIMING

Figure 2 DR8-ED Functional Block Diagram

PDP-8 COMPUTER INTERFACE MODULES

INPUT/OUTPUT MODULES (Cont'd)

Two-word Output, 24-bits — M1705

The M1705 is an output interface module that allows the PDP-8 computer to transfer data to, and control the operation of, remotely programmable instruments of similar digital devices. The function is to perform parallel transfers, under program or interrupt control, of 12-bit data words from the computer to peripheral devices.

The M1705 consists of duplicate logic sections. Each section includes device selection logic to address an external device, an operations decoder to determine the type of interface operation, a 12-bit storage register to buffer the output data, interrupt control logic, and bus drivers/receivers to allow operation on the OMNIBUS. Connection to the device(s) is made via standard cables that plug into a pair of connectors on the M1705 module board.

M1705 is quad-height, extended length and single width.

Cat. No.	Description	Size	List	Cat.	Cash	Shipping Weight
M1703	12-bit Input	EQS	**$99**	**$94**	**$90**	See p. 115
M1705	13-bit Output	EQS	**200**	**190**	**182**	See p. 115
DR8-ED	24-bit Input	EQS	**325**	**309**	**296**	3 lbs.

Interface Foundation Module — M1709

The M1709 OMNIBUS Interface Foundation module is a generalized OMNIBUS interface card that is constructed to allow the user to build a custom design using integrated circuits (ICs). All required OMNIBUS interface logic, i.e., bus drivers/receivers, device selectors, and interrupt/skip circuitry is provided. IC mounting pads with wire wrappable pins are made available for custom circuitry. Pads accommodate all common types of Dual-In-Line Pack (DIP) ICs with up to 40 pins.

Connection to user-equipment is made via standard cables (BC08R, BC07D, or BC04Z) that plug directly into the M1709 module board. The module cable connector allows several M1709 modules or W966/W967 wire wrappable modules to be strapped together to accommodate more extensive designs.

Cat. No.	Size	List	Cat.	Cash	Shipping Weight
M1709	EQS	**$142**	**$135**	**$129**	See p. 115

Wire Wrappable Boards — W966 and W967

The W966 Wire Wrappable Module is a PDP-8/A, 8/E, 8/F, 8/M general-purpose module that provides for construction of custom interface designs using integrated circuits (ICs) and wire wrapped interconnections. Up to 42 of 14- and/or 16-pin ICs can be easily mounted (with or without 16-pin sockets) onto the etched IC pads. Sockets are not supplied with W966 but are with W967, see below. Each wire wrap pin can accommodate two separate leads of 30-gauge wire. Discrete components may also be directly soldered onto the IC pads. Position E39 features a pad that can be used for mounting a potentiometer.

The W967 Wire Wrappable Module is identical to the W966 except that featured on the board are 42 low-profile IC sockets which easily accommodate 14- and/or 16-pin ICs. Each wire wrap pin can accommodate two separate leads of 30-gauge wire. Discrete components may also be directly inserted into the sockets. Position E39 features a pad that can be used for mounting a potentiometer by removing the socket.

Both modules have 72 etched contact fingers at the handle end, with a wire wrap pin connected to each finger. When a W966 or W967 is located adjacent to another W966 or W967, signals can be bused from one module to the other via these contact fingers by using an H851 edge connector. One H851 can bus 36 signals; therefore, two H851s are required to bus all 72 signals. In addition, the standard 144 contact fingers at the connector end of the module are also connected to wire wrap pins.

An H854 40-pin I/O connector (male) is contained on the module to provide access to the "outside world;" it can accept any cable equipped with an H856 connector. Eighteen of these connector pins are connected to wire wrap pins.

Cat. No.	Description	Size	List	Cat.	Cash	Shipping Weight
W966	w/o Sockets	EQS	**$121**	**$115**	**$110**	See p. 115
W967	w Sockets	EQS	**189**	**180**	**172**	

HARDWARE/ACCESSORIES CATALOG

HARDWARE/ACCESSORIES CATALOG

If you have ever been confronted by the need to know detailed dimensional specifications on a system enclosure or wanted to know how to order a cabinet with a left side opening door instead of right, then the Hardware/Accessories Catalog is what you need. Hundreds of detailed charts, diagrams and photographs describe DEC hardware from complete system cabinets down to the last nut and bolt. Information on power supplies, wire wrap modules and tools, cables, system units and connector blocks is also presented in the same graphic manner.

Next time you need the services of a mechanical engineer for catalog hardware, check the Hardware/Accessories Catalog!

digital

DIRECT SALES CATALOG

PDP-11 INTERFACE MODULES

MODULE SELECTION GUIDE

For detailed description see following pages.

Interface Controls, p. 66, p. 67

Description	Cat. No.	Size	List	Cat.	Cash
Address Selector	M105	ESS	$95	$90	$86
Bidirectional Bus Interfacing Gates	M1500	ESS	22	21	20
Bus Input Interface	M1501	ESS	38	36	35
Bus Output Interface	M1502	EDS	66	63	60
Interrupt Control	M7821	ESS	121	115	110
Word Count and Bus Address	M795	EDS	238	226	217
UNIBUS Master Control Module	M796	ESS	119	113	108

UNIBUS Drivers/Receivers, p. 67, p. 68

Description	Cat. No.	Size	List	Cat.	Cash
Drivers	M783	ESS	$44	$42	$40
Drivers (non-inverting)	M798	SSS	44	42	40
Receivers	M784	ESS	44	42	40
Transceivers	M785	ESS	55	52	50
IC Drivers	957	†			
IC Receivers	956	†			

Memory Interface, p. 68, p. 69

Description	Cat. No.	Size	List	Cat.	Cash
Direct Memory Access	DR11-B	*	$1620	$1539	$1474
DECkit Direct Memory Access	KIT11-D	*	850	808	774

Parallel I/O Interfaces, p. 69

Description	Cat. No.	Size	List	Cat.	Cash
Remote Instrument Control DVM's and programmable power supplies)	M1623	EQS	$165	$157	$150
DVM Data Input	M1621	EQS	138	131	126
Interface Foundation Module	M1710	EQS	275	261	250
Relay Output (16-bit)	M1801	EQS	390	371	355

UNIBUS Interfaces, p. 70

Description	Cat. No.	Size	List	Cat.	Cash
1-Word In, 1-Word Out	DR11-C	EQS#	$540	$513	$491
2-Word Input	DR11-L	EQS#	380	361	346
2-Word Output	DR11-M	EQS#	380	361	346

Serial I/O Interfaces, p. 70

Description	Cat. No.	Size	List	Cat.	Cash
20 mA Current Loop Asynchronous Interface	DL11-WA	EQS**	$770	$732	$701
EIA RS-232-C Asynchronous Interface	DL11-WB	EQS**	770	732	701

Analog Interfaces, p. 70

Description	Cat. No.	Size	List	Cat.	Cash
D/A and A/D Converter, 16-channel Multiplexer, Sample/Hold Amplifier, Clock, and Scope Control	AR11	EHS	$1815	$1724	$1652

*Shipping Weight is 13 lbs.

**Shipping Weight is 3 lbs.

†Shipping Weight is .25 lbs.

#Shipping Weight is 4 lbs.

INTERFACE CONTROLS

Bus Output Interface — M1502

The M1502 is a versatile buffered output interface for up to 16 data bits, arranged in two 8-bit bytes. The module accepts data from the UNIBUS Data lines and stores it in a 16-bit register. Outputs are supplied both to a 40-pin flat ribbon connector and to the backplane. Open-collector output drivers with pull-up resistors are included on the module. Three flip-flops with Type D as well as Type RS inputs are provided as flags or synchronizing devices.

Although intended for parallel data output, this module may be used to drive indicators or small relays provided the voltage and current limits are not exceeded.

Up to four M1502 modules (64-bits) can be controlled by one M105 Address Selector Module, one M7821 Interrupt Control Module, and one M1500 Bus Gates Module.

Interrupt Control Module — M7821

The M7821 Interrupt Control Module is used with the interface logic of a device in the PDP-11 systems. The M7821 allows one or two devices that request an interrupt to gain access to the UNIBUS and become bus master for one or more data transfers. It also provides a vector control circuit to enable the selection of an address in memory at which the device subroutine is stored.

The module consists of an A Master Control, B Master Control, and Vector Control logic. Either of the two master control circuits can be used to generate a Non-Processor Request (NPR) for direct data transfers to memory (DMA) or a Bus Request (BR) which interrupts the current processor program. The A Master Control, however, is normally used for generating the NPR and the B Master Control for the BR. When used as a DMA Control, the A Master Control has the ability to perform a burst mode block transfer which allows more than one data cycle to be performed each time the device becomes bus master.

The B Master Control contains logic which can be implemented to allow the monitoring of the bus NPR line. This capability permits an NPR initiated by a device to be honored under certain conditions and the device to gain access to the bus even though a BR from another device has occurred prior to the NPR. A jumper lead can be removed from the module to disable this feature if the B half is used for NPR transfers.

The sequence of interrupt control signals between the M7821 and processor is similar for both the NPR and BR; however, an interrupt signal and vector address is generated after the device becomes master during a BR. The interrupt signal halts the operating program in the processor and the vector address specifies a location in memory where the starting address of the interrupt status routine and a status word is stored.

PDP-11 INTERFACE MODULES

INTERFACE CONTROLS (Cont'd)

Address Selector — M105

The M105 is used in PDP-11 device interfaces to decode the UNIBUS Address and Control lines. It provides gating signals for up to four device registers that indicate a register is being referenced and three control signals that indicate the direction for data flow.

Bidirectional Bus Interfacing Gates — M1500

This module provides gating arrangements useful for interfacing to the PDP-11 computer. It is designed specifically to provide additional gating and output drive when using the M1501-M1502 Input/Out modules. Applications are:

General-Purpose Use:

1. Providing general-purpose high fan-out drivers.
2. Providing a stage of inversion with high fan-out capability.

PDP-11 Interfacing:

1. ANDing SELECT signals with direction signals (OUT HIGH, OUT LOW) to load registers.
2. ANDing SELECT signals with direction signals (OUT HIGH, OUT LOW) to form set or reset pulses.
3. Receiving the INIT (initialize) signal from the UNIBUS and distributing it via high-power drivers.

Bus Input Interface — M1501

The M1501 contains 16 bus drivers for interfacing parallel input data to the PDP-11 UNIBUS. The module includes two control flags that can be used for interrupt request and enable. Data inputs from an external device enter a 40-pin flat cable connector mounted on the module itself. All inputs are diode-clamped to ground and +5V. Up to four M1501 Modules (64-bits) can be controlled by one M105 Address Selector Module, one M7821 Interrupt Control Module, and one M1500 Bus Gates Module.

Word Count and Bus Address Module — M795

The M795 Word Count and Bus Address Module can be used to provide two of the essential elements of an interface which connects Direct Memory Access (DMA) devices to the UNIBUS. This module contains two 16-bit counters. One counter is used to count the number of data transfers that occur. The other counter is used to specify sequential bus addresses for the sources and/or destinations of the data to be transferred. This module is used to interface direct memory access (DMA) devices to the UNIBUS.

UNIBUS Master Control — M796

The M796 UNIBUS Master Control Module provides the necessary logic to enable a peripheral device to perform a bus cycle on the UNIBUS to transfer data. In addition to controlling the four transfer operations (DATI, DATIP, DATA, and DATOB), the M796 module generates strobe and gating signals which transfer both address and data to and from the bus; handles de-skewing of data received from the bus; protects against data transfers to nonexistent devices by the use of time-out circuits; and provides a flip-flop and integrating one-shot that can be used by the customer for special control functions.

Any device in the PDP-11 system may have the capability of gaining control of the bus and, as bus master, of transferring data to and from other slave devices on the bus. This operation is performed independently of processor control and is usually referred to as Direct Memory Access (DMA). The logic necessary to gain control of the UNIBUS is provided by the M7821 Interrupt Control Module.

UNIBUS DRIVERS/RECEIVERS

UNIBUS Drivers — M783

The M783 consists of 12 low-leakage bus drivers to be used as an input interface to the UNIBUS of the PDP-11. Each driver is open-collector and is capable of sinking 50 mA with a collector voltage of less than 0.8V. The output high leakage current is 25 microamperes maximum. Pin D2 is a TTL output that allows additional drivers to be controlled by the single enabling gate (inputs H1 and F1). Pin U1 provides +3V as a source of logic HIGH for 10 TTL loads.

UNIBUS Drivers — M798

This module consists of 16 non-inverting UNIBUS drivers with pull-up resistors on the inputs. The module is used in device interfaces to minimize the loading effect caused by attaching several drivers to the same UNIBUS signal line, as in the case of a device containing multiple registers. Loading of signal lines on the UNIBUS is restricted to the equivalent of one UNIBUS receiver input and two UNIBUS driver outputs per device.

In addition, the M798 Module allows the UNIBUS to be driven by standard open-collector TTL gates. The inputs to each M798 driver circuit are pulled up to +5V through a 1-kilohm resistor.

UNIBUS Receivers — M784

The M784 consists of 16 high-impedance inverting bus receivers that are used as an output interface from the UNIBUS of the PDP-11. All inputs present one UNIBUS receiver load. Each output has a fan-out capability of seven standard TTL loads.

PDP-11 INTERFACE MODULES

UNIBUS DRIVERS/RECEIVERS (Cont'd)

UNIBUS Transceiver — M785

The M785 consists of eight drivers and eight receivers for use as a device interface with the PDP-11 UNIBUS. Pin U1 provides +3V and has an output capability of 10 TTL loads. Driver gates have open collectors and are capable of sinking 50 mA with a collector voltage of less than 0.8V. The output high leakage current is 2.5 μA maximum.

UNIBUS IC Receiver — 956

The 956 is a package of ten 14-pin, dual-in-line package (DIP) DEC8640 integrated circuits (ICs). Each IC comprises four 2-input NOR gates. The DEC8640 gates are especially suitable as UNIBUS receivers because of their high impedance characteristics and, hence, minimal loading on the bus.

UNIBUS IC Drivers — 957

The 957 is a package of ten 14-pin, dual-in-line package (DIP) DEC8881-1 integrated circuits (ICs). Each IC comprises four 2-input NAND gates. The DEC8881-1 ICs are especially suitable by UNIBUS drivers because of their capability to sink 70 mA with a collector voltage of less than 0.8V.

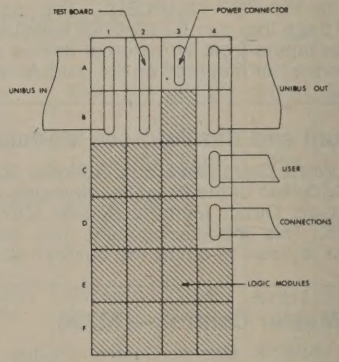
MEMORY INTERFACES

Direct Memory Access Interface — DR11-B

The DR11-B is a general purpose direct memory access (DMA) interface to the UNIBUS. The DR11-B, rather than using program controlled data transfers, operates directly to or from memory, moving data between the UNIBUS and the user device.

The interface consists of four registers: command and status, word count, bus address, and data. Operation is initialized under program control by loading word count with the 2's complement of the number of transfers, specifying the initial memory or bus address where the block transfer is to begin, and by loading the command/status register with function bits. The user device recognizes these function bits and responds by setting up the control inputs. If the user device requests data from memory or a UNIBUS device, the DR11-B performs a UNIBUS Data In transfer (DATI) and loads its data register with the information held at the referenced bus address. The outputs of this register are available to the user device. (This output data is buffered.) If the user device requests data to be written into memory, the DR11-B performs a UNIBUS Data Out transfer (DATO), moving data from the user device to the referenced bus address. (This input data from the user is not buffered.) Transfers normally continue at a user defined rate until the specified number of words are transferred.

The user is given a number of control lines allowing for flexible operation. Burst modes, read-modify-restore operations, and byte addressing are possible with the control structure.



DR11-B SYSTEM UNIT

The DR11-B is packaged in one standard System Unit allowing convenient incorporation into a PDP-11 system. A UNIBUS jumper module (M920) is supplied with the unit.

Connections to the user device are made through two M957 split lug cable boards or one M9760 cable connector board. The two M957's are supplied with the unit. Alternatively, an M920 can be used to jumper all user signals to an adjacent BB11 blank mounting panel, which can be used to hold some or all of the device logic. (Neither the additional M920 nor the BB11 is supplied with the unit.)

DECkit — Direct Memory Access — KIT11-D

A kit is basically a collection of logic modules assembled by the user to a prewired system unit, capable of performing a highly complex computer interface at low cost to the user.

The kits are defined in full or maximum configuration; i.e., the system unit wiring and the recommended complement of modules define the maximum I/O capability. If the user wishes, a lesser capability may be achieved by removing the appropriate modules.

The KIT11-D kit is designed specifically for the PDP-11 owner who requires high I/O data transfer rates. Full 16-bit data words can be transferred between the PDP-11 memory and an external device at UNIBUS speeds. The KIT11-D interface kit is physically and electronically compatible with all PDP-11 Family computers.

Parallel digital data is cabled directly to and from the interface kit; no additional logic or hardware is required to handle TTL-compatible data. External devices, such as lab instruments, mass storage units, display, pre-processors, and other CPUs can communicate conveniently with the PDP-11 memory.

The prewired backplane includes five unused module slots that can be used for custom logic such as level shifters and counters. Even modules for simple processing logic can be utilized in these unused slots.

KIT11-D is valuable to the OEM and the end-user. The predesigned interface concept frees the system designer from the complex problems usually associated with UNIBUS interfacing and the end-user has available the flexibility and speed of the UNIBUS for data transfers.

PDP-11 INTERFACE MODULES

DECkit — Direct Memory Access — KIT11-D (Cont'd)

Hardware/Accessories for DECkit11 Series

If mounting space is available in the existing PDP-11 processor mounting box, the DECkit can be installed there and jumpered to the existing panels by a UNIBUS Connector Module, M920*. Power is supplied from the processor power supply, or from an additional H720-E* Power Supply. If the Interface Kit is installed in a separate mounting rack, the UNIBUS is extended to that rack with a BC11A cable. This cable is available in various standard lengths from 2 ft. to 35 ft.; see elsewhere in this catalog.

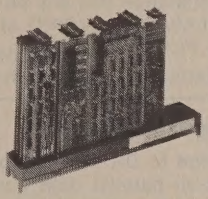
Input/Output Cables

Type	Connectors
BC08R-XX[1]	H856 to H856[2]
BC04Z-XX[1]	H856 to open-ended[2]
BC07A-XX[1]	H856 to open-ended[2]
BC07D-XX[1]	H856 to open-ended[2]

Notes: [1]XX is length in feet.
[2]H856 is a female connector.

*Not supplied with option.

Slot \ Row	A	B	C	D	E	F
04	UNIBUS OUT		SPARE			
03	G772 POWER	M796	M7219			
02		M7821	M205	M116	M113	M112
01	UNIBUS IN		M660	M9100	M1502	



PARALLEL I/O INTERFACES

Instrument Remote Control Interface — M1623

The M1623 is a PDP-11 Interface Module containing the bus receivers and control logic needed to remotely program several types of digital voltmeters and programmable power supplies. All outputs to the instrument are through a 40-pin cable connector mounted on the module.

Some of the digital voltmeters and power supplies that can be interfaced by the M1623 are:

Digital Voltmeters

Fluke	Models 8200A, 8400A
Hewlett-Packard	Models 3450A, 3480A
Data Precision	Series 2000
Systron-Donner	Model 7110
Dana	Model 4800

Programmable Power Supplies

Fluke	Models 4210A, 4216A, 4250A, 4265A
Hewlett-Packard	Models 6130B, 6129B, 6131B

The user should first compare the interfacing requirements of his particular instrument with the capabilities of this module. Many instrument manufacturers have various control options which should be chosen carefully for compatibility with the M1623.

DVM Data Input Interface — M1621

The M1621 is a PDP-11 Interface Module containing all the bus drivers and control logic needed to input TTL-level information from several types of digital voltmeters and multimeters. All inputs from the instruments enter a 40-pin cable connector mounted on the module.

Some of the digital voltmeters and multimeters that can be interfaced by the M1621 are:

Fluke	Models 8200A, 8400A
Hewlett-Packard	Models 3450A, 3480A
Data Precision	Series 2000
Systron-Donner	Model 7110
Dana	Model 4800

The user should first compare the interfacing requirements of his particular instrument with the capabilities of this module. Many instrument manufacturers have various control options which should be chosen carefully for compatibility with the M1621.

UNIBUS Interface Foundation Module — M1710

The M1710 UNIBUS Interface Foundation Module is a general-purpose board that provides for the construction of custom interface designs using integrated circuits (ICs). The M1710 lets users build their own interfaces between a wide variety of peripheral equipment and any PDP-11 processor. All essential UNIBUS logic, such as device address selection, interrupt circuitry, and bus receivers and drivers, is provided on the lower portion of the module. The remainder of the board contains IC mounting pads with wire wrappable pins for custom logic designs. These pads accommodate combinations of all common type of DIP (dual-in-line-package) integrated circuits with up to 40 pins.

The M1710 is a versatile module, ideal for any type of application. The end user, such as a university laboratory familiar with ICs, will appreciate both the capabilities and cost-effectiveness of the module; no additional mounting panel or power supply is required. These features, coupled with the fact that the M1710 is capable of automatic wire wrapping, also should prove valuable to the Original Equipment Manufacturer (OEM) who requires many custom interfaces. And, in all cases, the module is easily a adaptable to accommodate any changes in interface design.

The M1710 plugs into any Small Peripheral Controller (SPC) slot, or DD11 Peripheral Mounting Panel. Additionally, it may be used in a system unit such as the BB11. Connection to user equipment is made via a cable connector mounted on the M1710 Module.

16-Bit Relay Output Interface — M1801

The M1801 is a PDP-11 Interface Module containing the bus receivers, relay drivers and control logic needed to program 16 isolated single-pole relay contacts. The relay contact outputs are available at two 40-pin cable connectors mounted on the module.

PDP-11 INTERFACE MODULES

PARALLEL I/O INTERFACES (Cont'd)

UNIBUS INTERFACES

One-word Input / One-word Output — DR11-C

The DR11-C is a general-purpose interface between the PDP-11 UNIBUS and a user's peripheral. The DR11-C provides the logic and buffer register necessary for program-controlled parallel transfers of 16-bit data between a PDP-11 System and an external device.

It is directly compatible with the PDP-11 UNIBUS and is designed for installation into any one of the available Small Peripheral Controller slots (SPC) of a DD11 System Interfacing Unit and PDP-11 processor unit.

The DR11-C interface consists of three functional sections: address selection logic, interrupt control logic and device interface logic.

The DR11-C is designed for user applications and requires a minimum of external hardware to implement into the PDP-11 system. Two 40-pin connectors are conveniently mounted near the edge of the board. These connectors permit the external device to be easily connected using BC07D, BC08R or BC04Z flat cables available from DIGITAL. These cables have the mating connectors premounted and are supplied in any specified length. See elsewhere in catalog.

Two-word Input — DR11-L

Similar in function to DR11-C except DR11-L transfers two independent 16-bit parallel data words from a user's peripheral device into the PDP-11 computer system.

Two-word Output — DR11-M

Similar to DR11-C except DR11-M transfers two independent 16-bit parallel data words from the PDP-11 computer system to a user's peripheral device.

SERIAL I/O INTERFACES

Asynchronous Serial Line Units

20 mA Current Loop — DL11-WA / EIA RS232C — DL11-WB

DL11-WA and -WB serial line units are character-buffered communications interfaces that perform two basic operations. First, receiving and transmitting asynchronous serial data. Second, providing a line frequency clock that is used to measure time. DL11-WA is designed to interface with a 20 mA current loop (teletype for example). DL11-WB is compatible with EIA RS232C.

As a receiver of serial data, the interface converts an asynchronous serial character from an external device into the parallel character required for transfer to the UNIBUS. This parallel character can then be gated through the bus to memory, a processor register, or some other device.

As a transmitter, a parallel character from the bus is converted to a serial character for transmission to an external device. Because the two data transfer units (receiver and transmitter) are independent, they are capable of simultaneous two-way communication. The receiver and transmitter each operates through two related registers; a control and status register for command and monitoring functions, and a data buffer register for storing data prior to transfer to the bus or external device. The line frequency clock uses a signal derived from an ac input voltage by the power supply to generate timed interrupts. The clock portion utilizes a register for command and monitoring functions.

Switch selections on the interface provide the flexibility needed to handle a variety of terminals. The user can, for example, set up switches such that DL11-WA can interface to a teletype or, by resetting switches, to a high speed CRT terminal. The user has a choice of speeds, character size, stop-code length, parity and error checking.

The SLU/RTC option is packaged on a quad height integrated circuit module which can be inserted into either a small peripheral controller slot in a processor or one of the SPC slots in a DD11-A peripheral mounting panel. All users input and output signals are connected to the interface by Berg Connector D. Power of +5V at 2.0A and −15V at 150 mA (EIA level between +9V and +15V at 50 mA) is required. A 70-8360-1 20 mA current loop cable is provided with the DL11-WA whereas a BC05C-25 EIA interface cable is supplied with DL11-WB.

For Programming and Operating Characteristics refer to PDP11 Peripherals Handbook.

ANALOG INTERFACES — AR11

The AR11 is a compact analog real-time module for use with the PDP-11 family of computers. Included on the module are a 10-bit A/D converter, two 10-bit D/A converters, a crystal controlled clock, scope control, a 16-channel multiplexer, and a sample and hold amplifier. Operation and selection of functions is under software control.

The complete AR11 subsystem electronics are contained on one single hex module that can mount in either of the two center slots of a DD11-B, C, or D system unit, or within the CPU mainframe assembly. All external connections are made via a Berg connector (supplied with mating plug) which is mounted on an outside corner of the module.

No external analog supply voltages are required. A unique dc to dc converter without transformer uses the +5V logic power to generate the high-quality positive and negative voltages needed by the AR11.

DIGITAL'S MODULAR SYSTEMS

DIGITAL Modules are single-height, double-height, or quad-height; standard length or extended length; and single-width or double-width. Each DIGITAL Module is a specific, fixed size; the size of each module is stated in the module description. DIGITAL single-height and double-height modules are standard length or extended length. DIGITAL quad-height modules are always extended length. Any DIGITAL Module can be single-width or double-width; most, however, are single-width.

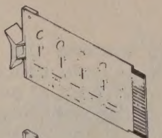
The height and length requirement is determined by the quantity and size of discrete components and integrated circuits located on side 1 of the module, and to some extent, by the amount of etched printed circuitry on sides 1 and 2. The width requirement is determined by the distance the largest component extends from its mounting surface on the module.

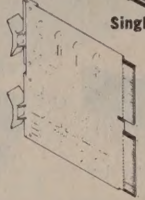
All DIGITAL Module connector blocks accommodate any height (standard or double) module. The length of the modules to be used in a logic system must, however, be considered when connector block mounting drawers, system unit mounting drawers, or cabinets are being selected; enough space must be provided to accommodate the longest module. DIGITAL's standard length modules are 5.40/5.60 in. long and extended length modules are 8.84/9.04 in. long from the bottom of the contact fingers to the top of the attached handle(s).

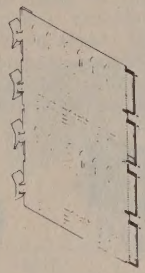
All DIGITAL Module connector blocks accommodate any width (single or double) module. The width of the module must be considered, however, when any connector block module slot is occupied by a double-width module; this is because no module can be inserted into the module slot on the immediate right on the same connector block unless that connector block provides sufficient space between module slots for the mounted components, i.e., an H808 Module Connector Block. Normal module spacing is on half-inch centers.

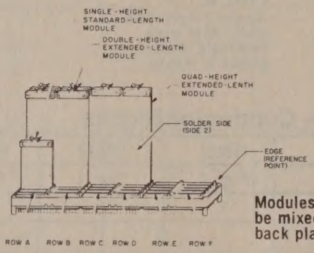
Some DIGITAL Module connector blocks accommodate only single-height modules and others accept either single-height or double-height modules. No single connector block can accommodate quad-height modules; quad-height modules must be counted in mounting frames, system units, or module drawers comprising module connector blocks with slotted ends so that four module slots are arranged end to end (i.e., at least two H863 or H8030 Module Connector Blocks mounted end to end). Single-height modules are 2.417/2.452 in. high, Double-height modules are 5.167/5.202 in. high, and quad-height modules are 10.437/10.472 in. high.

See Hardware Section of this catalog for descriptions of the connector blocks and mounting frames/enclosures available from the Direct Sales Catalog.


Single-height


Double-height


Quad-height


SINGLE-HEIGHT STANDARD-LENGTH MODULE
DOUBLE-HEIGHT EXTENDED-LENGTH MODULE
QUAD-HEIGHT EXTENDED-LENTH MODULE
SOLDER SIDE (SIDE 2)
EDGE (REFERENCE POINT)
ROW A
ROW B
ROW C
ROW D
ROW E
ROW F

Modules of differing sizes can be mixed on a single back plane of connector blocks.

LOGIC HANDBOOK

digital
logic handbook
20

The Logic Handbook, known as the computer industry's "Bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

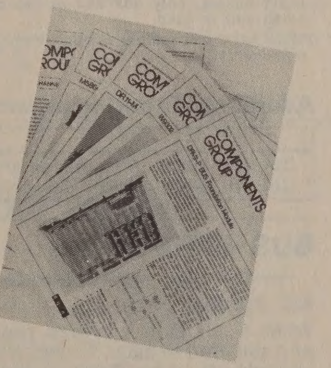
For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook!

MICROCOMPUTER HANDBOOK

digital
microcomputer handbook

The Microcomputer Handbook is our answer to the question, "Where can I find the answers to everything I've always wanted to know about the LSI-11, but didn't know where to look." Included are detailed chapters on the processor, options, installation, software, operating systems, peripheral devices, programming, maintenance and much more. The text covers the full range of LSI-11 systems from the LSI-11 board set to the PDP-11/03 microcomputer to the PDP-11V/03 disk based microcomputer system. Truly, everything you want and need to know of the LSI-11 microcomputer is found between the two covers of this handbook!

DIRECT SALES CATALOG APPLICATION NOTES AND PRODUCT BULLETINS



For the user who requires more complex and technical information on specific products or application ideas, the D.S.C. has a complete line of detailed product bulletins and application notes. These publications will tell you everything you should need to know about the particular product involved.

Over 50 different application notes and product bulletins are available for the asking.

HARDWARE AND ACCESSORIES
CONNECTORS AND MOUNTING HARDWARE

CONNECTOR BLOCKS

At the heart of DIGITAL's mounting systems are these Connector Blocks. Designed to make reliable connection with contact fingers on either one or both sides of pc modules, they can be classified as one-slot, two-slot or four-slot wide. The smallest block accepts one single-height module. The largest accepts eight single- or four double-height modules. Blocks can be mounted end-to-end for quad- or hex-height modules but blocks with slotted ends must be specified. Each slot has 36 contact positions though some blocks have contacts on only one side (for single-sided pc modules). Solder fork and wire wrap terminals are available. See table for details of each block.

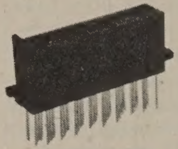


FIG. 1
Single height. Single slot. Wire wrap terminals. Shown is H807. H802 is physically similar.

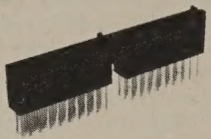


FIG. 2
Double height. Two slots. Wire wrap terminals. Slotted ends. Shown is H8030.

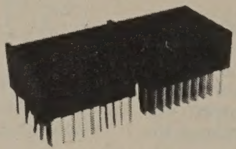


FIG. 3
Double height. Four slots. Wire wrap terminals. Shown is H808.

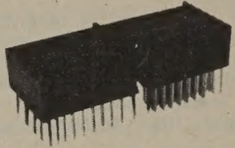


FIG. 4
Double height. Eight slots. Wire wrap or solder fork terminals. Shown is H800-W. H800-F and H803 are similar.

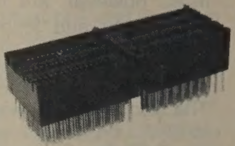


FIG. 5
Double height. Eight slots. Slotted ends. Shown is H863.

Selection Guide — Connector Blocks

Catalog Number	H802	H807	H8030	H808	H800-F	H800-W	H803	H863
Illustration	Fig. 1	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 4	Fig. 4	Fig. 5
Number of Slots	1	1	2	4	8	8	8	8
Boards Accepted								
Single-Height	1	1	2	4	8	8	8	8
Double-Height	—	—	1	2	4	4	4	4
No. of Sides	Single	Double*	Double*	Double*	Single	Single	Double*	Double*
Contacts per Slot	18	36	36	36	18	18	36	36
Total Contacts	18	36	72	144	144	144	288	288
Replacement Contact	—	—	—	H809	—	—	H805	H805
Terminal Style	WW	WW	WW	WW	SF	WW	WW	WW
Wire Size, AWG	24	30	30	24	24	24	30	30
End Style	US	US	S†	US	US	US	US	S†
Bus Strip No.	932	933	933	939	932	932	933	933
Price, List	**$10**	**$6**	**$7**	**$15**	**$14**	**$14**	**$16**	**$16**
Price, Cat.	**10**	**6**	**7**	**14**	**13**	**13**	**15**	**15**
Price, Cash	**9**	**5**	**6**	**14**	**13**	**13**	**15**	**15**
Shipping Weight, lbs.	.5	.5	1	2	2	2	2	2

*Although a single-sided board can be used in a slot that accepts double-sided boards, only one half of the contact capability of the double-sided slot is used.

†Must have this feature if quad height boards are to used with these connectors.

N/A — Not applicable
SF — Solder Fork
WW — Wire Wrap®

PC — Pins for PC boards
US — Unslotted
S — Slotted

®Wire Wrap is registered trademark of Gardner-Denver Co.

Additional Ordering Information

	List	Cat.	Cash	Shipping Weight
Cat. No. H805 36 Replacement Contacts	**$5**	**$5**	**$4**	.25 lb.
Cat. No. H809 36 Replacement Contacts	**5**	**5**	**4**	.25 lb.

BUS STRIPS

932 BUSING STRIP

When a bus strip is placed over the connector block pins, and soldered to each, it interconnects all pins for a common assignment, e.g., Ground, Signal, etc. Order Bus Strip appropriate to Blocks used according to table.

Use With Connector Blocks	Cat. No.	Strips per Pkg.	Length	Price per Pkg.		
				List	Cat.	Cash
H800, H802	932	5	13.5″	**$4**	**$4**	**$3**
H803, H8030, H863, H807	933	1	21.5″	**1**	**1**	**0.9**
H808	939	6	21.5″	**10**	**10**	**9**

Note: Shipping Weight for all items is 1 lb.

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CONNECTORS AND MOUNTING HARDWARE

19-INCH RACK MOUNTING PANELS

These 19-inch mounting panels mount on racks drilled or punched to standard EIA spacings. Each mounting panel comprises module connector blocks held together in mounting frames. The mounting frames are equipped with end-plates to protect the mounted modules that plug into the connector blocks. Various configurations are available as detailed in the table.

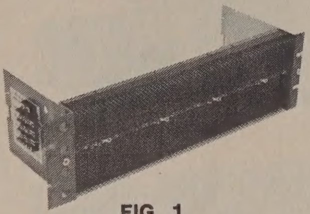


FIG. 1
H911-J
(was H911-B)

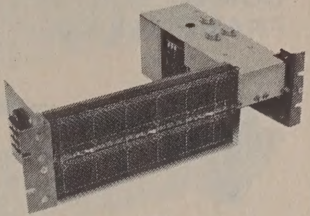


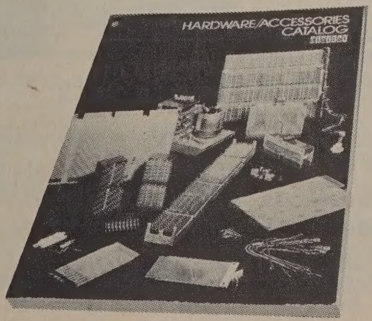
FIG. 2
H916

Selection Guide

Catalog Number	H911-J†	H911-K‡	H911-S	H914	H916	H917
Illustration	Fig. 1	Fig. 1	Fig. 1	Fig. 1	Fig. 2	Fig. 2
Connector Blocks						
Style	H803	H803	H803	H808	H803	H808
Quantity	8	8	8	8	6	6
Slots per Block	8	8	8	4	8	4
Contacts per Slot	36	36	36	36	36	36
Module Capacity						
Single-Height	64	64	64	32	48	24
Double-Height	32	32	32	16	24	12
Quad-Height	—	—	—	—	—	—
Length	Std.	Std.	Ext.	Std.	Std.	Std.
Terminal Block (+5V dc, −15V dc, and Grd.)	Yes	Yes	Yes	No	Yes	Yes
Busing						
Power	+5V dc	+5V dc	+5V dc	No	+5V dc, −15V dc	+5V dc, −15V dc
Ground	No	Yes	Yes	No	Yes	Yes
Pre-wired						
Power	No	+5V dc	+5V dc	No	+5V dc, −15V dc	+5V dc, −15V dc
Ground	No	Yes	Yes	No	Yes	Yes
Mounting Space L x W x D	19″ x 5.25″ x 6″	19″ x 5.25″ x 6″	19″ x 5.25″ x 9.5″	19″ x 5.25″ x 6″	19″ x 5.25″ x 13.25″	19″ x 5.25″ x 13.25″
Power Supply (equipped with)	—	—	—	—	H716*	H716*
Price, List	$200	$200	$230	$160	$330	$320
Price, Cat.	190	190	219	152	314	304
Price, Cash	182	182	209	146	300	291
Shipping Weight, lbs.	10	11	10	9	13	13

*H716 Power Supply provides +5V dc at 5.5 Amp and −15V dc at 1.5 Amp
Input is 105-130V ac or 210-260V ac, 47-63 Hz

†Formerly designated H911-B
‡Formerly designated H911-BP



HARDWARE/ACCESSORIES CATALOG

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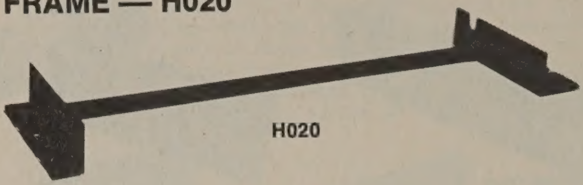
CONNECTORS AND MOUNTING HARDWARE

CONNECTOR BLOCK MOUNTING FRAME — H020

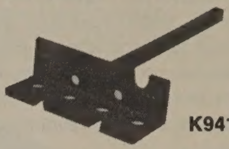


H020

Designed to accommodate a variety of module connector blocks, power supplies, and other components. Up to eight, H863, H800, H803 or H808 blocks can be mounted. Grounding lugs can be attached also. Fits 19″ racks.

Cat. No.	List	Cat.	Cash	Shipping Weight
H020	$17	$16	$15	1 lb.

MOUNTING BRACKET — K941
SUPPORT — K940



K941

K940

Up to four module connector blocks (H800, H803, H8030, H863, H808) can be mounted to any convenient surface with the K941 Mounting Bracket. K940 is a support that attaches to an enclosure to facilitate mounting K941.

Cat. No.	List	Cat.	Cash	Shipping Weight
K940	$9	$9	$8	1 lb.
K941	10	10	9	.3 lb.

STANDOFF END-PLATES (H021, H022) (H024, H025)

These end-plates attach to the ends of the H020 connector block mounting frame to provide strength to the frame, to protect the modules, and to provide a terminal block for dc power connections. Each end-plate occupies 5.25-inch of vertical mounting space. The H021 and H022 comprise a right and a left pair for standard length modules. Conversely H024 and H025 are for extended length module applications. The terminal block is three-section for +5V dc, −15V dc, and ground. It accepts spade and quick-connect terminals. Filtering capacitors (68 μF) are installed on H022 and H025.

H022

H021

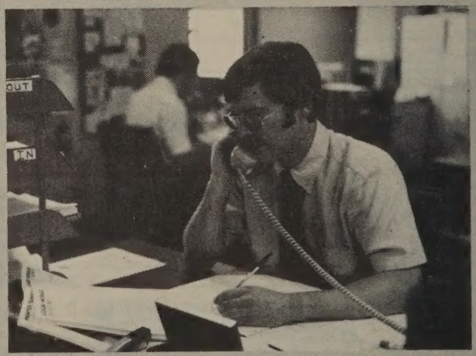
Cat. No.	List	Cat.	Cash	Shipping Weight
H021	$8	$8	$7	1 lb.
H022	22	21	20	1 lb.
H024	8	8	7	1 lb.
H025	22	21	20	1 lb.

HEX-SIZE SPC MOUNTING UNITS

The DD11-CK and -DK SPC (Small Peripheral Controller) mounting units are specifically designed to be mounted in BA11-L and BA11-K system expansion boxes. These mounting units differ from the DD11-A and -B models in that the -CK and -DK models will accept hex-size SPC interface modules unique to certain computer systems. Both come prewired with power cable harnesses compatible with the BA11-L and -K boxes.

Before ordering a DD11-CK or -DK, the user should be thoroughly familiar with the requirements of both the system unit and the computer system involved. Consult with the particular processor handbook for further information, or call the Catalog Sales Desk.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
DD11-CK	4-slot System Unit	$330	$314	$300	6 lbs.
DD11-DK	9-slot System Unit	660	627	601	10 lbs.



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CONNECTORS AND MOUNTING HARDWARE

FOUR-SLOT MOUNTING SYSTEMS

Four-slot Mounting Systems are designed to mount in the various Module System Enclosures available from DIGITAL. These systems comprise a mounting frame and up to three four-slot Module Connector Blocks mounted end-to-end. A fully complemented four-slot system unit provides mounting facilities for 24 single-height, 12 double-height or four quad-height plus eight single- or four double-height modules. See table for details of available units. An H014 Mounting Panel can be ordered to mount the four-slot units in a 19-inch rack.

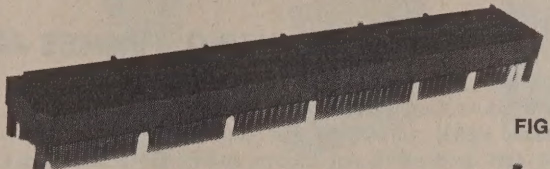


FIG. 1

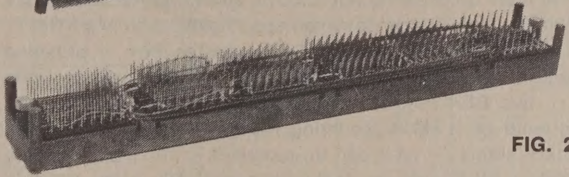


FIG. 2

Selection Guide — General System Units† H933-A, -B, -C, -CA, -CB, -D

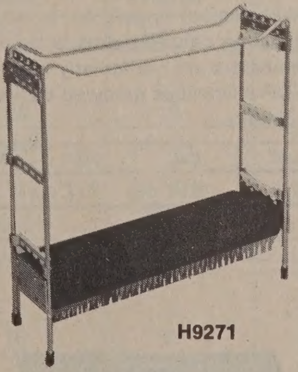
Catalog Number	H933-A	H933-B	H933-C	H933-CA	H933-CB	H933-D	BB11	BB11-A	DD11-A	DD11-B
Illustration	Fig. 1	Fig. 1	Fig. 1	Fig. 1	Fig. 1	Fig. 1	Fig. 2	Fig. 2	Fig. 2	Fig. 2
Connector Blocks†							These mounting systems are prewired and are associated with the UNIBUS System and so are dedicated units.			
Type	H800-W	H800-F	H803	H803/H863	H863	H808				
Quantity	3	3	3	1-H803 2-H863	3	3				
Slots per Block	8	8	8	8	8	4				
Contacts per Slot	18	18	36	36	36	36				
Module Capacity										
Single-Height	24	24	24	24	24	12				
Double-Height	12	12	12	12	12	6				
Quad-Height	—	—	—	4*	4*	—				
Terminals	Wire Wrap	Solder Fork	Wire Wrap	Wire Wrap	Wire Wrap	Wire Wrap				
Price, List	**$55**	**$55**	**$79**	**$79**	**$79**	**$50**	**$187**	**$187**	**$350**	**$350**
Price, Cat.	**52**	**52**	**75**	**75**	**75**	**48**	**178**	**178**	**333**	**333**
Price, Cash	**50**	**50**	**72**	**72**	**72**	**46**	**170**	**170**	**319**	**319**
Shipping Weight, lbs.	4	4	4	4	4	4	4	4	4	4

*Plus either an additional 8 singles or 4 doubles.
†Each System Unit is 16½″ long by 2¼′ wide by 1.59″ high (not counting terminals).

FOUR-BY-FOUR SLOT SYSTEM UNIT — H9271

The H9271 is a general purpose, four-wide by quad-height system unit mounted within an integral card cage assembly. The H9271 can be used as a general purpose system unit for non-standard LSI-11 configurations or for virtually any other application requiring a compact, easily mountable logic rack. The system unit is manufactured and machined in such a way as to facilitate mounting in any plane or axes.

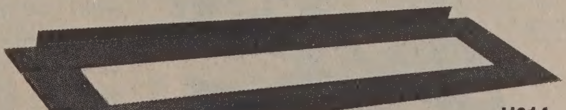
The H9271 consists of two H863 slotted connector blocks placed end to end for the mounting of four quad-height, eight double-height, or sixteen single-height modules or any combination of the above totaling sixteen single slots. The blocks are mounted within a rectangular steel frame allowing easy access to the pin side of the blocks for wire wrapping, and the card cage surrounds the module insertion side of the logic rack.


H9271

Cat. No.	List	Cat.	Cash	Shipping Weight
H9271	**$94**	**$89**	**$86**	5 lbs.

MOUNTING PANEL — H014

Shown is the H014 panel on to which a four-slot system unit can be mounted. H014 is a flat panel with raised edges and a rectangular central hole to allow the System Unit terminals to be accessed. Mounts in a 19″ rack and occupies 5¼″ vertically. An H726-B power supply (see p. 98) may be used in a rack mountable configuration by using the H014.


H014

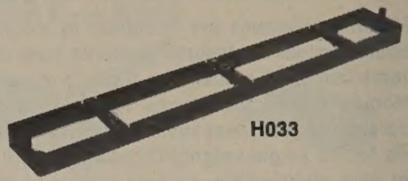
Cat. No.	List	Cat.	Cash	Shipping Weight
H014	**$23**	**$22**	**$21**	2 lbs.

HARDWARE AND ACCESSORIES

CONNECTORS AND MOUNTING HARDWARE

SYSTEM UNIT MOUNTING FRAMES — H033, H034

These are blank mounting frame predrilled to be equipped with Module Connector Blocks (H800-F, H800-W, H803, H808 or H863). Unit H033 can hold up to three blocks. H034 can hold six 4-slot blocks and three 1-slot blocks (H8030). The H034 is designed specifically to fit in a PDP-11 Processor Cabinet or a BA-11 Expansion Box. It provides module mounting space equivalent to two system units (e.g. two BB-11's). Shown is the H033. This unit can be mounted on a H014 Mounting Panel for installation in 19" rack systems — or it can be mounted in other enclosures. H033 is 2¼" wide by 16½" long by 1.59" high. H034 is 4.77" wide by 16.52" long by ¾" high.



H033

Cat. No.	List	Cat.	Cash	Shipping Weight
H033	$11	$10	$10	2 lbs.
H034	17	16	15	3 lbs.

NINE-SLOT SYSTEM UNITS — H934-CB, BB11-B

A nine-slot system unit comprises up to six four-slot wide Module Connector Blocks plus three one-slot wide blocks such as H8030. The blocks are mounted in groups of three: one four-slot wide, one one-slot wide, then one four-slot wide. A fully complemented system unit can hold 54 single-height or 27 double-height, or 9 quad-height plus 16 single-height (or 8 double-height) modules. H934-CB is an unwired unit for general use comprising six H863 eight-slot blocks and three two-slot blocks H8030. Each block has 36 contacts per slot and wire wrap pins. The BB11-B unit is dedicated to general PDP-11 interfacing and is prewired for UNIBUS power only. Both units have dimensions of 4.77" wide by 16.52" long by .75" high (not counting terminals).

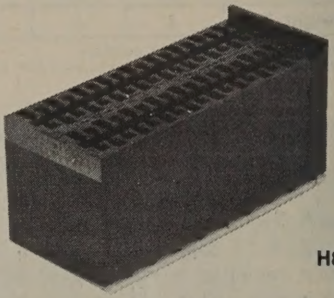
H934-CB

Cat. No.	List	Cat.	Cash	Shipping Weight
H934-CB	$150	$143	$137	8 lbs.
BB11-B	263	250	239	8 lbs.

EDGE CONNECTOR — H851

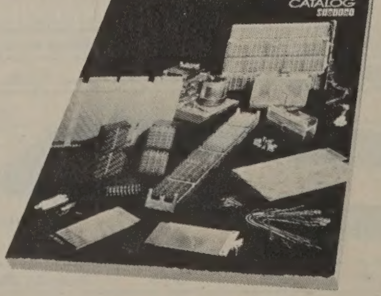
H851 is used to interconnect 36 top (Handle) contact fingers to 36 top (Handle) contact fingers on an adjacent module board. Interconnection between slots is by an in-place PC board. H851 connectors are particularly useful for the interconnection of PDP-8 Omnibus modules equipped with edge type connector fingers.

Cat. No.	List	Cat.	Cash	Shipping Weight
H851	$19	$18	$17	.25 lbs.



H851

HARDWARE/ACCESSORIES CATALOG



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CONNECTORS AND MOUNTING HARDWARE

BUS INTERCONNECTIONS/TERMINATIONS

These specially developed connectors are dedicated to UNIBUS or OMNIBUS applications. Check table for details.

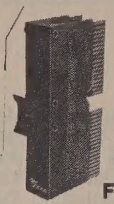


FIG. 1

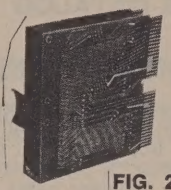


FIG. 2

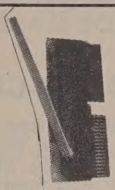


FIG. 3

Bus Interconnection/Termination

Cat. No.	Description	Illus.	Height	Length	Width	Comments	List	Cat.	Cash	Shipping Weight
M920	UNIBUS Jumper Module	Fig. 1	Double	Short	Double	Connects UNIBUS from one system unit to adjacent unit.	$65	$62	$59	.25 lbs.
M930	UNIBUS Terminator Module	Fig. 3	Double	Short	Single	Terminates last device on UNIBUS.	60	57	55	.25 lbs.
M981	UNIBUS Internal Terminator Module	Fig. 2	Double	Std.	Double	Terminates KD11-A internal UNIBUS and connects KD11-A processor to next device.	98	93	89	.25 lbs.
M976	UNIBUS Cable Connector	Fig. 3	Double	Short	Single	Accepts 60-cond. Flat Mylar. Solder to PC Board. Cable Clamp 12-09764 supplied.	20	19	18	.25 lbs.
M935	OMNIBUS Connector Module	Fig. 1	Double	Short	Double	Connects PDP-8/e OMNIBUS from one system unit to adjacent unit.	54	51	49	.25 lbs.

ADAPTERS

Adapters are similar to Cable Connectors. They feature, however, a plugable connector for connecting to a terminated cable. The five adapters are shown pictorially and their specifications are detailed in the table.

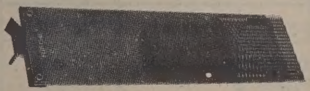


FIG. 1
M971 Adapter

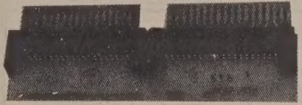


FIG. 3
M975 Adapter

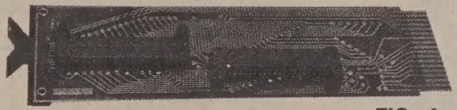


FIG. 4
M9100 Adapter

FIG. 2
M973 Adapter

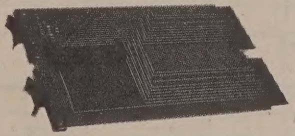


FIG. 5
M9970 Adapter

Adapters — PC to Connectors

Catalog Number	M971	M973	M975	M9100	M9970
Illustration	Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5
Contact Fingers					
Side 1	18	4	24	18	36
Side 2	18	—	24	18	36
Connector Type	H854	12-09340-00	H854	H854	H854
Quantity	1	1	2	2	1
Contacts	40 Male	4 Female*	80 Male	80 Male	40 Male
Height	Single	Single	Double	Single	Double
Length	Ext.	Ext.	Special Short†	Ext.	Ext.
Contact Finger Assignment					
Ground	—	—	6	4	—
Signal	32	4	36	32	40
Unused	—	—	4	—	32
Resistors	4‡	—	—	—	—
Cable Clamp Supplied	12-09764	—	—	—	—
E/W Handle	Yes	Yes	No	Yes	Yes
Comments	Current Limiting Resistors	TTY Cable Connector	Extra Short Length	T-junction	Connector to Contact Fingers
Price, List	**$33**	**$33**	**$37**	**$33**	**$40**
Price, Cat.	**31**	**31**	**35**	**31**	**38**
Price, Cash	**30**	**30**	**34**	**30**	**36**
Shipping Weight, lbs.	.25	.25	.25	.25	.25

*Mating connector must have male contacts in positions 2, 3, 5 and 7.
†Special length on M975 allows it to protrude only 1.5″ from logic panel.
‡10Ω .25W resistors in series with 4 lines.

CONNECTORS AND MOUNTING HARDWARE

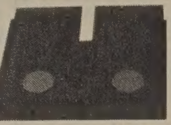
CABLE CONNECTORS

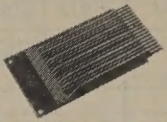
Each of these connectors comprise a unique printed wiring pattern on a PC board and means for connecting a cable to the PC board. The PC board is in fact the male half of a connector. It plugs into the slot of a standard Connector Block. Different cable types including Flat Ribbon, Flat Mylar, Flat Coaxial, Round Twisted Wire Pair, Round Coaxial and Multiconductor Round can be accommodated by specific connectors. Cables are connected by split-lug solder terminals, solderless clamp-type connector housings, or by PC soldering techniques to pads on the boards. Although certain of these connectors have been developed for specific applications, they are applicable to many other systems. Details of each connector are covered in the table. Typical connector configurations are shown pictorially to highlight the features that are available.

Typical Connector Configurations

Standard length. Single height. Current limiting resistors. Split-lug terminals. **M908**

Short length. Single height. Split-lug cabling terminals. Side entry cable. **M927**


Standard length. Double height. Top entry cabling. **M912**


Standard length. Solderless connector for flat shielded cable. **M953**

Extended length. Single height. E/W handle. Side cable entry. PC pads for cable connection. **M972**

Flat Ribbon 20-Conductor

Catalog Number	M908	M957	M933	W011	W018	W021	W023	W027
Cables								
Quantity	2	2	1	1	1	1	1	1
Total Conductors	40	40	20	20	20	20	20	20
Height	Single	Single	Single	Single	Single	Single	Single	Single
Length	Std.	Ext.	Std.	Short	Short	Std.	Std.	Std.
Contact Fingers								
Qty. — Side 1 / Side 2	18/18	18/18	8/18	18/0	18/0	18/0	18/0	18/0
Contact Assignments								
Ground	—	—	—	7	—	7	—	—
Signal	32	32	—	9	18	9	16	—
Resistors	4*	4*	40**	—	—	—	—	18§
Jumpers	—	—	—	—	—	—	2	—
Unused	—	—	—	2	—	2	—	—
Cable Connections								
Quantity	36	36	20	19	18	19	18	18
Method	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.
Cable Assignments								
Ground	—	—	—	10	—	10	—	—
Common	—	—	—	—	—	—	—	—
Signal	36	36	20	9	18	9	18	18
Entry Direction	Top	Side	Top	Top	Top	Top	Top	Top
Cable Clamp (supplied)	943	943	943	943	943	943	943	943
E/W Handle	No	Yes	No	No	No	No	No	No
Price, List	**$16**	**$24**	**$22**	**$9**	**$9**	**$8**	**$7**	**$8**
Price, Cat.	**15**	**23**	**21**	**9**	**9**	**8**	**7**	**8**
Price, Cash	**15**	**22**	**20**	**8**	**8**	**7**	**6**	**7**
Shipping Weight, lbs.	.25	.25	.25	.25	.25	.25	.25	.25

Flat Mylar 19-Conductor

Catalog Number	M901	M903	M918	M922	M943	M972	W031	W033
Cables								
Quantity	2	2	2	2	2	2	1	1
Total Conductors	38	38	38	38	38	38	19	19
Height	Single	Single	Single	Single	Single	Single	Single	Single
Length	Std.	Std.	Std.	Std.	Std.	Ext.	Short	Std.
Contact Fingers								
Qty. — Side 1 / Side 2	18/18	17/17	18/18	18/18	17/17	18/18	16/0	18/0
Contact Assignments								
Ground	—	14	—	—	14	—	7	—
Signal	32	18	—	32	18	34	9	16
Resistors	4*	—	—	—	—	2*	—	—
Jumpers	—	—	4	4	—	—	—	2
Unused	—	2	—	—	2	—	—	—
Cable Connections								
Quantity	36	38	36	36	32	36	19	18
Method	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.
Cable Assignments								
Ground	—	20	—	—	14	—	10	—
Common	—	—	—	—	—	—	—	—
Signal	36	18	36	36	18	36	9	18
Entry Direction	Top	Top	Side	Top	Side	Side	Top	Side
Cable Clamp (supplied)	940	940	940	940	940	940	940	940
E/W Handle	No	No	Yes	No	Yes	Yes	No	Yes
Price, List	**$17**	**$11**	**$12**	**$9**	**$8**	**$30**	**$6**	**$6**
Price, Cat.	**16**	**10**	**11**	**9**	**8**	**29**	**6**	**6**
Price, Cash	**15**	**10**	**11**	**8**	**7**	**27**	**5**	**5**
Shipping Weight, lbs.	.25	.25	.25	.25	.25	.25	.25	.25

Note: See following page for footnotes.

CONNECTORS AND MOUNTING HARDWARE

CABLE CONNECTORS (Cont'd)

	Flat Coaxial 9-conductor			Flat Shielded 40-conductor		
Catalog Number	M904	M917	W028	M954	M953	M955
Cables						
Quantity	2	2	1	2	1	1
Total Conductors	36	36	18	80	40	40
Height	Single	Single	Single	Single	Single	Single
Length	Std.	Std.	Std.	Std.	Std.	Std.
Contact Fingers						
Qty. — Side 1 / Side 2	18/18	17/17	18/0	18/18	18/18	18/0
Contact Assignments						
Ground	14	14	7	—	14	—
Signal	18	18	—	32	18	16
Resistors	—	—	—	4*	—	2*
Jumpers	—	—	9	—	—	—
Unused	4	2	2	—	4	—
Cable Connections						
Quantity	26	30	19	80	40	40
Method	S.L.	S.L.	S.L.	Con	Con	Con
Cable Assignments						
Ground	8	12	10	—	22	—
Common	—	—	—	44	—	22
Signal	18	18	9	36	18	18
Entry Direction	Top	Side	Top	Top	Top	Top
Cable Clamp (supplied)	944	940	940	Suppl.	Suppl.	Suppl.
E/W Handle	No	Yes	No	No	No	No
Price, List	$12	$13	$7	$30	$28	$30
Price, Cat.	11	12	7	29	27	29
Price, Cash	11	12	6	27	25	27
Shipping Weight, lbs.	.25	.25	.25	.25	.25	.25

	Round TWP 9-pair	Round TWP 18-pair		Round TWP 19-pair		Round Coaxial 9-conductor	Round Cable 24-conductor
Catalog Number	M927	M912	W024	M904	M908	M904	M959
Cables							
Quantity	1	2	1	2	2	2	1
Total Conductors	18	72	36	38	38	18‡‡	24
Height	Single	Double	Single	Single	Single	Single	Single
Length	Short	Std.	Short	Std.	Std.	Std.	Short
Contact Fingers							
Qty. — Side 1 / Side 2	18/18	36/36	18/0	18/18	18/18	18/18	18/18
Contact Assignment							
Ground	16	28	2	14	—	14	—
Signal	16	36	14	18	32	18	24
Resistors	—	—	2*	—	4*	—	—
Jumpers	—	—	—	—	—	—	—
Unused	4	8	—	4	—	4	12
Cable Connections							
Quantity	27	72	33	26	36	26	24
Method	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.	S.L.
Cable Assignments							
Ground	9	—	—	8	—	8	—
Common	—	35/35††	17	—	—	—	—
Signal	18	2	16	18	36	18	24
Entry Direction	Side	Top	Top	Top	Top	Top	Side
Cable Clamp (Supplied)	941	941	941	941	941	941	941
E/W Handle	No	No	No	No	No	No	No
Price, List	$10	$26	$11	$12	$16	$12	$13
Price, Cat.	10	25	10	11	15	11	12
Price, Cash	9	24	10	11	15	11	12
Shipping Weight, lbs.	.25	.25	.25	.25	.25	.25	.25

NOTES FOR CONNECTORS

*10 ohm ¼ series resistors.

§3000 ohm ¼W ±5% series resistors.

¶Each signal line has a D664 diode in series.

**M933 is a power distribution board that can contain 20 resistor divider networks plus ground and voltage-in terminals. Space is allowed for 2 dc filter capacitors. All components are supplied by customer.

††35/35 means that there are two mutually exclusive circuits each of which has 35 common paths.

‡‡Including drain wires.

SL — Solder lug (split lug) mounted on board.
Sld — Cable conductors soldered directly to PC board.
Con — Solderless terminals in a connector housing.
TWP — Twisted wire pair. e.g. 36 TWP is 18 individually twisted pairs.

?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

digital DIRECT SALES CATALOG

CONNECTORS AND MOUNTING HARDWARE

RECTANGULAR CONNECTORS

Three sets of connectors are offered each of which has a male and female half. The Board-to-Cable connectors, Fig. 1 and Fig. 2 have one half affixed to a PC board while the other terminates a flat cable. The Panel-to-Cable Connectors have one half, generally, mounted on a panel; the other half terminates a round cable. See table for details.

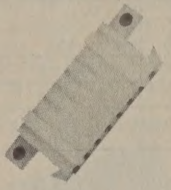


FIG. 1

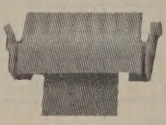


FIG. 2

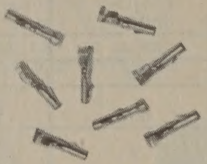


FIG. 7

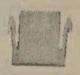
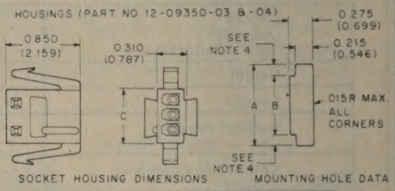
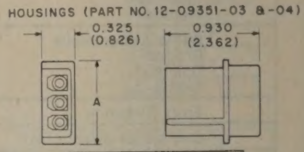


FIG. 5



Part No.	"A" Dim. ±0.005	"B" Dim.	"C" Dim.
12-09350-03	0.920	0.645/0.635	0.630
12-09350-04	1.120	0.845/0.835	0.830
12-09350-06	0.850	0.575/0.570	0.565
12-09350-09	1.085	0.815/0.810	0.805
12-09350-12	1.320	1.050/1.045	1.045
12-09350-15	1.555	1.290/1.285	1.280



Part No.	"A" Dim.
12-09351-03	0.810
12-09351-04	1.010
12-09351-06	0.655
12-09351-09	0.905
12-09351-12	1.145
12-09351-15	1.382

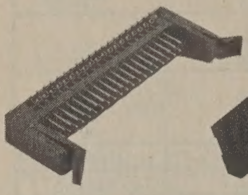


FIG. 3

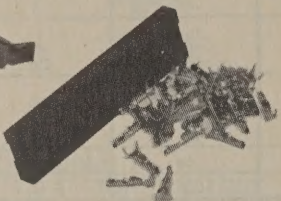


FIG. 4

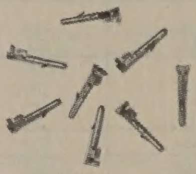


FIG. 8

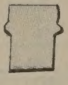


FIG. 6

Selection Guide

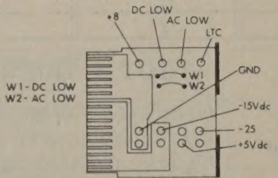
Catalog Number	Description	Contact Positions	Fig.	List	Cat.	Cash	Qty. (per pkg.)
Board-to-Cable Connectors							
12-09340-00‡	Housing Female (Board)	8	1	$1	$1	$0.90	2
12-09340-01‡	Housing Male (Cable)	8	2	1	1	0.90	2
H854*	Connector Male (Board)	40	3	6	6	5	1
H856*	Connector Female (Cable)	40	4	10	10	9	1
Panel-to-Cable Connectors‡							
12-09350-03	Housing Female (Panel)	3	5	$1	$1	$0.90	5
12-09350-04	Housing Female (Panel)	4	5	1	1	0.90	5
12-09350-06	Housing Female (Panel)	6	5	1	1	0.90	5
12-09350-09	Housing Female (Panel)	9	5	1	1	0.90	3
12-09350-12	Housing Female (Panel)	12	5	1	1	0.90	3
12-09350-15	Housing Female (Panel)	15	5	1	1	0.90	
12-09351-03	Housing Male (Cable	3	6	1	1	0.90	5
12-09351-04	Housing Male (Cable)	4	6	1	1	0.90	5
12-09351-06	Housing Male (Cable)	6	6	1	1	0.90	5
12-09351-09	Housing Male (Cable)	9	6	1	1	0.90	5
12-09351-12	Housing Male (Cable)	12	6	1	1	0.90	3
12-09351-15	Housing Male (Cable)	15	6	1	1	0.90	3
Contacts†							
12-09379-01	Female	8	7	$1	$1	$0.90	8
12-09378-01	Male	8	8	1	1	0.90	8

*Contacts supplied with connector.

†Contacts fit all connector housings in table. Female version accommodate one 22, 24 or 26 AWG wire, or two 26 or 28 AWG wire. Use tool HT95 for crimping. See page 83.

‡No contacts supplied. Order separately. See Contacts heading.

POWER CONNECTOR — G772



The G772 is a single-width, single-height, short-length board used to connect power to a backplane assembly such as a BB11 or DD11.

Cat. No.	List	Cat.	Cash	Shipping Weight
G772	$8	$8	$7	.25 lbs.

LOGIC HANDBOOK

logic handbook
20

The Logic Handbook, known as the computer industry's "bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook!

CABLE ASSEMBLIES

Preassembled cables are available from DIGITAL. A variety of lengths, cable types and terminations can be bought from this catalog. Some have a dedicated application, others are general purpose. The connectors referred to in the table are described in detail elsewhere in this catalog.

BC11A
BC07D
BC08R

Typical examples of cable assemblies.

Selection Guide

Cat. No.	Cable Length (feet)	Used On	Connector	Cable Material	Connector	List	Cat.	Cash	Shipping Weight (lbs.)
BC04Z-06	6	General Purpose	H856	Flat, 40-cond., Mylar	Open	$44	$42	$40	1
BC04Z-10	10	General Purpose	H856	Flat, 40-cond., Mylar	Open	53	50	48	2
BC04Z-15	15	General Purpose	H856	Flat, 40-cond., Mylar	Open	63	60	57	2
BC04Z-25	25	General Purpose	H856	Flat, 40-cond., Mylar	Open	89	85	81	3
BC05C-25	25	Multi-use	H856	Round 25-Cond.	RS232 (Male)	112	106	102	3
BC05C-50	50	Multi-use	H856	Round 25-Cond.	RS232 (Male)	143	136	130	5
BC05D-10	10	Multi-use	RS232 (Male)	Round 25-Cond.	RS232 (Female)	94	89	86	3
BC05D-25	25	Multi-use	RS232 (Male)	Round 25-Cond.	RS232 (Female)	132	125	120	5
BC06R-06	6	Mass-Bus	H855	Flat 40-cond.	H855	37	35	34	4
BC06R-10	10	Mass-Bus	H855	Flat 40-cond.	H855	45	43	41	5
BC06R-25	25	Mass-Bus	H855	Flat 40-cond.	H855	75	71	68	8
BC06R-50	50	Mass-Bus	H855	Flat 40-cond.	H855	125	119	114	12
BC07A-10	10	General Purpose	H856	Round 20-TWP	Open	77	73	70	2
BC07A-15	15	General Purpose	H856	Round 20-TWP	Open	88	84	80	3
BC07A-25	25	General Purpose	H856	Round 20-TWP	Open	99	94	90	5
BC07D-10	10	General Purpose	H856	Ribbon, 20-cond.	Open	53	50	48	2
BC07D-15	15	General Purpose	H856	Ribbon, 20-cond.	Open	58	55	53	3
BC07D-25	25	General Purpose	H856	Ribbon, 20-cond.	Open	69	66	63	5
BC08J-06	6	PDP-8 Series	H856	Flat, 40-cond.	M953	83	79	76	1
BC08J-10	10	PDP-8 Series	H856	Flat, 40-cond.	M953	94	89	86	1
BC08J-15	15	PDP-8 Series	H856	Flat, 40-cond.	M953	107	102	97	2
BC08J-25	25	PDP-8 Series	H856	Flat, 40-cond.	M953	127	121	116	3
BC08J-50	50	PDP-8 Series	H856	Flat, 40-cond.	M953	187	178	170	6
BC08R-01	1	General Purpose	H856	Flat, 40-cond.	M856	50	48	46	1
BC08R-03	3	General Purpose	H856	Flat, 40-cond.	H856	54	51	49	1
BC08R-06	6	General Purpose	H856	Flat, 40-cond.	H856	61	58	56	2
BC08R-08	8	General Purpose	H856	Flat, 40-cond.	H856	65	62	59	2
BC08R-10	10	General Purpose	H856	Flat, 40-cond.	H856	69	66	63	3
BC08R-12	12	General Purpose	H856	Flat, 40-cond.	H856	74	70	67	3
BC08R-20	20	General Purpose	H856	Flat, 40-cond.	H856	91	86	83	5
BC08R-25	25	General Purpose	H856	Flat, 40-cond.	H856	102	97	93	5
BC08R-50	50	General Purpose	H856	Flat, 40-cond.	H856	187	178	170	8
BC11A-02	2	UNIBUS	M919	Dual 60-cond.	M929	127	121	116	1
BC11A-05	5	UNIBUS	M919	Dual 60-cond.	M929	143	136	130	1
BC11A-08F	8.5	UNIBUS	M919	Dual 60-cond.	M929	160	152	146	2
BC11A-10	10	UNIBUS	M919	Dual 60-cond.	M929	176	167	160	2
BC11A-15	15	UNIBUS	M919	Dual 60-cond.	M929	193	183	176	3
BC11A-25	25	UNIBUS	M919	Dual 60-cond.	M929	220	209	200	4
BC11K-25	25	DR11-C	H856	Round 20-TWP	Open	140	133	127	4
BC11S-25	25	General Purpose	H856	Round	H856	100	95	91	6
BC11S-50	50	General Purpose	H856	Round	H856	150	143	137	8
BC11S-A0	100	General Purpose	H856	Round	H856	260	247	237	10

CONNECTORS AND MOUNTING HARDWARE

CABLING

The following cabling can be ordered directly from catalog. Specify part number, length desired (avail. in increments of 1 ft.)

Cat. No.	Description	List*	Cat.*	Cash*	Shipping Weight (lbs./foot)
17-00001-00	Flat Coaxial, 9 cond.	$1.00	$1.00	$ .90	.25
17-00002-00	Flat Coaxial, 19-cond.	1.00	1.00	.90	.25
17-00002-01	Flat Coaxial, 60-cond.	2.00	2.00	1.80	.25
17-00003-00	Round, Coaxial	1.00	1.00	.90	.25
17-00004-00	Flat Coaxial, 40-cond.	2.00	2.00	1.80	.25
17-00018-00	Cable, Round, 40-cond.	2.00	2.00	1.80	.25
91-7575-00	Cable, Ribbon, 20-cond.	.60	.60	.60	.25
91-7706	Cable, Round, 4-cond.	.50	.50	.50	.25
91-7736	Cable, Round, 25-cond.	1.20	1.20	1.10	.25

*Price per foot.

Wire Wrapping Wire

Cat. No.	Description	List†	Cat.†	Cash†	Shipping Weight (lbs./spool)
91-05740	Wire Wrapping Wire, 30 AWG, 1000 ft./spool	$66	$63	$60	2
91-07688	Wire Wrapping Wire, 24 AWG, 1000 ft./spool	55	52	50	3

†Price per spool.

Cable Clamps

Application	Pieces per Pkg.	Cat. No.	Price per Pkg.			Shipping Weight (lbs./pkg.)
			List	Cat.	Cash	
Flat Cable to 4.562″ Wide	5	12-09764‡	$3	$3	$2.70	.25
Round Cable from .29″ to .39″ Dia. Attachable to H807 Block	4	12-09925	1	1	0.90	.25
Flat Cable to 1.75″ Wide	25	940‡	8	8	7	.25
Round Cable .281″ to .438″ Dia.	25	941‡	9	9	8	.25

‡Eyelets to mount cable clamps supplied with each package.

GRIP CLIPS — H820, H821 — Make Your Own Patch Cords

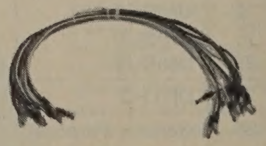
Designed to slip easily on to wire wrap pins, these grip-clip connectors are sold in 1,000 lot quantities. H820 fits wire wrap pins that accept 24 AWG; H821 for 30 AWG-designed pins. Tools H825 and H826 can be used to crimp these connectors to 24 or 30 AWG stranded wire. See tools elsewhere in this hardware section.

Cat. No.	Price per 1000			Shipping Weight
	List	Cat.	Cash	
H820	$53	$50	$48	1 lb.
H821	125	119	114	1 lb.

POWER PATCH CORDS — 914-7, 914-19

Equipped with Faston™ receptacles, Series 250 at each end joined by stranded IPVC wire these patch cords interconnect power supplies and mounting panels equipped with Faston male terminals.

™Faston is a trademark of AMP, INC.

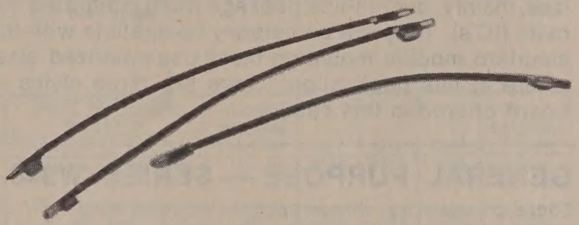


Cat. No.	Length	Qty. per Pkg.	Price per Pkg.			Shipping Weight
			List	Cat.	Cash	
914-7	7″	10	$5	$5	$4	1 lb.
914-19	19″	10	5	5	4	1 lb.

CONNECTORS AND MOUNTING HARDWARE

PATCH CORDS — FOR WIRE WRAP TERMINALS — 913, 915

Equipped with H820 or H821 grip-clip connectors to provide slip-on connections to wire wrap pins, these patch cords are available in assorted lengths and insulation colors. 913 fits wire wrap pins sized for 24 AWG; 915 for 30 AWG-designed pins. IPVC insulated stranded wire (24 AWG for 913, 26 AWG for 915) forms the patch cord.



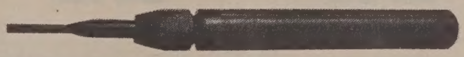
Ordering Information

Add appropriate dash number for color/length required according to the following: 2-in Brown (-2); 3-in Brown/White (-3); 4-in Red (-4); 6-in Red/White (-6); 8-in Orange (-8); 12-in Orange/White (-12); 16-in Yellow (-16); 24-in Yellow/White (-24); 32-in Green (-32); 48-in Green/White (-48); 64-in Blue (-64); order dash number (-AF) for a 100 assortment as follows: 30(-3), 25(-6), 25(-8), 10(-24), 5(-32), 5(-64).

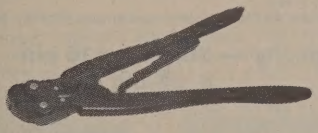
Cat. No.	Qty. per Pkg.	List	Cat.	Cash	Shipping Weight
913(-XX)	100	$28	$27	$25	1 lb.
915(-XX)	100	36	34	33	1 lb.

TOOLS

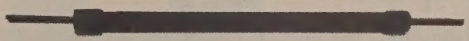
Battery operated wire wrap guns have rechargeable nickel-cadmium batteries. Supplied w/bit and sleeve set, and recharger.



Hand wrap tool is essential for service and repair work. Use for limited production applications, too.



Hand crimping tool to attach H821/H820 grip-clip connectors to 24/30 AWG stranded wire.



Hand unwrapping tool quickly removes wrapped wires.

Ordering Information

Description	Wire Size AWG	Cat. No.	List	Cat.	Cash	Shipping Weight
Wire Wrap Gun E/W Bit/Sleeve	24	H810-C	$165	$157	$150	2 lbs.
Wire Wrap Gun E/W Bit/Sleeve	30	H810-D	165	157	150	2 lbs.
Wire Wrap Hand Wrap Tool	24	H811	44	42	40	1 lb.
Wire Wrap Hand Wrap Tool	30	H811-A	44	42	40	1 lb.
Wire Wrap Hand Unwrap Tool	24	H812	11	10	10	1 lb.
Wire Wrap Hand Unwrap Tool	30	H812-A	13	12	12	1 lb.
Wire Wrap Gun, Bit (Replacement)	30	H813-A	39	37	35	1 lb.
Wire Wrap Gun Sleeve (Replacement)	30	H814-A	23	22	21	2 lbs.
Crimping Tool for H820 Grip-Clips	24	H825	161	153	147	2 lbs.
Crimping Tool for H821 Grip-Clips	30	H826	250	238	228	2 lbs.
Crimping Tool for H856 Contacts	*	HT-95	195	185	177	8 lbs.

*See contact description on p. 80.

DEALING DIRECT Saves You $$$

The Cat prices are generally about 5% less than List Price. Cash prices are about 4% less than Cat. Generally 9% savings — in all!! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See p. 109 for details.

HARDWARE AND ACCESSORIES

WIRE WRAPPABLE MODULE BOARDS

Wire wrappable modules provide a convenient, low-cost method of producing prototype or limited runs of production modules with special circuitry that utilizes, mainly, dual-in-line package (DIP) integrated circuits (IC's). They are completely compatible with the standard module mounting blocks summarized elsewhere in this publication. There are three styles of board offered in this catalog:

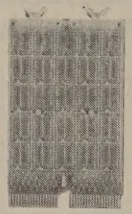
- *Series W940 and W950 — General purpose.*
- *Series W9300 — High density, socket pins.*
- *Series W9500 — LSI-11 and PDP-11 (SPC) compatible.*

Both Series W900 and W9500 can be obtained with or without pre-mounted sockets. Series W9300 has special "socket pins" that allow IC's (or other component leads) to be plugged in without soldering.

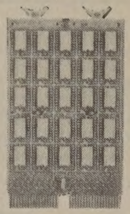
GENERAL PURPOSE — SERIES W940 AND W950

These glass epoxy, wire wrappable modules have +5V dc power and ground bused (printed circuit etch tracks) to wire wrap pins at each IC location to facilitate connection of Vcc and ground to the appropriate IC wire wrap pin. The wire wrap pins each accommodate two 30 AWG wire wraps. All of these modules have etched and gold-plated contact fingers and all have handles attached.

25 DIP Capacity, 14- or 16-pin



W941

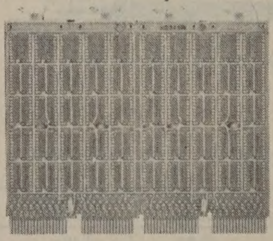


W943

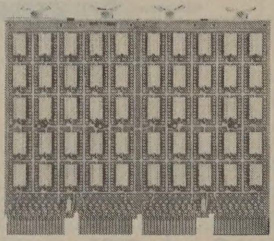
Cat. No.	Size	DIP Capacity 14-Pin	DIP Capacity 16-Pin	Sockets Supplied	List	Cat.	Cash
W941	EDS	25 or	25	None	$44	$42	$40
W943	EDS	—	25	25	88	84	80

Shipping Weight: 2 lbs.

50 DIP Capacity, 14- or 16-pin



W940

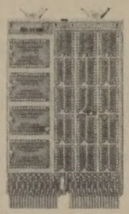


W942

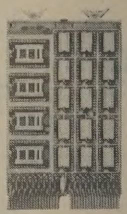
Cat. No.	Size	DIP Capacity 14-Pin	DIP Capacity 16-Pin	Sockets Supplied	List	Cat.	Cash
W940	EQS	50 or	50	None	$83	$79	$76
W942	EQS	—	50	50	165	157	150

Shipping Weight: 3 lbs.

19 DIP Capacity — 15, 14- or 16-pin 4, 24-pin*



W951

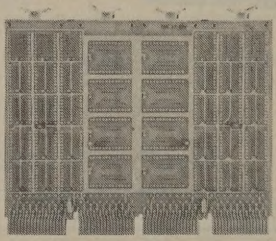


W953

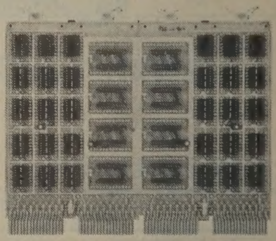
Cat. No.	Size	DIP Capacity 14-Pin	DIP Capacity 16-Pin	DIP Capacity 24-Pin	Sockets Supplied	List	Cat.	Cash
W951	EDS	15 or	15 and	4*		$51	$48	$46
W953	EDS	—	15 and	4*	15, 16-Pin 4, 24-Pin	95	90	86

Shipping Weight: 2 lbs.
*4, 14-pin or 16-pin DIP's can be used instead of 4, 24-pin.

38 DIP Capacity — 30, 14- or 16 pin 8, 24-pin



W950



W952

Cat. No.	Size	DIP Capacity 14-Pin	DIP Capacity 16-Pin	DIP Capacity 24-Pin	Sockets Supplied	List	Cat.	Cash
W950	EQS	30 or	30 and	8	None	$81	$77	$74
W952	EQS	—	30 and	8	30, 16-Pin 8, 24-Pin	176	167	160

Shipping Weight: 3 lbs.

NEW

LSI-11 AND SPC(PDP-11) COMPATIBLE W9500 SERIES

The W9500 Series of wire wrappable modules enable a user to easily configure special interface logic for the LSI-11 computer systems and small peripheral controller (SPC) logic for the PDP-11 computer system. In addition, these modules are suitable for any system requirements and consist of double, quad, and hex height sizes. Each module is available with or without premounted Dual-In-Line package (DIP) low profile sockets.

The W9500 Series modules will accept a variety of IC package types and discrete components. The printed circuit on each board connects the appropriate edge connector pins to the Vcc plane on side 1 of the board and the ground plane (GND) on side 2. The remaining edge connector pins terminate to a double row of wire wrap pins for user designated functions. Each of the modules also includes a 40-pin male cable connector to allow an interface cable to be attached to the module logic. The pins of the cable connector are also terminated to a double row of wire wrap pins. The quad and hex height modules are provided with a space where a 40-pin cable connector (labeled J2) can be inserted by the user. When a connector is not required, additional IC packages can be installed. Each board contains insulated standoffs to maintain the required clearance between adjacent modules and prevent shorting of wire wrap pins.

The wire wrap pins and components are mounted on side 1 of each module. Rows of predrilled holes accept IC packages with

WIRE WRAPPABLE MODULE BOARDS

LSI-11 AND SPC(PDP-11) COMPATIBLE W9500 SERIES (Cont'd)

pin spacings of 0.3, 0.4 and 0.6″. Universal areas on the W9500 Series modules are the areas which accept IC packages with standard pin spacings. These areas have four rows of predrilled holes spaced at 0.3, 0.4 and 0.6″. The W9500 hex height module also contains three areas which can accept IC packages with 0.3 and 0.4″ spacing.

SPC Compatible Modules — PDP-11

Cat. No.	Description	Size	Total* IC Capacity No. of Pins 14 or 16	24	40	Sockets Supplied 16-Pin	List	Cat.	Cash	Shipping Weight
W9500	Module with extractor bracket. No DIP sockets included. One 40-pin male cable connector mounted on board and space for additional 40-pin connector provided.	EHS	128 or 114	10	6	None	**$185**	**$176**	**$168**	5 lbs.
W9503	Same as W9500 except with premounted DIP sockets.	EHS	— 84	—	—	84	**325**	**309**	**296**	5 lbs.
W9501	Module with flip clip handles. No DIP sockets included. One 40-pin male cable connector premounted on board and space for additional 40-pin connector provided.	EQS	72 or 61	5	3	None	**115**	**109**	**105**	3 lbs.
W9504	Same as W9501 except with premounted DIP sockets.	EQS	— 54	—	—	54	**210**	**200**	**191**	3 lbs.
W9502	Module with flip clip handles. No DIP sockets included. One 40-pin male cable connector premounted on board.	EDS	40 or 38	5	3	None	**60**	**57**	**55**	2 lbs.
W9505	Same as W9502 except with premounted DIP sockets.	EDS	— 24	—	—	24	**110**	**105**	**100**	2 lbs.

LSI-11 Compatible Modules

W9511	Quad height, extended length, single width module with extractor handle. No DIP sockets included. One 40-pin male cable connector premounted on board and space for additional 40-pin connector provided.	EQS	72 or 61	5	3	None	**$125**	**$119**	**$114**	4 lbs.
W9514	Same as W9511 except with premounted DIP sockets.	EQS	— 58	—	—	58	**220**	**209**	**200**	4 lbs.
W9512	Double height, extended length, single width module with flip clip handle. No DIP sockets included. One 40-pin male cable connector premounted on board.	EDS	32 or 27	5	3	None	**70**	**67**	**64**	2 lbs.
W9515	Same as W9512 except with premounted DIP sockets.	EDS	— 25	—	—	25	**120**	**114**	**109**	2 lbs.

*Note that the capacities listed allow one pair of holes between each DIP for mounting additional decoupling capacitors.

HIGH DENSITY, SERIES W9300

The W9301 and W9302 are wire wrappable modules suitable for user designed logic interface applications. The module accepts a variety of dual-in-line (DIP) integrated circuits (IC's) or discrete components which can be mounted to the module without the use of solder. The component or IC leads insert into specially designed socket terminals which have a wire wrap pin on the opposite end. The electrical interconnection of the wire wrap pins can be performed manually or by using automated wire wrapping techniques.

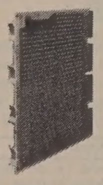
The W9301 board has four rows of 36 gold-plated contacts (18 contacts on each side of each row). Each contact is connected to a wire wrap pin by the board etch. A ground plane is etched on side 1 of the module and power (Vcc) plane is etched on side 2. Contact pin A2 of each of the four rows directly connects to the power plane, and contact pins C2 and T1 directly connect to the ground plane. The module is quad-height, extended length. A total of 68 decoupling capacitors are provided premounted between Vcc and GND at each main IC location. The module occupies 2 slots of a standard DIGITAL system unit. A 40-pin connector is mounted at the edge of the module to facilitate the attachment of a device cable assembly.

The W9302 board has six rows of 36 gold-plated contacts (18 contacts on each side of each row). Each contact is connected to a wire wrap pin by the board etch. A ground plane is etched on side 1 of the module and power (Vcc) plane is etched on side 2. Contact pin A2 of each of the six rows directly connects to the power plane, and contact pins C2 and T1 directly connect to the ground plane. The module is hex height, extended length. A total of 97 decoupling capacitors are provided premounted between Vcc and GND at each main IC location. The module occupies two slots in a standard DIGITAL system unit. Two 40-pin connectors are mounted at the edge of the module to facilitate the attachment of device cable assemblies.

Wire Wrap Terminals

All wire wrap terminals on side 2 of the modules are located on a grid of 0.1″ spacing to facilitate automatic point-to-point wire wrapping equipment. The connections to the pins are made using #30 gauge solid conductor insulated wire.

Total IC Complement


W9301

W9302

TABLE I IC TYPES

IC, Total Pins	Center Spacing (Inch.)
8	0.3
14	0.3
16	0.3
18	0.3
20	0.3
22	0.4
24	0.6
28	0.6
40	0.6

The W9301 module has three pin configuration areas assigned to 16-pin, 24- and 40-pin IC's. The 16-pin area consists of three rows of socket terminals and will accept a total of 47 IC's of the 8-, 14-, or 16-pin type and having a lead spacing of 0.3″. The 24-pin area will accept a total of 10 IC's with up to 24 pins per IC, and having a lead spacing of 0.3, 0.4, or 0.6″. The 40-pin area will accept a total of 11 IC's with up to 40 leads per IC having a lead spacing of 0.6″ or a total of 22 IC's with up to 16 leads per IC and having a lead spacing of 0.3″. Thus up to 79 IC equivalents (14- or 16-pin DIP) can be mounted on the module. Areas are provided on the board for mounting DIP's with a center spacing of 0.3, 0.4, or 0.6″. Table I lists the acceptable IC types and pin spacing.

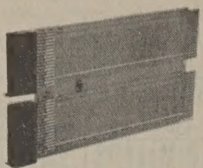
The W9302 module has three pin configuration areas assigned to 16-, 24-, and 40-pin IC's. The 16-pin area consists of three rows of socket terminals and will accept a total of 65 IC's of the 8-, 14-, or 16-pin type and having lead spacing of 0.3″. The 24-pin area will accept a total of 15 IC's with up to 24-pins per IC, and having a lead spacing of 0.3, 0.4, or 0.6″. The 40-pin area will accept a total of 17 IC's with up to 40 leads per IC and having a lead spacing of 0.6″ or a total of 34 IC's with up to 16 leads per IC and having a lead spacing of 0.3″. Thus up to 114 IC equivalents (14- or 16-pin DIP's) can be mounted on the module. Areas are proprovided on the board for mounting DIP's with a center spacing of 0.3, 0.4 or 0.6″. Table I lists acceptable IC types and pin spacing.

Cat. No.	Size	DIP Capacity 8-, 14- or 16-Pin	24-Pin	40-Pin	List	Cat.	Cash	Shipping Weight
W9301	EQS	47	10	11*	**$195**	**$185**	**$177**	3 lbs.
W9302	EHS	65	15	17†	**295**	**280**	**268**	4 lbs.

*Or 22 additional 16-Pin DIP's with 0.3″ lead spacing.
†Or 34 additional 16-Pin DIP's with 0.3″ lead spacing.

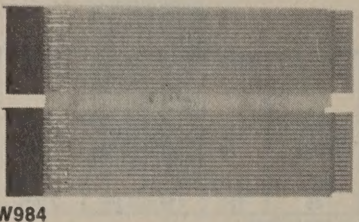
EXTENDER, COLLAGE AND BLANK BOARDS

MODULE EXTENDER BOARDS



W900

Used in systems comprising extended length modules to extend a double-height, 72-pin module with +5V dc power at contact fingers AA2 and BA2 and with ground at contact fingers AC2, BC2, AT1, and BT1, i.e., most double-height M-Series modules. This is a multilayer module: layer 2 is the ground plane and layer 3 is the +5V dc power plane.



W984

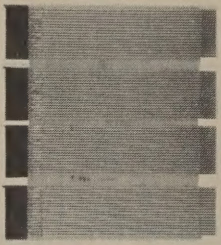
The same as W983 except the W984 is an extended length module extender board and should be used to extend a system module located beside one, or between two, extended length modules.

W980

Used in systems comprising standard length modules to extend a single-height, 18-pin (one side only) module, i.e., most A-, K-, and W-Series modules. None of the contact fingers are interconnected.

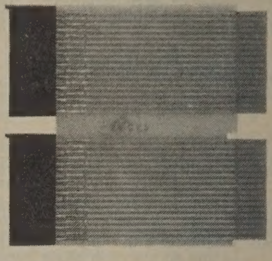
W982

Used in systems comprising standard length modules to extend a single-height, 36-pin module, i.e., single-height M-Series modules. None of the contact fingers are interconnected.



W987

The same as W984 except the W987 is a quad-height module extender board and should be used to extend quad-height (144-pin) modules.



W983

Used in systems comprising standard length modules to extend a double-height, 72-pin module, i.e., double-height M-Series modules. None of the contact fingers are interconnected.

Cat. No.	List	Cat.	Cash	Shipping Weight
W900	$130	$124	$118	2 lbs.
W980	17	16	15	½ lb.
W982	21	20	19	½ lb.
W983	32	30	29	½ lb.
W984	37	35	34	1 lb.
W987	59	56	54	2 lbs.

COLLAGE MODULE BOARDS

Collage module boards provide a convenient, low-cost method of producing prototype or limited runs of production modules with special circuitry that uses 14- or 16-pin dual-in-line package (DIP) integrated circuits (IC's) with or without wire wrap sockets and/or solder sockets. These different configurations are described in the table that follows. Collage module boards are completely compatible with the standard module mounting blocks. These glass epoxy modules have +5V dc power and ground bused (printed circuit etch tracks) to plated-through holes at each IC location to facilitate connection of Vcc and ground to the appropriate IC pin.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
W968	Accommodates up to seventy-two 14- or 16-pin DIP IC's with or without wire wrap sockets and/or solder sockets.	$74	$70	$67	3 lbs.
W969	Same as W968 except accommodates 36 IC's.	37	35	34	1 lb.
W979	Same as W968 except accommodates 18 IC's.	29	28	26	½ lb.

BLANK MODULE BOARDS

Blank module boards provide a convenient method of breadboarding (mounting) experimental or prototype circuits, and they provide a low-cost method of producing limited runs of production modules with special circuitry. They are completely compatible with the standard module mounting blocks. These glass epoxy, blank module boards have etched and gold-plated contact fingers and all have handles supplied.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
W930	Bare board wih 36 feed-through eyelets. Printed circuit etching from the eyelets to the contact fingers.	$11	$10	$10	¼ lb.
W970	Bare board with 36 plated-through holes in the printed circuit etching to the contact fingers.	11	10	10	¼ lb.
W971	Same as W970 except double-height and has 72 plated-through holes and two handles.	15	14	14	¼ lb.
W972	Copper-clad on both sides.	10	10	9	¼ lb.
W9720	Same as W972 except extended length.	9	9	8	½ lb.
W9721	Same as W9720 except double-height and has two handles.	17	16	15	½ lb.
W9722	Same as W9720 except quad-height and has four handles.	31	29	28	1 lb.
W973	Same as W972 except double-height.	17	16	15	½ lb.
W974	Perforated board with 36 plated-through holes in the printed circuit etching to the contact fingers.	10	10	9	¼ lb.
W975	Same as W974 except double-height and has 72 plated-through holes and two handles.	21	20	19	¼ lb.
W990	Bare board with 18 split-lug terminals. Printed circuit etching from the split-lugs to the contact fingers. This board has contact fingers on one side only.	8	8	7	¼ lb.
W991	Same as W990 except double-height and has 36 split-lug terminals and two handles.	13	12	12	½ lb.
W992	Same as W972 except copper-clad on one side only and has contact fingers on one side only.	6	6	5	¼ lb.
W993	Same as W973 except copper-clad on one side only and has contact fingers on one side only.	9	9	8	½ lb.
W998	Same as W974 except has 18 plated-through holes and has contact fingers on one side only.	6	6	5	¼ lb.
W999	Same as W975 except has 36 plated-through holes and has contact fingers on one side only.	10	10	9	¼ lb.

MISCELLANEOUS

MODULE HANDLE — 937

The 937 (90-08337-08) is a package containing 25 blank, gray module handles and the eyelets to attach them to modules. These blank handles are generally user-attached to prototype or limited-production run modules that utilize blank copper-clad or wire wrappable modules. The handles are compatible with the handles of all DIGITAL's standard A-, K-, M-, and W-Series modules. They have two 0.128″ diameter mounting holes spaced 2.00″ center-to-center.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight (per pkg.)
937	Package of 25 Blank Module Handles	$8	$8	$7	¼ lb.

MODULE HANDLE EXTENDER — H850

The H850 Module Handle Extender mounts over the handle of a single-height, single-length module and physically extends the length to make a single-length module congruous with extended length modules.

The H850 is manufactured from durable, U.L. Standard No. 94 recognized material and is sized to fit over DIGITAL's standard module handle. It is sold in lots of ten.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight (per pkg.)
H850	Package of 10 Module Handle Extenders	$15	$14	$14	¼ lb.

MODULE HOLDER CLIPS — H852, M853

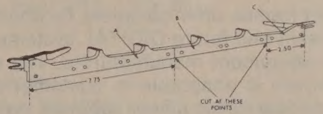
The H852 and H853 Module Holder Clips are used to maintain rigidity of the modules in a system. Each module holder clip fits over the top (handle end) of modules of the same length in adjacent slots of a system unit. The H852, a ribbed type, fits between handles of modules in the same connector block; the H853, a nonribbed type, fits between handles of modules in adjacent (end-to-end) connector blocks.

The H852 and H853 are manufactured from durable, plastic material that is nonconductive. Sold in lots of 25 each.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight (per 25 lot)
H852	Package of 25 Module Holder Clips (ribbed type)	$9	$9	$8	¼ lb.
H853	Package of 25 Module Holder Clips (nonribbed type)	9	9	8	¼ lb.

HOLD-DOWN BRACKET — 12-10711-02

The 12-10711-02 module hold-down bracket serves as a mechanical combination handle and hold-down bracket for Hex-size modules when used with appropriate card guides such as an H0341. This bracket can also be used as a hold-down bracket for LSI-11 compatible modules (quad-size) but must be modified as shown in the accompanying drawing.



Cat. No.	List	Cat.	Cash	Shipping Weight
12-10711-02	$4	$4	$3	1 lb.

IC SOCKETS — 954, 961, 962

These integrated circuit (IC) sockets provide low-cost, reliable production packaging of 14- or 16-, 24-, and 40-pin dual-in-line package (DIP) integrated circuits (ICs). These low-profile IC sockets are especially useful for limited-production runs of special, user-designed circuitry using blank or wire wrappable module boards (described in this section), which are available without factory-installed IC sockets. The 954 accepts 14- or 16-pin ICs; 10 sockets/package.

The 961 accepts 24-pin ICs; 5 sockets/package.

The 962 accepts 40-pin ICs; 5 sockets/package.

Cat. No.	Description	List	Cat.	Cash	Shipping Weight (per pkg.)
954	Package of 10 Sockets 14- or 16-pin IC's	$8	$8	$7	¼ lb.
961	Package of 5 Sockets for 24-pin IC's	8	8	7	¼ lb.
962	Package of 5 Sockets for 40-pin IC's	25	24	23	¼ lb.

DAISY CHAIN — 917-2.5

The 917 Daisy Chain is a continuous length of stranded insulated wire on a reel with 250 gold-plated and insulated terminals crimped at 2.5″ intervals. A prototype system is easily and quickly hand patched when the 917 Daisy Chain is used.

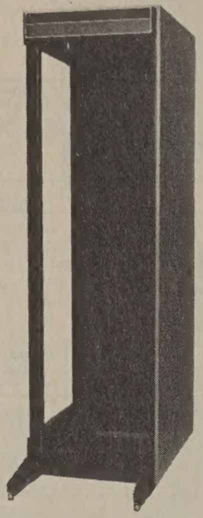
The terminals are designed to fit on module connector blocks that have wire wrap pins sized for wrapping with 30 AWG wire (0.025/0.026″ square) e.g., module connector blocks H803, H8030, H807, and H863.

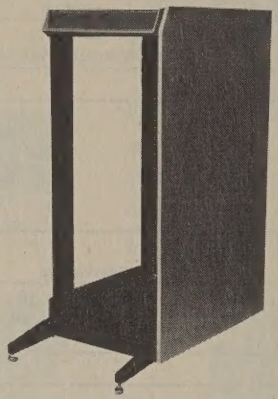
The 917-2.5 Daisy Chain has 250 terminals at 2.5″ intervals.

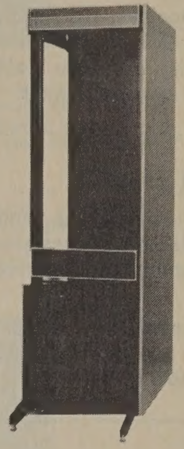
Cat. No.	List	Cat.	Cash	Shipping Weight
917-2.5	$61	$58	$56	2 lbs.

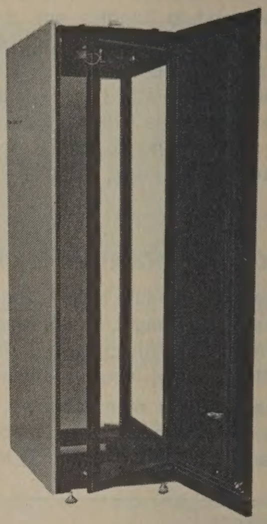
CABINETS AND ENCLOSURES

CABINETS — STANDARD AND SHORT


Standard height cabinet has 63″ of vertical mounting space


Short height cabinet has 42″ of vertical mounting space


Standard height equipped with short door and 5¼″ Bezel Cover Panel


Rear view of standard cabinet showing mounting panel door frame and full door

DIGITAL offers two basic cabinet frames: standard size and short size; plus a complete line of cabinet accessories and hardware. Both sizes accept panels or equipment designed to mount in standard 19″ electronics cabinets or racks. The cabinet frames are rigidly constructed of 12 and 13 gauge steel, either riveted or welded together.

Basic color of the cabinet is black. Gray is used for end panels and the bezel of the cover panels.

These cabinet frames offer complete flexibility and expandability to present and future DIGITAL systems for end users, and original equipment manufacturers. The enclosure area in these cabinets is adaptable to customer-designed hardware, logic module racks, power supplies, computer systems and peripherals.

All cabinets are configured around the basic H950-AA or H957-AA Cabinet Frame. These cabinet frames are drilled with 0.25″ diameter holes at standard EIA spacings to accommodate equipment, panels, or devices which are designed to mount in standard 19″ electronics cabinets or racks. Some cabinets contain a Power Controller for distribution and control of the main power to the equipment installed. The five basic configurations shown later include a rear mounting panel door frame, which is also drilled with 0.25″ diameter holes at standard EIA spacings; this mounting panel door frame allows the equipment and devices mounted on it to be swung out for maintenance or adjustment. Optional accessories as specified by the customer can be added to any of the basic configurations. The parts and accessories included with each of the basic cabinet configurations are listed on page 89. The optional accessories that are available for use with these cabinets are listed opposite. All cabinets are completely assembled before shipment.

The cabinets can be placed individually or attached to form a multi bay configuration. The accessories and hardware available include front and rear doors, panel mounting door frames and door skins, end panels, bezel and logo panels, blower fans, and power controllers.

Standard Size Cabinets

Four basic cabinet configurations (H960-BC, H960-CA, H961-A, H961-AA) are available in the standard size cabinet series. The H961-A, -AA are intended primarily for add-on configurations. The standard size cabinet is 71.5″ high and provides 63.0″ of vertical mounting space at the front; an additional 63.0″ of mounting space is available at the rear of the cabinet. These cabinets are configured to meet the requirements of most customer applications.

Short Size Cabinet

The short size cabinet (H967-BA) is 50.0″ tall and provides 42.0″ of vertical mounting space at the front; an additional 42.0″ of mounting space is available at the rear of the cabinet.

How to Order A Basic Cabinet Assembly

Determine if one of the basic cabinet assembly configurations will fulfill your requirements by referring to page 89. and comparing the items that comprise each configuration.

If one of these basic configurations will satisfy your requirements, you can order the completely assembled cabinet by specifying that cabinet assembly number; e.g. H960-BC. In addition to the accessories included in the five configurations, optional accessories are available, e.g. short doors, a cabinet table, and drawer mounting slides.

If one of the basic configurations will not fulfill your requirements, you can "build up" and order a cabinet that will suit your specific requirements by ordering an H950-AA standard size frame or an H957-AA short frame and the accessories (by specific part numbers) that you require. The frame and the accessories that you select will be shipped completely assembled.

CABINETS AND ENCLOSURES

BASIC CONFIGURATIONS

STANDARD HEIGHT

H960-CA and H960-BC — Both Models are E/W:

Cabinet frame 19W by 25D by 69″H
Mounting panel door frame. Rear mtg. RH
Logo frame panel (plastic)*
5 Bezel cover panels 10½″
2 End panels
Stabilizer feet (pair)
Kickplate
Fan assembly. Top mounted, 115V ac
Filter for fan
Power controller. 90-135V ac, Single phase

H960-CA only
Full door. Rear mounted. RH

H960-BC only
Mounting panel door skin

Cat. No.	List	Cat.	Cash	Shipping Weight
H960-CA	**$1210**	**$1150**	**$1101**	321 lbs.
H960-BC	**1210**	**1150**	**1101**	331 lbs.

STANDARD HEIGHT

H961-AA

Cabinet frame 19W by 25D by 69″H
Mounting panel door frame. Rear mtg. RH
Mounting panel door skin
Logo frame panel (plastic)*
6 Bezel cover panels 10½″
Filler strip (front and rear for 1 side only)
Kickplate
Fan assembly. Top mounted, 115V ac
Filter for fan
Power controller. 90-135V ac, Single phase

NOTE: End panels not supplied. Order separately if required.

Cat. No.	List	Cat.	Cash	Shipping Weight
H961-AA	**$935**	**$888**	**$851**	245 lbs.

STANDARD HEIGHT

H961-A

Cabinet frame 19W by 25D by 69″H
Mounting panel door frame. Rear mtg. LH
Mounting panel door skin
Logo frame panel (plastic)*
Kickplate
Filler strip set (front and rear for 1 side only)
Fan assembly. Top mounted, 115V ac
Filter for fan

NOTE: Front bezel cover panels are not supplied nor is a power controller. End panels if required must be ordered separately.

Cat. No.	List	Cat.	Cash	Shipping Weight
H961-A	**$935**	**$888**	**$851**	236 lbs.

*Inlay strip included. Specify color — terra cotta amber or magenta rose.

SHORT HEIGHT

H967-BA

Cabinet frame 19W by 25D by 47½″H
Mounting panel door frame. Rear mtg. RH
Full door. Rear mtg. RH
Logo frame panel*
End panel, right
End panel, left
Fan assembly. Rear mtg. 115V ac
Filter for fan
Kickplate
Stabilizer feet (pair)
Power controller. 90-135V ac, Single phase

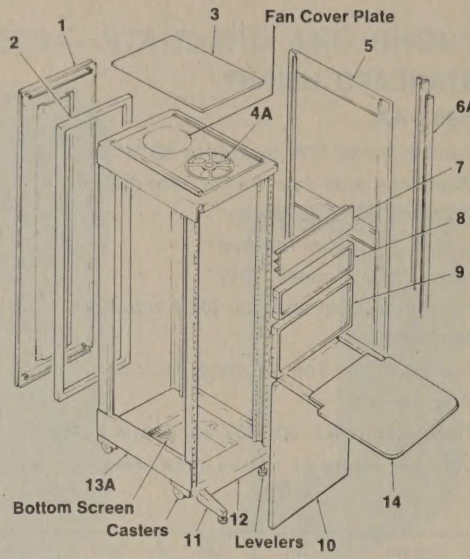
NOTE: Bezel cover panels are not supplied.

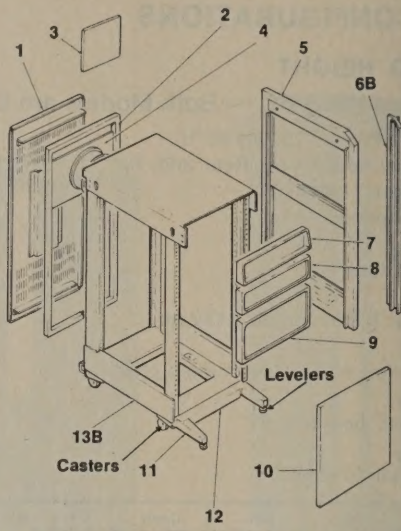
Cat. No.	List	Cat.	Cash	Shipping Weight
H967-BA	**$1210**	**$1150**	**$1101**	276 lbs.

DEALING DIRECT SAVES YOU $$$

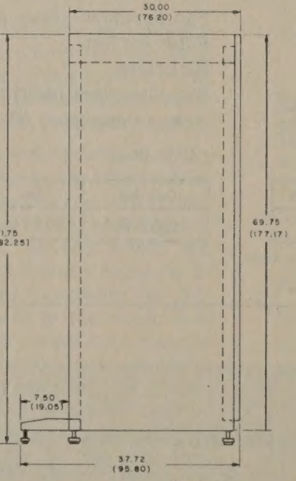
The Cat prices are generally about 5% less than List price. Cash prices are about 4% less than Cat. Generally 9% savings — in all! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See page 109 for details.

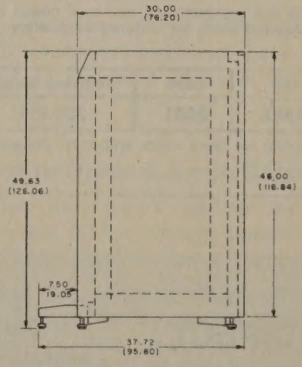
CABINETS AND ENCLOSURES

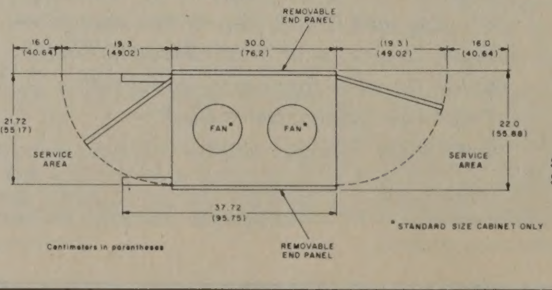

1
2
3
Fan Cover Plate
5
4A
6A
7
8
9
13A
Bottom Screen
Casters
11
12
Levelers
10
14


3
1
2
4
5
6B
7
8
9
Levelers
13B
Casters
11
10
12

1 *Full rear door*
2 *Mounting panel door frame*
3 *Air filter*
4 *Fan assembly, short cabinet*
4A *Fan assembly, standard cabinet*
5 *End panel*
6A *Filler strip set (front and rear — standard cabinet)*
6B *Filler strip set (top, front, and rear — short cabinet)*
7 *Logo frame panel*
8 *Bezel cover panel (covers 5.25″ of mounting height)*
9 *Bezel cover panel (covers 10.5″ of mounting height)*
10 *Short door*
11 *Stabilizer feet*
12 *Kickplate*
13A *Frame 19W by 69H by 25″D (standard cabinet only)*
13B *Frame 19W by 47.5H by 25″D (short cabinet only)*
41 *Cabinet-mounted table*


30.00
(76.20)
71.75
(182.25)
69.75
(177.17)
7.50
(19.05)
37.72
(95.80)


30.00
(76.20)
49.63
(126.06)
46.00
(116.84)
7.50
(19.05)
37.72
(95.80)


REMOVABLE END PANEL
16.0
(40.64)
19.3
(49.02)
30.0
(76.2)
(19.3)
(49.02)
16.0
(40.64)
21.72
(55.17)
FAN*
FAN*
22.0
(55.88)
SERVICE AREA
SERVICE AREA
37.72
(95.75)
*STANDARD SIZE CABINET ONLY
Centimeters in parentheses
REMOVABLE END PANEL

Site dimensions.
Standard and Short Cabinet

digital
DIRECT SALES CATALOG

HARDWARE AND ACCESSORIES

CABINETS AND ENCLOSURES

CUSTOMIZING OPTIONS

Standard or Short Cabinet	Description	Catalog Number		List	Cat.	Cash	Shipping Weight (lbs.)	Illustration Key
		Standard	Short					
	Cabinet frames (includes casters and levelers)							
Std.	19W by 25D by 69″H	H950-AA§	—	**$225**	**$214**	**$205**	173	13A
Short	19W by 25D by 47½″ H	—	H957-AA¶	**230**	**219**	**209**	146	13B
	Full Doors							
Std.	RH Front/Rear Mtg.	H950-BA*	—	**60**	**57**	**55**	38	1
Std.	LH Front/Rear Mtg.	H950-CA*	—	**67**	**64**	**61**	38	1
Short	RH Rear Mtg. only	—	H957-BA	**77**	**73**	**70**	22	1
Short	LH Rear Mtg. only	—	H957-CA	**77**	**73**	**70**	22	1
	Short Doors							
Both	21″	H950-HA†	H950-HA†	**68**	**65**	**62**	12	10
Both	31.5″	H950-HD	H950-HD	**120**	**114**	**109**	18	10
Both	42″	H950-HF	H950-HF	**88**	**84**	**80**	24	10
Std.	63″	H950-HK‡	—	**120**	**114**	**109**	33	10
	Mounting Panel Door Frames							
Std.	RH Rear Mtg.	H950-DA	—	**52**	**49**	**47**	19	2
Std.	LH Rear Mtg.	H950-EA	—	**62**	**59**	**56**	19	2
Short	RH Rear Mtg.	—	H957-DA	**59**	**56**	**54**	23	2
Short	LH Rear Mtg.	—	H957-EA	**60**	**57**	**55**	23	2
	Mounting Panel Door Skins							
Std.	Fits Door Frames	H950-FA	—	**35**	**33**	**32**	28	—
	End Panels							
Std.	Left and Right	H952-AA	—	**78**	**74**	**71**	72	5
Short	Right	—	H957-FA	**94**	**89**	**86**	61	5
Short	Left	—	H957-FB	**94**	**89**	**86**	61	—
	Logo Frame Panels							
Std.	Aluminum**	H950-LA	—	**27**	**26**	**25**	3	—
Std.	Plastic**	H950-LB	—	**13**	**12**	**12**	3	7
Short	Aluminum**	—	H957-LA	**47**	**45**	**43**	3	7
	Bezel Cover Panels							
Both	5¼″ Deep	H950-PA	H950-PA	**12**	**11**	**11**	2	8
Both	10½″ Deep	H950-QA	H950-QA	**17**	**16**	**15**	3	9
	Stabilizer Feet							
Both	Pair	H952-BA	H952-BA	**40**	**38**	**36**	7	11
	Cabinet Mounted Table							
Both	Mounts on Cabinet	H950-G	H950-G	**130**	**124**	**118**	25	15
	Kickplates							
Both	E/W Stabilizers	74-06782	74-06782	**7**	**7**	**6**	3	12
Both	W/O Stabilizers	74-06793	74-06793	**13**	**12**	**12**	3	—
	Drawer Mounting Slides							
Both	Straight Out	12-09154	12-09154	**28**	**27**	**25**	7	—
Both	Tiltable	12-09703	12-09703	**68**	**65**	**62**	10	—
	Bottom Cover Plate							
Short	Encloses Bottom	—	H957-JA	**17**	**16**	**15**	4	—
	Fan Assembly							
Std.	Top Mtg. 115V ac	H952-CA	—	**65**	**62**	**59**	8	4A
Short	Front/Rear Mtg. 115V ac	—	H957-HA	**91**	**86**	**83**	9	4
	Filters (air)							
Std.	For H952-CA Fan	H950-SA	—	**4**	**4**	**3**	1	3
Short	For H957-HA Fan	—	H957-SA	**7**	**7**	**6**	1	3
	Power Controllers							
Both	90-130V ac Two Phase	861-A	861-A	**330**	**314**	**300**	18	—
Both	90-135V ac One Phase	861-C	861-C	**385**	**366**	**350**	17	—
	Filler Strips (Join two cabinets)							
Std.	Front/Rear	H952-GA	—	**60**	**57**	**55**	9	6A
Short	Top/Front/Rear	—	H957-GA	**94**	**89**	**86**	8	6B

*Full doors can only be used on front if no kickplate or stabilizer feet are installed.
†Order H950-JA instead of H950-HA if 21″ door is to be used on a cabinet with stabilizer feet.
‡Order H950-JE instead of H950-HK if 63″ door is to be used on cabinet with stabilizer feet.
§Has 63″ each of mounting space both front and rear.
¶Has 42″ each of mounting space both front and rear.
**Inlay strip included. Specify color: terra cotta amber, or magenta rose.

CABINETS AND ENCLOSURES

CABINETS: GENERAL PURPOSE, LOW PROFILE

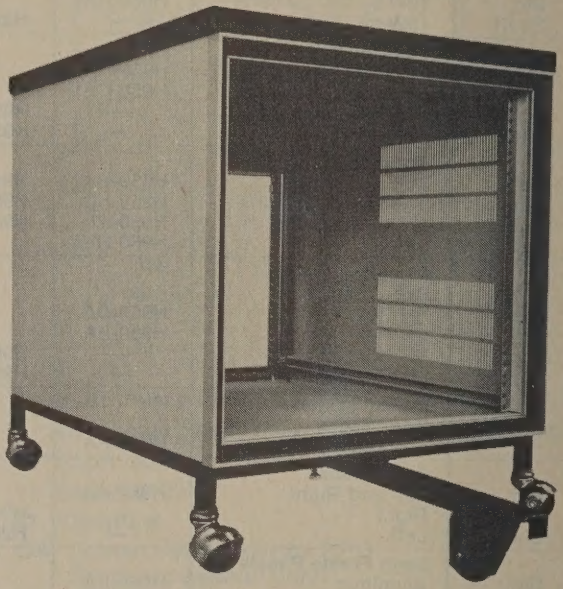
H984 SERIES

The H984-BA (115V ac) and the H984-BB (230V ac) are low profile cabinets equipped with a walnut-grained, plastic laminate top surface, and four ball-type casters mounted on a supporting frame for ease of positioning on solid or carpeted surfaces. The cabinets are a beige steel enclosure trimmed in flat black to make them compatible with the decor of the modern office or laboratory.

Each H984 provides mounting space for standard 19″ panels or racks at both the front and rear of the unit. Two vertical angles at the front and rear opening of the enclosure contain pre-drilled holes at EIA spacing. The angles can be laterally positioned within the cabinet to adjust for mounting units with varying depths. The right side of the steel enclosure contain ventilation ports to allow adequate cooling of the internal components.

A service leg with caster is located beneath the center of the unit and can be easily extended and retracted. The service leg provides stability to the cabinet when slide mounted chassis are withdrawn from the front of the cabinet. When not in use, the leg retracts into the channel.

A 115V ac or 230V ac power control panel is supplied with the cabinet and is mounted at the top of the rear opening of the cabinet. The panel can be easily repositioned to accommodate internal chassis when required.



OPTIONAL EQUIPMENT

Fan Panel Assembly

A fan panel assembly with two enclosed rotary fans is available as an option and provides additional cooling for the electrical components in the cabinet. The assembly is pre-wired with a cord and male connector which can be inserted into one of the outlets on the power connector panel. The fan assembly is available for 115V ac or 230V ac. The panel is supplied with hardware for mounting.

Black Plastic Front Cover

A flat black, plastic louvered cover panel 1.75″ in height can be used to complete the covering at the front of the H984. The panel slots allow increased air flow through cabinet.

Blank Connector Panel

The blank connector panel is designed to completely enclose the rear opening of the H984 when the blower fan assembly option is included. This provides a surface for mounting interface cable connectors or cable openings. The panel is supplied with hardware for mounting.

Blank Metal Panel

A light gray blank metal cover panel, 3.5″ in height can be ordered to complete the covering at the front of the cabinet. The color is the same as PDP-11/03 front panel and H984 cabinet.

SPECIFICATIONS

Dimensions

Width: 23.50″
Depth: 28.06″
Height: 21.50″

Color

Walnut grained top surface, beige side panels, chrome trim.

Mounting Space

Width: Standard 19″ EIA
Depth: 24.28″
Height: 17.56″

CABINETS AND ENCLOSURES

CABINETS: General Purpose, Low Profile (Cont'd)

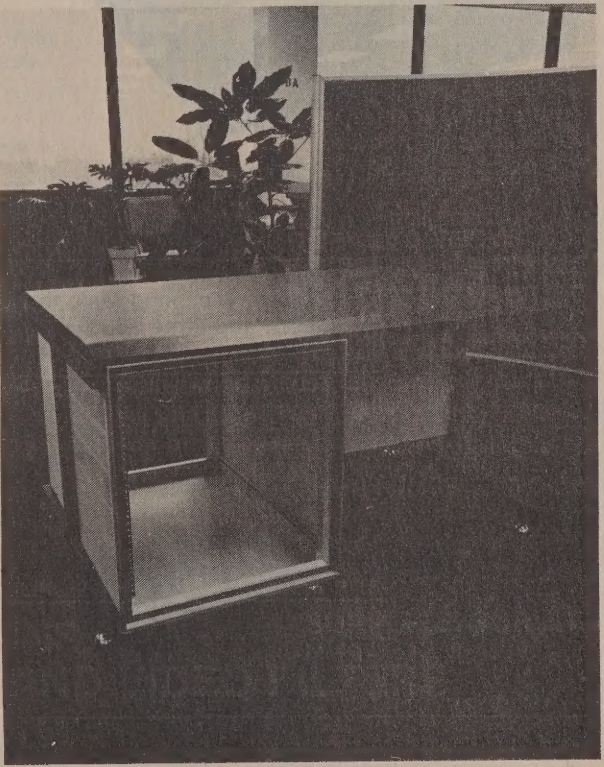
Description	Cat. No.	List	Cat.	Cash	Shipping Weight
Low Profile Cabinet (115V ac)	H984-BA	$390	$371	$355	70 lbs.
Low Profile Cabinet (230V ac)	H984-BB	390	371	355	70 lbs.
Optional Hardware					
Blower Fan (115V ac)	70-12438-0	90	86	82	8 lbs.
Blower Fan (230V ac)	70-12438-1	90	86	82	8 lbs.
Blank Connector Panel (back)	74-17440	15	14	14	5 lbs.
Louvered Cover Panel (front)	12-11474-0	5	5	4	1 lb.
Blank Metal Cover (front)	H950-NC	15	14	14	4 lbs.

GENERAL PURPOSE SYSTEMS DESK — H9800-A

The H9800-A is a low-profile systems desk equipped with a walnut grained plastic laminate top and color coordinated to fit into the modern office decor. The unit is equipped with six ball casters as standard equipment for easy positioning on carpeted surfaces. Included also is a 115V ac power distribution panel.

The H9800-A is constructed of quality materials including a top constructed of 55 lb. particle board with a dark-walnut plastic laminate. The "module" itself is constructed of 11 and 18 gauge steel with a maximum loading capacity of 400 lbs.

The H9800-A consists of a left-mounted rack enclosure offering 21″ of usable height and 29″ of usable depth in a standard 19″ EIA mount format. The right side offers knee space, a modesty panel, and a convenient work surface ideal for using terminals or typewriters.



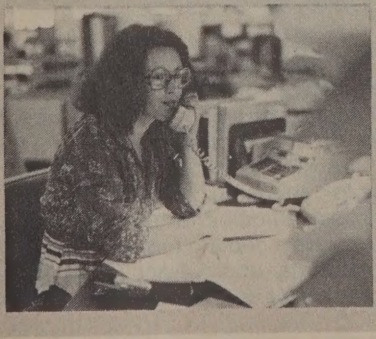
Cat. No.	List	Cat.	Cash	Shipping Weight
H9800-A	$750	$713	$683	100 lbs.

SPECIFICATIONS

Dimensions (overall)
Width: 48″
Depth: 32″
Height: 27.6″

Module Enclosure Mounting Space
Standard 19″ EIA width
21″ Usable height
29″ Usable depth (adjustable)

Color
Walnut grained top surface, beige side panels, chrome trim



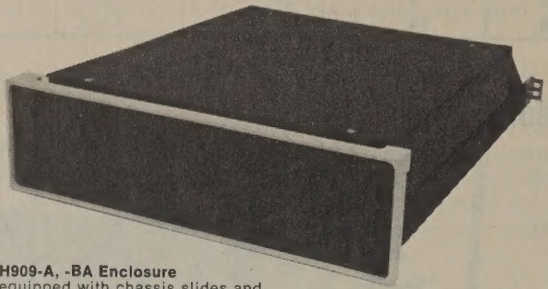
?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

MODULE ENCLOSURES — H909 SERIES

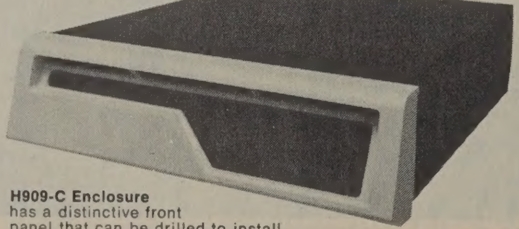
For Four-Slot or Nine-Slot System Units

The H909 Series of Module Enclosures—Logic Boxes—are designed to provide compact attractive enclosures for DIGITAL's single-height through hex-height module boards. Maximum capacity is the equivalent of nine hex-height boards (i.e. 54 single-height). Both standard length and extended length boards can be accommodated. Room is available to incorporate a power supply in H909-A and H909-C while H909-BA comes equipped with an H755 power supply. The H755 Power Supply provides ±15V dc at 2A and +5V dc at 13A. A line cord and circuit breaker are also included.



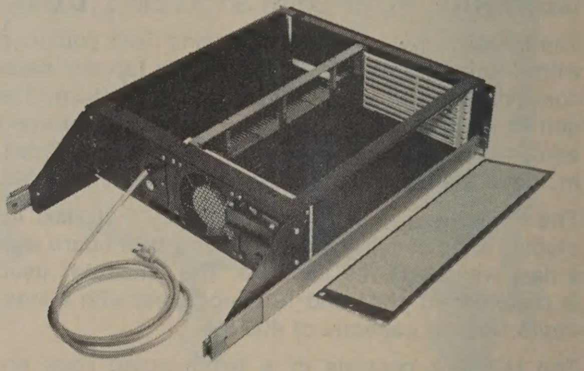
H909-A, -BA Enclosure
equipped with chassis slides and bracket for mounting in 19" rack. Note front Bezel Panel matches 5¼" Cover Panels on DIGITAL's Cabinets.

H909-A Enclosure is primarily designed to accommodate nine-slot System Mounting Units and can optionally be equipped with either an H034 nine-slot mounting frame, or H934-CB System Mounting Unit that itself is equipped with six H863 and three H8030 Connector Blocks, or the UNIBUS nine-slot unit BB11-B. Note the LSI-11 System Unit DDV11-B *does not* fit into this enclosure. A +5V dc at 7A power supply H726-B can also be ordered. This supply mounts on an H034 mounting frame which must be ordered separately specifically for the power supply.



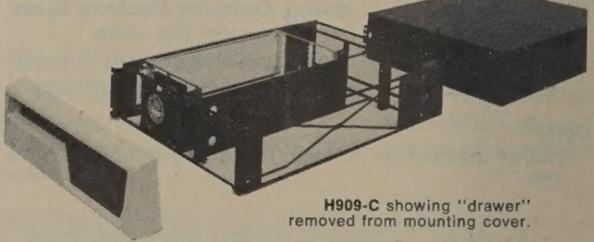
H909-C Enclosure
has a distinctive front panel that can be drilled to install lights or switches. Table top or 19" rack mounting.

H909-C Enclosure is more versatile than the H909-A or H909-BA units. It can accommodate both four-slot and nine-slot System Mounting Units. Or it can house other non-standard mounting arrangements if compatible mounting frames (H033 and H034) with Connector Blocks (such as H803) are employed. One or two four-slot System Mounting Units or one nine-slot unit can be accommodated. Additionally the LSI-11 System Unit DDV11-B *does* fit in this enclosure. The front panel can be drilled for customer installed lights and switches. This enclosure can directly mount without additional hardware the following system units and mounting frames: DDV11-B, H934, H933 Series, BB11 Series, DD11 Series, any DECkit 11, and mounting frames H033 and H034.



H909-A showing optional equipment installed.

H909-BA Enclosure is the same as the H909-A with the exception that the H755 Power Supply is included. All other options must be ordered separately.



H909-C showing "drawer" removed from mounting cover.

All the H909 Series can be mounted on 19" racks or can be used as stand-alone table-top enclosures. H909-C mounts directly on the 19" rack by attaching the ears on the enclosure cover to the rack. The inside "drawer" then can be pulled out to a "stop" position for servicing. H909-A and -BA require optional chassis slides and brackets. Included with all enclosures are a cooling fan, card guides (card cage), cable restraints, and a front bezel. H909-A and -BA have a top cover and removable side cover.

CABINETS AND ENCLOSURES

ORDERING INFORMATION

Basic Enclosures

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
H909-A	Enclosure	$310	$295	$282	40 lbs.
H909-BA	Enclosure Equipped With H755 Power Supply and BC05H Line Cord and Circuit Breaker	740	703	673	59 lbs.
H909-C	Enclosure	350	333	319	60 lbs.

Options for H909-A and H909-BA

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
H034	Nine-slot Mounting Frame	$17	$16	$15	3 lbs.
H934-CB	Nine-slot System Mounting Unit Equipped With Six H863 and Three H8030 Connector Blocks	150	143	137	8 lbs.
BB11-B	Nine-slot UNIBUS System Unit	263	250	239	5 lbs.
H726-B	Power Supply +5V at 7A. **Must Order** H034 Mounting Frame to Mount.	260	247	237	10 lbs.
12-10945	Chassis Slides	19	18	17	6 lbs.
74-09459	Required Bracket for Above Chassis Slides (left)	5	5	5	1 lb.
74-09449	Required Bracket for Above Chassis Slides (right)	5	5	5	1 lb.

Options for H909-C

Cat. No.	Description	List	Cat.	Cash	Shipping Weight
12-09403-01	5″ Blower Fan (optional for power bay)	$24	$23	$22	4 lbs.
H984-CA*	Bracket Set for H909-C and PDP-11/04, /34 Enclosures	4	4	4	1 lb.

*Required for mounting H909-C or PDP-11/04 or /34 enclosures in H984 cabinet. Attaches to rear.
This part no. formerly 74-16975

DEALING DIRECT SAVES YOU $$$

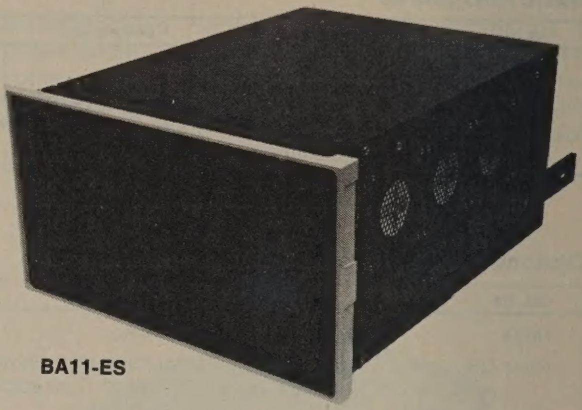
The **Cat** prices are generally about 5% less than **List** price. **Cash** prices are about 4% less than **Cat.** Generally 9% savings — in all! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See page 109 for details.

CABINETS AND ENCLOSURES

EXPANSION MOUNTING BOX — BA11-ES

The BA11-ES Expansion Mounting Box is a steel enclosure that is designed to house up to six four-slot or three nine-slot system units and an H720-E Power Supply. The BA11-ES enclosure consists of a chassis with brackets for mounting the system units and power supply; four side-mounted fans for forced air cooling; a removable top cover; two 12-09703 Tilting Chassis Slides; and an H950-QA Cover Panel. Included with the mounting box is an 8.5-ft. external I/O UNIBUS flat cable (BC11A-8F) used with PDP-11 Systems. An internal power cable is contained within the box; the power cable distributes dc power and power signals from the power supply to each of the BB11 System Units installed. An access hole at the rear of the box provides clearance for the receptacles and controls on the H720-E Power Supply. The BA11-ES is 16.75W by 23.25D by 10.50″H, excluding the cover panel and slides.

The BA11-ES can be installed in any electronics cabinet or rack equipped with 19″ mounting rails (front and rear) drilled at standard EIA spacings. The BA11-ES attaches to the cabinet frame by the two tilt slides mounted on each side of the unit. The tilt slides enable the unit to be pulled from the cabinet and tilted to facilitate servicing the system units or power supply.



BA11-ES

Cat. No.	List	Cat.	Cash	Shipping Weight
BA11-ES	**$1050**	**$998**	**$956**	55 lbs.

EXPANSION MOUNTING CHASSIS — BA11-KE

Description

BA11-KE is a general purpose PDP-11 expansion mounting chassis (10½H by 17W by 25″D) and mounts in standard cabinets. It includes the H765 power system for 115V operation and it supplies multiple voltages which deliver 660 watts of dc power. The expansion mounting chassis also includes mounting hardware, UNIBUS cable and a pop panel. BA11-KE is Underwriter Laboratories (UL) listed.

It accommodates any mix of modules including both quad and hex modules and has mounting space for up to 22 hex size modules. For example 2 nine by six slot system unit and 1 four by six slot system unit. A tilting chassis slide allows three positions: horizontal, 45° and 90°. Multiple dc voltages are available within BA11-KE as follows:

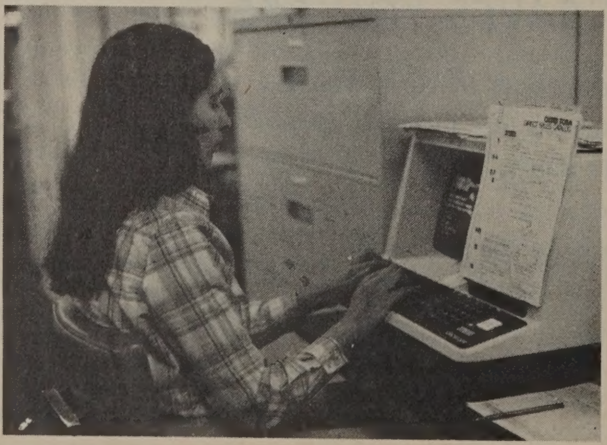
Multiple Voltages

(2) H744 Regulators	+ 5V @ 25A (each)
(1) H745 Regulator	−15V @ 10A
(1) H754 Regulator	+20V @ 8A − 5V @ 1.1A*
(1) 54-11086 Regulator	+15V @ 4A

*Maximum −5V current is dependent upon +20V current. It is equal to 1A plus the current of the +20V supply, up to a total of 8A.

Input power required is 90-132V ac (47-63 Hz) single phase at 12A.

Cat. No.	List	Cat.	Cash	Shipping Weight
BA11-KE	**$2420**	**$2299**	**$2202**	100 lbs. unloaded



?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST.

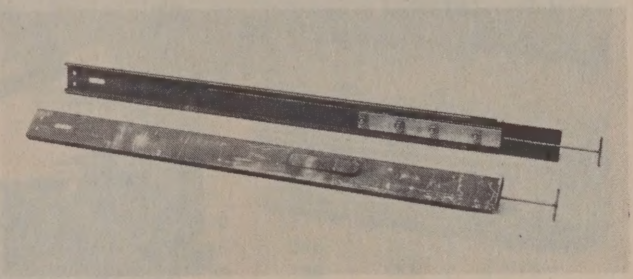
Catalog Sales saves you time and money.

CABINETS AND ENCLOSURES

CHASSIS SLIDES

Three types of chassis slide are offered. Shown is a tilting version of 12-09703. A chassis mounted on this slide can be extended out of a cabinet 22.28″ and tilted 90° either up or down. The 12-09154 extends the chassis 22″ but is not tiltable. The 12-10945 extends the chassis 19″. It features a two-part construction whereby part of the left member can be removed to allow the left side cover plate of the H909-A or H909-BA drawer to be removed to access the enclosed modules. All slides mount in cabinets with front and rear rails drilled or punch to standard EIA spacings.

Cat. No.	List	Cat.	Cash	Shipping Weight
12-09154	$28	$27	$25	6 lbs.
12-09703	68	65	62	8 lbs.
12-10945	19	18	17	6 lbs.



12-09703

LITERATURE AVAILABLE

Need more detailed information on a particular product? Would one of our application notes make your task easier? These publications are designed to complement the product descriptions offered in the Direct Sales Catalog. In most cases they will answer all of the product questions you have.

Here is a brief description of what you can expect:

LOGIC HANDBOOK

The Logic Handbook, known as the computer industry's "bible" on logic design, gives you the technical story on general purpose computer interfacing, various cable configurations, system boxes and enclosures, special purpose interfaces and a host of other compatible equipment.

For almost twenty years, the Logic Handbook has been regarded as the one reference book for customers for the world of interfacing and DEC products. Have your own resident DEC sales and technical consultant — the Logic Handbook!

logic handbook
20

MICROCOMPUTER HANDBOOK

The Microcomputer Handbook is our answer to the question, "Where can I find the answers to everything I've always wanted to know about the LSI-11, but didn't know where to look." Included are detailed chapters on the processor, options, installation, software, operating systems, peripheral devices, programming, maintenance and much, much more. The text covers the full range of LSI-11 systems from the LSI-11 board set to the PDP-11/03 microcomputer to the PDP-11V03 disk based microcomputer system. Truly, everything you want **and need** to know about the LSI-11 microcomputer is found between the two covers of this handbook!

microcomputer handbook

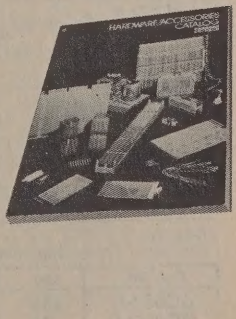
DIRECT SALES CATALOG APPLICATION NOTES AND PRODUCT BULLETINS

COMPONENTS GROUP

For the user who requires more complex and technical information on specific products or application ideas, the D.S.C. has a complete line of detailed product bulletins and application notes. These publications will tell you everything you should need to know about the particular product involved. Over 50 different application notes and product bulletins are available for the asking. Check catalog product index.

HARDWARE/ACCESSORIES CATALOG

If you have ever been confronted by the need to know detailed dimensional specifications on a system enclosure or want to know how to order a cabinet with a left side opening door instead of right, then the Hardware/Accessories Catalog is what you need. Hundreds of detailed charts, diagrams and photographs describe DEC hardware from complete system cabinets down to the last nut and bolt. Information on power supplies, wire wrap modules and tools, cables, system units and connector blocks is also presented in the same graphic manner. Next time you need services of a mechanical engineer for catalog hardware, check the Hardware/Accessories Catalog!



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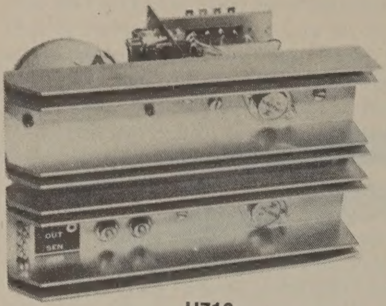
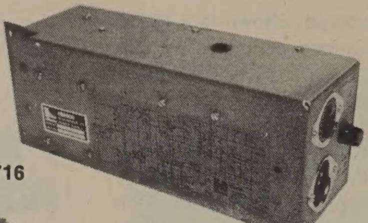
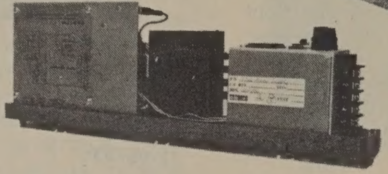
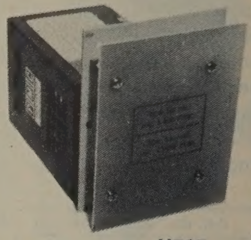
POWER SUPPLIES

POWER SUPPLIES +5V DC AND ±15V DC


H710


H716


H726-B

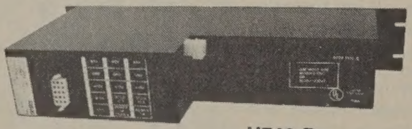

H707

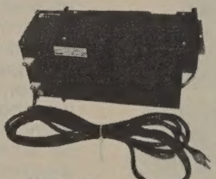
Featuring:

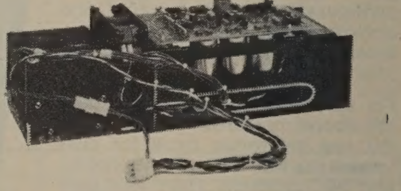
- *Short circuit protection.*
- *Floating output(s).*
- *Over voltage protection on +5V dc output*
- *Remote sensing (H710, H707).*
- *Mount in 19″ rack using H020 Mounting Bar (H710, H716, H707) or using H014 Mounting Panel (H726-B).*
- *Overload protection (H707).*

Cat. No.	Input	Output	Size	List	Cat.	Cash	Shipping Weight
H710	105-125V ac 210-250V ac 47-63 Hz	+5V dc at 7A, 1% Reg.	8″L 5¼″D 6″H	**$195**	**$185**	**$177**	6 lbs.
H716	120-240V ac 47-63 Hz	+5V dc at 4A, 3% Reg. −15V dc at 1.5A, 5% Reg.	5¼″L 12″D 4⅛″H	190	181	173	8 lbs.
H726-B	120-240V ac 47-63 Hz	+5V dc at 7A, 1% Reg.	16½″L 6¼″D 2¼″H	260	247	237	10 lbs.
H707	105-125V ac 47-420 Hz	±15V dc at 1.5A, 0.1% Reg.	4″L 5½″D 5″H	473	449	430	6 lbs.

SYSTEMS POWER SUPPLIES


H740-D


H720-E


H755*

Featuring:

- *19″ rack mounting (H740-D).*
- *Input frequency monitor and ac and dc low voltage detection (H720-E, H740-D).*
- *Overvoltage and overcurrent protection.*
- *20 msec holdup time on dc outputs after power failure (H721).*
- *Model H720-E mounts in BA11-ES Expansion Box, see page 96.*

Cat. No.	Input	Output	Size	List	Cat.	Cash	Shipping Weight
H720-E	120V ac 47-63 Hz	+ 5V dc at 22A −15V dc at 10A + 8V dc at 1.5A −22V dc at 1.5A	5½″L 16½″D 8½″H	$850	**$808**	**$774**	30 lbs.
H740-D*	115-230 47-63 Hz	+ 5V dc at 17A −15V dc at 5A +15V dc at 1A	19″L 8″D 3½″H	555	527	505	25 lbs.
H755*	115V ac 47-63 Hz	+ 5V dc at 13A ±15V dc at 2A	16¾″L 4⅞″D 5¼″H	680	646	619	25 lbs.

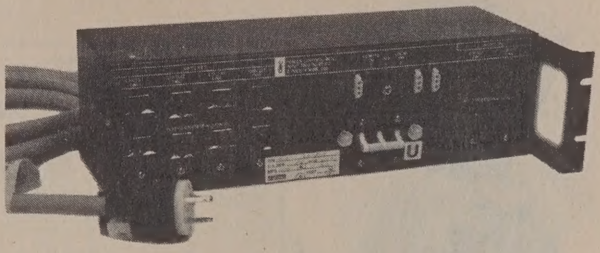
*Requires BC05H-6 line set for 115V ac or BC05J-6 line set for 230V ac operation. Order separately as follows:

Cat. No.	List	Cat.	Cash	Shipping Weight
BC05J-6	$88	$84	$80	10 lbs.
BC05H-6	88	84	80	10 lbs.

POWER SUPPLIES

POWER CONTROLLERS AC VOLTAGE

These power controllers control and distribute ac voltage to power supplies, fans and other ac-operated devices in a system. Ac receptacles on the front panel are used to connect to system points requiring ac power. Four switched dual receptacles and two unswitched duals are provided. The switched receptacles are activated either remotely or locally by panel switch selection. Power to the controller inputs is via a line cord. Controllers mount in a 19″ rack. 861-A requires an input of 90-130V ac, 2 phase, 16A per pole to output 90-130V ac at 12A for each ac outlet. 861-C is a single-phase input device (24A per pole) with a 12A output at each outlet. Input/output voltage is 90-130V ac. The 861-D requires an input of 90-130V ac, 3-phase, 24A per pole to output 90-130V ac at 12A for each outlet.

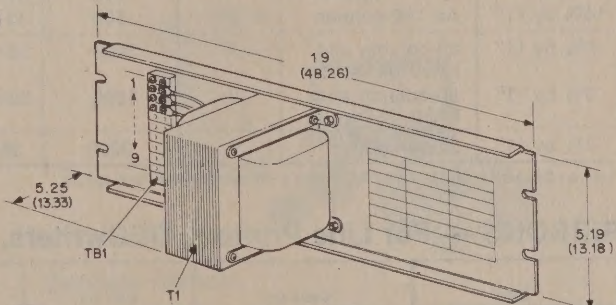


Cat. No.	List	Cat.	Cash	Shipping Weight
861-A	**$330**	**$314**	**$300**	18 lbs.
861-C	**385**	**366**	**350**	18 lbs.
861-D	**795**	**755**	**723**	20 lbs.

STEP-DOWN TRANSFORMER EQUIPPED WITH MOUNTING PANEL

Accepts 115, 189, 200, 217, 230, and 245V ac and steps it down to 115V ac at 4A. Mounts on panel on 19″ rack. Panel height 5.19″. Depth of installation 5¼″.

Cat. No.	List	Cat.	Cash	Shipping Weight
H722	**$110**	**$105**	**$100**	19 lbs.



NOTE:
Centimeters in parentheses

DISTRIBUTION PANEL — H322

This general purpose signal distribution panel has two 40-pin H854 connectors, two 9-pin 12-09350-09 connectors and nine 10-screw terminal strips mounted on it. From these connectors signals, power, and ground can be distributed to various devices. H854 mates with cable connector H856 while 12-09350-09 mates with cable connector 12-09351-09. H322 mounts via brackets to a 19″ rack.

Cat. No.	List	Cat.	Cash	Shipping Weight
H322	**$185**	**$176**	**$168**	12 lbs.

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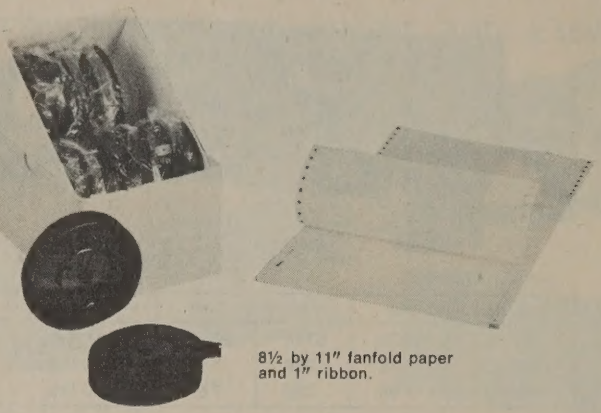
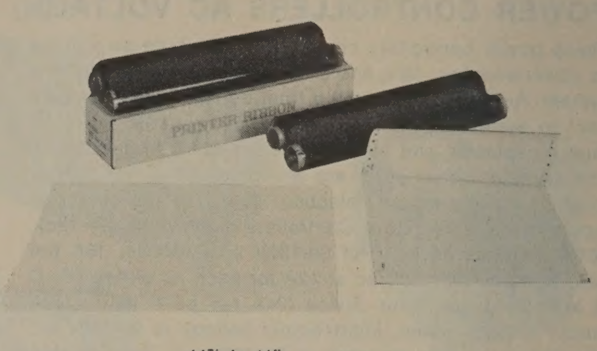
digital
DIRECT SALES CATALOG

PAPER, RIBBONS, PAPER-TAPE, AND VIDEO FILTERS



8½ by 11″ fanfold paper and 1″ ribbon.



14⅞ by 11″ fanfold paper and typical line printer ribbon.

PAPER† — For Line Printers and DECwriters

Size	Used on	Number of Parts	Sheets or Multipart Sets per Box	Cat. No.	Qty. 1-5		Qty. 6-Up		Shipping Weight
					Cat.	Cash	Cat.	Cash	
14⅞ by 11″	All 132-column	1	2400	36-09141-00	**$32 box**	**$31 box**	**$30 box**	**$29 box**	40 lbs.
14⅞ by 11″	All 132-column	2	1600	36-09141-01	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
14⅞ by 11″	All 132-column	3	1000	36-09141-02	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
14⅞ by 11″	All 132-column	4	750	36-09141-03	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
14⅞ by 11″	All 132-column	6	500	36-09141-04	**45 box**	**43 box**	**43 box**	**41 box**	45 lbs.
9⅞ by 11″	80-column and LA30 DECwriter	1	3200	36-09829-00	**30 box**	**29 box**	**28 box**	**27 box**	30 lbs.
9⅞ by 11″	80-column and LA30 DECwriter	2	1600	36-09829-02	**42 box**	**40 box**	**40 box**	**38 box**	45 lbs.
8½ by 11″	72-column*	1	3200	36-05361	**30 box**	**29 box**	**28 box**	**27 box**	24 lbs.

*Use on DECwriter II, III, and DECprinter with compressed font option.

†White, fanfold, lined.

RIBBONS — For Line Printers, DECwriters, and DECprinter

Size	Used On	Cat. No.	Qty. 1-5		Qty. 6-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
15″ by 20 yds.	V-, W-Series* (132-column)	36-11688	**$30 each**	**$29 each**	**$28 each**	**$27 each**	2 lbs.
9″ by 27 yds.	LP08, 09, 10, 11, 12, 15 and LE8 (80-column)	36-09828	**30 each**	**29 each**	**28 each**	**27 each**	2 lbs.
1″ by 36 yds.	Centronics LS8, LS08 and LS11 (132-column)	36-10998	**8 each**	**8 each**	**8 each**	**7 each**	1 lb.
14½″ by 25 yds.	132-column†	18-10156	**35 each**	**34 each**	**33 each**	**32 each**	2 lbs.
14½″ by 25 yds.	132-column‡	18-10156-01	**35 each**	**34 each**	**33 each**	**32 each**	2 lbs.
14½″ by 15 yds. (nylon)	Mohawk Data (132-column)	36-10418	**25 each**	**24 each**	**24 each**	**23 each**	2 lbs.
14½″ by 15 yds. (nylon)	LP10, older style (132-column)	18-09140-02	**25 each**	**24 each**	**24 each**	**23 each**	2 lbs.
1″ by 40 yds. (nylon)	DECwriter I, II 12 ribbons/box	36-10558-01	**50 box**	**48 box**	**47 box**	**45 box**	3 lbs.
1″ by 60 yds. (nylon)	DECwriter III, DECprinter 12 ribbons/box	36-12153-01	**65 box**	**62 box**	**62 box**	**59 box**	3 lbs.

*With aluminum foil reversing strips. †Has reversing bar. ‡No reversing bar.

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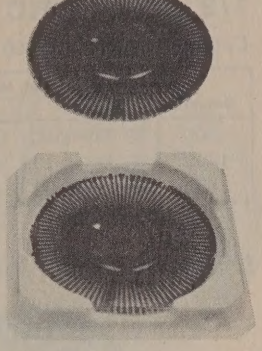
PAPER, RIBBONS, PAPER-TAPE, AND VIDEO FILTERS

WORD PROCESSING SUPPLIES

Description	Qty. per Box	Cat. No.	Qty. 1-5		Qty. 6-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
Mylar ribbon cartridge	4	LQP01-KA	$24 box	$23 box	$23 box	$22 box	1 lb.
Nylon ribbon cartridge	6	LQP01-KB	32 box	29 box	30 box	29 box	1 lb.
Paper 9½ by 11″ white, fanfold, unlined	2400 sheets	36-13202	30 box	29 box	29 box	27 box	40 lbs.
Print Wheels							
Courier 10	6	LQP01-PA	48 box	46 box	46 box	44 box	1 lb.
Pica 10	6	LQP01-PB					
Elite 12	6	LQP01-PC					
Courier 72	6	LQP01-PD					

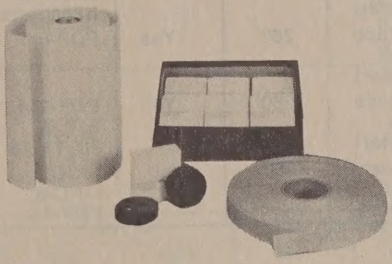

Print Wheels

SCREENFILTERS — For Video Terminal

Acrylic filters are available for use with DIGITAL's VT61, VT61/t, VT55, VT52, VT50 Video Terminals. Filters serve to reduce excessive glare from overhead lighting. Filters are available in three color choices. Shipping Weight: .5 lbs.

Cat. No.	Color	Qty. 1-5		Qty. 6-Up	
		Cat.	Cash	Cat.	Cash
12-13195-00 12-13195-01 12-13195-02	Gray Amber Green	$15 each	$14 each	$14 each	$13 each

TELEPRINTER SUPPLIES



Teleprinter Paper, 8½ by 11″

White, fanfold, lined; for use with Sprocket Feed model 35 teleprinters. 3200 sheets per box. Shipping Weight: 24 lbs.

Cat. No.	Qty. 1-5		Qty. 6-Up	
	Cat.	Cash	Cat.	Cash
36-05361	$30 box	$29 box	$28 box	$27 box

Teleprinter Paper, Non-Perforated

Rolled teleprinter paper non-perforated, white, unlined. For use on all ASR/KSR-33 Friction Feed Teleprinters. One case contains 12 rolls. Shipping Weight: 35 lbs.

Cat. No.	Qty. 1-5		Qty. 6-Up	
	Cat.	Cash	Cat.	Cash
36-05365-01	$36 case	$35 case	$34 case	$33 case

Teletype Paper-Tape, Oil Rolled

One inch by 950 ft., gray. For use with I/O Teletype Readers/Punches. Models ASR-33, 35, and 37. One case contains 28 rolls. Shipping Weight: 47 lbs.

Cat. No.	Qty 1-3		Qty. 4-Up	
	Cat.	Cash	Cat.	Cash
36-05360-01	$45 case	$43 case	$43 case	$41 case

Teletype Ribbon

For use with Models 28, 33, 35, and 37. One box contains 12 ribbons. Shipping Weight: 1 lb.

Cat. No.	Qty 1-3		Qty. 4-Up	
	Cat.	Cash	Cat.	Cash
18-09137-01	$20 box	$19 box	$19 box	$18 box

PAPER-TAPE

High Speed Fanfold Paper-Tape

For use on all DIGITAL's high speed paper-tape readers and punches. Sold by the case. One case contains 18 tapes (1″ by 1000 ft.). Shipping Weight: 28 lbs.

Cat. No.	Qty. 1-5		Qty. 6-Up	
	Cat.	Cash	Cat.	Cash
36-05363-01	$65 each	$62 each	$62 each	$59 each

Paper-Tape Trays (Blue Color)

Stores eight fanfold paper-tapes. Can be equipped with clear vinyl cover to prevent spilling. Shipping Weight: 1 lb.

Cat. No.	Description	Qty. 1-23 Cat./Cash	Qty. 24-Up	
			Cat.	Cash
36-05364	Tray	$3 each	$3 each	$3 each
36-05364-01	Cover	1 each	1 each	1 each
12-11528	Tray with Snap-on Cover	5 each	5 each	4 each

digital DIRECT SALES CATALOG

MAGNETIC MEDIA

1/2" MAGNETIC TAPE

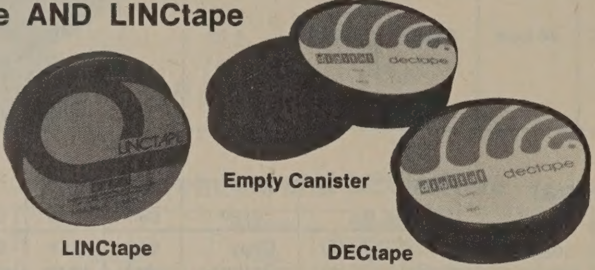
Certified for use at 1600 bpi on industry-standard transports.

Quantity	Cat. No.		Qty. 1-5		Qty. 6-Up		Shipping Weight
	Canister	Tape Seal	Cat.	Cash	Cat.	Cash	
600′	18-09540-00	18-09540-02	$15 each	$14 each	$14 each	$13 each	2 lbs.
1200′	18-09540-10	18-09540-12	20 each	19 each	19 each	18 each	3 lbs.
2400′	18-09543-02	18-09543-03	25 each	24 each	24 each	23 each	4 lbs.

Canister

Tape Seal

DECtape AND LINCtape



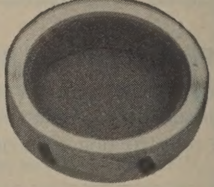
Type	Quantity	Certified? Formatted?	Use With	Cat. No.	Qty. 1-29		Qty. 30-Up		Shipping Weight
					Cat.	Cash	Cat.	Cash	
DECtape (blue canister)	260′	No	555, 55 or 56 transports	74-03860	$9 each	$8 each	$8 each	$8 each	.5 lb.
DECtape (blue canister)	260′	Yes	PDP-8	74-05996	12 each	11 each	11 each	11 each	.5 lb.
DECtape (blue canister)	260′	Yes	PDP-1, 4, 6, 7, 9, 10, 11, 15	74-05996-01	12 each	11 each	11 each	11 each	.5 lb.
LINCtape (green canister)	260′	No	LINC, LINC-8, PDP-12	74-03860-01	9 each	8 each	8 each	8 each	.5 lb.

DECtape Labels

Pressure sensitive labels available by the roll for easy DECtape identification. Labels are available in four colors. 250 labels per roll. Shipping Weight: 2 oz. per roll.

Cat. No.	Color	Price per Roll
90-07912-01	Red	$5
90-07912-02	Blue	5
90-07912-03	Green	5
90-07912-04	Yellow	5

DECtape



Labels

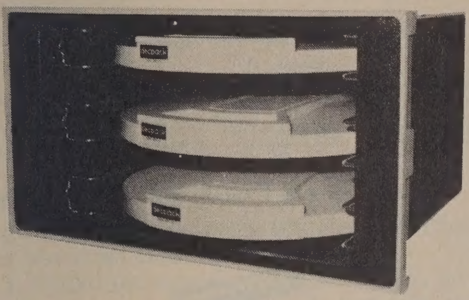
Empty Canisters — For DECtape/LINCtape

Cat. No.	For	Qty. per Pkg.	Color	Price per Pkg.	Shipping Weight
18-09777-01	LINCtape	2	Green	$1	1 lb.
18-09777-02	DECtape	2	Blue	1	1 lb.

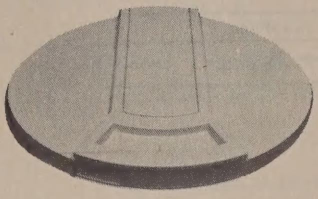
DISK PACKS — For Disk Drives

For Disk Drive	Disk Pack Cat. No.	Formatted Capacity Megabytes	Qty. 1-4		Qty. 5-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
RP06	RP06-P	176	$850 each	$816 each	$807 each	$773 each	25 lbs.
RP04, RP05	RP04-P	88	600 each	576 each	570 each	546 each	25 lbs.
RP03	RP03-P	40	325 each	312 each	309 each	296 each	18 lbs.
RP02	RP02-P	20	295 each	283 each	280 each	268 each	18 lbs.

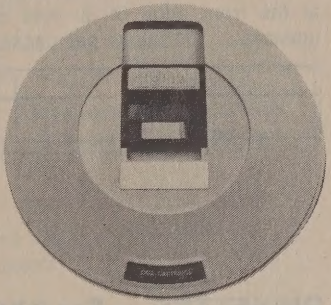
Disk Pack



RKR01-AC Disk Cartridge storage rack.
Holds up to 5 RK05 style Disk Cartridges.



RK05 Disk Cartridge.



RK06K-DC Disk Cartridge

DISK CARTRIDGES

For Computer	For Drive	Cartridge Cat. No.	Qty. 1-5		Qty. 6-Up		Shipping Weight
			Cat.	Cash	Cat.	Cash	
PDP-11	RK06	RK06K-DC	**$249 each**	**$239 each**	**$237 each**	**$227 each**	14 lbs.
PDP-11	RK05	RK05K-11	**99 each**	**95 each**	**94 each**	**90 each**	8 lbs.
PDP-8	RK05/RK8E	RK05K-8					8 lbs.
PDP-8	RK01*	30-09794					8 lbs.
PDP-11	RK02*	30-10350-01					8 lbs.

*Older style

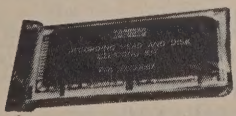
Storage Rack — For Disk Cartridges

Stores up to five RK05 style cartridges horizontally. Included are brackets, bezel and mounting hardware for secure mounting in DIGITAL's cabinetry, shown elsewhere in this catalog. Shipping Weight: 18 lbs.

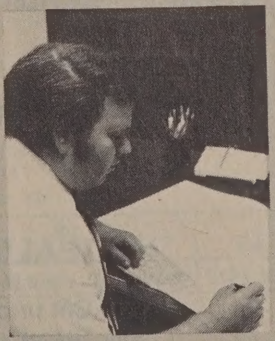
Cat. No.	Qty. 1-2		Qty. 3-Up	
	Cat.	Cash	Cat.	Cash
RKR01-AC	**$70 each**	**$67 each**	**$67 each**	**$64 each**

Disk Head Cleaning Kit

Kit contains alcohol-soaked pads and wand for cleaning the read/write heads. Shipping weight: 1 lb.



Cat. No.	Price
22-00007	$3



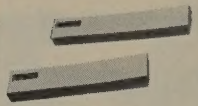
?GOT A QUESTION?

Need something clarified? Don't understand a spec? Call our Catalog Sales Desk toll free 800-225-9480 (Mass. residents (617) 481-7400 x 6608) between 8:30 am and 5 pm EST. Catalog Sales saves you time and money.

DECpack LABELS

DECpack labels are designed to fit into the molded frame at the front edge of all disk cartridges. No adhesive is necessary. 100 labels per package. Shipping Weight: 1 lb.

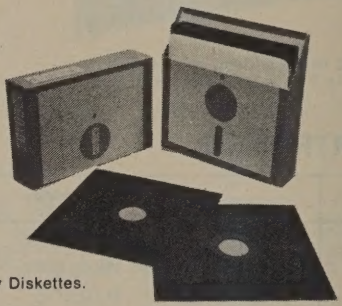
Cat. No.	Price
36-11715	**$3 pkg.**



DISKETTES — For RX01 Floppy Disk Drive

A thin, flexible, oxide-coated disk used for data entry and other applications on the RX01 Floppy Disk System. Each disk is permanently contained in an 8″ square envelope and then packaged in a paper slip-cover for extra protection. One box contains 10 diskettes. Shipping Weight: 1 lb.

	Qty. 1-4		Qty. 5-Up	
Cat. No.	Cat.	Cash	Cat.	Cash
RX01K-10	**$75 box**	**$72 box**	**$71 box**	**$68 box**

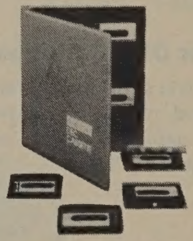


Floppy Diskettes.

DECcassettes — For TU60 Drive

100% certified digital cassette for use in TU60 Cassette Drives. Shipping Weight: 1 lb.

	Qty. 1-29		Qty. 30-Up	
Cat. No.	Cat.	Cash	Cat.	Cash
TU60-K	**$8 each**	**$7 each**	**$7 each**	**$7 each**



DECcassettes and binder.
Binder only available in Supply Kit TU60K-ST.

DEALING DIRECT SAVES YOU $$$

The **Cat** prices are generally about 5% less than **List** price. **Cash** prices are about 4% less than **Cat.** Generally 9% savings — in all! To qualify for these discounts simply follow the rules for dealing direct with DIGITAL's Catalog Sales Desk — See page 109 for details.

SUPPLY KITS

"Buy by the kit—for convenience"

DISK CARTRIDGE — For RK05, RK8E Disk Cartridge Drive

4 #RK05K-8 or #RK05K-11 Disk Cartridges
1 #RKR01-AC Cartridge Storage Unit
2 #36-11715 DECpack Labels
Shipping Weight: 45 lbs.

For Computer	For Disk Drive	Kit Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
PDP-8	RK05	RKR05-8	$440 each	$422 each	$418 each	$400 each
PDP-11	RK05/RK8E	RKR05-11	440 each	422 each	418 each	400 each

DECtape — For TU56 Tape Transports

12 #74-05996 or #74-05996-01 Certified DECtapes
12 #74-03860 Uncertified DECtapes
1 #TUC01 DECtape and Magtape Cleaning Kit
1 #18-09824 Bezel-mounted DECtape Storage Rack
4 Rolls of DECtape Reel Labels
Shipping Weight: 9 lbs.

For Computer	Kit Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
PDP-8, 12	TU56K-8	$280 each	$269 each	$266 each	$255 each
PDP-1, 4, 6, 7, 9, 10, 11, 15	TU56K-11	280 each	269 each	266 each	255 each

SUPPLY KIT — PCAST

Paper Tape — For PC-8, -11, -10, -12, -15 Paper Tape Devices

54 rolls of #36-05363-01 Fanfold Paper Tape
2 packages of #12-09898 Program Labels
12 #36-05364 Paper Tape Trays
12 #36-05364-01 Clear Vinyl No-spill Covers
Shipping Weight: 91 lbs.

Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
PCAST	$240 each	$230 each	$228 each	$218 each

SUPPLY KIT — TU60K-ST

Cassettes — For TU60 Cassette Drive

20 #TU60-K Cassettes
2 #TU60-LH Cassette Binders
Shipping Weight: 5 lbs.

Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
TU60K-ST	$160 each	$154 each	$152 each	$146 each

MAG TAPES — Tape Seal Only

Length (each)	Reels per Kit	Kit Cat. No.	Qty. 1-2 Kits Cat.	Qty. 1-2 Kits Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash	Shipping Weight
600 ft.	20	TUMAG-6	$250 each	$240 each	$238 each	$228 each	40 lbs.
1200 ft.	20	TUMAG-12	300 each	288 each	285 each	273 each	60 lbs.
2400 ft.	20	TUMAG-24	360 each	346 each	342 each	328 each	80 lbs.

SUPPLY KIT — LP05K-ST

For Line Printer LP05

6 #36-11688 Printer Ribbons
3 Boxes #36-09141 Printer Paper
Shipping Weight: 132 lbs.

Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
LP05K-ST	$260 each	$250 each	$247 each	$237 each

SUPPLY KIT — LS01K-ST

For Line Printer LS01 Centronics

6 #36-10998 Printer Ribbons
3 Boxes #36-09141 Printer Paper
Shipping Weight: 126 lbs.

Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
LS01K-ST	$135 each	$130 each	$128 each	$123 each

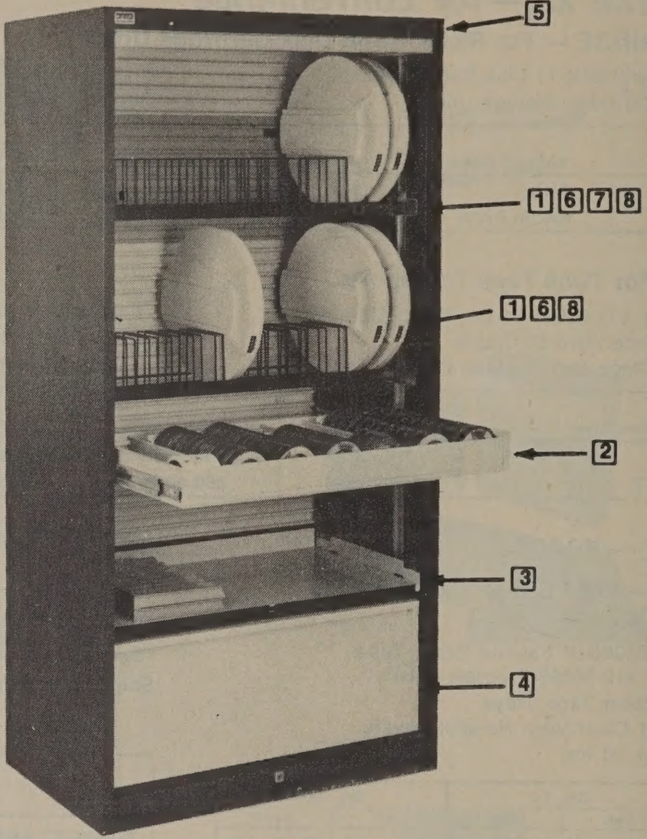
SUPPLY KIT — WP31K-ST

For Word Processing Installations

2 #RX01K-10 Boxes Floppies
2 #36-13202 Boxes Paper
2 #LQP01-KB Boxes Nylon Ribbons
2 #LQP01-KA Boxes Film Ribbons
3 Courier 10 Print Wheels
3 Pica 10 Print Wheels
3 Elite 12 Print Wheels
3 Courier 72 Print Wheels
1 Gray Filter 12-13195-00 (for Video Terminals)
1 Amber Filter 12-13195-01 (for Video Terminals)
1 Green Filter 12-13195-02 (for Video Terminals)

Cat. No.	Qty. 1-2 Cat.	Qty. 1-2 Cash	Qty. 3-Up Cat.	Qty. 3-Up Cash
WP31K-ST	$425 each	$408 each	$404 each	$387 each

MEDIA STORAGE CABINET



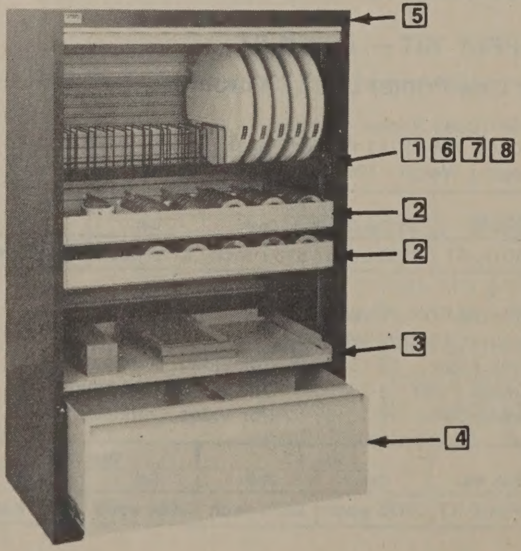
Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-AA	$699 each	$671 each	$664 each	$636 each

Complete Large Cabinet

The H980-AA measures 71⅜H by 36W by 18½″D. The unit contains:

1. Two H980-CC Disk Cartridge storage unit handling 28 RK05K Disk Cartridges.
2. One H980-CD roll-out-drawer with one H980-CH divider set for storing 72 DECtapes.
3. One H980-CG fixed shelf for storage of forms, punched cards, etc.
4. One H980-CF storage drawer for utility purposes.

Shipping Weight: 245 lbs.



Complete Small Cabinet

The H980-AB measures 58⅜H by 36W by 18½″D. The unit contains:

1. One H980-CC Disk Cartridge storage unit, handling 14 RK05K disk cartridges.
2. Two H980-CD roll-out-drawers, one with the H980-CH divider set, and one providing a work surface.
3. One H980-CG fixed shelf for storage of forms, etc.
4. One H980-CF storage drawer for utility purposes.

Shipping Weight: 225 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-AB	$649 each	$623 each	$616 each	$591 each

MEDIA STORAGE CABINET

1 Disk Cartridge Storage Rack

The H980-CC storage rack provides slots for 14 RK05K disk cartridges per level. The unit requires 17″ inside mounting space. Shipping Weight: 7 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CC	$35 each	$34 each	$33 each	$32 each

2 Roll-out Drawer — H980-CD

The H980-CD roll-out drawer provides either a work surface, a shelf for RP02-P disk packs, RP03-P disk packs, or forms the basis of the DECtape storage drawer (see H980-CH). The unit requires 4¾″ inside mounting space for DECtapes or 7″ inside mounting space for RP02-P, RP03-P, RP04-P, RP06-P packs. Shipping Wt.: 18 lbs.

Divider Kit — H980-CH

The H980-CH divider kit provides partitions within the H980-CD roll-out drawer, so that DECtape, cassettes, or any other small items may be divided into logical units, and stored economically. Shipping Weight: 15 lbs.

DECtape Wire Frame — H980-CK

The H980-CK DECtape wire frame provides slots so that up to 77 reels of DECtape in canisters may be stored conveniently and systematically. The wire frame fits easily within the H980-CD roll-out drawer. No screws or attachments necessary. Unit requires 4¾″ inside vertical mounting space for DECtape. Shipping Wt.: 5 lbs.

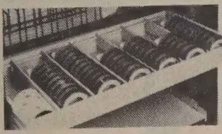


Fig. 1

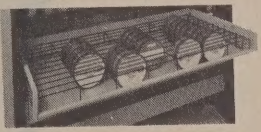


Fig. 2

Cat. No.	Description	Fig.	Qty. 1		Qty. 2-Up	
			Cat.	Cash	Cat.	Cash
H980-CD	Drawer	1	$65 each	$62 each	$62 each	$59 each
H980-CH	Divider	1	65 each	62 each	62 each	59 each
H980-CK	Frame	2	35 each	34 each	33 each	32 each

3 Fixed Shelf — H980-CG

The H980-CG fixed shelf provides storage space for such items as punched cards, forms for printing and printer paper. The shelf is fixed (does not roll), so that heavy items may be stored without worry of the cabinet toppling over. Shipping Weight: 11 lbs.

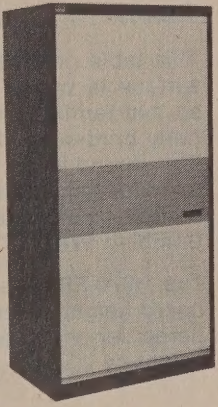
Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CG	$35 each	$34 each	$33 each	$32 each

4 Storage Drawer — H980-CF

The H980-CF storage drawer provides space for various items, including: maintenance manuals, paper tape trays, hanging binders, and many other "hard-to-find-a-place-for" items. Inside dimensions are 12H by 31½W by 12″D. The unit requires 13″ inside mounting space. Shipping Weight: 31 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CF	$80 each	$77 each	$76 each	$73 each

5 Cabinet Shells



The H980-BA provides 65″ of inside mounting space. The H980-BB provides 52″ of inside mounting space. Both cabinet shells are 36″ wide and require only 18½″ outside depth.

The cabinet closes and locks for overnight storage and security.

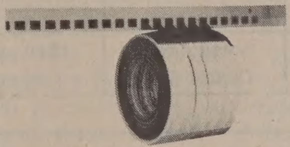
Cat. No.	Qty. 1		Qty. 2-Up	
	Cat.	Cash	Cat.	Cash
H980-BA	$399	$383	$379	$363

Shipping Weight: 145 lbs.

Cat. No.	Qty. 1		Qty. 2-Up	
	Cat.	Cash	Cat.	Cash
H980-BB	$349	$335	$332	$318

Shipping Weight: 135 lbs.

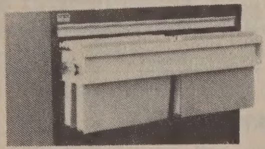
6 Magtape (tape seal) Hanger Bar — H980-CA



The H980-CA tape seal hanger bar provides space for reels of ½″ industry compatible magnetic tape. Either 600 ft., 1200 ft., or 2400 ft. reels of tape (tape seal style only) may be stored in any combination. Access to a given reel of tape is accomplished by pressing the reel inward allowing the spring loaded stabilizer to swing the reel outward where it can be grasped. The unit requires 14¾″ inside mounting space for 2400 ft. reels. Shipping Weight: 5 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CA	$35 each	$34 each	$33 each	$32 each

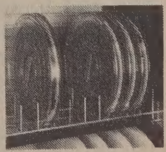
7 Hanging Binder Frame — H980-CE



The H980-CE hanging binder frame provides two sections of 12″ each for storage of print-out binders. These binders must have tabs or "ears" that hook onto the binder frame so that rapid access is available. Unit requires 13″ inside mounting space. Shipping Wt.: 18 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CE	$70 each	$67 each	$66 each	$64 each

8 Magtape (canister style) Storage Rack — H980-CB



The H980-CB tape storage rack provides slots for storing 20 rolls of ½″ industry compatible magnetic tape. Either 600 ft., 1200 ft., or 2400 ft. reels (canister style only) of tape may be stored in any combination. The unit requires 13″ inside mounting space for 2400 ft. reels. Shipping Weight: 5 lbs.

Cat. No.	Qty. 1		Qty. 2	
	Cat.	Cash	Cat.	Cash
H980-CB	$35 each	$34 each	$33 each	$32 each

digital FURNITURE

DIRECT SALES CATALOG

Tables

This table provides a convenient work surface. The surface is walnut finish. The table is wide enough so that terminals such as DECscope, as well as papers, print-outs, etc., may be placed on the surface. The shroud in the rear is ideal for holding a data set, or other items. The two sides have cable openings so that a complete unit appears neat and attractive. Shipping Weight: 50 lbs.

The H970-EB measures 27H by 36W by 30″D (keyboard height). A set of casters, 12-11526, can be ordered for the table. Installed, they increase table height by 2″.

Cat. No.	Description	Qty. 1-2		Qty. 3-Up		Shipping Weight
		Cat.	Cash	Cat.	Cash	
H970-EB	Small Table	$240 each	$230 each	$228 each	$218 each	50 lbs.
12-11526	Caster Set	20 each	19 each	19 each	18 each	1 lb.

Free Standing Table — H970-HB

The H970-HB serves as a support table for peripheral devices such as the VT52 DECscope in office environments. The table consists of a walnut wood-grained, scratch-resistant top, medium grey side rails, and an off-white modesty panel. The leading edge of the top is beveled for additional comfort. The H970-HB includes four adjustable leveling feet for firm positioning. Dimensions are 27H by 24W by 30″D.

Cat. No.	List	Cat.	Cash	Shipping Weight
H970-HB	$170	$162	$155	65 lbs.

Terminal Stand

DIGITAL's unique Terminal Stand features a rounded black steel center pole that attaches to five pedestal legs. Casters attach to each leg to facilitate unit mobility. The following terminals are supported on a base plate that is securely mounted to the center pole: VT50, VT52, VT55, VT71, and VT71/t.

Terminal Stand combines functional design with contemporary elegance. It measures 26″ in height and requires minimal floor space when fully assembled. Each stand is shipped unassembled for ease of storage and to reduce shipping costs. Instructions and necessary tools for easy and quick unit assembly are included. Please use Part No. VT71-ST for Terminal Stand to be used with the VT71 and VT71/t terminals.

Cat. No.	Description	Qty. 1-2		Qty. 3-Up		Shipping Weight
		Cat.	Cash	Cat.	Cash	
VTXX-ST	Terminal Stand (VT50, 52, 55)	$75 each	$72 each	$71 each	$68 each	25 lbs.
VT71-ST	Terminal Stand (VT71, 71/t)	75 each	72 each	71 each	68 each	25 lbs.

DIGITAL EQUIPMENT CORP. / Catalog Sales / Dept. EM / One Iron Way / Marlborough, MA 01752

digital
DIRECT SALES CATALOG

HOW TO ORDER

Catalog Sales Desk
800-225-9480
(Mass. residents (617) 481-7400 x 6608).
From 8:30 am to 5 pm EST.

To ensure prompt delivery and accurate charges you must use one of the four methods outlined below. Choose whichever best suits your company's internal operations.

1. **Preprinted Order Form**
A sample of this form — and detailed instructions for filling it in — are shown on page 112. We prefer you use this form. DIGITAL's Terms and Conditions for Catalog 1-77 (Note B) are printed on the reverse side. The submittal of your order on this form acknowledges your acceptance of these Terms and Conditions. For your review, the Terms and Conditions pertaining to Catalog 1-77 (Note B) are reproduced on page 113. See Note A.

2. **Purchase Order and Preprinted Form**
If you submit your own Purchase Order you can simply attach a **signed** copy of DIGITAL's Preprinted Order Form (Note A) to signify your acceptance of the Terms and Conditions pertaining to Catalog 1-77 (Note B) as documented on page 113. Be sure to provide us with all the required information as detailed under **Ordering Information.**

3. **Purchase Order Only**
If you submit a Purchase Order and do not include DIGITAL's Preprinted Order Form you must incorporate this statement "Terms and Conditions of DIGITAL's Direct Sales Catalog 1-77 govern this order." These Terms and Conditions (Note B) are documented on page 113. Be sure to provide us with all the required information as detailed under **Ordering Information.**

4. **Phone Orders**
If you have a current approved Catalog Open Account (see definition page 110) call the Catalog Sales Desk to enter your order. Your order will be processed and scheduled but not shipped until we receive a confirming, acceptable written catalog order as described in 1 through 3 above. We can handle your call more quickly if you have the following information ready: catalog part number, quantity, description, billing address, and shipping address.

ORDERING INFORMATION

We must have the following information to process your order:

(a) Company Name, and Complete Address including ZIP Code.

(b) A Ship To address, if different from the company address.

(c) Name, Title, and Phone Number of an Authorized Customer Contact.

(d) Tax Exemption Number if applicable. A copy of your Exemption Certificate is also required if not submitted with a previous catalog order. See **Sales Tax Information,** page 110.

(e) Purchase Order Number (for billing purposes only and for Catalog Open Accounts).

(f) State if you are subject to the Renegotiation Act.

(g) State if Transportation Insurance is required. See **Transportation Insurance,** page 110.

(h) Indicate which shipping method you require. Note that size and weight considerations sometimes limit your choice. See **Shipping and Delivery Information,** page 110.

(i) Give Quantity, Catalog Part Number, Description and Appropriate Price (Catalog or Cash) for each item. You can refer to the Product Index for a summary of all items and their prices. Include any special specifications (color, style, etc.) with the item description.

(j) Give the Shipping Weight for each item. For Modules you must check the Module Weight Chart on page 115 to compute the combined shipping weight of the Modules.

(k) Compute all taxes, shipping charges, and insurance costs in accordance with the instructions under **Sales Tax Information, Shipping and Delivery Information, Transportation Insurance.**

(l) Add costs in Items i and k. This is the Total Order Cost.

(m) When paying cash, remit the amount computed in (l) above. Pay by check or postal money order. Do NOT send currency or stamps. If the actual charges are less than you computed, DIGITAL will refund the difference provided it exceeds $2.

(n) **If your order is less than $100.00 you must pay cash.**

ADDRESS AND MAIL ORDERS TO:
Digital Equipment Corporation
Direct Sales Catalog, Dept. EM
P.O. Box 4202, Boston, MA 02107

Note A: We will send you a supply of the Order Forms at no charge. Call the Catalog Sales Desk to request them.

Note B: Expiration date of Catalog 1-77 is June 30, 1978. If you are using this catalog after this date you must check with the Catalog Sales Desk for any changes affecting Terms, Conditions, Products or Prices. Although we expect most prices to remain unchanged for the life of Catalog 1-77, some may change. You will be informed of any change when we process your order.

digital HOW TO ORDER

DIRECT SALES CATALOG

SHIPPING AND DELIVERY INFORMATION

DIGITAL will utilize the fastest service to your area by surface transportation unless indicated otherwise. Cash customers requesting UPS delivery and meeting weight and size limits of UPS may use the following charts to figure shipping and handling charges. Customers on the West Coast should indicate UPS Blue Label Service over regular UPS for faster delivery.

Use the Zip Code Chart for the continental U.S. and find the *first* three digits of your Zip Code to determine your zone. Then refer to the shipping rate chart for the charges appropriate to your zone according to the shipping weight of each item ordered. Figure UPS charges for each catalog item separately using the indicated shipping weight times the quantity. Then total the individual charges figured and remit the total amount. Unless otherwise stated, shipping weights are calculated to the nearest pound. Excess payments of transportation charges over two dollars will be refunded by check.

To calculate shipping charges for a module(s), first refer to the physical descriptions included with each module description. Modules are either standard-length or extended-length; single-height, double-height, or quad-height; and single-width, double-width, or triple-width. Then check the Logic Module Weight Chart on page 115 to determine shipping weight for each module size.

Some catalog products may exceed weight and/or size limitations (either individually or collectively) for shipment via UPS. These items will be shipped with freight charges collect (you will be billed by carrier), as will all cash orders when requesting shipment by air (except Blue Label Service).

All approved current Catalog Open Account customers should only indicate appropriate (by weight) and desired (surface or air) transportation mode. All shipping charges for open accounts will be prepaid by DIGITAL and added to the customer's invoice.

SALES TAX INFORMATION

Unless an *exemption certificate* which is valid for the state into which your order is being shipped has been submitted with this, or a previous catalog order DIGITAL must by law collect state sales tax for the following states at the rates shown below.

We are also required by law to collect any city, county, parish, or rapid transit taxes within these states. If your order is being shipped to an area which has a local tax of this type, please include such additional tax with your payment.

CATALOG OPEN ACCOUNTS

Catalog Open Accounts (net 30 days) will be granted to customers approved by the Catalog Sales Credit Department. To apply for Open Account Payment terms (net 30 days), call toll free 800-225-9480 (Mass. (617) 481-7400) and ask for the credit desk.

10-DAY FREE TRIAL RETURNS

Before sending material back to DIGITAL for credit, call our Catalog Order Desk and ask for a Return Authorization Number and shipping instructions. Material shipped to us without an Authorization Number will NOT be credited to you.

TRANSPORTATION INSURANCE

UPS charges include a $100 value for insurance. Insurance rates for UPS orders over $100 can be calculated by adding 25¢ for each additional $100 value or fraction thereof.

All cash customers requiring non-UPS delivery and approved current Catalog Open Account customers clearly indicating "yes, in-transit insurance is desired" will be provided insurance on their orders while in-transit, and a charge of 50¢ per $100 of catalog price, or fraction thereof, will be made. Cash customers should include these charges in their payment.

CURRENT STATE SALES TAX TABLE

Taxes subject to adjustment without notice in event of Legislative change.

State	Percent	State	Percent	State	Percent	State	Percent	State	Percent
Alabama*	4	Hawaii	4	Massachusetts	5	North Carolina*	3	Texas*	4
Arkansas*	3	Illinois	4	Michigan	4	Ohio*	4	Utah*	4
Arizona*	4	Indiana	4	Minnesota	4	Oklahoma*	2	Vermont	3
California*	4.75	Iowa	3	Mississippi	5	Pennsylvania	6	Virginia*	3
Colorado*	3	Kansas*	3	Missouri*	3	Rhode Island	6	Washington*	4.6
Connecticut	7	Kentucky	5	New Jersey	5	South Carolina	4	West Virginia	3
Florida	4	Louisiana*	3	New Mexico*	4	Tennessee*	4.5	Wisconsin	4
Georgia*	3	Maryland	4	New York*	4				

*Certain localities within these states require additional local taxes. After determining the exact amount from your local tax office, please include it on your order.

ZIP CODE TABLE

Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone	Zip Code Prefixes	Zone
010-043	2	140-147	4	258-279	4	382	5	541-546	5	690-693	7	812	7
044	3	148-149	3	280-284	5	383	6	547-548	6	700-704	6	813-816	8
045	2	150-168	4	285	4	384-385	5	549	5	705-706	7	820	7
046	3	169-171	3	286-299	5	386-397	6	550-574	6	707-729	6	821	8
047	4	172-174	4	300-315	5	400-436	5	575-577	7	730-739	7	822	7
048-049	3	175-176	3	316	6	437-449	4	580-584	6	740-745	6	823-825	8
050-053	2	177	4	317-322	5	450-456	5	585-588	7	746-748	7	826-828	7
054	3	178-199	3	323-355	6	457	4	590-591	8	749	6	829-880	8
056-069	2	200-218	4	356-359	5	458-479	5	592-593	7	750-754	7	881	7
070-089	3	219	3	360-361	6	480-482	4	594-599	8	755	6	882-883	8
100-108	2	220-241	4	362	5	484-499	5	600-619	5	756-784	7	884	7
109	3	242	5	363-367	6	500-516	6	620-623	6	785	8	890-898	8
110-126	2	243-245	4	368	5	520	5	624-629	5	786-796	7	900-961	8
127	3	246-248	5	369	6	521-526	6	630-675	6	797-799	8	970-986	8
128	2	249-254	4	370-379	5	527-539	5	676-679	7	800-810	7	988-994	8
129-139	3	255-257	5	380-381	6	540	6	680-689	6	811	8		

United Parcel Service

Effective January 9, 1977

COMMON CARRIER RATE CHART

See separate rate chart for BLUE LABEL AIR

ANY FRACTION OF A POUND OVER THE WEIGHT SHOWN TAKES THE NEXT HIGHER RATE

WEIGHT NOT TO EXCEED	RATES TO ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8
1 lb.	$.72	$.74	$.76	$.79	$.83	$.87	$.92
2 "	.78	.82	.87	.93	1.00	1.09	1.18
3 "	.85	.90	.98	1.06	1.18	1.30	1.45
4 "	.91	.98	1.09	1.20	1.35	1.52	1.71
5 "	.98	1.06	1.20	1.33	1.52	1.73	1.97
6 "	1.04	1.14	1.31	1.47	1.70	1.95	2.24
7 "	1.11	1.22	1.42	1.61	1.87	2.17	2.50
8 "	1.17	1.30	1.53	1.74	2.05	2.38	2.77
9 "	1.24	1.38	1.64	1.88	2.22	2.60	3.03
10 "	1.30	1.46	1.74	2.01	2.39	2.81	3.29
11 "	1.37	1.55	1.85	2.15	2.57	3.03	3.56
12 "	1.43	1.63	1.96	2.29	2.74	3.25	3.82
13 "	1.50	1.71	2.07	2.42	2.92	3.46	4.09
14 "	1.56	1.79	2.18	2.56	3.09	3.68	4.35
15 "	1.63	1.87	2.29	2.69	3.26	3.89	4.61
16 "	1.69	1.95	2.40	2.83	3.44	4.11	4.88
17 "	1.76	2.03	2.51	2.97	3.61	4.33	5.14
18 "	1.82	2.11	2.62	3.10	3.79	4.54	5.41
19 "	1.89	2.19	2.73	3.24	3.96	4.76	5.67
20 "	1.95	2.27	2.83	3.37	4.13	4.97	5.93
21 "	2.02	2.36	2.94	3.51	4.31	5.19	6.20
22 "	2.08	2.44	3.05	3.65	4.48	5.41	6.46
23 "	2.15	2.52	3.16	3.78	4.66	5.62	6.73
24 "	2.21	2.60	3.27	3.92	4.83	5.84	6.99
25 "	2.28	2.68	3.38	4.05	5.00	6.05	7.25

WEIGHT NOT TO EXCEED	RATES TO ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8
26 lb.	$2.34	$2.76	$3.49	$4.19	$5.18	$6.27	$7.52
27 "	2.41	2.84	3.60	4.33	5.35	6.49	7.78
28 "	2.47	2.92	3.71	4.46	5.53	6.70	8.05
29 "	2.54	3.00	3.82	4.60	5.70	6.92	8.31
30 "	2.60	3.08	3.92	4.73	5.87	7.13	8.57
31 "	2.67	3.17	4.03	4.87	6.05	7.35	8.84
32 "	2.73	3.25	4.14	5.01	6.22	7.57	9.10
33 "	2.80	3.33	4.25	5.14	6.40	7.78	9.37
34 "	2.86	3.41	4.36	5.28	6.57	8.00	9.63
35 "	2.93	3.49	4.47	5.41	6.74	8.21	9.89
36 "	2.99	3.57	4.58	5.55	6.92	8.43	10.16
37 "	3.06	3.65	4.69	5.69	7.09	8.65	10.42
38 "	3.12	3.73	4.80	5.82	7.27	8.86	10.69
39 "	3.19	3.81	4.91	5.96	7.44	9.08	10.95
40 "	3.25	3.89	5.01	6.09	7.61	9.29	11.21
41 "	3.32	3.98	5.12	6.23	7.79	9.51	11.48
42 "	3.38	4.06	5.23	6.37	7.96	9.73	11.74
43 "	3.45	4.14	5.34	6.50	8.14	9.94	12.01
44 "	3.51	4.22	5.45	6.64	8.31	10.16	12.27
45 "	3.58	4.30	5.56	6.77	8.48	10.37	12.53
46 "	3.64	4.38	5.67	6.91	8.66	10.59	12.80
47 "	3.71	4.46	5.78	7.05	8.83	10.81	13.06
48 "	3.77	4.54	5.89	7.18	9.01	11.02	13.33
49 "	3.84	4.62	6.00	7.32	9.18	11.24	13.59
50 "	3.90	4.70	6.10	7.45	9.35	11.45	13.85

ADDITIONAL CHARGES:

For each COD received for collection — 85 cents.
For each Address Correction -— 85 cents.
For each Acknowledgment of Delivery (AOD) — 20 cents.
For each package with a declared value over $100 — 25 cents for each additional $100 or fraction thereof.

WEIGHT AND SIZE LIMITS:

Maximum Weight per package — 50 POUNDS.
Maximum Weight of all packages from one shipper to one consignee in one day — 100 pounds.
Maximum Size per package — 108 INCHES IN LENGTH AND GIRTH COMBINED.
Minimum charge for a package measuring over 84 inches in length and girth combined will be equal to charge for a package weighing 25 pounds.

7240 1-77 REV.

Carrier rates published in this catalog are per UPS rates effective Jan. 9, 1977. These rates are subject to change. DIGITAL will use the rates in effect at the time of order placement.

BLUE LABEL AIR TO WEST COAST

Blue Label Air Service Charges to California, Oregon and Washington only

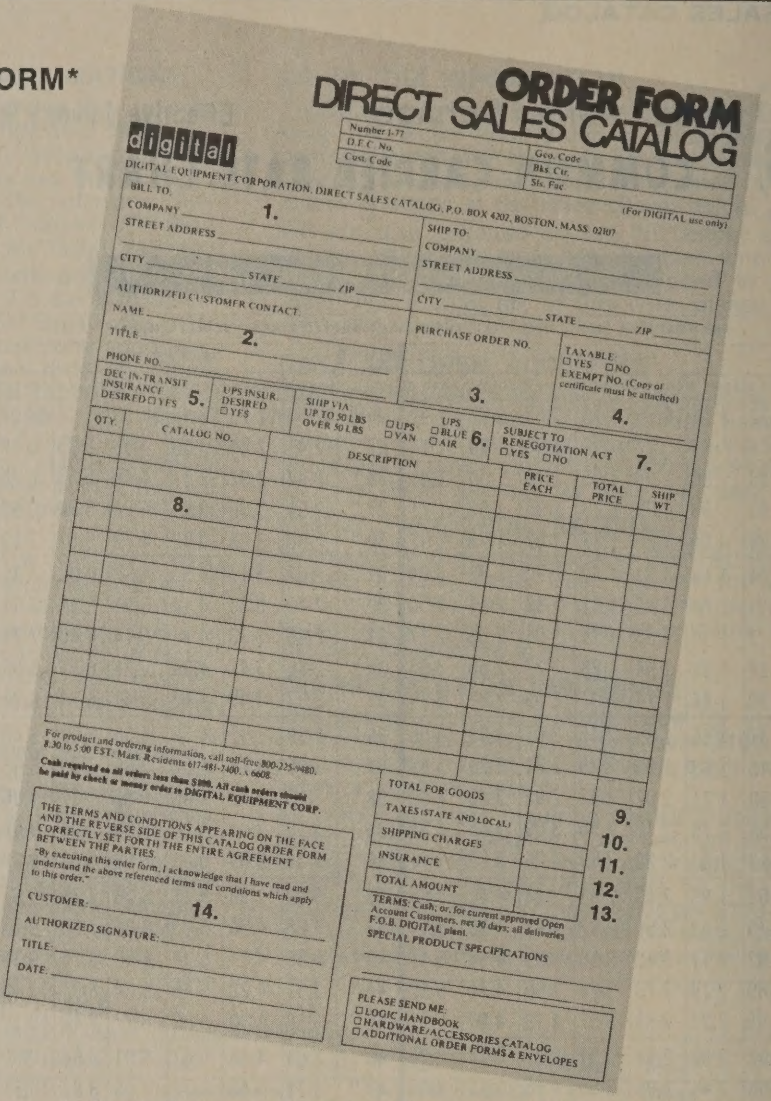
WEIGHT NOT TO EXCEED	
1 lb.	$1.17
2 "	1.68
3 "	2.19
4 "	2.71
5 "	3.22
6 "	3.73
7 "	4.25
8 "	4.76
9 "	5.27
10 "	5.78
11 "	6.30
12 "	6.81
13 "	7.32
14 "	7.84
15 "	8.35
16 "	8.86
17 "	9.38
18 "	9.89
19 "	10.40
20 "	10.91
21 "	11.43
22 "	11.94
23 "	12.45
24 "	12.97
25 "	13.48
26 "	13.99
27 "	14.51
28 "	15.02
29 "	15.53
30 "	16.04
31 "	16.56
32 "	17.07
33 "	17.58
34 "	18.10
35 "	18.61
36 "	19.12
37 "	19.64
38 "	20.15
39 "	20.66
40 "	21.17
41 "	21.69
42 "	22.20
43 "	22.71
44 "	23.23
45 "	23.74
46 "	24.25
47 "	24.77
48 "	25.28
49 "	25.79
50 "	26.30

digital DIRECT SALES CATALOG

HOW TO ORDER

PREPRINTED ORDER FORM*

Follow these 14 steps
to fill in the form.



ORDER FORM
DIRECT SALES CATALOG

digital

Number 1-77
D.E.C. No.
Cust. Code
Geo. Code
Bks. Ctr.
Sls. Fac.
(For DIGITAL use only)

DIGITAL EQUIPMENT CORPORATION, DIRECT SALES CATALOG, P.O. BOX 4202, BOSTON, MASS. 02107

BILL TO:
COMPANY ______ 1.
STREET ADDRESS ______
CITY ______ STATE ______ ZIP ______

SHIP TO:
COMPANY ______
STREET ADDRESS ______
CITY ______ STATE ______ ZIP ______

AUTHORIZED CUSTOMER CONTACT:
NAME ______
TITLE ______ 2.
PHONE NO. ______

PURCHASE ORDER NO. ______ 3.

TAXABLE: ☐ YES ☐ NO
EXEMPT NO. (Copy of certificate must be attached) ______ 4.

DEC IN-TRANSIT INSURANCE DESIRED ☐ YES 5.
UPS INSUR. DESIRED ☐ YES

SHIP VIA: UP TO 50 LBS ☐ UPS ☐ UPS BLUE; OVER 50 LBS ☐ VAN ☐ AIR 6.

SUBJECT TO RENEGOTIATION ACT ☐ YES ☐ NO 7.

QTY.	CATALOG NO.	DESCRIPTION	PRICE EACH	TOTAL PRICE	SHIP WT.
	8.				

For product and ordering information, call toll-free 800-225-9480, 8:30 to 5:00 EST. Mass. Residents 617-481-7400, x 6608.

Cash required on all orders less than $100. All cash orders should be paid by check or money order to DIGITAL EQUIPMENT CORP.

TOTAL FOR GOODS		9.
TAXES (STATE AND LOCAL)		10.
SHIPPING CHARGES		11.
INSURANCE		12.
TOTAL AMOUNT		13.

TERMS: Cash; or, for current approved Open Account Customers, net 30 days; all deliveries F.O.B. DIGITAL plant.

SPECIAL PRODUCT SPECIFICATIONS ______

THE TERMS AND CONDITIONS APPEARING ON THE FACE AND THE REVERSE SIDE OF THIS CATALOG ORDER FORM CORRECTLY SET FORTH THE ENTIRE AGREEMENT BETWEEN THE PARTIES.

"By executing this order form, I acknowledge that I have read and understand the above referenced terms and conditions which apply to this order."

CUSTOMER: ______ 14.
AUTHORIZED SIGNATURE: ______
TITLE: ______
DATE: ______

PLEASE SEND ME:
☐ LOGIC HANDBOOK
☐ HARDWARE/ACCESSORIES CATALOG
☐ ADDITIONAL ORDER FORMS & ENVELOPES

1. Put your company name and complete address, including Zip Code for **Bill To** information. If you want your order shipped to a different address, write this in the **Ship To** space.
2. Name, title, and phone number of **Authorized Customer Contact.**
3. Purchase order number (for Catalog Open Accounts and for invoicing purposes only).
4. Check off whether this order is taxable and include tax exemption number, if applicable (see notes under **Sales Tax Information). A copy of the exemption certificate must be attached if not submitted with a previous Catalog Order.**
5. Check if transportation insurance is desired. UPS or DIGITAL.
6. Check method of shipment (UPS, air, van). Verify that method selected will accept your shipment based on size and/or weight restrictions.
7. Check if you are subject to the Renegotiation Act.
8. Give the quantity, catalog part number, description, appropriate price (depending on the discount taken), total price, and shipping weight for each part ordered, plus any special product specifications required, in the description. Compute Module weight as shown on page 115.
9. Add up amounts in the **Total Price** column and enter total in the **Total for Goods** block.
10. Add state and local taxes, if applicable (see notes under **Sales Tax Information).**
11. Add shipping charges only if paying cash and shipping via UPS. All other shipping methods will be prepaid by DIGITAL and added to the customer's invoice or billed by the carrier. (See instructions under **Shipping and Delivery Information.)**
12. Add insurance charges only if paying cash. (See instructions under **Transportation Insurance** to calculate UPS or DIGITAL insurance charges.) All Open Account customers requesting DIGITAL insurance will be billed these charges.
13. Total all of the above items. Cash customers should remit this total with their order, including shipping charges, insurance, and taxes. All cash orders should be paid by check or postal money order. Do NOT send currency or stamps. If the charge for equipment and transportation is less than the amount you send us, we will refund the difference. **Cash is required on all orders totaling less than $100.**
14. Be sure and sign the order form. Orders cannot be processed without an authorized signature.

Address and mail orders to:
Digital Equipment Corporation, Direct Sales Catalog, Dept. EM, P.O. Box 4202, Boston, MA 02107.

*We will send you, at no charge, copies of these Preprinted Order Forms. Call the Catalog Sales Desk.

DIGITAL EQUIPMENT CORP. / Catalog Sales / Dept. EM / One Iron Way / Marlborough, MA 01752

TERMS AND CONDITIONS OF SALE FOR CATALOG 1-77

1. PRICE/PAYMENT:

A. All orders submitted on DIGITAL's Catalog Order Form and accompanied by a check in the amount of the catalog price plus transportation (if shipped UPS), insurance, charge, and sales tax shall be accepted and processed unless Customer is otherwise notified by DIGITAL within ten (10) days of receipt of order. If Customer has an approved current Catalog Open Account, a check need not accompany the Order Form, but rather, at Customer's option, full payment shall be due within thirty (30) days from date of delivery. Notwithstanding the above, cash is required for all orders of less than $100.

B. All catalog prices are exclusive of transportation charges and sales, use, and other similar tax. All such charges and taxes shall be added to the Catalog price and paid by Customer to DIGITAL. To qualify for tax exemption, Customer must submit a copy of a valid Tax Exemption Certificate with each order.

2. DELIVERY:

All deliveries shall be F.O.B. DIGITAL's Factory. Risk of loss shall pass to Customer upon delivery by DIGITAL to carrier. For all shipments, except via UPS, insurance will be provided on the products while in transit and a charge of $.50 per $100 of Catalog price will be made if Customer clearly indicates in the block marked "YES, IN-TRANSIT INSURANCE IS DESIRED" on the Catalog Order Form. UPS shipping charges include insurance of $100. Additional UPS insurance coverage can be obtained by Customer at the rates specified in the *How to Order* Section. DIGITAL shall not be liable for any damages or penalty for delivery delays when due to causes beyond its reasonable control.

3. ACCEPTANCE:

Should the Customer, upon receipt of the Product, find it unsatisfactory for any reason, DIGITAL will refund Customer the Catalog price, provided Customer returns the Product to DIGITAL, transportation prepaid and insured, in the same condition as delivered and in the same DIGITAL or equally suitable shipping container within ten (10) days of receipt. Before returning the product, Customer must call DIGITAL for a return authorization number.

4. WARRANTY:

A. All Products (except Software) purchased from this Catalog are warranted as stated below for a period of ninety (90) days from date of initial delivery, except that the warranty period for W, M, and A Series modules is one (1) year.

B. All Products (except Software) are warranted against defects in material and workmanship under normal and proper use and in their original unmodified condition for the period set forth in Clause 4A above. If found defective by DIGITAL within the terms of this warranty, DIGITAL's sole obligation shall be to repair or replace (at its option) the defective Product. If DIGITAL determines that the Product is not defective within the terms of this warranty, Customer shall pay all costs of handling and return transportation. All replaced Products become the property of DIGITAL. As a condition of this warranty, Customer must obtain a DIGITAL Return Authorization Number, and must return all Products, transportation prepaid and insured, to the appropriate location, as specified in the *Service* Section of this Catalog.

C. Transportation charges for the return to Customer shall be paid by DIGITAL within the contiguous United States only. These warranties outside the contiguous United States are limited to repair or replacement only and exclude all costs of shipping, Customs clearance, and other related charges.

D. All Software Products with a DIGITAL Support Category of A or B are warranted to conform to the DIGITAL Software Product Description (SPD) applicable at the time of order. DIGITAL's sole obligation hereunder shall be to remedy any nonconformance of the software to the SPD. Such remedy shall be provided as specified in the Software Support Categories Addendum to the SPD for nonconformances reported to DIGITAL during the one (1) year period following delivery. Software with a designated Support Category of C is furnished on an "as is" basis.

E. EXCEPT FOR THE EXPRESS WARRANTIES STATED ABOVE, DIGITAL DISCLAIMS ALL WARRANTIES ON PRODUCTS, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS; and the stated express warranties are in lieu of all obligations or liabilities on the part of DIGITAL for damages, including but not limited to special, indirect, or consequential damages arising out of or in connection with the use or performance of the Products.

5. SOFTWARE PRODUCT LICENSE:

Licensed software provided hereunder, including any subsequent improvements or updates, is furnished to Customer under a license for use on a single Unit and may only be copied in whole or in part (with the proper inclusion of copyright notice on the software) for use on such Unit. Customer shall not provide or otherwise make available the software, or any part thereof or any copies thereof, in any form to any third party. However, Customer may provide the software to a third party who agrees with Customer or DIGITAL to limit the use of the software to a single Unit transferred by Customer to the third party, to only copy the software, in whole or in part (with the proper inclusion of copyright notice on the software) for use on such Unit and not to provide or otherwise make available the software to any other party. For each copy of the software made by Customer and so provided to a third party, Customer shall pay DIGITAL its then current license fee for such software within thirty (30) days after transfer of the software to such third party. No title to or ownership of the software or any of its parts is hereby transferred to Customer. Notwithstanding the above, use of source software requires execution of a separate Source License Agreement.

6. PATENTS:

If notified promptly in writing of any action (and all prior claims relating to such action) brought against the customer, based on a claim that the customer's use or sale of the product(s) (including software) infringes a United States patent or copyright, DIGITAL will defend such action at its expense and will pay the costs and damages awarded in any such action, provided that DIGITAL shall have sole control of the defense of any such action and all negotiations for its settlement or compromise. In the event that a final injunction shall be obtained against the customer's use of the product(s) by reason of infringement of a United States patent or copyright, or if in DIGITAL's opinion the product(s) is likely to become the subject of a claim or infringement of a United States patent or copyright, DIGITAL will, at its option and at its expense, either procure for the customer the right to continue using the product(s), replace or modify the same so that it becomes noninfringing, or grant the customer a credit for such product(s) as depreciated and accept its return. The depreciation shall be an equal amount per year over the lifetime of the product(s) as established by DIGITAL. DIGITAL shall not have any liability to the customer under any provision of this clause if the infringement, or claim thereof, is based upon (i) the use or sale of the product(s) in combination with other products or devices which are not made by DIGITAL, or (ii) the use of the product(s) in practicing any process, or (iii) the furnishing to the customer of any information, service, or applications assistance. The customer shall hold DIGITAL harmless against any expense, judgement, or loss for infringement of any patents, copyrights, or trademarks which results from DIGITAL's compliance with the customer's designs, specifications, or instructions. No costs or expenses shall be incurred for the account of DIGITAL without the written consent of DIGITAL. In no event shall DIGITAL's total liability to the customer under or as a result of compliance with the provisions of this clause exceed the aggregate sum paid to DIGITAL by the customer for the allegedly infringing product(s).
The foregoing states the entire liability of DIGITAL with respect to infringement of patents and copyrights by the product(s) or any part thereof or by its operation.

7. SUBSTITUTION AND MODIFICATIONS OF SPECIFICATION:

DIGITAL reserves the right, without prior approval from or notice to customer, to make changes to the products (i) which do not effect physical or functional interchangeability or performance at a higher level of assembly or (ii) when required for purposes of safety or (iii) to meet product specifications.

8. GENERAL:

A valid contract binding upon the parties will come into being only as of the time a properly completed and executed Catalog Order Form or written customer acceptance of the catalog Terms and Conditions (such as "Terms and Conditions of Digital's Direct Sales Catalog govern this order," written or typed on the purchase order) together with full payment (except for approved current Catalog Open Account Customers), is received by DIGITAL, unless Customer is otherwise notified by DIGITAL within ten (10) days of receipt. The laws of the Commonwealth of Massachusetts shall apply and govern all Catalog Orders. The terms and conditions set forth in Clause 1 through 8 hereof and those set forth on the face of the Catalog Order Form shall apply to all Catalog Orders, notwithstanding any deviations and/or additions by Customer. In no event will DIGITAL be liable for special, indirect, or consequential damages.

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digital SUPPORT SERVICES

DIRECT SALES CATALOG

A wide range of maintenance and customer services are available from DIGITAL to support your DIGITAL hardware. Depending on the type of equipment ordered, you can select an alternative which meets your service needs; from complete DIGITAL maintenance to complete self-maintenance.

There are six service groups which are dedicated to satisfying the post sales service needs of DIGITAL customers. Consult your local yellow pages or call Catalog Sales Desk for nearest location. Support services available through these organizations are:

FIELD SERVICE

This organization provides DIGITAL customers with both on-site and off-site maintenance service through a variety of service products. There are over 300 service locations worldwide with over 5000 service personnel dedicated to servicing DIGITAL equipment.

EDUCATIONAL SERVICES

Through the Educational Services Group, DIGITAL customers can be trained from computer novice to advanced proficiency in software, hardware, and system management. Courses are offered at worldwide locations and at the customer's site.

SOFTWARE SERVICES

Software Services is an organization dedicated to supporting DIGITAL Software by providing software consulting, software maintenance, and software components to DIGITAL customers. Presently there are over 700 Software Specialists located worldwide to assist the customer with his software needs.

CUSTOMER SPARES

Customer Spares is in the business of selling spare parts to customers who wish to perform any level of self-maintenance. Customers in remote locations or with high uptime requirements who use the Field Service organization also benefit from the services offered by this organization. Services offered by Customer Spares, plus educational courses (see above), make it possible for the customer to be successful at self-maintenance.

ON-SITE SERVICE

There are a variety of contractual on-site service programs for terminals and computer systems. Per call service is also provided in which maintenance is provided on a non-contractual time and material basis.

OFF-SITE SERVICE

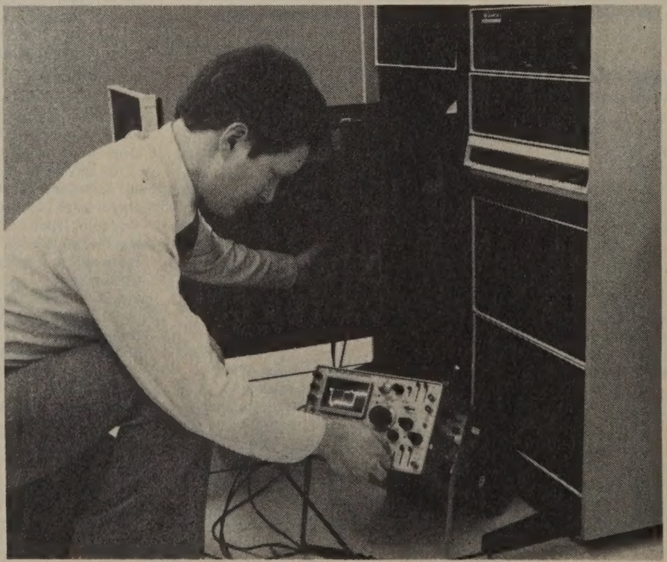
For the customer not desiring or qualified to receive on-site service, various programs are available for securing factory level repair off-site.

PRODUCT REPAIR CENTERS (PRC)

Centers are established through which a customer may receive fast, low-cost repairs for many off-site service needs. The PRC's offer factory equivalent repairs on a growing list of CPU's, peripherals, and module boards. There are presently 17 PRC's located worldwide. Services presently offered by the Product Repair Centers are:

1. **Major Repair Work** on electro-mechanical devices and CPU's. Customer sends his equipment to a PRC and DIGITAL will repair.
2. **Fixed Quote Repair** — Upon receipt, DIGITAL will inspect equipment, then contact customer with a fixed price for repair. Customer has the option to cancel order for a $50 fee.
3. **Repair of Modules** — Customer can send his modules to the PRC for repair. (This service is available in domestic U.S. via Customer Returns Area (617) 933-8710 x 2280.)

For further information, the customer should contact his local Field Service office for information concerning the repair charges and capabilities of the PRC in his area. See page 115 for locations.



SUPPORT SERVICES/ MODULE WEIGHT CHART

SERVICE

If your catalog product malfunctions for any reason, simply check the appropriate description below for your servicing needs.

Catalog Product	Under 90-Day Warranty	Over 90-Day Warranty
LA Series VT Series	Return to nearest Product Repair Center (listed below) for no-charge repair.	A variety of procedures for obtaining service is available including complete repair at a regional Product Repair Center, and/or a contract with DIGITAL's Field Service Group. Refer to description opposite, then contact your local Field Service office for complete details.
LSI-11, PDP-11/03 Microcomputer	LSI-11 and PDP-11/03 modules are to be returned for no-charge repair to the following address: Digital Equipment Corp. Customer Returns Area 36 Cabot Rd. Woburn, MA 01801 Before mailing, call (617) 933-8710, ext. 2280 for return procedures.	Fixed rate module repair. For quote and procedure, call (617) 933-8710, ext. 2280.
All other catalog items	Call 800-225-9480 for warranty and post-warranty information.	

AUTHORIZED FACTORY RETURN WARRANTY PRODUCT REPAIR CENTERS (NORTH AMERICA)

SANTA ANA
Digital Equipment Corporation
2110 South Anne Street
P.O. Box 4257
Santa Ana, California 92704
Tel. No.: (714) 979-1660

SUNNYVALE
Digital Equipment Corporation
Product Repair Center
310 Soquel Way
Sunnyvale, California 94086
Tel. No.: (408) 984-0200

KANATA
Digital Equipment Corporation
Product Repair Center
100 Herzberg Road
Kanata, Ontario, Canada
Tel. No.: (613) 592-5111

CHICAGO
Digital Equipment Corporation
Product Repair Center
5600 Apollo Drive
Rolling Meadows, Illinois 60008
Tel. No.: (312) 640-5500

PRINCETON
Digital Equipment Corporation
Product Repair Center
U.S. Route 1
Princeton, New Jersey 08540
Tel. No.: (609) 452-2940

WOBURN
Digital Equipment Corporation
Customer Returns Area
36 Cabot Road
Woburn, Massachusetts 01801
Tel. No.: (617) 933-8710, ext. 2280

LOGIC MODULE WEIGHT CHART

	MODULE SIZE CODE									
	SSS	SDS	SDD	ESD	EDD	EQS	EQD	ESS	SDT	EDS
Net Weight	3 oz.	6 oz.	4 oz.	8 oz.	8 oz.	12 oz.	16 oz.	6 oz.	20 oz.	9 oz.

Size Code Description (L by H by W)
Length: Standard (S), Extended (E)
Height: Single (S), Double (D), Quad (Q), Hex (H)
Width: Single (S), Double (D), Triple (T)

To calculate the gross shipping weight of your logic module order, locate the module size in the Logic Modules section of this catalog for each of the modules required. Using the Logic Module Weight Chart above, determine the total net weight of the modules. Add 25% (of total net weight) to the net weight to determine the gross weight and round off to the next whole pound. All shipping charges are based on the calculated gross weight. See the following example.

EXAMPLE:

No. Ordered	Cat. No.	Module Size	Net Weight
2	M3020	SSS	6 oz. (3 oz. ea.)
1	M1500	ESS	6 oz.
4	A811	SDD	16 oz. (4 oz. ea.)
			28 oz. (total net weight)

Calculate 25% of total net weight	28 oz. by .25 = 7 oz.
Add to net weight	28 oz. + 7 oz. = 35 oz. (gross weight)
Convert to lbs., 16 oz. = 1 lb.	35 oz. ÷ 16 = 2.19 lbs.
Next whole lb.	2.19 lbs. = 3.0 lbs. shipping weight

DIGITAL'S OTHER PRODUCTS AND SERVICES

Only a portion of DIGITAL's products and services are sold through this Direct Sales Catalog. Your local sales office can provide you with information on our complete product line, which is built around five computer series: The PDP-8, the DECsystem-10 and -20, the PDP-11 and the PDP-15. See listing of sales offices in yellow pages under DIGITAL Corporate Listing.

If you're looking for anything from a small dedicated controller to a large-scale, general-purpose computer, you will find the right system among them.

The PDP-8, introduced in 1965, was first used as a laboratory tool. Today it handles a wide variety of real-time monitoring and control applications. Six central processor models, three minicomputer and four microcomputers, make up the PDP-8 family.

All PDP-8's have as their central element a patented, synchronous data path, the Omnibus, to handle bidirectional communication between system elements. Since each element plugs into the bus through an electrically identical connector, the customer can upgrade the system by simply plugging new devices in. No wiring changes are needed. Many popular interface modules are available through the Direct Sales Catalog.

The PDP-8 customer can choose from more than 600 software programs. These include powerful program development systems like OS/8 and the real-time operating system RTS-8.

The DECsystem-10, introduced in 1967, is a family of large-scale computer systems designed for interactive timesharing, real-time processing, and multiprogramming tasks. A DECsystem-10 can serve multiple users simultaneously under one operating system, with a common user and operating command language.

Any DECsystem-10 can be made more powerful simply by adding more processors, memories, communications systems, and input/output devices. No user software changes are required to expand from the smallest DECsystem-10 to the largest.

All DECsystem-10 central processors can run under the same TOPS-10 operating system, execute the same programs, and utilize most of the same peripherals.

More than 500 DECsystem-10's are now handling a wide range of user applications, including accounting, communications, design and development, education, inventory management, management information, payroll, production control, research, simulation, transaction processing, and typesetting. More service bureaus use DECsystem-10's for timesharing than any other system.

The DECsystem-20 is the bridge machine between the DECsystem-10 and the PDP-8, -11, and -15 Series. Like the DECsystem-10, the DECsystem-20 offers highly reliable virtual memory, a multi-mode operating system (TOPS-20) and a complete range of programming languages and supporting utilities. The end result is an easy-to-learn, easy-to-use interactive system that can still offer all the throughput needed for traditional batch applications.

The PDP-11, introduced in 1970, has brought new technological advances to small, 16-bit computers. The innovations included the UNIBUS, a single, high-speed, bidirectional data bus through which all system elements communicate asynchronously; a hardware stacking capability for rapid processing of structured data; a vectored priority interrupt system for fast, real-time response; and a completely modular organization.

The PDP-11 family shares a common architecture, range of peripherals, and software. The family extends from the LSI-11 microcomputer on the low end to the high-end PDP-11/70, which offers data base management, COBOL programming, and up to four million bytes of main memory.

PDP-11 processors, memories, and peripherals are all designed as plug-in building blocks, simplifying expansion and access for maintenance. New options plug in, without the need for new interfaces. Many popular interface modules are available through the Direct Sales Catalog.

The PDP-15, introduced in 1972, is a family of 18-bit medium-scale computers used in computer-aided design, land use planning, architecture, cartography, stress analysis, construction, medical data bases, shipping, data acquisition and production control.

Hardware features include asynchronous processor operation, a memory processor, single and dual processor configurations and use of programs as large as 128K words.

PDP-15 software includes three operating systems: XVM/DOS for high volume interactive computation, including graphics and dedicated real time applications; XVM/RSX, combining graphics, batch and interactive processing and output spooling with many simultaneous users; and XVM/MUMPS, for timeshared data base management systems with up to 48 on-line users.

DIGITAL tailors these computers and their supporting hardware and software to meet many specific application requirements.

The principal marketing groups are listed below, with summaries of their primary interests.

Business Products — Multiuser/multitask interactive systems that can stand alone or serve as parts of a distributed processing network.

Data Communication — Products for message switching, front-end processing, transaction processing, networks, intercomputer communication, reservation file processing, and data concentrating.

Education Systems — CLASSIC and other interactive student systems, computer-assisted and computer-managed teaching, data reduction, business education, and computer science education.

Industrial Products — Systems for programmable control, power management, process control, equipment monitoring, order picking, and inventory control and billing.

Origial Equipment Manufacturing — Special packaging and design of computer elements and systems for system builders who resell to end users.

Telephone Data Management — Systems for traffic administration and planning, call addressing analysis, traffic pattern analysis, automatic interception, service order entry, directory assistance, extended testing, revenue collection, maintenance monitoring, billing, message unit recording, and time reporting.

Typesetting — Systems that aid in newswriting, composition, electronic editing and proofreading, automatic justification and hyphenation, classified advertising, accounting, payroll, and circulation.

Laboratory Data Products — Equipment for scientific research, clinical research, pollution monitoring, hospital information systems, radio-isotope study, data acquisition, apparatus control, and data analysis.

Traditional Products — Add-on equipment for current users of DIGITAL products no longer being actively manufactured, and recycled used equipment manufactured by DIGITAL.

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DIRECT SALES CATALOG

Listed here are the more than 600 products available from the Direct Sales Catalog. The computer-related Supplies items are listed in a separate section following the main index. Catalog part no.'s are listed numerically within each section. For your convenience, Catalog and Cash Prices are included.

Catalog No.	Description	Page No.	Cat. Price	Cash Price
861-A	Power Controller, Two-Phase	99	$314	$300
861-C	Power Controller, Single-Phase	99	366	350
861-D	Power Controller, Three-Phase	99	755	723
913- (all dash items)	24 AWG Patch Cords	83	27	25
914-7	7″ Power Patch Cord	82	5	4
914-19	19″ Power Patch Cord	82	5	4
915- (all dash items)	26 AWG Patch Cords	83	34	33
917-2.5	Daisy Chain	87	58	56
932	Bus Strip	72	4	3
933	Bus Strip	72	1	.90
937	Blank Module Handle	87	8	7
939	Bus Strip	72	10	9
940	Cable Clamp	82	8	7
941	Cable Clamp	82	9	8
954	Solder IC Sockets	87	8	7
956	UNIBUS DRIVER IC'c	66	25	24
957	UNIBUS Receiver IC's	66	18	17
961	24-Pin IC Sockets	87	8	7
962	40-Pin IC Sockets	87	24	23
12-09154	Mounting Slides	97	27	26
12-09340-00	8-Pin Cable Conn. Housing (Female)	80	1	.90
12-09340-01	8-Pin Cable Conn. Housing (Male)	80	1	.90
12-09350- (all dash items)	Cable Conn. Housing (Female)	80	1	.90
12-09351- (all dash items)	Cable Conn. Housing (Male)	80	1	.90
12-09378-01	Male Conn. Pins	80	1	.90
12-09379-01	Female Conn. Pins	80	1	.90
12-09403-01	Blower Fan for H909-C	95	23	22
12-09703	Mounting Slides, Tilt	97	65	62
12-09764	Cable Clamp	82	3	2
12-09925	Cable Clamp	82	1	.90
12-10711-02	Hex Module Handle	87	4	3
12-10945	Chassis Slides	97	18	17
12-11474-0	Cover Panel for H984	93	5	4
17-00001-00	Cable, 9-Cond. Flat Coax	82	1	.90
17-00002-00	Cable, 19-Cond. Flat Mylar	82	1	.90
17-00002-01	Cable, 60-Cond. Flat Mylar	82	2	1.80
17-00003-00	Cable, Round Coax	82	1	.90
17-00004-00	Cable, 40-Cond. Flat Mylar	82	2	1.80
17-00012	Cable, 6-Cond. Round	82	.50	.40
17-00018	Cable, 20 TWP	82	2	1.80
54-11808	Console PC Panel	47	48	46
70-08612	Console Cable	47	10	9
70-11656	Console Bezel	47	9	8
70-12438-0	Fan Assembly For H984 (115V ac)	93	86	82
70-12438-1	Fan Assembly For H984 (230V ac)	93	86	82
70-12754	Remote Signal Cable	47	12	12
74-06782	Kickplate	91	7	6
74-06793	Kickplate	91	12	12
74-09449	Bracket For Chassis Slides (Right)	95	5	5
74-09459	Bracket For Chassis Slides (Left)	95	5	5
74-17440	Blank Panel for H984	93	14	14
91-05740	Wire Wrapping Wire, 30 AWG	82	63	60
91-07575	Cable Ribbon 20-Cond.	82	.60	.50
91-07688	Wire Wrapping Wire, 24 AWG	82	52	50
91-07706	Cable, Round 4-Cond.	82	.50	.40
91-07736	Cable, Round 25-Cond.	82	1.20	1.10
A123	Analog Multiplexer	62	65	62
A126	Analog Multiplexer, 8-Ch.	62	79	76
A207	Operational Amplifier	62	54	52
A811	A/D Converter, 10-Bit	63	225	216
A866	A/D Converter, Hi Speed, 12-Bit	63	380	364
AAV11-A	Digital-to-Analog Converter	45	855	819

Catalog No.	Description	Page No.	Cat. Price	Cash Price
ADV11-A	Analog-to-Digital Converter	44	$950	$910
AR11	Analog Real Time Module	66	1724	1652
BA11-ES	Expansion Mounting Box	96	998	956
BA11-KE	Epansion Mounting Chassis	96	2299	2202
BA11-ME	Expansion Box, 115V ac	50	950	910
BB11	Pre-Wired Mounting System	75	178	170
BB11-A	Pre-Wired Mounting System	75	178	170
BB11-B	Nine-Slot UNIBUS System Unit	76	250	239
BC04Z-06	6′ 40-Conductor Cable	81	42	40
BC04Z-10	10′ 40-Conductor Cable	81	50	48
BC04Z-15	15′ 40-Conductor Cable	81	60	57
BC04Z-25	25′ 40-Conductor Cable	81	85	81
BC05C-25	EIA Interface Cable, 25′	81	106	102
BC05C-50	50′ Round 25-Cond.	81	136	130
BC05D-10	10′ Round 25-Cond.	81	89	86
BC05D-25	25′ Round 25-Cond.	81	125	120
BC05H-06	Line Set, 115V ac	98	84	80
BC05J-06	Line Set, 230V ac	98	84	80
BC06R-06	6′ Flat 40-Cond.	81	35	34
BC06R-10	10′ Flat 40-Cond.	81	43	41
BC06R-25	25′ Flat 40-Cond.	81	71	68
BC06R-50	50′ Flat 40-Cond.	81	119	114
BC07A-10	10′ Round — 20 TWP	81	73	70
BC07A-15	15′ Round — 20 TWP	81	84	80
BC07A-25	25′ Round — 20 TWP	81	94	90
BC07D-10	10′ Two-20-Cond. Flat Mylar Ribbon Cables	81	50	48
BC07D-15	15′ Two-20-Cond. Flat Mylar Ribbon Cables	81	55	53
BC07D-25	25′ Two-20-Cond. Flat Mylar Ribbon Cables	81	66	63
BC08J-06	6′ Flat 40-Cond.	81	79	76
BC08J-10	10′ Flat 40-Cond.	81	89	86
BC08J-15	15′ Flat 40-Cond.	81	102	97
BC08J-25	25′ Flat 40-Cond.	81	121	116
BC08J-50	50′ Flat 40-Cond.	81	178	170
BC08R-01	Maintenance Cable	81	48	46
BC08R-03	3′ General Purpose 40-Cond.	81	51	49
BC08R-06	6′ General Purpose 40-Cond.	81	58	56
BC08R-08	8′ General Purpose 40-Cond.	81	62	59
BC08R-10	10′ General Purpose 40-Cond.	81	66	63
BC08R-12	12′ General Purpose 40-Cond.	81	70	67
BC08R-20	20′ General Purpose 40-Cond.	81	86	83
BC08R-25	25′ General Purpose 40-Cond.	81	97	93
BC08R-50	50′ General Purpose 40-Cond.	81	178	170
BC11A-02	2′ UNIBUS Dual 60-Cond.	81	121	116
BC11A-05	5′ UNIBUS Dual 60-Cond.	81	136	130
BC11A-08F	8′ UNIBUS Dual 60-Cond.	81	152	146
BC11A-10	10′ UNIBUS Dual 60-Cond.	81	167	160
BC11A-15	15′ UNIBUS Dual 60-Cond.	81	183	176
BC11A-25	25′ UNIBUS Dual 60-Cond.	81	209	200
BC11K-25	25′ Round 20-TWP	81	133	127
BC11S-25	25′ General Purpose Round	81	95	91
BC11S-50	50′ General Purpose Round	81	143	137
BC11S-AO	100′ General Purpose Round	81	247	237
BCV1A-02	Cable Assembly 2′	48	200	191
BCV1A-04	Cable Assembly 4′	48	200	191
BCV1A-06	Cable Assembly 6′	48	200	191
BCV1A-10	Cable Assembly 10′	48	200	191
BCV1B-02	Cable Assembly/Term. Assembly 2′	48	276	264
BCV1B-04	Cable Assembly/Term. Assembly 4′	48	276	264
BCV1B-06	Cable Assembly/Term. Assembly 6′	48	276	264
BCV1B-10	Cable Assembly/Term. Assembly 10′	48	276	264
BN01A-04	IBV11-A Cable	42	119	114
BN11A-04	IBV11-A Cable	42	119	114
BN50A-7F	VT50 EIA Interface Cable 25′	30	68	66
BN52A-7F	VT52 EIA Interface Cable 25′	30	63	60
BN52B-7F	VT52 20mA Interface Cable 25′	30	63	60
DD11-A	Pre-Wired Mounting System	75	333	319

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Catalog No.	Description	Page No.	Cat. Price	Cash Price
DD11-B	Pre-Wired Mounting System	75	$333	$319
DD11-CK	SPC Mounting Unit — 4 Slot	74	314	300
DD11-DK	SPC Mounting Unit — 9 Slot	74	627	601
DDV11-B	LSI-11 Expansion Backplane	49	380	364
DF01-A	Acoustic Telephone Coupler	31	722	692
DL11-WA	20mA Asynchronous Line Unit	66	732	701
DL11-WB	EIA Asynchronous Line Unit	66	732	701
DLV11	Serial Line Unit	43	238	228
DLV11-E	Serial Line Unit	43	—	—
DR8-ED	Two Word Input 24-Bits	65	309	296
DR11-B	PDP-11 DMA Interface	66	1539	1474
DR11-C	PDP-11 General Purpose Interface	66	513	491
DR11-L	PDD-11 Two-Word Input Interface	66	361	346
DR11-M	PDP-11 Two-Word Output Interface	66	361	346
DRV11	Parallel Line Unit	43	200	191
DRV11-B	Direct Memory Access	42	551	528
DRV11-P	Interface Foundation Module	44	261	250
EKOVT50TM	VT50 Maintenance Manual	29	8*	8
EKOVT52MM	VT52 Maintenance Manual	29	10*	10
EK1LA36-MM-001	LA36 Maintenance Manual	10	70*	70
EKLA180-MM001	LA180 Maintenance Manual	23	17	17
G772	Power Connector	80	8	7
H014	Mounting Plate	75	22	21
H020	Connector Block Mounting Frame	74	16	15
H021	Standoff End-Plates	74	8	7
H022	Standoff End-Plates	74	21	20
H024	Standoff End-Plates	74	8	7
H025	Standoff End-Plates	74	21	20
H033	System Unit Casting	76	10	10
H034	Nine-Slot Mounting Frame	76	16	15
H0341	Card Cage	49	37	35
H322	Distribution Panel	99	176	168
H707	Power Supply	98	449	430
H710	Power Supply	98	185	177
H716	Power Supply	98	181	173
H720-E	Systems Power Supply	98	808	774
H722	Step-Down Transformer E/W Mounting Panel	99	105	100
H726-B	Power Supply	98	247	237
H740-D	Systems Power Supply	98	527	505
H755	Systems Power Supply	98	646	619
H780-H	Power Supply	46	665	637
H800-F	Connector Block 24-AWG	72	13	13
H800-W	Connector Block 24-AWG	72	13	13
H802	Connector Block	72	10	9
H803	Connector Block 30-AWG	72	15	15
H8030	Connector Block 30-AWG	72	7	6
H805	Connector Block 36	72	5	4
H807	Replacement Contacts	72	6	5
H808	Connector Block 24-AWG	72	14	14
H809	Connector Block 36 Replacement Contacts	72	5	4
H810-C	Wire Wrap Gun 24-AWG	83	157	150
H810-D	Wire Wrap Gun 30-AWG	83	157	150
H811	Wire Wrap Hand Tool 24-AWG	83	42	40
H811-A	Wire Wrap Hand Tool 30-AWG	83	42	40
H812	W/W Hand Unwrap Tool 24-AWG	83	10	10
H812-A	W/W Hand Unwrap Tool 30 AWG	83	12	12
H813-A	W/W Gun Bit (Replacement) 30-AWG	83	37	35
H814-A	W/W Gun Sleeve (Replacement) 30-AWG	83	22	21
H820	Grip Clip	82	50	48
H821	Grip Clip	82	119	114
H825	Crimping Tool 24-AWG	83	153	147
H826	Crimping Tool 30-AWG	83	238	228
H850	Handle Extender	87	14	14
H851	Terminal Adapter	76	18	17
H852	Module Holder	87	9	8
H853	Module Holder	87	9	8
H854	Male Connector (Board)	80	6	5
H856	Female Connector (Cable)	80	10	9
H863	Connector Block 30-AWG	72	15	15
H909-A	Enclosure for Mounting Rack	95	$295	$282
H909-BA	Enclosure	95	703	673
H909-C	Enclosure	95	333	319
H911-J	Mounting Panel	73	190	182
H911-K	Mounting Panel	73	190	182
H911-S	Mounting Panel	73	219	209
H914	Mounting Panel	73	152	146
H916	Mounting Panel	73	314	300
H917	Mounting Panel	73	304	291
H9270	LSI-11 Backplane/Card Guide Assembly	48	181	173
H9271	General Purpose 4-Slot Backplane	75	89	86
H933-A	4-Slot Mounting Systems	75	52	50
H933-B	4-Slot Mounting Systems	75	52	50
H933-C	4-Slot Mounting Systems	75	75	72
H933-CA	4-Slot Mounting Systems	75	75	72
H933-CB	4-Slot Mounting Systems	75	75	72
H933-D	System Unit	75	48	46
H934-CB	9-Slot Mounting Systems	76	143	137
H950-AA	Cabinet Frames	91	214	205
H950-BA	Mounting Door, Front & Rear, RH	91	57	55
H950-CA	Mounting Door, Front & Rear, LH	91	64	61
H950-DA	Door Frame, Rear Mounting, RH	91	49	47
H950-EA	Door Frame, Rear Mounting, LH	91	59	56
H950-FA	Mounting Panel Door Skins	91	33	32
H950-HA	Short Door 21″	91	65	62
H950-G	Mounts on Cabinet	91	124	118
H950-HD	Short Door 31.5″	91	71	68
H950-HF	Short Door 42″	91	84	80
H950-HK	Short Door 63″	91	87	84
H950-LA	Logo Frame Panel, Aluminum	91	26	25
H950-LB	Logo Frame Panel, Plastic	91	12	12
H950-NC	Blank Metal Cover	93	14	14
H950-PA	Bezel Cover Panels	91	11	11
H950-QA	Bezel Cover Panels	91	16	15
H952-AA	End Panel, Left & Right	91	74	71
H952-BA	Stabilizer Feet	91	38	36
H952-CA	Top Mounting Fan Assembly, 115V ac	91	62	59
H952-GA	Filler Strips, Front * Rear	91	57	55
H957-AA	Cabinet Frame	91	219	209
H957-BA	Cabinet Frame, Rear RH	91	73	70
H957-CA	Cabinet Frame, Rear LH	91	73	70
H957-DA	Door Frame, RH Rear	91	56	54
H957-EA	Door Frame, LH Rear	91	57	55
H957-FA	End Panels — Right	91	89	86
H957-FB	End Panels — Left	91	89	86
H957-GA	Filler Strips, Top, Front, Rear	91	89	86
H957-HA	Front & Rear Mounting Fan Assembly	91	86	83
H957-JA	Bottom Cover Plate	91	16	15
H957-SA	Filter For H957-HA Fan	91	7	6
H960-BC	Cabinet	89	1150	1101
H960-CA	Cabinet	89	1150	1101
H961-A	Cabinet	89	888	851
H961-AA	Cabinet	89	888	851
H967-BA	Cabinet	89	1150	1101
H970-HB	Table	108	162	155
H9800-A	General Purpose Systems Desk	93	713	683
H984-BA	Low Profile Cabinet	93	371	355
H984-BB	Low Profile Cabinet	93	371	355
H984-CA	Bracket Set for H909-C	95	3	3
HT-95	Crimping Tool—H856 Contacts	83	185	177
IBV11	Instrument Bus	42	713	683
K940	Mounting Bracket	74	9	8
K941	Mounting Bracket Support	74	10	9
KD11-F	Basic Processor W/4K RAM Memory	36	941	901
KD11-R	Basic Processor W/16K RAM Memory	36	2366	2266
KEV11	Arithmetic Function Package	39	181	173
KIT11-D	PDP-11 DMA Interface	66	808	774
KPV11-A	Power Controller W/O Term. Resistors	47	276	264
KPV11-B	Power Controller E/W 120 OHM Term.	47	299	287
KWV11-A	Real Time Clock	45	570	546
LA35-DE	DECwriter II W/O Keyboard, 115V ac	11	2123	2034
LA35-DJ	Same as -CE but for 230V ac	11	2123	2034

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Catalog No.	Description	Page No.	Cat. Price	Cash Price
LA36-DE	DECwriter II W/Keyboard 120V, 60Hz	11	$2252	$2157
LA36-DJ	Same as -DE but for 230V, 50Hz	11	2252	2157
LA180-PA	180 CPS, 132-Column Printer Parallel I/O 115V ac, 60 Hz	21	3078	2948
LA180-PD	Same as -PA but for 230V, 50Hz	21	3078	2948
LAXX-KG	EIA Interface	11	62	59
LAXX-KJ	Compressed Font	11	52	50
LAXX-KK	Numeric Keypad	11	100	96
LAXX-KV	Forms Feed	11	157	150
LAXX-KW	Selective Addressing	11	124	118
LAXX-KX	Auto Line Feed Plus Answerback	11	200	191
LAXX-KY	Forms Control	11	299	287
LAXX-LA	Auto Line Feed	11	81	77
LAXX-LB	Option Mounting Kit	11	105	100
LAXX-LG	EIA Interface W/Modem Control	11	105	100
LAXX-LM	Acoustic Coupler	11	451	432
LAXX-LN	Window, Scale, Pointer	11	29	27
LAXX-LZ	Paper-Out Sensor	11	24	23
LAXX-NE	Print Window	11	14	14
LAXX-NS	BSR Option, 4K	11	822	787
LAXX-NT	BSR Option, 8K	11	1107	1060
LAXX-NU	BSR Option,12K	11	1387	1329
LAXX-NV	BSR Option, 16K	11	1658	1588
LAXX-NW	EIA RS232C Buffered Serial Interface	21	499	478
LAXX-NX	20mA Current loop Buffered Serial Interface	21	499	478
LAXX-PK	ANSI/APL Character Set	11	684	655
LAXX-RA	Forms Package	17	81	77
LAXX-RB	Non-Programmable Communications Package	17	—	—
LAXX-RC	APL Character Set	17	114	109
LAXX-RD	Parity Selection, Rotary Switch	17	—	—
LAXX-RF	Programmable Communications Package	17	—	—
LAXX-RM	Numeric Keypad	17	100	96
LAXX-RN	20mA Current Loop	17	—	—
LS120-HE	DECwriter III, EIA Interface, 120V ac, 60Hz	17	3791	3631
LS120-HJ	DECwriter III, EIA Interface, 230V ac, 50Hz	17	3791	3631
M002	Logic High Source	57	14	14
M040	Solenoid Driver	55	41	39
M050	Incandescent Lamp Driver	55	34	33
M060	Solenoid Driver	55	57	55
M105	Address Selector	66	90	81
M1103	2-Input AND Gates	53	22	21
M111	Inverter	53	25	24
M112	NOR Gates	53	21	20
M1125	Exclusive OR	53	21	20
M113	NAND Gates	53	19	18
M1131	Open Collector NAND	53	29	27
M115	NAND Gates	53	20	19
M116	NOR Gates	53	22	21
M117	NAND Gates	53	20	19
M119	NAND Gates	53	20	19
M121	AND/NOR Gates	53	25	24
M1307	AND Gates	53	27	25
M133	High Speed NAND Gates	53	25	24
M135	High Speed NAND Gates	53	23	22
M137	High Speed NAND Gates	53	23	22
M139	High Speed NAND Gates	53	25	24
M141	NAND/OR Gates	53	31	30
M1500	Bidirectional Bus Interface	66	21	20
M1501	Bus Input Interface	66	36	35
M1502	Bus Output Interface	66	63	60
M155	4-Bit Binary to 16 Outputs	58	29	28
M161	Binary to Octal/Decimal	58	36	35
M162	Parity Circuit	58	36	35
M1621	DVM Data Input Interface	66	131	126
M1623	Instrument Remote Control Interface	66	157	150
M163	4-Bit Binary to Decimal	58	29	27
M165	Buffers	53	31	30
M168	Magnitude Comparator	59	48	46
M1701	Data Selector, 4 to 1	58	25	24
M1703	One Word Input, 12-Bits	65	94	90
M1705	Two Word Output, 24-Bits	65	190	182
M1709	Omnibus Interface Foundation Module	65	135	129

Catalog No.	Description	Page No.	Cat. Price	Cash Price
M1710	UNIBUS Interface Foundation Module	66	$261	$250
M1713	Data Selector 16 to 1	58	20	19
M1801	16-Bit Relay Output Interface	66	371	355
M2001	Tri-State Register 4-Bit (Dual)	60	42	40
M202	ANDed Inputs	54	21	20
M203	Reset/Set Flip Flop	54	26	25
M204	Buffer/Counter	54	27	25
M205	General Purpose Flip Flop	54	23	22
M206	General Purpose Flip Flop	54	31	30
M207	General Purpose Flip Flop	54	34	33
M230	BCD to Binary/Binary to BCD	58	73	70
M236	Up/Down Counter 12-Bit Binary	59	55	53
M237	Up/Down Counter 3-Digit BCD	59	55	53
M238	Up/Down Counter 4-Bit Binary	59	42	40
M239	Counter/Register 4-Bit	59	42	40
M245	Shift Register 4-Bit (Dual)	60	29	28
M246	High Speed Flip Flop	54	23	22
M248	Shift Register Multi-Purpose 4-Bit (Dual)	60	27	25
M2500	Serial FIFO Memory	60	79	76
M3020	Delay/Stretch	57	42	40
M306	Integrating One Shot	57	40	38
M310	Delay Line	57	57	55
M401	Variable Multivibrator Clock	56	57	55
M403	Multivibrator Clock	56	48	46
M404	Multifrequency Crystal Clock	56	85	81
M405	Crystal Clock	56	114	109
M4050	Crystal Clock	56	114	109
M501	Schmitt Trigger	57	28	26
M5864	Opto-Isolators — Input	61	125	120
M594	EIA Level Converter	61	89	86
M598	Opto-Coupled 20mA Loop Interface	61	73	70
M602	Amplifier/Generator	57	31	30
M611	Power, High Speed Inverter	53	35	34
M617	Power/NAND Gate	53	27	25
M627	Power, High Speed NAND Gate	53	29	27
M660	Cable Driver, Positive Level	55	28	26
M6865	Opto-Isolators Output	61	110	106
M706	Teletype Receiver	61	78	75
M707	Teletype Transmitter	61	78	75
M7390	Asynchronous Transceiver	61	207	198
M7821	Interrupt Control Module	66	115	110
M783	UNIBUS Drivers	66	42	40
M784	UNIBUS Receivers	66	42	40
M785	UNIBUS Transceiver	66	52	50
M795	Word Count Module	66	226	217
M796	UNIBUS Master Control	66	113	108
M798	UNIBUS Drivers	66	42	40
M901	Flat Mylar Cable Conn.	78	16	15
M903	Flat Mylar Cable Conn.	78	10	10
M904	Cable Connector	79	11	11
M908	Cable Connector	78	15	15
M9100	Adapters	77	31	30
M912	Cable Connector	79	25	24
M917	Flat Coaxial Cable Conn.	79	12	12
M918	Flat Mylar Cable Conn.	78	11	11
M920	UNIBUS Jumper Module	77	62	59
M922	Flat Mylar Cable Conn.	78	9	8
M927	Cable Connector	79	10	9
M930	UNIBUS Terminator	77	57	55
M933	Flat Ribbon Cable Conn.	78	21	20
M935	Omnibus Conn. Module	77	51	49
M943	Flat Mylar Cable Conn.	78	8	7
M953	Flat Coaxial Cable Conn.	79	27	25
M954	Flat Coaxial Cable Conn.	79	29	27
M955	Flat Coaxial Cable Conn.	79	29	27
M957	Flat Ribbon Cable Conn.	78	23	22
M959	Cable Connector Cable Conn.	79	12	12
M971	Adapter	77	31	30
M972	Flat Mylar Cable Conn.	78	29	27
M973	Adapter	77	31	30
M975	Adapter	77	35	34
M976	UNIBUS Cable Conn.	77	19	18
M981	UNIBUS Internal Term. Module	77	93	89
M9970	Adapter	77	38	36
MMV11-A	4K RAM Core Memory Module	41	941	901
MRV11-AA	4K PROM Memory	40	166	159
MRV11-AC	PROM Chip for MRV11-AA	40	38	36
MRV11-BA	PROM-RAM Memory	41	309	296
MRV11-BC	UV PROM Chips	41	95	91

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Catalog No.	Description	Page No.	Cat. Price	Cash Price
MSV11-B	4K RAM MOS Memory Module	40	$594	$569
MSV11-CD	16K RAM MOS Memory Module	40	1710	1638
PDP-11/03-EA	Pkg. Microcomputer W/4K RAM Memory	37	1895	1815
PDP-11/03-KA	Pkg. Microcomputer W/16K RAM Memory	37	3320	3180
PRS01-AA	Serial Paper Tape Reader, 2400Baud, 115V ac	31	713	683
PRS01-BA	Serial Paper Tape Reader, 300Baud, 115V ac	31	713	683
QJV10-CB	Paper Tape Software Pkg.	50	105	100
QJV11-CB	PROM Formatter Program	50	29	27
REV11-A	LSI-11 Refresh/Terminator Option	39	304	291
REV11-C	LSI-11 Refresh Option	39	304	291
TEV11	Terminator Module —120 OHM	48	105	100
VT50-AA	VT50 DECscope W/20mA Interface, 115V, Oper.	30	1378	1320
VT50-AB	VT50 DECscope W/20mA Interface, 230V, Oper.	30	1378	1320
VT52-AA	VT52 DECscope W/20mA Interface, 115V, Oper.	30	2090	2002
VT52-AB	VT52 DECscope W/20mA Interface, 230V, Oper.	30	2090	2002
VT52-AE	VT52 DECscope W/EIA Interface, 115V, Oper.	30	2090	2002
VT52-AF	VT52 DECscope W/EIA Interface, 230V, Oper.	30	2090	2002
VT55-EA	Graphics Terminal, 20mA	35	2613	2499
VT55-EE	Graphics Terminal, EIA	35	2613	2499
VT55-FA	Graphics Terminal W/Copy, 20mA	35	3795	3635
VT55-FE	Graphics Terminal W/Copy, EIA	35	3795	3635
VTXX-KA	VT52 Printer Interface	30	228	218
W011	Flat Ribbon Cable Conn.	78	9	8
W018	Flat Ribbon Cable Conn.	78	9	8
W021	Flat Ribbon Cable Conn.	78	8	7
W023	Flat Ribbon Cable Conn.	78	7	6
W024	Cable Connector	79	10	10
W027	Flat Ribbon Cable Conn.	78	8	7
W028	Flat Coaxial Cable Conn.	79	7	6
W031	Flat Mylar Cable Conn.	78	6	5
W033	Flat Mylar Cable Conn.	78	6	5
W900	Module Extender Board	85	124	118
W930	Blank Module	86	10	10
W9301	Wire Wrappable Module	85	185	177
W9302	Wire Wrappable Module	85	$280	$268
W940	Wire Wrappable Module	84	79	76
W941	Wire Wrappable Module	84	42	40
W942	Wire Wrappable Module	84	157	150
W943	Wire Wrappable Module	84	84	80
W950	Wire Wrappable Module	84	77	74
W9500	Wire Wrappable Module	86	176	168
W9501	Wire Wrappable Module	86	109	105
W9502	Wire Wrappable Module	86	57	55
W9503	Wire Wrappable Module	86	309	296
W9504	Wire Wrappable Module	86	200	191
W9505	Wire Wrappable Module	86	105	100
W951	Wire Wrappable Module	84	48	46
W9511	Wire Wrappable Module	86	119	114
W9512	Wire Wrappable Module	86	67	64
W9514	Wire Wrappable Module	86	209	200
W9515	Wire Wrappable Module	86	114	109
W952	Wire Wrappable Module	84	167	160
W953	Wire Wrappable Module	84	90	86
W960	MSI Module Board	58	9	8
W964	Universal Terminator Board	58	10	10
W966	Wire Wrappable Board	65	115	110
W967	Wire Wrappable Board	65	180	172
W968	Collage Module Board	86	70	67
W969	Collage Module Board	86	35	34
W970	Blank Module	86	10	10
W971	Blank Module	86	14	14
W972	Blank Module	86	10	9
W9720	Blank Module	86	9	8
W9721	Blank Module	86	16	15
W9722	Blank Module	86	29	28
W973	Blank Module	86	16	15
W974	Blank Module	86	10	9
W975	Blank Module	86	20	19
W979	Blank Module	86	28	26
W980	Blank Module	85	16	15
W982	Blank Module	85	20	19
W983	Blank Module	85	30	29
W984	Blank Module	85	35	34
W987	Quad Module Extender Board	85	56	54
W990	Blank Module	86	8	7
W991	Blank Module	86	12	12
W992	Blank Module	86	6	5
W993	Blank Module	86	9	8
W998	Blank Module	86	6	5
W999	Blank Module	86	10	9
ZJV01-RB	LSI-11 Documentation	51	114	109

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Catalog No.	Description	Page No.	Quantity			
			Cat. Price	Cash Price	Cat. Price	Cash Price
12-11526	Caster Set	108	1-2		3-Up	
			$20	$19	$19	$18
12-11528	Paper Tape Tray	101	1-23		24-Up	
	W/Snap-On Cover		5	5	5	4
12-12375	Dust Cover for LA36	12	1-2		3-Up	
			10	9	10	9
12-12376	Dust Cover for VT50	30	1-2		3-Up	
			10	9	10	9
12-13195-00	Acrylic Filter For	26	1-5		6-Up	
	VT50 & VT52		15	14	14	13
12-13195-01	Acrylic Filter For	26	1-5		6-Up	
	VT50 & VT52		15	14	14	13
12-13195-02	Acrylic Filter For	26	1-5		6-Up	
	VT50 & VT52		15	14	14	13
18-09137-01	Teletype Ribbon	101	1-3		4-Up	
	12 p/box		20	19	19	18
18-09140-02	Ribbons 132 Column	100	1-5		6-Up	
	Line Printer & Terminal		25	24	24	23
18-09540-00	Magnetic Tape	102	1-5		6-Up	
			15	14	14	13
18-09540-10	Magnetic Tape	102	1-5		6-Up	
			20	19	19	18
18-09543-02	Magnetic Tape	102	1-5		6-Up	
			25	24	24	23
18-09777-01	DECtape Canister	102	——		——	
	2 p/pkg. Blue		1	1	1	1
18-09777-02	LINCtape Canister	102	——		——	
	2 p/pkg. Green		1	1	1	1
18-10156	Ribbon, 132 Column	100	1-5		6-Up	
	Line Printer & Terminal		$35	$34	$22	$32
18-10156-01	Ribbon, 132 Column	100	1-5		6-Up	
	Line Printer & Terminal		35	34	22	32
22-00007	Disk Head Cleaning	103	——		——	
	Kit		3	3	3	3
30-09794	Disk Cartridge For	103	1-5		6-Up	
	RK01 Drive		99	95	94	90
30-10350-01	Disk Cartridge For	103	1-5		6-Up	
	RK02 Drive		99	95	94	90
36-05360-01	Teletype Paper Tape	101	1-3		4-Up	
	Oil Rolled		45	43	43	41
36-05361	Fanfold Paper	100	1-5		6-Up	
	72 Column		30	29	28	27
36-05363-01	High Speed	101	1-5		6-Up	
	Paper Tape		65	62	62	59
36-05364	Paper Tape Tray	101	1-23		24-Up	
			3	3	3	3
36-05364-01	Paper Tape	101	1-23		24-Up	
	Tray Cover		1	1	1	1
36-05365-01	Teleprinter Paper	101	1-5		6-Up	
	Non-Perforated 12 Rolls p/case		36	35	34	33
36-09141-00	Fanfold Paper, 1 Part	12	1-5		6-Up	
			32	30	30	29
36-09141-01	Fanfold Paper, 2 Part	12	1-5		6-Up	
			42	40	40	38

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Catalog No.	Description	Page No.	Quantity			
			Cat. Price	Cash Price	Cat. Price	Cash Price
36-09141-02	Fanfold Paper, 3 Part	12	1-5		6-Up	
			$42	$40	$40	$38
36-09141-03	Fanfold Paper, 4 Part	12	1-5		6-Up	
			42	40	40	38
36-09141-04	Fanfold Paper, 6 Part	12	1-5		6-Up	
			45	43	43	41
36-09828	Ribbon, 80 Column, For Line Printer & Terminal	100	1-5		6-Up	
			30	29	28	27
36-09829-00	Fanfold Paper, LA30	100	1-5		6-Up	
			30	29	28	27
36-09829-02	Fanfold Paper, LA30	100	1-5		6-Up	
			42	40	40	38
36-10418	Ribbon, 132 Column, Line Printer & Terminal	100	1-5		6-Up	
			25	24	24	23
36-10558-01	Nylon Ribbon	12	1-5		6-Up	
			50	48	47	45
36-10998	Ribbon, 132 Column, Line Printer & Terminal	100	1-5		6-Up	
			8	8	8	7
36-11688	Ribbon, 132 Column, Line Printer & Terminal	100	1-5		6-Up	
			30	29	28	27
36-11715	DECpack Labels	104	——		——	
			3	3	3	3
36-12153-01	Nylon Ribbons	17	1-5		6-Up	
			65	62	62	59
36-13202	Fanfold Paper, Unlined	101	1-5		6-Up	
			30	29	29	27
74-03860	DECtape Used W/ 555/55/56 Transports	102	1-29		30-Up	
			9	8	8	8
74-03860-01	LINCtape Used W/ LINC/LINC-8 & PDP-12	102	1-29		30-Up	
			9	8	8	8
74-05996	DECtape Used With PDP-8	102	1-29		30-Up	
			12	11	11	11
74-05996-01	DECtape Used W/PDP 1/4/6/7/9/10/11 & 15	102	1-29		30-Up	
			12	11	11	11
90-07912-01	DECtape Label 250 p/Roll Red	102	——		——	
			5	5	5	5
90-07912-02	DECtape Label 250 p/Roll Blue	102	——		——	
			5	5	5	5
90-07912-03	DECtape Label 250 p/Roll Green	102	——		——	
			5	5	5	5
90-07912-04	DECtape Label 250 p/Roll Yellow	102	——		——	
			5	5	5	5
H952-HA	Free Standing Table	108	——		——	
			261	250	261	250
H970-EB	Small Table	108	1-2		3-Up	
			240	230	228	218
H980-AA	Large Cabinet Complete	106	1		2-Up	
			699	671	664	636
H980-AB	Small Cabinet Complete	106	1		2-Up	
			649	623	616	591
H980-BA	Cabinet Shell — 65″ Mtg. Space	107	1		2-Up	
			399	383	379	363
H980-BB	Cabinet Shell — 52″ Mtg. Space	107	1		2-Up	
			349	335	332	318
H980-CA	Magtape Tape Seal Hanger Bar	107	1		2-Up	
			35	34	33	32
H980-CB	Magtape Canister Style Storage Rack	107	1		2-Up	
			35	34	33	32
H980-CC	Disk Cartridge Storage Rack	107	1		2-Up	
			35	34	33	32
H980-CD	Drawer	107	1		2-Up	
			65	62	62	59
H980-CE	Hanging Binder Frame	107	1		2-Up	
			70	67	66	64
H980-CF	Storage Drawer	107	1		2-Up	
			80	77	76	73
H980-CG	Fixed Shelf	107	1		2-Up	
			35	34	33	32
H980-CH	Divider	107	1		2-Up	
			65	62	62	59
H980-CK	Frame	107	1		2-Up	
			35	34	33	32
LA36K-S1	Extended Supply Kit	12	1-2		3-Up	
			220	211	209	200
LA36K-S2	Basic Supply Kit	12	1-2		3-Up	
			100	96	95	91

Catalog No.	Description	Page No.	Quantity			
			Cat. Price	Cash Price	Cat. Price	Cash Price
LA180-S1	Extended Supply Kit	23	1-2		3-Up	
			$210	$200	$202	$191
LA180-S2	Basic Supply Kit	23	1-2		3-Up	
			110	106	105	100
LAXX-KA	Accessory Kit	12	1-2		3-Up	
			80	77	76	73
LAXX-KB	Casters	12	1-2		3-Up	
			15	14	14	14
LAXX-KC	Surface Shelf	12	1-2		3-Up	
			45	43	43	41
LAXX-KD	Wire Shelf	12	1-2		3-Up	
			25	24	24	23
LAXX-NC	Basket	12	1-2		3-Up	
			25	24	24	23
LP05K-ST	LP05 Supply Kit	105	1-2		3-Up	
			260	250	247	237
LQP01-KA	Mylar Ribbon Cartridge 4 p/Box	101	1-5		6-Up	
			24	23	23	22
LQP01-KB	Nylon Ribbon Cartridge 6 p/Box	101	1-5		6-Up	
			32	29	30	29
LQP01-PA	Print Wheel—Courier 10 - 6 p/Box	101	1-5		6-Up	
			48	46	46	44
LQP01-PB	Print Wheel—Pica 10 - 6 p/Box	101	1-5		6-Up	
			48	46	46	44
LQP01-PC	Print Wheel—Elite 12 - 6 p/Box	101	1-5		6-Up	
			48	46	46	44
LQP01-PD	Print Wheel—Courier 72 - 6 p/Box	101	1-5		6-Up	
			48	46	46	44
LS01K-ST	LS01 Supply Kit	105	1-2		3-Up	
			135	130	128	123
PCAST	Paper Tape Supply Kit	105	1-2		3-Up	
			240	230	228	218
RK05K-8	Disk Cartridge For RK05/RK8E Drive	103	1-5		6-Up	
			99	95	94	90
RK05K-11	Disk Cartridge For RK05 Drive	103	1-5		6-Up	
			99	95	94	90
RK06K-DC	Disk Cartridge For RK06 Drive	103	1-5		6-Up	
			249	239	237	227
RKR01-AC	Storage Rack For Disk Cartridge	103	1-2		3-Up	
			70	67	67	64
RKR05-8	Disk Cartridge Supply Kit - PDP-8	105	1-2		3-Up	
			440	422	418	400
RKR05-11	Disk Cartridge Supply Kit - PDP-11	105	1-2		3-Up	
			440	422	418	400
RP02-P	Disk Pack 20 Megabytes	102	1-4		5-Up	
			295	283	280	268
RP03-P	Disk Pack 40 Megabytes	102	1-4		5-Up	
			325	312	309	296
RP04-P	Disk Pack 88 Megabytes	102	1-4		5-Up	
			600	576	570	546
RP06-P	Disk Pack 176 Megabytes	102	1-4		5-Up	
			850	816	807	773
RX01K-10	Diskettes For RX01 Floppy Disk Drive	104	1-4		5-Up	
			75	72	71	68
TU56K-8	TU56 Supply Kit - PDP-8	105	1-2		3-Up	
			280	269	266	255
TU56K-11	TU56 Supply Kit - PDP-11	105	1-2		3-Up	
			280	269	266	255
TU60-K	DECcassettes For TU60 Drive	104	1-29		30-Up	
			8	7	7	7
TU60K-ST	TU60 Supply Kit	105	1-2		3-Up	
			160	154	152	146
TUMAG-6	Mag Tape	105	1-2		3-Up	
			250	240	238	228
TUMAG-12	Mag Tape	105	1-2		3-Up	
			300	288	285	273
TUMAG-24	Mag Tape	105	1-2		3-Up	
			360	346	342	328
VTXX-ST	Terminal Stand	108	1-2		3-Up	
			75	72	71	68
VT50K-03	VT55 Copier Supply Kit	35	1-11		12-Up	
			24	23	23	26
VT50K-12	VT55 Copier Supply Kit	35	1-3		4-Up	
			96	92	91	87
WP31K-ST	Word Processing Supply Kit	105	1-2		3-Up	
			425	408	404	387

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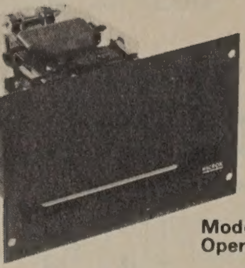


Model 264A-02 Remote Operation Badge Reader

STATIC CARD READERS

- ***22-column Badge and 80-column Tab Card Readers***
- ***Choice of Wiring and Reset Configurations***
- ***Interface Electronic Packages***

264-Bit Output Badge Reader, Model 264A, will read column 1 through 22 of a standard tab card (Media I) or a standard size CR60 plastic badge with Media I punching.

960-Bit Output Card Reader, Model 960A, will read 80 columns of a standard 80-column tab card (Media I).

Choice of output bussing combinations with diode isolation matrices is available for both the badge and card readers to reduce external wiring.

BRIEF SPECIFICATIONS, MODELS 264A, 960A READERS

CONTACTS: Form "A"; hole in card makes contact. Spacing per EIA-RS-292, Media I.
264A: 264 contacts. 12 rows x 22 columns.
960A: 960 contacts. 12 rows x 80 columns.
BADGE SIZE: 2.328 in. x 3.250 in. Thickness: 0.007 in to 0.035 in.
CARD SIZE: Standard Media I tab card. Thickness: 0.007 in to 0.015 in.
PRICES (single quantity):

264A Badge Reader	**$250**
960A Card Reader	**$895**

INDUSTRIAL CARD READERS

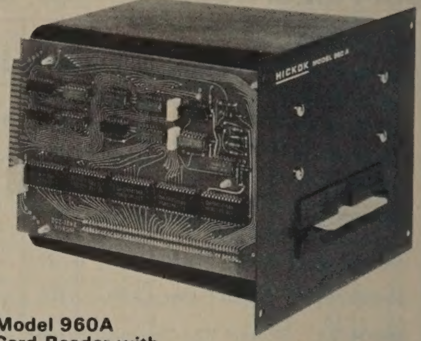
- ***Reliable Performance in Rugged Environments***
- ***Interposer Contacts for Error-Free Readings***

Proven success in industrial environments: applications include programmed control of batching and blending processes, automatic storage/retrival and conveyor systems, and automated test equipment, using high current contact closures.

Little maintenance is needed; the self-wiping interposer contact design eliminates periodic dissassembly or cleaning.

Sure, accurate readings result from using the interposer techniques. An interposer (switching mechanism post) slips through a hole in the card when the reader is actuated. Contacts are remote from the card, avoiding misreadings due to contaminants on the card often found in heavy industrial environments.

Additional choices are offered for manual and motor operation, and for form A (switch normally open) and form B (switch normally closed) switching. Blank and preprinted durable vinyl and mylar cards and card punches are available from Hickok.



Model 960A Card Reader with Model 80 Scanner

Set/reject options offer electrical actuation for remote control or manual actuation for economy.

TTL-compatible electronic scanners provide all circuitry for 12-row output in parallel, column serial. The Model 22 Scanner, for the 264A Reader, and the Model 80 Scanner, for the 960A Reader, translate the punched card data into TTL-compatible interfaces. The Scanners have two operating modes: sequential and addressable (random column selection).

BRIEF SPECIFICATIONS, MODELS 22, 80 SCANNERS

OPERATING MODES: Sequential scan or addressable modes.

LOGIC LEVELS: TTL/DTL levels.

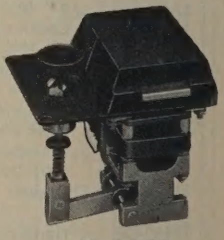
OUTPUTS: 12 data lines; ready; column control; deck position; address; overflow; enable.

INPUTS: 12 row lines; mode selection; inhibit; address; enable; advance; reset; eject (optional 5-volt control).

POWER REQUIREMENTS: 5 volts at 500 milliamperes.

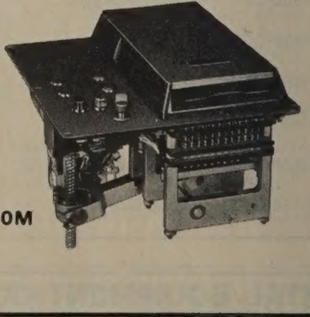
PRICES:

Model 22 Scanner for 22-column 264A Badge Reader	**$225**
Model 80 Scanner for 80-column 960A Card Reader	**$335**



Model 50

Model 187M



Model 540M

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Request Bulletin 7100

- **COMPACT DESIGN** — Up to 400 Channels in a Half Rack
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- **PROVEN RELIABILITY** — Over Six Years of Field History
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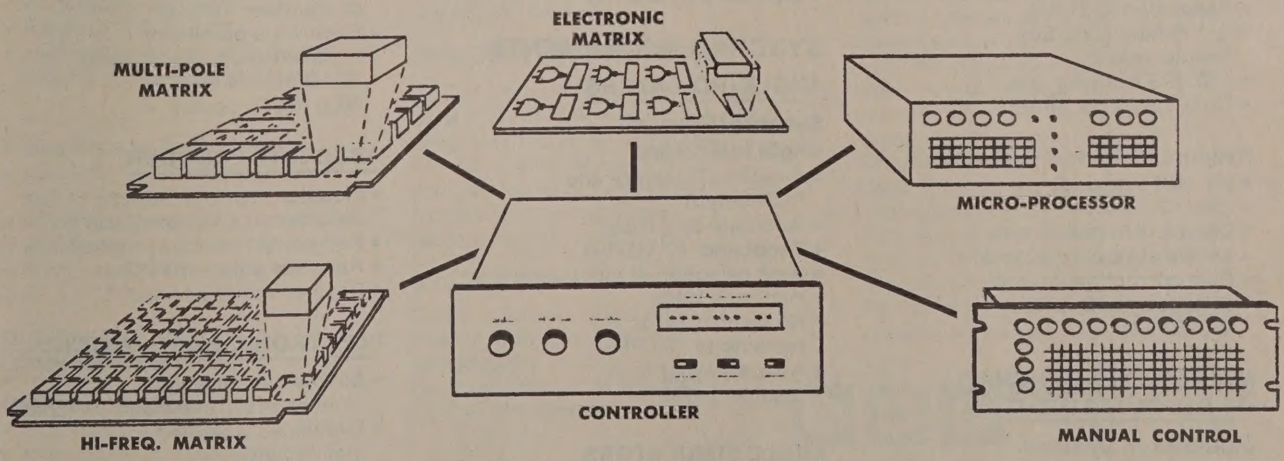
RELAYS, MATRICES & CONTROLLERS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SYNCHRO CONVERSION PRODUCTS

MODULAR COMPONENTS

SINGLE CHANNEL SYNCHRO OR RESOLVER INPUT

Synchro/Resolver-To-Digital
- Resolution to 21 bits
- ± 1 minute accuracy (single-speed)
- 100 RPS tracking rate
- Multi-speed converters

Synchro/DC and DC/Synchro
- 0.1° accuracy, 0.2 min/°C Tempco
- Choice of linear or non-
- variant sin θ, cos θ output
- Rate correction for continuous smooth output to 720°/sec

MULTIPLEXED SYNCHRO OR RESOLVER INPUT

Multiplexed Synchro Converters
- 14-bit binary resolution
- ± 6′ binary accuracy
- 55μsec/channel conversion time
- Simultaneous sampling of all channels

DIGITAL INPUT (D/S and D/R)

Digital-to-Synchro Resolver
- Resolution to 16 bits
- Accuracy ± 1 minute
- High Output; to 50VA

SYNCHRO INSTRUMENTS

ANGLE INDICATORS

Synchro/Resolver Angle Indicators
- 5-digit LED display and BCD output
- Accurate to ±0.005°
- Wideband: 47-1000Hz
- Auto selection of input gain
- Half-rack Wide
- No velocity error tracking to 100 RPS
- Accepts synchro or resolver input

ANGLE SIMULATORS

- Remotely Programmable
- 01° Resolution
- Broad Band 60-1000Hz

INDUSTRIAL PRODUCTS

INDUCTOSYN CONVERTER

- Interfaces directly with a Farrand Inductosyn® or standard resolver
- Presents a parallel or serial absolute digital word
- Resolution of 4096 or 4000 (BCD) counts

ABSOLUTE ENCODER

- Modular converter which includes size 11 transducer
- Self-contained AC excitation
- Requires only +15VDC
- Resolutions of 0.1° and .3°

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- Solid-state equivalent of mechanical cams and switches
- Eliminates wear and maintenance
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DATA CONVERSION PRODUCTS

ANALOG-TO-DIGITAL CONVERTERS

Analog-to-Digital

- Resolution to 15 binary bits
- Accuracies to 0.003%
- Rates to 100nS/bit
- High performance differential input Sample-and-Hold modules

Video Analog-to-Digital

- Accuracy and resolution to 8 bits
- Word rates to 15MHz
- 60pSec aperture time
- 10MΩ input impedance

DIGITAL-TO-ANALOG CONVERTERS

Digital-to-Analog

- Resolution to 15 bits
- Accuracies to ±0.0031%
- Settling time to 30nsec
- Output currents to 100mA

SAMPLE/HOLD and TRACK/HOLD AMPLIFIERS

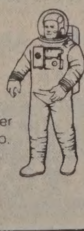
- 10nsec acquisition time
- 40MHz word rate
- 60pS aperture time
- 0.0125% linearity

SEM QUALIFIED MODULES

DDC is a qualified supplier on the SEM (Standard Electronic Module) program of the U.S. Navy. This level of quality reliability and manufacturing have been achieved for an entire series of our data converter product line.

SYSTEMS

DDC's broad standard product base in high reliability/high performance military electronic products enables DDC to be especially competitive in systems and subsystems falling into the categories of Signal Data Converters (SDC's) or "Interface Systems". This systems hardware capability is fully complemented by expertise in all the major systems supporting disciplines such as overall program management; R & M ability design, analysis and testing; Product Assurance; Configuration and Data management and ILS.
The above capabilities have been utilized in the complete design and production of hardware for both shipboard and airborne equipment.



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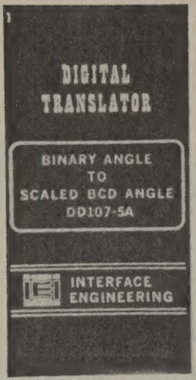


UNITS CONVERSION

CODE CONVERSION

ANGLE COMBINERS COMPARATORS

TRIG FUNCTIONS

DIGITAL SERVOS

SYNCHRO TO DIGITAL

SYNCHRO TO DC

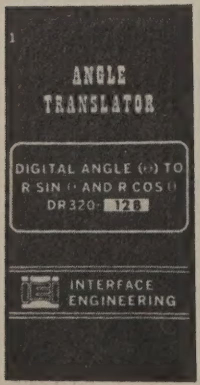
DIGITAL TO SYNCHRO

COORDINATE CONVERSION

SERIAL-OPTICAL DATA LINKS

FAST MATH OPERATORS

ANGLE DISPLAYS



Function	Model	Input	Output	FS/Rate	Accuracy	Size	Bulletin
Binary Angle to BCD Degrees	DD107-4 to -7	12,16,20,21 bits	4 to 7 digits	359.9° to 359.9995°	±0.6 LSD	C A	570115 370226
Binary Angle to BCD Radar Mils	DD124-4 to -7	12,16,20,21 bits	4 to 7 digits	6399 to 6399.997	±0.6 LSD	A	370630
BCD Degree to Arcmin. + Sec.	DD132	.999° BCD	4 digit BCD	59′57″	±1 arcsec	A	371204
Binary Angle to Bipolar Angle	DD117-16-21	17 or 21 bits	±17 or 21 bits	±180° — .3 μs	±0	C	370607
Binary Angle Combiner	DD118	16 bit θ & 16 bit ϕ	16 bit $\theta + \phi$ or $\theta - \phi$	.35 μs	±0	C	470221
Binary Angle Comparator	DD119	16 bit θ & 16 bit $\theta \pm \phi$	±16 bit ϕ shortest path	.4 μs	±0	A	370815
BCD Degrees to Binary Angle	DD127-4-5	4, 5 digit BCD	13 or 16 bits	359.9° or 359.99°	±.6 LSD	A	370915
BCD Degrees to Binary Angle	DD107-6 & DD141	6 digit BCD	19 bit angle	359.999°	±1 LSB	A A	670820 670820
BCD Degrees, Min, Sec. to Binary Angle	DD132, DD141 & DD107-6	7 digit BCD	19 bit angle	359° 59′57″	±1 LSB	AA C	670820 670820
Dual Speed Combiner	DD115A	X1 — 7 bits X36 — 14 bits	19 bit angle	0.25 μs	±.0013°	E	471120
Dual Speed Expanders	DD113-12-16	12 or 16 bits	X36-14 bits	0.2 μs	±1 LSB—X36	D	471215
TRIG FUNCTIONS							
Binary Angle to Binary Sine	DD108A,B,C	10, 13, 16 bits	16 bit sine	90°, .7 to .9 μs	±.005° to .001°	A BX	270928 570812
Angle to 4 Quad. Sine + Cos Cntrl.	DD109-209	12, 15, 18 bits	±16 bit sine or cosine	360° .9 to 1.5 μs	±.005° to .001°	C E	271007 570512
Binary Tan to Angle	DD130A,B	10 or 13 bits	16 bit angle	45°, 1.2 μs	±.0025°	A BX	371105 371105
Arcsin or Arccos	DD108/137	16 bits S or C	16 bit angle	90°, 20 μs	±.001°	A/BX	670915
Binary Angle to Tan.	DD130/137	16 bit angle	16 bit tan.	45°, 20 μs	±.0025°	A/BX	670915
DC Angle to Sin & Cos	SA840A,B,C	+10 v = 360°	10 sinθ, 10 cosθ	500/sec	±.3° to ±.1°	A	371214
DC Sin + Cos to Angle	SA880A,B,C	10 sinθ, 10 cosθ	+10 v = 360°	500/sec	±.3° to ±.1°	A	770320
Inverse Function	DD137	16 bit X	16 bit f (X)	16 X slave	tol. of slave	A	470303
Inverse Function	DD141-20-28	20 or 28 bit X	16 or 24 bit f (X)	.3 μs/count	tol. of slave	C	570210
SYNCHRO-DIGITAL							
Synchro to Digital	SD550	synchro	10 bit angle	720 RPM	±1 bit	F	770522
Synchro to Digital	SD540	synchro	14 bit angle	240 RPM	±4′ ±½ LSB	F	770415
S-D Multichannel	SD532	to 64 channels	13 bit angle	100 μs access	±4′ ±½ LSB	D/F	770318
S-D 4 Channel	SD528	4 ch. synchro	13 bit angle	0.2 μs access	±4′ ±½ LSB	D/BX	671120
S-D Dual Speed	SD560	X1, X36 synchro	16 bit angle	X1 — 20 RPM	±.01° ±½ LSB	F	770715
Synchro to BCD Angle	SD570	synchro	3 or 4 digit	359.9 or ±179.9	to ±0.1° ±1 LSD	F	770608
DIGITAL-SYNCHRO							
Digital to Synchro	DS340	14 bit angle	1-2 vA	360°	±4′	F	761215
Digital to Resolver	DR350	14 bit angle	7 v resolver	360°	±4′	F	770212
Digital to Resolver	DR320-A,B	10, 12, 14 bits	7 v resolver	360°	±3′ to ±12′	C	760815
Resolver to Synchro	AA750	7V resolver	3 to 30 vA	360°	±1′ to ±20′	H	770120
Solid State CT	DS360	synchro vs 14 bit angle	null/error .4 to 1 vac/°	±7 vac	±4′	F	770324
SYNCHRO-ANALOG							
Synchro to Linear DC	SA810A,B,C	synchro	+10 or ±5 vdc	0-360°, ±180°	±.25° to ±.1°	A	370612
Synchro to DC Sin & Cos-ABS	SA820A,B,C	synchro	10 sin θ 10 cos θ	60 or 400/sec	±.35° to ±.15°	B	371114
Synchro to DC Sin & Cos-Ref. scaled	SA830	synchro	10 sin θ 10 cos θ	60 or 400/sec	±.1°	C	371123

INTERFACE ENGINEERING

Function	Model	Input	Output	FS/Rate	Accuracy	Size	Bulletin
Binary Add/Subtract	DD129	16 bit A & B	16 bit A ± B	.4 μs	±0	C	370726
Binary Multiply	DD123	16 bit A & B	18 bit AB	10 μs	±0	A	470515
Multiply Double Prec.	DD123-DP	16 bit A & B	32 bit AB	10 μs	±0	BX	470515
Binary Divide	DD163	16 bit A & B	18 bit A/B	10 μs	±0	A	570719
Divide Double Prec.	DD163-DP	32A & 16B	32 bit A/B	10 μs	±0	BX	570719
Square Root	DD123/137	16 bit A	16 bit $\sqrt{A}$	160 μs	±0	A/A	670915
Floating Point	DD154	16A + 4 bit X	8 modes	.3 μs/shift	±0	A	570622
Complements	DD112	12-20 bit A	ones, two's, direct-thru	.25 μs	±0	C	370918
COORDINATE CONVERTERS							
DC Polar to Rectangular	SA850A,B,C	.1 to 10 v R 0 to 10 v θ	Rsin θ Rcos θ	500/sec	.125 to .5° .1 to .4%	A	371222
DC Rectangular to Polar	SA860A,B,C	.1 to 10 Rsin θ & Rcos θ	+10 v=360° abs. .1 to 10 R	500/sec	.125 to .5° .1 to .4%	A	371224
Polar to Analog Rectangular	DR320-10, -12 and -14	10 to 14 bit θ ±10 v R	Rsin θ Rcos θ	2 μs	.05° & .2° .1 and .3%	C	571022
Optically Isolated Serial Data Link	DD128T & DD128R	Accepts and delivers 24 bit parallel data at up to 20K words/sec. Serial transmission via low cost twisted pair up to 1 mile.				C C	371115 371115
Panel Display Kits	DD120-4 to -6	4 to 6 digit, .55″ numerals, complete with bezels, decoders, etc.				PI	371019

Notes: 1) Synchro translators interface 90 v/60 Hz (-96), 90 v/400 Hz (-94), and 11.8 v/400 Hz (-114) synchros. Contact IEI for resolver interfaces.

2) Cases: A) 3″x4″x.4″ B) 3″x4″x.8″ Bx) 3″x4″x.675″ C) 2″x4″x.4″ D) 2″x3″x.4″ E) 2″x4″x.8″ F) 2.625″x3.125″x.8″

FAST 16 BIT MATH

- Add
- Subtract
- Multiply
- Divide
- Square Root
- Sine
- Arc Sine
- Cosine
- Arc Cosine
- Tangent
- Arctan
- Inverse Functions
- Floating Point
- Complements

COORDINATE CONVERSION

SERIAL DATA LINKS

PANEL DISPLAYS

MAINFRAME SUBSYSTEMS

MAINFRAMES are integrated modular subsystems optimized by the selection of functions, resolutions, and speeds for the specifics of each application. Typical groups are outlined below. Contact IEI for additional information.

ANGLE DISPLAYS: The DD135 series accepts, converts, displays, and delivers angles in a variety of forms including binary, BCD, synchro resolver, dual speed, mils, degrees, arc-minutes and seconds and distance in any unit of linear measure at resolutions to 21 bits and accuracies to ±.0003°. Options include bipolar operation and programmable offsets and scaling factors.

SYNCHRO INTERFACES: Multichannel synchro to digital and digital to synchro interfaces accommodating mix of channels, synchro levels, references, and speed ratios, various display and BITE options.

PRECISION COORDINATE CONVERTERS: Polar, spherical, and rectangular coordinate conversion and translation units employing non-volatile hardware math and trig and providing angle and vector resolutions to 18 bits.

STABILIZATION COMPUTERS: ROM programmed microcomputer controllers which accept vehicle, object, and inertial position data, compute true pointing angle, and generate the command signals required to maintain true pointing. Units feature signed 16 bit floating point precision, computing speed, and dynamic accuracy.

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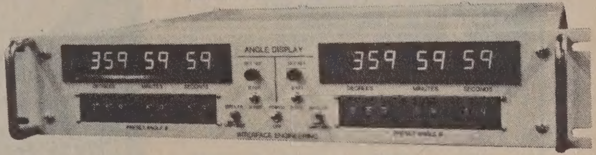
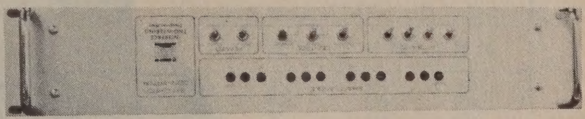
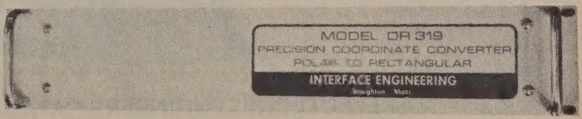
ANTENNA ANGLE DISPLAYS



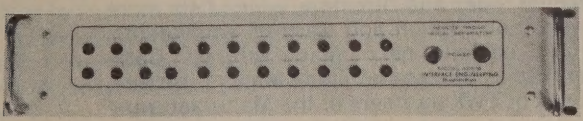
ROTARY TABLE DISPLAYS



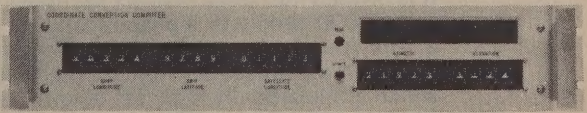
SYNCHRO INTERFACES



COORDINATE CONVERTERS



RADAR REMOTER — SEPARATOR UNIT



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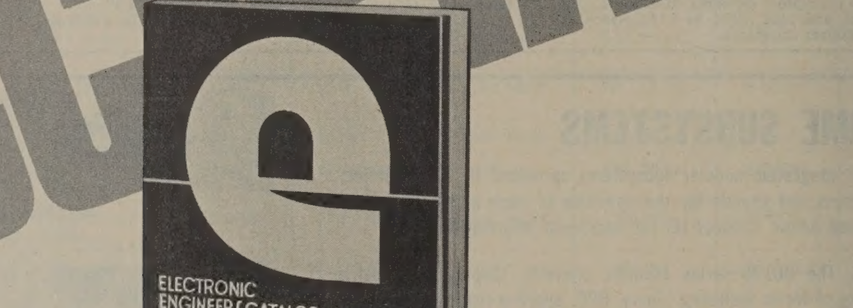

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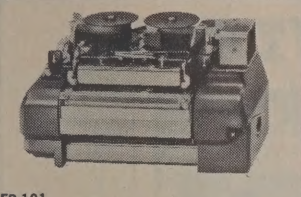
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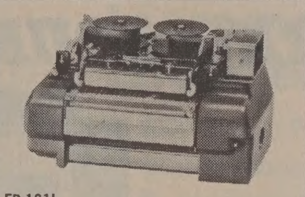
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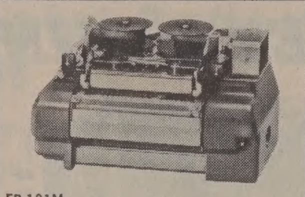
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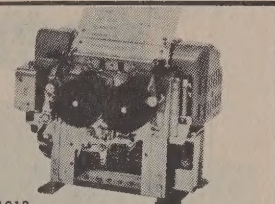
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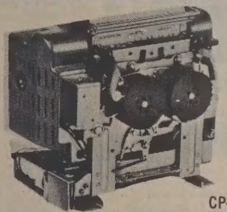
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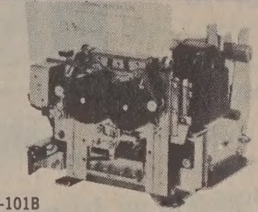
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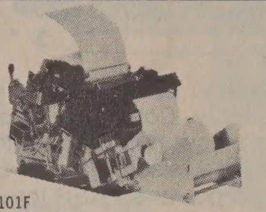
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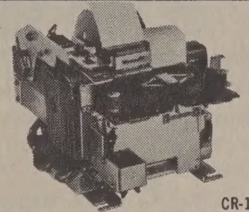
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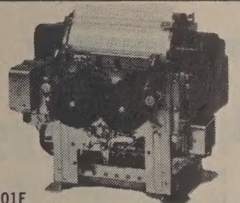
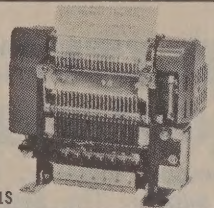

AN-101F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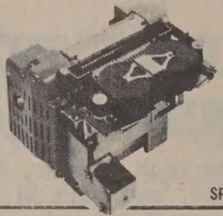
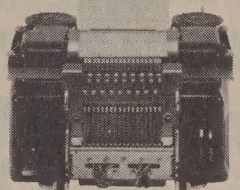

SP-101L


102

To Meet Your Every Need!

MODEL	EP-101	EP-101L	EP-101M	EP-101S	CP-101A	CP-101B	CP-101F	CR-101T	AN-101F	AN-101S	SP-101L	102
Column Capacity	21	19	21	19	19	17	19	Jrnl-10 Recpt-10	21	21	21	18
Character Set	16	16	16	16	16	16	16	16	42	(*)	12	13
Print Rate lines/sec.	2.8	2.3	2.8	2.6	2.6	2.6	2.3	2.6	1.2	2	3.4	2.5
Inking: Ribbon = R Impact Paper = IM	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R IM-Opt.	R-Opt. IM	R IM-Opt.	R IM-Opt.
Data Entry: Parallel	P	P	P	P	P	P	P	P	P	P	P	P
Feed: Friction = F Sprocket = Spr	F	F	F	Spr	F	F	F	F	F	F	F	F
Paper: Width- Rolled = RP Fan Fold = FF Card = C	3½" RP or FF	3½" RP	3½" RP	3½" RP or FF	3½" RP + 3½"C	3½" RP +C	3" RP + 3¼"C	Two 1¾" RP	3½" RP or FF	3½" RP	3½"	2½"
Power in VDC	17 ±3	17 ±2	17 ±2	17 ±3	17±2	17 ±2	16 ±2	17 ±2	17 ±2	12^{+2}_{-1}	17 ±2	15 ±2
Size (Height) (Width) (Length)	4" 6½" 5⅜"	6" 6½" 6½"	5¼" 6½" 4"	4" 6½" 5⅜"	5¼" 6½" 4"	5¼" 6½" 4"	7" 7" 15"	6¼" 6½" 4½"	6" 6½" 4½"	5⅜" 6½" 3"	5½" 6½" 5½"	3⅜" 5¾" 4⅞"
Weight in Lbs.	5½"	7¾	5½	5½	8	8	11	6	6¾	5½	5½"	3½
*Suggested Applications:	h, e, k, j, a, d	d (prints logo message with spec. stamp)	q (prints max. char. size of 0.15")	s, n, d	d, c, b, s	d, c, b, s	d, c, b, s	d (prints recpt. & jrnl copies on 2 sep. rolled paper	n, h, f, r, d	o, p, m, l, g	q (prints max. char. size of 0.22")	k, i, d

* Alphameric (Segment)

Applications:
- (a) Automation Monitoring
- (b) Billing Machine
- (c) Cash Dispenser
- (d) Cash Register
- (e) Cash Register (Elec.)
- (f) Computer Output
- (g) CRT Hard Copy
- (h) Data Logger
- (i) Data Logger, Low-Cost
- (j) Digital Voltmeter
- (k) Elec. Calculator
- (l) Emergency Vehicles
- (m) Fire Engines
- (n) Label Printer
- (o) Mobile Communications
- (p) Police Car
- (q) Scale
- (r) Tape Interpretation
- (s) Ticket Printer

Used by the world's leaders in cash registers, instrument data loggers, and all print-out applications.

Whatever your hard-copy need—alpha-numeric/digital printout; multi-copy; multi-color; ordinary calculator paper/pressure-sensitive tape; card, label, fan-folded forms, sales slip—one of our 12 basic field-proven impact printers will suit you perfectly.

Choose up to 21 columns, up to 42 characters/column, 3.4 lines/sec printing speed. Lowest sample prices.

Products of Shinshu-Seiki, world-famous for a decade of reliability.

Represented and guaranteed by C. Itoh Electronics—part of the 117-year C. Itoh & Co., Ltd. world-wide trading organization.

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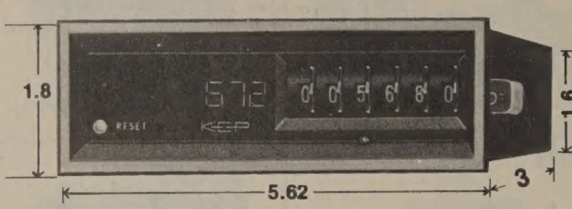
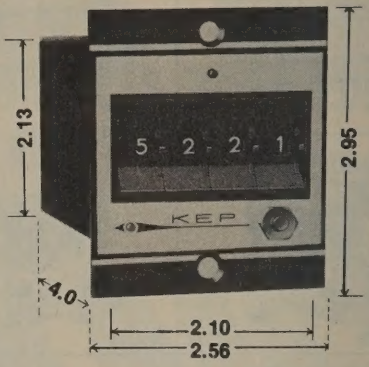
C. Itoh Electronics, Inc.

NEW

ELECTRONIC PREDETERMINING COUNTERS


1.8
1.6
3
5.62
572
005680
RESET
KEP

SCP-16


2.13
2.95
5-2-2-1
KEP
4.0
2.10
2.56

EL-4

With or without visual display. Up to 6 digits of preset. Built in 110 VAC power supply. Counts up to preset number or down from the preset number. Multiple presets available. Crystal time bases. Paralell BCD output. Current available to power all KEP input devices. In stock.

TACHOMETERS, TOTALIZERS, TIMERS ADD/SUBTRACT COUNTERS

The SC Series — for high speeds, BCD output, memory, battery standby circuitry, a .400 display, and built in power supply. The series that is ideal for totalizing events, recording precise elasped time, monitoring rate, comparing speeds of two variables, adding and subtracting, or monitoring position.

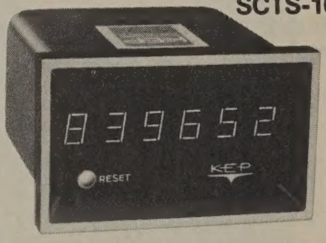
SC-116

SECONDS
83955.2
RESET
KEP

TOTALIZER /ADD SUBTRACT

BCD • 10 megahertz • c/MOS • 110 VAC Supply • Phase Discrimination • Small Handsome Aluminum Case • High Noise Immunity • Low Price • In stock

SCTS-16


839652
RESET
KEP

TIMERS

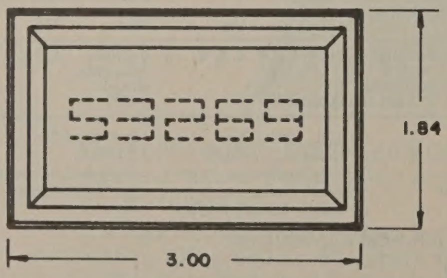
Line Controlled • Crystal Controlled • Any Resolution to milliseconds • BCD • Splits • Taylor • Built in 110 VAC Power Supply • C/MOS • 4 Digits • Low Cost • In Stock

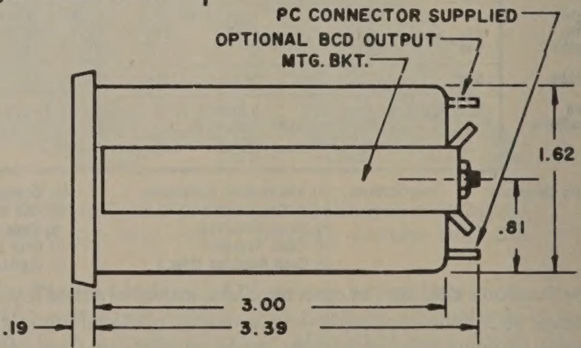
SCR-12

39 X100
RESET
KEP

RATE METER/TACHOMETER

4 Digits or fewer • Pulsed by KEP Inputs • Updates once per second • No display change without rate change • 110 VAC Supply Built In • Various Mounting Styles • BCD Output


53265
1.84
3.00


PC CONNECTOR SUPPLIED
OPTIONAL BCD OUTPUT
MTG. BKT.
1.62
.81
3.00
.19
3.39

See Product Section 2200

MINIATURE ELECTRONIC TOTALIZERS/ADD SUBTRACT COUNTERS/ELECTRO-MECHANICAL PRESET COUNTERS/TOTALIZERS/ELASPED TIME INDICATORS/PNEUMATIC COUNTERS

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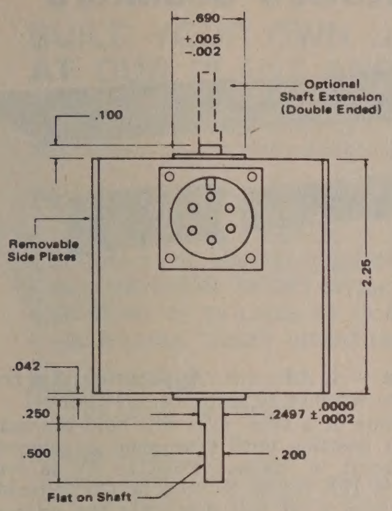
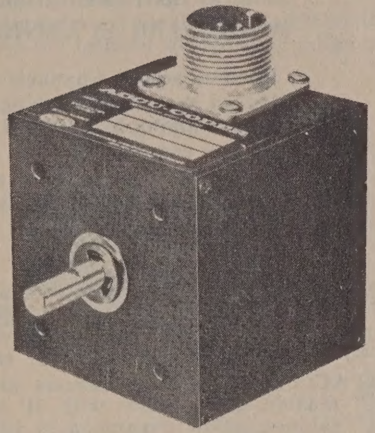


COUNTER DRIVERS

Incremental Optical Shaft Encoders

- 2000 Pulses Per Revolution
- Sealed Bearings
- Bi-Directional
- Uni-Directional
- Dual Outputs
- Reference Pulses
- Compatible with ALL KEP Counters

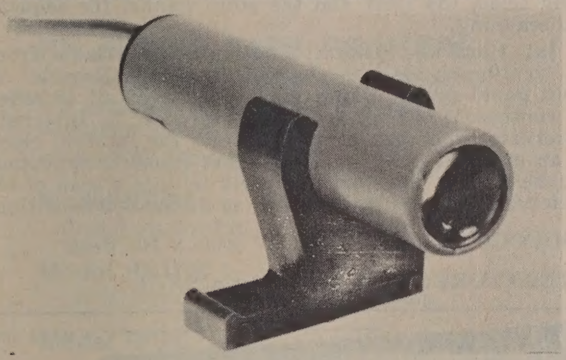
Ask for Bulletin 9 or Catalog 1300



In Stock

10 DAY DELIVERY MAXIMUM

RETRO REFLECTIVE INFRA-RED PHOTOELECTRICS



MRL-C-15 7/8 dia. Infra-red modulated beam. Used for distances to 12 ft. and beyond.

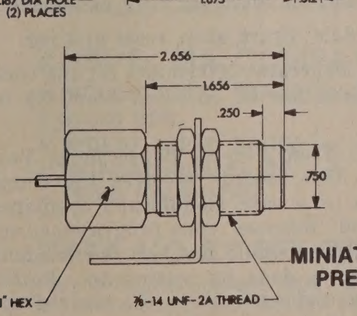
RL-A-15 7/7 dia. unmodulated Infra-red beam. Up to 5 ft.

These photo electric eyes use a solid state infra red LED light source to eliminate interference from ambient light and provide virtually unlimited light source life. The LED (light emitting diode) replaces the usual incandescent bulb which is fragile and of limited life.

The light beam is aimed across the path of the item to be counted to a reflector which directs the beam back to a sensor built into the photo head. The count is triggered when the beam is broken. Many variations are available.

These photo heads may be directly connected to any KEP counter.

TOTALLY SOLID STATE PROXIMITY SENSOR



Non-Contact Integral Sensor/Control

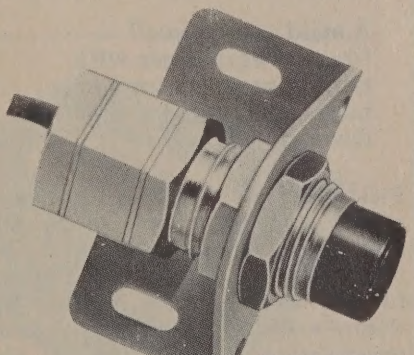
Detects All Metals — Features Extremely Compact Size For Dense Packaging Applications

All Solid State Design and Sealed Construction Insures Improved Reliability — Greater Stability — Longer Life

Two Models Available — 12VDC with Digital Output and 24VDC for Solid State Switching of Relays and Counters

Typical Sensing Range of 0.250"

Broad Frequency Response of 0-10K HZ for Wide Variety of Applications



Model 55191
Model 55192

See Product Section 2200

MINIATURE ELECTRONIC TOTALIZERS/ADD SUBTRACT COUNTERS/ELECTRO-MECHANICAL PRESET COUNTERS/TOTALIZERS/ELASPED TIME INDICATORS/PNEUMATIC COUNTERS

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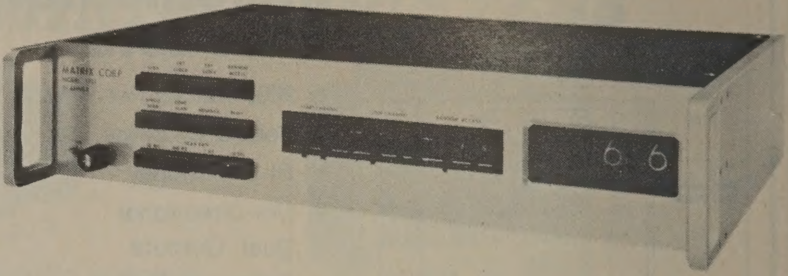
Thermocouple and General Instrumentation Scanners

General Instrumentation MODEL 1701 SCANNER

- **Random access. Channels controlled by a BCD input to allow programming by external source such as computer.**
- **Sequential scanning with end point selection by front panel digital switches.**



GENERAL: The BCD input is compatible with standard TTL logic. The unit contains BCD output for use on auxiliary equipment. Switches are available in multiples of 10 up to 100 channels in a 3½″ cabinet.

CAPACITY: 10 to 100 channels are available in the 3½″ master. Slave units with 10 to 200 channels in 3½″ cabinets allow expansion to 1000 channels.

SCAN RATE: The scan rate may be as fast as 5 msecs.

INPUT: 1. Level — Standard BCD TTL logic. True equals +5 volts and false equals 0 to +0.5 volts. Unused inputs must have a false level or be terminated in 500 ohms max. 2. BCD enable — A false signal must be applied to enable the input data.

CHANNEL READOUT: Neon numerical indicator lights are provided for a visual indication of the channel selected.

CONTACT RATINGS: 500 volts maximum between conductor and chassis, 350 volts maximum between conductors. Current should not exceed 100 ma for maximum life.

OPTIONS:

A. Manual Digital Switch — The switch can manually select any desired channel from the front panel.

B. Sequential Scan — 1. Advance: Application of a true level will cause the scanner to advance one channel. 2. Reset: Application of a true level will hold the scanner in reset (000) position until true level is removed. Short or open circuit is "false." Positive 5V is true. Input impedance is 10K ohms. 3. Stop or Ctr. Disable: Application of a true level will disenable the advance input or stop any external clock inputs. A false level is required to allow sequential scanning.

C. Sequential Scan with End Point Selection — Two digital switches are provided on the front panel to manually select the start and the stop channel for sequential scanning.

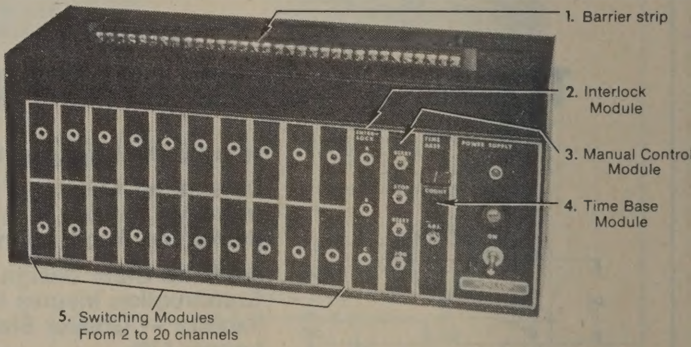
D. Int. Clock — 1. Rate: Continuously variable from .01 to 10 seconds per channel. 2. Single/Recycle: A front panel switch allows a single scan of all switches or continuous scanning of all switches. 3. Internal/External: Front panel switch selects the internal clock or an external clock input. 4. Start Input: Application of true level at the start input will initiate a scan of all switches only when the scanner is in the 000 condition.

DIMENSIONS: 3½″ high x 17″ wide x 10″ deep.

LITERATURE: Write for Bulletin RS-71.

Quantachron V Timer-Programmer

A solid state "cam" timer-programmer with plug-in modules for easier maintenance and less down time.



Field proven • All solid state high level logic • Triac output switching • Up to 20 channels per unit • Programmed by digital switches • Easy to maintain • Plug-in modules • Select only the number of channels and functions needed • Rack mounted, bench mount or enclosure mount • Digital display of count • Manual or remote control • Dimensions 16″ wide x 6¾″ high x 6″ deep.

1. Barrier Strip: All input, output and control functions connect to easily accessible barrier strip. All connections electrically isolated from digital logic.

2. Interlock Module: This module is optional. It allows four independent external contacts normally open to interrupt the count sequence and prevent an actuation of four ouput channels until the interlock is re-established.

3. Manual Control Module: Start, stop, reset and jog.

4. Time Base Module: Generates 100 counts for the time base selected. Time base can be adjusted from 0.5 to 1000 seconds.

5. Switching Modules: From two to 20 channels. Two channels per module. This module receives the count code generated by the time base module and compares it to the "Activate" and "Release" code programmed by the digital switches. Each module has two independent channels. Programming is done by setting the digital switches (by thumb or screwdriver) to the desired actuate and release times.

MATRIX CORPORATION

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MFE

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BUILD YOUR OWN DIGITAL TAPE OR TICKET PRINTERS AT OUR PLANT AND SAVE!

MFE has the proven electro-mechanical design and components to assure our ability to build and supply 100 or 1000 printer assemblies to your specifications at costs below your own. Tell us your needs and we will respond with quantity prices on mechanicals, or complete electronics:

TK SERIES TICKET PRINTERS

- TAB CARD PLUS 2 COPIES
- ACCEPTS PRE-PRINTED TICKETS
- ACCURATE LINE REGISTRATION
- INDEXING OF 28 LINES BY 11 COLUMNS
- ADJUSTABLE TICKET INSERTION DEPTH

Model TK11M

Ticket printer mechanism.

Model TK5E

Ticket Printer with interface and drive electronics • Up to 5 active columns, 11 possible column locations • 6″ wide P.C. board.

Model TK11E

Ticket Printer with interface and drive electronics • Up to 11 active columns • 8¼″ wide P.C. board.

RP SERIES TAPE PRINTERS

- IMPACT PRINTER CHARACTER QUALITY
- 6 COLUMN OR 12 COLUMN FRAMES
- SIMPLE PAPER LOADING
- NARROW FRAME

Model RP6M

Printer Mechanism • Up to 6 columns.

Model RP12M

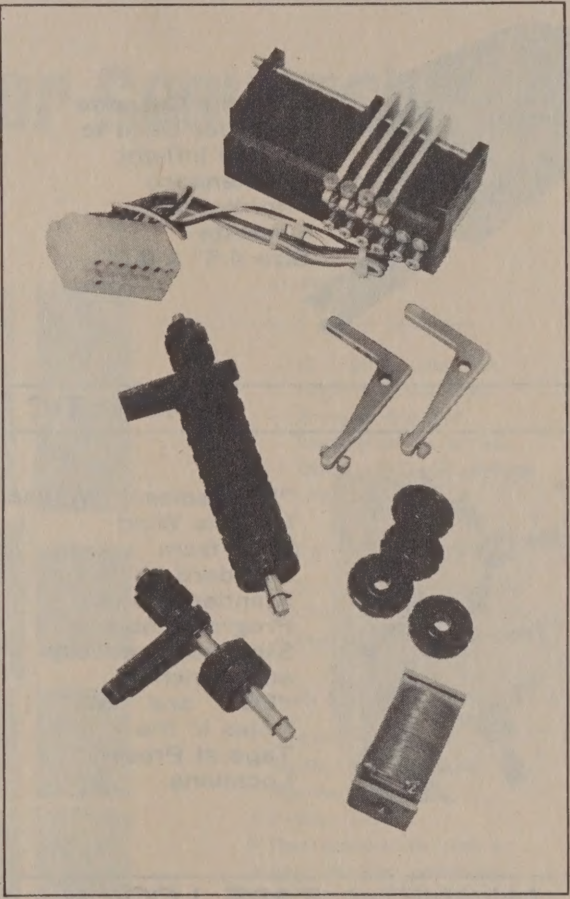
Printer Mechanism • Up to 12 columns.

Model RP6E

Printer with interface and drive electronics • Up to 6 columns • 6″ wide P.C. board.

Model RP12E

Printer with interface and drive electronics • Up to 12 columns • 8¼″ P.C. board.



DIGITAL CASSETTE TAPE TRANSPORTS

Model 250B

Standard Environment 0°C to +55°C

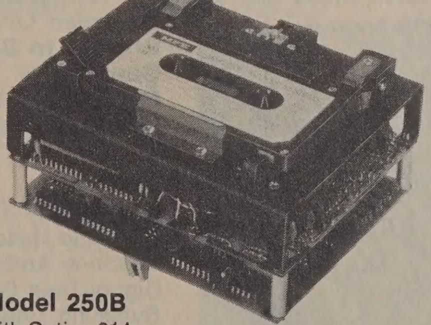
Model 250BH*

Hostile Environment −40°C to +70°C

* Mechanically qualified to MIL-E-5400R (helicopter)

ANSI/ECMA COMPATIBLE

- HIGHEST DATA TRANSFER RATE
- 32,000 BPS
- WIDEST SPEED RANGE
- HIGHEST RELIABILITY
- 15,000 HOUR MTBF



Model 250B
with Option 214
PAR 8 BIT PARALLEL OPTION

DATA I/O BY BIT OR BYTE

The MFE 250B cassette tape transport is ideal for program loading, communications terminals and data acquisition systems. It's ⅓ the size of a minifloppy, has a $1/10^8$ error rate, 366 Kilobyte storage and a 32 Kilobit transfer rate. Just 2 moving parts and no mechanical adjustments assure its constant speed, accuracy, speed range and reliability.

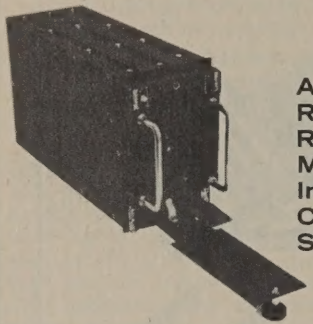
Computer and communications interfacing is simplified by your choice of 8 bit parallel or 8 bit serial option boards — which include Bi ϕ level — The ANSI/ECMA Standard.

The MFE 250 BH (Hostile Environment) tape transport incorporates MIL type components and a MIL connector. In addition, special high temperature heads and motors are used to provide operating ambient from −40°C to +70°C.

MPH
ELECTRONICS

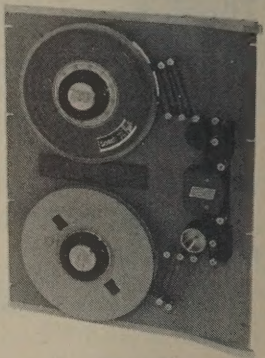
- ★ RUGGEDIZED MAGNETIC TAPE RECORDERS
- ★ MAGNETIC TAPE WINDERS AND TAPE LOOPS
- ★ PHOTOTYPESETTING AND COM CAMERAS
- ★ SPECIAL ELECTROMECHANICAL DEVICES TO CUSTOMER SPECIFICATIONS
- ★ COMPETITIVE PRICES AND FAST DELIVERY

MAGNETIC TAPE RECORDERS

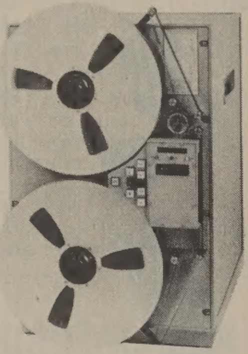


Airborne Cassette Recorder Used to Record Inflight Maintenance Information. Cassette Size 4.5" x 8.0".

"Ruggedized" Computer Peripheral Recorder Uses 8½" or 10½" IBM Reels. Medium Start/Stop Times.

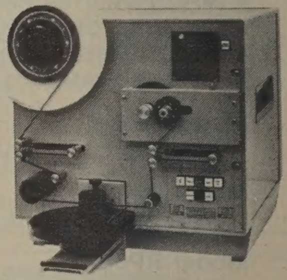


MAGNETIC TAPE WINDERS



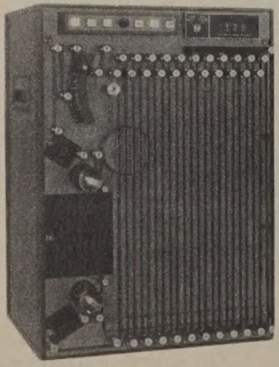
"Ruggedized" Winder Used to Wind Tape from Standard to Non Standard Reels. Programmable to Stop Automatically and Punch "EOT" and "BOT" Holes in the Tape at Preset Locations.

Automatic Tape Winder for Winding Magnetic Tape on Flangeless Tape Reels Used in Some Flight Recorders. Unit is Equipped with a Tape Preparation Platform.



MAGNETIC TAPE LOOPS

A Continuous Loop Recorder Available in Several Sizes and Styles. From Bench Mounted Units as Shown, to Self Standing 6 Foot Cabinet Mounted Units.



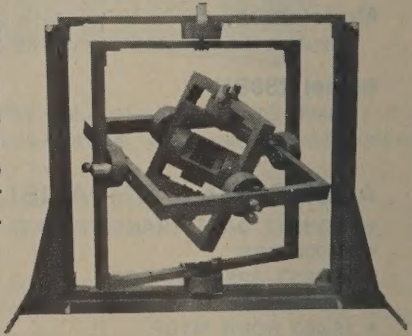
Typical Applications:

Magnetic Head Testing
Vibration Analysis
Digital Data Storage
Summing Units
Spectrum Analysis

SPECIAL PRODUCTS

5 Axis Gimbal Assembly

Typical of Special Electromechanical Products Designed and Built to Customer Specifications.



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So. El Monte, California 91733

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The Innovators In Synchro/Resolver Conversion

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- Dual speed S/D in ONE standard module; non-binary ratios [2SD402/16 bit resolution]
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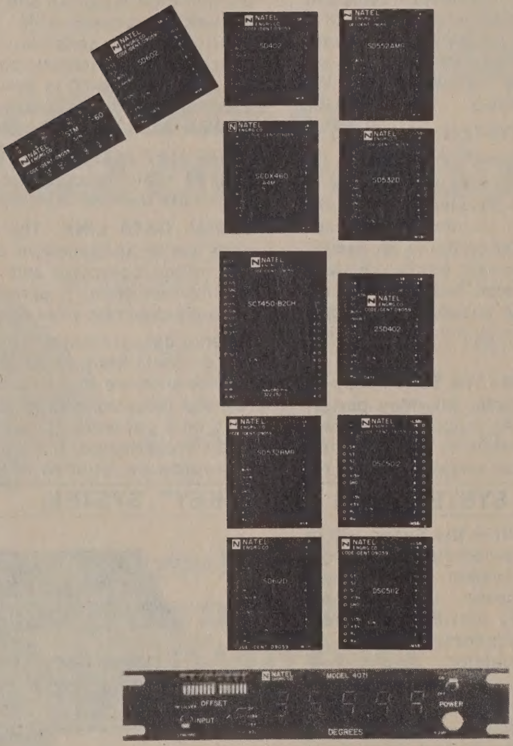
- Transformer isolated, 60 to 400 Hz S/D, ONE standard module. [SD630/10 to 16 bit resolution]
- Slim S/D occupies a single 0.5" card slot. [SD552/14 or 16 bit resolution]
- 0.1% transformation ratio, (constant gain), D/S [DSC5112/14 bit input]



#1 TECHNICALLY

- S/D or R/D Converters
  - — 10 to 20 bit resolution
  - — Single and dual speed
  - — Accuracy to 0.003°
  - — Tracking to 43,200°/sec.
  - — CMOS, LPTTL, TTL options
  - — Low Profile
- D/S or D/R Converters
  - — 0.1% transformation ratio
  - — CMOS, LPTTL, TTL options
  - — High power output

OTHER STANDARD PRODUCTS

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- Angle Position Indicators
- Solid State Control Transformers
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- Code Converters
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NEFF
Instrument Corporation

- **DATA ACQUISITION SYSTEMS**
- **COMPUTER INTERFACES**
- **SYSTEM 620/H-P CALCULATOR TURN-KEY SYSTEM**
- **INSTRUMENTATION AMPLIFIERS**

DATA ACQUISITION SYSTEMS

System 620 is a complete line of field-proven computer controlled data acquisition products — providing all functions from signal conditioning to computer interface. Each product reflects Neff's high standards of accuracy, versatility and reliability...

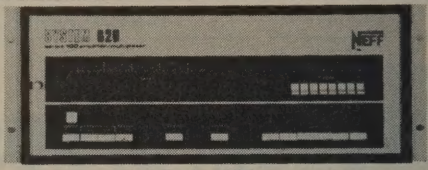
SERIES 100 AMPLIFIER PER CHANNEL SYSTEM. The top of the System 620 family of data acquisition products, the amplifier-per-channel Series 100 offers performance unmatched by any other data acquisition technique. High signal source isolation plus a differential amplifier with guard shield, high-level active filter and FET multiplexer switches **for each channel** provide low noise, 50 kHz throughput rate, 0.01% accuracy and 120dB common mode rejection.

Series 100 offers a choice of four types of differential input amplifiers with plug-in modules for gain and bandwidth selection on each channel. A programmable gain amplifier with gain of 1 through 40 increases the dynamic range of the system under program control. The system is available with a 12-, 14- or 15-bit ADC. Up to 64 channels mount in a single 7 x 19-inch (H x W) enclosure; it is expandable up to 256 channels.

SERIES 200 AMPLIFIER PER CHANNEL SYSTEM. Series 200 is identical to the Series 100 system, but is expandable to 2048 channels.

SERIES 300 SIGNAL CONDITIONER. A subsystem that conditions the output of signal transducers to be compatible with analog measuring systems, the System 300 contains an excitation power supply for each channel providing either constant voltage or constant current excitation. It also has bridge completion circuits and calibration for up to 64 channels per enclosure. Plug-in mode cards configure each channel for operation with a particular type of transducer.

SERIES 400 DIFFERENTIAL MULTIPLEXER. The Series 400, by virtue of its fully guarded differential inputs, provides performance unmatched by systems of its type. An input guard shield, surrounding sensitive input circuits, is driven by the common mode component of the input signal. This achieves 120dB rejection without switching individual guard shields and allows the system to operate from either grounded or floating inputs without degradation.


Series 100

An input filter on each channel rejects superimposed noise and unwanted signal frequencies. CMOS/FET multiplexer switches provide high isolation and allow throughput rates to 10kHz. The system's programmable gain amplifier provides program-controlled input sensitivity from 5mv to 10 volts. Accuracy is enhanced by an automatic zero circuit that compensates for internal drift. Series 400 is available with a 12- or 14-bit ADC. Up to 256 channels are accommodated in one enclosure; the system is expandable to 2048 channels.

COMPUTER INTERFACE. Standard interfaces to most commonly used minicomputers are available. Both Programmed I/O and DMA data transfer are offered.

SERIAL DATA LINK. The Serial Data Link provides asynchronous serial transmission over two coaxial cables between the controlling computer and up to eight System 620's located at remote test sites. It permits data acquisition and encoding at the individual test sites — reducing analog cabling requirements.

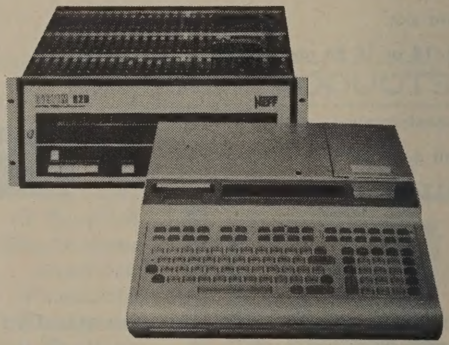
A serial data transmitter accepts 16-bit parallel computer words and converts them to serial form. Transmissions to and from the remote sites are in the form of a 20-bit pulse train. All transmitted and received data is checked for parity and pulse count — both on a per-word and data block basis. An error flag is set if errors are detected. Separate 16-bit parallel data output and status words are returned to the computer.

SYSTEM 620S "TURN-KEY" SYSTEM

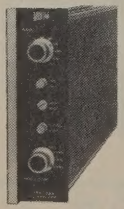
The "Turn-Key" System 620S consists of either the Series 100 or Series 400 system interfaced to the Hewlett-Packard Model 9825A Desk Top Calculator, used for system control, data storage and processing. The 9825A's speed, computational capability and fast semiconductor memory provide the system control and data processing power of a minicomputer while retaining the operating convenience of a calculator.

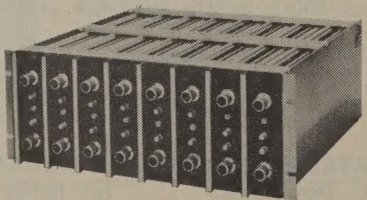
The system is supplied with standard data acquisition programs. A built-in, two-track tape cassette drive is used to load programs and record data. Its easy-to-learn high-level programming language was designed especially for technical personnel having little or no programming experience.

A variety of high-speed I/O techniques including DMA, buffered I/O and fast read/write with vectored interrupt capability can be utilized. A 16-bit parallel hardware interface provides data transfer rates to 43,000 samples per second in DMA mode with the Series 100 system and up to 9800 samples per second with Series 400.



INSTRUMENTATION AMPLIFIERS





Neff offers a complete line of differential instrumentation amplifiers for laboratory, industrial and aerospace applications. Neff amplifiers feature gains of 1 to 2500, accuracy of 0.01%, 120dB CMR, switch selectable filter, simultaneous narrowband and wideband outputs, integral power supplies and separate input and output zero controls.

Models are available with 300V common mode, programmable gain, galvanometer output and fullscale zero offset capability. A single-channel case is available as well as 8-channel or 16-channel rack mounting enclosures.

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Founded on our leadership in AC Instrumentation is our innovative line of data conversion modules. Making use of advanced LSI technology, all receive the same, intensive quality-control tests as our instruments including burn-in. If you're into data conversion, your logical next step should be to learn about our LSI-enhanced modules.

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LSI-enhanced reliability
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MODEL 8300 ANGLE POSITION INDICATOR
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High reliability with LSI
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Programmable for Synchro or Resolver and Line-Line Voltage
2 channel

MODEL 8800 ANGLE POSITION INDICATOR
0.005° accuracy, 5½ digits
High reliability with LSI
Small-size, remotely programmable
Synchro and/or resolver—auto line/line select
2 channel
IEEE Interface (optional) for ATE

MODEL 225 DIGITAL PHASE ANGLE VOLTMETER
High phase and voltage accuracy
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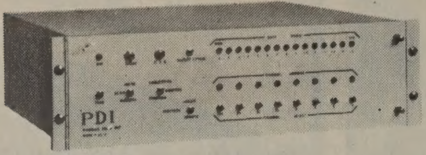
PDI® Analog Data Acquisition Subsystems

6000 SERIES High Level Analog Data Acquisition Systems



Units in the 6000 Series are highly flexible instruments, with many options, that can be matched exactly to the capabilities and characteristics of the control unit or data storage device. Within the 6000 Series there are three subgroups. The subgroups feature high speed, high temperature stability, and low cost. All three groups offer resolution from 8 to 15 binary bits and will accommodate up to 256 single ended or 128 differential inputs in a single chassis. These features combined with single channel, random and sequential address capabilities make the 6000 Series easily adaptable to your system requirements without the need for costly custom engineering. The system comes complete with all necessary power supplies for its operation and requires only 110V AC line power.

FEATURES:

- Multiplexed Thruput Rates to 1MHz
- Temperature Compensation to 10 ppm
- Versatile optional Manual Controls and Indicators
- Choice of Standard Input Voltage Range Options
- Field Expandable to 256 Channels (S.E.)
- Differential or Single Ended Input
- Resolution to 15 Bits
- Input Overvoltage Protection to ±30 Volts
- System Accuracies to 0.01%

3 SUB-SERIES

6900 - Highest Speed

The 6900 group provides the highest thruput rate in the 6000 Series. Resolution of 8 to 15 binary bits is available with multiplexing rates to 1 MHz for an 8 bit model, 400 KHz for a 12 bit model and 220 KHz for a 15 bit model. The 6900 system was designed primarily for applications where the analog input bandwidths are high. Base price: $3,155.00.

Model No.	6908	6910	6912	6913	6914	6915	Notes
No. of Bits (Binary)	8	10	12	13	14	15	
Resolution (1 Part in)	255	1,023	4,095	8,191	16,383	32,767	
Thruput Rate (KHz)	1000	800	400	250	220	220	(1)
Thruput Error (% FSR @ 25°C)	0.4	0.15	0.05	0.03	0.02	0.01	(2)
Input Ranges (STD)	A,B	A,B	A,B,C,D,E	A,B,C,D,E	B,C,D,E	B,C,D,E	(3)

General 6900 Specifications

System T.C.: 0.003% FSR/°C
Aperture Delay: 10 nanoseconds
Aperture Uncertainty: 1 nanosecond

Notes:

(1) Thruput rate for sequential mode or random mode when address is supplied one channel ahead.
(2) Accuracy specification includes all error sources and the quantizing error of ±½ LSB.
(3) Input ranges: A=0 to +5V; B=±5V; C=0 to 10V; D=±10V; E=±10.24V

6700 - Highest Stability

The 6700 group provides the highest thermal stability of the 6000 Series. The overall system temperature coefficient is less than 0.001% FSR/°C or 10PPM. This system was designed specifically for applications where wide temperature variations might be encountered and high accuracy must be maintained. Base price: $2,398.00.

Model No.	6708	6710	6712	6713	6714	6715	Notes
No. of Bits (Binary)	8	10	12	13	14	15	
Resolution (1 part in)	255	1,023	4,095	8,191	16,383	32,767	
Thruput Rate (KHz)	110	90	65	60	20	20	(1)
Thruput Error (% FSR @ 25°C)	0.4	0.1	0.025	0.015	0.01	0.01	(2)
Input Ranges (STD)			A,B,C,D,E			B,C,D,E	(3)

General 6700 Specifications

System T.C.: 0.001% FSR/°C
Aperture Delay: 10 nanoseconds
Aperture Uncertainty: 1 nanosecond

Notes:

(1) Thruput rate for sequential or random mode
(2) Accuracy specification includes all error sources and the quantizing error of ±½ LSB
(3) Input ranges: A=0 to +5V; B=±5V; C=0 to 10V; D=±10V; E=±10.24V

6400 - Lowest Cost

The 6400 offers an attractive compromise between thruput rate, temperature stability, and cost. While the lowest priced group in the 6000 Series, it offers moderate thruput rates and thermal stability. The 6400 group was designed for applications where low cost is a major consideration along with reasonably high performance. Base price: $1,973.00.

Model No.	6408	6410	6412	6413	6414	6415	Notes
Number of Bits (Binary)	8	10	12	13	14	15	
Resolution (1 part in)	255	1,023	4,095	8,191	16,383	32,767	
Thruput rate (KHz)	70	65	50	25	10	4	(1)
Thruput Error (% FSR @ 25°C)	0.4	0.1	0.025	0.015	0.01	0.01	(2)
Input Ranges (STD)			A,B,C,D,E			B,C,D,E	(3)

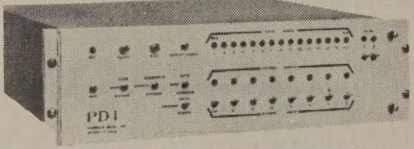
General 6400 Specifications

System T.C.: 0.002% FSR/°C
Aperture Delay: 50 nanoseconds
Aperture Uncertainty: 10 nanoseconds

Notes:

(1) Thruput rate for sequential or random mode
(2) Accuracy specification includes all error sources and the quantizing error of ±½ LSB
(3) Input Ranges: A=0 to +5V; B=±5V; C=0 to 10V; D=±10V; E=±10.24V

7000 SERIES • Automatic/Programmable Gain Ranging



The 7000 Series offers a unique solution to high speed analog to digital conversion where the input amplitude cannot be predicted in advance of the conversion. Utilizing a high speed, fast settling multi-range amplifier the 7000 Series can switch channels, determine the gain range, and perform a 14 bit A to D conversion in less than 20 microseconds. Five models with thruput rates from 10 KHz to 50 KHz are available. In the Autoranging mode a 14 bit data word is combined with 2 bits of range data for a 16 bit output word. A single chassis will accommodate from 8 to 128 differential channels. Base price: $6,007.00.

Model No.		7115	7215	7315	7415	7515	Notes
Thruput Rate (KHz)		10	20	30	40	50	
Thruput Error (% FSR @ 25°C)							(1)
Full Scale	±10.0	0.01	0.01	0.01	0.01	0.01	
Input	±1.0	0.015	0.02	0.025	0.03	0.035	
Range (Volts)	±0.1	0.02	0.025	0.03	0.04	0.05	

Features:

- Resolution to 15 bits
- Thruput Accuracy to .01%
- Auto or Programmable Gain Ranging
- Four Customer Selected Gain Ranges from 0.1 to 10.0 Volts
- Multiplexed Thruput Rates to 50 KHz

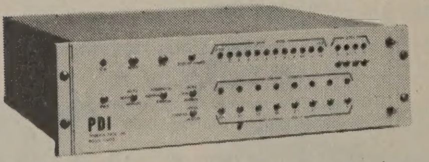
General 7000 Specifications

Input Ranges (Customer Selectable): Any four from ±0.1 to ±10.0 Volts
Input Impedance: 100 megohms (ON or OFF)
CMRR (DC to 60 Hz with 350 ohms source unbalance)
Gain Level: 1 = 80 db; 10 = 100 db; 100 = 120 db
Common Mode and Normal Mode Voltage: ±11 Volts.
Cross Talk Rejection (DC to 1 KHz with 350 ohms source unbalance)
Thruput Rate (KHz): 10 = 110 db; 20 = 104 db; 30 = 98 db; 40 = 92 db; 50 = 86 db
Gain Range Change: 90% of full scale
Thruput T.C.: 0.002% FSR±3 μ volts RTI/°C

Notes:

(1) Thruput error includes all error sources and ±½ LSB in automatic mode. Error is slightly less in programmed mode.

8000 SERIES • Automatic/Programmable Gains to 1024



The 8000 Series features adaptability to almost any input signal currently in use. The system offers automatic or programmed gain selection with 11 binary ranges from ±10 millivolts to ±10.24 volts full scale. In the automatic ranging mode the gain ranges effectively provide the system with a binary floating point capability. The data word (12 binary bits) is combined with the range data (4 binary bits) for a 16 bit output word. The 8000 System will resolve input changes at 5 microvolts on the ±10 millivolt range for an overall analog dynamic range of 132 db. Base price: $4,187.00.

Gain Ranges: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024
Input Ranges: ±10.24, 5.12, 2.56, 1.28, 0.64, 0.32, 0.16, 0.08, 0.04, 0.02, 0.01 Volts
Thruput Error: Less than .05% of the reading on any input over 5 millivolts @ 25°C
Differential CMRR (DC to 60 Hz): 80 db at unity gain and increasing to 120 db at a gain of 1024 with 350 ohms source unbalance
Common Mode and Normal Mode Voltage: ±11 Volts.

* Prices subject to change without notice.

Aperture Time: 50 nanoseconds
System T.C.: 0.001% FSR±1 μ volt RTI/°C
Crosstalk Rejection: Minimum of 100 db, DC to 60 Hz
Input Impedance: 100 megohms (ON or OFF)
Thruput Rates:

Automatic Gain Ranging Mode

Single Channel	2.5 KHz
Multiplexed Input	1.0 KHz

Programmed Gain Mode

Fixed Gain, Single Channel	20 KHz
Gain and Channel Switching	1.8 KHz

Features

- Resolution of 12 Bits
- 11 Binary Gain Ranges
- ±10 mv to ±10.24V Input Ranges
- Thruput Rates to 20 KHz
- Auto or Programmable Gains
- System Accuracy of 0.05% of Reading

Subsystem computer interfaces available. Contact factory for quotation.

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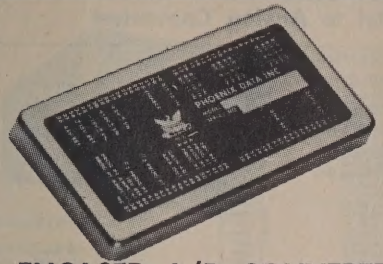
® PDI® Analog to Digital Converters



ENCASED A/D CONVERTERS

All 42 units in Phoenix Data's six new series of encased, modular A/D converters — ADC1300 thru ADC1800 — employ the highly reliable and stable voltage switching successive approximation conversion technique. Note these features:

1300 SERIES / Model No.	1308	1309	1310	1311	1312	1313	1314
Conv. Time (μsec.)*	15	20	25	30	40	50	100
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	20	20
TC (PPM/°C, 0 to 70°C)***	15	15	15	15	15	10	10
Price 1 to 9	$188.	$200.	$213.	$225.	$237.	$359.	$419.

1400 SERIES / Model No.	1408	1409	1410	1411	1412	1413	1414
Conv. Time (μsec.)*	12	14	17	20	24	35	70
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	20	20
TC (PPM/°C, 0 to 70°C)***	15	15	15	15	15	10	10
Price 1 to 9	$195.	$219.	$237.	$249.	$274.	$375.	$456.

1500 SERIES / Model No.	1508	1509	1510	1511	1512	1513	1514
Conv. Time (μsec.)*	8	9	10	12	15	25	35
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	4	4
TC (PPM/°C, 0 to 70°C)***	10	10	10	10	10	5	5
Price 1 to 9	$200.	$237.	$262.	$286.	$318.	$396.	$577.

1600 SERIES / Model No.	1608	1609	1610	1611	1612	1613	1614
Conv. Time (μsec.)*	6	7	8	9	10	15	20
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	4	4
TC (PPM/°C, 0 to 70°C)***	10	10	10	10	10	5	5
Price 1 to 9	$237.	$274.	$299.	$328.	$359.	$443.	$662.

1700 SERIES / Model No.	1708	1709	1710	1711	1712	1713	1714
Conv. Time (μsec.)*	3.5	4.0	4.5	5.0	6.5	10	15
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	4	4
TC (PPM/°C, 0 to 70°C)***	10	10	10	10	10	5	5
Price 1 to 9	$299.	$322.	$359.	$419.	$456.	$589.	$760.

1800 SERIES / Model No.	1808	1809	1810	1811	1812	1813	1814
Conv. Time (μsec.)*	2	2.5	3	3.5	4	8	12
Error (%FSR)**	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	4	4	4	4	4	4	4
TC (PPM/°C, 0 to 70°C)***	10	10	10	10	10	5	5
Price 1 to 9	$359.	$419.	$480.	$540.	$601.	$723.	$844.

NOTE: All characteristics are available in open-constructed modules. Write for details.

*Total conversion time from trailing edge of TTL/DTL Logic level.

**The conversion error includes all error sources, ±½ LSB and all temperature related errors over the temperature range of 10° to 40°C up to 12 bits and 15° to 35°C for 13 and 14 bit resolution with no adjustments. If an input range other than that specified at time of purchase is selected, the gain and offset may have to be adjusted.

***The temperature coefficient includes all gain, offset, reference, and differential linearity related temperature effects over 0 to 70°C. For extended operating temperature ranges the T.C. degrades by a factor of 2 from +70°C to +125°C and from 0°C to —55°C.

A/D CONVERTERS (PC CARD)

400 SERIES / Model No.	408	409	410	411	412	413	414
Conv. Time (μsec.)	8.0	9.0	10.0	11.0	15.0	35.0	80.0
Error (%FSR)	0.4	0.2	0.1	0.05	0.025	0.015	0.01
Input Z (Kohms)	20	20	20	20	20	20	20
TC (PPM/°C, 0 to 70°)	12 PPM/°C FSR						
Price 1 to 9	$212.	$237.	$261.	$291.	$317.	$375.	$419.

700 SERIES / Model No.	708	709	710	711	712
Conv. Time (μsec.)	3.5	4.0	4.5	5.0	6.5
Error (%FSR)	Up to ±0.025% of Full Range				
Input Z (Kohms)	20	20	20	20	20
TC (PPM/°C, 0 to 70°C)	±10 PPM/°C of Full Range				
Price 1 to 9	$286.	$304.	$335.	$388.	$419.

70 SERIES / Model No.	1270	1370	1470	1570	1670
Conv. Time (μsec.)	13.0	14.0	45.0	250.0	500.0
Error (%FSR)	±0.025	±0.015	±0.01	±0.005	±0.0025
Input Z (Kohms)	20	20	20	20	20
TC (PPM/°C, 0 to 70°C)	±5 PPM/°C				
Price 1 to 9	$359.	$443.	$577.	$881.	$1026.

800 SERIES / Model No.	808	809	810	811	812	813	814	815
Conv. Time (μsec.)	2	2.5	3	3.5	4	8	12	35
Error (%FSR)	0.4	0.2	0.1	0.05	0.025	0.015	0.01	0.005
Input Z (Kohms)	4	4	4	4	4	4	4	20
TC (PPM/°C, 0 to 70°C)	15	15	15	15	15	10	10	10
Price 1 to 9	$359.	$407.	$460.	$533.	$626.	$710.	$844.	$1026.

900 SERIES / Model No.	908	909	910	911	912
Conv. Time (μsec.)	0.8	0.9	1.	1.5	2.
Error (%FSR)	±0.4	±0.2	±0.1	±0.05	±0.025
Input Z (Kohms)	4	4	4	4	4
TC (PPM/°C, 0 to 70°C)	±20	±20	±20	±20	±20
Price 1 to 9	$759.	$826.	$882.	$1001.	$1126.

1100 SERIES / Model No.	1105-60	1105-100	1106-60	1106-100
Conv. Time (μsec.)	0.016	0.010	0.016	0.010
Error (%FSR)	±1.5%±½LSB	±1.5%±½LSB	±0.75%±½LSB	±0.75%±½LSB
Input Z (ohms)	50	50	50	50
Temp. Range (operating)	0°C to 50°C	0°C to 50°C	0°C to 50°C	0°C to 50°C
Price 1 to 9	$3327.	$6610.	$6459.	$12,944.

Military versions available. Contact factory for specifications and quotations.

1200 SERIES / Model No.	1215	1215F
Conv. Time (μsec.)	4	10
Error (%FSR)	0.005	0.0065
Input Z (Mohms)	10	100
TC (PPM/°C, 0 to 70°C)	10	10
Price 1 to 9	$1,208.	$1,813.

Prices subject to change without notice.

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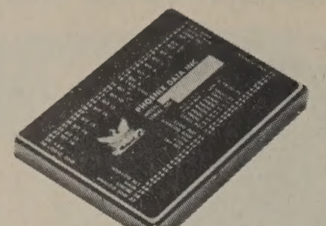
Ph. (602) 278-8528, TWX 910-951-1364

PDI® Encased Digital to Analog Converters – 3000 Series

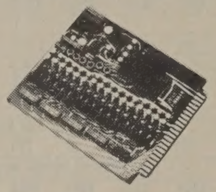
SPECIFICATIONS EDAC Series 3000 — Encased Digital to Analog Converters



Model	Input Resolution (Note 1)	Full Range Slew & Settling Time (Note 2) (usec.)	Accuracy of FSR (Note 3)	Linearity of FSR	Temperature Coefficient (0°C to 70°C) (Note 4)	Performance	Price 1-9
3012	12 Bits	15	±0.02%	±0.010%	10 ppm/°C	Standard	$194.
3112	12 Bits	15	±0.01%	±0.006%	5 ppm/°C	Precision	237.
3212	12 Bits	1	±0.02%	±0.010%	10 ppm/°C	High Speed	259.
3312	12 Bits	1	±0.01%	±0.008%	5 ppm/°C	Precision & High Speed	302.
3413	13 Bits	15	±0.015%	±0.008%	10 ppm/°C	Standard	247.
3414	14 Bits	17	±0.0125%	±0.007%	10 ppm/°C	Standard	301.
3415	15 Bits	20	±0.010%	±0.006%	10 ppm/°C	Standard	398.
3416	16 Bits	20	±0.007%	±0.004%	10 ppm/°C	Standard	538.
3513	13 Bits	15	±0.010%	±0.006%	5 ppm/°C	Precision	302.
3514	14 Bits	17	±0.007%	±0.004%	5 ppm/°C	Precision	367.
3515	15 Bits	20	±0.005%	±0.003%	5 ppm/°C	Precision	485.
3516	16 Bits	20	±0.003%	±0.0015%	5 ppm/°C	Precision	647.
3613	13 Bits	1.0	±0.015%	±0.008%	10 ppm/°C	High Speed	323.
3614	14 Bits	1.5	±0.0125%	±0.007%	10 ppm/°C	High Speed	388.
3615	15 Bits	2.0	±0.010%	±0.006%	10 ppm/°C	High Speed	518.
3616	16 Bits	3.0	±0.007%	±0.004%	10 ppm/°C	High Speed	691.
3713	13 Bits	2.0	±0.010%	±0.006%	5 ppm/°C	Precision & High Speed	377.
3714	14 Bits	2.5	±0.007%	±0.005%	5 ppm/°C	Precision & High Speed	453.
3715	15 Bits	3.5	±0.006%	±0.004%	5 ppm/°C	Precision & High Speed	604.
3716	16 Bits	4.5	±0.004%	±0.002%	5 ppm/°C	Precision & High Speed	809.

NOTES:
1. Lower resolution units available on request.
2. Conversion time includes settling time to rated accuracy for a full-range step (worse case). See Conversion Timing Diagram.
3. Accuracy figures include all error parameters.
4. Standard operating temperature range is 0°C to 70°C. Extended temperature ranges are available. Also, on special order, units available to 2.5 ppm/°C.
5. For Model Number Coding, see Ordering information.
6. For special configurations or applications, contact your local Phoenix Data, Inc. representative or the factory.
7. The temperature coefficient includes all gain, offset, reference and differential linearity related temperature effects over 0 to 70°C. For extended operating temperature ranges the T.C. degrades by a factor of 2 from +70°C to +90°C and from 0°C to —55°C.

DIGITAL TO ANALOG CONVERTERS — PC Card — including Military and Industrial Types



Model	Input Resolution (Bits)	Full Range Slew & Settling Time (Note 1) (usec.)	Accuracy of FSR (Note 6)	Linearity of FSR	Temperature Coefficient (0°C to 70°C) (Note 7)	Price 1-9
PDAC1270A(2)	12	10	±0.01%	±0.006%	±5 PPM/°C	$ 213.
PDAC1370A	13	10	±0.01%	±0.006%	±5 PPM/°C	274.
PDAC1470A	14	10	±0.01%	±0.006%	±5 PPM/°C	335.
PDAC1570A	15	15	±0.005%	±0.003%	±5 PPM/°C	552.
PDAC1670A	16	15	±0.005%	±0.0015%	±5 PPM/°C	699.
PDAC1270R(3)	12	10	±0.01%	±0.006%	±5 PPM/°C	237.
PDAC1370R	13	10	±0.01%	±0.006%	±5 PPM/°C	299.
PDAC1470R	14	10	±0.01%	±0.006%	±5 PPM/°C	359.
PDAC1570R	15	15	±0.005%	±0.003%	±5 PPM/°C	577.
PDAC1670R	16	15	±0.005%	±0.0015%	±5 PPM/°C	723.
DAC1570G(4)	15	20	±0.005%	±0.002%	±5 PPM/°C	893.
DAC1670G	16	20	±0.005%	±0.002%	±5 PPM/°C	1030.
DAC1670G-4D(5)	16	20	±0.005%	±0.002%	±5 PPM/°C	1087.
DAC1590G Mil.	15	20	±0.005%	±0.002%	±5 PPM/°C	1936.

NOTES: (1) Faster Settling Times Available. Settling time is to rated accuracy. (2) "A": Without Input Holding Register. (3) "R": With Input Holding Register. (4) "G": Put "Glitch" less than 1 LSB. (5) "4D": Four Decade BCD Code. (6) Accuracy at 25°C including all error sources. (7) Includes all temperature-related errors.

SAMPLE & HOLD 7000 SERIES SPECIFICATIONS

Model No.	Description	Standard Modules 4.5x3"	Standard Modules 4.5x5"	Double Ended Module 3.75x 4.625"	Input Connection Differential	Input Connection Single Ended	Acquisition Time (usec.) Full range step slew & settle to accuracy	Accuracy % FS @ 25°C	TC (PPM/°C) Thruput	Aperture Time Typical (ns)	Short Term Aperture Jitter (ns)	Track To Hold Settle Time (ns)	Input Characteristics (Typical) Impedance @ DC @ 25°C	Input Characteristics (Typical) Bias Current @ 25°C	Output Characteristics Impedance @ 25°C	Output Characteristics Current (Max.)	Price 1 to 9 (Single) Sample & Hold	Price 1 to 9 (Dual) Sample & Hold
7012	Moderate speed.	X				X	13	±0.0125	±2½	30	10	500	1000 Mohms	50 na	0.8 ohm @ DC	5 ma	$ 98.	$152.
7112			X			X	13	±0.0125	±2½	30	10	500					103.	157.
7212	Suitable for ADC's		X		X		15	±0.015	±3½	30	10	500					130.	184.
7312	thru 13 bits.			X		X	13	±0.0125	±2½	30	10	500					108.	171.
7412				X	X		15	±0.015	±3½	30	10	500					135.	224.
7014	Moderate speed.	X				X	15	±0.007	±2½	30	10	600	1000 Mohms	50 na	0.8 ohm @ DC	5 ma	152.	254.
7114			X			X	15	±0.007	±2½	30	10	600					157.	265.
7214	Suitable for ADC's		X		X		17	±0.009	±3½	30	10	600					184.	317.
7314	thru 15 bits			X		X	15	±0.007	±2½	30	10	600					162.	276.
7414				X	X		17	±0.009	±3½	30	10	600					189.	328.
8000 SERIES SPECIFICATIONS																		
8012	Higher speed.	X				X	4	±0.0125	±3.5	30	10	300	1000 Mohms	250 na	0.2 ohm @ DC	5 ma	128.	209.
8112			X			X	4	±0.0125	±3.5	30	10	300					133.	220.
8212	Suitable for ADC's		X		X		5	±0.015	±4.5	30	10	300					201.	350.
8312	thru 13 bits.			X		X	4	±0.0125	±3.5	30	10	300					141.	234.
8412				X	X		5	±0.015	±4.5	30	10	300					207.	360.
8014	Higher speed.	X				X	5	±0.008	±3.5	30	10	400	1000 Mohms	250 na	0.2 ohm @ DC	5 ma	197.	342.
8114			X			X	5	±0.008	±3.5	30	10	400					202.	353.
8214	Suitable for ADC's		X		X		6	±0.01	±4.5	30	10	400					265.	472.
8314	thru 15 bits.			X		X	5	±0.008	±3.5	30	10	400					210.	367.
8414				X	X		6	±0.01	±4.5	30	10	400					270.	483.
9000 SERIES SPECIFICATIONS																		
9010	High speed	X				X	1	±0.025	±10.	20	3	200	500 Mohms	250 na	0.2 ohm @ DC	10 ma	199.	346.
9110	Suitable for ADC's		X			X	1	±0.025	±10.	20	3	200					205.	356.
9210	thru 11 bits		X		X		1.5	±0.035	±12.	20	3	200					270.	483.
9310				X		X	1	±0.025	±10.	20	3	200					210.	367.
9410				X	X		1.5	±0.035	±12.	20	3	200					276.	493.
9012	High speed.	X				X	2	±0.015	±10.	20	3	250	500 Mohms	250 na	0.2 ohm @ DC	10 ma	233.	410.
9112	Suitable for ADC's		X			X	2	±0.015	±10.	20	3	250					238.	421.
9212	thru 13 bits.		X		X		2.5	±0.02	±12.	20	3	250					312.	561.
9312				X		X	2	±0.015	±10.	20	3	250					243.	431.
9412				X	X		2.5	±0.02	±12.	20	3	250					317.	572.
9014	High speed.	X				X	3	±0.01	±7.5	20	3	300	500 Mohms	250 na	0.2 ohm @ DC	10 ma	304.	547.
9114	Suitable for ADC's		X			X	3	±0.01	±7.5	30	3	300					309.	558.
9214	thru 15 bits.		X		X		3.5	±0.0125	±10.	20	3	300					375.	684.
9314				X		X	3	±0.01	±7.5	20	3	300					315.	511.
9414				X	X		3.5	±0.0125	±10.	20	3	300					381.	694.

NOTE 1: 15 bit SAH's require tuning to the individual ADC.

NOTE 2: All SAH's are designed to have a full scale range of ±10V output. That is: a voltage range of +5V input will have a gain of 2.

ENCASED SAMPLE AND HOLD

(2" long x 2" wide x 0.39" high, hot-tin-dipped steel covered module.) Shielded on six sides against RFI and on five sides against EMI. Completely repairable. One SAH per card.

		INPUT							
Model	Connection	Range	Impedance	Aperture	Accuracy	Settling Time	Output Current	Hold Mode Droop	Price 1 to 9
SAH1	Single ended	+10V to —10V	100 Mohm	50 ns	±0.01% of FS	10us to ±0.01%	±2 ma	2uv/us	$140.
SAH3	Single ended	+10V to —10V	100 Mohm	10 ns	±0.025% of FS	1us to ±0.025%	±5 ma	50uV/us	221.

MULTIPLEXERS. Open or encased modules; Standard 44-pin or double-ended card for back rack insertion. Input ranges to ±10V standard, others optional. Overvoltage protection optional. Single ended or Differential Inputs, Output submultiplexing.

MODEL	DESCRIPTION	PRICE
870S	8 channel Differential or	$304.
1670S	16 channel Single Ended Standard card.	304.

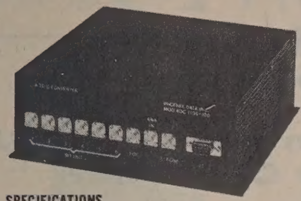
MODEL	DESCRIPTION	PRICE
1670D	16 channel Singled Ended; double ended card.	$304.
870D	8 channel Differential; double ended card.	304.
MUX08	8 channel Single Ended; 2"L x 2"W x 0.39"H encased module.	158.

Prices subject to change without notice.

/PHOENIX DATA, INC.

3384 W. OSBORN RD. PHOENIX, AZ 85017
Ph. (602) 278-8528, TWX 910-951-1364

PDI® High Speed Analog to Digital Converters



MODEL ADC1106-100
A/D CONVERTER COMBINES

High Speed with
(100 million conversions per second)

Exceptional Accuracy
(±0.75%±½LSB)

SPEEDS to 100 MHz

Phoenix Data's new very-high-speed (100 million conversions per second) analog to digital converter is designed to digitize ultra-high-speed analog input signals — including high-speed display and radar signal digitized input — with accuracy of ±0.75%±½LSB.

The new ADC1106-100 also has a resolution of 6-bit binary or 2's complement with a ±2 volt input range. A "system-ready" module only 8"x.8"x 3", it is totally self-contained and incorporates all of the functions necessary to perform 6-bit binary conversions at 100 million per second except for power supply. Model ADC1106-60 is identical with Model ADC1106-100 except that conversions are performed at a rate of 60 million per second.

SPECIFICATIONS

ANALOG INPUT SIGNAL

Accuracy	±0.75%±½LSB
Full Range	±2 volts
Connection	Coaxial, Single Ended
Input Impedance	50 Ohms
Bandwidth, 1dB	50 MHz

CTC (Command to Convert) STROBE

Logic Type	ECL
Input Impedance	50 Ohms
Conversion	Initiated on negative going transition
Pulse Repetition Rate (PRR)	100,000,000/Second
Pulse Duration	Square wave

END OF CONVERSION (EOC)

Pulse	ECL level, rising edge signifies EOC
Delay	Occurs approx. 30 nanoseconds after CTC Strobe

DATA OUTPUTS

Code	6-bit Binary and 2's complement with monotonicity
Logic Type	ECL compatible
Drive	50 Ohm lines
Parallel Data Out	Sustained 1 cycle
Output Skew	±1.0 nanosecond (typical)

POWER REQUIREMENT
+5.2Vdc ± 5% @ 2.0 ampere
—5.2Vdc ± 5% @ 4.0 ampere

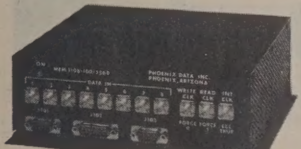
PACKAGE	Approx. 8.0"x8.0"x3'

ENVIRONMENTAL
Temperature

Operating	0°C to +50°C
Storage	—55°C to +125°C
Humidity	0 to 99% relative, no condensation

Base price: 1106-60 $ 6,459. 1106-100 $12,944.

HIGH SPEED BUFFER MEMORY for A/D converter, high speed data buffering



GENERAL DESCRIPTION

The Model MEM 1108-100/2560 Buffer Memory has been specifically designed for use with Phoenix Data's Ultra High Speed D/A Converters — Models 1105-60/100 1106-60/100, where standard analog conversion rates range as high as 100 MHz for high speed communication and other data acquisition applications. The MEM 1108-100/2560 is also ideally suited for use with other A/D converter systems employing up to 8-bit resolution and ECL interface logic. When used with Phoenix Data A/D Converters, the buffer memory accepts the 6-bit converter output, and in addition, two external CPU supplied control or identifier bits as a part of each 8-bit data word. All memory write operations are synchronized (strobed) by the converter End-Of-Conversion (EOC) pulse. Phoenix Data's Model MEM 1108-100/2560 High Speed Buffer Memory represents the latest in memory design technology and data acquisition modules — allowing the user to buffer ultra-high speed analog data conversions for greater efficiency and more effective use of computer interfacing. Data blocks of 2560 A/D converted data words can be accumulated and stored in memory at rates of up to 100 megawords per second, while memory readout is accomplished at a 4 megaword rate when using the internal buffer clock, or at any other selected rate up to 4 megawords per second when using an externally supplied clock.

FEATURES

- 2560 Word Storage Capacity
- 8-bit Word, Parallel Input/Output
- Up to 100 MHz Word Input Rate
- Up to 4 MHz Word Output Rate
- Load Synchronized With End-Of-Conversion Pulse (EOC)
- Internal/External Buffer Read Clock Selection
- ECL Logic (Converter Interface)
- TTL Logic (CPU Interface)
- Output & Recirculate Mode
- Output & Clear Mode
- Fill & Continue Mode
- Fill & Stop Mode

SPECIFICATIONS

- General

Memory Capacity	2560 words
Word Length	8 bits
Input Word Rate	Up to 100 megawords per second
Output Word Rate	4 Megawords per second with internal clock — 0 to 4 Megawords per second with external clock

• Input Data Format	Bit parallel, word serial
Output Data Format	Bit parallel, word serial (sequential . . . first in, first out)

- Input Control Signals

Write Clock (EOC Pulse)	Falling edge of ADC End of Conversion (EOC) pulse (ECL logic)
External Read Clock	0 to 4 MHz buffer read clock from CPU
Output And Recirculate	Output and Recirculate enable from CPU (TTL logic)
Output And Clear	Output and Clear enable from CPU (TTL logic)
Fill And Continue	Continuous Fill enable from CPU (TTL logic)
Fill And Stop	Fill and Stop enable from CPU (TTL logic)
External Stop	External Stop signal from CPU (TTL logic)

- Output Control Signals

Buffer Full	Logic level from memory (TTL logic). Occurs on first occurrence of location 2560 write (load), in Fill And Stop mode only.
Buffer Empty	Logic level from memory (TTL logic). Occurs on location 2560 read (empty), in Output And Stop mode only.
Output Strobe	One data word outputted for each strobe (TTL logic)

- Operating Modes

Write Memory	1. Fill and Stop — normal sequencial write and terminate on Buffer Full signal (2560 words stored) 2. Fill and Continue — sequential over-write until terminated by External Stop signal from CPU
Read Memory	1. Output and Clear — normal sequential read and clear, terminating on Buffer Empty signal (2560 words outputted) 2. Output and Recirculate — sequential read and circulate until terminated by External Stop signal from CPU

Base price: MEM 1108-100/2560: $9978.00

NEW AND EXCLUSIVE A/D CONVERTER features:
High Speed: 4 μsec. High Resolution: 15 Bits. High Accuracy: ±0.0065% of FSR

Phoenix Data's new Model ADC1215F A/D converter is a high-performance design with a total conversion time of 4 microseconds (250,000 conversions per second), a resolution of 15 binary bits (1 part in 32,767), and guaranteed accuracy of ±0.0065% of FSR in addition to complete monotonicity. Analog dynamic range is in excess of 86 db. Model ADC1215F is available in two basic models: single-ended and differential. The ADC1215F utilizes a single fold-back technique in conjunction with successive approximation conversions to achieve an equivalent conversion rate of 267 nanoseconds per bit.

Model ADC1215 is identical with the ADC1215F except that conversion time is 10 microseconds.

ADC1215F SPECIFICATIONS

ENCODING (Digital Quantizing)

Number of Bits	15 binary bits
Accuracy (% of Full Range)	0.0065%
Temperature Coefficient	±10 PPM/°C
Resolution	1 part in 32,767
Conversion Time (Total)	4.0 microseconds

ANALOG INPUT SIGNAL

Standard Full Range	±10V
Connection	Single Ended or Diff. Opt.
Input Impedance	100 Megohm
Overvoltage	±15V, Maximum

CONTROLS, INPUTS AND OUTPUTS

Output Codes	2's Complement and Offset Binary
Logic Levels	TTL/DTL
Data Output Drive	Full TTL capability
Output Data	Stored until updated at end of conversion
Command to Convert	Conversion is initiated on leading edge of positive going pulse.
Busy Output	Goes true at CTC and False at End of Conversion
End of Conversion	Pulse goes true at End of Conversion 100 nanoseconds duration
Overrange	Output goes full scale and overrange bit goes true

ENVIRONMENTAL

Temperature/Operating	0°C to +70°C
Temperature/Storage	—55°C to +100°C
Humidity	0 to 99% Relative, non-condensing

POWER REQUIREMENTS
+15V, ±5% @ 150 MA • —15V, ±5% @ 75 MA • +5V, ±5% @ 900 MA

Base price:
1215 $1,208.00
1215F $1,813.00

Prices subject to change without notice.

For additional information, contact your local Phoenix Data, Inc. representative.

Prices subject to change without notice.

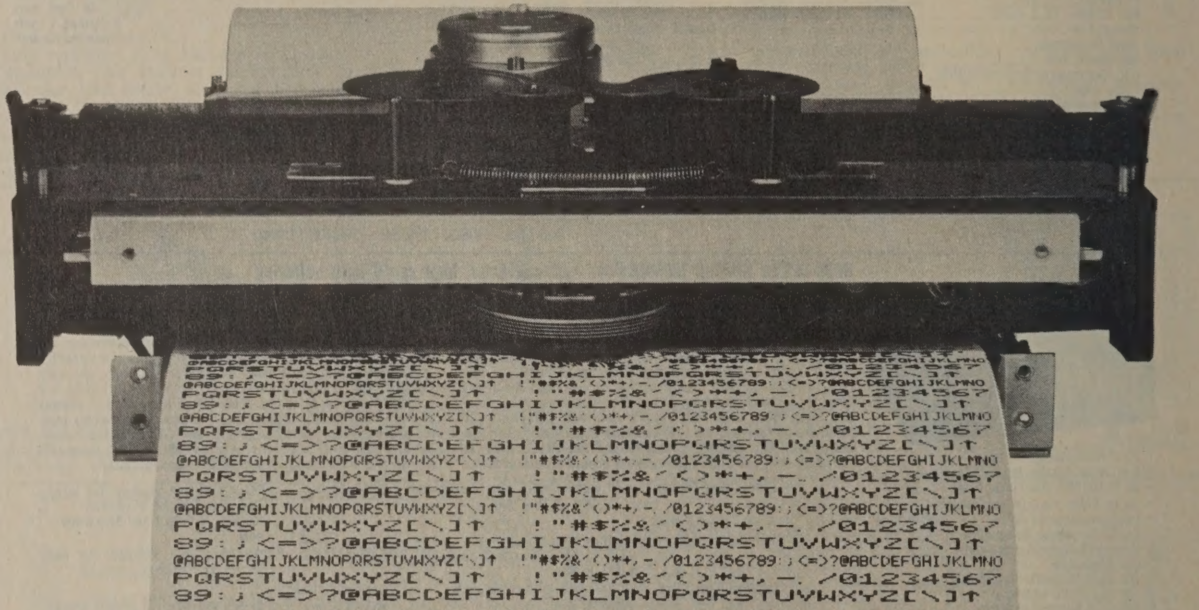
®/PHOENIX DATA, INC.

3384 W. OSBORN RD. PHOENIX, AZ 85017
Ph. (602) 278-8528, TWX 910-951-1364

DMTP-6 uP

Microprocessor Controlled Dot Matrix Impact Printer

Get everything in a Rugged Printer that money can BUY Including a built-in Microprocessor Controller



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This new addition to our DMTP-6 series printers provides a built-in microprocessor controller. Designed with the OEM user in mind, the printer provides a medium speed, matrix impact print head and controller for one low price.

Add up the advantages: 80-96 columns at 110 CPS of both data and text on standard 8½″ roll paper — that prints 1-4 copies at a clip — that can print fan-fold forms and labels — and that combines easily replaceable ink rollers with a self reversing 10 million character life ribbon.

Equally remarkable, where else can you find a budget printer with an integral microprocessor that not only provides a choice of such interface functions as parallel ASCII, RS-232C/I-Loop and switch selectable baud rates from 110 to 1200, but includes all needle drivers and required diagnostic routines as well. Where else, but at Practical Automation! For more details request bulletin #922.

The Practical Automation printer family includes ticket printers, text or data printers, print heads and printer sub-assemblies, all designed for the OEM who demands high quality and low prices. For more details call or write today.

P A

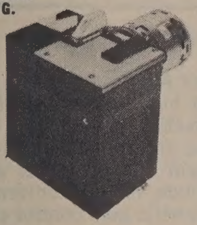
PRACTICAL AUTOMATION, INC.
Trap Falls Rd., Shelton, CT 06484
Tel. (203) 929-5381
Telex 96-4217

PRECISION TAPE PERFORATORS

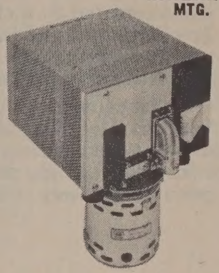
TAPE PERFORATORS

75 OR 120 CHARACTERS PER SECOND

VERTICAL MTG.



HORIZONTAL MTG.



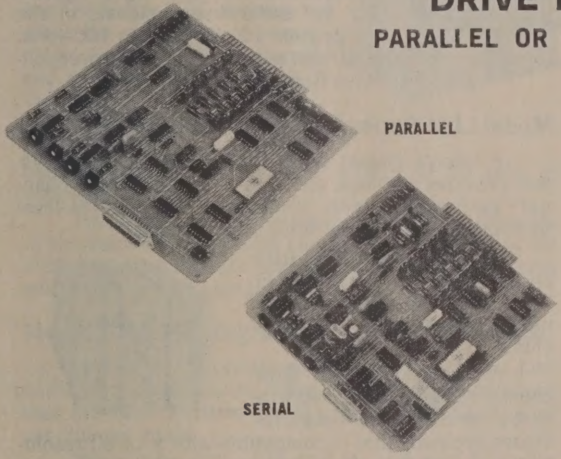
120 CHAR/SEC with QUIET COVER

PMC synchronous tape perforator mechanisms for front or behind panel applications punch 1, 7/8 and 11/16 inch wide mylar or paper tapes interchangeably in 5, 6, 7 or 8 level codes.

- Model P7501 for 75 char/sec, P1201 for 120 char/sec.
- Positive motor driven punching, punch retraction, and sprocket tape drive for highest reliability.
- Punch head assembly replaceable in minutes for effortless long term maintenance.
- All models complete, ready to be mounted, punch on application of 115 V, 60 Hz motor power and timed DC pulses.
- Sound absorbing cover for office environment front panel 120 char/sec punching.

DRIVE ELECTRONICS

PARALLEL OR RS232-C SERIAL INPUTS



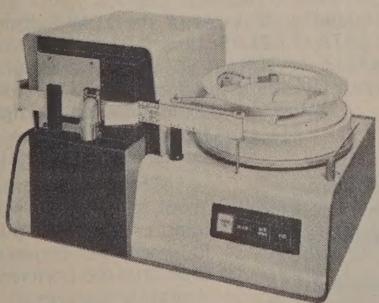
PARALLEL

SERIAL

For driving PMC tape perforator mechanisms from synchronous or asynchronous logic level inputs. Perforator starts up automatically on arrival of first character, data buffering for true asynchronous operation, automatic shut down.

- Part numbers PPE7501 and PPE1201 for parallel inputs and SPE7501 and SPE1201 for serial inputs match PMC 75 and 120 char/sec perforators.
- Boards interchangeable for choice of serial or parallel inputs.
- Punch inhibit circuits for tape out, loading and back space.
- Serial boards provide even or odd parity, parity error signal, and LED driver outputs for receive data, carrier detection, and data ready lines.

TAPE PERFORATOR SYSTEMS



PMC desk or panel mounted tape perforator systems combine PMC 75 or 120 char/sec perforators with PMC plug-in parallel or serial drive electronics and tape handling, roll or fan fold.

- Basic Model TPS-2000.
- Quiescent on-line operation with automatic start-up on first input datum.
- Data buffering for true asynchronous operation, zero to maximum punch speed.
- Interchangeable plug-in electronics for serial or parallel input data.
- Jumper selection of 115 V, 60 Hz or 230 V, 50 Hz power.

PRECISION MECHANISMS CORPORATION
44 BROOKLYN AVENUE, WESTBURY, L.I., NEW YORK 11590 • (516) ED 3-5955

PRESTON

ANALOG-TO-DIGITAL

For the Highest Accuracy

GMAD Series Analog-to-Digital Converters

Here are the world's most reliable Analog-to-Digital Conversion Systems with speed and resolution to meet the needs of every instrumentation and data conversion system.

From the 'world's fastest high resolution ADC'—the GMAD-01 — to the new 'low cost' GMAD-4 that can be easily expanded to over 1000 analog input channels at less than $25 per channel, Preston's GM Series of ADCs are delivered with exactly the right amplifiers, multiplexers, controls, indicators and interface features to give your system the ultimate in accuracy, flexibility and efficiency!

And every model in the GM Series comes complete with integral power supplies and interface connectors — ready to install in a standard 19 inch wide rack.

With the GM Series of ADCs, you have a complete selection of low-level and high-level analog amplifiers and multiplexers. This versatile input system is further complemented by a choice of several Sample-and-Hold Amplifiers and special gain scaling buffer amplifiers whose configurations include manual or remote programmed address and automatic gain control capability.

For complete information including detailed specifications, block diagrams, timing charts and examples of overall system performance, call or write Preston Scientific. We'll send you our "Specifying Guide" and include price and delivery information, too!

Preston's ADCs interface with all types of analog input signals —

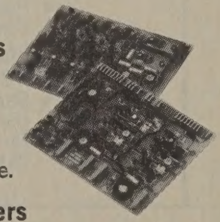
Model GMM Multiplexers

Available with both single-ended and differential inputs, GMM Multiplexers provide a common output line isolated from all other signals by 2000 Megohms.

Expandable to over 1000 channels as system requirements grow, Model GMM Multiplexers specifications include —

Input Impedance	Greater than 50 Megohms
Switching Time	Less than 1 microsecond
Input Offset Current	Less than 10 nanoamps
Input Voltage	Up to ±10 volts
Crosstalk	Less than ±0.01% for 100 channels
Linearity	±0.01% of Full Scale
Zero Drift	Less than ±0.01% of F.S.

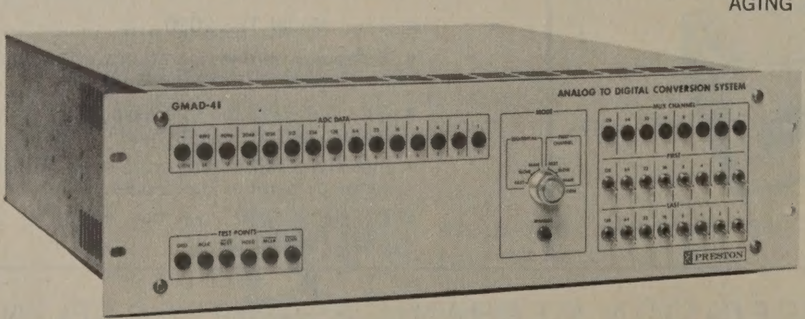
Model GMD-PG and GMD-ADC Programmable Gain Amplifiers



These gain scaling amplifiers are specifically designed for Analog-to-Digital Conversion applications where the full scale amplitude of the input signals vary over a wide range.

Model 8300 XWB Series Amplifiers

For the ultimate in accuracy, reliability and system flexibility, the exclusive "Balanced Precision" performance of the 8300 XWB Series Amplifier is unsurpassed. Models are available with both manual and remotely programmed gain and filter selection on a per-channel basis for use in ADC systems.

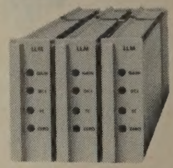


Model GMD Amplifier-Multiplexers

This card-mounted amplifier-multiplexer provides a low-cost amplifier-per-channel input signal system for full scale analog signals in the range from 10 millivolts to 100 volts. Optional output filters cover frequencies from 1 Hz to 60 kHz.

Model LLM Series Low Level Multiplexers

Preston's newest multi-channel analog input system provides the high accuracy of "amplifier-per-channel" performance with transformer isolated low-level multiplexing at channel rates up to 50 kHz.



Gain accuracy, stability and linearity are all within ±0.01% of full scale, and the input impedance is 100 Megohms.

As many as 2048 data channels can be combined in a single system. Performance includes accuracy that is compatible with a 14 bit resolution ADC and provides a CMR of 130 db at 60 Hz with a 350 volt CMV. Stability specifications include a Zero TC of less than 0.1 uV/°C RTI and 0.1 MV/°C RTO, resulting in the same "Balanced Precision" specifications that are the hallmark of Preston's famous instrumentation amplifiers.

Outstanding features of the LLM System include INPUT DATA FILTERS from 10 Hz to 30 kHz, PROGRAMMABLE GAIN from 1X to 1000X on a per-channel basis (gain memory optional), and DIGITAL AVERAGING using the ADC as a digital filter (programmable on a per-channel basis with optional memory).

There's a lot more to tell about how Preston's LLM Systems provide the ultimate in low-level A-D conversion with sophisticated performance and operating features at moderate cost, so please request our comprehensive 12-page brochure for the complete LLM System story.

CONVERSION SYSTEMS
in Data Acquisition Systems

PRESTON

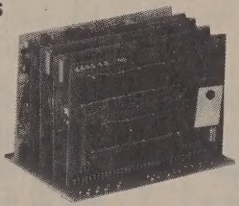
Five Models Are Included In the GMAD Series To Provide An Exceptionally Wide Range of Speeds and Resolutions.

Resolution	Accuracy (% of F.S. ±½ L.S.B.)	Conversion Time				
		GMAD-01	GMAD-1	GMAD-2	GMAD-3	GMAD-4
14 binary bits + sign	0.010%	*	1.5 μsec	5.0 μsec	10 μsec	20 μsec
13 binary bits + sign	0.015%	*	1.4 μsec	4.5 μsec	9 μsec	19 μsec
12 binary bits + sign	0.025%	0.5 μsec	1.2 μsec	4.0 μsec	8 μsec	18 μsec
11 binary bits + sign	0.05%	0.4 μsec	1.0 μsec	3.5 μsec	7 μsec	17 μsec
10 binary bits + sign	0.1%	0.3 μsec	0.3 μsec	3.0 μsec	*	16 μsec
9 binary bits + sign	0.2%	0.2 μsec	0.2 μsec	2.5 μsec	*	*
8 binary bits + sign	0.4%	0.1 μsec	0.1 μsec	2.0 μsec	*	*
7 binary bits + sign	0.8%	*	0.1 μsec	1.5 μsec	*	*
4-digit BCD and sign	0.01%	*	*	10 μsec	40 μsec	*
3-digit BCD and sign	0.1%	*	*	8 μsec	32 μsec	*

*These configurations not available

and all types of digital output, control and computer signals, too.

Digital-to-Analog Converters



Module-mounted multichannel digital-to-analog converters are also available in the GM Series ADC systems to make the generation of analog data simulation as accurate and reliable as the basic A-D converter.

Specifications include 15 bit resolution and accuracy, update rates to 500 kHz and outputs of 10 volts or 100 volts full scale.

These modules are designed to be installed within the standard GM Series chassis, and the outputs are available on rear-panel connectors for easy interfacing with other system components.

Model GMDSRC Digitally Programmable Clock

This optional crystal-based scan rate clock permits selection of a wide range of multiplexing rates so that the ADC system's speed can be optomized on a per-channel basis.

The multiplexing rate can be reduced from the maximum clock rate in a series of binary steps that are controlled from either a remote 15 binary address or from a series of front-panel switches.

The GMAD-1 ADC System shown here is equipped with these clock address controls, a series of lights that indicate the binary clock address being used to control the scan rate clock, controls for multiplexer first- and last-channel limits (GMC Logic System) and address switches to enter gain address for GMD-PG/AGC Gain Scaling Amplifiers.

Front panel indicators also provide ADC Data and Currently Addressed Channel as a LED binary display.

Logic Interface To Your Computer

Direct interfacing with your computer or controller can now be made an integral part of every GMAD Series A/D Conversion System. Preston can include plug-in logic and control modules that provide the right sequencing and logic levels to match your particular computer system.

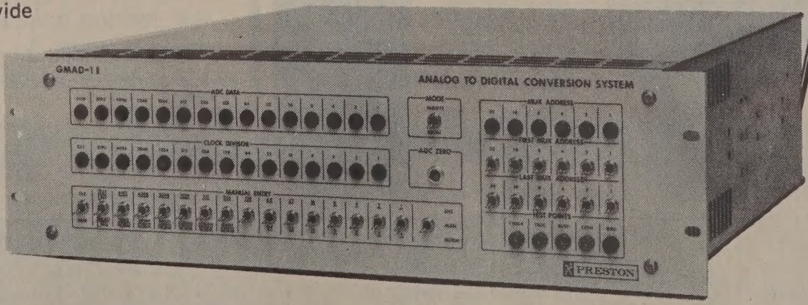
Just let us know the type of computer you plan to interface with our ADC, and we'll provide all the 'hand-shaking' signals you need.

If you're using a DEC PDP-11, HP 2100, Varian V-73, Data General NOVA or other similar computers, we already have the interface system ready to install, and we'll even provide the interconnecting cables!

Save yourself time, trouble and expense. Call or write Preston Scientific for details. We'll make certain you get a complete GMAD ADC System — ready to operate the first day it arrives!

PRESTON SCIENTIFIC INCORPORATED
805 East Cerritos Avenue,
Anaheim, California 92805
Telephone: (714) 776-6400
TELEX 65-5321

PRESTON



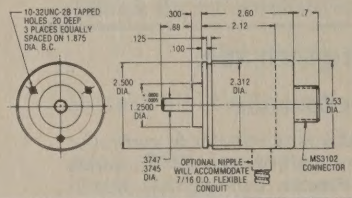
OPTICAL ENCODERS

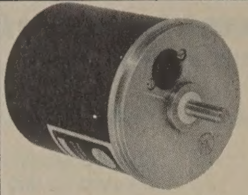
INCREMENTAL ENCODERS

MODEL 25HD

- A heavy duty industrial type encoder.
- .375'' stainless steel shaft running in Class 7 bearings.
- Shaft seal available.
- Heavy steel cover sealed against dust, oil and moisture.
- Optional conduit adapter for cabling directly to OEM Equipment.
- Available with direction sensing X1, X2, X4.

FIGURE 1: MODEL 25HD


10-32UNC-28 TAPPED HOLES .20 DEEP 3 PLACES EQUALLY SPACED ON 1.875 DIA. B.C.
.300
.88
2.60
2.12
.7
.125
.100
2.500 DIA.
2.312 DIA.
1.2500 DIA.
2.53 DIA.
.3747 .3745 DIA.
OPTIONAL NIPPLE WILL ACCOMMODATE 7/16 O.D. FLEXIBLE CONDUIT
MS3102 CONNECTOR



MODELS 25T,S,L

- General application type encoder.
- .250'' stainless steel shaft running in Class 7 bearings.
- Shaft seal available.
- Direction sensing X1, X2, and X4 available in 25S and 25L only.

FIGURE 2: MODEL 25T

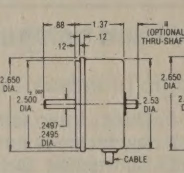
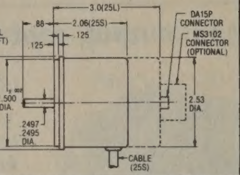
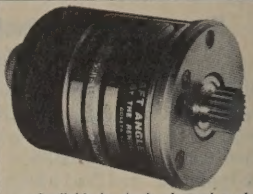

.88
1.37
.12
.12
(OPTIONAL THRU-SHAFT)
2.650 DIA.
2.500 DIA.
2.53 DIA.
.2497 .2495 DIA.
CABLE

FIGURE 3: MODELS 25S AND 25L

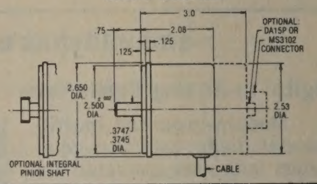

3.0(25L)
.88
2.06(25S)
.125
.125
DA15P CONNECTOR
MS3102 CONNECTOR (OPTIONAL)
2.650 DIA.
2.500 DIA.
2.53 DIA.
.2497 .2495 DIA.
CABLE (25S)



MODEL 25XH

- Available in single channel or dual selectable channel.
- Frequently used for machine tool applications where selection between English and Metric scale readout is required.
- Basic disc count is available multiplied by 1, 2 or 5 to achieve high resolutions to 12,700.
- Addition of direction sensing X4 provides resolution to 50,800.
- .375'' stainless shaft or integral pinion shaft mounted in Class 7 bearings.

FIGURE 4: MODEL 25XH

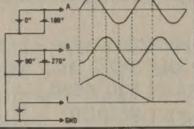

3.0
.75
2.08
.125
.125
OPTIONAL: DA15P OR MS3102 CONNECTOR
2.650 DIA.
2.500 DIA.
2.53 DIA.
.3747 .3745 DIA.
OPTIONAL INTEGRAL PINION SHAFT
CABLE

Supply Voltage: +5VDC ±5%
Current Requirements (Typical): 125 ma (Sinewave), 200 ma (TTL)
Output Format: 2 channels in quadrature, ± 27° electrical at 10KHz.
Output Options 25T, S, L and HD:
- Complement and index available
- Back to Back Sinewave (Figure 5)
- Differential Sinewave (Figure 6)
- TTL Options include: SN7406, SN7433 and SN74128

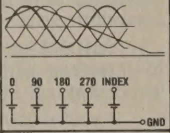
Output Options 25XH:
- Complement available (No index)
- TTL Output from SN7406

Frequency Response: TTL Output: 50KHz typical; Sinewave: See Figure 7.
Lamp: 40,000 hour incandescent
Operating Temperature: 0 to +70° standard.
Storage temperature: -40 to +90°C.
Humidity: 98% RH
Vibration: 5 to 2000 Hz at 20 G's
Shock: 50 G's for 11 MS

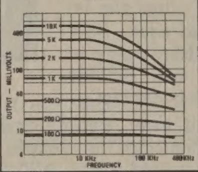
BACK TO BACK PHOTOCELL
FIGURE 5


0°
180°
A
90°
270°
B
I
GND

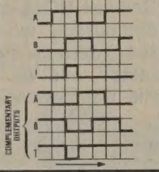
DIFFERENTIAL PHOTOCELL
FIGURE 6


0
90
180
270
INDEX
GND

PHOTOCELL OUTPUT VS FREQUENCY
FIGURE 7



TTL OUTPUT WAVE RELATIONSHIP
FIGURE 8


A
B
I
COMPLEMENTARY OUTPUTS
A
B
I

MECHANICAL SPECIFICATIONS

PARAMETER	UNIT	MODEL 25HD	MODEL 25T	MODEL 25S & 25L	MODEL 25XH DUAL SELECT	MODEL 25XH SINGLE CHANNEL
CONFIGURATION		FIGURE 1	FIGURE 2	FIGURE 3	FIGURE 4	FIGURE 4
SHAFT LOAD, RADIAL (MAX.)	KG	16	.9	.9	1.8	1.8
	POUNDS	35	2	2	4	4
SHAFT LOAD, AXIAL (MAX.)	KG	18	1.4	1.4	2.7	2.7
	POUNDS	40	3	3	6	6
SHAFT RUNOUT, RADIAL (MAX.)	MM(TIR)	.0076	.0076	.0076	.0050	.0050
	IN. (TIR)	.0003	.0003	.0003	.0002	.0002
SHAFT TORQUE (MAX.)	GM-CM	22	3.6	3.6	14.5	14.5
	OZ.-IN.	.3	.05	.05	.2	.2
INERTIA	GM-CM^2	26	24	24	23	23
	OZ.-IN.-SEC^2	39×10^{-5}	35×10^{-6}	35×10^{-6}	33×10^{-5}	33×10^{-5}
WEIGHT (MAX.)	KG	.5	.25	.38	.38	.38
	POUNDS	1	.5	.75	.75	.75
MAX. RESOLUTION	CYCLES PER REV.	2500 ①	1250	2500 ①	12700/10000 ①	12700 ①

① RESOLUTIONS CAN BE INCREASED BY FACTORS OF 2 OR 4 WITH ADDITION OF DIRECTION SENSING OPTION.

ABSOLUTE ENCODERS

Renco's absolute encoders are designed for universal application...covering industrial, military and aerospace applications. Most Renco absolute encoders are low cost, high precision. Outputs are furnished in parallel form in Cyclic Gray Codes, Natural Binary, or any of the XS or 8421 BCD codes. Other non-linear codes are available and serial outputs can be offered as an option. Encoders can be provided with or without electronics, internally or externally. Most encoders operate from a single +5VDC input and provide a TTL interface.

DETAILED SPECIFICATIONS:

For 9 to 13 bit Gray Code and Natural Binary ask for A72365 or A72174 (HD). For 1 to 8 bit Gray Code and Natural Binary ask for A72640. For XS3/XS14 Cyclic Gray Code or BCD 8421, TTL Output ask for A71049 or A72421 (HD).

New, low cost size 25 8-bit absolute position optical encoder. 1 to 8 bits Gray Code or Natural Binary with latch. Available in HD Model.

BCD
2500 XS3/XS14, 8421 BCD, 99, 359, 999, 1999, 3599. Also available in HD Model.

GC/NB
2500 Series Gray Code or Natural Binary up to 13 bits TTL Output or Photocell Output, available in HD Model.

SHAFT ANGLE
RENCO
MODEL NO.
OPTIONS

MODULAR ENCODERS

Renco's KT series Modular Optical Encoder/Tachometer kits are aligned and preadjusted at the factory for peak output and quadrature phasing. Installation can be accomplished using only a screwdriver and allen wrench. This is made possible with Renco's exclusive (pat. pending) alignment plate mounted in its proper relationship to the shaft.

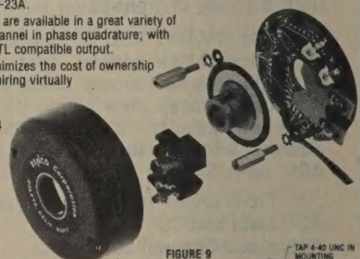
Renco's illumination system with its high efficiency optical components provides nearly ten times the output over a greater frequency range than found in other motor-tach kits.

Renco's low profile design provides the same outline size with or without TTL compatible electronics. 2.25'' diameter by .75'' high for the KT-23A.

Renco Modular Optical Encoder/Tachometer kits are available in a great variety of resolutions and output options: single or dual channel in phase quadrature; with or without zero index output; sensor output or TTL compatible output.

The ease with which Renco kits are installed minimizes the cost of ownership by permitting the use of unskilled labor and requiring virtually no capital equipment for installation purposes.

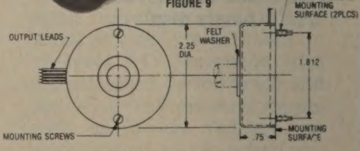
Ask for Specification A71945, A71955TTL, A72424 Differential Push-Pull Sinewave, A72624 Back to Back Push-Pull Sinewave.


Renco Corporation

DETAILED SPECIFICATIONS:

Hub Bores: .025, .031, .037, .05 diameter
Resolution: Up to 1000 cycles
Output: TTL or Sinewave
Supply Voltage: +5VDC ±5%
Current: 125 ma Sinewave, 200 ma TTL
Operating Temperature: 0 to +70°C standard
Illumination Source: 40,000 hour incandescent lamp
Sensors: Silicon Photovoltaic

FIGURE 9

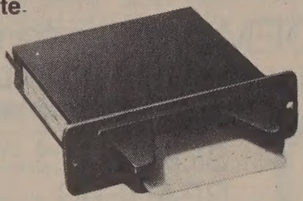

TAP 4-40 UNC IN MOUNTING SURFACE (2PLCS)
OUTPUT LEADS
FELT WASHER
2.25 DIA.
1.812
MOUNTING SCREWS
.75
MOUNTING SURFACE

RENCO CORPORATION

Santa Barbara Research Park • 26 Coromar Dr. • P.O. Box 246 • Goleta, CA 93017
Phone 805/968-1525 TWX 910-334-1180

CARD AND BADGE READERS

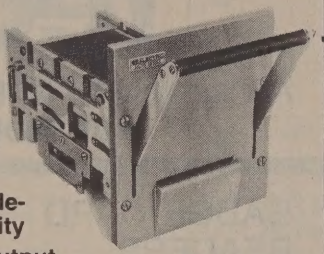
SOLID STATE BADGE READERS



- Completely solid state. One moving part
- Reads up to 22 Columns, 12 rows, Alpha-Numeric
- Absolute validation of readings
- Compact, low-cost

An ultra-reliable badge reader for time-clock, production floor data collection, security systems and other data station requirements. Reads complete Hollerith information. Provides column strobe for every column regardless of punched data. Cannot be "teased," misoriented, or otherwise fooled. Serial data output.

STATIC CARD READERS

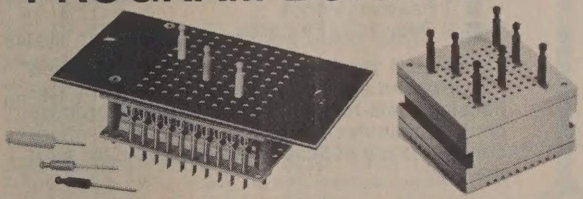


- 80 or 51 column x 12 row models
- Static. Data remains in "read" mode until card is removed
- Redundant contact designs assure reliability
- Discreet input and output at every data position

The best for heavy industrial use. Single transaction readers, manually operated with heavy duty mechanisms for long life. Buss bars available for rows or columns or both. Complete interlock systems to eliminate misinformation from incorrectly positioned documents.

PROGRAMMING DEVICES

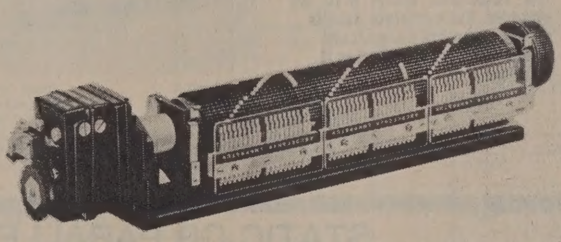
PROGRAM BOARDS



- Individual contacts for each position. No interaction
- Complete range of accessories for every type of programming
- Available in .250", 4mm, or .100" c-c spacing, in any number of holes

The economical, simple way to program, switch, or test any signals. Simple electrical matrix that can be interconnected by shorting or diode pins. Ideal for process control, machine control, sequential testing and dozens of other applications. Direct readout or program at all times.

PROGRAM SWITCHES



- 60 programs on drum. Up to 60 circuit control
- Manual, time based, or stepper drives
- 1 Amp, 7 Amp or 15 Amp carrying capacity

Extra compact programming capability at reasonable cost with high reliability. Simply set programs with inserts on each line of 60 position drum. Programs will run sequentially either on real time base, manually, or upon command from process feedback.

SEALECTRO

PROGRAMMING DEVICES DIVISION

SEALECTRO CORPORATION

MAMARONECK, NY 10543 PHONE: 914 698-5600 TWX: 710-566-1110

Sealectro West: 14011 Ventura Blvd., Suite 215, Sherman Oaks, CA 91423, (213) 990-8131
1901 Old Middlefield Way, Suite 19, Mountain View, CA 94043 (415) 965-1212
Sealectro Ltd., Portsmouth, Hants, England
Sealectro S.A., Zone Industrielle Toulon Est, 83087 Toulon Cedex, France

CIRCUIT COMPONENTS ■ R. F. COMPONENTS ■ PROGRAMMING DEVICES

TAURUS punched card readers STATIC/PARALLEL... SERIAL... SERIAL/PARALLEL

A complete line of readers for OEM and system applications

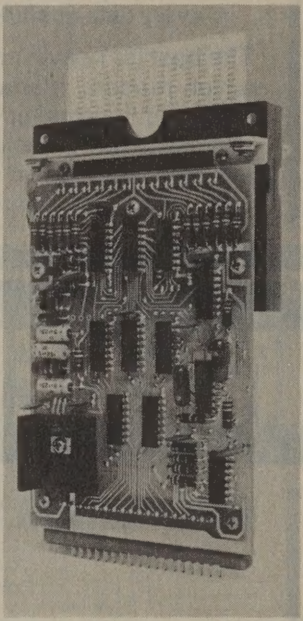
FOR INDUSTRIAL, COMMERCIAL, INSTITUTIONAL USES

BADGE/CARD READERS

New Series H . . .
4 standard models

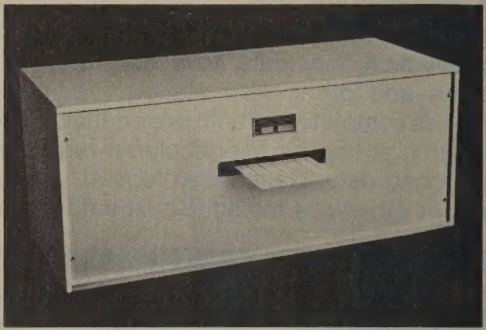
Read cards/badges of up to 12 rows and 10, 20, 30, or 68 columns. Optical reading with no moving parts, ensuring error-free readout, long life, minimum maintenance. Completely self-contained. To operate, merely insert badge or card fully and withdraw. Readout is character (column) serial, bit (row) parallel.

Particularly suitable for security and access-control applications. Can easily replace less satisfactory readers in existing installations. Designed for OEM and system applications. Custom-feature models can be supplied.



The 10-column Model H-10 is pictured. For complete details on our complete badge/card reader line, request Series H Catalog.

SERIAL READERS



Read cards one column at a time. Photo-electric hole sensing. Solid-state logic or relay output. With or without hopper feed. Free-standing or panel-mount. Various output formatting . . . bit parallel, ASCII, teletype, etc. In use since 1967.

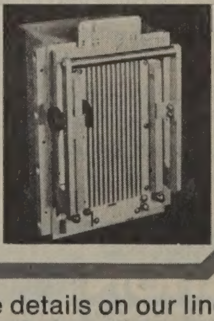
- 168 standard options. Custom options also available.
- 6 Card-Handling Modes
- 7 Readout Modes
- 3 Data-Valid Features

These card readers are specifically designed for OEM and systems applications in the warehousing, data-handling, industrial and process control, manufacturing and other fields where conditions are not especially favorable for card readers.

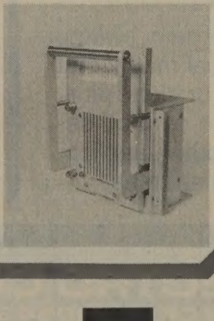
STATIC OR PARALLEL READERS . . . 3 MODELS

Read all or part of an IBM card in parallel. Put card in, push handle. HOLE . . . closed switch. NO HOLE . . . open switch. (Opposite can also be provided.) Contacts not through the card. Reliable indirect switching. All switching at one time. Thousands in use since 1956.

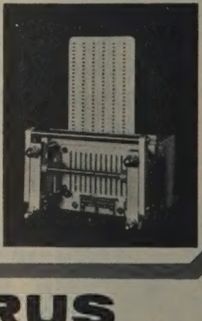
MODEL
M-4A
up to 80 columns



MODEL
JM-4A
up to 40 columns



MODEL
CM-20
specifically designed for stacker cranes



For complete details on our lines of serial and static/parallel readers, request Punched Card Readers Catalog.

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SOLID STATE S/D, D/S CONVERTERS—MUX SYSTEMS

	Input Availability	Output	Static Accuracy	Size
TRACKING SYNCHRO/RESOLVER TO DIGITAL. Series 1651: Miniaturized, fully isolated unit tracks 16 RPS Jitter Free. Full autoranging available.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	14 bits binary parallel TTL, DTL compatible.	±4′	3.125″ x 2.625″ x 0.82″
14 BIT SYNCHRO OR SIN/COS TO DIGITAL. Series 1623F: Includes ±5° offset capability. Miniaturized, solid state unit that converts synchro or resolver inputs into binary or BCD data. Can accept FLUX VALVE inputs.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	14 bit parallel binary 4 decade BCD, or **Both.** TTL, DTL compatible.	±4′	3.125″ x 2.625″ x 0.82″
TWO SPEED SYNCHRO-TO-DIGITAL. Series 1510: Accepts either binary or nonbinary gear Ratios from a two speed synchro system.	36:1, 18:1, 9:1, 16:1	Up to 19 bits binary parallel.	±0.08′	3.125″ x 2.625″ x 0.82″
MULTIPLEXED SYNCHRO-TO-DIGITAL. Series MUX: Simple, noise immune, small and inexpensive Modular system, up to to 128 channels.	Any combination of Synchros and Resolvers.	14 bits binary parallel 75 μs conversion.	±4′	3.125″ x 2.65″ x 0.82″ + 1.85″ x 0.85″ x 0.82″ per channel
ANGLE POSITION INDICATOR, SOLID STATE. Series 2623: Includes ±5° offset capability. Rugged, compact, accurate and economical. With or without built-in power supplies. Internal reference available.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	Readout: 3599, ±179.9 or 9999. Others available.	±0.1°	5.5″ x 1.75″ x 5.5″ deep
SYNCHRO OR SIN/COS TO LINEAR DC. Series E678-1637: Converts all standard synchro or resolver inputs to linear DC output proportional to the angle. Switching point is non-ambiguous. All models are short circuit proof. Various output formats available.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	**E678:** ±10VDC for angles −180° to +180°. **1637:** ±10VDC for angles −89.5° to +89.5°.	6′, 15′, 30′ or 1°	**E678:** 3.625″ x 3.06″ x 0.82″ **1637:** 2.53″ x 3.22″ x 0.82″
SYNCHRO/RESOLVER TO SINE-COSINE DC. Series 655/697: Generates sine and cosine DC outputs proportional to the angle.	Freq.: 60 or 400Hz L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115	−10 volts to +10VDC, representing the sine and cosine of the input angle.	±6′	**400Hz:** 1.85″ x .85″ x .82″ **60Hz:** 3.1″ x 15″ x .98″
SYNCHRO TO SINE-COSINE DC (non-variant). Series 655NV: Generates sine and cosine DC outputs proportional to the input angle. Insensitive to synchro reference and line voltage. Ideal for displays.	Freq.: 60 or 400Hz L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115	−10 volts to +10VDC representing the sine and cosine of the input angle.	±6′	3.44″ x 3.19″ x 0.82″
SYNCHRO TO SINE/COSINE DIGITAL. Series 655 NVD:	Freq.: 60 or 400Hz L-L V_{RMS}: 11.8 or 90	14 lines sine and cosine plus quadrant signs.	±5′	PC: 4.5 x 8″ x 1″
DIGITAL-TO-SYNCHRO/RESOLVER. Series 1673: Miniaturized, 2 watts, short circuit proof output. 1% Max. amplitude variation.	14 bits parallel, positive Logic, TTL levels binary coded angle.	Freq.: 50Hz to 10KHz L-L V_{RMS}: 5 to 90 Ref. V_{RMS}: 10 to 115	±4′	3.125″ x 2.625″ x 0.82″
DIGITAL-TO-SYNCHRO/RESOLVER, Series A1670: High power, solid state device converts a 14 bit input into either a 3 wire synchro or 4 wire resolver output. Overload and short circuit protected.	14 lines representing angles 0 to 360°.	L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115 Freq.: 60Hz or 400Hz	±4′	PC: 4.5″ x 8″ x 1.0″
ACP TO SINE/COSINE DC (non-variant). Series 1502:	4096 ACP & 1 ARP	±10VDC, representing the sine and cosine.	±5′	PC: 4.5″ x 4.5″ x .82″
ACP TO SYNCHRO. Series 1502-1:	4096 ACP & 1 ARP	See Model 1673.	±5′	PC: 4.5″ x 4.5″ x .82″
DIGITAL TO SINE COSINE DIGITAL. Series 1500:	14 lines representing angles 0 to 360°.	12 bits sine and cosine, also quadrant signs.	±2′	3.0″ x 4″ x 0.4″
DIGITAL TO SINE COSINE DC (non-variant). Series 1501: 1% max. amplitude variation.	14 lines representing angles 0 to 360°.	±10VDC, representing the sine and cosine of the input angle.	±4′ or ±15′	3.125″ x 2.625″ x 0.82″
DIGITAL-TO-RESOLVER. Series 1503: 1% max. amplitude variation.	14 bit input representing angles from 0 to 360°.	2 AC voltages, 20V P.P, representing the sine and cosine of the input angle.	±4′	3.125″ x 2.625″ x 0.82″
CONTROL TRANSFORMER, SOLID STATE. Series 1682: Fully transformer isolated unit. 1% max. amplitude variation.	Synchro and 14 bits Natural parallel binary.	±5 V_{RMS} representing ±12.5°.	±4′	3.125″ x 2.626″ x 0.82″
CONTROL DIFFERENTIAL TRANSMITTER, SOLID STATE. Series 1681: 1% max. amplitude variation.	Synchro and 14 bit Natural parallel binary.	6.5 V_{RMS}, sine/cosine.	±4′	3.125″ x 2.625″ x 0.82″
SINE-COSINE TO SYNCHRO DRIVERS. Series B676: Solid state device designed to handle large current surges of TR's. Will drive three 11TR4s to a low null. Overload and short circuit protected.	±10VDC, representing the sine and cosine of the required angle.	L-L V_{RMS}: 11.8 or 90 Ref. V_{RMS}: 26 or 115 Freq.: 60Hz or 400Hz	±10′	PC: 4.5″ x 8.0″ x 1″
LINEAR DC TO SINE-COSINE DC. Series C670: Converts a D.C. voltage, representing an angle, into two output voltages that are proportional to the sine and cosine of that angle.	±10VDC representing angles from −180° to +180°	$K \sin\theta$ and $K \cos\theta$ K = 10VDC	±10′	3.44″ x 3.19″ x 0.82″
COORDINATE ROTATOR. Series A689: Accepts rectangular inputs (X and Y) and rotates these coordinates through an angle that is proportional to a linear DC input.	$X = R \cos\theta$ $Y = R \sin\theta$ R = ±20MV to ±10VDC	$R \sin(\theta + \beta)$ $R \cos(\theta + \beta)$	±10′	3.19″ x 3.44″ x 0.82″
POLAR TO RECTANGULAR. Series A1618: Converts polar coordinates (R, θ) into rectangular (X, Y).	R: ±10VDC θ: ±10VDC	$X = R \cos\theta$, $Y = R \sin\theta$, R = ±20MV to ±10VDC	±10′	3.19″ x 3.44″ x 0.82″
RECTANGULAR TO POLAR. Series 695: Converts rectangular coordinates (X, Y) into polar (R, θ). Switching point is non-ambiguous.	$X = R \cos\theta$ $Y = R \sin\theta$	$R = \sqrt{X2 + Y2}$ $\theta = \tan^{-1} Y/X$	±10′	3.19″ x 3.44″ x 1.78″
COMPUTING DEMODULATORS. Series 840, 854: Fully isolated. Proportional phase sensitive bipolar output.	840: 0 to 5 V_{RMS} 854: 0 to 20 V_{RMS}	0 to ±4.3VDC 0 to ±10VDC	0.1% 0.1%	**840:** 1.63″ x 1.0″ x 1.0″ **854:** 1.63 x 1.0″ x 1.0″
COMPUTING MODULATORS. Series 1102MP4: Converts DC to proportional Sine wave AC.	±10VDC	0 to 6 V_{RMS}	0.1%	2.28″ x 2.03″ x 0.78″
BINARY ANGLE TO SCALED BCD ANGLE. Series 1505:	Up to 16 bits	5 decade BCD.	±0.008°	4.0″ x 2.0″ x 0.4″
SCALED BCD ANGLE TO BINARY ANGLE. Series 1619:	4 or 5 decade BCD	13 or 16 bits	0.1° or 0.01°	4.0 x 3.0 x 0.4″

Other frequencies and voltages available. Units available for either 0 to +70°C or −55°C to +85°C operation. Most units are hermetically sealed for extra protection.

TIMING EQUIPMENT

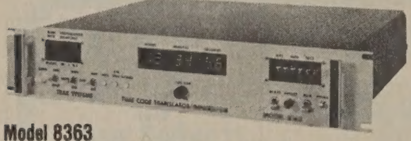
8363

Time Code Translator/Generator

SPECIFICATIONS

TIME BASE

EXTERNAL FREQUENCY STANDARD: 1 MHz (5 MHz Optional). **OPTIONAL INTERNAL FREQUENCY STANDARD: Frequency:** 1 MHz. **Temperature Stability:** $\pm 3 \times 10^{-9}$/°C. **Aging Rate:** $\pm 5 \times 10^{-9}$/day. **Retrace:** $\pm 1 \times 10^{-8}$ after 24 hours off.



Model 8363
Specify Model 8362 if days are desired

SYNCHRONIZATION

Automatic WWV Synchronization: WWV tick. **External Start:** Pulse. **Slew:** 1 μs/s through 100 ms/s in decade steps. **Propagation Delay:** Compensates for delays of 0 to 99.9 ms (18.6K miles) in 0.1 ms increments. **Translate Mode Synchronization:** Unit locks onto and remains fully synchronized to incoming code. Thumbwheel switches may be used to compensate for transmission delays of 0 to 99.9 ms.

TIME DISPLAY

Six 0.6-inch planar indicators display time-of-day.

CODE INPUT

Format: Available formats include IRIG A, IRIG B, IRIG G, NASA 36 Bit, XR3, and 2137. **Level:** 0.5 to 8 volts peak-to-peak (wide range options available).

CODE OUTPUTS

Formats: IRIG, NASA, XR3, and 2137 in modulated and DC level-shift forms. **Level-Shift Codes:** Standard TTL; adjustable outputs (0 to 10V peak into 300 ohms) optionally available. **Modulated Codes:** Mark/space ratio 3.3:1; coherence to "on-time" less than $\pm 1°$ of the carrier cycle; crossover discontinuities less than 1 percent; amplitude adjustable from 0 to 7 volts peak-to-peak; IRIG A, B, G, NASA 36 Bit, and 2137 will drive 50 ohms; others will drive 500 ohms.

OUTPUT OPTIONS

Parallel: BCD time-of-day plus 1 pps strobe, straight-binary time-of-day plus 1 pps strobe, or group-binary time-of-day plus 1 pps strobe. **Sinewave:** Consult factory for available frequencies and levels. **Millisecond and Rate:** BCD milliseconds plus 1 ppm through 10K pps, phase-coherent to within 10 ns.

OPTIONAL COMPUTER INTERFACE

Addressable storage of output formats and remote control of generator functions.

POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered. **Battery Backup Provision:** 11 to 14 VDC (display not on).

PHYSICAL

Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

8365

Universal IRIG Time Code Generator

SPECIFICATIONS

TIME BASE

EXTERNAL FREQUENCY STANDARD: 1 MHz (5 MHz optional). **OPTIONAL INTERNAL FREQUENCY STANDARD: Frequency:** 1 MHz. **Temperature Stability:** $\pm 3 \times 10^{-9}$/°C. **Aging Rate:** $\pm 5 \times 10^{-9}$/day. **Retrace:** $\pm 1 \times 10^{-8}$ after 24 hours off.

SYNCHRONIZATION

Automatic WWV Synchronization: WWV tick. **External Start:** Pulse. **Slew:** 1 μs/s through 100 ms/s in decade steps. **Propagation Delay:** Compensates for delays of 0 to 99.9 ms (18.6K miles) in 0.1 ms increments.

LEAP YEAR RESET

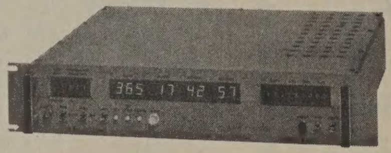
Day 001 after day 365 or 366.

TIME DISPLAY

Nine 0.6-inch planar indicators display time-of-year.

CODE OUTPUTS

Formats: IRIG A, IRIG B, IRIG D, IRIG E, IRIG G, and IRIG H in DC level-shift form. **Level:** Standard TTL; adjustable outputs (0 to 10V peak into 300 ohms) optionally available. **Optional Modulated Codes:** Mark/space ratio 3.3:1; coherence to "on-time" less than $\pm 1°$ of the carrier cycle; crossover discontinuities less than 1 percent; amplitude adjustable from zero to 7V peak-to-peak; IRIG A, B, G will drive 50 ohms, others will drive 500 ohms.



OUTPUT OPTIONS

Parallel: BCD time-of-year plus 1 pps strobe, straight-binary time-of-day plus 1 pps strobe, and group-binary time-of-day plus 1 pps strobe. **Sinewave:** Consult factory for selection of frequencies and levels. **Millisecond and Rate:** BCD milliseconds plus 1 ppm through 10K pps, phase-coherent to within 100 ns.

OPTIONAL COMPUTER INTERFACE

Addressable storage of output formats and remote control of generator functions.

POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered. **Battery Backup Provision:** 11 to 14 VDC (display not on).

PHYSICAL

Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

8366

Time Code Generator

SPECIFICATIONS

TIME BASE

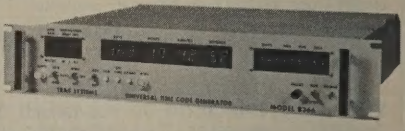
EXTERNAL FREQUENCY STANDARD: 1 MHz (5 MHz optional). **OPTIONAL INTERNAL FREQUENCY STANDARD: Frequency:** 1 MHz. **Temperature Stability:** $\pm 3 \times 10^{-9}$/°C. **Aging Rate:** $\pm 5 \times 10^{-9}$/day. **Retrace:** $\pm 1 \times 10^{-8}$ after 24 hours off.

SYNCHRONIZATION

Automatic WWV Synchronization: WWV tick. **External Start:** Pulse. **Slew:** 1 μs/s through 100 ms/s in decade steps. **Propagation Delay:** Compensates for delays of 0 to 99.9 ms (18.6K miles) in 0.1 ms increments.

LEAP YEAR RESET

Day 001 after day 365 or 366.



Model 8366
Specify Model 8361 if days not desired

TIME DISPLAY

Nine 0.6-inch planar indicators display time-of-year.

CODE OUTPUTS

Formats: IRIG, NASA, XR3, and 2137 in modulated and DC level-shift forms. **Level-Shift Codes:** Standard TTL; adjustable outputs (0 to 10V peak into 300 ohms) optionally available. **Optional Modulated Codes:** Mark/space ratio 3.3:1; coherence to "on-time" less than $\pm 1°$ of the carrier cycle; crossover discontinuities less than 1 percent; amplitude adjustable from zero to 7 volts peak-to-peak; IRIG A, B, G, NASA 36 Bit, and 2137 will drive 50 ohms; others will drive 500 ohms.

OUTPUT OPTIONS

Parallel: BCD time-of-year plus 1 pps strobe, straight-binary time-of-day plus 1 pps strobe, and group-binary time-of-day plus 1 pps strobe. **Sinewave:** Consult factory for selection of frequencies and levels. **Millisecond and Rate:** BCD milliseconds plus 1 ppm through 10K pps, phase-coherent to within 100 ns.

OPTIONAL COMPUTER INTERFACE

Addressable storage of output formats and remote control of generator functions.

POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered. **Battery Backup Provision:** 11 to 14 VDC (display not on).

PHYSICAL

Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

8368
Time Code Generator

SPECIFICATIONS

TIME BASE

OPTIONAL EXTERNAL FREQUENCY STANDARD: 1 or 5 MHz. **INTERNAL FREQUENCY STANDARD: Frequency:** 1 MHz. **Temperature Stability:** $\pm 3 \times 10^{-9}$/°C. **Aging Rate:** $\pm 5 \times 10^{-9}$/day. **Retrace:** $\pm 1 \times 10^{-8}$ after 24 hours off.

LEAP YEAR RESET

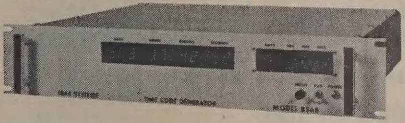
Day 001 after day 365 or 366.

TIME DISPLAY

Nine 0.6-inch planar indicators display time-of-year.

CODE OUTPUTS

Formats: IRIG, NASA, XR3, and 2137 in modulated and DC level-shift forms. **Level-Shift Codes:** Standard TTL; adjustable outputs (0 to 10V peak into 300 ohms) optionally available. **Modulated Codes:** Mark/space ratio 3.3:1; coherence to "on-time" less than ±1° of the carrier cycle; crossover discontinuities less than 1 percent; amplitude adjustable from 0 to 7 volts peak-to-peak; IRIG A, B, G, NASA 36 Bit, and 2137 will drive 50 ohms; others will drive 500 ohms.



Model 8368
Specify Model 8367 if days not desired

OUTPUT OPTIONS

Parallel: BCD time-of-year plus 1 pps strobe, straight-binary time-of-day plus 1 pps strobe, and group-binary time-of-day plus 1 pps strobe. **Sinewave:** Consult factory for selection of frequencies and levels. **Millisecond and Rate:** BCD milliseconds plus 1 ppm through 10K pps, phase-coherent to within 100 ns.

OPTIONAL COMPUTER INTERFACE

Addressable storage of output formats and remote control of generator functions.

POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered. **Battery Backup Provision** (optional): 11 to 14 VDC (display not on).

PHYSICAL

Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

8370
Time Code Translator/Generator

SPECIFICATIONS

TIME BASE

OPTIONAL EXTERNAL FREQUENCY STANDARD: 1 or 5 MHz. **INTERNAL FREQUENCY STANDARD: Frequency:** 1 MHz. **Temperature Stability:** $\pm 3 \times 10^{-9}$/°C. **Aging Rate:** $\pm 5 \times 10^{-9}$/day. **Retrace:** $\pm 1 \times 10^{-8}$ after 24 hours off.

TRANSLATE MODE SYNCHRONIZATION

Automatically locks onto and remains synchronized to incoming time code.

LEAP YEAR RESET

Day 001 after day 365 or 366.

TIME DISPLAY

Nine 0.6-inch planar indicators display time-of-year.

CODE INPUT

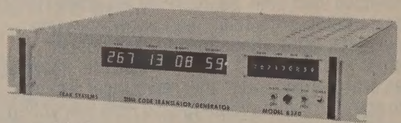
Format: Available formats include IRIG A, IRIG B, IRIG G, NASA 36 Bit, XR3, and 2137. **Level:** 0.5 to 8 volts peak-to-peak (wide range options available).

CODE OUTPUTS

Formats: IRIG, NASA, XR3, and 2137 in modulated and DC level-shift forms. **Level-Shift Codes:** Standard TTL; adjustable outputs (0 to 10V peak into 300 ohms) optionally available. **Modulated Codes:** Mark/space ratio 3.3:1; coherence to "on-time" less than ±1° of the carrier cycle; crossover discontinuities less than 1 percent; amplitude adjustable from 0 to 7 volts peak-to-peak; IRIG A, B, G, NASA 36 Bit, and 2137 will drive 50 ohms; others will drive 500 ohms.

OUTPUT OPTIONS

Parallel: BCD time-of-year plus 1 pps strobe, straight-binary time-of-day plus 1 pps strobe, and group-binary time-of-day plus 1 pps strobe. **Sinewave:** Consult factory for selection of frequencies and levels. **Millisecond and Rate:** BCD milliseconds plus 1 ppm through 10K pps, phase-coherent to within 100 ns.



Model 8370
Specify Model 8369 if days not desired

OPTIONAL COMPUTER INTERFACE

Addressable storage of output formats and remote control of generator functions.

POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered. **Battery Backup Provision** (optional): 11 to 14 VDC (display not on).

PHYSICAL

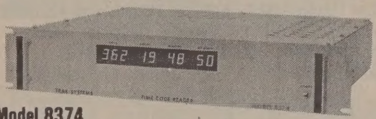
Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

8374
Time Code Reader

SPECIFICATIONS

INPUTS

Code Options: IRIG A, IRIG B, NASA 36 Bit (and XR3 and 2137 in Model 8373). **Impedance:** 100K ohms. **Level:** 30 mVpp space to 25 Vpp mark. **Modulation Ratio:** 2:1 to 6:1. **Frequency:** 100 Hz to 40 kHz with filter supplied; to 150 kHz with optional plug-in filter. **Filter:** 40 kHz, 12 dB/octave low pass filter supplied; other frequencies from 250 Hz through 150 kHz optionally available. **Optional Switchable Filter:** 250 Hz, 1000 Hz, 20 kHz, 60 kHz, 80 kHz.



Model 8374
Specify Model 8373 if days not desired

SYNCHRONIZATION

Major scaler is updated when two consecutive frames agree to within one second and continue to count at 1 pps rate derived from incoming code. All code errors are bypassed. Error bypass is active in reverse mode on IRIG and NASA code readers having reverse code reading options.

TIME DISPLAY

Nine 0.6-inch planar indicators display time-of-year.

OUTPUTS

Serial Code: Buffered input code capable of driving a minimum of 200 feet of unterminated coaxial cable or twisted pair. **Parallel (Optional):** BCD hours, minutes, and seconds, DTL and TTL compatible. **Isolation:** All outputs separately buffered and short-circuit proof.

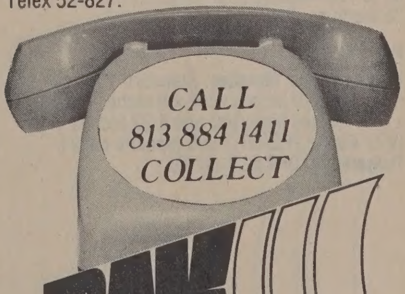
INPUT POWER

95 to 135 VAC, 48 to 440 Hz, RFI filtered, 25 watts (nominal).

PHYSICAL

Weight: 12 pounds. **Mounting:** Standard 19-inch rack (slides optional). **Size:** 19 inches wide x 3.47 inches high x 15 inches deep. **Temperature:** 0°C to +60°C.

For further information, contact TRAK Systems, Division of TRAK Microwave Corporation, 4722 E Eisenhower Boulevard, Tampa, Florida 33614. Telephone 813-884-1411. Telex 52-827.



TRAK SYSTEMS
DIVISION OF TRAK MICROWAVE CORP.

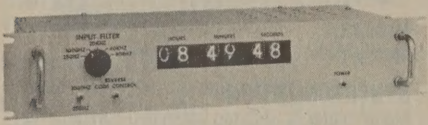
TIMING EQUIPMENT

8251 (V1) & (V2)
Time Code Reader

SPECIFICATIONS

INPUTS

Code Options: IRIG A, IRIG B, XR3, 2137, NASA 36 Bit. **Impedance:** 100K ohms. **Level:** 30 mVpp space to 25 Vpp mark. **Modulation Ratio:** 2:1 to 6:1. **Frequency:** 100 Hz to 40 kHz with filter supplied; to 150 kHz with optional plug-in filter. **Filter:** 40 kHz, 12 dB/octave low pass filter supplied; other frequencies from 250 Hz through 150 kHz optionally available. **Optional Switchable Filter—8251 (V1) only:** 250 Hz, 1000 Hz, 20 kHz, 60 kHz, 80 kHz.

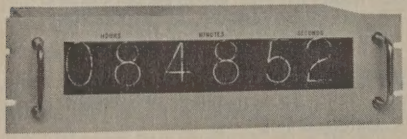


SYNCHRONIZATION

Major scaler is updated when two consecutive frames agree to within one second and continue to count at 1 pps rate derived from incoming code. All code errors are bypassed. These features are not provided in the reverse mode (where errors can be tolerated).

DISPLAY

Six NIXIES® display hours, minutes, and seconds. Numeral height is 0.6 inches on Model 8151 (V2) and 2 inches on Model 8151 (V2).



OUTPUTS

Serial Code: Buffered input code capable of driving a minimum of 200 feet of unterminated coaxial cable or twisted pair. **Parallel:** BCD hours, minutes, and seconds, DTL and TTL compatible. **Isolation:** All outputs separately buffered and short-circuit proof.

INPUT POWER

95 to 135 VAC, 48 to 400 Hz, RFI filtered, 25 watts nominal.

PHYSICAL

Weight: 10 lbs. **Mounting:** Standard 19-inch rack. **Size:** 19 inches wide x 9 inches deep x 3.47 inches high (V1) and 5.22 inches high (V2). **Finish:** FED-STD-595 (specify color). **Temperature:** 0°C to +60°C.

8270
Tape Control Unit

SPECIFICATIONS

LOGIC INPUTS

20-line parallel BCD time-of-day and 1 pps (TTL logic levels).

POWER INPUT

11 VAC from Reader.

LOGIC OUTPUTS

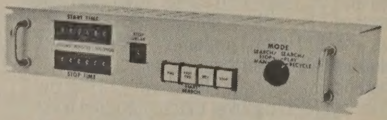
Same as inputs. All lines buffered and short-circuit proof.

CONTROL OUTPUTS

Each control output consists of all three contacts of a form C relay rated for 3 amps at 130 VAC. Four relays provide the following functions: Forward (Playback), Fast Forward, Reverse, Stop.

CONTROLS

Start Time: Preselects desired start time on the tape. **Stop Time:** Preselects desired stop time on the tape. **Stop Delay:** Allows selection of one to ten-second delay between stop command and playback command (required for some tape transports to prevent tape breakage). **Forward:** Causes tape transport to go into forward (playback) mode of operation. **Fast Forward:** Causes tape transport to go into its fast forward mode of operation. Also used to start search in automatic modes of operation. **Reverse:** Causes tape transport to go into its reverse or rewind mode of operation. **Stop:** Causes transport to stop. **Mode:** Selects one of four search modes: Manual—Provides for manual remote control of transport. Search/Stop—Causes tape reproducer to search for and stop just prior to selected start time. Search/Play—Same as search/stop except that reproducer goes into playback mode after stopping. Reproducer stops at preselected stop time. Recycle—Same as search/play except that reproducer recycles to start time after reaching stop time. Recycling continues until stop switch is actuated.



INDICATORS

Lights within the four control pushbuttons indicate which mode the tape transport is in.

PHYSICAL CHARACTERISTICS

Weight: 5 pounds. **Size:** 3.47 inches high x 19 inches wide x 7.6 inches deep.

ENVIRONMENTAL CHARACTERISTICS

Operating Temperature: 0°C to +60°C. **Storage Temperature:** −55°C to +100°C. **Humidity:** 95 percent RH.

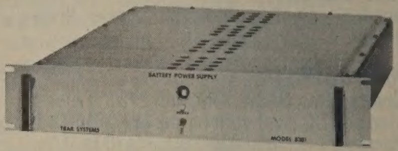
CABLES SUPPLIED

Signal Input Cable: W1, 12 inches. **Power Input Cable:** W2, 12 inches.

8381 & 8317
Battery Power Supply

MODEL 8381

Designed to smoothly and instantaneously supply all of the necessary DC voltages to TRAK Timing Equipment in the event of loss of primary AC power. The unit has the capacity to power the Timing Equipment for up to 36 hours, depending on the number of options in the equipment being operated.



SPECIFICATIONS

SWITCHES/INDICATORS

ON/OFF toggle switch; charging lamp indicator; analog voltmeter.

PHYSICAL

Weight: 55 pounds. **Mounting:** Standard 19-inch rack. **Size:** 19 inches wide x 3.47 inches high x 22 inches deep. **Panel Finish:** Light Gray. **Temperature:** 0°C to +60°C.

RECHARGE TIME

20 hours to recharge after a complete discharge cycle.

MODEL 8317

SPECIFICATION

Same as 8381 except:

POWER CAPACITY

Six to eight hours.

PHYSICAL

Weight: 23 pounds. **Size:** 19 inches wide x 3.47 inches high x 12 inches deep.

RECHARGE TIME

8 hours to recharge after a complete discharge cycle.

8156

Airborne Time Code Generator

SPECIFICATIONS

CLOCK SYNCHRONIZATION

Data Input: 20-line parallel BCD time-of-day. **Sync Enable:** External ground signal. **Minor Scaler Sync:** Minor scaler is reset to zero by negative-going transition of USA input when sync enable is activated.

INPUT POWER

Voltage: 16-32 VDC, 1.5 volts ripple. **Transients, Operating:** Limit 1; MIL-STD-704. **Transients, Non-Operating:** Limit 2; MIL-STD-704. **Current:** 0.5 Amp nominal. **Indicator:** Green indicator on front panel.

BACKUP BATTERY

Type: Nickel-cadmium. **Rating:** Provides full backup with no loss of data for dropouts lasting up to 30 seconds under all operating environments. **Number of Dropouts:** Five per hour or 15 in eight hours, whichever is greater. **Indicators:** Red indicator on front panel. **Automatic Cutout:** System is automatically shut down a minimum of 35 seconds after loss of external power or when power connector is removed. **Trickle-Charge:** Internal circuit provides 16 mA trickle-charge. **Normal Charge:** Power connector pin is provided for charging battery. **Available Option:** Full battery backup for several hours.

PHYSICAL CHARACTERISTICS

Weight: 3.2 pounds. **Size:** 5.6 inches wide x 3.5 inches high x 6.6 inches deep. **Primary Power:** 28 VDC. **Indicators:** Power on (Green); Battery on (Red).

TIME CODE GENERATOR
MODEL 8156
GEO SPACE SYSTEMS
CODE OUT
SYNC IN
OUTPUT
PWR

ELECTRICAL CHARACTERISTICS

Internal Standard: **Type:** Temperature-compensated crystal oscillator. **Frequency:** 1 MHz; 960 KHz optional. **Stability:** 1 x 10^{-6} over temperature range: 2 x 10^{-8} per week drift. Modulated Code Output: **Format:** Modified IRIG B (no days of SBTOD). **Carrier:** 1000 Hz. **Modulation:** 50 percent. **Level:** 1.0 VAC. **Output Impedance:** 1000 ohms. Parallel Time Output: **Format:** BCD time-of-day (20 line). Logic Levels: **Zero:** 0V; One: 5V. Output Resistance: **One:** 5000 ohms; **Zero:** Saturated NPN transistor. **Short-Circuit Protection:** Output circuits are not damaged and time accumulator is not affected by sustained shorts to ground.

ENVIRONMENTAL CHARACTERISTICS

Temperature Operating: −54°C to +60°C with maximum time above 40°C of six hours and maximum time below 0°C of one hour. **Temperature Non-Operating:** −54°C to +71°C. Battery requires recharge if temperature is held at 71°C for more than 30 minutes. **Altitude:** 50,000 feet. **Humidity:** 100 percent plus condensation. **Shock:** 15 G half sinewave for 11 milliseconds. **Acceleration:** 10 G. **Vibration:** Curve four, MIL-E-5400. **RFI:** MIL-I-6181.

8371 & 8395

Time Code Readers

SPECIFICATIONS

INPUTS

Code input: IRIG B, IRIG E, NASA 36 BIT, XR3, 2137. **Impedance:** 150K ohms level: 0.5 to 10.0Vpp without adjustments. **Modulation Ratio:** 2:1 to 6:1. **Carrier Frequency:** 100Hz (IRIG E), 250Hz (XR3) 1000Hz (others)

SYNCHRONIZATION

Display updates within ±5ms of "on-time" (once per second)

DISPLAY

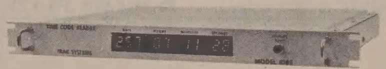
Seven-segment red LED's. Numeral height is 0.5 inches with reading distance of 30 feet.

INPUT POWER

110 or 220 VAC ±10%, 50 to 400 Hz, 15 watts nominal.

PHYSICAL

Weight: 4 pounds. **Height:** 3 inches. **Width:** 14 inches. **Depth:** 5 inches (excluding ¾" heat sink), mounting bracket supplied.



MODEL 8395

SPECIFICATIONS

INPUTS

Code input: IRIG A or B, NASA 36 BIT, XR3, 2137. **Impedance:** 4 ohms. **Level:** 50 mv to 10 Vpp (wider range option available). **Modulation ratio:** 2:1 to 6:1. **Carrier Frequency:** 100Hz to 25K Hz. **Input filtering:** Optionally available.

DISPLAY

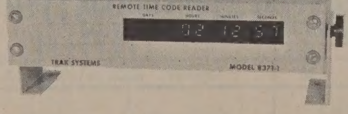
Red LED's. Numeral height is 0.5 inches. Display test optional.

INPUT POWER

115 VAC 10%, 60 to 400Hz.

OUPUTS

Serial code: Buffered input code capable of driving a minimum of 200 feet of unterminated coaxial cable or twisted pair (optional). **Parallel:** BCD days, hours, minutes and seconds, DTL and TTL compatible (optional). **Isolation:** All outputs separately buffered and short-circuit proof.



PHYSICAL

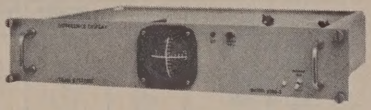
Weight: 8 pounds. **Height:** 1.72 inches. **Width:** 19 inches. **Depth:** 13.25 inches. **Mounting:** Standard 19 inch rack. **Temperature:** 0°C to +60°C.

6500-3

Difference Display

Model 6500-3 provides visual indication of the differences between true antenna position and designated antenna position.

Two pointers display azimuth and elevation differences from zero to ±10°. The variable sensitivity of the Model 6500-3 automatically transfers deflection sensitivity to the axis of greater difference while providing a logarithmic increase in deflection sensitivity of the selected axis toward smaller angular difference.



In addition to calling the operator's attention to the axis of greater difference, correction of the angular error is enhanced. An on-target indicator displays the status of an on-target input line to alert the operator of any antenna position error.

The Model 6500-3 is easily maintained because it uses plug-in digital and analog circuits and nearly 100 percent of the intraconnections are wire-wrapped.

A self-contained power supply system has overvoltage protection, short-circuit protection, and RFI line filtering.

PHYSICAL

Weight: 10 pounds. **Size:** 19 inches wide x 3.47 inches high x 12 inches deep. **Operating Temperature:** 50°F to 110°F.

For further information, contact TRAK Systems, Division of TRAK Microwave Corporation, 4722 E Eisenhower Boulevard, Tampa, Florida 33614. Telephone 813-884-1411. Telex 52-827.

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Synchro Conversion Modules & Systems

Synchro/Resolver-to-Digital Converters

Model	Hz	Synchro Input (V)	Reference Voltage	Output	Resolution (Arc-Minutes)	Accuracy (Arc-Minutes)	Tracking Speed (°/Sec-Min)
VSD-401-SM	400	11.8	26	14 Bit	1.32	4′ ±0.5 LSB	1440
VSD-409-SM	400	90	115	14 Bit	1.32	4′ ±0.5 LSB	1440
VSD-609-SM	50-60	90	115	14 Bit	1.32	4′ ±0.5 LSB	720

1. Available in 10 or 12 bit modules and PC board configurations
2. 2 speed and multiplexed designs available
3. Module size: 2.625 x 3.125 x .82

FEATURES
±4 minutes or ±0.5 LSB accuracy
14 Bit or 1.32 minutes resolution
Standard DC power requirements +5V & ±15V
PC board compatible
No field adjustments required
Inhibit and converter busy signals

Digital-to-Synchro/Resolver Converters

Model	Hz	Synchro Input (V)	Reference Voltage	Load Capability	Accuracy
VDS-401-SB-2	400	11.8	26	2VA	±6 minutes
VDS-409-SB-2	400	90	115	2VA	±6 minutes
VDS-609-SB-2	60	90	115	2VA	±6 minutes
VDS-401-SM	400	11.8	26	100 ohms L-L Balanced	±4 minutes
VDS-409-SM	400	90	115	5kohms L-L Balanced	±4 minutes
VDS-609-SM	60	90	115	4kohms L-L Balanced	±4 minutes

1. D/S output drive capability to 20 V.A. available

FEATURES
PC board compatible
High reliability
Low cost
Operating temperature: 0°C to +70°C

Angle Position Indicator

Model Number	Input	Hz
VNS-104-401	11.8V Synchro	400
VNS-104-409	90V L-L Synchro	400
VNS-104-609	90V L-L Synchro	60

The VNS-104 Angle Position Indicator is a Synchro-to-Digital Converter with a DTL/TTL compatible BCD ouput. These units are self contained including an integral power supply and a high intensity digital display. The VNS Series units are economically priced and feature variable range scale settings to allow for the display of physical units of measurement such as temperature, weight, and distance. The readout displays either zero to full scale or ± full scale.
Package size: 3¾ x 2$\frac{5}{32}$ x 6$\frac{1}{16}$.

FEATURES
DTL/TTL compatible BCD output
High reliability
Settable range scales
Built-in Power Supply
Low cost
CMOS circuitry

Special Converters

Synchro-to-BCD and Resolver-to-BCD Converters

Sampling Type

Model	Hz	Synchro Input (V)	Reference Voltage	BCD Output	4-Digit Accuracy	3-Digit Accuracy	Sample Rate
VSD-401-SM-D-002	400	11.8	26	359.9 (4)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec
VSD-409-SM-D-002	400	90	115	359.9 (4)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec
VSD-609-SM-D-002	50-60	90	115	359.9 (4)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec
VRD-401-SM-D-002	400	11.8	26	359 (3)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec
VRD-409-SM-D-002	400	90	115	359 (3)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec
VRD-609-SM-D-002	50-60	90	115	359 (3)	±6′ ±1 LSB	±30′ ±1 LSB	40/sec

FEATURES
±6 minutes of arc accuracy
4 decade BCD or 6 minute resolution
Standard DC power requirements +5V & ±15V
Variable scale converter
PC board compatible
No field adjustments required

Tracking Type

Model	Hz	Synchro Input (V)	Reference Voltage	Output	Resolution (Arc-Minutes)	Accuracy (Arc-Minutes)	Tracking Speed (°/Sec-Min)
VSD-609-SM-D	50-60	90	115	0-359.9 BCD	6 (.1°)	±6′	180
VSD-401-SM-D	400	11.8	26	0-359.9 BCD	6 (.1°)	±6′	360
VSD-409-SM-D	400	90	115	0-359.9 BCD	6 (.1°)	±6′	360

Synchro-to-Linear DC

Model	Hz	Synchro Input (V)	Balanced Load	Input Rates
VSDC-401-SM	400	11.8	15k	720°/sec
VSDC-409-SM	400	90	750k	720°/sec
VSDC-609-SM	60	90	200k	100°/sec

FEATURES
±6 minutes accuracy
Infinite resolution
High stability - minimum drift
PC board compatible
Low cost
CMOS circuitry

Synchro-to-Sin-Cosine DC

Model	Hz	Synchro Input (V)	Balanced Load	Reference Input	Input Rates
VSSC-401-SM	400	11.8	10k	26V @ 5mA	360°/sec
VSSC-409-SM	400	90	100k	115V @ 3mA	360°/sec
VSSC-609-SM	60	90	100k	115V @ 3mA	60°/sec

FEATURES
Non-variant output
Very low drift
Output filtered and smoothed
No field adjustments required
CMOS circuitry

14 Bit Miniature Control Differential Transmitter

Model	Hz	Synchro Input (V)	Balanced Load
VDCDX-401-SM	400	11.8	10k
VDCDX-409-SM	400	90	600k

FEATURES
±4.5 minutes accuracy
14 Bit resolution
PC board compatible
Low cost
Short circuit proof| output
Synchro & Digital angle inputs

14 Bit Miniature Control Transformer

Model	Hz	Synchro Input (V)	Balanced Load	Output Signal	Output Range
VDCT-401-SB	400	11.8	10k	0.4V RMS/0	±7° Off Null
VDCT-409-SB	400	90	600k	1.0V RMS/0	±7° Off Null

FEATURES
±4 minutes accuracy
14 Bit resolution
PC board compatible
Low cost

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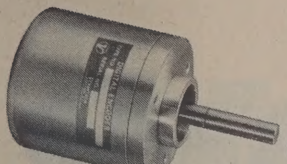
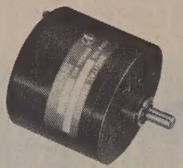


SHAFT ENCODERS
CONTACTING AND OPTICAL
INCREMENTAL — ABSOLUTE



OPTICAL INCREMENTAL

Size	Resolution	Diameter	Length	Features (Optical)	Options
11	To 1024 Pulses	1.062	1.500	All Solid State Light Source High Reliability Industrially Designed Construction	• Sealed • Index Marker • Quadrature Output • 1X-2X-4X Multiplier • Extended Temperature Range • Non-Std. Supply Voltage • Line Drivers • Connectors • Direction Sensing
23	To 2048 Pulses	2.250	1.875		
25	To 2048 Pulses	2.500	2.500		
35	To 2500 Pulses	3.500	2.250		

OPTICAL ABSOLUTE

Size	Output Code	Counts/Turn	Least Count Angle	Features	Options
23	BCD	Up to 1000	.18°	Quadrature Output on LSB Available	• Serial Output Available • Size 30 Available With Parity Bit
30	BCD	Up to 1000	.18°		

CONTACTING ABSOLUTE

Size	Code	Counts/Turn	Revolutions for Full Count	Full Count	Features	Options
11	Gray/Binary	To 256	1 to 64	To 2^{14}	Operating Speed: To 200 RPM	• Operating Temp.: −55°C to 125°C
	BCD	To 100	1 to 100	To 9999	DTL/TTL Compatable	• Various Output Voltage Ratings
18	Gray/Binary	To 512	1 to 2048	To 2^{19}	5,000,000 Rev. — Life	• 18 and 19 Bit Total Count
23	Binary	To 256	1 to 2048	To 2^{19}	Slew Speed: 1000 RPM	• Connectors
	BCD	To 400	1 to 100	1 x 10^6 BCD	Output: Parallel Non-Ambiguous	
31	Gray/Binary	1024	Single Turn	To 2^{10}	All Units Contain Self-Selecting Logic	• Increasing Count — CCW Rotation

OPTICAL KIT — INCREMENTAL — INDUSTRIAL USE

Size	Resolution	Light Source	Construction	Features	Options
Un-Housed	To 1000 Pulses	LED	Modular	Low Cost	2 Channel Output Index Channels Squared Output Operating Voltages: 5 to 15 V.D.C.

Housed versions also available.

VERNITECH.
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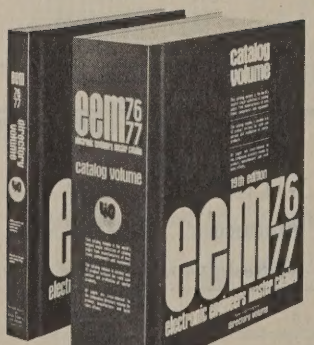

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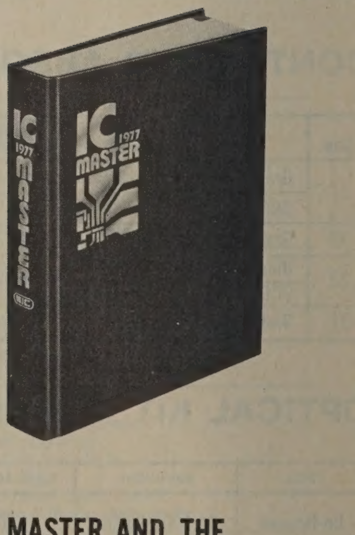

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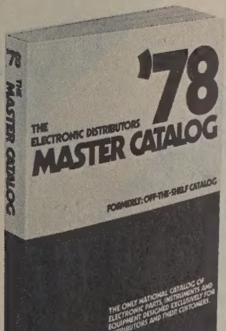
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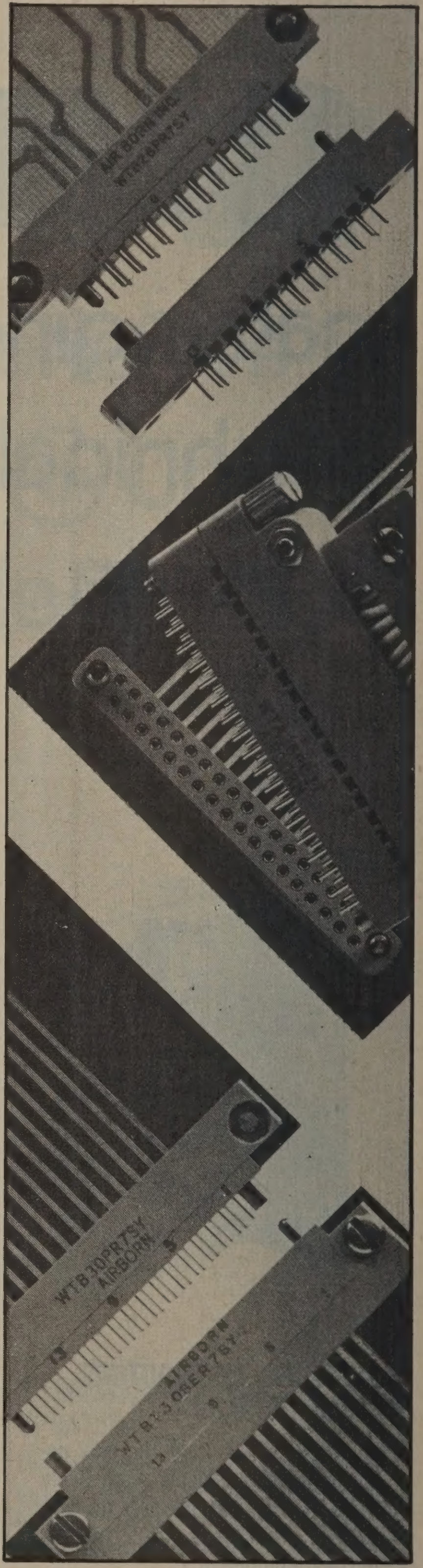
AirBorn connectors



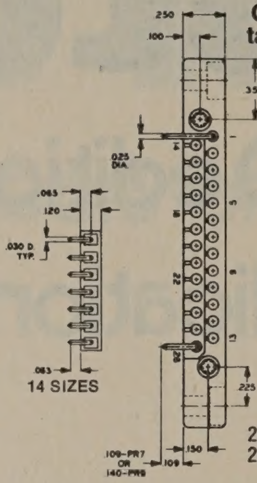
AirBorn Connectors for PC Card to Chassis or Mother Board Connections

Two series of subminiature, right-angle .030″ dia. BeCu pin to socket connectors.

Series WT: Single-row connectors on .100″ centers.

Series WTB: Double-row connectors on .100″ centers, offset .050″. Three or six 50-ohm Coax available with 20-contact connectors.

Terminations: Soldercup, wave solder, Wire-Wrap*, and crimp insertable.

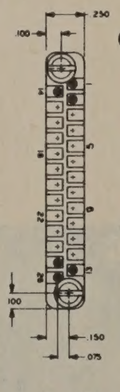


Contacts	Length Overall
10	1.350
14	1.550
20	1.850
24	2.050
26	2.150
30	2.350
36	2.650
40	2.850
44	3.050
50	3.350
54	3.550
56	3.650
60	3.850
66	4.150
70	4.350
90	5.650
100	6.150
120	7.150
20+3	2.850
20+6	4.050

AirBorn Connectors for PC Board Input-Output, Cable to Panel and Cable to Chassis Connections

Series WTA: Subminiature, rectangular plug and receptacle, .100″ centers, two rows offset .050″, .030″ dia. BeCu contacts.

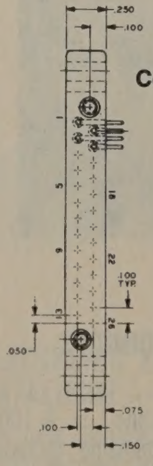
Terminations: Soldercup, wave solder, and Wire-Wrap*.



Contacts	Overall Length
10	.850
14	1.050
20	1.350
24	1.550
26	1.650
30	1.850
36	2.150
40	2.350
44	2.550
50	2.850
54	3.050
56	3.150
60	3.350
66	3.650
70	3.850

AirBorn Connectors for Extender Board and Test Applications

Series WTBT: Right angle receptacles combine with right angle plugs for extender board applications. Available in combinations from 10 to 70 contacts. Choice of .109″ or .140″ termination lengths. Also provides a test vehicle using conventional plugs with guiding or jackscrew locking devices.

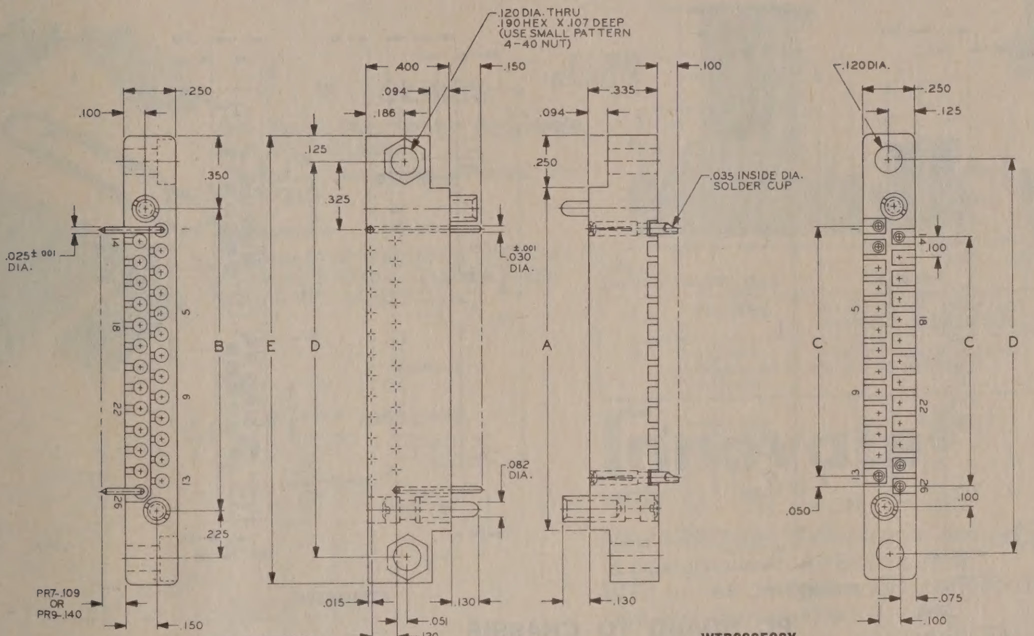


Contacts	Length Overall
10	1.350
14	1.550
20	1.850
24	2.050
26	2.150
30	2.350
36	2.650
40	2.850
44	3.050
50	3.350
54	3.550
56	3.650
60	3.850
66	4.150
70	4.350

Check with us on status of parts to: MIL-C-55302/55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66.

AirBorn connectors

PC CONNECTORS / APPLICATIONS


.120 DIA. THRU
.190 HEX X .107 DEEP
(USE SMALL PATTERN
4-40 NUT)
.250
.100
.350
.025 ± .001 DIA.
14
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OR
PR9-.140
.150
.400
.150
.094
.186
.125
.325
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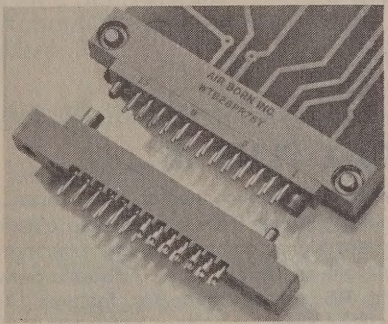
.030
DIA.
.082
DIA.
.015
.130
.051
.120
.100
.335
.094
.250
.035 INSIDE DIA.
SOLDER CUP
.130
.120 DIA.
.125
.100
.050
.075

WTB26PR7SY

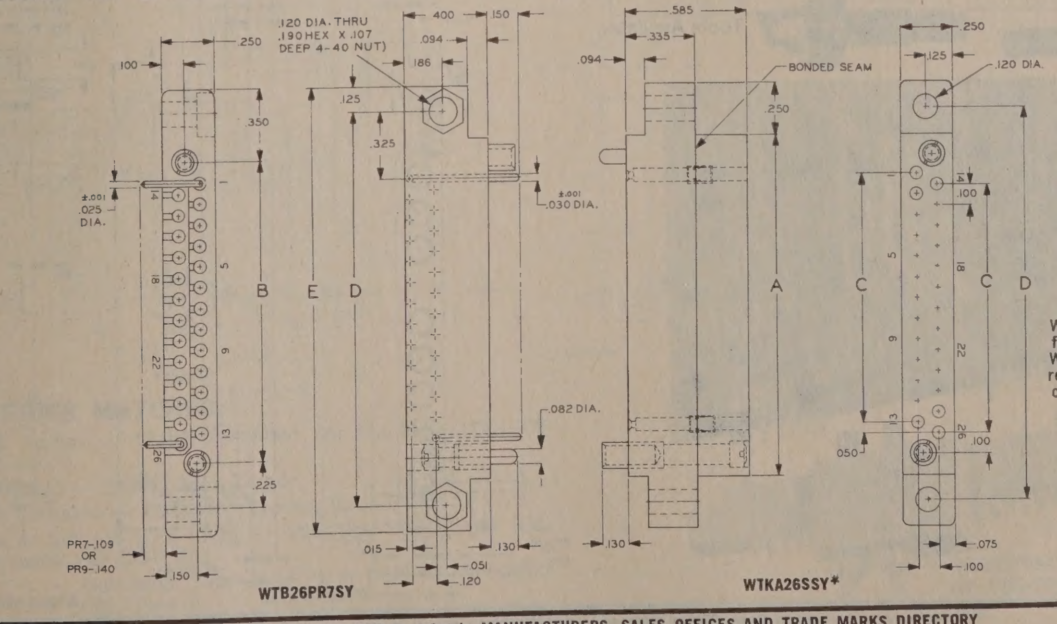
WTB26SECSY

PC BOARD TO MOTHER BOARD TO CHASSIS

Size	Dimensions A	B	C	D	E
10	.850	.650	.400	1.100	1.350
14	1.050	.850	.600	1.300	1.550
20	1.350	1.150	.900	1.600	1.850
24	1.550	1.350	1.100	1.800	2.050
26	1.650	1.450	1.200	1.900	2.150
30	1.850	1.650	1.400	2.100	2.350
36	2.150	1.950	1.700	2.400	2.650
40	2.350	2.150	1.900	2.600	2.850
44	2.550	2.350	2.100	2.800	3.050
50	2.850	2.650	2.400	3.100	3.350
54	3.050	2.850	2.600	3.300	3.550
56	3.150	2.950	2.700	3.400	3.650
60	3.350	3.150	2.900	3.600	3.850
66	3.650	3.450	3.200	3.900	4.150
70	3.850	3.650	3.400	4.100	4.350


AIR BORN INC.
WTB26PR7SY

PC BOARD TO CHASSIS


.120 DIA. THRU
.190 HEX X .107
DEEP 4-40 NUT)
.250
100
.350
±.001
.025
DIA.
14
18
22
26
5
9
13
B
E
D
A
C
.225
PR7-.109
OR
PR9-.140
.150
400
150
.094
.186
.125
.325
±.001
.030 DIA.
.082 DIA.
015
.130
.051
.120
.585
.335
.094
BONDED SEAM
.250
.130
.125
.120 DIA.
.100
050
.075
.100

WTB26PR7SY

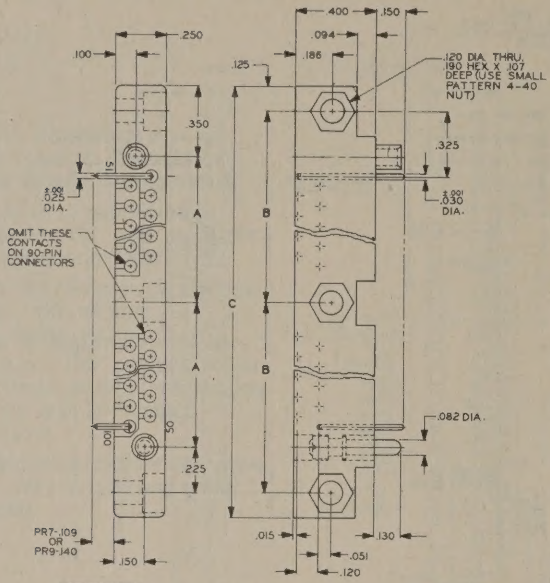
WTKA26SSY*

WTKA(*) — Includes full complement of WTK2222S crimp removable socket contacts.

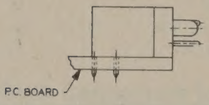
For Manufacturers Sales Offices refer to MANUFACTURERS, SALES OFFICES AND TRADE MARKS DIRECTORY

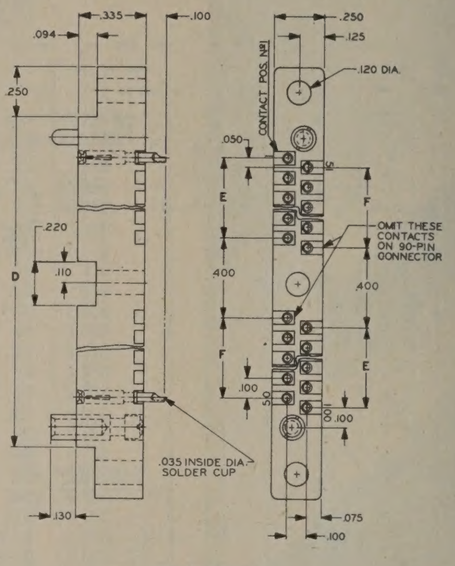
AirBorn connectors

PC & COAX CONNECTORS / APPLICATIONS


.400
.150
.250
.100
.094
.125
.186
.120 DIA. THRU.
.190 HEX X .107
DEEP (USE SMALL PATTERN 4-40 NUT)
.350
.325
±.001
.025
DIA.
±.001
.030
DIA.
OMIT THESE CONTACTS ON 90-PIN CONNECTORS
A
B
C
.082 DIA.
.225
PR7-.109 OR PR9-.140
.150
.015
.130
.051
.120

WTB100PR7SY




.335
.100
.094
.250
.125
.120 DIA.
CONTACT POS. NO1
.050
E
F
.220
.110
D
OMIT THESE CONTACTS ON 90-PIN CONNECTOR
.400
.400
.100
.035 INSIDE DIA. SOLDER CUP
.130
.075
.100

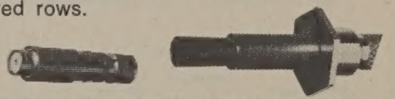
WTB100SECSY

PC BOARD TO CHASSIS
PC BOARD TO MOTHER BOARD

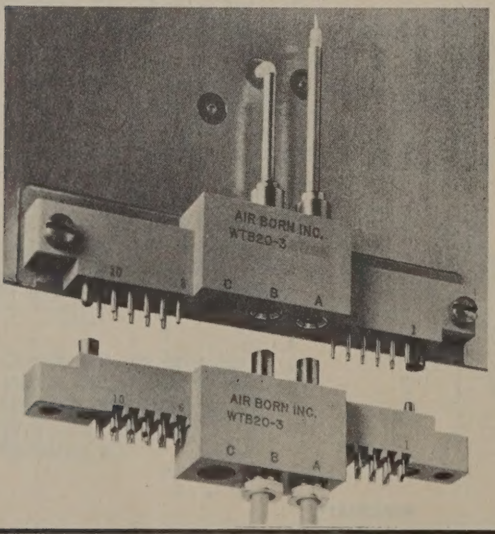
Size	Dimensions A	B	C	D	E	F
90	2.475	2.700	5.650	5.150	2.200	2.100
100	2.725	2.950	6.150	5.650	2.400	2.400
120	3.225	3.450	7.150	6.650	2.900	2.900

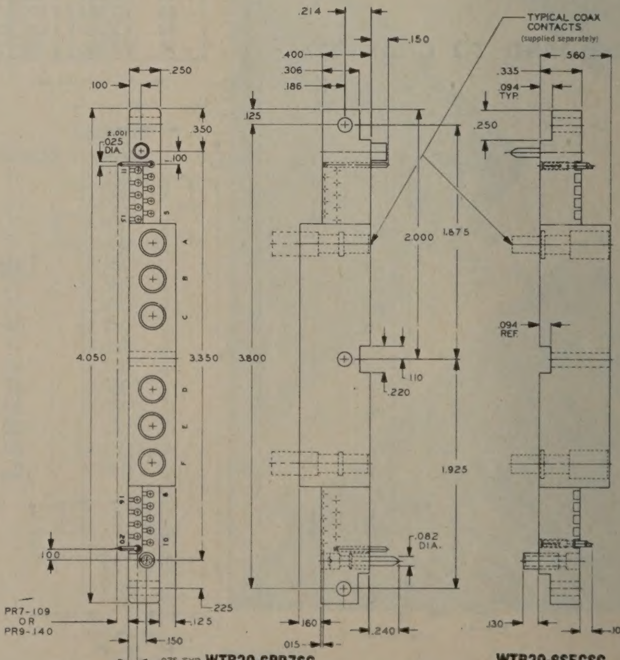
COAX PLUS 20...

This combination connector offers even more versatility by combining either 3 or 6 removable coaxial contacts with 20 standard signal contacts in one compact unit. Designed for semi-rigid or flexible cable, AirBorn's Series WTB-Coax right-angle PC board connector features .100″ spacing in 2 staggered rows.



Tools Available

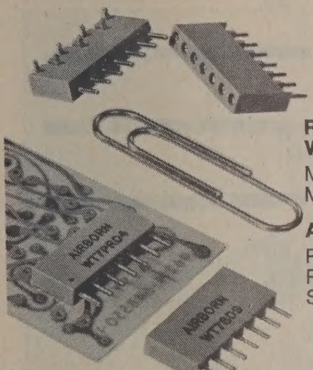

AIR BORN INC.
WTB20-3
AIR BORN INC.
WTB20-3
C
B
A


TYPICAL COAX CONTACTS (supplied separately)
.214
.150
.400
.306
.186
.560
.335
.094 TYP
.250
.100
.125
±.001
.025 DIA.
.350
2.000
1.675
.094 REF
4.050
3.350
3.800
.110
.220
1.925
.082 DIA.
.100
PR7-.109 OR PR9-.140
.225
.125
.150
.075 TYP
.160
.240
.015
.130
.100

WTB20-6PR7SC WTB20-6SECSC

AirBorn connectors

PC AND POWER CONNECTORS / APPLICATIONS


AIRBORN
WT7PRD4
AIRBORN
WT7SD9

WT SERIES

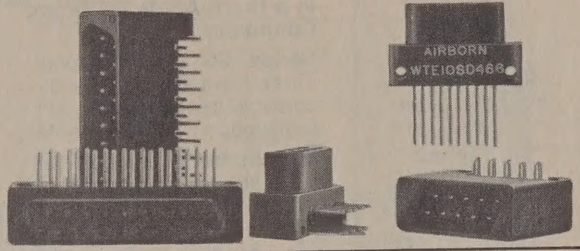
Right Angle Plug, In-Line Receptacle With .100″ Centers.

Material — Glass-Filled Phenolic Per MIL-M-14G

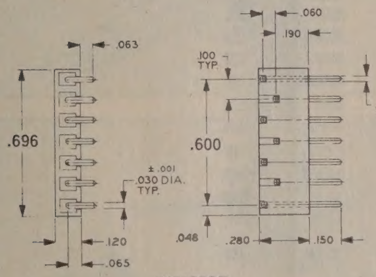
Applications

PC Card to Mother Board or Cable.
PC Board to Cable, Cable to Cable.
Sizes 3 thru 16 (Contacts).

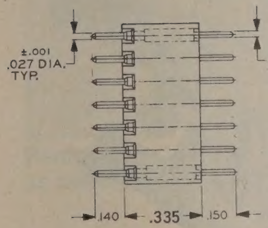
WTE SERIES


AIRBORN
WTE10SD466

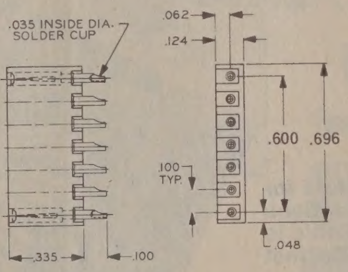
No. of Contacts	Female Shell	Male Shell	Dimensions	
			OAL	OAW
10	WTE10PR5	WTE10SER13 (rt. ∡ sockets) WTE10SED9 - WTE10SED23	.750	.300
20	WTE20PR5 PR5 = .081 extension	Same terminations as above but with 20 contacts	1.250	.300


.063
.696
±.001
.030 DIA.
TYP.
.120
.065
.060
.190
.100
TYP.
±.001
.030 DIA.
TYP.
.600
.048
.280
.150

WT7PRD7


±.001
.027 DIA.
TYP.
±.001
.030 DIA.
TYP.
.140
.335
.150

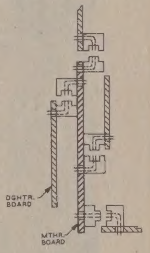
WT7PD9


.035 INSIDE DIA.
SOLDER CUP
.335
.100
.062
.124
.600
.696
.100
TYP.
.048

WT7SEC

Innovate!

with ┗ to ┗, ⊥, or || connectors.


DGHTR.
BOARD
MTHR.
BOARD

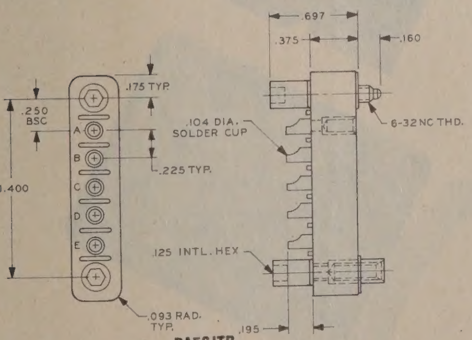
New flexibility in electronic design is possible with AirBorn's new WTE series of right angle connectors. Use any combination — right angle to right angle, perpendicular, parallel, or extended boards. Two sizes: 10 and 20 contacts. Spacing: .100″; 2 rows; offset .050.

NOTES:

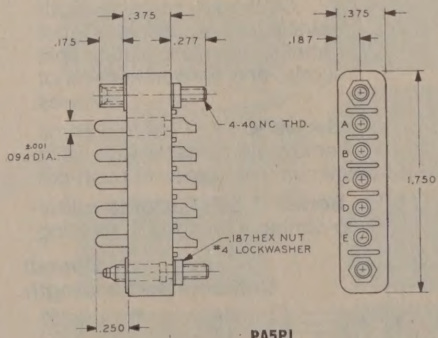
1. Molded bodies: glass filled nylon per Fed Spec. LP-395
2. Contacts: beryllium copper per QQ-C-530, gold plate per MIL-G-45204

PA POWER SERIES

Series	No. of Contacts	For Contact Type	Hardware Code
PA	5 (#12) (4-5) (4 #12) (5 #16)	**P** — Pin Contact Solder Cup **S** — Socket Contact Open Entry Solder Cup	**J** — Fixed Jackscrew Set **JT** — Turning Jackscrew Set **JTB** — Turning Jackscrew Set Short Knob **SY** — Guide Set


.250
BSC
.175 TYP.
A
B
C
D
E
.225 TYP.
1.400
.093 RAD.
TYP.
.697
.375
.160
.104 DIA.
SOLDER CUP
6-32NC THD.
.125 INTL. HEX
.195

PA5SJTB


.375
.175
.277
±.001
.094 DIA.
4-40NC THD.
.187 HEX NUT
#4 LOCKWASHER
.250
.375
.187
A
B
C
D
E
1.750

PA5PJ

PA SERIES MATERIAL:

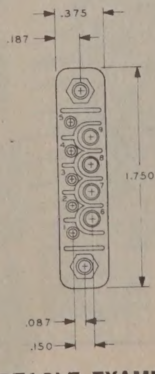
Molded Bodies — Diallyl Phthalate Per MIL-M-14 (GDI-30F OR SDG-F).

Pin Contacts — Brass, Gold Plated.

Socket Contacts — Phosphor Bronze, Gold Plated.

Guides & Jacks & JTB Knob — Stainless Steel, Type 303, Passivated Per QQ-P-35.

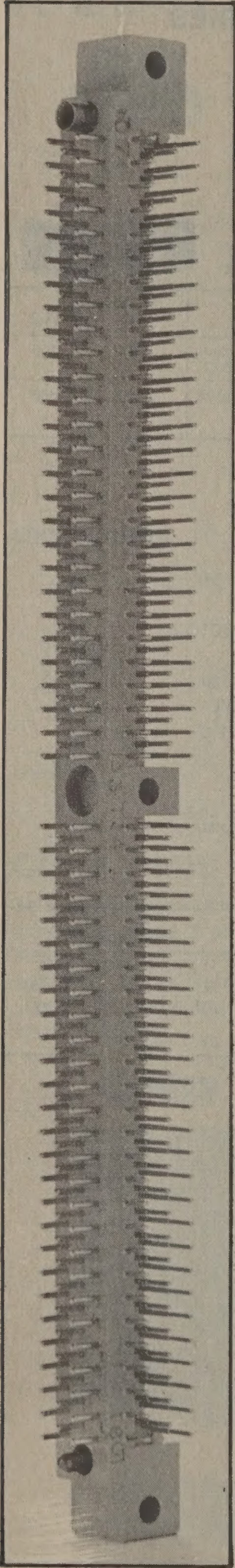
JT KNOB — Aluminum, Type 2024-T4 or 2017-T4, Anodized Per MIL-A-8625, Type II.


.375
.187
1.750
.087
.150

RECEPTACLE EXAMPLE OF PA4-5PJ

AirBorn connectors

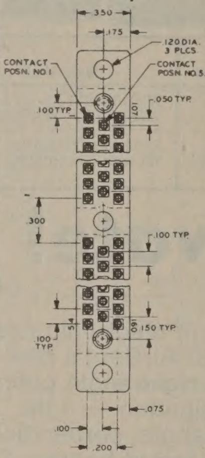
PC CONNECTORS/CABLE TO PANEL CONNECTORS



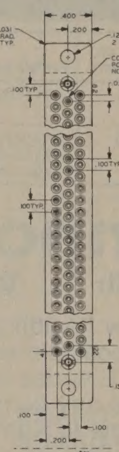
160 Dip Pin Contacts in a Right-Angle PC Board Connector

Series WG: Only 6.4″ long. Three rows staggered with contacts centered on .100″; terminations on .125″ centers.

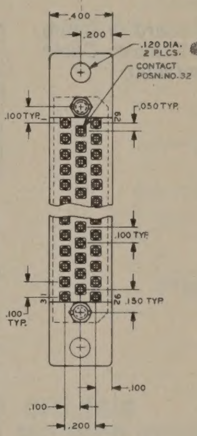
Terminations: Receptacles have solder cup, dip pin, or Wire-Wrap*.


.350
.175
.120 DIA.
3 PLCS.
CONTACT POSN. NO. 1
CONTACT POSN. NO. 55
.050 TYP.
.100 TYP.
107
.300
.100 TYP.
54
160
.150 TYP.
.100 TYP.
.075
.100
.200

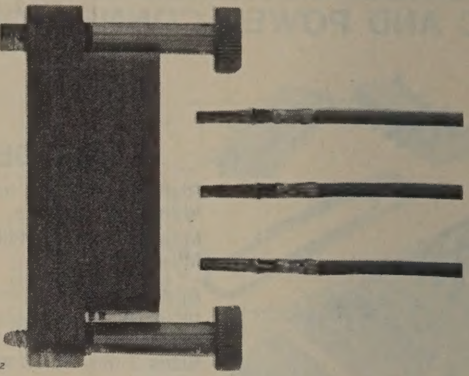
160 CONTACTS
6.400″ LONG

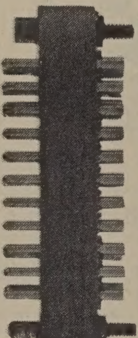

.400
.200
.031 RAD. TYP.
.120 DIA. 2 PLCS.
CONTACT POSN. NO. 42
.050 TYP.
.100 TYP.
82
.100 TYP.
.100 TYP.
41
22
.150 TYP.
.100
.100
.200

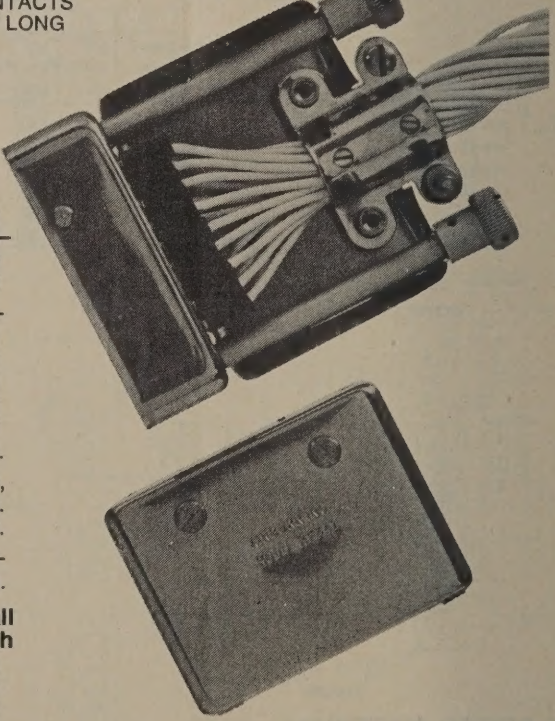
122 CONTACTS
4.900″ LONG


.400
.200
.120 DIA.
2 PLCS.
CONTACT POSN. NO. 32
.050 TYP.
.100 TYP.
62
.100 TYP.
31
92
.150 TYP.
.100 TYP.
.100
.100
.200

92 CONTACTS
3.900″ LONG





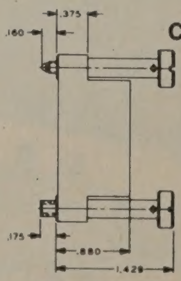


AirBorn Connectors for Inter-equipment Connections–Cable to Panel, Cable to Cable, and Drawer to Cabinet

Two series of miniature, rectangular connectors with rugged .0625″ dia. contacts. Both available with stainless steel shells, mounting plates, split hoods, and environment-proof features.

Series K, EK: Features crimp, removable contacts with 50 lb. minimum resistance to push-out.

Series P, EP: Features solder-cup contacts retained in molding.


.375
.160
.175
.880
1.429

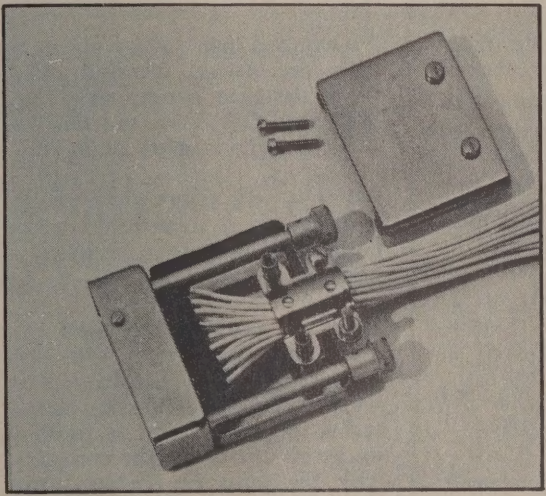
Contacts	Series	Overall Length
14	P	1.250
18	K	1.312
20	P	1.562
34	K&P	2.000
42	K&P	2.312
50	K&P	2.700
50-8	P	2.281
66	K&P	2.281
75	K&P	2.700
104	K&P	2.760

*Registered TM of Gardner-Denver Company.

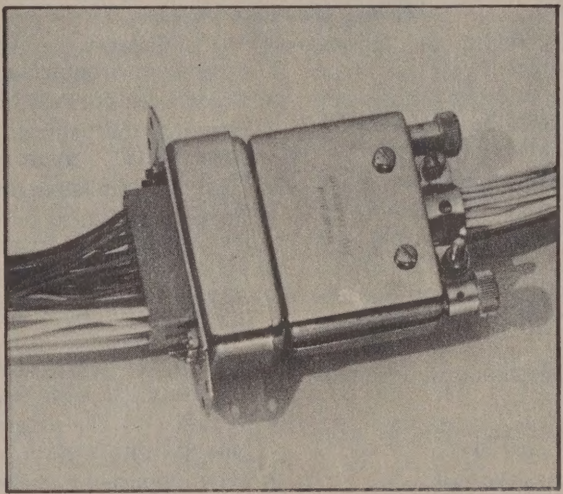
AirBorn connectors

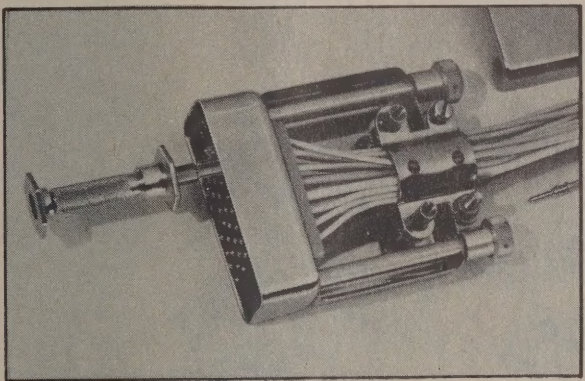
CABLE TO PANEL CONNECTORS

Removable Hood



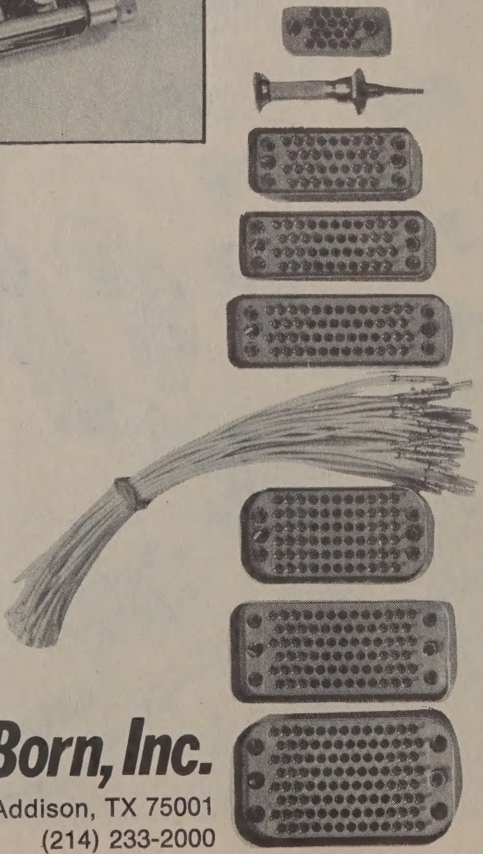
Stainless Steel Construction



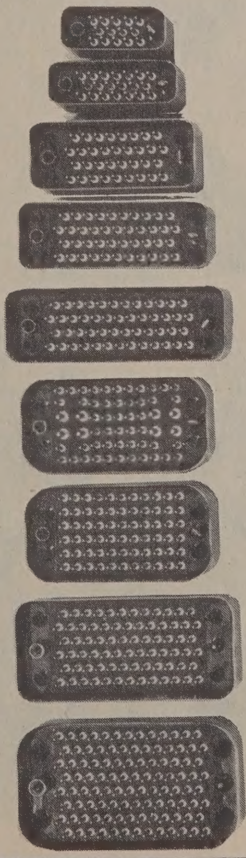


Removable Crimp Contacts
as well as standard solder cups

Crimp, Removable Contacts
50 lb. minimum resistance to push out. Stainless steel shells, mounting plates, and split hoods optional. Sizes: 18, 34, 42, 50, 66, 75, 104.



Soldercup Contacts
retained in molding. Rugged .0625 dia pins. Stainless steel shells, mounting plates, and split hoods optional. Sizes: 14, 20, 34, 42, 50, 50-8, 66, 75, 104.



AirBorn, Inc.

Dept. EM, 4321 AirBorn Dr., Addison, TX 75001
(214) 233-2000

For safety's sake, AMP high

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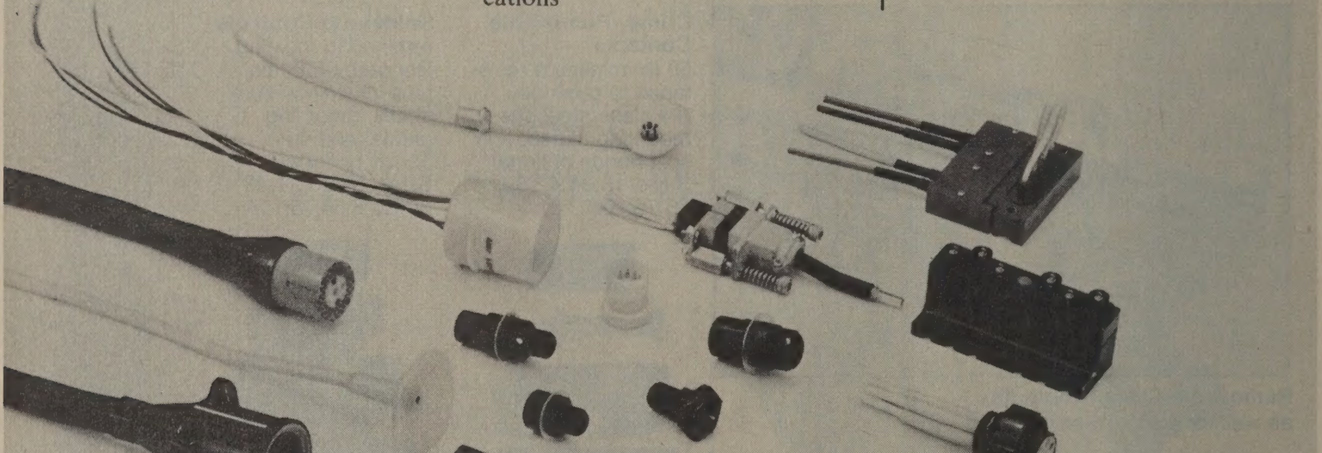
- High altitude operation — up to 70,000 feet without voltage derating
- Insulation: extruded silicone rubber
- Lead wire remains flexible from −62°C to +250°C
- Receptacles: glass epoxy
- High reliability — operate under extreme environmental conditions
- Color coded for easy identification
- Excellent mechanical strength — resistant to vibration and shock
- High dielectric strength
- Fungus, moisture, oil and chemical resistant
- Radiation resistant
- Positive mating of lead into receptacle
- RFI shielding — optional
- Preassembled — no tools required
- Versatile — top access, splice or bulkhead application
- Meet applicable military specifications

No exposed high voltage, the contacts are deeply recessed. And we've designed corona right out. With our LGH interconnection devices, in fact, it's safety all the way.

Safety — with many pluses. Such as compactness, light weight, quick connect/disconnect, great reliability.

Which is exactly what you'd expect from the people with the broadest line of high-voltage connectors, lead assemblies and receptacles. The specialists in custom design to a system. The company with the most experience — the



-voltage interconnections.

only one that covers both military and commercial markets with specialized designs for each.

Take a good look at these key product features. They add up to a lot of reasons why a lot of people rely on AMP for their interconnection needs. And why you should, too.

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Or write AMP Incorporated,
Capitron Division,
Elizabethtown, Pa. 17022.

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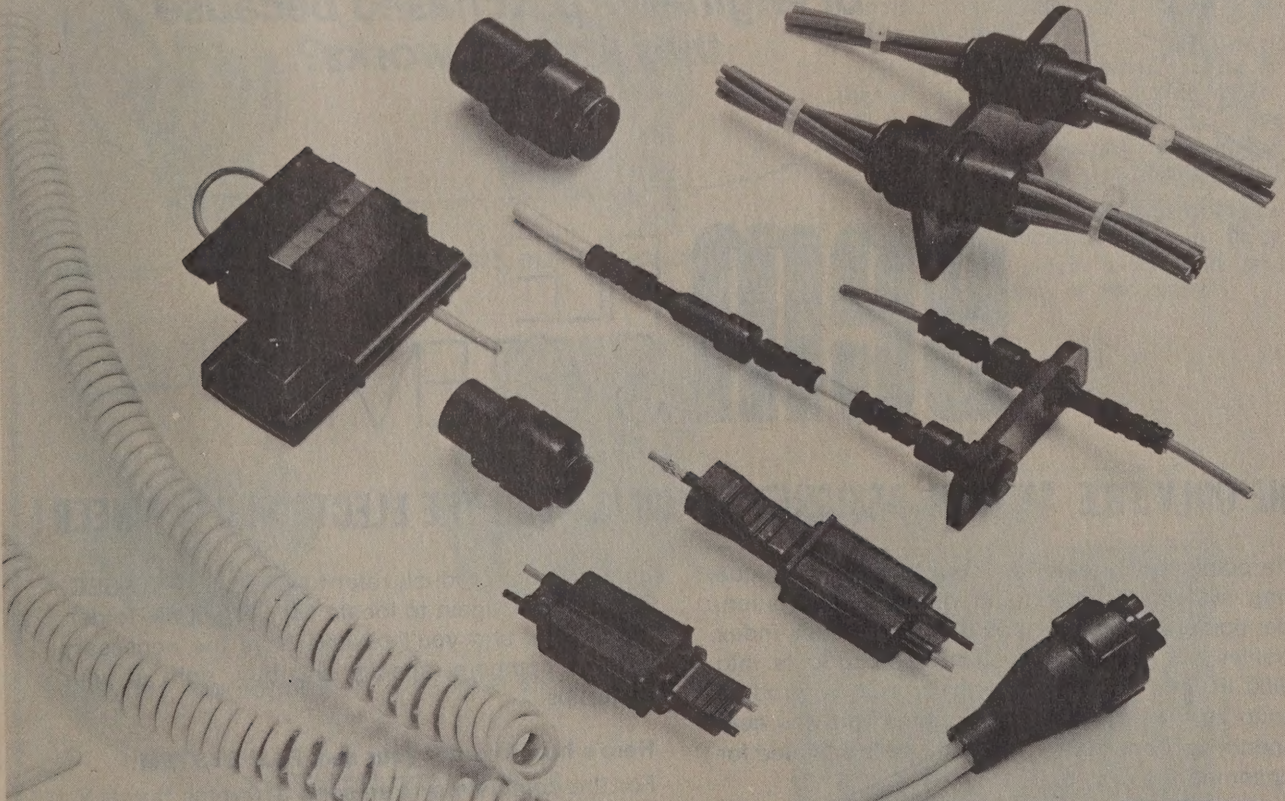
- The right balance of characteristics to solve high-voltage carrying problems at lowest applied cost
- Designed specifically for commercial application in industrial environments, and to meet large-volume production requirements
- Voltage ratings: to 8 KVAC, rms, 60 Hz; to 20 KVDC
- Temperature range: rated for operation within −15°C to +85°C
- Altitude operation — rated from sea level to 10,000 feet
- Safety construction — UL recognized, 94V-0 rated plastic material
- Exceed minimum creepage and clearance for specified voltages per applicable International Specifications
- Available with or without leads
- Crimp, snap-in contacts rated at 7.5 amperes
- Pins and sockets accept #22-20 AWG and #18-16 AWG wire
- Machine applied terminations assure lowest applied cost



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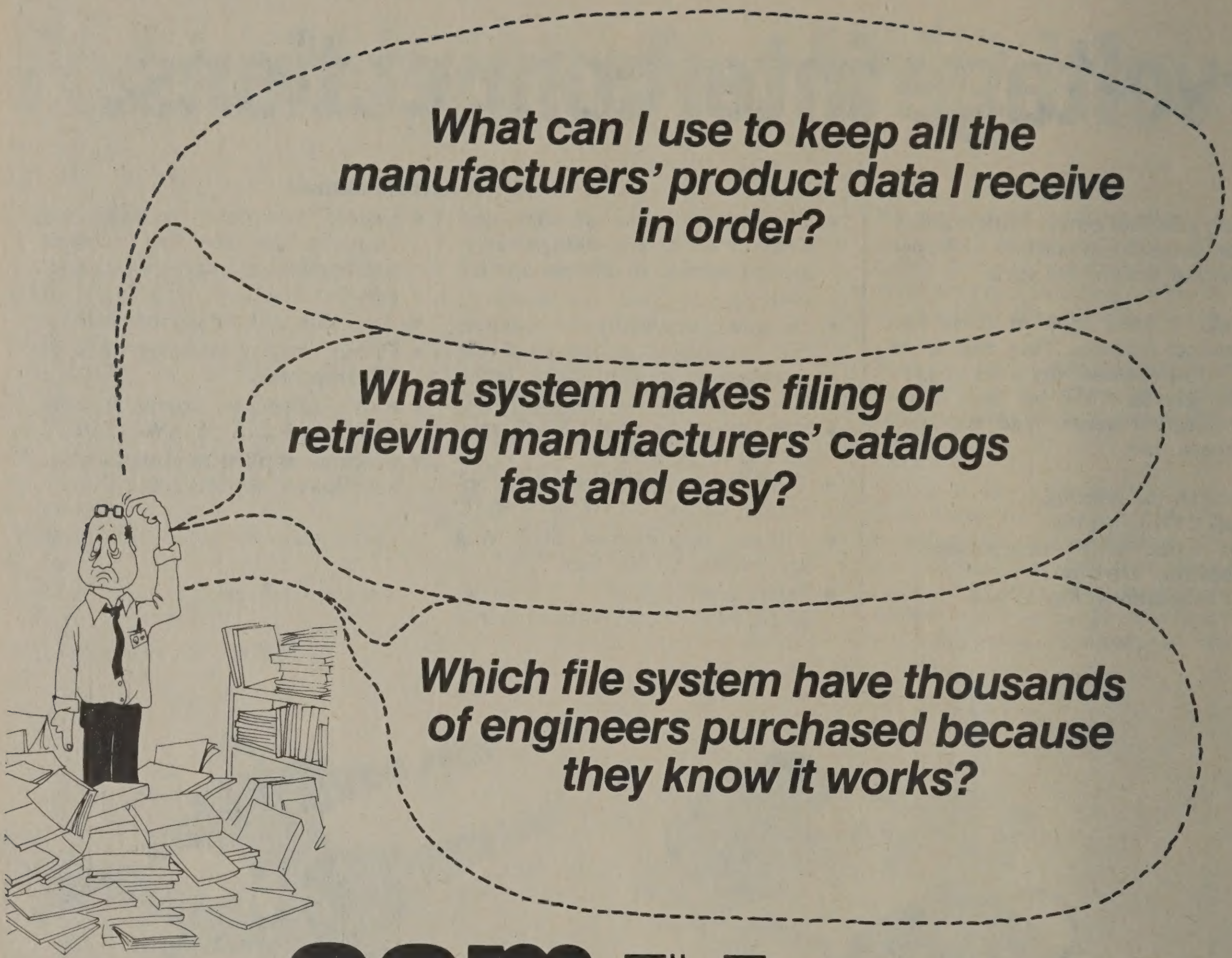
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Allied Systems now offers two complete lines of patchcord programming systems, with more than twenty-one sizes available. Allied also supplies associated patch cords and hardware for both lines.

Catalog 567 covers IBM style systems which normally have a contact spacing of .250 X .281 or .281 X .281. These systems use larger taper pins for rear panel wiring.

Catalog 667 covers hook type systems which have a contact spacing of .250 X .250. These systems are available for taper pin, wire wrap or locking latch type rear panel wiring.

Patch cords are available in a variety of types: single conductor, coax, two conductor shielded, etc., to fit any programming requirement.

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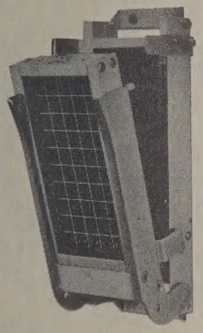
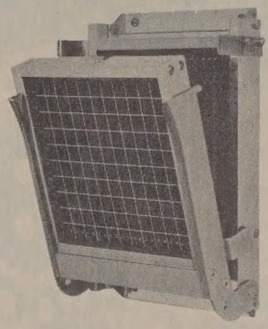
The extremely competitive pricing of the Allied Systems lines, plus the unexcelled quality of their products, gives you, the user, a competitive edge in the design and pricing of your system.

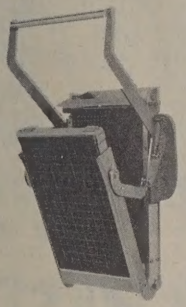
Call your nearest Allied Rep. or Home Office for application help in using Allied Systems patch panels and programming systems, or for prices.



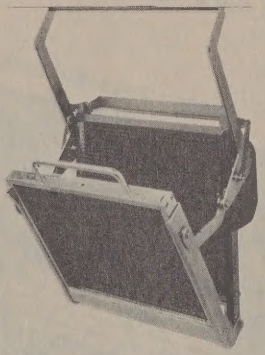
MODEL 902 200 POSITIONS



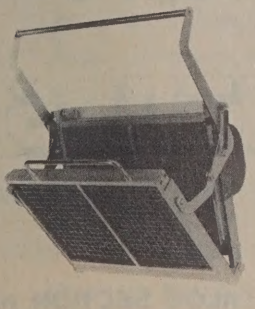
MODEL 904 440 POSITIONS



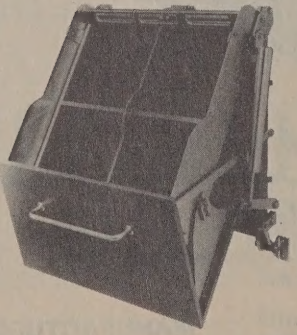
MODEL 901 680 POSITIONS



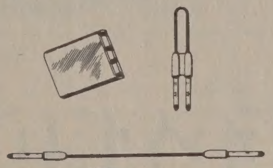
MODEL 922 1280 POSITIONS

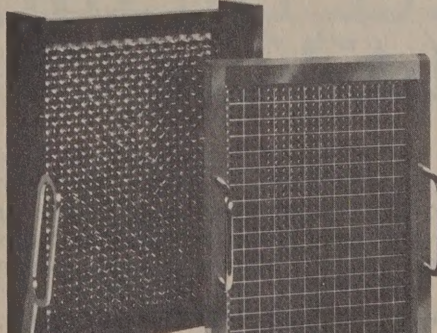


MODEL 921 1600 POSITIONS

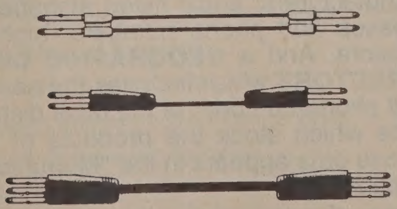


MODEL 910 5120 POSITIONS





MODEL 816



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The MASTER CATALOG is broken down into four basic sections. **A GENERAL INDEX** which lists manufacturers and products alphabetically. **A MANUFACTURERS' CATALOG SECTION** which displays their respective product pages and lists their addresses and phone numbers. **A MANUFACTURERS' DIRECTORY,** where participating manufacturers, again listed alphabetically with addresses and phone numbers, highlight their distributors. And a **GEOGRAPHIC DISTRIBUTORS' DIRECTORY** which includes the names, addresses and phone numbers of the local distributors nationwide which stock the products of manufacturers whose data appears in the "Manufacturers' Catalog Section."

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CA	El Segundo	Liberty Electronics	(213) 322-8100
CA	Irvine	Cramer Electronics Inc.	(714) 979-3000
CA	Los Angeles	Kierulff Electronics	(213) 725-0325
CA	Mountain View	Elmar Electronics	(415) 961-3611
CA	San Carlos	Sterling Electronics	(415) 592-2353
CA	San Diego	Liberty Electronics	(714) 565-9171
CA	San Diego	Kierulff Electronics	(714) 278-2112
CA	San Diego	Moltronics	(714) 278-5020
CA	South Gate	Moltronics	(213) 773-6521
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MD	Gaithersburg	Pioneer Electronics	(301) 948-0710
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MO	Kansas City	Walter Radio Supply	(816) 531-7015
MO	Kansas City	L Comp Electronics	(816) 221-2400
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NJ	Clifton	Wilshire Electronics	(201) 340-1900
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WA	Seattle	Liberty Electronics	(206) 763-8200
WI	Milwaukee	Electronic Expeditors	(414) 228-8100

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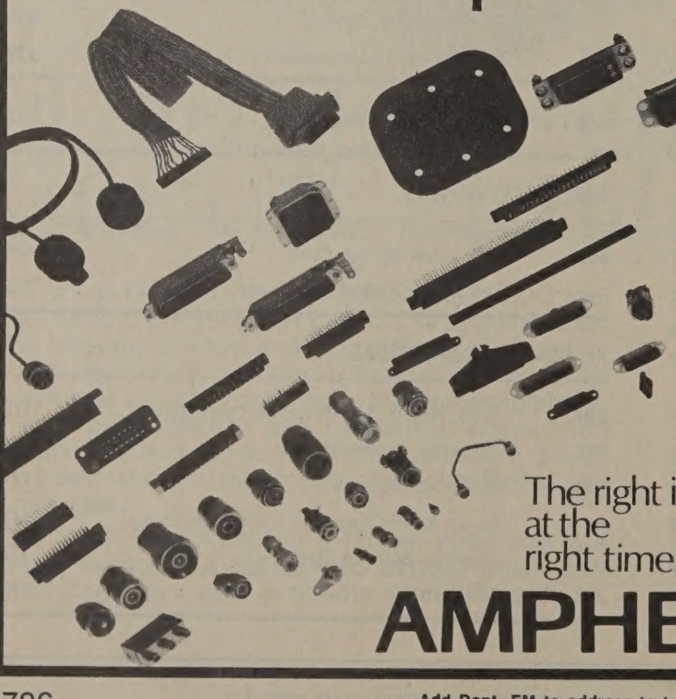

For consumer/industrial/ commercial products
Microphone connectors
Medical interface cables
Water- and fire-resistant connectors
Sub-miniature connectors

For aerospace/military applications
Circular environmental connectors
MIL-Spec connectors
Power distribution connectors
Radiation-resistant connectors

For RF applications
Fiber-optics connectors
Coaxial connectors
SMA connectors
UHF connectors

For business equipment
IC component connectors
PC connectors
Input/output connectors
Rack-and-panel connectors

For telephony
Connectorized back panels
Jack adapters
Terminal blocks
157 Series connectors

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For more information and product literature, contact:

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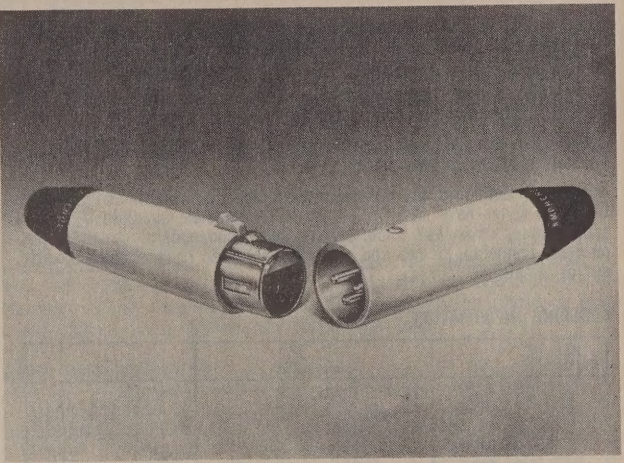
CONNECTORS FOR AUDIO/ELECTRONIC APPLICATIONS

NEW AMPHENOL 91-Q SERIES

The originator of the quick-disconnect microphone connector now brings you a new generation of connectors for audio/electronics that are intermateable and interchangeable with standard latch-lock type audio connectors.

The QWIK 91 Series is completely re-designed with rugged, high-strength zinc die-cast construction to withstand most severe uses without breakage. The non-reflective satin-nickel finish enhances the appearance of virtually any studio or test equipment.

The new 91-Q Series cable connectors also feature a "Twist-Lock" cable grip that uses no screws and needs no tools to assemble. The grip accommodates a wide range of cable diameters. This feature, plus unitized inserts, means the new 91-Q Series connectors give increased savings on connector assembly and termination.



Quality Features

Construction — Zinc die-cast connector shells and pushbutton latch.

Shell-to-Shell Ground Terminal — Separate and positive ground-to-shell terminals provided on all assemblies.

"Twist-Lock" Cable Grip — An internal, positive cable clamp activated by twisting the threaded back nut. No tools needed. No disassembly/assembly required. Quick and firm grip on 3/16" to 5/16" O.D. cables.

Anti-Vibration Springs — Place tension on mated connectors to dampen vibration and reduce hum and noise.

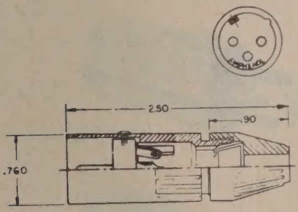
Latchlock — Pushbutton latching mechanism provides fast, positive lock and release. New die-cast construction for maximum service.

Shell Styles — Select from round or rectangular receptacle shells.

Contacts — Precision made from a copper alloy for optimum service life.

STRAIGHT CORD PLUGS

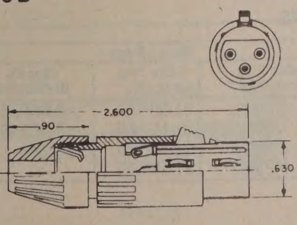
Figure A



Pin Contacts

Number of Contacts	3	4	5
Amphenol Part Number	91-3CM	91-4CM	91-5CM

Figure B

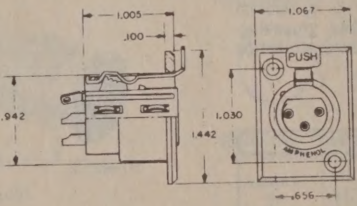


Socket Contacts

Number of Contacts	3	4	5
Amphenol Part Number	91-3CF	91-4CF	91-5CF

WALL MOUNTING RECEPTACLES

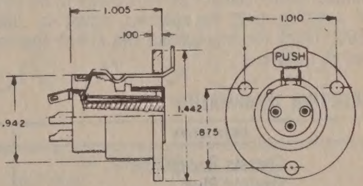
Figure A-1



Socket Contacts (mates with Fig. A)

Number of Contacts	3	4	5
Amphenol Part Number	91-3SF	91-4SF	91-5SF

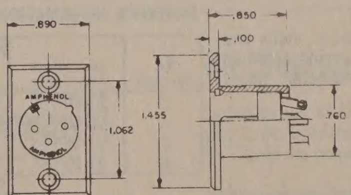
Figure A-2



Socket Contacts (mates with Fig. A)

Number of Contacts	3	4	5
Amphenol Part Number	91-3RF	91-4RF	91-5RF

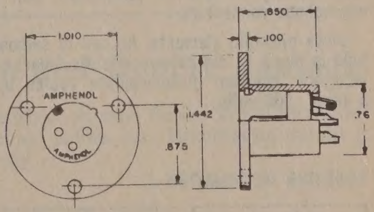
Figure B-1



Pin Contacts (mates with Fig. B)

Number of Contacts	3	4	5
Amphenol Part Number	91-3SM	91-4SM	91-5SM

Figure B-2



Pin Contacts (mates with Fig. B)

Number of Contacts	3	4	5
Amphenol Part Number	91-3RM	91-4RM	91-5RM

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MICROPHONE CONNECTORS
91 SERIES THREADED COUPLING CONNECTORS

These are 3, 4, and 6-contact connectors designed primarily for audio equipment but used extensively on all types of portable equipment.

Positive screw-type coupling ring connection eliminates accidental disconnects. Squeeze type clamp grips cable securely after assembly and prevents pulling and twisting strain on soldered contacts.

Dielectric is molded from black phenolic cable. Shells are of brass, finished in bright chrome plating.

Cord protector springs on a 3-contact style have .281″ I.D.; 4 and 6-contact styles have .385″ I.D. Chassis receptacles mount in 27/32″ dia. chassis holes up to ⅛″ thick. Service end accommodates coupling ring on cable connector or cap and chain to seal open chassis units against dirt or tampering.

ORDERING INFORMATION

No. Contacts	P/N	Description	Mates With
3	91-MC3F	Female Cable Jack	91-MC3M
3	91-MC3F1	Female Cable Plug	91-MC3M1, 91-PC3M
3	91-MC3M	Male Cable Plug	91-MC3F, 91-PC3F
3	91-MC3M1	Male Cable Jack	91-MC3F1
3	91-PC3F	Female Panel Receptacle	91-MC3M
3	91-PC3M	Male Panel Receptacle	91-MC3F1
4	91-MC4F	Female Cable Jack	91-MC4M
4	91-MC4F1	Female Cable Plug	91-MC4M1, 91-PC4M
4	91-MC4M	Male Cable Plug	91-MC4F, 91-PC4F
4	91-MC4M1	Male Cable Jack	91-MC4F1
4	91-PC4F	Female Panel Receptacle	91-MC4M
4	91-PC4M	Male Panel Receptacle	91-MC4F1
6	91-MC6F	Female Cable Jack	91-MC6M
6	91-MC6F1	Female Cable Plug	91-MC6M1, 91-PC6M
6	91-MC6M	Male Cable Plug	91-MC6F, 91-PC6F
6	91-MC6M1	Male Cable Jack	91-MC6F1
6	91-PC6F	Female Panel Receptacle	91-MC6M
6	91-PC6M	Male Panel Receptacle	91-MC6F1
—	91-CCC3	Cap & Chain for Receptacle	

75 SERIES SINGLE CONTACT

Standard type used on microphones, amplifiers, speakers, transmitters, etc. Brass machined shells with chrome finish. Threaded coupling and unique button contact permits plugs to be converted to jacks by removal of coupling ring. Receptacles mount in .385″ holes when grounding. .500″ holes for ungrounded two circut operation. Spring cord protection for ¼″ cable.

ORDERING INFORMATION

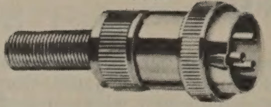
Description	Part No.
Chassis Receptacle	75-PC1M
Straight Plug	75-MC1F
Cable Jack	75-MC1M
Angle Plug	75-MC1FA
Cap & Chain	75-CCC1
Phone Plug Adapter	75-MC1P

91 SERIES MINIATURE CABLE CONNECTORS ORDERING INFORMATION

High quality compact connectors for shielded or unshielded cables. Make ideal battery or antenna connectors. Can also serve as inexpensive microphone connectors.

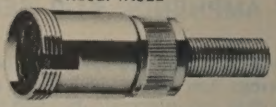
Black phenolic elements, housed in cadmium plated brass shells and held in place by set screws in side. Polarized contact spacing prevents incorrect insertion. Accommodate cables up to ¼″ diameter. Rated 3 amps., 500 volts.

PLUG

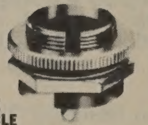


91-MC3M

RECEPTACLE

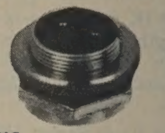


91-MC3F



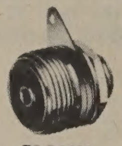
FEMALE RECEPTACLE

91-PC3F

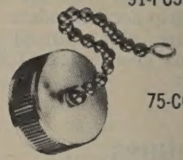


MALE RECEPTACLE

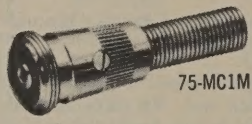
91-PC3M



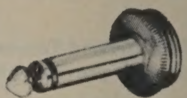
75-PC1M



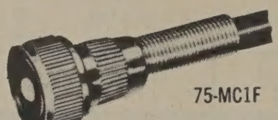
75-CCC1



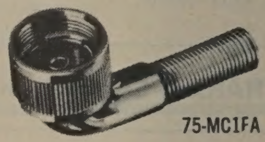
75-MC1M



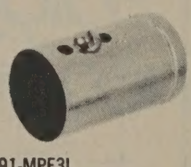
75-MC1P



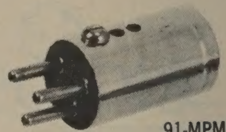
75-MC1F



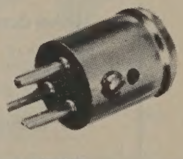
75-MC1FA



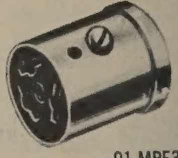
91-MPF3L



91-MPM3L



91-MPM3S



91-MPF3S

ORDERING INFORMATION — CABLE SOCKETS

No. Contacts	Short Shell 13/16″ Long	Long Shell 1 3/16″ Long	Mating Plugs		
			Cable Plug Short 13/16″	Cable Plug Long 1 3/16″	Chassis Unshielded
3	91-MPF3S	91-MPF3L	91-MPM3S	91-MPM3L	86-CP3S
4	91-MPF4S	91-MPF4L	91-MPM4S	91-MPM4L	86-CP4S
5	91-MPF5S	91-MPF5L	91-MPM5S	91-MPM5L	
6	91-MPF6S	91-MPF6L	91-MPM6S	91-MPM6L	

ORDERING INFORMATION

No. Contacts	Short Shell 13/16″ Long	Long Shell 1 3/16″ Long	Mating Sockets			
			Cable Socket Short 13/16″	Cable Socket Long 1 3/16″	*Chassis Shielded	Chassis Unshielded
3	91-MPM3S	91-MPM3L	91-MPF3S	91-MPF3L	78-PCG4	78-S3S
4	91-MPM4S	91-MPM4L	91-MPF4S	91-MPF4L	78-PCG3	78-S4S
5	91-MPM5S	91-MPM5L	91-MPF5S	91-MPF5L	78-PCG5	78-S5S
6	91-MPM6S	91-MPM6L	91-MPF6S	91-MPF6L	78-PCG6	78-S6S

*Note — long shell only

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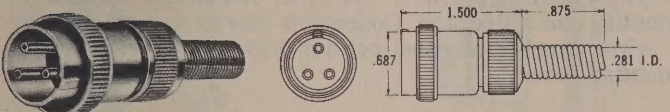
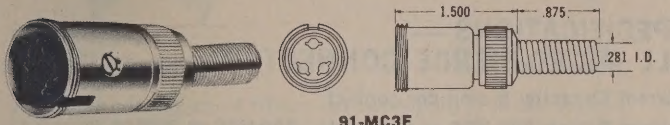
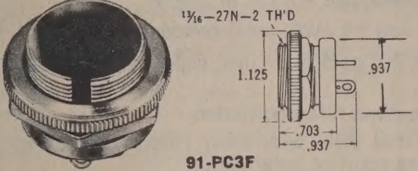
MICROPHONE CONNECTORS



91-MC3M



91-MC3F



91-PC3F

91 Series

These are 3, 4 and 6-contact connectors designed primarily for audio equipment but used extensively on all types of portable equipment.

Positive screw-type coupling ring connection eliminates accidental disconnects. Squeeze type clamp grips cable securely after assembly and prevents pulling and twisting strain on soldered contacts.

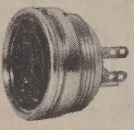
Dielectric is molded from black phenolic. Shell is of brass, finished in bright chrome plating.

Cord protector springs on 3-contact style have .281" I.D.; 4 and 6-contact styles have .385" I.D. Chassis receptacles mount in 27/32" dia. chassis holes up to 1/8" thick. Service end accommodates coupling ring on cable connector or cap and chain to seal open chassis units against dirt or tampering.

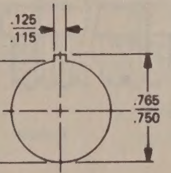
ORDERING INFORMATION

PLUGS		JACKS		RECEPTACLES	
Part No.	Contacts	Part No.	Contacts	Part No.	Contacts
91-MC3M	3 Male	91-MC3F	3 Female	91-PC3F	3 Female
91-MC3F	3 Female	91-MC3M1	3 Male	91-PC3M	3 Male
91-MC4M	4 Male	91-MC4F	4 Female	91-PC4F	4 Female
91-MC4F1	4 Female	91-MC4M1	4 Male	91-PC4M	4 Male
91-MC6M	6 Male	91-MC6F	6 Female	91-PC6F	6 Female

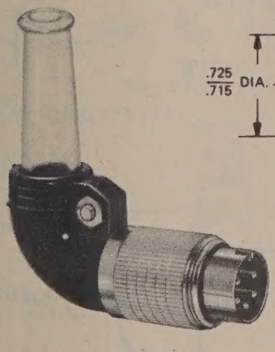
91-T-3360-1



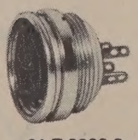
91-T-3363-9



Panel Cutout



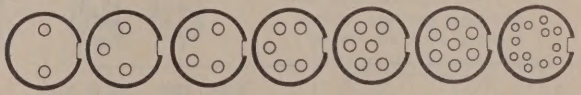
91-T-3360-6



91-T-3363-9

91-T Series

These miniature audio/electronic cable to panel connectors are available with up to 12 contacts in straight or right angle plug styles. They are ideal for use with microphones, recorders, two-way radios, test instruments, industrial controls and data processing. Approximately 33% smaller than Amphenol's standard 91 Series coupling ring connectors, these miniatures are intermateable with some types of imported European electronic equipment. They provide high density, low cost, top quality interconnections for many modern equipment requirements.



ORDERING INFORMATION

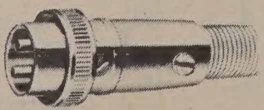
Number of Contacts	PART NUMBERS		
	Cable Plugs		Panel Receptacles
	Straight	Right Angle	
2*	91-T-3200-1	91-T-3200-6	91-T-3203-9
3	91-T-3260-1	91-T-3260-6	91-T-3263-9
4	91-T-3300-1	91-T-3300-6	91-T-3303-9
5	91-T-3360-1	91-T-3360-6	91-T-3363-9
6	91-T-3400-1	91-T-3400-6	91-T-3403-9
7	91-T-3475-1	91-T-3475-6	91-T-3478-9
12	91-T-3635	91-T-3635-6	91-T-3638-9

*Special order only.

JACK

80MC2F

PLUG



80-MC2M

PLUG

80-PC2M

RECEPTACLE

80-PC2F

80 Series Single and Double Contacts

Solid brass shells with polished chrome finish. Single or double pin type contacts for shielded cables, etc. Receptacles mount in 5/8" hole in panels up to 11/32".

ORDERING INFORMATION

Figure	Description	1 Contact	2 Contacts
2	Plug, Pin Contacts	80-M	80-MC2M
2	Plug, Socket Contacts	80-F1	80-MC2F1
1	Jack, Socket Contacts	80-F	80-MC2F
1	Jack, Pin Contacts	80-M1	80-MC2M1
3	Receptacle, Socket Contacts	80-C	80-PC2F
3	Receptacle, Pin Contacts	80-C1	80-PC2M
—	Cap and Chain for Receptacle	75-CCC1	75-CCC1

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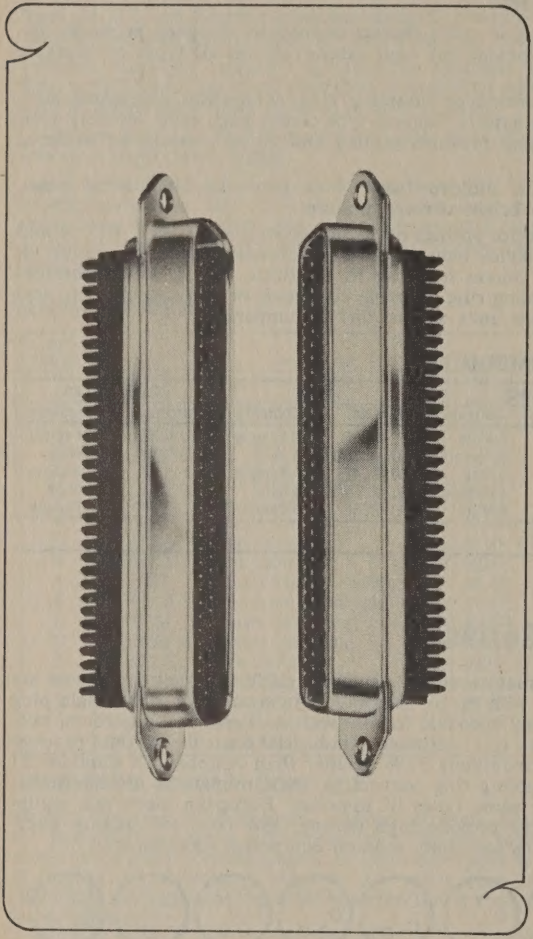
at the right time

AMPHENOL®

BUNKER
RAMO®

157 SERIES MICRO-PIERCE™ CONNECTORS



Note: All rack and panel receptacle connectors have a float-bushing mount that permits .018″ min. radial float for ease of mounting and connection. Connectors may be mounted above or below panels (see panel cut-out drawing below). Use #3 mounting screws.

SPECIFICATIONS — ALL MICRO-PIERCE CONNECTORS

Current Capacity: 5 amp per contact

Voltage Rating: 700 VDC at sea level — 200 VDC at 70,000 ft.

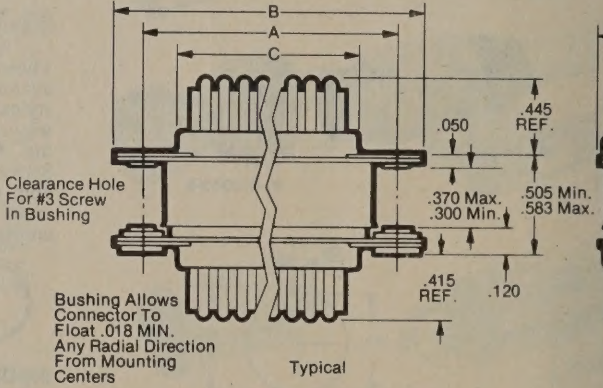
Operating Temperature: −67°F to 257°F

Wire Sizes: 24 and 26 AWG, solid conductor

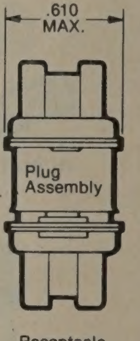
Contacts: .000030″ gold plate over copper flash on cadmium-copper base

Dielectric: Fiberglass-filled polyester

Shells: Zinc-plated steel with clear chromate coating. Trapezoidal shape assures positive polarization


B
A
C
.050
.445 REF.
Clearance Hole For #3 Screw In Bushing
.370 Max. .300 Min.
.505 Min. .583 Max.
.415 REF.
.120
Bushing Allows Connector To Float .018 MIN. Any Radial Direction From Mounting Centers

Typical

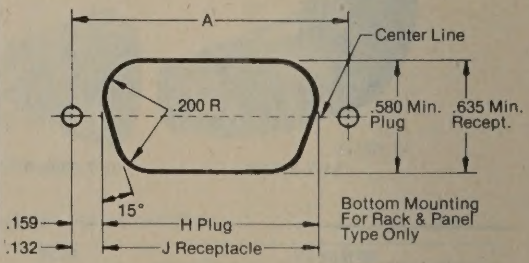

.610 MAX.
Plug Assembly

Receptacle Assembly

DIMENSIONS

(All dimensions are reference only and are in inches)

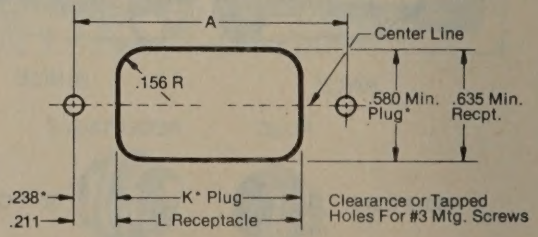
		14 Contacts	24 Contacts	36 Contacts	50 Contacts	64 Contacts
	A	1.417	1.842	2.352	2.947	3.542
	B	1.750	2.175	2.685	3.280	3.875
	C	.910	1.335	1.845	2.440	3.035
Bottom Mounting	H	1.099	1.524	2.034	2.629	3.224
	J	1.153	1.578	2.088	2.683	3.278
Top Mounting	K	.941	1.366	1.876	2.471	3.066
	L	.995	1.420	1.930	2.525	3.120


A
Center Line
.200 R
.580 Min. Plug
.635 Min. Recept.
15°
.159
.132
H Plug
J Receptacle

Bottom Mounting For Rack & Panel Type Only

ORDERING INFORMATION

Contacts	Plug	Receptacle
14	157-12140	157-22140
24	157-12240	157-22240
36	157-12360	157-22360
50	157-12500	157-22500
64	157-12540	157-22640


A
Center Line
.156 R
.580 Min. Plug*
.635 Min. Recpt.
.238*
.211
K* Plug
L Receptacle

Clearance or Tapped Holes For #3 Mtg. Screws

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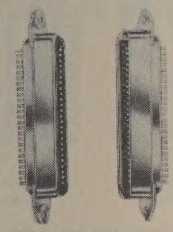
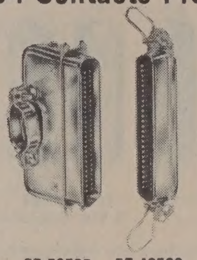
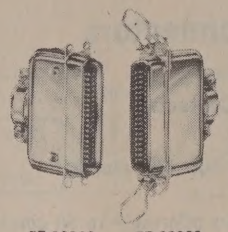
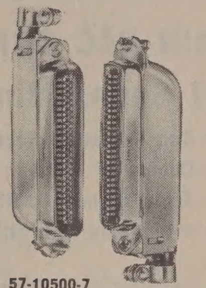
57 SERIES MICRO-RIBBON® CONNECTORS

High Contact Density — 14 to 64 Contacts Protective Polarized Shell


57-10500 57-20500
RACK & PANEL


57-50500 57-40500
SIDE CABLE ENTRY


57-30360 57-60360
TOP CABLE ENTRY


57-10500-7 57-20500-7
LOW PROFILE HOOD

All of the advantages of ribbon contacts apply to Micro Ribbon Connectors. This includes the self-cleaning, self-wiping action of the contacts and extremely low insertion and withdrawal forces. Dielectric is improved diallyl phthalate with high impact strength and low moisture absorbency characteristics. Trapezoidal shells provide polarization, and are made of zinc plated brass with a clear chromate conversion seal. Small size makes the Amphenol Micro Ribbon Connector ideal for high density miniature modules as well as rack and panel applications. Connectors may be top or bottom mounted. Rated 700V DC at sea level; 200 VDC at 70,000 feet.

Rack and Panel and Module Applications. Receptacle mounting plate includes float bushings to allow a float of .020 in each direction. This facilitates blind mating and minimizes the need for critical mounting dimensions.

Cable-To-Panel Application. Panel receptacles are equipped with sturdy spring latches which are guided and retained by cutouts in the plug's flanges. Receptacles must be top mounted. Cable entry at top side, as desired.

SPECIFICATIONS

(Meets requirements of SCL-6020A)

Current Capacity — 5 amps per contact.

Voltage Rating — 700 volts D.C. at sea level.
200 volts D.C. at 70,000 ft.

Operating Temperature — −55°C to +105°C
−67°F to +221°F

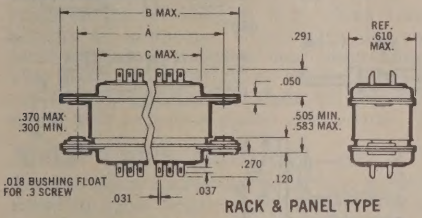
Wire Sizes — Solid — 22 gauge max.
Stranded — 24 gauge max.

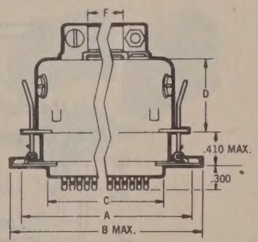
Contacts — .000030″ gold plated over copper flash on cadmium copper base.

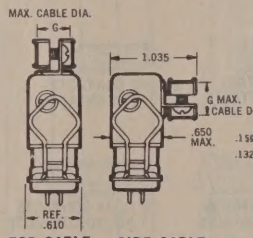
Dielectric — Diallyl phthalate per Mil-M-14F Type MDG

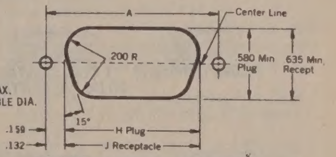
Shells — Zinc plated Steel with clear chromate coating, trapezoidal shape for polarization. Gold iridescent chromate finish also available.

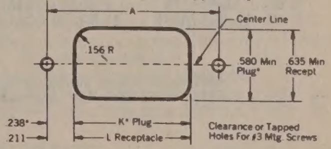
DIMENSIONS


B MAX.
A
C MAX.
.291
.050
REF. .610 MAX.
.370 MAX. .300 MIN.
.505 MIN. .583 MAX.
.270
.120
.018 BUSHING FLOAT FOR .3 SCREW
.031
.037
RACK & PANEL TYPE

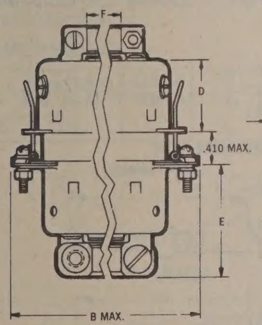

F
D
.410 MAX.
.300
C
A
B MAX.
CABLE-TO-PANEL TYPE

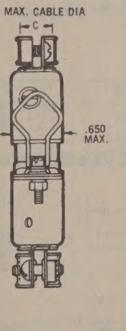

MAX. CABLE DIA.
G
1.035
G MAX. CABLE DIA.
.650 MAX.
REF. .610
TOP CABLE ENTRY SIDE CABLE ENTRY


A
Center Line
200 R
.580 Min Plug
.635 Min Recept
15°
.150
.132
H Plug
J Receptacle
CUTOUT—BOTTOM MOUNTING
for rack and panel type only

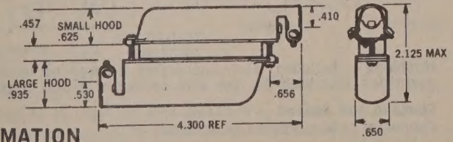

A
Center Line
156 R
.580 Min Plug*
.635 Min Recept
.238*
.211
K* Plug
L Receptacle
Clearance or Tapped Holes For #3 Mtg. Screws
CUTOUT—TOP MOUNTING
for both types

CABLE-TO-CABLE TYPE


F
D
.410 MAX.
E
B MAX.


MAX. CABLE DIA
C
.650 MAX.
TOP CABLE ENTRY

LOW PROFILE HOOD


.457
SMALL HOOD .625
.410
2.125 MAX
LARGE HOOD .935
.530
.656
4.300 REF
.650

DIMENSIONS

		14 Contacts	24 Contacts	36 Contacts	50 Contacts	64 Contacts
BOTH TYPES	A	1.417	1.842	2.352	2.947	3.542
	MAX. B	1.750	2.175	2.685	3.270	3.875
	MAX C	.910	1.335	1.845	2.440	3.035
CABLE TO CHASSIS TYPE ONLY	D	.843	.825	.905	.995	—
	E	1.243	1.225	1.305	1.395	—
	F	.301	.468	.629	.756	—
	G	.412	.468	.468	.468	—
BOTTOM MOUNTING FOR RACK & PANEL TYPE ONLY	H	1.098	1.523	2.033	2.628	3.224
	J	1.153	1.578	2.088	2.683	3.278
TOP MOUNTING FOR BOTH TYPES	K	.940	1.365	1.875	2.470	3.065
	L	.955	1.420	1.930	2.525	3.120

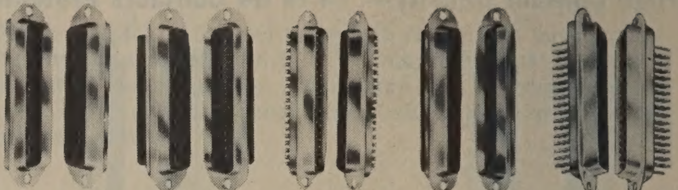
ORDERING INFORMATION

Con-tacts	Rack and Panel Module Applications Stand. Solder Cup Tails Plugs	 Re-ceptacles	 Tapered P.C. Tails Plugs	 Re-ceptacles	Cable to Panel Applications Top Entry Cable Plugs	 Side Entry Cable Plugs	 Re-ceptacles	Cable-To-Cable Application Plugs	 Re-ceptacles	Low Profile
14	57-10140	57-20140	57-10140-4	57-20140-8	57-30140	57-50140	57-40140	See Cable to Panel Listing	57-60140	50 contacts only. Receptacle — 57-20500-7 Plug — 57-10500-7
24	57-10240	57-20240	57-10240-3	57-20240-8	57-30240	57-50240	57-40240		57-60240	
36	57-10360	57-20360	57-10360-13	57-20360-9	57-30360	57-50360	57-40360		57-60360	
50	57-10500	57-20500	57-10500-27	57-20500-31	57-30500	57-50500	57-40500		57-60500	
64	57-10640	57-20640	—	—	—	—	—		—	

MIN RAC CONNECTORS

17 Series Min Rac® Connectors

- **Sub Miniature Rack and Panel**
- **Choice of Fixed or Removable Contacts.**
- **Eight Styles — Unlimited Variety**
- **Intermates with all "D" Shaped Sub Miniatures.**

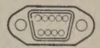


Poke Home | Encapsulated & Rear Release | Fixed Contact | Power & Coax | Solderless Wrap

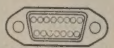
A complete line of versatile connectors offering 9 to 50 contacts in a choice of arrangements and dielectrics. Cable housings are available for cable-to-panel or cable-to-cable applications, and several locking devices are offered. These lightweight, miniature connectors are ideal for computers, telecommunications, instrumentation and avionics systems not requiring environmental capability. Meets EIA Standard RS-232C for data communications input output connectors.

Contact Arrangements

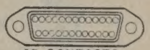
FOR ORIGINAL POKE HOME, REAR RELEASE, FIXED CONTACT, SOLDERLESS WRAP AND ENCAPSULATED CONTACT



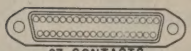
9 CONTACTS



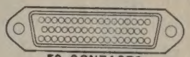
15 CONTACTS



25 CONTACTS

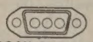


37 CONTACTS

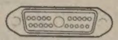


50 CONTACTS

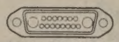
FOR POWER AND COAX COMBINATION



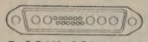
3 COAX CONTACTS



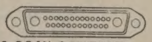
1 COAX CONTACT
20 NO. 20 CONTACTS



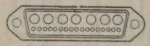
2 COAX CONTACTS
15 NO. 20 CONTACTS



5 COAX CONTACTS
12 NO. 20 CONTACTS



2 COAX CONTACTS
25 NO. 20 CONTACTS



7 COAX CONTACTS
17 NO. 20 CONTACTS

Additional insert configurations are available. Refer to factory for information.

Specifications

ORIGINAL POKE HOME & ENCAPSULATED CONTACT

Temperature Range: −55°C to +125°C.
Current Rating: 7.5 Amps.
Voltage Rating: 500 VAC (RMS) at sea level. 150 VAC (RMS) at 90,000 ft.
Dielectric: Zytel 101 nylon per Mil-P-20693.
Shells: Cadmium-plated cold-rolled steel with clear chromate finish.

Contacts: Crimp Type — .00002″ min. gold over copper plated silnic bronze. Solder type — .00002″ min. gold over copper plated brass.
Wire Size: Solder: Up to #20; crimp #20, #22 and #24 AWG.

FIXED CONTACTS and POWER & COAX.

Temperature Range: −55°C to +125°C.
Current Rating: 7.5 Amps.
Voltage Rating: 500 VAC (RMS) at sea level. 150 VAC (RMS) at 70,000 ft.
Dielectric: Glass-filled nylon.
Shells: Same as above.
Contacts: Power; Screw machine type — .00002″ min. gold over copper plated brass. Punch press type — Stamped from phosphor bronze and plated .00002″ gold over copper flash. Wire wrap type — .00002″ min. gold over copper plated brass. .500″ Lg. x .025″ Sq. Coax.; #1 Shielded contacts are gold plated.
Wire Size: Up to #20 wire.

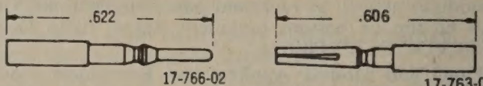
Rear Removable Contacts

Temperature Range: −55°C to +125°C.
Current Rating: 7.5 amps.
Voltage Rating: 500 VAC at sea level. 125 VAC at 70,000 ft.
Dielectric: Glass-filled nylon.
Shells: Same as above.
Contact Type: Crimp Poke-Home, rear insertion, rear release.
Contact Material: Machined contacts — silnic bronze. Strip formed contacts — beryllium copper.
Contact Finish: .000030″ gold over copper plating
Contact Wire Sizes: Machined contacts — 20 to 24 AWG. Strip formed contacts — 22 to 26 AWG.

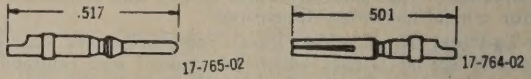
Contacts

For Original Poke Home Line Only

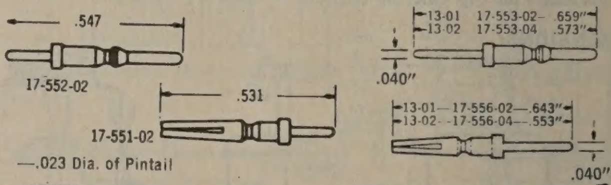
Standard Crimp Type Contacts

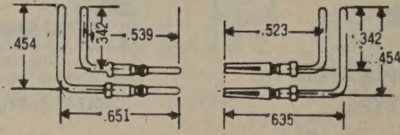


Standard Solder Type Contacts



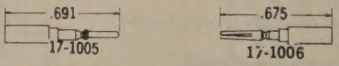
Pintail Contacts for P.C. Mounting





Right angle pintails for P.C. mounting—.040 dia. pintails

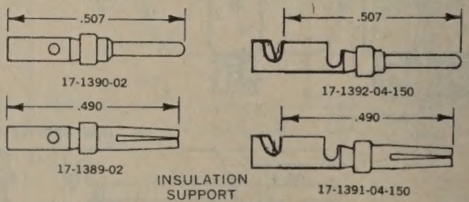
Optional Contacts



Over-size crimp barrel contacts for 16 ga. wire

For Rear Release Contact Line Only

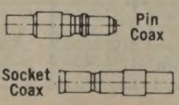
MACHINED | STRIP-FORMED



Machined — Included when connectors ordered by deviation —17. Order bulk quantities separately for use with connector bodies ordered by deviation —18.

Stamped and Formed — Available only on reels of 15,000 contacts for use with connector bodies ordered by deviation —18.

For Power & Coax Combination Only



Pin	Cables	Socket
17-1112-01	For RG195/U and RG195A/U cable	17-1113-01
17-1132-01	For RG178B/U, RG196/U and RG196A/U cable	17-1130-01
17-1264-01	For RG58/U, RG141/U, RG141A/U, and RG303/U	17-1265-01

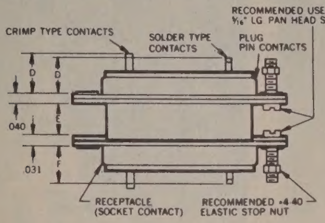
The right idea
at the right time

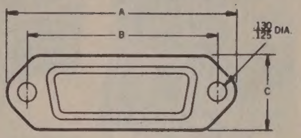
AMPHENOL®

BUNKER RAMO®

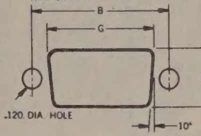
MIN RAC CONNECTORS

17 Series Min Rac® Connectors


RECOMMENDED USE OF #4-40 NC-2 5/16" LG. PAN HEAD SCREW
CRIMP TYPE CONTACTS
SOLDER TYPE CONTACTS
PLUG PIN CONTACTS
D
D
E
F
.040
.031
RECEPTACLE (SOCKET CONTACT)
RECOMMENDED #4-40 ELASTIC STOP NUT



MOUNTING CUTOUT



DIMENSIONS

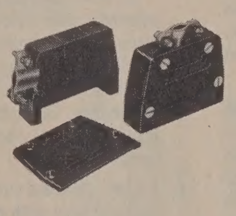
Con-nector Size	All Lines A Max.	All Lines B	All Lines C Max.	D (1)	D (2)	D (3)	D Encapsu-lated Contact Line Only	D Rear Release	D Power & Coax. Comb. Only	E All Lines	F (1)	F (2)	F (3)	F Encapsu-lated Contact Line Only	F Rear Release	F Power & Coax. Comb. Only	Mounting Dimensions — All Lines G (Min.) Back Mtg.	G (Min.) Front Mtg.	H (Min.) Back Mtg.	H (Min.) Front Mtg.
9	1.239	.984	.515	25/64	9/32	43/64	29/64	23/64	11/16	15/64	13/32	19/64	11/16	29/64	23/64	3/4	.798	.830	.448	.505
15	1.567	1.312	.515	25/64	9/32	43/64	29/64	23/64	11/16	15/64	13/32	19/64	11/16	29/64	23/64	3/4	1.116	1.161	.448	.505
25	2.114	1.852	.515	25/64	9/32	43/64	29/64	23/64	11/16	15/64	13/32	19/64	11/16	29/64	23/64	3/4	1.654	1.701	.448	.505
37	2.754	2.500	.515	25/64	9/32	43/64	29/64	23/64	23/32	15/64	13/32	19/64	11/16	29/64	23/64	3/4	2.304	2.348	.448	.505
50	2.661	2.406	.626	25/64	9/32	43/64	29/64	23/64	23/32	15/64	13/32	19/64	11/16	29/64	23/64	3/4	2.210	2.285	.559	.645

(1) Original Poke-Home with Crimp Contacts.
(2) Original Poke-Home and Fixed Contacts with Solder Contacts.
(3) Fixed Contacts with Solderless wrap tails only.

17 Series Min Rac Accessories

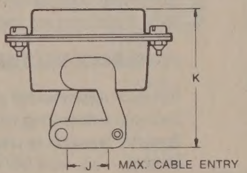
Plastic Backshell

A versatile accessory for all Min Rac connectors. Protects connector terminations and provides cable strain relief. Unique removable side panel allows attachment even after cable has been terminated. Can easily be removed for servicing in field. Deep recess accepts all connector styles, even encapsulated and power and coax lines. Interchangeable insert and cable clamp allows choice of top or side cable entry. Made of glass-filled nylon with cadmium plated steel clamp.



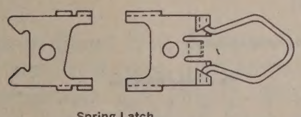
Metal Cable Housing

Used to adapt connector for cable to panel or cable to cable applications. Easily attached to connector by two screws. Available in clear chromate or gold iridite finish to match connector shells.

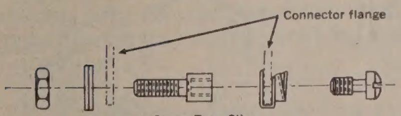


DIMENSIONS

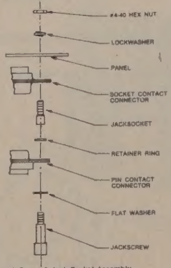
	Size 9	15	25	37	50
J	13/32	13/32	19/32	23/32	23/32
K	1 23/64	1 23/64	1 25/64	1 25/64	1 25/64



Spring Latch



Screw Type Clip



Jack Screw & Jack Socket Assembly

PART NUMBERS

Shell Size	Backshell & Cable Housings Plastic	Metal Clear Chromate	Metal Gold Iridite	Spring Latch Locking Device Clear Chromate	Gold Iridite	Screw Latch Locking Device Clear Chromate	Gold Iridite	Jackscrew & Socket Assembly Clear Finish Only	Potting Molds
9	17-1370	17-310-01	17-310-02	17-529	17-847	17-768	17-848	17-895	17-886-09
15	17-1371	17-311-01	17-311-02	17-529	17-847	17-768	17-848	17-895	17-886-15
25	17-1372	17-312-01	17-312-02	17-529	17-847	17-768	17-848	17-895	17-886-25
37	17-1373	17-313-01	17-313-02	17-529	17-847	17-768	17-848	17-895	17-886-37
50	17-1374	17-314-01	17-314-02	17-770	17-850	17-768	17-848	17-895	17-886-50

How to Order 17 Series Min Rac Connectors

17—1 1 09 0—1

DEVIATIONS

- **0** Solder Contacts
- **1** Crimp Contacts, Male or Female
- **5** Solder Contact and Float Mtd. (Female only)
- **6** Crimp Contact and Float Mtd. (Female only)
- **11** .023 Dia. .138 Pin Tail Contacts for Nylon inserts only
- **13-01** .040″ Dia. Pin Tail Contacts with .225″ usable tail length (for orig. Poke-Home Line only)
- **13-02** .040″ Dia. Pin Tail Contacts with .140″ usable tail length (for orig. Poke-Home Line only)
- **15** Low cost punch press type fixed contacts
- **16** Screw machine type fixed contacts
- **17** Rear Release Connectors with screw machined Poke-Home contacts
- **18** Rear Release Connector body only
- **19** 01 Wire wrap type tails .300″ Lg. x .025″ Sq.
- **19** 02 Wire wrap type tails .500″ Lg. x .025″ Sq.

COAX CONTACTS

(Must be ordered separately).

- **0** - None
- **1** - 1 Coax.
- **2** - 2 Coax.
  Etc.

NUMBER OF POWER CONTACTS

- **09** - 9 contacts
- **15** - 15 contacts

FINISH

- **0** Cadmium w/clear chromate
- **1** Cadmium w/gold iridite

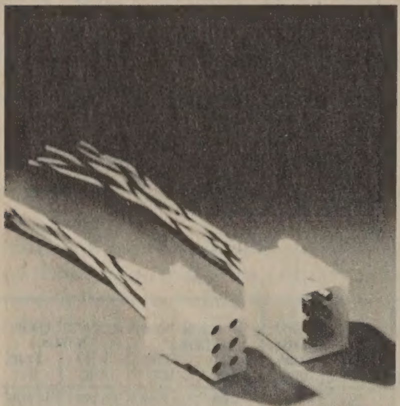
CONNECTOR TYPE

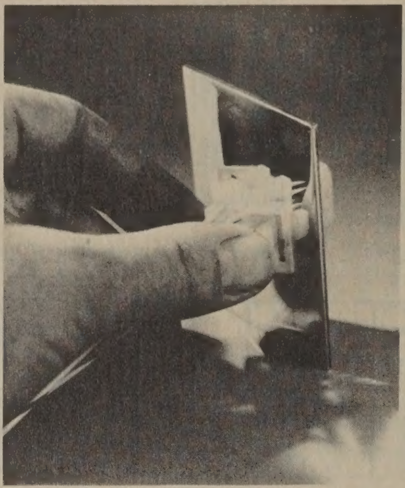
- **1** Receptacle (Zytel) Socket Contacts
- **2** Plug (Zytel) Pin Contacts
- **8** Receptacle (Glass-Filled Nylon) Socket Contacts
- **9** Plug (Glass-Filled Nylon) Pin Contacts

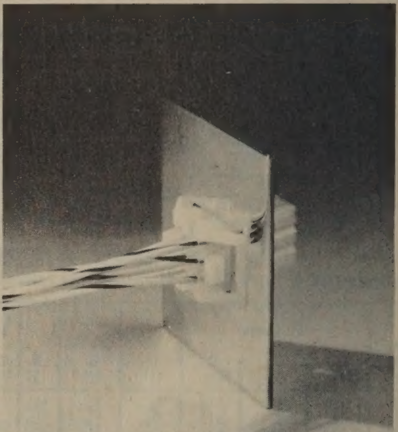
SERIES NUMBER 17

The right idea at the right time / **AMPHENOL®** / BUNKER RAMO®

32 SERIES FIRE-PLUG™ and ECONO-PLUG™ CONNECTORS







- **Flame Retardant Material**
- **Low Cost**
- **Rugged and Reliable**
- **2-3-6-9-12-15 contact sizes**
- **Intermateable and interchangeable with competitive connectors**
- **Panel mount and cable connector styles**

Amphenol's Commercial Electronics Connector provides reliable interconnections with real cost saving potential. Low initial procurement cost; automatic crimp contact termination: fast, easy assembly into panels; and quick, simple removal and replacement for field servicing, if necessary. They are ideal for appliances, home entertainment equipment, coin operated machines, business machines . . . anywhere.

The FIRE-PLUG connector housings are the stalwart of the industry, CSA approved, and carry U.L. flame retardant rating of 94V-0. The ECONO-PLUG housing are molded from 94V-2 rated material for less critical applications and are available in six different colors for coding. Both housings are rugged single piece molded. They are polarized to prevent mismating. Contact wire pockets are recessed to prevent exposed wires and possible electrical failure or shock hazard. Available in 2, 3, 6, 9, 12, and 15 contact sizes. Fully intermateable and intermountable with many competitive types.

ORDERING INFORMATION

FLAME RETARDANT NYLON. Contact Factory for Regular Nylon Material.

Receptacles

Housing Type		Interlock	Wing Panel Lock	Housing Type	Regular Nylon	Flame Retardant
2 Contacts	Pin	With	With	Panel-Mt. Plug	32-02P11-11	32-02P22-11
			Without	Cable-Mt. Plug	32-02P11-21	32-02P22-21
	Socket	With	With	Panel-Mt. Socket	32-02S11-11	32-02S22-11
			Without	Cable Socket	32-02S11-21	32-02S22-21
3 Contacts	Pin	With	With	Panel-Mt. Plug	32-03P11-11	32-03P22-11
			Without	Cable-Mt. Plug	32-03P11-21	32-03P22-21
	Socket	With	With	Panel-Mt. Socket	32-03S11-11	32-03S22-11
			Without	Cable Socket	32-03S11-21	32-03S22-21
6 Contacts	Pin	With	With	Panel-Mt. Plug	32-06P11-11	32-06P22-11
			Without	Cable-Mt. Plug	32-06P11-21	32-06P22-21
	Socket	With	With	Panel-Mt. Socket	32-06S11-11	32-06S22-11
			Without	Cable Socket	32-06S11-21	32-06S22-21
9 Contacts	Pin	With	With	Panel-Mt. Plug	32-09P11-11	32-09P22-11
			Without	Cable-Mt. Plug	32-09P11-21	32-09P22-21
	Socket	With	With	Panel-Mt. Socket	32-09S11-11	32-09S22-11
			Without	Cable Socket	32-09S11-21	32-09S22-21
12 Contacts	Pin	With	With	Panel-Mt. Plug	32-12P11-11	32-12P22-11
			Without	Cable-Mt. Plug	32-12P11-21	32-12P22-21
	Socket	Without	With	Panel-Mt. Socket	32-12S11-12	32-12S22-12
			Without	Cable Socket	32-12S11-22	32-12S22-22
15 Contacts	Pin	Without	With	Panel-Mt. Plug	32-15P11-12	32-15P22-12
			Without	Cable-Mt. Plug	32-15P11-22	32-15P22-22
	Socket	Without	With	Panel-Mt. Socket	32-15S11-12	32-15S22-12
			Without	Cable Socket	32-15S11-22	32-15S22-22

Panel mounted connectors have a unique locking feature that provides simple, secure mounting in panels from .032″ to .093″ thick. A simple push sets the connector automatically, no tools, no struggle. The locking wings hold it firmly in place. If necessary to remove the connector, simple press the locking tab from the rear and the connector slips out. The sturdy wings do not break off or come loose, even after repeated mounting cycles.

To conserve space and improve appearance, cable to cable connectors do not have panel mounting wings. Fully mated connectors lock together to prevent loosening under vibration.

32 Series contacts are furnished on reels for use with high volume semi-automatic production crimping presses, or individually in small quantities for manual wire termination. The contacts can be crimped to 14 through 30 gauge insulated wire. There are three wire barrel sizes to assure the correct combination of wire and contact for the strongest and most reliable crimp termination. Contacts are easilv inserted into the housing and locked in place with a hand tool. This same inexpensive hand tool is used to remove the contacts.

The standard-size .093″ diameter contacts are completely interchangeable with other contacts. Pin and socket contacts can be assembled in either the plug or the receptacle for quick "hot side" changes or for additional polarization. Normally the pin contacts are used in the plug and socket contacts are used in the mating receptacle.

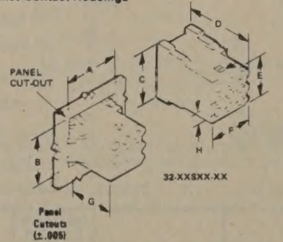
PERFORMANCE SPECIFICATIONS

Maximum recommended operating voltage:	250 volts
Dielectric withstanding voltage:	1800 volts
Operating temperature range:	−55°C to+105°C

Material: U.L. rated 94V-0 nylon-base material (Fire-Plug)
or 94V-2 nylon (Econo-Plug)

DIMENSIONS (all dimensions are reference only and are in inches)

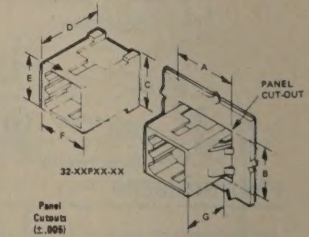
Socket-Contact Housings



32-XXSXX-XX

Sockets	A	B	C	D	E	F	G	H
2	.725	.312	.420	1.060	.250	.537	.730	.248
3	.840	.312	.420	1.060	.234	.671	.730	.198
6	.900	.718	.772	1.060	.632	.434	.730	.198
9	.828	.725	.772	1.060	.621	.666	.730	.198
12	1.050	.655	.772	1.060	.633	.870	.730	.198
15	1.240	.655	.772	1.060	.632	1.167	.730	.198

Pin-Contact Housings



32-XXPXX-XX

Sockets	A	B	C	D	E	F	G	H
2	.800	.375	.420	1.035	.352	.640	.706	.248
3	.933	.375	.420	1.035	.338	.773	.706	.198
6	.695	.750	.902	1.035	.734	.536	.706	.198
9	.937	.725	.802	1.035	.713	.775	.706	.198
12	1.155	.760	.818	1.035	.737	.975	.706	.198
15	1.343	.760	.822	1.035	.737	1.168	.706	.198

The right idea at the right time / AMPHENOL® / BUNKER RAMO®

COMMERCIAL ELECTRONIC CONNECTORS

32 Series Connectors (Cont'd)

Wire Size	Type	Amphenol Pin and Socket Terminals	
		Loose in Bag (100 per Bag)	Contacts on Reels*
14-16 Ga.	Pin	32-1416P-00100BT	32-1416P-5000RT
	Socket	32-1416S-00100BT	32-1416S-5000RT
16-20 Ga.	Pin	32-1620P-00100BT	32-1620P-6000RT
	Socket	32-1620S-00100BT	32-1620S-6000RT
22-30 Ga.	Pin	32-2230P-00100BT	32-2230P-6000RT
	Socket	32-2230S-00100BT	32-2230S-6000RT

*Contacts on carrier strips are packed on reels, 5000 contacts for 14-16, and 6000 each for 16-20 and 22-30 size.

Contacts are tin plated; gold plating available upon request.

ORDERING INFORMATION — TOOLS

Full Cycle Hand Crimp Tool, 357-564 Contact Insertion/Removal Tool, 356-229 Economy Hand Crimp Tool, 357-561

Semi-automatic Crimping Machine with Applicator

For 14-16 Ga. Wire Order, 359-202 For 16-20 Ga. Wire Order, 359-203 For 22-30 Ga. Wire Order, 359-204

ELECTRICAL AND MECHANICAL SPECIFICATIONS FOR AMPHENOL FIRE-PLUG AND ECONO-PLUG CONTACTS

Maximum Contact Resistance: 3 miliohms

Current Rating

Wire Gauge Size	Maximum Current Rating
14	12 Amp
16	10 Amp
18	7.5 Amp
20	4 Amp
22	3 Amp
24	2 Amp
26	1.5 Amp
28	1.1 Amp
30	1.0 Amp

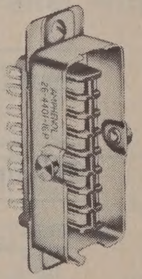
BLUE RIBBON™ CONNECTORS

26 Series Cable to Panel and Cable to Cable Types

- **Low Withdrawal Force**
- **Low Insertion Force**
- **Provisions for Safety Wiring**
- **Secure Spring Latch**
- **Alternate Positions**

Cable-to-Panel Blue Ribbon Connectors include a straight plug, right angle plug, and panel receptacle. The plug is equipped with a spring tension swivel latch to insure mating, even in vibration applications. Provision for safety wiring provides additional reliability.

The nickel plated brass shells are notched to provide keying for alternate positions. The large number of alternate positions available is effectively doubled since the plug and receptacles are available with either a male or a female insert. Add P to the catalog number for a male insert; S for a female insert.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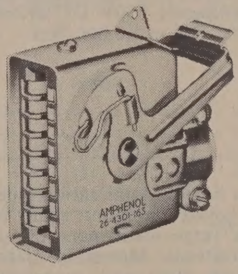
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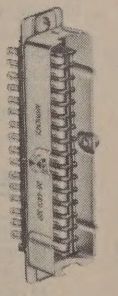
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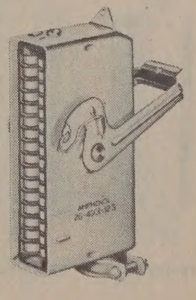
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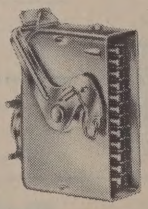
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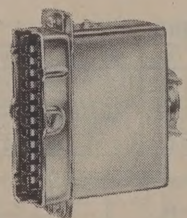
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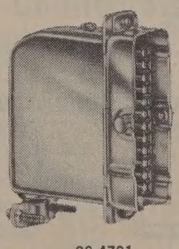
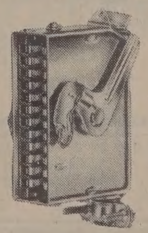
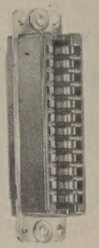

26-4701


26-4501

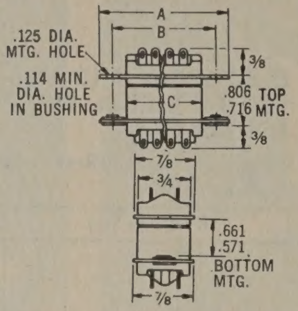
The right idea at the right time / AMPHENOL® / BUNKER RAMO®

26 Series Blue Ribbon™ Connectors

Barrier Polarization

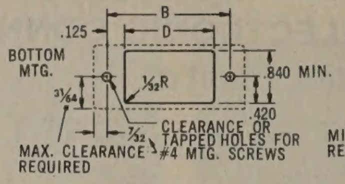

26-4200-24S

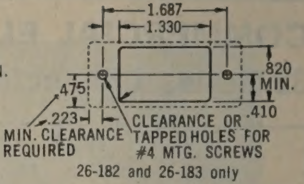
26-4100-24P


A
B
.125 DIA.
MTG. HOLE
3/8
.114 MIN.
DIA. HOLE
IN BUSHING
C
.806 TOP
.716 MTG.
3/8
7/8
3/4
.661
.571
BOTTOM
MTG.
7/8

Tapered design of plug body provides pre-alignment of mating contacts. Dielectric barriers between contacts vary in thickness by minute dimensions to provide polarization. Float bushings allow a float of up to .02 in each direction, facilitating the blind mating common in rack and panel applications. Requires simple rectangular panel cutout.

The eight contact size is also available with a molded key and keyway for polarization. Catalog numbers, 26-182 plug and 26-183 receptacle.


B
.125
D
BOTTOM
MTG.
1/32R
.840 MIN.
3/64
.420
CLEARANCE OR
7/32
TAPPED HOLES FOR
#4 MTG. SCREWS
MAX. CLEARANCE
REQUIRED


1.687
1.330
.820
MIN.
.475
.410
.223
MIN. CLEARANCE
REQUIRED
CLEARANCE OR
TAPPED HOLES FOR
#4 MTG. SCREWS

26-182 and 26-183 only

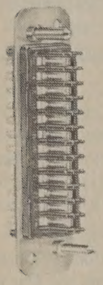
Contacts	Plugs	Mating Receptacles	DIMENSIONS A	B	C	D
8	26-4100-8P	26-4200-8S	1.719	1.375	1.036	1.120
16	26-4100-16P	26-4200-16S	2.469	2.125	1.784	1.868
24	26-4100-24P	26-4200-24S	3.219	2.875	2.536	2.620
32	26-4100-32P	26-4200-32S	3.969	3.625	3.286	3.370
8	26-182	26-183	—	—	—	—

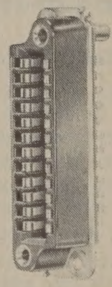
SPECIFICATIONS (Exceed requirements of SCL-6020A)

Current Capacity — 5 Amps per contact
Voltage Rating — 750 volts D.C. at sea level.
300 volts D.C. at 60,000 feet
Operating Temperature — −55°C to +125°C
−67°F to +257°F
Contact Plating — .00002″ gold over copper base
Maximum Wire Size — 16 gauge

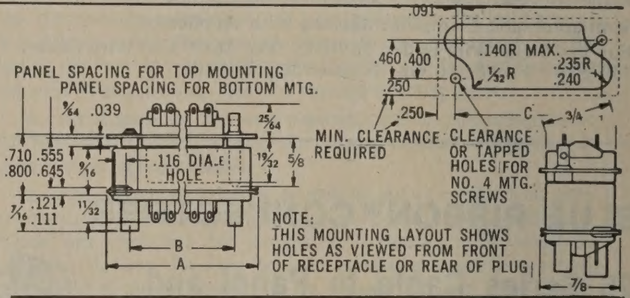
Plugs and receptacles are molded of high impact diallyl phthalate dielectric with molded-in mounting plates of corrosion resistant passivated stainless steel.

Pin Polarization


26-159-24


26-190-24

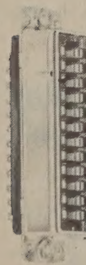
Sturdy guide pins pre-align connectors before contact engagement. Pins are of dissimilar size to avoid reverse mating. Float bushings on receptacle allow a float in all directions of .02″ to minimize the need for close mounting dimensions and to assist in blind matings. Rated 5 amperes, 750V DC at sea level; 300V DC at 60,000 feet.

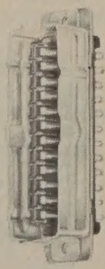

.091
.460 .400
.250
.140R MAX.
.235R
1/32R
.240
PANEL SPACING FOR TOP MOUNTING
PANEL SPACING FOR BOTTOM MTG.
5/64 .039
25/64
.250
C
3/4
MIN. CLEARANCE
REQUIRED
CLEARANCE
OR TAPPED
HOLES FOR
NO. 4 MTG.
SCREWS
.710 .555
.800 .645
5/16
.116 DIA.
HOLE
19/32
5/8
.121
7/16 .111
11/32
B
A
7/8

NOTE:
THIS MOUNTING LAYOUT SHOWS HOLES AS VIEWED FROM FRONT OF RECEPTACLE OR REAR OF PLUG

Contacts	Plug	Receptacle	DIMENSIONS A	B	C
16	26-159-16	26-190-16	2.442	1.842	2.024
24	26-159-24	26-190-24	3.118	2.522	2.704
32	26-159-32	26-190-32	3.798	3.202	3.384

Keyed Shells

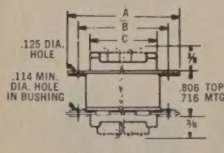

26-4201-24P

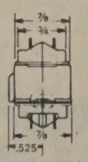

26-4101-24S

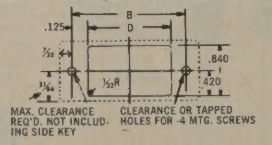
Similar to barrier polarization type, but with keyed aluminum shells to provide a large assortment of alternate positions. Mounting plates are stainless steel and receptacle includes float bushings which allow a float of .02 in all directions. Rated 5 amperes, 800 V DC at sea level; 300 V DC at 70,000 feet.

DIMENSIONS

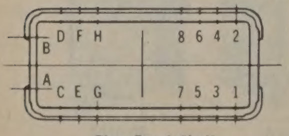
	A	B	C	D
8 contact	1.719	1.375	1.036	1.120
16 contact	2.469	2.125	1.784	1.868
24 contact	3.219	2.875	2.536	2.620
32 contact	3.969	3.625	3.286	3.370


A
B
C
.125 DIA.
HOLE
.114 MIN.
DIA. HOLE
IN BUSHING
3/8
.806 TOP
.716 MTG.
3/8

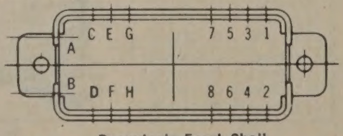



B
.125
D
7/32
.840
3/64
1/32R
.420
MAX. CLEARANCE
REQ'D. NOT INCLUD-
ING SIDE KEY
CLEARANCE OR TAPPED
HOLES FOR #4 MTG. SCREWS

KEYING IDENTIFICATION


D F H
8 6 4 2
B
A
C E G
7 5 3 1

Plug Front Shell


C E G
7 5 3 1
A
B
D F H
8 6 4 2

Receptacle Front Shell

Ordering Information

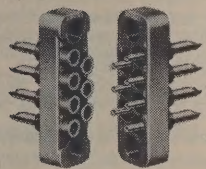
Contacts	Plug	Receptacle	Position	Shell Keys Letters	Numbers
8	26-4101-8P	26-4201-8S	1	A	1
	26-4102-8P	26-4202-8S	2	A	2
	26-4103-8P	26-4203-8S	3	B	1
	26-4104-8P	26-4204-8S	4	B	2
16	26-4101-16P	26-4201-16S	1	A-C	3-6
	26-4102-16P	26-4202-16S	2	A-D	2-5
	26-4103-16P	26-4203-16S	3	A-E	5-6
	26-4104-16P	26-4204-16S	4	A-F	4-5
	26-4105-16P	26-4205-16S	5	B-C	1-6
	26-4106-16P	26-4206-16S	6	B-D	1-2
	26-4107-16P	26-4207-16S	7	B-E	1-4
	26-4108-16P	26-4208-16S	8	B-F	2-3
24	26-4101-24P	26-4201-24S	1	A-C	3-6
	26-4102-24P	26-4202-24S	2	A-D	4-7
	26-4103-24P	26-4203-24S	3	A-E	5-6
	26-4104-24P	26-4204-24S	4	A-F	4-5
	26-4105-24P	26-4205-24S	5	A-G	6-7
	26-4106-24P	26-4206-24S	6	A-H	1-6
	26-4107-24P	26-4207-24S	7	B-C	2-7
	26-4108-24P	26-4208-24S	8	B-D	1-2
	26-4109-24P	26-4209-24S	9	B-E	1-4
	26-4110-24P	26-4210-24S	10	B-F	2-3
	26-4111-24P	26-4211-24S	11	B-G	3-4
	26-4112-24P	26-4212-24S	12	B-H	2-5
32	26-4101-32P	26-4201-32S	1	A-C	3-6
	26-4102-32P	26-4202-32S	2	A-D	4-7
	26-4103-32P	26-4203-32S	3	A-E	5-6
	26-4104-32P	26-4204-32S	4	A-F	4-5
	26-4105-32P	26-4205-32S	5	A-G	6-7
	26-4106-32P	26-4206-32S	6	A-H	1-6
	26-4107-32P	26-4207-32S	7	B-C	2-7
	26-4108-32P	26-4208-32S	8	B-D	1-2
	26-4109-32P	26-4209-32S	9	B-E	1-4
	26-4110-32P	26-4210-32S	10	B-F	2-3
	26-4111-32P	26-4211-32S	11	B-G	3-4
	26-4112-32P	26-4212-32S	12	B-H	2-5

The right idea at the right time / **AMPHENOL®** / **BUNKER RAMO®**

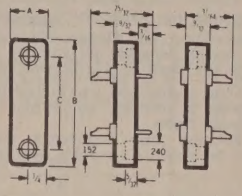
126 Series Miniature Rack and Panel Connectors

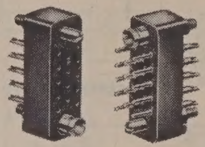
Heavy duty, reliable, time proven connectors. Dielectric is of melamine. Contacts are gold over silver plated. Voltage rating of types 1 and 2 is 700V RMS between contacts and 600V RMS between contacts and ground with a current rating of 17 amperes. Voltage rating of types 3 and 4 is 600V RMS with a current rating of 7½ amperes.

Connectors Type	Pin Part Number	Socket Part Number	No. of Contacts	Amps	Wire Gauge Solid	Wire Gauge Strand.	Width A	Length B	Mount'g Centers C
1	126-016	126-017	7	17	12	14	.500	1.625	1.250
	126-204	126-205	15	17	12	14	.500	2.600	2.225
2	126-206	126-207	18	17	12	14	1.000	2.000	1.688
3	126-173	126-174	14	7½	18	20	.437	1.250	.937
	126-199	126-189	18	7½	18	20	.562	1.312	1.000
	126-171	126-172	21	7½	18	20	.375	2.250	1.937
4	126-188	126-187	34	7½	18	20	.750	2.000	1.687



TYPE 1





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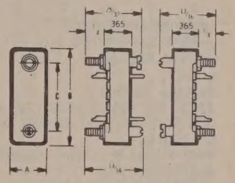

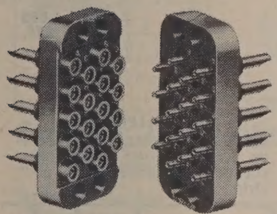

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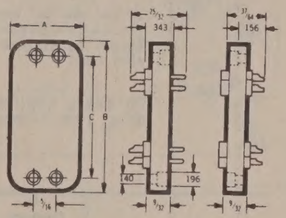

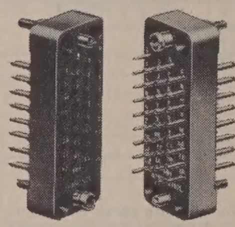

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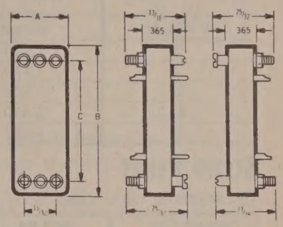
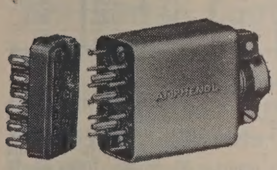


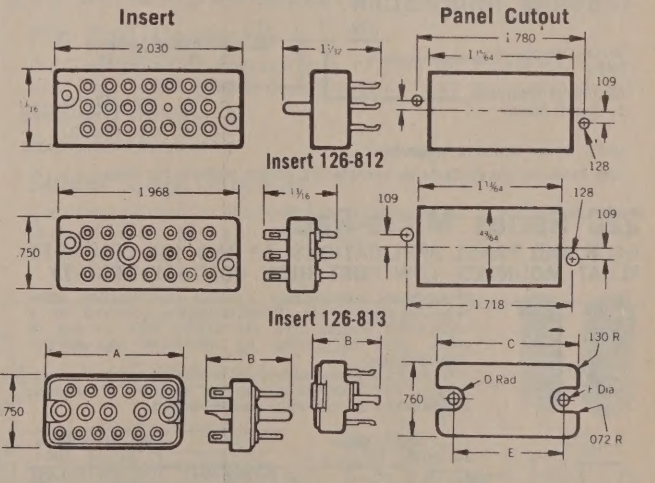
126 Series Rectangular Rack & Panel with Shells For Cable Connections

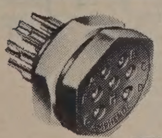


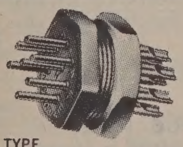
Rated a full 900V RMS, contacts are gold, over silver. Four contact configurations are available with 3 contact sizes. Contact size 12 is rated 23 amperes; size No. 16 is rated 13 amperes; size 20 is 7½ amperes. Dielectric is mica filled phenolic. Aluminum housing with mechanical strain relief is available for cable applications. Gold over silver plated contacts.

No. of Contacts Size 12	No. of Contacts Size 16	No. of Contacts Size 20	Pin Contacts Insert Only	Pin Contacts With Housing	Socket Contacts Insert Only	Socket Contacts With Housing	Mounting Screw Size No.	Shell Height
2	—	9	126-804	126-809	126-805	126-808	4	1.75
3	—	12	126-151	126-152	126-150	126-153	6	2.06
4	—	16	126-806	126-811	126-807	126-810	4	2.06
—	20	—	126-813	—	126-812	—	4	—

INSERTS	A	B	C	D	E	F
126-804	1.171	.937	1.181	.120	.864	.120
126-805	1.171	49/64	1.181	.120	.864	.120
126-151	1.500	.937	1.510	.115	1.188	.145
126-150	1.500	49/64	1.510	.115	1.188	.145
126-806	1.932	.937	1.947	.120	1.620	.120
126-807	1.937	49/64	1.947	.120	1.620	.120







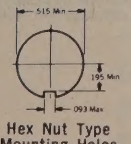
HEX. NUT TYPE

HOOD & CLAMP TYPE

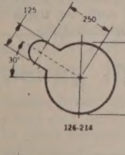
126 Series Hex Connectors 4 to 9 Contacts

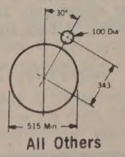
Popular hexagon rack and panel connectors. Diallyl phthalate dielectric, gold over silver plated contacts. 500 V (RMS) at sea level.

Contacts	Hex Nut Panel Mount	Panel Mount With Locking Clip	With Hood and Cable Clamp
4 Pin	126-1431	126-214	126-214 - 1000
4 Socket	126-3815	126-233	126-215 (Hood Only)
5 Pin	126-010	126-216	126-217
5 Socket	126-011	126-218	126-223
7 Pin	126-191	126-197	126-195
7 Socket	126-192	126-198	126-196
9 Pin	126-012	126-219	126-220
9 Socket	126-013	126-221	126-222



Hex Nut Type Mounting Holes





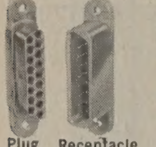
All Others

LOCKING CLIP TYPE

The right idea
at the right time
AMPHENOL®
BUNKER RAMO®

223 Series Tiny Tim® Connectors

5 TO 33 CONTACTS
POLY CARBONATE OR NYLON CONSTRUCTION


Plug Receptacle
(Relia-Tac Contacts
Illustrated)

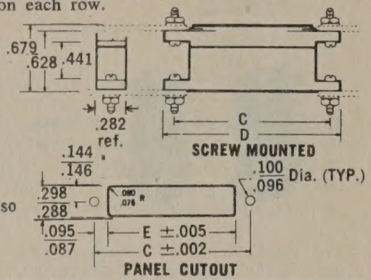
Exceptional interconnections for circuit modules, either potted-in or surface mounted, and can also be used as micro-miniature rack-and-panel, cable-to-cable, and cable-to-panel connectors.

The positive mating is the result of the snap latch engagement locking device molded into the connector body. Contact identification numbers are also molded in.

Trapezoidal mating faces are used for polarization. Guide pins provide keying. Contact spacing is .100" on centers on each row.

SPECIFICATIONS

Temperature Range:
−55°C to +125°C
Current Rating:
5 amps
Voltage Rating:
1500 VAC (RMS) at sea level.
375 VAC (RMS) at 70,000 ft.
Dielectric:
Polycarbonate resin. (Nylon also available).
Contact factor for performance specifications



No. of Contacts	E Length of Cutout	C Mounting Centers	D ref. Overall Length
5	.410	.593	.843
9	.610	.793	1.043
17	1.015	1.193	1.443
25	1.410	1.593	1.843
33	1.810	1.993	2.243

Strain Relief

Thermoplastic cable clamp strain relief housings for use with above connectors:

Contact Size	Part No.	Contact Size	Part No.
9	223-714-09	25	223-714-25
17	223-714-17	33	223-714-33

Ordering Information

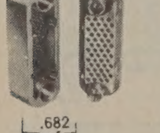
223- 1 1 17
Series Designation 223
Method of Mounting 1—Screw Mount
Number of Contacts 05, 09, 17, 25, 33
Insert Style
1—Plug, Lexan (Green)
2—Receptacle, Lexan (Green)
5—Plug, Nylon (Black)
6—Receptacle, Nylon (Black)

NOTE: Order Contacts Separately

Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

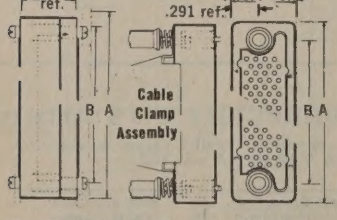
220 Series Micro-Rac®

RACK AND PANEL APPLICATIONS: 52 AND 104 CONTACTS
FLOAT MOUNTED: LOW COST HIGH CONTACT DENSITY

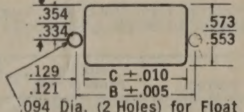


Mono-block construction. Contact identification numbers are molded in. Polarization is achieved by a trapazoidal mating area and keying with the use of guide pins or keying by molded-in slot-and-key arrangements.

Cable clamp assemblies are available for both sizes. Special size connectors can be supplied if needed, Environmental resistance can be added.



Dim Access.	No. of Contacts 52	104
Potting Mold	220-635	220-634
Cable Clamp	220-5	220-6
Max. Length A	1.888	3.017
Mtg. Ctrs. B	1.492	2.611
Cutout C	1.250	2.359



.094 Dia. (2 Holes) for Float Mtg. Only. .172 Dia. (2 Holes) for Mtgs. Other Than Float.

Ordering Information

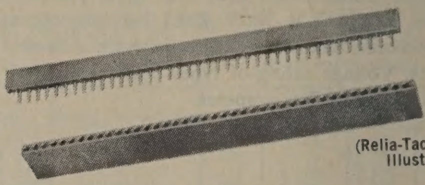
220- 1 N 104
Series Designation
Insert Style
1—Plug (Lexan)
2—Receptacle (Lexan)
(Includes Hardware)
Number of Contacts
052, 104
Connector Class
N—Non-environmental

NOTE: Order Contacts Separately

Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

221 Series Strip Connectors

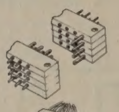
ADAPTABLE TO ANY SHAPE: STACK, CUT, CUT AND STACK, USE AS IS... HIGH CONTACT DENSITY,

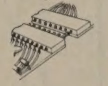

(Relia-Tac Contacts Illustrated)

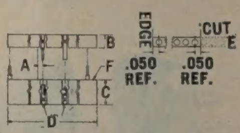
AMPHENOL Strip Connectors are highly reliable, low cost micro-miniatures with great application versatility. They are furnished in 4" and 6" lengths, but you can cut and stack them to whatever configuration you need to satisfy your various application requirements.

Strip connectors use Poke-Home contacts and perform superbly. Where keying is desired, guide pins are inserted in two or more plug strip contact holes.

Because Strip connectors are injection molded, special configurations can be produced quickly and inexpensively.


Strips can be used in stacked arrangement. Should be stacked parallel only.


PC board application using strip connectors.



CUSTOM LENGTH
Number of holes multiplied by contact center dimension equals approximate length of strip.

Description	A Contact Centers	B	C	D	E	F Contact Positions
6" Plug Strip	.100	—	.456	6.00	.105	60
6" Receptacle Strip	.100	.230	—	6.00	.105	60
4" Plug Strip	.075	—	.456	4.00	.105	53
4" Receptacle Strip	.075	.230	—	4.00	.105	53
4" Plug Strip	.050	—	.281	4.00	.075	80
4" Receptacle Strip	.050	.218	—	4.00	.075	80

Ordering Information

Standard and custom lengths.

221 - 1 5 02
Series Designation
Contact Centers
1—.100 in.
2—.075 in.
Insert Style
1—Plug, polycarbonate
2—Receptacle, polycarbonate
5—Plug, Nylon
6—Receptacle, Nylon
Number of Contact Holes needed: from 02 to 60 on .100 centers (standard 6" strip contains 60 holes); from 02 to 53 on .075 centers (standard 4" strip contains 53 holes); from 02 to 80 on .050 centers (standard 4" strip contains 80 holes).
Note: Must use 2 digits.

Note: Order Contacts Separately

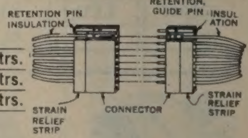
Use Relia-Tac pin contacts for receptacles; socket contacts for plugs.

Strain Relief Strips Protect Wire

AMPHENOL has a solution to the problem of excessive flexing that breaks wire strands in cable-terminated applications. Strain relief strips are available to encase and protect the wire in the crimp area at the rear of the strips. Molded in black Nylon 6/6 material, the strips can be ordered to match any Amphenol strip connector. Held in place by retention pins, which can also be used as a guide pin.

Ordering Information

221-9160—for use with strip connectors on .100 ctrs.
221-9253—for use with strip connectors on .075 ctrs.
221-9380—for use with strip connectors on .050 ctrs.



Poke-Home® Guide Pins

Poke-Home guide pins when seated in plug inserts serve functions of polarizing, keying or connector alignment. They can be used in conjunction with Relia-Tac contacts. Contact factory for information.

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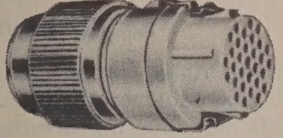
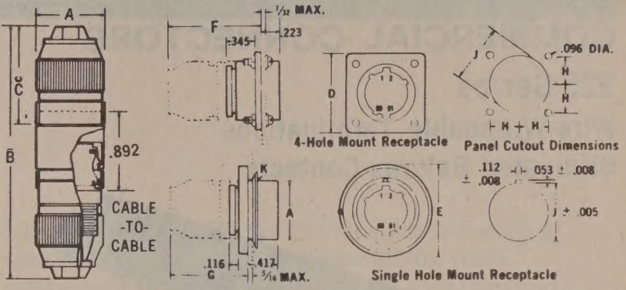
222 Series Mighty-Mite® Connectors

7 to 61 Contacts — .085 Contact Centers
CABLE APPLICATIONS — 222-11N31

222-22N31



222-519


A
C
B
.892
CABLE
-TO-
CABLE
F
7/32 MAX.
.345
.223
D
4-Hole Mount Receptacle
J
.096 DIA.
H
H
H
H
Panel Cutout Dimensions
K
A
.116
.417
G
5/16 MAX.
E
Single Hole Mount Receptacle
.112 ± .008
.053 ± .008
J ± .005

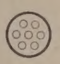
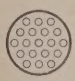
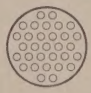
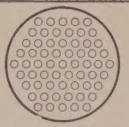
Superior Performance at Low Cost

AMPHENOL Mighty-Mite connectors are low cost, highly reliable micro-miniature connectors designed to serve an exceptionally wide range of cable-to-cable and cable-to-chassis applications.

Mighty-Mite connectors are available as straight plugs, single hole mounting, square flange, and cable receptacles. Standard connectors are molded of one-piece, rugged polycarbonate.

ARRANGEMENTS

INSERTS AVAILABLE (Showing front face of plug insert)

Shell Size	10	12	14	18
Size 22 contacts rated 5 amperes for wire sizes 22-24-26-28 solid and 24-26-28 stranded	 7 contacts 10-7	 19 contacts 12-19	 31 contacts 14-31	 61 contacts 18-61

		No. of Contacts			
		7	19	31	61
DIMENSIONS	A ref. diameter	.496	.621	.746	.996
	B ref. length	2.402	2.618	2.948	3.530
	C ref. length	.854	.962	1.134	1.418
	D ref. square	.750	.875	1.000	1.250
	E ref. diameter	.940	1.065	1.189	1.444
	F ref. length	1.170	1.278	1.450	1.734
	G ref. length	.976	1.084	1.256	1.540
	H length	.250	.312	.375	.500
	J diameter	.511	.636	.761	1.011
ACC	Strain Relief Assembly No.	222-517	222-518	222-519	222-520
	Retaining Ring No.	2-310	2-311	2-312	2-313

Ordering Information

222- 1 1 N 61

Series Designation 222

Method of Mounting
1—Flangeless
2—4 hole mount receptacle
3—Single hole mount Receptacle (includes retaining ring)

Number of Contacts 07, 19, 31, 61

Connector Class: N—Non-environmental

Insert Style
1—Plug (Polycarbonate)
2—Receptacle (Polycarbonate)

NOTE: Order Contacts Separately.
Use Relia-Tac pin contacts for receptacles, socket contacts for plugs.

220 Series Contacts for 220, 221, 222, 223 Series Connectors

Ultra-Tac Contacts

Top quality micro-miniature contacts. The socket contacts are hooded to resist test prod damage.

Relia-Tac Contacts

Durable, customer-proven contacts.

Part Number	Description
220-P02 (Pin) 220-S02 (Socket)	Standard, See specifications below
220-844-02 (Pin) 220-845-02 (Socket)	Same as above, except heavy gold plating and inspection hole in crimp area

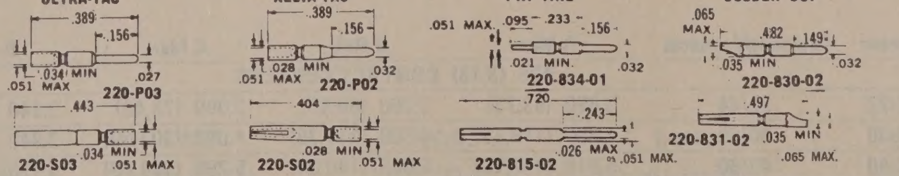
Pin Tail Contacts

Pin Tail Relia-Tac contacts may be used for mounting connectors directly to printed circuit boards. Can be provided with right angle bend.

Solder Cup Contacts

Can be soldered to leads before insertion or, with proper heat sink, after contacts are assembled.

SPECIFICATIONS


ULTRA-TAC
.389
.156
.034 MIN
.027
.051 MAX
220-P03
.443
.034 MIN
.051 MAX
220-S03
RELIA-TAC
.389
.156
.028 MIN
.032
.051 MAX
220-P02
.404
.028 MIN
.051 MAX
220-S02
PIN TAIL
.051 MAX.
.095
.233
.156
.021 MIN.
.032
220-834-01
.720
.243
.026 MAX
.051 MAX.
220-815-02
SOLDER CUP
.065 MAX
.482
.149
.035 MIN
.032
220-830-02
.497
220-831-02
.035 MIN
.065 MAX.

	Ultra-Tac	Relia-Tac	Pin Tail	Solder Cup
Current (Amps) Rating	5	5	5	5
Contact Resistance* (ohms)	.0060	.0060	.0050 to .0060	.0060
Wire Range (Ga.) (Solid & Stranded)	22, 24, 26	24, 26, 28	N/A	24, 26, 28
Contact Finish	Gold-over-Nickel on Copper Alloy Bodies	Gold-over-Nickel on Copper Alloy Bodies	Gold-over-Nickel on Copper Alloy Bodies	Gold-over-Nickel on Copper Alloy Bodies

* Constant to a minimum of 100 cycles of insertion and withdrawal.

Ordering Information

Minimum order quantity is 100 pieces. Contacts can be supplied on reels for use in semi-automatic crimp machines. Consult factory.

NOTE: All socket contacts are completely shrouded within the plug inserts for optimum protection against damage. Pin contacts are normally exposed when assembled into receptacle inserts.

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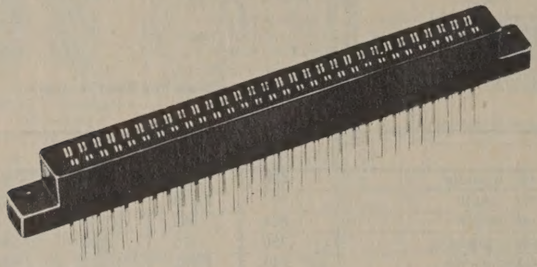
COMMERCIAL CONNECTORS

225 Series

Wire-Wrappable Terminations
Bifurcated Bellows Contacts



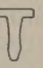
AMPHENOL 225 Series Printed Circuit Commercial Connectors with wire-wrappable terminations provide an economical and reliable connector for either automatic or hand-wire-wrapping applications.

Contacts are on a .100 x .200 (2,54 mm x 5,08 mm) or .125 x .250 (3,18 mm x 6,35 mm) grid spacing. Connectors are available in 22-, 30-, 40-, 43- and 50-position models with either grid spacing. The .025 (0,64 mm) square posts will accept a minimum of 3 wraps of #26 AWG wire.

SPECIFICATIONS

Operating Voltage:	600 VAC (RMS) at sea level 150 VAC (RMS) at 70,000 ft.
Current Rating:	5 amps
Dielectric Material:	Electrical Grade Phenolic, Black
Insulation Resistance:	5,000 megohms minimum
Contact Material:	Phosphor bronze plated .000020 (0,000508) min. gold over copper
Contact Resistance:	30 millivolts maximum at rated current
Board Thickness:	.054 (1,37) to .071 (1,80)

POLARIZING KEYS

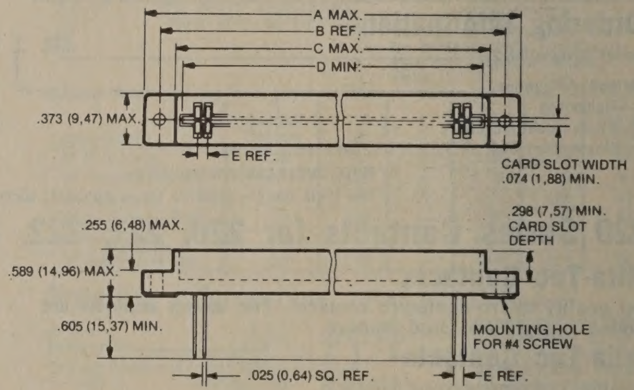


225-645

Over contact key can be used with 225 Series wire-wrappable connectors on .100 (2,54) and .125 (3,18) centers.

225-594

Between contact key may be used with .125 (3,18) center wire-wrappable connectors.



ALL DIMENSIONS REFERENCE ONLY

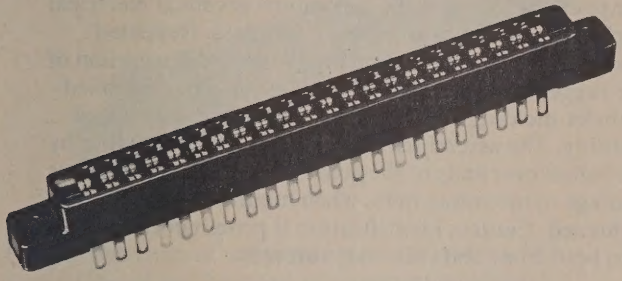
DIMENSIONS AND ORDERING INFORMATION

Part Number	Positions/Contacts	A Max.	B Ref.	C Max.	D Min.	E Ref.
		.125 (3,18) CONTACT CENTERS				
225-804-22	22/44	3.690 (93,73)	3.380 (85,85)	3.090 (78,49)	2.940 (74,68)	.125 (3,18)
225-804-30	30/60	4.690 (119,13)	4.380 (111,25)	4.090 (103,89)	3.940 (100,08)	.125 (3,18)
225-804-40	40/80	5.815 (147,70)	5.545 (140,84)	5.295 (134,49)	5.120 (130,05)	.125 (3,18)
225-804-43	43/86	6.318 (160,48)	6.005 (152,53)	5.715 (145,16)	5.565 (141,35)	.125 (3,18)
225-804-50	50/100	7.190 (182,63)	6.880 (174,75)	6.590 (167,39)	6.440 (163,58)	.125 (3,18)
		.100 (2,54) CONTACT CENTERS				
225-805-22	22/44	3.165 (80,39)	2.855 (72,52)	2.565 (65.15)	2.415 (61,34)	.100 (2,54)
225-805-30	30/60	3.965 (100,71)	3.653 (92,79)	3.365 (85,47)	3.215 (81,66)	.100 (2,54)
225-805-40	40/80	4.845 (123,06)	4.575 (116,21)	4.270 (108,46)	4.095 (104,01)	.100 (2,54)
225-805-43	43/86	5.265 (133,73)	4.955 (125,86)	4.665 (118,49)	4.515 (114,68)	.100 (2,54)
225-805-50	50/100	5.958 (151,33)	5.655 (143,64)	5.365 (136,27)	5.215 (132,46)	.100 (2,54)

NOTE: For 4-40 NC Threaded Hole Mounting use Deviation (122). Example: 225-8XX-XX(122).

COMMERCIAL CONNECTORS

225 Series
Solder Terminations



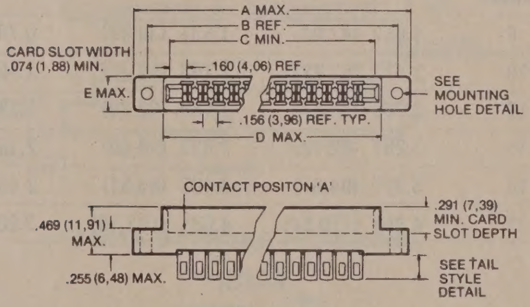
225 Series Printed Circuit Commercial Connectors with solder terminations are intended for flush installation on printed circuit boards with pads and spacer barriers that permit thorough flux washing.

Four different tail styles provide unusual termination flexibility—one eyelet and three straight tails. The eyelet accepts up to three #20 AWG wires at each terminal; the others are for dip or flow soldering. With 2-tail bridged or common contacts, you can connect 6 wires to one point on a printed circuit board. You can also obtain two 2-tail configurations—one with bridged terminals for single or common-contact (redundant) boards; the other with dual contact terminals for independent opposing circuits.

All dip-solder terminals are designed for .043 (1,09 mm) min. diameter holes.

SPECIFICATIONS

Operating Voltage:	600 VAC (RMS) at sea level 150 VAC (RMS) at 70,000 ft.
Current Rating:	5 amps
Dielectric Material:	Electrical Grade Phenolic, Black
Insulation Resistance:	5,000 megohms minimum
Contact Material:	Copper alloy with .000020 (0,000508) min. gold over copper
Contact Resistance:	30 millivolts maximum at rated current
Board Thickness:	.054 (1,37) to .071 (1,80)



ALL DIMENSIONS REFERENCE ONLY

DIMENSIONS

SIZES	A MAX.	B REF.	C MIN.	D MAX.	E MAX.
06	1.854 (47,09)	1.532 (38,91)	1.095 (27,81)	1.240 (31,50)	.346 (8,79)
10	2.478 (62,94)	2.156 (54,76)	1.719 (43,66)	1.864 (47,35)	.346 (8,79)
15	3.258 (82,75)	2.938 (74,63)	2.499 (63,47)	2.646 (67,21)	.346 (8,79)
18	3.726 (94,64)	3.406 (86,51)	2.967 (75,36)	3.115 (79,12)	.346 (8,79)
22	4.360 (110,74)	4.032 (102,41)	3.584 (91,03)	3.750 (95,25)	.350 (8,89)
28	5.274 (133,96)	4.969 (126,21)	4.512 (114,60)	4.662 (118,41)	.503 (12,78)
36	6.522 (165,66)	6.219 (157,96)	5.765 (146,43)	5.910 (150,11)	.503 (12,78)
43	7.610 (193,29)	7.302 (185,47)	6.854 (174,09)	7.010 (178,05)	.506 (12,85)

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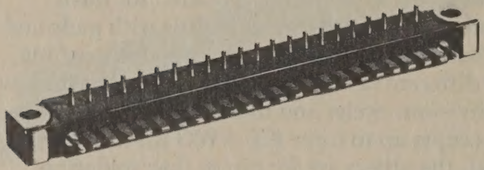
PLUGS

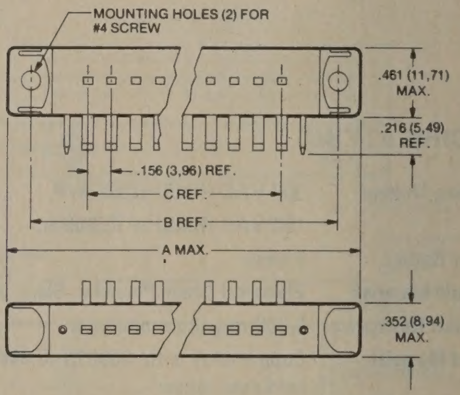
133 Series



Amphenol 133 Series Plugs combine excellent electrical performance with mechanical sturdiness. Repeated matings, even at an angle, will not cause deformation of the rugged contacts. Amphenol's process of controlled-transfer molding assures uniformity and dimensional stability. The assembled body is rigidly held together by the rolled-over ends of the guide pins. End caps prevent damage to mounting holes when mounting screws are tightened. Contact identification is prominently molded into both front and rear body surfaces.

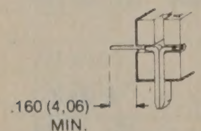
DIMENSIONS

No. of Contact Positions	A Max.	B Ref.	C Ref.
6	1.852 (47,04)	1.531 (38,89)	0.781 (19,84)
10	2.477 (62,92)	2.156 (54,76)	1.406 (35,91)
12	2.790 (70,87)	2.468 (62,69)	1.718 (43,64)
15	3.257 (82,73)	2.937 (74,60)	2.187 (55,55)
18	3.727 (94,67)	3.406 (86,51)	2.656 (67,46)
22	4.352 (110,54)	4.031 (102,39)	3.281 (83,38)

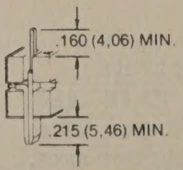

MOUNTING HOLES (2) FOR #4 SCREW
.461 (11,71) MAX.
.216 (5,49) REF.
.156 (3,96) REF.
C REF.
B REF.
A MAX.
.352 (8,94) MAX.

ALL DIMENSIONS REFERENCE ONLY

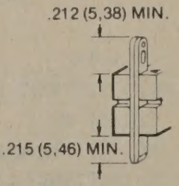
TAIL STYLES



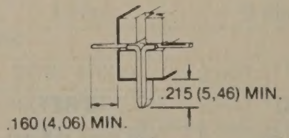
-03


.160 (4,06) MIN.
.215 (5,46) MIN.

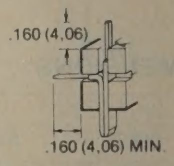
-13


.212 (5,38) MIN.
.215 (5,46) MIN.

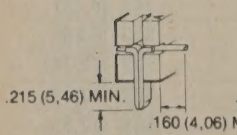
-21


.215 (5,46) MIN.
.160 (4,06) MIN.

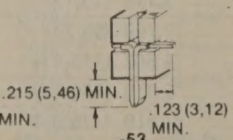
-23


.160 (4,06)
.160 (4,06) MIN.

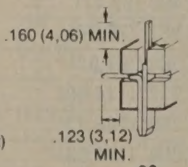
-33


.215 (5,46) MIN.
.160 (4,06) MIN.

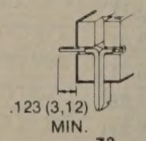
-43


.215 (5,46) MIN.
.123 (3,12) MIN.

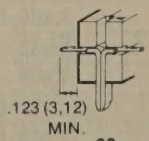
-53


.160 (4,06) MIN.
.123 (3,12) MIN.

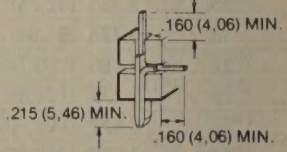
-63



-73



-83


.160 (4,06) MIN.
.215 (5,46) MIN.
.160 (4,06) MIN.

-93

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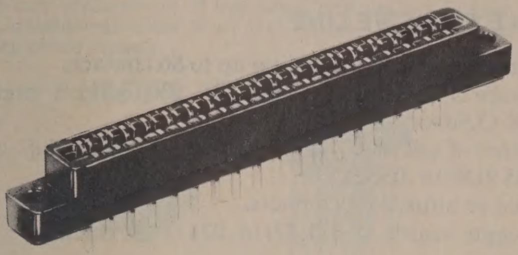
RECEPTACLES

143 Series



Even at extremes of temperature and vibration, 143 Series Connectors keep voltage losses at an absolute minimum through the strong, firm action of their tuning-fork-type contacts. With their connector-body design and contact "float", 143 Series Connectors prevent board rocking. In addition, the design assures that warped boards will not affect performance.

Extra-strong contact faces slide readily over the mating surfaces of the PC board and conductivity remains virtually unaffected for at least 500 cycles of insertion and withdrawal. Where more cycling is anticipated, a 133 Series Plug can be attached to the board and mated with a 143 Series Connector.

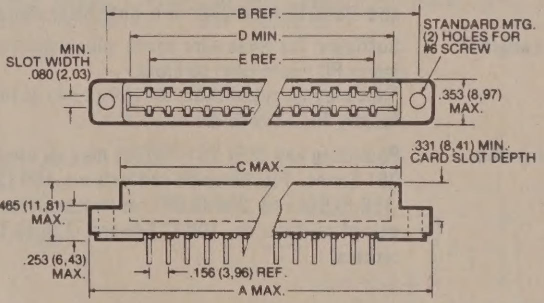
The molded connector body in either mineral-filled diallyl phthalate or phenolic (117 deviation) is dimensionally stable. It is designed for flush mounting and can be mounted either on the front or rear of the panel. Contact identification letters are molded in both the top face and terminal surface.

DIMENSIONS

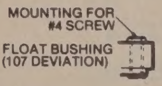
No. of Contact Positions	A Max.	B Ref.	C Max.	D Min.	E Ref.
6	1.784 (45,31)	1.531 (38,89)	1.242 (31,55)	1.093 (27,76)	.781 (19,84)
10	2.411 (61,24)	2.156 (54,76)	1.868 (47,45)	1.719 (43,66)	1.406 (35,71)
12	2.724 (69,19)	2.468 (62,69)	2.181 (55,40)	2.031 (51,59)	1.718 (43,64)
15	3.194 (81,13)	2.937 (74,60)	2.650 (67,31)	2.500 (63,50)	2.187 (55,55)
18	3.664 (93,07)	3.406 (86,51)	3.120 (79,25)	2.968 (75,36)	2.656 (67,46)
22	4.291 (108,99)	4.031 (102,39)	3.747 (95,17)	3.593 (91,26)	3.281 (83,34)
*28	5.227 (132,77)	4.968 (126,19)	4.683 (118,95)	4.529 (115,04)	4.219 (107,16)
**36	6.475 (164,46)	6.210 (157,73)	5.928 (150,57)	5.766 (146,46)	5.490 (139,45)

*Also available in this size on .125 (3,18) centers.

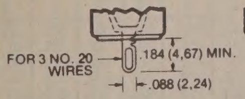
**.36 card slot contains two .056 (1,42) barriers: one between contacts N&P, and one between contacts b&c.


B REF.
D MIN.
E REF.
STANDARD MTG. (2) HOLES FOR #6 SCREW
MIN. SLOT WIDTH .080 (2,03)
.353 (8,97) MAX.
.331 (8,41) MIN. CARD SLOT DEPTH
C MAX.
.465 (11,81) MAX.
.253 (6,43) MAX.
.156 (3,96) REF.
A MAX.

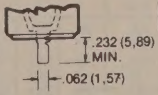
OTHER MOUNTING PROVISIONS


MOUNTING FOR #4 SCREW
FLOAT BUSHING (107 DEVIATION)

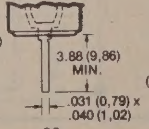
TAIL STYLES


FOR 3 NO. 20 WIRES
.184 (4,67) MIN.
.088 (2,24)

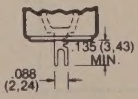
-01
SOLDER EYELET


.232 (5,89) MIN.
.062 (1,57)

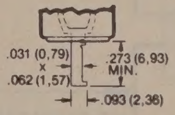
-02
SINGLE-WIRE-WRAP


3.88 (9,86) MIN.
.031 (0,79) x .040 (1,02)

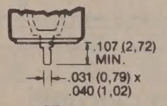
-03
DIP SOLDER


.135 (3,43) MIN.
.088 (2,24)

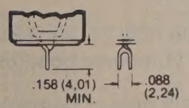
-04
OPEN EYELET
(Permits fast commoning)


.031 (0,79) x .062 (1,57)
.273 (6,93) MIN.
.093 (2,36)

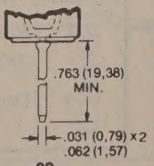
-06
SOLDER WRAP


.107 (2,72) MIN.
.031 (0,79) x .040 (1,02)

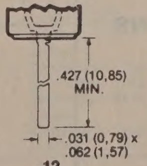
-07
SHORT DIP SOLDER


.158 (4,01) MIN.
.088 (2,24)

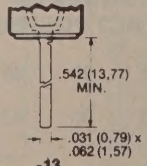
-08
PRODUCTION SOLDER OR BUSSING


.763 (19,38) MIN.
.031 (0,79) x 2 .062 (1,57)

-09
3-WIRE WRAP

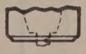

.427 (10,85) MIN.
.031 (0,79) x .062 (1,57)

-12
2-WIRE WRAP


.542 (13,77) MIN.
.031 (0,79) x .062 (1,57)

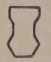
-13
2-WIRE WRAP

POLARIZATION

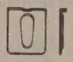


PERMANENT POLARIZING KEY
(Factory Installed)

FIELD SERVICEABLE POLARIZING KEYS



143-754
BETWEEN-THE-CONTACT PLASTIC KEY
(Available for 15, 18, 22 or 28 sizes on (114) deviation)



143-953
OVER-THE-CONTACT METAL KEY

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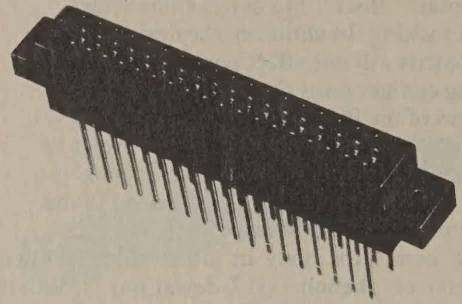
PRINTED CIRCUIT EDGE CARD CONNECTORS
261 SERIES



AN EXTENSIVE LINE

- ☐ 15 to 43 positions providing up to 86 contacts
- ☐ Choice of .100 (2,54), .125 (3,18), .150 (3,81), .156 (3,96) or .200 (5,08) spacing
- ☐ Choice of tail sizes: .025 (0,64) sq., .035 (0,89) sq., or .035 (0,89) x .050 (1,27)
- ☐ Solid or bifurcated contacts.
- ☐ Accepts boards .054 (1,37) to .071 (1,80) thick

SPECIFICATIONS

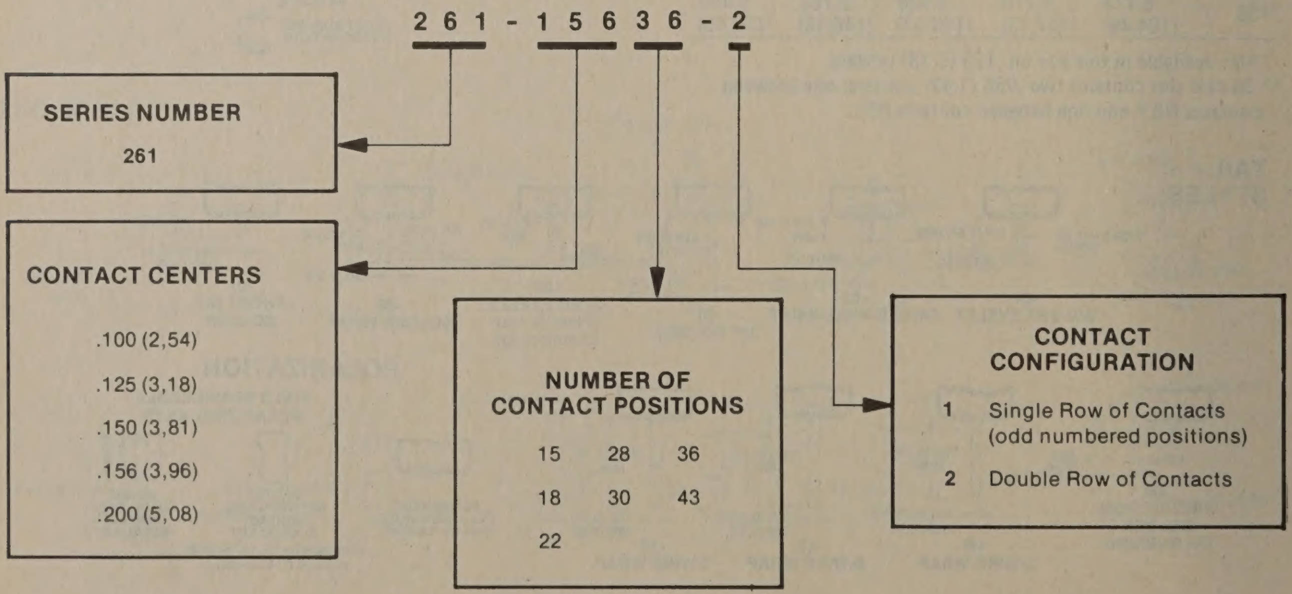
Dielectric Material:	Electrical grade phenolic, medium impact, black.
Contact Materials:	.100 (2,54) and .125 (3,18) centers utilize phosphor-bronze base metal with tin tintalate plate and a Precious Metal Tip (PMT) on the contacting surface. .150 (3,81), .156 (3,96) and .200 (5,08) centers use phosphor-bronze base with copper flash and .000030 (0,00076) min. gold plate overall.
Tail Length:	Sufficient for three wire wraps, plus space for bussing or PC board next to block Tails may be cut as short as .100 (2,54) at the factory for wave-solder applications.
Polarization:	Polarizing key (P/N 261-70005) may be used on all 261 Series. Fits between contacts on .150 (3,81), .156 (3,96) and .200 (5,08) centers; replaces one pair of contacts on .100 (2,54) and .125 (3,18) centers.

ELECTRICAL CHARACTERISTICS

Contact Spacing	Current Rating (Max.) Amps	Contact Resistance (Max.) Milliohms	Voltage Rating (Sea Level)	Voltage Breakdown (Min.)
.100 (2,54) on Center	5.0	6.0	300 V RMS	1800 V RMS
.125 (3,18) on Center	5.0	6.0	350 V RMS	2000 V RMS
.150 (3,81) on Center	6.0	5.5	400 V RMS	2500 V RMS
.156 (3,96) on Center	7.5	5.0	400 V RMS	2500 V RMS
.200 (5,08) on Center	7.5	4.5	500 V RMS	4500 V RMS

ORDERING INFORMATION

To order the specific 261 Series Connector you want, put together the part number as per the following example:



261 - 156 36 - 2

SERIES NUMBER
261

CONTACT CENTERS
.100 (2,54)
.125 (3,18)
.150 (3,81)
.156 (3,96)
.200 (5,08)

NUMBER OF CONTACT POSITIONS
15 28 36
18 30 43
22

CONTACT CONFIGURATION
1 Single Row of Contacts (odd numbered positions)
2 Double Row of Contacts

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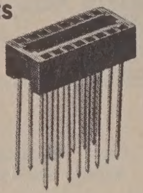
Dual-In-Line IC Production Sockets

The 821-25, 821-20 and 821-40 Series are high reliability production mounting sockets for Dual-In-Line I.C. devices. They are most useful in production applications where it is desirable to provide easy replacement of individual DIP devices without the risk of unsoldering them from P.C. boards or the expense of replacing entire boards.

Standard Profile DIP Sockets



Standard profile sockets have replaceable, one piece contacts with dual-wiping action for round or flat I.C. leads. Removable lid provides closed entry and chamfered lead-in. Available in anti-wicking solder tab or solid square post for solderless wrap termination.

SPECIFICATIONS

Contact Material: 30 micro inch gold over 50 micro inch nickel over phosphor bronze

Contact Resistance: 5 milliohms

Contact Rating: 1 amp

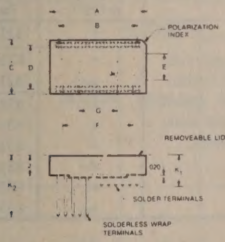
Voltage Breakdown: 1800 volts

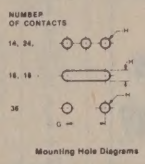
Terminations: Choice of solderless wrap with up to 3 complete wraps of 30 AWG wire, short solderless wrap for 2 wraps, or solder tab.

Body Material: Molded glass filled nylon

Temperature Rating: —55° to +125°C

Mounting: Press fit, hex nut and screw, direct solder, or epoxy





Mounting Hole Diagrams

DIMENSIONS

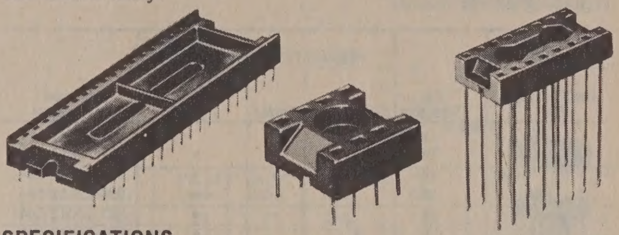
Number of Contacts	A	B	C	D	E	F	G	H	J	K1 Solder Terminals	K2 Solderless Terminals
14	.795	.600	.395	.300	.160	.630	.312	.078	.230	.390	.930
16	.895	.700	.395	.300	.160	.730	.412	.078	.230	.390	.930
24	1.290	1.100	.695	.500	.330	.975	.500	.120	.260	.340	.980
24	1.290	1.100	.695	.600	.330	.975	.500	.120	.260	.340	.980
36	1.890	1.700	.695	.600	.330	1.575	.900	.120	.260	.340	.980

ORDERING INFORMATION

Amphenol Number	Number of Contacts	Lead Row Spacing	Termination
821-25011-144	14	.300	Solder
821-25011-164	16	.300	Solder
821-25012-144	14	.300	Solderless Wrap
821-25012-164	16	.300	Solderless Wrap
821-40004-244	24	.600	Solderless Wrap
821-40014-244	24	.600	Solder
821-40021-364	36	.600	Solderless Wrap
821-40023-364	36	.600	Solder

Low Profile DIP Sockets

Designed for low cost, reliable, high density connections. Overall height is only .160″ above board, allowing closer stacking. Also permits side-by-side mounting on .100″ x .300″ and with no wasted space between sockets. Large sockets include lead guides and closed entry.



SPECIFICATIONS

Contact Material: 30 micro inch gold over 50 micro inch nickel over phosphor bronze, or beryllium copper

Contact Resistance: .005 ohms

Contact Rating: 1 amp max.

Voltage Breakdown: 1800 volts

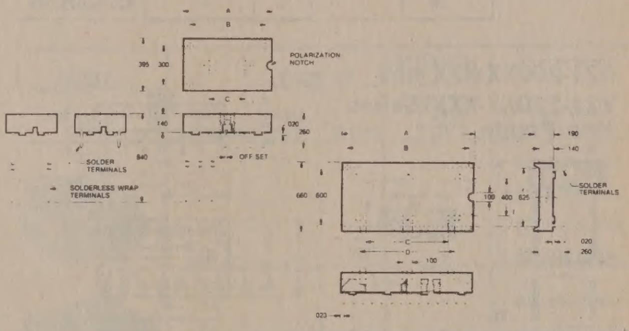
Terminations: Choice of solderless wrap with up to 3 complete wraps of 30 AWG wire, or solder tab

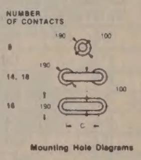
Body Material: Molded glass filled nylon

Temperature Rating: —55° to +125°C

Mounting: Press fit, hex nut and screw, direct solder, or epoxy

Mating Leads: Contacts accept standard IC leads up to .024″ square, rectangular or .024″ diameter





Mounting Hole Diagrams

Number of Contacts	A	B	C
8	.395	.300	—
14	.695	.600	.312
16	.795	.700	.312
18	.895	.800	.400

Number of Contacts	A	B	C	D
24	1.190	1.100	.700	.820
28	1.390	1.300	.900	1.020
40	1.990	1.900	1.500	1.620

ORDERING INFORMATION

Amphenol Number	No. of Contacts	Lead Row Spacing	Termination	Contact Material
821-20012-084	8	.300	Solder	Beryllium Copper
821-20011-144	14	.300	Solder	Phosphor Bronze
821-20012-144	14	.300	Solder	Beryllium Copper
821-20013-144	14	.300	Solderless Wrap	Beryllium Copper
821-20011-164	16	.300	Solder	Phosphor Bronze
821-20012-164	16	.300	Solder	Beryllium Copper
821-20013-164	16	.300	Solderless Wrap	Beryllium Copper
821-20042-184	18	.300	Solder	Phosphor Bronze
821-23011-244	24	.600	Solder	Phosphor Bronze
821-23013-244	24	.600	Solder	Beryllium Copper
821-23011-284	28	.600	Solder	Phosphor Bronze
821-23011-404	40	.600	Solder	Phosphor Bronze

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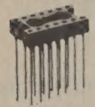
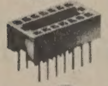
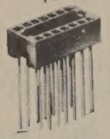
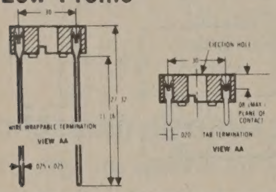
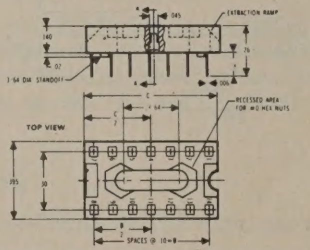
Dual-In-Line Production Sockets

The 821-25, 821-20 and 821-40 Series are high reliability production mounting sockets for Dual-In-Line I.C. devices. They are most useful in production applications where it is desirable to provide easy replacement of individual DIP devices without the risk of unsoldering them from P.C. boards or the expense of replacing entire boards.

FAMILY		TERMINATION		MATERIALS/ TEMP. RANGE	
Dual-In-Line (DIP)	No. Contacts	Wire Wrap	Solder	Nylon −55 to +125°C	Amphenol Part Number
	8				821-20012-084
	14		•	•	821-20011-144
	16		•	•	821-20011-164
	14		•	•	821-20012-144
	16		•	•	821-20012-164
	14	•		•	821-20013-144
	16	•		•	821-20013-164
	18		•	•	821-20042-184
	24		•	•	821-23011-244
	28		•	•	821-23011-284
	40		•	•	821-23011-404
	14		•	•	821-25011-144
	16		•	•	821-25011-164
	14	•		•	821-25012-144
	16	•		•	821-25012-164
	24		•	•	821-40004-244
	24			•	821-40014-244
	36	•		•	821-40021-364
	36		•	•	821-40023-364

821-200XX-XXX and 821-230XX-XXX Series Low Profile

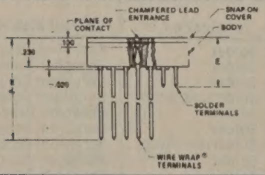

30
EJECTION HOLE
30
27/32
11/16
WIRE WRAPPABLE TERMINATION
VIEW AA
.025 x .025
OR (MAX.)
PLANE OF CONTACT
.020
TAB TERMINATION
VIEW AA

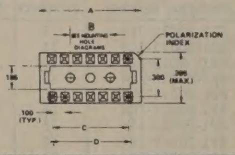

.045
EXTRACTION RAMP
.140
.02
3/64 DIA STANDOFF
.006
.76
A
C
C/2
4/64
RECESSED AREA FOR #0 HEX NUTS
TOP VIEW
.395
.30
B/2
SPACES @ .10=B

Part Number	No. of Leads	"A" Dim.	"B" Dim.	"C" Dim.	Contact Material	Termination Contact
821-20012-084	8	4	.300	.395	BC	Tab Type
821-20011-144	14	6	.600	.695	PB	Tab Type
821-20011-164	16	8	.700	.795	PB	Tab Type
821-20012-144	14	6	.600	.695	BC	Tab Type
821-20012-164	16	7	.700	.796	BC	Tab Type
821-20013-144	14	6	.600	.695	BC	Wire Wrap
821-20013-164	16	7	.700	.795	BC	Wire Wrap
821-20042-184	18	8	.800	.895	PB	Tab Type
821-23011-244	24	12	1.100	.695	PB	Tab Type
821-23011-284	28	14	1.300	.695	PB	Tab Type
821-23011-404	40	20	1.900	.695	PB	Tab Type

BC=Beryllium Copper PB=Phosphor Bronze

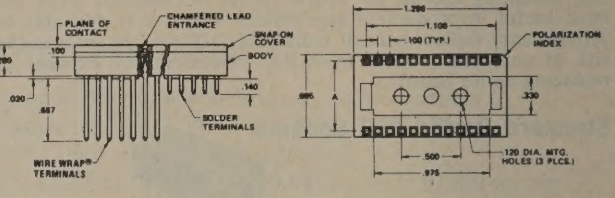
821-250XX-XXX Series Standard Profile


CHAMFERED LEAD ENTRANCE
SNAP ON COVER
PLANE OF CONTACT
BODY
.100
.230
E
.020
SOLDER TERMINALS
WIRE WRAP® TERMINALS


A
B
POLARIZATION INDEX
.300
(MAX.)
.100 (TYP.)
C
D

No. of Leads	"A" Dim.	"B" Dim.	"C" Dim.	"D" Dim.	"E" Dim.	Termination	Lid Color	Part Number
14	.795	.312	.600	.630	25/64	Solder	Black	821-25011-144
16	.895	.412	.700	.730	25/64	Solder	Black	821-25011-164
14	.795	.312	.600	.630	15/16	Wire Wrap	Black	821-25012-144
16	.895	.412	.700	.730	15/16	Wire Wrap	Black	821-25012-164

821-400XX-XXX Series Standard Profile

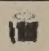
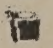

PLANE OF CONTACT
CHAMFERED LEAD ENTRANCE
SNAP-ON COVER
BODY
.100
.280
.020
.887
.140
SOLDER TERMINALS
WIRE WRAP® TERMINALS
1.290
1.100
.100 (TYP.)
POLARIZATION INDEX
.885
A
.330
.500
.975
.120 DIA. MTG. HOLES (3 PLCS.)

Typical view for 24-Lead.

Part Number	No. of Leads	"A" Dim.	Terminalton
821-40014-244	24	.600	Solder
821-40004-244	24	.600	Wire Wrap
821-40021-364	36	.500	Wire Wrap
821-40023-364	36	.600	Solder

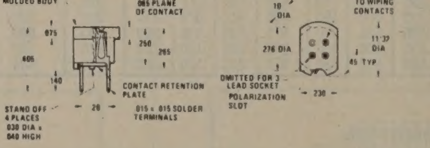
T.O. Can Production Sockets

These production type sockets (nylon) are built to hold devices in firm, long time contact, resisting dirt and environmental attacks upon their contacts. They accept TO-5 and TO-18 type 3 to 12 lead devices and are press fit or solder mounted.

FAMILY		MOUNTING	MATERIALS/ TEMP. RANGE	
T.O. Can	No. Contacts		Nylon −55 to +125°C	Amphenol Part Number
	3		•	831-55011-034
 	3	Sockets will press fit into a double–D shaped chassis hole, or dip solder to a P.C. board.	•	831-55021-034
	8		•	831-55021-084
 	3		•	831-55022-034
	4		•	831-55022-044
	6		•	831-55022-064
	8		•	831-55022-084
	10		•	831-55022-104
	12		•	831-55022-124

831-55011-XXX Series

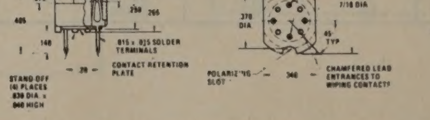
For TO-18 Devices Having 3 Leads


CONTACT
MOLDED BODY
.065 PLANE OF CONTACT
.075
.250
.265
.405
.140
CONTACT RETENTION PLATE
STAND OFF 4 PLACES .030 DIA x .040 HIGH
.28
.015 x .015 SOLDER TERMINALS
10 DIA
.276 DIA
OMITTED FOR 3 LEAD SOCKET
POLARIZATION SLOT
.230
CHAMFERED LEAD ENTRANCES TO WIPING CONTACTS
11/32 DIA
45 TYP

Part Number	No. of Leads
831-55011-034	3

831-55021-XXX Series

For TO-5 Devices Having 3 and 8 Leads


CONTACT
.065 PLANE OF CONTACT
.075
.250
.265
.405
.140
.015 x .025 SOLDER TERMINALS
.28
CONTACT RETENTION PLATE
STAND OFF (4) PLACES .030 DIA x .040 HIGH
.2 DIA
.370 DIA
7/16 DIA
45 TYP
POLARIZING SLOT
.340
CHAMFERED LEAD ENTRANCES TO WIPING CONTACTS

Part Number	No. of Leads
831-55021-034	3
831-55021-084	8

The right idea
at the right time

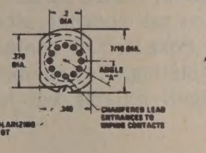
AMPHENOL®

BUNKER RAMO®

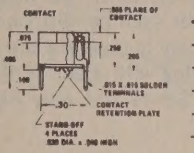
T. O. Can Production Sockets (Continued)

831-55022-XXX Series

For TO-5 Devices Having 3, 4, 6, 8, 10 and 12 Leads



2 DIA
7/16 DIA.
.370 DIA.
ANGLE "A"
.300
CHAMFERED LEAD ENTRANCES TO WIPING CONTACTS
POLARIZING SLOT



CONTACT
PLANE OF CONTACT
.250
.015 X .015 SOLDER TERMINALS
.30
CONTACT RETENTION PLATE
STAND-OFF 4 PLACES

Part Number	No. of Leads	Angle "A"
831-55022-034	3	90°
831-55022-044	4	90°
831-55022-064	6A	45°
831-55022-084	8	45°
831-55022-104	10	36°
831-55022-124	12	30°

Flat Pack Test Sockets

AMPHENOL flat pack sockets meet the needs of production and will withstand repeated temperature cycles.

Sockets are available to fit all standard configurations and sizes of flat integrated circuit packages with peripheral leads, micro-mesa transistors and other similar components. Suitable for test, aging, and breadboard.

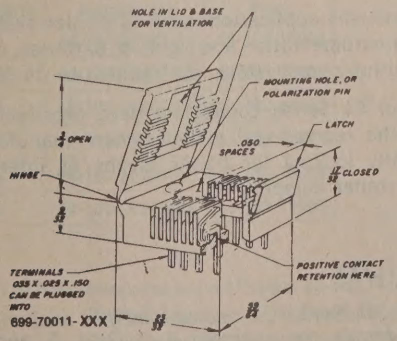
The new sockets feature wiping, gold plated contacts. Molded barriers between leads provide positive lead separation and increase speed and ease of loading. Loading is simple — the hinged latch is snapped forward and the hinged lip raised, opening the cavity for easy insertion or removal of the component. Ample tweezer clearance is provided. The component is dropped into place and positioned by the cavity. No stress of force is exerted on the body, leads, or seal. The socket is closed and latched — bosses on the cover depress the leads against the wiping contacts.

DETAIL SPECIFICATIONS DIFFERING FROM STD SPECIFICATIONS

- **BODY DIELECTRIC:** Filled polypropylene
- **LEADS ACCEPTED:** Flat to .025″ w. — .008″ thick — spaced at .050″
- **BASE PINS:** 0.025″ x 0.035″ x 0.150″ long
- **TEMPERATURE:** −65°C to +150°C

FAMILY		MOUNTING	MATERIALS/ TEMP. RANGE		
Flat Pack	No. Contacts	Chassis	Polysulfone −65 to +150°C	Poly-propylene −55 to +125°C	Amphenol Part Number
	14	•		•	611-01041-143
	16	•		•	611-01042-163
	28	•	•		611-10031-281
	22	•	•		611-10071-221
	24	•	•		611-10071-241
	16	•	•		611-10081-161

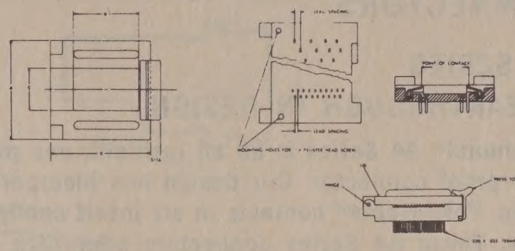
611-010XX-XXX Series



HOLE IN LID & BASE FOR VENTILATION
MOUNTING HOLE, OR POLARIZATION PIN
LATCH
3/4 OPEN
.050 SPACES
HINGE
17/32 CLOSED
9/32
TERMINALS .035 X .025 X .150 CAN BE PLUGGED INTO 699-70011-XXX
POSITIVE CONTACT RETENTION HERE
23/32
33/64

Part Number	Nominal Package Size Accepted	No. of Leads
611-01041-143	¼″ x ¼″ — ¼″ x ⅜″	14
611-01042-163	¼″ x ¼″ — ¼″ x ⅜″	16

611-100XX-XXX Series



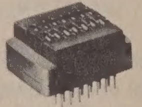
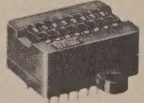
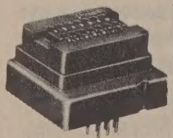
HINGE
PRESS TO CLOSE

Part Number	No. of Leads	No. of Rows	"A" Dim.	"B" Dim.	"C" Dim.	"D" Dim.
611-10031-281	28	2	1 35/64	1 17/32	.810	.938
611-10071-221	22	3	1 5/32	1 13/64	.420	.531
611-10071-241	24	2	1 5/32	1 19/64	.420	.703
611-10081-161	16	2	1 5/32	1 11/32	.420	.750

Dual-In-Line Test Sockets

The Amphenol DIP test sockets are rugged and molded.

For greatest reliability, contacts are one-piece, precision-formed of beryllium copper, nickel/gold plated, and provide a gentle wiping action on device leads to insure low, uniform contact resistance. Contacts are designed for minimal insertion and withdrawal forces consistent with reliable electrical contact.

FAMILY		MOUNTING		MATERIALS/ TEMP. RANGE	
Dual-In-Line (DIP)	No. Contacts	Printed Circuit	Chassis	Polysulfone −65 to +150°C	Amphenol Part Number
	14	•		•	621-01011-141
	16	•		•	621-01011-161
	14		•	•	621-01012-141
	16		•	•	621-01012-161
	14		•	•	621-05012-141
	16		•	•	621-05012-161
	40	•		•	621-10011-401
	24		•	•	621-10031-241
	24	•		•	621-10033-241
	28		•	•	621-10041-281
	14		•	•	621-30011-141
	16		•	•	621-30011-161
	14	•		•	629-70021-141
	16	•		•	629-70022-161
	14	•		•	629-70041-141
	16	•		•	629-70042-161

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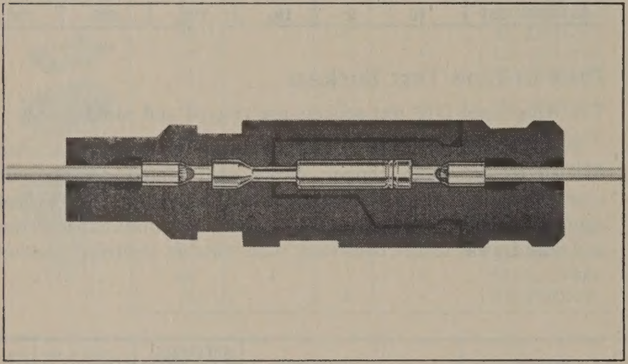
LOW COST WATERPROOF CONNECTORS

44 SERIES

BREAKTHROUGH IN DESIGN

Amphenol® 44 Series is an all resilient, one piece, waterproof connector. Our design has incorporated crimp Poke-Home® contacts in six insert configurations. These 44 Series connectors offer high performance along with low cost, making this connector ideally suited for those applications where an environmentally sealed yet inexpensive connector is needed.



USER BENEFITS

- **Environmentally Sealed.** Waterproof seals prevent liquids from entering the connector to cause electrical or electronic circuit failures. Not intended for submergible applications.
- **Longer Service Life.** The unique one-piece shell and insert construction minimize the number of parts and failure modes for predictably longer service life.
- **Durable.** The resilient connector body is abrasion resistant and is impervious to water, lubricants, fuel, ozone, and road salts.
- **Lower Installed Cost.** Punch-press contacts enable the use of automated stripping and crimping equipment resulting in lower on-line production and installed assembly cost.
- **High Reliability.** The use of hooded female contacts in addition to the molded-in polarizing flat assures proper contact/connector alignment and eliminates the possibility of lost or cross-wired circuits.
- **Low Maintenance Cost.** Should the need arise, the connectors can be easily serviced in the field with the use of inexpensive hand crimp and insertion tools. This minimizes equipment down-time and required maintenance time.
- **Easy Mating.** Simple, positive, push-pull coupling and disconnect of connectors requires no special assembly instructions. Obvious visual and mechanical mating indicators help avoid damage to components resulting in lost or intermittent circuits.

NEW MATERIALS

A resilient material in the 44 Series allows the insulator to be molded as one complete unit. This material proved to be the most successful under such conditions as salt spraying, vibration and shock. Added to this are our Poke-Home® contacts made of a copper alloy with electrotin plating. This combination makes the 44 Series not only highly reliable but less costly to use.

OPERATIONAL CHARACTERISTICS

Voltage Rating: Limiting operating voltage at sea level — AC 250 Volts RMS.

Current Rating: 8 amps continuous.

Temperature Range: Continuous operation from −40°C to +105°C.

TERMINATION

- Punch-press contacts utilize semi-automatic or hand crimping equipment.
- Contacts accept wire sizes of 14 AWG, 16 AWG, and 18 AWG with an overall wire insulation diameter range of .080 to .130 inches.
- Standard contact packaging: 5,000 unit reels for semi-automatic machine crimping.
- Contacts available individually packaged in bags of 100, 500, or 1000 pieces for hand tool crimping applications, order deviation (101).

TYPICAL APPLICATIONS

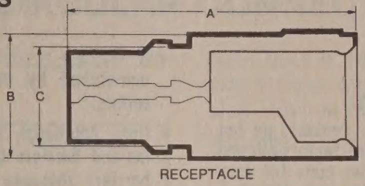
- 44 Series connectors can be used as truck accessory disconnects under the hood or frame, on axles or near the engine, or in the driver's compartment.
- Automotive applications could call for the 44 Series in systems such as ignition, anti-skid, brake warning, pressure warning or speed indication.
- Periphery equipment like toll booths, traffic signals or highway safety and lighting equipment also could have a need fulfilled by the 44 Series.
- Marine industry applications such as ignition systems, starter motors, instrumentation and lighting, batteries, controls and even fuel injection systems are fulfilled by 44 Series.
- Amphenol 44 Series connectors have excellent opportunities in the recreational vehicle where manufacturers are continually looking for better means of inter-connecting cars to trailer/campers.

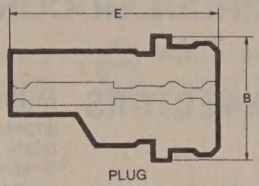
AVAILABILITY

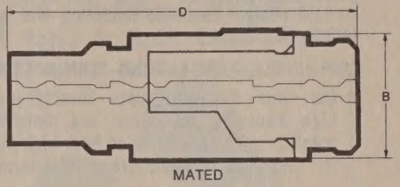
Amphenol's 44 Series connector family is available now. The 44 Series family now includes 1, 2, 3, 4, 5, and 6 contact configurations.

® Registered trademark of Bunker Ramo Corporation.

DIMENSIONS



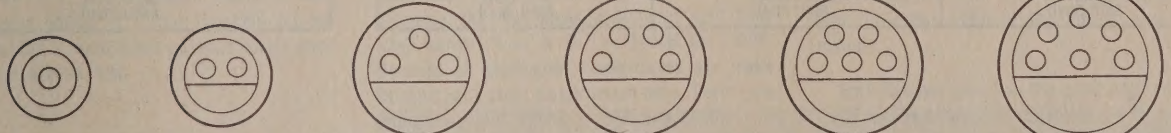




CONNECTORS

NUMBER OF CONTACTS	A Max.		B Max.		C ± .005 In. .13 MM		D Max.		E Max.	
	Inches	MM	Inches	MM	Inches	MM	Inches	MM	Inches	MM
1	1.780	45.21	.500	12.70	.445	11.30	2.220	56.39	1.282	32.56
2	1.780	45.21	.620	15.75	.470	11.94	2.220	56.39	1.282	32.56
3	1.780	45.21	.721	18.31	.571	14.50	2.220	56.39	1.282	32.56
4	1.780	45.21	.832	21.13	.682	17.32	2.220	56.39	1.282	32.56
5	1.780	45.21	.832	21.13	.682	17.32	2.220	56.39	1.282	32.56
6	1.780	45.21	.946	24.03	.796	20.22	2.220	56.39	1.282	32.56

INSERT CONFIGURATIONS



PART NUMBER INFORMATION

CONNECTORS

No. of Contacts	Receptacles	Plugs
1	44-104-10001-02	44-103-10001
2	44-104-10002-02	44-103-10002
3	44-104-10003-02	44-103-10003
4	44-104-10004-02	44-103-10004
5	44-104-10005-02	44-103-10005
6	44-104-10006-02	44-103-10006

TOOLS:

Semi-automatic crimping machine	359-206
—applicator	359-510
Full cycle hand crimp tool	294-562
Economy hand crimp tool	357-561
Hand contact insertion tool	294-553
Socket contact removal tool	294-557
Pin contact removal tool	294-556
Semi-automatic contact insertion machine	294-565-01
—plug adapter	294-566-XP
—receptacle adapter	294-566-XR

CONTACTS: Pin Contact—Part Number 44-100-1414P—Used In Receptacles Only.
Socket Contact—Part Number 44-102-1414S—Used In Plugs Only.
Contacts shipped on carrier strips Reels of 5000 for semi-automatic crimping machine
Add (101) Deviation to Contact Part Number to receive Contacts removed from reels and packaged in bags.

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STANDARD CIRCULAR CONNECTORS

97 SERIES CONNECTORS

- **PROVEN**
- **LOW COST**
- **RELIABLE**

FASTER, EASIER TERMINATIONS

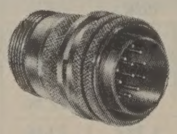
Amphenol 97 Series connector contacts do not rotate within the insert. They're factory-aligned to uniformly position the solder cups for easy soldering. Why waste valuable assembly time positioning contacts? — Amphenol non-rotating contact design simplifies soldering and lowers termination costs.

DEPENDABLE, LONG-LASTING TERMINATIONS

- Our blue diallyl-phthalate inserts provide high insulating resistance and dimensional stability in the presence of **both** high humidity and high temperature . . . performance unmatched by melamine or neoprene materials.
- Only Amphenol 97 Series inserts feature molded barriers between each contact. The barriers increase the surface distance between contacts, thus increasing the insert's voltage rating.
- For added strength, Amphenol pin inserts in sizes 20 and larger have additional dielectric thickness.
- Amphenol coupling rings are machined from solid bar stock. This exclusive feature provides extra strength.

PLUGS

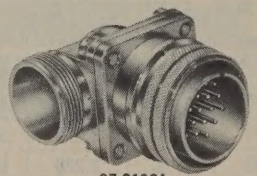
Straight



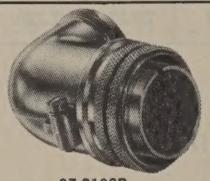
97-3106A
Solid Shell

973106B
Split Shell

Angle



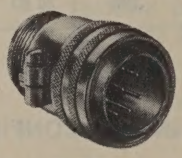
97-3108A
Solid Shell



97-3108B
Split Shell

Quick Disconnect

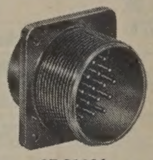
97-3107A
Solid Shell



97-3107B
Split Shell

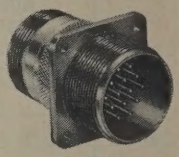
RECEPTACLES

Box Mounting



97-3102A
Solid Shell

Wall Mounting



97-3100A
Solid Shell

Cable

97-3101A
Solid Shell

A cure for the connector part number problem.

1 How many wires are you going to connect? What gauge?

These two questions are important, because they indicate which insert you need. There are literally hundreds to choose from.

The insert chart illustrates the 203 inserts with 43 inserts most often used are bracketed. Chances are the one you need is there.

Here's an example of how to use the chart. Say you want to connect eight 16-ga. wires. Just find the section of the chart marked 8 contacts. Insert number 20-7 is the one you want because it contains eight 16-ga. contacts and is one of the most often used. The one you choose might depend on your space or voltage requirements. The voltage capacity of each insert is listed under its diagram.

If you have more than one wire size to connect, the method is essentially the same. Actually, the insert configurations for multiple-size wires are a lot more flexible than they appear. That's because you can always solder a smaller wire to a larger contact. However, soldering a large wire to a small contact isn't recommended because of size and current requirements.

2 What if several identical connectors have different functions?

Here's a situation to watch out for. You have four identical receptacles on a panel. One carries high current loads. The others have low current functions. A plug mated with the wrong receptacle (cross-mating) could ruin your valuable equipment.

To avoid cross-mating, you can order identical inserts positioned in both the plugs and receptacles at various angles from standard. These variations from standard position are called Alternate Insert Positions.

The right idea
at the right time
AMPHENOL®
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STANDARD CIRCULAR CONNECTORS

3 What kind of receptacle do you need?

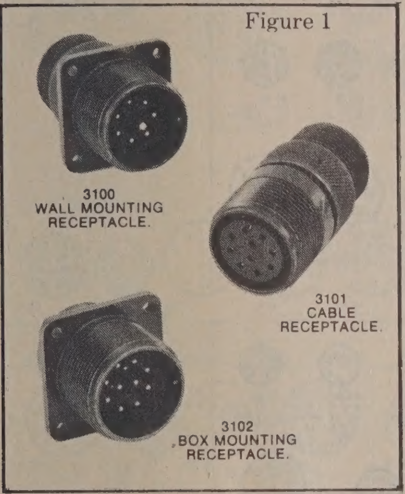


Figure 1

For wall mounting. Figure 1 shows a Wall Receptacle, type 3100. The elongated back of this receptacle extends through thick wall material. It is threaded to accept standard hardware fittings.

For unmounted applications. Use the Cable Receptacle, type 3101, shown in Figure 1.

For box or panel mounting. Use the Box Receptacle, type 3102. This receptacle's back is short to conserve space. It is not threaded on the back end and is used when no accessories such as clamps are needed.

4 What kind of plug do you need?

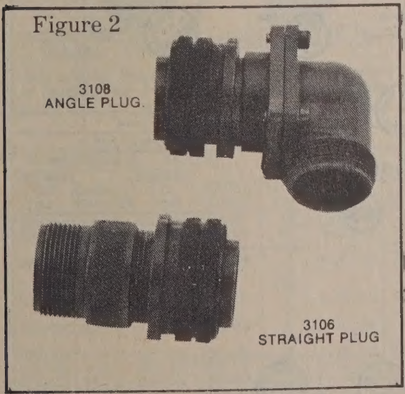


Figure 2

For ordinary situations. The Straight Plug, type 3106 (Figure 2), meets most connector requirements. However . . .

When space is critical. You may want to consider using an Angle Plug, type 3108. This type plug, shown in Figure 2, lets the cable enter your equipment at a right angle.

5 Do you need a plug with Solid or Split Back Shell?

SPLIT BACK SHELL.
SOLID SHELL.

You can get both straight and angle plugs in solid or split back shell designs. With the solid shell, you have greater strength. You save space, too. On the other hand, the split shell design lets you quickly inspect the solder terminals when you need to. This feature could be pretty important if you'll be subjecting the connector to rough handling and heavy use.

The type identification for solid shell construction is the letter A immediately after the main shell type number: i.e. 3106A or 3108A. Likewise, the type identification for split back shell construction is B: i.e. 3106B or 3108B. Because of application, receptacles are made in solid back shell construction only. Their type identification is 3100A, 3101A and 3102A.

6 Which connector gets the socket? The receptacle or the plug?

You're at the point where you designate which inserts are used with which shells. Since either pin or socket inserts can be used with plugs or receptacles, now's the time to make your choice.

Here's a good rule of thumb. Order the sockets for the connector at the "hot" side of the circuit. By having sockets at the power source, there's little chance that a wayward finger or screwdriver will short the circuit or cause personal injury.

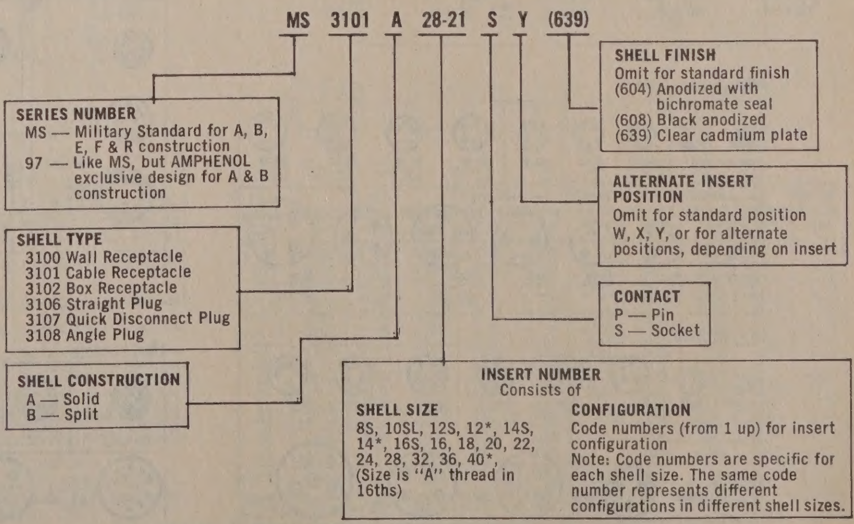
The code for Sockets is simply S following the insert code number. For Pins, it is P. Therefore, 20-7P insert would have pin contacts while a 20-7S insert would have socket contacts.

7 Do you need a non-reflective finish or a shiny finish?

If you prefer the standard dull-olive cadmium plate finish, which is non-reflective, then no suffix number is needed. If you would rather have the shiny, clear cadmium plate finish, just add the suffix (639) at the end of your part number.

Both finishes give you the same high conductivity and resistance to corrosion.

HOW TO ASSEMBLE MS CONNECTOR PART NUMBERS


MS 3101 A 28-21 S Y (639)

SERIES NUMBER
MS — Military Standard for A, B, E, F & R construction
97 — Like MS, but AMPHENOL exclusive design for A & B construction

SHELL TYPE
3100 Wall Receptacle
3101 Cable Receptacle
3102 Box Receptacle
3106 Straight Plug
3107 Quick Disconnect Plug
3108 Angle Plug

SHELL CONSTRUCTION
A — Solid
B — Split

SHELL FINISH
Omit for standard finish
(604) Anodized with bichromate seal
(608) Black anodized
(639) Clear cadmium plate

ALTERNATE INSERT POSITION
Omit for standard position
W, X, Y, or for alternate positions, depending on insert

CONTACT
P — Pin
S — Socket

INSERT NUMBER
Consists of

SHELL SIZE
8S, 10SL, 12S, 12*, 14S, 14*, 16S, 16, 18, 20, 22, 24, 28, 32, 36, 40*, (Size is "A" thread in 16ths)

CONFIGURATION
Code numbers (from 1 up) for insert configuration
Note: Code numbers are specific for each shell size. The same code number represents different configurations in different shell sizes.

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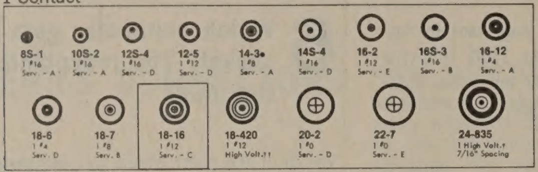
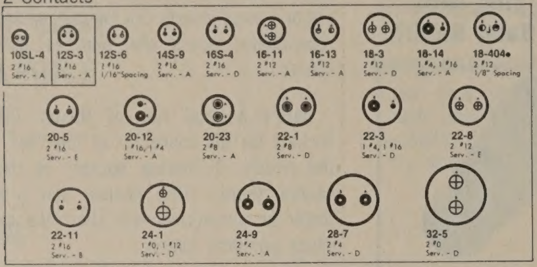
STANDARD CIRCULAR CONNECTORS

97 Series — Insert Arrangements

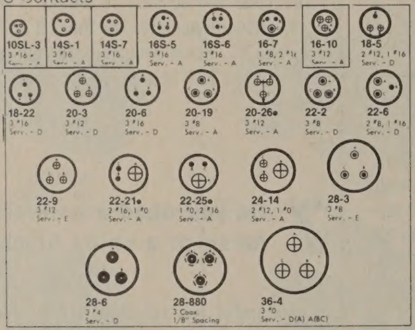
1 Contact


8S-1 1 #16 Serv. - A
10S-2 1 #16 Serv. - A
12S-4 1 #16 Serv. - D
12-5 1 #12 Serv. - D
14-3• 1 #8 Serv. - A
14S-4 1 #16 Serv. - D
16-2 1 #12 Serv. - E
16S-3 1 #16 Serv. - B
16-12 1 #4 Serv. - A
18-6 1 #4 Serv. D
18-7 1 #8 Serv. B
18-16 1 #12 Serv. - C
18-420 1 #12 High Volt.††
20-2 1 #0 Serv. - D
22-7 1 #0 Serv. - E
24-835 1 High Volt.† 7/16" Spacing

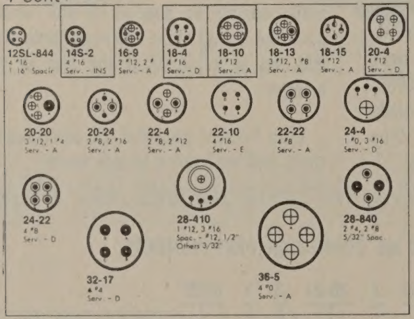
2 Contacts


10SL-4 2 #16 Serv. - A
12S-3 2 #16 Serv. - A
12S-6 2 #16 1/16" Spacing
14S-9 2 #16 Serv. - A
16S-4 2 #16 Serv. - D
16-11 2 #12 Serv. - A
16-13 2 #12 Serv. - A
18-3 2 #12 Serv. - D
18-14 1 #4, 1 #16 Serv. - A
18-404• 2 #12 1/8" Spacing
20-5 2 #16 Serv. - E
20-12 1 #16, 1 #4 Serv. - A
20-23 2 #8 Serv. - A
22-1 2 #8 Serv. - D
22-3 1 #4, 1 #16 Serv. - D
22-8 2 #12 Serv. - E
22-11 2 #16 Serv. - B
24-1 1 #0, 1 #12 Serv. - D
24-9 2 #4 Serv. - A
28-7 2 #4 Serv. - D
32-5 2 #0 Serv. - D

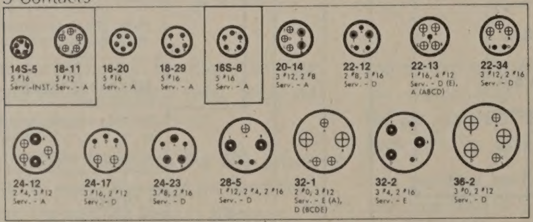
3 Contacts


10SL-3 3 #16 • Serv. - A
14S-1 3 #16 Serv. - A
14S-7 3 #16 Serv. - A
16S-5 3 #16 Serv. - A
16S-6 3 #16 Serv. - A
16-7 1 #8, 2 #16 Serv. - A
16-10 3 #12 Serv. - A
18-5 2 #12, 1 #16 Serv. - D
18-22 3 #16 Serv. - D
20-3 3 #12 Serv. - D
20-6 3 #16 Serv. - D
20-19 3 #8 Serv. - A
20-26• 3 #12 Serv. - A
22-2 3 #8 Serv. - D
22-6 2 #8, 1 #16 Serv. - D
22-9 3 #12 Serv. - E
22-21• 2 #16, 1 #0 Serv. - A
22-25• 1 #0, 2 #16 Serv. - A
24-14 2 #12, 1 #0 Serv. - A
28-3 3 #8 Serv. - E
28-6 3 #4 Serv. - D
28-880 3 Coax 1/8" Spacing
36-4 3 #0 Serv. - D(A) A(BC)

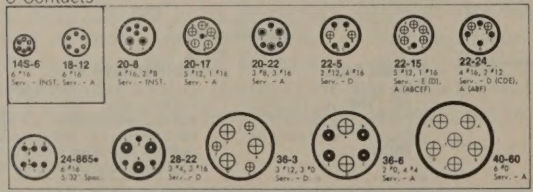
4 Contacts


12SL-844 4 #16 1/16" Spacing
14S-2 4 #16 Serv. - INS
16-9 2 #12, 2 # Serv. - A
18-4 4 #16 Serv. - D
18-10 4 #12 Serv. - A
18-13 3 #12, 1 #8 Serv. - A
18-15 4 #12 Serv. - A
20-4 4 #12 Serv. - D
20-20 3 #12, 1 #4 Serv. - A
20-24 2 #8, 2 #16 Serv. - A
22-4 2 #8, 2 #12 Serv. - A
22-10 4 #16 Serv. - E
22-22 4 #8 Serv. - A
24-4 1 #0, 3 #16 Serv. - D
24-22 4 #8 Serv. - D
28-410 1 #12, 3 #16 Spac. - #12, 1/2" Others 3/32"
28-840 2 #4, 2 #8 5/32" Spac.
32-17 4 #4 Serv. - D
36-5 4 #0 Serv. - A

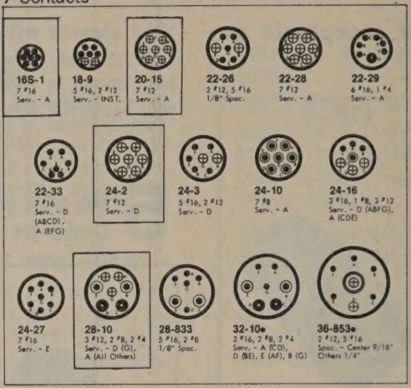
5 Contacts


14S-5 5 #16 Serv.-INST.
18-11 5 #12 Serv. - A
18-20 5 #16 Serv. - A
18-29 5 #16 Serv. - A
16S-8 5 #16 Serv. - A
20-14 3 #12, 2 #8 Serv. - A
22-12 2 #8, 3 #16 Serv. - D
22-13 1 #16, 4 #12 Serv. - D (E), A (ABCD)
22-34 3 #12, 2 #16 Serv. - D
24-12 2 #4, 3 #12 Serv. - A
24-17 3 #16, 2 #12 Serv. - D
24-23 3 #8, 2 #16 Serv. - D
28-5 1 #12, 2 #4, 2 #16 Serv. - D
32-1 2 #0, 3 #12 Serv. - E (A), D (BCDE)
32-2 3 #4, 2 #16 Serv. - E
36-2 3 #0, 2 #12 Serv. - D

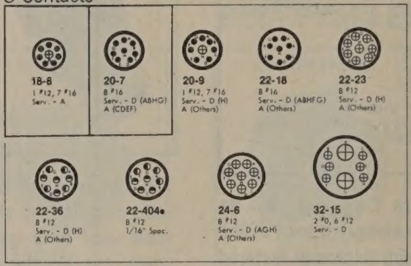
6 Contacts


14S-6 6 #16 Serv. - INST.
18-12 6 #16 Serv. - A
20-8 4 #16, 2 #8 Serv. - INST.
20-17 5 #12, 1 #16 Serv. - A
20-22 3 #8, 3 #16 Serv. - A
22-5 2 #12, 4 #16 Serv. - D
22-15 5 #12, 1 #16 Serv. - E (D), A (ABCEF)
22-24 4 #16, 2 #12 Serv. - D (CDE), A (ABF)
24-865• 6 #16 5/32" Spac.
28-22 3 #4, 3 #16 Serv. - D
36-3 3 #12, 3 #0 Serv. - D
36-6 2 #0, 4 #4 Serv. - A
40-60 6 #0 Serv. - A

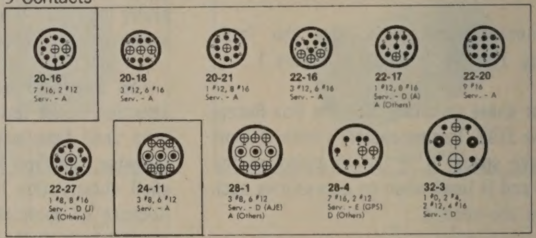
7 Contacts


16S-1 7 #16 Serv. - A
18-9 5 #16, 2 #12 Serv. - INST.
20-15 7 #12 Serv. - A
22-26 2 #12, 5 #16 1/8" Spac.
22-28 7 #12 Serv. - A
22-29 6 #16, 1 #4 Serv. - A
22-33 7 #16 Serv. - D (ABCD), A (EFG)
24-2 7 #12 Serv. - D
24-3 5 #16, 2 #12 Serv. - D
24-10 7 #8 Serv. - A
24-16 3 #16, 1 #8, 3 #12 Serv. - D (ABFG), A (CDE)
24-27 7 #16 Serv. - E
28-10 3 #12, 2 #8, 2 #4 Serv. - D (G), A (All Others)
28-833 5 #16, 2 #8 1/8" Spac.
32-10• 3 #16, 2 #8, 2 #4 Serv. - A (CD), D (BE), E (AF), B (G)
36-853• 2 #12, 5 #16 Spac. - Center 9/16" Others 1/4"

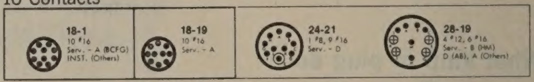
8 Contacts


18-8 1 #12, 7 #16 Serv. - A
20-7 8 #16 Serv. - D (ABHG) A (CDEF)
20-9 1 #12, 7 #16 Serv. - D (H) A (Others)
22-18 8 #16 Serv. - D (ABHFG) A (Others)
22-23 8 #12 Serv. - D (H) A (Others)
22-36 8 #12 Serv. - D (H) A (Others)
22-404• 8 #12 1/16" Spac.
24-6 8 #12 Serv. - D (AGH) A (Others)
32-15 2 #0, 6 #12 Serv. - D

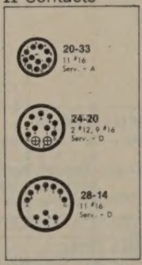
9 Contacts


20-16 7 #16, 2 #12 Serv. - A
20-18 3 #12, 6 #16 Serv. - A
20-21 1 #12, 8 #16 Serv. - A
22-16 3 #12, 6 #16 Serv. - A
22-17 1 #12, 8 #16 Serv. - D (A) A (Others)
22-20 9 #16 Serv. - A
22-27 1 #8, 8 #16 Serv. - D (J) A (Others)
24-11 3 #8, 6 #12 Serv. - A
28-1 3 #8, 6 #12 Serv. - D (AJE) A (Others)
28-4 7 #16, 2 #12 Serv. - E (GPS) D (Others)
32-3 1 #0, 2 #4, 2 #12, 4 #16 Serv. - D

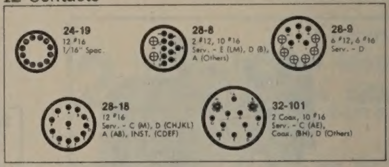
10 Contacts


18-1 10 #16 Serv. - A (BCFG) INST. (Others)
18-19 10 #16 Serv. - A
24-21 1 #8, 9 #16 Serv. - D
28-19 4 #12, 6 #16 Serv. - B (HM) D (AB), A (Others)

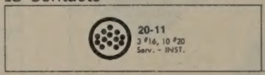
11 Contacts


20-33 11 #16 Serv. - A
24-20 2 #12, 9 #16 Serv. - D
28-14 11 #16 Serv. - D

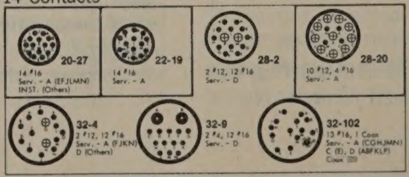
12 Contacts


24-19 12 #16 1/16" Spac.
28-8 2 #12, 10 #16 Serv. - E (LM), D (B), A (Others)
28-9 6 #12, 6 #16 Serv. - D
28-18 12 #16 Serv. - C (M), D (CHJKL) A (AB), INST. (CDEF)
32-101 2 Coax, 10 #16 Serv. - C (AE), Coax. (BH), D (Others)

13 Contacts


20-11 3 #16, 10 #20 Serv. - INST.

14 Contacts


20-27 14 #16 Serv. - A (EFJLMN) INST. (Others)
22-19 14 #16 Serv. - A
28-2 2 #12, 12 #16 Serv. - D
28-20 10 #12, 4 #16 Serv. - A
32-4 2 #12, 12 #16 Serv. - A (FJKN) D (Others)
32-9 2 #4, 12 #16 Serv. - D
32-102 13 #16, 1 Coax Serv. - A (CGHJMN) C (E), D (ABFKLP) Coax. (D)

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STANDARD CIRCULAR CONNECTORS

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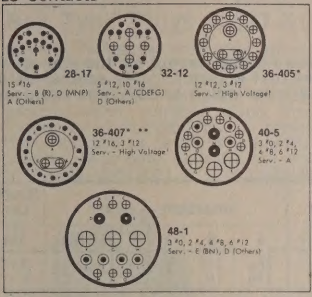
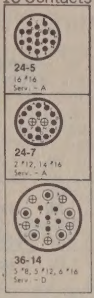
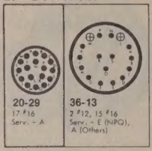
15 Contacts


28-17
15 #16
Serv. - B (R), D (MNP) A (Others)
32-12
5 #12, 10 #16
Serv. - A (CDEFG) D (Others)
36-405*
12 #12, 3 #12
Serv. - High Voltage!
36-407* **
12 #16, 3 #12
Serv. - High Voltage!
40-5
3 #0, 2 #4, 4 #8, 6 #12
Serv. - A
48-1
3 #0, 2 #4, 4 #8, 6 #12
Serv. - E (BN), D (Others)

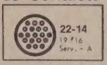
16 Contacts


24-5
16 #16
Serv. - A
24-7
2 #12, 14 #16
Serv. - A
36-14
5 #8, 5 #12, 6 #16
Serv. - D

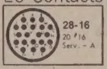
17 Contacts


20-29
17 #16
Serv. - A
36-13
2 #12, 15 #16
Serv. - E (NPQ), A (Others)

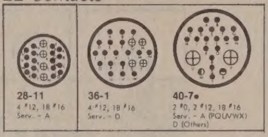
19 Contacts


22-14
19 #16
Serv. - A

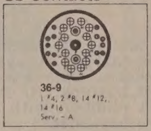
20 Contacts


28-16
20 #16
Serv. - A

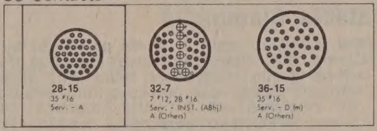
22 Contacts


28-11
4 #12, 18 #16
Serv. - A
36-1
4 #12, 18 #16
Serv. - D
40-7•
2 #0, 2 #12, 18 #16
Serv. - A (PQUVWX) D (Others)

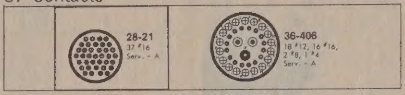
31 Contacts


36-9
1 #4, 2 #8, 14 #12, 14 #16
Serv. - A

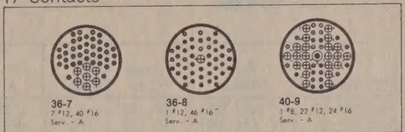
35 Contacts


28-15
35 #16
Serv. - A
32-7
7 #12, 28 #16
Serv. - INST. (ABhj) A (Others)
36-15
35 #16
Serv. - D (m) A (Others)

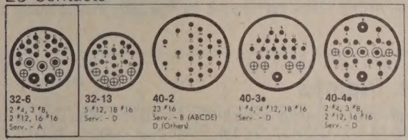
37 Contacts


28-21
37 #16
Serv. - A
36-406
18 #12, 16 #16, 2 #8, 1 #4
Serv. - A

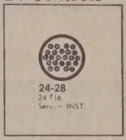
47 Contacts


36-7
7 #12, 40 #16
Serv. - A
36-8
1 #12, 46 #16
Serv. - A
40-9
1 #8, 22 #12, 24 #16
Serv. - A

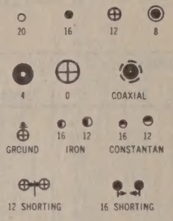
23 Contacts


32-6
2 #4, 3 #8, 2 #12, 16 #16
Serv. - A
32-13
5 #12, 18 #16
Serv. - D
40-2
23 #16
Serv. - B (ABCDE) D (Others)
40-3•
1 #4, 4 #12, 18 #16
Serv. - D
40-4•
2 #4, 3 #8, 2 #12, 16 #16
Serv. - D

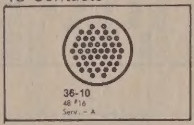
24 Contacts


24-28
24 #16
Serv. - INST

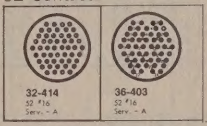
CODE OF WIRE SIZES


20
16
12
8
4
0
COAXIAL
GROUND
16
12
IRON
16
12
CONSTANTAN
12 SHORTING
16 SHORTING

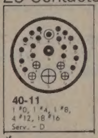
48 Contacts


36-10
48 #16
Serv. - A

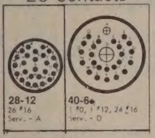
52 Contacts


32-414
52 #16
Serv. - A
36-403
52 #16
Serv. - A

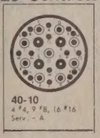
25 Contacts


40-11
1 #0, 1 #4, 1 #8, 4 #12, 18 #16
Serv. - D

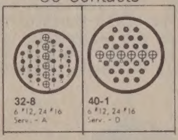
26 Contacts


28-12
26 #16
Serv. - A
40-6•
1 #0, 1 #12, 24 #16
Serv. - D

29 Contacts


40-10
4 #4, 9 #8, 16 #16
Serv. - A

30 Contacts


32-8
6 #12, 24 #16
Serv. - A
40-1
6 #12, 24 #16
Serv. - D

CURRENT RATING

Contact Size	20	16	12	8	4	0
Amperes	10	22	41	73	135	245

SERVICE		INST	A	D	E	B	C
Limiting Operating Voltage at sea level	DC	250	700	1250	1750	2450	4200
	AC (rms)	200	500	900	1250	1750	3000

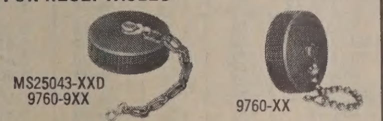
CAP AND CHAIN ASSEMBLIES

Ordering Information and Dimensions

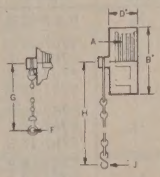
Fit 97 type receptacles and plugs. Provide protection against live circuits and keep out dirt and dust when connector is not in use.

Two styles are available: the MS type with a stainless steel link chain, and the Amphenol standard type with a beaded chain. Both use the same caps and both have a cadmium olive drab finish.

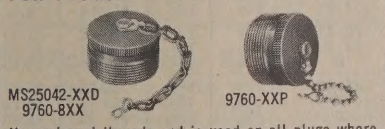
FOR RECEPTACLES


MS25043-XXD
9760-9XX
9760-XX

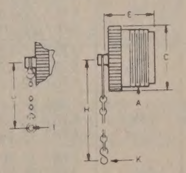
Has internal threads and is used on all receptacles (MS3102, MS3101 and MS3100). A soft rubber disc seats on the connector shell forming a watertight joint.



FOR PLUGS


MS25042-XXD
9760-8XX
9760-XXP

Has external threads and is used on all plugs where a coupling nut is provided (MS3106 and MS3108).



Part Numbers				For Connector Size	Dimensions — Inches										
For Receptacles		For Plugs													
MS25043-XXD Type‡	Amphenol Standard†	MS25042-XXD Type‡	Amphenol Standard†		A Thrds.	B*	C	D*	E	F	G	H	I	J	K
9760-908	9760-8	9760-808	9760-8P	8S	1/2-28	5/8	1/2	7/16	21/32	.125	2 9/16	4.0	.125	.140	.156
9760-910	9760-10	9760-810	9760-10P	10S, 10SL	5/8-24	13/16	5/8	7/16	21/32	.125	2 9/16	4.0	.125	.140	.156
9760-912	9760-12	9760-812	9760-12P	12, 12S, 12SL	3/4-20	15/16	3/4	7/16	27/32	.125	2 9/16	4.5	.125	.140	.156
9760-914	9760-14	9760-814	9760-14P	14, 14S	7/8-20	1 1/16	7/8	7/16	27/32	.125	2 9/16	4.5	.125	.140	.156
9760-916	9760-16	9760-816	9760-16P	16, 16S	1 -20	1 1/8	1	7/16	27/32	.167	4 5/8	4.5	.167	.140	.156
9760-918	9760-18	9760-818	9760-18P	18	1 1/8-18	1 5/16	1 1/8	7/16	27/32	.167	4 5/8	4.5	.167	.140	.156
9760-920	9760-20	9760-820	9760-20P	20	1 1/4-18	1 7/16	1 1/4	7/16	27/32	.167	4 5/8	5.0	.167	.140	.187
9760-922	9760-22	9760-822	9760-22P	22	1 3/8-18	1 9/16	1 3/8	7/16	27/32	.167	4 5/8	5.0	.167	.140	.187
9760-924	9760-24	9760-824	9760-24P	24	1 1/2-18	1 11/16	1 1/2	7/16	27/32	.167	4 5/8	5.5	.167	.171	.187
9760-928	9760-28	9760-828	9760-28P	28	1 3/4-18	1 59/64	1 3/4	1/2	27/32	.167	4 5/8	7.5	.167	.171	.187
9760-932	9760-32	9760-832	9760-32P	32	2 -18	2 3/16	2	1/2	27/32	.190	5 3/4	7.5	.260	.187	.218
9760-936	9760-36	9760-836	9760-36P	36	2 1/4-16	2 7/16	2 1/4	1/2	27/32	.190	5 3/4	7.5	.260	.187	.218

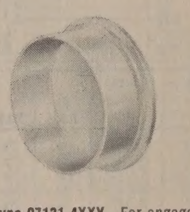
* B dimension 1/16" less and D dimension 1/64" less for screw machine parts.

† Caps less chains are available. To order, add G to the part number; for example, 9760-8G.

‡ Complete the MS part number by substituting the shell size for XX. For example, to get a MS type cap for a size 10 receptacle, order MS25043-10D.

97 CONNECTOR ACCESSORIES

Protective Caps for MS Connectors — 97121



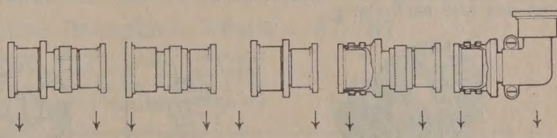
MS90376 Expendable polyethylene dust caps provide added protection for precision-built MS connectors during storage and handling, in assembling with other equipment, and after complete assembly into a finished apparatus. Protective caps cover threaded sections of plugs and receptacles; assure against damage to thread from any cause; permit low-cost, attractive coverings which protect contacts and the insulation from dust, dirt and handling damage.

Type 97121-4XXY—For engagement with internal threads of coupling rings.

Type 97121-4XXR—For engagement with external threads; for coupling and fitting threads

How to Order Connectors with Caps Assembled

TYPES AND SIZES REQUIRED



	For Type MS3100		For Type MS3101		For Type MS3102		For Type MS3106		For Type MS3108	
Connector Size	Mating End	Termination End	Mating End	Termination End	Mating End	Termination End	Mating End	Termination End	Mating End	Termination End
8S	-408R	-408R	-408R	-408R	-408R		-408Y	-408R	-408Y	-408R
10S	-410R	-408R	-410R	-408R	-410R	-408R	-410Y	-408R	-410Y	-408R
10SL	-410R	-410R	-410R	-410R	-410R	-410R	-410Y	-410R	-410Y	-410R
12S-12	-412R	-410R	-412R	-410R	-412R		-412Y	-410R	-412Y	-410R
14S-14	-414R	-412R	-414R	-412R	-414R	-412R	-414Y	-412R	-414Y	-412R
16S-16	-416R	-414R	-416R	-414R	-416R	-414R	-416Y	-414R	-416Y	-414R
18	-418R	-416R	-418R	-416R	-418R	-416R	-418Y	-416R	-418Y	-416R
20	-420R	-420Y	-420R	-420Y	-420R	-418R	-420Y	-420Y	-420Y	-420Y
22	-422R	-420Y	-422R	-420Y	-422R	-420R	-422Y	-420Y	-422Y	-420Y
24	-424R	-424Y	-424R	-424Y	-424R	-422R	-424Y	-424Y	-424Y	-424Y
28	-428R	-424Y	-428R	-424Y	-428R		-428Y	-424Y	-428Y	-424Y
32	-432R	-428R	-432R	-428R	-432R		-432Y	-428R	-432Y	-428R
36	-436R	-432R	-436R	-432R	-436R		-436Y	-432R	-436Y	-432R
40	-440R	-436R	-440R	-436R	-440R		-440Y	-436R	-440Y	-436R

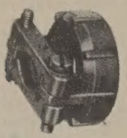
NOTE: A complete part number consists of type number 97121 and the size indicated by a dash number such as -408R, or 440Y. Examples of complete part numbers: 97121-408R, 97121-440Y, etc.

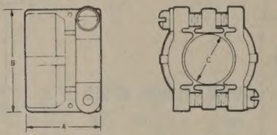
STANDARD CIRCULAR CONNECTORS

97 Connector Accessories

Cable Clamp

For jacketed cable or wires protected by tubing. On MS3057A Cable Clamp, both clamping halves float, so that cable is always centered, affording maximum strain relief. With unjacketed cable or wire bundles without tubing, use corresponding MS3420 bushing. To order clamp with bushing, add -1 to the Amphenol part number. With shell sizes 16 and larger, two telescoping bushings are furnished.

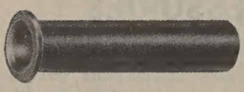


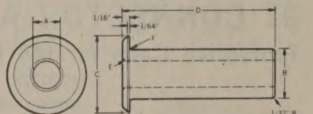


MS Number	Part Number	Shell Size	Max. O.D. Cable	Dimensions — Inches A	B	C	Threads
MS3057-4A	97-3057-1004	10SL, 12S	5/16	.795	.842	5/16	5/8-24
MS3057-6A	97-3057-1007	14, 14S	7/16	.850	.995	7/16	3/4-20
MS3057-8A	97-3057-1008	16, 16S	9/16	.920	1.120	9/16	7/8-20
MS3057-10A	97-3057-1010	18	5/8	.920	1.216	5/8	1 -20
MS3057-12A	97-3057-1012	20, 22	3/4	.927	1.403	3/4	1 3/16-18
MS3057-16A	97-3057-1016	24, 28	15/16	1.015	1.683	15/16	1 7/16-18
MS3057-20A	97-3057-1020	32	1 1/4	1.095	2.050	1 1/4	1 3/4-18
MS3057-24A	97-3057-1024	36	1 3/8	1.156	2.245	1 3/8	2 -18

Bushing

Rubber bushing specifically designed for MS3057A Cable Clamp. Protects wire bundles and unjacketed cables from possible damage by cable clamp. Can also be used as reducing bushing.

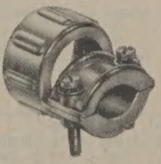


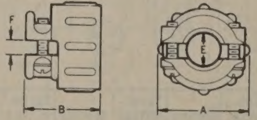


Part Number MS	Amphenol	Dimensions — Inches A Dia.	B Dia.	C Dia.	D	E Rad	F Rad
3420-3	9779-513-3	.130	2.10	.374	2.875	1/32	1/32
3420-4	9779-513-4	.220	.302	.500	2.750	1/32	1/32
3420-6	9779-513-6	.312	.427	.614	2.625	1/32	1/16
3420-8	9779-513-8	.437	.552	.739	2.500	1/16	1/16
3420-10	9779-513-10	.562	.615	.864	2.375	1/16	1/16
3420-12	9779-513-12	.625	.740	1.059	2.250	1/16	1/16
3420-16	9779-513-16	.750	.927	1.039	2.125	1/16	1/16
3420-20	9779-513-20	.937	1.240	1.591	2.000	1/16	1/16
3420-24	9779-513-24	1.250	1.365	1.842	1.875	1/16	1/16

Cable Clamp

For jacketed cable or wires protected by tubing. To provide for the most firm grip, the cable or wires should be centered in the jaws of the clamp. A vinyl or rubber bushing or sleeve may be used for this purpose. In applications where the cable is subject to considerable flexing, the resilient sleeve should project for several inches along the wire. This reinforcement lengthens the life of the cable. For centering and sealing, one resilient washer and two fiber washers are included with each clamp.

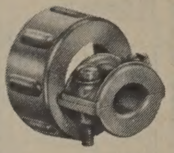




AN Number	Fits Shell Size	Fits AN Fitting Size	Max. O.D. Cable	Dimensions — Inches A	B	E	F	Threads	Weight Lbs. per 100
AN3057-3	8S, 10S	3	1/4	11/16	1	1/4	1/8	1/2-28	1.89
AN3057-4	†10SL, 12S	4	5/16	25/32	1	5/16	3/16	5/8-24	2.12
AN3057-6	14, 14S	6	7/16	15/16	1 5/64	7/16	3/16	3/4-20	2.94
AN3057-8	16, 16S	8	9/16	1 1/16	1 1/8	9/16	9/32	7/8-20	3.44
AN3057-10	18	10	5/8	1 3/16	1 1/8	5/8	5/16	1 -20	4.72
AN3057-12	20, 22	12	3/4	1 3/8	1 3/16	3/4	5/16	1 3/16-18	6.10
AN3057-16	24, 28	16	15/16	1 5/8	1 5/16	15/16	3/8	1 7/16-18	8.71
AN3057-20	32	20	1 1/4	1 15/16	1 1/2	1 1/4	1/2	1 3/4-18	14.85
AN3057-24	36	24	1 3/8	2 3/16	1 9/16	1 3/8	19/32	2 -18	18.15
AN3057-28	40	28	1 5/8	2 1/2	1 9/16	1 5/8	21/32	2 1/4-16	21.50

† Clamps for connectors size 12 are the same as for sizes 10SL and 12S.

Step Down Cable Clamp — 97-3057



Like the AN3057 except for the step down feature that accommodates smaller cable than that for which AN3057 was designed.

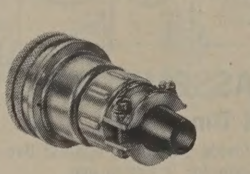
Part Number	Fits Shell Size	Fits AN Fitting Size	Max. O.D. Cable	Dimensions — Inches A	B	E	F	Threads	Weight Lbs. per 100
97-3057-10-6	18	10	1/2	1 3/16	1 1/8	7/16	3/16	1 -20	3.94
97-3057-12-6	20, 22	12	1/2	1 3/8	1 3/16	7/16	3/16	1 3/16-18	4.40

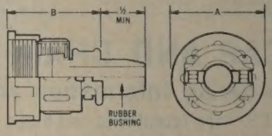
NOTE: The selection of fittings for connection to MS connectors is based on the connector size AND the cable or conduit size. For other connections, such as terminations and couplings, fitting sizes correspond to the size of the cable or conduit used.

Waterproof Cable Clamps

The complete waterproof cable clamp assembly No. 9767 (for use with MS connectors) consists of an AN3057 Cable Clamp, a rubber bushing, washer and an AN3055 Adapter. It is available for all sizes MS and 97 plugs. The sectional view of Amphenol 9767 Waterproof Cable Clamp shows the parts of the clamp.

To assure the watertight integrity of this clamp when assembled to an MS plug, the plug must be ordered with deviation (417) which supplies a W washer cemented to the shoulder of the plug shell.





Max. Cable O.D. Inches	Part Number	Connector Size	Dimensions — Inches A	B	Threads	Weight Lbs. per 100
5/32	9767-12-3	10SL, 12S, 12	25/32	1 17/32	5/8-24	3.19
7/32	9767-10-4	8S, 10S	11/16	1 17/32	1/2-28	3.46
	9767-12-4	10SL, 12S, 12	25/32	1 17/32	5/8-24	3.82
	9767-14-4	12SL, 14S, 14	29/32	1 17/32	3/4-20	3.87
	9767-16-4	16S, 16	1 1/16	1 17/32	7/8-20	4.00
11/32	9767-14-6	12SL, 14S, 14	29/32	1 19/32	3/4-20	5.54
	9767-16-6	16S, 16	1 1/16	1 19/32	7/8-20	5.84
	9767-18-6	18	1 3/16	1 19/32	1 -20	5.94
7/16	9767-16-8	16S, 16	1 1/16	1 19/32	7/8-20	6.92
	9767-18-8	18	1 3/16	1 19/32	1 -20	7.10
	9767-22-8	20, 22	1 3/8	1 19/32	1 3/16-18	7.27
9/16	9767-18-10	18	1 3/16	1 19/32	1 -20	8.79
	9767-22-10	20, 22	1 3/8	1 19/32	1 3/16-18	8.97
	9767-28-10	24, 28	1 5/8	1 17/32	1 7/16-18	9.12
11/16	9767-22-12	20, 22	1 3/8	1 21/32	1 3/16-18	12.65
	9767-28-12	24, 28	1 5/8	1 21/32	1 7/16-18	12.86
	9767-32-12	32	1 15/16	1 23/32	1 3/4-18	13.05
27/32	9767-28-16	24, 28	1 5/8	1 25/32	1 7/16-18	14.95
	9767-32-16	32	1 15/16	1 27/32	1 3/4-18	16.13
	9767-36-16	36	2 3/16	1 31/32	2 -18	16.26
1 1/32	9767-32-20	32	1 15/16	1 31/32	1 3/4-18	22.27
	9767-36-20	36	2 3/16	2 1/32	2 -18	22.41
	9767-40-20	40	2 7/16	2 3/32	2 1/4-16	22.61
1 3/16	9767-36-24	36	2 3/16	2 3/32	2 -18	29.85

For AN Fittings

When selecting a cable clamp for a connection with fittings, the 9767 Waterproof Cable Clamp without the adapter may be used. AN fittings have the required inside tapered surface for seating the special rubber bushing.

Max. Cable O.D. Inches	Part Number	Fitting Size	Dimensions — Inches A	B	Threads	Weight Lbs. per 100
5/32	9767-3	3	21/32	1	1/2-28	2.09
7/32	9767-4	4	25/32	1	5/8-24	2.45
11/32	9769-6	6	29/32	1 5/64	3/4-20	3.94
7/16	9767-8	8	1 1/16	1 1/8	7/8-20	4.57
9/16	9767-10	10	1 3/16	1 1/8	1 -20	5.97
11/16	9767-12	12	1 3/8	1 3/16	1 3/16-18	7.85
27/32	9767-16	16	1 5/8	1 5/16	1 7/16-18	9.53
1 1/32	9767-20	20	1 15/16	1 1/2	1 3/4-18	16.41
1 3/16	9767-24	24	2 3/16	1 9/16	2 -18	22.40

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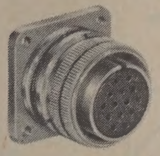
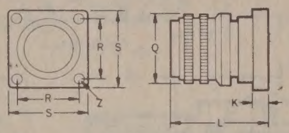
STANDARD CIRCULAR CONNECTORS

97 Series — Special Purpose Connectors

Box Type Plugs — (97-5105 Construction)

Square flange for mounting directly on box or housing. Provides a means of directly connecting two pieces of equipment without interconnecting wires. Available in all sizes with either male or female inserts. To order, complete the part number (97-5105) by adding the proper insert number. (See other pages for insert information.) Example: 97-510528-20S. To prevent connectors from rotating, order deviation 205 (a single stake, with swivel ring pinned) or 206 (double staking, with both swivel plate and swivel ring pinned); for example: 97-510528-20S(205) or 97-510528-20S(206).

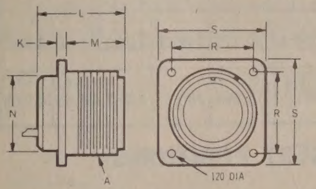




Connector Size	Dimensions — Inches					Z Mounting Threads
	K	L	Q	R	S	
8S	1/8	7/8	3/4	9/16	25/32	4-36
10S	1/8	7/8	7/8	9/16	25/32	4-36
12S	5/32	31/32	1	13/16	1 1/16	4-36
12	5/32	1 3/8	1	13/16	1 1/16	4-36
14S	5/32	31/32	1 1/8	13/16	1 1/16	4-36
14	5/32	1 3/8	1 1/8	13/16	1 1/16	4-36
16S	5/32	31/32	1 1/4	1	1 5/16	6-32
16	5/32	1 13/32	1 1/4	1	1 5/16	6-32
18	5/32	1 13/32	1 11/32	1	1 5/16	6-32
20	3/16	1 13/32	1 15/32	1 1/4	1 5/8	10-24
22	3/16	1 13/32	1 19/32	1 1/4	1 5/8	10-24
24	3/16	1 13/32	1 23/32	1 9/16	2	10-24
28	3/16	1 13/32	1 31/32	1 9/16	2	10-24
32	1/4	1 1/2	2 7/32	1 13/16	2 1/2	10-24
36	1/4	1 1/2	2 15/32	1 13/16	2 1/2	10-24

Small Flange Receptacles — (115 Construction)

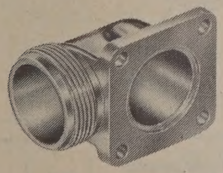
Receptacles are available in sizes 12S and 14S with pin or socket inserts and in size 10SL with pin contacts only. To order, complete part number (97-3102) by adding proper insert and construction number (115).

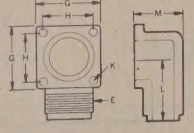


Connector Size	Coupling Threads A	Dimensions — Inches					
		K	L	M	N	R	S
10SL	5/8-24	5/64	55/64	9/16	5/8	.625	13/16
12S	3/4-20	3/32	27/32	9/16	5/8	.664	7/8
14S	7/8-20	3/32	27/32	9/16	23/32	.730	15/16

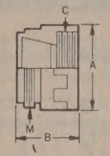
Junction Shells — 9784

These junction shells may be used as panel terminations to hold cable harnesses when not in use or as right-angle feed-throughs similar to the AN3064. Adding the AN3057 cable clamps provides strain relief.





Part Number	Use Fitting Size	Dimensions — Inches						Weight Lbs. per 100
		E Threads	G	H	K Dia.	L	M	
9784-10S	3	1/2-28	25/32	9/16	.120	7/8	5/8	1.20
9784-12	4	5/8-24	1 1/16	13/16	.125	1	23/32	1.20
9784-14	6	3/4-20	1 1/16	13/16	.125	1	25/32	2.34
9784-16	8	7/8-18	1 5/16	1	.141	1 1/8	31/32	2.84
9784-18	10	1 -20	1 5/16	1	.141	1 1/8	1 1/32	3.98
9784-22	12	1 3/16-18	1 5/8	1 1/4	.203	1 5/16	1 1/4	6.60
9784-28	16	1 7/16-18	2	1 9/16	.203	1 1/2	1 25/32	12.47
9784-32	20	1 3/4-18	2 1/2	1 13/16	.203	1 25/32	2 1/16	12.47
9784-36	24	2 -18	2 1/2	1 13/16	.203	1 25/32	2 13/16	20.01



Adapter — AN3055

The AN3055 adapter is used with standard MS connectors as a reducing or extending bushing.

Conduit Size Inches*	AN Number	Used on Connector Sizes	Dimensions — Inches				Weight Lbs. per 100
			A	B	C Threads	M Threads	
3/16	AN3055-12-3	12S, 12	25/32	7/8	5/8-24	1/2-28	1.10
	AN3055-12-4	12S, 12	25/32	7/8	5/8-24	5/8-24	1.37
1/4	AN3055-14-4	14S, 14	29/32	7/8	3/4-20	5/8-24	1.42
	AN3055-16-4	16S, 16	1 1/16	7/8	7/8-20	5/8-24	1.55
	AN3055-14-6	14S, 14	23/32	7/8	3/4-20	3/4-20	1.60
3/8	AN3055-16-6	16S, 16	1 1/16	7/8	7/8-20	3/4-20	1.90
	AN3055-18-6	18	1 3/16	7/8	1 -20	3/4-20	2.00
	AN3055-16-8	16S, 16	1 1/16	7/8	7/8-20	7/8-20	2.35
1/2	AN3055-18-8	18	1 3/16	7/8	1 -20	7/8-20	2.53
	AN3055-22-8	20, 22	1 3/8	7/8	1 3/16-18	7/8-20	2.70
	AN3055-18-10	18	1 3/16	7/8	1 -20	7/8-20	2.82
5/8	AN3055-22-10	20, 22	1 3/8	7/8	1 3/16-18	1 -20	3.00
	AN3055-28-10	24, 28	1 5/8	7/8	1 7/16-18	1 -20	3.15
	AN3055-22-12	20, 22	1 3/8	7/8	1 3/16-18	1 3/16-18	4.80
3/4	AN3055-28-12	24, 28	1 5/8	7/8	1 7/16-18	1 3/16-18	5.01
	AN3055-32-12	32	1 15/16	15/16	1 3/4-18	1 3/16-18	5.20
	AN3055-28-16	24, 28	1 5/8	7/8	1 7/16-18	1 7/16-18	5.42
1	AN3055-32-16	32	1 15/16	15/16	1 3/4-18	1 7/16-18	5.60
	AN3055-36-16	36	2 3/16	1 1/16	2 -18	1 7/16-18	5.73
	AN3055-32-20	32	1 7/8	15/16	1 3/4-18	1 3/4-18	5.86
1 1/4	AN3055-36-20	36	2 3/16	1 1/16	2 -18	1 3/4-18	6.00
	AN3055-40-20	40	2 7/16	1 1/16	2 1/4-16	1 3/4-18	6.20
1 1/2	AN3055-36-24	36	2 1/8	1 1/16	2 -18	2 -18	7.45

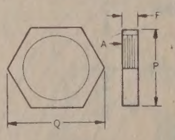
* Indicates nominal inside diameter of flexible Shielding Conduit No. AN-WW-C-561 or outside diameter of rigid aluminum conduit No. AND-10101. Brass or other conduit of similar size may be used with these fittings.

Conduit Box Connectors — AN3064

Used with AN3066 conduit coupling locknut to form a termination at conduit boxes or panel. The conduit box connector may also be used with AN3057 cable clamp to relieve strain on wiring cable terminals.

Conduit Size Inches*	AN Number	Use Conduit Coupling Lock Nut Size	Use Conduit Coupling Nut No.	Dimensions — Inches				Weight Lbs. per 100
				A Threads	B	F	P	
3/16	AN3064-3	AN3066-3	AN3054-3	1/2-28	3/4	1/8	11/16	1.17
1/4	AN3064-4	AN3066-4	AN3054-4	5/8-24	3/4	1/8	13/16	1.75
3/8	AN3064-6	AN3066-6	AN3054-6	3/4-20	3/4	1/8	15/16	2.18
1/2	AN3064-8	AN3066-8	AN3054-8	7/8-20	7/8	3/16	1 1/16	3.15
5/8	AN3064-10	AN3066-10	AN3054-10	1 -20	7/8	3/16	1 1/4	3.94
3/4	AN3064-12	AN3066-12	AN3054-12	1 3/16-18	7/8	3/16	1 3/8	4.98
1	AN3064-16	AN3066-16	AN3054-16	1 7/16-18	7/8	3/16	1 5/8	5.75
1 1/4	AN3064-20	AN3066-20	AN3054-20	1 3/4-18	15/16	3/16	2	9.17

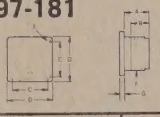
Lock Nut — AN3066



Conduit Size Inches*	AN Number	Dimensions — Inches				Weight Lbs. per 100
		A Threads	F	P	Q	
3/16	AN3066-3	1/2-28	1/8	11/16	51/64	.28
1/4	AN3066-4	5/8-24	1/8	13/16	15/16	.36
3/8	AN3066-6	3/4-20	1/8	15/16	1 3/32	.41
1/2	AN3066-8	7/8-20	3/16	1 1/16	1 15/64	.72
5/8	AN3066-10	1 -20	3/16	1 1/4	1 7/16	.86
3/4	AN3066-12	1 3/16-18	3/16	1 3/8	1 19/32	1.01
1	AN3066-16	1 7/16-18	3/16	1 5/8	1 7/8	1.25
1 1/4	AN3066-20	1 3/4-18	3/16	2	2 5/16	1.85
1 1/2	AN3066-24	2 -18	3/16	2 3/16	2 17/32	2.04

Dummy Receptacle Shells — 97-181

Same as standard MS receptacle without installation or contacts. Used for anchoring straight or angle type MS plugs when they are not in use.

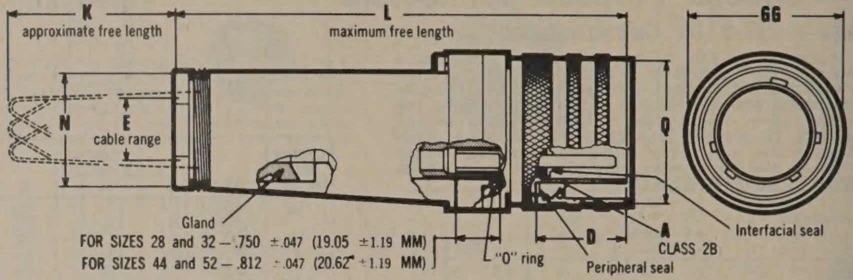


For Connector Size	MS Number	Part Number	Dimensions — Inches						Mtg. Flange Thickness		Wt. Lbs. per 100
			A	B	C	D	E Dia.	F Threads	Max.	Min.	
8S	MS3105-8S	97-181-8S	.562	.375	.594	.875	.120	1/2-28	.156	.078	1.01
10S	MS3105-10S	97-181-10S	.562	.375	.719	1.000	.120	5/8-24	.156	.078	1.10
12S	MS3105-12S	97-181-12S	.562	.375	.812	1.094	.120	7/8-20	.156	.078	1.73
14S	MS3105-14S	97-181-14S	.750	.625	.812	1.094	.120	1 -20	.156	.078	2.00
16S	MS3105-16S	97-181-16S	.562	.375	.906	1.188	.120	3/4-20	.156	.078	2.35
12	MS3105-12	97-181-12	.750	.625	.906	1.188	.120	7/8-20	.156	.078	2.30
14	MS3105-14	97-181-14	.562	.375	.969	1.281	.120	1 -20	.156	.078	2.41
16	MS3105-16	97-181-16	.750	.625	.969	1.281	.120	1 -20	.156	.078	3.10
18	MS3105-18	97-181-18	.750	.625	1.062	1.375	.120	1 1/8-16	.203	.094	3.18
20	MS3105-20	97-181-20	.750	.625	1.156	1.500	.120	1 1/4-18	.203	.094	3.80
22	MS3105-22	97-181-22	.750	.625	1.250	1.625	.120	1 3/8-18	.203	.094	4.50
24	MS3105-24	97-181-24	.812	.625	1.375	1.750	.147	1 1/2-18	.203	.094	5.00
28	MS3105-28	97-181-28	.812	.625	1.562	2.000	.147	1 3/4-18	.203	.094	6.58
32	MS3105-32	97-181-32	.875	.625	1.750	2.250	.173	2 -18	.359	.125	9.75
36	MS3105-36	97-181-36	.875	.625	1.933	2.500	.173	2 1/4-16	.359	.125	11.90
40	MS3105-40	97-181-40	.875	.625	2.188	2.750	.173	2 1/2-16	.359	.125	14.25

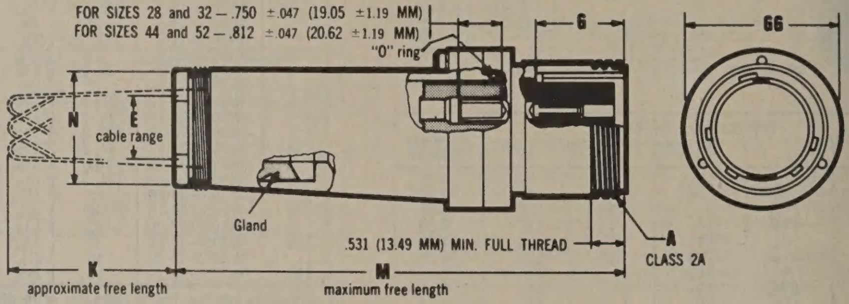
229 SERIES POWER-DISTRIBUTION INTERCONNECT

DIMENSIONS

CABLE PLUG

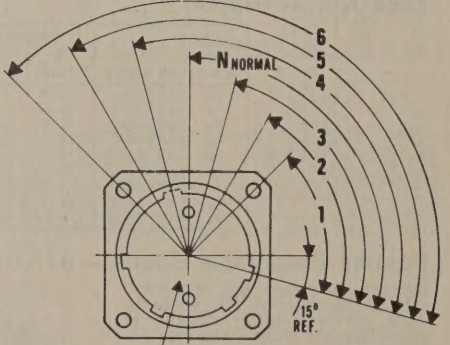

K
approximate free length
L
maximum free length
GG
N
E
cable range
Q
Gland
FOR SIZES 28 and 32 — .750 ±.047 (19.05 ±1.19 MM)
FOR SIZES 44 and 52 — .812 ±.047 (20.62 ±1.19 MM)
"O" ring
D
A
CLASS 2B
Peripheral seal
Interfacial seal

CABLE RECEPTACLE


FOR SIZES 28 and 32 — .750 ±.047 (19.05 ±1.19 MM)
FOR SIZES 44 and 52 — .812 ±.047 (20.62 ±1.19 MM)
"O" ring
G
GG
N
E
cable range
Gland
.531 (13.49 MM) MIN. FULL THREAD
A
CLASS 2A
K
approximate free length
M
maximum free length

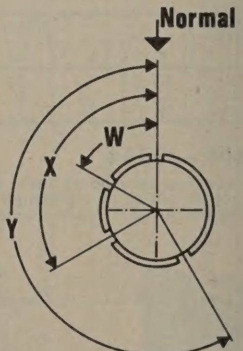
Size	A Thread	D IN. ±.005	D MM ±.13	Arrangement Number	E INCHES	E MM	G IN. ±.005	G MM ±.13	K IN.	K MM	L IN.	L MM	M IN.	M MM	N diameter IN. +.011 −.020	N diameter MM +.28 −.51	Q dia. max. IN.	Q dia. max. MM	GG diameter IN.	GG diameter MM
28	2.000-.1428P-.2857L	1.557	39.55	—12	1.047/ .922	26.59/23.42	1.514	38.46	7.188	182.58	8.188	207.98	8.156	207.16	2.000	50.80	2.312	58.72	2.439	61.95
				—13	1.130/1.005	28.70/25.53													2.428	61.67
32	2.500-.1428P-.2857L	1.557	39.55	—12	1.130/1.005	28.70/25.53	1.514	38.46	7.188	182.58	8.188	207.98	8.156	207.16	2.000	50.80	2.562	65.07	2.689	68.30
				—13	1.342/1.217	34.09/30.91			8.688	220.68									2.678	68.02
44	3.000-.1428P-.2857L	1.776	45.11	—12	1.516/1.391	38.51/35.33	1.733	44.02	10.688	271.48	10.172	258.37	10.125	257.18	2.500	63.50	3.531	89.68	3.667	93.14
				—13	1.672/1.547	42.47/39.29			12.688	322.28									3.646	92.61
52	3.500-.1428P-.2857L	1.776	45.11	—12	2.328/2.183	95.13/55.45	1.733	44.02	17.188	436.58	11.109	281.17	11.062	280.87	3.250	82.55	4.016	102.01	4.146	105.48
				—13	2.453/2.308	62.31/58.62			18.188	461.98									4.146	105.33

SHELL MAIN KEY POSITIONS


6
5
4
3
2
1
N NORMAL
15°
REF.

Typical socket arrangement. Pin arrangement opposite.
Insert arrangement does not rotate with main keyway.

INSERT POSITIONS



Grounding assemblies

FINISH **C** (conductive)

Size	Shell Main Key Positions					
	60 Hz & 400 Hz (See Note)					
	1 Phase			3 Phase		
	2 Wire		3 Wire	4 Wire		
	120 V	240 V	120/ 240 V	120/ 208 V	240/ 416 V	277/ 480 V
28	4(120°)	5(135°)	4(120°)	4(120°)	5(135°)	6(150°)
32	4(120°)	5(135°)	4(120°)	4(120°)	5(135°)	6(150°)
44	4(120°)	—	4(120°)	4(120°)	5(135°)	6(150°)
52	—	—	4(120°)	4(120°)	5(135°)	6(150°)

NOTE: Discrimination of 60 Hz and 400 Hz assemblies is accomplished by alternate positioning of inserts. See insert position for keying.

Non-grounding assemblies

FINISH **N** (non-conductive)

Size	Shell Main Key Positions
	DC
	2 Wire
	28 V
28	N(105°)
32	N(105°)
44	N(105°)
52	N(105°)

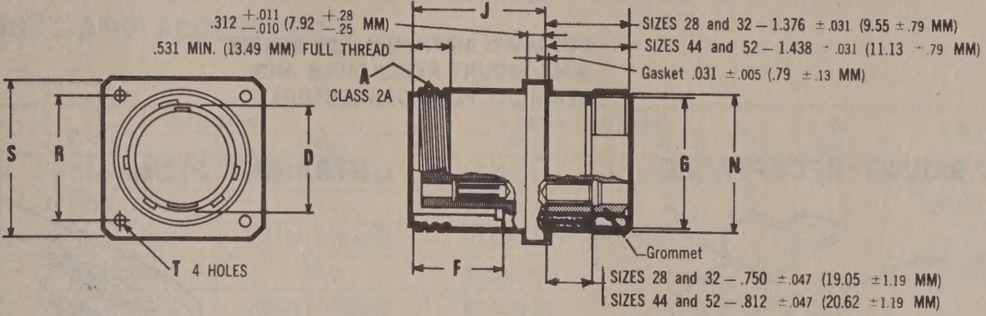
Size	Arrangement Number	Keying Positions Location (Degrees)				Current Rating (Amps)	Contact Size
		DC or 60 Hz	400 Hz				
		Normal	W	X	Y		
28	—12 —13	0°	—	—	180°	40	6
32	—12 —13	0°	—	—	180°	60	4
44	—12 —13	0°	60°	—	—	100	1/0
52	—12 —13	0°	60°	—	—	200	4/0

The right idea at the right time / AMPHENOL® / BUNKER RAMO®

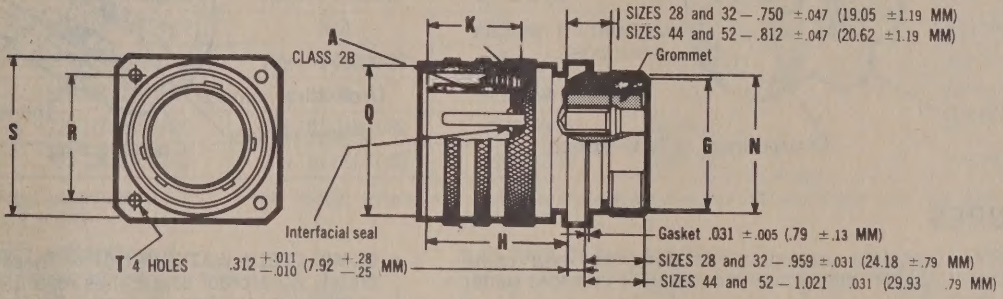
229 SERIES POWER-DISTRIBUTION INTERCONNECT

DIMENSIONS

WALL MOUNT RECEPTACLE

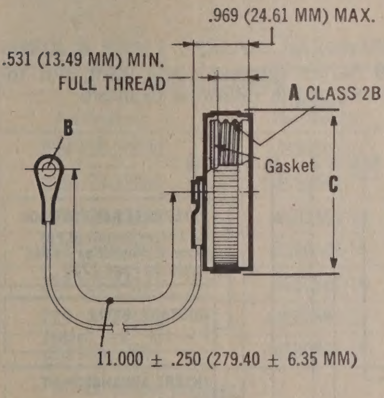

.312 +.011 −.010 (7.92 +.28 −.25 MM)
.531 MIN. (13.49 MM) FULL THREAD
J
SIZES 28 and 32 — 1.376 ±.031 (9.55 ±.79 MM)
SIZES 44 and 52 — 1.438 ±.031 (11.13 ±.79 MM)
Gasket .031 ±.005 (.79 ±.13 MM)
A CLASS 2A
S
R
D
G
N
T 4 HOLES
Grommet
F
SIZES 28 and 32 — .750 ±.047 (19.05 ±1.19 MM)
SIZES 44 and 52 — .812 ±.047 (20.62 ±1.19 MM)

WALL MOUNT PLUG

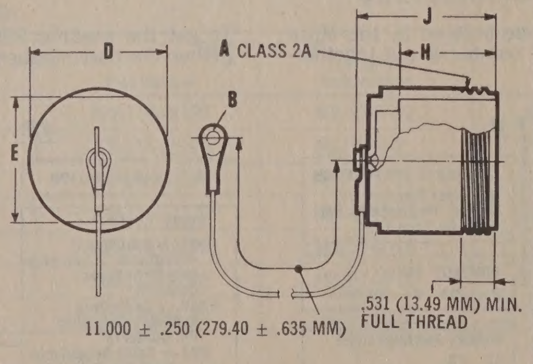

SIZES 28 and 32 — .750 ±.047 (19.05 ±1.19 MM)
SIZES 44 and 52 — .812 ±.047 (20.62 ±1.19 MM)
K
A CLASS 2B
Grommet
Q
S
R
G
N
Interfacial seal
H
T 4 HOLES
.312 +.011 −.010 (7.92 +.28 −.25 MM)
Gasket .031 ±.005 (.79 ±.13 MM)
SIZES 28 and 32 — .959 ±.031 (24.18 ±.79 MM)
SIZES 44 and 52 — 1.021 .031 (29.93 .79 MM)

Size	A Thread	D Diameter		F		G Diametr		H		J		K		N Diameter		Q Dia. Max.		R (Basic)		S		Diameter	
		IN. +.005 −.010	MM +.13 −.25	IN. ±.005	MM ±.13	IN. +.006 −.010	MM +.15 −.25	IN. +.016 −.000	MM +.41 −.00	IN. +.016 −.000	MM +.41 −.00	IN. ±.005	MM ±.13	IN. +.011 −.020	MM +.13 −.51	IN.	MM	IN.	MM	IN. +.021 −.020	MM +.53 −.51	IN. ±.005	MM ±.13
28	2.000-1428P-2857L	1.536	3.901	1.514	38.46	1.938	49.23	2.639	67.03	2.188	55.58	1.557	39.55	2.000	50.80	2.312	58.72	1.844	46.84	2.375	60.33	.177	4.50
32	2.250-1428P-2857L	1.786	45.36	1.514	38.46	2.188	55.58	2.639	67.03	2.188	55.58	1.557	39.55	2.250	57.15	2.562	65.07	2.062	52.37	2.625	66.68	.209	5.31
44	3.000-1428P-2857L	2.545	64.64	1.733	44.02	3.062	77.77	2.998	76.15	2.532	64.31	1.776	45.11	3.125	79.88	3.531	89.69	2.812	71.42	3.375	85.75	.281	7.14
52	3.500-1428P-2785L	3.005	76.33	1.733	44.02	3.562	90.47	2.998	76.15	2.532	64.31	1.776	45.11	3.625	90.47	4.016	102.01	3.156	80.16	3.875	90.43	.281	7.14

PROTECTIVE COVER (RECEPTACLE)


.969 (24.61 MM) MAX.
.531 (13.49 MM) MIN.
FULL THREAD
A CLASS 2B
B
Gasket
C
11.000 ± .250 (279.40 ± 6.35 MM)

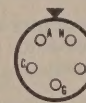
PROTECTIVE COVER (PLUG)


D
A CLASS 2A
J
H
B
E
.531 (13.49 MM) MIN.
FULL THREAD
11.000 ± .250 (279.40 ± .635 MM)

Size	A Thread	B Hole Dia. Reference				C Diameter Maximum		D Diameter Maximum		E Across Flats		H Minimum		J Maximum	
		Wall Mount Plug and Receptacle		Cable Plug and Receptacle											
		IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM	IN.	MM
28	2.000-.1428P-.2857L	.177	4.50	.177	4.50	2.219	56.36	2.000	50.80	1.750	44.45	1.562	39.67	2.266	57.56
32	2.250-.1428P-.2857L	.209	5.31	.177	4.50	2.469	62.71	2.250	57.15	2.000	50.80	1.562	39.67	2.266	57.56
44	3.000-.1428P-.2857L	.281	7.14	.281	7.14	3.219	81.76	3.000	76.20	7.50	69.85	1.781	45.24	2.484	63.09
52	3.500-.1428P-.2857L	.281	7.14	.281	7.14	3.750	95.25	3.500	88.90	3.250	82.55	1.781	45.24	2.484	63.09

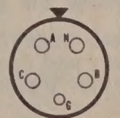
INSERT ARRANGEMENTS

Front face of pin insert shown. (Socket insert opposite.) Neutral (N) contact is not connected to shell. Grounding (G) contact is connected to shell.



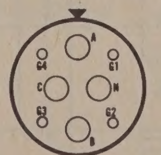
28-12 / 28-13

Contact	Size
A-B-C	G
N-G	GN



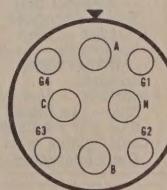
32-12 / 32-13

Contact	Size
A-B-C	4
N	4N
G	GN


A
G4
G1
C
N
G3
G2
B

44-12 / 44-13

Contact	Size
A-B-C	1/0
N	1/0N
G1-G2-G3	6G


A
G4
G1
C
N
G3
G2
B

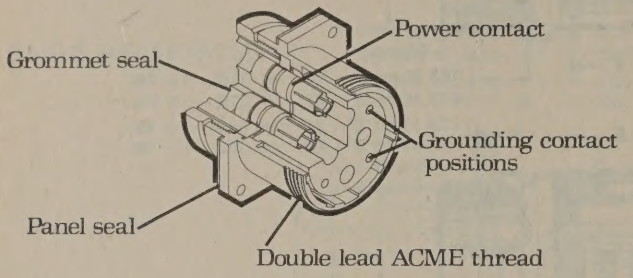
52-12 / 52-13

Contact	Size
A-B-C	4/0
N	4/0N
G1-G2-G3-G4	4G

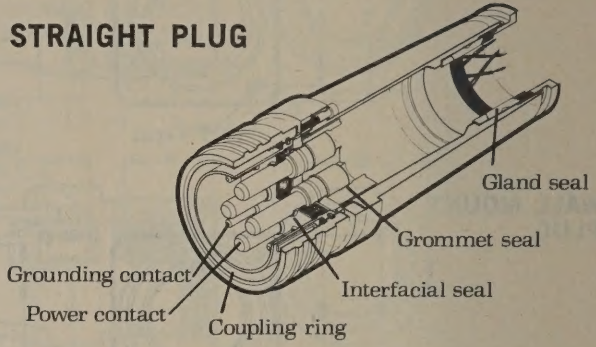
229 SERIES POWER-DISTRIBUTION INTERCONNECT

CUTAWAY: AMPHENOL 229 SERIES WALL MOUNT RECEPTACLE AND STRAIGHT PLUG CONNECTORS

WALL MOUNT RECEPTACLE



STRAIGHT PLUG



FEATURES

- **SAFETY**—Complete protection for personnel and using equipment whether connectors are mated or unmated under rated load.
- **ARC QUENCHING**—Socket contacts are recessed within the socket insert to provide an arc-suppressing chamber within the connector. This assures positive safety for the user.
- **ENVIRONMENT RESISTANT**—Connector design and materials withstand the most severe operating conditions. See specifics under Performance Characteristics.
- **CRIMP CONTACTS**—Connector design permits cable termination to contacts by solder or crimp method. Contacts are removable for repair or maintenance.
- **ACME-THREAD COUPLING**—Modified Acme thread will not clog under adverse conditions such as ice, snow, sand or mud. Quick coupling is an additional feature.
- **COMPLETELY WATERPROOF**—These connectors are completely waterproof assemblies regardless whether mated, or unmated, capped or uncapped. Sealing is accomplished by:

Main-Joint Gasket	Interfacial Seal
"O"-Ring Seal	Cable-Gland Seal
Grommet Seal for Individual Conductors	

- **NO CROSS MATING**—Connector design is foolproof, with mating polarization detailed for specific voltage, current, frequency, phase and grounding requirements. Five-key shell polarizing prevents mating with a connector of different power characteristics.
- **RUGGED**—All metal parts are high-strength aluminum. Molded parts are of high-strength materials designed to withstand heavy and severe usage.

HOW TO ORDER 229 SERIES CONNECTORS

MIL-C-22992 Class L connectors can be ordered by the Military part numbers. The connector part number is put together as per the following example:

MS90558 C 44 4 12 P W

SHELL STYLE
MS90555 — Wall Mount Receptacle Available Only with Socket Contacts
+MS90556 — Cable Plug — Available Only With Pin Contacts
MS90557 — Cable Receptacle — Available Only With Socket Contacts
+MS90558 — Wall Mount Plug — Available Only With Pin Contacts
+Coupling Ring Is On These Connectors

SHELL FINISHES
C — Conductive
N — Non-conductive

SHELL SIZE
28 32 44 52

SHELL KEY POSITION
1 Thru 6, N = Normal Positions As Per Table On Page 1739

INSERT ARRANGEMENT
12 13

CONTACT STYLE
P — Pin S — Socket

ALTERNATE KEY POSITION
No Letter Required For Normal. Positions As Per Table On Page 1739

NOTE: Each connector comes complete with protective cap and chain. In addition, the cable plug and cable receptacle come with the cable gland and cable grip sized for the cable on which they will be used. This sizing is controlled by the insert arrangement number.

To get the specific 229 Series connector you want, put together the part number as per the following example:

229 - 558 0 4 - 44 12 P W

SERIES DESIGNATION

SHELL STYLE
555 — Wall Mount Receptacle — Available Only With Socket Contacts
+556 — Cable Plug — Available Only With Pin Contacts
557 — Cable Receptacle — Available Only With Socket Contacts
+558 — Wall Mount Plug — Available Only With Pin Contacts
+Coupling Ring Is On These Connectors

SHELL FINISHES
0 — Cadmium OD
1 — Cadmium — Clear
2 — Black Hard Coat Anodize

SHELL KEY POSITION
1 Thru 6, N = Normal Positions As Per Table On Page 1739

SHELL SIZE
28 32 44 52

INSERT ARRANGEMENT
12 13

CONTACT STYLE
P — Pin S — Socket

ALTERNATE KEY POSITION
No Letter Required For Normal. Positions As Per Table On Page 1739

NOTE: Each connector comes complete with protective cap and chain. In addition, the cable plug and cable receptacle come with the cable gland and cable grip sized for the cable on which they will be used. This sizing is controlled by the insert arrangement number.

229 SERIES POWER-DISTRIBUTION INTERCONNECT

COMPONENT PARTS AND ACCESSORIES

CONTACTS

Contact Size	Rating Amps	Part Number		Military Part Number		Crimp Tool	Removal Tool
		Pin	Socket	Pin	Socket		
4/0	200	229-100-11000-02	229-101-11000-02	MS90559-1	MS90560-1	SEE NOTE*	294-551-03
4/0N	200	229-100-11001-02	N/A	MS90559-2	N/A		(MS90562-1)
1/0	100	229-100-01000-02	229-101-01000-02	MS90559-5	MS90560-3		294-551-04
1/0N	100	229-100-01001-02	N/A	MS90559-6	N/A		(MS90562-3)
4	60	229-100-04000-02	229-101-04000-02	MS90559-8	MS90560-5		294-551-01
4N	60	229-100-04001-02	N/A	MS90559-9	N/A		(MS90562-5)
6	40	229-100-06000-02	229-101-06000-02	MS90559-11	MS90560-7		294-551-02
6N	40	229-100-06001-02	N/A	MS90559-12	N/A		(MS90562-6)
4G	N/A	229-100-04002-02	229-101-04001-02	MS90559-13	MS90560-9		294-551-01
6G	N/A	229-100-06002-02	229-101-06001-02	MS90559-14	MS90560-8		294-551-02

* Contacts shall be crimped using MS25441 crimp tool with MS3150 crimping dies or use Pico Model 400B crimp tool with appropriate heads and locators.

INSERT AND GROMMET ASSEMBLIES

Insert	Pin Insert	Socket Insert	Grommet Assembly*
28-12	229-132-28120	229-133-28120	229-131-2812X
28-13	229-132-28130	229-133-28130	229-131-2813X
32-12	229-132-32120	229-133-32120	229-131-3212X
32-13	229-132-32130	229-133-32130	229-131-3213X
44-12	229-132-44120	229-133-44120	229-131-4412X
44-13	229-132-44130	229-133-44130	229-131-4413X
52-12	229-132-52120	229-133-52120	229-131-5212X
52-13	229-132-52130	229-133-52130	229-131-5213X

* Replace "X" in part number with "P" for pin grommet or "S" for socket grommet.

CAP AND CHAIN ASSEMBLIES

Size	Plug		Receptacle	
	Part Number	Military† Part Number	Part Number	Military† Part Number
28	229-135-28000	MS90564-1X	229-134-28000	MS90563-1X
32	229-135-32000*	MS90564-3X	229-134-32000*	MS90563-3X
32	229-135-32001*	MS90564-4X	229-134-32001*	MS90563-4X
44	229-135-44000	MS90564-7X	229-134-44000	MS90563-7X
52	229-135-52000	MS90564-11X	229-134-52000	MS90563-11X

* 229-135-32000 used on 229-55804-32XXP. 229-135-32001 used on 229-55604-32XXP. 229-134-32000 used on 229-55504-32XXS. 229-134-32001 used on 229-55704-32XXS.

† MS90564-1X
† MS90563-1X } C = Conductive Finish, N = Non-conductive.

SHELL & CABLE SEALING HARDWARE

Cable Grip (Kellum)		Cable Gland Seal		Follower*	Used With Inserts
Part Number	Military Part Number	Part Number	Military Part Number		
229-128-28000	MS90561-12	229-116-28120	MS23747-12	229-125-28000-02	28-12
229-128-32000	MS90561-2	229-116-32120	MS23747-2	229-125-32000-02	28-13, 32-12
229-128-32001	MS90561-13	229-116-32130	MS23747-13	229-125-32001-02	32-13
229-128-44000	MS90561-15	229-116-44120	MS23747-15	229-125-44000-02	44-12
229-128-44001	MS90561-16	229-116-44130	MS23747-16	229-125-44001-02	44-13
229-128-52000	MS90561-17	229-116-52120	MS23747-18	229-125-52000-02	52-12
229-128-52001	MS90561-18	229-116-52130	MS23747-19	229-125-52001-02	52-13

* = No MS Number Assigned.

HARDWARE

Size	Back Nut (Gland Nut) Plug Connector (229-556XX and 229-557XX)	Back Nut (Gland Nut) Receptacle (229-555XX and 229-558XX)	Backshell for 229-556XX and 229-557XX	Screws for 229-556XX and 557XX	Split Lockwasher for Use with Screws	"O" Ring Plug Connector	Panel Gasket
28	229-127-28000-02	229-111-28000-02	229-118-28000-02	34-1224	43-777	169-362	229-112-28000
32	229-127-32000-02	229-111-32000-02	229-118-32000-02	34-1224	43-777	169-361	229-112-32000
44	229-127-44000-02	229-111-44000-02	229-118-44000-02	34-1222	43-776	169-363	229-112-44000
52	229-127-52000-02	229-111-52000-02	229-118-52000-02	34-1222	43-776	169-360	229-112-52000

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BUNKER RAMO®

STANDARD CIRCULAR CONNECTORS

165 Series Miniature MS-Type Connectors

COMPACT AND CONVENIENT

Connectors in the 165 Series are only about one-third the size and weight of standard MS connectors with the same number of contacts.

Bayonet coupling provides quick disconnect.

WIDELY APPLICABLE

Eight different insert configurations and five different shell styles in two sizes — large and small — provide enough variations for a wide range of applications.

Plugs and cable receptacles are available with either a built-in cable clamp to provide positive strain relief or with provision for potting. On all connectors, alternate insert positions are available for gang mounting.

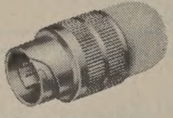
WEATHERPROOF AND PRESSURE PROOF

When mated, 165 Series connectors are pressure proof and completely waterproof. The connectors using female inserts feature a sandwich construction with the insert spun into a cartridge; the connectors are factory sealed to prevent leakage. O-ring seals are used in both plugs and receptacles. They meet the exacting pressure seal requirements of MIL-C-5015, Class C construction.

Cable Receptacle for Jacketed Cable

Plug for Jacketed Cable

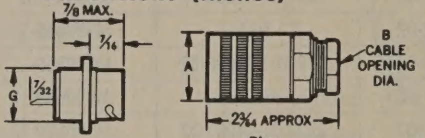
Plug for Potting



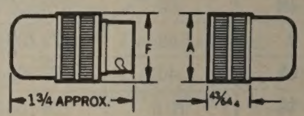
Cable Receptacle for Potting

Square Flange Receptacle

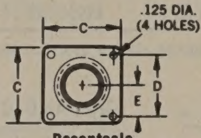
Dimensions (Inches)



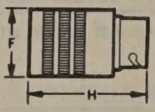
Plug



Potting Constructions



Receptacle



Cable Receptacle

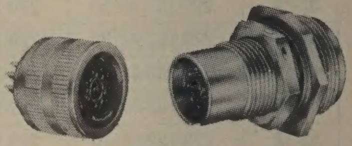
	A	B	C	D	E	F	G	H
Small	57/64	3/8	1 1/16	25/32	25/64	7/8	13/16	1 59/64
Large	1 9/64	21/32	1 5/16	31/32	31/64	1 1/8	1 1/16	1 15/16

Connectors with Shielded Contact and Ground Shield

- Important in aircraft and instrumentation applications, for example, fuel gaging.
- Shield continuity was recently upgraded by addition of heat treated beryllium copper finger pressure members to the socket shield.
- Available in a number of shell styles, including potting construction plug and cable receptacle, plugs with spring-loaded coupling ring, and square flange receptacle.
- Available also in combination of environmentally sealed and cable clamp construction.
- Two different insert configurations.

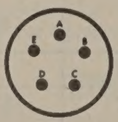
  Eight #20 contacts,
  1 shielded contact

  Nineteen #20 contacts,
  1 shielded contact

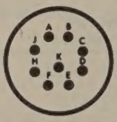


Insert Arrangements (Approx. 3/5 Actual Size)

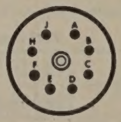
Showing front face of pin insert, socket insert is reversed



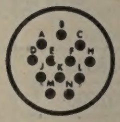
5 #20 contacts
Current rating
(Amperes) 7.5
Voltage rating
(Volts RMS
at sea level) 600



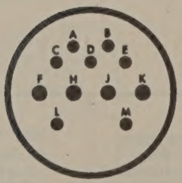
9 #20 contacts
Current rating
(Amperes) 7.5
Voltage Rating
(Volts RMS
at sea level) 500



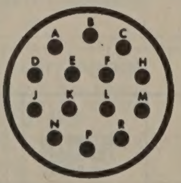
8 #20 contacts
1 Shielded
Current rating
(Amperes) 10
Voltage rating
(Volts RMS
at sea level) 500



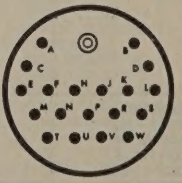
12 #20 contacts
Current rating
(Amperes) 7.5
Voltage rating
(Volts RMS
at sea level) 500



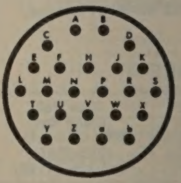
7 #20 contacts
4 #16 contacts
Current rating
(Amperes) no. 20 7.5
no. 16 17
Voltage rating
(Volts RMS
at sea level) 500



14 #16 contacts
Current rating
(Amperes) 17
Voltage rating
(Volts RMS
at sea level) 500



19 #20 contacts
1 Shielded
Current rating
(Amperes) 10
Voltage rating
(Volts RMS
at sea level) 500



24 #20 contacts
Current rating
(Amperes) 7.5
Voltage rating
(Volts RMS
at sea level) 500

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CIRCULAR ENVIRONMENTAL CONNECTORS

Design Features

① **Molded One-Piece Polymer Contact Retention Disc**—Fewer connector parts—Greater reliability

② **Fluorosilicone Fluid Resistant Seal Material**—Allows one connector to meet stringent fluid requirements of various specifications.

③ **Closed Entry Socket Insert and Contacts**—Eliminates mis-mating due to bent pins—System reliability

④ **Bayonet Coupling System**—Quick mating of connectors—Lowers operating costs

⑤ **5 Key Shell Polarization**—Assures positive contact alignment prior to mating

⑥ **Interfacial Mating Seal**—Maintains system integrity

⑦ **Static Peripheral Shell Seal**—Maintains system integrity

⑧ **Monoblock Construction—Inserts Bonded to Shells**—Helps to assure complete connector reliability

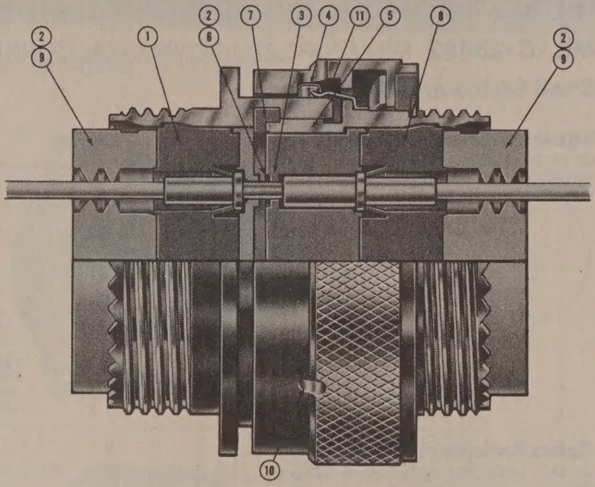
⑨ **Self-Sealing Rear Grommets**—Assures environmental sealing with or without rear hardware

⑩ **Visual Mating Indicators**—Quick indication that connector is fully mated

11 **Shell to Shell Grounding Fingers**

12 **Accepts standard MIL-C-38999 hardware**

13 **Durable Conductive Shell Finish**

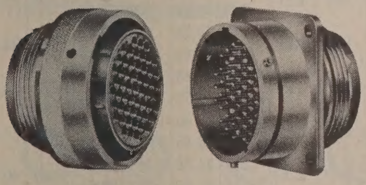


418 Series (Series II, Low Silhouette shown here.)

User Benefits

- 62% increased dielectric separation.
- Reduced number of connector parts, up to 128 decreases failure modes while increasing reliability.
- Resistant to fuels, oils, and cleaning solutions for longer life.
- Mis-mating due to bent pins eliminated by hard front closed entry socket insert with a hooded tined, prod-proof socket contact.
- Intermateable and intermountable with existing circuitry reducing replacement and upgrading costs.

MIL-C-26482/Series 2
118 Series



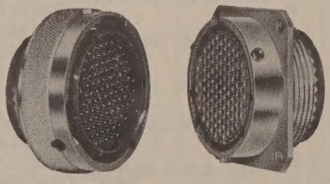
The Amphenol Connector 118 Series is manufactured in accordance with and fully qualified to MIL-C-83723 Series I, MIL-C-0026482 Series 2 and MIL-C-26482 Series 2.

This Series is manufactured to the highest Connector Class within these military specifications and can be supplied in accordance with the following classes:

- MIL-C-83723 Series I
  Class R-200°C fluid resistant, conductive finish, superseded by MIL-C-26482 Series 2.
- MIL-C-26482
  Class E-200°C non-fluid resistant, conductive finish has been superseded by Class L.
  Class L-200°C fluid resistant, conductive finish

The 118 Series Connectors are marked with both the MIL-C-83723 and MIL-C-26482 military part numbers to avoid logistic problems and simplify your stocking procedures.

MIL-C-38999/Series I and II
418 Series



The Amphenol Connector 418 Series is manufactured in accordance with and fully qualified to MIL-C-38999 Series I and Series II.

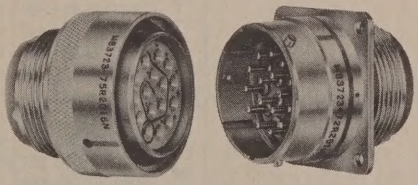
This Series is manufactured to the highest Connector Class within this military specification and can be supplied in accordance with the following classes:

- Class E—Environment Resisting
- Class T—Environment Resisting without Rear Accessories

They are available in the following finishes:

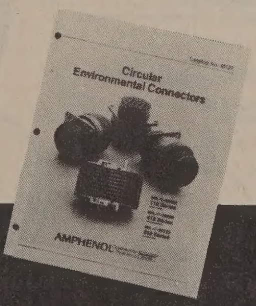
- Finish F—Electroless Nickel (-65°C to +200°C)
- Finish B—Olive Drab Cadmium over Nickel (-65°C to +150°C)

MIL-C-83723/Series III
518 Series



The Amphenol Connector 518 Series is manufactured in accordance with and fully qualified to MIL-C-83723 Series III.

This Series is manufactured to the highest Connector Class within this military specification and can be supplied in Class R. Class R is fluid resistant with conductive shell operates in the temperature range of -65°C to +200°C. Available with bayonet or threaded coupling systems.



For complete information ask for Circular Environmental Connectors Catalog M-123

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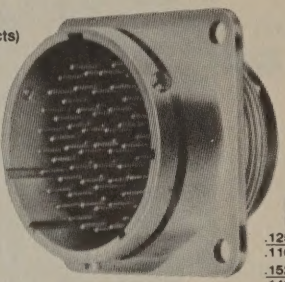
MIL-C-26482 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN I / 118 SERIES

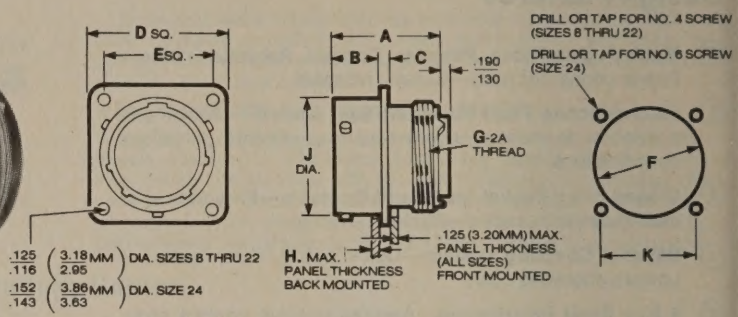
Shell Styles and Dimensions

Square Flange Receptacle

MS 3470 or M83723/01 (with socket contacts)
MS 3470 or M83723/02 (with pin contacts)
118-20L (Amphenol Part No.)

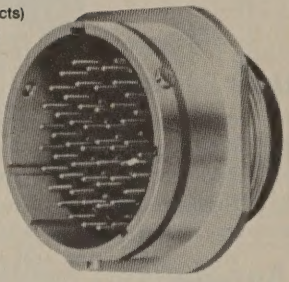


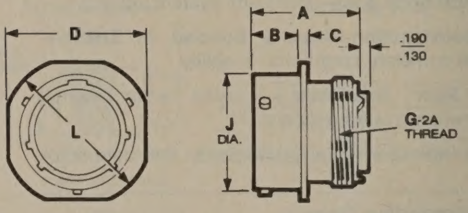
Panel Cutout


D SQ.
E SQ.
.125 / .116 (3.18 / 2.95 MM) DIA. SIZES 8 THRU 22
.152 / .143 (3.86 / 3.63 MM) DIA. SIZE 24
A
B
C
.190
.130
J DIA.
G-2A THREAD
H. MAX. PANEL THICKNESS BACK MOUNTED
.125 (3.20MM) MAX. PANEL THICKNESS (ALL SIZES) FRONT MOUNTED
DRILL OR TAP FOR NO. 4 SCREW (SIZES 8 THRU 22)
DRILL OR TAP FOR NO. 6 SCREW (SIZE 24)
F
K

Cable Receptacle

MS 3471 or M83723/07 (with socket contacts)
MS 3471 or M83723/08 (with pin contacts)
118-21L (Amphenol Part No.)

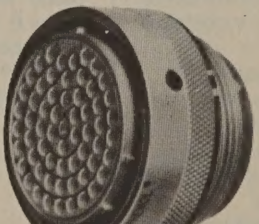


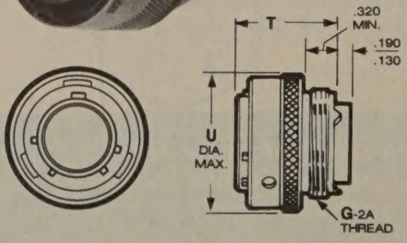

D
L
A
B
C
.190
.130
J DIA.
G-2A THREAD

SHELL SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D MAX In.	D MAX MM	E In.	E MM	F In.	F MM	G THREAD	H MAX In.	H MAX MM	J DIA. In.	J DIA. MM	K In.	K MM	L MAX In.	L MAX MM
8	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	.828	21.03	.594	15.09	.573 .563	14.55 14.30	1/2-20 UNF	.087	2.21	.474 .468	12.04 11.89	.599 .589	15.21 14.96	.958	24.33
10	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	.954	24.23	.719	18.26	.690 .680	17.53 17.27	5/8-24 UNEF	.087	2.21	.591 .585	15.01 14.86	.724 .714	18.39 18.14	1.082	27.48
12	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	1.047	26.59	.812	20.62	.869 .859	22.07 21.82	3/4-20 UNEF	.087	2.21	.751 .745	19.08 18.92	.817 .807	20.75 20.50	1.176	29.87
14	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	1.141	28.98	.906	23.01	.994 .984	25.25 24.99	7/8-20 UNEF	.087	2.21	.876 .870	22.25 22.10	.911 .901	23.14 22.89	1.270	32.26
16	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	1.234	31.34	.969	24.61	1.118 1.108	28.40 28.14	1-20 UNEF	.087	2.21	1.001 .995	25.43 25.27	.974 .964	24.74 24.49	1.364	34.65
18	1.040 1.023	26.42 25.98	.442 .431	11.23 10.95	.056 .046	1.42 1.17	1.328	33.73	1.062	26.97	1.243 1.233	31.57 31.32	1-1/16-18 UNEF	.087	2.21	1.126 1.120	28.60 28.45	1.067 1.057	27.10 26.85	1.458	37.03
20	1.103 1.086	28.02 27.58	.567 .556	14.40 14.12	.088 .078	2.24 1.98	1.453	36.91	1.156	29.36	1.368 1.358	34.75 34.49	1-3/16-18 UNEF	.212	5.38	1.251 1.245	31.78 31.62	1.161 1.151	29.49 29.24	1.582	40.18
22	1.103 1.086	28.02 27.58	.567 .556	14.40 14.12	.088 .078	2.24 1.98	1.578	40.08	1.250	31.75	1.493 1.483	37.92 37.67	1-5/16-18 UNEF	.212	5.38	1.376 1.370	34.95 34.80	1.255 1.245	31.88 31.62	1.708	43.38
24	1.103 1.086	28.02 27.58	.600 .589	15.24 14.96	.088 .078	2.24 1.98	1.703	43.26	1.375	34.93	1.620 1.610	41.15 40.89	1-7/16-18 UNEF	.212	5.38	1.501 1.495	38.13 37.97	1.380 1.370	35.05 34.80	1.832	46.53

Plug

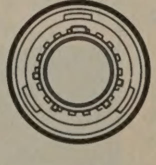
MS 3476 or M83723/13
(with socket contacts)
MS 3476 or M83723/14
(with pin contacts)
118-26L
(Amphenol Part No.)




T
.320 MIN.
.190
.130
U DIA. MAX.
G-2A THREAD

RFI Plug

MS 3475 or M83723/42
(with pin contacts)
MS 3475 or M83723/43
(with socket contacts)
118-28L
(Amphenol Part No.)



SHELL SIZE	T In.	T MM	U DIA. MAX. In.	U DIA. MAX. MM	G THREAD
8	1.035 1.014	26.29 25.76	.761	19.33	1/2-20 UNF
10	1.035 1.014	26.29 25.76	.871	22.12	5/8-24 UNEF
12	1.035 1.014	26.29 25.76	1.001	25.43	3/4-20 UNEF
14	1.035 1.014	26.29 25.76	1.133	28.79	7/8-20 UNEF
16	1.035 1.014	26.29 25.76	1.290	32.77	1-20 UNEF
18	1.035 1.014	26.29 25.76	1.350	34.29	1-1/16-18 UNEF
20	1.035 1.014	26.29 25.76	1.470	37.34	1-3/16-18 UNEF
22	1.035 1.014	26.29 25.76	1.602	40.69	1-5/16-18 UNEF
24	1.035 1.014	26.29 25.76	1.711	43.46	1-7/16-18 UNEF

The right idea
at the right time

AMPHENOL®

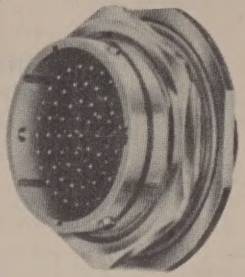
BUNKER RAMO®

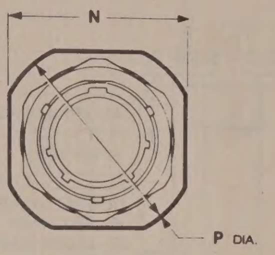
MIL-C-26482 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN I / 118 SERIES

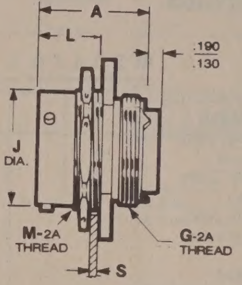
Shell Styles and Dimensions

Single Hole Mount Receptacle

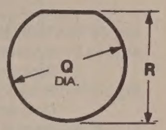
MS 3474 or M83723/05 (with socket contacts)
MS 3474 or M83723/06 (with pin contacts)
118-23L (Amphenol Part No.)







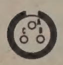
Panel Cutout



SHELL SIZE	A In.	A MM	G THREAD	J DIA. In.	J DIA. MM	L In.	L MM	M THREAD	N In.	N MM	P DIA. In.	P DIA. MM	Q DIA. In.	Q DIA. MM	R In.	R MM	S In.	S MM
8	1.040	26.42	1/2-20	.474	12.04	.664	16.87	9/16-24	.954	24.23	1.078	27.38	.577	14.66	.541	13.74	.187	4.75
	1.023	25.98	UNF	.468	11.89	.658	16.71	UNEF	.923	23.44	1.047	26.59	.567	14.40	.531	13.49	.062	1.57
10	1.040	26.42	5/8-24	.591	15.01	.664	16.87	11/16-24	1.078	27.38	1.203	30.56	.702	17.83	.666	16.92	.187	4.75
	1.023	25.98	UNEF	.585	14.86	.658	16.71	UNEF	1.047	26.59	1.172	29.77	.692	17.58	.656	16.66	.062	1.57
12	1.040	26.42	3/4-20	.751	19.08	.664	16.87	7/8-20	1.266	32.16	1.391	35.33	.900	22.86	.829	21.06	.187	4.75
	1.023	25.98	UNEF	.745	18.92	.658	16.71	UNEF	1.235	31.37	1.360	34.54	.890	22.61	.819	20.80	.062	1.57
14	1.040	26.42	7/8-20	.876	22.25	.664	16.87	1-20	1.391	35.33	1.516	38.51	1.015	25.78	.953	24.21	.187	4.75
	1.023	25.98	UNEF	.870	22.10	.658	16.71	UNEF	1.360	34.54	1.485	37.72	1.005	25.53	.943	23.95	.062	1.57
16	1.040	26.42	1-20	1.001	25.43	.664	16.87	1-1/8-18	1.516	38.51	1.641	41.68	1.140	28.96	1.077	27.36	.187	4.75
	1.023	25.98	UNEF	.995	25.27	.658	16.71	UNEF	1.485	37.72	1.610	40.89	1.130	28.70	1.067	27.10	.062	1.57
18	1.040	26.42	1-1/16-18	1.126	28.60	.664	16.87	1-1/4-18	1.641	41.68	1.766	44.86	1.265	32.13	1.202	30.53	.187	4.75
	1.023	25.98	UNEF	1.120	28.45	.658	16.71	UNEF	1.610	40.89	1.735	44.07	1.255	31.88	1.192	30.28	.062	1.57
20	1.103	28.02	1-3/16-18	1.251	31.78	.727	18.47	1-3/8-18	1.828	46.43	1.954	49.63	1.390	35.31	1.327	33.71	.250	6.35
	1.086	27.58	UNEF	1.245	31.62	.721	18.31	UNEF	1.797	45.64	1.923	48.84	1.380	35.05	1.317	33.45	.062	1.57
22	1.103	28.02	1-5/16-18	1.376	34.95	.727	18.47	1-1/2-18	1.954	49.63	2.078	52.78	1.515	38.48	1.452	36.88	.250	6.35
	1.086	27.58	UNEF	1.370	34.80	.721	18.31	UNEF	1.923	48.84	2.047	51.99	1.505	38.23	1.442	38.63	.062	1.57
24	1.103	28.02	1-7/16-18	1.501	38.13	.727	18.47	1-5/8-18	2.078	52.78	2.203	55.96	1.640	41.66	1.577	40.06	.219	5.56
	1.086	27.58	UNEF	1.495	37.97	.721	18.31	UNEF	2.047	51.99	2.172	55.17	1.630	41.40	1.567	39.80	.062	1.57

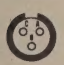
Insert Arrangements

8-33



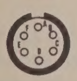
3#20
Service Rating I

8-98



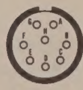
3#20
Service Rating I

10-6



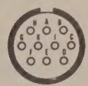
6#20
Service Rating I

12-8



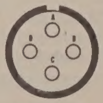
8#20
Service Rating I

12-10



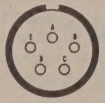
10#20
Service Rating I

14-4



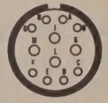
4#12
Service Rating I

14-5



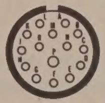
5#16
Service Rating I

14-12



8#20, 4#16
Service Rating I

14-15

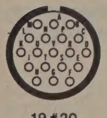


14#20, 1#16
Service Rating I

SHELL SIZE	INSERT ARRANGE-MENT	α				
		N	W	X	Y	Z
8	-33	0°	90°	—	—	—
8	-98	0°	—	—	—	—
10	-6	0°	90°	—	—	—
12	-8	0°	90°	112°	203°	292°
12	-10	0°	60°	155°	270°	295°
14	-4	0°	45°	—	—	—
14	-5	0°	40°	92°	184°	273°
14	-12	0°	43°	90°	—	—
14	-15	0°	17°	110°	155°	234°
14	-19	0°	30°	165°	315°	—
16	-8	0°	54°	152°	180°	331°
16	-26	0°	60°	—	275°	338°
18	-8	0°	180°	—	—	—
18	-11	0°	62°	119°	241°	340°
18	-32	0°	35°	138°	222°	265°
20	-16	0°	238°	318°	333°	347°
20	-39	0°	63°	144°	252°	333°
20	-41	0°	45°	126°	225°	—
22	-21	0°	16°	135°	175°	349°
22	-41	0°	39°	135°	264°	—
22	-55	0°	30°	142°	226°	314°
24	-61	0°	30°	180°	270°	324°

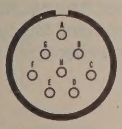
Pin Insert Shown (Socket Insert Opposite)

14-19



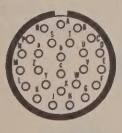
19#20
Service Rating I

16-8



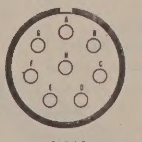
8#16
Service Rating II

16-26



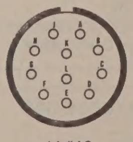
26#20
Service Rating I

18-8



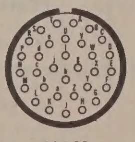
8#12
Service Rating I

18-11



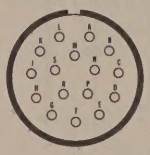
11#16
Service Rating II

18-32



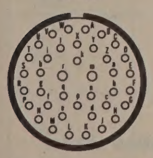
32#20
Service Rating I

20-16



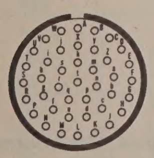
16#16
Service Rating II

20-39



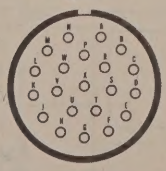
37#20, 2#16
Service Rating I

20-41



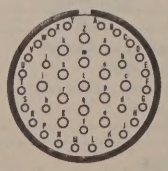
41#20
Service Rating I

22-21



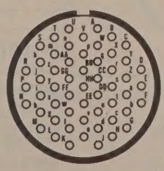
21#16
Service Rating II

22-41



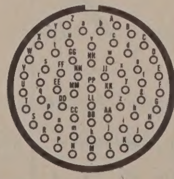
27#20, 14#16
Service Rating I

22-55



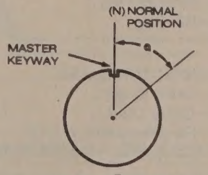
55#20
Service Rating I

24-61



61#20
Service Rating I

Alternate Insert Positions



VERTICAL ℄ OF INSERT
ROTATED IN RESPECT
TO MASTER KEYWAY

Contact identification is for front face of pin insert (Socket insert opposite)

The right idea at the right time / AMPHENOL® / BUNKER RAMO®

MIL-C-26482 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN I / 118 SERIES

Ordering Information

Military Standard Part Number for MIL-C-26482 Connectors

MIL-C-26482 connectors can be ordered by the Military part numbers. The connector part number is per the example.

MS3470 L22-55PN

SPECIFICATION NUMBER
- MS3470—Receptacle, narrow flange mount
- MS3471—Receptacle Cable Connecting
- MS3474—Receptacle, rear mounting jam nut
- MS3475—RFI Plug
- MS3476—Plug, straight

CONNECTOR CLASS
- E—Order Class L
- L—Fluid Resistant, 200°C, conductive finish

Amphenol Class L Connector meets or exceeds all Requirements of Class E.

SHELL SIZE
8 10 12 14 16 18 20 22 24

INSERT ARRANGEMENT
See configuration and specification for every insert number.

CONTACT TYPE
- P—Pin Contact
- S—Socket Contact

For non-power contact applications substitute "A" for "P" and "B" for "S"

ALTERNATE POSITION
N, W, X, Y, Z
As per table

Military Standard Part Number for MIL-C-83723 Connectors

MIL-C-83723, Series I connectors can be ordered by the Military part numbers. The connector part number is per the example.

M83723/02R2255N

SPECIFICATION NUMBER

SHELL AND CONTACT STYLE
- 01—Narrow Square Flange with socket contacts
- 02—Narrow Square Flange with pin contacts
- 05—Single Hole Mount with socket contacts
- 06—Single Hole Mount with pin contacts
- 07—Cable Receptacle with socket contacts
- 08—Cable Receptacle with pin contacts
- 13—Straight Plug with socket contacts
- 14—Straight Plug with pin contacts
- 42—RFI Plug with pin contacts
- 43—RFI Plug with socket contacts

CONNECTOR CLASS
R—Fluid Resistant 200°C, conductive finish

SHELL SIZE
8 10 12 14 16 18 20 22 24

INSERT ARRANGEMENT
See configuration and specification for every insert number.

ALTERNATE POSITION
N, W, X, Y, Z
As per table

How To Order 118 Series Connectors

To order the specific 118 Series connectors you want, the connector part number is per the example.

118-20L22-55PN(101)

SERIES DESIGNATION

MILITARY SPECIFICATION
- MIL-C-83723
- MIL-C-26482
- MIL-C-0026482

SHELL STYLE
- 0—Square Flange Receptacle
- 1—Cable Connecting Receptacle
- 3—Single Hole Mtg. Receptacle
- 6—Straight Plug
- 8—RFI Plug

CONNECTOR CLASS
- E—Order Class L
- R—Order Class L
- L—Fluid Resistant, 200°C conductive finish (MIL-C-26482)

Amphenol Class L Connector meets or exceeds all requirements of Classes E & R.

SHELL SIZE
8 10 12 14 16 18 20 22 24

INSERT ARRANGEMENT
See configuration and specification for every insert number.

CONTACT TYPE
- P—Pin Contact
- S—Socket Contact

ALTERNATE POSITION
N, W, X, Y, Z
As per table

DEVIATION
- (101) Connector less contacts
- (110) Olive Drab Cadmium over Nickel.

For complete information ask for Circular Environmental Connectors Catalog M-123

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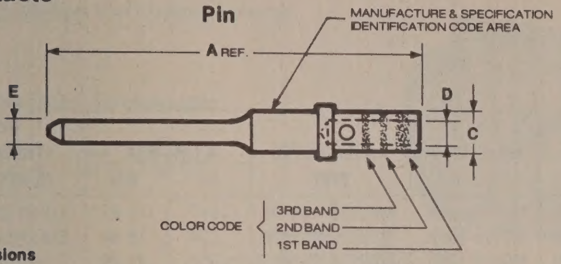
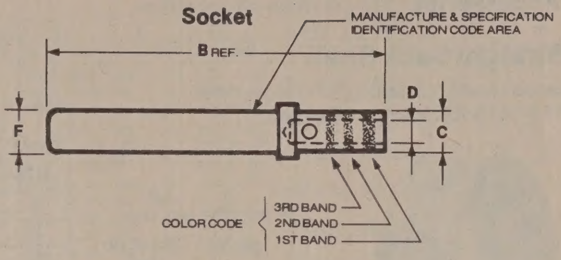
MIL-C-26482 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN I / 118 SERIES

Contacts





Dimensions

SIZE	A		B		C		D		E		F		CURRENT CONTACT RATING
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	
20	.720 Max.	18.29 Max.	.656 Max.	16.66 Max.	.078 .076	1.98 1.93	.050 .048	1.27 1.22	.041 .039	1.04 0.99	.078 .076	1.98 1.93	7.5
16	.821 Max.	20.85 Max.	.759 Max.	19.28 Max.	.103 .101	2.62 2.57	.068 .066	1.73 1.68	.0635 .0615	1.61 1.56	.113 .110	2.87 2.79	13.0
12	.821 Max.	20.85 Max.	.759 Max.	19.28 Max.	.151 .148	3.84 3.76	.102 .098	2.59 2.49	.095 .093	2.41 2.36	.161 .158	4.09 4.01	23.0

Wire Range Accommodation

CONTACT SIZE	WIRE SIZE	O.D. OF FINISHED WIRE (INCHES)*
20	24 22 20	.040/.083
16	20 18 16	.053/.103
12	14 12	.099/.158

* All contacts may be assembled with either minimum or maximum diameter wire as shown or any combination thereof.

Pin Contacts

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS			MILITARY SPECIFICATION	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED PART NUMBERS
		1	2	3				
20	▨	Brown	Brown	Black	MIL-C-39029	118-126-2000P-03	M39029/4-20-20	M83723/33B20 M39029/4-001
16	▨	Brown	Brown	Brown	MIL-C-39029	118-126-1600P-03	M39029/4-16-16	M83723/33B16 M39029/4-002
12	▨	Brown	Brown	Orange	MIL-C-39029	118-126-1200P-03	M39029/4-12-12	M83723/33B12 M39029/4-004

Socket Contacts

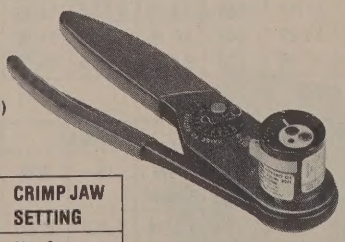
CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS			MILITARY SPECIFICATION	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED PART NUMBERS
		1	2	3				
20	▨	Brown	Brown	Green	MIL-C-39029	118-126-2000S-03	M39029/5-20-20	M83723/34B20 M39029/5-001
16	▨	Brown	Brown	Blue	MIL-C-39029	118-126-1600S-03	M39029/5-16-16	M83723/34B16 M39029/5-002
12	▨	Brown	Brown	Gray	MIL-C-39029	118-126-1200S-03	M39029/5-12-12	M83723/34B12 M39029/5-004

Accessory Information

Mounting

Two receptacle shell styles are available for panel mounting. See the applicable MS drawings for mounting hole dimensions. The square flange receptacle, sizes 8 thru 22, is fastened to the panel with four size #4-40 machine screws. The 24 size shell is fastened with #6-32 machine screws. The jam nut receptacle mounts into a "D" hole panel cutout and is fastened to the panel with a jam nut.

Crimping Tool



M22520/1-01 Tool with
M22520/1-02 Turret Head
(Amphenol 294-542 and 294-1889-01)

Crimping Tool Jaw Settings

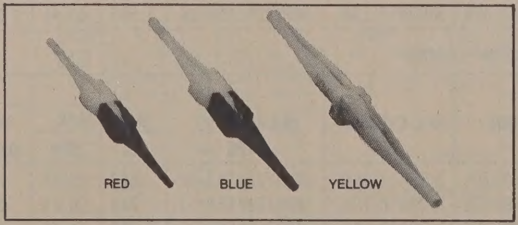
CONTACT SIZE	WIRE SIZE	CRIMP JAW SETTING
20	24 22 20	No. 2 No. 3 No. 4
16	20 18 16	No. 4 No. 5 No. 6
12	14 12	No. 7 No. 8

Grommet Seal Plug

Use seal plug to assure proper connector sealing whenever all contacts are not employed. For ease of removal leave end bell portion exposed.

CONTACT SIZE	SEAL PLUG PARTS NUMBERS			COLOR
	AMPHENOL	MIL-C-83723	MIL-C-26482	
20	118-117-20000	M83723/28-20	MS3187-20-2	Red
16	118-117-16000	M83723/28-16	MS3187-16-2	Blue
12	118-117-12000	M83723/28-12	MS3187-12-2	Yellow

Assembly Tools



Assembly Tools (Insertion & Extraction)

CONTACT SIZE	COLOR	AMPHENOL	MIL-C-83723	MIL-C-26482
20	RED	294-108	M83723/31-20	MS3447-20
16	BLUE	294-109	M83723/31-16	MS3447-16
12	YELLOW	294-110	M83723/31-12	MS3447-12

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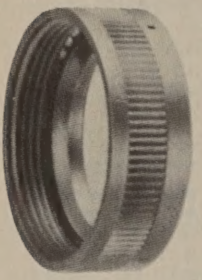
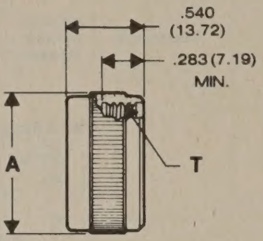
MIL-C-26482 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN I / 118 SERIES

Accessories (FOR 118 SERIES AND 518 SERIES)

Straight Back Shell

MS3416-XXEN or M83723/15N-XX TYPE
118-3416-XX (Amphenol Part No.)

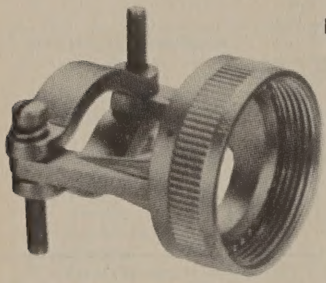


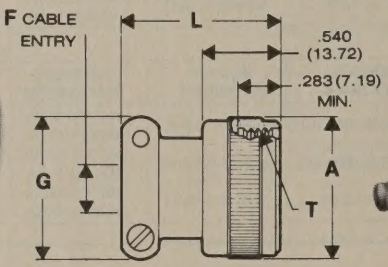


SHELL SIZE	AMPHENOL	MIL-C-26482	MIL-C-83723 TYPE	A DIA. MAX. In.	A DIA. MAX. MM	T THREAD CLASS 2B
8	118-3416-08EN	M3416-08EN	M83723/15N-08	.617	15.67	1/2-20 UNF
10	118-3416-10EN	M3416-10EN	M83723/15N-10	.734	18.64	5/8-20 UNEF
12	118-3416-12EN	M3416-12EN	M83723/15N-12	.858	21.79	3/4-20 UNEF
14	118-3416-14EN	M3416-14EN	M83723/15N-14	.984	24.99	7/8-20 UNEF
16	118-3416-16EN	M3416-16EN	M83723/15N-16	1.112	28.24	1-20 UNEF
18	118-3416-18EN	M3416-18EN	M83723/15N-18	1.218	30.94	1-1/16-18 UNEF
20	118-3416-20EN	M3416-20EN	M83723/15N-20	1.345	34.16	1-3/16-18 UNEF
22	118-3416-22EN	M3416-22EN	M83723/15N-22	1.468	37.29	1-5/16-18 UNEF
24	118-3416-24EN	M3416-24EN	M83723/15N-24	1.593	40.46	1-7/16-18 UNEF

Straight Strain Relief Clamp

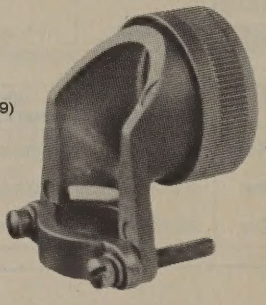
MS3417-XXN or M83723/15S TYPE
118-3417-XX (Amphenol Part No.)

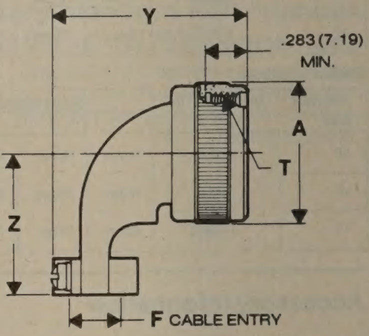




90° Strain Relief Clamp

MS3418-XXN or M83723/15A TYPE
118-3418-XX (Amphenol Part No.)





Straight Strain Relief Clamp

SHELL SIZE	AMPHENOL	MIL-C-26482	MIL-C-83723 TYPE	A DIA. MAX. In.	A DIA. MAX. MM	F CABLE ENTRY In. Open	F CABLE ENTRY MM Open	F CABLE ENTRY In. Closed	F CABLE ENTRY MM Closed	G. MAX. In.	G. MAX. MM	L MAX. In.	L MAX. MM	T THREAD CLASS 2B
8	118-3417-08N	MS3417-08N	M83723/15S-08	.617	15.67	.204	5.18	.125	3.16	.752	19.10	.952	24.18	1/2-20 UNF
10	118-3417-10N	MS3417-10N	M83723/15S-10	.734	18.64	.286	7.26	.187	4.75	.832	21.13	1.062	26.97	5/8-24 UNEF
12	118-3417-12N	MS3417-12N	M83723/15S-12	.858	21.79	.416	10.57	.291	7.39	.988	25.10	1.187	30.15	3/4-20 UNEF
14	118-3417-14N	MS3417/14N	M83723/15S-14	.984	24.99	.476	12.09	.351	8.91	1.046	26.57	1.187	30.15	7/8-20 UNEF
16	118-3417-16N	MS3417-16N	M83723/15S-16	1.112	28.24	.625	15.90	.501	12.73	1.319	33.50	1.312	33.32	1-20 UNEF
18	118-3417-18N	MS3417-18N	M83723/15S-18	1.218	30.94	.706	17.93	.518	13.16	1.451	36.86	1.562	39.67	1-1/16-18 UNEF
20	118-3417-20N	MS3417-20N	M83723/15S-20	1.345	34.16	.831	21.11	.581	14.76	1.557	34.55	1.687	42.85	1-3/16-18 UNEF
22	118-3417-22N	MS3417-22N	M83723/15S-22	1.468	37.29	.956	24.28	.644	16.36	1.653	41.99	1.812	46.02	1-5/16-18 UNEF
24	118-3417-24N	MS3417-24N	M83723/15S-24	1.593	40.46	1.081	27.46	.706	17.93	1.775	45.09	1.937	49.20	1-7/16-18 UNEF

90° Strain Relief Clamp

SHELL SIZE	AMPHENOL	MIL-C-26482	MIL-C-83723 TYPE	A DIA. MAX. In.	A DIA. MAX. MM	F CABLE ENTRY In. Open	F CABLE ENTRY MM Open	F CABLE ENTRY In. Closed	F CABLE ENTRY MM Closed	Y. MAX. In.	Y. MAX. MM	Z MAX. In.	Z MAX. MM	T THREAD CLASS 2B
8	118-3418-08N	MS3418-08N	M83723/15A-08	.617	15.67	.204	5.18	.125	3.16	1.101	27.97	.808	20.52	1/2-20 UNF
10	118-3418-10N	MS3418-10N	M83723/15A-10	.734	18.64	.286	7.26	.187	4.75	1.183	30.05	.867	22.02	5/8-20 UNEF
12	118-3418-12N	MS3418-12N	M83723/15A-12	.858	21.79	.416	10.57	.291	7.39	1.376	34.95	.929	23.55	3/4-20 UNEF
14	118-3418-14N	MS3418-14N	M83723/15A-14	.984	24.99	.476	12.09	.351	8.91	1.436	36.47	.992	25.20	7/8-20 UNEF
16	118-3418-16N	MS3418-16N	M83723/15A-16	1.112	28.24	.625	15.90	.501	12.73	1.585	40.26	1.056	26.82	1-20 UNEF
18	118-3418-18N	MS3418-18N	M83723/15A-18	1.218	30.94	.706	17.93	.518	13.16	1.697	43.10	1.233	31.32	1-1/16-18 UNEF
20	118-3418-20N	MS3418-20N	M83723/15A-20	1.345	34.16	.831	21.11	.581	14.76	1.822	46.28	1.296	32.92	1-3/16-18 UNEF
22	118-3418-22N	MS3418-22N	M83723/15A-22	1.468	37.29	.956	24.28	.644	16.36	1.947	49.45	1.358	34.49	1-5/16-18 UNEF
24	118-3418-24N	MS3418-24N	M83723/15A-24	1.593	40.46	1.081	27.46	.706	17.93	2.072	52.63	1.420	36.07	1-7/16-18 UNEF

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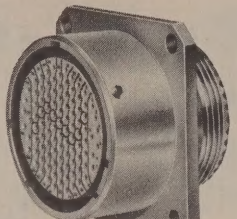
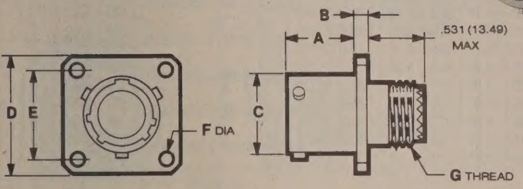
MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Shell Styles and Dimensions

Wall Mounting Receptacles Series I

MS 27466 E & MS 27466 T
418-10E & 418-10T (Amphenol Part No.)

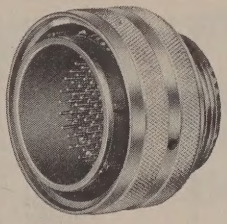


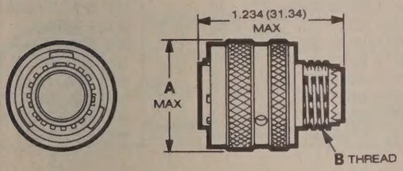


SHELL SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D MAX In.	D MAX MM	E BASIC In.	E BASIC MM	F In	F MM	G THREAD
9	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.573 .567	14.55 14.40	.952	24.18	.719	18.26	.138 .123	3.50 3.12	7/16-28 UNEF
11	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.701 .695	17.81 17.65	1.046	26.57	.812	20.62	.138 .123	3.50 3.12	9/16-24 UNEF
13	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.851 .845	21.62 21.46	1.140	28.96	.906	23.01	.138 .123	3.50 3.12	11/16-24 UNEF
15	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.976 .970	24.79 24.64	1.240	31.50	.969	24.61	.138 .123	3.50 3.12	13/16-20 UNEF
17	.632 .627	16.05 15.93	.100 .085	2.54 2.16	1.101 1.095	27.97 27.81	1.334	33.88	1.062	26.97	.138 .123	3.50 3.12	15/16-20 UNEF
19	.632 .627	16.05 15.93	.100 .085	2.54 2.16	1.208 1.202	30.68 30.53	1.452	36.88	1.156	29.36	.138 .123	3.50 3.12	1-1/16-18 UNEF
21	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.333 1.327	33.86 33.71	1.577	40.06	1.250	31.75	.138 .123	3.50 3.12	1-3/16-18 UNEF
23	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.458 1.452	37.03 36.88	1.708	43.38	1.375	34.93	.157 .142	3.99 3.61	1-5/16-18 UNEF
25	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.583 1.577	40.21 40.06	1.827	46.41	1.500	38.10	.157 .142	3.99 3.61	1-7/16-18 UNEF

Straight Plug Grounded Series I

MS 27467 E & MS 27467 T
418-18E & 418-18T (Amphenol Part No.)

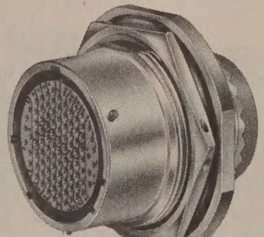


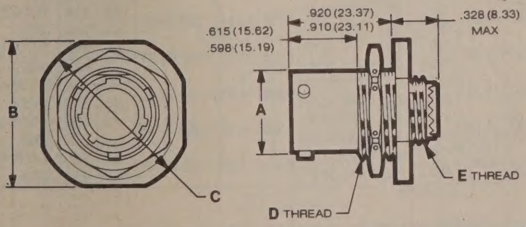


SHELL SIZE	A DIA MAX In.	A DIA MAX MM	B THREAD
9	.823	20.90	7/16-28 UNEF
11	.955	24.26	9/16-24 UNEF
13	1.111	28.22	11/16-24 UNEF
15	1.231	31.27	13/16-20 UNEF
17	1.351	34.32	15/16-20 UNEF
19	1.471	37.36	1-1/16-18 UNEF
21	1.591	40.41	1-3/16-18 UNEF
23	1.711	43.46	1-5/16-18 UNEF
25	1.843	46.81	1-7/16-18 UNEF

Jam Nut Receptacle Series I

MS 27468 E & MS 27468 T
418-13E & 418-13T (Amphenol Part No.)

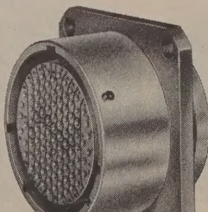


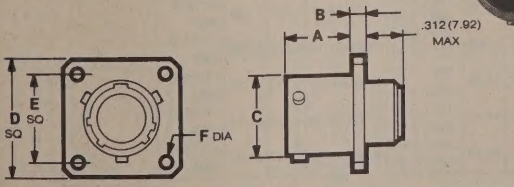


SHELL SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D THREAD	E THREAD
9	.573 .567	14.55 14.40	1.078 1.046	27.38 26.57	1.204 1.172	30.58 29.77	11/16-24 UNEF	7/16-28 UNEF
11	.701 .695	17.81 17.65	1.266 1.234	32.16 31.34	1.391 1.359	35.33 34.52	13/16-20 UNEF	9/16-24 UNEF
13	.851 .845	21.62 21.46	1.391 1.359	35.33 34.52	1.516 1.484	38.51 37.69	1-20 UNEF	11/16-24 UNEF
15	.976 .970	24.79 24.64	1.516 1.484	38.51 37.69	1.641 1.609	41.68 40.87	1-1/8-18 UNEF	13/16-20 UNEF
17	1.101 1.095	27.97 27.81	1.641 1.609	41.68 40.87	1.766 1.734	44.86 44.04	1-1/4-18 UNEF	15/16-20 UNEF
19	1.208 1.202	30.68 30.53	1.828 1.796	46.43 45.62	1.954 1.922	49.63 48.82	1-3/8-18 UNEF	1-1/16-18 UNEF
21	1.333 1.327	33.86 33.71	1.954 1.922	49.63 48.82	2.078 2.046	52.78 51.97	1-1/2-18 UNEF	1-3/16-18 UNEF
23	1.458 1.452	37.03 36.88	2.078 2.046	52.78 51.97	2.204 2.172	55.98 55.17	1-5/8-18 UNEF	1-5/16-18 UNEF
25	1.583 1.577	40.21 40.06	2.204 2.172	55.98 55.17	2.328 2.296	59.13 58.32	1-3/4-18 NS	1-7/16-18 UNEF

Box Mounting Receptacle Series I

MS 27496 E
418-12E (Amphenol Part No.)





SHELL SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D MAX In.	D MAX MM	E BASIC In.	E BASIC MM	F In.	F MM
9	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.573 .567	14.55 14.40	.952	24.18	.719	18.26	.138 .123	3.50 3.12
11	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.701 .695	17.81 17.65	1.046	26.57	.812	20.62	.138 .123	3.50 3.12
13	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.851 .845	21.62 21.46	1.140	28.96	.906	23.01	.138 .123	3.50 3.12
15	.632 .627	16.05 15.93	.100 .085	2.54 2.16	.976 .970	24.79 24.64	1.240	31.50	.969	24.61	.138 .123	3.50 3.12
17	.632 .627	16.05 15.93	.100 .085	2.54 2.16	1.101 1.095	27.97 27.81	1.334	33.88	1.062	26.97	.138 .123	3.50 3.12
19	.632 .627	16.05 15.93	.100 .085	2.54 2.16	1.208 1.202	30.68 30.53	1.452	36.88	1.156	29.36	.138 .123	3.50 3.12
21	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.333 1.327	33.86 33.71	1.577	40.06	1.250	31.75	.138 .123	3.50 3.12
23	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.458 1.452	37.03 36.88	1.708	43.38	1.375	34.93	.157 .142	3.99 3.61
25	.602 .597	15.29 15.16	.130 .115	3.30 2.91	1.583 1.577	40.21 40.06	1.827	46.41	1.500	38.10	.157 .142	3.99 3.61

The right idea
at the right time

AMPHENOL®

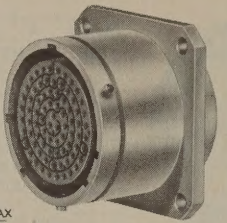
BUNKER RAMO®

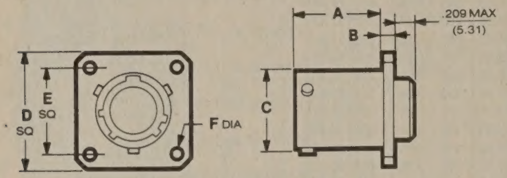
MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Shell Styles and Dimensions

Box Mounting Receptacle (Back Panel) Series I

MS 27505 E
418-15E (Amphenol Part No.)

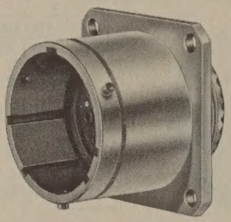


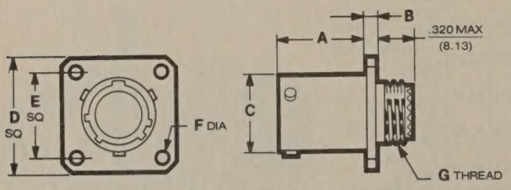


SHELL SIZE	A		B		C		D MAX		E BASIC		F	
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM
9	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.573 .567	14.55 14.40	.952	24.18	.719	18.26	.138 .123	3.50 3.12
11	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.701 .695	17.81 17.65	1.046	26.57	.812	20.62	.138 .123	3.50 3.12
13	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.851 .845	21.62 21.46	1.140	28.96	.906	23.01	.138 .123	3.50 3.12
15	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.976 .970	24.79 24.64	1.240	31.50	.969	24.61	.138 .123	3.50 3.12
17	.820 .815	20.83 20.70	.100 .085	2.54 2.16	1.101 1.095	27.97 27.81	1.334	33.88	1.062	26.97	.138 .123	3.50 3.12
19	.820 .815	20.83 20.70	.100 .085	2.54 2.16	1.208 1.202	30.68 30.53	1.452	36.88	1.156	29.36	.138 .123	3.50 3.12
21	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.333 1.327	33.86 33.71	1.577	40.06	1.250	31.75	.138 .123	3.50 3.12
23	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.458 1.452	37.03 36.88	1.708	43.38	1.375	34.93	.157 .142	3.99 3.61
25	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.583 1.577	40.21 40.06	1.827	46.41	1.500	38.10	.157 .142	3.99 3.61

Wall Mounting Receptacle (Back Panel) Series I

MS 27656 E & MS 27656 T
418-17E & 418-17T (Amphenol Part No.)

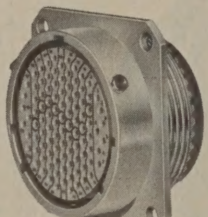


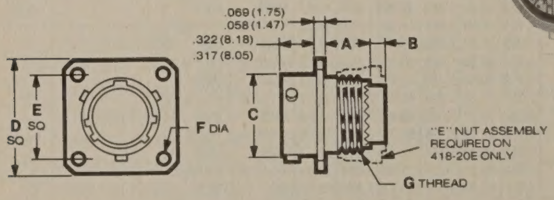


SHELL SIZE	A		B		C		D MAX		E BASIC		F		G
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	THREAD
9	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.573 .567	14.55 14.40	.952	24.18	.719	18.26	.138 .123	3.50 3.12	7/16-28 UNEF
11	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.701 .695	17.81 17.65	1.046	26.57	.812	20.62	.138 .123	3.50 3.12	9/16-24 UNEF
13	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.851 .845	21.62 21.46	1.140	28.96	.906	23.01	.138 .123	3.50 3.12	11/16-24 UNEF
15	.820 .815	20.83 20.70	.100 .085	2.54 2.16	.976 .970	24.79 24.64	1.240	31.50	.969	24.61	.138 .123	3.50 3.12	13/16-20 UNEF
17	.820 .815	20.83 20.70	.100 .085	2.54 2.16	1.101 1.095	27.97 27.81	1.334	33.88	1.062	26.97	.138 .123	3.50 3.12	15/16-20 UNEF
19	.820 .815	20.83 20.70	.100 .085	2.54 2.16	1.208 1.202	30.68 30.53	1.452	36.88	1.156	29.36	.138 .123	3.50 3.12	1-1/16-18 UNEF
21	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.333 1.327	33.86 33.71	1.577	40.06	1.250	31.75	.138 .123	3.50 3.12	1-3/16-18 UNEF
23	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.458 1.452	37.03 36.88	1.708	43.38	1.375	34.93	.157 .142	3.99 3.61	1-5/16-18 UNEF
25	.790 .785	20.07 19.94	.130 .115	3.30 2.91	1.583 1.577	40.21 40.06	1.827	46.41	1.500	38.10	.157 .142	3.99 3.61	1-7/16-18 UNEF

Wall Mounting Receptacle Series II

MS 27472E & MS 27472T
418-20E & 418-20T (Amphenol Part No.)

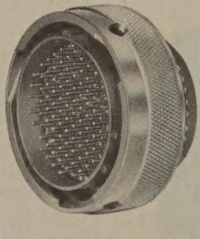


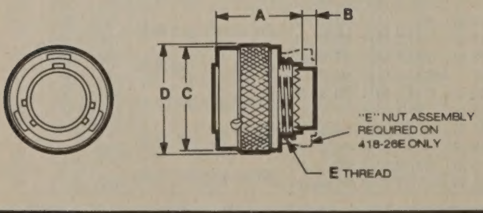


SHELL SIZE	A MAX		B		C		D MAX		E BASIC		F		G
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	THREAD
8	.391	9.93	.150 .090	3.81 2.29	.474 .468	12.04 11.89	.828	21.03	.594	15.09	.130 .115	3.30 2.92	7/16-28 UNEF
10	.391	9.93	.150 .090	3.81 2.29	.591 .585	15.01 14.86	.954	24.23	.719	18.26	.130 .115	3.30 2.92	9/16-24 UNEF
12	.391	9.93	.150 .090	3.81 2.29	.751 .745	19.08 18.92	1.047	26.59	.812	20.62	.130 .115	3.30 2.92	11/16-24 UNEF
14	.391	9.93	.150 .090	3.81 2.29	.876 .870	22.25 22.10	1.141	28.98	.906	23.01	.130 .115	3.30 2.92	13/16-20 UNEF
16	.391	9.93	.150 .090	3.81 2.29	1.001 .995	25.43 25.27	1.234	31.34	.969	24.61	.130 .115	3.30 2.92	15/16-20 UNEF
18	.391	9.93	.150 .090	3.81 2.29	1.126 1.120	28.60 28.45	1.328	33.73	1.062	26.97	.130 .115	3.30 2.92	1-1/16-18 UNEF
20	.391	9.93	.150 .090	3.81 2.29	1.251 1.245	31.78 31.62	1.453	36.91	1.156	29.36	.130 .115	3.30 2.92	1-3/16-18 UNEF
22	.391	9.93	.150 .090	3.81 2.29	1.376 1.370	34.95 34.80	1.578	40.08	1.250	31.75	.130 .115	3.30 2.92	1-5/16-18 UNEF
24	.421	10.69	.120 .060	3.05 1.52	1.501 1.495	38.13 37.97	1.703	43.26	1.375	34.93	.157 .142	3.99 3.61	1-7/16-18 UNEF

Straight Plug Series II

MS 27473E & MS 27473T
418-26E & 418-26T (Amphenol Part No.)





SHELL SIZE	A MAX		B		C DIA MAX		D DIA MAX		E
	In.	MM	In.	MM	In.	MM	In.	MM	THREAD
8	.766	19.46	.150 .090	3.81 2.29	.630	16.00	.727	18.47	7/16-28 UNEF
10	.766	19.46	.150 .090	3.81 2.29	.752	19.10	.837	21.26	9/16-24 UNEF
12	.766	19.46	.150 .090	3.81 2.29	.925	23.49	.979	24.87	11/16-24 UNEF
14	.766	19.46	.150 .090	3.81 2.29	1.050	26.67	1.099	27.91	13/16-20 UNEF
16	.766	19.46	.150 .090	3.81 2.29	1.172	29.77	1.255	31.88	15/16-20 UNEF
18	.766	19.46	.150 .090	3.81 2.29	1.304	31.12	1.375	34.92	1-1/16-18 UNEF
20	.766	19.46	.150 .090	3.81 2.29	1.435	36.45	1.495	37.97	1-3/16-18 UNEF
22	.766	19.46	.150 .090	3.81 2.29	1.560	39.62	1.627	41.33	1-5/16-18 UNEF
24	.795	20.19	.120 .060	3.05 1.52	1.688	42.88	1.747	44.37	1-7/16-18 UNEF

Add Dept. EM to address to tell them you saw it in eem

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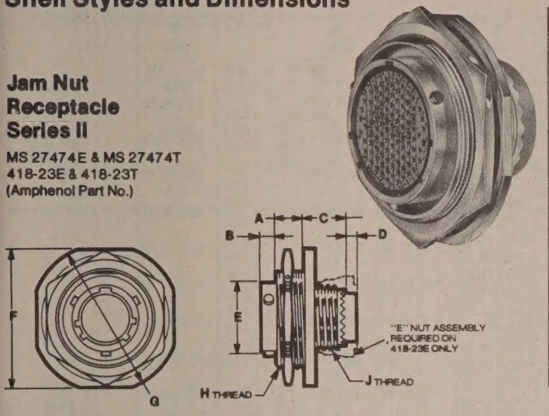
MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Shell Styles and Dimensions

Jam Nut Receptacle Series II

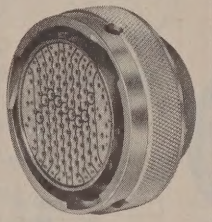
MS 27474E & MS 27474T
418-23E & 418-23T
(Amphenol Part No.)

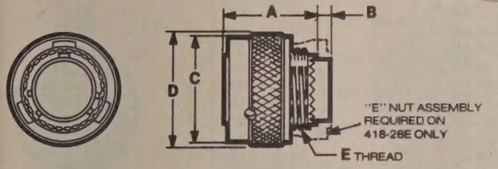


SHELL SIZE	A		B		C MAX		D		E		F		G		H	J
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	THREAD	THREAD
8	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	.474 .468	12.04 11.89	1.266 1.234	32.16 31.34	1.391 1.359	35.33 34.52	7/8-20 UNEF	7/16-28 UNEF
10	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	.591 .585	15.01 14.86	1.391 1.359	35.33 34.52	1.516 1.484	38.51 37.69	1-20 UNEF	9/16-24 UNEF
12	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	.751 .745	19.08 18.92	1.516 1.484	38.51 37.69	1.641 1.609	41.68 40.87	1-1/8-18 UNEF	11/16-24 UNEF
14	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	.876 .870	22.25 22.10	1.641 1.609	41.68 40.87	1.766 1.734	44.86 44.04	1-1/4-18 UNEF	13/16-20 UNEF
16	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	1.001 .995	25.43 25.27	1.797 1.765	45.64 44.83	1.954 1.922	49.63 48.82	1-3/8-18 UNEF	15/16-20 UNEF
18	.443 .433	11.25 10.99	.145 .140	3.68 3.56	.344	8.74	.150 .090	3.81 2.29	1.126 1.120	28.60 28.45	1.906 1.874	48.41 47.60	2.032 2.000	51.61 50.80	1-1/2-18 UNEF	1-1/16-18 UNEF
20	.469 .459	11.91 11.66	.171 .166	4.34 4.22	.312	7.92	.150 .090	3.81 2.29	1.251 1.250	31.78 31.62	2.032 2.000	51.61 50.80	2.157 2.125	54.79 53.97	1-5/8-18 UNEF	1-3/16-18 UNEF
22	.469 .459	11.91 11.66	.171 .166	4.34 4.22	.312	7.92	.150 .090	3.81 2.29	1.376 1.370	34.95 34.80	2.156 2.124	54.76 53.95	2.281 2.249	57.94 57.12	1-3/4-18 NS	1-5/16-18 UNEF
24	.469 .459	11:91 11.66	.171 .166	4.34 4.22	.375	9.52	.120 .060	3.05 1.52	1.501 1.495	38.13 37.97	2.281 2.249	57.94 57.12	2.406 2.374	61.11 60.30	1-7/8-16 UN	1-7/16-18 UNEF

Straight Plug—Grounded Series II

MS 27484E & MS 27484T
418-28E & 418-28T (Amphenol Part No.)

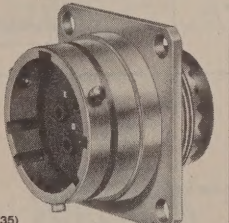


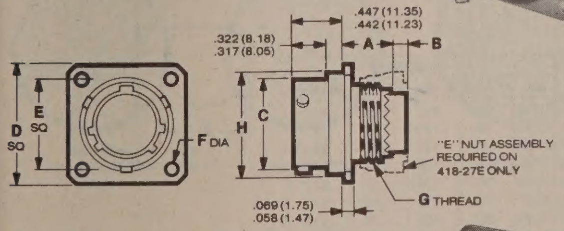


SHELL SIZE	A MAX		B		C DIA MAX		D DIA MAX		E
	In.	MM	In.	MM	In.	MM	In.	MM	THREAD
8	.766	19.46	.150 .090	3.81 2.29	.630	16.00	.727	18.47	7/16-28 UNEF
10	.766	19.46	.150 .090	3.81 2.29	.752	19.10	.837	21.26	9/16-24 UNEF
12	.766	19.46	.150 .090	3.81 2.29	.925	23.49	.979	24.87	11/16-24 UNEF
14	.766	19.46	.150 .090	3.81 2.29	1.050	26.67	1.099	27.91	13/16-20 UNEF
16	.766	19.46	.150 .090	3.81 2.29	1.172	29.77	1.255	31.88	15/16-20 UNEF
18	.766	19.46	.150 .090	3.81 2.29	1.304	33.12	1.375	34.92	1-1/16-18 UNEF
20	.766	19.46	.150 .090	3.81 2.29	1.435	36.45	1.495	37.97	1-3/16-18 UNEF
22	.766	19.46	.150 .090	3.81 2.29	1.560	39.62	1.627	41.33	1-5/16-18 UNEF
24	.795	20.19	.120 .060	3.05 1.57	1.688	42.88	1.747	44.37	1-7/16-18 UNEF

Wall Mounting Receptacle (Back Panel) Series II

MS 27497E & MS 27497T
418-27E & 418-27T (Amphenol Part No.)

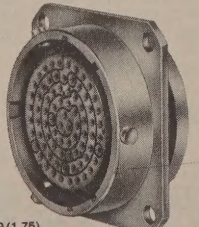


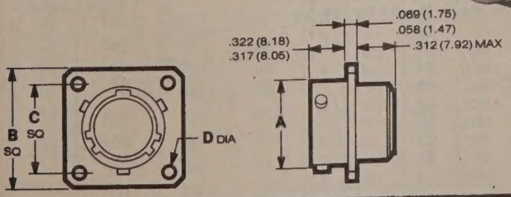


SHELL SIZE	A MAX		B		C		D MAX		E BASIC		F		H MAX		G
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	THREAD
8	.262	6.65	.150 .090	3.81 2.29	.474 .468	12.04 11.89	.828	21.03	.594	15.09	.130 .115	3.30 2.92	.522	13.26	7/16-28 UNEF
10	.262	6.65	.150 .090	3.81 2.29	.591 .585	15.01 14.86	.954	24.23	.719	18.26	.130 .115	3.30 2.92	.639	16.23	9/16-24 UNEF
12	.262	6.65	.150 .090	3.81 2.29	.751 .745	19.08 18.92	1.047	26.59	.812	20.62	.130 .115	3.30 2.92	.808	20.52	11/16-24 UNEF
14	.262	6.65	.150 .090	3.81 2.29	.876 .870	22.25 22.10	1.141	28.98	.906	23.01	.130 .115	3.30 2.92	.933	23.70	13/16-20 UNEF
16	.262	6.65	.150 .090	3.81 2.29	1.001 .995	25.43 25.27	1.234	31.34	.969	24.61	.130 .115	3.30 2.92	1.058	26.87	15/16-20 UNEF
18	.262	6.65	.150 .090	3.81 2.29	1.126 1.120	28.69 28.45	1.328	33.73	1.062	26.97	.130 .115	3.30 2.92	1.183	30.05	1-1/16-18 UNEF
20	.262	6.65	.150 .090	3.81 2.29	1.251 1.245	30.78 31.62	1.453	36.91	1.156	29.36	.130 .115	3.30 2.92	1.308	33.22	1-3/16-18 UNEF
22	.262	6.65	.150 .090	3.81 2.29	1.376 1.370	34.95 34.80	1.578	40.08	1.250	31.75	.130 .115	3.30 2.92	1.433	36.40	1-5/16-18 UNEF
24	.292	7.42	.120 .060	3.05 1.52	1.501 1.495	38.13 37.97	1.703	43.26	1.375	34.93	.157 .142	3.99 3.61	1.558	39.57	1-7/16-18 UNEF

Box Mounting Receptacle Series II

MS 27499 E
418-22E (Amphenol Part No.)





SHELL SIZE	A DIA		B MAX		C BASIC		D	
	In.	MM	In.	MM	In.	MM	In.	MM
8	.474 .468	12.04 11.89	.828	21.03	.594	15.09	.130 .115	3.30 2.92
10	.591 .585	15.01 14.86	.954	24.23	.719	18.26	.130 .115	3.30 2.92
12	.751 .745	19.08 18.92	1.047	26.59	.812	20.62	.130 .115	3.30 2.92
14	.876 .870	22.25 22.10	1.141	28.98	.906	23.01	.130 .115	3.30 2.92
16	1.001 .995	25.43 25.27	1.234	31.34	.969	24.61	.130 .115	3.30 2.92
18	1.126 1.120	28.60 28.45	1.328	33.73	1.062	26.97	.130 .115	3.30 2.92
20	1.251 1.245	31.78 31.62	1.453	36.91	1.156	29.36	.130 .115	3.30 2.92
22	1.376 1.370	34.95 34.80	1.578	40.08	1.250	31.75	.130 .115	3.30 2.92
24	1.501 1.495	38.13 37.97	1.703	43.26	1.375	34.93	.157 .142	3.99 3.61

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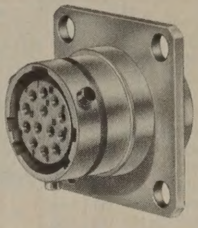
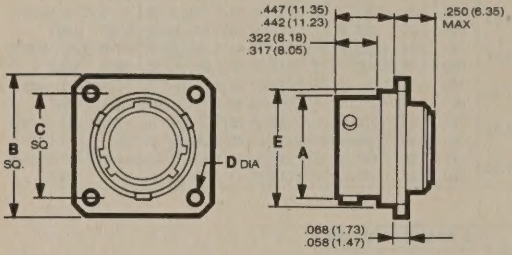
MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Shell Styles and Dimensions

Box Mounting Receptacle (Back Panel) Series II

MS 27508 E
418-25E (Amphenol Part No.)

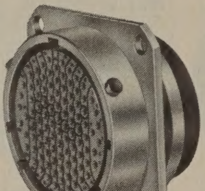


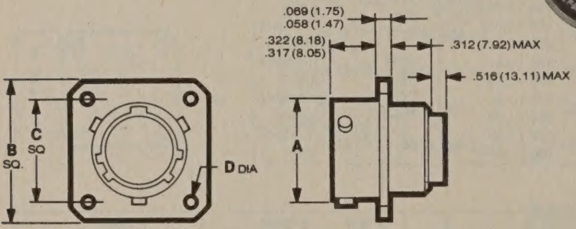


SHELL SIZE	A DIA		B MAX		C BASIC		D		E MAX	
	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM
8	.474 .468	12.04 11.89	.828	21.03	.594	15.09	.130 .115	3.30 2.92	.522	13.31
10	.591 .585	15.01 14.86	.954	24.23	.719	18.26	.130 .115	3.30 2.92	.639	16.23
12	.751 .745	19.08 18.92	1.047	26.59	.812	20.62	.130 .115	3.30 2.92	.808	20.52
14	.876 .870	22.25 22.10	1.141	28.98	.906	23.01	.130 .115	3.30 2.92	.933	23.70
16	1.001 .995	25.43 25.27	1.234	31.34	.969	24.61	.130 .115	3.30 2.92	1.058	26.87
18	1.126 1.120	28.60 28.95	1.328	33.73	1.062	26.97	.130 .115	3.30 2.92	1.183	30.05
20	1.251 1.245	31.78 31.62	1.453	36.91	1.156	29.36	.130 .115	3.30 2.92	1.308	33.22
22	1.376 1.370	34.95 34.80	1.578	40.08	1.250	31.75	.130 .115	3.30 2.92	1.433	36.40
24	1.501 1.495	38.13 37.97	1.703	43.26	1.375	34.93	.157 .142	3.99 3.61	1.558	39.57

Box Mounting Receptacle (with full grommet) Series II

MS 27513 E
418-22R (Amphenol Part No.)



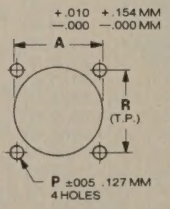


SHELL SIZE	A DIA		B DIA		C BASIC		D	
	In.	MM	In.	MM	In.	MM	In.	MM
8	.474 .468	12.04 11.89	.828	21.03	.594	15.09	.130 .115	3.30 2.92
10	.591 .585	15.01 14.86	.954	24.23	.719	18.26	.130 :115	3.30 2.92
12	.751 .745	19.08 18.92	1.047	26.59	.812	20.62	.130 .115	3.30 2.92
14	.876 .870	22.25 22.10	1.141	28.98	.906	23.01	.130 .115	3.30 2.92
16	1.001 .995	25.43 25.27	1.234	31.34	.969	24.61	.130 .115	3.30 2.92
18	1.126 1.120	28.60 28.45	1.328	33.73	1.062	26.97	.130 .115	3.30 2.92
20	1.251 1.245	31.78 31.62	1.453	36.91	1.156	29.36	.130 .115	3.30 2.92
22	1.376 1.370	34.95 34.80	1.578	40.08	1.250	31.75	.130 .115	3.30 2.92
24	1.501 1.495	38.13 37.97	1.703	43.26	1.375	34.93	.157 .142	3.99 3.61

Panel Cutouts

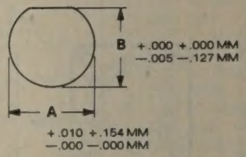
Series I Connectors

Flanged Mounted Receptacles
(Front and Back Panel Mounting)



SHELL SIZE	A DIA		R		P DIA		MOUNTING SCREW
	In.	MM	In.	MM	In.	MM	
9	.734	18.64	.719	18.26	.125	3.18	#4
11	.860	21.84	.812	20.62	.125	3.18	#4
13	.985	25.02	.906	23.01	.125	3.18	#4
15	1.110	28.19	.969	24.61	.125	3.18	#4
17	1.234	31.34	1.062	26.97	.125	3.18	#4
19	1.360	34.54	1.156	29.36	.125	3.18	#4
21	1.484	37.69	1.250	31.75	.125	3.18	#4
23	1.611	40.92	1.375	34.92	.152	3.86	#6
25	1.736	44.09	1.500	38.10	.152	3.86	#6

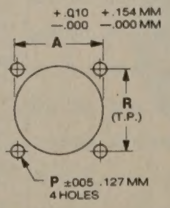
Jam Nut Receptacles



SHELL SIZE	A		B		THICKNESS			
	In.	MM	In.	MM	In. Min.	In. Max.	MM Min.	MM Max.
9	.697	17.70	.665	16.89	.062	.125	1.57	3.17
11	.822	20.88	.765	19.43	.062	.125	1.57	3.17
13	1.007	25.58	.952	24.18	.062	.125	1.57	3.17
15	1.134	28.80	1.076	27.33	.062	.125	1.57	3.17
17	1.259	31.98	1.201	30.51	.062	.125	1.57	3.17
19	1.384	35.15	1.331	33.81	.062	.125	1.57	3.17
21	1.507	38.28	1.451	36.86	.062	.125	1.57	3.17
23	1.634	41.50	1.576	40.03	.062	.125	1.57	3.17
25	1.759	44.68	1.701	43.21	.062	.125	1.57	3.17

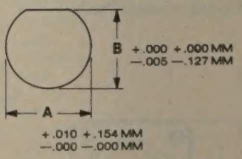
Series II Connectors

Flanged Mounted Receptacles
(Front and Back Panel Mounting)



SHELL SIZE	A DIA		R		P DIA		MOUNTING SCREW
	In.	MM	In.	MM	In.	MM	
8	.608	15.44	.594	15.09	.125	3.18	#4
10	.734	18.64	.719	18.26	.125	3.18	#4
12	.860	21.84	.812	20.62	.125	3.18	#4
14	.985	25.02	.906	23.01	.125	3.18	#4
16	1.110	28.19	.969	24.61	.125	3.18	#4
18	1.234	31.34	1.062	26.97	.125	3.18	#4
20	1.360	34.54	1.156	29.36	.125	3.18	#4
22	1.484	37.69	1.250	31.75	.125	3.18	#4
24	1.611	40.92	1.375	34.92	.152	3.86	#6

Jam Nut Receptacles



SHELL SIZE	A		B		THICKNESS			
	In.	MM	In.	MM	In. Min.	In. Max.	MM Min.	MM Max.
8	.884	22.45	.828	21.03	.062	.109	1.57	2.77
10	1.007	25.58	.952	24.18	.062	.109	1.57	2.77
12	1.134	28.80	1.076	27.33	.062	.109	1.57	2.77
14	1.259	31.98	1.201	30.51	.062	.109	1.57	2.77
16	1.384	35.15	1.331	33.81	.062	.109	1.57	2.77
18	1.507	38.28	1.451	36.86	.062	.109	1.57	2.77
20	1.634	41.50	1.576	40.03	.062	.109	1.57	2.77
22	1.759	44.68	1.701	43.21	.062	.109	1.57	2.77
24	1.884	47.85	1.826	46.38	.062	.109	1.57	2.77

The right idea
at the right time

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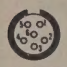
BUNKER RAMO®

MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

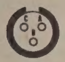
Insert Arrangements

8-35
9-35



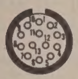
6 #22D
Service Rating M

8-98
9-98



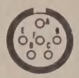
3 #20
Service Rating M

10-35
11-35



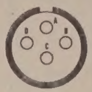
13 #22D
Service Rating M

10-98
11-98



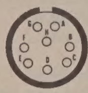
6 #20
Service Rating M

12-4
13-4



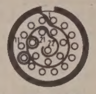
4 #16
Service Rating I

12-8
13-8



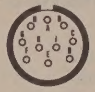
8 #20
Service Rating I

12-35
13-35



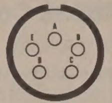
22 #22D
Service Rating M

12-98
13-98



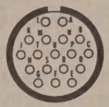
10 #20
Service Rating I

14-5
15-5



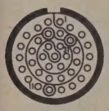
5 #16
Service Rating II

14-18
15-18



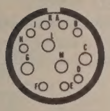
18 #20
Service Rating I

14-35
15-35



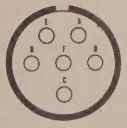
37 #22D
Service Rating M

14-97
15-97



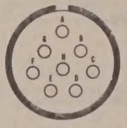
8 #20
4 #16
Service Rating I

16-6
17-6



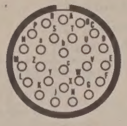
6 #12
Service Rating I

16-8
17-8



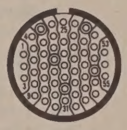
8 #16
Service Rating II

16-26
17-26



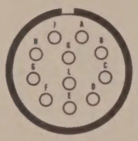
26 #20
Service Rating I

16-35
17-35



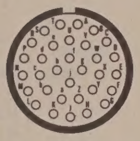
55 #22D
Service Rating M

18-11
19-11



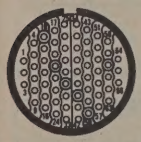
11 #16
Service Rating II

18-32
19-32



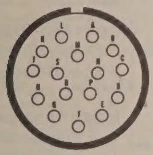
32 #20
Service Rating I

18-35
19-35



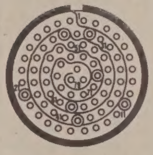
66 #22D
Service Rating M

20-16
21-16



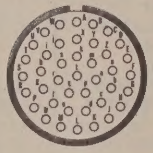
16 #16
Service Rating II

20-35
21-35



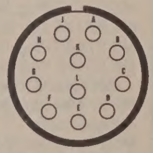
79 #22D
Service Rating M

20-41
21-41



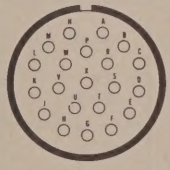
41 #20
Service Rating I

21-11



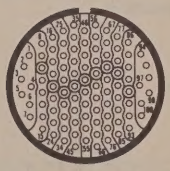
11 #12
Service Rating I

22-21
23-21



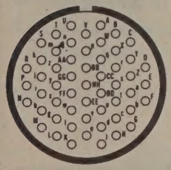
21 #16
Service Rating II

22-35
23-35



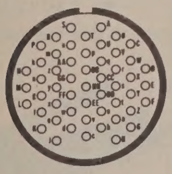
100 #22D
Service Rating M

22-55



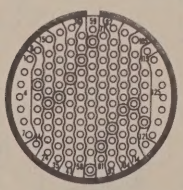
55 #20
Service Rating I

23-53



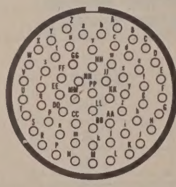
53 #20
Service Rating I

24-35
25-35



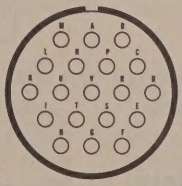
128 #22D
Service Rating M

24-61
25-61



61 #20
Service Rating I

25-19



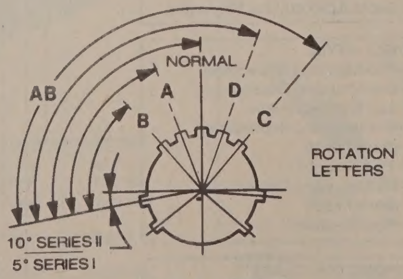
19 #12
Service Rating I

Contact
identification
is for front
face of pin
insert (socket
insert opposite)

Master Key/Keyway Rotation

Short Series II

SHELL SIZE	AB ANGLE OF ROTATION (Degrees) NORMAL	A	B	C	D
8	100°	82°	—	—	118°
10	100°	86°	72°	128°	114°
12	100°	80°	68°	132°	120°
14	100°	79°	66°	134°	121°
16	100°	82°	70°	130°	118°
18	100°	82°	70°	130°	118°
20	100°	82°	70°	130°	118°
22	100°	85°	74°	126°	115°
24	100°	85°	74°	126°	115°



RELATIVE POSSIBLE POSITION
OF ROTATED MASTER KEYWAY.
(FRONT FACE OF RECEPTACLE SHOWN)

Note:
Insert arrangement does not
rotate with main key

Long Series I

SHELL SIZE	AB ANGLE OF ROTATION (Degrees) NORMAL	A	B	C	D
9	95°	77°	—	—	113°
11	95°	81°	67°	123°	109°
13	95°	75°	63°	127°	115°
15	95°	74°	61°	129°	116°
17	95°	77°	65°	125°	113°
19	95°	77°	65°	125°	113°
21	95°	77°	65°	125°	113°
23	95°	80°	69°	121°	110°
25	95°	80°	69°	121°	110°

The right idea at the right time / **AMPHENOL®** / **BUNKER RAMO®**

MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Ordering Information

Military Standard Part Number For MIL-C-38999 Connectors

SERIES I (SCOOP-PROOF)

MIL-C-38999, Series I connectors can be ordered by the military part number. The connector part number is per the example:

MS 27466 T 15 F 18 P A

SPECIFICATION NUMBER
MS 27466 Wall Mounting Receptacle
MS 27467 Plug, Grounded
MS 27468 Jam Nut Receptacle
MS 27496 Box Mounting Receptacle
MS 27505 Box Mounting Receptacle (Back)
MS 27656 Wall Mounting Receptacle (Back)

CONNECTOR CLASS
E Environment Resisting
T Environment Resisting (Less Rear Accessory)

SHELL SIZE
9 11 13 15 17 19 21 23 25

ALTERNATE POSITION
A, B, C, D. (No Suffix for Normal)

CONTACT TYPE
P-Pin Contact
S-Socket Contact

INSERT ARRANGEMENT
See configuration and specification for every insert number

SHELL FINISH
F-Electroless Nickel
B-Olive Drab Cadmium over Nickel

SERIES II (LOW SILHOUETTE)

MIL-C-38999, Series II connectors can be ordered by the military part number. The connector part number is per the example:

MS 27472 T 24 F 61 P A

SPECIFICATION NUMBER
MS 27472 Wall Mounting Receptacle
MS 27473 Plug, Straight
MS 27474 Jam Nut Receptacle
MS 27484 Plug, Grounded
MS 27497 Wall Mounting Receptacle (Back)
MS 27499 Box Mounting Receptacle
MS 27508 Box Mounting Receptacle (Back)
MS 27513 Box Mounting Receptacle (with full Grommet)

CONNECTOR CLASS
E Environment Resisting
T Environment Resisting (Less Rear Accessory)

ALTERNATE POSITION
A, B, C, D. (No Suffix for Normal)

CONTACT TYPE
P-Pin Contact
S-Socket Contact

INSERT ARRANGEMENT
See configuration and specification for every insert number

SHELL FINISH
F-Electroless Nickel
B-Olive Drab Cadmium over Nickel

SHELL SIZE
8 10 12 14 16 18 20 22 24

How to Order 418 Series Connectors

To order the specific 418 Series Connectors you want, the connector part number is per the example:

418 - 1 0 T 15 - 18 P A (101)

SERIES DESIGNATION

CONNECTOR SERIES
1-Series I (Long/Scoop-Proof)
2-Series II (Short/Low Silhouette)

SHELL STYLE
0-Wall Mounting Receptacle
2-Box Mounting Receptacle
3-Jam Nut Receptacle
5-Box Mounting Receptacle) (Back Panel)
6- Plug Straight
7-Wall Mounting Receptacle (Back Panel)
8-Plug Grounded

CONNECTOR CLASS
E-Environmental Resisting
T-Environment Resisting (Less Rear Accessory)
R-Environment Resisting with Full Grommet Seal (Box Mounting Receptacle Only)

DEVIATIONS:
(101) Connector Less Contacts
(110) Olive Drab Cadmium Over Nickel Finish

ALTERNATE POSITION
A, B, C, D. (No Suffix for Normal)

CONTACT TYPE
P-Pin Contacts
S-Socket Contacts

INSERT ARRANGEMENTS
See Configuration and Specification for Every Insert Number

SHELL SIZE
SERIES I
9 11 13 15 17 19 21 23 25
SERIES II
8 10 12 14 16 18 20 22 24

For complete information ask for Circular Environmental Connectors Catalog M-123

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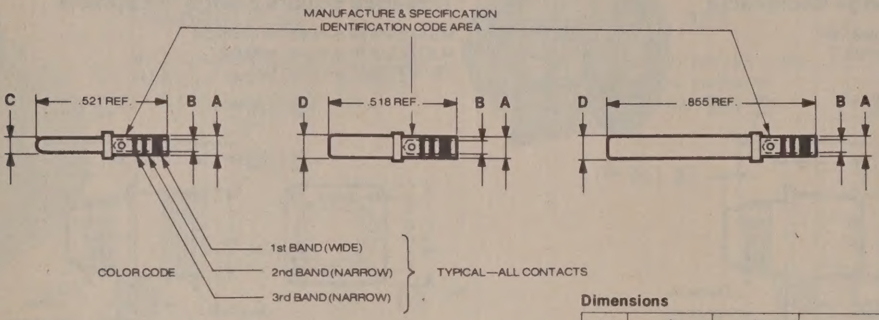
MIL-C-38999 MINIATURE HIGH DENSITY ENVIRONMENTAL CONNECTOR / MERLIN II / 418 SERIES

Contacts

Pin Contact Series I & II • Short Socket Contact Series II • Long Socket Contact Series I



Pin Contacts (Series I & II) Per MIL-C-39029/58

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS 1	2	3	.AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED MILITARY PART NUMBER
22D	[illegible]	Orange	Blue	Black	418-100-2200P-02	MS27493-22D	MS27494-22D
20	[illegible]	Orange	Blue	Orange	418-100-2000P-02	MS27493-20	MS27494-20
16	[illegible]	Orange	Blue	Yellow	418-100-1600P-02	MS27493-16	MS27494-16
12	[illegible]	Orange	Blue	Green	418-100-1200P-02	MS27493-12	MS27494-12

Socket (Series I) Per MIL-C-39029/56

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS 1	2	3	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED MILITARY PART NUMBER
22D	[illegible]	Orange	Yellow	Gray	418-100-2200S-02	MS27490-22D	MS27655-22D
20	[illegible]	Orange	Green	Brown	418-100-2000S-02	MS27490-20	MS27655-20
16	[illegible]	Orange	Green	Red	418-100-1600S-02	MS27490-16	MS27655-16
12	[illegible]	Orange	Green	Orange	418-100-1200S-02	MS27490-12	MS27655-12

Socket Contacts (Series II) Per MIL-C-39029/57

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS 1	2	3	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED MILITARY PART NUMBER
22D	[illegible]	Orange	Green	Yellow	418-200-2200S-02	MS27491-22D	MS27492-22D
20	[illegible]	Orange	Green	Violet	418-200-2000S-02	MS27491-20	MS27492-20
16	[illegible]	Orange	Green	Gray	418-200-1600S-02	MS27491-16	MS27492-16
12	[illegible]	Orange	Green	White	418-200-1200S-02	MS27491-12	MS27492-12

Dimensions

SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D In.	D MM	CONTACT CURRENT RATING
22D	.048 .046	1.22 1.17	.0355 .0335	0.90 0.85	.0305 .0295	0.77 0.75	.062 MAX	1.57 MAX	5.0
20	.070 .068	1.78 1.73	.048 .046	1.22 1.17	.041 .039	1.04 0.99	.078 MAX	1.98 MAX	7.5
16	.103 .101	2.62 2.57	.068 .066	1.73 1.68	.0635 .0615	1.61 1.56	.113 MAX	2.87 MAX	13.0
12	.151 .148	3.84 3.76	.102 .098	2.59 2.49	.095 .093	0.95 0.93	.161 MAX	4.09 MAX	23.0

Wire Range Accommodation:

CONTACT SIZE	WIRE SIZE	O.D. OF FINISHED WIRE (INCHES)*
22D	28 26 24 22	.030/.054
20	24 22 20	.040/.083
16	20 18 16	.065/.109
12	14 12	.097/.142

*All contacts may be assembled with either minimum or maximum diameter wire as shown or any combination thereof.

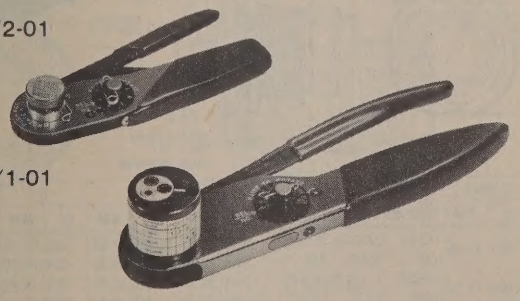
Accessory Information

Crimping Tools

See chart for proper crimp tool and respective positioner part number.

M22520/2-01

M22520/1-01



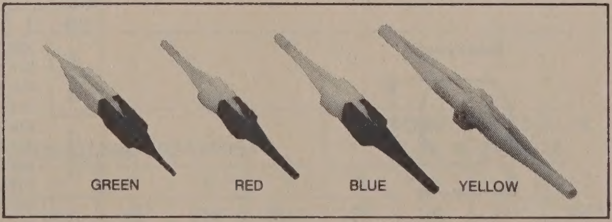
CONTACT STYLE	CONTACT SIZE	CRIMP TOOL AMPHENOL PART NO.	CRIMP TOOL MILITARY PART NO.	POSITIONER OR TURRET HEAD AMPHENOL PART NO.	POSITIONER OR TURRET HEAD MILITARY PART NO.
PIN	22D	294-268	M22520/2-01	294-1918	M22520/2-09
CONTACT SERIES I & II	20 16 12	294-542	M22520/1-01	294-1917	M22520/1-04
SOCKET	22D	294-268	M22520/2-01	294-1920	M22520/2-07
CONTACT SERIES I (LONG)	20 16 12	294-542	M22520/1-01	294-1917	M22520/1-04
SOCKET	22D	294-268	M22520/2-01	294-1919	M22520/2-06
CONTACT SERIES II (SHORT)	20 16 12	294-542	M22520/1-01	294-1917	M22520/1-04

Grommet Seal Plug

Use seal plug to assure proper connector sealing whenever all contacts are not employed. For ease of removal leave end bell portion exposed.

CONTACT SIZE	SEAL PLUG PART NUMBERS AMPHENOL	SEAL PLUG PART NUMBERS MIL-C-38999	COLOR
22D	418-122-22000	MS27488-22	BLACK
20	418-122-20000	MS27488-20	RED
16	418-122-16000	MS27488-16	BLUE
12	418-122-12000	MS27488-12	YELLOW

Assembly Tools



CONTACT SIZE	COLOR	AMPHENOL PART NO.	MILITARY PART NO.
22D	GREEN	294-549	MS27534-22D
20	RED	294-559	MS27534-20
16	BLUE	294-109	MS27534-16
12	YELLOW	294-110	MS27534-12

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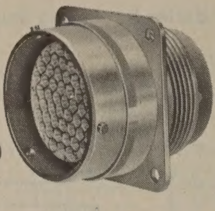
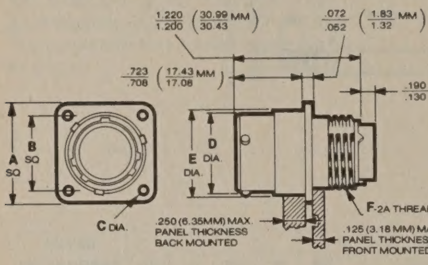
MIL-C-83723 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN III / 518 SERIES

Shell Styles and Dimensions

Bayonet Square Flange Receptacle

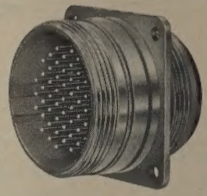
M 83723/71R (with socket contacts)
M 83723/72R (with pin contacts)
518-10R (Amphenol Part No.)

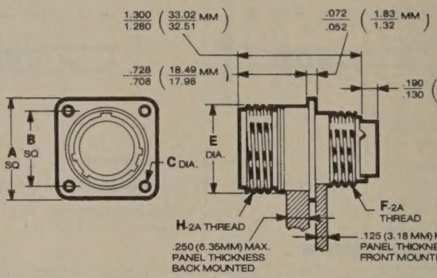



1.220/1.200 (30.99/30.43 MM)
.072/.052 (1.83/1.32 MM)
.723/.708 (17.43/17.08 MM)
.190/.130 (4.83/3.30 MM)
B
A SQ
SQ
D
E DIA.
DIA.
C DIA.
F-2A THREAD
.250 (6.35MM) MAX. PANEL THICKNESS BACK MOUNTED
.125 (3.18 MM) MAX. PANEL THICKNESS FRONT MOUNTED

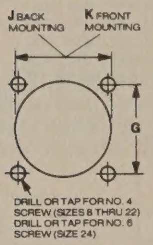
Threaded Square Flange Receptacle

M 83723/82R (with socket contacts)
M 83723/83R (with pin contacts)
518-00R (Amphenol Part No.)




1.300/1.280 (33.02/32.51 MM)
.072/.052 (1.83/1.32 MM)
.728/.708 (18.49/17.98 MM)
.190/.130 (4.83/3.30 MM)
B
A SQ
SQ
E DIA.
C DIA.
F-2A THREAD
H-2A THREAD
.250 (6.35MM) MAX. PANEL THICKNESS BACK MOUNTED
.125 (3.18 MM) MAX. PANEL THICKNESS FRONT MOUNTED

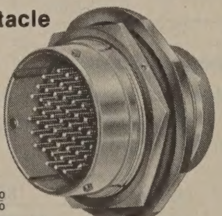
Panel Cutout

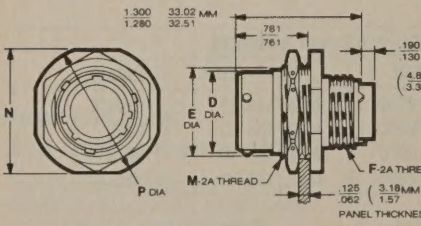

J BACK MOUNTING
K FRONT MOUNTING
G
DRILL OR TAP FOR NO. 4 SCREW (SIZES 8 THRU 22)
DRILL OR TAP FOR NO. 6 SCREW (SIZE 24)

SHELL	A		B		C		D		E MAX		F	G		H	J MIN		K MIN	
SIZE	In.	MM	In.	MM	In.	MM	In.	MM	In.	MM	THREAD	In.	MM	THREAD	In.	MM	In.	MM
8	.817 .807	20.75 20.50	.594	15.09	.125 .115	3.18 2.92	.536 .513	13.61 13.49	.561	14.25	1/2-20 UNF	.599 .589	15.21 14.96	9/16-24 UNEF	.620	15.75	.447	11.35
10	.942 .932	23.93 23.67	.719	18.26	.125 .115	3.18 2.92	.659 .654	16.74 16.61	.696	17.68	5/8-24 UNEF	.724 .714	18.39 18.14	11/16-24 UNEF	.748	19.00	.572	14.53
12	1.036 1.026	26.31 26.06	.812	20.62	.125 .115	3.18 2.92	.829 .824	21.06 20.93	.875	22.23	3/4-20 UNEF	.817 .807	20.75 20.50	7/8-20 UNEF	.913	23.19	.760	19.30
14	1.130 1.120	28.70 28.45	.906	23.01	.125 .115	3.18 2.92	.898 .893	22.81 22.63	.935	23.75	7/8-20 UNEF	.911 .901	23.14 22.89	15/16-20 UNEF	.980	24.89	.822	20.88
16	1.255 1.245	31.88 31.62	.969	24.61	.125 .115	3.18 2.92	1.025 1.020	26.04 25.91	1.062	26.98	1-20 UNEF	.974 .964	24.74 24.49	1-1/16-18 UNEF	1.107	28.12	.948	24.08
18	1.348 1.338	34.24 33.99	1.062	26.97	.125 .115	3.18 2.92	1.131 1.126	28.73 28.60	1.187	30.15	1-1/16-18 UNEF	1.067 1.057	27.10 26.85	1-3/16-18 UNEF	1.209	30.71	1.072	27.23
20	1.442 1.432	36.63 36.37	1.156	29.36	.125 .115	3.18 2.92	1.256 1.251	31.90 31.78	1.312	33.33	1-3/16-18 UNEF	1.161 1.151	29.49 29.24	1-5/16-18 UNEF	1.337	33.96	1.192	30.28
22	1.567 1.557	39.80 39.55	1.250	31.75	.125 .115	3.18 2.92	1.381 1.376	35.08 34.95	1.437	36.50	1-5/16-18 UNEF	1.255 1.245	31.88 31.62	1-7/16-18 UNEF	1.452	36.88	1.322	33.58
24	1.708 1.698	43.38 43.13	1.375	34.93	.154 .144	3.91 3.66	1.506 1.501	38.25 38.13	1.562	39.68	1-7/16-18 UNEF	1.380 1.370	35.05 34.30	1-9/16-18 UNEF	1.577	40.06	1.442	36.63

Bayonet Single Hole Mounting Receptacle

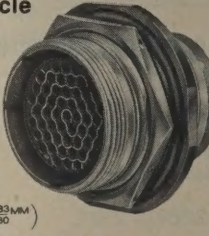
M83723/73R (with socket contacts)
M83723/74R (with pin contacts)
518-13R (Amphenol Part No.)

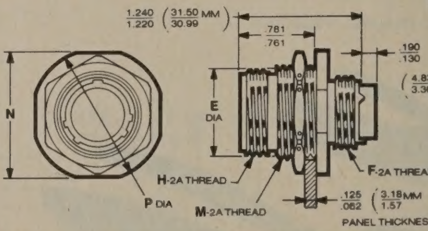



1.300/1.280 33.02/32.51 MM
.781/.761
.190/.130
(4.83/3.30 MM)
N
D
E DIA.
DIA.
F-2A THREAD
M-2A THREAD
P DIA
.125/.062 (3.18/1.57 MM)
PANEL THICKNESS

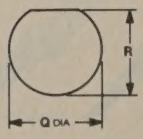
Threaded Single Hole Mounting Receptacle

M83723/84R (with socket contacts)
M83723/85R (with pin contacts)
518-03R (Amphenol Part No.)




1.240/1.220 (31.50/30.99 MM)
.781/.761
.190/.130
(4.83/3.30 MM)
N
E DIA
H-2A THREAD
F-2A THREAD
P DIA
M-2A THREAD
.125/.062 (3.18/1.57 MM)
PANEL THICKNESS

Panel Cutout



SHELL	D		E MAX		F	H	M	N		P		Q		R	
SIZE	In.	MM	In.	MM	THREAD	THREAD	THREAD	In.	MM	In.	MM	In.	MM	In.	MM
8	.536 .531	13.61 13.49	.561	14.25	1/2-20 UNF	9/16-24 UNEF	5/8-20 UN	.979 .969	24.37 24.61	1.066 1.056	27.08 26.82	.640 .630	16.26 16.00	.610 .600	15.43 15.24
10	.659 .654	16.74 16.61	.696	17.68	5/8-24 UNEF	11/16-24 UNEF	3/4-20 UNEF	1.104 1.094	28.04 27.79	1.192 1.182	30.23 30.02	.765 .755	19.43 19.18	.735 .725	18.67 18.42
12	.829 .824	21.06 20.93	.875	22.23	3/4-20 UNEF	7/8-20 UNEF	15/16-20 UNEF	1.291 1.281	32.79 32.54	1.380 1.370	35.05 34.80	.952 .942	24.18 23.93	.922 .912	23.42 23.17
14	.898 .893	22.81 22.68	.935	23.75	7/8-20 UNEF	15/16-20 UNEF	1-20 UNEF	1.391 1.381	35.33 35.08	1.505 1.495	38.23 37.97	1.015 1.005	25.78 25.53	.985 .975	25.02 24.77
16	1.025 1.020	26.04 25.91	1.062	26.98	1-20 UNEF	1-1/16-18 UNEF	1-1/8-18 UNEF	1.516 1.506	38.51 38.25	1.630 1.620	41.40 41.15	1.140 1.130	28.96 28.70	1.110 1.100	28.19 27.94
18	1.131 1.126	28.73 28.60	1.127	30.15	1-1/16-18 UNEF	1-3/16-18 UNEF	1-1/4-18 UNEF	1.641 1.631	41.68 41.43	1.756 1.746	44.60 44.35	1.265 1.255	32.13 31.88	1.230 1.220	31.24 30.99
20	1.256 1.251	31.90 31.78	1.312	33.33	1-3/16-18 UNEF	1-5/16-18 UNEF	1-3/8-18 UNEF	1.766 1.756	44.86 44.60	1.860 1.850	47.24 46.99	1.390 1.380	35.31 35.05	1.355 1.345	34.42 34.16
22	1.381 1.376	35.08 34.95	1.437	36.50	1-5/16-18 UNEF	1-7/16-18 UNEF	1-1/2-18 UNEF	1.954 1.944	49.63 49.38	2.068 2.058	52.53 52.27	1.515 1.505	38.48 38.23	1.480 1.470	37.59 37.34
24	1.506 1.501	38.25 38.13	1.562	39.68	1-7/16-18 UNEF	1-9/16-18 UNEF	1-5/8-18 UNEF	2.079 2.069	52.81 52.55	2.160 2.150	54.86 54.61	1.640 1.630	41.66 41.40	1.605 1.595	40.77 40.51

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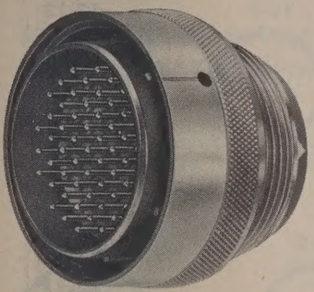
MIL-C-83723 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN III / 518 SERIES

Shell Styles and Dimensions



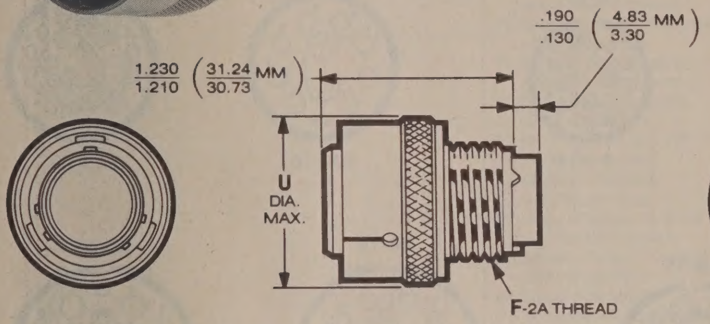
Bayonet Plug

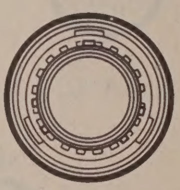
M83723/75R (with socket contacts)
M83723/76R (with pin contacts)
518-16R (Amphenol Part No.)

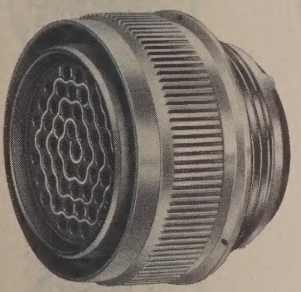
Bayonet Plug, RFI

M83723/77R (with socket contacts)
M83723/78R (with pin contacts)
518-18R (Amphenol Part No.)

SHELL SIZE	U MAX In.	U MAX MM	F THREAD
8	.776	19.71	1/2-20 UNF
10	.906	23.01	5/8-24 UNEF
12	1.078	27.38	3/4-20 UNEF
14	1.141	28.98	7/8-20 UNEF
16	1.266	32.16	1-20 UNEF
18	1.375	34.93	1-1/16-18 UNEF
20	1.510	38.35	1-3/16-18 UNEF
22	1.625	41.28	1-5/16-18 UNEF
24	1.760	44.70	1-7/16-18 UNEF







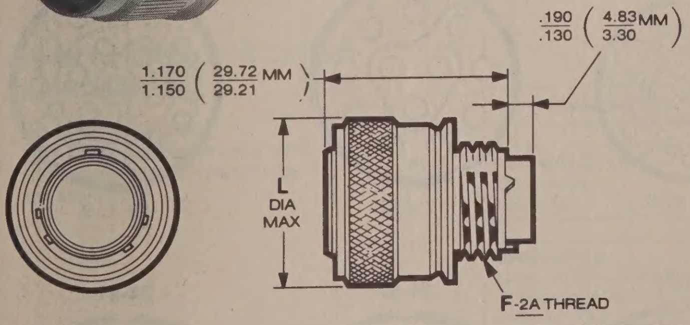
Threaded Plug

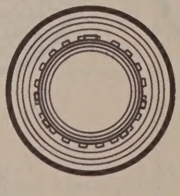
M83723/86R (with socket contacts)
M83723/87R (with pin contacts)
518-06R (Amphenol Part No.)

Threaded Plug, RFI

M83723/91R (with socket contacts)
M83723/92R (with pin contacts)
518-08R (Amphenol Part No.)

SHELL SIZE	L MAX In.	L MAX MM	F THREAD
8	.756	19.20	1/2-20 UNF
10	.906	23.01	5/8-24 UNEF
12	1.078	27.38	3/4-20 UNEF
14	1.141	28.98	7/8-20 UNEF
16	1.266	32.16	1-20 UNEF
18	1.375	34.93	1-1/16-18 UNEF
20	1.510	38.35	1-3/16-18 UNEF
22	1.625	41.28	1-5/16-18 UNEF
24	1.760	44.70	1-7/16-18 UNEF

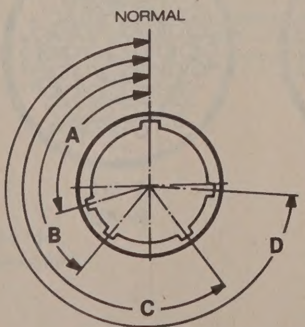




Alternate Positions

Front face of receptacle shown

Note: Alternate positions 6 through 10 incorporate special shell polarizing key and keyways. All inserts remain in the normal position.



	FOR CONNECTORS SIZE 8 AND 10				FOR CONNECTORS SIZE 12, 14, 16, 18, 20, 22 AND 24			
POSITION	A	B	C	D	A	B	C	D
Normal	105°	140°	215°	265°	105°	140°	215°	265°
6	102°	132°	248°	320°	18°	149°	192°	259°
7	80°	118°	230°	312°	92°	152°	222°	342°
8	35°	140°	205°	275°	84°	152°	204°	334°
9	64°	155°	234°	304°	24°	135°	199°	240°
10*	25°	115°	220°	270°	98°	152°	268°	338°

*Position 10 not available in size 8 connector.

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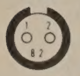
MIL-C-83723 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN III / 518 SERIES

Insert Arrangements

8-2

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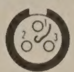
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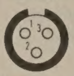
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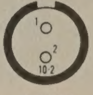
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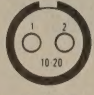
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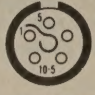
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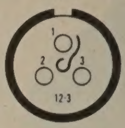
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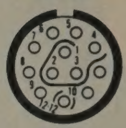
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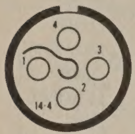
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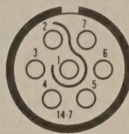
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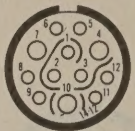
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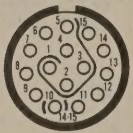
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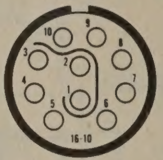
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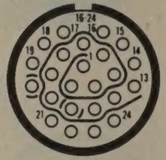
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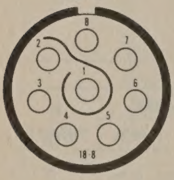
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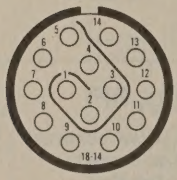
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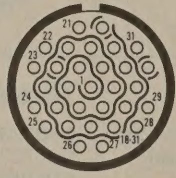
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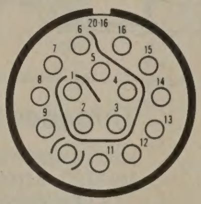
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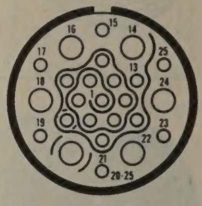
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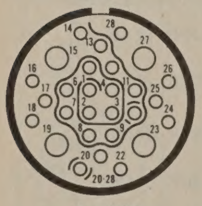
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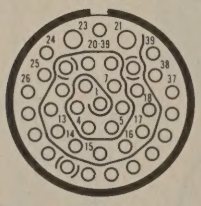
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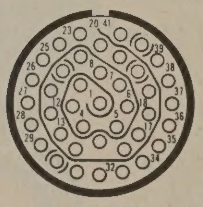
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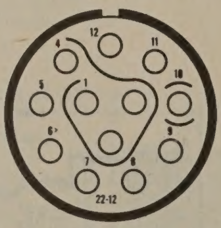
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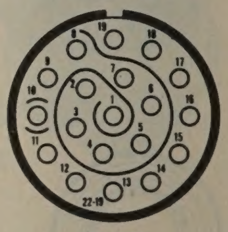
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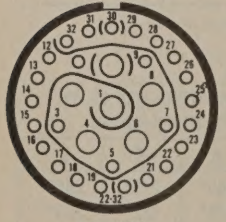
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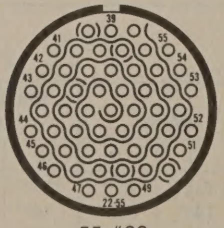
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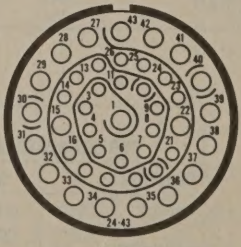
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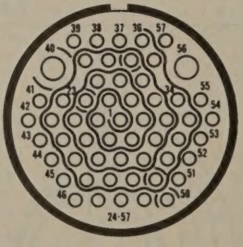
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55 #20

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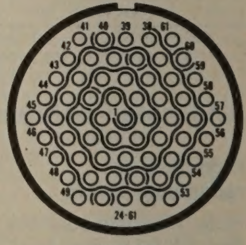
61#20

All insert arrangements are in accordance to MIL-STD-1554

Contact identification is for front face of socket insert (pin insert opposite)

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AMPHENOL®

BUNKER RAMO®

MIL-C-83723 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN III / 518 SERIES

Ordering Information

Military Standard Part Number for MIL-C-83723, Series III Connectors

MIL-C-83723 connectors can be ordered by the Military part numbers. The connector part number is per the example:

M83723/71 R 22 55 N

SPECIFICATION NUMBER

SHELL AND CONTACT STYLE
- 71-Square Flange Bayonet with Socket Contacts
- 72-Square Flange Bayonet with Pin Contacts
- 73-Single Hole Mount Bayonet with Socket Contacts
- 74-Single Hole Mount Bayonet with Pin Contacts
- 75-Straight, Plug, Bayonet, with Socket Contacts
- 76-Straight Plug, Bayonet, with Pin Contacts
- 77-RFI Plug, Bayonet, with Socket Contacts
- 78-RFI Plug, Bayonet, with Pin Contacts
- 82-Square Flange, Threaded with Socket Contacts
- 83-Square Flange, Threaded with Pin Contacts
- 84-Single Hole Mount, Threaded with Socket Contacts
- 85-Single Hole Mount, Threaded with Pin Contacts
- 86-Straight Plug, Threaded with Socket Contacts
- 87-Straight Plug, Threaded with Pin Contacts
- 91-RFI Plug, Threaded, with Socket Contacts
- 92-RFI Plug, Threaded, with Pin Contacts

CONNECTOR CLASS
R-Fluid Resistant
200°C, Conductive Finish

SHELL SIZE
8, 10, 12, 14, 16, 18, 20, 22, 24

INSERT ARRANGEMENTS
See configuration

ALTERNATE POSITIONS
N, 6, 7, 8, 9, 10

How to Order 518 Series Connectors

To order the specific 518 Series Connectors you want, the connector part number is per the example:

518 - 1 0 R 22 - 55 P N (101)

SERIES DESIGNATION

CONNECTOR TYPE
0-Threaded
1-Bayonet

SHELL STYLE
0-Square Flange Receptacle
3-Single Hole Mount Receptacle
6-Straight Plug
8-RFI Plug

CONNECTOR CLASS
R-Fluid Resistant 200°C
Conductive Finish

SHELL SIZE
8, 10, 12, 14, 16, 18, 20, 22, 24

INSERT ARRANGEMENTS
See configuration

CONTACT TYPE
P-Pin Contact
S-Socket Contact

ALTERNATE POSITIONS
N, 6, 7, 8, 9, 10

DEVIATION
(101) Connector less contact

For complete information ask for Circular Environmental Connectors Catalog M-123

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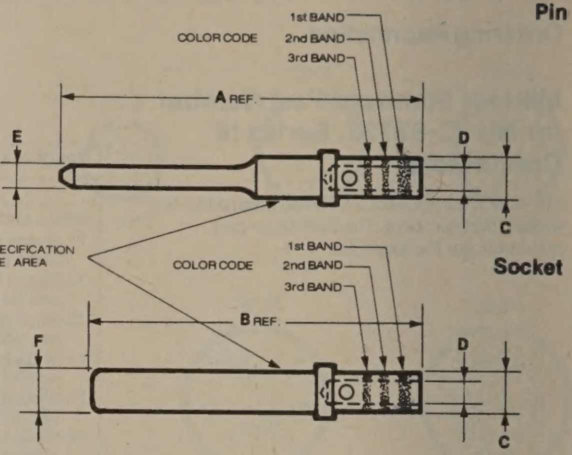
MIL-C-83723 MINIATURE ENVIRONMENTAL CONNECTOR / MERLIN III / 518 SERIES

Contacts



Dimensions

SIZE	A In.	A MM	B In.	B MM	C In.	C MM	D In.	D MM	E In.	E MM	F In.	F MM	CURRENT CONTACT RATING
20	.720 Max.	18.29 Max.	.656 Max.	16.66 Max.	.078 .076	1.98 1.93	.050 .048	1.27 1.22	.041 .039	1.04 0.99	.078 .076	1.98 1.93	7.5
16	.821 Max.	20.85 Max.	.759 Max.	19.23 Max.	.103 .101	2.62 2.57	.068 .066	1.73 1.68	.0635 .0615	1.61 1.56	.113 .110	2.87 2.79	13.0
12	.821 Max.	20.85 Max.	.759 Max.	19.28 Max.	.151 .148	3.84 3.76	.102 .098	2.59 2.49	.095 .093	2.41 2.36	.161 .158	4.09 4.01	23.0

Pin Contacts

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS 1	COLOR BANDS 2	COLOR BANDS 3	MILITARY SPECIFICATION	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED PART NUMBERS
20	▨	Brown	Brown	Black	MIL-C-39029	118-126-2000P-03	M39029/4-20-20	M83723/33B20 M39029/4-001
16	▨	Brown	Brown	Brown	MIL-C-39029	118-126-1600P-03	M39029/4-16-16	M83723/33B16 M39029/4-002
12	▨	Brown	Brown	Orange	MIL-C-39029	118-126-1200P-03	M39029/4-12-12	M83723/33B12 M39029/4-004

Socket Contacts

CONTACT SIZE	IDENTIFICATION CODE	COLOR BANDS 1	COLOR BANDS 2	COLOR BANDS 3	MILITARY SPECIFICATION	AMPHENOL PART NUMBER	MILITARY PART NUMBER	SUPERSEDED PART NUMBERS
20	▨	Brown	Brown	Green	MIL-C-39029	118-126-2000S-03	M39029/5-20-20	M83723/34B20 M39029/5-001
16	▨	Brown	Brown	Blue	MIL-C-39029	118-126-1600S-03	M39029/5-16-16	M83723/34B16 M39029/5-002
12	▨	Brown	Brown	Gray	MIL-C-39029	118-126-1200S-03	M39029/5-12-12	M83723/34B12 M39029/5-004

Wire Range Accommodation

CONTACT SIZE	WIRE SIZE	O.D. OF FINISHED WIRE (INCHES)*
20	24 22 20	.040/.083
16	20 18 16	.053/.103
12	14 12	.099/.158

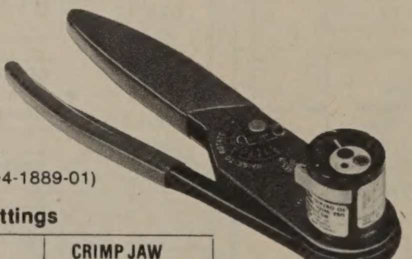
* All contacts may be assembled with either minimum or maximum diameter wire as shown or any combination thereof.

Accessory Information (SEE 118 SERIES FOR BACK SHELLS AND RELIEF CLAMPS)

Mounting

Two receptacle shell styles are available for panel mounting. See the applicable MS drawings for mounting hole dimensions. The square flange receptacle, sizes 8 thru 22, is fastened to the panel with four size #4-40 machine screws. The 24 size shell is fastened to the panel with #6-32 machine screws. The jam nut receptacle mounts into a "D" hole panel cutout and is fastened to the panel with a jam nut.

Crimping Tool



M22520/1-01 Tool with
M22520/1-02 Turret Head
(Amphenol 294-542 and 294-1889-01)

Crimping Tool Jaw Settings

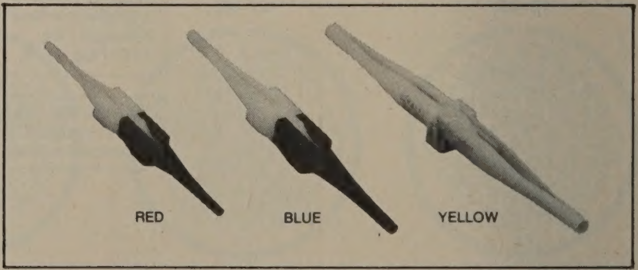
CONTACT SIZE	WIRE SIZE	CRIMP JAW SETTING
20	24 22 20	No. 2 No. 3 No. 4
16	20 18 16	No. 4 No. 5 No. 6
12	14 12	No. 7 No. 8

Grommet Seal Plug

Use seal plug to assure proper connector sealing whenever all contacts are not employed. For ease of removal leave end bell portion exposed.

CONTACT SIZE	SEAL PLUG PART NUMBERS AMPHENOL	SEAL PLUG PART NUMBERS MIL-C-83723	SEAL PLUG PART NUMBERS MIL-C-26482	COLOR
20	118-117-20000	M83723/28-20	MS3187-20-2	Red
16	118-117-16000	M83723/28-16	MS3187-16-2	Blue
12	118-117-12000	M83723/28-12	MS3187-12-2	Yellow

Assembly Tools



Assembly Tools (Insertion & Extraction)

CONTACT SIZE	COLOR	AMPHENOL	MIL-C-83723	MIL-C-26482
20	RED	294-108	M83723/31-20	MS3447-20
16	BLUE	294-109	M83723/31-16	MS3447-16
12	YELLOW	294-110	M83723/31-12	MS3447-12

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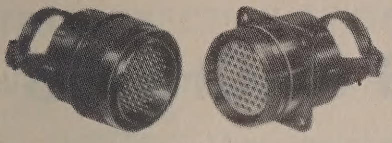
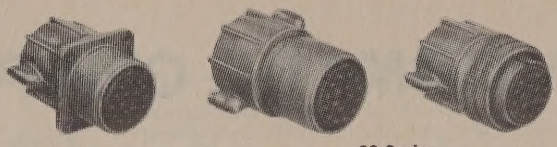
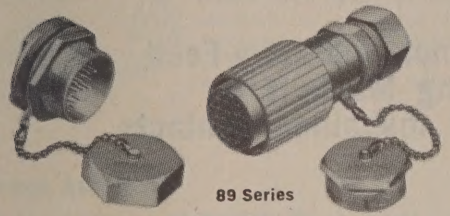
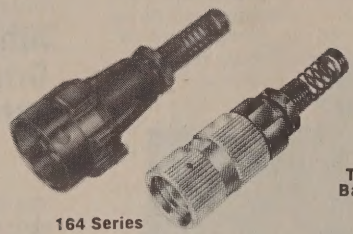
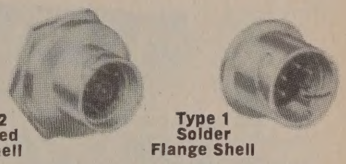

48 Series


69 Series

115 Series


89 Series

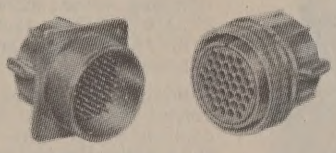

164 Series


Type 2 Threaded Back Shell

Type 1 Solder Flange Shell

182 Series

217 Series


246 Series

348 Series

48 Series

High Reliability, Miniature Connector

Available in 30 insert arrangements — size 8 thru 24: 48 Series are available in square flange and jam nut type receptacles and straight plug in both bayonet and threaded type coupling power and shielded contacts are available. The 48 Series is an environmental connector fully qualified to Military specification MIL-C-26500 Revision "E".

69 Series

Poke-Home®, Environmental Connectors

This line offers 32 insert configurations, and shell styles, are square flange, cable receptacle and straight plug. 69 Series utilize poke-home crimp type contacts and are interchangeable and intermatable with standard "MS" types.

"MS" Environmental Connectors

Available in 43 insert arrangements with solder type contacts — shell sizes 8S thru 36: This series comes in square flange and cable receptacles and straight plug type shell styles. Connectors in this series are qualified to Military specification MIL-C-5015 Revision "F".

89 Series

Submersion-proof Connectors

General purpose, heavy duty connectors: A total of 70 insert arrangements are available for shell sizes 22, 28 and 32. 89 Series are available in panel and cable receptacles and straight plug type shell styles. Whenever the application requires the connector to be submerged in mud, ice or water, the 89 Series is specified because of its rugged and reliable waterproof capability.

115 Series

Subminiature Connectors

Includes three types of connectors: One group consists of rugged lightweight blade type pin connectors which allow easy mating of the 50 or 100 contact size arrangements. The second group consists of a vibration resistant line of shear type missile connectors which disengage upon firing. The third comes with fuel resistant face seals and is available with stainless steel shells capable of meeting temperatures up to 1000°F. They can also be hermetically sealed and are vibration and corrosion resistant.

164 Series

Waterproof Audio Connectors

Available in 5 and 10 contact configurations in panel and plug type shell styles: The 5 and 10 contact configurations conform to the latest revision of MIL-C-55116 (EL) and MIL-C-10544 respectively. The 164 Series is used on military communications equipment and commercial applications where a completely waterproof audio type connector is required.

182 Series

Hermetic Miniature "MS" Type

Available in 18 insert configurations: These connectors are available in a solder flange and threaded backshell receptacle only. 182 Series can be specified where a highly reliable miniature hermetic connector is required. These recptacles mate with the standard 165 Series plugs.

217 Series

Miniature Environment Resistant

A series of rectangular connectors that are qualified to MIL-C-26518: They fulfill the need for an environmentally protected high performance line of connectors without sacrificing weight and area. The resilient inserts used are resistant to fluid and high temperatures. 48 Series Poke-Home contacts are used in the nine insert arrangements.

246 Series

Environment Resistant Connectors

MIL-C-5015 type low temperature environmental connectors: These are available in 36 insert configurations and shell styles, square flange receptacle and straight plug. These connectors utilize a damage resistant contact retention system and employ Poke-Home contacts. The 246 Series connectors are interchangeable and intermountable with all other MIL-C-5015 type connectors.

348 Series

High Density Connector

Available in 28 insert arrangements, size 8 thru 24: This product is offered in the square flange, straight plug, cable receptacle and jam nut type shell styles. Power and shielded contacts are available. The 348 Series is an environmental type connector and is qualified to Military specification MIL-C-81511 Revision "C."

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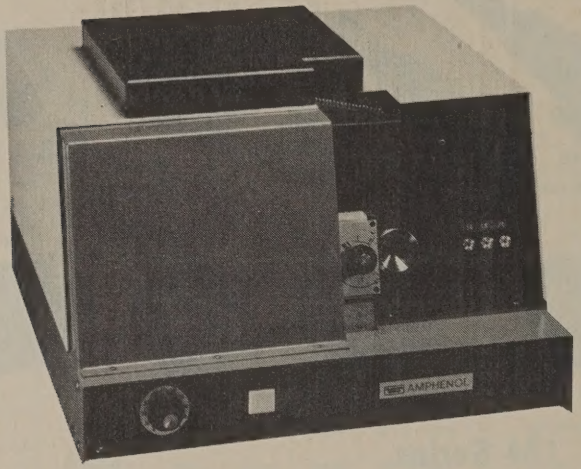
SEMI-AUTOMATIC CRIMPING MACHINES



Amphenol® Vibratory-Feed Crimping Machine for various machined contacts

The fast, easy way to get up to 900 eight-indent crimped terminations per hour.

Amphenol vibratory-feed crimping machines are designed for crimping loose screw-machine contacts used in Amphenol 17/220/221/223 rack-and-panel connectors and Amphenol 118/418/518 circular environmental connectors. Machine handles wire in the 12-30 AWG ranges.

Vibratory-feed mechanism automatically arranges contacts in correct position and feeds them to built-in crimper. Dial knob controls contact flow for delivery at desired production rate. Operator depresses foot pedal to actuate pneumatic crimper.

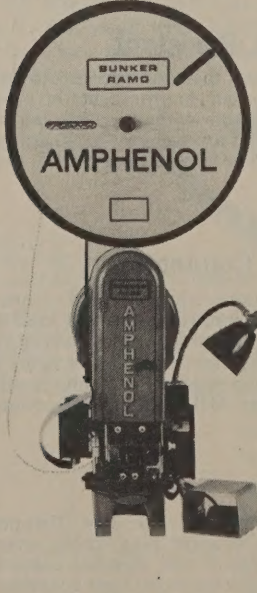
Optional front-end wire stripper accommodates various wire gauges.

Amphenol vibratory-feed crimping machines can be leased or purchased outright. Amphenol field service engineers will supervise installations and train operators.

SPECIFICATIONS

Dimensions: 16 in. W x 10½ in. H x 16 in. L.
Weight: 51 lbs.
Electrical Requirements: 117 VAC.
Air Pressure Requirements: 80-100 psi.
Production Rate: 630 to 900 terminations per hour (depending on operator speed).
Contact Capacity: 500.

Semi-Automatic Reel-Fed Crimping Machine



For various contacts, this crimping machine is similar to those used to crimp wire terminals. It comes with an applicator designed to crimp stamped and formed contacts on a carrier strip. Capable of operating at 1000-1500 terminations per hour, the press firmly attaches contacts onto pre-stripped wire. Use of the reel-fed press and applicator permits even greater economy from low cost stamped and formed contacts.

STRIPPER/CRIMPER MACHINE

Same basic crimping machine can also be provided with stripper attachment to strip and crimp contacts at same speed.

SPECIFICATIONS

Crimping (Stripping) Speed: 1000-1500 termination per hour depending on contact and operator.
Contacts: Stamped and formed contacts of the 17-, 32-, 44-, 220-, and 225- Series.
Wire Sizes: Depending on contacts used, 12-30 AWG.
Connections Required: 110 VAC standard 3 wire grounded supply.
Dimensions: 18″ wide x 24″ deep x 30″ high (with reel 54″ high).
Weight: Approximately 200 lbs.

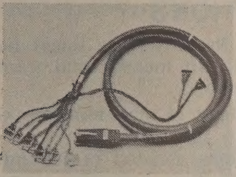
ORDERING INFORMATION

359-2100	Basic Crimp Machine	
359-504	Applicator (Crimper)	17 Series
359-613	Applicator (Stripper/Crimper)	17 Series
359-506	Applicator (Crimper)	32-1416 Series
359-614	Applicator (Stripper/Crimper)	32-1416 Series
359-507	Applicator (Crimper)	32-1620 Series
359-615	Applicator (Stripper/Crimper)	32-1620 Series
359-508	Applicator (Crimper)	32-2230 Series
359-616	Applicator (Stripper/Crimper)	32-2230 Series
359-509	Applicator (Crimper)	225 Series
359-617	Applicator (Stripper/Crimper)	225 Series
359-510	Applicator (Crimper)	44 Series
359-618	Applicator (Stripper/Crimper)	44 Series
359-511	Applicator (Crimper)	220 Series
359-619	Applicator (Stripper/Crimper)	220 Series

The right idea at the right time / **AMPHENOL®** / BUNKER RAMO®

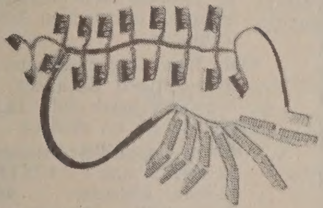
INTERCONNECTION SYSTEMS

Multi-Conductor Cables Commercial/Military



These Amphenol multiconductor cables meet rigidly controlled quality standards at every stage of production. Just before shipment, each cable is again completely tested on custom-modified automatic inspection equipment.

Harness Assembly



We have years of experience in harness manufacturing. One result has been a large accumulation of harness know-how. Many customers come to us for redesign of point-to-point wiring in engineering prototypes; others for high volume production of complex harness systems.

When advanced programs require optimum-reliability intra-unit connections, many defense contractors turn to us for high environmental harness systems.

Electromechanical Assemblies

We can help keep you on schedule and your costs in line. Temporary plant overloads not only delay shipments but also tie up valuable time and material in progress. Extended overtime and decreased efficiency rapidly begin to cut into profits. One way to avoid these problems and stay on schedule is by subcontracting the over-capacity production.

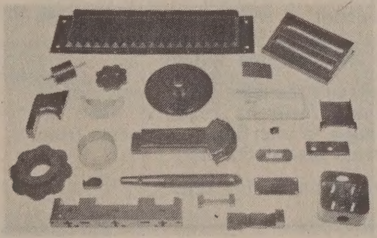
We can quickly absorb short-term plant overloads usually at a price less than in-house cost.

Working closely with a customer's engineering laboratory, our production design people can competently turn engineering models into practical production realities.

Our design recommendations on chassis and printed circuit board layout, harness and cable configurations, molded plastic alternates for costly hardware, and connector and termination approaches have saved many manufacturers expensive trial and error prototype production and redesign.

Custom Molding

POLYSTYRENE • POLYPROPYLENE • POLYCARBONATES • ACETALS • POLY-VINYL-CHLORIDE • POLYETHELENE • NYLONS • ACRILONITRILE-BUTADIENE-STYRENE • NEOPRENE • Others



SEMI-AUTOMATIC WIRE-WRAPPING; AUTOMATIC TEST

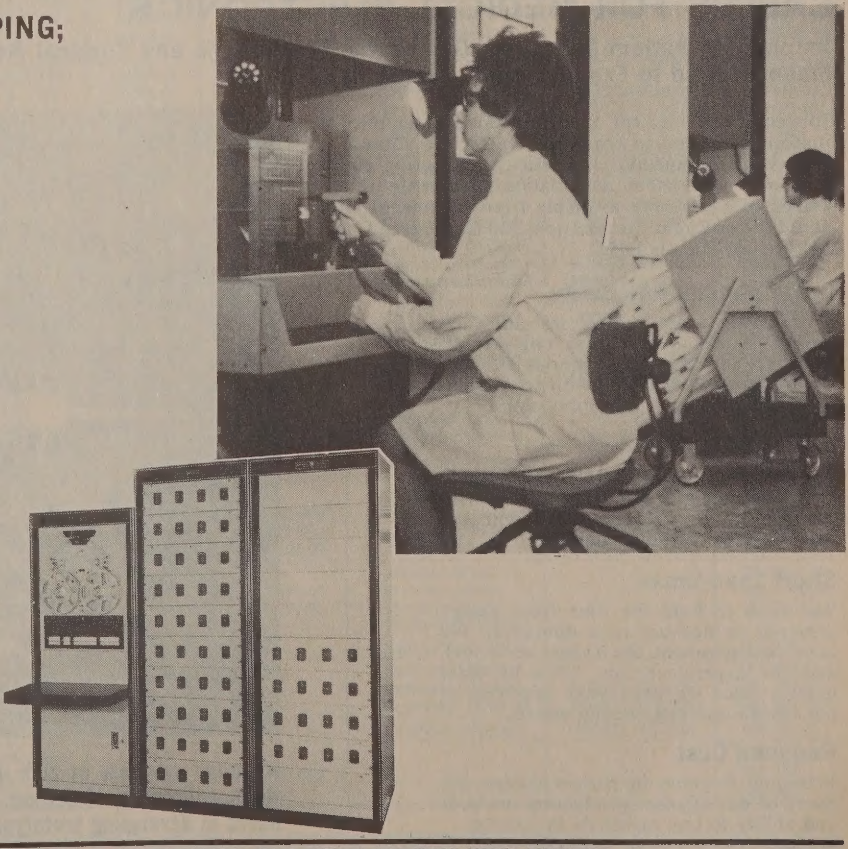
We can handle your complete back-panel wire-wrapping including all inventories right up to and including final inspection. You just have to bolt it in. And you can be sure of a completely tested, 100%-error-free back panel.

All your back panels can be tested with an Omnitester 900 Wiring Analyzer. This unit, pictured here in the center, has forward scan capabilities to determine, for example, whether a missing wire went to some other point. It then identifies that point.

The unit further tests for continuity resistance, insulation resistance, DC hipot, and features programmable dwell time.

All this at a price less than in-house fabrication. No costly inventories, no capital tied to costly equipment. You can furnish the back panels or we can supply our own.

Delivery? Just 2 to 8 weeks, depending on the job and material availability. For more details just call your nearest Amphenol sales office or contact us direct. Amphenol Division, Bunker Ramo Corp. 900 Commerce Drive, Oak Brook, IL 60521.



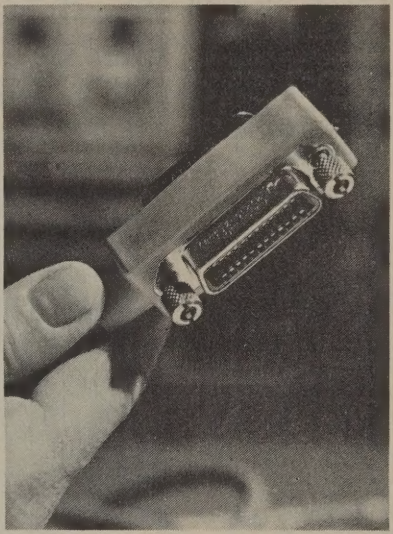
The right idea at the right time / **AMPHENOL®** / BUNKER RAMO®

IEEE STD 488-1975 DIGITAL INTERFACE FOR PROGRAMMABLE INSTRUMENTATION

The Amphenol® 488 Interface Bus Cable Assembly serves systems utilizing a byte-serial, bit-parallel means to transfer data among a group of instruments and systems components. This product is designed as an interdevice for system components in relatively close proximity that are able to communicate over a contiguous party-line bus system.

BENEFITS

- Eliminates the troublesome aspects of assembling an automatic instrumentation system, and provides that critical link between system components.
- Interconnect up to 15 devices (over total distance of 60 feet).
- Provides a convenient method of interconnecting a wide range of products from any number of manufacturers, into an integrated system.
- Eliminates the need for extensive jerry-rigging previously required when attempting to interface components from different manufacturers.
- Minimum assembly time.



Three standard cable lengths, 1, 2, and 4 meter, are available off-the-shelf. Other lengths are available on special order.

The Amphenol 488 Interface Bus Cable Assembly uses 24 conductor cable terminated to 57 Series Micro-Ribbon® Connectors.

SPECIFICATIONS

Interconnection Path: Star or linear bus network up to 20 meters total transmission path length.

Number of Devices: 15 maximum on one continuous bus.

Active Signal Lines: A total of 16 composed of 8 data lines, 3 transfer control lines, and 5 bus management message lines.

Message Transfer Scheme: Byte-serial, bit parallel asynchronous data transfer using an interlocked 3-wire handshake technique.

Data Rate: One megabyte/sec. maximum over limited distances; 250-500 kilobytes/sec. over full transmission path (dependent on device).

Address Capability: Primary addresses — 31 TALK and 31 LISTEN; Secondary (2-byte) addresses — 961 TALK and 961 LISTEN. Maximum of 1 TALKER and up to 14 LISTENERS at one time.

Control Shift: Although systems can have more than one controller, only one can be active at a time. Currently active controller can pass control to another, but only the designated system controller can assume control over others.

Interface Circuits: Driver and receiver circuits are TTL compatible.

CABLES FOR MEDICAL ELECTRONICS

Amphenol® Patient Cables for Diagnostic, Therapeutic and Surgical Needs Manufactured to Exacting High Standards of Quality

Connectorized medical interface cable assemblies — custom designed to transmit electronic signals to diagnostic, therapeutic and patient monitoring equipment without system degradation or loss — are described in a brochure available from Amphenol Division, Bunker Ramo Corporation, 900 Commerce Drive, Oak Brook, Illinois 60521.

Custom-made Reliability

Since patient cables must transmit biomedical signals faithfully for long periods, materials and assembly methods are chosen for proven reliability with strict quality control on every assembly step.

Aesthetic Design

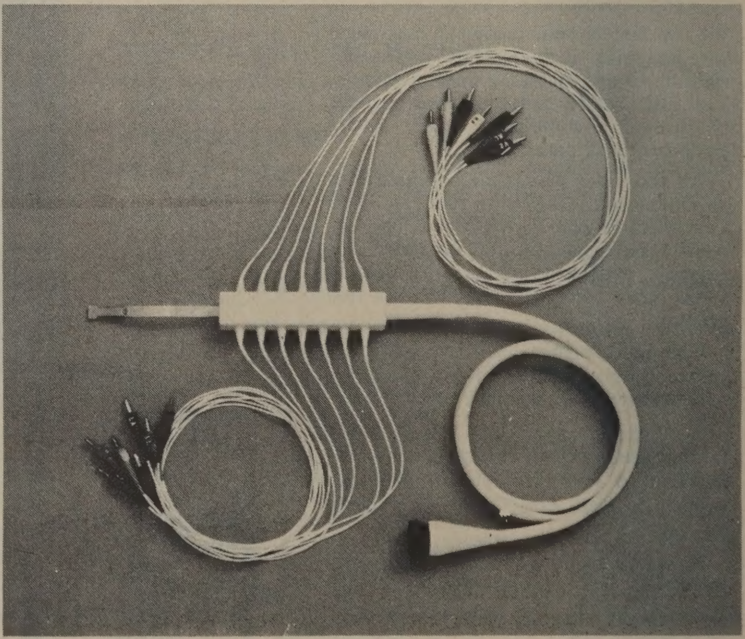
The components, such as junction boxes, are streamlined to give them an unobtrusive look and to blend in well with the overall design of your equipment.

Short Lead-times

We strive to hold the time from design approval to delivery to a minimum. We have the equipment, the trained personnel, and the experience that helps us react quickly once we have your approval of our design and engineering efforts.

Reduced Cost

Economy is yours in patient cables, because of our efficient production methods and ability to buy materials in volume.



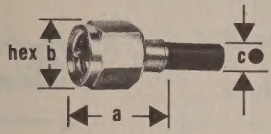
We offer a variety of high quality medical interface cables for diagnostic therapeutic surgical devices. We are ready to assist you with your specific needs in developing prototypes for your evaluation.

The right idea at the right time / **AMPHENOL®** / **BUNKER RAMO®**

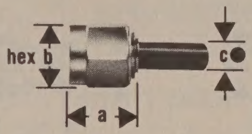
SMA SERIES COAXIAL CONNECTORS

SMA's are 50 ohm semi-precision sub-miniature (3mm), high-frequency (0-18 GHz) connectors with ¼-36 threaded coupling. They meet all MIL-C-39012 requirements for SMA connectors and are available in stainless steel or beryllium copper.

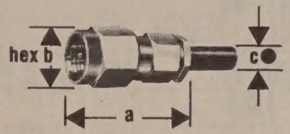
SOLDER TYPE
901-113



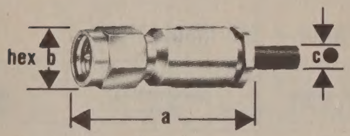
SOLDER TYPE
901-183



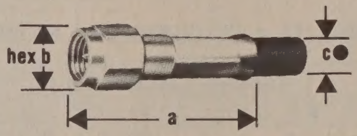
SOLDER TYPE
901-105



CLAMP
901-107



CRIMP
901-101



STRAIGHT PLUGS / MALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Cable RG-/U	Cable Termi-nation	Dimensions, inches(millimeters)			Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
		a	b	c				
.085″ Dia. Semi-Rigid with Contact and Insulator	Solder	43/64(17.1)	5/16(7.9)	.088(2.24)	—	—	—	901-126
	Solder	7/16(11.1)	5/16(7.9)	.088(2.24)	—	—	—	901-339
	Solder	.385(9.8)	5/16(7.9)	.088(2.24)	—	—	—	901-390-1△
	Solder	17/32(13.5)	5/16(7.9)	.088(2.24)	—	—	—	901-390-2△
.141″ Dia. Semi-Rigid Less Contact and Insulator	Solder	1/2(12.7)	5/16(7.9)	.144(3.7)	—	—	—	901-113
	Solder	21/64(8.3)	5/16(7.9)	.144(3.7)	—	Short Skirt	—	901-183△
	Solder	43/64(17.1)	5/16(7.9)	.144(3.7)	—	With Contact and Insulator	—	901-105
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.144(3.7)	—	—	—	901-111
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.144(3.7)	—	—	—	901-107
	Solder	.330(8.4)	5/16(7.9)	.146(3.7)	—	Stainless Steel/ Short Skirt	—	901-9183-1△
55, 58, 141, 142, 223	Clamp	31/32(24.6)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	—	901-103
	Clamp	31/32(24.6)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	M39012/55-4009	901-103-11
	Clamp	31/32(24.6)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	M39012/55-4004	901-103-12
55, 142, 223, 400	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	—	901-101
	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	M39012/55-4022	901-101-11
	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	M39012/55-4015	901-101-12
	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	M39012/55-4023	901-101-13
	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	M39012/55-4016	901-101-14
	Crimp	1 1/32(26.2)	5/16(7.9)	.220(5.6)	227-1221-11	Captivated Contact	M39012/55-4502	901-101-15
58, 141, 303	Crimp	29/32(23.0)	5/16(7.9)	.206(5.2)	227-1221-11	Captivated Contact	—	901-109
	Crimp	29/32(23.0)	5/16(7.9)	.206(5.2)	227-1221-11	Captivated Contact	M39012/55-4021	901-109-11
	Crimp	29/32(23.0)	5/16(7.9)	.206(5.2)	227-1221-11	Captivated Contact	M39012/55-4014	901-109-12
	Crimp	29/32(23.0)	5/16(7.9)	.206(5.2)	227-1221-11	Captivated Contact	M39012/55-4024	901-109-13
	Crimp	29/32(23.0)	5/16(7.9)	.206(5.2)	227-1221-11	Captivated Contact	M39012/55-4017	901-109-14
122	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	—	901-243
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/55-4008	901-243-11
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/55-4003	901-243-12
122, 180, 195	Crimp	1 1/32(26.2)	5/16(7.9)	.175(4.4)	227-1221-09	Captivated Contact	—	901-246
	Crimp	1 1/32(26.2)	5/16(7.9)	.175(4.4)	227-1221-09	Captivated Contact	M39012/55-4020	901-246-11
	Crimp	1 1/32(26.2)	5/16(7.9)	.175(4.4)	227-1221-09	Captivated Contact	M39012/55-4013	901-246-12
174, 188, 316	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	—	901-128
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/55-4007	901-128-11
	Clamp	63/64(25.0)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/55-4002	901-128-12
	Crimp	1.109(28.7)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	—	901-155
	Crimp	1.109(28.7)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	M39012/55-4019	901-155-11
	Crimp	1.109(28.7)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	M39012/55-4012	901-155-12
174, 179, 187, 188, 316	Solder	.690(17.5)	5/16(7.9)	.128(3.3)	—	Stainless Steel	—	901-9501-3
	Crimp	.690(17.5)	5/16(7.9)	.128(3.3)	227-1221-03	Stainless Steel	—	901-9511-3
	Crimp	.705(17.9)	5/16(7.9)	.128(3.3)	227-1221-03	Stainless Steel/ Captivated Contact	—	901-9601-3
178	Clamp	63/64(25.0)	11/32(8.8) Dia.	.078(2.0)	—	Captivated Contact	—	901-281
178, 196	Clamp	1 1/32(26.2)	11/32(8.7)	.078(2.0)	—	Captivated Contact	—	901-242
	Clamp	1 1/32(26.2)	11/32(8.7)	.078(2.0)	—	Captivated Contact	M39012/55-4006	901-242-11
	Clamp	1 1/32(26.2)	11/32(8.7)	.078(2.0)	—	Captivated Contact	M39012/55-4001	901-242-12
178	Crimp	1 1/4(31.8)	.360(9.1) Dia.	.075(1.9)	227-1221-03	Captivated Contact	M39012/55-4018	901-245-11
180, 195	Clamp	63/64(25.0)	11/32(8.8) Dia.	.158(4.0)	—	—	—	901-139
	Crimp	3/4(19.1)	5/16(7.9)	.175(4.4)	227-1221-09	—	—	901-192
303	Clamp	31/32(24.6)	11/32(8.7) Dia.	.178(4.5)	—	—	—	901-282

● Accommodates Cable Diameter
▲ Use with Tool Handle 227-944, Cavity A
△ Preferred Dismountable Coupling Nut Design Allows Precise Trimming After Soldering

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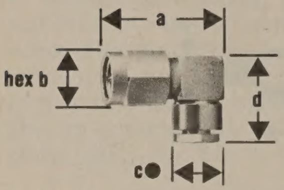
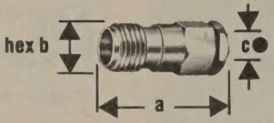
SMA SERIES COAXIAL CONNECTORS (Continued)

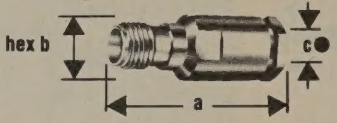
SOLDER TYPE
901-136



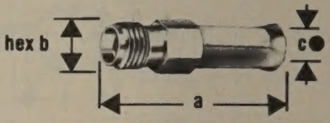
SOLDER TYPE
901-106



CLAMP
901-108



CRIMP
901-102



ANGLE PLUGS / MALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Cable RG-/U	Cable Termination	Dimensions, inches(millimeters) a	b	c	d	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
.085″ Dia. Semi-Rigid	Solder	11/16(17.5)	5/16(7.9)	.088(2.2)	35/64(13.9)	—	—	—	901-136
.141″ Dia. Semi-Rigid	Solder	21/32(16.7)	5/16(7.9)	.144(3.7)	35/64(13.9)	—	—	—	901-142
	Clamp	11/16(17.5)	5/16(7.9)	.144(3.7)	1⅛(28.6)	—	—	—	901-289
55, 58, 141, 142, 223	Clamp	11/16(17.5)	5/16(7.9)	.220(5.6)	⅞(22.2)	—	—	—	901-130
	Clamp	11/16(17.5)	5/16(7.9)	.220(5.6)	⅞(22.2)	—	—	M39012/56-4009	901-130-11
	Clamp	11/16(17.5)	5/16(7.9)	.220(5.6)	⅞(22.2)	—	—	M39012/56-4004	901-130-12
55, 142, 223	Crimp	21/32(16.7)	5/16(7.9)	.220(5.6)	⅞(22.2)	227-1221-11	—	—	901-148
58, 141	Crimp	21/32(16.7)	5/16(7.9)	.206(5.2)	57/64(22.6)	227-1221-11	—	—	901-149
142, 400	Crimp	21/32(16.7)	5/16(7.9)	.220(5.6)	57/64(22.6)	227-1221-11	—	M39012/56-4502	901-148-15
161, 174, 179, 187, 188, 316	Solder	11/16(17.5)	5/16(7.9)	.125(3.2)	¾(19.1)	—	—	—	901-361
174, 188, 316	Clamp	11/16(17.5)	5/16(7.9)	.144(2.9)	51/64(20.2)	—	—	—	901-140
	Clamp	11/16(17.5)	5/16(7.9)	.114(2.9)	49/64(19.6)	—	—	—	901-368
	Clamp	11/16(17.5)	5/16(7.9)	.114(2.9)	49/64(19.6)	—	—	M39012/56-4002	901-368-11
	Clamp	11/16(17.5)	5/16(7.9)	.114(2.9)	49/64(19.6)	—	—	M39012/56-4007	901-368-12
174, 179, 187,	Solder	.675(17.1)	5/16(7.9)	.128(3.3)	.565(14.4)	—	Stainless Steel/ Captivated Contact	—	901-9521-3
188, 316	Crimp	.675(17.1)	5/16(7.9)	.128(3.3)	.600(15.2)	227-1221-03	Stainless Steel/ Captivated Contact	—	901-9531-3
178	Clamp	11/16(17.5)	5/16(7.9)	.078(2.0)	51/64(20.2)	—	—	—	901-287
	Clamp	11/16(17.5)	5/16(7.9)	.078(2.0)	49/64(19.6)	—	—	—	901-367
	Clamp	11/16(17.5)	5/16(7.9)	.078(2.0)	49/64(19.6)	—	—	M39012/56-4006	901-367-11
	Clamp	11/16(17.5)	5/16(7.9)	.078(2.0)	49/64(19.6)	—	—	M39012/56-4001	901-367-12
180, 195	Clamp	11/16(17.5)	5/16(7.9)	.158(4.0)	51/64(20.2)	—	—	—	901-270
303	Clamp	11/16(17.5)	5/16(7.9)	.178(4.5)	⅞(22.2)	—	—	—	901-288

STRAIGHT JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

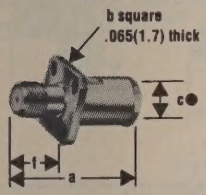
Cable RG-/U	Cable Termination	Dimensions, inches(millimeters) a	b	c	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
.085″ Dia. Semi-Rigid	Solder	41/64(16.3)	¼(6.4)	.088(2.2)	—	—	—	901-127
.141″ Dia. Semi-Rigid	Solder	41/64(16.3)	¼(6.4)	.144(3.7)	—	—	—	901-106
	Clamp	59/64(23.4)	11/32(8.7) Dia.	.144(3.7)	—	—	—	901-108
	Solder	½(12.7)	¼(6.4)	.143(3.7)	—	—	—	901-408
55, 58, 141, 142, 223	Clamp	15/16(23.8)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	—	901-104
	Clamp	15/16(23.8)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	M39012/57-4009	901-104-11
	Clamp	15/16(23.8)	11/32(8.7) Dia.	.219(5.6)	—	Captivated Contact	M39012/57-4004	901-104-12
55, 142, 223	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	—	901-102
	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	M39012/57-4022	901-102-11
	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	M39012/57-4015	901-102-12
	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	M39012/57-4023	901-102-13
	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	M39012/57-4016	901-102-14
58, 141, 303	Crimp	⅞(22.2)	¼(6.4)	.206(5.2)	227-1221-11	Captivated Contact	—	901-110
	Crimp	1(25.4)	¼(6.4)	.206(5.2)	227-1221-11	Captivated Contact	M39012/57-4021	901-110-11
	Crimp	1(25.4)	¼(6.4)	.206(5.2)	227-1221-11	Captivated Contact	M39012/57-4014	901-110-12
	Crimp	1(25.4)	¼(6.4)	.206(5.2)	227-1221-11	Captivated Contact	M39012/57-4024	901-110-13
	Crimp	1(25.4)	¼(6.4)	.206(5.2)	227-1221-11	Captivated Contact	M39012/57-4017	901-110-14
59	Crimp	1(25.4)	¼(6.4)	.261(6.6)	227-1221-13	—	—	901-200
142, 400	Crimp	1(25.4)	¼(6.4)	.220(5.6)	227-1221-11	Captivated Contact	M39012/57-4502	901-102-15
161, 174, 179, 187, 188, 316	Crimp	31/32(24.6)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	—	901-156
	Crimp	31/32(24.6)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	M39012/57-4019	901-156-11
	Crimp	31/32(24.6)	5/16(7.9)	.128(3.3)	227-1221-09	Captivated Contact	M39012/57-4012	901-156-12
174, 179, 187, 188, 316	Crimp	.900(22.9)	5/16(7.9)	.128(3.3)	227-1221-03	Stainless Steel/ Captivated Contact	—	901-9602-3
174, 188, 316	Clamp	15/16(23.8)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	—	901-129
	Clamp	15/16(23.8)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/57-4007	901-129-11
	Clamp	15/16(23.8)	11/32(8.7) Dia.	.114(2.9)	—	Captivated Contact	M39012/57-4002	901-129-12

● Accommodates Cable Diameter

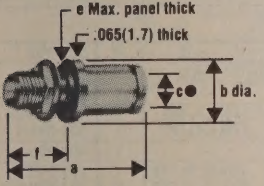
▲ Use with Tool Handle 227-944, Cavity A

SMA SERIES (Continued)

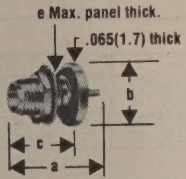
PANEL JACK
901-121



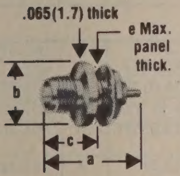
BULKHEAD JACK
901-122



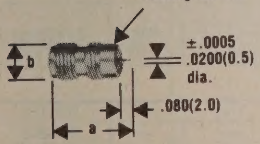
REAR MOUNT
RECEPTACLE 901-116

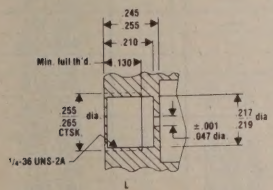


FRONT MOUNT
RECEPTACLE 901-117



SPARK PLUG
901-470





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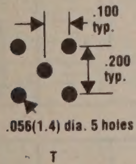

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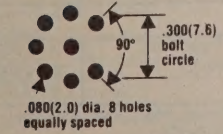

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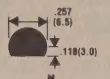

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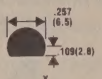

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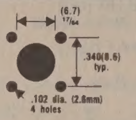

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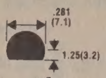

Z

JACKS / FEMALE CONTACTS • REAR MOUNTED • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

PANEL

Cable RG-/U	Termi-nation	Dimensions, inches(millimeters)					Mtg. Hole	Tool Data▲ Die Set P/N	M39012/ Number	Amphenol Number
		a	b	c	e	f				
.085″ Dia. Semi-Rigid	Solder	41/64(16.3)	1/2(12.7)	.088(2.24)	—	.325(8.3)	Y	—	—	901-151
.141″ Dia. Semi-Rigid	Solder	41/64(16.3)	1/2(12.7)	.144(3.7)	—	.325(8.3)	Y	—	—	901-141
	Solder	9/16(14.3)	1/2(12.7)	.144(3.7)	—	.310(7.9)	Y	—	—	901-386
55, 58, 141, 142, 223	Clamp	15/16(23.8)	1/2(12.7)	.219(5.6)	—	.325(8.3)	Y	—	—	901-121
	Clamp	15/16(23.8)	1/2(12.7)	.219(5.6)	—	.325(8.3)	Y	—	58-4009	901-121-11
	Clamp	15/16(23.8)	1/2(12.7)	.219(5.6)	—	.325(8.3)	Y	—	58-4004	901-121-12
55, 142, 223, 400	Crimp	1(25.4)	1/2(12.7)	.220(5.6)	—	.325(8.3)	Y	227-1221-11	—	901-152
	Crimp	1(25.4)	1/2(12.7)	.220(5.6)	—	.325(8.3)	Y	227-1221-11	58-4502	901-152-15
58, 141, 303	Crimp	1(25.4)	1/2(12.7)	.206(5.2)	—	.325(8.3)	Y	227-1221-11	—	901-153
174, 188, 316	Clamp	15/16(23.8)	1/2(12.7)	.114(2.9)	—	.325(8.3)	Y	—	—	901-150
	Clamp	15/16(23.8)	1/2(12.7)	.114(2.9)	—	.325(8.3)	Y	—	58-4007	901-150-11
	Clamp	15/16(23.8)	1/2(12.7)	.114(2.9)	—	.325(8.3)	Y	—	58-4002	901-150-12
180, 195	Clamp	15/16(23.8)	1/2(12.7)	.158(4.0)	—	.325(8.3)	Y	—	—	901-220

BULKHEAD

Cable RG-/U	Termi-nation	Dimensions, inches(millimeters)					Mtg. Hole	Tool Data▲ Die Set P/N	M39012/ Number	Amphenol Number
		a	b	c	e	f				
.085″ Dia. Semi-Rigid	Solder	41/64(16.3)	7/16(11.1)	.088(2.24)	.103(2.6)	.407(10.3)	Z	—	—	901-158
	Solder	57/64(22.6)	3/8(9.5)	.140(3.6)	.140(3.6)	.455(11.6)	X	—	—	901-193
.141″ Dia. Semi-Rigid	Solder	41/64(16.3)	7/16(11.1)	.144(3.7)	.103(2.6)	.407(10.3)	Z	—	—	901-157
	Solder	57/64(22.6)	3/8(9.5)	.144(3.7)	.140(3.6)	.455(11.6)	X	—	—	901-195
	Solder	3/4(19.1)	7/16(11.1)	.143(3.6)	.093(2.4)	.415(10.5)	M	—	—	901-380
	Solder	35/64(13.9)	7/16(11.1)	.143(3.6)	.093(2.4)	.415(10.5)	M	—	—	901-381
	Clamp	59/64(23.4)	7/16(11.1)	.144(3.7)	.103(2.6)	.407(10.3)	Z	—	—	901-159
	Clamp	31/32(24.6)	7/16(11.1)	.144(3.7)	.103(2.6)	.407(10.3)	Z	—	—	901-286
55, 58, 141 142, 223	Clamp	15/16(23.8)	7/16(11.1)	.219(5.6)	.103(2.6)	.407(10.3)	Z	—	—	901-122
	Clamp	15/16(23.8)	.430(11.0)	.219(5.6)	.103(2.6)	.407(10.3)	Z	—	59-4009	901-122-11
	Clamp	15/16(23.8)	.430(11.0)	.219(5.6)	.103(2.6)	.407(10.3)	Z	—	59-4004	901-122-12
55, 142, 223, 400	Crimp	1(25.4)	.437(11.1)	.220(5.6)	.103(2.6)	.407(10.3)	Z	227-1221-11	—	901-291
	Crimp	1(25.4)	.437(11.1)	.220(5.6)	.103(2.6)	.407(10.3)	Z	227-1221-11	59-4502	901-291-15
122	Clamp	15/16(23.8)	.430(11.0)	.168(4.3)	.103(2.6)	.407(10.3)	Z	—	—	901-257
	Clamp	15/16(23.8)	.430(11.0)	.168(4.3)	.103(2.6)	.407(10.3)	Z	—	59-4008	901-257-11
	Clamp	15/16(23.8)	.430(11.0)	.168(4.3)	.103(2.6)	.407(10.3)	Z	—	59-4003	901-275-12
174, 188, 316	Clamp	15/16(23.8)	7/16(11.1)	.114(2.9)	.103(2.6)	.407(10.3)	Z	—	—	901-256
	Clamp	15/16(23.8)	7/16(11.1)	.114(2.9)	.103(2.6)	.407(10.3)	Z	—	59-4007	901-256-11
	Clamp	15/16(23.8)	7/16(11.1)	.114(2.9)	.103(2.6)	.407(10.3)	Z	—	59-4002	901-256-12
178	Clamp	.96(24.6)	.430(11.0)	.078(2.0)	.103(2.6)	.407(10.3)	Z	—	—	901-255
	Clamp	.96(24.6)	.430(11.0)	.078(2.0)	.103(2.6)	.407(10.3)	Z	—	59-4006	901-255-11
	Clamp	.96(24.6)	.430(11.0)	.078(2.0)	.103(2.6)	.407(10.3)	Z	—	59-4001	901-255-12
	Clamp	.96(24.6)	.430(11.0)	.078(2.0)	.103(2.6)	.407(10.3)	Z	—	—	901-283
180, 195	Clamp	21/32(16.7)	7/16(11.1)	.158(4.0)	.103(2.6)	.407(10.3)	Z	—	—	901-284
303	Clamp	15/16(23.8)	7/16(11.1)	.178(4.5)	.103(2.6)	.407(10.3)	Z	—	—	901-285

RECEPTACLES / FEMALE CONTACTS • 50 OHM IMPEDANCE • TFE INSULATION

BULKHEAD

Description	Terminal Style	Dimensions, inches(millimeters)				Mtg. Hole	Military Number	Amphenol Number
		a	b	c	e			
Rear Mounted/Gasket	Solder Cup	21/32(16.8)	7/16(11.1) Dia.	.409(10.4)	.103(2.6)	Z	M39012/61-4001	901-116
Rear Mounted	Solder Cup	21/32(16.8)	7/16(11.1) Dia.	.409(10.4)	.103(2.6)	Z	—	901-134
Rear Mounted	Solder Cup	43/64(17.0)	5/16(7.9) Hex	.429(10.9)	.125(3.2)	X	—	901-190
Rear Mtd./Hermetic Sealed	Spade	21/32(16.8)	7/16(11.1) Dia.	.407(10.4)	.103(2.6)	Z	M39012/62-4001	901-161
Front Mtd./Hermetic Sealed	Spade	11/16(17.5)	7/16(11.1) Dia.	.290(7.4)	.103(2.6)	Z	M39012/62-4002	901-162
Front Mtd./Gasket	Solder Cup	11/16(17.5)	7/16(11.1) Dia.	.290(7.4)	.103(2.6)	Z	M39012/61-4002	901-117
Front or Rear/.050″ Dia.x.084″ Long (1.3x2.1mm) Terminal	Blunt	21/32(16.8)	5/16(7.9) Hex	—	—	1/4-36 thd.	—	901-206
Front or Rear/Hermetic Sealed/.020″ Dia.x.115″ Long (0.5x2.9mm) Terminal	Blunt	5/8(16.0)	5/16(7.9) Hex	—	—	1/4-36 thd.	—	901-233

PRINTED CIRCUIT

Description	Terminal Style	Dimensions, inches(millimeters)				Mtg. Hole	Military Number	Amphenol Number
		a	b	c	e			
Straight/.050″(1.3mm) Dia. Term/.040″(1.0mm) Sq. 4 Legs	P.C. Pins	17/32(13.5)	1/4 Sq.(6.4)	3/8(9.5)	5/32(4.0) long pins	T	—	901-144
Angle/.050″(1.3mm) Dia. Term/.040″(1.0mm) Sq. 4 Legs	P.C. Pins	.585(14.9)	.530(13.5) long inc. legs	3/8(9.5)	5/32(4.0) long pins	T	—	901-143

STRIPLINE LAUNCHERS

Description	Terminal Style	Dimensions, inches(millimeters)				Mtg. Hole	Military Number	Amphenol Number
		a	b	c	e			
Jack for .031″(0.8mm) Thick Board	Turret	.416(10.6)	13/32(10.4)Dia.	.375(9.5)	—	V	—	901-182-1
Jack/Microstrip/1″x.370″ (25.4x9.4mm) Flange	Tab	33/64(13.2)	1(25.4)	5/16(7.9)	—	—	—	901-232
Spark Plug for Mic Pkg./Hermetic Sealed/Use With Torque Tool 901-2450	Blunt	.541(13.7)	1/4-36 Thd.	—	—	L	—	901-470

● Accommodates Cable Diameter

▲ Use with Tool Handle 227-944, Cavity A

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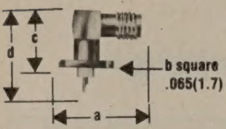
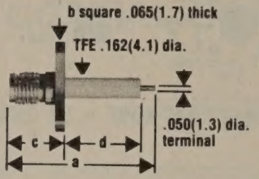
SMA SERIES (Continued)

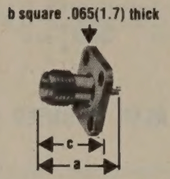
STANDARD ANGLE



EXPOSED TFE & BLUNT TERM FOR SUBSTRATE OR CIRCUIT BOARD



STANDARD TYPE FOR USE WITH WIRE OR CABLE



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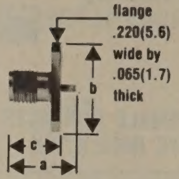
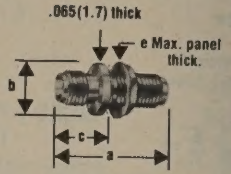


ADAPTER 901-120



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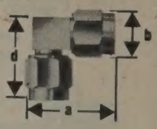

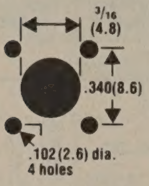

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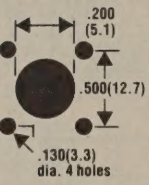

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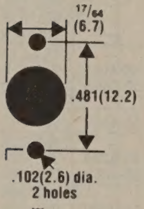

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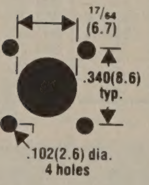

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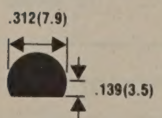
INSTALLATION TOOL 901-2450



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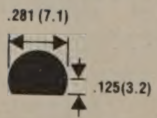


Z

PANEL RECEPTACLES / 50 OHM IMPEDANCE • TFE INSULATION

Description	Terminal Style	Dimensions, inches(millimeters)				Mtg. Hole	Number Amphenol
		a	b	c	d		
JACK MATING / CAPTIVATED FEMALE CONTACT • SQUARE FLANGE							
Std. Type/.025 Wide X .050″ Deep (.64x1.27mm) Slot	Slotted	.440(11.2)	½(12.7)	.390(9.9)	—	Y	901-352
Std. Type/Mil No. 39012/60-4001	Solder Cup	.562(14.3)	½(12.7)	.390(9.9)	—	Y	901-112
Std. Type/Stainless Steel Body/Epoxy Captivation	Solder Cup	.575(14.6)	½(12.7)	.375(9.5)	—	Y	901-9215
TFE Type/Large Flange	Blunt	.620(15.8)	11/16(17.5)	.390(9.9)	.110(2.8) TFE	J	901-349-2
TFE Type/Large Flange	Blunt	.765(19.4)	11/16(17.5)	.390(9.9)	.175(4.4) TFE	J	901-349-1
Std. Type/.035 Wide X .100″ Deep (.89x2.54mm) Slot	Slotted	.781(19.8)	½(12.7)	.390(9.9)	—	Y	901-299
TFE Type	Blunt	.850(12.6)	½(12.7)	.390(9.9)	.430(10.9) TFE	Y	901-298
TFE Type	Blunt	1.080(27.4)	½(12.7)	.375(9.5)	.590(15.0) TFE	Y	901-9204CC
TFE Type/Stainless Steel Body/Epoxy Captivation	Blunt	1.093(27.8)	½(12.7)	.390(9.9)	.590(15.0) TFE	Y	901-176-2
TFE Type/Same as 901-176-2 Except Non-Captivated Contact	Blunt	1.093(27.8)	½(12.7)	.390(9.9)	.590(15.0) TFE	Y	901-176-1
PLUG MATING / CAPTIVATED MALE CONTACT • SQUARE FLANGE							
Standard Type	Tab	.607(15.4)	½(12.7)	.507(12.9	—	K	901-357
TFE Type/Large Flange	Blunt	.537(13.6)	11/16(17.5)	.507(12.9)	.110(2.8) TFE	J	901-378-2
TFE Type/Large Flange	Blunt	.882(22.4)	11/16(17.5)	.507(12.9)	.175(4.4) TFE	J	901-378-1
TFE Type/Stainless Steel Nut & Body/Epoxy Captivation	Blunt	.995(25.3)	½(12.7)	.507(12.9)	.330(8.4) TFE	K	901-9214CC
TFE Type/Stainless Steel Nut & Body/Epoxy Captivation	Blunt	1.573(39.9)	½(12.7)	.507(12.9)	.150(3.8) TFE	K	901-414
STANDARD ANGLES / JACK MATING • SQUARE FLANGE							
Standard Type	Solder Cup	.708(18.0)	½(12.7)	.503(12.8)	.685(17.4)	Y	901-124
TFE Type.093 Dia.x.275″ Long (2.36x 6.99mm) TFE/.015″ (38mm) Thick Tab	Tab	.708(18.0)	½(12.7)	.503(12.8)	.953(24.2)	Y	901-417
TRIM-LINE FLANGE / JACK MATING • CAPTIVATED FEMALE CONTACT							
Standard Type/Non-Captivated Contact	Solder Hole	.375(9.5)	⅝(16.0)	.375(9.5)	—	W	901-371
TFE Type	Solder Cup	.593(15.1)	⅝(16.0)	.390(9.9)	.035(0.9) TFE	W	901-214
TFE Type	Blunt	1.093(27.8)	⅝(16.0)	.390(9.9)	.590(15.0) TFE	W	901-353-2
TFE Type/.025 Wide X .100″ Deep (.64x2.54mm) Slot	Slotted	.640(16.3)	⅝(16.0)	.375(9.5)	.035(0.9) TFE	W	901-213
TFE Type/Same as 901-353-2 Except Non-Captivated Contact	Blunt	1.093(27.8)	⅝(16.0)	.390(9.9)	.590(15.0) TFE	W	901-353-1
.016 Wide X .025″ (Deep) (.41x.64mm) Slot Angle/Male Contact (Plug Mating)/	Slotted	.890(22.6)	⅝(16.0)	.550(14.0)	.620(15.8)	W	901-326

ADAPTERS, CAP & CHAIN, TOOLS, CABLE ASSEMBLIES

Description	Dimensions, inches(millimeters)					Mtg. Hole	Amphenol Number
	a	b	c	d	e		
ADAPTERS / 50 OHM IMPEDANCE • TFE INSULATION							
Straight/Plug-Plug (Long)	57/64(22.6)	5/16(7.9) Hex	—	—	—	—	901-118
Straight/Plug-Plug	⅞(22.2)	5/16(7.9) Hex	—	—	—	—	901-303
Straight/Jack-Jack (Long)	19/32(15.1)	¼(6.4) Dia.	—	—	—	—	901-119
Straight/Jack-Jack	½(12.7)	¼(6.4) Dia.	—	—	—	—	901-302
Straight/Plug-Jack	27/32(21.4)	5/16(7.9) Hex	—	—	—	—	901-276
Angle/Plug-Plug	21/32(16.7)	—	—	21/32(16.7)	—	—	901-274
Angle/Jack-Jack	35/64(13.9)	—	—	35/64(13.9)	—	—	901-275
Angle/Plug-Jack	⅝(15.9)	—	—	39/64(15.5)	—	—	901-304
Angle/Plug-Jack	⅝(15.9)	—	—	9/16(14.3)	—	—	901-125
Bulkhead/Jack-Jack	13/16(20.6)	⅜(9.5) Dia.	.335(8.5)	—	.103(2.6)	Z	901-120
Bulkhead/Jack-Jack (Long)	⅞(22.2)	⅜(9.5) Hex	.303(7.7)	—	.250(6.4)	Z	901-191
Bulkhead/Jack-Jack/ Hermetic Sealed	⅞(22.2)	7/16(11.1) Hex	.565(14.4)	—	.187(4.8)	S	901-160
Tee/Jack-Jack-Jack	1(25.4)	—	—	11/16(17.5)	—	—	901-178
Tee/Plug-Jack-Plug	1⅛(28.6)	—	—	11/16(17.5)	—	—	901-229
Tee/Jack-Plug-Jack	1(25.4)	—	—	¾(19.1)	—	—	901-305
Tee/Plug-Plug-Jack	1.08(27.4)	—	—	.754(19.1)	—	—	901-382
CAP AND CHAIN							
Non-Shorting/Plug/2 (50.8mm) Chain/.130 (3.3mm) Dia. Eyelet	29/64(11.5)	5/16(7.9) Hex	—	—	—	—	901-163

SMA TOOLS

Tool Kit contains recommended jacket and dielectric trim tools for precise cable preparation required to obtain the electrical performance specified. Complete assembly instructions are included.

Tool Kit with jacket and dielectric trim tools (less Taper Tool).	901-2500
Taper Tool for .141(3.5mm) semi-rigid center conductor	901-2400
Torque Tool for 901-470 stripline launcher	901-2450

CABLE ASSEMBLIES

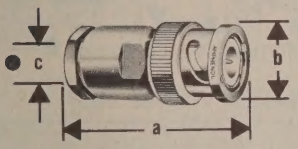
Custom semi-precision cable assemblies are available with .141(3.5mm) and .085(2.2mm) dia. semi-rigid cable fitted with SMA connectors;contact factory with your specifications.

The right idea at the right time / **AMPHENOL®** / BUNKER RAMO®

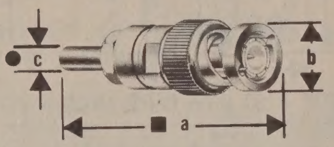
BNC SERIES COAXIAL CONNECTORS

Miniature in size and light in weight, the BNC is characterized by its two-stud quick disconnect bayonet lock coupling arrangement. They function well to 11 GHz and are available in a wide selection of configurations for all popular cables.

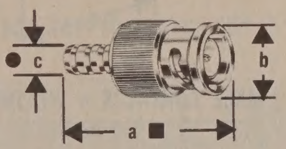
TYPICAL CLAMP & SOLDER TYPE



ORIGINAL-CRIMP



QUICK-CRIMP, MIL-CRIMP & CRIMP-CRIMP



STRAIGHT PLUGS / MALE CONTACTS • 50 OHM IMPEDANCE • WEATHERPROOF • TFE INSULATION

Cable RG-/U	Cannot be Used With	Cable Termination	Dimensions, inches(millimeters) a	b	c	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
8, 9	—	Std. Clamp	1 21/32(42.1)	11/16(17.5)	.437(11.1)	—	"b" dim. is body O.D.	UG-959	6775
6	—	Std. Clamp	1 1/4(31.8)	9/16(14.3)	.348(8.8)	—	Rexolite Insulation	—	9350
59, 62, 71, 140, 210, 302	71	Mil-Crimp II	1 3/32(27.8)	9/16(14.3)	.259(6.6)	227-1221-13	—	M39012/16-0015	31-4321
	71	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.259(6.6)	227-1221-13	—	—	68175
	71	Orig.-Crimp	1 15/32(37.3)	9/16(14.3)	.259(6.6)	227-1221-13	—	—	31-359
	—	Std.-Clamp	1 1/16(27.0)	9/16(14.3)	.259(6.6)	—	Rexolite Insulation	UG-260	31-012
	—	Std.-Clamp	1 1/16(27.0)	9/16(14.3)	.259(6.6)	—	Non-Weatherproof/Rex. Ins.	UG-260A	31-021
	—	Mil-Clamp I	1 3/32(27.8)	9/16(14.3)	.259(6.6)	—	—	UG-260B	31-212
	—	C.C. Clamp II	1 5/32(29.4)	9/16(14.3)	.259(6.6)	—	Captivated Cont.	—	31-304
	—	Mil-Clamp I	1 3/32(27.8)	9/16(14.3)	.259(6.6)	—	Beryl. Outer Cont.	UG-260C	31-2212
	—	Mil-Clamp I	1 3/32(27.8)	9/16(14.3)	.259(6.6)	—	Beryl. Outer Cont.	UG-260D	31-3212
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.259(6.6)	—	75 Ohm	—	86475
	—	Mil-Clamp II	1 3/32(27.8)	9/16(14.3)	.259(6.6)	—	—	M39012/16-0002	31-3302
55, 58, 141, 142, 223, 400	58, 141	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.220(5.6)	227-1221-11	—	—	36875
	58, 141	Crimp-Crimp	1 7/32(31.0)	9/16(14.3)	.220(5.6)	227-1221-11	—	M39012/16-0503	31-4427
	55A, 223	Std.-Clamp	31/32(24.6)	9/16(14.3)	.214(5.5)	—	—	UG-88	31-002
	55A, 223	Std.-Clamp	31/32(24.6)	9/16(14.3)	.214(5.5)	—	—	UG-88A	14525
	55A, 223	Std.-Clamp	1(25.4)	9/16(14.3)	.214(5.5)	—	Female Contact/Polarized	—	14625
	55A, 223	Std.-Clamp	31/32(24.6)	9/16(14.3)	.214(5.5)	—	Non-Weatherproof	UG-88B	31-018
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.214(5.5)	—	—	UG-88C	31-202
	—	C.C Clamp	1 5/32(29.4)	9/16(14.3)	.214(5.5)	—	Capt. Contact	—	31-301
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.214(5.5)	—	Beryl. Outer Cont.	UG-88D	31-2202
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.214(5.5)	—	Beryl. Outer Cont.	UG-88E	31-3202
	—	Mil-Clamp II	1 1/16(27.0)	9/16(14.3)	.214(5.5)	—	—	M39012/16-0001	31-3301
58, 141	—	Mil-Crimp II	1 3/32(27.8)	9/16(14.3)	.206(5.2)	227-1221-11	—	M39012/16-0013	31-4320
	—	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.206(5.2)	227-1221-11	—	—	36775
	—	Orig.-Crimp	1 15/32(37.3)	9/16(14.3)	.206(5.2)	227-1221-11	—	—	31-351
122, 180, 195	180, 195	Crimp-Crimp	1 7/32(31.0)	9/16(14.3)	.175(4.4)	227-1221-09	—	M39012/16-0501	31-4425
	180, 195	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	99575
	122	Crimp-Crimp	1 7/32(31.0)	9/16(14.3)	.175(4.4)	227-1221-09	—	M39012/16-0502	31-4426
	122	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	36650
	180	Mil-Clamp I	1 1/16(27.0)	9/16.14.3)	.175(4.4)	—	—	UG-1033	84975
	—	Mil-Clamp II	1 5/32(29.4)	9/16(14.3)	.175(4.4)	—	—	M39012/16-0003	31-3303
	122, 195	Std. Clamp	1(25.4)	9/16(14.3)	.150(3.8)	—	—	—	16300
.141" Dia. Semi-Rigid	—	Solder Type	1 1/16(27.0)	9/16(14.3)	.144(3.7)	—	—	—	31-4214
174, 179, 187, 188	174, 188	Mil-Crimp I	1 13/64(30.6)	9/16(14.3)	.115(2.9)	227-1221-09	—	—	31-242
	179, 187	Mil-Crimp I	1 13/64(30.6)	9/16(14.3)	.115(2.9)	227-1221-09	—	—	31-315
	—	Orig.-Crimp	1 11/32(34.1)	9/16(14.3	.128(3.3)	227-1221-09	—	—	31-371
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.115(2.9)	—	—	—	69475
178, 196	—	Std.-Clamp	1(25.4)	9/16(14.3)	.094(2.4)	—	—	—	15875
Beldon 8281	—	Quick-Crimp	1 5/16(33.3)	9/16(14.3)	.342(8.7)	—	—	—	31-321-1000
Essex 21-597 or Equiv.	—	Mil-Crimp I	1 13/64(30.6)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	31-325
	—	Quick-Crimp	1 17/64(32.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	99600
WE724A	—	Std. Clamp	1 1/4(31.8)	9/16(14.3)	.328(8.3)	—	—	—	9325
No. 18, 20, 22 H.V. Wire shld. & unshld.	—	Std. Clamp	1(25.4)	9/16(14.3)	.123(3.1)	—	—	—	13925

● Accommodates Cable Diameter
■ Includes Outer Ferrule not Shown on Illustration

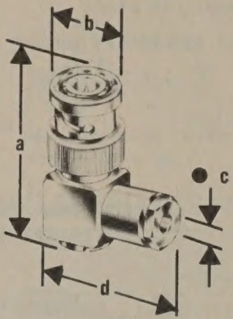
▲ Use with Tool Handle 227-944

The right idea
at the right time

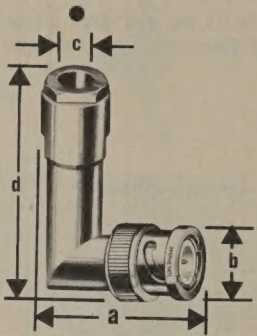
AMPHENOL®

BUNKER RAMO®

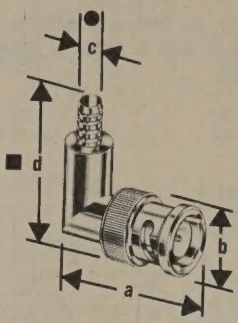
BNC SERIES (Continued)



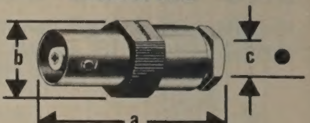
CUBIC BODY



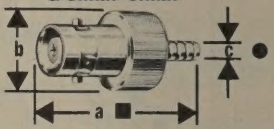
TYPICAL CLAMP & SOLDER TYPE



QUICK-CRIMP, MIL-CRIMP & CRIMP-CRIMP



TYPICAL CLAMP & SOLDER TYPE



QUICK-CRIMP, MIL-CRIMP & CRIMP-CRIMP

ANGLE PLUGS / MALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION • MITRE BODY

Cable RG-/U	Cannot be Used With	Cable Termination	Dimensions, inches(millimeters) a	b	c	d	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
71	180, 195	Crimp-Crimp	1 1/8(28.6)	9/16(14.3)	.175(4.4)	1 9/16(39.7)	227-1221-09	—	M39012/20-0501	31-4444
59, 62, 71, 140, 210	71	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.259(6.6)	1 19/32(40.5)	227-1221-13	—	—	31-336
	71	Quick-Crimp	1 1/8(28.6)	9/16(14.3)	.259(6.6)	1 9/16(39.7)	227-1221-13	—	—	95625
	—	Std.-Clamp	1 1/4(31.6)	9/16(14.3)	.259(6.6)	1 1/32(26.2)	—	Rexolite Ins./Cubic	—	31-850
	—	Std.-Clamp	1 1/4(31.6)	9/16(14.3)	.259(6.6)	1(25.4)	—	Cubic Body	—	8575
	—	Std.-Clamp	29/32(23.0)	9/16(14.3)	.259(6.6)	1 5/32(29.4)	—	Cubic Body	—	33750
	—	Mil-Clamp I	1 1/16(27.0)	9/16(14.3)	.259(6.5)	1 9/16(39.7)	—	—	—	86225
55, 58, 141, 142, 223, 400	58, 141	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.220(5.6)	1 19/32(40.5)	227-1221-11	—	—	31-334
	58, 141	Quick-Crimp	1 1/8(28.6)	9/16(14.3)	.220(5.6)	1 9/16(39.7)	227-1221-11	—	—	95575
	58, 141	Mil-Crimp II	1 3/32(27.8)	9/16(14.3)	.220(5.6)	1 21/32(42.1)	227-1221-11	—	M39012/20-0003	31-3365
	58, 141	Crimp-Crimp	1 1/8(28.6)	9/16(14.3)	.220(5.6)	1 21/32(42.1)	227-1221-11	—	M39012/20-0503	31-4446
	—	Std. Clamp	1 3/32(28.8)	9/16(14.3)	.214(5.5)	.214(5.5)	—	—	UG-913	31-204
	—	Mil-Clamp I	1 3/32(27.8)	9/16(14.3)	.214(5.5)	1 5/8(41.3)	—	Beryl. Outer Cont.	UG-913A	31-2204
	55A, 223	Std. Clamp	1 1/4(31.6)	9/16(14.3)	.214(5.5)	1(25.4)	—	Cubic Body	—	8525
	55A, 223	Std. Clamp	29/32(23.0)	9/16(14.3)	.214(5.5)	1 5/32(29.4)	—	Cubic Body	—	38250
	—	Mil-Clamp II	1 3/32(27.8)	9/16(14.3)	.214(5.5)	1 5/8(41.3)	—	—	M39012/20-0001	31-3361
58, 141	—	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.206(5.2)	1 19/32(40.5)	227-1221-11	—	—	31-335
	—	Quick-Crimp	1 1/8(28.6)	9/16(14.3)	.206(5.2)	1 9/16(39.7)	227-1221-11	—	—	95600
	—	Mil-Crimp II	1 1/8(28.6)	9/16(14.3)	.206(5.2)	1 21/32(42.1)	227-1221-11	—	M39012/20-0002	31-3364
122, 180, 195	180, 195	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.175(4.4)	1 19/32(40.5)	227-1221-09	—	—	31-339
	122	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.175(4.4)	1 19/32(40.5)	227-1221-09	—	—	31-338
	122	Crimp-Crimp	1 1/8(28.6)	9/16(14.3)	.175(4.4)	1 21/32(42.1)	227-1221-09	—	M39012/20-0502	31-4445
	180	Std. Clamp	1 1/4(31.6)	9/16(14.3)	.175(4.5)	1(25.4)	—	Cubic Body	—	33775
	122, 195	Std. Clamp	1 1/4(31.6)	9/16(14.3)	.150(3.8)	1(25.4)	—	Cubic Body	—	16975
.141″ Dia. Semi-Rigid	—	Solder Type	1 1/16(27.0)	9/16(14.3)	.144(3.7)	1 9/16(39.7)	—	—	—	31-4216
174, 179, 187, 188	174, 188	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.115(2.9)	1 19/32(40.5)	227-1221-09	—	—	31-243
	179, 187	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.115(2.9)	1 19/32(40.5)	227-1221-09	—	—	31-316
178, 196	—	Std. Clamp	1 1/4(31.6)	9/16(14.3)	.096(2.4)	1(25.4)	—	Cubic Body	—	21975
Essex 21-597 or Equiv.	—	Mil-Crimp I	1 3/16(30.2)	9/16(14.3)	.175(4.4)	1 19/32(40.5)	227-1221-09	—	—	31-340
	—	Quick-Crimp	1 1/8(28.6)	9/16(14.3)	.175(4.4)	1 9/16(39.7)	227-1221-09	—	—	99650

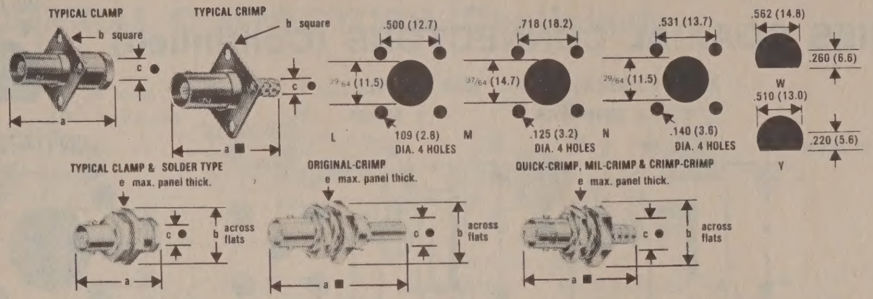
STRAIGHT JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Cable RG-/U	Cannot be Used With	Cable Termination	Dimensions, inches(millimeters) a	b	c	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
59, 62, 71, 140, 210	71	Mil-Crimp II	1 11/64(29.8)	9/16(14.3)	.259(6.6)	227-1221-13	—	M39012/17-0015	31-4328
	71	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.259(6.6)	227-1221-13	—	—	68150
	—	Std. Clamp	1 9/64(29.0)	9/16(14.3)	.259(6.6)	—	70 Ohm	UG-261	31-015
	—	Std. Clamp	1 9/64(29.0)	9/16(14.3)	.259(6.6)	—	Non-Weatherproof/70 Ohm	UG-261A	31-022
	—	Mil-Clamp I	1 9/64(29.0)	9/16(14.3)	.259(6.6)	—	—	UG-261B	31-215
	—	C.C. Clamp II	1 15/64(31.4)	9/16(14.3)	.259(6.6)	—	Captivated Contact	—	31-305
	—	Mil-Clamp I	1 9/64(29.0)	9/16(14.3)	.259(6.6)	—	—	UG-261C	31-2215
	—	Mil-Clamp II	1 9/64(29.0)	9/16(14.3)	.259(6.6)	—	—	M39012/17-0002	31-3320
55, 58, 141, 142 223, 400	55A	Std.-Clamp	1 9/64(29.0)	9/16(14.3)	.214(5.5)	—	—	UG-89	31-005
	55A	Std.-Clamp	1 9/64(29.0)	9/16(14.3)	.214(5.5)	—	Non-Weatherproof	UG-89A	31-019
	—	Mil-Clamp I	1 9/64(29.0)	9/16(14.3)	.214(5.5)	—	—	UG-89B	31-205
	—	C.C. Clamp I	1 15/64(31.4)	9/16(14.3)	.214(5.5)	—	Captivated Contact	—	31-302
	—	Mil-Clamp I	1 9/64(29.0)	9/16(14.3)	.214(5.5)	—	—	UG-89C	31-2205
	—	Mil-Clamp II	1 9/64(29.0)	9/16(14.3)	.214(5.5)	—	—	M39012/17-0001	31-3319
	58, 141	Crimp-Crimp	1(25.4)	7/16(11.1)	.220(5.6)	227-1221-09	—	M39012/17-0503	31-4431
	58, 141	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.220(5.6)	227-1221-11	—	—	36900
58, 141	—	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.206(5.2)	227-1221-11	—	—	36800
	—	Mil-Crimp II	1 11/64(29.8)	9/16(14.3)	.206(5.2)	227-1221-11	—	M39012/17-0013	31-4327
122, 180, 195	180, 195	Crimp-Crimp	1(25.4)	7/16(11.1)	.175(4.4)	227-1221-09	—	M39012/17-0501	31-4429
	180, 195	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	99675
	122	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	36675
	—	Mil-Clamp II	1 9/64(29.0)	9/16(14.3)	.175(4.4)	—	—	M39012/17-003	31-3321
	122, 195	Std.-Clamp	1 5/64(27.4)	9/16(14.3)	.150(3.8)	—	—	—	16925
	122	Crimp-Crimp	1(25.4)	7/16(11.1)	.175(4.4)	227-1221-09	—	M39012/17-0502	31-4430
.141″ Dia. Semi-Rigid	—	Solder Type	1 9/64(29.0)	9/16(14.3)	.144(3.7)	—	—	—	31-4218
174, 179, 187, 188	174, 188	Mil-Crimp I	1 25/64(35.3)	9/16(14.3)	.115(2.9)	227-1221-09	—	—	31244
	179, 187	Mil-Crimp I	1 25/64(35.3)	9/16(14.3)	.115(2.9)	227-1221-09	—	—	31-317
Essex 21-597 or Equiv.	—	Mil-Crimp I	1 25/64(35.3)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	31-332
	—	Quick-Crimp	1 11/32(34.1)	9/16(14.3)	.175(4.4)	227-1221-09	—	—	99700

● Accommodates Cable Diameter ■ Includes Outer Ferrule Not Shown on Illustration ▲ Use with Tool Handle 227-944

The right idea at the right time / AMPHENOL® / BUNKER RAMO®

BNC SERIES (Continued)



PANEL JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • NO. 3-56 TAPPED FLANGE HOLES • FRONT OR REAR MOUNTED • TFE INSULATION

Cable RG-/U	Cannot be Used With	Cable Termination	Dimensions, inches(millimeters) a	b	c	Mtg. Hole	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Numbers
8	—	Std. -Clamp	$1\frac{15}{32}$(37.3)	1(25.4)	.438(11.1)	M	—	.125 Dia. Flange Holes /Rear Mounted Only	—	6750
59, 62, 71, 140, 210	71	Mil-Crimp II	1(25.4)	$\frac{11}{16}$(17.5)	.259(6.6)	L	227-1221-13	—	M39012/18-0015	31-4244
	—	Std. Clamp	1⅛(28.6)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	Rexolite Insulation	UG-262	31-011
	—	Std. Clamp	$1\frac{5}{64}$(27.4)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	Non-Weatherproof/ Rexolite Insulation	UG-262A	31-023
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	—	UG-262B	31-211
	—	C.C. Clamp II	$1\frac{15}{64}$(31.4)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	Captivated Contact	—	31-303
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	—	UG-262C	31-2211
	—	Mil-Clamp II	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.259(6.6)	L	—	—	M39012/18-0001	31-3334
55, 58, 141, 142, 223, 400	55A, 223	Std. Clamp	1⅛(28.6)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	—	UG-291	31-001
	55A, 223	Std. Clamp	$1\frac{5}{64}$(27.4)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	Non-Weatherproof	UG-291A	31-020
	55A, 223	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	—	UG-291B	31-201
	—	C.C. Clamp I	$1\frac{15}{64}$(31.4)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	Captivated Contact	—	31-300
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	—	UG-291C	31-2201
	55A, 223	Std. Clamp	$1\frac{5}{64}$(27.4)	¾(19.1)	.214(5.4)	N	—	.136 Dia. Flange Holes /Rear Mounted Only	UG-90	1300
	—	Mil-Clamp II	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.214(5.4)	L	—	—	M39012/18-0002	31-3333
	58, 141	Mil-Crimp II	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.220(5.6)	L	227-1221-11	—	M39012/18-0014	31-4243
	58, 141	Crimp-Crimp	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.220(5.6)	L	227-1221-11	—	M39012/18-0503	31-4435
58, 141	—	Mil-Crimp II	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.206(5.2)	L	227-1221-11	—	M39012/18-0013	31-4242
122, 180, 195	—	Std. -Clamp	$1\frac{5}{64}$(27.4)	$\frac{11}{64}$(17.5)	.175(4.4)	L	—	Rexolite Insulation	—	164-75
	180, 195	Crimp-Crimp	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.175(4.4)	L	227-1221-09	—	M39012/18-0501	31-4433
	122	Crimp-Crimp	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.175(4.4)	L	227-1221-09	—	M39012/18-0502	31-4434
	—	Mil-Clamp II	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.175(4.4)	L	—	—	M39012/18-0003	31-3335
174, 179, 187, 188	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.117(3.0)	L	—	—	—	86425

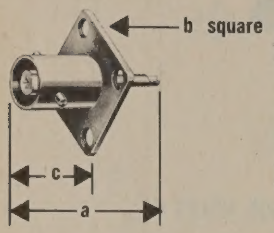
BULKHEAD JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • REAR MOUNTED • TFE INSULATION

Cable RG-/U	Cannot be Used With	Cable Termination	Dimensions, inches(millimeters) a	b	c	e	Mtg. Hole	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Ampheno Number
59, 62, 71, 140, 210	71	Mil-Crimp II	$1\frac{13}{32}$(35.7)	$\frac{11}{16}$(17.5)	.259(6.6)	.125(3.2)	Y	227-1221-13	—	M39012/19-0015	31-4343
	71	Quick-Crimp	$1\frac{5}{16}$(33.3)	$\frac{11}{16}$(17.5)	.259(6.6)	.125(3.2)	Y	227-1221-13	—	—	95750
	71	Orig.-Crimp	$1\frac{19}{32}$(40.5)	$\frac{11}{16}$(17.5)	.259(6.6)	.125(3.2)	Y	227-1221-13	—	—	31-365
	—	Mil-Clamp I	1⅛(28.6)	$\frac{11}{16}$(17.5)	.259(6.6)	.218(5.5)	Y	—	—	UG-910	31-207
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.259(6.6)	.218(5.5)	Y	—	—	UG--910A	31-2207
	—	Mil-Clamp	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.259(6.6)	.218(5.5)	Y	—	—	UG-910B	31-3207
	—	Mil-Clamp II	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.259(6.6)	.218(5.5)	Y	—	—	M39012/19-0002	31-3348
	—	Std.-Clamp	$1\frac{1}{16}$(27.0)	⅝(15.9)	.259(6.6)	.125(3.2)	W	—	Front Mtg./Rex. Ins.	UG-624	2075
	—	Std.-Clamp	$1\frac{5}{64}$(27.4)	⅝(15.9)	.259(6.6)	.125(3.2)	W	—	Rexolite Insulation	—	2675
55, 58, 141, 142, 223, 400	55A, 223	Mil-Clamp I	1⅛(28.6)	$\frac{11}{16}$(17.5)	.214(5.4)	.218(5.5)	Y	—	—	UG-909	31-206
	55A, 223	Std. Clamp	$1\frac{1}{16}$(27.0)	⅝(15.9)	.214(5.4)	.125(3.2)	W	—	Front Mounting	—	2475
	55A, 223	Std. Clamp	$1\frac{5}{64}$(27.4)	⅝(15.9)	.214(5.4)	.125(3.2)	W	—	—	—	2575
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.214(5.4)	.218(5.5)	Y	—	—	UG-909A	31-2206
	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	¾(19.1)	.214(5.4)	.218(5.5)	Y	—	—	UG-909B	31-3206
	—	Mil-Clamp I	$1\frac{49}{64}$(44.8)	⅝(15.9)	.214(5.4)	.156(4.0)	Y	—	Herm. Sealed	—	17725
	—	Mil-Clamp II	$1\frac{11}{64}$(29.8)	$\frac{11}{16}$(17.5)	.214(5.4)	.218(5.5)	Y	—	—	M39012/19-0001	31-3347
55, 142, 223 400	—	Crimp-Crimp	$1\frac{13}{32}$(35.7)	$\frac{11}{16}$(17.5)	.220(5.6)	.218(5.5)	Y	227-1221-11	—	M39012/19-0503	31-4439
	—	Quick-Crimp	$1\frac{5}{16}$(33.3)	$\frac{11}{16}$(17.5)	.220(5.6)	.125(3.2)	Y	227-1221-11	—	—	95700
	—	Orig.-Crimp	$1\frac{19}{32}$(40.5)	$\frac{11}{16}$(17.5)	.220(5.6)	.125(3.2)	Y	227-1221-11	—	—	31-357
58, 141	—	Mil-Crimp II	$1\frac{13}{32}$(35.7)	$\frac{11}{16}$(17.5)	.206(5.2)	.218(5.5)	Y	227-1221-11	—	M39012/19-0013	31-4342
	—	Quick-Crimp	$1\frac{5}{16}$(33.3)	$\frac{11}{16}$(17.5)	.206(5.2)	.125(3.2)	Y	227-1221-11	—	—	95725
	—	Orig. Crimp	$1\frac{19}{32}$(40.5)	$\frac{11}{16}$(17.5)	.206(5.2)	.125(3.2)	Y	227-1221-11	—	—	31-358
122, 180, 195	122	Crimp-Crimp	$1\frac{13}{32}$(35.7)	$\frac{11}{16}$(17.5)	.175(4.4)	.218(5.5)	Y	227-1221-09	—	M39012/19-0502	31-4438
	122	Quick-Crimp	$1\frac{5}{16}$(33.3)	$\frac{11}{16}$(17.5)	.175(4.4)	.125(3.2)	Y	227-1221-09	—	—	95800
	180, 195	Crimp-Crimp	$1\frac{13}{32}$(35.7)	$\frac{11}{16}$(17.5)	.175(4.4)	.218(5.5)	Y	227-1221-09	—	M39012/19-0501	31-4437
	—	Orig. Crimp	$1\frac{19}{32}$(40.5)	$\frac{11}{16}$(17.5)	.175(4.4)	.125(3.2)	Y	227-1221-09	—	—	31-372
.141″ Dia. Semi-Rigid	—	Solder-Type	1⅛(28.6)	$\frac{11}{16}$(17.5)	.144(3.7)	.125(3.2)	Y	—	—	—	31-4220
174, 179, 187, 188	174, 188	Mil-Crimp I	1⅜(34.9)	$\frac{11}{16}$(17.5)	.115(2.9)	.125(3.2)	Y	227-1221-09	—	—	31-245
	179, 187	Mil-Crimp I	1⅜(34.9)	$\frac{11}{16}$(17.5)	.115(2.9)	.125(3.2)	Y	227-1221-09	—	—	31-318
	—	Orig. Crimp	$1\frac{15}{32}$(37.3)	$\frac{11}{16}$(17.5)	.128(3.3)	.125(3.2)	Y	227-1221-09	—	—	31-369
	—	Std. Clamp	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.115(2.9)	.250(6.4)	Y	—	—	—	86350
179	179A, B	Std. Clamp	$1\frac{5}{64}$(27.4)	⅝(15.9)	.094(2.4)	.125(3.2)	W	—	Front Mounting	—	17825
178, 196	—	Mil-Clamp I	$1\frac{9}{64}$(29.0)	$\frac{11}{16}$(17.5)	.098(2.5)	.250(6.4)	Y	—	—	—	86850
Essex 21-597 or Equiv.	—	Mil-Crimp I	1⅜(34.9)	$\frac{11}{16}$(17.5)	.175(4.4)	.125(3.2)	Y	227-1221-09	—	—	31-347
	—	Quick-Crimp	$1\frac{5}{16}$(33.3)	$\frac{11}{16}$(17.5)	.175(4.4)	.125(3.2)	Y	227-1221-09	—	—	99750

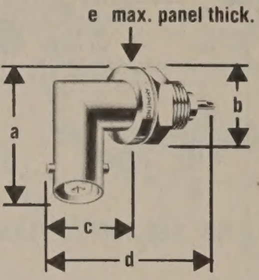
● Accommodates Cable Diameter ■ Includes Outer Ferrule Not Shown on Illustration ▲ Use with Tool Handle 227-944

BNC SERIES COAXIAL CONNECTORS (Continued)

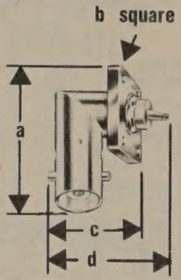
PANEL

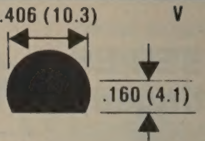


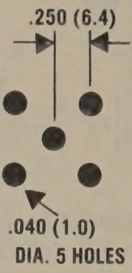
ANGLE BULKHEAD

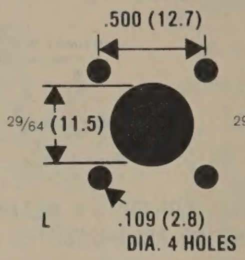


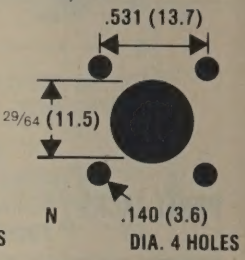
ANGLE PANEL



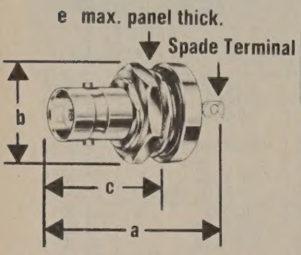




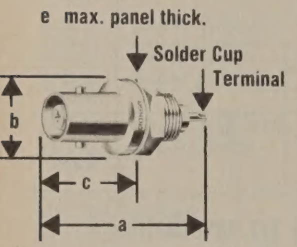


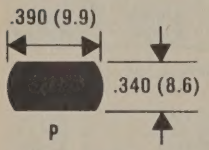


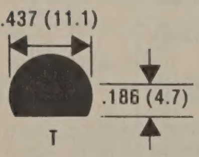
REAR MOUNT

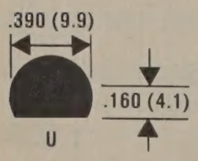


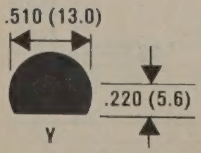
FRONT MOUNT











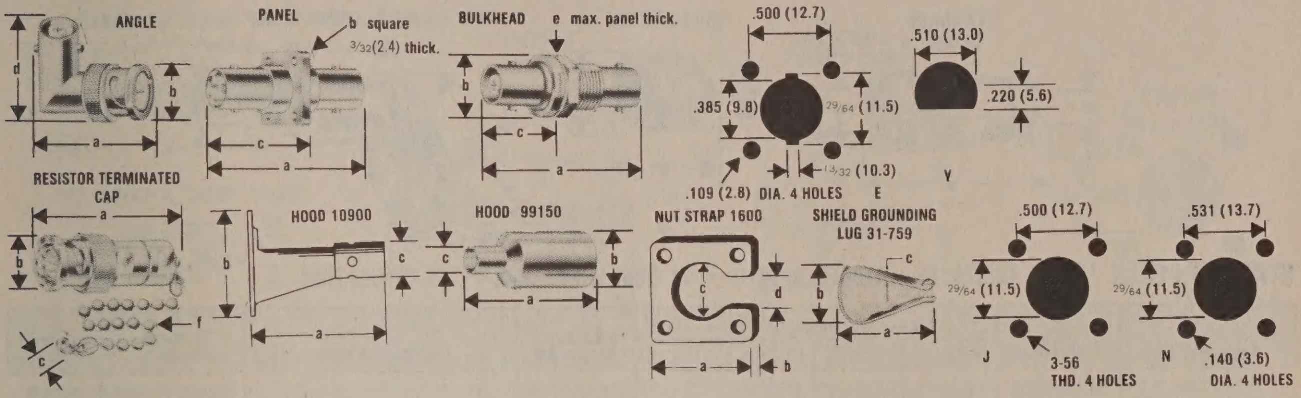
RECEPTACLES / FEMALE CONTACTS • 50 OHM IMPEDANCE • TFE INSULATION

Description	Terminal Style	Dimensions, inches(millimeters) a	b	c	d	e	Mtg. Hole	Military Number	Amphenol Number
PANEL									
Printed Circuit Pins, .040″ Dia. by 1/8″ Long	P.C. Pins	49/64(19.4)	11/16(17.5)	41/64(16.3)	—	—	I	—	18225
No. 3-56 Tapped Flange Holes	Solder Cup	1 1/16(27.0)	11/16(17.5)	23/32(18.3)	—	—	L	M39012/ 22-0001	31-3377
No. 3-56 Tapped Flange Holes	Solder Cup	1 1/16(27.0)	11/16(17.5)	23/32(18.3)	—	—	L	UG-290A	31-203
No. 3-56 Tapped Flange Holes	Solder Cup	1 1/16(27.0)	11/16(17.5)	23/32(18.3)	—	—	L	UG-290	31-003
No. 3-56 Tapped Flange Holes	Solder Cup	1 1/32(26.2)	11/16(17.5)	23/32(18.3)	—	—	L	—	31-842
.109″ Dia. Flange Holes, Rexolite Insulation	Solder Cup	1 1/32(26.2)	11/16(17.5)	23/32(18.3)	—	—	L	UG-447	31-817
.120″ Dia. Flange Holes, Rexolite Insulation	Solder Cup	1 1/32(26.2)	11/16(17.5)	23/32(18.3)	—	—	L	—	31-105
.136″ Dia. Flange Holes Rexolite Insulation	Turret	1 5/64(27.4)	3/4(19.1)	39/64(15.5)	—	—	N	UG-185	4500
.136″ Dia. Flange Holes Rexolite Insulation	Spade	27/32(21.4)	3/4(19.1)	19/32(14.2)	—	—	N	UG-928	1100
.140″ Dia. Flange Holes, Polystyrene Insulation	Turret	1 15/32(37.3)	3/4(19.1)	43/64(17.1)	—	—	N	—	31-104
Plug Mating Face (Male Contact), .136″ Dia. Flange Holes	Solder Cup	1 1/4(31.8)	3/4(19.1)	55/64(21.8)	—	—	N	—	3150
ANGLE									
No. 3-56 Tapped Flange Holes	Solder Cup	1 1/16(27.0)	11/16(17.5)	3/4(19.1)	15/16(23.8)	—	L	—	5075
.136″ Dia. Flange Holes	Solder Cup	1 3/32(27.8)	3/4(19.1)	3/4(19.1)	15/16(23.8)	—	N	UG-535	5675
Front Mount Bulkhead, External Toothed Lockwasher	Solder Cup	29/32(23.0)	19/32(15.1)	3/4(19.1)	1 9/32(32.5)	.156(4.0)	V	UG-1098	31-222☐
Front Mount Bulkhead, Thick Panel, External Toothed Lockwasher	Solder Cup	29/32(23.0)	19/32(15.1)	3/4(19.1)	1 3/8(34.9)	.312(7.9)	V	UG-1098A	31-2222☐
BULKHEAD / FRONT MOUNT • INTERNAL TOOTH LOCKWASHER									
Isolated from Panel, White Molded Thermo Plastic Insulation	Solder Cup	1 3/16(30.2)	1/2(12.7)	31/64(12.3)	—	.187(4.8)	U	—	31-010
Gold Plated Contact	Solder Cup	1 3/16(30.2)	1/2(12.7)	31/64(12.3)	—	.250(6.4)	U	M39012/ 21-0002	31-3376☐
Standard Type	Solder Cup	1 3/16(30.2)	1/2(12.7)	31/64(12.3)	—	.250(6.4)	U	UG-1094A	31-2221☐
Thin Panel	Solder Cup	1 1/16(27.0)	1/2(12.7)	31/64(12.3)	—	.125(3.2)	U	UG-1094	31-221☐
Gold Plated Contact	Solder Cup	1 1/16(27.0)	1/2(12.7)	15/32(11.9)	—	.156(4.0)	T	M39012/ 21-0001	31-3375☐
Standard Type	Solder Cup	1 1/16(27.0)	1/2(12.7)	15/32(11.9)	—	.156(4.0)	T	UG-625B	31-236☐
Standard Type	Solder Cup	1 1/16(27.0)	1/2(12.7)	15/32(11.9)	—	.156(4.0)	T	UG-625	5575☐
Standard Type	Solder Cup	1 1/32(26.2)	1/2(12.7)	1/2(12.7)	—	.156(4.0)	T	—	11300☐
Polarized, Male Contact	Solder Cup	1 1/32(26.2)	1/2(12.7)	1/2(12.7)	—	.156(4.0)	T	—	11325☐
Pressurized	Solder Cup	1 19/64(32.9)	37/64(14.7)	19/32(15.1)	—	.250(6.4)	P	UG-657A	31-239☐
Pressurized	Solder Cup	1 19/64(32.9)	37/64(14.7)	19/32(15.1)	—	.250(6.4)	P	UG-657	31-102☐
Hermetic Sealed, Gold Plated Contact	Spade	1 13/64(30.6)	19/32(14.2)	33/64(13.1)	—	.250(6.4)	U	M39012/ 24-0002	31-4238☐
Hermetic Sealed, External Tooth Lockwasher	Spade	1 13/64(30.6)	19/32(14.2)	33/64(13.1)	—	.250(6.4)	U	UG-912	31-238☐
Hermetic Sealed	Spade	1 13/32(35.7)	3/4(19.1)	5/8(15.9)	—	.312(7.9)	P	—	87225☐
Plug Mating Face, Male Contact Hermetic Sealed	Spade	1 13/32(35.7)	9/16(14.3)	7/8(22.2)	—	.156(4.0)	U	—	86250☐
Hermetic Sealed, Gold Plated Contact, Rear Mt.	Spade	1 11/32(34.1)	11/16(17.5)	53/64(21.0)	—	.250(6.4)	Y	M39012/ 24-0001	31-4237
Pressurized, External Tooth Lockwasher, Rear Mt.	Solder Cup	1 15/32(37.3)	13/16(20.6)	53/64(21.0)	—	.250(6.4)	.516 Dia.	UG-254A	31-016

☐ To Ground Cable Shield Use Lug P/N 31-759

The right idea at the right time / **AMPHENOL®** / **BUNKER RAMO®**

BNC SERIES COAXIAL CONNECTORS (Continued)



ADAPTERS / 50 OHM IMPEDANCE • TFE INSULATION

Construction	Adapter Ends	Dimensions, inches(millimeters) a	b	c	d	e	Mtg. Hole	Construction Notes	Military Number	Amphenol Number
STRAIGHT	Plug-Plug	1¼(31.8)	9/16(14.3)	—	—	—	—	—	UG-491A	31-218
	Plug-Plug	1¼(31.8)	9/16(14.3)	—	—	—	—	Beryl. Outer Contact	UG-491B	31-2218
	Jack-Jack	1 9/32(32.5)	7/16(11.1)	—	—	—	—	—	UG-914	31-219
	Plug-Plug	1¼(31.8)	9/16(14.3)	—	—	—	—	—	UG-491	8425
	Jack-Plug	1 17/32(38.9)	9/16(14.3)	—	—	—	—	—	—	21925
ANGLE	Jack-Plug	1(25.4)	9/16(14.3)	—	31/32(24.6)	—	—	—	UG-306	31-009
	Jack-Plug	1 1/16(27.0)	9/16(14.3)	—	57/64(22.6)	—	—	Beryl. Outer Contact	UG-306A	31-209
	Jack-Plug	1 1/16(27.0)	9/16(14.3)	—	57/64(22.6)	—	—	Beryl. Outer Contact	UG-306B	31-2209
PANEL	Jack-Jack	1 9/32(32.5)	11/16(17.5)	19/32(15.1)	—	.250(6.4)	E	3-56 Tapped Flange Holes	UG-414	47000
	Jack-Jack	1 9/32(32.5)	11/16(17.5)	11/16(17.5)	—	.187(4.8)	E	3-56 Tapped Flange Holes	UG-414A	47025
BULKHEAD	Jack-Jack	1 13/32(35.7)	11/16(17.5)	43/64(17.0)	—	.187(4.8)	Y	Herm. Sealed/Glass-TFE Insul./ Internal Lockwasher Teeth	UG-492A	31-220
	Jack-Jack	1 25/64(35.3)	11/16(17.5)	43/64(17.0)	—	.156(4.0)	Y	Herm. Sealed/Glass-TFE Insul./ External Lockwasher Teeth	UG-492B	31-2220
	Jack-Jack	1 17/32(38.9)	11/16(17.5)	43/64(17.0)	—	.281(7.1)	Y	Herm. Sealed/Glass-TFE Insul./ External Lockwasher Teeth/ Thick Panel	UG-492D	31-3220
	Jack-Jack	1 13/32(35.7)	11/16(17.5)	43/64(17.0)	—	.187(4.8)	Y	Standard Type/Internal Lockwasher Teeth	—	4525
TEE	Jack-Plug-Jack	1 9/32(32.5)	9/16(14.3)	—	1 3/32(27.8)	—	—	Rexolite Insulation	UG-274	31-008
	Jack-Plug-Jack	1 9/32(32.5)	9/16(14.3)	—	1 1/16(27.0)	—	—	Beryl. Outer Contact	UG-274A	31-208
	Jack-Plug-Jack	1 9/32(32.5)	9/16(14.3)	—	1 1/16(27.0)	—	—	Beryl. Outer Contact	UG-274B	31-2208
	Plug-Plug-Plug	1 13/16(46.0)	9/16(14.3)	—	1 7/32(31.0)	—	—	—	—	4725
	Jack-Jack-Jack	1 9/32(32.5)	11/16(17.5)	11/16(17.5)	1 7/16(36.5)	.281(7.1)	E	Panel Mount/3-56 Tapped Flange Holes/Rexolite Insul.	—	17450
	Plug-Jack-Jack	1 17/32(38.9)	⅜(9.6)	—	1(25.4)	—	—	—	—	21900
	Plug-Jack-Plug	1 13/16(46.0)	7/16(11.1)	—	1 3/16(30.2)	—	—	—	—	27750
	Cable-Plug-Cable	1¾(44.5)	9/16(14.3)	—	29/32(23.0)	—	—	RG-58/U Cable/Standard Clamp	—	33725

CAPS AND ACCESSORIES

Construction	Description	Dimensions, inches(millimeters) a	b	c	d	f	Mtg. Hole	Military Number	Amphenol Number
Resistor Terminated Caps ° Male Contacts ° Weatherproof ° Tfe Insulation	Rexolite Insulation/100 Ohm	1¼(31.8)	9/16(14.3)	.144(3.7)	—	3½(88.9)	—	MX-554	4700☐
	100 Ohm	1¼(31.8)	9/16(14.3)	.144(3.7)	—	3½(88.9)	—	MX-554A	39575
	—	1¼(31.8)	9/16(14.3)	.144(3.7)	—	3½(88.9)	—	—	35650☐
	—	1 13/64(30.6)	9/16(14.3)	—	—	—	—	—	35725☐
	Rexolite Insulation	1 9/64(29.0)	9/16(14.3)	—	—	—	—	—	40750☐
	51 or 75 Ohm 1 Watt Resistor	1½(38.1)	9/16(14.3)	—	—	—	—	—	46650☐
Male Caps ° Weatherproof	Shorting Male Contact	11/16(17.5)	9/16(14.3)	.144(3.7)	—	2¼(57.2)	—	CW-159	31-017
	Shorting Male Contact	11/16(17.5)	9/16(14.3)	.144(3.7)	—	2½(63.5)	—	M39012/25-0016	31-3017
	Shorting Male Contact	19/32(15.1)	9/16(14.3)	—	—	—	—	—	5275
	Solder Lug	23/32(18.3)	9/16(14.3)	.510(13.0)	—	2½(63.5)	—	—	87300
	—	23/32(18.3)	9/16(14.3)	.375(9.5)	—	3½(88.9)	—	—	900
	—	11/16(17.5)	9/16(14.3)	.142(3.6)	—	2¼(57.2)	—	CW-123	31-006
	—	45/64(17.9)	9/16(14.3)	.130(3.3)	—	2¼(57.2)	—	M39012/25-0006	31-026
	—	37/64(14.7)	9/16(14.3)	—	—	—	—	CW-155	31-007
	—	37/64(14.7)	9/16(14.3)	—	—	—	—	CW-155A	31-027
	—	37/64(14.7)	9/16(14.3)	—	—	—	—	M39012/25-0015	31-3207
Female Caps ° Weatherproof	—	11/16(17.5)	½(12.7)	.281(7.1)	—	3¼(82.6)	—	M39012/25-0008	31-3210
	—	25/32(19.8)	9/16(14.3)	—	—	—	—	—	1750
Accessories ° Non-Weatherproof	Hood with Square Flange for use with RG-55, 58/U Cable	⅞(22.2)	11/16(17.5)	7/32(5.6)	—	—	J	MX-195	10900
	Hood for use with RG-55, 58, 59, 62, 71, 223/U Cable	13/16(20.6)	11/32(8.7)	3/16(4.7)	—	—	—	M39012/25-0010	99150
	Nut Strap, 4 Holes with 4-40 NC-23 Threads	¾sq.(19.1)	.081(2.1)	7/16(11.1)	.200(5.1)	—	N	MT-412	1600
	Shield Grounding Lug Used on Front Mount Receptacles as Shown	29/32(23.0)	37/64(14.7)	⅛(3.2)	—	—	—	—	31-759

☐ To order without resistor, add -1 to part number; to order with resistor, add resistor value to part number. ½Watt 5% resistor values (ohms) stocked: 47, 51, 68, 75, 82, 91, 100, 120, 130, 150, 180, 240, 270, 300, 470, 510, 560, 680, 750, 820, 1000, 1500, 3900, 4700, 10000, 100000, 150000.

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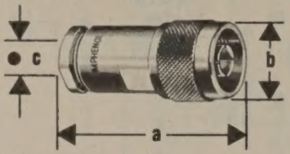
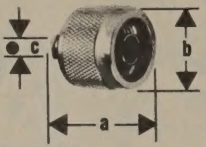
N SERIES COAXIAL CONNECTORS

Series N connectors are medium size weatherproof, threaded coupling units with a frequency limit of 11 GHz. They have a peak voltage rating of 1500 volts and are impedance matched to either 50 or 70 ohm cables as listed. Cable affixment methods include crimp, clamp and solder-type.

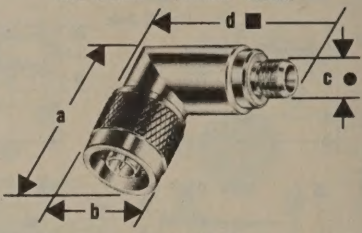
STANDARD CLAMP



SOLDER-TYPE



MIL-CRIMP & CRIMP-CRIMP



STRAIGHT PLUGS / MALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Cable RG-/U△	Cable Termination	Dimensions, inches(millimeters) a	b	c	d	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
5, 21, 143, 212, 222	Mil-Crimp II	1 29/64(36.9)	13/16(20.6)	.342(8.7)	—	227-1221-29	—	M39012/01-0016	82-4341
	Std. -Clamp	2(50.8)	¾(19.1)	.357(9.1)	—	—	Non-Weatherproof/ Copolymer of Styrene Insulation	UG-18	3400
	Std. -Clamp	1⅞(47.6)	13/16(20.6)	.357(9.1)	—	—	Modified Clamp	UG-18B	82-86
	Mil-Clamp I	1½(38.1)	25/32(19.8)	.347(8.8)	—	—	—	UG-18C	82-203
	Mil-Clamp I	1½(38.1)	13/16(20.6)	.347(8.8)	—	—	Safety Wiring	UG-18D	82-3202
6	Std. -Clamp	1¾(44.5)	13/16(20.6)	.357(9.1)	—	—	70 Ohm Impedance	UG-91A	7200
8, 9, 213, 214	Std. -Clamp	2(50.8)	¾(19.1)	.444(11.3)	—	—	Copolymer of Styrene Insulation	UG-21	3900
8, 9, 213, 214, 225	Std. -Clamp	1⅞(47.6)	13/16(20.6)	.444(11.3)	—	—	Modified Clamp	UG-21B	82-61
	Mil-Clamp I	1⅞(47.6)	13/16(20.6)	.444(11.3)	—	—	—	UG-21C	82-96
	Mil-Clamp I	1½(38.1)	25/32(19.8)	.444(11.3)	—	—	Safety Wiring	UG-21D	82-202
	Mil-Clamp I	1½(38.1)	13/16(20.6)	.444(11.3)	—	—	Safety Wiring	UG-21E	82-3202
	C.C. Clamp	1½(38.1)	25/32(19.8)	.444(11.3)	—	—	Captivated Contact	UG-1185	82-312
	C.C. Clamp	1½(38.1)	25/32(19.8)	.444(11.3)	—	—	Captivated Contact	UG-1185A	82-3312
	Mil-Clamp II	1 35/64(39.3)	13/16(20.6)	.444(11.3)	—	—	Captivated Contact	M39012/01-0005	82-4352
	Mil-Clamp II	1 35/64(39.3)	13/16(20.6)	.444(11.3)	—	—	—	M39012/01-0002	82-4352-1
10, 12, 116, 215, 227	Mil-Clamp I	2⅛(54.0)	13/16(20.6)	.511(13.0)	—	—	Armor Clamp	UG-941A	82-204
	Mil-Clamp I	2⅛(54.0)	13/16(20.6)	.511(13.0)	—	—	Armor Clamp	UG-941B	82-3204
11, 149	Mil-Crimp II	1 31/64(37.7)	13/16(20.6)	.418(10.6)	—	227-1221-25	Safety Wiring/Captivated Contact	M39012/01-0013	82-342
11, 13, 149, 216	Std. -Clamp	1⅞(47.6)	13/16(20.6)	.444(11.3)	—	—	70 Ohm Impedance	UG-94A	82-84
	Mil-Clamp I	1½(38.1)	13/16(20.6)	.444(11.3)	—	—	70 Ohm Impedance	—	91150
14, 217	Std.-Clamp	2(50.8)	1(25.4)	.557(14.1)	—	—	Copolymer of Styrene Insulation	UG-204A	82-105
	Mil-Clamp I	1 21/32(42.1)	⅞(22.2)	.557(14.1)	—	—	—	UG-204C	82-214
	Mil-Clamp II	1 23/32(43.7)	13/16(20.6)	.557(14.1)	—	—	Safety Wiring	M39012/01-0003	82-4365
	Mil-Clamp II	1 23/32(43.7)	13/16(20.6)	.557(14.1)	—	—	Safety Wiring/Captivated Contact	M39012/01-0015	82-4368
17, 218	Std.-Clamp	2⅜(60.3)	1 5/16(33.3)	.900(22.9)	—	—	—	UG-167A	82-104
	Mil-Clamp I	2⅛(54.0)	1 5/16(33.3)	.900(22.9)	—	—	Safety Wiring	UG-167D	82-215
	Mil-Clamp I	2⅛(54.0)	1 5/16(33.3)	.900(22.9)	—	—	Safety Wiring	UG-167F	82-3215
18, 219	Mil-Clamp I	3(76.2)	1 5/16(33.3)	.963(24.5)	—	—	Armor Clamp	UG-982	92125
35	Std.-Clamp	2⅜(60.3)	1 5/16(33.3)	.900(22.9)	—	—	70 Ohm Imp./Armor Clamp	—	82-113
55, 142, 223	Mil-Crimp I	1 31/64(37.7)	13/16(20.6)	.220(5.6)	—	227-1221-57	—	—	82-5370
58, 141	Mil-Crimp I	1 31/64(37.7)	13/16(20.6)	.206(5.2)	—	227-1221-57	—	—	82-5375
58, 141, 142	Std.-Clamp	1 25/32(45.2)	13/16(20.6)	.214(5.4)	—	—	Copolymer of Styrene Insulation	UG-536	34000
	Mil-Clamp I	1⅜(34.9)	13/16(20.6)	.214(5.4)	—	—	—	UG-536B	34025
59, 62, 71, 140, 210	Mil-Crimp I	1 31/64(37.7)	13/16(20.6)	.261(6.6)	—	227-1221-59	—	—	82-5380
	Std.-Clamp	1 25/32(45.2)	13/16(20.6)	.257(6.5)	—	—	Copolymer of Styrene Insulation	UG-603	34500
	Mil-Clamp I	1⅜(34.9)	13/16(20.6)	.257(6.5)	—	—	—	UG-603A	34525
	Std.-Clamp	1⅝(41.3)	13/16(20.6)	.257(6.5)	—	—	70 Ohm Impedance	—	34750
	Mil-Clamp I	1⅜(34.9)	13/16(20.6)	.257(6.5)	—	—	70 Ohm Impedance	—	91300
63, 114	Std.-Clamp	1¾(44.5)	13/16(20.6)	.435(11.0)	—	—	—	UG-1003	12400
142, 400	Crimp-Crimp	1 29/64(36.9)	13/16(20.6)	.220(5.6)	—	227-1221-57	Safety Wiring/Captivated Contact	M39012/01-0503	82-4427
213	Crimp-Crimp	1 29/64(36.9)	13/16(20.6)	.418(10.6)	—	227-1221-25	Safety Wiring/Captivated Contact	M39012/01-0502	82-4426
214, 225, 393	Crimp-Crimp	1 29/64(36.9)	13/16(20.6)	.438(11.1)	—	227-1221-25	Safety Wiring/Captivated Contact	M39012/01-0501	82-4425
.141″ Dia. Semi-Rigid	Solder Type	63/64(25.0)	13/16(20.6)	.143(3.6)	—	—	Gold Plated	—	82-28

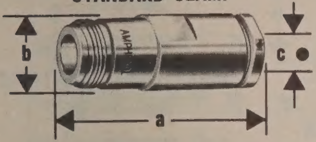
ANGLE PLUGS / MALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

5, 21, 143, 212, 222	Mil-Crimp I	1 9/16(39.7)	13/16(20.6)	.342(8.7)	2 1/64(51.2)	227-1221-29	—	—	82-5350
	Mil-Clamp I	1⅜(34.9)	13/16(20.6)	.343(8.7)	1⅝(41.3)	—	—	—	15950
8, 9, 87, 213, 214, 223	C.C. Clamp	1 19/64(32.9)	13/16(20.6)	.444(11.3)	1 15/16(49.2)	—	Captivated Contact	—	82-326
	Std.-Clamp	1 7/16(36.5)	13/16(20.6)	.437(11.1)	1⅞(47.6)	—	—	—	82-835
	Mil-Clamp II	1 15/32(37.3)	13/16(20.6)	.437(11.1)	1 59/64(48.8)	—	—	M39012/05-0001	82-4357
	Std.-Clamp	1⅝(41.3)	13/16(20.6)	.437(11.1)	1 11/16(42.9)	—	—	—	6875
	Mil-Clamp I	1 9/32(32.5)	13/16(20.6)	.444(11.3)	1⅝(41.3)	—	—	—	15975
	Std.-Clamp	1 7/16(36.5)	13/16(20.6)	.437(11.1)	2 1/32(51.6)	—	—	UG-594A	15425
11, 49	Mil-Crimp I	1 9/16(39.7)	13/16(20.6)	.418(10.6)	2 1/64(51.2)	227-1221-25	—	—	82-5351
11, 13, 149, 216	Std.-Clamp	1⅝(41.3)	13/16(20.6)	.437(11.1)	1 11/16(42.9)	—	70 Ohm Impedance	—	17025
55, 142, 223	Mil-Crimp I	1 9/16(39.7)	13/16(20.6)	.220(5.6)	2 1/64(51.2)	227-1221-57	—	—	82-5374
58, 141	Mil-Crimp I	1 9/16(39.7)	13/16(20.6)	.206(5.2)	2 1/64(51.2)	227-1221-57	—	—	82-5379
58, 141, 142	Std. Clamp	1⅝(41.3)	13/16(20.6)	.210(5.3)	1 7/32(31.0)	—	—	—	18750
	Std. Clamp	1 9/16(39.7)	13/16(20.6)	.214(5.4)	1 7/32(31.0)	—	Less Cap	—	25850
59, 62, 71, 140, 210	Std. Clamp	1⅝(41.3)	13/16(20.6)	.257(6.5)	1 7/32(31.0)	—	—	—	19250
142, 400	Crimp-Crimp	1 17/32(38.9)	53/64(21.0)	.220(5.6)	2⅜(60.3)	227-1221-57	Safety Wiring/Captivated Contact	M39012/05-0503	82-4442
213	Crimp-Crimp	1 17/32(38.9)	53/64(21.0)	.418(10.6)	2⅜(60.3)	227-1221-25	Safety Wiring/Captivated Contact	M39012/05-0502	82-4441
214, 225, 393	Crimp-Crimp	1 9/16(39.7)	13/16(20.6)	.438(11.1)	2 1/64(51.2)	227-1221-25	Safety Wiring/Captivated Contact	M39012/05-0501	82-4440
RG-8A & 87A Semi-Rigid	—	1 15/32(37.3)	13/16(20.6)	.333(8.5)	2(50.8)	—	Incl. 82-887 Kit Clamp/ Safety Wiring	—	82-177

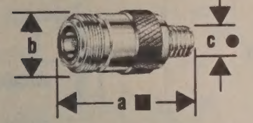
● Accommodates Cable Diameter ▲ Use with Tool Handle 227-944 ■ Includes Outer Ferrule Not Shown on Illustration △ For Armored Cables, See Armor Clamps

N SERIES COAXIAL CONNECTORS (Continued)

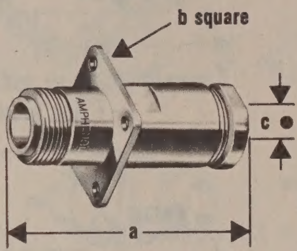
STANDARD CLAMP



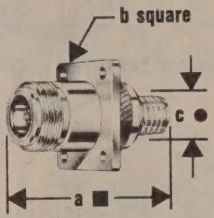
MIL-CRIMP & CRIMP-CRIMP

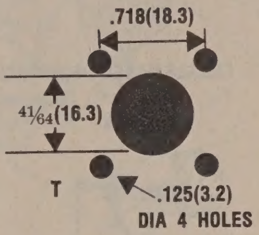


STANDARD CLAMP



MIL-CRIMP & CRIMP-CRIMP





STRAIGHT JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Cable RG-/U△	Cable Termination	Dimensions, inches(millimeters) a	b	c	Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
5, 21, 143, 212, 222	Mil-Crimp II	1 9/16(39.7)	11/16(17.5)	.342(8.7)	227-1221-29	—	M39012/02-0007	82-338
	Mil-Clamp II	1⅞(47.6)	11/16(17.5)	.346(8.8)	—	—	M39012/02-0001	82-358
	Std.-Clamp	2(50.8)	¾(19.1)	.357(9.1)	—	Copolymer of Styrene Insulation	UG-20	42000
	Std.-Clamp	1 15/16(49.2)	11/16(17.5)	.357(9.1)	—	—	UG-20B	82-88
	Mil-Clamp I	1 9/16(39.7)	¾(19.1)	.347(8.8)	—	—	UG-20C	82-210
	Mil-Clamp I	1 9/16(39.7)	¾(19.1)	.347(8.8)	—	Modified Cable Clamp	UG-20D	82-3210
6	Std.-Clamp	1⅞(47.6)	11/16(17.5)	.357(9.1)	—	70 Ohm Impedance	UG92A	7700
	Mil-Clamp I	1 9/16(39.7)	¾(19.1)	.347(8.8)	—	75 Ohm Impedance	—	91225
8, 9, 213, 214	Std.-Clamp	2(50.8)	¾(19.1)	.444(11.3)	—	Copolymer of Styrene Insulation/ Non-Weatherproof	UG-23	48000
8, 9, 87, 213, 214, 225	Std.-Clamp	1⅞(47.6)	11/16(17.5)	.440(11.2)	—	Copolymer of Styrene Insulation	UG-23A	7600
	Std.-Clamp	1 15/16(49.2)	11/16(17.5)	.437(11.1)	—	—	UG-23B	82-63
	Mil-Clamp I	1 13/16(46.0)	11/16(17.5)	.437(11.1)	—	—	UG-23C	82-94
	Mil-Clamp I	1 9/16(39.7)	¾(19.1)	.444(11.3)	—	Modified Cable Clamp	UG-23D	82-209
	Mil-Clamp I	1 9/16(39.7)	¾(19.1)	.444(11.3)	—	Modified Cable Clamp	UG-23E	82-3209
	Mil Clamp II	1 39/64(40.9)	11/16(17.5)	.443(11.3)	—	—	M39012/02-0002	82-4356-1
	C.C. Clamp	1 9/16(39.7)	¾(19.1)	.444(11.3)	—	Captivated Contact	UG-1186	82-313
	Mil-Clamp II	1 39/64(40.9)	11/16(17.5)	.443(11.3)	—	Captivated Contact	M39012/02-0003	82-4356
10, 12, 116, 215, 227	Mil-Clamp I	2¼(57.2)	¾(19.1)	.444(11.3)	—	Armor Clamp	UG-940A	82-212
	Mil-Clamp I	2¼(57.2)	¾(19.1)	.444(11.3)	—	Armor Clamp	UG-940B	82-3212
11, 149	Mil-Crimp II	1 9/16(39.7)	11/16(17.5)	.418(10.6)	227-1221-25	—	M39012/02-0014	82-339
11, 13, 149, 216	Std.-Clamp	1 15/16(49.2)	11/16(17.5)	.437(11.1)	—	70 Ohm Impedance	UG-95A	82-89
17	Std.-Clamp	2 3/16(55.6)	1 5/16(33.3)	.900(22.9)	—	—	—	14850
55, 142, 223	Mil-Crimp I	1 9/16(39.7)	11/16(17.5)	.220(5.6)	227-1221-57	—	—	82-5371
58, 141	Mil-Crimp I	1 9/16(39.7)	11/16(17.5)	.206(5.2)	227-1221-57	—	—	82-5376
58, 141, 142	Std.-Clamp	1 13/16(46.0)	11/16(17.5)	.214(5.4)	—	Copolymer of Styrene Insulation	—	35000
	Mil-Clamp I	1½(38.1)	⅝(15.9)	.214(5.4)	—	—	—	35025
59, 62, 71, 140, 210	Std.-Clamp	1⅝(41.3)	11/16(17.5)	.257(6.5)	—	Copolymer of Styrene Insulation	UG-602	36500
142, 400	Crimp-Crimp	1 17/32(38.9)	⅝(15.9)	.220(5.6)	227-1221-57	Captivated Contacts	M3901?/02-0503	82-4431
213	Crimp-Crimp	1 17/32(38.9)	⅝(15.9)	.418(10.6)	227-1221-25	Captivated Contacts	M39012/02-0502	82-4430
214, 225, 393	Crimp-Crimp	1 17/32(38.9)	⅝(15.9)	.438(11.1)	227-1221-25	Captivated Contacts	M39012/02-0501	82-4429

PANEL JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • .125" (3.2) DIA. FLANGE HOLES • MOUNTING HOLE T • REAR MOUNTED • TFE INSULATION

5, 21, 143, 212, 222	Mil-Crimp II	1 9/16(39.7)	1(25.4)	.342(8.7)	227-1221-29	—	M39012/02-0015	82-344
	Std.-Clamp	2(50.8)	1(25.4)	.355(9.0)	—	Copolymer of Styrene Insulation	UG-19	3500
	Std.-Clamp	1 13/16(46.0)	1(25.4)	.357(9.1)	—	Modified Cable Clamp	UG-19B	82-87
	Mil-Clamp I	1 9/16(39.7)	1(25.4)	.343(8.7)	—	—	UG-19C	82-207
	Mil-Clamp I	1 9/16(39.7)	1(25.4)	.347(8.8)	—	Modified Cable Clamp	UG-19D	82-3207
6	Std.-Clamp	1⅞(47.6)	1(25.4)	.357(9.1)	—	70 Ohm Impedance	UG-93A	7800
8, 9, 87, 213, 214, 225	Mil-Clamp II	1 39/64(40.9)	1(25.4)	.444(11.3)	—	—	M39012/02-0005	82-4360-1
	Mil-Clamp II	1 39/64(40.9)	1(25.4)	.444(11.3)	—	Captivated Contacts	M39012/02-0006	82-4360
	Std.-Clamp	1 13/16(46.0)	1(25.4)	.437(11.1)	—	—	UG-22B	82-62
	Std.-Clamp	1 13/16(46.0)	1(25.4)	.437(11.1)	—	Modified Cable Clamp	UG-22C	82-95
	Mil-Clamp I	1 9/16(39.7)	1(25.4)	.444(11.3)	—	—	UG-22D	82-208
	Mil-Clamp I	1 9/16(39.7)	1(25.4)	.444(11.3)	—	Modified Cable Clamp	UG-22E	82-3208
	C.C. Clamp	1 9/16(39.7)	1(25.4)	.444(11.3)	—	Captivated Contact	UG-1187	82-314
10, 12, 116, 215, 227	Mil-Clamp I	2¼(57.2)	1(25.4)	.444(11.3)	—	Armor Clamp	UG-935A	82-211
	Mil-Clamp I	2¼(57.2)	1(25.4)	.444(11.3)	—	Armor Clamp	UG-935B	82-3211
11, 149	Mil-Crimp I	1 9/16(39.7)	1(25.4)	.418(10.6)	227-1221-25	—	—	82-5345
11, 13, 149, 216	Std.-Clamp	1 13/16(46.0)	1(25.4)	.437(11.1)	—	70 Ohm Impedance	UG-96A	82-90
55, 58, 141, 142, 223	Mil-Clamp I	1½(38.1)	1(25.4)	.224(5.7)	—	—	UG-1095A	36250
55, 141, 142	Mil-Crimp I	1 9/16(39.7)	1(25.4)	.220(5.6)	227-1221-57	—	—	82-5372
58, 141,	Mil-Crimp I	1 9/16(39.7)	1(25.4)	—	227-1221-57	—	—	82-5377
58, 141, 142	Std.-Clamp	1 13/16(46.0)	1(25.4)	.214(6.4)	—	Copolymer of Styrene Insulation	UG-1052	36000
59, 62, 71, 140 210	Std.-Clamp	1 13/16(46.0)	1(25.4)	.257(6.5)	—	Copolymer of Styrene Insulation	UG-593	35500
	Mil-Clamp I	1 13/16(46.0)	1(25.4)	.257(6.5)	—	70 Ohm Impedance	—	35550
	Mil-Clamp I	1½(38.1)	1(25.4)	.257(6.5)	—	70 Ohm Impedance	—	91250
142, 400	Crimp-Crimp	1 17/32(38.9)	1(25.4)	.220(5.6)	227-1221-57	Captivated Contact	M39012/02-0513	82-4434
213	Crimp-Crimp	1 17/32(38.9)	1(25.4)	.418(10.6)	227-1221-25	Captivated Contact	M39012/02-0512	82-4433
214, 225, 393	Crimp-Crimp	1 17/32(38.9)	1(25.4)	.438(11.1)	227-1221-25	Captivated Contact	M39012/02-0511	82-4432

● Accommodates Cable Diameter
■ Includes Outer Ferrule Not Shown on Illustration
▲ Use with Tool Handle 227-944
△ For Armored Cables. See Armor Clamps

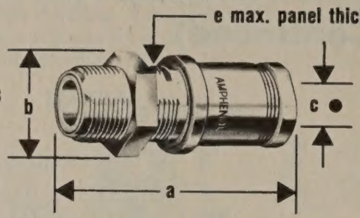
The right idea
at the right time

AMPHENOL®

BUNKER RAMO®

N SERIES (Continued)

STANDARD CLAMP



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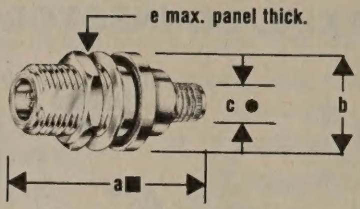

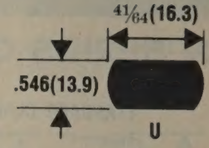

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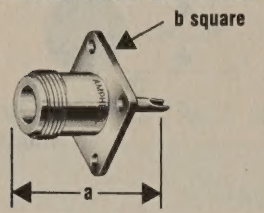
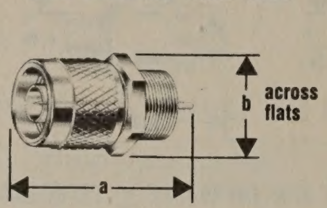


MALE BULKHEAD RECEPTACLE



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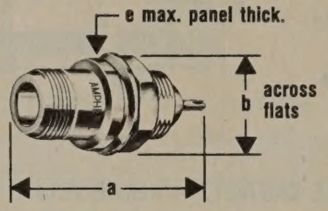

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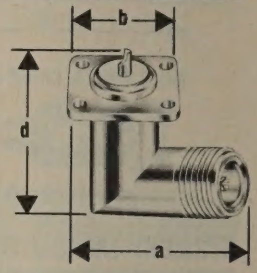
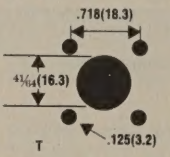
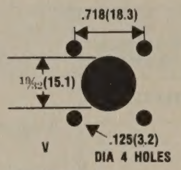
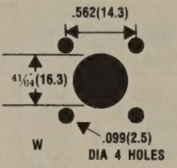
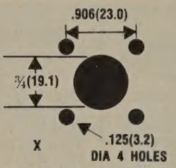










BULKHEAD JACKS / FEMALE CONTACTS • WEATHERPROOF • 50 OHM IMPEDANCE • MOUNTING HOLE U • REAR MOUNTED

Cable RG-/U△	Cable Termination	Dimensions, inches(millimeters) [a]				Tool Data▲ Die Set P/N	Construction Notes	Military Number	Amphenol Number
		a	b	c	e				
5, 21, 143, 212, 222	Mil-Crimp II Mil-Clamp I	1 27/32(46.8) 1 3/4(44.5)	7/8(22.2) 7/8(22.2)	.342(8.7) .343(8.7)	.250(6.4) .334(8.5)	227-1221-29 —	— —	M39012/03-0003 UG-159B	82-347 15550
8, 9, 213, 214	Mil-Clamp I	2 5/32(54.8)	7/8(22.2)	.444(11.3)	.334(8.5)	—	Herm. Sealed/Glass TFE Insul.	—	23025
8, 9, 87, 213, 214, 225	Mil-Clamp II Std.-Clamp Std.-Clamp Mil-Clamp I	1 53/64(46.4) 1 13/16(46.0) 1 13/16(46.0) 1 3/4(44.5)	7/8(22.2) 13/16(20.6) 13/16(20.6) 7/8(22.2)	.334(8.5) .437(11.1) .437(11.1) .444(11.3)	.250(6.4) .343(8.7) .343(8.7) .334(8.5)	— — — —	— — Modified Cable Clamp —	M39012/03-0002 UG-160A UG-160B UG-160D	82-4364 82-67 82-93 91025
11, 149	Mil-Crimp II	1 27/32(46.8)	7/8(22.2)	.418(10.6)	.250(6.4)	227-1221-25	—	M39012/03-0010	82-348
11, 144, 165, 213, 214, 216, 225	Mil-Clamp II	1 23/32(48.4)	29/32(22.3)	.443(11.3)	.250(6.4)	—	Captivated Contact	M39012/03-0012	82-4369
55, 58, 141, 142, 223	Mil-Clamp I	1 43/64(42.5)	13/16(20.6)	.224(5.7)	.317(8.1)	—	—	UG-556B	35275
55, 142, 223	Mil-Crimp I	1 27/32(46.8)	7/8(22.2)	.220(5.6)	.250(6.4)	227-1221-57	—	—	82-5373
58, 141	Mil-Crimp I	1 27/32(46.8)	7/8(22.2)	.206(5.2)	.250(6.4)	227-1221-57	—	—	82-5378
58, 141, 142	Mil-Clamp I	1 13/16(46.0)	13/16(20.6)	.214(5.4)	.294(7.5)	—	—	UG-556	35250
59, 62, 71, 140, 210	Std.-Clamp	1 27/32(46.8)	13/16(20.6)	.257(8.5)	.294(7.5)	—	Copolymer of Styrene Insul.	—	18250
142, 400	Crimp-Crimp	1 15/64(31.3)	7/8(22.2)	.220(5.6)	.250(6.4)	227-1221-57	Captivated Contact	M39012/03-0503	82-4438
165	Mil-Crimp II	2.031(51.6)	.9(22.9)	.418(10.6)	.250(6.4)	227-1221-25	—	M39012/03-0008	82-397
213	Crimp-Crimp	1 15/64(31.3)	7/8(22.2)	.418(10.6)	.250(6.4)	227-1221-25	Captivated Contact	M39012/03-0502	82-4437
214, 225, 393	Crimp-Crimp	1 15/64(31.3)	7/8(22.2)	.438(11.1)	.250(6.4)	227-1221-25	Captivated Contact	M39012/03-0501	82-4436
225	Mil-Crimp II	2 1/32(51.6)	29/32(22.9)	.438(11.1)	.250(6.4)	227-1221-25	—	M39012/03-0009	82-398
.141″ Dia. Semi-Rigid	Solder Type	1 43/64(42.5)	3/4(19.1)	.143(3.6)	.343(8.7)	—	Contact Factory for Assembly Instructions	—	82-118

RECEPTACLES / 50 OHM IMPEDANCE • FEMALE CONTACTS

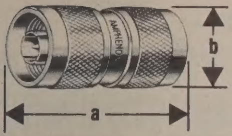
Description	Dimensions, inches(millimeters)				Mtg. Hole	Military Number	Amphenol Number
	a	b	d	e			
PANEL / WEATHERPROOF • .125″ (3.2mm) • FLANGE HOLES • TFE INSULATION							
Plug Mating Face (Male Contact), Front Mount Only, Copolymer of Styrene Insulation	1 3/32(27.8)	1(25.4)	—	—	V	—	49000
Standard Female	1 7/64(28.2)	1(25.4)	—	—	T	M39012/04-0002	82-368
Standard Female	1 7/64(28.2)	1(25.4)	—	—	T	UG-58	82-24
Standard Female	1 7/64(28.2)	1(25.4)	—	—	T	UG-58A	82-97
Standard Female	1 17/32(38.9)	1 3/16(30.1)	—	—	X	UG-496	82-92
#4-40 Flange Holes With Hood for RG-58/U, Copolymer of Styrene Insulation	1 3/4(44.5)	1(25.4)	—	—	T	UG-231	2750
70 Ohm Impedance	1 1/8(28.6)	1(25.4)	—	—	T	—	82-112
.100″ (2.5mm) Flange Holes	1 7/64(28.2)	3/4(19.1)	—	—	W	—	9575
Angle Female, 1 1/16″(27mm) Clearance Above Panel	1 7/64(28.2)	1(25.4)	1 29/64(36.9)	—	V	UG-997A	8975
Angle Female, 3/4″ (19.1mm) Clearance Above Panel	1 7/64(28.2)	1(25.4)	1 29/64(36.9)	—	V	—	23775
BULKHEAD / FRONT MOUNTED • HERMETICALLY SEALED • GLASS-TFE INSULATION							
Plug Mating Face (Male Contact), Less Mounting Hardware	1 7/64(28.2)	13/16(20.6)	—	—	U	—	19550
Standard Female	1 37/64(40.1)	13/16(20.6)	—	.250(6.4)	U	M39012/04-0001	82-369
Standard Female	1 37/64(40.1)	13/16(20.6)	—	.209(5.3)	U	UG-680	82-811
Weatherproof with Hood, TFE Insulation	1 3/8(34.9)	13/16(20.6)	—	.364(9.2)	U	—	13275
Standard Female	1 15/32(37.3)	1(25.4)	—	.331(8.4)	U	—	31150

● Accommodates Cable Diameter ▲ Use with Tool Handle 227-944 ■ Includes Outer Ferrule Not Shown on Illustration △ For Armored Cables, See Armor Clamps

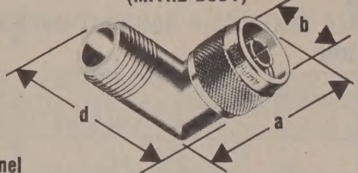
The right idea at the right time / AMPHENOL® / BUNKER RAMO®

N SERIES COAXIAL CONNECTORS (CONTINUED)

STRAIGHT



ANGLE (MITRE BODY)



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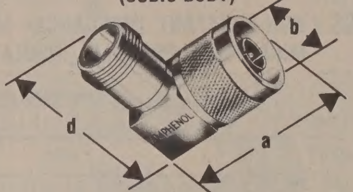

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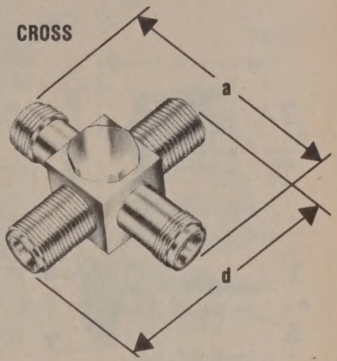
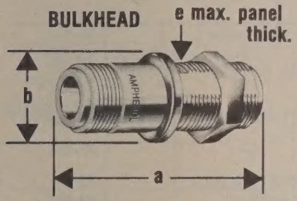


BULKHEAD



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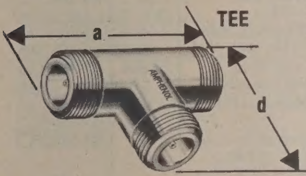

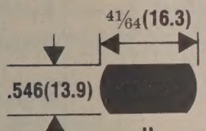

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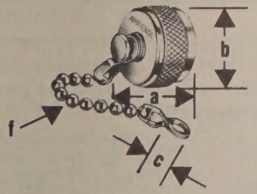
MALE CAP & CHAIN



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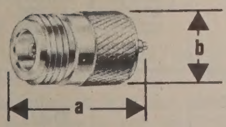
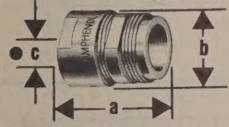
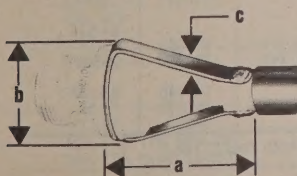


ARMOR CLAMP



SHIELD GROUNDING LUG



ADAPTERS / 50 OHM IMPEDANCE • TFE INSULATION

Adapter Ends	Dimensions, inches(millimeters) a	b	d	e	Mtg. Hole	Construction Notes	Military Number	Amphenol Number
STRAIGHT								
Jack-Jack	1¾(44.5)	21/32(16.7)	—	—	—	—	UG-29A	82-65
Plug-Plug	1 19/32(40.5)	13/16(20.6)	—	—	—	—	UG-57B	82-100
Jack-Jack	1¾(44.5)	21/32(16.7)	—	—	—	—	UG-29B	82-101
Jack-Jack	1¾(44.5)	21/32(16.7)	—	—	—	—	UG-29	15000
Plug-Plug	1 19/32(40.5)	13/16(20.6)	—	—	—	70 Ohm Impedance	—	17075
Jack-Jack	1¾(44.5)	21/32(16.7)	—	—	—	—	—	21650
Plug-Plug	1 19/32(40.5)	13/16(20.6)	—	—	—	—	UG-57A	45250
ANGLE								
Jack-Plug	1 7/16(36.5)	13/16(20.6)	1.37(34.9)	—	—	Mitre Body	UG-27A	82-64
Jack-Plug	1 13/16(46.0)	13/16(20.6)	1.31(33.3)	—	—	Mitre Body	UG-27B	82-98
Plug-Jack	1 5/16(33.3)	13/16(20.6)	1.40(35.7)	—	—	Cubic Body	UG-27C	82-213
Jack-Plug	1 17/32(38.9)	⅞(22.2)	1.46(37.3)	—	—	Mitre Body	UG-212A	82-91
BULKHEAD								
Jack-Jack	1⅝(41.3)	13/16(20.6)	—	.312(7.9)	U	Copolymer of Styrene Insul./Pressurized	UG-30	82-66
Jack-Jack	1¾(44.5)	13/16(20.6)	—	.343(8.7)	U	Glass Insulation/Hermetically Sealed	UG-30C	82-201
Jack-Jack	1⅝(41.3)	13/16(20.6)	—	.312(7.9)	U	Pressurized	—	82-849
Jack-Jack	1 15/16(49.2)	⅞(22.2)	—	.625(15.9)	U	Glass Insul./"O" Ring/Hermetically Sealed	—	90950
Jack-Jack	1 17/32(38.9)	⅞(22.)	—	.339(8.6)	U	Glass Insul./"O" Ring/Hermetically Sealed	UG-30D	91100
TEE								
Jack-Plug-Jack	1¾(44.5)	—	1 31/64(37.7)	—	—	—	UG-107A	82-36
Jack-Jack-Jack	1¾(44.5)	—	1 7/32(31.0)	—	—	—	UG-28A	82-99
Jack-Plug-Jack	1¾(44.5)	—	1 31/64(37.7)	—	—	—	UG-107B	82-102
Jack-Plug-Jack	1¾(44.5)	—	1 31/64(37.7)	—	—	—	UG-107	4800
Plug-Plug-Plug	2 11/32(59.5)	—	1 31/64)37.7)	—	—	—	—	4850
CROSS								
Jack-Jack-Jack-Jack	2¼(57.2)	—	2¼(57.2)	—	—	—	—	17125

ACCESSORIES

Description	Dimensions, inches(millimeters) a	b	c	f	Military Number	Amphenol Number
CAPS / WEATHERPROOF						
Male Cap & Chain	9/16(14.3)	¾(19.1)	.144(3.7)	1¾(44.5)	M39012/25-0011	82-3106
Male Cap & Chain	9/16(14.3)	¾(19.1)	.144(3.7)	1¾(44.5)	MX-913	82-106
Male Cap	7/16(11.1)	¾(19.1)	—	—	—	9225
Male Cap & Chain, Shorting Male Contact	27/32(21.4)	13/16(20.6)	.144(3.7)	2½(63.5)	—	13700
Male Cap & Chain	9/16(14.3)	¾(19.1)	.144(3.7)	3(76.3)	—	18575
Female Cap & Chain	31/32(24.6)	⅝(15.9)	.188(4.8)	2¼(57.2)	—	6950
Female Cap, Shorting Female Contact	1(25.4)	⅝(15.9)	—	—	—	13675
RESISTOR TERMINATED CAP						
Male Cap & Chain	1⅜(34.9)	13/16(20.6)	.144(3.7)	3½(88.9)	—	82-3200▲
ARMOR CLAMPS / ASSEMBLE TO CONNECTORS DESIGNED FOR IDENTICAL CABLE WITHOUT ARMOR						
Use with Std.-Clamp on RG-10, 12, 79, 116, 215/U Cable	⅞(22.2)	11/16(17.5)	.470(11.9)	—	MX-564	82-48
Use with Std.-Clamp on RG-10, 12, 79, 116, 215, 227/U Cable	1 1/16(27.0)	11/16(17.5)	.511(13.0)	—	M-564A	82-109
Use with Mil-Clamp I on RG-10, 12, 79, 116, 215, 227/U Cable	1⅛(28.6)	¾(19.1)	.511(13.0)	—	M39012/25-0013	82-3517
Use with Mil-Clamp I on RG-18, 219/U Cable	1⅜(34.9)	1 5/16(33.3)	.963(24.5)	—	M39012/25-0014	99175
SHIELD GROUNDING LUG / NON-WEATHERPROOF						
Used on Font Mount Receptacles as Shown	1(25.4)	37/64(14.7)	⅛(3.2)	—	—	82-1275

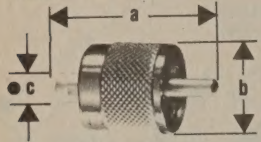
● Accommodates Cable Diameter

▲ To Order Without Resistor, Add -1 to Part Number; To Order With Resistor, Add Resistor Value to Part Number. ½ Watt 5% Resistor Values (Ohms) Stocked: 47, 51, 75, 82, 91, 100, 120, 130, 150, 180, 240, 270, 300, 470, 510, 560, 680, 750, 820, 1000, 1500, 3900, 4700. 10K. 50K

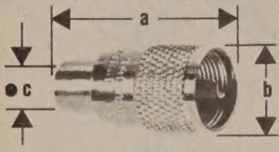
The right idea at the right time / **AMPHENOL®** / BUNKER RAMO®

UHF SERIES COAXIAL CONNECTORS

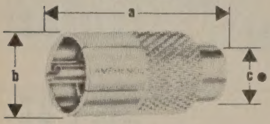
CRIMP



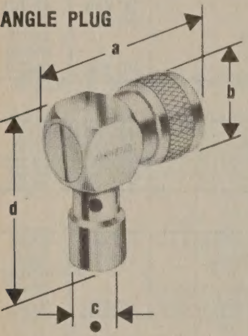
UG STANDARD



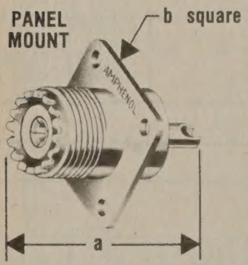
PUSH-ON



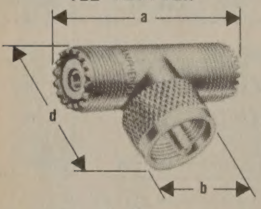
ANGLE PLUG

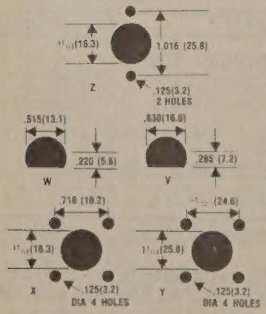


PANEL MOUNT



TEE ADAPTER





Threaded coupling UHF series are low-cost, general purpose connectors for lower frequency applications up to 500 MHz. Both threaded and push-on mating are available with Braid-solder, solderless clamp, hex crimp and the new FCP style cable affixment which requires no special tools.

PLUGS / NON-CONSTANT IMPEDANCE● MALE CONTACTS • NON-WEATHERPROOF • MICA-FILLED PHENOLIC INSULATION

Cable RG-/U	Termination Cable	Dimensions, inches(millimeters)				Tool Data Die Set P/N	Construction Notes	Military Number	Amphenol Number
		a	b	c	d				
STRAIGHT									
8, 11, 149, 213	Braid Crimp	1 5/16(33.3)	¾(19.1)	.418(10.4)	—	227-1221-23▲	Solder Contact	—	83-8SP
8, 9, 11, 13, 63, 87, 149, 213, 214, 216, 225	UG Standard	1½(38.1)	¾(19.1)	.444(11.2)	—	—	—	PL-259	83-1SP
	UG Standard	1½(38.1)	11/16(17.5)	.437(11.1)	—	—	TFE Insulation	PL-259	83-822
	Clamp Set Screw	1 9/16(39.7)	23/32(18.3)	.444(11.2)	—	—	—	PL-259A	83-ISPN
	Clamp Set Screw	1 9/16(39.7)	13/16(20.6)	.450(11.4)	—	—	TFE Insulation	PL-259A	83-756
	Solderless Clamp	1 43/64(42.5)	¾(19.1)	.444(11.2)	—	—	—	—	83-851
	UG Standard	1½(38.1)	23/32(18.3)	.444(11.2)	—	—	Push-On Mating	—	83-5SP
11, 149	Solderless Clamp	1 43/64(42.5)	¾(19.1)	.437(11.1)	—	—	Solderless Contact	—	83-850
17, 218	UG Standard	2⅛(54.0)	1 5/16(33.3)	.625(15.9)	—	—	TFE Ins., Contact RF for Assy. Inst.	—	83-86
34	UG Standard	1 3/16(30.2)	1⅛(28.6)	.625(15.9)	—	—	Large Body, Weatherproof	UG-358	83-21SP
55, 142, 223	Braid Crimp	1 5/16(33.3)	¾(19.1)	.220(5.7)	—	227-1221-11/ Cax. A▲	Solder Contact	—	83-55SP
58	CB Clamp	1 1/16(27.0)	¾(19.1)	—	—	—	Slotted Ferrule/ No Tools Req./ Short Cplg. Nut	—	83-58FCP☐
	Crimp-Crimp	1⅜(34.9)	¾(19.1)	.245(6.2)	—	227-947△ 227-1242▲	Standard Const./ Long Cplg. Nut	—	83-58SCP
58, 59	Crimp-Crimp	1 13/32(35.7)	¾(19.1)	.262(6.7)	RG-58/U RG-59/U	227-946△ 227-948△	Economy Formed Metal Body/ Short Cplg. Nut	—	83-58DCP
58, 141	Braid Crimp	1 5/16(33.3)	¾(19.1)	.206(5.3)	—	227-1221-11/ Cax. A▲	Solder Contact	—	83-58SP
	Clamp Set Screw	1 9/16(39.7)	23/32(18.3)	.214(5.5)	—	—	—	UG-203	83-776
59, 62, 140, 210	Braid Crimp	1 5/16(33.3)	¾(19.1)	.251(6.4)	—	227-1221-13/ Cax. A▲	Solder Contact	—	83-59SP
59, 62, 71, 140, 210	UG Standard	1 11/16(42.9)	25/32(19.8)	.257(6.6)	—	—	—	UG-111	83-750
ANGLE									
8, 9, 11, 13, 63, 87, 149, 213, 214, 216, 225	UG Standard	1⅜(34.9)	¾(19.1)	.444(11.2)	1 35/64(39.3)	—	TFE Insulation	—	83-67
	UG Standard	1⅜(34.9)	¾(19.1)	.444(11.2)	1 35/64(39.3)	—	Polystyrene Ins.	—	83-59

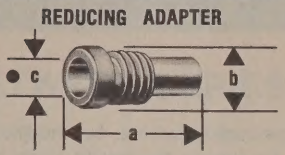
RECEPTACLES AND ADAPTERS / NON-CONSTANT IMPEDANCE • NON-WEATHERPROOF

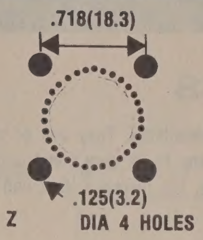
Description	Dimensions, inches(millimeters)				Mounting Hole	Military Number	Amphenol Number
	a	b	d	e			
PANEL RECEPTACLES / .125″(3.2mm) DIA. FLANGE HOLES • FEMALE CONTACTS • MICA FILLED PHENOLIC INSULATION							
Standard Type	1 1/16(27.0)	1(25.4)	—	—	X	SO-239	83-IR
Polystyrene Insulation	1 1/16(27.0)	1(25.4)	—	—	X	SO-239	83-IRTY
TFE Insulation	1 1/16(27.0)	1(25.4)	—	—	X	SO-239A	83-798
Large Body	1 5/64(27.4)	1 9/32(32.5)	—	—	Y	UG-357	83-21R
Pressurized/Ceramic Ins.	1 3/16(30.2)	1(25.4)	—	—	X	—	83-716
Special/Oval Flange	1 1/16(27.0)	1 19/64(32.9)	—	—	Z	—	83-876
BULKHEAD RECEPTACLES / FEMALE CONTACTS							
Front Mount/Copolymer of Styrene and TFE Ins.	1 3/32(27.8)	9/16(14.3)	—	.156(4.0)	W	—	83-875
Front Mount/Mica-Filled Phenolic Ins.	1 3/32(27.8)	9/16(14.3)	—	.156(4.0)	W	—	83-875-1002
Rear Mount/Mica-Filled Phenolic Ins.	1 1/16(27.0)	¾(19.1)	—	.093(2.4)	V	—	83-878
Rear Mount/Pressurized/ Copolymer of Styrene Ins.	1 13/32(35.7)	⅞(22.2)	—	.515(13.1)	41/64(16.3) Dia.	UG-266	4575
Rear Mount/Hermetic Sealed/Glass-TFE Ins.	1 13/32(35.7)	⅞(22.2)	—	.515(13.1)	41/64(16.3) Dia.	—	74525
ADAPTERS / POLYSTYRENE INSULATION							
Straight/Jack-Jack	1⅛(28.6)	⅝(15.9)	—	—	—	PL-258	83-1J
Straight/Jack-Jack/ Large Body	1⅛(28.6)	1(25.4)	—	—	—	UG-360	83-21J
Straight/Jack-Jack TFE Ins.	1⅛(28.6)	⅝(15.9)	—	—	—	—	11850
Straight/Plug-Plug	1 5/16(33.3)	25/32(19.8)	—	—	—	—	83-877
Bulkhead/Jack-Jack	2(50.8)	⅝(15.9)	—	.890(22.6)	41/64(16.3) Dia.	UG-363	83-1F
Bulkhead/Jack-Jack/ Copolymer of Styrene Ins.	1⅜(34.9)	⅝(15.9)	—	.281(7.1)	41/64(16.3) Dia.	UG-224	29500
Angle/Jack-Plug	1 9/32(32.5)	¾(19.1)	1 3/16(30.2)	—	—	UG-646	83-1AP
Angle/Plug-Jack	1 7/32(31.0)	¾(19.1)	1 1/16(27.0)	—	—	M-359A	83-58
Tee/Jack-Plug-Jack	1⅝(41.3)	¾(19.1)	1 13/64(30.6)	—	—	M-358	83-1T

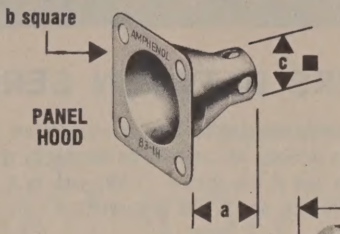
● Accommodates Cable Diameter
▲ Contact Factory for Assembly Instructions
△ Use with Semi-Automatic Pneumatic Bench Tool 227-945
☐ Patent Applied For

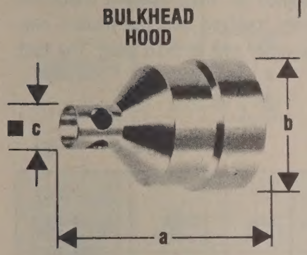
The right idea at the right time / AMPHENOL® / BUNKER RAMO®

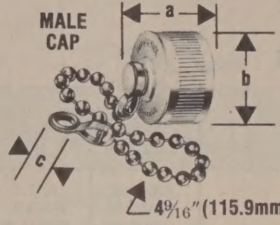
UHF SERIES

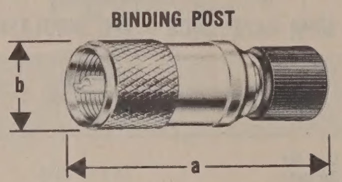


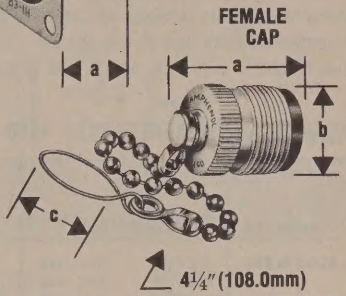












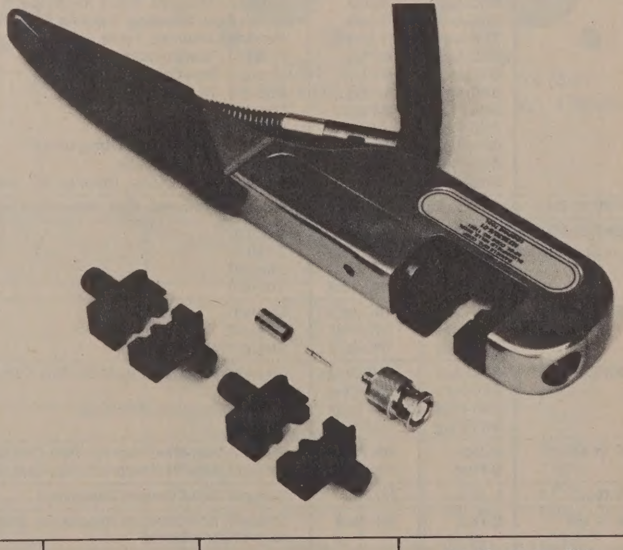
ACCESSORIES

Construction	Description	Dimensions, inches(millimeters) a	b	c	Mtg. Hole	Military Number	Amphenol Number
REDUCING ADAPTERS **For P/N 83-ISP, 83-59, 83-67, 83-750, 83-822, 83-850, 83-851** **Non-Weatherproof**	RG-55, 58, 141, 142 Cable (Except 55A)	1(25.4)	7⁄16(11.1)	.209(5.3)	—	UG-175	83-185
	RG, 59, 62, 71, 140, 210 Cable	1(25.4)	7⁄16(11.1)	.257(6.5)	—	UG-176	83-168
HOODS **Non-Weatherproof** **For Use with Cables Indicated and Panel Receptacles** **P/N 83-IR, 83-IRTY, 83-716, 83-798**	RG-8, 10, 11, 12, 63, 79, 115, 149, 213, 215 Cable	¾(19.1)	1(25.4)	.345(8.8)	Z	UG-106	83-1H
	RG-8, 9, 10, 11, 12, 63, 79, 87, 115, 149, 213, 215 Cable	⅞(22.2)	1(25.4)	.360(9.1)	Z	UG-372	83-1HP
	RG-58, 141 Cable	¾(19.1)	1(25.4)	.155(3.9)	Z	UG-177	83-765
	RG-58, 141 Cable Cadmium Plating	¾(19.1)	1(25.4)	.155(3.9)	Z	—	83-765-1001
	RG-58, 141 Cable	⅞(22.2)	1(25.4)	.156(4.0)	Z	—	83-786
HOOD **Threaded for Mounting on Bulkhead Receptacles P/N 4575 & 74525**	RG-55, 59, 140, 142, 223 Cable ⅝-24 Mounting Threads	1(25.4)	11⁄16(17.5)	.201(5.1)	—	MX-539	5375
CAPS **Weatherproof**	Male	15⁄32(11.9)	¾(19.1)	.130(3.3)	—	—	83-1AC
	Female	11⁄16(17.5)	⅝(15.9)	.562(14.3)	—	—	83-1BC
BINDING POST **Non-Weatherproof**	Male Contact/Copolymer of Styrene Insulation	1⅞(47.6)	23⁄32(18.3)	—	—	UG-332	58000

TOOLS

TWIN-HEX CRIMP TOOL SYSTEM

APPLICATION NOTES



Amphenol has introduced a new concept in cable-connector assembly tools, consisting of a universal tool frame with interchangeable crimping dies selected according to the cable and connector being assembled. A single Twin-Hex tool and one set of dies will crimp the outer ferrule to the cable braid and the center contact to the center conductor of the cable. With a few additional die sets, a wide variety of diameters can be crimped.

Die sets are easily interchanged. They are designed so there is no confusion regarding proper orientation. For permanent installation, a set of roll pins is included with each die set. Complete instructions are supplied.

HOW TO ORDER

Twin-Hex tool frame 227-944 is purchased separately. Select the die set required for your application from the table below and order by Amphenol Die Set number. (Hex size dimensions are listed for reference only.) Die sets are stamped with the Military number on one side and the Cavity designation on the reverse side. (Cavity A crimps outer conductor and Cavity B crimps inner conductor.)

RG-/ Cable Group	Connector Series	Cavity	Amphenol Die Set Number	Military Die Set Number	Hex Size Across Flats Cavity A (Outer)	Hex Size Across Flats Cavity B (Inner)
5, 6, 21, 143, 212, 222, 304	N	A & B	227-1221-29	M22520/5-29	.324	.100
8, 9, 11, 149, 213	UHF	A only	227-1221-23	M22520/5-23	.384	—
8, 9, 11, 87A, 149, 165, 213, 214, 216, 225, 393	N & SC	A & B	227-1221-25	M22520/5-25	.429	.100
55, 58, 141, 142, 223, 303, 400	BNC/TNC UHF/SMA	A & B A only	227-1221-11	M22520/5-11	.213	.068
	N & SC	A & B	227-1221-57	M22520/5-57	.213	.100
59, 62, 140, 210	BNC/TNC UHF	A & B A only	227-1221-13	M22520/5-13	.255	.068
	N	A & B	227-1221-59	M22520/5-59	.255	.100
71	BNC/TNC	A & B	227-1221-15	M22520/5-15	.263	.068
122, 174, 179, 180, 187, 188, 195, Essex 21-597	BNC/TNC SMA	A & B A only	227-1221-09	M22520/5-09	.178	.068
Tool Frame Less Die		Amphenol Number 227-944		Military No. M22520/5-01		

ADAPTERS BETWEEN SERIES

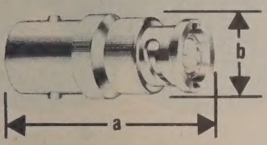
Many different combinations of between series adapters are available. They are of non-constant impedance, but designed so that inherent electrical discontinuities are minimal. We describe an adapter by referring to its own construction. We indicate the specific series involved and the mating configuration of each end of the adapter . . . BNC jack to N plug, for instance. One end of the adapter is a BNC jack. The other end is an N plug. The fact that it joins a BNC plug and N jack is understood.

ADAPTERS / WEATHERPROOF • 50 OHM IMPEDANCE • TFE INSULATION

Construction	Adapter Ends		Description	Dimensions inches(millimeters)		Mtg. Hole	Military Number	Amphenol Number
				a	b			
ALC-5 to BNC	ALC-Plug	BNC-Jack	Straight	.920(23.4)	.390(9.9)	—	—	904-10011
	ALC-Jack	BNC-Jack	Straight	.960(24.4)	.390(9.9)	—	—	904-10012
	ALC-Jack	BNC-Jack	Bulkhead, .125(3.2) Max. Panel Thickness	.950(24.1)	.620(15.8)	Z	—	904-10003
ALC-5 to SMA	ALC-Jack	SMA-Jack	Straight	.570(14.5)	.250(6.4)	—	—	904-10013
APC-7 to SMA	APC-7	SMA-Jack	Straight	1 11/32(34.1)	13/16(20.6)	—	—	131-1028
	APC-7	SMA-Plug	Straight	1⅜(34.9)	13/16(20.6)	—	—	131-1038
APC-N to SMA	APC-Jack	SMA-Jack	Straight	1 19/32(40.5)	⅝(15.9)	—	—	131-1077
	APC-Jack	SMA-Plug	Straight	1 23/64(34.5)	⅝(15.9)	—	—	131-1076
	APC-Plug	SMA-Plug	Straight	1¾(44.5)	13/16(20.6)	—	—	131-1074
	APC-Plug	SMA-Jack	Straight	1⅝(41.2)	13/16(20.6)	—	—	131-1075
BNC to C	BNC-Plug	C-Jack	Straight	1 9/32(32.5)	19/32(15.1)	—	UG-635	83175
	BNC-Jack	C-Plug	Straight	1 15/64(31.3)	¾(19.1)	—	UG-635A	83200
BNC to HN	BNC-Jack	HN-Plug	Straight	1½(38.1)	27/32(21.4)	—	UG-309	8900
	BNC-Plug	HN-Jack	Angle, Rexolite Insulation	1½(38.1)	19/32(15.1)	—	UG-559	17750
	BNC-Plug	HN-Jack	Rexolite/TFE Insulation/Non-Constant Impedance	1 21/32(42.1)	¾(19.1)	—	—	32750
	BNC-Jack	HN-Jack	Panel, Front or Rear Mounting	1⅜(34.9)	¾(19.1)	Y	—	35050
BNC to MB	BNC-Jack	MB-Jack	Panel, Front or Rear Mounting/Kel-F/TFE Insulation	1 5/32(29.4)	.377(9.6)	X	—	33200
	BNC-Jack	MB-Jack	Bulkhead Mounted, Rear, Hermetic Seal, Glass-TFE Ins.	1⅛(28.6)	.595(15.1)	W	—	47200
	BNC-Jack	MB-Plug	Kel-F/TFE Insulation	15/16(23.8)	9/16(14.3)	—	—	47250
	BNC-Plug	MB-Jack	Kel-F/TFE Insulation	1(25.4)	9/16(14.3)	—	—	47275
BNC to N	BNC-Jack	N-Jack	Angle, Panel, Rear Mounting	1 7/16(36.5)	1(25.4)sq.	V	—	2800
	BNC-Jack	N-Jack	Bulkhead Mounted, Front, Rexolite-TFE Ins., Pressurized	1 27/32(46.8)	13/16(20.6)	U	—	5850
	BNC-Jack	N-Jack	Panel, Rear Mounting, Rexolite Insulation	1½(38.1)	1(25.4)sq.	V	—	21850
	BNC-Jack	N-Jack	Bulkhead Mounted, Front, Hermetic Seal/Non-Const. Imp.	1 11/16(42.9)	13/16(20.6)	T	—	93075
	BNC-Jack	N-Plug	Straight/Non-Constant Impedance	1 5/16(33.3)	13/16(20.6)	—	UG-201A	31-216
	BNC-Jack	N-Plug	Straight/Non-Constant Impedance	1 15/32(37.3)	13/16(20.6)	—	UG-201	31-830
	BNC-Jack	N-Plug	Straight, 70 Ohm Impedance	1 9/16(39.7)	¾(19.1)	—	—	4250
	BNC-Plug	N-Plug	Straight	1½(38.1)	13/16(20.6)	—	—	4900
	BNC-Plug	N-Plug	Straight	1½(38.1)	13/16(20.6)	—	UG-1034	5225
	BNC-Plug	N-Jack	Straight/Non-Constant Impedance	1 9/16(39.7)	39/64(15.5)	—	UG-349A	31-217
	BNC-Plug	N-Jack	Rexolite-TFE Insulation	1¾(44.5)	⅝(15.9)	—	UG-349	2975
	BNC-Plug	N-Jack	Panel, Rear Mounting, Rexolite-TFE Insulation	1¾(44.5)	1(25.4)sq.	V	UG-335	3025
BNC to SM	BNC-Jack	SM-Jack	Bulkhead Mounted, Rear, Hermetic Seal/Non-Const. Imp.	1⅛(28.6)	19/32(15.1)	W	UG-691	89250
BNC to SMA	BNC-Jack	SMA-Jack	Straight	1⅛(28.6)	9/16(14.3)	—	—	901-167
	BNC-Jack	SMA-Plug	Straight	1 5/32(29.4)	9/16(14.3)	—	—	901-166
	BNC-Plug	SMA-Plug	Straight	1 3/32(27.8)	9/16(14.3)	—	—	901-164
	BNC-Plug	SMA-Jack	Straight	1 1/16(27.0)	9/16(14.3)	—	—	901-165
BNC to TNC	BNC-Jack	TNC-Jack	Straight	1 19/32(32.5)	7/16(11.1)	—	—	76400
	BNC-Jack	TNC-Plug	Straight	1¼(31.8)	⅝(15.9)	—	—	79675
	BNC-Plug	TNC-Jack	Straight	1¼(31.8)	⅝(15.9)	—	—	79025
BNC to UHF	BNC-Jack	UHF-Plug	Straight, Rexolite Insulation/Non-Constant Impedance	1 3/16(30.2)	23/32(18.3)	—	UG-273	31-028
	BNC-Jack	UHF-Plug	Straight	1 9/32(32.5)	¾(19.1)	—	—	12025
	BNC-Plug	UHF-Jack	Straight, Rexolite Insulation	1 5/16(33.3)	⅝(15.9)	—	UG-255	2900
	BNC-Plug	UHF-Jack	Straight	1 5/16(33.3)	⅝(15.9)	—	—	2925
C to HN	C-Jack	HN-Plug	Straight/Non-Weatherproof/Non-Constant Impedance	1½(38.1)	27/32(21.4)	—	UG-702	83350
	C-Plug	HN-Jack	Straight/Non-Weatherproof/Non-Constant Impedance	1½(38.1)	¾(19.1)	—	UG-703A	83400
C to LC	C-Jack	LC-Jack	Straight/Non-Constant Impedance	3 29/64(87.7)	1¼(31.8)	—	—	82350
C to MB	C-Jack	MB-Jack	Straight/Non-Constant Impedance/Glass-TFE Insulation/ Hermetically Sealed	1 7/32(31.0)	¾(19.1)	U	—	83950
C to N	C-Jack	N-Plug	Straight	1⅜(34.9)	13/16(20.6)	—	UG-564	82-508
	C-Plug	N-Jack	Straight	1 17/32(38.9)	¾(19.1)	—	UG-565A	82-540
	C-Jack	N-Plug	Angle	1 9/32(32.5)	1 9/32(32.5)	—	—	83875
C to UHF	C-Jack	UHF-Plug	Straight/Non-Weatherproof/Non-Constant Impedance	1⅜(34.9)	13/16(20.6)	—	UG-637	83225
HN to LC	HN-Jack	LC-Jack	Panel/Non-Constant Impedance	2 13/64(56.0)	1¼(31.8)	S	UG-259A	2500
	HN-Jack	LC-Plug	Straight/Non-Constant Impedance/Polyethylene Insulation	2 9/32(57.9)	1⅝(41.3)	—	UG-252	2625
HN to MHV	HN-Plug	MHV-Jack	Straight	1½(38.1)	27/32(21.4)	—	—	20625
HN to N	HN-Plug	N-Jack	Straight	1 9/16(39.7)	⅞(22.2)	—	—	16050
	HN-Jack	N-Plug	Straight	1 9/16(39.7)	13/16(20.6)	—	—	16075
	HN-Jack	N-Jack	Straight/Copolymer of Styrene-TFE Insulation	1 49/64(44.8)	¾(19.1)	—	—	16100
MB to N	MB-Jack	N-Jack	Straight	1¼(31.8)	⅝(15.9)	—	—	47375
MB to UHF	MB-Jack	UHF-Plug	Straight/Non-Constant Impedance/Non-Weatherproof Male Contacts	1 11/32(34.1)	¾(19.1)	—	—	47400
MHV to UHF	MHV-Jack	UHF-Plug	Straight/Non-Constant Impedance	1 9/32(32.5)	¾(19.1)	—	—	28050
	MHV-Plug	UHF-Jack	Straight/Non-Constant Impedance	1⅜(34.9)	⅝(15.9)	—	—	28075
N to LC	N-Jack	LC-Jack	Panel/Polyethylene Insulation	2 13/64(56.0)	1 9/16(39.7)	R	UG-271A	55000

ADAPTERS BETWEEN SERIES

STRAIGHT



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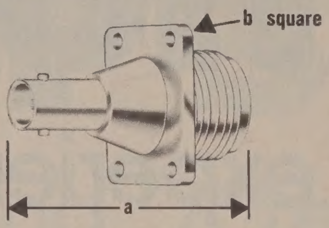

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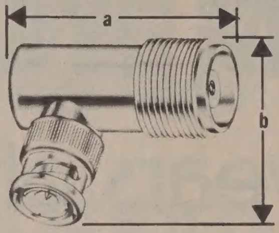

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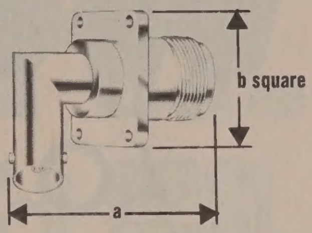

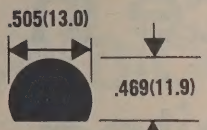
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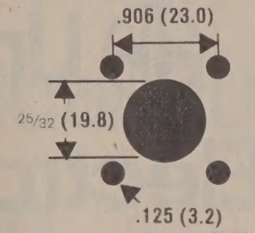
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DIA. 4 HOLES

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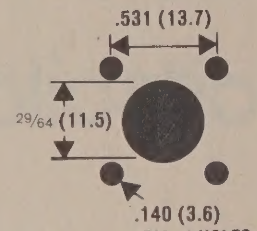
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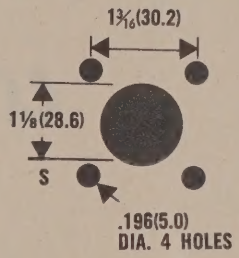
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1⅛(28.6)
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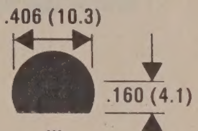
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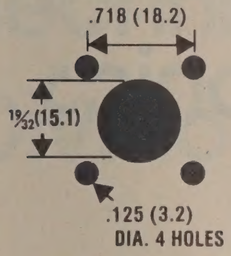
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19/32(15.1)
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DIA. 4 HOLES

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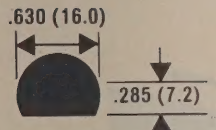
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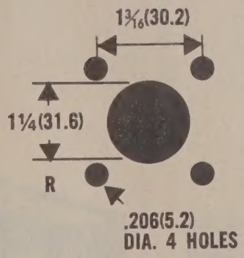
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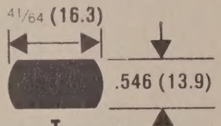
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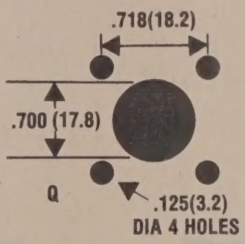
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DIA 4 HOLES

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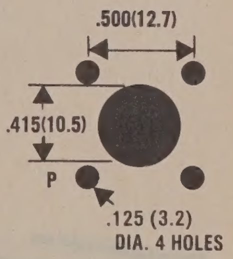
.500(12.7)
.415(10.5)
.125 (3.2)
DIA. 4 HOLES

P

ADAPTERS (Cont'd)

Construction	Adapter Ends		Description	Dimensions inches(millimeters) a	b	Mtg. Hole	Military Number	Amphenol Number
N to SMA	N-Plug	SMA-Jack	Straight	1.659(42.1)	13/16(20.6)	—	—	901-294
	N-Jack	SMA-Plug	Straight	1.7(43.2)	⅝(15.9)	—	—	901-293
	N-Plug	SMA-Plug	Straight	1.7(43.2)	13/16(20.6)	—	—	901-292
	N-Jack	SMA-Jack	Straight	1.657(42.1)	⅝(15.9)	—	—	901-295
	N-Jack	SMA-Plug	Panel	1.657(42.1)	1(25.4)sq.	Q	—	901-278
	N-Jack	SMA-Jack	Panel	1.657(42.1)	1(25.4)sq.	Q	—	901-268
N to TNC	N-Plug	TNC-Jack	Straight	1 5/16(33.3)	13/16(20.6)	—	—	78800
	N-Jack	TNC-Jack	Straight	1 25/64(35.3)	⅝(15.9)	—	—	78825
	N-Plug	TNC-Plug	Straight	1 9/32(32.5)	13/16(20.6)	—	—	78875
	N-Jack	TNC-Plug	Straight	1 21/32(42.1)	⅝(15.9)	—	—	79825
	N-Plug	TNC-Plug	Straight	1 9/16(39.7)	13/16(20.6)	—	—	79850
N to UHF	N-Plug	UHF-Jack	Straight/Copolymer of Styrene Insulation/ Non-Weatherproof/Non-Constant Impedance	1 13/32(35.7)	13/16(20.6)	—	UG-146	4400
	N-Jack	UHF-Plug	Straight/Copolymer of Styrene-TFE Insulation Non-Constant Impedance	1 9/16(39.7)	¾(19.1)	—	UG-83	14000
	N-Plug	UHF-Jack	Straight/Non-Weatherproof/Non-Constant Impedance	1 13/32(35.7)	13/16(20.6)	—	—	14650
	N-Plug	UHF-Plug	Straight/Copolymer of Styrene Insulation/ Non-Constant Impedance	1 47/64(44.1)	¾(19.1)	—	UG-318	26700
	N-Jack	UHF-Plug	Straight/Non-Constant Impedance	1 13/16(46.0)	13/16(20.6)	—	UG-83B	34125
SMA to TNC	SMA-Jack	TNC-Jack	Straight	1⅛(28.6)	9/16(14.3)	—	—	901-171
	SMA-Jack	TNC-Jack	Straight/Long	1 27/64(36.1)	9/16(14.3)	—	—	901-328
	SMA-Jack	TNC-Jack	Panel/Mounting	1 27/64(36.1)	11/16(17.5)	P	—	901-280
	SMA-Jack	TNC-Plug	Straight	1 3/32(27.8)	19/32(15.1)	—	—	901-169
	SMA-Jack	TNC-Plug	Straight/Long	1 17/32(38.9)	19/32(15.1)	—	—	901-329
	SMA-Plug	TNC-Plug	Straight	1⅛(28.6)	19/32(15.1)	—	—	901-168
	SMA-Plug	TNC-Plug	Straight/Long	1 37/64(40.1)	19/32(15.1)	—	—	901-331
	SMA-Plug	TNC-Jack	Straight	1 5/32(29.4)	9/16(14.3)	—	—	901-170
	SMA-Plug	TNC-Jack	Straight/Long	1 15/32(37.3)	9/16(14.3)	—	—	901-330
	SMA-Plug	TNC-Jack	Panel/Mounting	1 15/32(37.3)	11/16(17.5)	P	—	901-279

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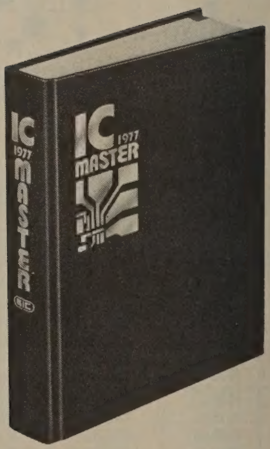

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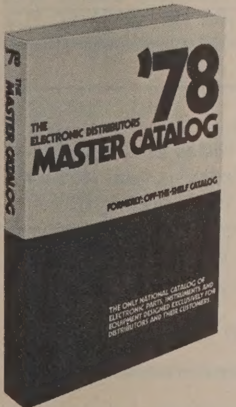
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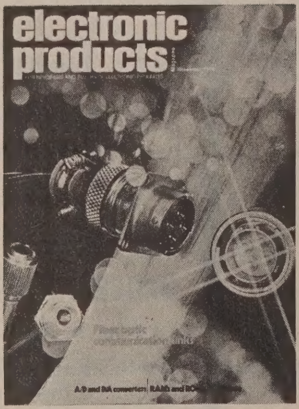
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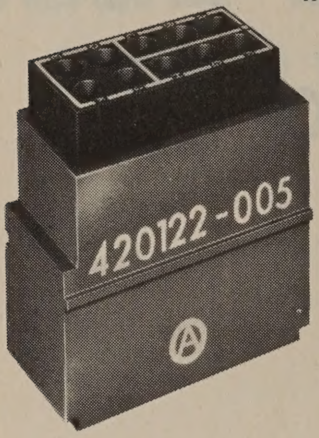
TERMINAL JUNCTION SYSTEM MODULES (MIL-T-81714)

Appleton ELECTRIC COMPANY *electronics division*

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

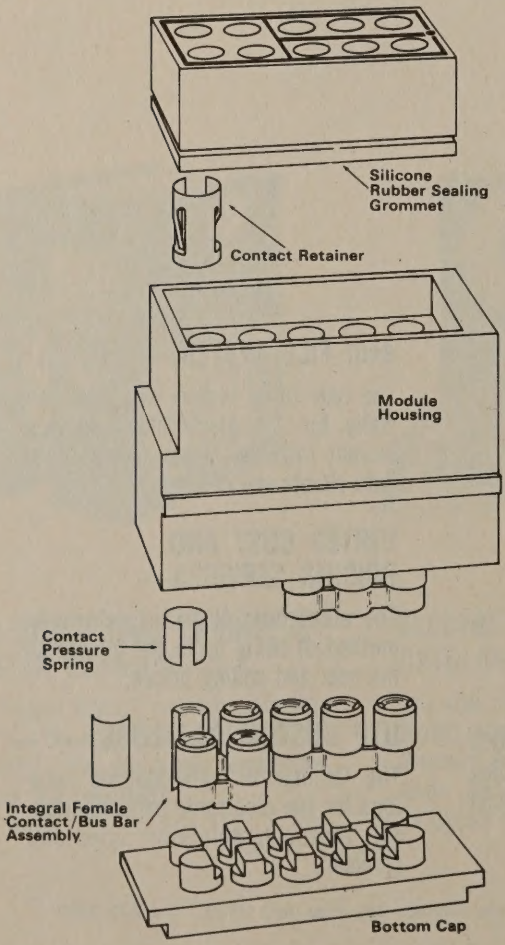
Terminal Junction System Modules — QPL Approved in accordance with MIL-T-81714 Contacts are approved to MIL-C-39029. Appleton terminal junction system modules are available in feedback and feedthru types, sizes 16, 20, and 22, with a full selection of bussing arrangements. Several mounting track variations are also available. An Appleton exclusive, total peripheral pin-to-socket surface contact and one-piece contact/bus design, provides superior electrical characteristics.



INSIDE THE APPLETON TERMINAL JUNCTION MODULE

The most important element in a terminal junction system is the **terminal junction module.** It is here that environmental conditions are overcome, margins for error are reduced, versatility is the highest, and the most important, reliability is, above all, achieved.

To attain these goals, the Appleton terminal junction module embodies several outstanding advantages. The exploded view below shows you how these advantages work.


Silicone Rubber Sealing Grommet
Contact Retainer
Module Housing
Contact Pressure Spring
Integral Female Contact/Bus Bar Assembly
Bottom Cap

SPECIFICATIONS FOR APPLETON TERMINAL JUNCTION SYSTEMS

Insulators: Glass-filled, flame-retardant thermoset plastic. **Contacts:** Copper alloy, plated with gold per MIL-G-45204. **Wire-Sealing Grommets:** Silicone rubber. **Tracks:** Aluminum alloy, anodized per MIL-A-8625. **Hardware:** Non-magnetic stainless steel passivated. **Sealing Plugs:** Teflon®. **Applicable Specifications:** Appleton Terminal Junction Modules, Splices, and Track Assemblies meet or exceed the electrical, mechanical, and environmental requirements of MIL-T-81714. **Contact Resistance:** Appleton's unique peripheral surface contacts exhibit millivolt-drop readings consistently BELOW the range specified in MIL-T-81714. **Reproducibility:** Appleton contacts are made from uniform half-cylinders, gold-plated after forming, and joined by a pressure spring, they are remarkably free of performance variations. From contact to contact, and from module to module, critical performance characteristics are highly reproducible.

WIRE RANGE ACCOMMODATIONS

Module Size	Conductor Size, AWG	Module Size	Conductor Size, AWG
22	26 24 22	16	20 18 16
20	24 22 20	12	14 12

CLASSIFICATION

Class A 150°C max. Environmental type, limited fluid resistance.
Class B 175°C max. Environmental type, extended fluid resistance.
Class C 200°C max. Environmental type, limited fluid resistance.

ORDERING INFORMATION

To order an Appleton Terminal Junction System:

1. Choose the basic size: 20, 22, etc.
2. Choose the class: A, B, C.
3. Choose the bussing arrangement in relationship to the class designation.
4. For example: Size 20 module, Class C, all common bus; order, 420120-101 (reference M81714/2-CA1).

Appleton *electronics division*
ELECTRIC COMPANY

TERMINAL JUNCTION SYSTEM MODULES (MIL-T-81714)

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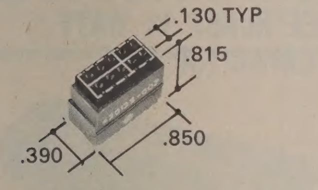
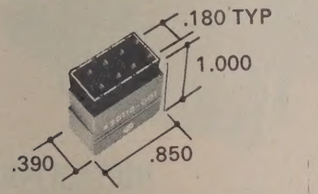
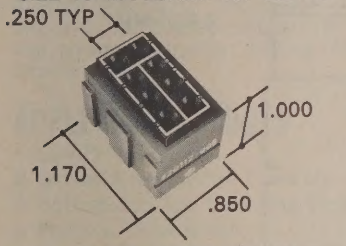
SIZE 22*MIL NO. M81714/1
SIZE 22*APPLETON NO. 420122-



SIZE 20*MIL NO. M81714/2
SIZE 20*APPLETON NO. 420120-

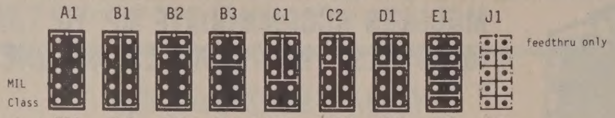


SIZE 16 MIL NO. M81714/3
SIZE 16 APPLETON NO. 420116-

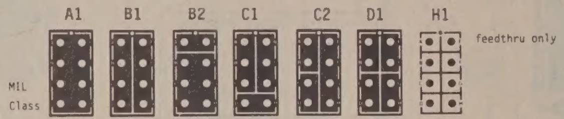


SIZE 12 MIL NO. M81714/4
SIZE 12 APPLETON NO. 420112-

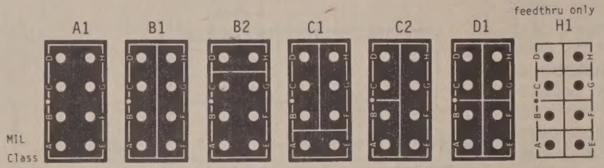
TERMINAL JUNCTION SYSTEM MODULE MILITARY MODULE BUSSING ARRANGEMENT



MIL Class	A1	B1	B2	B3	C1	C2	D1	E1	J1
A	501	502	503	504	505	506	507	508	509
B	301	302	303	304	305	306	307	308	309
C	101	102	103	104	105	106	107	108	109



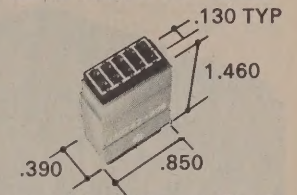
MIL Class	A1	B1	B2	C1	C2	D1	H1
A	501	502	503	505	506	507	509
B	301	302	303	305	306	307	309
C	101	102	103	105	106	107	109



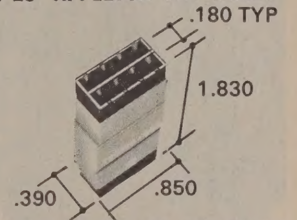
MIL Class	A1	B1	B2	C1	C2	D1	H1
A	501	502	503	505	506	507	509
B	301	302	303	305	306	307	309
C	101	102	103	105	106	107	109

* Size 22 & 20 are same physical size.

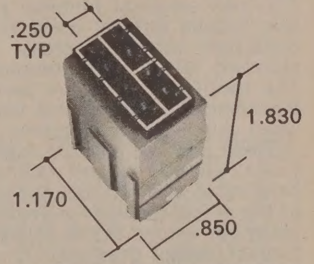
SIZE 22*MIL NO. M81714/6
SIZE 22*APPLETON NO. 420222-



SIZE 20*MIL NO. M81714/7
SIZE 20*APPLETON NO. 420220-



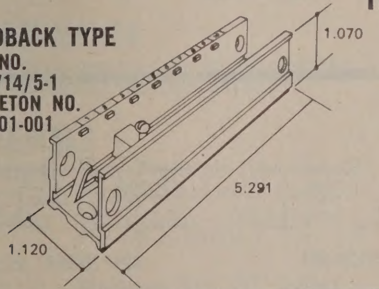
SIZE 16 MIL NO. M81714/8
SIZE 16 APPLETON NO. 420216-



SIZE 12 MIL NO. M81714/9
SIZE 12 APPLETON NO. 420212-

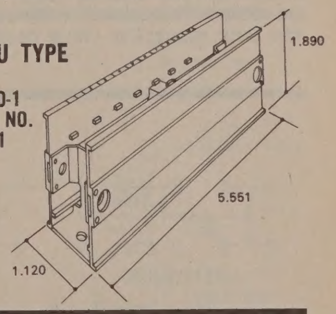
TERMINAL JUNCTION SYSTEM TRACK

FEEDBACK TYPE
MIL NO.
M81714/5-1
APPLETON NO.
420501-001

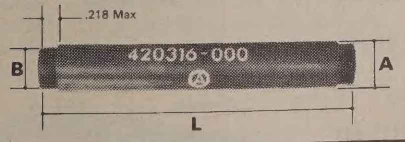


This track assembly will accommodate up to ten size 22, 20, or 16 modules, or any combination thereof. Three size 12 modules may be installed in this track assembly. Additional lengths are available. Call or write Appleton.

FEEDTHRU TYPE
MIL NO.
M81714/10-1
APPLETON NO.
420502-001

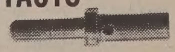


TERMINAL JUNCTION SYSTEM SPLICES



MIL No.	Appleton No.	Size	"A" Dia. +.025	"B" Dia. Max.	"L" +.032
M81714/11-22A	420322-000	22	.250	.225	1.460
M81714/11-20A	420320-000	20	.250	.225	1.460
M81714/11-16A	420316-000	16	.281	.256	1.830
M81714/11-12A	420312-000	12	.344	.319	1.830

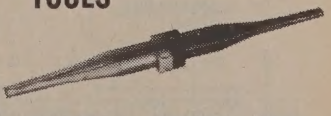
PIN CONTACTS



Pin contacts are available to accommodate their respective module block sizes.

MIL No.	Appleton No.	Contact Size	Wire Barrel Size	Conductor Size	O.D. Range of Finished Wires (Inch)
M39029/01-16-22	422068-000	22	22	26 24 22	0.034-0.066
M39029/01-16-20	422006-000	20	20	24 22 20	0.038-0.083
M39029/01-14-16	422037-000	16	16	20 18 16	0.060-0.101
M39029/01-12-12	422072-000	12	12	14 12	0.087-0.147

INSERTION/REMOVAL TOOLS



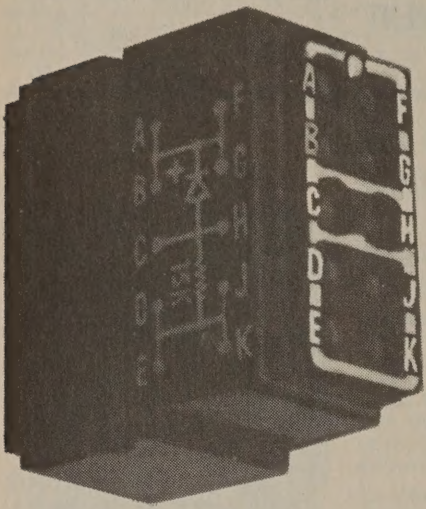
NAS1664 standard insertion/removal tools for the various size pins are available from Appleton.

MIL No.	Size	Appleton No.
M83723-31-20	20	422078-001
M83723-31-16	16	422078-002
M83723-31-12	12	422078-003

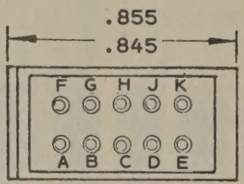
IMPEDANCE MATCHING TERMINAL JUNCTION MODULES

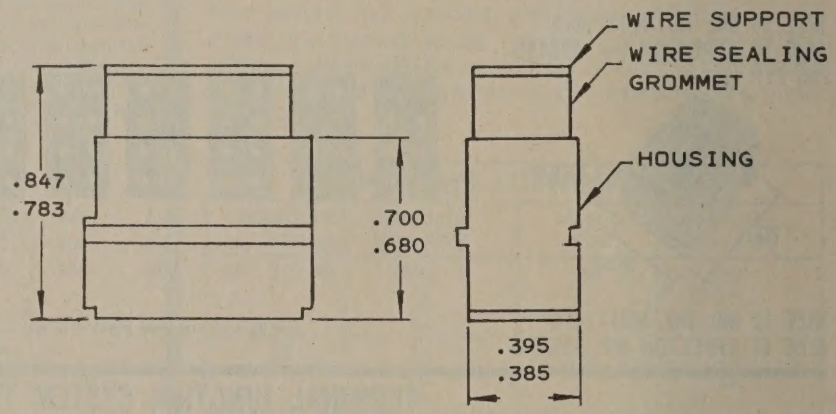
Appleton ELECTRIC COMPANY *electronics division*

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400


A
B
C
D
E
F
G
H
J
K

MODULES ACCOMMODATE UP TO THREE RCR07 ¼ WATT RESISTORS, 1N2071 DIODES, OR ONE CAPACITOR


.855
.845
F G H J K
A B C D E

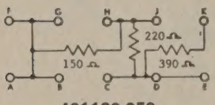

WIRE SUPPORT
WIRE SEALING GROMMET
HOUSING
.847
.783
.700
.680
.395
.385

This new series of terminal junction modules feature internal resistors, diodes, and capacitors with no increase in size over standard MIL-T-81714 terminal junctions. The specific modules are used for balancing unmatched impedance values incurred when using various electronic components.

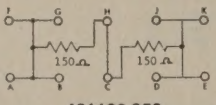
These terminal junction modules also feature a rigid wire support which allows severe bending of wires without opening wire seals of the silicone rubber grommet. All components are welded to the field-proven socket contact design developed for the MIL approved modules.

These modules can be mounted in the standard feedback track (see Appleton Terminal Junction Module page). Listed below are several available schematic diagrams and their respective value designations.

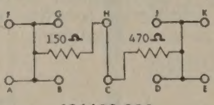
SCHEMATIC DIAGRAMS


220Ω
150Ω
390Ω

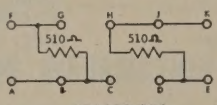
421120-950



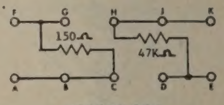
421120-956



421120-966



421120-961



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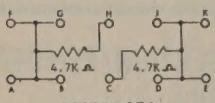
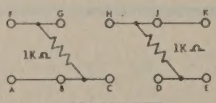
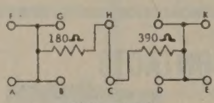


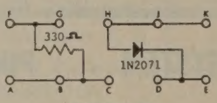
421120-951



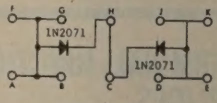
421120-957



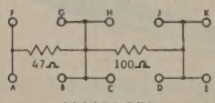
421120-967


330Ω
1N2071

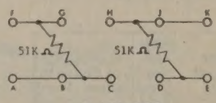
421120-962


1N2071
1N2071

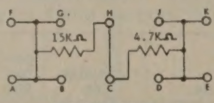
421120-965



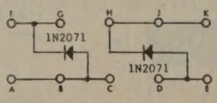
421120-952



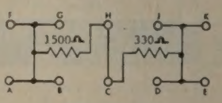
421120-958



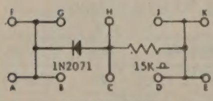
421120-968


1N2071
1N2071

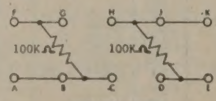
421120-963



421120-969


1N2071
15KΩ

421120-955


100KΩ
100KΩ

421120-959

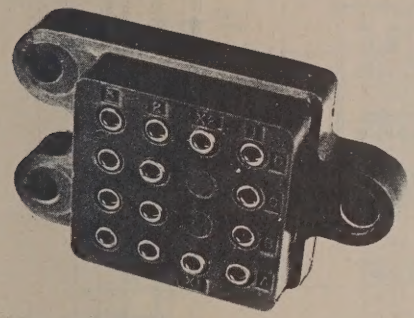
If you so desire, Appleton will custom make any value changes to suit your particular application. Feel free to request any such assistance from Appleton's quality engineering staff. Just call or write for details.

Appleton electronics division
ELECTRIC COMPANY

RELAY SOCKETS (MIL-R-6106)

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

Appleton relay sockets for MIL-R-6106 relays are available in many configurations with a full range of standard styles with fixed and removable closed-entry socket contacts. The low profile designs can be mounted from the top or bottom of the panel. Appleton relay sockets provide numerous variations of polarization; and possible terminal styles include: crimp removable, solder pot, pierced tab, turret lug, dip solder, and wire wrap.



APPLICATION

Appleton relay sockets can be used in conjunction with airbourne and shipboard equipment, plus any and all industrial electronic equipment utilizing MIL-R-6106 electro-mechanical relays and commercial relays having the same interface design.

APPLETON FEATURES

- Low Profile Design
- Closed Entry Socket Contacts
- Bottom and Top Mounting Versatility
- Positive Polarization
- Unique .200 Grid Pattern
- Plus a wide variety of contact termination possibilities: solder pot, pierced tab, turret lug, dip solder, wire wrap.

PERFORMANCE

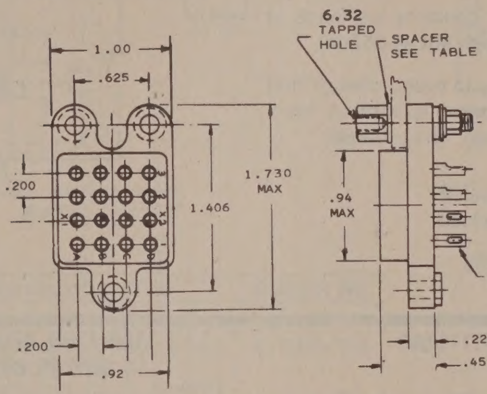
Appleton connector assemblies meet the requirements of NAVORD 3020237.

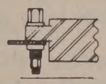
MATERIALS

Insulators: Dialyl Phthalate Type SDG-F Per MIL-M-14 color Green.
Contacts: Copper Alloy — Gold Plated Per MIL-G-45204
Contact Hood: Stainless Steel 300 Series
"C" Ring — Contact Retainer: Stainless Steel Per MIL-S-7720
Mounting Hardware:
Stud: Stainless Steel per MIL-S-7720
Spacer: Stainless Steel per MIL-S-7720
Washer: Stainless Steel Per MIL-S-7720
Hex Nut: MS 21043-06

NON-ENVIRONMENTAL TYPE

APPLETON RELAY SOCKET NO. 451116-030
14 SIZE 16 CONTACTS

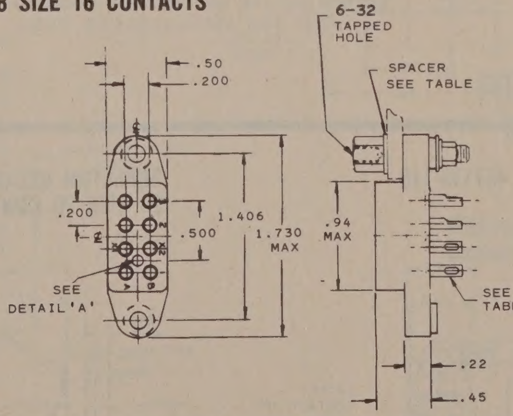




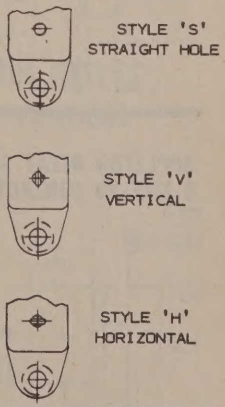
Shown Top Panel Mounted

Appleton No.	Navord P/N	Mating Relay	Contact Style	Omit Contacts	Panel	Spacer
451116-042	3020237-011	MS 24700-4	Solder Cup	X1, A; X2, D	.090	3
451116-041	3020237-004	MS 24700-4	Pierced Tab	X1, A; X2, D	.090	3
451116-040	3020237-003	MS 24700-4	Pierced Tab	X1, A; X2, D	.125	None
451116-032	3020237-012	MS 27400-2	Solder Cup	X1, B; X2, C	.090	3
451116-031	3020237-002	MS 27400-2	Pierced Tab	X1, B; X2, C	.090	3
451116-030	3020237-001	MS 27400-2	Pierced Tab	X1, B; X2, C	.125	None

APPLETON RELAY SOCKET NO. 451116-050
8 SIZE 16 CONTACTS



DETAIL 'A' POLARIZATION STYLE



Appleton No.	Navord P/N	Mating Relay	Contact Style	Polarization	Panel	Spacer
451116-071	3020237-010	30203-8-003	Pierced Tab	Style H	.090	2
451116-070	3020237-009	30203-8-003	Pierced Tab	Style H	.125	None
451116-061	3020237-008	MS 27401-4	Pierced Tab	Style V	.090	2
451116-060	3020237-007	MS 27401-4	Pierced Tab	Style V	.125	None
451116-052	3020237-003	MS 27401-2	Solder Cup	Style S	.090	2
451116-051	3020237-006	MS 27401-2	Pierced Tab	Style S	.090	2
451116-050	3020237-005	MS 27401-2	Pierced Tab	Style S	.125	None

RELAY SOCKETS (MIL-R-6106)

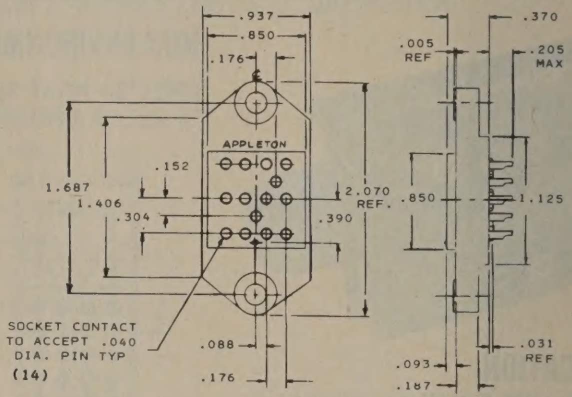
Appleton *electronics division*
ELECTRIC COMPANY

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

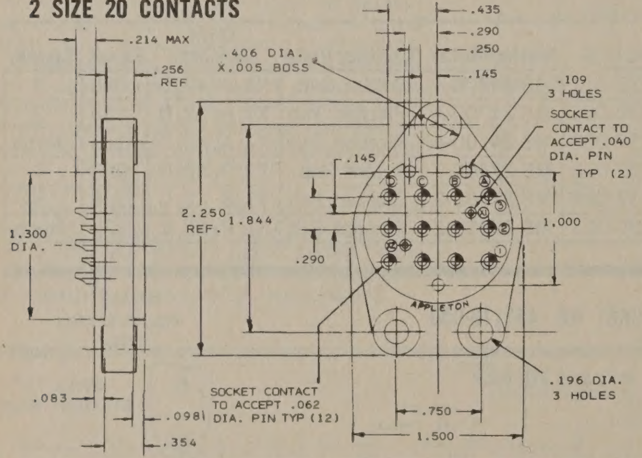
MATERIALS

- Attractive tan housing is thermoset material in accordance with MIL-M-14, Type SDG-F.
- Fixed, closed-entry type socket contacts are made of copper alloy and gold plated per MIL-G-45204.
- Mounting hardware is available; to order, change first digit after dash to "8." For example, without hardware, 451116-080; with hardware, 451116-880.

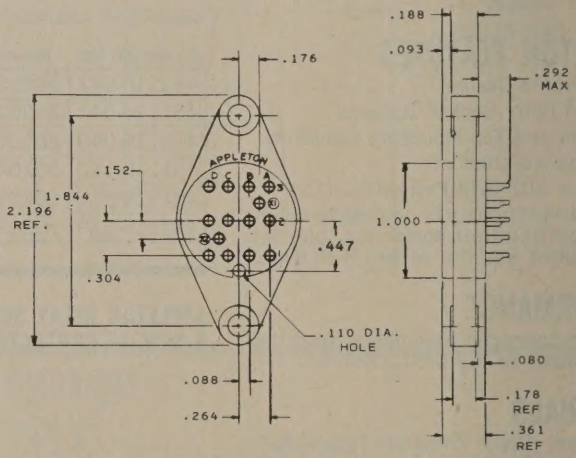
APPLETON RELAY SOCKET NO. 451116-080
14 SIZE 20 CONTACTS


.937
.850
.176
APPLETON
.152
1.687
1.406
.304
2.070 REF.
.390
SOCKET CONTACT TO ACCEPT .040 DIA. PIN TYP (14)
.088
.176
.370
.005 REF
.205 MAX
.850
1.125
.031 REF
.093
.187

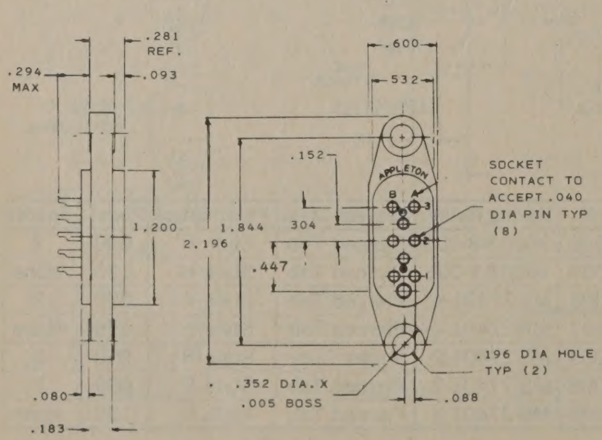
APPLETON RELAY SOCKET NO. 451116-090
12 SIZE 16 CONTACTS
2 SIZE 20 CONTACTS


.214 MAX
.256 REF
1.300 DIA.
.083
.098
.354
.406 DIA. X.005 BOSS
.435
.290
.250
.145
.109 3 HOLES
SOCKET CONTACT TO ACCEPT .040 DIA. PIN TYP (2)
.145
2.250 REF.
1.844
.290
1.000
APPLETON
.196 DIA. 3 HOLES
SOCKET CONTACT TO ACCEPT .062 DIA. PIN TYP (12)
.750
1.500

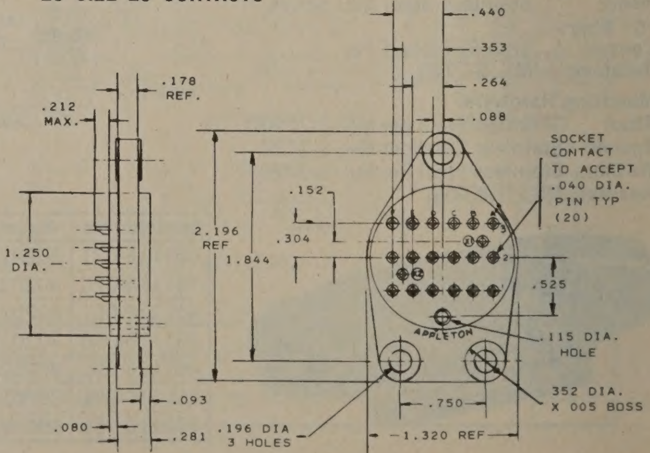
APPLETON RELAY SOCKET NO. 451116-100
14 SIZE 20 CONTACTS


.176
APPLETON
.152
1.844
2.196 REF.
.304
.447
.110 DIA. HOLE
.088
.264
.188
.093
.292 MAX
1.000
.080
.178 REF
.361 REF

APPLETON RELAY SOCKET NO. 451116-110
8 SIZE 20 CONTACTS


.294 MAX
.281 REF.
.093
1.200
.080
.183
.600
.532
.152
APPLETON
1.844
2.196
304
.447
SOCKET CONTACT TO ACCEPT .040 DIA PIN TYP (8)
.196 DIA HOLE TYP (2)
.352 DIA. X .005 BOSS
.088

APPLETON RELAY SOCKET NO. 451116-120
20 SIZE 20 CONTACTS


.212 MAX.
.178 REF.
1.250 DIA.
.093
.080
.281
.196 DIA 3 HOLES
.440
.353
.264
.088
SOCKET CONTACT TO ACCEPT .040 DIA. PIN TYP (20)
.152
2.196 REF
1.844
.304
.525
APPLETON
.115 DIA. HOLE
352 DIA. X 005 BOSS
.750
1.320 REF

Appleton *electronics division*
ELECTRIC COMPANY

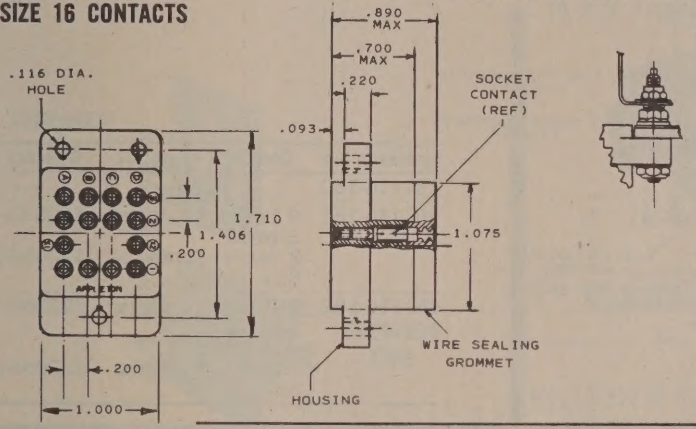
RELAY SOCKETS (MIL-R-6106)

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

APPLETON RELAY SOCKET NO. 451116-130, 131, 132 14 SIZE 16 CONTACTS

ENVIRONMENTAL TYPE

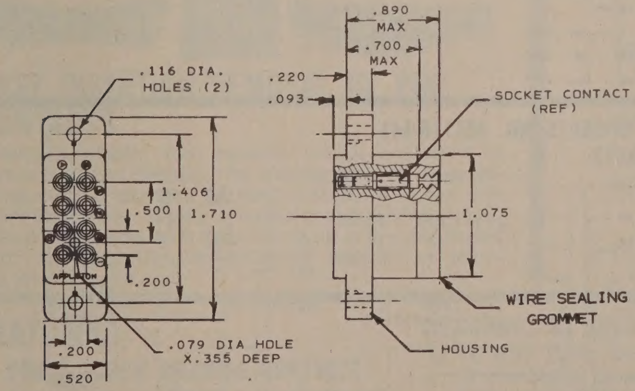
REAR ENTRY REAR RELEASE


.116 DIA.
HOLE
APPLETON
1.710
1.406
.200
.200
1.000
.890
MAX
.700
MAX
.220
.093
SOCKET
CONTACT
(REF)
1.075
WIRE SEALING
GROMMET
HOUSING

Appleton No.	Contacts Supplied	Contact No.
451116-130	None	—
451116-131	Size 16 Contact, Mating End, Crimp End to Accommodate 16-18-20 AWG	422046-900
451116-132	Size 16 Contact, Mating End, Crimp End to Accommodate 20-22-24 AWG	422047-900

MATERIALS

- Attractive light green housing is thermoset molded material in accordance with MIL-M-14, Type SDG-F.
- Red sealing grommet is made of silicone rubber.
- Closed entry, crimp type sockets are copper alloy gold plated per MIL-G-45204.
- Stud material and mounting hardware are made of corrosion resistant steel.
- All hardware is supplied in separate bag within socket package.
- A MS3191 crimp tool should be used to terminate pin contacts to their respective wire sizes.
- NAS1664-16 and -12 tools should be used for inserting and removing wired contacts.
- Contacts are supplied in separate bag within socket package (see table).

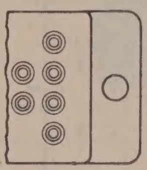

.116 DIA.
HOLES (2)
APPLETON
1.406
.500
1.710
.200
.200
.520
.079 DIA HOLE
X.355 DEEP
.890
MAX
.700
MAX
.220
.093
SOCKET CONTACT
(REF)
1.075
WIRE SEALING
GROMMET
HOUSING

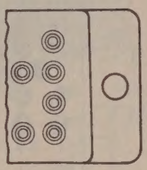
Appleton No.	Contacts Supplied	Contact No.
451116-140	None	—
451116-141	Size 16 Contact, Mating End, Crimp End to Accept 16-18-20 AWG	422046-900
451116-142	Size 16 Contact, Mating End, Crimp End to Accept 20-22-24 AWG	422047-900

APPLETON RELAY SOCKET NO. 451116-

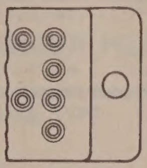
POLARIZATION STYLES

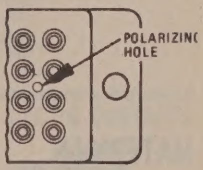
14 & 16 CONTACT POSITIONS





14 CONTACTS		14 CONTACTS	
Without Contacts	With Contacts	Without Contacts	With Contacts
580	581	590	591

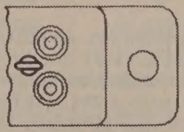
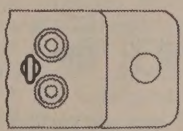



POLARIZING
HOLE

14 CONTACTS		16 CONTACTS	
600	601	610	611

POLARIZATION STYLES

8 CONTACT POSITIONS

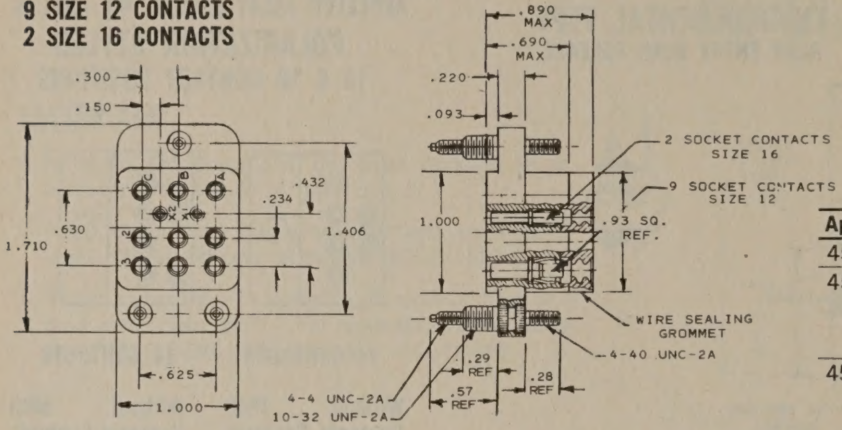
Without Contacts		With Contacts
550		551
560		551

RELAY SOCKETS (MIL-R-6106)

Appleton electronics division
ELECTRIC COMPANY

DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

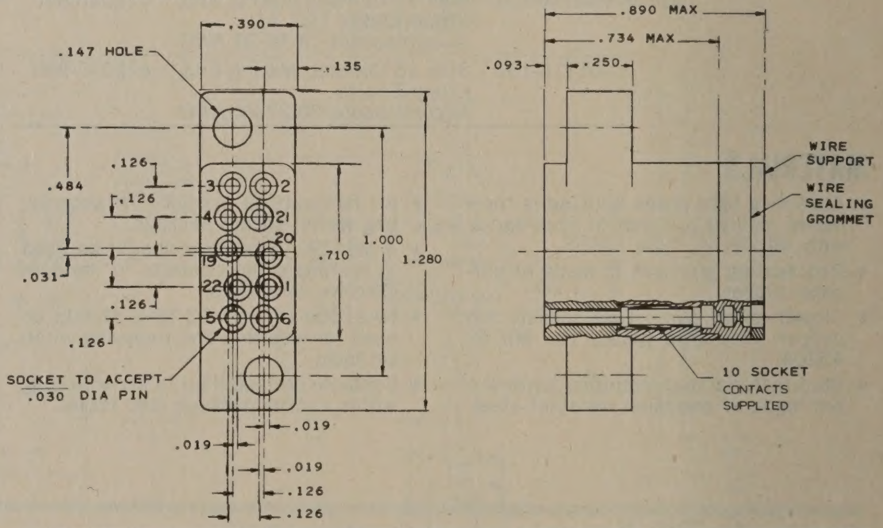
APPLETON RELAY SOCKET NO. 41116-160, 161, 162
9 SIZE 12 CONTACTS
2 SIZE 16 CONTACTS



.300
.150
.432
.234
.630
1.710
1.406
.625
1.000
.890 MAX
.690 MAX
.220
.093
2 SOCKET CONTACTS SIZE 16
9 SOCKET CONTACTS SIZE 12
1.000
.93 SQ. REF.
WIRE SEALING GROMMET
4-40 UNC-2A
.29 REF
.28 REF
.57 REF
4-4 UNC-2A
10-32 UNF-2A

Appleton No.	Contacts Supplied	Contact No.
451116-160	None	—
451116-161	9 Socket Contacts, Size 12 2 Socket Contacts, Size 16	422053-900 422054-900
451116-162	9 Socket Contacts, Size 12, #16 Crimp 2 Socket Contacts, Size 16	422089-900 422054-900

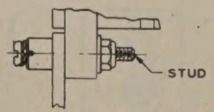
APPLETON RELAY SOCKET NO. 451116-431
22 SIZE 10 CONTACTS



.390
.147 HOLE
.135
.126
.484
.126
.031
.126
.126
1.000
.710
1.280
SOCKET TO ACCEPT .030 DIA PIN
.019
.019
.019
.126
.126
.890 MAX
.734 MAX
.093
.250
WIRE SUPPORT
WIRE SEALING GROMMET
10 SOCKET CONTACTS SUPPLIED

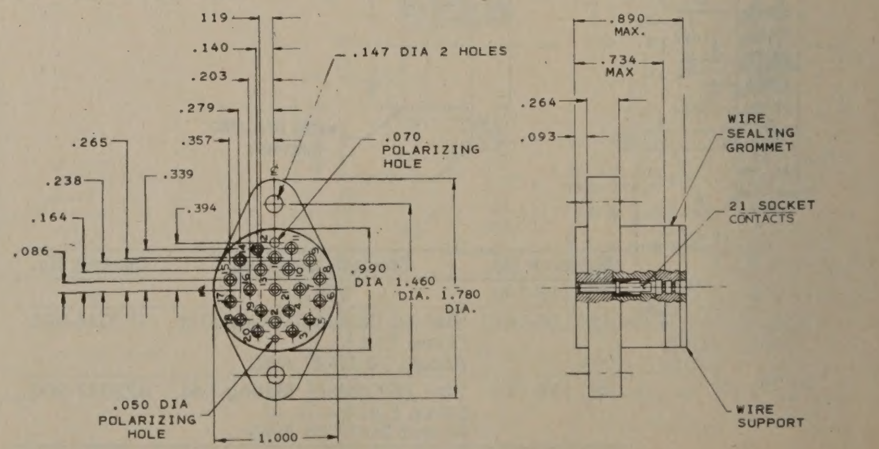
MATERIALS

- Attractive green housing and wire support is thermoset molded material in accordance with MIL-M-14, Type SDG-F.
- Appleton socket contacts are copper alloy and gold plated per MIL-G-45204.
- The stud material and mounting hardware are corrosion resistant passivated steel.
- Socket contacts are of the closed entry type.
- All hardware and contacts are supplied.
- With Appleton No. 451116-431, crimp tool M22520/2-01 should be used to terminate socket contacts to their respective wire sizes. Furthermore, for the above Appleton No., MS27534-22 tool should be used for inserting and removing wired mating socket contacts.
- With Appleton No. 451116-441, crimp tool M22520/1-01 should be used to terminate socket contacts to their respective wire sizes. Furthermore, for the above Appleton No., MS27534-20 tool should be used for inserting and removing wired mating socket contacts.



Hardware Supplied

APPLETON RELAY SOCKETS NO. 451116-441
20 SIZE 21 CONTACTS



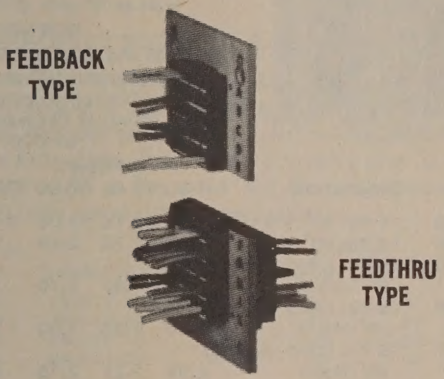
119
.140
.203
.279
.357
.265
.339
.238
.394
.164
.086
.147 DIA 2 HOLES
.070 POLARIZING HOLE
.990 DIA
1.460 DIA.
1.780 DIA.
.050 DIA POLARIZING HOLE
1.000
.890 MAX.
.734 MAX
.264
.093
WIRE SEALING GROMMET
21 SOCKET CONTACTS
WIRE SUPPORT

Appleton *electronics division*
ELECTRIC COMPANY

PROGRAMMING TERMINAL BLOCKS

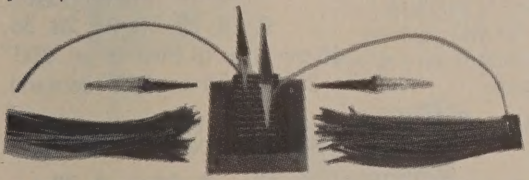
DEPT. EM / 1701 WELLINGTON AVENUE / CHICAGO, ILLINOIS 60657 / (312) 281-6400

Appleton programming terminal blocks offer a complete selection of bussed or individual circuits. Choose from feedback or feedthru types in sizes 16 and 20 (color coded). The unique one-piece socket contact design provides uninterrupted circuit through all bussed positions. Appleton individual terminal blocks meet your needs for interconnection, bussing, and signal distribution.


FEEDBACK TYPE
FEEDTHRU TYPE

TERMINAL BLOCKS

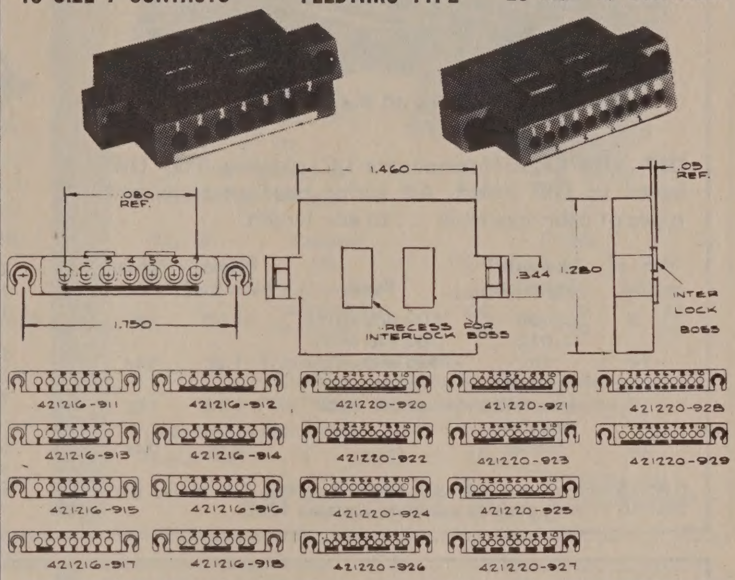
Appleton Programming Terminal Blocks are offered in Feedthru and Feedback types to provide electrical continuity program bussing for input/output as required for your application. Size 16 blocks (color coded blue and rated at 13 amps) accept 16, 18, and 20 AWG stranded wire, and provide up to 15 contacts per square inch. Size 20 blocks (color coded red, rated at 7.5 amps) accept 20, 22, and 24 AWG stranded wire, and provide up to 21 contacts per square inch. Appleton Programming Terminal Blocks are available for plate mounting; call or write Appleton's quality engineering staff for assistance in order to meet your various application problems. They will follow your designs or develop mounting plates for your particular situation.



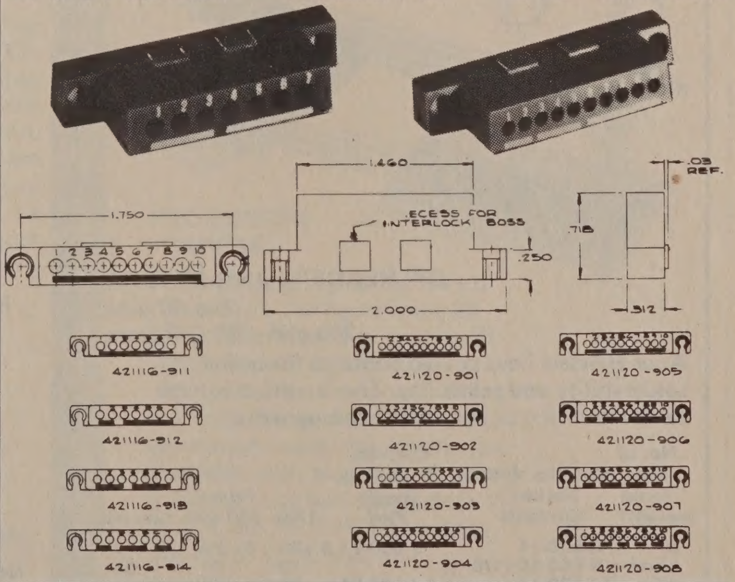
EASY INSERTION/REMOVAL OF PIN CONTACTS

Standard plastic tool permits simple insertion or removal of pin contacts for disassembly or programming circuit changes without disturbing other program functions. Highly reliable crimp wire termination pin contacts are used. Crimping is accomplished with standard industry-accepted manual or semi-automatic tools.

16 SIZE 7 CONTACTS FEEDTHRU TYPE 20 SIZE 10 CONTACTS


1.460
.080 REF.
.05 REF.
1 2 3 4 5 6 7
.344
1.280
1.750
RECESS FOR INTERLOCK BOSS
INTER LOCK BOSS
421216-911
421216-912
421220-920
421220-921
421220-928
421216-913
421216-914
421220-922
421220-923
421220-929
421216-915
421216-916
421220-924
421220-925
421216-917
421216-918
421220-926
421220-927

16 SIZE 7 CONTACTS FEEDBACK TYPE 20 SIZE 10 CONTACTS


1.460
.03 REF.
1.750
ECESS FOR INTERLOCK BOSS
.718
1 2 3 4 5 6 7 8 9 10
.250
2.000
.312
421116-911
421120-901
421120-905
421116-912
421120-902
421120-906
421116-913
421120-903
421120-907
421116-914
421120-904
421120-908

FEATURING

1. CRIMP SCREW MACHINE CONTACTS

A) Accepts MIL-C-39029/1 Pin Contacts
B) Rear Release Removable
C) MIL-C-83723/31 Contact Insertion/Extraction Tool

2. INTERNAL BUSSING

A) One Piece, Contact and Buss Insures Low, Constant Millivolt Drop
B) Bussing Combinations to Suit Your Needs

3. CONNECTOR SIZES

A) 16 Size Color Coded Blue Available in Feedback and Feedthru Design, Includes 7 Contacts
B) 20 Size Color Coded Red Feedback and Feedthru Design Includes 10 Contacts
C) 12 Size Color Coded Yellow Feedback and Feedthru Design Includes 5 Contacts

4. MOUNTING

A) Two 4-40 Screws are Required for Mounting
B) Snap-on Mounting Feature
C) Interlocking Bosses and Recess for Polarizing and Stacking

5. APPLICATION STANDARDIZATION

The Low-cost Terminal Blocks are Designed to Use the Same MS-39029/1 Pin Contact, MIL-T-22520 Crimping System and MIL-83723/31 Insertion Removal Tools used in the Sophisticated Military MIL-T-81714 Terminal Junction System. Appleton is also a Major Supplier of MIL-T-81714 T.J.S.

ARIES™ ELECTRONICS, INC. DIP Sockets,

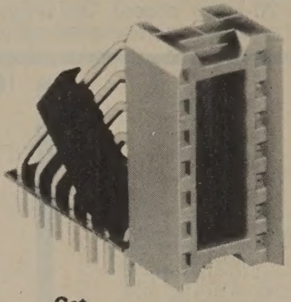
P.O. Box 231, Frenchtown, N.J. 08825
Telephone (201) 996-4096, TWX 510-235-3391

8 to 40 Pins

DIP JUMPERS: Interconnect I.C. patterns from DIP board to DIP board. All wiring configurations and types of cable available . . . to any length.

No. of Pins	Length in Inches	Type	Prices Each End	Cable/ ft.
8	—006 —012	100 side entry 103 top entry	$1.00	14¢
14	etc. to any	115 end entry etc.	1.00	14¢
16	specified length in	see cat. 1200	1.10	16¢
24	inches		2.50	24¢

DIP Extenders and DIP-ER Logic Jumpers with Aries DIP Sockets at ends are also available. Catalog 1200.



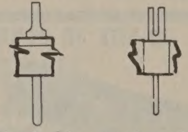
VERTISOCKETS for LED's 30°, 45°, 60°, 90°

For standard LED's and incandescent displays as well as .5" and .6" high large displays

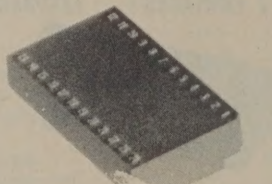
.200,.300 and .600 DIP Rows
2 to 40 pins on .100 centers
Gold plated bifurcated contacts accept round or flat leads up to .020" dia.

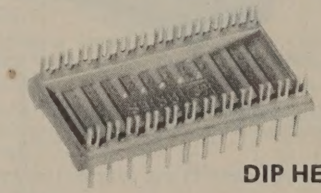
Cat. No.	Description	Prices 1-9	10-49	50-99	100-249
14-810-90	14 Pin 90° Vert.	$2.25	$2.15	$2.05	$1.95
16-810-90	16 Pin 90° Vert.	2.85	2.75	2.65	2.35
14-823-90	14 Pin (.300 spacing)* 90° Horiz.	1.85	1.80	1.70	1.60
16-823-90	16 Pin (.300 spacing)* 90° Horiz.	2.10	2.00	1.90	1.80
18-823-90	18 Pin (.300 spacing)* 90° Horiz.	2.35	2.25	2.15	2.05

Horizontal and edge card mounting styles available. Collet style vertical and horizontal Vertisockets 8 to 40 pins. See Catalog 8000-A for complete listing of horizontal, vertical, edge card and specials.


Single Pin Forked Contact

Covers (1/8", 3/8", 1/2", 3/4")





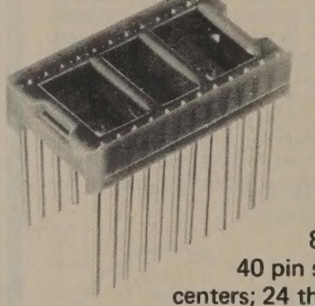
DIP HEADERS AND COVERS

2 to 40 pins
.300 and .600 DIP rows

Aries Headers have coined contacts for better solderability and reliability. The "bathtub" shape eases mounting of cylindrical components.

No. of Pins (gold plated)*	Cat. No. with Forked Contacts	Cat. No. with Single Pins	Prices 1-99	100-499	500-959
8	8-600-11	8-600-21	$ .89	$ .79	$ .72
cover	8-650-10 (1/8"†)		.10	.09	.08
14	14-600-11	14-600-21	.95	.85	.77
cover	14-650-10 (1/8"†)		.09	.08	.07
cover	14-650-20 (3/8"†)		.095	.085	.075
cover	14-650-30 (1/2"†)		.10	.09	.08
cover	14-650-40 (3/4"†)		.105	.095	.085
16	16-600-11	16-600-21	1.08	.98	.88
cover	16-650-10 (1/8"†)		.10	.09	.08
cover	16-650-20 (3/8"†)		.105	.095	.085
cover	16-650-30 (1/2"†)		.11	.10	.09
cover	16-650-40 (3/4"†)		.115	.105	.095
24	24-600-11	24-600-21	1.80	1.45	1.16
cover	24-650-10 (1/8"†)		.19	.14	.10
cover	24-650-20 (3/8"†)		.21	.15	.12

*Tin plating also available. † component height



DIP SOCKETS

Available with gold or tin plated bifurcated contacts, Solder Tail or 2 wrap or 3 wrap pins on .100" spacing. Socket 30% glass filled thermoplastic. 8, 14, 16, 18, 24, 28, 36, 40 pin sizes (8 thru 18 on .300" centers; 24 thru 40 on .600" centers).

No. of Pins	Catalog No. (Solder Tail)	Prices 100-499	500-999	1000-2499
8	8-511-10*	$ .42	$ .34	$ .29
14	14-511-10	.43	.35	.30
16	16-511-10	.50	.42	.36
18	18-511-10	.57	.49	.42
24	24-511-10	1.19	1.09	.94
28	28-511-10	1.42	1.32	1.21
36	36-511-10	1.67	1.50	1.39
40	40-511-10	1.79	1.63	1.45

Wire-Wrap Pins

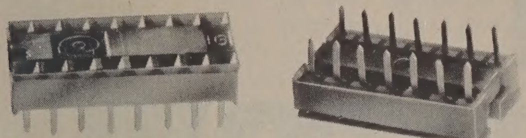
No. of Pins	Catalog No. 2 Wrap	3 Wrap	Prices 10-499	500-999	1000-2499
8	8-501-20*	8-501-30*	$ .66	$ .53	$ .45
14	14-501-20	14-501-30	.70	.58	.50
16	16-501-20	16-501-30	.78	.66	.57
18	18-501-20	18-501-30	.95	.82	.70
24	24-501-20	24-501-30	1.49	1.25	1.09
28	28-501-20	28-501-30	1.72	1.53	1.36
36	36-501-20	36-501-30	2.19	1.93	1.76
40	40-501-20	40-501-30	2.39	2.19	1.96

*Tin plated. Gold plating also available.
See Catalog 5000.

Sockets with collet type pins available from 2 to 40 pins.
Consult factory.

Jumpers, Headers

The product listings shown here are abbreviated. Complete data, dimensions and material specifications are available in various Aries catalogs, which have been noted with each listing. Our line of DIP packaging accessories is extremely broad and we urge you to contact the factory or our sales representative in your area. Your inquiries will receive our prompt attention.



LO-PROFILE SOCKETS 8 to 40 Pins

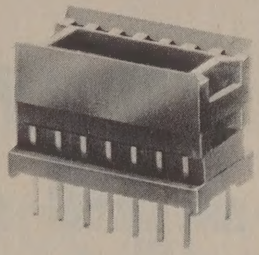
Extremely low profile socket (.150 nominal height). Side and end stackable on .100 grid (closed entry top). Bottom sealed to prevent solder wicking or flux contamination. Bifurcated contacts grip smooth flat edges of IC's. Body of S.E.O. rated thermoplastic. .020 high stand off for easy cleaning.

No. of Pins	Catalog No.	Prices			
		1-99	100-499	500-999	1000-2499
8	8-512-10*	$.45	$.42	$.31	$.26
14	14-512-10	.46	.43	.32	.27
16	16-512-10	.56	.50	.39	.32
24	24-512-10	.92	.86	.64	.54

*Tin Plated. Gold plating also available.
Use 1 as last digit to denote gold plating.

SPECIAL: A TRIAL ORDER of any combination of 100 LO-PRO Sockets $29.00

ELEVATOR SOCKET



14 Pin elevator socket allows mounting devices, such as LED's, displays, switches, etc. to any desired height (¼" to 1¼" from board to bottom of device).

No. of Pins	Catalog No.	Prices		
		1-999	1M	5M
14	14-8250-10*	$.99	$.79	$.59
	14-8670-10	.99	.79	.59
	14-81250-10	.99	.79	.59

These are stock items.
Other sizes available on one week delivery.
*Tin Plated. Gold plating also available.

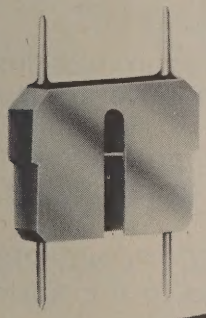
Catalog No. Description

No. of Pins — 14 — 8250 — 10

Style 250 = .250 high from board to bottom of device

10 = Tin Plating
1 = Gold Plating

DP-300



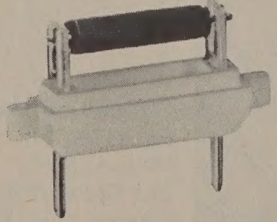
DIPATCH

Programmer-Shorting Plug
Two styles of DIPATCH are available. DP 300 has storage ears to stay with socket in open position. When metal pins are inserted it becomes a switch. The LP-300 is a low profile model without storage ears.

LP-300

TWO PIN HEADER 2-600-11E

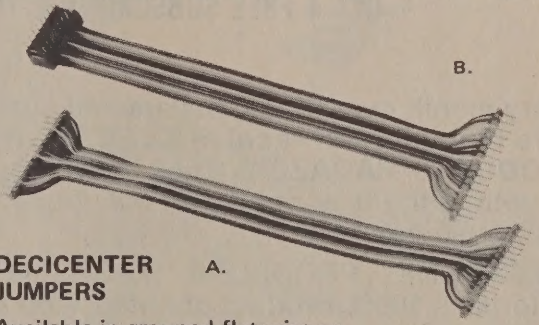
Allows any discrete component to be interposed into a DIP Socket position. High forked contacts for easy soldering.



TWO PIN HEADER

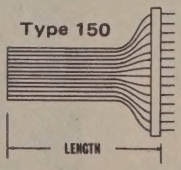
Cat. No.	Prices			
	10-49	50-99	100-499	500-999
DP-300	$.40	$.30	$.25	$.20
LP-300	.40	.30	.25	.20
2-600-11*	.29	.28	.25	.20

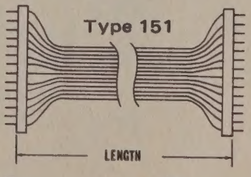
*Gold plated. Tin Plating also available. See Catalog 3000.



DECICENTER JUMPERS

Available in grouped flat wire or twisted pair configurations. 26 AWG Color Coded (7 strands 34 AWG) Type B 600 Volt 105°C. .010 wall. For component wiring at low cost. Shipped pre-tested and pre-tinned—ready for installation. Available with plug ends (B above) in consecutive wiring sequence (1, 2, 3, 4, etc.) or DIP sequence (1, 16, 2, 15, 3, 14, etc.)





No. of Conductors	Price Per End			Price Cable/Ft.
	1-9	10-24	25-99	
14 or less	$1.25	$1.10	$1.00	$.15
15 to 24	1.50	1.30	1.20	.20

For complete information see Catalog 1250.

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Coaxial connectors? Automatic wrote the books!

Automatic has earned its leadership role in the design and production of special coaxial connectors and RF devices. Perhaps the broadest line in the industry. A learning experience of 40 years. A completely integrated capability from prototype to volume manufacturing capacity. A reputation for quality that sets the standards for commercial, industrial and mil-spec application.

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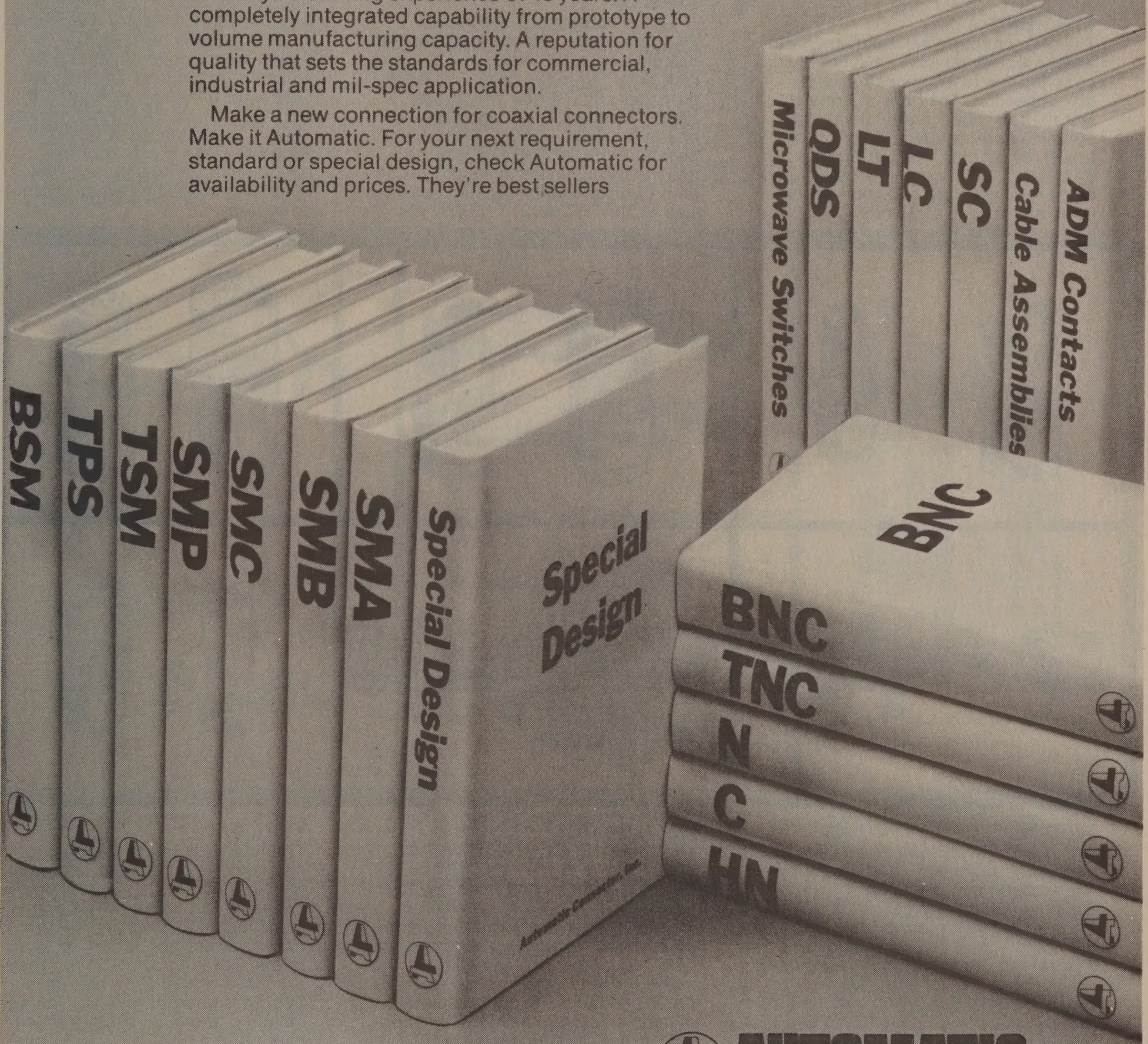
Microwave Switches
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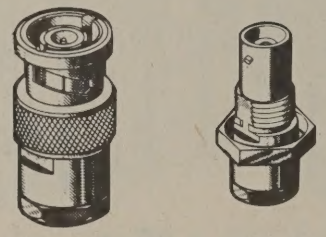
A subsidiary of **ASU** *Industries, Inc.*

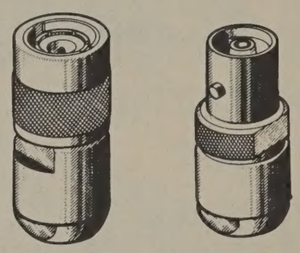
AUTOMATIC CONNECTOR, INC.

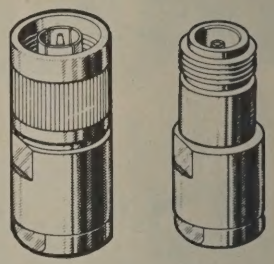
TYPE BNC
These Connectors are small and lightweight, equipped with a bayonet lock coupling for fast connection and disconnection. They are of constant impedance with a nominal value of 50 ohms and introduce little discontinuity in 50 ohm coaxial circuits. BNC's are fully weatherproofed, and rated for use where maximum voltage does not exceed 500 volts.

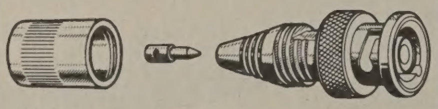
TYPE C
C series connectors are recommended where fast connection and disconnection by means of a bayonet-lock coupling is required. For these purposes, this series which has improved mechanical and electrical characteristics is ideal. They are of constant impedance and may be used with minimum mismatch in 50 ohm circuits employing such medium size cables as RG-213, 214/U etc.

TYPE N
Recommended for use where a medium size connector with screw type coupling is desired. They are a general purpose connector of constant impedance and may be used with minimum mismatch in 50 ohm circuits. These connectors have a maximum peak rating of 1500 volts and a practical frequency limit of 10,000 mc. They are also gasketed for weatherproof operation.

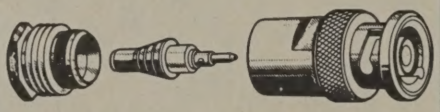


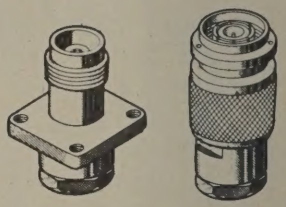






Typical captive contact, Wedge-Lock construction.





WEDGE-EZE^{T.M.} TYPE BNC
The WEDGE-EZE connectors provide reliability, efficiency, and economy far exceeding that of ordinary "crimp" type connectors. WEDGE-EZE connectors are field serviceable and reusable! They utilize an exclusive "spiral ratchet" that allows assembly by automatic machinery, as well as assembly and disassembly in the field without the use of special tools. WEDGE-EZE connectors are available in many series types.

WEDGE-LOCK^{T.M.}
The CAPTIVE CONTACT, WEDGE-LOCK provides the ultimate in efficiency, reliability and economy in the application of coaxial connectors. The time used for normal assembly procedures is reduced by more than 50%. Combing and trimming of the cable braid is not required, thereby greatly reducing, if not completely eliminating, the possibility of "shorting" inside the connector. These connectors are completely field serviceable and reusable.

TYPE TNC
TNC connectors are a threaded coupling version of the improved BNC connectors. The threaded coupling and safety wire provisions insure locking and secure mating under conditions of extreme vibration and shock. They are rated at 500 volts and have been designed to give low voltage standing wave ratios at frequencies up to 11,000 MHz in 50 ohm circuits and are gasketed for weather-proof operation.

WEDGE-LOCK, WEDGE-EZE and ECONO-CRIMP, TM's Automatic Connector, Inc.

A subsidiary of **ASU** *Industries, Inc.*

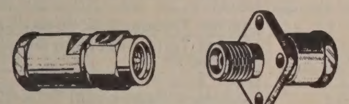
AUTOMATIC CONNECTOR, INC.

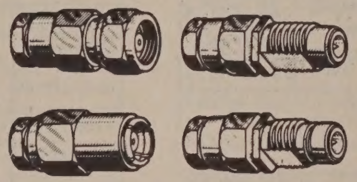
TYPE SMA

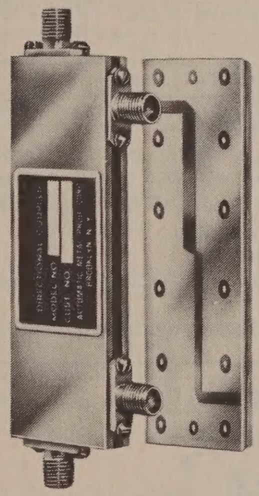
Developed to fill the need for a low VSWR general purpose connector for use at all microwave frequencies. Its inherent ruggedness, simplicity and size lend well to lower frequency usage. It is especially well suited for systems as well as components use; with a complete range of types available. The relatively small size and low VSWR, compared to other commonly used microwave connectors, has contributed measurably to the miniaturization of microwave connectors. It also allows operation at all frequencies up to 26 GHz. Choice of materials is an important consideration. All shell and body parts are made of stainless steel for ruggedness and long life.

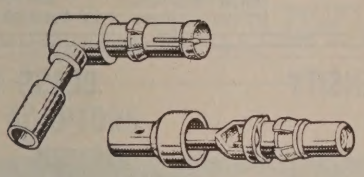
TYPE SMB & SMC

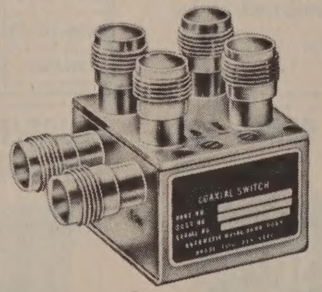
Designed for critical miniaturization requirements. Recommended for use in test equipment video lead applications, communication receivers, IF & RF circuits, or wherever miniaturization is a factor. Their rugged construction, matched impedance and excellent frequency characteristics make them well suited to missile & satellite applications. Both series are fundamentally of the same interior construction allowing outside dimensions to remain essentially constant for most cable sizes used.











ADM CONTACTS

Due to the increased usage of modularization and miniaturization of military and commercial communications, radar, IFF, and test equipment, there is an ever expanding need for miniature multipin connectors that include D.C., low frequency, video and high frequency, as well as high voltage and high power connection capabilities in one unit. These connectors afford a reliable multipin connection in all these combinations mentioned above in a mix or match type of application.

MICROWAVE SWITCHES

Automatic Connector, Inc. coaxial switches are designed for compactness, fast operation, maximum economy, and with a view toward extreme reliability. They are available in many combinations of connector series and configuration.

SPECIAL PRODUCTS

Automatic Connector, Inc. has full capability to manufacture many microwave products as well as various types of coaxial cable assemblies. Some of the other products are attenuators, directional couplers, dummy loads, coaxial filters, power dividers. Why not give us a call for your next production requirement?

AUGAT® Boards/Accessories

SOCKET/TERMINAL VARIATIONS

Two piece tapered entry socket terminal — four leaf machined closed entry inner contact and machined outer sleeve.

All catalogued boards are supplied with 3 level socket terminals, gold over nickel plated sleeves and contacts.

Any board may be purchased with 2 level socket terminals and optional plating combinations, by adding the proper suffix to the part number, as indicated in the example box below.

SOCKET TERMINAL OPTIONS: For wrap length, plating and replacement parts, see table below.

Example Part Number	Suffix Added to Number	Contact Plating	Sleeve Plating	Socket Terminal Length	Replacement Part Number
8136-PG1-30	None	Gold	Gold	12,95/.510 (3 level)	LSG-1FG1-1
8136-PG1-30-TG	-TG	Gold	Tin		LSG-1FG1-14
8136-PG1-30-2	-2	Gold	Gold	9,40/.370 (2 level)	LSG-1FG6-1
8136-PG1-30-2TG	-2TG	Gold	Tin		LSG-1FG6-14

MATERIALS

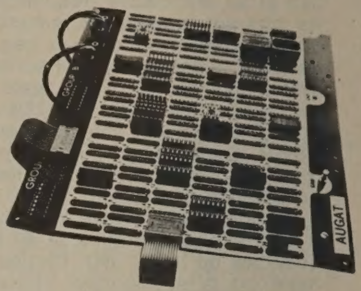
Two-piece, Machined Socket Terminal:
Inner Contact — beryllium copper, gold over nickel plated.
Outer Sleeve — brass, gold over nickel plated or tin over copper plated.

Board: Glass epoxy, 2 oz. copper circuitry, tin plated both sides.

Pins: phosphor bronze, gold over nickel plated.

PATTERNED BOARDS CLASS 005

P-SERIES

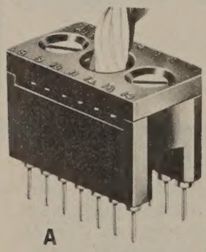


- 1/8" thick board accepts 14 and 16 lead dip I.C.'s.
- Modular Construction — boards may be purchased in multiples of 30 patterns (up to 180 patterns) indicated by suffix number. EXAMPLE: 8136-PG1-90 90 patterns.

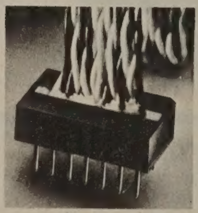
See specs. for socket terminal variations.

Part Number	Socket/ Terminals Per Pattern	Voltage & Ground Connections	I.O. Area (for Every 30-Pattern Section)
8136-PG1	14	7 & 14	Socket Terminals (2 Rows of 23)
8136-PG18			Feed Thru Pins (2 Sets: 2 Rows of 13) Total-52 Pins
8136-PG3	14 + 2 (V & G)	V & G Sleeves	Socket Terminals (2 Rows of 23)
8136-PG189			Socket Terminals, High Density (4 Rows of 7)
8136-PG19			Feed Thru Pins (2 Sets: 2 Rows of 13) Total-52 Pins
8136-PG5	16	8 & 16	Socket Terminals (2 Rows of 23)
8136-PG190			Socket Terminals, High Density (4 Rows of 7)
8136-PG20			Feed Thru Pins (2 Sets: 2 Rows of 13) Total-52 Pins
8136-PG13	16 + 2 (V & G)	V & G Sleeves	Socket Terminals (2 Rows of 23)
8136-PG191			Socket Terminals, High Density (4 Rows of 7)
8136-PG21			Feed Thru Pins (2 Sets: 2 Rows of 13) Total-52 Pins

PLUGS/MALE CLASS 130


A

Styles A & B plugs available unassembled.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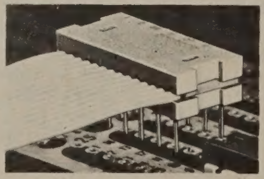

.300" x .100" Spacing

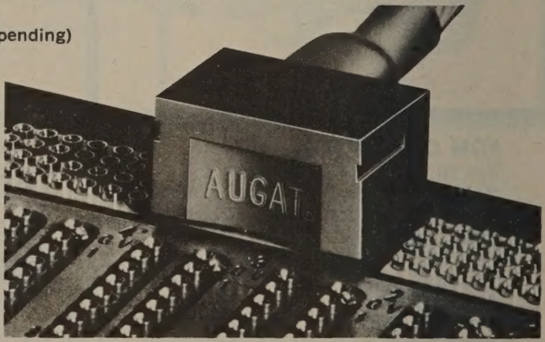
B

Part Number	Style	No. of Pins	Description
1P14-3T12-1	A	14	Inter-facing Plugs
2P14-1R12-1	B	14	Flat Cable Plugs
7P14-2T12-1	C	14	Ribbon Cable (twisted pair)
7P14-3T12-1	C	14	Ribbon Cable (flat cable)

NOTE: Standard 12", 24" and 36" lengths available. EXAMPLE: 1P14-3T12"-1. NOTE: For 16 pin assemblies, replace 14 with 16. EXAMPLE: 1P16. NOTE: For double ended plug assemblies, replace -1 suffix with -2. EXAMPLE: 1P14-3T12-2.

PLUGS/HIGH DENSITY CLASS 130

(patent pending)



28 PINS
.100" x .100"
Grid Spacing

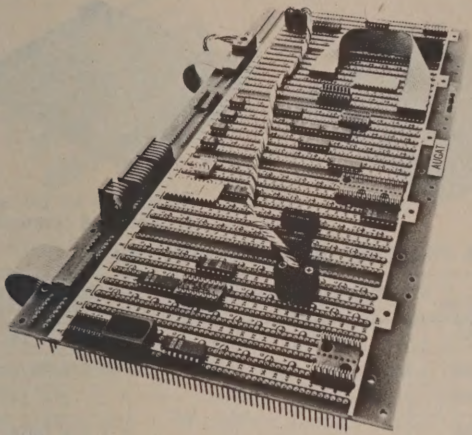
Part Number	Description
9P28-2S12-1	Assembly
8136-742P1	Hood
9P28-2G1	Base (with pins)

NOTE: Standard 12", 24" and 36" lengths available. EXAMPLE: 9P28-2S12"-1. NOTE: For double ended plug assemblies, replace -1 suffix with -2. EXAMPLE: 9P28-2S12-2.

MATING SOCKETS AVAILABLE
Part No. 528-AG28D (P.C.)
Part No. 528-AG24F (Wire wrap)

Boards / Accessories

UNIVERSAL BOARDS CLASS 005



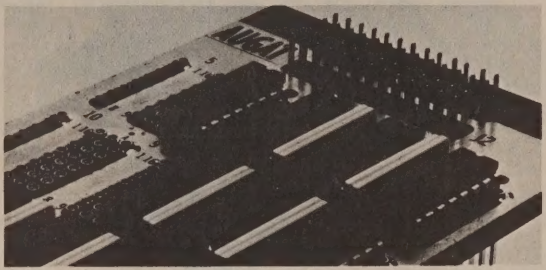
U-SERIES

• 1/8″ thick board accepts any combination of 6 through 40 lead dip I.C.'s. • Modular Construction — boards may be purchased in multiples of 9 rows (up to 54 rows) indicated by suffix number. EXAMPLE: 8136-UG1-27 27 rows on .300″ centers. See specs. for socket terminal variations.

Part Number	Voltage & Ground Connections	I.O. Area (for every 9-Row Section
8136-UG1	V & G Sleeves	Socket Terminals (2 Rows of 23)
8136-UG119		Socket Terminals, High Density (3 Sets: 4 Rows of 7) Total-84-Pins
8136-UG56	V & G Socket/Terminals	Socket Terminals (2 Rows of 23)
8136-UG6	V & G Sleeves	Feed-Thru Pins (2 Sets: 2 Rows of 13) Total - 52 Pins
8136-UG61	V & G Socket/Terminals	

ECL BOARDS CLASS 020

(3 PLANES)



ECL/SIP SERIES

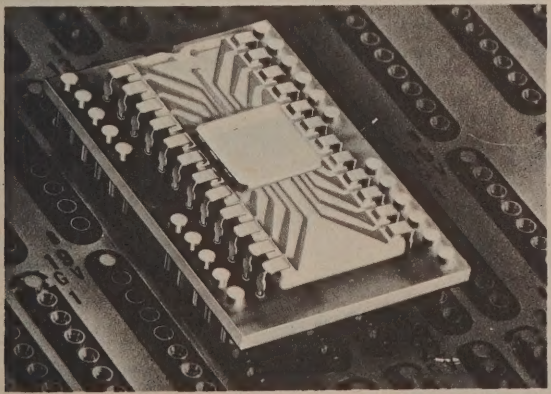
(patent pending)

• 1/8″ thick, 3 voltage plane boards include — 2.0V plane to terminate pull down resistors. Accommodates pluggable sip resistor networks without loss of density. Board available for ECL/TTL translators. 24-pin ALV and standard 16 pin gates.

• Modular construction available in multiple I.C. positions. See specs. for socket terminal variations.

Part Number	Function	Socket/ Terminals Per Pattern	Voltage & Ground Connections	I.O. Terminations
8136-ECL21	Standard	16	Vcc Pin 1 + 16 (ALU) 1 + 24 (Translator) 16 Vee Pin 8 (ALU) 12 + Vcc (Translator) 9 Vtt (All sip networks Pin 1)	Feed Thru
8136-ECL23	Translator			
8136-ECL26				
8136-ECL24	Array Multiplier	16 and 24		
8136-ECL25	ALU			

LSI ADAPTORS CLASS 105



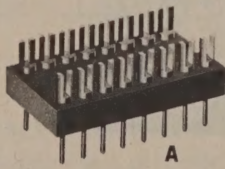
• Accept up to 40 lead LSI dip's. • Interposing LSI circuits on 14 and 16 pin patterns. • Adaptor pins located to prevent improper position on panel. •Dip's soldered into adaptor which plugs into panel. • Adaptor plugs also available for TO-5 conversion.

Part Number	Application
628-HG16	Up to 28 Pins .600″ x .100″ Spacing
640-HG16	Up to 40 Pins .600″ x .100″ Spacing

ADAPTORS CLASS 100

- 3 Pin styles.
- Single, double patterns.

- Slotted pin only.
- Low profile.
- Low cost.
- Cover available.



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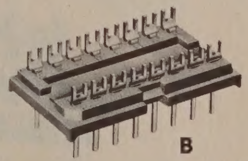


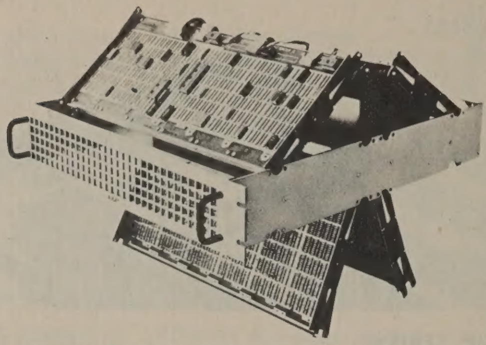
B

Part Number	Style	No. of Pins	Pin Spacing	Description
614-CG1	A	14	.300″ x .100″	Slotted Pin
616-CG1	A	16		
614-DG5	B	14		
616-DG5	B	16		
614-CG3	A	14	.600″ x .100″	Slotted Pin
616-CG3	A	16		
624-CG1	A	24		
628-CG2	A	28		
636-CG1	A	36		
640-CG1	A	40		

NOTE: Plugs available in 3 pin styles: round, solder pocket and slotted — single and double patterns. (Style A only.)
Cover — 14 pin, 614-2P1: 16 pin, 616-2P1. (Style B only.)

AUGAT® *Drawers Boards/Racks*

DRAWER ASSEMBLIES CLASS 200



DRAWER ASSEMBLIES

- Accepts up to four plane mount boards, up to 720 dip I.C.'s.
- Frames are hinged either side for accessibility and easy removal.
- Dust covers furnished.
- Designed for 19″ rack mounting.
- Optional perforated or solid end plates.

FULL DRAWER DEPTH: 20.425 ±.030

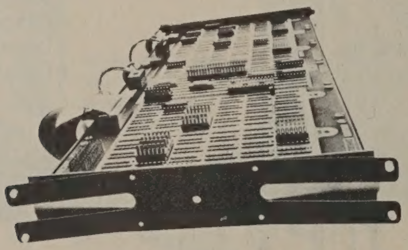
Part Number	Description
8170-DG1	Drawer assembly with fan cutout rear plate and perforated front plate. (Accepts 4 board frames.)
8170-DG2	Drawer assembly with rear blank plate and front blank plate. (Accepts 4 board frames.)

HALF DRAWER DEPTH: 12.325 ±.030

Part Number	Description
8170-DG4	Drawer assembly with fan cutout rear plate and perforated front plate. (Accepts 2 board frames.)
8170-DG5	Drawer assembly with rear blank plate and front blank plate. (Accepts 2 board frames.)

NOTE: Order board frames separately.

MATERIALS: (Full drawer and half drawer)
All frame members are aluminum, gold iridite. Front plate is painted blue.



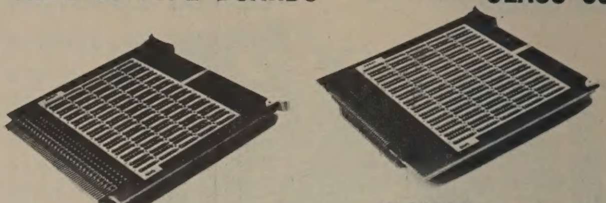
BOARD FRAMES

Frames are hinged at both ends with spring latch, permitting accessibility to either component side or wire wrapped side of board. Frame may also be removed by depressing both ends of spring latch. Mounts full 180 pattern board or a combination of board styles up to 180 patterns.

Part Number 8170-14G1
Accepts any board series with 175,26/6.900 Max. Width x 411,48/16.200 Max. Length.

Part Number 8170-14G2
Accepts any board series with 190,50/7.500 Max. Width x 411,48/16.200 Max. Length.

PLUG IN TYPE BOARDS CLASS 005



W-SERIES for pin and socket type connections.

R-SERIES FOR EDGE BOARD CONNECTIONS

Part Number	Socket/Terminals Per Pattern	Board Thickness	Voltage & Ground Connections
8136-RG1	14 .300″ x .100″ Spacing	⅛″	7 + 14
8136-RG2			V + G Terminals
8136-RG7		1/16″	7 + 14
8136-RG8			V + G Terminals
8136-RG3	16 .300″ x .100″ Spacing	⅛″	8 + 16
8136-RG4			V + G Terminals
8136-RG9		1/16″	8 + 16
8136-RG10			V + G Terminals
8136-RG58	Blank Card	⅛″	
8136-RG85		1/16″	
8136-138G1	Extender Card	⅛″	
8136-RG86		1/16″	

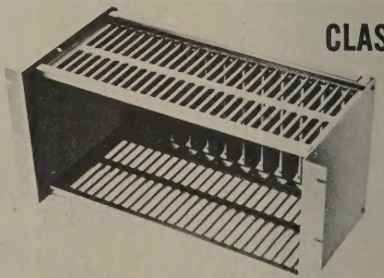
NOTE: Connector only — Part No. 14005-1P1 (⅛″) 14005-19P1 (1/16″) (120 contact — 60 dual row).

UNIVERSAL TYPE

Part Number	No. of Rows	Board Thickness	Voltage & Ground Connection
8136-URG1	20 Rows of 50 Contacts on.300″ Centers	⅛″	V + G Terminals
8138-URG14		1/16″	

Also available . . . A universal style I.C. packaging board for station access in the "CAMAC" crate.

RACKS CLASS 205



R-SERIES RACKS FOR R SERIES BOARDS

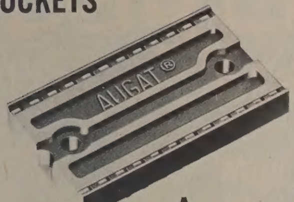
Part Number	Accepts Panel Thickness	Description
8160-EG10	⅛″	Back Panel Only (with 13 connectors)
8160-EG21	1/16″	
8170-RG1	⅛″	Rack with Back Panel for 19″ Rack Mounting
8170-RG14	1/16″	
8170-RG3	⅛″	Same as RG1 or RG14, Except without Back Panel
8170-RG16	1/16″	

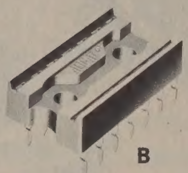
NOTE: The above part numbers are for 13 connector positions. For 3,6 or 9 connector position racks and back panels, simply add proper suffix to the end of part number.
EXAMPLE: 8160-EG10-3 (3 connector position).

AUGAT INC. 33 Perry Avenue, P.O. Box 779, Attleboro, Massachusetts 02703 / (617) 222-2202 / TWX 710-391-0644

Sockets

SOCKETS CLASS 410


A


B

(Low Profile — Printed Circuit)

• Low Cost. • Low Profile — **.163 above P.C. board** (I.C. Seating Plane). • Two termination styles available: APPLICATION: Style A — any hole size down to .025 dia., Style B — recommended mounting hole .035 ±.002 dia. for good retention in P.C. board during wave soldering. • Beryllium copper contacts insures greater and more uniform normal force.

Part Number	No. of Contacts	Insulator		Contact Plating	Termination
		Length	Width		
308-AG39D	8 .300″ x .100″	.400″ Max.	.405″ Max.	Tin	A
308-AG40D				Gold	
308-AG37D				Tin	B
308-AG38D				Gold	
314-AG39D	14 .300″ x .100″	.700″ Max.	.405″ Max.	Tin	A
314-AG40D				Gold	
314-AG37D				Tin	B
314-AG38D				Gold	
316-AG39D	16 .300″ x .100″	.800″ Max.	.405″ Max.	Tin	A
316-AG40D				Gold	
316-AG37D				Tin	B
316-AG38D				Gold	
318-AG39D	18 .300″ x .100″	.900″ Max.	.405″ Max.	Tin	A
318-AG40D				Gold	
318-AG37D				Tin	B
318-AG38D				Gold	
324-AG39D	24 .600″ x .100″	1.200″ Max.	.705″ Max.	Tin	A
324-AG40D				Gold	
324-AG37D				Tin	B
324-AG38D				Gold	
340-AG39D	40 .600″ x .100″	2.000″ Max.	.705″ Max.	Tin	A
340-AG40D				Gold	
340-AG37D				Tin	B
340-AG38D				Gold	

NOTE: Request information on 22 and 28 contact sizes.

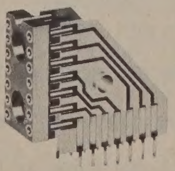
MATERIALS

Insulator: Thermoplastic polyester, UL rated 94V-O.
Contacts: Beryllium copper, gold over nickel or tin plated.
Wafer: .005 Tk. Nomex.

SOCKETS (L.E.D.) CLASS 425

45°, 60°, and 90° L.E.D. NUMERIC DISPLAY SOCKET

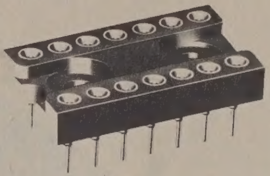
• Two piece machined contact assembly — inner contact and outer sleeve. • Design will permit gang mounting on P.C. board — .400 centers or greater.

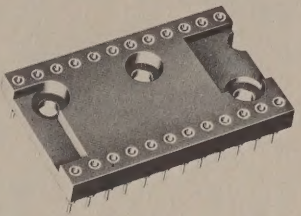

(patent pending)

Part Number	No. of Pins	Socket Angle	Termination
514-AG21D	14 .300″ x .100″	90°	Printed Circuit
514-AG25D		45°	
514-AG26D		60°	

NOTE: For 16 pin, replace 14 with 16. EXAMPLE: 516-AG21D.

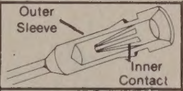
SOCKETS CLASS 415


(Machined Contact)



• Meets most severe environmental conditions including military requirements of high shock and vibration. • Two piece tapered entry socket terminal — four leaf machined closed entry inner contact and machined outer sleeve. • Wire Wrap* (2 or 3 level) or P.C. termination. Gold plated contacts, gold or tin plated outer sleeves.

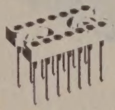
All sockets listed are with printed circuit termination. See note below for ordering sockets with wire wrap termination.



Part Number	No. of Contacts	Insulator			Contact Plating	Sleeve Plating
		Length	Width	Height		
508-AG10D	8 .3″ x .1″	.400″ Max.	.450″	.180″ Max.	Gold	Gold
508-AG11D					Gold	Tin
514-AG10D	14 .3″ x .1″	.750″	.450″	.135″ Max.	Gold	Gold
514-AG11D					Gold	Tin
516-AG10D	16 .3″ x .1″	.850″	.450″	.135″ Max.	Gold	Gold
516-AG11D					Gold	Tin
518-AG10D	18 .3″ x .1″	.900″ Max.	.450″	.135″ Max.	Gold	Gold
518-AG11D					Gold	Tin
522-AG10D	22 .4″ x .1″	1.150″	.550″	.135″ Max.	Gold	Gold
522-AG11D					Gold	Tin
524-AG10D	24 .6″ x .1″	.1200″ Max.	.750″	.135″ Max.	Gold	Gold
524-AG11D					Gold	Tin
528-AG10D	28 .6″ x .1″	1.400″ Max.	.750″	.135″ Max.	Gold	Gold
528-AG11D					Gold	Tin
532-AG10D	32 .6″ x .1″	1.600″ Max.	.750″	.135″ Max.	Gold	Gold
532-AG11D					Gold	Tin
536-AG10D	36 .6″ x .1″	1.800″ Max.	.750″	.135″ Max.	Gold	Gold
536-AG11D					Gold	Tin
540-AG10D	40 .6″ x .1″	2.000″ Max.	.750″	.135″ Max.	Gold	Gold
540-AG11D					Gold	Tin

NOTE: The above sockets are also standard with wire wrap termination, simply replace "D" suffix with "F" suffix for three level and "F"-2 for two level. EXAMPLE:

	Gold/Gold	Gold/Tin
2 Level	516-AG10F-2	516-AG11F-2
3 Level	516-AG10F	516-AG11F



MATERIALS

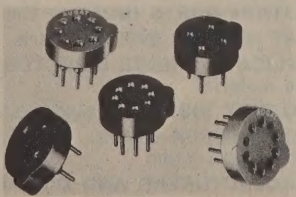
Insulator: Thermoplastic polyester, UL Rated 94V-O.

SOCKET/TERMINALS:

Terminal: Brass, gold over nickel or tin plated.
Female Contact: Beryllium copper, gold over nickel or tin plated.

SOCKETS CLASS 510

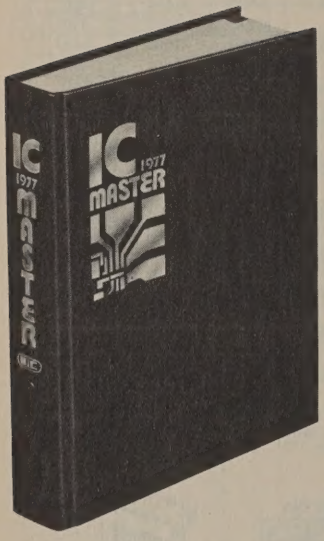
(Trans. & I.C., Low Profile)



• Low cost. • Molded insulator and automated contact assembly — save you money. • Ultra low profile — precision machined contact assembly.

WHEN THE CHIPS ARE DOWN...

THE NEW 1977 IC MASTER PAYS OFF!



The new IC MASTER is the ultimate IC source book.

It lists virtually every IC device manufactured in the United States.

The IC MASTER is the easy, sensible means of narrowing down your IC choices quickly, accurately and systematically. All information is cross-referenced and indexed for rapid problem solving and device selection. And, additionally, the MASTER is updated three times yearly by accumulative supplements.

THE FORMAT OUTLINED:

- **FIVE MASTER SELECTION GUIDES** — 84 companies' IC's organized by type, function, key parameters
- **OVER 1,000 PAGES OF TECHNICAL INFORMATION** — Provided directly by manufacturers covering 17,000 IC's
- **ALTERNATE SOURCE DIRECTORY** — The only industry-wide, pin-for-pin version available
- **MILITARY PARTS INDEX AND CROSS REFERENCE CHART** — Identifies all IC's with JAN qualification
- **MILITARY DEVICE TESTING TABLE** — List companies that screen to Mil. Std. 883
- **MILITARY PARTS INDEX** — The first functional guide to JAN qualified parts
- **PART NUMBER INDEX** — Parts from 84 manufacturers, in numerical sequence
- **APPLICATION NOTE DIRECTORY** — Digest of currently active application note material
- **PRODUCT INDEX** — Provides alphanumeric listing of 84 manufacturers' lines
- **PART NUMBER GUIDE** — Instantly decodes each company's part numbering system
- **MANUFACTURERS AND DISTRIBUTORS DIRECTORY**

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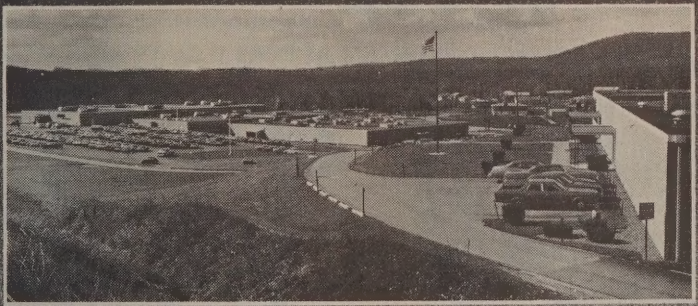
Berg Electronics

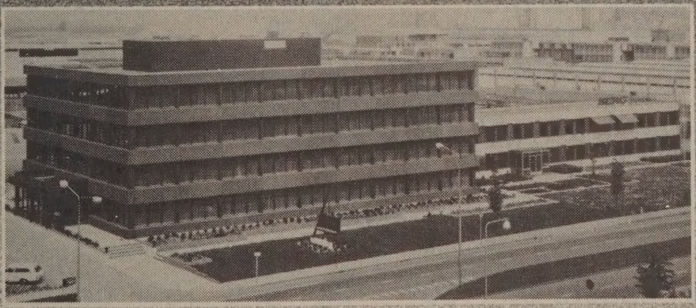
Division E. I. du Pont de Nemours & Co. (Inc.)

A Concise
Review of Berg
Connectors,
Terminals and
Application
Machines

Modular Interconnection Systems for the data processing, instrumentation and communications industries.



Divisional Headquarters: New Cumberland, Pa. U.S.A.



European Headquarters: 's-HERTOGENBOSCH, NETHERLANDS

BERG ELECTRONICS
Division, E. I. du Pont de Nemours & Co. (Inc.)

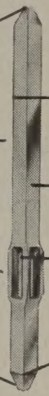
NEW CUMBERLAND, PENNSYLVANIA 17070 • TELEPHONE (717) 938-6711 / IN EUROPE; 's-HERTOGENBOSCH, NETHERLANDS • TELEPHONE 073-123432

BergCon™ .025" square modular interconnection system . . .

offering high density .100" grid stacking . . . end-to-end or side-to-side . . . across a wide range of connector types.

BergPin™ male terminals for disconnect and wire-wrapping

System provides a fast, reliable method for staking pins in circuitboard. Here are the features that distinguish BergPin terminals from ordinary wire-wrapping pins:


Pin tip is designed to facilitate wire-wrapping or disconnect lead-in.

Sharp corners held to .003" maximum radius.

Star-wedge shape provides 8 lbs. retention (at nominal hole size) before soldering; up to 50 lbs. retention after soldering.

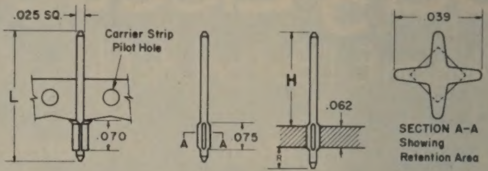
Pin tip is designed to facilitate lead-in when staking.

Uniform cross-section. Made from drawn, not stamped, material. Result: smooth, flat contact surfaces.

Available in six types of surface platings.

Pins are ¾-hard phosphor bronze.

Tapered lead-in will not damage plated through hole or multi-layer construction.



Part Number	Plating	Underplating	Material
75401-	30 mill min. gold*	50 mill min. nickel	Phosphor-bronze (¾ hard) ASTM B159-66
75402-	50 mill min. gold**	10 mill copper flash	Phosphor-bronze (¾ hard) ASTM B159-66
75403-	50 mill min. gold**	50 mill min. nickel	Phosphor-bronze (¾ hard) ASTM B159-66
75404-	150 min. acid tin***	none	Phosphor-bronze (¾ hard) ASTM B159-66
75405-	100 mill min. gold	50 mill min. nickel	Phosphor-bronze (¾ hard) ASTM B159-66
75406-	100 min. gold	100 min. copper	Phosphor-bronze (¾ hard) ASTM B159-66
75407-	PLAIN	none	Phosphor-bronze (¾ hard) ASTM B159-66
75408-	PLAIN	none	Cupro-Nickel C.D.A. No 725

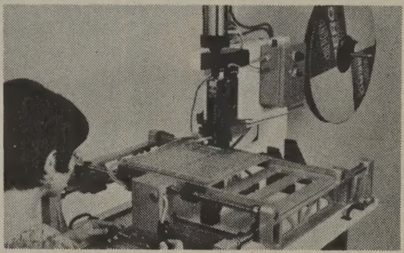
*MIL-G-45204 Type 2 **MIL-G-45204 Type 1 Class 1 ***MIL-T-10727A Type 1

This listing gives the material, plating and underplating; it does not show the pin length or height above board. For these dimensions, we refer you to Berg Bulletin 105 which is available upon request.

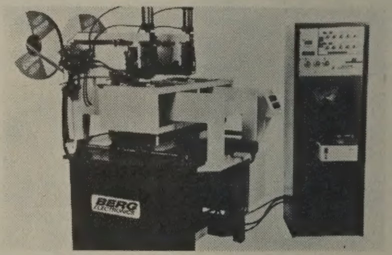
BergPin staking machines cut costs, control quality

PRODUCTION MACHINE (Model BP-161)

For staking boards with limited number of pins or boards with varying pin configurations. Operator manually locates hole position and initiates staking cycle for up to 2000 insertions per hour.

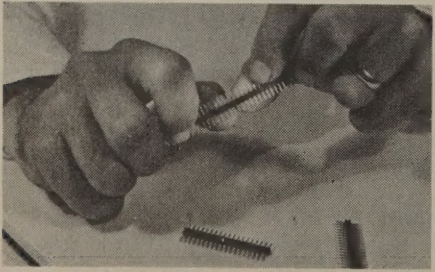

PANTOGRAPH MACHINE (Model BP-151)

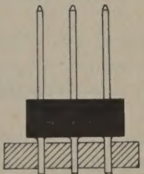
Ideal for straight-line insertion in boards or for high quantities of identical boards. Stakes up to 3500 pins per hour.

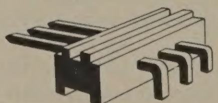

NUMERICALLY-CONTROLLED MACHINE (Model NC)

For high-speed automatic staking. Features a numerically-controlled, X-Y positioning system for programming pin-to-pin spacing and row patterns. Twin insertion heads simultaneously stake two identical boards at rates up to 12,000 per hour.

BergStik™ straight and right angle headers on .100", .125" and .150" centers


IT'S A SNAP! Headers can be broken to desired length by hand.


Straight Header


Right Angle Header

An inexpensive new method for inserting .025" sq. pins in boards for wire-wrapping or input/output usage. Suitable for high-volume production as well as prototyping. Supplied in many lengths and in choice of platings. Stackable to grid pattern on their respective pin centers. BergStik Headers are notched to allow user to break to any desired number of positions.

See Bulletin 140 for complete details.

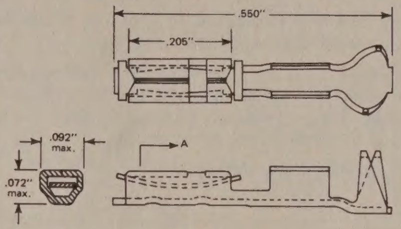
BergCon™ .025″ square modular interconnection system

Dual-metal PV receptacles provide superior electrical and mechanical properties

(Beryllium copper spring; ¼-hard brass body)

PV Receptacles . . . mate with .025″ square pins on .125″ grid or greater

The Berg "PV" connector is the most reliable .025″ post receptacle in use today. This unique terminal provides a virtually constant retention force even after repeated cycles on a male pin. The spring of the PV is available in a choice of thicknesses enabling you to "design in" a retention force that is tailored to the application.



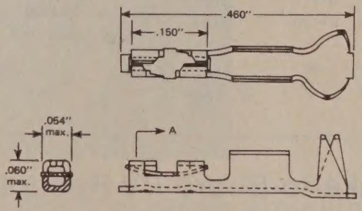
PV RECEPTACLE PART NUMBERS (CONTINUOUS STRIP)

Wire Gage, AWG	#18, #20, or two #22, two #24			#22, #24, #26, or two #26			#28, #30, #32		
Spring thickness	.005″	.006″	.008″	.005″	.006″	.008″	.005″	.006″	.008″
Finish:									
Gold, 40 μ-in. over Ni	46226	46221	46223	46236	46231	46233	46246	46241	46243
* Gold, 75 μ-in. over Ni	46228	46220	46222	46238	46230	46232	46248	46240	46242
BERGflo solder coat	47736	47388	46580	47737	47389	46590	47738	47390	46600
SPOT O' GOLD	75694 -001	75694 -002	75694 -003	75694 -004	75694 -005	75694 -006	75694 -007	75694 -008	75694 -009

*Minimum order required

Mini-PV Receptables . . . mate with .025″ square pins on .100″ grid spacing

The smaller version of the PV is of similar two-piece design for lasting retention after repeated disconnects. The Mini-PV is available in 4 varieties of platings including SPOT O' GOLD. (The latter gives you the electrical and mechanical properties of gold where you need it—in the contact area and in the spring.) Install the Mini-PV in a latch housing for 1 through 72 simultaneous connections. See application machines below.



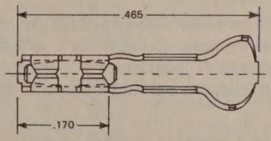
MINI-PV RECEPTACLE PART NUMBERS (CONTINUOUS STRIP)

Wire Gage, AWG	#20, or two #22, two #24		#22, #24, #26, or two #26, two #28			#28, #30, #32, two #30, two #32		
Spring thickness	.005″	.0065″	.0035″	.005″	.0065″	.0035″	.005″	.0065″
Finish:								
Gold, 40 μ-in. over	47441	47566	47457	47439	47565	47456	47437	47564
* Gold, 75 μ-in. over Ni	47220	–	47784	47216	–	47883	47212	–
BERGflo solder coat	47221	47648	47445	47217	47649	47446	47213	47650
SPOT O' GOLD	48047	48052	48049	48046	48051	48048	48045	48050

*Minimum order required

Jumbo-PV Receptacles

This female disconnect is designed for use with .040″ (1MM) or .045″ square or round pins. Maximum contact resistance: 1.5 milliohms. Current rating: 7 amperes minimum. Standard spring thickness—.0065″.



Sizes shown are representative of line. See Bulletin 101B for additional listings.

JUMBO-PV RECEPTACLE PART NUMBERS (CONTINUOUS STRIP)

MATES WITH .040″ (1mm) PIN				MATES WITH .045″ PIN			
Wire Gage, AWG	#18, #20, #22	#22, #24, #26	#28, #30, #32	Wire Gage, AWG	#18, #20, #22	#22, #24, #26	#28, #30, #32
Spring Thickness	.0065″	.0065″	.0065″	Spring Thickness	.0065″	.0065″	.0065″
Finish:				Finish:			
Gold, 40 μ-in.	75369-003	75369-002	75369-001	Gold, 40 u-in.	75375-003	75375-002	75375-001
Tin Lead, 20 μ-in.	75369-006	75369-005	75369-004	Tin Lead, 20 u-in.	75375-006	75375-005	75375-004

Insertion Force*—Series 75369—750 grams max. Series 75375—700 grams max.
Withdrawal force*—Series 75369—200 grams max. Series 75375—300 grams max.

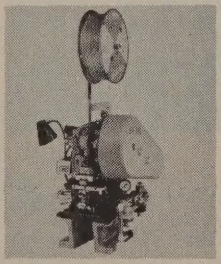
*Gold Contacts Only
For complete details, contact your local Berg Sales Engineer.

Applying PV Receptacles

MODEL 200 PV CRIMPER

This electrically-operated bench press provides 1500 or more quality crimps per hour. Machine has 2½ ton capacity and features a short press stroke and direct clutch linkage. Size: 29″ high x 26″ long x 16″ wide. Weight: 150 lbs. Power Requirements: 80-100 psi air; 120 V electrical.

(See Bulletin 101B for additional information)

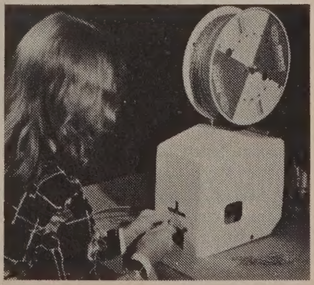


MODEL 250 PV CRIMPER

Air-powered unit is compact, delivers approximately 1000 terminals per hour (depending on operator dexterity.) Operates on 80 psi air. Uses 110 V for light source. Size: 26½″ high x 18″ long x 10″ wide. Weight 50 lbs.

HAND TOOL (not shown)

Sturdy. Duplicates the quality of crimping machines. Features a positive ratchet that does not release until full crimping pressure is applied to a terminal.



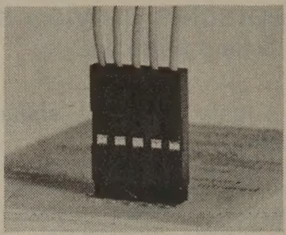
BergCon™ .025″ square modular interconnection system

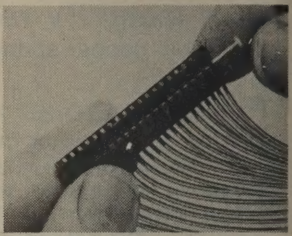
Housing (Latch or Rod Type)

Berg Mini-Latch Housings allow simultaneous connection of as many as 72 Mini-PV terminated conductors; are available in many standard sizes.

Berg Lock-Rod Housings employ a lock rod to retain the terminal; ideal for applications requiring frequent wiring changes or for prototyping. Lock-Rod Housings connect as many as 31 Mini-PV terminated conductors in a single row—up to 62 in twin rows on .100″ grid. Supplied 31 single row for .150″ centers.

(See Bulletin 101B for complete details.)


Latch Housing


Lock-Rod Housing

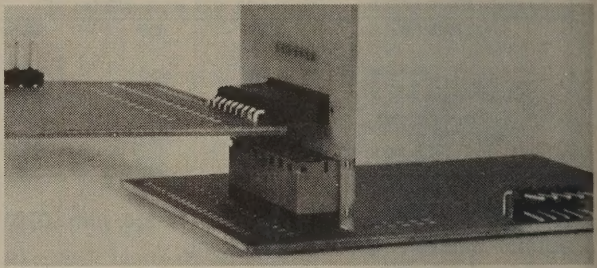
PV Card Connectors–Vertical-Horizontal

These PV Card Connectors are available in single and double row configurations to mate with .025″ square pins on .100″ or .150″ grids. Applications: Programmable or functional board-to-board mounting at right angle, parallel or the same plane.

Number of Positions

		Horizontal	Vertical
.100″ GRID	Single Row	5–52	2–50
	Double Row	10–130	4–100
.150″ GRID	Single Row	5–30	2–72
	Double Row	10–86	12,16,20&24

(See Bulletin 112C or your Berg Sales Engineer for additional information)


BergPin .025″ square post and ferrule assemblies mate with Berg PV card connectors.

Vertical Stake-to-Board PV Receptacle

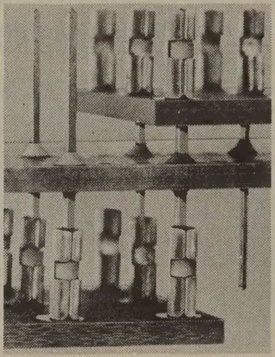
Receptacle stakes to PC board allowing dense packaging configuration by parallel mounting 1/16″ glass-epoxy circuit boards. Features top or bottom entry which gives greater flexibility in placement on circuit board. Two-piece design provides lasting retention even after repeated cycling. Reliable application machines substantially reduce applied cost.

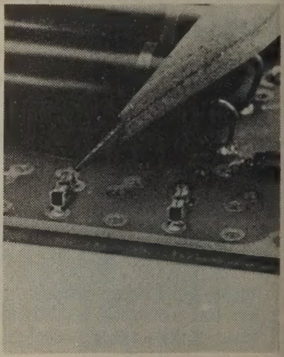
(See Bulletin 118 for additional information.)

Horizontal Stake-to-Board PV Receptacle

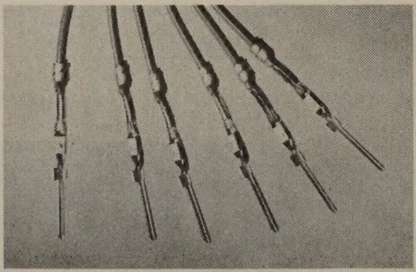
This version of the Berg PV receptacle is staked to the PC board, then wave soldered. Its design allows for dense packaging configurations in vertical mounting 1/16″ glass-epoxy circuit boards. Horizontal PV receptacles can be employed with BergPin terminals to provide quick pluggability. Receptacles are supplied in strip form for high-speed machine staking.

(See Bulletin 333 for additional information)


Vertical PV Receptacle

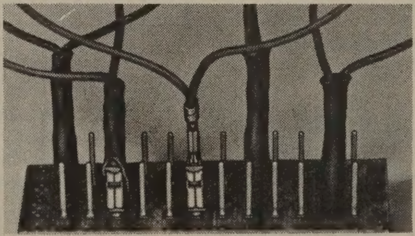

Horizontal PV Receptacle

Crimp-to-Wire Male Pin



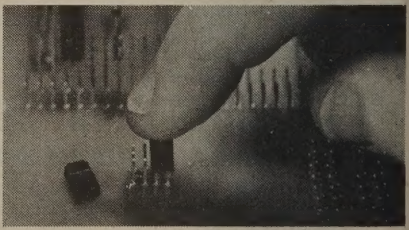
Compatible with BergCon .025″ square interconnection system. Makes flying-type connector when mated with Berg Mini-PV receptacle and used with Mini-latch housing. Maximum current rating: 5 amperes. 5.0 milliohms maximum contact resistance when mated with a Mini PV contact. *(See Bulletin 101B for additional information)*

Daisy Chain for Pre-testing Layouts



Here's a back-panel wiring system in easy-to-handle reel form. Consists of a continuous length of #28 gauge stranded wire with 250 insulated PV's crimped at constant intervals (2½″ to 5″ center-to-center spacing). Eliminates wire measuring, stripping, soldering, or expensive hand-tool terminating in your plant. *(See Bulletin 101B.)*

Mini-Jump Connector

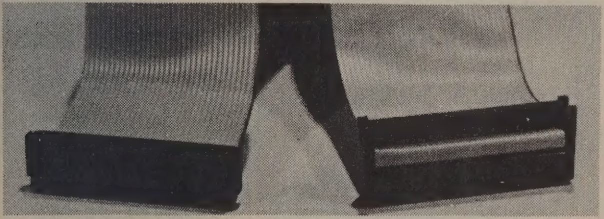


MINI-JUMP, provides flexibility in circuit programming of mini-computers, card readers, printers, modems, and POS equipment. It allows for high density packaging; is stackable in both directions on .100″ centers and up. Low-profile design permits tight packaging in the vertical plane. Mates with industry standard .025″ square pins or .028″ round pins. MINI-JUMP, which features Berg dual-metal receptacles, is supplied in a variety of package sizes. *(See Bulletin 144 for additional information)*

Positive-Latch Quickie™ Connectors terminate multi-lead cable in about 10 seconds

The Berg QUICKIE series of connectors is designed to interface with flat, flexible round conductor cable on .050″ centers. Connectors in this series eliminate the time, problems and expense of pre-stripping.

Standard Female Connector *



This form is used to interface flat flexible round conductor cable on .050″ centers to .025 square wire-wrapping pins on .100″ square grid. (It also mates with .025″ round pins.) The standard QUICKIE Connector consists of two basic parts—the housing and the cover. A third part—the strain relief—is not essential in all uses.

Quickie assemblies supplied with strain reliefs

Type	Part Number	Cover Style
2 X 5	65484-001	A
2 X 5	65484-003	B
2 X 7	65484-025	A
2 X 7	65484-027	B
2 X 8	65484-029	A
2 X 8	65484-031	B
2 X 10	65484-005	A
2 X 10	65484-007	B
2 X 13	65484-009	A
2 X 13	65484-011	B
2 X 17	65484-013	A
2 X 17	65484-015	B
2 X 20	65484-017	A
2 X 20	65484-019	B
2 X 15	65484-021	A
2 X 15	65484-023	B

Quickie assemblies supplied without strain relief

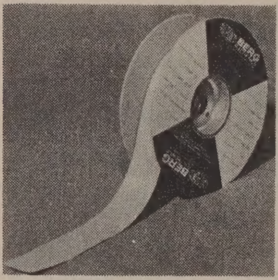
Type	Part Number	Cover Style
2 X 5	65485-001	A
2 X 5	65485-003	B
2 X 7	65485-025	A
2 X 7	65485-027	B
2 X 8	65485-029	A
2 X 8	65485-031	B
2 X 10	65485-005	A
2 X 10	65485-007	B
2 X 13	65485-009	A
2 X 13	65485-011	B
2 X 17	65485-013	A
2 X 17	65485-015	B
2 X 20	65485-017	A
2 X 20	65485-019	B
2 X 25	65485-021	A
2 X 25	65485-023	B

Notes: A—Closed end cover style   B—Thru end cover style

*Note: A polarized version of the standard female is also available. Polarization is accomplished without loss of a pin position.

Quickie Assembly Equipment

Berg offers both hand-powered and pneumatically powered assembly presses.



Quickie Cable

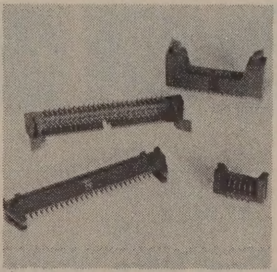
Cable is supplied in PVC insulation including a choice of 28 AWG stranded or 30 AWG solid wire. Cable is available in 8 sizes.

BERG
CONNEL

Quickie Male Dip and PCB Connectors

The Male DIP Connector is available in 2 X 7 and 2 X 8 configurations . . . may be plugged into standard IC sockets.

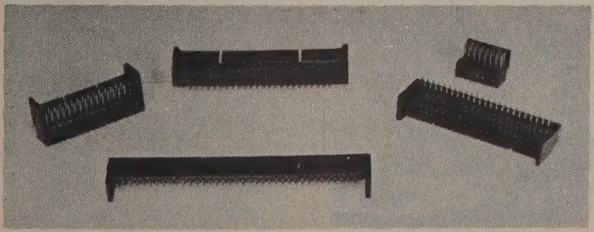
The PCB Connector is available in 6 sizes for solder application directly to the printed circuit board.



Quickie Shielded Right-Angle Headers and Straight Headers

Berg QUICKIE Right-Angle Headers are fully compatible with the standard female connector. Available with plastic latches which give assurance that connector remains mated during vibration. The Straight Header also is fully compatible with the standard female connector; it is shielded on three sides.

See Bulletin 131C for a comprehensive listing of the various forms of the QUICKIE Connector.



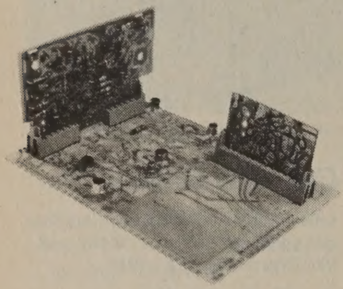
Shielded Right Angle Headers for .100″, .125″ or .150″ Grid

Headers consist of glass-reinforced Nylon housings having .025″ square pins on .100 grid which are molded in position for maximum strength. The configuration provides an integral top shield that serves to protect the pins from damage, plus side shields that prevent pin bending when female housings are removed. *See Bulletin 150*

BergLok™ Modular Interconnection Blocks . . . a simple, reliable way to mount replaceable daughter-board modules in electronic assemblies

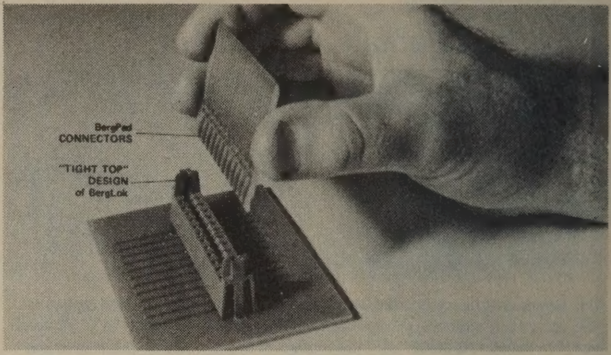
BergLok Connector Blocks provide a vertical mounting system for logic cards, ceramic substrates, and printed circuit cards, single or double sided. These blocks afford complete pluggability of modules into any conventional PC mother board, ⅛₆" thick. Standard center-to-center spacing is .200".

These connector blocks can be mounted in any position on the mother board and, thus, permit complete flexibility in packaging design and assembly. In most applications, BergLok Interconnection Blocks resist impact, shock and vibration without **supplementary support devices.**



Blocks have snap-lock base to anchor connectors firmly in mother board prior to wave soldering. No tools or fixtures needed. End-block latches lock daughter-boards firmly in place during handling and shipping. Yet boards can be easily removed for servicing or replacement.

(See Bulletin 116 for complete details)

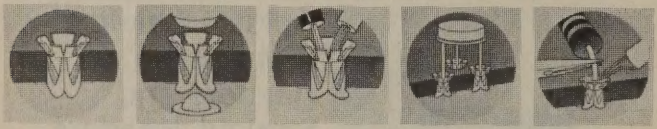


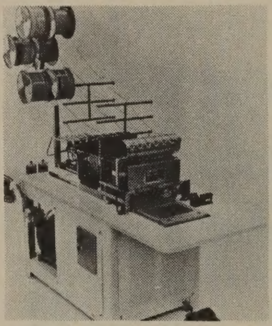
The tightly-controlled card guide that guarantees the stabilization of .062" daughter board in BergLok blocks is known as **"Tight-Top."**

"BergPad," a terminal which is applied to the edge of P.C. board to replace copper-clad fingers, eliminates the problems of peel strength and wave solder thickness control. BergPad terminals can be applied to one side of the standard .062" board or to both sides of .031" to .045" board. (Write for details or see your local Berg Electronics Sales Engineer.)

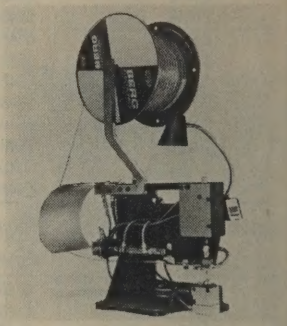
Griplet® Lead-Holding Connector for PC Boards . . . machine-insertable at rates up to 100,000 per hour

The Griplet connector is inserted into holes in a PC board in order to hold component leads or wires at a desired depth. It protects the pads, firmly retains the inserted conductor and promotes a more reliable solder joint . . . while providing faster circuit assembly. Griplets are also used as a mechanical means of obtaining an electrical connection between two sides of a PC board.





MULTIGRIP MACHINE The Multigrip is designed for multiple inserting and staking of Griplet connectors in large quantities of identical boards. Rate: approximately eight boards per minute; inserts up to 70,000 Griplet connectors per hour. Berg also has several other Griplet model machines.

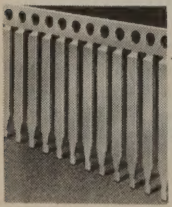


MODEL K Semi-Automatic Machine. Designed for economy and reliability. Inserts and stakes one connector per cycle. Rate: approximately 1,800 per operator-hour.

(See Bulletin 301 for complete listing.)

BergLance™ Low-Cost Wire-Wrapping Posts . . . for rapid, reliable staking in circuit board

BergLance posts and application machines provide high-speed staking of termination points in circuit boards for radio, TV, electronic organ, and similar consumer electronic products. Available in 2 basic cross-sections (.025" x .061" and .025" square) and with choice of lengths. Terminals, which are supplied in strip form for automatic insertion, have solder pre-coat and high-quality 60-40 tin lead finish.



(See Bulletin 107 for additional information.)

Berg "Shotgun" Machine has staking potential of up to 150,000 pins/day. Board area—11" x 12". Many other machines available to meet production needs.

Minisert™ Low Profile, Miniature PC Socket
. . . provides repeated pluggability

The Berg MINISERT is a superior pluggable socket that assures positive retention in the circuit board prior to soldering, and spring-to-board electrical contact after soldering. The unique design of the MINISERT cup and spring extension allows solder to be drawn to the top surface of a two-sided board, producing a solder fillet on the top pad without overflow into the socket.

An elastomeric seal keeps foreign matter out of the socket before and after the component lead has been inserted. This seal remains in place throughout the life of the socket.

The MINISERT accepts round leads ranging from .012″ to .022″ diameter, or flat leads .008″ to .015″ thick by .015″ to .023″ wide. Sockets will fit a hole size ranging from .050″ to .058″ and are furnished on a metal carrier strip for insertion by the Berg MS-105 Machine. This machine provides substantial savings in time and in total applied cost.

The MINISERT socket is also supplied in Kapton tape; it can be clipped to length for manual insertion in dual-in-line pattern or for terminating flat cable PC board jumpers. Those sockets are on .100″ centers. Supplied on reels of 25,000 or 5,000 socket quantities.

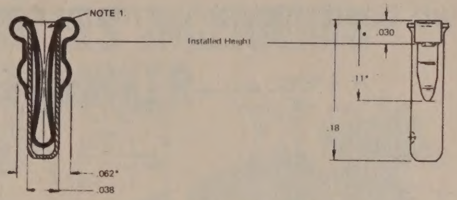
Features

- Low-Profile—Extends only .030″ above and .088″ below a 1/16″ board.
- Fits wide range of hole sizes; accepts many sizes of round or flat leads.
- Provides repeated pluggability for dual-in-line packages, LED's, lamps, transistors, etc.

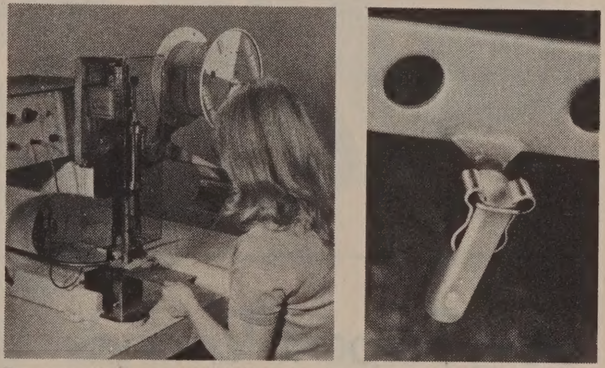
Part Number	Standard Packaging	Recommended Applicator
75060-007	25M per reel	MS-105
75060-008	5M per reel	MS-100
75315-001	Loose piece	Tool
75540-001	25M reel (KAPTON)	Hand Inserted
75540-002	5M reel (KAPTON)	Hand Inserted

(See Bulletin 120 for complete details.)

Minisert Sockets are now supplied in Kapton® Tape. Just clip to length for manual insertion.



NOTE 1. Elastomeric Seal keeps foreign matter out of the socket before and after component lead has been inserted. This seal remains in place throughout the life of the socket.

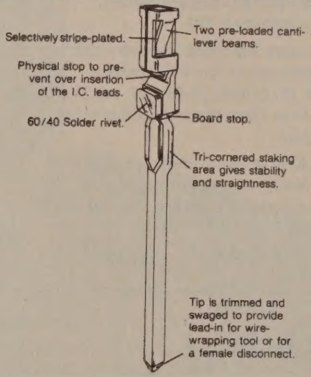


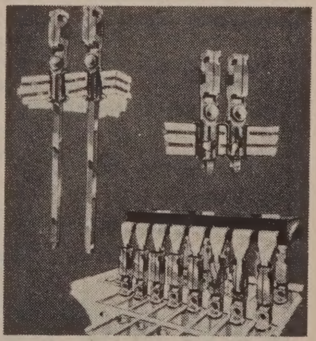
Berg pneumatically operated MS-105 machine inserts approximately 2,000 sockets per hour. A hand-operated (MS-100) insertion device is available for small runs; rate 800–1,000 per hour. A handtool kit can be purchased for prototyping purposes.

Berg Tri-Socket™. . . a .025″ square wire-wrapping or solder-tab socket for 1/16″ through 1/8″ thick boards.

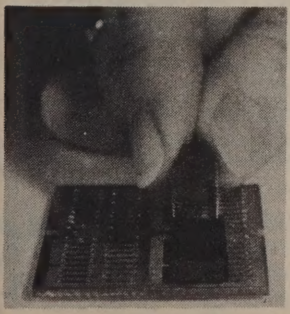
Berg's Tri-Socket is a one-piece, free-standing design which will accommodate a variety of lead sizes. It has tri-cornered fins in the staking area which extend beyond the suggested hole diameter of the PC board. When inserted, the fins retract allowing gentle entry into the board. The 3-point contact gives the Tri-Socket stability and straightness without causing damage to the thru plating. (The Tri-Socket does not introduce the great stresses to the PC board that are created with interference-fit type pins).

A unique feature is a 60/40 solder rivet which is precisely positioned above the tri-cornered area. This rivet is already for reflow. After reflow, retention force exceeds 60 pounds. *(See Bulletin 390 for complete listing.)*


Selectively stripe-plated.
Two pre-loaded cantilever beams.
Physical stop to prevent over insertion of the I.C. leads.
60/40 Solder rivet.
Board stop.
Tri-cornered staking area gives stability and straightness.
Tip is trimmed and swaged to provide lead-in for wire-wrapping tool or for a female disconnect.



Low-Profile, Dual-Beam IC Socket Package

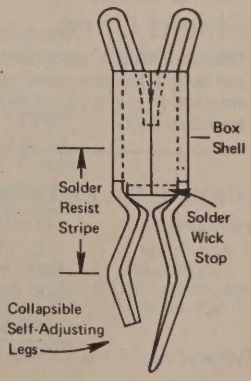


Berg's Dual-Beam I.C. Socket is a highly reliable low-profile DIP Package which will not allow solder wicking. The target area is .020″ X .040″; socket design has a press-fit leg so the package will not fall out of the P.C. board after insertion. Ventilated molding and stand-offs allow for easy cleaning of the complete P.C. board assembly. This package consists of tin or gold plated phosphor bronze sockets which are inserted into a precision molded one-piece glass-filled polyester thermoplastic housing.

The Berg Dual-Beam DIP Package will accept leads ranging from .009″ to .012″. Face-wipe design provides maximum wiping action with mating package leads. Beams serve to track a bent or biased lead.

Plastic housing has a height of .175″ maximum; its width allows for side-by-side mounting and measures .430″ maximum. Housing material is rated UL 94V-0.

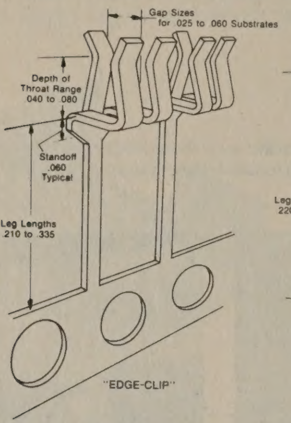
(See Bulletin 147 for complete listing)



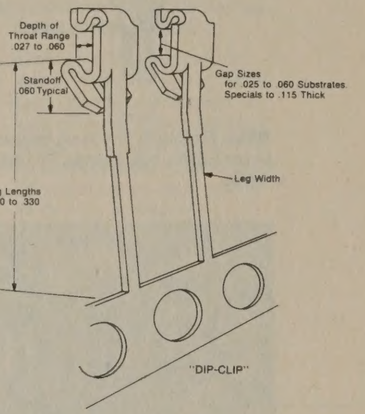
Solok* Terminations for Ceramic Hybrid Microcircuits

Solok* Terminations clip onto substrate rather than into holes drilled through it. They mechanically hold their position until soldered for a permanent connection. Berg offers a complete terminal application machine system. Its broad standard line is backed by an unusual custom design capability. *DuPont Trademark

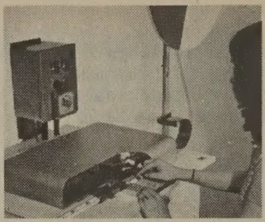
Two basic types . . . many configurations


Gap Sizes
for .025 to .060 Substrates
Depth of Throat Range .040 to .080
Standoff .060 Typical
Leg Lengths .210 to .335

"EDGE-CLIP"

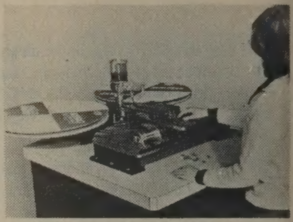


"DIP-CLIP"



Edge-Clip Machine

This machine is used for single edge-mounted terminals. It can be programmed to install terminals at any given pad location or to skip terminals in an area where there is no pad. Rate: Up to 1500 packages per hour.



Dip-Clip Machine

This semi-automatic machine is used for DIP type terminations; it, too, operates at rates up to 1500 substrates per hour. (Terminals must be ordered "left" and "right" handed for this machine.)

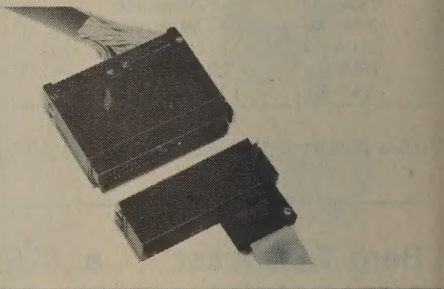
Definition of Terms

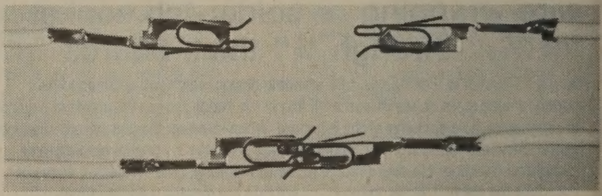
1. **Depth of Throat**—Distance from edge of substrate to point where terminal contacts pad.
2. **Standoff**—Distance that terminal will hold substrate away from mouting board.
3. **Leg Length**—Distance from substrate to end of leg **with carrier strip removed.**
4. **Gap Size**—Opening in clip area of terminal designed to assure a mechanical hold on the substrate.

For complete details and specifications, contact your local Berg Sales Engineer or request Bulletin 124.

Berg Serpent Terminals

. . . mate with input/output connectors of IBM 360 and 370 Systems





The Berg "Serpent" is a 48-position connector which provides a reliable I/O connection within your system . . . or plug compatibility to IBM.

Its crimp-type contact, is made of phosphor bronze, and plated gold-over-nickel for excellent conductivity. Contacts have insulation-support ears which provide termination strength for conventional wires in 18–20 AWG, 22–26 AWG, and 28–32 AWG ranges as well as coaxial and shielded wires. These contacts self lock in the connector housing and provide firm wiping action.

Connector housings, made of polycarbonate, have an alphanumeric coding on front and rear for easy cavity identification. Other features include: a spring-loaded jackscrew which assures positive locking, a strain-relief cover, and mounting slots for panel mounting.

(See Bulletin 250 for additional information)

Lugs and Tie Points

for Bobbins, Coil Forms, Shield Cans

THRU-LUG TERMINALS—are precision stamped with sections that, when staked, clinch the terminal securely to both sides of the board. Catalog Section #406.

EXTRUDED COLUMN LUGS—designed for high-strength retention in circuit and terminal boards. Job-matched machines rapidly stake as many as six lugs simultaneously. Catalog Section #407.

COIL FORM AND BUTTERFLY TERMINALS—feature specially designed tips for rapid insertion and immediate retention in circuit boards. Provide wrapping and soldering points for coil winding wire. Catalog Section #202.

CAN LUGGING SYSTEMS—Berg offers a complete line of lugs for mounting shield cans to circuit boards. Designs include flat-sided or cylindrical can types for flush or elevated mounting and four styles to automatically key cans. Catalog Section #203.

BOBBIN TERMINATIONS—Berg's system for inserting lugs into molded bobbins eliminates costly insert molding and provides secure connection points. Available in thru-lug and blind-pocket types. Catalog Section #204

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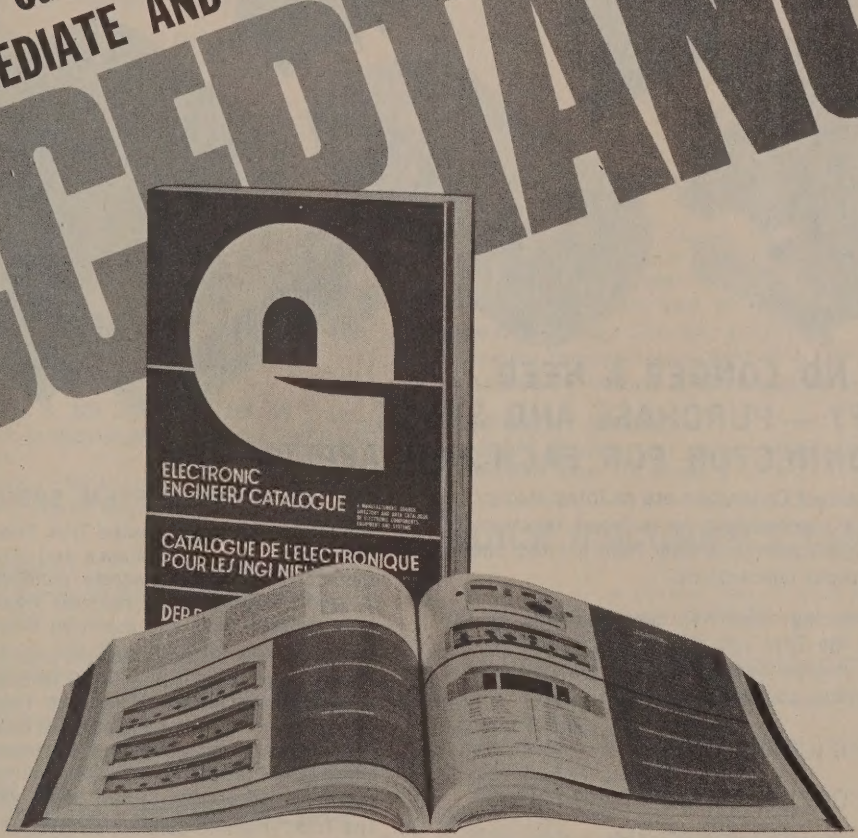
ELECTRONIC ENGINEERS CATALOGUE
CATALOGUE DE L'ELECTRONIQUE POUR LES INGENIEURS
DER PRODUKTKALOG FÜR ELEKTRONIKER

The book is out...and the response is in...

IMMEDIATE AND OVERWHELMING

ACCEPTANCE



The ELECTRONIC ENGINEERS CATALOGUE is the only comprehensive, trilingual catalogue/source-directory of electronic products available to - and from - Western Europe and the United Kingdom.

It is divided into three distinct sections: 1. **The Product Index and Directory,** which lists more than 3,000 products alphabetically in English with their French and German equivalents. 2. **The Manufacturers' Catalogue Section,** which is a compilation of Manufacturers' Catalogues in alphabetical order. 3. **The Manufacturers' Sales Offices and Trade Marks Directory,** which alphabetically includes country, address, telex or TWX numbers of the Manufacturers' main and local sales offices and/or agents.

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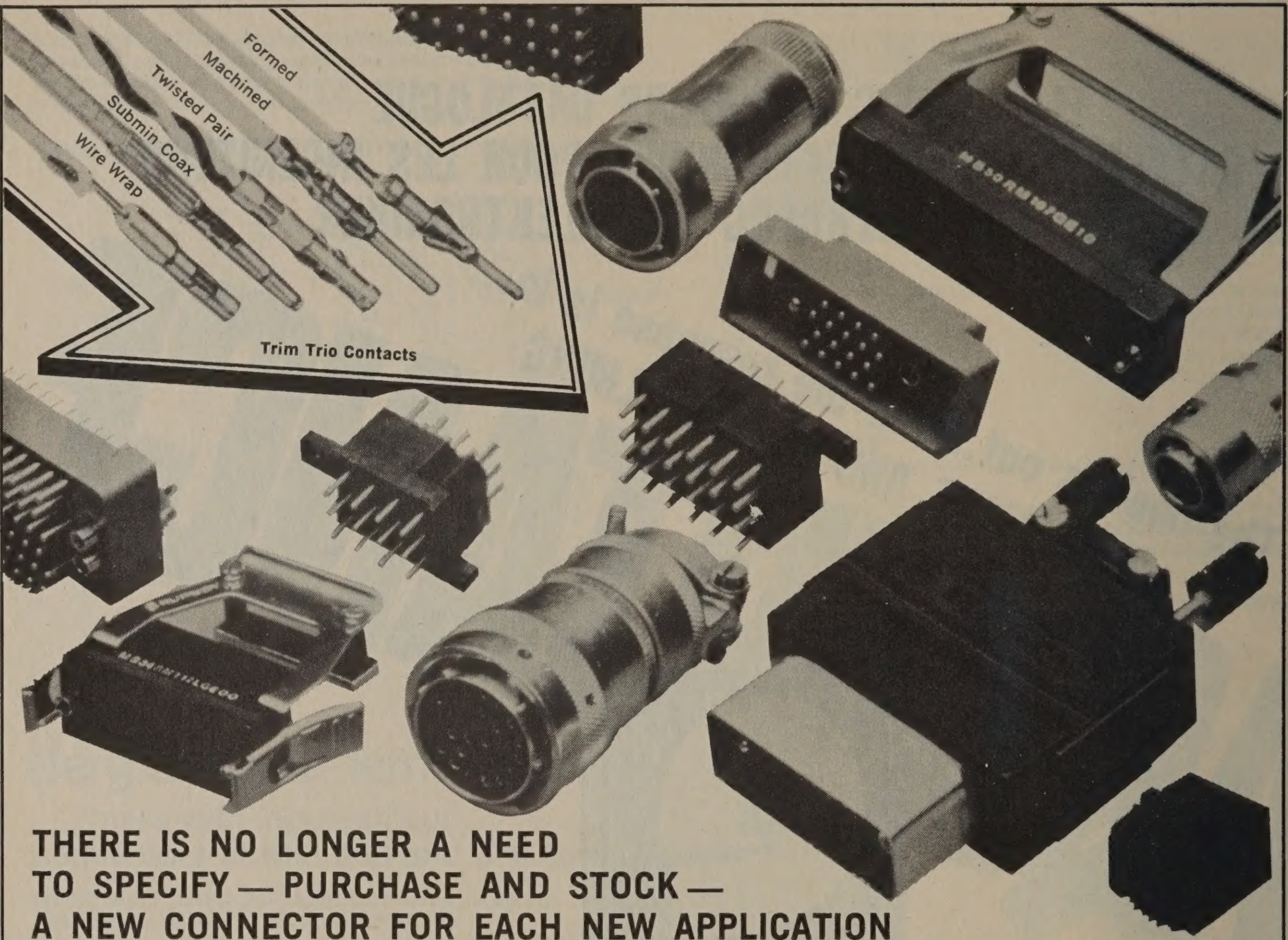
BURNDY

TRIM TRIO™ INTERCONNECTION SYSTEM



THERE IS NO LONGER A NEED TO SPECIFY — PURCHASE AND STOCK — A NEW CONNECTOR FOR EACH NEW APPLICATION

The Trim Trio™ Contact Connectors are an integrated group of reliable, versatile connectors for a broad spectrum of interconnection applications, varying from printed circuit board to input/output connections.

True value engineering objectives are obtainable by the Universal use of the Trim Trio contacts and their associated connectors. Independent of external geometries and mounting techniques, commonality exists in:

CONTACT CONFIGURATION

RETENTION CONFIGURATION

HOUSING (INSERT) CONTACT CAVITY CONFIGURATION

CRIMP TOOLING

ASSEMBLY PROCEDURES

QUALITY ASSURANCE PROCEDURES

MAINTENANCE AND FIELD SERVICE PROCEDURES

PERSONNEL TRAINING

ONE CONTACT SYSTEM SERVES THEM ALL

The internationally accepted Trim Trio contacts will fit into a variety of connector shapes and sizes from 1 up to 152 contact positions in discrete connectors and up to 456 contact positions using modular frames. All are serviced with common tools and assembly methods.

The Trim Trio contacts accommodate an extensive range of wire sizes from No. 14 AWG through No. 28 AWG, plus subminiature coaxial cables and twisted pair wires. Any combination of contacts, wire and cable, in any connector family, of any geometry may be used. Additional contact termination variations are available to accommodate wire wrapping and printed circuit board mounting.

The Trim Trio Interconnection System assures the benefits of convenience in the evolution and expansion of equipments and product lines by maximizing the available choices and options to the equipment designer.

No matter how many different combinations you use, you still get all the advantages of standardization, faster, more economical assembly, reduced inventory, uniform quality control procedures, universal tooling, simplified operator training.

Design goals and objectives easily achieved with the Trim Trio Interconnection System are:

STANDARDIZATION/VERSATILITY

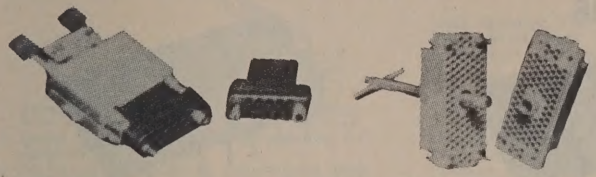
RELIABILITY/ECONOMY

BURNDY CORP. / DEPT. EM / NORWALK, CT 06856 / TEL: (203) 838-4444

BURNDY

RACK AND PANEL CONNECTORS
TRIM TRIO INTERCONNECTION SYSTEM

RECTANGULAR Connectors



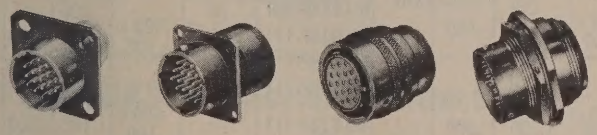
PHYSICAL AND ELECTRICAL

Number of Contacts: 14, 20, 26, 34, 42, 50, 75, 104, 152
Test Potential: 200 VAC at 60 Hz
Operating Voltage: 750 VAC at 60 Hz
Operating Temperature: −55°C to +125°C
Insulation Resistance: 5,000 Megohms (min.) at 500 VAC

COMPONENT MATERIALS

MS-M Blocks: Glass-filled Phenolic per MIL-M-14F, Type MFH
MSD-M Blocks: Diallyl Phthalate per MIL-M-19833
Guide Pins and Sockets: Brass per ASTM B1.6 (accessories #303 stainless steel)
Keyed Jacks and Rotating Jacks: #303 stainless steel

BANTAMATE™ Connectors



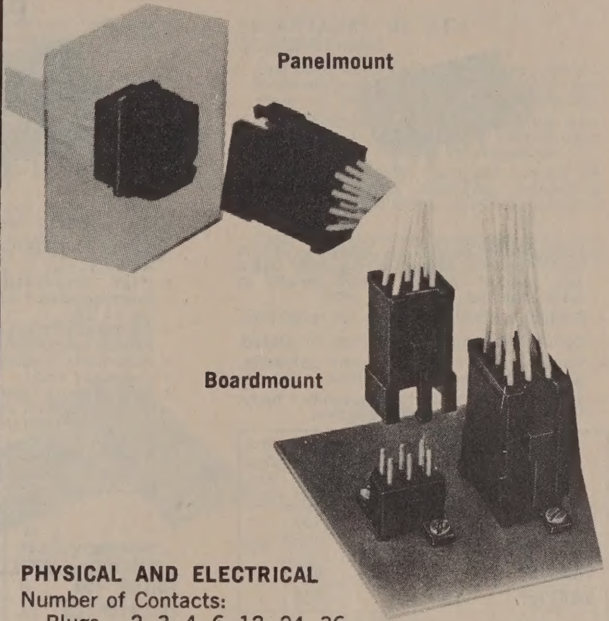
PHYSICAL AND ELECTRICAL

Number of Contacts: 4, 8, 12, 19, 22, 30, 38, 48
Test Potential (Dielectric Withstanding Voltage): 2,000 VAC, 60 Hz for 1 minute
Operating Temperature: −55°C to +125°C
Insulation Resistance: 5,000 Megohms (min.)
Durability: 500 cycles

COMPONENT MATERIALS

Plug and Receptacle Shells: High strength aluminum
Finishes: Consult factory
Inserts: Diallyl Phthalate per MIL-M-19833
Terminations: High strength aluminum

QIKMATE™ Connectors



PHYSICAL AND ELECTRICAL

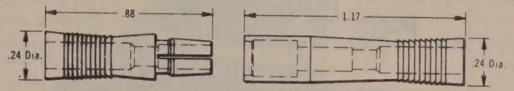
Number of Contacts:
- Plugs — 2, 3, 4, 6, 12, 24, 36
- Boardmount Receptacles — 2, 3, 4, 6, 12, 24, 36
- Panelmount Receptacles — 6, 12, 24, 36

Test Potential: 2,000 VAC, 60 Hz
Operating Voltage: 250 VAC at 60 Hz
Operating Temperature: −55°C to +105°C
Insulation Resistance: 5,000 Megohms at 500 VAC

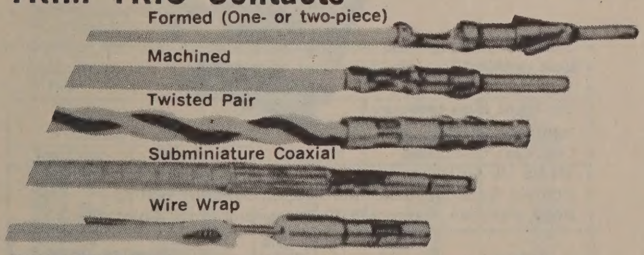
COMPONENT MATERIAL

QIKMATE Blocks and Components: Nylon per MIL-M-20693A Type III, Grade E

QUICK DISCONNECT Cable Splice



TRIM TRIO Contacts



TRIM TRIO Contacts fit all the above connectors; rectangular, cylindrical, and QIKMATE. Differing types of contacts can be applied in any one connector body. Mix and match all contact variations. See opposite page for more information on the TRIM TRIO system.

PHYSICAL AND ELECTRICAL

Contact Voltage Drop:
Machined — 23 millivolt, max.
One-/two piece — 25 millivolt, max.

Contact Rating:
- Machined — 13 Amp
- Two-piece — 7.5 Amp
- One-piece — 5 Amp

Wire Range:
- Machined — #16 to #28 AWG per MIL-W-16878 or equivalent
- Two-piece — #14 to #26 AWG
- One-piece — #16 to #26 AWG

Note — For subminiature coaxial, wire wrap, and twisted pair contacts consult factory.

COMPONENT MATERIAL

One-piece:
  Copper alloy per QQ-B-6136. Plating — tin, gold
Two-piece:
  Copper alloy per QQ-B-6136. Plating — tin, gold
  (retaining spring — #301 stainless steel)
Machined:
  Copper alloy. Plating — gold
  (retaining spring — Beryllium copper)

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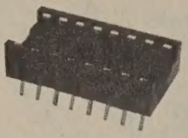
BURNDY IC SOCKETS

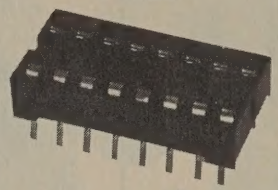
LOW PROFILE P-1



- Low profile design — body height is .231″ above pc board. With a .125″ package, special nesting feature results in total inserted height of .280″.
- Exclusive GTH™ contacts for reliability.
- Contact Material: Copper alloy, tin plated.
- Body Material: Thermoplastic polyester, glass-reinforced. Color, black.
- Self-extinguishing thermoplastic body. Flammability Rating: UL 94V-0

Catalog Number	Number of Contacts	Grid Pattern (Inch)	Dimensions Length Max. (Inch)	Dimensions Width Max. (Inch)
DILBZ 8P-1	8	.300 x .100	.430	.450
DILBZ14P-1	14		.730	
DILBZ16P-1	16		.830	
DILBZ18P-1	18		.930	
DILBZ22P-1	22	.400 x .100	1.130	.550
DILBZ24P-1	24	.600 x .100	1.230	.750
DILBZ28P-1	28		1.430	
DILBZ40P-1	40		2.030	

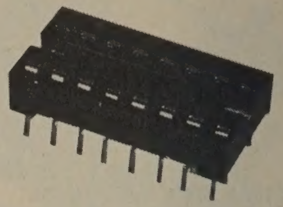
HIGH PERFORMANCE P-108



- Exclusive GTH™ contacts for highest reliability.
- High temperature self-extinguishing thermoplastic body. Flammability rating: UL 94 V-0
- Compact size for high-density packaging. Profile height only .175″ max.
- Automatic loading capability.
- Polarized body.
- Self-aligning contacts.
- Unique contact design prevents wicking.
- Contact material: Beryllium copper, tin alloy plating.
- Body material: Thermoplastic polyester, glass-reinforced. Color, black.

Catalog Number	Number of Contacts	Grid Pattern (Inch)	Dimensions Length (Inch)	Dimensions Width (max.) (Inch)
DILB8P-108	8	.300 x .100	.400	.400
DILB14P-108	14		.700	
DILB16P-108	16		.800	
DILB18P-108	18		.900	
DILB20P-108	20		1.000	
DILB22P-108	22	.400 x .100	1.100	.500
DILB24P-108	24	.600 x .100	1.200	.700
DILB28P-108	28		1.400	
DILB40P-108	40		2.000	

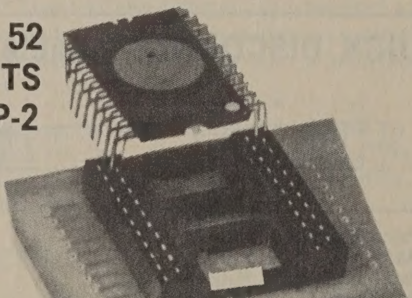
ECONOMY P-111



- Exclusive GTH™ contacts for highest reliability. Yet costs less than 1¢ per line in volume.
- Self-extinguishing thermoplastic body. Flammability Rating: UL 94V-0
- Compact size for high-density packaging. Profile height only .175″ max.
- Automatic loading capability.
- Polarized body.
- Self-aligning contacts.
- Unique contact design prevents wicking.
- Contact Material: Copper alloy.
- Body Material: Thermoplastic polyester glass-reinforced. Color, black with white stripe for identification.

Catalog Number	Number of Contacts	Grid Pattern (Inch)	Dimensions Length Max. (Inch)	Dimensions Width Max. (Inch)
DILB 8P-111	8	.300 x .100	.400	.400
DILB14P-111	14		.700	
DILB16P-111	16		.800	
DILB18P-111	18		.900	
DILB20P-111	20		1.000	
DILB22P-111	22	.400 x .100	1.100	.500
DILB24P-111	24	.600 x .100	1.200	.700
DILB28P-111	28		1.400	
DILB40P-111	40		2.000	

42 AND 52 CONTACTS P-2



- Exclusive GTH™ contacts for high reliability.
- Self-aligning contacts for fast and easy package installation.
- Unique contact design prevents wicking.
- Compact low profile .231″ maximum above pc board.
- Self-extinguishing thermoplastic body. Flammability Rating: UL 94V-0
- Contact Material: Copper alloy, tin plating.
- Body Material: Thermoplastic, glass-reinforced. Color, black.

Catalog Number	Number of Contacts	Grid Spacing (Inch) Outer Rows	Grid Spacing (Inch) Inner Rows	Dimensions (Inch) Length max.	Dimensions (Inch) Width max.
DILEZ42P-2	42	.925 x .1	.750 x .1	1.13	1.13
DILEZ52P-2	52	.900 x .1	.700 x .1	1.38	1.10

QIKEJECT™ P-101

MICROPROCESSOR RECEPTACLE

- Zero extraction force.
- Low profile.
- High density.
- Gas-tight high pressure contacts GTH™.
- Low cost reliability.
- Meets UL 94V-0 rating.
- Contact Material: Beryllium copper, tin alloy plating.
- Body Material: Thermoplastic glass-reinforced. Color, black.

Catalog Number	Number of Contacts	Grid Pattern (Inch)	Dimensions (Inch) Length	Dimensions (Inch) Width
DILBQ24P-101	24	.6 x .1	1.20	.70
DILBQ28P-101	28	.6 x .1	1.40	.70
DILBQ40P-101	40	.6 x .1	2.00	.70
DILBQ50P-101	50	.9 x .1	2.50	1.00
DILBQ64P-101	64	.9 x .1	3.20	1.00

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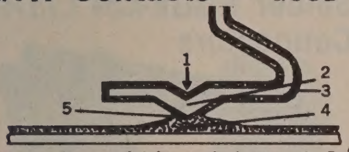
GTH™ CONTACTS FLEXLOK™ CONNECTORS

GTH Contacts — GOOD AS GOLD — AT A FRACTION OF THE COST



1 Spring force maintains contact pressure. Prevents fretting corrosion.
2 Unique contact geometry concentrates pressure at point of contact for gas-tightness.
3 Whisker-free tin-alloy plating.
4 Ordinary soft solder target rather than gold.
5 High-pressure plastic deformation forms gas-tight, corrosion-free contact without the use of gold.

With Burndy GTH connectors, you enjoy the performance characteristics of gold — without suffering its high cost.

The secret behind the amazing performance of GTH is the use of high pressure plastic deformation to achieve a gas-tight, corrosion-free contact, and a contact geometry that provides an ingenious mechanical interlock to insure good metal-to-metal contact despite vibration or thermal expansion.

Burndy GTH contacts not only eliminate the need for gold in the connector, they eliminate gold in the mating component as well. You save both ways — without sacrificing performance or reliability.

ADVANTAGES OF GTH CONNECTIONS

- **Low Cost, High Reliability:** Helps you cut interconnection costs up to 33% and more — without sacrificing reliability.
- **Interchangeability:** May be used with existing gold, tin or solder-plated components with no loss in reliability.
- **Design Flexibility:** Compact design for close packaging densities, simplified handling, installation and field serviceability.
- **Ease of Installation:** Requires no special tooling or operator training. Installs like any ordinary connector.

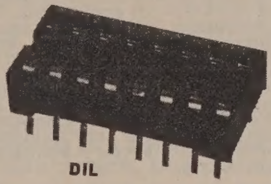
GTH™ Contacts are used with these connectors:

FLEXLOK™ FC (Flat Cable)

EDGE-TITE™

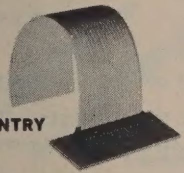
QIKSTACK™

FLEXLOK™ RC (Round Cable)



DIL

FLEXLOK™ FC Series Connectors



TOP ENTRY

SIDE ENTRY

- For flexible printed circuitry and flat cables.
- Top and side entry styles available.
- Will accommodate flat cable thicknesses from .005″ to .022″.
- Exclusive GTH contacts using tin instead of gold give total savings up to 60% with reliability equal to gold even in hostile environments.
- Solder connector to pc board so no extra handling.
- Supplied complete with assembled contacts so no special tooling or operator training needed.
- Compact low profile design.
- Self-extinguishing thermoplastic body. Flammability Rating: UL 94V-0
- Contact Material: Copper alloy, tin alloy plating.
- Body Material: Thermoplastic polyester, glass-reinforced. Color, black.

Catalog Numbers		Number of Contacts	Min. Connector Length (Inch)	Min. Slot Length (Inch)
Top Entry	Side Entry			
HBLB 6S-1	HBLB 6R-1	6	.820	.706
HBLB 7S-1	HBLB 7R-1	7	.920	.806
HBLB 8S-1	HBLB 8R-1	8	1.020	.906
HBLB 9S-1	HBLB 9R-1	9	1.120	1.006
HBLB10S-1	HBLB10R-1	10	1.220	1.106
HBLB11S-1	HBLB11R-1	11	1.320	1.206
HBLB12S-1	HBLB12R-1	12	1.420	1,306
HBLB13S-1	HBLB13R-1	13	1.520	1.406
HBLB14S-1	HBLB14R-1	14	1.620	1.506
HBLB15S-1	HBLB15R-1	15	1.720	1.606
HBLB16S-1	HBLB16R-1	16	1.820	1.706
HBLB17S-1	HBLB17R-1	17	1.920	1.806
HBLB18S-1	HBLB18R-1	18	2.020	1.906
HBLB19S-1	HBLB19R-1	19	2.120	2.006
HBLB20S-1	HBLB20R-1	20	2.220	2.106
HBLB21S-1	HBLB21R-1	21	2.320	2.206
.275″ max.	.190″ max.	Height		
.190″ max.	.275″ max.	Width		

FLEXLOK™ RC Series Connectors

TOP ENTRY
SIDE ENTRY

- For Flat Cable with round-solid, or fused-stranded conductors. Sizes #24, #26 AWG.
- Top-entry or side-entry styles available.
- Exclusive GTH contacts using tin instead of gold give total savings up to 60% with reliability equal to gold even in hostile environments.
- Solder connector to pc board so no extra handling.
- Supplied complete with contacts assembled so no special tooling or operator training needed.
- Compact, low profile design.
- Self-extinguishing thermoplastic body. Flammability Rating: UL 94V-0
- Contact Material: Copper alloy, tin alloy plating.
- Body Material: Thermoplastic polyester glass-reinforced. Color, white.

Catalog Number		Number of Contacts	Max. Connector Length (Inch)
Top Entry	Side Entry		
HBRB 2S-1	HBRB 2R-1	2	.20
HBRB 3S-1	HBRB 3R-1	3	.30
HBRB 4S-1	HBRB 4R-1	4	.40
HBRB 5S-1	HBRB 5R-1	5	.50
HBRB 6S-1	HBRB 6R-1	6	.60
HBRB 7S-1	HBRB 7R-1	7	.70
HBRB 8S-1	HBRB 8R-1	8	.80
HBRB 9S-1	HBRB 9R-1	9	.90
HBRB10S-1	HBRB10R-1	10	1.00
HBRB11S-1	HBRB11R-1	11	1.10
HBRB12S-1	HBRB12R-1	12	1.20
HBRB13S-1	HBRB13R-1	13	1.30
HBRB14S-1	HBRB14R-1	14	1.40
HBRB15S-1	HBRB15R-1	15	1.50
HBRB16S-1	HBRB16R-1	16	1.60
HBRB17S-1	HBRB17R-1	17	1.70
HBRB18S-1	HBRB18R-1	18	1.80
HBRB19S-1	HBRB19R-1	19	1.90
HBRB20S-1	HBRB20R-1	20	2.00
HBRB21S-1	HBRB21R-1	21	2.10
.275″ max.	.190″ max.	Height	
.190″ max.	.275″ max.	Width	

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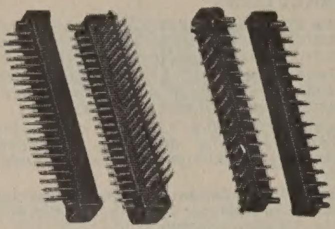
BURNDY

PRINTED CIRCUIT CONNECTORS

Solder Plug and Receptacle — Qualified MIL-C-55302



TYPE UPC — .100″ AND .150″ SPACING

The UPC Series is an ultraminiature plug and receptacle printed circuit connector. It is used in board-to-board (both single- and multi-layered) applications. The plugs accommodate .062″ thick boards; the receptacles .094″ thick boards. Both plugs and receptacles are dip soldered to the pc board though some sizes can be obtained with solder-cup or solderless wire wrap terminations. Both two-row and three-row styles are available. The two-row can be ordered with either .100″ centers or .150″ centers. The three-row is available in .100″ centers only.

Two-row, .100″ Centers: Available contact positions — 17, 25, 33, 41, 77

Two-row, .150″ Centers: Available contact positions — 17, 23, 28, 41

Three-row, .100″ Centers: Available contact positions — 13, 25, 37, 49, 59, 61, 92, 107

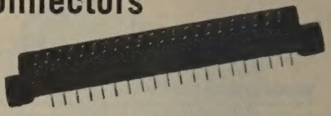
Performance Characteristics

Operating Voltage: 300 VAC, 60 Hz
Current Rating: 3 Amp
Operating Temperature: −55°C to +125°C
Contact Resistance: Measured at 0.010 Amp shall not exceed .010 ohms average and .020 ohms individual
Insulation Resistance: Between adjacent contacts, 1,000 Megohms min.

Materials

Connector Bodies: Glass-filled Diallyl Phthalate per MIL-M-14F, Type SDG-F. Color, green
Contacts, Pin and Socket: Beryllium copper per QQ-C-530 plated in accordance with MIL-C-55302
Guide Pins and Guide Sockets: Brass per QQ-W-321b composition B plated in accordance with MIL-C-55302

Solder EDGE-ON™ Connectors



TYPE PSC — .156″ SPACING

The PSC EDGE-ON Connector is available in 15 and 22 contact positions spaced .156″ center-to-center. Termination is solder dip. These connectors can accept single-sided boards (.058″ to .072″ thick) and double-sided boards (.054″ to .072″ thick).

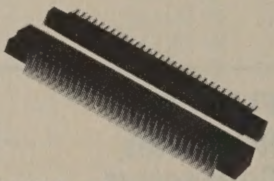
Performance Characteristics

Operating Voltage: 350 VAC or 490 VDC
Current Rating: 3 Amp
Operating Temperature: −55°C to +175°C
Initial Contact Voltage Drop: 50 millivolt max. at 3 Amp
Insulation Resistance: 5,000 Megohms

Materials

Body: Glass-filled phenolic per MIL-M-14F, Type MFH. Color, green
Spring Contact: Beryllium copper per Fed. Spec. QQ-533
Finish: 30 microinch min. gold

Solder Plug with Solderless Wrap Receptacle



TYPE ML2B — .100″ SPACING

The ML2B Series two-piece connectors are tooled for 16, 28, 40, 80, and 100 contact positions. Other sizes, in increments of two positions, are available on special order. The receptacle half of the connector has .025″ square solderless wrap posts on a .100″ square grid. The right-angle type plug has solder dip terminations on .100″ centers.

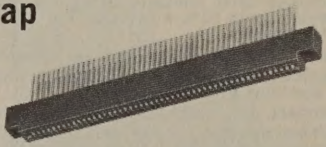
Performance Characteristics

Operating Voltage: 300 VAC
Current Rating: 3 Amp
Operating Temperature: −55°C to +125°C
Contact Resistance: 30 milliohms max. at 3 Amp
Insulation Resistance: 5,000 Megohms min.

Materials

Body: Glass-filled Phenolic per MIL-M-14F, Type MFH
Socket Contact: Phosphor bronze Grade A per Fed. Spec. QQ-B-750 or QQ-W-321
Blade Contact: Brass, CDA alloy #260 Fed. Spec. QQ-B-613
Plating: 20 microinch gold over nickel in contact area; 5 microinch min. gold over nickel for remainder of contact

Solderless Wrap EDGE-ON™ EDGE-TITE™



PWBH4DD — .100″ SPACING, Gold Contacts
ETBH4DD — .100″ SPACING, GTH Contacts

This .100″ by .200″ wiring grid connector is available with 10, 15, 22, 25, 30, 36, 40, 43, and 50 contact positions in single-sided or double-sided construction. Other sizes can be made available on special order. Solderless wrap tail lengths are either .200″ or .630″.

Performance Characteristics

Working Voltage: 230 VAC, 330 VDC
Current Rating: 5 Amp
Operating Temperature: −55°C to +125°C (Edge-Tite to +105°C)
Contact Resistance: 30 milliohms max. at 5 Amp
Dry Circuit: 25% variance max. on contact resistance spec.
Insulation Resistance: 5,000 Megohms min.

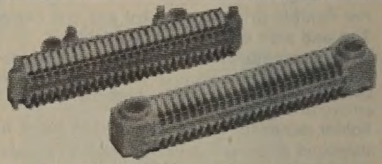
Materials

Body: 30% glass-filled polyester to MIL-M-24519. Color, black

PWBH
Spring Contact: Phosphor bronze, Grade A per Spec. QQ-B750
Plating: 20 microinch gold plate over nickel on contact areas and 5 microinch gold plate over nickel for remainder

EDGE-TITE
Spring Contact: Copper alloy
Plating: Tin alloy

QIKSTACK™ Stacking Connectors



FEED-THRU AND SOLDER TAIL TYPES — .100″ SPACING

QIKSTACK Connectors are designed for interconnections between two parallel pc boards. Contacts on the connector press tightly against solder pads on the pc boards. These connectors also can be obtained with one side having solder tails for permanent soldering to the pc board. Two body configurations are available. The B6054966 version has a body height of .335″ and has 28 contact positions. The B6056984 version has a body height of .387″ with 25 contact positions. Integrally molded mounting/alignment bosses on both versions ensure the proper alignment of the GTH contacts with the pc board solder pads.

Performance Characteristics

Operating Voltage: 300 VAC
Current Rating: 3 Amp
Operating Temperature: −25°C to +85°C
Contact Resistance: 30 Milliohms at 3 Amp
Insulation Resistance: 100 Megohms min. between any two positions

Materials

Body: Thermoplastic polyester. Color, natural
Contacts: B6054966 — Copper alloy
B6056984 — Phosphor bronze
Plating: Tin/lead
Flammability Rating: UL 94V-0

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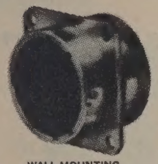
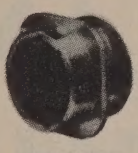
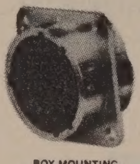
BURNDY CYLINDRICAL CONNECTORS

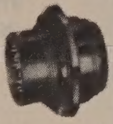
SHELL STYLES

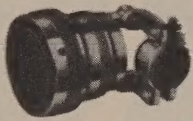
These shell styles are available for all the connectors shown on this page; MIL-C-26482 with solder and crimp removable contacts, MIL-38999 with crimp removable contacts, and the TRIM TRIO BANTAM with crimp removable TRIM TRIO contacts.

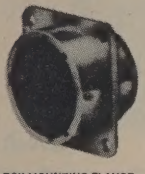

WALL MOUNTING FLANGE RECEPTACLE

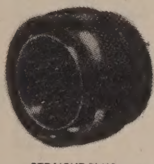

CABLE CONNECTING RECEPTACLE

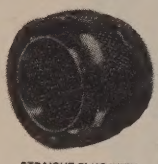

BOX MOUNTING FLANGE RECEPTACLE

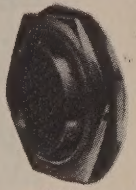

JAM NUT REAR MOUNTING RECEPTACLE (SMOOTH BANTAM ONLY)

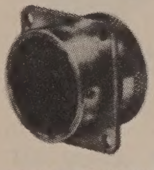

PLUG WITH 90° ELBOW AND STRAIN RELIEF (COMPACT ONLY)

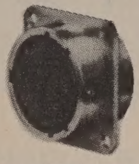

BOX MOUNTING FLANGE RECEPTACLE LONG GROMMET


STRAIGHT PLUG

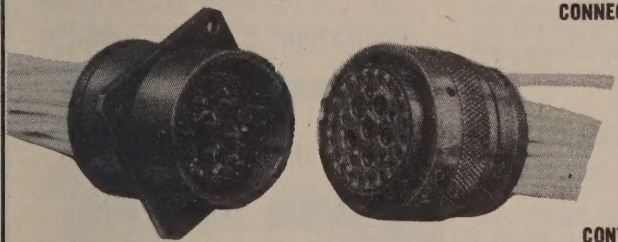

STRAIGHT PLUG WITH RFI GROUNDING


JAM NUT RECEPTACLE (COMPACT ONLY)


BACK PANEL WALL MOUNTING FLANGE RECEPTACLE

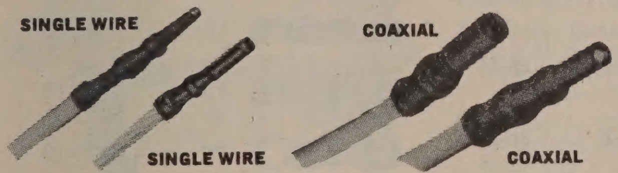

BACK PANEL BOX MOUNTING FLANGE RECEPTACLE

MIL-C-26482 Miniature Environmental



CONNECTORS Burndy is a military qualified manufacturer of these connectors and contacts. Known as SMOOTH BANTAM they are available with either solder contacts as an integral part of the connector or crimp, removable contacts. They are intermateable and interchangeable.

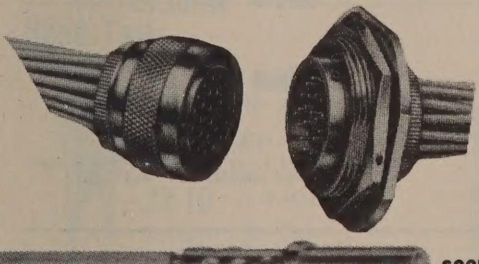
Operational within a temperature range of −55°C to 125°C, they are shock and vibration resistant. Moisture resistance is provided by interfacial and wire seal grommets. SMOOTH BANTAM will accommodate AWG #24 thru AWG #12.



CONTACTS The military qualified crimp removable contacts may also be ordered separately; reel mounted for semi-automatic "BANDOMATIC" installation. Burndy can provide crimping machines. This offers significant cost savings over more expensive hand crimping.

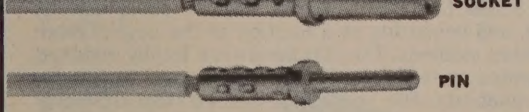
Standard signal and power contacts, coaxial contacts as well as thermocouple (Alumel/Chrome or iron constantan) are available.

MIL-C-38999 Miniature Environmental

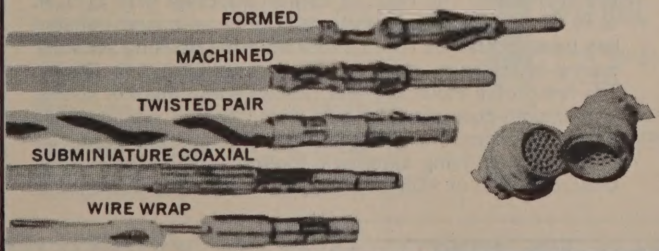


CONNECTORS The COMPACT BANTAM connector has received full military qualification. The design is a rear release type and they are manufactured to meet the reliability requirements of MIL STD 790.

Operational within a range of −65°C thru 200°C, COMPACT BANTAM has the capability of meeting very high vibration and shock parameters. In addition to high moisture resistance, the connectors have been designed to resist a variety of exotic fluids as well as hydraulic and lubrication oils.



CONTACTS Qualified contacts of all specification sizes are normally supplied with connectors. Contacts may be ordered separately, mounted for machine crimping on the BANDOMATIC machine. Coaxial contacts in #16 and #12 sizes are also available.



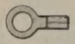
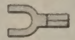
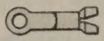
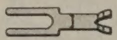
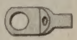
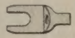
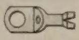
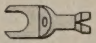
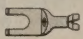
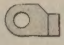
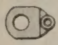
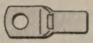
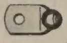
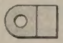
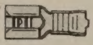
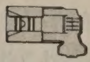
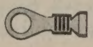
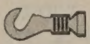
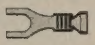
TRIM TRIO BANTAM Connectors

Part of the TRIM TRIO family these cylindrical connectors can be equipped with a mixture of contact sizes and styles from the collection of TRIM TRIO contacts shown. All contacts are crimp removable. More details on p 1811.

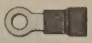
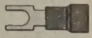
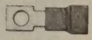
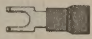
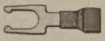
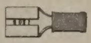
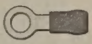
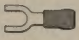
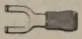
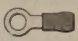
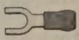
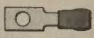
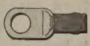
BURNDY CORP. / DEPT. EM / NORWALK, CT 06856 / TEL: (203) 838-4444

BURNDY TERMINALS/HYLOK CONNECTORS

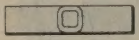
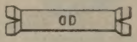
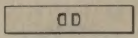
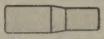
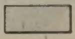
UNINSULATED TERMINALS

	Catalog No.*	Wire Range
	YAD	22-10
	YAD-F	22-10
	YAD-H	22-14
	YAD-N-F	22-8
	YAV	22-8
	YAV-F	22-10
	YAV-H	22-10
	YAV-H-F	22-10
	YAV-Z	20-14
	YBV	22-10
	YAV-R	22-8
	YAV-L	6-4/0
	YAV-R	6-4/0
	YBV	8-2/0
	FINGRIP™	22-14
	FINGRIP (Flag)	18-14
	B-CRIMP (Ring)	22-14
	B-CRIMP (Hook)	22-14
	B-CRIMP (Fork)	22-14

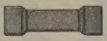
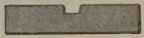
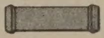
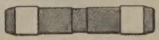
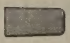
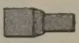
INSULATED TERMINALS

	Catalog No.	Wire Range
VINYL INSULATION**		
	BA-E	22-10
	BA-EF	22-10
	BA-ES	22-10
	BA-EZ	22-10
	BA-EL	22-12
	PQ	22-14
NYLON INSULATION†		
	YAE	26-10
	YAE-F	26-14
	YAE-Z	26-12
	YAES	22-10
	YAES-F	22-10
	YAES-L	22-10
	YAEV	12-2/0

UNINSULATED SPLICES

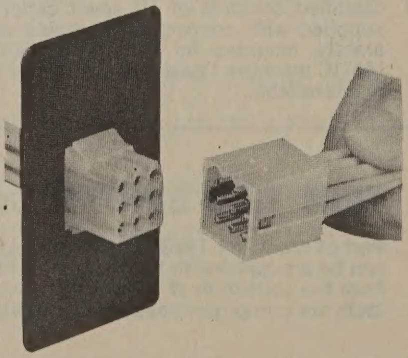
	Catalog No.	Wire Range
	YSV	22-9
	YSV-H	22-10
	YSV-L	8-4/0
	YSV, YRV-L	22-5
	YSM	18-4/0

INSULATED SPLICES

	Catalog No.	Wire Range
INSULATION		Vinyl
	BS	22-10
INSULATION		Nylon
	YSE-HN	22-10
	YSES	22-10
	YSE	22-10
	PS	26-10
	CYW DEADEND	26-10
	YQE PIGTAIL SPLICE	26-10

*Stud size #4 to 5/16″
**Stud Size #1 to 3/8″ except PQ which accepts quick connect tab size .187″ and .250″
†Stud size #4 to 5/8″

HYLOK™ Connector System Series 900



The 900 Series Connector System, HYLOK, offers quality, reliability, and versatility at a fraction of the cost of more sophisticated methods. The 900 Series is a totally matched and integrated system of housing, contacts, and tooling for low-cost reliability. The housing is molded from UL-recognized 6/6 nylon that is tough, resilient, and has good dielectric properties. The housing can be supplied with 2, 3, 4, 6, 9, 12, or 15 contact positions. The panel-mount housing has integral take-up springs that hold the housing securely over a wide range of panel thicknesses (.025″ to .125″). The low profile mounting ears occupy a minimum of space. The smooth-nose pin and bell-mouth socket provide easy and sure mating. The contacts are crimp removable and can be assembled using automatic tooling such as the Burndy UTM, or ASET, or ADET.

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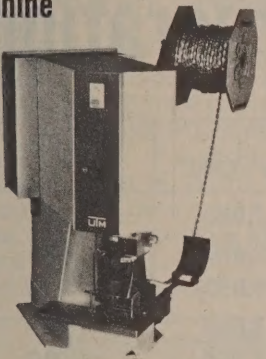
BURNDY

INSTALLATION TOOLING

UTM-Universal Terminating Machine

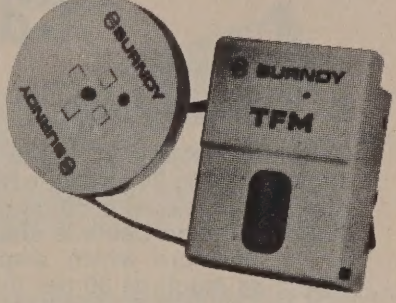


The Burndy UTM installs open barrel — end or side fed — strip terminals and contacts. The crimp mechanism has a dial selection for independent wire and insulation crimp heights. Crimp a wide range of wire sizes without changing the crimp tooling. The UTM is electrically powered and controlled.

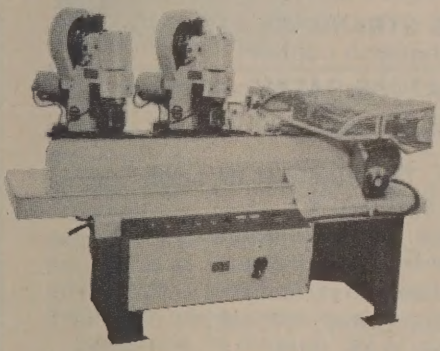
BANDOLUG™-Semi-Automatic Terminating Machine

Burndy's BANDOLUG machine is fed with terminals mounted on a continuous metal band. A sensing unit is featured which insures the correct positioning of the stripped wire into the terminal and automatically trips the crimp cycle.

TFM-Tape Fed Machine



The Burndy TFM machine installs vinyl insulated, nylon insulated and uninsulated terminals sizes #22-#10 without time-consuming die changes. Rotating turret die holder consists of three die sets. The TFM is powered by air and electrically controlled.



ASET-Automatic Single End Terminator (see photo)

Wire Range: #22-#10 AWG

Lead Lengths: 3½″ to 194″

Terminals: Open Barrel — fed from continuous strip
Closed Barrel — insulated or uninsulated — fed from tape.

Rates: Up to 60,000 leads per hour, terminated one end — stripped the other end

ADET — Automatic Double End Terminator

Wire Range: #24 to #10 AWG.

Lead Lengths: 7½″ to 100″

Terminals: Open Barrel — fed from continuous strip.

Closed Barrel — insulated or uninsulated — fed from tape mounted.

Rates: Up to 4000 leads per hour, terminated both ends.

Hand Tools

HYTOOL™ MR8-(RATCHET TOOL)

Wire Range:
22-10
Weight: 1 lb. 7 oz.
Length: 10½″

HYTOOL M8ND (RATCHET CONTROL)

Wire Range:
26-8
Weight: 1¾″
Length: 10¾″
Removable "N" dies

HYTOOL M10S-1 (RATCHET TOOL)

The M10S-1, four indent full cycling, ratchet controlled hand tool is a high reliability installation tool, conforming to the requirements of MIL-T-22520 and MS-3191. These specifications cover crimp and tool configuration required to install the Military Standard contact barrel specified in MS-3190. All contact sizes covered by MIL-C-39029 can be accommodated.

HYTOOL Y10M

Wire Range:
22-10
Weight: 10½ oz.
Length: 9⅜″

BURNDY
BANDOMATIC

BANDOMATIC™

The automatic four and eight indent, BANDOMATIC machine meets the applicable sections of MIL-T-22520 and MS-3191. It is recommended for high speed, high quantity production. Crimping rates are better than two thousand per hour.

BURNDY CORP. / DEPT. EM / NORWALK, CT 06856 / TEL: (203) 838-4444

DEPT. EM, 1610A MANNING BLVD.
LEVITTOWN, PA. 19057 • (215) 547-5273

cable concepts corporation

C³ RIBBON CABLE

C³ Ribbon Cable is available in standard PVC insulation, utilizing 28 gauge, seven-strand #36 copper wire. Flat cable with 30 gauge solid wire is available. C³ Ribbon Cable is ideal for use with U-contact connectors which displace insulation, thus saving as much as 90 per cent in production time and 50 per cent in termination costs. Spacing between conductors is .050″, with controlled tolerance of ±.002″, providing predictable/controlled capacitance, attenuation and impedance. Precise, controlled spacing also makes possible accurate matching of conductors with circuit board and connector hole patterns.

NO. OF COND.	"A" DIM.	TOLERANCE
60	2.950	±.015
50	2.450	±.015
40	1.950	±.015
34	1.650	±.015
26	1.250	±.010
20	.950	±.010
16	.750	±.010
14	.650	±.010

WIRE STYLE: Meets UL style 2651

GAUGE & STRANDING: #28 AWG 7/36 soft annealed copper and tinned.

TEMPERATURE RATING: 105°C.

VOLTAGE RATING: 300 VAC

NOMINAL TRANSMISSION LINE CHARACTERISTICS:

Impedance: (Zo): 105 ohms
Ground-Signal-Ground
Capacitance: 15 Pf/Ft
Propagation Delay: 1.40 NS/Ft
Inductance: 0.20 μH/Ft

COLOR CODE: Gray with Red tracer if no color specified

WIRE STYLE: Meets UL style 2651

GAUGE & STRANDING: #30 AWG solid annealed copper

TEMPERATURE RATING: 105°C.

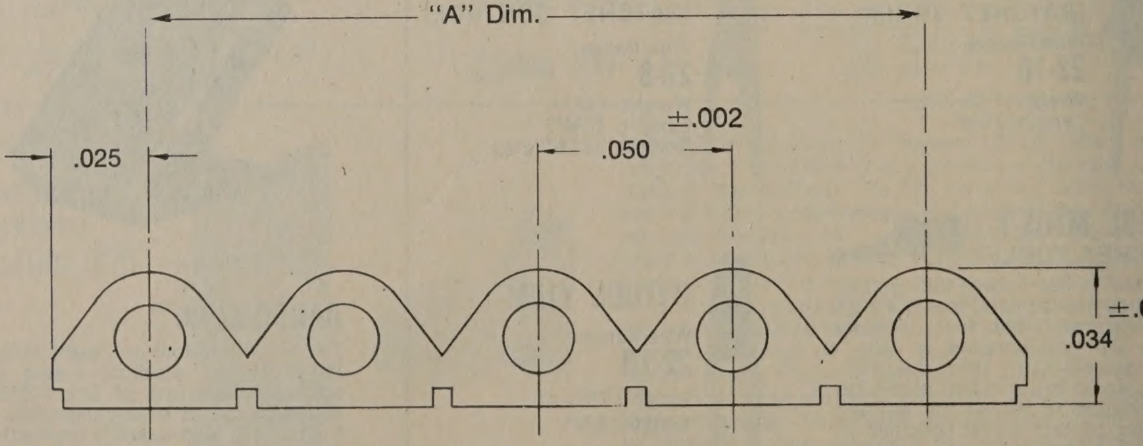
VOLTAGE RATING: 300 VAC

NOMINAL TRANSMISSION LINE CHARACTERISTICS:

Impedance: (Zo): 125 ohms
Ground-Signal-Ground
Capacitance: 12 Pf/Ft
Propagation Delay: 1.42 NS/Ft
Inductance: 0.23 μH/Ft

COLOR CODE: Gray with Red tracer if no color specified

FIGURE 1



Shielded C³ Ribbon Cable should be specified when single side shielding or ground planes are needed to control noise, adjust impedance or reduce crosstalk. A special copper shield has been developed and encapsulated within the cable. Crosstalk is effectively eliminated with no danger of shorting or impedance alterations.

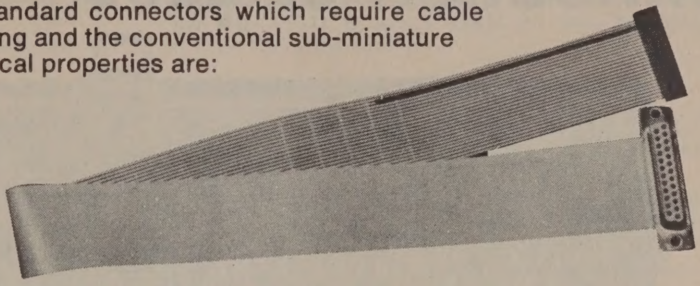
DEPT. EM, 1610A MANNING BLVD.
LEVITTOWN, PA. 19057 • (215) 547-5273

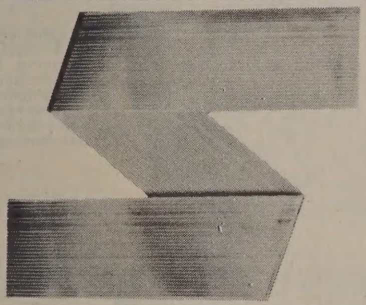
TRANSITION CABLE (PVC)

Cable to allow connection between standard connectors which require cable spacing at .050″ center-to-center spacing and the conventional sub-miniature D type of input output is available. Typical properties are:

Impedance (Zo) 94 ohms
Ground-Signal-Ground
Capacitance: 14.6 pf/Ft
Inductance: 0.16 μH/Ft
Propagation Delay: 1.46 NS/Ft

The cable is available in 26 AWG bare copper or 28 AWG (7/36) TC and is 25 conductors wide.





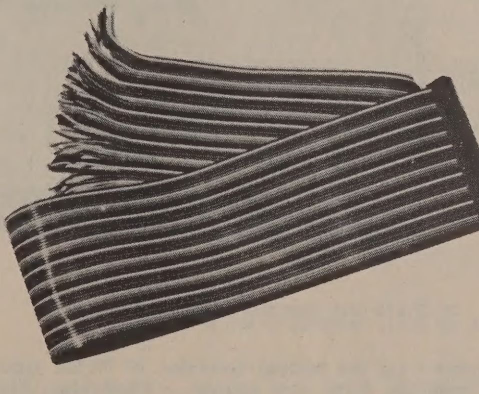
FLAT CABLE WITH RECTANGULAR CONDUCTORS

Generally speaking rectangular conductor cable is used with Mylar* or Kapton* as the insulation. The requirement varies from customer to customer and are all considered special. The advantage of flat conductor flat cable is better form factor and head dissipation and the combining of different effective gauges by varying the width of the conductors.

MULTICOLOR RAINBOW CABLE (PVC)

Multiple conductor ribbon cable made by laminating discrete pre-insulated wires in 10 colors and repeat allows mass termination techniques to be used with conventional wiring. The individual wires can be separated and wired to lights, switches, fuses, and actuators in different locations while still taking advantage of precise centers and the use of insulation displacement connectors.

Generally, 28 AWG (7/36) TC conductors are used and laminated on .050″ centers. The general specifications of the solid color cable using the same wire construction and spacing will apply. Special constructions and color sequences for specific production applications can be supplied.



EXTREME ENVIRONMENTAL CONDITIONS

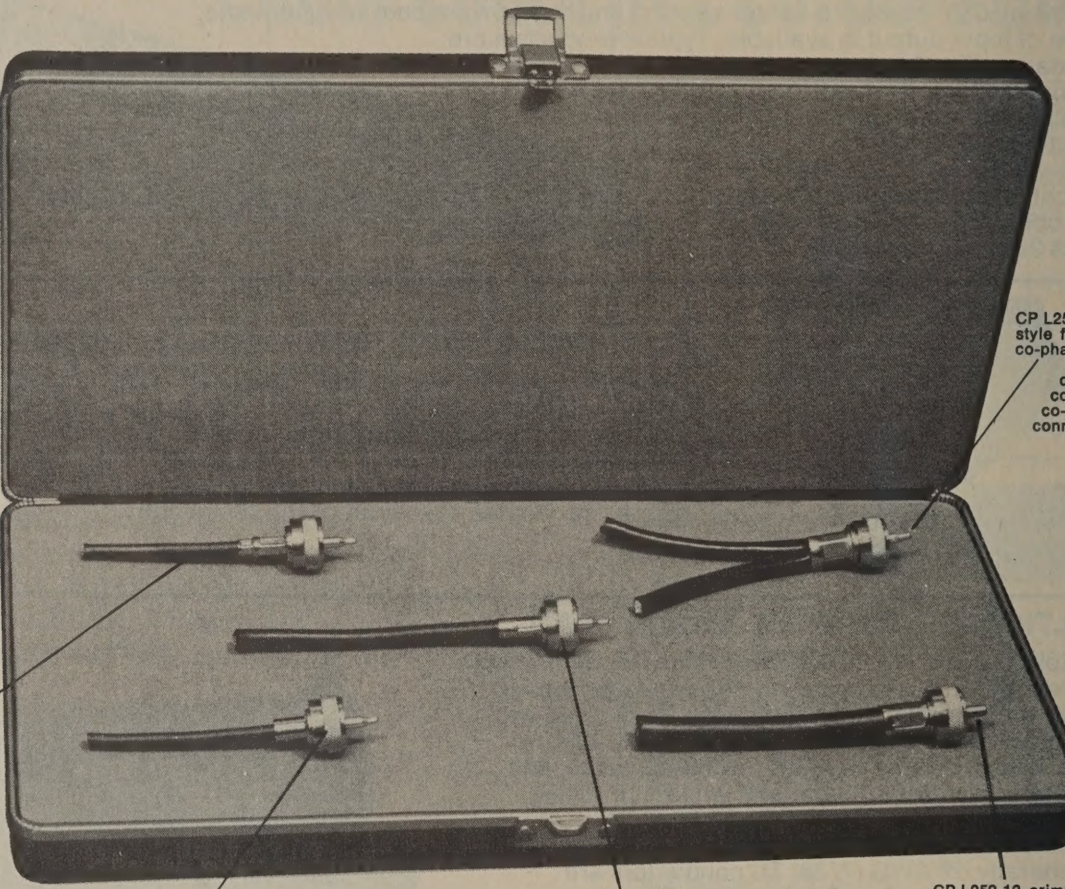
C^3 Ribbon Cable with special insulations is available to resist extreme thermal, electrical, chemical or physical conditions.

FIGURE 2
COMPARATIVE EVALUATION OF DIFFERENT INSULATIONS****

	Temp. Range °C	Chemical Resistance	Dielectric Properties*	Relative Cost Position**	Application
Vinyl Insulated Wire Vinyl Film	−25 to +80	Excellent except for some organic solvents	dc 3.9 Avg. Hipot > 500V/mil	8	General Usage Low Cost
Teflon Insulated Wire Vinyl Film	−25 to +80***	Excellent except for some organic solvents	dc 2.5 Hipot > 500V/mil	5	High temperature Chemical Resistance
Teflon Insulated Wire Teflon Film	−76 to +200	Excellent	dc 1.8 Hipot > 500V/mil	2	High temperature Chemical Resistance
Teflon Insulated Wire Teflon & Kapton Films	−76 to +225	Excellent	dc 2.1 Hipot > 500V/mil	1 - Most Expensive	Thermal stability Chemical Resistance
Bare Wire Mylar/Polyolefin Film	−76 to +80	Very Good	dc 2.0 Hipot > 500V/mil	7	Excellent dielectric properties — good chemical properties
Bare Wire Polyester/Adhesive Film	−76 to +125	Very Good	dc 2.5 Hipot > 500V/mil	6	Good design versatility — may be single side insulation
Bare Wire Vinyl Film	−25 to +105	Excellent except for some organic solvents	dc 2.7 - 5 Hipot > 500V/mil	9 - Least Expensive	High density wiring Low Cost
Bare Wire Teflon Film	−76 to +200	Excellent	dc 1.6 - 2.2 Hipot > 500V/mil	4	High density wiring, good chemical & electrical properties
Bare Wire Kapton Adhesive Film	−76 to +220	Excellent except strong alkalies	dc 2.7 Hipot > 500V/mil	3	High temperature thermal stability design versatility

*Average composite dielectric constant in cable form will vary with wire size and spacing.
**These figures are for cost relationship only. In some configurations these relative positions may change.
***Ends of wires may enter hostile environments if film support is not required in this area.
****Kapton, Mylar, Teflon are Dupont Trademarks.

The CAMBRIDGE Connection CP L259



CP L259-9 crimp style for 59U co-phasing. Easily installed compared to conventional co-phasing connectors.

CP L259-1 Crimp style for 58U cable. Specify CP L259-14 for 59U cable.

CP L259-15 field installable without special tools and without soldering for 58U or 59U cable.

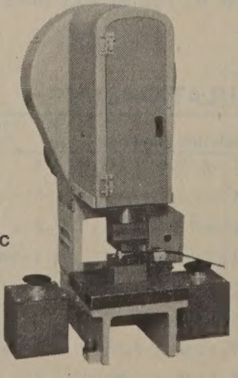
CP L259-5 solder style for 58U or 59U cable. Also available is CP L259-6 crimp on ferrule/solder center pin.

CP L259-12 crimp style for 8U cable.

Your choice from the Widest Selection of PL259 type connectors available from one source . . . Cambridge Products Corporation. We have CP L259 models for 58U, 59U, 8U, 59U co-phasing and 58U co-phasing. You can also have your choice of crimp installation, solder installation, or installation with a field-installable connector which requires no special tools and no soldering. Whichever you need, CP L259 connectors are quality manufactured of brass with a bright nickel plate finish. A few of our more popular models are shown above. Made in U.S.A.

Our services don't stop with connectors themselves. For our crimp connectors, we offer a complete line of hand operated, manual bench mounted, pneumatic and electric crimp tools, each with the necessary crimp dies.

Shown here is our high-speed electric press, complete with dies and dual palm controls for safe operation.



CP L259 ORDERING INFORMATION

STANDARD CP L259 CONNECTORS

Model Number	Cable Size	Attachment Method	
		Braid	Center Conductor
CP L259-1	58U	Crimp	Crimp
CP L259-5	58U or 59U	Solder	Solder
CP L259-6	58U	Crimp	Solder
CP L259-8	Twin 58U Co-Phase	Crimp	Crimp or Solder
CP L259-9	Twin 59U Co-Phase	Crimp	Crimp or Solder
CP L259-12	8U	Crimp	Crimp or Solder
CP L259-14	59U	Crimp	Crimp
CP L259-15	58U or 59U	Field Installable — No special tools or soldering	
CP L259-19	59U	Crimp	Solder

244 Woodland Avenue, Bloomfield, Connecticut 06002
Tel: (203) 243-1761 / TWX: 710-420-0592

CAMBRIDGE PRODUCTS CORP
A Hi-G Company

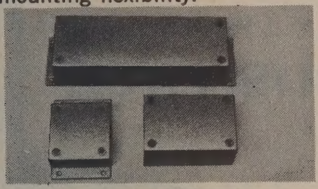
COMPAC™ LOW COST RFI SHIELDED CASES

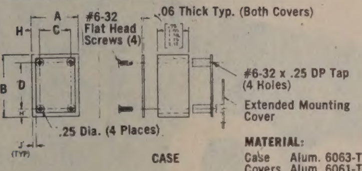
COMPAC's line of cases gives the customer the choice of BLANK CASE assemblies without connectors, STANDARD CASES with flange mounted RF connectors, and RFI filter feedthroughs, and a CUSTOM LINE of cases made to order at low cost. An optional circuit board is available which is part of COMPAC's accessory group.

COMPAC's RFI shielded cases are effective from 60 to ≥ 100 dB @ 100 MHz. Even greater shielding capacity is achieved when an RFI gasket is positioned between the covers and the case frame. The cases are made of extruded aluminum alloy Type 6063-T5 with .12 thick walls. The top and bottom covers are made of .062 thick aluminum alloy, Type 6061-T4. Case enclosures are completely finished with a chemical film per MIL-C-5541 B, which makes for excellent conductivity. (Prices start from $9.85.)

BLANK SERIES

COMPAC's BLANK SERIES consists of blank cases in 13 standard sizes, with five various heights (.75, 1.00, 1.38, 1.75, 2.12). All have top and bottom covers mounted in place with four flat head machine screws. Extended covers are available to give mounting flexibility.




A
#6-32 Flat Head Screws (4)
.06 Thick Typ. (Both Covers)
H
C
B
D
#6-32 x .25 DP Tap (4 Holes)
Extended Mounting Cover
.25 Dia. (4 Places)
J (TYP)
CASE

MATERIAL:
Case Alum. 6063-T5
Covers Alum. 6061-T4
Finish Chemical Film per MIL-C-5541, Class 1A

Case[1] Part No.	TABULATION CHART A	B	C	D	E	F	H	J
5111-	1.50	2.00	1.000	1.500	2.375	2.75	.25	.12
5112-	1.50	2.50	1.000	2.000	2.875	3.75	.25	.12
5113-	1.50	6.00	1.000	5.500	6.375	6.75	.25	.12
5114-	1.75	1.75	1.250	1.250	2.125	2.50	.25	.12
5115-	1.75	3.00	1.250	2.500	3.375	3.75	.25	.12
5116-	2.00	2.00	1.500	1.500	2.375	2.75	.25	.12
5117-	2.00	3.00	1.500	2.500	3.375	3.75	.25	.12
5118-	2.00	4.00	1.500	3.500	4.375	4.75	.25	.12
5119-	2.00	5.00	1.500	4.500	5.375	5.75	.25	.12
5120-	2.00	6.00	1.500	5.500	6.375	6.75	.25	.12
5121-	3.00	3.00	2.500	2.500	3.375	3.75	.25	.12
5122-	3.00	5.00	2.500	4.500	5.375	5.75	.25	.12
5123-	3.00	6.00	2.375	5.375	6.375	6.75	.31	.19

[1](a) Any case size in above column includes top and bottom covers, and (4) #6-32 flat head screws.

(b) Other size cases available; contact factory.

HOW TO ORDER:

5111 — 138 — 0

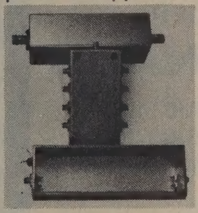
Case Part No.

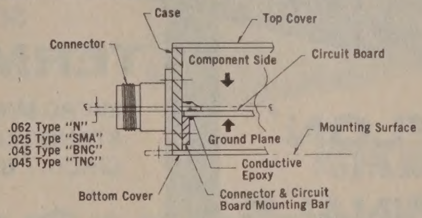
Cover Type
0 = Std. Flush
1 = Extended (1), Flush (1)

Case Height
075 = 0.75
100 = 1.00
138 = 1.38
175 = 1.75
212 = 2.12

STANDARD SERIES

COMPAC's STANDARD SERIES consists of 9 standard case sizes, each having a top and bottom flush cover mounted in place with four screws (extended covers available), and a selection of four flange mounted "female" connectors (SMA, TNC, N, BNC) all military approved per MIL-C-39012. One nut plate is supplied with each connector which secures the connector to the case, and supports the circuit board providing an excellent ground plane. COMPAC's cases offer very easy accessibility to the circuit board. By removing the four screws, the top and bottom covers disengage to allow complete accessibility to both sides of the board. Three sample configurations are shown.




Case
Top Cover
Connector
Component Side
Circuit Board
.062 Type "N"
.025 Type "SMA"
.045 Type "BNC"
.045 Type "TNC"
Ground Plane
Mounting Surface
Conductive Epoxy
Bottom Cover
Connector & Circuit Board Mounting Bar

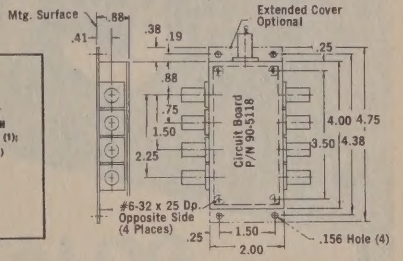
HOW TO ORDER

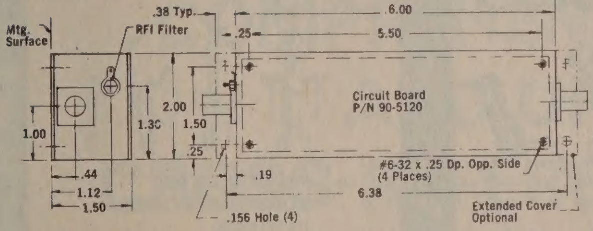
6210 — 5120 — 2 — 0

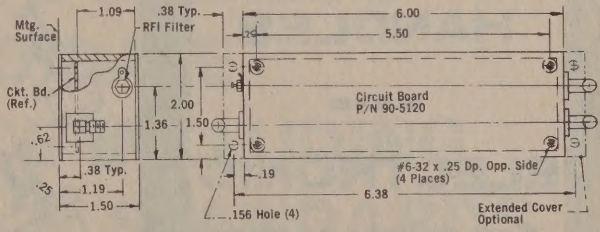
BASIC PART NO.

CONNECTOR TYPE
A, B { 1 = SMA FEMALE (STRAIGHT)
2 = BNC FEMALE
3 = TNC FEMALE
C { 5 = SMA FEMALE (RIGHT ANGLE)

COVER TYPE
0 = STD. FLUSH
1 = EXTENDED (1); FLUSH (1)


Mtg. Surface
.88
.41
.38
.19
Extended Cover Optional
.25
.88
.75
1.50
2.25
Circuit Board P/N 90-5118
4.00
4.75
3.50
4.38
#6-32 x 25 Dp. Opposite Side (4 Places)
.25
1.50
2.00
.156 Hole (4)


.38 Typ.
6.00
Mtg. Surface
RFI Filter
.25
5.50
Circuit Board P/N 90-5120
2.00
1.30
1.50
1.00
.25
.44
1.12
1.50
.19
#6-32 x .25 Dp. Opp. Side (4 Places)
6.38
.156 Hole (4)
Extended Cover Optional

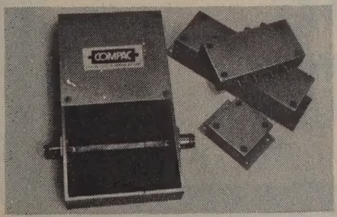

1.09
.38 Typ.
Mtg. Surface
RFI Filter
6.00
.25
5.50
Ckt. Bd. (Ref.)
Circuit Board P/N 90-5120
2.00
1.36
1.50
.62
.38 Typ.
.25
1.19
1.50
.19
#6-32 x .25 Dp. Opp. Side (4 Places)
6.38
.156 Hole (4)
Extended Cover Optional

CUSTOM SERIES

COMPAC's CUSTOM SERIES serves the need for special design requirements where size, type and location of connectors and feedthroughs are important. COMPAC makes these cases in 13 basic case sizes found in the "blank" series. COMPAC works from drawings supplied by the customer to reduce design and drafting time, and makes the special cases to their specifications. COMPAC furnishes at no cost a software package consisting of to-scale, reproducible "A" size drawing forms. COMPAC also has the facilities to fabricate RF cases in all sizes. Contact factory for details.

ACCESSORY GROUP

COMPAC provides a full line of accessories including circuit boards, RF gaskets, feedthroughs, connectors and additional hardware.



This listing will give you some indication of the capabilities of COMPAC. For additional details and specifications, send for our complete catalog.

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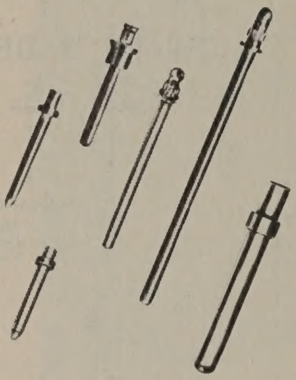
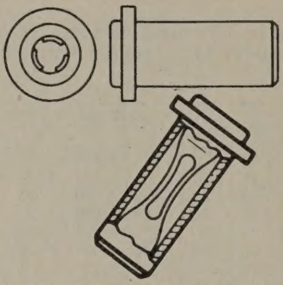


PRINTED CIRCUIT

JACKS

& CONNECTORS



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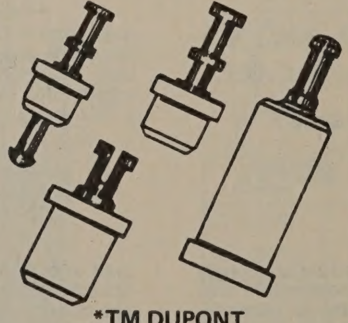

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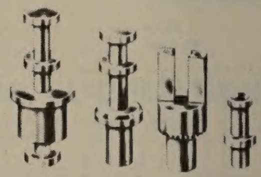

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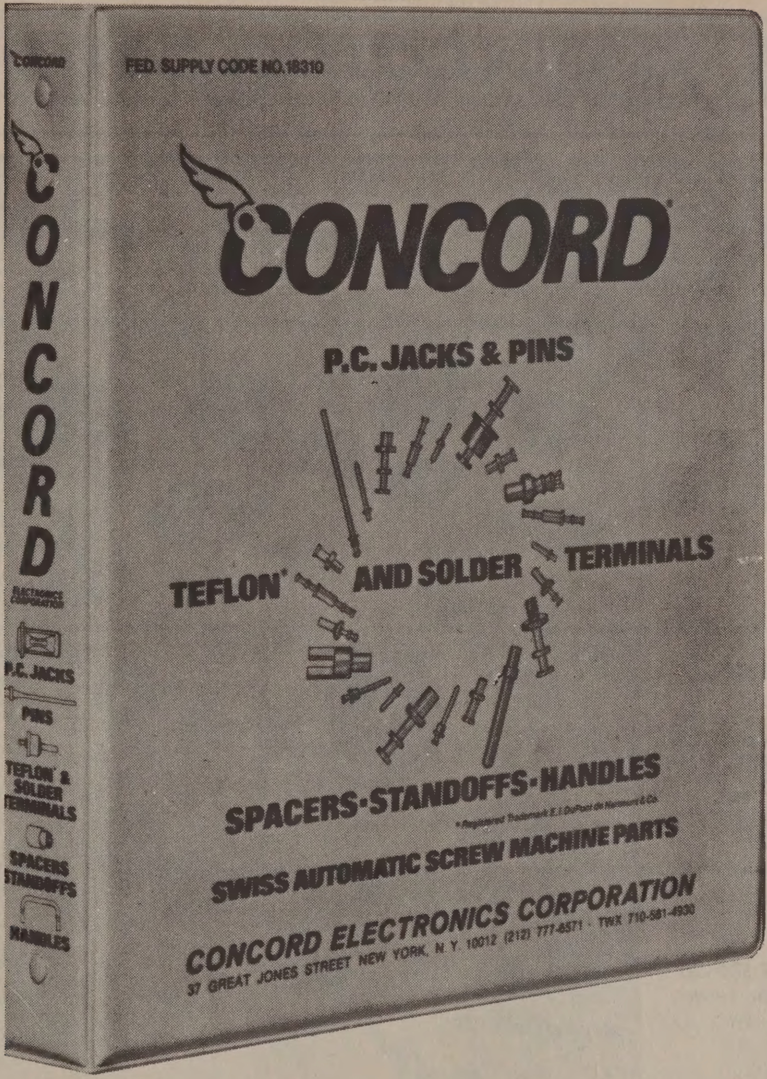
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CONNECTOR CORPORATION

6025 N. KEYSTONE AVENUE • CHICAGO, ILLINOIS 60646 • TELEPHONE: 312, 539-3108

For many years the electronic industry has relied on the wide range of products, engineering services and consistent production quality of Connector Corporation.

A limited cross section of Connector Corporation's line is illustrated. Your specific requirement can be exactly met and mass produced with good delivery. Many items can be supplied with leads attached and color coded, offering production savings for your assembly. Special items can be designed or developed at relatively low cost. Just let us know what you need.

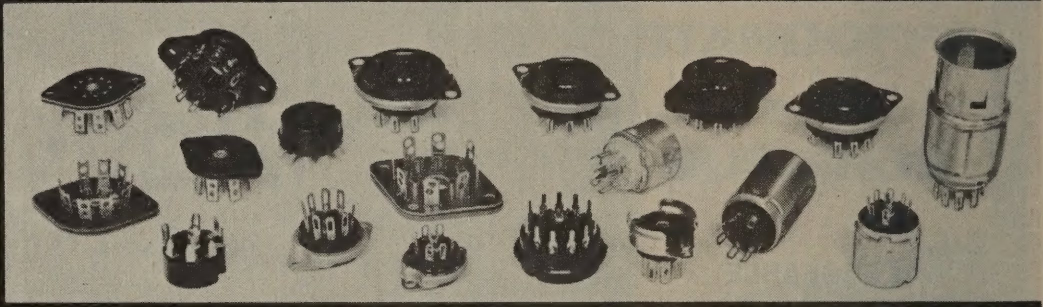
Products are available in a wide range of insulations and contact materials:

Insulations include: general purpose or mica-filled low loss Phenolic, glass filled alkyd, polypropolene, ceramic,etc., in molded versions. Laminated types include XP, XXP, XXXP Phenolics, X2B Hard Rubber, Glass Epoxy, Glass alkyd.

Contacts and Platings include: High tensile brass, phosphor bronze or beryllium copper with cadmium, electro tin, silver, hot tin dipped, silver-gold flash, gold plating, etc.

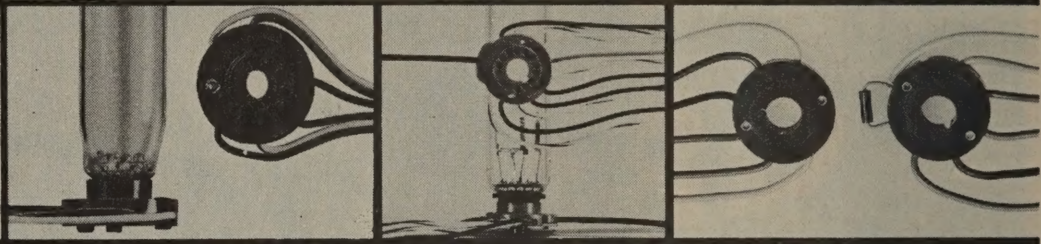
TUBE SOCKETS

Most standard and many special molded & ceramic configurations available as well as laminated socket types. Fixed or collapsible types of shielding are available.



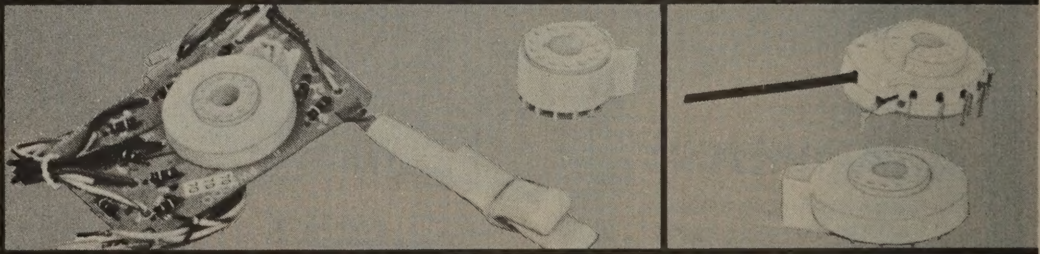
KINESCOPE SOCKET ASSEMBLIES

Include: Miniature Di Heptal Socket for 90° color tubes, 110° Eightar CRT sockets, miniature types for JEDEC E7-91, B7-247 basing (HEPTAL). Many special configurations and types may be furnished in quantity lots.



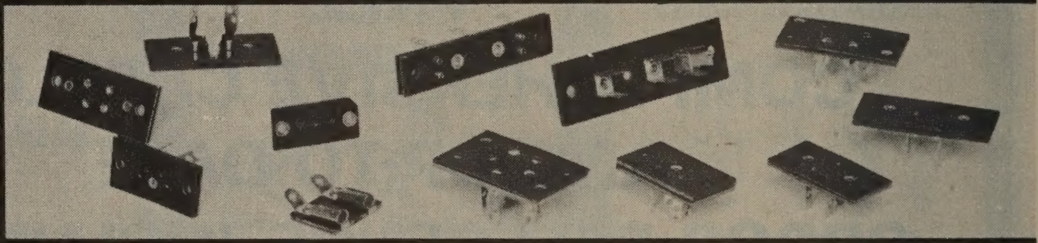
PC KINESCOPE SOCKETS

With or without internal spark gapping.



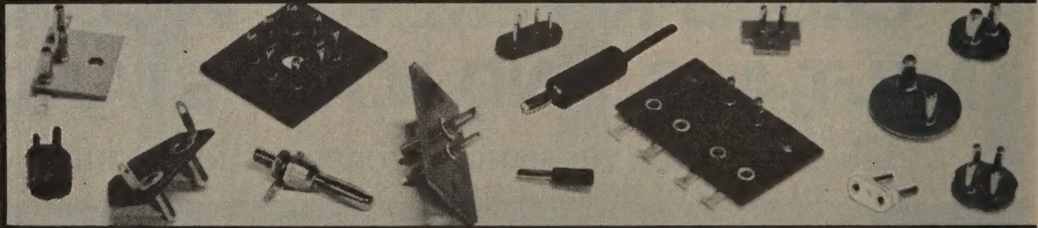
RECEPTACLES

Numerous varieties. Available in molded or laminated construction. Reliable contacts offer positive electrical and mechanical mating.



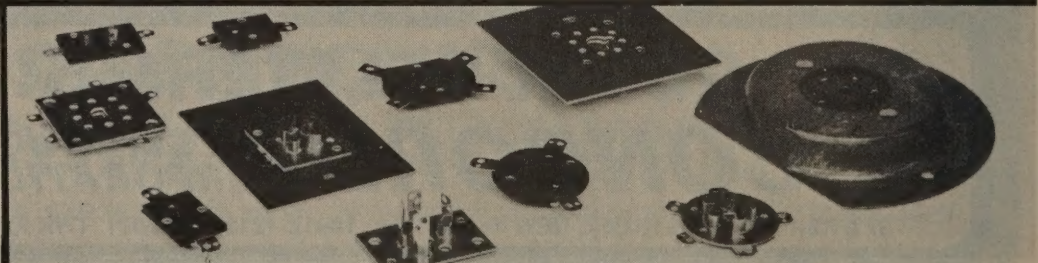
PLUGS

Numerous types available, with molded or laminated phenolic insulations. Leads may be supplied to specification.



BATTERY SOCKETS

Complete line for commercial & military batteries. Custom designed to your requirements.



CONNECTOR CORPORATION

6025 N. KEYSTONE AVENUE • CHICAGO, ILLINOIS 60646 • TELEPHONE: 312, 539-3108

TRANSISTOR SOCKETS

3- or 4-pin on .100 or .200 centers. Accept TO3 and TO66 types power transistors.

NUVISTOR SOCKETS

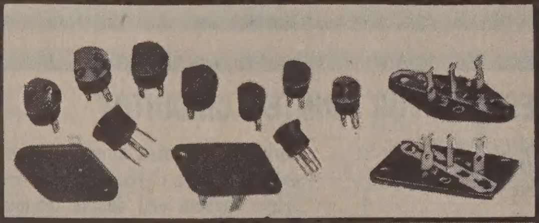
Miniature positive contact.

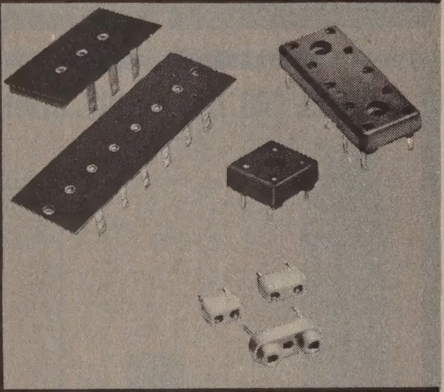
IC SOCKETS

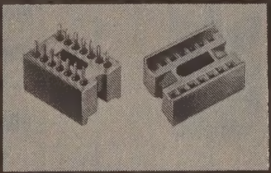
14-pin dual in-line on .100 centers.

CRYSTAL SOCKETS

Accommodate single and multiple crystals. Both p.c. and solder lug versions for crystals with .486, .273 and .192 pin centers and with .050 or .040 pin diameters. Available to MIL Specs.





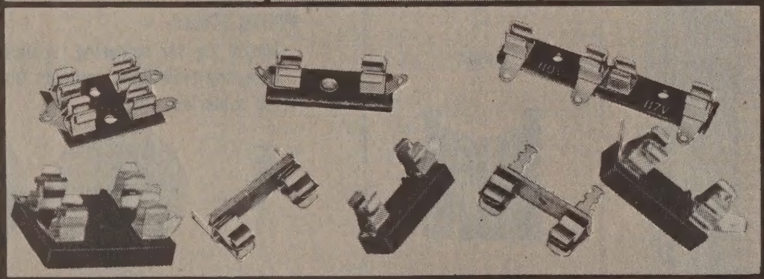


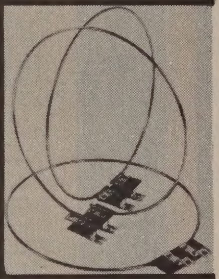
FUSE HOLDERS

Positive grip open type. Features: easy solderability, and versatility of construction which permit multiples or variations to your spec at reasonable cost.

UHF TV ANTENNAE

Attaches easily. Can be rotated in many different planes for optimum performance. Long life, trouble-free operation.



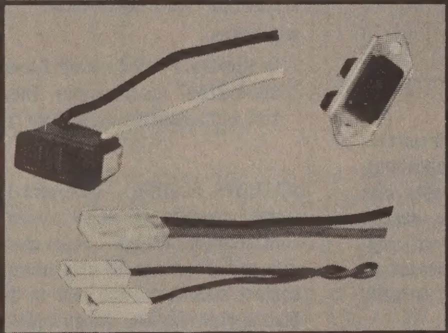


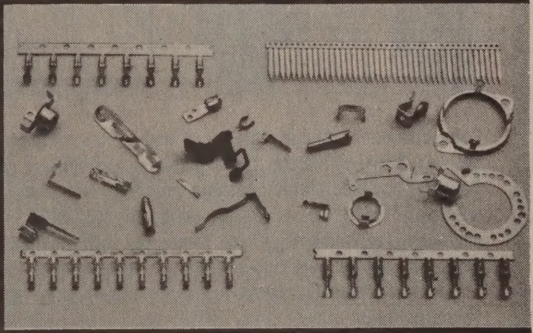
VARIOUS INSULATED CONNECTOR ASSEMBLIES

Includes 110 Volt AC Power Receptacles.

PRECISION METAL STAMPINGS

Bulk or chain type contacts, terminals and flat stampings for your high production needs.



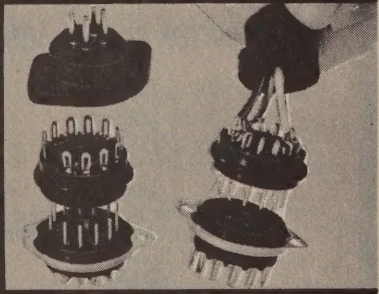


RF COAXIAL ANTENNA CONNECTORS

For auto receivers & similar applications. Rugged construction. Excellent contact resistance and retention.

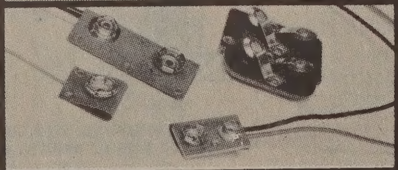
MULTI-PIN MALE/FEMALE CONNECTORS

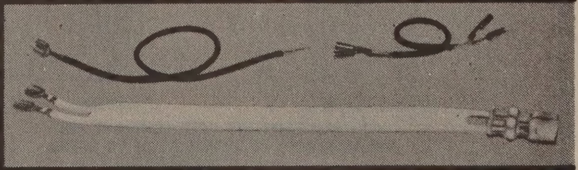
Provide quick reliable connect and disconnect for cable assemblies. Insert and extract easily, yet have reliable contact retention and resistance.



BATTERY CONNECTORS AND WIRE ASSEMBLIES

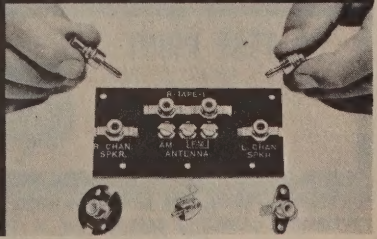
Snap-on and positive contact types available with wired leads if desired. Wire assemblies furnished to your specifications as to type of wire, length and termination attachments.





MULTI PURPOSE PHONO CONNECTORS

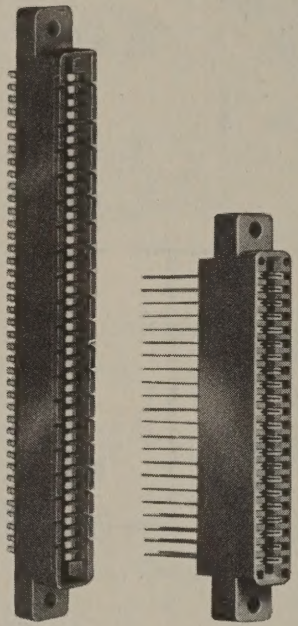
Sockets available in multiples up to 12 per section. Broad line of individual male and female types in a variety of mountings. Highly reliable for dependable repeated use.



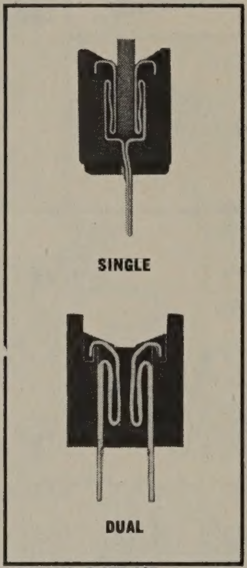
CONTINENTAL CONNECTORS

Precision Electronic Connectors For Commercial & Military Applications

SERIES 600 CARD-EDGE CONNECTORS FOR PRINTED CIRCUITRY



BELLOWFORM CONTACTS*



* PAT. NO. 2,875,425

Connector body molding material is made of a variety of compounds such as Diallyl Phthalate, for commercial and military applications. Contacts are gold plated phosphor bronze or beryllium copper with optional plating in accordance with all MIL SPECS or special customer requirements. These contacts, with "bellowform" construction, are durable and capable of withstanding thousands of insertions and withdrawals without failure; they are virtually indestructible.

Series 600 printed circuit connectors represent one of the most extensive lines of receptacle or card-edge types. A wide variety of single readout and double readout construction, with sizes from three to 210 contacts are available.

CONTACT CENTERS:

.050″, .075″, .100″, .125″, .140″, .150″, .156″ and .200″

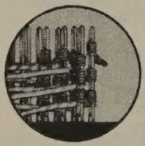
BOARD THICKNESS:

1/32″, 3/64″, 1/16″, 3/32″ and 1/8″

WIRING STYLES:

Eyelet lug for soldering, solderless-wrap terminations for wire-wrapping technique, contacts for dip or flow soldering and taper tab solderless wiring

EYELET LUG



SOLDERLESS-WRAP

DIP SOLDER

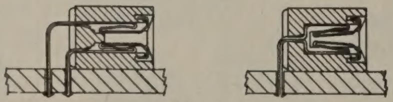
TAPER TAB

MIL SPECS:

Continental Printed Circuit Connectors meet or exceed applicable MIL-C-21097 specifications. They withstand a 50-hour salt spray test and ambient temperature range of −55°C to +125°C.

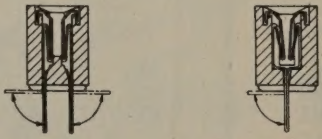
SELECTIVE PLATING — Continental's continuous process selective plating deposits an equal amount of gold on each contact. The contacts pass through various cleaning and plating baths, resulting in a controlled amount of gold uniformly deposited on the critical contact area. By plating gold on the contact surface only, selective plating automatically brings down your connector cost enormously.

PRINTED CIRCUIT APPLICATIONS



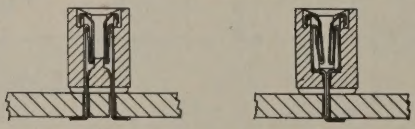
DUAL SINGLE

RIGHT ANGLE MOUNTING WITH CONTACTS FOR DIP SOLDERING TO UNDERSIDE OF PC BOARD



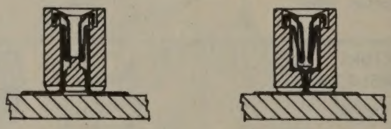
DUAL SINGLE

VERTICAL MOUNTING WITH CONTACTS FOR SRAIGHT OR RIGHT ANGLE HARNESS WIRING



DUAL SINGLE

VERTICAL MOUNTING WITH CONTACTS FOR DIP SOLDERING TO UNDERSIDE OF PC BOARD



DUAL SINGLE

VERTICAL MOUNTING WITH CONTACTS SOLDERED TO TOP SIDE OF PRINTED CIRCUIT BOARD

PC TEST POINT

SERIES 672. Provide conveniently located test points to check printed circuitry. Available with 4, 5, 6, 8, 10, 11, 20, 21, 28, 30, 42 and 63 contacts which grip and hold securely a standard .080″ test probe. Connectors have recessed and floating pin terminals mounted at right angle to the test socket. Pins dip solder to printed circuit board.

FOR COMPLETE CATALOG ON ANY SERIES WRITE OR PHONE:
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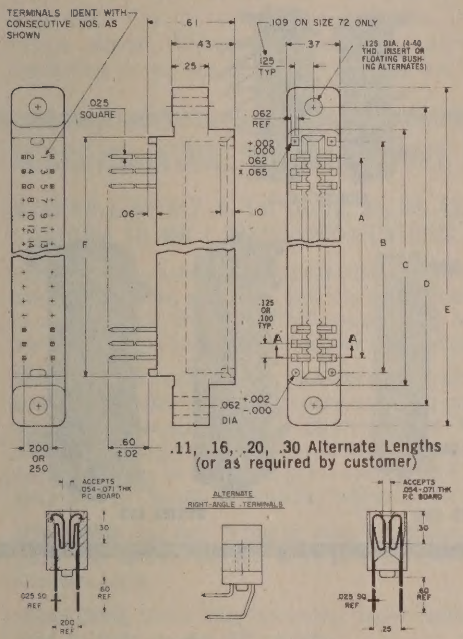
CONTINENTAL CONNECTORS

Precision Electronic Connectors For Commercial & Military Applications

PRINTED CIRCUIT CONNECTORS FOR MINIATURE WIRE WRAPPING


TERMINALS IDENT. WITH CONSECUTIVE NOS. AS SHOWN
.61
.43
.25
.109 ON SIZE 72 ONLY
.125 TYP
.37
.125 DIA. (4-40 THD. INSERT OR FLOATING BUSHING ALTERNATES)
.025 SQUARE
.062 REF
+.002 -.000
.062 x .065
.06
.10
F
A
B
C
D
E
.125 OR .100 TYP.
A
.062 +.002 -.000 DIA
200 OR 250
.60 ±.02
.11, .16, .20, .30 Alternate Lengths (or as required by customer)
ACCEPTS .054-.071 THK P.C. BOARD
ALTERNATE RIGHT-ANGLE TERMINALS
30
60 REF
.025 SQ REF
200 REF
.25

Full Bellowform Contacts on Connector with .100 Contact Centers (Series 6100-200)

Semi Bellowform Contacts on Connectors with .125 Contact Centers (Series 6125-250)

No. of Contact	SERIES 6100-200 .100 CONTACT CENTERS						SERIES 6125-250 .125 CONTACT CENTERS					
	A	B	C	D	E	F	A	B	C	D	E	F
6/6	.500	.700	.860	1.175	1.435	.750	.625	.875	1.035	1.295	1.555	.875
10/10	.900	1.100	1.260	1.575	1.835	1.150	1.125	1.375	1.535	1.795	2.055	1.375
15/15	1.400	1.600	1.760	2.075	2.335	1.650	1.750	2.000	2.160	2.420	2.680	2.000
17/17	1.600	1.820	1.972	2.240	2.500	1.840	—	—	—	—	—	—
18/18	1.700	1.900	2.060	2.375	2.635	1.950	2.125	2.375	2.535	2.795	3.055	2.375
20/20	1.900	2.100	2.260	2.575	2.835	2.150	2.375	2.625	2.785	3.045	3.305	2.625
22/22	2.100	2.300	2.460	2.775	3.035	2.350	2.625	2.875	3.035	3.295	3.555	2.875
24/24	2.300	2.500	2.660	2.975	3.235	2.550	—	—	—	—	—	—
25/25	2.400	2.600	2.760	3.075	3.335	2.650	3.000	3.250	3.410	3.670	3.930	3.250
26/26	2.500	2.700	2.900	3.200	3.500	2.775	—	—	—	—	—	—
28/28	2.700	2.900	3.060	3.375	3.635	2.950	3.375	3.625	3.785	4.045	4.305	3.625
30/30	2.900	3.100	3.260	3.575	3.835	3.150	3.625	3.875	4.035	4.295	4.555	3.875
31/31	—	—	—	—	—	—	3.750	4.000	4.160	4.420	4.680	4.000
35/35	3.400	3.600	3.760	4.075	4.335	3.650	4.250	4.500	4.660	4.920	5.180	4.500
36/36	3.500	3.700	3.860	4.175	4.435	3.750	4.375	4.625	4.785	5.045	5.305	4.625
40/40	3.900	4.100	4.260	4.575	4.835	4.150	4.875	5.125	5.285	5.545	5.805	5.125
43/43	4.200	4.400	4.560	4.875	5.135	4.450	5.250	5.500	5.660	5.920	6.180	5.500
44/44	4.300	4.500	4.660	4.975	5.235	4.550	—	—	—	—	—	—
48/48	4.700	4.900	5.150	5.450	5.710	5.130	—	—	—	—	—	—
49/49	—	—	—	—	—	—	6.000	6.250	6.410	6.670	6.930	6.250
50/50	4.900	5.100	5.260	5.575	5.835	5.150	6.125	6.375	6.535	6.795	7.055	6.375
60/60	5.900	6.100	6.260	6.575	6.835	6.150	7.375	7.625	7.785	8.045	8.305	7.625
65/65	6.400	6.600	6.760	7.075	7.335	6.650	8.000	8.250	8.410	8.670	8.930	8.250
75/75	7.400	7.600	7.760	8.075	8.335	7.650	9.250	9.500	9.650	9.920	10.180	9.500
100/100	9.900	10.100	10.260	10.575	10.835	10.150	12.375	12.625	7.785	13.045	13.305	12.625

SERIES 6100-200 and 6125-250. The most extensive line of printed circuit connectors for miniature wire wrapping in the industry. All densities from 2 to 200 contacts can be supplied . . . the most popular sizes being tabulated above. Available in two grid patterns — .100 x .200 (Series 6100-200) and .125 x .250 (Series 6125-250) with .025 square terminals true positioned to make these particularly suitable for automatic wiring techniques. Terminal lengths to exact customer needs for one, two or three wraps; or for flow soldering to boards of any thickness. Choice of mounting styles — thru hole, thd. inserts, floating bushing, flat bottom and without mounting "ears." Connector body molding material may be any of a variety of compounds for commercial and military applications. Contacts are gold plated phosphor bronze with optional plating in accordance with all MIL specs or special customer requirements.

Voltage Rating (sea level) — 1800 V. RMS (.100 spacing); 2100 V. RMS (.125 spacing) Current Rating — 3 amps continuous.

CONTINENTAL CONNECTORS CORPORATION CATALOGS

micro-miniature connectors
miniature rectangular power connectors
right angle pc & socket connectors
sub-miniature connectors

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CONTINENTAL CONNECTORS

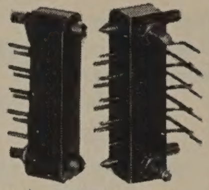
Precision Electronic Connectors For Commercial & Military Applications

RIGHT ANGLE SERIES PLUG & SOCKET TYPES FOR PRINTED CIRCUITRY

IN ACCORDANCE WITH MIL-C-55302, MIL-E-5400, MIL-C-28748 SPECIFICATIONS

.050″, .100″, .156″, .200″ CONTACT CENTERS

SERIES 145-5. 7, 9, 11, 15, 19, 23, 37 contacts. Solder cup on socket, dip solder pin for plug. For use in airborne electronic equipment in accordance with MIL-C-55302 specs.

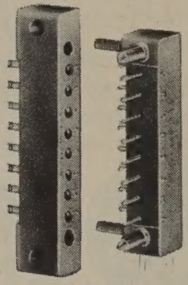

SERIES 145-5

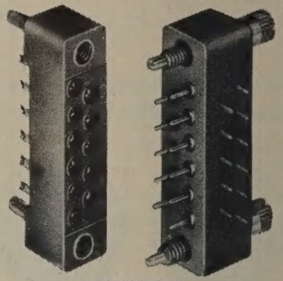
SERIES 600-1-45. 17, 23, 25, 33, 41, 45 & 77 contacts on .050″ center spacing. Right angle configuration of two and three rows of dip solder contacts.

SERIES 600-1-50. 50 contacts on .100″ center spacing.

SERIES 670. 4, 8, 10, 12, 13, 22, 28 single row contacts on .156″ center spacing. Guide pins in plug and guide bushings in socket provide polarized mating of parts.

SERIES 683. 11, 12, 18, 19, 23, 32, 33, with polarizing screwlocks or guidepins and guide sockets. Meet aircraft requirements for vibration and high altitude.


SERIES 670_


SERIES 683

SERIES J RIGHT ANGLE OR STRAIGHT THRU WIRING — .050″/.100″ CONTACT CENTERS

9, 11, 15, 21, 25, 31, 37, 51 CONTACTS

These plug and socket connectors are widely used in all electronic systems. Their size and rugged construction make them particularly adaptable to aircraft applications. They can be used for mounting on single or dual sided printed circuit boards of varying thickness. The contact configuration is excellent for flat cable use. Plug contacts are integrally molded into the rugged body material and are protected by a high strength, single piece molded shell of glass fiber reinforced phenolic. Molding configuration prevents mismatching of plug and socket.

Socket contacts are wire crimp removable and free floating. They feature a self-wiping action that eliminates the need for precious metal plating such as gold. Excellent conductivity and a low millivolt drop. Hoods are available.

ELECTRICAL AND MECHANICAL RATINGS:

Voltages	Breakdown	Recommended Test
At Sea Level	2000V. RMS	1325V. RMS
At 70,000 Ft.	400V. RMS	300V. RMS

Current Rating: 3 Amps Continuous .... 5 Amps Max.
Minimum Creepage Between Contacts .... .047″
Minimum Air Space Between Contacts .... .047″
Male Contact Pin Diameter .... .030″
Crimp Barrel for Socket Contact: Accommodates #22, #24, #26 AWG Wire

NOTES:

1. Body Material: Glass fiber reinforced phenolic Type MFH per MIL-M-14.
2. Contact Material: Copper alloy, gold plated.
3. Socket contact 2500-S2A22-39 must be ordered separately.
4. For electroplated tin contact add suffix "SN" to connector part number (J21P90-15-SN).

J51S RECEPTACLE USES REMOVABLE SOCKET CONTACTS

J51P90-15 PLUG RIGHT ANGLE WIRING & MOUNTING

ENLARGED VIEW OF REMOVABLE SOCKET CONTACT SHOWS DETAIL OF CLOSED ENTRY CONSTRUCTION

FOR COMPLETE CATALOG ON ANY SERIES WRITE OR PHONE:
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CONTINENTAL CONNECTORS

Precision Electronic Connectors For Commercial & Military Applications

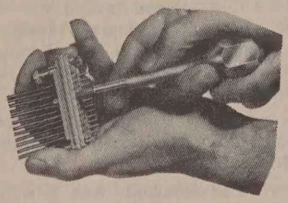
RACK AND PANEL CONNECTORS FOR VARIOUS EQUIPMENT

A complete line of high-reliability connectors for computers, missile, aircraft, communications and other critical electronic applications. In addition to standard specifications, these connectors can be supplied with such optional accessories as aluminum hoods, protective shells, polarizing screwlocks* and solder filled contacts. Various molding compounds are also available.

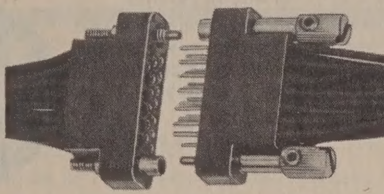
* PATENT NO. 2,746,022

MICROMINIATURE AND MINIATURE WITH CRIMP REMOVABLE CONTACTS

AVAILABLE WITH 7, 9, 14, 18, 20, 26, 34, 42, 50, 66, 75, 104 & 152 CONTACTS CONFORM TO MIL-C-28748 SPECIFICATIONS



Continental Connector's removable contacts and wire crimp terminations eliminate all connector soldering operations. Contacts are supplied separately and wired independently of connector body, and can be readily replaced with simple, low cost hand tools. Connectors are available with guide pins and sockets or screwlock hardware.

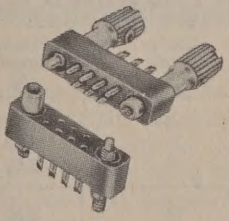


SERIES 25. Removable contact connectors are interchangeable with our Series 20 fixed contact types. .025″ and .045″ square solderless-wrap terminations with .062″ or .040″ pin diameters are also available. Optional aluminum hoods, protective shells and mounting plates can be supplied. Shielded crimp removable contacts for RG-178B/U and RG-196A/U coaxial cable can be intermixed in any combination with the standard type contacts. Select guide pins and sockets or polarizing screwlocks for mating hardware.

SERIES MMM. Five thru 75 contact sizes. Interchangeable with Series MM-22 fixed contact types. Can be supplied with guide pins and guide sockets, polarizing screwlocks and aluminum hoods.

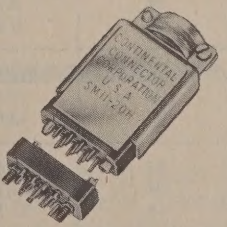
SERIES 25MM. Center screwlock locking device. Available with 50, 76, 100 and 200 contact sizes. Contacts are on .100″ centers.

FIXED CONTACT MICROMINIATURE, SUBMINIATURE, MINIATURE



SERIES MM-22 MICROMINIATURE. Five to 104 contacts. Ruggedized to withstand shock and vibration extremes. Meet MIL-C-28748 specs or commercial type. Available with guide pins and guide sockets, polarizing screwlocks, cable brackets and aluminum hoods.

Breakdown Voltage (sea level), 2000V. RMS • Current Rating, 3A • Minimum Creepage Between Contacts, .070″ • Minimum Air Space Between Contacts, .040″ • Contact Center Spacing, .093″ • Pin Diameter, .030″ • Solder Cup, #22 AWG wire.



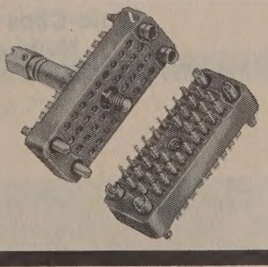
SERIES SM-20 SUBMINIATURE. Five to 104 contacts. Meet MIL-C-28748 specs or commercial type. Optional features include guide pins and guide sockets, polarizing screwlocks, protective shells and aluminum hoods.

Breakdown Voltage (sea level), 2000V. RMS • Current Rating, 5A Continuous, 7.5A Maximum • Minimum Creepage Between Contacts, .078″ • Minimum Air Space Between Contacts, .045″ • Contact Center Spacing, .125″ • Pin Diameter, .040″ • Solder Cup, #20 AWG wire.

SERIES 20 MINIATURE. Five to 104 contacts. Similar to above except larger size. Meet MIL-C-28748 specs or commercial type. Hexagonal configuration with 1, 4, 5, 7, 9 and 10 contacts is also available.

Breakdown Voltage (sea level), 3000V. RMS • Current Rating, 5A Continuous, 7.5A Maximum • Minimum Creepage Between Contacts, .125″ • Minimum Air Space Between Contacts, .070″ • Contact Center Spacing, .150″ • Pin Diameter, .040″ • Solder Cup, #20 AWG wire.

CENTER SCREWLOCK



SERIES 1900. 10, 22, 34, 50, 78, 104 and 152 contacts. Double lead thread action screwlock, stainless steel side channels and closed entry contacts for maximum reliability. Series 2500 available with 152 removable contacts.

Breakdown Voltage (sea level), 3000V. RMS • Current Rating, 10A Continuous, 13A Maximum • Pin Diameter, .062″ • Minimum Creepage Between Contacts, .110″ • Minimum Air Space Between Contacts, .050″ • Contact Center Spacing, .150″ • Solder Cup (also solderless-wrap and taper pin) #16 AWG wire.

FOR COMPLETE CATALOG ON ANY SERIES WRITE OR PHONE:
CONTINENTAL CONNECTOR CORPORATION / DEPT. EM / 34-63 56th STREET, WOODSIDE, NEW YORK 11377 / PHONE SALES: (212) 899-4422

PROTO-CLIPS FOR FOOL-PROOF, SHORT-PROOF, POWER-ON, IN-CIRCUIT IC TESTING.

Wherever you use DIP's, you need CSC Proto-Clip connectors. The clip-on, short-proof way to bring up leads from crowded circuit boards, for fast signal-tracing, signal injection . . . even wiring unused circuits into existing boards. In time (and components) saved, they'll pay for themselves the very first time they're used.

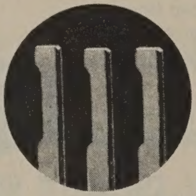
Squeeze the two ends together, slip them over a DIP and release—that's all there is to it. Molded flexible web insures positive operation for thousands of tests; high-impact plastic construction eliminates troublesome springs and pivots. Self-aligning, non-corroding nickel-silver contacts give simultaneous low-resistance connections to all IC leads; molded-in spacers automatically prevent shorts.

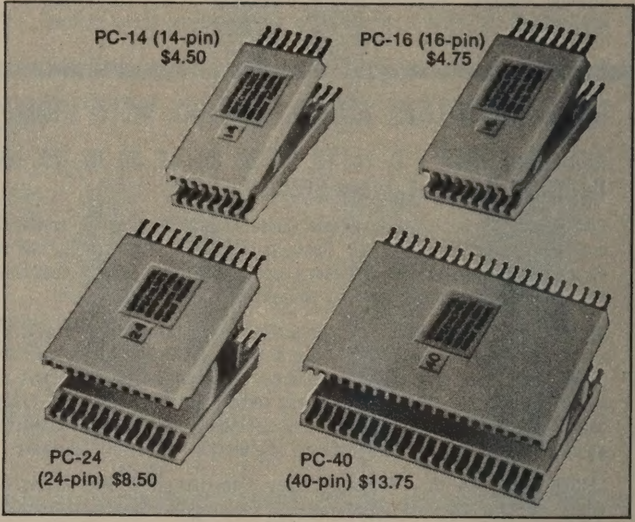
Once contact is made, you simply hook probe over one of the unique slip-proof teeth (see inset). Easy-grip design won't let probe slip off, frees hands for other work.

Proto-Clip models are available with or without cable for 14, 16, 24 and 40-pin DIP's (larger-capacity clips can generally be used with smaller DIP's e.g., PC-16 with 14-pin DIP).

Factory assembled and tested, Proto-Clips with prewired cables simplify a wide variety of jobs. Like simplifying IC connections to other IC's, other boards, test fixtures . . . even interconnecting Proto-Board units.

*U.S. Pat. Des. No. 3914007





NEW! PROTO-CLIPS WITH PREWIRED CABLES

Model No.	Cable length: inches	Price: Single clip	Price: Dual clip
PC-14-	18	$7.75	$14.75
PC-14-	24	8.00	15.00
PC-14-	36	8.50	15.50
PC-16-	18	8.50	16.00
PC-16-	24	8.75	16.25
PC-16-	36	9.25	16.75
PC-24-	18	12.25	25.25
PC-24-	24	12.50	25.50
PC-24-	36	13.00	26.00
PC-40-	18	21.00	42.00
PC-40-	24	21.25	42.25
PC-40-	36	21.75	42.75

Note: S = Single Clip D = Dual Clips
When ordering include Part No.—Cable Length-Single (S) or Dual (D) Clips.

Factory assembled and tested, Proto-Clips with prewired cables simplify a wide variety of jobs. Like simplifying IC connections to other IC's, other boards, test fixtures . . . even interconnecting Proto-Boards. Available with connectors at one or both ends, cables are rated to 150V and 105°C. Conductors are #28 AWG stranded conductors with PVC insulation.

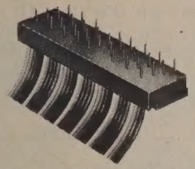
Proto-Clips with and without cable are standard in-stock items.
Need an IC test clip? Why wait! See your CSC dealer
or call 203-624-3103 (East Coast) or 415-421-8872 (West Coast) 9 AM to 5 PM local time.

CONTINENTAL SPECIALITIES CORPORATION
CSC

44 Kendall Street, Box 1942, New Haven, CT. 06509/203-624-3103/TWX: 710-465-1227
West Coast Office: Box 7809, San Francisco, CA. 94119/415-421-8872/TWX: 910-372-7992

GeeWee* ROUND WIRE FLAT CABLE CONNECTORS

CF006 PCB CONNECTORS

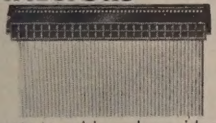


Permanently connects cable to printed circuit board.

- For connecting cable with up to 50 conductors
- Connections can be inspected before cover is applied
- No cable stripping necessary

Sizes are available for terminating flat cable having 10, 20, 26, 34, 40 or 50 round conductors. Cover with integral strain relief and lip for protection of bare ends of wires is standard; cover without lip that permits wire to pass freely through connector (daisy chaining) without interference from protective lip is also available.

CF008 SOCKET CONNECTORS

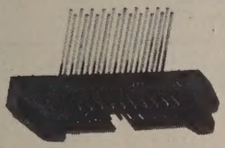


Connects to cable and provides female socket nose to mate with headers CN711 and CN712, or to properly oriented pins permanently fastened to a PC board.

- For connecting cable with up to 50 conductors
- Connections can be inspected before cover is applied
- "T" Bars on cover simplify assembly and disassembly

For terminating cable with 10, 20, 26, 34, 40, and 50 conductors. Designed for rapid connect/disconnect of cable to two rows of .025" square or round posts on .100" x .100" centers. Cover variations include a self-locking cover with built-in strain relief for termination of conductor ends (standard); also available is a cover for intermediate connections that permits conductor cable to pass through connector (daisy chaining).

CN711 & CN712 HEADERS

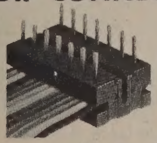


For quickly connecting cable that is terminated with female socket CF008 to either printed circuit board or to wire wrap termination.

- Accepts connectors with up to 50 contacts
- Side guides assure correct alignment of mating connectors
- Posts can be soldered to PC boards or wire wrapped

Headers available to mate with CF008 sockets terminating 10, 20, 26, 34, 40, or 50 conductor cable. Each has two rows of .025" diameter contacts that are straight through or bent at 90°. End of contacts opposite to socket mating end are .025" x .025" square pins for wire wrap termination, or .025" diameter round pins usually wave soldered permanently to PC board. Protective lip prevents damage to contacts when not in use. Available with latches that lock headers to mating CF008 sockets.

CP200 DIP CONNECTORS

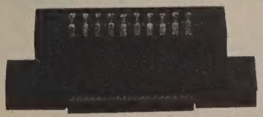


Permanently connects flat cable to printed circuit board having holes on standard DIP .100" x .300" spacing, or with connect/disconnect provision to I.C. socket.

- Cover ridges assure proper cable alignment
- Cover preassembled to connector base at factory to simplify handling
- Numbered contact positions simplify conductor identification

DIP (Dual in-line package) connector for terminating 14 conductor and 16 conductor cable. Provision for connect/disconnect into I.C. socket or permanent wave solder termination to mating PC board. Pre-assembled cover permits rapid termination with simple hand tool.

CF100 CARD EDGE CONNECTORS



Connects/disconnects flat cable with etched conductive lines on edge of 1/16" thick PC board.

- Accepts cable with up to 50 conductors
- Contacts are bifurcated for maximum integrity of connection
- Cantilever contact will operate with up to .075" PC board thickness

Sizes available for termination of 10, 20, 26, 34, 40, and 50 conductor strip cable. Standard connector includes integral strain relief. Available with or without mounting ears.

For additional information, request CW Connector Catalog 2101.

*Registered Trademark

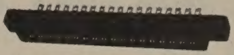
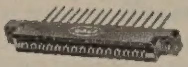
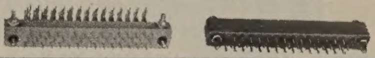
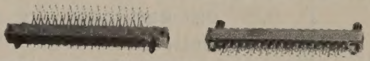
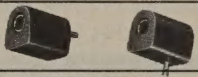
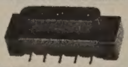
CW INDUSTRIES

550 DAVISVILLE ROAD, WARMINSTER PENNSYLVANIA 18974
PHONE 215–355-7080 • TWX 510–667-1875 • Cable–CWIND
Quality products through creative engineering

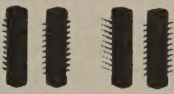
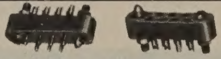
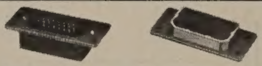
DALE®

CONNECTORS QUICK REFERENCE GUIDE

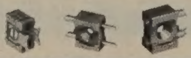
PRINTED CIRCUIT

DALE TYPE		BASIC DESCRIPTION
EB 7 **Edgeboard**		Choice of single or dual readout models with .156″ spacing. Accepts card thicknesses from .054″ to .071″. 6 to 22 contacts.
EBT 156 **Edgeboard**		Single readout modified tuning fork contacts with .156″ spacing. For 1/16″ boards. Accommodates thickness variance from .054″ to .070″. 6 to 22 contacts.
ES 1 **Digital Display Connector** **ES 5** **Digital Display Connector**		Single readout digital display connectors. Both ES 1 and ES 5 accommodate substrate lengths from 1.000″ to 6.000″. Incremental variation is .100″ for ES 1 and .050″ for ES 5. Both models accommodate 3/64″, 1/16″ and 1/8″ substrate thicknesses. ES 1 is available with from 10 through 60 contacts on .100″ spacing. ES 5 is available with from 20 through 120 contacts on .050″ spacing. No tooling charge for variations within these ranges.
ED 1 **Edgeboard** **ED 5** **Edgeboard**		Dual readout edgeboard connectors. Both ED 1 and ED 5 accommodate substrate lengths from 1.200″ to 4.500″. Incremental variation is .100″ for ED 1 and .050″ for ED 5. Both models accommodate 1/32″ and 1/16″ substrate thicknesses. ED 1 available with 10 through 44 contacts on .100″ spacing. ED 5 available with 20 through 87 contacts on .050″ spacing. No tooling charge for variations within these ranges.
300 **Dip Solder**		Right angle or straight through terminals. 7 to 25 staggered contacts with .250″ spacing (.125″ grid). Meets applicable paragraphs of MIL-C-28748.
303 **Dip Solder**		45 contacts in compact 3-row design. Meets applicable paragraphs of MIL-C-8384.
315 **Dip Solder**		50 contacts with .200″ spacing. Staggered rows provide a .100″ grid.
PJ **Test Point**		Right angle or straight through types with dip solder pin for permanent mounting.
500SR5 **Test Point**		One-piece molding with 5 dip solder contacts for permanent mounting.

RANK AND PANEL

MM22, MM24 **Microminiature**		Choice of solder cup or dip solder contacts. 5 to 44 contacts with .09″ spacing. Meets MIL-C-8384. Available with or without hardware.
SM20 **Subminiature**		Compact, lightweight. Fixed or turnable screwlocks. 5 to 75 contacts on .12″ spacing. Meets MIL-C-8384.
S20 **Housed**		Lightweight. Protective housing and hood. For RF and power interconnect applications.

SIDE MOUNT

A20		Body components available with any desired pin and socket combination. Floating contacts. Hole through body permits flat or building block type mounting. Meets applicable paragraphs of MIL-C-8384. Special locking device on G16.
G20		
G16		

SPECIALS

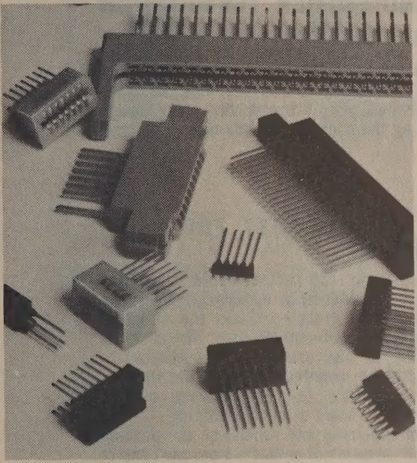
QX32 **QX72 & MX72** **400 & 401**		Umbilical and round keyed shell types.

For complete information, contact:

DALE ELECTRONICS, INC., *East Highway 50, Yankton, South Dakota 57078 • Phone 605-665-9301*

ELECTRONIC CONNECTORS AND INTRACONNECTION SYSTEMS

ELECTRONIC CONNECTOR PRODUCTS



CONNECTORS & SOCKETS,

Standard or Custom

Dynatech proprietary fabrication and high volume assembly techniques offer low cost production of precision P.C. card edge connectors with 0.100", 0.125", 0.156" or 0.200" contact spacing and 14 or 16 pin DIP sockets.

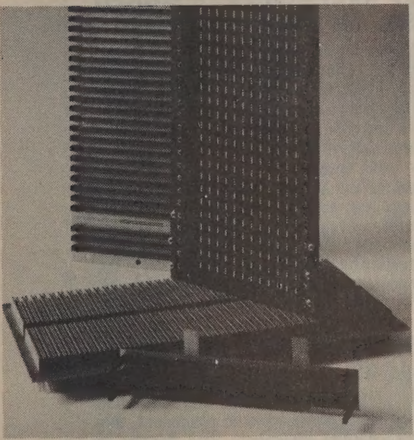
Custom designs to customer specifications.

EXCLUSIVE "ZIP" GOLD PLATING

Dynatech exclusive contact plating process reduces gold use up to 90% compared to conventional techniques. "ZIP" puts high density 23K gold on the contact surface where it's needed in thicknesses of 10 to 100 millionths. Nickel underplate available, but not required.

Exclusive Dynatech "ZIP" plating process puts gold on contact surface where it's needed, thus eliminating wasteful plating of non-contact surfaces.

iC INTRA-CON BACKPANEL INTRACONNECTION SYSTEMS

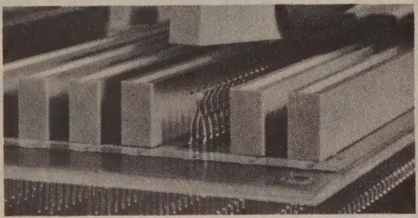


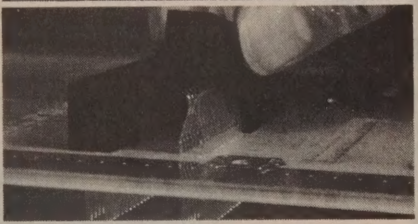
ALUMINUM BACKPANELS

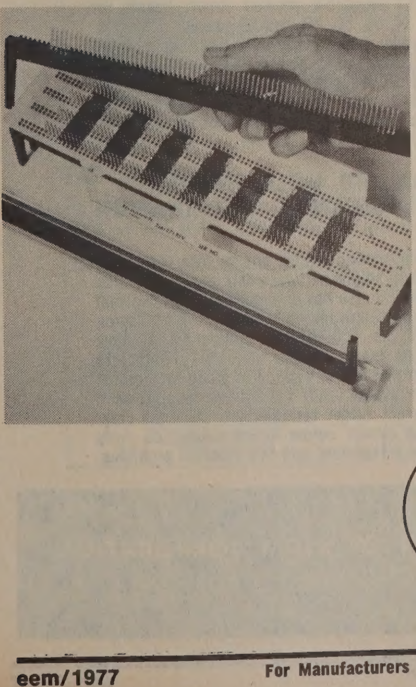
Dynatech aluminum backpanels reduce external wiring using standard connectors and insulated layers for various voltage or grounding intraconnections. They also offer the versatility of mixing several connector types.

PRINTED CIRCUIT BACKPANELS

Dynatech two-sided and multilayer backpanels will intraconnect several random voltages and reduce external wiring. They use friction fit contacts that can simultaneously connect several plated-thru holes. Minimum thickness for the P.C. board backpanel is 0.125".





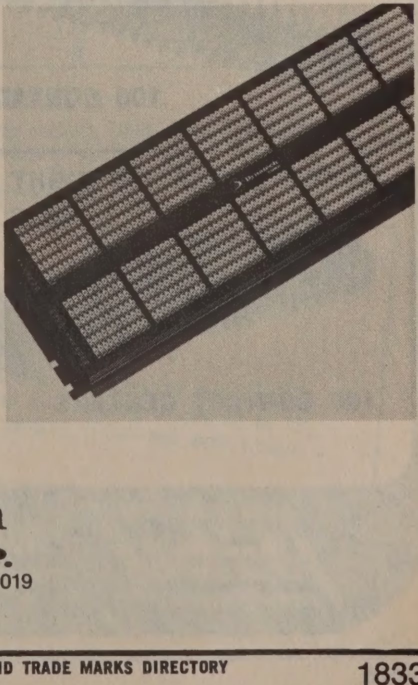


MICROPROCESSOR BACKPANELS

Dynatech backpanels simplify use of microprocessors such as Intel's, Motorola's and National's. Many standard configurations are available, but custom designs can be created from either aluminum or printed circuit backpanels.

TELEPHONE CROSS CONNECT BACKPANELS

Dynatech Cross Connect systems save cable, cut space 50% or more and reduce craftsman wiring time. Systems are directly interchangeable with accepted telecommunication systems.

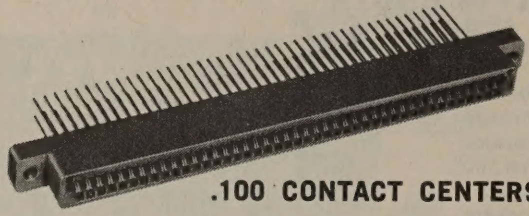


Dynatech CORP.
1225 East Wakeham, P.O. Box 1019
Santa Ana, California 92702
Phone: (714) 558-8755

Eby™

CONNECTORS
CARD-EDGE . . . BOX EDGEBOARD . . . MOLDED MALE HEADERS

CE-CON CARD-EDGE CONNECTOR

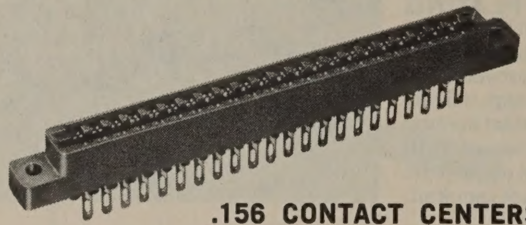


.100 CONTACT CENTERS

SOLDERLESS WRAP AND SOLDER TERMINATION

Ce-Con Series Connectors are supplied in a complete range of sizes up to 50/100 contact positions. They have .025" square wire wrap contact tails on .100 centers that permit hand, semi-automatic and automatic wire wrapping. Printed circuit solder termination is also available. Designed to accommodate an .062 thick printed circuit board, the entry design prevents overstressing or deforming the contacts. Standard and selective plating available.

CE-CON CARD-EDGE CONNECTOR

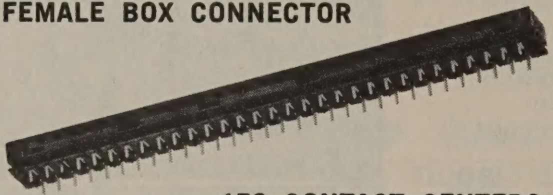


.156 CONTACT CENTERS

HIGHER RELIABILITY AT LOW COST FOR COMMERCIAL APPLICATION

Eby's economical card-edge connector on .156 contact centers has been designed for commercial computer and industrial applications. With its body and contact design, this connector greatly reduces the effect of board rocking and board warpage. Smooth acting, long life contacts enhance the operational reliability of the assembly. The housing is designed for flush mounting and can be mounted either on the front or rear of a panel. A durable key is available that fits between contact positions. Contacts are supplied with standard or special plating . . . and various sizes and terminations. For efficiency and reliability, the housing and contacts are designed to permit omission of contacts from any contact position without impairing the function.

EB-CON SERIES 102 EDGEBOARD FEMALE BOX CONNECTOR

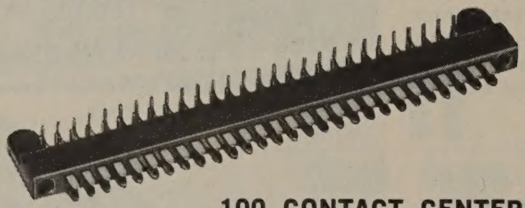


.150 CONTACT CENTERS

CLOSED ENTRY FEMALE RECEPTACLE DESIGNED TO MATE WITH .025 SQ. OR ROUND CONTACTS

Versatile new female connector series for PC Board applications. Mates with either .025" round or square pins. Contacts have a dual wiping surface for mating with square wire wrap terminals, staked in printed circuit back panel assemblies. Molded body of connector has a closed entry interface that protects contact members and acts as a guide in positioning male pin. A significant feature is staggered pattern of contact rows. This two-tier pressure point design halves the peak insertion force needed to mate connector to mother board. Reduced mating force does not affect reliability of individual contacts. Terminations are designed for thru board wave soldering. Connector housing is molded of rugged glass-filled phenolic that assures circuit fidelity and dependability, and a unique integral insulator barrier that prevents accidental shorting by pass-through penetration of the lower row of female contacts. Contacts are gold plated phosphor bronze.

RA-CON RIGHT ANGLE MALE HEADERS

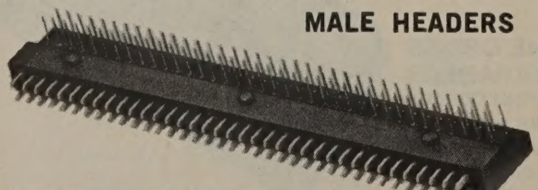


.100 CONTACT CENTERS

RIGHT ANGLE MALE HEADERS FOR USE WITH PRINTED CIRCUIT BOARDS

Designed primarily for terminating printed circuit boards into wire-wrap back panels on military airborne and shipboard electronic equipment, this header also has applications in commercial computers. High density of molded male allows packaging of pluggable printed circuit boards on .200 centers. Standard sizes are 34, 50, 56, 60, and 80 contact positions. Insulator material is diallyl phthalate; male contacts are brass, gold plated and molded in place for precise consistent contact location. Male blades (.020 x .050) are located on a .100 square grid and printed circuit terminations are on a staggered .100 grid. All printed circuit terminations are fully exposed eliminating potential gas entrapment and flux removal problems.

RA-CON SERIES 100 RIGHT ANGLE MALE HEADERS



.100 CONTACT CENTERS

HIGH RELIABILITY MOLDED MALE HEADERS FOR USE IN SOLDERLESS WRAP TERMINATION SYSTEMS

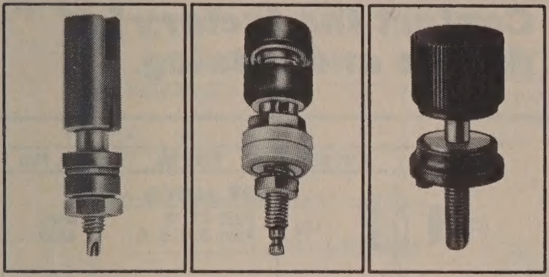
Designed primarily for terminating printed circuit boards into wire-wrap back panels on military airborne and shipboard electronic equipment, this sturdy, reliable, highly efficient header also has applications in commercial computers. The high density, low profile of molded male allows packaging of pluggable printed circuit boards on .400 centers. Standard units have 50, 74, 90 and 110 contact positions. Insulator material is diallyl phthalate and male contacts are brass, gold plated and molded in place for precise consistent contact location. Male blades (.020 x .050) are located on a .100 square grid, and printed circuit solder terminations are on a staggered .100 grid. All the printed circuit solder terminations are fully exposed eliminating potential gas entrapment and flux removal problems.

Eby™

HUGH H. EBY CO. DIVISION OF REDM CORPORATION
4701 GERMANTOWN AVE., PHILADELPHIA, PA. 19144 (215) 842-3000

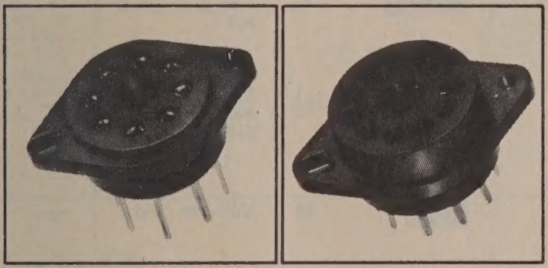
Eby™

BINDING POSTS . . . TEST POINTS . . . SOCKETS



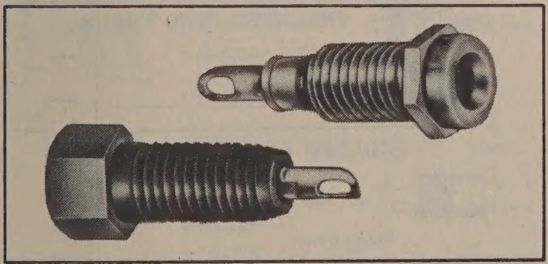
MILITARY BINDING POSTS, WATERPROOF BINDING POSTS, PANEL MOUNT BINDING POSTS

Eby produces more waterproof and panel mount binding posts per MIL-P-55149 than any other supplier. Binding posts are also available for commercial and industrial applications. They are supplied in panel mount, screw, and spring-activated.



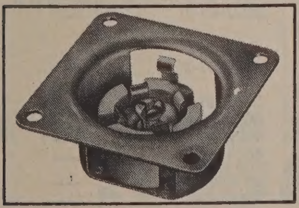
RELAY SOCKETS, ROUND, 8 AND 11 CONTACT

8 and 11 contact relay sockets; molded integral saddles; rugged proven reliability; commercial prices.



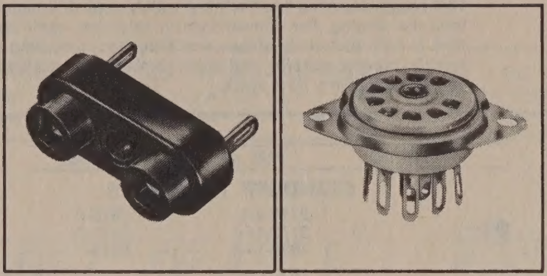
TIP JACKS

Tip jacks and test points; plastic bodies; metal sleeves; screw machine and sheet metal contacts; press fit and thread mounting.



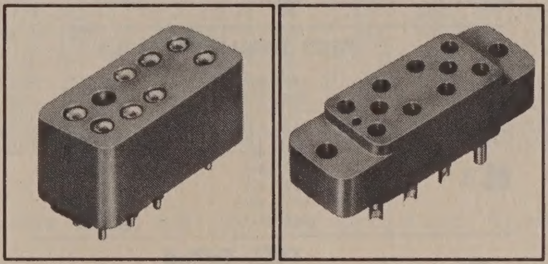
SPECIAL SOCKETS, POWER TUBE SOCKETS

Special and custom designed sockets and plugs, built to your specifications.



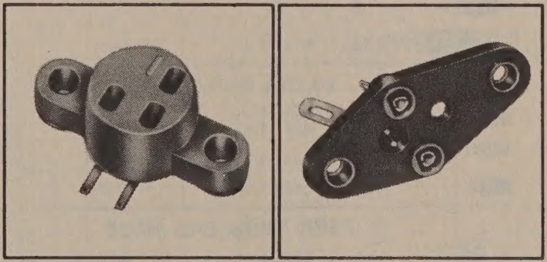
CRYSTAL SOCKETS, TUBE SOCKETS

Crystal and tube sockets; ceramic and plastic; Eby supplies more Q.P.L. listed sockets per MIL-S-12883 than any other manufacturer — the only listed supplier! 7 to 9 pin tube adaptors available.



RELAY SOCKETS, RECTANGULAR, 8 CONTACT AND 10 CONTACT

Military approved rectangular relay sockets, printed circuit and panel mounted.



TRANSISTOR SOCKETS

A broad line of transistor sockets, TO-66, TO-3, TO-5, etc., low cost commercial and industrial applications.

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This is just a small sampling of our standard products — send for a catalog — consult us for special custom devices. Small and large volume.

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E 106

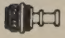
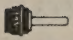
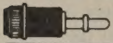
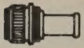
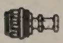
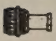
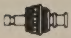
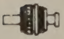
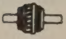
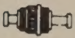
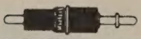
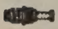
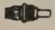
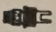
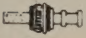
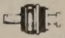
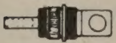
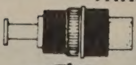
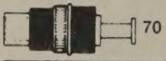
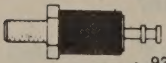
ELECTRONIC MOLDING CORPORATION
96 MILL STREET/WOONSOCKET, R. I. 02895 U.S.A.
PHONE (401) 769-3800 TWX 710-387-1350

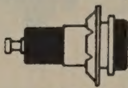
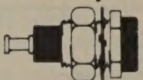
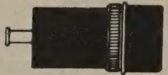
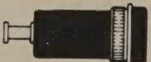
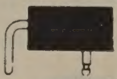
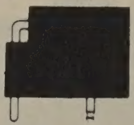
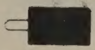
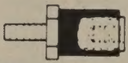
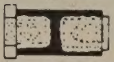
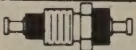
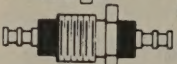
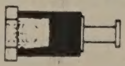
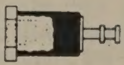
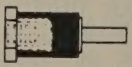
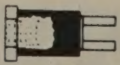
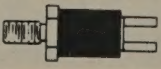
EMC
Interconnection Specialists

SUPPLEMENT TO TERMINALS CATALOG

This ready-reference lists the most widely applied components from the catalog. For convenience in selection, each popular item is both pictorially shown and tabulated according to its specific plating, material and color combinations available for immediate delivery from stock.

Contact the factory for details and catalog.

	TYPE NO.	PART NO.	MTG. TOOL
		STANDOFF TERMINALS	
	1	2772-4-1 2772-14-1 4632-14-1	2873-2 2873-2 2873-1
	12	2938-14-1 2938-17-1 2939-14-1 2940-14-1	2873-5 2873-5 2873-5 2873-5
	105	5144-5-1	4408
		FEED THRUS	
	119	5446-4-1	2873-1
		FEED THRU-THRU HOLE	
	2	2497-4-1,-9 2598-4-1	2873-1 2873-2
	10	2894-14-1 2925-4-1 2927-4-1 3097-4-1 4479-16-1 4487-4-1	2873-3 2873-3 2873-3 2873-3 2873-3 2873-3
		FEED THRUS	
	3	4639-4-1	2873-2
	7	4616-4-1 4616-16-1 5129-4-1	2873-3 2873-3 2873-1
	13	5979-4-1	2873-5
	9	2819-5-1	2873-4
	135	5141-5-1	4408
		ULTRA MINIATURE	
	10	4547-4-1 4547-14-1	4126 4126
	12	3337-4-1	4127
	117	5428-17-1	4126
		FEED THRU END HOLE	
	6	2803-14-1	2873-3
	8	2792-4-1 5128-4-1	2873-1 2873-1
	51	4338-67-0,-1	4665
		THREADED NURL-LOC FEED THRUS	
	37	4179-148-1	4648
	70	4806-165-1	4799
		MOLDED STANDOFF TERMINALS	
	93	2385-91-5 2376-87-1 2055-52-5 4024-91-1 2522-91-1 2162-91-1	— — — — — —
	94	5627-7-1 5629-52-6 4077-91-6 2723-186-1	— — — —
	95	5702-52-6	—

	TYPE NO.	PART NO.	MTG. TOOL
		TEST JACKS	
	158	6220-217-2 Also -3,-4,-5,-6	4882 4882
	85	6304-247-0 Also -3,-4,-5,-6,-8 & -9	—
	76	4836-165-0 Also -2,-4,-6	4883
	78	4928-113-9	4644
	77	4879-125-0 Also -2,-3,-4,-5,-6 & -9	—
	104	5173-125-0 Also -2,-5 & -9 5173-143-2	—
	88	5075-139-1 & -5	—
		INSULATED SPACERS	
	83	3329-53-5	—
	84	3328-53-5	—
		THREADED FEED THRUS	
	32	4363-91-1	—
	33	3376-67-1	—
		MOLDED STANDOFF TERMINALS	
	89 Single turret	2014-91-1 2014-67-1 2020-5-1 2503-91-1	— — — —
	91 Double turret	2310-67-1 2333-91-1 2013-91-1 & -5 2019-91-1 & -5 5684-52-6 & -9 5684-91-1 5685-52-6 2321-91-5 2037-91-1	— — — — — — — — —
	98 Straight pin	2003-91-1 2762-91-1 6051-52-6 4602-91-1 4604-91-1	— — — — —
	101 Bifurcated	2304-91-1 Also -4,-5 2840-91-1 &-5 2308-91-1 Also -4 & -5	— — — — —
	100	3340-91-1 3340-52-1 4999-91-1 2871-91-5 5777-52-6	— — — — —

SOCKETS TABULATED ARE IN POPULAR INSULATION MATERIAL AND CONTACT—TERMINAL PLATING COMBINATIONS, AVAILABLE FROM STOCK. FOR DETAILS AND COMPLETE CATALOG CONTACT FACTORY.

DIP SOCKETS LO—PAC SERIES

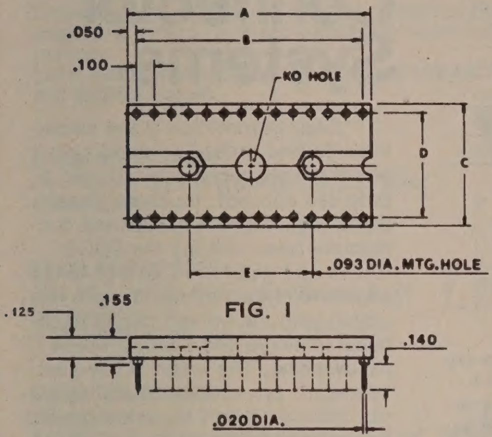


FIG. I

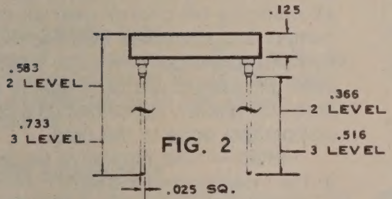


FIG. 2

SOCKETS SHOWN ARE BUT A SMALL PORTION OF THE MANY STYLES AND VARIETIES AVAILABLE. FOR INFORMATION ON OTHER MODELS PLEASE CONTACT FACTORY.

FIG. I PART NO. SOLDER TAIL	FIG. 2 PART NO. 2 LEVEL WRAP	FIG. 2 PART NO. 3 LEVEL WRAP	NO. OF PINS	A	B	DIP SPACING C	D	E
7086—362—0	7144—362—0	7143—362—0	6	.295	.200	.395	.300	*
7048—362—0	7121—362—0	7049—362—0	8	.395	.300	.395	.300	*
7087—362—0	7146—362—0	7145—362—0	10	.495	.400	.395	.300	*
7014—362—0	7027—362—0	7023—362—0	14	.695	.600	.395	.300	.300
7016—362—0	7026—362—0	7025—362—0	16	.795	.700	.395	.300	.400
7197—362—0	7853—362—0	7854—362—0	16	.795	.700	.495	.400	.400
7018—362—0	7117—362—0	7034—362—0	18	.895	.800	.395	.300	.500
7198—362—0	7855—362—0	7856—362—0	20	.995	.900	.395	.300	.600
7022—362—0	7119—362—0	7037—362—0	22	1.095	1.000	.495	.400	.800
7024—362—0	7031—362—0	7038—362—0	24	1.200	1.100	.700	.600	.700
7028—362—0	7032—362—0	7039—362—0	28	1.400	1.300	.700	.600	.700
7036—362—0	7120—362—0	7041—362—0	36	1.800	1.700	.700	.600	.700
7040—362—0	7122—362—0	7042—362—0	40	2.000	1.900	.700	.600	.800

* NO HOLE

TOLERANCE UNLESS OTHERWISE SPECIFIED ± .005

LO—PAC TO—5 AND TO—18 SOCKETS

AVAILABLE WITH 3 TO 12 PINS

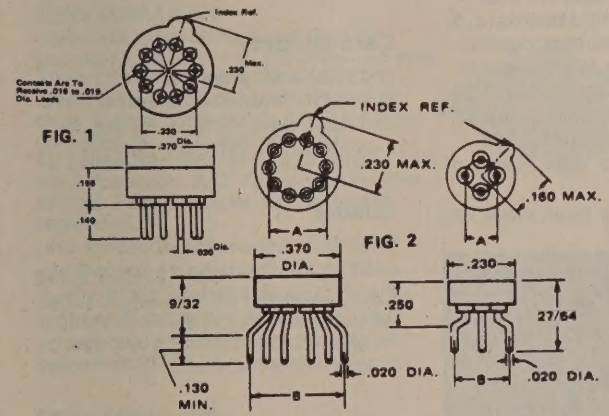


FIG. 1

FIG. 2

PART NO.	FIG. NO.	NO. OF PINS	DEVICE LEAD CIRCLE DIA. A	TERMINAL CIRCLE DIA. B	DESCRIPTION
7003—362—0	1	3	.200	.200	STRAIGHT LEAD TERMINAL
7004—362—0	1	4	.200	.200	
7006—362—0	1	6	.200	.200	
7008—362—0	1	8	.200	.200	
7009—362—0	1	8	.230	.230	
7010—362—0	1	10	.230	.230	
7012—362—0	1	12	.275	.275	
7073—362—0	2	3	.100	.200	BENT LEAD IN CIRCULAR PATTERN FOR CIRCUITRY
7074—362—0	2	4	.100	.200	
7075—362—0	2	3	.100	.150	
7076—362—0	2	4	.100	.150	
7058—362—0	2	8	.200	.400	
7059—362—0	2	8	.230	.400	
7064—362—0	2	10	.230	.400	
7069—362—0	2	12	.275	.400	

PLATING CODES AND MATERIALS ⇨

CODE	TERMINAL BRASS PER QQ—B—626	CONTACT BERYLLIUM COPPER PER QQ—C—533	INSULATION
-295-5	.00015—.0002 TIN PER MIL—T—10727A OVER .0002—.00025 COPPER FLASH	.00003 GOLD PER MIL—G—45204 OVER .00005—.0001 NICKEL PER —QQ—N—290	GLASS FILLED PHENOLIC PER MIL—M—14 (GREEN) TYPE M F H
-362-0	.00015—.0002 TIN PER MIL—T—10727A OVER .0002—.00025 COPPER FLASH	.000010—.000015 GOLD PER MIL—G—45204 OVER .000050—.000100 NICKEL PER QQ—N—290	PHENOLIC PER MIL—M—14 (BLACK) TYPE C F G

FOR INFORMATION ON E M C'S COMPLETE LINE OF

IC WIRE WRAP® PACKAGING PANELS

CONTACT THE FACTORY—ASK FOR NEW CATALOG

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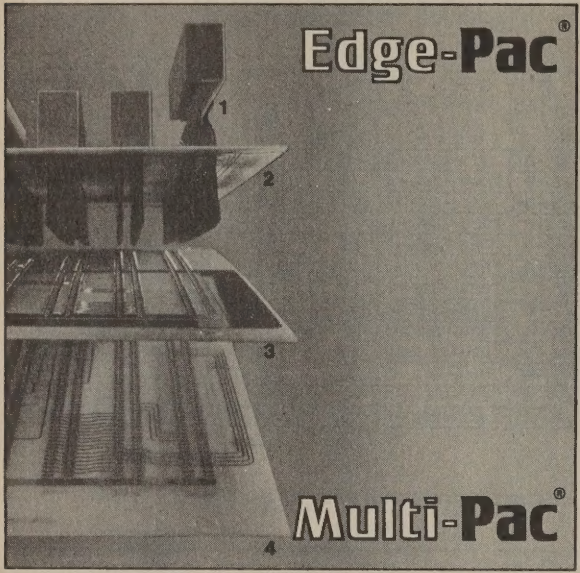
ELECTRONIC MOLDING CORPORATION
96 MILL STREET, WOONSOCKET, R.I. 02895
(401) 769—3800

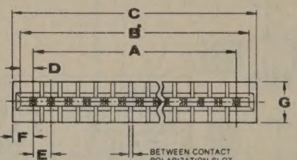
WIRE-WRAP ®Trademark Gardner-Denver Co

Connector Design Parameters

SPACING AVAILABLE		DIMENSIONS								
Series	Grid Spacing	A	B	C	D	E	F	G	H	Polarizing Tab Part No.
EP1010	.100 × .100	NUMBER OF CONTACTS MINUS ONE TIMES E	A + (2 TIMES D)	A + (2 TIMES F)	.100	.100	.180	.382	.100	EPT 1010
EP1020	.100 × .200				.100	.100	.180	.382	.200	EPT 1020
EP1212	.125 × .125				.115	.125	.180	.294	.125	EPT 1212
EP1225	.125 × .250				.125	.125	.180	.354	.250	EPT 1225
EP1515	.150 × .150				.145	.150	.210	.315	.150	EPT 1515
EP1562	.156 × .200				.156	.156	.218	.294	.200	EPT 1562
* EP2020	.200 × .200				.360	.200	.440	.315	.200	EPT 2020

* Insertion depth .400.





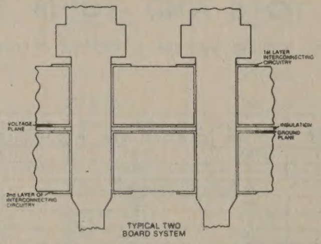
* CUSTOMER CARD MATING EDGE LENGTH TO BE THE "B" DIMENSION LESS .010 ± .005 IN.

A patented card edge backpanel system. A pre-loaded contact (1) is press-fit directly into plated-thru holes in the etched board. (2) The insulator is held firmly into place by an interference fit with the contact. Use the design parameter information shown above for specifying your custom backpanel.

U.S. Patent #3,671,917

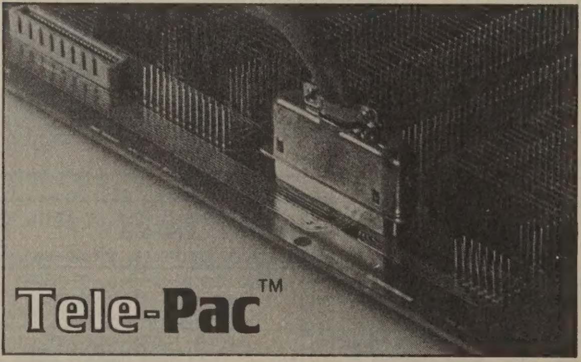
Combines the reliability of EDGE-PAC® with the cost savings of multi-layer backpanels. The discrete two-sided plated-thru boards (2, 3, 4) are sandwiched together with the high force press-fit contacts. A mylar insulating layer separates each board allowing interconnect systems of up to eight planes of circuitry.

U.S. Patent #3,660,726


1st LAYER INTERCONNECTING CIRCUITRY
VOLTAGE PLANE
INSULATION
GROUND PLANE
2nd LAYER OF INTERCONNECTING CIRCUITRY
TYPICAL TWO BOARD SYSTEM

Developed by ELFAB as an extension of our reliable press-fit contact system, the 8500 series receptacle is mateable with standard telephone 25 pair connectors. Utilizing similar design features of EDGE-PAC®, the contacts make solderless, gas tight connections with the plated-thru hole, TELE-PAC™ can be used with single, two and three board MULTI-PAC® System assemblies.

U.S. Patent #3,671,971
3,868,162



Mag-Pac™
PWR-Pac™

Hybrid systems for arraying metal planes into the backpanel where low-loss voltage supply or EMI shielding is required.

Patents Pending

Dip-Pac®

Combines MULTI-PAC® packaging with the advantages of low profile (.160") press-fit Dip sockets 8-40 contact positions available.

Patent Pending

©1976 Elfab Corporation

Elfab Backpanel Connector Systems

Elfab Corporation is the leader in solderless press-fit printed circuit board system technology. Under its patented concept, multi-pin glass planar interconnect backpanels are manufactured utilizing the EDGE-PAC® and MULTI-PAC® technology; edgecard circuit connectors are integrated with the printed circuit backpanel in single and multiple board sandwiching. The result is low-cost connector systems incorporating signal interconnection as well a ground and voltage termination.

Every phase of backpanel construction is housed within our facility, affording us full control over all the component processes involved in the manufacture of our products. Not only does this assure you of reliability and precision quality, it provides us a clear competitive edge in the field.

Elfab — the innovative leader in the interconnect industry.

Card Guides

End card and center connector card guides are available on series 1212 and 1225 only. Consult factory for availability of additional designs.

Busbar

Elfab solid copper alloy busbars are used as an extension of, or part of, the voltage and ground plane system. The buses are press-fitted to lengths as specified by customer requirements.

EPK Series

Contact Replacement Kit
Contacts are readily removable and can be replaced using this kit. Ask for instruction sheet RK4-76.

Specify the Pac . . . solderless press-fit backpanel connector systems from Elfab. Call or write today for our free design catalog.

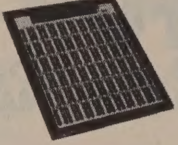
ELFAB
The Leader in Press-fit Technology

P.O. Box 34555 · Dallas, Texas 75234
(214) 233·3033 · TWX 910-860-5460.

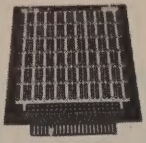
EXCEL

DEPT. EM, EXCEL PRODUCTS COMPANY INC.
401 Joyce Kilmer Ave., New Brunswick, N.J. 08903
(201) 249-6600 • TWX 710-480-6255

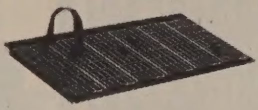
Excel manufactures in-house every standard panel made by Augat and others. They are completely interchangeable in every manner.
Excel manufactures complete ranges of newest versions of ECL and Shottky panels.



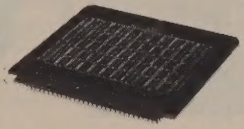
EXCEL SERIES 1000
14+V&G or 16+V&G pin patterns in 30 or 60 positions.



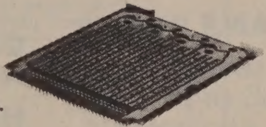
EXCEL SERIES 2000
14+V&G or 16+V&G pin patterns 30 or 60 position.
Gold finger edge connector take off.



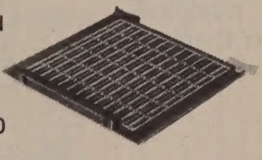
EXCEL SERIES 3000
30 position to 240 position.
Available in all pin patterns including 24 pin. Also universal 50 pin rows. Sockets or feed thrus in I/O areas.



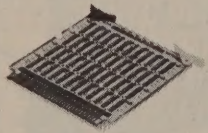
EXCEL SERIES 4000
60 position available in all pin patterns including universal 50 pin rows and also combination 14 and 16 pin patterns.



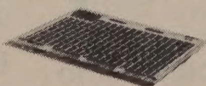
EXCEL SERIES 5000
Edge board connections-provision and hardware for mounting voltage regulators. 20 rows of 62 contacts each.



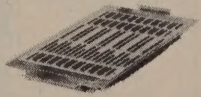
EXCEL SERIES 6000
Complete range of high density DIP packaging panels in all patterns—60 and 72 positions including 20 rows of universal 50 or 58 contacts. 1/16″ or 1/8″ thick. Can accommodate IC's with legs centered at .300, .400 and .600.
All panels supplied with high density 120 pin 3 row male .100″ centers connector affixed. Female connectors available separately.



EXCEL SERIES 7000
Series edgeboard 24 position—special sockets and slotted pins for variable voltage and ground and mounting components. 14-16 patterns.

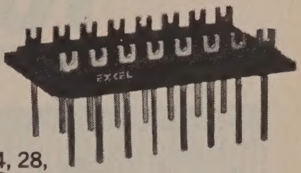


EXCEL SERIES 8000
8430 and 8460 are Mini Panels to interface with Data General's Nova® computers. Series 84A1 and 8532 are Mini Panels to interface with DEC PDP8® and PDP11® computers.

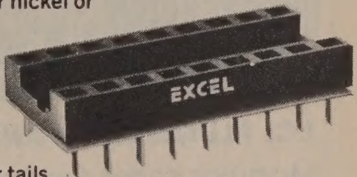


MPU PANEL EXCLUSIVE—
EXCEL SERIES 9000
This is a new family of pluggable panels for Microprocessor kits. Panel #9045-3BD-60 accommodates nearly all MPU kits currently available. Memory panel #9042-3BD-60 accepts any 16 - 18 - 22 or 28 pin LSI, RAM, ROM or PROM in 4K byte increments. Both panels have all necessary provisions for I/O drivers, receivers, buffers and control lines. Measuring 6″ x 10″ the panels mate to standard 44 pin edge connectors for ease of system expansion during prototyping, evaluating and programming of MPU devices.
For the first time, most requirements for processor boards, memory boards, I/O boards and the multitude of various sizes of panels used for MPU devices, and in the various MPU kits can be condensed into and handled by the two new **Excel** panels.

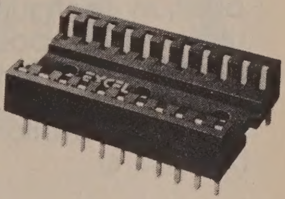
ONE SOURCE, ONE INSPECTION,
AND ONE COMPANY RESPONSIBLE TO YOU



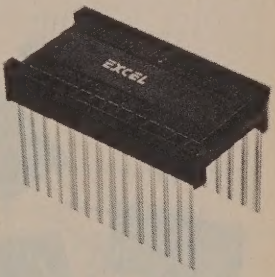
EXCEL SERIES 400
Component leaders 14, 16, 17, 24, 28, 36, 40- glass filled polyester SE-O, Phosphor Bronze, Gold over nickel or bright tin covers available.



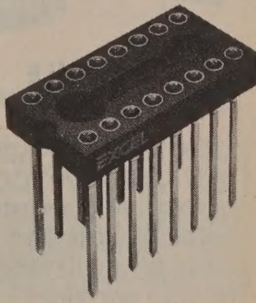
EXCEL SERIES 500
Low Profile. 8-40 pin solder tails, gold over nickel or bright tin plated. Glass filled Polyester SE-O. Beryllium copper holds the edge of IC leg for better contact.



EXCEL SERIES 600
Low Profile. Low cost 8-40 pin solder tail. Gold over nickel or bright tin. Glass filled Polyester SE-O. Beryllium copper holds the flat of the IC leg. End stackable.



EXCEL SERIES 700
Standard Profile. 8-40 pin wire wrap or solder tails. Contact is gold over nickel or bright tin plated Phosphor Bronze. Body is SE-O rated glass filled Polyester. Tapered entry holds the edge of IC leg for best contact.



EXCEL SERIES 800
8-14-16-22-24-28-36-40-42
Highest quality available. Precision Swiss screw machine contacts. Wire wrap 1, 2 or 3 levels. Solder tails or component headers. Terminal contact is beryllium copper over nickel, terminal body is brass, gold over nickel or tin plated. Body for 8-14-16 contact is SE-O rated Polyester for 18-42 body is 94V-O rated FR-4 Glass Epoxy. Very low profile.

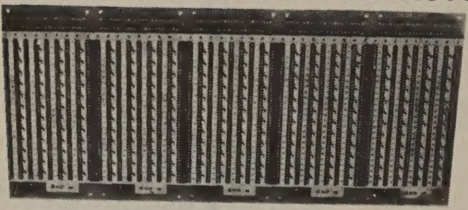
EXCEL MANUFACTURES IN HOUSE

Printed Circuit Boards
Pluggable Panels
Swiss Screw Machine Pins & Sockets
Custom Swiss Screw Machine Parts
Custom Panels
Contact Wire Wrapping on fully automatic or semiautomatic equipment
Sockets and Connectors, Accessory items

One Source Responsibility for your Packaging Needs

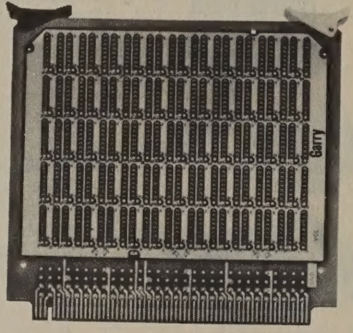
GARRY'S "TOTAL PACKAGING" CONCEPT PUTS IT ALL TOGETHER FOR YOU!

WITH I.C. PLUGGABLE PANELS, LOW PROFILE SOCKETS AND AUTOMATIC WIRE WRAP* MACHINES



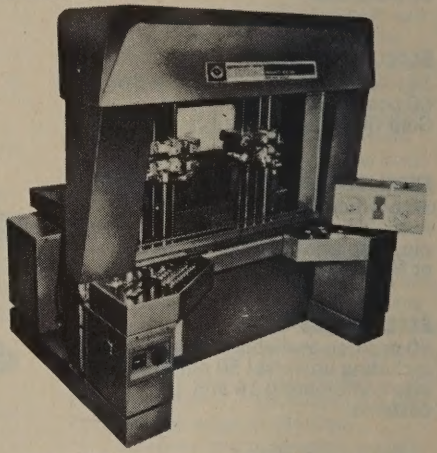
I.C. PLUGGABLE PANELS

Modular series features your choice of 4 I.C. position configurations or universal I.C. position configuration in one section of 30 I.C. positions through 8 sections (240 I.C.'s)



I.C. PLUGGABLE PANELS

Card Edge series offers 12, 16, 24, 30, 60 or 72 positions in your choice of 4 I.C. configuration, plus universal I.C. position configuration and 72 to 120 I-O pins.

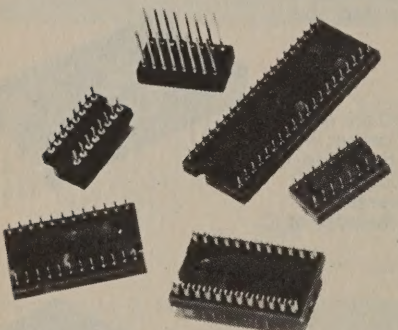


GARRY'S AUTOMATIC WIRE WRAP* MACHINES

Never a Bum Wrap! Think of it. No more scrapped PC boards. (You can actually fix a faulty wire wrap!) No more high inventory costs. No more complicated "doctoring" in the field. No more expensive tooling start-ups. No more headaches because you're "locked into" a PC design.

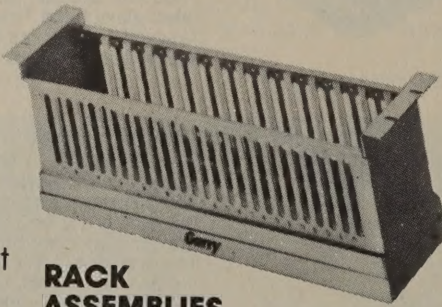
A complete in-house wire-wrap service is also available to give you quick turnaround.

It Never Varies. Our precision beryllium spring clip has the most consistent I.C. insertion-withdrawal ratio in the industry. All this because our facilities are among the world's best.



LOW PROFILE SOCKETS ADAPTORS

Low profile sockets accept standard DIP packages. Machined contact features closed end construction, eliminating solder or flux wicking problem.



RACK ASSEMBLIES

Card racks accept up to 13 boards on 1 .200 centers, or up to 25 boards on .600 centers.

Send for Garry's new free catalog!

Find out why the leading electronics companies use thousands of our wire-wrapped panels each week...

We won't pin a bum wrap on you!

*Trademark of
Gardner-Denver Co.

Garry
Manufacturing Co.

1010 Jersey Avenue
New Brunswick, N.J. 08902
N.J. (201) 545-2424
N.Y. (212) 267-6844

TERMINATION HARDWARE SERIES 2, 22, 29

Grayhill®

BINDING POSTS

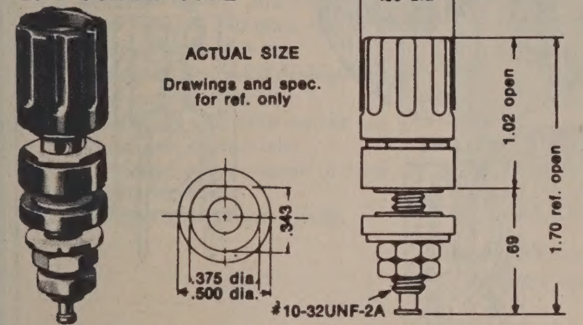
RATING:

Rating at 120 VDC: 15 amps continuously with a max. temperature rise of 20°C.

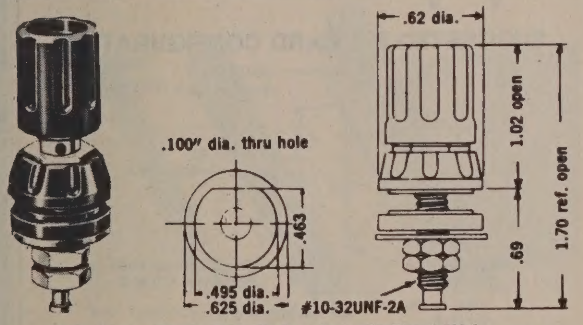
Insulation Resistance: Between stud and mounting panel.
No. 29-1: 120,000 megohms. **No. 29-3:** 200,000 megohms.

Voltage Breakdown: Between studs and mounting panel.
No. 29-1: 1500 VAC. **No. 29-3:** 3000 VAC.

29-1 SCREW TYPE


ACTUAL SIZE
Drawings and spec. for ref. only
.50 dia.
1.02 open
1.70 ref. open
.69
.343
.375 dia.
.500 dia.
#10-32UNF-2A

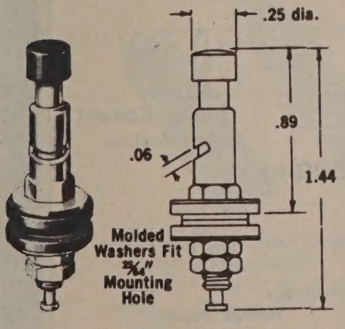
29-1 Standard Screw Type Binding Post with Straight Skirt. Fits ⅜″ Diameter Mounting Hole Allowing Close Spacing.


.62 dia.
.100″ dia. thru hole
1.02 open
1.70 ref. open
.69
.463
.495 dia.
.625 dia.
#10-32UNF-2A

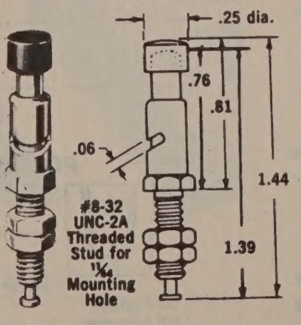
29-3 Standard Screw Type Binding Post with Flared Skirt Fits ½″ Diameter Mounting Hole Allowing Wider Spacing.

New plunger type binding post for positive connections. To operate, button is depressed, lead is placed in slot, and button is released. Spring pressure assures firm positive contact. Extends only ⅞″ above mounting board.

Rating at 120 VDC: 20 amps continuously with a max. temperature use of 20°C.


.25 dia.
.89
.06
1.44
Molded Washers Fit 25/64″ Mounting Hole

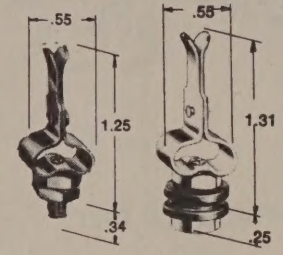
29-104


.25 dia.
.76
.81
.06
1.44
#8-32 UNC-2A Threaded Stud for 11/64 Mounting Hole
1.39

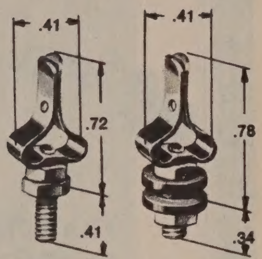
29-100

TEST CLIPS

STANDARD


.55
1.25
.34
.55
1.31
.25

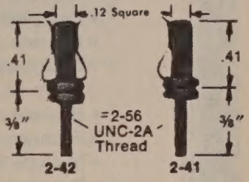
MINIATURE


.41
.72
.41
.41
.78
.34

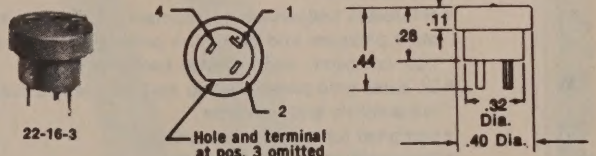
ULTRA MINIATURE

PAT. NO. 3,116,101

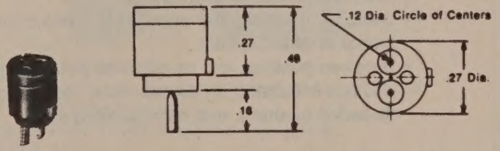
For simplified, rapid testing of "pig tail" components, also single wire connections and bread board work. Panel area required, exclusive of nut; single unit — 3/16″ x ⅛″, double unit — ¼″ x ⅛″. Mounting stud — ⅜″ long. Nickel plated brass with nickel plated, heat treated beryllium copper spring. Hex nut under spring adjust tension.


.12 Square
.41
⅜″
=2-56 UNC-2A Thread
.41
⅜″
2-42
2-41

SOCKETS


4
1
2
Hole and terminal at pos. 3 omitted
.11
.28
.44
.32 Dia.
.40 Dia.

22-16-3


.27
.40
.16
.12 Dia. Circle of Centers
.27 Dia.

22-3

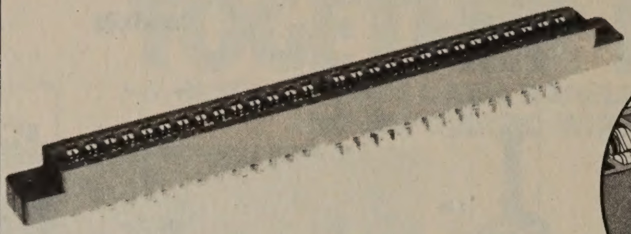
ORDERING INFORMATION

Part No.	Unit Price	2000-4999 Pieces	Part No.	Unit Price	2000-4999 Pieces	Part No.	Unit Price	500-900 Pieces
2-0	$0.45	$0.38	2-20	$0.45	$0.38	22-3	$0.65	$0.52
2-1	0.75	0.64	2-21	0.75	0.64	22-16-3	0.65	0.52
2-4	0.70	0.60	2-41	0.45	0.38			
			2-42	0.50	0.43			

Part No.	Button Cap Color	Unit Price	100-999 Pieces
29-1 RED	Red	$1.00	$0.75
29-1 BLK	Black	1.00	0.75
29-3 RED	Red	1.00	0.75
29-3 BLK	Black	1.00	0.75
29-100 RED	Red	0.70	0.53
29-100 BLK	Black	0.70	0.53
29-104 RED	Red	1.00	0.75
29-104 BLK	Black	1.00	0.75

GTE SYLVANIA INCORPORATED

CARD EDGE CONNECTORS



FEATURES OF THE GOLD DOT CONTACT

- Bifurcated Gold Dot (contact point) is a coined gold/silver alloy assuring maximum conductivity at the exact point of contact.
- Designed for easy card insertion.
- Discrete contact identification.
- Designed to meet the applicable performance requirements of MIL-C-21097.
- Between-position and on-position polarizing available.
- Economy connector with maximum reliability.
- Multiple mounting styles available, including: thru hole, threaded bushing, and no mounting ear.

FEATURES OF THE BELLOWS CONTACT

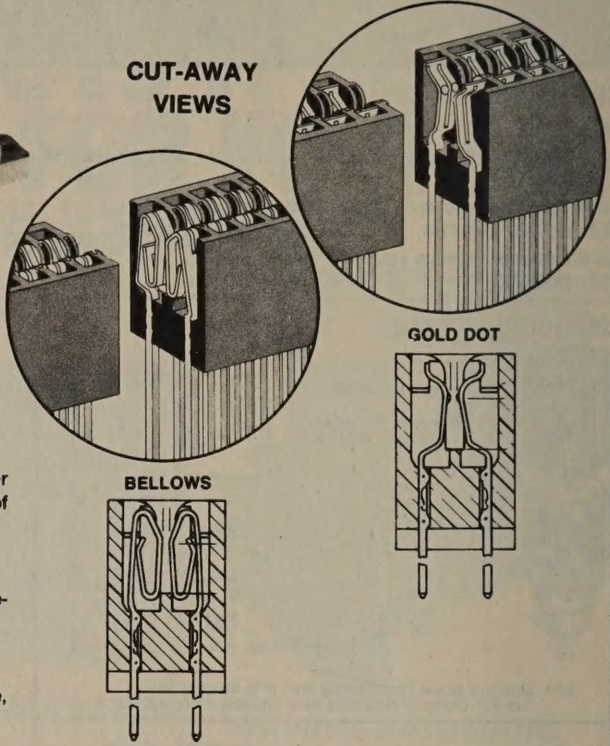
- Bifurcated bellows-shaped contact springs provide constant pressure and maximum protection against vibration, corrosion, and repeated card insertion.
- 24 karat gold-plated mating surface assures maximum conductivity and reliability.
- Designed for easy card insertion.
- Discrete contact identification.
- Designed to meet the applicable performance requirements of MIL-C-21097.
- Between-position and on-position polarizing available.
- Multiple mounting styles available, including: thru hole, threaded bushing, and no mounting ear.

GOLD DOT AND BELLOWS CONTACT CONNECTOR SPECIFICATIONS:

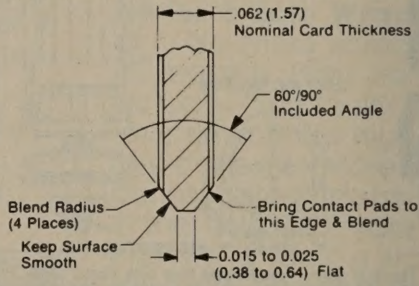
- Operating voltage (sea level). . .600v dc.
- Current. . .3 amps.
- Designed to mate with circuit boards from .054(1.372) to .071(1.803) thick.
- Temperature range. . .−85°F(−65°C) to 257°F(125°C).
- Voltage drop not to exceed 30 mv @ rated current.
- Diallyl Phthalate or Phenolic housing materials.
- Phosphor bronze contact material.
- Specifications subject to change. Consult GTE Sylvania Product Specifications for additional technical information.

This is only a sample of the GTE Sylvania connector product line. For additional information or complete catalogue, please write to GTE Sylvania.

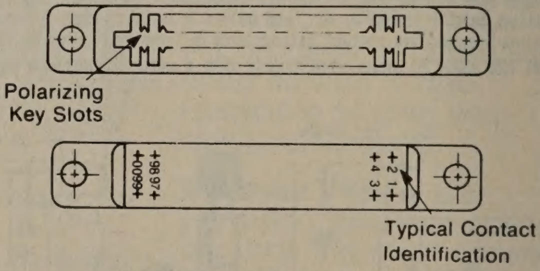
CUT-AWAY VIEWS



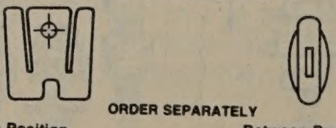
SUGGESTED P/C CARD CONFIGURATION



TYPICAL FEATURES



POLARIZING KEYS



ORDER SEPARATELY

On Position
P/N 7192-0558
Matl/G.R. Polyester Thermoplastic
Color/Natural

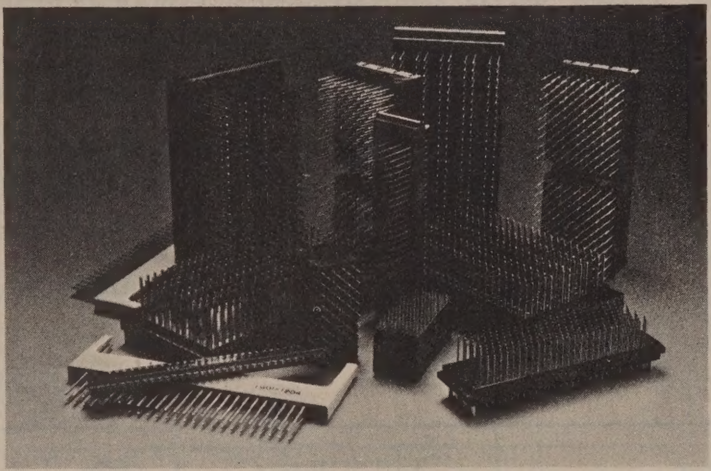
Between Position
P/N 7192-0370
Matl/G.R.Nylon
Color/Natural

GTE SYLVANIA INCORPORATED, PRECISION MATERIALS PRODUCTS BUSINESS, CONNECTOR PRODUCTS OPERATION OF THE PARTS DIVISION. TITUSVILLE, PENNSYLVANIA 16354.
PHONE: (814) 589-7071. TWX 510-692-6763.

GTE SYLVANIA INCORPORATED

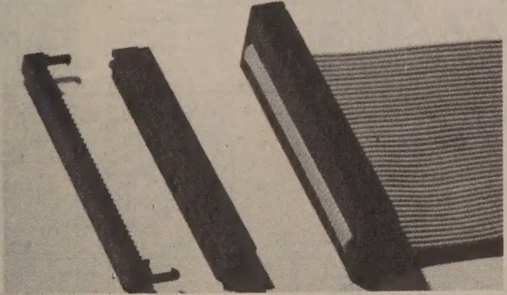
CUSTOM CONNECTORS

- Designed to specific customer applications.
- Provide reliable connectors to major industries for over two decades.
- Feature complete material and process control from product concept to customer shipment via total vertical integration.
- Provide highest reliability contact in the industry including the GTE Sylvania proven gold dot.
- Designed to provide the highest possible packaging density.
- Available with both solder tab and wrap-post contact tails.
- Available in wide range of sizes and mounting styles.
- Choice of housing materials.



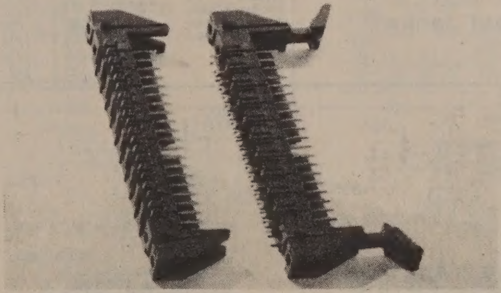
Have GTE Sylvania combine its expertise with yours to design a custom connector to your exact specifications.

FLAT CABLE CONNECTOR SYSTEMS



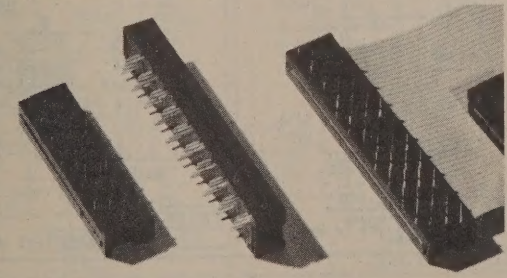
"BA" SOCKET CONNECTORS

- Designed to terminate to cable on .050 (1.270) conductor centers.
- Mass insulation displacing concept offers good gas-tight termination.
- Accepts 28-30 AWG solid or stranded conductors.
- Designed to mate to .025 (.635) sq. posts or .025 dia. pins.
- Positive locking assembly.



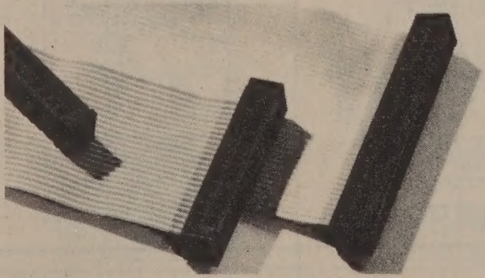
"BB" HEADER CONNECTORS

- Low Profile Design - max. height for vertical application is .700 (17.780) not including latch option.
- Designed for solder or wire-wrappable applications.
- Positive latch option.
- Shielded design to protect contacts when disconnected.
- Vertical or right angle applications.



"BC" PCB FLAT CABLE CONNECTORS

- Positive locking assembly.
- Low profile design .255 (6.477) max. height.
- Open or closed cover designs for end-wire or thru-wire applications.
- Optional contact lengths for PC boards up to .125(3.175) thick.
- Connector design and termination tooling guarantee uniform reliable interconnections.



"BD" STACKABLE SOCKET CONNECTORS

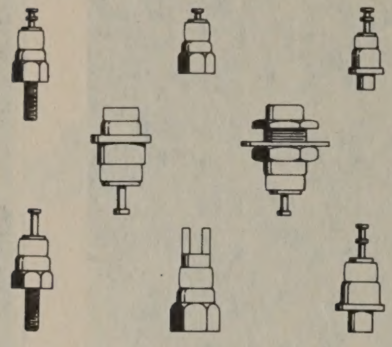
- Mass insulation displacing concept, offering good gas-tight seal.
- Positive locking assembly.
- Low profile package with maximum height of .275(6.985) permits stacking of two connectors on a typical wire-wrappable post.
- Latest concept in interconnect packaging.
- Lowest total applied cost than other I/O (input/output) connector types.

GTE SYLVANIA INCORPORATED, PRECISION MATERIALS PRODUCTS BUSINESS, CONNECTOR PRODUCTS OPERATION OF THE PARTS DIVISION. TITUSVILLE, PENNSYLVANIA 16354. PHONE: (814) 589-7071. TWX 510-692-6763.

HIRAM JONES

manufacture and design of circuit components

Teflon† Insulated * One-Piece * Terminals and Test Jacks



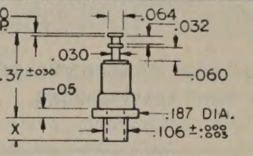
*** DELIVERY** Immediate — from stock on catalog items.

*** QUALITY** QPL facility, insuring highest product reliability. Complete traceability on all raw material and processes.

*** PRODUCTION** Precision Swiss automatic machines — long or short runs to customer design and specifications.

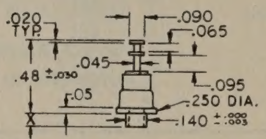
* ONE-PIECE *

Teflon† Insulated Terminals Male-Female Threads and Swage Types and Test Jacks


.020 TYP.
.064
.032
.030
.060
.37 ±.030
.05
.187 DIA.
X
.106 ±.000 .003

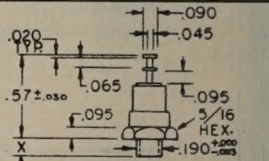
Single Turret also available
O/A Height above Board: .30 ±.030
P/N TS-111-A/-4

Part No.	X	Board Thickness
TS-112-A	.055	1/64
TS-112-0	.075	1/32
TS-112-1	.095	.050
TS-112-2	.105	1/16
TS-112-3	.135	3/32
TS-112-4	.165	1/8


.020 TYP.
.090
.065
.045
.48 ±.030
.095
.05
.250 DIA.
X
.140 ±.000 .003

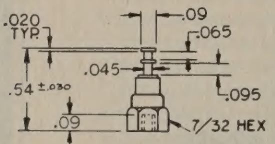
Single Turret also available
O/A Height above Board: .39 ±.030
P/N TS-231-0/-4

Part No.	X	Board Thickness
TS-232-0	.075	1.32
TS-232-1	.095	.050
TS-232-2	.105	1/16
TS-232-3	.135	3/32
TS-232-4	.175	1/8


.090
.045
.020 TYP.
.065
.57 ±.030
.095
.095
5/16 HEX.
X
.190 +.000 -.003

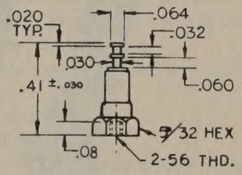
Single Turret also available
O/A Height above Board: .50 ±.030
P/N TS-351-0/-4

Part No.	X	Board Thickness
TS-352-0	.075	1/32
TS-352-1	.095	.050
TS-352-2	.105	1/16
TS-352-3	.135	3/32
TS-352-4	.165	1/8


.020 TYP.
.09
.065
.045
.54 ±.030
.095
.09
7/32 HEX

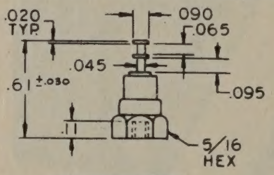
Part No.	Thread
TS-232-8F	4-40
TS-232-9F	6-32

Single Turret also available
O/A Length: .47 ±.030
P/N TS-231-8F/-9F


.020 TYP.
.064
.032
.030
.41 ±.030
.060
5/32 HEX
.08
2-56 THD.

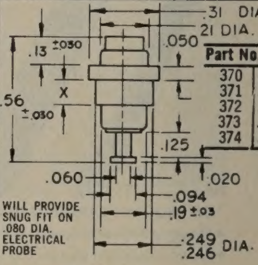
Part No.	Thread
TS-112-6F	2-56

Single Turret also available
O/A Length: .35 ±.030
P/N TS-111-6F


.020 TYP.
090
.065
.045
.61 ±.030
.095
.11
5/16 HEX

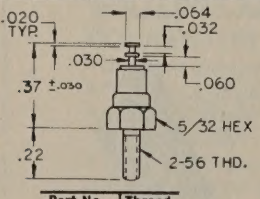
Part No.	Thread
TS-352-8F	4-40
TS-352-9F	6-32

Single Turret also available
O/A Length: .54 ±.030
P/N TS-351-8F/-9F


.31 DIA.
.21 DIA.
.13 ±.030
.050
X
.56 ±.030
.125
.060
.020
.094
.19 ±.03
.249 .246 DIA.
WILL PROVIDE SNUG FIT ON .080 DIA. ELECTRICAL PROBE

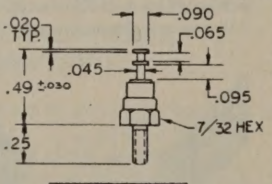
Part No.	X	T
370	.075	1/32
371	.095	.050
372	.105	1/16
373	.135	3/32
374	.165	1/8

SWAGE TEST JACK
Available in 10 Standard E.I.A. colors


.020 TYP.
.064
.032
.030
.37 ±.030
.060
5/32 HEX
.22
2-56 THD.

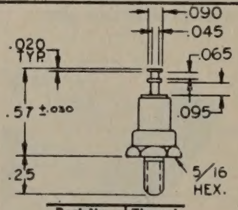
Part No.	Thread
TS-112-6M	2-56

Single Turret also available
O/A Height above Board: .34 ±.030
P/N TS-111-6M


.020 TYP.
.090
.065
.045
.49 ±.030
.095
7/32 HEX
.25

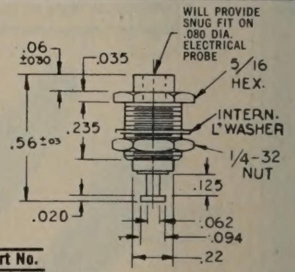
Part No.	Thread
TS-232-8M	4-40
TS-232-9M	6-32

Single Turret also available
O/A Height above Board: .42 ±.030
P/N TS-231-8M/-9M


.090
.045
.020 TYP.
.065
.57 ±.030
.095
.25
5/16 HEX.

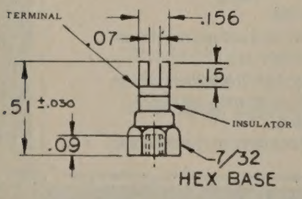
Part No.	Thread
TS-352-8M	4-40
TS-352-9M	6-32

Single Turret also available
O/A Height above Board: .50 ±.030
P/N TS-351-8M/9M

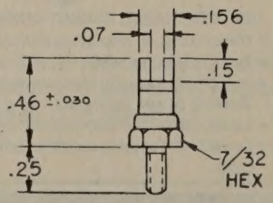

WILL PROVIDE SNUG FIT ON .080 DIA. ELECTRICAL PROBE
.06 ±.030
.035
5/16 HEX.
INTERN. L' WASHER
.235
.56 ±.03
1/4-32 NUT
.125
.020
.062
.094
.22

Part No.
375

THREADED TEST JACK


TERMINAL
.07
.156
.15
.51 ±.030
INSULATOR
.09
7/32 HEX BASE

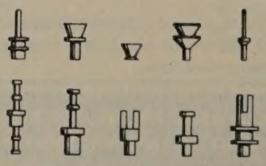
Part No.	Thread
TS-233-8F	4-40
TS-233-9F	6-32


.07
.156
.15
.46 ±.030
.25
7/32 HEX

Part No.	Thread
TS-233-8M	4-40
TS-233-9M	6-32

Other Hiram Jones Products:

Non-Insulated Terminals, Test Jacks and Contacts
Printed Circuit, MS and MIL-T-55155 Terminals



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†Reg. Trademark, E.I. DuPont de Nemours and Co.

DEPT. EM
11607 VANOWEN STREET, NORTH HOLLYWOOD, CALIF. 91605
(213) 875-0213

HIRAM JONES

Teflon† Insulated * Press-Type * Terminals and Test Jacks

TEFLON†

(TFE-FLUOROCARBON) per MIL-P-19468 has outstanding mechanical and electrical properties over a wide range of frequencies and temperatures (−100°C to +250°C), extreme chemical inertness, high heat resistance, zero water absorption and complete anti-hesiveness which make it a superior insulation.

TERMINALS

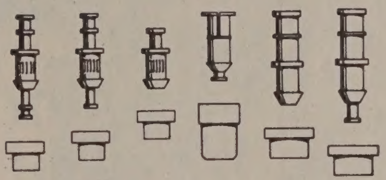
MATERIAL: Half-hard Brass per QQ-B-626, CDA360.
FINISH: Standard plating is Gold per MIL-G-45204. Other finishes supplied on request.

INSTALLATION TOOLS

Tools are available for all HIRAM JONES components. Specify Part Number and prefix "S." Example: S-602 Assembly Tool.

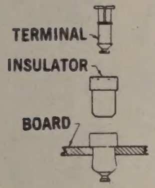
* PRESS-TYPE *

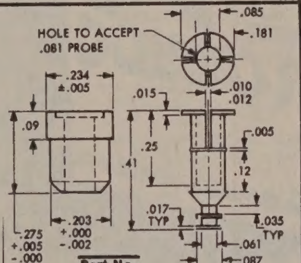
For simple, fast economical installation



* PRESS-TYPE *

Teflon† Insulated Test Jacks


TERMINAL
INSULATOR
BOARD

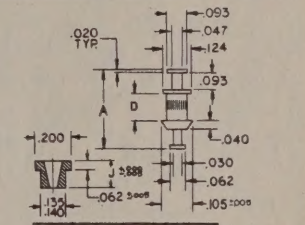

HOLE TO ACCEPT .081 PROBE
.085
.181
.234 ±.005
.015
.010
.012
.09
.25
.41
.005
.12
.017 TYP
.203 +.000 -.002
.275 +.005 -.000
.035 TYP
.061
.087

Part No. L-606 Also available without slots (non-gripping) P/N 606

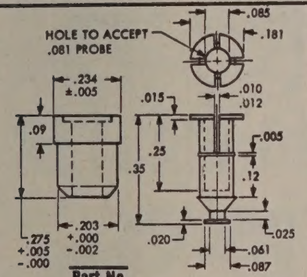
* PRESS-TYPE *

Teflon† Insulated Feed-Thrus and Standoffs

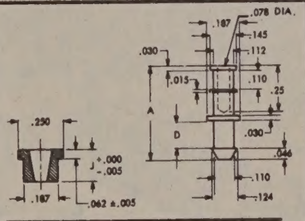
Available in Ten Standard E.I.A. Colors


.020 TYP
.093
.047
.124
.093
A
D
.200
.040
.030
.062
J
.062 ±.005
.135
.140
.105 ±.005

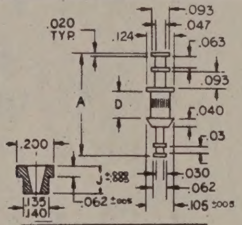
Part No.	A	D	J	Board Thickness
625-A	.41	.147	.147	1/32-.050
625-G	.42	.157	.157	1/16


HOLE TO ACCEPT .081 PROBE
.085
.181
.234 ±.005
.015
.010
.012
.09
.25
.35
.005
.12
.203 +.000 -.002
.275 +.005 -.000
.020
.025
.061
.087

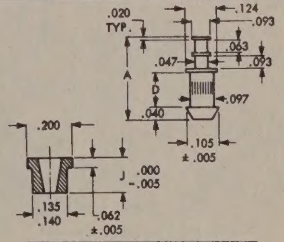
Part No. L-602 Also available without slots (non-gripping) P/N 602


.078 DIA.
.187
.145
.112
.030
.015
.110
.25
.250
A
D
.030
J +.000 -.005
.046
.110
.187
.062 ±.005
.124

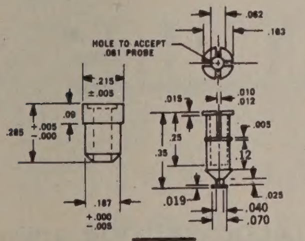
Part No.	A	D	J	Board Thickness
630-A	.51	.150	.150	1/32-.050
630-G	.52	.160	.160	1/16
630-H	.58	.220	.220	1/8


.020 TYP
.124
.093
.047
.063
.093
A
D
.040
.03
.200
J
.030
.062
.135
.140
.062 ±.005
.105 ±.005

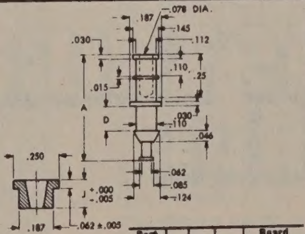
Part No.	A	D	J	Board Thickness
622-A	.55	.147	.147	1/32-.050
622-G	.56	.157	.157	1/16
622-H	.59	.189	.189	1/8


.020 TYP.
.124
.093
.063
.047
.093
A
D
.040
.097
.200
.105 ± .005
J .000 -.005
.135
.140
.062 ±.005

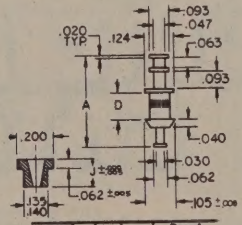
No.	A	D	J	Thickness
626-A	.40	.147	.147	1/32-.050
626-G	.41	.157	.157	1/16


HOLE TO ACCEPT .081 PROBE
.062
.183
.215 ±.005
.019
.010
.012
.09
.285 +.005 -.000
.25
.35
.005
.12
.019
.025
.187 +.000 -.005
.040
.070

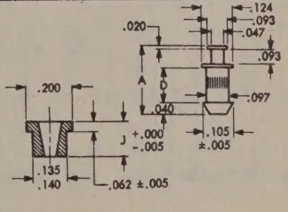
Part No. 605


.078 DIA.
.187
.145
.112
.030
.110
.25
.015
A
D
.030
.110
.046
.250
J +.000 -.005
.062
.085
.124
.187
.062 ±.005

Part No.	A	D	J	Board Thickness
632-A	.61	.150	.150	1/32-.050
632-G	.62	.160	.160	1/16
632-H	.69	.220	.220	1/8


.020 TYP
.124
.093
.047
.063
.093
A
D
.040
.200
J
.030
.062
.135
.140
.062 ±.005
.105 ±.005

Part No.	A	D	J	Board Thickness
623-A	.50	.147	.147	1/32-.050
623-G	.51	.157	.157	1/16


.020
.124
.093
.047
.093
A
D
.097
.040
.200
J +.000 -.005
.105 ±.005
.135
.140
.062 ±.005

Part No.	A	D	J	Board Thickness
627-A	.32	.147	.147	1/32-.050
627-G	.33	.157	.157	1/16

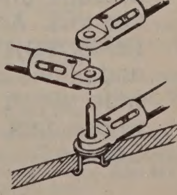
9W WIRE TERMINATION SYSTEM COMPONENTS

FOR BUILT-IN RELIABILITY:

Provides a solder-wicking barrier to minimize wire fatigue failures.

SERVICEABILITY:

Utilizing fast, simple wire connection and disconnection.



9W Crimp Terminal			AWG Wire Sizes	Mating Terminal Post	Board Thickness
Part No.	O.D.	Lgth.			
9W-206 9W-207	.078 .062	.265 .226	20 & 22 24 & 26	9W-507-1 Standoff 9W-507-5 Standoff 9W-510-1 Feed-thru 9W-510-3 Feed-thru	3/32″ 1/16″ 3/32″ 1/16″
9W-230	.094	.282	16 & 18	9W-507-3 Standoff 9W-507-7 Standoff 9W-510-2 Feed-thru 9W-510-4 Feed-thru	3/32″ 1/16″ 3/32″ 1/16″

'78
THE MASTER CATALOG
THE ELECTRONIC DISTRIBUTORS MASTER CATALOG '78
FORMERLY: OFF-THE-SHELF CATALOG
THE ONLY NATIONAL CATALOG OF ELECTRONIC PARTS, INSTRUMENTS AND EQUIPMENT DESIGNED EXCLUSIVELY FOR DISTRIBUTORS AND THEIR CUSTOMERS.
YESTERDAY'S RADIO MASTER IS TODAY'S
ELECTRONIC DISTRIBUTORS MASTER CATALOG

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The MASTER CATALOG is broken down into four basic sections. **A GENERAL INDEX** which lists manufacturers and products alphabetically. **A MANUFACTURERS' CATALOG SECTION** which displays their respective product pages and lists their addresses and phone numbers. **A MANUFACTURERS' DIRECTORY,** where participating manufacturers, again listed alphabetically with addresses and phone numbers, highlight their distributors. And a **GEOGRAPHIC DISTRIBUTORS' DIRECTORY** which includes the names, addresses and phone numbers of the local distributors nationwide which stock the products of manufacturers whose data appears in the "Manufacturers' Catalog Section."

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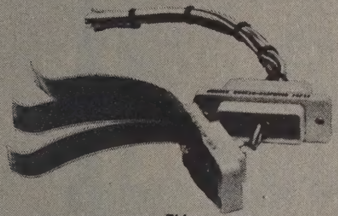
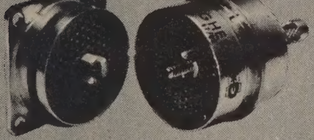
CALL ON HUGHES HIGH TECHNOLOGY CONNECTORS FOR THE TOUGHEST JOBS.

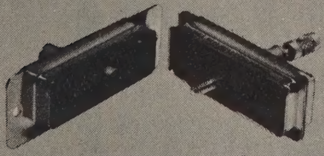
C-21 Tightest Sealing Environmental Connector—to 250 psi.



New HAC-PAK™ Round-to-Flat Cable Connector



Highest density Circular Connector



Highest density Subminiature Connector

We specialize in connector problems nobody else can crack. If it's simple and easy, anybody can do it, including us. But the tough nut is our specialty.

When you need high density connectors with positive polarization, high contact retention and unmatched reliability, call us. (714) 549-5701. Or write: 17150 Von Karman Avenue, Irvine, CA 92714.

HUGHES
HUGHES AIRCRAFT COMPANY
CONNECTING DEVICES DIV.

We crack the tough ones.

HUGHES
HUGHES AIRCRAFT COMPANY
CONNECTING DEVICES DIV.

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4410 N. Rockcliff Pl., Tucson 85715
(602) 749-5026

California (Southern), **Nevada** (Southern)
W. E. S. T., Inc.
3825 Birch Street, Newport Beach, CA 92660
(714) 540-9040

California (Northern), **Nevada** (Northern)
J. T. McFarland Associates Corp.
1485 Kerley Drive, San Jose, CA 95112
(408) 286-9333

Florida
Bolton Associates, Inc.
2457 East Commercial Blvd., Ft. Lauderdale, Florida 33308
(305) 491-5161

Maryland, Delaware, District of Columbia, West Virginia, Virginia (Eastern)
Kraft Electronics Sales, Inc.
510 Woodbine Avenue, Towson, Maryland 21204
(301) 828-5838

Massachusetts, New Hampshire, Maine, Vermont, Rhode Island, Connecticut
L-K Harman, Inc.—Haverhill Office
86 Summer Street, Haverhill, Massachusetts 01830
(617) 373-1313
L-K Harman, Inc.—Brookline Office
251 Harvard Street, Brookline, Massachusetts 02146
(617) 232-6687
L-K Harman Associates—Lee Office
17 Maritta Avenue, Lee, Massachusetts 01238
(413) 243-1158

Minnesota, North Dakota, South Dakota, Wisconsin (Western)
Bill Deming and Associates
8053 Bloomington Freeway, Minneapolis, Minnesota 55420
(612) 888-5000

Illinois (Northern), **Wisconsin** (Eastern)
Probe Electronics
118 West Higgins Road, Park Ridge, Illinois 60068
(312) 696-2828

Missouri, Nebraska, Iowa, Kansas, Illinois (Southern), **Kentucky** (Western), **Tennessee** (Western)
Ensco-Rep, Inc.—St. Louis Office
11714 Lackland Industrial Drive, St. Louis, Missouri 63141
(314) 567-3935
Ensco-Rep, Inc.—Overland Park Office
7339 Floyd, Suite L-12, Overland Park, Kansas 66204
(913) 381-7557

New York (Southern), **New Jersey, Pennsylvania** (Eastern)
T. A. Adamo Sales, Inc.
702 Newark Pompton Turnpike,
Pompton Plains, New Jersey 07444
(201) 835-5344

North Carolina, South Carolina, Alabama, Georgia, Tennessee (Eastern)
L & D Inc.
5510 W. Friendly Avenue, Greensboro, North Carolina 27410
(919) 292-3201
L & D Inc.—Greenville Office
15 Drexel Avenue, Greenville, South Carolina 29607
L & D Inc.—Richmond, Virginia Office
P.O. Box 25608, Richmond, Virginia 23260
L & D Inc.—Huntsville Office
333 Ardenmore Highway, P.O. Box 5005,
Huntsville, Alabama 35805
(205) 859-1690

Ohio, Michigan, Indiana, Pennsylvania (Western), **Kentucky** (Eastern), **Virginia** (Western)
Luebbe Sales Company—Cincinnati Office
2649 Erie Avenue, Cincinnati, Ohio 45208
(513) 871-4211
Luebbe Sales Company—Cleveland Office
21330 Center Ridge Road, Cleveland, Ohio 44116
(216) 333-0425
Luebbe Sales Company—Dayton Office
3832 Kettering Boulevard, Dayton, Ohio 45439
(513) 294-0426
Luebbe Sales Company—Detroit Office
20905 Greenfield Road, Southfield, Michigan 48075
(313) 357-0355
Luebbe Sales Company—Pittsburgh Office
411 Manor Road, Delmont, Pennsylvania 15626
(412) 468-4019

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Space Electronics Corporation
Irving Bank Tower, Suite 409, Irving, Texas 75060
(214) 251-3636

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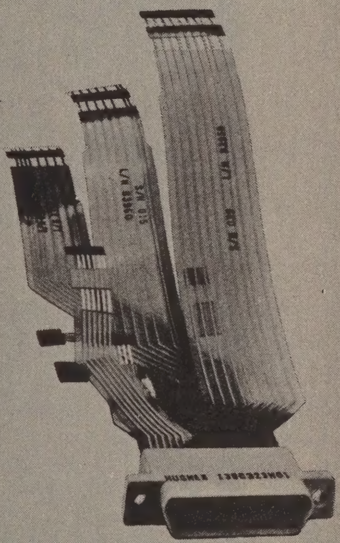

We're the company that has total interconnection capability—in flat cable, flex circuits and connectors. And we've had more experience designing them for high technology applications.

But we do more than design them to work together—we also put them together for you in special assemblies.

So call the people you can count on. Call us. (714) 549-5701. Or write: 17150 Von Karman Avenue, Irvine, CA 92714.

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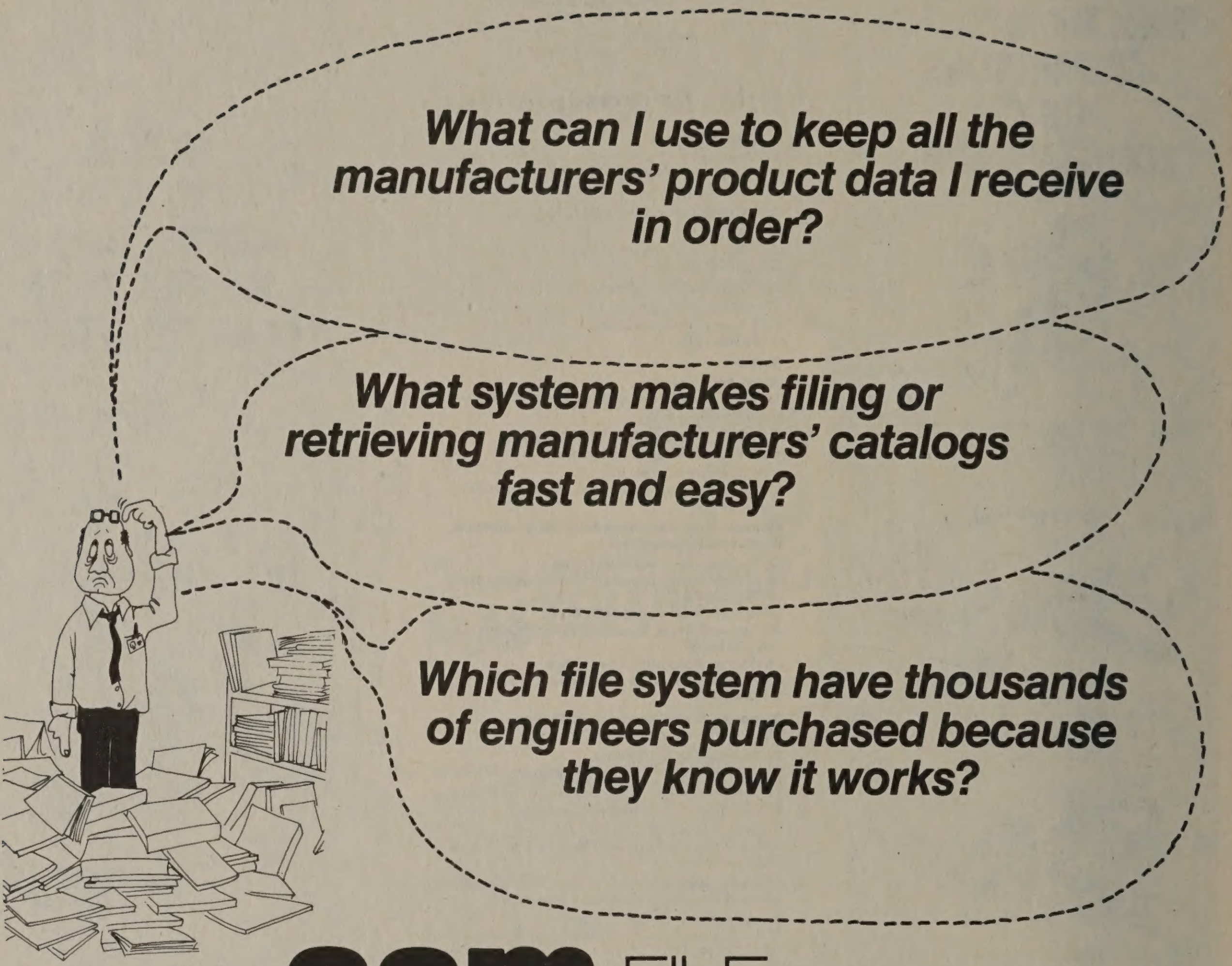
HUGHES AIRCRAFT COMPANY
CONNECTING DEVICES DIV.

We crack the tough ones.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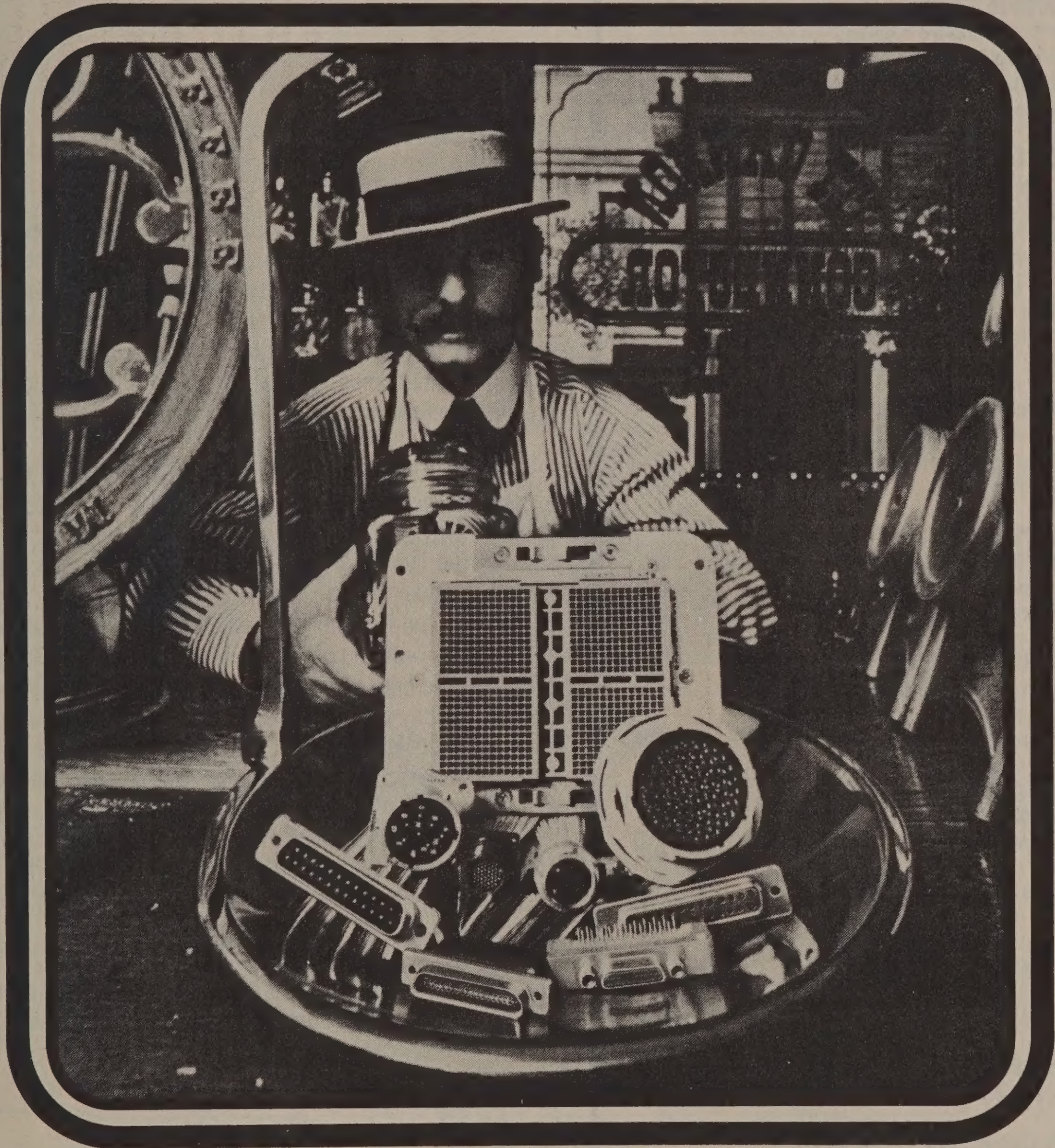

CANNON STANDARD LINE CONNECTORS

for commercial, industrial, military and aerospace

Six decades on the leading edge of interconnect technology.

CANNON ITT

1977/1978 EDITION

ITT CANNON ELECTRIC

AUDIO Connectors — for audio, electronic and other low-level circuit applications 1859

CV/MIL-C-005015 Standard Circular Connectors — threaded coupling, removable rear release crimp contacts, intermateable with MIL-C-5015 and MIL-C-83723 (threaded) type connectors 1863

CVA/M83723 Standard Circular Connectors — threaded coupling, removable rear release crimp contacts, environment and fluid resistant, intermateable with MIL-C-5015 type connectors 1870

K Connectors — lightweight, rugged, circular connectors with quick connect/disconnect Acme threads 1878

KJL/KJ Subminiature Circular MIL-C-38999 Connectors — high performance, high contact density, lightweight, bayonet coupling, rear release crimp snap-in contacts 1851

KPT/KPTM/KPSE Miniature Circular MIL-C-26482 Connectors — general purpose, solder and crimp removable contacts, bayonet coupling 1886

MSA/MSB/MSE/MSF/ER MIL-C-5015 Standard Circular Connectors — general purpose, threaded coupling, solder and crimp removable contacts 1896

PV Miniature Circular Connectors — designed to M83723 Series I) and M26482 (Series II), bayonet coupling 1916

D Subminiature Rectangular Connectors — for commercial/industrial and general military/aerospace MIL-C-24308 applications (ORIGINAL D, BURGUN-D, D*P (all plastic PCB), GOLDEN-D, ROYAL-D, MAS/TER-D) 1925

SMA Connectors — for RF and coaxial requirements for commercial and military applications 1961

ADAPTA-CON Connectors — low force receptacle and post interconnections for PC and I/O applications 1965

DL "ZIF" Connectors — designed for commercial/industrial, computer and peripheral equipment; zero mating force via cam actuated contacts 1973

MAS/TER-UND Interconnect System — high reliability, low cost, high speed mass termination insulation displacement spring-action contacts 1981

MICROMINIATURE Connectors — rectangular, circular, strip configurations, with MICRO (3 amp), Centi (5 amp) and NANO (1 amp) Twist Pin Contacts*...................... 1985

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*Licensed by New Twist

INTRODUCTION

It's almost impossible to find electrical or electronic equipment anywhere in the world that doesn't involve the use of one or more ITT Cannon products. Our interconnection devices are currently solving problems in equipment and systems ranging from computers to cable TV, telecommunications to transportation, vending machines to nuclear reactors, deep space to deep submergence, braking systems for trucks to applications on every commercial aircraft now flying.

The result of this is a truly unequalled depth of engineering experience in all phases of interconnection technology.

Through our CAPS® distributors (Cannon Authorized Plug Specialists), we offer customers the world's largest organization of stocking and assembling distributors — with representation in every major electronics center. Having passed the same quality standards we impose on our own assembly operations, these distributors buy component parts and sub-assemblies from our factories, then assemble them to your requirements at their facilities. Thus, they can customize your connectors and save you the cost of inventory. More specialized orders are passed on to our factories where they are expedited by one of the finest computerized production control systems in the world. It all adds up to getting you the right product at the right time. And at the right price.

For more information, please contact your local ITT Cannon representative or distributor. If you have an interconnect problem, we can help you.

CONNECTOR ACTION:
CALL YOUR CANNON DISTRIBUTOR OR THE
CANNON HOTLINE:
800/854-3573
IN CALIFORNIA DIAL:
800/432-7063

Who can fill all your needs for KJL-Series I and KJ-Series II connectors designed to MIL-C-38999?

Cannon can!

Six decades on the leading edge of interconnect technology.

CANNON ITT

MINIATURE CIRCULAR CONNECTORS KJL/KJ CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

KJL-SERIES I SCOOP-PROOF AND KJ-SERIES II LOW PROFILE CONNECTORS... DESIGNED TO MIL-C-38999

- **High contact density**
- **Lightweight/low-profile/scoop proof**
- **Environment-resistant**
- **Operating temperature range from −29°C to +200°C (−85°F to +392°F)**
- **Crimp snap-in contacts in the NEW SUPER CAESAR™ rear release contact retention assembly**

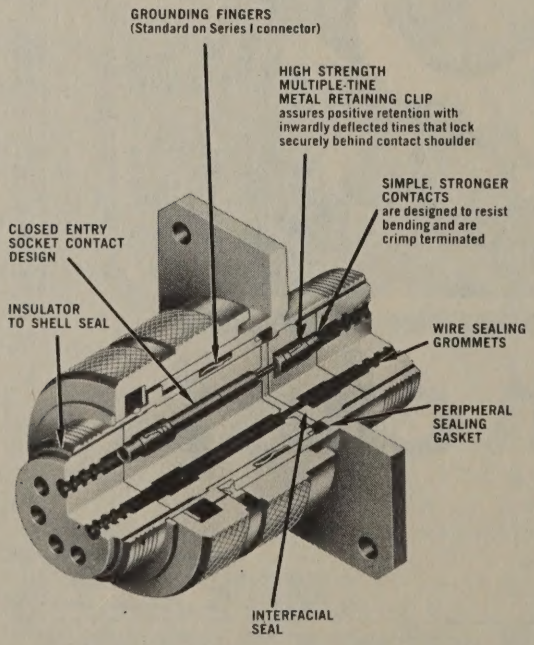
ITT Cannon's KJL and KJ miniature circular connectors are environment-resistant and designed to meet the critical performance and design requirements of MIL-C-38999. Engineered for high density circuitry capabilities, these connectors are designed to operate at temperatures ranging from −29°C to +200°C (−85°F to +392°F). They are readily adaptable to both commercial and space age requirements where size, weight, low-profile/scoop proof design and high reliability are key factors. KJL/KJ connectors are offered in nine shell sizes. A total of 59 contact arrangements are available that will accommodate from 3 to 128 contacts using AWG wire sizes 16 through 28. Contacts are of high conductivity copper alloy with gold plated finish.

The KJL-Series of connectors are designed with a "scoop-proof" feature which provides a safety factor in blind mating applications.

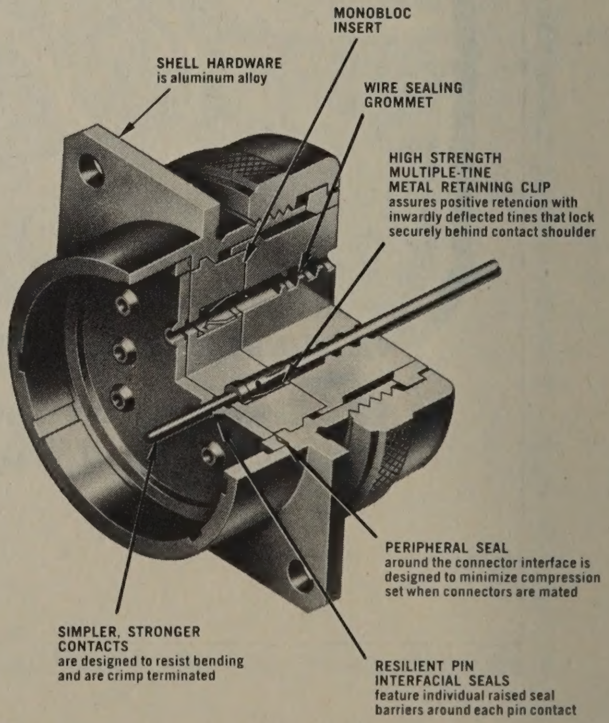
Contact retention is provided by the newly developed SUPER CAESAR™ rear release contact assembly. SUPER CAESAR more than meets the MIL Specs, for contact retention. The assembly features a multiple-tine **metal** retaining clip housed in a monobloc plastic insert. Contacts are inserted, released, and extracted from the rear of the connector, offering lower installation and maintenance costs to the user.

Monobloc (one-piece) inserts are made of strong, durable plastic. Pin contact cavities in the insert are constructed with a closed-down effect. This feature offers superior pin stability and positive axial alignment of the contacts. Lead-in chamfers in the socket front insert face provide for positive contact mating. The shells feature five-keyway shell polarization to assure alignment during engagement. A three-point bayonet lock coupling provides fast connect and disconnect. Complete environmental sealing is accomplished by an interfacial seal, with individual raised tapered sealing barriers around each pin contact; a peripheral seal, and a multiple-ripple wire sealing grommet. Hermetic shell styles are also available.

KJL-SERIES 1


GROUNDING FINGERS
(Standard on Series I connector)
HIGH STRENGTH MULTIPLE-TINE METAL RETAINING CLIP
assures positive retention with inwardly deflected tines that lock securely behind contact shoulder
SIMPLE, STRONGER CONTACTS
are designed to resist bending and are crimp terminated
CLOSED ENTRY SOCKET CONTACT DESIGN
INSULATOR TO SHELL SEAL
WIRE SEALING GROMMETS
PERIPHERAL SEALING GASKET
INTERFACIAL SEAL

KJ-SERIES 2


MONOBLOC INSERT
SHELL HARDWARE
is aluminum alloy
WIRE SEALING GROMMET
HIGH STRENGTH MULTIPLE-TINE METAL RETAINING CLIP
assures positive retention with inwardly deflected tines that lock securely behind contact shoulder
PERIPHERAL SEAL
around the connector interface is designed to minimize compression set when connectors are mated
SIMPLER, STRONGER CONTACTS
are designed to resist bending and are crimp terminated
RESILIENT PIN INTERFACIAL SEALS
feature individual raised seal barriers around each pin contact

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS
KJL/KJ CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL INFORMATION—HOW TO ORDER

ITT CANNON VERSION

NOTE: KJL/KJ supplied with exact complement of contacts.

KJL 0 E 21 A 61 S N
KJ 6 E 18 A 35 S N

Series Prefix
Shell Style
Class
Shell Size
Hardware Finish
Contact Arrangement
Contact Type
Shell Position

SERIES PREFIX

KJL Series I — Scoop proof
KJ Series II — Low profile

SHELL STYLE

0* — Wall mounting receptacle
2 — Box mounting receptacle (available as hermetic)
3* — Wall mounting receptacle (back panel mounting)
5 — Box mounting receptacle (back panel mounting)
6* — Straight plug
G6 — Straight plug, grounded
7* — Jam nut receptacle (available as hermetic)

CLASS

E* — Environment-resistant with rear accessory (without strain relief)
F — Environment-resistant with strain relief accessory
P — Environment-resistant with straight potting cup accessory
R — Environment-resistant with full grommet seal **without rear accessory; shell styles 2 and 5 only**
T* — Environment-resistant (without rear accessory). Class T not applicable to KJ2E, KJ2R, KJ5E, KJ5R, MS27499, MS27513, and MS27508.

SHELL SIZE

KJL: 9, 11, 13, 15, 17, 19, 21, 23, 25
KJ: 10, 12, 14, 16, 18, 20, 22, and 24

HARDWARE FINISH STANDARD

A — Bright cadmium over electroless nickel plate (—85°F to +302°F) (—29°C to +150°C)
B — Olive drab cadimum over electroless nickel plate (—85°F to +302°F) (—29°C to +150°C)
C — Anodic (non-conductive) (—85°F to +392°F) (—29°C to +200°C)
N — Electroless nickel (—85°F to +392°F) (—29°C to +200°C)

CONTACT ARRANGEMENT

See following pages

CONTACT STYLE

P — Pin
S — Socket

ALTERNATE SHELL POSITION

N (normal), A, B, C, D

*Available in KJL

MS VERSION

NOTE: MS supplied with specified complement of contacts and wire sealing plugs.

MS27473 E * A 66 P A

MS Number Shell Style
Class
Shell Size
Hardware Finish
Contact Arrangement
Contact Style
Alternate Shell Position

MS NUMBER SHELL STYLE

KJL	KJ	
MS27466	MS27472	— Wall Mounting Receptacle
—	MS27473	— Straight Plug
MS27468	MS27474	— Jam Nut Receptacle
MS27467	MS27484	— Grounded Plug
MS27565	MS27497	— Wall Mounting Receptacle (back panel mounting)
—	MS27513	— Box Mounting Receptacle
—	MS27479	— Wall Mounting Receptacle (C Finish)
—	MS27480	— Straight Plug (C Finish)
—	MS27481	— Jam Nut Receptacle (C Finish)
—	MS27499	— Box Mounting Receptacle (Class E)
—	MS27508	— Box Mounting (Back Panel Mounting)

CLASS

E — Environment-resistant
P — Environment-resistant with straight potting cup accessories
R — Environment-resistant with full grommet seal without rear accessory; shell styles 2 and 5 only
T — Environment-resistant (without rear accessory). Class T not applicable to KJ2E, KJ2R, KJ5E, KJ5R, MS27499, MS27513, and MS27508.

SHELL SIZES

KJL: 9, 11, 13, 15, 17, 19, 21, 23, 25
KJ: 10, 12, 14, 18, 20, 22, 24

HARDWARE FINISH STANDARD

A — Bright cadmium over electroless nickel plate (—85°F to +302°F) (—29°C to +150°C)
B — Olive drab cadmium over electroless nickel plate (—85°F to +302°F) (—29°C to +150°C)
C — Anodic (non-conductive) (—85°F to +392°F) (—29°C to +200°C)
F — Electroless nickel (—85°F to +392°F) (—29°C to +200°C)

CONTACT ARRANGEMENT

See following pages

CONTACT STYLE

P — Pin; S — Socket

ALTERNATE SHELL POSITION

A, B, C, and D (not required for normal)

STANDARD DATA

MATERIALS AND FINISHES

	MIL-C-38999 and KJ	Grounded Plug
Shell	Aluminum alloy	Aluminum alloy, cad. plate
Insulator	Thermosetting plastic	Thermosetting plastic
Contacts	Copper alloy, gold plate	Copper alloy, gold plate
Grommet and Seal	Silicone base elastomer	Silicone base elastomer
Jam Nut	Aluminum alloy	—
Grounding Spring	—	Beryllium copper, cad. plate

MECHANICAL FEATURES

Shell Styles	0 — Wall mounting receptable 2 — Box mounting receptacle 3 — Wall mounting receptacle (back panel) 5 — Box mounting receptacle (back panel) 6 — Straight plug 7 — Jam nut receptacle
Shell Sizes	KJL: 9 thru 25; KJ: 10 thru 24
Coupling	3 point bayonet, quick-release
Polarization Shell	5 keys and keyways

ELECTRICAL DATA

Contact Size 22M*, 22D, 22*, 20 and 16

Contact Rating and Wire Size Accommodation

Wire Size	Contact size and test amps 22D	20	16	12
28	1.5	—	—	—
26	2.0	—	—	—
24	3.0	3.0	—	—
22	5.0	5.0	—	—
20	—	7.5	7.5	—
18	—	—	10.0	—
16	—	—	13.0	—
14	—	—	—	17.0
12	—	—	—	23.0

Service Rating (unmated condition)

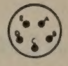
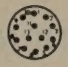
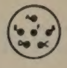
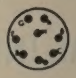
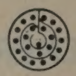
Test Voltages	Service Rating M	Service Rating I	Service Rating II
Sea Level	1300	1800	2300
110,000 ft.	200	200	200

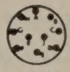
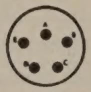
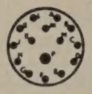
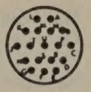
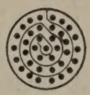
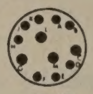
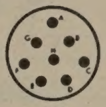
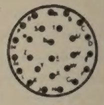
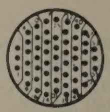
Contact Termination Crimp (classes E, F, P, R, T)

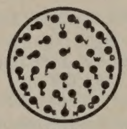
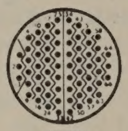
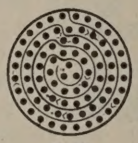
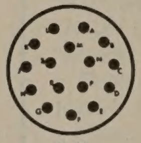
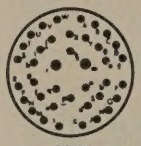
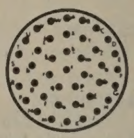
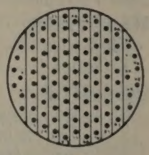
MINIATURE CIRCULAR CONNECTORS
KJL/KJ CONNECTORS

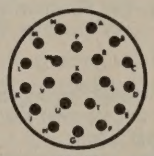
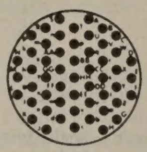
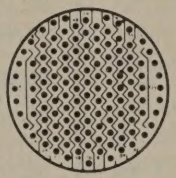
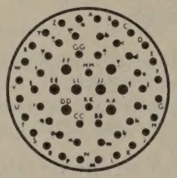
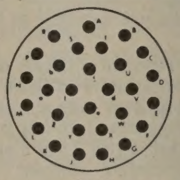
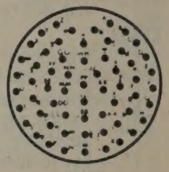
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONTACT ARRANGEMENTS
KJL-SERIES I
(ENGAGING VIEW PIN INSERT)

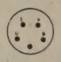
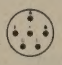
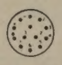
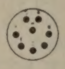
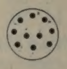
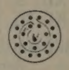
							
Shell Size	9-35	9-98	11-5 *	11-35	11-98	13-8*	13-35
No. of Contacts	6 #22D	3 #20	5 #20	13 #22D	6 #20	8 #20	22 #22D
Service Rating	M	I	I	M	I	I	M

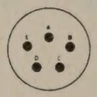
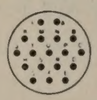
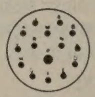
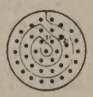
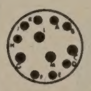
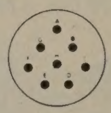
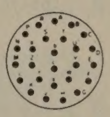
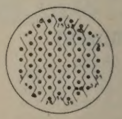
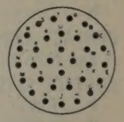
									
Shell Size	13-98	15-5	15-15	15-18	15-35	15-97	17-8	17-26	17-35 *
No. of Contacts	10 #20	5 #16	14 #20, 1 #16	18 #20	37 #22D	8 #20, 4 #16	8 #16	26 #20	55 #22D
Service Rating	I	I	I	I	M	I	II	I	M

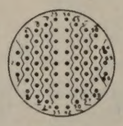
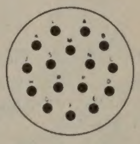
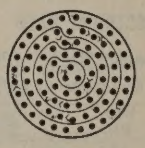
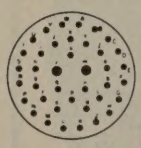
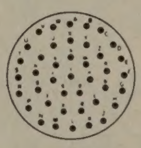
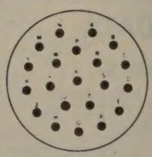
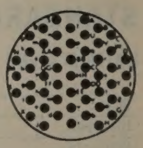
							
Shell Size	19-32	19-35	21-35	21-16	21-39	21-41 •	23-35
No. of Contacts	32 #20	66 #22D	79 #22D	16 #16	37 #20, 2 #16	41 #20	100 #22D
Service Rating	I	M	M	II	I	I	M

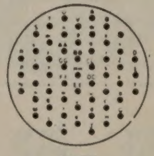
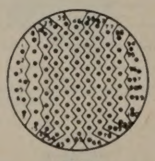
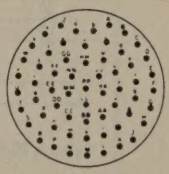
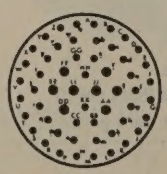
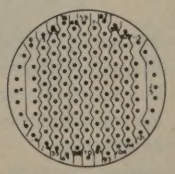
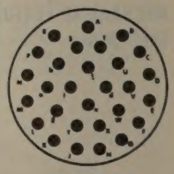
						
Shell Size	23-21	23-53	25-35	25-4	25-29	25-61
No. of Contacts	21 #16	53 #20	128 #22D	48 #20, 8 #16	29 #16	61 #20
Service Rating	II	I	M	I	I	I

CONTACT ARRANGEMENTS
KJ SERIES II
(ENGAGING VIEW PIN INSERT)

								
Shell Size	8-35 * *	8-98 * *	10-5	10-98 • * *	10-35 •	12-8	12-98 •	12-35 •
No. of Contacts	6 #22D	3 #20	5 #20	6 #20	13 #22D	8 #20	10 #20	22 #22D
Service Rating	I	I	I	I	M	I	I	M

									
Shell Size	14-5	14-15	14-18 •	14-35 •	14-97 * *	16-8 •	16-26	16-35 •	18-32
No. of Contacts	5 #16	1 #16, 14 #20	18 #20	37 #22D	8 #20, 4 #16	8 #16	26 #20	55 #22D	32 #20
Service Rating	II	I	I	M	I	II	I	M	I

							
Shell Size	18-35 •	20-16	20-35 •	20-39	20-41	22-21	23-53 * *
No. of Contacts	66 #22D	16 #16	79 #22D	37 #20, 2 #16	41 #20	21 #16	53 #20
Service Rating	M	II	M	I	I	II	I

						
Shell Size	22-55	22-35	24-61	24-4 * *	24-35	24-29 * *
No. of Contacts	55 #20	100 #22D	61 #20	48 #20, 8 #16	128 #22D	29 #16
Service Rating	I	M	I	I	M	I

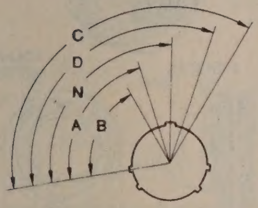
• Layouts are available in all shell sizes including MS27499, MS27508, KJ2E and KJ5E. * Inactive for new design but available for replacement * * Pin insert only

MINIATURE CIRCULAR CONNECTORS KJL/KJ CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ALTERNATE POLARIZING POSITIONS

Front face of receptacle. Insert arrangement does not rotate with main key.



KJL

AB ANGLE OF ROTATION (Degrees)

Shell Size	Normal	A	B	C	D
9	95°	77°	—	—	113°
11	95°	81°	67°	123°	109°
13	95°	75°	63°	127°	115°
15	95°	74°	61°	129°	116°
17	95°	77°	65°	125°	113°
19	95°	77°	65°	125°	113°
21	95°	77°	65°	125°	113°
23	95°	80°	69°	121°	110°
25	95°	80°	69°	121°	110°

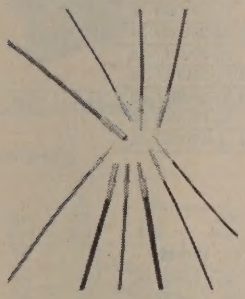
KJ

AB ANGLE OF ROTATION (Degrees)

Shell Size	Normal	A	B	C	D
8	100°	82°	—	—	118°
10	100°	86°	72	128°	114°
12	100°	80°	68°	132°	120°
14	100°	79°	66°	134°	121°
16	100°	82°	70°	130°	118°
18	100°	82°	70°	130°	118°
20	100°	82°	70°	130°	118°
22	100°	85°	74°	126°	115°
24	100°	85°	74°	126°	115°

TOOLING/ACCESSORIES

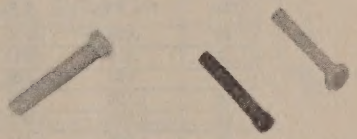
CONTACTS



Series	Cannon Contact	Size	Description	MS Contact*
KJL	021-1251-001	16	Socket	MS27490-16
KJL	031-1250-001	20	Socket	MS27490-20
KJL	031-1147-007	22D	Socket	MS27490-22D
KJ	031-1123-016	16	Socket	MS27491-16
KJ	031-1124-020	20	Socket	MS27491-20
KJ	031-1147-000	22D	Socket	MS27491-22D
KJL/KJ	030-1995-016	16	Pin	MS27493-16
KJL/KJ	030-1997-020	20	Pin	MS27493-20
KJL/KJ	030-2042-000	22D	Pin	MS27493-22D

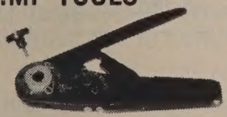
*MIL-C-39029/56/57/58 specification.

WIRE SEALING PLUGS



Size	Part Number ITT Cannon	MS	Color Code
22D	225-1013-000	MS27488-22	Black
20	225-1014-000	MS27488-20	Red
16	225-1015-000	MS27488-16	Blue

CRIMP TOOLS

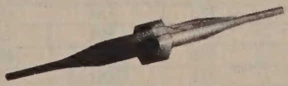


M22520/2-01

M22520/1-01

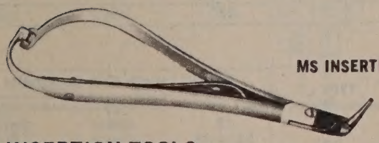
Contact Size	Crimp Tool Part No.	Locator or Turret Part Number
22D	M22520/2-01	Pin: M22520/2-09; Socket: M22520/2-06
20	M22520/1-01	TH187
16	M22520/1-01	TH187

INSERTION AND EXTRACTION TOOLS



INSERTION/EXTRACTION TOOLS

Contact Size	Part Number ITT Cannon	MS Number Insertion	MS Number Extraction
20	CIET-20	MS27534A20	MS27534R20
16	CIET-16	MS27534A16	MS27534R16
22D	CIET-22D	MS27534A22D	MS27534R22D



MS INSERTION TOOL

MS EXTRACTION TOOL

MS INSERTION TOOLS

Contact Size	MS Part Number	ITT Cannon Part Number	Color Band†
16	MS27495A16	CIT16-KJ 070149-0000	Blue
20	MS27495A20	CIT20-KJ 070151-0000	Red
22D	MS27495A22M	CIT22M-KJ 070155-0000	Black

†Color band indicates tool size

MS EXTRACTION TOOLS

Contact Size	MS Part Number	ITT Cannon Part Number	Color Band† No. 1	Color Band† No. 2
16	MS27495R16	CET-16-KJ 070150-0000	Blue	White
20	MS27495R20	CET-20-KJ 070152-0000	Red	White
22D	MS27495R22M	CET-22M-KJ 070156-0000	Black	White

†Band No. 1 indicates tool size; Band No. 2 indicates removal tool.

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS KJL/KJ CONNECTORS

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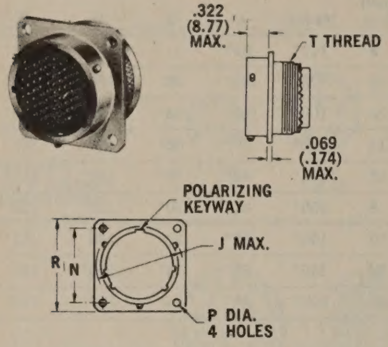
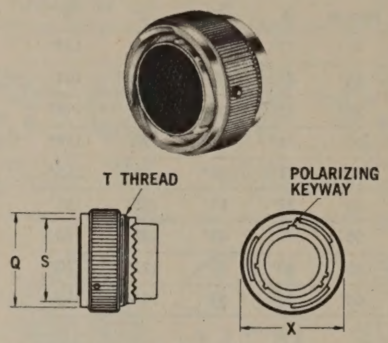
WALL MOUNTING RECEPTACLE

KJL/KJO (ITT Cannon designation)
MS27472 (MS designation—KJ)
MS27466 (MS designation—KJL)



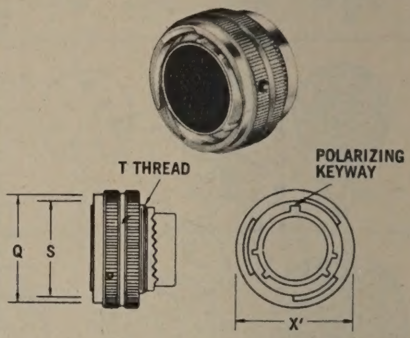
STRAIGHT PLUG

KJL6/KJ6 (ITT Cannon designation)
MS27467 (MS designation—KJL)
MS27473 (MS designation—KJ)



STRAIGHT PLUG GROUNDED

KJG6 (ITT Cannon designation)
MS27484 (MS designation)



SHELL DIMENSIONS WITHOUT BACKSHELLS

NOTE: KJL overall length dimension is longer than KJ to accommodate "scoop-proof" feature. Consult factory or the applicable MIL SPEC at this time for this dimension.

INCHES

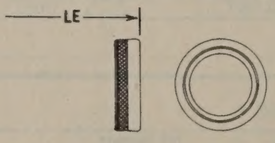
Shell Size	J Dia. Max.	N T.P.	P +.005 −.010	Q Dia. Max.	R Max.	S Dia. Max.	X Dia. Max.	X' Dia. Max.	T Thread
10	.680	.719	.125	.737	.954	.606	.858	.879	9/16-24UNEF-2A
12	.859	.812	.125	.910	1.047	.765	1.030	1.055	11/16-24UNEF-2A
14	.984	.906	.125	1.035	1.141	.890	1.155	1.188	13/16-20UNEF-2A
16	1.108	.969	.125	1.157	1.234	1.014	1.280	1.305	15/16-20UNEF-2A
18	1.233	1.062	.125	1.289	1.328	1.140	1.405	1.438	1 1/16-18UNEF-2A
20	1.358	1.156	.125	1.410	1.453	1.264	1.530	1.555	1 3/16-18UNEF-2A
22	1.483	1.250	.125	1.535	1.578	1.389	1.640	1.672	1 5/16-18UNEF-2A
24	1.610	1.375	.152	1.663	1.703	1.514	1.765	1.805	1 7/16-18UNEF-2A

MILLIMETERS

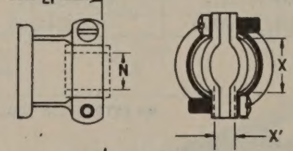
Shell Size	J Dia. Max.	N T.P.	P +0,03 −0,25	Q Dia. Max.	R Max.	S Dia. Max.	X Dia. Max.	X' Dia. Max.	T Thread
10	17,27	18,26	3,17	18,72	24,33	15,4	21,79	22,3	9/16-24UNEF-2A
12	21,82	20,62	3,17	23,11	26,59	19,4	26,16	26,8	11/16-24UNEF-2A
14	25,09	23,01	3,17	26,29	28,98	22,6	29,34	29,2	13/16-20UNEF-2A
16	28,14	24,61	3,17	29,39	31,34	25,8	32,51	33,2	15/16-20UNEF-2A
18	31,32	26,97	3,17	32,74	33,73	29,0	35,69	36,5	1 1/16-18UNEF-2A
20	34,49	27,36	3,17	35,81	36,81	32,1	38,86	39,5	1 3/16-18UNEF-2A
22	37,47	31,76	3,17	38,99	39,08	35,3	40,66	42,5	1 5/16-18UNEF-2A
24	40,89	34,92	3,86	42,24	42,26	38,5	44,83	45,9	1 7/16-18UNEF-2A

SHELL DIMENSIONS WITH BACKSHELLS

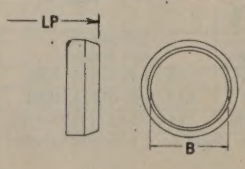
Type LE



Type LF



Type LP



INCHES

Shell Size	TYPE LF N Dia. Max.	X Dia. Min.	X' Dia. Min.	TYPE LP B Dia. Min.	Overall Length With Backshells LE Straight	LF Cable Clamp	LP Potting Max.
10	.198	.297	.187	.548	.850	1.555	1.020
12	.322	.422	.281	.673	.850	1.555	1.020
14	.385	.547	.325	.798	.850	1.790	1.020
16	.510	.609	.356	.899	.850	1.790	1.020
18	.635	.734	.456	1.024	.850	1.790	1.020
20	.635	.734	.519	1.141	.850	1.790	1.020
22	.760	.922	.519	1.274	.850	1.930	1.020
24	.810	.984	.657	1.399	.860	1.900	1.080

MILLIMETERS

Shell Size	TYPE LF N Dia. Max.	X Dia. Min.	X' Dia. Min.	TYPE LP B Dia. Min.	Overall Length With Backshells LE Straight	LF Cable Clamp	LP Potting Max.
10	5,03	7,54	4,75	13,92	21,59	39,50	25,90
12	7,18	10,72	7,14	17,09	21,59	39,50	25,90
14	9,78	12,89	8,26	20,27	21,59	45,47	25,90
16	12,95	15,47	9,04	22,83	21,59	45,47	25,90
18	16,13	18,64	11,58	26,01	21,59	45,47	25,90
20	16,13	18,64	13,18	28,98	21,59	45,47	25,90
22	19,30	23,42	13,18	32,36	21,59	49,02	25,90
24	20,57	24,99	16,69	35,53	21,84	48,26	27,43

(millimeters are in parentheses)

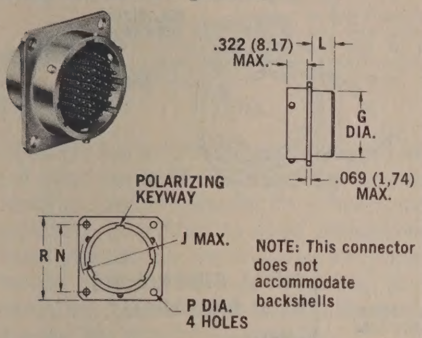
Dimensions subject to change.

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS
KJL/KJ CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

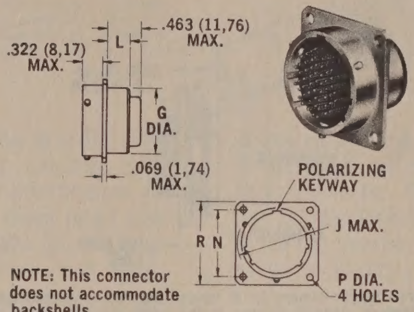
BOX MOUNTING RECEPTACLE
KJ2E (ITT Cannon designation)
MS27499 (MS designation)



.322 (8.17) MAX.
L
G DIA.
.069 (1,74) MAX.
POLARIZING KEYWAY
J MAX.
R
N
P DIA. 4 HOLES

NOTE: This connector does not accommodate backshells

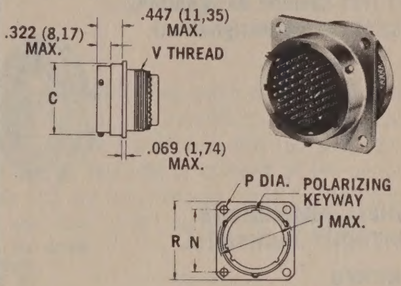
BOX MOUNTING RECEPTACLE
KJ2R (ITT Cannon designation)
MS27513 (MS designation)



.463 (11,76) MAX.
.322 (8,17) MAX.
L
G DIA.
.069 (1,74) MAX.
POLARIZING KEYWAY
J MAX.
R
N
P DIA. 4 HOLES

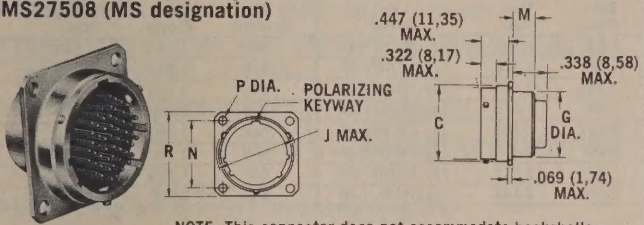
NOTE: This connector does not accommodate backshells

BOX MOUNTING RECEPTACLE (Bank Panel)
KJL3/KJ3 (ITT Cannon designation)
MS27515 (MS designation—KJL)
MS27497 (MS designation—KJ)



.447 (11,35) MAX.
.322 (8,17) MAX.
V THREAD
C
.069 (1,74) MAX.
P DIA.
POLARIZING KEYWAY
J MAX.
R
N

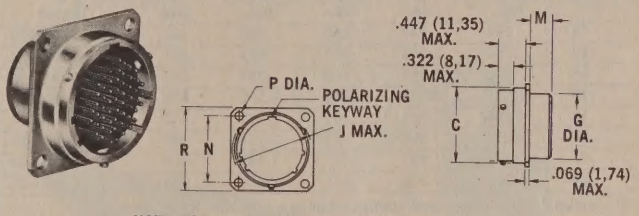
BOX MOUNTING RECEPTACLE (Back Panel)
KJ5E (ITT Cannon designation)
MS27508 (MS designation)



.447 (11,35) MAX.
M
.322 (8,17) MAX.
.338 (8,58) MAX.
P DIA.
POLARIZING KEYWAY
J MAX.
R
N
C
G DIA.
.069 (1,74) MAX.

NOTE: This connector does not accommodate backshells

BOX MOUNTING RECEPTACLE (Back Panel)
KJ5R (ITT Cannon designation)



.447 (11,35) MAX.
M
.322 (8,17) MAX.
P DIA.
POLARIZING KEYWAY
J MAX.
R
N
C
G DIA.
.069 (1,74) MAX.

NOTE: This connector does not accommodate backshells

SHELL DIMENSIONS WITHOUT BACKSHELLS

NOTE: KJL overall length dimension is longer than KJ to accommodate "scoop-proof" feature. Consult factory or the applicable MIL SPEC at this time for this dimension.

INCHES

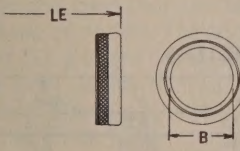
Shell Size	C Dia. Max.	G Dia. Max.	J Dia. Max.	L Max.	M Max.	N T.P.	P Dia. +.005 —.010	R Max.	V Thread
10	.638	.542	.680	.312	.187	.719	.125	.954	9/16-24UNEF-2A
12	.807	.667	.859	.312	.187	.812	.125	1.047	11/16-24UNEF-2A
14	.934	.791	.984	.312	.187	.906	.125	1.141	13/16-20UNEF-2A
16	1.057	.916	1.108	.312	.187	.969	.125	1.234	15/16-20UNEF-2A
18	1.182	1.034	1.233	.312	.187	1.062	.125	1.328	1 1/16-18UNEF-2A
20	1.307	1.158	1.358	.312	.187	1.156	.125	1.453	1 3/16-18UNEF-2A
22	1.432	1.283	1.483	.312	.187	1.250	.125	1.578	1 5/16-18UNEF-2A
24	1.567	1.408	1.610	.312	.187	1.375	.152	1.703	1 7/16-18UNEF-2A

MILLIMETERS

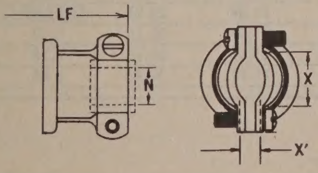
Shell Size	C Dia. Max.	G Dia. Max.	J Dia. Max.	L Max.	M Max.	N T.P.	P Dia. +0,13 —0,25	R Max.
10	16,21	13,77	17,27	7,92	4,75	18,26	3,17	24,23
12	20,50	16,94	21,82	7,92	4,75	20,62	3,17	26,59
14	23,72	20,09	24,99	7,92	4,75	23,01	3,17	28,98
16	26,85	23,27	28,14	7,92	4,75	24,61	3,17	31,34
18	30,02	26,26	31,32	7,92	4,75	26,97	3,17	33,73
20	33,20	29,41	34,49	7,92	4,75	27,36	3,17	36,81
22	36,37	32,59	37,67	7,92	4,75	31,76	3,17	39,08
24	40,80	35,76	40,89	7,92	4,75	34,92	3,86	43,26

SHELL DIMENSIONS WITH BACKSHELL FOR KJ3 ONLY

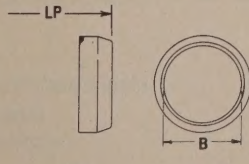
Type LE



Type LF



Type LP



INCHES

Size Shell	TYPE LF N Dia. Max.	TYPE LF Y Max.	TYPE LF X Dia. Min.	TYPE LF X' Dia. Min.	TYPE LP B Dia. Min.	Overall Length With Backshells LE Straight	Overall Length With Backshells LF Cable Clamp	Overall Length With Backshells LP Potting Max.
10	.198	.891	.297	.187	.548	.855	1.570	1.020
12	.322	1.016	.422	.281	.673	.855	1.570	1.020
14	.385	1.141	.547	.325	.798	.855	1.780	1.020
16	.510	1.203	.609	.356	.899	.855	1.780	1.020
18	.635	1.469	.734	.456	1.024	.855	1.780	1.020
20	.635	1.469	.734	.519	1.141	.855	1.780	1.020
22	.760	1.656	.922	.519	1.274	.855	1.960	1.020
24	.810	1.750	.984	.657	1.399	.855	1.960	1.080

MILLIMETERS

Shell Size	TYPE LF N Dia. Max.	TYPE LF Y Max.	TYPE LF X Dia. Min.	TYPE LF X' Dia. Min.	TYPE LP B Dia. Min.	Overall Length With Backshells E Straight	Overall Length With Backshells F Cable Clamp	Overall Length With Backshells Potting Max.
10	5,03	22,63	7,54	4,75	13,92	21.80	39,88	25,90
12	7,18	25,81	10,72	7,14	17,09	21.80	39,88	25,90
14	9,78	28,98	12,89	8,26	20,27	21,80	45,21	25,90
16	12,95	30,56	15,47	9,04	22,83	21,80	45,21	25,90
18	16,13	37,31	18,64	11,58	26,01	21,80	45,21	25,90
20	16,13	37,31	18,64	13,18	28,98	21,80	45,21	25,90
22	19,30	42,06	23,42	13,18	32,36	21,80	49,78	25,90
24	20,57	44,45	24,99	16,69	35,53	21,80	49,78	27,43

Dimensions subject to change.

(millimeters are in parentheses)

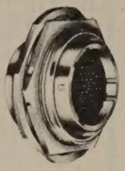
ITT CANNON ELECTRIC

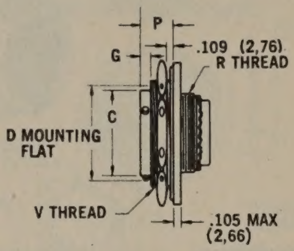
MINIATURE CIRCULAR CONNECTORS KJL/KJ CONNECTORS

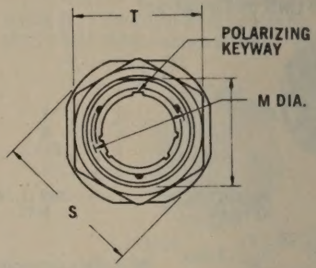
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

JAM NUT RECEPTACLE

KJ7 (ITT Cannon designation)
MS27474 (MS designation)







SHELL DIMENSIONS WITHOUT BACKSHELL / SHELL DIMENSIONS WITH BACKSHELL*

NOTE: KJL overall length dimension is longer than KJ to accommodate "scoop-proof" feature. Consult factory or the applicable MIL SPEC at this time for this dimension.

INCHES

										Overall Length With Backshells		
Size Shell	C Dia. Max.	D Max.	G Max.	M Dia. Max.	P Max.	R Thread	Dia. Max.	T Max. Hex.	V Thread	LE Straight	LF Cable Clamp	LP Potting Max.
10	.591	.942	.145	.680	.443	9/16-24UNEF-2A	1.506	1.205	1-20UNEF-2A	.840	1.555	1.020
12	.751	1.066	.145	.859	.433	11/16-24UNEF-2A	1.631	1.329	1⅛-18UNEF-2A	.840	1.555	1.020
14	.876	1.191	.145	.984	.433	13/16-20UNEF-2A	1.756	1.455	1¼-18UNEF-2A	.840	1.790	1.020
16	1.001	1.321	.145	1.108	.433	15/16-20UNEF-2A	1.944	1.579	1⅜-18UNEF-2A	.840	1.790	1.020
18	1.126	1.441	.145	1.233	.443	1 1/16-18UNEF-2A	2.022	1.705	1½-18UNEF-2A	.840	1.790	1.020
20	1.251	1.566	.171	1.358	.469	1 3/16-18UNEF-2A	2.147	1.829	1⅝-18UNEF-2A	.840	1.790	1.020
22	1.376	1.691	.171	1.483	.469	1 5/16-18UNEF-2A	2.271	2.017	1¾-18UNS -2A	.840	1.930	1.020
24	1.501	1.816	.171	1.610	.469	1 7/16-18UNEF-2A	2.396	2.142	1⅞-16UN -2A	.860	1.900	1.080

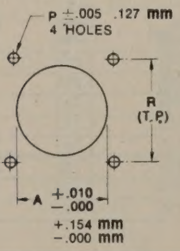
*For backshell dimensions and configuration see KJO, KJ6, KJ6G backshells.

MILLIMETERS

										Overall Length With Backshells		
Shell Size	C Dia. Max.	D Max.	G Max.	M Dia. Max.	P Max.	R Thread	S Dia. Max.	T Max. Hex.	V Thread	LE Straight	LF Cable Clamp	LP Potting Max.
10	15,11	23,93	3,68	17,27	11,00	9/16-24UNEF-2A	38,25	30,61	1-20UNEF-2A	21,34	39,50	25,90
12	19,07	27,08	3,68	21,81	11,00	11/16-24UNEF-2A	41,43	33,76	1⅛-18UNEF-2A	21,34	39,50	25,90
14	22,25	30,25	3,68	24,99	11,00	13/16-20UNEF-2A	44,60	36,96	1¼-18UNEF-2A	21,34	45,47	25,90
16	25,42	33,55	3,68	28,14	11,00	15/16-20UNEF-2A	49,38	40,11	1⅜-18UNEF-2A	21,34	45,47	25,90
18	28,60	36,60	3,68	31,32	11,00	1 1/16-18UNEF-2A	51,36	43,31	1½-18UNEF-2A	21,34	45,47	25,90
20	31,77	39,78	4,34	34,49	11,91	1 3/16-18UNEF-2A	54,63	46,46	1⅝-18UNEF-2A	21,34	45,47	25,90
22	33,95	42,95	4,34	37,67	11,91	1 5/16-18UNEF-2A	57,68	51,23	1¾-18UNS -2A	21,34	49,02	25,90
24	38,12	46,13	4,34	40,89	11,91	1 7/16-18UNEF-2A	59,86	54,41	1⅞-16UN -2A	21,84	48,26	27,43

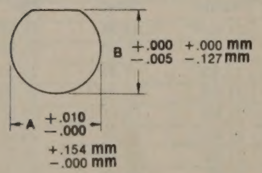
PANEL CUTOUTS

FLANGE MOUNTED RECEPTACLES



INCHES					MILLIMETERS			
Shell Size	A Dia.	R	P Dia.	Mtg. Screw	A Dia.	R	P Dia.	Screw Mtg.
10	.734	.719	.125	#4	18,64	18,26	3,18	#4
12	.860	.812	.125	#4	21,84	20,62	3,18	#4
14	.985	.906	.125	#4	25,02	23,01	3,18	#4
16	1.110	.969	.125	#4	28,19	24,61	3,18	#4
18	1.234	1.062	.125	#4	31,34	26,97	3,18	#4
20	1.360	1.156	.125	#4	34,54	29,36	3,18	#4
22	1.484	1.250	.125	#4	37,69	31,75	3,18	#4
24	1.611	1.375	.152	#6	40,92	34,92	3,86	#6

JAM NUT RECEPTACLES

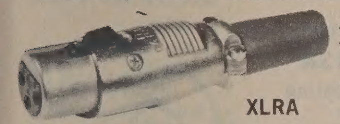


INCHES			MILLIMETERS	
Shell Size	A Dia.	B Dia.	A Dia.	B Dia.
10	1.010	.952	25,65	24,18
12	1.135	1.076	28,82	27,33
14	1.260	1.201	32.00	30,51
16	1.385	1.331	35,18	33,81
18	1.510	1.451	38,35	36.86
20	1.635	1.576	41,53	40,03
22	1.760	1.701	44,70	43,21
24	1.885	1.826	47,88	46,38

(millimeters are in parentheses)

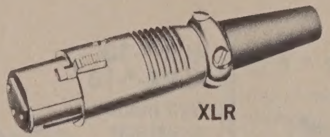
Dimensions subject to change.

XLRA/XLR SERIES



XLRA

Newest Audio connector series, available with dual purpose insertable contacts that can be terminated by crimp or solder. Contacts can be supplied in reel or bulk form.



XLR

Similar to XLRA except for factory installed solder termination contacts only. Socket insulator is resilient.

CANNON® Audio connectors are designed for use in audio/video and other low level circuit applications where reliability, quiet operation, and the elimination of mechanical interference are necessary. In addition to audio applications, these plugs have found wide usage in the industrial/electronic field. Common uses include microphones, tape recorders, amplifiers, test instrumentation, computers, medical instruments, cameras, control devices, and high fidelity systems.

XLRA FEATURES

- **Most economical advanced design audio connector.**
- **Popular high strength glass-filled nylon insulator provides exceptional dielectric properties.**
- **Latch-lock coupler molded of reinforced plastic.**
- **Contact termination by high speed automatic crimp, hand crimp or solder.**
- **High strength drawn shell with grounding tab.**
- **Polarization accomplished through contact arrangement and polarizing boss and groove.**

XLRA/XLR Audio Connectors developed by ITT Cannon Electric feature the most innovative design characteristics: Strong, compact, and streamlined shells with a protective satin finish. Cross ribbing sections increase the inherent shell strength for rugged applications. Glass-filled nylon insulators provide outstanding dielectric properties and improved shock construction. The XLRA is available in a three-contact arrangement, which accommodates three 10-amp contacts, and also features a shell grounding tab housed in any one of five shell styles. Crimp/solder type contacts offer the option of high speed automatic crimp, hand crimp, or standard solder termination. For high speed automatic crimp termination contacts are available in reel form. For small quantity usage the same contacts may be terminated by either solder or a hand crimp tool. The integral cable clamp used for both XLRA and XLR provides two clamping positions for a positive grip on cable sizes ranging from 7/32" to 5/16" diameter. Neoprene bushings provide strong cable relief with an internal design to permit easy cable insertion.

HOW TO ORDER

XLRA - 3 - 11C
XLR - 4 - 12C

Prefix
Contact Arrangement
Shell Style

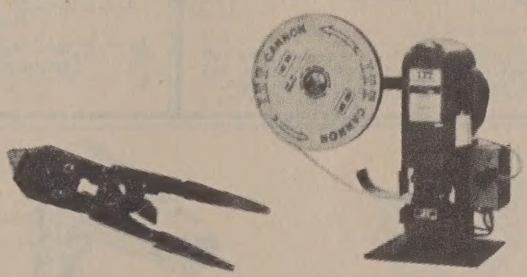
Prefix
XLRA, XLR — ITT Cannon prefix

Contact Arrangement
Number of contacts

Shell Style
See following pages

In this catalog the XLRA and XLR Series connectors are shown. Of these two series, the XLRA is the newest, most economical audio connector. The XLRA is available with dual purpose contact terminations that can be **soldered or crimped** at the option of the user (socket side only for the present), while the XLR connector is available in standard solder contact termination.

ASSEMBLY & TERMINATION TOOLING DATA



The new XLRA crimp contact is available in reel form for high speed, large volume, automatic termination. ITT Cannon's ABT-500 automatic termination tool is factory equipped with the XLRA die set to insure quality contact terminations. XLRA crimp contacts are also available in individual packaging for hand termination with the CCT-XLRA, for smaller quantity contact terminations.

STANDARD DATA

<table>
<tr><th></th><th></th><th>XLRA</th><th>XLR*</th></tr>
<tr><td rowspan="2">SHELL, ENDBELL, ENDBELL CAP, CABLE CLAMP</td><td>Material</td><td colspan="2">Aluminum Alloy</td></tr>
<tr><td>Finish</td><td colspan="2">Satin Nickel</td></tr>
<tr><td rowspan="2">BARREL</td><td>Material</td><td>Nickel Silver Alloy</td><td>Steel</td></tr>
<tr><td>Finish</td><td>—</td><td>Satin Nickel</td></tr>
<tr><td rowspan="2">CONTACTS</td><td>Material</td><td>Nickel Silver Alloy</td><td>Copper Alloy</td></tr>
<tr><td>Finish</td><td>—</td><td>Silver Plate</td></tr>
<tr><td>CONTACT TERMINATION</td><td></td><td>Crimp and Solder</td><td>Solder</td></tr>
<tr><td>CONTACT ARRANGEMENTS</td><td></td><td>3-10 amp contacts
#16 B&S wire</td><td>3-15 amp contacts
#14 B&S wire
4-10 amp contacts
#16 B&S wire
5-7½ amp contacts
#18 B&S wire</td></tr>
<tr><td>PIN INSULATOR</td><td>Material</td><td colspan="2">Reinforced Thermoplastic</td></tr>
<tr><td>SOCKET INSULATOR</td><td>Material</td><td>Reinforced Thermoplastic</td><td>Resilient</td></tr>
<tr><td>CABLE RELIEF</td><td>Material</td><td colspan="2">Resilient</td></tr>
<tr><td rowspan="2">MOUNTING BRACKET</td><td>Material</td><td colspan="2">Steel</td></tr>
<tr><td>Finish</td><td colspan="2">Cadmium Plate</td></tr>
</table>

*Available in steel in 11S and 12S style plugs only.

ITT CANNON ELECTRIC

AUDIO CONNECTORS

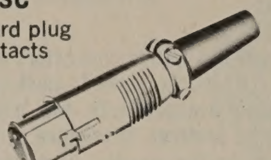
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

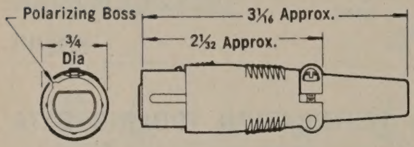
*Add contact arrangement number.

XLRA/XLR SERIES

XLR-*-11C
XLRA-*-11C
XLR-*-11SC

Straight cord plug
Socket contacts

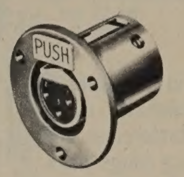


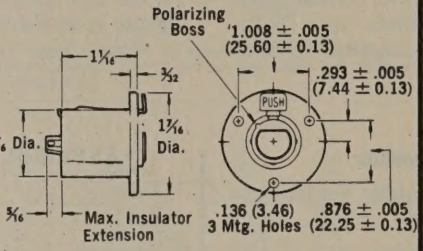

Polarizing Boss
3¹⁄₁₆ Approx.
2¹⁄₃₂ Approx.
¾ Dia

In the XLR series the 11SC is the same as the 11C model except that the shell material is steel, and finger grips extend completely around the shell.

XLR-*-13
XLRA-*-13

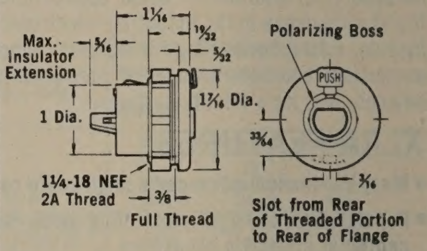
Wall mounting receptacle
Socket contacts




1¹⁄₁₆
³⁄₃₂
1⁷⁄₁₆ Dia.
¹⁵⁄₁₆ Dia.
⁵⁄₁₆
Max. Insulator Extension
Polarizing Boss
1.008 ± .005 (25.60 ± 0.13)
.293 ± .005 (7.44 ± 0.13)
PUSH
.136 (3.46) 3 Mtg. Holes
.876 ± .005 (22.25 ± 0.13)

XLR-*-13N
XLRA-*-13N

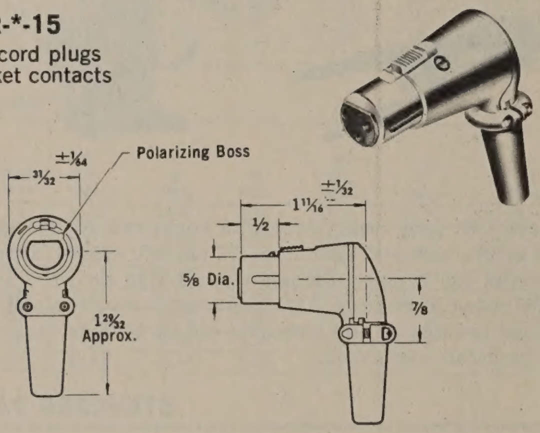
Panel mounting receptacle
Socket contacts


1¹⁄₁₆
¹⁹⁄₃₂
⁵⁄₃₂
Max. Insulator Extension
⁵⁄₁₆
1 Dia.
1⁷⁄₁₆ Dia.
1¼-18 NEF 2A Thread
⅜
Full Thread
Polarizing Boss
PUSH
³³⁄₆₄
³⁄₁₆
Slot from Rear of Threaded Portion to Rear of Flange

The mounting nut can accommodate a ⅓₂" panel. By reversing the nut, panels to ⁵⁄₁₆" can be used.

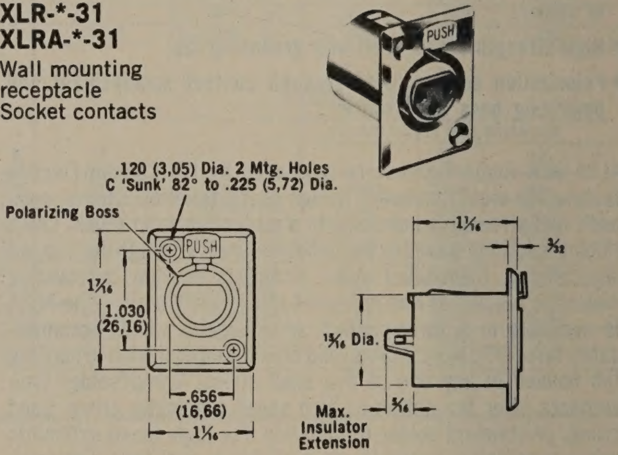
XLR-*-15

90° cord plugs
Socket contacts


±¹⁄₆₄
³¹⁄₃₂
Polarizing Boss
1²⁹⁄₃₂ Approx.
±¹⁄₃₂
1¹¹⁄₁₆
½
⅝ Dia.
⅞

XLR-*-31
XLRA-*-31

Wall mounting receptacle
Socket contacts


.120 (3,05) Dia. 2 Mtg. Holes
C 'Sunk' 82° to .225 (5,72) Dia.
Polarizing Boss
PUSH
1⁷⁄₁₆
1.030 (26,16)
.656 (16,66)
1¹⁄₁₆
1¹⁄₁₆
³⁄₃₂
¹⁵⁄₁₆ Dia.
⁵⁄₁₆
Max. Insulator Extension

AVAILABLE IN XLRA/XLR

CROSS REFERENCE MATING GUIDE

XLRA XLR •	ITT CANNON ELECTRIC									SWITCHCRAFT**							AMPHENOL** 3 contact type			AMPHENOL** 4 contact type		
	XLR(*)-11C	XLR(*)-12C	XLR(*)-13	XLR(*)-13N	XLR(*)-14	XLR(*)-14N	XLR(*)-15	XLR(*)-31	XLR(*)-32	A(*)F (XLR-*-11C)	A(*)M (XLR-*-12C)	B(*)M (XLR-*-14N)	C(*)F (XLR-*-13)	C(*)M (XLR-*-14)	D(*)F (XLR-*-31)	D(*)M (XLR-*-32)	91-853 (XLR-3-12C)	91-855 (XLR-3-14)	91-856 (XLR-3-13)	91-857 (XLR-4-12C)	91-859 (XLR-4-14)	91-860 (XLR-4-13)
XLR(*)-11C		•			•	•			•		•	•		•		•	•	•		•	•	
XLR(*)-12C	•		•	•			•	•		•			•		•				•			
XLR(*)-13		•									•						•			•		
XLR(*)-13N		•									•											
XLR(*)-14	•						•			•												
XLR(*)-14N	•						•			•												
XLR(*)-15		•			•	•			•		•	•		•		•	•	•	•	•	•	•
XLR(*)-31		•									•						•			•		
XLR(*)-32	•						•			•												

*Number of insert contacts or pins must be specified (3, 4 or 5) on ITT Cannon Electric and Switchcraft connectors to complete number and to insure proper selection of mating connectors.

**XLR numbers shown in parentheses are ITT Cannon equivalents to Switchcraft and Amphenol part numbers shown.

(millimeters are in parentheses)

Dimensions subject to change.

AUDIO CONNECTORS

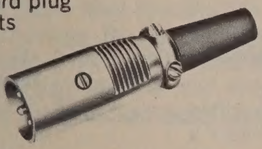
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

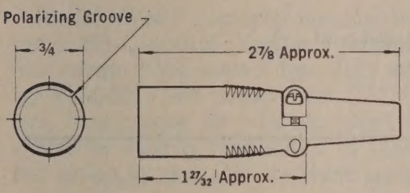
XLR SERIES

*Add contact arrangement number.

XLR-*-12C
XLR-*-12SC

Straight cord plug
Pin contacts

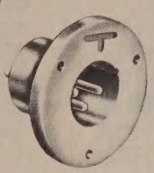


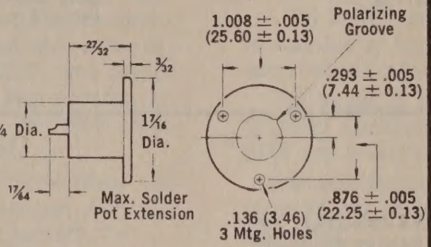

Polarizing Groove
3/4
2 7/8 Approx.
1 27/32 Approx.

In the XLR series the 12SC is the same as the 12C model except that the shell material is steel, and finger grips extend completely around the shell.

XLR-*-14

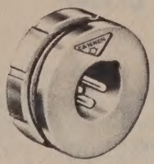
Wall mounting
receptacle
Pin contacts

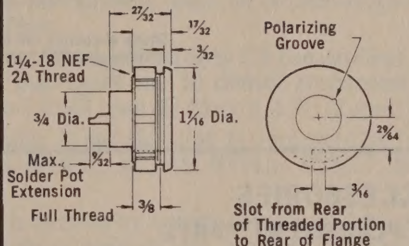



27/32
3/32
3/4 Dia.
1 7/16 Dia.
17/64
Max. Solder Pot Extension
1.008 ± .005 (25.60 ± 0.13)
Polarizing Groove
.293 ± .005 (7.44 ± 0.13)
.876 ± .005 (22.25 ± 0.13)
.136 (3.46) 3 Mtg. Holes

XLR-*-14N

Panel mounting
receptacle
Pin contacts

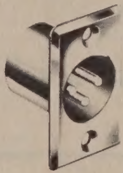


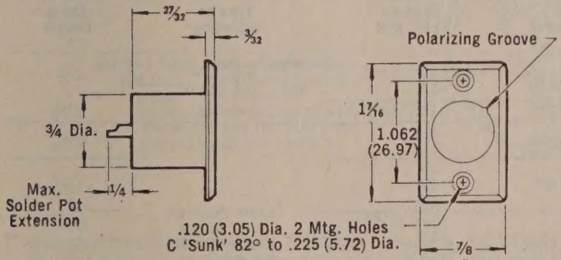

27/32
17/32
3/32
1 1/4-18 NEF-2A Thread
3/4 Dia.
1 7/16 Dia.
Max. Solder Pot Extension
9/32
Full Thread
3/8
Polarizing Groove
29/64
3/16
Slot from Rear of Threaded Portion to Rear of Flange

The mounting nut can accommodate a 1/32" panel. By reversing the nut, panels to 3/16" can be used.

XLR-*-32

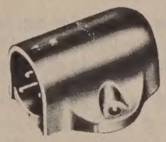
Wall mounting
receptacle
Pin contacts

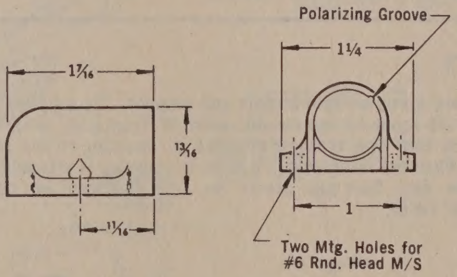



27/32
3/32
3/4 Dia.
Max. Solder Pot Extension
1/4
Polarizing Groove
1 7/16
1.062 (26.97)
.120 (3.05) Dia. 2 Mtg. Holes C 'Sunk' 82° to .225 (5.72) Dia.
7/8

XLR-(*)-42

90° wall or microphone
mounting receptacle
Pin contacts




Polarizing Groove
1 1/4
1 7/16
13/16
11/16
1
Two Mtg. Holes for #6 Rnd. Head M/S

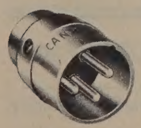
Not available with contact arrangement having 5 contacts.

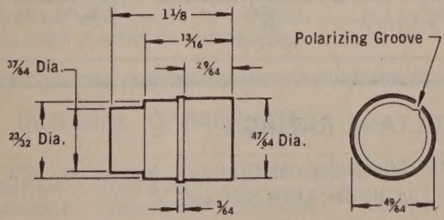
AVAILABLE IN XLR ONLY

ADAPTER RECEPTACLES

XLR-*-50

Plain shell

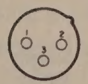



1 1/8
13/16
37/64 Dia.
29/64
23/32 Dia.
47/64 Dia.
3/64
Polarizing Groove
49/64

Adapter receptacles are for mounting in or onto microphones or other units where they can be adequately supported. They are brass with satin nickel finish. Type 50 is a plain shell; type 50N includes a coupling nut to mate with the threaded portion of a microphone unit; and type 50T has a threaded barrel to mate into the equipment. All socket plugs (type 11C, 11SC, and 15) mate with these adapter receptacles.

CONTACT ARRANGEMENTS

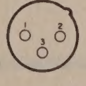
XLRA



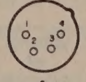
3
3-10 amp contacts
#16 B&S wire

Face view of pin insert
not to full scale

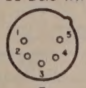
XLR



3
3-15 amp contacts
#14 B&S wire



4
4-10 amp contacts
#16 B&S wire



5
5-7 1/2 amp contacts
#18 B&S wire

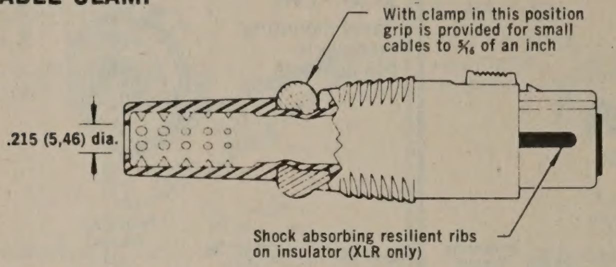
Dimensions subject to change.

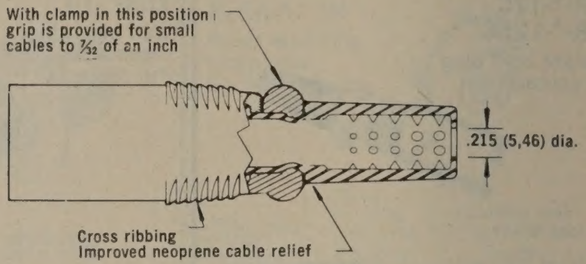
(millimeters are in parentheses)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

XLRA/XLR SERIES AUDIO CONNECTORS

CABLE CLAMP


With clamp in this position grip is provided for small cables to 5/16 of an inch
.215 (5,46) dia.
Shock absorbing resilient ribs on insulator (XLR only)


With clamp in this position grip is provided for small cables to 7/32 of an inch
.215 (5,46) dia.
Cross ribbing
Improved neoprene cable relief

ACCESSORIES

REPLACEMENT PARTS

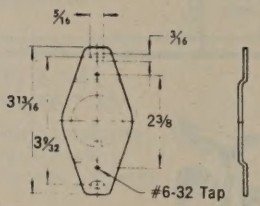
Replacement parts are available for the XLR and XLRA connectors. Contact your local ITT Cannon sales office or distributor for price availability.

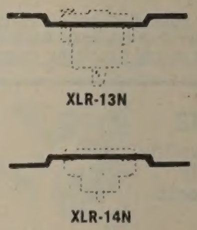
FLOOR MOUNTING BRACKETS

XLR series receptacles can be installed in the floor by using a bracket for mounting in a Russell and Stoll floor box number 2503.
The bracket permits the floor mounting of the following receptacles:

XLR-13N and XLR-14N. (These receptacles are mounted by using different sides of the same bracket. See illustration.)

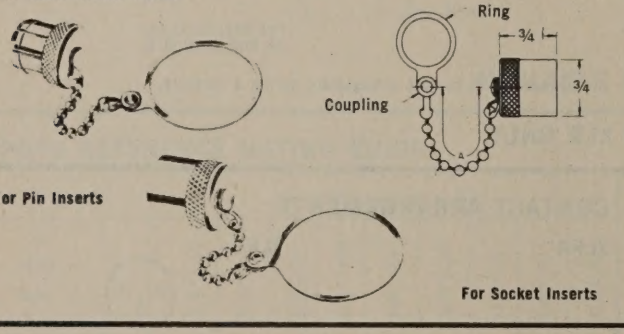
Part number for this bracket is 015-0094-000.


5/16
3/16
3 13/16
2 3/8
3 9/32
#6-32 Tap


XLR-13N
XLR-14N

DUST CAPS

XLR dust caps are furnished with a chain and coupling. The coupling has clearance for a #6 screw for use on wall mounted receptacles. When the plug is a straight cord type, a ring is attached for mounting on the cable relief bushing. When the receptacle is a panel type, a ring is attached for mounting on the shell. Dust caps are on the shell. Dust caps are brass with satin nickel finish.


Ring
3/4
3/4
Coupling
For Pin Inserts
For Socket Inserts

Part Number	Used on XLRA/XLR	Type of Mounting	Chain Length A
XLR-11RC	XLR-11C (11SC) -15	Mounted to cable relief bushing .630 $^{+.010}_{-.002}$ (16.00 $^{+0.25}_{-0.05}$) dia. ring	3¼
XLR-12PC	-12C (12SC)		2 15/16
XLR-13RC	-13 -31	Screw mounted coupling has clearance hole for #6 screw	1 13/16
XLR-14PC	-14 -32 -42		1 13/16
XLR-11SRC	-11C (11SC) -13 -15 -31		3¼
XLR-12SPC	-12C (12SC) -14 -32 -42		2 15/16
XLR-13N-RC	-13N -35 -35-2G	Shell mounted 1 17/64 dia. ring	2⅛
XLR-14N-PC	-14N -36 XLR-36-2G		2⅛ ±3/32

CONTACT DATA

Series	Number of Contacts	Voltages Test	Voltages Service	Current Rating (amps)	Wire Size B & S
XLRA	3	1400	133	10	16
XLR	3	1400	133	15	14
	4	1400	133	10	16
	5	1400	133	7.5	18

VOLTAGE RATINGS

TEST CONDITIONS: 25°C ambient temperature, 40% relative humidity, 29.7 in. Hg barometric pressure.

METHOD: Sixty-cycle AC sine-wave potential was applied between adjacent contacts and shell in steps of 100 volts, maintaining each step at approximately 80% of the initial flashover value. All values are rms meter readings.

SELECTED VALUES: The safe test potential sustained for one minute on the lowest capacity circuit encountered was selected as the governing value of all circuits in all connectors of similar construction and spacing.

STANDARD CIRCULAR HIGH ENVIRONMENTAL CONNECTORS designed to MIL-C-005015F

The United States Navy Specification MIL-C-005015F (Navy) provides specifications for the connector series covered by this catalog. These connectors are available for many applications, from commercial/industrial and mass transportation systems to the most stringent high reliability military and space requirements.

The MS/CV345* connector manufactured by ITT Cannon Electric to MIL-C-005015F (Navy) is a threaded coupling, removable rear release crimp contact type. Fully intermateable with existing MIL-C-5015 and threaded MIL-C-83723 (USAF) type connectors, they provide for minimum effort and high economy upgrades for existing applications. In addition, they offer simplified design for new and interphase equipment.

MS/CV connectors covered under MIL-C-005015F (Navy) utilize fluid resistant elastomers to provide maximum protection against degrading fuels, oils, coolants and cleansers.

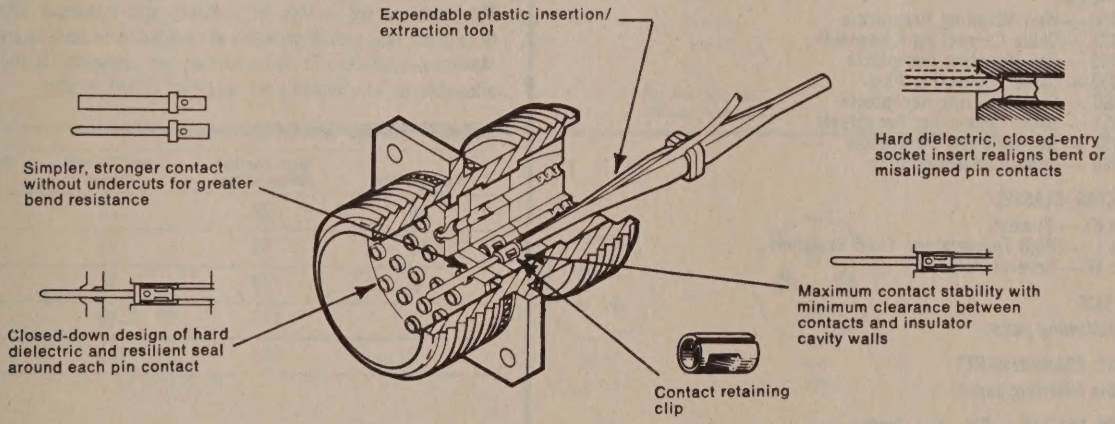
Temperature withstanding capabilities range from −55°C to +200°C depending upon the class. The use of electroless nickel and cadmium plating for hardware finishes gives the connectors maximum protection from the above factors. High quality manufacturing processes and materials combine to insure the optimum in performance and reliability under an extreme range of environmental conditions.

The MS/CV connector manufactured by ITT Cannon Electric is available in four shell styles and 58 contact arrangements accommodating from 1 to 48 contacts (sizes 0, 4, 8, 12 and 16).

This connector series is manufactured to accommodate the following backshells: MS3414, MS3415, MS3416, MS3417, MS-3418 and MS3419.

Shell polarization is effected by a single keyway and key, and standard MS polarization positions are available to prevent mismating.

FEATURES


Expendable plastic insertion/ extraction tool
Simpler, stronger contact without undercuts for greater bend resistance
Hard dielectric, closed-entry socket insert realigns bent or misaligned pin contacts
Closed-down design of hard dielectric and resilient seal around each pin contact
Maximum contact stability with minimum clearance between contacts and insulator cavity walls
Contact retaining clip

1. **Universal Insertion/Extraction Tool Style**—A single, expendable plastic tool is used for insertion and extraction of both pins and sockets. Tool never touches engaging ends of contacts, cannot damage insert.
2. **Simple, Strong Contact Design** — One basic configuration eliminates undercuts, maximizes bend resistance for positive contact mating.
3. **Interfacial Pin Insert Seal** — Universal Interconnect permits design of raised moisture barriers around each pin which mate into lead-in chamfers of hard face socket insert for individual contact sealing. Interfacial seal is never touched by service tools.
4. **Superior Contact Stability**—"Closed-down" design of each contact cavity in the insulator supports each contact, minimizes contact splaying.
5. **Closed Entry Socket Insert**—Hard dielectric socket face of mating connector has lead-in chamfers for positive alignment of pins and sockets.
6. **Simplified Assembly Operations** — One standard procedure for assembling connectors and contacts . . . standard MS crimp tools . . . all servicing of contacts accomplished from the rear of the connector.

CONNECTOR GENERAL CAPABILITIES

Class	Moisture Resistance	Fluid & Fuel Resistance	Operating Temperature	
			Maximum	Minimum
MS345*KT	Yes	Complete	+175°C	−55°C
MS345*L	Yes	Complete	+200°C	−55°C
MS345*W	Yes	Partial	+125°C	−55°C

NOTES: Fluid and fuel resistance definitions are as follows:

Limited: Resistant to hydraulic fluid per MIL-H-5606 and lubricating oil per MIL-L-7808.

Partial: Resistant to hydraulic fluid per MIL-H-5606, lubricating oil per MIL-L-7808, Aerosafe 2300, and Skydrol (LD).

Complete: Resistant to hydraulic fluid per MIL-H-5606 or Skydrol (LD), lubricating oils per MIL-L-7808 and MIL-L-23699, cleaners CeeBee A694 or Aerosafe 2300, jet engine fuel per MIL-J-5624 Grade JP-5, Ethylene Glycol, and Coolanol 25.

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL INFORMATION

HOW TO ORDER

CV 345 6 L 18 — 9 P W
MS 345 6 L 18 — 9 P W

Prefix
Series
Shell Style
Connector Class
Shell Size
Contact Arrangement
Contact Sex
Polarization

PREFIX

MS — Complies with MIL-C-005015F
CV — ITT Cannon Prefix

SHELL STYLES

MS3450 — Wall Mounting Receptacle
MS3451 — Cable Connecting Receptacle
MS3452 — Box Mounting Receptacle
MS3456 — Cable Connecting Plug
CV3450 — Wall Mounting Receptacle
CV3451 — Cable Connecting Receptacle
CV3452 — Box Mounting Receptacle
CV3456 — Cable Connecting Plug

CONNECTOR CLASSES

Class KT — Firewall
Class L — High Temperature, Fluid Resistant
Class W — General Purpose

SHELL SIZE

See following pages

CONTACT ARRANGEMENTS

See the following pages.

CONTACT SEX: P — Pin S — Socket

A — Less Pin Contact
B — Less Socket Contact
*D — #1622 for #1616 Pin
#1216 for #1212 Pin
*E — #1622 for #1616 Socket
#1216 for #1212 Socket

*Used on Class "L" only

TEST DATA

HIGH POTENTIAL TEST VOLTAGE

MS/CV connectors show no evidence of breakdown when the test voltage given below is applied between the two closest contacts and between the shell and the contacts closest to the shell for a period of one minute.

TEST VOLTAGE

Service Rating	Test Voltage (rms) 60 cps	Suggested Operating Voltages* DC	AC (rms)
Inst.	1000	250	200
A	2000	700	500
D	2800	1250	900
E	3500	1750	1250
B	4500	2450	1750
C	7000	4200	3000

*As indicated in previous MS Specification and to be used by the designer only as a guide.

TEST CURRENT

Maximum current ratings of contacts and maximum allowable voltage drop under test conditions when assembled as in service are shown below. Maximum total current to be carried per connector is the same as that allowable in wire bundles as specified in MIL-W-5088.

CURRENT RATING (MIL-C-005015 test method)

Contact Size	Max. Current Rating (amps)	Test Current (amps)	Potential Drop (millivolts)
16	22	13	50
12	41	23	50
8	73	46	25
4	135	80	14
0	245	150	12

WIRE RANGE ACCOMMODATIONS

Contact Size	Wire Size	OD of Finished Wire (inch)[1] Minimum	Maximum
16-16	20	.053 (1,35)	.103 (2,62)
	18		
	16		
12-12	14	.085 (2,16)	.158 (4,01)
	12		
8-8	10	.132 (3,35)	.255 (6,48)
	8		
4-4	6	.237 (6,02)	.370 (9,40)
	4		
0-0	2	.360 (9,14)	.550 (13,97)
	0		

[1] Wire Reference — MIL-W-16878, MIL-W-22759, MIL-W-81381, MIL-C-915, MIL-C-24145 and MIL-C-2194.

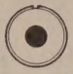
ITT CANNON ELECTRIC

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

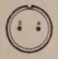
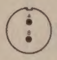
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONTACT ARRANGEMENTS

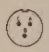
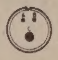
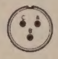
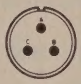
1 CONTACT

				
Shell Size	8S-1	10S-2	12-5	20-2
No. of Contacts	1 #16	1 #16	1 #12	1 #0
Service Rating	A	A	D	D

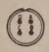
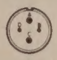
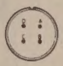
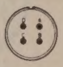
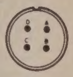
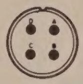
2 CONTACTS

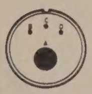
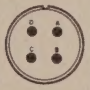
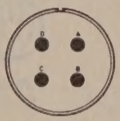
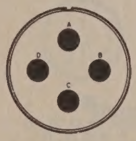
					
Shell Size	10SL-4	12S-3	14S-9	16S-4	16-11
No. of Contacts	2 #16	2 #16	2 #16	2 #16	2 #12
Service Rating	A	A	A	D	A

3 CONTACTS

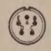
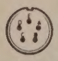
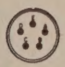
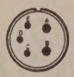
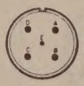
					
Shell Size	10SL-3	14S-7	16-7	16-10	22-2
No. of Contacts	3 #16	3 #16	2 16 (A, B) 1 #8 (C)	3 #12	3 #8
Service Rating	A	A	A	A	D

4 CONTACTS

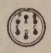
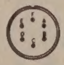
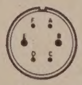
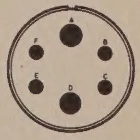
						
Shell Size	14S-2	16-9	18-4	18-10	20-4	22-22
No. of Contacts	4 #16	2 #16 (B, D) 2 #12 (A, C)	4 #16	4 #12	4 #12	4 #8
Service Rating	Inst.	A	D	A For new MIL equip. design, use 18-11	D	A

				
Shell Size	24-4	24-22	32-17	36-5
No. of Contacts	3 #16 (B, C, D) 1 #0 (A)	4 #8	4 #4	4 #0
Service Rating	D	D	D	A

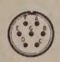
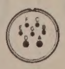
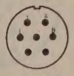
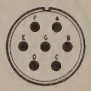
5 CONTACTS

					Socket Only 
Shell Size	14S-5	16S-8	18-11	20-14	22-13
No. of Contacts	5 #16	5 #16	5 #12	3 #12 (C, D, E) 2 #8 (A, B)	1 #16 (E) 4 #12 (A-D)
Service Rating	Inst.	A	A	A	A (A-D), D (E)

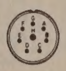
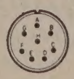
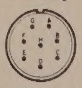
6 CONTACTS

				
Shell Size	14S-6	18-12	22-5	36-6
No. of Contacts	6 #16	6 #16	4 #16 (A, C, D, F) 2 #12 (B, E)	4 #4 (B, C, E, F) 2 #0 (A, D)
Service Rating	Inst.	A For new MIL equip. design, use 16S-1	D	A

7 CONTACTS

				
Shell Size	16S-1	18-9	20-15	24-10
No. of Contacts	7 #16	5 #16 (B, C, E-G) 2 #12 (A, D)	7 #12	7 #8
Service Rating	A	Inst.	A	A

8 CONTACTS

			Pin Only 
Shell Size	18-8	20-7	22-18
No. of Contacts	7 #16 (A-G) 1 #12 (H)	8 #16	8 #16
Service Rating	A	A (C-F) D (A, B, G, H)	A (C-E) D (all others)

ITT CANNON ELECTRIC

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

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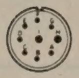
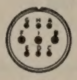
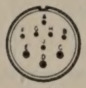
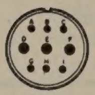
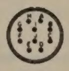
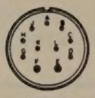
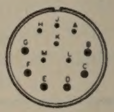
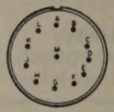
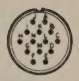
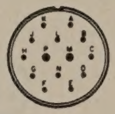
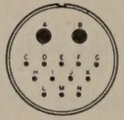
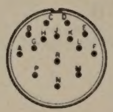
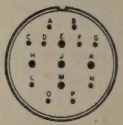
CONTACT ARRANGEMENTS

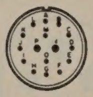
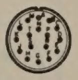
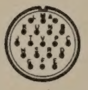
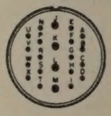
Socket Only



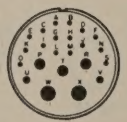
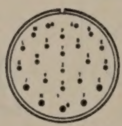
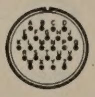
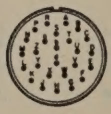
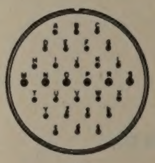
	9 CONTACTS				10 CONTACTS	11 CONTACTS	12 CONTACTS	
Shell Size	20-16	20-18	22-16	24-11	18-1	24-20	28-9	28-18
No. of Contacts	7 #16 (A-G) 2 #12 (H, I)	6 #16 (A, C-E, G, H) 3 #12 (B, F, I)	6 #16 3 #12	6 #12 (A-C, G-I) 3 #8 (D-F)	10 #16	9 #16 (A-D, G-L) 2 #12 (E, F)	6 #16 (A, H-M) 6 #12 (B-G)	12 #16
Service Rating	A	A	A	A	A (B, C, F, G) Inst. (all others)	D	D	A (A, B) C (M) D (G-L) Inst. (C-F)

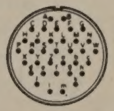
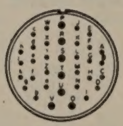
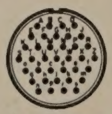
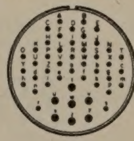
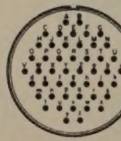
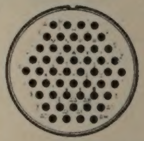
	14 CONTACTS			15 CONTACTS	
Shell Size	20-27	28-2	32-9	28-17	32-12
No. of Contacts	14 #16	12 #16 (A-L, N) 2 #12 (M, P)	12 #16 (C-N) 2 #4 (A, B)	15 #16	10 #16 (A-D, F, G, L, N-P) 5 #12 (E, H, J, K, M)
Service Rating	A	D	D	A (A-L), B (R), D (M-P)	A (C-G,) D (all others)

	16 CONTACTS	17 CONTACTS	19 CONTACTS	22 CONTACTS
Shell Size	24-7	20-29	22-14	28-11
No. of Contacts	14 #16 (A-M, O) 2 #12 (P, N)	17 #16	19 #16	18 #16 (A-I, N-X) 4 #12 (J-M)
Service Rating	A	A	A	A

	23 CONTACTS		24 CONTACTS	26 CONTACTS	30 CONTACTS
Shell Size	32-6	32-13	24-28	28-12	40-1
No. of Contacts	16 #16 (A-O, S) 2 #12 (U, V) 3 #8 (P-T) 2 #4 (W, X)	18 #16 (A-D, K-Z) 5 #12 (E-J)	24 #16	26 #16	24 #16 (A-L, T-e) 6 #12 (M-S)
Service Rating	A	D	Inst.	A	D

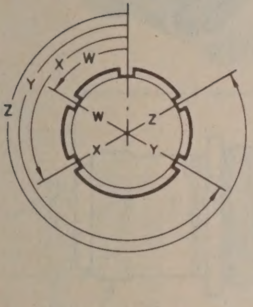







	35 CONTACTS		37 CONTACTS	47 CONTACTS	48 CONTACTS	52 CONTACTS
Shell Size	28-15	32-7	28-21	36-7	36-10	36-52
No. of Contacts	35 #16	28 #16 (A-N, W-Z, a-k) 7 #12 (O-V)	37 #16	40 #16 (A-Z, a-s) 7 #12 (T-Z)	48 #16	52 #16
Service Rating	A For new equip. design, use 28-21	Inst. (A, B, H, J) A (all others)	A	A	A	A

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

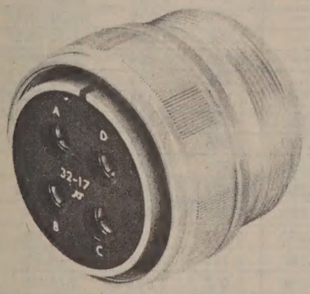
MS DESIGNATED ALTERNATE INSERT POSITIONS

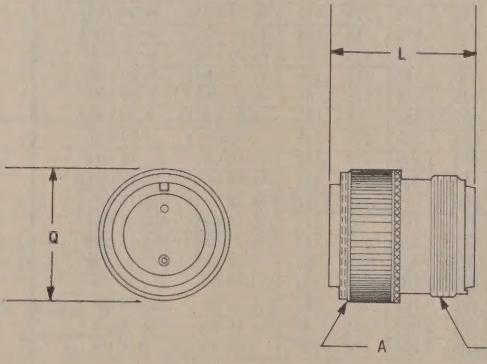


ALTERNATE POSITIONS

No. of Contacts	Contact Arrangement	Degrees W	X	Y	Z
2	12S-3	70	145	215	290
	14.5-9	—	—	—	—
	16S-4	35	110	250	325
	16-11	35	110	250	325
3	14S-7	90	180	270	—
	16-7	80	110	250	280
	16-10	—	—	—	—
	22-2	70	145	215	290
4	14S-2	—	120	240	—
	16-9	35	110	250	325
	18-4	35	110	250	325
	18-10	—	120	240	—
	20-4	45	110	250	—
	22-22	—	110	250	—
	24-4	80	110	250	280
	24-22	45	110	250	—
	32-17	45	110	250	—
	36-5	—	120	240	—
5	14S-5	—	110	—	—
	16S-8	—	170	265	—
	18-11	—	—	—	—
	22-13	35	110	250	325
	20-14	—	—	—	—
6	18-12	80	—	—	280
	22-5	35	110	250	325
	36-6	—	—	—	—
7	16S-1	80	—	—	280
	18-9	80	110	250	280
	20-15	80	—	—	280
	24-10	80	—	—	280
8	18-8	70	—	—	290
	20-7	80	110	250	280
	22-18	80	110	250	280
9	20-16	80	110	250	280
	20-18	—	—	—	—
	22-16	80	110	250	280
	24-11	—	—	—	—
10	18-1	70	145	215	290
11	24-20	—	—	—	—
12	28-9	80	110	250	280
	28-18	70	145	215	290
14	20-27	35	110	250	325
	32-9	—	—	—	—
15	28-17	80	110	250	280
	32-12	80	110	250	280
16	24-7	80	110	250	280
17	20-29	80	—	—	280
19	22-14	80	—	—	280
22	28-11	80	110	250	280
23	32-6	80	110	250	280
	32-12	80	110	250	280
24	24-28	80	110	250	280
26	28-12	90	180	270	—
30	40-1	65	130	235	300
35	28-15	80	110	250	280
	32-7	80	125	235	280
37	28-21	80	110	250	280
47	36-7	80	110	250	280
48	36-10	80	125	235	280
52	36-52	—	—	—	—

MS 3456 / CV3456
CABLE CONNECTING PLUG





	INCHES					MILLIMETERS		
	L Max.					L Max.		
Shell Size	Contact #16-4	Contact #0	Q Dia. Max.	A Thread Class 2B	V Thread Class 2A	Contact #16-4	Contact #0	Q Dia. Max.
8S	1.750	—	.844	½-28 UNEF	½-20 UNEF	44,45	—	21,44
10S	1.750	—	.969	⅝-24 UNEF	⅝-24 UNEF	44,45	—	24,61
10SL	1.750	—	.969	⅝-24 UNEF	⅝-24 UNEF	44,45	—	24,61
12S	1.750	—	1.062	¾-20 UNEF	¾-20 UNEF	44,45	—	26,97
12	2.100	—	1.062	¾-20 UNEF	¾-20 UNEF	44,45	—	26,97
14S	1.750	—	1.156	⅞-20 UNEF	⅞-20 UNEF	53,34	—	29,36
14	2.100	—	1.156	⅞-20 UNEF	⅞-20 UNEF	44,45	—	29,36
16S	1.750	—	1.250	1-20 UNEF	1-20 UNEF	53,34	—	31,75
16	2.100	—	1.250	1-20 UNEF	1-20 UNEF	44,45	—	31,75
18	2.100	—	1.344	1⅛-18 UNEF	1¹⁄₁₆-18 UNEF	53,34	—	34,14
20	2.100	2.250	1.469	1¼-18 UNEF	1³⁄₁₆-18 UNEF	53,34	57,15	37,31
22	2.100	2.250	1.594	1⅜-18 UNEF	1⁵⁄₁₆-18 UNEF	53,34	57,15	40,49
24	2.100	2.250	1.719	1½-18 UNEF	1⁷⁄₁₆-18 UNEF	53,34	57,15	43,66
28	2.100	2.250	1.969	1¾-18 UNS	1¾-18 UNS	53,34	57,15	50,01
32	2.100	2.250	2.219	2-18 UNS	2-18 UNS	53,34	57,15	56,36
36	2.100	2.250	2.469	2¼-16 UN	2¼-16 UN	53,34	57,15	62,71
40	2.100	2.250	2.719	2½-16 UN	2½-16 UN	53,34	57,15	69,06
44	2.100	2.250	2.969	2¾-16 UN	2¾-16 UN	53,34	57,15	75,41
48	2.100	2.250	3.219	3-16 UN	3-16 UN	53,34	57,15	81,76

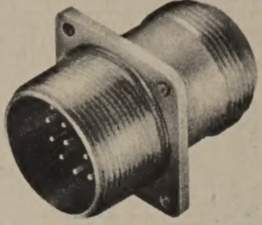
Dimensions subject to change.

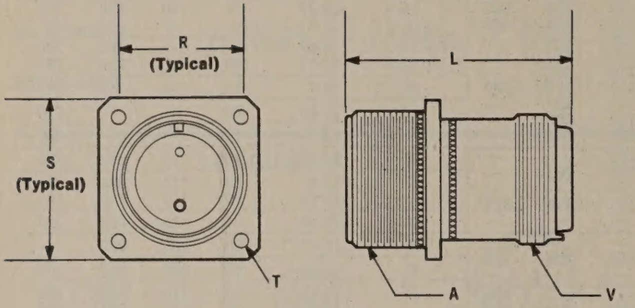
ITT CANNON ELECTRIC

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MS3450 / CV3450
WALL MOUNTING RECEPTACLE





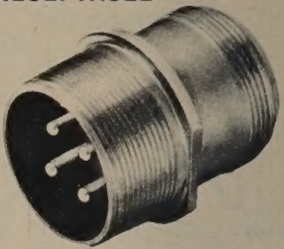
INCHES

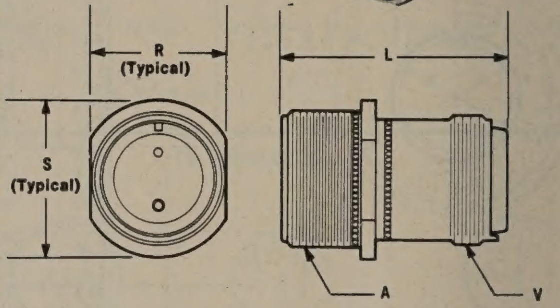
Size Shell	L Max. Contact #16-4	L Max. Contact #0	R ±.005	S ±.031	T Dia. +.015 −.000 Class L,W	T Dia. +.015 −.000 Class K	A Thread Class 2A	V Thread Class 2A
8S	1.750	—	.594	.875	.115	.145	½-28 UNEF	½-20 UNEF
10S	1.750	—	.719	1.000	.115	.145	⅝-24 UNEF	⅝-24 UNEF
10SL	1.750	—	.719	1.000	.115	.145	⅝-24 UNEF	⅝-24 UNEF
12S	1.750	—	.812	1.094	.115	.145	¾-20 UNEF	¾-20 UNEF
12	2.100	—	.812	1.094	.115	.145	¾-20 UNEF	¾-20 UNEF
14S	1.750	—	.906	1.188	.115	.145	⅞-20 UNEF	⅞-20 UNEF
14	2.100	—	.906	1.188	.115	.145	⅞-20 UNEF	⅞-20 UNEF
16S	1.750	—	.969	1.281	.115	.145	1-20 UNEF	1-20 UNEF
16	2.100	—	.969	1.281	.115	.145	1-20 UNEF	1-20 UNEF
18	2.100	—	1.062	1.375	.115	.172	1⅛-18 UNEF	1 1/16-18 UNEF
20	2.100	2.250	1.156	1.500	.115	.172	1¼-18 UNEF	1 3/16-18 UNEF
22	2.100	2.250	1.250	1.625	.115	.172	1⅜-18 UNEF	1 5/16-18 UNEF
24	2.100	2.250	1.375	1.750	.142	.172	1½-18 UNEF	1 7/16-18 UNEF
28	2.100	2.250	1.562	2.000	.142	.172	1¾-18 UNS	1¾-18 UNS
32	2.100	2.250	1.750	2.250	.168	.204	2-18 UNS	2-18 UNS
36	2.100	2.250	1.938	2.500	.168	.204	2¼-16 UN	2¼-16 UN
40	2.100	2.250	2.188	2.750	.168	.204	2½-16 UN	2½-16 UN
44	2.100	2.250	2.375	3.000	.168	.204	2¾-16 UN	2¾-16 UN
48	2.100	2.250	2.625	3.250	.168	.204	3-16 UN	3-16 UN

MILLIMETERS

Shell Size	L Max. Contact #16-4	L Max. Contact #0	R ±.13	S ±7.87	T Dia. +0,38 −0,00 Class L,W	T Dia. +0,38 −0,00 Class K	A Thread Class 2A	V Thread Class 2A
8S	44,45	—	15,09	22,22	2,92	3,68	½-28 UNEF	½-20 UNEF
10S	44,45	—	18,26	25,40	2,92	3,68	⅝-24 UNEF	⅝-24 UNEF
10SL	44,45	—	18,26	25,40	2,92	3,68	⅝-24 UNEF	⅝-24 UNEF
12S	44,45	—	20,62	27,79	2,92	3,68	¾-20 UNEF	¾-20 UNEF
12	53,34	—	20,62	27,79	2,92	3,68	¾-20 UNEF	¾-20 UNEF
14S	44,45	—	23,01	30,18	2,92	3,68	⅞-20 UNEF	⅞-20 UNEF
14	53,34	—	23,01	30,18	2,92	3,68	⅞-20 UNEF	⅞-20 UNEF
16S	44,45	—	24,61	32,54	2,92	3,68	1-20 UNEF	1-20 UNEF
16	53,34	—	24,61	32,54	2,92	3,68	1-20 UNEF	1-20 UNEF
18	53,34	—	26,97	34,92	2,92	4,37	1⅛-18 UNEF	1 1/16-18 UNEF
20	53,34	57,15	29,36	38,10	2,92	4,37	1¼-18 UNEF	1 3/16-18 UNEF
22	53,34	57,15	31,75	41,28	2,92	4,37	1⅜-18 UNEF	1 5/16-18 UNEF
24	53,34	57,15	34,92	44,45	3,61	4,37	1½-18 UNEF	1 7/16-18 UNEF
28	53,34	57,15	39,67	50,80	3,61	4,37	1¾-18 UNS	1¾-18 UNS
32	53,34	57,15	44,45	57,15	4,27	5,18	2-18 UNS	2-18 UNS
36	53,34	57,15	49,23	63,50	4,27	5,18	2¼-16 UN	2¼-16 UN
40	53,34	57,15	55,58	69,85	4,27	5,18	2½-16 UN	2½-16 UN
44	53,34	57,15	60,32	76,20	4,27	5,18	2¾-16 UN	2¾-16 UN
48	53,34	57,15	66,68	82,55	4,27	5,18	3-16 UN	3-16 UN

MS3451 / CV3451
CABLE CONNECTING RECEPTACLE





INCHES

Shell Size	L Max. Contact #18-4	L Max. Contact #0	R Max.	S ±.031	A Thread Class 2A	V Thread Class 2A
8S	1.750	—	.504	.729	½-28 UNEF	½-20 UNEF
10S	1.750	—	.629	.854	⅝-24 UNEF	⅝-24 UNEF
10SL	1.750	—	.629	.854	⅝-24 UNEF	⅝-24 UNEF
12S	1.750	—	.754	.974	¾-20 UNEF	¾-20 UNEF
12	2.100	—	.754	.974	¾-20 UNEF	¾-20 UNEF
14S	1.750	—	.879	1.099	⅞-20 UNEF	⅞-20 UNEF
14	2.100	—	.879	1.099	⅞-20 UNEF	⅞-20 UNEF
16S	1.750	—	1.005	1.224	1-20 UNEF	1-20 UNEF
16	2.100	—	1.005	1.224	1-20 UNEF	1-20 UNEF
18	2.100	—	1.131	1.349	1⅛-18 UNEF	1 1/16-18 UNEF
20	2.100	2.250	1.256	1.474	1¼-18 UNEF	1 3/16-18 UNEF
22	2.100	2.250	1.381	1.599	1⅜-18 UNEF	1 5/16-18 UNEF
24	2.100	2.250	1.506	1.715	1½-18 UNEF	1 7/16-18 UNEF
28	2.100	2.250	1.756	1.974	1¾-18 UNS	1¾-18 UNS
32	2.100	2.250	2.007	2.224	2-18 UNS	2-18 UNS
36	2.100	2.250	2.257	2.474	2¼-16 UN	2¼-16 UN
40	2.100	2.250	2.511	2.724	2½-18 UN	2½-18 UN
44	2.100	2.250	2.761	2.974	2¾-16 UN	2¾-16 UN
48	2.100	2.250	3.011	3.224	3-16 UN	3-16 UN

MILLIMETERS

Shell Size	L Max. Contact #18-4	L Max. Contact #0	R Max.	S ±0,79	A Thread Class 2A	V Thread Class 2A
8S	44,45	—	12,80	18,52	½-28 UNEF	½-20 UNEF
10S	44,45	—	15,98	21,69	⅝-24 UNEF	⅝-24 UNEF
10SL	44,45	—	15,98	21,69	⅝-24 UNEF	⅝-24 UNEF
12S	44,45	—	19,15	24,74	¾-20 UNEF	¾-20 UNEF
12	53,34	—	19,15	24,74	¾-20 UNEF	¾-20 UNEF
14S	44,45	—	22,33	27,91	⅞-20 UNEF	⅞-20 UNEF
14	53,34	—	22,33	27,91	⅞-20 UNEF	⅞-20 UNEF
16S	44,45	—	25,53	31,09	1-20 UNEF	1-20 UNEF
16	53,34	—	25,53	31,09	1-20 UNEF	1-20 UNEF
18	53,34	—	28,73	34,26	1⅛-18 UNEF	1 1/16-18 UNEF
20	53,34	57,15	31,90	37,44	1¼-18 UNEF	1 3/16-18 UNEF
22	53,34	57,15	35,08	40,61	1⅜-18 UNEF	1 5/16-18 UNEF
24	53,34	57,15	38,25	43,56	1½-18 UNEF	1 7/16-18 UNEF
28	53,34	57,15	44,60	50,14	1¾-18 UNS	1¾-18 UNS
32	53,34	57,15	50,98	56,49	2-18 UNS	2-18 UNS
36	53,34	57,15	57,33	62,84	2¼-16 UN	2¼-16 UN
40	53,34	57,15	63,78	69,19	2½-18 UN	2½-18 UN
44	53,34	57,15	70,13	75,54	2¾-16 UN	2¾-16 UN
48	53,34	57,15	76,48	81,89	3-16 UN	3-16 UN

Dimensions subject to change.

HIGH ENVIRONMENTAL CONNECTORS DESIGNED TO MIL-C-005015F

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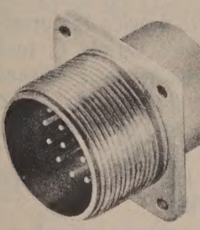
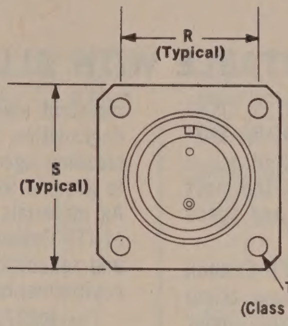
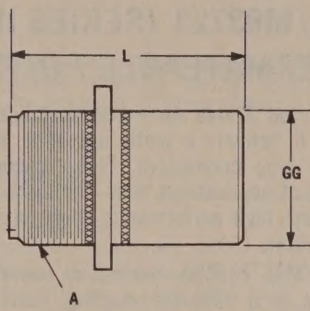
MS3452 / CV3452

BOX MOUNTING RECEPTACLE







INCHES

Shell Size	G Dia. ±.016	L Max. Contact #16 & 12	L Max. Contact #8, 4, & 0	R ±.005	S ±.031	T Dia. +.015 −.000 Class L, W	A Thread Class 2A
8S	.500	1.662	—	.594	.875	.115	½-28-UNEF
10S	.625	1.662	—	.719	1.000	.115	⅝-24 UNEF
10SL	.625	1.662	—	.719	1.000	.115	⅝-24 UNEF
12S	.750	1.662	—	.812	1.094	.115	¾-20 UNEF
12	.750	1.662	—	.812	1.094	.115	¾-20 UNEF
14S	.875	1.662	—	.906	1.188	.115	⅞-20 UNEF
14	.875	1.662	—	.906	1.188	.115	⅞-20 UNEF
16S	1.000	1.662	—	.969	1.281	.115	1-20 UNEF
16	1.000	1.662	1.937	.969	1.281	.115	1-20 UNEF
18	1.062	1.662	1.937	1.062	1.375	.115	1⅛-18 UNEF
20	1.187	1.662	1.937	1.156	1.500	.115	1¼-18 UNEF
22	1.312	1.662	1.937	1.250	1.625	.115	1⅜-18 UNEF
24	1.437	1.662	1.937	1.375	1.750	.142	1½-18 UNEF
28	1.750	1.662	1.937	1.562	2.000	.142	1¾-18 UNS
32	2.000	1.662	1.937	1.750	2.250	.168	2-18 UNS
36	2.250	1.662	1.937	1.938	2.500	.168	2¼-16 UN
40	2.500	1.662	1.937	2.188	2.750	.168	2½-16 UN
44	2.750	1.662	1.937	2.375	3.000	.168	2¾-16 UN
48	3.000	1.662	1.937	2.625	3.250	.168	3-16 UN

MILLIMETERS

G Dia. ±0,41	L Max. Contact #16 & 12	L Max. Contact #8, 4, & 0	R ±0,13	S ±0,79	T Dia. +0,38 −0,00 Class L, W
12,70	42,21	—	15,09	22,22	2,92
15,88	42,21	—	18,26	25,40	2,92
15,88	42,21	—	18,26	25,40	2,92
19,05	42,21	—	20,62	27,79	2,92
19,05	42,21	—	20,62	27,79	2,92
22,22	42,21	—	23,01	30,18	2,92
22,22	42,21	—	23,01	30,18	2,92
25,40	42,21	—	24,61	32,54	2,92
25,40	42,21	49,20	24,61	32,54	2,92
26,97	42,21	49,20	26,97	34,92	2,92
30,15	42,21	49,20	39,36	38,10	2,92
33,32	42,21	49,20	31,75	41,28	2,92
36,50	42,21	49,20	34,92	44,45	3,61
44,45	42,21	49,20	39,67	50,80	3,61
50,80	42,21	49,20	44,45	57,15	4,27
57,15	42,21	49,20	49,23	63,50	4,27
63,50	42,21	49,20	55,58	69,85	4,27
69,85	42,21	49,20	60,32	76,20	4,27
76,20	42,21	49,20	66,68	82,55	4,27

ACCESSORIES

CONTACTS

THERMOCOUPLE

Contact Size	ALUMEL PIN	ALUMEL SOCKET	CHROMEL PIN	CHROMEL SOCKET
16S	—	031-3113-011	—	031-3113-012
16	030-3196-015	031-3114-014	030-3196-016	031-3114-015
12	030-3197-011	031-3115-009	030-3197-012	031-3115-010

PIN, MS3162 (Navy)

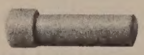
Dash No.	Mating End Size	Mating End Color	Wire Barrel Size	Wire Barrel Color	Part Number
16-16	16	Blue	16	Blue	030-3196-008
12-12	12	Yellow	12	Yellow	030-3197-007
8-8	8	Red	8	Red	030-3198-003
4-4	4	Blue	4	Blue	030-3199-004
0-0	0	Yellow	0	Yellow	030-3200-003

SOCKET, MS3163 (Navy)

Dash No.	Mating End Size	Mating End Color	Wire Barrel Size	Wire Barrel Color	Part Number
*16S-16	16S	Blue	16	Blue	031-3113-005
16-16	16	Blue	16	Blue	031-3114-008
12-12	12	Yellow	12	Yellow	031-3115-006
8-8	8	Red	8	Red	031-3116-003
4-4	4	Blue	4	Blue	031-3117-003
0-0	0	Yellow	0	Yellow	031-3118-003

*16S type socket contacts are for use in 8S, 10S, 10SL, 12S, 14S and 16S Shell Size Connectors.

WIRE HOLE FILLERS

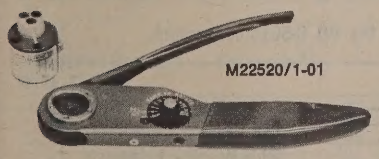


Contact Size	Part Number	Color Code
16	225-0071-000	Blue
12	225-0072-000	Yellow
*8	225-1009-000	Red
*4	225-1008-000	Blue
*0	225-1007-000	Yellow

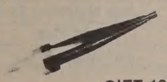
*Consult factory for availability.

TOOLS

A complete line of crimp, insertion and extraction tools is provided for MIL-C-005015 connectors. Crimp tools are made from high quality metal and are designed for long life and trouble-free service. Insertion and extraction tools are made of a durable plastic and are inexpensive and expendable.



M22520/1-01



CIET-16

Contact Size	INSERTION/EXTRACTION TOOLS PLASTIC MS No.	PLASTIC ITT Cannon No.	METAL MS No.	METAL ITT Cannon No.	Crimp Tool	Unwired Contact
16	MS3447-16	CIET-16	—	—	M22520/1-01 with	274-7008-000
12	MS3447-12	CIET-12	—	—	M22520/1-02 Turret	274-7009-000
8	MS3165-8	CET 8-2	MS3483-1	CET-CVR-8	CBT 600B Power Unit CCH-8-1 Crimp Head CCHP-8-6 Locator	— — —
4	MS3165-4	CET 4-8	MS3483-2	CET-CVR-4	CBT 600B Power Unit CCH-4-1 Crimp Head CCHP-4-8 Locator	— — —
0	MS3165-0	CET 0-1	MS3483-3	CET-00-CV	CBT 600B Power Unit CCH-0-1 Crimp Head CCHP-0-8 Locator	— — —

Dimensions subject to change.

CVA/M83723 (SERIES II) INTERMATEABLE / INTERMOUNTABLE WITH ALL MIL-C-5015

The United States Air Force specification, MIL-C-83723, USAF Series II, reflects a vastly upgraded, hi-rel version of the MIL-C-5015 type connectors. These connectors are suited for a variety of applications from commercial/industrial to the most stringent, high performance, high reliability military and space applications.

The M83723/CVA connector, manufactured by ITT Cannon Electric, is a threaded coupling, removable rear release crimp contact type which is fully qualified and QPL approved under MIL-C-83723 (USAF). They are fully intermateable/intermountable with all existing MIL-C-5015 connectors.

The removable rear release crimp contact concept utilized by this connector has become the standard design in the military/aerospace and commercial industries. Features such as faster and easier wire termination, use of common termination tooling and minimizing field repair during maintenance are combined to provide a maximum savings in termination and training time.

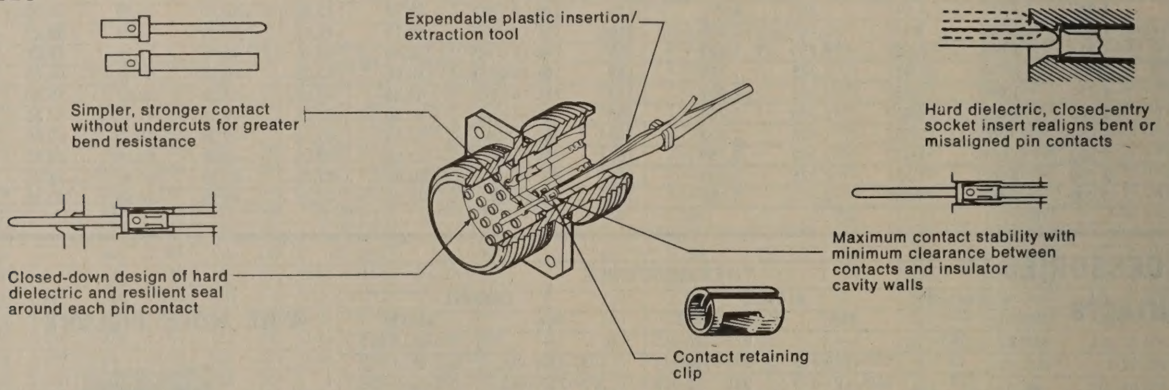
CVA connectors covered under MIL-C-83723 (USAF) utilize fluid resistant elastomers to provide the greatest protection against degradation from a wide variety of fuels, oils, coolants, and cleaning agents. The hardware is finished in electroless nickel to provide for operating temperatures from −55° to +200°C. All materials, finishes and processes used in the manufacture of ITT Cannon's CVA connectors assure the best performance and reliability in the industry for the widest possible range of environmental conditions.

The M83723/CVA connector manufactured by ITT Cannon is available in 4 shell styles and 75 contact arrangements accommodating from 1 to 48 contacts (sizes 0, 4, 8, 12 and 16).

Backshells are available in three configurations for the CVA connector series: straight with strain relief, 90° with strain relief, and straight, short without strain relief. All are fully qualified and QPL-listed under MIL-C-83723 (USAF). **Backshells are not included with the connector and must be ordered separately.**

Shell polarization is effected by a single key and keyway with alternate insert positions available to prevent mismating.

FEATURES


Expendable plastic insertion/extraction tool
Simpler, stronger contact without undercuts for greater bend resistance
Hard dielectric, closed-entry socket insert realigns bent or misaligned pin contacts
Closed-down design of hard dielectric and resilient seal around each pin contact
Maximum contact stability with minimum clearance between contacts and insulator cavity walls
Contact retaining clip

1. **Universal Insertion/Extraction Tool Style** — A single, expendable plastic tool is used for insertion and extraction of both pins and sockets. Tool never touches engaging ends of contacts, cannot damage insert.
2. **Simple, Strong Contact Design** — One basic configuration eliminates undercuts, maximizes bend resistance for positive contact mating.
3. **Interfacial Pin Insert Seal** — Universal Interconnect permits design of raised moisture barriers around each pin which mate into lead-in chamfers of hard face socket insert for individual contact sealing. Interfacial seal is never touched by service tools.
4. **Superior Contact Stability**—"Closed-down" design of each contact cavity in the insulator supports each contact, minimizes contact splaying.
5. **Closed Entry Socket Insert** — Hard dielectric socket face of mating connector has lead-in chamfers for positive alignment of pins and sockets.
6. **Simplified Assembly Operations** — One standard procedure for assembling connectors and contacts . . . standard MS crimp tools . . . all servicing of contacts accomplished from the rear of the connector.

MILITARY SPECIFICATION CROSS REFERENCE CHART

MIL-C-83723/MIL-C-5015

Shown here are the corresponding MIL-C-83723 slash sheet numbers of those connectors that are equivalent to the MIL-C-5015 connectors.

Replacements For MIL-C-5015	MIL-C-83723 "Slash" Sheet Numbers* Sockets	Pin	ITT Cannon Equivalent Prefix Designation for MIL-C-83723	Description
MS3100/3400/3450	-19	-20	CVA0	Wall Mounting Receptacle
MS3101/3401/3451	-17	-18	CVA1	Cable Mounting Receptacle
MS3102/3402/3452	-21	-22	CVA2	Box Mounting Receptacle
MS3106/3406/3456	-23	-24	CVA6	Straight Plug
MS3108/3406/3456	-23**	-24**	CVA6**	90° Angle Plug

* If parts per MIL-C-83723 are desired, order per applicable M83723 number only.
** Requires 90° Backshell (must be purchased separately).

STANDARD CIRCULAR CONNECTORS CVA/M83723 (SERIES II)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL INFORMATION

Use the Military part number (M83723) when ordering connectors for military use. These M part number connectors have the required acceptance testing for each part lot per Mil Spec requirements. If a military type connector is needed but without the added acceptance testing for each part, yet having "in process" checking, specify the ITT Cannon equivalent part number on the drawing or purchase order.

HOW TO ORDER

MS DESIGNATION

M83723 - 19 R 11 04 *

MILITARY DESIGNATION

SHELL STYLE AND CONTACT TYPE
See Shell Style chart at right

CONNECTOR CLASS
R — Conductive Finish:
Operating Temp. −55°C to +200°C; fluid-resistant

SHELL SIZE*
8(8S), 10(10S), 11(10SL), 12, 13(12S), 15(14S), 16, 17(16S), 18, 20, 22, 24, 28, 32, 36, and 40

CONTACT ARRANGEMENTS
1-48 contacts (sizes 16, 12, 8, 4, and 0)

INSULATOR POSITION
N, W, X, Y, and Z

*Shell sizes shown in parentheses—i.e. 8 (8S)—are the MIL-C-5015 quivalent shell sizes.

ITT CANNON EQUIVALENT **CVA 0 R 10SL 4 S ***

ITT CANNON DESIGNATION

SHELL STYLE
See Shell Style chart at right

CONNECTOR CLASS
R — Conductive Finish:
Operating Temp. −55°C to +200°C; fluid-resistant

SHELL SIZE (In 1/16ths inch)
8S, 10S, 10SL, 12S, 14S, 16S, 16, 18, 20, 22, 24, 28, 32, 36, and 40

CONTACT ARRANGEMENTS
1-48 contacts (sizes 16, 12, 8, 4, and 0)

CONTACT TYPE
P for Pin; S for Socket

INSULATOR POSITION
N, W, X, Y, and Z

CONDENSED DATA

STANDARD MATERIALS AND FINISHES

Shell MATERIAL FINISH	 Aluminum alloy Conductive (electroless nickel)
Insulator	Silicone elastomers (−55°C to +200°C) Hard dielectric is glass filled epoxy
Contacts MATERIAL FINISH	 Copper alloy Gold plated

MECHANICAL FEATURES

Shell Size	8S, 10S, 10SL, 12S, 14S, 16S, 16, 18, 20, 22, 24, 28, 32, 36, and 40
Service Classes	R — Conductive finish; operating temp. −55°C to +200°C
Coupling	Threaded
Polarization	1 key and keyway
Shell Styles	Wall mounting receptacle Cable connecting receptacle Box mounting receptacle Straight plug
Number of Contacts	1 to 48 (Sizes 16, 12, 8, 4, 0)
Contact Termination	Crimp removable Rear release

SHELL STYLE AND CONTACT TYPE CHART

Shell Style	Contact Type	MS Designation	ITT Cannon Designation
Cable Connecting Receptacle	Socket	M83723-17	CVA1R
	Pin	M83723-18	
Wall Mounting Receptacle	Socket	M83723-19	CVA0R
	Pin	M83723-20	
Box Mounting Receptacle	Socket	M83723-21	CVA2R
	Pin	M83723-22	
Straight Plug	Socket	M83723-23	CVA6R
	Pin	M83723-24	

ELECTRICAL DATA

TEST CURRENT

Maximum current ratings of contacts and maximum allowable voltage drop under test conditions when assembled as in service are shown below. Maximum total current to be carried per connector is the same as that allowable in wire bundles as specified in MIL-W-5088.

HIGH POTENTIAL TEST VOLTAGE

CV connectors show no evidence of breakdown when the test voltage given below is applied between the two closed conacts and between the shell and the contacts closest to the shell for a period of one minute.

Number of Contacts — 1 through 48
WIRE SIZE

Contact Size	Wire Size (MIL-W-16878)	Insul. O.D. Minimum	Limit (inch.) Maximum
16	16 thru 22	.068 (1,73)	.103 (2,62)
12	12 thru 14	.097 (2,46)	.158 (4,01)
8	8 thru 10	.164 (4,17)	.255 (6,48)
4	4 thru 6	.288 (7,32)	.370 (9,40)
0	0 thru 2	.415 (10,54)	.550 (13,97)

CURRENT RATING (MIL-C-5015 Test Method)

Contact Size	Max. Current Rating (amps)	Test Current (amps)	Potential Drop (millivolts)
16	22	20	21
12	41	35	22
8	73	60	46
4	135	110	38
0	245	200	36

TEST VOLTAGE

Service Rating	Test Voltage (rms) 60 cps	Suggested* Operating Voltages DC	AC (rms)
Inst.	1000	250	200
A	2000	700	500
D	2800	1250	900
E	3500	1750	1250
B	4500	2450	1750
C	7000	4200	3000

*As indicated in previous MS Specification and to be used by the designer only as a guide.

(millimeters are in parentheses)

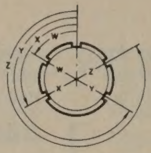
ITT CANNON ELECTRIC

STANDARD CIRCULAR CONNECTORS CVA/M83723 (SERIES II)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONTACT ARRANGEMENTS

ALTERNATE INSERT ARRANGEMENT POSITIONS



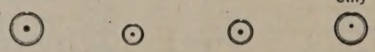
LEGEND:
All arrangements are available in pin and socket side unless otherwise noted:

Shell Size	M83723 Arrangement	MIL-C-5015 Equiv Arrangement	Wire Size	Service Rating	Alternate Positions Degrees W	X	Y	Z
8S	8001	8S-1	1 #16	A	—	—	—	—
10S	1002	10S-2	1 #16	A	—	—	—	—
10SL	1103 1104	10SL-3 10SL-4	3 #16 2 #16	A A	— —	— —	— —	— —
12	1205	12-5	1 #12	D	—	—	—	—
12S	1303	12S-3	2 #16	A	70	145	215	290
	1304	12S-4	1 #16	D	—	—	—	—
14S	1502	14S-2	4 #16	Inst.	—	120	240	—
	1505	14S-5	5 #16	Inst.	—	110	—	—
	1506	14S-6	6 #16	Inst.	—	—	—	—
	1507	14S-7	3 #16	A	90	180	270	—
	1509	14S-9	2 #16	A	70	145	215	290
16	1609	16-9	2 #12 2 #16	A	35	110	250	315
	1610	16-10	3 #12	A	90	180	270	—
	1611	16-11	2 #12	A	25	110	250	325
16S	1701	16S-1	7 #16	A	80	—	—	280
	1708	16S-8	5 #16	A	—	170	265	—
18	1801	18-1	10 #16	A (B, C, F & G) Inst. (others)	70	145	215	290
	1804	18-4	4 #16	A	35	110	250	325
	1805	18-5	2 #12 1 #16	D	80	110	250	280
	1808	18-8	1 #12 7 #16	A	70	—	—	290
	1809	18-9	2 #12 5 #16	Inst.	80	110	250	280
	1810	18-10	4 #12	A	—	120	240	—
	1811	18-11	5 #12	A	—	170	265	—
20	2004	20-4	4 #12	D	45	110	250	—
	2007	20-7	8 #16	A (C, D, E & F) D (A, B, H & G)	80	110	250	280
	2014	20-14	2 #8 3 #12	A	80	110	250	280
	2015	20-15	7 #12	A	80	—	—	280
	2016	20-16	2 #12 7 #16	A	80	110	250	280
	2018	20-18	3 #12 6 #16	A	35	110	250	325
	2021	20-21	1 #12 8 #16	A	35	110	250	325
	2024	20-24	2 #8 2 #16	A	35	110	250	325
	2027	20-27	14 #16	A	35	110	250	325
	2029	20-29	17 #16	A	80	—	—	280
	2033	20-33	11 #16	A	—	—	—	—
22	2202	22-2	3 #8	D	70	145	215	290
	2205	22-5	2 #12 4 #16	D	35	110	250	325
	2206	22-6	2 #8 1 #16	D	80	110	250	280
	2214	22-14	19 #16	A	80	—	—	280
	2219	22-19	14 #16	A	80	110	250	280
	2221	22-21	1 #0 2 #16	A	80	110	250	280
	2222	22-22	4 #8	A	—	110	250	—
	2223	22-23	8 #12	D (A) D (all others)	35	—	250	—
24	2402	24-2	7 #12	D	80	—	—	280
	2405	24-5	16 #16	A	80	110	250	280
	2407	24-7	2 #12 14 #16	A	80	110	250	280
	2409	24-9	2 #4	A	35	110	250	325
	2410	24-10	7 #8	A	80	—	—	280
	2411	24-11	3 #8 6 #12	A	35	110	250	325
	2412	24-12	2 #4 3 #12	A	80	110	250	280
	2420	24-20	2 #12 9 #16	D	80	110	250	280
	2428	24-28	24 #16	Inst.	80	110	250	280
28	2802	28-2	2 #12 12 #16	D	35	110	250	325
	2809	28-9	6 #12 6 #16	D	80	110	250	280
	2811	28-11	4 #12 18 #16	A	80	110	250	280
	2812	28-12	26 #16	A	90	180	270	—
	2815	28-15	35 #16	A	80	110	250	280
	2817	28-17	15 #16	A (A to L) D (M, N, P) B (R)	80	110	250	280
	2820	28-20	4 #16 10 #12	A	80	110	250	280
	2821	28-21	37 #16	A	80	110	250	280
32	3205	32-5	2 #0	D	35	110	250	325
	3207	32-7	7 #12 28 #16	Inst. (A, B, h, j) A (all others)	80	125	235	280
	3209	32-9	2 #4 12 #16	D	80	110	250	280
	3213	32-13	5 #12 18 #16	D	80	110	250	280
	3217	32-17	4 #4	D	45	110	250	—
36	3605	36-5	4 #0	A	—	120	240	—
	3606	36-6	2 #0 4 #4	A	35	110	250	325
	3607	36-7	7 #12 40 #16	A	80	110	250	280
	3608	36-8	1 #12 46 #16	A	80	110	250	280
	3609	36-9	1 #4 2 #8 14 #12 14 #16	A	80	125	235	280
	3610	36-10	48 #16	A	80	125	235	280
	3615	36-15	35 #16	D (m) A (all others)	60	125	245	305
40	4001	40-1	6 #12 24 #16	D	65	130	235	300
	4009	40-9	1 #8 22 #12 24 #16	A	65	125	225	310
	4010	40-10	4 #4 9 #8 16 #16	D	65	125	225	310

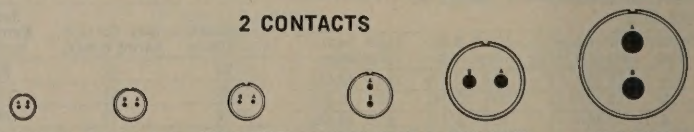
Numbers shown in parentheses are the M83723 shell size/insert arrangement equivalent for the MIL-C-5015 insert arrangement shown in bold type, i.e. 10SL-4. (1104)

1 CONTACT

Available Socket Only



2 CONTACTS



	1 Contact				2 Contacts					
Shell Size	12-5 (1205)	8S-1 (8001)	10S-2 (1002)	12S-4 (1304)	10SL-4 (1104)	12S-3 (1303)	14S-9 (1509)	16-11 (1611)	24-9 (2409)	32-5 (3205)
No. of Contacts	1 #12	1 #16	1 #16	1 #16	2 #16	2 #16	2 #16	2 #12	2 #4	2 #0
Service Rating	D	A	A	D	A	A	A	A	A for new MIL. equip. design use 24-12	D

ITT CANNON ELECTRIC

STANDARD CIRCULAR CONNECTORS
CVA/M83723 (SERIES II)

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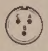
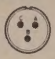
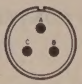
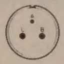
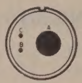
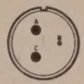
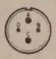
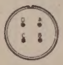
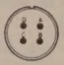
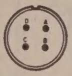
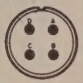
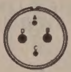
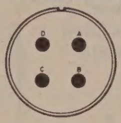
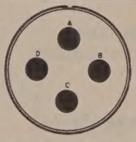
CONTACT ARRANGEMENTS

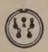
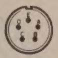
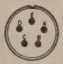
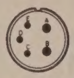
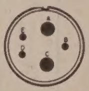
3 CONTACTS

					Available Socket only		Available Socket only
							
Shell Size No. of Contacts	10SL-3 (1103) 3 #16	14S-7 (1507) 3 #16	16-10 (1610) 3 #12	22-2 (2202) 3 #8	18-5 (1805) 2 #12 (B, C) 1 #16 (A)	22-21 (2221) 1 #0 (A) 2 #16 (B, C)	22-6 (2206) 1 #16 (B) 2 #8 (A, C)
Service Rating	A	A	A	D	D	A	D

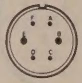
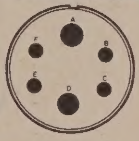
4 CONTACTS

									
Shell Size No. of Contacts	14S-2 (1502) 4 #16	16-9 (1609) 2 #16 (B, D) 2 #12 (A, C)	18-4 (1804) 4 #16	18-10 (1810) 4 #12	20-4 (2004) 4 #12	22-22 (2222) 4 #8	20-24 (2024) 2 #16 (A, C) 2 #8 (B, D)	32-17 (3217) 4 #4	36-5 (3605) 4 #0
Service Rating	Inst.	A	D	A	D	A	A	D4	A

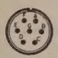
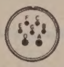
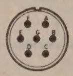
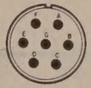
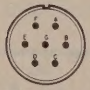
5 CONTACTS

					
Shell Size No. of Contacts	14S-5 (1505) 5 #16	16S-8 (1708) 5 #16	18-11 (1811) 5 #12	20-14 (2014) 3 #12 (C, D, E) 2 #8 (A, B)	24-12 (2412) 3 #12 (B, D, E) 2 #4 (A, C)
Service Rating	Inst.	A	A	A	A

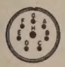
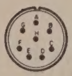
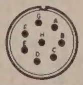
6 CONTACTS

			
Shell Size No. of Contacts	14S-6 (1506) 6 #6	22-5 (2205) 4 #16 (A, C, D, F) 2 #12 (B, E)	36-6 (3606) 4 #4 (B, C, E, F) 2 #0 (A, D)
Service Rating	Inst.	D	A

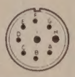
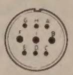
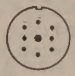
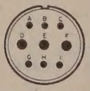
7 CONTACTS

					Available Pin only
					
Shell Size No. of Contacts	16S-1 (1701) 7 #16	18-9 (1809) 5 #16 (B, C, E, F, G) 2 #12 (A, D)	20-15 (2015) 7 #12	24-10 (2410) 7 #8	24-2 (2402) 7 #12
Service Rating	A	Inst.	A	A	D

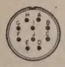
8 CONTACTS

			
Shell Size No. of Contacts	18-8 (1808) 7 #16 (A-G) 1 #12 (H)	20-7 (2007) 8 #16	22-23 (2223) 8 #12
Service Rating	A	A (C-F) D (A, B, G, H)	D (H) A (all others)

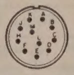
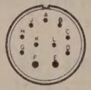
9 CONTACTS

				
Shell Size No. of Contacts	20-16 (2016) 7 #16 (A-G) 2 #12 (H, I)	20-18 (2018) 6 #16 (A, C-E, G, H) 3 #12 (B, F, I)	20-21 (2021) 1 #12 8 #16	24-11 (2411) 6 #12 (A-C, G-I) 3 #8 (D-F)
Service Rating	A	A	A	A

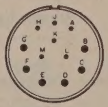
10 CONTACTS

	
Shell Size	18-1 (1801)
No. of Contacts	10 #16
Service Rating	A (B, C, F, G) Inst. (all others)

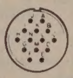
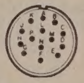
11 CONTACTS

	
20-33 (2033) 11 #16	24-20 (2420) 9 #16 (A-D, G-L) 2 #12 (E, F)
A	D

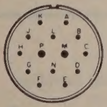
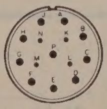
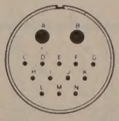
12 CONTACTS


28-9 (2809) 6 #16 (A, H-M) 6 #12 (B-G)
D

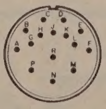
14 CONTACTS

	Available Socket only
	
20-27 (2027) 14 #16	22-19 (2219) 14 #16
A	A

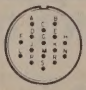
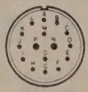
14 CONTACTS

			
Shell Size No. of Contacts	28-2 (2802) 12 #16 (A-L, N) 2 #12 (M, P)	28-20 (2820) 4 #16 (K-N) 10 #12 (A-J, P)	32-9 (3209) 12 #16 (C-N) 2 #4 (A, B)
Service Rating	D	A	D

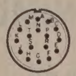
15 CONTACTS


28-17 (2817) 15 #16
A (A-L), B (R) D (M-P)

16 CONTACTS

Available Socket only	
	
24-5 (2405) 16 #16	24-7 (2407) 14 #15 (A-M, O) 2 #12 (P, N)
A	A

17 CONTACTS

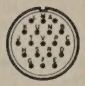
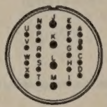
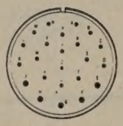
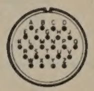
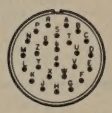
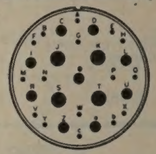

20-29 (2029) 17 #16
A

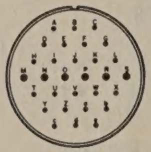
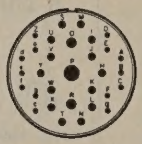
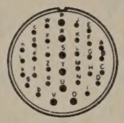
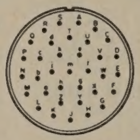
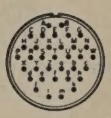
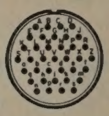
ITT CANNON ELECTRIC

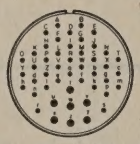
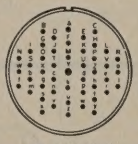
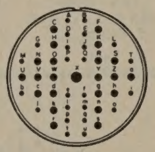
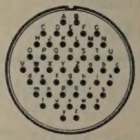
STANDARD CIRCULAR CONNECTORS CVA/M83723 (SERIES II)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

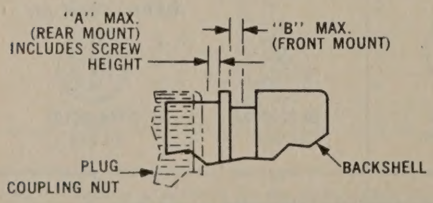
CONTACT ARRANGEMENTS

	19 CONTACTS	22 CONTACTS	23 CONTACTS	24 CONTACTS	26 CONTACTS	29 CONTACTS
						Available Socket only
						
Shell Size	22-14 (2214)	28-11 (2811)	32-13 (3213)	24-28 (2428)	28-12 (2812)	40-10 (4010)
No. of Contacts	19 #16	18 #16 (A-I, N-X) 4 #12 (J-M)	18 #16 (A-D, K-Z) 5 #12 (E-J)	24 #16	26 #16	16 #16 (A, B, E-H, M, N, P, Q, V-Y, b, c) 9 #8 (C, D, I, L, O, R, U, Z, a) 4 #4 (J. K, S, T)
Service Rating	A	A	D	Inst.	A	A

	30 CONTACTS	31 CONTACTS	35 CONTACTS			37 CONTACTS
		Available Pin only	Available Socket only			
						
Shell Size	40-1 (4001)	36-9 (3609)	32-7 (3207)	36-15 (3615)	28-15 (2815)	28-21 (2821)
No. of Contacts	24 #16 (A-L, T-e) 6 #12 (M-S)	14 #16 (A-G, Z-f) 14 #12 (H-N, S-Y) 2 #8 (O, R), 1 #4 (P)	28 #16 (A-N, W-Z, a-k) 7 #12 (O, V)	35 #16	35 #16	37 #16
Service Rating	D	A	Inst. (A, B, h, J) A (all others)	D (m) A (all others)	A For new MIL equip. design, use 28-21	A

	47 CONTACTS			48 CONTACTS
		Available Socket only		
				
Shell Size	36-7 (3607)	36-8 (3608)	40-9 (4009)	36-10 (3610)
No. of Contacts	40 #16 (A-Z, a-s) 7 #12 (t-z)	46 #16 (A-X, Z-z) 1 #12 (Y)	24 #16 (A, B, D, E, G, I, J, L, M, P, Q, T, b, e, f, i, j, l, m, o, p, q, t, u) 22 #12 (C, F, H, K, N, O, R, S, U-W, Y, Z, a, c, d, g, h, k, n, r, s) 1 #8 (X)	48 #16
Service Rating	A	A	A	A

PANEL CLEARANCE



RECEPTACLE

Shown here are the maximum dimensions allowable to ensure complete connector operation.

Panel Thickness	SHELL SIZE																	
	8S	10S	10SL	12S	14S	16S	12	14	16	18	20	22	24	28	32	36	40
A (Max.)	.187 (4,75)						.125 (3,18)						.187 (4,75)		.250 (6,35)		
B (Max.)	.125 (3,18)																

MINIMUM I. D. BUSHING DIMS.

	Single Bushing						Two Bushings			
Shell Size	8S, 10S	10SL, 12S, 12	14S, 14	16S, 16	18	20, 22	24, 28	32	36	40
Bushing I.D. ±.015 (0,38mm)	.130 (3,30)	.220 (5,59)	.312 (7,92)	.437 (11,10)	.562 (14,27)	.625 (15,88)	.625 (15,88)	.750 (19,05)	.937 (23,80)	1.250 (31,75)

(millimeters are in parentheses)

Dimensions subject to change.

STANDARD CIRCULAR CONNECTORS CVA/M83723 (SERIES II)

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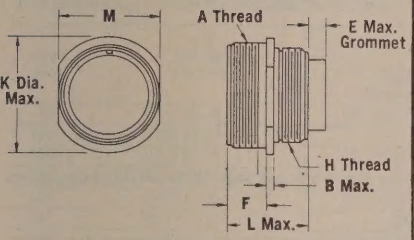
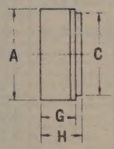
SHELL STYLES

CABLE CONNECTING RECEPTACLE

MIL-C-83723-17 SOCKET
MIL-C-83723-18 PIN

CVA1



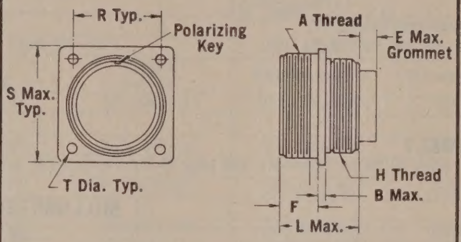


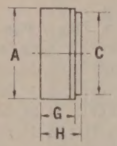
Ferrule

WALL MOUNTING RECEPTACLE

MIL-C-83723-19 SOCKET
MIL-C-83723-20 PIN

CVA0



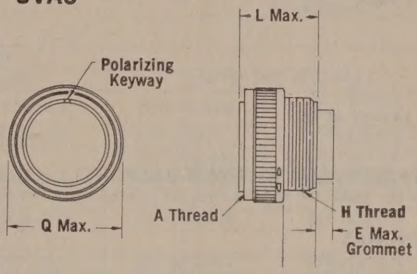


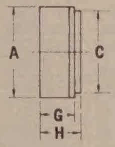
Ferrule

STRAIGHT PLUG

MIL-C-83723-23 SOCKET
MIL-C-83723-24 PIN

CVA6





Ferrule

RECEPTACLE WITHOUT BACKSHELL

NOTE: Backshells and Bushings are crdered separately see page 29 for part numbers. See page 26 for minimum I.D. bushing dimensions and page 28 for backshell dimensions.

INCHES

When contact arr. size 18 thru 40 contain one or more size 0 contacts E dim. will increase .150(3,81mm).

														FERRULE OVERALL DIMENSIONS			
M83723 Shell Size	M5015 Shell Size	B Max.	E Max.	F +.015 −.000	K Max.	L Max.	M ±.004	Q Max.	R ±.005	S Max.	T +.015 −.000	A Thread Class 2A	H Thread Class 2A	A Max.	C Max.	G Max.	H Max.
8	8S	.110	.378	.562	.729	1.135	.500	.760	.594	.906	.115	½-28UNEF	7/16-28UNEF	.280	.245	.342	.427
10	10S	.110	.378	.562	.854	1.135	.625	.880	.719	1.031	.115	⅝-24UNEF	½-28UNEF	.340	.298	.335	.420
11	10SL	.110	.378	.562	.849	1.135	.625	.880	.719	1.031	.115	⅝-24UNEF	9/16-24UNEF	.409	.378	.335	.430
13	12S	.130	.378	.562	.974	1.135	.750	1.010	.812	1.125	.115	¾-20UNEF	⅝-24UNEF	.460	.403	.340	.419
12	12	.130	.317	.750	.974	1.495	.750	1.010	.812	1.125	.115	¾-20UNEF	⅝-24UNEF	.460	.403	.340	.419
15	14S	.130	.378	.562	1.099	1.135	.875	1.130	.906	1.219	.115	⅞-20UNEF	¾-20UNEF	.563	.485	.339	.414
14	14	.130	.317	.750	1.099	1.495	.875	1.130	.906	1.219	.115	⅞-20UNEF	¾-20UNEF	.563	.485	.339	.414
17	16S	.130	.378	.562	1.224	1.135	1.000	1.250	.969	1.312	.115	1-20UNEF	⅞-20UNEF	.689	.605	.339	.424
16	16	.130	.317	.750	1.224	1.495	1.000	1.250	.969	1.312	.115	1-20UNEF	⅞-20UNEF	.689	.605	.339	.424
18	18	.160	.367	.750	1.349	1.495	1.125	1.340	1.062	1.406	.115	1⅛-18UNEF	1-20UNEF	.806	.725	.449	.574
20	20	.160	.367	.750	1.474	1.495	1.250	1.469	1.156	1.531	.115	1¼-18UNEF	1⅛-18UNEF	.941	.863	.458	.573
22	22	.160	.367	.750	1.599	1.495	1.375	1.590	1.250	1.656	.115	1⅜-18UNEF	1¼-18UNEF	1.059	.973	.456	.551
24	24	.160	.305	.812	1.715	1.556	1.500	1.719	1.375	1.781	.142	1½-18UNEF	1⅜-18UNEF	1.170	1.085	.457	.547
28	28	.160	.305	.812	1.974	1.556	1.750	1.969	1.562	2.031	.142	1¾-18UNS	1⅝-18UNEF	1.401	1.245	.458	.573
32	32	.160	.244	.875	2.224	1.620	2.000	2.219	1.750	2.281	.168	2-18UNS	1⅞-16UN	1.652	1.515	.459	.544
36	36	.160	.244	.875	2.474	1.620	2.250	2.469	1.938	2.521	.168	2¼-16UN	2⅛-16UN	1.860	1.751	.463	.573
40	40	.160	.244	.875	2.724	1.620	2.505	2.728	2.188	2.781	.168	2½-16UN	2⅜-16UN	2.105	—	—	.823

MILLIMETERS

M83723 Shell Size	M5015 Shell Size	B Max.	E Max.	F +0,38 −0,00	K Max.	L Max.	M ±0,10	Q Max.	R ±0,13	S Max.	T +0,38 −0,00	A Thread Class 2A	H Thread Class 2A	A Max.	C Max.	G Max.	H Max.
8	8S	2,79	9,60	14,27	18,52	28,83	12,70	19,30	15,09	23,01	2,92	½-28UNEF	7/16-28UNEF	7,11	6,22	8,69	10,85
10	10S	2,79	9,60	14,27	21,69	28,83	15,87	22,35	18,26	26,19	2,92	⅝-24UNEF	½-28UNEF	8,64	7,57	8,51	10,67
11	10SL	2,79	9,60	14,27	21,56	28,83	15,87	22,35	18,26	26,19	2,92	⅝-24UNEF	9/16-24UNEF	10,39	9,60	8,51	10,92
13	12S	3,30	9,60	14,27	24,74	28,83	19,05	25,65	20,62	28,58	2,92	¾-20UNEF	⅝-24UNEF	11,68	10,24	8,64	10,64
12	12	3,30	8,05	19,05	24,74	37,97	19,05	25,65	20,62	28,58	2,92	¾-20UNEF	⅝-24UNEF	11,68	10,24	8,64	10,64
15	14S	3,30	9,60	14,27	27,91	28,83	22,22	28,70	23,01	30,96	2,92	⅞-20UNEF	¾-20UNEF	14,30	12,32	8,61	10,52
14	14	3,30	8,05	19,05	21,91	37,97	22,22	28,70	23,01	30,96	2,92	⅞-20UNEF	¾-20UNEF	14,30	12,32	8,61	10,52
17	16S	3,30	9,60	14,27	31,09	28,83	25,40	31,75	24,61	33,32	2,92	1-20UNEF	⅞-20UNEF	17,50	15,37	8,61	10,77
16	16	3,30	8,05	19,05	31,09	37,97	25,40	31,75	24,61	33,32	2,92	1-20UNEF	⅞-20UNEF	17,50	15,37	8,61	10,77
18	18	4,06	9,32	19,05	34,26	37,97	28,57	34,04	26,97	35,71	2,92	1⅛-18UNEF	1-20UNEF	20,47	18,42	11,41	14,58
20	20	4,06	9,32	19,05	37,44	37,97	31,75	37,31	29,36	38,89	2,92	1¼-18UNEF	1⅛-18UNEF	23,90	21,92	11,63	14,55
22	22	4,06	9,32	19,05	40,61	37,97	34,92	40,39	31,75	42,06	2,92	1⅜-18UNEF	1¼-18UNEF	26,90	24,71	11,58	13,99
24	24	4,06	7,75	20,62	43,56	39,52	38,10	43,54	34,92	45,24	3,61	1½-18UNEF	1⅜-18UNEF	29,72	27,46	11,61	13,89
28	28	4,06	7,75	20,62	50,14	39,52	44,45	49,89	39,67	51,59	3,61	1¾-18UNS	1⅝-18UNEF	35,58	31,62	11,63	14,55
32	32	4,06	6,20	25,22	56,49	41,15	50,80	56,23	44,45	57,94	4,27	2-18UNS	1⅞-16UN	41,96	38,48	11,66	13,84
36	36	4,06	6,20	22,22	62,84	41,15	57,15	62,59	49,22	64,29	4,27	2¼-16UN	2⅛-16UN	47,24	44,48	11,76	14,55
40	40	4,06	6,20	22,22	69,19	41,15	63,62	69,16	55,57	70,64	4,27	2½-16UN	2⅜-16UN	53,47	—	—	20,90

Dimensions subject to change.

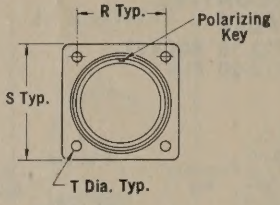
STANDARD CIRCULAR CONNECTORS CVA/M83723 (SERIES II)

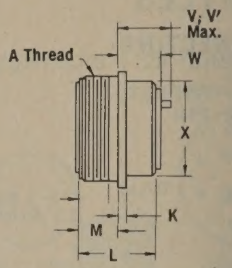
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

SHELL STYLES

BOX MOUNTING RECEPTACLE

MIL-C-83723-21 SOCKET
MIL-C-83723-22 PIN
CVA2





RECEPTACLE WITHOUT BACKSHELL ASSEMBLY

NOTE: Backshells and Bushings are ordered separately see page 29 for part numbers. See page 26 for minimum I.D. bushing dimensions and page 28 for backshell dimensions.

INCHES

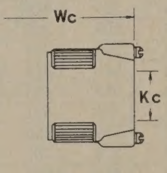
M83723 Shell Size	M5015 Shell Size	K Max.	L Max.	M +.016 −.000	X Max.	R ±.005	W Max.	S Max.	Max. Contact Ext. V Size 0	Max. Contact Ext. V' Sizes 8, 4	T +.015 −.000	A Thread Class 2A
8	8S	.100	.943	.562	.449	.594	.557	.906	—	—	.115	½-28UNEF
10	10S	.100	.943	.562	.509	.719	.521	1.031	—	—	.115	⅝-24UNEF
11	10SL	.115	1.065	.562	.625	.719	.521	1.031	—	—	.115	⅝-24UNEF
13	12S	.100	.960	.562	.625	.812	.557	1.125	—	—	.115	¾-20UNEF
12	12	.100	1.150	.750	.625	.812	.625	1.125	—	—	.115	¾-20UNEF
15	14S	.100	.960	.562	.750	.906	.557	1.218	—	—	.115	⅞-20UNEF
14	14	.100	1.150	.750	.750	.906	.625	1.218	—	—	.115	⅞-20UNEF
17	16S	.100	.960	.562	.875	.969	.557	1.312	—	—	.115	1-20UNEF
16	16	.100	1.150	.750	.875	.969	.625	1.312	—	.790	.115	1-20UNEF
18	18	.140	1.130	.750	.984	1.062	.640	1.406	.915	.790	.115	1⅛-18UNEF
20	20	.140	1.161	.750	1.171	1.156	.640	1.531	.915	.790	.115	1¼-18UNEF
22	22	.140	1.161	.750	1.265	1.250	.640	1.656	.915	.790	.115	1⅜-18UNEF
24	24	.140	1.317	.812	1.390	1.375	.578	1.781	.853	.728	.142	1½-18UNEF
28	28	.140	1.317	.812	1.640	1.562	.578	2.031	.853	.728	.142	1¾-18UNS
32	32	.170	1.317	.875	1.890	1.750	.515	2.281	.790	.655	.168	2-18UNS
36	36	.170	1.317	.875	2.140	1.938	.515	2.531	.790	.655	.168	2¼-16UN
40	40	.170	1.348	.875	2.359	2.188	.515	2.781	.790	.655	.168	2½-16UN

MILLIMETERS

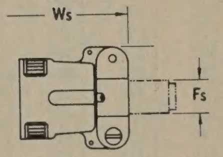
K Max.	L Max.	M +0,41 −0,00	X Max.	R ±0,13	W Max.	S Max.	Max. Contact Ext. V Size 0	Max. Contact Ext. V' Sizes 8, 4	T +0,38 −0,00
2,54	23,95	14,27	11,40	15,09	14,15	23,01	—	—	2,92
2,54	23,95	14,27	12,93	18,26	14,15	26,19	—	—	3,05
2,92	27,05	14,27	15,87	18,26	13,23	26,19	—	—	3,05
2,54	24,38	14,27	15,87	20,62	14,15	28,57	—	—	3,05
2,54	29,21	19,05	15,87	20,62	15,87	28,57	—	—	3,05
2,54	24,38	14,27	19,05	23,01	14,15	30,94	—	—	3,05
2,54	29,21	19,05	19,05	23,01	15,87	30,94	—	—	3,05
2,54	24,38	14,27	22,22	24,61	14,15	33,32	—	—	3,05
2,54	29,21	19,05	22,22	24,61	15,87	33,32	—	17,14	3,05
3,05	28,70	19,05	24,99	26,97	16,26	35,71	23,24	20,07	3,05
3,05	29,49	19,05	29,74	29,36	16,26	38,89	23,24	20,07	3,05
3,05	29,49	19,05	32,13	31,75	16,26	42,06	23,24	20,07	2,92
3,05	33,45	20,62	35,31	34,92	14,68	45,24	21,67	18,49	3,61
3,05	33,45	20,62	41,66	39,67	14,68	51,59	21,67	18,49	3,61
4,32	33,45	22,23	48,01	44,45	13,08	57,94	20,07	16,64	4,27
4,32	33,45	22,23	54,36	49,22	13,08	64,29	20,07	16,64	4,27
4,32	35,24	22,23	59,92	55,57	13,08	70,64	20,07	16,64	4,27

BACKSHELL ASSEMBLIES

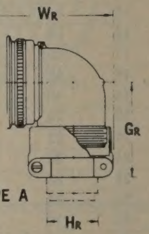
CVA1, CVA0, CVA6



TYPE N



TYPE S



TYPE A

RECEPTACLE WITH BACKSHELL ASSEMBLY

INCHES

M83723 Shell Size	Type N (Straight) †K_C Max.	Type N (Straight) W_C Max.	Type S (Cable Clamp) †F_S Max.	Type S (Cable Clamp) W_S Max.	Type A (90° Clamp) G_R Max.	Type A (90° Clamp) †H_R Max.	Type A (90° Clamp) W_R Max.
8S	.245	1.535	.235	2.065	1.220	.235	2.177
10S	.300	1.550	.235	2.065	1.250	.235	2.177
10SL	.380	1.540	.297	2.065	1.280	.297	2.272
12S	.403	1.562	.297	2.065	1.280	.297	2.272
12	.403	1.921	.297	2.425	1.280	.297	2.632
14S	.485	1.538	.422	2.155	1.405	.422	2.427
14	.485	1.897	.422	2.505	1.405	.422	2.787
16S	.604	1.530	.547	2.205	1.529	.547	2.505
16	.604	1.907	.547	2.560	1.529	.547	2.865
18	.725	2.017	.610	2.680	1.593	.610	2.944
20	.865	2.036	.735	2.680	1.655	.735	3.170
22	.973	2.003	.735	2.680	1.718	.735	3.170
24	1.085	2.016	.922	2.975	1.894	.922	3.505
28	1.245	2.016	.922	2.975	1.973	.922	3.505
32	1.515	2.024	1.235	2.975	2.187	1.235	3.389
36	1.750	2.023	1.360	2.975	2.405	1.360	4.139
40	1.865	2.449	1.630	3.950	5.100	1.630	7.151

MILLIMETERS

Type N (Straight) †K_C Max.	Type N (Straight) W_C Max.	Type S (Cable Clamp) †F_S Max.	Type S (Cable Clamp) W_S Max.	Type A (90° Clamp) G_R Max.	Type A (90° Clamp) †H_R Max.	Type A (90° Clamp) W_R Max.
6,22	38,99	5,97	52,45	30,99	6,10	49,91
7,62	39,37	5,97	52,45	31,75	6,10	49,91
9,65	39,12	7,54	52,45	32,51	7,75	53,09
10,32	39,67	7,54	52,45	32,51	7,75	53,09
10,32	48,79	7,54	61,60	32,51	7,75	62,20
12,31	39,06	10,72	54,74	35,69	10,95	56,26
12,31	48,18	10,72	63,63	35,69	10,95	65,38
15,34	38,86	13,89	56,01	38,84	14,10	58,67
15,34	48,44	13,89	65,02	38,84	14,10	67,67
18,41	51,23	15,49	68,07	40,46	15,70	70,08
21,97	51,71	18,67	68,07	42,04	18,87	75,79
24,71	50,88	18,67	68,07	43,64	18,87	75,79
27,55	51,21	23,42	75,56	48,11	23,67	84,40
31,62	51,21	23,42	75,56	50,11	23,67	84,40
38,48	51,41	31,37	75,56	55,55	31,57	94,01
44,45	51,38	34,54	75,56	61,09	34,75	100,36
47,37	62,20	41,99	100,33	129,54	41,10	175,11

† Maximum entry into end bell excluding bushings. See page 26 for minimum I.D. bushing dimensions.

ITT CANNON ELECTRIC

STANDARD CIRCULAR CONNECTORS
CVA/M83723 (SERIES II)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

BACKSHELL BUSHINGS

Shell Size	Part Number
8S & 10S	012-0215-007
10SL, 12S & 12	012-0216-016
14S & 14	012-0217-019
16S & 16	012-0218-017
18	012-0219 009
20 & 22	012 0220-012

Shell Size	Part Number
24 & 28	012-0220-012 & 012 0221-014
32	012-0221-014 & 012 0222-010
36	012-0220-010 & 012-0223-008
40	012-0223-008 & 012-0224-007

BACKSHELLS
(MIL-C-83723 cross reference to ITT Cannon part numbers with and without bushings and ground screws)

Shell Size	Military Part No.	ITT Cannon Part Number					
		Type "A" (90°)		Type "N" (Str. No Clamp)		Type "S" (Str. w/Clamp)	
		With Bushing	Without Bushing	With Ground Scr.	Without Ground Scr.	With Bushing	W/O Ground Screw/Bushing
8S	M83723-35*-08**	057-3365-000	057-3365-001	057-3143-003	058-0602-002	057-0438-011	057-0438-012
10S	M83723-35*-10**	—	—	—	—	057-0439-012	057-0439-014
10SL	M83723-35*-11**	057-3366-000	057-3366-001	057-3086-005	058-0604-009	057-0440-033	057-0440-037
12	M83723-35*-12**	—	—	—	—	—	—
12S	M83723-35*-13**	057-3367-000	057-3367-001	057-0612-002	058-0605-006	057-0441-016	057-0441-025
14	M83723-35*-14**	—	—	—	—	—	—
14S	M83723-35*-15**	057-3355-000	057-0355-001	057-0618-005	058-0607-009	057-0443-031	057-0443-035
16	M83723-35*-16**	057-3357-000	057-3357-001	057-3255-002	058-0610-004	057-0446-015	057-0446-017
16S	M83723-35*-17**	057-3356-000	057-3356-001	057-3085-002	058-0609-005	057-0445-021	057-0445-023
18	M83723-35*-18**	057-3358-000	057-3358-001	057-0553-007	058-0611-007	057-0447-025	057-0447-028
20	M83723-35*-20**	057-3359-000	057-3359-001	057-0500-007	058-0612-007	057-0448-030	057-0448-031
22	M83723-35*-22**	057-3360-000	057-3360-001	057-0536-007	058-0613-007	057-0449-024	057-0449-026
24	M83723-35*-24**	057-3361-000	057-3361-001	057-3068-008	058-0614-008	057-0450-026	057-0450-028
28	M83723-35*-28**	057-3362-000	057-3362-001	057-0613-008	058-0615-009	057-0451-026	057-0451-027
32	M83723-35*-32**	057-3363-000	057-3363-001	057-0537-005	058-0616-005	057-0452-022	057-0452-023
36	M83723-35*-36**	057-3364-000	057-3364-001	057-3126-003	058-0617-003	057-0453-023	057-0453-024
40	M83723-35*-40**	—	—	057-3161-002	058-3237-002	057-3368-000	057-3368-004

* = Add Type, "A", "N", or "S"
** = Add Class; R = Conductive Finish (Electroless Nickel)
A = Non-Conductive Finish (Hard Anodize). Consult Factory on availability and part numbers.

NOTE: Unless specifically requested, all backshells ordered by the M83723 part number will be supplied without bushings and ground screws.

CONTACTS

MS Number		Mating End		Wire Barrel		ITT Cannon Part Number	
Pin	Socket	Size	Color	Size	Color	Pin	Socket
—	MS3163-16S-16	16S	Blue	16	Blue	—	031-3113-005
MS3162-16-16	MS3163-16-16	16	Blue	16	Blue	030-3196-008	031-3114-008
MS3162-12-12	MS3163-12-12	12	Yellow	12	Yellow	030-3197-007	031-3115-006
MS3162-8-8	MS3163-8-8	8	Red	8	Red	030-3198-003	031-3116-003
MS3162-4-4	MS3163-4-4	4	Blue	4	Blue	030-3199-004	031-3117-003
MS3162-0-0	MS3163-0-0	0	Yellow	0	Yellow	030-3200-003	031-3118-003

THERMOCOUPLE

Contact Size	Alumel		Chromel	
	Pin	Skt	Pin	Skt
16S	—	031-3113-011	—	031-3113-012
16	030-3196-015	031-3114-014	030-3196-016	031-3114-015
12	030-3197-011	031-3115-009	030-3197-012	031-3115-010

SEALING PLUGS

Contact Size	MS Part No.	ITT Cannon Part No.	Contact Size	MS Part No.	ITT Cannon Part No.	Contact Size	MS Part No.	ITT Cannon Part No.
0	M83723-28-0	225-1007-000	8	M83723-28-8	225-1009-000	16	M83723-28-16	225-0071-000
4	M83723-28-4	225-1008-000	12	M83723-28-12	225-0072-000			

TERMINATION TOOLS

A complete line of crimp, insertion and extraction tools is provided for MIL-C-83723 connectors. Crimp tools are made from high quality metal and are designed for long life and trouble-free service. Insertion and extraction tools are made of a durable plastic and are inexpensive and expandable.

Contact Size	INSERTION/EXTRACTION TOOLS				Crimp Tool	Tool Handle	Tool for Unwired Contact
	Plastic		Metal				
	MS No.	ITT Cannon No.	MS No.	ITT Cannon No.			
16	M83723-31-16	CIET-16	—	—	M22520/1-01 with M22520/1-02 Turret	084-0068-000	274-7008-000
12	M83723-31-12	CIET-12	—	—		084-0069-000	274-7009-000
8	M83723-32-8	CET 8-2	MS3483-1	CET-CVR-8	CBT 600B Power Unit CCH-8-1 Crimp Head CCHP-8-6 Locator	—	—
4	M83723-32-4	CET 4-8	MS3483-2	CET-CVR-4	CBT 600B Power Unit CCH-4-1-Crimp Head CCHP-4-8 Locator	—	—
0	M83723-32-0	CET 0-1	MS3483-3	CET-00-CV	CBT 600B Power Unit CCH-0-1 Crimp Head CCHP-0-8 Locator	—	—

K CONNECTORS

RUGGED CIRCULAR CONNECTORS WITH QUICK CONNECT/DISCONNECT ACME THREADS

K standard circular connectors with special Acme thread coupling are rugged, lightweight and economical. These connectors are extremely versatile, with eight shell types and insert diameters, totaling more than 350 contact arrangements, in a variety of amperage and voltage capacities. K connectors have made the quick disconnect concept a standard in the industry, saving time and money in servicing, assembly, testing and inspection. K connectors are used on aircraft, transmitters, instrument panels, Geiger counters, television cameras, potentiometers, cathode ray recorders and other equipment.

The general basic K series connectors are shown as follows:

- **K/RK** Standard circular connector with special Acme thread couplings for quick connect and disconnect. Used in color and monochrome TV cameras, transmitters, telephone circuits, etc.
- **SK** "BEEP" telephone connectors — special telephone, television applications, and for use on general ground support equipment.

PART NUMBER EXPLANATION

R W K - 6 - 22C - ⅝"

Reverse Coupling
Shell Size
Series Prefix
Contact Arrangement
Shell Style
Cable Clamp
Clamp Capacity

REVERSE COUPLING

R — Pin insert typical in plug, socket insert typical in receptacle and coupling nut reversed; will not mate with K connectors.

SHELL SIZE

W — ⅞" threaded coupling dia.
N — 1 9/16" threaded coupling dia.
L — 2½" threaded coupling dia.
G — 1 3/16" threaded coupling dia.
F — 1 13/16" threaded coupling dia.
S — 1 5/16" threaded coupling dia.
I — 2¼" threaded coupling dia.

SERIES PREFIX

K — ITT Cannon Prefix

CONTACT ARRANGEMENT

See following pages

SHELL STYLE

21 — Straight plug, socket insert
22 — Straight plug, pin insert
23 — 90° plug, socket insert
24 — 90° plug, pin insert
31S — Small flange receptacle, socket insert
31SL — Large flange receptacle, socket insert
32S — Small flange receptacle, pin insert
32SL — Large flange receptacle, pin insert

CABLE CLAMP

C — Cable clamp

CLAMP CAPACITY

See K-21C, K-22C, RK-22C, K-23, K-24 and RK-24C

CONDENSED DATA

STANDARD MATERIALS AND FINISHES

Shell — Aluminum alloy, cadmium plate (clear)

Insulator — Thermosetting plastic or fabricated phenolic

Contacts — Copper alloy, silver plate (gold plate for size 20 contact only)

ELECTRICAL DATA

Number of Contacts — 1 thru 110

Wire Size / Amps —
#20 — 7.5 amps
#16 — 10 amps
#14 — 15 amps
#10 — 30 amps
#8 — 40 amps
#6 — 60 amps
#4 — 80 amps
#2 — 115 amps
#0 — 200 amps

Other Contacts Available — Coax. min. coax.

Termination — Solder pot

MECHANICAL FEATURES

Coupling — K — Special Acme thread coupling nut
RK — Reverse coupling nut

Cable Entry — Cable clamp

MATING GUIDE

	K-21	K-22	K-23	K-24	K-31	K-32
K-21		●		●		●
K-22	●		●		●	
K-23		●		●		●
K-24	●		●		●	
K-31		●		●		●
K-32	●		●		●	

ITT CANNON ELECTRIC

STANDARD CIRCULAR CONNECTORS
K SERIES

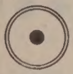
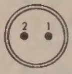
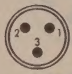
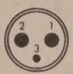
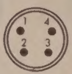
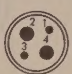
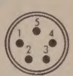
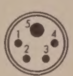
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

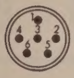
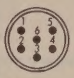
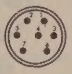
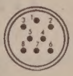
CONTACT ARRANGEMENTS

FRONT VIEW, PIN INSERTS

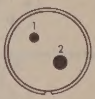
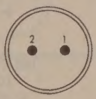
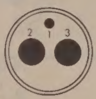
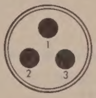
*See page 37 for contact spacing/voltage rating.

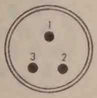
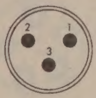
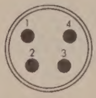
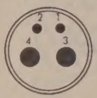
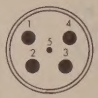
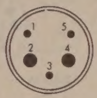
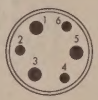
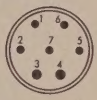
SHELL SIZE WK

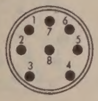
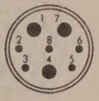
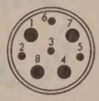
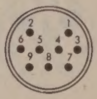
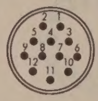
								
	WK-1*	**WK-M2**	**WK-3**	**WK-C3**	**WK-4**	**WK-S4**	**WK-5**	**WK-S5**
Contacts	1	2	3	3	4	4	5	5
Wires	1-#10	2-#16	3-#14	1-#16 (3) 2-#10 (1 & 2)	4-#16	2-#16 (1 & 3) 2-#10 (2 & 4)	5-#16	4-#16 (1-4) 1-#10 (5)
Contact Spacing*	11/64	3/32	1/16	3/64	3/64	3/64	3/64	3/64

				
	WK-M6*	**WK-6**	**WK-A7**	**WK-8***
Contacts	6	6	7	8
Wires	6-#16	6-#16	7-#16	8-#20
Contact Spacing*	1/32	3/64	3/64	5/64

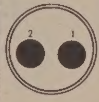
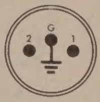
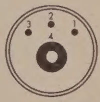
SHELL SIZE GK

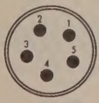
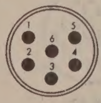
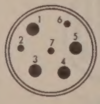
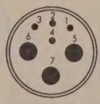
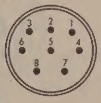
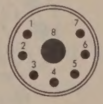
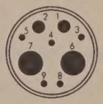
				
	GK-N2	**GK-V2***	**GK-C3**	**GK-E3***
Contacts	2	2	3	3
Wires	1-#14 (1) 1-#10 (2)	2-#14	1-#14 (1) 2-#6 (2 & 3)	3-#8
Contact Spacing*	9/64	11/64	3/64	3/64

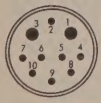
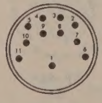
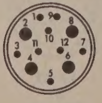
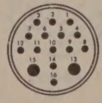
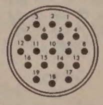
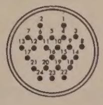
								
	GK-M3*	**GK-S3**	**GK-4**	**GK-C4***	**GK-G5**	**GK-M5***	**GK-P6**	**GK-R7**
Contacts	3	3	4	4	5	5	6	7
Wires	3-#14	3-#10	4-#10	2-#14 (1 & 2) 2-#8 (3 & 4)	1-#16 (5) 4-#10 (1-4)	3-#16 (1, 3 & 5) 2-#10 (2 & 4)	3-#14 (2, 4 & 6) 3-#10 (1, 3 & 5)	5-#16 (1, 2, 5, 6 & 7) 2-#14 (3 & 4)
Contact Spacing*	5/64	5/64	3/64	5/64	3/64	5/64	1/32	9/64 (7) 3/64 (1-6)

					
	GK-8	**GK-C8***	**GK-S8**	**GK-9**	**GK-12**
Contacts	8	8	8	9	12
Wires	8-#14	5-#16 (2, 3, 5, 6 & 8) 3-#10 (1, 4 & 7)	4-#16 (2, 3, 5 & 6) 4-#10 (1, 4, 7 & 8)	9-#16	12-#16
Contact Spacing*	3/64	3/64	3/64	1/16	3/64

SHELL SIZE SK

			
	SK-S2	**SK-L3**	**SK-U4***
Contacts	2	3	4
Wires	2-#4	skt. contacts 1-2 (#10) grd. to skt. contact G (#10) when pin insert is removed for RG-7/U cable	3-#16 (1-3) 1-#16 coax. (4)
Contact Spacing*	5/64	3/64	3/64

							
	SK-5	**SK-6**	**SK-M7**	**SK-V7***	**SK-8***	**SK-A8***	**SK-C9**
Contacts	5	5	7	7	8	8	9
Wires	5-#10	6-#10	3-#16 (2, 6 & 7) 4-#10 (1, 3, 4 & 5)	4-#16 (1-4) 3-#8 (5-7)	8-#16	7-#14 (1-7) 1-#6 (8)	5-#16 (3-5, 8, 9) 2-#10 (1 & 2) 2-#6 (6 & 7)
Contact Spacing*	5/64	1/16	5/64	3/64 (1-4) 5/64 (5-7)	5/64	3/64	3/64

						
	SK-M10	**SK-W11***	**SK-D12**	**SK-C16**	**SK-19**	**SK-24**
Contacts	10	11	12	16	19	24
Wires	8-#16 (2, 4-10) 2-#10 (1 & 3)	11-#16	8-#16 (1, 3, 5, 7, 9-12) 4-#10 (2, 4, 6 & 8)	14-#16 (1-12, 14, 16) 2-#10 (13 & 15)	19-#16	24-#20
Contact Spacing*	5/64	3/64	3/64	3/64	3/64	1/16

ITT CANNON ELECTRIC

STANDARD CIRCULAR CONNECTORS K SERIES

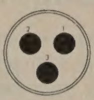
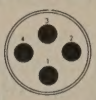
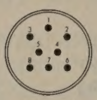
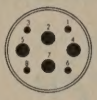
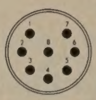
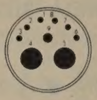
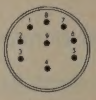
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONTACT ARRANGEMENTS

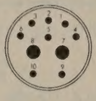
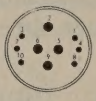
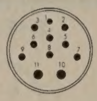
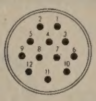
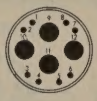
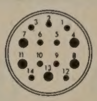
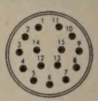
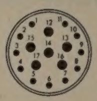
FRONT VIEW, PIN INSERTS

*See page 37 for contact spacing/voltage rating.

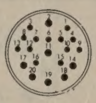
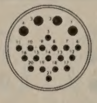
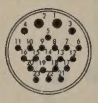
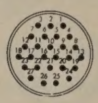
SHELL SIZE NK

	NK-E3*	NK-P4*	NK-D8*	NK-L8	NK-M8	NK-C9*	NK-P9*
Contacts	3	4	8	8	8	9	9
Wires	3-#4	4-#6	8-#14	4-#14 (1, 3, 6, 8) 4-#8 (2, 4, 5, 7)	8-#10	6-#16 (1, 3, 6-8) 1-#10 (9), 2-#4 (4, 5)	9-#16
Contact Spacing*	3/32	5/64	7/64	5/64	5/64	5/64	15/64 (4), 11/64 (9) 7/64 (1-3, 5-7), 5/64 (8)

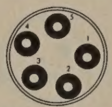
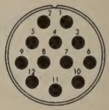
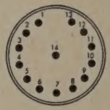









	NK-M10*	NK-S10*	NK-L11	NK-12	NK-L12	NK-N14	NK-L15	NK-V17
Contacts	10	10	11	12	12	14	15	17
Wires	8-#14 (1-6, 9 & 10) 2-#8 (7 & 8)	6-#16 (1, 3, 4, 7, 8, 10) 4-#10 (2, 5, 6, 9)	1-#16 (1), 8-#14 (2-9) 2-#10 (10 & 11)	12-#14	8-#16 (1-8) 4-#6 (9-12)	9-#16 (1-3, 5, 6, 9, 10, 12, 14) 5-#10 (4, 7, 8, 11, 13)	15-#14	11-#16 (1-11) 6-#10 (12-17)
Contact Spacing*	5/64	5/64	5/64		3/64 (1-8) 5/64 (9-12)	5/64	1/16	3/64

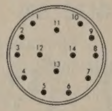
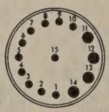
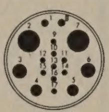
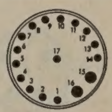
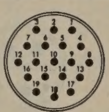
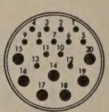
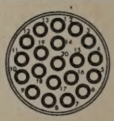





	NK-L20*	NK-L21*	NK-L23	NK-27
Contacts	20	21	23	27
Wires	7-#14 (2, 11, 14, 17-20) 13-#16 (1, 3-10, 12, 13, 15, 16)	17-#16 (5-21) 4-#10 (1-4)	19-#16 (5-23) 2-#14 (3, 4), 2-#10 (1, 2)	27-#16
Contact Spacing*	3/64 (1-13, 15, 16) 5/64 (14, 17-20)	3/64	3/64	3/64

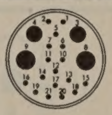
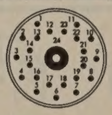
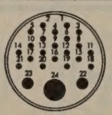
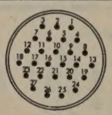
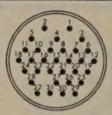
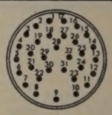
SHELL SIZE FK

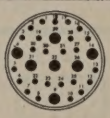
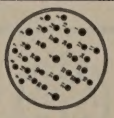
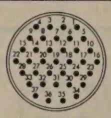
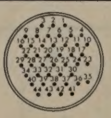
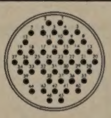
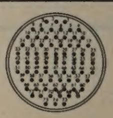
	FK-G5C*	FK-12*	FK-B14
Contacts	5	12	14
Wires	5-#16 coax. alum. insulator grd. to shell for RG-7/U cable	12-#10	14-#14
Contact Spacing*	3/64	7/64	3/32 (1-13) 25/64 (14)

	FK-R14	FK-L15*	FK-G17	FK-L17	FK-19	FK-L20	FK-W20*
Contacts	14	15	17	17	19	20	20
Wires	14-#16	11-#14 (1-10 & 15) 4-#10 (11-14)	9-#16 (9-17) 2-#14 (1 & 8) 2-#10 (4 & 5), 2-#8 (3 & 6) 2-#4 (2 & 7)	15-#14 (1-14 & 17) 2-#10 (15 & 16)	19-#14	13-#16 (1-13) 7-#10 (14-20)	20 min. coax.
Contact Spacing*	5/64 (1-10) 15/64 (11-14)	7/64 (1-10) 3/64 (11-14), 3/8 (15)	3/64	3/8 (17) 3/64 (1-16)	5/64	5/64	1/32

	FK-21	FK-24*	FK-V24*	FK-27*	FK-32	FK-C32*
Contacts	21	24	24	27	32	32
Wires	17-#16 (1, 2, 5-7, 10-21) 2-#8 (3, 4) 2-#4 (8, 9)	23-#16 (1-23) 1-#16 coax. for RG-58/U cable	21-#16 (1-21) 2-#10 (22 & 23), 1-#4 (24)	27-#16	32-#16	32-#16
Contact Spacing*	1/16	1/32 (1-11) 5/64 (12-23), 1/8 (24)	3/64	5/64	1/8 (1-2) 1/16 (3-32)	3/64

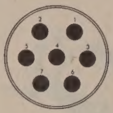
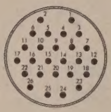
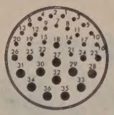
	FK-L32	FK-W32	FK-37	FK-44*	FK-46	FK-75
Contacts	32	32	37	44	46	75
Wires	25-#16 (1-3, 5-8, 10-13,15-20, 22-25, 27, 28, 30, 31) 7-#10 (4, 9, 14, 21, 26, 29, 32)	28-#16 (5-32) 4-#14 (1-4)	37-#16	44-#20	46-#16	75-#20
Contact Spacing*	3/64	1/32	3/64	3/32	3/64	3/64

CONTACT ARRANGEMENTS

FRONT VIEW, PIN INSERT

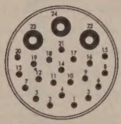
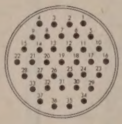
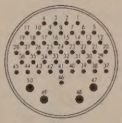
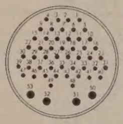
*See page 37 for contact spacing/voltage rating.

SHELL SIZE IK

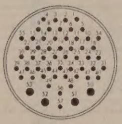
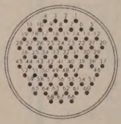
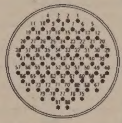
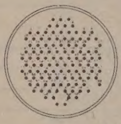




	IK-M7*	**IK-26**	**IK-A36**
Contacts	7	26	36
Wires	7-#6	26-#14	21-#16 (1-17, 19-22) 5-#14 (18, 23-26), 10-#10 (27-36)
Contact Spacing*	9/64	5/64	3/64 (1-26) 1/16 (29-36)

SHELL SIZE LK

	LK-R24C	**LK-37***	**LK-A50***	**LK-A53**
Contacts	24	37	50	53
Wires	21-#14 (1-21), 3-#16 coax. (22-24) for RG-7/U cable	37-#14	46-#16 (1-46) 4-#10 (47-50)	49-#16 (1-49) 4-#10 (50-53)
Contact Spacing*	3/64 (1-3, 5-8, 13, 15, 20, 22-24) 7/64 (4, 9-12, 14, 16-19, 21)	5/64	3/64 (1-46) 5/64 (47-50)	3/64 (1-49) 7/64 (50-53)

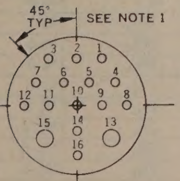
	LK-57*	**LK-68***	**LK-81**	**LK-110**
Contacts	57	68	81	110
Wires	53-#16 (1-49, 54-57) 4-#10 (50-53)	68-#16	81-#16	110-#20
Contact Spacing*	3/64 (1-49, 54-57) 7/64 (50-53)	1/16	3/64	1/16

POLARIZATION POSITIONS

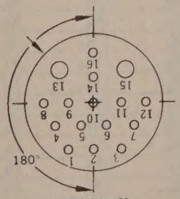
Face View — Pin Insert. (As viewed from engaging end.)

NOTES:

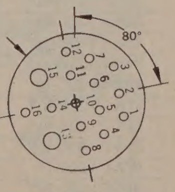
1. Shell polarizing means is indicated by arrow at 45° and will remain constant regardless of insert rotation.
2. Insert to be rotated within the shell to the required position as viewed from engaging end.
3. For alternate positions not shown consult factory.



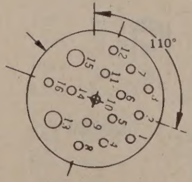
Position N



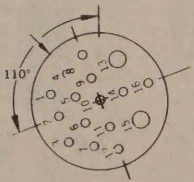
Position V



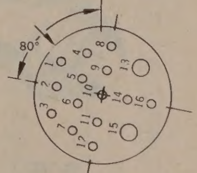
Position W



Position X



Position Y

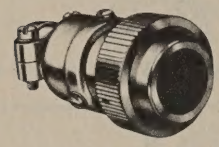


Position Z

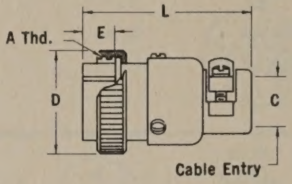
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

K AND RK SERIES

K-21C
STRAIGHT PLUG
SOCKET INSERTS



K-21C

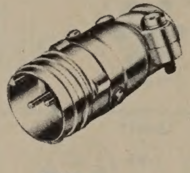


K-21C (Cable Clamp)

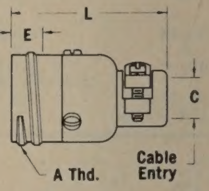
Part Number	C ±1/64	D ±1/64	E ±1/64	L ±3/64	A Thd.
WK-(*)-21C-1/4″	15/64	1 3/64	7/16	2 3/32	7/8-6
WK-(*)-21C-5/16″	11/32	1 3/64	7/16	2 3/32	7/8-6
WK-(*)-21C-3/8″	13/32	1 3/64	7/16	2 3/32	7/8-6
WK-(*)-21C-1/2″	17/32	1 3/64	7/16	2 3/32	7/8-6
WK-(*)-21C-5/8″	21/32	1 3/64	7/16	2 3/32	7/8-6
GK-(*)-21C-1/2″	17/32	1 23/64	7/16	2 3/16	1 3/16-6
GK-(*)-21C-5/8″	21/32	1 23/64	7/16	2 3/16	1 3/16-6
SK-(*)-21C-1/2″	17/32	1 15/32	7/16	2 3/16	1 5/16-6
SK-(*)-21C-5/8″	21/32	1 15/32	7/16	2 3/16	1 5/16-6
SK-(*)-21C-3/4″	25/32	1 15/32	7/16	2 3/16	1 5/16-6
NK-(*)-21C-1/2″	17/32	1 47/64	7/16	2 5/32	1 9/16-6
NK-(*)-21C-5/8″	21/32	1 47/64	7/16	2 5/32	1 9/16-6
NK-(*)-21C-3/4″	25/32	1 47/64	7/16	2 5/32	1 9/16-6
NK-(*)-21C-7/8″	29/32	1 47/64	7/16	2 5/32	1 9/16-6
FK-(*)-21C-9/16″	19/32	2 1/64	7/16	2 5/16	1 13/16-6
FK-(*)-21C-5/8″	21/32	2 1/64	7/16	2 5/16	1 13/16-6
FK-(*)-21C-7/8″	29/32	2 1/64	7/16	2 5/16	1 13/16-6
FK-(*)-21C-1″	1 1/16	2 1/64	7/16	2 15/32	1 13/16-6
IK-(*)-21C-7/8″	29/32	2 1/2	1/2	3	2 1/4-6
IK-(*)21C-1″	1 1/16	2 1/2	1/2	3 5/32	2 1/4-6
IK-(*)-21C-1 1/8″	1 3/16	2 1/2	1/2	3	2 1/4-6
LK-(*)-21C-1″	1 1/16	2 7/8	1/2	3 5/64	2 1/2-6
LK-(*)-21C-1 1/2″	1 9/16	2 7/8	1/2	3 1/8	2 1/2-6

*Add contact arrangement.

K-22C
STRAIGHT PLUG
PIN INSERTS



K-22C

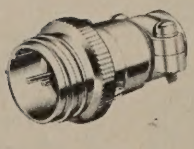


K-22C (Cable Clamp)

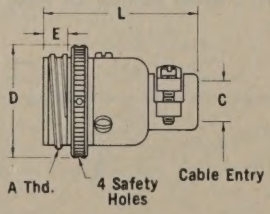
Part Number	C ±1/64	E ±1/64	L ±3/64	A Thd.
WK-(*)-22C-1/4″	15/64	7/16	1 29/32	7/8-6
WK-(*)-22C-5/16″	11/32	7/16	1 29/32	7/8-6
WK-(*)-22C-3/8″	13/32	7/16	1 29/32	7/8-6
WK-(*)-22C-1/2″	17/32	7/16	1 29/32	7/8-6
WK-(*)-22C-5/8″	21/32	7/16	1 29/32	7/8-6
GK-(*)-22C-1/2″	17/32	7/16	2	1 3/16-6
GK-(*)-22C-5/8″	21/32	7/16	2	1 3/16-6
SK-(*)-22C-1/2″	17/32	7/16	2	1 5/16-6
SK-(*)-22C-5/8″	21/32	7/16	2	1 5/16-6
SK-(*)-22C-3/4″	25/32	7/16	2	1 5/16-6
NK-(*)-22C-1/2″	17/32	7/16	1 31/32	1 9/16-6
NK-(*)-22C-5/8″	21/32	7/16	1 31/32	1 9/16-6
NK-(*)-22C-3/4″	25/32	7/16	1 31/32	1 9/16-6
NK-(*)-22C-7/8″	29/32	7/16	1 31/32	1 9/16-6
FK-(*)-22C-9/16″	19/32	7/16	2 5/32	1 13/16-6
FK-(*)-22C-5/8″	21/32	7/16	2 5/32	1 13/16-6
FK-(*)-22C-7/8″	29/32	7/16	2 5/32	1 13/16-6
FK-(*)-22C-1″	1 1/16	7/16	2 5/16	1 13/16-6
IK-(*)-22C-7/8″	29/32	1/2	2 13/16	2 1/4-6
IK-(*)-22C-1″	1 1/16	1/2	2 31/32	2 1/4-6
IK-(*)-22C-1 1/8″	1 3/16	1/2	2 13/16	2 1/4-6
LK-(*)-22C-1″	1 1/16	1/2	2 57/64	2 1/2-6
LK-(*)-22C-1 1/2″	1 9/16	1/2	2 15/16	2 1/2-6

*Add contact arrangement.

RK-22C
STRAIGHT PLUG
REVERSE COUPLING PIN INSERTS



RK-22C



RK-22C (Cable Clamp)

Part Number	C ±1/64	D ±1/64	E ±1/64	L ±3/64	A Thd.
RWK-(*)-22C-1/4″	15/64	1 9/64	7/16	1 29/32	15/16-6
RWK-(*)-22C-5/16″	11/32	1 9/64	7/16	1 29/32	15/16-6
RWK-(*)-22C-3/8″	13/32	1 9/64	7/16	1 29/32	15/16-6
RWK-(*)-22C-1/2″	17/32	1 9/64	7/16	1 29/32	15/16-6
RWK-(*)-22C-5/8″	21/32	1 9/64	7/16	1 29/32	15/16-6
RGK-(*)-22C-1/2″	17/32	1 7/16	7/16	2	1 1/4-6
RGK-(*)-22C-5/8″	21/32	1 7/16	7/16	2	1 1/4-6
RSK-(*)-22C-1/2″	17/32	1 9/16	7/16	2	1 3/8-6
RSK-(*)-22C-5/8″	21/32	1 9/16	7/16	2	1 3/8-6
RSK-(*)-22C-3/4″	25/32	1 9/16	7/16	2	1 3/8-6
RNK-(*)-22C-1/2″	17/32	1 9/16	7/16	1 31/32	1 5/8-6
RNK-(*)-22C-5/8″	21/32	1 13/16	7/16	1 31/32	1 5/8-6
RNK-(*)-22C-3/4″	25/32	1 13/16	7/16	1 31/32	1 5/8-6
RNK-(*)-22C-7/8″	29/32	1 13/16	7/16	1 31/32	1 5/8-6
RFK-(*)-22C-9/16″	19/32	2 1/8	7/16	2 5/32	1 15/16-6
RFK-(*)-22C-5/8″	21/32	2 1/8	7/16	2 5/32	1 15/16-6
RFK-(*)-22C-7/8″	29/32	2 1/8	7/16	2 5/32	1 15/16-6
RFK-(*)-22C-1″	1 1/16	2 1/8	7/16	2 5/16	1 15/16-6
RIK-(*)-22C-7/8″	29/32	2 9/16	1/2	2 13/16	2 5/16-6
RIK-(*)-22C-1″	1 1/16	2 9/16	1/2	2 31/32	2 5/16-6
RIK-(*)-22C-1 1/8″	1 3/16	2 9/16	1/2	2 13/16	2 5/16-6
RLK-(*)-22C-1″	1 1/16	2 13/16	1/2	2 57/64	2 9/16-6
RLK-(*)-22C-1 1/2″	1 9/16	2 13/16	1/2	2 15/16	2 9/16-6

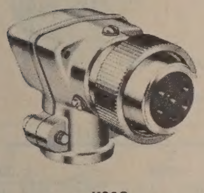
*Add contact arrangement.

Dimensions subject to change.

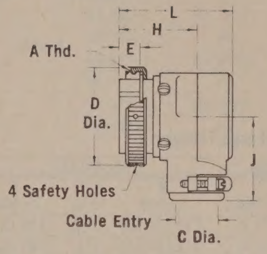
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

K AND RK SERIES

K-23
90° ANGLE PLUG
SOCKET INSERTS



K23C

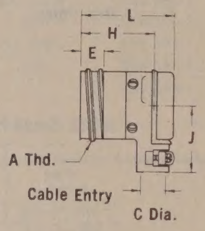


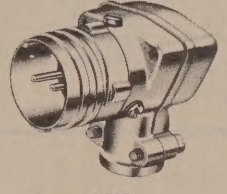
K-23C (Cable Clamp)

Part Number	C ±1/64	D ±1/64	E ±1/64	H ±3/64	J ±1/64	L ±1/16	A Thd.
WK-(*)-23C-3/8"	13/32	1 3/64	7/16	1 23/64	1	1 3/4	7/8-6
WK-(*)-23C-1/2"	17/32	1 3/64	7/16	1 31/64	1	2	7/8-6
GK-(*)-23C-3/8"	25/64	1 23/64	7/16	1 7/16	1 9/32	1 15/16	1 3/16-6
GK-(*)-23C-1/2"	17/32	1 23/64	7/16	1 7/16	1 9/32	1 15/16	1 3/16-6
GK-(*)-23C-5/8"	21/32	1 23/64	7/16	1 9/16	1 9/32	2 5/32	1 3/16-6
SK-(*)-23C-1/2"	17/32	1 15/32	7/16	1 29/64	1 7/16	1 15/16	1 5/16-6
SK-(*)-23C-5/8"	21/32	1 15/32	7/16	1 17/32	1 7/16	2 3/32	1 5/16-6
SK-(*)-23C-3/4"	25/32	1 15/32	7/16	1 19/32	1 7/16	2 7/32	1 5/16-6
NK-(*)-23C-9/16"	19/32	1 47/64	7/16	1 35/64	1 9/16	2 1/8	1 9/16-6
NK-(*)-23C-5/8"	21/32	1 47/64	7/16	1 35/64	1 9/16	2 1/8	1 9/16-6
NK-(*)-23C-11/16"	23/32	1 47/64	7/16	1 35/64	1 9/16	2 1/8	1 9/16-6
FK-(*)-23C-9/16"	19/32	2 1/64	7/16	1 33/64	1 23/32	2 1/32	1 13/16-6
FK-(*)-23C-5/8"	21/32	2 1/64	7/16	1 33/64	1 23/32	2 1/16	1 13/16-6
IK-(*)-23C-1 1/8"	1 3/16	2 1/2	1/2	2 1/32	2 5/32	2 55/64	2 1/4-6
LK-(*)-23C-1"	1 1/16	2 13/16	1/2	1 31/32	2 1/8	2 25/32	2 1/2-6

*Add contact arrangement.

K-24
90° ANGLE PLUG
PIN INSERTS





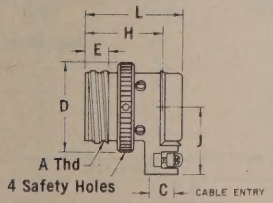
K-24C

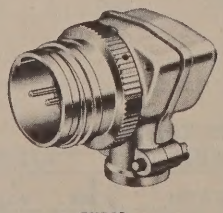
K-24C (Cable Clamp)

Part Number	C ±1/64	E ±1/64	H ±3/64	J ±1/64	L ±1/16	A Thd.
WK-(*)-24C-3/8"	13/32	7/16	1 11/64	1	1 9/16	7/8-6
WK-(*)-24C-1/2"	17/32	7/16	1 19/64	1	1 13/16	7/8-6
GK-(*)-24C-1/2"	17/32	7/16	1 1/4	1 9/32	1 3/4	1 3/16-6
GK-(*)-24C-3/8"	25/64	7/16	1 1/4	1 9/32	1 3/4	1 3/16-6
GK-(*)-24C-5/8"	21/32	7/16	1 3/8	1 9/32	1 31/32	1 3/16-6
SK-(*)-24C-1/2"	17/32	7/16	1 17/64	1 7/16	1 3/4	1 5/16-6
SK-(*)-24C-5/8"	21/32	7/16	1 11/32	1 7/16	1 29/32	1 5/16-6
SK-(*)-24C-3/4"	25/32	7/16	1 13/32	1 7/16	2 1/32	1 5/16-6
NK-(*)-24C-9/16"	19/32	7/16	1 23/64	1 9/16	1 15/16	1 9/16-6
NK-(*)-24C-5/8"	21/32	7/16	1 23/64	1 9/16	1 15/16	1 9/16-6
NK-(*)-24C-11/16"	23/32	7/16	1 23/64	1 9/16	1 15/16	1 9/16-6
FK-(*)-24C-9/16"	19/32	7/16	1 23/64	1 23/32	1 7/8	1 13/16-6
FK-(*)-24C-5/8"	21/32	7/16	1 23/64	1 23/32	1 7/8	1 13/16-6
IK-(*)-24C-1 1/8"	1 3/16	1/2	1 27/32	2 5/32	2 43/64	2 1/4-6

*Add contact arrangement.

RK-24C
90° ANGLE PLUG
REVERSE COUPLING PIN INSERTS





RK24C

RK-24C (Cable Clamp)

Part Number	C ±1/64	D ±1/64	E ±1/64	H ±3/64	J ±1/64	L ±1/16	A Thd.
RWK-(*)-24C-3/8"	13/32	1 9/64	7/16	1 11/64	1	1 9/16	15/16-6
RWK-(*)-24C-1/2"	17/32	1 9/64	7/16	1 19/64	1	1 13/16	15/16-6
RGK-(*)-24C-1/2"	17/32	1 7/16	7/16	1 1/4	1 9/32	1 3/4	1 1/4-6
RGK-(*)-24C-5/8"	21/32	1 7/16	7/16	1 3/8	1 9/32	1 31/32	1 1/4-6
RSK-(*)-24C-1/2"	17/32	1 9/16	7/16	1 17/64	1 7/16	1 3/4	1 3/8-6
RSK-(*)-24C-5/8"	21/32	1 9/16	7/16	1 11/32	1 7/16	1 29/32	1 3/8-6
RSK-(*)-24C-3/4"	25/32	1 9/16	7/16	1 13/32	1 7/16	2 1/32	1 3/8-6
RNK-(*)-24C-9/16"	19/32	1 13/16	7/16	1 23/64	1 9/16	1 15/16	1 5/8-6
RNK-(*)-24C-5/8"	21/32	1 13/16	7/16	1 23/64	1 9/16	1 15/16	1 5/8-6
RNK-(*)-24C-11/16"	23/32	1 13/16	7/16	1 23/64	1 9/16	1 15/16	1 5/8-6
RFK-(*)-24C-9/16"	19/32	2 1/8	7/16	1 23/64	1 23/32	1 7/8	1 15/16-6
RFK-(*)-24C-5/8"	21/32	2 1/8	7/16	1 23/64	1 23/32	1 7/8	1 15/16-6
RIK-(*)-24C-1 1/8"	1 3/16	2 9/16	1/2	1 27/32	2 5/32	2 43/64	2 5/16-6
RLK-(*)-24C-1"	1 1/16	2 13/16	1/2	1 25/32	2 1/8	2 19/32	2 9/16-6

*Add contact arrangement.

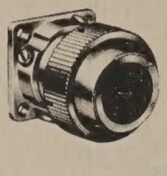
Dimensions subject to change.

STANDARD CIRCULAR CONNECTORS
K SERIES

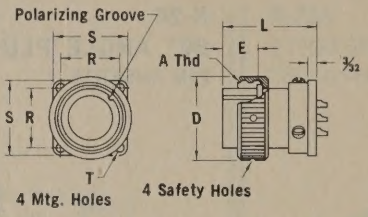
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

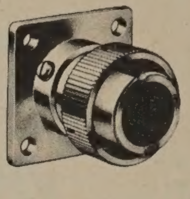
K AND RK SERIES

K-31S, K-31SL
WALL MOUNTING RECEPTACLE
PIN INSERTS

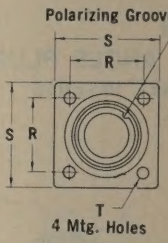


K-31S





K-31SL



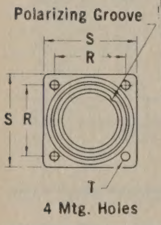
K-31S (Small Flange) and K-31SL (Large Flange)

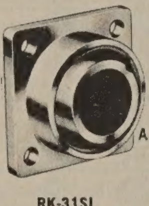
Part Number	For K-31S and K-31SL				For K-31S			For K-31SL		
	D ±1/64	E ±1/64	L ±3/64	A Thd.	R ±.005	S ±1/64	T ±.005	R ±.005	S ±1/64	T ±.005
WK-(*)-31S	1 3/64	7/16	1 3/16	7/8-6	.730 (18,54)	15/16	.120 (3,05)	.972 (24,69)	1 5/16	.144 (3,65)
GK-(*)-31S	1 23/64	7/16	1 7/32	1 3/16-6	.972 (24,69)	1 1/4	.120 (3,05)	1.192 (30,28)	1 9/16	.169 (4,29)
SK-(*)-31S	1 15/32	7/16	1 7/32	1 5/16-6	1.038 (26,37)	1 3/8	.120 (3,05)	1.282 (32,56)	1 11/16	.169 (4,29)
NK-(*)-31S	1 47/64	7/16	1 7/32	1 9/16-6	1.259 (31,98)	1 5/8	.169 (4,29)	1.500 (38,1)	1 15/16	.169 (4,29)
FK-(*)-31S	2 1/64	7/16	1 1/4	1 13/16-6	1.502 (38,15)	1 7/8	.169 (4,29)	1.678 (42-62)	2 1/8	.169 (4,29)
IK-(*)-31S	2 1/2	1/2	1 13/32	2 1/4-6	1.944 (49,38)	2 5/16	.169 (4,29)	2.031 (51,59)	2 9/16	.169 (4,29)
LK-(*)-31S	2 7/8	1/2	1 13/32	2 1/2-6	2.077 (52,76)	2 9/16	.169 (4,29)	2.210 (56,13)	2 7/8	.169 (4,29)

For K31SL (Large Flange), add "L" to nomenclature. e.g., WK-(*)-31S becomes WK-(*)-31SL.

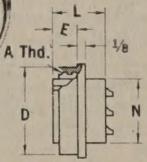
*Add contact arrangement.

RK-31SL
WALL MOUNTING RECEPTACLE
REVERSE COUPLING PIN INSERTS





RK-31SL

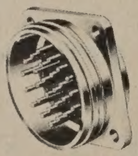


RK-31SL (Large Flange)

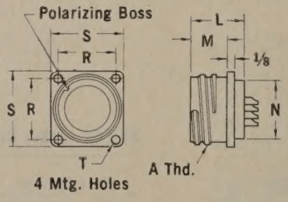
Part Number	L ±3/64	N ±.005	E ±1/64	A Thd.	D ±1/64	R ±.005	S ±1/64	T ±.005
RWK-(*)-31SL	15/16	3/4	7/16	15/16-6	1 1/16	.972 (24,69)	1 5/16	.144 (3,65)
RGK-(*)-31SL	15/16	1	7/16	1 1/4-6	1 3/8	1.192 (30,28)	1 9/16	.169 (4,29)
RSK-(*)-31SL	15/16	1 1/8	7/16	1 3/8-6	1 1/2	1.282 (32,56)	1 11/16	.169 (4,29)
RNK-(*)-31SL	15/16	1 3/8	7/16	1 5/8-6	1 3/4	1.502 (38,15)	1 15/16	.169 (4,29)
RFK-(*)-31SL	15/16	1 5/8	7/16	1 15/16-6	2 1/16	1.680 (42,67)	2 1/8	.169 (4.29)
RIK-(*)-31SL	15/16	1 15/16	1/2	2 5/16-6	2 1/2	2.032 (51,61)	2 9/16	.169 (4,29)
RLK-(*)-31SL	15/16	2 1/4	1/2	2 9/16-6	2 3/4	2.210 (56,13)	2 7/8	.169 (4,29)

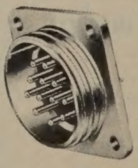
*Add contact arrangement.

K-32S, K-32SL
WALL MOUNTING RECEPTACLE
PIN INSERTS

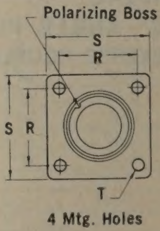


K-32S





K-32SL



K-32S (Small Flange) and K-32SL (Large Flange)

Part Number	For K-32S and K-32SL				For K-32S			For K-32SL		
	L ±3/64	N ±.005	M ±1/64	A Thd.	R ±.005	S ±1/64	T ±.005	R ±.005	S ±1/64	T ±.005
WK-(*)-32S	3/4	3/4	7/16	7/8-6	.730 (18,54)	15/16	.120 (3,05)	.972 (24,69)	1 5/16	.144 (3,65)
GK-(*)-32S	3/4	1	7/16	1 3/16-6	.972 (24,69)	1 1/4	.120 ((3,05)	1.192 (30,28)	1 9/16	.169 (4,29)
SK-(*)-32S	3/4	1 1/8	7/16	1 5/16-6	1.038 (26,37)	1 3/8	.120 (3,05)	1.282 (32,56)	1 11/16	.169 (4,29)
NK-(*)-32S	3/4	1 3/8	7/16	1 9/16-6	1.259 (31,98)	1 5/8	.144 (3,66)	1.503 (38,18)	1 15/16	.169 (4,29)
FK-(*)-32S	3/4	1 5/8	7/16	1 13/16-6	1.502 (38,15)	1 7/8	.144 (3,66)	1.679 (42,65)	2 1/8	.169 (4,29)
IK-(*)-32S	27/32	1 15/16	1/2	2 1/4-6	1.944 (49,38)	2 5/16	.169 (4,29)	2.031 (51,59)	2 9/16	.169 (4,29)
LK-(*)-32S	27/32	2 1/4	1/2	2 1/2-6	2.077 (52,76)	2 9/16	.169 (4,29)	2.210 (56,13)	2 7/8	.169 (4,29)

For K-32L (Large Flange), add "L" to nomenclature. e.g., WK-(*)-32S becomes WK-(*)-32SL.
*Add contact arrangement.

(millimeters are in parentheses)

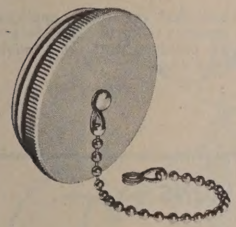
Dimensions subject to change.

STANDARD CIRCULAR CONNECTORS K SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

K AND RK SERIES ACCESSORIES

K & RK-59A DUST CAPS



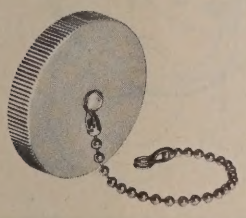
K-59A (for K-21, K-23 Plugs, K-31SL Receptacle)

Shell Size	Chain	Shell Size	Chain
WK-59A-1	No chain	FK-59A-1	No chain
WK-59A-2	#6	FK-59A-2	#6
GK-59A-1	No chain	IK-59A-1	No chain
GK-59A-2	#6	IK-59A-1	#10
SK-59A-1	No chain	LK-59A-1	No chain
SK-59A-2	#6	LK-59A-2	#10
NK-59A-1	No chain		
NK-59A-2	#6		

RK-59A (for RK-31SL Receptacle)

Shell Size	Chain	Shell Size	Chain
RWK-59A-1	No chain	RNK-59A-2	#6
RWK-59A-2	#6	RFK-59A-1	No chain
RGK-59A-1	No chain	RFK-59A-2	#6
RGK-59A-2	#6	RIK-59A-1	No chain
RSK-59A-1	No chain	RIK-59A-2	#10
RSK-59A-2	#6	RLK-59A-1	No chain
RNK-59A-1	No chain	RLK-59A-2	#10

K & RK-60A DUST CAPS



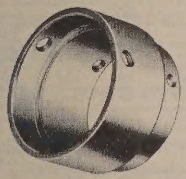
K-60A (for K-22 Plug and K-32S, K-32SL Receptacles)

Shell Size	Chain	Shell Size	Chain
WK-60A-1	No chain	FK-60A-1	No chain
WK-60A-2	#6	FK-60A-2	#6
GK-60A-1	No chain	IK-60A-1	No chain
GK-60A-2	#6	IK-60A-2	#10
SK-60A-1	No chain	LK-60A-1	No chain
SK-60A-2	#6	LK-60A-2	#10
NK-60A-1	No chain		
NK-60A-2	#6		

RK-60A (for RK-22 and RK-24 Plugs)

Shell Size	Chain	Shell Size	Chain
RWK-60A-1	No chain	RNK-60A-2	#6
RWK-60A-2	#6	RFK-60A-1	No chain
RGK-60A-1	No chain	RFK-60A-2	#6
RGK-60A-2	#6	RIK-69A-1	No chain
RSK-60A-1	No chain	RIK-69A-2	#10
RSK-60A-2	#6	RLK-60A-1	No chain
RNK-60A-1	No chain	RLK-60A-2	#10

BARREL EXTENSIONS



Shell Size	Length	Part Number
WK	½"	019961-0017
	1"	019961-0009
GK	½"	019961-0023
	1"	019961-0011
IK	½"	019961-0018
	¾"	019961-0019

Shell Size	Length	Part Number
NK	½"	019961-0014
	¾"	019961-0021
	1⅛"	019961-0006
FK	17/32"	019961-0003
	1"	019961-0016
	1 7/32"	019961-0004
SK	½"	019961-0010
	¾"	019961-0020
	1 7/32"	019961-0001

CONTACT ARRANGEMENTS by number of contacts

Code	Contact Spacing	Test Voltage 60 cps. (ac rms)	Code	Contact Spacing	Test Voltage 60 cps. (ac rms)	Code	Contact Spacing	Test Voltage 60 cps. (ac rms)
A	1/64	540 volts	J	9/64	3050 volts	S	19/64	4940 volts
B	1/32	1000 volts	K	5/32	3250 volts	T	5/16	5100 volts
C	3/64	1300 volts	L	11/64	3450 volts	U	23/64	5580 volts
D	1/16	1700 volts	M	3/16	3650 volts	V	⅜	5750 volts
E	5/64	2050 volts	N	13/64	3850 volts	W	25/64	5890 volts
F	3/32	2350 volts	O	7/32	4050 volts	X	13/32	6020 volts
G	7/64	2600 volts	P	15/64	4240 volts	Y	7/16	6300 volts
H	⅛	2900 volts	Q	¼	4420 volts	Z	½	6800 volts
			R	9/32	4780 volts			

SPACING/VOLTAGE CODE

There shall be no evidence of breakdown when the test voltages indicated below are applied, for a period of one minute, between the contacts and between the shell and the contacts with spacings as noted below:

Laboratory Conditions

Ambient Temperature	20°C to 27°C
Relative Humidity	69% to 73%
Barometric Pressure	29.70" to 29.75"
Insert Material	Phenolic XXX-P or molded melamine

Dimensions subject to change.

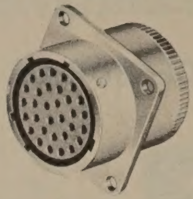
ITT CANNON ELECTRIC

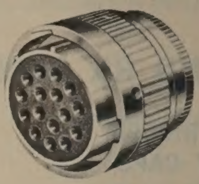
MINIATURE CIRCULAR CONNECTORS KPT/KPTM/KPSE SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MINIATURE CIRCULAR CONNECTORS DESIGNED TO MIL-C-26482 SERIES I, SOLDER AND CRIMP CONTACTS

KPT/KPTM/KPSE





This catalog describes CANNON® connectors using MIL-C-26482 Series I type hardware with three-point bayonet coupling and five-key polarization. These miniature circular connectors are grouped into three series ranging from general purpose solder pot connectors . . . to high performance, crimp connectors . . . to connectors with high contact density. This broad range provides the most complete family of 26482 connectors available today. The versatility of these connectors is proven by the fulfillment of requirements ranging from general purpose to space environmental.

In addition to the three basic series, connectors for special applications are also available. They include RFI filtering versions (with low pass internal filter pin contacts), hermetic connectors for high pressure watertight requirements, and twist-on pull-off couplers for MIL-C-26482 plugs.

STANDARD DATA

Standard Materials and Finishes	**KPT**	**KPTM**	**KPSE**
SHELL	aluminum alloy, conductive olive drab chromate over cadmium finish per QQ-P-416		
INSULATOR	polychloroprene	polychloroprene	polychloroprene
GROMMET AND SEAL	polychloroprene	polychloroprene	polychloroprene
CONTACTS	Copper alloy, gold over copper plate per MIL-G-45204 type II, Class I		

Mechanical Data

SHELL SIZES	00—wall mounting receptacle 01—cable connecting plug 02—box mounting receptacle 06—straight plug	07—jam nut receptacle 08—90° angle plug B—thru-bulkhead receptacle (KPT only)
SHELL SIZES	KPT/KPTM 8 thru 24	KPSE 10 thru 24
POLARIZATION/COUPLING	fine keyway/three point bayonet	
SERVICE CLASSES	A—general duty B—general duty with strain relief E—grommet seal F—grommet seal with strain relief	J—gland nut with strain relief for jacketed cable P—potted

Electrical Data

NUMBER OF CONTACTS	KPT/KPTM 2 thru 61	KPSE 3 thru 61
WIRE SIZE, AWG	KPT/KPTM 12 thru 24	KPSE 16 thru 24

WIRE RANGE ACCOMMODATIONS

CONTACT SIZE	AW6 WIRE SIZE	MIN. KPT	MIN. KPTM/ KPSE	MAX. KPT/ KPTM/KPSE
20	24, 22, and 20	.060	.047	.083
16	20, 18 and 16	.066	.066	.109
12	14 and 12	.097		.142

CONTACT TERMINATION	solder	crimp snap-in

Contact Rating	CONTACT SIZE	RATED AMPS	TEST CURRENT	MILLIVOLT DROP
	20	7.5	7.5	less than 55
	16	22.0	13.0	less than 50

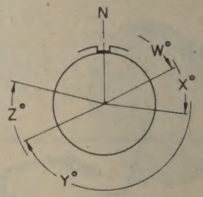
Service Rating	TEST VOLT.	SERVICE	AC (rms)	DC	MAXIMUM OPERATING VOLTAGE	SERVICE	AC (rms)	DC
	Sea Level	1	1500	2100				
		2	2300	3200				
	70,000 ft.	1	375	535	Sea Level	1	600	850
		2	550	770		2	1000	1275

Coaxial Contacts	—	RG-55/U, RG-59/U, RG-62/U, and RG-223/U	—

ALTERNATE INSERT POSITIONS

The diagram at the left indicates alternate insert positions. The five positions (W, X, Y, Z and Normal) differ in degree of rotation for various sizes and arrangements. For the exact degree of rotation, and for the list of contact arrangements and alternate positions available, refer to the tabulation below.

INSERT POSITION
(Face view of pin insert)

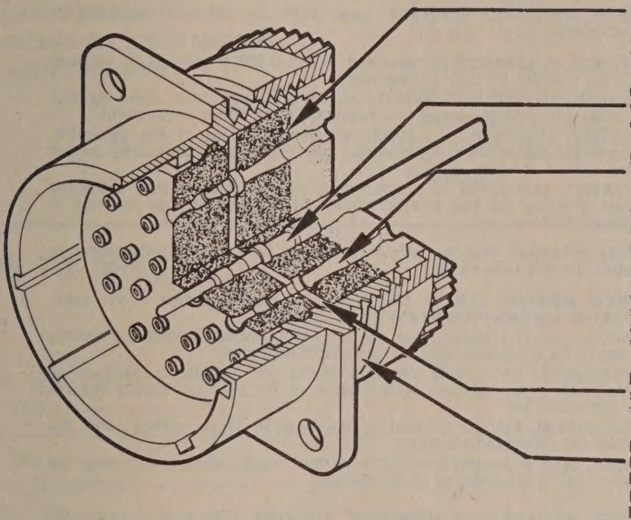


NO. OF CONTACTS	SHELL SIZE	ARR. NO.	Degrees of Rotation W	X	Y	Z
2	8	8-2	58	122	—	—
3	8	8-3	60	210	—	—
	8	8-33	90	—	—	—
	12	12-3	—	—	180	—
4	8	8-4	45	—	—	—
5	14	14-5	40	92	184	273
6	10	10-6	90	—	—	—
	10	10-98	90	180	240	270
8	12	12-8	90	112	203	292
	16	16-8	54	152	180	331
	24	24A8	—	—	—	—
	24	24A8	—	—	—	—
	24	24A9	—	—	—	—
10	12	12-10	60	155	270	295
11	18	18-11	62	119	241	340
12	14	14-12	43	90	—	—
15	14	14-15	17	110	155	234
16	20	20-16	238	318	333	347
18	14	14-18	15	90	180	270
19	14	14-19	30	165	315	—
21	22	22-21	16	135	175	349
23	16	16-23	158	270	—	—
	16	**16A99**	**66**	**156**	**223**	**340**
24	20	20-24	70	145	215	290
26	16	16-26	60	—	275	338
28	18	18A28	—	—	—	—
30	18	18-30	180	193	285	350
31	24	24A31	90	225	—	—
32	18	18-32	85	138	222	265
	22	22-32	72	145	215	288
34	22	22-34	62	142	218	298
36	22	22-36	72	144	216	288
39	20	20-39	63	144	252	333
41	20	20-41	45	126	225	—
	22	22-41	39	135	264	—
55	22	22-55	30	142	226	314
57	**24**	**24A57**	**90**	**180**	**270**	**324**
61	24	24-61	90	180	270	324

Numbers in bold face indicate contact arrangements are not to MIL-C-26482.

GENERAL PURPOSE, CRIMP CONTACT CONNECTORS

KPTM SERIES



DUAL-SHORE® INSULATOR is integrally molded polychloroprene with a firm front section and a soft resilient rear section that provides a moistureproof seal around each wire. A hard plastic web is molded within the firm front section to prevent over-insertion of the contacts. This construction eliminates the moisture traps characteristic of other types of insulators.

CRIMP, SNAP-IN CONTACTS are to MIL-C-23216 specification and can be crimped with the standard M22520/1 crimp tool. They are especially suited to quick and easy field service by unskilled personnel.

BOW SPRING SOCKET CONTACTS increase socket contact area, provide smooth insertion and prolong connector life.

CLOSED-ENTRY SOCKETS eliminate damage from abuse by test probes and automatically correct misaligned pins. Lead-in chamfers around the socket assures proper mating even with up to .060" misalignment or splay of mating pins.

INTERFACIAL SEALING is assured by raised barriers around each pin contact that compress into the lead-in chamfers at each socket contact. This method provides such a positive seal around each pair of mated contacts that, if several contacts are removed from the insert, there will be no leakage to the remaining contacts when the connector is immersed in water.

POSITIVE STOP, a tough thermoplastic web molded into the DUAL-SHORE insulator, prevents over-insertion of contacts by providing a close-fitting seat for the shoulder of each pin or socket.

HARDWARE is aluminum alloy, finished to QQ-P-416, and conforms to MIL-C-26482. Five key polarization assures correct hardware engagement, and three-point bayonet lock provides quick connect/disconnect. To aid further in sealing, a peripheral neoprene ring is mounted in the receptacle and is compressed by the plug barrel while engaged.

FEATURES

- **unique DUAL-SHORE insulator**
- **crimp snap-in contacts**
- **closed-entry bow spring socket contacts**
- **interfacial sealing**
- **positive stop to prevent over-insertion of contacts**

KPTM connectors are recommended for applications which require an extremely reliable, environment-resistant connector designed for economy, efficiency and simplicity, but not requiring MIL-SPEC qualifications. The KPTM is a version of the KPT with a DUAL-SHORE insulator and MS-3192/3193 crimp snap-in contacts. The DUAL-SHORE insulator is a simple, compact unit with no retaining clips or rings to move or obstruct, and no glued joints to loosen or serve as moisture entry paths.

Interfacial sealing is assured by raised barriers around each pin contact cavity that compress into the lead-in chamfers at each socket contact cavity when mated, providing such a positive seal there will be no leakage when the connector is immersed in water even if several contacts are removed.

KPTM connectors are intermateable, intermountable and interchangeable with all MIL-C-26482 connectors. In fact, they utilize the same crimp, removable (MIL-C-23216) contacts as used in the MIL-qualified KPSE series, thus allowing the user to standardize on one contact for use in both the qualified MS (KPSE) series and the KPTM series.

HOW TO ORDER

KPTM 00 E 18 - 32 P X **

Series Prefix
Shell Style
Service Type
Shell Size
Contact Arrangement
Contact Type
Alternate Insert Position
Modification Code

SERIES PREFIX
KPTM — ITT Cannon prefix

SHELL STYLE
00 — wall mounting receptacle
01 — cable connecting plug
02 — box mounting receptacle
06 — straight plug
07 — jam nut receptacle
08 — 90° angle plug

SERVICE TYPE
A — general duty
B — general duty with strain relief
E — grommet seal
F — grommet seal with strain relief
J — watertight gland seal with strain relief for jacketed cable
P — potted

SHELL SIZE
8, 10, 12, 14, 16, 18, 20, 22 and 24.

CONTACT ARRANGEMENT
See contact arrangement page.

CONTACT TYPE
P — pin
S — socket

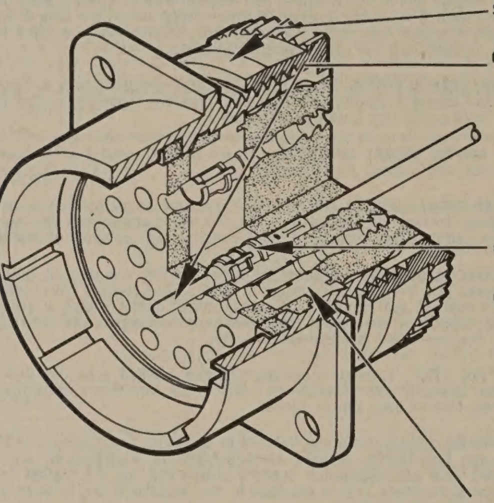
ALTERNATE INSERTION POSITION
W, X, Y, and Z. (Omit for normal.)

MODIFICATION CODE
Consult factory. Omit first digit (0) of shell style indication when using modification code, except for code FO. FO designates connector less contacts. See COMPONENTS/ACCESSORIES page for contact part numbers.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

HIGH PERFORMANCE, MIL-C-26842 SERIES I CRIMP CONTACT CONNECTORS

KPSE SERIES



STANDARD MIL-C-26482 HARDWARE mates with any connector designed to MIL-C-26482.

CRIMP, SNAP-IN CONTACTS are designed to MIL-C-23216 and can be crimped with the standard M22520/1 crimp tool.

CLOSED-ENTRY SOCKET CONTACTS eliminate damage from abuse by test probes and help to correct any misaligned pins during engagement.

CONTACT INSERTION is accomplished from the rear of the connector. When the contact is fully inserted, the clip tines snap securely behind the contact shoulder.

CONTACT EXTRACTION is accomplished with a front-inserted extraction tool. Pressing the tool plunger pushes the contact out thru the rear of the connector.

CONTACT RETAINING CLIP is completely encased in a tough plastic wafer to protect the clip from damage.

COMPLETE MOISTURE SEALING is achieved by combining four seals: shell, peripheral, interfacial and wire seals.

SHELL SEAL is effected when the plug shell pushes against the sealing ring in the receptacle when the connectors are mated.

PERIPHERAL SEAL around the edge of the pin insulator is designed so that mating the connector puts tension on the seal and greatly reduces compression set.

INTERFACIAL SEAL is achieved by the insulator faces meeting when the plug and receptacle are mated.

WIRE SEAL is accomplished by a multiple ripple design, exceeding the wire sealing requirements of MIL-C-26482.

POSITIVE INSERT-TO-SHELL MECHANICAL RETENTION with hard plastic wafer firmly locked into a groove in the shell, in addition to a strong adhesive bond between the insert and shell.

FEATURES

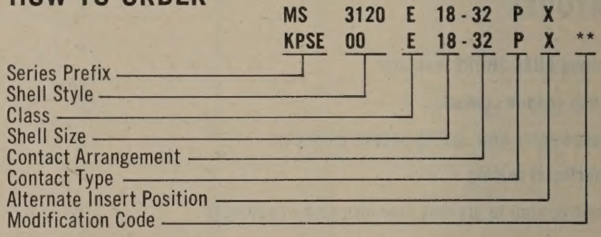
- environment-resistant
- voidless integrally molded insulator
- front-release, crimp snap-in contacts
- closed entry socket contacts
- 4 moisture seals for complete sealing
- contact clip protected in hard dielectric
- positive insert-to-shell mechanical retention

KPSE environment-resistant, miniature circular, quick disconnect connectors, qualified to MIL-C-26482, are designed for the exacting requirements of today's electronic industry. The KPSE features an insulator which is mechanically retained in the shell by a positive, hard plastic-to-metal lock retention augmented by a reliable adhesive bond. Complete moisture sealing is achieved by four seals; shell, peripheral, interfacial and wire seals.

Crimp snap-in contacts are retained in clips that are completely encased in a tough hard dielectric wafer, thus protecing the clip tines from damage. Closed-entry socket contacts facilitate positive mating.

The KPSE series is intermateable, intermountable and interchangeable with all MIL-C-26482 connectors, whether crimp or solder type, and is available with many materials, finishes and configurations.

HOW TO ORDER



SERIES PREFIX
KPSE — ITT Cannon prefix
MS — MIL-C-26482 prefix

SHELL STYLE
ITT Cannon Number:

00 — wall mounting receptacle	06 — straight plug
01 — cable connecting plug	07 — jam nut receptacle
02 — box mounting receptacle (without wire seals)	08 — 90° angle plug

MS Designation:

3120 — wall mounting receptacle	3124 — jam nut receptacle
3121 — cable connecting plug	3126 — straight plug
3122 — box mounting receptacle	

CLASS
A — general duty (not MS approved)
B — general duty with strain relief without grommet & ferrule, (may be used for potting when strain relief is desired) (not MS approved)
E — grommet seal (MS specification)
F — grommet seal with strain relief (MS specification)
J — gland seal with strain relief for jacketed cable (not MS approved)
P — potted (MS specification)

SHELL SIZE
10, 12, 14, 16, 18, 20, 22, and 24

CONTACT ARRANGEMENT
See contact arrangement page

CONTACT TYPE
P — pin
S — socket

ALTERNATE INSERT POSITION
W, X, Y, and Z. (Omit for normal.)

MODIFICATION CODE
Consult factory. Omit first digit (0) of shell style indication when using modification code, except for code FO., FO designates connector less contacts. See COMPONENTS/ACCESSORIES page for contact part numbers.

GENERAL PURPOSE, MIL-C-26482 SOLDER CONTACT CONNECTORS

KPT SERIES

FEATURES

- general purpose
- closed-entry socket contacts
- solder termination

KPT connectors are a series of general-purpose, environment-resistant, miniature circular connectors, qualified for use in military applications. These connectors are also widely used in industrial applications calling for quick-disconnect connectors with fixed contacts for solder termination.

The KPT series is intermateable and intermountable with all MIL-C-26482 connectors, whether solder or crimp type and is available with many materials, finishes and configurations.

HOW TO ORDER

MS 3110 E 22-36 P Y
KPT 00 E 22-36 P Y **

Series Prefix
Shell Style
Class
Shell Size
Contact Arrangement
Contact Type
Alternate Insert Position
Modification Code

SERIES PREFIX
KPT — ITT Cannon prefix
MS — MIL-C-26482 prefix

SHELL STYLE
ITT Cannon number:
00 — wall mounting receptacle
01 — cable connecting plug
02 — box mounting receptacle (Class E only)
06 — straight plug
07 — jam nut receptacle (available in hermetic version also)
08 — 90° angle plug
B — thru-bulkhead receptacle (Class E only)

MS Designation:
3110 — wall mounting receptacle
3111 — cable connecting plug
3112 — box mounting receptacle (Class E only)
3114 — jam nut receptacle
3116 — straight plug
3119 — thru-bulkhead receptacle (Class E only)

CLASS
A — general duty (not MS approved)
B — general duty with strain relief without grommet & ferrules (may be used for potting when strain relief is desired) (not MS approved)
E — grommet seal except on 02 and 3112 (MS specification)
F — grommet seal with strain relief (MS specification)
J — water tight gland seal with strain relief for jacketed cable (MS specification)
P — potted (MS specification)

SHELL SIZE
8, 10, 12, 14, 16, 18, 20, 22, and 24

CONTACT ARRANGEMENT
See contact arrangements page.

CONTACT TYPE
P — pin; S — socket

ALTERNATE INSERT POSITION
W X, Y and Z. (Omit for normal.)

MODIFICATION CODE
Consult factory. Omit first (0) of shell style indication when using modification code.

KPTB CONNECTORS

- general purpose
- double ended pin and socket contacts
- contains KPT socket insert
- nonremovable contacts

KPTB connectors are a series of general purpose, miniature circular connectors, qualified for use in military applications. They are also widely used in industrial applications. The KPTB in a thru-bulkhead version with double faced pin and socket insert construction allowing mating from both ends. They contain KPT socket inserts with feedthru (pin/socket) nonremovable contacts.

The thru-bulkhead receptacle is provided for applications requiring the disconnection of a power source from either side of a panel. A typical connector to be used if air leakage requirements are critical.

HOW TO ORDER

Thru-Bulkhead Receptacle Connectors:

KPTB 22 - 55 PS Y

Series Prefix
Shell Size
Contact Arrangement
Contact Style (pin & socket)
Alternate Insert Position

MS3119 E 22 - 55 Y

MIL-C-26482 Prefix
Class
Shell Size
Contact Arrangement
Alternate Insert Position

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS
KPT/KPTM/KPSE SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

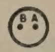
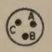
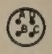
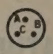
CONTACT ARRANGEMENTS (See page 38 for Alternate Insert Positions)

Drawing not to scale;
face view of pin insert shown
(socket view is opposite)

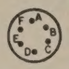
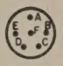
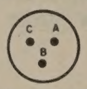
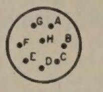
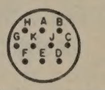
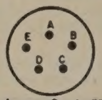
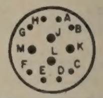
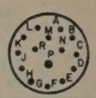
LEGEND

▲	KPT	△	Authorized per MIL-C-26482 (NAVY)
●	KPTM	□	Authorized per SCL-6019 (SIGNAL CORPS)
◆	KPSE		

SHELL SIZE 8

				
	▲□△	▲□△	▲□△	●▲△
SHELL SIZE	8-2	8-3	8-4	8-33
NO. OF CONTACTS	2-#20	3-#20	4-#20	3-#20
SERVICE RATING	1	1	1	1

SHELL SIZE 10 | **SHELL SIZE 12** | **SHELL SIZE 14**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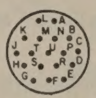
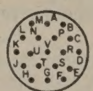
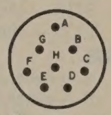
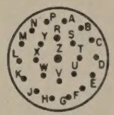
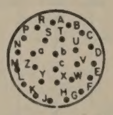
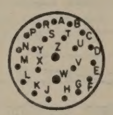
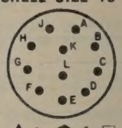
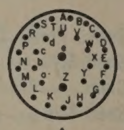
SHELL SIZE	10-6	10-98	12-3	12-8	12-10	14-5	14-12	14-15
NO. OF CONTACTS	6-#20	6-#20	3-#16	8-#20	10-#20	5-#16	8-#20 4-#16	14-#20 1-#16
SERVICE RATING	1	1	2	1	1	2	1	1

SHELL SIZE 16 | **SHELL SIZE 18**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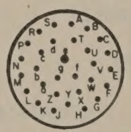
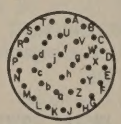
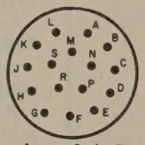
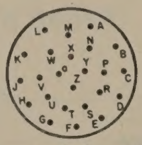
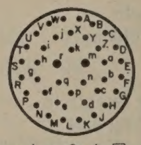
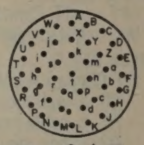
SHELL SIZE	14-18	14-19	16-8	16-23	16-26	16A99	18-11	18A28
NO. OF CONTACTS	18-#20	19-#20	8-#16	22-#20 1-#16	26-#20	21-#20 2-#16	11-#16	26-#20 2-#16
SERVICE RATING	1	1	2	1	1	1	2	1

SHELL SIZE 20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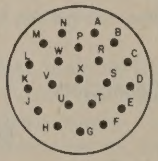
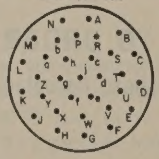
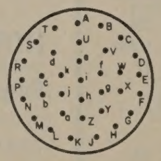
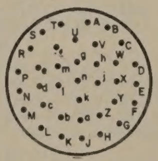
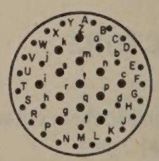
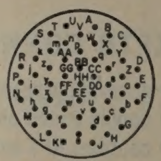
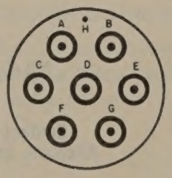
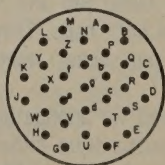
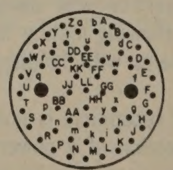
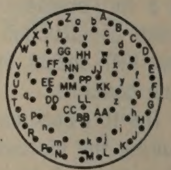
SHELL SIZE	18-30	18-32	20-16	20-24	20-39	20-41
NO. OF CONTACTS	29-#20 1-#16	32-#20	16-#16	24-#20	37-#20 2-#16	41-#20
SERVICE RATING	1	1	2	1	1	1

SHELL SIZE 22

		PIN INSERT ONLY KPTM				
						
	▲●◆△□	▲●△	▲△	▲●□	▲●△	▲●◆△□
SHELL SIZE	22-21	22-32	22-34	22-36	22-41	22-55
NO. OF CONTACTS	21-#16	32-#20	34-#20	36-#20	27-#20 14-#16	55-#20
SERVICE RATING	2	1	1	1	(#20's); 2 (#16's)	1

SHELL SIZE 24

						
	●	●	●	●	▲	▲●◆△□
SHELL SIZE	24A4	24A8	24A9	24A31	24A57	24-61
NO. OF CONTACTS	1-#20 2-RG-55/U	1-#20	1-#20	31-#16	55-#20 2-#12	61-#20
SERVICE RATING	5-RG-59/U	7-RG-59/U or 62/U	7-RG-223/U	1	1	1

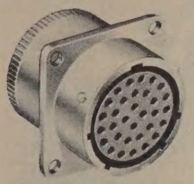
ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS KPT/KPTM/KPSE SERIES

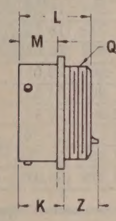
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

WALL MOUNTING RECEPTACLES

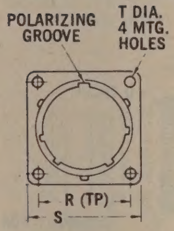
KPT00/MS3110
(MS service class E, F, J, P)
KPSE00/MS3120
(MS service class E, F, J, P)
KPTM00

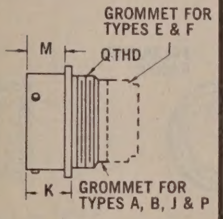


RECEPTACLE ASSEMBLY



SOLDER
KPT00/MS3110



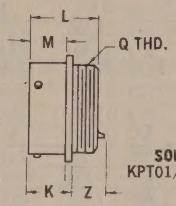


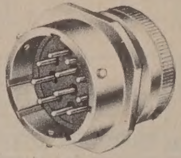
CRIMP
KPTM00/KPSE00/MS3120

CABLE CONNECTING PLUGS

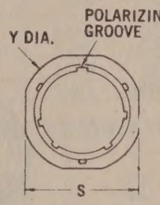
KPT01/MS3111
(MS service class E, F, J, P)
KPSE01/MS3121
(MS service class E, F, P)
KPTM01

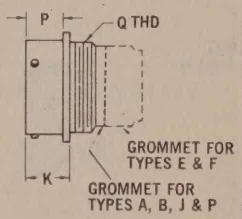
PLUG ASSEMBLY





SOLDER
KPT01/MS3111

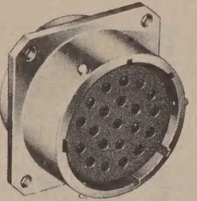




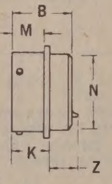
CRIMP
KPTM01/KPSE01/MS3121

BOX MOUNTING RECEPTACLES

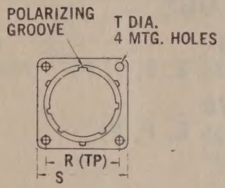
KPT02/MS3112
(MS service class E)
KPSE02/MS3122
(MS service class E)
KPTM02

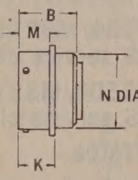


RECEPTACLE ASSEMBLY



SOLDER
KPT02/MS3112





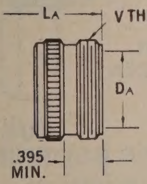
CRIMP
KPTM02/KPSE02

WITHOUT TERMINATION ASSEMBLIES

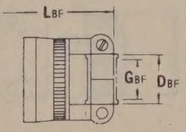
Shell Size	B Max.	K ±.010(±0,25)	L Max.	M ±.005(±0,13)	KPT/KPTM/KPSE N Dia. Max.	P ±.005(±0,13)	R• (TP)	S Max.	T ±.005(±0,13)	Y Max.	KPT Z Max.	Q Thread UNEF Class 2A
‡8	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	.436 (11,07)	.425 (10,79)	.594 (15,09)	.828 (21,03)	.120 (3,05)	.958 (24,33)	.483 (12,27)	7/16-28
10	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	.526 (14,27)	.425 (10,79)	.719 (18,26)	.954 (24,23)	.120 (3,05)	1.082 (27,48)	.483 (12,27)	9/16-24
12	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	.687 (17,45)	.425 (10,79)	.812 (20,62)	1.047 (26,59)	.120 (3,05)	1.176 (29,87)	.483 (12,27)	11/16-24
14	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	.812 (20,62)	.425 (10,79)	.906 (23,01)	1.141 (28,98)	.120 (3,05)	1.270 (32,26)	.483 (12,27)	13/16-20
16	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	.936 (23,77)	.425 (10,79)	.969 (24,61)	1.234 (31,34)	.120 (3,05)	1.364 (34,65)	.483 (12,27)	15/16-20
18	.832 (21,13)	.530 (13,46)	.848 (21,54)	.457 (11,61)	1.061 (26,95)	.425 (10,79)	1.062 (26,97)	1.328 (33,73)	.120 (3,05)	1.458 (37,03)	.483 (12,27)	1 1/16-18
20	.895 (22,73)	.650 (16,51)	1.055 (26 80)	.561 (14,25)	1.186 (30,12)	.540 (13,72)	1.156 (29,36)	1,453 (36,91)	.120 (3,05)	1.582 (40,18)	.427 (10,85)	1 3/16-18
22	.895 (22,73)	.650 (16,51)	1.055 (26,80)	.561 (14,25)	1.311 (33,30)	.540 (13,72)	1.250 (31,75)	1.578 (40,08)	.120 (3,05)	1.708 (43,38)	.427 (10,85)	1 5/16-18
24	.895 (22,73)	.683 (17,35)	1.055 (26,80)	.594 (15,09)	1.436 (36,47)	.573 (14,55)	1.375 (34,92)	1.703 (43,26)	.147 (3,73)	1.832 (46,53)	.393 (9,98)	1 7/16-18

‡ Not available in KPSE. • (TP) located within .010 T.P. with respect to diameter A and master keyway.

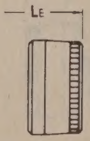
WITH TERMINATION ASSEMBLIES



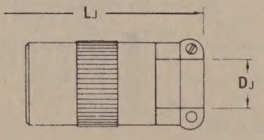
TYPE A



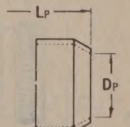
TYPE B AND F



TYPE E



TYPE J



TYPE P

Shell Size	TYPE A D_A Min.	L_A Max.	TYPE B and F D_{BF} Min.	G_{BF} Min.	L_{BF} Max.	TYPE E L_E Max.	TYPE J D_J Min.	D_J Max.	L_J Max.	TYPE P D_P Min.	L_P Max.	V Thread UNEF Class 2A
‡8	.335(8,51)	1.444(36,68)	.234(5,94)	.115(2,92)	1.776(45,11)	1.328(33,73)	.168(4,27)	.230(5,84)	2.270(57,66)	.327(8,31)	1.450(36,83	1/2-28
10	.466(11,84)	1.444(36,68)	.297(7,54)	.178(4,52)	1.776(45,11)	1.328(33,73)	.205(5,21)	.312(7,92)	2.270(57,66)	.444(11,28)	1.450(36,83)	5/8-24
12	.591(15,01)	1.444(36,68)	.422(10,72)	.302(7,67)	1.176(45,11)	1.328(33,73)	.338(8,59)	.442(11,23)	2.410(61,21)	.558(14,17)	1.450(36,83)	3/4-20
14	.705(19,05)	1.444(36,68)	.547(13,89)	.365(9,27)	1.776(45,11)	1.328(33,73)	.416(10,57)	.539(13,56)	2.600(66,04)	.683(17,35)	1.450(36,83)	7/8-20
16	.830(21,08)	1.444(36,68)	.609(15,47)	.490(12,45)	1.896(48,16)	1.328(33,73)	.550(13,97)	.616(15,65)	2.880(73,15)	.808(20,52)	1.450(36,83)	1-20
18	.948(24,08)	1.444(36,68)	.740(18,80)	.615(15,62)	1.896(48,16)	1.328(33,73)	.660(15,24)	.672(17,07)	3.170(80,52)	.909(23,09)	1.450(36,83)	1 3/16-18
20	1.043(26,49)	1.728(43,89)	.740(18,80)	.615(15,62)	1.970(50,04)	1.360(34,54)	.635(16,13)	.747(18,97)	3.610(91,69)	1.034(26,26)	1.660(42,16)	1 3/16-18
22	1.198(30,43)	1.728(43,89)	.928(23,57)	.740(18,80)	1.970(50,04)	1.360(34,54)	.670(17,02)	.846(21,49)	3.760(95,50)	1.159(29,44)	1.660(42,16)	1 7/16-18
24	1.293(32,84)	1.738(43,89)	.984(24,99)	.790(20,07)	1.970(50,04)	1.360(34,54)	.740(18,80)	.894(22,71)	3.900(99,06)	1.284(32,61)	1.730(43,94)	1 7/16·18

‡ Not available in KPSE.

Dimensions subject to change. *(millimeters are in parentheses)*

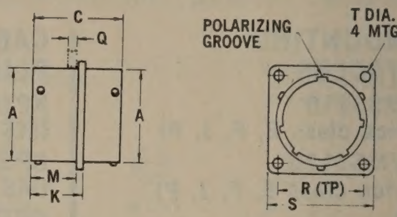
MINIATURE CIRCULAR CONNECTORS
KPT/KPTM/KPSE SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

BOX MOUNTING RECEPTACLES

KPTB/MS3119
(MS service class E)

THRU-BULKHEAD RECEPTACLE



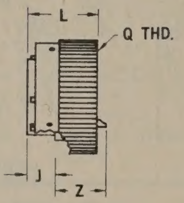
Shell Size	A Dia. ±.003	K ±.020	C Max.	M ±.010	Q Max.	R* (TP)	S Max.	T ±.00
8	.471 (11,96)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	.594 (15,09)	.828 (21,03)	.120 (3,05)
10	.588 (14,94)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	.719 (18,26)	.954 (24,23)	.120 (3,05)
12	.748 (18,00)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	.812 (20,62)	1.047 (26,59)	.120 (3,05)
14	.873 (22,17)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	.906 (23,01)	1.141 (28,98)	.120 (3,05)
16	.998 (25,35)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	.969 (24,61)	1.234 (31,34)	.120 (3,05)
18	1.123 (28,52)	.634 (16,10)	1.125 (28,58)	.572 (14,53)	.188 (4,78)	1.062 (26,97)	1.328 (33,73)	.120 (3,05)
20	1.248 (31,70)	.792 (20,12)	1.255 (31,88)	.698 (17,73)	.312 (7,92)	1.156 (29,36)	1.453 (36,91)	.120 (3,05)
22	1.373 (34,87)	.792 (20,12)	1.255 (31,88)	.698 (17,73)	.312 (7,92)	1.250 (31,75)	1.578 (40,08)	.120 (3,05)
24	1.498 (38,05)	.792 (20,12)	1.255 (31,88)	.698 (17,73)	.312 (7,92)	1.375 (34,92)	1.703 (43,26)	.147 (3,73)

*(T.P.) located within .010 T.P. with respect to diameter A and master keyway.

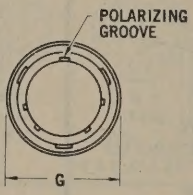
STRAIGHT PLUGS

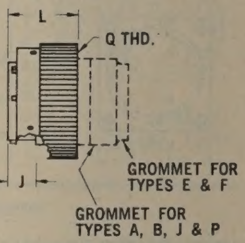
KPT06/MS3116
(MS service class E, F, J, P)
KPSE06/MS3126
(MS service class E, F, P)
KPTM06

PLUG ASSEMBLY

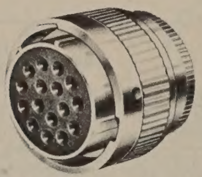


SOLDER
KPT06/MS3116



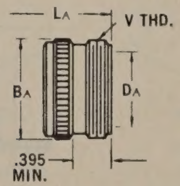


CRIMP
KPTM06/KPSE06/MS3126

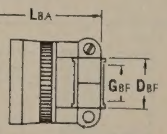


WITHOUT TERMINATION ASSEMBLIES

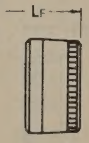
Shell Size	KPT/KPTM/KPSE G Max.	J ±.005 (±0,13)	L Max.	KPT Z Max.	Q Thread UNEF Class 2A
‡8	.782 (19,86)	.358 (9,09)	.844 (21,44)	.641 (16,28)	7/16-28
10	.926 (23,52)	.358 (9,09)	.844 (21,44)	.641 (16,28)	9/16-24
12	1.043 (26,49)	.358 (9,09)	.844 (21,44)	.641 (16,28)	11/16-24
14	1.183 (30,05)	.358 (9,09)	.844 (21,44)	.641 (16,28)	13/16-20
16	1.305 (33,15)	.358 (9,09)	.844 (21,44)	.641 (16,28)	15/16-20
18	1.391 (35,33)	.368 (9,09)	.844 (21,44)	.641 (16,28)	1 1/16-18
20	1.631 (41,43)	.420 (10,67)	.989 (25,12)	.584 (14,83)	1 3/16-18
22	1.656 (42,06)	.420 (10,67)	.989 (25,12)	.584 (14,83)	1 5/16-18
24	1.777 (45,14)	.420 (10,67)	.989 (25,12)	.584 (14,83)	1 7/16-18



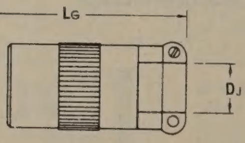
TYPE A



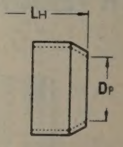
TYPE B AND F



TYPE E



TYPE J



TYPE P

WITH TERMINATION ASSEMBLIES

Shell Size	TYPE A L_A Max.	D_A Min.	TYPE B and F L_{BA} Max.	D_{BF} Min.	G_{BF} Min.	TYPE E L_F Max.	TYPE J L_G Max.	D_J Min.	D_J Max.	TYPE P L_H Max.	D_P Min.	V Thread UNEF Class 2A
‡ 8	1.440(36,58)	.335(8,51)	1.812(46,02)	.234(5,94)	.115(2,92)	1.328(33,73)	2.270(57,66)	.168(4,27)	.230(5,84)	1.450(36,83)	.327(8,31)	1/2-28
10	1.440(36,58)	.466(11,84)	1.812(46,02)	.297(7,54)	.178(4,52)	1.328(33,73)	2.270(57,66)	.205(5,21)	.312(7,92)	1.450(36,83)	.444(11,28)	5/8-24
12	1.440(36,58)	.591(15,01)	1.812(46,02)	.422(10,72)	.322(7,67)	1.328(33,73)	2.410(61,21)	.338(8,59)	.442(11,23)	1.450(36,83)	.558(14,17)	3/4-20
14	1.440(36,58)	.705(19,05)	1.812(46,02)	.547(13,89)	.365(9,27)	1.328(33,73)	2.600(66,04)	.416(10,57)	.539(13,56)	1.450(36,83)	.683(17,35)	7/8-20
16	1.440(36,58)	.830(21,08)	1.938(49,23)	.609(15,47)	.490(12,45)	1.328(33,73)	2.880(73,15)	.550(13,97)	.616(15,65)	1.450(36,83)	.808(20,52)	1-20
18	1.440(36,58)	.948(24,08)	1.938(49,23)	.740(18,80)	.615(15,62)	1.328(33,73)	3.170(80,52)	.600(15,24)	.672(17,07)	1.450(36,83)	.909(23,09)	1 3/16-18
20	1.662(42,21)	1.043(26,49)	1.953(49,61)	.740(18,80)	.615(15,62)	1.294(34,54)	3.510(89,15)	.635(16,13)	.747(18,97)	1.600(42,16)	1.034(26,26)	1 3/16-18
22	1.662(42,21)	1.198(30,43)	1.953(49,61)	.928(23,57)	.740(18,80)	1.294(34,54)	3,670(93,22)	.670(17,02)	.846(21,49)	1.600(42,16)	1.159(29,44)	1 7/16-18
24	1.672(42,21)	1.293(32,84)	1.953(49,61)	.984(24,99)	.790(20,07)	1.294(34,54)	3.800(96,52)	.740(18,80)	.894(22,71)	1.690(43,94)	1.284(32,61)	1 7/16-18

‡ Not available in KPSE.

(millimeters are in parentheses)

Dimensions subject to change.

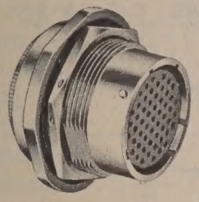
ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS
KPT/KPTM/KPSE SERIES

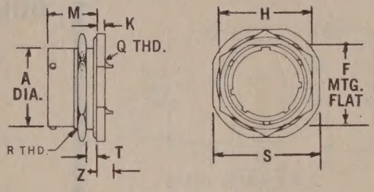
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

JAM NUT RECEPTACLES

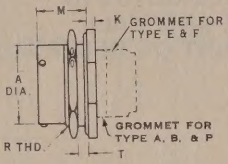
KPT07/MS3114
(MS service class E, F, P)
KPSE07/MS3124
(MS service class E, F, P)
KPTM07



RECEPTACLE ASSEMBLY

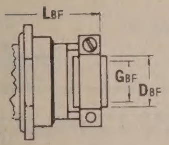


SOLDER
KPT07/MS3114
(Type A—Without Term. Access.)

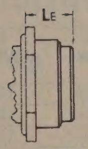


CRIMP
KPTM07/KPSE07/MS3124
(Type A—Without Term. Access.)

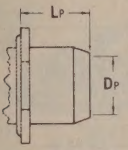
TERMINATION ASSEMBLIES



TYPE B & F



TYPE E



TYPE P

WITHOUT TERMINATION ASSEMBLIES

Shell Size	KPT/KPTM/KPSE A ±.003	F ±.005	H ±.005	K ±.010	M ±.005	S ±.010	T Panel Thick. Min.	T Panel Thick. Max.	KPT Z Max.	R Thread Class 2A UNEF
‡8	.471	.525	.750	.125	.696	.938	.062	.125	.312	$\frac{9}{16}$-24
10	.588	.650	.875	.125	.696	1.062	.062	.125	.312	$\frac{11}{16}$-24
12	.748	.813	1.062	.125	.696	1.250	.062	.125	.312	$\frac{7}{8}$-20
14	.873	.937	1.188	.125	.696	1.375	.062	.125	.312	1-20
16	.998	1.061	1.312	.125	.696	1.500	.062	.125	.312	1$\frac{1}{8}$-18
18	1.123	1.186	1.438	.125	.696	1.625	.062	.125	.312	1$\frac{1}{4}$-18
20	1.248	1.311	1.562	.156	.884	1.812	.062	.250	.187	1$\frac{3}{8}$-18
22	1.373	1.436	1.688	.156	.884	1.938	.062	.250	.187	1$\frac{1}{2}$-18
24	1.498	1.561	1.812	.156	.917	2.062	.062	.250	.150	1$\frac{5}{8}$-18

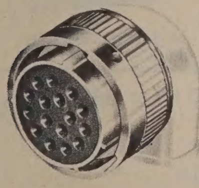
WITH TERMINATION ASSEMBLIES

Shell Size	TYPE B and F D_{BF} Min.	G_{BF} Min.	L_{BF} Max.	TYPE E L_E Max.	TYPE P D_P Min.	L_P Max.
‡8	.234	.115	1.812	.672	.327	.625
10	.297	.178	1.812	.672	.444	.625
12	.422	.302	1.812	.672	.558	.625
14	.547	.365	1.812	.672	.683	.625
16	.609	.490	1.938	.672	.808	.625
18	.740	.615	1.938	.672	.909	.625
20	.740	.615	2.016	.692	1.034	.746
22	.928	.740	2.016	.692	1.159	.746
24	.984	.790	2.016	.658	1.284	.716

‡ Not available in KPSE.

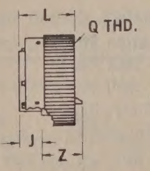
RIGHT ANGLE PLUGS

KPT08/KPSE08/KPTM08

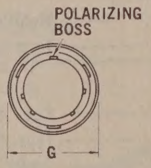


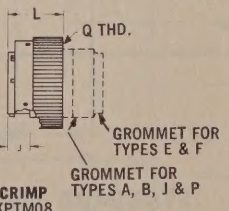
PLUG ASSEMBLY

RECEPTACLE ASSEMBLY



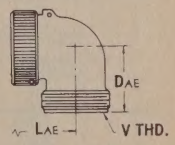
SOLDER
KPT08



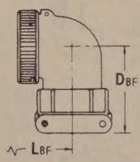


CRIMP
KPTM08
KPSE08

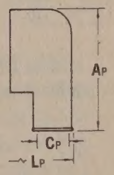
TERMINATION ASSEMBLIES



TYPE A and E



TYPE B and F



TYPE P

WITHOUT TERMINATION ASSEMBLIES

Shell Size	KPT/KPTM/KPSE G Max.	J ±.005	L Max.	KPT Z Max.	Q Thread UNEF Class 2A
‡8	.782	.358	.844	.641	$\frac{7}{16}$-28
10	.926	.358	.844	.641	$\frac{9}{16}$-24
12	1.043	.358	.844	.641	$\frac{11}{16}$-24
14	1.183	.358	.844	.641	$\frac{13}{16}$-20
16	1.305	.358	.844	.641	$\frac{15}{16}$-20
18	1.391	.358	.844	.641	1$\frac{1}{16}$-18
20	1.631	.420	.989	.584	1$\frac{3}{16}$-18
22	1.656	.420	.989	.584	1$\frac{5}{16}$-18
24	1.777	.420	.989	.584	1$\frac{7}{16}$-18

WITH TERMINATION ASSEMBLIES

Shell Size	TYPE A and E L_{AE} Max.	D_{AE} Max.	V Thread UNEF Class 2A	TYPE B and F D_{BF} Max.	L_{BF} Max.	TYPE P A_P Max.	L_P Max.	C_P Max.
‡8	1.421	.822	$\frac{1}{2}$-28	1.238	1.421	—	—	—
10	—	—	—	—	—	1.030	1.320	.252
12	1.546	.916	$\frac{3}{4}$-20	1.395	1.546	1.030	1.507	.252
14	1.577	.978	$\frac{7}{8}$-20	1.519	1.577	1.030	1.507	.283
16	1.609	1.041	1-20	1.582	1.609	1.280	1.507	.355
18	1.734	1.103	1$\frac{3}{16}$-18	1.644	1.734	1.280	1.695	.530
20	1.879	1.166	1$\frac{3}{16}$-18	1.707	1.879	1.530	1.752	.562
22	2.035	1.245	1$\frac{7}{16}$-18	1.884	2.035	1.530	1.752	.562
24	—	—	—	—	—	1.780	2.027	.610

‡ Not available in KPSE. NOTE: For size 10 and 24 consult factory for availability in Type A, B, E, and F. For size 8 consult factory for availability in Type P.

Dimensions subject to change.

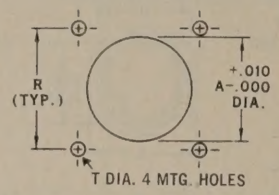
ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS KPT/KPTM/KPSE SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MOUNTING DATA

PANEL CUTOUTS BOX AND WALL MOUNTING RECEPTACLE

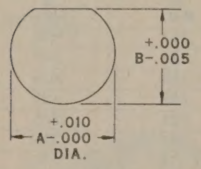


	FLANGE (FRONT MOUNTING) KPT/KPTM/KPSE			MOUNTING HOLE DIA. KPT/KPTM/KPSE	
Shell Size	A	A•	R	T ±.005	SCREW
‡8	.449	.563	.594	.125	#4
10	.573	.680	.719	.125	#4
12	.699	.859	.812	.125	#4
14	.823	.984	.906	.125	#4
16	.949	1.108	.969	.125	#4
18	1.073	1.233	1.062	.125	#4
20	1.199	1.358	1.156	.125	#4
22	1.323	1.483	1.250	.125	#4
24	1.449	1.610	1.375	.155	#6

‡ Not available in KPSE connectors.

• For back panel mounting.

JAM NUT RECEPTACLE



Shell Size	KPT/KPTM/KPSE A	B
‡8	.578	.542
10	.703	.669
12	.890	.830
14	1.015	.955
16	1.140	1.084
18	1.265	1.208
20	1.390	1.333
22	1.515	1.459
24	1.640	1.584

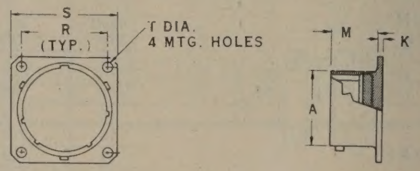
‡ Not available in KPSE connectors.

DUMMY RECEPTACLES

HOW TO ORDER

KPT 15 8 A
MS 3115 10 A

Prefix
Dummy Receptacle
Shell Size
Flange: A — standard



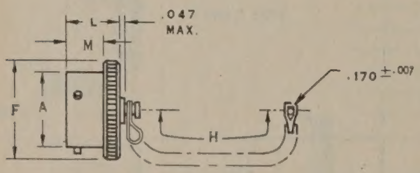
Shell Size	A ±.003	K ±.016	M +.015 —.016	R• (TP)	S Max.	T Dia.
*- 8A	.471	.062	.478	.594	.828	.120
*-10A	.588	.062	.478	.719	.954	.120
*-12A	.748	.062	.478	.812	1.047	.120
*-14A	.873	.062	.478	.906	1.141	.120
*-16A	.998	.062	.478	.969	1.234	.120
*-18A	1.123	.062	.478	1.062	1.328	.120
*-20A	1.248	.094	.572	1.156	1.453	.120
*-22A	1.373	.094	.572	1.250	1.578	.120
*-24A	1.498	.094	.605	1.375	1.703	.147

* Add prefix KPT15 or MS3115.

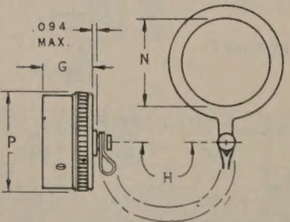
• (T.P.) located within .010 T.P. with respect to diameter A and master keyway.

PROTECTIVE CAPS

80 — cap for plugs



81 — cap for receptacles



* Add prefix: KPT or MS and add type: 80 for plug cap, 81 for receptacle cap; 3180 for MS plug cap, 3181 for MS receptacle cap.

** Add termination style; see part number explanation above.

HOW TO ORDER

KPT 81 - 12 C •
MS 3180 - 10

Modification: Consult factory.
Termination Style: no letter—without chain
C — sash chain
N — sash chain with ring (MIL SPEC) (81 or 3181 only)
Size: 8 thru 24
Type: 80 or 3180 — plug cap 81 or 3181 — receptacle cap
Prefix: KPT, MS use KPT for KPSE/KPTM

STANDARD MATERIALS AND FINISHES

	KPT/KPSE/MS
Protective Cap	aluminum alloy, olive drab finish, per QQ-P-416
Sash Chain	stainless steel
Ring/Rivet	stainless steel
Gasket	polychloroprene

Shell Size	A ±.003	F Max.	G Max.	H ±.250	L Max.	M +.015 —.016	N Min.	P Max.
*- 8**	.471	.719	.562	3.000	.562	.384	.578	.719
*-10**	.588	.844	.562	3.000	.562	.384	.703	.812
*-12**	.748	1.000	.562	3.500	.562	.384	.891	1.000
*-14**	.873	1.125	.562	3.500	.562	.384	1.016	1.125
*-16**	.998	1.250	.562	3.500	.562	.384	1.141	1.250
*-18**	1.123	1.375	.562	3.500	.562	.384	1.266	1.375
*-20**	1.248	1.500	.562	4.000	.625	.446	1.391	1.500
*-22**	1.373	1.625	.562	4.000	.625	.446	1.516	1.625
*-24**	1.498	1.750	.602	4.000	.658	.479	1.641	1.750

Dimensions subject to change.

ITT CANNON ELECTRIC

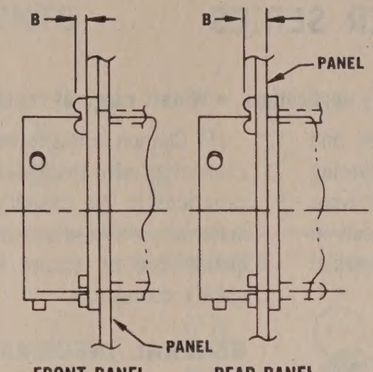
MINIATURE CIRCULAR CONNECTORS KPT/KPTM/KPSE SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

PANEL THICKNESS

Shown here are the maximum panel thickness dimensions allowable to ensure complete connector operation for the Wall Mounting Receptacle, Box Mounting Receptacle, and Thru-Bulkhead Receptacle.

Size	B Max
8	.087
10	
12	
14	
16	
18	
20	.212
22	
24	

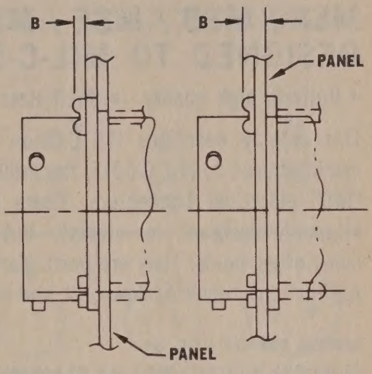


FRONT PANEL MTG REF

REAR PANEL MTG REF

WALL MOUNTING BOX MOUNTING RECEPTACLE

Size	B Max panel and screw head
8	.218
10	
12	
14	
16	
18	
20	.344
22	
24	.311



FRONT PANEL MTG REF

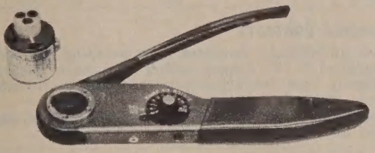
REAR PANEL MTG REF

THRU-BULKHEAD RECEPTACLE

COMPONENTS/ACCESSORIES

TOOLING

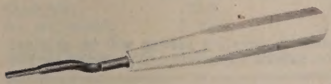
Crimp



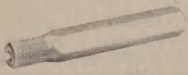
M22520/1-01 CRIMP TOOL

Connector Series	MS
KPTM/KPSE	M22520/1-01 Crimp Tool with M22520/1-02 Turret

Insertion/Extraction



KPTM Insertion



KPTM Extraction

KPSE Insertion

KPSE Extraction

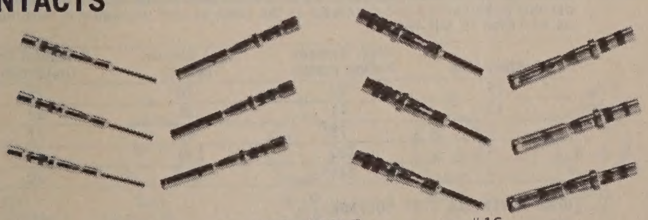
KPTM

Contact Size	Insertion	Extraction
20 without insulation support	CIT-20-18	CET-20-4
20 with insulation support	CIT-20-5A	CET-20-4
16	CIT-16-1	CET-16-3A

KPSE

Contact Size	Insertion MS	Extraction MS
20	MS24256A20	MS24256R20
16	MS24256A16	MS24256R16

CONTACTS

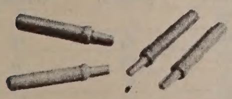


#20 KPTM/KPSE #16

KPTM/KPSE

Size/Type	MS	ITT CANNON
20 socket	MS3193A20-20A	031-9074-002
20 pin	MS3192A20-20A	030-9036-000
16 socket	MS3193-16-16A	031-9095-003
16 pin	MS3192-16-16A	030-9032-003

WIRE HOLE FILLERS/GROMMET SEALING PLUGS



KPTM/KPSE

Contact Size	Color Code	MS	ITT Cannon
20	Red	MS3187A20	225-1012-000
16	Blue	MS3187-16A	225-1011-000

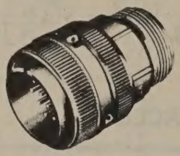
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

MSA / MSB / MSE / MSF / MSR /ER SERIES DESIGNED TO MIL-C-5015

• Uniform high quality • Shell sizes and types for every application • Widest range of contact arrangements

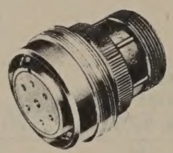
This catalog describes ITT Cannon connectors designed and manufactured to MIL-C-5015, the military specification covering "MS" electrical connectors. These circular connectors were originally designed for aircraft, but are now widely used in many other fields. They are particularly suitable for commercial applications requiring low cost and high reliability.

GENERAL PURPOSE MS-A, MS-B



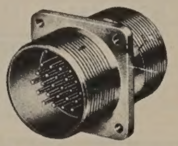
Designed to MIL-C-5015, MS-A and MS-B connectors are widely used in aircraft, commercial and industrial applications. MS-A connectors have solid endbells; MS-B connectors have split endbells; MS-C connectors are pressurized. Standard insulation is diayll phthalate. Shells are aluminum alloy. Contacts are silver plated copper alloy.

QUICK DISCONNECT CA-AQ AND CA-BQ



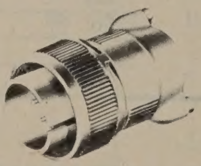
CA-AQ and CA-BQ are MS-A and MS-B plugs incorporating a quick-disconnect accessory. The accessory consists of a coupler and an adapter. CA-AQ and CA-BQ connectors are used in quick disconnect applications, such as between breakaway assemblies or where disconnect by a straight-away pull is required.

PRESSURIZED BULKHEAD BFR AND TBF



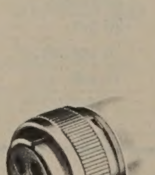
The BFR is a pressurized bulkhead connector that will mate with standard MS plugs. The TBF is a thru-bulkhead version with double faced construction allowing mating from both ends. Both connectors use resilient insulators. Contacts are silver plated copper alloy. Shells are aluminum alloy.

ENVIRONMENTAL RESISTANT MS-E, MS-F, MS-R and F-80 (Solder/Crimp Termination)



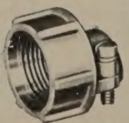
MS-E, MS-F and MS-R are similar to MS-A and MS-B connectors but have resilient insulators and wire sealing grommets for extreme environmental conditions and high altitude sealing. MS-E's and MS-F's have a mechanical cable clamp; the MS-R has a shorter, lighter weight endbell without the cable clamp. Both the MS-F and MS-R have O rings to supplement the interfacial seal. Shells are aluminum alloy. Contacts are silver plated copper alloy. The F-80 modification (crimp contact termination) is available in E, R, F and BFR styles with resilient insulators.

POTTING ER CONNECTORS (Solder Contact Termination)



These lightweight potting connectors provide resistance to salt water, fuels, etc., and will withstand the effects of high vibration. 3100 and 3106 connectors with plastic potting cups and resilient inserts meet the requirements of MS3103 and MS25183. Contacts are silver plated copper or brass. ER insulators are resilient; shells are aluminum alloy. A 90° plug (3108ER) is also available.

ACCESSORIES



Accessories to fit MS connectors include junction shells, protective caps, dummy or stowage receptacles, cable clamps, telescoping bushings.

ITT Cannon is the foremost manufacturer of MS and MS type connectors with the widest range of connector styles, sizes and variations in the industry. These connectors utilize the finest materials, which, along with precision manufacturing and rigid quality control, assure ITT Cannon customers of the finest quality connectors.

GENERAL INFORMATION

CONTACTS

Pin and socket contacts are designed to resist severe vibration and repeated connection and disconnection. The average force to either engage or separate pin and socket contacts will not exceed the average values given in the latest revision of MIL-C-5015.

Force in Lbs.	Contact Sizes 16	12	8	4	0
Maximum	3.00	5.00	10.00	15.00	20.00
Average	2.10	3.50	7.00	10.50	14.00
Minimum	.25	.50	.75	1.00	2.00

THERMOCOUPLE CONTACTS

Size 12 and 16 contacts, machined from matching thermocouple lead wire alloys, can be supplied in ITT Cannon connectors. These thermocouple contacts maintain continuity from thermal-sensor leads thru a bulkhead or other closures in temperature measuring applications.

These contacts for matching lead wires are detailed by the standards of the Instrument Society of America (I.S.A.):

I.S.A. Standards	Material
J and Y	Iron and constantan
K	Chromel and alumel
T	Copper and constantan

Since the thermocouple connector application determines the soldering methods and materials to be used, thermocouple contacts, identified by permanent markings, are normally supplied with untinned solder pots. Thermocouple contacts are supplied only in connectors having resilient insulators.

WIRING

For class E, R and F connectors, satisfactory moisture sealing will be obtained if AWG and MS wire sizes and insulation outside diameters are governed by this table.

Contact Size	Wire Size (MIL-W-5086)	Insulation OD Limit (inches)
16	16 thru 22	.064 min. to .130 max.
12	12 thru 14	.114 min. to .170 max.
8	8 thru 10	.164 min. to .255 max.
4	4 thru 6	.275 min. to .370 max.
0	0 thru 2	.415 min. to .550 max.

ELECTRICAL SERVICE DATA

Maximum current ratings of contacts and maximum allowable voltage drop under test conditions when assembled as in service are shown below. Maximum total current to be carried per connector is the same as that allowable in wire bundles as specified in MIL-W-5088.

Contact Size	Max. Current Rating (amps)	Test Current (amps)	Potential Drop (millivolts)
16	22	20	21
12	41	35	20
8	73	60	12
4	135	110	10
0	245	200	10

HIGH POTENTIAL TEST VOLTAGE

MS connectors show no evidence of breakdown when the test voltage given below is applied between the two closest contacts and between the shell and the contacts closest to the shell for a period of one minute.

MS Service Rating	Test Voltage (RMS) 60 cps	Suggested* Operating Voltages DC	AC (rms)	Air Spacing Nom. (inches)	Creepage Distance Nom. (inches)
Inst.	1000	250	200		1/16
A	2000	700	500	1/16	1/8
D	2800	1250	900	1/8	3/16
E	3500	1750	1250	3/16	1/4
B	4500	2450	1750	1/4	5/16
C	7000	4200	3000	5/16	1

*As indicated in previous MS Specification and to be used by the designer only as a guide.

ITT CANNON ELECTRIC

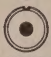
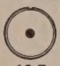
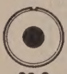
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

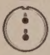
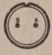
CONTACT ARRANGEMENTS

LEGEND
- • Resilient only
- ▲ Resilient & Plastic
- ■ Plastic only
- ¢ Cannon Cost Cutter — readily available from Cannon Distributors

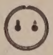
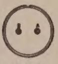
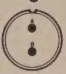
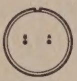
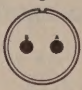
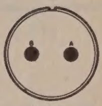
1 CONTACT

	•	•	•	•	•	•	•	•	¢▲	¢▲
										
Shell Size	8S-1	10S-2	12S-4	12-5	14-3	16-12	18-7	20-2	10SL-4	12S-3
No. of Contacts	1 #16	1 #16	1 #16	1 #12	1 #8	1 #4	1 #8	1 #0	2 #16	2 #16
Service Rating	A	A	D	D	A	A	B	D	A	A

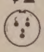
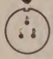
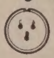
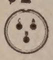
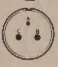
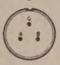
HIGH VOLTAGE

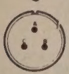
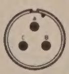
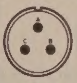
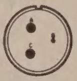
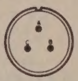
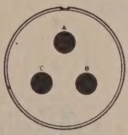
	¢▲	▲	•
			
Shell Size	14S-9	16-11	16S-4
No. of Contacts	2 #16	2 #12	2 #16
Service Rating	A	A	D

2 CONTACTS

	•	•	•	•	•	•
						
Shell Size	16-13	18-3	20-23	22-11	24-9	28-7
No. of Contacts	2 #12 (A-Iron B-Constantan)	2 #12	2 #8	2 #16	2 #4	2 #4
Service Rating	A	D	A	B	A	D

3 CONTACTS

	¢▲	•	¢▲	•	•	¢▲	▲	•
								
Shell Size	10SL-3	14S-1	14S-7	16S-5	16S-6	16-10	18-5	18-22
No. of Contacts	3 #16	3 #16	3 #16	3 #16	3 #16	3 #12	1 #16 (A) 2 #12 (B, C)	3 #16
Service Rating	A	A	A	A	A	A	D	D

	•	•	•	•	•	
						
Shell Size	20-3	20-19	22-2	22-6	22-9	36-4
No. of Contacts	3 #12	3 #8	3 #8	1 #16 (B) 2 #8 (A, C)	3 #12	3 #0
Service Rating	D	A	D	D	E	A (B, C), D (A)

4 CONTACTS

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Shell Size	12SA10	14S-2
No. of Contacts	4 #16	4 #16
Service Rating	A	Inst.

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	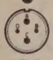	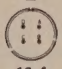	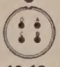	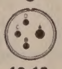	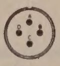	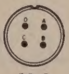	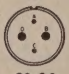	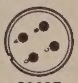
Shell Size	16-9	18-4	18-10	18-13	18-15	20-4	20-24	20A37
No. of Contacts	2 #16 (B, D) 2 #12 (A, C)	4 #16	4 #12	3 #12 (B, C) 1 #8 (A)	4 #12 (A, C-Iron; B, D-Constantan)	4 #12	2 #16 (A, C) 2 #8 (B, D)	ITT Cannon pos. #8 of 20-4
Service Rating	A	D	A	A	A	D	A	

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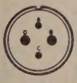
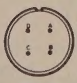
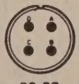
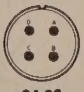
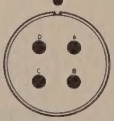
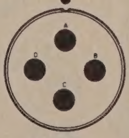
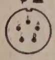
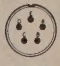
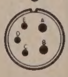
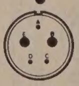
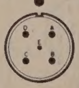
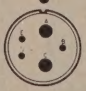
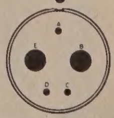
						
Shell Size	22-4	22-10	22-22	24-22	32-17	36-5
No. of Contacts	2 #12 (A, C) 2 #8 (B, D)	4 #16	4 #8	4 #8	4 #4	4 #0
Service Rating	A	E	A	D	D	A

5 CONTACTS

	•	¢▲
Shell Size	10SLA4	14S-5
No. of Contacts	5 #20	5 #16
Service Rating	A	Inst.

	¢▲	¢▲	•	•	•	•	•
							
Shell Size	16S-8	18-11	20-14	22-12	22-13	24-12	32-1
No. of Contacts	5 #16	5 #12	3 #12 (C, D, E) 2 #8 (A, B)	3 #16 (A, C, D) 2 #8 (B, E)	1 #16 (E) 4 #12 (A-D)	3 #12 (B, D, E) 2 #4 (A, C)	3 #12 (A, C, D) 2 #0 (B, E)
Service Rating	A	A	A	D	A (A-D), D (E)	A	E (A), D (all others)

CANNON ELECTRIC

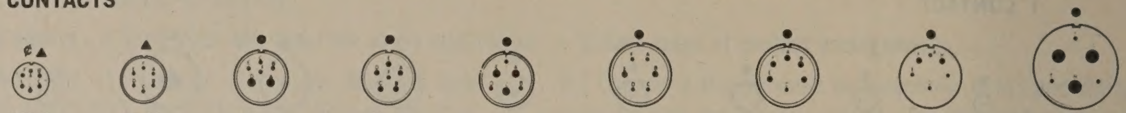
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONTACT ARRANGEMENTS

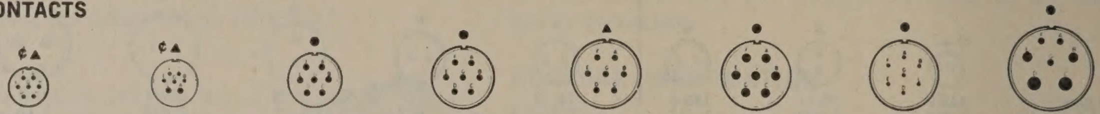
LEGEND
- • Resilient only
- ▲ Resilient & Plastic
- ■ Plastic only
- ¢ Cannon Cost Cutter — readily available from Cannon Distributors

6 CONTACTS



	¢ ▲	▲	•	•	•	•	•	•	•
Shell Size	**14S-6**	**18-12**	**20-8**	**20-17**	**20-22**	**22-5**	**22-15**	**22-24**	**28-22**
No. of Contacts	6 #16	6 #16	4 #16 (B, C, E, F) 2 #8 (A, D)	1 #16 (F) 5 #12 (A-E)	3 #16 (B, D, F) 3 #8 (A, C, E)	4 #16 (A, C, D, F) 2 #12 (B, E)	1 #16 (D) 5 #12 (A-C, E, F)	4 #16 (A, C-E) 2 #12 (B, F)	3 #16 (D-F) 3 #4 (A-C)
Service Rating	Inst.	A	Inst.	A	A	D	A (E-C, E, F), E (D)	A (A, B, F), D (C-E)	D

7 CONTACTS



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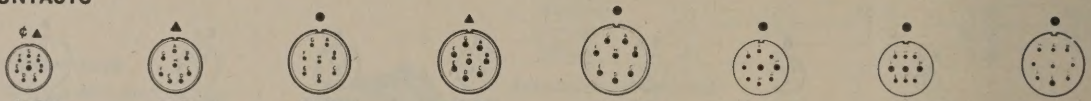
Shell Size	**16S-1**	**18-9**	**20-15**	**22-28**	**24-2**	**24-10**	**24-27**	**28-10**
No. of Contacts	7 #16	5 #16 (B, C, E-G) 2 #12 (A, D)	7 #12	7 #12	7 #12	7 #8	7 #16	3 #12 (A, F, G) 2 #8 (B, E) 2 #4 (C, D)
Service Rating	A	Inst.	A	A	D	A	E	D (G), A (all others)

8 CONTACTS



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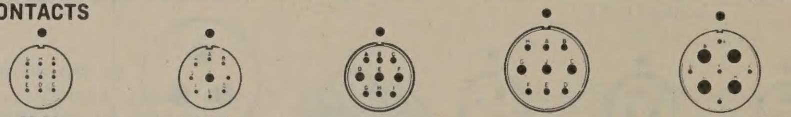
Shell Size	**18-8**	**20-7**	**22-18**	**22-23**	**24-6**	**20-16**	**20-18**	**22-17**
No. of Contacts	7 #16 (A-G) 1 #12 (H)	8 #16	8 #16	8 #12	8 #12	7 #16 (A-G) 2 #12 (H, I)	6 #16 (A, C-E, G, H) 3 #12 (B, F, I)	8 #16 (A-D, F-J) 1 #12 (E)
Service Rating	A	A (C-F) D (A, B, G, H)	A (C-E) D (all others)	D (H), A (all others)	D (A, G, H) A (all others)	A	A	D (A), A (all others)

9 CONTACTS



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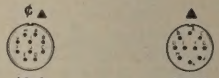
Shell Size	**22-20**	**22-27**	**24-11**	**28-1**	**28A16**
No. of Contacts	9 #16	8 #16 (A-H) 1 #8 (J)	6 #12 (A-C, G-I) 3 #8 (D-F)	6 #12 (A, B, D-F, H) 3 #8 (C, J, G)	5 #16 (A, D-F, J) 4 #4 (B, C, G, H)
Service Rating	A	D (J), A (all others)	A	D (A, E, J) A (all others)	A

10 CONTACTS



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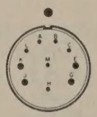
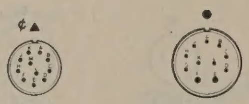
Shell Size	**18-1**	**18-19**
No. of Contacts	10 #16	10 #16
Service Rating	A (B, C, F, G) Inst. (all others)	A

10 CONTACTS



	•
Shell Size	**28-19**
No. of Contacts	6 #16 (A-C, H, L, M) 4 #12 (E, G, J, K)
Service Rating	A (C, E, G, J, K, L) B (H, M), D (A, B)

11 CONTACTS



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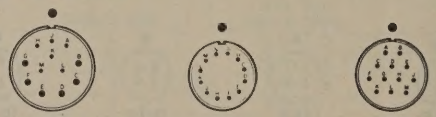
Shell Size	**20-33**	**24-20**
No. of Contacts	11 #16	9 #16 (A-D, G-L) 2 #12 (E, F)
Service Rating	A	D

12 CONTACTS



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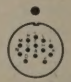
Shell Size	**28-9**	**24-19**	**24A24**
No. of Contacts	6 #16 (A, H-M) 6 #12 (B-G)	12 #16	12 #12
Service Rating	D	A	A

13 CONTACTS



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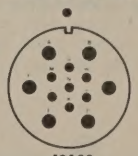
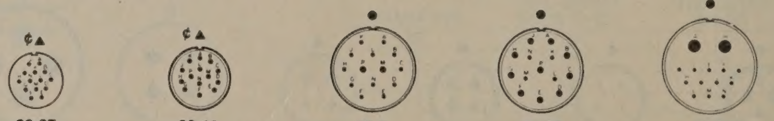
Shell Size	**20-11**
No. of Contacts	13 #16
Service Rating	Inst.



	•
Shell Size	**40A33**
No. of Contacts	7 #8 (G-N) 6 #4 (A-F)
Service Rating	A

14 CONTACTS



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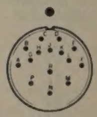
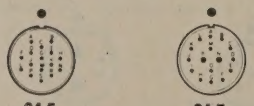
Shell Size	**20-27**	**22-19**	**28-2**	**28-20**	**32-9**
No. of Contacts	14 #16	14 #16	12 #16 (A, L, N) 2 #12 (M, P)	4 #16 (K-N) 10 #12 (A-J, P)	12 #16 (C-N) 2 #4 (A, B)
Service Rating	A	A	D	A	D

15 CONTACTS



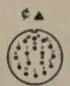
	•
Shell Size	**28-17**
No. of Contacts	15 #16
Service Rating	A (A-L), B (R) D (M-P)

16 CONTACTS



	•	•
Shell Size	**24-5**	**24-7**
No. of Contacts	16 #16	14 #16 (A-M, O) 2 #12 (P, N)
Service Rating	A	A

17 CONTACTS



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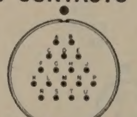
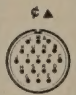
Shell Size	**20-29**
No. of Contacts	17 #16
Service Rating	A

18 CONTACTS



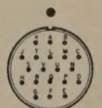
	•
Shell Size	**36A16**
No. of Contacts	(B, C, G, J, K, M, N, R, T-Iron; A, D-F, H, L, P, S, U-Constantan)
Service Rating	A

19 CONTACTS



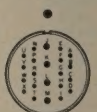
	¢ ▲
Shell Size	**22-14**
No. of Contacts	19 #16
Service Rating	A

20 CONTACTS



	•
Shell Size	**28-16**
No. of Contacts	20 #16
Service Rating	A

22 CONTACTS



	•
Shell Size	**28-11**
No. of Contacts	18 #16 (A-I, N-X) 4 #12 (J-M)
Service Rating	A

ITT CANNON ELECTRIC

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

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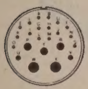
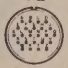
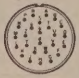
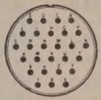
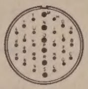
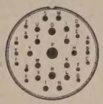
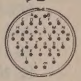
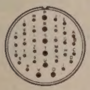
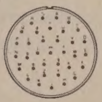
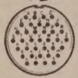
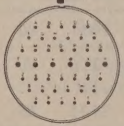
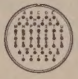
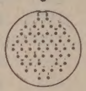
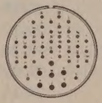
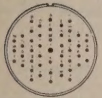
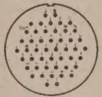
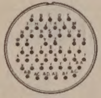
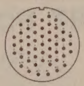
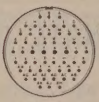
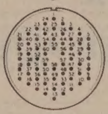
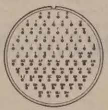
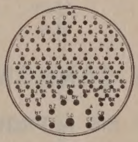
CONTACT ARRANGEMENTS

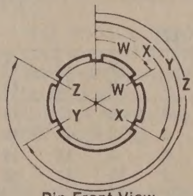
LEGEND
• Resilient only
▲ Resilient & Plastic
■ Plastic only
¢ Cannon Cost Cutter — readily available from Cannon Distributors

	23 CONTACTS	24 CONTACTS	26 CONTACTS	27 CONTACTS	30 CONTACTS	31 CONTACTS	
	• 	¢▲ 	¢▲ 	• 	• 	• 	¢▲ 
Shell Size	**32-6**	**24-28**	**28-12**	**36A46**	**32-8**	**36-9**	**28-15**
No. of Contacts	16 #16 (A-O, S) 2 #12 (U, V) 3 #8 (P-T) 2 #4 (W, X)	24 #16	26 #16	27 #12	24 #16 (A-L, T-Z, a-e) 6 #12 (M-S)	14 #16 (A-G, Z-f) 14 #12 (H-N, S-Y) 2 #8 (O, R) 1 #4 (P)	35 #16
Service Rating	A	Inst.	A	A	A For new MIL equip. design, use 32-7	A	A For new MIL equip. design, use 28-21

			37 CONTACTS	42 CONTACTS	43 CONTACTS	47 CONTACTS	
	• 	• 	¢▲ 	■ 	• 	• 	• 
Shell Size	**32-7**	**36-15**	**28-21**	**44-1**	**28A51**	**32A47**	**36-7**
No. of Contacts	28 #16 (A-N, W-Z, a-k) 7 #12 (O-V)	35 #16	37 #16	36 #16 (A-S, Z-t) 6 #12 (T-Y)	43 #16	47 #16	40 #16 (A-Z, a-s) 7 #12 (t-z)
Service Rating	Inst. (A, B, h, j) A (all others)	D (m), A (all others)	A	D	A	A	A

	47 CONTACTS	48 CONTACTS	52 CONTACTS	54 CONTACTS	56 CONTACTS		85 CONTACTS	100 CONTACTS
	• 	¢▲ 	▲ 	• 	• 	• 	• 	• 
Shell Size	**36-8**	**36-10**	**36A34**	**32A10**	**36A66**	**40A27**	**40-56**	**48-5**
No. of Contacts	46 #16 (A-X, Z-z) 1 #12 (Y)	48 #16	52 #16	54 #16	52 #16 (A-c, h-AH) 4 #12 (d, e, f, g)	60 #16	85 #16	90 #16 (A-BL, BN-BT, BW, BV) 1 #8 (CD) 9 #12 (BM, BU, BV, BY-CC, CE)
Service Rating	A	A	A	A	A	A	A	A

MS ALTERNATE INSERT POSITIONS



Pin Front View

No. of Contacts	Contact Arrange-ment	Degrees W	Degrees X	Degrees Y	Degrees Z
2	12S-3	70	145	215	290
	14S-9	70	145	215	290
	16S-4	35	110	250	325
	16-11	35	110	250	325
	16-13	35	110	250	325
	18-3	35	110	250	325
	20-23	35	110	250	325
	22-11	35	110	250	325
	24-9	35	110	250	325
	28-7	35	110	250	325
3	14S-7	90	180	270	—
	16S-5	70	145	215	290
	16S-6	90	180	270	—
	16-10	90	180	270	—
3	18-5	80	110	250	280
	18-22	70	145	215	290
	20-3	70	145	215	290
	20-19	90	180	270	—
	22-2	70	145	215	290
	22-6	80	110	250	280
	22-9	70	145	215	290
	36-4	70	145	215	290
4	14S-2	—	120	240	—
	16-9	35	110	250	325
	18-4	35	110	250	325
	18-10	—	120	240	—
	18-13	80	110	250	280
	18-15	—	120	240	—
	20-4	45	110	250	—
	20-24	35	110	250	325
	22-4	35	110	250	325
	22-10	35	110	250	325
4	22-22	—	110	250	—
	24-22	45	110	250	—
	32-17	45	110	250	—
	36-5	—	120	240	—
5	14S-5	—	110	—	—
	16S-8	—	170	265	—
	18-11	—	170	265	—
	20-14	80	110	250	280
	22-12	80	110	250	280
	22-13	35	110	250	325
	24-12	80	110	250	280
	32-1	80	110	250	280
6	18-12	80	—	—	280
	20-8	80	110	250	280
	20-17	90	180	270	—
	20-22	80	110	250	280

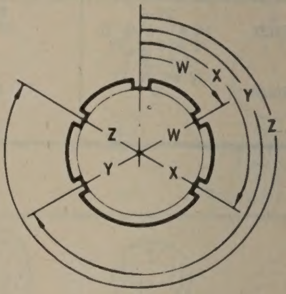
(Continued next page)

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MS ALTERNATE INSERT POSITIONS (Continued)

No. of Contacts	Contact Arrange-ment	Degrees			
		W	X	Y	Z
6	22-5	35	110	250	325
	22-15	80	110	250	280
	22-24	80	110	250	280
	28-22	70	145	215	290
7	16S-1	80	—	—	280
	18-9	80	110	250	280
	20-15	80	—	—	280
	22-28	80	—	—	280
	24-2	80	—	—	280
	24-10	80	—	—	280
	24-27	80	—	—	280
	28-10	80	110	250	280
8	18-8	70	—	—	290
	20-7	80	110	250	280
	22-18	80	110	250	280
	22-23	35	—	250	—
	24-6	80	110	250	280
9	20-16	80	110	250	280
	20-18	35	110	250	325
	22-17	80	110	250	280
	22-20	35	110	250	325
	22-27	80	—	250	280
	24-11	35	110	250	325
	28-1	80	110	250	280
10	18-1	70	145	215	290
	28-19	80	110	250	280
11	24-20	80	110	250	280
12	28-9	80	110	250	280
14	20-27	35	110	250	325
	22-19	80	110	250	280
	28-2	35	110	250	325
	28-20	80	110	250	280
	32-9	80	110	250	280
15	28-17	80	110	250	280
16	24-5	80	110	250	280
	24-7	80	110	250	280
17	20-29	80	—	—	280
19	22-14	80	—	—	280
20	28-16	80	110	250	280
22	28-11	80	110	250	280
23	32-6	80	110	250	280
24	24-28	80	110	250	280
26	28-12	90	180	270	—
30	32-8	80	125	235	280
31	36-9	80	125	235	280
35	28-15	80	110	250	280
	32-7	80	125	235	280
	36-15	60	125	245	305
37	28-21	80	110	250	280
42	44-1	65	125	225	310
47	36-7	80	110	250	280
	36-8	80	110	250	280
48	36-10	80	125	235	280
85	40-56	72	144	216	288
100	48-5	65	125	225	310

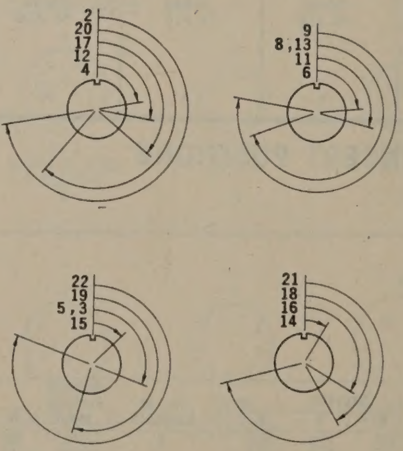


ITT CANNON DESIGNATED ALTERNATE INSERT POSITIONS

NOT MS APPROVED

Shell Size	Contact Arrange-ment	Available Position								
10SL	A4	2	3	5	8	12	13			
12S	A10	3	5	8	13					
24	A24	2	4	9	12					
28	A16	2	3	8	9					
	A51	3	4	8	9	12				
32	A10	2	3	4	5		9	12	13	
	A47	2	3	4	5	8	9	12	13	
36	A16	2	3	4	5	8	9	12	13	15
	A34	2	3	4	5	8	9	12	13	20
	A46	2	3	4	5	6	7	12	13	15
	A66	2	3	5	8	9	13	17	18	
40	A27	4	14	17	20	22				
	A33	2	3	5	8	13				

NOTE: For ITT Cannon contact arrangements not listed above, consult factory.



NOTE: Front view of pin insulator rotated as shown.

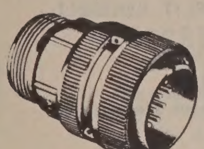
Position	Angle (degrees)
Normal	0
2	260
3	110
4	80
5	use pos. 3
6	85
8	250
9	280
11	105
12	100
13	use pos. 8
14	30
15	45
16	120
17	130
18	150
19	195
20	220
21	255
22	290
23	165
24	330
25	235
26	125

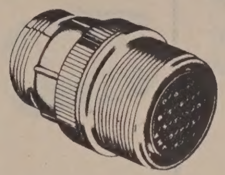
ITT CANNON ELECTRIC

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL PURPOSE MS-A/MS-B





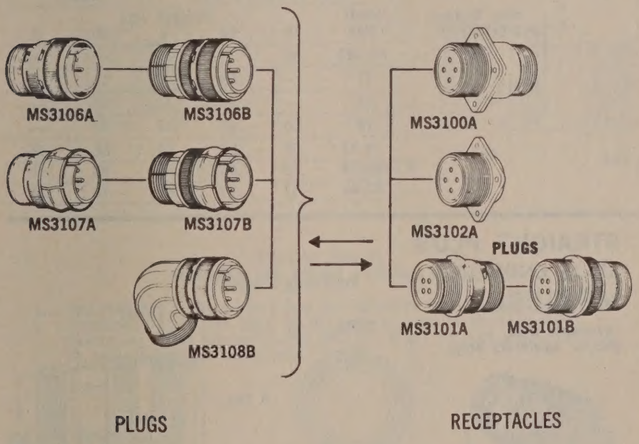
MS-A and MS-B connectors were originally designed and approved under Military Specifications for use in military aircraft. Since then, commercial and industrial demand for these connectors has grown because of their uniform quality, dependability, low cost and interchangeability as prescribed in MIL-C-5015. These MS connectors are available in two classes:

- A — Solid endbell with plastic or resilient insulators.
- B — Split endbell with plastic insulators for greater accessibility to solder connections.

The MS-A and MS-B are available as plugs or receptacles. The term plug applies to any assembly fixed to the end of a cable. The term receptacle applies to any assembly mounted to a wall or box. MS shells will accept either pin or socket insert assemblies. Socket contacts are the closed-entry type.

Standard MS connectors are available with from 1 to 100 contacts in 15 different insert diameters ranging from .250 to 2.550 inches. Each contact arrangement is available with pin or socket contacts and will mate with all MS type connectors having the same size and contact arrangement.

TYPICAL MATING GUIDE



STANDARD DATA

Shell	Material	Aluminum alloy
	Finish	Olive drab chromate coating over cadmium plating
Insulator	Material	(Plastic) diayll phthalate
Contacts	Material	Brass or copper alloy
	Finish	Silver plate
	Termination	Tinned solder pot

HOW TO ORDER

MS 3102 A 18-8 P X (RES)*
CA 3106 B 18-8 P X

Prefix
Shell Style
Class
Shell Size
Contact Arrangement**
Contact Type
Alternate Insert Position

PREFIX

MS — Complies with Military Specification MIL-C-5015
CA — ITT Cannon prefix indicating special application or variation of MS. See modification codes.

SHELL STYLE

3100 — Wall mounting receptacle
3101 — Cord connecting plug
3102 — Box mounting receptacle
3106 — Straight plug
3107 — Quick disconnecting plug
3108 — 90° angle plug

CLASS

A — Solid or one-piece endbell
B — Split or two-piece endbell

SHELL SIZE

Coupling thread diameter in sixteenths of an inch

CONTACT ARRANGEMENTS

See pages 49-51

CONTACT TYPE

P for Pin; S for Socket

ALTERNATE INSERT POSITIONS

See pages 51-52

*When resilient insulators are desired, see pages 49-51 for availability.
When ordering (EG) a 10SLA4 contact arrangement it will be the same as a 10SL-20-4 which is stamped on the shell.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

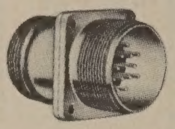
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

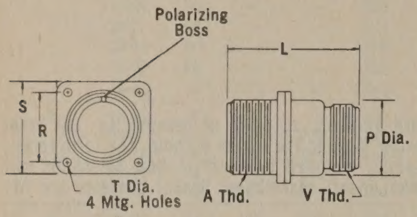
GENERAL PURPOSE MS-A/MS-B

WALL MOUNTING RECEPTACLE

SOLID SHELL

MS3100A



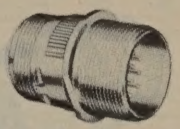


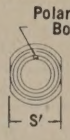
MS3100A wall mounting receptacles are used with the MS3057 cable clamp or with conduit to eliminate need for the conduit box in applications where wires are carried thru walls or bulkheads.

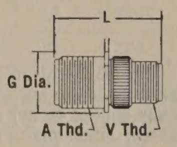
CABLE CONNECTING PLUG

SOLID ENDBELL

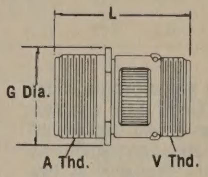
MS3101A







SIZES 8S thru 16



SIZES 18 thru 36

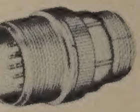
MS3101A solid endbell cable connecting plugs are used for cable extension requirements where mounting provisions are unnecessary.

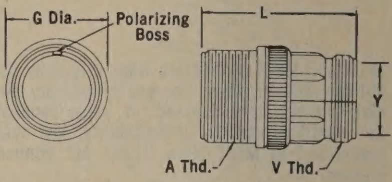
CABLE CONNECTING PLUG

SPLIT ENDBELL

MS3101B

(Available with plastic insulators only)



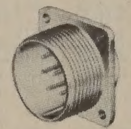


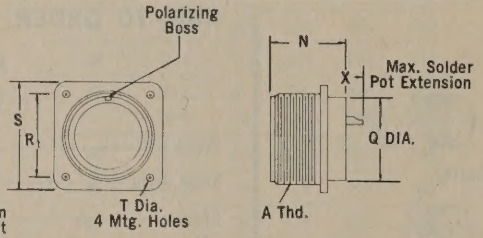
MS3101B split endbell cable connecting plugs are used for cable extension requirements where mounting provisions are unnecessary.

BOX MOUNTING RECEPTACLE

MS3102A

(Available with plastic or resilient insulators)





The MS3102A box mounting receptacles are used on boxes and equipment cases where no cable support is required.

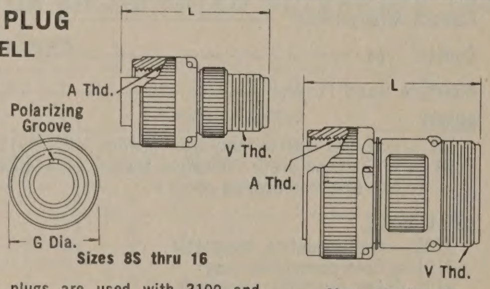
X DIMENSION
Max. Solder Pot Ext. — Pin or Socket

Shell Size	Contact Size 16	12	8	4	0
8S-16S	.50	—	—	—	—
12	—	.59	—	—	—
14	—	—	.73	—	—
16	.50	.59	.73	.86	—
18-22	.50	.59	.72	.86	.86
24-28	.59	.65	.76	.90	.90
32-48	.47	.53	.66	.78	.78

STRAIGHT PLUG

SOLID ENDBELL

MS3106A



Sizes 8S thru 16

Sizes 18 thru 40

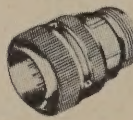
MS3106A straight plugs are used with 3100 and 3102 receptacles and 3101 plugs.

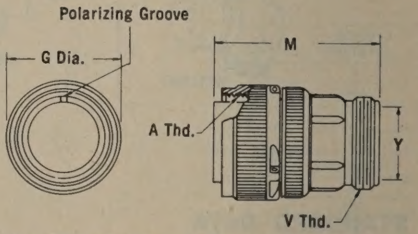
STRAIGHT PLUG

SPLIT ENDBELL

MS3106B

(Available with plastic insulators only)





MS3106B straight plugs with split endbell are used to connect circuits with 3100 and 3102 receptacles and 3101 plugs.

Shell Size	G Max.	L Max.	M Max.	N Max.	P Max.	Q Max.	R ±.005	S Max.	S^1 Max.	T +.010 −.005	Y Max.	A Thread	V Thread
8S	.844	1.469	1.469	1.000	.532	.454	.594	.906	.530	.120	.312	½-28NUEF-2B	½-28UNEF-2A
10S	.969	1.531	1.531	1.000	.656	.514	.719	1.031	.656	.120	.311	⅝-24NEF-2B	½-28UNEF-2A
•10SL	.969	1.531	1.531	1.000	.782	.630	.719	1.031	.781	.120	.410	⅝-24NEF-2B	⅝-24NEF-2A
12S	1.062	1.688	1.688	1.000	.782	.630	.812	1.125	.781	.120	.358	¾-20UNEF-2B	⅝-24NEF-2A
14S	1.156	1.688	1.688	1.000	.906	.755	.906	1.219	.908	.120	.471	⅞-20UNEF-2B	¾-20UNEF-2A
16S	1.250	1.688	1.688	1.000	1.032	.880	.969	1.312	1.031	.120	.596	1-20UNEF-2B	⅞-20UNEF-2A
12	1.062	2.062	2.062	1.205	.782	.630	.812	1.125	.781	.120	.358	¾-20UNEF-2B	⅝-24NEF-2A
14	1.156	2.062	2.062	1.205	.906	.755	.906	1.219	.905	.120	.471	⅞-20UNEF-2B	¾-20UNEF-2A
16	1.250	2.062	2.062	1.205	1.032	.880	.969	1.312	1.031	.120	.596	1-20UNEF-2B	⅞-20UNEF-2A
18	1.344	2.062	2.062	1.205	1.156	.989	1.062	1.406	1.155	.120	.774	1⅛-18NEF-2B	1-20UNEF-2A
20	1.469	2.188	2.188	1.205	1.282	1.176	1.156	1.531	1.280	.120	.886	1¼-18NEF-2B	1³⁄₁₆-18NEF-2A
22	1.594	2.188	2.188	1.205	1.406	1.270	1.250	1.656	1.405	.120	.894	1⅜-18NEF-2B	1³⁄₁₆-18NEF-2A
24	1.719	2.312	2.312	1.375	1.532	1.395	1.375	1.781	1.530	.147	1.143	1½-18NEF-2B	1⁷⁄₁₆-18NEF-2A
28	1.969	2.312	2.312	1.375	1.782	1.645	1.562	2.031	1.778	.147	1.152	1¾-18NS-2B	1⁷⁄₁₆-18NEF-2A
32	2.219	2.438	2.438	1.375	2.032	1.895	1.750	2.281	2.030	.173	1.455	2-18NS-2B	1¾-18NS-2A
36	2.469	2.438	2.438	1.375	2.282	2.145	1.938	2.531	2.280	.173	1.704	2¼-16UN-2B	2-18NS-2A
40	2.719	2.438	2.438	1.375	2.532	2.364	2.188	2.781	—	.173	1.946	2½-16UN-2B	2¼-16UN-2A
44	2.969	2.562	2.600	1.375	2.782	2.645	2.375	3.031	—	.173	2.196	2¾-16UN-2B	2½-16UN-2A
48	3.219	2.562	2.600	1.375	3.032	2.895	2.625	3.281	—	.173	2.699	3-16UN-2B	3-16UN-2A

• Socket contact connectors in 10SL size must be ordered with CA prefix in part number.

Dimensions subject to change.

ITT CANNON ELECTRIC

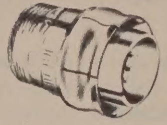
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

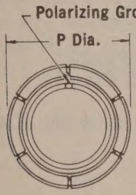
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

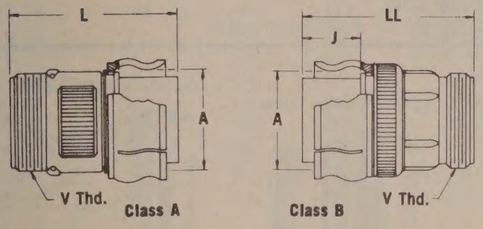
GENERAL PURPOSE MS-A/MS-B

QUICK DISCONNECT PLUG

SOLID ENDBELL
MS3107A
SPLIT ENDBELL
MS3107B





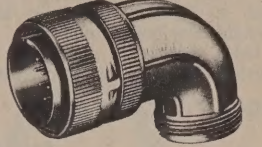


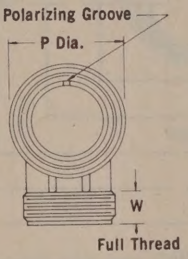
Sizes 8S thru 28
(Available with plastic insulators only)

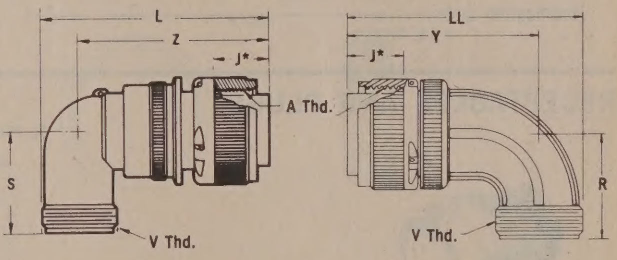
The MS3107A (solid endbell) and the MS3107B (split endbell) quick disconnect plugs are used at the end of a cable on equipment demanding rapid disconnection. MS3107 plugs are not adaptable to severe vibration conditions.

90° ANGLE PLUG

SOLID ENDBELL
SPLIT ENDBELL
MS3108A
MS3108B







Class A
(Available with resilient insulators only)

Class B
(Available with plastic insulators only)

Sizes 8S thru 48

MS3108B 90° angle plugs, have a split endbell and are used where wires must be brought at an abrupt angle. Where a solid endbell is required, MS-3108A is available in sizes 8S thru 36 only. Either the split or solid endbells on the 3108 are capable of being rotated and locked.

MS3107

		Class A	Class B		
Shell Size	A Max.	L Max.	LL Max.	P Max.	V Thread
8S	.500	1.469	1.469	.720	½-28UNEF-2A
10S	.625	1.531	1.531	.845	½-28UNEF-2A
•10SL	.625	1.531	1.531	.845	⅝-24NEF-2A
12S	.750	1.688	1.688	1.000	⅝-24NEF-2A
14S	.875	1.688	1.688	1.125	¾-20UNEF-2A
16S	1.000	1.688	1.688	1.250	⅞-20UNEF-2A
12	.750	2.062	2.062	1.000	⅝-24NEF-2A
14	.875	2.062	2.062	1.125	¾-20UNEF-2A
16	1.000	2.062	2.062	1.250	⅞-20UNEF-2A
18	1.125	2.062	2.062	1.375	1-20UNEF-2A
20	1.250	2.188	2.188	1.500	1³⁄₁₆-18NEF-2A
22	1.375	2.188	2.188	1.625	1³⁄₁₆-18NEF-2A
24	1.500	2.312	2.312	1.750	1⁷⁄₁₆-18NEF-2A
28	1.750	2.312	2.312	2.000	1⁷⁄₁₆-18NEF-2A

• Pin contact connectors in 10SL size must be ordered with CA prefix in part number.

MS3108

	Class A	Class B							
Shell Size	L Max.	LL Max.	P Max.	R Max.	S Max.	Y Max.	Z Max.	A Thread	V Thread
8S	1.93	1.750	.844	.938	.801	1.500	1.640	½-28UNEF-2B	½-28UNEF-2A
10S	1.93	1.750	.969	1.000	.832	1.500	1.640	⅝-24NEF-2B	½-28UNEF-2A
•10SL	2.05	1.812	.969	1.000	.863	1.500	1.703	⅝-24NEF-2B	⅝-24NEF-2A
12S	2.05	2.000	1.062	1.062	.863	1.688	1.703	¾-20UNEF-2B	⅝-24NEF-2A
14S	2.41	2.125	1.156	1.125	.926	1.750	1.765	⅞-20UNEF-2B	¾-20UNEF-2A
16S	2.37	2.375	1.250	1.188	.988	1.938	1.796	1-20UNEF-2B	⅞-20UNEF-2A
12	2.55	2.250	1.062	1.062	.863	1.938	2.062	¾-20UNEF-2B	⅝-24NEF-2A
14	2.63	2.312	1.156	1.125	.926	1.938	2.125	⅞-20UNEF-2B	¾-20UNEF-2A
16	2.73	2.562	1.250	1.188	.988	2.125	2.156	1-20UNEF-2B	⅞-20UNEF-2A
18	2.79	2.688	1.344	1.312	1.051	2.188	2.250	1⅛-18NEF-2B	1-20UNEF-2A
20	2.94	3.031	1.469	1.375	1.113	2.438	2.312	1¼-18NEF-2B	1³⁄₁₆-18NEF-2A
22	2.94	3.031	1.594	1.375	1.176	2.438	2.312	1⅜-18NEF-2B	1³⁄₁₆-18NEF-2A
24	3.29	3.406	1.719	1.562	1.253	2.688	2.531	1½-18NEF-2B	1⁷⁄₁₆-18NEF-2A
28	3.29	3.406	1.969	1.562	1.332	2.688	2.531	1¾-18NS-2B	1⁷⁄₁₆-18NEF-2A
32	3.75	3.750	2.219	1.875	1.551	2.875	2.750	2-18NS-2B	1¾-18NS-2A
36	3.91	3.938	2.409	2.062	1.770	2.938	2.875	2¼-16UN-2B	2-18NS-2A
40	7.21††	4.750	2.723††	2.125	3.885††	3.625	5.690	2½-16UN-2B	2¼-16UN-2A
44	—	4.750	2.969	2.250	—	3.275	—	2¾-16UN-2B	2½-16UN-2A
48	—	5.031	3.219	2.375	—	3.531	—	3-16UN-2B	3-16UN-2A

†† Not to MS specifications. • Pin connectors in 10SL size must be ordered with CA prefix in part number

Dimensions subject to change.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

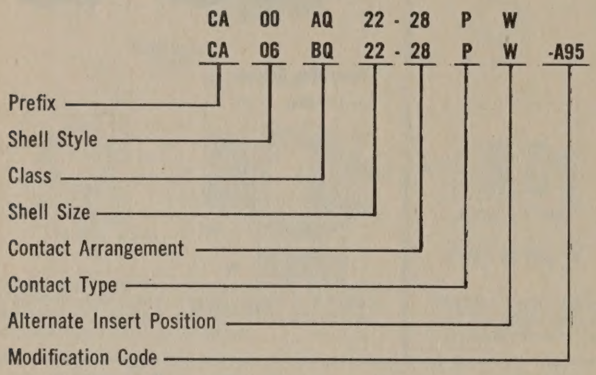
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

QUICK DISCONNECT AQ/BQ

CA-AQ and CA-BQ connectors are used in quick disconnect applications, such as between break-away assemblies or where disconnect by a straight-away pull is required.

Quick disconnect accessories (adapters and couplers) fit standard plastic insert MS and CA connectors. The manual coupler replaces the coupling nut on the plug; the adapter screws onto the coupling thread on the receptacle. These accessories are available thru size 28 and may be purchased separately or as part of a standard plastic insert MS or CA connector assembly.

HOW TO ORDER



PREFIX
CA — ITT Cannon prefix

SHELL STYLE
00 — Wall mounting receptacle
01 — Cable connecting plug
02 — Box mounting receptacle
06 — Straight plug
08 — 90° angle plug

CLASS
AQ — Quick disconnect, solid endbell
BQ — Quick disconnect, split endbell

SHELL SIZE
Coupling thread diameter in sixteenths of an inch

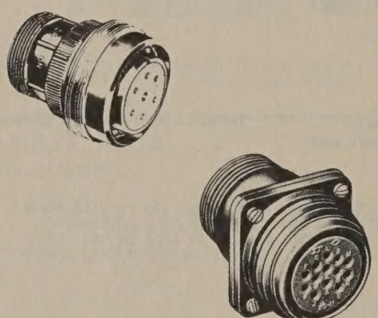
CONTACT ARRANGEMENTS
See pages 49-51

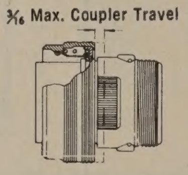
CONTACT TYPE
P for Pin; S for Socket

ALTERNATE INSERT POSITION
See pages 51-52

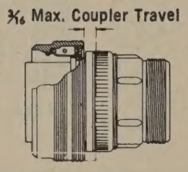
MODIFICATION CODE
Consult factory for modification codes

RECEPTACLES AND PLUGS

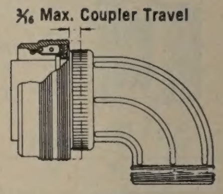




CA06AQ
SOLID ENDBELL

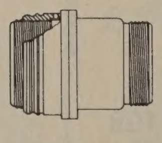


CA06BQ
SPLIT ENDBELL

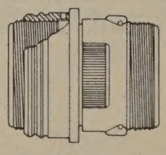


CA08BQ
90° ANGLE ENDBELL

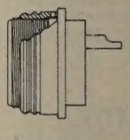
Plug with Coupler



CA00AQ



CA01AQ



CA02AQ

Receptacle with Adapter

To order complete AQ/BQ connector assemblies (plug with coupler or receptacle with adapter), see tabulation. For complete assembly dimensions, use coupler or adapter dimensions (page 57) with the standard plastic insulator MS or CA connector dimensions on pages 54-55.

	RECEPTACLE WITH ADAPTER				PLUG WITH COUPLER		
Shell Size	Part Number for MS3100A with Quick Disconnect Adapter, Pin Insert*	Part Number for MS3101A with Quick Disconnect Adapter, Pin Insert*	Part Number for MS3101B with Quick Disconnect Adapter, Pin Insert*	Part Number for MS3102A with Quick Disconnect Adapter, Pin Insert*	Part Number for MS3109A with Quick Disconnect Coupler, Pin Insert**	Part Number for MS3106B with Quick Disconnect Coupler, Pin Insert**	Part Number for MS3108B with Quick Disconnect Coupler, Pin Insert**
8S	CA00AQ8S-**P	CA01AQ8S-**P	CA01BQ8S-**P	CA02AQ8S-**P	CA06AQ8S-**P	CA06BQ8S-**P	CA08BQ8S-**P
•10SL	CA00AQ10SL-**P	CA01AQ10SL-**P	CA01BQ10SL-**P	CA02AQ10SL-**P	▲CA06AQ10SL-**S	CA06BQ10SL-**S	CA08BQ10SL-**S
12S	CA00AQ12S-**P	CA01AQ12S-**P	CA01BQ12S1**P	CA02AQ12S-**P	CA06AQ12S-**P	CA06BQ12S-**P	CA08BQ12S-**P
14S	CA00AQ14S-**P	CA01AQ14S-**P	CA01BQ14S-**P	CA02AQ14S-**P	CA06AQ14S-**P	CA06BQ14S-**P	CA08BQ14S-**P
16S	CA00AQ16S-**P	CA01AQ16S-**P	CA01BQ16S-**P	CA02AQ16S-**P	CA06AQ16S-**P	CA06BQ16S-**P	CA08BQ16S-**P
12	CA00AQ12-**P	CA01AQ12-**P	CA01BQ12-**P	CA02AQ12-**P	CA06AQ12-**P	CA06BQ12-**P	CA08BQ12-**P
14	CA00AQ14-**P	CA01AQ14-**P	CA01BQ14-**P	CA02AQ14-**P	CA06AQ14-**P	CA06BQ14-**P	CA08BQ14-**P
16	CA00AQ16-**P	CA01AQ16-**P	CA01BQ16-**P	CA02AQ16-**P	CA06AQ16-**P	CA06BQ16-**P	CA08BQ16-**P
18	CA00AQ18-**P	CA01AQ18-**P	CA01BQ18-**P	CA02AQ18-**P	CA06AQ18-**P	CA06BQ18-**P	CA08BQ18-**P
20	CA00AQ20-**P	CA01AQ20-**P	CA01BQ20-**P	CA02AQ20-**P	CA06AQ20-**P	CA06BQ20-**P	CA08BQ20-**P
22	CA00AQ22-**P	CA01AQ22-**P	CA01BQ22-**P	CA02AQ22-**P	CA06AQ22-**P	CA06BQ22-**P	CA08BQ22-**P
24	CA00AQ24-**P	CA01AQ24-**P	CA01BQ24-**P	CA02AQ24-**P	CA06AQ24-**P	CA06BQ24-**P	CA08BQ24-**P
28	CA00AQ28-**P	CA01AQ28-**P	CA01BQ28-**P	CA02AQ28-**P	CA06AQ28-**P	CA06BQ28-**P	CA08BQ28-**P

*For socket inserts, substitute S for P following the contact arrangement number.
**Add contact arrangement number. See pages 49-51.

• 10SL available only in 10SL-3P or 10SL-4P, pin inserts only.
▲ 10SL available only in 10SL-3S or 10SL-4S socket inserts only.

QUICK DISCONNECT AQ/BQ

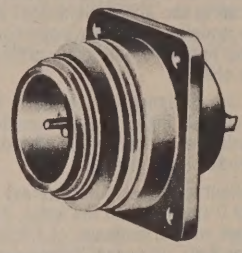
CA22181 ADAPTERS

FOR STANDARD PLASTIC INSULATOR MS AND CA RECEPTACLES

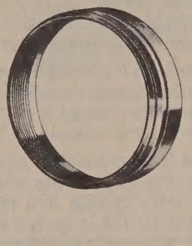
The CA22181 adapter is designed to screw over the coupling threads of a standard MS or CA receptacle with plastic insulator. It has a locking groove, which receives the formed end of the coupler latch when fully engaged.

Adapters may be ordered as part of a standard plastic insulator MS or CA receptacle, or they may be ordered separately. To order adapters separately, a listing is given in the table below. To order complete assemblies (standard plastic insulator MS or CA receptacles with adapters), see page 56.

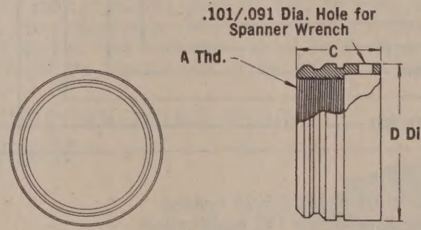
Adapter Part Number	For Shell Size	C Max.	D Max.	A Thread
CA22181-8	8S	.480	.615	½-28UNEF-2B
CA22181-10	10S & 10SL	.480	.740	⅝-24UNEF-2B
CA22181-12	12S	.480	.915	¾-20UNEF-2B
CA22181-14	14S	.480	1.045	⅞-20UNEF-2B
CA22181-16	16S	.480	1.170	1-20UNEF-2B
CA22181-13	12	.665	.915	¾-20UNEF-2B
CA22181-15	14	.665	1.045	⅞-20UNEF-2B
CA22181-17	16	.665	1.170	1-20UNEF-2B
CA22181-18	18	.540	1.305	1⅛-18NEF-2B
CA22181-20	20	.540	1.405	1¼-18NEF-2B
CA22181-22	22	.540	1.530	1⅜-18NEF-2B
CA22181-24	24	.575	1.655	1½-18NEF-2B
CA22181-28	28	.575	1.905	1¾-18NS-2B



MS3101 RECEPTACLE WITH ADAPTER



ADAPTER

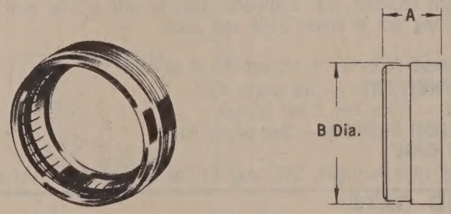


CA22182 COUPLERS

FOR STANDARD PLASTIC INSULATOR MS AND CA PLUGS

CA22182 couplers are designed to replace the coupling nut on standard ITT Cannon plastic insulator MS or CA connectors. A standard manual coupler (AQ and BQ) is available.

Couplers may be ordered separately or as part of a standard plastic insulator MS or CA connector assembly (see page 56).



MANUAL TYPE COUPLER

Part Number	Type Disconnect	For Shell Size	A Max.	B Max.
CA22182-7	AQ	8S	.740	1.040
CA22182-8	BQ			
CA22182-9	AQ	10S & 10SL	.740	1.165
CA22182-10	BQ			
CA22182-11	AQ	12 & 12S	.740	1.240
CA22182-12	BQ			
CA22182-14	AQ BQ	14 & 14S	.740	1.415
CA22182-16	AQ BQ	16 & 16S	.740	1.540
CA22182-18	AQ	18	.880	1.665
CA22182-20	AQ & BQ	20	.880	1.780
CA22182-21	AQ	22	.880	1.910
CA22182-22	BQ			
CA22182-23	AQ	24	.950	1.995
CA22182-24	BQ			
CA22182-27	AQ	28	.950	2.240
CA22182-28	BQ			

ITT CANNON ELECTRIC

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MS-E/MS-R/MS-F
SOLDER/F80 CRIMP ENVIRONMENTAL

In the latest revision of MIL-C-5015, a new class of environment-resistant connectors was added. This new class F connector supersedes the previous class E connector. The MS-3106F is identical to the MS-3106E except that the MS-3106F has an "O" ring under the coupling nut. The class E will still be available upon request for existing programs, and upon ordering will also bear the E nomenclature on the shell.

ITT Cannon MS-F and MS-R connectors are designed to operate in the extreme environmental conditions of high altitude flight. These connectors must be completely sealed to withstand moisture, condensation, vibration, corona and flashover caused by high altitude environments.

MS-F and MS-R connectors have a resilient grommet with internal restrictions in the wire cavities which act as O rings around the wires. This allows the wires to slide thru the grommet with a minimum of friction, yet when the ferrule is seated and the endbell tightened it provides a perfect wire seal thru a wide variety of wire diameters. This seal at the rear, plus the interfacial seal at the front, effects a completely environment-resistant assembly when the plug is mated to an F or R receptacle. Sockets are of the closed-entry type.

The F-80 modification (crimp contact termination) is available in resilient insulators in the E, R, F, and BFR styles, creating a large selection of insert assemblies and hardware. Components are identical to the MS–5015 except that the contacts are modified for crimp termination providing an inexpensive crimp contact connector with the proven reliability of and complete intermateability with the MS-5015 series. See page 61 for assembly instructions.

Cable clamps have been integrally designed with the endbell on MS-E and MS-F connectors. Class R is without the cable clamp.

HOW TO ORDER

	CA	3106	R	20 - 27	P	W	*
	MS	3106	R	20 - 27	P	W	—

Prefix
Shell Style
Class
Shell Size
Contact Arrangement
Contact Type
Alternate Insert Position
Modification Code

PREFIX
MS — Conforms to latest MIL-C-5015 revision
CA — Cannon designation (for F80 modification)

SHELL STYLE
3100 — Wall mounting receptacle
3102 — Box mounting receptacle
3106 — Straight plug
3108 — 90° angle plug

CLASS
E/F — Environmental with resilient insulators and integral cable clamp.
R — Environmental with resilient insulators and shortened light-weight end-bell; also additional sealing with O ring seal under coupling nut in styles 3106 and 3108

SHELL SIZE
Coupling thread diameter in sixteenths of an inch

CONTACT ARRANGEMENTS — See pages 49-51

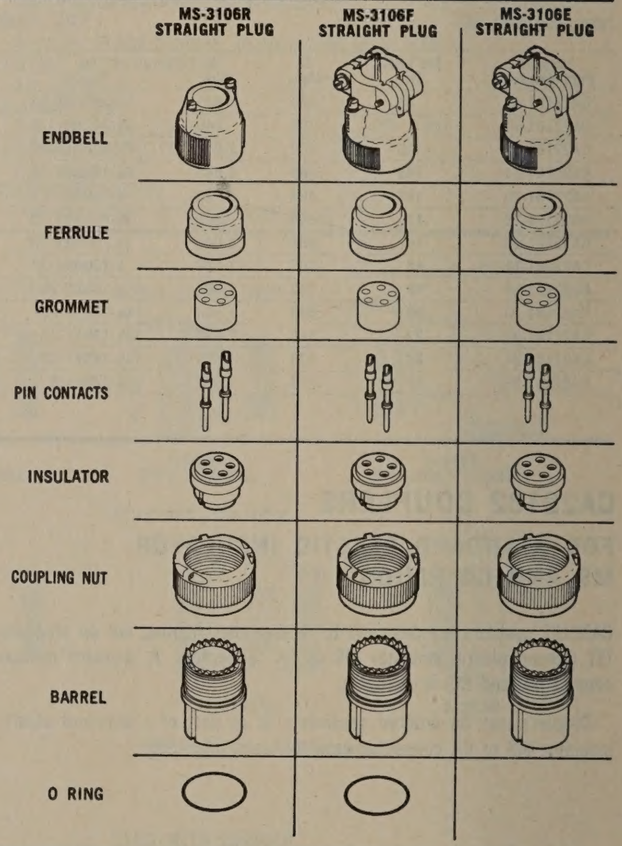
CONTACT TYPE — P for Pin; S for Socket

ALTERNATE INSERT POSITION — See pages 51-52

MODIFICATION CODE
F80 — Crimp type contacts. See page 61 for assembly instructions.

STANDARD DATA

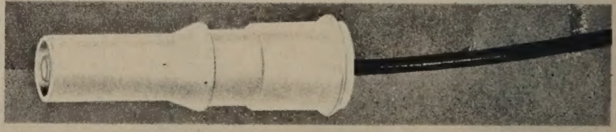
Shell	Material	Aluminum alloy
	Finish	Chromate coating over cadmium plating
Insulator	Material	Polychloroprene (resilient)
Contacts	Material	Brass or copper alloy
	Finish	Silver plate
	Termination	Tinned solder pot



HIGH VOLTAGE CARTRIDGES FOR MS-E AND MS-R

- **Standard contact arrangements are adaptable to high voltage applications.**
- **Eliminates need for a separate high voltage connector.**
- **Assembly time is reduced.**

High voltage conductors as well as power and/or control signal conductors can now be connected simultaneously in standard MS connectors. Previously, MS connectors involved in high voltage circuitry required individual design considerations and could only be ordered as a "special." The new high voltage cartridge allows conversion of a standard connector to one capable of handling up to 15,000 volts DC (Test Voltage — mated), operating voltage — sea level 5,000 VDC or 3,500 VAC. These cartridges are molded of nylon and provide a high degree of arc-over protection between adjacent contacts or between a contact and the connector shell. Unmated, each cartridge provides a nylon isolating barrier capable of withstanding up to 10,000 volts DC (or peak).



The contact within the cartridge is a 7.5 amp, size 20, crimp snap-in type with dielectric rear release clip retention. This contact is removable with the plastic CIET20 insertion/extraction tool provided the insulation is .084" or less. The contact may be crimped with the standard MS-3191 tool and hand inserted into the nylon cartridge. The cartridge body is installed in the connector at the factory.

High voltage cartridges now available fit in the space normally occupied by a #4 or #8 size contact in an MS-E, MS-R or MS-F type connector.

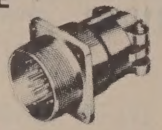
Over forty-nine contact arrangements are currently available in which these high voltage cartridges may be used. Consult factory for ordering information.

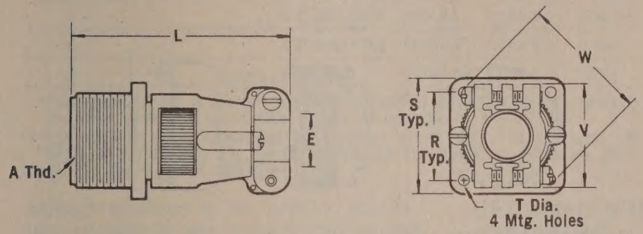
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MS-E/MS-R/MS-F
SOLDER/F80 CRIMP ENVIRONMENTAL

WALL MOUNTING RECEPTACLE
INTEGRAL CABLE CLAMP
MS3100E / MS3100F

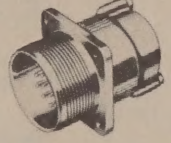


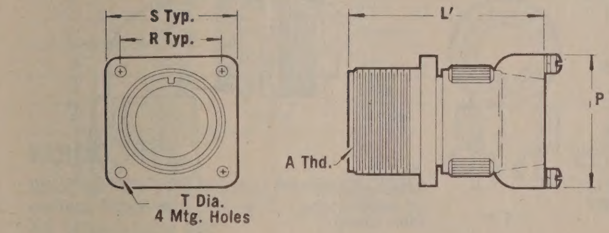


MS3100E is identical to MS3100F and is available upon request. For new equipment, customer should specify MS3100F.

MS3100F wall mounting receptacles are used to carry wires thru walls or bulkheads, or to provide a means of disconnection at a bulkhead. MS3100F receptacles mate with 3106 and 3108 plugs.

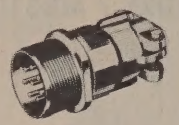
WALL MOUNTING RECEPTACLE
MS3100R

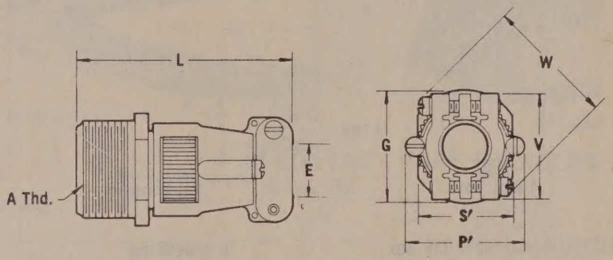




The MS3100R receptacle is identical in purpose to the MS3100F. The MS3100R features a shorter lightweight endbell and mates with 3106 and 3108 plugs.

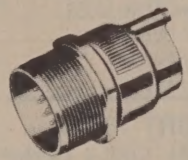
CABLE CONNECTING PLUG
INTEGRAL CABLE CLAMP
MS3101E / MS3101F

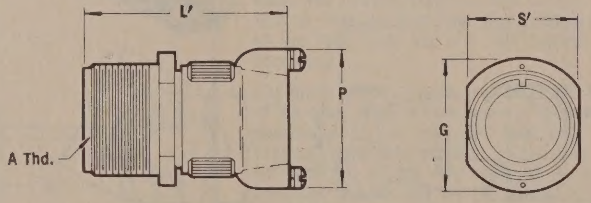




MS3101E cable connecting plugs are used for cable extension requirements, where mounting provisions are unnecessary. MS3101E plugs mate with 3106, 3107 and 3108 plugs. Note: The D revision of MIL-C-5015 has changed the nomenclature of the 3101 from receptacle to plug.

CABLE CONNECTING PLUG
MS3101R





MS3101R cable connecting plug is identical in purpose to the MS3101E. The MS3101R features a shorter lightweight endbell and mates with 3106, 3107 and 3108 plugs. Note: The D revision of the MIL-C-5015 specification has changed the nomenclature of the 3101 from receptacle to plug.

Shell Size	E Max.	E Min.	G Max.	L Max.	L' Max.	P Max.	P' Max.	R ±.005	S ±.031	S' Max.	T +.010 −.005	V Max.	W Max.	A Thread
8S	.235	.102	.844	2.250	1.838	.890	.890	.594	.875	.515	.120	.840	1.046	½-28UNEF-2A
10S	.235	.102	.969	2.250	1.838	.890	.890	.719	1.000	.640	.120	.840	1.046	⅝-24UNEF-2A
10SL	.297	.140	1.062	2.250	1.838	.970	.970	.719	1.000	.640	.120	.900	1.125	⅝-24UNEF-2A
12S	.297	.140	1.062	2.250	1.838	.970	.970	.812	1.094	.765	.120	.900	1.125	¾-20UNEF-2A
14S	.422	.195	1.156	2.250	1.838	1.150	1.150	.906	1.188	.890	.120	1.100	1.343	⅞-20UNEF-2A
16S	.547	.255	1.281	2.250	1.838	1.250	1.250	.968	1.281	1.015	.120	1.200	1.484	1-20UNEF-2A
12	.297	.140	1.062	2.625	2.181	.970	.970	.812	1.094	.765	.120	.900	1.125	¾-20UNEF-2A
14	.422	.195	1.156	2.625	2.181	1.150	1.150	.906	1.188	.890	.120	1.100	1.343	⅞-20UNEF-2A
16	.547	.255	1.281	2.625	2.181	1.250	1.250	.969	1.281	1.015	.120	1.200	1.484	1-20UNEF-2A
18	.610	.285	1.344	2.688	2.281	1.450	1.450	1.062	1.375	1.140	.120	1.300	1.609	1⅛-18UNEF-2A
20	.735	.350	1.500	2.750	2.281	1.570	1.570	1.156	1.500	1.265	.120	1.500	1.890	1¼-18UNEF-2A
22	.735	.350	1.625	2.750	2.281	1.570	1.570	1.250	1.625	1.390	.120	1.500	1.890	1⅜-18UNEF-2A
24	.922	.468	1.750	2.969	2.281	1.880	1.880	1.375	1.750	1.515	.147	1.740	2.170	1½-18UNEF-2A
28	.922	.468	2.000	3.031	2.281	1.880	1.880	1.562	2.000	1.765	.147	1.740	2.170	1¾-18UNS-2A
32	1.235	.664	2.250	3.031	2.322	2.205	2.205	1.750	2.250	2.015	.173	2.075	2.656	2-18UNS-2A
36	1.360	.694	2.500	3.281	2.322	2.400	2.400	1.938	2.500	2.270	.173	2.300	2.922	2¼-16UN-2A
*40	1.630	.911	—	3.530†	2.427†	2.840	—	2.188	2.750	—	.173	—	—	2½-16UN-2A

† Not to MS specification

* Not available in MS3101E and MS3101R.

Dimensions subject to change.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

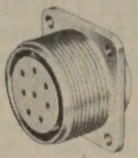
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

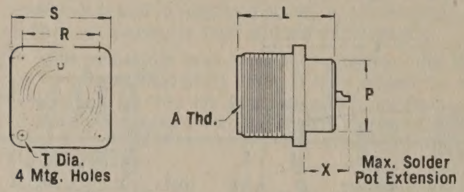
MS-E/MS-R/MS-F

SOLDER/F80 CRIMP ENVIRONMENTAL

BOX MOUNTING RECEPTACLE

MS3102E / MS3102R





MS3102E and MS3102R box mounting receptacles are used in junction boxes or as an integral part of equipment. These connectors are identical in construction and will mate with 3106, 3107 and 3108 plugs. For new equipment, customer should specify MS3102R.

X DIMENSION

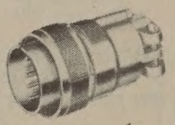
Max. Solder Pot Ext. — Pin or Socket

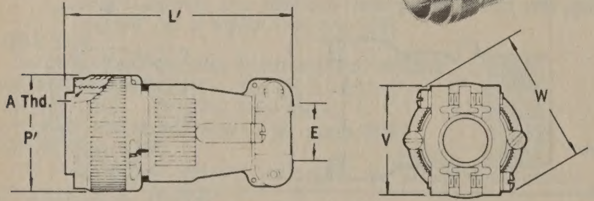
	Contact Size				
Shell Size	**16**	**12**	**8**	**4**	**0**
8S, 10S, 10SL	.534	—	—	—	—
12S, 14S, 16S	.518	—	—	—	—
12	.705	.705	—	—	—
14	.705	.705	.767	—	—
16	.705	.705	.767	.767	—
18	.674	.674	.736	.736	—
20, 22	.674	.674	.736	.736	.971
24, 28	.612	.612	.674	.674	.909
32, 36	.549	.549	.611	.611	.846

STRAIGHT PLUG

INTEGRAL CABLE CLAMP

MS3106E / MS3106F



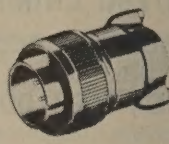


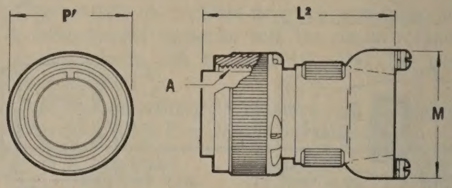
MS3106E is identical to MS3106F except for O ring under the coupling nut, and is available upon request. For new equipment, customer should specify MS3106F.

MS3106F straight plugs mate with 3100 and 3102 receptacles and 3101 plugs.

STRAIGHT PLUG

MS3106R

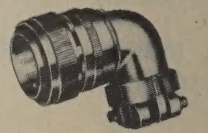


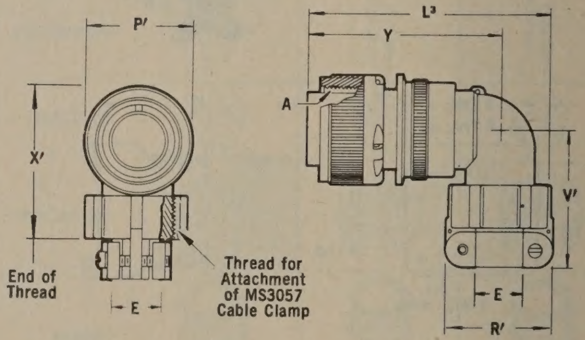


The MS3106R straight plug is identical in purpose to the MS3106F. The MS3106R has the shorter endbell. This plug will mate with 3100 and 3102 receptacles and 3101 plugs.

90° ANGLE PLUG

MS3108E / MS3108R





MS3108R 90° angle plugs (with O ring seal less cable clamp) and the MS3108E 90° angle plugs (less O ring seal with cable clamp) are used where there is limited space and where wires must be brought at abrupt angles. This plug will mate with 3100 and 3102 receptacles and 3101 plugs.

Shell Size	E Min.	E Max.	L Max.	L¹ Max.	L² Max.	L³ Max.	M Max.	P Max.	P¹ Max.	R ±.005	R¹ Max.	S +.031	T +.010 −.005	V Max.	V¹ Max.	W Max.	X¹ Max.	Y Max.	A Thread
8S	.102	.235	1.040	2.250	1.838	2.156	.890	.426	.844	.594	.835	.875	.120	.840	1.218	1.046	1.546	1.640	½-28UNEF-2A
10S	.102	.235	1.040	2.250	1.838	2.156	.890	.520	.969	.719	.835	1.000	.120	.840	1.250	1.046	1.697	1.640	⅝-24UNEF-2A
10SL	.140	.297	1.040	2.250	1.838	2.188	.970	.614	.969	.719	.895	1.000	.120	.900	1.281	1.125	1.728	1.703	⅝-24UNEF-2A
12S	.140	.297	1.040	2.250	1.838	2.188	.970	.614	1.062	.812	.895	1.094	.120	.900	1.281	1.125	1.858	1.703	¾-20UNEF-2A
14S	.195	.422	1.040	2.250	1.838	2.312	1.150	.739	1.156	.906	1.085	1.188	.120	1.100	1.406	1.343	2.041	1.765	⅞-20UNEF-2A
16S	.255	.547	1.040	2.250	1.838	2.406	1.250	.854	1.250	.969	1.180	1.281	.120	1.200	1.531	1.484	2.223	1.796	1-20UNEF-2A
12	.140	.297	1.400	2.625	2.181	2.531	.970	.614	1.062	.812	.895	1.094	.120	.900	1.281	1.125	1.858	2.062	¾-20UNEF-2A
14	.195	.422	1.400	2.625	2.181	2.688	1.150	.739	1.156	.906	1.085	1.188	.120	1.100	1.406	1.343	2.041	2.125	⅞-20UNEF-2A
16	.255	.547	1.400	2.625	2.181	2.781	1.250	.864	1.250	.969	1.180	1.281	.120	1.200	1.531	1.484	2.223	2.156	1-20UNEF-2A
18	.285	.610	1.400	2.688	2.281	2.844	1.450	.989	1.344	1.062	1.275	1.375	.120	1.300	1.593	1.609	2.376	2.250	1⅛-18UNEF-2A
20	.350	.735	1.400	2.750	2.281	3.250	1.570	1.145	1.469	1.156	1.475	1.500	.120	1.500	1.656	1.890	2.567	2.312	1¼-18UNEF-2A
22	.350	.735	1.400	2.750	2.281	3.250	1.570	1.270	1.594	1.250	1.475	1.625	.120	1.500	1.718	1.890	2.751	2.312	1⅜-18UNEF-2A
24	.468	.922	1.400	2.969	2.281	3.719	1.880	1.395	1.719	1.375	1.715	1.750	.147	1.740	1.890	2.170	2.957	2.531	1½-18UNEF-2A
28	.468	.922	1.400	3.031	2.281	3.719	1.880	1.614	1.969	1.562	1.715	2.000	.147	1.740	1.968	2.170	3.272	2.531	1¾-18UNS-2A
32	.664	1.235	1.400	3.031	2.322	4.188	2.205	1.864	2.219	1.750	2.040	2.250	.173	2.075	2.187	2.656	3.755	2.750	2-18UNS-2A
36	.694	1.360	1.400	3.281	2.322	4.297	2.400	2.051	2.469	1.938	2.285	2.500	.173	2.300	2.406	2.922	4.078	2.875	2¼-16UN-2A
40	.911	1.630	1.400	3.577†	2.430	7.211†	2.840	2.390	2.723†	2.188	2.948	2.750	.173	—	5.875	—	6.152	5.690	2½-16UN-2A

† Not to MS specification

Dimensions subject to change.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

F80 ASSEMBLY INSTRUCTIONS

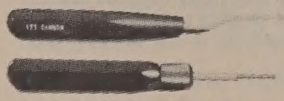
TOOLS

ITT Cannon provides a complete line of crimp insertion and extraction tooling to be used with CA-F80 contacts as follows:

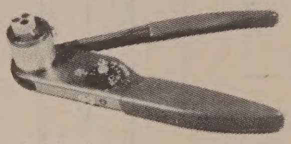
Contact Size	Hand Crimp Tool*	Locator	Power Crimp Tool**	Crimp Head	Locator	Gauge
16	M-22520/1-01	TH-70-1				
12	M-22520/1-01	TH-70-1	CBT-600/600B	CCN-12-2	CCHP-12-2	—
8	—	—	CBT-600/600B	CCN-8-1	CCHP-8-1	CCN-8-1
4	—	—	CBT-600/600B	CCN-4-1	CCHP-4-1	CCN-4
0	—	—	CBT-600B	CCH-0-1	CCHP-0-9	CCN-0

*The M-22520/1-01 is the MIL standard crimp tool for #12 thru #20 contacts and when used with crimp #12, 16, and 20 contacts for the CA-F80.

**The CBT-600- is recommended for crimping of #4 thru #12 contacts. The 6BT-600B for #0 thru #8. The appropriate locators and crimp heads are available as shown above.



Insertion/Extraction Tools



M-22520/1-01

CBT-600

Although obsoleted by MIL-T-22520, MS3191-1 tool is commonly used in non-military commercial applications. The chart below specifies contact size and corresponding locator used with the MS3191-1 tool.

Shell Styles	Contact Size	Locator
8S thru 16S	16 Pin 16 Socket	L-16-3191-7 L-16-3191-46
12 thru 36	16 Pin 16 Socket 12 Pin 12 Socket	L-16-3191-10 L-16-3191-52 L-16-3191-16 L-16-3191-20

Insertion and extraction tools used for these connectors are available for contact sizes 16 thru 0 as shown.

Contact Size	Insertion Tools	Extraction Tools	Handle Color
16	CIT-16	CET-16-4	Blue
12	CIT-12	CET-12-2	Yellow
8	CIT-8	CET-8	Red
4	CIT-4	CET-4	Blue
0	CIT-0	CET-0	Yellow

GUIDE PINS

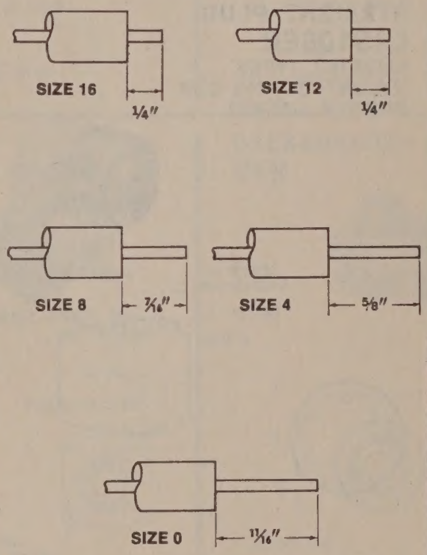
Guide pins are used to assist insertion of socket contact Sizes #16 and #12. Larger sizes do not require guide pins.

Contact	Guide Pin
#16	226-1017-000
#12	226-1018-000

CRIMPING CONTACTS

1. Check the crimp tool to be sure that the proper crimp head locator is used.
2. Cycle the tool to be sure the indentors are open.
3. Place the contact, mating end first, into the tool.
4. Insert the stripped wire into the hollow end of the contact. Be sure the wire is inserted as far as it will go.
5. Close the tool completely to crimp. Unless the tool is closed completely, the tool will not release the contact.
6. Remove the crimped contact from the tool. Check the inspection hole to verify that the wire is fully inserted.

RECOMMENDED WIRE STRIPPING



INSERTION OF CONTACTS

1. Before inserting the contacts, remove the endbell, grommets, and ferrule from the receptacle. Remove the endbell, grommet, ferrule, and coupling nut from the plug. Slide the hardware over the wire bundle in the proper order for reassembly after all the contacts are inserted.
2. To assist insertion of contacts, lubricate insert cavities with isopropyl alcohol. Alcohol will evaporate and will not leave a conductive film. **Caution: Never use any lubricant other than isopropyl alcohol.** Hold the plug or receptacle body firmly and insert the wired contacts as far as possible by hand. Starting at one side of the insulator, work progressively from contact to contact across the layout. When inserting socket contacts, be sure to provide fixture space below the front face to permit length of guide pins for #16 and #12 contacts to clear insulator face.

PIN CONTACT PART NUMBERS

Contact Size	F80
16S	330-0345-016
16	330-0351-016
12	330-0351-012
8	330-0351-008
4	330-0351-004
0	330-0351-000

SOCKET CONTACT PART NUMBERS

Contact Size	F80
16S	031-0554-161
16	031-0560-161
12	031-0560-121
8	031-0560-081
4	031-0560-041
0	031-0560-001

3. Place the correct insertion tool on the contact so that the wire runs along the groove in the tool. (Tool tip will butt against the shoulder.)
4. Beginning with a cavity on the outer edge of the plug, apply a slow, even pressure perpendicular to the insulator face until the contact snaps into position. If contacts are not inserted all the way prior to removing insertion tool, do not try to reinsert the insertion tool. Instead, using the extraction tool, push the contact back to position it was in when the insertion tool was originally placed over the contact for push-in; otherwise the inside of contact cavity may be damaged by reinserting the insertion tool.
5. Inspect the front end of the insulator to assure that the contacts are inserted to the proper depth.

COMPLETION

After all the cavities have been filled, slide the hardware back into position on the barrel. Tighten the endbell until the ferrule and endbell are flush. Compression of the grommet in this manner results in maximum sealing characteristics of the plug.

EXTRACTION OF CONTACTS

1. Select the appropriate tool. (Tool tips are reversible for either pin or socket.) Place the extraction tool over the pin or into the socket.
2. Apply a slow, even pressure to push the contact out of the rear of the insulator.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ER POTTING CONNECTORS

MS type potting connectors are available with nylon cups. 00 and 06 shell styles with plastic cups and resilient insulators meet the requirements of MS3103 and MS25183. Also available is the 08 plug with resilient insulator and 90° angle nylon potting cup.

ITT Cannon provides for a ¼" clearance for potting on all contact sizes.

HOW TO ORDER

CA 3100 ER 18 - 10 P

Prefix
Shell Style
Class
Shell Size
Contact Arrangement
Contact Type

PREFIX
CA — ITT Cannon prefix indicating special application or variation of MS

SHELL STYLE
3100 — Wall mounting receptacle
3106 — Straight plug
3108 — 90° angle plug

CLASS
ER — Resilient insulator, nylon potting cup and thread attachment ring

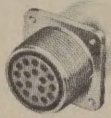
SHELL SIZE
Coupling thread diameter figured in sixteenths of an inch

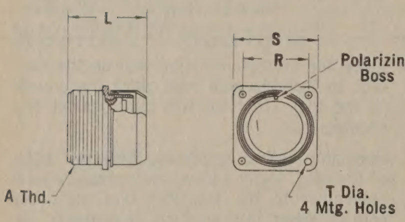
CONTACT ARRANGEMENTS
See pages 49-51

CONTACT TYPE
P for Pin; S for Socket

WALL MOUNTING RECEPTACLE CA3100ER

MS3103 TYPE NYLON POTTING CUP THREADED ATTACHMENT RING

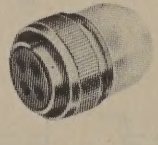


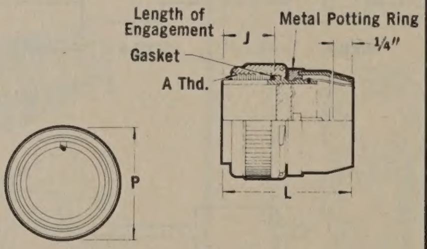


The CA3100ER receptacle (MS3103 type) is supplied with a resilient insulator and a nylon potting cup with a threaded attachment ring. This receptacle mates with 3106, 3107 and 3108 plugs.

STRAIGHT PLUG CA3106ER

MS25183 TYPES NYLON POTTING CUP RUBBER GASKET

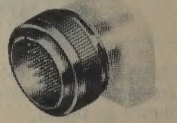


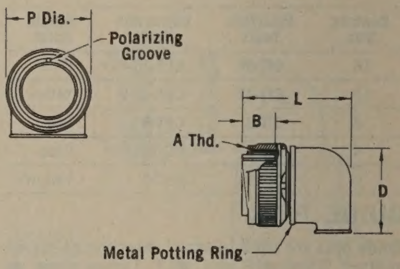


The CA3106ER plug is supplied with resilient insulators, nylon potting cups with threaded attachment rings, and a rubber gasket under the coupling nut. This plug mates with 3100 and 3102 receptacles and 3101 plugs.

90° ANGLE PLUG CA3108ER

NYLON POTTING CUP RUBBER GASKET





The CA3108ER is supplied with resilient insulator, 90° nylon potting cup and threaded attachment ring with a rubber gasket under the coupling nut. This plug mates with 3100 and 3102 receptacles and 3101 plugs.

CA3100ER

Shell Size	L Max.	R ±.005	S Max.	T +.010 −.005	A Thread
8S	1.531	.594	.906	.120	½-28UNEF-2A
10S	1.531	.719	1.031	.120	⅝-24NEF-2A
10SL	1.531	.719	1.031	.120	⅝-24NEF-2A
12S	1.531	.812	1.125	.120	¾-20UNEF-2A
14S	1.531	.906	1.219	.120	⅞-20UNEF-2A
16S	1.531	.969	1.312	.120	1-20UNEF-2A
12	1.968	.812	1.125	.120	¾-20UNEF-2A
14	1.968	.906	1.219	.120	¾-20UNEF-2A
16	1.968	.968	1.312	.120	1-20UNEF-2A
18	1.968	1.062	1.406	.120	1⅛-18NEF-2A
20	2.188	1.156	1.531	.120	1¼-18NEF-2A
22	2.188	1.250	1.656	.120	1⅜-18NEF-2A
24	2.188	1.375	1.781	.147	1½-18NEF-2A
28	2.188	1.562	2.031	.147	1¾-18NS-2A
32	2.188	1.750	2.281	.173	2-18NS-2A
36	2.188	1.938	2.531	.173	2¼-16UN-2A

CA3106ER

Shell Size	J Max.	L Max.	P Max.	A Thread
8S	.536	1.562	.844	½-28UNEF-2B
10S	.536	1.562	.969	⅝-24UNEF-2B
10SL	.536	1.562	.969	⅝-24UNEF-2B
12S	.536	1.562	1.062	¾-24UNEF-2B
14S	.536	1.562	1.156	⅞-20UNEF-2B
16S	.536	1.562	1.250	1-20UNEF-2B
12	.724	2.000	1.062	¾-20UNEF-2B
14	.724	2.000	1.156	⅞-20UNEF-2B
16	.724	2.000	1.250	1-20UNEF-2B
18	.724	2.000	1.344	1⅛-18UNEF-2B
20	.724	2.125	1.469	1¼-18UNEF-2B
22	.724	2.125	1.594	1⅜-18UNEF-2B
24	.724	2.125	1.719	1½-18UNEF-2B
28	.724	2.125	1.969	1¾-18UNS-2B
32	.724	2.180	1.219	2-18UNS-2B
36	.724	2.180	2.469	2¼-16UN-2B
40	.724	2.180	2.723	2½-16UN-2B

CA3108ER

Shell Size	D Max.	L Max. For Arr. w/#16 & #12 Contacts	L Max. For Arr. w/#8 & #4 Contacts	P Max.	A Thread
8S	—	—	—	—	—
10S	—	—	—	—	—
10SL	1.040	1.463	—	.969	⅝-24UNEF-2B
12S	1.040	1.600	—	1.062	¾-20UNEF-2B
14S	1.040	1.600	2.300	1.156	⅞-20UNEF-2B
16S	1.290	1.600	2.550	1.250	1-20UNEF-2B
12	1.040	1.910	—	1.062	¾-20UNEF-2B
14	1.040	1.910	2.610	1.156	⅞-20UNEF-2B
16	1.290	1.910	2.850	1.250	1-20UNEF-2B
18	1.290	2.100	2.850	1.344	1⅛-18UNEF-2B
20	1.540	2.100	2.850	1.469	1¼-18UNEF-2B
22	1.540	2.100	2.850	1.594	1⅜-18UNEF-2B
24	1.790	2.281	2.985	1.719	1½-18UNEF-2B
28	2.040	2.485	2.985	1.969	1¾-18UNS-2B
32	2.290	2.485	2.985	1.219	2-18UNS-2B
36	2.540	2.485	2.985	2.469	2¼-16UN-2B

Dimensions subject to change.

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

BULKHEAD CONNECTORS BFR / TBF

TBF and BFR pressurized bulkhead receptacles mate with standard MS type plugs (3106, 3107 and 3108) if contact arrangements correspond. Both the BFR and TBF have resilient insulators. The TBF (thru-bulkhead fitting) version has a double-faced construction allowing mating from both ends. An O ring is supplied as standard on both the BFR and the TBF. Contacts are silver plated copper or brass alloy. Shells are aluminum alloy.

HOW TO ORDER

BF R 14S - 5 P - 1
TBF 20 - 15 PS

Prefix
Class
Shell Size
Contact Arrangement
Contact Type
Mounting (BFR only)

PREFIX
BF — Bulkhead fittings
TBF — Thru bulkhead fittings
CLASS
R — Resilient insulators
H — Hermetic; see Hermetic catalog
SHELL SIZE
Coupling thread diameter figured in sixteenths of an inch
CONTACT ARRANGEMENTS — See pages 49-51
CONTACT TYPE
P for Pin; S for Socket; PS for Pin and Socket (TBF only)
MOUNTING — BFR only; see chart on right

BFR MOUNTING DIMENSIONS

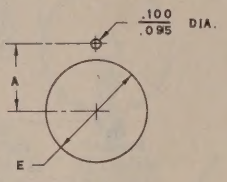


Figure 1

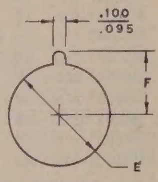
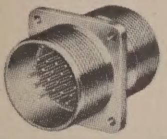


Figure 2

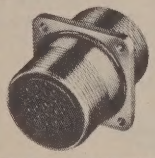
Shell Size	A ±.005	E +.015 −.000	F ±.005
8S	.323	.500	.373
10S, 10SL	.385	.625	.435
12S, 12	.448	.750	.498
14S, 14	.510	.875	.560
16S, 16	.573	1.000	.623
18	.635	1.125	.685
20	.698	1.250	.748
22	.760	1.375	.810
24	.823	1.500	.873
28	.948	1.750	.998
32	1.073	2.000	1.123
36	1.198	2.250	1.248

THRU-BULKHEAD RECEPTACLE

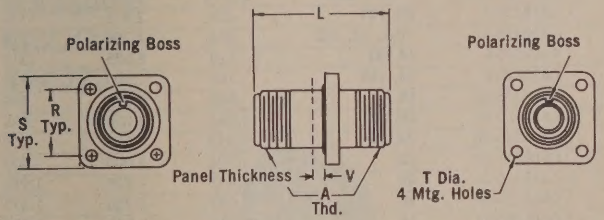
TBF — RESILIENT INSULATOR



PIN INSERT END



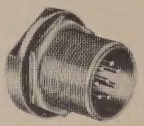
SOCKET INSERT END



TBF thru-bulkhead fittings have pressurized resilient insulators. Special double-face pin and socket contact construction permits cable components to be wired and tested in the shop and then to be plugged into the mounted TBF plug to complete the installation. The TBF mates with 3106, 3107 and 3108 plugs.

PRESSURIZED BULKHEAD RECEPTACLE

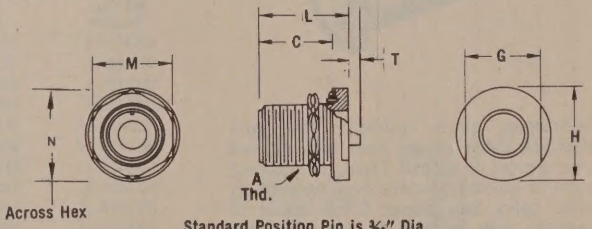
BFR



TYPE 1

Shell	Standard
Insulator	Polychloroprene
Lock Nut	Hex with 6 wire holes
O Ring	Neoprene
Position Pin	Standard
Mounting	Figure 1 or 2

PART NO. EXAMPLE: BFR14S-5P-1



Standard Position Pin is $\frac{3}{32}$" Dia.

BFR pressurized bulkhead receptacles withstand the air leakage requirements of MIL-C-5015 not to exceed 1 cu. in. of air per hour when subjected to a pressure differential of 30 psi at −55°C. Insulators are resilient material bonded to the aluminum shell. Both pin and socket assemblies are available. The BFR will mate with standard MS type 3106, 3107, 3108 plugs.

TBF

Shell Size	R ±.005	S ±.031	T +.010 −.005	V Max.
8S	.594	.875	.120	.325
10S	.719	1.000	.120	.325
10SL	.719	1.000	.120	.325
12S	.812	1.094	.120	.325
14S	.906	1.188	.120	.325
16S	.968	1.281	.120	.325
12	.812	1.094	.120	.445
14	.906	1.188	.120	.445
16	.968	1.281	.120	.445
18	1.062	1.375	.120	.445
20	1.156	1.500	.120	.445
22	1.250	1.625	.120	.445
24	1.375	1.750	.147	.383
28	1.562	2.000	.147	.383
32	1.750	2.250	.173	.320
36	1.938	2.500	.173	.383
40	2.188	2.750	.173	.383

BFR / **TBF/BFR**

Shell Size	C Max.	G Max.	H Max.	L Max.	M Max.	N Max.	T Max. Solder Pot Ext. #16	#12	#8	#4	#0	A Thread
8S	.853	.895	1.077	1.087	.697	.820	.140	—	—	—	—	½-28UNEF-2A
10S	.853	1.015	1.203	1.087	.822	.960	.140	—	—	—	—	⅝-24NEF-2A
10SL	.853	1.015	1.203	1.087	.822	.960	.140	—	—	—	—	⅝-24NEF-2A
12S	.853	1.077	1.327	1.087	.955	1.110	.140	—	—	—	—	¾-20UNEF-2A
14S	.853	1.203	1.453	1.087	1.072	1.250	.140	—	—	—	—	⅞-20UNEF-2A
16S	.853	1.327	1.577	1.087	1.265	1.460	.140	—	—	—	—	1-20UNEF-2A
12	1.244	1.077	1.327	1.525	.947	1.110	.062	.062	—	—	—	¾-20UNEF-2A
14	1.244	1.203	1.453	1.525	1.072	1.250	.062	.062	.125	—	—	⅞-20UNEF-2A
16	1.244	1.327	1.577	1.525	1.265	1.460	.062	.062	.125	.125	—	1-20UNEF-2A
18	1.244	1.453	1.703	1.525	1.395	1.610	.062	.062	.125	.125	—	1⅛-18NEF-2A
20	1.244	1.577	1.827	1.525	1.515	1.750	.062	.062	.125	.125	.359	1¼-18NEF-2A
22	1.244	1.577	1.953	1.525	1.635	1.900	.062	.062	.125	.125	.359	1⅜-18NEF-2A
24	1.244	1.827	2.077	1.525	1.765	2.030	.062	.062	.125	.125	.359	1½-18NEF-2A
28	1.244	1.953	2.327	1.525	2.015	2.330	.062	.062	.125	.125	.359	1¾-18NS-2A
32	1.244	2.203	2.577	1.525	2.205	2.550	.062	.062	.125	.125	.359	2-18NS-2A
36	1.244	2.577	2.827	1.525	2.455	2.840	.062	.062	.125	.125	.359	2¼-16UN-2A

Dimensions subject to change.

ITT CANNON ELECTRIC

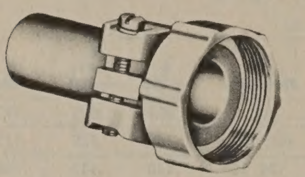
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

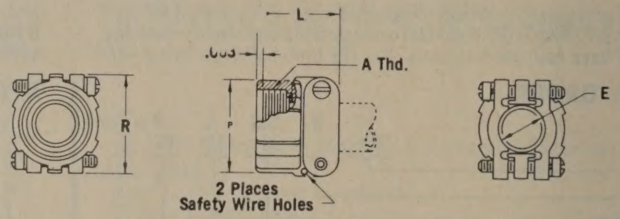
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

CABLE CLAMP WITH OR WITHOUT BUSHING

MS3057A





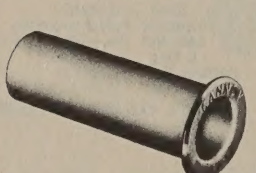
The MS3057A cable clamp is made for plugs and receptacles that have an endbell with external conduit threads. The double clamping action provides a balanced, positive hold on the wires and greatly reduces moisture transmission. Provision is made for safety wiring. This clamp is supplied without bushing; to order bushing, add "with bushing" after part number.

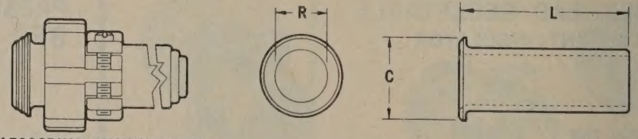
Part Number*	Fits Shell Size	Accommodates MS Bushings†	E Min.	E Max.	L ±.031	P ±.031	R ±.031	A Thread
MS3057-3A	**8S-10S**	MS3420-3	.102	.250	.812	.688	.812	½-28UNEF-2B
MS3057-4A	**10SL, 12S, 12**	MS3420-4	.140	.312	.812	.812	.875	⅝-24UNEF-2B
MS3057-6A	**14S, 14**	MS3420-6	.195	.438	.875	.969	1.062	¾-20UNEF-2B
MS3057-8A	**16S, 16**	MS3420-8	.255	.562	.938	1.094	1.156	⅞-20UNEF-2B
MS3057-10A	**18**	MS3420-10	.285	.625	.938	1.188	1.250	1-20UNEF-2B
MS3057-12A	**20, 22**	MS3420-12	.350	.750	.938	1.375	1.469	1³⁄₁₆-18UNEF-2B
MS3057-16A	**24, 28**	MS3420-16, 12	.468	.938	1.031	1.656	1.688	1⁷⁄₁₆-18UNEF-2B
MS3057-20A	**32**	MS3420-20, 16	.664	1.250	1.094	2.031	2.031	1¾-18UNS-2B
MS3057-24A	**36**	MS3420-24, -20	.694	1.375	1.156	2.219	2.281	2-18UNS-2B
MS3057-28A	**40**	MS3420, -24, -20	.911	1.625	1.688	2.500	2.688	2¼-16UN-2B
MS3057-32A	**44**	MS3420-32, -28, -24	—	1.875	1.750	2.781	2.938	2½-16UN-2B
MS3057-40A	**48**	MS3420-40, -32, -28	—	2.375	1.750	3.281	3.500	3-16UN-2B

*To order cable clamp with bushing, add "with bushing" after part number, i.e., MS3057-10A with bushing.
†MS bushings are polychloroprene.

TELESCOPING BUSHING

MS3420 / MS39056 (REF.)





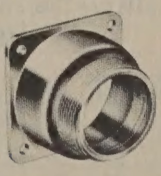
TELESCOPING BUSHING WITH MS3057A CABLE CLAMP

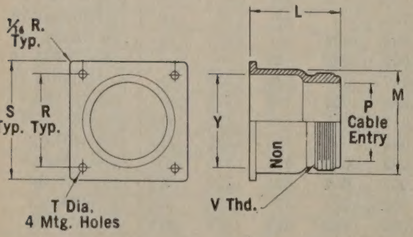
Telescoping gland bushings (used with MS3057A cable clamp) keep dirt, oil and moisture out of endbell. Taping or wrapping wires is eliminated since bushing protects wires going thru clamp. Combinations of bushings may be used to decrease cable entry diameter to improve sealing. Material is polychloroprene (MS).

MS Part Number	POLYCHLOROPRENE MS Part Number	ITT Cannon Part Number	Fits Shell Size	C ±.016	L ±.031	R ±.016
MS3420-3	MS39056-1	CA18220-3	**8S, 10S**	.379	2.875	.130
MS3420-4	MS39056-2	CA18220-4	**10SL, 12, 12S**	.505	2.750	.220
MS3420-6	MS39056-3	CA18220-6	**14,14S**	.619	2.625	.312
MS3420-8	MS39056-4	CA18220-8	**16, 16S**	.744	2.500	.437
MS3420-10	MS39056-5	CA18220-10	**18**	.869	2.375	.562
MS3420-12	MS39056-6	CA18220-12	**20, 22**	1.064	2.250	.625
MS3420-16	MS39056-7	CA18220-16	**24, 28**	1.314	2.125	.750
MS3420-20	MS39056-8	CA18220-20	**32**	1.596	2.000	.937
MS3420-24	MS39056-9	CA18220-24	**36**	1.847	1.875	1.250
MS3420-28	MS39056-10	CA18220-28	**40**	2.085	1.750	1.375
MS3420-32	MS39056-11	CA18220-32	**44**	2.335	1.625	1.624
MS3420-40	MS39056-12	CA18220-40	**48**	2.835	1.500	1.874

JUNCTION SHELL

CA2120





The CA2120 straight junction shell is used with MS3102 box mounting receptacle to protect and enclose the wires behind a panel or bulkhead and to connect flexible or rigid conduit. Material is aluminum alloy; finish is olive drab chromate over cadmium plate.

Part Number	Fits Shell Size	L Max.	M Max.	P Max.	R ±.005	S Max.	T +.010 −.005	Y Max.	V Thread
CA2120-1	**8S**	.789	.532	.350	.594	.906	.120	.472	½-28UNEF-2A
CA2120-2	**10S**	.789	.056	.350	.719	1.031	.120	.530	½-28UNEF-2A
CA2120-2A	**10SL**	.749	.782	.430	.719	1.031	.120	.655	⅝-24UNEF-2A
CA2120-3	**12S & 12**	.811	.782	.430	.812	1.125	.120	.655	⅝-24UNEF-2A
CA2120-4	**14S & 14**	.812	.906	.550	.906	1.219	.120	.772	¾-20UNEF-2A
CA2120-5	**16S & 16**	.890	1.032	.679	.969	1.312	.120	.896	⅞-20UNEF-2A
CA2120-9	**18**	1.119	1.156	.780	1.062	1.406	.120	1.004	1-20UNEF-2A
CA2120-10	**20**	1.276	1.282	.890	1.156	1.531	.120	1.192	1³⁄₁₆-18UNEF-2A
CA2120-11	**22**	1.244	1.406	.900	1.250	1.656	.120	1.285	1³⁄₁₆-18UNEF-2A
CA2120-12	**24**	1.354	1.532	1.150	1.375	1.781	.147	1.411	1⁷⁄₁₆-18UNEF-2A
CA2120-13	**28**	1.338	1.782	1.159	1.562	2.031	.147	1.660	1⁷⁄₁₆-18UNEF-2A
CA2120-14	**32**	1.385	2.032	1.460	1.750	2.281	.173	1.910	1¾-18UNS-2A
CA2120-15	**36**	1.385	2.282	1.710	1.938	2.531	.173	2.160	2-18UNS-2A
CA2120-16	**40**	1.385	2.532	1.960	2.188	2.781	.173	2.379	2¼-16UN-2A
CA2120-17	**44**	1.510	2.782	2.210	2.375	3.031	.173	2.661	2½-16UN-2A
CA2120-18	**48**	1.510	3.032	2.704	2.625	3.281	.173	2.910	3-16UN-2A

Dimensions subject to change.

ITT CANNON ELECTRIC

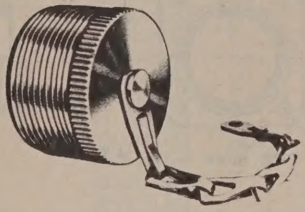
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

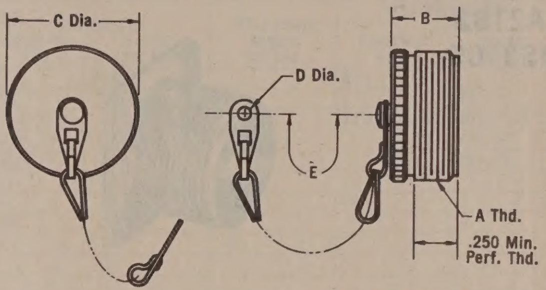
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

PROTECTIVE METAL CAPS

MS25042
CA17530
CA19741



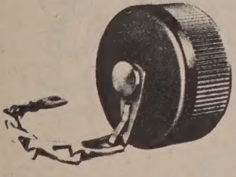


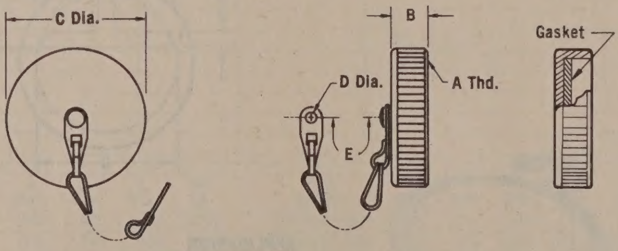
FOR 06 AND 08 STYLE PLUGS

These externally threaded metal dust caps are used to protect the MS3106 and MS3108 plugs. Material is aluminum alloy. They are furnished with sash chain or less sash chain.

Part Number with Sash Chain MS (Ref.)	Part Number with Sash Chain ITT Cannon	Less Sash Chain ITT Cannon	Fits Shell Size	B Max.	C Dia. Max.	E Max.	D Dia. Max.	A Thread
MS25042-8D	CA17530-5100	CA19741-8	**8S**	.656	.562	4.500	.166	½-28UNEF-2A
MS25042-10D	CA17530-5101	CA19741-10	**10S, 10SL**	.656	.687	4.500	.166	⅝-24UNEF-2A
MS25042-12D	CA17530-5102	CA19741-12	**12, 12S**	.844	.812	5.000	.166	¾-20UNEF-2A
MS25042-14D	CA17530-5103	CA19741-14	**14S & 14**	.844	.937	5.000	.166	⅞-20UNEF-2A
MS25042-16D	CA17530-5104	CA19741-16	**16S & 16**	.844	1.062	5.000	.166	1-20UNEF-2A
MS25042-18D	CA17530-5105	CA19741-18	**18**	.844	1.187	5.000	.166	1⅛-18UNEF-2A
MS25042-20D	CA17530-5106	CA19741-20	**20**	.844	1.312	5.500	.197	1¼-18UNEF-2A
MS25042-22D	CA17530-5107	CA19741-22	**22**	.844	1.437	5.500	.197	1⅜-18UNEF-2A
MS25042-24D	CA17530-5108	CA19741-24	**24**	.844	1.562	6.000	.197	1½-18UNEF-2A
MS25042-28D	CA17530-5109	CA19741-28	**28**	.844	1.812	8.250	.197	1¾-18UNEF-2A
MS25042-32D	CA17530-5110	CA19741-32	**32**	.844	2.062	8.250	.228	2-18UNEF-2A
MS25042-36D	CA17530-5111	CA19741-36	**36**	.844	2.312	8.250	.228	2¼-16UN-2A
MS25042-40D	CA17530-5112	CA19741-40	**40**	.844	2.562	8.250	.228	2½-16UN-2A
MS25042-44D	CA17530-5113	CA19741-44	**44**	.844	2.812	8.250	.228	2¾-16UN-2A
MS25042-48D	CA17530-5114	CA19741-48	**48**	.844	3.062	8.250	.228	3-16UN-2A

MS25043
CA2209
CA2322





FOR 00, 01 AND 02 STYLE RECEPTACLES

These internally threaded metal dust caps are used to protect MS3100, MS3101 and MS3102 receptacles. Material is aluminum alloy. They are furnished with sash chain or less sash chain.

Part Number with Sash Chain MS (Ref.)	Part Number with Sash Chain ITT Cannon	Less Sash Chain ITT Cannon	Fits Shell Size	B Max.	C Dia. Max.	E Max.	D Dia. Max.	A Thread
MS25043-8D	CA2209-5100	CA2322-1	**8S**	.469	.688	4.500	.150	½-28UNEF-2B
MS25043-10D	CA2209-5101	CA2322-2	**10S, 10SL**	.469	.815	4.500	.150	⅝-24UNEF-2B
MS25043-12D	CA2209-5102	CA2322-3	**12S, 12S**	.469	1.000	5.000	.150	¾-20UNEF-2B
MS25043-14D	CA2209-5103	CA2322-4	**14, 14S**	.469	1.125	5.000	.150	⅞-20UNEF-2B
MS25043-16D	CA2209-5104	CA2322-5	**16, 16S**	.469	1.188	5.000	.150	1-20UNEF-2B
MS25043-18D	CA2209-5105	CA2322-6	**18**	.469	1.344	5.000	.150	1⅛-18UNEF-2B
MS25043-20D	CA2209-5106	CA2322-7	**20**	.469	1.469	5.500	.150	1¼-18UNEF-2B
MS25043-22D	CA2209-5107	CA2322-8	**22**	.469	1.594	5.500	.150	1⅜-18UNEF-2B
MS25043-24D	CA2209-5108	CA2322-9	**24**	.469	1.719	6.000	.181	1½-18UNEF-2B
MS25043-28D	CA2209-5109	CA2322-10	**28**	.531	1.969	8.250	.181	1¾-18UNS-2B
MS25043-32D	CA2209-5110	CA2322-11	**32**	.531	2.219	8.250	.197	2-18UNS-2B
MS25043-36D	CA2209-5111	CA2322-12	**36**	.531	2.469	8.250	.197	2¼-16UN-2B
MS25043-40D	CA2209-5112	CA2322-13	**40**	.531	2.719	8.250	.197	2½-16UN-2B
MS25043-44D	CA2209-5113	CA2322-14	**44**	.531	2.969	8.250	.197	2¾-16UN-2B
MS25043-48D	CA2209-5114	CA2322-15	**48**	.531	3.188	8.250	.197	3-16UN-2B

Dimensions subject to change.

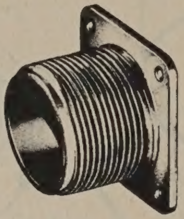
MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

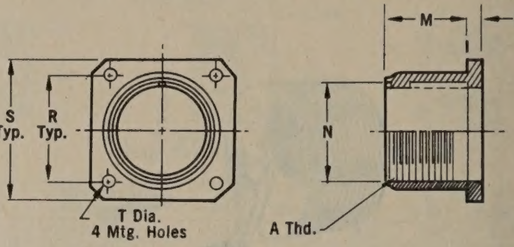
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

DUMMY RECEPTACLE

CA2182
MS3105



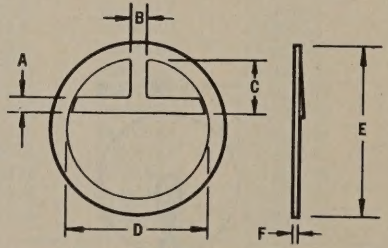


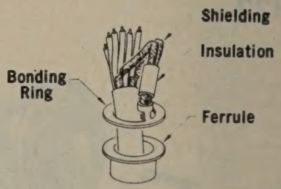
The CA2182 dummy receptacle holds MS3106 or MS3108 plugs when not in use. Material is aluminum alloy; finish is olive drab chromate over cadmium plate. These receptacles meet the requirements of MS3105.

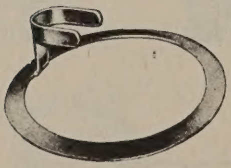
ITT Cannon Part No.	MS Part No.	Fits Shell Size	K Max.	M Max.	N Max.	R ±.005	S Max.	T +.010 −.005	A Thread
CA2182-2	MS3105-10S	10S & 10SL	.156	.593	.463	.719	1.031	.120	⅝-24UNEF-2A
CA2182-16	MS3105-12S	12S	.156	.593	.572	.812	1.125	.120	¾-20UNEF-2A
CA2182-17	MS3105-14S	14S	.156	.593	.697	.906	1.219	.120	⅞-20UNEF-2A
CA2182-18	MS3105-16S	16S	.156	.593	.822	.969	1.312	.120	1-20UNEF-2A
CA2182-3	MS3105-12	12	.156	.781	.572	.812	1.125	.120	¾-20UNEF-2A
CA2182-4	MS3105-14	14	.156	.781	.697	.906	1.219	.120	⅞-20UNEF-2A
CA2182-5	MS3105-16	16	.156	.781	.822	.969	1.312	.120	1-20UNEF-2A
CA2182-6	MS3105-18	18	.203	.781	.947	1.062	1.406	.120	1⅛-18UNEF-2A
CA2182-7	MS3105-20	20	.203	.781	1.073	1.156	1.531	.120	1¼-18UNEF-2A
CA2182-8	MS3105-22	22	.203	.781	1.197	1.250	1.656	.120	1⅜-18UNEF-2A
CA2182-9	MS3105-24	24	.203	.843	1.322	1.375	1.781	.147	1½-18UNEF-2A
CA2182-10	MS3105-28	28	.203	.843	1.541	1.562	2.031	.147	1¾-18UNS-2A
CA2182-11	MS3105-32	32	.359	.906	1.791	1.750	2.281	.173	2-18UNS-2A
CA2182-12	MS3105-36	36	.359	.906	2.010	1.938	2.531	.173	2¼-16UN-2A
CA2182-13	—	40	.359	.906	2.260	2.188	2.781	.173	2½-16UN-2A
CA2182-14	—	44	.359	.906	2.510	2.375	3.031	.173	2¾-16UN-2A
CA2182-15	—	48	.359	.906	2.760	2.625	3.281	.173	3-16UN-2A

BONDING RING

CA2250
AN3111







APPLICATION

The wire shield is separated from wire by drawing wire thru a pierced hole in the shielding. The bonding ring tongues are formed around the shielding pigtail and soldered. The soldered connection is protected by insulation such as plastic tubing or friction tape to prevent stray wires of the shielding braid from rupturing the insulation of other wires, thereby causing a short circuit. When the flexible conduit nut or cable clamp is tightened to the endbell of the plug, a satisfactory bond between the wire shielding and plug endbell is ensured.

Bonding rings are used for bonding between endbell and wire shielding, and may be used with either a cable clamp or a flexible conduit coupling nut. Material is soft copper. All excess lengths of tongue may be cut away.

Part Number	Fits Shell Size	A Min.	B Min.	C Max.	D Min.	E Max.	F Max.
AN3111-1	8S, 10S	.052	.052	.166	.318	.453	.025
AN3111-2	10SL, 12, 12S	.052	.052	.198	.436	.571	.025
AN3111-3	14 & 14S	.052	.052	.198	.552	.687	.025
AN3111-4	16 & 16S	.084	.084	.416	.615	.812	.025
AN3111-5	18	.115	.115	.322	.677	.937	.025
AN3111-6	20 & 22	.115	.115	.510	.909	1.110	.025
AN3111-7	24 & 28	.115	.115	.448	1.100	1.360	.025
AN3111-8	32	.115	.115	.572	1.413	1.673	.037
AN3111-9	36	.115	.115	.572	1.663	1.923	.037
AN3111-10	40	.115	.115	.572	1.905	2.165	.037
AN3111-11	44	.115	.115	.698	2.155	2.415	.037
AN3111-12	48	.115	.115	.698	2.655	2.915	.037

Dimensions subject to change.

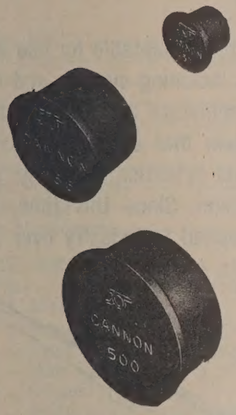
ITT CANNON ELECTRIC

MS STANDARD CIRCULAR CONNECTORS DESIGNED TO MIL-C-5015

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

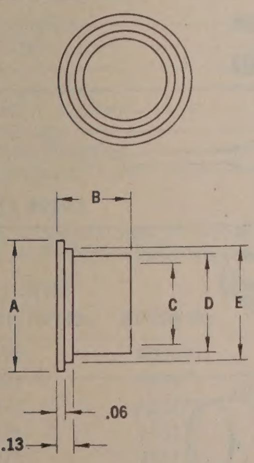
PLASTIC PROTECTIVE CAPS



Protective dust caps are designed to cover the coupling and conduit ends of MS connectors where there is a possibility of foreign matter accumulating on the interior of the connector or of damage to the threaded parts. Material is red polyethylene. Plastic dust caps can be reused, but are not intended to replace the standard aluminum dust caps shown on preceding pages.

Part Number	MS3100F, R Coupling End	MS3100F, R Solder Pot End	MS3102F, R Coupling End	MS3102F, R Solder Pot End	MS-F (only) Solder Pot End	MS3106/MS3108 F, R Coupling End	MS3106/MS3108 F, R Solder Pot End
025-0458-000				8S		8S	
025-0459-000	8S	8S, 10S	8S	8S, 10S	10S		8S, 10S
025-0460-000	10S, 10SL	10SL, 12S, 12	10S, 10SL	10SL, 12S, 12		10SL, 12S, 12	10SL, 12S, 12
025-0462-000	12S, 12	14S, 14	12S, 12	14S, 14			14S, 14
025-0463-000	14S, 14	16S, 16	14S, 14	16S, 16			16S, 16
025-0466-000				18	18		
025-0467-000				20		20	
025-0468-000	20		20	22	22		
025-0469-000	22			24	24		
025-0470-000				28			
025-0471-000				32			
025-0472-000				36			
025-0473-000				40			
025-0474-000				44			
025-0475-000				48			
025-0477-000						10S, 10SL	
025-0478-000						12S, 12	
025-0479-000						14S, 14	
025-0480-000						16S, 16	
025-0484-000						18	
025-0486-000						22	
025-0487-000						24	
025-0488-000						28	
025-0489-000						32	
025-0490-000						36	
025-0491-000						40	
025-0492-000						44	
025-0493-000						48	
025-0498-000	16S, 16	18	16S, 16	48			18
025-0499-000		20, 22		36		22	20, 22
025-0500-000		24, 28		40			24, 28
025-0501-000	28	32	28	44			32
025-0502-000	32	36	32	32			36
025-0503-000	36	40	36	24, 28			40
025-0504-000	40	44	40	20, 22			44
025-0505-000	48		48	18			48
025-0507-000	18		18		20		
025-0510-000	24		24				
025-0511-000	44	48	44				
025-0608-000					8S		
025-0609-000					10SL, 12S, 12		
025-0610-000					14S, 14		
025-0611-000					16S, 16		
025-0612-000					28		
025-0613-000					32		
025-0614-000					36		

DIMENSIONS



Part Number	A Max.	B Max.	C Max.	D Max.	E Max.	Wt. Lb.
025-0458-000	.673	.440	.430	.486	.583	.0012
025-0459-000	.734	.440	.490	.546	.644	.0014
025-0460-000	.848	.700	.600	.656	.758	.0022
025-0462-000	.973	.700	.730	.786	.883	.0028
025-0463-000	1.098	.700	.850	.908	1.008	.0033
025-0466-000	1.209	.700	.950	1.016	1.119	.0042
025-0467-000	1.396	.700	1.150	1.216	1.308	.0054
025-0468-000	1.500	.700	1.240	1.306	1.405	.0060
025-0469-000	1.625	.700	1.360	1.426	1.530	.0067
025-0470-000	1.870	,700	1.610	1.676	1.775	.0087
025-0471-000	2.120	.700	1.860	1.926	2.025	.0103
025-0472-000	2.370	.700	2.110	2.176	2.275	.0141
025-0473-000	2.501	.700	2.310	2.380	2.491	.0164
025-0474-000	2.872	.700	2.590	2.660	2.772	.0186
025-0475-000	3.122	.700	2.840	2.910	3.022	.0222
025-0477-000	.802	.491	.550	.616	.712	.0017
025-0478-000	.911	.571	.669	.725	.821	.0022
025-0479-000	1.036	.571	.794	.850	.946	.0027
025-0480-000	1.161	.571	.919	.975	1.071	.0033
025-0484-000	1.290	.576	1.028	1.094	1.195	.0044
025-0486-000	1.540	.576	1.278	1.344	1.445	.0058
025-0487-000	1.665	.576	1.403	1.469	1.570	.0066
025-0488-000	1.907	.576	1.645	1.711	1.812	.0084
025-0489-000	2.157	.576	1.895	1.961	2.062	.0102
025-0490-000	2.412	.576	2.140	2.216	2.317	.0132
025-0491-000	2.672	.576	2.390	2.466	2.572	.0163
025-0492-000	2.922	.576	2.640	2.716	2.822	.0186
025-0493-000	3.172	.576	2.890	2.966	3.072	.0213
025-0498-000	1.240	.700	.990	1.056	1.150	.0044
025-0499-000	1.427	.700	1.117	1.183	1.337	.0055
025-0500-000	1.677	.700	1.420	1.486	1.587	.0072
025-0501-000	1.985	.700	1.730	1.796	1.895	.0095
025-0502-000	2.245	.700	1.980	2.046	2.155	.0114
025-0503-000	2.495	.700	2.230	2.296	2.400	.0134
025-0504-000	2.742	.700	2.480	2.546	2.652	.0186
025-0505-000	3.257	.700	2.980	3.046	3.157	.0233
025-0507-000	1.365	.700	1.110	1.176	1.275	.0050
025-0510-000	1.740	.700	1.490	1.556	1.650	.0077
025-0511-000	3.007	.700	2.730	2.796	2.907	.0220
025-0608-000	.643	.440	.400	.456	.553	.0011
025-0609-000	.829	.700	.580	.636	.739	.0021
025-0610-000	.954	.700	.710	.766	.864	.0028
025-0611-000	1.079	.700	.830	.886	.989	.0032
025-0612-000	1.839	.700	1.570	1.626	1.744	.0083
025-0613-000	2.089	.700	1.820	1.876	1.994	.0100
025-0614-000	2.376	.700	2.010	2.066	2.231	.0132

Dimensions subject to change.

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS
PV/M83723/M26482

PVA/MIL-C-83723 (SERIES I)
PV7*/MIL-C-26482 (SERIES II)

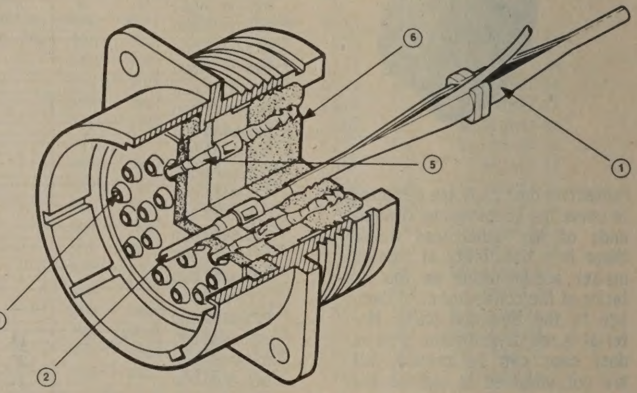
- **Intermateable with MIL-C-26482 Series I and NAS1599**
- **Operating temperature —55°C to +200°C**

The PV connector series is designed to meet the rugged requirements of NAS1599, the specification which delineates the critical requirements of space-age applications. PV connectors have been used extensively on major aerospace programs requiring general-purpose, miniature cylindrical bayonet coupling connectors such as Apollo, ATM, OWS, Minuteman, Skylab, Space Shuttle, Thor-Delta, Titan IIIC, and Viking.

PVA/PV7* connectors are available under numerous industrial specifications, some of which are listed below:

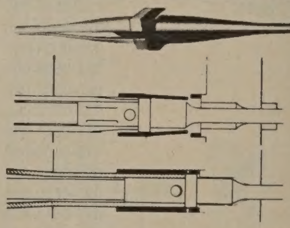
- MIL-C-83723 (Series I) USAF
- 40M39569 NASA, George C. Marshall Sprace Flight Center
- 81D52 Martin Marietta, Denver Division
- MC414-0365 Rockwell International Space Division
- AC414-0013 Rockwell International Autonetics Division
- STS0003 McDonnell Douglas Astronautics
- SV81 NAS1599 Martin Marietta/NASA Langley
- MIL-C-26482 (Series II) Navy

The PV series is an important member of the Universal Interconnect System (UIS) — the only system that can perform all interconnection missions. This system is adaptable for use with connectors of all shapes and sizes, including circular and rectangular configurations, standard, miniature and subminiature sizes. UIS is a rear servicing system that evolved from the LITTLE CAESAR® rear release contact retention assembly, pioneered and developed by ITT Cannon. Since this time, ITT Cannon, and its licensees, have supplied to industry over 250 million interconnections utilizing this system.



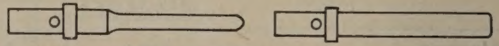
Universal Insertion/Extraction Tool Style — A single, expendable plastic tool is used for insertion and extraction of both pins and sockets. The tool never touches the engaging ends of contacts, and cannot damage the insert. **Contact Insertion** is accomplished with the colored insertion tip of the tool that butts against the contact shoulder. When the contact is fully inserted, the tines snap behind the contact shoulder. **Contact extraction** is equally simple. Using the white ends of the tool, insert the tool tip into the rear of the plug (or receptacle), expanding the tines beyond the contact shoulder and releasing the contact.

1.



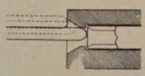
Simple, Strong Contact Design — One basic configuration eliminates undercuts and maximizes bend resistance for positive contact mating.

2.



Closed-Entry Socket Insert — Hard dielectric socket face of mating connector has lead-in chamfers for positive alignment of pins and sockets.

3.

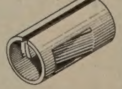


Interfacial Pin Insert Seal — Universal interconnect permits design of raised moisture barriers around each pin which mate into lead-in chambers of hard face socket insert for individual contact sealing. Interfacial sealing is never touched by service tools.

4.

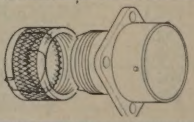
Superior Contact Stability — Rear Contact Release System (LITTLE CAESAR contact assembly) features a stamped metal retaining clip captivated by molded-in shoulders of each contact cavity in the insulator. A rear-inserted plastic tool expands the tines beyond the contact shoulder, releasing the contact.

5.



Polarized Backshells — Interlocking teeth on the front of the backshell and rear portion of the shell allow endbells to be positioned as desired, eliminating chafing of wire during assembly.

6.



ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS PV/M83723/M26482

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

HOW TO ORDER

SERIES I — MIL-C-83723

ITT CANNON DESIGNATION

PVA 0 R 22 B 55 P N C L

- Series Prefix
- Shell Style
- Class
- Shell Size
- Coupling Means
- Contact Arrangement
- Contact Style
- Insert Polarization
- Endbell Type
- Less Components

SERIES PREFIX

PVA — Interchangeable with MIL-C-83723, Series I

SHELL STYLE

0 — Narrow flange mounting receptacle
1 — Cable connecting receptacle
4 — Wide flange mounting receptacle
6 — Straight plug
7 — Single hole mounting receptacle

CLASS

R — Conductive finish (nickel), operating temp. −55°C to 200°C, fluid resistant
G — Conductive finish (nickel), operating temp. −55°C to 200°C, fluid resistant, RFI grounding (plug only)
A — Non-conductive finish (black anodize), operating temp. −55°C to 200°C, fluid resistant

SHELL SIZE

10, 12, 14, 16, 18, 20, 22 and 24

COUPLING MEANS

B — Bayonet

CONTACT ARRANGEMENTS

See following page.

INSERT POLARIZATION

N (normal), W, X, Y and Z

ENDBELL TYPE

C — Short (without strain relief)
R — 90° (with strain relief)
S — Straight (with strain relief)

LESS COMPONENTS

Use letter "L" if connectors are to be supplied less contacts, grommet sealing plugs, and insertion/extraction tools. ("L" is not marked on connectors)

MS DESIGNATION

M 83723 01 R 22 55 N

- Military Part Number Indicator
- Basic Specification
- Specification Sheet Number Indicates Shell Style and Contact Type)
- Class
- Shell Size
- Contact Arrangement
- Insert Polarization

MILITARY PART NO. INDICATOR

M

BASIC SPECIFICATION

MIL-C-83723

SPECIFICATION SHEET NUMBER (shell style and contact type)

01 — Narrow flange mounting receptacle with socket contacts
02 — Narrow flange mounting receptacle with pin contacts
03 — Wide flange mounting receptacle with socket contacts
04 — Wide flange mounting receptacle with pin contacts
05 — Single hole mounting receptacle with socket contacts
06 — Single hole mounting receptacle with pin contacts
07 — Cable connecting receptacle with socket contacts
08 — Cable connecting receptacle with pin contacts
13 — Straight plug with socket contacts
14 — Straight plug with pin contacts
42 — Straight plug, RFI grounding with pin contacts
43 — Straight plug, RFI grounding with socket contacts

CLASS

R — Conductive finish (nickel), operating temp. −55°C to 200°C, fluid resistant
A — Non-conductive finish (black anodize), operating temp. −55°C to 200°C, fluid resistant

SHELL SIZE

10, 12, 14, 16, 18, 20, 22 and 24

CONTACT ARRANGEMENTS

See following page.

INSERT POLARIZATION

N (normal), W, X, Y and Z

SERIES II — MIL-C-26482

PV 70 L 18 32 P W L
MS 3470 L 18 32 P W

- Series Prefix
- Shell Style
- Class
- Size
- Contact Arrangement
- Contact Type
- Alternate Polarizing
- Less Contacts (PV only)

SERIES PREFIX

MS — Complies with MIL-C-26482
PV — ITT Cannon Interchangeable with MIL-C-26482 Series II

SHELL STYLE

Cannon Part No.	Military No.	Description
PV70	MS3470	— Narrow flange receptacle
PV71	MS3471	— Cable connecting receptacle
PV72	MS3472	— Wide flange receptacle
PV74	MS3474	— Jam nut receptacle
PV75	MS3475	— Straight plug, RFI grounding
PV76	MS3476	— Straight plug

CLASS

PV Series

L

MS Series

E — High temperature, 200°C, conductive finish (nickel)
L — Fluid resistant, 175°C, conductive finish (nickel)
(NOTE: ITTCE's PV, class "L" connectors meet the qualification requirements for both class "E" and "L" of MIL-C-26482.)

SHELL SIZE

10, 12, 14, 16, 18, 20, 22 and 24

CONTACT ARRANGEMENTS

See following page.

CONTACT TYPE

P — Pin contact
S — Socket contact
A — Less pin contact* (MS only)
B — Less socket contacts* (MS only)
*The "A" and "B" designators are used only when **other** than power contacts are to be installed (i.e. shielded, coaxial and thermocouple contacts).

ALTERNATE POLARIZING

No designation required for normal position.
Standard MS alternate positions available.

LESS CONTACTS

Use "L" if PV connectors are ordered less contacts, grommet sealing plugs and insertion/extraction tool ("L" is not stamped on connectors). To order MS connectors less contacts, purchase order must state less contacts.

MINIATURE CIRCULAR CONNECTORS PV/M83723/M26482

MILITARY SPECIFICATION CROSS REFERENCE CHART

PVA/PV7*, MIL-C-83723 (Series I) and MIL-C-26482 (Series II) Replacement for	MS Standards	ITT Cannon Prefix Commercial Design	MIL-C-83723 "Slash Sheet" Socket	Pin	ITT Cannon Prefix Commercial Design	Description
MIL-C-26482		**MIL-C-26482**			**MIL-C-83723**	
MS3110, MS3120	MS3470	PV70	/1	/2	PVA0	Narrow Flange Receptacle
MS3111, MS3121	MS3471	PV71	/7	/8	PVA1	Cable Connecting Receptacle
MS3112, MS3122	MS3470	PV70	/1	/2	PVA0	Narrow Flange Receptacle
MS3114, MS3124	MS3474	PV74	/5	/6	PVA7	Single Hole Mount Receptacle
MS3116, MS3126	MS3476	PV76	/13	/14	PVA6	Straight Plug
KSP/KSPM/KSSE	MS3472	PV72	/3	/4	PVA4	Wide Flange Receptacle
PV75	MS3475	PV75	/42	/43	PVA6G	Straight Plug, RFI Grounding
NAS1599						
NAS1650, NAS1699	MS3470	PV70	/1	/2	PVA0	Narrow Flange Receptacle
NAS1651, NAS1700	MS3472	PV72	/3	/4	PVA4	Wide Flange Receptacle
NAS1652, NAS1701	MS3474	PV74	/5	/6	PVA7	Single Hole Mount Receptacle
NAS1653, NAS1702	MS3476	PV76	/13	/14	PVA6	Straight Plug

ELECTRICAL DATA

Contact Size	Wire Size	Insulation O.D. Limits inch (mm) min.	max.	Max. Current For Tests (amps) (MIL-C-83723)	Potential Drop (Millivolts at 25°C)
12	12	.097 (2,46)	.158 (4,01)	23	50
	14			17	45
16	16	.053 (1,35)	.103 (2,62)	13	50
	20			7.5	45
20	20	.040 (1,02)	.083 (2,11)	7.5	55
	24			3.0	45

Service Rating	Dielectric Withstanding Voltage seal level	70,000 ft. altitude	Insulation Resistance (25°C)
1	1500 Vac rms	375 Vac rms	5000 megohms minimum
2	2300 Vac rms	500 Vac rms	5000 megohms minimum

STANDARD DATA

MATERIALS AND FINISHES

Description	Material	Finish
SHELL	Aluminum alloy per QQ-A-367	Electroless nickel plating per MIL-C-26074 or black anodize
INSULATORS	Mineral glass-filled epoxy	None
ELASTOMERS (grommets, interfacial and O ring seals)	Silicone rubber (ITT Cannon blend) Fluorosilicone rubber (ITT Cannon blend)	None None
CONTACTS	Copper alloy	Gold plate per MIL-G-45204
COUPLING NUT	Aluminum alloy per QQ-A-591	Electroless nickel plating per MIL-C-26074 or black anodize
JAM NUT (on PV74, PVA7)	Aluminum alloy per QQ-A-282	Electroless nickel plating per MIL-C-26074 or black anodize

MINIATURE CIRCULAR CONNECTORS PV/M83723/M26482

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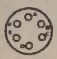
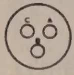
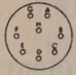
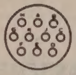
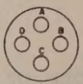
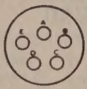
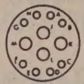
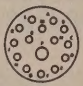
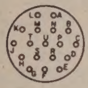
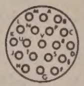
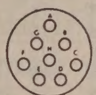
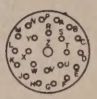
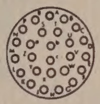
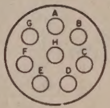
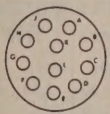
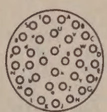
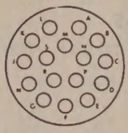
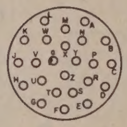
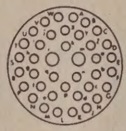
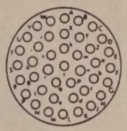
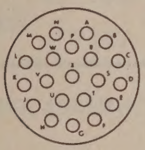
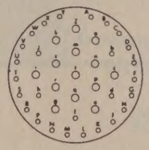
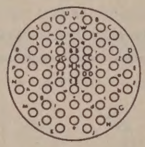
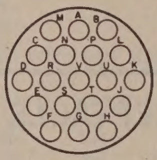
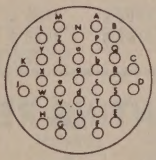
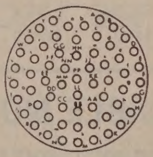
CONTACT ARRANGEMENTS

								
SHELL SIZE	**10-6**	**12-3**	**12-8**	**12-10**	**14-4**	**14-5**	**14-12**	**14-15**
NO. OF CONTACTS	6-#20	3-#16	8-#20	10-#20	4-#12	5-#16	4-#16, 8-#20	1-#16, 14-#20
SERVICE RATING	1	2	1	1	1	2	1	1

						
SHELL SIZE	**14-18**	**14-19**	**16-8**	**16-23**	**16-26**	**18-8**
NO. OF CONTACTS	18-#20	19-#20	8-#16	1-#16, 22-#20	26-#20	8-#12
SERVICE RATING	1	1	2	1	1	1

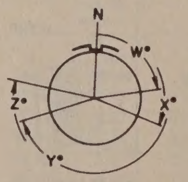
						
SHELL SIZE	**18-11**	**18-32**	**20-16**	**20-24**	**20-39**	**20-41**
NO. OF CONTACTS	11-#16	32-#20	16-#16	24-#20	2-#16, 37-#20	41-#20
SERVICE RATING	2	1	2	1	1	1

						
SHELL SIZE	**22-21**	**22-41**	**22-55**	**24-19**	**24-31**	**24-61**
NO. OF CONTACTS	21-#16	27-#20, 14-#16	55-#20	19-#12	31-#16	61-#20
SERVICE RATING	2	1 2	1	2	1	1

ALTERNATE POSITIONS

SHELL SIZE	ARRANGE-MENT	N	W	POS CODE X	Y	Z
10	6	0°	90°	—	—	—
12	3	0°	—	—	180°	—
	8	0°	90°	112°	203°	292°
	10	0°	60°	155°	270°	295°
14	4	0°	45°	—	—	—
	5	0°	40°	92°	184°	273°
	12	0°	43°	90°	—	—
	15	0°	17°	110°	155°	234°
	18	0°	15°	90°	180°	270°
	19	0°	30°	165°	315°	—
16	8	0°	54°	152°	180°	331°
	23	0°	158°	270°	—	—
	26	0°	60°	—	275°	338°
18	8	0°	180°	—	—	—
	11	0°	62°	119°	241°	340°
	32	0°	85°	138°	222°	265°
20	16	0°	238°	318°	333°	347°
	24	0°	70°	145°	215°	290°
	39	0°	63°	144°	252°	333°
	41	0°	45°	126°	225°	—
22	21	0°	16°	135°	175°	349°
	36	0°	72°	144°	216°	288°
	41	0°	39°	135°	264°	—
	55	0°	30°	142°	226°	314°
24	19	0°	30°	165°	315°	—
	31	0°	90°	225°	255°	—
	61	0°	90°	180°	270°	324°

INSERT POSITION



(Face view of pin insert)

Contact arrangements requiring reduced diameter for lead-in chamfer on outer row of contact cavities as indicated below.

Shell	Contact Arrangements	Contact Cavities
12	10	C, G
14	12	A, B, C, D, E, F, G, and H
14	19	B, D, F, H, K, and M
16	26	A, B, C, D, E, F, G, H, J, K, L, M, N, P, and R
18	32	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, and T
22	41	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, X, and Y

ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS PV/M83723/M26482

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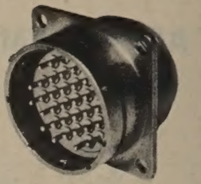
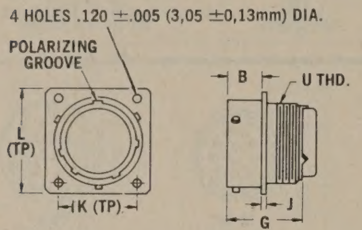
NARROW FLANGE RECEPTACLE

MS3470/PV70
M83723-01 (socket) / PVA0
M83723-02 (pin)



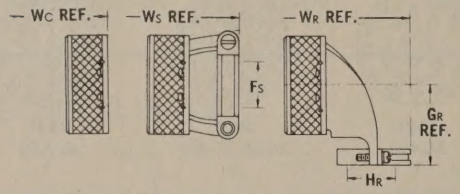
RECEPTACLE ASSEMBLY



RECEPTACLE ASSEMBLY WITHOUT BACKSHELL

	INCHES						MILLIMETERS					
SHELL SIZE*	B Max.	G Max.	J Max.	K	L	U Thread UNEF Class 2A	B Max.	F Max.	G Max.	J Max.	K	L
10	.462	1.215	.078	.719	.954	$\frac{5}{8}$-24	11,73	15,01	30,85	1,98	18,26	24,23
12	.462	1.215	.078	.812	1.047	$\frac{3}{4}$-20	11,73	19,08	30,85	1,98	20,62	26,59
14	.462	1.215	.078	.906	1.141	$\frac{7}{8}$-20	11,73	22,25	30,85	1,98	23,01	28,98
16	.462	1.215	.078	.969	1.234	1-20	11,73	25,43	30,85	1,98	24,61	31,34
18	.462	1.215	.078	1.062	1.328	$1\frac{1}{16}$-18	11,73	28,60	30,85	1,98	26,97	33,73
20	.587	1.275	.110	1.156	1.453	$1\frac{3}{16}$-18	14,91	31,78	32,40	2,79	29,36	36,91
22	.587	1.275	.110	1.250	1.578	$1\frac{5}{16}$-18	14,91	34,95	32,40	2,79	31,75	40,08
24	.620	1.275	.110	1.375	1.703	$1\frac{7}{16}$-18	15,75	38,13	32,40	2,79	34,93	43,26

BACKSHELL ASSEMBLIES
(Not supplied with MS connectors)



M83723	TYPE N	TYPE S	TYPE A
PVA0	TYPE C	TYPE S	TYPE R

RECEPTACLE ASSEMBLIES WITH BACKSHELL†

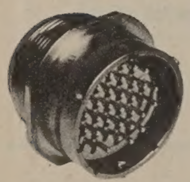
	INCHES						MILLIMETERS					
	TYPE C	TYPE S		TYPE R			TYPE C	TYPE S		TYPE R		
SHELL SIZE*	W_C Max.	F_S Max.	W_S Max.	G_R Max.	H_R Max.	W_R Max.	W_C Max.	F_S Max.	W_S Max.	G_R Max.	H_R Max.	W_R Max.
10	1.492	.286	1.842	.880	.286	2.115	37,90	7,26	46,79	23,35	7,26	53,72
12	1.492	.416	1.842	.950	.416	2.250	37,90	10,57	46,79	24,13	10,57	57,15
14	1.492	.476	2.077	1.010	.476	2.340	37,90	12,09	52,76	25,65	12,09	59,44
16	1.492	.626	2.077	1.070	.626	2.475	37,90	15,90	52,76	27,18	15,90	62,87
18	1.492	.706	2.077	1.130	.706	2.574	37,90	17,93	52,76	28,70	17,93	65,38
20	1.552	.831	2.137	1.190	.831	2.767	39,42	21,11	54,28	30,23	21,11	70,28
22	1.552	.956	2.137	1.260	.956	2.890	39,42	24,28	54,28	32,00	24,28	73,41
24	1.552	1.081	2.137	1.320	1.081	3.012	39,42	27,46	54,28	33;53	27,46	76,50

* See page 69 for part numbers.

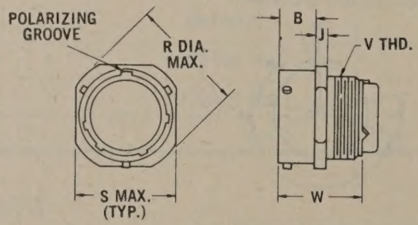
† To order backshell assemblies, see page 76.

CABLE MOUNTING RECEPTACLE

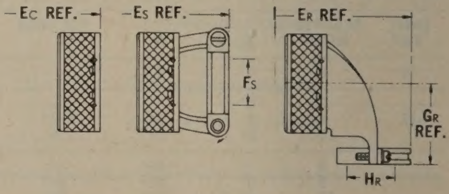
MS3471/PV71
M83723-07 (socket) / PVA1
M83723-08 (pin)



RECEPTACLE ASSEMBLY



BACKSHELL ASSEMBLIES
(Not supplied with MS connectors)



M83723	TYPE N	TYPE S	TYPE A
PVA1	TYPE C	TYPE S	TYPE R

RECEPTACLE ASSEMBLIES WITHOUT BACKSHELL

	INCHES						MILLIMETERS				
SHELL SIZE*	B Max.	J Max.	R Dia. Max.	S Max.	W Max.	V-Thread UNEF Class 2A	B Max.	J Max.	R Dia. Max.	S Max.	W Max.
10	.462	.078	1.082	.954	1.215	$\frac{5}{8}$-24	11,73	1,98	27,48	24,23	30,86
12	.462	.078	1.176	1.047	1.215	$\frac{3}{4}$-20	11,73	1,98	29,87	26,59	30,86
14	.462	.078	1.270	1.141	1.215	$\frac{7}{8}$-20	11,73	1,98	32,26	28,98	30.86
16	.462	.078	1.364	1.234	1.215	1-20	11,73	1,98	34,64	31,34	30,86
18	.462	.078	1.458	1.328	1.215	$1\frac{1}{16}$-18	11,73	1,98	37,03	33,73	30,86
20	.587	.110	1.582	1.453	1.275	$1\frac{3}{16}$-18	14,91	2,79	40,18	36,91	32.38
22	.587	.110	1.708	1.578	1.275	$1\frac{5}{16}$-18	14,91	2,79	43,38	40,08	32,38
24	.620	.110	1.832	1.703	1.275	$1\frac{7}{16}$-18	15,75	2,79	46,53	43,26	32,38

RECEPTACLE ASSEMBLIES WITH BACKSHELL†

	INCHES						MILLIMETERS					
	TYPE C	TYPE S		TYPE R			TYPE C	TYPE S		TYPE R		
SHELL SIZE*	E_C Max.	F_S Max.	E_S Max.	G_R Max.	H_R Max.	E_R Max.	E_C Max.	F_S Max.	E_S Max.	G_R Max.	H_R Max.	E_R Max.
10	1.492	.286	1.842	.880	.286	2.115	37,90	7,26	46,79	23,35	7,26	53,72
12	1.492	.416	1.842	.950	.416	2.250	37,90	10,57	46,79	24,13	10,57	57,15
14	1.492	.476	2.077	1.010	.476	2.340	37,90	12,09	52,76	25,65	12,09	59,44
16	1.492	.626	2.077	1.070	.626	2.475	37,90	15,90	52,76	27,18	15,90	62,87
18	1.492	.706	2.077	1.130	.706	2.574	37,90	17,93	52,76	28,70	17,93	65,38
20	1.552	.831	2.137	1.190	.831	2.767	39,42	21,11	54,28	30,23	21,11	70,28
22	1.552	.956	2.137	1.260	.956	2.890	39,42	24,28	54,28	32,00	24,28	73,41
24	1.552	1.081	2.137	1.320	1.081	3.012	39,42	27,46	54,28	33,53	27,46	76,50

* See page 69 for part numbers.

† To order backshell assemblies separately, see page 76.

Dimensions subject to change.

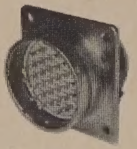
ITT CANNON ELECTRIC

MINIATURE CIRCULAR CONNECTORS PV/M83723/M26482

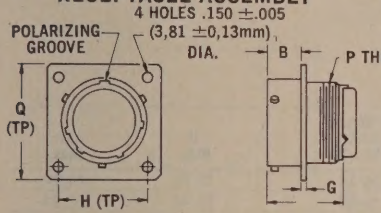
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

WIDE FLANGE RECEPTACLE

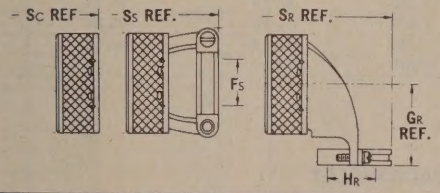
MS3472/PV72 M83723-03 (socket) M83723-04 (pin) / PVA4



RECEPTACLE ASSEMBLY



BACKSHELL ASSEMBLIES
(Not supplied with MS connectors)



M83723	TYPE N	TYPE S	TYPE A
PVA4	TYPE C	TYPE S	TYPE R

RECEPTACLE ASSEMBLIES WITHOUT BACKSHELL

	INCHES						MILLIMETERS				
SHELL SIZE*	B Max.	F Max.	G Max.	H Max.	Q Max.	P Thread UNEF Class 2A	B Max.	F Max.	G Max.	H Max.	Q Max.
10	.493	1.215	.078	.812	1.141	$\frac{5}{8}$-24	12,52	30,85	1,98	20,62	28,98
12	.493	1.215	.078	.938	1.266	$\frac{3}{4}$-20	12,52	30,85	1,98	23,83	32,16
14	.493	1.215	.078	1.031	1.360	$\frac{7}{8}$-20	12,52	30,85	1,98	26,19	34,54
16	.493	1.215	.078	1.125	1.453	1-20	12,52	30,85	1,98	28,58	36,91
18	.493	1.215	.078	1.203	1.532	1$\frac{1}{16}$-18	12,52	30,38	1,98	30,56	38,91
20	.587	1.275	.110	1.297	1.688	1$\frac{3}{16}$-18	14,91	32,40	1,98	32,94	42,88
22	.587	1.275	.110	1.375	1.766	1$\frac{5}{16}$-18	14,91	32,40	1,98	34,93	44,86
24	.620	1.275	.110	1.500	1.891	1$\frac{7}{16}$-18	15,75	32,40	1,98	38,10	48,03

RECEPTACLE ASSEMBLIES WITH BACKSHELL†

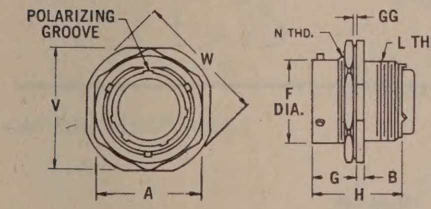
	INCHES						MILLIMETERS					
	TYPE C	TYPE S		TYPE R			TYPE C	TYPE S		TYPE R		
SHELL SIZE*	S_C Max.	F_S Max.	S_S Max.	G_R Max.	H_R Max.	S_R Max.	S_C Max.	F_S Max.	S_S Max.	G_R Max.	H_R Max.	S_R Max.
10	1.492	.286	1.842	.880	.286	2.115	37,90	7,26	46,79	22,35	7,26	53,72
12	1.492	.416	1.842	.950	.416	2.250	37,90	10,57	46,79	24,13	10,57	57,15
14	1.492	.476	2.077	1.010	.476	2.340	37,90	12,09	52,76	25,65	12,09	59,44
16	1.492	.626	2.077	1.070	.626	2.475	37,90	15,90	52,76	27,18	15,90	62,87
18	1.492	.706	2.077	1.130	.706	2.574	37,90	17,93	52,76	28,70	17,93	65,38
20	1.552	.831	2.137	1.190	.831	2.767	39,42	21,11	54,28	30,23	21,11	70,28
22	1.552	.956	2.137	1.260	.956	2.890	39,42	24,28	54,28	32,00	24,28	73,41
24	1.552	1.081	2.137	1.320	1.081	3.012	39,42	27,46	54,28	33,53	27,46	76,50

* See page 69 for part numbers.
† To order backshell assemblies separately, see page 76.

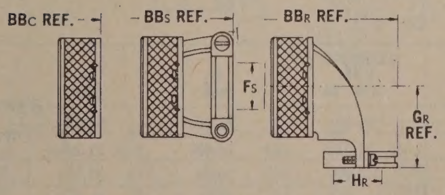
JAM NUT

MS3474/PV74 M83723-05 (socket) M83723-06 (pin) / PVA7

RECEPTACLE ASSEMBLY



BACKSHELL ASSEMBLIES
(Not supplied with MS connectors)



M83723	TYPE N	TYPE S	TYPE A
PVA7	TYPE C	TYPE S	TYPE R

RECEPTACLE ASSEMBLIES WITHOUT BACKSHELL

INCHES

SHELL SIZE*	V Max.	A Max.	B Max.	F Max.	G	GG Panel Thickness	H Max.	W Dia.	L Thread UNEF Class 2A
10	1.078	.892	.113	.591	.707	.187	1.215	1.203	$\frac{5}{8}$-24
12	1.266	1.079	.113	.751	.707	.187	1.215	1.391	$\frac{3}{4}$-20
14	1.391	1.205	.113	.876	.707	.187	1.215	1.516	$\frac{7}{8}$-20
16	1.516	1.329	.113	1.001	.707	.187	1.215	1.641	1 -20
18	1.641	1.455	.113	1.126	.707	.187	1.215	1.766	1$\frac{1}{16}$-18
20	1.828	1.579	.148	1.251	.772	.250	1.275	1.954	1$\frac{3}{16}$-18
22	1.954	1.705	.148	1.376	.772	.250	1.275	2.078	1$\frac{5}{16}$-18
24	2.078	1.829	.148	1.501	.772	.219	1.275	2.203	1$\frac{7}{16}$-18

MILLIMETERS

SHELL SIZE*	V Max.	A Max.	B Max.	F Max.	G	GG Panel Thickness	H Max.	W Dia.
10	27,38	22,66	2,87	15,01	17,96	4,75	30,85	30,56
12	32,16	27,41	2,87	19,08	17,96	4,75	30,85	35,33
14	35,33	30,61	2,87	22,25	17,96	4,75	30,85	38,51
16	38,51	33,76	2,87	25,43	17,96	4,75	30,85	41,68
18	41,68	36,96	2,87	28,60	17,96	4,75	30,85	44,86
20	46,43	40,11	3,76	31,78	19,61	6,35	32,40	49,63
22	49,63	43,31	3,76	34,95	19,61	6,35	32,40	52,78
24	52,78	46,46	3,76	38,13	19,61	5,56	32,40	55,96

RECEPTACLE ASSEMBLIES WITH BACKSHELL†

	INCHES						MILLIMETERS					
	TYPE C	TYPE S		TYPE R			TYPE C	TYPE S		TYPE R		
SHELL SIZE*	BB_C Max.	BB_S Max.	F_S Max.	BB_R Max.	G_R Max.	H_R Max.	BB_C Max.	BB_S Max.	F_S Max.	BB_R Max.	G_R Max.	H_R Max.
10	1.492	1.842	.286	2.115	.880	.286	37,90	46,79	7,26	53,72	22,35	7,26
12	1.492	1.842	.416	2.250	.950	.416	37,90	46,79	10,57	57,15	24,13	10,57
14	1.492	2.077	.476	2.340	1.010	.476	37,90	52,76	12,09	59,44	25,65	12,09
16	1.492	2.077	.626	2.475	1.070	.626	37,90	52,76	15,90	62,87	27,18	15,90
18	1.492	2.077	.706	2.574	1.130	.706	37,90	52,76	17,93	65,38	28,70	17,93
20	1.552	2.137	.831	2.767	1.190	.831	39,42	54,28	21,11	70,28	30,23	21,11
22	1.552	2.137	.956	2.890	1.260	.956	39,42	54,28	24,28	73,41	32,00	24,28
24	1.552	2.137	1.081	3.012	1.320	1.081	39,42	54,28	27,46	76,50	33,53	27,46

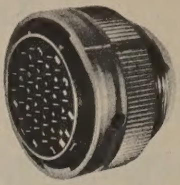
* See page 69 for part numbers.
† To order backshell assemblies separately, see page 76.

Dimensions subject to change.

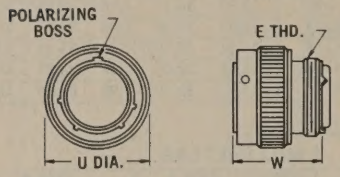
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

STRAIGHT PLUG

MS3476/PV76
M83723-13 (socket) / PVA6
M83723-14 (pin)



PLUG ASSEMBLY

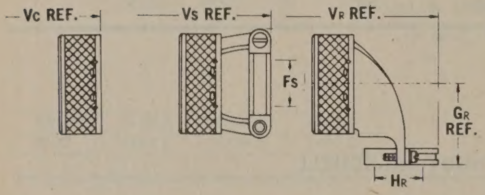


PLUG ASSEMBLIES WITHOUT BACKSHELL

INCHES

SHELL SIZE*	U Max.	W Max.	E Thread UNEF Class 2A	U Max.	W Max.
10	.926	1.230	$\frac{5}{8}$-24	21,72	31,24
12	1.048	1.230	$\frac{3}{4}$-20	26,42	31,24
14	1.183	1.230	$\frac{7}{8}$-20	29,97	31,24
16	1.305	1.230	1 -20	33,15	31,24
18	1.391	1.230	$1\frac{1}{16}$-18	35,33	31,24
20	1.531	1.230	$1\frac{3}{16}$-18	38,89	31,24
22	1.656	1.230	$1\frac{5}{16}$-18	42,06	31,24
24	1.777	1.230	$1\frac{7}{16}$-18	45,14	31,24

BACKSHELL ASSEMBLIES
(Not supplied with MS connectors)



M83723	TYPE N	TYPE S	TYPE A
PVA6	TYPE C	TYPE S	TYPE R

PLUG ASSEMBLIES WITH BACKSHELL†

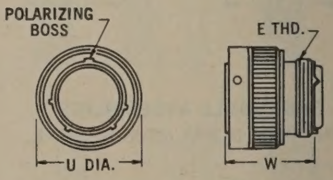
	INCHES						MILLIMETERS					
	TYPE C	TYPE S		TYPE R			TYPE C	TYPE S		TYPE R		
SHELL SIZE*	V_C Max.	F_S Max.	V_S Max.	G_R Max.	H_R Max.	V_R Max.	V_C Max.	F_S Max.	V_S Max.	G_R Max.	H_R Max.	V_R Max.
10	1.507	.286	1.857	.880	.286	2.130	38,28	7,26	47,17	22,35	7,26	54,10
12	1.507	.416	1.857	.950	.416	2.265	38,28	10,57	47,17	24,13	10,57	57,53
14	1.507	.476	2.092	1.010	.476	2.355	38,28	12,09	53,14	25,65	12,09	59,82
16	1.507	.626	2.092	1.070	.626	2.490	38,28	15,90	53,14	27,18	15,90	63,25
18	1.507	.706	2.092	1.130	.706	2.589	38,28	17,93	53,14	28,70	17,93	65,76
20	1.507	.831	2.092	1.190	.831	2.722	38,28	21,11	53,14	30,23	21,11	69,14
22	1.507	.956	2.092	1.260	.956	2.845	38,28	24,28	53,14	32,00	24,28	72,26
24	1.507	1.081	2.092	1.320	1.081	2.967	38,28	27,46	53,14	33,53	27,46	75,36

* See page 69 for part numbers.
† To order backshell assemblies separately, see page 76.

STRAIGHT PLUG R. F. I. SHIELDED

MS3475/PV75
M83723-42 (pin) / PVA6G
M83723-43 (socket)

PLUG ASSEMBLY

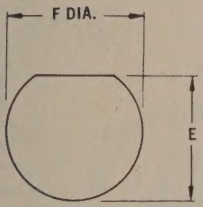


	INCHES				MILLIMETERS			
SHELL SIZE*	E Thread UNEF Class 2A	U Max.	W Max.	SHELL SIZE*	E Thread UNEF Class 2A	U Max.	W Max.
10	$\frac{5}{8}$-24	.926	1.230	10	$\frac{5}{8}$-24	21,72	31,24
12	$\frac{3}{4}$-20	1.048	1.230	12	$\frac{3}{4}$-20	26,42	31,24
14	$\frac{7}{8}$-20	1.183	1.230	14	$\frac{7}{8}$-20	29,97	31,24
16	1 -20	1.305	1.230	16	1 -20	33,15	31,24
18	$1\frac{1}{16}$-18	1.391	1.230	18	$1\frac{1}{16}$-18	35,33	31,24
20	$1\frac{3}{16}$-18	1.531	1.230	20	$1\frac{3}{16}$-18	38,89	31,24
22	$1\frac{5}{16}$-18	1.656	1.230	22	$1\frac{5}{16}$-18	42,06	31,24
24	$1\frac{7}{16}$-18	1.777	1.230	24	$1\frac{7}{16}$-18	45,14	31,24

* See page 69 for part numbers.

PANEL CUTOUTS

JAM NUT RECEPTACLE

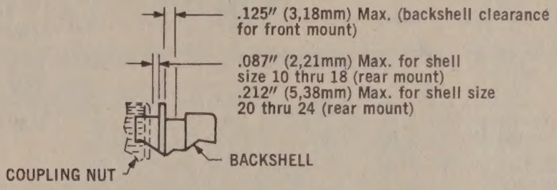


INCHES			MILLIMETERS	
Shell Size	E	F DIA.	E	F DIA.
8				
10	.661	.697	16,79	17,70
12	.824	.895	20,93	22,73
14	.948	1.010	24,08	25,65
16	1.072	1.135	27,23	28,33
18	1.197	1.260	30,40	32,00
20	1.322	1.385	33,58	35,18
22	1.447	1.510	36,75	38,35
24	1.572	1.635	39,93	41,53

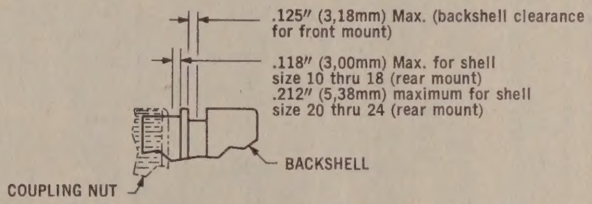
PANEL THICKNESS

Shown here are the maximum panel thickness dimensions allowable to ensur complete connector operation.

NARROW FLANGE RECEPTACLE

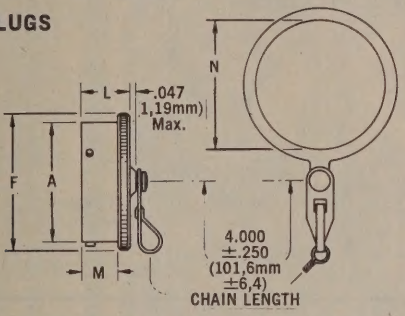

.125″ (3,18mm) Max. (backshell clearance for front mount)
.087″ (2,21mm) Max. for shell size 10 thru 18 (rear mount)
.212″ (5,38mm) Max. for shell size 20 thru 24 (rear mount)
BACKSHELL
COUPLING NUT

WIDE FLANGE RECEPTACLE

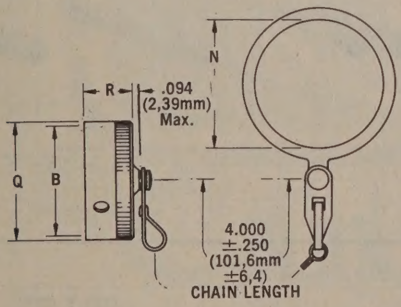

.125″ (3,18mm) Max. (backshell clearance for front mount)
.118″ (3,00mm) Max. for shell size 10 thru 18 (rear mount)
.212″ (5,38mm) maximum for shell size 20 thru 24 (rear mount)
BACKSHELL
COUPLING NUT

PROTECTIVE METAL CAPS

CAP FOR PLUGS


N
L
.047 (1,19mm) Max.
F
A
M
4.000 ±.250 (101,6mm ±6,4) CHAIN LENGTH

CAP FOR RECEPTACLES


N
R
.094 (2,39mm) Max.
Q
B
4.000 ±.250 (101,6mm ±6,4) CHAIN LENGTH

HOW TO ORDER

PV DESCRIPTION

PVS G 80 -22 C

Series Prefix
PVS—ITT Cannon prefix

Class
G—Conductive, nickel finish, fluid resistant
A—Nonconductive anodize finish

Type
80—Plug cap
81—Receptacle cap

Shell Size
8 through 24

Termination Style
No letter—without chain
C—Sash chain without ring
N—Sash chain with ring

MS DESCRIPTION

M83723 -44 -22 C

M Number Prefix

Slash Sheet
44—Receptacle cap
46—Plug cap

Shell Size

Termination Style
No letter—without chain
C—Sash chain without ring
N—Sash chain with ring

INCHES									MILLIMETERS							
Shell Size	A Max.	B Max.	F Max.	L Max.	M Max.	N Min.	Q Max.	R Max.	A Max.	B Max.	F Max.	L Max.	M Max.	N Max.	Q Max.	R Max.
8	.474	.486	.719	.562	.399	.578	.734	.562	12,04	12,34	18,26	14,27	10,13	14,68	18,64	14,27
10	.591	.607	.844	.562	.399	.703	.859	.562	15,01	15,42	21,44	14,27	10,13	17,86	21,82	14,27
12	.751	.766	1.000	.562	.399	.891	1.000	.562	19,08	19,46	25,40	14,27	10,13	22,63	25,40	14,27
14	.876	.890	1.125	.562	.399	1.016	1.125	.562	22,25	22,60	28,58	14,27	10,13	25,81	28,58	14,27
16	1.001	1.015	1.250	.562	.399	1.141	1.250	.562	25,43	25,78	31,75	14,27	10,13	28,98	31,75	14,27
18	1.126	1.141	1.375	.562	.399	1.266	1.375	.562	28,60	28,98	34,93	14,27	10,13	32,16	34,93	14,27
20	1.251	1.265	1.500	.625	.461	1.391	1.500	.562	31,78	32,13	38,10	15,88	11,71	35,33	38,10	14,27
22	1.376	1.390	1.625	.625	.461	1.516	1.625	.562	34,96	35,31	41,26	15,88	11,71	38,51	41,26	14,27
24	1.501	1.515	1.750	.658	.494	1.641	1.750	.602	38,13	38,48	44,45	16,71	12,55	41,68	44,45	15,29

Dimensions subject to change.

COMPONENTS/ACCESSORIES

DUMMY RECEPTACLES

HOW TO ORDER

PVS -15 G 12

Series Prefix — PVS

Dummy Receptacle Indicator — -15
-15 — PV

Class: — G
G — conductive finish (nickel)
A — nonconductive finish (anodized)

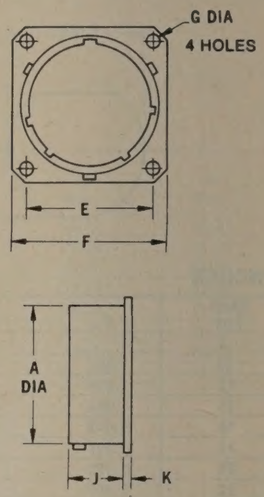
Shell Size — 12
10 thru 24

M83723 -45 -22

M Number Prefix — M83723

Slash Sheet — -45

Shell Size — -22

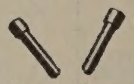


Inches							Millimeters					
Shell Size	A Max.	E Basic	F Max.	G Max.	J Max.	K Max.	A Max.	E Basic	F Max.	G Max.	J Max.	K Max.
8	.474	.594	.828	.125	.493	.078	12,04	15,09	21,03	3,18	12,52	1,98
10	.591	.719	.954	.125	.493	.078	15,01	18,26	24,23	3,18	12,52	1,98
12	.751	.812	1.047	.125	.493	.078	19,06	20,62	26,60	3,18	12,52	1,98
14	.876	.906	1.141	.125	.493	.078	22,25	23,01	28,98	3,18	12,52	1,98
16	1.001	.969	1.234	.125	.493	.078	25,43	24,61	31,34	3,18	12,52	1,98
18	1.126	1.062	1.328	.125	.493	.078	28,60	26,97	33,73	3,18	12,52	1,98
20	1.251	1.156	1.453	.125	.587	.110	31,76	29,36	36,91	3,18	14,91	2,79
22	1.376	1.250	1.578	.125	.587	.110	34,95	31,75	40,08	3,18	14,91	2,79
24	1.501	1.375	1.703	.152	.620	.110	38,13	34,93	43,26	3,86	15,75	2,79

CONTACTS

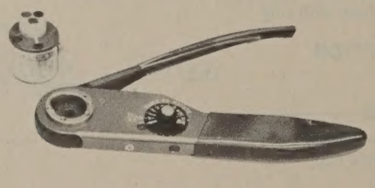
Contact Size	Type	Part Numbers (MS26482) M39029-	M83723-	ITT Cannon
20	Socket	5-20-20	34B20	031-9174-004
20	Pin	4-20-20	33B20	030-9173-006
16	Socket	5-16-16	34B16	031-9206-006
16	Pin	4-16-16	33B16	030-9205-007
12	Socket	5-12-12	34B12	031-9186-003
12	Pin	4-12-12	33B12	030-9185-003

WIRE HOLE FILLERS



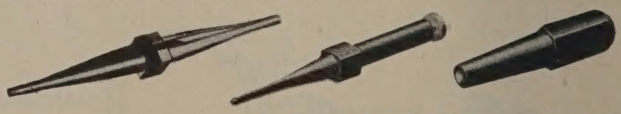
Contact Size	Part Numbers (MS26482) MS3187-	M83723-	ITT Cannon	Color Code
20	20-2	28-20	225-0070-000	Red
16	16-2	28-16	225-0071-000	Blue
12	12-2	28-12	225-0072-000	Yellow

CRIMP TOOL



M22520/1-01 Crimp Tool
with M22520/1-02 Turret

INSERTION/EXTRACTION TOOLS



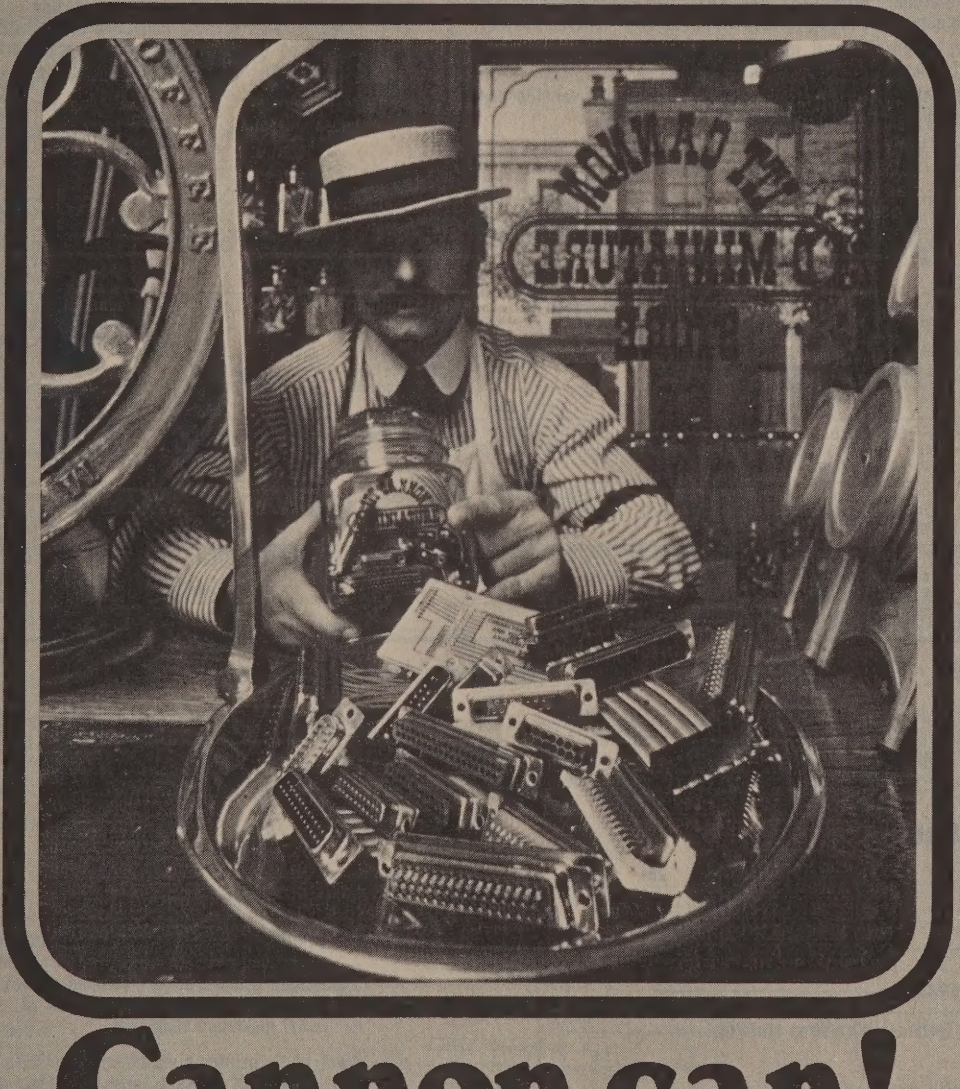
Size Contact	Part Number MS3447-	M83723-	ITT Cannon	Tool Handle	Tool for Unwired Contacts
20	20	31-20	CIET-20	084-0067-000	274-7007-000
16	16	31-16	CIET-16	084-0068-000	274-7008-000
12	12	31-12	CIET-12	084-0069-000	274-7009-000

BACKSHELLS (Not supplied with MS Connectors)

	TYPE C (SHORT)			TYPE S (STRAIGHT)			TYPE R (90°)		
Shell Size	M83723 Conductive (Nickel finish)	ITT CANNON Non-conductive (Anodized finish)	ITT CANNON Conductive (Nickel finish)	M83723 Conductive (Nickel finish)	ITT CANNON Non-conductive (Anodized finish)	ITT CANNON Conductive (Nickel finish)	M83723 Conductive (Nickel finish)	ITT CANNON Non-conductive (Anodized finish)	ITT CANNON Conductive (Nickel finish)
10	15N-10	057-0716-000	057-0716-002	15S-10	057-0683-000	057-0683-002	15A-10	057-0704-000	057-0704-001
12	15N-12	057-0717-000	057-0717-002	15S-12	057-0684-000	057-0684-002	15A-12	057-0705-000	057-0705-001
14	15N-14	057-0718-000	057-0718-002	15S-14	057-0685-000	057-0685-002	15A-14	057-0706-000	057-0706-001
16	15N-16	057-0719-000	057-0719-002	15S-16	057-0686-000	057-0686-002	15A-16	057-0707-000	057-0707-001
18	15N-18	057-0720-000	057-0720-002	15S-18	057-0687-000	057-0687-002	15A-18	057-0708-000	057-0708-001
20	15N-20	057-0721-000	057-0721-002	15S-20	057-0688-000	057-0688-002	15A-20	057-0709-000	057-0709-001
22	15N-22	057-0722-000	057-0722-002	15S-22	057-0689-000	057-0689-002	15A-22	057-0710-000	057-0710-001
24	15N-24	057-0723-000	057-0723-002	15S-24	057-0713-000	057-0713-002	15A-24	057-0711-000	057-0711-001

Dimensions subject to change.

Who can meet your greatest needs in D Subminiatures?



Cannon can!

Six decades on the leading edge of interconnect technology.

CANNON ITT

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL INFORMATION

D Subminiature rectangular connectors are designed for applications where space and weight are prime considerations. They accommodate a great number of circuits in relation to their size and weight and are especially suited for aircraft, missile, and ground support systems. Although designed essentially for rack/panel applications, D series connectors may be adapted for cable attachments by accessory junction shells (shields) with integral clamps.

- ORIGINAL D with solder pot contacts in a two-piece insulator.
- BURGUN-D Mark IV connector with crimp snap-in contacts in a rear release dielectric retention assembly for economical, commercial applications.
- D*U: Flame-retardant BURGUN-D low cost non-environmental subminiature connectors with rear release crimp, snap-in contacts.
- D*P: Flame retardent 90° all plastic PCB connectors ideal for low cost high performance commercial applications.
- D*SP: Mas/Ter interconnect system connectors providing reliable high speed mass termination; flame retardant.
- D*M: GOLDEN-D Mark I connector with solder pot contacts in a monobloc insulator for improved moisture resistance.
- D*M: ROYAL D Mark III connectors have crimp snap-in contacts in the LITTLE CAESAR® rear release contacts retention assembly for high performance, high reliability applications.

These intermateable connectors will accommodate up to 50 contacts that are rated at 5-amps per contact for #20 gauge wire. A high density arrangement with 78 size 22 contacts is also available, as are combination arrangements with provisions for coaxial, power, and/or high voltage contacts and printed circuit terminations. Polarization is by the keystone shape of the shell; coupling is by friction.

The versatility of the D Subminiature line is enhanced by the variety of finishes, as well as by a complete line of accessories. Many of these D Subminiature connector series and accessories are U.L. recognized. Inquiries regarding modifications and custom harnessing of connectors are invited.

SUMMARY

Series	Description	Designation	Insulator	Contacts Termination
D*	D Subminiature connector, low cost	ORIGINAL-D	Two pieces, white Nylon	Solder, Wire-Wrap† and printed circuit
D*C	D Subminiature connector, low cost for commercial applications	BURGUN-D (Mark IV)	Two pieces, burgundy, glass-filled Nylon	Crimp snap-in rear release, and printed circuit Plastic retention clip
D*U	Flame-retardant BURGUN-D D Subminiature	BURGUN-D (Mark IV)	Two pieces, black, glass-filled thermoplastic	Crimp snap-in, rear release, and printed circuit Plastic cone retention
D*P	D Subminiature 90° all plastic PCB connector, low cost, high performance, flame retardant	—	Housing / Retainer: glass-filled thermoplastic, UL rated 94V-0, black	Solder and printed circuit
D*SP	D Subminiature, connectors with high speed mass termination for lower cost, flame retardant	Mas/Ter-D	Glass-filled thermoplastic, UL rated 94V-0, black	Insulation displacement technique
D*M	D Subminiature connector for more critical applications conforms to MIL-C-24308	GOLDEN-D (Mark I)	Monobloc, Diallyphthalate glass-filled, dark green	Solder and printed circuit Coaxial, high power and high voltage
D*MA	D Subminiature with LITTLE CAESAR contact retention system conforms to MIL-C-24308	ROYAL-D (Mark III)	Monobloc, Diallylphthalate glass-filled, dark green	Crimp snap-in, rear release coaxial and/or high voltage

† Wire-Wrap is a registered trademark of Gardner-Denver

ORIGINAL D* Solder Type, Non-Removable Contacts

The Original D connector utilizes a two-piece nylon insulator in five basic shell sizes: E, A, B, C, and D. These nylon insulators operate in temperatures ranging from −65°F to +250°F (−55°C to +120°C). Contact arrangements accommodate 9, 15, 25, 37, and 50 size 20 solder pot, Wire-Wrap or printed circuit contacts respectively. Standard contact terminations accommodate up to #20 AWG stranded wire. Current rating is 5 amps. Polarization is by keystone shape of the shell. Locking accessories and shells with float mounts are also available.

HOW TO ORDER

D B E 25 P A

Series Prefix — D
Shell Size — B
Mounting Type — E
Contact Arrangements — 25
Contact Type — P
Printed Circuit Terminal/Wire-Wrap Modifier — A

SERIES PREFIX

D — ITT Cannon designation

SHELL SIZE

E, A, B, C and D

MOUNTING TYPE

No designation: standard .120 (3,05) diameter mounting hole
E — 4-40 clinch nut for rear panel mounting
F — Float mount for rear panel mounting
G — 2-56 clinch nut for rear panel mounting
K — .154 (3,91) diameter mounting holes
R — Reverse float mount for front panel mounting

CONTACT ARRANGEMENTS

9, 15, 25, 37 and 50 contacts

CONTACT TYPE

P — Pin; S — Socket

PRINTED CIRCUIT TERMINAL/WIRE-WRAP MODIFIER

A — Right-angle printed circuit connector with .040 (1,02) diameter terminals, with bracket; accommodates printed circuit boards up to 1/16" (1,57) maximum thickness.

C — Right angle printer circuit connector with .040 (1,02) diameter terminals, without bracket; accommodates printed circuit boards up to 1/16" (1,57) maximum thickness.

U — Straight printed circuit connector with .024 (0,61) diameter terminals; accommodates printed circuit boards up to .093 (2,36) maximum thickness.

V — Straight printed circuit connector with .040 (1,02) diameter terminals; accommodates printed circuit boards up to 1/16" (1.57) maximum thickness.

Wire-Wrap Termination: F179 — 2 wraps per termination
F179A — 3 wraps per termination
F179B — 1 wrap per termination

(millimeters are in parentheses)

ITT CANNON ELECTRIC

D SUBMINIATURE RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ORIGINAL D D* Solder Type, Non-Removable Contacts

CONDENSED DATA

STANDARD MATERIALS AND FINISHES

Shell	Steel, yellow chromate over cadmium plate
Insulator	Two piece white Nylon
Contacts	Copper alloy, gold over nickel plate
Rivets and Washers (float mounting)	Stainless steel

MECHANICAL FEATURES

Coupling	Friction and lock accessories
Polarization	Keystone-shaped shells
Contact Type	Captivated
Termination	Solder pot, Wire-Wrap or printed circuit

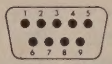
ELECTRICAL DATA

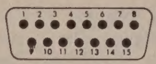
Wire Size	Size 20
Current Rating	Size 20 Contacts: 5 amps

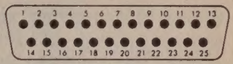
VOLTAGE RATING see page 99.

CONTACT ARRANGEMENTS

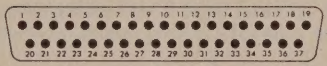
FACE VIEW PIN INSERT



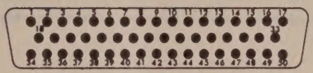

1 2 3 4 5 6 7 8
9 10 11 12 13 14 15


1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25

Shell Size	**E**	**A**	**B**
No. of Contacts	9	15	25
Contact Size	#20	#20	#20


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Shell Size	**C**
No. of Contacts	37
Contact Size	#20



Shell Size	**D**
No. of Contacts	50
Contact Size	#20

† Wire-Wrap is a registered trademark of Gardner-Denver

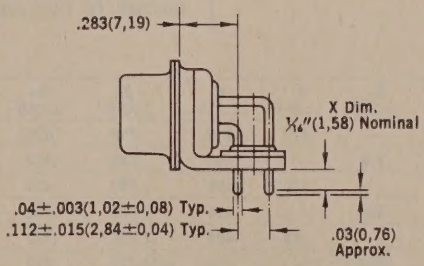
PRINTED CIRCUIT APPLICATIONS

RIGHT ANGLE 90° TERMINAL

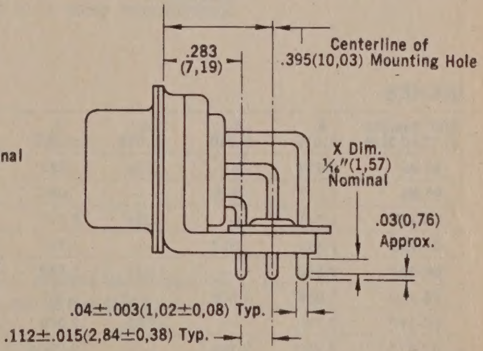
Connectors are furnished with or without a bracket. Spacer assemblies not supplied.

Part Number Printed Circuit Terminal Modifier	90° Bracket Included
A	Yes
C	No

Example: DE-9PA, see page 78 for ordering nomenclature.


.283(7,19)
X Dim.
1/16"(1,58) Nominal
.04±.003(1,02±0,08) Typ.
.112±.015(2,84±0,04) Typ.
.03(0,76)
Approx.

DE, DA, DB, DC SIZES


.283
(7,19)
Centerline of
.395(10,03) Mounting Hole
X Dim.
1/16"(1,57)
Nominal
.03(0,76)
Approx.
.04±.003(1,02±0,08) Typ.
.112±.015(2,84±0,38) Typ.

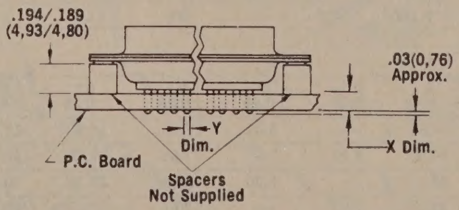
DD SIZE

STRAIGHT TERMINAL

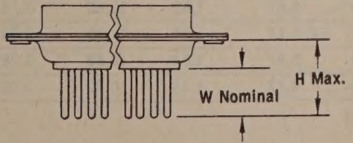
For printed circuit boards up to 1/16"(1,58mm) maximum thickness the straight terminals extend 3/32"(2,38mm) beyond the rear of the insert.

Part Number Printed Circuit Terminal Modifier	X Nominal	Y ±.003 (±0,08)
U	3/32 (2,38)	.024 (0,61)
V	1/16 (1,58)	.04 (1,02)

Example: DE-9PA, see page 78 for ordering nomenclature.


.194/.189
(4,93/4,80)
.03(0,76)
Approx.
Y
Dim.
X Dim.
P.C. Board
Spacers
Not Supplied

WIRE WRAPPING APPLICATIONS


H Max.
W Nominal

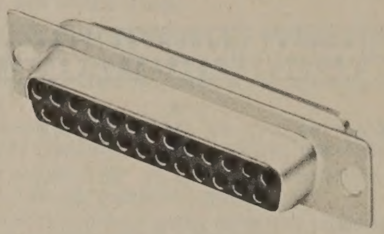
Modification Code	H	W	Wrap Accommodations
F179	.587 (14,91)	.375 (9,52)	2
F179A	.713 (18,11)	.500 (12,7)	3
F179B	.465 (11,8)	.250 (6,35)	1

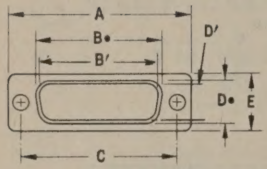
.024" square (0,61) contact tails will accommodate #28 or #30 AWG rigid wire (diagonal of square is .034/.031" (0,86/0,79mm)).

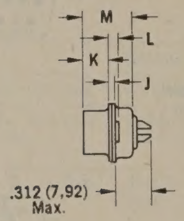
Dimensions are subject to change. (millimeters are in parentheses)

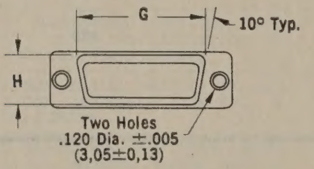
ORIGINAL D* Solder Type, Non-Removable Contacts

STANDARD SHELL

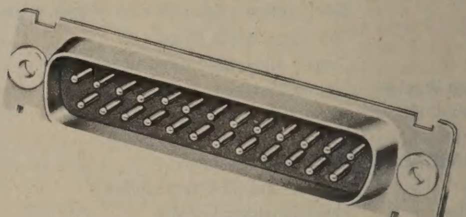




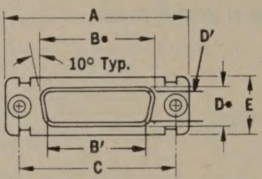


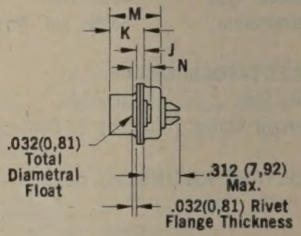


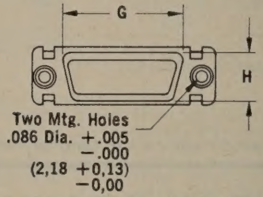
SHELL WITH FLOAT MOUNTS



(millimeters are in parentheses)







It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount; see page 108.

INCHES

Part Number by Shell Size	A ±.015	B• ±.010	B' ±.010	C ±.005	D• ±.010	D' ±.010	E ±.015	G• ±.010	H• ±.010	J ±.010	K ±.010	L ±.010	M ±.015	N ±.010
DE-9P	1.213	—	.666	.984	—	.329	.494	.759	.422	.030	.236	.045	.422	.120
DE-9S	1.213	.640	—	.984	.308	—	.494	.759	.422	.030	.243	.045	.429	.120
DA-15P	1.541	—	.994	1.312	—	.329	.494	1.083	.422	.030	.236	.045	.422	.120
DA-15S	1.541	.968	—	1.312	.308	—	.494	1.083	.422	.030	.243	.045	.429	.120
DB-25P	2.088	—	1.534	1.852	—	.329	.494	1.625	.422	.039	.231	.060	.426	.129
DB-25S	2.088	1.508	—	1.852	.308	—	.494	1.625	.422	.030	.243	.045	.429	.120
DC-37P	2.729	—	2.182	2.500	—	.329	.494	2.272	.422	.039	.231	.060	.426	.129
DC-37S	2.729	2.156	—	2.500	.308	—	.494	2.272	.422	.030	.243	.045	.429	.120
DD-50P	2.635	—	2.079	2.406	—	.436	.605	2.178	.534	.039	.231	.060	.426	.129
DD-50S	2.635	2.062	—	2.406	.420	—	.605	2.178	.534	.030	.243	.045	.429	.120

MILLIMETERS

Part Number by Shell Size	A ±0,38	B• ±0,25	B' ±0,25	C ±0,12	D• ±0,25	D' ±0,25	E ±0,38	G• ±0,25	H• ±0,25	J ±0,25	K ±0,25	L ±0,25	M ±0,38	N ±0,25
DE-9P	30,81	—	16,91	24,99	—	8,36	12,55	19,28	10,72	0,76	5,99	1,14	10,72	3,05
DE-9S	30,81	16,25	—	24,99	7,82	—	12,55	19,28	10,72	0,76	6,17	1,14	10,90	3,05
DA-15P	39,14	—	25,24	33,32	—	8,36	12,55	27,51	10,72	0.76	5,99	1,14	10,72	3,05
DA-15S	39,14	24,58	—	33,32	7,82	—	12,55	27,51	10,72	0,76	6,17	1,14	10,90	3,05
DB-25P	53,03	—	38,96	47,04	—	8,36	12,55	41,27	10,72	0,99	5,87	1,52	10,82	3,28
DB-25S	53,03	38,30	—	47,04	7,82	—	12,55	41,27	10,72	0,76	6,17	1,14	10,90	3,05
DC-37P	69,31	—	55,42	63,50	—	8,36	12,55	57,71	10,72	0,99	5,87	1,52	10,82	3,28
DC-37S	69,31	54,76	—	63,50	7,82	—	12,55	57,71	10,72	0,76	6,17	1,14	10,90	3,05
DD-50P	66,92	—	52,81	61,11	—	11,07	15,37	55,32	13,56	0,99	5,87	1,52	10,82	3,28
DD-50S	66,92	52,37	—	61,11	10,67	—	15,37	55,32	13,56	0,76	6,17	1,14	10,90	3,05

• Dimensions B, D, G, and H are measured as outside dimensions at the bottom of draw.
For shell with float mounts, add letter F after letter C, e.g., DEF-9P.

NOTE: B • and D • are the O.D. dims. for socket side, B' and D' are the I.D. dims. for pin side.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

BURGUN-D (Mark IV) D*C/D*U Crimp Type, Removable Contacts

BURGUN-D CONNECTORS

CRIMP SNAP-IN CONTACTS

BURGUN-D Mark IV connectors are non-environmental, subminiature rectangular connectors with rear release, crimp snap-in contacts. They are intermateable and intermountable with existing types. BURGUN-D connectors operate in temperatures from −65°F to +250°F (−55°C to +120°C) and are used for plug-in module applications, cable-to-cable and cable-to-panel installations, computers, business machines, and many other commercial applications. Available in both glass-filled Nylon (D*C) and flame-retardant glass reinforced thermoplastic UL rated 94V-0 (D*U).

These connectors feature size 20 crimp contacts, accommodating wire size #18 thru #30 AWG stranded wire, the socket contact is a highly reliable, sleeveless, spring finger contact. These contacts are inserted and extracted from the rear of the insulator with an expendable, plastic insertion/extraction tool CIET- HDB, or consult the factory for a metal tweezer type device for high volume users. Closed entry socket insulators correct misaligned pins during engagement. Connectors may be ordered

There is a variety of contacts available for termination to printed circuit boards and flex circuits. Semi-automatic crimp machines are also available for volume crimping requirements. For additional cost savings, purchase these connectors without contacts (Code FO), then purchase the contacts in bulk and use them in the connectors as required. With the vast amount of contact combinations in the standard BURGUND-D connector this connector has proven to be one of the most versatile, low cost, rugged connectors available.

The five shell sizes accommodate from 9 to 50 contacts. Polarization and coupling are accomplished through shell configuration and friction, respectively.

with or without contacts. When ordering connectors less contacts, the suffix "FO" must be added to the part number, and the contacts ordered separately. All assembly tools are ordered separately.

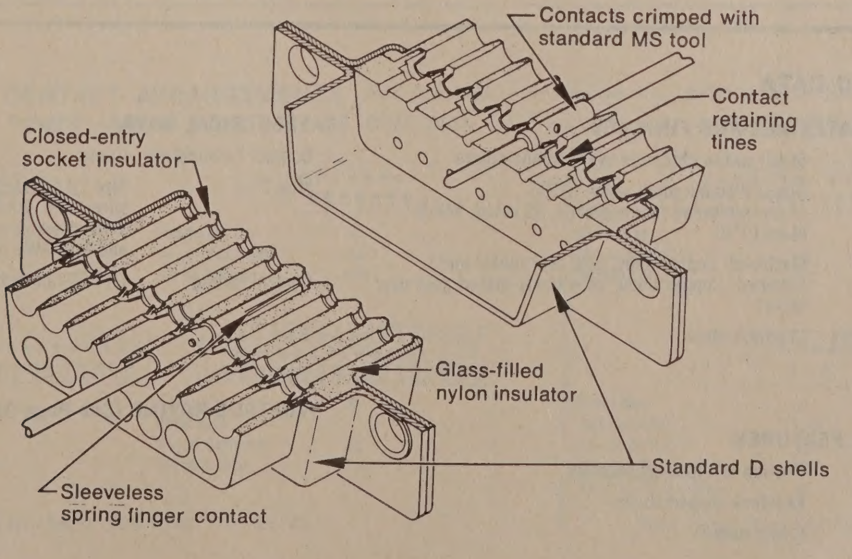
REAR RELEASE CONTACT RETENTION SYSTEM UTILIZING DIELECTRIC BIFURCATED CONES

The D*C and D*U connectors feature a rear insulator with integral, molded contact retaining tines. These plastic tines permit the insertion and extraction of contacts from the rear of the connector with a simple, expendable plastic insertion/extraction tool.

During contact insertion, the retaining tines expand as the contact passes thru. These rugged tines snap into place behind the contact shoulder when the contact is fully inserted. The tool is inserted to expand the tines, allowing easy extraction of the wired contact.

The retention system and the integral contact retaining tines guarantee functional reliability in many environments.

- **Mates with existing D types**
- **Operates in temperatures to +250°F**
- **Crimp snap-in contacts**
- **Highly reliable socket contacts**
- **Insertion/extraction with expendable tool**
- **Corrects misaligned contacts**


Contacts crimped with standard MS tool
Contact retaining tines
Closed-entry socket insulator
Glass-filled nylon insulator
Standard D shells
Sleeveless spring finger contact

BURGUN-D (Mark IV) D*C/D*U Crimp Type, Removable Contacts

HOW TO ORDER

D B C E 25 P * * FO

Code	
D	Series Prefix
B	Shell Size
C	Class
E	Mounting Type
25	Contact Arrangements
P	Contact Type
*	Printed Circuit Terminal Type
*	Printed Circuit Terminal Modifier
FO	Modification (Connector Less Contacts)

SERIES PREFIX

D — ITT Cannon designation

SHELL SIZE

E, A, B, C and D

CLASS

C — Contact retention cone, rear release contacts
U — Flame retardant, contact retention cone, rear release contacts

MOUNTING TYPE

No designator: standard .120" (3,05) diameter mounting holes
E — 4-40 clinch nut for rear panel mounting
F — Float mount for rear panel mounting
G — 2-56 clinch nuts for rear panel mounting
K — .154 (3,91) diameter mounting hole
R — Reverse float mount for front panel mounting

CONTACT ARRANGEMENTS

9, 15, 25, 37 and 50 (basic arrangements); 13W3 coaxial

CONTACT TYPE

P — Pin; S — Socket

PRINTED CIRCUIT TERMINAL TYPE

A — 90° contacts
B — Straight

PRINTED CIRCUIT TERMINAL MODIFIER

A — .030/.026 (0,76/0,66) dia. with .164/.149 (4,16/3,78) extension from bracket (stamped contacts with bracket).
B — .030/.026 (0,76/0,66) dia. with .159/.129 (4,04/3,28) extension from rear of insulator (stamped contacts).
D — .030/.026 (0,76/0.66) dia. with .164/.149 (4,16/3,78) extension from bracket. Machine contacts to be supplied.
F — .030/.026 (0,76/0,66) dia. with .159/.129 (4,04/3,28) extension from rear of insulator. Machine contacts to be supplied.
K — .030/.026 (0,76/0,66) dia. with .164/.149 (4,16/3,78) extension from flange, less bracket (machined contacts).
L — .030/.026 (0,76/0,66) dia. with .125/.095 (3,18/2,41) extension from bracket (stamped contacts with bracket).

MODIFICATION

FO — Connector less contacts (not stamped on connector)

CONDENSED DATA

STANDARD MATERIALS AND FINISHES

Shell	Steel, yellow chromate over cadmium plate
Insulator	Glass-filled burgundy nylon (D*C) Glass reinforced thermoplastic, UL rated, 94V-0, black (D*U)
Contacts	Machined: Copper alloy, gold over nickel plate Stamped: Copper alloy, selectively plated gold over nickel
Rivets and Washers (float mounting)	Stainless steel

MECHANICAL FEATURES

Coupling	Friction and lock accessories
Polarization	Keystone-shaped shells
Contact Type	Crimp snap-in

ELECTRICAL DATA

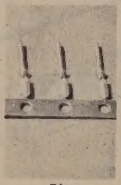
Contact Termination	Crimp
Wire Size	Size 20 Contacts: #20, #22 and #24 AWG stranded wire; size 20-18 contacts: one #18 or two #22 AWG stranded wire; size 20-26 contacts: #26, #28 and #30 AWG stranded wire
Current Rating	Size 20 Contacts: 5 amps

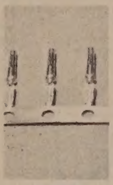
VOLTAGE RATING (See Page 99 for Data)

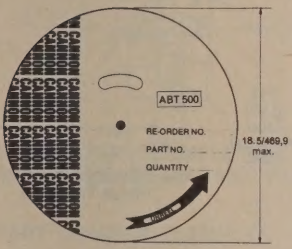
BURGUN-D (Mark IV) D*C/D*U Crimp Type, Removable Contacts

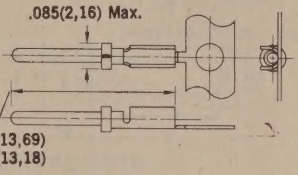
STAMPED CONTACTS

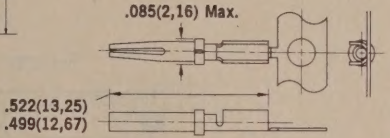
Stamped contacts are furnished on reels for use with the semi-automatic ABT-500 crimp and strip/crimp machines. These contacts will accommodate wire sizes #18 thru #28 AWG solid and stranded wire.


Pin


Socket


ABT 500
RE-ORDER NO.
PART NO.
QUANTITY
18.5/469,9 max.

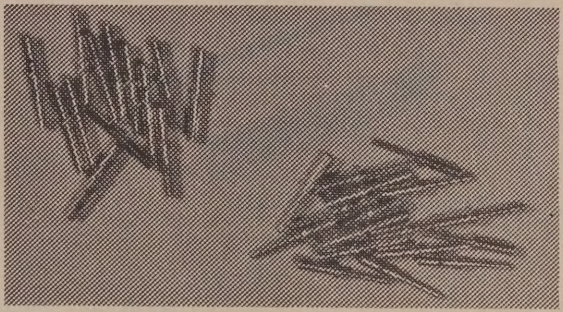

.085(2,16) Max.
.539(13,69)
.519(13,18)

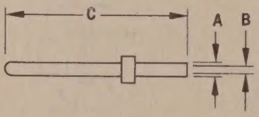

.085(2,16) Max.
.522(13,25)
.499(12,67)

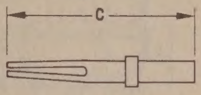
Wire Accommodation	Contact Part Number Pin	Contact Part Number Socket	Contacts Per Reel
AWG #18 thru 22 (For AWG #24 consult factory)	D110238-165	D110238-166	7,500
AWG #20 thru 28 (For AWG #30 consult factory)	D110238-34	D110238-35	10,000

***Note:** Insulation support (crimp) is available on D110238-34 and -35 contacts by modifying the ABT-500 or the Stripper Crimper (recommended wire sizes: 24, 26, 28 AWG).

MACHINED CONTACTS







For low volume usage and field repair. These contacts are available for use with the CBT-460 semi-automatic crimp tool.

NOTE for Size 20-18 contacts only: Shrink sleeving is suggested on the crimp pot to prevent contacts from touching.

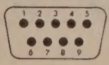
Description	Part Number	Wire Accommodation	A ±.002 (±0,05)	B ±.002 (±0,05)	C Max.
Pin 20	030-1952-000	20, 22, 24	.067(1,70)	.045(1,14)	.537(13,64)
Pin 20-18	030-1954-000	(1) 18 or (2) #22	.086(2,18)	.066(1,68)	.874(22,20)
Pin 20-26	030-1952-002	26, 28, 30	.067(1,70)	.025(0,63)	.537(13,64)
Socket 20	030-1953-000	20, 22, 24	.067(1,70)	.045(1,14)	.523(13,28)
Socket 20-18	030-1955-000	(1) 18 or (2) #22	.086(2,18)	.066(1,68)	.852(21,64)
Socket 20-26	030-1953-002	26, 28, 30	.067(1,70)	.025(0,63)	.523(13,28)

BASIC AND COMBINED CONTACT ARRANGEMENTS

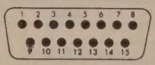
Note: Color Code — Pin Connector: Red, Socket Connector: Blue

#20 CONTACTS WITH COAX, POWER AND/OR HIGH VOLTAGE CONTACTS

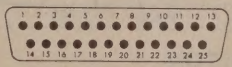
FACE VIEW PIN INSERT



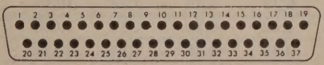
Shell Size E
No. of Contacts 9
Contact Size #20


1 2 3 4 5 6 7 8
9 10 11 12 13 14 15

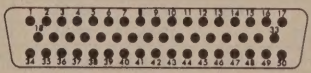
Shell Size A
No. of Contacts 15
Contact Size #20


1 2 3 4 5 6 7 8 9 10 11 12 13
14 15 16 17 18 19 20 21 22 23 24 25

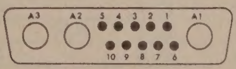
Shell Size B
No. of Contacts 25
Contact Size #20


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

Shell Size C
No. of Contacts 37
Contact Size #20


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 33
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

Shell Size D
No. of Contacts 50
Contact Size #20


A3 A2 5 4 3 2 1 A1
10 9 8 7 6

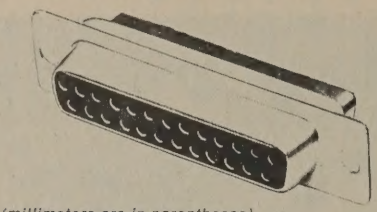
Shell Size B
Arrangement 13W3
No. of Contacts 10
Contact Size #20
Coax or HV Cavities 3

D*MA coaxials and high voltage contacts are used for 13W3 layout. See page 102.

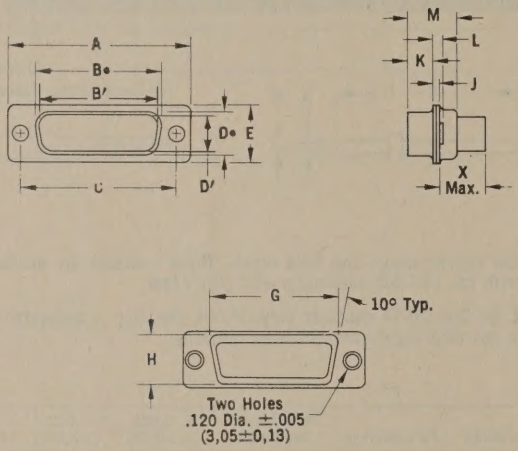
Note: Consult factory for flame retardant D*U.

BURGUN-D (Mark IV) D*C/D*U Crimp Type, Removable Contacts

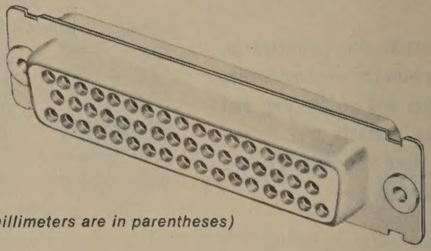
STANDARD SHELL



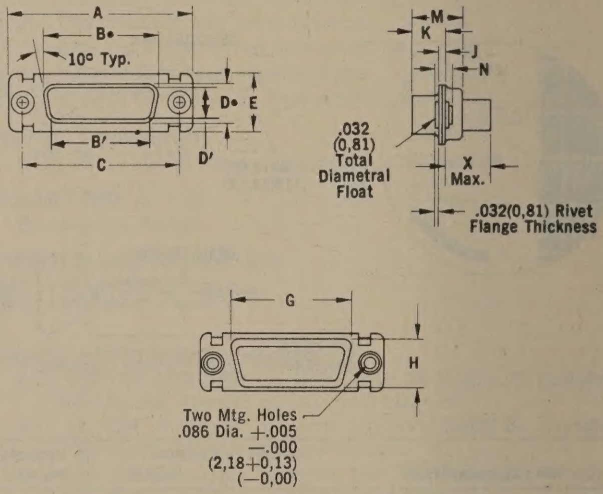
(millimeters are in parentheses)



SHELL WITH FLOAT MOUNTS



(millimeters are in parentheses)



It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount; see page 108.

INCHES

Part Number by Shell Size	A ±.015	B• ±.010	B′ ±.010	C ±.005	D• ±.010	D′ ±.010	E ±.015	G• ±.010	H• ±.010	J ±.010	K ±.010	L ±.010	M ±.015	N ±.010	X Max.
DEC-9P	1.213	—	.666	.984	—	.329	.494	.759	.422	.030	.236	.045	.422	.120	.375
DEC-9S	1.213	.640	—	.984	.308	—	.494	.759	.422	.030	.243	.045	.429	.120	.375
DAC-15P	1.541	—	.994	1.312	—	.329	.494	1.083	.422	.030	.236	.045	.422	.120	.375
DAC-15S	1.541	.968	—	1.312	.308	—	.494	1.083	.422	.030	.243	.045	.429	.120	.375
DBC-25P	2.088	—	1.534	1.852	—	.329	.494	1.625	.422	.039	.231	.060	.426	.129	.375
DBC-25S	2.088	1.508	—	1.852	.308	—	.494	1.625	.422	.030	.243	.045	.429	.120	.375
DCC-37P	2.729	—	2.182	2.500	—	.329	.494	2.272	.422	.039	.231	.060	.426	.129	.375
DCC-37S	2.729	2.156	—	2.500	.308	—	.494	2.272	.422	.030	.243	.045	.429	.120	.375
DDC-50P	2.635	—	2.079	2.406	—	.436	.605	2.178	.534	.039	.231	.060	.426	.129	.375
DDC-50S	2.635	2.062	—	2.406	.420	—	.605	2.178	.534	.030	.243	.045	.429	.120	.375

MILLIMETERS

Part Number by Shell Size	A ±.0,38	B′ ±0,25	B• ±0,25	C ±0,12	D• ±0,25	D′ ±0,25	E ±0,38	G• ±0,25	H• ±0,25	J ±0,25	K ±0,25	L ±0,25	M ±0,38	N ±0,25	X Max.
DEC-9P	30,81	—	16,91	24,99	—	8,36	12,55	19,28	10,72	0,76	5,99	1,14	10,72	3,05	9,52
DEC-9S	30,81	16,25	—	24,99	7,82	—	12,55	19,28	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DAC-15P	39,14	—	25,24	33,32	—	8,36	12,55	27,51	10,72	0,76	5,99	1,14	10,72	3,05	9,52
DAC-15S	39,14	24,58	—	33,32	7,82	—	12,55	27,51	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DBC-25P	53,03	—	38,96	47,04	—	8,36	12,55	41,27	10,72	0.99	5,87	1,52	10,82	3,28	9,52
DBC-25S	53,03	38,30	—	47,04	7,82	—	12,55	41,27	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DCC-37P	69,31	—	55,42	63,50	—	8,36	12,55	57,71	10,72	0,99	5,87	1,52	10,82	3,28	9,52
DCC-37S	69,31	54,76	—	63,50	7,82	—	12,55	57,71	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DDC-50P	66,92	—	52,81	61,11	—	11,07	15,37	55,32	13,56	0,99	5,87	1,52	10,82	3,28	9,52
DDC-50S	66,92	52,37	—	61,11	10,67	—	15,37	55,32	13,56	0,76	6,17	1,14	10,90	3,05	9,52

•Dimensions B, D, G, and H are measured as outside dimensions at the bottom of draw. For shell with float mounts, add letter F after letter C, e.g., DECF-9P.

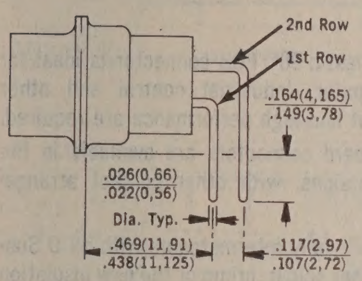
*Add number of contacts for basic arrangements, OR add contact arrangement number for coaxial and/or HV comb. arrangements.

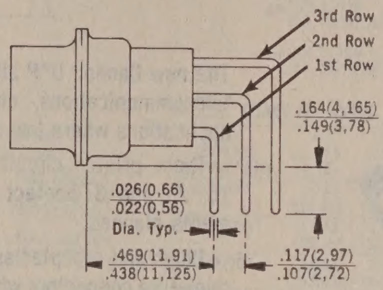
NOTE: B• and D• are the O.D. dims. for socket side, B′ and D′ are the I.D. dims. for pin side.

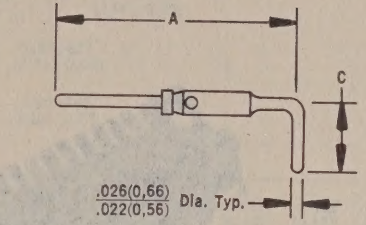
BURGUN-D (Mark IV) D*C/D*U Crimp Type, Removable Contacts

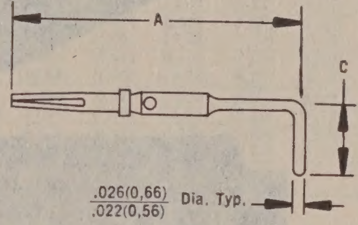
PRINTED CIRCUIT APPLICATIONS

90° PRINTED CIRCUIT CONTACTS (ordered as components)


2nd Row
1st Row
.164(4,165)
.149(3,78)
.026(0,66)
.022(0,56)
Dia. Typ.
.469(11,91)
.438(11,125)
.117(2,97)
.107(2,72)


3rd Row
2nd Row
1st Row
.164(4,165)
.149(3,78)
.026(0,66)
.022(0,56)
Dia. Typ.
.469(11,91)
.438(11,125)
.117(2,97)
.107(2,72)


A
C
.026(0,66)
.022(0,56)
Dia. Typ.


A
C
.026(0,66)
.022(0,56)
Dia. Typ.

CONNECTORS COMPLETELY ASSEMBLED WITH 90° FRAME RETARDANT PLASTIC BRACKETS

PART NUMBER EXAMPLES

Machined Contacts

With Bracket: **AD** designation (Ex.: DBC-25P-AD)
Without Bracket: **AK** designation (Ex.: DBU-25P-AK)

Stamped Contacts

With Bracket: **AA** designation (Ex.: DBC-25P-AA)
Without Bracket: Not available

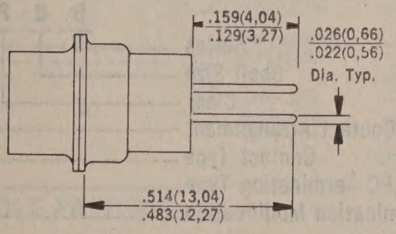
Note: See page 106 for part numbers and dimensions of 90° Plastic Bracket for use with right angle printed circuit connectors.

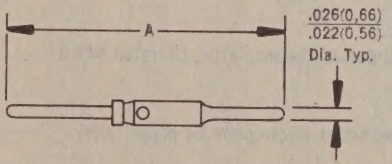
90° MACHINED CONTACTS

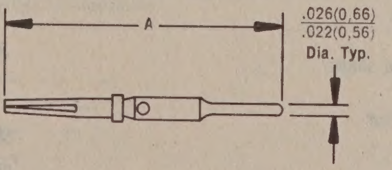
	Row	Contact Part Number	A	C
Pin	1st	030-2086-000	.684(17,37)	.345(8,76)
*Pin	2nd	030-2087-000	.796(20,21)	.457(11,61)
**Pin	3rd	030-2088-000	.908(23,06)	.569(14,45)
Socket	1st	030-2089-000	.666(16,92)	.345(8,76)
*Socket	2nd	030-2090-000	.778(19,76)	.457(11,61)
**Socket	3rd	030-2091-000	.890(22,61)	.569(14,45)

*2nd row for shell sizes E, A, B and C starting from cavity 1.
**3rd row for shell size D only, starting from cavity 1.

STRAIGHT PRINTED CIRCUIT CONTACTS (ordered as components)


.159(4,04)
.129(3,27)
.026(0,66)
.022(0,56)
Dia. Typ.
.514(13,04)
.483(12,27)


A
.026(0,66)
.022(0,56)
Dia. Typ.


A
.026(0,66)
.022(0,56)
Dia. Typ.

CONNECTORS COMPLETELY ASSEMBLED WITH CONTACTS INSTALLED

PART NUMBER EXAMPLES

Machined Contacts

-BF

Example: DBC-25P-BF
Example: DBU-25P-BF

Stamped Contacts

-BB

Example: DBC-25P-BB
Example: DBU-25P-BB

STRAIGHT MACHINED CONTACTS

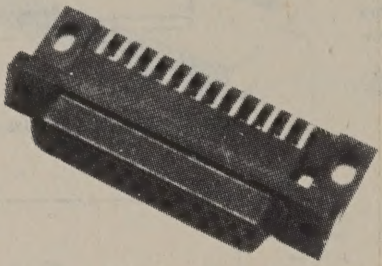
	Contact Order No.	A±.010
Pin	030-1989-000	0.729(18,5)
Socket	030-1990-000	0.711(18,0)

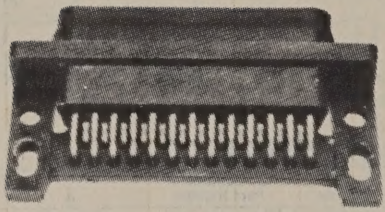
ITT CANNON ELECTRIC

D SUBMINIATURE RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ALL PLASTIC 90° D*P A UNIVERSAL LOW COST RIGHT-ANGLE CONNECTOR FOR PRINTED CIRCUIT BOARDS.





The new Cannon D*P all plastic 90° PCB connector is ideal for telecommunications, computer, industrial control and other applications where low cost and high performance are required.

These printed circuit board connectors are available in the 15, 25 and 37-contact versions, with other contact arrangements planned.

Plugs and receptacles are fully intermateable with all D Subminiature connectors whether solder, crimp or the new insulation displacement types. Mating is complete even when junction shells are used, as in telephone industry applications.

Contacts are held in place by a special snap-in retainer plate that prevents contact pushout and holds the pins precisely aligned for easier assembly to the printed circuit board. Two configurations are available, one for printed circuit boards drilled for any Cannon 90° D Subminiature-type PCB connector, and one for boards drilled for other 90° PCB connectors, metal or plastic. The D*P is fully intermountable in both applications with no redrilling, no extra hardware.

The D*P connector is flame retardant (UL listed 94V-0) glass filled thermoplastic, while contacts are those used in the low-cost Cannon Burgun-D Series.

STANDARD DATA

Housing/Retainer	Glass reinforced thermoplastic, UL rated 94V-0, black.
Contacts	Gold over nickel electroplate on copper alloy.
Coupling	Friction.
Polarization	Keystone shape.
Contact Type	Captivated.
Contact Termination	Solder.
Current Rating	Size 20 contacts: 5 amperes.
Dielectric Withstanding Voltage	1000 VAC sea level to 20,000 feet (6096 meters)
Insulation Resistance	1000 megohms
Temperature Range	−55°C to +125°C (−67°F to +257°F)

HOW TO ORDER

D B P - 25 P A A

Series — D
Shell Size — B
Class — P
Contact Arrangement — 25
Contact Type — P
PC Termination Type — A
PC Termination Modification — A

SERIES	D Subminiature
SHELL SIZES	E*, A, B, C, D*
CLASS	P — UL listed flame retardant thermoplastic
CONTACT ARRANGEMENTS	9*, 15, 25, 37, 50*
CONTACT TYPE	P — Pin (Receptacle) S — Socket (Plug)
PC TERMINATION TYPE	A — 90°, .478 (12,14) length C — 90°, .590 (14,99) length
PC TERMINATION MODIFICATION	A — Standard Cannon extension

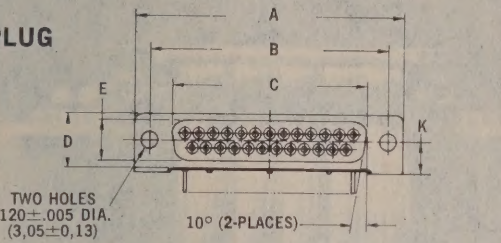
*Consult factory for availability.

D SUBMINIATURE RECTANGULAR CONNECTORS

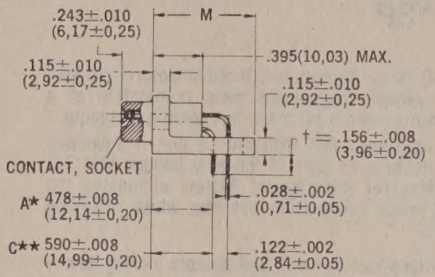
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ALL PLASTIC 90° D*P DIMENSIONAL DATA

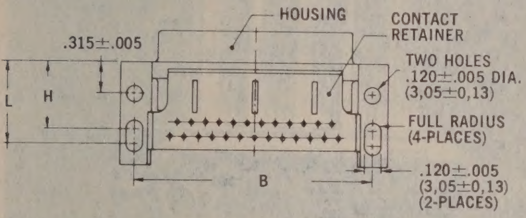
PLUG



A
B
C
E
D
K
TWO HOLES .120±.005 DIA. (3,05±0,13)
10° (2-PLACES)



.243±.010 (6,17±0,25)
M
.395(10,03) MAX.
.115±.010 (2,92±0,25)
.115±.010 (2,92±0,25)
† = .156±.008 (3,96±0.20)
CONTACT, SOCKET
.028±.002 (0,71±0,05)
A★ 478±.008 (12,14±0,20)
C★★ 590±.008 (14,99±0,20)
.122±.002 (2,84±0.05)



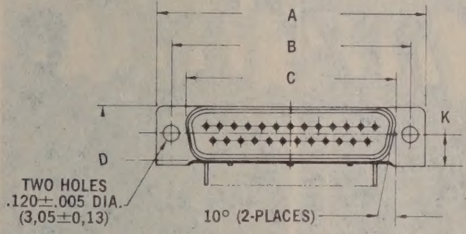
HOUSING
CONTACT RETAINER
.315±.005
TWO HOLES .120±.005 DIA. (3,05±0,13)
L
H
FULL RADIUS (4-PLACES)
.120±.005 (3,05±0,13) (2-PLACES)
B

PLUG DIMENSIONS

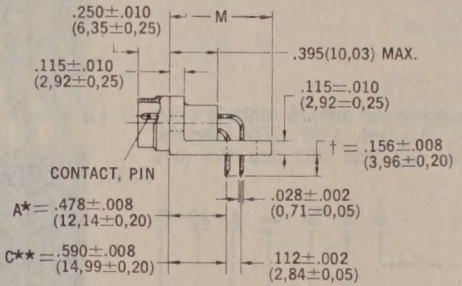
Part No. by Shell Size	A ±.015 (0,38)	B ±.005 (0,13)	C ±.005 (0,13)	D ±.015 (0,38)	E ±.005 (0,13)	H ±.005 (0,13)	K ±.010 (0,25)	L ±.005 (0,13)	M ±.010 (0,25)
DEP-9S*	1.213 (30,80)	0.984 (24,99)	0.643 (16,33)	0.419 (10,64)	0.311 (7,80)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DAP-15S*	1.543 (39,19)	1.312 (33,32)	0.971 (24,66)	0.419 (10,64)	0.311 (7,80)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DBP-25S	2.088 (53,03)	1.852 (47,04)	1.511 (38,38)	0.419 (10,64)	0.311 (7,80)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DCP-37S*	2.729 (69,32)	2.500 (63,50)	2.159 (54,84)	0.419 (10,64)	0.311 (7,80)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DDP-50S*	2.635 (66,93)	2.406 (61,11)	2.064 (52,43)	0.525 (13,33)	0.423 (10,74)	0.558 (14,17)	0.300 (7,62)	0.670 (17,02)	0.908 (23,06)

*Consult factory for availability.

RECEPTACLE



A
B
C
K
D
TWO HOLES .120±.005 DIA. (3,05±0,13)
10° (2-PLACES)

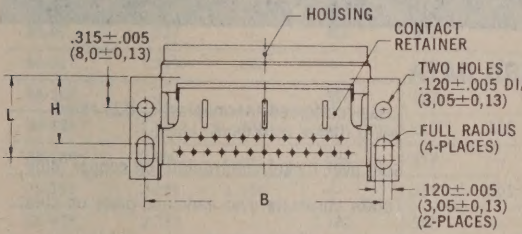


.250±.010 (6,35±0,25)
M
.395(10,03) MAX.
.115±.010 (2,92±0,25)
.115±.010 (2,92±0,25)
† = .156±.008 (3,96±0,20)
CONTACT, PIN
.028±.002 (0,71±0,05)
A★ = .478±.008 (12,14±0,20)
C★★ = .590±.008 (14,99±0,20)
.112±.002 (2,84±0,05)

A★ For replacing Cannon 90° D Subminiature-type connectors.

C★★ For replacing other 90° PCB connectors.

†For other contact extensions, consult factory.



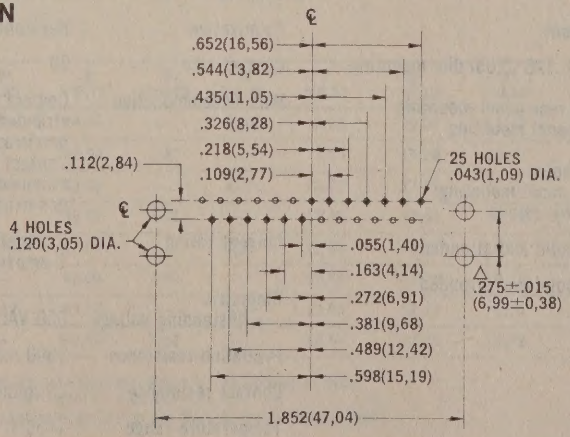
HOUSING
CONTACT RETAINER
.315±.005 (8,0±0,13)
TWO HOLES .120±.005 DIA. (3,05±0,13)
L
H
FULL RADIUS (4-PLACES)
.120±.005 (3,05±0,13) (2-PLACES)
B

RECEPTACLE DIMENSIONS

Part No. by Shell Size	A ±.015 (0,38)	B ±.005 (0,13)	C ±.010 (0,25)	D ±.015 (0,38)	H ±.005 (0,13)	K ±.010 (0,25)	L ±.005 (0,13)	M ±.010 (0,25)
DEP-9P1	1.213 (30,81)	0.984 (24.99)	0.752 (19,10)	(10,64) 0.419	(13,28) 0.523	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DAP-15P	1.543 (39,19)	1.312 (33,32)	1.080 (27,43)	0.419 (10,64)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DBP-25P	2.088 (53,03)	1.852 (47,04)	1.620 (41,15)	0.419 (10,64)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DCP-37P	2.729 (69,32)	2.500 (63,50)	2.268 (57,61)	0.419 (10.64)	0.523 (13,28)	0.245 (6,22)	0.635 (16,13)	0.796 (20,22)
DDP-50P*	2.635 (66,93)	2.406 (61,11)	2.168 (55,07)	0.525 (13,33)	0.558 (14,17)	0.300 (7,62)	0.670 (17,02)	0.908 (23,06)

*Consult factory for availability.

P.C. BOARD HOLE PATTERN



℄
.652(16,56)
.544(13,82)
.435(11,05)
.326(8,28)
.218(5,54)
.112(2,84)
.109(2,77)
25 HOLES .043(1,09) DIA.
℄
4 HOLES .120(3,05) DIA.
.055(1,40)
.163(4,14)
.272(6,91)
.381(9,68)
.489(12,42)
.598(15,19)
△ .275±.015 (6,99±0,38)
1.852(47,04)

△ Location of Connector Mounting Holes Optional As Shown

Dimensions subject to change.

(millimeters are in parentheses)

MAS/TER-D D*SP

The new Cannon® Mas/Ter-D (Mass Terminated, D Subminiature) pin-and-socket connectors provide reliable high-speed mass termination at a lower total installed cost than conventional mass termination techniques.

Fully intermateable and intermountable with the Cannon D Subminiature Series, Mas/Ter-D connectors are part of the new Cannon Mas/Ter Interconnect System. The Mas/Ter Interconnect System eliminates the drawbacks of conventional mass termination systems while providing several benefits all its own.

- Fully intermateable and intermountable with and accepts locking device accessories from the Cannon D Subminiature Series.
- Entire connector is terminated at once with no insulation stripping, no complex tooling.
- Terminates cables or may be used in a daisy chain configuration with no break in the cable.
- Each contact size terminates two wire gages, solid or stranded, utilizing both variable spaced .054/.050 (1,37/1,27) and .050/.050 (1,27/1,27) spaced round conductor flat cable or individual wires, with most standard insulation materials.
- Plastic materials used are flame retardant, U.L. listed.

For more information on the full capabilities of the Cannon Mas/Ter Interconnect System, contact your nearest ITT Cannon Sales Office.

HOW TO ORDER

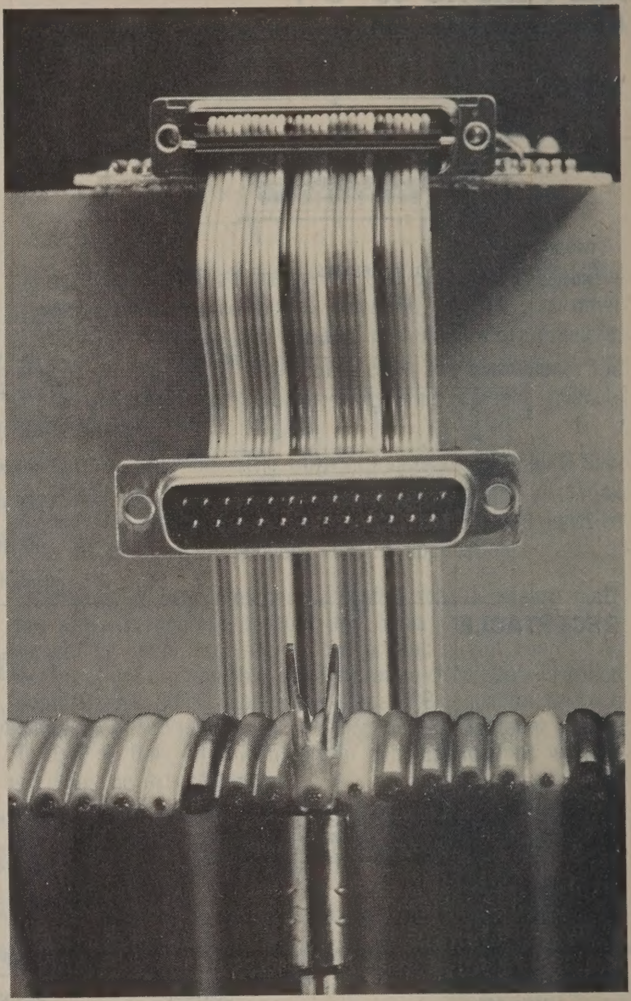
Example: To order a D Subminiature connector with 25 contacts using the Mas/Ter termination technique, standard .120" (3,05) diameter mounting holes, for solid or stranded wire from #22 thru #24 AWG and pin contacts, order as follows:

D B SP — A 25 P

Series
Shell Size
Class
Mounting
Wire Accommodation
Contact Arrangement
Contact Type

SERIES	D Subminiature Series with keystone-shaped insulator
SHELL SIZES	E*, A*, B, C
CLASS	SP — Insulation displacement
MOUNTING	No designation — Standard .120 (3,05) dia. mounting holes E — #4-40 clinch nuts for rear panel mounting F — Float mount for rear panel mounting G — #2-56 clinch nuts K — .154 (3,91) mounting holes R — Float mount for front panel mounting Consult factory for mounting details
WIRE ACCOMMODATION	A — #22 thru #24 AWG, solid and stranded B — #26 thru #28 AWG, solid and stranded
CONTACT ARRANGEMENT	9*, 15*, 25, 37
CONTACT TYPE	P — Pin S — Socket

*Consult factory for availability



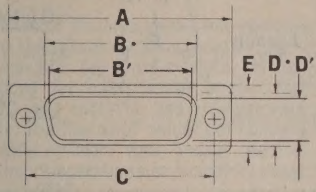
STANDARD DATA

Insulator	Glass reinforced thermoplastic, U.L. rated 94V-0 (flame retardant), black
Contacts	Gold over nickel electroplate on copper alloy
Shell	Yellow chromate over cadmium plate on steel
Termination technique	Insulation displacement
Coupling	Friction
Polarization	Keystone shape
Contact size	20
Wire accommodation	Contact A: #22 thru #24 AWG solid and stranded, .053 (1,35) max. insulation dia., non-irradiated PVC insulation preferable. Contact B: #26 thru #28 AWG solid and stranded, .041 (1,04) max. insulation dia., non-irradiated PVC insulation preferable.
Current rating	3 amperes continuous, contact A 1 ampere continuous, contact B
Dielectric withstanding voltage	650 VAC
Insulation resistance	1000 megohms
Contact resistance	15 milliohms
Temperature range	—55°C to +105°C (—67°F to +221°F)

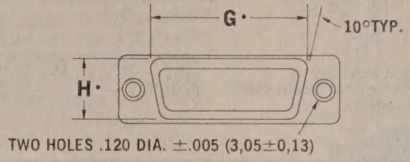
(millimeters are in parentheses)

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

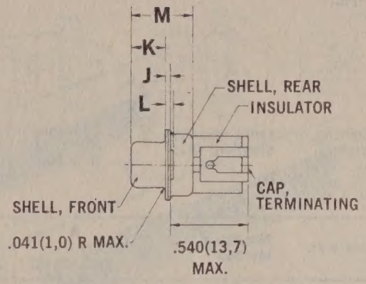
STANDARD SHELL



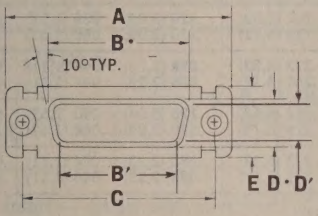
FRONT


G•
10°TYP.
H•
TWO HOLES .120 DIA. ±.005 (3,05±0,13)

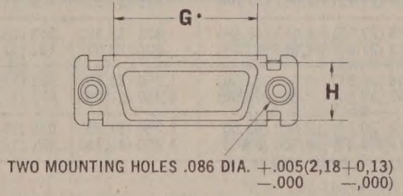
REAR


M
K
J
L
SHELL, REAR
INSULATOR
CAP, TERMINATING
SHELL, FRONT
.041(1,0) R MAX.
.540(13,7) MAX.

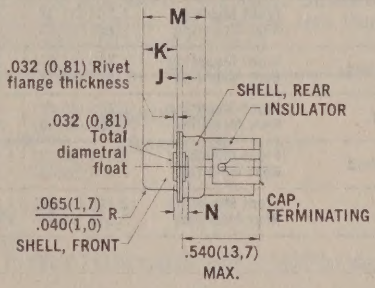
SHELL WITH FLOAT MOUNTS


A
B•
10°TYP.
B′
C
E D•D′

FRONT


G•
H
TWO MOUNTING HOLES .086 DIA. +.005(2,18+0,13) −.000 −,000)

REAR


M
K
.032 (0,81) Rivet flange thickness
J
SHELL, REAR
INSULATOR
.032 (0,81) Total diametral float
.065(1,7) / .040(1,0) R
N
CAP, TERMINATING
SHELL, FRONT
.540(13,7) MAX.

INCHES

Part Number by Shell Size	A ±.015	B• ±.010	B′ ±.010	C ±.005	D• ±.010	D′ ±.010	E ±.015	G• ±.010	H• ±.010	J ±.010	K ±.010	L ±.010	M ±.015	N ±.010
DE-9P	1.213	—	.666	.984	—	.329	.494	.759	.422	.030	.236	.045	.422	.120
DE-9S	1.213	.640	—	.984	.308	—	.494	.759	.422	.030	.243	.045	.429	.120
DA-15P	1.541	—	.994	1.312	—	.329	.494	1.083	.422	.030	.236	.045	.422	.120
DA-15S	1.541	.968	—	1.312	.308	—	.494	1.083	.422	.030	.243	.045	.429	.120
DB-25P	2.088	—	1.534	1.852	—	.329	.494	1.625	.422	.039	.231	.060	.426	.129
DB-25S	2.088	1.508	—	1.852	.308	—	.494	1.625	.422	.030	.243	.045	.429	.120
DC-37P	2.729	—	2.182	2.500	—	.329	.494	2.272	.422	.039	.231	.060	.426	.129
DC-37S	2.729	2.156	—	2.500	.308	—	.494	2.272	.422	.030	.243	.045	.429	.120

MILLIMETERS

Part Number by Shell Size	A ±0,38	B• ±0,25	B′ ±0,25	C ±0,12	D• ±0,25	D′ ±0,25	E ±0,38	G• ±0,25	H• ±0,25	J ±0,25	K ±0,25	L ±0,25	M ±0,38	N ±0,25
DE-9P	30,81	—	16,91	24,99	—	8,36	12,55	19,28	10,72	0,76	5,99	1,14	10,72	3,05
DE-9S	30,81	16,25	—	24,99	7,82	—	12,55	19,28	10,72	0,76	6,17	1,14	10,90	3,05
DA-15P	39,14	—	25,24	33,32	—	8,36	12,55	27,51	10,72	0,76	5,99	1,14	10,72	3,05
DA-15S	39,14	24,58	—	33,32	7,82	—	12,55	27,51	10,72	0,76	6,17	1,14	10,90	3,05
DB-25P	53,03	—	38,96	47,04	—	8,36	12,55	41,27	10,72	0,99	5,87	1,52	10,82	3,28
DB-25S	53,03	38,30	—	47,04	7,82	—	12,55	41,27	10,72	0,76	6,17	1,14	10,90	3,05
DC-37P	69,31	—	55,42	63,50	—	8,36	12,55	57,71	10,72	0,99	5,87	1,52	10,82	3,28
DC-37S	69,31	54,76	—	63,50	7,82	—	12,55	57,71	10,72	0,76	6,17	1,14	10,90	3,05

• Dimensions B, D, G, and H are measured as outside dimensions at the bottom of draw.
For shell with float mounts, add letter F after letter C, e.g., DEF-9P.

NOTE: B• and D• are the O.D. dims. for socket side, B′ and D′ are the I.D. dims. for pin side.

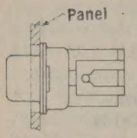
ITT CANNON ELECTRIC

D SUBMINIATURE RECTANGULAR CONNECTORS

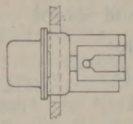
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MOUNTING VIEWS AND PANEL CUTOUTS

STANDARD SHELL

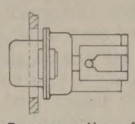


Rear mounting of standard shell

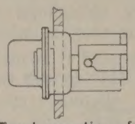


Front mounting of standard shell

SHELL WITH FLOAT MOUNTS

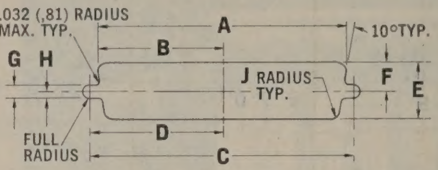


Rear mounting of float mount shell (F code)

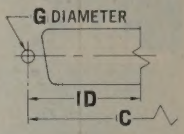


Front mounting of reverse float mount shell (R code)

STANDARD CUTOUT



OPTIONAL CUTOUT
(For rear mounting)

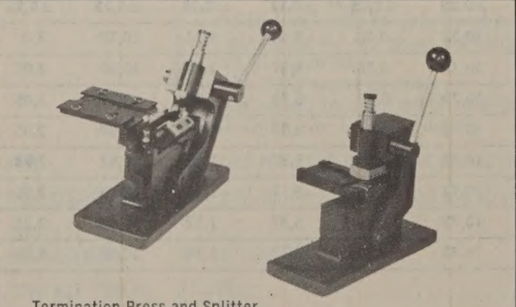


Connector size	Mounting Method	A ±.005 ±(0,13)	B ±.005 ±(0,13)	C ±.005 ±(0,13)	D ±.005 ±(0,13)	E ±.005 ±(0,13)	F ±.005 ±(0,13)	G ±.002 ±(0,05)	H ±.002 ±(0,05)	J ±.002 ±(0,05)
E Standard	Front Mounting	.874 (22,19)	.437 (11,09)	.984 (24,99)	.492 (12,49)	.513 (13,03)	.257 (6,52)	.120 (3,04)	.060 (1,52)	.083 (2,10)
	Rear Mounting	.806 (20,47)	.403 (10,23)	.984 (24,99)	.492 (12,49)	.499 (11,40)	.225 (5,71)	.120 (3,04)	.060 (1,52)	.132 (3,35)
E Float	Front Mounting	.906 (23,01)	.453 (11,50)	.984 (24,99)	.492 (12,49)	.545 (13,84)	.273 (6,93)	.088 (2,23)	.044 (1,11)	.083 (2,10)
	Rear Mounting	.838 (21,28)	.419 (10,64)	.984 (24,99)	.492 (12,49)	.481 (12,21)	.241 (6,12)	.088 (2,23)	.044 (1,11)	.132 (3,35)
A Standard	Front Mounting	1.202 (30,53)	.601 (15,26)	1.312 (33,32)	.656 (16,66)	.513 (13,03)	.257 (6,52)	.120 (3,04)	.060 (1,52)	.083 (2,10)
	Rear Mounting	1.134 (28,80)	.567 (14,40)	1.312 (33,32)	.656 (16,66)	.449 (11,40)	.225 (5,71)	.120 (3,04)	.060 (1,52)	.132 (3,35)
A Float	Front Mounting	1.234 (31,34)	.617 (15,67)	1.312 (33,32)	.656 (16,66)	.545 (13,84)	.273 (6,93)	.088 (2,23)	.044 (1,11)	.083 (2,10)
	Rear Mounting	1.166 (29,61)	.583 (14,80)	1.312 (33,32)	.656 (16,60)	.481 (12,21)	.241 (6,12)	.088 (2,23)	.044 (1,11)	.132 (3,35)
B Standard	Front Mounting	1.743 (44,27)	.872 (22,14)	1.852 (47,04)	.926 (23,52)	.513 (13,03)	.257 (6,52)	.120 (3,04)	.060 (1,52)	.083 (2,10)
	Rear Mounting	1.674 (42,51)	.837 (21,25)	1.852 (47,04)	.926 (23,52)	.449 (11,40)	.225 (5,71)	.120 (3,04)	.060 (1,52)	.132 (3,35)
B Float	Front Mounting	1.775 (45,08)	.888 (22,55)	1.852 (47,04)	.926 (23,52)	.545 (13,84)	.273 (6,93)	.088 (2,23)	.044 (1,11)	.083 (2,10)
	Rear Mounting	1.706 (43,33)	.853 (21,66)	1,852 (47,04)	.926 (23,52)	.481 (12,21)	.241 (6,12)	.088 (2,23)	.044 (1,11)	.132 (3,35)
C Standard	Front Mounting	2.391 (60,73)	1.196 (30,37)	2.500 (63,50)	1.250 (31,75)	.513 (13,03)	.257 (6,52)	.120 (3,04)	.060 (1,52)	.083 (2,10)
	Rear Mounting	2.326 (59,08)	1.163 (29,54)	2.500 (63,50)	1.250 (31,75)	.449 (11,40)	.225 (5,71)	.120 (3,04)	.060 (1,52)	.132 (3,35)
C Float	Front Mounting	2.423 (61,54)	1.212 (30,78)	2.500 (63,50)	1.250 (31,75)	.545 (13,84)	.273 (6,93)	.088 (2,23)	.044 (1,11)	.083 (2,10)
	Rear Mounting	2.354 (59,79)	1.177 (29,89)	2.500 (63,50)	1.250 (31,75)	.481 (12,21)	.241 (6,12)	.088 (2,23)	.044 (1,11)	.132 (3,35)

ASSEMBLY PROCEDURE

The lower total installed cost of the Mas/Ter Interconnect System is achieved through a quick, simple termination procedure. The entire operation is performed at a single work station with a single stroke of the press, with no stripping of insulation and no complex tooling.

Either .054/.050 (1,37/1,27) variable-spaced or .050/.050 (1,27/1,27) fixed-spacing round conductor flat cable may be mass terminated with the Mas/Ter interconnect system. .050/.050 (1,27/1,27) wires are first separated on a splitting press. For assembly, the .054 (1,37) portion of the variable-spaced or the separated portion of the fixed-spacing flat cable is positioned over the connector body, the cap is placed over it, and a single stroke of the press terminates all wires. After termination, a strain-relief clamp may be snapped into place quickly and easily.



Termination Press and Splitter

MAS/TER-D Tooling Ordering Information:

Select appropriate components and equipment press to terminate various cable configurations and connector sizes from locator and comb kit listing below.

LOCATOR KITS		COMB KITS	
Connector Layout	**P/N Locator**	**Wire Type**	**P/N**
37 Contacts Pin and Socket	320-7004-005	.050" (1,27) Split Cable*	320-7004-009
25 Contacts Pin and Socket	320-7004-006	.050" (1,27) Split Cable* .050"/.054" (1,37/1,27) Variable Pitch	320-7004-010 320-7004-014
15 Contacts Pin and Socket	320-7004-007	.050" (1,27) Split Cable*	320-7004-011

Termination Press P/N 317-1489-000

*Splitter (P/N 070296-0001) is required to pre split .050" cable prior to termination. Splitter will split **all** widths (15 to 37 conductors) with adjustment of wire guide.

EXAMPLE: Required to terminate 25 conductor .050" (1,27) flat cable to 25 contact connector (pin or socket).

SELECT — Locator Kit 320-7004-006
— Comb Kit 320-7004-010
— Termination Press 317-1489-000
— Splitter 070296-0001

For other connector layout and wire configuration not shown consult factory for appropriate kit numbers.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

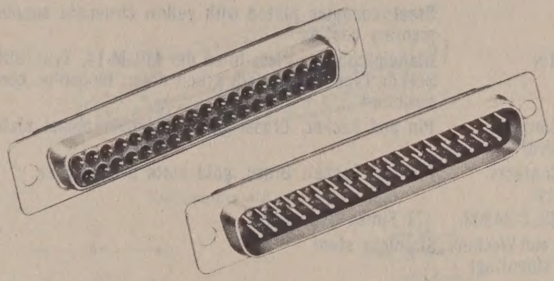
GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

GENERAL INFORMATION

The D*M connector features solder pot contacts in a monobloc insulator for improved temperature characteristics and increased moisture resistance. Two insulator types are available: combination arrangements with accommodations for coax, power and/or high voltage contacts, plus standard AWG wire contacts; and arrangements with standard AWG wire contacts only. The five amp* solder pot contacts accommodate wire sizes up to #20 AWG standard wire. Socket contacts are of the closed entry type. Operating temperatures of insulators range from −65°F to +300°F (−55°C to +148°C).

Combination arrangements are supplied with unfilled coax, power and/or high voltage contact cavities. Coax, power, high voltage contacts must be ordered separately, and may be used interchangeably in any of the arrangements listed. High voltage contacts accommodate up to #20 wire sizes. Coax contacts (with crimp or solder braid type terminations) and high voltage contacts are snap-in and removable. Coax and high voltage contacts have captivated solder type center contacts.

Standard coax and high voltage plugs contain female center contacts; receptacles contain male center contacts. Combination arrangement pin connector assemblies accommodate coax, power, and high voltage plugs only; socket assemblies accommodate receptacles. Connector assemblies and contact inserts are matched and color coded to ease assembly. No insertion tool is required for coax, power, and high voltage contacts; they may be extracted with ITT Cannon Tool CET-C6B.



Connectors for non-magnetic applications are available. Standard NMB non-magnetic connectors have magnetic flux densities less than 200 gamma after magnetization with a 5000 gauss magnet.

HOW TO ORDER

D B M M R 15 P A *

- Series Prefix — D
- Shell — B
- Monobloc Insert — Solder Type Contacts — Mark I Series — M
- Military Specification — M
- Mounting Type — R
- Contact Arrangement — 15
- Contact Type — P
- Printed Circuit Terminal Modifier — A
- Modification — *

SERIES PREFIX
D — ITT Cannon designation

SHELL
A, B, C, D, and E

MARK I SERIES DESIGNATION

MILITARY SPECIFICATION
M — For connectors to MIL-C-24308 specification — omit for standard

MOUNTING TYPE
No Designator — Standard .120 (3,05) diameter hole
E — 4-40 clinch nut for rear panel mounting
F — Float mounts for rear panel mounting
G — 2-56 clinch nut for rear panel mounting
K — .154 (3,91) diameter mounting hole
R — Reverse float mount for front panel mounting

CONTACT ARRANGEMENT
See page 92

CONTACT TYPE
P — Pin; S — Socket

PRINTED CIRCUIT TERMINAL MODIFIER CODES (See Chart Below)

MODIFICATION
Please consult factory

						Commercial		Military		
Code	Straight	Right Angle	Bracket With	Bracket Without	Below Board	Contact Extension ±.020(0,51)	Max. Board Thickness	Contact Extension	Max. Board Thickness	Terminal Diameter
*A	—	•	•	—	—	△2 .093(2,36)	.062(1,57)	△2 △4 .099/.154(2,54/39,12)	.062(1,57)	.040(1,02)
B	•	—	—	—	—	△1 .125(3,18)	.062(1,57)	—	—	.040(1,02)
C	—	•	—	•	—	△3 .093(2,36)	.062(1,57)	—	—	.040(1,02)
*D	—	•	•	—	—	△2 .093(2,36)	.062(1,57)	△2 △4 .099/.154(2,54/39,12)	.062(1,57)	.030(0,76)
E	•	—	—	—	—	△1 .125(3,18)	.062(1,57)	—	—	.030(0,76)
F	—	•	—	•	—	△3 .093(2,36)	.062(1,57)	—	—	.030(0,76)
*G	—	•	•	—	—	△2 .125(3,18)	.093(2,36)	△2 △4 .130/.185(33,02/46,99)	.094(2,39)	.040(1,02)
H	•	—	—	—	—	△1 .156(3,96)	.094(2,39)	△1 .130/.185(33,02/46,99)	.094(2,39)	.040(1,02)
K	—	•	—	•	—	△3 .125(3,18)	.093(2,36)	—	—	.040(1,02)
*L	—	•	•	—	—	△2 .125(3,18)	.093(2,36)	△2 △4 .130/.185(33,02/46,99)	.094(2,39)	.030(0,76)
M	•	—	—	—	—	△1 .156(3,96)	.094(2,39)	△1 .130/.185(33,02/46,99)	.094(2,39)	.030(0,76)
P	—	•	—	•	—	△3 .125(3,18)	.093(2,36)	—	—	.030(0,76)
R	—	•	—	•	—	△3 .184(4,67)	.156(3,96)	—	—	.030(0,76)
*S	—	•	•	—	—	△2 .184(4,67)	.156(3,96)	△2 △4 .155/.210(39,37/53,34)	.125(3,18)	.030(0,76)
T	—	•	—	•	•	△3 .125(3,18)	.093(2,36)	—	—	.040(1,02)
*W	—	•	•	—	—	△2 .156(3,96)	.125(3,18)	△2 △4 .155/.210(39,37/53,34)	.125(3,18)	.040(1,02)
*X	•	—	—	—	—	△1 .184(4,67)	.156(3,96)	△1 .155/.210(39,37/53,34)	.125(3,18)	.040(1,02)
Y	—	•	—	—	•	△3 .093(2,36)	.062(1,57)	—	—	.030(0,76)
*Z	•	—	—	—	—	△1 .184(4,67)	.156(3,96)	△1 .155/.210(39,37/53,34)	.125(3,18)	.030(0,76)

*When suffix "M" is used on Commercial designators, Military contact extension applies. △1 From Insulator △2 From Bracket △3 From Flange △4 Available, Pin Side Only

Dimensions subject to change. *(millimeters are in parentheses)*

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

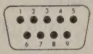
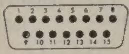
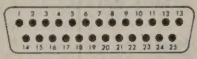
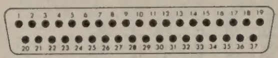
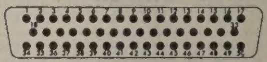
STANDARD DATA

Shell	Steel, cadmium plated with yellow chromate supplementary coating
Insulator	Diallylphthalate, glass-filled per MIL-M-14, Type GDI-30F or Type SD6-F, dark green color, monobloc construction
#20 Contacts (Standard)	Pin and Socket: Brass, gold plate over nickel plate
#20 Contacts (Military)	Pin and Socket: Brass, gold plate over copper
Ref. MIL-C-24308	ITT Finish Code A156
Rivets and Washers (Float Mounting)	Stainless steel
High Voltage Contacts	*Pin: Brass, gold plate over nickel plate *Socket: Copper alloy, gold plate over nickel plate
Coaxial Contacts	Outer Contact: *Plug: Brass, gold plate over nickel plate; *Receptacle: Beryllium copper, gold plate over nickel plate *Center Female Contact: Copper alloy, gold plate over nickel plate *Center Male Contact: Brass, gold plate over nickel plate Insulator: Teflon
High Power Contacts	*Pin: Brass, gold plate over nickel plate *Socket: Beryllium copper, gold plate over nickel plate
Voltage Rating	See page 99

***NOTE:** Also available in Military Finish: Gold over copper plate (ITT Cannon Finish Code A156).

BASIC CONTACT ARRANGEMENTS

FACE VIEW PIN INSERT

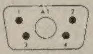
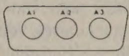
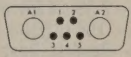
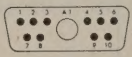
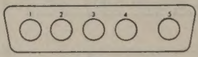
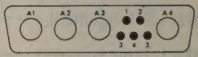






Shell Size	E	A	B	C	D
No. of Contacts	9	15	25	37	50
Contact Size	#20	#20	#20	#20	#20

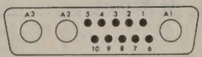
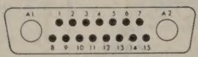
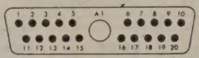
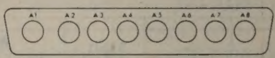
COMBINATION ARRANGEMENTS

#20 CONTACTS WITH COAX, POWER AND/OR HIGH VOLTAGE CONTACTS

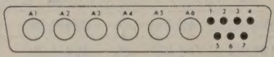
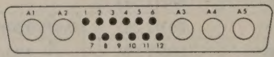
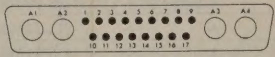
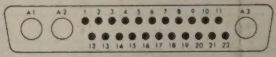
Note: Color Code — Pin Connector: Red, Socket Connector: Blue

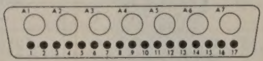
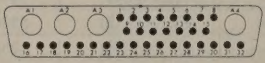
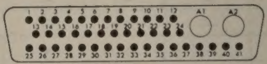
Shell Size	E	A	A	A	B	B
Arrangement	5W1	3W3	7W2	11W1	5W5	9W4
No. of Contacts	4	0	5	10	0	5
Contact Size	#20	—	#20	#20	—	#20
Coax or HV Cavities	1	3	2	1	5	4

Shell Size	B	B	B	C
Arrangement	13W3	17W2	21W1	8W8
No. of Contacts	10	15	20	0
Contact Size	#20	#20	#20	—
Coax or HV Cavities	3	2	1	8

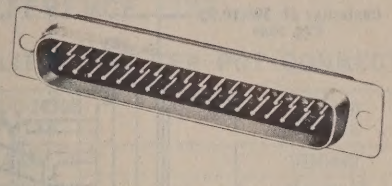
Shell Size	C	C	C	C
Arrangement	13W6	17W5	21WA4	25W3
No. of Contacts	7	12	17	22
Contact Size	#20	#20	#20	#20
Coax or HV Cavities	6	5	4	3

Shell Size	D	D	D
Arrangement	24W7	36W4	43W2
No. of Contacts	17	32	41
Contact Size	#20	#20	#20
Coax or HV Cavities	7	4	2

GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

STANDARD SHELL



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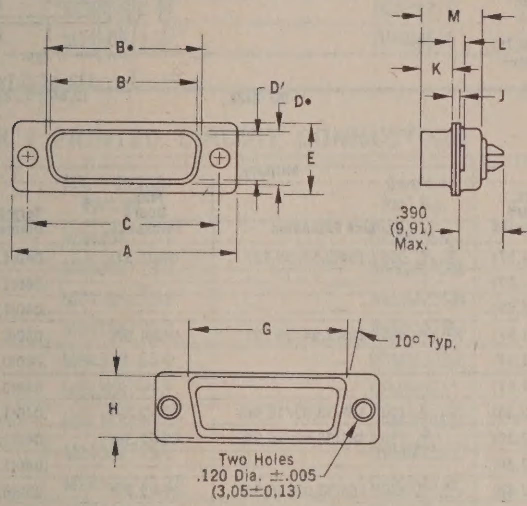
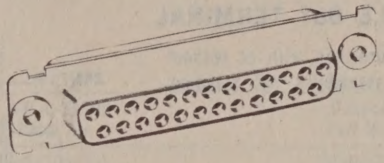
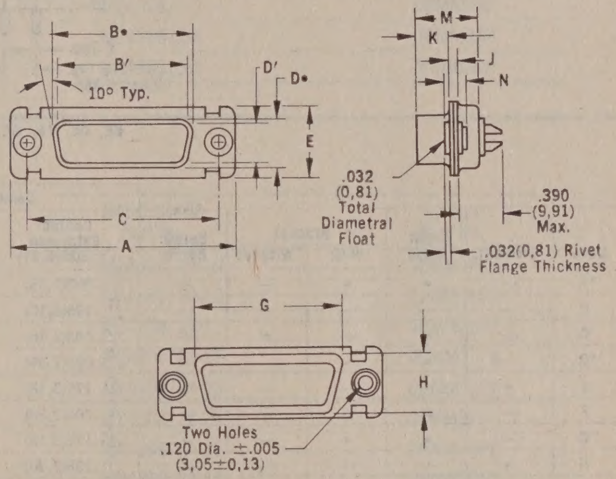


SHELL WITH FLOAT MOUNTS



(millimeters are in parentheses)



It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount; see page 108.

INCHES

Part Number by Shell Size	A ±.015	B• ±.010	B′ ±.010	C ±.005	D• ±.010	D′ ±.010	E ±.015	G• ±.010	H• ±.010	J ±.010	K ±.010	L ±.010	M ±.015	N ±.010
DEM-*P	1.213	—	.666	.984	—	.329	.494	.759	.422	.030	.236	.045	.422	.120
DEM-*S	1.213	.640	—	.984	.308	—	.494	.759	.422	.030	.243	.045	.429	.120
DAM-*P	1.541	—	.994	1.312	—	.329	.494	1.083	.422	.030	.236	.045	.422	.120
DAM-*S	1.541	.968	—	1.312	.308	—	.494	1.083	.422	.030	.243	.045	.429	.120
DBM-*P	2.088	—	1.534	1.852	—	.329	.494	1.625	.422	.039	.231	.060	.426	.129
DBM-*S	2.088	1.508	—	1.852	.308	—	.494	1.625	.422	.030	.243	.045	.429	.120
DCM-*P	2.729	—	2,182	2.500	—	.329	.494	2.272	.422	.039	.231	.060	.426	.129
DCM-*S	2.729	2.156	—	2.500	.308	—	.494	2.272	.422	.030	.243	.045	.429	.120
DDM-*P	2.635	—	2.079	2.406	—	.436	.605	2.178	.534	.039	.231	.060	.426	.129
DDM-*S	2.635	2.062	—	2.406	.420	—	.605	2.178	.534	.030	.243	.045	.429	.120

MILLIMETERS

Part Number by Shell Size	A ±0,38	B• ±0,25	B′ ±0,25	C ±0,12	D• ±0,25	D′ ±0,25	E ±0,38	G• ±0,25	H• ±0,25	J ±0,25	K ±0,25	L ±0,25	M ±0,38	N ±0,25
DE-9P	30,81	—	16,91	24,99	—	8,36	12,55	19,28	10,72	0,76	5,99	1,14	10,72	3,05
DE-9S	30,81	16,25	—	24,99	7,82	—	12,55	19,28	10,72	0,76	6,17	1,14	10,90	3,05
DA-15P	39,14	—	25,24	33,32	—	8,36	12,55	27,51	10,72	0,76	5,99	1,14	10,72	3,05
DA-15S	39,14	24,58	—	33,32	7,82	—	12,55	27,51	10,72	0.76	6,17	1,14	10,90	3,05
DB-25P	53,03	—	38,96	47,04	—	8,36	12,55	41,27	10,72	0,99	5,87	1,52	10,82	3,28
DB-25S	53,03	38,30	—	47,04	7,82	—	12,55	41,27	10,72	0,76	6,17	1,14	10,90	3,05
DC-37P	69,31	—	55,42	63,50	—	8,36	12,55	57,71	10,72	0,99	5,87	1,52	10,82	3,28
DC-37S	69,31	54,76	—	63,50	7,82	—	12,55	57,71	10,72	0,76	6,17	1,14	10,90	3,05
DD-50P	66,92	—	52,81	61,11	—	11,07	15,37	55,32	13,56	0.99	5,87	1,52	10,82	3,28
DD-50S	66,92	52,37	—	61,11	10,67	—	15,37	55,32	13,56	0,76	6,17	1,14	10,90	3,05

Add number of contacts for basic arrangements, OR add the contact arrangement number for coaxial and/or HV combination arrangements.

•Dimensions B, D, G, and H are measured as outside dimensions at the bottom of draw.
For shell with float mounts, add letter F after letter M, e.g., DEMF-*P.

NOTE: B• and D• are the O.D. dims. for socket side, B′ and D′ are the I.D. dims. for pin side.

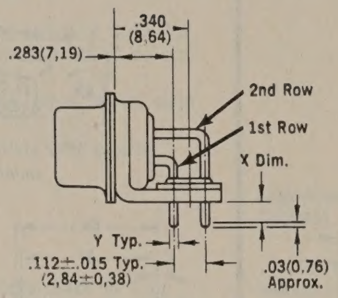
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

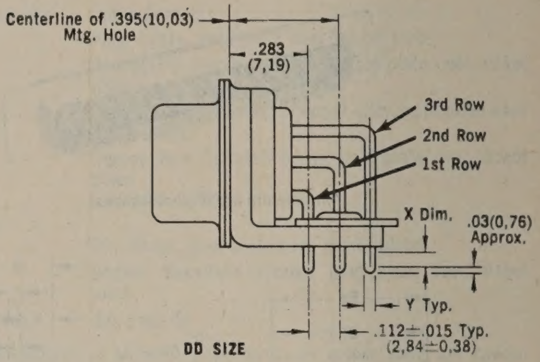
PRINTED CIRCUIT APPLICATIONS

RIGHT ANGLE 90° TERMINAL

Connectors are furnished with or without bracket. Spacer assemblies not supplied.


.340
(8,64)
.283(7,19)
2nd Row
1st Row
X Dim.
Y Typ.
.112±.015 Typ.
(2,84±0,38)
.03(0,76)
Approx.

DE, DA, DB, DC SIZES

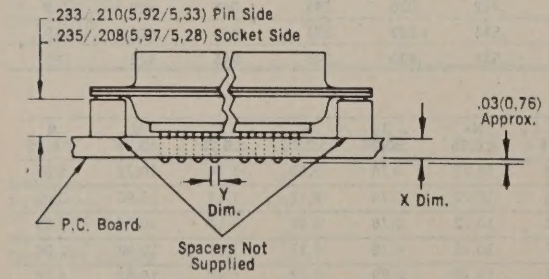

Centerline of .395(10,03)
Mtg. Hole
.283
(7,19)
3rd Row
2nd Row
1st Row
X Dim.
.03(0,76)
Approx.
Y Typ.
.112±.015 Typ.
(2,84±0,38)

DD SIZE

Code	Straight	Right Angle	Bracket With	Bracket Without	Below Board	Commercial Contact Extension ±.020(0,51)	Commercial Max. Board Thickness	Military Contact Extension	Military Max. Board Thickness	Terminal Diameter
*A	—	•	•	—	—	△2 .093(2,36)	.062(1,57)	△2 △4 .099/.154(2,54/39,12)	.062(1,57)	.040(1,02)
B	•	—	—	—	—	△1 .125(3,18)	.062(1,57)	—	—	.040(1,02)
C	—	•	—	•	—	△3 .093(2,36)	.062(1,57)	—	—	.040(1,02)
*D	—	•	•	—	—	△2 .093(2,36)	.062(1,57)	△2 △4 .099/.154(2,54/39,12)	.062(1,57)	.030(0,76)
E	•	—	—	—	—	△1 .125(3,18)	.062(1,57)	—	—	.030(0,76)
F	—	•	—	•	—	△3 .093(2,36)	.062(1,57)	—	—	.030(0,76)
*G	—	•	•	—	—	△2 .125(3,18)	.093(2,36)	△2 △4 .130/.185(33,02/46,99)	.094(2,39)	.040(1,02)
H	•	—	—	—	—	△1 .156(3,96)	.094(2,39)	△1 .130/.185(33,02/46,99)	.094(2,39)	.040(1,02)
K	—	•	—	•	—	△3 .125(3,18)	.093(2,36)	—	—	.040(1,02)
*L	—	•	•	—	—	△2 .125(3,18)	.093(2,36)	△2 △4 .130/.185(33,02/46,99)	.094(2,39)	.030(0,76)
M	•	—	—	—	—	△1 .156(3,96)	.094(2,39)	△1 .130/.185(33,02/46,99)	.094(2,39)	.030(0,76)
P	—	•	—	•	—	△3 .125(3,18)	.093(2,36)	—	—	.030(0,76)
R	—	•	—	•	—	△3 .184(4,67)	.156(3,96)	—	—	.030(0,76)
*S	—	•	•	—	—	△2 .184(4,67)	.156(3,96)	△2 △4 .155/.210(39,37/53,34)	.125(3,18)	.030(0,76)
T	—	•	—	•	•	△3 .125(3,18)	.093(2,36)	—	—	.040(1,02)
*W	—	•	•	—	—	△2 .156(3,96)	.125(3,18)	△2 △4 .155/.210(39,37/53,34)	.125(3,18)	.040(1,02)
*X	•	—	—	—	—	△1 .184(4,67)	.156(3,96)	△1 .155/.210(39,37/53,34)	.125(3,18)	.040(1,02)
Y	—	•	—	—	•	△3 .093(2,36)	.062(1,57)	—	—	.030(0,76)
*Z	•	—	—	—	—	△1 .184(4,67)	.156(3,96)	△1 .155/.210(39,37/53,34)	.125(3,18)	.030(0,76)

*When suffix "M" is used on Commercial designators, Military contact extension applies. △1 From Insulator △2 From Bracket △3 From Flange △4 Available, Pin Side Only

STRAIGHT TERMINAL


.233/.210(5,92/5,33) Pin Side
.235/.208(5,97/5,28) Socket Side
.03(0,76)
Approx.
Y
Dim.
X Dim.
P.C. Board
Spacers Not
Supplied

Part Number Printed Circuit Terminal Modifier	X	Y ±.003(±0,08)
B	3/32(2,38)	.04(1,02)
E	3/32(2,38)	.03(0,76)
H	1/8(3,17)	.04(1,02)
M	1/8(3,17)	.03(0,76)

Example: DAM-15PB, see page 91 for ordering nomenclature.

(millimeters are in parentheses)

Dimensions subject to change.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

CROSS REFERENCE LIST

MARK I MILITARY SOLDER POT CONNECTORS

MIL-C-24308 Part No.	Cannon Part No.
M24308/1-1	DEMM9S
M24308/1-2	DAMM15S
M24308/1-3	DBMM25S
M24308/1-4	DCMM37S
M24308/1-5	DDMM50S

MIL-C-24308 Part No.	Cannon Part No.
M24308/3-1	DEMM9P
M24308/3-2	DAMM15P
M24308/3-3	DBMM25P
M24308/3-4	DCMM37P
M24308/3-5	DDMM50P

MARK I PRINTED CIRCUIT CONNECTORS

MIL-C-24308 Part No.	Cannon Part No.
M24308/23-1	DEMM9SM
M24308/23-2	DAMM15SM
M24308/23-3	DBMM25SM
M24308/23-4	DCMM37SM
M24308/23-5	DDMM50SM
M24308/23-7	DEMM9SZ
M24308/23-8	DAMM15SZ
M24308/23-9	DBMM25SZ
M24308/23-10	DCMM37SZ
M24308/23-11	DDMM50SZ
M24308/23-13	DEMM9SH
M24308/23-14	DAMM15SH
M24308/23-15	DBMM25SH
M24308/23-16	DCMM37SH
M24308/23-17	DDMM50SH
M24308/23-19	DEMM9SX
M24308/23-20	DAMM15SX
M24308/23-21	DBMM25SX
M24308/23-22	DCMM37SX
M24308/23-23	DDMM50SX
M24308/24-1	DEMM9PM
M24308/24-2	DAMM15PM
M24308/24-3	DBMM25PM
M24308/24-4	DCMM37PM
M24308/24-5	DDMM50PM
M24308/24-7	DEMM9PZ
M24308/24-8	DAMM15PZ
M24308/24-9	DBMM25PZ
M24308/24-10	DCMM37PZ
M24308/24-11	DDMM50PZ
M24308/24-13	DEMM9PH
M24308/24-14	DAMM15PH
M24308/24-15	DBMM25PH
M24308/24-16	DCMM37PH
M24308/24-17	DDMM50PH

MIL-C-24308 Part No.	Cannon Part No.
M24308/24-19	DEMM9PX
M24308/24-20	DAMM15PX
M24308/24-21	DBMM25PX
M24308/24-22	DCMM37PX
M24308/24-23	DDMM50PX
M24308/24-25	DEMM9PD
M24308/24-26	DAMM15PD
M24308/24-27	DBMM25PD
M24308/24-28	DCMM37PD
M24308/24-29	DDMM50PD
M24308/24-31	DEMM9PL
M24308/24-32	DAMM15PL
M24308/24-33	DBMM25PL
M24308/24-34	DCMM37PL
M24308/24-35	DDMM50PL
M24308/24-37	DEMM9PA
M24308/24-38	DAMM15PA
M24308/24-39	DBMM25PA
M24308/24-40	DCMM37PA
M24308/24-41	DDMM50PA
M24308/24-43	DEMM9PG
M24308/24-44	DAMM15PG
M24308/24-45	DBMM25PG
M24308/24-46	DCMM37PG
M24308/24-47	DDMM50PG
M24308/24-49	DEMM9PS
M24308/24-50	DAMM15PS
M24308/24-51	DBMM25PS
M24308/24-52	DCMM37PS
M24308/24-53	DDMM50PS
M24308/24-55	DEMM9PW
M24308/24-56	DAMM15PW
M24308/24-57	DBMM25PW
M24308/24-58	DCMM37PW
M24308/24-59	DDMM50PW

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

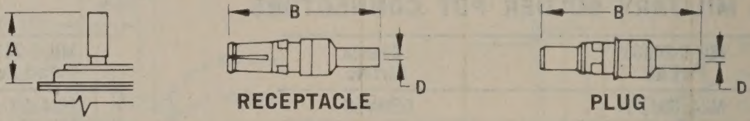
GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

REMOVABLE COAXIAL, HIGH VOLTAGE, AND HIGH POWER CONTACTS

For recommended stripping dimensions and termination data see pages 111 and 112. All coaxial and high voltage contacts have solder center contact. For coax, high voltage, and power contact material, see page 92.

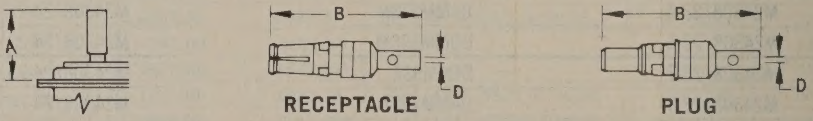
Color Code: Receptacle - Blue; Plug - Red

STRAIGHT CRIMP BRAID COAXIAL CONTACTS



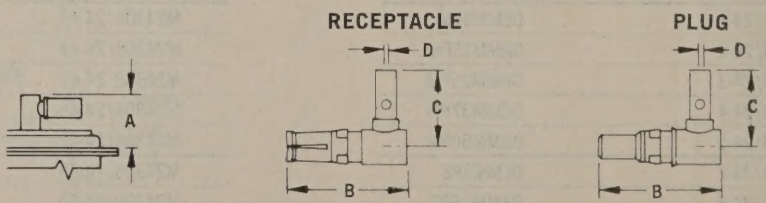
	Part Number Standard Finish	Military Finish*	A Max.	B Ref.	D ±.005(±0,13)	RG Cable No. Old	New
Plug	DM53740	DM53740-17	.739(18,8)	.929(23,6)	.040(1,0)	196/U	178B/U
Plug	DM53742-5	DM53740-15	.739(18,8)	.929(23,6)	.067(1,7)	187/U 188/U	179B/U 316B/U
Plug	DM53740-3	DM53740-16	.847(21,5)	1.037(26,3)	.110(2,8)	195/U	180B/U
Plug	DM53740-5	DM53740-18	.847(21,5)	1.037(26,3)	.125(3,17)	58/U	58B/U
Receptacle	DM53742	DM53742-18	.739(18,8)	.929(23,6)	.040(1,0)	196/U	178B/U
Receptacle	DM53742-1	DM53742-16	.739(18,8)	.929(23,6)	.067(1,7)	187/U 188/U	179B/U 316B/U
Receptacle	DM53742-3	DM53742-17	.847(21,5)	1.037(26,3)	.110(2,8)	195/U	180B/U
Receptacle	DM53742-5	DM43742-19	.847(21,5)	1.037(26,3)	.125(3,17)	58/U	58B/U

STRAIGHT SOLDER BRAID COAXIAL CONTACTS



	Part Number Standard Finish	Military Finish*	A Max.	B Ref.	D ±.005(±0,13)	Old RG Cable No.	New
Plug	DM53740-5008	DM53740-5105	.739(18,8)	.929(23,6)	.040(1,0)	196/U	178B/U
Plug	DM53740-5001	DM53740-5099	.739(18,8)	.929(23,6)	.067(1,7)	187/U 188/U	179B/U 316B/U
Plug	DM53740-5002	DM53740-5104	.847(21,5)	1.037(26,3)	.110(2,8)	196/U	178B/U
Plug	DM53740-5005	DM53740-5101	.847(21,5)	1.037(26,3)	.125(3,17)	58/U	58B/U
Receptacle	DM53742-5006	DM53742-5092	.739(18,8)	.929(23,6)	.040(1,0)	196/U	178B/U
Receptacle	DM53742-5001	DM53742-5089	.739(18,8)	.929(23,6)	.067(1,7)	187/U 188/U	179B/U 316B/U
Receptacle	DM53742-5002	DM53742-5091	.847(21,5)	1.037(26,3)	.110(2,8)	195/U	180B/U
Receptacle	DM53742-5004	DM53742-5086	.847(21,5)	1.037(26,3)	.125(3,17)	58/U	58B/U
Plug (Short Type)	DM53740-5000	DM53740-5100	.670(17,0)	.860(21,8)	.040(1,0)	196/U	178B/U
Receptacle (Short Type)	DM53742-5000	DM53742-5085	.670(17,0)	.860(21,8)	.040(1,0)	196/U	178B/U

RIGHT ANGLE SOLDER BRAID COAXIAL CONTACTS



	Part Number Standard Finish	Military Finish*	A Max.	B Ref.	C	D ±.005(±0,13)	RG Cable No. Old	New
Plug	DM53741-5000	DM53741-5059	.530(13,46)	.734(18,64)	.492(12,50)	.040(1,02)	196/U	178B/U
Plug	DM53741-5001	DM53741-5062	.530(13,46)	.734(18,64)	.492(12,50)	.067(1,70)	187/U 188/U	179B/U 316B/U
Plug	DM53741-5003	DM53741-5063	.530(13,46)	.734(18,64)	.601(15,27)	.110(2,79)	195/U	180B/U
Plug	DM53741-5004	DM53741-5060	.530(13,46)	.734(18,64)	.601(15,27)	.125(3,18)	58/U	58B/U
Receptacle	DM53743-5000	DM53743-5073	.530(13,46)	.734(18,64)	.492(12,50)	.040(1,02)	196/U	178B/U
Receptacle	DM53743-5001	DM53743-5076	.530(13,46)	.734(18,64)	.492(12,50)	.067(1,70)	187/U 188/U	179B/U 316B/U
Receptacle	DM53743-5003	DM53743-5077	.530(13,46)	.734(18,64)	.601(15,27)	.110(2,79)	195/U	180B/U
Receptacle	DM53743-5004	DM53743-5074	.530(13,46)	.734(18,64)	.601(15,27)	.125(3,18)	58/U	58B/U

*MIL-C-24308 Finish: 0.00005(0,00127) minimum gold plate over copper plate (ITT Cannon code A 156).

(millimeters are in parentheses)

Dimensions subject to change.

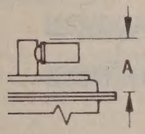
GOLDEN-D (Mark I) D*M Solder Type, Non-Removable Contacts

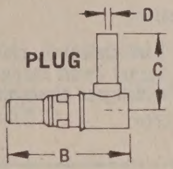
REMOVABLE COAXIAL, HIGH VOLTAGE, AND HIGH POWER CONTACTS

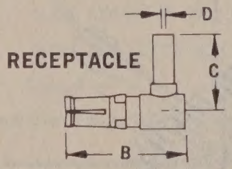
For recommended stripping dimensions and termination data see pages 111 and 112. All coaxial and high voltage contacts have solder center contact. For coax, high voltage, and power contact material, see page 92.

Color Code: Receptacle - Blue; Plug - Red

RIGHT ANGLE CRIMP BRAID COAXIAL CONTACTS

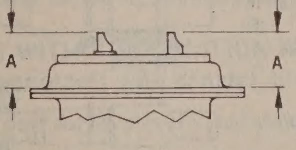


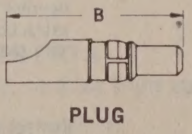


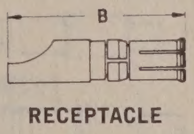


	Part Number		A	B		D	RG Cable No.	
	Standard Finish	Military Finish*	Max.	Ref.	C	±.005(±0,13)	Old	New
Plug	DM53741	DM53741-12	.530(13,46)	.734(18,64)	.492(12,50)	.040(1,02)	196/U	178B/U
Plug	DM53741-1	DM53741-11	.530(13,46)	.734(18,64)	.492(12,50)	.067(1,70)	187/U 188/U	179B/U 316B/U
Plug	DM53741-3	DM53741-10	.530(13,46)	.734(18,64)	.601(15,27)	.110(2,79)	195/U	180B/U
Plug	DM53741-4	DM53741-13	.530(13,46)	.734(18,64)	.601(15,27)	.125(3,18)	58/U	58B/U
Receptacle	DM53743-2	DM53743-18	.530(13,46)	.734(18,64)	.492(12,50)	.040(1,02)	196/U	178B/U
Receptacle	DM53743-3	DM53743-16	.530(13,46)	.734(18,64)	.492(12,50)	.067(1,70)	187/U 188/U	179B/U 316B/U
Receptacle	DM53743-5	DM53743-17	.530(13,46)	.734(18,64)	.601(15,27)	.110(2,79)	195/U	180B/U
Receptacle	DM53743-6	DM53743-19	.530(13,46)	.734(18,64)	.601(15,27)	.125(3,18)	58/U	58B/U

HIGH POWER SOLDER TYPE CONTACTS

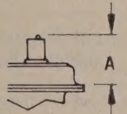


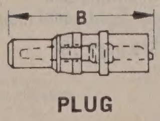


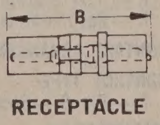


	Part Number		A	B	Current Rating	Wire
	Standard Finish	Military Finish*	Max.	Ref.	(Amps)	Size
Plug	DM53745-1	DM53745-28	.666(16,92)	.866(22,00)	40	#8
Plug	DM53745-7	DM53745-27	.666(16,92)	.866(22,00)	20	#12
Plug	DM53745-8	DM53745-25	.666(16,92)	.866(22,00)	10	#16
Receptacle	DM53744-1	DM53744-21	.666(16,92)	.856(21,74)	40	#8
Receptacle	DM53744-6	DM53744-25	.666(16,92)	.856(21,74)	20	#12
Receptacle	DM53744-7	DM53744-24	.666(16,92)	.856(21,74)	10	#16

STRAIGHT HIGH VOLTAGE CONTACTS

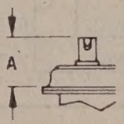


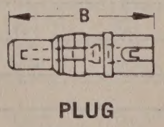


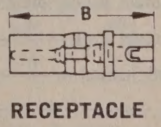


	Part Number		A	B	Wire
	Std. Finish	Mil. Finish*	Max.	Ref.	Size
Plug	DM51157	DM51157-8	.539(13,69)	.734(18,64)	#20
Receptacle	DM51155	DM51155-7	.539(13,69)	.734(18,64)	#20

RIGHT ANGLE HIGH VOLTAGE CONTACTS







	Part Number		A	B	Wire
	Standard Finish	Military Finish*	Max.	Ref.	Size
Plug	DM51157-5000	DM51157-5005	.491(12,47)	.697(17,70)	#20
Receptacle	DM51155-5000	DM51155-5004	.491(12,47)	.697(17,70)	#20

*MIL-C-24308 Finish: 0.00005(0,00127) minimum gold plate over copper plate (ITT Cannon code A 156).

ROYAL-D (Mark III) D*MA Crimp Type, Removable Contacts

LITTLE CAESAR® REAR RELEASE CONTACT ASSEMBLY

The D*MA connector is a D Subminiature connector that utilizes the LITTLE CAESAR rear release contact assembly. This contact assembly allows rear insertion, release and extraction of crimp snap-in contacts. The simplified contact design with no undercuts offers greater bend resistance and a hard closed entry socket insulator insures positive contact alignment. Consult the factory for availability of rear release coaxial, power and/or high voltage contacts. Crimp terminations accommodate #18, #20, #22, #24, #26 and #30 AWG stranded wire and are rated for 5 amps.†

Extra contacts may be ordered for replacement purposes; for part numbers of contacts, see page 100.

Connectors for non-magnetic applications are available. Standard NMB non-magnetic connectors have magnetic flux densities less than 200 gamma after magnetization with a 5000 gauss magnet.

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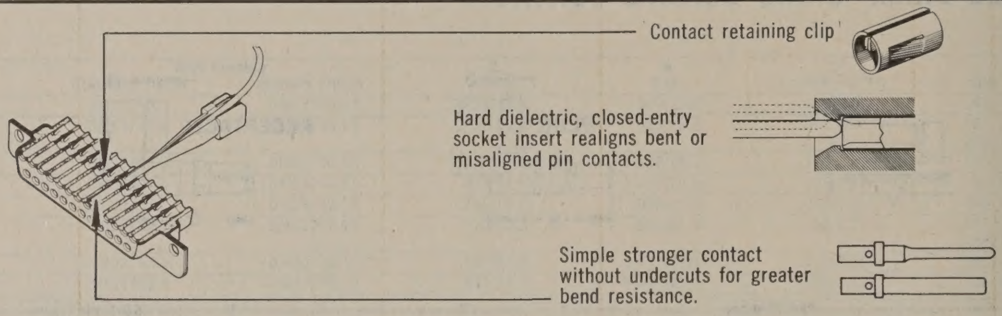
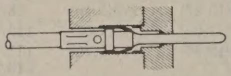
†Military rating of 20 contacts or wires is 1.5 amps average, and 7.5 amps maximum. See Current Ratings shown on page 99.


Contact retaining clip
Hard dielectric, closed-entry socket insert realigns bent or misaligned pin contacts.
Simple stronger contact without undercuts for greater bend resistance.

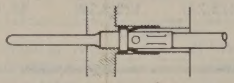
CONTACT INSERTION

Size 20 Contacts

Contact partially inserted.

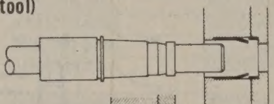


Tines snap behind contact shoulder when contact is fully inserted.

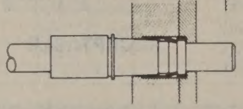


Coaxial Contact and Size 8 High Power Contacts (with built-in metal extraction tool)

Contact partially inserted.

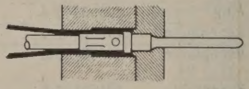


Tines snap behind contact should when contact is fully inserted.

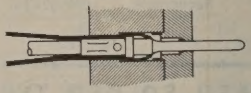


CONTACT EXTRACTION

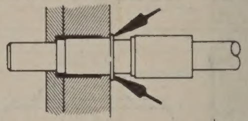
Tines expanded beyond contact shoulder with extraction tool, ready for release.



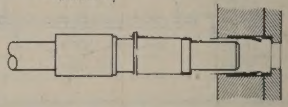
Contact partially removed.



Depress flange of built-in extraction tool until flush with rear of insulator.



Contact being pulled from connector.



HOW TO ORDER

D B MA M R 25 P * FO

Series Prefix
Shell Size
Class
Military Specification
Mounting Type
Contact Arrangements
Contact Type
Modification
FO

SERIES PREFIX
D — ITT Cannon designation

SHELL SIZE
E, A, B, C and D

CLASS
MA — Monobloc with LITTLE CAESAR rear release contact retention systems.

MILITARY SPECIFICATION
M — For connectors to MIL-C-243008 specification — omit for standard

MOUNTING TYPE
No designator: standard .120 (3,05) diameter mounting hole
E — 4-40 clinch nut for rear panel mounting
F — Float mount for rear panel mounting
G — #2-56 clinch nut for rear panel mounting
K — .154 (3,91) diameter mounting hole
R — Reverse float mount for front panel mounting

CONTACT ARRANGEMENTS See page 100

CONTACT TYPE
P — Pin; S — Socket

MODIFICATION
Please consult factory

FO
Connector without contacts (FO will not be printed on the connector)

ROYAL-D (Mark III) D*MA Crimp Type, Removable Contacts

STANDARD DATA

Shell	Steel with yellow chromate over cadmium plate
Insulator	(Monobloc-type) Dially phthalate, glass-filled per MIL-M-14 Type GDI-30F or Type SD6F, dark green color
#20 Contacts (Standard)	Pin: Leaded copper, gold plate over nickel plate Socket: Copper alloy, gold plate over nickel plate with stainless steel sleeves
#20 Contacts (Military) Ref: MIL-C-24308	Pin and Socket: Gold over copper (ITT Cannon finish code A156)
Rivets and Washers (Float Mounting)	Stainless steel
High Voltage Contacts	*Pin: Brass, gold plate over nickel plate *Socket: Copper alloy, gold plate over nickel plate Insulator: Nylon (Temperature Range: —65°F to +250°F (—55°C to +120°C)
Coaxial Contacts	Outer Contact: *Plug: Brass, gold plate over nickel plate *Receptacle: Beryllium copper, gold plate over nickel plate Center Contact: *Female: Copper alloy, gold plate over nickel plate *Male: Brass, gold plate over nickel plate Insulator: Teflon
High Power Contacts	*Pin: Brass, gold plate over nickel plate *Socket: Beryllium copper, gold plate over nickel plate
Contact Retention	9 lbs. min (40 N) after 10 insertions
(#20 Contacts)	5 lbs. min. (22 N) after 100 insertions
Voltage Ratings	See below

***NOTE:** Also available in Military Finish: Gold over copper plate (ITT Cannon Finish Code A156).

VOLTAGE AND CURRENT RATING

CONNECTORS WITH BASIC ARRANGEMENTS
AWG #20 wire contacts only

All voltages are measured from contact to contact and from contact to shell in unmated condition.

		Altitude (feet/m)			
Connector Type		Sea Level	20,000/6096	50,000/15240	70,000/21336
D*MA, D*C, D*U	Average Flashover	1500	1000	500	500
	Test	1000	650	325	325
D*M, D*	Average Flashover	1700	1000	650	500
	Test	1250	750	475	375

All voltage figures are AC 60 rms cps, measured at approximately 77°F, 50% rh.

CONNECTORS WITH COMBINATION ARRANGEMENTS
AWG #20 wire contacts with coaxial, high power, and/or high voltage contacts

All voltages are for plugs and receptacles in both mated and unmated conditions.

		Altitude (feet/m)							
		Sea Level		20,000/6096		50,000/15240		70,000/21336	
Type of Contact		90°	Straight	90°	Straight	90°	Straight	90°	Straight
Center Conductor to Coaxial Shell	Average Flashover	1200	1500	900	1000	600	700	400	500
	Test	800	1000	600	650	400	475	275	325
High Power Contact and/or Coaxial Shell to Plug Shell	Average Flashover	1500	1500	1000	1000	500	500	500	500
	Test	1000	1000	650	650	325	325	325	325
Coaxial Shell to Nearest Standard Solder Pot Contact	Average Flashover	●	1500	●	1500	●	900	●	650
	Test	●	1000	●	1000	●	600	●	425
HV Contact to Nearest Contact or to Shell	Average Flashover	3800	3800	2300	2300	900	900	650	650
	Test	2800	2800	1700	1700	675	675	475	475

● Not applicable due to variable rotation.

TEST CURRENT

Maximum current ratings of contacts are as shown at right. For the maximum total current per connector refer to MIL-W-5088 (the maximum recommended total current per connector is the same as the continuous duty current for wires in conduit or bundles).

Contact Size	Max. Current Rating (rms)
20	7.5
22D	5

ROYAL-D (Mark III) D*MA Crimp Type, Removable Contacts

CRIMP TYPE CONTACTS

Contact Size	Wire Size Accom.	Standard Finish Male	Standard Finish Female	Finish A 156 Male	Finish A 156 Female
20	20, 22, 24	330-5291-000	031-1007-000	330-5291-037	031-1007-042
20-18	1 #18, 2 #22	330-5291-001	031-1007-001	330-5291-055	031-1007-054
20-26	26, 28, 30	330-5291-004	031-1007-004	330-5291-050	031-1007-048
22D*	24, 26, 28	——	——	030-2042-002	031-1147-002

NOTE: ROYAL-D connectors meet the requirements of ITT Cannon Electric Specification CS-141.

*Max. insulation O.D. is .050 (1,27) max.

MIL-C-24308

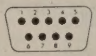
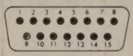
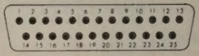
D*MA connectors are also available to MIL-C-24308. To order add another M to part number. For example: DAMAM-15P. See cross reference list.

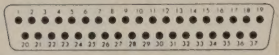
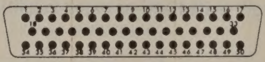
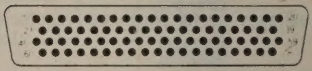
CROSS REFERENCE LIST

STANDARD MARK III LAYOUTS MIL-C-24308 Part No.	STANDARD MARK III LAYOUTS Cannon Part No.	SIZE 22 CONTACT LAYOUTS ONLY MIL-C-24308 Part No.	SIZE 22 CONTACT LAYOUTS ONLY Cannon Part No.
M24308/2-1	DEMAM-9S	M24308/2-15	DDMAM-78S
M24308/2-2	DAMAM-15S	M24308/2-32	DDMAMF-78S
M24308/2-3	DBMAM-25S	M24308/2-301	DDMAMF-78S-FO
M24308/2-4	DCMAM-37S	M24308/2-290	DDMAM-78S-FO
M24308/2-5	DDMAM-50S	M24308/4-15	DDMAM-78P
M24308/4-1	DEMAM-9P	M24308/4-268	DDMAM-78P-FO
M24308/4-2	DAMAM-15P	M24308/4-311	DDMAMF-78P
M24308/4-3	DBMAM 25P	M24308/4-333	DDMAMF-78P-FO
M24308/4-4	DCMAM-37P	M24308/6-15	DDMAM-78S-NM
M24308/4-5	DDMAM-50P	M24308/6-268	DDMAMF-78S-NM
M24308/10-1	031-1007-042	M24308/6-290	DDMAM-78S-NM-FO
M24308/11-1	330-5291-037	M24308/6-333	DDMAMF-78S-NM-FO
		M24308/8-15	DDMAM-78P-NM
		M24308/8-269	DDMAM-78P-NM-FO
		M24308/8-311	DDMAMF-78P-NM
		M24308/8-333	DDMAMF-78P-NM-FO
		M24308/12-1	031-1147-002
		M24308/13-1	030-2042-002

BASIC CONTACT ARRANGEMENTS

FACE VIEW PIN INSERT

			
Shell Size	E	A	B
No. of Contacts	9	15	25
Contact Size	#20	#20	#20

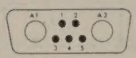
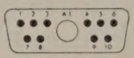
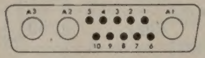
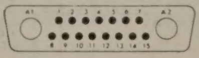
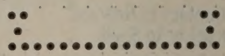
			
Shell Size	C	D	D
No. of Contacts	37	50	78
Contact Size	#20	#20	#22D Contacts only

COMBINATION ARRANGEMENTS

NOTE: Color Code — Pin Connector, Red; Socket Connector, Blue

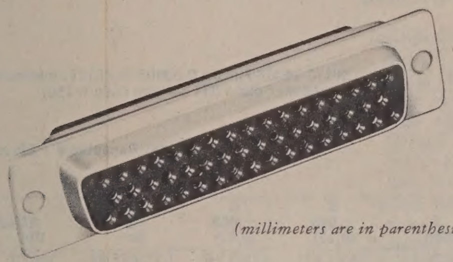
#20 CONTACTS WITH COAX, POWER AND/OR HIGH VOLTAGE CONTACTS

NOTE: This arrangement for DMA110335 and DMA110336 Shielded Contacts only. See page 102.

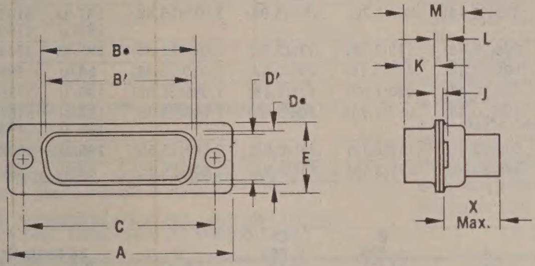
					
Shell Size	A	A	B	B	D
Arrangement	7W2	11W1	13W3	17W2	30WS7
No. of Contacts	5	10	10	15	23
Contact Size	#20	#20	#20	#20	#20
Coax or HV Cavities	2	1	3	2	7 shielded contacts only

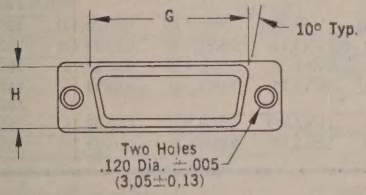
ROYAL-D (Mark III) D*MA Crimp Type, Removable Contacts

STANDARD SHELL

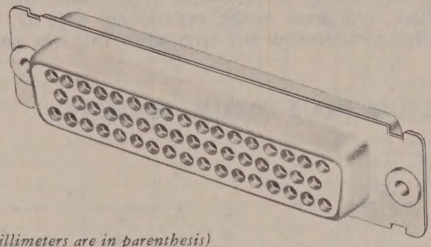


(millimeters are in parenthesis)

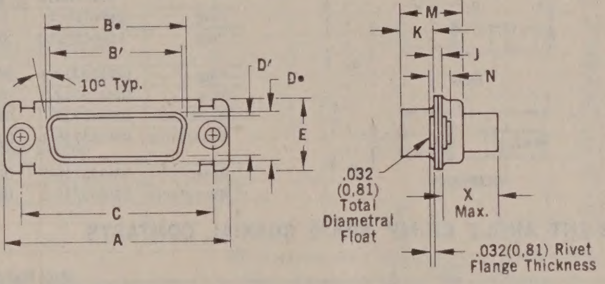


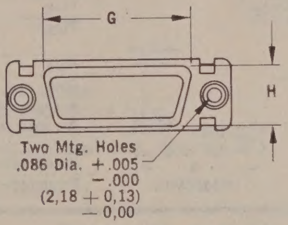


SHELL WITH FLOAT MOUNTS



(millimeters are in parenthesis)





It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount; see page 108.

INCHES

Part Number by Shell Size	A ±.015	B• ±.010	B′ ±.010	C ±.005	D• ±.010	D′ ±.010	E ±.015	G• ±.010	H• ±.010	J ±.010	K ±.010	L ±.010	M ±.015	N ±.010	X Max.
DEMA-*P	1.213	—	.666	.984	—	.329	.494	.759	.422	.030	.236	.045	.422	.120	.375
DEMA-*S	1.213	.640	—	.984	.308	—	.494	.759	.422	.030	.243	.045	.429	.120	.375
DAMA-*P	1.541	—	.994	1.312	—	.329	.494	1.083	.422	.030	.236	.045	.422	.120	.375
DAMA-*S	1.541	.968	—	1.312	.308	—	.494	1.083	.422	.030	.243	.045	.429	.120	.375
DBMA-*P	2.088	—	1.534	1.852	—	.329	.494	1.625	.422	.039	.231	.060	.426	.129	.375
DBMA-*S	2.088	1.508	—	1.852	.308	—	.494	1.625	.422	.030	.243	.045	.429	.120	.375
DCMA-*P	2.729	—	2.182	2.500	—	.329	.494	2.272	.422	.039	.231	.060	.426	.129	.375
DCMA-*S	2.729	2.156	—	2.500	.308	—	.494	2.272	.422	.030	.236	.045	.429	.120	.375
DDMA-*P	2.635	—	2.079	2.406	—	.436	.605	2.178	.534	.039	.231	.060	.426	.129	.375
DDMA-*S	2.635	2.062	—	2.406	.420	—	.605	2.178	.534	.030	.243	.045	.429	.120	.375

MILLIMETERS

Part Number by Shell Size	A ±0,38	B′ ±0,25	B• ±0,25	C ±0,12	D• ±0,25	D′ ±0,25	E ±0,38	G• ±0.25	H• ±0,25	J ±0,25	K ±0,25	L ±0,25	M ±0,38	N ±0,25	X Max.
DEC-9P	30,81	—	16,91	24,99	—	8,36	12,55	19.28	10,72	0,76	5,99	1,14	10,72	3,05	9,52
DEC-9S	30,81	16,25	—	24,99	7,82	—	12,55	19,28	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DAC-15P	39,14	—	25.24	33,32	—	8,36	12,55	27,51	10,72	0,76	5,99	1,14	10,72	3,05	9,52
DAC-15S	39,14	24,58	—	33,32	7,82	—	12,55	27,51	10,72	0,76	6,17	1,14	10,90	3,05	9,52
DBC-*P	53,03	—	38.96	47,04	—	8,36	12,55	41,27	10,72	0,99	5,87	1,52	10,82	3,28	9,52
DBC-*S	53,03	38,30	—	47,04	7,82	—	12.55	41.27	10,72	0,76	6,17	1,14	10,90	3.05	9,52
DCC-37P	69,31	—	55,42	63,50	—	8,36	12.55	57,71	10,72	0,99	5,87	1,52	10,82	3.28	9,52
DCC-37S	69,31	54.76	—	63,50	7,82	—	12.55	57.71	10,72	0,76	6.17	1,14	10,90	3.05	9,52
DDC-50P	66.92	—	52,81	61,11	—	11,07	15,37	55.32	13,56	0,99	5,87	1,52	10,82	3.28	9,52
DDC-50S	66.92	52,37	—	61.11	10,67	—	15.37	55.32	13,56	0,76	6,17	1,14	10,90	3,05	9,52

•Dimensions B, D, G, and H are measured as outside dimensions at the bottom of draw. For shell with float mounts, add letter F after letter C, e.g., DECF-9P.

NOTE: B• and D• are the O.D. dims. for socket side, B′ and D′ are the I.D. dims. for pin side.

*Add number of contacts for basic arrangements, OR add contact arrangement number for coaxial and/or HV comb. arrangements.

ROYAL-D (Mark III) D*MA Crimp Type, Removable Contacts

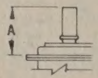
REMOVABLE COAXIAL, HIGH VOLTAGE, AND HIGH POWER CONTACTS

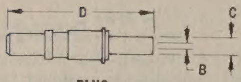
All coaxial and high voltage contacts have solder center contact. For coax, high voltage, and power contact material see page 92. For recommended stripping dimensions and termination data see page 112.

* MIL-C-24308 Finish: 0.00005 (0,00127) minimum gold plate over copper plate (ITT Cannon code A 156)

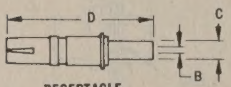
STRAIGHT CRIMP BRAID COAXIAL CONTACTS

Color Code: Receptacle - Blue; Plug - Red





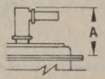
PLUG

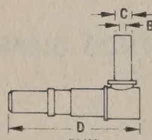


RECEPTACLE

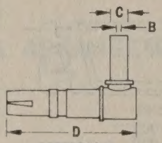
	Part Number Std. Finish	Mil. Finish*	A Max.	B ±.005 (0,12)	C ±.005 (0,12)	D Ref.	RG Cable No. Old	New
Plug	DMA43717	DMA43717-4	.805(20,44)	.040(1,02)	.125(3,18)	1.019(25,88)	196/U	178B/U
Plug	DMA43717-1	DMA43717-5	.805(20,44)	.067(1.70)	.156((3,96)	1.019(25,88)	187/U 188/U	316B/U 179B/U
Plug	DMA43717-2	DMA43717-6	.805(20,44)	.110(2,79)	.235(5,97)	1.019(25,88)	195/U	180B/U
Plug	DMA43717-3	DMA43717-7	.805(20,44)	.125(3,18)	.235(5,97)	1.019(25,88)	58/U	58B/U
Receptacle	DMA43717	DMA43716-4	.805(20,44)	.040(1,02)	.125(3,18)	1.006(25,55)	196/U	178B/U
Receptacle	DMA43716-1	DMA43716-5	.805(20,44)	.067(1,70)	.156(3,96)	1.006(25,55)	187/U 188/U	316B/U 179B/U
Receptacle	DMA43716-2	DMA43716-6	.805(20,44)	.110(2,79)	.235(5,97)	1.006(25,55)	195/U	180B/U
Receptacle	DMA43716-3	DMA43716-7	.805(20,44)	.125(3,18)	.235(5,97)	1.006(25,55)	58/U	58B/U

RIGHT ANGLE CRIMP BRAID COAXIAL CONTACTS





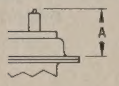
PLUG

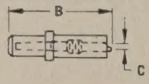


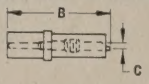
RECEPTACLE

	Part Number Std. Finish	Mil. Finish*	A Max.	B ±.005 (0,12)	C ±.005 (0,12)	D Ref.	RG Cable No. Old	New
Plug	DMA43719	DMA43719-4	.703(17,85)	.040(1,02)	.125(3,18)	.922(23,42)	196/U	178B/U
Plug	DMA43719-1	DMA43719-5	.703((17,85)	.067(1,70)	.156(3,96)	.922(23,42)	187/U 188/U	316B/U 179B/U
Plug	DMA43719-2	DMA43719-6	.703(17,85)	.110(2,79)	.235(5,97)	.922(23,42)	195/U	180B/U
Plug	DMA43719-3	DMA43719-7	.703(17,85)	.125(3,18)	.235(5,97)	.922(23,42)	58/U	58B/U
Receptacle	DMA43718	DMA43718-4	.703(17,85)	.040(1,02)	.125(3,18)	.910(23,11)	196/U	178B/U
Receptacle	DMA43718-1	DMA43718-5	.703(17,85)	.067(1,70)	.156(3,96)	.910(23,11)	187/U 188/U	316B/U 179B/U
Receptacle	DMA43718-2	DMA43718-6	.703(17,85)	.110(2,79)	.235(5,97)	.910(23,11)	195/U	180B/U
Receptacle	DMA43718-3	DMA43718-7	.703(17,85)	.125(3,18)	.235(5,97)	.910(23,11)	58/U	58B/U

STRAIGHT HIGH VOLTAGE CONTACTS

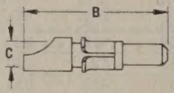




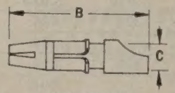


	Part Number Std. Finish	Mil. Finish*	A Max.	B Ref.	C ±.005 (0,12)	Wire Size
Plug	DMA44157	DMA44157-1	.539(13,7)	.734(18,6)	.045(1,1)	20
Receptacle	DMA44159	DMA44159-1	.539(13,7)	.734(18,6)	.045(1,1)	20

POWER CONTACTS

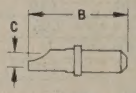


PLUG

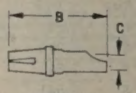


RECEPTACLE

Size 8

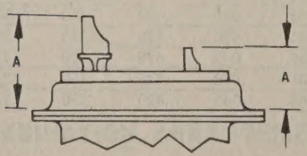


PLUG



RECEPTACLE

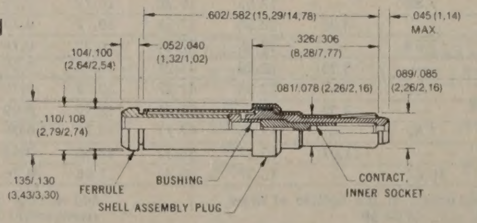
Size 12 and 16



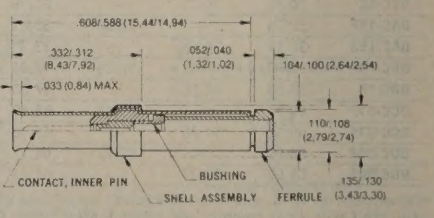
	Part Number Standard Finish	Military Finish*	A Max.	B Ref.	C +.005(0,13) −.004(0,10)	Wire Size	Current Rating (Amps)
Plug	DMA44348	DMA44348-1	.800(20,32)	1.000(25,40)	.188(4,78)	#8	40
Plug	DMA44349	DMA44349-1	.500(12,7)	.697(17,70)	.112(2,84)	#12	20
Plug	DMA44350	DMA44350-1	.500(12,7)	.697(17,70)	.069(1,75)	#16	10
Receptacle	DMA44351	DMA44351-1	.800(20,32)	.993(25,22)	.188(4,78)	#8	40
Receptacle	DMA44352	DMA44352-1	.500(12,7)	.690(17,53)	.112(2,84)	#12	20
Receptacle	DMA44353	DMA44353-1	.500(12,7)	.690(17,53)	.069(1,75)	#16	10

SHIELDED #16 CONTACTS

Crimp Inner Contact and Outer Shell


.602/.582 (15,29/14,78)
.045 (1,14) MAX.
.104/.100 (2,64/2,54)
.052/.040 (1,32/1,02)
.326/.306 (8,28/7,77)
.089/.085 (2,26/2,16)
.081/.078 (2,26/2,16)
.110/.108 (2,79/2,74)
.135/.130 (3,43/3,30)
FERRULE
BUSHING
SHELL ASSEMBLY PLUG
CONTACT, INNER SOCKET

PLUG: DDMA110335 — RG196A/U and RG178B/U cable


.608/.588 (15,44/14,94)
.332/.312 (8,43/7,92)
.052/.040 (1,32/1,02)
.104/.100 (2,64/2,54)
.033 (0,84) MAX.
.110/.108 (2,79/2,74)
CONTACT, INNER PIN
BUSHING
SHELL ASSEMBLY
FERRULE
.135/.130 (3,43/3,30)

RECEPTACLE: DDMA110336 — RG196A/U and RG178B/U cable

(millimeters are in parentheses)

Dimensions subject to change.

D SUBMINIATURE RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

CONVERSION CHART FOR DIMS. TOL.						
Inches	.005	.010	.015	.020	.025	.030
Millimeter	0,13	0,25	0,38	0,51	0,64	0,76

CONNECTOR APPLICATION

ACCESSORY DESCRIPTION	D*C/ D*U	D*MA	D*MA Combination	D*M	D*M Combination	D*	D* Combination	Pages
Junction Shells — Straight clamp	•	•		•		•		103
Straight with latching mechanism	•	•	•	•	•	•	•	103
Round clamp	•	•	★	•	★	•	★	103
Deep straight clamp	•	•	★	•	★	•	★	104
Right angle	•	•	★	•	★	•	★	104
Straight and right angle plastic	•	•	★	•	★	•	★	104
Universal	•	•		•		•		107
Data phone				•		•		107
Potting Shells — Less grips	★	★	★	•	★	•	★	104
Nylon	★	★	★	•	★	•	★	105
Switching Shells — Less handle				•		•		105
Sliding Lock Assemblies	•	•	•	•	•	•	•	105
Screw Lock Assemblies — Male and female	•	•	•	•	•	•	•	105
Jackscrew Assemblies	•	•	•	•	•	•	•	106
D Spring Latch Assembly	•	•	•	•	•	•	•	106
Guide Pin Plates — Male and female	•	•	•	•	•	•	•	106
Modular Plates	•	•	★	•	★	•	•	107
Right Angle Connector Mounting Bracket	•	•	•	•	•	•	★	106
Dust Caps — Polyethylene	•	•	•	•	•	•	•	107
Sealing Gaskets	•	•		•		•	•	107
Wire Hole Fillers		•			★	•		107
Alignment Tool	•							107

All tolerances are ±.010(0,3) unless noted otherwise.

•Connector type with which accessory may be used.

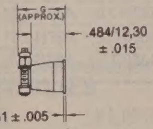
★Consult factory.

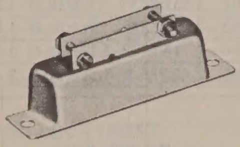
For non-magnetic or non-magnetic gold plated junction shells consult factory.

NOTE: Accessories are shown assembled for reference only, components are shipped loose.

JUNCTION SHELLS

STRAIGHT CLAMP

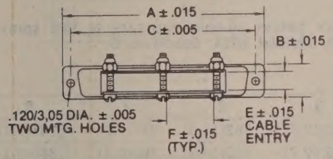




Material: Low carbon steel.

Finish: Cadmium plate, yellow chromate.

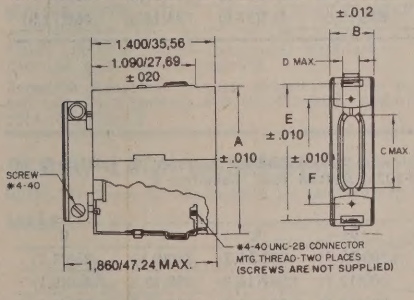
Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

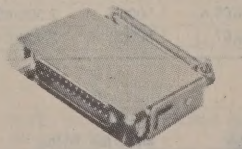


Part Number by Shell Size

Cannon	Mil. Spec.	No. of Cable Locking Screws Reqd.	A	B	C	E	F	G
DA 19678-1	M24308/22-2	2	1.531(38,9)	.500(12,7)	1.312(33,3)	.296(7,5)	.312(7,9)	.640(16,2)
DB 19678-2	M24308/22-3	2	2.078(52,8)	.500(12,7)	1.852(47,0)	.296(7,5)	.796(20,2)	.640(16,2)
DC 19678-3	M24308/22-4	3	2.718(69,0)	.500(12,7)	2.500(63,5)	.296(7,5)	.687(17,4)	.640(16,2)
DD 19678-4	M24308/22-5	3	2.625(66,7)	.609(12,7)	2.406(61,1)	.390(9,9)	.687(17,4)	.703(17,8)

STRAIGHT WITH LATCHING MECHANISM





Material: Low carbon steel.

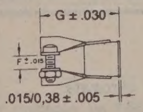
Finish: Cadmium plate, yellow chromate.

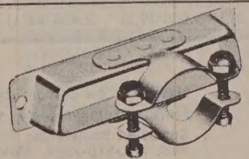
Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

Part Number by Shell Size

Cannon	A	B	C	D	E	F
DA 44546	1.880(47,8)	.542(13,8)	.943(24,0)	.322(8,	1.723(43,8)	1.317(33,5)
DB 44547	2.419(61,4)	.542(13,8)	1.490(37,8)	.322(8	2.263(57,5)	1.857(47,2)
DC 44548	3.067(77,9)	.542(13,8)	2.140(54,4)	.322(8,2)	2.911(73,9)	2.505(63,6)
DD 44549	2.973(75,5)	.653(16,6)	1.879(47,7)	.427(10,8)	2.817(71,6)	2.411(61,2)
DE 44550	1.551(39,4)	.542(13,8)	.625(15,9)	.322(8,2)	1.395(35,4)	.989(25,1)

ROUND CLAMP

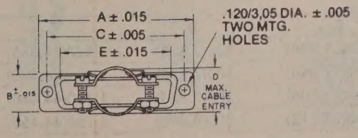




Material: Low carbon steel.

Finish: Cadmium plate, yellow chromate.

Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.



Part Number by Shell Size

Cannon	Mil. Spec	A	B	C	D	E	F	G
DE 44994	M24308/21-1	1.208(30,7)	.500(12,7)	.984(25,0)	.406(10,3)	.661(16,8)	.125(3,2)	1.031(26,2)
DA 20961	M24308/21-2	1.531(38,9)	.500(12,7)	1.312(33,3)	.406(10,3)	.984(25,0)	.125(3,2)	1.031(26,2)
DB 20962	M24308/21-3	2.078(52,8)	.500(12,7)	1.852(47,0)	.593(15,1)	1.515(38,5)	.187(4,7)	1.062(27,0)
DC 20963	M24308/21-4	2.718(69,0)	.500(12,7)	2.500(63,5)	.718(18,2)	2.171(55,1)	.250(6,3)	1.062(27,0)
DD 20964	M24308/21-5	2.625(66,7)	.609(15,5)	2.406(61,1)	.812(20,6)	2.093(53,2)	.312(7,9)	1.062(27,0)

Dimensions subject to change.

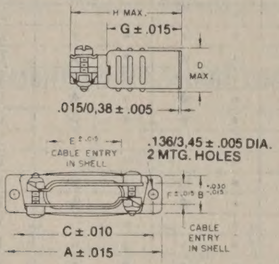
(millimeters are in parentheses)

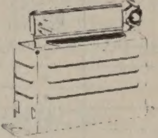
D SUBMINIATURE RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES (Cont'd)

DEEP STRAIGHT CLAMP


H MAX.
G ± .015
D MAX.
.015/0,38 ± .005
E ± .015
CABLE ENTRY IN SHELL
.136/3,45 ± .005 DIA. 2 MTG. HOLES
F ± .015
B +.030 −.015
C ± .010
CABLE ENTRY IN SHELL
A ± .015



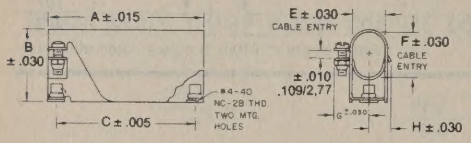
Material: Low carbon steel
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

Part Number by Shell Size

Cannon	Mil. Spec.	A	B	C	D	E	F	G	H
DD 24657	M24308/20-1	1.203(30,6)	.484(12,3)	.984(25,0)	.578(14,7)	.375(9,5)	.375(9,5)	.750(19,0)	1.250(31,7)
DA 24658	M24308/20-2	1.531(38,9)	.484(12,3)	1.312(33,3)	.578(14,7)	.713(18,1)	.312(7,9)	.750(19,0)	1.250(31,7)
DB 24659	M24308/20-3	2.078(52,8)	.484(12,3)	1,852(47,0)	.578(14,7)	1.000(25,4)	.312(7,9)	1.000(25,4)	1.563(39,7)
DC 24660	M24308/20-4	2.718(69,0)	.484(12,3)	2.500(63,5)	.578(14,7)	1.375(34,9)	.312(7,9)	1.000(25,4)	1.563(39,7)
DD 24661	M24308/20-5	2.625(66,7)	.593(15,1)	2.406(61,1)	.687(17,4)	1.406(35,7)	.406(10,3)	1.125(28,6)	1.688(42,9)

RIGHT ANGLE

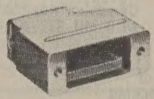
Material: Low carbon steel
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.


A ± .015
B ± .030
#4-40 NC-2B THD. TWO MTG. HOLES
C ± .005
E ± .030
CABLE ENTRY
F ± .030
CABLE ENTRY
± .010
.109/2,77
G ± .030
H ± .030

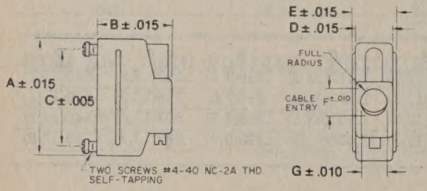
Part Number by Shell Size

Cannon	Mil. Spec.	A	B	C	E	F	G	H
DE 19977-5	M24308/19-1	1.203(30,6)	.718(18,2)	.984(25,0)	.437(11,1)	.437(11,1)	.468(11,9)	.281(7,1)
DA 19977-1	M24308/19-2	1.531(38,9)	.718(18,2)	1.312(33,3)	.437(11,1)	.437(11,1)	.468(11,9)	.281(7,1)
DB 19977-2	M24308/19-3	2.078(52,8)	.968(24,6)	1.852(47,0)	.437(11,1)	.625(15,9)	.468(11,9)	.281(7,1)
DC 19977-3	M24308/19-4	2.718(69,0)	1.187(30,1)	2.500(63,5)	.437(11,1)	.812(20,6)	.468(11,9)	.281(7,1)
DD 19977-4	M24308/19-5	2.625(66,7)	1.250(31,7)	2.406(61,1)	.562(14,3)	.906(23,1)	.531(13,5)	.343(8,7)

PLASTIC STRAIGHT



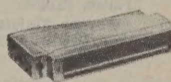
Material: Nylon.
Finish: None.
Corrosion Resistance: Hardware passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.


B ± .015
A ± .015
C ± .005
TWO SCREWS #4-40 NC-2A THD SELF-TAPPING
E ± .015
D ± .015
FULL RADIUS
CABLE ENTRY
F ± .010
G ± .010

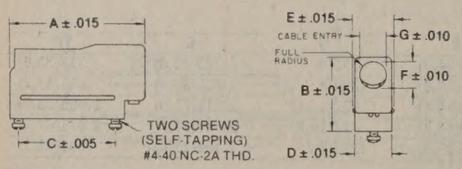
Part Number by Shell Size

Cannon	A	B	C	D	E	F	G
DE 51218-1	1.218(30,9)	1.000(25,4)	.984(25,0)	.500(12,7)	.562(14,3)	.281(7,1)	.281(7,1)
DA 51210-1	1.546(39,3)	1.000(25,4)	1.312(33,3)	.500(12,7)	.562(14,3)	.360(9,1)	.360(9,1)
DB 51212-1	2.093(53,2)	1.250(31,7)	1.852(47,0)	.500(12,1)	.562(14,3)	.493(12,5)	.360(9,1)
DC 51214-1	2.734(69,4)	1.500(38,1)	2.500(63,5)	.500(12,7)	.562(14,3)	.694(17,6)	.360(9,1)
DD 51216-1	2.640(67,1)	1.500(38,1)	2.406(61,1)	.609(15,5)	.671(17,0)	.734(18,6)	.468(11,9)

PLASTIC RIGHT ANGLE



Material: Nylon.
Finish: None.
Corrosion Resistance: Hardware passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

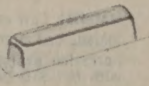

A ± .015
TWO SCREWS (SELF-TAPPING) #4-40 NC-2A THD.
C ± .005
E ± .015
CABLE ENTRY
FULL RADIUS
G ± .010
F ± .010
B ± .015
D ± .015

Part Number by Shell Size

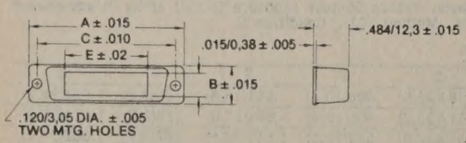
Cannon	A	B	C	D	E	F	G
DA 51211-1	1.822(46,3)	1.000(25,4)	1.312(33,3)	.500(12,7)	.562(14,3)	.360(9,1)	.360(9,1)
DB 51213-1	2.368(60,1)	1.250(31,7)	1.852(47,0)	.500(12,7)	.562(14,3)	.493(12,5)	.360(9,1)
DC 51215-1	3.009(76,4)	1.500(38,1)	2.500(63,5)	.500(12,7)	.562(14,3)	.694(17,6)	.360(9,1)
DD 51217-1	2.915(74,0)	1.500(38,1)	2.406/61,1)	.609(15,5)	.671(17,0)	.734(18,6)	.468(11,9)

POTTING SHELLS

LESS GRIPS



Material: Low carbon steel
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 50-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.


A ± .015
C ± .010
E ± .02
.015/0,38 ± .005
.484/12,3 ± .015
B ± .015
.120/3,05 DIA. ± .005 TWO MTG. HOLES

Part Number by Shell Size

Cannon	A	B	C	D	E
DA 19678-10	1.531(38,887)	.500(12,700)	1.312(33,324)	.300(7,620)	.588(14,935)
DB 19678-11	2.078(52,781)	.500(12,700)	1.852(47,040)	.300(7,620)	1.125(28,575)
DC 19678-12	2.718(69,037)	.500(12,700)	2.500(63,500)	.300(7,620)	1.750(44,450)
DD 19678-13	2.625(66,675)	.609(15,468)	2.406(61,112)	.390(9,906)	1.750(44,450)

(millimeters are in parentheses)

Dimensions subject to change.

ITT CANNON ELECTRIC

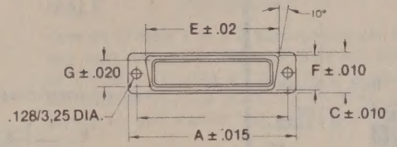
D SUBMINIATURE RECTANGULAR CONNECTORS

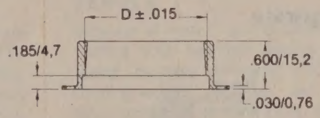
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES (Cont'd)

POTTING SHELLS CONT'D

NYLON POTTING SHELLS


E ± .02
10°
G ± .020
F ± .010
.128/3,25 DIA.
C ± .010
A ± .015


D ± .015
.185/4,7
.600/15,2
.030/0,76

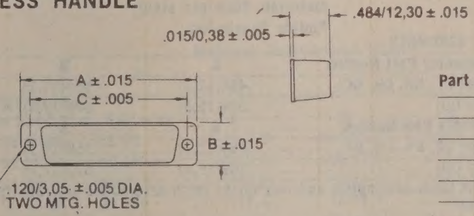
Note: Nylon potting shells are molded with a thin flange .030(0,76) to permit the use of D Subminiature locking devices.

Part Number by Shell Size

Cannon	A	B	C	D	E	F	G
DE 50904-1	1.208(30,683)	.984(24,993)	.495(12,573)	.641(16,281)	.769(19,532)	.430(10,992)	.345(8,763)
DA 50905-1	1.536(39,014)	1.312(33,324)	.495(12,573)	.973(24,714)	1.104(28,041)	.430(10,992)	.345(8,763)
DB 50906-1	2.083(52,908)	1.852(47,040)	.495(12,573)	1.516(38,506)	1.639(41,630)	.430(10,992)	.345(8,763)
DC 50907-1	2.723(69,164)	2.500(63,500)	.495(12,573)	2.154(54,711)	2.289(58,140)	.430(10,992)	.345(8,763)
DD 50908-1	2.630(66,802)	2.406(61,112)	.606(15,392)	1.938(49,225)	2.189(55,600)	.545(13,843)	.445(11,303)

SWITCHING SHELLS

LESS HANDLE


.484/12,30 ± .015
.015/0,38 ± .005
A ± .015
C ± .005
B ± .015
.120/3,05 ± .005 DIA.
TWO MTG. HOLES

Material: Low carbon steel.

Finish: Cadmium plate, yellow chromate.

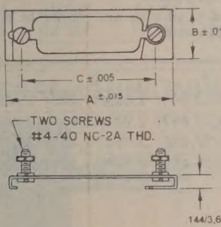
Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

Part Number by Shell Size

Cannon	A	B	C
DA 19678-6	1.531(38,887)	.500(12,700)	1.312(33,324)
DB 19678-7	2.078(52,781)	.500(12,700)	1.852(47,040)
DC 19678-8	2.718(69,037)	.500(12,700)	2.500(63,500)
DD 19678-9	2.625(66,675)	.609(15,468)	2.406(61,112)

SLIDING LOCK ASSEMBLIES

SLIDING LOCK RETAINER

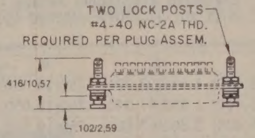

B ± .015
C ± .005
A ± .015
TWO SCREWS
#4-40 NC-2A THD.
144/3,66 ± .015

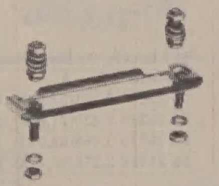
Material: Retainer plate — stainless steel; hardware — cold rolled steel.

Finish: Retainer plate — passivated hardware — Cadmium plate, yellow chromate.

Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A. Method 101A, Condition B.

SLIDING LOCK POST


TWO LOCK POSTS
#4-40 NC-2A THD.
REQUIRED PER PLUG ASSEM.
416/10,57
.102/2,59

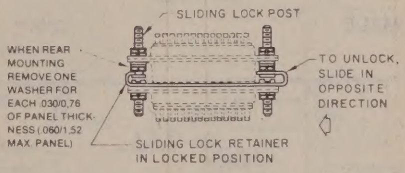


SLIDING LOCK POST

	Part Number
Steel	**D53018**
Non-Magnetic	**D53018-5**

NOTE: Two sliding lock post assemblies are required per connector.

LOCKED POSITION


SLIDING LOCK POST
WHEN REAR MOUNTING REMOVE ONE WASHER FOR EACH .030/0,76 OF PANEL THICKNESS (.060/1,52 MAX. PANEL)
TO UNLOCK, SLIDE IN OPPOSITE DIRECTION
SLIDING LOCK RETAINER IN LOCKED POSITION

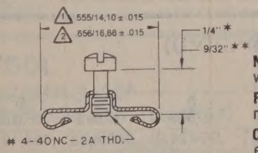
SLIDING LOCK RETAINER
Part Number by Shell Size

Cannon	A	B	C
DE 51224-1	1.392(35,36)	.500(12,70)	.984(25,00)
DA 51220-1	1.720(43,70)	.500(12,70)	1.312(33,32)
DB 51221-1	2.260(57,40)	.500(12,70)	1.852(47,07)
DC 51222-1	2.908(73,86)	.500(12,70)	2.500(63,50)
DD 51223-1	2.814(71,47)	.609(15,47)	2.406(61,10)

SCREW LOCK ASSEMBLIES

NOTE: Two screw lock assemblies are required per connector.

MALE


1 555/14,10 ± .015
2 656/16,66 ± .015
1/4" *
9/32" **
# 4-40NC-2A THD.

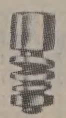
Material: Clip — sheet steel; hardware — cold rolled steel.

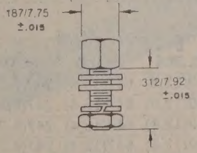
Finish: Cadmium plate, yellow chromate.

Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

⚠1 FOR SHELL SIZES DE, DA, DB
⚠2 FOR SHELL SIZE DD

FEMALE




187/7,75 ±.015
312/7,92 ±.015

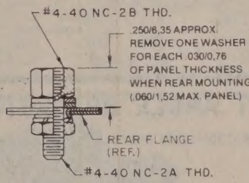
Material: Cold rolled steel.

Finish: Cadmium plate, yellow chromate.

Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

NOTE: An 8 inch/pound (female) and 4 inch/pound (male) maximum torque during assembly is recommended on steel screw lock assemblies.

MOUNTED POSITION


#4-40 NC-2B THD.
.250/6,35 APPROX. REMOVE ONE WASHER FOR EACH .030/0,76 OF PANEL THICKNESS WHEN REAR MOUNTING (.060/1,52 MAX. PANEL)
REAR FLANGE (REF.)
#4-40 NC-2A THD.

Part Number by Shell Size

Cannon	Mil. Spec.	Type	Usage
***D20419**		Male	DA, DE pin or socket; DB, DC socket
****D20419-16**		Male	DA, DE pin or socket; DB, DC socket both with junction shell
***D20419-18**	M24308/25-1,2,3,4	Male	DB, DC pin
****D20419-21**		Male	DB, DC pin with junction shell
***D20420**		Male	DD socket
****D20420-12**		Male	DD socket with junction shell
***D20420-13**	M24308/25-5	Male	DD pin
****D20420-15**		Male	DD pin with junction shell
D20418-2	M24308/26-1	Female	DE, DA, DB, DC, DD pin or socket with or without junction shell

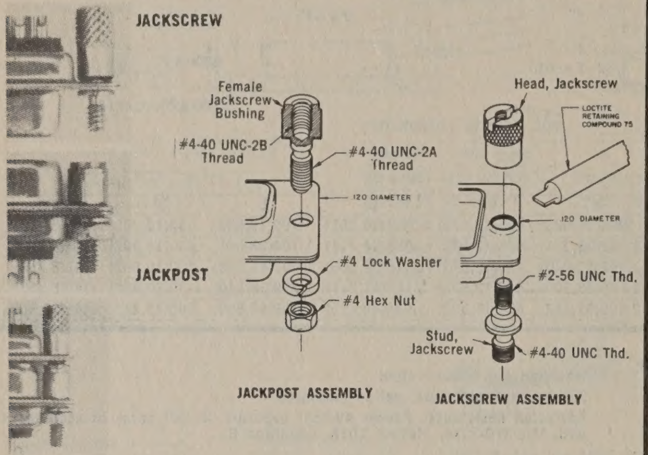
Dimensions subject to change.

(millimeters are in parentheses)

ACCESSORIES (Cont'd)

JACKSCREW ASSEMBLY

(not recommended for use with metal junction shells)


JACKSCREW
JACKPOST
Female Jackscrew Bushing
#4-40 UNC-2B Thread
#4-40 UNC-2A Thread
.120 DIAMETER
#4 Lock Washer
#4 Hex Nut
Head, Jackscrew
LOCTITE RETAINING COMPOUND 75
.120 DIAMETER
#2-56 UNC Thd.
Stud, Jackscrew
#4-40 UNC Thd.

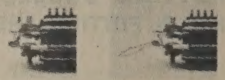
JACKPOST ASSEMBLY

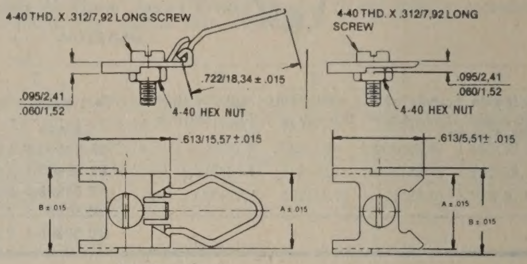
JACKSCREW ASSEMBLY

	Part Number	Material	Finish
Jackscrew	D110550*	Stainless steel	None
Jackpost	D110551*	Stainless steel	Passivate

*Part number consists of two assemblies each as required per connector. Fits all standard D Series with .120 diameter mounting holes.
5½ inch/pounds maximum torque during assembly is recommended.

D SPRING LATCH ASSEMBLY




4-40 THD. X .312/7,92 LONG SCREW
.722/18,34 ± .015
.095/2,41
.060/1,52
4-40 HEX NUT
4-40 THD. X .312/7,92 LONG SCREW
.095/2,41
.060/1,52
4-40 HEX NUT
.613/15,57 ±.015
B ± .015
A ± .015
.613/5,51± .015
A ± .015
B ± .015

Spring Latch Assembly

Material: Stainless steel.
Finish: Passivated.

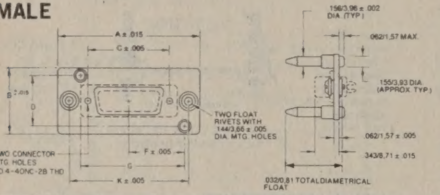
END DISC LATCH ASSEMBLY

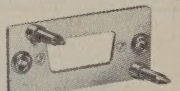
End Disc Latch Assembly Part Number	A	B
D110278 (Sizes DE, DA, DB, DC)	.484(12,3)	.556(14,1)
D110280 (Size DD)	.609(15,5)	.673(17,1)
Spring Latch Assembly Part Number	**A**	**B**
D110277 (Sizes DE, DA, DB, DC)	.484(12,3)	.556(14,1)
D110279 (Size DD)	.609(15,5)	.673(17,1)

NOTE: Two end disk latch assemblies and two spring latch assemblies are required per mated connector.

GUIDE PIN PLATES

MALE


A ± .015
C ± .005
B ± .015
D
TWO FLOAT RIVETS WITH 144/3,66 ± .005 DIA. MTG. HOLES
TWO CONNECTOR MTG. HOLES NO 4-40NC-2B THD
F ± .005
G
K ± .005
156/3,96 ± .002 DIA. (TYP)
.062/1,57 MAX.
155/3,93 DIA. (APPROX. TYP.)
.062/1,57 ± .005
343/8,71 ± .015
032/0,81 TOTAL DIAMETRICAL FLOAT

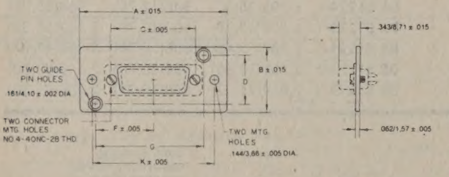


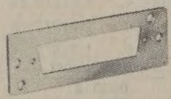
Material: Plates and float hardware are cold rolled steel; guidepins are stainless steel.
Plate Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

Part Number by Shell Size

Cannon	A	B	C	D	F	G	K
DA 22213	2.281(57,937)	1.000(25,400)	1.312(33,324)	.750(19,050)	.898(22,809)	1.663(47,240)	1.906(48,412)
DB 22255	2.820(71,628)	1.000(25,400)	1.852(47,040)	.750(19,050)	1.168(29,667)	2.203(55,956)	2.446(62,128)
DC 22070	3.468(88,087)	1.000(25,400)	2.500(63,500)	.750(19,050)	1.492(37,896)	2.851(72,415)	3.094(78,587)
DD 21962	3.375(85,725)	1.125(28,575)	2.406(61,112)	.874(22,1996)	1.437(36,499)	2.749(69,824)	3.000(76,200)

FEMALE


A ± .015
C ± .005
B ± .015
D
TWO GUIDE PIN HOLES
161/4,10 ± .002 DIA
TWO CONNECTOR MTG. HOLES NO 4-40NC-2B THD
F ± .005
G
K ± .005
TWO MTG. HOLES 144/3,66 ± .005 DIA.
343/8,71 ± .015
.062/1,57 ± .005



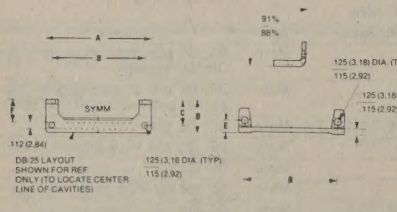
Material: Cold rolled steel.
Plate Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48-hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

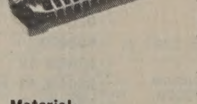
Part Number by Shell Size

Cannon	A	B	C	D	F	G	K
DA 22214	2.281(57,937)	1.000(25,400)	1.312(33,324)	.750(19,050)	.898(22,809)	1.663(47,240)	1.906(48,412)
DB 22254	2.820(71,628)	1.000(25,400)	1.852(47,040)	.750(19,050)	1.168(29,667)	2.203(55,956)	2.446(62,128)
DC 22071	3.468(88,087)	1.000(25,400)	2.500(63,500)	.750(19,050)	1.492(37,896)	2.851(72,415)	3.094(78,587)
DD 21961	3.375(85,725)	1.125(28,575)	2.406(61,112)	.874(22,1996)	1.437(36,499)	2.749(69,824)	3.000(76,200)

RIGHT ANGLE BRACKETS (used with 90° printed circuit connector D*M, D*, D*C/D*U)

NOTE: For applicable contact extension see pages 80 and 90.


A
B
91%
88%
125 (3.18) DIA. (TYP)
115 (2.92)
125 (3.18) DIA
115 (2.92) (TYP.)
SYMM
F
C
D
E
112 (2.84)
DB-25 LAYOUT SHOWN FOR REF ONLY (TO LOCATE CENTER LINE OF CAVITIES)
125 (3.18 DIA. (TYP)
115 (2.92)
B



Material:
Nylon 6/6 heat stabilized 30% glass fiber, UL-SE-0.
Color: Natural.

D*/D*M

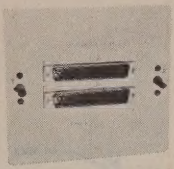
Shell Size	Part Number	A ±.015	B ±.005	C ±.005	D ±.010	E ±.010	F ±.010
DE	015-0338-000	1.224(31,1)	.984(24,0)	.340(8,63)	.484(12,3)	.247(6,27)	.283(7,2)
DA	015-0339-000	1.552(39,4)	1.312(33,3)	.340(8,63)	.484(12,3)	.247(6,27)	.283(7,2)
DB	015-0340-000	2.092(53,1)	1.852(47,0)	.340(8,63)	.484(12,3)	.247(6,27)	.283(7,2)
DC	015-0341-000	2.740(69,0)	2.500(63,5)	.340(8,63)	.484(12,3)	.247(6,27)	.283(7,2)
DD	015-0342-000	2.646(67,2)	2.406(61,1)	.395(10,0)	.594(15,1)	.302(7,67)	.283(7,2)

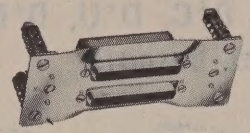
D*C/D*U

Shell Size	Part Number	A ±.015	B ±.005	C ±.005	D ±.010	E ±.010	F ±.010
DE	015-0348-000	1.224(31,1)	.984(24,0)	.502(12,8)	.647(16,4)	.247(6,27)	.445(11,3)
DA	015-0349-000	1.552(39,4)	1.312(33,3)	.502(12,8)	.647(16,4)	.247(6,27)	.445(11,3)
DB	015-0350-000	2.092(53,1)	1.852(47,0)	.502(12,8)	.647(16,4)	.247(6,27)	.445(11,3)
DC	015-0351-000	2.740(69,0)	2.500(63,5)	.502(12,8)	.647(16,4)	.247(6,27)	.445(11,3)
DD	015-0352-000	2.646(67,2)	2.406(61,1)	.558(14,2)	.756(19,2)	.302(7,67)	.445(11,3)

ACCESSORIES (Cont'd)

MODULAR PLATES





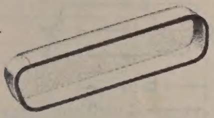
MALE

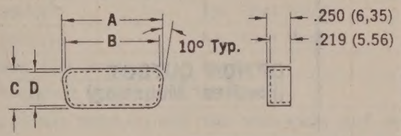
Consists of from 1 to 3 D Subminiature pin connectors float mounted to retaining plate and protected by connector housing at front face of assembly. Available in 36 fixed polarizing positions. Consult factory for part number and additional information.

FEMALE

Consists of from 1 to 3 D Subminiature socket connectors with terminal sealing kits assembled to spring mounted retaining plate. Available in 36 fixed polarizing positions, and a 32- or 48-pound total spring force. Consult factory for part number and additional information.

DUST CAPS

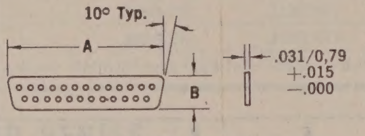




Material: Polyethylene (red).

Part Number by Shell Size	Use with	A	B	C	D
DE 59-20	**DE 9S**	.694(17,6)	.627(15,9)	.362(9,2)	.295(7,5)
DE 60-20	**DE 9P**	.749(19,0)	.682(17,3)	.412(10,5)	.345(8,8)
DA 59-20	**DA 15S**	1.022(26,0)	.955(24,3)	.362(9,2)	.295(7,5)
DA 60-20	**DA 15P**	1.077(27,4)	1.010(25,7)	.412(10,5)	.345(8,8)
DB 59-20	**DB 25S**	1.562(39,7)	1.495(38,0)	.362(9,2)	.295(7,5)
DB 60-20	**DB 25P**	1.635(41,5)	1.568(39,8)	.430(10,9)	.363(9,2)
DC 59-20	**DC 37S**	2.210(56,1)	2.143(54,4)	.362(9,2)	.295(7,5)
DC 60-20	**DC 37P**	2.283(57,9)	2.216(56,3)	.430(10,9)	.363(9,2)
DD 59-20	**DD 50S**	2.116(53,7)	2.049(52,0)	.474(12,0)	.407(10,3)
DD 60-20	**DD 50P**	2.179(55,3)	2.112(53,6)	.536(13,6)	.469(11,9)

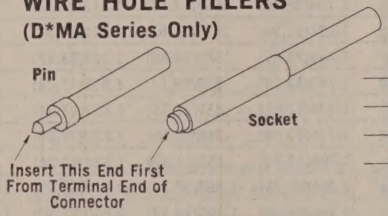
SEALING GASKETS



Material: Silastic sheet

Part Number by Shell Size	A	B
DE 53750	.656(16,7)	.328(8,3)
DA 53750-1	.984(25,0)	.328(8,3)
DB 53750-2	1.531(38,9)	.328(8,3)
DC 53750-3	2.171(55,1)	.328(8,3)
DD 53750-4	2.078(52,8)	.437(11,1)

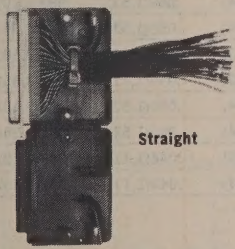
WIRE HOLE FILLERS
(D*MA Series Only)



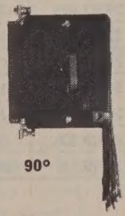
Material: Nylon.

Part Number	Insert Type
DMA 51236-1	Socket
DMA 51235-1	Pin

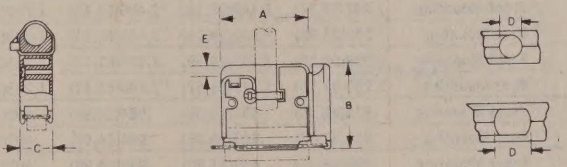
UNIVERSAL JUNCTION SHELL



Straight



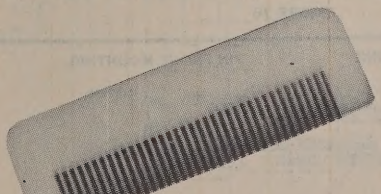
90°



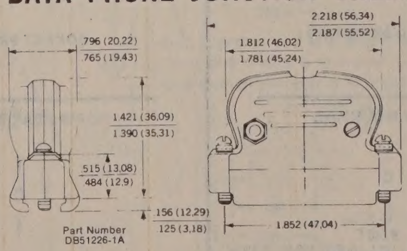
Material: Junction shell — polypropylene; hardware — steel; ty-rap — nylon.
Finish: Hardware — cadmium plate, yellow chromate.
Color: Black (junction shell).

Part Number by Shell Size	A ±.015(±,381)	B ±.020(±,508)	C ±.020(±,508)	D ±.020(±,508)	E ±.010(±,254)
DE 110963-1	.765(19,431)	1.400(35,560)	.600(15,240)	.250(6,350)	.125(3,175)
DA 110963-2	1.097(27,863)	1.569(39,852)	.600(15,240)	.375(9,525)	.161(4,089)
DB 110963-3	1.641(41,681)	1.651(41,935)	.600(15,240)	.410(10,414)	.205(5,207)
DC 110963-4	2.279(57,886)	1.899(48,234)	.600(15,240)	.593(15,062)	.250(6,350)
DD 110963-5	2.063(52,400)	1.925(48,895)	.710(18,034)	.670(17,018)	.285(7,239)

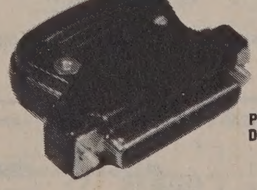
ALIGNMENT TOOL
(For D*C/D*U BURGUN-D 90° Connectors with Machined Contacts Only)



DATA PHONE JUNCTION SHELL



Part Number
DB51226-1A



**Part Number
DB 51226-1A**

**Max. Cable Entry
.312 (7,92)**

Material: Junction shell — melamine; hardware — steel.
Finish: Hardware — cadmium plate, clear chromate.
Color: Black (junction shell).

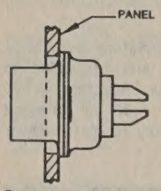
ITT CANNON ELECTRIC

D SUBMINIATURE RECTANGULAR CONNECTORS

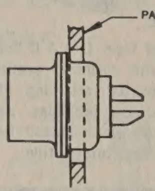
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

D*, D*C, D*U, D*M, D*MA

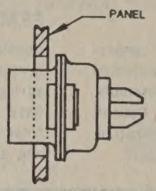
PANEL CUTOUTS



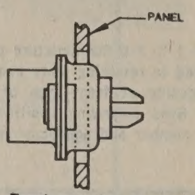
Rear mounting of standard shell



Front mounting of standard shell

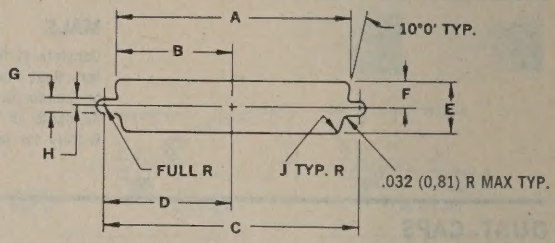


Rear mounting of float mount shell (F code)

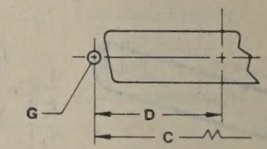


Front mounting of reverse float mount shell (R code)

STANDARD CUTOUT



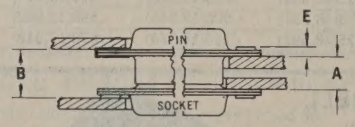
OPTION CUTOUT (For Rear Mounting)



Connector Size	Mounting Method	A ±.005(0,13)	B ±.005(0,13)	C ±.005(0,13)	D ±.005(0,13)	E ±.005(0,13)	F ±.005(0,13)	G ±.002(0,05)	H ±.002(0,05)	J ±.002(0,05)
A Standard	Front Mounting	1.202(30,53)	.601(15,26)	1.312(33,32)	.656(16,66)	.513(13,03)	.257(6,52)	.120(3,04)	.060(1,52)	.083(2,10)
	Rear Mounting	1.134(28,80)	.567(14,40)	1.312(33,32)	.656(16,66)	.449(11,40)	.225(5,71)	.120(3,04)	.060(1,52)	.132(3,35)
A Float	Front Mounting	1.234(31,34)	.617(15,67)	1.312(33,32)	.656(16,66)	.545(13,84)	.273(6,93)	.088(2,23)	.044(1,11)	.083(2,10)
	Rear Mounting	1.166(29,61)	.583(14,80)	1.312(33,32)	.656(16,66)	.481(12,21)	.241(6,12)	.088(2,23)	.044(1,11)	.132(3,35)
B Standard	Front Mounting	1.743(44,27)	.872(22,14)	1.852(47,04)	.926(23,52)	.513(13,03)	.257(6,52)	.120(3,04)	.060(1,52)	.083(2,10)
	Rear Mounting	1.674(42,51)	.837(21,25)	1.852(47,04)	.926(23,52)	.449(11,40)	.225(5,71)	.120(3,04)	.060(1,52)	.132(3,35)
B Float	Front Mounting	1.775(45,08)	.888(22,55)	1.852(47,04)	.926(23,52)	.545(13,84)	.273(6,93)	.088(2,23)	.044(1,11)	.083(2,10)
	Rear Mounting	1.706(43,33)	.853(21,66)	1.852(47,04)	.926(23,52)	.481(12,21)	.241(6,12)	.088(2,23)	.044(1,11)	.132(3,35)
C Standard	Front Mounting	2.391(60,73)	1.196(30,37)	2.500(63,50)	1.250(31,75)	.513(13,03)	.257(6,52)	.120(3,04)	.060(1,52)	.083(2,10)
	Rear Mounting	2.326(59,08)	1.163(29,54)	2.500(63,50)	1.250(31,75)	.449(11,40)	.225(5,71)	.120(3,04)	.060(1,52)	.132(3,35)
C Float	Front Mounting	2.423(61,54)	1.212(30,78)	2.500(63,50)	1.250(31,75)	.545(13,84)	.273(6,93)	.088(2,23)	.044(1,11)	.083(2,10)
	Rear Mounting	2.354(59,79)	1.177(29,89)	2.500(63,50)	1.250(31,75)	.481(12,21)	.241(6,12)	.088(2,23)	.044(1,11)	.132(3,35)
D Standard	Front Mounting	2.297(58,34)	1.149(29,18)	2.406(61,11)	1.203(30,55)	.623(15,82)	.312(7,92)	.120(3,04)	.060(1,52)	.083(2,10)
	Rear Mounting	2.218(56,33)	1.109(28,16)	2.406(61,11)	1.203(30,55)	.555(14,09)	.278(7,06)	.120(3,04)	.060(1,52)	.132(3,35)
D Float	Front Mounting	2.239(59,15)	1.165(29,59)	2.406(61,11)	1.203(30,55)	.655(16,63)	.328(8,33)	.088(2,23)	.044(1,11)	.083(2,10)
	Rear Mounting	2.250(57,15)	1.125(28,57)	2.406(61,11)	1.203(30,55)	.587(14,90)	.294(7,46)	.088(2,23)	.044(1,11)	.132(3,35)
E Standard	Front Mounting	.874(22,19)	.437(11,09)	.984(24,99)	.492(12,49)	.513(13,03)	.257(6,52)	.120(3,04)	.060(1,52)	.083(2,10)
	Rear Mounting	.806(20,47)	.403(10,23)	.984(24,99)	.492(12,49)	.449(11,40)	.225(5,71)	.120(3,04)	.060(1,52)	.132(3,35)
E Float	Front Mounting	.906(23,01)	.453(11,50)	.984(24,99)	.492(12,49)	.545(13,84)	.273(6.93)	.088(2,23)	.044(1,11)	.083(2,10)
	Rear Mounting	.838(21,28)	.419(10,64)	.984(24,99)	.492(12,49)	.481(12,21)	.241(6,12)	.088(2,23)	.044(1,11)	.132(3,35)

PANEL MOUNTING

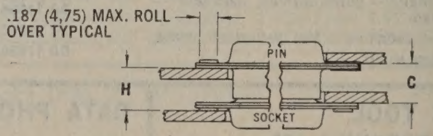
PIN FRONT MOUNTING **PIN REAR MOUNTING**



SOCKET FRONT MOUNTING **SOCKET REAR MOUNTING**

FIGURE 1A

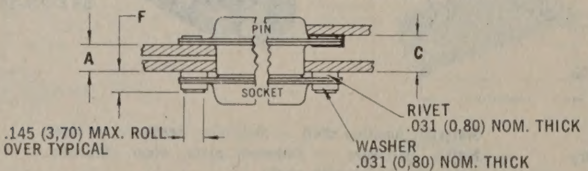
PIN REAR MOUNTING **PIN FRONT MOUNTING**



SOCKET FRONT MOUNTING **SOCKET REAR MOUNTING**

FIGURE 1B

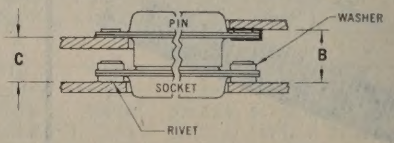
PIN REAR MOUNTING **PIN FRONT MOUNTING**



SOCKET FLOAT MOUNTING **SOCKET FLOAT MOUNTING**

FIGURE 2

PIN REAR MOUNTING **PIN FRONT MOUNTING**



SOCKET REVERSE FLOAT MOUNTING **SOCKET REVERSE FLOAT MOUNTING**

FIGURE 3

(millimeters are in parentheses)

Dimensions subject to change.

D SUBMINIATURE RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

D*, D*C, D*U, D*M, D*MA

PANEL MOUNTING CONT'D

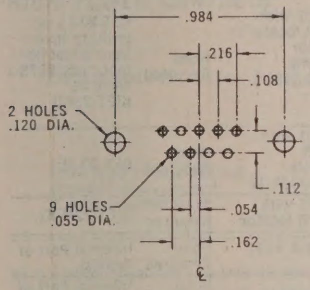
NOTE: A, B, C, and H are dimensions between panels and represent the recommended limit to be used in the design of the connector mounting method.

	Combination of Mated Connectors			A	B	C	F	H
Fig. No.	Size	Pin (See Note below)	Socket	+.030(+0,76) −.000(−0)	+.030(+0,76) −.000(−0)	+.030(+0,76) −.000(−0)	±.010(±0,25)	+.030(+0,76) −.000(−0)
1	A, E	Standard	Standard	.250(6,35)	.340(8,63)	.295(7,49)	—	.295(7,49)
1	B, C, D	Standard	Standard	.238(6,04)	.343(8,71)	.298(7,56)	—	.283(7,18)
2	A, E	Standard	Float Mount	.218(5,53)	—	.263(6,68)	.120(3,04)	—
2	B, C, D	Standard	Float Mount	.206(5,23)	—	.266(6,75)	.120(3,04)	—
2	A, E	Float Mount	Standard	.218(5,53)	—	.263(6,68)	.120(3,04)	—
2	B, C, D	Float Mount	Standard	.206(5,23)	—	.251(6,37)	.130(3,30)	—
3	A, E	Standard	Rev. Float Mount	—	.358(9,09)	.313(7,95)	.120(3,04)	—
3	B, C, D	Standard	Rev. Float Mount	—	.361(9,16)	.301(7,64)	.120(3,04)	—
3	A, E	Rev. Float Mount	Standard	—	.358(9,09)	.313(7,95)	.120(3,04)	—
3	B, C, D	Rev. Float Mount	Standard	—	.355(9,01)	.310(7,87)	.130(3,30)	—

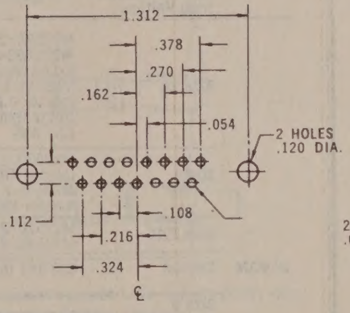
NOTE: Standard pin assemblies contain .015(3,81) inch thick front shells on E and A sizes; .024(6,09) inch thick front shells on B, C, and D sizes.

D*, D*C, D*U, D*M PRINTED CIRCUIT BOARD SERIES

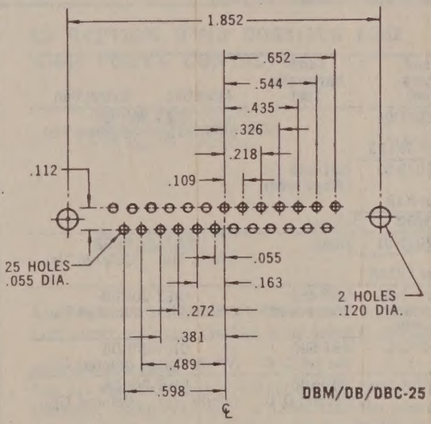
BOARD CUTOUTS


.984
.216
.108
2 HOLES
.120 DIA.
.112
9 HOLES
.055 DIA.
.054
.162
℄

DEM/DE/DEC-9

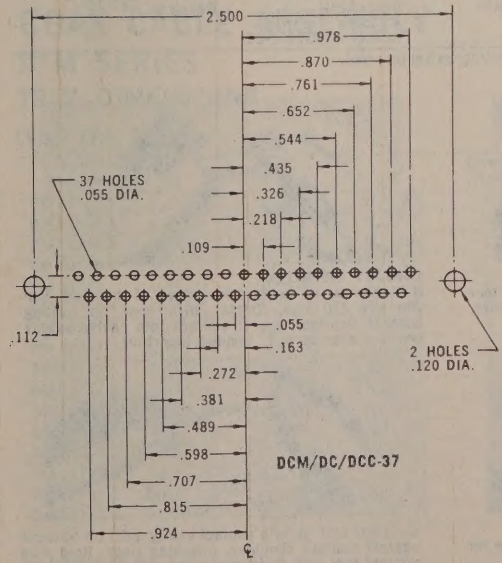

1.312
.378
.270
.162
.054
2 HOLES
.120 DIA.
.112
.108
.216
.324
℄

DAM/DA/DAC-15

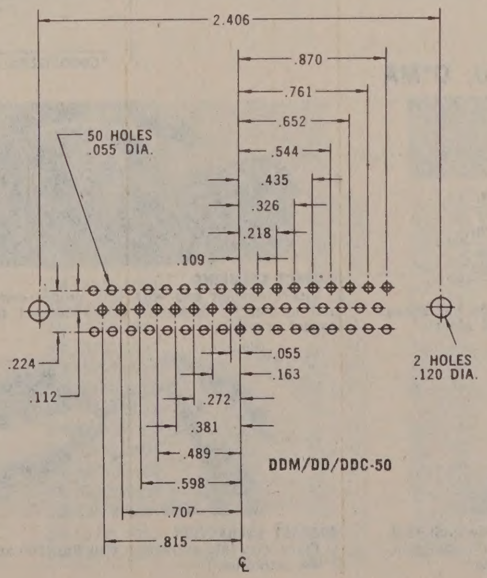

1.852
.652
.544
.435
.326
.218
.112
.109
25 HOLES
.055 DIA.
.055
.163
.272
.381
.489
.598
2 HOLES
.120 DIA.
℄

DBM/DB/DBC-25

Conversion Chart — Inches to Millimeters	
Inches	mm
.054	1,37
.055	1,40
.108	2,74
.109	2,77
.112	2,84
.120	3,05
.162	4,11
.163	4,14
.216	5,49
.218	5,54
.224	5,69
.270	6,86
.272	6,91
.324	8,23
.326	8,28
.378	9,60
.381	9,68
.435	11,05
.489	12,42
.544	13,82
.598	15,19
.652	16,56
.707	17,96
.761	19,33
.816	20,73
.870	22,10
.924	23,47
.978	24,84
.984	24,99
1.312	33,32
1.852	47,04
2.406	61,11
2.500	63,50


2.500
.976
.870
.761
.652
.544
.435
37 HOLES
.055 DIA.
.326
.218
.109
.112
.055
.163
.272
.381
.489
.598
.707
.815
.924
2 HOLES
.120 DIA.
℄

DCM/DC/DCC-37


2.406
.870
.761
.652
50 HOLES
.055 DIA.
.544
.435
.326
.218
.109
.224
.112
.055
.163
.272
.381
.489
.598
.707
.815
2 HOLES
.120 DIA.
℄

DDM/DD/DDC-50

Dia. P/C Tail	Recommended P/C Board Hole Dia.
.028(0,71)	.045(1,14)
.030(0,76)	.045(1,14)
.040(1,02)	.055(1,40)

Dimensions subject to change. *(millimeters are in parentheses)*

D SUBMINIATURE RECTANGULAR CONNECTORS

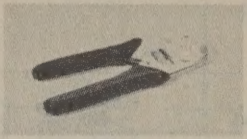
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

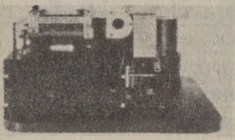
ASSEMBLY INSTRUCTIONS

CRIMP AND ASSEMBLY TOOLS D*C, D*U, D*MA

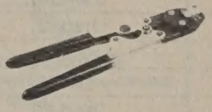
M22520/1-01

M22520/2-01


DAVO-320D


CBT-460

ABT-500


CCT-D*C-1

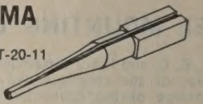
CIET-20-HDB

D*C/D*U

Contact	Wire Accom.	Hand Crimp Tool	Semi-Automatic Tool	Insertion	Extraction
20 (Machined)	24, 22, 20	M22520/1-01 with Locator TH185		CIET-20HDB (White Tip)	(Colored Tip)
		M22520/2-01 with Locator K18	CBT-460 (Vibra-feed)		
		Davo 320D			
20-18 (Machined)	1 #18 or 2 #22	M22520/1-01 with Locator TH185	None	CIET-2018HDB (White Tip)	(Colored Tip)
20-26 (Machined)	30, 28, 26	M22520/2-01 with Locator L3198/HDL	CBT-460 (Vibra-feed)	CIET-20HDB (White Tip)	(Colored Tip)
20 (Stamped)	20 thru 30	CCT—D*C-1	ABT-500 Die Set D*C	CIET-20HDB (White Tip)	Colored Tip)
20-18 (Stamped)	18, 20, 22 or 2 #22	CCT-D*C-4	ABT-500 Die Set D*C	CIET-20HDB (White Tip)	(Colored Tip)

NOTE: To extract a contact with a #18 wire the wire will have to be clipped off the contact first.

EXTRACTION D*MA



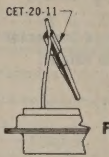


Figure 2

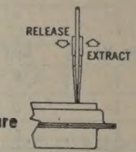


Figure 3

The CET-20-11 tool extracts size 20 pin and socket contacts from the D*MA Series.

Operating Instructions:

A. Place the tool slot over the wire (Figure 2) with the tool tip approximately ¼ inch behind the insulator. Then slide the tool back along the wire until the tool slit opens and surrounds the wire.

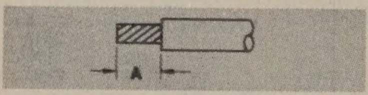
B. Slide the tool forward along the wire (Figure 3) and push the tool firmly into the insulator until it bottoms, releasing the contact. Press the wire against the tool and remove wire, tool, and contact from the connector.

D*MA

Connector	Contact	Crimp	Insertion	Extraction
D*MM	Coaxial	CCT-DM (braid only)	None Required	CET-C6B
	Size 8, 12 & 16 High Power and High Voltage	None (solder type)	None Required	CET-C6B
	Size 20	M22520/2-01 with M225202-08 locator or K-13-1 locator MS3191-1 with locator P-20-3191-1 DAVO-300D CBT-460	None Required	CET-20-11 or military insertion/extraction tool, *MS18278-1 same as CIET-20HD
	20-18	M22520/1-01 with locator TH25 MS3191-1 with locator P20-3191-17	None Required	CET 20-15
	Size 22D	M22520/2-01 with M22520/2-06 locator	None Required	CIET-22M KJ
D*MAM	Coaxial	CCT-DM (braid only)	None Required	Integral Part of Coaxial
	Size 8 High Power	None (solder type)	None Required	Integral Part of Coaxial
	Size 12 and 16 High Power and High Voltage	None (solder type)	None Required	CET-12-14
	Shielded Contacts	Inner contact: M22520/2-01 with locator M22520/2-12 Outer Shell: M22520/1-01 with locator M22520/1-02	None Required	CET-16

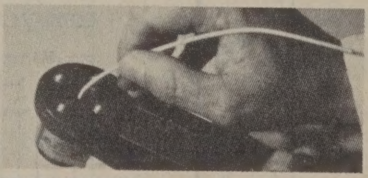
*Combination insertion/extraction tool.

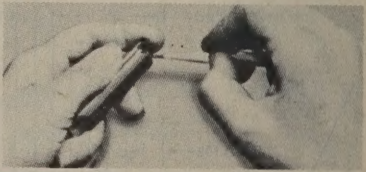
ASSEMBLY OF D*C, D*U, D*MA

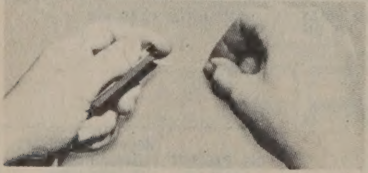


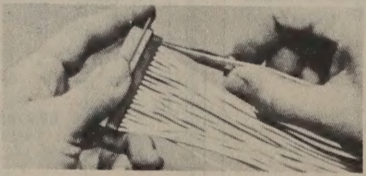
	Min.	Max.
D*C/D*U	.156 (3,96)	.187 (4,75)
D*MA	.188 (4,78)	.208 (5,28)

WIRE STRIPPING
1. Cut wires to length. Strip insulation per above illustration. Check for broken or frayed wires.


CONTACT CRIMPING
2. Insert contact and wire into proper crimp tool (and locator, if required). Crimp contact to wire. Inspect crimp.


CONTACT INSERTION
3. Center wired contact in groove of insertion tool (for size 22D also, D*MA) with tool tip butting contact shoulder. Insert contact into cavity until a positive stop is felt. Inspect insertion.


4. To be sure contact is locked securely, pull back lightly on wire. Repeat for balance of contacts, working row by row across the insulator.


CONTACT EXTRACTION
5. Place wire into extraction tool tip. (See above for D*MA extraction.)

6. Insert tool tip into contact cavity until tip bottoms against contact shoulder, releasing tines. Hold wire against tool with finger and remove tool and contact. Repeat for balance of contacts.

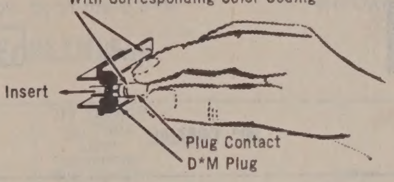
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

TOOLS (D*MA, D*C, D*U COAXIALS)

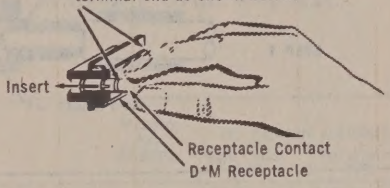
INSERTION D*M COAX, POWER, AND HV CONTACTS

No insertion tool is required. Color coded coax, power, and high voltage contacts are accepted by corresponding color coded D*M assemblies.

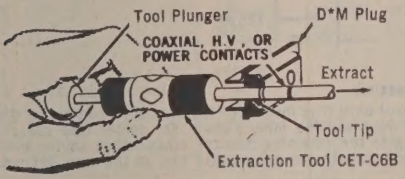
RED Color Coded Connector Accepts Contacts With Corresponding Color Coding



BLUE color coded connectors accepts contacts with corresponding color coding. Insert from terminal end as shown below.



EXTRACTION D*M COAXIAL, H.V., AND POWER CONTACTS CET-C6B
(Formerly CET-C6A)

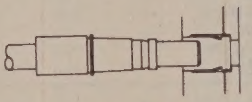


The CET-C6B tool extracts coax, power and high voltage contacts (plug and receptacle) from the D*M Series.

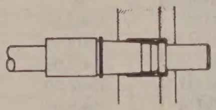
Operating Instructions:
To extract the D*M coax contact, hold the tool by the body and insert the tip into the front of the contact cavity until it booms and closes the coax retaining ring. Holding the body in this position securely enough to keep coax retaining ring closed, push the plunger; contact will be pushed out of the rear of the assembly.

INSERTION D*MA COAXIALS AND HIGH POWER CONTACTS

Contact partially inserted.



Tines snap behind contact shoulder when contact is fully inserted.

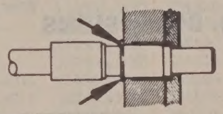


No insertion tools are required for the coaxial contact, size 8 high power contacts, and sizes 12 and 16 high power and high voltage contacts.

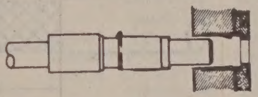
Insertion Procedure:
Push the contact into the rear of the connector. Tines will snap behind the contact shoulder when the contact is fully inserted.

EXTRACTION D*MA COAXIALS AND HIGH POWER CONTACTS

Depress flange of built-in extraction tool until flush with rear of insulator.



Contact being pulled from connector.



A separate extraction tool is not required for the coaxial contact or the size 8 high power contacts. The tool is an integral part of the contact.

Insertion Procedure:
Depress flange of built-in extraction tool until it is flush with the rear of the insulator. Contact can then be pulled from the connector. For extraction of sizes 12 and 16 high power and high voltage contacts the CET-12-16 is recommended.

COAX CABLE ASSEMBLY

D*M SERIES

TRIM DIMENSIONS

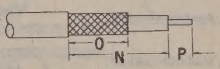
CRIMP TYPE

Part Number	N	O	P	Crimp Tool
DM 53740	5/16(7,92)	1/4(6,35)	5/64(1,98)	A
DM 53740-1	5/16(7,92)	1/4(6,35)	5/64(1,98)	B
DM 53740-3	3/8(9,52)	5/16(7,92)	5/64(1,98)	C
DM 53740-5	3/8(9,52)	5/16(7,92)	5/64(1,98)	C
DM 53741	3/8(9,52)	15/64(5,94)	1/16(1,57)	A
DM 53741-1	3/8(9,52)	15/64(5,94)	1/16(1,57)	B
DM 53741-3	27/64(10,69)	5/16(7,92)	3/32(2,39)	C
DM 53741-4	27/64(10,69)	5/16(7,92)	3/32(2,39)	C
DM 53742	5/16(7,92)	1/4(6,35)	5/64(1,98)	A
DM 53742-1	5/16(7,92)	1/4(6,35)	5/64(1,98)	B
DM 53742-3	3/8(9,52)	5/16(7,92)	5/64(1,98)	C
DM 53742-5	3/8(9,52)	5/16(7,92)	5/64(1,98)	C
DM 53743-2	3/8(9,52)	15/64(5,94)	1/16(1,57)	A
DM 53743-3	3/8(9,52)	15/64(5,94)	1/16(1,57)	B
DM 53743-5	27/64(10,69)	5/16(7,92)	3/32(2,39)	C
DM 53743-6	27/64(10,69)	5/16(7,92)	3/32(2,39)	C

All tolerances are ±.010 (0,25)

SOLDER TYPE

Part Number	N	O	P
DM 53740-5000	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53740-5001	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53740-5002	3/8(9,52)	5/16(7,92)	5/64(1,98)
DM 53740-5005	3/8(9,52)	5/16(7,92)	5/64(1,98)
DM 53740-5008	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53741-5000	3/8(9,52)	15/64(5,94)	1/16(1,57)
DM 53741-5001	3/8(9,52)	15/64(5,94)	1/16(1,57)
DM 53741-5003	27/64(10,69)	5/16(7,92)	3/32(2,39)
DM 53741-5004	27/64(10,69)	5/16(7,92)	3/32(2,39)
DM 53742-5000	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53742-5001	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53742-5002	3/8(9,52)	5/16(7,92)	5/64(1,98)
DM 53742-5004	3/8(9,52)	5/16(7,92)	5/64(1,98)
DM 53742-5006	5/16(7,92)	1/4(6,35)	5/64(1,98)
DM 53743-5000	3/8(9,52)	15/64(5,94)	1/16(1,57)
DM 53743-5001	3/8(9,52)	15/64(5,94)	1/16(1,57)
DM 53743-5003	27/64(10,69)	5/16(7,92)	3/32(2,39)
DM 53743-5004	27/64(10,69)	5/16(7,92)	3/32(2,39)

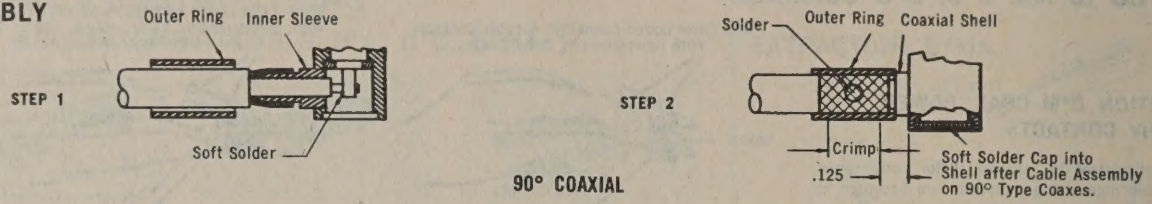


Trim coaxial cable to these dimensions for installation to D*M coaxial contacts.

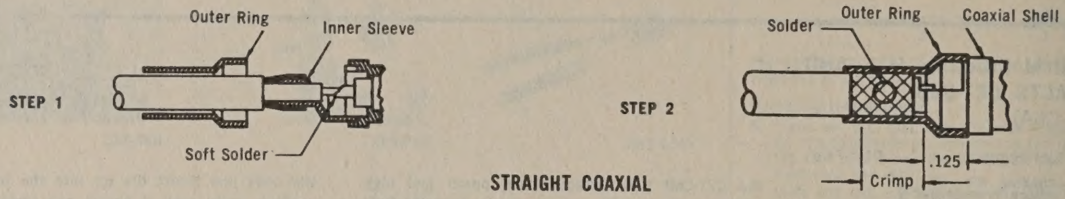
CRIMP TOOL
A. CCT-DM (small die)
B. CCT-DM (intermediate die)
C. CCT-DM (large die)

D*M SERIES (Cont'd)

ASSEMBLY


Outer Ring
Inner Sleeve
STEP 1
Soft Solder
Solder
Outer Ring
Coaxial Shell
STEP 2
Crimp
.125
Soft Solder Cap into Shell after Cable Assembly on 90° Type Coaxes.

90° COAXIAL


Outer Ring
Inner Sleeve
STEP 1
Soft Solder
Solder
Outer Ring
Coaxial Shell
STEP 2
.125
Crimp

STRAIGHT COAXIAL

STEP 1: Straight and 90° Coaxials

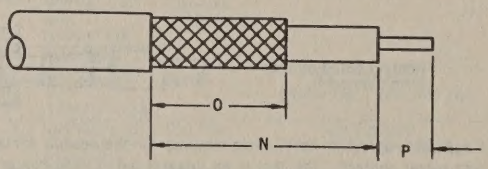
1. Slide the outer ring over the cable jacket. Trim the cable as specified in the table of Coax Cable Trim Dimensions. Insert the cable dielectric and center conductor into the inside diameter of the inner sleeve. Then solder the center conductor to the coax center contact.

STEP 2: Straight and 90° Coaxials

2. Slide the outer ring forward until it is flush with the coax shell containing the braid between the outer ring and the inner sleeve. For solder type coaxes, soft solder the outer ring to the assembly thru the cross-drilled solder hold. For crimp type coaxes, crimp with the appropriate tool in the area defined.

D*MA SERIES

TRIM DIMENSIONS



CRIMP TOOL

CCT-DM (small die)

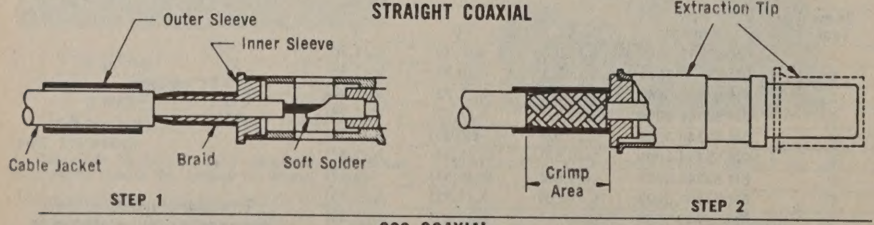
Trim coaxial cable to these dimensions for installation to D*MA coaxial contacts.

CRIMP TYPE

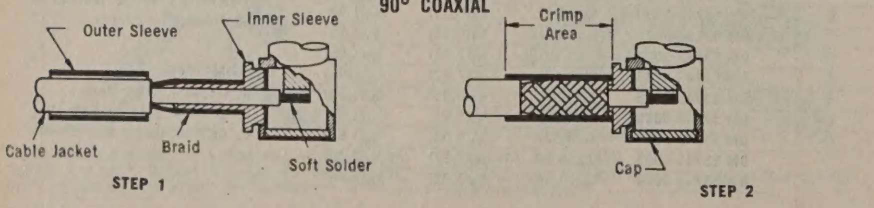
Part Number	N	O	P	Crimp Tool
DMA 43717	.354(8,99)	.190(4,83)	.090(2,29)	A
DMA 43717-1	.354(8,99)	.190(4,83)	.090(2,29)	B
DMA 43717-2	.354(8,99)	.190(4,83)	.090(2,29)	C
DMA 43717-3	.354(8,99)	.190(4,83)	.090(2,29)	C
DMA 43716	.354(8,99)	.190(4,83)	.090(2,29)	A
DMA 43716-1	.354(8,99)	.190(4,83)	.090(2,29)	B
DMA 43716-2	.354(8,99)	.190(4,83)	.090(2,29)	C
DMA 43716-3	.354(8,99)	.190(4,83)	.090(2,99)	C
DMA 43719	.316(8,03)	.190(4,83)	.062(1,57)	A
DMA 43719-1	.316(8,03)	.190(4,83)	.062(1,57)	B
DMA 43719-2	.316(8,03)	.190(4,83)	.062(1,57)	C
DMA 43719-3	.316(8,03)	.190(4,83)	.062(1,57)	C
DMA 43718	.316(8,03)	.190(4,83)	.062(1,57)	A
DMA 43718-1	.316(8,03)	.190(4,83)	.062(1,57)	B
DMA 43718-2	.316(8,03)	.190(4,83)	.062(1,57)	C
DMA 43718-3	.316(8,03)	.190(4,83)	.062(1,57)	C

ASSEMBLY

STRAIGHT COAXIAL


Outer Sleeve
Inner Sleeve
Cable Jacket
Braid
Soft Solder
STEP 1
Extraction Tip
Crimp Area
STEP 2

90° COAXIAL


Outer Sleeve
Inner Sleeve
Cable Jacket
Braid
Soft Solder
STEP 1
Crimp Area
Cap
STEP 2

STEP 1: Straight Type

Slide outer sleeve over cable jacket and trim cable. Insert cable dielectric and center conductor into inside dimension of inner sleeve. Solder center conductor to coaxial center contact.

Slide outer sleeve forward until flush with inner sleeve to confine braid. Crimp outer sleeve, using crimp tool CCT-DM. Crimp as close as possible to the inner sleeve shoulder. Push extraction tip over the coaxial (as shown) until it rests against the inner sleeve shoulder.

STEP 2: 90° Angle Type

Slide outer sleeve over cable jacket and trim cable. Insert cable dielectric and center conductor into inside dimension of inner sleeve. Solder center conductor to coaxial center contact.

Slide outer sleeve forward until flush with coaxial shell, confining braid between outer and inner sleeves. Crimp in area shown. Soft solder cap in place.

ITT CANNON ELECTRIC

SMA SERIES CONNECTORS

The SMA Series is a 50 ohm impedance, threaded coupling, high frequency (0-18 GHz) connector. ITT CANNON ELECTRIC SMA's meet all requirements of and, indicated connectors are, qualified to MIL-C-39012. The stainless steel bodies are available in gold plated or passivated finishes. Both male and female center contacts are gold plated beryllium copper. The dielectric material is TFE. Moisture sealing is provided by silicone rubber gaskets.

PERFORMANCE DATA AND SPECIAL APPLICATIONS INFORMATION AVAILABLE UPON REQUEST.

SMA SERIES STRAIGHT CABLE PLUGS
(MALE CENTER CONTACT)

Fig.	Cable Group Size — Type	Dimensions Inches (Millimeters) A	B	C	ITT CANNON ELECTRIC Cable Termination Tool Number	Notes	Military P/N M39012/( )	ITT CANNON ELECTRIC Gold Plated P/N	ITT CANNON ELECTRIC Passivated P/N
1	.047 Dia. Semi-rigid	.049(1.2)	—	—	None Required	Solder Clamp — Captive Contact — Thick Wall	—	150500-4010	150500-4011
1	.056 Dia. Semi-rigid	.058(1.5)	—	—	None Required	Solder Clamp — Captive Contact — Thick Wall	—	150500-4020	150500-4021
1	.070 Dia. Semi-rigid	.071(1.8)	—	—	None Required	Solder Clamp — Captive Contact — Thick Wall	—	150500-4030	150500-4031
1	.086 Dia. Semi-rigid (RG-405/U)	.0875(2.2)	—	—	None Required	Solder Clamp — Captive Contact — Thick Wall	—	150500-4040	150500-4041
1		.0875(2.2)	—	—	None Required	Solder Clamp — Captive Contact — Thin Wall	—	150500-4042	150500-4043
3		—	—	—	None Required	Simplon Clamp — Captive Contact — Thick Wall	—	150500-5040	150500-5041
3		—	—	—	None Required	Simplon Clamp — Captive Contact — Thin Wall	—	150500-5042	150500-5043
2		.0875(2.2)	.120(3.0)	.440(11.2)	152200-1000	Military Standard Version	/79-3001	150505-3046	150505-3048
2		.0875(2.2)	.120(3.0)	.435(11.0)	152200-1000	Solder on Center Contact	—	150505-3047	150505-3048
1	.141 Dia. Semi-rigid (RG-402/U)	.142(3.6)	—	—	None Required	Solder Clamp — Captive Contact — Thick Wall	—	150500-4050	150500-4051
1		.142(3.6)	—	—	None Required	Solder Clamp — Captive Contact — Thin Wall	—	150500-4052	150500-4053
3		—	—	—	None Required	Simplon Clamp — Captive Contact — Thick Wall	—	150500-5050	150500-5052
3		—	—	—	None Required	Simplon Clamp — Captive Contact — Thin Wall	—	150500-5057	150500-5058
2		.142(3.6)	.180(4.6)	.445(11.3)	152200-1000	Trimmed Center Conductor	—	150505-3050	150505-3054
2		.142(3.6)	.180(4.6)	.440(11.2)	152200-1000	Solder on Center Contact	—	150505-3052	150505-3150
2		.142(3.6)	.180(4.6)	.440(11.2)	152200-1000	Military Standard Version	/79-3002	150505-3801	150505-3059
2	.141 Dia. Semi-rigid Microporous TFE	.142(3.6)	.180(4.6)	.440(11.2)	152200-1000	Solder on Center Contact	—	150505-3151	150505-3152
4	RG-58C/U RG-141A/U RG-303/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp — Captive Contact	—	150500-1200	150500-1202
4		—	—	—		Military Standard Version	/55-3021	150500-1207	150500-1205
4		—	—	—		Military Standard Version	/55-3024	150500-1208	150500-1206
4		—	—	—		Military Standard Version	/55-3029	150500-1203	150500-1204
4		—	—	—		Crimp Clamp — Captive Contact — Thick Wall	—	150500-1209	150500-1180
4		—	—	—		Crimp Clamp — Captive Contact — Thin Wall	—	150500-1181	150500-1182
5		—	—	—		Direct Crimp — Non-Captive Contact	—	150505-1200	150505-1201
5		—	—	—		Military Standard Version	/55-3014	150505-1203	150505-1204
5		—	—	—		Military Standard Version	/55-3017	150505-1202	150505-1205
5		—	—	—		Direct Crimp — Captive Contact — Thick Wall	—	150505-1209	150505-1180
4	RG-55B/U RG-142B/U RG-223/U RG-400/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp — Captive Contact	—	150500-1210	150500-1212
4		—	—	—		Military Standard Version	/55-3022	150500-1217	150500-1215
4		—	—	—		Military Standard Version	/55-3023	150500-1218	150500-1216
4		—	—	—		Military Standard Version	/55-3028	150500-1213	150500-1214
4		—	—	—		Crimp Clamp — Captive Contact — Thick Wall	—	150500-1190	150500-1191
4		—	—	—		Crimp Clamp — Captive Contact — Thin Wall	—	150500-1192	150500-1193
5		—	—	—		Direct Crimp — Non-Captive Contact	—	150505-1210	150505-1211
5		—	—	—		Military Standard Version	/55-3015	150505-1213	150505-1214
5		—	—	—		Military Standard Version	/55-3016	150505-1212	150505-1215
5		—	—	—		Direct Crimp—Non-Captive Contact—Thick Wall	—	150505-1219	150505-1190
4	RG-174/U RG-179B/U RG-187A/U RG-188A/U RG-316/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-868	Direct Crimp — Captive Contact	—	150500-1270	150500-1272
4		—	—	—		Military Standard Version	/55-3019	150500-1277	150500-1275
4		—	—	—		Military Standard Version	/55-3026	150500-1278	150500-1276
4		—	—	—		Crimp Clamp — Captive Contact — Thick Wall	—	150500-1170	150500-1171
4		—	—	—		Crimp Clamp — Captive Contact — Thin Wall	—	150500-1172	150500-1173
5		—	—	—		Crimp — Non-Captive Contact	—	150505-1270	150505-1272
5		—	—	—		Military Standard Version	/55-3012	150505-1273	150505-1274
5		—	—	—		Crimp — Non-Captive Contact — Thick Wall	—	150505-1279	150505-1170
4	RG-178B/U RG-196A/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-868	Military Standard Version	/55-3018	150500-1283	150500-1285
4		—	—	—		Military Standard Version	/55-3025	150500-1282	150500-1284
4		—	—	—		Crimp Clamp — Captive Contact — Thick Wall	—	150500-1280	150500-1281
4		—	—	—		Crimp Clamp — Captive Contact — Thin Wall	—	150500-1286	150500-1287
4	RG-180B/U RG-195A/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-861	Crimp Clamp — Captive Contact — Thick Wall	—	150500-1261	150500-1262
4		—	—	—		Crimp Clamp — Captive Contact — Thin Wall	—	150500-1263	150500-1264
5		—	—	—		Crimp — Non-Captive Contact — Thick Wall	—	150505-1261	150505-1262

SMA SERIES RIGHT ANGLE CABLE PLUGS
(MALE CENTER CONTACT — CAPTIVE)

Fig.	Cable Group Size — Type	Dimensions Inches (Millimeters) A	—	—	ITT CANNON ELECTRIC Cable Termination Tool Number	Notes	Military P/N M39012/( )	ITT CANNON ELECTRIC Gold Plated P/N	ITT CANNON ELECTRIC Passivated P/N
6	.086 Dia. Semi-rigid (RG-405/U)	.0875(2.2)	—	—	152200-1000	Direct Solder — Thin Wall	—	150520-3040	150520-3042
6		.0875(2.2)	—	—	152200-1000	Military Standard Version	/80-3003	150520-3044	150520-3043
6		.0875(2.2)	—	—	152200-1000	Direct Solder — Thin Wall — Epoxy Captive	—	150520-3045	150520-3046
6		.0875(2.2)	—	—	152200-1000	Direct Solder — Thick Wall — Epoxy Captive	—	150520-3047	150520-3048
7		—	—	—	None Required	Simplon Clamp — Thick Wall	—	150526-5040	150526-5041
7		—	—	—	None Required	Simplon Clamp — Thin Wall	—	150526-5042	150526-5043
6	.141 Dia. Semi-rigid (RG-402/U)	.142(3.6)	—	—	152200-1000	Direct Solder — Thin Wall	—	150520-3050	150520-3052
6		.142(3.6)	—	—	152200-1000	Military Standard Version	/80-3004	150520-3055	150520-3054
6		.142(3.6)	—	—	152200-1000	Direct Solder — Thin Wall — Epoxy Captive	—	150520-3058	150520-3059
6		.142(3.6)	—	—	152200-1000	Direct Solder — Thick Wall — Epoxy Captive	—	150520-3151	150520-3152
7		—	—	—	None Required	Simplon Clamp — Thick Wall	—	150526-5050	150526-5052
7		—	—	—	None Required	Simplon Clamp — Thin Wall	—	150526-5056	150526-5057

(CONTINUED)

(millimeters are in parentheses)

SMA SERIES RIGHT ANGLE PLUGS (Cont'd)

Fig.	Cable Group Size — Type	Dimensions Inches (Millimeters)			ITT CANNON ELECTRIC Cable Termination Tool Number	Notes	Military P/N M39012/( )	ITT CANNON ELECTRIC	
		A	—	—				Gold Plated P/N	Passivated P/N
6	.141 Dia. Semi-rigid Microporous TFE	.142(3.6)	—	—	152200-1000	Direct Solder — Thin Wall — Epoxy Captive	—	150520-3056	150520-3057
8	RG-58C/U RG-141A/U RG-303/U	.475(12.1)	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp — Thin Wall	—	150520-1200	150520-1201
8		.475(12.1)	—	—		Military Standard Version	/56-3021	150520-1207	150520-1205
8		.475(12.1)	—	—		Military Standard Version	/56-3024	150520-1208	150520-1206
8		.475(12.1)	—	—		Military Standard Version	/56-3029	150520-1203	150520-1204
8		.475(12.1)	—	—		Direct Crimp — Thin Wall — Epoxy Captive	—	150520-1180	150520-1181
8		.475(12.1)	—	—		Direct Crimp — Thick Wall — Epoxy Captive	—	150520-1182	150520-1183
8	RG-55B/U RG-142B/U RG-223/U RG-400/U	.475(12.1)	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp — Thin Wall	—	150520-1210	150520-1211
8		.475(12.1)	—	—		Military Standard Version	/56-3022	150520-1217	150520-1215
8		.475(12.1)	—	—		Military Standard Version	/56-3023	150520-1218	150520-1216
8		.475(12.1)	—	—		Military Standard Version	/56-3028	150520-1213	150520-1214
8		.475(12.1)	—	—		Direct Crimp — Thin Wall — Epoxy Captive	—	150520-1219	150520-1190
8		.475(12.1)	—	—		Direct Crimp — Thick Wall — Epoxy Captive	—	150520-1191	150520-1192
8	RG-55B, 58C, 141A, 142B, 223, 303, 400/U	.630(16.0)	—	—	N/A	Solder Ferrule	—	150520-6202	150520-6203
8	RG-174/U RG-179B/U RG-187A/U RG-188A/U RG-316/U	.475(12.1)	—	—	Frame #995-0001-761 Die Set #995-0001-868	Direct Crimp — Thin Wall	—	150520-1270	150520-1273
8		.475(12.1)	—	—		Military Standard Version	/56-3019	150520-1277	150520-1275
8		.475(12.1)	—	—		Military Standard Version	/56-3026	150520-1278	150520-1276
8		.475(12.1)	—	—		Direct Crimp — Thin Wall — Epoxy Captive	—	150520-1170	150520-1171
8		.475(12.1)	—	—		Direct Crimp — Thick Wall — Epoxy Captive	—	150520-1172	150520-1173
8		.440(11.2)	—	—	N/A	Solder Ferrule	—	150520-6273	150520-6274
8	RG-178B/U RG-196A/U	.475(12.1)	—	—	Frame #995-0001-761 Die Set #995-0001-868	Military Standard Version	/56-3018	150520-1283	150520-1285
8		.475(12.1)	—	—		Military Standard Version	/56-3025	150520-1282	150520-1284
8		.475(12.1)	—	—		Direct Crimp — Thin Wall — Epoxy Captive	—	150520-1286	150520-1287
8		.475(12.1)	—	—		Direct Crimp — Thick Wall — Epoxy Captive	—	150520-1288	150520-1289
8	RG-180B/U RG-195A/U	.475(12.1)	—	—	Frame #995-0001-761 Die Set #995-0001-861	Direct Crimp — Thin Wall — Epoxy Captive	—	150520-1262	150520-1263
8		.475(12.1)	—	—		Direct Crimp — Thick Wall — Epoxy Captive	—	150520-1264	150520-1265

SMA SERIES STRAIGHT CABLE JACKS
(FEMALE CENTER CONTACT)

Fig.	Cable Group Size — Type	Dimensions Inches (Millimeters)			ITT CANNON ELECTRIC Cable Termination Tool Number	Notes	Military P/N M39012/( )	ITT CANNON ELECTRIC	
		A	B	C				Gold Plated P/N	Passivated P/N
9	.086 Dia. Semi-rigid (RG-405/U)	.0875(2.2)	.120(3.0)	—	152200-1000	Preassembled Dielectric	—	150515-3040	—
9		.0875(2.2)	.120(3.0)	—		Military Standard Version	/81-3001	150515-3043	—
9		.0875(2.2)	.120(3.0)	—		—	—	150515-3044	—
10		.0875(2.2)	.120(3.0)	—		Preassembled Dielectric	—	150516-3040	—
10		.0875(2.2)	.120(3.0)	—		—	—	150516-3043	—
11		.0875(2.2)	.120(3.0)	.560(14.2)		Preassembled Dielectric	—	150518-3040	—
11		.0875(2.2)	.120(3.0)	.560(14.2)		Military Standard Version	/82-3001	150518-3042	—
11		.0875(2.2)	.120(3.0)	.500(12.7)		—	—	150518-3043	—
12		.0875(2.2)	.120(3.0)	.500(12.7)		—	—	150519-3040	—
13		.0875(2.2)	.120(3.0)	—	None Required	Solder Clamp	—	150518-4040	150518-4041
14		—	—	—	None Required	Simplon Clamp	—	150511-5040	150511-5041
9	.141 Dia. Semi-rigid (RG-402/U)	.142(3.6)	.185(4.7)	—	152200-1000	Preassembled Dielectric	—	150515-3050	—
9		.142(3.6)	.185(4.7)	—		Military Standard Version	/81-3002	150515-3057	—
9		.142(3.6)	.185(4.7)	—		—	—	150515-3059	—
10		.142(3.6)	.185(4.7)	—		Preassembled Dielectric	—	150516-3050	—
10		.142(3.6)	.185(4.7)	—		—	—	150516-3150	—
11		.142(3.6)	.185(4.7)	.560(14.2)		Preassembled Dielectric	—	150518-3050	—
11		.142(3.6)	.185(4.7)	.560(14.2)		Military Standard Version	/82-3002	150518-3052	—
11		.142(3.6)	.185(4.7)	.560(14.2)		—	—	150518-3054	—
12		.142(3.6)	.185(4.7)	.560(14.2)		—	—	150519-3050	—
13		.142(3.6)	.185(4.7)	—	None Required	Solder Clamp	—	150518-4050	150518-4051
14		—	—	—	None Required	Simplon Clamp	—	150511-5050	150511-5051
9	.141 Dia. Semi-rigid Microporous TFE	.142(3.6)	.185(4.7)	—	152200-1000	—	—	150515-3058	—
10		.142(3.6)	.185(4.7)	—	152200-1000	—	—	150516-3059	—
11		.142(3.6)	.185(4.7)	.560(14.2)	152200-1000	—	—	150518-3053	—
15	RG-58C/U RG-141A/U RG-303/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp	—	150511-1200	150511-1202
15		—	—	—		Crimp Clamp	—	150511-1203	150511-1204
16		—	—	—		Direct Crimp	—	150513-1200	150513-1201
16		—	—	—		Crimp Clamp	—	150513-1202	150513-1203
15	RG-55B/U RG-142B/U RG-223/U RG-400/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-863	Direct Crimp	—	150511-1210	150511-1212
15		—	—	—		Crimp Clamp	—	150511-1215	150511-1216
16		—	—	—		Direct Crimp	—	150513-1210	150513-1211
16		—	—	—		Crimp Clamp	—	150513-1215	150513-1216
15	RG-174/U RG-179B/U RG-187A/U RG-188A/U RG-316/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-868	Direct Crimp	—	150511-1270	150511-1271
15		—	—	—		Crimp Clamp	—	150511-1273	150511-1274
16		—	—	—		Direct Crimp	—	150513-1270	150513-1271
16		—	—	—		Crimp Clamp	—	150513-1272	150513-1273
15	RG-178B/U RG-196A/U	—	—	—	Frame #995-0001-761 Die Set #995-0001-868	Crimp Clamp	—	150511-1280	150511-1281
16		—	—	—		Crimp Clamp	—	150513-1280	150513-1281
15	RG-180B/U RG-195A/U	—	—	—	Frame #995-0001-761 Die Set #995-001-861	Crimp Clamp	—	150511-1260	150511-1261
16		—	—	—		Crimp Clamp	—	150513-1261	150513-1262

(millimeters are in parentheses)

ITT CANNON ELECTRIC

SMA SERIES CONNECTORS

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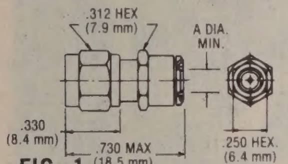
SMA SERIES RECEPTACLES
PLUGS (MALE CENTER CONTACT)
JACKS (FEMALE CENTER CONTACT)

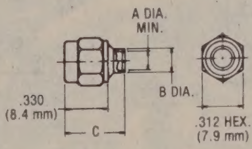
	Dimensions — Inches (Millimeters)				ITT CANNON ELECTRIC	
Fig.	A	B	—	Notes	Gold Plated (P/N)	Passivated P/N
17	—	—	—	Captive Contact	150542-0000	150542-0001
17	—	—	—	Captive Contact — Thick Wall	150542-0006	150542-0007
17	—	—	—	Non-Captive Contact	150542-4000	150542-4001
17	—	—	—	Non-Captive Contact — Thick Wall	150542-4002	150542-4003
18	—	—	—	Captive Contact	150550-0001	150550-0007
18	—	—	—	Non-Captive Contact	150550-4001	150550-4009
19	—	—	—	Captive Contact	150551-0001	150551-0005
19	—	—	—	Non-Captive Contact	150551-4002	150551-4003
20	.014(0.4)	—	—	Captive Contact	150550-0047	150550-0048
20	.014(0.4)	—	—	Non-Captive Contact	150550-4005	150550-4006
20	.020(0.5)	—	—	Captive Contact	150550-0046	150550-0049
20	.020(0.5)	—	—	Non-Captive Contact	150550-4007	150550-4008
20	.030(0.8)	—	—	Captive Contact	150550-0050	150550-0051
20	.030(0.8)	—	—	Non-Captive Contact	150550-4010	150550-4011
21	—	—	—	Captive Contact	150550-0000	150550-0006
22	—	—	—	Captive Contact	150550-0014	150550-0056
22	—	—	—	Non-Captive Contact	150550-4012	150550-4013
23	—	—	—	Captive Contact	150551-0010	150551-0029
23	—	—	—	Non-Captive Contact	150551-0009	150551-0028
24	—	—	—	Captive Contact	150551-0000	150551-0004
25	—	—	—	Captive Contact	150548-0000	150548-0003
26	—	—	—	Captive Contact	150592-0008	150592-0012
27	—	—	—	Captive Contact	150562-0000	150562-0002
28	—	—	—	Captive Contact	150563-0001	—
29	—	—	—	Captive Contact	150553-0000	—
30	.031(0.8)	—	—	—	150554-4004	150554-4008
30	.063(1.6)	—	—	—	150554-4005	150554-4007
30	.125(3.2)	—	—	—	150554-4000	150554-4009
31	.031(0.8)	—	—	—	150554-4003	150554-4011
31	.063(1.6)	—	—	—	150554-4002	150554-4010
31	.125(3.2)	—	—	—	150554-4001	150554-4006
32	.062(1.6)	.025(0.6)	—	—	—	150555-0006
32	.125(3.2)	.050(1.3)	—	—	—	150555-0007
32	.250(6.4)	.050(1.3)	—	—	—	150555-0008
33	—	—	—	—	—	150555-0009

STRAIGHT PLUGS



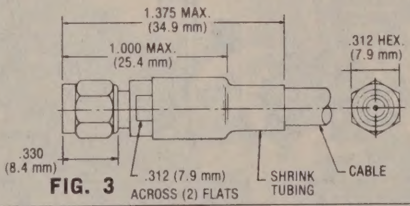
.312 HEX
(7.9 mm)
A DIA.
MIN.
.330
(8.4 mm)
.730 MAX
(18.5 mm)
.250 HEX.
(6.4 mm)

FIG. 1



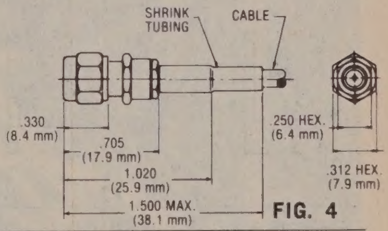
A DIA.
MIN.
B DIA.
.330
(8.4 mm)
C
.312 HEX.
(7.9 mm)

FIG. 2



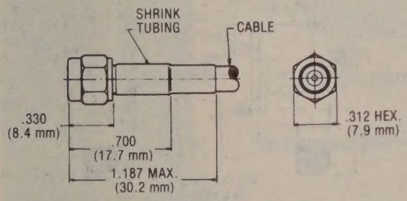
1.375 MAX.
(34.9 mm)
1.000 MAX.
(25.4 mm)
.312 HEX.
(7.9 mm)
.330
(8.4 mm)
.312 (7.9 mm)
ACROSS (2) FLATS
SHRINK
TUBING
CABLE

FIG. 3



SHRINK
TUBING
CABLE
.330
(8.4 mm)
.705
(17.9 mm)
1.020
(25.9 mm)
1.500 MAX.
(38.1 mm)
.250 HEX.
(6.4 mm)
.312 HEX.
(7.9 mm)

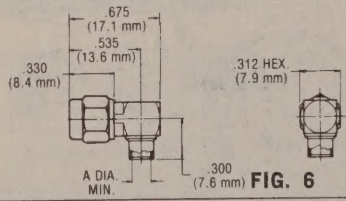
FIG. 4



SHRINK
TUBING
CABLE
.330
(8.4 mm)
.700
(17.7 mm)
1.187 MAX.
(30.2 mm)
.312 HEX.
(7.9 mm)

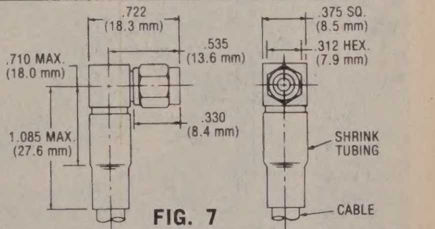
FIG. 5

RIGHT ANGLE PLUGS



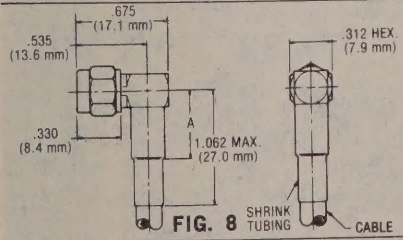
.675
(17.1 mm)
.535
(13.6 mm)
.330
(8.4 mm)
.312 HEX.
(7.9 mm)
A DIA.
MIN.
.300
(7.6 mm)

FIG. 6



.722
(18.3 mm)
.535
(13.6 mm)
.710 MAX.
(18.0 mm)
1.085 MAX.
(27.6 mm)
.330
(8.4 mm)
.375 SQ.
(8.5 mm)
.312 HEX.
(7.9 mm)
SHRINK
TUBING
CABLE

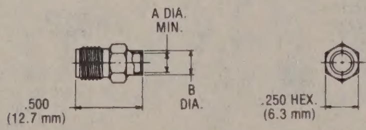
FIG. 7



.675
(17.1 mm)
.535
(13.6 mm)
.330
(8.4 mm)
A
1.062 MAX.
(27.0 mm)
.312 HEX.
(7.9 mm)
SHRINK
TUBING
CABLE

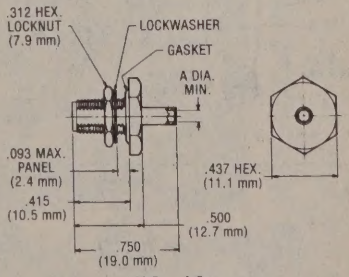
FIG. 8

STRAIGHT CABLE JACKS



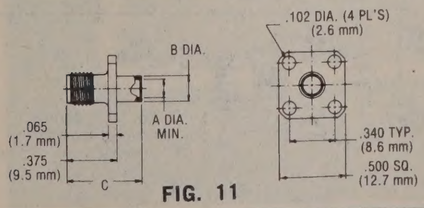
A DIA.
MIN.
B
DIA.
.500
(12.7 mm)
.250 HEX.
(6.3 mm)

FIG. 9



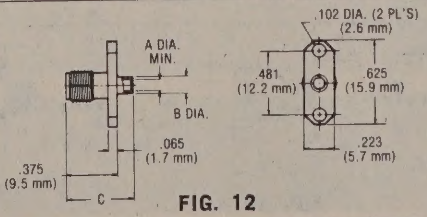
.312 HEX.
LOCKNUT
(7.9 mm)
LOCKWASHER
GASKET
A DIA.
MIN.
.093 MAX.
PANEL
(2.4 mm)
.415
(10.5 mm)
.750
(19.0 mm)
.500
(12.7 mm)
.437 HEX.
(11.1 mm)

FIG. 10



.102 DIA. (4 PL'S)
(2.6 mm)
B DIA.
A DIA.
MIN.
.065
(1.7 mm)
.375
(9.5 mm)
C
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 11



.102 DIA. (2 PL'S)
(2.6 mm)
A DIA.
MIN.
B DIA.
.481
(12.2 mm)
.625
(15.9 mm)
.065
(1.7 mm)
.375
(9.5 mm)
C
.223
(5.7 mm)

FIG. 12

(millimeters are in parentheses)

ITT CANNON ELECTRIC

SMA SERIES CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

STRAIGHT CABLE JACKS *(CONTINUED)*

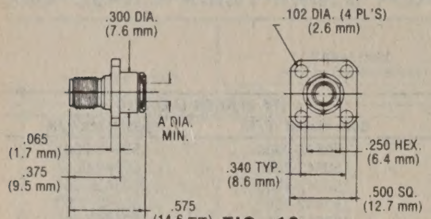

.300 DIA.
(7.6 mm)
.102 DIA. (4 PL'S)
(2.6 mm)
A DIA.
MIN.
.065
(1.7 mm)
.375
(9.5 mm)
.575
(14.6 mm)
.250 HEX.
(6.4 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 13

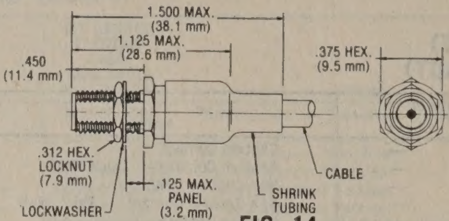

1.500 MAX.
(38.1 mm)
1.125 MAX.
(28.6 mm)
.450
(11.4 mm)
.375 HEX.
(9.5 mm)
.312 HEX.
LOCKNUT
(7.9 mm)
LOCKWASHER
.125 MAX.
PANEL
(3.2 mm)
CABLE
SHRINK
TUBING

FIG. 14

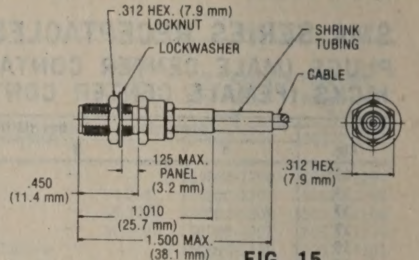

.312 HEX. (7.9 mm)
LOCKNUT
LOCKWASHER
SHRINK
TUBING
CABLE
.125 MAX.
PANEL
(3.2 mm)
.450
(11.4 mm)
1.010
(25.7 mm)
1.500 MAX.
(38.1 mm)
.312 HEX.
(7.9 mm)

FIG. 15

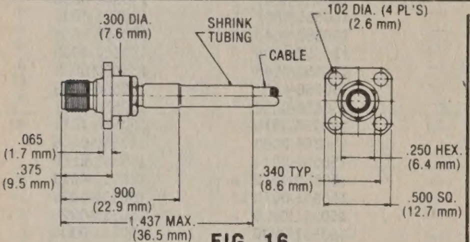

.300 DIA.
(7.6 mm)
SHRINK
TUBING
CABLE
.102 DIA. (4 PL'S)
(2.6 mm)
.065
(1.7 mm)
.375
(9.5 mm)
.900
(22.9 mm)
1.437 MAX.
(36.5 mm)
.250 HEX.
(6.4 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 16

RECEPTACLES

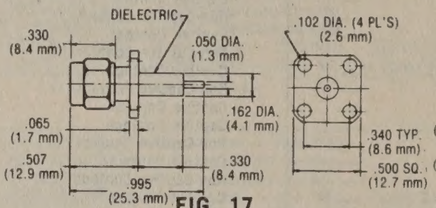

DIELECTRIC
.330
(8.4 mm)
.050 DIA.
(1.3 mm)
.102 DIA. (4 PL'S)
(2.6 mm)
.162 DIA.
(4.1 mm)
.065
(1.7 mm)
.507
(12.9 mm)
.995
(25.3 mm)
.330
(8.4 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 17

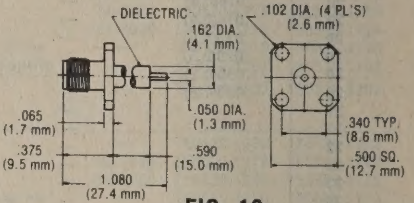

DIELECTRIC
.162 DIA.
(4.1 mm)
.102 DIA. (4 PL'S)
(2.6 mm)
.065
(1.7 mm)
.375
(9.5 mm)
.050 DIA.
(1.3 mm)
.590
(15.0 mm)
1.080
(27.4 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 18

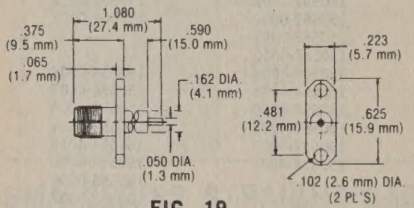

1.080
(27.4 mm)
.375
(9.5 mm)
.065
(1.7 mm)
.590
(15.0 mm)
.162 DIA.
(4.1 mm)
.050 DIA.
(1.3 mm)
.223
(5.7 mm)
.481
(12.2 mm)
.625
(15.9 mm)
.102 (2.6 mm) DIA.
(2 PL'S)

FIG. 19

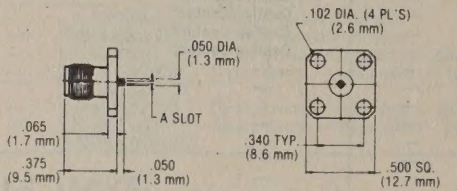

.102 DIA. (4 PL'S)
(2.6 mm)
.050 DIA.
(1.3 mm)
A SLOT
.065
(1.7 mm)
.375
(9.5 mm)
.050
(1.3 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 20

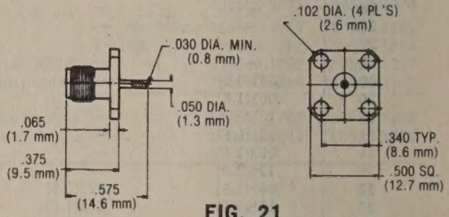

.102 DIA. (4 PL'S)
(2.6 mm)
.030 DIA. MIN.
(0.8 mm)
.050 DIA.
(1.3 mm)
.065
(1.7 mm)
.375
(9.5 mm)
.575
(14.6 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 21

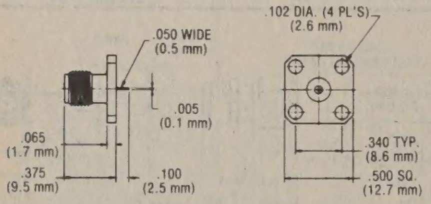

.102 DIA. (4 PL'S)
(2.6 mm)
.050 WIDE
(0.5 mm)
.005
(0.1 mm)
.065
(1.7 mm)
.375
(9.5 mm)
.100
(2.5 mm)
.340 TYP.
(8.6 mm)
.500 SQ.
(12.7 mm)

FIG. 22

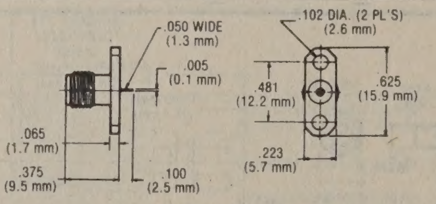

.050 WIDE
(1.3 mm)
.005
(0.1 mm)
.102 DIA. (2 PL'S)
(2.6 mm)
.481
(12.2 mm)
.625
(15.9 mm)
.223
(5.7 mm)
.065
(1.7 mm)
.375
(9.5 mm)
.100
(2.5 mm)

FIG. 23

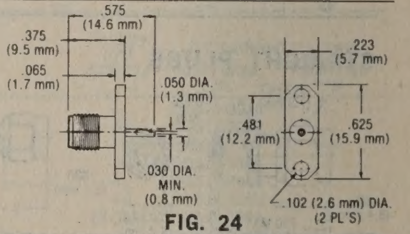

.575
(14.6 mm)
.375
(9.5 mm)
.065
(1.7 mm)
.050 DIA.
(1.3 mm)
.030 DIA.
MIN.
(0.8 mm)
.223
(5.7 mm)
.481
(12.2 mm)
.625
(15.9 mm)
.102 (2.6 mm) DIA.
(2 PL'S)

FIG. 24

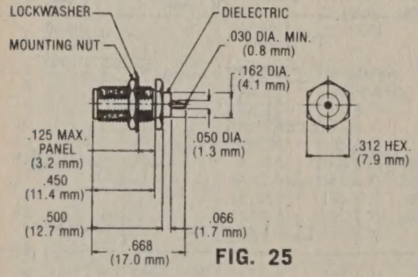

LOCKWASHER
MOUNTING NUT
DIELECTRIC
.030 DIA. MIN.
(0.8 mm)
.162 DIA.
(4.1 mm)
.050 DIA.
(1.3 mm)
.125 MAX.
PANEL
(3.2 mm)
.450
(11.4 mm)
.500
(12.7 mm)
.066
(1.7 mm)
.668
(17.0 mm)
.312 HEX.
(7.9 mm)

FIG. 25

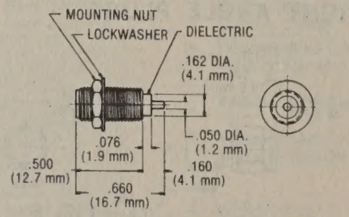

MOUNTING NUT
LOCKWASHER
DIELECTRIC
.162 DIA.
(4.1 mm)
.050 DIA.
(1.2 mm)
.076
(1.9 mm)
.160
(4.1 mm)
.500
(12.7 mm)
.660
(16.7 mm)

FIG. 26

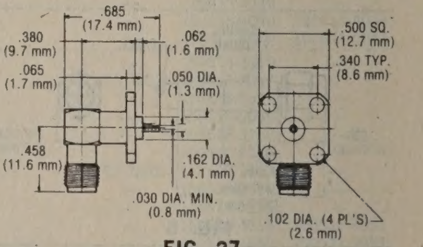

.685
(17.4 mm)
.380
(9.7 mm)
.062
(1.6 mm)
.065
(1.7 mm)
.050 DIA.
(1.3 mm)
.458
(11.6 mm)
.162 DIA.
(4.1 mm)
.030 DIA. MIN.
(0.8 mm)
.500 SQ.
(12.7 mm)
.340 TYP.
(8.6 mm)
.102 DIA. (4 PL'S)
(2.6 mm)

FIG. 27

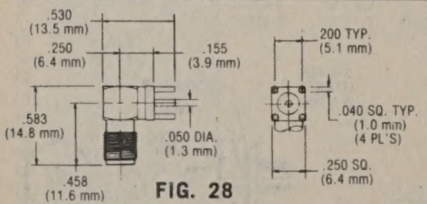

.530
(13.5 mm)
.250
(6.4 mm)
.155
(3.9 mm)
.583
(14.8 mm)
.050 DIA.
(1.3 mm)
.458
(11.6 mm)
200 TYP.
(5.1 mm)
.040 SQ. TYP.
(1.0 mm)
(4 PL'S)
.250 SQ.
(6.4 mm)

FIG. 28

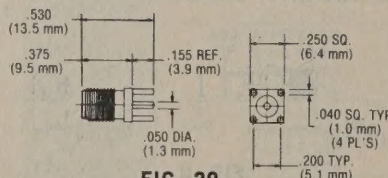

.530
(13.5 mm)
.375
(9.5 mm)
.155 REF.
(3.9 mm)
.050 DIA.
(1.3 mm)
.250 SQ.
(6.4 mm)
.040 SQ. TYP.
(1.0 mm)
(4 PL'S)
.200 TYP.
(5.1 mm)

FIG. 29

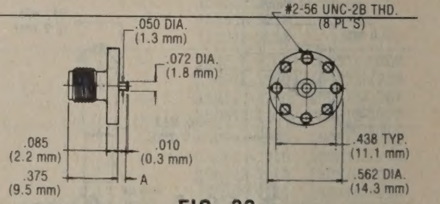

.050 DIA.
(1.3 mm)
.072 DIA.
(1.8 mm)
.085
(2.2 mm)
.010
(0.3 mm)
.375
(9.5 mm)
A
#2-56 UNC-2B THD.
(8 PL'S)
.438 TYP.
(11.1 mm)
.562 DIA.
(14.3 mm)

FIG. 30

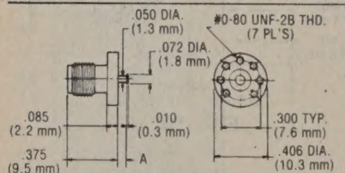

.050 DIA.
(1.3 mm)
.072 DIA.
(1.8 mm)
#0-80 UNF-2B THD.
(7 PL'S)
.085
(2.2 mm)
.010
(0.3 mm)
.375
(9.5 mm)
A
.300 TYP.
(7.6 mm)
.406 DIA.
(10.3 mm)

FIG. 31

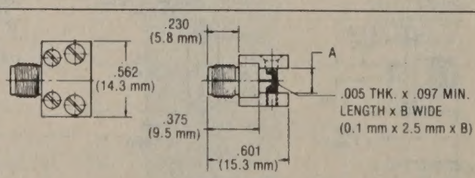

.562
(14.3 mm)
.230
(5.8 mm)
A
.375
(9.5 mm)
.601
(15.3 mm)
.005 THK. x .097 MIN.
LENGTH x B WIDE
(0.1 mm x 2.5 mm x B)

FIG. 32

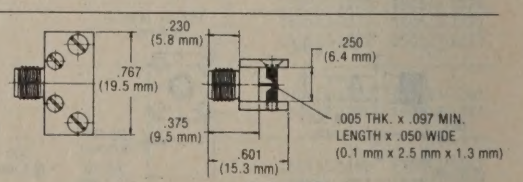

.767
(19.5 mm)
.230
(5.8 mm)
.250
(6.4 mm)
.375
(9.5 mm)
.601
(15.3 mm)
.005 THK. x .097 MIN.
LENGTH x .050 WIDE
(0.1 mm x 2.5 mm x 1.3 mm)

FIG. 33

(millimeters are in parentheses)

Who can solve your electronic packaging interconnection requirements?

Cannon can!

Six decades on the leading edge of interconnect technology.

CANNON ITT

ITT CANNON ELECTRIC

ADAPTA-CON
P. C. AND I/O PACKAGING

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

A SPECIAL APPROACH TO P. C. AND I/O PACKAGING DESIGNS...

- **Low cost**
- **Post and Receptacle P. C. interconnections**
- **Printed circuit, I/O applications**
- **Custom made backplane panels**
- **Contacts on .100″ (2,54), .125″ (3,18) and .150″ (3,81) centers**
- **High and low force versions**

ITT Cannon Electric's ADAPTA-CON connector series meets the ever increasing demand for more versatile post and receptacle interconnections at less cost per termination. The ADAPTA-CON connector series reflects a new concept in electronic packaging and represents the latest state of the art.

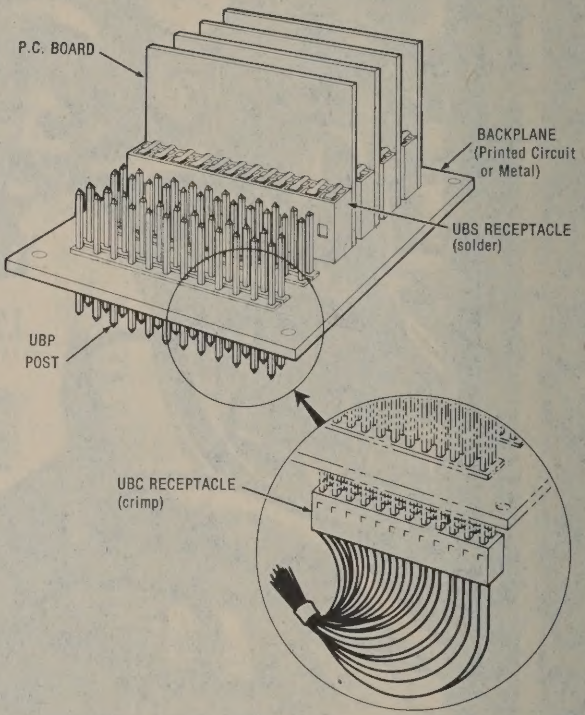
ADAPTA-CON connectors provide a versatile approach to dual contact P. C. and I/O interconnecting packaging designs. They are available in two styles: the UBS (solder type) for printed circuit applications; and the UBC (crimp type) for I/O applications. These designs fulfill the industry's need for post and receptacle connections between P. C. boards and backplane assemblies as well as for I/O applications.

UBS receptacles are mounted to the P. C. board by standard flow-solder techniques. The unit is then mated with UBP posts mounted in a metal or epoxy backplane.

UBC receptacles utilize insertable and removable crimp contacts that accommodate #18 thru #30 AWG wire for I/O applications.

The UBP mounting plate post contact is a simple, economical post with a .025″ square tail, standard for wire wrapping termination. For optimum electrical continuity, the mating receptacle square is designed with a closed entry to guide the post contact during mating. A simple, but rugged tang lock retains the receptacle contact in the insulator.

To fulfill your mounting and interconnect requirements, our backplanes are custom made to **any** size or configuration. And, they are precision punched with .100″ (2,54), .125″ (3,18), or .150″ (3,81) center-to-center holes for use with either grounded or insulated .025″ (0,64) square posts.



STANDARD DATA

	UBS (P.C.)	UBC (I/O)
MATERIALS AND FINISHES		
Insulator	Phenolic Self Extinguishing Thermoplastic UL 94 VI min.	Phenolic Self Extinguishing Thermoplastic UL 94 VI min.
Contacts, Low and High Force	Material: Copper alloy Finish: Gold over nickel 90/10 tin lead electrodeposited*	Material: Copper alloy Finish: Gold over nickel 90/10 tin lead electrodeposited*
MECHANICAL FEATURES		
Termination Technique	Flow solder (.013″ (0,33) x .026″ (0,66) solder tab)	Crimp
Max. Engagement Force	6.0 oz. (1.67 N) per contact (low) 8.0 oz. (2,22 N) per contact (high)	6.0 oz. (1.67 N) per contact (low) 8.0 oz. (2,22 N) per contact (high)
Min. Separation Force	0.5 oz. (0,14 N) per contact (low) 2.0 oz. (0,56 N) per contact (high)	0.5 oz. (0,14 N) per contact (low) 2.0 oz. (0,56 N) per contact (high)
ELECTRICAL DATA		
Current Rating	3 amps max.	3 amps max.
Temperature Rating	−65°C to +105°C	−65°C to +85°C
Insulation Resistance	≥ 5000 Megohms	≥ 5000 Megohms
Contact Resistance (Initial)	8 Milliohms max.	8 Milliohms max.
Dielectric Withstanding Voltage (sea level)	650 Vac	650 Vac

*Consult factory for performance.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

GENERAL INFORMATION

HOW TO ORDER

UBS connector assemblies with solder contact termination (.100" (2,54), .125" (3,18) and .150" (3,81) centers)

UBS 4 A 022 A 1 D L *

Series Prefix
Contact Spacing
Contact Finish
Number of Contacts
Termination Length
Mounting
Contact Rows
Contact Forces
Modification Code

SERIES PREFIX
UBS — Solder type P.C.

CONTACT SPACING
4 — .100" (2,54) centers
5 — .125" (3,18) centers
6 — .150" (3,81) centers

CONTACT FINISH (selective plating)
A — 20 microinches gold over 50 microinches nickel
B — 30 microinches gold over 50 microinches nickel
C — 50 microinches gold over 50 microinches nickel
E — Electrodeposited bright 90% tin and 10% lead†

NUMBER OF CONTACTS
4 to 65 — (.100" (2,54) centers) single row*
8 to 130 — (.100" (2,54) centers) double row
4 to 51 — (.125" (3,18) centers) single row*
4 to 43 — (.150" (3,81) centers) single row*
8 to 86 — (.150" (3,81) centers) double row

TERMINATION LENGTH
A — .115 (2,92) nominal

MOUNTING
1 — P.C. board mounting

CONTACT ROWS
S — Single
D — Double

CONTACT FORCES
L — Low: .5 to 6 oz. (0,14 to 1,67 N)
H — High: 2 to 8 oz. (0,56 to 2,22 N)

MODIFICATION CODE
Consult factory for modifications

* When ordering an even number of contacts for the single row UBS connector the number 1 contact will have the termination tail on the mating face (left hand side) unless otherwise specified.
† Consult factory for availability.

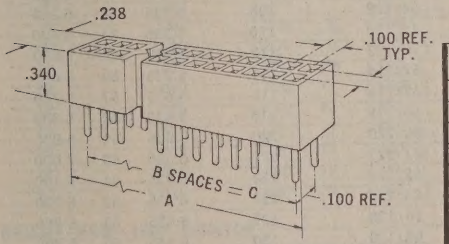
UBC connector insulators with crimp contact termination (.100" (2,54), .125" (3,18) and .150" (3,81) centers)

To order UBC connector insulators use the part numbers shown in the tables on pages 114 and 115. Contacts for UBC connections are available in bulk or reel and must be ordered separately.

See page 116 for contact part numbers. Please consult the factory for termination tooling for UBC.

C — .125 (3,18) for .062 (1,57) thick PCB—vertical mount.
D — .156 (3,96) for .093 (2,36) thick PCB—vertical mount
E — .188 (4,78) for .125 (3,18) thick PCB—vertical mount

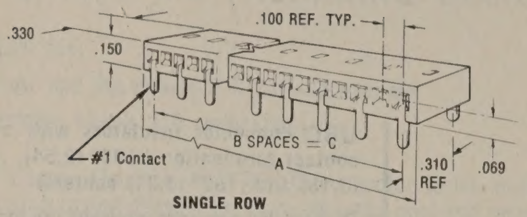
UBS CONNECTOR ASSEMBLIES—VERTICAL PC MOUNTING .100" CENTERS



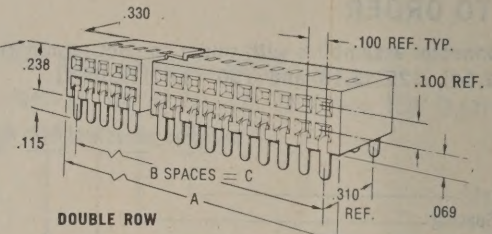
No. of Contacts	Part Number	A	B	C
4/8	UBS 4 * 008 * 4D	.420	3	.300
5/10	010	.520	4	.400
6/12	012	.620	5	.500
7/14	014	.720	6	.600
8/16	016	.820	7	.700
9/18	018	.920	8	.800
10/20	020	1.020	9	.900
11/22	022	1.120	10	1.000
12/24	024	1.220	11	1.100
13/26	026	1.320	12	1.200
14/28	028	1.420	13	1.300
15/30	030	1.520	14	1.400
16/32	032	1.620	15	1.500
17/34	034	1.720	16	1.600
18/36	UBS 4 * 036 * 4D	1.820	17	1.700
19/38	038	1.920	18	1.800
20/40	040	2.020	19	1.900
21/42	042	2.120	20	2.000
22/44	044	2.220	21	2.100
23/46	046	2.320	22	2.200
24/48	048	2.420	23	2.300
25/50	050	2.520	24	2.400
26/52	052	2.620	25	2.500
27/54	054	2.720	26	2.600
28/56	056	2.820	27	2.700
29/58	058	2.920	28	2.800
30/60	060	3.020	29	2.900
31/62	062	3.120	30	3.000
32/64	064	3.220	31	3.100
33/66	066	3.320	32	3.200
34/68	068	3.420	33	3.300
35/70	070	3.520	34	3.400
36/72	072	3.620	35	3.500
37/74	074	3.720	36	3.600
38/76	076	3.820	37	3.700
39/78	078	3.920	38	3.800
40/80	080	4.020	39	3.900
41/82	082	4.120	40	4.000
42/84	UBS 4 * 084 * 4D	4.220	41	4.100
43/86	086	4.320	42	4.200
44/88	088	4.420	43	4.300
45/90	090	4.520	44	4.400
46/92	092	4.620	45	4.500
47/94	094	4.720	46	4.600
48/96	096	4.820	47	4.700
49/98	098	4.920	48	4.800
50/100	100	5.020	49	4.900
51/102	102	5.120	50	5.000
52/104	104	5.220	51	5.100
53/106	106	5.320	52	5.200
54/108	108	5.420	53	5.300
55/110	110	5.520	54	5.400
56/112	112	5.620	55	5.500
57/114	114	5.720	56	5.600
58/116	116	5.820	57	5.700
59/118	118	5.920	58	5.800
60/120	120	6.020	59	5.900
61/122	122	6.120	60	6.000
62/124	124	6.220	61	6.100
63/126	126	6.320	62	6.200
64/128	128	6.420	63	6.300
65/130	130	6.520	64	6.400

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

UBS CONNECTOR ASSEMBLIES
.100″ CENTERS



SINGLE ROW



DOUBLE ROW

SINGLE ROW, .100″ CENTERS

No. of Contacts	Part Number	A	B	C
4	UBS 4 * 004 * 1S	.435	3	.300
5	005	.535	4	.400
6	006	.635	5	.500
7	007	.735	6	.600
8	008	.835	7	.700
9	009	.935	8	.800
10	010	1.035	9	.900
11	011	1.135	10	1.000
12	012	1.235	11	1.100
13	013	1.335	12	1.200
14	014	1.435	13	1.300
15	015	1.535	14	1.400
16	016	1.635	15	1.500
17	017	1.735	16	1.600
18	018	1.835	17	1.700
19	019	1.935	18	1.800
20	020	2.035	19	1.900
21	021	2.135	20	2.000
22	022	2.235	21	2.100
23	023	2.335	22	2.200
24	024	2.435	23	2.300
25	UBS 4 * 025 * 1S	2.535	24	2.400
26	026	2.635	25	2.500
27	027	2.735	26	2.600
28	028	2.835	27	2.700
29	029	2.935	28	2.800
30	030	3.035	29	2.900
31	031	3.135	30	3.000
32	032	3.235	31	3.100
33	033	3.335	32	3.200
34	034	3.435	33	3.300
35	035	3.535	34	3.400
36	036	3.635	35	3.500
37	037	3.735	36	3.600
38	038	3.835	37	3.700
39	039	3.935	38	3.800
40	040	4.035	39	3.900
41	041	4.135	40	4.000
42	042	4.235	41	4.100
43	043	4.335	42	4.200
44	044	4.435	43	4.300
45	045	4.535	44	4.400
46	UBS 4 * 046 * 1S	4.635	45	4.500
47	047	4.735	46	4.600
48	048	4.835	47	4.700
49	049	4.935	48	4.800
50	050	5.035	49	4.900
51	051	5.135	50	5.000
52	052	5.235	51	5.100
53	053	5.335	52	5.200
54	054	5.435	53	5.300
55	055	5.535	54	5.400
56	056	5.635	55	5.500
57	057	5.735	56	5.600
58	058	5.835	57	5.700
59	059	5.935	58	5.800
60	060	6.035	59	5.900
61	061	6.135	60	6.000
62	062	6.235	61	6.100
63	063	6.335	62	6.200
64	064	6.435	63	6.300
65	065	6.545	64	6.400

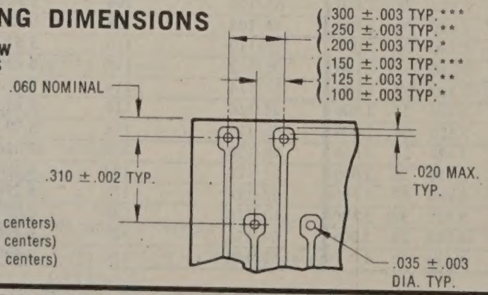
DOUBLE ROW, .100″ x .100″ CENTERS

No. of Contacts	Part Number	A	B	C
4/8	UBS 4 *008 * 1D	.435	3	.300
5/10	010	.535	4	.400
6/12	012	.635	5	.500
7/14	014	.735	6	.600
8/16	016	.835	7	.700
9/18	018	.935	8	.800
10/20	020	1.035	9	.900
11/22	022	1.135	10	1.000
12/24	024	1.235	11	1.100
13/26	026	1.335	12	1.200
14/28	028	1.435	13	1.300
15/30	030	1.535	14	1.400
16/32	032	1.635	15	1.500
17/34	034	1.735	16	1.600
18/36	036	1.835	17	1.700
19/38	038	1.935	18	1.800
20/40	040	2.035	19	1.900
21/42	042	2.135	20	2.000
22/44	044	2.235	21	2.100
23/46	046	2.335	22	2.200
24/48	048	2.435	23	2.300
25/50	UBS 4 * 050 * 1D	2.535	24	2.400
26/52	052	2.635	25	2.500
27/54	054	2.735	26	2.600
28/56	056	2.835	27	2.700
29/58	058	2.935	28	2.800
30/60	060	3.035	29	2.900
31/62	062	3.135	30	3.000
32/64	064	3.235	31	3.100
33/66	066	3.335	32	3.200
34/68	068	3.435	33	3.300
35/70	070	3.535	34	3.400
36/72	072	3.635	35	3.500
37/74	074	3.735	36	3.600
38/76	076	3.835	37	3.700
39/78	078	3.935	38	3.800
40/80	080	4.035	39	3.900
41/82	082	4.135	40	4.000
42/84	084	4.235	41	4.100
43/86	086	4.335	42	4.200
44/88	088	4.435	43	4.300
45/90	090	4.535	44	4.400
46/92	UBS 4 * 092 * 1D	4.635	45	4.500
47/94	094	4.735	46	4.600
48/96	096	4.835	47	4.700
49/98	098	4.935	48	4.800
50/100	100	5.035	49	4.900
51/102	102	5.135	50	5.000
52/104	104	5.235	51	5.100
53/106	106	5.335	52	5.200
54/108	108	5.435	53	5.300
55/110	110	5.535	54	5.400
56/112	112	5.635	55	5.500
57/114	114	5.735	56	5.600
58/116	116	5.835	57	5.700
59/118	118	5.935	58	5.800
60/120	120	6.035	59	5.900
61/122	122	6.135	60	6.000
62/124	124	6.235	61	6.100
63/126	126	6.335	62	6.200
64/128	128	6.435	63	6.300
65/130	130	6.545	64	6.400

* Plating Code.

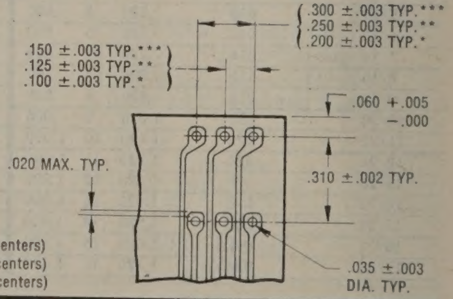
MOUNTING DIMENSIONS

SINGLE ROW CONTACTS



*(for .100″ centers)
**(for .125″ centers)
***(for .150″ centers)

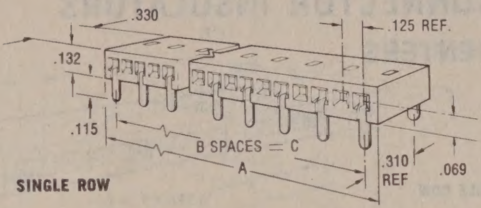
DOUBLE ROW CONTACTS



*(for .100″ centers)
**(for .125″ centers)
***(for .150″ centers)

Dimensions subject to change.

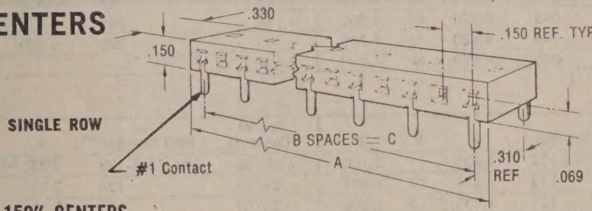
UBS CONNECTOR ASSEMBLIES
.125" CENTERS

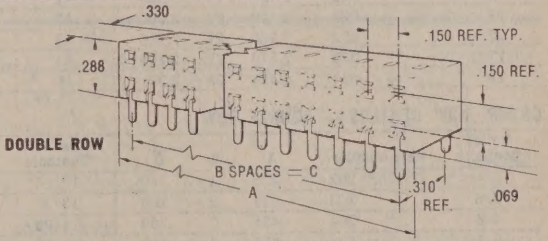


SINGLE ROW .125" CENTERS

No. of Contacts	Part Number	A	B	C
4	UBS 5 * 004 * 1S	.530	3	.375
5	005	.655	4	.500
6	006	.780	5	.625
7	007	.905	6	.750
8	008	1.030	7	.875
9	009	1.155	8	1.000
10	010	1.280	9	1.125
11	011	1.405	10	1.250
12	012	1.530	11	1.375
13	013	1.655	12	1.500
14	014	1.780	13	1.625
15	015	1.905	14	1.750
16	016	2.030	15	1.875
17	017	2.155	16	2.000
18	018	2.280	17	2.125
19	019	2.405	18	2.250
20	UBS 5 * 020 * 1S	2.530	19	2.375
21	021	2.655	20	2.500
22	022	2.780	21	2.625
23	023	2.905	22	2.750
24	024	3.030	23	2.875
25	025	3.155	24	3.000
26	026	3.280	25	3.125
27	027	3.405	26	3.250
28	028	3.530	27	3.375
29	029	3.655	28	3.500
30	030	3.780	29	3.625
31	031	3.905	30	3.750
32	032	4.030	31	3.875
33	033	4.155	32	4.000
34	034	4.280	33	4.125
35	035	4.405	34	4.250
36	UBS 5 * 036 * 1S	4.530	35	4.375
37	037	4.655	36	4.500
38	038	4.780	37	4.625
39	039	4.905	38	4.750
40	040	5.030	39	4.875
41	041	5.155	40	5.000
42	042	5.280	41	5.125
43	043	5.405	42	5.250
44	044	5.530	43	5.375
45	045	5.655	44	5.500
46	046	5.780	45	5.625
47	047	5.905	46	5.750
48	048	6.030	47	5.875
49	049	6.155	48	6.000
50	050	6.280	49	6.125
51	051	6.405	50	6.250

.150" CENTERS





SINGLE ROW .150" CENTERS

No. of Contacts	Part Number	A	B	C
4	UBS 6 * 004 * 1S	.600	3	.450
5	005	.750	4	.600
6	006	.900	5	.750
7	007	1.050	6	.900
8	008	1.200	7	1.050
9	009	1.350	8	1.200
10	010	1.500	9	1.350
11	011	1.650	10	1.500
12	012	1.800	11	1.650
13	013	1.950	12	1.800
14	014	2.100	13	1.950
15	015	2.250	14	2.100
16	016	2.400	15	2.250
17	017	2.550	16	2.400
18	UBS 6 * 018 * 1S	2.700	17	2.550
19	019	2.850	18	2.700
20	020	3.000	19	2.850
21	021	3.150	20	3.000
22	022	3.300	21	3.150
23	023	3.450	22	3.300
24	024	3.600	23	3.450
25	025	3.750	24	3.600
26	026	3.900	25	3.750
27	027	4.050	26	3.900
28	028	4.200	27	4.050
29	029	4.350	28	4.200
30	030	4.500	29	4.350
31	031	4.650	30	4.500
32	UBS 6 * 032 * 1S	4.800	31	4.650
33	033	4.950	32	4.800
34	034	5.100	33	4.950
35	035	5.250	34	5.100
36	036	5.400	35	5.250
37	037	5.550	36	5.400
38	038	5.700	37	5.550
39	039	5.850	38	5.700
40	040	6.000	39	5.850
41	041	6.150	40	6.000
42	042	6.300	41	6.150
43	043	6.445	42	6.300

DOUBLE ROW .150" CENTERS

No. of Contacts	Part Number	A	B	C
4/8	UBS 6 * 008 * 1D	.600	3	.450
5/10	010	.750	4	.600
6/12	012	.900	5	.750
7/14	014	1.050	6	.900
8/16	016	1.200	7	1.050
9/18	018	1.350	8	1.200
10/20	020	1.500	9	1.350
11/22	022	1.650	10	1.500
12/24	024	1.800	11	1.650
13/26	026	1.950	12	1.800
14/28	028	2.100	13	1.950
15/30	030	2.250	14	2.100
16/32	032	2.400	15	2.250
17/34	034	2.550	16	2.400
18/36	UBS 6 * 036 * 1D	2.700	17	2.550
19/38	038	2.850	18	2.700
20/40	040	3.000	19	2.850
21/42	042	3.150	20	3.000
22/44	044	3.300	21	3.150
23/46	046	3.450	22	3.300
24/48	048	3.600	23	3.450
25/50	050	3.750	24	3.600
26/52	052	3.900	25	3.750
27/54	054	4.050	26	3.900
28/56	056	4.200	27	4.050
29/58	058	4.350	28	4.200
30/60	060	4.500	29	4.350
31/62	062	4.650	30	4.500
32/64	UBS 6 * 064 * 1D	4.800	31	4.650
33/66	066	4.950	32	4.800
34/68	068	5.100	33	4.950
35/70	070	5.250	34	5.100
36/72	072	5.400	35	5.250
37/74	074	5.550	36	5.400
38/76	076	5.700	37	5.550
39/78	078	5.850	38	5.700
40/80	080	6.000	39	5.850
41/82	082	6.150	40	6.000
42/84	084	6.300	41	6.150
43/86	086	6.445	42	6.300

* Plating Code.

Dimensions subject to change.

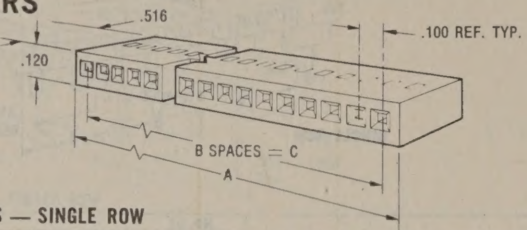
ITT CANNON ELECTRIC

ADAPTA-CON
P. C. AND I/O PACKAGING

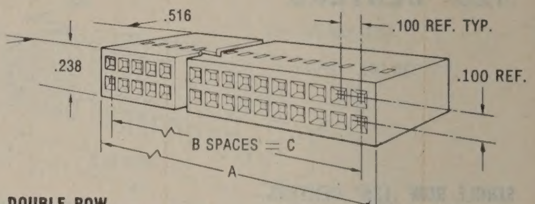
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

UBC CONNECTOR INSULATORS

.100" CENTERS



SINGLE ROW



DOUBLE ROW

CRIMP .100" CENTERS — SINGLE ROW

No. of Contacts	Part Number	A	B	C
4	121-7356-004	.420	3	.300
5	005	.520	4	.400
6	006	.620	5	.500
7	007	.720	6	.600
8	008	.820	7	.700
9	009	.920	8	.800
10	010	1.020	9	.900
11	011	1.120	10	1.000
12	012	1.220	11	1.100
13	013	1.320	12	1.200
14	014	1.420	13	1.300
15	015	1.520	14	1.400
16	016	1.620	15	1.500
17	017	1.720	16	1.600
18	018	1.820	17	1.700
19	019	1.920	18	1.800
20	020	2.020	19	1.900
21	021	2.120	20	2.000
22	022	2.220	21	2.100
23	023	2.320	22	2.200
24	024	2.420	23	2.300
25	121-7356-025	2.520	24	2.400
26	026	2.620	25	2.500
27	027	2.720	26	2.600
28	028	2.820	27	2.700
29	029	2.920	28	2.800
30	030	3.020	29	2.900
31	031	3.120	30	3.000
32	032	3.220	31	3.100
33	033	3.320	32	3.200
34	034	3.420	33	3.300
35	035	3.520	34	3.400
36	036	3.620	35	3.500
37	037	3.720	36	3.600
38	038	3.820	37	3.700
39	039	3.920	38	3.800
40	040	4.020	39	3.900
41	041	4.120	40	4.000
42	042	4.220	41	4.100
43	043	4.320	42	4.200
44	044	4.420	43	4.300
45	045	4.520	44	4.400
46	121-7356-046	4.620	45	4.500
47	047	4.720	46	4.600
48	048	4.820	47	4.700
49	049	4.920	48	4.800
50	050	5.020	49	4.900
51	051	5.120	50	5.000
52	052	5.220	51	5.100
53	053	5.320	52	5.200
54	054	5.420	53	5.300
55	055	5.520	54	5.400
56	056	5.620	55	5.500
57	057	5.720	56	5.600
58	058	5.820	57	5.700
59	059	5.920	58	5.800
60	060	6.020	59	5.900
61	061	6.120	60	6.000
62	062	6.220	61	6.100
63	063	6.320	62	6.200
64	064	6.420	63	6.300
65	065	6.520	64	6.400

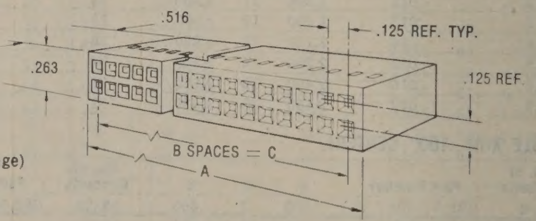
CRIMP .100" CENTERS — DOUBLE ROW

No. of Contacts	Part Number	A	B	C
2/4	121-7326-202	.235	1	.100
3/6	203	.335	2	.200
4/8	204	.435	3	.300
5/10	105	.535	4	.400
6/12	106	.635	5	.500
7/14	107	.735	6	.600
8/16	108	.835	7	.700
9/18	109	.935	8	.800
10/20	110	1.035	9	.900
11/22	111	1.135	10	1.000
12/24	121-7326-112	1.235	11	1.100
13/26	113	1.335	12	1.200
14/28	114	1.435	13	1.300
15/30	115	1.535	14	1.400
16/32	116	1.635	15	1.500
17/34	117	1.735	16	1.600
18/36	118	1.835	17	1.700
19/38	119	1.935	18	1.800
20/40	120	2.035	19	1.900
21/42	121	2.135	20	2.000
22/44	122	2.235	21	2.100
23/46	121-7236-123	2.335	22	2.200
24/48	124	2.435	23	2.300
25/50	125	2.535	24	2.400
26/52	126	2.635	25	2.500
27/54	127	2.735	26	2.600
28/56	128	2.835	27	2.700
29/58	129	2.935	28	2.800
30/60	130	3.035	29	3.000
31/62	131	3.135	30	3.000
32/64	132	3.235	31	3.100

.125" CENTERS

DOUBLE ROW

(single row .125" centers on following page)



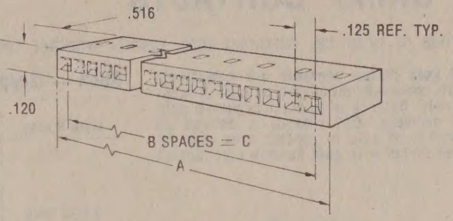
CRIMP .125" CENTERS — DOUBLE ROW

No. of Contacts	Part Number	A	B	C
4/8	121-7325-104	.515	3	.375
5/10	105	.640	4	.500
6/12	106	.765	5	.625
7/14	107	.890	6	.750
8/16	108	1.015	7	.875
9/18	109	1.140	8	1.000
10/20	110	1.265	9	1.125
11/22	111	1.390	10	1.250
12/24	112	1.515	11	1.375
13/26	113	1.640	12	1.500
14/28	121-7325-114	1.765	13	1.625
15/30	115	1.890	14	1.750
16/32	116	2.015	15	1.875
17/34	117	2.140	16	2.000
18/36	118	2.265	17	2.125
19/38	119	2.390	18	2.250
20/40	120	2.515	19	2.375
21/42	121	2.640	20	2.500
22/44	122	2.765	21	2.625
23/46	123	2.890	22	2.750
24/48	121-7325-124	3.015	23	2.875
25/50	125	3.140	24	3.000
26/52	126	3.265	25	3.125
27/54	127	3.390	26	3.250
28/56	128	3.515	27	3.375
29/58	129	3.640	28	3.500
30/60	130	3.765	29	3.625
31/62	131	3.890	30	3.750
32/64	132	4.015	31	3.875

Dimensions subject to change.

UBC CONNECTOR INSULATORS

.125" CENTERS

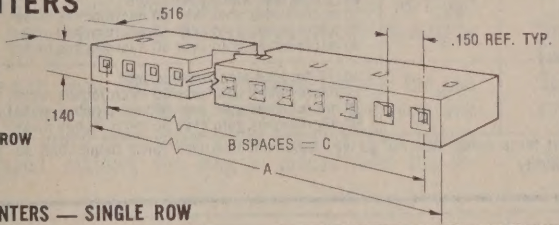


SINGLE ROW

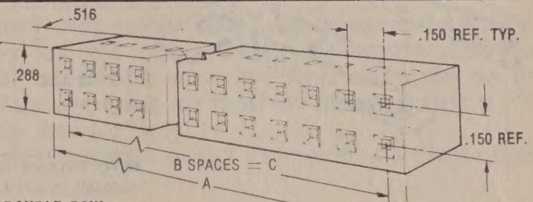
CRIMP .125" CENTERS — SINGLE ROW

No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C
4	121-7358-004	.495	3	.375	20	121-7358-020	2.495	19	2.375	36	121-7358-036	4.495	35	4.375
5	005	.620	4	.500	21	021	2.620	20	2.500	37	037	4.620	36	4.500
6	006	.745	5	.625	22	022	2.745	21	2.625	38	038	4.745	37	4.625
7	007	.870	6	.750	23	023	2.870	22	2.750	39	039	4.870	38	4.750
8	008	.995	7	.875	24	024	2.995	23	2.875	40	040	4.995	39	4.875
9	009	1.120	8	1.000	25	025	3.120	24	3.000	41	041	5.120	40	5.000
10	010	1.245	9	1.125	26	026	3.245	25	3.125	42	042	5.245	41	5.125
11	011	1.370	10	1.250	27	027	3.370	26	3.250	43	043	5.370	42	5.250
12	012	1.495	11	1.375	28	028	3.495	27	3.375	44	044	5.495	43	5.375
13	013	1.620	12	1.500	29	029	3.620	28	3.500	45	045	5.620	44	5.500
14	014	1.745	13	1.625	30	030	3.745	29	3.625	46	046	5.745	45	5.625
15	015	1.870	14	1.750	31	031	3.870	30	3.750	47	047	5.870	46	5.750
16	016	1.995	15	1.875	32	032	3.995	31	3.875	48	048	5.995	47	5.875
17	017	2.120	16	2.000	33	033	4.120	32	4.000	49	049	6.120	48	6.000
18	018	2.245	17	2.125	34	034	4.245	33	4.125	50	050	6.245	49	6.125
19	019	2.370	18	2.250	35	035	4.370	34	4.250	51	051	6.370	50	6.250

.150" CENTERS



SINGLE ROW



DOUBLE ROW

CRIMP .150" CENTERS — SINGLE ROW

No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C
4	121-7357-004	.570	3	.450	18	121-7357-018	2.670	17	2.550	32	121-7357-032	4.770	31	4.650
5	005	.720	4	.600	19	019	2.820	18	2.700	33	033	4.920	32	4.800
6	006	.870	5	.750	20	020	2.970	19	2.850	34	034	5.070	33	4.950
7	007	1.020	6	.900	21	021	3.120	20	3.000	35	035	5.220	34	5.100
8	008	1.170	7	1.050	22	022	3.270	21	3.150	36	036	5.370	35	5.250
9	009	1.320	8	1.200	23	023	3.420	22	3.300	37	037	5.520	36	5.400
10	010	1.470	9	1.350	24	024	3.570	23	3.450	38	038	5.670	37	5.550
11	011	1.620	10	1.500	25	025	3.720	24	3.600	39	039	5.820	38	5.700
12	012	1.770	11	1.650	26	026	3.870	25	3.750	40	040	5.970	39	5.850
13	013	1.920	12	1.800	27	027	4.020	26	3.900	41	041	6.120	40	6.000
14	014	2.070	13	1.950	28	028	4.170	27	4.050	42	042	6.270	41	6.150
15	015	2.220	14	2.100	29	029	4.320	28	4.200	43	043	6.420	42	6.300
16	016	2.370	15	2.250	30	030	4.470	29	4.350					
17	017	2.520	16	2.400	31	031	4.620	30	4.500					

CRIMP .150" CENTERS — DOUBLE ROW

No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C	No. of Contacts	Part Number	A	B	C
4/8	121-7355-104	.590	3	.450	18/36	121-7355-118	2.690	17	2.550	32/64	121-7355-132	4.790	31	4.650
5/10	105	.740	4	.600	19/38	119	2.840	18	2.700	33/66	133	4.940	32	4.800
6/12	106	.890	5	.750	20/40	120	2.990	19	2.850	34/68	134	5.090	33	4.950
7/14	107	1.040	6	.900	21/42	121	3.140	20	3.000	35/70	135	5.240	34	5.100
8/16	108	1.190	7	1.050	22/44	122	3.290	21	3.150	36/72	136	5.390	35	5.250
9/18	109	1.340	8	1.200	23/46	123	3.440	22	3.300	37/74	137	5.540	36	5.400
10/20	110	1.490	9	1.350	24/48	124	3.590	23	3.450	38/76	138	5.690	37	5.550
11/22	111	1.640	10	1.500	25/50	125	3.740	24	3.600	39/78	139	5.840	38	5.700
12/24	112	1.790	11	1.650	26/52	126	3.890	25	3.750	40/80	140	5.990	39	5.850
13/26	113	1.940	12	1.800	27/54	127	4.040	26	3.900	41/82	141	6.140	40	6.000
14/28	114	2.090	13	1.950	28/56	128	4.190	27	4.050	42/84	142	6.290	41	6.150
15/30	115	2.240	14	2.100	29/58	129	4.340	28	4.200	43/86	143	6.440	42	6.300
16/32	116	2.390	15	2.250	30/60	130	4.490	29	4.350					
17/34	117	2.540	16	2.400	31/62	131	4.640	30	4.500					

Dimensions subject to change.

ITT CANNON ELECTRIC

ADAPTA-CON P. C. AND I/O PACKAGING

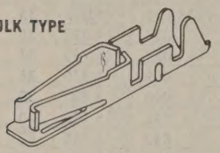
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

UBC CRIMP CONTACTS

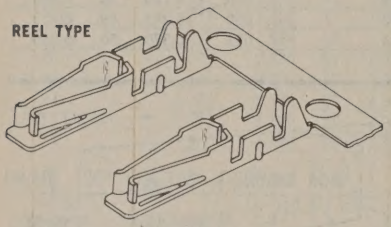
At the time of ordering, customer may specify whether reel carrier strip contacts or loose contacts are desired. Ordering information is below.

NOTE: All gold plated contacts are selectively plated with specified minimums of gold in contact area only. Balance of contact is plated gold flash. For example, -012 plating is defined as 20 microinches of gold in contact area over 50 microinches nickel with gold flash in non-contact area.

BULK TYPE



REEL TYPE



BULK — (Supplied in Quantity, Loose)

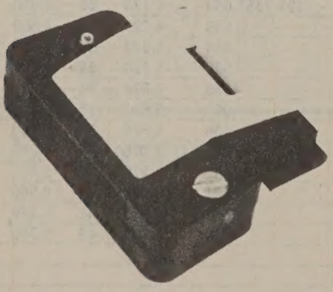
Wire Range	Withdrawal Force, Min.	Insertion Force, Max.	Contact and Plating Thickness	Part No.
18-22 AWG	2 oz.	8 oz.	90/10 tin lead electrodeposited*	030-7313-506
			20 microinches gold over 50 microinches nickel	030-7313-016
			30 microinches gold over 50 microinches nickel	030-7313-096
			50 microinches gold over 50 microinches nickel	030-7313-076
	0.5 oz.	6 oz.	90/10 tin lead electrodeposited*	030-7361-506
			20 microinches gold over 50 microinches nickel	030-7361-016
			30 microinches gold over 50 microinches nickel	030-7361-096
			50 microinches gold over 50 microinches nickel	030-7361-076
24-30 AWG	2 oz.	8 oz.	90/10 tin lead electrodeposited*	030-7313-502
			20 microinches gold over 50 microinches nickel	030-7313-012
			30 microinches gold over 50 microinches nickel	030-7313-092
			50 microinches gold over 50 microinches nickel	030-7313-072
	0.5 oz.	6 oz.	90/10 tin lead electrodeposited*	030-7361-502
			20 microinches gold over 50 microinches nickel	030-7361-012
			30 microinches gold over 50 microinches nickel	030-7361-092
			50 microinches gold over 50 microinches nickel	030-7361-072

REEL — (Supplied 5000 Contacts per Reel)

Wire Range	Withdrawal Force, Min.	Insertion Force, Max.	Plating	Part No.
18-22 AWG	2 oz.	8 oz.	90/10 tin lead electrodeposited*	
			20 microinches gold over 50 microinches nickel	110238-0095
			30 microinches gold over 50 microinches nickel	110238-0155
			50 microinches gold over 50 microinches nickel	110238-0154
	0.5 oz.	6 oz.	90/10 tin lead electrodeposited*	
			20 microinches gold over 50 microinches nickel	110238-0099
			30 microinches gold over 50 microinches nickel	110238-0157
			50 microinches gold over 50 microinches nickel	110238-0156
24-30 AWG	2 oz.	8 oz.	90/10 tin lead electrodeposited*	
			20 microinches gold over 50 microinches nickel	110238-0087
			30 microinches gold over 50 microinches nickel	110238-0151
			50 microinches gold over 50 microinches nickel	110238-0150
	0.5 oz.	6 oz.	90/10 tin lead electrodeposited*	
			20 microinches gold over 50 microinches nickel	110238-0091
			30 microinches gold over 50 microinches nickel	110238-0153
			50 microinches gold over 50 microinches nickel	110238-0152

NOTE: Minimum withdrawal force using .024 sq. gauge. Maximum insertion force using .026 sq. gauge.
*Consult factory for availability.

SPECIAL ASSEMBLIES

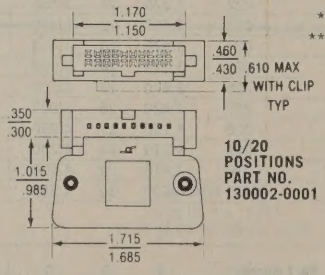


These three special assemblies consist of a modified UBC insulator into which standard UBC contacts are inserted. Cable protection and strain relief is provided by molded plastic clam shells. A locking clip is also provided for latching to printed circuit headers. These connectors mate to matching groups of .025 square pins.

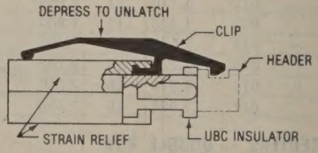
	Material
Contacts	Copper Alloy
Insulator	30% Glass Filled Nylon
Strain Relief	30% Glass Filled Nylon

Positions	Insulator	Clam Shell Strain Relief*	Kit**	Kit***
10/20	121-7366-000	317-7301-001	130002-0001	130002-0101
20/40	121-7367-000	317-7302-002	130002-0002	130002-0102
25/50	121-7367-002	317-7305-000	130002-0005	130002-0105

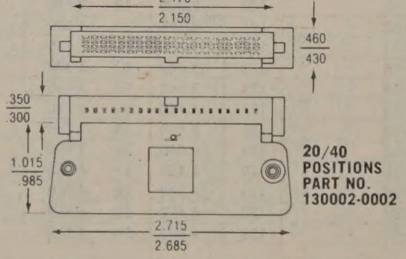
*Requires 2.
** Consists of 1 insulator, 2 clam shells and 2 screws.
***Consists of 1 insulator, 2 clam shells, 2 screws and a locking clip.



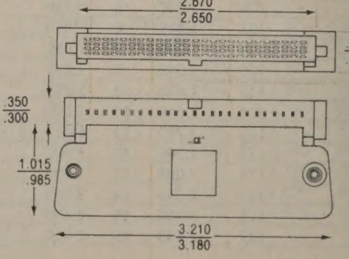
10/20 POSITIONS PART NO. 130002-0001



PART NO. 029-7300-0000 LOCKING CLIP



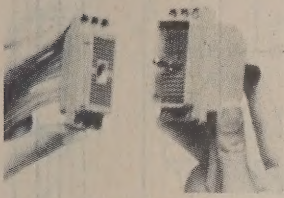
20/40 POSITIONS PART NO. 130002-0002

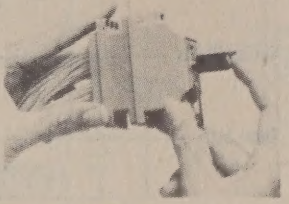


25/50 POSITIONS PART NO. 130002-0005

Dimensions subject to change.

CANNON DL SERIES ZERO INSERTION FORCE CONNECTORS ARE LONG-LIVED, FAST AND INEXPENSIVE


This is our "DL" Series.


Simply place it together.

Turn the cam lock a quarter turn.

It's locked and mated.

The Cannon DL Series of ZIF connectors fills the need in the commercial/industrial, computer and peripheral equipment market places for low-cost, high performance multiple-wire power and signal connectors.

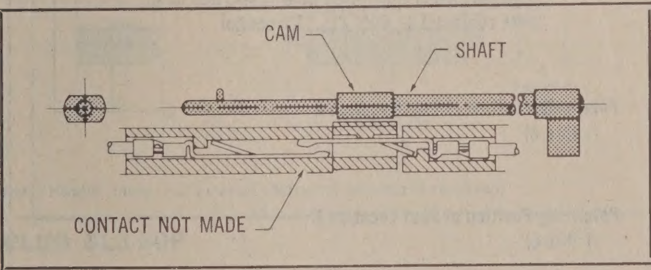
DL connectors feature: a minimum rated life of 10,000 complete mating and unmating cycles with no performance loss; can be mated and unmated in less than two seconds even with as many as 2,496 contacts; and they cost less (often as much as 25% less) per mated line than competitive high-density rack-and-panel connectors.

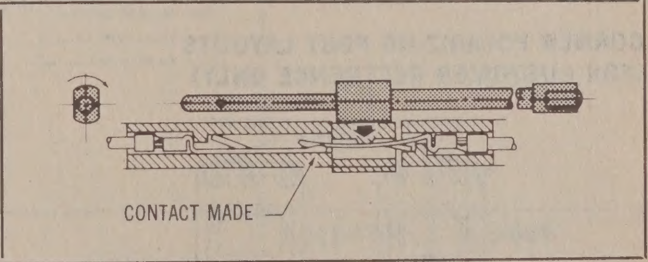
The long life and rapid mating are achieved through the use of our Zero Insertion Force design. Contacts in the plug and receptacle do not touch each other while the connector halves are being engaged. Instead, the plug is placed over the receptacle, then a quarter turn of an actuating shaft mates all the contacts at once, while also physically locking the connector halves together. Connector engagement force is zero, and the only wear on the contacts occurs as they are pressed together and lightly wiped past each other during the camming and locking operation.

Simple. Effective. And reliable.

Combining their special design with commercial-grade materials and low cost crimp and wrappable hermaphroditic contacts that may be hand or machine terminated makes the DL Series of ZIF connectors the finest low-cost-per-mated-line I/O connectors available today.

For more information, contact your nearest ITT Cannon Field Office.





STANDARD DATA

MATERIALS AND FINISHES

Connectors

- Glass filled thermoplastic insulator
- Copper alloy contacts
- Stainless steel insulator retainer
- Stainless steel cam actuator
- Contacts plated .000020" gold over .000050" nickel or 90/10 tin lead, electrodeposited

Accessories

- Thermoplastic junction shell
- Stainless steel cable clamp
- Glass filled nylon actuating handle
- Polyvinyl chloride protective boot
- Polyethylene protective cap

MECHANICAL FEATURES

- Crimp or wire wrapping contacts
- 60, 96, 156, 624, 1248 or 2496 contact positions
- Multiple polarizing positions
- 8 lbs. (35,585 N) min. contact retention
- Permanent raised cavity identification
- Actuation by screwdriver, socket wrench, allen wrench (for DLI, 2 and 3 only) or handle

ELECTRICAL DATA

- Ambient Operating Temperature: See page 128
- Wire Range: 18 AWG thru 30 AWG (solid or stranded)
- Current Rating: 5 amps (see page 128)
- DWV: 1200 VAC at sea level
- Contact Resistance: 15 milliohms max.
- 5000 megohms insulation resistance min.

ITT CANNON ELECTRIC

DL "ZIF" RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

HOW TO ORDER

STANDARD PLUGS AND RECEPTACLES

The basic DL connector is a standard plug and receptacle for applications requiring cable-to-cable, cable-to-panel and panel-to-panel interconnections. Either crimp or wrap post contacts may be used in any connector. DL Series connectors are available in shell sizes 1, 2, 3 and 4.

DL 4-2496 RW 4

Series Prefix

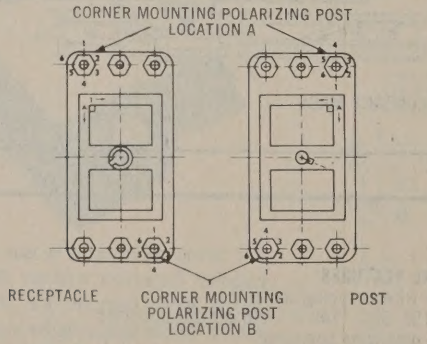
Shell Size
1, 2, 3 or 4

Number of Contacts
Shell Size 1: 156 Contacts
Shell Size 2: 96 Contacts
Shell Size 3: 60 Contacts
Shell Size 4: Three shell sizes — 2496 Contacts or 1248 Contacts or 624 Contacts

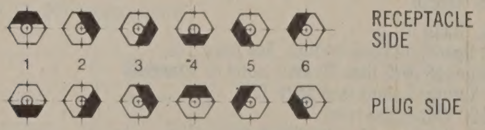
Shell Style
P — Plug (crimp contacts must be ordered separately)
R — Receptacle (crimp contacts must be ordered separately)
PW — Plug with wrap post contacts and adapter assembled (with front insertable/removable contacts)
RW — Receptacle with wrap post contacts and adapter assembled (with front insertable/removable contacts) Note: DL1, 2 and 3 receptacles are also available with rear-entry wrap post contacts.

.025" (0,64) Square Wrap Post Tail Length
(Use only when specifying front removable wrap post contacts) 4: .605" (15,37) nominal

CORNER POLARIZING POST LAYOUTS (FOR CUSTOMER REFERENCE ONLY)



DL1-156, DL2-96 and DL3-60
REFERENCE VIEWS FOR POLARIZING ARRANGEMENTS



NOTE: All polarizing is accomplished by installing P/N DL-POL-POST in corners. May be used in place of mounting nut.

POLARIZED PLUGS AND RECEPTACLES

Polarizing is available only on DL1, 2 and 3 connectors, and requires three digits. If no polarization required, leave blank.

DL 1-156 RW 4 X X C

Series Prefix

Shell Size
1, 2 or 3

Number of Contacts
Shell Size 1: 156 Contacts
Shell Size 2: 96 Contacts
Shell Size 3: 60 Contacts

Shell Style
P — Plug (crimp contacts must be ordered separately)
R — Receptacle (crimp contacts must be ordered separately)
PW — Plug with wrap post contacts and adapter assembled (with front removable/insertable contacts)
RW — Receptacle with wrap post contacts and adapter assembled (with front removable/insertable contacts) Note: DL1, 2 and 3 connectors are also available with rear-entry wrap post contacts.

.025" (0,64) Square Wrap Post Tail Length
(Use only when specifying front removable wrap post contacts) 4: .605" (15,37) nominal

Polarizing Position of Post Location A
(1 thru 6)

Polarizing Position of Post Location B
(1 thru 6)

Corner Polarizing Post
Standard

EXAMPLE:
DL1-156RW432C describes a Size 1 receptacle connector with 156 front insertable/removable wrap post contacts with polarization position 3 at location A and position 2 at location B.

Note:
All corner mounting polarization is accomplished by replacing the nut with the polarizing post (Part No. DL-Pol-Post)

EXAMPLE:
Receptacle DL1-156RW432C would mate with plug DL1-156PW432C.

(Millimeters are in parentheses)

ITT ELECTRIC CANNON

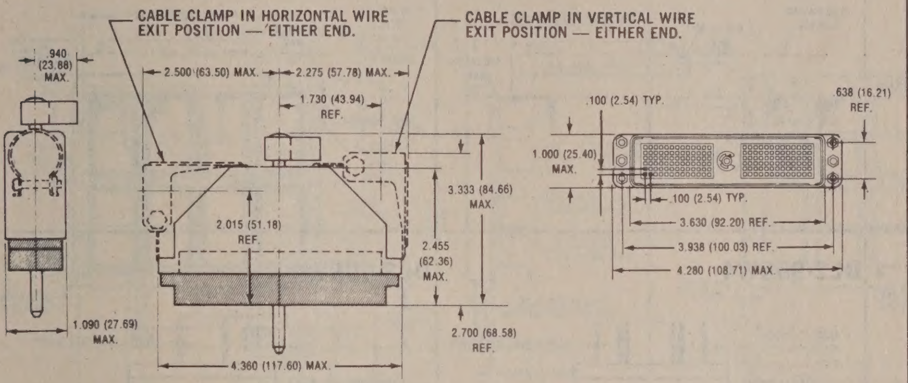
DL "ZIF" RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

SHELL DIMENSIONS

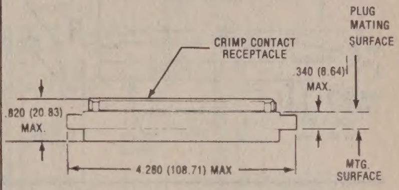
CRIMP CONTACTS

PLUG DL1-156P

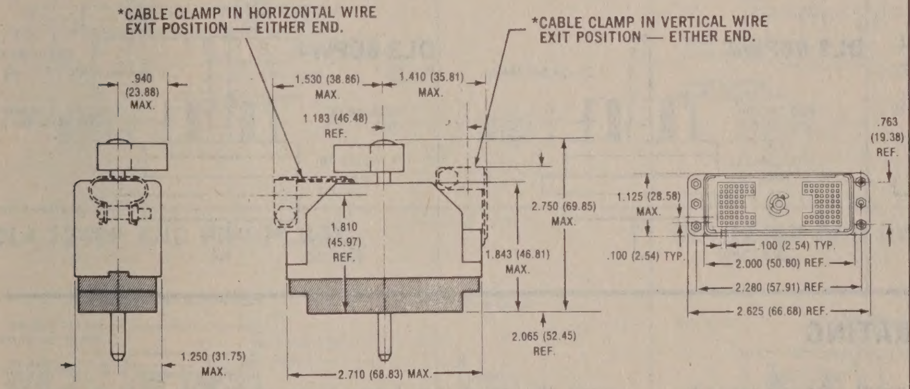

CABLE CLAMP IN HORIZONTAL WIRE EXIT POSITION — EITHER END.
CABLE CLAMP IN VERTICAL WIRE EXIT POSITION — EITHER END.
.940 (23.88) MAX.
2.500 (63.50) MAX.
2.275 (57.78) MAX.
1.730 (43.94) REF.
.100 (2.54) TYP.
.638 (16.21) REF.
1.000 (25.40) MAX.
3.333 (84.66) MAX.
2.015 (51.18) REF.
2.455 (62.36) MAX.
.100 (2.54) TYP.
3.630 (92.20) REF.
3.938 (100.03) REF.
4.280 (108.71) MAX.
1.090 (27.69) MAX.
2.700 (68.58) REF.
4.360 (117.60) MAX.

Note: Handle, clamp, and junction shell must be ordered separately.

RECEPTACLE DL1-156R

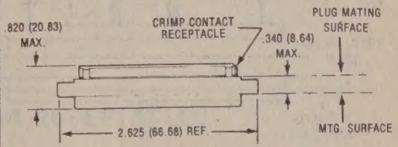

PLUG MATING SURFACE
CRIMP CONTACT RECEPTACLE
.340 (8.64) MAX.
.820 (20.83) MAX.
4.280 (108.71) MAX
MTG. SURFACE

PLUG DL2-96P

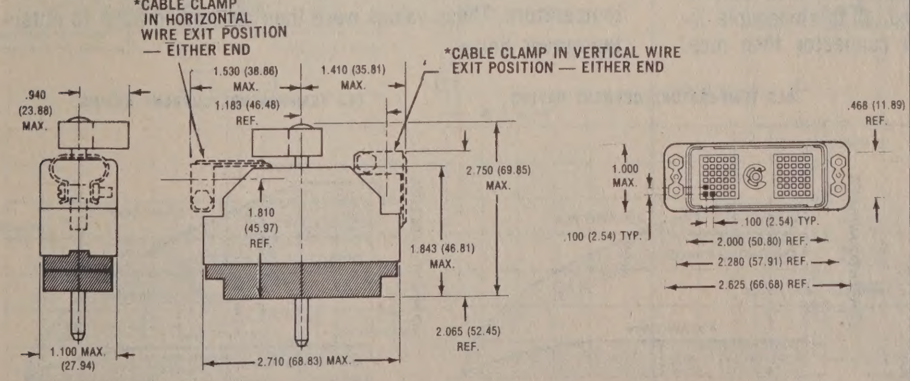

*CABLE CLAMP IN HORIZONTAL WIRE EXIT POSITION — EITHER END.
*CABLE CLAMP IN VERTICAL WIRE EXIT POSITION — EITHER END.
.940 (23.88) MAX.
1.530 (38.86) MAX.
1.410 (35.81) MAX.
1.183 (46.48) REF.
.763 (19.38) REF.
2.750 (69.85) MAX.
1.125 (28.58) MAX.
1.810 (45.97) REF.
1.843 (46.81) MAX.
.100 (2.54) TYP.
.100 (2.54) TYP.
2.000 (50.80) REF.
2.280 (57.91) REF.
2.625 (66.68) REF.
2.065 (52.45) REF.
1.250 (31.75) MAX.
2.710 (68.83) MAX.

Note: Handle, clamp, and junction shell must be ordered separately.

RECEPTACLE DL2-96R

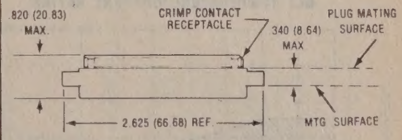

.820 (20.83) MAX.
CRIMP CONTACT RECEPTACLE
PLUG MATING SURFACE
.340 (8.64) MAX.
2.625 (66.68) REF.
MTG. SURFACE

PLUG DL3-60P


*CABLE CLAMP IN HORIZONTAL WIRE EXIT POSITION — EITHER END
*CABLE CLAMP IN VERTICAL WIRE EXIT POSITION — EITHER END
.940 (23.88) MAX.
1.530 (38.86) MAX.
1.410 (35.81) MAX.
1.183 (46.48) REF.
.468 (11.89) REF.
2.750 (69.85) MAX.
1.000 MAX.
1.810 (45.97) REF.
.100 (2.54) TYP.
.100 (2.54) TYP.
1.843 (46.81) MAX.
2.000 (50.80) REF.
2.280 (57.91) REF.
2.625 (66.68) REF.
2.065 (52.45) REF.
1.100 MAX. (27.94)
2.710 (68.83) MAX.

Note: Handle, clamp, and junction shell must be ordered separately.

RECEPTACLE DL3-60R


.820 (20.83) MAX.
CRIMP CONTACT RECEPTACLE
PLUG MATING SURFACE
.340 (8.64) MAX
2.625 (66.68) REF.
MTG SURFACE

Dimensions subject to change.

(millimeters are in parentheses)

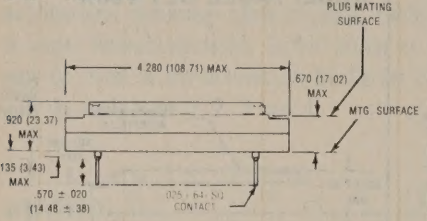
DL "ZIF" RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

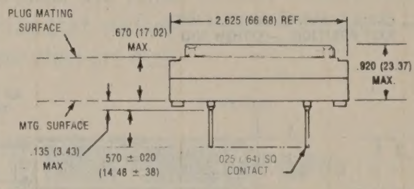
SHELL DIMENSIONS

SQUARE WRAP POST RECEPTACLES

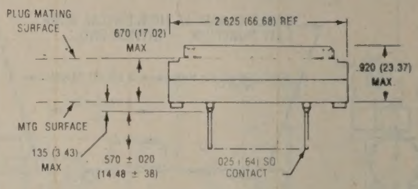
DL1-156RW


PLUG MATING SURFACE
4.280 (108.71) MAX
.670 (17.02) MAX
MTG SURFACE
.920 (23.37) MAX
.135 (3.43) MAX
.570 ± .020 (14.48 ± .38)
.025 (.64) SQ CONTACT

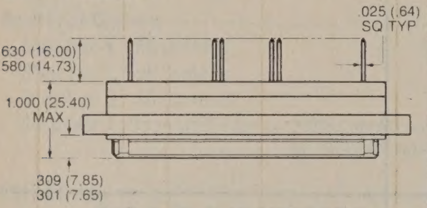
DL2-96RW


PLUG MATING SURFACE
.670 (17.02) MAX
2.625 (66.68) REF
.920 (23.37) MAX.
MTG SURFACE
.135 (3.43) MAX
.570 ± .020 (14.48 ± .38)
.025 (.64) SQ CONTACT

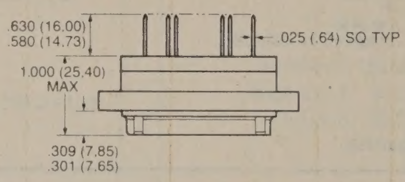
DL3-60RW


PLUG MATING SURFACE
.670 (17.02) MAX
2.625 (66.68) REF
.920 (23.37) MAX
MTG SURFACE
.135 (3.43) MAX
.570 ± .020 (14.48 ± .38)
.025 (.64) SQ CONTACT

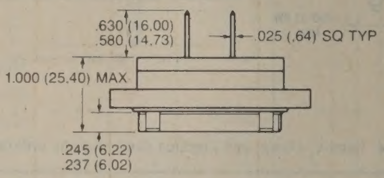
DL1-156RW4


.025 (.64) SQ TYP
.630 (16.00)
.580 (14.73)
1.000 (25.40) MAX
.309 (7.85)
.301 (7.65)

DL2-96RW4

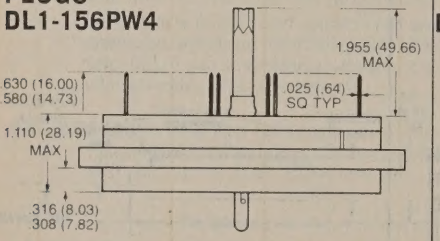

.630 (16.00)
.580 (14.73)
.025 (.64) SQ TYP
1.000 (25.40) MAX
.309 (7.85)
.301 (7.65)

DL3-60RW4

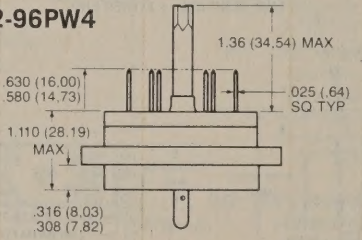

.630 (16.00)
.580 (14.73)
.025 (.64) SQ TYP
1.000 (25.40) MAX
.245 (6.22)
.237 (6.02)

PLUGS

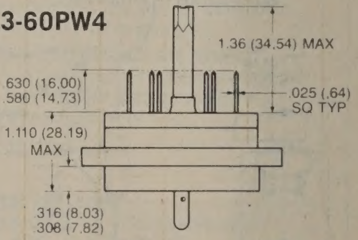
DL1-156PW4


1.955 (49.66) MAX
.630 (16.00)
.580 (14.73)
.025 (.64) SQ TYP
1.110 (28.19) MAX
.316 (8.03)
.308 (7.82)

DL2-96PW4


1.36 (34.54) MAX
.630 (16.00)
.580 (14.73)
.025 (.64) SQ TYP
1.110 (28.19) MAX
.316 (8.03)
.308 (7.82)

DL3-60PW4

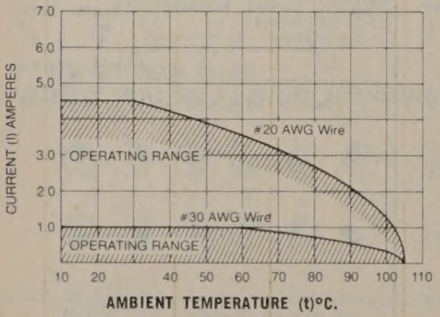

1.36 (34.54) MAX
.630 (16.00)
.580 (14.73)
.025 (.64) SQ TYP
1.110 (28.19) MAX
.316 (8.03)
.308 (7.82)

TEMPERATURE/CURRENT RATING

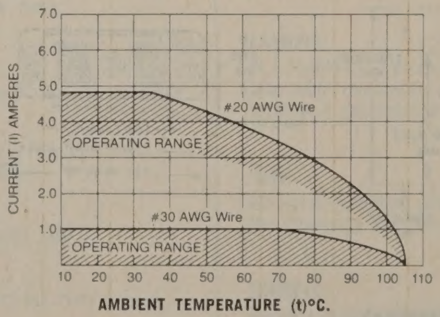
The curves shown represent the rated current carrying capacity of the Cannon DL1, DL2 and DL3 electrical connectors, derated to 80% of the values recorded using the methods specified by International Electro-Technical Commission Document 48 (1975).

Current was applied to the total connector (all contacts) in one-half ampere increments and maintained at each current level until thermal stability was achieved. A thermocouple inserted into the "hottest area" of each connector then measured the connector temperature at the same time that an ambient temperature reading was taken. The difference between the two measured values is the heat rise or self-heating created solely by the current flow, and this temperature rise for each current level was deducted from the insulator material rated temperature. These values were then derated to 80% to obtain the curves below.

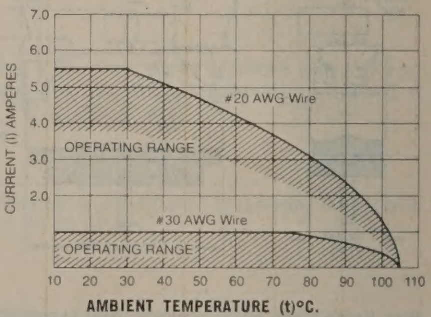
DL1 TEMPERATURE/CURRENT RATING



DL2 TEMPERATURE/CURRENT RATING



DL3 TEMPERATURE/CURRENT RATING



(millimeters are in parentheses)

Dimensions subject to change.

ITT CANNON ELECTRIC

DL "ZIF" RECTANGULAR CONNECTORS

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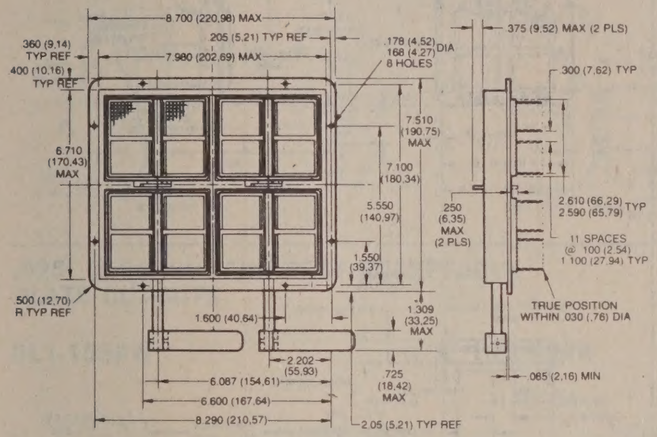
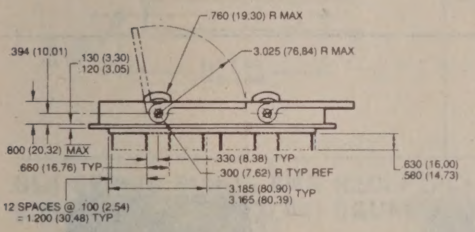
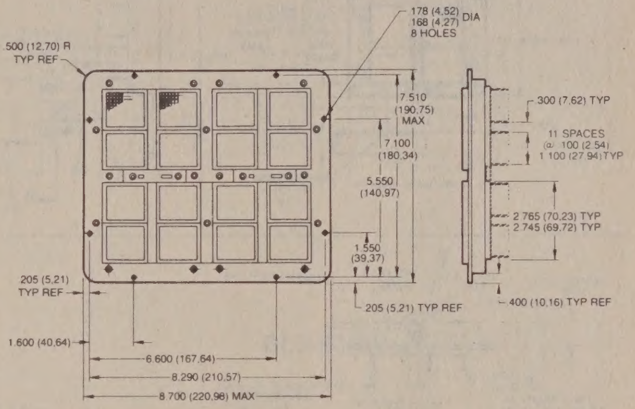
SHELL DIMENSIONS

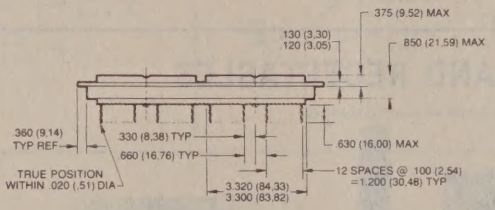
DL4-2496P AND PW4 PLUGS


8.700 (220,98) MAX
.205 (5,21) TYP REF
.360 (9,14) TYP REF
7.980 (202,69) MAX
.400 (10,16) TYP REF
.178 (4,52)
.168 (4,27) DIA
8 HOLES
.375 (9,52) MAX (2 PLS)
.300 (7,62) TYP
6.710 (170,43) MAX
7.510 (190,75) MAX
7.100 (180,34)
5.550 (140,97)
.250 (6,35) MAX (2 PLS)
2.610 (66,29)
2.590 (65,79) TYP
11 SPACES @ .100 (2,54) 1.100 (27,94) TYP
1.550 (39,37)
.500 (12,70) R TYP REF
1.600 (40,64)
1.309 (33,25) MAX
TRUE POSITION WITHIN .030 (,76) DIA
2.202 (55,93)
6.087 (154,61)
.725 (18,42) MAX
.085 (2,16) MIN
6.600 (167,64)
8.290 (210,57)
2.05 (5,21) TYP REF

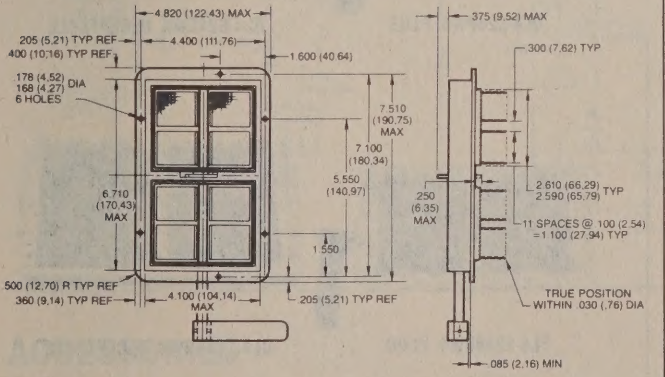

.760 (19,30) R MAX
.394 (10,01)
.130 (3,30)
.120 (3,05)
3.025 (76,84) R MAX
.800 (20,32) MAX
.660 (16,76) TYP
.330 (8,38) TYP
.300 (7,62) R TYP REF
3.185 (80,90)
3.165 (80,39) TYP
.630 (16,00)
.580 (14,73)
12 SPACES @ .100 (2,54) = 1.200 (30,48) TYP

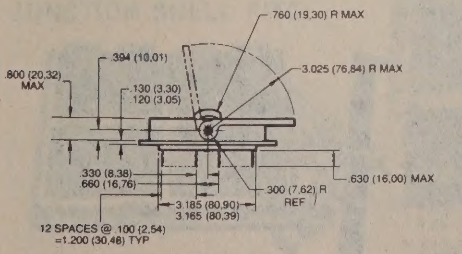
DL4-2496R AND RW4 RECEPTACLES


.178 (4,52)
.168 (4,27) DIA
8 HOLES
.500 (12,70) R TYP REF
7.510 (190,75) MAX
7.100 (180,34)
5.550 (140,97)
1.550 (39,37)
.300 (7,62) TYP
11 SPACES @ .100 (2,54) 1.100 (27,94) TYP
2.765 (70,23) TYP
2.745 (69,72) TYP
.205 (5,21) TYP REF
.205 (5,21) TYP REF
.400 (10,16) TYP REF
1.600 (40,64)
6.600 (167,64)
8.290 (210,57)
8.700 (220,98) MAX

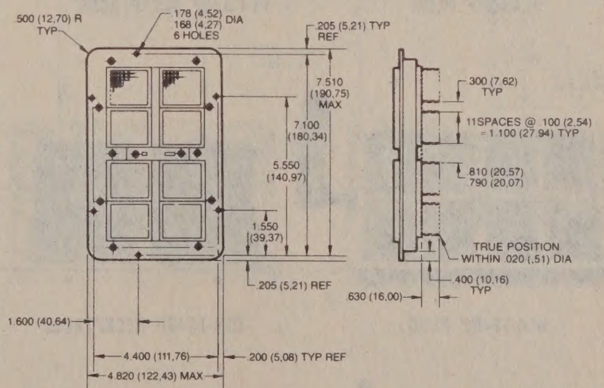

.375 (9,52) MAX
.130 (3,30)
.120 (3,05)
.850 (21,59) MAX
.360 (9,14) TYP REF
.330 (8,38) TYP
.660 (16,76) TYP
.630 (16,00) MAX
TRUE POSITION WITHIN .020 (,51) DIA
12 SPACES @ .100 (2,54) =1.200 (30,48) TYP
3.320 (84,33)
3.300 (83,82)

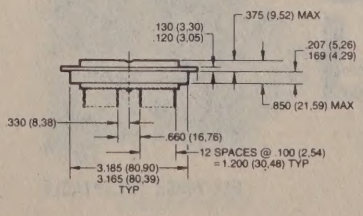
DL4-1248P AND PW4 PLUGS


4.820 (122,43) MAX
.205 (5,21) TYP REF
4.400 (111,76)
.400 (10,16) TYP REF
1.600 (40,64)
.178 (4,52)
.168 (4,27) DIA
6 HOLES
.375 (9,52) MAX
.300 (7,62) TYP
7.510 (190,75) MAX
7.100 (180,34)
5.550 (140,97)
6.710 (170,43) MAX
2.610 (66,29)
2.590 (65,79) TYP
.250 (6,35) MAX
11 SPACES @ .100 (2,54) =1.100 (27,94) TYP
1.550
.500 (12,70) R TYP REF
.360 (9,14) TYP REF
4.100 (104,14) MAX
.205 (5,21) TYP REF
TRUE POSITION WITHIN .030 (,76) DIA
.085 (2,16) MIN


.760 (19,30) R MAX
.394 (10,01)
3.025 (76,84) R MAX
.800 (20,32) MAX
.130 (3,30)
.120 (3,05)
.330 (8,38)
.660 (16,76)
.630 (16,00) MAX
3.185 (80,90)
3.165 (80,39)
.300 (7,62) R REF
12 SPACES @ .100 (2,54) =1.200 (30,48) TYP

DL4-1248R AND RW4 RECEPTACLES


.500 (12,70) R TYP
.178 (4,52)
.168 (4,27) DIA
6 HOLES
.205 (5,21) TYP REF
7.510 (190,75) MAX
7.100 (180,34)
5.550 (140,97)
1.550 (39,37)
.300 (7,62) TYP
11SPACES @ .100 (2,54) = 1.100 (27,94) TYP
.810 (20,57)
.790 (20,07)
TRUE POSITION WITHIN .020 (,51) DIA
.400 (10,16) TYP
.205 (5,21) REF
.630 (16,00)
1.600 (40,64)
4.400 (111,76)
.200 (5,08) TYP REF
4.820 (122,43) MAX


.375 (9,52) MAX
.130 (3,30)
.120 (3,05)
.207 (5,26)
.169 (4,29)
.850 (21,59) MAX
.330 (8,38)
.660 (16,76)
12 SPACES @ .100 (2,54) = 1.200 (30,48) TYP
3.185 (80,90)
3.165 (80,39) TYP

Dimensions are subject to change.

(millimeters are in parentheses)

ITT CANNON ELECTRIC

DL "ZIF" RECTANGULAR CONNECTORS

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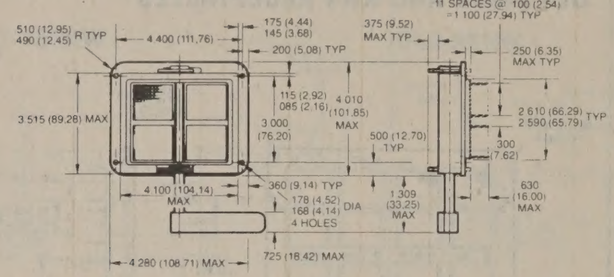
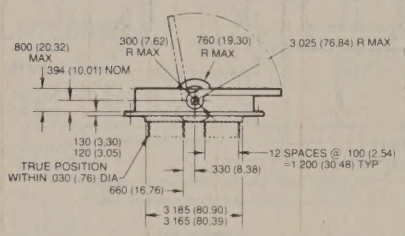
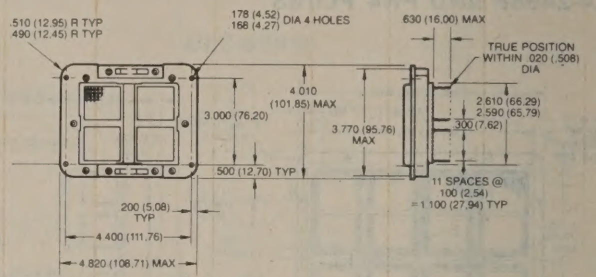
SHELL DIMENSIONS

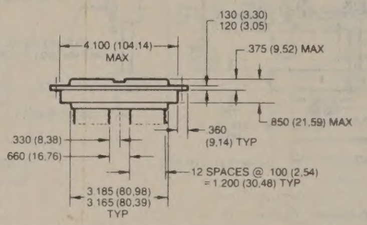
DL4-624P AND PW4 PLUGS


510 (12.95) 490 (12.45) R TYP
4.400 (111.76)
175 (4.44) 145 (3.68)
200 (5.08) TYP
375 (9.52) MAX TYP
11 SPACES @ .100 (2.54) =1.100 (27.94) TYP
250 (6.35) MAX TYP
3.515 (89.28) MAX
115 (2.92) 085 (2.16)
4.010 (101.85) MAX
3.000 (76.20)
2.610 (66.29) 2.590 (65.79) TYP
500 (12.70) TYP
300 (7.62)
4.100 (104.14) MAX
360 (9.14) TYP
178 (4.52) 168 (4.14) DIA 4 HOLES
1.309 (33.25) MAX
630 (16.00) MAX
4.280 (108.71) MAX
725 (18.42) MAX

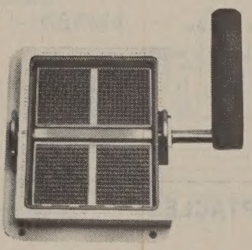

800 (20.32) MAX
300 (7.62) R MAX
760 (19.30) R MAX
3.025 (76.84) R MAX
394 (10.01) NOM
130 (3.30) 120 (3.05)
TRUE POSITION WITHIN .030 (.76) DIA
12 SPACES @ .100 (2.54) =1.200 (30.48) TYP
330 (8.38)
660 (16.76)
3.185 (80.90) 3.165 (80.39)

DL4-624R AND RW4 RECEPTACLES

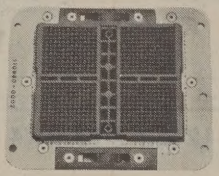

.510 (12.95) R TYP .490 (12.45) R TYP
178 (4.52) 168 (4.27) DIA 4 HOLES
630 (16.00) MAX
TRUE POSITION WITHIN .020 (.508) DIA
4.010 (101.85) MAX
3.000 (76.20)
3.770 (95.76) MAX
2.610 (66.29) 2.590 (65.79)
300 (7.62)
500 (12.70) TYP
11 SPACES @ .100 (2.54) =1.100 (27.94) TYP
200 (5.08) TYP
4.400 (111.76)
4.820 (108.71) MAX


130 (3.30) 120 (3.05)
4.100 (104.14) MAX
375 (9.52) MAX
850 (21.59) MAX
360 (9.14) TYP
330 (8.38)
660 (16.76)
12 SPACES @ .100 (2.54) =1.200 (30.48) TYP
3.185 (80.98) 3.165 (80.39) TYP

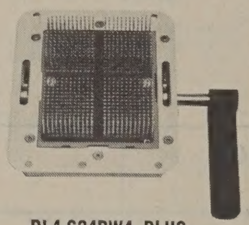
PLUGS AND RECEPTACLES



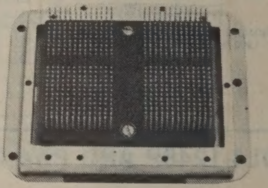
DL4-624P PLUG



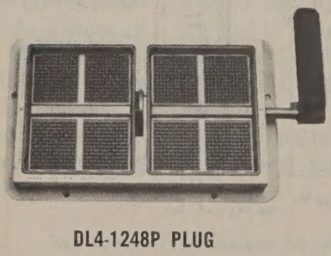
DL4-624R RECEPTACLE



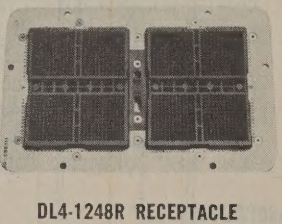
DL4-624PW4 PLUG



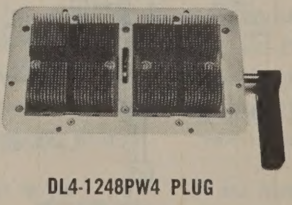
DL4-624RW4 RECEPTACLE



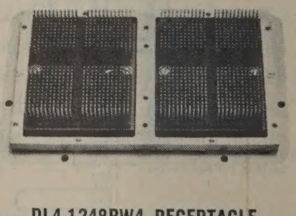
DL4-1248P PLUG



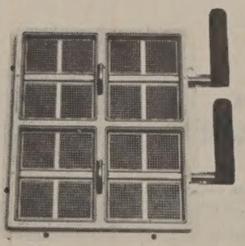
DL4-1248R RECEPTACLE



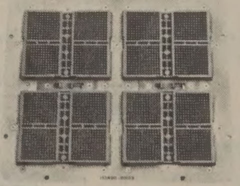
DL4-1248PW4 PLUG



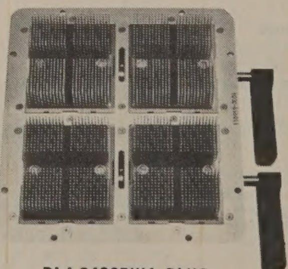
DL4-1248RW4 RECEPTACLE



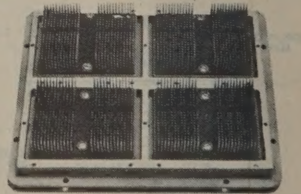
DL4-2496P PLUG



DL4-2496R RECEPTACLE



DL4-2496PW4 PLUG



DL4-2496RW4 RECEPTACLE

(millimeters are in parentheses)

Dimensions subject to change.

ITT CANNON ELECTRIC

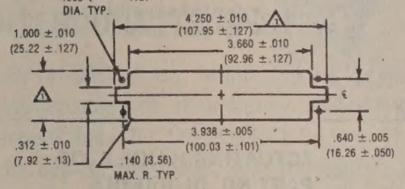
DL "ZIF" RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

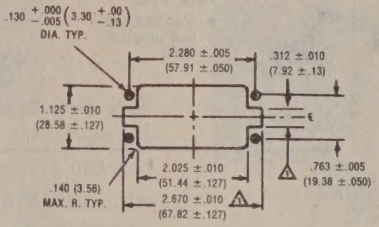
PANEL CUTOUTS

STANDARD PLUGS AND RECEPTACLES

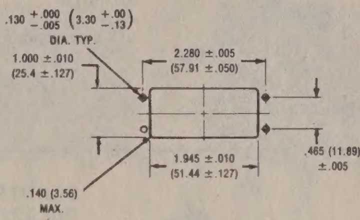
DL1-156


130 +.000 −.005 (3.30 +.00 −.13)
DIA. TYP.
4.250 ±.010
(107.95 ±.127)
1
3.660 ±.010
(92.96 ±.127)
1.000 ±.010
(25.22 ±.127)
1
℄
3.938 ±.005
(100.03 ±.101)
.640 ±.005
(16.26 ±.050)
.312 ±.010
(7.92 ±.13)
.140 (3.56)
MAX. R. TYP.

DL2-96

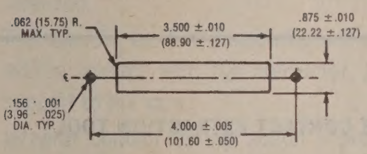

.130 +.000 −.005 (3.30 +.00 −.13)
DIA. TYP.
2.280 ±.005
(57.91 ±.050)
.312 ±.010
(7.92 ±.13)
1.125 ±.010
(28.58 ±.127)
℄
2.025 ±.010
(51.44 ±.127)
.763 ±.005
(19.38 ±.050)
1
.140 (3.56)
MAX. R. TYP.
2.670 ±.010
(67.82 ±.127)
1

DL3-60

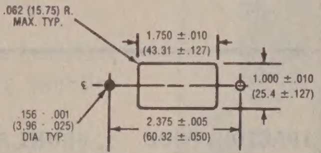

.130 +.000 −.005 (3.30 +.00 −.13)
DIA. TYP.
1.000 ±.010
(25.4 ±.127)
2.280 ±.005
(57.91 ±.050)
1.945 ±.010
(51.44 ±.127)
.465 (11.89)
±.005
.140 (3.56)
MAX.

.025" (0,64) SQUARE POST RECEPTACLE PLATE CUTOUTS

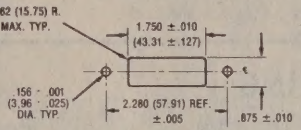
DL1-156RW


.062 (15.75) R.
MAX. TYP.
3.500 ±.010
(88.90 ±.127)
.875 ±.010
(22.22 ±.127)
℄
.156 · .001
(3,96 · .025)
DIA. TYP.
4.000 ±.005
(101.60 ±.050)

DL2-96RW


.062 (15.75) R.
MAX. TYP.
1.750 ±.010
(43.31 ±.127)
℄
1.000 ±.010
(25.4 ±.127)
.156 · .001
(3,96 · .025)
DIA TYP.
2.375 ±.005
(60.32 ±.050)

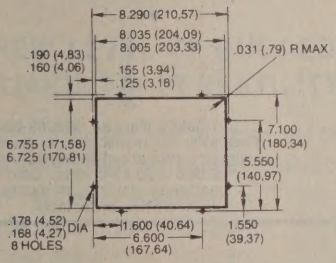
DL3-60RW


.062 (15.75) R.
MAX. TYP.
1.750 ±.010
(43.31 ±.127)
℄
.156 · .001
(3,96 · .025)
DIA. TYP.
2.280 (57.91) REF.
±.005
.875 ±.010

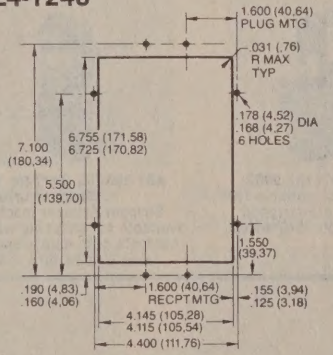
△ REQUIRED FOR CENTER MOUNTING POLARIZATION ONLY

DL4 SERIES PLUGS AND RECEPTACLES (CRIMP AND .025" (0,64) SQUARE POST CONTACTS)

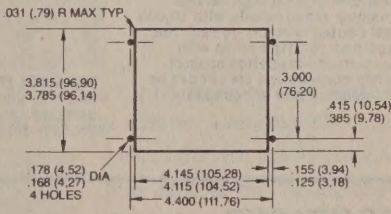
DL4-2496


8.290 (210,57)
8.035 (204,09)
8.005 (203,33)
.031 (,79) R MAX
.190 (4,83)
.160 (4,06)
.155 (3,94)
.125 (3,18)
7.100
(180,34)
6.755 (171,58)
6.725 (170,81)
5.550
(140,97)
.178 (4,52)
.168 (4,27)
DIA
8 HOLES
1.600 (40,64)
6.600
(167,64)
1.550
(39,37)

DL4-1248

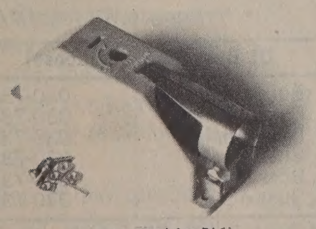

1.600 (40,64)
PLUG MTG
.031 (,76)
R MAX
TYP
.178 (4,52)
.168 (4,27)
DIA
6 HOLES
7.100
(180,34)
6.755 (171,58)
6.725 (170,82)
5.500
(139,70)
1.550
(39,37)
.190 (4,83)
.160 (4,06)
1.600 (40,64)
RECPT MTG
.155 (3,94)
.125 (3,18)
4.145 (105,28)
4.115 (105,54)
4.400 (111,76)

DL4-624


.031 (,79) R MAX TYP
3.815 (96,90)
3.785 (96,14)
3.000
(76,20)
.415 (10,54)
.385 (9,78)
.178 (4,52)
.168 (4,27)
DIA
4 HOLES
4.145 (105,28)
4.115 (104,52)
.155 (3,94)
.125 (3,18)
4.400 (111,76)

ACCESSORIES

JUNCTION SHELL KITS



(Standard for DL1)

PART NO. DL1-J/S

- Stainless steel cable clamps
- Fits on plug or receptacle housing
- Cable clamp can be mounted for right angle and straight cable entry
- Knockout plug provides alternate second cable entry

(Standard for DL3)

PART NO. DL3-J/S

- Stainless steel cable clamps
- For max. .625 (15,9) cable entry
- 90° or 180° cable entry

Dimensions subject to change.

(Millimeters are in parentheses)

ITT CANNON ELECTRIC

DL "ZIF" RECTANGULAR CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ACCESSORIES

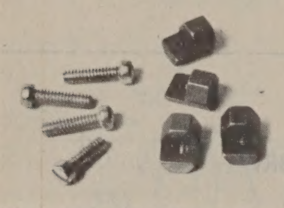
CABLE CLAMPS

PART NO. DL1-C/C
- For use on DL1 junction shell only

PART NO. DL2-C/C
- Also used on DL3 junction shell

Standard for DL2)

PART NO. DL2-J/S-LRG-C/C
- Stainless steel cable clamps
- For .625" (15,9) max. cable entry
- Two piece junction shell
- 45° cable entry



(Standard for 1-156, 2-96 and 3-60)

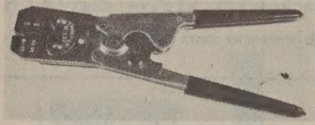
CORNER MOUNTING POLARIZING KIT
PART NO. DL-POL-POST
- Provides multiple polarizing positions

NOTE: For center mounting polarizing kit for DL1-156 and 2-96 please consult the factory.

ACTUATING HANDLE KIT
PART NO. DL-HANDLE
- Provides a convenient method of actuating the contacts and cam for locking the connector
- Kit provides actuating handle and attaching self tapping screw
- Pointer on handle denotes "locked" and "open" positions

TOOLING

HAND CRIMP TOOL

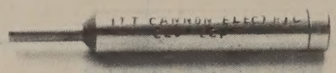


Part No. CCT-DL (for AWG 20 thru 30 wire)

CONTACT EXTRACTION TOOL

Part No. CET-DL-2

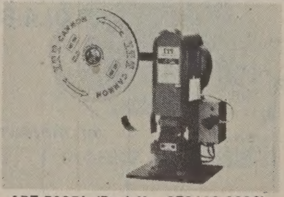
FRONT REMOVABLE CONTACT EXTRACTION TOOL



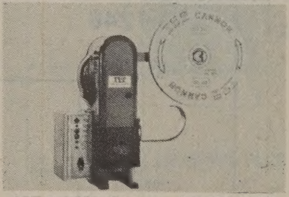
PART NO. CET-ECP
Front removable .025 (,64) Square Wrap Post Contact Extraction Tool.

SEMI-AUTOMATIC CRIMPING MACHINES (FOR REEL CARRIED CONTACTS)

Designed to meet high volume crimping requirements with 10,000 reel carried contacts on each reel. Modified "B" type crimp with wrap-around insulation support. Crimp machine and die set can be ordered together or separately.



ABT-500DL (Part No. 070186-0002)
Crimp machine. Die sets available for crimping contacts on pre-stripped individual #18 thru #30 AWG wires.

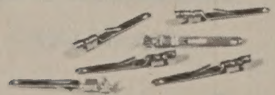


ABT-500CCS (Part No. 070232-0000)
Stripper Crimper
Stripper-Crimper machine. Die sets available for stripping wire and crimping contacts onto multi-conductor jacketed cable in #18 thru #30 AWG sizes.

ABT-606DL (Part No. 070293-001)
Pneumatic crimp machine for crimping contacts onto pre-stripped individual #18 thru #30 AWG wires. Used by customers requiring moderate quantities of contacts.

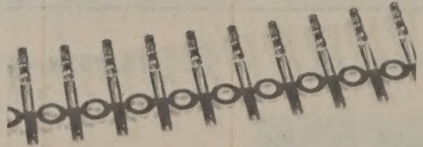
CONTACTS

LOOSE



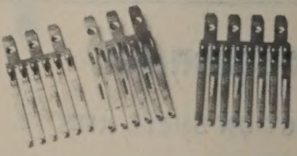
- Hermaphroditic for low cost

REELED



- Crimp removable with .025 (0,64) sq. posts for wire wrapping

BUSSING



- Accommodates #18 thru #30 AWG wire

Crimp type	Loose	Reeled	Plating
#22 thru #30 AWG	030-2064-010	110238-0039	.000020(,0005) gold over .000050(,0012) nickel
#20 thru #22 AWG	030-2064-014	110238-0167	
#18 AWG	030-2064-028	110238-0207	
#22 thru #30 AWG	030-2064-029	110238-0206	90/10 tin-lead electro-deposited
#20 thru #22 AWG	030-2064-030	110238-0208	
#18 AWG	030-2064-031	110238-0209	

DL Buss Contacts (Loose)	
DL-C, Buss 1 pair	030-7380-001
DL-C, Buss 2 pair	030-7380-002
DL-C, Buss 3 pair	030-7380-003
DL-C, Buss 4 pair	030-7380-004
DL-C, Buss 5 pair	030-7380-005
DL-C, Buss 6 pair	030-7380-006

Consult factory for information on buss contact removal tool.

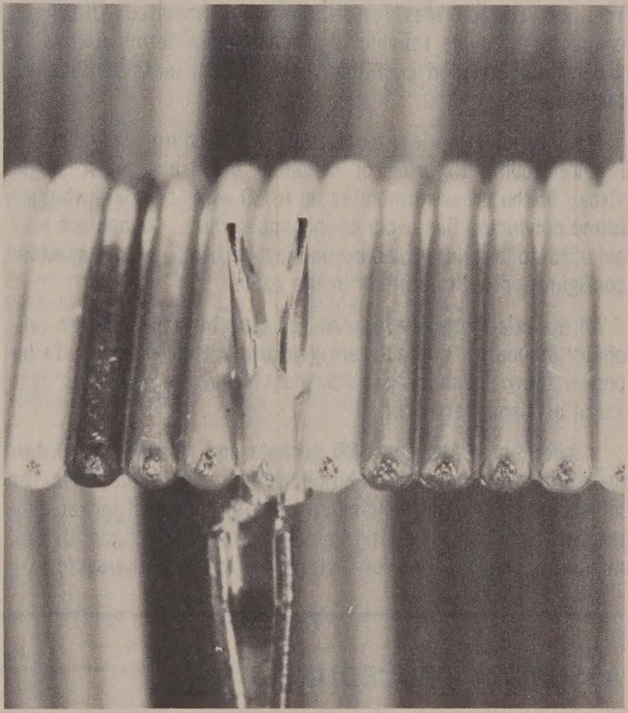
MAS/TER-UND

A NEW LEVEL OF RELIABILITY IN LOW-COST MASS TERMINATION.

THE MAS/TER INTERCONNECT SYSTEM

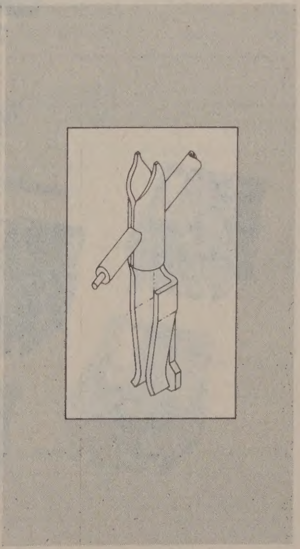
Mas/Ter-UND (Mass Terminated, UND-type) connectors, while intermateable with other similar connectors, are part of the new Cannon® Mas/Ter Interconnect System. The Mas/Ter Interconnect System eliminates the drawbacks of conventional mass termination systems while providing several benefits all its own:

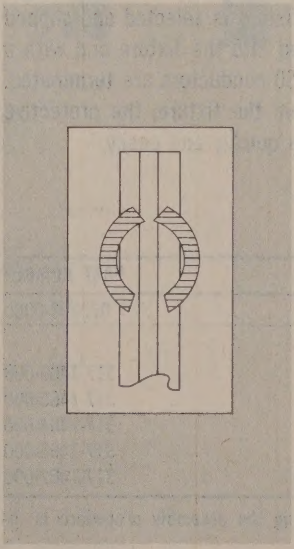
- With the Cannon Mas/Ter system, the entire connector is terminated at one time with no insulation stripping, no wire trimming and no complex tooling, utilizing either standard round conductor flat cable or individual wires, solid or stranded.
- The Mas/Ter contact penetrates and displaces the insulation, makes contact with the conductor, and provides insulation support to the wire.
- Integral contact spring action wipes the conductor during termination to produce a high force, low resistance interface.
- Uniform, constant force is maintained even under extremes of temperature, shock and vibration.
- Mas/Ter contact design provides 25% more wire-to-contact surface area.



A NEW LEVEL OF RUGGEDNESS, RELIABILITY, VERSATILITY

The key to the Mas/Ter Interconnect System is a special insulation-displacement, spring-action contact.





The contact is essentially a cylinder with a thin slit down the front and a wider slot part way down the back, with the two cylinder halves pointed at the top.

As a wire is terminated, the contact points penetrate the insulation, then push it aside. The interface where mating occurs is the thin slit at the front of the contact. The angled entry increases the effective surface area. The rear slot may contact the conductor, but serves primarily as an integral strain relief.

Insertion of the conductor into the slit causes the two halves of the cylinder to exert a spring force as they spread. This produces a wiping action that ensures a reliable low resistance interface consistently. It also adds to the flexibility of the system as it permits the termination of two wire sizes, solid or stranded, with the same contact.

This inherent spring action also increases the reliability of the contact under adverse operation conditions. The contact spring action maintains a constant pressure on the conductor under extremes of temperature, shock and vibration, even when tested without the cable retaining cap.

MAS/TER-UND INTERCONNECT SYSTEM

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

LOWER COST MASS TERMINATION

The new Cannon Mas/Ter-UND (Mass Terminated, UND-type) connectors provide reliable high-speed mass termination at a lower total installed cost than conventional mass termination techniques.

Mass termination is a quick, simple procedure that does not require double fixturing or stripping of insulation. A single stroke of the press terminates up to 50 wires at once, whether round conductor flat cable or individual wires. Connectors may be used to terminate cables or may be used in a daisy-chain configuration with no break in the cable.

All materials used have been selected to maintain high reliability standards. Contacts are gold over nickel electroplate on copper alloy. Insulator is black glass filled thermoplastic, U.L. listed as flame retardant.

In addition to Mas/Ter-UND sockets and headers that intermate with other mass termination systems, the Cannon Mas/Ter Interconnect System includes subminiature pin-and-socket connectors that are fully intermateable with the Cannon D Subminiature Series. Other connector types will join the system.

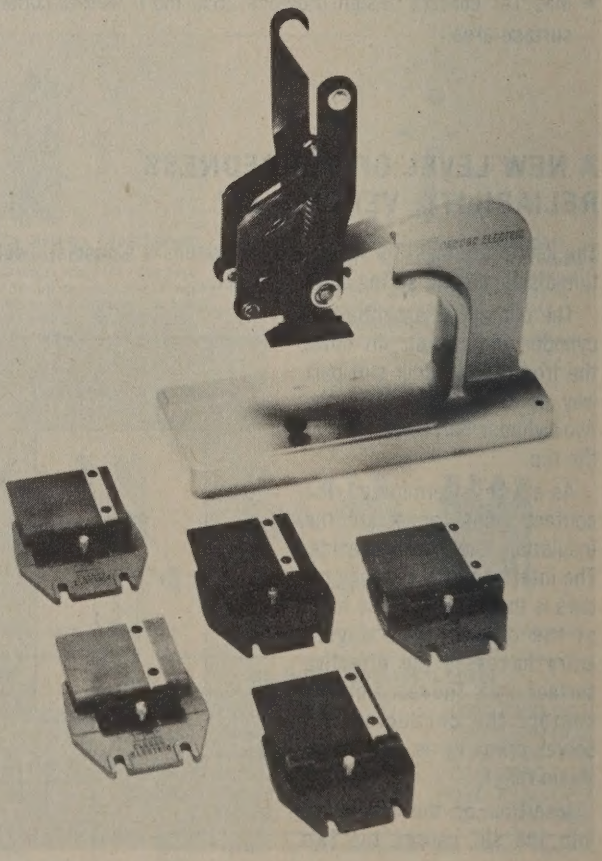
TEST	CONDITIONING	CRITERIA OF ACCEPTANCE
Thermal shock	—55°C to +105°C	No physical damage
Physical shock	100 G's, 3-axes	No physical damage. No loss of continuity >1 μsec.
Contact resistance	Low level—1 mA	Initial: 10 milliohms max. After conditioning: 15 milliohms max.
Vibration	15 G's, 10-2,000 Hz 12 hours	No physical damage. No loss of continuity >1 μsec.
Salt spray	48 hours	Shall be capable of mating and unmating, and meet contact resistance requirements.
Durability	500 cycles of mating and unmating	
Industrial gas	100 hours in hydrogen sulfide (H_2S) solution vapor	

ASSEMBLY PROCEDURE

The lower total installed cost of the Mas/Ter Interconnect System is achieved through a quick, simple termination procedure. The entire operation is performed at a single work station with a single stroke of the press, with no stripping and no complex tooling.

Termination fixtures for each UND connector configuration are color coded and imprinted for ease of selection. They may be used in the Cannon press or other presses of similar design.

For assembly, the termination fixture is selected and slipped into the press. The cable is placed into the fixture and with a single stroke of the press, up to 50 conductors are terminated. After removing the connector from the fixture, the protective cable retaining cap is snapped on quickly and easily.



ORDERING INFORMATION

DESCRIPTION	PART NUMBER
Press assembly	070290-0000
Connector fixture for	
UND 20	317-1466-000
UND 26	317-1465-000
UND 34	317-1464-000
UND 40	317-1463-000
UND 50	317-1462-000

A complete instruction manual detailing the assembly procedure is included with each assembly tool.

MAS/TER-UND INTERCONNECT SYSTEM

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CABLE CONNECTORS

BOX-CONTACT TYPE

STANDARD DATA

MATERIALS AND FINISHES

Insulator	Glass filled thermoplastic U.L. rated 94V-0 (flame retardant), black
Contacts	Gold over nickel electroplate on copper alloy

MECHANICAL FEATURES

Termination technique	Insulation displacement
Max. engagement force	8 oz. (2,2 N) per contact
Min. separation force	2 oz. (,56 N) per contact

ELECTRICAL DATA

Current rating	1 ampere max.
Temperature rating	—55°C to +105°C
Insulation resistance	>5000 megohms
Contact resistance	10 milliohms max. (initial)
Dielectric withstanding voltage	>500 V rms at sea level

HOW TO ORDER

UND 4 A 026 G 1 D *

- Connector Series — UND
- Contact Spacing — 4
- Plating Code — A
- Number of Contacts — 026
- Type of Termination — G
- Type of Connector — 1
- Contact Rows — D
- Modification Code — *

CONNECTOR SERIES UND

CONTACT SPACING 4—.100" (2,54) centers

PLATING CODE A—.000020" (,51 μm) gold over.000050" (1,27 μm) nickel standard
Consult factory for other platings.

NUMBER OF CONTACTS 20, 26, 34, 40 and 50

TYPE OF TERMINATION G—Insulation displacement, #26 to #28 AWG, solid and stranded

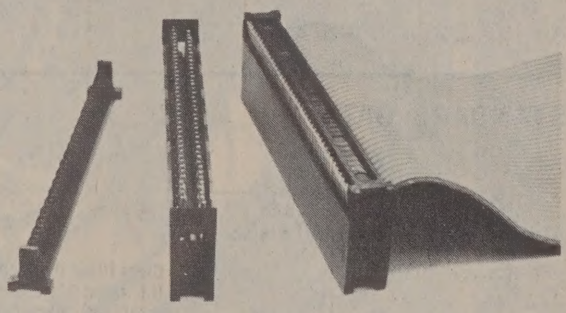
TYPE OF CONNECTOR 1—Insulation displacement cable connector

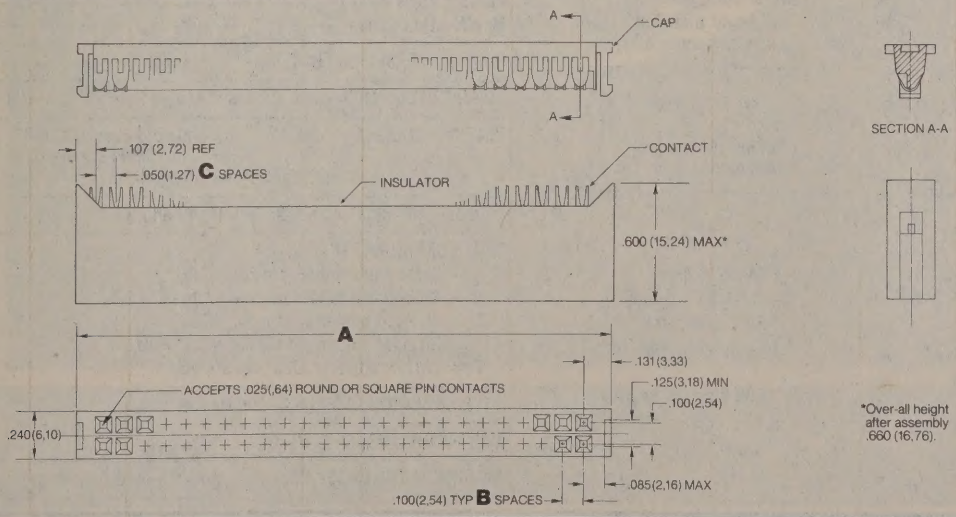
CONTACT ROWS D—Double

MODIFICATION CODE Consult factory for modifications

The Cannon Mas/Ter-UND cable connector allows quick, convenient mass termination of up to 50 conductors. The box contacts are universal and will mount on an array of .025" (0,64) round or square pins or with a matching header.

NUMBER OF CONTACTS	PART NUMBER	A	B	C
20	UND 4 A 020 G 1 D	1.170(29,72)	9	19
26	UND 4 A 026 G 1 D	1.470(37,34)	12	25
34	UND 4 A 034 G 1 D	1.870(47,50)	16	33
40	UND 4 A 040 G 1 D	2.170(55,12)	19	39
50	UND 4 A 050 G 1 D	2.670(67,82)	24	49




A
CAP
A
SECTION A-A
.107 (2,72) REF
.050(1,27) C SPACES
CONTACT
INSULATOR
.600 (15,24) MAX*
A
.131(3,33)
.125(3,18) MIN
.100(2,54)
ACCEPTS .025(,64) ROUND OR SQUARE PIN CONTACTS
.240(6,10)
.085(2,16) MAX
.100(2,54) TYP B SPACES
*Over-all height after assembly .660 (16,76).

(Millimeters are in parentheses)

ITT CANNON ELECTRIC

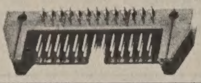
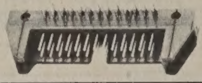
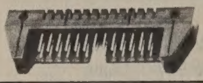
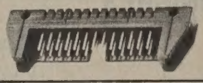
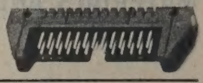
MAS/TER-UND INTERCONNECT SYSTEM

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

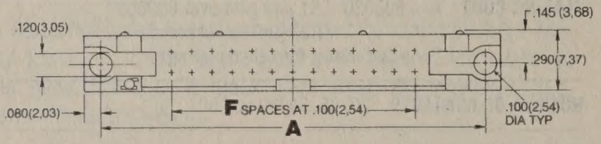
HEADERS

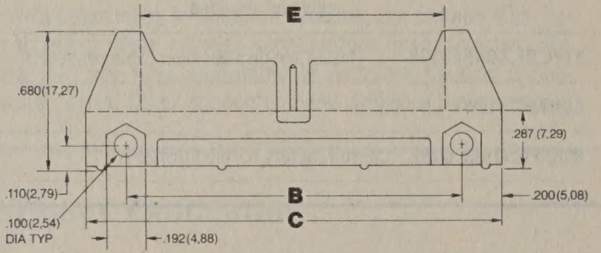
Cannon Mas/Ter-UND headers are available in right angle and straight configurations, with solder pins or wire wrappable posts, and are ideal for applications that require multiple quick connects and disconnects.

Number of Contacts	A	B	C	E	F
20	1.600(40,64)	1.360(34,54)	1.760(44,70)	1.193(30,30)	9
26	1.900(48,26)	1.660(42,16)	2.060(52,32)	1.493(37,92)	12
34	2.300(58,42)	2.060(52,32)	2.460(62,48)	1.893(48,08)	16
40	2.600(66,04)	2.360(59,94)	2.760(70,10)	2.193(55,70)	19
50	3,100(78,74)	2.860(72,64)	3.260(82,80)	2.693(68,40)	24

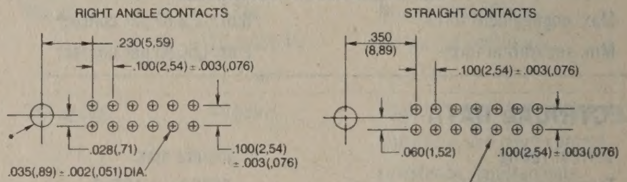
Number of Contacts	90° SOLDER TAIL ROUND PIN HEADER FOR .062 PC BOARD	90° SOLDER TAIL ROUND PIN HEADER FOR .094-.125 PC BOARD	STRAIGHT SOLDER TAIL ROUND PIN HEADER FOR .062 PC BOARD	STRAIGHT SOLDER TAIL ROUND PIN HEADER FOR .094-.125 PC BOARD	STRAIGHT WRAP TAIL SQUARE PIN HEADER
20	UND 4 A 020 A 3 D	UND 4 A 020 B 3 D	UND 4 A 020 D 3 D	UND 4 A 020 E 3 D	UND 4 A 020 F 3 D
26	UND 4 A 026 A 3 D	UND 4 A 026 B 3 D	UND 4 A 026 D 3 D	UND 4 A 026 E 3 D	UND 4 A 026 F 3 D
34	UND 4 A 034 A 3 D	UND 4 A 034 B 3 D	UND 4 A 034 D 3 D	UND 4 A 034 E 3 D	UND 4 A 034 F 3 D
40	UND 4 A 040 A 3 D	UND 4 A 040 B 3 D	UND 4 A 040 D 3 D	UND 4 A 040 E 3 D	UND 4 A 040 F 3 D
50	UND 4 A 050 A 3 D	UND 4 A 050 B 3 D	UND 4 A 050 D 3 D	UND 4 A 050 E 3 D	UND 4 A 050 F 3 D



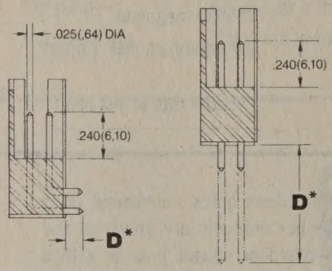


*NOTE: Mounting hole diameter is .116(2,95) when a #4 x ¼" long self-tapping screw is used, #2-56 screws and nuts may be used.

RECOMMENDED P.C. BOARD HOLE PATTERN



NOTE: Recommended hole diameter .045 (1,14) ± .002 (,05) for wire wrappable contacts.



* For .062 PC Board "D" = .092

For .094-.125 PC Board "D" = .155

For Straight Wrap Tail "D" = .610

STANDARD DATA

MATERIALS AND FINISHES

Insulator	Glass filled thermoplastic U.L. rated 94V-0 (flame retardant), black
Contacts	Gold over nickel electroplate on copper alloy

MECHANICAL FEATURES

Termination techniques	Solder pin or wire wrappable

ELECTRICAL DATA

Current rating	1 amperes max.
Temperature rating	—55°C to +105°C
Insulation resistance	>5000 megohms
Contact resistance	10 milliohms max. (initial)
Dielectric withstanding voltage	>500 V rms at sea level

HOW TO ORDER

UND 4 A 026 A 3 D *

Connector Series
Contact Spacing
Plating Code
Number of Contacts
Tail Configuration
Type of Insulator
Contact Rows
Modification Code

CONNECTOR SERIES: UND

CONTACT SPACING: 4 — .100" centers

PLATING CODE: A — .000020" (,51 μm) gold over .000050" (1,27 μm) nickel standard
Consult factory for other platings.

NUMBER OF CONTACTS: 20, 26, 34, 40 and 50

TAIL CONFIGURATION:
- A — Right angle solder pin for 1/16" PCB
- B — Right angle solder pin for 3/32" to 1/8" PCB
- D — Straight solder pin for 1/16" PCB
- E — Straight solder pin for 3/32" to 1/8" PCB
- F — Wire wrappable .025" square post

TYPE OF CONNECTOR: 3 — Pin Header

CONTACT ROWS: D — Double

MODIFICATION CODE: Consult factory for modifications.

(millimeters are in parentheses)

When you need small connectors, and dense packaging, who can solve your biggest problems?

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MICRO
SMALL WORLD
STORE
ITT
YELLO

Cannon can!

Six decades on the leading edge of interconnect technology.

CANNON ITT

The interconnect system scaled for today's requirements

In electronic systems today, space is becoming a precious commodity. More and more is being designed into less and less space, with resulting demands for reductions in size and weight yet with no relaxation of reliability requirements.

A frequent choice for interconnecting microminiature systems has been hard-wiring—in spite of the loss of plugability and versatility—because conventional connectors are too large.

But there is a better choice.

Cannon microminiature connectors.

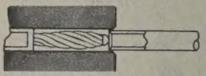
Our microminiature connectors are available with densities as high as 1600 contacts per square inch and, with reliability in excess of 99.9%, provide the reliability of hard-wired systems with none of the drawbacks. Three basic contact families encompass 40,000 standard line items that may be used in their standard configurations, readily and inexpensively modified for your specific applications, or provided in completely assembled, wired and tested multiple connector harnesses.

We have manufactured hundreds of millions of contact lines in our microminiature connectors and have a high volume capability and range of designs that make our microminiature connectors competitive in even the most cost-conscious commercial applications.

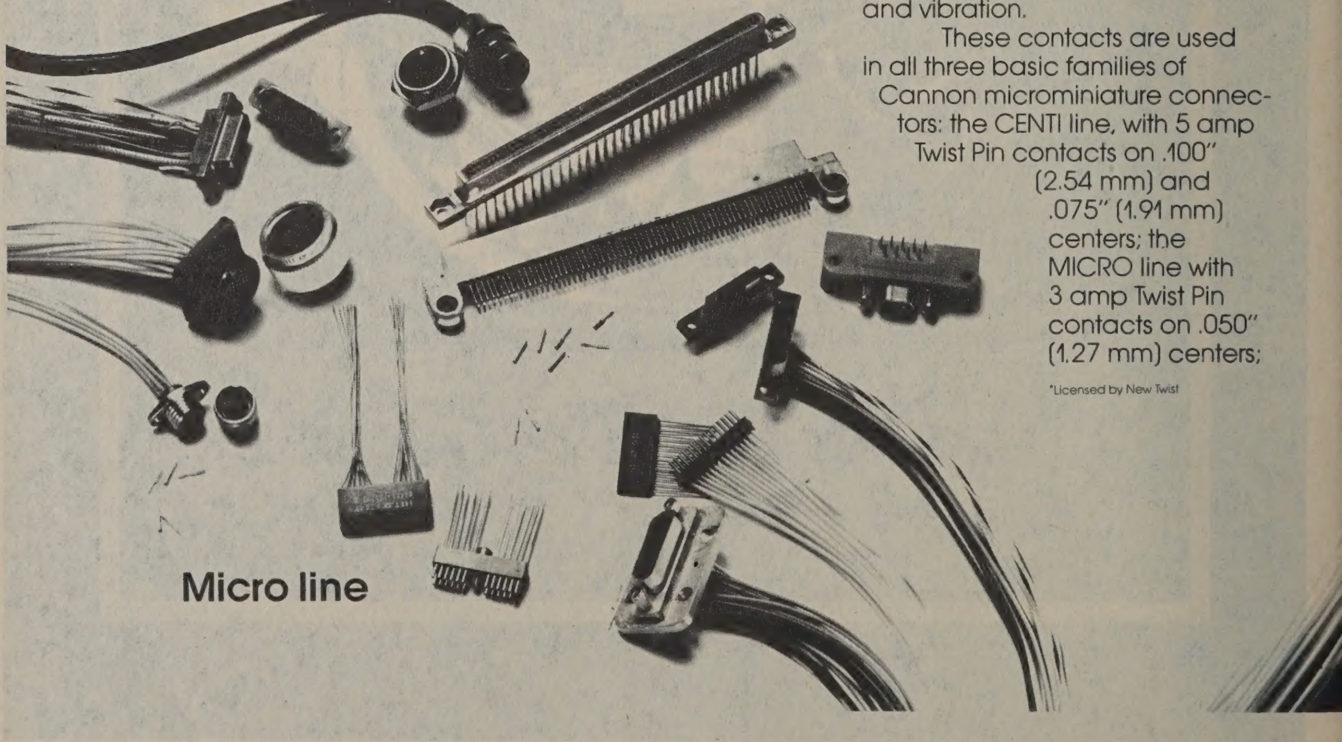
Our microminiature connectors are flying in artillery shells where they withstand 20,000 G shocks and in model airplanes, computer mainframes and peripherals, seismic streamers and portable radios.

The key to the high performance and reliability of Cannon microminiature connectors is the Twist Pin Contact* system. In this design, the conventional positions and action of the pin and socket are reversed. The spring action is in the flexible Twist Pin, not the socket, and the socket is exposed while the pin is recessed within a positive alignment cavity within the insulator.

The flexible Twist Pin Contact consists of several strands of wire in a compressible spiral which is welded at both ends, with one end crimped into a tubular sleeve. During mating, the protruding socket is guided into the pin cavity by the lead-in chamfer. The walls of the pin cavity keep the pin within the capture radius of the socket, while the controlled radius on the pin tip combines with the interior chamfer of the socket to cam the pin into alignment, assuring positive mating. Once mated, the compression of the pin spring members exerts a constant pressure that ensure electrical continuity and resists the highest levels of shock and vibration.



These contacts are used in all three basic families of Cannon microminiature connectors: the CENTI line, with 5 amp Twist Pin contacts on .100" (2.54 mm) and .075" (1.91 mm) centers; the MICRO line with 3 amp Twist Pin contacts on .050" (1.27 mm) centers;



Micro line

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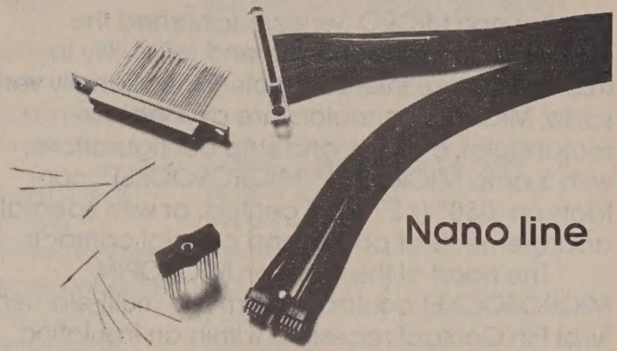
*Licensed by New Twist

and the NANO line, with 1 amp Twist Pin contacts on .025"(0.64 mm) centers. Connectors are available in miniature rectangular, circular, center jackscrew, strip and many other special configurations. The MICRO and NANO lines can be ordered in metal and plastic shells; with solder pots and P.C. tail terminations; in your choice of several insulator materials, some with interfacial seals; as standard catalog items or customized versions; with coax or 16 amp power contacts; and in complete multi-connector harnesses. The CENTI line is available as connectors you wire yourself or in complete assembled harnesses.

The remainder of this catalog details our standard line items. For more information and applications assistance, contact your nearest ITT Cannon Electric field office, or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573; in California, (800) 432-7063.



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The CENTI Line

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Section I: The MICRO Line

The Cannon MICRO Series established the standards for performance and reliability in microminiature interconnects. Exceptionally versatile, MICRO connectors are available in rectangular, circular, and strip configurations, with 3 amp MICROPIN®/MICROSOCKET® contacts on .050" (1.27 mm) centers, or with special arrangements of power and coaxial contacts.

The heart of the Cannon MICROPIN/MICROSOCKET contact system is a multi-element Twist Pin Contact recessed within an insulating housing. The rugged, cylindrical sockets are mounted in the exposed half of the connector. When connector halves are mated, the chamfered sockets are first aligned by the connector body, then guide the spiral MICROPIN contacts into proper and positive alignment, even under worst-case tolerance conditions. This is Cannon's POS-A-LINE® connector design.

The multiple spring elements of the MICROPIN, then under compression, form a multipoint contact system of high mechanical and electrical integrity. Contacts will provide fail-safe reliability over thousands of mating and unmating cycles, and have proven themselves in applications that range from commercial products to equipment that has been landed on the moon.

STANDARD DATA

- Contact rating—3 amps max.
- Minimum contact centers—0.050" (1.27 mm).
- Wire sizes—#26 thru #30 AWG, stranded or solid.
- Contact termination—multiple indent crimp.
- Contact retention—fixed via epoxy.
- Contact materials and finish—Copper alloy, gold-plated per MIL-G-45204, Type II, Grade C, Class 1.
- Mating/unmating force—8 oz. per contact, max.

PERFORMANCE DATA

The table below summarizes the results of key tests performed in accordance with MIL-STD-202, where applicable. Data is applicable to standard connectors with standard terminations. Variations may affect this data, so please consult the factory for further information on your requirements.

TEST	METHOD	CRITERIA OF ACCEPTANCE
Dielectric Withstanding Voltage	Method 301: 900 VAC at sea level 300 VAC at 70,000' altitude	 No breakdown No breakdown
Insulation Resistance	Method 302, Condition A	5,000 megohms minimum
Thermal Shock	Method 107, Condition B: −65°C to +125°C	No physical damage
Physical Shock	Method 213, Condition I: 1100 G's, 3-axes, 6 millisecond duration sawtooth pulse	No physical damage No loss of continuity >1 μsec
Vibration	Method 204, Condition B: 15 G's, 10-2,000 Hz, 12 hrs.	No physical damage No loss of continuity >1 μsec
Durability	500 cycles of mating and unmating, 500 CPH max.	No mechanical or electrical defects
Moisture Resistance	Method 106, omit 7b	Insulation resistance >100 megohms
Salt Spray	Method 101, Condition B: 48 hours	Shall be capable of mating and unmating, and meet contact resistance requirements
Contact Resistance	Method 307: At 3 amps At 1 milliamp	 8 milliohms maximum 10 milliohms maximum
Contact Retention	——	5 lb. minimum axial load

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MICROMINIATURE CONNECTORS MDM SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

INTRODUCTION

MDM connectors are used in applications requiring highly reliable, extremely small, lightweight connectors. They are available in 7 shell sizes accommodating from 9 to 1 contacts, and special arrangements of power and coaxial contacts.

These connectors are designed to meet the rapidly increasing demands for an environmental, high performance, rugged, moisture-sealed microminiature connector. This connector employs size 24 MICROPIN® /MICROSOCKET® contacts on .050" (1,27 mm) centers in a contact density identical to the standard MICRO-D connector series, but with these additional features:

- Aluminum shells to provide greater strength, prevent chipping, cracking or breaking, offer electromagnetic (EMI) and RFI shielding.
- Silicone elastomer compression interfacial seal to provide a complete moisture and humidity seal between each contact and between contacts and shell.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573; in California, (800) 432-7063.

STANDARD DATA

STANDARD MATERIALS AND FINISHES

Shell	— Aluminum alloy, cadmium plate, yellow chromate
Insulator	— Glass-filled diallyl phthalate per MIL-M-14, Type SDGF.
Contacts	— Copper alloy, gold plate
Jackscrew & Jackpost	— 300 Series stainless steel, passivate

ELECTRICAL DATA

No. of Contacts	— 9 thru 51 standard; 5 signal/2 coaxial; 5 signal/2 power; 20 signal/4 coaxial
Coaxial Contacts	— RG-196/U and RG-178/U
Wire Size	— #24 thru #30 AWG
Contact Termination	— Crimp stationary

MECHANICAL FEATURES

Size or Length	— 7 sizes
Service Classes	— Environmental
Coupling	— Friction/jackscrews
Polarization	— Keystone-shaped shells
Contact Spacing Centers	— .050 (1,27)
Shell Styles	— Plug and receptacle

HOW TO ORDER

MDM - 51 P H 001 P - XXX

- Series — MDM
- Contact Layout — 51
- Contact Type — P
- Termination Type — H
- Termination Code — 001
- Hardware — P
- Shell Plating Mods — XXX

SERIES
Micro D Metal Shell Series

CONTACT ARRANGEMENTS
9-15-21-25-31-37-51 (standard)
7C2, 24C4 (coaxial)
7P2, 24P4 (power)

CONTACT TYPE
P = Pin
S = Socket

TERMINATION TYPE
H = Harness-insulated wire.
L = Solid-uninsulated wire.
S = Solder pot to accept #26 AWG MAX. harness wire.

TERMINATION CODE*
(H) 001 = 18" #26 AWG-MIL-W-16878-Type E Teflon, yellow.
(H) 003 = 18" #26 AWG-MIL-W-16878-E Teflon, color coded to MIL-STD-681 System I.
(L) 1 = ½" uninsulated solid #25 AWG gold plated copper.
(L) 2 = 1" uninsulated solid #25 AWG gold plated copper.

HARDWARE
P = Jackpost
K = Jackscrew — standard
L = Jackscrew — low profile
F = Float mounting
B = No hardware

SHELL FINISH MOD CODES
No Number = Standard cadmium over yellow chromate
A174 = Electroless nickel
A172 = Gold over nickel
A141 = Irridite/alodine
A30 = Black anodize

*See below for additional Termination Codes.

NOTE: For other modification not listed, consult the factory.

STANDARD WIRE TERMINATION CODES

The following termination codes are listed for your information. For lengths not shown, consult factory for proper modification code. All wire lengths are minimum.

HARNESS TYPE (H)

#26 AWG per MIL-W-16878 type E. Teflon stranded.

Length	All Yellow	Color Coded
3(76.2)	H020	H027
6(152.4)	H019	H016
8(203.2)	H026	H034
10(254.0)	H029	H025
12(304.8)	H028	H002
18(457.2)	H001	H003
20(508.0)	H038	H023
24(609.6)	H009	H004
30(762.0)	H010	H005
36(914.4)	H011	H006
48(1219.2)	H013	H048
72(1828.8	H017	H046
120(3048.0)	H042	H041

SOLID UNINSULATED TYPE (L)

#25 AWG gold plated copper.

	Length
L61	.125(3.18)
L56	.150(3.81)
L57	.190(4.83)
L39	.250(6.35)
L58	.375(9.52)
L1	.500(12.70)
L14	.750(19.05)
L2	1.000(25.40)
L7	1.500(38.10)
L6	2.000(50.80)
L16	2.500(63.50)
L10	3.000(76.20)

Dimensions subject to change.

(millimeters are in parentheses)

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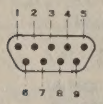
MICROMINIATURE CONNECTORS MDM SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

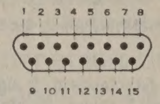
CONTACT ARRANGEMENTS

Face view of pin insert — use reverse order for socket side

STANDARD



9 CONTACTS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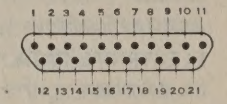
9 10 11 12 13 14 15

15 CONTACTS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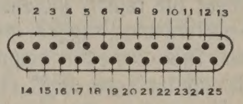
12 13 14 15 16 17 18 19 20 21

21 CONTACTS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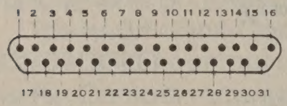
14 15 16 17 18 19 20 21 22 23 24 25

25 CONTACTS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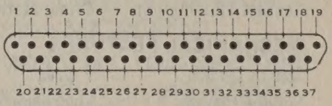
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

31 CONTACTS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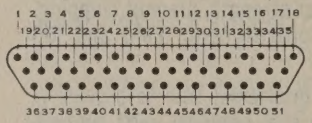
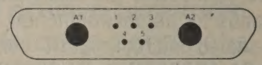
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

37 CONTACTS

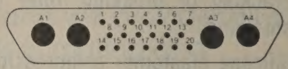

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51

51 CONTACTS

COAXIAL



5 MICRO CONTACTS
2 COAX OR 2 POWER

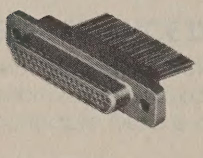


20 MICRO CONTACTS
4 COAX OR 4 POWER

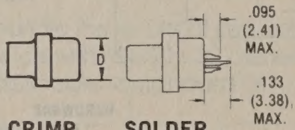
Contact identification numbers do not appear on connector.

SHELL DIMENSIONS

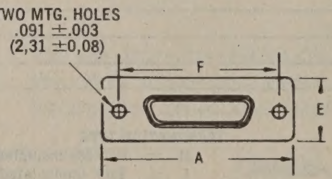
MDM

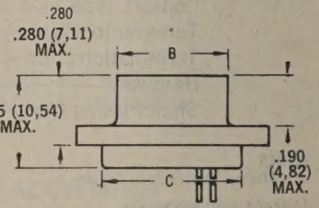


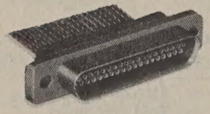
PLUG


D
.095
(2.41)
MAX.
.133
(3.38)
MAX.

CRIMP SOLDER


TWO MTG. HOLES
.091 ±.003
(2,31 ±0,08)
F
E
A


.280
.280 (7,11)
MAX.
B
4.15 (10,54)
MAX.
C
.190
(4,82)
MAX.



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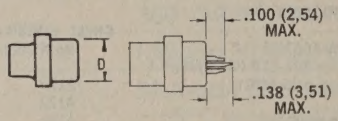
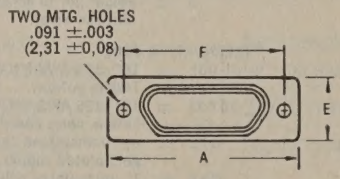
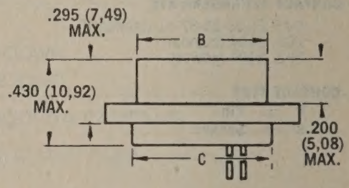

D
.100 (2,54)
MAX.
.138 (3,51)
MAX.

CRIMP SOLDER


TWO MTG. HOLES
.091 ±.003
(2,31 ±0,08)
F
E
A


.295 (7,49)
MAX.
B
.430 (10,92)
MAX.
C
.200
(5,08)
MAX.

Part Number by Shell Size	A Max.	B Max.	C Max.	D Max.	E Max.	F ± .005 (0.13)	Average Weights** oz (gm) ± 5%
MDM-9P*	.785 (19.94)	.340 (8.64)	.405 (10.29)	.270 (6.86)	.305 (7.75)	.565 (14.35)	.063 (1.79)
MDM-9S*	.785 (19.94)	.340 (8.64)	.405 (10.29)	.270 (6.86)	.305 (7.75)	.565 (14.15)	.062 (1.79)
MDM-15P*	.935 (23.75)	.490 (12.45)	.555 (14.10)	.270 (6.86)	.305 (7.75)	.715 (18.16)	.084 (2.39)
MDM-15S*	.935 (23.75)	.545 (13.84)	.555 (10.14)	.270 (6.86)	.305 (7.75)	.715 (18.16)	.083 (2.37)
MDM-21P*	1.085 (27.56)	.640 (16.26)	.705 (17.91)	.270 (6.86)	.305 (7.75)	.865 (21.97)	.105 (2.99)
MDM-21S*	1.085 (27.56)	.695 (17.65)	.705 (17.91)	.270 (6.86)	.305 (7.75)	.865 (21.97)	.104 (2.97)
MDM-25P*	1.185 (30.10)	.740 (18.80)	.805 (20.45)	.270 (6.86)	.305 (7.75)	.965 (24.51)	.119 (3.39)
MDM-25S*	1.185 (30.10)	.795 (20.19)	.805 (20.45)	.270 (6.86)	.305 (7.75)	.965 (24.51)	.118 (3.36)
MDM-31P*	1.335 (33.91)	.890 (22.61)	.955 (23.26)	.270 (6.86)	.305 (7.75)	1.115 (28.32)	.140 (3.99)
MDM-31S*	1.335 (33.91)	.945 (24.00)	.955 (23.26)	.270 (6.86)	.305 (7.75)	1.115 (28.32)	.139 (3.96)
MDM-37P*	1.485 (37.72)	1.040 (26.42)	1.105 (28.07)	.270 (6.86)	.305 (7.75)	1.265 (32.13)	.161 (4.59)
MDM-37S*	1.485 (37.72)	1.095 (27.81)	1.105 (28.07)	.270 (6.86)	.305 (7.75)	1.265 (32.13)	.160 (4.56)
MDM-51P*	1.435 (36.45)	.990 (25.15)	1.055 (26.80)	.310 (7.87)	.345 (8.76)	1.215 (30.86)	.193 (5.50)
MDM-51S*	1.435 (36.45)	1.045 (26.54)	1.055 (26.80)	.310 (7.87)	.345 (8.76)	1.215 (30.86)	.188 (5.35)

*Add lead type and length; see How To Order.
**Weight given is ½", uninsulated, solid, #25 AWG gold plated copper pigtails.

NOTE: SHELL DIMENSIONS MAY BE MODIFIED UPON REQUEST. CONSULT THE FACTORY.

(millimeters are in parentheses)

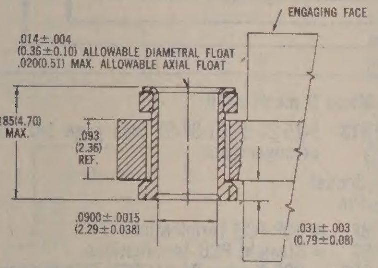
Dimensions subject to change.

MICROMINIATURE CONNECTORS MDM SERIES

PANEL MOUNTING HARDWARE

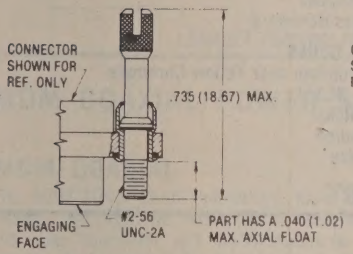
SCREW MOUNTING

NOTE: THIS HARDWARE IS FACTORY INSTALLED

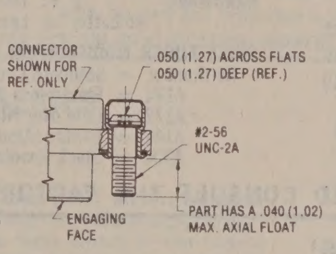

ENGAGING FACE
.014±.004
(0.36±0.10) ALLOWABLE DIAMETRAL FLOAT
.020(0.51) MAX. ALLOWABLE AXIAL FLOAT
.185(4.70) MAX.
.093 (2.36) REF.
.0900±.0015 (2.29±0.038)
.031±.003 (0.79±0.08)

FLOAT MOUNT—(F)

Shown here is a cut-away view of the float mount for the MDM connector. The basic shell dimensions are the same for the float mount and the screw mounting hole configurations. View shown is for standard float mount front panel mounting. Reverse mounting is available on request.

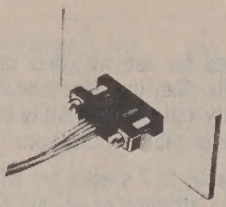

CONNECTOR SHOWN FOR REF. ONLY
.735 (18.67) MAX.
ENGAGING FACE
#2-56 UNC-2A
PART HAS A .040 (1.02) MAX. AXIAL FLOAT

JACKSCREW—(K)
STANDARD

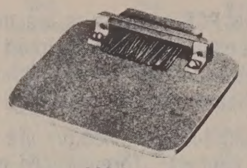

CONNECTOR SHOWN FOR REF. ONLY
.050 (1.27) ACROSS FLATS
.050 (1.27) DEEP (REF.)
#2-56 UNC-2A
ENGAGING FACE
PART HAS A .040 (1.02) MAX. AXIAL FLOAT

JACKSCREW—(L)
LOW PROFILE

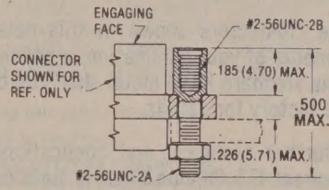
NOTE: THIS HARDWARE IS SHIPPED UNASSEMBLED



SCREW LOCK ASSEMBLY



90° ANGLE MOUNTING BRACKET

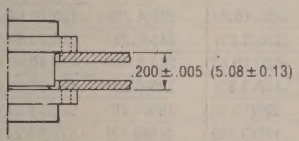

ENGAGING FACE
#2-56UNC-2B
CONNECTOR SHOWN FOR REF. ONLY
.185 (4.70) MAX.
.500 MAX.
.226 (5.71) MAX.
#2-56UNC-2A

JACKPOST—(P)

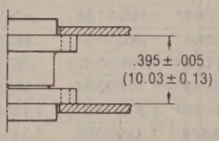
Description	Part Number
Screw Lock Assembly	322-9500-000
Jackpost Kit	320-9505-000
Mounting Bracket, 90° Angle— for 9 thru 37 shell sizes	015-9516-002
for 51 shell size	015-9516-003

NOTES: Screw lock assembly (322-9500-000) can be used for any of the described mounting centers. Jackpost kit (320-9505-000) consists of 2 assemblies, shipped unassembled.

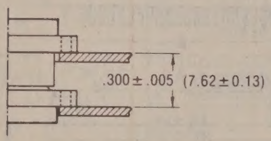
PANEL MOUNTING DIMENSIONS


.200±.005 (5.08±0.13)

PLUG AND RECEPTACLE REAR MOUNTED


.395±.005 (10.03±0.13)

PLUG AND RECEPTACLE FRONT MOUNTED


.300±.005 (7.62±0.13)

PLUG FRONT MOUNTED RECEPTACLE REAR MOUNTED

PANEL CUTOUTS

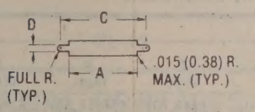

D
C
A
FULL R. (TYP.)
.015 (0.38) R. MAX. (TYP.)

FIGURE 1
FRONT MOUNTING

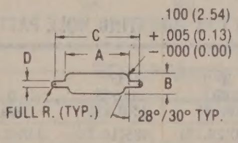
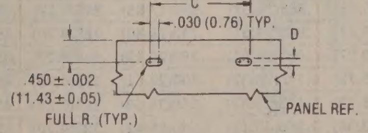

.100 (2.54)
C
+.005 (0.13)
−.000 (0.00)
D
A
B
FULL R. (TYP.)
28°/30° TYP.

FIGURE 2
REAR MOUNTING

FIGURE 3
EDGEBOARD MOUNTING


C
.030 (0.76) TYP.
D
.450±.002 (11.43±0.05)
FULL R. (TYP.)
PANEL REF.

Part Number by Shell Size	Cutout Figure	A + .004 (0,10) − .000 (0,00)	B + .004 (0,10) − .000 (0,00)	C + .005 (0,13) − .000 (0,00)	D + .005 (0,13) − .000 (0,00)
MDM-9	1	.408 (10,36)	.270 (7,86)	.570 (14,48)	.089 (2,26)
	2	.398 (10,11)	.248 (6,3)	.570 (14,48)	.089 (2,26)
	3	—	—	.570 (14,48)	.089 (2,26)
MDM-15	1	.558 (14,17)	.270 (7,86)	.720 (18,29)	.089 (2,26)
	2	.548 (13,92)	.248 (6,3)	.720 (18,29)	.089 (2,26)
	3	—	—	.720 (18,29)	.089 (2,26)
MDM-21	1	.708 (17,98)	.270 (7,86)	.870 (22,10)	.089 (2,26)
	2	.698 (17,72)	.248 (6,3)	.870 (22.10)	.089 (2,26)
	3	—	—	.870 (22,10)	.089 (2,26)
MDM-25	1	.808 (20,52)	.270 (7,86)	.970 (24,64)	.089 (2,26)
	2	.798 (20,27)	.248 (6,3)	.970 (24,64)	.089 (2,26)
	3	—	—	.970 (24,64)	.089 (2,26)
MDM-31	1	.958 (24,33)	.270 (7,86)	1.120 (28,45)	.089 (2,26)
	2	.948 (24,08)	.248 (6,3)	1.120 (28,45)	.089 (2,26)
	3	—	—	1.120 (28,45)	.089 (2,26)
MDM-37	1	1.108 (28,14)	.270 (7,86)	1.270 (32,36)	.089 (2,26)
	2	1.098 (27,89)	.248 (6,3)	1.270 (32,26)	.089 (2,26)
	3	—	—	1.270 (32,26)	.089 (2,26)
MDM-51	1	1.058 (26,87)	.315 (8,0)	1.220 (30,99)	.089 (2,26)
	2	1.048 (26,62)	.292 (7,42)	1.220 (30,99)	.089 (2,26)
	3	—	—	1.220 (30,99)	.089 (2,26)

NOTES:

1. Front mounting (figure 1) and rear mounting (figure 2) accommodates #2-56 screws.
2. Front mounting is preferred. However, when rear mounting is necessary, use figure 2 dimensions.
3. Edgeboard mounting bracket (figure 3) uses #2-56 screws. Dimension .450 ± .002 (11,43 ± 0,05) locates the MDM receptacle insulator flush with the end of the board.

Dimensions subject to change.

(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS
MDM-PCB SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

INTRODUCTION

MDM-PCB connectors are designed for use with flex circuitry, flat cable and printed circuit boards. They use the standard MDM metal shell and provide high density and high reliability in board-to-board, board-to-cable and cable-to-cable applications.

MDM-PCB connectors are available in 7 shell sizes with 9 to 51 contacts. Terminations may be straight or at 90° for PCB mounting. Jackpost mounting and locking hardware is also available.

If the connectors shown in this catalog do not meet the requirements of your application, a special shape, size or layout using the standard MDM metal shell can be made available. Contact the factory for details.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573; in California, (800) 432-7063.

HOW TO ORDER

MDM- 37 S BR * - ***

Series
Contact Arrangements
Contact Type
Termination Type
Hardware
Modification Codes

CONNECTOR SERIES Micro D metal shell

CONTACT ARRANGEMENTS 9-15-21-25-31-37-51 (see page 142 for basic arrangements)

CONTACT TYPE S = Socket
P = Pin

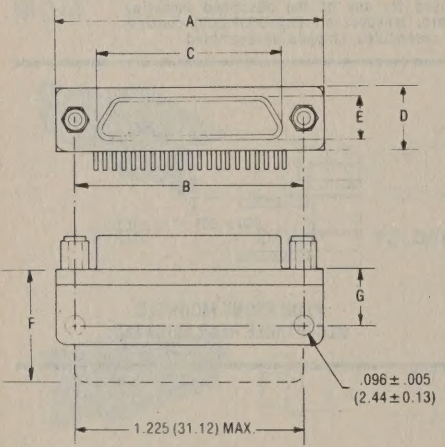
TERMINATION TYPE BR = 90° PCB Terminations
BS = Straight PCB Terminations
CBR = 90° Narrow Profile PCB Terminations

HARDWARE P = Jackpost
No Letter = Less Hardware

SHELL FINISH MODIFICATION CODES
No Number = Standard Cadmium over Yellow Chromate
A174 = Electroless Nickel
A172 = Gold over Nickel
A141 = Irridite/Alodine
A304 = Black Anodize

NOTE: FOR OTHER MODIFICATIONS NOT LISTED CONSULT THE FACTORY.

CBR SERIES (90° NARROW PROFILE MOUNTING)



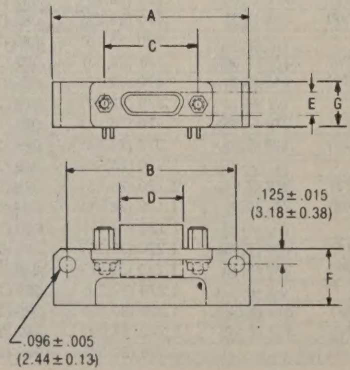
Part Number By Shell Size	A Max.	B ±.005 (±0.13)	C Max.	D ±.010 (±0.25)	E Max.	F Max.	G ±.010 (±0.25)
MDM-9PCBR*	.785(19.94)	.565(14.35)	.340(8.64)	.420(10.67)	.185(4.70)	.420(10.67)	.250(6.35)
MDM-9SCBR*	.785(19.94)	.565(14.35)	.395(10.03)	.230(5.84)	.245(6.22)	.420(10.67)	.250(6.35)
MDM-15PCBR*	.935(23.75)	.715(18.16)	.490(12.45)	.420(10.67)	.185(4.70)	.420(10.67)	.250(6.35)
MDM-15SCBR*	.935(23.75)	.715(18.16)	.545(13.84)	.130(3.30)	.245(6.22)	.420(10.67)	.250(6.35)
MDM-21PCBR*	1.085(27.56)	.865(21.97)	.640(16.26)	.420(10.67)	.185(4.70)	.420(10.67)	.250(6.35)
MDM-21SCBR*	1.085(27.56)	.865(21.97)	.695(17.65)	.130(3.30)	.245(6.22)	.420(10.67)	.250(6.35)
MDM-25PCBR*	1.185(30.10)	.965(24.51)	.740(18.80)	.420(10.67)	.185(4.70)	.420(10.67)	.250(6.35)
MDM-25SCBR*	1.185(30.10)	.965(24.51)	.795(20.19)	.130(3.30)	.245(6.22)	.420(10.67)	.250(6.35)
MDM-31PCBR*	1.335(33.91)	1.115(28.32)	.890(22.61)	.520(13.21)	.185(4.70)	.520(13.21)	.250(6.35)
MDM-31SCBR*	1.335(33.91)	1.115(28.32)	.945(24.00)	.130(3.30)	.245(6.22)	.520(13.21)	.250(6.35)
MDM-37PCBR*	1.485(37.72)	1.265(32.13)	1.040(26.42)	.520(13.21)	.185(4.70)	.520(13.21)	.250(6.35)
MDM-37SCBR*	1.485(37.72)	1.265(32.13)	1.095(27.81)	.130(3.30)	.245(6.22)	.520(13.21)	.250(6.35)
MDM-51PCBR*	1.435(36.45)	1.215(30.86)	.990(25.15)	.650(16.51)	.230(5.84)	.650(16.51)	.300(7.62)
MDM-51SCBR*	1.435(36.45)	1.215(30.86)	1.045(26.54)	.150(3.81)	.290(7.37)	.650(16.51)	.300(7.62)

*For jackpost locking add letter "P."

NOTE: Standard lead termination is #24 AWG, solid copper, solder or tin dipped.

CONSULT FACTORY FOR PCB PIN IDENTIFICATION NUMBERS AND FOR MOUNTING HOLE PATTERN DIMENSIONS

BR SERIES (90° MOUNTING)



Part Number By Shell Size	A Max.	B ±.007 (±0.18)	C ±.005 (±0.13)	D Max.	E Max.	F Max.	G Max.
MDM-9PBR*	1.390(35.31)	1.150(29.21)	.565(14.35)	.340(8.64)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-9SBR*	1.390(35.31)	1.150(29.21)	.565(14.35)	.395(10.03)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-15PBR*	1.540(39.12)	1.300(33.02)	.715(18.16)	.490(12.45)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-15SBR*	1.540(39.12)	1.300(33.02)	.715(18.16)	.545(13.84)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-21PBR*	1.690(42.93)	1.450(30.83)	.865(21.97)	.640(16.26)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-21SBR*	1.690(42.93)	1.450(30.83)	.865(21.97)	.695(17.65)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-25PBR*	1.790(45.47)	1.550(39.37)	.965(24.51)	.740(18.80)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-25SBR*	1.790(45.47)	1.550(39.37)	.965(24.51)	.795(20.19)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-31PBR*	2.040(51.82)	1.800(45.72)	1.115(28.32)	.890(22.61)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-31SBR*	2.040(51.82)	1.800(45.72)	1.115(28.32)	.945(24.00)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-37PBR*	2.340(59.44)	2.100(53.34)	1.265(32.13)	1.040(26.42)	.185(4.70)	.455(11.56)	.305(7.75)
MDM-37SBR*	2.340(59.44)	2.100(53.34)	1.265(32.13)	1.095(27.81)	.245(6.22)	.455(11.56)	.305(7.75)
MDM-51PBR*	1.875(47.63)	1.600(40.64)	1.215(30.86)	.990(25.15)	.230(5.84)	.455(11.56)	.345(8.76)
MDM-51SBR*	1.875(47.63)	1.600(40.64)	1.215(30.86)	1.045(26.54)	.290(7.37)	.455(11.56)	.345(8.76)

*For jackpost locking add letter "P."

NOTE: Standard lead termination is #24 AWG, solid copper, solder or tin dipped.

CONSULT FACTORY FOR PCB PIN IDENTIFICATION NUMBERS AND FOR MOUNTING HOLE PATTERN DIMENSIONS

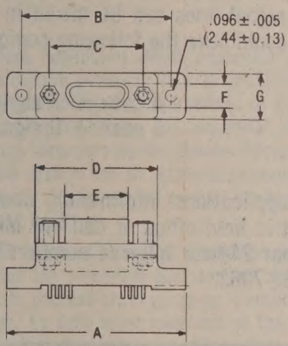
(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MDM-PCB SERIES/MDM COAXIAL POWER SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

BS SERIES (STRAIGHT)


B
C
.096 ± .005
(2.44 ± 0.13)
F
G
D
E
A

Part Number by Shell Size	A Max.	B ±.007(±0.18)	C ±.005(±.013)	D Max.	E Max.	F Max.	G Max.
MDM-9PBS*	1.390(35.31)	1.150(29.21)	.565(14.35)	.785(19.94)	.340(8.64)	.185(4.70)	.305(7.75)
MDM-9SBS*	1.390(35.31)	1.150(29.21)	.565(14.35)	.785(19.94)	.395(10.03)	.245(6.22)	.305(7.75)
MDM-15PBS*	1.390(35.31)	1.150(29.21)	.715(18.16)	.935(23.75)	.490(12.45)	.185(4.70)	.305(7.75)
MDM-15SPS*	1.390(35.31)	1.150(29.21)	.715(18.16)	.935(23.75)	.545(13.84)	.245(6.22)	.305(7.75)
MDM-21PBS*	1.690(42.93)	1.450(30.83)	.865(21.97)	1.085(27.56)	.640(16.26)	.185(4.70)	.305(7.75)
MDM-21SBS*	1.690(42.93)	1.450(30.83)	.865(21.97)	1.085(27.56)	.695(17.65)	.245(6.22)	.305(7.75)
MDM-25PBS*	1.740(44.20)	1.500(38.10)	.965(24.51)	1.185(30.10)	.740(18.80)	.185(4.70)	.305(7.75)
MDM-25SBS*	1.740(44.20)	1.500(38.10)	.965(24.51)	1.185(30.10)	.795(20.19)	.245(6.22)	.305(7.75)
MDM-31PBS*	2.040(51.82)	1.800(45.72)	1.115(28.32)	1.335(33.91)	.890(22.61)	.185(4.70)	.305(7.75)
MDM-31SBS*	2.040(51.82)	1.800(45.72)	1.115(28.32)	1.335(33.91)	.945(24.00)	.245(6.22)	.305(7.75)
MDM-37PBS*	2.340(59.44)	2.100(53.34)	1.265(32.13)	1.485(37.72)	1.040(26.42)	.185(4.70)	.305(7.75)
MDM-37SBS*	2.340(59.44)	2.100(53.34)	1.265(32.13)	1.485(37.72)	1.095(27.81)	.245(6.22)	.305(7.75)
MDM-51PBS*	2.270(57.66)	2.000(50.80)	1.215(30.86)	1.435(36.45)	.990(25.15)	.230(5.84)	.345(8.76)
MDM-51SBS*	2.270(57.66)	2.000(50.80)	1.215(30.86)	1.435(36.45)	1.045(26.54)	.290(7.37)	.345(8.76)

*For jackpost locking add letter "P."
Consult factory for PCB pin identification number and for mounting hole pattern dimensions.

NOTE: Standard lead termination is #24 AWG, solid copper, solder or tin dipped.

CONSULT FACTORY FOR PCB PIN IDENTIFICATION NUMBERS AND FOR MOUNTING HOLE PATTERN DIMENSIONS

MDM COAXIAL/POWER SERIES

MDM COAXIAL

The MDM Metal Shell Connectors have been tooled in several coaxial layouts and offer the versatility of combining coaxial and signal lines in the same connector. Any modifications to these layouts or new requirements, please consult the factory. For ordering information see page 141. For contact layouts see page 142.

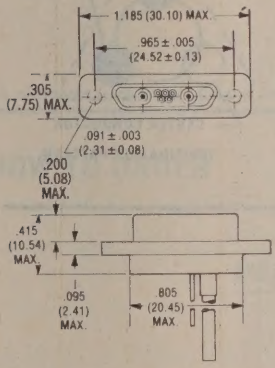
MDM POWER

The same insulator that is used with coaxial contacts is available with power contacts. This offers the versatility of combining power and signal lines in the same connector. Power contacts are rated at 13 amps, 24V rms, AWG #16 white stranded.

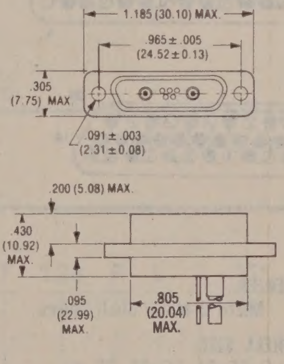
MDM COAXIAL/POWER

Power and coaxial contacts can be interchanged as desired.

7C2/7P2

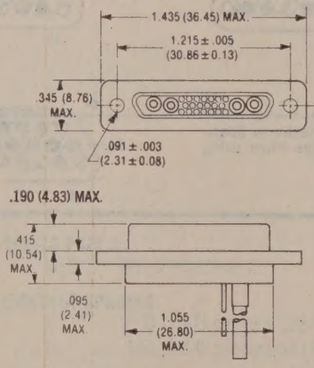

1.185 (30.10) MAX.
.965 ± .005
(24.52 ± 0.13)
.305
(7.75) MAX.
.091 ± .003
(2.31 ± 0.08)
.200
(5.08)
MAX.
.415
(10.54)
MAX.
.095
(2.41)
MAX.
.805
(20.45)
MAX.

PLUG

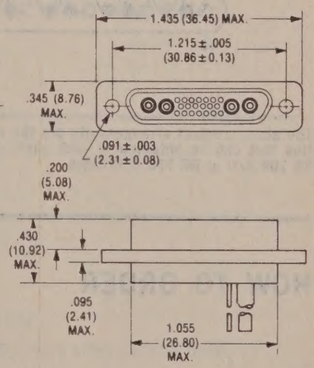

1.185 (30.10) MAX.
.965 ± .005
(24.52 ± 0.13)
.305
(7.75) MAX
.091 ± .003
(2.31 ± 0.08)
.200 (5.08) MAX.
.430
(10.92)
MAX.
.095
(22.99)
MAX.
.805
(20.04)
MAX.

RECEPTACLE

24C4/24P4

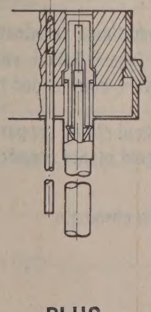

1.435 (36.45) MAX.
1.215 ± .005
(30.86 ± 0.13)
.345 (8.76)
MAX.
.091 ± .003
(2.31 ± 0.08)
.190 (4.83) MAX.
415
(10.54)
MAX.
.095
(2.41)
MAX.
1.055
(26.80)
MAX.

PLUG

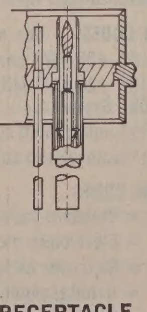

1.435 (36.45) MAX.
1.215 ± .005
(30.86 ± 0.13)
.345 (8.76)
MAX.
.091 ± .003
(2.31 ± 0.08)
.200
(5.08)
MAX.
.430
(10.92)
MAX.
.095
(2.41)
MAX.
1.055
(26.80)
MAX.

RECEPTACLE

COAXIAL CONTACTS

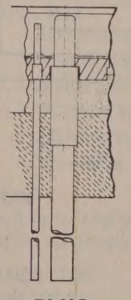


PLUG

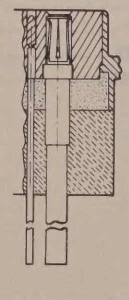


RECEPTACLE

POWER CONTACTS



PLUG



RECEPTACLE

Dimensions subject to change

(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MDM TRI-TERM SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

INTRODUCTION

MDM TRI-TERM connectors provide RF performance in standard MDM metal shells and insulator layouts. RG196, RG178 coaxial or shielded cables are terminated to three MICROPIN®/MICROSOCKET® contacts, providing isolation of the center conductor in a standard connector.

MDM TRI-TERM connectors are available in seven shell sizes that accommodate up to a maximum of 17 coax or shielded terminations. Terminations are designed for operation from 100 to 1000 MHz with VSWR's of 1.2:1.0 to 1.4:1.0. Overall envelope and mounting dimensions are the same as the standard MDM Series, except for an additional .250"(6,35mm) max. rear back potting for strain relief.

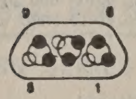
Shown below are arrangements with coaxial or shielded wire terminations, but coaxial and signal lines can be mixed in the same shell size. A 15-pin shell could have the following combinations:

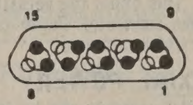
1 coax + 12 signal
2 coax + 9 signal
3 coax + 6 signal
4 coax + 3 signal
5 coax + 0 signal

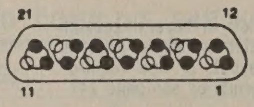
For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

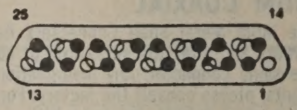
CABLE TERMINATION ARRANGEMENTS

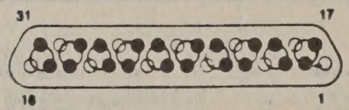
Coaxial termination arrangements as viewed from the engaging face of the pin side — use reverse order for socket side.

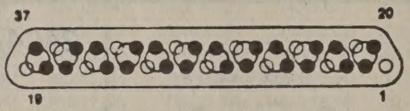


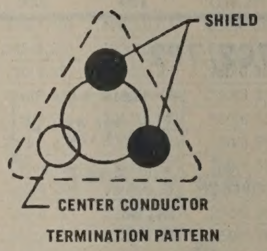




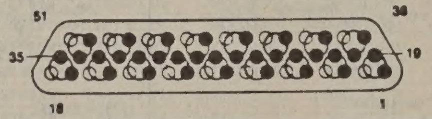








The above contact arrangements are the maximum densities that can be obtained in each shell size when using RG 196 A/U or RG 178 B/U cable.



HOW TO ORDER

MDM — 37 A P H XXX XX

Series
Shell Size
Contact Arrangements
Contact Type
Termination Type
Termination Codes
Modification Codes

NOTE: For other plating modifications not listed, consult the factory.

SERIES
Micro D Metal Shell Series

SHELL SIZE
9, 15, 21, 25, 31, 37, 51

CONTACT TYPE
P = Pin; S = Socket

TERMINATION TYPE
H = Harness-insulated wire.

TERMINATION CODES — See page 141 for additional termination codes.
(H) 001 = 18" #26 AWG per MIL-W-16878 Type E Teflon, yellow.
(H) 003 = 18" #26 AWG MIL-W-16878-E Teflon, color coded to MIL-STD-681 System I.
(L) 1 = ½" uninsulated solid #25 AWG gold plated copper.
(L) 2 = 1" uninsulated solid #25 AWG gold plated copper.

MODIFICATION CODES
No Number = Standard cadmium over yellow chromate
A174 = Electroless nickel
A172 = Gold over nickel
A141 = Irridite/alodine
A30 = Black anodize

MICROMINIATURE CONNECTORS MEB SERIES

INTRODUCTION

The Micro Edgeboard (MEB) connector system has been added to the microminiature products line to provide a combination of high density and high reliability for applications in airborne and space systems, computers and peripherals, and industrial and commercial control systems. Its design incorporates the pioneer Micropin®/Microsocket® contact system. This system has an outstanding record of high reliability and millions of contacts are in use in various applications where electrical interconnects are used.

The MEB has cast aluminum shells for ruggedness, diallyl phthalate insulation for top electrical performance and a 36-position polarization key system to prevent cross plugging. Contacts are on .050″ (1.27mm) center spacings. As with other members of the Micro family of connectors, the MEB has the advantage of a wide variety of types of termination. Termination types available include 90° P.C. pigtails for multi-layered boards, "coke bottle" termination for double-sided P.C. boards, and capability for Wire-Wrap† termination. Harnessing capability is also available for both pin and socket sides.

The MEB, including the SBR 90° variation available for multi-layer boards, can be mounted on the female (daughter) side of double or single-sided P.C. boards. The mating male (mother) board side can have the terminations formed to meet the application demands. Wire-wrapping, using .025″ x .025″ (0.64mm x 0.64mm) square posts is also available.

For further information, contact your nearest ITT Cannon Electric field office, or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

STANDARD DATA

STANDARD MATERIALS AND FINISHES

Shell	— Aluminum alloy, cadmium plate, yellow chromate
Insulation	— Glass-filled diallyl phthalate
Contacts	— Copper alloy, gold plate
Jackscrew and Jackpost	— 300 stainless steel, passivate

TERMINATION TYPES — Consult Factory

MECHANICAL FEATURES

Size or Length	— 2 sizes
Coupling	— Friction/Jackscrew
Polarization	— Shells, keys, pins
Contact Spacing Centers	— .050″ (1,27 mm)
Shell Styles	— Plug and receptacle

SHELL PLATING MOD CODES

No Number = Standard cadmium over yellow chromate
A174 = Electroless nickel
A172 = Gold over nickel
A141 = Irridite
A30 = Black anodize

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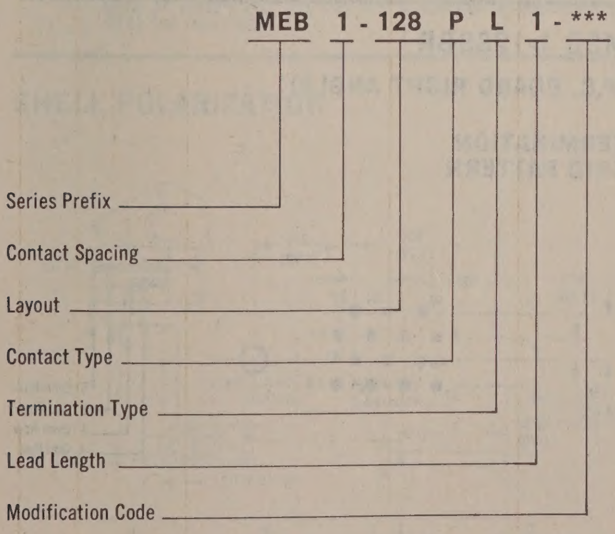
† A registered trademark of Gardner-Denver Co.

HOW TO ORDER



SERIES PREFIX
MEB = Micro edgeboard

CONTACT SPACING
1 = .050 (1,27) centers 128/184
2 = .100 (2,54) centers 64/92 (every other contact hole)

LAYOUT
64, 92, 128, 184

CONTACT TYPE
P = Pin
S = Socket

TERMINATION TYPE*
L = Uninsulated solid wire
H = Insulated stranded round harness wire
S = Solder pots
BS = PC board straight
BR = PC board right angle
W = Wire-Wrap

LEAD LENGTH
Consult factory for proprietary materials and lengths

MODIFICATION CODE
Consult factory

*Consult factory for stranded wire lead modification codes.

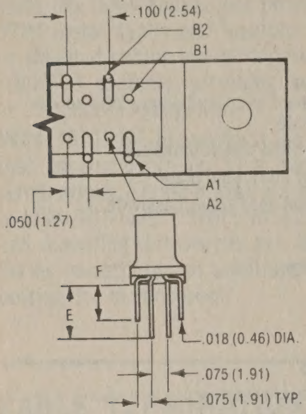
ITT CANNON ELECTRIC

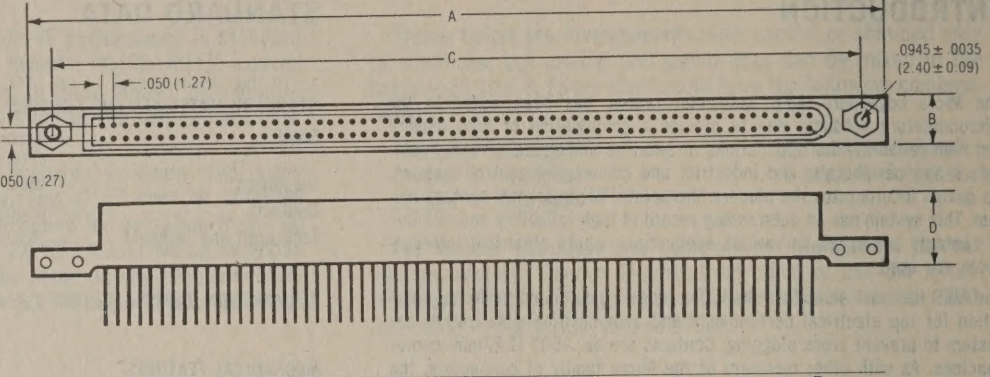
MICROMINIATURE CONNECTORS MEB SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MEB 1-128

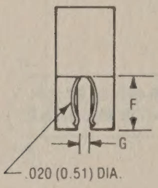
PLUG

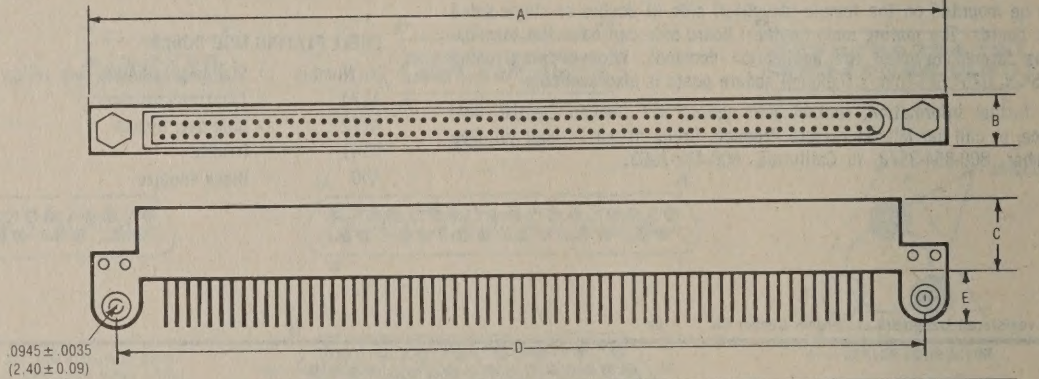

.100 (2.54)
B2
B1
A1
A2
.050 (1.27)
F
E
.018 (0.46) DIA.
.075 (1.91)
.075 (1.91) TYP.


A
C
.050 (1.27)
.0945 ± .0035
(2.40 ± 0.09)
B
.050 (1.27)
D

A	B	C	D	E	F
± .015 (± 0.38)	± .010 (± 0.25)	± .010 (± 0.25)	± .010 (± 0.25)	± .025 (± 0.64)	± .025 (± 0.64)
3.950 (100.33)	.250 (6.35)	3.700 (93.98)	.400 (101.60)	.350 (8.89)	.275 (6.99)

RECEPTACLE


F
G
.020 (0.51) DIA.



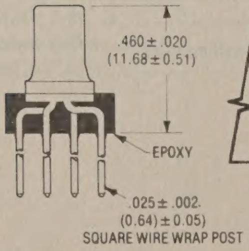
.0945 ± .0035
(2.40 ± 0.09)
DIA. THRU
C'BORE .187 (4.75) 2 PLACES
1 SIDE ONLY

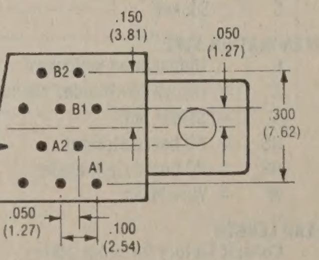
A	B	C	D	E	F	G
± .015 (± 0.38)	± .010 (± 0.25)	± .010 (± 0.25)	± .010 (± 0.25)	± .010 (± 0.25)	Max.	Max.
3.950 (100.33)	.250 (6.35)	.400 (10.16)	3.700 (93.98)	.300 (7.62)	.275 (6.98)	.030 (0.76)

NOTE: All round pigtail #25 AWG wire termination designs now available for the MEB1-128 receptacles will apply on the MEB1-184 series also.

MEB 1-128PW

(WIRE-WRAP)

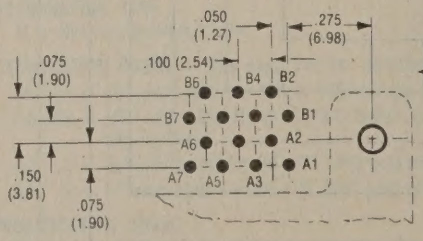

.460 ± .020
(11.68 ± 0.51)
EPOXY
.025 ± .002
(0.64) ± 0.05)
SQUARE WIRE WRAP POST

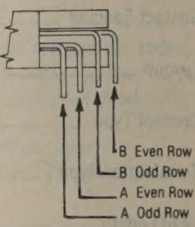

.150
(3.81)
.050
(1.27)
B2
B1
A2
A1
.300
(7.62)
.050
(1.27)
.100
(2.54)

MEB 1-128SBR

(P.C. BOARD RIGHT ANGLE)

TERMINATION GRID PATTERN


.050
(1.27)
.275
(6.98)
.075
(1.90)
.100 (2.54)
B6
B4
B2
B7
B1
A6
A2
A1
A7
A5
A3
.150
(3.81)
.075
(1.90)


B Even Row
B Odd Row
A Even Row
A Odd Row

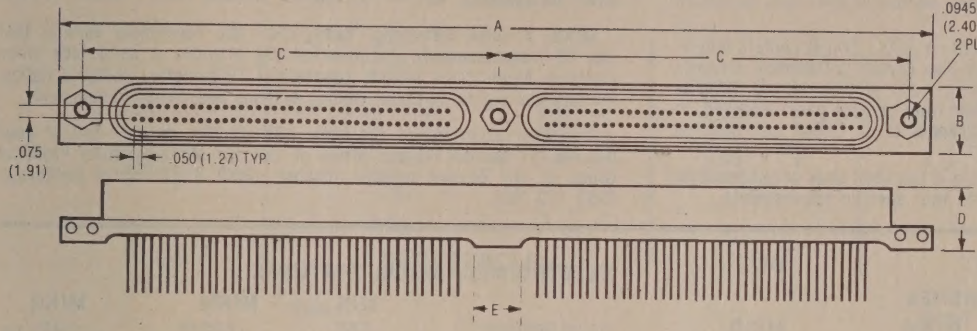
ITT CANNON ELECTRIC

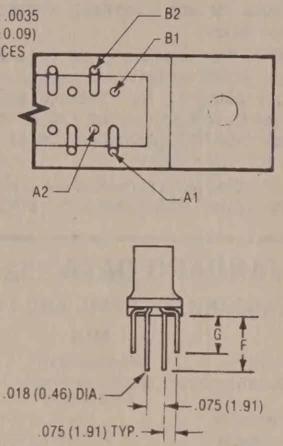
MICROMINIATURE CONNECTORS MEB SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MEB 1-184

PLUG

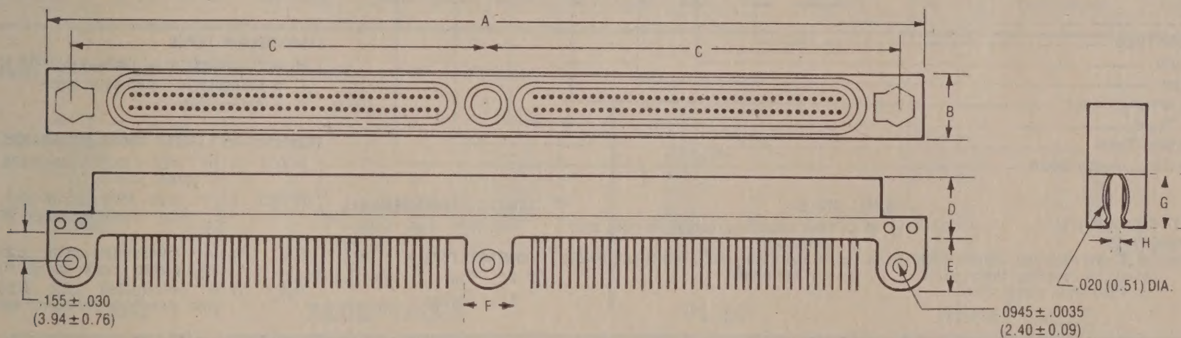

A
C
C
.0945 ± .0035
(2.40 ± 0.09)
2 PLACES
B
.075
(1.91)
.050 (1.27) TYP.
D
E


B2
B1
A2
A1
G
F
.018 (0.46) DIA.
.075 (1.91)
.075 (1.91) TYP.

A	B	C	D	E	F	G
±.015(±0.25)	±.025(±0.64)	±.005(±0.13)	±.010(±0.25)	±.010(±0.25)	±.025(±0.64)	±.025(±0.64)
5.800(147.32)	.3425(87.00)	2.775(70.49)	.400(10.16)	.250(6.35)	.350(8.89)	.275(6.98)

Wire-wrap termination similar to the 128 PW-A wire-wrap will be available in 1-184 plugs. Consult the factory for specific information.

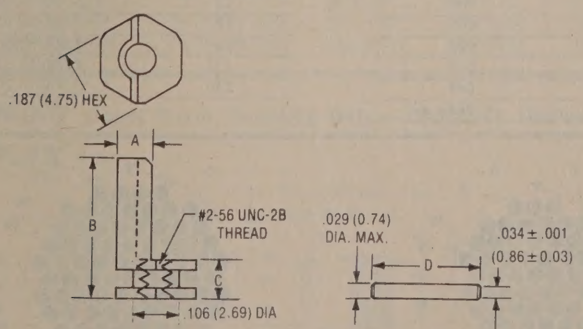
RECEPTACLE


A
C
C
B
D
E
G
H
.155 ± .030
(3.94 ± 0.76)
F
.020 (0.51) DIA.
.0945 ± .0035
(2.40 ± 0.09)
DIA. THRU
C'BORE .187 (4.75) DIA.
3 PLACES. 1 SIDE ONLY

A	B	C	D	E	F	G	H
±.010(±0.25)	±.025(±0.64)	±.005(±0.13)	±.010(±0.25)	±.010(±0.25)	±.010(±0.25)	Max.	Max.
5.800(147.32)	.3425(87.00)	2.775(70.49)	.400(10.16)	.300(7.62)	.250(6.35)	.275(6.98)	.030(0.76)

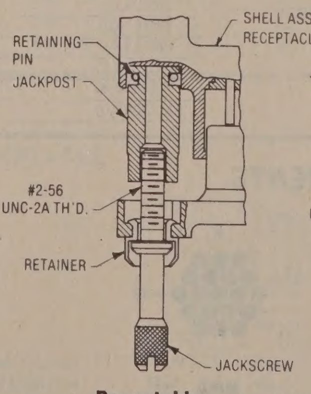
NOTE: All round pigtail #25 AWG wire termination designs now available for the MEB1-128 receptacles will apply on the MEB1-184 series also.

SHELL POLARIZATION

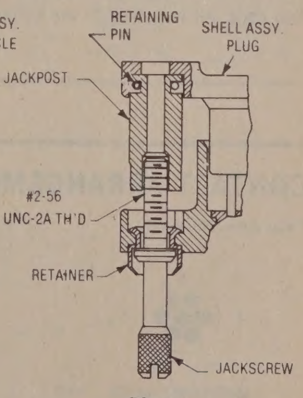

.187 (4.75) HEX
A
B
#2-56 UNC-2B
THREAD
C
.106 (2.69) DIA
.029 (0.74)
DIA. MAX.
.034 ± .001
(0.86 ± 0.03)
D

A	B	C	D
	±.005(±0.13)	±.003(±0.08)	±.010(±0.25)
.082(2.08)	.325(8.26)	.090(2.29)	.250(6.35)

JACKSCREW/JACKPOST ASSEMBLY


SHELL ASSY.
RECEPTACLE
RETAINING PIN
JACKPOST
#2-56
UNC-2A TH'D.
RETAINER
JACKSCREW

Receptable with Jackscrew


RETAINING PIN
SHELL ASSY.
PLUG
JACKPOST
#2-56
UNC-2A TH'D
RETAINER
JACKSCREW

Plug with Jackscrew

(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MICRO-K/MIK SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

INTRODUCTION

MICRO-K microminiature circular connectors are rugged yet lightweight — and meet or exceed the applicable requirements of MIL-C-26482. Applications include computers, biomedical, instrumentation and miniature black boxes.

MIK: Accommodate up to 55 contacts on .050(1,27mm) centers (equivalent to 420 contacts per square inch). Five keyway polarization prevents cross plugging. The threaded coupling nuts provide strong, reliable coupling. MIK receptacles can be either front or back panel mounted; in back mounting applications, panel thickness of up to 3/32" can be used on the larger sizes.

Standard MIK connectors are available in two shell sizes accommodating two contact arrangements pre-wired to your specific requirements.

MIKM: Similar to our MIK, except has a steel shell and receptacle for improved ruggedness and RFI resistance. It accommodates up to 85 twist pin contacts.

MIKQ: A quick disconnect metal shell and receptacle version that can be instantaneously disconnected yet provides a solid lock when engaged. Applications include commercial TV cameras, portable radios, military gun sights, airborne landing systems and medical equipment.

For other variations of the basic MIK circular design, contact your nearest ITT Cannon Electric office or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573, in California, (800) 432-7063.

STANDARD DATA

STANDARD MATERIAL AND FINISHES

	MIK	MIKM	MIKQ
Shell	Thermoplastic	Stainless Steel	Brass
Coupling Nut	Stainless Steel Passivated	Stainless Steel Passivated	Brass, Electroless Nickel Plated
Insulator	— Glass-reinforced Thermoplastic —		
Contacts	— 50 Microinch Gold Plated Copper Alloy —		

*Availability at time of printing, consult factory for others

ELECTRO/MECHANICAL FEATURES

	MIK	MIKM	MIKQ
No. of Contacts*	7.55	7,55,85	7,19
Wire Size		#26 AWG thru #32 AWG	
Contact Termination		Crimp or Solder Pot	
Contact Rating		3 Amps	
Coupling	Threaded	Threaded	Push/Pull
Polarization		Keyways	
Contact Spacing		.050" (1,27 mm) Centers	
Shell Styles	0-Wall Mtg. 6-Straight Plug	0-Wall Mtg. 6-Straight Plug	7-Jam Nut 6-Straight Plug

HOW TO ORDER

MIK M 6- 4- 55 P * **

- Series — MIK
- Connector Type — M
- Shell Style — 6-
- Shell Size — 4-
- Contact Arrangement — 55
- Contact Type — P
- Termination Type — *
- Termination Length Code — **

SERIES
MIK: ITT Cannon Prefix

CONNECTOR TYPES
No letter = Screw coupling, plastic shell
M = Screw coupling, metal shell
Q = Push/Pull, metal shell

SHELL STYLES
0 = Wall mounting receptacle (MIK and MIKM only)
6 = Straight plug (MIK, MIKM and MIKQ)
7 = Jam nut mount

CONTACT ARRANGEMENTS
1-7, 2-19, 4-55, 5-85

CONTACT TYPE
P = Pin
S = Socket

TERMINATION TYPES
H = Insulated round hook-up wire
L = Uninsulated round solid wire
S = Solder pot

TERMINATION LENGTH CODES (STANDARDS)
(H)001 = 18" #26 AWG MIL-W-16878, Type E, yellow wire
(H)003 = 18" #26 AWG MIL-W-1687, Type E, color coded wire per MIL-STD-681
(L)1 = ½" uninsulated solid #25 AWG gold plated copper round wire
(L)2 = 1" uninsulated solid #25 AWG gold plated copper round wire

STANDARD WIRE TERMINATION CODES

The following termination mod codes are listed for your information. For lengths not shown, consult factory for proper modification code. All wire lengths are minimum.

HARNESS TYPE (H)

#26 AWG per MIL-W-16878 Type E, Teflon Stranded

Length	— All Yellow	Color Coded
3(76,2)	020	027
6(152,4)	019	016
8(203,2)	026	034
10(254,0)	029	025
12(304,8)	028	002
18(457,2)	001	003
20(508,0)	038	023
24(609,6)	009	004
30(762,0)	010	005
36(914,4)	011	006
48(1219,2)	013	048
72(1828,8)	017	046
120(3048,0)	042	041

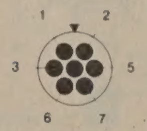
SOLID UNINSULATED TYPE (L)

#25 AWG Gold Plated Copper

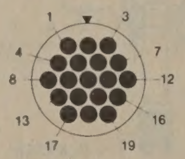
	Length
L61	.125(3,18)
L56	.150(3,81)
L57	.190(4,33)
L39	.250(6,35)
L58	.375(9,52)
L1	.500(12,70)
L14	.750(19,05)
L2	1.000(25,10)
L7	1.500(38,10)
L6	2.000(50,80)
L16	2.500(63,50)
L10	3.000(76,20)

CONTACT ARRANGEMENTS

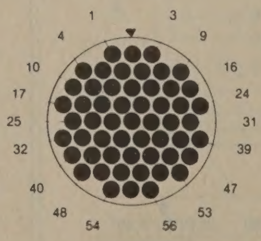
Face view, plug side



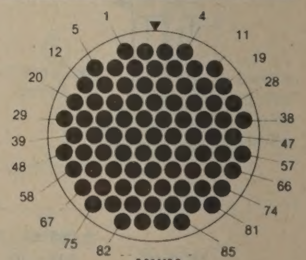
MIK/MIKM/MIKQ
7 CONTACTS



MIKQ
19 CONTACTS



MIK/MIKM
55 CONTACTS



MIKM
85 CONTACTS

Cavity identification numbers are for reference, do not appear on connectors.

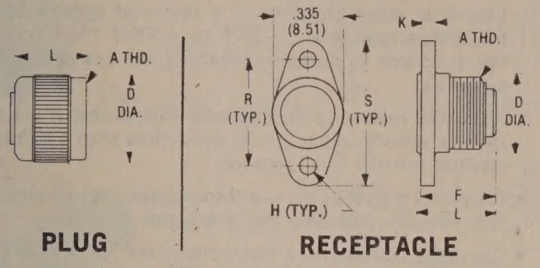
Dimensions subject to change

MICROMINIATURE CONNECTORS
MIK SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

SHELL DIMENSIONS

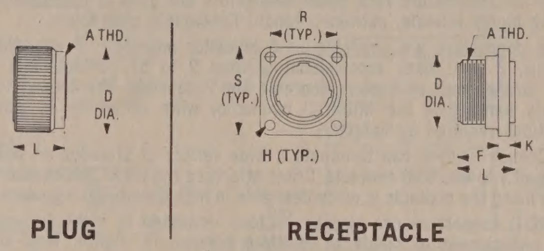
MIK (Rear Panel Mount Thickness — see Tabulation "T")



L
A THD.
D DIA.
.335 (8.51)
R (TYP.)
S (TYP.)
H (TYP.)
K
A THD.
D DIA.
F
L

PLUG **RECEPTACLE**

Size 1



A THD.
D DIA.
L
R (TYP.)
S (TYP.)
H (TYP.)
A THD.
D DIA.
K
F
L

PLUG **RECEPTACLE**

Size 4

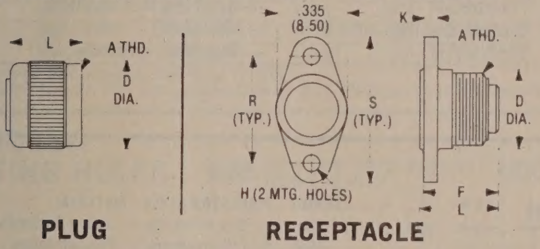
PLUG

Part Number by Shell Size	A Thread	D Max.	L Max.	Avg. Weight oz. (gm.) ±5%
MIK6-1-7P	5/16-24UNEF-2B	.375(9.52)	.315(8.00)	2.900(82.21)
MIK6-4-55P	9/16-24UNEF-2B	.750(19.05)	.440(11.18)	2.135(60.53)

RECEPTACLE

Part Number by Shell Size	A Thread	D	F Max.	H ±.003(±0.08)	K	L Max.	R ±.005(±0.13)	S Max.	Avg. Weight oz. (gm.) ±5%	T Max.
MIK0-1-7S	5/16-24UNEF-2A	.325(8.26)	.315(8.00)	.078(1.98)	.062(1.57)	.355(9.02)	.460(11.68)	.630(16.00)	.242(6.86)	.032(0.81)
MIK0-4-55S	9/16-24UNEF-2A	.625(15.88)	.440(11.18)	.089(2.26)	.100(2.54)	.495(12.57)	.580(14.73)	.760(19.30)	2.065(58.54)	.062(1.57)

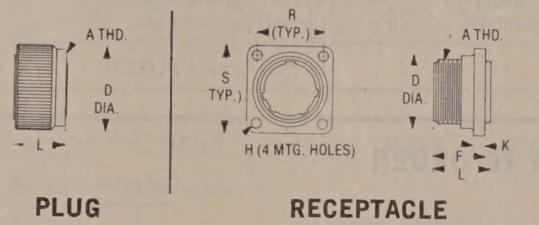
MIKM (Rear Panel Mount Thickness — see Tabulation "T")



L
A THD.
D DIA.
.335 (8.50)
R (TYP.)
S (TYP.)
H (2 MTG. HOLES)
K
A THD.
D DIA.
F
L

PLUG **RECEPTACLE**

Size 1



A THD.
D DIA.
L
R (TYP.)
S TYP.)
H (4 MTG. HOLES)
A THD.
D DIA.
K
F
L

PLUG **RECEPTACLE**

Size 4

PLUG

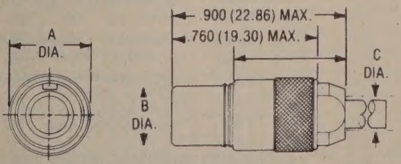
Part Number by Shell Size	A Thread	D Max.	L Max.
MIKMG6-1-7P	5/16-24UNEF-2B	.370(9.40)	.315(8.00)
MIKMG6-4-55P	5/8-24UNEF-2B	.750(19.05)	.440(11.18)
MIKMG6-5-85P	11/16-24UNEF-2B	.860(21.84)	.440(11.18)

RECEPTACLE

Part Number by Shell Size	A Thread	D	F Max.	H ±.003(±0.08)	K	L Max.	R ±.005(±0.13)	S Max.	T Max.
MIKM0-1-7S	5/16-24UNEF-2A	.325(8.26)	.320(8.13)	.078(1.98)	.062(1.57)	.375(9.52)	.460(11.68)	.630(16.00)	.032(0.81)
MIKM0-4-55S	5/8-24UNEF-2A	.625(15.88)	.426(10.82)	.091(2.31)	.062(1.57)	.490(12.45)	.580(14.73)	.760(19.30)	.125(3.18)
MIKM0-5-85S	11/16-24UNEF-2A	.745(18.92)	.426(10.82)	.091(2.31)	.062(1.57)	.490(12.45)	.674(17.12)	.845(21.46)	.125(3.18)

MIKQ (Front Panel Mounting Only — .093(2.36) Thickness)

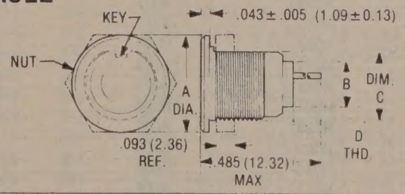
PLUG



A DIA.
.900 (22.86) MAX.
.760 (19.30) MAX.
B DIA.
C DIA.

Part Number by Shell Size	A Max.	B Max.	C Ref.
MIKQ6-1-7S	.385 (9.78)	.305 (7.75)	.180 (4.57)
MIKQ6-2-19S	.515 (13.08)	.405 (10.29)	.260 (6.60)

RECEPTACLE



KEY
.043 ± .005 (1.09 ± 0.13)
NUT
A DIA.
B
DIM. C
D THD
.093 (2.36) REF.
.485 (12.32) MAX

Part Number by Shell Size	A Max.	B Max.	C Max.	D Thread
MIKQ7-1-7P	.510 (12.95)	.240 (6.10)	.353 (8.97)	3/8-32UNEF-2A
MIKQ7-2-19P	.575 (14.60)	.340 (8.64)	.463 (11.76)	1/2-28UNEF-2A

(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MD SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MICROMINIATURE RECTANGULAR CONNECTORS WITH MICROPIN® CONTACTS ON .050″ (1,27 mm) CENTERS

MICRO-D microminiature rack/panel connectors are used in applications requiring highly reliable, extremely small, lightweight connectors.

These connectors are available in 4 insulator materials, 2 mounting variations, 7 shell sizes accommodating from 9 to 51 contacts and a special arrangement of 5 micro contacts and 2 coaxials. The 4 insulator materials listed give the MICRO-D connector wide versatility in most applications required by industry:

ITT Cannon Electric can terminate a wide variety of stranded or solid wire directly to MICRO-D contacts. Crimp attaching the wires before inserting and fixing the contacts is often desirable in high density arrangements.

MICRO-D connectors can also be custom harnessed to meet any customer requirement of single or multiple connectors. Piptail lead and harness description must be given by the customer. A typical description would be: ½″ #25 AWG, gold plated copper leads or 18″ of #26 yellow, Teflon-insulated, Type E wire. Shown below are various methods of termination. Consult factory for any routine or complex harnessing of MICRO-D connectors.

- Glass-filled diallyl phthalate — a thermoset material used in high temperature applications, −65°F to +300°F (−18°C to +149°C), that is immune to cleaning solvents. It also has excellent dielectric properties.
- Glass-filled nylon — a thermoplastic material that is not affected by cleaning solvents, and is used in applications when a high temperature resistant material is not required.
- Glass-filled polycarbonate — a thermoplastic material exhibiting excellent dielectric properties and dimensional stability.
- Glass-filled polyester — a thermoplastic that is not affected by cleaning solvents and exhibits excellent dielectric properties.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

STANDARD DATA

STANDARD MATERIALS AND FINISHES

Shell/Insulator (One-Piece) — MD/MDB: Glass-filled thermoset—plastic
MDA/MDN/MDNB/MDVB: Thermoplastic
Contacts — Copper alloy, gold plate

ELECTRICAL DATA

No. of Contacts — 9 to 51; 1 arrangement of 5 contacts and 2 coaxials
Coaxial Contacts — RG-196/U and RG-178/U
RG-196A/U and RG-178B/U

Wire Size — #24 thru #30 AWG
Contact Termination — Crimp stationary

MECHANICAL FEATURES

Size or Length — 7 sizes
Coupling — Friction/jackscrews
Polarization — Keystone-shaped shells
Contact Spacing Centers — .050 (1,27)
Shell Styles — Plug and receptacle

HOW TO ORDER

MD** 1- 9 P H *** *

Series - Insulator Style - Material
Contact Spacing
Contact Arrangement
Contact Type
Termination Type
Termination Code
Locking Hardware

SERIES - INSULATOR STYLE - MATERIAL
MD = Clip mounting — Daillyl Phthalate
MDA = Clip mounting — Polycarbonate
MDB = Screw mounting — Diallyl Phthalate
MDC = Screw mounting — Polycarbonate
MDN = Clip mounting — Nylon
MDNB = Screw mounting — Nylon
MDVB = Screw mounting — Polyester

CONTACT SPACING
.050″ (1,27 mm) centers

CONTACT ARRANGEMENT
8-15-21-25-31*-37-51 See page 142 for views

CONTACT TYPE
P = Pin
S = Socket

TERMINATION CODE**
H = Insulated solid or stranded wire
L = Uninsulated solid wire
S = Solder pot

TERMINATION CODE
(H) 001 = 18″ insulated stranded #26 AWG Teflon yellow per MIL-W-16878, Type E
(H) 003 = Same as above except color coded to MIL-STD-681 System
(L) 1 = ½″ uninsulated solid copper gold plated #25 AWG
(L) 2 = 1″ uninsulated solid copper gold plated #24 AWG

LOCKING HARDWARE (SCREW MOUNTING ONLY)
P = Jackpost
K = Jackscrew — regular
L = Jackscrew — low profile
F = Float mount
No designator = no hardware

STANDARD WIRE TERMINATION CODES

The following termination codes are listed for your information. For lengths not shown, consult factory for proper modification code. All wire lengths are minimum.

HARNESS TYPE (H)

#26 AWG per MIL-W-16878 Type E, Teflon Stranded

Length	All Yellow	Color Coded
3(76,2)	H020	H027
6(152,4)	H019	H016
8(203,2)	H026	H034
10(254,0)	H029	H025
12(304,8)	H028	H072
18(457,2)	H001	H003
20(508,0)	H038	H023
24(609,6)	H009	H004
30(762,0)	H010	H005
36(914,4)	H011	H006
48(1219,2)	H013	H008
72(1828,8)	H017	H046
120(3048,0)	H042	H041

SOLID UNINSULATED TYPE (L)

#25 AWG Gold Plated Copper

	Length
L61	.125(3,18)
L56	.150(3,81)
L57	.190(4,83)
L39	.250(6,35)
L58	.375(9,52)
L1	.500(12,70)
L14	.750(19,05)
L2	1.000(25,40)
L7	1.500(38,10)
L6	2.000(50,80)
L16	2.500(63,50)
L10	3.000(76,20)

*Not available in clip mounting.
**See table on left for additional codes.

ITT CANNON ELECTRIC

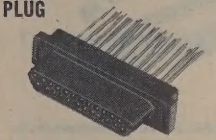
MICROMINIATURE CONNECTORS MD/MDA/MDN/MDB/MDC/MDNB/MDVB SERIES

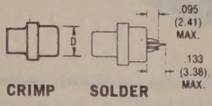
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

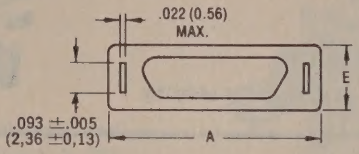
WITH CLIP MOUNTING SLOTS

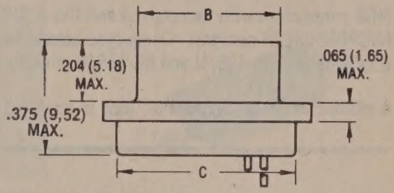
MD Glass-filled Diallyl Phthalate Plastic Insulator **MDA** Glass-filled Polycarbonate Plastic Insulator **MDN** Glass-filled Nylon Plastic Insulator

PLUG

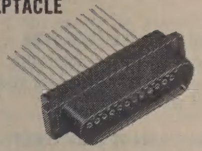


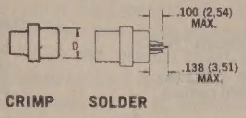


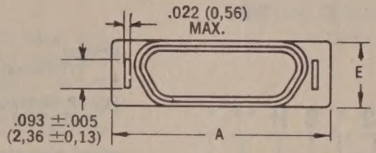


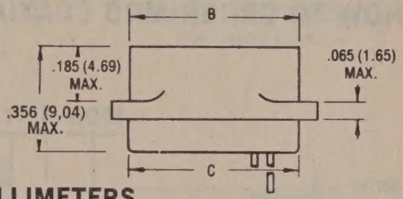


RECEPTACLE









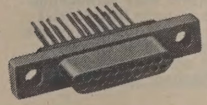
Part Number by Shell Size			INCHES A Max.	B Max.	C Max.	D Max.	E Max.	Avg. Weight** ±5% (oz.)	MILLIMETERS A Max.	B Max.	C Max.	D Max.	E Max.	Avg. Weight** (gm.) ±5%
MD1-9P*	MDA1-9P*	MDN1-9P*	.512	.292	.405	.170	.215	.026	13,00	7,42	10,29	4,32	5,46	,73
MD1-9S*	MDA1-9S*	MDN1-9S*	.512	.376	.405	.170	.215	.025	13,00	9,55	10,29	4,32	5,46	,70
MD1-15P*	MDA1-15P*	MDN1-15P*	.662	.442	.555	.170	.215	.038	16,81	11,23	14,10	4,32	5,46	1,10
MD1-15S*	MDA1-15S*	MDN1-15S*	.662	.526	.555	.170	.215	.035	16,81	13,36	14,10	4,32	5,46	1,00
MD1-21P*	MDA1-21P*	MDN1-21P*	.812	.592	.705	.170	.215	.053	20,62	15,04	17,91	4,32	5,46	1,50
MD1-21S*	MDA1-21S*	MDN1-21S*	.812	.676	.705	.170	.215	.050	20,62	17,17	17,91	4,32	5,46	1,40
MD1-25P*	MDA1-25P*	MDN1-25P*	.912	.692	.805	.170	.215	.063	23,16	17,58	20,45	4,32	5,46	1,80
MD1-25S*	MDA1-25S*	MDN1-25S*	.912	.776	.805	.170	.215	.056	23,16	19,71	20,45	4,32	5,46	1,60
MD1-37P*	MDA1-37P*	MDN1-37P*	1.212	.992	1.105	.170	.215	.086	30,78	25,20	28,07	4,32	5,46	2,45
MD1-37S*	MDA1-37S*	MDN1-37S*	1.212	1.076	1.105	.170	.215	.076	30,78	27,33	28,07	4,32	5,46	2,15
MD1-51P*	MDA1-51P*	MDN1-51P*	1.162	.942	1.055	.213	.258	.109	29,51	23,93	26,80	5,41	6,55	3,10
MD1-51S*	MDA1-51S*	MDN1-51S*	1.162	1.026	1.055	.213	.258	.093	29,51	26,06	26,80	5,41	6,55	2,65

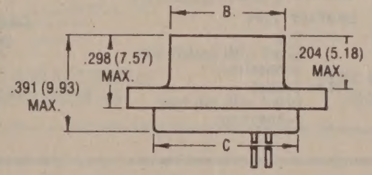
*Add lead type and length; see How To Order
**Weight given is with ½", uninsulated, solid #25 AWG gold plated copper pigtails.

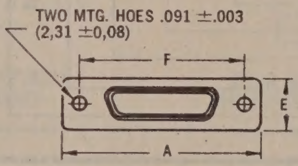
WITH SCREW MOUNTING HOLES

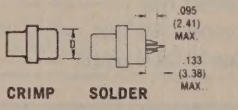
MDB Glass-filled Diallyl Phthalate Plastic Insulator **MDC** Glass-filled Polycarbonate Plastic Insulator **MDNB** Glass-filled Nylon Plastic Insulator **MDVB** Glass-filled Polyester Insulator

PLUG

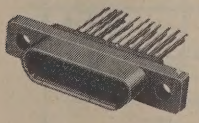


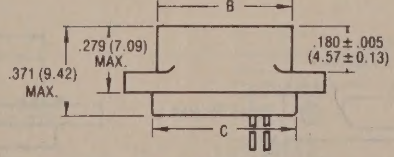


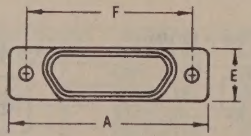


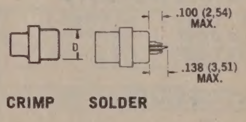


RECEPTACLE









Part Number by Shell Size				INCHES A Max.	B Max.	C Max.	D Max.	E Max.	F ±.005	Avg. Weight** (oz.) ±5%	MILLIMETERS A Max.	B Max.	C Max.	D Max.	E Max.	F ±.013	Avg. Weight** (gm.) ±5%
MDB1-9P*	MDC1-9P*	MDNB1-9P*	MDVB1-9P*	.785	.292	.405	.170	.215	.565	.026	19,93	7,38	10,29	4,32	5,46	14,35	,73
MDB1-9S*	MDC1-9S*	MDNB1-9S*	MDNB1-9S*	.785	.376	.405	.170	.215	.565	.025	19,93	9,55	10,29	4,32	5,46	14,35	,70
MDB1-15P*	MDC1-15P*	MDNB1-15P*	MDVB1-15P*	.935	.442	.555	.170	.215	.715	.038	23,74	11,21	14,10	4,32	5,46	18,16	1,10
MDB1-15S*	MDC1-15S*	MDVB1-15S*	MDVB1-15S*	.935	.526	.555	.170	.215	.715	.035	23,74	13,36	14,10	4,32	5,46	18,16	1,00
MDB1-21P*	MDC1-21P*	MDNB1-21P*	MDVB1-21P*	1.085	.592	.705	.170	.215	.865	.053	27,55	15,00	17,91	4,32	5,46	21,97	1,50
MDB1-21S*	MDC1-21S*	MDNB1-21S*	MDVB1-21S*	1.085	.676	.705	.170	.215	.865	.050	27,55	17,17	17,91	4,32	5,46	21,97	1,40
MDB1-25P*	MDC1-25P*	MDBN1-25P*	MDVB1-25P*	1.185	.692	.805	.170	.215	.965	.063	30,09	17,54	20,45	4,32	5,46	24,51	1,80
MDB1-25S*	MDC1-25S*	MDNB1-25S*	MDVB1-25S*	1.185	.776	.805	.170	.215	.965	.056	30,09	19,71	20,45	4,32	5,46	24,51	1,60
MDB1-31P*	MDC1-31P*	MDNB1-31P*	MDVB1-31P*	1.335	.842	.955	.170	.215	1.115	.080	33,90	21,35	24,26	4,32	5,46	28,32	2,30
MDB1-31S*	MDC1-31S*	MDNB1-31S*	MDVB1-31S*	1.335	.926	.955	.170	.215	1.115	.073	33,90	23,52	24,26	4,32	5,46	28,32	2,10
MDB1-37P*	MDC1-37P*	MDNB1-37P*	MDVB1-37P*	1.485	.992	1.105	.170	.215	1.270	.086	37,71	25,16	28,07	4,32	5,46	32,13	2,45
MDB1-37S*	MDC1-37S*	MDNB1-37S*	MDVB1-37S*	1.485	1.076	1.105	.170	.215	1.270	.076	37,71	27,33	28,07	4,32	5,46	32,13	2,15
MDB1-51P*	MDC1-51P*	MDNB1-51P*	MDVB1-51P*	1.435	.942	1.055	.213	.258	1.215	.109	36,44	23,89	26,80	5,41	6,55	30,86	3,10
MDB1-51S*	MDC1-51S*	MDNB1-51S*	MDVB1-51S*	1.435	1.026	1.055	.213	.258	1.215	.093	36,44	26,06	26,80	5,41	6,55	30,86	2,65

*Add lead type and length; see How To Order
**Weight given is with ½", uninsulated, solid #25 AWG gold plated copper pigtails.

Dimensions subject to change. *(millimeters are in parentheses)*

ITT CANNON ELECTRIC

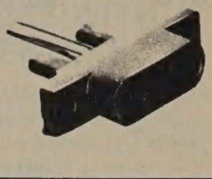
MICROMINIATURE CONNECTORS
MDB COAXIAL SERIES

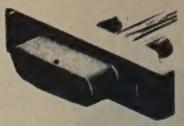
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MDB COAXIAL WITH SCREW MOUNTING HOLES

MDB connectors with two coaxial and five MICROPIN®/MICROSOCKET® contacts. Crimp-type coaxial contacts accommodate RG-196/U and RG-178/U miniature cables.

A plastic insertion/extraction tool is supplied with each connector assembly.





HOW TO ORDER MDB COAXIAL

MDB 1 -7 C2 * S H ** *

- Series
- Power Contact Spacing
- Total Contact Cavities
- Number of Coaxials
- Coaxial Type
- Power Contact Type
- Power Contact Lead Type
- Power Contact Lead Length
- Modification

SERIES
ITT Cannon Electric Prefix

POWER CONTACT SPACING
.050 (1,27 mm) centers

TOTAL CONTACT CAVITIES 7

NUMBER OF COAXIALS 2

COAXIAL TYPE
No letter = Coaxial assembly installed and nonremovable
RO = Coaxial assembly ordered separately
RA = Coaxial shipped assembled but uninstalled

SIGNAL CONTACT TYPE
P = Pin
S = Socket

SIGNAL CONTACT LEAD TYPE
L = Uninsulated, solid wire
H = Uninsulated, solid or stranded
S = Solder pot

SIGNAL CONTACT LEAD LENGTH
See Standard Wire Termination Codes on page 141. Coaxial cable will be RG196U (white) unless otherwise specified; length will be same as wire modification.

MODIFICATION
Consult factory

HARDWARE
No letter = No hardware standard mounting .091 (2.31) hole
F = Float
K = Jackscrew (standard)
L = Jackscrew (low profile)
P = Jackpost

HOW TO ORDER COAXIAL CABLE ASSEMBLIES

MD CC S * ***

- Series
- Coaxial Cable
- Contact Type
- Coaxial Cable Type
- Coaxial Cable Length

SERIES
ITT Cannon Electric prefix

COAXIAL CABLE

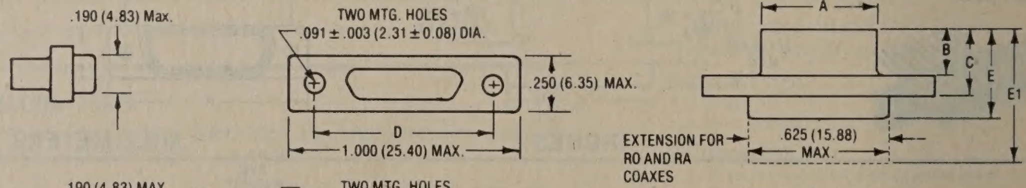
CONTACT TYPE
P = Pin
(used with socket side connection)
S = Socket
(used with pin type connection)

COAXIAL CABLE TYPE
0 = RG196/U
1 = RG178/U

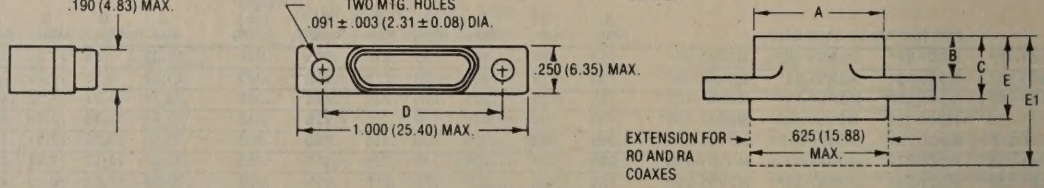
COAXIAL CABLE LENGTH
See Standard Wire Termination Codes on page 141. Coaxial cable will be RG196/U (white) unless otherwise specified; length will be same as wire modification.

DIMENSIONS

PLUG



RECEPTACLE



	INCHES							MILLIMETERS						
Part Number by Shell Size	A Max.	B Max.	C Max.	D ±.005	E Max.	E¹ Max.	Avg. Weight** (oz.) ±5%	A Max.	B Max.	C Max.	D ±.127	E Max.	E¹ Max.	Avg. Weight** (gm.) ±5%
MDB1-7C2P*	.510	.204	.298	.782	.395	.510	.290	12.95	5.18	7.57	19.86	9.93	12.95	8.30
MDB1-7C2S*	.600	.185	.279	.782	.375	.540	.273	12.44	4.70	7.09	19.86	9.42	13.72	7.80

*Add lead type and length; see Part Number Explanation.
**Weight given is with 7″ (177.80mm) insulated leads, #26 AWG silver plated copper pigtails and RG178/U coaxials.

(millimeters are in parentheses)

Dimensions subject to change

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MD/MDA/MDN SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

PANEL MOUNTING HARDWARE

CLIP MOUNTING

Illustrated is the recommended method of front mounting with metal panel mounting keys. Panel mounting keys are available with or without coupling retention clips.

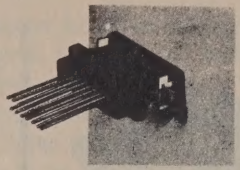
For front mounting, place the rear of the connector thru the panel cutout. With the mounting flange against the panel, fully insert the panel mounting keys thru the slots in the flange and thru the panel cutout. Retaining the keys in this position, bend them outward against the rear of the panel. When mating a front mounted connector with an unmounted connector, a coupling retention clip assembly may be used to securely lock the two together. Mounting screw brackets are available and may be used instead of the panel mounting keys.

Description	Part Number
*Panel Mounting Key	201-9100-000
*Mounting Key and Coupling Clip Assembly	294-9100-000
*Mounting Screw Bracket	015-9100-000
*Edgeboard Mounting Bracket	015-5009-000
**Edgeboard Mounting Bracket and Coupling Clip Assembly	MD51428-1

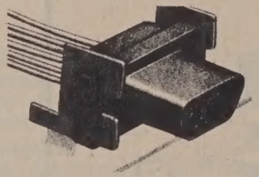
*Must be ordered separately; specify left and right hand for complete assembly.

**Must be ordered separately; assembly already contains a set of left and right hand.

NOTE: Panel mounting keys, coupling clip assemblies and mounting screw brackets are accessories and must be ordered separately.


COUPLING RETENTION CLIP
(see Figure 2)

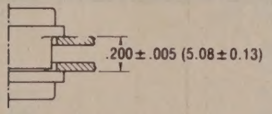
MOUNTING SCREW BRACKETS
(see Figures 1 and 3)


EDGEBOARD MOUNTED
(see Figure 4)

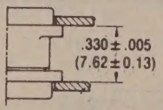
PANEL MOUNTING KEY

CLIP MOUNTING TYPES ONLY

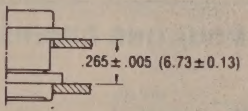
DIMENSIONS



PLUG AND RECEPTACLE REAR MOUNTED



PLUG AND RECEPTACLE FRONT MOUNTED



PLUG FRONT MOUNTED RECEPTACLE REAR MOUNTED

PANEL CUTOUTS

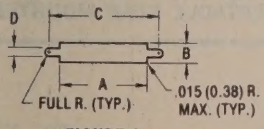


FIGURE 1

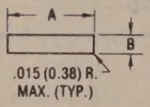


FIGURE 2

FRONT MOUNTING

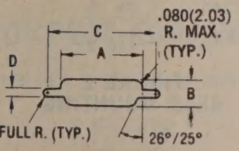


FIGURE 3
REAR MOUNTING

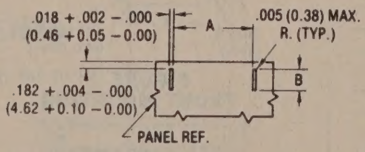


FIGURE 4
EDGEBOARD MOUNTING

NOTES:

1. A panel thickness of ½″ (3.17mm) maximum is recommended for ease of tab bending when a panel mounting key & clip assembly or edgeboard mounting brackets are used.
2. Front mounting is preferred. However, when rear mounting is necessary, use figure 3 for dimensions.
3. Figure 4 is for edgeboard mounting bracket or edgeboard clip assembly. The .184 ± .002 (4.67 ± 0.05) dimension locates the MD socket insulator flush with the end of the board.
4. Screw brackets (015-9100-000) will accommodate #2-56 screws.

Shell Size	Cutout Figure	+.004(0,10) −.000(0,00)	+.004(0,10) −.000(0,00)	+.004(0,10) −.000(0,00)	+.005(0,13) −.000(0,00)
-9	1	.438(11,13)	.172(4,37)	.650(16,51)	.090(2,29)
	2	.438(11,13)	.172(4,37)	—	—
	3	.378(9,60)	.217(5,51)	.625(15,88)	.090(2,29)
	4	.400(10,16)	.091(2,31)	—	—
-15	1	.588(14,94)	.172(4,37)	.795(20,19)	.090(2,29)
	2	.588(14,94)	.172(4,37)	—	—
	3	.528(13,28)	.217(5,51)	.775(19,69)	.090(2,29)
	4	.550(13.97)	.091(2,31)	—	—
-21	1	.738(18,75)	.172(4,37)	.945(24,00)	.090(2,29)
	2	.738(18,75)	.172(4,37)	—	—
	3	.678(17,27)	.217(5,51)	.925(23,50)	.090(2,29)
	4	.700(17,78)	.091(2,31)	—	—
-25	1	.838(21,29)	.172(4,37)	1.045(26,54)	.090(2,29)
	2	.838(21,29)	.172(4,37)	—	—
	3	.778(19,76)	.217(5,51)	1.025(26,04)	.090(2,29)
	4	.800(20,32)	.091(2,31)	—	—
-37	1	1.138(28,91)	.172(4,37)	1.345(34,16)	.090(2,29)
	2	1.138(28,91)	.172(4,37)	—	—
	3	1.078(27,38)	.217(5,51)	1.325(33,66)	.090(2,29)
	4	1.100(27,94)	.091(2,31)	—	—
-51	1	1.088(27,64)	.215(5,46)	1.295(32,89)	.090(2,29)
	2	1.088(27,64)	.215(5,46)	—	—
	3	1.028(26,11)	.260(6,60)	1.275(32,39)	.090(2,29)
	4	1.050(26,67)	.091(2,31)	—	—

(millimeters are in parentheses)

ITT CANNON ELECTRIC

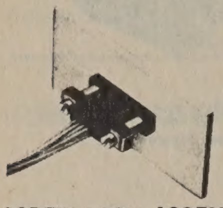
MICROMINIATURE CONNECTORS MDB/MDC/MDNB/MDVB SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

PANEL MOUNTING HARDWARE

SCREW MOUNTING

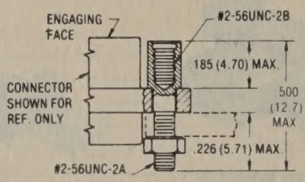
NOTE: This hardware is shipped unassembled.



SCREW LOCK ASSEMBLY

90° ANGLE MOUNTING BRACKET

JACKPOST — (P)


ENGAGING FACE
#2-56UNC-2B
.185 (4.70) MAX.
CONNECTOR SHOWN FOR REF. ONLY
.500 (12.7) MAX
.226 (5.71) MAX.
#2-56UNC-2A

Description	Part Number
Screw Lock Assembly	322-9500-000
Jackpost Kit	320-9505-000
Mounting Bracket, 90° Angle —	
for 9 thru 37 Shell Sizes	015-9516-002
for 51 Shell Size	015-9516-003

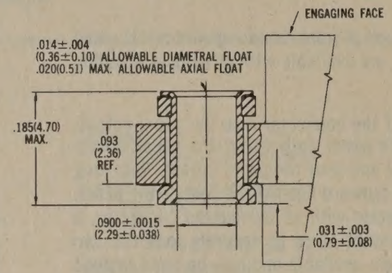
NOTES:

Screw lock assembly (322-9500-000) can be used for any of the described mounting methods.

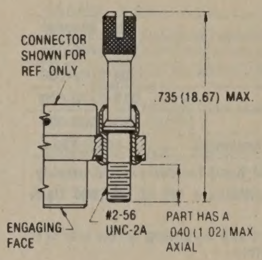
Jackpost kit (320-9505-000) consists of 2 assemblies, shipped unassembled.

FLOAT MOUNT — (F)

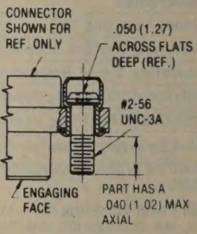
NOTE: This hardware is shipped unassembled.


ENGAGING FACE
.014±.004 (0.36±0.10) ALLOWABLE DIAMETRAL FLOAT
.020(0.51) MAX. ALLOWABLE AXIAL FLOAT
.185(4.70) MAX.
.093 (2.36) REF.
.0900±.0015 (2.29±0.038)
.031±.003 (0.79±0.08)

Shown here is a cutaway view of the float mount for the MDM connector. The basic shell dimensions are the same for the float mount and the screw mounting hole configurations. View shown is for standard float mount front panel mounting. Reverse mounting is available on request.

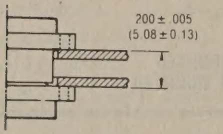

CONNECTOR SHOWN FOR REF. ONLY
.735 (18.67) MAX.
ENGAGING FACE
#2-56 UNC-2A
PART HAS A .040 (1.02) MAX AXIAL

JACKSCREW — (K) STANDARD

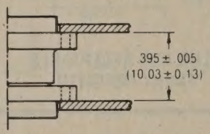

CONNECTOR SHOWN FOR REF. ONLY
.050 (1.27) ACROSS FLATS DEEP (REF.)
#2-56 UNC-3A
ENGAGING FACE
PART HAS A .040 (1.02) MAX AXIAL

JACKSCREW — (L) LOW PROFILE

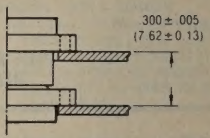
PANEL MOUNTING DIMENSIONS


.200±.005 (5.08±0.13)

PLUG AND RECEPTACLE REAR MOUNTED


.395±.005 (10.03±0.13)

PLUG AND RECEPTACLE FRONT MOUNTED


.300±.005 (7.62±0.13)

PLUG FRONT MOUNTED RECEPTACLE REAR MOUNTED

PANEL CUTOUTS

Shell Size	Cutout Figure	A + .004(0,10) − .000(0,00)	B + .004(0,10) − .000(0,00)	C + .005(0,13) − .000(0,00)	D + .005(0,13) − .000(0,00)
9	1	.408(10,66)	.172(4,37)	.570(14,48)	.089(2,26)
	2	.373(9,47)	.216(5,49)	.570(14,48)	.089(2,26)
15	1	.558(14,17)	.172(4,37)	.720(18,29)	.089(2,26)
	2	.523(13,28)	.216(5,49)	.720(18,29)	.089(2,26)
21	1	.708(17,96)	.172(4,37)	.870(22,10)	.089(2,26)
	2	.674(17,12)	.216(5,49)	.870(22,10)	.089(2,26)
25	1	.808(20,52)	.172(4,37)	.970(24,64)	.089(2,26)
	2	.774(19,60)	.216(5,49)	.970(24,64)	.089(2,26)
31	1	.958(24,33)	.172(4,37)	1.120(28,45)	.089(2,26)
	2	.924(23,47)	.216(5,49)	1.120(28,45)	.089(2,26)
37	1	1.108(28,14)	.172(4,37)	1.270(32,26)	.089(2,26)
	2	1.074(27,28)	.216(5,49)	1.270(32,26)	.089(2,26)
51	1	1.058(26,87)	.215(5,46)	1.220(30,99)	.089(2,26)
	2	1.024(26,01)	.259(6,58)	1.220(30,99)	.089(2,26)

NOTES:

1. Front mounting (figure 1) and rear mounting (figure 2) accommodate #2-56 screws.
2. Front mounting is preferred. However, when rear mounting is necessary,use figure 2 dimensions.
3. Edgebaord mounting bracket (figure 3) uses #2-56 screws. Dimension .4.50 ± .002 (11,43 ± 0,05) locate the MD receptacle insulator flush with the end of the board.

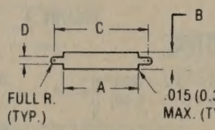

D
C
B
A
FULL R. (TYP.)
.015 (0.38) R. MAX. (TYP.)

FIGURE 1
FRONT MOUNTING

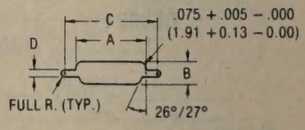

C
A
D
B
.075 +.005 −.000 (1.91 +0.13 −0.00)
FULL R. (TYP.)
26°/27°

FIGURE 2
REAR MOUNTING

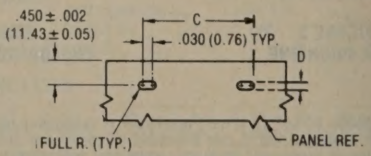
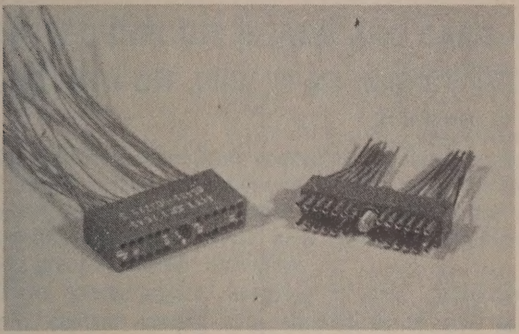

.450±.002 (11.43±0.05)
C
.030 (0.76) TYP.
D
FULL R. (TYP.)
PANEL REF.

FIGURE 3
EDGEBOARD MOUNTING

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS MJS SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).



MICRO CENTER JACKSCREW

The MJS center jackscrew series provides a reliable interconnect for board-to-board, board-to-cable and in-line cable-to-cable applications. Arrangements accommodating up to 66 MICROPIN®/MICROSOCKET® contacts are available, with the same wide range of options as are offered with the other MICRO products offered in this catalog.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

HOW TO ORDER

MJS-* 26 P H 001

Series
Insulator Material
Contact Arrangement
Contact Type
Termination Type
Termination Code

Series
MJS = Micro Center Jackscrew
Insulator Material
B = Diallyl phthalate.
V = Polyester.
Contact Arrangements
Unshrouded Receptacle: 10, 26, 51, 66
Shrouded Receptacle: 16, 34
Low Profile Plug and Receptacle: 28
Contact Type
P = Pin
S = Socket
Contact Type
H = Insulated wire harness.
L = Solid-uninsulated wire.
S = Solder pot to accept #26 AWG harness wire.

Termination Code*
(H) 001 = 18″ #26 AWG MIL-W-16878-E Teflon yellow.
(H) 003 = 18″ #26 AWG MIL-W-16878-E Teflon, color coded to MIL-STD-681 System I.
(L) 1 = ½″ uninsulated solid #25 AWG gold plated copper.
(L) 2 = 1″ uninsulated solid #25 AWG gold plated copper.

*See Termination Codes shown below for additional length mod codes.

STANDARD WIRE TERMINATION CODES

The following termination codes are listed for your information. For lengths not shown, consult factory for proper modification code. All wire lengths are minimum.

HARNESS TYPE (H)
#26 AWG per MIL-W-16878 Type E, Stranded

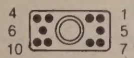
Length	All Yellow	Color Coded
3(76,2)	H020	H027
6(152,4)	H019	H016
8(203,2)	H026	H034
10(254,0)	H029	H025
12(304,8)	H028	H002
18(457,2)	H001	H003
20(508,0)	H038	H023
24(609,6)	H009	H004
30(762,0)	H010	H005
36(914,4)	H011	H006
48(1219,2)	H013	H048
72(1828,8)	H017	H046
120(3048,0)	H042	H041

SOLID UNINSULATED TYPE (L)
#25 AWG Gold Plated Copper

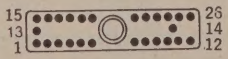
	Length
L61	.125(3,18)
L56	.150(3,81)
L57	.190(4,83)
L39	.250(6,35)
L58	.375(9,52)
L1	.500(12,70)
L14	.750(19,05)
L2	1.000(25,40)
L7	1.500(38,10)
L6	2.000(50,80)
L16	2.500(63,50)
L10	3.000(76,20)

CONTACT ARRANGEMENTS

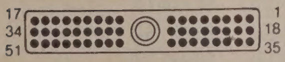
Face view of pin — use reverse order for socket



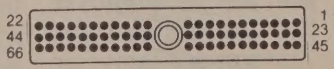
10 CONTACTS



26 CONTACTS

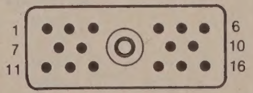


51 CONTACTS

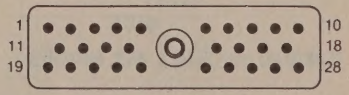


66 CONTACTS

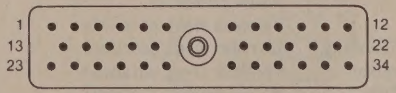
Identification numbers are for reference, do not appear on connectors



16 CONTACTS



*28 CONTACTS



34 CONTACTS

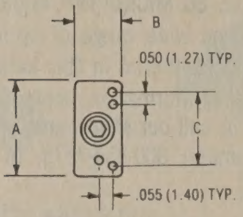
*Low profile insulator.

ITT CANNON ELECTRIC

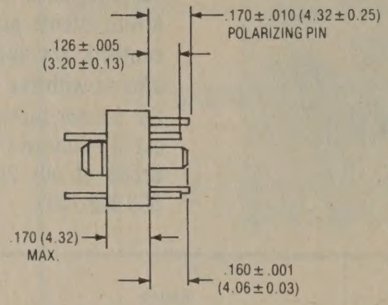
MICROMINIATURE CONNECTORS
MJS SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

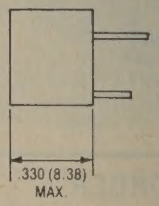
UNSHROUDED RECEPTACLE (10-26-51-66)


B
.050 (1.27) TYP.
A
C
.055 (1.40) TYP.

FACE VIEW


.170 ± .010 (4.32 ± 0.25)
POLARIZING PIN
.126 ± .005
(3.20 ± 0.13)
.170 (4.32)
MAX.
.160 ± .001
(4.06 ± 0.03)

RECEPTACLE



PLUG

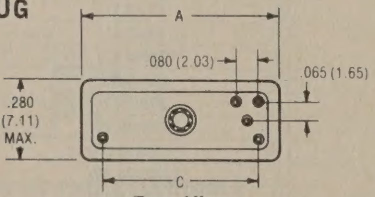
STANDARD MATERIALS AND FINISHES

Micropin	Copper alloy, 50 micro-inch gold
Microsocket	Copper alloy, 50 micro-inch gold
Insulator	Diallyl phthalate,
Jackscrew	Stainless steel, passivate
Washer and Bushing	Stainless steel, passivate
Insert, Threaded	Stainless steel, passivate
Polarizing Post	Stainless steel, passivate

Part Number	A Max.	B Max.	C Basic
MJSB-10P	.373(9.47)	.185(4.70)	.290(7.37)
MJSB-10S	.373(9.47)	.185(4.70)	.290(7.37)
MJSB-26P	.773(19.63)	.185(4.70)	.690(17.53)
MJSB-26S	.773(19.63)	.185(4.70)	.690(17.53)
MJSB-51P	1.023(25.98)	.255(6.48)	.940(23.88)
MJSB-51P	1.023(25.98)	.255(6.48)	.940(23.88)
MJSB-66P	1.275(32.39)	.255(6.48)	1.190(30.23)
MJSB-66S	1.275(32.39)	.255(6.48)	1.190(30.23)

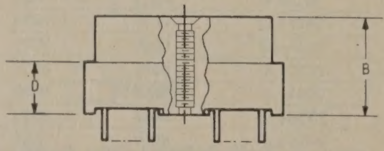
SHROUDED RECEPTACLE (16-28*-34)

PLUG

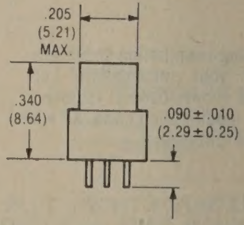

A
080 (2.03)
.065 (1.65)
.280
(7.11)
MAX.
C

Face View

SIDE

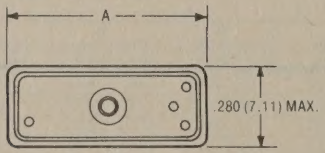


FRONT


.205
(5.21)
MAX.
.340
(8.64)
.090 ± .010
(2.29 ± 0.25)

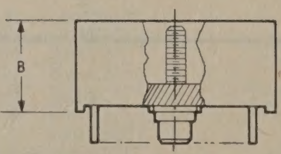
TOP

RECEPTACLE

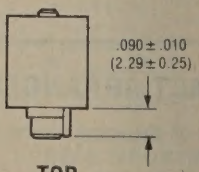

A
.280 (7.11) MAX.

Face View

SIDE



FRONT


.090 ± .010
(2.29 ± 0.25)

TOP

STANDARD MATERIALS AND FINISHES

Micropin	Copper alloy, 50 micro-inch gold
Microsocket	Copper alloy, 50 micro-inch gold
Insulator	Diallyl phthalate
Jackscrew	Stainless steel, passivate
Washer and Bushing	Stainless steel, passivate
Insert, Threaded	Stainless steel, passivate
Polarizing Post	Stainless steel, passivate

Part Number	A Max.	B Max.	C Basic	D ±.005 (±0.13)
MJSV-16P	.695(17.65)	.340(8.64)	.555(14.10)	.175(4.44)
MJSV-16S	.695(17.65)	.320(8.13)	.555(14.10)	—
MJSV-28P*	1.015(25.78)	.227(5.77)	.865(21.97)	.062(1.57)
MJSV-28S*	1.015(25.78)	.241(6.12)	.865(21.97)	—
MJSV-34P	1.175(29.85)	.325(8.26)	1.025(26.04)	.160(4.06)
MJSV-34S	1.175(29.85)	.305(7.75)	1.025(26.04)	—

*Low profile configuration.

(millimeters are in parentheses)

MICROMINIATURE CONNECTORS
MT SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

PRINTED CIRCUIT BOARD AND CARD MOUNTING FRAME APPLICATIONS

CONTACTS ON .050" (1,27 mm) CENTERS

50-MIL STRIP microminiature connectors are designed for space and weight saving applications in a space conscious industry. The strip configuration provides an extremely dense and reliable interconnection device in a minimum profile package, giving great application flexibility.

These connectors are available in many combinations of length, contact spacing and terminations to give designers maximum latitude in their packaging and interconnection solutions. They have been used successfully on printed circuit boards and card mounting frames. Because of its configuration, the 50-MIL STRIP connector is particularly suited for mounting with high strength epoxy adhesive. In lengths over 2" (50,80 mm), guides, rails or other systems should be used to assure alignment.

50-MIL STRIP connectors use either a flexible insulator of polycarbonate or nylon thermoplastic that can be mounted on curved surfaces up to a radius of approximately eight inches, or a more rigid insulator of diallyl phthalate — giving the connector a higher temperature capability. Up to 120 micropin contacts can be held in a single strip on .050" (1,27 mm) centers. Guide pins and polarizing devices are available. Special termination with hookup wire is available to meet specific customer requirements. Crimping hookup wire to contacts before they are inserted is often desirable in high density contact arrangements. Color coded wires of any length in sizes #24 thru #30 AWG solid and #26 thru #30 AWG stranded can be harnessed by the factory. For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

HOW TO ORDER

MT* 1- 120 P L 1- **

Series and Materials
Contact Spacing
Number of Insulator Cavities
Contact Type
Termination Type
Termination Code
Modification

SERIES AND MATERIALS

MTA = Glass filled polycarbonate (105°C)
MTB = Glass filled diallyl phthalate (150°C)
MTN = Glass filled nylon (105°C)
MTV = Glass filled polyester (125°C)

CONTACT SPACING

1 = .050" (1,27 mm) centers MTA1, MTB1, MTN1 and MTV1 only
2 = .100" (2,54 mm) centers MTA2, MTB2, MTN2 and MTV2 only

*See Termination Codes below for additional length modification codes.
**Consult factory for variations from standard not shown.

NUMBER OF INSULATOR CAVITIES

MTV1, MTA1, MTN1 = 120 Max.
MTV2, MTA1, MTN2 = 60 Max.
MTB1 = 81 Max.
MTB2 = 41 Max.

CONTACT TYPE

P = Pin
S = Socket

TERMINATION TYPE

L = Uninsulated solid pigtail
H = Insulated
S = Solder pots

TERMINATION CODE*

(H) 001 = 18" #26 AWG per MIL-W-16878 Type E Teflon yellow.
(H) 003 = 18" #26 AWG MIL-W-16878 Type E Teflon, color coded to MIL-STD-681, System I.
(L) 1 = ½" uninsulated solid #25 AWG gold plated copper.
(L) 2 = 1" uninsulated solid #25 AWG gold plated copper.

MODIFICATION**

01 = Guide posts each end of socket strip — blank cavities each end of pin strips.

NOTE: PCB terminations preformed at 90° increments of .050" (1,27 mm) to bend from rear of insulator on solid uninsulated leads are available. Consult factory for proper ordering nomenclature.

STANDARD WIRE TERMINATION CODES

The following termination codes are listed for your Teflon information. For lengths not shown, consult factory for proper modification code. All wire lengths are minimum.

HARNESS TYPE — (H)
#26 AWG per MIL-W-16878 Type E, Teflon Stranded

Length	All Yellow	Color Coded
3(76,2)	H020	H027
6(152,4)	H019	H016
8(203,2)	H026	H034
10(254,0)	H029	H025
12(304,8)	H028	H002
18(457,2)	H001	H003
20(508,0)	H038	H023
24(609,6)	H009	H004
30(762,0)	H010	H005
36(914,4)	H011	H006
48(1219,2)	H013	H048
72(1828,8)	H017	H046
120(3048,0)	H020	H027

SOLID UNINSULATED TYPE — (L)
#25 AWG Gold Plated Copper

	Length
L61	.125(3,18)
L56	.150(3,81)
L57	.190(4,83)
L39	.250(6,35)
L58	.375(9,52)
L1	.500(12,70)
L14	.750(19,05)
L2	1.000(25,40)
L7	1.500(38,10)
L6	2.000(50,80)
L16	2.500(63,50)
L10	3.000(76,20)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS
MT SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

STANDARD DATA

STANDARD MATERIALS AND FINISHES

One-piece insulator — MTA: glass-filled polycarbonate
MTB: glass-filled diallyl phthalate
MTN: glass-filled nylon
MTV: glass-filled polyester

Contacts — Copper alloy, gold plate

ELECTRICAL DATA

No. of Contacts — MTA/MTN/MTV: 120 max.
MTB: 81 max.

Wire Size — Solid: #24 thru #30 AWG
Stranded: #26 thru #30 AWG

Contact Termination — Crimp stationary

MECHANICAL FEATURES

Size or Length — MTA/MTN/MTV: 6.04" (153,42 mm) max. "yardage"
MTB: 4.09" (103,89 mm) max. "yardage"

Coupling — Friction

Polarization — Guide posts

Contact Spacing Centers — .050" (1,27 mm) and .100" (2,54 mm)

TEST DATA

CONTACT RESISTANCE

Tests give constant resistance readings from 10 μa to 3 amps on individually mated contacts. The maximum allowable contact resistance, measured on the wire at the rear of the contact, is 8 milliohms. The average contact resistance is 6 milliohms.

Current Rating—3 amps max.
Max. Voltage Drop—24 millivolts at 3 amps.
Average Voltage Drop—12 millivolts at 3 amps.
Low Level Contact Resistance—Measured voltage drop is .24 x 10^{-8} volts at 10 x 10^{-6} amps.

DIELECTRIC WITHSTANDING VOLTAGE

Min. Flashover voltage (at room temp.) at 60 cps rms 50% R.H.
Sea Level—900 VAC
70,000 feet—250 VAC

VIBRATION AND SHOCK

No discontinuity detected (in excess of 1 micro second) after twelve 15-min. sweeps from 10 to 2000 cps at .060" (1,52 mm) double amplitude or 20g, or after twenty shocks of 50g. Connectors were mounted to simulate service condition. Tests conducted to MIL-STD-202, Method 204A, Condition D and Method 213, Condition G.

TEMPERATURE RANGE

MTA, MTN: —65°F to +275°F (—53°C to +135°C)
MTB: —65°F to +302°F (—53°C to +150°C)

ENGAGING AND SEPARATING FORCE

For an individual contact the maximum engaging force is 8 ounces (226,80 grams). Minimum separating force is 0.5 ounces (14,17 grams) per contact. Test conducted using min./max. bushings.

SALT SPRAY

No damage or unacceptable increase in contact resistance after mated sample subjected to 48 hours of salt spray per MIL-STD-202, Method 101C, 5% solution, Condition B.

Note: MICRO-D environmental connectors were tested successfully in accordance with MIL-C-26482, Para. 4.6.14, and MIL-STD-202, Method 106B. The moisture resistance test was conducted using mineral-free water for a 10-day period. After this, insulaton resistance tests were conducted with satisfactory results.

CONTACT AND INSERT RETENTION

Over 6 lbs. (2,72 kg.) min. axial load after 10 cycles.

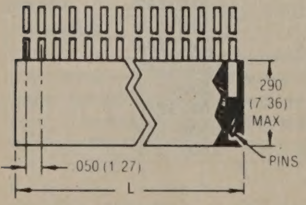
DIMENSIONAL DATA

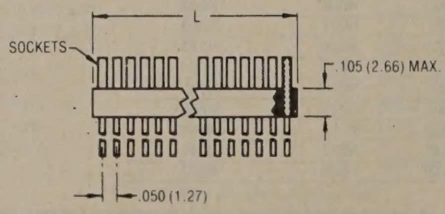
LENGTH

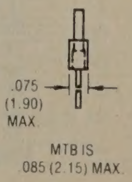
Contact cavities in 50-MIL STRIP connectors are in a single row and located on .050" (1,27 mm) centers or increments thereof. MTA and MTN connectors can be supplied in lengths up to 6.02 inches (157,91 mm) with a maximum of 120 contacts on .050" (1,27 mm) centers. MTB connectors can be supplied in lengths up to 4.07 inches (103,37 mm) with a maximum of 81 contacts on .050" (1,27 mm) centers. Length of connectors can be calculated as follows:

L = number of contacts times .050" (1,27 mm) plus .020" (0,51 mm)

EXAMPLE:
50 contacts (installed in each cavity):
L = (50 x .050)") + .020" = 2.52" length of strip
L = (50 x 1,27 mm) + 0,51 mm = 64,01 mm length of strip





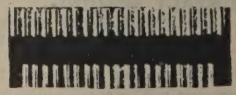


WEIGHT

			lbs.	gms.
Contact (with std. ½" copper pigtails)		pin	.000088	.040
		socket	.000088	.040
Insulator (per contact cavity)	MTB	pin	.000046	.021
		socket	.000013	.006
	MTA MTN MTV	pin	.000031	.014
		socket	.000009	.004
Guide Post	Stainless Steel		.000079	.035

NOTE: MTA not to be terminated with insulated wire in more than 41 cavities.

POLARIZATION



Modification code "-01" in the part number refer to guide posts located on both ends of the socket side of the 50-MIL STRIP connector and blank cavities on the pin side to accept the guide posts.

Although in many cases it is not necessary to polarize 50-MIL STRIP connectors, there are several ways to prevent cross plugging. One method is the use of guide posts that can be located in specified cavities to assure that the contacts will align when these posts are positioned before mating.

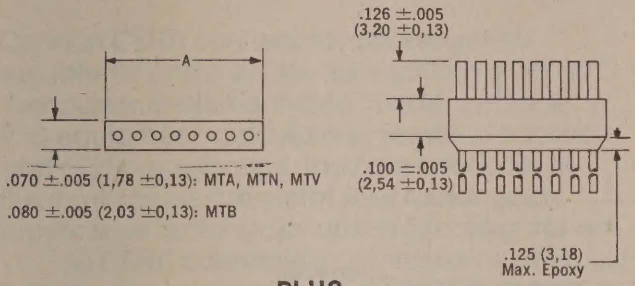
(millimeters are in parentheses)

ITT CANNON ELECTRIC

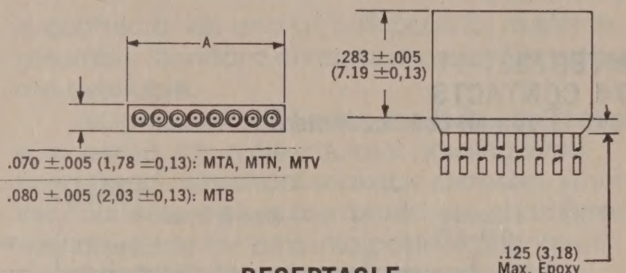
MICROMINIATURE CONNECTORS MT SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

MTA1, MTB1, MTN1 and MTV1
(.050 (1,27 mm) Contact Centers)


.126 ±.005
(3,20 ±0,13)
A
.070 ±.005 (1,78 ±0,13): MTA, MTN, MTV
.080 ±.005 (2,03 ±0,13): MTB
.100 ±.005
(2,54 ±0,13)
.125 (3,18)
Max. Epoxy

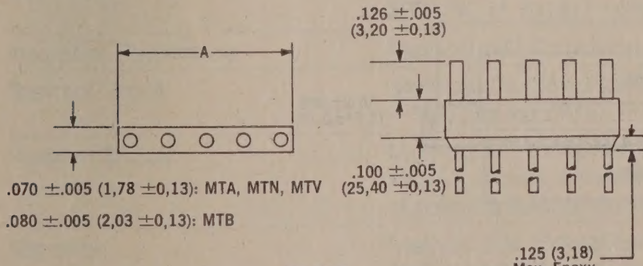
PLUG


A
.283 ±.005
(7.19 ±0,13)
.070 ±.005 (1,78 ±0,13): MTA, MTN, MTV
.080 ±.005 (2,03 ±0,13): MTB
.125 (3,18)
Max. Epoxy

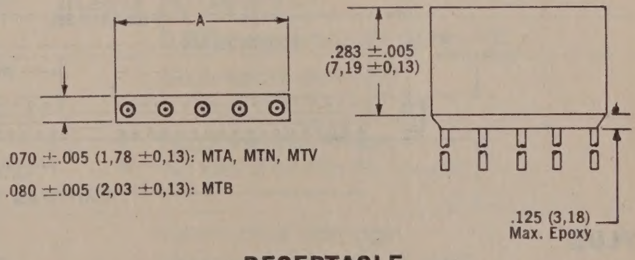
RECEPTACLE

Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)
MT*1-1**	.070(1,78)	MT*1-21**	1.070(27,18)	MT*1-41**	2.070(52,58)	MT*1-61**	3.070(77,98)	MT*1-81**	4.070(103,38)	MT*1-101**	5.070(128,78)
MT*1-2**	.120(3,05)	MT*1-22**	1.120(28,45)	MT*1-42**	2.120(53,85)	MT*1-62**	3.120(79,25)	MT*1-82**	4.120(104,65)	MT*1-102**	5.120(130,05)
MT*1-3**	.170(4,32)	MT*1-23**	1.170(29,72)	MT*1-43**	2.170(55,12)	MT*1-63**	3.170(80,52)	MT*1-83**	4.170(105,92)	MT*1-103**	5.170(131,32)
MT*1-4**	.220(5,59)	MT*1-24**	1.220(30,99)	MT*1-44**	2.220(56,39)	MT*1-64**	3.220(81,79)	MT*1-84**	4.220(107,19)	MT*1-104**	5.220(132,59)
MT*1-5**	.270(6,85)	MT*1-25**	1.270(32,26)	MT*1-45**	2.270(57,66)	MT*1-65**	3.270(83,06)	MT*1-85**	4.270(108,46)	MT*1-105**	5.270(133,86)
MT*1-6**	.320(8,13)	MT*1-26**	1.320(33,53)	MT*1-46**	2.320(58,93)	MT*1-66**	3.320(84,33)	MT*1-86**	4.320(109,73)	MT*1-106**	5.320(135,13)
MT*1-7**	.370(9,40)	MT*1-27**	1.370(34,80)	MT*1-47**	2.370(60,20)	MT*1-67**	3.370(85,60)	MT*1-87**	4.370(111,00)	MT*1-107**	5.370(136,40)
MT*1-8**	.420(10,67)	MT*1-28**	1.420(36,07)	MT*1-48**	2.420(61,47)	MT*1-68**	3.420(86,87)	MT*1-88**	4.420(112,27)	MT*1-108**	5.420(137,67)
MT*1-9**	.470(11,94)	MT*1-29**	1.470(37,34)	MT*1-49**	2.470(62,74)	MT*1-69**	3.470(88,14)	MT*1-89**	4.470(113,54)	MT*1-109**	5.470(138,94)
MT*1-10**	.520(13,20)	MT*1-30**	1.520(38,61)	MT*1-50**	2.520(64,01)	MT*1-70**	3.520(89,41)	MT*1-90**	4.520(114,81)	MT*1-110**	5.520(140,21)
MT*1-11**	.570(14,48)	MT*1-31**	1.570(39,88)	MT*1-51**	2.570(65,28)	MT*1-71**	3.570(90,68)	MT*1-91**	4.570(116,08)	MT*1-111**	5.570(141,48)
MT*1-12**	.620(15,75)	MT*1-32**	1.620(41,15)	MT*1-52**	2.620(66,55)	MT*1-72**	3.620(91.95)	MT*1-92**	4.620(117,35)	MT*1-112**	5.620(142,75)
MT*1-13**	.670(17,02)	MT*1-33**	1.670(42,42)	MT*1-53**	2.670(67,82)	MT*1-73**	3.670(93,22)	MT*1-93**	4.670(118,62)	MT*1-113**	5.670(144,02)
MT*1-14**	.720(18,29)	MT*1-34**	1.720(43,69)	MT*1-54**	2.720(69,10)	MT*1-74**	3.720(94.49)	MT*1-94**	4.720(119,89)	MT*1-114**	5.720(145,29)
MT*1-15**	.770(19,56)	MT*1-35**	1.770(44,96)	MT*1-55**	2.770(70,36)	MT*1-75**	3.770(95,76)	MT*1-95**	4.770(121,16)	MT*1-115**	5.770(146,56)
MT*1-16**	.820(20.83)	MT*1-36**	1.820(46,23)	MT*1-56**	2.820(71,62)	MT*1-76**	3.820(97.03)	MT*1-96**	4.820(122.43)	MT*1-116**	5.820(147,83)
MT*1-17**	.870(22,10)	MT*1-37**	1.870(47,50)	MT*1-57**	2.870(72,90)	MT*1-77**	3.870(98,30)	MT*1-97**	4.870(123,70)	MT*1-117**	5.870(149,10)
MT*1-18**	.920(23,37)	MT*1-38**	1.920(48.77)	MT*1-58**	2.920(74,17)	MT*1-78**	3.920(99,57)	MT*1-98**	4.920(124,97)	MT*1-118**	5.920(150,37)
MT*1-19**	.970(24,64)	MT*1-39**	1.970(50,04)	MT*1-59**	2.970(75,44)	MT*1-79**	3.970(100,84)	MT*1-99**	4.970(126.24)	MT*1-119**	5.970(151.64)
MT*1-20**	1.020(25.91)	MT*1-40**	2.020(51,31)	MT*1-60**	3.020(76,71)	MT*1-80**	4.020(102.11)	MT*1-100**	5.020(127,50)	MT*1-120**	6.020(152,91)

MTA1, MTB2, MTN2 and MTV2
(.100 (2,54 mm) Contact Centers)



PLUG


A
.283 ±.005
(7,19 ±0,13)
.070 ±.005 (1,78 ±0,13): MTA, MTN, MTV
.080 ±.005 (2,03 ±0,13): MTB
.125 (3,18)
Max. Epoxy

RECEPTACLE

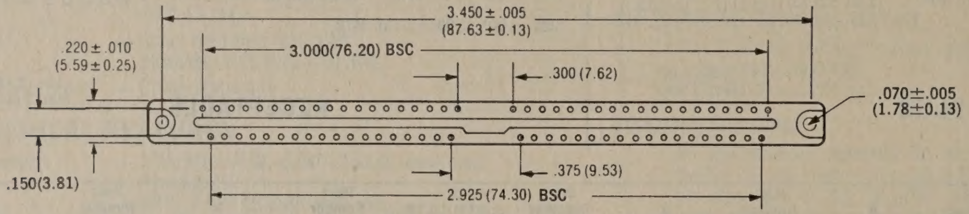
Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)	Part Number by Size	A ±.015(±0,38)
MT*2-1**	.070(1,78)	MT*2-11**	1.070(27,18)	MT*2-21**	2.070(52,58)	MT*2-31**	3.070(77,98)	MT*2-41**	4.070(103,38)	MT*2-51**	5.070(128,78)
MT*2-2**	.170(4,32)	MT*2-12**	1.170(29,72)	MT*2-22**	2.170(55,12)	MT*2-32**	3.170(80,52)	MT*2-42**	4.170(105,92)	MT*2-52**	5.170(131,32)
MT*2-3**	.270(6,86)	MT*2-13**	1.270(32,26)	MT*2-23**	2.270(57,66)	MT*2-33**	3.270(83,06)	MT*2-43**	4.270(108,46)	MT*2-53**	5.270(133,86)
MT*2-4**	.370(9.40)	MT*2-14**	1.370(34,80)	MT*2-24**	2.370(60,20)	MT*2-34**	3.370(85,60)	MT*2-44**	4.370(111,00)	MT*2-54**	5.370(136,40)
MT*2-5**	.470(11,94)	MT*2-15**	1.470(37,34)	MT*2-25**	2.470(62,74)	MT*2-35**	3.470(88,14)	MT*2-45**	4.470(113,53)	MT*2-55**	5.470(138,94)
MT*2-6**	.570(14,48)	MT*2-16**	1.570(39,88)	MT*2-26**	2.570(65,28)	MT*2-36**	3.570(90,68)	MT*2-46**	4.570(116,08)	MT*2-56**	5.570(141,48)
MT*2-7**	.670(17,02)	MT*2-17**	1.670(42,42)	MT*2-27**	2.670(67,82)	MT*2-37**	3.670(93,22)	MT*2-47**	4.670(118,62)	MT*2-57**	5.670(144,02)
MT*2-8**	.770(19,56)	MT*2-18**	1.770(44,96)	MT*2-28**	2.770(70,36)	MT*2-38**	3.770(95,76)	MT*2-48**	4.770(121,16)	MT*2-58**	5.770(146,56)
MT*2-9**	.870(22,10)	MT*2-19**	1.870(47,50)	MT*2-29**	2.870(72,90)	MT*2-39**	3.870(98,30)	MT*2-49**	4.870(123,70)	MT*2-59**	5.870(149,10)
MT*2-10**	.970(24,64)	MT*2-20**	1.970(50,04)	MT*2-30**	2.970(75,44)	MT*2-40**	3.970(100,84)	MT*2-50**	4.970(126,24)	MT*2-60**	5.970(151,64)

Dimensions subject to change.

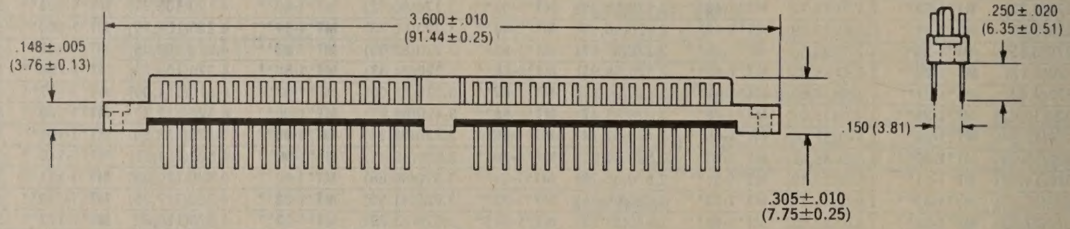
(millimeters are in parentheses)

SPECIAL VARIATIONS
DUAL ROW STRIP (EDGECARD) MTB

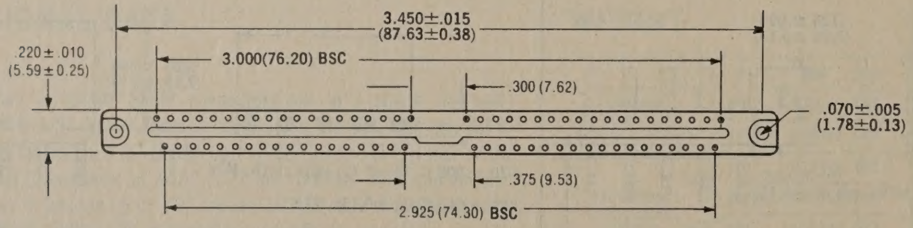
MTB97321-11
74 CONTACTS
.075 (1.90mm) contact centers


3.450 ± .005
(87.63 ± 0.13)
.220 ± .010
(5.59 ± 0.25)
3.000(76.20) BSC
.300 (7.62)
.070±.005
(1.78±0.13)
.150(3.81)
.375 (9.53)
2.925 (74.30) BSC

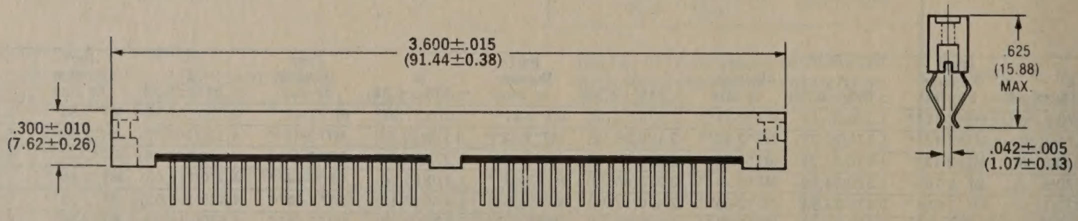
RECEPTACLE


3.600 ± .010
(91.44 ± 0.25)
.148 ± .005
(3.76 ± 0.13)
.250 ± .020
(6.35 ± 0.51)
.150 (3.81)
.305±.010
(7.75±0.25)

MTB97321-10
74 CONTACTS
.075 (1.90mm) contact centers


3.450±.015
(87.63±0.38)
.220 ± .010
(5.59 ± 0.25)
3.000(76.20) BSC
.300 (7.62)
.070±.005
(1.78±0.13)
.375 (9.53)
2.925 (74.30) BSC

PLUG


3.600±.015
(91.44±0.38)
.300±.010
(7.62±0.26)
.625
(15.88)
MAX.
.042±.005
(1.07±0.13)

Section II: The CENTI Line

Cannon CENTI connectors are especially suitable for commercial applications such as computers, instrumentation, model airplane R/C equipment, calculators, communications and audio equipment. They are available in D subminiature size metal shell rectangular, plastic shell rectangular and strip configurations.

All CENTI connectors use the same reliable Twist Pin Contact design as our MICRO connectors, but in a slightly larger 5 amp version terminated on .075" (1.91 mm) and .100" (2.54 mm) centers. This larger contact is crimp removable, so CENTI Series connectors are available in connector kits and as bulk parts for customer assembly. Standard crimp and assembly tools are available.

As in our MICRO Series, the Twist Pin Contact is recessed within the insulator housing while the rugged cylindrical socket is exposed. When the connector halves are mated, the chamfered sockets guide the pins into positive alignment.

The CENTIPIN contact, now under compression, forms a multi-point contact with the CENTISOCKET to provide fail-safe reliability over thousands of mating and unmating cycles.

STANDARD DATA

- Contact rating—5 amps max.
- Minimum contact centers—0.075"(1.91 mm).
- Wire sizes—#22 thru #26 AWG, stranded or solid.
- Contact termination—multiple indent crimp.
- Contact retention—crimp snap-in/removable.
- Contact materials and finish—Copper alloy, gold-plated per MIL-G-45204, Type II, Class 0.
- Mating/unmating force—10 oz. per contact, max.

PERFORMANCE DATA

The table below summarizes the results of key tests performed in accordance with MIL-STD-202, where applicable. Data is applicable to standard connectors with standard terminations. Variations may affect this data, so please consult the factory for further information on your requirements.

TEST	METHOD	CRITERIA OF ACCEPTANCE
Dielectric Withstanding Voltage	Method 301: 1,000 VAC at sea level 300 VAC at 70,000' altitude	No breakdown No breakdown
Insulation Resistance	Method 302, Condition A	5,000 megohms minimum
Thermal Shock	Method 107, Condition A: −55°C to +85°C	No physical damage
Physical Shock	Method 213, Condition I: 100 G's, 3 axes, 6 millisecond duration sawtooth pulse	No physical damage No loss of continuity >1μsec
Vibration	Method 204, Condition B: 15 G's, 10-2,000 Hz, 12 hours	No physical damage No loss of continuity >1 μsec
Durability	500 cycles of mating and unmating, 500 CPH max.	No mechanical or electrical defects
Moisture Resistance	Method 106m omit 7b	Insulation resistance >100 megohms
Salt Spray	Method 101, Condition B: 48 hours	Shall be capable of mating and unmating, and meet contact resistance requirements
Contact Resistance	Method 307: At 5 amps	9 milliohms maximum
Contact Retention	— —	4 lb. minimum axial load

MICROMINIATURE CONNECTORS
2D CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

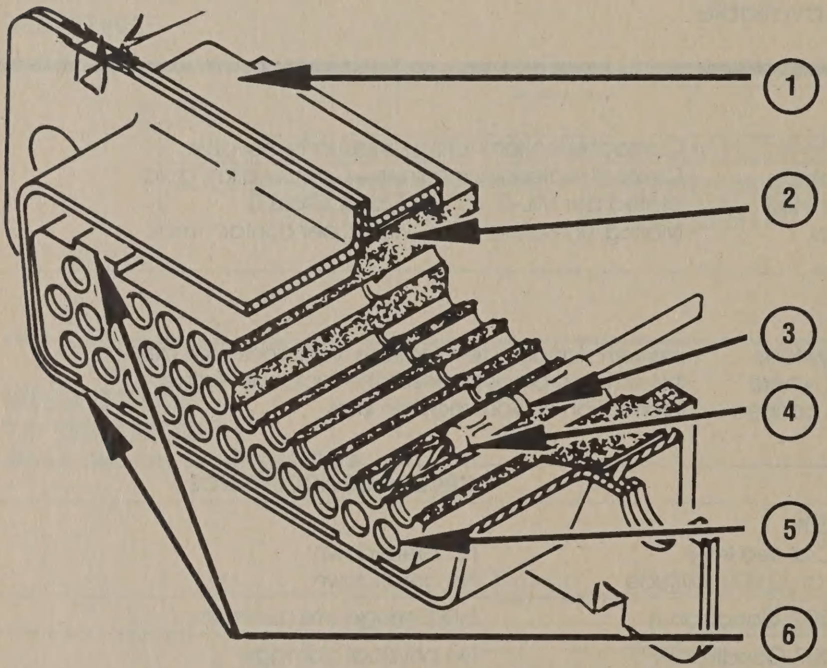
INTRODUCTION

The Double Density D is a rectangular connector in the popular D Subminiature shell configuration featuring double the contact density in the same insert area. The Double Density D connector can thus accommodate up to 100 contacts instead of 50.

This double contact density is achieved by using field-proven, highly reliable centipin/centisocket contacts on .075" (1,91) mm) centers, in the positive contact alignment design. In this design contact positions are reversed; the flexible centipin contacts are recessed in the insulator and the more rugged centisocket contacts are exposed. This reversal of positions, and the chamfered-entry of the sockets, assures positive mating even under severe misalignment conditions. The contacts are retained in the monobloc insulator by a resilient internal shoulder that snaps into a locking groove in the contact. The chamfered front of the contact will not damage the internal shoulder in the insulator. Contacts are crimp removable type.

The Double Density D connector is available in the five popular shell and insert sizes accommodating up to 100 contacts. While these connectors do not intermate with standard D Subminiature connectors, they do share a wide range of accessories that can be used interchangeably, including junction shells, potting cups, switching shells, guide pin plates, and dust caps.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573; in California, (800) 432-7063.



1. **STANDARD D HARDWARE—** including full range of D Subminiature accessories
2. **MONOBLOC INSULATOR—** glass-filled nylon material
3. **CONTACT RETENTION—** thermoplastic internal shoulder snaps into a locking groove in the contact.

   Retention Force: 10 lbs. min. initially 4 lbs. min. after 10 cycles.
4. **TWIST PIN CONTACTS—** seven outer wiping surfaces assure electrical continuity even under severe shock and vibration
5. **POSITIVE CONTACT ALIGNMENT—** flexible pin is recessed in insulator cavity and rugged socket is exposed
6. **GUIDE-IN KEYS AND KEYWAYS—** assure alignment during mating and prevent scooping

DOUBLE DENSITY D/CENTI-LOC® CONNECTORS ASSEMBLY INSTRUCTIONS

The Double Density D and CENTI-LOC Connectors are highly reliable and simple connectors to use. There are a few helpful suggestions that will assure complete satisfaction when followed:

1. The instructions found under the section marked ASSEMBLY should be followed.

2. The proper crimp tool and locator (if required) must be used. These tools have been designed for use with this product. Substitutions of crimping equipment may result in connector failure at the assembly operation.

3. After crimping a contact to a lead the selection of insertion tools is shown in the section marked TOOLING. It is of vital importance that the proper tool be used to assure seating the contact in the insulator in the proper position. Any substitution of insertion tools may result in over or under insertion of the contact which will damage the retention system of the insulator.

4. The female (socket) side of the connector has been designed with a controlled float to allow for ease of mating. To avoid reducing this float or causing a splaying of the contacts, any unnecessary strain by clamping too close to the rear of the connector should be avoided.

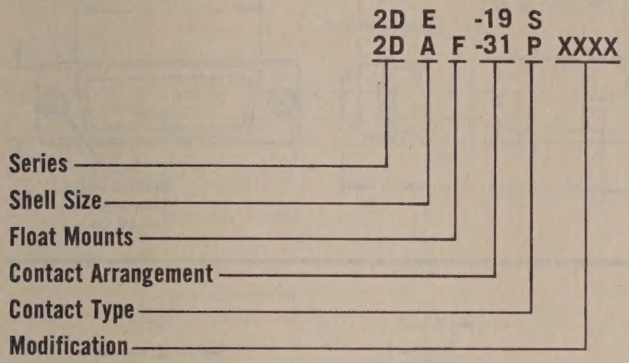
Recommended tooling together with proper assembly techniques with the knowledge and care required by a microminiature unit will pay dividends in reliability and reduced costs.

(millimeters are in parentheses)

MICROMINIATURE CONNECTORS
2D CONNECTORS

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

HOW TO ORDER



NOTE: Connectors may be ordered less contacts by adding the mod callout "FO" at end of number. Contacts are then supplied in bulk form. For type of contacts and installation/assembly tools refer to pages 168-171.

SERIES
2D = ITT Cannon prefix

SHELL SIZE
E, A, B, C and D

FLOAT MOUNTS
F = Float Mount
F171 = Jackpost assembly
F172 = Standard jackscrew
F173 = Low profile jackscrew

CONTACT ARRANGEMENT
9, 31, 52, 79 and 100

CONTACT TYPE
P = Pin
S = Socket

MODIFICATION
For modification, consult factory

STANDARD DATA

STANDARD MATERIALS AND FINISHES

*Shell — Steel, cadmium plated with yellow chromate supplementary coating
Float mounts — Stainless steel
Insulator — Glass-filled nylon
Contacts — Copper alloy, gold plate

MECHANICAL FEATURES

Sizes — Five shell sizes: E, A, B, C, and D
Coupling — Friction, jackscrew
Polarization — Keystone-shaped shells
Contact Spacing — .075 (1,91)
Contact Termination — Crimp snap-in

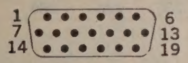
ELECTRICAL DATA

No. of Contacts — 19, 31, 52, 79 and 100
Wire Size — #26, #24 and #22 AWG stranded wire
Current Rating — 5 amps/contact
Contact Resistance — 9 milliohms max.
DWV — Sea level: 1000 VAC
70,000 ft.: 250 VAC
Max. Voltage Drop — 45 millivolts at 5 amps
Temperature Rating — —55°C to 105°C

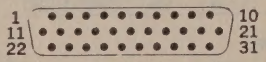
*Brass non-magnetic also available

CONTACT ARRANGEMENTS

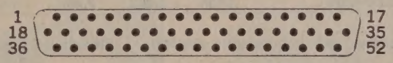
All views are pin front face. Use reverse order for socket side.



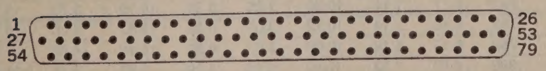
DE
19 CONTACTS



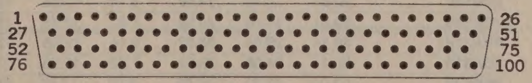
DA
31 CONTACTS



DB
52 CONTACTS



DC
79 CONTACTS



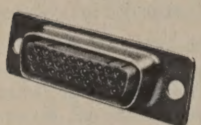
DD
100 CONTACTS

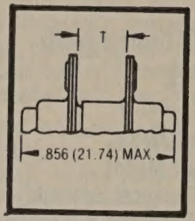
Cavity identification numbers are shown for reference only and do not appear on insulator or connector.

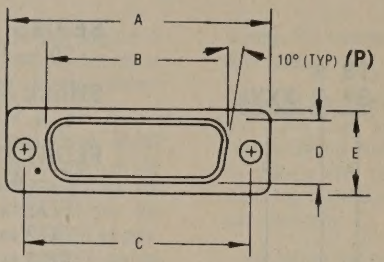
MICROMINIATURE CONNECTORS
2D CONNECTORS

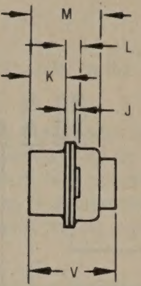
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

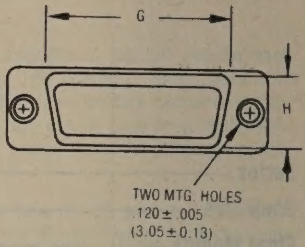
STANDARD SHELL



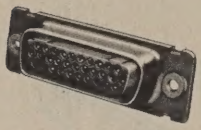


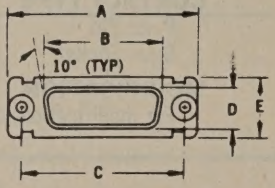


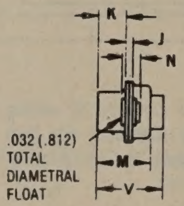


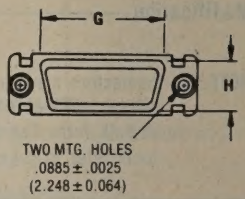


FLOAT MOUNT

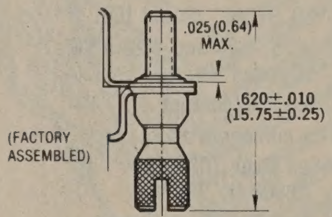




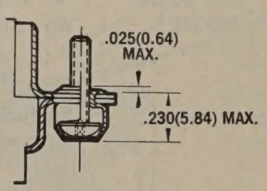




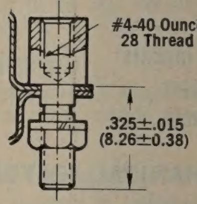
STANDARD JACKSCREW (F172) (factory installed)



LOW PROFILE JACKSCREW (F173) (factory installed)



JACKPOST ASSEMBLY (F171)



INCHES

Part Number by Shell Size	A ±.015	B ±.010	C ±.010	D ±.010	E ±.015	G ±.010	H ±.010	J ±.010	K ±.010	L ±.010	M ±.010	N ±.010	T +.020 ±.000	V Max.	Weight (in oz.) Less Contacts	Weight (in oz.) With Contacts
2DE19P	1.213	.697	.984	.360	.494	.759	.422	.030	.236	.045	.422	.120	.250	.546	.142	.177
2DE19S	1.213	.640	.984	.308	.494	.759	.422	.030	.243	.045	.429	.120	.250	.555	.133	.182
2DA31P	1.541	1.025	1.312	.360	.494	1.083	.422	.030	.236	.045	.422	.120	.250	.546	.183	.239
2DA31S	1.541	.968	1.312	.308	.494	1.083	.422	.030	.243	.045	.429	.120	.250	.555	.173	.255
2DB52P	2.088	1.583	1.852	.378	.494	1.625	.422	.039	.231	.060	.426	.129	.236	.546	.308	.402
2DB52S	2.088	1.508	1.852	.308	.494	1.625	.422	.030	.243	.045	.429	.120	.236	.555	.252	.390
2DC79P	2.729	2.231	2.500	.378	.494	2.272	.422	.039	.231	.060	.426	.129	.236	.546	.413	.555
2DC79S	2.729	2.156	2.500	.308	.494	2.272	.422	.030	.243	.045	.429	.120	.236	.555	.342	.551
2DD100P	2.635	2.127	2.406	.484	.605	2.178	.534	.039	.231	.060	.426	.129	.236	.546	.453	.633
2DD100S	2.635	2.062	2.406	.420	.605	2.178	.534	.030	.243	.045	.429	.120	.236	.555	.386	.651

For shell with float mounts, add letter F after shell size, e.g., 2DEF19P.

MILLIMETERS

Part Number by Shell Size	A ±0.38	B ±0.25	C ±0.25	D ±0.25	E ±0.38	G ±0.25	H ±0.25	J ±0.25	K ±0.25	L ±0.25	M ±0.25	N ±0.25	T +0.51 ±0.00	V Max.	Weight (in gr.) Less Contacts	Weight (in gr.) With Contacts
2DE19P	30.81	17.70	24.99	9.14	12.55	19.28	10.72	.762	5.99	1.14	10.72	3.05	6.35	13.87	4.05	5.02
2DE19S	30.81	16.26	24.99	7.82	12.55	19.28	10.72	.762	6.17	1.14	10.90	3.05	6.35	14.10	3.75	5.17
2DA31P	39.14	26.03	33.32	9.14	12.55	27.51	10.72	.762	5.99	1.14	10.72	3.05	6.35	13.87	5.20	6.78
2DA31S	39.14	24.58	33.32	7.82	12.55	27.51	10.72	.762	6.17	1.14	10.90	3.05	6.35	14.10	4.90	7.22
2DB52P	53.03	40.21	47.04	9.60	12.55	41.27	10.72	.990	5.87	1.52	10.82	3.28	5.99	3.87	8.75	11.40
2DB52S	53.03	38.30	47.04	7.82	12.55	41.27	10.72	.762	6.17	1.14	10.90	3.05	5.99	14.10	7.15	11.05
2DC79P	69.31	56.67	63.50	9.60	12.55	57.71	10.72	.990	5.87	1.52	10.82	3.28	5.99	13.87	11.70	15.73
2DC79S	69.31	54.76	63.50	7.82	12.55	57.71	10.72	.762	6.17	1.14	10.90	3.05	5.99	14.10	9.70	15.62
2DD100P	66.92	54.02	61.11	12.29	15.37	55.32	13.56	.990	5.87	1.52	10.82	3.28	5.99	13.87	12.85	17.95
2DD100S	66.92	52.37	61.11	10.67	15.37	55.32	13.56	.762	6.17	1.14	10.90	3.05	5.99	14.10	10.95	18.45

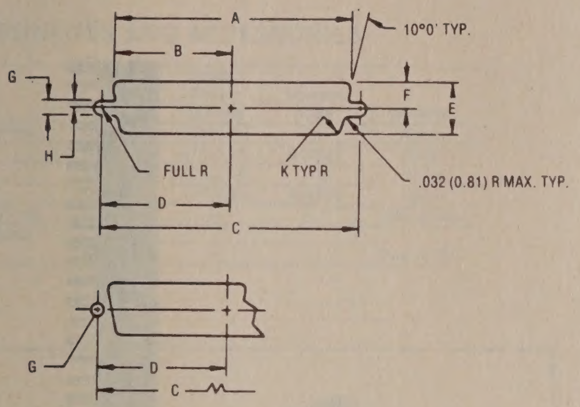
(millimeters are in parentheses)

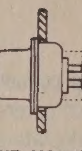
Dimensions subject to change

MICROMINIATURE CONNECTORS 2D SERIES

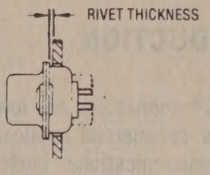
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

PANEL CUTOUTS

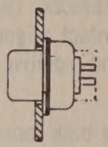




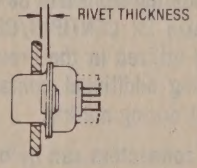
FRONT MOUNTING STANDARD



FRONT MOUNTING FLOAT



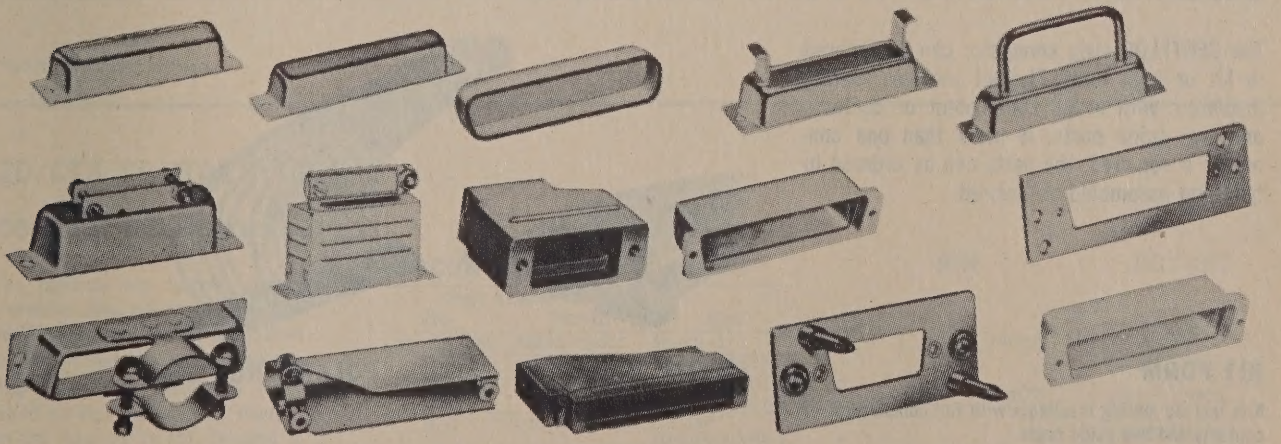
REAR MOUNTING STANDARD



REAR MOUNTING FLOAT

INCHES											MILLIMETERS								
CONN.	MTG. METHOD	A ±.005	B ±.005	C ±.005	D ±.005	E ±.005	F ±.005	G ±.002	H ±.002	K ±.005	A ±0.13	B ±0.13	C ±0.13	D ±0.13	E ±0.13	F ±0.13	G ±0.05	H ±0.05	K ±0.13
2DE	Front	.874	.437	.984	.492	.513	.257	.120	.060	.083	22.20	11.10	24.99	12.50	13.03	6.53	3.05	1.52	2.11
	Rear	.806	.403	.984	.492	.449	.225	.120	.060	.132	20.47	10.24	24.99	12.50	11.40	5.71	3.05	1.52	3.35
2DA	Front	1.202	.601	1.312	.656	.513	.257	.120	.606	.083	30.53	15.26	33.32	16.66	13.03	6.53	3.05	1.52	2.11
	Rear	1.134	.567	1.312	.656	.449	.225	.120	.060	.132	28.80	14.40	33.22	16.66	11.40	5.71	3.05	1.52	3.35
2DB	Front	1.743	.872	1.852	.926	.513	.257	.120	.060	.083	44.27	22.15	47.04	23.52	13.03	6.53	3.05	1.52	2.11
	Rear	1.674	.837	1.852	.926	.449	.225	.120	.060	.132	42.52	21.26	47.04	23.52	11.40	5.71	3.05	1.52	3.35
2DC	Front	2.391	1.196	2.500	1.250	.513	.257	.120	.060	.083	60.73	30.38	63.50	31.75	13.03	6.53	3.05	1.52	2.11
	Rear	2.326	1.163	2.500	1.250	.449	.225	.120	.060	.132	59.08	29.54	63.50	31.75	11.40	5.71	3.05	1.52	3.35
2DD	Front	2.297	1.149	2.406	1.203	.623	.312	.120	.060	.083	58.34	29.18	61.11	30.56	15.82	7.92	3.05	1.52	2.11
	Rear	2.218	1.109	2.406	1.203	.555	.278	.120	.060	.132	56.34	28.17	61.11	30.56	14.10	7.06	3.05	1.52	3.35

ACCESSORIES



TOOLING

For contact part number termination tooling and assembly see pages 169, 170 and 171.

(millimeters are in parentheses)

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS
CTA STRIP CONNECTORS

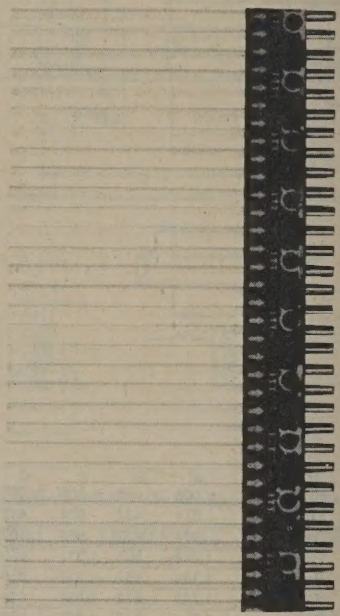
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

INTRODUCTION

CENTILOC® connectors are low-cost nylon strip connectors designed for commercial applications such as computers, instruments, communications, audio equipment, calculators, model equipment and prototype development. They are available in "yardage" from up to a 6" (152,40 mm) maximum length, accommodating from 1 to 60 rear insertion, front release, crimp snap-in size 22 CENTIPIN/CENTISOCKET contacts. These contacts are utilized in the proven positive contact alignment design, giving additional contact strength and positive contact alignment during mating.

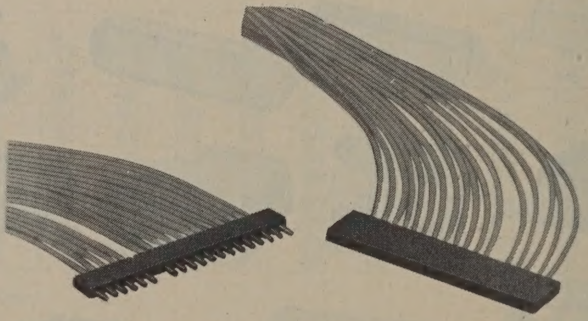
These connectors can be ordered in kit or bulk form. The kit comprises all the parts necessary to assemble one complete 6" (152,40 mm) strip connector with 60 contacts on .100" (2,54 mm) centers or a 4" (101,60 mm) strip with 53 contacts on .075" (1,91 mm) centers. If more than one connector is required, the parts can be ordered in bulk and assembled as desired.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.



ORDERING INFORMATION FOR STRIP CONNECTORS

The CENTI-LOC strip connector can be ordered in kit or bulk form. The kit includes mating insulators with a full compliment of contacts and two guide posts. If more than one connector is required, the parts can be ordered in bulk and assembled as desired.



GUIDE POSTS **POLARIZING POSTS**

KIT FORM

Kits include mating insulators with full complement of contacts and two guide posts.

Part Number	Contact Center Spacing
CTA3-KIT	.075 (1,91)
CTA4-KIT	.100 (25,40)
CTA3-CTA4-KIT	.075 (1,91) & .100 (2,54)

The guide posts and polarizing posts are inserted in the same manner as the contacts. The guide posts are inserted into the socket insulator, and the polarizing posts are inserted into the pin insulator. The corresponding contact in the mating insulator must be removed for each. See assembly instructions on page 171.

MICROMINIATURE CONNECTORS
CTA SERIES

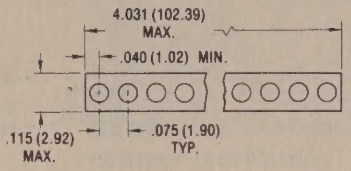
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

DIMENSIONAL DATA FOR STRIP CONNECTORS

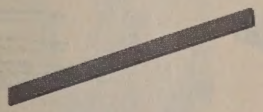
Dimensions are inches (millimeters)

COMPONENTS AND ACCESSORIES

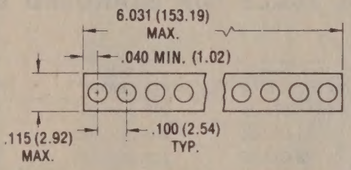
	Part Number	Contact Center Spacing	Contact Type	Material
Insulators	CTA3-IP	.075 (1.91)	Pin	Nylon
	CTA-31S	.075 (1.91)	Socket	Nylon
	CTA4-IP	.100 (2.54)	Pin	Nylon
	CTA4-IS	.100 (2.54)	Socket	Nylon
Guide Post	CTA-GP	—	—	Pas. St. Stl.
Polarizing Post	CTA-PP	—	—	Pas. St. Stl.



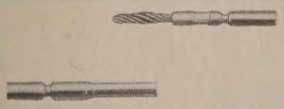
CTA 3-.075 (1,91) CENTERS



INSULATOR



CTA4-.100 (2,54) CENTERS



CONTACTS*

WEIGHTS

Part Number	No. of Contacts	Contact Type	Avg. Weight oz.	5% gm.
CTA3	53	pin	.185	5.25
		socket	.203	5.75
CTA4	60	pin	.230	6.30
		socket	.241	6.90

*See below for part numbers.

2D/CTA CONTACT DATA

CONTACT PART NUMBERS

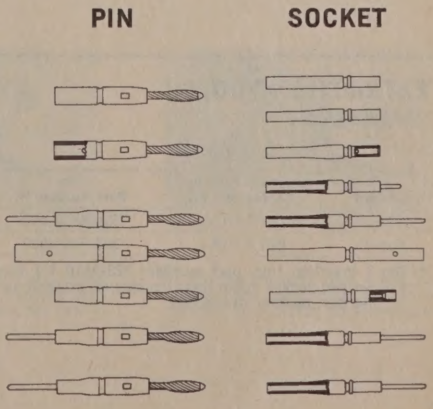
The contacts are retained in the monobloc insulator by means of a resilient internal shoulder that allows contact to snap into a locking groove. The front of the contact is chamfered so that the internal shoulder in the insulator is not damaged as the contact is pushed thru.

NOTE: Plating except as noted is 30 pin gold.

*Consult factory for any tail size or plating requirements.

CONTACT PART NUMBERS

Part Number Pin	Socket	Type
031-9540-000	030-9542-001	Standard
031-9540-004	030-9542-002	50μ in. plating
031-9540-005	030-9542-004	With inspection hole; 50μ in. plating
N/A	030-9542-011	P.C. tail .026 dia.x.190 lg.
*031-9540-013	030-9542-012	P.C. tail .020 dia.x.190 lg.
031-9540-016	030-9542-014	Long crimp barrel
031-9540-006 031-9540-007	030-9556-000	Small crimp bore
*031-9540-015	030-9542-015	P.C. tail .020 dia. x .250 lg.
*031-9540-019	030-9542-016	P.C. tail .018 dia. x .450 lg.; 50μ in. plating



(millimeters are in parentheses)

ITT CANNON ELECTRIC

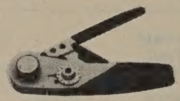
MICROMINIATURE CONNECTORS 2D/CTA TOOLING

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CRIMP AND ASSEMBLY TOOLS 2D AND CENTI-LOC

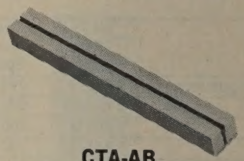
CRIMP TOOLS

Part Number	Pin	Locators	Socket
M22520/2-01	L3198-CLP	L3198-PSL	L3198-CLS



M22520/2-01

096268-0000



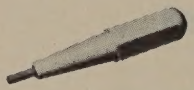
CTA-AB ASSEMBLY HOLDING BLOCK

INSERTION TOOLS FOR STANDARD CONTACT

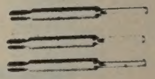
AWG Size*	Kit Part Number (handle and tip)	Tip Part Number**	Handle Part Number**
22	CIT-PS-CTA-22	323-5910-001	204-9500-000
24	CIT-PS-CTA-24	323-9510-002	204-9500-000
26	CIT-PS-CTA-26	323-9510-003	204-9500-000

*Based on wire size per MIL-W-16878 with Type E insulation, use smaller tool for wire with thin insulation, larger tool for wire having thick insulation.

**The 3 insertion tips (part numbers 323-9510-001 thru -003), plus handle, and the pin and socket extraction tips may be ordered as a SINGLE KIT by specifying the part number CIET-CTA-2.



CIET-CTA HANDLE



INSERTION TIPS

INSERTION TIP PART NUMBERS FOR LONG CRIMP BARREL CONTACT

AWG Size*	Tip Part Number*** Pin Contact	Tip Part Number*** Socket Contact	Handle Part Number**
22	323-9510-008	323-9510-012	204-9500-000
24	323-9510-009	323-9510-013	204-9500-000
26	323-9510-010	323-9510-014	204-9500-000

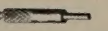
*Based on wire size per MIL-W-16878 with Type E insulation, use smaller tool for wire with thin insulation, larger tool for wire having thick insulation.

***To order the SINGLE KIT for the long crimp barrel contact (tip part numbers 323-9510-008 thru -014, handle and pin and socket extraction tips) please specify CIET-CTA-3.

EXTRACTION TOOLS

Contact	Kit Part Number (handle and tip)	Tip Part Number**	Handle Part Number**
Pin	CET-P-CTA-1	324-9502-000	204-9500-000
Socket	CET-S-CTA-1	324-9501-000	204-9500-000

**The 3 insertion tips (part numbers 323-9510-001 thru -003), plus handle, and the pin and socket extraction tips may be ordered as a SINGLE KIT by specifying the part number CIET-CTA-2.



SOCKET EXTRACTION TIP

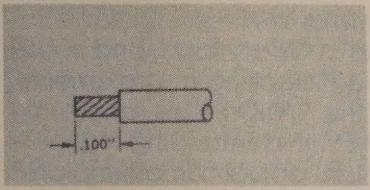
PIN EXTRACTION TIP

MICROMINIATURE CONNECTORS 2D/CTA ASSEMBLY

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

ASSEMBLY

(See page 169 for crimp insertion and extraction tools)

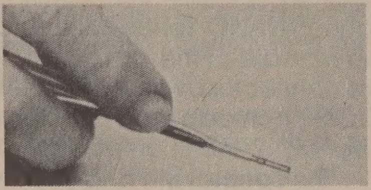


WIRE STRIPPING

1. Cut the wires to length required and strip .100" of insulation from the end to be crimped. Check for cut or broken wires and frayed insulation.

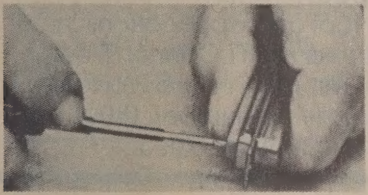
CONTACT CRIMPING

2. Using the proper crimp tool and locator, insert the contact into the locator. Insert the stripped end of the wire into the contact crimp pot, and crimp the contact to the wire. Squeeze the handles firmly to insure a proper crimp (tool will not release if crimping is incomplete). NOTE: Contact stop must be changed in tool locator when crimping pin and socket contacts.

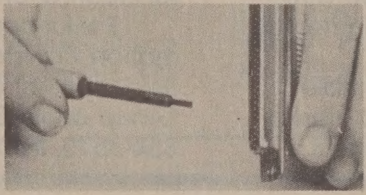


CONTACT INSERTION

3. Place the proper insertion tip in the insertion/-extraction handle and put the tip over the wire as shown. The tool tip will butt up against the crimp pot. Connector must be firmly supported during both insertion and extraction operations.

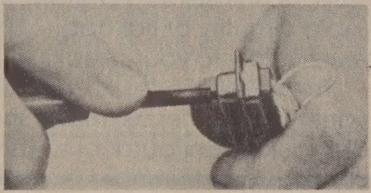


4. Using a firm, steady pressure, push the contact into the cavity until the resilient internal shoulder in the insulator snaps into the locking groove in the contact. The shoulder of the tool tip bottoms against the rear of the insulator, preventing over-insertion. Repeat for balance of contacts.



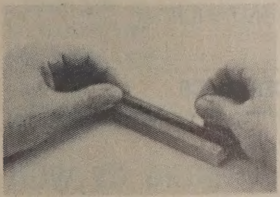
CONTACT EXTRACTION

5. For contact extraction, remove the insertion tool tip and replace it with the proper extraction tool tip. (The socket tip will fit into the socket, and the pin tip will slide over the pin bundle). Insert the tool tip into the contact cavity: (the pin tip will butt up against the shoulder of the pin contact, and the socket tip will bottom in the socket contact.)



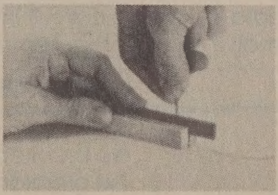
6. Apply a firm, steady pressure until the contact is released from the internal shoulder in the insulator. The shoulder of the tool tip will bottom against the insulator face to prevent damage to the internal shoulder. Remove the tool tip and pull the contact from the rear of the connector. Repeat for the balance of contacts to be removed.

CTA

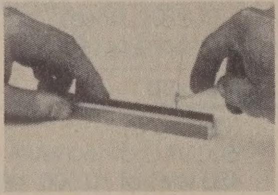


INSERTION

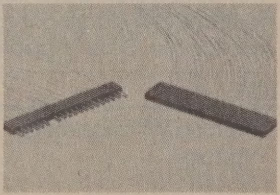
1. Place the connector into the slot in the assembly block with the arrows on the insulator pointing downward. The connector will bottom against the internal shoulder in the groove in the assembly block. Start contact insertion by placing the crimped contact in the cavity by hand.



2. Position the insertion tool tip on the rear of contact as shown. The insulation must be pulled back from the crimp pot approximately 1/32" to allow the tool tip to butt against the contact crimp pot.



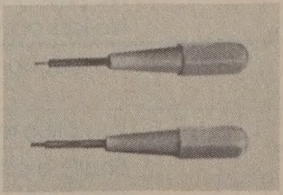
3. With firm steady pressure, push the contact into the cavity until the resilient internal shoulder snaps into the locking groove in the contact. To prevent over insertion, the tool tip bottoms against the rear of the insulator.



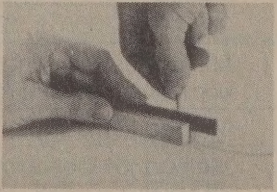
4. The guide post and polarizing posts are inserted in the same manner as the contacts. The guide posts are inserted into the socket insulator, and the polarizing posts are inserted into the pin insulator. The corresponding contact in the mating insulator must be removed for each.

EXTRACTION

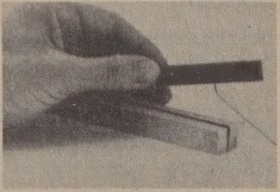
5. To extract the contacts, place the connector face up in the assembly block so that the contact to be extracted is in the end of the block that has a fully slotted opening.



The pin extraction tool tip is tubular, slides over the pin bundle and butts against the front shoulder of the pin. The socket extraction tool is a solid rod that fits into the socket contact, the external shoulder butts against the contact socket shoulder.



6. Insert the extraction tool into the cavity and apply firm pressure until the contact is pushed thru the rear of the connector.



7. Lift the insulator from the groove and pull the contact out. Repeat for balance of contacts to be removed.

Section III: The NANO Line

Cannon NANO Series connectors are the current state-of-the-art in high density miniature connectors, with 1 amp NANOPIN/NANOSOCKET contacts on .025"(0.64 mm) centers for a density of 1600 contacts per square inch.

The special pin and socket design permits this extremely high contact density with no degradation in reliability, maintaining continuity in these dense areas even under severe shock and vibration while requiring very low engagement and separation forces. Terminations can consist of uninsulated pigtails, insulated wire, flexible circuitry or flat cable, all pre-harnessed at our factory to your specifications.

The NANO Series is currently available in a variety of strip forms; metal shell and plastic rectangular configurations, with or without center jackscrew; a metal shell rectangular combining signal and coax contacts; and in a discrete board-to-board stacking arrangement.

Applications for the NANO Series range from military programs with demanding high reliability requirements to actual human implantations in medical research. In all of them, the NANO Series has proven highly successful.

If the NANO connectors shown do not meet your specific needs, consult the factory. Other connectors can be designed and economically fabricated for your specific applications.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: (800) 854-3573; in California, (800) 432-7063.

STANDARD DATA

- Contact rating—1 amp max.
- Minimum contact centers—0.025"(0.64 mm).
- Wire sizes—#30 and #32 AWG, stranded or solid.
- Contact termination—integral pigtail or multiple indent crimp.
- Contact retention—fixed via epoxy.
- Contact materials—pin sleeve and socket: nickel silver.
  —pin: precious metal alloy.
- Mating/unmating force—6 oz. per contact, max.

PERFORMANCE DATA

The table below summarizes the results of key tests performed in accordance with MIL-STD-202, where applicable. Data is applicable to standard connectors with standard terminations. Variations may affect this data, so please consult the factory for further information on your requirements.

TEST	METHOD	CRITERIA OF ACCEPTANCE
Dielectric Withstanding Voltage	Method 301: 600 VAC at sea level 150 VAC at 70,000' altitude	 No breakdown No breakdown
Insulation Resistance	Method 302, Condition A	5,000 megohms minimum
Thermal Shock	Method 107, Condition B: −65°C to +125°C	No physical damage
Physical Shock	Method 213, Condition I: 100 G's, 3-axes, 6 millisecond duration sawtooth pulse	No physical damage No loss of continuity >1 μsec
Vibration	Method 204, Condition D: 20 G's, 10-2,000 Hz, 12 hours	No physical damage No loss of continuity >1 μsec
Durability	500 cycles of mating and unmating, 500 CPH max.	No mechanical or electrical defects
Moisture Resistance	Method 106, omit 7b	Insulation resistance >100 megohms
Salt Spray	Method 101, Condition B: 48 hours	Shall be capable of mating and unmating, and meet contact resistance requirements
Contact Resistance	Method 307: At 1 amp At 100 milliamps	 60 milliohms maximum 60 milliohms maximum
Contact Retention	— —	3 lb. minimum axial load

ITT CANNON ELECTRIC

MICROMINIATURE CONNECTORS NANO SERIES

INTRODUCTION

To meet the growing need for microminiaturization, ITT Cannon Electric has designed the NANO Contact System. These NANO Series connectors are the current state of the art in high density miniature connectors, with 1 amp NANOPIN/NANOSOCKET contacts as close as .025″(0.64) centers. Densities to 1600 contacts per square inch can be accomplished.

The special pin and socket design permits this extremely high contact density with no degradation in reliability, maintaining continuity in these dense areas even under severe shock and vibration while requiring very low engagement and separation forces. Terminations can consist of uninsulated pigtails, insulated wire, flexible circuitry or flat cable, all pre-harnessed at our factory to your specifications.

The NANO Series is currently available in a variety of strip forms; metal shell and plastic rectangular configurations, with or without center jackscrew; a metal shell rectangular combining signal and coax contacts; and in a discrete board-to-board stacking arrangement.

Applications for the NANO Series range from military programs with demanding high reliability requirements to actual human implantations in medical research. In all of them, the NANO Series has proven highly successful.

If the NANO connectors shown do not meet your specific needs, consult the factory. Other connectors can be designed and economically fabricated for your specific applications.

For further technical and applications information, contact your nearest ITT Cannon Electric field office or call our Microminiature Products Group at our 24-hour toll-free number: 800-854-3573; in California, 800-432-7063.

HOW TO ORDER

See page 174 for dimensional data

NT P 1-/2 40 P/S L/T/H *

Series — NT
Insulator Material — P
Contact Location — 1-/2
Contact Arrangements — 40
Contact Type — P/S
Termination Type — L/T/H
Modification Code — *

SERIES
NanoStrip

INSULATOR MATERIAL
P = Phenolic standard .050 (1.27) wide and with cement trough

CONTACT LOCATION
1 = Contacts on .025 (0.64) MIL center
2 = Contacts on .050 (1.27) MIL center

CONTACT TYPE
P = Pin (Plug)
S = Socket (Receptacle)

CONTACT ARRANGEMENTS
40 Maximum

TERMINATION TYPE
L = Solid copper (#30 AWG, solid copper, gold plate)
T = One piece contact/lead
H = Insulated wire (#30 AWG, Strd.), Type "E" per MIL-W-16878/4

MODIFICATION CODE
To specify lead lengths, type and mechanical modifications, consult factory

HOW TO ORDER

See page 175 for dimensional data

NDM- 9 P T *

Series — NDM-
Contact Arrangements — 9
Contact Type — P
Termination Type — T
Modification Code — *

SERIES
NDM — Nano D Metal Shell

CONTACT ARRANGEMENTS
9, 15, 21, 25, 31, 37, 51

CONTACT TYPE
P = Pin (Plug)
S = Socket (Receptacle)

TERMINATION TYPE
H = Insulated wire
L = Solid copper
T = One piece contact/lead

MODIFICATION CODE
To specify, lead lengths, type and mechanical modification, consult factory

HOW TO ORDER

See page 175 for dimensional data

NCJS-/NJS- 26 P T *

Series — NCJS-/NJS-
Contact Arrangements — 26
Contact Type — P
Termination Type — T
Modification Code — *

SERIES
NJS — Nano center jackscrew/rectangular
NCJS — Nano center jackscrew/circular

CONTACT ARRANGEMENTS
9, 24, 72

CONTACT TYPE
P = Pin (Plug)
S = Socket (Receptacle)

TERMINATION TYPE
H = Insulated wire
L = Solid copper
T = One piece contact/lead

MODIFICATION CODE
To specify, lead lengths, type and mechanical modification, consult factory

Dimensions subject to change

(millimeters are in parentheses)

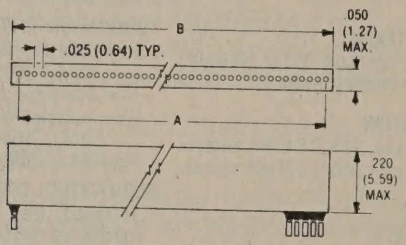
MICROMINIATURE CONNECTORS NANO SERIES

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

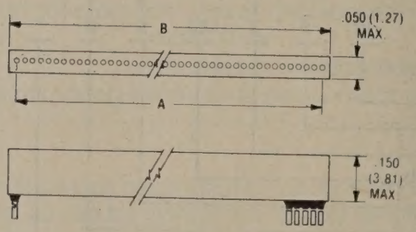
STANDARD DATA

	NTP	NDM	NJS	NCJS	NTDP
Type	Single Row Strip	Metal Shell Rectangular	Rectangular Center Jackscrew	Circular Center Jackscrew	Dual Row Strip
Shell	—	Alum. Alloy (6061-T4) Nickel Plate	—	—	—
Insulator	Phenolic	Phenolic	Polyester	Polyester	Phenolic
No. of Contacts	1-40 Contacts	9, 15, 21, 25, 31, 37, 51	9, 24	72	90
Contact Material Pin	Precious Metal/ASTMB477, ASTMB541, per MIL-E-46065				
Socket & Pin Contact Sleeve	Nickel Silver/ASTMB122, Comb. B				

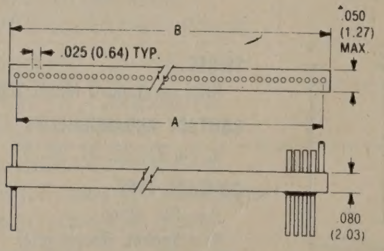
NTP



PLUG/CRIMP(H)



PLUG/1 PC(T)



RECEPTACLE

Part Number by Shell Size	A Basic	B ±.010(±0.25)	Part Number by Shell Size	A Basic	B ±.010(±0.25)	Part Number by Shell Size	A Basic	B ±.010(±0.25)	Part Number by Shell Size	A Basic	B ±.010(±0.25)
NTPI-1*-**	—	.050(1.27)	NTPI-11*-**	.250(6.35)	.300(7.62)	NTPI-21*-**	.500(12.70)	.550(13.97)	NTPI-31*-**	.750(19.05)	.800(20.32)
NTPI-2*-**	.025(.635)	.075(1.91)	NTPI-12*-**	.275(6.99)	.325(8.26)	NTPI-22*-**	.525(13.34)	.575(14.61)	NTPI-32*-**	.775(19.69)	.825(20.96)
NTPI-3*-**	.050(1.27)	.100(2.54)	NTPI-13*-**	.300(7.62)	.350(8.89)	NTPI-23*-**	.550(13.97)	.600(15.24)	NTPI-33*-**	.800(20.32)	.850(21.59)
NTPI-4*-**	.075(1.91)	.125(3.18)	NTPI-14*-**	.325(8.26)	.375(9.53)	NTPI-24*-**	.575(14.61)	.625(15.88)	NTPI-34*-**	.825(20.96)	.875(22.23)
NTPI-5*-**	.100(2.54)	.150(3.81)	NTPI-15*-**	.350(8.89)	.400(10.16)	NTPI-25*-**	.600(15.24)	.650(16.51)	NTPI-35*-**	.850(21.59)	.900(22.86)
NTPI-6*-**	.125(3.18)	.175(4.45)	NTPI-16*-**	.375(9.53)	.425(10.80)	NTPI-26*-**	.625(15.88)	.675(17.15)	NTPI-36*-**	.875(22.23)	.925(23.50)
NTPI-7*-**	.150(3.81)	.200(5.08)	NTPI-17*-**	.400(10.16)	.450(11.43)	NTPI-27*-**	.650(16.51)	.700(17.78)	NTPI-37*-**	.900(22.86)	.950(24.13)
NTPI-8*-**	.175(4.45)	.225(5.72)	NTPI-18*-**	.425(10.80)	.475(12.07)	NTPI-28*-**	.675(17.15)	.725(18.42)	NTPI-38*-**	.925(23.50)	.975(24.77)
NTPI-9*-**	.200(5.08)	.250(6.35)	NTPI-19*-**	.450(11.43)	.500(12.70)	NTPI-29*-**	.700(17.78)	.750(19.05)	NTPI-39*-**	.950(24.13)	1.000(25.40)
NTPI-10*-**	.225(5.72)	.275(6.99)	NTPI-20*-**	.475(12.07)	.525(13.34)	NTPI-30*-**	.725(18.42)	.775(19.69)	NTPI-40*-**	.975(24.77)	1.025(26.04)

(millimeters are in parentheses)

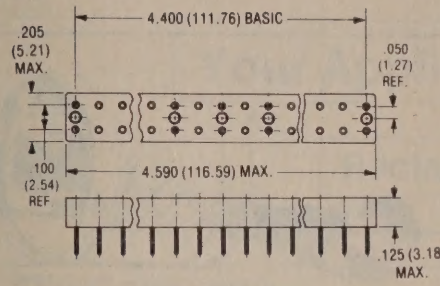
Dimensions subject to change

MICROMINIATURE CONNECTORS NANO CONNECTOR SPECIALS

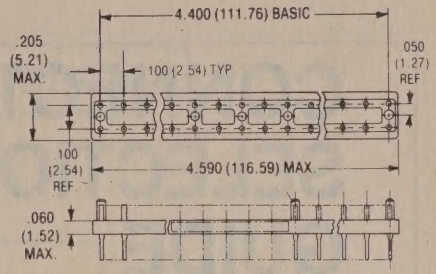
For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

NTDP3-90-ST*

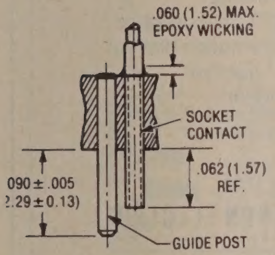
PLUG


4.400 (111.76) BASIC
.205
(5.21)
MAX.
.050
(1.27)
REF.
.100
(2.54)
REF.
4.590 (116.59) MAX.
.125 (3.18)
MAX.

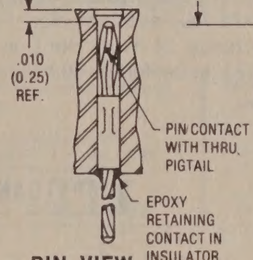
RECEPTACLE


4.400 (111.76) BASIC
.205
(5.21)
MAX.
.100 (2.54) TYP
.050
(1.27)
REF
.100
(2.54)
REF.
4.590 (116.59) MAX.
.060
(1.52)
MAX.

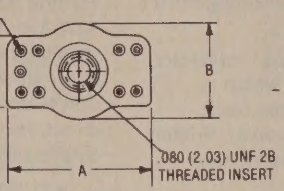
NJS CENTER JACKSCREW/RECTANGULAR


.060 (1.52) MAX.
EPOXY WICKING
SOCKET
CONTACT
.062 (1.57)
REF.
090 ± .005
2.29 ± 0.13)
GUIDE POST

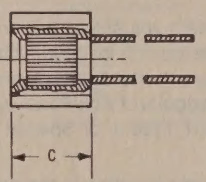
SOCKET VIEW


.010
(0.25)
REF.
PIN CONTACT
WITH THRU.
PIGTAIL
EPOXY
RETAINING
CONTACT IN
INSULATOR

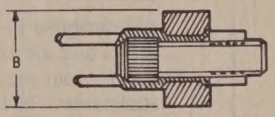
PIN VIEW


①
D
B
A
.080 (2.03) UNF 2B
THREADED INSERT

FACE VIEW PIN INSERT



PLUG SIDE VIEW

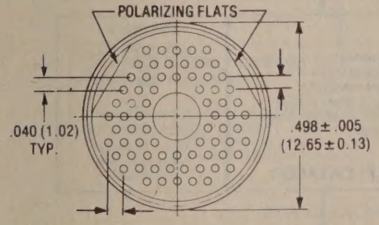


RECEPTACLE SIDE VIEW

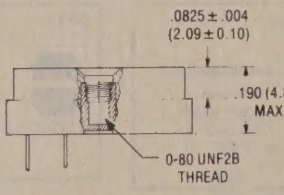
Part Number	A Max.	B Max.	C ±.005(±0.13)	D ±.005(±0.13)
NJS-9P	.250 (6.35)	.165 (4.19)	.138 (3.50)	.116 (2.95)
NJS-9S	.250 (6.35)	.165 (4.19)	.078 (1.98)	.116 (2.95)
NJS-24P	.430 (10.92)	.165 (4.19)	.138 (3.50)	.116 (2.95)
NJS-24S	.430 (10.92)	.165 (4.19)	.078 (1.98)	.116 (2.95)

NOTE: Contacts can be replaced by guide posts for polarization purposes.

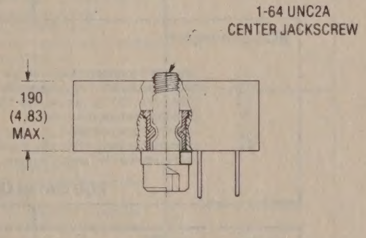
NCJS CENTER JACKSCREW/CIRCULAR


POLARIZING FLATS
.040 (1.02)
TYP.
.498 ± .005
(12.65 ± 0.13)

FACE VIEW


.0825 ± .004
(2.09 ± 0.10)
.190 (4.83)
MAX.
0-80 UNF2B
THREAD

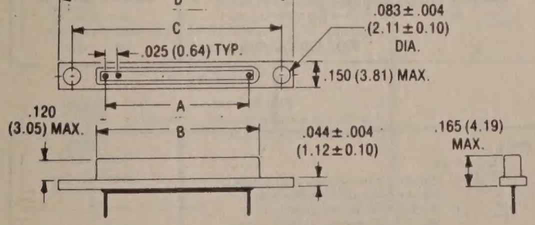
PLUG


1-64 UNC2A
CENTER JACKSCREW
.190
(4.83)
MAX.

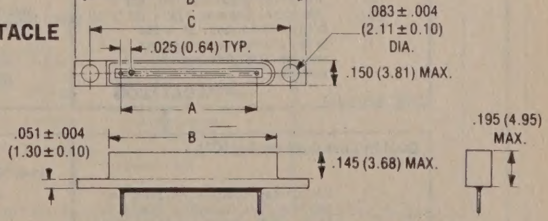
RECEPTACLE

NDM

PLUG


D
C
.025 (0.64) TYP.
.083 ± .004
(2.11 ± 0.10)
DIA.
.150 (3.81) MAX.
A
.120
(3.05) MAX.
B
.044 ± .004
(1.12 ± 0.10)
.165 (4.19)
MAX.

RECEPTACLE


D
C
.025 (0.64) TYP.
.083 ± .004
(2.11 ± 0.10)
DIA.
.150 (3.81) MAX.
A
.051 ± .004
(1.30 ± 0.10)
B
.145 (3.68) MAX.
.195 (4.95)
MAX.

Part Number by Shell Size	A Basic	B Ref.	C Basic	D Max.
NDM-9P*	.200(5.08)	.315(8.00)	.565(14.35)	.720(18.29)
NDM-15P*	.350(8.89)	.465(11.81)	.715(18.16)	.870(22.10)
NDM-21P*	.500(12.7)	.615(15.62)	.865(21.97)	1.020(25.91)
NDM-25P*	.600(15.24)	.715(18.16)	.965(24.51)	1.120(28.45)
NDM-31P*	.750(19.05)	.865(21.97)	1.115(28.32)	1.270(32.26)
NDM-37P*	.900(22.86)	1.015(25.78)	1.265(32.13)	1.420(36.07)
NDM-51P*	1.250(31.75)	1.365(34.67)	1.615(41.02)	1.770(44.96)

Part Number by Shell Size	A Basic	B Ref.	C Basic	D Max.
NDM-9S*	.200(5.08)	.380(9.65)	.565(14.35)	.720(18.29)
NDM-15S*	.350(8.89)	.530(13.46)	.715(18.16)	.870(72.10)
NDM-21S*	.500(12.7)	.680(17.27)	.865(21.97)	1.020(25.91)
NDM-25S*	.600(15.24)	.780(19.81)	.965(24.51)	1.120(28.45)
NDM-31S*	.750(19.05)	.930(23.62)	1.115(28.32)	1.270(32.26)
NDM-37S*	.900(22.86)	1.080(27.43)	1.265(32.13)	1.420(36.07)
NDM-51S*	1.250(31.75)	1.430(36.32)	1.615(41.02)	1.770(44.96)

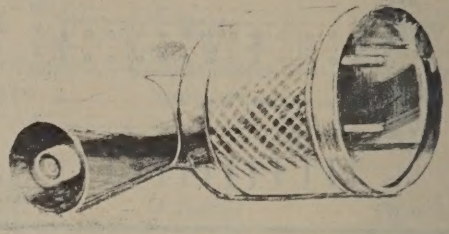
Dimensions subject to change

(millimeters are in parentheses)

For Manufacturers Sales Offices refer to MANUFACTURERS, SALES OFFICES AND TRADE MARKS DIRECTORY

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

CONNECTOR SELECTION GUIDE



This guide lists additional catalog information (for products not shown in this directory) available from ITT Cannon.

It is designed to help you select the proper connector series and the appropriate catalog from which to specify your requirements. Determine your basic application: Rectangular, Rack/Panel, Circular, Printed Circuit/Input-Output, Filters, or Special Application connectors.

Go to the appropriate heading in the chart. Below each heading are several blocks listing the various connector series. Check these requirements with the data on the right side of each block. Write ITT Cannon Electric, 666 E. Dyer Road, Santa Ana, California 92702, or telephone (714) 557-4700 for the proper catalog, detailed product data, and ordering information, or consult your nearest ITT Cannon sales office. Should you need immediate information dial our direct, no charge, 24 hour "Hot Line" number: 800/854-3573 (in California: 800/432-7063).

ITT CANNON ELECTRIC
666 E. DYER ROAD, SANTA ANA, CALIF. 92702
A DIVISION OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

CANNON PLUGS

Printed Circuit/Input Output

ECS connectors

Edgecard connectors with single beam preloaded contacts on .100" (2.54 mm), .125" (3.18 mm) and .156" (3.96 mm) enters, mounted on custom-made precision-punched aluminum panels. Integrally molded card guides of ¾" and 2" heights.

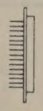
ECS CATALOG

CONTACTS

Any number of contacts available

WIRE-WRAPPING TERMINATION

PRESS-T-MATE™ — backpanel packaging system



Custom printed circuit back panel packaging using inherent reliability of P.C. interconnections with latest cardedge connectors, contacts in .100" x .100" (2.54 x 2.54 mm), .100" x .200" (2.54 x 5.08 mm), .125" x .125" (3.18 x 3.18 mm) and .125" x .250" (3.18 x 6.35 mm) center spacings; feed-thru .025" (0.64 mm) post contacts.

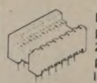
PTM CATALOG

CONTACTS

By Request

WIRE-WRAPPING TERMINATION

Dual In-Line sockets for IC's



Economically designed, low cost, low profile sockets that unplug. Size 14, 16, 24, 28, and 40 contact layouts in solder pin versions. Size 14 and 16 contact layouts with wire-wrapping terminations.

DICA CATALOG

14-40 CONTACTS

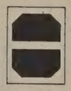
Amps

3

SOLDER OR WIRE-WRAPPING TERMINATIONS

Filters — RFI/EMI

DPXJ



Rack/panel filter connectors in single, two, three or four gang shells interchangeable with standard DPX, DPXMA, DPXME and meets requirements of ARINC 404. Provide optimum attenuation of RFI/EMI.

FDPXJ CATALOG

CONTACTS

Contact/Wire Size

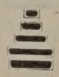
22
20
16

Coax. contacts avail.

SOLDER TERMINATION

Consult factory for availability of crimp filter contacts.

D*J



Rectangular subminiature filter connectors intermateable with standard D subminiature and MIL-24308 types. Optimum RFI/EMI attenuation provided.

FDJ CATALOG

CONTACTS

Contact/Wire Size

20

Coax. contacts avail.

SOLDER TERMINATION

Consult factory for availability of crimp filter contacts.

PVJ

Bayonet Coupling

Miniature circular filter connectors provide optimum attenuation of RFI/EMI. PVJ equivalents to MIL-C-26482 and MIL-C-83723 types.

PVJ CATALOG

CONTACTS

Contact/Wire Size

20
16

SOLDER TERMINATION

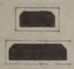
Consult factory for availability of crimp filter contacts.

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

Your Application Requirement

Rectangular Rack/Panel

DPGM/DPJM — general purpose, environmental



DPGM — short shell, economical ring-type contact retention
DPJM — same as DPGM except shell is longer
DPJMB — LITTLE CAESAR® contact assembly

■

DPGM/DPJM CATALOG

12-98 CONTACTS
Contacts/Wire Size
20
16
12
Coax. contacts avail.
CRIMP TERMINATION

DPK — high performance, environmental MIL-C-83733

Environmental sealing, thermal resistant connector with rear release of PV crimp snap-in contacts

■ ●

DPK CATALOG

18-185 CONTACTS
Contact/Wire Size
12
16
20
22
22D
Coax. contacts avail.
CRIMP TERMINATION

DJS — environmental, high density, rugged

Single gang, two gang, size 22D KJ crimp snap-in contacts, miniature

■

DJS CATALOG

78-128 CONTACTS
Contact/Wire Size
24
26
28
CRIMP TERMINATION

DPX ARINC Type Connector Flat cable terminations

Flat cable layers in module form for easy termination, long flex life, weight reduction. Available in single, 2-, 3-, and 4-gang configurations.

FCA CATALOG

2-424 CONTACTS

DPD Series — general purpose single gang

DPD — standard rack/panel connector with widest range of contact arrangements
DPDMA — LITTLE CAESAR® contact assembly

— two gang DPD

DPD2 — two gang DPD
DPD2MA — two gang DPD with LITTLE CAESAR® contact assembly

■

DPD CATALOG

2-128 CONTACTS (single gang)
4-256 CONTACTS (two gang)
Contact/Wire Size
20
16
14
10
8
6
4
2
0
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

DPX Series — small, rugged, general purpose, single gang

For commercial/industrial application

DPXA — single shell
DPXAF — float mount DPXA
DPXB — polarized ARINC shell
DPXL — large flange
DPXLF — float mount DPXL
DPXAMA — LITTLE CAESAR® contact assembly
DPXBMA — LITTLE CAESAR® contact assembly
DPXBME — LITTLE CAESAR® contact assembly — environmental

For general military/aerospace application

DPXBNA — non-environmental, MIL-C-81659, type IV
DPXBNE — environmental, MIL-C-81659, types II and III

2-106 CONTACTS
Contact/Wire Size
22
20
16
2
6
4
Coax. contacts avail.
SOLDER OR CRIMP TERMINATION

DPX2 — two gang DPX

DPX2 — two gang DPX
DPX2A — ARINC A shell
DPX2B — ARINC B shell
DPX2MA — LITTLE CAESAR® contact assembly
DPX2ME — LITTLE CAESAR® contact assembly — environmental
DPX2NA — non-environmental, MIL-C-81659, type IV
DPX2NE — environmental, MIL-C-81659, types II and III

4-212 CONTACTS

DPX3 — three gang DPX

DPX3 — three gang DPX
DPX3MA — LITTLE CAESAR® contact assembly
DPX3ME — LITTLE CAESAR® contact assembly — environmental
DPX3NA — non-environmental, MIL-C-81659, type IV
DPX3NE — environmental, MIL-C-81659, types II and III

6-318 CONTACTS

DPX4 — four gang DPX

DPX4 — four gang DPX
DPX4MA — LITTLE CAESAR® contact assembly
DPX4ME — LITTLE CAESAR® contact assembly — environmental
DPX4NA — non-environmental, MIL-C-81659, type IV
DPX4NE — environmental, MIL-C-81659, types II and III

■ ●

DPX CATALOG

8-424 CONTACTS

LEGEND

- ☐ Environmental version only
- ■ Environmental versions available. Consult factory.
- ● Hermetic versions available. For information please write for applicable hermetic catalogs, or consult factory.

ITT CANNON ELECTRIC

For immediate budgetary information contact your nearest Cannon Sales Office or Distributor (see Manufacturers' Directory).

Circular

SRC — miniature circular, rugged, general purpose

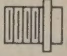
Threaded Coupling

Lightweight, economical, used for test instrumentation, electronic and industrial equipment, and other general purpose application.

SRC CATALOG

3-24 CONTACTS
Contact/Wire Size
20
16
SOLDER OR CRIMP TERMINATION

MR — standard weatherproof, submersible


Submersible
□

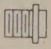
Rugged environmental MIL-C-5015 type, designed to MIL-C-12520B

MR CATALOG

1-56 CONTACTS
Contact/Wire Size
16
12
8
4
0
SOLDER TERMINATION

HIGH TEMPERATURE connectors

HRM — 1300°F (704°C), nuclear radiation-resistant miniature circular connector
CA-HR — 650° & 1000°F (343°C & 538°C), radiation-resistant


Threaded Coupling

HT CATALOG

1-73 CONTACTS
Contact/Wire Size
16
12
8
4
0
CRIMP OR WELD TERMINATIONS

FIREWALL CONNECTORS

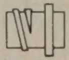
MS-K — 350°F (177°C), meets MIL-C-5015 fireproof test, crimp contacts
CA-KE — 350°F (177°C), moisture-resistant, for sealable wires, meets MIL-C-5015 fireproof test or 350°F (177°C) continuous
FRF — Firewall connector with front release crimp shap-in MS90453, MS90454 contacts; moisture sealed, exceeds MIL-C-5015 fireproof requirements; 400°F (204°C) continuous, 800°F (427°C) shorter term.

Threaded Coupling
■

FW CATALOG

1-47 CONTACTS
Contact/Wire Size
16
12
8
4
0
CRIMP TERMINATION

KO — rugged lightweight


Acme Threads
□ ●

Miniature environmental version of standard K connector with special Acme threads.

MC CATALOG

3-50 CONTACTS
Contact/Wire Size
20
16
12
SOLDER TERMINATION

MC — subminiature, sealed connectors

Rugged
□ ●

Designed to withstand severe handling and environmental conditions.

MC CATALOG

3-12 CONTACTS
Contact/Wire Size
20
SOLDER TERMINATION

WATERPROOF connectors

For underwater applications, uses MIL-C-5015 contact arrangements, Acme thread coupling.

W CATALOG

1-56 CONTACTS
Contact/Wire Size
16
12
8
4
0
Coax. contacts avail.
SOLDER TERMINATION

Special Applications

CABLE TELEVISION connectors

All-weather resistant coaxial connectors used for CATV application. Exceptional long-life RFI leakage provided.

CATV CATALOG

Cable Sizes
.412, .500, .750
SOLDER OR CLAMP TERMINATION

LKTMA/B connectors

Designed for use in combination color/monochrome television cameras.

LKTMA/B CATALOG

UP TO 85 CONTACTS
Contact/Wire Size
20
12
Coax. contacts avail.
CRIMP TERMINATION

BATTERY connectors

Connect auxiliary power equipment to electrical systems; eliminates need for batteries and generators for each power equipment

BAT CATALOG

SURE SEAL™ connectors

High performance, low cost environmentally sealed connectors with rugged multiple moisture seals. Meets automotive/industrial standards including vibration, shock, temp. cycling, salt water spray and immersion, petroleum derivitives, and industrial gases.

SS CATALOG

NUCLEAR INTERCONNECT products

Power, instrumentation and control penetrators, cables and connectors for sensors and displays, fuel handling equipment, control rod drives.

NUCLEAR BROCHURE

SUBSEA, ENVIRONMENTAL connectors and INTERCONNECT systems

HYDROSPACE connectors — submersible, corrosion-resistant for high-pressure underwater applications
BOP connectors — subsea blowout preventor connectors for control cables
CUSTOM connectors — electrical penetrators, impervious to sea water; electro hydraulic connectors; geophysical "hermaphroditic" connectors; fiber optic connectors, data transmission in optical format.

SEC CATALOG

FIBER OPTIC connectors

BNC, DPK, SMA, PV-type, ideal for any application where systems requirements dictate fiber optics for EMI/RFI/EMP immunity, wide bandwidth, light weight and small size.

FIBER OPTIC CATALOG

Who can supply all your termination and tooling needs?

ITT CANNON
TERMINAL PRODUCTS
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Cannon/ETC can!

Six decades on the leading edge of interconnect technology.

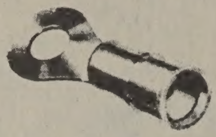
ETC Terminal Products Unit

CANNON ITT

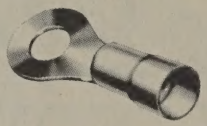
CONNECTING DEVICES FOR EVERY NEED

TERMINALS

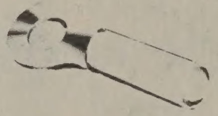
- **Wire Ranges:** #26 thru #4/0 AWG, Loose Piece. Mounted on Tape or in Continuous Strips in #26 thru 10 sizes.
- **Tongue Types:** Ring, Rectangular, Spade, Flanged Spade, Hook, Slotted Ring and Snap Spade.
- **Approvals:** Terminals are covered by UL, CSA and Military Specifications, where Applicable.



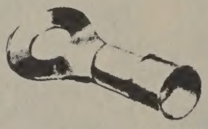
AVIKRIMP® — Tin-plated brass sleeve strengthens barrel. Color coded Nylon insulating sleeve adds more wire protection. Operating temperatures: continuous duty — −40°F to 250°F, intermittent duty — to 350°F. WIRE RANGE: #26-10. Also available on tape.



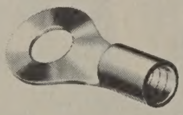
INSULKRIMP® — PVC insulation sleeve permanently attached to butted seam barrel (#22-10) or brazed seam barrel (#8-2). Operating temperatures: continuous duty — −40°F to 167°F, intermittent — to 300°F. WIRE RANGE: #22-2. Also available on tape.



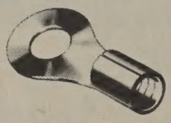
NYLAKRIMP™ — Ideal for larger wire applications involving temperature extremes and vibration. Rigid, overhanging Nylon insulating sleeve covers silver-brazed barrel. Withstands continuous duty temperatures from −60°F to 250°F. WIRE RANGE: #8-4/0.



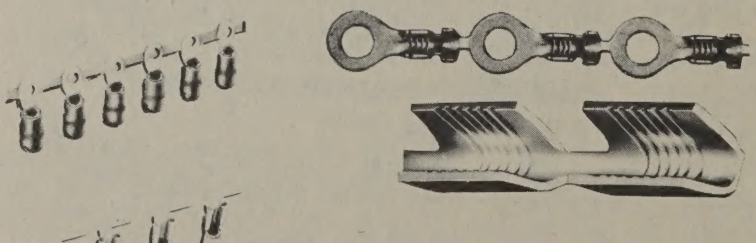
VIBRAKRIMP® — Made for excessive vibration applications. Seamless tin-plated brass sleeve covers basic KRIMPTITE barrel. Its overhang prevents wire flex. Single crimp terminates wire. WIRE RANGE: #22-10. Also available on tape.



VERSAKRIMP™ — Has silver brazed barrel. Seam will not open under stress or wire pull. Crimps using many types of tooling. Ideal for solid or stranded wires. WIRE RANGE: #22-4/0. Also available on tape.



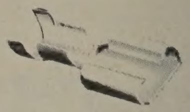
KRIMPTITE® — One piece, non-insulated design. Ideal general purpose terminal for uses where special features are unnecessary. Full length barrel makes crimping easy. WIRE RANGE: #26-10. Also available on tape.



AUTOMATED STRIP AND TAPED TERMINALS, quick disconnects and magnet wire splices from #26 thru #10 AWG sizes. Popular tongue types, barrels insulated or open with insulation support. Quick disconnects available in straight or flag designs.

QUICK CONNECTS

- **Female Receptacles and Male Tabs**

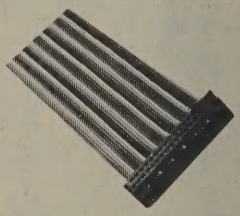


PDQ™ quick connect receptacle terminals handle #26-12 AWG wires and .110 x .020, .110 x .032, .187 x .020 and .250 x .032 inch male tabs. Insulated or non-insulated barrels. Available loose piece, on tape or continuous strip. Meet NEMA and UL standards. Male tabs and single or twin tab lugs are .250 thru .110 inches wide for PDQ female receptacles.

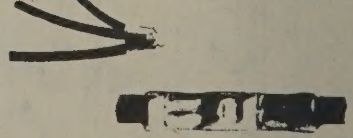
CABLE TIES

NYLON CABLE TIES are one-piece self-locking straps that quickly and safely speed harness assemblies. Different sizes handle bundle diameters up to 4″. Rugged application tools provide the right tension and cut ties flush with tie heads.

CONNECTORS & SPLICES



FLAT CABLE CONNECTOR — Easy way to mass terminate all .050 spaced flat cable with up to 50 conductors. Receptacles available in seven contact layouts. Assorted Pin Headers available. Assemble with ETC Tool.



CLOSED-END CONNECTORS AND SPLICES — Provide secure connections in insulated or non-insulated styles. WIRE RANGE: #22-4/0.

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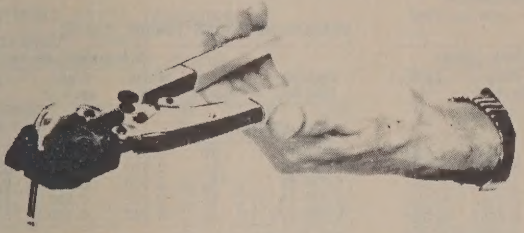
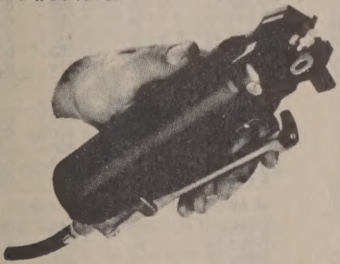
CONNECTING DEVICES FOR EVERY NEED

CRIMPING TOOLS

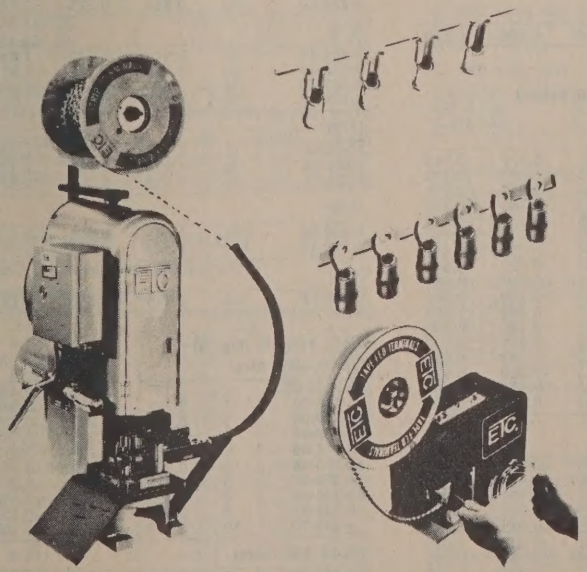
- Hand Operated and Semi-automatic ... Matched-to-terminal Designs ... Free 30-day Evaluation Trials



RATCHET HAND TOOLS — Special ratchet mechanism won't allow terminal to be released until fully crimped. Handle terminals and splices from #26 thru #10 AWG.



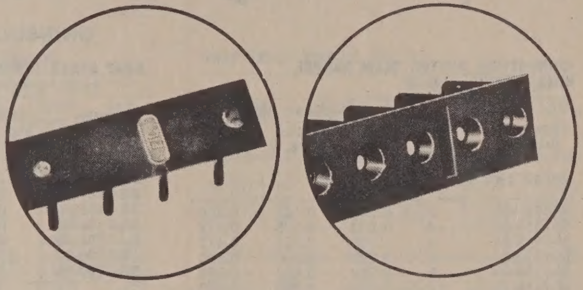
PORTABLE AIR TOOLS — 27 oz. AT-200 hand tool uses standard air pressure to crimp #26 thru #6 AWG terminals and splices. Bench adapter accessories available.



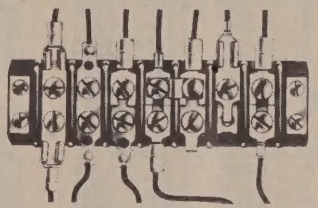
AUTOMATIC FEED TAPE AND STRIP PRESSES — Terminals are loaded into crimping dies automatically. Cycled for up to 3,600 terminations per hour. Crimps #26 thru #10 AWG sizes. Air and electrically operated models.

TERMINAL BLOCKS

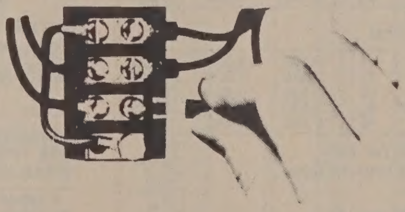
- Closed Back ... Open Back ... Military Blocks



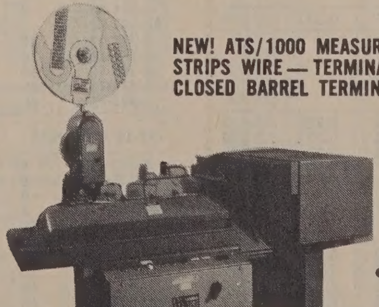
CLOSED BACK **OPEN BACK**



TWIN SCREW OR SINGLE SCREW — Choose closed back design with molded-in plates and protected mounting holes. Or open back design. Rated 5 to 30 amps. Complete selection of lugs and hardware.



TERMINAL BLOCK TERMINALS — Match-fitting to blocks assures reliability in sizes #26 thru #10 AWG. Spade, Flanged Spade and Rectangular tongues are 3/16", 19/64", 21/64" or 27/64" wide.



NEW! ATS/1000 MEASURES, CUTS, STRIPS WIRE — TERMINATES OPEN AND CLOSED BARREL TERMINALS

- 3,000 terminated wire leads per hour.
- Attractive lease rates.

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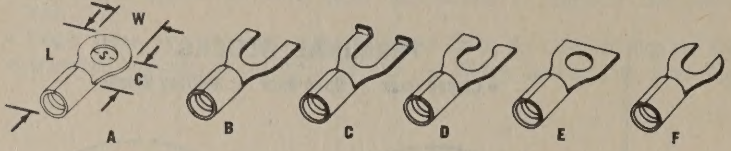
CANNON ETC.
SOLDERLESS TERMINALS



UNINSULATED TERMINALS

KRIMPTITE® BUTTED SEAM BARREL RING TONGUE (Fig. A)

		Dimensions, inches		
Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(26-24 AWG wire)				
M-1122-02	2	0.140	0.131	0.346
M-1113-04	4	0.203	0.225	0.472
M-1113-06	6	0.203	0.225	0.472
M-1118-06	6	0.250	0.300	0.570
M-1118-08	8	0.250	0.300	0.570
M-1118-10	10	0.250	0.300	0.570
(22-18 AWG wire)				
AA-120-04	4	0.225	0.177	0.464
AA-132-04	4	0.254	0.260	0.562
A-120-06	6	0.225	0.177	0.543
AA-120-06	6	0.225	0.177	0.464
AA-132-06	6	0.254	0.260	0.562
AA-132-08	8	0.254	0.260	0.562
AA-121-08	8	0.312	0.290	0.621
AA-121-10	10	0.312	0.290	0.621
(16-14 AWG wire)				
BB-123-04	4	0.250	0.229	0.540
B-123-06	6	0.250	0.229	0.619
BB-123-06	6	0.250	0.229	0.540
B-123-08	8	0.250	0.229	0.619
B-137-08	8	0.312	0.305	0.710
B-137-10	10	0.312	0.305	0.710
BB-137-10	10	0.312	0.305	0.625
BB-139-10	10	0.342	0.330	0.676
B-125-14	¼	0.467	0.408	0.896
BB-125-14	¼	0.467	0.408	0.817
BB-125-56	5⁄16	0.467	0.408	0.817
(12-10 AWG wire)				
C-136-06	6	0.282	0.326	0.721
C-128-10	10	0.375	0.323	0.765
C-130-14[a]	¼	0.530	0.413	0.932
C-130-56[a]	5⁄16	0.530	0.413	0.932
C-140-38[b]	⅜	0.592	0.486	1.036

[a] 500 terminals per reel.
[b] Parts not available on tape.

SPADE TONGUE (Fig. B)

(26-24 AWG wire)				
M-1123-00	0	0.125	0.131	0.342
M-1116-02	2	0.182	0.225	0.476
M-1121-04	4	0.203	0.225	0.467
(22-18 AWG wire)				
A-134-06	6	0.291	0.227	0.619

FLANGED SPADE TONGUE (Fig. C)

(22-18 AWG wire)				
A-115-06	6	0.291	0.227	0.615
AA-115-06	6	0.291	0.227	0.536
AA-115-08	8	0.291	0.227	0.536

SNAP SPADE TONGUE (Fig. D)

(22-18 AWG wire)				
AA-1704-06	6	0.250	0.250	0.565
AA-1190-06	6	0.260	0.255	0.625
AA-1191-08	8	0.290	0.255	0.635
AA-1705-08	8	0.375	0.250	0.626
AA-1192-10	10	0.328	0.255	0.685
AA-1706-10	10	0.406	0.281	0.626

SNAP SPADE TONGUE (Cont'd)

		Dimensions, inches		
Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(16-14 AWG wire)				
BB-1707-06	6	0.250	0.250	0.565
BB-1193-06	6	0.260	0.255	0.625
BB-1194-08	8	0.290	0.255	0.635
BB-1708-08	8	0.375	0.281	0.626
BB-1195-10	10	0.328	0.255	0.685
BB-1709-10	10	0.406	0.281	0.674
(12-10 AWG wire)				
C-1710-06	6	0.250	0.250	0.644
C-1196-06	6	0.290	0.325	0.786
C-1197-08	8	0.320	0.325	0.814
C-1711-08	8	0.375	0.281	0.705
C-1198-10	10	0.320	0.325	0.834
C-1712-10	10	0.406	0.281	0.753
C-1199-14	¼	0.415	0.395	0.960

RECTANGULAR TONGUE (Fig. E)

(22-18 AWG wire)				
AA-114-06	6	0.296	0.227	0.540
AA-114-08	8	0.296	0.227	0.540
(16-14 AWG wire)				
BB-113-06	6	0.295	0.231	0.545
BB-113-08	8	0.295	0.231	0.545
BB-188-10	10	0.325	0.255	0.623

SLOTTED TONGUE (Fig. F)

(26-24 AWG wire)				
M-1120-06	6	0.250	0.300	0.570

VERSAKRIMP™ BRAZED SEAM BARREL RING TONGUE (Fig. A)

(22-18 AWG wire)				
A-320-04	4	0.225	0.177	0.543
AA-320-04	4	0.225	0.177	0.464
A-332-04	4	0.254	0.260	0.641
AA-332-04	4	0.254	0.260	0.562
A-320-06	6	0.225	0.177	0.543
AA-320-06	6	0.225	0.177	0.464
A-332-06	6	0.254	0.260	0.641
AA-332-06	6	0.254	0.260	0.562
A-332-08	8	0.254	0.260	0.641
AA-332-08	8	0.254	0.260	0.562
A-321-08	8	0.312	0.290	0.700
AA-321-08	8	0.312	0.290	0.700
A-321-10	10	0.312	0.290	0.700
AA-321-10	10	0.312	0.290	0.621
AA-333-10	10	0.273	0.260	0.571
A-322-14	¼	0.467	0.406	0.894
A-322-56	5⁄16	0.467	0.406	0.894
(16-14 AWG wire)				
B-323-06	6	0.250	0.229	0.619
BB-323-06	6	0.250	0.229	0.540
B-337-08	8	0.312	0.305	0.710
BB-339-08	8	0.342	0.330	0.676
B-337-10	10	0.312	0.305	0.710
BB-337-10	10	0.312	0.305	0.625
B-339-10	10	0.342	0.330	0.755
BB-339-10	10	0.342	0.330	0.676
B-325-14	¼	0.467	0.408	0.896
BB-325-14	¼	0.467	0.408	0.817
B-325-56	5⁄16	0.467	0.408	0.896
BB-325-56	5⁄16	0.467	0.408	0.817

VERSAKRIMP™ RING TONGUE (Cont'd)

		Dimensions, inches		
Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(12-10 AWG wire)				
C-328-10	10	0.375	0.323	0.765
C-330-14[a]	¼	0.530	0.413	0.932
C-330-56	5⁄16	0.530	0.413	0.932
C-340-14	¼	0.592	0.486	1.036
C-340-38[b]	⅜	0.592	0.486	1.036

[a] 500 terminals per reel.
[b] Parts not available on tape.

(8 AWG wire)				
D-350-10	10	0.468	0.388	0.954
D-350-14	¼	0.468	0.388	0.954
D-351-14	¼	0.583	0.453	1.076
D-351-38	⅜	0.583	0.453	1.076
D-351-56	5⁄16	0.583	0.453	1.076
D-356-10	10	0.374	0.388	0.907
(6 AWG wire)				
E-360-10	10	0.470	0.538	1.158
E-360-14	¼	0.470	0.538	1.158
E-357-14	¼	0.630	0.538	1.238
E-357-56	5⁄16	0.630	0.538	1.238
E-357-38	⅜	0.630	0.538	1.238
(4 AWG wire)				
F-366-14	¼	0.665	0.547	1.327
F-366-56	5⁄16	0.665	0.547	1.327
F-366-38	⅜	0.665	0.547	1.327
(2 AWG wire)				
G-375-14	¼	0.630	0.723	1.553
G-375-56	5⁄16	0.630	0.723	1.553
G-374-38	⅜	0.864	0.723	1.670
G-375-38	⅜	0.630	0.723	1.553
G-374-12	½	0.864	0.723	1.670
(1/0)				
H-381-14	¼	0.820	0.770	1.880
H-380-38	⅜	0.882	0.770	1.911
H-381-38	⅜	0.820	0.770	1.880
H-380-12	½	0.882	0.770	1.911
(2/0)				
J-385-14	¼	0.928	0.790	1.979
J-385-38	⅜	0.928	0.790	1.979
J-385-12	½	0.928	0.790	1.979
(3/0)				
K-390-38	⅜	1.047	0.825	2.113
K-390-12	½	1.047	0.825	2.113
(4/0)				
L-395-12	½	1.115	0.850	2.175

SPADE TONGUE (Fig. B)

(22-18 AWG wire)				
AA-3109-02	2	0.187	0.203	0.482
AA-338-04	4	0.245	0.227	0.540
A-338-06	6	0.245	0.227	0.619
AA-338-06	6	0.245	0.227	0.540
A-334-06	6	0.291	0.227	0.619
AA-334-06	6	0.291	0.227	0.540
A-335-06	6	0.316	0.323	0.758
AA-334-08	8	0.291	0.227	0.540
A-335-08	8	0.316	0.323	0.758
A-335-10	10	0.316	0.323	0.758
(16-14 AWG wire)				
B-324-06	6	0.295	0.231	0.615
B-324-08	8	0.295	0.231	0.615
BB-324-08	8	0.295	0.231	0.544
B-327-10	10	0.362	0.289	0.750
BB-327-10	10	0.362	0.289	0.667

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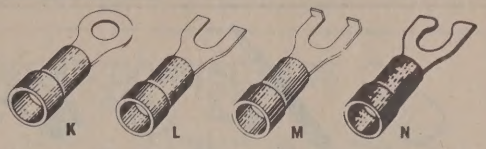

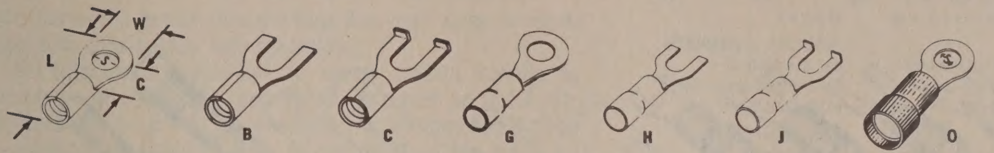

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UNINSULATED TERMINALS

VERSAKRIMP™ (Cont'd)

SPADE TONGUE (Fig. B) (Cont'd)

Cannon Part no.	Stud size, S	Dimensions, inches Width, W	Clear-ance, C	Lgth., L
(12-10 AWG wire)				
C-341-08	8	0.375	0.321	0.792
C-341-10	10	0.375	0.321	0.792

FLANGED SPADE TONGUE (Fig. C)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire)				
A-315-06	6	0.291	0.227	0.615
AA-315-06	6	0.291	0.227	0.536
A-315-08	8	0.291	0.227	0.615
AA-315-08	8	0.291	0.227	0.536
(16-14 AWG wire)				
B-316-06	6	0.291	0.229	0.629
B-316-08	8	0.291	0.229	0.629
B-383-10	10	0.375	0.255	0.693

VIBRAKRIMP® INSULATION SUPPORT TIN-PLATED BRASS SLEEVE RING TONGUE (Fig. G)

(22-18 AWG wire; max. wire-insulation dia., 0.140)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
AA-432-06	6	0.254	0.260	0.697
A-421-08	8	0.312	0.290	0.857
AA-421-10	10	0.312	0.290	0.751

SPADE TONGUE (Fig. H)

(22-18 AWG wire)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
AA-434-06	6	0.291	0.227	0.670
AA-434-08	8	0.291	0.227	0.670

FLANGED SPADE TONGUE (Fig. J)

(16-14 AWG wire; max. wire-insulation dia., 0.170)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
BB-416-06	6	0.291	0.229	0.675
BB-416-08	8	0.291	0.229	0.675
BB-483-10	10	0.375	0.255	0.748

INSULATED TERMINALS

INSULKRIMP® PVC INSULATION

RING TONGUE (Fig. K)

(22-18 AWG wire; max. wire-insulation dia., 0.145)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
A-220-04X	4	0.225	0.177	0.703
AA-220-04X	4	0.225	0.177	0.609
A-232-04X	4	0.254	0.260	0.820
AA-232-04X	4	0.254	0.260	0.737
A-220-06X	6	0.225	0.177	0.703
AA-220-06X	6	0.225	0.177	0.609
A-232-06X	6	0.254	0.260	0.820
AA-232-06X	6	0.254	0.260	0.737
A-232-08X	8	0.254	0.260	0.820
AA-232-08X	8	0.254	0.260	0.737
A-221-08X	8	0.312	0.290	0.873
AA-221-08X	8	0.312	0.290	0.796
A-221-10X	10	0.312	0.290	0.873
AA-221-10X	10	0.312	0.290	0.796
A-222-14X	¼	0.467	0.406	1.066
A-222-56X	5/16	0.467	0.406	1.066
A-226-38	⅜	0.534	0.572	1.270

INSULKRIMP® RING TONGUE (Cont'd)

Cannon Part No.	Stud size, S	Dimensions, Inches Width, W	Clear-ance, C	Lgth., L
(16-14 AWG wire; max. wire-insulation dia., 0.175)				
B-223-06X	6	0.250	0.229	0.785
BB-223-06X	6	0.250	0.229	0.708
BB-237-06X	6	0.312	0.305	0.793
BB-239-06X	6	0.342	0.330	0.844
B-237-08X	8	0.312	0.305	0.880
BB-237-08X	8	0.312	0.305	0.793
BB-239-08X	8	0.342	0.330	0.844
B-228-08HDX[a]	8	0.375	0.323	1.051
B-237-10X	10	0.312	0.305	0.880
BB-237-10X	10	0.312	0.305	0.793
B-239-10X	10	0.342	0.330	0.913
D-228-10HDX[a]	10	0.375	0.323	1.051
B-225-14X	¼	0.467	0.408	1.062
BB-225-14X	¼	0.467	0.408	0.985
B-225-56X	5/16	0.467	0.408	1.062
BB-225-56X	5/16	0.467	0.408	0.985

[a] 500 terminals per reel.

Cannon Part No.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(12-10 AWG wire; max. wire-insulation dia., 0.260)				
C-228-08X	8	0.375	0.323	1.051
C-228-10X	10	0.375	0.323	1.051
C-241-10X	10	0.375	0.321	1.078
C-230-14X[a]	¼	0.530	0.413	1.218
C-240-14X[a]	¼	0.592	0.486	1.322
C-230-56X	5/16	0.530	0.413	1.218
C-240-56X	5/16	0.592	0.486	1.322
C-240-38X	⅜	0.592	0.486	1.322
(8 AWG wire; max. wire-insulation dia., 0.300)				
D-650-10	10	0.468	0.388	1.241
D-656-10	10	0.374	0.388	1.200
D-650-14	¼	0.468	0.388	1.241
D-656-14	¼	0.374	0.388	1.200
(4 AWG wire; max. wire-insulation dia., 0.515)				
F-666-14X	¼	0.665	0.547	1.755
(2 AWG wire; max. wire-insulation dia., 0.650)				
G-675-14X	¼	0.630	0.723	2.023
G-675-56X	5/16	0.630	0.723	2.023
G-675-38X	⅜	0.630	0.723	2.023

SPADE TONGUE (Fig. L)

Cannon Part No.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire; max. wire-insulation dia., 0.145)				
A-234-06X	6	0.291	0.227	0.795
A-238-06X	6	0.245	0.227	0.765
AA-235-08X	8	0.316	0.323	0.845
(16-14 AWG wire; max. wire-insulation dia., 0.175)				
B-224-06X	6	0.295	0.231	0.795
BB-224-06X	6	0.295	0.231	0.712
B-224-08X	8	0.295	0.231	0.795
B-227-10X	10	0.362	0.289	0.939
(12-10 AWG wire; max. wire-insulation dia., 0.260)				
C-2105-06X	6	0.320	0.325	1.050

FLANGED SPADE TONGUE (Fig. M)

Cannon Part No.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire; max. wire-insulation dia., 0.145)				
AA-215-06X	6	0.291	0.227	0.711
AA-215-08X	8	0.291	0.227	0.711
(16-14 AWG wire; max. wire-insulation dia., 0.175)				
B-216-06X	6	0.291	0.229	0.800
B-216-08X	8	0.291	0.229	0.800
BB-216-08X	8	0.291	0.229	0.718
B-283-10X	10	0.375	0.255	0.880

SNAP SPADE TONGUE (Fig. N)

Cannon Part no.	Stud size, S	Dimensions, inches Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire; max. wire-insulation dia., 0.145)				
AA-2704-06F	6	0.250	0.250	0.740
AA-2705-08F	8	0.375	0.250	0.801
AA-2706-10F	10	0.406	0.281	0.849
(16-14 AWG wire; max. wire-insulation dia., 0.175)				
BB-2707-06F	6	0.250	0.250	0.733
BB-2708-08F	8	0.375	0.281	0.794
BB-2709-10F	10	0.406	0.281	0.842
(12-10 AWG wire; max. wire-insulation dia., 0.260)				
C-2710-06F	6	0.250	0.250	0.930
C-2711-08F	8	0.375	0.281	0.991
C-2712-10F	10	0.406	0.281	1.039

AVIKRIMP® NYLON INSULATED VIBRATION SUPPORT RING TONGUE (Fig. O)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(26-24 AWG wire; max. wire-insulation dia., 0.075)				
M-8122-02	2	0.140	0.131	0.492
M-8113-04	4	0.203	0.225	0.617
M-8113-06	6	0.203	0.225	0.617
M-8118-06	6	0.250	0.300	0.765
M-8118-08	8	0.250	0.300	0.765
M-8118-10	10	0.250	0.300	0.765
(22-18 AWG wire; max. wire-insulation dia., 0.140)				
A-520-04	4	0.225	0.177	0.749
AA-820-04	4	0.225	0.177	0.641
A-532-04	4	0.254	0.260	0.860
AA-832-04	4	0.254	0.260	0.739
A-520-06	6	0.225	0.177	0.749
AA-820-06	6	0.225	0.177	0.641
A-532-06	6	0.254	0.260	0.860
AA-832-06	6	0.254	0.260	0.739
A-521-08	8	0.312	0.290	0.918
AA-821-08	8	0.312	0.290	0.798
A-521-10	10	0.312	0.290	0.918
AA-821-10	10	0.312	0.290	0.798
A-522-14	¼	0.467	0.406	1.109
AA-522-14	¼	0.467	0.406	0.992
A-522-56	5/16	0.467	0.406	1.109
(16-14 AWG wire; max. wire-insulation dia., 0.170)				
BB-823-04	4	0.250	0.229	0.717
BB-823-06	6	0.250	0.229	0.717
B-537-06	6	0.312	0.305	0.903
BB-537-06	6	0.312	0.305	0.802
B-537-08	8	0.312	0.305	0.903
BB-837-08	8	0.312	0.305	0.802
B-537-10	10	0.312	0.305	0.903
BB-537-10	10	0.312	0.305	0.802
B-539-10	10	0.342	0.330	0.960
BB-839-10	10	0.342	0.330	0.853
B-525-14	¼	0.467	0.408	1.090
BB-825-14	¼	0.467	0.408	0.994
B-525-56	5/16	0.467	0.408	1.090
BB-525-56	5/16	0.467	0.408	0.994
BB-518-38	⅜	0.534	0.574	1.193
(12-10 AWG wire; max. wire-insulation dia., 0.225)				
C-836-06	6	0.282	0.326	1.017
C-828-08	8	0.375	0.323	1.061
C-828-10	10	0.375	0.323	1.061
C-830-14[a]	¼	0.530	0.413	1.228
C-830-56[a]	5/16	0.530	0.413	1.228
C-840-38[b]	⅜	0.592	0.486	1.327

[a] 500 terminals per reel.

[b] Parts not available on tape.

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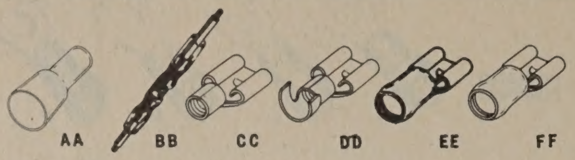

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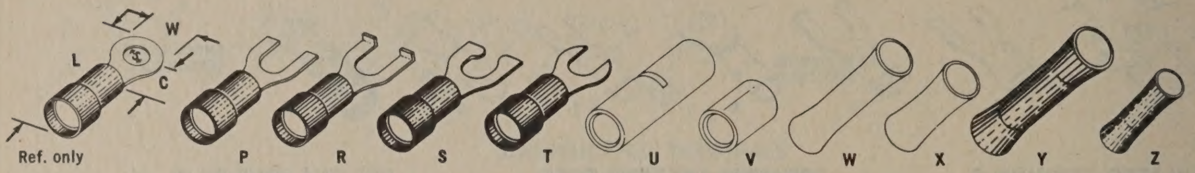

INSULATED TERMINALS

AVIKRIMP® (Cont'd)

SPADE TONGUE (Fig. P)

Cannon Part no.	Stud size, S	Dimensions, inches		
		Width, W	Clear-ance, C	Lgth., L
(26-24 AWG wire; max. wire-insulation dia., 0.075)				
M-8123-00	0	0.125	0.131	0.503
M-8116-02	2	0.182	0.225	0.636
M-8121-04	4	0.203	0.225	0.625
(22-18 AWG wire; max. wire-insulation dia., 0.140)				
AA-8109-02	2	0.187	0.203	0.659
AA-838-04	4	0.245	0.227	0.717
A-538-06	6	0.245	0.227	0.816
AA-838-06	6	0.245	0.227	0.717
A-534-06	6	0.291	0.227	0.817
AA-834-06	6	0.291	0.227	0.717
A-535-06	6	0.316	0.323	0.994
A-535-08	8	0.316	0.323	0.994
A-535-10	10	0.316	0.323	0.994
(16-14 AWG wire; max. wire-insulation dia., 0.170)				
B-524-06	6	0.295	0.231	0.804
BB-824-06	6	0.295	0.231	0.721
B-524-08	8	0.295	0.231	0.804
BB-824-08	8	0.295	0.231	0.721
B-527-10	10	0.362	0.289	0.948
BB-827-10	10	0.362	0.289	0.721
(12-10 AWG wire; max. wire-insulation dia., 0.225)				
C-841-08	8	0.375	0.486	1.088
C-841-10	10	0.375	0.486	1.088

FLANGED SPADE TONGUE (Fig. R)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire; max. wire-insulation dia., 0.140)				
A-515-06	6	0.291	0.227	0.812
AA-515-06	6	0.291	0.227	0.713
A-515-08	8	0.291	0.227	0.812
AA-515-08	8	0.291	0.227	0.713
AA-896-08	8	0.325	0.225	0.797
(16-14 AWG wire; max. wire-insulation dia., 0.170)				
B-516-06	6	0.291	.0229	0.824
BB-816-06	6	0.291	0.229	0.727
B-516-08	8	0.291	0.229	0.824
BB-816-08	8	0.291	0.229	0.727
B-583-10	10	0.375	0.255	0.899
BB-883-10	10	0.375	0.255	0.790

SNAP SPADE (Fig. S)

Cannon Part no.	Stud size, S	Width, W	Clear-ance, C	Lgth., L
(22-18 AWG wire; max. wire-insulation dia., 0.140)				
AA-8704-06	6	0.250	0.250	0.747
AA-8190-06	6	0.260	0.255	0.802
AA-8191-08	8	0.260	.0255	0.802
AA-8705-08	8	0.375	0.250	0.808
AA-8192-10	10	0.328	0.255	0.863
AA-8706-10	10	0.406	0.281	0.856
(16-14 AWG wire; max. wire-insulation dia., 0.170)				
BB-8707-06	6	0.250	0.250	0.742
BB-8193-06	6	0.260	0.255	0.625
BB-8194-08	8	0.290	0.255	0.635
BB-8708-08	8	0.375	0.281	0.803
BB-8195-10	10	0.328	0.255	0.862
BB-8709-10	10	0.406	0.281	0.851
(12-10 AWG wire; max. wire-insulation dia., 0.225)				
C-8710-06	6	0.250	0.250	0.938
C-8196-06	6	0.290	0.325	1.077
C-8197-08	8	0.320	0.325	1.105
C-8711-08	8	0.375	0.281	0.999
C-8198-10	10	0.320	0.325	1.125
C-8712-10	10	0.406	0.281	1.047
C-8199-14	¼	0.415	0.395	1.251

SLOTTED RING (Fig. T)

Cannon Part no.	Stud size, S	Dimensions, inches		
		Width, W	Clear-ance, C	Lgth., L
(26-24 AWG wire; max. wire-insulation dia., 0.075)				
M-8120-06	6	0.250	0.300	0.710

UNINSULATED SPLICES

VERSAKRIMP™ BUTT SPLICE (Fig. U)

Cannon Part no.	Wire range	Length, inches
AS-345[b]	22-18	0.660
BS-331[b]	16-14	0.660
CS-346[b]	12-10	0.812
D-354[b]	8	0.834
E-362[b]	6	1.015
F-364[b]	4	1.125
G-372[b]	2	1.250

[b] Parts not available on tape.

PARALLEL SPLICE (Fig. V)

Cannon Part no.	Wire range	Length, inches
AS-302[b]	22-18	0.317
BS-304[b]	16-14	0.305
CS-303[b]	12-10	0.307

[b] Parts not available on tape.

INSULATED SPLICES

INSULKRIMP® PVC INSULATED BUTT SPLICE (Fig. W)

Cannon Part no.	Wire range	Lgth., in.	Diam. †
A-245X[a]	22-18	0.935	0.145
B-231X[a]	16-14	0.955	0.175
C-246X[a]	12-10	1.106	0.260
CL-246X[a]	12-10	1.240	0.260

[a] 500 terminals per reel.

PARALLEL SPLICE (Fig. X)

Cannon Part no.	Wire range	Lgth., in.	Diam. †
ASV-302X	22-18	0.682	0.145
B-204X[b]	16-14	0.715	0.175
C-203X[b]	12-10	0.801	0.260

[b] Parts not available on tape.

NYLAKRIMP™ NYLON INSULATED BUTT SPLICE (Fig. Y)

Cannon Part no.	Wire range	Lgth., in.	Diam. †
AS-N-345[a]	22-18	1.030	0.120
BS-N-331[a]	16-14	1.060	0.150
CS-N-346[a]	12-10	1.260	0.210

[a] 500 terminals per reel.

PARALLEL SPLICE (Fig. Z)

Cannon Part no.	Wire range	Lgth., in.	Diam. †
AS-N-302	22-18	0.620	0.120
BS-N-304	16-14	0.620	0.150
CS-N-303	12-10	0.665	0.210

†Max. wire-insulation.

TAPE-FED PARTS

Terminals, Splices, and Quick Disconnects are available on tape for automated crimping. For ordering information, please contact ETC.

NYLON CLOSED END CONNECTORS (Fig. AA)

Cannon Part no.	Wire range	Circular mil area
NC-2214	22-14	600- 5,180
NC-1610	16-10	2400-13,100

MS-25181 SPLICES (Fig. BB)

MS Part no.	Wire range	Cannon Part no.‡	Class
MS-25181-1	22-18	AW-542	2
MS-25181-1	16-14	BW-543	2
MS-25181-1	12-10	CW-544	2

‡Replaceable for Gov't. designation.

QUICK DISCONNECTS

KRIMPTITE® UNINSULATED BUTTED SEAM BARREL (Fig. CC)

Cannon Part no.	Wire range	Fits tab size
AA-1140	22-18	0.250 x 0.032
BB-1141	16-14	0.250 x 0.032
P-1142	14-12	0.250 x 0.032
AA-1137	22-18	0.187 x 0.020
BB-1138	16-14	0.187 x 0.020

VIBRAKRIMP® VIBRATION SUPPORT BARREL (Fig. DD)

Cannon Part no.	Wire range	Fits tab size
AA-4176	22-18	0.250 x 0.032
BB-4177	16-14	0.250 x 0.032
P-4178	14-12	0.250 x 0.032
AA-4173	22-18	0.187 x 0.020
BB-4174	16-14	0.187 x 0.020
AA-4167	22-18	0.110 x 0.020

Max. wire-insulation dia.

22-18: 0.060/0.125
16-14: 0.085/0.145
14-12: 0.100/0.175

INSULKRIMP® PVC INSULATED BARREL (Fig. EE)

Cannon Part no.	Wire range	Fits tab size
AA-2140	22-18	0.250 x 0.032
BB-2141	16-14	0.250 x 0.032
P-2142	14-12	0.250 x 0.032

Max. wire-insulation dia.

22-18: 0.135
16-14: 0.145
14-12: 0.175

AVIKRIMP® NYLON INSULATION AND VIBRATION SUPPORT (Fig. FF)

Cannon Part no.	Wire range	Fits tab size
AA-8140	22-18	0.250 x 0.032
BB-8141	16-14	0.250 x 0.032
P-8142	14-12	0.250 x 0.032
M-8136	26-24	0.187 x 0.020
AA-8137	22-18	0.187 x 0.020
BB-8138	16-14	0.187 x 0.020
P-8139	14-12	0.187 x 0.020
M-8130	26-24	0.110 x 0.020
AA-8131	22-18	0.110 x 0.020
BB-8132	16-14	0.110 x 0.020
P-8139	14-12	0.110 x 0.020

Max. wire-insulation dia.

26-24: 0.072
22-18: 0.125
16-14: 0.142
14-12: 0.170

NOTES:

1. All dimensions are nominal.
2. Heavy-duty parts (HDX at end of part number) have 0.050 copper stock in 16-14 wire range and should be crimped by 12-10 tooling.

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CANNON ETC INSULATION DISPLACEMENT CONNECTORS

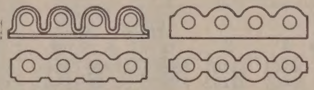
A SIMPLIFIED, LESS EXPENSIVE APPROACH TO RELIABLE MASS TERMINATION OF FLAT CABLES

ETC Series PS connectors combine low cost mass termination with consistently high reliability.

Receptacles are available in seven contact layouts to terminate all .050(1,27) spaced flat cable with up to 50 conductors with no pre- or post-assembly operations and may be applied to the cable ends or at any point on the cable for daisy-chain assemblies. These receptacles are intermateable with all existing flat cable system pin headers, and accept .025(,64) round or square pins.

Matching straight, right angle and wrappable headers are available in a standard configuration that allows access to the pins for testing, or with shielded pins to prevent inadvertent short circuits. Shielded pin headers are also available with an integral latch and with a latch and quick-release feature.

MATERIALS AND FINISHES	
Insulator	Glass-filled polyester, U.L. rated 94V-O (flame retardant), black
Contacts	Gold over nickel electroplate on copper alloy
MECHANICAL FEATURES	
Contact spacing	.100(2,54) by .100(2,54) grid
Max. engagement force	3000 grams per contact
Min. separation force	40 grams per contact
ELECTRICAL DATA	
Current rating	1 ampere max.
Temperature rating	−50°C to +105°C
Insulation resistance	>5000 megohms
Contact resistance	15 milliohms max. initial 20 milliohms max. after conditioning
Dielectric withstanding voltage	>650 V rms at sea level
TERMINATION (RECEPTACLES)	
Type	Insulation displacement
Cable	Flat ribbon cable on .050(1,27) centers, tin plated, any of the following types:

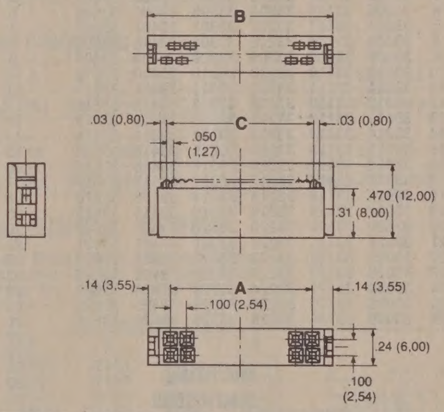


Wire size	#26 thru #28 AWG, solid and stranded

HOW TO ORDER RECEPTACLES

PS - 10 S E - D4 P 1 - SR

Connector Series
Number of Contacts
Type of Connector
Socket contact receptacle
Contact Configuration
E — Dual cantilever type
Contact Spacing
D4 — Double row, .100(2,54) x .100(2,54) contact centers
Type of Termination
P — Insulation displacement
Cable Type
1 — Flat ribbon, round conductor
Modification
SR — With strain relief (omit for no strain relief)



PART No.	DIMENSIONS IN INCHES (MILLIMETERS) A	B	C	STRAIN RELIEF PART NO.	RECEPTACLE WITH STRAIN RELIEF
PS-10SE-D4P1	.400(10,16)	.680(17,26)	.450(11,43)	PS-SR10	PS-10SE-D4P1-SR
PS-20SE-D4P1	.900(22,86)	1.180(29,96)	.950(24,13)	PS-SR20	PS-20SE-D4P1-SR
PS-26SE-D4P1	1.200(30,48)	1.480(37,58)	1.250(31,75)	PS-SR26	PS-26SE-D4P1-SR
PS-30SE-D4P1	1.400(35,56)	1.680(42,66)	1.450(36,83)	PS-SR30	PS-30SE-D4P1-SR
PS-34SE-D4P1	1.600(40,64)	1.880(47,74)	1.650(41,91)	PS-SR34	PS-34SE-D4P1-SR
PS-40SE-D4P1	1.900(48,26)	2.180(55,36)	1.950(49,53)	PS-SR40	PS-40SE-D4P1-SR
PS-50SE-D4P1	2.400(60,96)	2.680(68,06)	2.450(62,23)	PS-SR50	PS-50SE-D4P1-SR

HOW TO ORDER PIN HEADERS

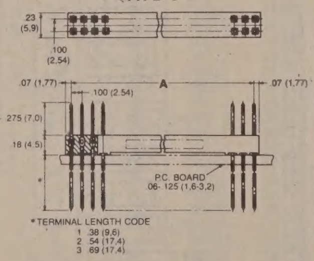
PS - 10 P A - D4 T 1 - A 1

Connector Series
Number of Contacts
Type of Connector
P — Pin header
Contact Configuration
A — .025(0,64) square
Contact Spacing
D4 — Double row, .100(2,54)x.100(2,54) contact centers
Type of Termination
T — Thru-hole; R — Wrapping; LT — Right angle thru-hole
Terminal Length
1 — .38(9,6); 2 — .54(13,6); 3 — .69(17,4)
Insulator Configuration
A — Without mounting; HG — Shielded pin header;
OL — Shielded pin header with latches;
RL — Shielded pin header with latches and quick release
Contact Finish
1 — Gold over nickel

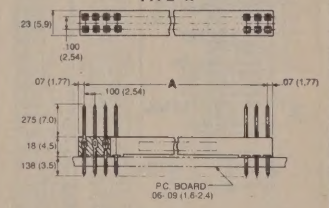
NUMBER OF CONTACTS	DIMENSIONS IN INCHES (MILLIMETERS) A	B	C	D
10	.400(10,16)	.695(17,66)	.860(21,84)	1.325(33,66)
20	.900(22,86)	1.195(30,36)	1.360(34,54)	1.825(46,36)
26	1.200(30,48)	1.495(37,98)	1.660(42,16)	2.125(53,98)
30	1.400(35,56)	1.695(43,06)	1.860(47,24)	2.325(59,06)
34	1.600(40,64)	1.895(48,14)	2.060(52,32)	2.525(64,14)
40	1.900(48,26)	2.195(55,76)	2.360(59,94)	2.825(71,76)
50	2.400(60,96)	2.695(68,46)	2.860(72,64)	3.325(84,46)

PIN HEADERS

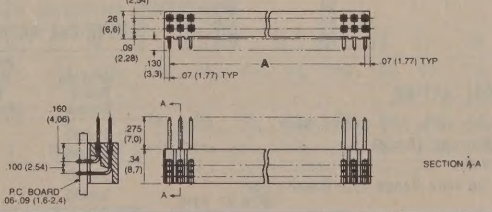
TYPE T



TYPE R



TYPE LT



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CANNON ETC TERMINAL BLOCKS— CLOSED AND OPEN BACK

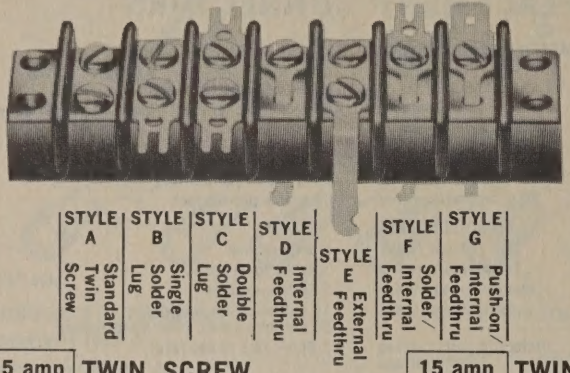
Cannon Terminal Blocks are available with closed or open backs. The part number tables on these pages show the closed back number. See tables for ordering open back version. Standard block material is general purpose phenolic. Other materials available that meet or exceed Mil. Spec. requirements: MIL-M-14F and MIL-M-19833.

Open Back Blocks are available with Lugs and Quick Disconnect Blades permanently riveted to the Block. Lugs available with rivets are: Double Solder Lug; Solder/Internal Feedthru; Push-on Internal Feedthru.

To order riveted version, change first digit of Open Back Block from "2" to "1."

57000 Series: A 6-32 x 3/16" binder head screw version of the 27000 Series is available. Use 57000 in place of 27000.

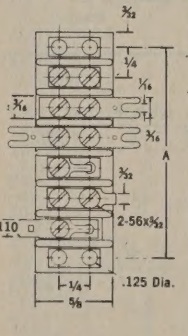
67000 Series: A 6-32 x 3/16" binder head screw version of the 37000 Series is available. Use 67000 in place of 37000.

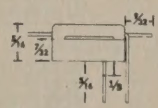

STYLE A Standard Twin Screw
STYLE B Single Solder Lug
STYLE C Double Solder Lug
STYLE D Internal Feedthru
STYLE E External Feedthru
STYLE F Solder/ Internal Feedthru
STYLE G Push-on/ Internal Feedthru

5 amp TWIN SCREW

Closed Back Only: 1 to 26 terminal sections (52 screws). Standard screws are 2-56 x 5/32" binder head brass nickel-plated.

No. Sections	STYLE A	B	C	D	E	G
1	33001	33101	33201	33301	33401	33601
2	33002	33102	33202	33302	33402	33602
3	33003	33103	33203	33303	33403	33603
4	33004	33104	33204	33304	33404	33604
5	33005	33105	33205	33305	33405	33605
6	33006	33106	33206	33306	33406	33606
7	33007	33107	33207	33307	33407	33607
8	33008	33108	33208	33308	33408	33608
9	33009	33109	33209	33309	33409	33609
10	33010	33110	33210	33310	33410	33610
11	33011	33111	33211	33311	33411	33611
12	33012	33112	33212	33312	33412	33612
13	33013	33113	33213	33313	33413	33613
14	33014	33114	33214	33314	33414	33614
15	33015	33115	33215	33315	33415	33615
16	33016	33116	33216	33316	33416	33616
17	33017	33117	33217	33317	33417	33617
18	33018	33118	33218	33318	33418	33618
19	33019	33119	33219	33319	33419	33619
20	33020	33120	33220	33320	33420	33620
21	33021	33121	33221	33321	33421	33621
22	33022	33122	33222	33322	33422	33622
23	33023	33123	33223	33323	33423	33623
24	33024	33124	33224	33324	33424	33624
25	33025	33125	33225	33325	33425	33625
26	33026	33126	33226	33326	33426	33626





MOUNTING DIMENSIONS

No. of Sections	"A" Dimen.
1	½
2	¾
3	1
4	1¼
5	1½
6	1¾
7	2
8	2¼
9	2½
10	2¾
11	3
12	3¼
13	3½
14	3¾
15	4
16	4¼
17	4½
18	4¾
19	5
20	5¼
21	5½
22	5¾
23	6
24	6¼
25	6½
26	6¾

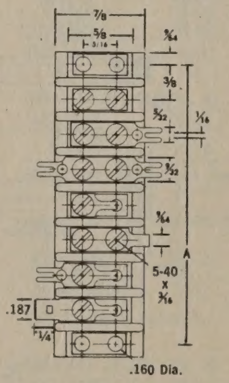
ELECTRICAL RATING

- Breakdown Volts RMS Closed Back 2500
- Rated Current (Amps) 5
- Rated Volts 100
- Suggested Wire Range with Cannon Lug #26-22 AWG

15 amp TWIN SCREW

Closed Back Part Numbers shown in table below. To order Open Back version, replace first digit (3) with a "2." Standard screw is 5-40 x 3/16" binder head brass nickel-plated.

No. Sections	STYLE A	B	C	D	E	F	G
1	37001	37101	37201	37301	37401	37501	37601
2	37002	37102	37202	37302	37402	37502	37602
3	37003	37103	37203	37303	37403	37503	37603
4	37004	37104	37204	37304	37404	37504	37604
5	37005	37105	37205	37305	37405	37505	37605
6	37006	37106	37206	37306	37406	37506	37606
7	37007	37107	37207	37307	37407	37507	37607
8	37008	37108	37208	37308	37408	37508	37608
9	37009	37109	37209	37309	37409	37509	37609
10	37010	37110	37210	37310	37410	37510	37610
11	37011	37111	37211	37311	37411	37511	37611
12	37012	37112	37212	37312	37412	37512	37612
13	37013	37113	37213	37313	37413	37513	37613
14	37014	37114	37214	37314	37414	37514	37614
15	37015	37115	37215	37315	37415	37515	37615
16	37016	37116	37216	37316	37416	37516	37616
17	37017	37117	37217	37317	37417	37517	37617
18	37018	37118	37218	37318	37418	37518	37618
19	37019	37119	37219	37319	37419	37519	37619
20	37020	37120	37220	37320	37420	37520	37620
21	37021	37121	37221	37321	37421	37521	37621
22	37022	37122	37222	37322	37422	37522	37622
23	37023	37123	37223	37323	37423	37523	37623
24	37024	37124	37224	37324	37424	37524	37624
25	37025	37125	37225	37325	37425	37525	37625
26	37026	37126	37226	37326	37426	37526	37626
27	37027	37127	37227	37327	37427	37527	37627
28	37028	37128	37228	37328	37428	37528	37628
29	37029	37129	37229	37329	37429	37529	37629
30	37030	37130	37230	37330	37430	37530	37630
31	37031	37131	37231	37331	37431	37531	37631



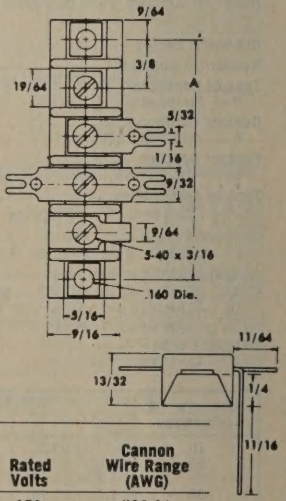
TWIN/SINGLE SCREW MOUNTING DIMENSIONS

No. of Sec.	"A" Dim.	No. of Sec.	"A" Dim.
1	¾	17	6¾
2	1⅛	18	7⅛
3	1½	19	7½
4	1⅞	20	7⅞
5	2¼	21	8¼
6	2⅝	22	8⅝
7	3	23	9
8	3⅜	24	9⅜
9	3¾	25	9¾
10	4⅛	26	10⅛
11	4½	27	10½
12	4⅞	28	10⅞
13	5¼	29	11¼
14	5⅝	30	11⅝
15	6	31	12
16	6⅜		

15 amp SINGLE SCREW

Table shows **Closed Back.** Double solder lug style block comes in Open Back with rivets. To order, replace 1st digit (3) with "1."

No. Sections	STYLE A	B	C	E
1	34001	34101	34201	34401
2	34002	34102	34202	34402
3	34003	34103	34203	34403
4	34004	34104	34204	34404
5	34005	34105	34205	34405
6	34006	34106	34206	34406
7	34007	34107	34207	34407
8	34008	34108	34208	34408
9	34009	34109	34209	34409
10	34010	34110	34210	34410
11	34011	34111	34211	34411
12	34012	34112	34212	34412
13	34013	34113	34213	34413
14	34014	34114	34214	34414
15	34015	34115	34215	34415
16	34016	34116	34216	34416
17	34017	34117	34217	34417
18	34018	34118	34218	34418
19	34019	34119	34219	34419
20	34020	34120	34220	34420
21	34021	34121	34221	34421
22	34022	34122	34222	34422
23	34023	34123	34223	34423
24	34024	34124	34224	34424
25	34025	34125	34225	34425
26	34026	34126	34226	34426
27	34027	34127	34227	34427
28	34028	34128	34228	34428
29	34029	34129	34229	34429
30	34030	34130	34230	34430
31	34031	34131	34231	34431



ELECTRICAL RATING FOR TWIN AND SINGLE SCREW BLOCKS

Terminal Block Series	Breakdown Volts RMS Without Marker Strip	Breakdown Volts RMS With Marker Strip	Breakdown Volts RMS Closed Back	Rated Current (AMPS)	Rated Volts	Cannon Wire Range (AWG)
14000	1100	1200	—	15	150	#22-16
27000	1100	1200	—	15	150	#22-16
34000	—	—	3000	15	150	#22-16
37000	—	—	3000	15	150	#22-16

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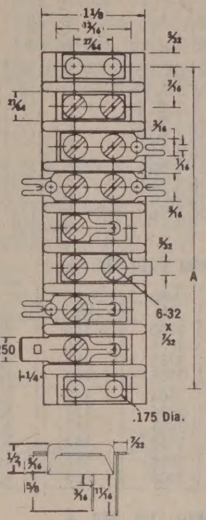
CANNON ETC TERMINAL BLOCKS— CLOSED AND OPEN BACK

20 amp TWIN SCREW

Closed Back Part Numbers shown in table below. To order Open Back version, replace first digit (3) with a "2." Standard screw is 6-32 x ⁷⁄₃₂″ binder head brass nickel-plated. See previous page for rivet information.

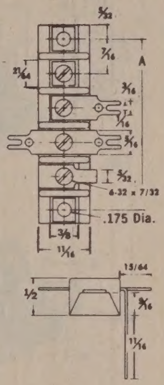
No. Sections	STYLE*						
	A	B	C	D	E	F	G
1	38001	38101	38201	38301	38401	38501	38601
2	38002	38102	38202	38302	38402	38502	38602
3	38003	38103	38203	38303	38403	38503	38603
4	38004	38104	38204	38304	38404	38504	38604
5	38005	38105	38205	38305	38405	38505	38605
6	38006	38106	38206	38306	38406	38506	38606
7	38007	38107	38207	38307	38407	38507	38607
8	38008	38108	38208	38308	38408	38508	38608
9	38009	38109	38209	38309	38409	38509	38609
10	38010	38110	38210	38310	38410	38510	38610
11	38011	38111	38211	38311	38411	38511	38611
12	38012	38112	38212	38312	38412	38512	38612
13	38013	38113	38213	38313	38413	38513	38613
14	38014	38114	38214	38314	38414	38514	38614
15	38015	38115	38215	38315	38415	38515	38615
16	38016	38116	38216	38316	38416	38516	38616
17	38017	38117	38217	38317	38417	38517	38617
18	38018	38118	38218	38318	38418	38518	38618
19	38019	38119	38219	38319	38419	38519	38619
20	38020	38120	38220	38320	38420	38520	38620
21	38021	38121	38221	38321	38421	38521	38621
22	38022	38122	38222	38322	38422	38522	38622
23	38023	38123	38223	38323	38423	38523	38623
24	38024	38124	38224	38324	38424	38524	38624
25	38025	38125	38225	38325	38425	38525	38625
26	38026	38126	38226	38326	38426	38526	38626



20 amp SINGLE SCREW

Table shows **Closed Back**. Double solder lug style block comes in open back with rivets. To order, replace first digit (3) with "1."

No. Sections	STYLE*			
	A	B	C	E
1	35001	35101	35201	35401
2	35002	35102	35202	35402
3	35003	35103	35203	35403
4	35004	35104	35204	35404
5	35005	35105	35205	35405
6	35006	35106	35206	35406
7	35007	35107	35207	35407
8	35008	35108	35208	35408
9	35009	35109	35209	35409
10	35010	35110	35210	35410
11	35011	35111	35211	35411
12	35012	35112	35212	35412
13	35013	35113	35213	35413
14	35014	35114	35214	35414
15	35015	35115	35215	35415
16	35016	35116	35216	35416
17	35017	35117	35217	35417
18	35018	35118	35218	35418
19	35019	35119	35219	35419
20	35020	35120	35220	35420
21	35021	35121	35221	35421
22	35022	35122	35222	35422
23	35023	35123	35223	35423
24	35024	35124	35224	35424
25	35025	35125	35225	35425
26	35026	35126	35226	35426



ELECTRICAL RATING FOR TWIN AND SINGLE SCREW BLOCKS

Terminal Block Series	Breakdown Volts RMS			Rated Current (AMPS)	Rated Volts	Cannon Wire Range (AWG)
	Without Marker Strip	With Marker Strip	Closed Back			
15000	1100	1600	—	20	250	#16-14
28000	1100	1600	—	20	250	#16-14
35000	—	—	3400	20	250	#16-14
38000	—	—	3400	20	250	#16-14

TWIN/SINGLE SCREW MOUNTING DIMENSIONS

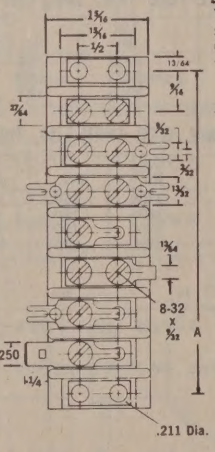
No. of Sec.	1	2	3	4	5	6	7	8	9	10	11	12	13
"A" Dim.	⅞	1⁵⁄₁₆	1¾	2³⁄₁₆	2⅝	3¹⁄₁₆	3½	3¹⁵⁄₁₆	4⅜	4¹³⁄₁₆	5¼	5¹¹⁄₁₆	6⅛

No. of Sec.	14	15	16	17	18	19	20	21	22	23	24	25	26
"A" Dim.	6⁹⁄₁₆	7	7⁷⁄₁₆	7⅞	8⁵⁄₁₆	8¾	9³⁄₁₆	9⅝	10¹⁄₁₆	10½	10¹⁵⁄₁₆	11⅜	11¹³⁄₁₆

30 amp TWIN SCREW

Closed Back Part Numbers shown in table below. To order Open Back version, replace first digit (3) with a "2." Standard screw is 8-32 x ⁵⁄₃₂″ binder head brass nickel-plated.

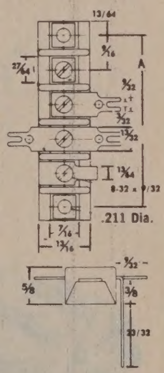
No. Sections	STYLE*						
	A	B	C	D	E	F	G
1	39001	39101	39201	39301	39401	39501	39601
2	39002	39102	39202	39302	39402	39502	39602
3	39003	39103	39203	39303	39403	39503	39603
4	39004	39104	39204	39304	39404	39504	39604
5	39005	39105	39205	39305	39405	39505	39605
6	39006	39106	39206	39306	39406	39506	39606
7	39007	39107	39207	39307	39407	39507	39607
8	39008	39108	39208	39308	39408	39508	39608
9	39009	39109	39209	39309	39409	39509	39609
10	39010	39110	39210	39310	39410	39510	39610
11	39011	39111	39211	39311	39411	39511	39611
12	39012	39112	39212	39312	39412	39512	39612
13	39013	39113	39213	39313	39413	39513	39613
14	39014	39114	39214	39314	39414	39514	39614
15	39015	39115	39215	39315	39415	39515	39615
16	39016	39116	39216	39316	39416	39516	39616
17	39017	39117	39217	39317	39417	39517	39617
18	39018	39118	39218	39318	38418	39518	39618
19	39019	39119	39219	39319	39419	39519	39619
20	39020	39120	39230	39330	39420	39520	39620
21	39021	39121	39221	39321	39421	39521	39621
22	39022	39122	39222	39322	39422	39522	39622
23	39023	39123	39223	39323	39423	39523	39623
24	39024	39124	39224	39324	39424	39524	39624
25	39025	39125	39225	39325	39425	39525	39625
26	39026	39126	39236	39326	39426	39526	39626



30 amp SINGLE SCREW

Table shows **Closed Back**. Double solder lug style block comes in open back with rivets. To order, replace first digit (3) with "1."

No. Sections	STYLE*			
	A	B	C	E
1	36001	36101	36201	36401
2	36002	36102	36202	36402
3	36003	36103	36203	36403
4	36004	36104	36204	36404
5	36005	36105	36205	36405
6	36006	36106	36206	36406
7	36007	36107	36207	36407
8	36008	36108	36208	36408
9	36009	36109	36209	36409
10	36010	36110	36210	36410
11	36011	36111	36211	36411
12	36012	36112	36212	36412
13	36013	36113	36213	36413
14	36014	36114	36214	36414
15	36015	36115	36215	36415
16	36016	36116	36216	36416
17	36017	36117	36217	36417
18	36018	36118	36218	36418
19	36019	36119	36219	36419
20	36020	36120	36220	36420
21	36021	36121	36221	36421
22	36022	36122	36222	36422
23	36023	36123	36223	36423
24	36024	36124	36224	36424
25	36025	36125	36225	36425
26	36026	36126	36226	36426



ELECTRICAL RATING FOR TWIN AND SINGLE SCREW BLOCKS

Terminal Block Series	Breakdown Volts RMS			Rated Current (AMPS)	Rated Volts	Cannon Wire Range (AWG)
	Without Marker Strip	With Marker Strip	Closed Back			
16000	1600	2500	—	30	600	#14-12
29000	1600	2500	—	30	600	#14-12
36000	—	—	4000	30	600	#14-12
39000	—	—	4000	30	600	#14-12

*See previous page for available block styles.

TWIN/SINGLE SCREW MOUNTING DIMENSIONS

No. of Sec.	1	2	3	4	5	6	7	8	9	10	11	12	13
"A" Dim.	1⅛	1¹¹⁄₁₆	2¼	2¹³⁄₁₆	3⅜	3¹⁵⁄₁₆	4½	5¹⁄₁₆	5⅝	6³⁄₁₆	6¾	7⁵⁄₁₆	7⅞

No. of Sec.	14	15	16	17	18	19	20	21	22	23	24	25	26
"A" Dim.	8⁷⁄₁₆	9	9⁹⁄₁₆	10⅛	10¹¹⁄₁₆	11¼	11¹³⁄₁₆	12⅜	12¹⁵⁄₁₆	13½	14¹⁄₁₆	14⅝	15³⁄₁₆

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CANNON ETC TERMINAL BLOCK LUGS, QUICK DISCONNECTS

Lugs available loose-piece. Prime quality brass. Per Mil Spec QQ-B-613, hot-dip plated in electrolytic tin for easy soldering. Note in tables below that Lugs are for both Open and Closed back blocks.

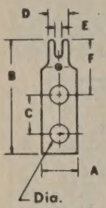


FIG. 1

SINGLE SOLDER LUG, FIG. 1
FITS TWIN AND SINGLE SCREW BLOCKS

Fits Block No.	Lug No.	Dia.	A	B	C	D	E	F
14000, 34000	3401	.156	9/32	37/64	—	1/16	5/32	29/64
15000, 35000	3501	.162	5/16	47/64	—	1/16	3/16	37/64
16000, 36000	3601	.192	13/32	7/8	—	3/32	9/32	11/16
27000, 37000	3701	.156	9/32	57/64	5/16	5/32	1/16	29/64
28000, 38000	3801	.162	5/16	1 5/32	27/64	3/16	1/16	37/64
29000, 39000	3901	.192	13/32	1 3/8	1/2	9/32	3/32	11/16
33000	3301	.095	—	13/16	1/4	3/16	1/16	15/32

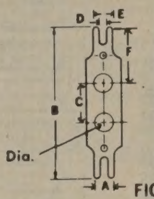


FIG. 2

DOUBLE SOLDER LUG, FIG. 2
FITS TWIN AND SINGLE SCREW BLOCKS

Fits Block No.	Lug No.	Dia.	A	B	C	D	E	F
14000, 34000	3402	.156	9/32	29/32	—	1/16	5/32	29/64
15000, 35000	3502	.162	5/16	1 5/32	—	1/16	3/16	37/64
16000, 36000	3602	.192	13/32	1 3/8	—	3/32	9/32	11/16
27000, 37000	3702	.156	9/32	1 7/32	5/16	5/32	1/16	29/64
28000, 38000	3802	.162	5/16	1 37/64	27/64	3/16	1/16	37/64
29000, 39000	3902	.192	13/32	1 7/8	1/2	9/32	3/32	11/16
33000	3302	.095	—	1 3/16	1/4	3/16	1/16	15/32

INTERNAL FEEDTHRU LUG, FIG. 3

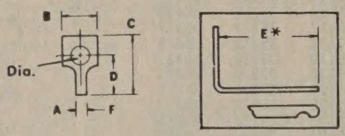


FIG. 3

Fits Block No.	Lug No.	Dia.	A	B	C	D	E*
27000, 37000	3703	.156	3/32	9/32	29/64	21/64	23/32
	3734	.156	3/32	9/32	29/64	21/64	13/32
	3735	.156	3/32	9/32	29/64	21/64	15/32
	3736	.156	3/32	9/32	29/64	21/64	31/32
28000, 38000	3803	.162	7/64	5/16	19/32	7/16	31/32
	3834	.162	7/64	5/16	19/32	7/16	15/32
	3835	.162	7/64	5/16	19/32	7/16	17/32
	3836	.162	7/64	5/16	19/32	7/16	1 1/16
29000, 39000	3903	.192	1/8	13/32	45/64	33/64	1 1/32
33000	3303	.095	1/16	3/16	23/64	17/64	9/16

EXTERNAL FEEDTHRU LUG, FIG. 4
FITS TWIN AND SINGLE SCREW BLOCKS

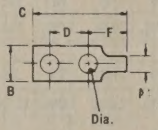


FIG. 4

Fits Block No.	Lug No.	Dia.	A	B	C	D	E*	F
14000, 34000	3404	.156	9/64	9/32	15/32	—	31/32	11/32
15000, 35000	3504	.162	5/32	5/16	37/64	—	1 1/32	25/64
16000, 36000	3604	.192	13/64	13/32	21/32	—	1 1/8	15/32
27000, 37000	3704	.156	9/64	9/32	25/32	5/16	31/32	11/32
28000, 38000	3804	.162	5/32	5/16	1	27/64	1 1/32	27/64
29000, 39000	3904	.192	13/64	13/32	1 5/32	1/2	1 1/8	15/32
33000	3304	.095	3/32	3/16	37/64	1/4	9/16	15/64

SOLDER INTERNAL FEED THRU LUG, FIG. 5

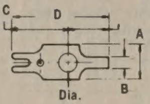


FIG. 5

Fits Block No.	Lug No.	Dia.	A	B	C	D	E*	F
27000, 37000	3705	.156	9/32	3/32	29/64	25/32	23/32	21/64
28000, 38000	3805	.162	5/16	7/64	37/64	1 1/64	31/32	7/16
29000, 39000	3905	.192	13/32	1/8	11/16	1 13/64	1 1/32	33/64

PUSH-ON INTERNAL FEED THRU LUG, FIG. 6

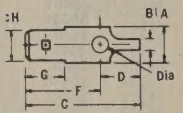
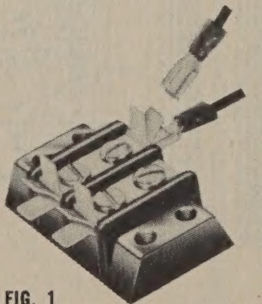
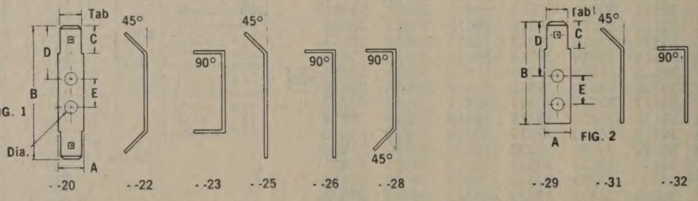


FIG. 6

Fits Block No.	Lug No.	Dia.	A	B	C	D	E*	F	G	H
27000, 37000	3706	.156	9/32	3/32	55/64	21/64	15/32	17/32	1/4	.187
28000, 38000	3806	.162	5/16	7/64	1 3/64	7/16	17/32	39/64	5/16	.250
29000, 39000	3906	.192	13/32	1/8	1 11/64	33/64	19/32	21/32	5/16	.250
33000	3306	.095	3/16	1/16	47/64	1/4	3/8	15/32	1/4	.110





Male Quick Disconnect Blades are brass electroplated with tin. Complete last two digits of Blade series in chart based on illustrations and corresponding last two digits above. To order, suffix the number to the Block number, e.g., 27012-3722.

FIG. 1

Fits Block No.	Tab Size	Blade Series	Dia.	A	B	C	D	E
14000, 34000	.187	34 - -	.156	9/32	21/32	1/4	17/32	—
15000, 35000	.250	35 - -	.162	5/16	1 7/32	5/16	39/64	—
16000, 36000	.250	36 - -	.192	13/32	1 5/16	5/16	21/32	—
27000, 37000	.187	37 - -	.156	9/32	1 3/8	1/4	17/32	5/16
28000, 38000	.250	38 - -	.162	5/16	1 41/64	5/16	39/64	27/64
29000, 39000	.250	39 - -	.192	13/32	1 13/16	5/16	21/32	1/2
33000	.110	33 - -	.095	3/16	1 3/16	1/4	15/32	1/4

FIG. 2

Fits Block No.	Tab Size	Blade Series	Dia.	A	B	C	D	E
14000, 34000	.187	34 - -	.156	9/32	21/32	1/4	17/32	—
15000, 35000	.250	35 - -	.162	5/16	49/64	5/16	39/64	—
16000, 36000	.250	36 - -	.192	13/32	27/32	5/16	21/32	—
27000, 37000	.187	37 - -	.156	9/32	11/32	1/4	17/32	5/16
28000, 38000	.250	38 - -	.162	5/16	1 3/16	5/16	39/64	27/64
29000, 39000	.250	39 - -	.192	13/32	1 11/32	5/16	21/32	1/2
33000	.110	33 - -	.095	3/16	1 3/16	1/4	15/32	1/4

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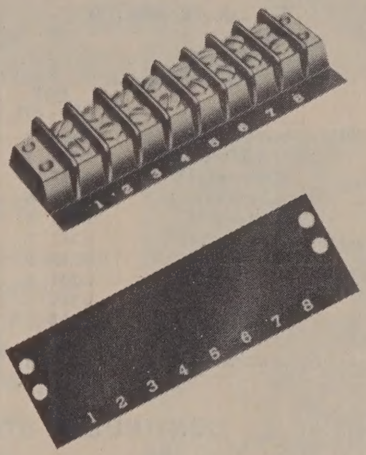
CANNON ETC MARKER STRIPS

Cannon Marker Strips serve the dual purpose of affording additional insulation protection and serving as a method of terminal identification. Numbers are 1/8″ high and are imprinted in white on a dark surface. Twin or Single Screw Blocks.

Insulating Strips — Open-back blocks are available with permanently bonded insulating strips. Suffix "-88" to block part number. To order unbonded insulating strip, do not suffix printing style code (see ordering system below).

Permanently Bonded Marker Strips: To order, suffix "-91" for a printed marker strip bonded to block. Suffix "-92" for an unprinted marker strip bonded to block.



Available material:

XP	Paper base phenolic (black)
VF	Comm. grade vulcanized fiber (black): MIL-F-1148
XXXP	Paper base phenolic (black): L-P-513
NPG	Nylon cloth phenolic: MIL-P-15047
GMG	Fiberglass, Melamine: MIL-P-15037
GEE	Fiberglass, Epoxy: MIL-P-18177

NOTE: A special moisture and fungus-proof varnish can be provided to seal the surfaces and edges of the Marker Strips, in accordance with MIL-V-173A.

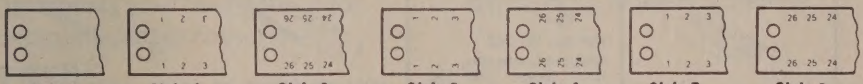
ORDERING SYSTEM (Example: 2772-18-XP — Style 5)

Terminal Block Series	70 — Double Side Marking — Std. Block 71 — Double Side Marking — Feedthru 72 — Single Side Marking — Std. Block 73 — Single Side Marking — Feedthru 74 — Single Side Marking — Feedthru	No. of Terminals	Material	Printing Style
27	72	18	XP	5

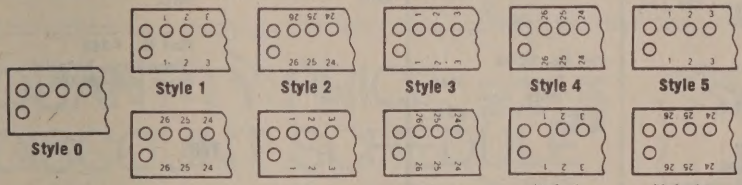
STRIP WIDTH

Block Series	Strip No.				
	70	71	72	73	74
33	1 1/8	1 1/8	7/8	7/8	7/8
34	1 1/16		13/16		
35	1 3/16		15/16		
36	1 5/16		1 1/16		
37 & 27	1 3/8	1 3/8	1 1/8	1 1/8	1 1/8
38 & 28	1 5/8	1 5/8	1 3/8	1 3/8	1 3/8
39 & 29	1 13/16	1 13/16	1 9/16	1 9/16	1 9/16

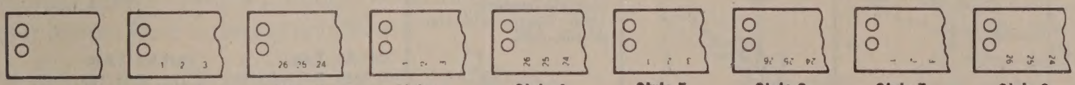
Double Side Marking — Standard Block - - 70 (Fill in First Two Digits with Series Block No., examples: **2770**, **2870**, etc.)


Style 0
Style 1
Style 2
Style 3
Style 4
Style 5
Style 6

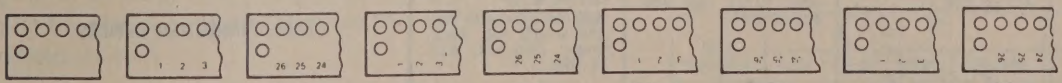
Double Side Marking — Feedthru Block - - 71 (Fill in First Two Digits with Series Block No., examples: **2771**, **2871**, etc.)


Style 1
Style 2
Style 3
Style 4
Style 5
Style 0
Style 6
Style 7
Style 8
Style 9
Style 10

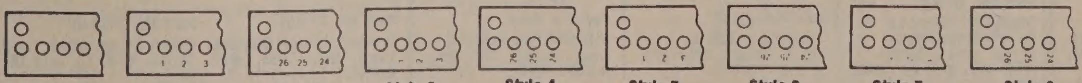
Single Side Marking — Standard Block - - 72 (Fill in First Two Digits with Series Block No., examples: **2772**, **2872**, etc.)


Style 0
Style 1
Style 2
Style 3
Style 4
Style 5
Style 6
Style 7
Style 8

Single Side Marking — Feedthru Block - - 73 (Fill in First Two Digits with Series Block No., examples: **2773**, **2873**, etc.)


Style 0
Style 1
Style 2
Style 3
Style 4
Style 5
Style 6
Style 7
Style 8

Single Side Marking — Feedthru Block - - 74 (Fill in First Two Digits with Series Block No., examples: **2774**, **2874**, etc.)


Style 0
Style 1
Style 2
Style 3
Style 4
Style 5
Style 6
Style 7
Style 8

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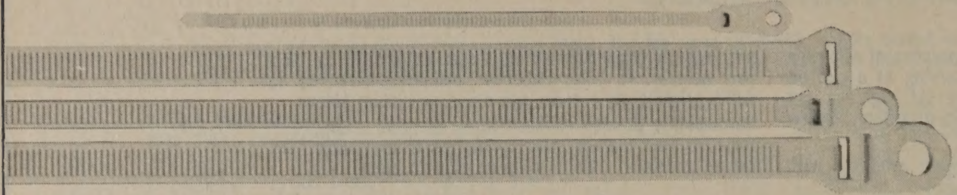
CANNON ETC® SELF-LOCKING CABLE TIES



TENSION-
CONTROL
APPLICATION TOOL†

THE "CAN DO" CABLE TIES*...

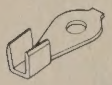
Part no.	Width In.	Width mm	Bundle Dia. In.	Bundle Dia. mm	Length In.	Length mm	Meet Military Standards	Minimum Loop Tensile Strength (MIL-S-23190) LB	Minimum Loop Tensile Strength (MIL-S-23190) KG	Use Cable Tying Tool Catalog Number
N-4-D Miniature	0.100	3	1/16- 5/8	2- 16	4.0	102	MS-3367-4	18	8.2	CT-100
N-5-C Intermediate	0.145	4	1/16-1¼	2- 32	5.3	135	MS-3367-5	30	13.6	CT-100
N-7-B Standard	0.187	5	1/16-1¾	2- 44	6.9	175	MS-3367-1	50	22.7	CT-100 or CT-200
N-11-C Intermediate	0.145	4	1/16-3	2- 76	10.8	274	—	30	13.6	CT-100
N-13-A Large	0.300	8	3/16-3½	5- 89	13.0	330	MS-3367-3	120	54.4	CT-200
N-14-B Standard	0.187	5	1/16-4	2-102	13.9	353	MS-3367-2	50	22.7	CT-100 or CT-200
N-14-MB Standard	0.187	5	1/16-4	2-102	14.4	366	—	50	22.7	CT-100 or CT-200
N-13-MA Large	0.300	8	3/16-3½	5- 89	13.6	345	—	120	54.4	CT-200
N-11-MC Intermediate	0.145	4	1/16-3	2- 76	11.3	287	—	30	13.6	CT-100
N-7-MB Standard	0.187	5	1/16-1¾	2- 44	7.4	188	—	50	22.7	CT-100 or CT-200
N-5-MC Intermediate	0.145	4	1/16-1¼	2- 32	5.8	147	—	30	13.6	CT-100
N-4-MD Miniature	0.100	3	1/16- 5/8	2- 16	4.4	112	—	18	8.2	CT-100

†U.S. Patent 3,782,426

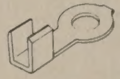
CONTINUOUS STRIP TERMINALS AND CONNECTING DEVICES

#10 to #24 AWG. Non-insulated or with insulation supports where vibration is excessive. Tin and other plating available.

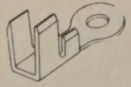
RING TONGUES



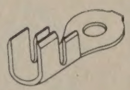
Part No. RX-20
Basic part: .020 brass, #16-20 AWG.



Part No. RX-100
Basic part: .030 brass, #14-18 AWG.

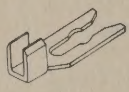


Part No. R-81
Basic part: .020 brass, Insul. Range: .120-.170, #14-18 AWG.

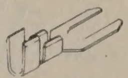


Part No. R-98
Basic part: .030 brass, Insul. Range: .140-.200, #10-12 AWG.

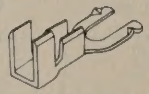
SPADE TONGUES



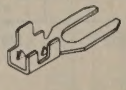
Part No. S-300
Marine Application, Basic part: .032 brass, #12-16 AWG.



Part No. S-2
Standard Spade, Basic part: .020 brass, Insul. Range: .060-.100, #18-20 AWG.



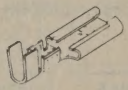
Part No. SG-17
Grip design tongue, Basic part: .025 brass, Insul. Range: .130-.180, #14-18 AWG.



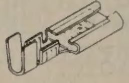
Part No. SP-60
Insulation Piercing for Tele/Communication Equip., Insul. Range: .055-.090, #20-24 AWG.

QUICK CONNECTS

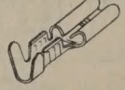
General use on appliances: fits .187 and .250 mating tabs.



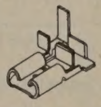
Part No. Q-6
For .032 x .250 tab, Insul. Range: .120-.170, #14-18 AWG.



Part No. Q-95
For .188 x .020 tab, Insul. Range: .090-.130, #16-20 AWG.



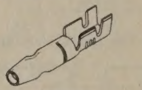
Part No. QJ11
For .020 x .205 tab, Insul. Range: .085-.125, #18-22 AWG.



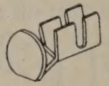
Part No. Q-25R
For .250 x .020 tab, Insul. Range: .090-.170, #16-20 AWG.

AUTOMOTIVE CONNECTING DEVICES

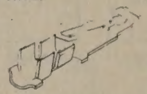
Wide range of devices in wire ranges to cover most applications.



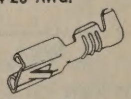
Part No. MT-740
Multiple Connector, Insul. Range: .090-.190, #12-18 AWG.



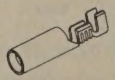
Part No. BC-55
Bulb Contact for head/stop lights. Insul. Range: .075-.121, #18-16 AWG.



Part No. 89
Multiple Connector, Insul. Range: .075-.160, #14-20 AWG.



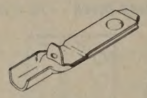
Part No. Q-220
Multiple Connector for .250 x .032 tab, Insul. Range: .109-.187, #12-18 AWG.



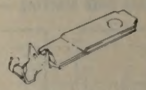
Part No. F-60
Multiple Connector, Insul. Range: .090-.190, #12-20 AWG.

BLADES

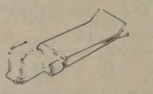
Male, female and grounding contact blades for cord and live set mfgs.; #14-20 AWG. Male blades are available polarized.



Part No. 6MBHX44-247
Material: Brass, #16-20 AWG.

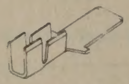


Part No. 11MBH44-250
Material: Brass, #18-20 AWG.

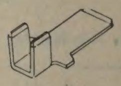


Part No. F-288
Wiper Blade, Material: Brass, #14-18 AWG.

TABS

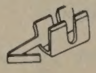


Part No. T-80
¼ Male Tab, with or without insulation supports, #14-18 AWG.

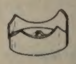


Part No. TX-83
.187 Male Tab, with or without insulation supports, #14-18 AWG.

OTHER CONNECTING DEVICES



Part No. PF-401
Printed Circuit Contact, Insul. Dia.: .065, #22 AWG.



Part No. CC-140
Crown Crimp, Screw Series: 6, 8, 10, #16-18 AWG.

ETC Terminal Products Unit
CANNON ITT

ETC TERMINAL PRODUCTS UNIT • 29000 AURORA ROAD, SOLON, OHIO 44139 • (216) 248-8800
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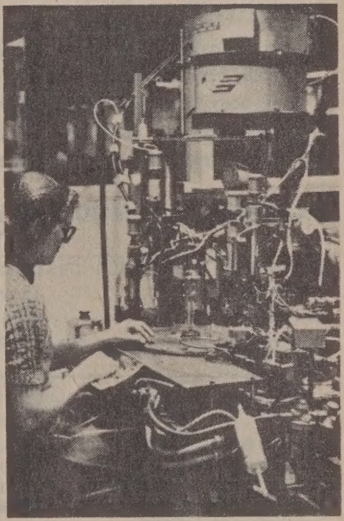
POMONA ELECTRONICS

We are proud of the service and quality of the products we manufacture. Customers and others having an interest in our products are welcome to visit us at any time.

POMONA TEST ACCESSORIES...

Designed to Meet Rigid Industrial and Military Applications



ITT Pomona Electronics provides an extremely broad, versatile line of electronic test accessories, usable by virtually anyone working with any electronic equipment.

Specialization in items such as molded patch cords, cable assemblies, test socket adaptors, ¾" spaced molded accessories, molded test leads, connecting leads and other design accessories make ITT Pomona Electronics your best source for electronic test accessories.

Our complete engineering facilities are geared to assuring excellent product quality. Every item is the result of choosing the best in materials, and carefully planning the processing and assembly.

We offer wide distribution and off-the-shelf delivery at all times. Our processing and shipping facilities are geared to fast, accurate deliveries to meet your most demanding delivery schedule.

ITT POMONA ELECTRONICS A Division of International Telephone and Telegraph Corporation
1500 East Ninth St. • Pomona, Calif. 91766 • Phone: (714) 623-3463 TWX: 910-581-3822

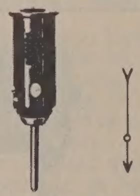
QUANTITY PRICE DISCOUNT SCHEDULE

For the convenience of our many industrial customers who purchase Pomona products in quantities, we offer a simplified ordering procedure.

You will find a code letter printed next to the single-item net price of every model listed in the general catalog. This code refers to the particular quantity discount price schedule that applies to each individual item.

To find the quantity discount price for a specific model, simply note the net price, and quantity discount schedule code letter listed for the item in the catalog. Then, referring to the industrial price list, locate the net price in the left-hand column, and the code letter in one of the right-hand columns. This will give you the quantity discount price for that particular item.

ADAPTER



MODEL 1432
(Specify Color)

BANANA JACK TO PIN TIP

Permits standard single banana plug patch cords to be used with equipment having tip jacks.

UPPER: Banana jack, .166 dia. Brass, nickel plated.

LOWER: Pin tip, .080 dia. Brass, nickel plated. Cross hole (.166 dia.) in body provides side Stack Up connection.

COLORS: Black, Red.

QUANTITY DISC. CODE Ⓐ

Standard Package: 10 (per color)

NET .35

NET PRICES	Ⓐ				Ⓑ			
	1-24	25-49	50-99	100-249	1-9	10-24	25-49	50-99
.10	.10	.09	.08	.07				
.15	.15	.14	.13	.11				
.20	.20	.18	.17	.14				
.22	.22	.20	.19	.15				
.25	.25	.23	.21	.18				
.29	.29	.26	.25	.20				
.35	.35	.32	.30	.25				
.45	.45	.41	.38	.32				

¾" SPACED MOLDED BANANA PLUGS

POMONA
ELECTRONICS

General specifications listed below apply to items using banana plugs in this catalog.

FEATURES

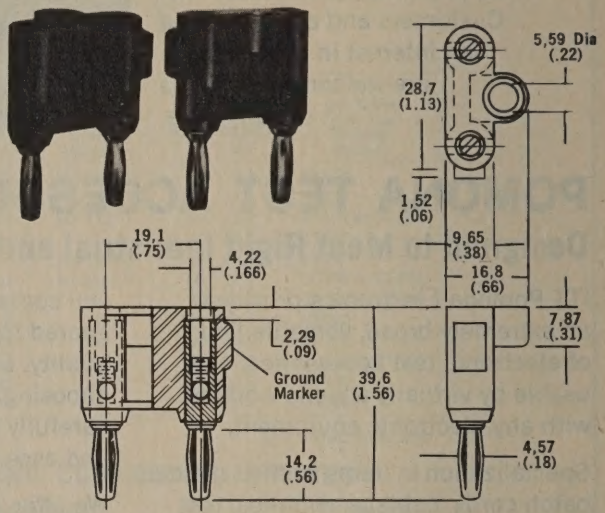
- One piece beryllium copper heat treated spring for maximum long life.
- Rounded spring design results in maximum contact area.
- Stack-up feature allows an unlimited number of connections at the same electrical point.
- Tough thermoplastic molded directly on to the metal body of the plugs and connectors.

SPECIFICATIONS

- Fits standard 4,22mm (.166) dia. banana jacks.
- Spring, beryllium copper alloy 170 per QQ-C-533.
- Plug body, brass per QQ-B-626, berylco 25.
- Nickel plated per QQ-N-290, Class 2.
- Contact resistance less than 0.001 ohm per banana plug.

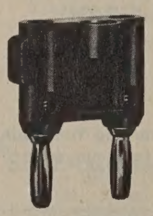
RATINGS	MODELS: MDP; MDP-ST; 1330; 1330-ST; 2970
• Capacity	0.8 pf to 10 MHz
• Current	15 amps. cont., 30 amps. int.
• Voltage	5000 W VDC
• Temperature	−25°C to +85°C, operating temp.

Two-thirds Size



DOUBLE BANANA PLUG

Double banana plug on ¾" centers; set screws secure leads; simplifies cable construction or component mounting; banana jacks permit top stack-up for multiple connections.



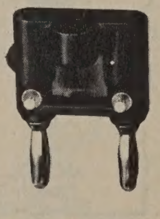
Model No.	Color
MDP-0	Black
MDP-1	Brown
MDP-2	Red
MDP-3	Orange
MDP-4	Yellow
MDP-5	Green
MDP-6	Blue
MDP-7	Violet
MDP-8	Gray
MDP-9	White

★QUANTITY DISC. CODE A NET 1.10

DOUBLE BANANA PLUG WITH SOLDER TURRET TERMINALS

Similar to Model MDP, except has solder turret terminals for permanent noise-free connections of cables and components. Double banana plug on ¾" centers; banana jacks permit top stack-up for multiple connections.

COLOR: Black

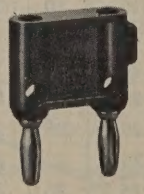


Model No.
MDP-ST

QUANTITY DISC. CODE A NET 1.25

INSULATED SHORTING BAR

Ideal as a connecting link for use with ¾" spaced banana jacks. Banana plugs internally solder-bonded with #14 AWG wire. Banana jacks provide top stack-up. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections. Resistance less than 1.5 milliohms installed. "Shorting Bar" marked on top of plug.

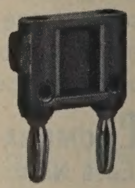


Model No.	Color
MDP-S-0	Black
MDP-S-2	Red
MDP-S-9	White

★QUANTITY DISC. CODE A NET 1.50

COMPONENT MOUNTING DOUBLE BANANA PLUG

Double banana plug on ¾" centers; set screws secure leads; features recess for mounting small components; banana jacks permit top stack-up for multiple connections.

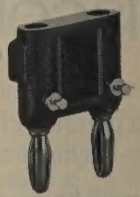


Model No.	Color
1330-0	Black
1330-2	Red

★QUANTITY DISC. CODE A NET .95

COMPONENT PLUG WITH SOLDER TURRET TERMINALS

Similar to Model 1330, except has solder turret terminals for permanent noise-free connections of components, etc. Double banana plug on ¾" centers: Banana jacks permit top stack-up for multiple connections.



Model No.	Color
1330-ST-0	Black
1330-ST-2	Red

★QUANTITY DISC. CODE A NET 1.25

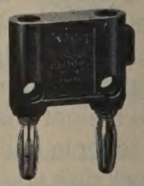
2,03mm (.080) DIA. TIP JACKS TO DOUBLE BANANA PLUG

Permits 2,03mm (.080) dia. tip plugs to be used with equipment having banana jacks.

UPPER: Tip jacks, beryllium copper, gold flashed; spaced on ¾" centers to accept 2,03mm (.080) dia. pin tip plugs.

LOWER: Double banana plug, on ¾" centers, nickel plated. Cross holes 4,22-mm (.166) dia. in body provide side stack-up connections.

COLOR: Black



Model No.
1845

QUANTITY DISC. CODE A NET 1.25

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

BANANA PLUG ACCESSORIES

POMONA ELECTRONICS

SOLDERLESS BANANA PLUG—STACK-UP

Wire firmly held in place with internal set screw, eliminating soldering. Assembly of test leads simplified.

UPPER: Banana jack, 4,22mm (.166) dia.; brass, nickel plated.

LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 4,22mm (.166) dia. banana jack.

Model No.	Color
1325-0	Black
1325-1	Brown
1325-2	Red
1325-3	Orange
1325-4	Yellow
1325-5	Green
1325-6	Blue
1325-7	Violet
1325-8	Gray
1325-9	White

★QUANTITY DISC. CODE A NET 6.00
(10 per pkg.)

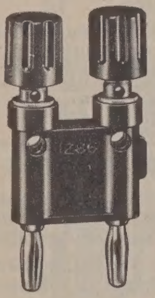
BINDING POSTS TO DOUBLE BANANA PLUG

Features insulated binding posts on ¾″ centers for rapid mounting and interchangeability of components. Binding posts allow top stack-up for multiple connections. Side stack-up provided by thru-holes in plug body.

UPPER: Insulated double binding posts, 1 red, 1 black, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

LOWER: Double banana plug, on ¾″ centers.

COLOR: Black



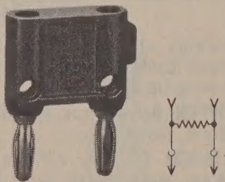
Model No.
1286

QUANTITY DISC. CODE A NET 2.95

MOLDED PRECISION RESISTOR

Ideal where rapid interchange of resistance values is required. Used in breadboarding, R & D labs, standards, terminations, etc. Deposited carbon 1% resistor, ½ watt, molded internally. Resistor soldered to double banana plug, on ¾″ centers. Top stack-up provided for multiple connections. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections. Resistance value stamped on top of plug.

COLOR: Red



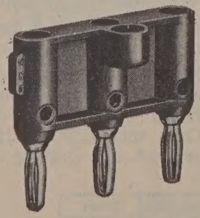
Model No.
MPD-R

Specify Resistance in Ohms				
50	200	1K	100K	1 Meg.
75	250	5K	200K	2 Meg.
120	500	10K	250K	5 Meg.
130	600	20K	500K	10 Meg.
150	900	50K		

★QUANTITY DISC. CODE A NET 3.50

TRIPLE BANANA PLUG

Triple banana plug on ¾″ centers; set screws secure leads. Ideal for balanced line 2 conductor shielded cable assemblies. Banana jacks permit top stack-up for multiple connections.



Model No.	Color
2970-0	Black
2970-2	Red

★QUANTITY DISC. CODE A NET 1.85

SOLDERLESS BANANA PLUG WITH SAFETY COLLAR—STACK-UP

Features integral safety collar that insulates exposed wire leads. Wire firmly held in place with internal set screw, eliminates soldering, simplified assembly of test leads.

UPPER: Banana jack, 4,22mm (.166) dia.; brass, nickel plated.

LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 4,22mm (.166) dia. banana jack.

Model No.	Color
1825-0	Black
1825-1	Brown
1825-2	Red
1825-3	Orange
1825-4	Yellow
1825-5	Green
1825-6	Blue
1825-7	Violet
1825-8	Gray
1825-9	White

★QUANTITY DISC. CODE A NET 6.00
(10 per pkg.)

BINDING POST TO SINGLE BANANA PLUG

Features insulated binding post. Binding post allows top stack-up for multiple connections. Side stack-up provided by thru-hole in plug body.

UPPER: Insulated binding posts, red or black. Cross hole 4,22mm (.166) dia. in body provides side stack-up connections.

LOWER: Single banana plug, one piece nickel plated beryllium copper spring for use with standard 4,22mm (.166) dia. banana jack.

BODY COLOR: Black

Model No.	Color
2894-0	Black
2894-2	Red

★QUANTITY DISC. CODE A NET 1.75

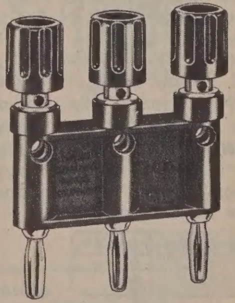
BINDING POSTS TO TRIPLE BANANA PLUG

Features insulated binding posts on ¾″ centers for rapid component mounting and interchangeability. Binding posts allow top stack-up for multiple connections. Side stack-up provided by thru-holes in plug body.

UPPER: Insulated triple binding posts, red-black-black, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

LOWER: Triple banana plug, on ¾″ centers.

COLOR: Black

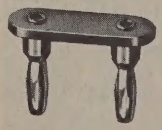


Model No.
3405

QUANTITY DISC. CODE A NET 5.85

METAL SHORTING BAR

Low profile, nickel plated brass shorting bar. Double banana plugs on ¾″ centers swaged to $\frac{3}{32}$″ thick brass bar. Resistance, less than 1.5 milliohms installed. Cur. rating: 15 amps., cont., 30 amps. int.



Model No.
1855

QUANTITY DISC. CODE A NET 1.25

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

2,03mm (.080) DIA. PIN TIP PLUG ACCESSORIES

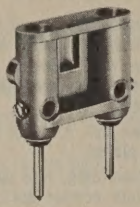
POMONA ELECTRONICS

COMPONENT MOUNTING — TIP JACKS TO DOUBLE PIN TIP PLUG — SET SCREWS

Features set screws on side of body to secure leads or components. Recess permits mounting of small component parts.

UPPER: Tip jacks, beryllium copper, gold flashed, spaced on ¾″ centers, to accept 2,03mm (.080) dia. pin tip plugs.

LOWER: Pin tips, 2,03mm (.080) dia. on ¾″ centers. Brass, nickel plated.



Model No.	Color
2192-0	Black
2192-2	Red

★QUANTITY DISC. CODE A NET 3.50

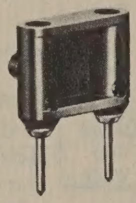
COMPONENT MOUNTING PLUG— BANANA JACKS TO DOUBLE PIN TIP —SET SCREWS

Permits single or double banana plugs to be used in equipment having tip jacks. Features recess for component mounting. Internal set screws firmly secure wire leads.

UPPER: Banana jacks, 4,22mm (.166) dia., on ¾″ centers. Brass, nickel plated.

LOWER: Pin tips 2,03mm (.080) dia. on ¾″ centers. Brass, nickel plated.

COLOR: Black



Model No.
1858

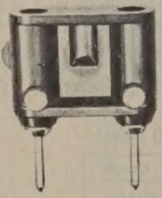
QUANTITY DISC. CODE A NET 1.25

PLUG — COMPONENT MOUNTING — DOUBLE PIN TIP PLUG—SOLDER TURRETS

Features recess for mounting components. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Tip jacks, beryllium copper, gold flashed; spaced on ¾″ centers to accept 2,03mm (.080) dia. pin tip plugs.

LOWER: Pin tips, 2,03mm (.080) dia. Brass, nickel plated.



Model No.	Color
1904-0	Black
1904-2	Red

★QUANTITY DISC. CODE A NET 1.75

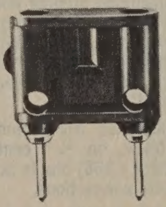
INSULATED SHORTING BAR

Used as a connecting link with equipment having tip jacks. Plugs internally solder bonded with 14 AWG wire. Top stack-up feature.

Current rating: 5 amps. cont., 10 amps. int. "Shorting Bar" marked on top of plug.

UPPER: Banana jacks, 4,22mm (.166) dia. on ¾″ centers. Brass, nickel plated.

LOWER: Pin tips, 2,03mm (.080) dia. on ¾″ centers. Brass, nickel plated. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.



Model No.	Color
1730-0	Black
1730-2	Red

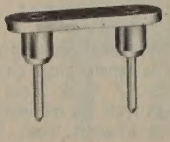
★QUANTITY DISC. CODE A NET 1.50

METAL SHORTING BAR

Used as a connecting link with equipment having tip jacks. Low profile, nickel plated brass shorting bar. Double pin tip plugs on ¾″ centers swaged to 3/32″ thick brass bar.

RESISTANCE: Less than 1.5 milliohms installed.

CURRENT RATING: 5 amps. cont., 10 amps. int.



Model No.
2072

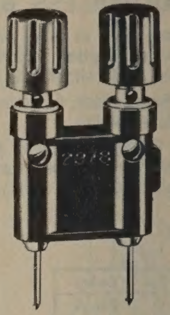
QUANTITY DISC. CODE A NET 1.25

BINDING POSTS TO DOUBLE PIN TIP PLUG

Features insulated binding posts on ¾″ centers for rapid mounting and interchangeability of components. Binding posts allow top stack-up for multiple connections. Side stack-up provided by thru-holes in plug body.

UPPER: Insulated double binding posts, 1 red, 1 black, on ¾″ centers. Top and side stack-up connectors 4,22mm (.166) dia. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections. 1 red and 1 black.

LOWER: Pin tips, 2,03mm (.080) dia. on ¾″ centers. Brass, nickel plated.



Model No.
2978

COLOR: Black

QUANTITY DISC. CODE A NET 3.25

BINDING POST TO SINGLE PIN TIP PLUG

Features insulated binding post. Binding post allows top stack-up for multiple connections. Side stack-up provided by thru-holes in plug body.

UPPER: Insulated binding post, red or black. Top and side stack-up connectors 4,22mm (.166) dia. Cross hole 4,22mm (.166) dia. in body provides side stack-up connections.

LOWER: Pin tip, 2,03mm (0.80) dia. Brass, nickel plated.

Model No.	Color
2953-0	Black
2953-2	Red

★QUANTITY DISC. CODE A

NET 1.50

SOLDERLESS PIN TIP PLUG—STACK-UP

Wire firmly held in place with internal set screw, eliminates soldering. Assembly of test leads simplified.

UPPER: Tip jack, beryllium copper, gold flashed; accepts 2,03mm (.080) dia. pin.

LOWER: Pin tip, 2,03mm (.080) dia. Brass, nickel plated.

Model No.	Color
1922-0	Black
1922-2	Red

★QUANTITY DISC. CODE A

(10 per pkg.)

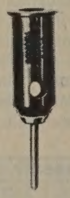
NET 15.00

BANANA JACK TO PIN TIP

Permits standard single banana plug patch cords to be used with equipment having tip jacks.

UPPER: Banana jack, 4,22mm (.166) dia. Brass, nickel plated.

LOWER: Pin tip, 2,03mm (.080) dia. Brass, nickel plated. Cross hole 4,22mm (.166) dia. in body provides side stack-up connection.



Model No.	Color
1432-0	Black
1432-2	Red

★QUANTITY DISC. CODE A

(10 per pkg.)

NET 3.50

2,03mm (.080) DIA. TIP JACK TO BANANA PLUG

Permits 2,03mm (.080) dia. pin tip cords to be used with equipment having banana jacks. Insulation molded to plug body.

UPPER: Tip jack, beryllium copper, gold flashed. Accepts 2,03mm (.080) dia. pin.

LOWER: Banana plug, one piece nickel plated beryllium copper spring for use with standard 4,22mm (.166) dia. banana jack. Cross hole 4,22mm (.166) dia. in body provides side stack-up connection.

Model No.	Color
1809-0	Black
1809-2	Red

★QUANTITY DISC. CODE A

(10 per pkg.)

NET 7.50

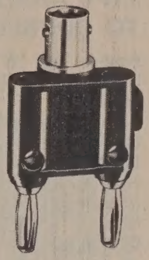
★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

BNC TEST ADAPTERS

POMONA ELECTRONICS

BNC RECEPTACLE TO DOUBLE BANANA PLUG



Permits BNC plug to be used with equipment having banana jacks. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.

UPPER: BNC receptacle.

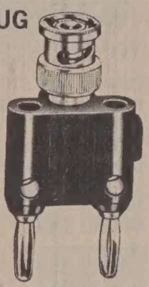
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

COLOR: Black

Model No.
1269

QUANTITY DISC. CODE A **NET 3.50**

BNC PLUG TO DOUBLE BANANA PLUG



Permits BNC receptacle to be used with equipment having banana jacks. Minimizes number of coaxial connections for maximum efficiency.

UPPER BNC plug.

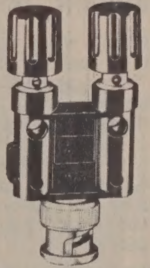
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

COLOR: Black

Model No.
1270

QUANTITY DISC. CODE A **NET 4.25**

BINDING POSTS TO BNC PLUG



Permits single or double banana plugs to be used with equipment having BNC receptacle. Excellent for use with laboratory oscilloscopes.

UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

LOWER: BNC plug.

COLOR: Black

Model No.
1296

QUANTITY DISC. CODE A **NET 5.45**

SINGLE BINDING POST TO BNC PLUG

Permits single banana plug to be used with equipment having a BNC receptacle. Connector body features a non-tarnish finish.

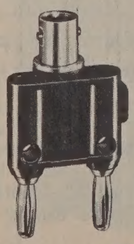
UPPER: Insulated binding post, Red or Black, for multiple stacking.

LOWER: BNC plug.

Model No.	Color
3430-0 3430-2	Black Red

★QUANTITY DISC. CODE A **NET 2.50**

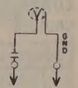
SIGNAL ISOLATOR — BNC RECEPTACLE TO DOUBLE BANANA PLUG



Permits BNC male connector to be used with equipment having banana jacks. General purpose ceramic capacitor molded internally. Rated @ .01 MFD ±20%, 200 W VDC. Insulation resistance 10,000 megohms min. Ideal for isolating DC signals from VTVM inputs and signal generator outputs.

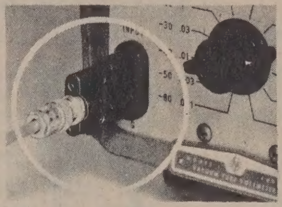
UPPER: BNC receptacle.

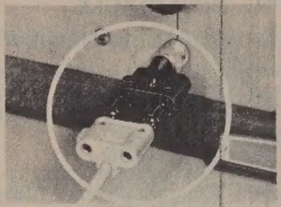
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.



Model No.	Color
1868-6	Blue

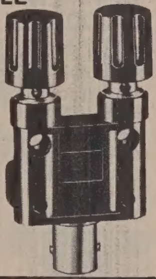
QUANTITY DISC. CODE A **NET 8.50**





Now! Increase the flexibility of your laboratory with the use of POMONA Molded test accessories. Minimize the necessity of stocking a large quantity and variety of coaxial cables by using POMONA molded adapters. Tough thermo-plastic material molded to plug body or connectors insures maximum strength, moisture resistance and excellent insulative properties.

BINDING POSTS TO BNC RECEPTACLE



Permits single or double banana plugs to be used with equipment having BNC plug.

UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

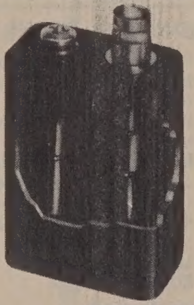
LOWER: BNC receptacle.

COLOR: Black

Model No.
1452

QUANTITY DISC. CODE A **NET 4.95**

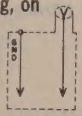
BNC RECEPTACLE TO SHIELDED BANANA PLUGS



Permits BNC plug to be used with equipment having banana jack binding posts. Black anodized aluminum shield, noise rejection greater than 70 db. Ideal for low level inputs to oscilloscopes, wave analyzers, etc.

UPPER: BNC receptacle.

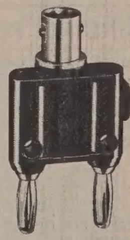
LOWER: Shielded double banana plug, on ¾″ centers.



Model No.
1645

QUANTITY DISC. CODE A **NET 4.85**

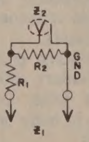
BNC MATCHING PAD



Adapts 600 OHM sources to 50, 75 or 93 OHM cables. Excellent for matching signal generators and VTVM's to standard coaxial cables. Ideal for receiver alignment. Molded in deposited carbon resistors 1%, ¼W.

UPPER: BNC receptacle.

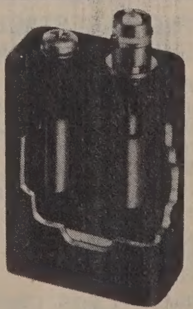
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.



Model No.	Color	Range — Ohms
1656-1 1656-2 1656-3 1656-4	Yellow Red White Blue	600 to 50 600 to 75 600 to 93 300 to 50

QUANTITY DISC. CODE A **NET 12.50**

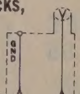
BNC RECEPTACLE TO SHIELDED BANANA JACKS



Permits BNC plug to be used with equipment having banana plugs. Black anodized aluminum shield, noise rejection greater than 70 db. Ideal for low level inputs to oscilloscopes, wave analyzers, etc.

UPPER: BNC receptacle,

LOWER: Shielded double banana jacks, on ¾″ centers.



Model No.
1681

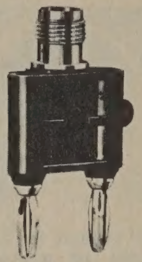
QUANTITY DISC. CODE A **NET 5.85**

★Colors may be aggregated for best quantity price.

TNC & TYPE N ADAPTERS

POMONA
ELECTRONICS

TNC RECEPTACLE TO DOUBLE BANANA PLUG

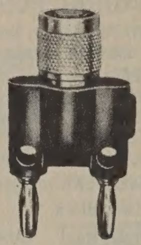


Permits TNC plug to be used with equipment having banana jacks. Perfect for connecting modern control systems to laboratory test equipment.
UPPER: TNC receptacle.
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
COLOR: Black

Model No. 1340

QUANTITY DISC. CODE **A** **NET 8.85**

TNC PLUG TO DOUBLE BANANA PLUG

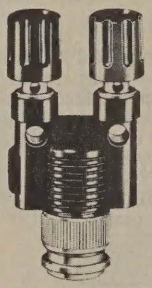


Permits TNC receptacle to be used with equipment having banana jacks. Minimizes your stock of coaxial cables.
UPPER: TNC plug.
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
COLOR: Black

Model No. 1981

QUANTITY DISC. CODE **A** **NET 8.85**

BINDING POSTS TO TNC PLUG

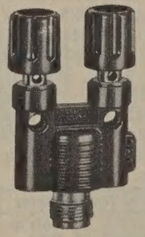


Permits single or double banana plugs to be used with equipment having a TNC receptacle. Exceptional for signal insertion with rapid interchangeability of terminations.
UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
LOWER: TNC plug.
COLOR: Black

Model No. 1982

QUANTITY DISC. CODE **A** **NET 8.85**

BINDING POSTS TO TNC RECEPTACLE



Permits single or double banana plugs to be used with equipment having TNC plug. Useful for rapid interconnection of systems and components.
UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
LOWER: TNC receptable.
COLOR: Black

Model No. 1976

QUANTITY DISC. CODE **A** **NET 7.85**

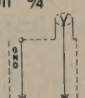
TNC RECEPTACLE TO SHIELDED BANANA PLUGS

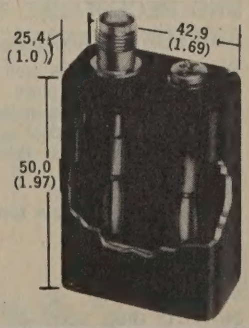
Permits TNC plug to be used with equipment having banana jack binding posts. Black anodized aluminum shield, noise rejection greater than 70 db.
UPPER: TNC receptacle.
LOWER: Double banana plug, on ¾″ centers.

Model No. 1975

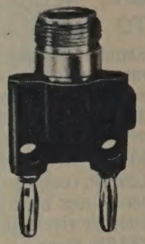
NET 7.85

QUANTITY DISC. CODE **A**





TYPE "N" RECEPTACLE TO DOUBLE BANANA PLUG

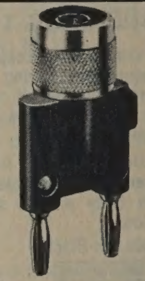


Permits Type "N" plug to be used with equipment having banana jacks. Ideal for connecting R.F. equipment to conventional test equipment.
UPPER: Type "N" receptable.
LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
COLOR: Black

Model No. 1740

QUANTITY DISC. CODE **A** **NET 7.50**

TYPE "N" PLUG TO DOUBLE BANANA PLUG

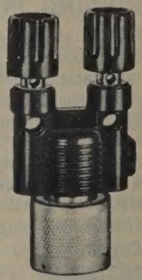


Permits Type "N" receptable to be used with equipment having banana jacks.
UPPER: Type "N" plug.
LOWER: Double banana plug on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
COLOR: Black

Model No. 1770

QUANTITY DISC. CODE **A** **NET 9.50**

BINDING POSTS TO TYPE "N" PLUG

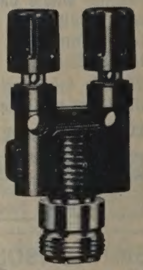


Permits single or double banana plugs to be used with equipment having Type "N" receptacle. Binding posts allow component insertion.
UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
LOWER Type "N" plug.
COLOR: Black

Model No. 1796

QUANTITY DISC. CODE **A** **NET 9.50**

BINDING POSTS TO TYPE "N" RECEPTACLE



Permits single or double banana plugs to be used with equipment having Type "N" plug. Useful for rapid interconnection of systems and components.
UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.
LOWER: Type "N" receptacle.
COLOR: Black

Model No. 1992

QUANTITY DISC. CODE **A** **NET 7.85**

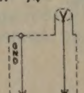
TYPE "N" RECEPTACLE TO SHIELDED BANANA PLUGS

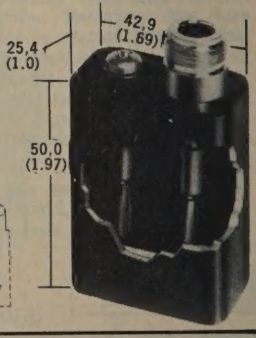
Permits Type "N" plug to be used with equipment having banana jack binding posts. Black anodized aluminum shield, noise rejection greater than 70 db.
UPPER: Type "N" receptacle.
LOWER: Double banana plug, on ¾″ centers.

Model No. 1983

NET 7.85

QUANTITY DISC. CODE **A**





All dimensions are shown millimeters (inches)

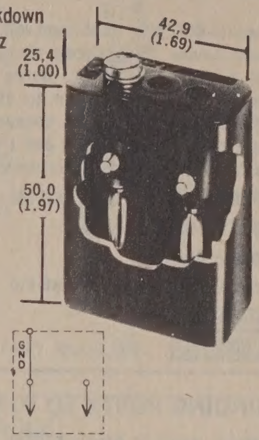
SHIELDED BANANA PLUGS & UHF ADAPTERS

POMONA ELECTRONICS

SHIELDED DOUBLE BANANA PLUG IN-LINE CABLE ENTRY

RATED: 15A Continuous 3400 VDC Breakdown
1200 W VDC 2.5 PF @ 1 MHz

- Shielded double plug, ¾" spaced.
- Die cast aluminum shell, black anodized.
- Noise rejection: greater than 70 db.
- Gold flashed solder turret terminals for positive reliable cable connections.
- One piece nickel plated beryllium copper springs for use with standard 4,22mm (.166) dia. banana jack binding posts.
- Rounded banana spring design results in maximum contact area and minimum contact resistance.
- GND clearly molded in shell.
- Cable opening, 7/32" diameter.



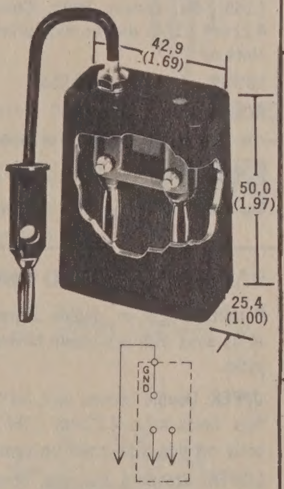
Model No.
1433

QUANTITY DISC. CODE **A** **NET 3.95**

BALANCED LINE SHIELDED DOUBLE BANANA PLUG

RATED: 15A Continuous
1000 W V Peak; Line to Shield
2000 W V Peak; Line to Line
2500 V Peak Breakdown: Line to Shield
5000 V Peak Breakdown, Line to Line
2.0 PF @ 1 MHz Capacity; Line to Line
3.0 PF @ 1 MHz Capacity; Both Lines to Shield

- Unique 3 terminal design allows connection to shielded two conductor cable while maintaining balanced conditions.
- Minimizes ground loop errors in low signal level applications.
- Die cast aluminum shell, black anodized.
- Noise rejection: greater than 70 db.
- Gold flashed solder turret terminals for reliable noise free connections.
- One piece nickel plated beryllium copper spriggs for use with standard 4,22mm (.166) dia. banana jack binding posts.



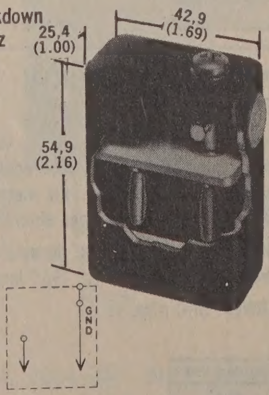
Model No.
1921

QUANTITY DISC. CODE **A** **NET 8.50**

SHIELDED DOUBLE BANANA PLUG RIGHT ANGLE CABLE ENTRY

RATED: 15A Continuous 5000 VDC Breakdown
2800 Peak W V 2.0 PF @ 1 MHz

- Shielded double plug, ¾" spaced.
- Polycarbonate insulating base.
- Die cast aluminum shell, black anodized.
- GND clearly molded in shell.
- Noise rejection: greater than 70 db.
- One piece nickel plated beryllium copper springs for use with standard 4,22mm (.166) dia. banana jack binding posts.
- Rounded banana spring design results in maximum contact area and minimum contact resistance.
- Vinyl grommet and nickel plated snap button supplied.



Model No.
1791

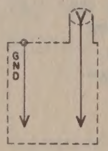
QUANTITY DISC. CODE **A** **NET 4.95**

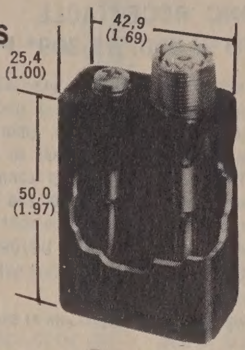
UHF RECEPTACLE TO SHIELDED BANANA PLUGS

Permits UHF plug to be used with equipment having banana jack binding posts. Black anodized shield, noise rejection greater than 70 db.

UPPER: UHF receptacle, ⅝" dia.

LOWER: Double banana plug on ¾" centers.





Model No.
1708

QUANTITY DISC. CODE **A** **NET 8.50**

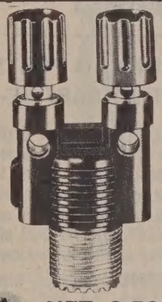
BINDING POSTS TO UHF RECEPTACLE

Permits single or double banana plugs to be used with equipment having UHF plug.

UPPER: Insulated binding posts, 1 red, 1 black, on ¾" centers with 4,22mm (.166) dia. jacks. Cross holes 4,22mm dia. in body provide side stack-up connections.

LOWER: UHF receptacle, ⅝" dia.

COLOR: Black



Model No.
1792

QUANTITY DISC. CODE **A** **NET 8.50**

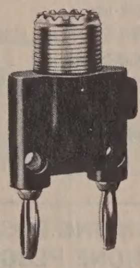
UHF RECEPTACLE TO DOUBLE BANANA PLUG

Permits UHF plug to be used with equipment having banana jacks.

UPPER: UHF receptacle, ⅝" dia.

LOWER: Double banana plug, on ¾" centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

COLOR: Black



Model No.
1707

QUANTITY DISC. CODE **A** **NET 6.50**

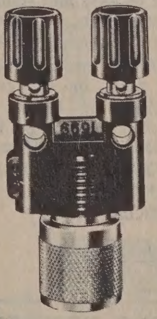
BINDING POSTS TO UHF PLUG

Permits single or double banana plugs to be used with equipment having a UHF receptacle, ⅝" dia. Convenient for use with modern oscilloscopes.

UPPER: Insulated binding posts, 1 red, 1 black, on ¾" centers with 4,22mm (.166) dia. jacks.

LOWER: UHF plug.

COLOR: Black



Model No.
1699

QUANTITY DISC. CODE **A** **NET 6.85**

BINDING POST TO UHF PLUG

Permits single banana plug to be used with equipment having a UHF receptacle, ⅝" dia. Adds flexibility to your oscilloscope.

UPPER: Insulated binding post with 4.22 mm (.166) dia. banana jack. **COLOR:** Red

LOWER: UHF plug.

Model No.
1698

QUANTITY DISC. CODE **A** **NET 4.85**

All dimensions are shown millimeters (inches)

PHONE PLUG TEST ADAPTERS

POMONA ELECTRONICS

BNC RECEPTACLE TO PJ-068/WE-309* PHONE PLUG

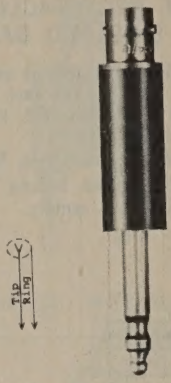
Permits BNC plug to be used with equipment having three circuit phone jacks for 5,23mm (.206) dia. phone plugs. Readily adapts equipment to available BNC coaxial cables. Tip connected to inner contact of connector and ring connected to shell. Sleeve, no connection.

UPPER: BNC receptacle, UG1094/U.

LOWER: Phone plug, PJ-068/WE-309*.

COLOR: Black

*WE-309 interchangeable with PJ-068.



Model No. 1794

QUANTITY DISC. CODE A **NET 8.85**

BINDING POSTS TO PJ-068/WE-309* PHONE PLUG

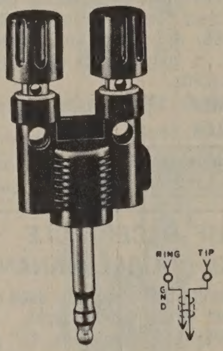
Permits single or double banana plug to be used with equipment having three circuit phone jacks for 5,23mm (.206) dia. phone plugs. Ideal for rapid mounting of components and test leads. The PJ-068 and WE-309 plugs have the same mechanical dimensions.

UPPER: Insulated binding posts, 1 red, 1 black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up.

LOWER: Phone plug, PJ-068/WE-309*.

COLOR: Black

*WE-309 interchangeable with PJ-068.



Model No. 3365

QUANTITY DISC. CODE A **NET 8.85**

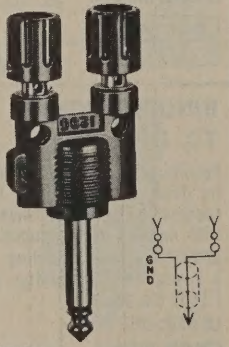
BINDING POSTS PHONE PLUG

Permits single or double banana plug to be used with equipment having phone jacks. Ideal for rapid mounting of components and test leads.

UPPER: Insulated binding posts, 1 red, 1 black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (1.66) dia. in body provide side stack-up connections.

LOWER: Standard ¼″ dia. phone plug, 1 3/16″ long.

COLOR: Black



Model No. 1285

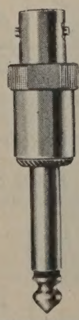
QUANTITY DISC. CODE A **NET 4.85**

BNC RECEPTACLE TO PHONE PLUG

Permits BNC plug to be used with equipment having standard ¼″ dia. phone jacks. Readily adapts equipment to available BNC coaxial cables. All metal construction to insure proper shielding.

UPPER: BNC receptacle, UG1094/U.

LOWER: Standard ¼″ dia. phone plug, 1 3/16″ long.



Model No. 1297

QUANTITY DISC. CODE A **NET 5.85**

BNC RECEPTACLE TO PJ-051* PHONE PLUG

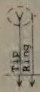
Permits BNC plug to be used with equipment having three circuit phone jacks for 6,35mm (.250) dia. phone plugs. Readily adapts equipment to available BNC coaxial cables. Tip connected to inner contact of connector and ring connected to shell. Sleeve, no connection.

UPPER: BNC receptacle, UG1094/U.

LOWER: Phone plug, PJ-051*.

COLOR: Black

*PJ-051 interchangeable with WE-310.



Model No. 2798

QUANTITY DISC. CODE A **NET 8.85**

BINDING POSTS TO PJ-051* PHONE PLUG

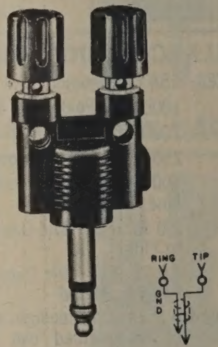
Permits single or double banana plug to be used with equipment having three circuit phone jacks for 6,35mm (.250) dia. phone plugs. Tip connected to hot side of adapter and ring connected to ground side. Sleeve, no connection.

UPPER: Insulated binding posts, 1 red, 1 black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up.

LOWER: Phone plug, PJ-051*.

COLOR: Black

*PJ-051 interchangeable with WE-310.



Model No. 2112

QUANTITY DISC. CODE A **NET 7.85**

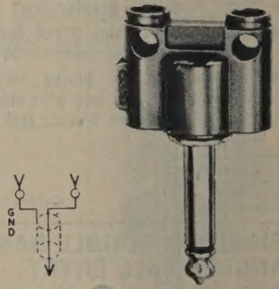
BANANA JACKS TO PHONE PLUG

Permits single or double banana plug to be used with equipment having phone jacks.

UPPER: Double banana jack, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

LOWER: Standard ¼″ dia. phone plug, 1 3/16″ long.

COLOR: Black



Model No. 1980

QUANTITY DISC. CODE A **NET 4.50**

PHONE PLUG JACK TO BNC PLUG

Permits a standard 2 conductor ¼″ dia. phone plug to be used with equipment having BNC receptacle. All metal construction to insure proper shielding.

UPPER: Phone plug jack, accepts standard ¼″ dia. phone plug, 1 3/16″ long.

LOWER: BNC plug.

Model No. 4043

QUANTITY DISC. CODE A **NET 8.85**

All dimensions are shown millimeters (inches)

MISCELLANEOUS TEST ADAPTERS

POMONA ELECTRONICS

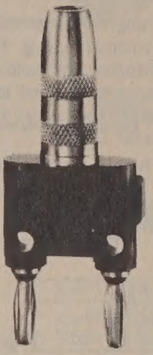
PHONE PLUG JACK TO DOUBLE BANANA PLUG

Permits a standard 2 conductor ¼″ dia. phone plug to be used with equipment having banana jacks or binding posts.

UPPER: Phone plug jack, accepts standard ¼″ dia. phone plug, 1$\frac{3}{16}$″ long.

LOWER: Double banana plug on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

COLOR: Black



Model No.
4044

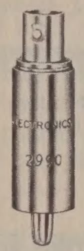
QUANTITY DISC. CODE A **NET 6.85**

ADAPTER — BNC RECEPTACLE TO SHIELDED BANANA PLUG

Permits BNC plug to be used with equipment having banana jacks or binding posts. Ideal for use when shielding of single banana jacks are needed. All metal construction for proper shielding.

UPPER: BNC receptacle, UG1094/U.

LOWER: Shielded single banana plug.



Model No.
2990

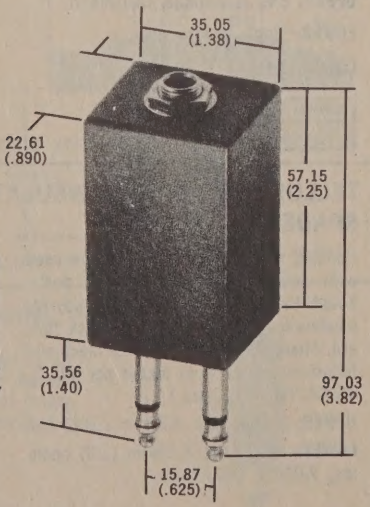
QUANTITY DISC. CODE A **NET 2.95**

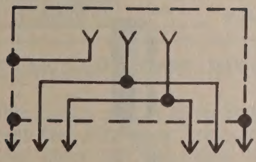
LOOPING PLUG WITH MONITOR JACK

With this combination adapter it is possible to monitor the looping plug circuit. Die cast aluminum housing with baked enamel finish.

UPPER: Phone Jack (Accepts ¼″ Dia. PJ-051 Plug).

LOWER: (2) Phone Plugs, PJ-051 on ⅝″ Centers (Equivalent to WE-310).





Model No.
4104A

QUANTITY DISC. CODE A **NET 29.95**

PHONE PLUG JACK TO BNC RECEPTACLE

This adapter allows a cable with a 2 conductor ¼″ dia. phone plug to be attached to a cable with a BNC plug. All metal construction for proper shielding.

UPPER: Phone plug jack, accepts standard ¼″ dia. phone plug, 1$\frac{3}{16}$″ long.

LOWER: BNC receptacle UG1094/U.

Model No.
4026

QUANTITY DISC. CODE A **NET 6.85**

BNC RECEPTACLE TO TINI-PLUG

Permits BNC plugs to be used with equipment having Tini-Jacks. Readily adapts equipment to available BNC coaxial cables. All metal construction to insure proper shielding.

UPPER: BNC receptacle UG1094/U.

LOWER: 2 conductor Tini-Plug.

Model No.
3837

QUANTITY DISC. CODE A **NET 4.85**

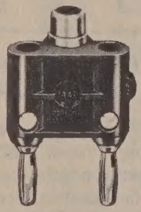
PHONO JACK TO DOUBLE BANANA PLUG

Permits phono plug to be used with equipment having banana jacks or binding posts. Quickly converts a cable with a phono plug to a double banana plug.

UPPER: Phono jack.

LOWER: Double banana plug on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provides side stack-up connections.

COLOR: Black



Model No.
1442

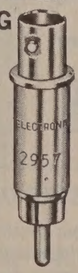
QUANTITY DISC. CODE A **NET 4.85**

BNC RECEPTACLE TO PHONO PLUG

Permits BNC plug to be used with equipment having phono jacks. Readily adapts equipment to available BNC coaxial cables. All metal construction to insure proper shielding.

UPPER: BNC receptacle UG1094/U.

LOWER: Phono plug.



Model No.
2957

QUANTITY DISC. CODE A **NET 3.95**

PHONO JACK TO BNC PLUG

Permits phono plug to be used with equipment having BNC receptacles. Quickly converts a cable with a phono plug to a BNC plug. All metal construction to insure proper shielding.

UPPER: Phono jack.

LOWER: BNC plug.

Model No.
4054

QUANTITY DISC. CODE A **NET 5.85**

All dimensions are shown millimeters (inches)

MISCELLANEOUS TEST ACCESSORIES

POMONA
ELECTRONICS

ADAPTER—MHV RECEPTACLE TO DOUBLE BANANA PLUG

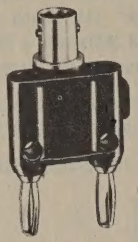
This adapter allows a MHV plug to be used with equipment having ¾″ spaced banana jacks.

UPPER: MHV receptacle.

LOWER: Double banana plug, on ¾″ centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

VOLTAGE RATING: 5,000 volts peak.

COLOR: Black



Model No.
3290

QUANTITY DISC. CODE A **NET 8.85**

ADAPTER—BINDING POSTS TO MHV PLUG

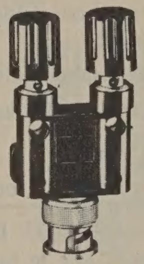
This adapter converts a MHV receptacle to standard ¾″ 5-way binding posts

UPPER: Insulated binding posts, 1 Red, 1 Black, on ¾″ centers with 4,22mm (.166) dia. banana jacks. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

LOWER: MHV plug.

VOLTAGE RATING: 5,000 volts peak.

COLOR: Black



Model No.
3291

QUANTITY DISC. CODE A **NET 13.85**

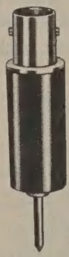
ADAPTER—BNC RECEPTACLE TO SINGLE PIN TIP PLUG

Permits BNC plug to be used with equipment having 2,03mm (.080) dia. pin tip jacks. Inner conductor connected only. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.

UPPER: BNC receptacle, UG1094/U.

LOWER: Single pin tip plug 2,03mm (.080) dia.

COLOR: Black



Model No.
3415

QUANTITY DISC. CODE A **NET 2.85**

QUAD STACKING PLUG

Features four parallel connectors to the same point. Excellent for use when many test points must be tied together.

UPPER: Banana jack, 4,22mm (.166) dia. brass, nickel plated.

CENTER: 3 crossholes, 4,22mm (.166) dia. in body provide side stack-up connection.

LOWER: Banana plug, one piece heat treated beryllium copper spring, nickel plated, for use with 4,22mm (.166) dia. banana jack.

Model No.	Color
3364-0 3364-2	Black Red

QUANTITY DISC. CODE A **NET 2.50**

INSULATED SPADE LUG ADAPTER

Permits single banana plug to be used with equipment having binding posts. Tough thermoplastic molded to body for maximum reliability and low shock hazard. Spade lug body, one piece machined brass, nickel plated.

UPPER: Banana jack, 4,22mm (.166) dia.

LOWER: Spade lug, 6,60mm (.26) opening, 1,52mm (.06) thick.

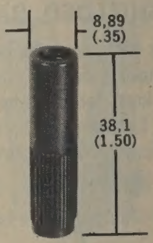
Model No.	Color
1614-0 1614-2	Black Red

★QUANTITY DISC. CODE A **NET 5.00**
(10 per pkg.)

DO-IT-YOURSELF IN-LINE BANANA JACK

This In-Line Banana Jack will accept all standard banana plugs including the 20,3mm (.800) long European version. Jack can either be soldered or crimped. Will accept wires up to 18 AWG.

MATERIAL: Jack, brass electrotin plated. Jacket, Lexan.



Model No.	Color
4237-0 4237-2	Black Red

QUANTITY DISC. CODE A **NET .75**

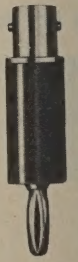
ADAPTER—BNC RECEPTACLE TO SINGLE BANANA PLUG

Permits BNC plug to be used with equipment having banana jacks. Inner conductor connected only. Excellent for adapting laboratory VTVM, oscilloscopes and signal generator inputs to readily available coaxial cables.

UPPER: BNC receptacle, UG1094/U.

LOWER: Single banana plug.

COLOR: Black



Model No.
1894

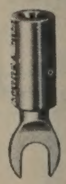
QUANTITY DISC. CODE A **NET 2.75**

TELLURIUM COPPER INSULATED SPADE LUG ADAPTER

Permits single banana plug to be used with equipment having binding posts. Tough thermoplastic molded to body for maximum reliability and low shock hazard. Spade lug body, one piece machined tellurium copper, gold plated per MIL-G-45204, Type 11, Class 1.

UPPER: Banana jack, 4,22mm (.166) dia.

LOWER: Spade lug, 6,60mm (.26) opening, 2,03mm (.08) thick.



Model No.
2305

QUANTITY DISC. CODE A **NET 3.00**
(per pkg.
(package 1 Red & 1 Black)

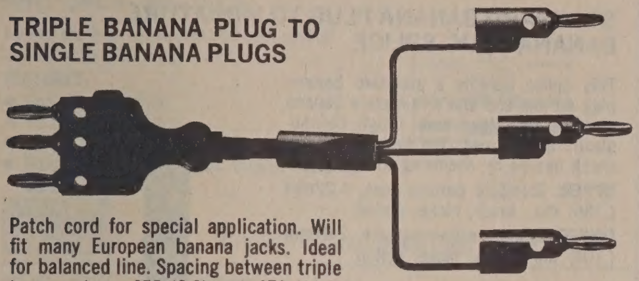
★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

EUROPEAN CABLE ASSEMBLIES & ADAPTERS

POMONA
ELECTRONICS

TRIPLE BANANA PLUG TO SINGLE BANANA PLUGS



Patch cord for special application. Will fit many European banana jacks. Ideal for balanced line. Spacing between triple banana plugs, .355 (8,8) and .470 (11,9) will mate with Model 4163.

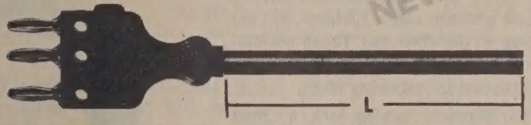
Model No.	Length
1701-18	18″
1701-24	24″
1701-36	36″
1701-48	48″
1701-60	60″

★QUANTITY DISC. CODE **B**

NET 24.95

TRIPLE BANANA PLUG ONE END

NEW



Patch cord for special application. Will fit many European banana jacks. Ideal for balanced line. Spacing between triple banana plugs. 9,0mm (.355) and 11,9mm (.470) will mate with Model 4163.

1st END — Triple Banana Plug:

MATERIAL: Spring, one piece heat treated beryllium copper. Berylco 25 per QQ-C-533. Plug body, brass per QQ-B-626, alloy #360.

FINISH: Nickel plated.

INSULATION: Polyethylene thermoplastic. Color: Black.

CABLE: Two conductor shielded microphone. 22 AWG, stranding 19 x 34 T.C. Color: Gray.

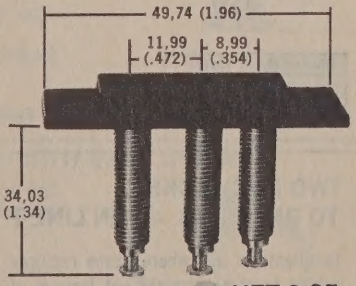
Model No.	Length	Model No.	Length
4523-18	18″	4523-36	36″
4523-24	24″	4523-48	48″
		4523-60	60″

★QUANTITY DISC. CODE **B**

NET 19.95

EUROPEAN TRIPLE BANANA JACK

- Initial connection made with ground receptacle.
- Accepts 20,32mm (.800″) long European banana plugs.
- Mates with Model 1701.
- Supplied with (2) 6-32 hex nuts and screws.



Model No.	Color
4163-0	Black
4163-2	Red
4163-8	Gray

★QUANTITY DISC. CODE **A** **NET 2.95**

STANDARD TYPE BINDING POST

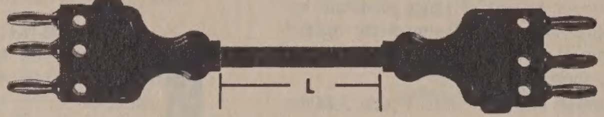
This binding post is made longer to accept the .800″ long European banana plug. Brass body and thumb nut insert, nickel plated per QQ-N-290 Class 2.

Model No.	Color
4244-0	Black
4244-2	Red
4244-4	Yellow
4244-5	Green
4244-6	Blue
4244-9	White

★QUANTITY DISC. CODE **A** **NET 1.50**

TRIPLE BANANA PLUG BOTH ENDS

NEW



Patch cord for special application. Will fit many European banana jacks. Ideal for balanced line. Spacing between triple banana plugs, 9.0mm (.355) and 11,9mm (.470) will mate with Model 4163.

1st End — Triple Banana Plug:

MATERIAL: Spring, one piece heat treated beryllium copper, Berylco 25 per QQ-C-533. Plug body, brass per QQ-B-626, alloy #360.

FINISH: Nickel plated.

INSULATION: Polyethylene thermoplastic. Color: Black.

CABLE: Two conductor shielded microphone. 22 AWG, stranding 19 x 34 T.C. Color: Gray.

2nd END — Same as first.

Model No.	Length	Model No.	Length
4428-18	18″	4428-36	36″
4428-24	24″	4428-48	48″
		4428-60	60″

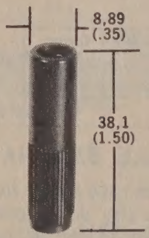
★QUANTITY DISC. CODE **B**

NET 24.95

DO-IT-YOURSELF IN-LINE BANANA JACK

This In-Line Banana Jack will accept all standard banana plugs including the 20,3mm (.800) long European version. Jack can either be soldered or crimped. Will accept wires up to 18 AWG.

MATERIAL: Jack, brass electrotin plated. Jacket, Lexan.



Model No.	Color
4237-0	Black
4237-2	Red

QUANTITY DISC. CODE **A** **NET .75**

DO-IT-YOURSELF IN-LINE BANANA PLUG

NEW

This In-line Banana Plug is ideal for on the job repairs of patch cords. Plug can either be soldered or crimped. Will accept wires up to 18 AWG.

MATERIAL: Plug body: brass, electro-tin plated. Spring: Beryllium copper. Jacket: Lexan.

Model No.	Color
4521-0	Black
4521-2	Red

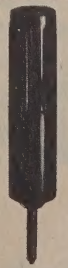
QUANTITY DISC. CODE **A** **NET 1.50**

DO-IT-YOURSELF 2,03MM (.080) DIA. PIN TIP PLUG

NEW

This In-Line ,03mm (.080) dia. pin tip plug is ideal for on the job repairs of patch cords. Plug can either be soldered or crimped. Will accept wires up to 18 AWG.

MATERIAL: Brass electrotin plated. Jacket: Lexan.



Model No.	Color
4495-0	Black
4495-2	Red

★QUANTITY DISC. CODE **A** **NET 1.25**

All dimensions are shown millimeters (inches)

SPLICES/BNC TEST ADAPTERS

POMONA
ELECTRONICS

SINGLE MINIATURE BANANA PLUG SPLICE

Permits splicing of single miniature banana plugs. Tough thermoplastic molded onto the body eliminates shock hazard by enclosing plugs.

UPPER: Miniature banana jacks 2,64mm (.104) dia., brass, nickel plated.

LOWER: Same as upper.

Model No.	Color
3833-0	Black
3833-2	Red

QUANTITY DISC. CODE A NET 9.50
(10 per pkg.)

SINGLE 2,03MM (.080) DIA. PIN TIP PLUG SPLICE

Permits splicing of single 2,03mm (.080) dia. pin tip patch cords. Tough thermoplastic molded onto the body eliminates shock hazard by enclosing plugs.

UPPER: Tip jack, beryllium copper, gold plated, accepts 2,03mm (.080) dia. pin.

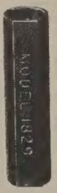
LOWER: Same as upper.

Model No.	Color
3832-0	Black
3832-2	Red

★QUANTITY DISC. CODE A NET 9.50
(10 per pkg.)

SINGLE BANANA PLUG SPLICE

Provides rapid method for splicing single banana plug patch cords. Reduces the necessity of storing extra long patch cords. Molded thermoplastic body eliminates shock hazard by completely enclosing banana plug contact. Brass, nickel plated banana jack, 4,22mm (.166) dia.



Model No.	Color
1829-0	Black
1829-2	Red

★QUANTITY DISC. CODE A NET 4.00
(10 per pkg.)

ADAPTER — BINDING POSTS TO DOUBLE BANANA PLUG WITH BNC JACK

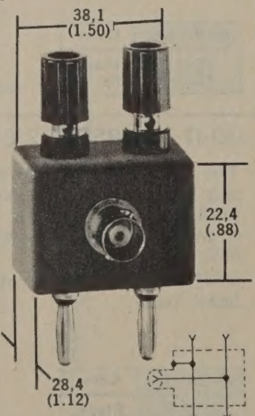
With this combination adapter it is possible to connect to equipment cables with both, double banana plugs and BNC plugs. Excellent for use with signal generators. Die cast aluminum housing with baked enamel finish.

UPPER: Insulated binding posts on ¾″ centers. Black/Red.

CENTER: BNC receptacle, UG1094/U.

LOWER: Banana plugs on ¾″ centers, nickel plated.

COLOR: Blue.



Model No.
4050

QUANTITY DISC. CODE A NET 15.85

STANDARD BANANA PLUG TO MINIATURE BANANA PLUG SPLICE

This splice accepts a standard banana plug on one end and a miniature banana plug on the other end. Tough thermoplastic molded onto the body eliminates shock hazard by enclosing the plugs.

UPPER: Standard banana jack, 4,22mm (.166) dia., brass, nickel plated.

LOWER: Miniature banana jack, 2,64mm (.104) dia., brass, nickel plated.

Model No.	Color
3835-0	Black
3835-2	Red

★QUANTITY DISC. CODE A NET 5.00
(10 per pkg.)

STANDARD BANANA PLUG TO 2,03MM (.080) DIA. PIN TIP PLUG SPLICE

This splice accepts a standard banana plug on one end and a 2,03mm .080 pin tip plug on the other end. Tough thermoplastic molded onto the body eliminates shock hazard by enclosing plugs.

UPPER: Standard banana jack, 4,22mm (.166) dia. Brass, nickel plated.

LOWER: Tip jack, beryllium copper, gold plated, accents 2,03mm (.808) dia. pin.

Model No.	Color
3834-0	Black
3834-2	Red

★QUANTITY DISC. CODE A NET 8.50
(10 per pkg.)

DOUBLE BANANA PLUG SPLICE

Provides rapid method for splicing cables. Reduces necessity of storing extra long cables. Molded thermoplastic body eliminates shock hazard by completely enclosing banana plug contact. Brass, nickel plated banana jacks. 4,22mm (.166) dia., on ¾″ centers.

Model No.	Color
1823-0	Black
1823-2	Red

★QUANTITY DISC. CODE A NET 9.50
(10 per pkg.)

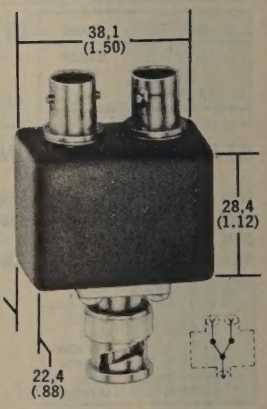
TWO BNC JACKS TO BNC PLUG — "IN LINE T"

Excellent for use where space requires cables to come straight out instead of at a right angle. Die cast aluminum housing with baked enamel finish. All metal construction to insure proper shielding.

UPPER: (2) BNC receptacles UG1094/U.

LOWER: BNC plug UG1104A/U.

COLOR: Blue.



Model No.
4057

QUANTITY DISC. CODE A NET 15.85

All dimensions are shown millimeters (inches)

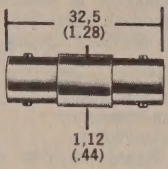
COAXIAL TEST ACCESSORIES

POMONA ELECTRONICS

BNC JACK TO JACK

Allows the interconnection of two coaxial cables with BNC plugs.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.



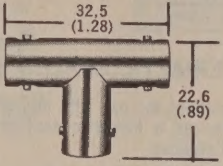
Model No.
3283

QUANTITY DISC. CODE A **NET 1.85**

BNC "T" — 3 JACKS

Allows the interconnection of three coaxial cables with BNC plugs.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.



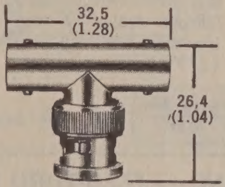
Model No.
3284

QUANTITY DISC. CODE A **NET 6.25**

BNC "T" JACK — PLUG — JACK

With this adapter, equipment or coaxial cables having a single BNC jack are changed to two BNC jacks.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper female and outer male contact.



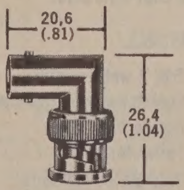
Model No.
3285

QUANTITY DISC. CODE A **NET 4.85**

RIGHT ANGLE BNC JACK TO BNC PLUG

Adapts straight BNC plug to right angle BNC plug.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper female and outer finger contact.
- Gold flashed female and male contact.



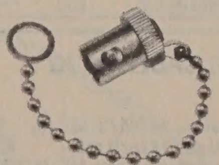
Model No.
3534

QUANTITY DISC. CODE A **NET 4.95**

BNC CAP FOR PLUGS — WITH BEAD CHAIN

Female dust cap for protection of BNC plugs from dirt and accidental shorting.

FEATURES:
- Non-tarnish finish.
- 3⅛" bead chain.
- 7,11mm (.28) dia. hole in lug.



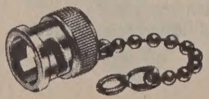
Model No.
4157

QUANTITY DISC. CODE A **NET 1.75**

BNC CAP FOR JACKS — WITH BEAD CHAIN

Male dust cap for protection of BNC jacks from dirt and accidental shorting.

FEATURES:
- Non-tarnish finish.
- 2¼" bead chain.
- 3,56mm (.14) dia. hole in lug.



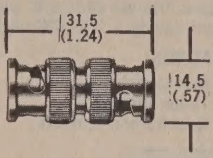
Model No.
3839

QUANTITY DISC. CODE A **NET 1.50**

BNC PLUG TO PLUG

Allows the interconnection of two coaxial cables with BNC jacks.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contacts.
- Gold flashed male contacts.



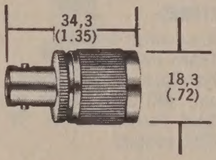
Model No.
3533

QUANTITY DISC. CODE A **NET 3.95**

BNC JACK TO UHF PLUG

Allows the use of a BNC plug on equipment having a UHF jack.

FEATURES:
- Non-tarnish finish.
- Rexolite insulation.
- Gold flashed beryllium copper female contact.
- Gold flashed male contact.



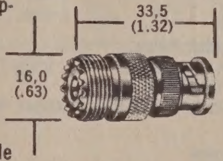
Model No.
3286

QUANTITY DISC. CODE A **NET 2.95**

UHF JACK TO BNC PLUG

Allows the use of a UHF plug on equipment having a BNC jack.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Rexolite insulation.
- Gold flashed Phosphor Bronze female UHF and male BNC contacts.



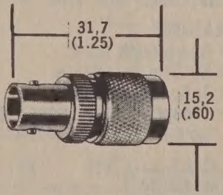
Model No.
3287

QUANTITY DISC. CODE A **NET 4.25**

BNC JACK TO TNC PLUG

Allows the use of a BNC plug on equipment having a TNC jack.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger TNC contacts.
- Gold flashed beryllium copper female BNC and TNC male contact.



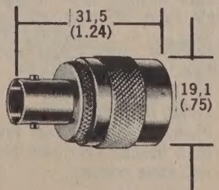
Model No.
3844

QUANTITY DISC. CODE A **NET 7.25**

BNC JACK TO TYPE "C" PLUG

Allows the use of a BNC plug on equipment having a Type "C" jack.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper Type "C" outer finger contact.
- Gold flashed beryllium copper female BNC and TNC male contact.



Model No.
3845

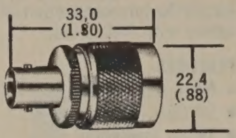
QUANTITY DISC. CODE A **NET 5.45**

All dimensions are shown millimeters (inches)

COAXIAL TEST ACCESSORIES

POMONA ELECTRONICS

BNC JACK TO TYPE "N" PLUG



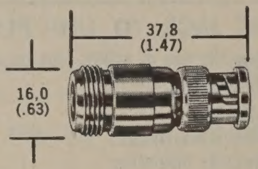
Allows the use of a BNC plug on equipment having a Type "N" jack.

FEATURES:
- Non-tarnish finish.
- Teflon insulation.
- Gold flashed contacts.

Model No.
3288

QUANTITY DISC. CODE A **NET 3.50**

TYPE "N" JACK TO BNC PLUG



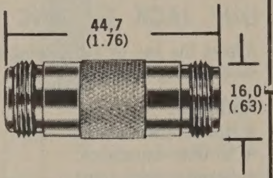
Allows the use of a Type "N" plug on equipment having a BNC jack.

FEATURES:
- Non-tarnish finish.
- Teflon insulation.
- Beryllium copper female "N" contact and BNC outer finger contact.
- Gold flashed female "N" and male BNC contact.

Model No.
3535

QUANTITY DISC. CODE A **NET 4.95**

TYPE "N" JACK TO JACK



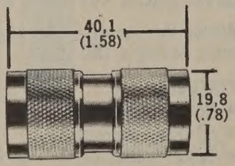
Allows the interconnection of two coaxial cables with Type "N" plugs.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.

Model No.
3841

QUANTITY DISC. CODE A **NET 4.50**

TYPE "N" PLUG TO PLUG



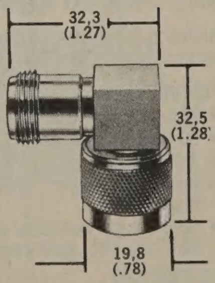
Allows the interconnection of two coaxial cables with Type "N" jacks.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Phosphor bronze outer finger contacts. Gold flashed male contacts.

Model No.
3842

QUANTITY DISC. CODE A **NET 5.25**

RIGHT ANGLE TYPE "N" JACK TO TYPE "N" PLUG



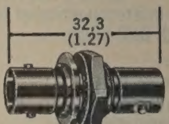
Adapts straight Type "N" plug to right angle Type "N" plug.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Phosphor bronze outer finger contact.
- Gold flashed beryllium copper female and male contact.

Model No.
3843

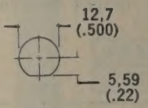
QUANTITY DISC. CODE A **NET 5.85**

ISOLATED GROUND BNC JACK TO JACK



Outer conductor is isolated from the panel. Excellent for feeding through panels which require a floating shield.

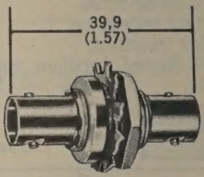
FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Mounts in panels up to 4,44mm (.175") thick.



Model No.
3846

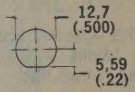
QUANTITY DISC. CODE A **NET 8.85**

HERMETIC SEALED BNC JACK TO JACK



Excellent for use with equipment which requires a hermetic seal for pressure differences.

FEATURES:
- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Silicone rubber 0 ring.
- Mounts in panels up to 7,09mm (.279") thick.



Model No.
3847

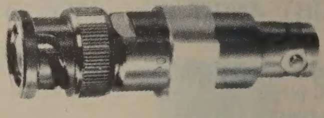
QUANTITY DISC. CODE A **NET 5.45**

BNC — FEED-THRU SERIES RESISTOR

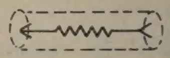
NEW

Ideal for adding in series resistance to coaxial lines with BNC connectors.

1st end: Female BNC.
2nd end: Male BNC.



FEATURES:
- 5% 2 watt resistor.
- Resistance value stamped on body.
- Non-tarnish finish.
- Teflon insulation.
- Gold plated contacts.



Model No.	Resist. in Ohms
4391-1	50
4391-2	75
4391-3	93
4391-4	600

QUANTITY DISC. CODE A **NET 7.85**

BNC CABLE PLUG

NEW

For use on RG58A/U, 58C/U, 141/U and 141A/U cable. This connector meets MIL-C-39012 equirements.

FEATURES:
- Non tarnish finish
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed male contacts.

Model No.
4488

QUANTITY DISC. CODE A **NET 1.95**

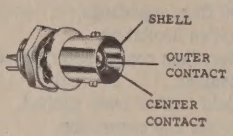
All dimensions are shown millimeters (inches)

COAXIAL TEST ACCESSORIES / TERMINATIONS

POMONA ELECTRONICS

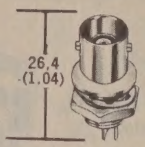
TWINAX JACKS, PLUGS

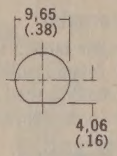
Twinax patch cords and jacks accommodate the need for low level signal patching and balanced line applications. Designed for use with 2 conductor shielded cable.
These connectors feature a concentric design with a center contact, outer contact and outer shell (see dwg.). This concentric design does not require matching of halves such as the polarized stepped insulator connectors.



TWINAX BULKHEAD RECEPTACLE

FEATURE:
- Mounts in panels up to 6,35mm (.25) thick.



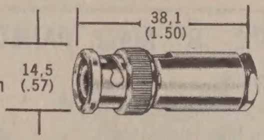


Model No.
3580

QUANTITY DISC. CODE A **NET 6.95**

TWINAX CABLE PLUG

- For use with RG 108A/U and Belden 9272.



Model No.
3600

QUANTITY DISC. CODE A **NET 7.85**

MATERIAL:
- Bodies and fittings: Brass per QQ-B-626, alloy #360.
- Insulators: Teflon per MIL-P-19468.
- Center contacts: Female — beryllium copper per QQ-C-530 Cond. H.
  Male — brass per QQ-B-626, alloy #360.
- Outer contacts: Beryllium copper per QQ-C-530 Cond. H.

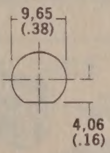
FINISH:
- Bodies and fittings: Non-tarnish.
- Center contacts: Gold over copper plate.
- Outer contacts: Gold over copper plate.

RATING:
- 500 VRMS.

NEW

TWINAX BNC HERMETIC SEALED BULKHEAD RECEPTACLE

FEATURES:
- Mounts in panels up to 6,35mm (.25") thick.
- Gasket seal will withstand 50 psi.

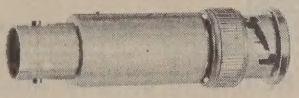


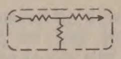
Model No.
4388

QUANTITY DISC. CODE A **NET 19.95**

BNC 50-OHM ATTENUATORS

For use with pulse, microwave, or UHF instruments.
1st end: Female BNC.
2nd end: Male BNC.
50 Ohm, 2 watt T-Pad network.





FEATURES:
- Non-tarnish finish.
- Teflon insulation.
- Gold plated contacts.

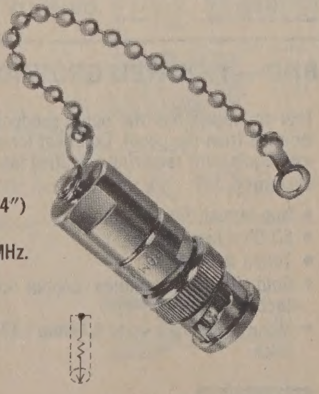
Model No.	Attenuation	VSWR	Attenuation (Limits)
4108-1	3 db	1.1 to 1 GHz	±0.4 db to 1 GHz
4108-2	6 db	1.2 to 2 GHz	±0.45 db to 2 GHz
4108-3	10 db	1.35 to 4 GHz	±0.65 db to 4 GHz
4108-4	14 db	1.45 to 6 GHz	±0.75 db to 6 GHz
4108-5	20 db	1.65 to 8 GHz	±0.9 db to 8 GHz

QUANTITY DISC. CODE A **NET 24.95**

BNC RESISTOR TERMINATED PLUG

Ideal for terminating coaxial lines.

FEATURES:
- 1% resistor, ½ watt.
- Resistance value stamped on body.
- Non-tarnish finish.
- Teflon insulation.
- Gold plated male contact.
- 3½" bead chain with 3,56mm (.14") dia. hole in lug.
- VSWR: 1.1 max. from DC to 250 MHz.



Model No.	Resist. in Ohms
3840-1	50
3840-2	75
3840-3	93
3840-4	100
3840-5	600

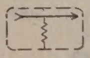
QUANTITY DISC. CODE A **NET 4.85**

BNC FEED-THRU TERMINATION

Ideal for terminating pulse, microwave or UHF instruments in their characteristic impedance.
1st end: Female BNC.
2nd end: Male BNC.
50 Ohm termination resistor, 1%, 2W.

POMONA
ELECT
4119

FEATURES:
- Non-tarnish finish.
- Teflon insulation.
- Gold plated contacts.
- Maximum VSWR: DC to 250 MHz: 1.1
  250 MHz to 500 MHz: 1.2



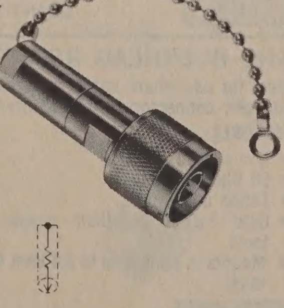
Model No.	Resist. in Ohms
4119-1	50
4119-2	75
4119-3	93
4119-4	600

QUANTITY DISC. CODE A **NET 17.85**

TYPE N-RESISTOR TERMINATED PLUG

Ideal for terminating coaxial lines.

FEATURES:
- 1% 1 watt, deposited carbon resistor.
- Resistance value stamped on body.
- Non-tarnish finish.
- Teflon insulation.
- Gold plated male contact.
- 5" bead chain with 3,56mm (.14") dia. hole in lug.
- VSWR: 1.15 max. from DC to 100 MHz.



Model No.	Resist. in Ohms
4240-1	50
4240-2	75
4240-3	93
4240-4	100
4240-5	600

QUANTITY DISC. CODE A **NET 8.85**

All dimensions are shown millimeters (inches)

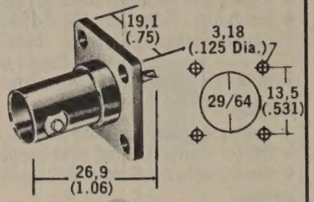
PANEL/BULKHEAD RECEPTACLES

POMONA ELECTRONICS

BNC FEMALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Beryllium copper outer finger contact.
- Solder cup connection.


19,1 (.75)
3,18 (.125 Dia.)
29/64
13,5 (.531)
26,9 (1.06)

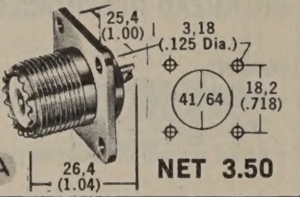
Model No.
2451

QUANTITY DISC. CODE **A** **NET 1.85**

UHF FEMALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- Teflon insulation.
- Gold flashed phosphor bronze contact.
- Solder cup connection.


25,4 (1.00)
3,18 (.125 Dia.)
41/64
18,2 (.718)
26,4 (1.04)

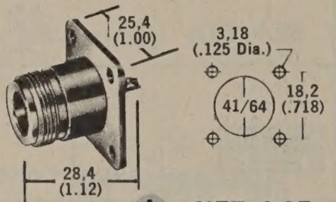
Model No.
2449

QUANTITY DISC. CODE **A** **NET 3.50**

TYPE "N" FEMALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Solder cup connection.

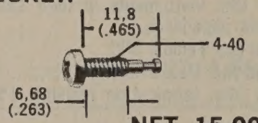

25,4 (1.00)
3,18 (.125 Dia.)
41/64
18,2 (.718)
28,4 (1.12)

Model No.
2455

QUANTITY DISC. CODE **A** **NET 2.95**

SOLDER TURRET TERMINAL SCREW

Excellent for mounting of panel receptacles. Turret on end of screw for soldering. #4-40, Phillips head, steel, cadmium plated.


11,8 (.465)
4-40
6,68 (.263)

Model No.
2352

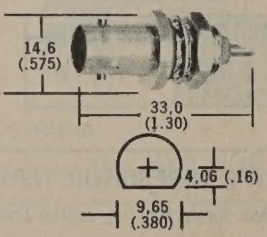
QUANTITY DISC. CODE **A** **NET 15.00** (100 per pkg.)

BNC PRESSURIZED BULKHEAD RECEPTACLE

Excellent for use with equipment which requires pressure differences. Front hole mounting.

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Silicon rubber O ring, withstands 50 psi.
- Mounts in panels up to 6,15mm (.242) thick.


14,6 (.575)
33,0 (1.30)
4,06 (.16)
9,65 (.380)

Model No.
4158

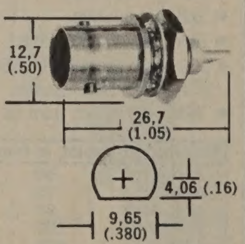
QUANTITY DISC. CODE **A** **NET 4.25**

BNC BULKHEAD RECEPTACLE

Ideal for use where space requirements between connectors are at a premium.

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Mounts in panels up to 3,40mm (.134) thick.


12,7 (.50)
26,7 (1.05)
4,06 (.16)
9,65 (.380)

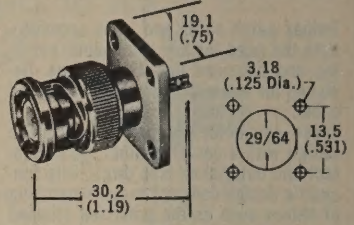
Model No.
4160

QUANTITY DISC. CODE **A** **NET 1.50**

BNC MALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contact.
- Gold flashed male contact.
- Solder cup connection.


19,1 (.75)
3,18 (.125 Dia.)
29/64
13,5 (.531)
30,2 (1.19)

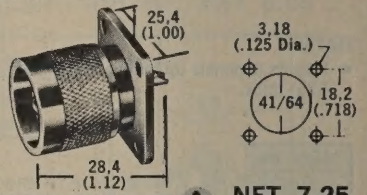
Model No.
2447

QUANTITY DISC. CODE **A** **NET 3.75**

UHF MALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- Teflon insulation.
- Gold flashed male contact.
- Solder cup connection.


25,4 (1.00)
3,18 (.125 Dia.)
41/64
18,2 (.718)
28,4 (1.12)

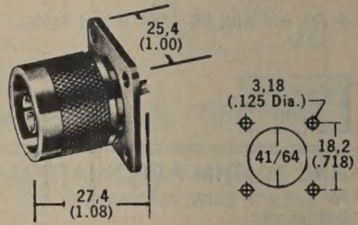
Model No.
2450

QUANTITY DISC. CODE **A** **NET 7.25**

TYPE "N" MALE PANEL RECEPTACLE

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Beryllium copper outer finger contact.
- Gold flashed male contact.
- Solder cup connection.


25,4 (1.00)
3,18 (.125 Dia.)
41/64
18,2 (.718)
27,4 (1.08)

Model No.
2454

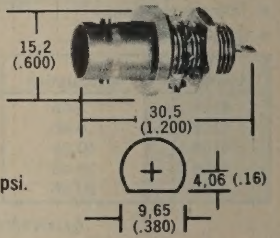
QUANTITY DISC. CODE **A** **NET 9.85**

BNC HERMETIC SEALED BULKHEAD RECEPTACLE

Excellent for use with equipment which requires a hermetic seal for pressure differences. Front hole mounting.

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Silicon rubber O ring, withstands 50 psi.
- Mounts in panels up to 9,37mm (.369) thick.


15,2 (.600)
30,5 (1.200)
4,06 (.16)
9,65 (.380)

Model No.
4159

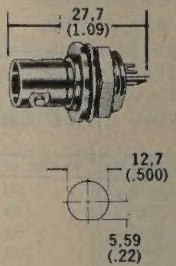
QUANTITY DISC. CODE **A** **NET 4.95**

BNC — ISOLATED GROUND BULKHEAD RECEPTACLE

This connector has the outer conductor isolated from the panel. Excellent for use with equipment requiring a floating input.

FEATURES:

- Non-tarnish finish.
- 50 Ohm impedance.
- Teflon insulation.
- Gold flashed beryllium copper contacts.
- Mounts in panels up to 4,44mm (.175) thick.


27,7 (1.09)
12,7 (.500)
5,59 (.22)

Model No.
3778

QUANTITY DISC. CODE **A** **NET 5.45**

All dimensions are shown millimeters (inches)

SMA ADAPTERS/TERMINATIONS

POMONA ELECTRONICS

These SMA adapters are manufactured in accordance with MIL-C-39012. The 50 ohm miniature series R.F. connectors are especially adaptable to microwave component applications such as couplers, dividers and mixers.

MATERIAL:

- Bodies and coupling nut: Beryllium copper per QQ-C-530, cond. H.T., gold plated.
- Female contact: Beryllium copper, gold plated.
- Male contact: Brass per QQ-B-626, alloy #360, cond. H.T., hard, gold plated.
- Teflon insulation.
- Gaskets: Silicone rubber per ZZ-R-765a, Class II, Grade 50.

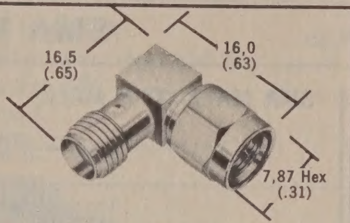
SPECIFICATIONS:

- Nominal impedance: 50 ohms.
- Frequency range: 0-12.4 GHz.
- Dielectric withstanding voltage: 1000 VRMS, 60 Hz at sea level.
- R.F. leakage: 90 db min. between 6-8 GHz.
- Temperature range: −65°C to +165°C.

ACTUAL SIZE

WITHIN SERIES

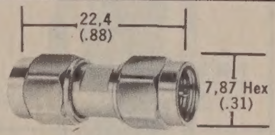
FEMALE TO MALE RIGHT ANGLE


16,5
(.65)
16,0
(.63)
7,87 Hex
(.31)

Model No. 4282

QUANTITY DISC. CODE A NET 17.85

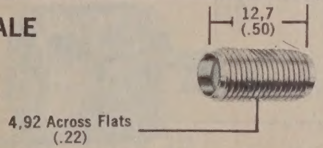
FEED THRU MALE TO MALE


22,4
(.88)
7,87 Hex
(.31)

Model No. 4283

QUANTITY DISC. CODE A NET 9.85

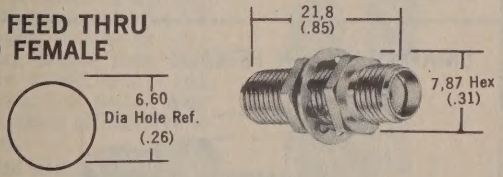
FEED THRU FEMALE TO FEMALE


12,7
(.50)
4,92 Across Flats
(.22)

Model No. 4284

QUANTITY DISC. CODE A NET 8.85

BULKHEAD FEED THRU FEMALE TO FEMALE

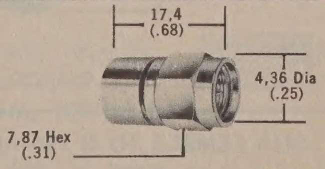

6,60
Dia Hole Ref.
(.26)
21,8
(.85)
7,87 Hex
(.31)

Model No. 4285

QUANTITY DISC. CODE A NET 8.85

MALE TERMINATION

VSWR Readings
1:1 Max DC to 12.4 GHz
1.25 Max to 12.4 to 18 GHz
50 Ohms ½ Watt

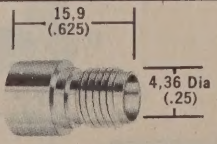

17,4
(.68)
4,36 Dia
(.25)
7,87 Hex
(.31)

Model No. 4286

QUANTITY DISC. CODE A NET 34.50

FEMALE TERMINATION

VSWR Readings
1:1 Max DC to 12.4 GHz
1.25 Max to 12.4 to 18 GHz
50 Ohms ½ Watt

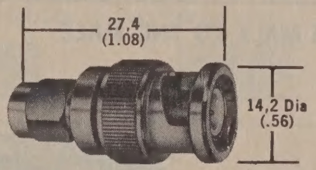

15,9
(.625)
4,36 Dia
(.25)

Model No. 4287

QUANTITY DISC. CODE A NET 32.95

SMA TO BNC

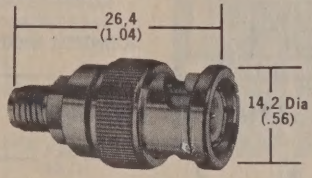
SMA MALE TO BNC MALE


27,4
(1.08)
14,2 Dia
(.56)

Model No. 4288

QUANTITY DISC. CODE A NET 8.85

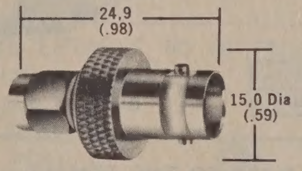
SMA FEMALE TO BNC MALE


26,4
(1.04)
14,2 Dia
(.56)

Model No. 4289

QUANTITY DISC. CODE A NET 10.50

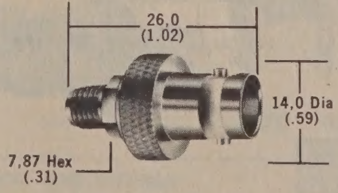
SMA MALE TO BNC FEMALE


24,9
(.98)
15,0 Dia
(.59)

Model No. 4290

QUANTITY DISC. CODE A NET 7.85

SMA FEMALE TO BNC FEMALE

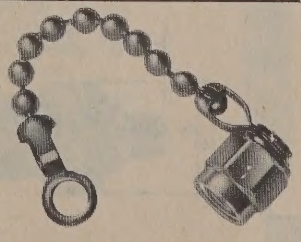

26,0
(1.02)
14,0 Dia
(.59)
7,87 Hex
(.31)

Model No. 4291

QUANTITY DISC. CODE A NET 9.85

SMA DUST CAPS

NEW



Model No. 4484

QUANTITY DISC. CODE A NET 5.85

All dimensions are shown millimeters (inches)

SMA ADAPTERS

POMONA
ELECTRONICS

These SMA adapters are manufactured in accordance with MIL-C-39012. The 50 ohm miniature series R.F. connectors are especially adaptable to microwave component applications such as couplers, dividers and mixers.

MATERIAL:

- Bodies and coupling nut: Beryllium copper per QQ-C-530, cond. H.T., gold plated.
- Female contact: Beryllium copper, gold plated.
- Male contact: Brass per QQ-B-626, alloy #360, cond. H.T., hard, gold plated.
- Teflon insulation.
- Gaskets: Silicone rubber per ZZ-R-765a, Class II, Grade 50.

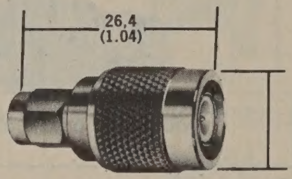
SPECIFICATIONS:

- Nominal impedance: 50 ohms.
- Frequency range: 0-12.4 GHz.
- Dielectric withstanding voltage: 1000 VRMS, 60 Hz at sea level.
- R.F. leakage: 90 db min. between 6-8 GHz.
- Temperature range: −65°C to +165°C.

SMA TO TNC

ACTUAL SIZE

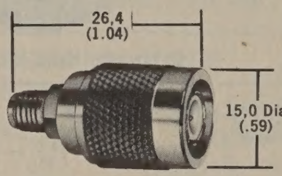
SMA MALE TO TNC MALE



Model No.
4292

QUANTITY DISC. CODE A **NET 9.85**

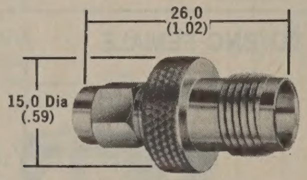
SMA FEMALE TO TNC MALE



Model No.
4293

QUANTITY DISC. CODE A **NET 9.85**

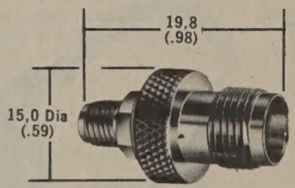
SMA MALE TO TNC FEMALE



Model No.
4294

QUANTITY DISC. CODE A **NET 7.85**

SMA FEMALE TO TNC FEMALE

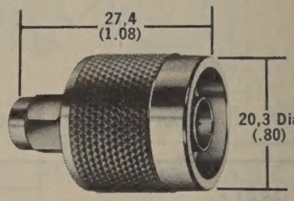


Model No.
4295

QUANTITY DISC. CODE A **NET 9.85**

SMA TO N

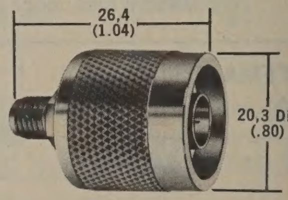
SMA MALE TO N MALE



Model No.
4296

QUANTITY DISC. CODE A **NET 9.85**

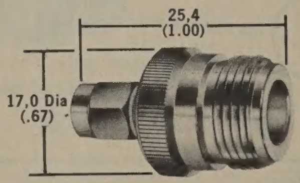
SMA FEMALE TO N MALE



Model No.
4297

QUANTITY DISC. CODE A **NET 10.85**

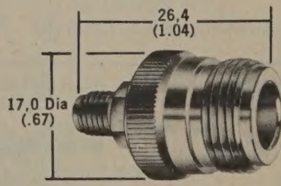
SMA MALE TO N FEMALE



Model No.
4298

QUANTITY DISC. CODE A **NET 7.5**

SMA FEMALE TO N FEMALE



Model No.
4299

QUANTITY DISC. CODE A **NET 10.8**

All dimensions are shown millimeters (inche

COMPONENT MOUNTING ISOLATION PLUGS

POMONA ELECTRONICS

SPLIT-TERMINAL ISOLATION PLUGS

Create passive and active networks, voltage dividers, isolation networks or attenuators with the split-terminal isolation plugs described below.

Gold flashed solder turret terminals provide permanent, reliable noise-free connections for component mounting.

Tough thermoplastic material molded to plug body and connectors insures maximum strength, moisture resistance and excellent insulative properties.

Specifications for MDP-X, 1390, 1837, 1468:

- Fits standard 4,22mm (.166) dia. banana jack.
- Spring, heat treated beryllium copper berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Nickel plated per QQ-N-290, class 2.
- Contact resistance less than 0.001 Ohms per banana plug.

TYPICAL APPLICATION

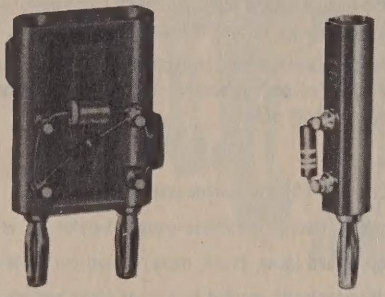


PHOTO REDUCED TO TWO-THIRDS SIZE

Model No.
MDP-X

Model No.
1390

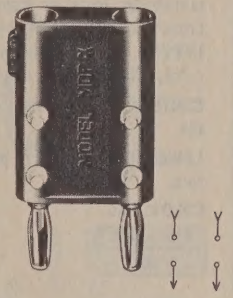
DOUBLE BANANA PLUG, FOUR TERMINAL ISOLATION

Provides four terminal isolation. Top stack-up receptacles isolated from lower plugs. Ideal for insertion of matching networks in laboratory VTVM's, signal generators, etc. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Double banana jacks, 4,22mm (.166) dia., on ¾″ centers.

LOWER: Double banana plug on ¾″ centers.

COLOR: Red.



Model No.
MDP-X

QUANTITY DISC. CODE Ⓐ **NET 3.85**

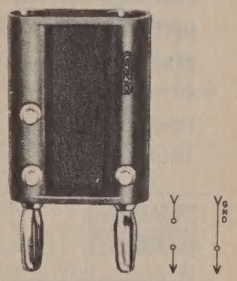
DOUBLE BANANA PLUG, THREE TERMINAL ISOLATION

Provides three terminal isolation. Excellent for "L" and "Pi" networks. Plug and receptacle nickel plated. Gold flashed solder turret terminals for permanent noise-free connections. "Ground" is straight feed-thru. Hot side isolated.

UPPER: Banana jacks, 4,22mm (.166) dia. on ¾″ centers.

LOWER: Double banana plug on ¾″ centers.

COLOR: Blue.



Model No.
1837-6

QUANTITY DISC. CODE Ⓐ **NET 2.95**

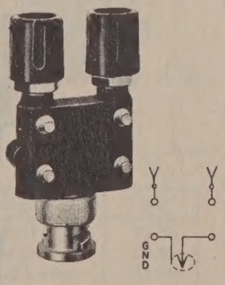
ADAPTER — BINDING POSTS TO BNC PLUG, ISOLATION

Permits single or double banana plugs to be used with equipment having BNC receptacle. Provides isolation for a four terminal network. Binding posts facilitate connections of test leads or additional components. Gold flashed solder turret terminals provide permanent noise-free connections.

UPPER: Insulated binding posts, on ¾″ centers with 4,22mm (.166) dia. jacks.

LOWER: BNC plug.

COLOR: Black.



Model No.
1469

QUANTITY DISC. CODE Ⓐ **NET 10.85**

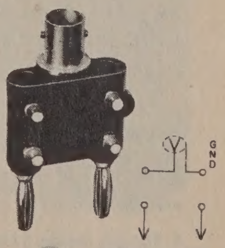
ADAPTER — BNC RECEPTACLE TO DOUBLE BANANA PLUG, ISOLATION

Permits BNC plug to be used with equipment having banana jacks. Provides isolation for a four terminal network. Excellent for matching pad networks. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: BNC receptacle.

LOWER: Double banana plug on ¾″ centers.

COLOR: Black.



Model No.
1468

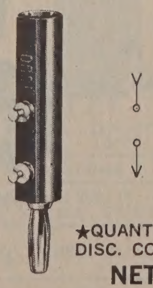
QUANTITY DISC. CODE Ⓐ **NET 9.85**

PLUG — SINGLE BANANA, ISOLATION

Provides two terminal isolation. Top stack-up receptacle is isolated from lower plug to permit addition of series resistors, diodes, etc. Ideal for computers, lab, circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Banana jack, 4,22mm (.166) dia.

LOWER: Banana plug.



Model No.	Color
1390-0	Black
1390-2	Red

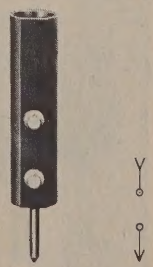
★QUANTITY DISC. CODE Ⓐ **NET 1.95**

PLUG — PIN TIP, ISOLATION

Pin tip jack is isolated from 2,03mm (.080) pin tip plug. Provides for addition of series components. Ideal for use with computer boards, lab circuit designs, etc. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Tip jack, beryllium copper, gold flashed; accepts 2,03mm (.080) dia. pin.

LOWER: Pin tip, 2,03mm (.080) dia. Brass, nickel plated.



Model No.	Color
1910-0	Black
1910-2	Red

★QUANTITY DISC. CODE Ⓐ **NET 2.50**

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

SERIES PARALLEL ISOLATION PLUGS & CONNECTOR TEST ADAPTERS

POMONA ELECTRONICS

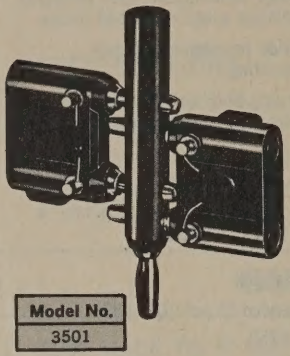
SERIES PARALLEL ISOLATION PLUGS

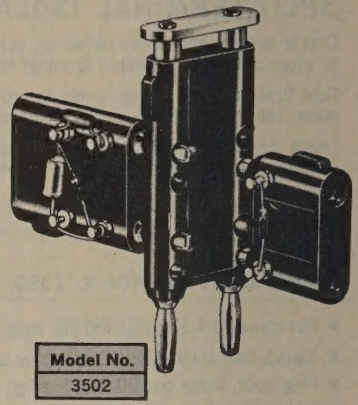
These plugs enable you to build unlimited combinations of series parallel networks e.g., voltage dividers attenuator, etc.

Upper crossholes spaced ¾″ on centers from lower crossholes to allow connection of double banana plugs. Double banana plugs may be plugged in from both sides.

FEATURES:

- Fits 4,22mm (.166) dia. banana jacks.
- Spring, heat treated beryllium copper berylco 25 per QQ-C-533.
- Plug bodies and jacks, brass, nickel plated per QQ-N-290 class 2.
- Tough thermoplastic molded to banana jacks and plug bodies.


Model No. 3501


Model No. 3502

SERIES-PARALLEL ISOLATION PLUG

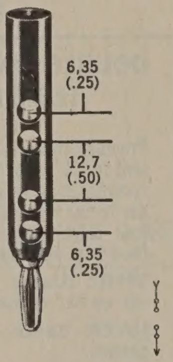
Top banana jack and upper pair of crossholes isolated from lower pair of crossholes and banana plug.

UPPER: Banana jack 4,22mm (.166) dia.

CENTER: 4 crossholes 4,22mm (.166) dia.

LOWER: Banana plug.

COLOR: Red.



Model No.
3501

QUANTITY DISC. CODE A **NET 3.95**

DUAL SERIES-PARALLEL ISOLATION PLUG

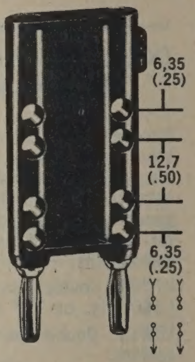
Excellent for building attenuators, voltage dividers, isolation networks, etc. Top banana jacks and upper pair of crossholes isolated from lower pair of crossholes and banana plugs.

UPPER: Double banana jack 4,22mm (.166) dia., on ¾″ centers.

CENTER: 8 crossholes 4,22mm (.166) dia.

LOWER: Double banana plug on ¾″ centers.

COLOR: Red.



Model No.
3502

QUANTITY DISC. CODE A **NET 5.85**

CONNECTOR TEST ADAPTERS

An ideal test adapter for the rapid testing of the hard to get at contacts of multi-pin MS type connectors such as miniature circular, standard circular and rack and panel. Excellent for testing of continuity, voltage and signal on individual contacts. Test adapter available in pin and socket contact sizes 20, 16 and 12.

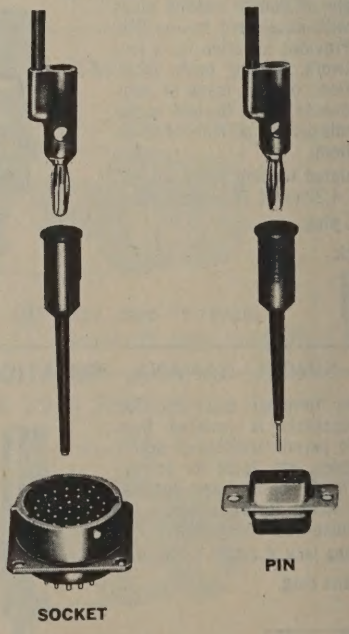
- Gold flashed contacts conform to "MS" dimensions.
- Flexible tip prevents damage to connector contacts if test adapter is accidentally bent.
- Flexible tip allows testing of adjacent contacts.
- Fully insulated to prevent accidental shorting.
- Accepts standard banana plug.

UPPER: Banana jack, 4,22mm (.166) dia., brass, nickel plated.

LOWER: "MS" style contact, gold flashed, see tab block.

Model No.	Color	Contact Size	Type	Net
3560-0	Black	20	Socket	1.50
3560-2	Red	20	Socket	1.50
3561-0	Black	20 1,02mm (.040 dia.)	Pin	1.50
3561-2	Red	20 1,02mm (.040 dia.)	Pin	1.50
3562-0	Black	16	Socket	1.75
3562-2	Red	16	Socket	1.75
3563-0	Black	16 1,60mm (.063 dia.)	Pin	1.50
3563-2	Red	16 1,60mm (.063 dia.)	Pin	1.50
3564-0	Black	12	Socket	2.50
3564-2	Red	12	Socket	2.50
3565-0	Black	12 2,36mm (.093 dia.)	Pin	1.50
3565-2	Red	12 2,36mm (.093 dia.)	Pin	1.50

TYPICAL APPLICATION



★QUANTITY DISC. CODE A

All dimensions are shown millimeters (inches)

*Colors may be aggregated for best quantity prices.

MISCELLANEOUS ACCESSORIES

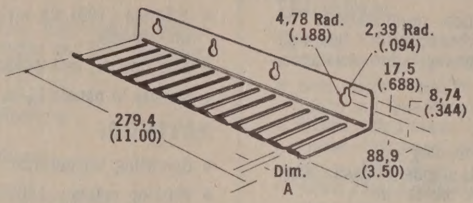
POMONA ELECTRONICS

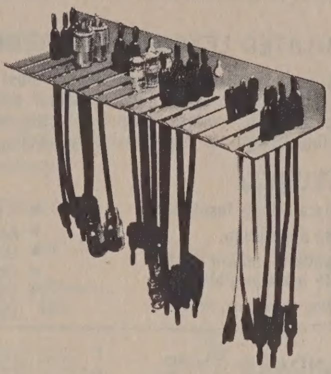
TEST LEAD HOLDER

No need to spend time searching for a particular test lead. With these new racks, all of your patch cords and cable assemblies can be conveniently filed for instant selection — within easy reach. Holder mounts quickly on any vertical surface. Test leads are easy to store, easy to remove. Three models to choose from for different size cables.

MATERIAL: Cold rolled steel.

FINISH: Baked enamel.





Model No.	Color	Max. Cable Dia. (Dim. A)	Net
1508-3	Orange	5,33mm (.210")	3.85
2708-6	Blue	11,4mm (.450")	3.85
NEW 4408-0	Black	8,13mm (.320")	3.85

SEE PAGE 72 FOR TEST SOCKET ADAPTER HOLDER

QUANTITY DISC. CODE A

Universal Harness

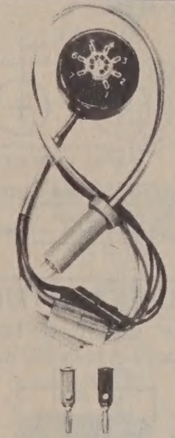
TESTING ADAPTER

Takes the Trouble out of Trouble Shooting!

TEST SOCKET: Extended test tabs, phosphor bronze contacts, heavy duty molded phenolic base with easy-to-read socket connections.

CURRENT MEASUREMENT CONNECTIONS: Fully insulated, molded 2,03mm (.080) phone tip plugs.

INSULATED PLUG: Fits either shielded or unshielded tube sockets.



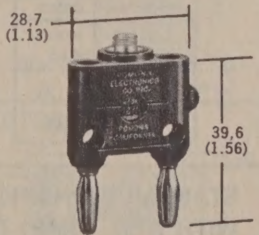
Model No.	Pin	Net
1737	(7 Pin)	14.95
1738	(8 Pin)	14.95
1739	(9 Pin)	14.95

QUANTITY DISC. CODE D

ADAPTER — MICRODOT RECEPTACLE TO DOUBLE BANANA PLUG

Permits miniature coaxial plug to be used with equipment having banana jacks. Cross holes in body provide side stack-up connections.

LOWER: Double banana plug, on ¾" centers. Cross holes 4,22mm (.166) dia. in body provide side stack-up connections.

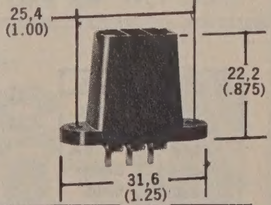


Model No.	Color	Type (Ohms)	Receptacle Type	Net
1275-5	Green	50	10-32 thread	12.50
1276-0	Black	50	Slide-on	12.50
1277-7	Violet	70	12-32 thread	12.50
1279-9	White	93	¼-32 thread	12.50

QUANTITY DISC. CODE A

TRANSISTOR SOCKET

For use in testing 3 lead transistors with 0,43mm (.017) dia. leads. Beryllium copper springs for long life. Ideal for aging racks, incoming inspection, life testing, etc.



Model No.	Color	Temp. Range	Insulation Resistance	Net
TS187-0	Black	−100°C to +200°C	1 x 10⁵ Megohms Min. @ 500 VDC @ 40% R.H., 24°C	2.95

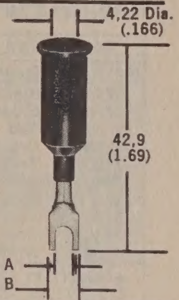
QUANTITY DISC. CODE A

INSULATED BARRIER STRIP SPADE LUG ADAPTERS

Permits single banana plug to be used with equipment having barrier strips. Lugs fit a No. 4, 5, 6, 8, or 10 screw (see listing). Tough thermoplastic molded to body for maximum reliability.

UPPER: Banana jack, 4,22mm (.166) dia., brass, nickel plated.

LOWER: 0,76mm (.03) thick. Spade lug, (see listing). Copper, electro-tin plated.



Model No.	Color	Lug Size	Dim. A	Dim. B
3744-0	Black	4, 5 & 6	3,81 (.15)	6,1 (.24)
3744-2	Red	4, 5, & 6	3,81 (.15)	6,1 (.24)
3777-0	Black	8 & 10	4,83 (.19)	7,62 (.30)
3777-2	Red	8 & 10	4,83 (.19)	7,62 (.30)

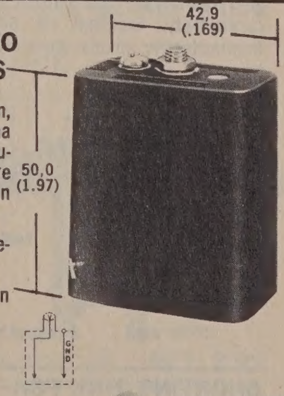
★QUANTITY DISC. CODE A NET .85

ADAPTER — MICRODOT RECEPTACLE TO SHIELDED BANANA PLUGS

Permits miniature coaxial plug, 50 ohm, to be used with equipment having banana jack binding posts. Black anodized aluminum shield reduces noise pick-up more than 70 db. Ideal for noise reduction in low level acceleration systems.

UPPER: Receptacle, screw-on type, receptacle thread 10-32.

LOWER: Shielded double banana plug, on ¾" centers.



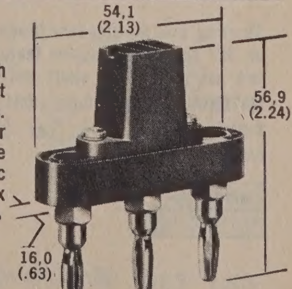
Model No.
1575

QUANTITY DISC. CODE A NET 15.85

ADAPTER — TRANSISTOR TEST SOCKET

Permits the insertion of transistors with 0,43mm (.017) dia. leads into equipment having banana jacks on ¾" centers. Ideal for incoming inspection. Transistor socket contact and banana spring made of beryllium copper. Heavy duty phenolic construction. Insulation resistant: 1 x 10⁵ megohms min. @ 500 VDC at 40% R.H., 24°C.

COLOR: Black.



Model No.
1472

QUANTITY DISC. CODE A NET 9.85

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

INSULATED BINDING POSTS

POMONA ELECTRONICS

INSULATED LEXAN* POLYCARBONATE BINDING POSTS

These binding posts fill the needs of most critical requirements. The plastic molding on these units is Lexan* polycarbonate which has high impact strength, low loss, low power factor and high insulation resistance. Thin line design for high-density packaging.

FEATURES:

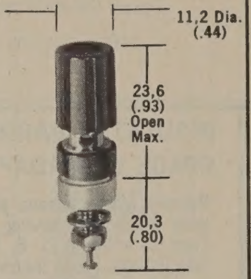
- Polycarbonate insulation.
- Thin line design.
- Standard and low thermal EMF types available.
- Lower insulator, white.
- 5 way binding post.
- Accepts standard banana plug.
- Captive thumb nut.
- Gold or nickel plated.
- Upper insulator same color as thumb nut.
- 2,54mm (.100) dia. wire cross hole is perpendicular with flat on insulator.
- 8-32 hex nut and lockwasher included.
- Mounts in panels 1/16-1/4" thick.

RATINGS:

- Operating temperature: −65°C to +150°C.
- Working voltage: 1500 VDC.
- Current: 15 amps cont., 30 amps int.

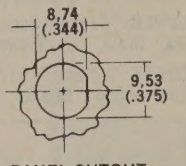
STANDARD TYPE

Brass body and thumb nut insert, available gold flashed per MIL-G-45204 or nickel plated per QQ-N-290 class 2.



Gold Flashed		Nickel Plated	
Model No.	Color	Model No.	Color
3750-0	Black	3760-0	Black
3750-1	Brown	3760-1	Brown
3750-2	Red	3760-2	Red
3750-3	Orange	3760-3	Orange
3750-4	Yellow	3760-4	Yellow
3750-5	Green	3760-5	Green
3750-6	Blue	3760-6	Blue
3750-7	Violet	3760-7	Violet
3750-8	Gray	3760-8	Gray
3750-9	White	3760-9	White
★QUANTITY DISC. CODE A		★QUANTITY DISC. CODE A	
NET 15.00		NET 11.00	

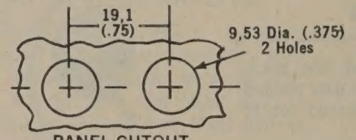
(10 per pkg.)



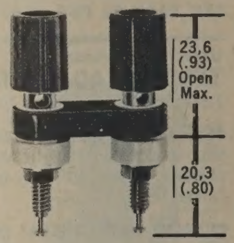
PANEL CUTOUT

DOUBLE BINDING POSTS ASSEMBLY

One red and one black nickel plated binding post with double mounting base.



PANEL CUTOUT

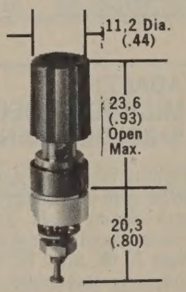


Model No.	Color
4243-0	Black
4243-2	Red

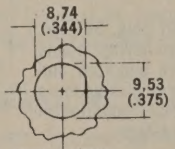
★QUANTITY DISC. CODE A NET 2.50

LOW THERMAL EMF STANDARD TYPE

Copper body and thumb nut insert, gold flashed per MIL-G-45204 for high conductivity. Excellent for use when thermoelectric effects are a significant source of error.



Model No.	Color
3770-0	Black
3770-1	Brown
3770-2	Red
3770-3	Orange
3770-4	Yellow
3770-5	Green
3770-6	Blue
3770-7	Violet
3770-8	Gray
3770-9	White

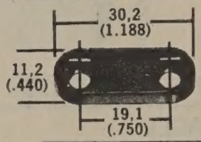


PANEL CUTOUT

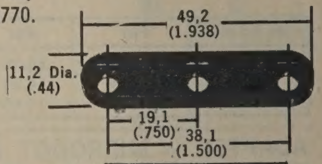
(10 per pkg.) ★QUANTITY DISC. CODE A NET 28.50

DOUBLE AND TRIPLE MOUNTING BASES

Lexan* polycarbonate bases which may be used with Models 3750, 3760 or 3770.



Model No.	Color
3362-0	Black
3862-2	Red
★QUANTITY DISC. CODE A	
NET 2.50	



Model No.	Color
3863-0	Black
3863-2	Red
★QUANTITY DISC. CODE A	
NET 3.00	

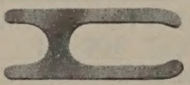
(10 per pkg.)

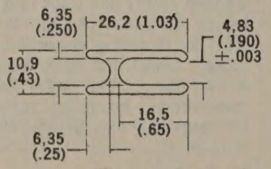
SHORTING LINK FOR STANDARD BINDING POSTS

Shorting link for standard binding posts on 3/4" centers. A snap-on feature holds link on post when short not needed.

MATERIAL: Brass 0,78mm (.031) thick.

FINISH: Nickel plated per QQ-N-290 class 2.





Model No.
4115

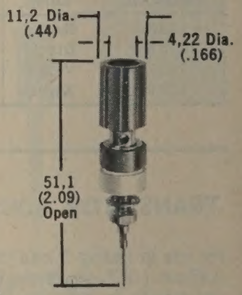
QUANTITY DISC. CODE A NET 1.50
(10 per pkg.)

STANDARD BINDING POST WITH WIRE-WRAP† TERMINAL

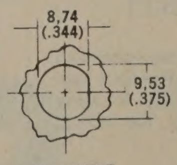
Excellent for rapid connection of wires using wire-wrapping tools or machines.

FEATURES:

- Gold plated beryllium copper 0,63mm (.025) sq. Wire-Wrap† terminal.



Model No.	Color
4098-0	Black
4098-2	Red
4098-4	Yellow
4098-5	Green
4098-6	Blue
4098-8	Grey
4098-9	White



PANEL CUTOUT

★QUANTITY DISC. CODE A NET 1.95

All dimensions are shown millimeters (inches)

★Colors may be aggregated for best quantity price.

*Lexan is a trademark of General Electric.

†Wire-Wrap is a trademark of Gardner-Denver.

INSULATED BANANA JACKS

POMONA
ELECTRONICS

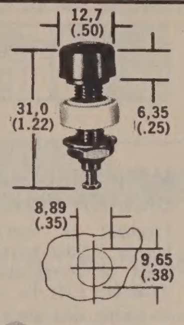
INSULATED LEXAN POLYCARBONATE BANANA JACKS

These jacks are molded of Lexan* polycarbonate thermoplastic which has high impact strength, low loss, low power factor and high insulation resistance.

FEATURES: (All Models)

- Lexan* polycarbonate insulator head molded directly to one piece brass body.
- Panel insulator molded of white Lexan* polycarbonate.
- Solder turret or Wire-Wrap† terminal.
- Nickel plated lockwasher and hex nut included unassembled.
- Operating temperature: —65°C to +150°C.

BANANA JACK — ELECTRO-TIN

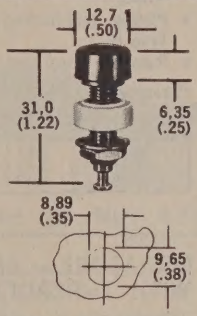


- Electro-tin plated brass body.
- Closed entry receptacle, 4,22mm (.166) dia. x 23,37mm (.920) deep.
- Rated 2500 W VDC 15 amps cont., 30 amps int.
- Mounts in panels from 0,89mm (.035″) to 9,53mm (.375″) thick.
- ¼-32 thread.

Model No.	Color	Model No.	Color
1581-0	Black	1581-5	Green
1583-1	Brown	1581-6	Blue
1581-2	Red	1581-7	Violet
1581-3	Orange	1581-8	Gray
1581-4	Yellow	1581-9	White

★QUANTITY DISC. CODE A **NET 3.50**
(10 per pkg.)

BANANA JACK — GOLD PLATED

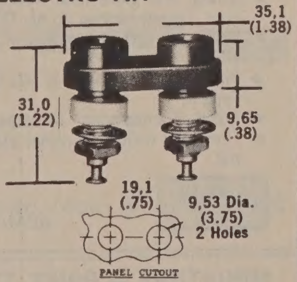


- Gold plated brass body.
- Closed entry receptacle, 4,22mm (.166) dia. x 23,37mm (.920) deep.
- Rated 2500 W VDC 15 amps cont., 30 amps int.
- Mounts in panels from 0,89mm (.035″) to 9,53mm (.375″) thick.
- ¼-32 thread.

Model No.	Color	Model No.	Color
2854-0	Black	2854-5	Green
2854-1	Brown	2854-6	Blue
2854-2	Red	2854-7	Violet
2854-3	Orange	2854-8	Gray
2854-4	Yellow	2854-9	White

★QUANTITY DISC. CODE A **NET 7.50**
(10 per pkg.)

DOUBLE BANANA JACK — ELECTRO-TIN

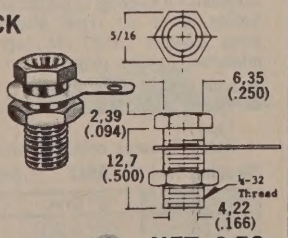


- Electro-tin plated brass body.
- Closed entry receptacle, 4,22mm (.166) dia. x 23,37mm (.920) deep.
- Rated 2500 W VDC 15 amps cont., 30 amps int.
- Mounts in panels from 0,89mm (.035″) to 9,53mm (.375″) thick.
- One red and one black jack.
- Choice of black or red plate.
- ¼-32 thread on ¾″ centers.

Model No.	Color
2269-0	Black
2269-2	Red

(5 per pkg.)
★QUANTITY DISC. CODE A **NET 6.25**

UNINSULATED—BANANA JACK



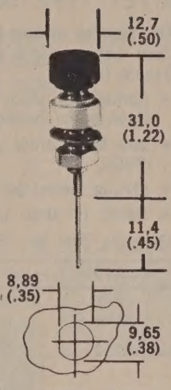
Threaded for rapid mounting. Used with standard banana plugs. Furnished with hex nut and solder lug.

- Jack body, brass per QQ-B-626, alloy #360.
- Plating, nickel per QQ-N-290, class 2.
- Rated, 15 amps cont., 30 amps int.
- ¼-32 hex nut, solder lug included.

Model No.
3267

QUANTITY DISC. CODE A **NET 2.50**
(10 per pkg.)

BANANA JACK — WITH WIRE-WRAP TERMINAL



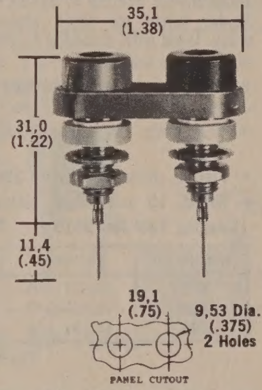
Excellent for rapid connection of wires using wire-wrapping tools or machines.

- Gold plated beryllium copper 0,64mm (.025) sq. Wire-Wrap† terminal.
- Nickel plated brass body.
- Closed entry receptacle 4,22mm (.166) dia. x (.920) deep.
- Rated 2500 W VDC 15 amps. cont., 30 amps int.
- Mounts in panels from 0,89mm (.035″) to 9,52mm (.375″) thick.
- ¼-32 thread.

Model No.	Color	Model No.	Color
4005-0	Black	4005-6	Blue
4005-2	Red	4005-8	Gray
4005-4	Yellow	4005-9	White
4005-5	Green		

★QUANTITY DISC. CODE A **NET 7.50**
(10 per pkg.)

DOUBLE BANANA JACK — WITH WIRE-WRAP TERMINAL



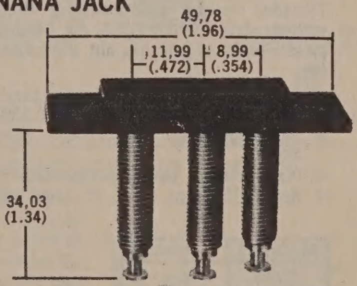
Excellent for rapid connection of wires using wire-wrapping tools or machines.

- Gold plated beryllium copper 0,64mm (.025) sq. Wire-Wrap† terminal.
- Nickel plated brass bodies.
- Closed entry receptacle, 4,22mm (.166) dia. x 23,37mm (.920) deep.
- Rated 2500 W VDC 15 amps. cont., 30 amps. int.
- Mounts in panels from 0,89mm (.035″) to 6,98mm (.275″) thick.
- One red and one black jack.
- Choice of black or red plate.
- ¼-32 thread on ¾″ centers.

Model No.	Color
4069-0	Black plate
4069-2	Red plate

★QUANTITY DISC. CODE A **NET 11.00**
(5 per pkg.)

EUROPEAN TRIPLE BANANA JACK

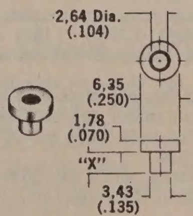


- Initial connection made with ground receptacle.
- Accepts 20,32mm (.800″) long European banana plugs.
- Supplied with (2) 6-32 hex nuts and screws.
- Electro-tin plated Brass.

Model No.	Color
4163-0	Black
4163-2	Red
4163-8	Gray

★QUANTITY DISC. CODE A **NET 2.95**

MINIATURE — RIVET TYPE BANANA JACK



Excellent for riveting to panels or boards. 2,64mm (.104) dia. jack accepts miniature banana plug.

- Jack body, leaded copper.
- Plating, gold flashed per MIL-G-45204 Type II.
- Rated, 5 amps cont., 10 amps int.

(Swaging Tool No. 3523 ......Net 23.95)

Model No.	"X" Dim.	Panel
3280	2,67 (.105)	1/16″
3281	3,43 (.135)	3/32″
3282	4,19 (.165)	1/8″

QUANTITY DISC. CODE A **NET 1.50**
(10 per pkg.)

★Colors may be aggregated for best quantity price.
†Wire-Wrap is a trademark of Gardner-Denver.

*Lexan is a trademark of General Electric.

All dimensions are shown millimeters (inches)

STANDARD & MINIATURE BANANA PLUGS & JACKS

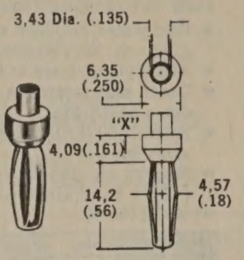
POMONA ELECTRONICS

RIVET TYPE BANANA PLUG

Excellent for riveting to panels or boards. Used with standard 4,22mm (.166) dia. banana jacks.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Jack body, brass per QQ-B-626, alloy #360.
- Plating, nickel per QQ-N-290 class 2.
- Rated 16 amps cont., 30 amps int.

(Swaging Tool No. 3518 ......Net 23.95)



Model No.	"X" Dim.	Panel
3257	(2,39) .094	1/16"
3258	(3,18) .125	3/32"
3259	(3,96) .156	1/8"

(10 per pkg.)

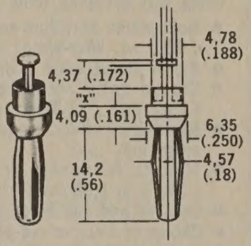
QUANTITY DISC. CODE A NET 4.50

RIVET TYPE BANANA PLUG WITH TURRET

Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires. Used with standard 4,22mm (.166) dia. banana jacks.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-26, alloy #360.
- Plating, nickel per QQ-N-290 class 2.
- Rated, 15 amps cont., 30 amps int.

(Swaging Tool No. 3519 ....Net 23.95)



Model No.	"X" Dim.	Panel
3260	(2,67) .105	1/16"
3261	(3,43) .135	3/32"
3262	(4,19) .165	1/8"

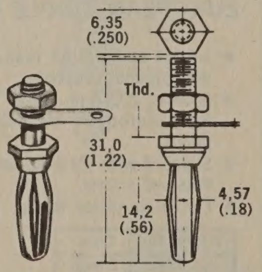
(10 per pkg.)

QUANTITY DISC. CODE A NET 4.50

BANANA PLUG WITH THREADED STUD

Threaded stud for rapid mounting. Used with standard 4,22mm (.166) dia. banana jacks. Furnished with hex nut and solder lug.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Plating, nickel per QQ-N-290 class 2.
- Rated, 15 amps cont., 30 amps int.



Model No.	Thread
3263	6-32 x ½"
3264	8-32 x ½"

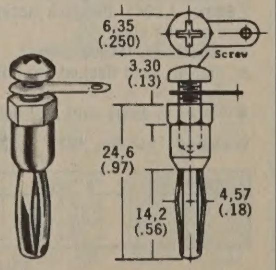
(10 per pkg. unassembled)

QUANTITY DISC. CODE A NET 5.00

BANANA PLUG WITH SCREW

Mounts to various size panels. Used with standard 4,22mm (.166) dia. banana jacks. Furnished with screw and solder lug.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Plating, nickel per QQ-N-290 class 2.
- Rated, 15 amps cont., 30 amps int.



Model No.	Screw
3265	6-32 x ¼"
3266	8-32 x ¼"

(10 per pkg. unassembled)

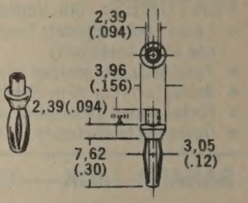
QUANTITY DISC. CODE A NET 5.00

MINIATURE — RIVET TYPE BANANA PLUG

Excellent for riveting to panels or boards. Used with miniature 2,64mm (.104) dia. banana jacks.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Plating, gold flashed per MIL-G-45204 Type II.
- Rated, 5 amps cont., 10 amps int.

(Swaging Tool No. 3520 ....Net 23.95)



Model No.	"X" Dim.	Panel
3268	2,39 (.094)	1/16"
3271	3,18 (.125)	3/32"
3272	3,96 (.156)	1/8"

(10 per pkg.)

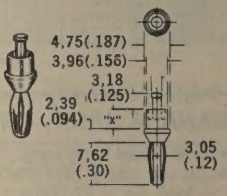
QUANTITY DISC. CODE A NET 3.80

MINIATURE — RIVET TYPE BANANA PLUG WITH TURRET

Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires. Used with miniature 2,64mm (.104) dia. banana jacks.

- Spring, one piece heat treated beryllium copper berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Plating, gold flashed per MIL-G-45204 Type II.
- Rated, 5 amps cont., 10 amps int.

(Swaging Tool No. 3521 ....Net 23.95)



Model No.	"X" Dim.	Panel
3273	2,67 (.105)	1/16"
3274	3,43 (.135)	3/32"
3275	4,19 (.165)	1/8"

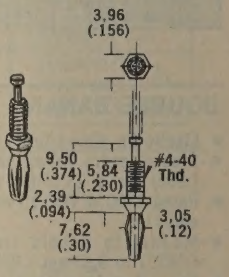
(10 per pkg.)

QUANTITY DISC. CODE A NET 5.00

MINIATURE — BANANA PLUG WITH THREADED STUD

Threaded stud for rapid mounting. Solder turret for attachment of wires. Used with 2,64mm (.104) dia. miniature banana jacks.

- Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Plating, gold flashed per MIL-G-45204 Type II.
- Rated, 5 amps cont., 10 amps int.
- Furnished with 4-40 nickel plated hex nut.



Model No.
3276

(10 per pkg.)

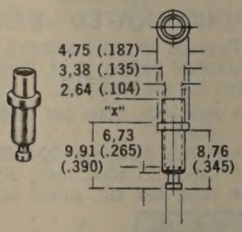
QUANTITY DISC. CODE A NET 4.00

MINIATURE — RIVET TYPE BANANA JACK WITH TURRET

Excellent for riveting to panels or boards. Solder turret for rapid attachment of wires 2,64mm (.104) dia. jack accepts miniature banana plug.

- Jack body, leaded copper.
- Plating, gold flashed per MIL-G-45204 Type II.
- Rated, 5 amps cont., 10 amps int.

(Swaging Tool No. 3522 ....Net 23.95)



Model No.	"X" Dim.	Panel
3277	2,67 (.105)	1/16"
3278	3,43 (.135)	3/32"
3279	4,19 (.165)	1/8"

(10 per pkg.)

QUANTITY DISC. CODE A NET 2.20

All dimensions are shown millimeters (inches)

TEST CLIPS & ½″ SPACED PIN TIP PLUGS

POMONA ELECTRONICS

INSULATED ALLIGATOR CLIP TO BANANA JACK

Alligator clip, steel, cadmium plated, vinyl insulators, (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.

Model No.
2240

QUANTITY DISC. CODE A **NET 2.95** (per pkg.)

GOLD PLATED—INSULATED ALLIGATOR CLIP TO BANANA JACK

Alligator clip, solid copper, gold plated, vinyl insulators (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.

Model No.
3289

QUANTITY DISC. CODE A **NET 9.50** (per pkg.)

INSULATED ALLIGATOR CLIP TO PIN TIP JACK

Alligator clip, steel, cadmium plated. Tip jack, beryllium copper, gold flashed, accepts 2,03mm (.080) dia. pin tip plug. Vinyl insulators (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.

Model No.
1437

QUANTITY DISC. CODE A **NET 9.50** (per pkg.)

INSULATED MINIGATOR CLIP TO BANANA JACK

This minigator clip accepts a standard banana plug in the rear. Clip is steel, cadmium plated. Banana jack, brass, nickel plated. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.

Model No.
3448

QUANTITY DISC. CODE A **NET 9.50** (per pkg.)

INSULATED MINIGATOR CLIP TO PIN TIP JACK

This minigator clip accepts a 2,03mm (.080) dia. pin tip plug. Clip is steel, cadmium plated. Tip jack, beryllium copper, gold flashed. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.

Model No.
3491

QUANTITY DISC. CODE A **NET 13.50** (per pkg.)

FEATURES:

- Fits 2,03mm (.080) dia. pin tip jacks.
- Plug body brass, gold flashed per MIL-G-45204 Type 2 (.00001/.00002).
- Stack-up spring, berylco 25 per QQ-C-533, gold flashed.
- Tough thermoplastic molded directly to plug bodies.

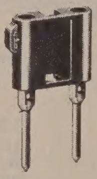
RATINGS:

- Operating Temperature: −25°C to +85°C.
- Working Voltage: 2500 VDC.
- Current: 5 amps cont., 10 amps int.

MINIATURE — DOUBLE PIN TIP PLUG WITH SET SCREWS

Miniature 2,03mm (.080) double pin tip plug on ½″ centers. Set screws secure cable or component leads.

(Recommend using Screwdriver No. 3736)



Model No.	Color
3544-0	Black
3544-2	Red

★QUANTITY DISC. CODE A **NET 1.50**

MINIATURE — DOUBLE PIN TIP PLUG WITH SOLDER TURRET TERMINALS

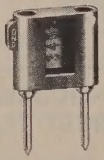
Miniature 2,03mm (.080) double pin tip plug on ½″ centers. Gold flashed solder turrent terminals for permanent noise-free connection of cables. 2,03mm (.080) tip jacks on ½″ centers permit top stacking.

Model No.	Color
3545-0	Black
3545-2	Red

★QUANTITY DISC. CODE A **NET 2.50**

MINIATURE — DOUBLE PIN TIP PLUG WITH SHORTING BAR

Ideal as a connecting link for use with ½″ spaced pin tip jacks. 2,03mm (.080) dia. tip jacks on ½″ centers permit top stacking. Miniature 2,03mm (.080) double pin tip plugs internally solder-bonded with #20 AWG wire. "Shorting bar" stamped on plug.



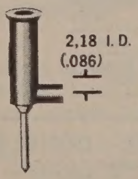
Model No.	Color
3452-0	Black
3452-2	Red

★QUANTITY DISC. CODE A **NET 1.85**

MINIATURE — SOLDERLESS PIN TIP PLUG WITH SAFETY COLLAR

This integral collar insulates exposed wire leads and acts as a strain relief by preventing the flexing of the lead at the set screw. Wire firmly held in place with internal set screw, eliminating soldering.

(Recommend using Screwdriver No. 3736)

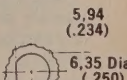


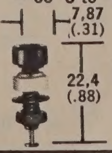
Model No.	Color
3548-0	Black
3548-2	Red

★QUANTITY DISC. CODE A **NET .85**

MINIATURE — PIN TIP JACK 2,03MM (.080) DIA.

- Gold plated brass body.
- Contact spring, heat treated beryllium copper, gold flashed.
- Rated 1500 W VDC, 5 amps cont., 10 amps int.
- Mounts in panels from 0,88mm (.035″) to 6,35mm (.250″) thick.
- 8-32 threaded.
- Operating temp.: −65°C to +150°C.





Model No.	Color	Model No.	Color
3542-0	Black	3542-5	Green
3542-1	Brown	3542-6	Blue
3542-2	Red	3542-7	Violet
3542-3	Orange	3542-8	Gray
3542-4	Yellow	3542-9	White

★QUANTITY DISC. CODE A **NET 5.00** (10 per pkg.)

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

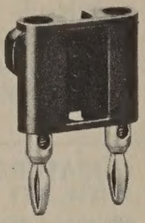
½" SPACED MINIATURE BANANA PLUGS

POMONA ELECTRONICS

One-third smaller miniature banana plugs, a state-of-the-art development for the ever increasing demand for miniaturized test equipment. Banana plug springs are precision formed of one-piece beryllium copper, heat treated for maximum life and low contact resistance. Tough thermoplastic molded to plug bodies.

SPECIFICATIONS:

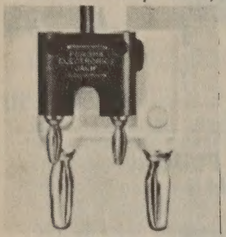
- Fits 2,64mm (.104) dia. miniature banana jacks.
- Plug body brass, per QQ-B-626, alloy #360.
- Gold flashed per MIL-G-45204 Type II 0,0025/0,0051 mm (.0001/.0002).
- Spring, beryllium copper Berylco 25 per QQ-C-533.



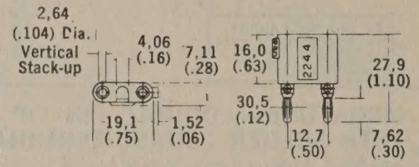
ACTUAL SIZE

RATINGS:

- Operating temperature: −25°C to +85°C.
- Working voltage: 2500 VDC.
- Current: 5 amps cont., 10 amps int.



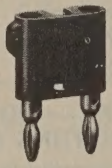
Two-thirds Size



MINIATURE—DOUBLE BANANA PLUG WITH SET SCREWS

Miniature double banana plug on ½" centers. Internal set screws to secure cable or component leads. 2,64mm (.104) dia. banana jacks on ½" centers permit top stack-up for multiple connections.

(Recommend using Screwdriver No. 3736)

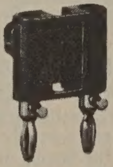


Model No.	Color
2244-0	Black
2244-2	Red

★QUANTITY DISC. CODE A NET 1.50

MINIATURE—DOUBLE BANANA PLUG WITH SOLDER TURRET TERMINALS

Miniature double banana plug on ½" centers. Solder turret terminals for permanent noise-free connections of cables or components. 2,64mm (.104) dia. banana jacks on ½" centers permit top stack-up for multiple connections.



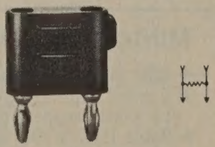
Model No.	Color
2245-0	Black
2245-2	Red

★QUANTITY DISC. CODE A NET 1.95

MINIATURE—DOUBLE BANANA PLUG WITH MOLDED PRECISION RESISTOR

Ideal where rapid interchange of resistance values is required. Deposited carbon 1% ¼ watt, molded internally. 2,64mm (.104) dia. banana jacks on ½" centers permit top stack-up for multiple connections. Resistance value stamped on plug.

COLOR: Blue.



Model No.
2246

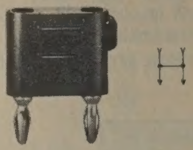
(Specify Value)

SPECIFY RESISTANCE IN OHMS		
50	10K	200K
600	20K	250K
1K	50K	500K
5K	100K	1 Meg

★QUANTITY DISC. CODE A NET 5.25

MINIATURE—DOUBLE BANANA PLUG WITH SHORTING BAR

Ideal as a connecting link for use with ½" spaced banana jacks. 2,64mm (.104) dia. banana jacks on ½" centers permit top stack-up for multiple connections. Banana plugs internally solder-bonded with #18 AWG wire. "Shorting bar" stamped on plug.



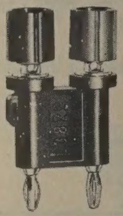
Model No.	Color
2035-0	Black
2035-2	Red

★QUANTITY DISC. CODE A NET 1.85

ADAPTER — MINIATURE BINDING POSTS TO MINIATURE DOUBLE BANANA PLUG

This adapter converts miniature banana jacks to miniature binding posts. Excellent for attaching wires or components. Insulated gold flashed 5 way binding posts. Gold flashed one piece heat treated beryllium copper spring. Binding posts, Black/Red.

COLOR: Black.



Model No.
3822

QUANTITY DISC. CODE A NET 4.25

MINIATURE SOLDER TYPE BANANA PLUG

Miniature in line plug for use with miniature binding posts or banana jacks. Wire is soldered directly to the threaded plug. Glass-filled nylon insulated handle.

Model No.	Color
3690-0	Black
3690-2	Red

★QUANTITY DISC. CODE A NET .55

MINIATURE SOLDERLESS BANANA PLUG-STACK-UP

Miniature banana plug for rapid assembly of test leads. For use with miniature binding posts or banana jacks. Wire firmly held in place with internal set screw, eliminating soldering.

(Recommend using Screwdriver No. 3736

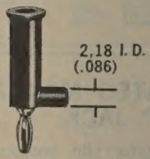
Model No.	Color
2944-0	Black
2944-2	Red

★QUANTITY DISC. CODE A NET .85

MINIATURE SOLDERLESS BANANA PLUG WITH SAFETY COLLAR-STACK-UP

This integral collar insulates exposed wire leads and acts as a strain relief by preventing the flexing of the lead at the set screw. Wire firmly held in place with internal set screw, eliminating soldering.

(Recommend using Screwdriver No. 3736)

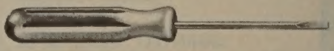


Model No.	Color
2945-0	Black
2945-2	Red

★QUANTITY DISC. CODE A NET .85

MINIATURE SCREWDRIVER FOR SET SCREWS

A specially designed screwdriver with slender tip for tightening of set screws on miniature plugs.



Model No.
3736

QUANTITY DISC. CODE A NET .75

★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

MINIATURE TEST PROBES

POMONA ELECTRONICS

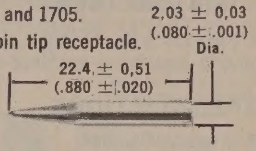
These slim miniature test probes feature a sharp replaceable needle tip. The tip easily pierces varnish or plating to give a good electrical reading. Tough thermoplastic is molded directly onto probe tip and wire lead providing a strong, reliable integral unit.

NEEDLE TIP: Replaceable, stainless steel.

NEEDLE TIP NUT: Insulated.

REPLACEMENT NEEDLE TIP

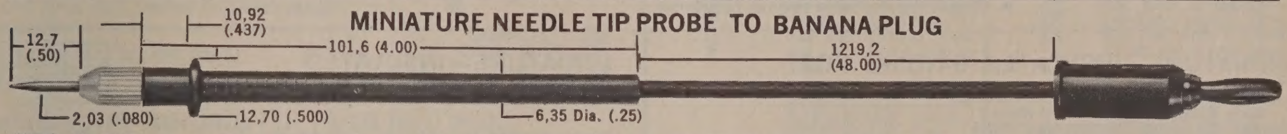
- Fits Models 4410, 4411, 4071, 3860, 3861 and 1705.
- Stainless steel 2,03mm (.08) dia. to fit pin tip receptacle.
- .08 dia. to fit pin tip receptacle.
- Sharp point to pierce varnish for good electrical contact.



Model No.
4174

QUANTITY DISC. CODE A NET 2.00
(10 per pkg.)

MINIATURE NEEDLE TIP PROBE TO BANANA PLUG



WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144) O.D

Model No.	Color	Length
4410-48-0	Black	48″
4410-48-2	Red	48″

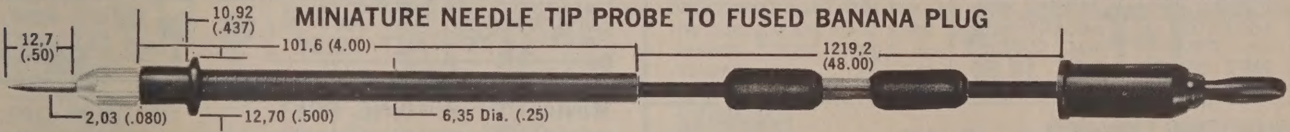
NEW

BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE A NET 3.85

MINIATURE NEEDLE TIP PROBE TO FUSED BANANA PLUG



WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144) O.D.

Model No.	Color	Length
4411-48-0	Black	48″
4411-48-2	Red	48″

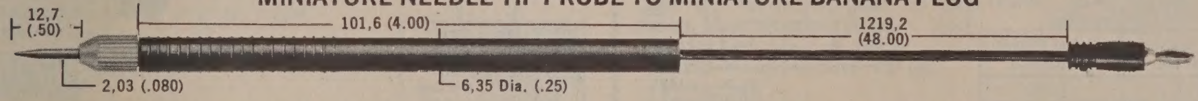
NEW

BANANA PLUG: Spring one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded onto plug body and wire.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE A NET 4.85

MINIATURE NEEDLE TIP PROBE TO MINIATURE BANANA PLUG



WIRE: 20 AWG, strand 41 x 36 T.C. extra flexible polyvinyl insulation 2,21mm (.087) OD.

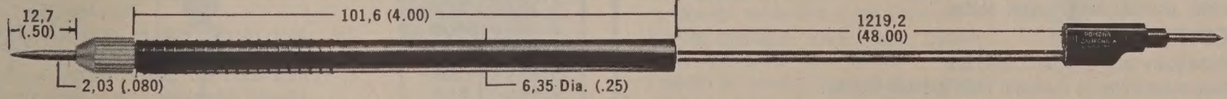
Model No.	Color	Length
4071-48-0	Black	48″
4071-48-2	Red	48″

MINIATURE BANANA PLUG: Fits 2,64mm (.104) dia. miniature banana jacks. Spring, one piece heat treated beryllium copper. Plug body, brass per QQ-B-626, alloy #360. Gold plated. Tough thermoplastic molded onto plug body and wire.

OPERATING TEMPERATURE: −0°C to +105°C.

★QUANTITY DISC. CODE A NET 3.85

MINIATURE NEEDLE TIP PROBE TO STACKING .080 PIN TIP PLUG



WIRE: 20 AWG, strand 41 x 36 T.C. extra flexible polyvinyl insulation 2,21 mm (.087) OD.

Model No.	Color	Length
3860-48-0	Black	48″
3860-48-2	Red	48″

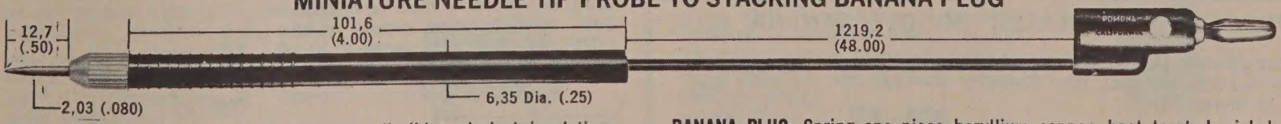
PIN TIP PLUG: .080 dia., brass, gold plated. Tough thermoplastic molded onto plug body and wire.

STACK-UP: Beryllium copper spring, gold plated, accepts 2,03mm (.080) dia. pin.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE A NET 3.85

MINIATURE NEEDLE TIP PROBE TO STACKING BANANA PLUG



WIRE: 20 AWG, strand 41 x 36 T.C. extra flexible polyvinyl insulation 2,21mm (.087) OD.

Model No.	Color	Length
3861-48-0	Black	48″
3861-48-2	Red	48″

BANANA PLUG: Spring one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded onto plug body and wire.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE A NET 3.85

★Colors and Length may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

½" SPACED MINIATURE BINDING POSTS & JACKS

POMONA
ELECTRONICS

MINIATURE BINDING POSTS

A complete 5-way binding post in "miniature." Captive thumb nut and binding post body, machined brass; gold or nickel plated. Thumb nut, mounting base and shouldered insulator molded of high impact polycarbonate thermoplastic. 8-32 hex nut and lockwasher included, unassembled, nickel plated.

SPECIFICATIONS:

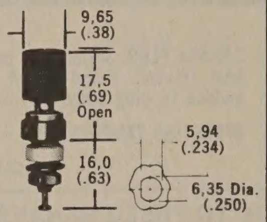
- 5-way binding post.
- Mounts ¼" dia. "D" hole.
- Panels up to $^3/_{16}$" thick.
- Lower insulator white Lexan.
- Captive thumb nut.
- 2,08mm (.082) dia. cross hole.
- Thumb nut and binding post body — gold flashed per MIL-G-45204 Type 2 or nickel plated per QQ-N-290 class 2.
- Upper insulator same color as thumb nut.

RATINGS:

- Operating temperature: −65°C to +150°C.
- Working voltage: 1500 VDC.
- Current: 5 amps cont., 10 amps int.

MINIATURE—INSULATED BINDING POST

Gold Flashed		Nickel Plated	
Model No.	**Color**	**Model No.**	**Color**
2382-0	Black	2439-0	Black
2382-1	Brown	2439-1	Brown
2382-2	Red	2439-2	Red
2382-3	Orange	2439-3	Orange
2382-4	Yellow	2439-4	Yellow
2382-5	Green	2439-5	Green
2382-6	Blue	2439-6	Blue
2382-7	Violet	2439-7	Violet
2382-8	Gray	2439-8	Gray
2382-9	White	2439-9	White
★QUANTITY DISC. CODE A		★QUANTITY DISC. CODE A	
NET 15.00		NET 12.50	



(10 per pkg.)

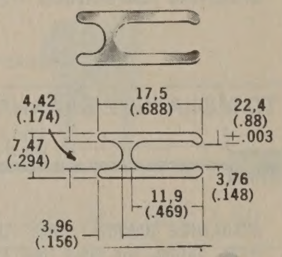
SHORTING LINK FOR MINIATURE BINDING POSTS

Shorting link for miniature binding posts on ½" centers. A snap-on feature holds link on post when short not needed.

MATERIAL: Brass 0,79mm (.031) thick.

FINISH: Nickel plated per QQ-N-290 class 2 or gold flashed per MIL-G-45204 Type 2.

Gold Flashed Model No.	Nickel Plated Model No.
3478	3479
NET 2.50	NET 2.50



(10 per pkg.) ★ QUANTITY DISC. CODE A

MINIATURE BANANA JACKS

Insulator head and shouldered washer molded of high impact polycarbonate thermoplastic. Banana jack body, machined brass, gold flashed on 2142 and 2143, nickel plated on 4022. 8-32 hex nut and lockwasher included, unassembled, nickel plated.

SPECIFICATIONS:

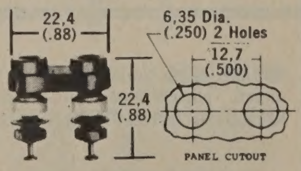
- Closed entry jack 2,64mm (.104) dia.
- Lexan polycarbonate insulator head molded to body.
- Mounts in ¼" dia. hole. Model 2142 and 4022, panels up to ¼" thick. Model 2143, panels up to $^3/_{16}$" thick. Solder turret or Wire-Wrap† terminal.
- Lower insulator Lexan polycarbonate, white.

RATINGS:

- Operating temperature: −65°C to +150°C.
- Working voltage: 1500 VDC.
- Current: 5 amps cont., 10 amps int.

MINIATURE—INSULATED DOUBLE BANANA JACK

Double banana jack on ½" centers with one red and one black jack. Choice of black or red plate.



Model No.	Color
2143-0	Black
2143-2	Red

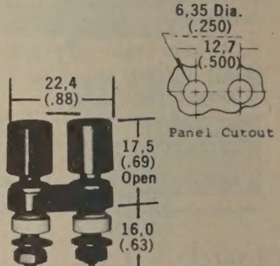
(5 per pkg.)

★QUANTITY DISC. CODE A NET 4.75

MINIATURE—INSULATED DOUBLE BINDING POST

Double binding post body on ½" centers with one red and one black binding post. Choice of black or red plate.

Gold Flashed		Nickel Plated	
Model No.	**Color**	**Model No.**	**Color**
2383-0	Black	2440-0	Black
2383-2	Red	2440-2	Red
★QUANTITY DISC. CODE A		★QUANTITY DISC. CODE A	
NET 14.75		NET 12.50	



(5 per pkg.)

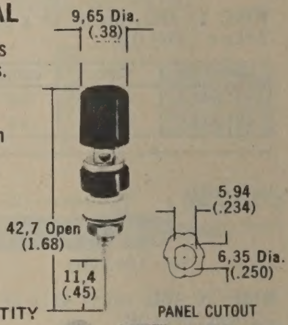
MINIATURE BINDING POST WITH WIRE-WRAP TERMINAL

Excellent for rapid connection of wires using wire-wrapping tools or machines.

FEATURES:

- Gold plated beryllium copper, 0,64mm (.025) sq. Wire-Wrap terminal.

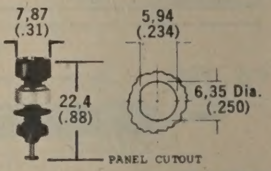
Model No.	Color
4101-0	Black
4101-2	Red
4101-4	Yellow
4101-5	Green
4101-6	Blue
4101-8	Gray
4101-9	White



★QUANTITY DISC. CODE A NET 1.75 ea.

MINIATURE—INSULATED BANANA JACK

Model No.	Color
2142-0	Black
2142-1	Brown
2142-2	Red
2142-3	Orange
2142-4	Yellow
2142-5	Green
2142-6	Blue
2142-7	Violet
2142-8	Gray
2142-9	White

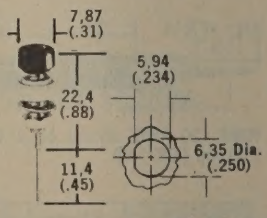


(10 per pkg.)

★QUANTITY DISC. CODE A NET 3.50

MINIATURE—INSULATED BANANA JACK WITH WIRE-WRAP TERMINAL

Excellent for rapid connection of wires using wire-wrapping tools or machines. Gold plated beryllium copper 0,64mm (.025") sq. Wire-Wrap terminal. Nickel plated brass bodies.



Model No.	Color
4022-0	Black
4022-2	Red
4022-4	Yellow
4022-5	Green
4022-6	Blue
4022-8	Gray
4022-9	White

(10 per pkg.)

★QUANTITY DISC. CODE A NET 8.50

★Colors and Length may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

½″ SPACED MINIATURE BANANA PLUG ADAPTERS & ACCESSORIES

POMONA
ELECTRONICS

BNC RECEPTACLE TO MINIATURE DOUBLE BANANA PLUG

This adapter allows a BNC plug to be used with equipment having ½″ spaced miniature 2,64mm (.104) dia. banana jacks. Excellent for adapting test equipment to standard coaxial cables.

UPPER: BNC receptacle, UG 1094/U.

LOWER: Miniature double banana plug on ½″ centers, for use with 2,64mm (.104) dia. miniature jacks. Gold flashed one piece heat treated beryllium copper springs.

Model No.
3269

COLOR: Black.

QUANTITY DISC. CODE A

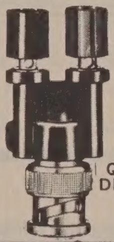
NET 4.25

MINIATURE BINDING POSTS TO BNC PLUG

This adapter converts a BNC receptacle to miniature ½″ spaced 5-way binding posts.

UPPER: Insulated, gold flashed miniature 5-way binding posts on ½″ centers with 2,64mm (.104) dia. miniature banana jacks.

LOWER: BNC plug.



Model No.
3296

COLOR: Black.

QUANTITY DISC. CODE A

NET 5.85

BNC PLUG TO MINIATURE DOUBLE BANANA PLUG

Allows a BNC cable jack to be used on equipment having ½″ spaced 2,64mm (.104) dia. banana jacks.

UPPER: BNC plug.

LOWER: Miniature double banana plug on ½″ centers, for use with 2,64mm (.104) dia. miniature jacks. Gold flashed one piece heat treated beryllium copper springs.

Model No.
3270

COLOR: Black.

QUANTITY DISC. CODE A

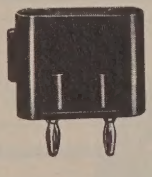
NET 5.85

STANDARD DOUBLE BANANA JACK TO MINIATURE DOUBLE BANANA PLUG

Permits standard double banana plug on ¾″ centers to be used with equipment having miniature double banana jacks on ½″ centers.

UPPER: Standard double banana jacks 4,22mm (.166) dia. on ¾″ centers. Brass, nickel plated.

LOWER: Miniature double banana plug on ½″ centers. One piece nickel plated beryllium copper spring for use with 2,64mm (.104) dia. miniature banana jacks.



Model No.
2952

COLOR: Black.

QUANTITY DISC. CODE A

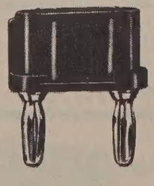
NET 2.50

MINIATURE DOUBLE BANANA JACK TO STANDARD DOUBLE BANANA PLUG

Permits miniature double banana plug on ½″ centers to be used with equipment having standard double banana jacks on ¾″ centers.

UPPER: Miniature double banana jacks, 2,64mm (.104) dia. on ½″ centers. Brass, nickel plated.

LOWER: Standard double banana plug on ¾″ centers. One piece nickel plated beryllium copper spring for use with 4,22mm (.166) dia. standard banana jacks.



Model No.
2943

COLOR: Black.

QUANTITY DISC. CODE A

NET 2.25

STANDARD BANANA JACK TO MINIATURE BANANA PLUG

Permits standard banana plug to be used with equipment having miniature banana jacks.

UPPER:
Banana jack, 4,22mm (.166) dia.; brass, nickel plated.

LOWER:
Miniature banana plug, one piece nickel plated beryllium copper sping for use with 2,64mm (.104) dia. miniature banana jacks.

Model No.	Color
2138-0	Black
2138-2	Red

★QUANTITY DISC. CODE A

NET .75

MINIATURE BANANA JACK TO STANDARD BANANA PLUG

Permits miniature banana plugs to be used with equipment having standard banana jacks.

UPPER:
Miniature banana jack, 2,64mm (.104) dia.; brass, nickel plated.

LOWER:
Standard banana plug, one piece nickel plated beryllium copper spring for use with 4,22mm (.166) dia. banana jacks.

Model No.	Color
2477-0	Black
2477-2	Red

★QUANTITY DISC. CODE A

NET .65

METAL SHORTING BAR

Low profile, gold flashed, brass shorting bar. Miniature banana plugs on ½″ centers swaged to ⅙″ thick brass bar. Center hole accepts #4-40 screw for easy removal. Current rating 5 amps cont., 10 amps int.

Model No.
3030

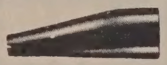
QUANTITY DISC. CODE A

NET 1.50

INSULATED MINIGATOR CLIP TO MINIATURE BANANA JACK

This minigator clip accepts a miniature banana plug in the rear. Clip is steel, cadmium plated. Pinned hinge construction with full-meshing jaws for small wires. Vinyl insulators (5 red, 5 black). Unassembled.

10 clips and 10 insulators per pkg.



Model No.
3217

QUANTITY DISC. CODE A

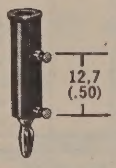
NET 3.00
(per pkg.)

SINGLE BANANA PLUG ISOLATION

Provides two terminal isolation. Allows for addition of series components. Excellent for circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Miniature banana jack, 2,64mm (.104) dia. brass, gold flashed.

LOWER: Miniature banana plug, one piece gold flashed beryllium copper spring.



Model No.	Color	Model No.	Color
2831-0	Black	2831-2	Red

★QUANTITY DISC. CODE A

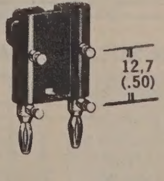
NET 2.95

DOUBLE BANANA PLUG — 4 TERMINAL ISOLATION

Provides four terminal isolation. Top stack-up receptacles isolated from lower plugs. Ideal for insertion of matching networks in computer boards, circuit design and testing. Gold flashed solder turret terminals for permanent noise-free connections.

UPPER: Miniature double banana jack, 2,64mm (.104) dia. brass, gold flashed.

LOWER: Miniature double banana plug on ½″ centers. Gold flashed one piece beryllium copper spring.



Model No.	Color	Model No.	Color
2830-0	Black	2830-2	Red

★QUANTITY DISC. CODE A

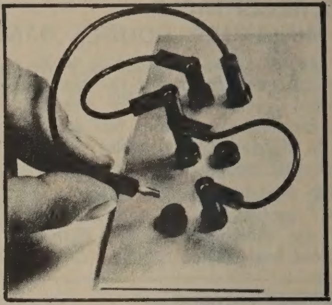
NET 3.85

All dimensions are shown millimeters (inches)

★Colors may be aggregated for best quantity price.

MINIATURE BANANA PLUG PATCH CORDS

POMONA ELECTRONICS



Miniature patch cords for use with 2,64mm (.104) dia. miniature banana jacks. Excellent for miniaturization of test equipment and high density packaging for patch systems.

Banana plug springs precision formed of one piece beryllium copper, heat treated for maximum life and low contact resistance. Tough thermoplastic molded to plug body and wire.

FEATURES:

- Fits .104 dia. miniature banana jacks. Plug body brass, per QQ-B-626, alloy #360.
- Gold flashed per MIL-G-45204 Type II (.00001/.00002). Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533.

SPECIFICATIONS:

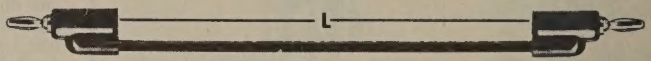
- Wire: 20 awg, strand. 41 x 36 T.C. extra flexible polyvinyl insulation 2,21mm (.087") O.D.
- Rated: 5 amps cont., 10 amps int., 5000 VDC
- Operating temperature: −0°C to +105°C.

*Select color per adjacent color code.

Color	No.	Color	No.	Color	No.	Color	No.	Color	No.
Black	0	Red	2	Yellow	4	Blue	6	Gray	8
Brown	1	Orange	3	Green	5	Violet	7	White	9

MINIATURE — BANANA PLUG STACK-UP PATCH CORD

Model No.	Color	Length	Net
1081-4-*	*	4"	1.80
1081-8-*	*	8"	1.80
1081-12-*	*	12"	1.80
1081-18-*	*	18"	1.80
1081-24-*	*	24"	1.80
1081-36-*	*	36"	1.80
1081-48-*	*	48"	1.90
1081-60-*	*	60"	2.00

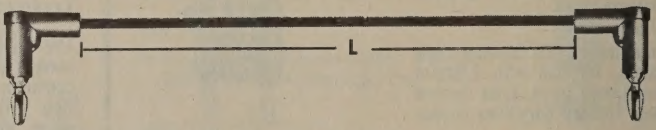


COLORS AVAILABLE: Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, White.

★QUANTITY DISC. CODE A

MINIATURE — RIGHT ANGLE BANANA PLUG PATCH CORD STACK-UP

Model No.	Color	Length	Net
2860-4-*	*	4"	1.95
2860-8-*	*	8"	1.95
2860-12-*	*	12"	1.95
2860-18-*	*	18"	1.95
2860-24-*	*	24"	1.95
2860-36-*	*	36"	1.95
2860-48-*	*	48"	2.05
2860-60-*	*	60"	2.15

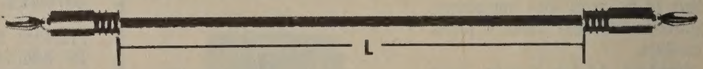


COLORS AVAILABLE: Black, Red.

★QUANTITY DISC. CODE A

MINIATURE — BANANA PLUG PATCH CORD

Model No.	Color	Length	Net
2842-4-*	*	4"	1.85
2842-8-*	*	8"	1.85
2842-12-*	*	12"	1.85
2842-18-*	*	18"	1.85
2842-24-*	*	24"	1.85
2842-36-*	*	36"	1.85
2842-48-*	*	48"	1.95
2842-60-*	*	60"	2.05

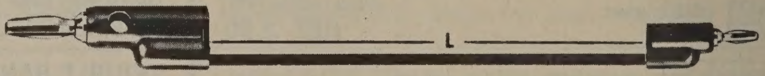


COLORS AVAILABLE: Red, Black.

★QUANTITY DISC. CODE A

STANDARD BANANA PLUG TO MINIATURE BANANA PLUG PATCH CORD

Model No.	Color	Length	Net
3014-12-*	*	12"	2.25
3014-18-*	*	18"	2.25
3014-24-*	*	24"	2.25
3014-36-*	*	36"	2.25
3014-48-*	*	48"	2.35
3014-60-*	*	60"	2.45



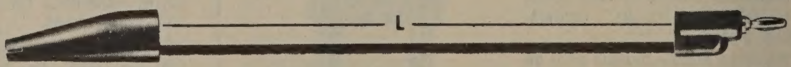
STANDARD BANANA PLUG: Spring, Beryllium copper, nickel plated.

COLORS AVAILABLE: Black, Red.

★QUANTITY DISC. CODE A

INSULATED MINIGATOR CLIP TO MINIATURE BANANA PLUG

Model No.	Color	Length	Net
3222-12-*	*	12"	1.50
3222-18-*	*	18"	1.50
3222-24-*	*	24"	1.50
3222-36-*	*	36"	1.50
3222-48-*	*	48"	1.60
3222-60-*	*	60"	1.70



CLIP: Minigator, steel, cadmium plated.
COLORS AVAILABLE: Black, Red.

INSULATOR: Vinyl, red with red wire, black with black wire.

★QUANTITY DISC. CODE A

★Various lengths may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

°Consult factory for color code part numbers.

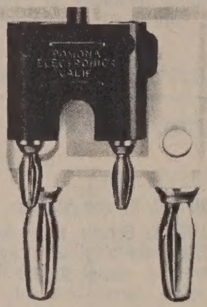
½" SPACED MINIATURE DOUBLE BANANA PLUG PATCH CORDS

POMONA ELECTRONICS

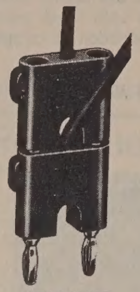
MOLDED MINIATURE DOUBLE BANANA PLUG PATCH CORDS ⅓ SMALLER

A miniature double banana plug on ½" centers. This patch cord enables miniaturization of test equipment and high density packaging for patch systems.

Banana plug springs precision formed of one piece beryllium copper, heat treated for maximum life and low contact resistance.



ACTUAL SIZE



STACK-UP

FEATURES:

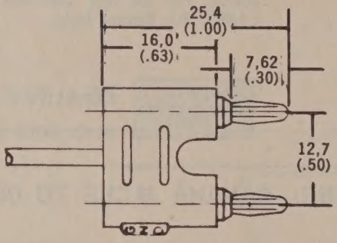
- One piece beryllium copper heat treated spring for long life.
- Rounded spring design results in maximum contact area.
- G.N.D., clearly molded on plug body and shell.
- Solder-bonded noise-free connections.

SPECIFICATIONS:

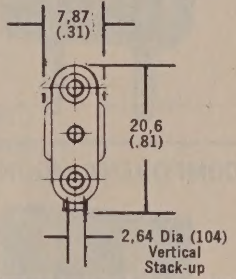
- Fits standard 2,64mm (0.104) dia. banana jacks, on ½" centers.
- Spring, beryllium copper berylco 25 per QQ-C-533.
- Plug body brass per QQ-B-626, alloy #360.
- Gold flashed per MIL-G-45204, Type II.

CABLE DESCRIPTION:

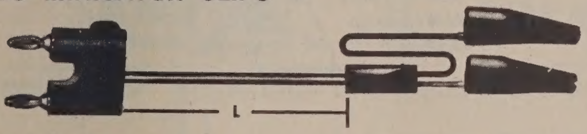
Shielded coax., RG174/U polyethylene insulation, vinyl jacket, nom. cap. 29.5 pf/ft., nom. imp. 50 ohms, nom. O.D. 2,54mm (100"). Color: Black.



NOTE: Molded double plug matches color of cable.



MINIATURE — DOUBLE BANANA PLUG TO MINIGATOR CLIPS

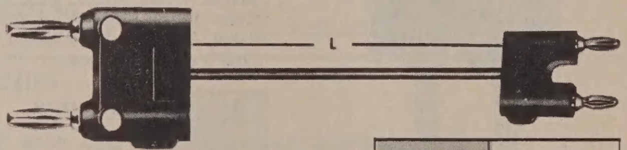


CONN: 1st END
Miniature double banana plug on ½" centers.
CABLE:
Shielded coax., RG174/U.
CONN: 2nd END
Minigator clips, steel, cad. plated; insulators, vinyl. Color: Black/Red.

Model No.	Length
3027-K-12	12"
3027-K-24	24"
3027-K-36	36"
3027-K-48	48"
3027-K-60	60"

★QUANTITY DISC. CODE B NET 6.85

DOUBLE BANANA PLUG TO MINIATURE DOUBLE BANANA PLUG

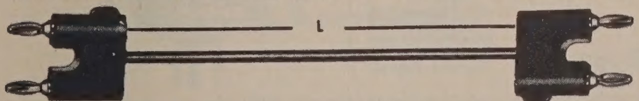


CONN: 1st END
Double banana plug, on ¾" centers.
CABLE:
Shielded coax., RG174/U.
CONN: 2nd END
Miniature double banana plug on ½" centers.

Model No.	Length
2443-K-12	12"
2443-K-24	24"
2443-K-36	36"
2443-K-48	48"
2443-K-60	60"

★QUANTITY DISC. CODE B NET 6.85

MINIATURE — DOUBLE BANANA PLUG BOTH ENDS

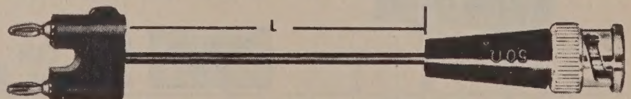


CONN: 1st END
Miniature double banana plug on ½" centers.
CABLE:
Shielded coax., RG174/U.
CONN: 2nd END
Miniature double banana plug on ½" centers.

Model No.	Length
2247-K-12	12"
2247-K-24	24"
2247-K-36	36"
2247-K-48	48"
2247-K-60	60"

★QUANTITY DISC. CODE B NET 5.95

MINIATURE-DOUBLE BANANA PLUG TO BNC MALE



CONN: 1st END
Miniature double banana plug on ½" centers.
CABLE:
Shielded coax., RG174/U.
CONN: 2nd END
Male BNC.

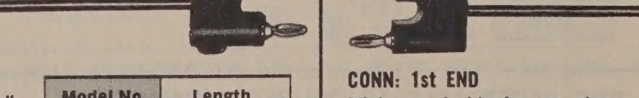
Model No.	Length
2248-K-12	12"
2248-K-24	24"
2248-K-36	36"
2248-K-48	48"
2248-K-60	60"

★QUANTITY DISC. CODE B NET 7.50

NEW

STRESS RELIEVED AND WEATHERPROOFED CRIMP BNC CABLE ASSEMBLY

CONN: 1st END Crimp male BNC (comparable to UG88E/U)
CABLE: Shielded coaxial, RG174/U
CONN: 2nd END Crimp male BNC (comparable to UG88E/U)



★QUANTITY DISC. CODE B NET 5.95

Model No.	Length
2249-K-12	12"
2249-K-24	24"
2249-K-36	36"
2249-K-48	48"
2249-K-60	60"

★Various lengths may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

PHENOLIC "BLACK BOXES"

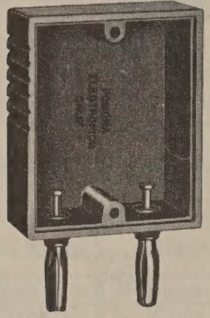
POMONA ELECTRONICS

Create passive and active networks, voltage dividers, isolation networks or attenuators with these units. Solder turret terminals for permanent noise-free connection of components, etc. Entire unit may be potted or encapsulated.

Housing molded of thermosetting electrical grade phenolic. Cover, punched XXP laminated paper base phenolic. Color, housing and cover, black. Cover plate and 2 each #2-56 cover screws included.

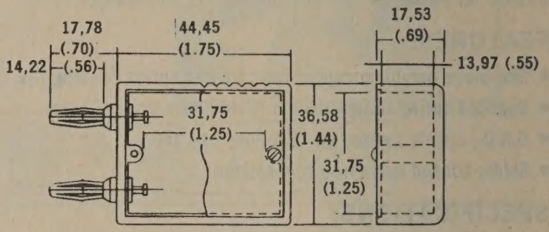
OPERATING TEMPERATURE: −25°C to +125°C. WORKING VOLTAGE: 5000 VDC. CURRENT: 15 amps cont., 30 amps int.

COMPONENT MOUNTING—ACROSS BANANA PLUGS



UPPER: No connection.

LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.

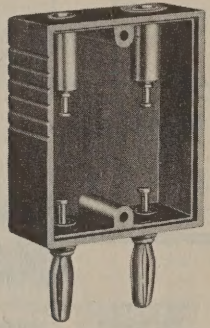

17,78
(.70)
44,45
(1.75)
14,22
(.56)
17,53
(.69)
13,97 (.55)
31,75
(1.25)
36,58
(1.44)
31,75
(1.25)

Model No.
2096

QUANTITY

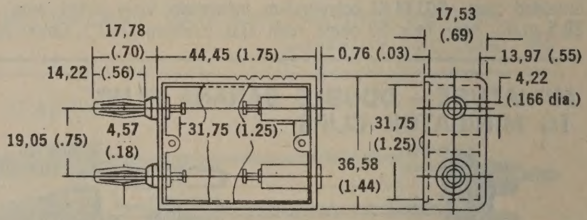
DISC. CODE A NET 2.75

COMPONENT MOUNTING—BANANA JACKS TO DOUBLE BANANA PLUG—JUNIOR SIZE



UPPER: Banana jacks, 4,22mm (.166″) dia. and solder turret terminals on ¾″ centers. Brass, nickel plated. Polarity indicator on top; color, red.

LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.

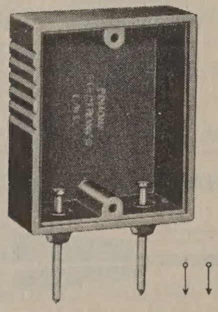

17,78
(.70)
44,45 (1.75)
0,76 (.03)
17,53
(.69)
13,97 (.55)
14,22
(.56)
4,22
(.166 dia.)
19,05 (.75)
4,57
(.18)
31,75 (1.25)
31,75
(1.25)
36,58
(1.44)

Model No.
2098

QUANTITY

DISC. CODE A NET 4.50

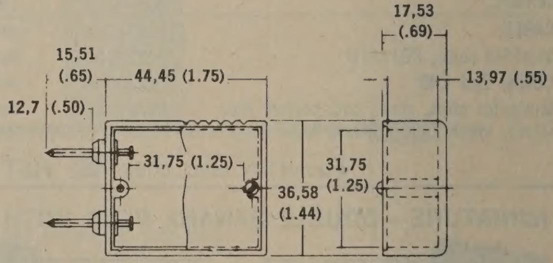
COMPONENT MOUNTING—ACROSS PIN TIP PLUGS



UPPER: No connection.

LOWER: Pin tip plugs, 2,03mm (.080″) dia. on ¾″ centers. Plus bodies and solder turret terminals, brass, nickel plated.

APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 5000 VDC.
Current: 5 amps cont., 10 amps int.

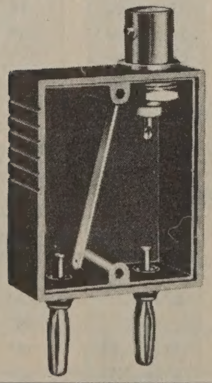

17,53
(.69)
15,51
(.65)
44,45 (1.75)
13,97 (.55)
12,7
(.50)
31,75 (1.25)
31,75
(1.25)
36,58
(1.44)

Model No.
2268

QUANTITY

DISC. CODE A NET 2.50

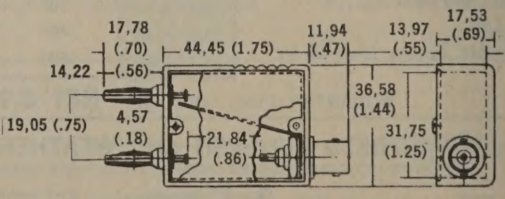
COMPONENT MOUNTING—BNC RECEPTACLE TO DOUBLE BANANA PLUG



UPPER: BNC receptacle M39012/21-0002.

LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.

APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 500 V peak.


17,78
(.70)
44,45 (1.75)
11,94
(.47)
13,97
(.55)
17,53
(.69)
14,22
(.56)
36,58
(1.44)
19,05 (.75)
4,57
(.18)
21,84
(.86)
31,75
(1.25)

Model No.
2097

QUANTITY

DISC. CODE A NET 5.25

All dimensions are shown millimeters (inches)

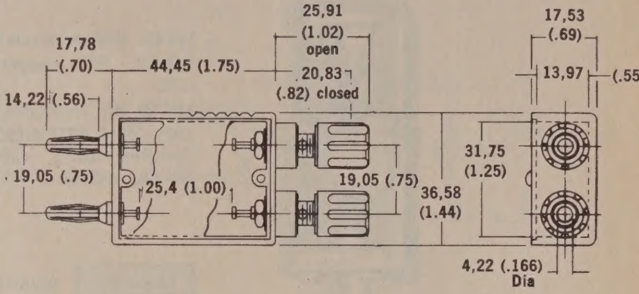
PHENOLIC "BLACK BOXES"

POMONA ELECTRONICS

COMPONENT MOUNTING—BINDING POSTS TO DOUBLE BANANA PLUG

UPPER: Banana jack binding posts with solder turret terminals, on ¾″ centers. One red and one black.

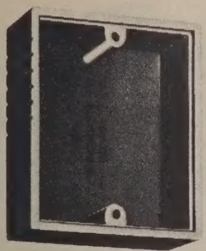
LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.


25,91
(1.02)
open
17,78
(.70)
44,45 (1.75)
20,83
(.82) closed
14,22 (.56)
19,05 (.75)
25,4 (1.00)
19,05 (.75)
36,58
(1.44)
17,53
(.69)
13,97
(.55
31,75
(1.25)
4,22 (.166)
Dia

Model No.
2259

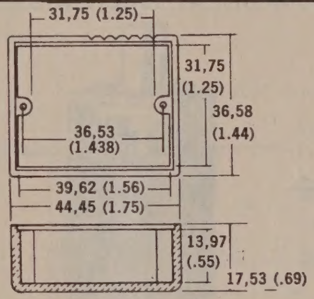
QUANTITY
DISC. CODE Ⓐ **NET 5.95**

BLACK BOX—JUNIOR SIZE

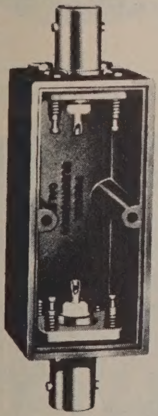


Model No.	Color
2105-0	Black
3720-2	Red
3721-5	Green

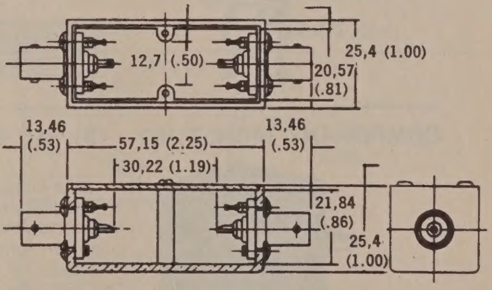
QUANTITY DISC. CODE Ⓐ **NET .95**


31,75 (1.25)
31,75
(1.25)
36,58
(1.44)
36,53
(1.438)
39,62 (1.56)
44,45 (1.75)
13,97
(.55)
17,53 (.69)

COMPONENT MOUNTING—BNC RECEPTACLE BOTH ENDS



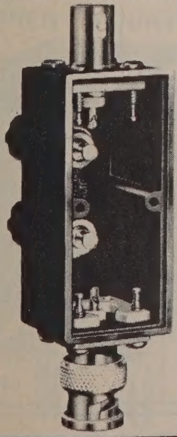
UPPER: BNC receptacle M39012/22-0001
LOWER: BNC receptacle M39012/22-0001
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 500 V peak.


12,7 (.50)
25,4 (1.00)
20,57
(.81)
13,46
(.53)
57,15 (2.25)
13,46
(.53)
30,22 (1.19)
21,84
(.86)
25,4
(1.00)

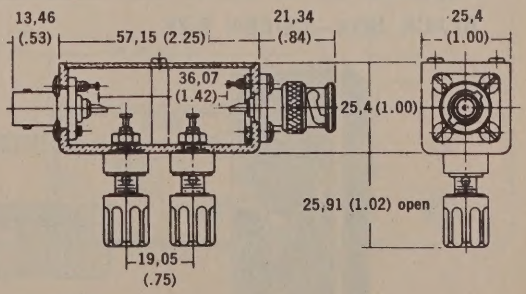
Model No.
2101

QUANTITY
DISC. CODE Ⓐ **NET 8.95**

COMPONENT MOUNTING—BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS



UPPER: BNC receptacle M39012/22-0001
CENTER: Banana jack binding posts with solder turret terminals. One red and one black.
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 500 V peak.


13,46
(.53)
57,15 (2.25)
21,34
(.84)
25,4
(1.00)
36,07
(1.42)
25,4 (1.00)
25,91 (1.02) open
19,05
(.75)

Model No.
2100

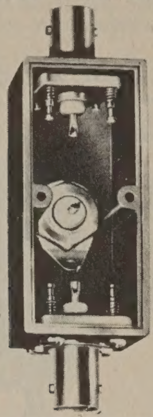
QUANTITY
DISC. CODE Ⓐ **NET 14.85**

All dimensions are shown millimeters (inches)

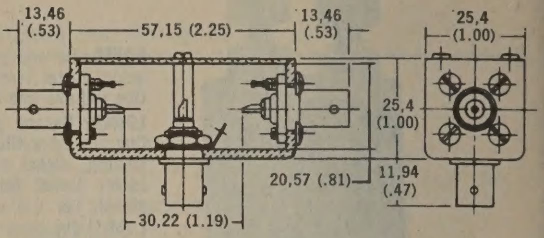
PHENOLIC "BLACK BOXES"

POMONA ELECTRONICS

COMPONENT MOUNTING— BNC RECEPTACLE "T"



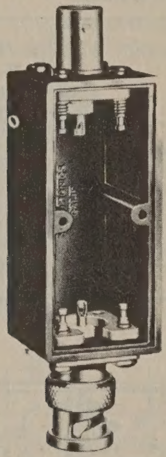
UPPER: BNC receptacle M39012/22-0001
CENTER: BNC receptacle M39012/22-0001
LOWER: BNC receptable M39012/22-0001
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 500 V peak.


13,46 (.53)
57,15 (2.25)
13,46 (.53)
25,4 (1.00)
25,4 (1.00)
20,57 (.81)
11,94 (.47)
30,22 (1.19)

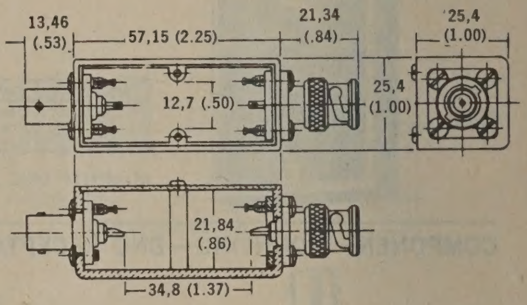
Model No.
2102

QUANTITY
DISC. CODE A NET 12.50

COMPONENT MOUNTING— BNC RECEPTACLE TO BNC PLUG



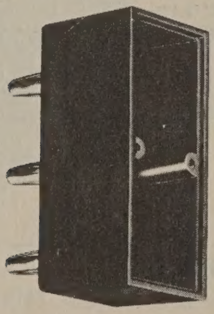
UPPER: BNC receptacle M39012/22-0001
LOWER: BNC plug UG1104A/U
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 500 V peak.


13,46 (.53)
57,15 (2.25)
21,34 (.84)
25,4 (1.00)
12,7 (.50)
25,4 (1.00)
21,84 (.86)
34,8 (1.37)

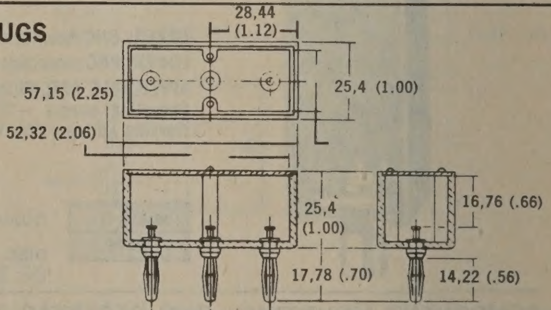
Model No.
2099

QUANTITY
DISC. CODE A NET 10.85

COMPONENT MOUNTING— (3) ¾" SPACED BANANA PLUGS



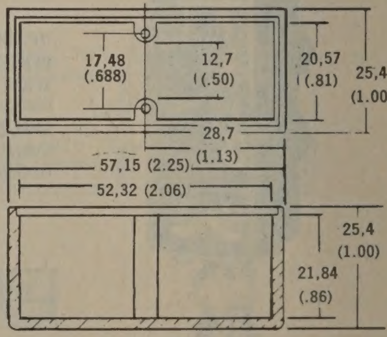
Three-in-line ¾" spaced banana plugs. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166") dia. banana jacks.
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 5000 VDC.
Current: 15 amps cont., 30 amps int.


28,44 (1.12)
57,15 (2.25)
25,4 (1.00)
52,32 (2.06)
25,4 (1.00)
16,76 (.66)
17,78 (.70)
14,22 (.56)

Model No.
2095

QUANTITY
DISC. CODE A NET 3.50

BLACK BOX—QUEEN SIZE


17,48 (.688)
12,7 (.50)
20,57 (.81)
25,4 (1.00)
28,7 (1.13)
57,15 (2.25)
52,32 (2.06)
25,4 (1.00)
21,84 (.86)

Model No.	Color
2103-0	Black
3722-2	Red
3723-5	Green

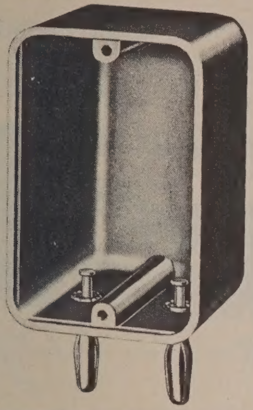
QUANTITY DISC. CODE A NET .95

All dimensions are shown millimeters (inches)

PHENOLIC & THERMOPLASTIC "BLACK BOXES"

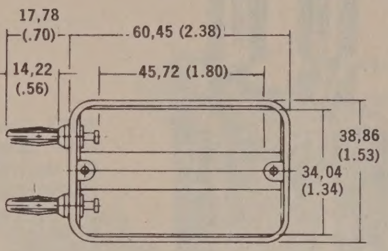
POMONA
ELECTRONICS

COMPONENT MOUNTING — ACROSS BANANA PLUGS



UPPER: No connection.

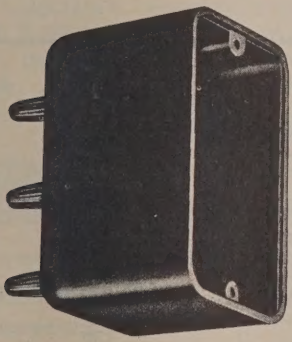
LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.


17,78
(.70)
60,45 (2.38)
14,22
(.56)
45,72 (1.80)
38,86
(1.53)
34,04
(1.34)

Model No.
1177

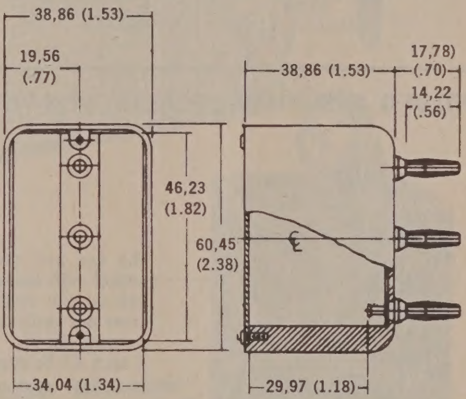
QUANTITY DISC. CODE **A** **NET 2.75**

COMPONENT MOUNTING — (3) ¾″ SPACED BANANA PLUGS — KING SIZE



Three-in-line ¾″ spaced banana plugs. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.

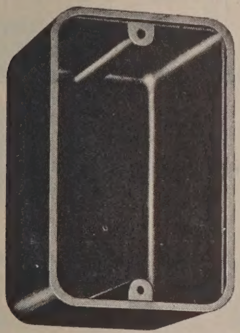
APPLICABLE SPECIFICATIONS:
Operating temp.: −25°C to +125°C.
Working voltage: 5000 VDC.
Current: 15 amps cont., 30 amps int.

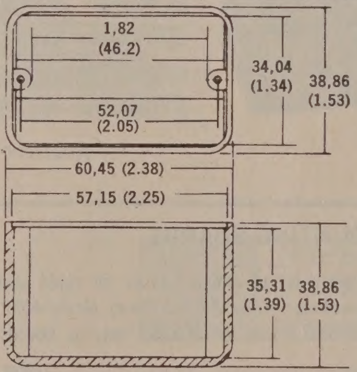

38,86 (1.53)
19,56
(.77)
17,78)
(.70)
38,86 (1.53)
14,22
(.56)
46,23
(1.82)
60,45
(2.38)
34,04 (1.34)
29,97 (1.18)

Model No.
1943

QUANTITY DISC. CODE **A** **NET 3.75**

BLACK BOX—KING SIZE

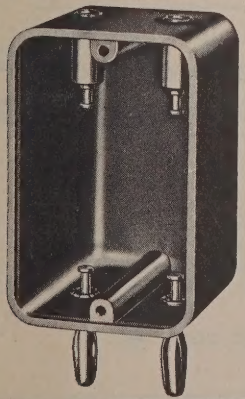



1,82
(46.2)
52,07
(2.05)
34,04
(1.34)
38,86
(1.53)
60,45 (2.38)
57,15 (2.25)
35,31
(1.39)
38,86
(1.53)

Model No.	Color
2104-0	Black
3724-2	Red
3725-5	Green

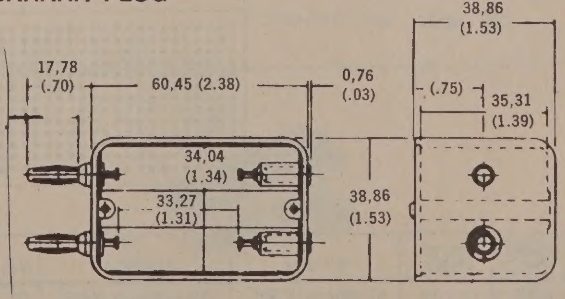
QUANTITY DISC. CODE **A** **NET .95**

COMPONENT MOUNTING— BANANA JACKS TO DOUBLE BANANA PLUG



UPPER: Banana jacks, 4,22mm (.166″) dia. and solder turret terminals on ¾″ centers. Brass, nickel plated. Polarity indicator on top; color, red.

LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.


38,86
(1.53)
17,78
(.70)
60,45 (2.38)
0,76
(.03)
(.75)
35,31
(1.39)
34,04
(1.34)
33,27
(1.31)
38,86
(1.53)

Model No.
2224

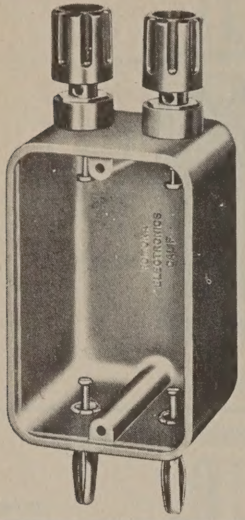
QUANTITY DISC. CODE **A** **NET 4.50**

All dimensions are shown millimeters (inches)

PHENOLIC & THERMOPLASTIC "BLACK BOXES"

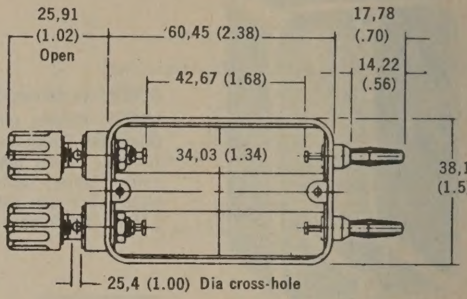
POMONA
ELECTRONICS

COMPONENT MOUNTING— BINDING POSTS TO DOUBLE BANANA PLUG



UPPER: Banana jack binding posts with solder turret terminals, on ¾″ centers. One red and one black.

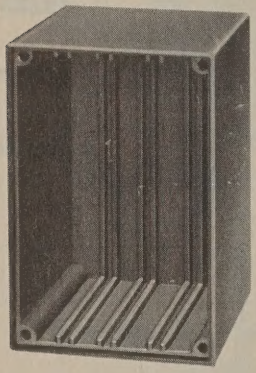
LOWER: Banana plugs on ¾″ centers. One piece beryllium copper spring, heat treated, nickel plated. Plug body and solder turret terminals, brass, nickel plated. For use with standard 4,22mm (.166″) dia. banana jacks.


25,91
(1.02)
Open
60,45 (2.38)
17,78
(.70)
42,67 (1.68)
14,22
(.56)
34,03 (1.34)
38,1
(1.5)
25,4 (1.00) Dia cross-hole

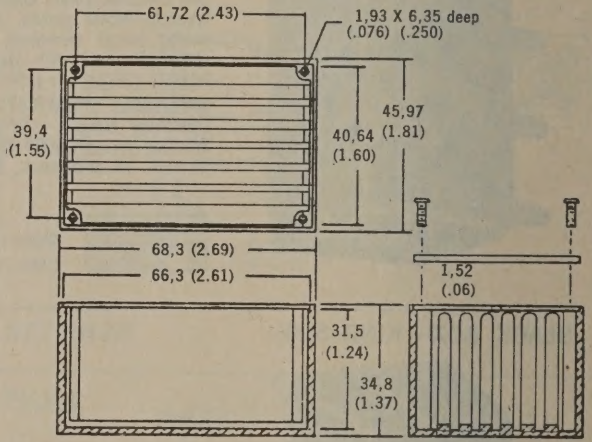
Model No.
2262

QUANTITY DISC. CODE **A** **NET 5.95**

MOLDED ABS THERMOPLASTIC BOX WITH CARD GUIDES



The box and cover are molded of high impact ABS thermoplastic and are almost unbreakable under normal use. Box and cover are easily machined. Three slots are provided for 1/16″ circuit board. Cover and 4 each #2-56 cover screws included.


61,72 (2.43)
1,93 X 6,35 deep
(.076) (.250)
39,4
(1.55)
40,64
(1.60)
45,97
(1.81)
68,3 (2.69)
66,3 (2.61)
1,52
(.06)
31,5
(1.24)
34,8
(1.37)

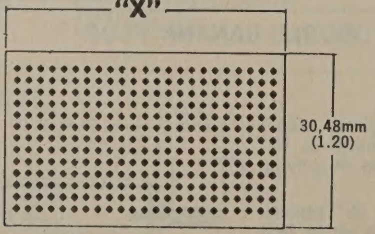
Model No.	Color
3850-0	Black
3850-6	Blue
3850-9	White

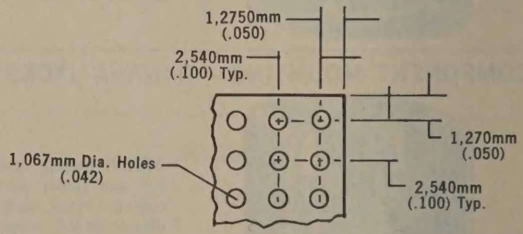
QUANTITY DISC. CODE **A** **NET 1.25**

CIRCUIT MOUNTING BOARDS

NEW

Two models of pre-punched circuit boards for rapid assembly of components. Both boards are made of Glass Epoxy. Model 4392 is Copper Clad one side. Both models fit the Model 3850 housing. Boards are 1/16″ thick.


"X"
30,48mm
(1.20)


1,2750mm
(.050)
2,540mm
(.100) Typ.
1,067mm Dia. Holes
(.042)
1,270mm
(.050)
2,540mm
(.100) Typ.

Model No.	No. of Holes	"X" Dim.	Material	Net
4393	25 x 12	63,30mm (2.50)	Glass-Epoxy (GEE)	.95
4392	25 x 12	63,30mm (2.50)	Glass-Epoxy (GEE) Copper Clad 1 Side	.95

QUANTITY DISC. CODE **A**

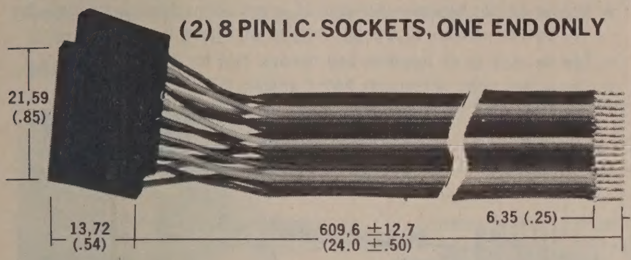
All dimensions are shown millimeters (inches)

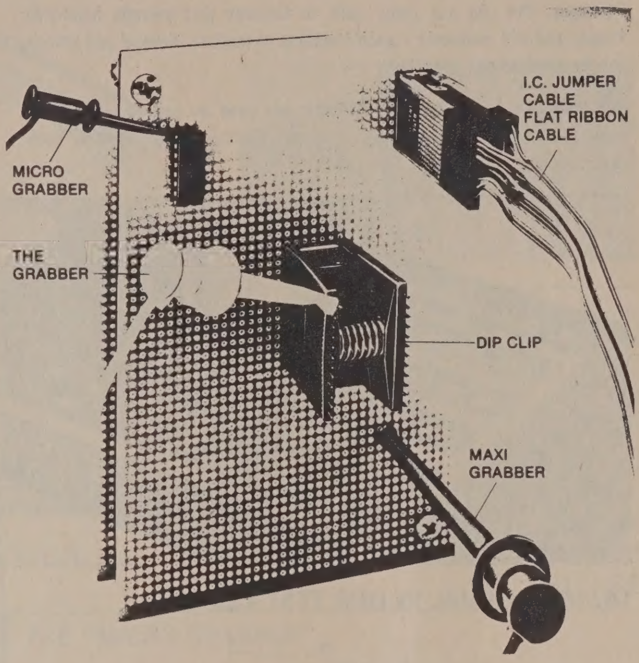
FLAT RIBBON CABLE/I.C. ACCESSORIES

POMONA
ELECTRONICS

I.C. JUMPER CABLE (FOR USE WITH 3916 & 4236)

NEW


(2) 8 PIN I.C. SOCKETS, ONE END ONLY
21,59
(.85)
13,72
(.54)
609,6 ±12,7
(24.0 ±.50)
6,35 (.25)


I.C. JUMPER
CABLE
FLAT RIBBON
CABLE
MICRO
GRABBER
THE
GRABBER
DIP CLIP
MAXI
GRABBER

CONN:
1st end – (2) 8 Pin I.C. Sockets.
MATERIAL: Contacts, Beryllium Copper.
FINISH: Gold Plated.
INSULATION: Thermoplastic (Black).

WIRE: 26 AWG; stranding, 7/34, 16 conductor flat ribbon cable. color coded.

CONN:
2nd end – None (Wires individually stripped & tinned 1/4" long).

Model No.
4185-24

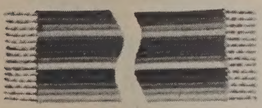
QUANTITY DISC. CODE **A** **NET 11.85**

FLAT RIBBON CABLE

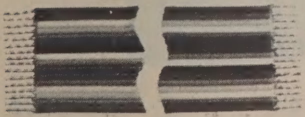
NEW

26 AWG; stranding, 7/34, flat ribbon cable, color coded & bonded. Wires individually stripped and tinned .25 long.

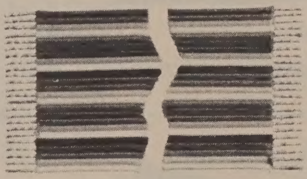
8 CONDUCTOR
MODEL NO. 4191



14 CONDUCTOR
MODEL NO. 4192



16 CONDUCTOR
MODEL NO. 4193



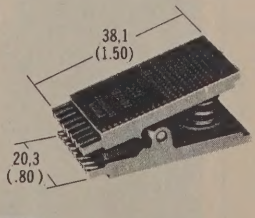
24 CONDUCTOR
MODEL 4194

Model No.	Conductors	Net
4191	8 Conductor	2.50
4192	14 Conductor	2.75
4193	16 Conductor	2.95
4194	24 Conductor	3.95

★QUANTITY DISC. CODE **A**

14/16 PIN DUAL IN-LINE DIP REMOVER

NEW


38,1
(1.50)
20,3
(.80)

The dip remover is an excellent tool for the removal of 14/16 pin dual in-line I.C. chips. With this tool accidental bending of the contacts is at a minimum. The dip remover has been designed using a glass-filled nylon material that will withstand 240°C at 40% R.H.

COLOR: Red.

Model No.
4386

QUANTITY DISC. CODE **C** **NET 1.85**

All dimensions are shown millimeters (inches)

"DIP CLIP"™ IC TEST CLIP

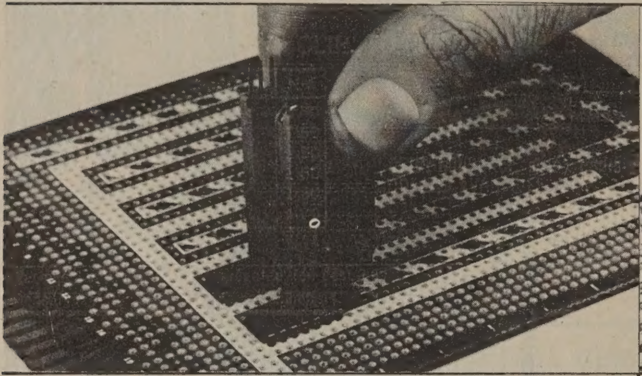
POMONA ELECTRONICS

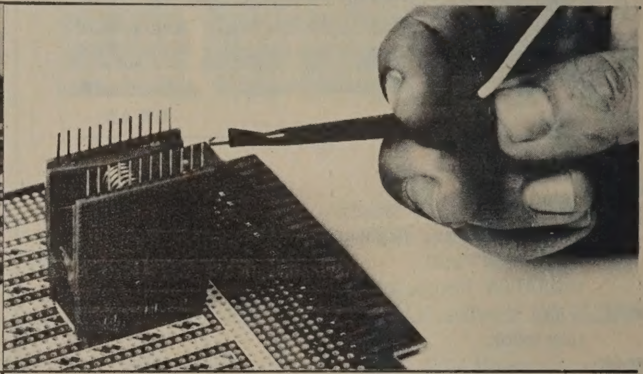
The "Dip Clip" is engineered for the attachment of test probes to I.C. Packages. The clip has many built in features that permits hand-free testing and still maintains a good electrical connection. Several test probes can be used at one time.

The "Dip Clips" with reduced thickness are used for testing ultra dense packaged chips that have only 2,54mm, (.100") spacing between each other. Models: 4236, 4324 and 4340.

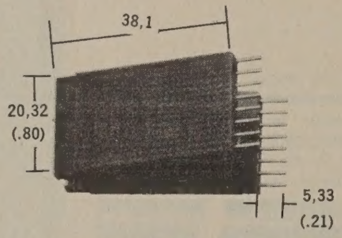
FEATURES

- Solid non-tarnish nickel silver contacts.
- Serrated 1,27mm,(.050") wide contacts on lower end for good electrical connection. Will assist in removal of foreign material from DIP.
- 0,63mm, (.025") square serrated test points on upper end will accept wire wraps or mini test clips.
- Molded barrier between each contact allows connections to be made on live boards without accidental shorting of adjacent contacts.
- Can be used as an insertion and removal tool for DIPS.
- Glass-filled nylon, withstands 240°C at 40% R.H.





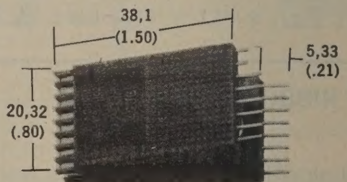
14/16 PIN DUAL IN-LINE TEST CLIP



Model No.
3916

QUANTITY DISC. CODE A NET 5.75

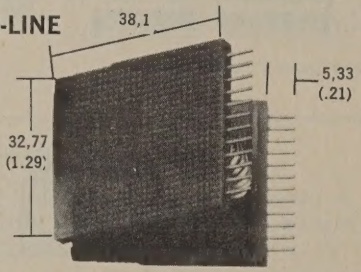
14/16 PIN DUAL IN-LINE TEST CLIP — Reduced thickness for testing ultra dense packages.



Model No.
4236

QUANTITY DISC. CODE A NET 5.75

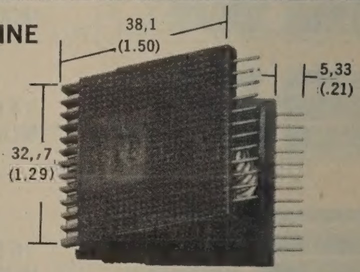
24 PIN DUAL IN-LINE TEST CLIP



Model No.
4124

QUANTITY DISC. CODE A NET 13.85

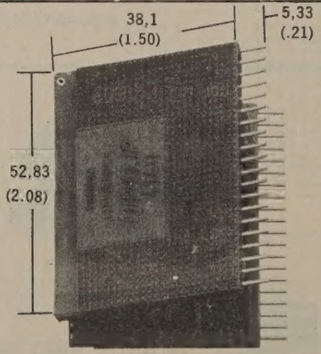
24 PIN DUAL IN-LINE TEST CLIP Reduced thickness for testing ultra dense packages.



Model No.
4324

QUANTITY DISC. CODE A NET 13.85

40 PIN DUAL IN-LINE TEST CLIP

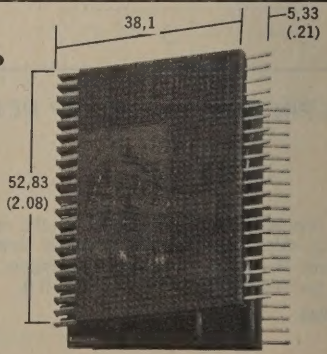


Model No.
4140

QUANTITY DISC. CODE A NET 19.95

40 PIN DUAL IN-LINE TEST CLIP

Reduced thickness for testing ultra dense packages.



Model No.
4340

QUANTITY DISC. CODE A NET 19.95

All dimensions are shown millimeters (inches)

DO IT YOURSELF GRABBER

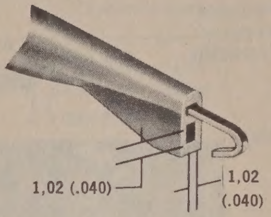
POMONA ELECTRONICS

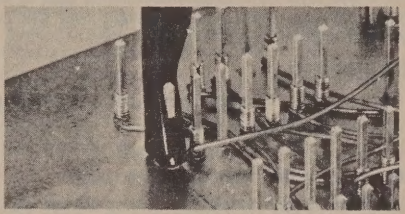
FEATURES:

- Plunger type action between thumb and two fingers.
- Comfortable finger grip operation.
- Positive connection that won't pop off.
- No sharp teeth to damage or nick wires.
- Simplified assembly procedure.
- High temperature material that resists melting when soldering.
- Accepts wire up to 2,29mm (.090″) dia.

MATERIALS:

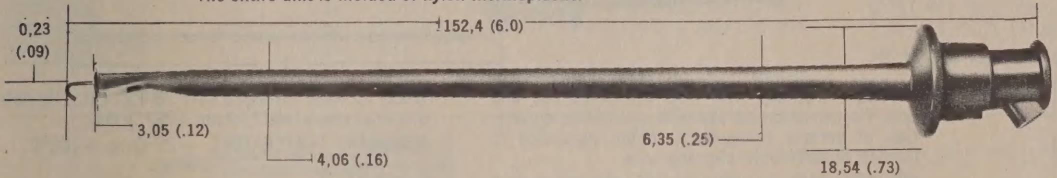
- Molded glass-filled nylon, withstands 240°C at 40% R.H.
- Beryllium copper contact per QQ-C-533, Berylco 25.
- Gold plated per MIL-G-45204 Type I.
- Stainless steel spring.





THE "MAXI GRABBER"

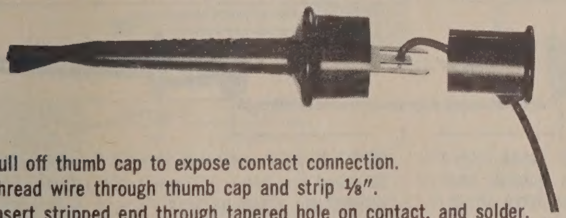
The maxi-grabber is an extended length do-it-yourself grabber designed especially for high-rise packaging of electronic components where depth of testing point is a key factor. The maxi-grabber will fit entry holes as small as ¼″ dia. and the unit is completely field serviceable. The gold plated contact hook can be connected rapidly to component leads or the tip will accept 0,63mm (.025) square Wire-Wrap† terminals. The entire unit is molded of nylon thermoplastic.



Model No.	Color
4225-0	Black
4225-1	Brown
4225-2	Red
4225-3	Orange
4225-4	Yellow
4225-2	Green
4225-6	Blue
4225-7	Violet
4225-8	Gray
4225-9	White

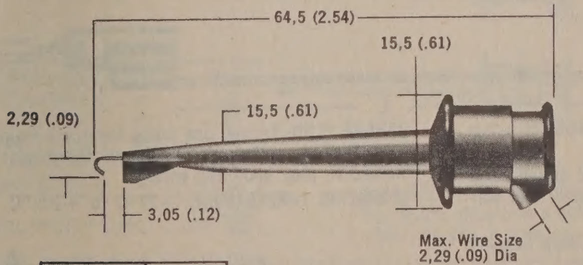
QUANTITY DISC. CODE **A** **NET 1.65**

SIMPLIFIED ASSEMBLY PROCEDURE



1. Pull off thumb cap to expose contact connection.
2. Thread wire through thumb cap and strip ⅛″.
3. Insert stripped end through tapered hole on contact, and solder.
   NOTE: Stripped end should be placed into the large opening of the tapered hole.
4. Slide thumb cap back onto contact.

THE GRABBER



Model No.	Color
3925-0	Black
3925-1	Brown
3925-2	Red
3925-3	Orange
3925-4	Yellow
3925-5	Green
3925-6	Blue
3925-7	Violet
3925-8	Gray
3925-9	White

QUANTITY DISC. CODE **A**

(10 per pkg.)
NET 8.50

DO-IT-YOURSELF "GRABBER" KIT

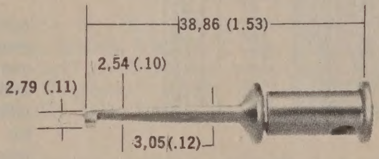
Model No.
4176

(pkgd. 1 black and 1 red)
QUANTITY DISC. CODE **A** **NET 1.95**

THE "MICRO GRABBER"

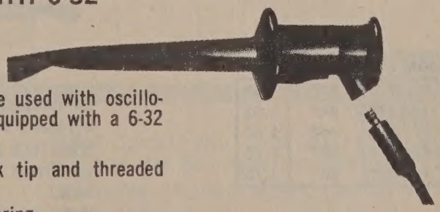
This do-it-yourself grabber is designed for testing of high density packaging. Lightweight and small size permits multiple usage of units in confined areas.

Model No.	Color
4233-0	Black
4233-1	Brown
4233-2	Red
4233-3	Orange
4233-4	Yellow
4233-5	Green
4233-6	Blue
4233-7	Violet
4233-8	Gray
4233-9	White



QUANTITY DISC. CODE **A** **NET 1.00**

"GRABBER" WITH 6-32 THREAD



This Grabber can be used with oscilloscopes and leads equipped with a 6-32 screw on tip.

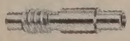
- Gold plated hook tip and threaded insert.
- Stainless steel spring.
- Molded nylon body per MIL-P-20693.

Model No.	Color
4011-0	Black
4011-2	Red

QUANTITY DISC. CODE **A** **NET 1.50**

6-32 SCREW-ON TIP

- Can be crimped or soldered to wire.
- Nickel plated brass.
- Supplied with shrink sleeving.
- Mates with 4011.



Model No.
4311

(10 per pkg.)
QUANTITY DISC. CODE **A** **NET 7.50**

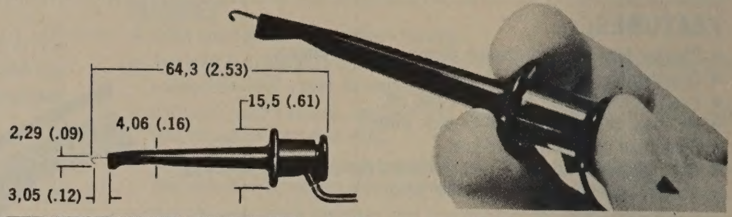
★Colors may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

MINI TEST CLIP GRABBER

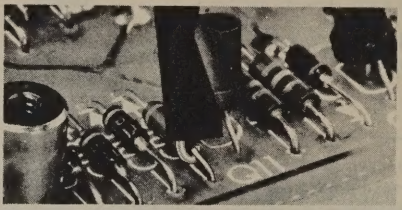
POMONA
ELECTRONICS

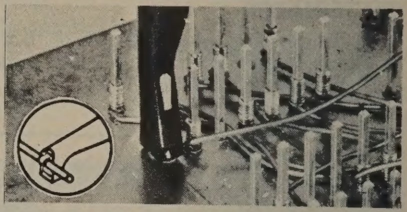
These plunger type action clips are called "grabbers." The gold plated contact hook can be connected rapidly to component leads and the specially designed tip slides down over 0,63mm (.025″) square Wire-Wrap† pins. Nylon insulation molded directly onto clip and wire providing a strong, reliable integral unit. Clip is completely insulated to point of connection.



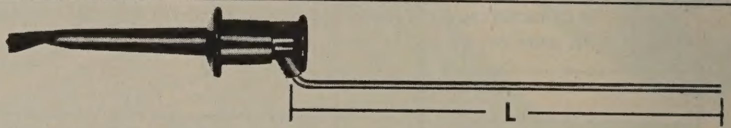
FEATURES:

- Plunger type action between thumb and two fingers.
- Comfortable finger grip operation.
- Positive connection that won't pop off.
- No sharp teeth to damage or nick wires.
- Beryllium copper conductor Berylco 25 per QQ-C-533; gold plated per MIL-G-45204 Type I.
- Stainless steel spring.
- Molded glass-filled nylon.





MINI-TEST CLIP GRABBER — ONE END ONLY



Model No.	Length	Net
3780-8-*	8″	1.00
3780-12-*	12″	1.00
3780-24-*	24″	1.00
3780-36-*	36″	1.00
3780-48-*	48″	1.05
3780-60-*	60″	1.10

Miniature test clip with wire connected one end only. No connector on opposite end allows connection of various components. Nylon insulation is molded directly onto clip and wire.

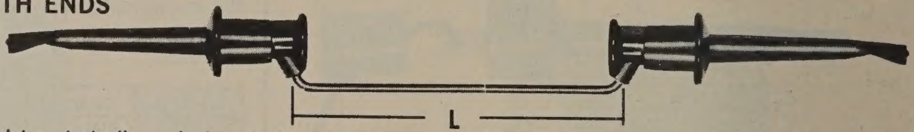
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 20 AWG, stranded 41 x 38 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE **A**

MINI-TEST CLIP GRABBER — BOTH ENDS



Model No.	Length	Net
3781-8-*	8″	1.65
3781-12-*	12″	1.65
3781-18-*	18″	1.65
3781-24-*	24″	1.65
3781-36-*	36″	1.65
3781-48-*	48″	1.70
3781-60-*	60″	1.75

Miniature test clip on both ends for rapid interconnection of test points. Connects quickly and gently to test points without damage from sharp teeth.

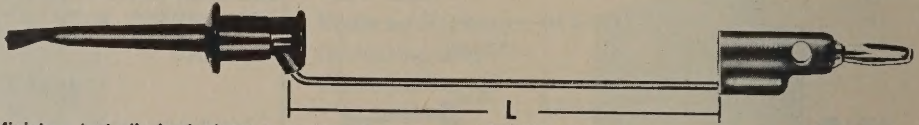
MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 20 AWG, stranded 41 x 38 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE **A**

MINI-TEST CLIP GRABBER — TO STACKING BANANA PLUG



Model No.	Length	Net
3782-12-*	12″	1.65
3782-24-*	24″	1.65
3782-36-*	36″	1.65
3782-48-*	48″	1.70
3782-60-*	60″	1.75

Miniature test clip lead adapts to equipment using standard banana jacks.

MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

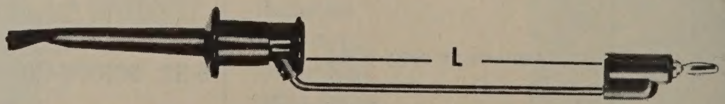
WIRE: 20 AWG, stranded 41 x 38 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE **A**

MINI-TEST CLIP GRABBER — TO STACKING MINIATURE BANANA PLUG



Model No.	Length	Net
3784-12-*	12″	1.85
3784-24-*	24″	1.85
3784-36-*	36″	1.85
3784-48-*	48″	1.95
3784-60-*	60″	2.05

Miniature test clip adapts to equipment using miniature banana jacks.

MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 20 AWG, stranded 41 x 38 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

MINIATURE BANANA PLUG: Spring, one piece beryllium copper, heat treated, gold flashed. Tough thermoplastic molded to plug body and wire.

OPERATING TEMPERATURE: −25°C to +105°C.

★QUANTITY DISC. CODE **A**

★Colors and Length may be aggregated for best quantity price. Other lengths available to order.
†Wire-Wrap is a trademark of Gardner-Denver.
° Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

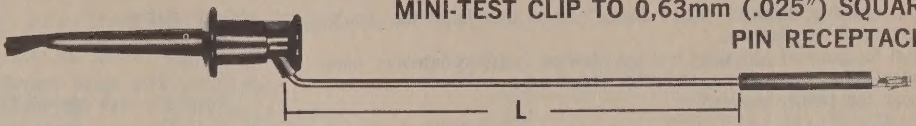
MINI TEST CLIP GRABBER

POMONA
ELECTRONICS

MINI-TEST CLIP TO 0,63mm (.025″) SQUARE PIN RECEPTACLE

Model No.	Color	Length	Net
3783-12-0	Black	12″	2.25
3783-24-0	Black	24″	2.25
3783-36-0	Black	36″	2.25
3783-48-0	Black	48″	2.35
3783-60-0	Black	60″	2.45
3783-12-2	Red	12″	2.25
3783-24-2	Red	24″	2.25
3783-36-2	Red	36″	2.25
3783-48-2	Red	48″	2.35
3783-60-2	Red	60″	2.45

★QUANTITY DISC. CODE A



This miniature test clip lead has a 0,63mm (.025″) square pin receptacle which slides over 0,63mm (.025″) square pins.

MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 20 AWG, stranded 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

.025 PIN RECEPTACLE: Gold plated phosphor bronze contact.

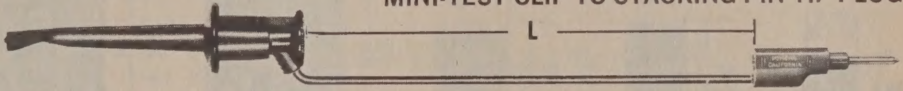
OPERATING TEMPERATURE: −25°C to +105°C.

COLORS AVAILABLE: Black, red only.

MINI-TEST CLIP TO STACKING PIN TIP PLUG

Model No.	Color	Length	Net
3785-12-0	Black	12″	1.85
3785-24-0	Black	24″	1.85
3785-36-0	Black	36″	1.85
3785-48-0	Black	48″	1.95
3785-60-0	Black	60″	2.05
3785-12-2	Red	12″	1.85
3785-24-2	Red	24″	1.85
3785-36-2	Red	36″	1.85
3785-48-2	Red	48″	1.95
3785-60-2	Red	60″	2.05

★QUANTITY DISC. CODE A



Miniature test clip adapts to equipment using standard pin tip jacks.

MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire.

WIRE: 20 AWG, stranded 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.

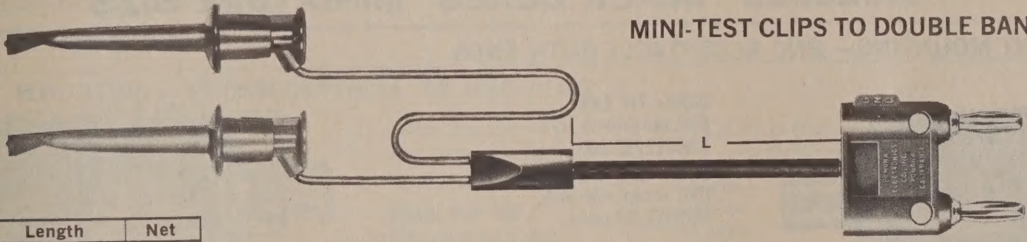
PIN TIP PLUG: 2,03mm (.080″) dia., ½″ long, brass, gold flashed.

STACK-UP: Beryllium copper, gold flashed. Accepts 2,03mm (.080″) dia. pin.

OPERATING TEMPERATURE: −25°C to +105°C.

COLORS AVAILABLE: Black, red only.

MINI-TEST CLIPS TO DOUBLE BANANA PLUG



Model No.	Length	Net
3786-C-18	18″	6.50
3786-C-24	24″	6.50
3786-C-36	36″	6.50
3786-C-48	48″	6.50
3786-C-60	60″	6.50

★QUANTITY DISC. CODE B

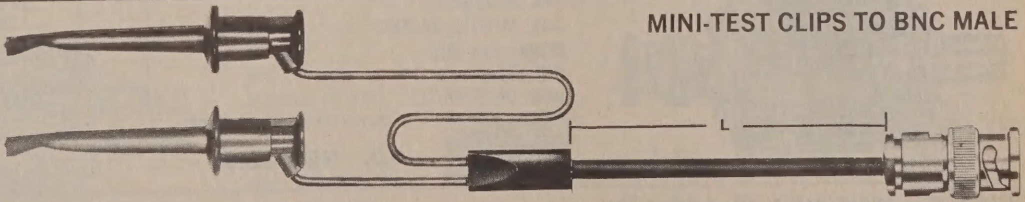
For use with equipment having standard binding posts or banana jacks.

MINI-TEST CLIP: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire: one red, one black.

CABLE: Shielded coax., RG58C/U, 4,95mm (.195″) O.D., nom. cap. 28.5 pf/ft. Color, black.

DOUBLE BANANA PLUG: On ¾″ center. Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded onto double plug body and cable. Color, black.

MINI-TEST CLIPS TO BNC MALE



Model No.	Length	Net
3787-C-18	18″	6.50
3787-C-24	24″	6.50
3787-C-36	36″	6.50
3787-C-48	48″	6.50
3787-C-60	60″	6.50

★QUANTITY DISC. CODE B

For use with equipment having BNC receptacles.

MINI-TEST CLIPS: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire: one red, one black.

CABLE: Shielded coax., RG58C/U, 4,95mm (.195″) O.D., nom. cap 28.5 pf/ft. Color: black.

CONNECTOR: BNC male, M39012/16-0001 with non-tarnish finish.

MINI-TEST CLIPS TO BNC RECEPTACLE

This molded breakout converts to coaxial cable with a male plug to a test cable with clips.

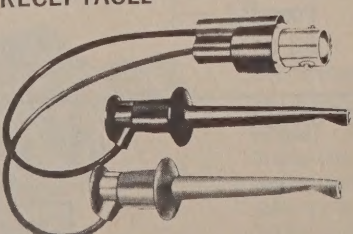
MINI-TEST CLIPS: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire: one black, one red.

WIRE: 20 AWG, stranded, 41 x 36 T.C. PVC insulation 2,21mm (.087″) O.D.

CONNECTOR: BNC receptacle UG1094/U with non-tarnish finish.

INSULATION: Tough thermoplastic molded to connector and wire.

OVERALL LENGTH: 7″.



Model No.
3788

QUANTITY DISC. CODE A

NET 3.95

MINI-TEST CLIPS TO BNC PLUG

This molded breakout converts a coaxial cable with a BNC receptacle to a test cable with clips.

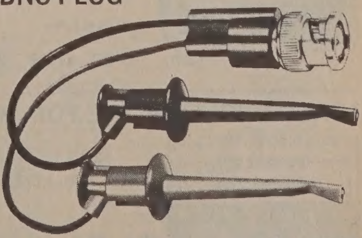
MINI-TEST CLIPS: Beryllium copper gold plated hook tip. Nylon insulation molded directly onto clip and wire: one black, one red.

WIRE: 20 AWG, stranded, 41 x 36 T.C. PVC insulation 2,21mm (.087″) O.D.

CONNECTOR: BNC plug with non-tarnish finish.

INSULATION: Tough thermoplastic molded to connector and wire.

OVERALL LENGTH: 7″.



Model No.
3789

QUANTITY DISC. CODE A

NET 4.95

★Colors and Length may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

DIE CAST SHIELDED "BLACK BOXES"

POMONA ELECTRONICS

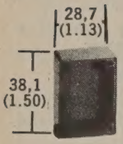
Now available, **shielded** "Black Boxes." Boxes that fulfill the requirement for RF applications.
Ideal for compact packaging (voltage dividers, isolation networks, impedance matching networks), and other varied uses.
Cover and screws included.

SPECIFICATIONS: (All Models)

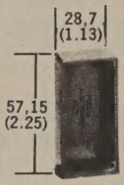
- Operating temperature: −55°C to +150°C.
- Working voltage: 500 V peak (Model 2415, 1500 V peak).
- Noise rejection: Greater than 70 db.

FEATURES:

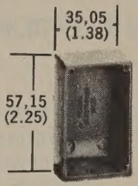
- Shielded housing; Die cast aluminum.
- Finish: Blue baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- Cover: Aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- Screws secure cover for proper shielding.


28,7
(1.13)
38,1
(1.50)

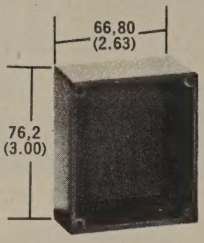
Miniature


28,7
(1.13)
57,15
(2.25)

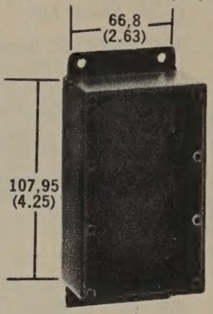
A
Size


35,05
(1.38)
57,15
(2.25)

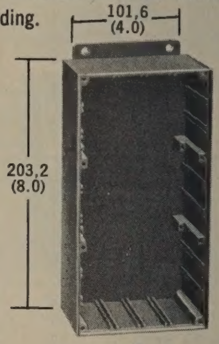
B
Size


66,80
(2.63)
76,2
(3.00)

D
Size


66,8
(2.63)
107,95
(4.25)

C
Size

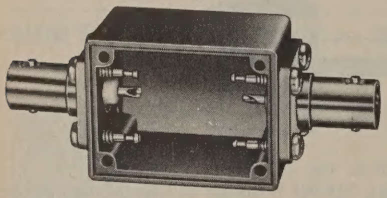

101,6
(4.0)
203,2
(8.0)

E
Size

See following pages for Model Numbers.

SHIELDED "BLACK BOXES" MINIATURE SIZE

COMPONENT MOUNTING— BNC RECEPTACLE BOTH ENDS

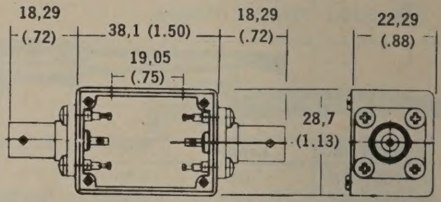


CONN: 1st END
BNC receptacle jack, M39012/22-0001.

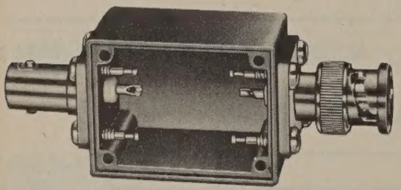
CONN: 2nd END
BNC receptacle jack, M39012/22-0001.

Model No.
3751

QUANTITY DISC. CODE A NET 9.85


18,29
(.72)
38,1 (1.50)
18,29
(.72)
19,05
(.75)
22,29
(.88)
28,7
(1.13)

COMPONENT MOUNTING—BNC RECEPTACLE TO BNC PLUG

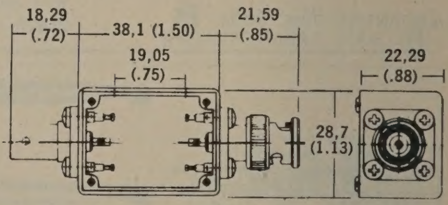


CONN: 1st END
BNC receptacle jack, M29012/22-0001

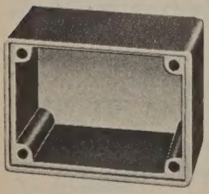
CONN: 2nd END
BNC receptacle plug, UG1104A/U.

Model No.
3752

QUANTITY DISC. CODE A NET 10.85


18,29
(.72)
38,1 (1.50)
21,59
(.85)
19,05
(.75)
22,29
(.88)
28,7
(1.13)

EMPTY — SHIELDED "BLACK BOX"

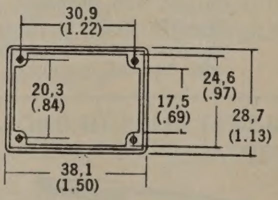


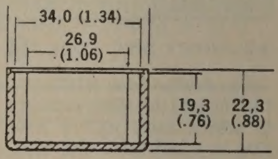
Model No.	Net
3753	2.95
3754	2.75

QUANTITY DISC. CODE A

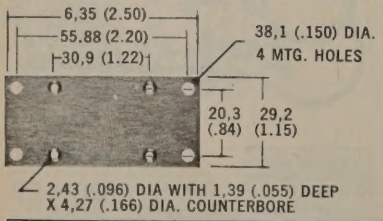
MODEL 3753
FINISH: Blue baked enamel. Includes cover with part number on cover and four cover screws.

MODEL 3754
FINISH: None.
Includes unmarked cover and four cover screws.


30,9
(1.22)
20,3
(.84)
17,5
(.69)
24,6
(.97)
28,7
(1.13)
38,1
(1.50)


34,0 (1.34)
26,9
(1.06)
19,3
(.76)
22,3
(.88)

LARGER COVER PLATE FOR MOUNTING MINIATURE SIZE BOXES


6,35 (2.50)
55,88 (2.20)
30,9 (1.22)
38,1 (.150) DIA.
4 MTG. HOLES
20,3
(.84)
29,2
(1.15)
2,43 (.096) DIA WITH 1,39 (.055) DEEP
X 4,27 (.166) DIA. COUNTERBORE

This larger plate, when attached to the box, provides flanges for mounting.

MATERIAL: 2.03mm (.080") aluminum #6061-T6, clear anodized per MIL-A-8625A.

Model No.
3729

(plate only)

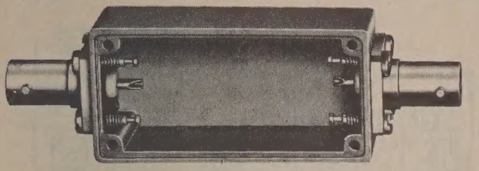
QUANTITY DISC. CODE A NET .85

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" — SIZE "A"

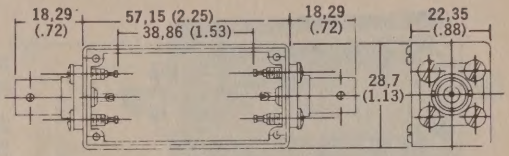
POMONA ELECTRONICS

COMPONENT MOUNTING — BNC RECEPTACLE BOTH ENDS



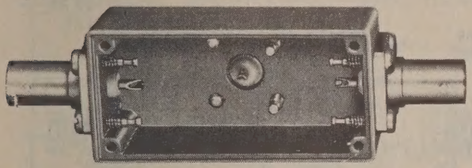
CONN: 1st END
BNC receptacle jack, M39012/22-0001.

CONN: 2nd END
BNC receptacle jack, M39012/22-0001.


18,29 (.72)
57,15 (2.25)
38,86 (1.53)
18,29 (.72)
22,35 (.88)
28,7 (1.13)

Model No.	QUANTITY DISC. CODE	
2390	A	NET 9.85

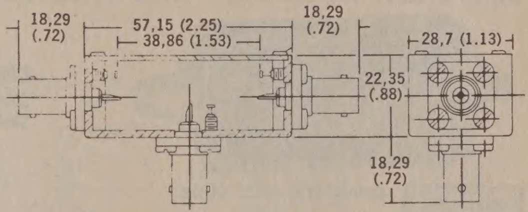
COMPONENT MOUNTING — BNC RECEPTACLE "T"



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

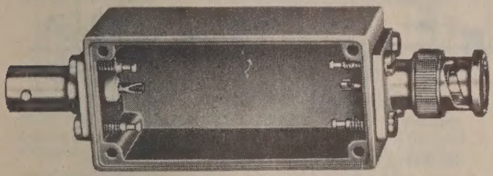
CENTER:
BNC receptacle jack, M39012/22-0001.

CONN: 2nd END
BNC receptacle jack, M39012/22-0001.


18,29 (.72)
57,15 (2.25)
38,86 (1.53)
18,29 (.72)
28,7 (1.13)
22,35 (.88)
18,29 (.72)

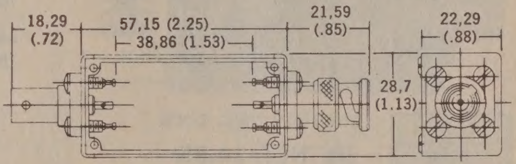
Model No.	QUANTITY DISC. CODE	
2392	A	NET 11.50

COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG



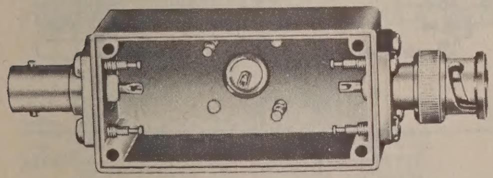
CONN: 1st END
BNC receptacle jack, M39012/22-0001.

CONN: 2nd END
BNC receptacle plug, UG1104A/U.


18,29 (.72)
57,15 (2.25)
38,86 (1.53)
21,59 (.85)
22,29 (.88)
28,7 (1.13)

Model No.	QUANTITY DISC. CODE	
2391	A	NET 10.85

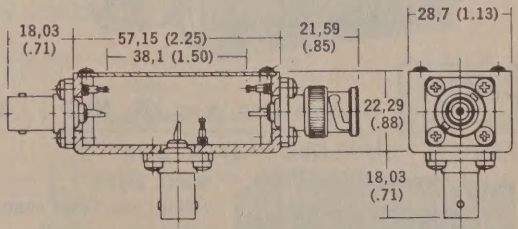
COMPONENT MOUNTING — "T" TWO BNC RECEPTACLES TO BNC PLUG



CONN:
1st END
BNC receptacle M39012/22-0001 jack,

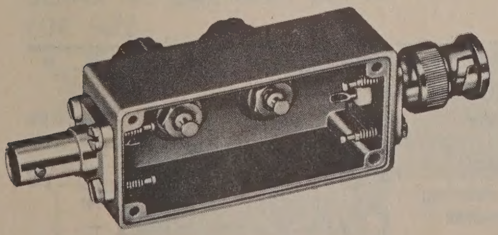
CENTER:
BNC receptacle jack, M39012/22-0001

CONN: 2nd END
BNC receptacle plug, UG1104A/U.


28,7 (1.13)
18,03 (.71)
57,15 (2.25)
38,1 (1.50)
21,59 (.85)
22,29 (.88)
18,03 (.71)

Model No.	QUANTITY DISC. CODE	
2401	A	NET 12.85

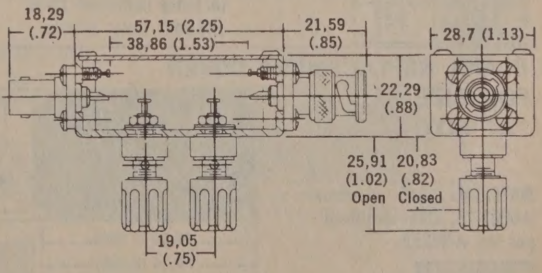
COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS



CONN:
1st END
BNC receptacle jack, M39012/22-0001.

CENTER:
Banana jack binding posts with solder turret terminals; red and black.

CONN: 2nd END
BNC receptacle plug, UG1104A/U.


18,29 (.72)
57,15 (2.25)
38,86 (1.53)
21,59 (.85)
28,7 (1.13)
22,29 (.88)
25,91 (1.02) Open
20,83 (.82) Closed
19,05 (.75)

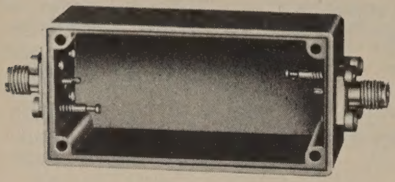
Model No.	QUANTITY DISC. CODE	
2393	A	NET 14.85

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES"—SIZE "A"

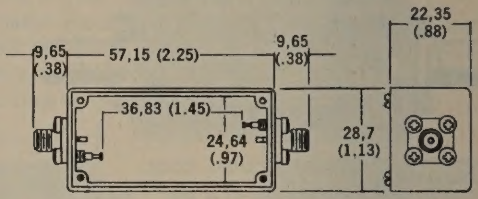
POMONA ELECTRONICS

COMPONENT MOUNTING—SMA RECEPTACLE BOTH ENDS



CONN: 1st END
SMA receptacle jack.

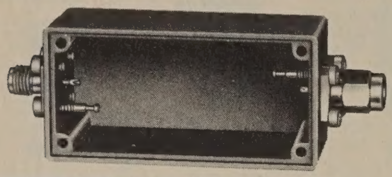
CONN: 2nd END
SMA receptacle jack.


22,35
(.88)
9,65
(.38)
57,15 (2.25)
9,65
(.38)
36,83 (1.45)
24,64
(.97)
28,7
(1.13)

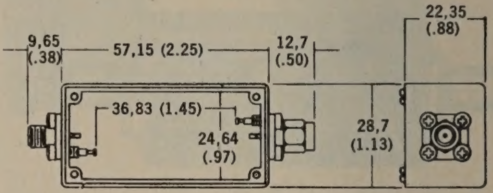
Model No.
2399

QUANTITY DISC. CODE A NET 19.95

COMPONENT MOUNTING—SMA RECEPTACLE TO SMA PLUG



CONN: 1st END
SMA receptacle jack.
SMA receptacle plug.


22,35
(.88)
9,65
(.38)
57,15 (2.25)
12,7
(.50)
36,83 (1.45)
24,64
(.97)
28,7
(1.13)

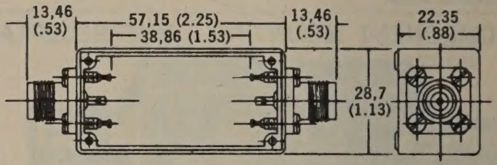
Model No.
2398

QUANTITY DISC. CODE A NET 24.95

COMPONENT MOUNTING—TNC RECEPTACLE BOTH ENDS

CONN: 1st END
TNC receptacle jack.

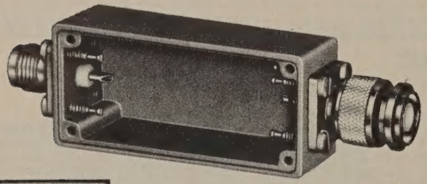
CONN: 2nd END
TNC receptacle jack.


13,46
(.53)
57,15 (2.25)
38,86 (1.53)
13,46
(.53)
22,35
(.88)
28,7
(1.13)

Model No.
2396

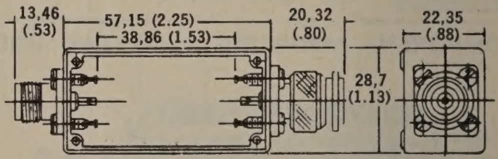
QUANTITY DISC. CODE A NET 14.85

COMPONENT MOUNTING—TNC RECEPTACLE TO TNC PLUG



CONN: 1st END
TNC receptacle jack.

CONN: 2nd END
TNC receptacle plug.


13,46
(.53)
57,15 (2.25)
38,86 (1.53)
20,32
(.80)
22,35
(.88)
28,7
(1.13)

Model No.
2395

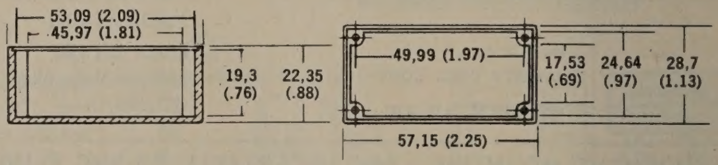
QUANTITY DISC. CODE A NET 17.85

EMPTY — SHIELDED "BLACK BOX"

MODEL 2397
FINISH: Blue baked enamel. Includes cover with part number on cover and four cover screws.

MODEL 2400
FINISH: None. Includes unmarked cover and four cover screws.

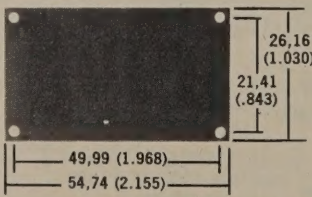
Model	NET
2397	2.95
2400	2.75


53,09 (2.09)
45,97 (1.81)
19,3
(.76)
22,35
(.88)
49,99 (1.97)
17,53
(.69)
24,64
(.97)
28,7
(1.13)
57,15 (2.25)

QUANTITY DISC. CODE A

BLANK REPLACEMENT COVER FOR SIZE "A" BOX

MATERIAL: .040 aluminum #6061-T6, clear anodized per MIL-A-8625A.


26,16
(1.030)
21,41
(.843)
49,99 (1.968)
54,74 (2.155)

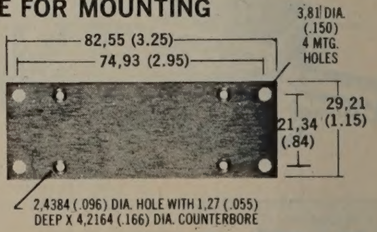
Model No.
4245

QUANTITY DISC. CODE A NET .75

LARGER COVER PLATE FOR MOUNTING SIZE "A" BOXES

This larger plate, when attached to the box, provides flanges for mounting.

MATERIAL: .080 aluminum #6061-T6, clear anodized per MIL-A-8625A.


3,81 DIA.
(.150)
4 MTG.
HOLES
82,55 (3.25)
74,93 (2.95)
29,21
(1.15)
21,34
(.84)
2,4384 (.096) DIA. HOLE WITH 1,27 (.055)
DEEP X 4,2164 (.166) DIA. COUNTERBORE

Model No.
3728

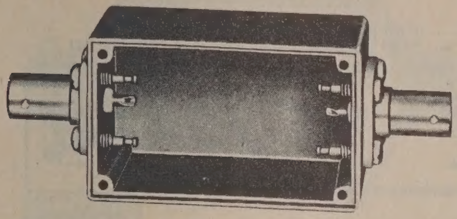
QUANTITY DISC. CODE A NET 1.25

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" — SIZE "B"

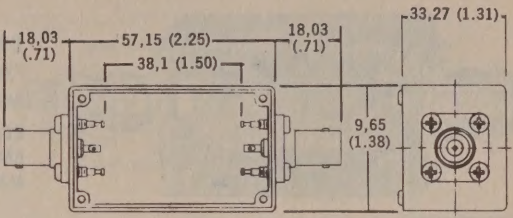
POMONA ELECTRONICS

COMPONENT MOUNTING — BNC RECEPTACLE BOTH ENDS



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

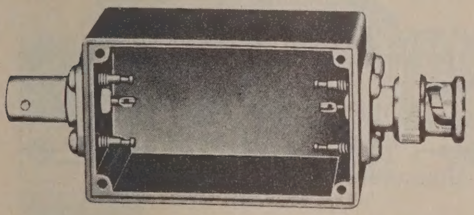
CONN: 2nd END
BNC receptacle jack, M39012/22-0001.


18,03 (.71)
57,15 (2.25)
18,03 (.71)
38,1 (1.50)
33,27 (1.31)
9,65 (1.38)

Model No.
3230

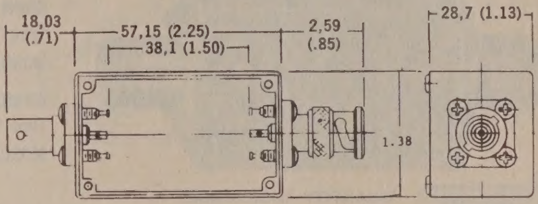
QUANTITY DISC. CODE **A** **NET 9.85**

COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

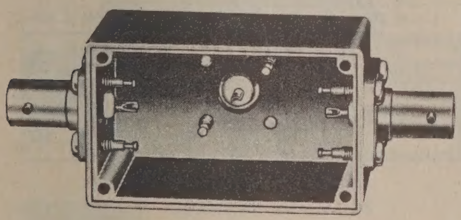
CONN: 2nd END
BNC receptacle plug, M39012/22-0001.


18,03 (.71)
57,15 (2.25)
38,1 (1.50)
2,59 (.85)
28,7 (1.13)
1.38

Model No.
3231

QUANTITY DISC. CODE **A** **NET 10.85**

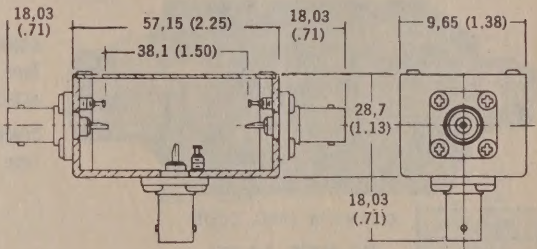
COMPONENT MOUNTING — BNC RECEPTACLE "T"



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

CENTER:
BNC receptacle jack, M39012/22-0001.

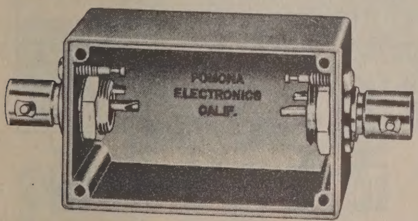
CONN: 2nd END
BNC receptacle jack, M39012/22-0001.


18,03 (.71)
57,15 (2.25)
18,03 (.71)
38,1 (1.50)
9,65 (1.38)
28,7 (1.13)
18,03 (.71)

Model No.
3232

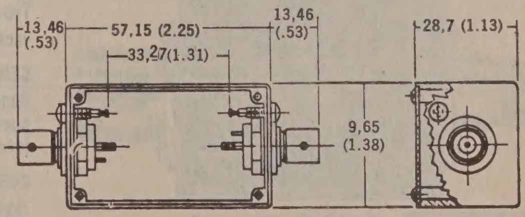
QUANTITY DISC. CODE **A** **NET 11.50**

COMPONENT MOUNTING — ISOLATED BNC RECEPTACLE BOTH ENDS


POMONA
ELECTRONICS
CALIF.

CONN: 1st END
Isolated BNC receptacle jack.

CONN: 2nd END
Isolated BNC receptacle jack.

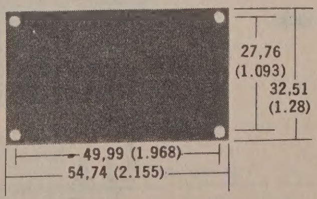

13,46 (.53)
57,15 (2.25)
13,46 (.53)
33,27 (1.31)
28,7 (1.13)
9,65 (1.38)

Model No.
3239

QUANTITY DISC. CODE **A** **NET 16.85**

BLANK REPLACEMENT COVER FOR SIZE "B" BOX

MATERIAL: .040 aluminum #6061-T6, clear anodized per MIL-A-8625A.


27,76 (1.093)
32,51 (1.28)
49,99 (1.968)
54,74 (2.155)

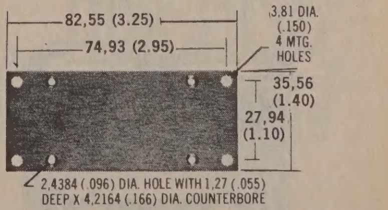
Model No.
4246

QUANTITY DISC. CODE **A** **NET .75**

LARGER COVER PLATE FOR MOUNTING SIZE "B" BOXES

This larger plate, when attached to the box, provides flanges for mounting.

MATERIAL: .080 aluminum #6061-T6, clear anodized per MIL-T-8625A.


82,55 (3.25)
74,93 (2.95)
3,81 DIA. (.150) 4 MTG. HOLES
35,56 (1.40)
27,94 (1.10)
2,4384 (.096) DIA. HOLE WITH 1,27 (.055) DEEP X 4,2164 (.166) DIA. COUNTERBORE

Model No.
3719

(plate only)

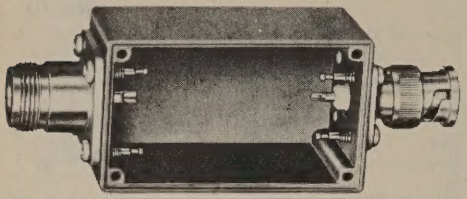
QUANTITY DISC. CODE **A** **NET 1.25**

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" — SIZE "B"

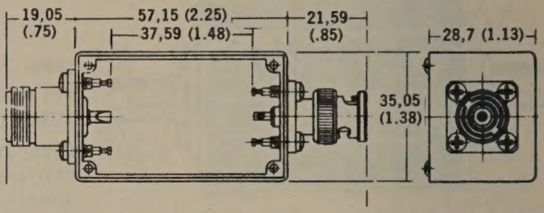
POMONA ELECTRONICS

COMPONENT MOUNTING — TYPE "N" RECEPTACLE TO BNC PLUG



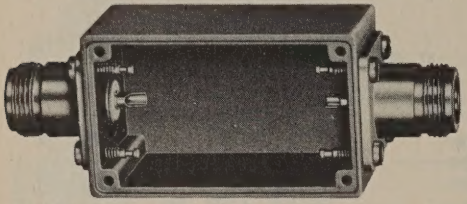
CONN: 1st END
Type "N" receptacle jack,
M39012/04-0002.

CONN: 2nd END
BNC receptacle plug,
M39012/02-0002.


19,05 (.75)
57,15 (2.25)
37,59 (1.48)
21,59 (.85)
28,7 (1.13)
35,05 (1.38)

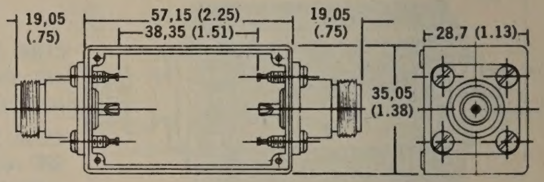
Model No.	QUANTITY DISC. CODE
2421	A NET 12.85

COMPONENT MOUNTING — TYPE "N" RECEPTACLE BOTH ENDS



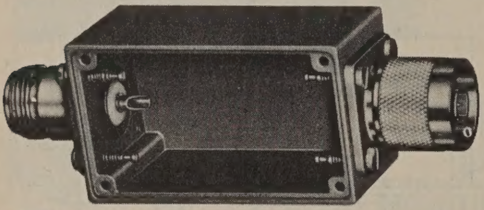
CONN: 1st END
Type "N" receptacle jack,
M39012/04-0002.

CONN: 2nd END
Type "N" receptacle jack,
M39012/04-0002.


19,05 (.75)
57,15 (2.25)
38,35 (1.51)
19,05 (.75)
28,7 (1.13)
35,05 (1.38)

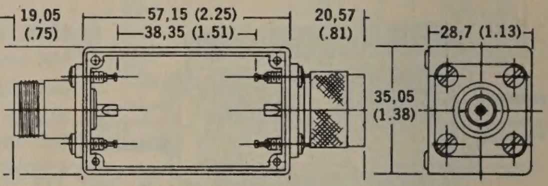
Model No.	QUANTITY DISC. CODE
2410	A NET 11.85

COMPONENT MOUNTING — TYPE "N" RECEPTACLE TO TYPE "N" PLUG



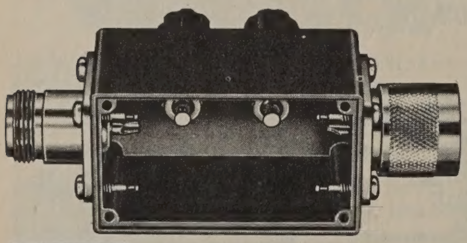
CONN: 1st END
Type "N" receptacle jack,
M39012/04-0002.

CONN: 2nd END
Type "N" receptacle plug.


19,05 (.75)
57,15 (2.25)
38,35 (1.51)
20,57 (.81)
28,7 (1.13)
35,05 (1.38)

Model No.	QUANTITY DISC. CODE
2411	A NET 14.85

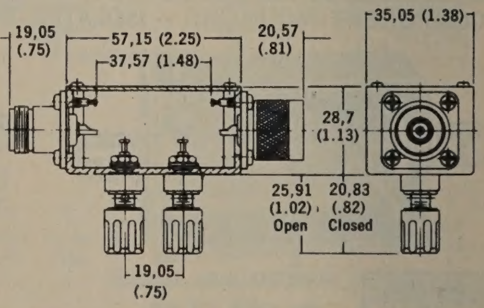
COMPONENT MOUNTING TYPE "N" RECEPTACLE TO TYPE "N" PLUG WITH BINDING POSTS



CONN: 1st END
Type "N" receptacle jack, M39012/04-0002.

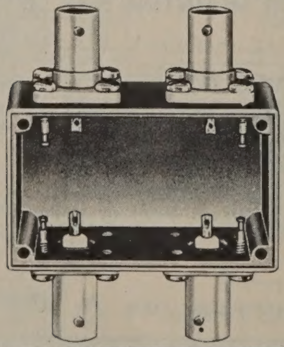
CENTER:
Banana jack binding posts with solder turret terminals; red and black.

CONN: 2nd END
Type "N" receptacle plug.

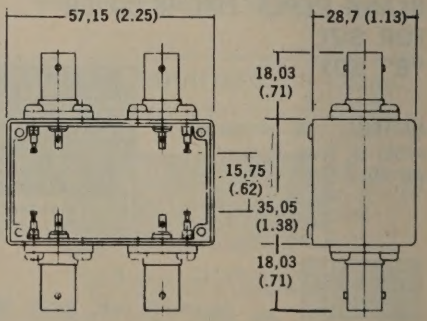

19,05 (.75)
57,15 (2.25)
37,57 (1.48)
20,57 (.81)
35,05 (1.38)
28,7 (1.13)
25,91 (1.02) Open
20,83 (.82) Closed
19,05 (.75)

Model No.	QUANTITY DISC. CODE
2423	A NET 19.85

COMPONENT MOUNTING — CROSS CONNECTIONS



CONN:
4 each BNC receptacle jacks,
M39012/04-0002.


57,15 (2.25)
28,7 (1.13)
18,03 (.71)
15,75 (.62)
35,05 (1.38)
18,03 (.71)

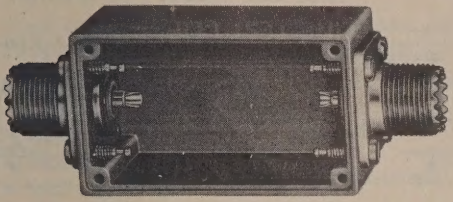
Model No.	QUANTITY DISC. CODE
3234	A NET 14.85

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" — SIZE "B"

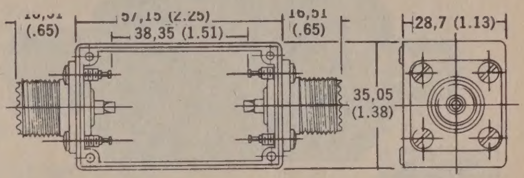
POMONA ELECTRONICS

COMPONENT MOUNTING — UHF RECEPTACLE BOTH ENDS



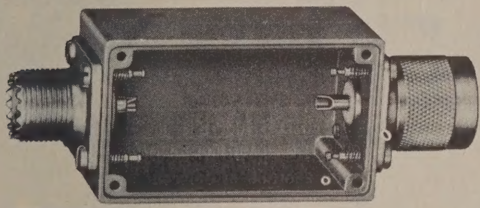
CONN: 1st END
UHF receptacle jack.

CONN: 2nd END
UHF receptacle jack.


16,51
(.65)
57,15 (2.25)
38,35 (1.51)
16,51
(.65)
28,7 (1.13)
35,05
(1.38)

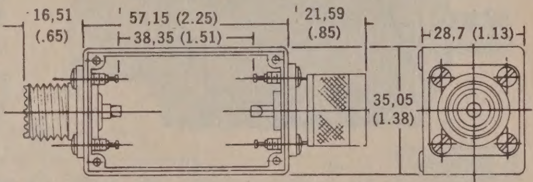
Model No.	QUANTITY DISC. CODE	
2412	A	NET 11.85

COMPONENT MOUNTING — UHF RECEPTACLE TO UHF PLUG



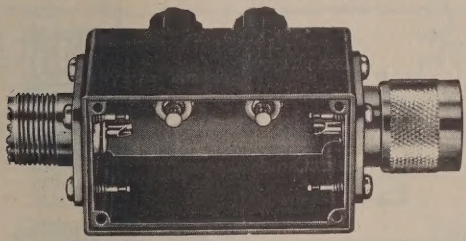
CONN: 1st END
UHF receptacle jack.

CONN: 2nd END
UHF receptacle plug.


16,51
(.65)
57,15 (2.25)
38,35 (1.51)
21,59
(.85)
28,7 (1.13)
35,05
(1.38)

Model No.	QUANTITY DISC. CODE	
2413	A	NET 14.85

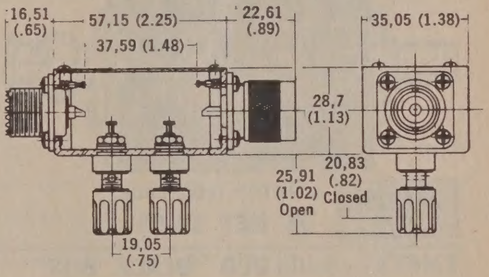
COMPONENT MOUNTING — UHF RECEPTACLE TO UHF PLUG WITH BINDING POSTS



CONN: 1st END
UHF receptacle jack.

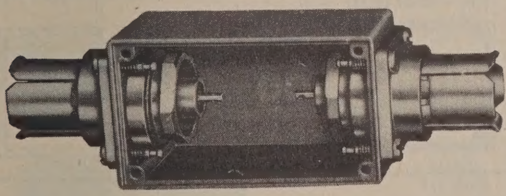
CENTER:
Banana jack binding posts with solder turret terminals; red and black.

CONN: 2nd END
UHF receptacle plug.


16,51
(.65)
57,15 (2.25)
37,59 (1.48)
22,61
(.89)
35,05 (1.38)
28,7
(1.13)
20,83
(.82)
Closed
25,91
(1.02)
Open
19,05
(.75)

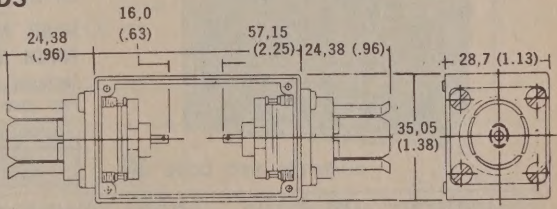
Model No.	QUANTITY DISC. CODE	
2422	A	NET 17.85

COMPONENT MOUNTING — GR-874 CONNECTOR BOTH ENDS



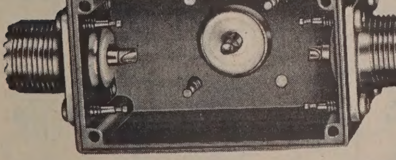
CONN: 1st END
Type GR-874 connector.

CONN: 2nd END
Type GR-874 connector.

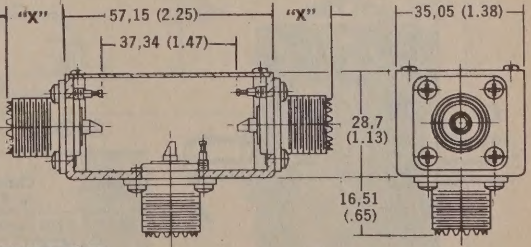

16,0
(.63)
24,38
(.96)
57,15
(2.25)
24,38 (.96)
28,7 (1.13)
35,05
(1.38)

Model No.	QUANTITY DISC. CODE	
2416	D	NET 39.85

COMPONENT MOUNTING — UHF AND TYPE "N" RECEPTACLE "T"



MODEL 2418 SHOWN


"X"
57,15 (2.25)
"X"
37,34 (1.47)
35,05 (1.38)
28,7
(1.13)
16,51
(.65)

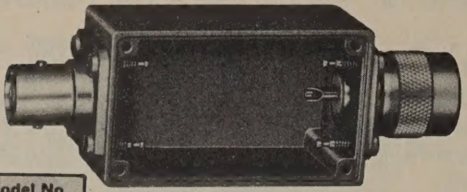
Model No.	Connectors	"X" Dim.	Disc. Quan. Code	Net
2418	(3) UHF receptacle jacks	16,51 (.65)	A	14.85
2419	(3) Type "N" receptacle jacks, M39012/04-0002	19,05 (.75)	A	13.85

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES"—SIZE "B"

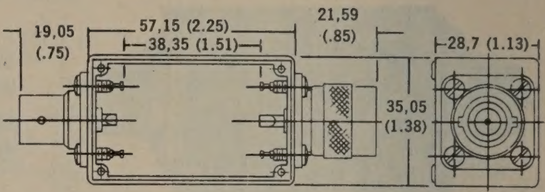
POMONA ELECTRONICS

COMPONENT MOUNTING— TYPE "C" RECEPTACLE TO TYPE "C" PLUG



CONN: 1st END
Type "C" receptacle jack, UG568/U.

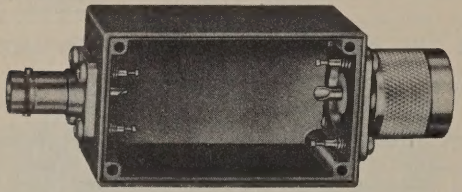
CONN: 2nd END
Type "C" receptacle plug.


19,05
(.75)
57,15 (2.25)
38,35 (1.51)
21,59
(.85)
28,7 (1.13)
35,05
(1.38)

Model No.
2415

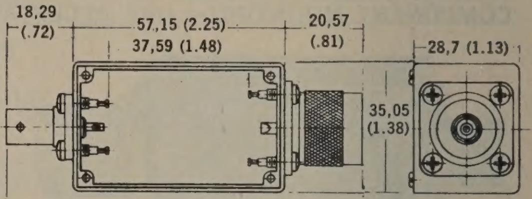
QUANTITY DISC. CODE **A** **NET 24.95**

COMPONENT MOUNTING — BNC RECEPTACLE TO TYPE "N" PLUG



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

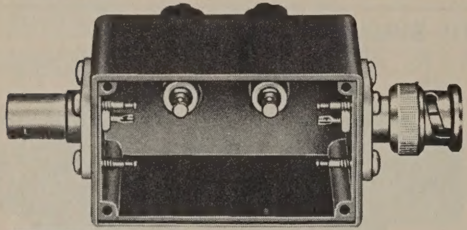
CONN: 2nd END
Type "N" receptacle plug.


18,29
(.72)
57,15 (2.25)
37,59 (1.48)
20,57
(.81)
28,7 (1.13)
35,05
(1.38)

Model No.
2420

QUANTITY DISC. CODE **A** **NET 14.85**

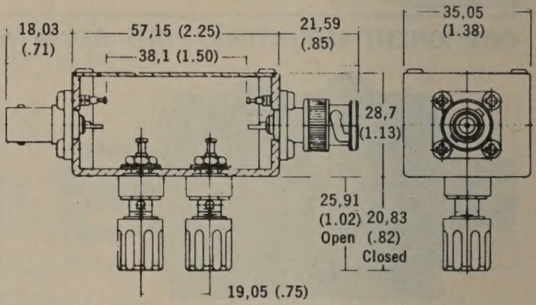
COMPONENT MOUNTING — BNC RECEPTACLE TO BNC PLUG WITH BINDING POSTS



CONN: 1st END
BNC receptacle jack, M39012/22-0001.

CENTER:
Banana jack binding posts with solder turret terminals; red and black.

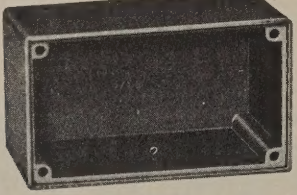
CONN: 2nd END
BNC receptacle plug, UG1104A/U.


18,03
(.71)
57,15 (2.25)
38,1 (1.50)
21,59
(.85)
35,05
(1.38)
28,7
(1.13)
25,91
(1.02)
Open
20,83
(.82)
Closed
19,05 (.75)

Model No.
3233

QUANTITY DISC. CODE **A** **NET 14.85**

EMPTY — SHIELDED "BLACK BOX"

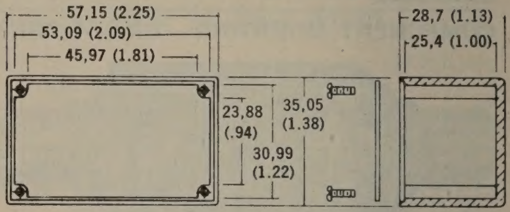


QUANTITY DISC. CODE **A**

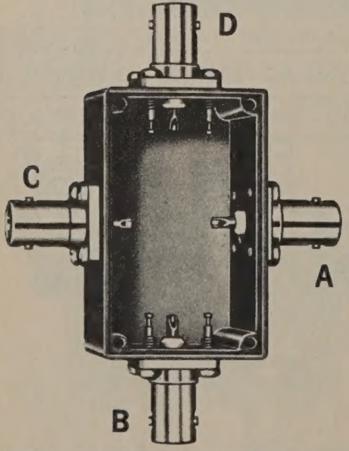
MODEL 2417
FINISH: Blue baked enamel.
Includes cover with part number on cover and four cover screws.

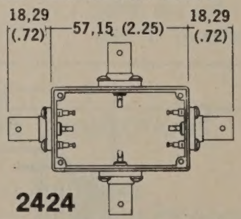
MODEL 2428
FINISH: None.
Includes unmarked cover and four cover screws.

Model No.	Net
2417	2.95
2428	2.75

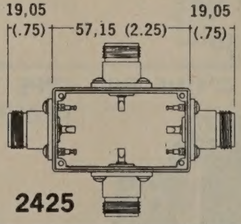

57,15 (2.25)
53,09 (2.09)
45,97 (1.81)
23,88
(.94)
35,05
(1.38)
30,99
(1.22)
28,7 (1.13)
25,4 (1.00)

COMPONENT MOUNTING — CROSS CONNECTIONS

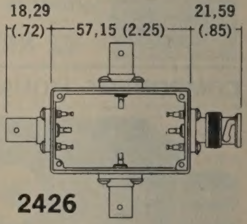



18,29
(.72)
57,15 (2.25)
18,29
(.72)

2424

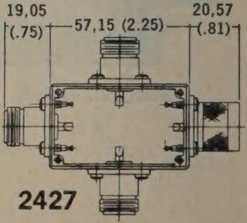

19,05
(.75)
57,15 (2.25)
19,05
(.75)

2425


18,29
(.72)
57,15 (2.25)
21,59
(.85)

2426

Model No.	Connection A, B and C	Connection D	Quantity Disc. Code	Net
2424	BNC receptacle jack, M39012/22-0001	BNC receptacle jack, M39012/22-0001	A	14.85
2425	Type "N" receptacle jack, M39012/04-0002	Type "N" receptacle jack, M39012/04-0002	A	14.85
2426	BNC receptacle jack, M39012/22-0001	BNC receptacle plug, UG1104A/U	A	14.85
2427	Type "N" receptacle jack, M39012/04-0002	Type "N" receptacle plug	A	19.85


19,05
(.75)
57,15 (2.25)
20,57
(.81)

2427

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" — SIZE "C"

POMONA ELECTRONICS

A series of larger shielded "Black Boxes."

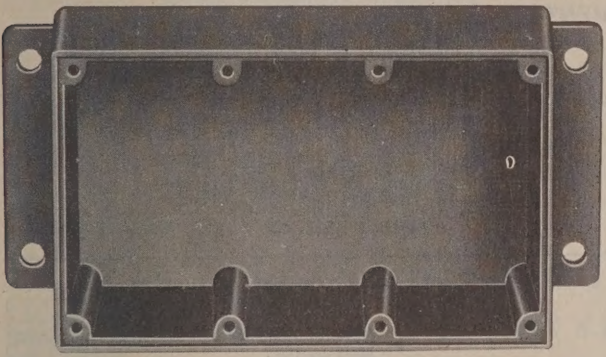
These larger boxes are excellent for compact packaging of voltage dividers, isolation networks and many other applications.

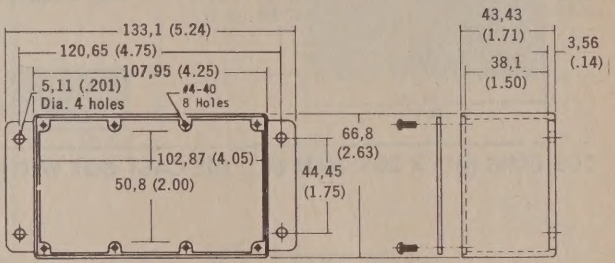
SPECIFICATIONS: (All Models)

- Operating temperature: −55°C to +150°C.
- Working voltage: 500 peak.
- Noise rejection: Greater than 70 db.

FEATURES:

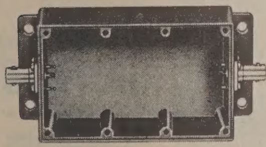
- Shielded housing: Die cast aluminum, alloy #A380.
- Finish: Blue baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- Cover: 2,03mm (.080) thick aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- 8 ea. #4-40 x ¼" screws secure cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.
- 2 flanges for easy mounting of box.



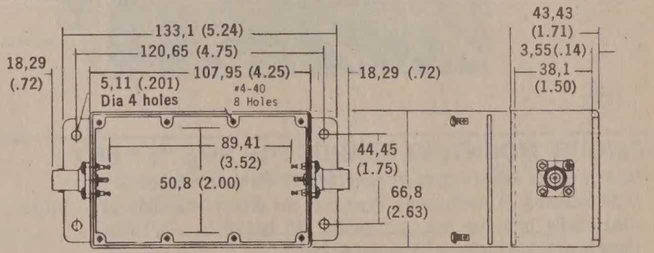

133,1 (5.24)
120,65 (4.75)
107,95 (4.25)
5,11 (.201)
Dia. 4 holes
#4-40
8 Holes
102,87 (4.05)
50,8 (2.00)
66,8
(2.63)
44,45
(1.75)
43,43
(1.71)
3,56
(.14)
38,1
(1.50)

Model No.		
2901	(Shown 2/3 actual size)	NET 7.85
2906	Same as Model 2901 except box is unpainted and cover is unmarked.	NET 7.50

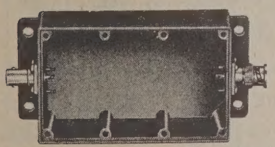
QUANTITY DISC. CODE A NET 6.50



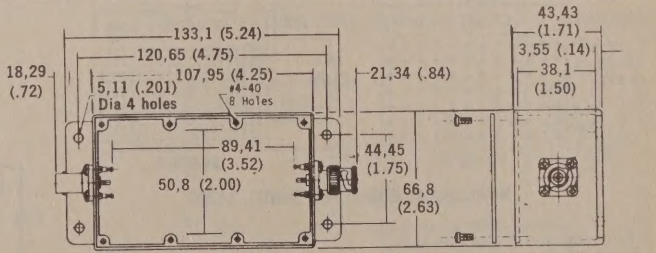
CONN: 1st END	CONN: 2nd END
BNC receptacle jack M39012/ 22-0001	BNC receptacle jack M39012/ 22-0001


133,1 (5.24)
120,65 (4.75)
107,95 (4.25)
18,29
(.72)
5,11 (.201)
Dia 4 holes
#4-40
8 Holes
18,29 (.72)
89,41
(3.52)
50,8 (2.00)
44,45
(1.75)
66,8
(2.63)
43,43
(1.71)
3,55(.14)
38,1
(1.50)

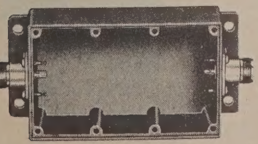
Model No.	QUANTITY DISC. CODE	NET
2902	A	14.85



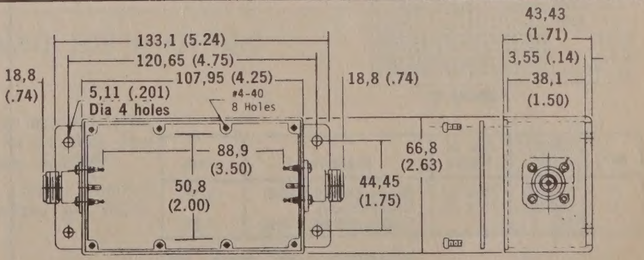
CONN: 1st END	CONN: 2nd END
BNC receptacle jack M39012/ 22-0001	BNC receptacle plug UG1104A/U


133,1 (5.24)
120,65 (4.75)
107,95 (4.25)
18,29
(.72)
5,11 (.201)
Dia 4 holes
#4-40
8 Holes
21,34 (.84)
89,41
(3.52)
50,8 (2.00)
44,45
(1.75)
66,8
(2.63)
43,43
(1.71)
3,55 (.14)
38,1
(1.50)

Model No.	QUANTITY DISC. CODE	NET
2903	A	15.85



CONN. 1st END	CONN. 2nd END
Type "N" receptacle jack M39012/ 04-0002	Type "N" receptacle jack M39012/ 04-0002

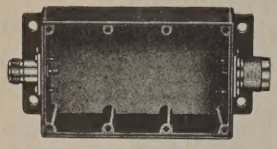

133,1 (5.24)
120,65 (4.75)
107,95 (4.25)
18,8
(.74)
5,11 (.201)
Dia 4 holes
#4-40
8 Holes
18,8 (.74)
88,9
(3.50)
50,8
(2.00)
66,8
(2.63)
44,45
(1.75)
43,43
(1.71)
3,55 (.14)
38,1
(1.50)

Model No.	QUANTITY DISC. CODE	NET
2904	A	12.85

All dimensions are shown millimeters (inches)

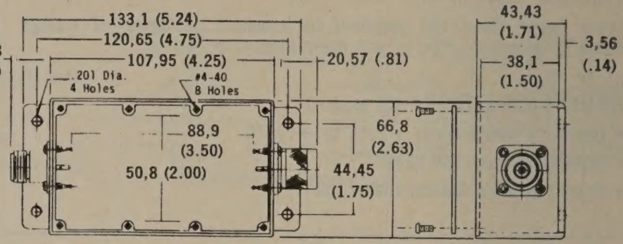
SHIELDED "BLACK BOXES" – SIZE "C" & "E"

POMONA ELECTRONICS

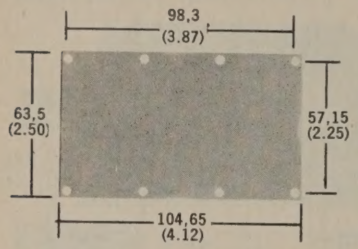


Model No.	QUANTITY DISC. CODE	NET
2905	A	18.85

CONN. 1st END	CONN. 2nd END
Type "N" receptacle jack M39012/04-0002	Type "N" receptacle plug



133,1 (5.24)
120,65 (4.75)
107,95 (4.25)
18,8 (.74)
.201 Dia. 4 Holes
#4-40 8 Holes
20,57 (.81)
88,9 (3.50)
50,8 (2.00)
66,8 (2.63)
44,45 (1.75)
43,43 (1.71)
38,1 (1.50)
3,56 (.14)



98,3 (3.87)
63,5 (2.50)
57,15 (2.25)
104,65 (4.12)

BLANK REPLACEMENT COVER FOR SIZE "C" BOX

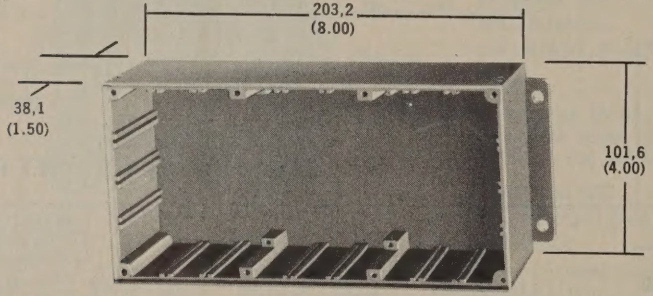
MATERIAL: 2,03mm (.080) aluminum #6061-T6 clear anodized per MIL-A-8625A.

Model No.
4248

QUANTITY DISC. CODE A **NET 1.50**

101,6MM (4″) X 203,2MM (8″) DIE CAST BOX WITH CARD GUIDES — SIZE "E"

NEW



203,2 (8.00)
38,1 (1.50)
101,6 (4.00)

SHIELDED HOUSING: Die Cast Aluminum, Alloy #A380.

FINISH: BLUE baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.

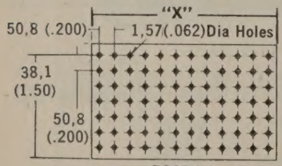
COVERS: Top and bottom, 2,03mm (.080) thick Aluminum #6061-T6 with clear anodized Finish per MIL-A-8625A.

Model No.
4226

QUANTITY DISC. CODE A **NET 19.95**

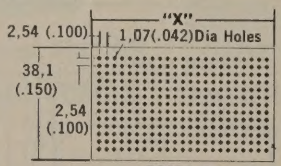
CIRCUIT MOUNTING BOARDS FOR SIZE "E" BOX

Three sizes of various types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16″ thick. These boards are for use with Model 4226.



"X"
50,8 (.200)
1,57(.062)Dia Holes
38,1 (1.50)
50,8 (.200)

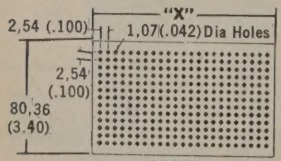
BOARD A



"X"
2,54 (.100)
1,07(.042)Dia Holes
38,1 (.150)
2,54 (.100)

BOARD B

HORIZONTAL BOARD FOR MODEL 14226



"X"
2,54 (.100)
1,07(.042)Dia Holes
2,54 (.100)
80,36 (3.40)

BOARD C

Brd.	Model No.	No. of Holes	Material	Net
C	4481	75 x 33	Glass-Epoxy (GEE)	3.85
C	4482	75 x 33	Glass-Epoxy Copper-Clad 1 Side	4.50

QUANTITY DISC. CODE A

Brd.	Model No.	No. of Holes	"X" Dim.	Material	Net
A	4261	37 x 7	203,2 (8.00)	Glass-Epoxy (GEE)	1.95
A	4263	37 x 7	203,2 (8.00)	Glass-Epoxy Copper-Clad 1 Side	3.25
B	4262	75 x 15	203,2 (8.00)	Glass-Epoxy	2.95
A	3330	19 x 7	99,06 (3.90)	Paper-Epoxy (PEE)	.95
A	3331	19 x 7	99,06 (3.90)	Glass-Epoxy (GEE)	.95
A	3332	19 x 7	99,06 (3.90)	Glass-Epoxy (GEE) Copper-Clad 1 Side	1.95
B	3333	38 x 15	99,06 (3.90)	Glass-Epoxy (GEE)	1.85

QUANTITY DISC. CODE A

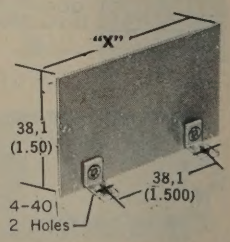
SHIELDING DIVIDERS FOR SIZE "E" BOX

These aluminum dividers are for dividing the box into shielded compartments.

MATERIAL: 1,60mm (.063) aluminum, clear anodized per MIL-A-8625A.

- Divider 38,1mm (1.50) x 60,71mm (2.39) used laterally.
- Divider 38,1mm (1.50) x 99,06mm (3.90) used lengthwise.

This divider is for use with Model 4226.



"X"
38,1 (1.50)
38,1 (1.500)
4-40 2 Holes

Model	"X" Dim.	Net
4265	203,2 (8.00)	3.00
3334	99,06 (3.90)	1.90

QUANTITY DISC. CODE A

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" – SIZE "D"

POMONA ELECTRONICS

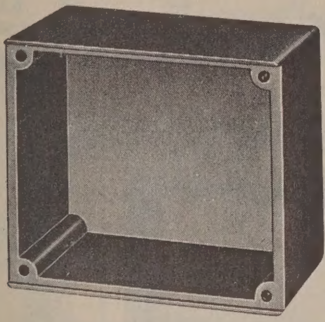
Another series of shielded "Black Boxes." These boxes fill the need between the size "B" and "C" boxes and are excellent for compact packaging of voltage dividers, isolation networks and many other applications.

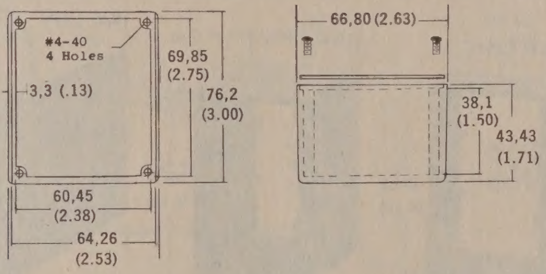
SPECIFICATIONS: (All Models)

- Operating temperature: −55°C to +150°C.
- Working voltage: 500 peak.
- Noise rejection: Greater than 70 db.

FEATURES:

- Shielded housing: Die cast aluminum, alloy #A380.
- Finish: Blue baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- Cover: .063 thick aluminum #6061-T6 with clear anodized finish per MIL-A-8625A.
- 4 ea. #4-40 x ¼" screws secure cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.

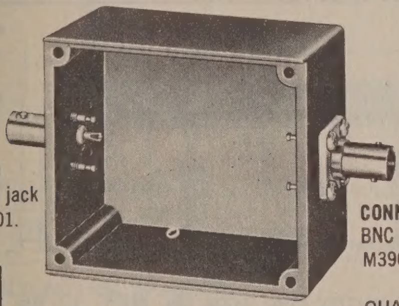




#4-40
4 Holes
69,85 (2.75)
76,2 (3.00)
3,3 (.13)
60,45 (2.38)
64,26 (2.53)
66,80 (2.63)
38,1 (1.50)
43,43 (1.71)

Model No.		
3601	(Shown 2/3 actual size)	NET 5.85
3606	Same as Model 3601 except box is unpainted and cover is unmarked.	NET 5.45

QUANTITY DISC. CODE A

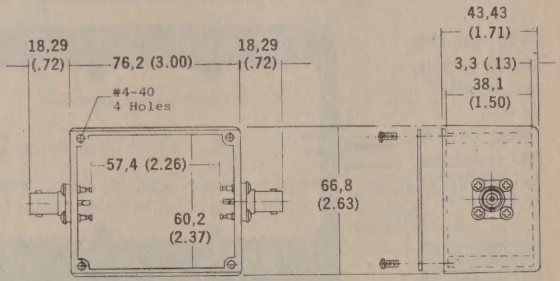


CONN: 1st END
BNC receptacle jack
M39012/22-0001.

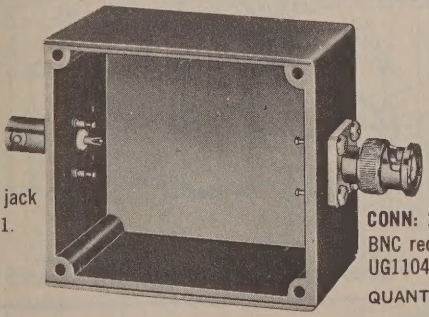
CONN: 2nd END
BNC receptacle jack
M39012/22-0001.

Model No. 3602

QUANTITY DISC. CODE A **NET 11.85**



43,43 (1.71)
18,29 (.72)
76,2 (3.00)
18,29 (.72)
3,3 (.13)
38,1 (1.50)
#4-40
4 Holes
57,4 (2.26)
66,8 (2.63)
60,2 (2.37)

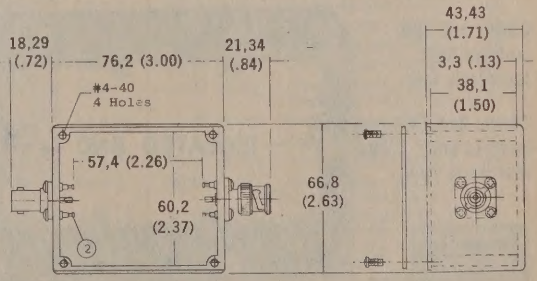


CONN: 1st END
BNC receptacle jack
M39012/22-0001.

CONN: 2nd END
BNC receptacle plug
UG1104A/U.

Model No. 3603

QUANTITY DISC. CODE A **NET 13.50**

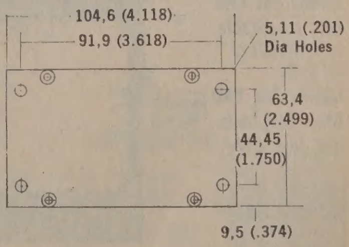


43,43 (1.71)
18,29 (.72)
76,2 (3.00)
21,34 (.84)
3,3 (.13)
38,1 (1.50)
#4-40
4 Holes
57,4 (2.26)
66,8 (2.63)
60,2 (2.37)
②

LARGER BOTTOM PLATE FOR MOUNTING

This larger plate, when attached to the box provides flanges for mounting. Four #4-40 flat head screws included.

MATERIAL: 2,03mm (.080) aluminum #6061-T6, clear anodized per MIL-A-8625A.



104,6 (4.118)
91,9 (3.618)
5,11 (.201) Dia Holes
63,4 (2.499)
44,45 (1.750)
9,5 (.374)

Model No. 3958

QUANTITY DISC. CODE A

NET 1.75

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES"

POMONA ELECTRONICS

Aluminum boxes, slotted to accept 1/16" circuit boards and shielding dividers. Excellent for packaging electronic circuitry. Boxes have removable top and bottom covers.

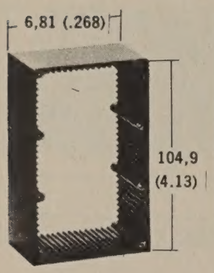
SPECIFICATIONS: (All Models)

- Operating temperature: −55°C to +150°C.
- Working voltage: 500 peak.
- Noise rejection: Greater than 70 db.

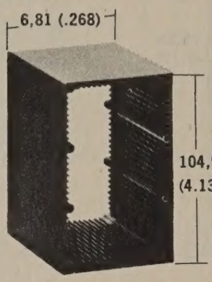
FEATURES:

- Shielded housing: Extruded aluminum, alloy #6061-T6.
- Finish: Blue baked enamel per Federal Standard 595 #25109 over phosphoric etch per MIL-C-15328A.
- Covers: Top and bottom, 2,03mm (.080) thick aluminum #6016-T6 with clear anodized finish per MIL-A-8625A.
- Cover screws: #4-40 x ¼" screws secure top and bottom cover for proper shielding.
- Solder turret terminals for permanent noise free connection of components.

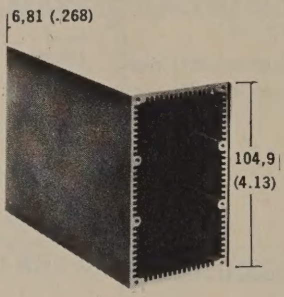
(See following pages for model numbers)


6,81 (.268)
104,9
(4.13)

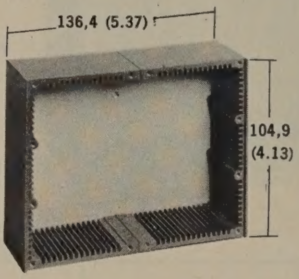
1½" Deep


6,81 (.268)
104,9
(4.13)

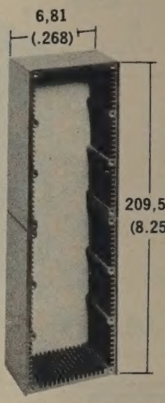
3" Deep


6,81 (.268)
104,9
(4.13)

6" Deep


136,4 (5.37)
104,9
(4.13)

1½" Deep

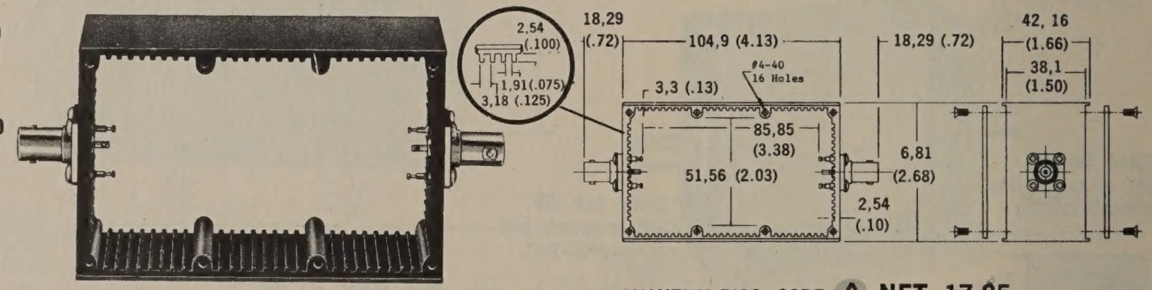

6,81
(.268)
209,55
(8.25)

1½" Deep

SHIELDED "BLACK BOXES" 1½" DEEP

CONN: 1st END
BNC receptacle jack M39012/22-0001.
CONN: 2nd END
BNC receptacle jack M39012/22-0001.

Model No.
3302

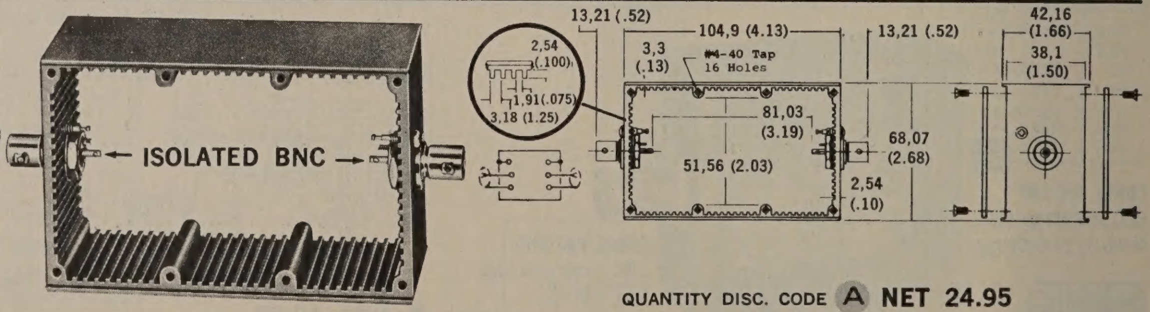

2,54
(.100)
1,91(.075)
3,18 (.125)
18,29
(.72)
104,9 (4.13)
#4-40
16 Holes
3,3 (.13)
85,85
(3.38)
51,56 (2.03)
18,29 (.72)
6,81
(2.68)
2,54
(.10)
42, 16
(1.66)
38,1
(1.50)

QUANTITY DISC. CODE **A** **NET 17.85**

CONN: 1st END
Isolated BNC receptacle jack

CONN: 2nd END
Isolated BNC receptacle jack

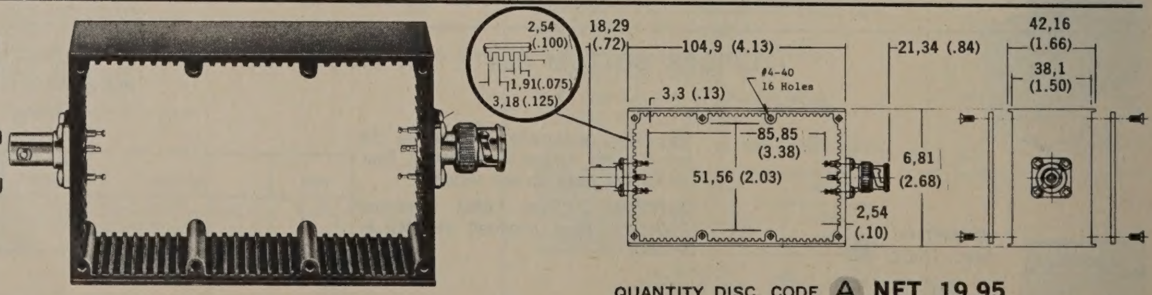
Model No.
3307


ISOLATED BNC
2,54
(.100)
1,91(.075)
3,18 (1.25)
13,21 (.52)
104,9 (4.13)
3,3
(.13)
#4-40 Tap
16 Holes
81,03
(3.19)
51,56 (2.03)
13,21 (.52)
68,07
(2.68)
2,54
(.10)
42,16
(1.66)
38,1
(1.50)

QUANTITY DISC. CODE **A** **NET 24.95**

CONN: 1st END
BNC receptacle jack M39012/22-0001.
CONN: 2nd END
BNC receptacle plug UG1104A/U

Model No.
3303


2,54
(.100)
1,91(.075)
3,18 (.125)
18,29
(.72)
104,9 (4.13)
#4-40
16 Holes
3,3 (.13)
85,85
(3.38)
51,56 (2.03)
21,34 (.84)
6,81
(2.68)
2,54
(.10)
42,16
(1.66)
38,1
(1.50)

QUANTITY DISC. CODE **A** **NET 19.95**

All dimensions are shown millimeters (inches)

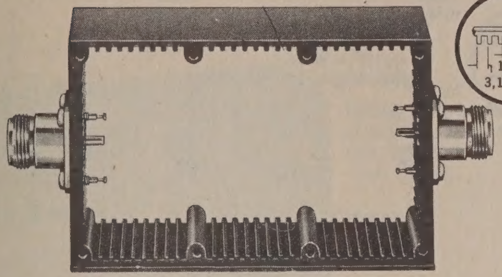
SHIELDED "BLACK BOXES" WITH CARD GUIDES—1½" DEEP

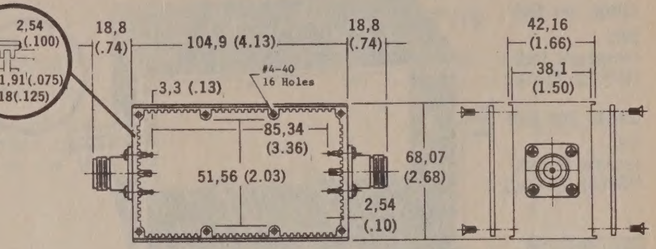
POMONA ELECTRONICS

CONN: 1st END
Type "N" receptacle jack M39012/04-0002

CONN: 2nd END
Type "N" receptacle jack M39012/04-0002

Model No.
3304



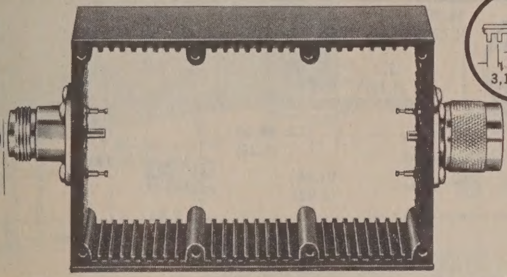

2,54 (.100)
1,91 (.075)
3,18 (.125)
18,8 (.74)
104,9 (4.13)
18,8 (.74)
42,16 (1.66)
38,1 (1.50)
#4-40 16 Holes
3,3 (.13)
85,34 (3.36)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)

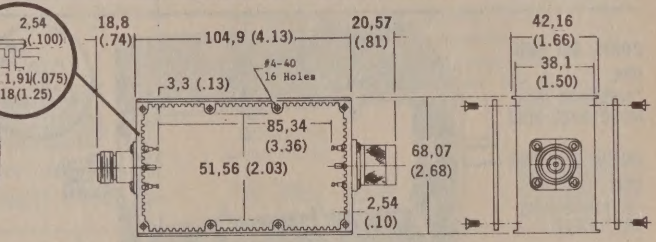
QUANTITY DISC. CODE A NET 19.95

CONN: 1st END
Type "N" receptacle jack M39012/04-0002

CONN: 2nd END
Type "N" receptacle plug

Model No.
3305

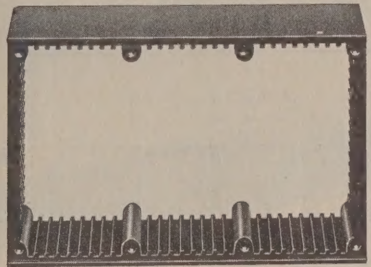


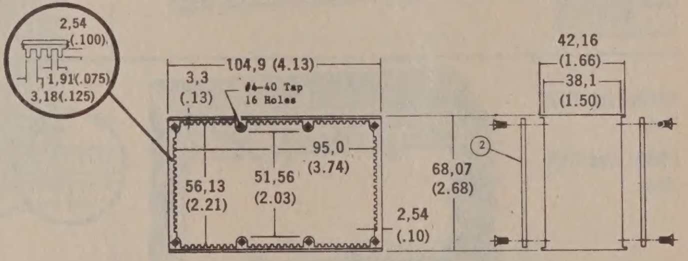

2,54 (.100)
1,91 (.075)
3,18 (1.25)
18,8 (.74)
104,9 (4.13)
20,57 (.81)
42,16 (1.66)
38,1 (1.50)
#4-40 16 Holes
3,3 (.13)
85,34 (3.36)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)

QUANTITY DISC. CODE A NET 19.95

CONN: 1st END
None

CONN: 2nd END
None




2,54 (.100)
1,91 (.075)
3,18 (.125)
104,9 (4.13)
3,3 (.13)
#4-40 Tap 16 Holes
42,16 (1.66)
38,1 (1.50)
95,0 (3.74)
56,13 (2.21)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)
2

QUANTITY DISC. CODE A

Model No.	Net
3301	11.85

FINISH: Blue baked enamel. Includes top and bottom covers with part number on one and 16 cover screws.

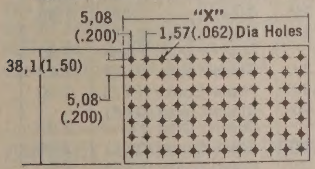
FINISH: None. Includes unmarked top and bottom covers with 16 cover screws.

Model No.	Net
3306	11.50

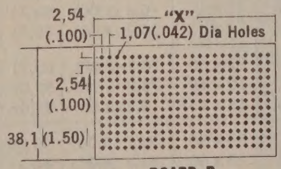
CIRCUIT MOUNTING BOARDS

Two sizes of various types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16" thick.

- Boards 1.50 x 2.39 used laterally.
- Boards 1.50 x 3.90 used lengthwise.


5,08 (.200)
"X"
1,57(.062) Dia Holes
38,1 (1.50)
5,08 (.200)

BOARD A


2,54 (.100)
"X"
1,07(.042) Dia Holes
2,54 (.100)
38,1 (1.50)

BOARD B

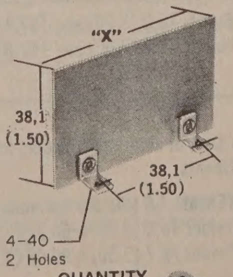
Brd.	Model No.	No. of Holes	"X" Dim.	Material	Net
A	3321	12 x 7	60,71 (2.39)	Paper-Epoxy (PEE)	.60
A	3322	None	60,71 (2.39)	Paper-Epoxy (PEE)	.55
A	3323	12 x 7	60,71 (2.39)	Glass-Epoxy (GEE)	.85
A	3324	None	60,71 (2.39)	Glass-Epoxy (GEE)	.55
A	3325	12 x 7	60,71 (2.39)	Glass-Epoxy (GEE) Copper Clad 1 Side	1.75
B	3326	24 x 15	60,71 (2.39)	Glass-Epoxy (GEE)	.95
A	3330	19 x 7	99,06 (3.90)	Paper-Epoxy (PEE)	.95
A	3331	19 x 7	99,06 (3.90)	Glass-Epoxy (GEE)	.95
A	3332	19 x 7	99,06 (3.90)	Glass-Epoxy (GEE) Copper Clad 1 Side	1.95
B	3333	38 x 15	99,06 (3.90)	Glass-Epoxy (GEE)	1.85

QUANTITY DISC. CODE A NET 1.25

SHIELDING DIVIDERS

Two sizes of aluminum dividers for dividing the box into shielded compartments.
MATERIAL: 1,60mm (.063) aluminum, clear anodized per MIL-A-8625A.

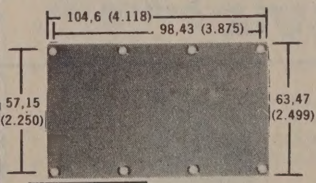
- Divider 38,1mm (1.50) x 6,71mm (2.39) used laterally.
- Divider 38,1mm (1.50) x 99,06mm (3.90) used lengthwise.


"X"
38,1 (1.50)
38,1 (1.50)
4-40
2 Holes

Model No.	"X" Dim.	Net
3327	60,71 (2.39)	1.50
3334	99,06 (3.90)	1.90

QUANTITY DISC. CODE A

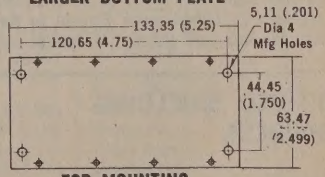
COVER


104,6 (4.118)
98,43 (3.875)
57,15 (2.250)
63,47 (2.499)

Model No.
4247

NET 1.95

LARGER BOTTOM PLATE


5,11 (.201) Dia 4 Mfg Holes
133,35 (5.25)
120,65 (4.75)
44,45 (1.750)
63,47 (2.499)

FOR MOUNTING

MATERIAL: 2,03mm (.080) aluminum #6061-T6, clear anodized per MIL-A-8625A.

Model No.
3328

QUANTITY DISC. CODE A NET 2.50

All dimensions are shown millimeters (inches)

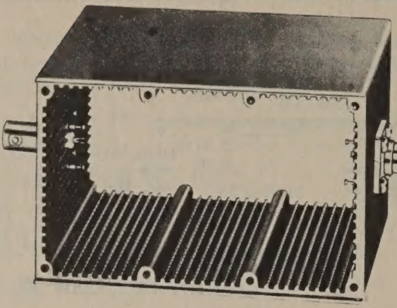
SHIELDED "BLACK BOXES" WITH CARD GUIDES—3" & 6" DEEP

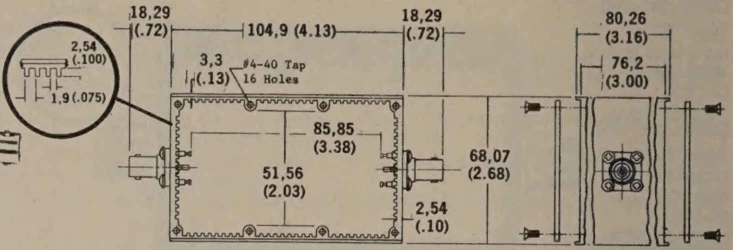
POMONA ELECTRONICS

CONN: 1st END
BNC
receptacle jack
M39012/22-0001

CONN: 2nd END
BNC
receptacle jack
M39012/22-0001

Model No.
3312



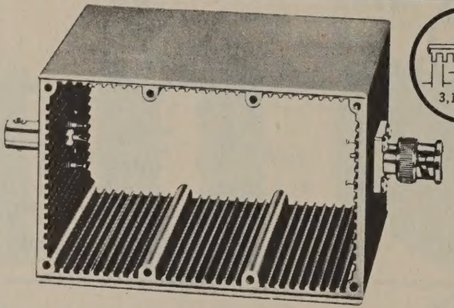

18,29 (.72)
104,9 (4.13)
18,29 (.72)
2,54 (.100)
1,9 (.075)
3,3 (.13)
#4-40 Tap 16 Holes
85,85 (3.38)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)
80,26 (3.16)
76,2 (3.00)

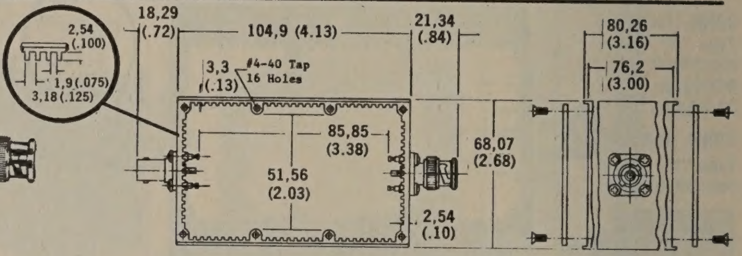
QUANTITY DISC. CODE **A** **NET 19.95**

CONN: 1st END
BNC
receptacle jack
M39012/22-0001

CONN: 2nd END
BNC
receptacle plug
UG1104A/U

Model No.
3313

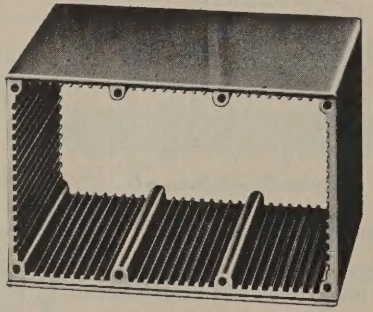


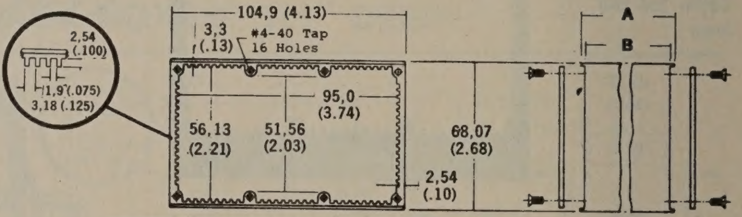

18,29 (.72)
104,9 (4.13)
21,34 (.84)
2,54 (.100)
1,9 (.075)
3,18 (.125)
3,3 (.13)
#4-40 Tap 16 Holes
85,85 (3.38)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)
80,26 (3.16)
76,2 (3.00)

QUANTITY DISC. CODE **A** **NET 19.95**

CONN: 1st END
None

CONN: 2nd END
None




104,9 (4.13)
2,54 (.100)
1,9 (.075)
3,18 (.125)
3,3 (.13)
#4-40 Tap 16 Holes
95,0 (3.74)
56,13 (2.21)
51,56 (2.03)
68,07 (2.68)
2,54 (.10)
A
B

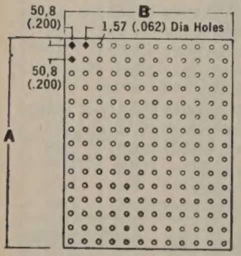
MODEL No.'s 3311 & 3742
FINISH: Blue baked enamel. Includes top and bottom cover with part no. on one.

MODEL No.'s 3316 & 3743
FINISH: None. Unmarked covers.

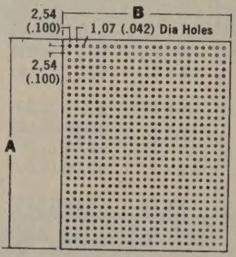
Model No.	Dim.		Net
	A	B	
3311	80,26 (3.16)	76,2 (3.00)	14.85
3316	80,26 (3.16)	76,2 (3.00)	14.50
3742	156,46 (6.16)	152,4 (6.00)	17.95
3743	156,46 (6.16)	152,4 (6.00)	17.60

QUANTITY DISC. CODE **A**

3" AND 6" BOX CIRCUIT MOUNTING BOARDS


50,8 (.200)
B
1,57 (.062) Dia Holes
50,8 (.200)
A

BOARD A


2,54 (.100)
B
1,07 (.042) Dia Holes
2,54 (.100)
A

BOARD B

Brd.	Model No.	No. of Holes	Dim.		Material	Net
			A	B		
A	3550	12 x 15	76,2 (3.00)	60,71 (2.39)	Paper-Epoxy (PEE)	1.50
A	3551	12 x 15	76,2 (3.00)	60,71 (2.39)	Glass-Epoxy (GEE)	1.85
A	3552	12 x 15	76,2 (3.00)	60,71 (2.39)	Glass-Epoxy (GEE) Copper Clad 1 Side	2.25
B	3553	23 x 30	76,2 (3.00)	60,71 (2.39)	Glass-Epoxy (GEE)	2.25
A	3554	19 x 15	76,2 (3.00)	99,06 (3.90)	Paper-Epoxy (PEE)	1.50
A	3556	19 x 15	76,2 (3.00)	99,06 (3.90)	Glass-Epoxy (GEE) Copper Clad 1 Side	2.25
B	3557	39 x 30	76,2 (3.00)	99,06 (3.90)	Glass-Epoxy (GEE)	2.25
B	3726	23 x 60	152,4 (6.00)	60,71 (2.39)	Glass-Epoxy (GEE)	4.50
B	3727	39 x 60	152,4 (6.00)	99,06 (3.90)	Glass-Epoxy (GEE)	4.50

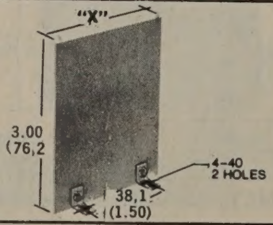
Various sizes and types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16" thick.

- Boards 76,2 (3.00) and 152,4 (6.00) x 60,71 (2.39) used laterally.
- Boards 76,2 (3.00) and 152,4 (6.00) x 99,06 (3.90) used lengthwise.

DISC. CODE **A**

3" BOX SHIELDING DIVIDERS

Model No.	"X" Dim.	Net
3558	60,71 (2.39)	1.95
3559	99,06 (3.90)	2.25


"X"
3.00 (76,2
4-40 2 HOLES
38,1 (1.50)

Two sizes of aluminum dividers for dividing the box into shielded compartments.

MATERIAL: 1,6 (.063) aluminum, clear anodized per MIL-A-8625A.

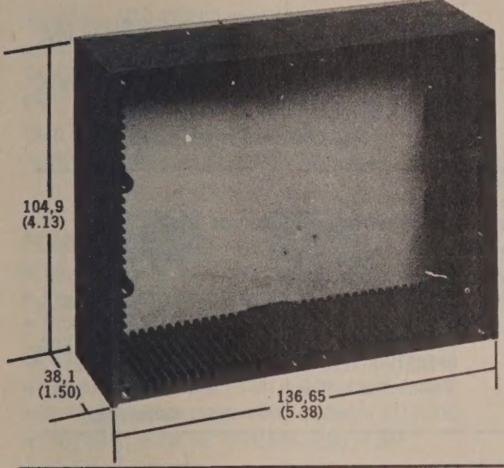
- Divider 76,2 (3.00) x 60,71 (2.39) used laterally.
- Divider 76,2 (3.00) x 99,06 (3.90) used lengthwise.

QUANTITY DISC. CODE **A**

All dimensions are shown millimeters (inches)

SHIELDED "BLACK BOXES" WITH CARD GUIDES—1½" DEEP

POMONA
ELECTRONICS

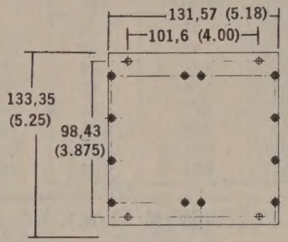

104,9
(4.13)
38,1
(1.50)
136,65
(5.38)

FINISH: Blue baked enamel. Includes top and bottom covers with part number on one and cover screws.

Model No.
4253

QUANTITY DISC. CODE A NET 24.95

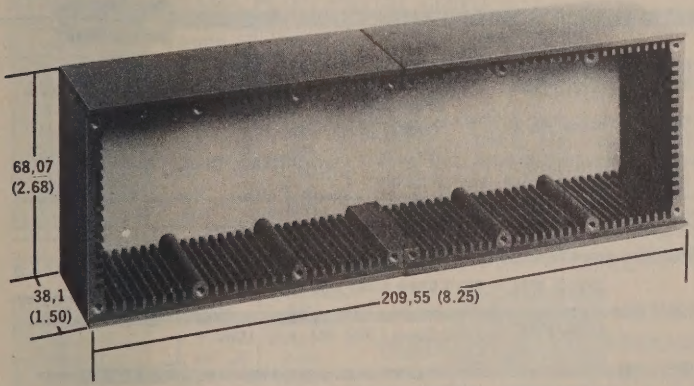
BOTTOM PLATE FOR MOUNTING


131,57 (5.18)
101,6 (4.00)
133,35
(5.25)
98,43
(3.875)

This larger plate, when attached to the box, provides flanges for mounting.
MATERIAL: 2,03mm (.080) aluminum #6061-T6, clear anodized per MIL-A-8625A.

QUANTITY
DISC. CODE A NET 3.95

Model No.
4257

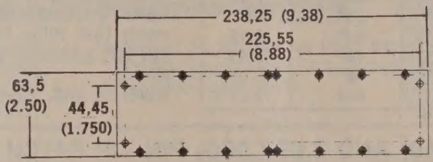

68,07
(2.68)
38,1
(1.50)
209,55 (8.25)

FINISH: Blue baked enamel. Includes top and bottom covers with part number on one and 16 cover screws.

Model No.
4260

QUANTITY DISC. CODE A NET 24.95

BOTTOM PLATE FOR MOUNTING


238,25 (9.38)
225,55
(8.88)
63,5
(2.50)
44,45
(1.750)

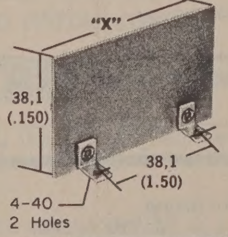
This larger plate, when attached to the box, provides flanges for mounting.
MATERIAL: 2,03mm (.080) aluminum #6061-T6, clear anodized per MIL-A-8625A.

QUANTITY
DISC. CODE A NET 3.95

Model No.
4264

SHIELDING DIVIDERS

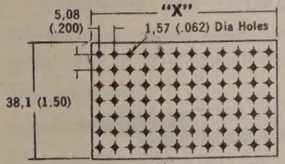
Two sizes of aluminum dividers for dividing the box into shielded compartments.
MATERIAL: 1,60mm (.063) aluminum, clear anodized per MIL-A-8625A.


"X"
38,1
(.150)
38,1
(1.50)
4-40
2 Holes

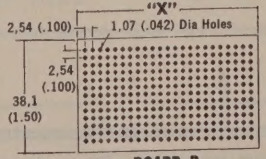
Model No.	"X" Dim.	Net
3327	60,71 (2.39)	1.50
3334	99,06 (3.90)	1.90
4265	203,2 (8.00)	3.00
4258	128,52 (5.06)	2.50

QUANTITY
DISC. CODE A

CIRCUIT MOUNTING BOARDS


5,08
(.200)
"X"
1,57 (.062) Dia Holes
38,1 (1.50)

BOARD A


2,54 (.100)
"X"
1,07 (.042) Dia Holes
2,54
(.100)
38,1
(1.50)

BOARD B

Two sizes of various types of punched and blank circuit boards for rapid assembly of components. Pre-cut to the proper size. Boards slide easily into the box card guides. All boards are 1/16" thick.

QUANTITY DISC. CODE A

Brd.	Model No.	No. of Holes	"X" Dim.	Material	Net
A	3321	12 x 7	60,71 (2.39)	Paper-Epoxy	.60
A	3325	12 x 7	60,71 (2.39)	Glass-Epoxy Cop. Clad 1 Side	1.75
B	3326	24 x 15	60,71 (2.39)	Glass-Epoxy	.95
A	4261	37 x 7	203,2 (8.00)	Paper-Epoxy	1.95
A	4263	37 x 7	203,2 (8.00)	Glass-Epoxy Cop. Clad 1 Side	3.25
B	4262	75 x 15	203,2 (8.00)	Glass-Epoxy	2.95
A	4254	25 x 7	128,52 (5.06)	Paper-Epoxy	1.75
B	4255	51 x 15	128,52 (5.06)	Glass-Epoxy	2.50
A	4256	25 x 7	128,52 (5.06)	Glass-Epoxy Copper Clad	2.25
A	3330	19 x 7	99,06 (3.90)	Paper-Epoxy	.95
A	3332	19 x 7	99,06 (3.90)	Glass-Epoxy Copper Clad	1.95
B	3333	38 x 15	99,06 (3.90)	Glass-Epoxy	1.85

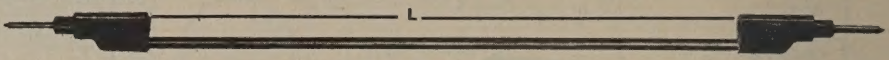
All dimensions are shown millimeters (inches)

2,03mm (.080) PIN TIP PATCH CORDS

POMONA ELECTRONICS

PIN TIP VERTICAL STACKING PATCH CORD

Model No.	Length	Net
P-4 *	4″	1.85
P-8 *	8″	1.85
P-12 *	12″	1.85
P-18 *	18″	1.85
P-24 *	24″	1.85
P-36 *	36″	1.85
P-48 *	48″	1.95
P-60 *	60″	2.05



A must in circuit designing and testing, with instruments that utilize tip jacks.
PIN TIP: 2,03mm (.080) dia., ½″ long, brass, gold flashed.
TIP JACK, STACK-UP: Beryllium copper, gold flashed. Accepts 2,03mm (.080) dia. pin.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.
RATED: 5 amps cont., 10 amps int. 5,000 W VDC.
OPERATING TEMPERATURE: −0°C to +105°C.
***Colors:** Black, brown, red, orange, yellow, green, blue, violet, gray, white.

★QUANTITY DISC. CODE A

PIN TIP EXTENSION STACKING PATCH CORD

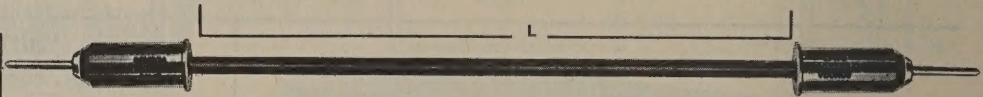
Model No.	Length	Net
1727-4 *	4″	2.50
1727-8 *	8″	2.50
1727-12*	12″	2.50
1727-18*	18″	2.50
1727-24*	24″	2.50
1727-36*	36″	2.50
1727-48*	48″	2.60
1727-60*	60″	2.70

Dual purpose, insulates exposed leads when used as an extension cord. Endless extension coupling possible. Also provides stacking from 2,03mm (.080) jack.
PIN TIP: 2,03mm (.080) dia., ½″ long, brass, gold flashed.
TIP JACK: Beryllium copper, gold flashed. Accepts 2,03mm (.080) dia. pin.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.
RATED: 5 amps cont., 10 amps int. 5,000 W VDC.
OPERATING TEMPERATURE: −0°C to +105°C.
***Colors:** Black, red.

★QUANTITY DISC. CODE A

PIN TIP PATCH CORD

Model No.	Length	Net
1990-4 *	4″	1.95
1990-8 *	8″	1.95
1990-12*	12″	1.95
1990-18*	18″	1.95
1990-24*	24″	1.95
1990-36*	36″	1.95
1990-48*	48″	2.05
1990-60*	60″	2.15

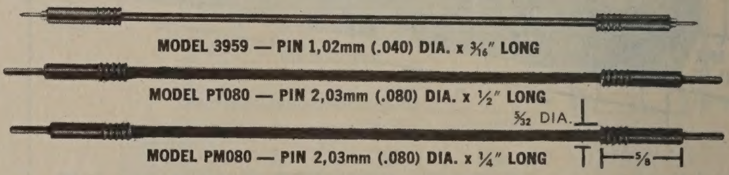


Heavy duty patch cord. Excellent for general lab work. Permits interconnection between test instruments that utilize tip jacks.
PIN TIP: 2,03mm (.080) dia. ½″ long, brass, nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
RATED: 5 amps cont., 10 amps int. 10,000 W VDC.
OPERATING TEMPERATURE: −0°C to +105°C.
***Colors:** Black, red.

★QUANTITY DISC. CODE A

1,02 (.040) AND 2,03 (.080) PIN TIP PATCH CORDS

Model No.			Lgth.	Net
3959-4 *	PT080-4 *	PM080-4 *	4″	1.50
3959-8 *	PT080-8 *	PM080-8 *	8″	1.50
3959-12*	PT080-12*	PM080-12*	12″	1.50
3959-18*	PT080-18*	PM080-18*	18″	1.50
3959-24*	PT080-24*	PM080-24*	24″	1.50
3959-36*	PT080-36*	PM080-36*	36″	1.50
3959-48*	PT080-48*	PM080-48*	48″	1.60
3959-60*	PT080-60*	PM080-60*	60″	1.70



MODEL 3959 — PIN 1,02mm (.040) DIA. x 3/16″ LONG

MODEL PT080 — PIN 2,03mm (.080) DIA. x ½″ LONG

MODEL PM080 — PIN 2,03mm (.080) DIA. x ¼″ LONG

Small body style permits usage in equipment having receptacles spaced closely together. Three models shown.

PIN TIP: Leaded copper. Gold flashed.
WIRE: 22 AWG, strand. 19 x 34 T.C. Insulation, polyvinyl 1,63mm (.064″) O.D.

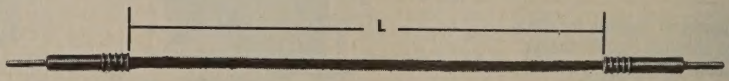
RATED: 3 amps cont., 7.5 amps int. 1,000 W VDC.
OPERATING TEMPERATURE: −0°C to +105°C.
***Colors:** Black, red.

★QUANTITY DISC. CODE A

2,36mm (.093) PIN TIP PATCH CORD

Model No.	Length	Net
4493-4 *	4″	1.50
4493-8 *	8″	1.50
4493-12*	12″	1.50
4493-18*	18″	1.50
4493-24*	24″	1.50
4493-36*	36″	1.50
4493-40*	48″	1.60
4493-60*	60″	1.70

NEW



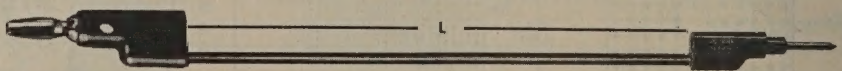
PIN TIP: Leaded copper. Gold flashed.
WIRE: 20 AWG, strand. 41 x 36 T.C. PVC. 1,63mm (.064″ O.D.

RATED: 3 amps cont., 7.5 amps int. 1,000 W VDC.
OPERATING TEMPERATURE: —0°C to +105°C.
***Colors:** Black, red.

★ QUANTITY DISC. CODE A

BANANA PLUG TO PIN TIP STACK-UP PATCH CORD

Model No.	Length	Net
1126-4 *	4″	1.95
1126-8 *	8″	1.95
1126-12 *	12″	1.95
1126-18 *	18″	1.95
1126-24 *	24″	1.95
1126-36 *	36″	1.95
1126-48 *	48″	2.05
1126-60 *	60″	2.15



Adapts to equipment using banana jacks and pin jacks. Banana plug and pin tip allow vertical stack-up.

BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated.
PIN TIP: 2,03mm (.080) dia., ½″ long, brass, gold flashed.
TIP JACK, STACK-UP: Beryllium copper, gold flashed. Accepts 2,03mm (.080) dia. pin.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087) O.D.
RATED: 5 amps cont., 10 amps int. 5,000 W VDC.
OPERATING TEMPERATURE: −0°C to +105°C.
***Colors:** Black, red.

★QUANTITY DISC. CODE A

★Various lengths may be aggregated for best quantity price. Other lengths available to order.
* Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

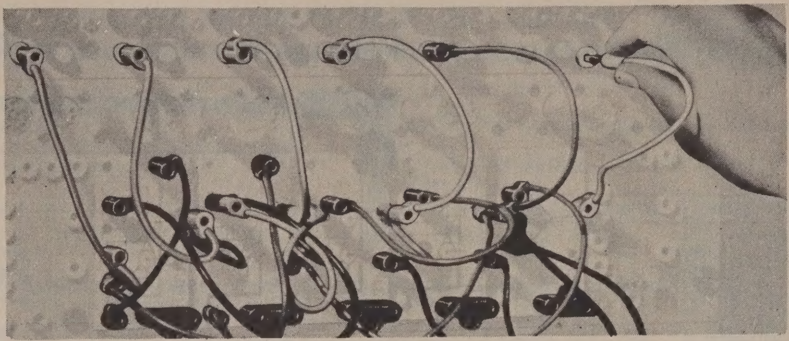
STANDARD BANANA PLUG PATCH CORDS

POMONA ELECTRONICS

POMONA BANANA PLUG PATCH CORDS

Tough thermoplastic insulation molds the plug and leads into a strong moisture resistant integral unit. Excellent for computer board and test equipment applications.

Used by leading industries in applications where extreme reliability is of prime importance.



FEATURES:

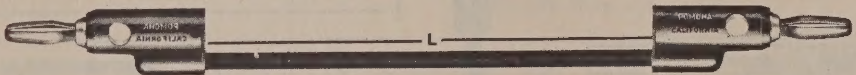
- One piece beryllium copper heat treated spring for maximum long life.
- Rounded spring design results in maximum contact area.
- Extra flexible polyvinyl insulation used on all leads.

SPECIFICATIONS:

- Fits standard 4,22mm (.166) dia. banana jacks.
- Spring, beryllium copper Berylco 25 per QQ-C-533.
- Plug body, brass per QQ-B-626, alloy #360.
- Nickel plated per QQ-N-290, Class 2.
- Contact resistance less than 0.001 ohm per banana plug.
- Operating temperature: —0°C to +105°C.
- Wire, 18 AWG, stranding 65 x 36 T.C.
- Insulation, polyvinyl 3,66mm (.144") O.D.
- Ratings: 15 amps cont., 30 amps int. 10,000 W VDC.

STACK-UP BANANA PLUG PATCH CORD

Model No.	Length	Net
B-4 *	4"	1.80
B-8 *	8"	1.80
B-12 *	12"	1.80
B-18 *	18"	1.80
B-24 *	24"	1.80
B-36 *	36"	1.80
B-48 *	48"	1.90
B-60 *	60"	2.00

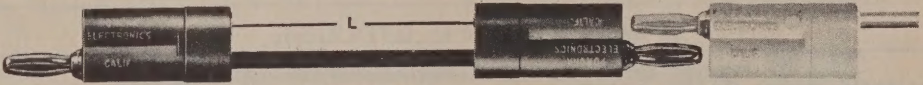


Multiple stacking feature accommodates the most complex stacking; keeps circuitry neater. Greatly simplifies circuit connections and changes. Reliable solder-bonded connections withstand pull test in excess of 50 lbs. Banana plugs both ends.
***COLORS:** Black, brown, red, orange, yellow, green, blue, violet, gray, white.

★QUANTITY DISC. CODE A

EXTENSION STACKING BANANA PLUG PATCH CORD

Model No.	Length	Net
HB-4 *	4"	2.50
HB-8 *	8"	2.50
HB-12 *	12"	2.50
HB-18 *	18"	2.50
HB-24 *	24"	2.50
HB-36 *	36"	2.50
HB-48 *	48"	2.60
HB-60 *	60"	2.70

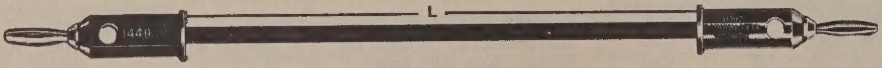


Dual purpose. Insulates all hot leads when used as an extension cord. Endless extension couplings possible with any banana plug patch cord. Provides vertical stacking from any jack. Reliable solder-bonded connections withstand pull test in excess of 50 lbs. Banana plugs both ends.
***COLORS:** Black, brown, red, orange, yellow, green, blue, violet, gray, white.

★QUANTITY DISC. CODE A

HORIZONTAL STACKING BANANA PLUG PATCH CORD

Model No.	Length	Net
1440-4 *	4"	1.80
1440-8 *	8"	1.80
1440-12 *	12"	1.80
1440-18 *	18"	1.80
1440-24 *	24"	1.80
1440-36 *	36"	1.80
1440-48 *	48"	1.90
1440-60 *	60"	2.00



Ideal as an interconnecting lead between power supplies, test equipment, etc. Horizontal stacking feature. Banana plugs on both ends.
***COLORS:** Black, red.

★QUANTITY DISC. CODE A

NEW

18 AWG WIRE

This is the same quality wire that Pomona uses on their 18 AWG patch cords. Ideal for do-it-yourself leads.

SPECIFICATIONS:

STRANDING: 65 x 36 tinned copper.

O.D.: 3,66mm (.144").

JACKET: 105°C PVC.

TEMP. RANGE: —20°C to +105°C.

Model No.	Color
4418-0	Black
4418-2	Red

(Std. Pkg. 500' Reel)
★ QUANTITY DISC. CODE A

NET 65.00

20 AWG WIRE

NEW

This is the same quality wire that Pomona uses on their 20 AWG patch cords. Ideal for do-it-yourself leads.

SPECIFICATIONS:

STRANDING: 41 x 36 tinned copper.

O.D.: 2,21mm (.087").

JACKET: 105°C PVC.

TEMP. RANGE: —20°C to +105°C.

Model No.	Color
4420-0	Black
4420-2	Red

(Std. Pkg. 500' Reel)
★ QUANTITY DISC. CODE A

NET 50.00

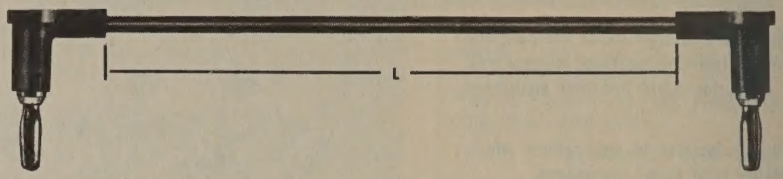
★Various lengths may be aggregated for best quantity price. Other lengths available to order.
* Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

STANDARD BANANA PLUG PATCH CORDS

POMONA
ELECTRONICS

STACK-UP RIGHT ANGLE BANANA PLUG PATCH CORD



Model No.	Length	Net
2864-4 *	4″	2.25
2864-8 *	8″	2.25
2864-12 *	12″	2.25
2864-18 *	18″	2.25
2864-24 *	24″	2.25
2864-36 *	36″	2.25
2864-48 *	48″	2.35
2864-60 *	60″	2.45

Vertical stacking feature allows endless circuit connections and the right angle design keeps wires close to the chassis. An oversize shoulder allows easy connect and disconnect.

BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexibl polyvinyl insulation, 3,66mm (.144″) O.D.

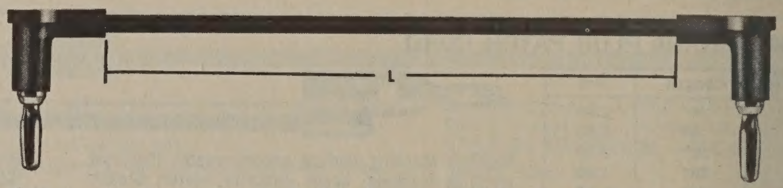
OPERATING TEMPERATURE: −0°C to +105°C.

RATED: 15 amps cont., 30 amps int. 10,000 W VDC

***COLORS:** Black, red.

★QUANTITY DISC. CODE A

RIGHT ANGLE BANANA PLUG PATCH CORD



Model No.	Length	Net
2700-4 *	4″	1.95
2700-8 *	8″	1.95
2700-12 *	12″	1.95
2700-18 *	18″	1.95
2700-24 *	24″	1.95
2700-36 *	36″	1.95
2700-48 *	48″	2.05
2700-60 *	60″	2.15

Designed for use where vertical space is limited. Right angle plug features concave ribbed top and oversize shoulder for ease of connect and disconnect in tight places.

BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, 3,66mm (.144″) O.D.

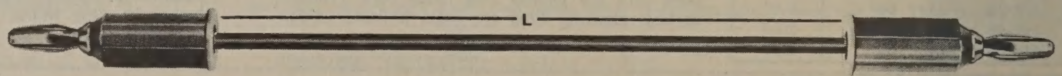
OPERATING TEMPERATURE: −0°C to +105°C.

RATED: 15 amps cont., 30 amps int. 10,000 W VDC.

***COLORS:** Black, red.

★QUANTITY DISC. CODE A

BANANA PLUG PATCH CORD



Model No.	Length	Net
1985-4 *	4″	1.70
1985-8 *	8″	1.70
1985-12 *	12″	1.70
1985-18 *	18″	1.70
1985-24 *	24″	1.70
1985-36 *	36″	1.70
1985-48 *	48″	1.80
1985-60 *	60″	1.90

Excellent for general lab work. Permits interconnection between test instruments, etc. Banana plugs both ends.

BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, 3,66mm (.144″) O.D.

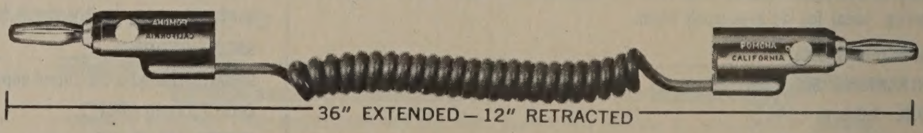
OPERATING TEMPERATURE: −0°C to +105°C.

RATED: 15 amps cont., 30 amps int. 10,000 W VDC.

***COLORS:** Black, red.

★QUANTITY DISC. CODE A

RETRACTILE (COILED) PATCH CORD—WITH STACK-UP BANANA PLUGS



Model No.	Length	Net
2484-36 *	36″	4.25

Permits the use of one size patch cord in place of many various lengths.

BANANA PLUGS: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to body and wire.

WIRE: 20 AWG, strand. 41 x 36 T.C. Rubber insulation 3,68mm (.145″) O.D.

RATED: 4 amps cont., 10 amps int. 5,000 W VDC.

OPERATING TEMPERATURE: −0°C to +105°C.

***COLORS:** Black, red.

★QUANTITY DISC. CODE A

★Various lengths may be aggregated for best quantity price. Other lengths available to order.
* Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

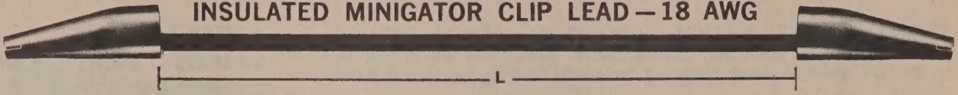
CLIP LEADS & SPADE LUG JUMPERS

POMONA
ELECTRONICS

Model No.	Length	Net
MG-B-4 *	4″	1.50
MG-B-8 *	8″	1.50
MG-B-12 *	12″	1.50
MG-B-24 *	24″	1.50
MG-B-36 *	36″	1.50
MG-B-48 *	48″	1.60
MG-B-60 *	60″	1.70

★QUANTITY DISC. CODE Ⓐ

INSULATED MINIGATOR CLIP LEAD—18 AWG



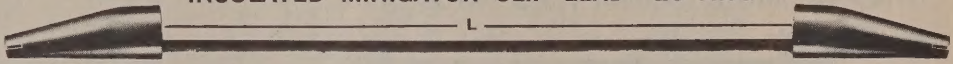
CLIP: Minigator, steel, cad. plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.

INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

Model No.	Length	Net
1236-4 *	4″	1.50
1236-8 *	8″	1.50
1236-12 *	12″	1.50
1236-24 *	24″	1.50
1236-36 *	36″	1.50
1236-48 *	48″	1.60
1236-60 *	60″	1.70

★QUANTITY DISC. CODE Ⓐ

INSULATED MINIGATOR CLIP LEAD—20 AWG



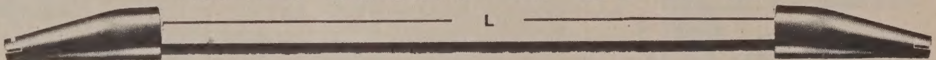
CLIP: Minigator, solid copper.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, 2,21mm (.087″) O.D.

INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

Model No.	Length	Net
1613-4 *	4″	1.50
1613-8 *	8″	1.50
1613-12 *	12″	1.50
1613-24 *	24″	1.50
1613-36 *	36″	1.50
1613-48 *	48″	1.60
1613-60 *	60″	1.70

★QUANTITY DISC. CODE Ⓐ

INSULATED MICROGATOR CLIP LEAD—20 AWG



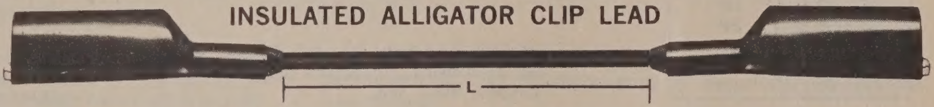
CLIP: Microgator, solid copper.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, 2,21mm (.087″) O.D.

INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

Model No.	Length	Net
AL-B-4 *	4″	1.75
AL-B-8 *	8″	1.75
AL-B-12 *	12″	1.75
AL-B-24 *	24″	1.75
AL-B-36 *	36″	1.75
AL-B-48 *	48″	1.85
AL-B-60 *	60″	1.95

★QUANTITY DISC. CODE Ⓐ

INSULATED ALLIGATOR CLIP LEAD



CLIP: Alligator, steel, cad. plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.

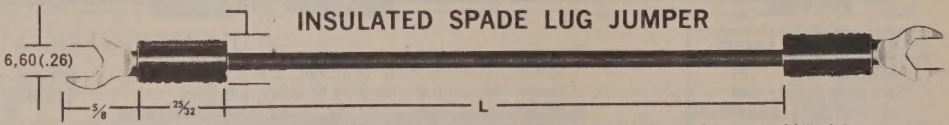
INSULATOR: Red vinyl with red wire. Black on all other colors.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

Model No.	Length	Net
1743-12 *	12″	1.95
1743-24 *	24″	1.95
1743-36 *	36″	1.95
1743-48 *	48″	2.05
1743-60 *	60″	2.15

(Typical Dimensions spade lug)

★QUANTITY DISC. CODE Ⓐ

INSULATED SPADE LUG JUMPER

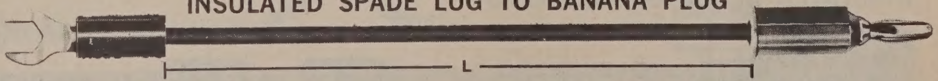


Spade lug, heavy duty machined one piece brass. Tough thermo-plastic molded to spade lug body.
SPADE LUG: Brass 1/16″ thick, nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
RATED: 15 amps cont., 30 amps int. 10,000 W VDC.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red, green, white.

Model No.	Length	Net
1987-12 *	12″	1.95
1987-24 *	24″	1.95
1987-36 *	36″	1.95
1987-48 *	48″	2.05
1987-60 *	60″	2.15

★QUANTITY DISC. CODE Ⓐ

INSULATED SPADE LUG TO BANANA PLUG

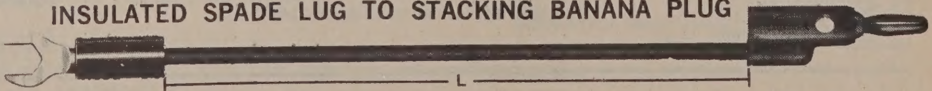


SPADE LUG: Brass 1/16″ thick, nickel plated.
BANANA PLUG: Spring one piece beryllium copper heat treated, nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
RATED: 15 amps cont., 30 amps int. 10,000 W VDC.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

Model No.	Length	Net
1370-12 *	12″	1.95
1370-24 *	24″	1.95
1370-36 *	36″	1.95
1370-48 *	48″	2.05
1370-60 *	60″	2.15

★QUANTITY DISC. CODE Ⓐ

INSULATED SPADE LUG TO STACKING BANANA PLUG

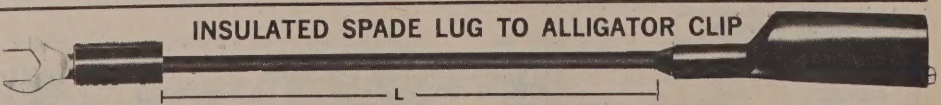


SPADE LUG: Brass 1/16″ thick, nickel plated.
BANANA PLUG: Spring one piece beryllium copper heat treated, nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
RATED: 15 amps cont., 30 amps int. 10,000 W VDC.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red, green, white.

Model No.	Length	Net
1960-12 *	12″	1.95
1960-24 *	24″	1.95
1980-36 *	36″	1.95
1960-48 *	48″	2.05
1960-60 *	60″	2.15

★QUANTITY DISC. CODE Ⓐ

INSULATED SPADE LUG TO ALLIGATOR CLIP



SPADE LUG: Brass 1/16″ thick, nickel plated.
INSULATOR: Red vinyl with red wire. Black on all other colors.
CLIP: Alligator, steel, cad. plated.

WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS:** Black, red.

★Various lengths may be aggregated for best quantity price. Other lengths available to order.
*Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

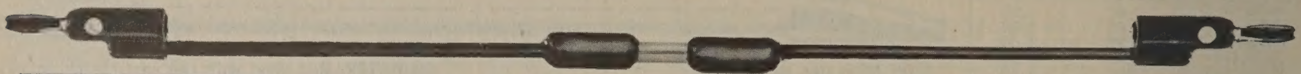
PATCH CORDS WITH MOLDED IN-LINE FUSE HOLDERS

POMONA ELECTRONICS

These molded in-line fuse holder patch cords are used as an added safety feature for your electronic test equipment. Fuse holder will accept ¼″ dia. SFE and AGC fuses (fuse not included). Fuse holder specifications:

- **MATERIAL:** Brass.
- **FINISH:** Electro-tin plated.
- **INSULATION:** Polyvinylchloride.
- **COLOR:** Red or black.
- **RATINGS** — Banana plugs and wire:
  Operating temperature: 0°C to +105°C.
  Working voltage: 10,000 VDC.
  Current: 15 amps cont., 30 amps int.
  Contact resistance: Less than .001 ohm per banana plug.

STACK-UP ANGLE BANANA PLUG PATCH CORD



Model No.	Length
4274-12 *	12″
4274-24 *	24″
4274-36 *	36″
4274-48 *	48″
4274-60 *	60″

Multiple stacking feature accommodates the most complex stacking; keeps circuitry neater. Greatly simplifies circuit connections and changes. Reliable solder-bonded connections withstand pull test in excess of 50 lbs. Banana plugs both ends.
***COLORS:** Black, red.

★QUANTITY DISC. CODE A **NET 3.50**

BANANA PLUG PATCH CORD

Model No.	Length
4273-12 *	12″
4273-24 *	24″
4273-36 *	36″
4273-48 *	48″
4273-60 *	60″

Excellent for general lab work. Permits interconnection between test instruments, etc. Banana plugs both ends.
***COLORS:** Black, red.

★QUANTITY DISC. CODE A **NET 3.50**

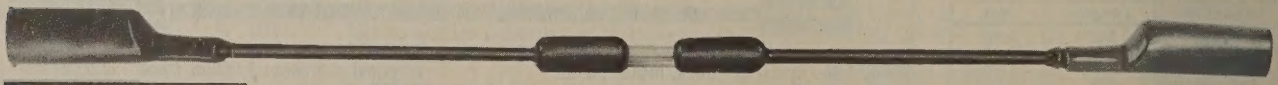
INSULATED SPADE LUG JUMPER

Model No.	Length
4353-12 *	12″
4353-24 *	24″
4353-36 *	36″
4353-48 *	48″
4353-60 *	60″

Spade lug heavy duty machined one piece brass. Tough thermoplastic molded to spade lug body.
SPADE LUGS: Brass 1/16″ thick, nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
***COLORS:** Black, red.

★QUANTITY DISC. CODE A **NET 3.50**

INSULATED ALLIGATOR CLIP LEAD

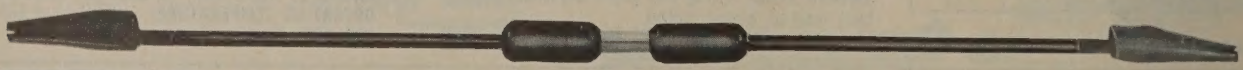


Model No.	Length
4354-12 *	12″
4354-24 *	24″
4354-36 *	36″
4354-48 *	48″
4354-60 *	60″

CLIP: Alligator, steel, cad. plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
INSULATOR: Red vinyl, black vinyl.
***COLORS:** Black, red.

★QUANTITY DISC. CODE A **NET 3.50**

INSULATED MINIGATOR CLIP LEAD



Model No.	Length
4355-12 *	12″
4355-24 *	24″
4355-36 *	36″
4355-48 *	48″
4355-60 *	60″

CLIP: Minigator, steel, cad. plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
INSULATOR: Red vinyl, black vinyl.
***COLORS:** Black, red.

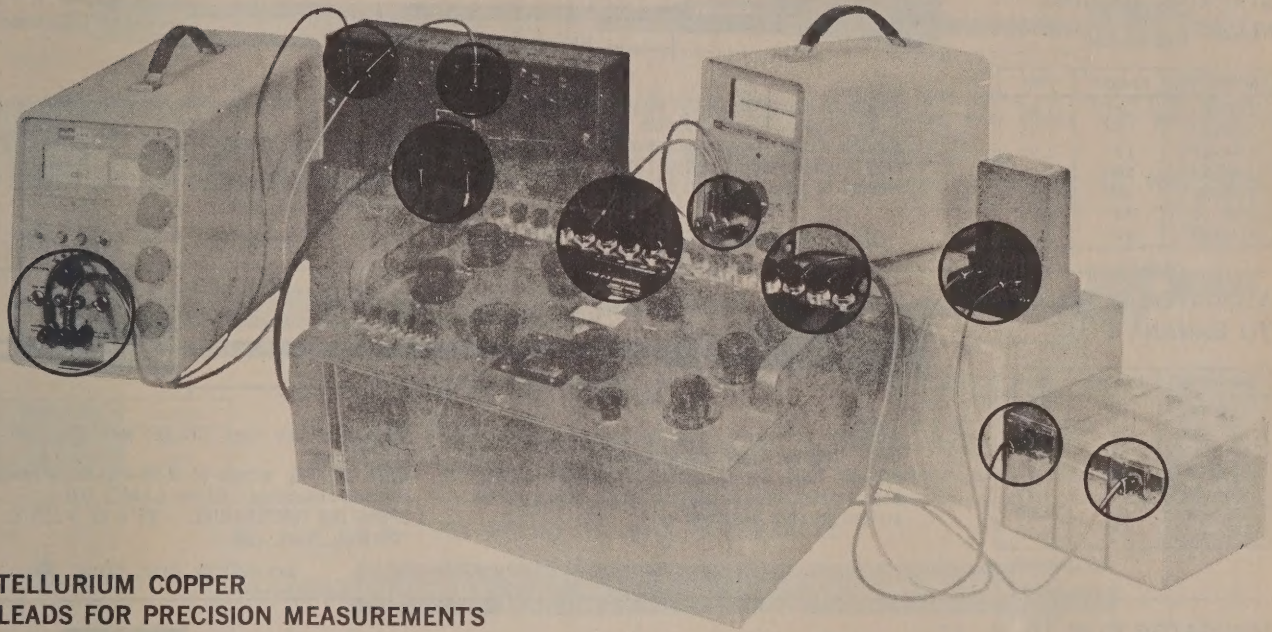
★QUANTITY DISC. CODE A **NET 3.50**

★Various lengths may be aggregated for best quantity price. Other lengths available to order.
*Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

LOW TERMINAL E.M.F. SPADE LUG JUMPERS

POMONA
ELECTRONICS



TELLURIUM COPPER LEADS FOR PRECISION MEASUREMENTS

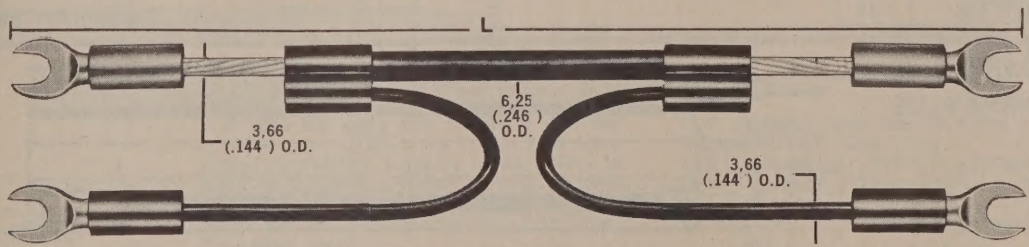
Pomona Electronics has advanced the state of the art in measurements where Thermoelectric Effects are significant sources of error. Comparators designed for use with the Kelvin-Varley voltage divider and microvolt leads were tested with Primary Standards Laboratory equipment.

Thermoelectric voltages were not detected until the most sensitive galvanometer range was used.

Thermoelectric properties — Tellurium copper gold plated spade lugs cold-staked to multi-stranded 12 gauge copper wire minimize thermoelectric effects — an absolute necessity for low voltage, high precision measurements.

Low resistance — 12 gauge multi-stranded copper wire results in extremely low cable resistance. Spade lugs plated with 15 micro inches gold for minimum contact resistance and minimum thermal EMF when using copper binding posts (less than 0.01 μV/°C).

TELLURIUM COPPER SPADE LUGS, SHIELDED LEAD

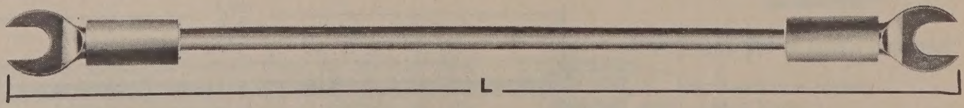


Model No.	Length
1756-24	24″
1756-48	48″

Designed for use with Kelvin-Varley voltage dividers where extreme precision is required for low voltage measurements. Features guard shield to effectively reduce shunt resistance. Tough thermoplastic molded to spade lug body, color; center conductor lug red, shield lug black. Tellurium copper heavy duty one piece machined spade lug gold plated per MIL-G-45204, Type II, Class I. Center conductor 12 AWG multi-stranded bare copper, shield lead wire, 18 AWG, stranded. Polyethylene primary insulation. Braided shield bare copper. Polyvinyl jacket, color black, per MIL-C-17C Type IIA.

★QUANTITY DISC. CODE A **NET 14.85**

TELLURIUM COPPER SPADE LUG JUMPER



Model No.	Length
1693-12*	12″
1693-18*	18″
1693-24*	24″
1693-36*	36″
1693-48*	48″
1693-60*	60″

Single conductor tellurium copper spade lug jumper used in applications where guard shield is not required. Tough thermoplastic molded to spade lug body. Color matches wire. Tellurium copper heavy duty one piece machined spade lug, gold plated per MIL-G-45204, Type II, Class I. Conductor, 12 AWG multi-stranded bare copper. Insulation polyvinyl, 105°C, 3,66mm (.144″) O.D.
***COLORS:** Black, red, green.

★QUANTITY DISC. CODE A **NET 4.25**

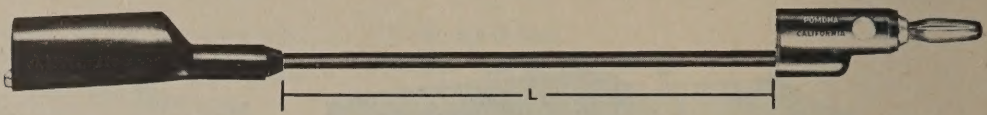
★Various lengths may be aggregated for best quantity price. Other lengths available to order.
*Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

CLIP LEADS & TEST PROBES

POMONA ELECTRONICS

ALLIGATOR CLIP TO STACKING BANANA PLUG



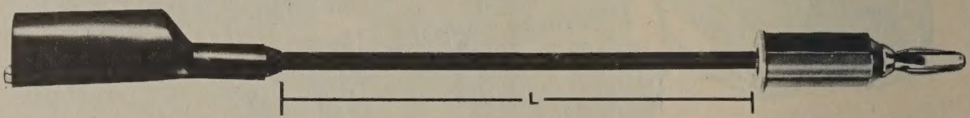
Model No.	Length	Net
1166-4 *	4″	1.95
1166-8 *	8″	1.95
1166-12*	12″	1.95
1166-24*	24″	1.95
1166-36*	36″	1.95
1166-48*	48″	2.05
1166-60*	60″	2.15

Adapts to equipment using standard banana jacks.
CLIP: Alligator, steel, cadmium plated.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS**: Black, red.

★QUANTITY DISC. CODE A

ALLIGATOR CLIP LEAD TO BANANA PLUG



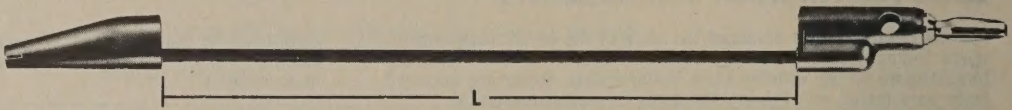
Model No.	Length	Net
1959-4*	4″	1.95
1959-8*	8″	1.95
1959-12*	12″	1.95
1959-24*	24″	1.95
1959-36*	36″	1.95
1959-48*	48″	2.05
1959-60*	60″	2.15

Adapts to equipment using standard banana jacks.
CLIP: Alligator, steel, cadmium plated.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation 3,66mm (.144″) O.D.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS**: Black, red.

★QUANTITY DISC. CODE A

MINIGATOR CLIP TO STACKING BANANA PLUG



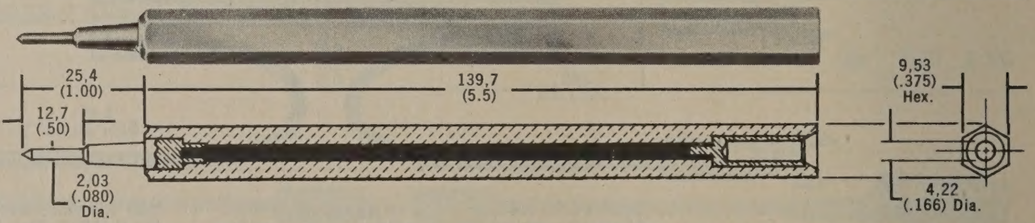
Model No.	Length	Net
3220-4*	4″	1.95
3220-8*	8″	1.95
3220-12*	12″	1.95
3220-24*	24″	1.95
3220-36*	36″	1.95
3220-48*	48″	2.05
3220-60*	60″	2.15

Adapts to equipment using standard banana jacks.
CLIP: Minigator, steel, cadmium plated.
BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.

INSULATOR: Red vinyl with red wire. Black on all other colors.
WIRE: 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation 2,21mm (.087″) O.D.
OPERATING TEMPERATURE: −25°C to +105°C.
***COLORS**: Black, red.

★QUANTITY DISC. CODE A

TEST PROBE TO BANANA PLUG



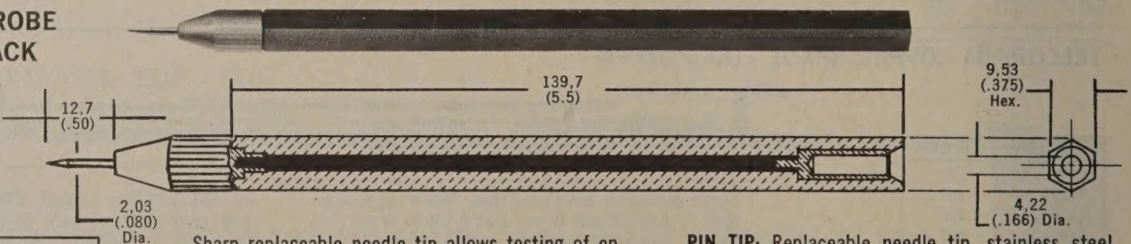
Model No.	Color
1589-0	Black
1589-2	Red

Banana jack in handle connected to tip. Permits use of standard banana plugs for circuit testing as a test prod. Heavy duty insulated handle molded to banana jack and tip.

PIN TIP: 2,03mm (.080) dia. x ½″ long, brass nickel plated.
BANANA JACK: 4,22mm (.166) dia. brass nickel plated. Accepts standard banana plug.

★QUANTITY DISC. CODE A **NET 1.95**

NEEDLE TIP PROBE TO BANANA JACK



Model No.	Color
1705-0	Black
1705-2	Red

Sharp replaceable needle tip allows testing of encapsulated circuits. Banana jack in handle connected to tip. Permits use of standard banana plugs for circuit testing as a test prod. Heavy duty insulated handle molded to banana jack and tip.

PIN TIP: Replaceable needle tip, stainless steel. Needle tip nut insulated.
BANANA JACK: 4,22mm (.166) dia. brass nickel plated. Accepts standard banana plug.

★QUANTITY DISC. CODE A **NET 1.95**

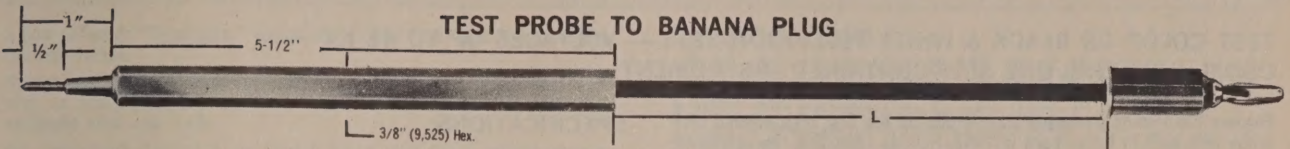
★Various lengths may be aggregated for best quantity price. Other lengths available to order.
°Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

TEST PROBES

POMONA ELECTRONICS

TEST PROBE TO BANANA PLUG



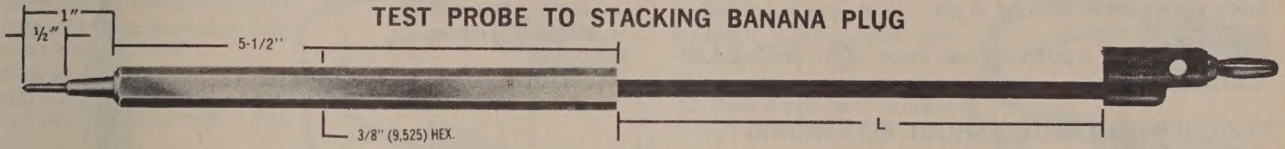
Model No.	Length
1986-36	36"
1986-48	48"

Insulated handle molded to probe tip and wire lead.
PROBE PIN TIP: 2,03mm (.080) dia. x ½" long. Brass nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, 3,66mm (.144") O.D.

BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to body.
***COLORS:** Black, red.

QUANTITY DISC. CODE **A** **NET 3.25**

TEST PROBE TO STACKING BANANA PLUG



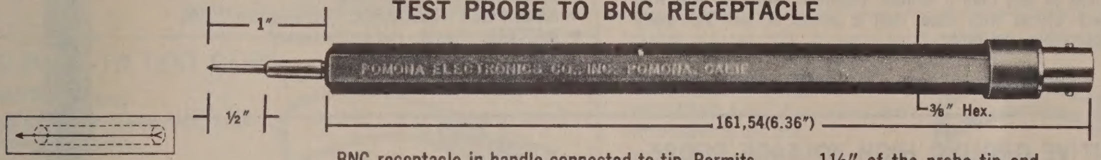
Model No.	Length
1382-36*	36"
1382-48*	48"

Insulated handle molded to probe tip and wire lead.
PROBE PIN TIP: 2,03mm (.080) dia. x ½" long. Brass nickel plated.
WIRE: 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, 3,66mm (.144") O.D.

BANANA PLUG: Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug body and wire.
***COLORS:** Black, red.

QUANTITY DISC. CODE **A** **NET 3.25**

TEST PROBE TO BNC RECEPTACLE

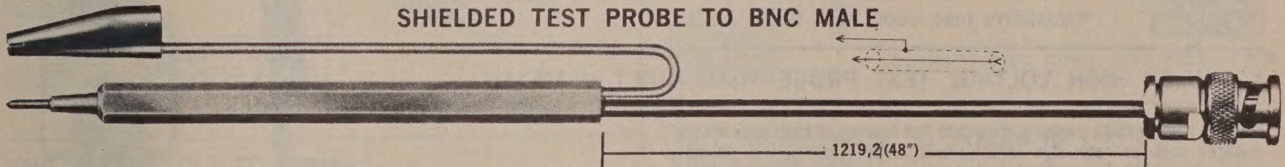


Model Nc.	Color
1748-0	Black
1748-2	Red

BNC receptacle in handle connected to tip. Permits the use of coaxial cables with BNC plug for circuit testing as a test prod. Tough thermoplastic molded to BNC receptacle and tip. Shield extends to within 1½" of the probe tip end.
PIN TIP: 2,03mm (.080) dia. x ½" long, brass, nickel plated.
RECEPTACLE: BNC, UG1094/U.

QUANTITY DISC. CODE **A** **NET 6.50**

SHIELDED TEST PROBE TO BNC MALE



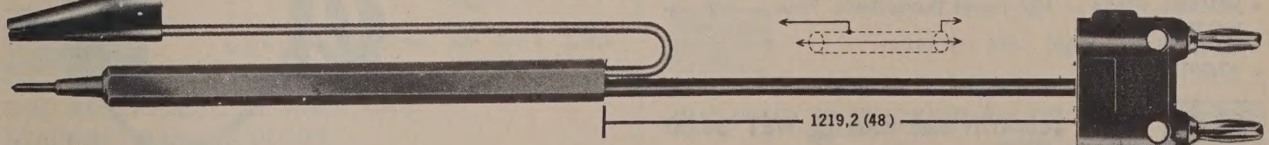
Model No.	Length
2739-C-48	48"

A shielded test probe with the shield extending to within 1½" of the probe tip end. One piece molded construction. Insulated handle molded to probe tip and cable. Insulated minigator clip connected to shield lead.
PROBE PIN TIP: 2,03mm (.080) dia. x ½" long. Brass nickel plated.
CONNECTOR: BNC male, M39012/16-0001

CLIP: Minigator, steel, cadmium plated.
INSULATOR, VINYL: Color, black.
CABLE: Shielded coax., RG58C/U, polyethylene insulation. Vinyl jacket, 4,95mm (.195") O.D., nom. Cap. 28.5 pf/ft.
HANDLE: Color, red, molded of tough thermoplastic.

QUANTITY DISC. CODE **B** **NET 8.50**

SHIELDED TEST PROBE TO DOUBLE BANANA PLUG



Model No.	Length
1569-C-48	48"

A shielded test probe with the shield extending to within 1½" of the probe tip end. One piece molded construction. Insulated handle molded to probe tip and cable. Insulated minigator clip connected to shield lead.
PROBE PIN TIP: 2,03mm (.080) dia. x ½" long. Brass nickel plated.
DOUBLE BANANA PLUG: On ¾" centers. Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to double plug body. Color, black.
CLIP: Minigator, steel, cadmium plated.
INSULATOR, VINYL: Color, black.
CABLE: Shielded coax., RG58C/U, polyethylene insulation. Vinyl jacket, 4,95mm (.195") O.D., nom. Cap. 28.5 pf/ft.
HANDLE: Color, red, molded of tough thermoplastic.

QUANTITY DISC. CODE **B** **NET 8.95**

***Consult factory for color code part numbers.**
Other lengths available to order.

All dimensions are shown millimeters (inches)

HIGH VOLTAGE TEST PROBES

POMONA ELECTRONICS

TEST COLOR OR BLACK & WHITE TELEVISION SETS — VOLTAGES UP TO 42 KV — USING JUST THIS ONE SELF-CONTAINED INSTRUMENT

Pomona Electronics perfected and introduced the first high voltage test probe with built-in meter back in 1967. Now we offer this new advanced test probe, Model 4242, to test existing television sets (color or black & white), plus new and future models with voltages up to 42KV.

It is easy to make high voltage adjustments in the home without carrying bulky equipment. Just ground the probe to TV chassis with alligator clip, contact test probe tip to high voltage anode, read voltage indicated on built-in meter, and make adjustments as required. On-off switch in handle protects meter when not in use.

Model No.
4242

★ QUANTITY DISC. CODE C NET 24.95

SPECIFICATIONS:

- **RANGE:** 42,000 VDC.
- **SENSITIVITY:** 20,000 ohms/volt.
- **METER MOVEMENT:** 50 μa.
- **ACCURACY:** ±2% full scale.
- **MULTIPLIER RESISTANCE:** 720 megohm ±2%.
- **MATERIAL:** Handle and probe Lexan*.
- **LENGTH:** 14¾″ overall.
- **WEIGHT:** 8¼ ounces.

DESIGNED TO TROUBLESHOOT ELECTRONIC AIR CLEANER SYSTEM MALFUNCTIONS

The Model 3157 High Voltage Test Probe is designed to speed and simplify the servicing of electronic air cleaner systems. It replaces heavy, bulky old fashioned voltmeters with a modern, compact hand-held instrument which a serviceman can carry in his tool case. He can use it to check for ionizer screen continuity, line opens, transformer failure, or other component malfunctions in less than a minute. Extended probe tip gets into those hard-to-reach places with ease. Unit is priced so low that every serviceman can carry his own probe.

Model No.
3157

★ QUANTITY DISC. CODE C NET 24.95

SPECIFICATIONS:

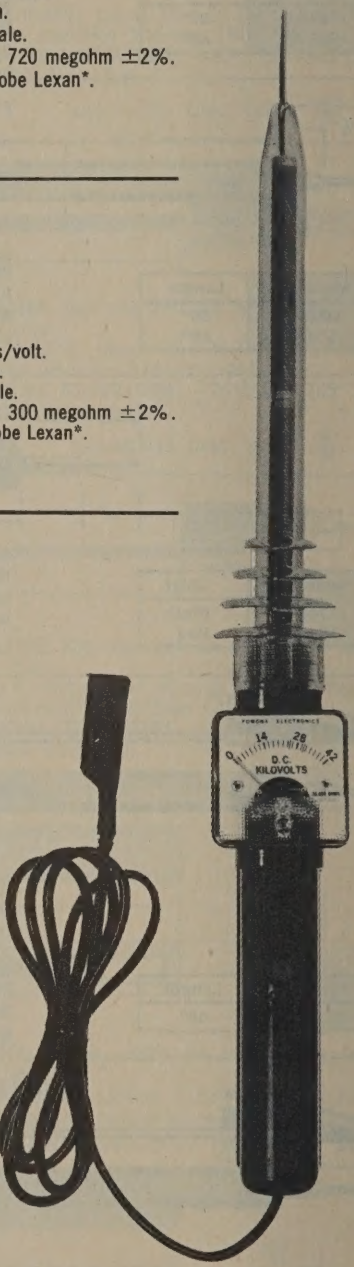
- **RANGE:** 15,000 VDC.
- **SENSITIVITY:** 20,000 ohms/volt.
- **METER MOVEMENT:** 50 μa.
- **ACCURACY:** ±3% full scale.
- **MULTIPLIER RESISTANCE:** 300 megohm ±2%.
- **MATERIAL:** Handle and probe Lexan*.
- **LENGTH:** 14¾″ overall.
- **WEIGHT:** 8¼ ounces.

15 KV POSITIVE GROUND HIGH VOLTAGE PROBE

The Model 4312 has been designed with a positive ground for use in microwave oven repair. Specifications are the same as on Model 3157.

Model No.
4312

★ QUANTITY DISC. CODE C NET 24.95



10 KV AC HIGH VOLTAGE TEST PROBE WITH BUILT-IN METER

This AC high voltage probe is excellent for testing of high potential AC voltages such as neon sign transformers, Hi-pot testers, etc. Shielded meter movement for protection from stray magnetic fields. Probe is supplied with Model 3295 carrying case.

Easy to operate! Just ground the test probe instrument by attaching alligator clip to chassis, contact test probe tip to high voltage being measured and read voltage from the built-in meter. No warm-up time. No batteries.

SPECIFICATIONS:

- **RANGE:** 10,000 VAC.
- **SENSITIVITY:** 2,000 ohms/volt (500 μA) movement.
- **ACCURACY:** ±3% 30 Hz to 1,000 Hz.
- **MULTIPLIER RESISTANCE:** 20 megohm ±2%.
- **MATERIAL:** Handle — high impact thermoplastic. Probe — high impact polystyrene.
- **LENGTH:** 14¾″ overall.
- **WEIGHT:** 8 ounces.

Model No.
3200

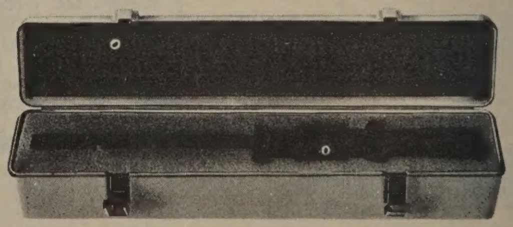
★QUANTITY DISC. CODE C NET 34.50

CARRYING CASE FOR HIGH VOLTAGE PROBES

A quality built carrying case for protection of your high voltage probe. The case is made of tough thermoplastic. The inside is lined with soft, shock absorbing material. All of the above probes fit in this protective carrying case.

Model No.
3295

★QUANTITY DISC. CODE D NET 5.95



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*Lexan is a trademark of General Electric.

★Various lengths may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

MOLDED BREAKOUTS

POMONA
ELECTRONICS

A new series of "Breakouts," designed to convert standard coaxial cables to test cables.

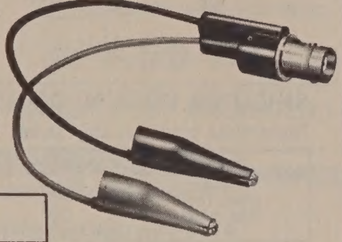
By connecting proper breakout receptacle or plug to corresponding cable plug or receptacle, any standard coaxial cable becomes a test cable equipped with clip leads.

All connections feature a non-tarnish finish, and tough molded thermoplastic insulation molded to connector and wire.

SPECIFICATIONS:

- **WIRE:** (With alligator clips) 18 AWG, strand. 65 x 36 T.C. Extra flexible polyvinyl insulation, 4,22mm (.144") O.D.
- **WIRE:** (With minigator clips) 20 AWG, strand. 41 x 36 T.C. Extra flexible polyvinyl insulation, 2,21mm (.087") O.D.
- **OPERATING TEMPERATURE:** −25°C to +85°C.
- **WORKING VOLTAGE:** 500 V peak.

BNC RECEPTACLE TO TEST CLIPS



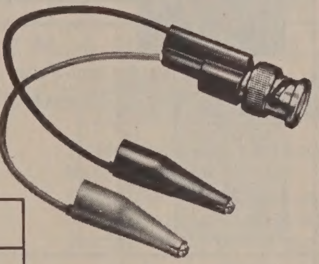
CONNECTOR: BNC receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or alligator, steel, cad. plated. Insulators, Vinyl: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.	
2630	(Alligator Clips)
2631	(Minigator Clips)

QUANTITY DISC. CODE Ⓐ NET 3.75

BNC PLUG TO TEST CLIPS



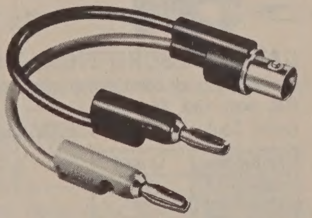
CONNECTOR: BNC plug.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Minigator or alligator, steel, cad. plated. Insulators, Vinyl: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.	
2885	(Alligator Clips)
2886	(Minigator Clips)

QUANTITY DISC. CODE Ⓐ NET 4.95

BNC RECEPTACLE TO STACKING BANANA PLUGS



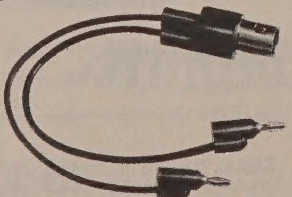
CONNECTOR: BNC receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 18 AWG.
STACKING BANANA PLUGS: Spring, one piece heat-treated beryllium copper, nickel plated: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
3073

QUANTITY DISC. CODE Ⓐ NET 3.85

BNC RECEPTACLE TO MINIATURE STACKING BANANA PLUGS



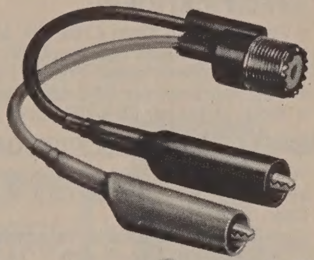
CONNECTOR: BNC receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 20 AWG.
MINIATURE STACKING BANANA PLUGS: For use with 2,64mm (.104) dia. jacks. Spring, one piece beryllium copper, gold plated: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
3966

QUANTITY DISC. CODE Ⓐ NET 4.50

UHF RECEPTACLE TO TEST CLIPS



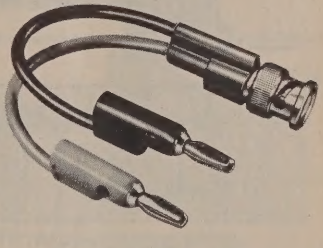
CONNECTOR: UHF receptacle jack.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above.
TEST CLIPS: Alligator, steel, cad. plated. Insulators, Vinyl: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
2632

QUANTITY DISC. CODE Ⓐ NET 5.45

BNC PLUG TO STACKING BANANA PLUGS



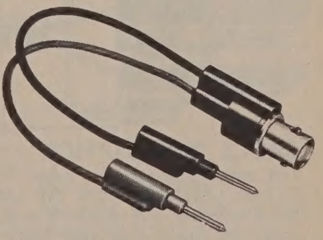
CONNECTOR: BNC plug.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 18 AWG.
STACKING BANANA PLUGS: Spring, one piece heat-treated beryllium copper, nickel plated: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
3957

QUANTITY DISC. CODE Ⓐ NET 4.95

BNC RECEPTACLE TO STACKING PIN TIP PLUGS



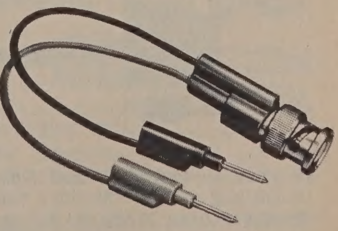
CONNECTOR: BNC receptacle, UG1094/U.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 20 AWG.
STACKING PIN TIP PLUGS: 2 single plugs, 2,03mm (.080) dia.: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
3221

QUANTITY DISC. CODE Ⓐ NET 3.85

BNC PLUG TO STACKING PIN TIP PLUGS



CONNECTOR: BNC plug.
INSULATION: Tough thermoplastic molded to connector and wire.
WIRE: See above, 20 AWG.
STACKING PIN TIP PLUGS: 2 single plugs, 2,03mm (.080) dia.: 1 black, 1 red.

OVERALL LENGTH 177,8mm (7")

Model No.
3901

QUANTITY DISC. CODE Ⓐ NET 4.95

All dimensions are shown millimeters (inches)

¾" DOUBLE BANANA PLUG PATCH CORDS

POMONA ELECTRONICS

These patch cords are indispensable for bridge transformer connections, three terminal capacitor measurements and general hook-up for two wire systems. They are horizontally and vertically stackable in parallel. Tough thermoplastic material molded to plug body and cable insures maximum strength, moisture resistance and excellent insulative properties. Used by leading industries in applications where extreme reliability is of prime importance.

FEATURES:

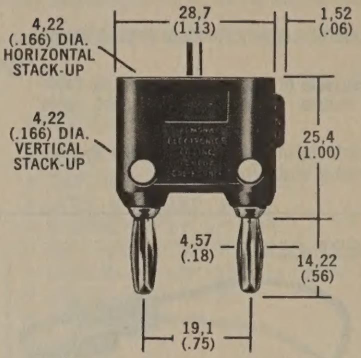
- One piece beryllium copper heat treated spring for long life.
- Rounded spring design results in maximum contact area.
- GND., clearly molded on plug body and shell.
- Solder-bonded noise-free connections.

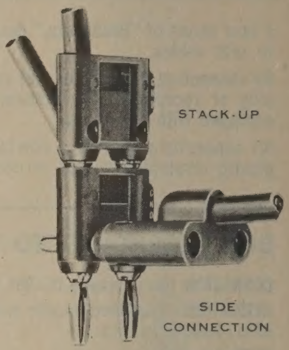
SPECIFICATIONS:

- Fits standard 4,22mm (.166) dia. banana jacks, on ¾" centers.
- Contact resistance less than 0.001 ohms per plug.
- Spring beryllium copper Brylco 25 per QQ-C-533.
- Plug body brass per QQ-B-626, alloy #360
- Nickel plated per QQ-N-290, Class 2.

CABLE TYPE DESCRIPTION

Two cond. twisted pair: 18 AWG, strand. 65 x 36 T.C. vinyl insulation. Vinyl jacket, 6,35mm (.250") O.D. Nom. Cap. 30 pf/ft.
Color: Gray.
Shielded microphone cable: Polyethylene insulation. Vinyl jacket, 4,95mm (.195") O.D. nom. cap 25 pf/ft.
Color: Gray.





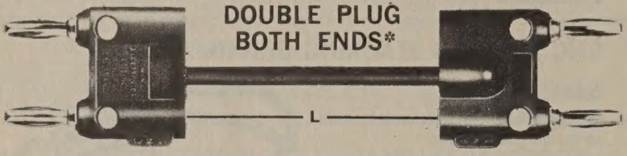
SHIELDED COAXIAL CABLE

Polyethylene insulation, vinyl jacket.

Types	RG58C/U	RG59B/U	RG62A/U
Color	Black	Black	Black
Nom. Imp.	50	75	93
Cap. pf/ft.	30	21	13.5
O.D.	4,93mm (.195)	6,15mm (.242)	6,15mm (.242)

NOTE: Molded double plug matches color of cable. Two cond. twisted pair, gray. Shielded mic. cable, gray. Coaxial RG58C/U cable, black.

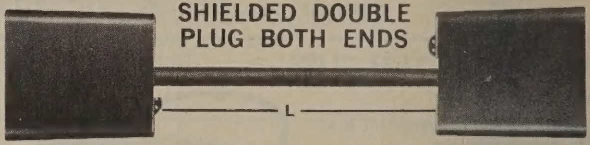
DOUBLE PLUG BOTH ENDS*



Two Cond. Twisted Pr.	Shielded Mic. Cable	RG58C/U	RG59B/U	Length
2BA-18	2BB-18	2BC-18	2BE-18	18"
2BA-24	2BB-24	2BC-24	2BE-24	24"
2BA-30	2BB-30	2BC-30	2BE-30	30"
2BA-36	2BB-36	2BC-36	2BE-36	36"
2BA-48	2BB-48	2BC-48	2BE-48	48"
2BA-60	2BB-60	2BC-60	2BE-60	60"

★QUANTITY DISC. CODE B **NET 5.95**

SHIELDED DOUBLE PLUG BOTH ENDS

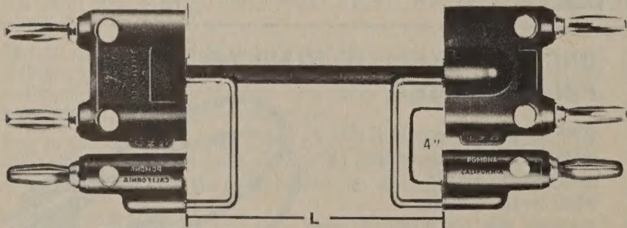


Shielded double plug — black anodized aluminum.

Model No.	Length
1550-C-18	18"
1550-C-24	24"
1550-C-30	30"
1550-C-36	36"
1550-C-48	48"
1550-C-60	60"

★QUANTITY DISC. CODE B **NET 12.85**

TWO COND. SHIELDED BALANCED LINE



CABLE DESCRIPTION

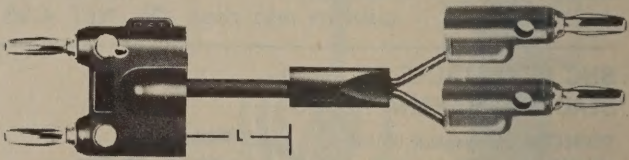
Two cond. shielded mic. cable. Polyethylene insulation. Vinyl jacket, 6,12mm (.241") O.D. nom. cap. between cond. 18 pf/ft. nom. cap. between one cond. and remaining cond. connected to shield, 32 pf/ft. Color: Cable and double plug, gray. Single ground plug, green.

Model No.	Length
1167-18	18"
1167-24	24"
1167-30	30"

Model No.	Length
1167-36	36"
1167-48	48"
1167-60	60"

★QUANTITY DISC. CODE B **NET 11.85**

DOUBLE PLUG TO SINGLE BANANA PLUGS



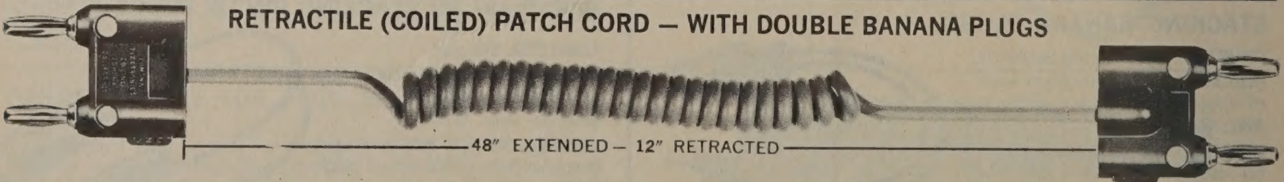
CABLE DESCRIPTION: TWO COND. TWISTED PAIR

18 AWG, strand. 65 x 36 T.C. vinyl insulation. Vinyl jacket, 6,35mm (.250") O.D. nom. cap. 30 pf/ft
Color: Double plug, gray. Single plugs: red, black.

Model No.	Length
1368-A-18	18"
1368-A-24	24"
1368-A-30	30"
1368-A-36	36"
1368-A-48	48"
1368-A-60	60"

★QUANTITY DISC. CODE B **NET 8.85**

RETRACTILE (COILED) PATCH CORD — WITH DOUBLE BANANA PLUGS



This one size cord can be used in place of many various lengths. Staking double plug on both ends with a shielded microphone cable.

DOUBLE BANANA PLUGS: On ¾" centers. Spring, one piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded to plug bodies and cable. Color: Black.

CABLE: Shielded microphone. Center conductor 24 AWG (45 x 40), rubber insulated Spiral T.C. shield with neoprene packet 4,06mm (.160) O.D. Color: Black.

Model No.
3864-48

QUANTITY DISC. CODE B **NET 9.85**

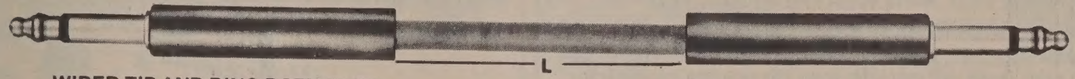
★Various lengths may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

PATCH CORDS & CABLE ASSEMBLIES

POMONA ELECTRONICS

PJ-051* PHONE PLUG BOTH ENDS



WIRED TIP AND RING BOTH ENDS

Cable Description:

Two cond. twisted pair. 18 AWG, strand. 65 x 36 T.C. vinyl insulation. Vinyl jacket 6,35mm (.250") O.D. nom. cap. 30 pf/ft. Color: Cable, gray. Phone plug handle, red.

Model No.	Length
2524-A-18	18"
2524-A-24	24"
2524-A-36	36"
2524-A-48	48"
2524-A-60	60"

*PJ-051 interchangeable with WE310.

★QUANTITY DISC. CODE B **NET 11.50**

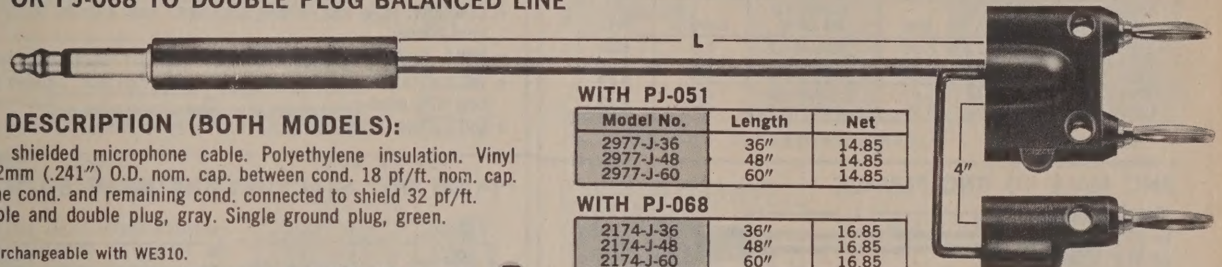
WIRED TIP, RING AND SLEEVE BOTH ENDS

Cable Description:
Two cond. shielded microphone cable. Polyethylene insulation. Vinyl jacket. 6,12mm (.241") O.D. nom. cap. between cond. 18 pf/ft. nom. cap. between one cond. and remaining cond. connected to shield, 32 pf/ft.
Color: Cable, gray. Phone plug handle, red.

Model No.	Length
2524-J-18	18"
2524-J-24	24"
2524-J-36	36"
2524-J-48	48"
2524-J-60	60"

★QUANTITY DISC. CODE B **NET 14.85**

PJ-051* OR PJ-068 TO DOUBLE PLUG BALANCED LINE



CABLE DESCRIPTION (BOTH MODELS):

Two cond. shielded microphone cable. Polyethylene insulation. Vinyl jacket, 6,12mm (.241") O.D. nom. cap. between cond. 18 pf/ft. nom. cap. between one cond. and remaining cond. connected to shield 32 pf/ft. Colors: Cable and double plug, gray. Single ground plug, green.

*PJ-051 interchangeable with WE310.

WITH PJ-051

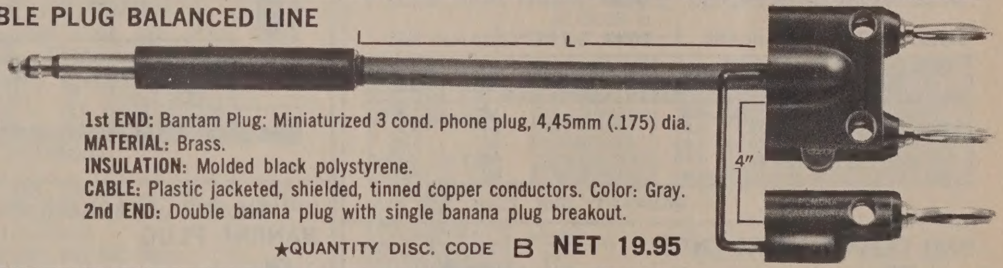
Model No.	Length	Net
2977-J-36	36"	14.85
2977-J-48	48"	14.85
2977-J-60	60"	14.85

WITH PJ-068

Model No.	Length	Net
2174-J-36	36"	16.85
2174-J-48	48"	16.85
2174-J-60	60"	16.85

★QUANTITY DISC. CODE B

BANTAM PLUG TO DOUBLE PLUG BALANCED LINE

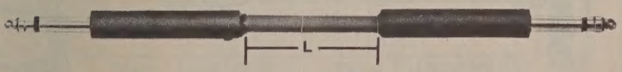


Model No.	Length
4281-12	12"
4281-24	24"
4281-36	36"
4281-48	48"
4281-60	60"

1st END: Bantam Plug: Miniaturized 3 cond. phone plug, 4,45mm (.175) dia.
MATERIAL: Brass.
INSULATION: Molded black polystyrene.
CABLE: Plastic jacketed, shielded, tinned copper conductors. Color: Gray.
2nd END: Double banana plug with single banana plug breakout.

★QUANTITY DISC. CODE B **NET 19.95**

BANTAM PLUG TO BANTAM PLUG

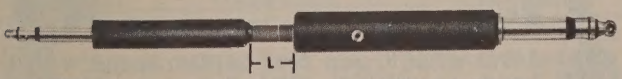


Miniaturized 3 cond. phone plug, 4,45mm (.175) dia. Both ends.
MATERIAL: Brass.
INSULATION: Molded black polystyrene.
CABLE: Plastic jacketed, shielded, tinned copper conductors. Color: Gray.

Model No.	Length	Model No.	Length
4279-12	12"	4279-48	48"
4279-24	24"	4279-60	60"
4279-36	36"		

★QUANTITY DISC. CODE B **NET 16.85**

BANTAM PLUG TO PJ-051

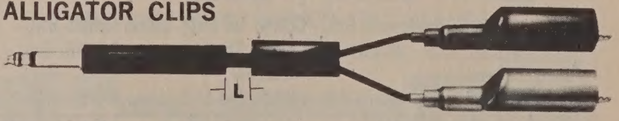


1st END: Miniaturized 3 cond. phone plug, 4,45mm (.175) dia.
MATERIAL: Brass.
INSULATION: Molded black polystyrene.
CABLE: Plastic jacketed, shielded, tinned copper conductors. Color: Gray.
2nd END: PJ-051 phone plug.

Model No.	Length	Model No.	Length
4280-12	12"	4280-48	48"
4280-24	24"	4280-60	60"
4280-36	36"		

★QUANTITY DISC. CODE B **NET 17.85**

PJ-051* PHONE PLUG TO ALLIGATOR CLIPS



Plug wired tip to red alligator and ring to black alligator.
PHONE PLUG: PJ-051 with red handle.
CLIPS: Alligator, steel, cadmium plated.
INSULATORS: Vinyl, 1 red and 1 black.

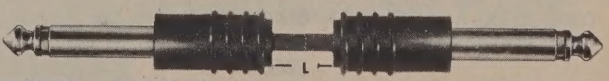
Model No.	Length	Net
3352-A-36	36"	11.50
3352-A-60	60"	11.50
3352-A-84	84"	13.50
3352-A-120	120"	14.85

CABLE DESCRIPTION:
Two cond. twisted pair. 18 AWG, strand. 65 x 36 T.C. vinyl insulation. Vinyl jacket 6,35mm (.250") O.D., nom. cap. 30 pf/ft. Color: Cable, grey.

*PJ-051 interchangeable with WE310.

★QUANTITY DISC. CODE B

STANDARD PHONE PLUG BOTH ENDS



STANDARD 2 CONDUCTOR PLUG: Tip and sleeve, brass, nickel plated.
INSULATION: Polypropylene molded directly to handle and cable.
CABLE: Shielded microphone coaxial, polyethylene insulation, gray vinyl jacket 4,93 mm (.195) O.D. nom. cap. 25 pf/ft. Color: Plug handle and cable, gray.

Model No.	Length	Model No.	Length
4053-B-12	12"	4053-B-48	48"
4053-B-24	24"	4053-B-60	60"
4053-B-36	36"		

★QUANTITY DISC. CODE B **NET 5.85**

★Various lengths may be aggregated for best quantity price.

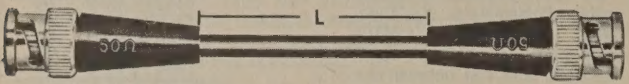
All dimensions are shown millimeters (inches)

BNC CABLE ASSEMBLIES & PATCH CORDS

POMONA ELECTRONICS

STRESS RELIEVED AND WEATHERPROOFED CRIMP BNC CABLE ASSEMBLIES

These new cable assemblies feature polyethylene collars which are molded directly onto cable jacket and connector body. The resulting encapsulation offers two outstanding advantages, stress protection against failure from excess bending, flexing, and twisting. Weatherproof seal between cable and connector. Connectors have non-tarnish finish and conform to MIL-C-39012.



CONN: 1st END Crimp male BNC
CABLE: Shielded coaxial, RG58C/U
CONN: 2nd END Crimp male BNC

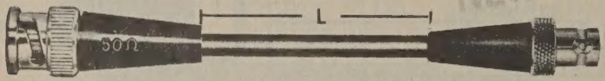
CONN: 1st END Crimp male BNC
CABLE: Shielded coaxial, RG59B/U or RG62A/U
CONN: 2nd END Crimp male BNC

RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
2249-C-12	2249-E-12	5.95	2249-M-12	12″	6.85
2249-C-24	2249-E-24	5.95	2249-M-24	24″	6.85
2249-C-36	2249-E-36	5.95	2249-M-36	36″	6.85
2249-C-48	2249-E-48	5.95	2249-M-48	48″	6.85
2249-C-60	2249-E-60	5.95	2249-M-60	60″	6.85

★QUANTITY DISC. CODE **B**

BNC MALE TO BNC FEMALE

NEW



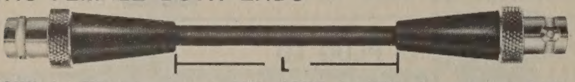
CONN: 1st END Crimp male BNC
CABLE: Shielded coaxial, RG58C/U
CONN: 2nd END Crimp male BNC

CONN: 1st END Crimp male BNC
CABLE: Shielded coaxial, RG59B/U or RG62A/U
CONN: 2nd END Crimp male BNC

RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
4524-C-12	4524-E-12	8.85	4524-M-12	12″	9.85
4524-C-24	4524-E-24	8.85	4524-M-24	24″	9.85
4524-C-36	4524-E-36	8.85	4524-M-36	36″	9.85
4524-C-48	4524-E-48	8.85	4524-M-48	48″	9.85
4524-C-60	4524-E-60	8.85	4524-M-60	60″	9.85

★QUANTITY DISC. CODE **B**

BNC FEMALE BOTH ENDS



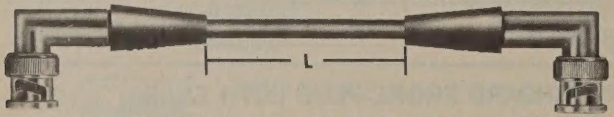
CONN: 1st END Crimp female BNC
CABLE: Shielded coax., RG58C/U
CONN: 2nd END Crimp female BNC

CONN: 1st END Crimp female BNC
CABLE: Shielded coax., RG59B/U or RG62A/U
CONN: 2nd END Crimp female BNC

RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
4277-C-12	4277-E-12	9.85	4277-M-12	12″	9.85
4277-C-24	4277-E-24	9.85	4277-M-24	24″	9.85
4277-C-36	4277-E-36	9.85	4277-M-36	36″	9.85
4277-C-48	4277-E-48	9.85	4277-M-48	48″	9.85
4277-C-60	4277-E-60	9.85	4277-M-60	60″	9.85

★QUANTITY DISC. CODE **B**

RIGHT ANGLE BNC MALE BOTH ENDS



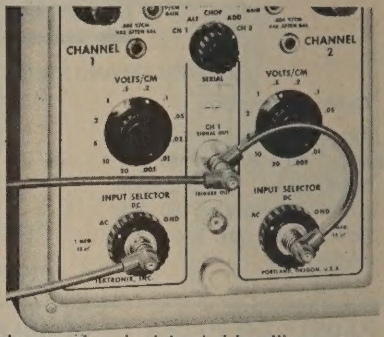
CONN: 1st END Crimp male BNC
CABLE: Shielded coax., RG58C/U
CONN: 2nd END Crimp male BNC

CONN: 1st END Crimp male BNC
CABLE: Shielded coax., RG59B/U or RG62A/U
CONN: 2nd END Crimp male BNC

RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
4276-C-12	4276-E-12	14.85	4276-M-12	12″	15.85
4276-C-24	4276-E-24	14.85	4276-M-24	24″	15.85
4276-C-36	4276-E-36	14.85	4276-M-36	36″	15.85
4276-C-48	4276-E-48	14.85	4276-M-48	48″	15.85
4276-C-60	4276-E-60	14.85	4276-M-60	60″	15.85

★QUANTITY DISC. CODE **B**

"PUSH ON" STACKING BNC PATCH CORDS

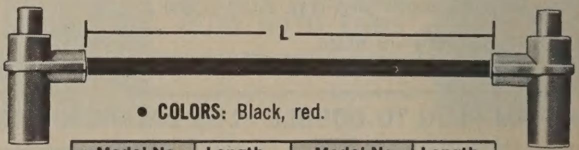


These multiple stacking patch cords connect the center conductors of BNC jacks having a common chassis. Excellent for use with instruments such as oscilloscopes. Stacking feature enables an endless number of connections to the same point.

FEATURES:

- **CONTACT:** Male and female, one piece heat treated beryllium copper, gold flashed.
- **WIRE:** 18 AWG, stranded 65 x 36 T.C., polyvinyl insulation.
- **INSULATION:** Tough thermoplastic, polypropylene, molded around contact and wire.
- **OPERATING TEMPERATURE:** −25°C to +125°C.

"PUSH ON" STACKING BNC MALE BOTH ENDS

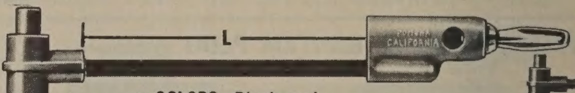


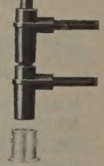
- **COLORS:** Black, red.

Model No.	Length	Model No.	Length
3201-4 *	4″	3201-24*	24″
3201-8 *	8″	3201-36*	36″
3201-12*	12″	3201-48*	48″
3201-18*	18″	3201-60*	60″

★QUANTITY DISC. CODE **B** **NET 3.50**

"PUSH ON" STACKING BNC MALE TO STACKING BANANA PLUG



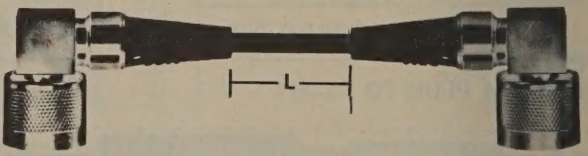


- **COLORS:** Black, red.

Model No.	Length	Model No.	Length
3202-4 *	4″	3202-24*	24″
3202-8 *	8″	3202-36*	36″
3202-12*	12″	3202-48*	48″
3202-18*	18″	3202-60*	60″

★QUANTITY DISC. CODE **B** **NET 2.50**

RIGHT ANGLE TYPE "N" MALE BOTH ENDS



CONN: 1st END Crimp type "N" conn.
CABLE: Shielded coax., RG58C/U
CONN: 2nd END Crimp type "N" conn.

CONN: 1st END Crimp type "N" conn.
CABLE: Shielded coax., RG59B/U or RG62A/U
CONN: 2nd END Crimp type "N" conn.

RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
4278-C-12	4278-E-12	24.95	4278-M-12	12″	25.85
4278-C-24	4278-E-24	24.95	4278-M-24	24″	25.85
4278-C-36	4278-E-36	24.95	4278-M-36	36″	25.85
4278-C-48	4278-E-48	24.95	4278-M-48	48″	25.85
4278-C-60	4278-E-60	24.95	4278-M-60	60″	25.85

★QUANTITY DISC. CODE **B**

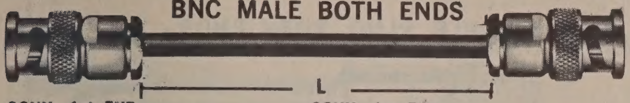
★Various lengths may be aggregated for best quantity price. Other lengths available to order.
°Consult factory for color code part numbers.

All dimensions are shown millimeters (inches)

BNC CABLE ASSEMBLIES & PATCH CORDS

POMONA
ELECTRONICS

BNC MALE BOTH ENDS



CONN: 1st END
M39012/16-0001 male BNC
CABLE:
Shielded coax., RG58C/U
CONN: 2nd END
M39012/16-0001 male BNC

CONN: 1st END
M39012/16-0002 male BNC
CABLE:
Shielded coax., RG59B/U or RG62A/U
CONN: 2nd END
M39012/16-0002 male BNC

Shielded Mic. Cable 50 Ohms	RG58C/U 50 Ohms	Net	RG59B/U 75 Ohms	RG62A/U 93 Ohms	Length	Net
BNC-B-18	BNC-C-18	6.85	BNC-E-18	BNC-M-18	18″	8.85
BNC-B-24	BNC-C-24	6.85	BNC-E-24	BNC-M-24	24″	8.85
BNC-B-30	BNC-C-30	6.85	BNC-E-30	BNC-M-30	30″	8.85
BNC-B-36	BNC-C-36	6.85	BNC-E-36	BNC-M-36	36″	8.85
BNC-B-48	BNC-C-48	6.85	BNC-E-48	BNC-M-48	48″	8.85
BNC-B-60	BNC-C-60	6.85	BNC-E-60	BNC-M-60	60″	8.85

★QUANTITY DISC. CODE B

"PUSH ON" BNC MALE BOTH ENDS

CONN: 1st END
Crimp "PUSH ON" BNC, male

CABLE:
Shielded coax., RG58C/U

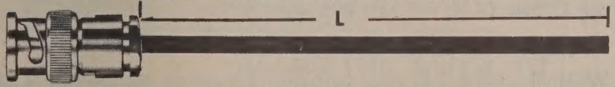
CONN: 2nd END
Crimp "PUSH ON" BNC, male

A test cable for rapid interconnection of equipment. Connector is pushed on and requires no twisting. Beryllium copper outer fingers maintain continuity of shield. Excellent for hard to get at places.

Model No.	Length
3199-C-12	12″
3199-C-24	24″
3199-C-36	36″
3199-C-48	48″
3199-C-60	60″

★QUANTITY DISC. CODE B NET 6.85

BNC MALE ONE END ONLY



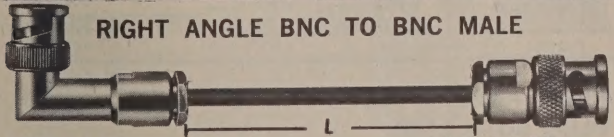
CONN: 1st END M39012/16-0001 male BNC
CABLE: Shielded coax., RG58C/U
CONN: 2nd END None

CONN: 1st END UG260B/U male BNC
CABLE: Shielded coax., RG59B/U or RG62A/U
CONN: 2nd END None

RG58C/U	Net	RG59B/U	RG62A/U	Length	Net
1661-C-12	3.95	1661-E-12	1661-M-12	12″	4.85
1661-C-24	3.95	1661-E-24	1661-M-24	24″	4.85
1661-C-36	3.95	1661-E-36	1661-M-36	36″	4.85
1661-C-48	3.95	1661-E-48	1661-M-48	48″	4.85
1661-C-60	3.95	1661-E-60	1661-M-60	60″	4.85

★QUANTITY DISC. CODE B

RIGHT ANGLE BNC TO BNC MALE



CONN: 1st END
UG913A/U, angle male BNC

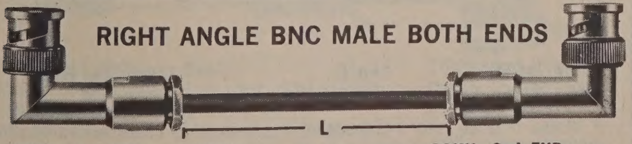
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
M39012/16-0001 male BNC

Model No.	Length	Model No.	Length
1383-C-18	18″	1383-C-36	36″
1383-C-24	24″	1383-C-48	48″
		1383-C-60	60″

★QUANTITY DISC. CODE B
NET 12.85

RIGHT ANGLE BNC MALE BOTH ENDS



CONN: 1st END
UG913A/U, angle male BNC

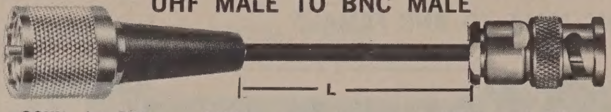
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
UG913A/U, angle male BNC

Model No.	Length	Model No.	Length
1155-C-18	18″	1155-C-36	36″
1155-C-24	24″	1155-C-48	48″
		1155-C-60	60″

★ QUANTITY DISC. CODE B
NET 14.50

UHF MALE TO BNC MALE



CONN: 1st END
Crimp UHF male

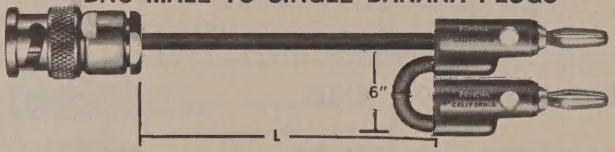
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
M39012/16-0001 male BNC

Model No.	Length	Model No.	Length
1367-C-18	18″	1367-C-36	36″
1367-C-24	24″	1367-C-48	48″
		1367-C-60	60″

★ QUANTITY DISC. CODE B
NET 6.95

BNC MALE TO SINGLE BANANA PLUGS



CONN: 1st END
M39012/16-0001 male BNC

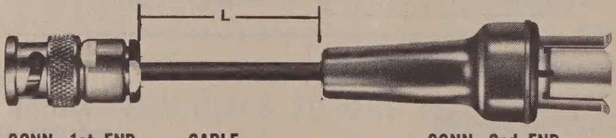
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Single banana plugs
Color: 1 black, 1 red

Model No.	Length
2241-C-18	18″
2241-C-24	24″
2241-C-36	36″
2241-C-48	48″

★QUANTITY DISC. CODE B
NET 7.50

BNC MALE TO GR-874



CONN: 1st END
M39012/16-0001 male BNC

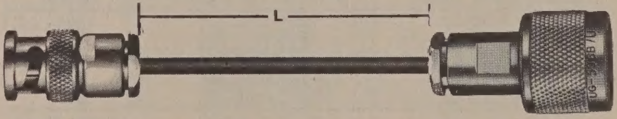
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
GR-874

Model No.	Length
1703-C-24	24″
1703-C-36	36″
1703-C-48	48″

★QUANTITY DISC. CODE D
NET 18.85

BNC MALE TO SERIES "N" MALE



CONN: 1st END
M39012/16-0001 male BNC

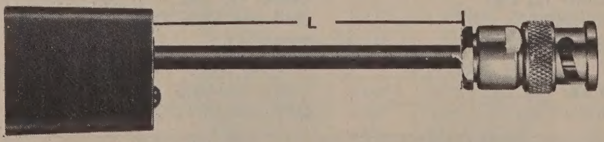
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
UG536B/U "N" male

Model No.	Length
1366-C-24	24″
1366-C-36	36″
1366-C-48	48″

★QUANTITY DISC. CODE B
NET 7.85

SHIELDED DOUBLE PLUG TO BNC MALE



CONN: 1st END
Shielded double plug, on ¾″ centers. Black anodized aluminum.

CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
UG88E/U, male BNC

Model No.	Length	Model No.	Length
1555-C-18	18″	1555-C-36	36″
1555-C-24	24″	1555-C-48	48″
1555-C-30	30″	1555-C-60	60″

★ QUANTITY DISC. CODE B
NET 11.85

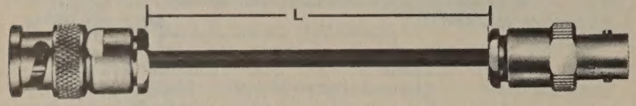
★Various lengths may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

CABLE ASSEMBLIES & PATCH CORDS

POMONA ELECTRONICS

BNC MALE TO BNC FEMALE



CONN: 1st END
M39012/16-0001 male BNC

CABLE:
Shielded coax., RG58C/U

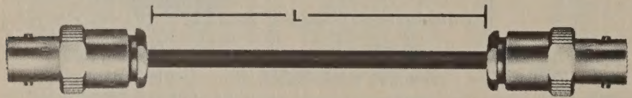
CONN: 2nd END
UG89C/U female BNC

Model No.	Length
2223-C-12	12″
2223-C-24	24″
2223-C-36	36″
2223-C-48	48″
2223-C-60	60″

★QUANTITY DISC. CODE B

NET 7.50

BNC FEMALE BOTH ENDS



CONN: 1st END
UG89C/U female BNC

CABLE:
Shielded coax., RG58C/U

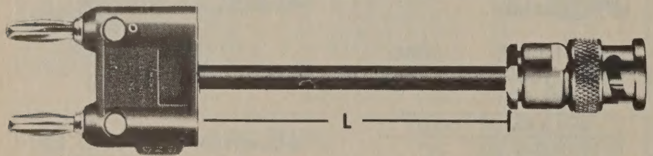
CONN: 2nd END
UG89C/U female BNC

Model No.	Length
1808-C-12	12″
1808-C-24	24″
1808-C-36	36″
1808-C-48	48″
1808-C-60	60″

★QUANTITY DISC. CODE B

NET 7.50

DOUBLE BANANA PLUG TO BNC MALE



CONN: 1st END
Double banana plug, on ¾″ centers

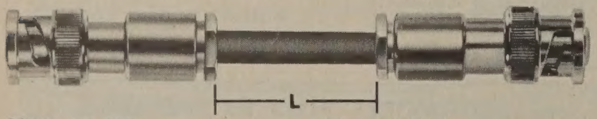
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
M39012/16-0001 male BNC

Shielded Mic. Cable	Shielded Coax. Cable	Length
2BB-BNC-18	2BC-BNC-18	18″
2BB-BNC-24	2BC-BNC-24	24″
2BB-BNC-30	2BC-BNC-30	30″
2BB-BNC-36	2BC-BNC-36	36″
2BB-BNC-48	2BC-BNC-48	48″
2BB-BNC-60	2BC-BNC-60	60″

★QUANTITY DISC. CODE B **NET 6.95**

MHV MALE BOTH ENDS



CONN: 1st END
MHV conn.

CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
MHV conn.

CONN: 1st END
MHV conn. UG932C/U

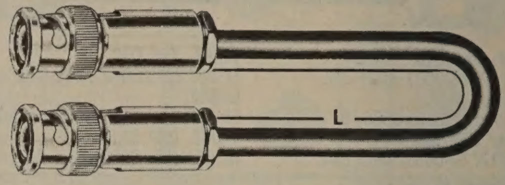
CABLE:
Shielded coax., RG59B/U or RG62A/U

CONN: 2nd END
MHV conn. UG932C/U

Shielded Mic. Cable 50 Ohm	RG58C/U 50 Ohm	RG59B/U 75 Ohm	Net	RG62A/U 93 Ohm	Length	Net
4175-B-18	4175-C-18	4175-E-18	19.95	4175-M-18	18″	20.95
4175-B-24	4175-C-24	4175-E-24	19.95	4175-M-24	24″	20.95
4175-B-30	4175-C-30	4175-E-30	19.95	4175-M-30	30″	20.95
4175-B-36	4175-C-36	4175-E-36	19.95	4175-M-36	36″	20.95
4175-B-48	4175-C-48	4175-E-48	19.95	4175-M-48	48″	20.95
4175-B-60	4175-C-60	4175-E-60	19.95	4175-M-60	60″	20.95

★QUANTITY DISC. CODE B

TWINAX CABLE PLUG BOTH ENDS



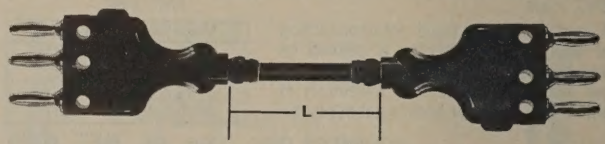
CABLE DESCRIPTION:

Belden 9272. Impedance, 78 ohm. 2 conductor shielded. Conductors, 20 AWG (7 x 28) with polyethylene insulation. Shield, tinned copper. Jacket, blue vinyl, 6,15mm (.242″) O.D. Capacitance, between conductors, 19 pf/ft.

Model No.	Length
3581-CC-18	18″
3581-CC-24	24″
3581-CC-36	36″
3581-CC-48	48″
3581-CC-60	60″

★QUANTITY DISC. CODE B **NET 22.95**

BALANCE LINE TRIPLE BANANA PLUG BOTH ENDS



Patch cord for special application. Will fit many European banana jacks. Ideal for balanced line. Spacing between triple banana plugs, 9,0mm (.355) and 11,9mm (.470) will mate with Model 4163.

1st END — Triple Banana Plug:

MATERIAL: Spring, one piece heat treated beryllium copper, berylco 25 per QQ-C-533. Plug body, brass per QQ-B-626, alloy #360.

FINISH: Nickel plated.

INSULATION: Polyethylene thermoplastic. Color: Black.

CABLE: Two conductor shielded microphone. 22 AWG, stranding 19 x 34 T.C. Color: Gray.

2nd END — Same as first.

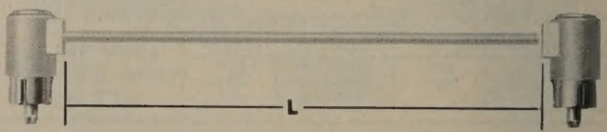
Model No.	Length	Model No.	Length
4428-18	18″	4428-36	36″
4428-24	24″	4428-48	48″
		4428-60	60″

★QUANTITY DISC. CODE B

NET 24.95

RIGHT ANGLE MOLDED PHONO PLUG BOTH ENDS

NEW



CONN: 1st END
Phono plug

CABLE:
Shielded mic.

CONN: 2nd END
Phono Plug

A stress relieved and weatherproofed phono plug cable assembly. The molded boot is molded directly to the cable and connector.

Model No.	Length	Model No.	Length
4430-18	18″	4430-36	36″
4430-24	24″	4430-48	48″
		4430-60	60″

★QUANTITY DISC. CODE B **NET 3.75**

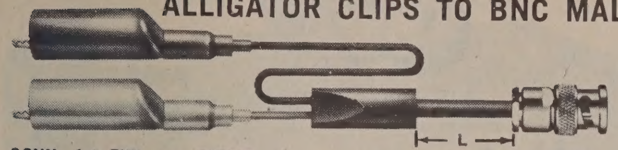
★Various lengths may be aggregated for best quantity price. Other lengths available to order.

All dimensions are shown millimeters (inches)

PATCH CORDS & CABLE ASSEMBLIES

POMONA ELECTRONICS

ALLIGATOR CLIPS TO BNC MALE



CONN: 1st END
Alligator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

CABLE:
Shielded mic. or
Shielded coax., RG58C/U

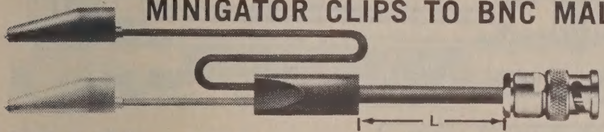
CONN: 2nd END
M39012/16-0001
BNC, male

Shielded Mic. Cable	Shielded Coax. Cable	Length
AL-B-BNC-18	AL-C-BNC-18	18″
AL-B-BNC-24	AL-C-BNC-24	24″
AL-B-BNC-30	AL-C-BNC-30	30″
AL-B-BNC-36	AL-C-BNC-36	36″
AL-B-BNC-48	AL-C-BNC-48	48″
AL-B-BNC-60	AL-C-BNC-60	60″

★QUANTITY DISC. CODE B

NET 6.85

MINIGATOR CLIPS TO BNC MALE



CONN: 1st END
Minigator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

CABLE:
Shielded mic. or
Shielded coax., RG58C/U

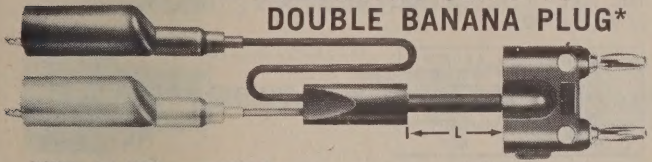
CONN: 2nd END
M39012/16-0001
BNC, male

Shielded Mic. Cable	Shielded Coax. Cable	Length
MG-B-BNC-18	MG-C-BNC-18	18″
MG-B-BNC-24	MG-C-BNC-24	24″
MG-B-BNC-30	MG-C-BNC-30	30″
MG-B-BNC-36	MG-C-BNC-36	36″
MG-B-BNC-48	MG-C-BNC-48	48″
MG-B-BNC-60	MG-B-BNC-60	60″

★QUANTITY DISC. CODE B

NET 6.85

ALLIGATOR CLIPS TO DOUBLE BANANA PLUG*



CONN: 1st END
Alligator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

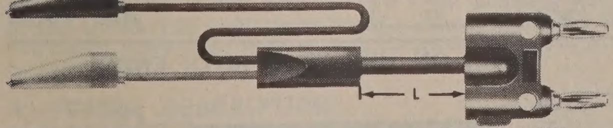
CABLE:
Two cond. twisted pair,
shielded mic. or
shielded coax., RG58C/U

CONN: 2nd END
Double banana plug,
on ¾″ centers

★QUANTITY DISC. CODE B NET 6.95

Two Cond. Twisted Pair	Shielded Mic. Cable	Shielded Coax. Cable	Length
2BA-AL-18	2BB-AL-18	2BC-AL-18	18″
2BA-AL-24	2BB-AL-24	2BC-AL-24	24″
2BA-AL-30	2BB-AL-30	2BC-AL-30	30″
2BA-AL-36	2BB-AL-36	2BC-AL-36	36″
2BA-AL-48	2BB-AL-48	2BC-AL-48	48″
2BA-AL-60	2BB-AL-60	2BC-AL-60	60″

MINIGATOR CLIPS TO DOUBLE BANANA PLUG*



CONN: 1st END
Minigator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

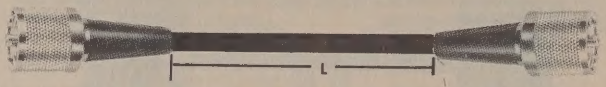
CABLE:
Two cond. twisted pair,
shielded mic. or
shielded coax., RG58C/U

CONN: 2nd END
Double banana plug,
on ¾″ centers

★QUANTITY DISC. CODE B NET 6.95

Two Cond. Twisted Pair	Shielded Mic. Cable	Shielded Coax. Cable	Length
2BA-MG-18	2BB-MG-18	2BC-MG-18	18″
2BA-MG-24	2BB-MG-24	2BC-MG-24	24″
2BA-MG-30	2BB-MG-30	2BC-MG-30	30″
2BA-MG-36	2BB-MG-36	2BC-MG-36	36″
2BA-MG-48	2BB-MG-48	2BC-MG-48	48″
2BA-MG-60	2BB-MG-60	2BC-MG-60	60″

UHF MALE BOTH ENDS



CONN: 1st END
Crimp UHF, male

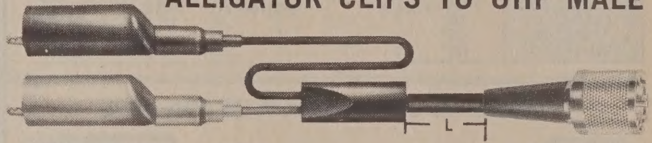
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Crimp UHF, male

Model No.	Length	Model No.	Length
UHF-C-18	18″	UHF-C-36	36″
UHF-C-24	24″	UHF-C-48	48″
		UHF-C-60	60″

★QUANTITY DISC. CODE B NET 7.85

ALLIGATOR CLIPS TO UHF MALE



CONN: 1st END
Alligator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

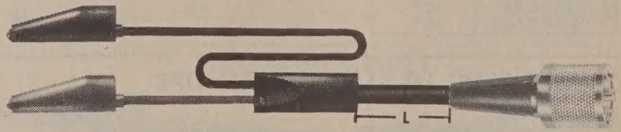
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Crimp UHF, male

Model No.	Length	Model No.	Length
AL-C-UHF-18	18″	AL-C-UHF-36	36″
AL-C-UHF-24	24″	AL-C-UHF-48	48″
		AL-C-UHF-60	60″

★QUANTITY DISC. CODE B NET 7.85

MINIGATOR CLIPS TO UHF MALE



CONN: 1st END
Minigator clips, steel, cadmium plated.
Insulators, vinyl:
Black-red

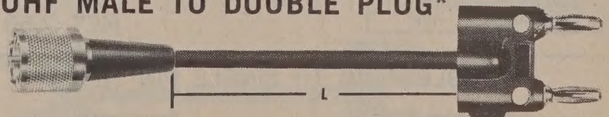
CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Crimp UHF, male

Model No.	Length	Model No.	Length
MG-C-UHF-18	18″	MG-C-UHF-36	36″
MG-C-UHF-24	24″	MG-C-UHF-48	48″
		MG-C-UHF-60	60″

★QUANTITY DISC. CODE B NET 7.85

UHF MALE TO DOUBLE PLUG*



CONN: 1st END
Crimp UHF, male

CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Double banana plug,
on ¾″ centers

Model No.	Length	Model No.	Length
2BC-UHF-18	18″	2BC-UHF-36	36″
2BC-UHF-24	24″	2BC-UHF-48	48″
		2BC-UHF-60	60″

★QUANTITY DISC. CODE B NET 6.95

***NOTE:** Molded double plug matches color of cable. Two cond. twisted pair, gray. Shielded mic. cable, gray. Coaxial RG58C/U cable, black.

1. Other cable colors available to order on the two cond. twisted pair and shielded mic. cable models, with plug to match.
   COLORS: Black, brown, red, orange, yellow, green, blue, violet, gray, white.
2. Other lengths and cable types available to order.

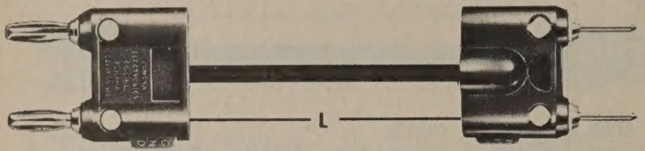
★Various lengths may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

PATCH CORDS & CABLE ASSEMBLIES

POMONA ELECTRONICS

DOUBLE BANANA PLUG TO DOUBLE PIN TIP PLUG



CONN: 1st END
Double banana plug, on ¾″ centers

CABLE:
Shielded coax., RG58C/U

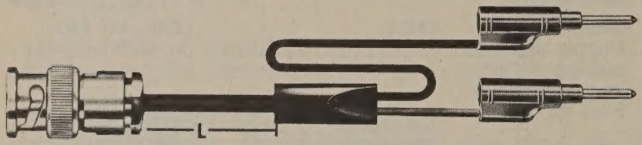
CONN: 2nd END
Double pin tip plug, 2,03mm (.080) dia. on ¾″ centers

Model No.	Length
2288-C-18	18″
2288-C-24	24″
2288-C-36	36″
2288-C-48	48″
2288-C-60	60″

★QUANTITY DISC. CODE B

NET 6.95

BNC MALE TO STACK-UP PIN TIPS



CONN: 1st END
BNC, male
M39012/16-0001

CABLE:
Shielded coax., RG58C/U

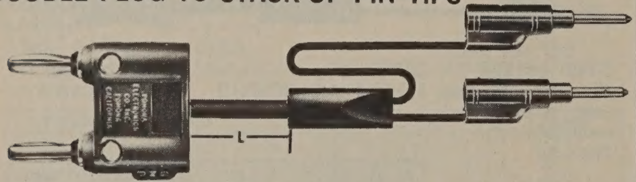
CONN: 2nd END
Single stack-up pin tip plugs, 2,03mm (.080) dia.
Color: 1 black, 1 red

Model No.	Length
2882-C-18	18″
2882-C-24	24″
2882-C-36	36″
2882-C-48	48″
2882-C-60	60″

★QUANTITY DISC. CODE B

NET 7.50

DOUBLE PLUG TO STACK-UP PIN TIPS



CONN: 1st END
Double banana plug, on ¾″ centers

CABLE:
Shielded coax., RG58C/U

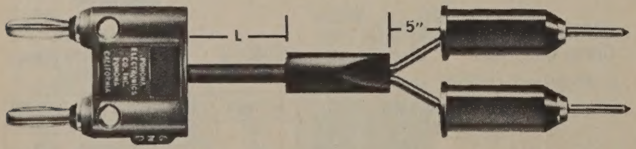
CONN: 2nd END
Single stack-up pin tip plugs, 2,03mm (.080) dia.
Color: 1 black, 1 red

Model No.	Length
2BC-PP-18	18″
2BC-PP-24	24″
2BC-PP-36	36″
2BC-PP-48	48″
2BC-PP-60	60″

★QUANTITY DISC. CODE B

NET 7.50

DOUBLE PLUG TO SINGLE PIN TIPS



CONN: 1st END
Double banana plug, on ¾″ centers

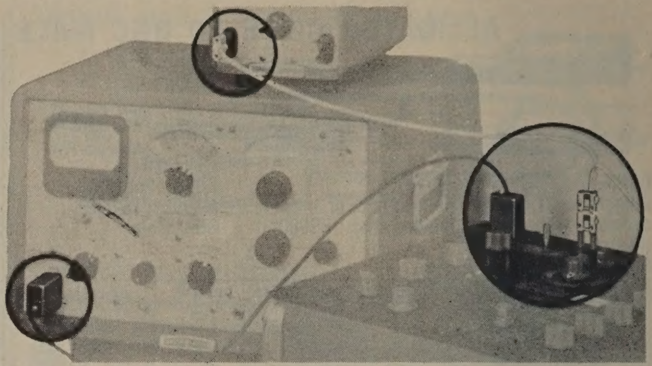
CABLE:
Two cond. twisted pair

CONN: 2nd END
Single pin tip plugs, 2,03mm (.080) dia.
Color: 1 black, 1 red

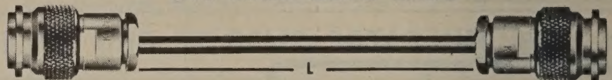
Model No.	Length
2184-A-24	24″
2184-A-36	36″
2184-A-48	48″
2184-A-60	60″

★QUANTITY DISC. CODE B

NET 7.85



TNC MALE BOTH ENDS



CONN: 1st END
Male TNC

CABLE:
Shielded coax., RG58C/U

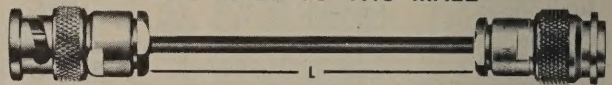
CONN: 2nd END
Male TNC

Model No.	Length
1944-C-12	12″
1944-C-24	24″
1944-C-36	36″
1944-C-48	48″
1944-C-60	60″

★QUANTITY DISC. CODE B

NET 9.85

BNC MALE TO TNC MALE



CONN: 1st END
BNC, male
M39012/16-0001

CABLE:
Shielded coax., RG58C/U

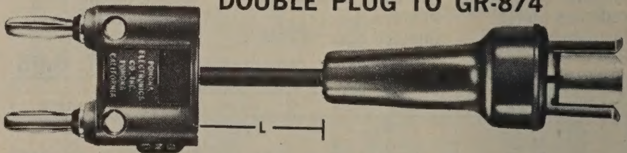
CONN: 2nd END
Male TNC

Model No.	Length
1948-C-12	12″
1948-C-24	24″
1948-C-36	36″
1948-C-48	48″
1948-C-60	60″

★QUANTITY DISC. CODE B

NET 8.85

DOUBLE PLUG TO GR-874



CONN: 1st END
Double banana plug, on ¾″ centers

CABLE:
Shielded coax., RG58C/U

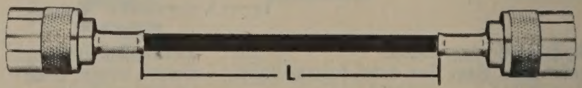
CONN: 2nd END
GR-874

Model No.	Length
2243-C-24	24″
2243-C-36	36″
2243-C-48	48″

★QUANTITY DISC. CODE D

NET 19.95

PUSH ON UHF MALE BOTH ENDS



CONN: 1st END
Crimp push on UHF, male

CABLE:
Shielded coax., RG58C/U

CONN: 2nd END
Crimp push on UHF, male

Model No.	Length
3137-C-12	12″
3137-C-24	24″
3137-C-36	36″
3137-C-48	48″
3137-C-60	60″

★QUANTITY DISC. CODE B

NET 9.85

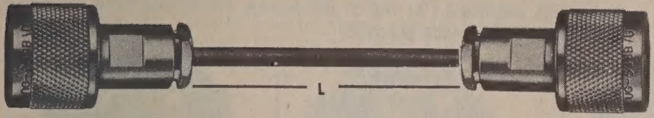
★Various lengths may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

PATCH CORDS & CABLE ASSEMBLIES

POMONA ELECTRONICS

SERIES "N" MALE BOTH ENDS



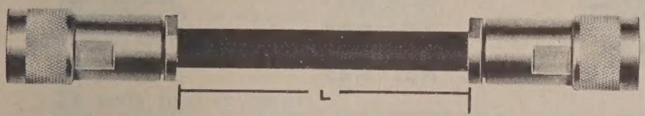
CONN: 1st END	CABLE:	CONN: 2nd END
UG536B/U "N" male	Shielded coax., RG58C/U	UG536B/U "N" male

Model No.	Length
2256-C-24	24"
2256-C-36	36"
2256-C-48	48"
2256-C-60	60"

★QUANTITY DISC. CODE B

NET 9.85

SERIES "N" MALE BOTH ENDS

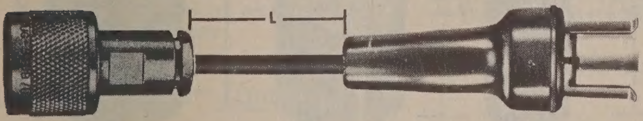


CONN: 1st END	CABLE:	CONN: 2nd END
UG21E/U "N" male	Coax., RG213/U or RG214/U	UG21E/U "N" male

RG213/U	Net	Length	RG214/U	Net
1658-S-18	12.50	18"	1658-T-18	16.85
1658-S-24	12.50	24"	1658-T-24	16.85
1658-S-36	12.50	36"	1658-T-36	16.85
1658-S-48	13.25	48"	1658-T-48	18.60
1658-S-60	14.00	60"	1658-T-60	20.35

★QUANTITY DISC. CODE B

SERIES "N" MALE TO GR-874



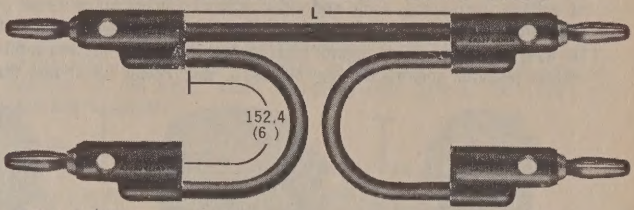
CONN: 1st END	CABLE:	CONN: 2nd END
UG536B/U "N" male	Shielded coax., RG58C/U	GR-874

Model No.	Length
2438-C-24	24"
2438-C-36	36"
2438-C-48	48"
2438-C-60	60"

★QUANTITY DISC. CODE D

NET 20.95

SINGLE BANANA PLUGS BOTH ENDS



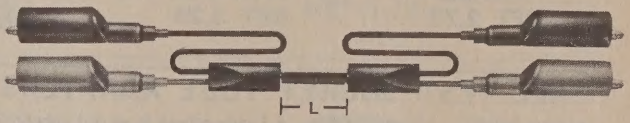
CONN: 1st END	CABLE:	CONN: 2nd END
Single banana plugs. Colors: Inner conductor plug, red. Ground plug, black.	Shielded coax., RG122/U	Single banana plugs. Colors: Inner conductor plug, red. Ground plug, black.

Model No.	Length
2239-R-24	24"
2239-R-36	36"
2239-R-48	48"
2239-R-60	60"

★QUANTITY DISC. CODE B

NET 7.85

ALLIGATOR CLIPS BOTH ENDS



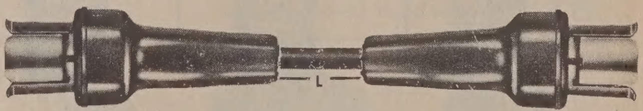
CONN: 1st END	CABLE:	CONN: 2nd END
Alligator clips, steel, cad. plated. Insulators, vinyl: Black-red.	Shielded coax., RG58C/U	Alligator clips, steel, cad. plated. Insulators, vinyl: Black-red.

Model No.	Length
1152-C-12	12"
1152-C-24	24"
1152-C-36	36"
1152-C-48	48"
1152-C-60	60"

★QUANTITY DISC. CODE B

NET 7.50

GR-874 TO GR-874



CONN: 1st END	CABLE:	CONN: 2nd END
GR-874	Shielded coax., RG58C/U	GR-874

Model No.	Length
2316-C-24	24"
2316-C-36	36"
2316-C-48	48"
2316-C-60	60"

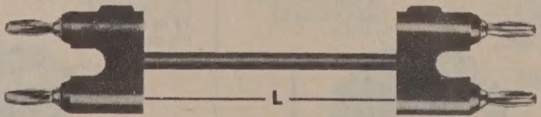
★QUANTITY DISC. CODE D

NET 34.50

NON-STACKING DOUBLE PLUG BOTH ENDS

This non-stacking cable is excellent for those applications requiring no exposed metal when inserted. There is no side or top stacking.

DOUBLE BANANA PLUG: On ¾" center. Spring, one-piece beryllium copper, heat treated, nickel plated. Tough thermoplastic molded onto double plug body and cable.



A — CABLE DESCRIPTION:

Two cond. twisted pair, 18 AWG, strand. 65 x 36 T.C. vinyl insulation, vinyl jacket, 6,35mm (.250") O.D., nom. cap. 30 pf/ft.

COLOR: Cable and double plug, gray.

Model No.	Length
4059-A-12	12"
4059-A-24	24"
4059-A-36	36"
4059-A-48	48"
4059-A-60	60"

C — CABLE DESCRIPTION:

Shielded coaxial, RG58C/U, polyethylene insulation, vinyl jacket, 4,95mm (.195") O.D., nom. cap. 30 pf/ft.

COLOR: Cable and double plug, black.

Model No.	Length
4059-C-12	12"
4059-C-24	24"
4059-C-36	36"
4059-C-48	48"
4059-C-60	60"

E — CABLE DESCRIPTION

Shielded coaxial, RG59B/U, polyethylene insulation, vinyl jacket, 6,15mm (.242) O.D., nom. cap. 21 pf/ft.

COLOR: Cable and double plug, black.

Model No.	Length
4059-E-12	12"
4059-E-24	24"
4059-E-36	36"
4059-E-48	48"
4059-E-60	60"

★QUANTITY DISC. CODE B NET 6.85

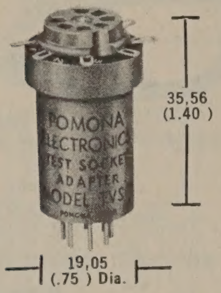
★Various lengths may be aggregated for best quantity price.

All dimensions are shown millimeters (inches)

TUBE TEST SOCKET ADAPTERS & HOLDER

POMONA
ELECTRONICS

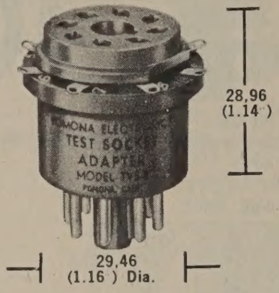
Pomona test socket tube adapters are ideal for making measurements of voltage, resistance, audio and video without tracing complicated circuits from the bottom of the chassis. They feature: Extended test tabs for easy use with either alligator clips or test prods; low loss mica-filled molded phenolic construction per MIL-M-14, MFE. Power factor less than 0.010 at 10 MHz; high insulation resistance, the I.R. exceeds 500,000 megohms at 40% R.H., at 24°C; distributed capacity, inter-element approximately 1 pico farad; high voltage operation, voltage breakdown elements exceeds 1,700 VAC or DC. Models TVS-12 and 1779 molded of electrical grade black phenolic.


35,56
(1.40)
19,05
(.75) Dia.

Model No.
TVS-7

7 PIN MIN.

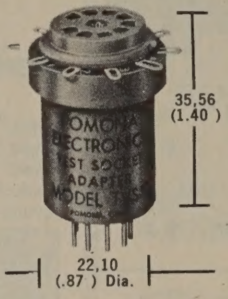
NET 2.75


28,96
(1.14)
29,46
(1.16) Dia.

Model No.
TVS-8

8 PIN OCTAL

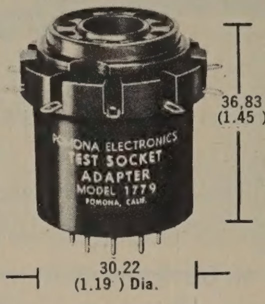
NET 3.25


35,56
(1.40)
22,10
(.87) Dia.

Model No.
TVS-9

9 PIN MIN.

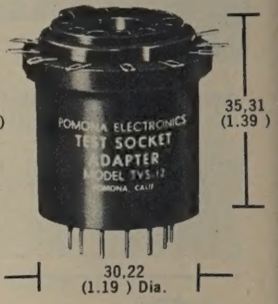
NET 2.95


36,83
(1.45)
30,22
(1.19) Dia.

Model No.
1779

9 PIN NOVAR

NET 3.25


35,31
(1.39)
30,22
(1.19) Dia.

Model No.
TVS-12

12 PIN COMPACTRON

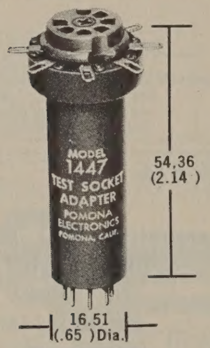
NET 3.85

QUANTITY DISC. CODE **C**

TALL TEST SOCKET TUBE ADAPTERS For sockets having captive or telescoping tube shields

- Extra height — clears shields.
- Ready access to socket connections.
- Exposed operation saves time.
- Pins .040 dia.

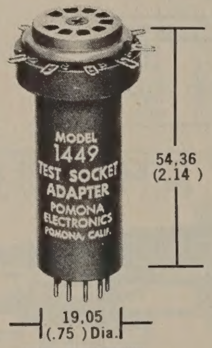
These adapters rise above the shield and place testing in the open. Shields or tuner covers do not have to be removed. All construction is the highest quality. Inter-element distributed capacity is approximately 1.5 pico farad. Voltage breakdown elements exceed 1800 VAC or DC.


MODEL 1447 TEST SOCKET ADAPTER POMONA ELECTRONICS POMONA, CALIF.
54,36
(2.14)
16,51
(.65)Dia.

Model No.
1447

7 PIN MIN.

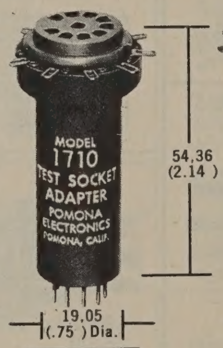
NET 2.75


MODEL 1449 TEST SOCKET ADAPTER POMONA ELECTRONICS POMONA, CALIF.
54,36
(2.14)
19,05
(.75)Dia.

Model No.
1449

9 PIN MIN.

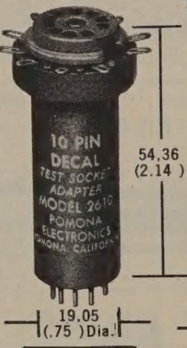
NET 2.95


MODEL 1710 TEST SOCKET ADAPTER POMONA ELECTRONICS POMONA, CALIF.
54,36
(2.14)
19,05
(.75)Dia.

Model No.
1710

10 PIN MIN.

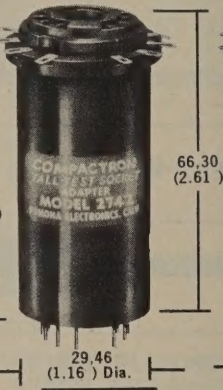
NET 3.85


10 PIN DECAL TEST SOCKET ADAPTER MODEL 2610 POMONA ELECTRONICS POMONA, CALIFORNIA
54,36
(2.14)
19,05
(.75)Dia.

Model No.
2610

10 PIN DECAL

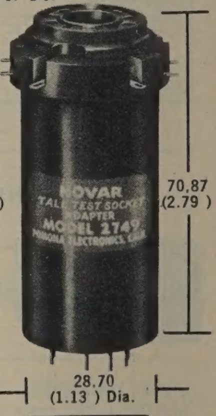
NET 3.85


COMPACTRON TALL TEST SOCKET ADAPTER MODEL 2742 POMONA ELECTRONICS, CALIF.
66,30
(2.61)
29,46
(1.16) Dia.

Model No.
2742

12 PIN COMPACTRON

NET 4.75


NOVAR TALL TEST SOCKET ADAPTER MODEL 2749 POMONA ELECTRONICS, CALIF.
70,87
(2.79)
28,70
(1.13) Dia.

Model No.
2749

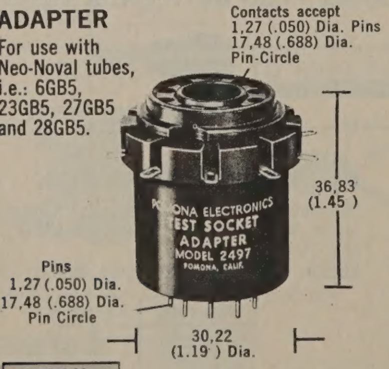
9 PIN NOVAR

NET 4.25

QUANTITY DISC. CODE **C**

MAGNOVAL TEST ADAPTER

For use with Neo-Noval tubes, i.e.: 6GB5, 23GB5, 27GB5 and 28GB5.

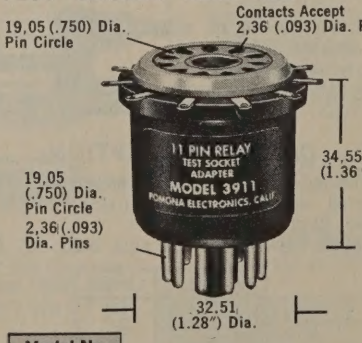

Contacts accept
1,27 (.050) Dia. Pins
17,48 (.688) Dia.
Pin-Circle
POMONA ELECTRONICS TEST SOCKET ADAPTER MODEL 2497 POMONA, CALIF.
36,83
(1.45)
Pins
1,27 (.050) Dia.
17,48 (.688) Dia.
Pin Circle
30,22
(1.19) Dia.

Model No.
2497

9 PIN MAGNOVAL

QUANTITY DISC. CODE **C** **NET 3.50**

11 PIN RELAY TEST SOCKET ADAPTER


19,05 (.750) Dia.
Pin Circle
Contacts Accept
2,36 (.093) Dia. Pin
11 PIN RELAY TEST SOCKET ADAPTER MODEL 3911 POMONA ELECTRONICS, CALIF.
34,55
(1.36)
19,05
(.750) Dia.
Pin Circle
2,36 (.093)
Dia. Pins
32,51
(1.28") Dia.

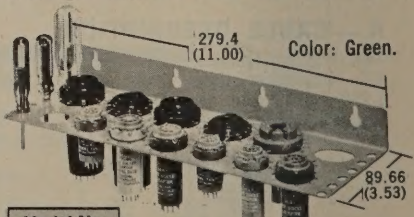
Model No.
3911

QUANTITY DISC. CODE **C** **NET 17.50**

TEST SOCKET ADAPTER HOLDER

The holder accepts up to seven socket adapters of ⅞" in diameter or less, and six adapters of 1$\frac{5}{32}$" in diameter or less. Holes at both ends of the rack accommodate 12 service tools. Mounting holes are provided for easy installation on any vertical surface. Fabricated from cold rolled steel with baked enamel finish.

Color: Green.


279.4
(11.00)
89.66
(3.53)

Model No.
2898

QUANTITY DISC. CODE **A** **NET 3.85**

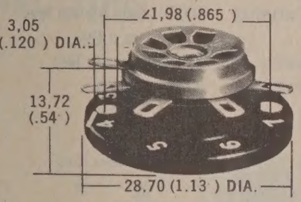
All dimensions are shown millimeters (inches)

BREADBOARD SOCKETS—RELAY SOCKETS & SOCKETS SAVERS® ADAPTERS

POMONA ELECTRONICS

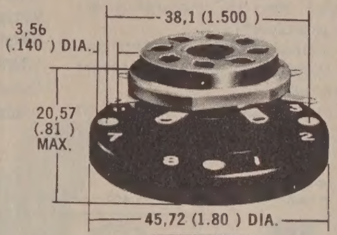
SURFACE MOUNTED BREADBOARD SOCKETS

Surface mounted breadboard sockets are ideal for experimental circuit design, portable and enclosed units, plug-in and packaged assemblies. They feature: An insulated base to prevent connections from shorting to chassis; elimination of double chassis design; circuits may be wired in an enclosed unit; base connections are numbered for easy identification; grade-A phosphor bronze spring contacts; standard center to center mounting holes. For ease of installation the 7 and 9 pin miniatures may be mounted either in the center or on the sides, the 8 pin octal is mounted on the sides; small mounting holes permits the re-use of experimental chassis.



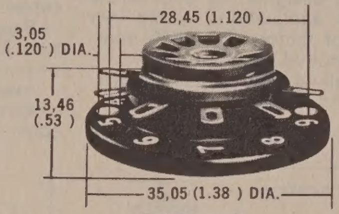
Model No.
XS-7

7 PIN MINIATURE
(600 VRMS)
NET .90



Model No.
XS-8

8 PIN OCTAL
(600 VRMS
AT 10 AMPS)
NET 1.50



Model No.
XS-9

9 PIN MINIATURE
(600 VRMS)
NET 1.10

QUANTITY DISC. CODE Ⓒ

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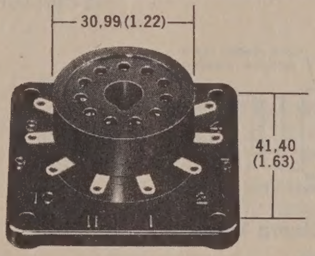
11 CONTACT RELAY SOCKET

Ideal for use in Industrial Control equipment requiring a rugged compact 11 contact configuration.

FEATURES:

- Simplified above chassis mounting.
- Socket and base molded of melamine-phenolic, electrical, per MIL-M-14 Type CMG.
- Socket connections numbered for easy identification.
- Socket may be gang mounted.
- Heat treated beryllium copper contacts.
- 600 VRMS at 10 amps.
- Contacts accept 2,36mm (.093) dia. pins.
- Height 22,35mm (.88).
- 50,8mm (2.00) square base.
- Mounting holes 41,40mm (1.63) center to center. Dia. 3,81mm (.150).
- 19,05mm (.750) pin circle dia.
- Contact tab holes 1,98mm (.078 dia.).



Model No.
2811

QUANTITY DISC. CODE Ⓐ **NET 3.85**

SOCKET SAVER® ADAPTERS

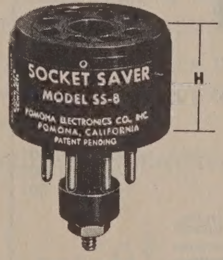
The Socket Saver® Adapter is designed to be installed on tube checkers and other electronic equipment to prevent wear and tear of sockets on original equipment. They are easy to install and remove. This eliminates the necessity of replacing and rewiring sockets on original equipment. Built of quality materials. Beryllium copper long life contacts to give maximum service.

Model No.	Type	Size H	Net
SS-7	7 Pin Miniature	20,57mm (.81)	2.50
SS-8	8 Pin Octal	20,57mm (.81)	4.50
SS-9	9 Pin Miniature	20,57mm (.81)	2.85
SS-11	11 Pin Octal	34,29mm (1.35)	8.50
SS-12	12 Pin Compactron	20,57mm (.81)	3.50
1451	9 Pin Magnoval	22,35mm (.88)	3.25
1751	9 Pin Novar	20,57mm (.81)	3.25

U.S. Pat. No. 2952003

SOCKET SAVER
MODEL SS-7
H

Model No.
SS-7



Model No.
SS-8

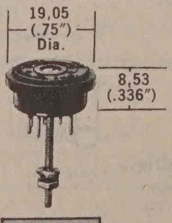
SOCKET SAVER
MODEL SS-9
H

Model No.
SS-9

QUANTITY DISC. CODE Ⓒ

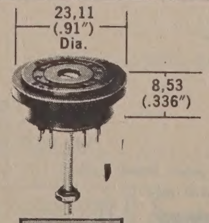
MINIATURIZED SOCKET SAVER® ADAPTERS

For use in applications where vertical height is restricted. Contacts made of beryllium copper, heat treated. Models 1847 and 1849 closed entry receptacles, contact and pin one piece formed beryllium copper, molded of black phenolic electrical grade.



Model No.
1847

7 PIN MINIATURE
NET 2.50



Model No.
1849

9 PIN MINIATURE
NET 2.85

QUANTITY
DISC. CODE
Ⓒ

All dimensions are shown millimeters (inches)

JOHNSON®

E. F. JOHNSON COMPANY, WASECA, MINNESOTA 56093

Connectors

COAXIAL CONNECTORS

The JCM is a miniature (3mm) connector that is fully compatible with SMA types, at a fraction of SMA prices.

The JCM is designed for commercial and industrial applications where low cost is a major factor, and SMA compatibility is required.

The non-galling gold finish is resistant to wear and abrasion.

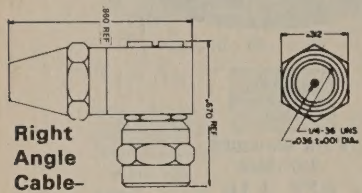
Cable clamp JCM plugs and jacks consist of 5 or fewer parts which are easily assembled. Only one set of stripping dimensions is required for all cables from 0.075 to 0.216" overall diameter. Panel, bulkhead, and PC mounting receptacles are preassembled.

Beryllium copper center contacts assure superior spring qualities and lowest contact resistance.

Available on special order basis with nickel plating for especially cost conscious applications.

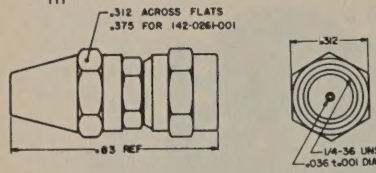
ELECTRICAL, TYPICAL

Impedance	50 ohms
Frequency	DC - 6 GHz or more
Voltage Rating	500 V RMS @ sea level
Dielectric Withstanding	1000 V RMS @ sea level
VSWR	1.15 : 1 to 6 GHz
Contact Resistance	3.0 milliohms or less
Insulation Resistance	5000 megohms


.880 REF
.312
.670 REF
1/4-36 UNS
.036±.001 DIA.

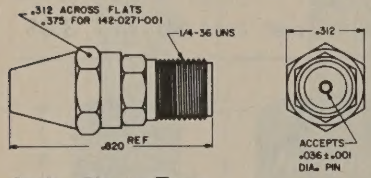
Right Angle Cable–Male Plug

Cable Group	
I	142-0202-001
II	142-0222-001
III	142-0262-001


.312 ACROSS FLATS
.375 FOR 142-0261-001
.312
.83 REF
1/4-36 UNS
.036±.001 DIA.

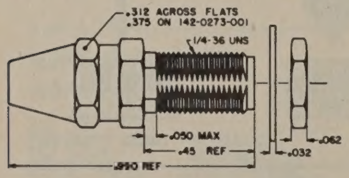
Plug—Clamp Type

Cable Group	
I	142-0201-001
II	142-0221-001
III	142-0261-001


.312 ACROSS FLATS
.375 FOR 142-0271-001
1/4-36 UNS
.312
.820 REF
ACCEPTS .036±.001 DIA. PIN

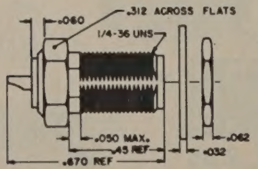
Jack—Clamp Type

Cable Group	
I	142-0211-001
II	142-0231-001
III	142-0271-001

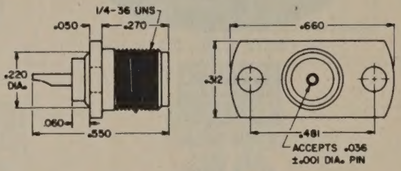

.312 ACROSS FLATS
.375 ON 142-0273-001
1/4-36 UNS
.050 MAX
.45 REF
.990 REF
.062
.032

Bulkhead Jack—Clamp Type

Cable Group	
I	142-0213-001
II	142-0233-001
III	142-0273-001

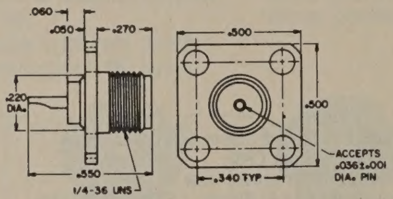

.060
.312 ACROSS FLATS
1/4-36 UNS
.050 MAX.
.45 REF
.670 REF
.062
.032

Bulkhead Receptacle, Rear Mount
142-0294-001

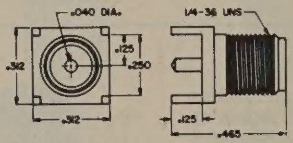

1/4-36 UNS
.050
.270
.220 DIA.
.060
.550
.660
.312
.481
ACCEPTS .036 ±.001 DIA. PIN

2-hole Panel Receptacle, Front Mount

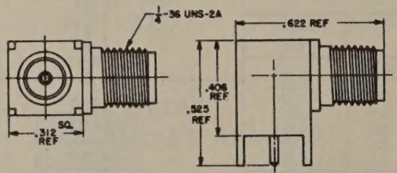
142-0296-001


.060
.050
.270
.220 DIA.
.550
1/4-36 UNS
.500
.500
.340 TYP
ACCEPTS .036±.001 DIA. PIN

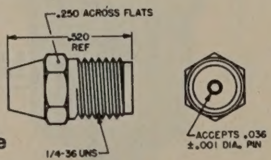
4-hole Panel Receptacle, Front Mount
142-0297-001


.040 DIA.
1/4-36 UNS
.312
.125
.250
.312
.125
.465

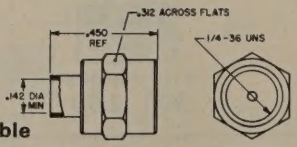
PC Receptacle
142-0298-001


1/4-36 UNS-2A
.622 REF
.406 REF
.525 REF
.312 SQ. REF

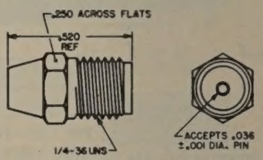
Right angle PC mount, receptacle
142-0299-001


.250 ACROSS FLATS
.520 REF
1/4-36 UNS
ACCEPTS .036 ±.001 DIA. PIN

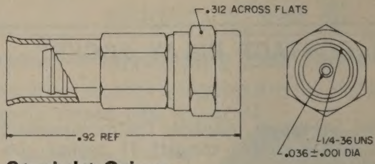
Jack/Cable
142-0284-001


.312 ACROSS FLATS
.450 REF
1/4-36 UNS
.142 DIA MIN

Plug/Cable
142-0281-001

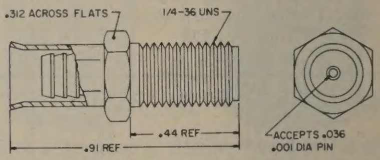

.250 ACROSS FLATS
.520 REF
1/4-36 UNS
ACCEPTS .036 ±.001 DIA. PIN

Jack/Cable
142-0283-001


.312 ACROSS FLATS
.92 REF
1/4-36 UNS
.036±.001 DIA

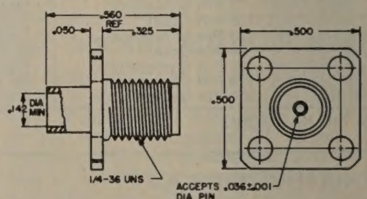
Straight Crimp Type Cable Plug

Cable Group	
I	142-0301-001
II	142-0321-001
III	142-0361-001

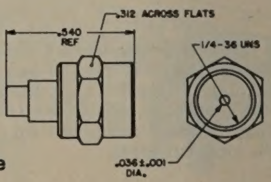

.312 ACROSS FLATS
1/4-36 UNS
.44 REF
.91 REF
ACCEPTS .036 .001 DIA PIN

Straight Crimp Type Cable Jack

Cable Group	
I	142-0311-001
II	142-0331-001
III	142-0371-001


.560 REF
.050
.325
.142 DIA MIN
1/4-36 UNS
.500
.500
ACCEPTS .036±.001 DIA PIN

4-hole flange mount, cable/jack
142-0286-001


.312 ACROSS FLATS
.540 REF
1/4-36 UNS
.036±.001 DIA.

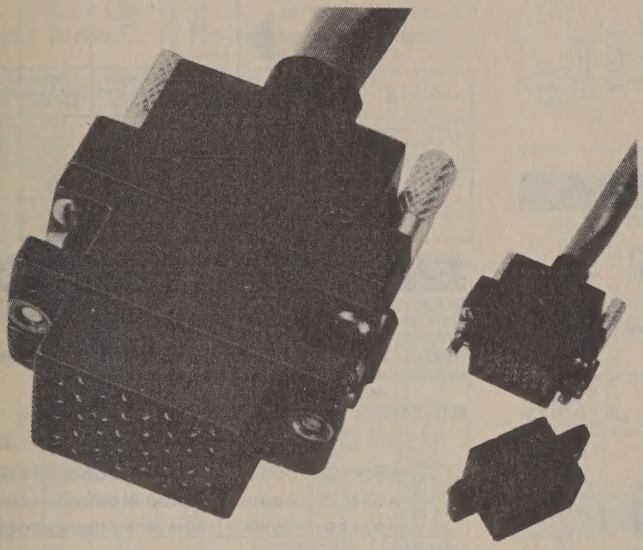
Plug/Cable
142-0282-001

Prices available on request.

JOHNSON®
E. F. JOHNSON COMPANY, WASECA, MINNESOTA 56093

Connectors

MULTI-PIN CONNECTORS



CATALOG NUMBERS

117-0900-142	117-0900-236
117-0900-144	117-0900-362
117-0900-146	117-0900-364
117-0900-232	117-0900-366
117-0900-234	

- **Rugged, high strength construction**
- **UL recognized**
- **Available in 36-23-14 pin sizes**
- **Low cost**
- **Crimp or solder type terminals**
- **Wide variety of configurations and options available**

Moisture-resistant insulator block is glass-filled nylon. It is impact resistant and functionally designed. Recessed contacts in both male and female housings provide proper mating and protection for contacts. Hood provides cable positive strain relief.

Contacts are replaceable with use of simple tool. A blade and tuning-fork concept assures low, constant contact resistance.

Jackscrews are available for maximum vibration and shock resistance.

SPECIFICATIONS

Voltage Rating (adjacent contacts)	250 VRMS
Flashover Voltage	1000 VDC
Current Rating (continuous max/ckt)	3 amps
Contact Resistance (typical) .006 ohms (max.)	.0075 ohms
Insulation Resistance	5000 Megohms
Contact Material (male)	Nickel Silver
Contact Material (female)	Nickel Silver
Insertion Force (per contact pair)	6 oz. min./17 oz. max.
Withdrawal Force (per contact pair)	5 oz. min./12 oz. max.
Cycle Life	500 min.
Insulation	Type 6/6 30% Glass Filled Nylon

STANDARD CONFIGURATIONS

TOTAL PLUG DESCRIPTION	14 PIN SERIES	23 PIN SERIES	36 PIN SERIES
Plug, Receptacle, 2 Hoods, Solder Type Contacts	117-0900-142	117-0900-232	117-0900-362
Plug, Receptacle, 2 Hoods, Solder Type Contacts, Jackscrews	117-0900-144	117-0900-234	117-0900-364
Plug, Receptacle, Solder Type Contacts	117-0900-146	117-0900-236	117-0900-366

Form No. 5032 115 bp(1m)

For immediate information: Phone (507) 835-6222 — Telex 29-0470

STANDARDIZED TERMINAL BOARDS

STANDARDIZED TURRET TERMINAL BOARDS

Cut your production cost by eliminating the tooling and setup charge usually applied to nonstandardized boards. Terminals are securely riveted and hot tinned for easy soldering.

TERMINALS: Your choice of most popular types.
Made of Brass: QQ-626, comp. 22, ½ hard.
Hot Dip Solder finish: Mil-F-14072 Type 221.

Material: Your choice of either PBE or GEE Phenolic.

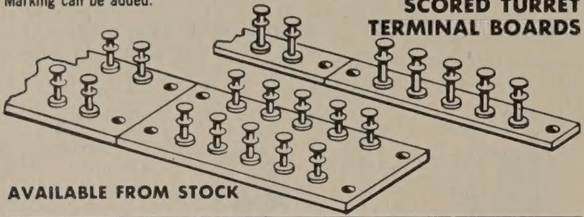
PBE: Paper base electrical, Mil-P-3115C, Temp. 250° F max. Type XXXP.

GEE: Glass Epoxy, Mil-P-18177, Temp. 300° F max. Type G-10.

Five sections **SCORED** for easy **separation** M'tg. holes in each section.

These boards **CAN BE MODIFIED** with terminals staked in all holes, scoring eliminated. Marking can be added.

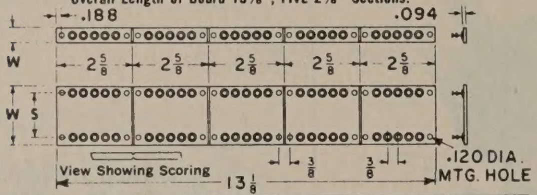
SCORED TURRET TERMINAL BOARDS



AVAILABLE FROM STOCK

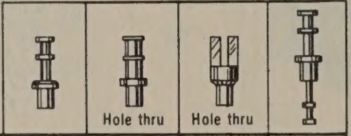
3/8" SPACING AND SCORED

3/32" THICK PHENOLIC — Choice of 4 Types of Terminals
Overall Length of Board 13⅛", FIVE 2⅝" Sections.



Five sections **SCORED** for easy operation.
M'tg. holes in each section.

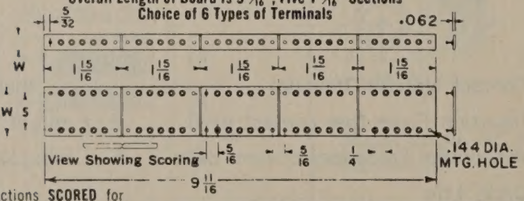
CHOICE OF TERMINALS



W	S	No. of Terms.	Material	With 1503 Term. Cat. No.	With 1509 Term. Cat. No.	With 1507 Term. Cat. No.	With 1545 Term. Cat. No.
½	Single Row	25	PBE	15031	15091	15071	15041
			GEE	15231	15291	15271	15241
1½	1	50	PBE	15032	15092	15072	15042
			GEE	15232	15292	15272	15242
1½	1³⁄₁₆	50	PBE	15036	15096	15076	15046
			GEE	15236	15296	15276	15246
2	1½	50	PBE	15033	15093	15073	15043
			GEE	15233	15293	15273	15243
2½	2	50	PBE	15034	15094	15074	15044
			GEE	15234	15294	15274	15244
3	2½	50	PBE	15035	-15095	15075	15045
			GEE	15235	15295	15275	15245

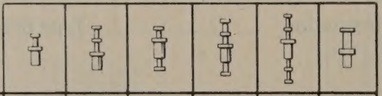
MINIATURE TURRET TERMINAL BOARDS

1/4" SPACING AND SCORED — 1/16" THICK PHENOLIC
Overall Length of Board Is 9¹¹⁄₁₆", Five 1¹⁵⁄₁₆" Sections
Choice of 6 Types of Terminals



Five sections **SCORED** for easy operation.
M'tg. holes in each section.

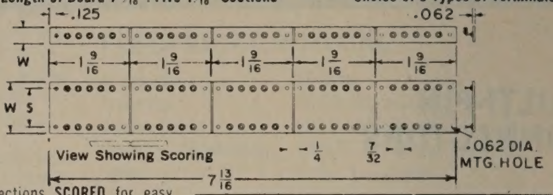
CHOICE OF TERMINALS



W	S	No. of Terms.	Material	With 1572 Term. Cat. No.	With 1573 Term. Cat. No.	With 1574 Term. Cat. No.	With 1575 Term. Cat. No.	With 1583 Term. Cat. No.	With 1559 Term. Cat. No.
5/16	Single Row	25	PBE	15047	15057	15067	15077	15087	15097
			GEE	15247	15257	15267	15277	15287	15297
7/8	9/16	50	PBE	15048	15058	15068	15078	15088	15098
			GEE	15248	15258	15268	15278	15288	15298
1⅛	13/16	50	PBE	15049	15059	15069	15079	15089	15099
			GEE	15249	15259	15269	15279	15289	15299

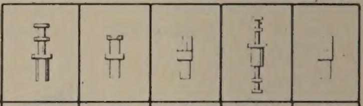
MINIATURE TURRET TERMINAL BOARDS

7/32" SPACING AND SCORED — 1/16" THICK PHENOLIC
Overall Length of Board 7¹³⁄₁₆". Five 1⁹⁄₁₆" Sections
Choice of 5 Types of Terminals



Five sections **SCORED** for easy operation.
M'tg. holes in each section

CHOICE OF TERMINALS



W	S	No. of Terms.	Material	With 1502 Term. Cat. No.	With 1562 Term. Cat. No.	With 1526 Term. Cat. No.	With 1512 Term. Cat. No.	With 1533 Term Cat. No.
5/16	Single Row	25	PBE	15021	15023	15025	15063	15053
			GEE	15221	15223	15225	15263	15253
3/4	½	50	PBE	15028	15029	15026	15064	15054
			GEE	15228	15229	15226	15264	15254
1	3/4	50	PBE	15022	15024	15030	15065	15056
			GEE	15222	15224	15230	15265	15256

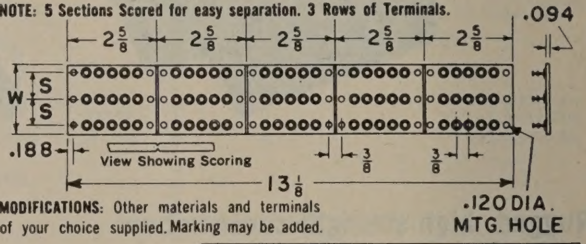
UNIVERSAL TERMINAL BOARDS

Designed for production or experimental use, these **standardized boards** are well suited for any electronic application requiring a sturdy mounting surface for resistors, condensers and components.

TERMINAL: 1503-3 HOT TIN DIP finish for easier soldering and infinite shelf life.

MATERIALS: PBE (Paper Base Elect. Mil-P-3115C type XXXP)
GEE (Glass Epoxy Mil-P-18177 type G-10)

NOTE: 5 Sections Scored for easy separation. 3 Rows of Terminals.



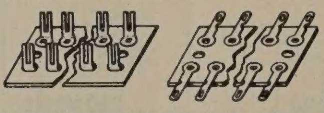
MODIFICATIONS: Other materials and terminals of your choice supplied. Marking may be added.

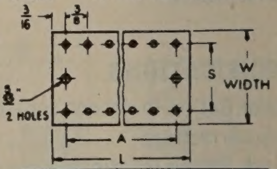
Assembled. with **TERMINAL** 1503-3

W	S	Total No. of Terms.	Material	Cat. No.
2½	1	75	PBE	15332
			GEE	15342
3½	1½	75	PBE	15333
			GEE	15343

READI-MADE TERMINAL BOARDS

• **ECONOMICAL** • **SAVE TOOLING COST**
• **DELIVERY FROM STOCK** • **RANGE OF SIZES** • **APPROVED MATERIALS**





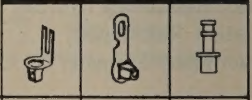
Readi-Made Terminal Boards are ideal for General Use. Excellent for mounting resistors, condensers, etc. Choice of Terminals.

MATERIAL: 1/16" thick Bakelite (Mil Spec 3115C Pbe-P grade).

TERMINALS: 1204 and 1268 are stamped from .023 thick brass. 1539 is turned from 3/16" dia. brass rod.

PLATING: 1204 is Cadmium plated. 1268 and 1539 are Hot Tinned for easy soldering.

CHOICE OF TERMINALS



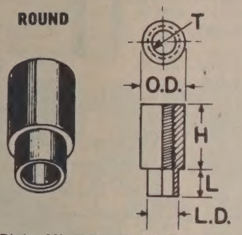
W	L	S	A	Terminals Each Side	With 1268 Term. Cat. No.	With 1204 Term. Cat. No.	With 1539 Term. Cat. No.
1	1⅞	¹¹⁄₁₆	1½	5	1268-10	1204-10	1239-10
1	2¼	¹¹⁄₁₆	1⅞	6	1268-12	1204-12	1239-12
1	5¼	¹¹⁄₁₆	4⅞	14	1268-28	1204-28	1239-28
1¾	3¾	1⁷⁄₁₆	3⅜	10	1268-20	1204-20	1239-20
1¾	4⅛	1⁷⁄₁₆	3¾	11	1268-22	1204-22	1239-22
1¾	7⅛	1⁷⁄₁₆	6¾	19	1268-38	1204-38	1239-38
½	7⅛	Single Row	6¾	19	1268-19	1204-19	1239-19

KEYSTONE ELECTRONICS CORP., 49 BLEECKER ST., NEW YORK, N. Y. 10012 • (212) 475-4600

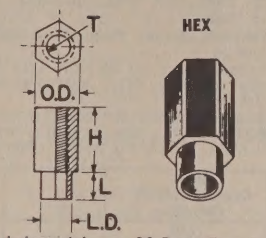
FREE
17 x 22 ENGINEERING
WALL CHART

STANDOFFS & SPACERS

SWAGE TYPE THREADED STANDOFFS



Nickel Plate Mil-F-14072 QQ-N-290 Type VII.



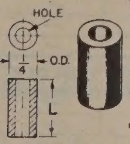
Cadmium plate per QQ-P-416 Type 2 Class B and clear chromate.

Material: MADE OF: BRASS MIL SPEC. QQ-B-626A COMP. 22—½ HARD.

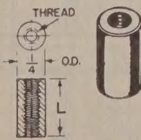
ROUND Nickel Plated Cat. No.	H Height Above Panel	L	For Panel Thick-ness	LD	OD	T Thread	HEX Cadmium Plated Cat. No.
1589-2	⅛	.109	1/16	.125	5/32	2-56	—
1589-3	⅛	.140	3/32	.125	5/32	2-56	—
1590-2	3/16	.109	1/16	.125	5/32	2-56	—
1590-3	3/16	.140	3/32	.125	5/32	2-56	—
1591-2	¼	.109	1/16	.125	5/32	2-56	—
1591-3	¼	.140	3/32	.125	5/32	2-56	—
1596-2	⅜	.109	1/16	.125	5/32	2-56	—
1596-3	⅜	.140	3/32	.125	5/32	2-56	—
1560 A	⅛	.109	1/16	.187	¼	4-40	1653-2
1560 F	⅛	.140	3/32	.187	¼	4-40	1653-3
1650-2	¼	.109	1/16	.187	¼	4-40	1627-2
1650-3	¼	.140	3/32	.187	¼	4-40	1627-3
1651-2	⅜	.109	1/16	.187	¼	4-40	1628-2
1651-3	⅜	.140	3/32	.187	¼	4-40	1628-3
1623-2	½	.109	1/16	.187	¼	4-40	1629-2
1623-3	½	.140	3/32	.187	¼	4-40	1629-3
1624-2	⅝	.109	1/16	.187	¼	4-40	1654-2
1624-3	⅝	.140	3/32	.187	¼	4-40	1654-3
1625-2	¾	.109	1/16	.187	¼	4-40	1655-2
1625-3	¾	.140	3/32	.187	¼	4-40	1655-3
1652-2	1	.109	1/16	.187	¼	4-40	1630-2
1652-3	1	.140	3/32	.187	¼	4-40	1630-3
1560 B	⅛	.109	1/16	.187	¼	6-32	1620-2
1560 C	⅛	.140	3/32	.187	¼	6-32	1620-3
1560 D	⅛	.171	⅛	.187	¼	6-32	1620-4
1612-2	3/16	.109	1/16	.187	¼	6-32	—
1612-3	3/16	.140	3/32	.187	¼	6-32	—
1612-4	3/16	.171	⅛	.187	¼	6-32	—
1546	¼	.109	1/16	.187	¼	6-32	1621-2
1546 B	¼	.140	3/32	.187	¼	6-32	1621-3
1546 D	¼	.171	⅛	.187	¼	6-32	1621-4
1561 B	⅜	.109	1/16	.187	¼	6-32	1622-2
1561 C	⅜	.140	3/32	.187	¼	6-32	1622-3
1561 D	⅜	.171	⅛	.187	¼	6-32	1622-4
1604-2	½	.109	1/16	.187	¼	6-32	—
1604-3	½	.140	3/32	.187	¼	6-32	—
1604-4	½	.171	⅛	.187	¼	6-32	—
1605-2	⅝	.109	1/16	.187	¼	6-32	—
1605-3	⅝	.140	3/32	.187	¼	6-32	—
1605-4	⅝	.171	⅛	.187	¼	6-32	—
1608-2	¾	.109	1/16	.187	¼	6-32	—
1608-3	¾	.140	3/32	.187	¼	6-32	—
1608-4	¾	.171	⅛	.187	¼	6-32	—
1609-2	1	.109	1/16	.187	¼	6-32	—
1609-3	1	.140	3/32	.187	¼	6-32	—
1609-4	1	.171	⅛	.187	¼	6-32	—

ALUMINUM SPACERS

WITH IRIDITE FINISH PER SPEC MIL-C-5541



- Lightweight
- Round — Clear Hole
- Spacers — Drilled Hole Only



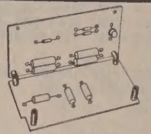
- Non-magnetic
- Round — Tapped Hole
- Spacers — with Tapped Hole

SPACERS — DRILLED HOLE ONLY **SPACERS — WITH TAPPED HOLE**

Length Inches	For #4 Screw .120 Hole Cat. No.	For #6 Screw .140 Hole Cat. No.	For #8 Screw .171 Hole Cat. No.		Length Inches	4-40 Thread Cat. No.	6-32 Thread Cat. No.	8-32 Thread Cat. No.
¼ (.250)	3457	3464	3471		¼ (.250)	3478	3485	3492
⅜ (.375)	3458	3465	3472		⅜ (.375)	3479	3486	3493
½ (.500)	3459	3466	3473		½ (.500)	3480	3487	3494
¾ (.750)	3460	3467	3474		¾ (.750)	3481	3488	3495
1 (1.000)	3461	3468	3475		1 (1.000)	3482	3489	3496
1½ (1.500)	3462	3469	3476		1½ (1.500)	3483	3490	3497
2 (2.000)	3463	3470	3477		2 (2.000)	3484	3491	3498

1.500 and 2″ are tapped ⅜ deep each end

HINGED STANDOFFS FOR TERMINAL BOARDS

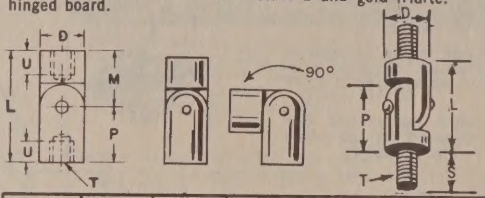


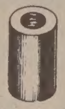
Only 2 screws used to fasten board in place or open the hinged board.

- APPLICATIONS UNLIMITED • TIME SAVER
- CUT COST OF SERVICING • SPACE SAVER
- INTERCONNECT CIRCUITS OR SERVICES WITHOUT DANGER OF SHORTING • WIRING EXPOSED FOR EASY TEST

Material: Made of Brass MIL Spec. QQ-B-626A Comp. 22—½ Hard.

Finishes: Cadmium plate per QQ-P-416 Type 2 Class 2 and gold Iridite.





These standoffs mount at front of the board.

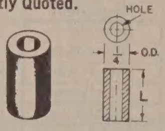
Hinge Cat. No.	T Thread	D Diam.	L Length	U	M	P	Standoff Only Cat. No.
351	4-40	.187	¾	.172	.375	.375	1657A
352	4-40	.187	1	.250	.375	.625	1657B
353	6-32	.250	¾	.172	.375	.375	1548E
354	6-32	.250	1	.250	.375	.625	1548F
355	8-32	.250	¾	.172	.375	.375	1692D
356	8-32	.250	1	.250	.375	.625	1692E

Hinge Cat. No.	T Thread	L Length	D Diam.	S	P	Standoff Only For Front of Board Cat. No.
357	4-40	½	.187	¼	¼	1657
358	6-32	½	.250	5/16	¼	1548C
359	8-32	½	.250	5/16	¼	1692C

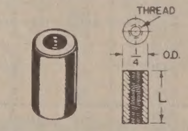
PHENOLIC SPACERS

- GOOD MECHANICAL STRENGTH • RESISTS ABRASIONS & CHEMICALS
- EXCELLENT DIELECTRIC • LOW MOISTURE ABSORPTION

Material: PBE Grade MIL-P-79A Natural Color Phenolic — Special Sizes Made to Order — Promptly Quoted.



SPACERS — DRILLED HOLE ONLY



SPACERS — WITH TAPPED HOLE

Length Inches	For #4 Screw .120 Hole Cat. No.	For #6 Screw .140 Hole Cat. No.	For #8 Screw .171 Hole Cat. No.	4-40 Thread Cat. No.	6-32 Thread Cat. No.	8-32 Thread Cat. No.
¼ (.250)	360	367	1490	376	383	390
⅜ (.375)	361	368	1491	377	384	391
½ (.500)	362	369	1492	378	385	392
¾ (.750)	363	370	1493	379	386	393
1 (1.000)	364	371	1494	380	387	394
1½ (1.500)	365	372	374	381	389	395
2 (2.000)	366	373	375	382	389	396

1.500 and 2″ are tapped ⅜ deep each end.

ALUMINUM ECONOMY SPACERS

FOR No. 4, 6 or 8 SCREWS

- PRECISION FORMED • NO BURRS

Made of flat strip aluminum and rolled on precision equipment. Assures maximum bearing surface, square ends.

Description and Tolerance

Spacer For	I.D. ±.005	O.D. ±.007
#4	.125	.167
#6	.151	.193
#8	.178	.232

L Length Inches	For #4 Cat. No.	For #6 Cat. No.	For #8 Cat. No.		L Length Inches	For #4 Cat. No.	For #6 Cat. No.	For #8 Cat. No.
3/16	397	—	—		¾	418	425	432
¼	398	405	412		⅞	419	426	433
5/16	399	406	413		1	420	427	434
⅜	400	407	414		1¼	421	428	435
7/16	401	408	415		1½	422	429	436
½	402	409	416		1¾	—	430	437
⅝	403	410	417		2	—	—	438

KEYSTONE ELECTRONICS CORP., 49 BLEECKER ST., NEW YORK, N. Y. 10012 • (212) 475-4600

ELECTRONIC COMPONENTS

PLUG IN HOUSINGS

Enhance the appearance and give that professional look to your products using these molded housings. Ideally suited for packaging relays, logic packages, networks and miniature circuitry. Durable, lightweight covers that will withstand vibrations and rough usage.

HEADERS: Molded of GP black phenolic and fit standard sockets. Pins are brass. Nickel plated guide hole tapped 8-32 for terminal board mounting stud.

- **Variety of molded materials**
- **Good chemical resistance**

MATERIAL CHARACTERISTICS:

Polystyrene: For general purpose use where high impact strength is not required and temperature would not exceed 170°F.

Butyrate: 3 times the impact strength of Polystyrene and excellent electrical properties, use wherever temperatures of 210°F exist.

Nylon: Impact strength slightly less than Butyrate but recommended for use where temperatures are as high as 300°F.

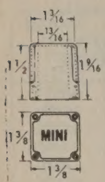


FIG. 1

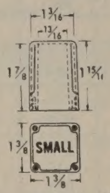


FIG. 2

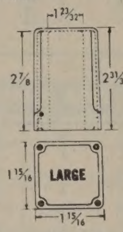


FIG. 3

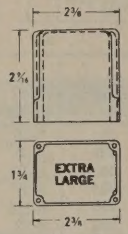


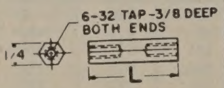
FIG. 4

Housing with Octal Header & 4 Screws Cat. No.	Housing Only Cat. No.	Fig. No.	Type	Material	Color
660	670	1	Mini	Butyrate	Clear
661	671	1	Mini	Nylon	White
662	672	1	Mini	Polystyrene	Clear
641	645	1	Mini	Polystyrene	Opaque Black
642	646	1	Mini	Polystyrene	Transp Red
663	673	2	Small	Butyrate	Clear
664	674	2	Small	Nylon	White
665	676	2	Small	Polystyrene	Clear
643	647	2	Small	Polystyrene	Opaque Black
644	648	2	Small	Polystyrene	Transp Red
650	649	3	Large	Butyrate	Clear
668	679	3	Large	Polystyrene	Clear
677	686	3	Large	Polystyrene	Opaque Black
678	667	3	Large	Polystyrene	Transp Red
639	640	4	Xtra-Lge	Polystyrene	Clear
710	711	4	Xtra-Lge	Polystyrene	Opaque Black
712	713	4	Xtra-Lge	Butyrate	Clear

HEX SPACERS 6-32 TAPPED BOTH ENDS

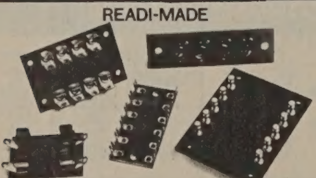
Extra long length spacers ideal as standoff legs for Keystone pre-punched boards or your special application.

Brass cadmium plated and chromate. ¼″ O.D. with 6-32 x ⅜″ deep tapped holes both ends.

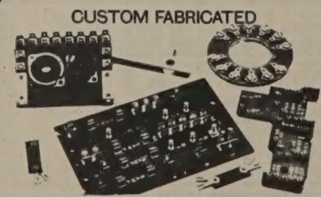


Cat. No.	Length
1635	1
1636	1¼
1637	1½
1638	1¾
1639	2
1642	2¼
1643	2½

TERMINAL BOARDS



SEND BLUEPRINTS
FOR SPECIAL
FABRICATION
PROMPT QUOTATIONS
RENDERED



NEW FREE
CATALOG
ON REQUEST

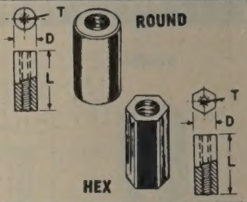
THREADED SPACERS

Material: ALL HARDWARE ON THIS PAGE IS MADE OF: BRASS MIL SPEC. QQ-B-626A COMP. 22 — ½ HARD.

Finishes: Nickel Plate Mil-F-14072 QQ-N-290 Type V.

Cadmium plate per QQ-P-416 Type 2 Class B and clear chromate. Other finishes available on special order.

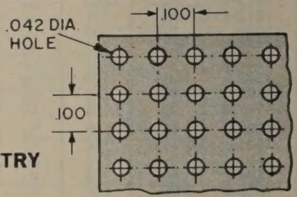
Threaded spacers ¼″ O.D. threaded 4-40, 6-32, 8-32 available either in round or hex. Round type is nickel plated, hex type is cadmium.



HEX Cadmium Plated Cat. No.	D	L	T Thread	ROUND Nickel Plated Cat. No.
1450	³⁄₁₆	¼	4-40	1547
1656	³⁄₁₆	½	4-40	1657
1656A	³⁄₁₆	¾	4-40	1657A
1656B	³⁄₁₆	1	4-40	1657B
1450A	¼	¼	4-40	1547A
1450B	¼	⅜	4-40	1547B
1450C	¼	½	4-40	1547C
1450D	¼	¾	4-40	1547D
1450E	¼	1	4-40	1547E
1451A	¼	¼	6-32	1548A
1451B	¼	⅜	6-32	1548B
1451C	¼	½	6-32	1584C
1451D	¼	⅝	6-32	1548D
1451E	¼	¾	6-32	1548E
1635	¼	1	6-32	1548F
1474A	¼	¼	8-32	1692A
1474B	¼	⅜	8-32	1692B
1474C	¼	½	8-32	1692C
1474D	¼	¾	8-32	1692D
1474E	¼	1	8-32	1692E
1452A	⅜	⅜	8-32	1549A
1452B	⅜	½	8-32	1549B
1452C	⅜	⅝	8-32	1549C
1452D	⅜	¾	8-32	1549D
1452E	⅜	1	8-32	1549E

MICRO-MINIATURE KEYBOARDS

- FOR MODULE STACKS
- SMALLER PLUG-IN CARDS POSSIBLE
- PERMITS HIGHER COMPONENT DENSITY FOR SUBMINIATURE CIRCUITRY



"P" PATTERN .042 HOLES .100 x .100

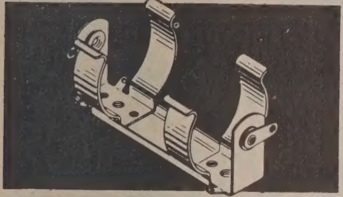
Width & Length	No. Holes W & L	Glass Epoxy	Glass Epoxy Cop. Clad (1 Side)	XXXP Natural Phenolic
¹⁄₃₂ THICK MATERIAL		Cat. No.	Cat. No.	Cat. No.
2 x 4½	19 x 44	4225	4234	—
2 x 6	19 x 59	4226	4235	—
4½ x 6	44 x 59	4227	4236	—
6 x 17	59 x 169	4228	4237	—
³⁄₆₄ THICK MATERIAL		Cat. No.	Cat. No.	Cat. No.
2 x 4½	19 x 44	4229	4238	—
2 x 6	19 x 59	4230	4239	—
4½ x 6	44 x 59	4231	4240	—
6 x 17	59 x 169	4232	4241	—
¹⁄₁₆ THICK MATERIAL		Cat. No.	Cat. No.	Cat. No.
2 x 4½	19 x 44	3405	3415	3396
2 x 6	19 x 59	3406	3416	3397
2.73 x 17	26 x 169	3407	3417	3398
3 x 4½	29 x 44	3408	3418	3399
4½ x 6	44 x 59	3409	3419	3400
4½ x 6½	44 x 64	3410	3420	3404
4½ x 8½	44 x 84	3411	3421	3425
4½ x 17	44 x 169	3412	3422	3426
6 x 17	59 x 169	3413	3423	3427

KEYSTONE ELECTRONICS CORP., 49 BLEECKER ST., NEW YORK, N. Y. 10012 • (212) 475-4600

KEYSTONE ALL STEEL BATTERY HOLDERS

STANDARDIZED ALL STEEL BATTERY HOLDERS

An important advance in design that has gained wide acceptance for military and commercial usage. Battery when installed is held under spring tension at a constant pressure assuring low resistance contact will hold up to 4 cells in series in sturdy insulating tube. Retainer clips available to lock battery securely. This prevents shifting or loosening of battery in holder. Recommended for use where shock or severe vibration is encountered.



- **CORROSION RESISTANT NICKEL PLATED**
- **STAINLESS STEEL CONTACTS**
- **MOISTURE PROOF INSULATING WASHERS**
- **IDEAL FOR NI-CAD AND ALKALINE CELLS**

SPECIFICATIONS

Made of SAE 1065 Carbon Steel to MIL Spec. 17919, heat treated to spring temper and nickel plated .0002 thick. Contact assembly consists of a stainless steel eyelet, moisture proof vulcoid washers and a coated copper solder lug. Ribbed carbon steel base for added support is nickel plated and has 2 mounting holes for ease in mounting.

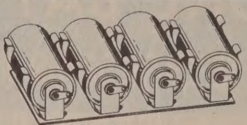


FIG. 25

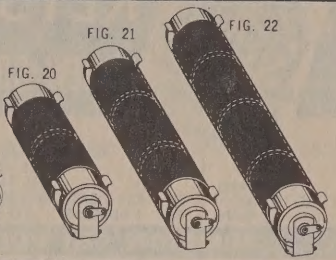


FIG. 20

FIG. 21

FIG. 22

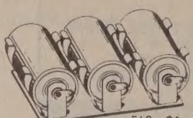


FIG. 24

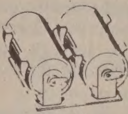


FIG. 23

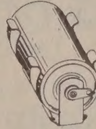
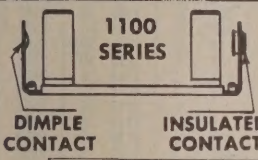
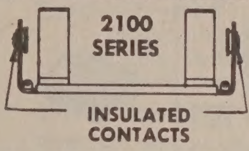


FIG. 19





One Insulated Contact	All Contacts Insulated	Fig. No.	Holds No. of Cells	All Batteries in the Group are of Similar Size and Fit Holders Listed Burgess	Eveready	RCA
PENCELL HOLDERS						
Cat. No.	Cat. No.					
1139	2139	19	1	Z, HG9	E9, E12	VS034A
	2140*	23	2	CD6, 9R	E91, E133	VS144
	2171*	24	3	HG12R	E502, N46	VS149
	2182*	25	4	H133	515, 915	VS313A
1189	2189	20	2	HG502R	1015	VS334
1191	2191	21	3	920		
1194	2194	22	4	930		
"C" CELL HOLDERS						
1173	2173	19	1	1		VS035A
	2174*	23	2	P6	E233	VS300
	2187*	24	3	120	635	VS335
	2188*	25	4	130	935	VS400
1185	2185	20	2	H233		
1195	2195	21	3	302599		
1198	2198	22	4			
"D" CELL HOLDERS						
1175	2175	19	1	2	E42	VS036
	2176*	23	2	2R	N56	VS036A
	2190*	24	3	CD7	E95	VS336
	2192*	25	4	210	D99	
1186	2186	20	2	230	A100	
1199	2199	21	3		950	
1162	2162	22	4		1050	
1179	2179	19	1		E94	

*Clips mounted on phenolic 1/16" thick Mil Spec 3115B

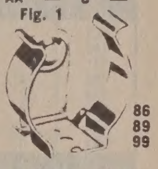
SPACE SAVER BATTERY CLIPS

Available with insulated contact or dimple. Positive contact grips battery securely. They will accommodate the "AA" — "C" — "D" — **Mercury** and **NI-CAD batteries.**

- **CORROSION RESISTANT NICKEL PLATED**
- **STAINLESS STEEL CONTACTS**

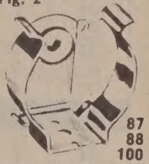
Clips — Carbon Steel, SAE 1065 per Mil-S-17919-#4, Heated Treated to Spring Temper, Nickel Plate Finish.
Contact Eyelets — Stainless Steel per Mil-S-18170 Comp 304.
Insulating Washers — Resin Impregnated Fibre.
Terminal Lugs — Copper Per QQ-C-576A, Cad. Plated per QQ-P-416.

Fig. 1



DIMPLE CONTACT

Fig. 2



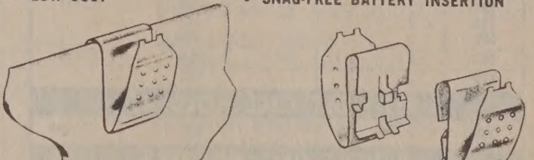
INSULATED CONTACT

Cat. No.	Fig.	A Dia. Min. - Max.	Steel Thickness	For Cells
86	1	.875 to 1.125	.020	C
87	2	.875 to 1.125	.020	C
88	2	1.187 to 1.350	.020	D
89	1	1.187 to 1.350	.020	D
99	1	.531 to .650	.015	AA
100	2	.531 to .650	.015	AA

PENCELL SNAP-ON BATTERY HOLDER CLIPS

Clips over panels from .060 to .070 thick and is anchored by sharp barbs. Made of spring tempered steel, nickel plated.

- **IDEAL FOR MOLDED CASES**
- **LOW COST**
- **SELF ANCHORING**
- **SNAG-FREE BATTERY INSERTION**



CAT. No. 209

ECONOMY CLIPS for "AA" Pencells — "C" and "D" Cells

A low cost clip used with non-metallic bases. **Features:** Single eyelet mount — non-rotating tab. **Material:** Spring Temper Steel and Nickel Plated.

206

Cat. No.	B	C	H	M Mtg. Hole	For Cells
206	.609	.468	.500	.128	AA
207	.687	.547	.875	.128	C
208	.765	.562	1.290	.128	D
67	.765	.562	1.290	.156	D

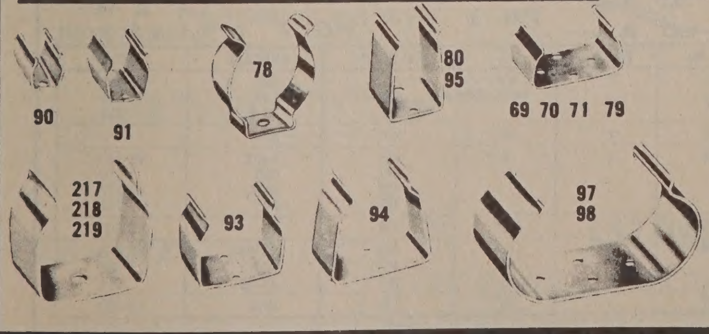
67 does not have Non-Rotation Tab

207

208

BATTERY AND COMPONENT HOLDERS

A complete line of clips suitable for secure mounting of round or square battery cells or electronic components.



Cat. No.	A Min.-Max. Dia. or Size	Material	For Cells*
69	.562 (2)	.015 Steel	(2) AA
70	.656 (2)	.025 Alum.	(2) RM12
71	.593 x 1.031	.015 Steel	2U6
78	1.187 to 1.350	.020 Steel	D
79	.650 x 1.280	.015 Steel	T 146 X
80	.650 x 1.280	.020 Steel	T 146 X
90	.375 to .468	.016 Alum.	AAA
91	.531 to .656	.020 Alum.	AA
93	.875 to 1.1250	.025 Alum.	C
94	1.187 to 1.375	.032 Alum.	D
95	.625 x 1.000	.025 Alum.	U-15
97	1.031 (2)	.025 Alum.	(2) C
98	1.312 (2)	.032 Alum.	(2) D
217	1.375 to 1.500	.025 Steel	NI-CAD
218	1.437 to 1.687	.025 Steel	NI-CAD
219	2.000 to 2.500	.025 Steel	NI-CAD

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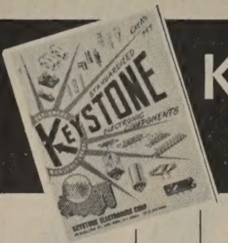
KEYSTONE BATTERY HOLDERS

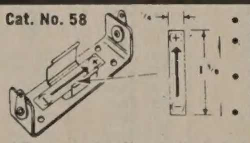
NEW COMPLETE CATALOG ON REQUEST



Cat. No.	Holds No. of Cells	Fig. No.	ALL BATTERIES LISTED WITHIN BOXES ARE IN THE SAME SIZE GROUP BATTERY CROSS REFERENCE BURGESS	EVEREADY	R.C.A.
MINIATURE CELL HOLDERS					
137	1	1	7	912	VS074
138	2	2			
169	3	3			
170	4	4			
PENCELL HOLDERS					
139	1	1	CD6	E9, E12	VS034A
140	2	2	9R, Z	E91	VS144
171	3	3	HC9	E133	VS149
182	4	4	HG12R	333	VS313A
189	2	5	H133	E502	VS334
191	3	6	HG502R	515	
192	4	7	920	915, 1015	
193	6	8	930	N46	
"C" CELL HOLDERS					
173	1	1	1	226	VS035A
174	2	2	P6	E233	VS300
187	3	3	120	635	VS335
185	2	5	130	935	VS400
195	3	6	H233		
196	4	7	302599		
197	6	8			
"D" CELL HOLDERS					
175	1	1	2	E42	VS036A
176	2	2	2R	N56	VS036
190	3	3	CD7	E95	VS336
186	2	5	210	D99	
199	3	6	230	A100	
200	4	7		950	
201	6	8		1050	
205	6	12			
1½ VOLT CELL HOLDERS					
154	1	1	N	E340	VS073
155	2	2		E400	
156	3	3		E401	
160	1	1	21R	964	VS236
179	1	1		E94	
4½ VOLT CELL HOLDERS					
139	1	1		333	VS1149
9 VOLT CELL HOLDERS					
139-B	1	1		206	VS327
203P	1	14	2U6	216	VS323
173P	1	1	P6M	226	VS300A
15 VOLT CELL HOLDERS					
163	1	11	K10	417	
161	1	11	U10		VS083
166	1	9			
167	2	10		411	
225	1	1	Y10	504	
226	2	2			
22½ VOLT CELL HOLDERS					
164	1	11	K15		
168	1	11		420	
177	1	9	U15	412	VS084
178	2	10			
139A	1	1	Y15	505	
140A	2	2			
171A	3	3			
182A	4	4			
30 VOLT CELL HOLDERS					
157	1	14	Y20	506	
165	1	11	K20	430	
183	1	9	U20	413	VS085
184	2	10			
134	1	1	Y20S	507	

POLARITY LABELS

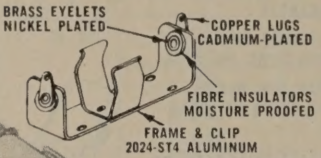
Cat. No. 58

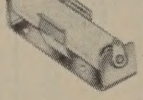


- PRESSURE SENSITIVE
- WILL ADHERE TO ANY SURFACE
- NO GLUE OR DAMPING REQUIRED
- ECONOMICAL

Wherever circuit polarity is to be shown labels are colored Blue and Red.

A standard line of battery holders available for immediate shipment from stock. Low cost, lightweight and sturdily constructed of quality materials. Good electrical contact, low leakage current and snap-fit clips are the outstanding features.


BRASS EYELETS NICKEL PLATED
COPPER LUGS CADMIUM-PLATED
FIBRE INSULATORS MOISTURE PROOFED
FRAME & CLIP 2024-ST4 ALUMINUM



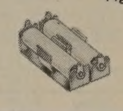


Fig. 2

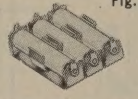


Fig. 3

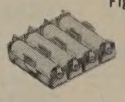


Fig. 4

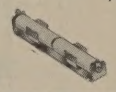


Fig. 5

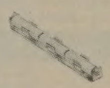


Fig. 6

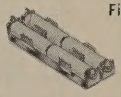


Fig. 7

Fig. 8

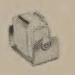


Fig. 9

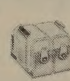


Fig. 10

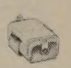


Fig. 11

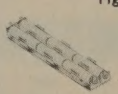


Fig. 12

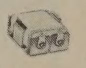


Fig. 14

MERCURY BATTERY HOLDERS

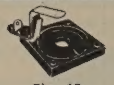


Fig. 13

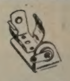


Fig. 15

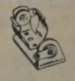


Fig. 16

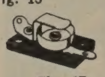


Fig. 17

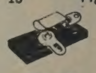


Fig. 18

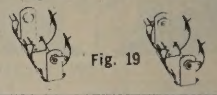


Fig. 19

Mallory Mercury Battery Listing	Aluminum and Phenolic Base Holders Cat. No.	Fig. No.	All Steel Holders One Insulated Contact Cat. No.	Fig. No.	All Steel Holders All Contacts Insulated Cat. No.	Fig. No.
RM1R	101*	13	1101	15	2101	16
RM3R	103*	13	1103	15	2103	16
RM4R	104*	13	1104	15	2104	16
ZM9	139	1	1139	19	2139	19
RM12R	139	1	1139	19	2139	19
RM42	175	1	1175	19	2175	19
TR113			1113	15	2113	16
TR114			1114	15	2114	16
TR115	132	1	1132	15	2132	16
TR132	132	1	1132	15	2132	16
TR133	139	1	1139	19	2139	19
TR134	134	1	1134	15	2134	19
TR135	135	5	1135	19	2135	19
TR136	189	5	1189	19	2189	19
TR137			1125	19	2125	15
TR145			1145	15	2145	16
TR152	124**	1				
TR153	106**	1				
TR162			1113	15	2113	16
TR163	132	1	1132	15	2132	16
TR164	109	1	1109	19	2109	19
TR165	110	1	1110	19	2110	19
TR169	189	5	1189	19	2189	19
TR175	124**	1				
TR177			1142	19	2142	19
TR233	173	1	1173	19	2173	19
TR234			1144	19	2144	19
RM400	111*	18				
RM401	124**	1				
RM411	166**	9				
RM412	177**	9				
RM413	183**	9				
RM450	112*	17				
RM502	139	1	1139	19	2139	19
RM601			1116	15	2116	16
RM625	117*	17				
RM630	126*	18				
RM640	118*	13				
RM675	127*	18				
302351	119	1	1119	19	2119	19
302478	120	5	1120	19	2120	19
302642	121	1	1121	19	2121	19
302435	122**	1				
302437	139	1	1139	19	2139	19
302599	173	1	1173	19	2173	19

BATTERY STRAPS

Made for batteries requiring a snap-on connection. Contacts are mounted securely to fibre and wire leads attached.

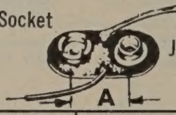


FIG. 1

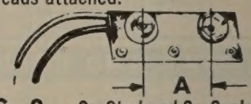
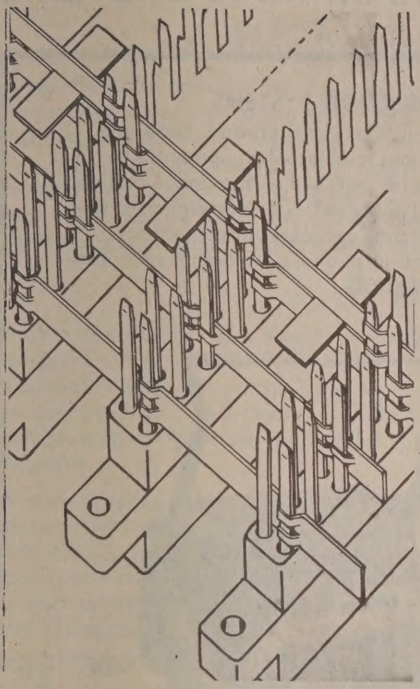


FIG. 2 Sr. Stud and Sr. Socket

Cat. No.	Fig. No.	A	EVEREADY	BURGESS	R.C.A.
72 83	1 2	½″	216 246 416	2U6 2N6 UX-5	VS-312 305 318
73	2	¾″	266	M-6	
74	2	15⁄16″	495 479 437 477	N60X P60 XX50 P45	VS-316 216 217 218
75	2	1⅜″	276	D6	VS-306
76	2	1½″	455 457 467	XX-30 K45 XX-45	VS-055 082 016
77	2	2½″	490	N-60	VS-090

KEYSTONE ELECTRONICS CORP., 49 BLEECKER ST., NEW YORK, N. Y. 10012 • (212) 475-4600

LSi Pin Bar® means:



- Thousands of "hi-rel" solderless bussing connections per hour at a fraction the cost of your present busing method.
- Fast, simple, "foolproof" connections that lower production costs — eliminate continuity checks.
- Low uniform contact resistance that will electrically enhance any circuit — especially frequency applications.
- Efficient back panel design (greater pin exposure, increased discrete wiring area and easier checkout).
- A "spec" performance electrical component produced to your exact requirements.

solderless bus bar for common connections

SPECIFICATIONS

Terminal Spacing and Length: Selectable.

Spacing Tolerance: ±0.010" between terminals — ±0.020/foot cumulative.

Material: 1000, 1200 Series: Beryllium Copper Alloy #172 per QQ-C-533.
1100 Series: Beryllium Copper Alloy #175 per QQ-C-533.

Standard Finishes:

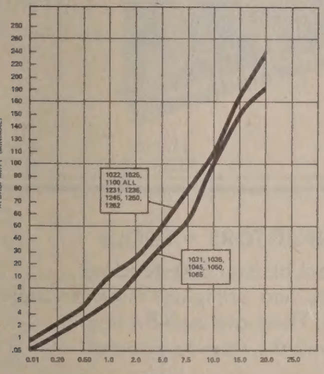
Tin: Electro-tin plate, fused, per MIL-T-10727, Type I, 0.0003" thickness.

Gold: Gold plate per MIL-G-45204, Type II, 0.000050" minimum thickness over nickel plate per QQ-N290, 0.000050" minimum thickness.

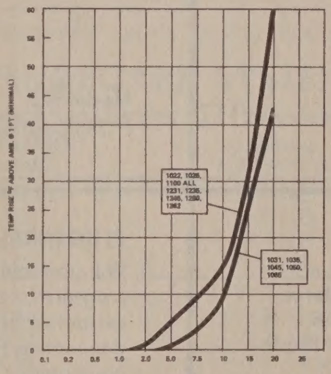
Options: Insulation, special finishes, unique end configurations.

Insertion: Manual or semi-automatic insertion equipment available.

PERFORMANCE DATA



IR DROP



TEMPERATURE RISE

The following performance data meets or exceeds MIL-STD-202 "D" (Full Report Available).

Thermal Shock: Method 107, Condition A.

Mechanical Shock:
Method 213, Condition H.

Vibration: Method 201.

Corrosion Resistance: Method 101, Condition B 48 Hour Exposure Salt Spray.

Contact Voltage Drop:
0.533 millivolts maximum per amp.

Gas Tight Contact: 10 minutes of 1:1 hydrochloric/nitric acid followed by 10 minutes of ammonium sulfide fumes.

DESIRED PIN BAR CONFIGURATION

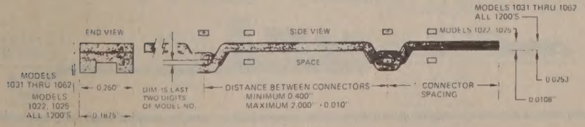
Alternate Pins (Series 1000 & 1200)		Connector Pin Size	Adjacent Pins (Series 1100)
	1022	.022" x .036"	1122
	1025	.025" x .025"	1125
1031	1231	.031" x .062"	1131
1035	1235	.035" x .050"	1135
1045	1245	.045" x .045"	1145
1050	1250	.050" x .035"	1150
1062	1262	.062" x .031"	1162

HOW TO ORDER

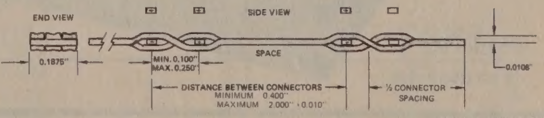
An 11-digit number is used for ordering. An example would be as follows:

1031	— 0.500	— 32	— G	or T
Model No.	Connector Spacing 0.500"	No. of Connectors	gold finish	tin finish

MODEL 1000 & 1200 SERIES ALTERNATE PIN BUSS


END VIEW
SIDE VIEW
SPACE
MODELS 1031 THRU 1062
ALL 1200'S
MODELS 1022 1025
MODELS 1031 THRU 1062
0.260"
MODELS 1022, 1025 ALL 1200'S
0.1875"
DIM. IS LAST TWO DIGITS OF MODEL NO.
DISTANCE BETWEEN CONNECTORS
MINIMUM 0.400"
MAXIMUM 2.000" ±0.010"
CONNECTOR SPACING
0.0253
0.0108"

MODEL 1100 SERIES ADJACENT PIN BUSS


END VIEW
SIDE VIEW
SPACE
0.1875"
MIN. 0.100"
MAX. 0.250"
DISTANCE BETWEEN CONNECTORS
MINIMUM 0.400"
MAXIMUM 2.000" ±0.010"
½ CONNECTOR SPACING
0.0108"

NOTE: 1100 0.400 MODELS WILL PICK UP A PIN EVERY 0.200" ON CENTER

LEAR SIEGLER, INC.

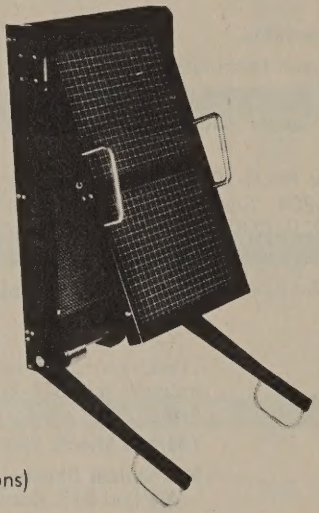
LSi Pin Bar Products

ELECTRONIC INSTRUMENTATION DIVISION
714 NORTH BROOKHURST STREET • ANAHEIM, CALIFORNIA 92803
(714) 774-1010 TWX — 910-591-1157 • TLX — 65-5444

MAC/PANEL PLUGBOARD PROGRAMMING SYSTEMS

SERIES 140 PLUGBOARD SYSTEMS

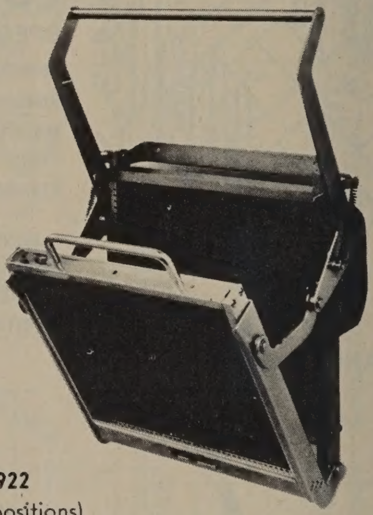
Extremely strong and compact systems with removable plugboards. Features cam-closing mechanism. Choice of taper pin or wrap terminations for connecting to external equipment. A complete line of manual or fixed (semi-permanent) plugwires are offered. Nine standard sizes from 240 to 5,120 gold or nickel plated contact positions, mounted in phenolic or diallyl phthalate insulation on 0.250" x 0.250" centers. Catalog 102.



Model 939
(2,560 positions)

SERIES 157 PLUGBOARD SYSTEMS

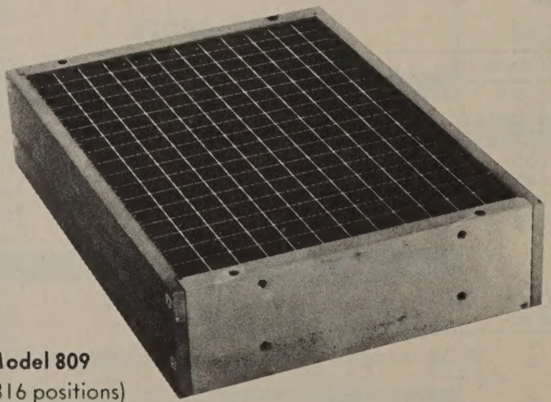
Reliable, economical program control. Taper pin or wrap terminations to external equipment. Removable plugboards patched with manual or fixed (semi-permanent) plugwires. Nineteen standard sizes from 200 to 5,120 gold or nickel plated contact positions, mounted in phenolic or diallyl phthalate insulation. Catalog 101.



Model 922
(1,280 positions)

FIXED PLUGBOARD SYSTEMS

Used where program change requirements do not dictate the use of removable plugboards. Systems from 200 to 1,632 contact positions are offered from stock. Sizes up to 9,600 positions are made to order.



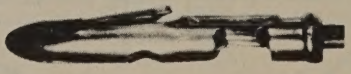
Model 809
(816 positions)

PLUGWIRES • CONNECTORS • TOOLS

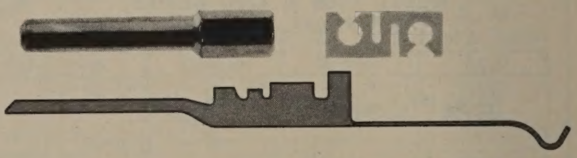
We maintain shelf stock on over 500 standard plugwires, connectors, and crimping, insertion and extracting hand tools. These are used for interconnecting the plugboard system to external equipment.

Series 157

Series 140



Series 157 Fixed



MAC/PANEL Company maintains a large inventory of catalogued components; most orders are shipped "off-the-shelf." Our design engineers are available for consultation on unique or unusual problems. See your MAC/PANEL representative, or write or call for catalog data and specifications.

MAC/PANEL COMPANY
P. O. Box 5027, High Point, N. C. 27262
Telephone (919) 882-8138

MAC/PANEL

PLUGBOARD PROGRAMMING SYSTEMS

APPLICATIONS OF REMOVABLE PLUGBOARD SYSTEMS

MAC/PANEL Plugboard Programming Systems are used whenever there is a need for frequent or fast changes in the functions performed by electrical equipment and circuits or in the interconnection of two or more machines and/or circuits. Removable Plugboards are prewired with plugwire assemblies to provide a given pattern of interconnection. Changes can be made either by changing the program wired in the removable Plugboard or by simply replacing the Plugboard in the Receiver with another preprogrammed Plugboard in a matter of a few seconds. *MAC/PANEL* Plugboard Programming Systems are used as large connectors with up to 5,120 contact positions on standard models. Thousands of *MAC/PANEL* systems have been installed in the United States and in over forty foreign countries since 1958.

GENERAL PRODUCT DESCRIPTION

Each system consists of a Receiver and one or more removable Plugboards. The Receiver is the frame and the engaging mechanism that accepts the removable Plugboard. Depending on the system, thew are from one to six molded black phenolic or blue diallyl phthalate panels in the Receiver and Plugboard frames. A molded panel will contain from 200 to 1280 holes or contact positions. These panels are silk screened with a grid pattern that provides a unique alphanumeric address for each contact position in the system. Special customized printing in any number of colors can be provided on either the Plugboard or Receiver.

A contact spring is factory installed in each Receiver contact position. The front portion of these nickel or gold plated contact springs mates with nickel or gold plated plugwire tips inserted in the appropriate contact position of the Plugboard when the Plugboard is inserted in the Receiver. All Receivers are equipped with a mechanical interlock that assures proper mating of contact springs and plugwire tips. Each contact position can also be directly connected to the equipment from the rear of the Receiver by soldering, insertion of taper pins, or wire-wrapping. The desired method of connection must be determined prior to ordering so that the appropriate type of contact springs will be provided in the Receiver.

MAC/PANEL maintains shelf stock on over 500 types of plugwire assemblies. These include single conductor and multi-conductor unshielded and shielded plugwires as well as crimpable and wire-wrapable plugwire tips.

MAC/PANEL customer service personnel and design engineers invite your inquiries. We can promptly and economically design, build, and install a special custom system or plugwire if our standard product will not meet your requirements.

SERIES 157 PLUGBOARD SYSTEMS (Catalog 101)

(Accepts Series 157 Plugwire Tips)

CONTACT POSITIONS	MODEL NUMBER	HOLE PATTERN HOR.-VERT.	LOCKING MECHANISM	RECEIVER DIMENSIONS WIDTH	HEIGHT	DEPTH
200	902	10 X 20	SPRING	4.1	10.4	3.0
320	903	16 X 20	SPRING	5.6	10.4	3.0
440	904	22 X 20	SPRING	7.1	10.4	3.0
440	905	20 X 22	SPRING	6.6	11.0	3.0
680	901	20 X 34	LEVER-ARM	8.6	14.1	6.0
748	906	22 X 34	LEVER-ARM	8.6	14.1	6.0
816	907	24 X 34	LEVER-ARM	9.2	14.1	6.0
1280	922	40 X 32	LEVER-ARM	13.4	13.6	6.0
1600	921	50 X 32	LEVER-ARM	16.3	13.6	6.0
680	918	20 X 34	CAM-ARM	8.0	12.1	2.5
748	920	22 X 34	CAM-ARM	8.0	12.1	2.5
816	919	24 X 34	CAM-ARM	8.6	12.1	2.5
1280	924	40 X 32	CAM-ARM	12.5	11.6	2.5
1496	923	44 X 34	CAM-ARM	16.0	12.5	4.0
1632	925	48 X 34	CAM-ARM	17.0	12.5	4.0
2560	926	40 X 64	CAM-ARM	13.0	23.0	4.0
3264	927	48 X 68	CAM-ARM	17.5	24.0	4.0
4896	928	48 X 102	CAM-ARM	17.5	35.0	4.0
5120	929	80 X 64	CAM-ARM	24.5	23.0	4.0

SERIES 140 PLUGBOARD SYSTEMS (Catalog 102)

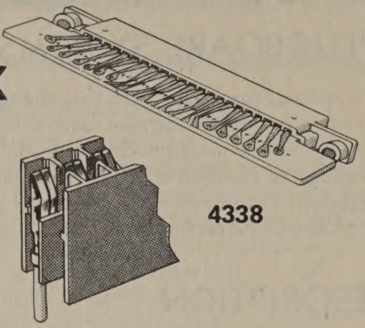
(Accepts Series 140 Plugwire Tips)

CONTACT POSITIONS	MODEL NUMBER	HOLE PATTERN HOR.-VERT.	LOCKING MECHANISM	RECEIVER DIMENSIONS WIDTH	HEIGHT	DEPTH
240	930	10 X 24	CAM-ARM	5.2	8.9	2.0
480	931	20 X 24	CAM-ARM	7.7	8.9	2.0
640	932	20 X 32	CAM-ARM	7.7	10.9	2.0
816	933	24 X 34	CAM-ARM	8.7	11.4	2.0
1280	934	40 X 32	CAM-ARM	13.1	10.9	2.0
1632	935	48 X 34	CAM-ARM	15.1	11.4	2.0
2560	939	40 X 64	CAM-ARM	13.5	22.0	2.5
3264	937	48 X 68	CAM-ARM	15.9	23.0	2.5
5120	938	64 X 80	CAM-ARM	20.1	26.0	2.5

MAC/PANEL COMPANY, P. O. BOX 5027, HIGH POINT, N. C. 27262, TELEPHONE (919) 882-8138

New Molex Value-Engineered Connectors & Sockets

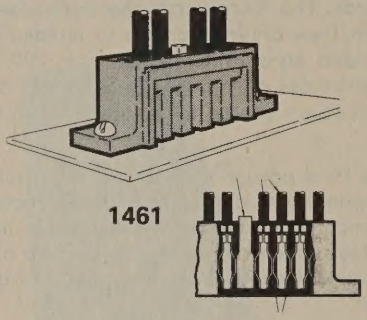
molex®



4338

DUALCON™ Dual P.C. Board Edge Connector
4338 Series

Molex has introduced a new .156 crimp/snap-in dual read out edge connector for .062 P.C. cards. The crimp snap-in type contact allows greater production flexibility and at the same time reduces labor/assembly man-hours, because you use only the contacts you need. The black polyester housing is dimensionally stable and requires no mounting panel revisions to replace most of the currently available edge-connectors of the solder loop or P.C./wire wrap type. The 5 AMP rated terminals are available with pre-tin gold over nickel, or selective gold plating and will accommodate 18-24, and 24-30 AWG. Crimp, solder loop, and split eyelet type terminals are available. Inter-contact and on-contact polarizing keys are optional. The connector housing is available with or without mounting flanges in 6, 8, 10, 12, 15, 18, 22, 24, 25 and 28 dual row positions.

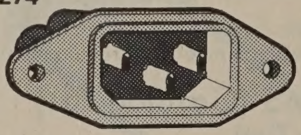


1461

COMPLUS™ Commoning Connector 1461 Series

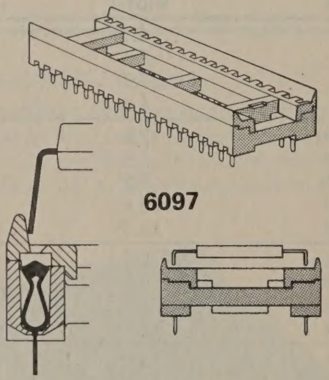
A simple, less expensive method for power distribution in electric/electronic products. This system allows a two part inventory, greater design flexibility, stackable for multiple rows, low cost crimp/snap-in termination and the ability to design any practical commoning combination. Optional polarizing key. Cold stamping standard. Housings available in 5, 10, 15 and 20 circuits. Terminals are in two sizes to accommodate wire sizes from #14 to #22 gauge wire and insulation diameter of .061 to .145 inches maximum. 15 AMP rating.

4274



A.C. RECEPTACLE 4274 Series

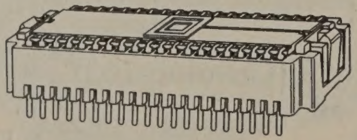
Three prong inter-nationally approved line cord receptacle for equipment which must be unplugged offers the lowest installed cost in the industry today. Approved by UL, CSA and VDE. Contacts do not have to be soldered. Three crimp/snap-in type rectangular pins rather than the conventional solder lugs are used in a polarized receptacle.



6097

ZIPCON™ Closed Entry LSI Socket 6097 Series

The socket combines the time-tested quality of the Molex Soldercon 1938 Dual Beam contact with a new 94V-O flame retardant polyester housing. This new combination allows insertion and withdrawal of fragile LSI's without damage while maintaining sufficient normal force for a reliable low-level electrical contact. The Molex Soldercon features side bearing contacts. These contacts offer better overall contact reliability, mechanically and electrically, because we are making contact with the main surface of the lead frame. The 94V-O black housing design incorporates many desirable features such as the closed entry cap ... a tapered lead-in ramp to insure positive positioning of the LSI in the contact areas, and a closed socket base to prevent solder wicking during wave soldering. The 6097 is available in 24, 28 and 40 positions on .100 x .600 spacing. Contact platings and materials are available in tin, selective gold, and overall gold over brass or phos-bronze material.



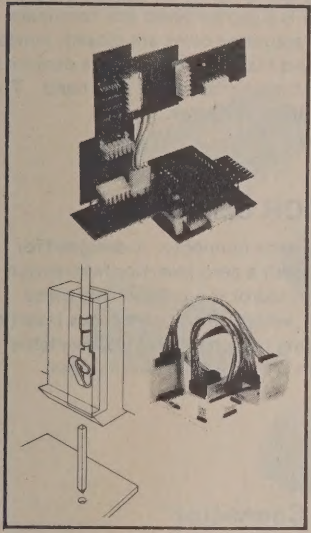
ZERO FORCE LSI Sockets 24, 28, or 40 Position

Features zero axial insertion force, assures that LSI leads will not be damaged even after multiple insertions. Positive lock-in in the loaded position. Plus self-ejection of the LSI module. SE-O nylon housings.

Molex Incorporated, Dept. EEM74, 2222 Wellington Court, Lisle, Illinois 60532, (312) 969-4550

Molex Value-Engineered Connectors

molex



KK-100 and KK-156 Interconnection Systems

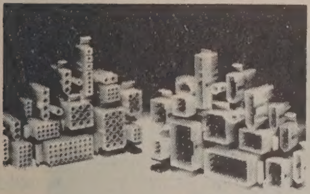
11 basic components handle all your printed circuit interconnection needs: cable-to-board; board-to-board, parallel; board-to-board, perpendicular; board-to-chassis; and power transistor connectors.

Cable-to-board connections: 2 to 24 circuits
Board-to-board connections: 2 to 18 circuits
Pin material: tin-plated brass; gold plating available upon request
Housing material: nylon 94VE-2 (SE-2 rated)

.025″ and .045″ rigid square wire pins—simple . . . low cost . . . reliable. 1/2″ to 2″ lengths permit connecting multiple boards to the same circuit.

KK system includes:

- Flat wafer connectors (round wire with nylon wafer).
- Crimp-type connectors with locking ramp.
- Nylon wafer connectors (round wire).
- Right-angle wafer connectors (square wire with nylon wafer).
- Friction-lock wafer connectors (round wire with nylon wafer).
- P.C. board connectors (right-angle, top, and bottom entry).
- Polarizing wafer connectors (round wire with nylon wafer).
- Crimp-type connectors (mates to square wire or round wire assembly).
- Crimp-type edge connectors (plain and with optional mounting ears).
- Power transistor sockets (.156″ crimp-type and solder-tail; .100″ crimp-type and solder-tail).



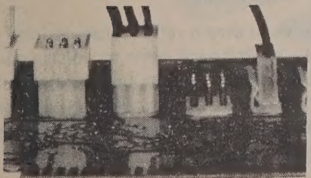
Molex .093″/.062″ Multi-Pin Connectors

.093″ connectors in 3, 6, 9, and 15 circuits
.062″ connectors in 1 through 36 circuits

These famous Molex connectors are SE-2 rated nylon with integral shielding sleeves that isolate each terminal. A positive locking device prevents connectors from separating due to vibration. Integrally molded mounting ears provide fast snap-lock panel mounting without screws, brackets, etc. Connectors cannot be misconnected. Pin and socket terminals can be inserted for added polarity. Use Molex standard .093″ dia crimp-type pin and socket. Hand, bench, and automatic assembly tools are available.

Edgecon^(R) Edge Connectors

Fast, reliable, and economical means for connecting circuits to the edges of .063″ printed circuit boards. Bifurcated flat terminal contact makes excellent connection with board contact faces without damaging pads. Available with or without mounting flanges and in right angle or straight models for added design flexibility. Housings accept Molex 1797/1799 crimp terminals. Also, terminals can be supplied with selective or overall gold plating. Consult Molex for details.



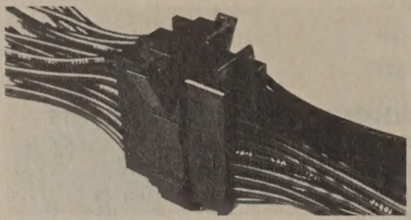
Wafercon^(R) Printed Circuit Connectors

These .093″ bead pin-type terminals are preassembled into nylon wafers to save time and labor during production, testing, and servicing. Assemblies are supplied ready for press fitting and soldering into place. Intermix of male and female terminals assures error-free connection and positive polarity. Wafercon connectors may be mated anywhere on the board—circuits do not have to be run to the edge. Use Molex standard .093″ dia receptacles.

Molex Incorporated, Dept. EEM74, 2222 Wellington Court, Lisle, Illinois 60532

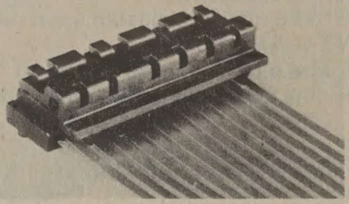
New Molex Value-Engineered Connectors

molex®



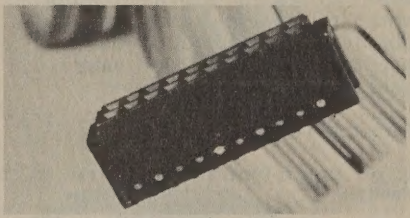
ZIFCON 4346 Zero Force Connector

The design and operation of the 4346 ZIFCON zero insertion force connector is simple, economical and reliable. When the plug is mated with the receptacle, there is a gap between the terminals and no contact is made. As the actuating cams are closed, contact is made between the terminals and the two housings are positively locked together. The operation can be made with one hand. The connector comes in 16, 24 and 36 circuit sizes.



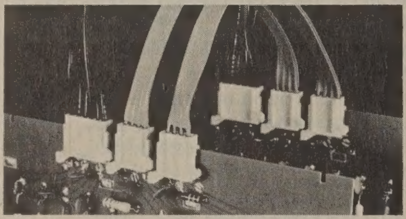
4850 FLAT CONDUCTOR Connector

The new Molex 4850 Flat Conductor connector is designed for cable or flexible etched circuits with a zero insertion/extraction force. The focal point of the connector is a unique two-piece design with a snap-on hinge cam, which allows numerous insertions and withdrawals without damaging expensive and fragile etched circuits. The 4850 is available in 5 through 25 circuit sizes.



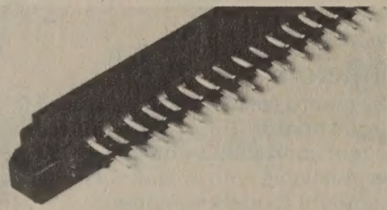
4700 RIBBON CABLE Connector

The 4700 is an insulation displacement connector. It is designed for mass termination of ribbon cable with conductors on .050″ centers. Featured is accurate placement of the cable relative to the insulation displacement terminal by grooves in the mating housing.



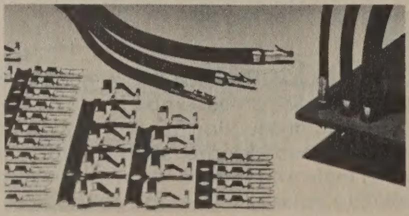
PRESS-SURE-MATE 6763 Connector

Cut your interconnection costs by eliminating gold contacts and by gang crimping with the new Press-Sure-Mate 6763 connector series. This unique zero insertion force connector system incorporates a high pressure point contact to achieve connection to P.C.B. solder pads creating a gas-tight interface. The connector is available in 2, 4 and 6 contact configurations.



6511 DOUBLE-SIDED, P.C. Tail Edge Connector

With the 6511, Molex enters the P.C. tail double sided edge connector market. Terminals are phosphor bronze, selectively gold plated on .156″ centers and .140″ and .200″ row to row spacing of P.C. tails. Housings are sturdy 30% glass filled polyester.



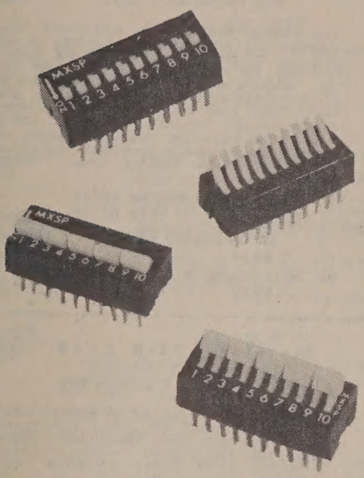
4811 STRAIN RELIEF Terminal

The recently developed 4811 series of strain relief terminals are used to secure wire leads to a printed circuit board prior to soldering. Thus, eliminating the need for pre-affixed eyelets or griplets on the printed circuit board. The terminal construction allows the actual wire lead to be soldered, and because the terminal fills the printed circuit board hole, solder voiding is minimized.

Molex Incorporated, Dept. EEM74, 2222 Wellington Court, Lisle, Illinois 60532, (312) 969-4550

Molex Switch Products

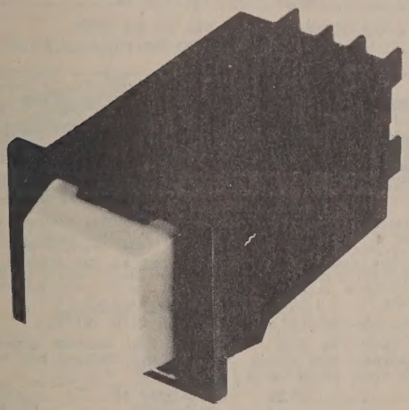
The BOSS™ Switch 4130 series
Binary Option Selection Switch



BOSS™ Multi Position Dip Switches
4130 Series

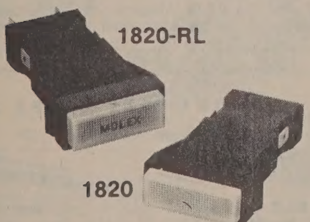
Molex has introduced a versatile DIP switch family developed for printed circuit board applications. The Boss (Binary Option Selection Switch) Switch Family consists of a unique SPST long actuator lever, SPDT or DPST model, and SPST low profile (.360" high) version. Every switch in the Boss Family offers a truly low cost method of programming functions into solid state equipment. Any electronic device requiring optional preset logic to achieve a varying result can use this type of product. Solder-tail leads on .100 x .300 centers let you mount the Boss through a DIP socket or directly to the P.C. board eliminating the cost of interconnection wiring to perform the switching function. Snap-on covers and rubber boots are available. The Boss is rated for 50 ma at 30 VDC; minimum contact resistance of 100 Milli-Ohms and tested to 5,000 actuations; and it programs a savings of up to 50%.

Molex Lighted Pushbutton Switches



"THE SWITCH FOR UNDER A BUCK"
Replaceable Lamp Lighted Push Button Switch 10400 / 10410 / 10420 Series

Molex has introduced a new U.L. listed replaceable bulb/lens lighted push button switch family. The buttons may be molded in an assortment of colors and shapes to enhance the appearance of your assembled unit. Switch actions include SPST, SPDT, DPST, and DPDT with momentary or alternate action. Applications include office machines, appliances, computers and the home entertainment field. 10400 Rectangular bezel w/molded mounting ears. 10410 Rectangular bezel w/spring clip mounting. 10420 Square bezel w/spring clip mounting. 50,000 minimum life cycle. In addition to the 10.1 AMP rating, the entire series offers reliable switching action at low levels (100 milli-amps at 30 volts), and a replaceable T 1-3/4 bulb in all but the 125 Neon version.



1820 – combines functional beauty with economy. Available in more than 1000 variations of bulbs, button colors, button shapes, bezels, and legends. Light may be wired independently or to show on-off action of the switch. Integrally molded mounting ears speed panel mounting, without additional hardware,

1820-RL – the popular 1820 series featuring a replaceable light bulb. Bulb can be easily and quickly replaced from the front.

Standard lighted push button, rocker, and combination switch and receptacle units are also available through local distributors.

Molex Incorporated, Dept.,EEM74, 2222 Wellington Court, Lisle, Illinois 60532, (312) 969-4550

mueller clips

a complete line of

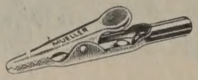
ALLIGATOR TEST & BATTERY CLIPS

Mueller Electric Co. CLEVELAND, OHIO 44114

"60 SERIES" ALLIGATOR CLIPS

U.S. Patent No. 3,321,736

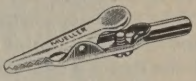
No. 60—CONVENTIONAL TYPE



New slim design with full-meshing teeth. Convenient, round thumb grip, barrel connection for banana plug. Equipped with small soldering lip. Strong spring with a hard bite. Cadmium plated. 2" long.

EACH NET........................ $0.16 LOTS OF 10........................ $0.122

No. 60-S—SCREW CONNECTION



Eliminates necessity for soldering. Otherwise same as No. 60.

EACH NET.... $0.19 LOTS OF 10... $0.143

No. 60-NS—ALLIGATOR NEEDLE CLIP

Like No. 60-S, but with insulation piercing needle in one jaw. Screw connection. 2" long. 10 per box.

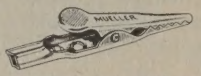
EACH NET........................ $0.35 LOTS OF 10........................ $0.264

No. 60-CS—COPPER ALLIGATOR CLIP

Solid copper version of No. 60-S. Screw connection. 2" long. 10 per box.

EACH NET........................ $0.30 LOTS OF 10........................ $0.225

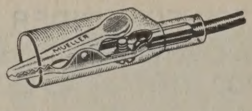
No. 60PR-2—SPECIAL BARREL FOR TEST PROD OR PHONE TIP



Barrel crimped to provide friction fit on standard test prod or phone tip. Holds prod on test, frees hand for other work.

EACH NET........................ $0.24 LOTS OF 10........................ $0.18

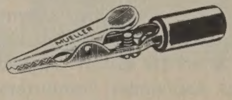
No. 62 FLEXIBLE VINYL INSULATOR



Red and black insulators for Alligator Clips 60, 60-S, 60-CS, 60PR-2, 60-NS.

EACH NET........................ $0.09 LOTS OF 10........................ $0.071

No. 60-HS—STEEL ALLIGATOR CLIP WITH INSULATED HANDLE



Same as No. 60-S except equipped with red and black insulating sleeves on end. Very convenient for distinguishing leads. Has screw connection also. Cadmium plated. 2$\frac{11}{32}$" long. Shipped half red, half black.

EACH NET........................ $0.26 LOTS OF 10........................ $0.195

No. 60-CHS—COPPER ALLIGATOR CLIP, INSULATED HANDLE

Solid copper version of No. 60-HS. Screw connection. Shipped with half red, half black insulating sleeves. 10 per box.

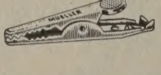
EACH NET........................ $0.36 LOTS OF 10........................ $0.27

"70 SERIES" ALLIGATOR CLIPS

U.S. Patent No. 2,762,028

Features simplified design, fast connection of wire with cord strain relief ears, patented hinge construction and lower cost.

No. 70—FOR SOLDERED CONNECTION



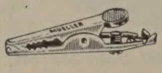
Steel, cadmium plated. 1$\frac{11}{16}$" long.

EACH NET..... $0.13 LOTS OF 10...... $0.098

No. 70-S—SCREW CONNECTION

Otherwise same as No. 70.

EACH NET..... $0.16 LOTS OF 10...... $0.12

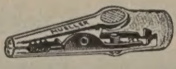


No. 70-CS—COPPER SCREW CONNECTION

Solid copper version of No. 70-S.

EACH NET...... $0.26 LOTS OF 10..... $0.196

No. 72— SKIN-TIGHT INSULATOR FOR 70 SERIES ALLIGATOR CLIPS!



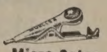
For the first time complete, skin-tight, one-piece insulation for a standard size Alligator Clip! Covers entire clip right down to nose. Special tip slot permits full jaw opening without exposing teeth.

EACH NET........................ $0.09 LOTS OF 10........................ $0.071

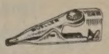
MICRO-GATOR CLIP

(Smallest Insulated Clip Ever Made)

U.S. Patent No. 2,762,028 Trademark Reg.



Micro-Gator



Micro-Gator with Insulator

The alligator clip with the microscopic tip! This is the alligator clip you now can use where no other clip will do . . . on printed circuits, in tight spots and on tiny terminals too crowded for anything but its microscopic tip. Including separate skin-tight insulator the tip is no bigger than the head of a pin! Yet the Micro-gator has ample thumb grip, and plenty of bite to stand up straight on the smallest terminals. Ample $\frac{7}{32}$" jaw spread. 1$\frac{3}{32}$" long. Solder connection. Skin-tight flexible vinyl insulator (sold separately) has "lip-action" tip slot so that jaws stay covered whether open or closed.

No. 34 (Steel, cadmium plated)

EACH NET........................ $0.11 LOTS OF 10........................ $0.083

No. 34-C (Solid Copper)

EACH NET........................ $0.14 LOTS OF 10........................ $0.105

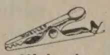
No. 36 (Insulator for Nos. 34 and 34-C)

EACH NET........................ $0.07 LOTS OF 10........................ $0.054

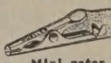
MINI-GATOR CLIP

U.S. Patent No. 3,321,736

Trademark Reg.



Mini-gator



Mini-gator with Insulator

Indispensable for testing or incorporation into miniaturized equipment. New design features rivet hinge for greater strength, full-meshing teeth to grip finest wires. Skin-tight flexible Vinyl insulator (sold separately) covers completely — has slotted "lip action" tip. Clip weighs 1/20th oz., has tiny $\frac{11}{64}$" O.D. nose, but ample $\frac{3}{16}$" jaw spread 1$\frac{3}{32}$" long. Crimping ears. Solder connection. Surprisingly strong bite penetrates corrosion and coatings.

No. 30 (Steel, cadmium plated)

EACH NET........................ $0.13 LOTS OF 10........................ $0.10

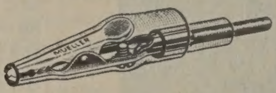
No. 30-C (Solid Copper)

EACH NET........................ $0.16 LOTS OF 10........................ $0.12

No. 32 (Insulator for Nos. 30 and 30-C)

EACH NET........................ $0.07 LOTS OF 10........................ $0.054

COMPLETELY INSULATED ALLIGATOR CLIPS



Patent Pending

No. 63 or 63-C Clip

Sold only as a unit, with factory-applied insulators.

Completely insulated right down to the nose. Flexible 2-piece skin-type vinyl insulator of high dielectric strength, with "lip action" slotted tip that permits opening of clip without exposing metal. Insulator nose is only 13/64" O.D. The tight fitting sheath preserves all the slimness of the Alligator Clip, still giving complete protection against shorts in even the tightest spots. Screw connection easily made by slipping insulator forward. 2$\frac{1}{8}$" long.

No. 63—INSULATED ALLIGATOR CLIP (STEEL)

Composed of Mueller No. 60-S Alligator Clip steel, cadmium plated, screw connection, complete with 2-piece vinyl insulator. Shipped half with red insulators, half black. 10 per box.

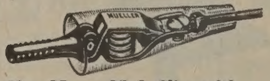
EACH NET........................ $0.36 LOTS OF 10........................ $0.27

No. 63-C—INSULATED ALLIGATOR CLIP (COPPER)

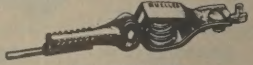
Composed of Mueller No. 60-CS Alligator Clip, solid copper, screw connection. Shipped half with red insulators, half black. 10 per box.

EACH NET........................ $0.42 LOTS OF 10........................ $0.317

CROCODILE CLIPS



No. 85 or 85-C Clip with No. 87 Insulator



No. 85-T Clip

No. 85—A very small clip with slender, elongated jaws for getting into tight places in radio or electrical test work. Screw connection. 2$\frac{1}{8}$" long.

EACH NET........................ $0.19 LOTS OF 10........................ $0.143

No. 85-C—Same as No. 85,, except solid copper with phosphor bronze spring, brass screw. A radio frequency, entirely non-ferrous test clip. 10 per box.

EACH NET........................ $0.38 LOTS OF 10........................ $0.285

No. 85-T—Crocodile "Tip-Clip"—equipped with standard phone tip on one jaw, otherwise same as No. 85. Ideal for use as a prod, for ordinary clip connections and for connections to insulated binding posts having non-removale heads. 2$\frac{5}{8}$" long. 10 per box.

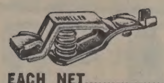
EACH NET........................ $0.50 LOTS OF 10........................ $0.375

Use No. 87 Insulators for clips 85, 85-C and 85-T. Red and Black. Cover entire clip except nose. Protect against short and shock. Help to distinguish leads.

mueller clips

a complete line of
ALLIGATOR TEST & BATTERY CLIPS
Mueller Electric Co. CLEVELAND, OHIO 44114

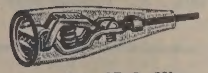
TEST CLIPS



No. 45 PEE WEE

A very small test clip for radio, ignition, meter and similar work. 1½" long. Jaw spread 5/16". Steel, cadmium plated.

EACH NET..........................$0.17 LOTS OF 10........................ $0.128



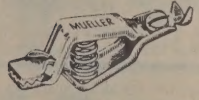
No. 45-C Clip
No. 47 Insulator

No. 45-C
Solid Copper R.F. Test Clip

Solid copper radio frequency test clip. Phosphor bronze spring, brass screw. Will not heat up in high frequency test work, entirely non-ferrous. 1½" long. 10 per box.

EACH NET..........................$0.29 LOTS OF 10........................ $0.22

Use No. 47 Insulator for clips 45 and 45-C.



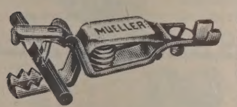
No. 48-B

A small test and battery clip for radio use and general testing purposes. 2" long. Jaw spread ½". Steel, cadmium plated. 10 per box.

EACH NET......$0.24 LOTS OF 10..... $0.18

No. 48C—Solid Copper. Same size as 48-B.

EACH NET..........................$0.33 LOTS OF 10........................ $0.25



No. 50-C Needle Clip

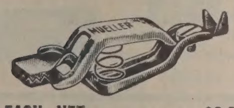
Solid copper. Needle pierces insulation of wire for quick test contact. 2¼" long. 10 per box.

EACH NET.... $0.54 LOTS OF 10..$0.405

No. 51-C—Large crocodile clip. Same as 50-C but without needle. 10 per box.

EACH NET.... $0.39 LOTS OF 10.... $0.293

Use No. 49 insulator for Clips 48-B, 48-C, 50-C and 51-C.



No. 27

A high grade test clip with meshing teeth on three sides of jaws. For laboratory and shop test work 2 1/16" long. Jaw spread ⅝". Steel, cadmium plated. 10 per box.

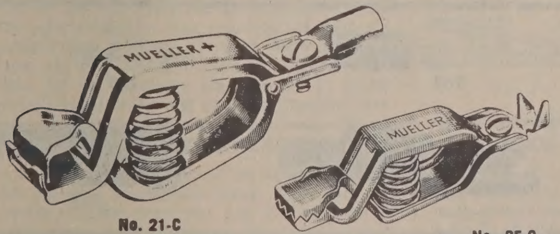
EACH NET..........................$0.31 LOTS OF 10........................$0.233

No. 27-C—Solid copper. Same size as No. 27. 10 per box.

EACH NET......................... $0.49 LOTS OF 10........................ $0.368

Use No. 29 Insulator for clips 27 and 27-C.

LARGER SIZES OF CLIPS



No. 21-C

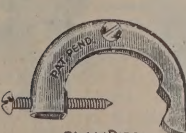
No. 25-C

All packed 10 per box.

	Each Net	Lots of 10
No. 24-A — 25 Amp. Steel, lead plated, 2⅞" long	$0.46	$0.346
No. 25 — 40 Amp. Steel, cadmium plated, 3" long	.41	.31
No. 25-C — 75 Amp. Solid Copper, 3" long	.81	.61
No. 21-A — 50 Amp. Steel, lead plated, 4" long	.84	.63
No. 21-C*—100 Amp. Solid Copper, 4½" long	1.98	1.49
No. 11-A*—100 Amp. Steel, lead plated, 6" long	2.22	1.66
No. 11-C*—200 Amp. Solid Copper, 6" long	3.88	2.91
No. 33-C*—300 Amp. Solid Copper, 7¾" long	7.25	5.45

(*Furnished with detachable lug connection for easy securing to large cables.)

GROUND CLAMP

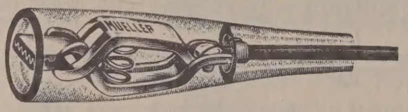


CLAMPIPE
No. 58

The ClamPipe will not spread, bend or lop over when applied. Point of large screw bites through corrosion into clean metal to insure good contact. Applicable to pipe ⅜" to 1⅜" O.D. The best ground clamp on the market!

EACH NET..... $0.48 LOTS OF 10..... $0.36

FLEXIBLE INSULATORS FOR CLIPS



A convenient protection against short circuit and electric shock. Colors help to distinguish leads. Packed half red and half black to indicate polarity. Long tail prevents breakage of wire. Constructed so that clip is held in firmly. NOW AVAILABLE also in blue, white, yellow and green at 10% above regular price are insulators marked * below.

Insulator No.	For Use with Clip No.	Each Net	Lots of 10
13*	11-A, 11-C	$1.39	$1.05
23*	21-A, 21-C	.71	.53
26*	24-A, 25, 25-C	.49	.366
29*	27, 27-C	.30	.227
32*	30, 30-C	.07	.054
35	33-C	3.99	2.99
36*	34, 34-C	.07	.054
47*	45, 45-C	.12	.091
49*	48-B, 48-C, 50-C, 51-C	.23	.173
62*	60, 60-S, 60-CS, 60PR-2, 60-NS (also 70 Series)	.09	.071
72*	70, 70-S, 70-CS	.09	.071
87*	85, 85-C, 85-T	.11	.086

*Also available in blue, white, yellow and green.

MUELLER *QUALITY* BATTERY BOOSTER CABLES

Highest quality cables, equipped with famous Hippo-Clips, for boosting "dead" 6 or 12-volt vehicle batteries with an external battery. Cables are pure copper, finely stranded for high flexibility and covered with rubber insulation which stays flexible in the coldest weather and resists oil, grease and acid. 413 strands of No. 30 wire in the 4-gauge cable and 259 strands of No. 30 wire in the 6-gauge cable. The many fine features of the Hippo-Clips alone are listed elsewhere on this page. The clips are both soldered to the cable and clinched around the cable insulation by means of clinching ears.

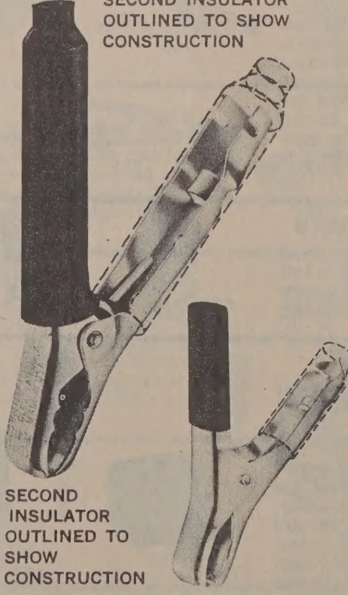
Packaged: pair of cables with clips in a bright, attractive display carton. Standard shipping container 10 cartons.

No. 8A6—8 ft., 6-gauge, with No. 41A Hippo-Clips (Steel, bright copper plated)
NET PRICE PER PAIR......$11.10

No. 12A6—12 ft., 6-gauge, with No. 41A Hippo-Clips (Steel, bright copper plated)
NET PRICE PER PAIR..............$14.70

Mueller
Quality
BATTERY
BOOSTER CABLES
with famous Mueller Hippo Clips
Mueller Electric Co.
12C4
DISPLAY CARTON

No. 12C4—12 ft., 4-gauge, with No. 41C Hippo-Clips (Solid Copper)
NET PRICE PER PAIR..................$24.00


SECOND INSULATOR OUTLINED TO SHOW CONSTRUCTION
SECOND INSULATOR OUTLINED TO SHOW CONSTRUCTION

HIPPO-CLIP

HIPPO-CLIP—For battery booster cables and fast chargers. Proved higher quality and superior design. Built-in solder strap and clinching ears for fast, sure cable connection. Supplied with vinyl handle insulators in red or black. Full 1-9/16" jaw spread. 6" long.

	Net price ea.
No. 41-A Steel, bright copper plated, 100 amp.	$0.93
No. 41-C Solid Copper, 200 amp.	2.46

PIGMY HIPPO-CLIP

PIGMY HIPPO-CLIP—A new small plier clip for battery operated equipment and automotive test. Flat, wide handle allows positive grip. Won't "squirt away". Built-in solder strap and wire clinching ears. Supplied with vinyl handle insulators in red or black. Ample 1⅛" jaw spread. 3" long.

	Net price ea.
No. 46-A Steel, bright copper plated, 50 amp.	$0.30
No. 46-C Solid Copper, 75 amp.	.48

NATIONAL TEL-TRONICS

DEPT. EM, STATE ROAD HILL, MEADVILLE, PA. 16325
A division of Electro Audio Dynamics, Inc. (814) 724-6440

For all your connector and component needs, there is no larger or more reliable source than National Tel-Tronics. Having produced parts for over twenty-five years for all the major OEM equipment manufacturers, National Tel-Tronics has a vast background of component and connector experience on which to draw. Complete tool shop, stamping facilities and in house production capability enable us to have the flexibility to rapidly produce a vast range of electronic connectors and components, either standard or to the customer's specific requirements. Many of our standard parts are listed here. If you don't see your specific requirement, contact our company for a fast and reliable quotation.

PHONO PLUGS AND JACK PLUGS

Choose from the largest selection of plugs; solder, all-crimp, shielded, short and long shell, handled and insulated versions. Also offering the largest selection of single and multiple phono jacks for chassis, panel and P.C. mounting.

36A

39C

333-15

329

49C

60A

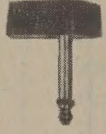
5005

PHONE PLUGS AND JACKS

All standard 2 and 3 circuit jacks and plugs including stereo circuit types are stock items. Ultraminiature, miniature and standard size jacks are available in both enclosed and standard wafer types. Phone Plugs include both screw and solder type and are available in military versions per MIL-P-642.

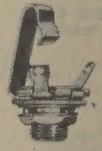
300

308


309

311

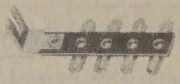
337ENC

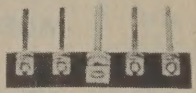

336

338

TERMINAL STRIPS

Thousands of configurations available in XP phenolic or UL approved flame retardant materials. ⅜″ or ½″ spacing is standard. Solder-type, wrap-around, quick disconnect. miniature and sub-miniature types are all standard.


CLIP-ON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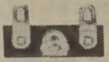
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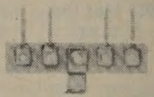
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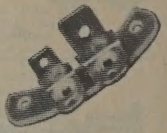
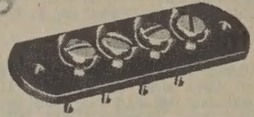


BINDING POST BOARDS

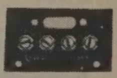
6-32 screw type binding post boards manufactured to standard and custom configurations. Standards include 1 through 12 lug positions in 7⁄16″ or ½″ spacing. Heavy-duty ⅛″ boards and heavy-duty binding post lugs also available. Can be manufactured to custom configurations with silk-screening, hot stamping, fungus resistant finishes and other special requirements.

2554

2404


2704

001-3

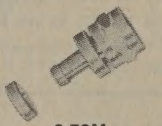

001-7

COAXIAL PLUG AND JACKS, INCLUDING F CONNECTORS

Standard coaxial connectors for battery chargers, AC adapters, calculators, etc. Available in .218 and .195 O.D.'s. Male mating plugs also available. F connectors available in both male and female versions for RG cable. Also have solderless type for RG 58 and 59 versions and PL-259 variations.

6-200

6-200P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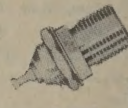
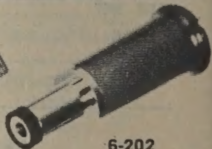
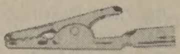

6-72F


6-202

ALLIGATOR CLIPS

Available in both standard high-grade plated steel and in copper construction for extra low resistance. Standard type have ⅜″ jaw opening and will accept banana plug in the rear. Both screw and solder versions are standard. Also available in insulated handle versions and in screw and solder types, tip plug adapters, miniature versions for space saving applications and vinyl insulators in six colors for both the standard and the miniature versions.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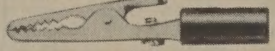
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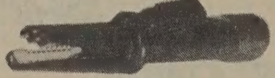

745

749

4 AND 5 WAY BINDING POSTS

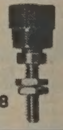
All metal and insulated molded posts are standard items. Available in nickle and gold plating in both 10-32 and 8-32 threads. Dual binding posts in red or black combinations and ¾″ spring also standard.

875

876

4-876

877


878

880

TIP PLUGS AND JACKS

.080 tip plugs are available in a full selection of both solder and solderless types, insulated and non-insulated, including the needle tip and chuck versions. Fully insulated push button meter type plug is also standard for rapid assembly. Molded handles in 1″, 4″ and 5½″ lengths, both threaded and force fit are standard for creating insulated plugs or test probes. Tip jacks are available in insulated and non-insulated types in a variety of colors. Molded nylon tip jacks with metal shell or all nylon shells are also available, including a speed clip type for inexpensive and rapid assembly.

801

855

868

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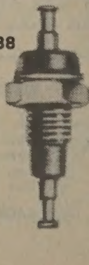
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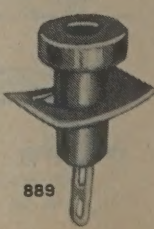

889

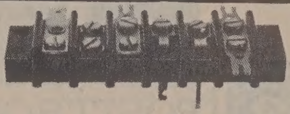
NATIONAL TEL-TRONICS

DEPT. EM, STATE ROAD HILL, MEADVILLE, PA. 16325
A division of Electro Audio Dynamics, Inc. (814) 724-6440

ntt

BARRIER BLOCKS

A complete line of high quality, double row, barrier blocks are available in ⅜″ and ⁷⁄₁₆″ pitch spacing with a variety of terminations to meet your needs. Both eyelet and screw type terminations are available. Eleven terminal variations, 2 block styles and 20 lead positions offer a choice of over 400 standard configurations.



BANANA PLUGS AND JACKS

A full variety of standard and miniature banana plugs with nickle-plated brass bodies and phosphor bronze springs are standard, including side screw and top hex stud mounting version. Insulated handles are available for all plugs. Insulated push-button meter type plug is also standard. Included in the standard line are stacking banana plugs in both single and dual fully molded versions. Banana jacks are available in insulated and non-insulated types in a variety of colors.

809

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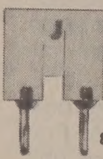
836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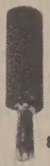
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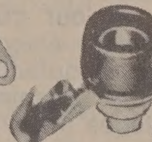
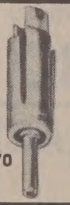

844

ANTENNA PLUGS AND JACKS

National Tel-Tronics is a prime supplier to the major automotive car radio manufacturers as well as to CATV-MATV industry. All standard antenna plugs and jacks are available. The standard 4 prong Motorola type plug as well as less expensive 2 and 3 prong plugs are manufactured to exacting standards. A great variation in shell and contact design on the antenna jacks is available from our inventory.

6-68

6-69


6-70

6-71

6-74

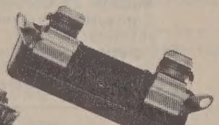
6-75

6-77

FUSE MOUNTING BASES AND HOLDERS

Designed for 3AG type fuses, fuse mounting bases are available in a variety of materials from ¹⁄₁₆″ to ³⁄₁₆″ XP phenolic and UL rated FR materials, in both single and multiple configurations. Panel mount fuse holders for 3AG short type fuses are available in both straight and space-saving right-angle configurations with ribbed and fluted caps. The panel mounted fuse holder parts are CSA and UL approved.

413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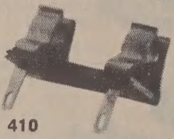
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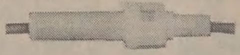
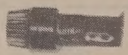

449

450F

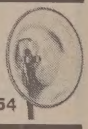

450RA

ANODE AND HIGH VOLTAGE CONNECTORS

Anode connectors to 40 KV rating for BW and color television, and oscilloscopes, are available in a variety of configurations. Spring clips and solderless stainless-steel clips assure continuity. Anode cups are standard in neoprene rubber, flame retardant grade PVC or silicone rubber variations in sizes of 1½″, 1¾″ and 3″. Anode connectors are UL approved.

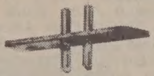
250

239

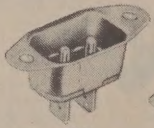

254

INTERLOCK RECEPTACLES

Both flush and bathtub type receptacles for AC connections are standard in a variety of materials from XP phenolic through UL approved flame retardant materials. Solder type, polarized and quick disconnect type pins are standard. Molded snap-in types are also available in flame retardant materials. All the interlocks are approved by Underwriter's Laboratories and Canadian Standard Assn.


712

716


726

732

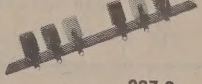
60-740

60-746

MOLDED AND COMPRESSION TERMINAL BLOCKS

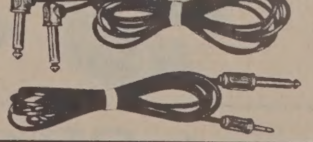
A variety of molded terminal blocks in flexible PVC are available as standard items. Screw type connections, screw driver slot, and .250 quick disconnect connections are standard. Standard size blocks are in a 12 position configuration but can be cut to smaller size if desired. Two types of compression type boards are available from stock. Series 927 features push-button multi-covered terminals which are mounted on phenolic or FR type boards. Available in six different colors in single or multi-roll configurations.

905


927-6

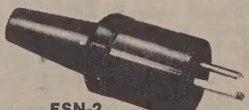
MOLDED CABLE AND HARNESS ASSEMBLIES

A complete molding facility allows great flexibility in providing the audio and electronics industry with a variety of molded cable assemblies. Standard molds includes phone plugs and jacks in 2 and 3 conductor configurations, phono plugs and jacks, miniature phono plugs and miniature jacks, mike connectors, ultra-miniature plugs, coaxial connectors and various adapters. Coaxial and zip cord cables are readily available as well as those for more special applications. Custom assemblies include molds designed to customer specifications and also include capability of amp and molex crimp type assemblies, wire harnesses and multiple conductor assemblies.

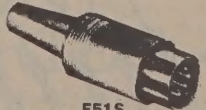


DIN CONNECTORS

NTT European style "Europlugs" are available in two, three and five contact arrangements in both male and female versions. In-line and panel mounted types are standard in both flush and extended barrel configurations.


FSN-2

F51B


F51S

F5K

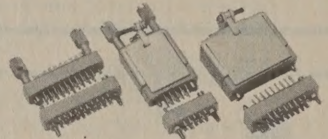
This listing will give you some indication of the capabilities of National Tel-Tronics.
For more details and specifications, send for our complete catalog.

POSITRONIC INDUSTRIES, INC.

At Positronic Industries, we produce connectors for our customers under a *Complete Capability Concept*, which means total in-house manufacturing of all connector components. Complete capability minimizes stock shortages and insures prompt deliveries. For quality and service at a fair price, we are unbeaten. Give us a try. We are in business to serve you.

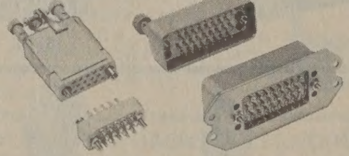
STANDARD CONNECTORS

RECTANGULAR, RACK & PANEL CONNECTORS



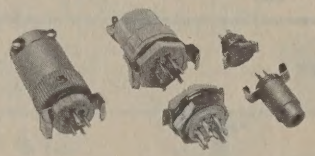
SGM AND SLM, SUB-MINIATURE RECTANGULAR CONNECTORS

Number of Contacts — 5, 7, 9, 14, 20, 26, 29, 34, 44, & 50.
Contacts — Copper Alloy, Gold Plated, 5 & 3 AMP Rated.
Insulator — Glass Filled DAP, SDG-F
Polarization — Guides or Rotating and Fixed Threadlocks, as Desired.
Termination — Solder Cup, Accepts 22 AWG Wire
Hoods — Available for Most Sizes



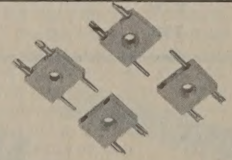
GM AND XGM SERIES, MINIATURE RECTANGULAR

Number of Contacts — 7, 8, 9, 14, 18, 20, 21, 26, 34, 41, & 50.
Contacts — Copper Alloy, Gold Plated, 7.5 AMP Rated.
Insulator — Glass Filled DAP, SDG-F
Polarization — Guides or Rotating and Fixed Threadlocks, as Desired.
Termination — Solder Cup, 20 AWG Wire, and Turret Style.
Hoods & Shells — Available on All Size Connectors. Hoods Have Both Top & Side Cable Opening:
Underwriters' Laboratory Listed*



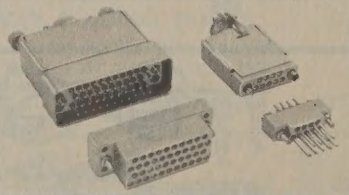
GH & MGH SERIES, MINIATURE AND SUB-MINIATURE HEXAGONAL

Number of Contacts — 4, 5, 7, 9, and 10, Miniature, 3 for Sub-Miniature.
Contacts — Copper Alloy, Gold Plated, 5 & 7.5 AMPS.
Termination — Solder Cup Accepts 20 & 22 AWG Wire
Insulator — Glass Filled DAP, SDG-F
Polarization — Contact Placement Permits Proper Engagement.
Hoods — Glass Filled DAP, SDG-F & Aluminum. Order With or Without Strain Relief.
Accessories — Vibration Locks, Mounting Nuts and Lock Washers.



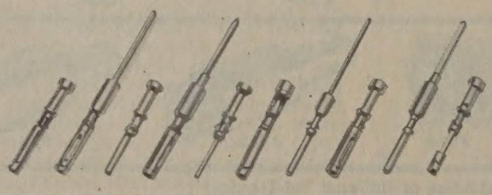
GF SERIES, MINIATURE, SIDE MOUNTING

Number of Contacts — 2 and 4.
Contacts — Copper Alloy, Gold Plated, 7.5 AMP Rated.
Termination — Solder Cup, Accepts 20 AWG Wire, Dip Solder, .025 Dia. for P.C. Mount.
Insulator — Glass Filled DAP, SDG-F and Glass Phenolic.
Polarization — Contact Arrangement Provides Polarization
Optional — Closed Entry Contacts



GMCT SERIES, MINIATURE RECTANGULAR REMOVABLE CONTACT CONNECTORS

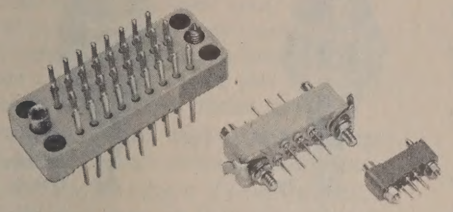
Number of Contacts — 9, 14, 18, 20, 26, 34, 41, 42, 50, 66, 75 & 104.
Removable Contacts — Copper Alloy, Gold Plated, 13 & 7.5 AMP Rated
Contact Termination — Solder, Dip Solder, Crimp and Wire Wrap Wire Size, 14 to 30 AWG
Insulator — Glass Filled DAP, SDG-F
Polarization — Guides or Fixed and Rotating Threadlocks, as Desired
Hoods & Shells — Aluminum, Available for all Sizes.
Underwriters' Laboratory Listed*



CONTACTS, REMOVABLE, SOLDER, DIP SOLDER, CRIMP AND WIRE WRAP

Removable contacts are for use with GMCT Series connector bodies. Contacts are machined copper alloy, gold plated over copper flash. Crimp and solder styles are sized to accept 14 to 30 AWG wire. Wire wrap terminations are .045 and .025 Sq.-dip solder terminations are .026 dia. Crimp and solder styles are available in both .062 and .040 pin diameters. Wire wrap and dip solder are .062 dia. Contacts may be purchased on reels of 2,000 for automatic installation. Contact crimping tools, insertion tools, and removal tools are available from stock.

PRINTED CIRCUIT CONNECTORS



GM, GAP, AND SGM SERIES, PERPENDICULAR MOUNTING ON P.C. BOARD, PIN OR SOCKET

Number of Contacts — GM Series, 7, 8, 9, 14, 18, 20, 21, 26, 34, 41, and 50.
GAP Series, 9, 14, 18, 20, 26, 34, 41, and 50.
SGM Series, 5, 7, 9, 14, 20, 26, 34, 44, and 50.

Contacts — Rated 7½ amps for GAP Series, 5 amps for GM Series, and 3 amps for SGM Series. GM and SGM Series available both pin and socket. GAP Series — pin only, copper alloy, gold plated.

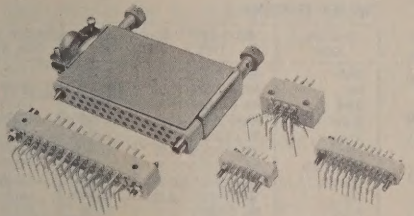
Termination — Dip solder, GAP series .034 dia., SGM and GM Series .025 dia. Tails from 3/32, 4/32, 5/32 and 6/32 long.

Spacing — .150 between contact spacing for GAP and GM Series, and .094 for SGM Series.

Insulator — Glass filled DAP, SDG-F

Polarization — Guides and Threadlocks, also used for mechanical mounting of connector to P.C. Board.

Hoods and Strain Reliefs — Available for mating cable connector Underwriters Laboratory Listing for GM and GAP Series.



GMPL, GAPL, AND SMPL SERIES, RIGHT ANGLED CONTACTS, PARALLEL MOUNTING ON P.C. BOARD, PIN OR SOCKET

Number of Contacts — GMPL Series, 7, 8, 9, 14, 20, 21, and 41.
GAPL Series, 9, 14, 20, 26, 34, 41, and 50.
SMPL Series, 5, 7, 9, 14, 20, 26, and 29.

Contacts — GMPL Series, pin or socket, 5 amp rating. GAPL SERIES, pin only, 7½ amp rating. SMPL Series, pin or socket, 3 amp rating. Copper Alloy, Gold Plated.

Termination — Dip Solder, GMPL Series .025 dia., GAPL Series .034 dia., SMPL Series .020 dia.

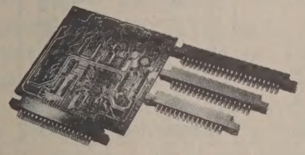
Spacing — .150 hole spacing on P.C. Board for GMPL and GAPL Series, and .094 hole spacing for SMPL Series.

Insulator — Glass filled, DAP, SDG-F

Polarization — Guides and threadlocks for positive alignment and vibration locking.

Mounting — Angle bracket available for bolting of connector to P.C. Board. Connector can also be cemented to board.

Mating Cable Connector — GMPL mates with GM series, GAPL with GMCT Series, SMPL with SGM Series.



GQD AND GKD SERIES, DOUBLE ROW CARD RECEPTACLE TYPE, .156 CONTACT CENTERS.

Number of contacts — 10/20, 15/30, 18/36, 22/44, 28/56, 36/72, and 43/86

Contacts — Bellows, Gold Plated, Phosphor Bronze and Berlyllium Copper. 5 amp rated.

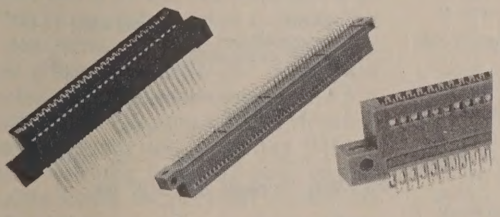
Termination — Dip solder and solder eyelet styles

Insulator — Glass filled DAP, SDG-F for GQD series, Glass filled, flame retardant phenolic for GKD series

P.C. Board Thickness — Will accommodate from .054 through .071 in. thickness

Polarization — Between contacts, plastic keys

Mounting — .128 dia. clearance hole, floating bushings or threaded inserts.



HE 901 AND HE 902 SERIES, DOUBLE ROW CARD RECEPTACLE TYPE, .100 CONTACT CENTERS

Number of Contacts — HE 901 Series, 19/38, 25/50, 31/62, 37/74, 43/86 and 49/98
HE 902 Series, all combinations between 10/20 and 50/100

Contacts — Phosphor Bronze, Bifurcated Type, Gold Plated, 3 amp. current rating.

Termination — Wrap post .025 SQ., dip solder, and solder eyelet.

Insulator — Glass filled phenolic for HE 901, and glass filled polycarbonate for HE 902 Series.

P.C. Board Thickness — Will accommodate from .054 through .071 in. thickness.

Polarization — Between contacts, and in contact key polarization positions.

Mounting — Clearance hole .126 diameter.

Representatives and Distributors located throughout the United States. Foreign representatives listed below —

INTERNATIONAL RECTIFIER
330 Nantucket Blvd.
Scarborough, Ontario, Canada
416-755-7793

TEKDATA LTD.
Westport Lake
Canal Lane, Tunstall
Stoke on Trent
United Kingdom
0782-811711

SOCIETE METOX
86, rue villiers de l'Ise Adam
75020 Paris, France
636.31-10

PRESSKON GmbH
D-7110 Oehringen
Zeilbaumweg, West Germany
(07 941) 3005

PPC ELECTRONIC AG
CH 6301 Zug
Grienbachstrasse 35 A
Switzerland
042-315688

WARBURTON FRANKI, Pty. LTD.
199 Parramatta Rd.
Auburn, N.S.W., Australia 2144

PASINI ELETTRONICA
20124 Milano
Via A. da Recanate, 4
Italy
2.043.276

CEINSA
Pasaje Pradillo 2
Madrid 2, Spain
416 66 82-3

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RAYTHEON

TEST JACKS

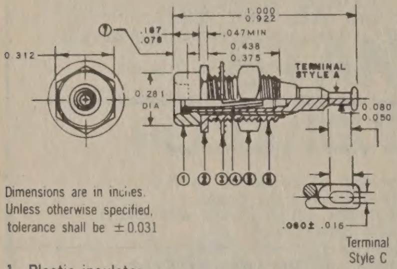
See other Raytheon Products in EEM

Opto-electronics—Section 3700
Switches—Section 5100
Knobs—Section 2400
Hardware—Section 2800

BUSHING MOUNTED TIP JACK

The Raytheon MIL-C-39024/10 tip jack combines highest quality materials and design techniques to provide a highly reliable tip jack for both military and industrial electronic equipment applications. The tip jacks fully meet the requirements of MIL-C-39024. An outstanding, and exclusive, design feature of this jack is its separate beryllium copper spring pin closed entry contact. Closed entry contact design prevents damage to contact through careless probe insertion.

These jacks are designed to accept a 0.080 ± 0.001 dia. test probe and to **prevent** the entrance of a 0.085" test probe.



Dimensions are in inches.
Unless otherwise specified,
tolerance shall be ±0.031

1. Plastic insulator
2. Metal sleeve
3. Internal tooth lockwasher 13/32 o.d. x .013 to .026 thk
4. Spring pin contact
5. Hex nut 11/32 across flats x 1/8 thk
6. Threaded body (insulator) 1/4-32 UNEF-2A
7. Plastic to metal distance 0.062 min.

MATERIAL DATA

Insulator—Polyamide per MIL-P-17091. Teflon material per MIL-P-19468.

Contact—Beryllium copper per QQ C-533, Cond. A, gold plated per MIL-G-45204, Type II, Class I (50 millionths).

Threaded Sleeve—Brass per QQ-B-626, nickel plated per QQ-N-290. Type V, Class 1.

Terminal—Brass per QQ B-626, plated

Mounting Nut—Brass per QQ-B-626, nickel plated per QQ-N-290, Type V, Class I.

Lockwasher—Phosphor bronze per QQ-P-330, Cond. A, Spring temper. Nickel plated per QQ-N-290, Type V, Class I.

ENVIRONMENTAL AND MECHANICAL DATA

Thermal Shock— −65°C to 125°C Method 107 Cond. B MIL-STD-202.

Salt Spray—48 hours—Method 101, Cond. B. MIL-STD-202.

Vibration—Method 201 MIL-STD-202.

Durability—1000 insertion-withdrawal cycles.

Withdrawal Force— 8 oz. minimum (0.080 ± 0.001 probe)

Insertion Force—5 lb. max.

Shock Test—MIL-STD-202, Method 213, acceleration at 50G.

ELECTRICAL CHARACTERISTICS

Rated Current—5 amperes, max.

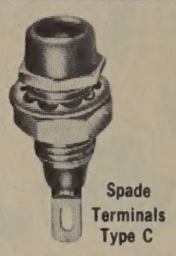
Operating Voltage—2000 volts RMS at sea level, 350 volts RMS at 80,000 feet.

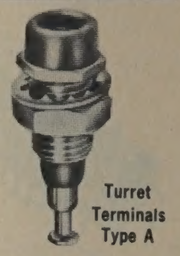
Insulation Resistance—5,000 megohms per Method 302, MIL-STD-202 Cond. A 100 vdc.

Dielectric Withstanding Voltage—3000 volts RMS, 60 Hz, at sea level per Method 301, MIL-STD-202.

Millivolt Drop—at 5 amperes, 15 mv after completion of all environmental and durability tests.

Capacitance— <10 pf at 1500 KC.





ORDERING DATA

Commercial Version also available

Contact and terminal has 400 millionth tin-plate. To order add C in order number prefix. That is, TJC, etc.

TURRET TERMINALS

Insulator Color	MIL-C-39024/10 TYPE A	Raytheon Cat. No.	Fed. Std. 595 Color No.
White	MIL-C-39024/10-01	TJ108W	17875
Red	MIL-C-39024/10-02	TJ103R	11105
Black	MIL-C-39024/10-03	TJ105BL	17038
Brown	MIL-C-39024/10-04	TJ102B	10075
Green	MIL-C-39024/10-05	TJ106GN	14110
Orange	MIL-C-39024/10-06	TJ104OR	12246
Marine Blue	MIL-C-39024/10-07	TJ107MB	15123
Yellow	MIL-C-39024/10-08	TJ101Y	13655
Gray	MIL-C-39024/10-09	TJ109GY	16187
Purple	MIL-C-39024/10-10	TJ110V	27144
Natural Nylon	NO MIL-SPEC	TJ100N	
Natural Teflon	NO MIL-SPEC	TJ111WT	

SPADE TERMINALS

Insulator Color	MIL-C-39024/10 TYPE C	Raytheon Cat. No.	Fed. Std. 595 Color No.
White	MIL-C-39024/10-11	TJ158W	17875
Red	MIL-C-39024/10-12	TJ153R	11105
Black	MIL-C-39024/10-13	TJ155BL	17038
Brown	MIL-C-39024/10-14	TJ152B	10075
Green	MIL-C-39024/10-15	TJ156GN	14110
Orange	MIL-C-39024/10-16	TJ154OR	12246
Marine Blue	MIL-C-39024/10-17	TJ157MB	15123
Yellow	MIL-C-39024/10-18	TJ151Y	13655
Gray	MIL-C-39024/10-19	TJ159GY	16187
Purple	MIL-C-39024/10-20	TJ160V	27144

MINIATURE PC MOUNT JACKS

Raytheon Printed Circuit Test Jacks are miniature units designed specifically for printed circuit applications. Two types are offered; a **standard** model for dip solder board application, and a **short** model for use on boards soldered on automatic flow soldering equipment, or for back-to-back board mounting.

The units consist of a small diameter nylon insulator, a Beryllium-copper spring pin contact, and a gold-plated contact sleeve. Nine brilliant insulator colors are available for convenient visual circuit identification. They accept the standard. .080 dia. test prods.

ELECTRICAL AND MATERIAL SPECIFICATIONS

Rated current: 5 amperes maximum

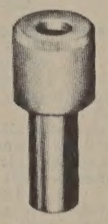
Operating voltage: 1500 volts RMS, 60Hz at sea level, and 300 volts RMS, 60Hz at 80,000 feet.

Contact Resistance: Less than .0015 ohm, at room temperature with standard .080 test prod.

Insulator material: Nylon, per MIL-M-20693.

Contact Sleeve material: Brass, yellow per QQ-B-626, Comp 22, half hard temper, underplate of .0002 minimum thickness of copper per class 3 of MIL-C-14550, overplate of .004 thick tin plate per type 1 of MIL-T-10727.

Contact material: Beryllium copper per QQ-C-533, Condition A. Gold plated (50 millionths) per MIL-G-45204 type 11, class 1.



Standard

Short

ENVIRONMENTAL AND MECHANICAL DATA

Thermal Shock: MIL-STD-202, Method 107, Condition B (−65°C to +125°C)

Salt Spray: MIL-STD-202, Method 101, Condition B (48 hours)

Humidity: MIL-STD-202, Method 103, Condition B (96 hours)

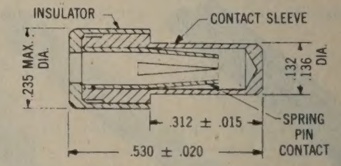
Fungus: Non-nutrient material.

Solderability: Per MIL-STD-202

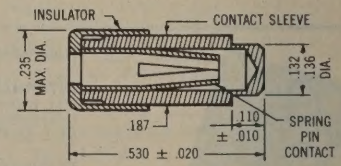
Insertion force: 5.0 lbs. maximum

Withdrawal force: 0.4 lbs. minimum (.080 ± .001 test probe)

Standard Style: For panels up to 1/4" thk.



Short Style: For panels up to 3/16" thk.



ORDERING DATA

Commercial Version also available

Contact and terminal has 400 millionth tin-plate. To order add C in order number prefix. That is, TJC, etc.

Insulator	Fed STD 595	Standard	Short
Color	Color No.	Catalog No.	Catalog No.
Natural		TJ300N	TJ360N
Yellow	13655	TJ301Y	TJ361Y
Brown	10075	TJ302B	TJ362B
Red	11105	TJ303R	TJ363R
Orange	12246	TJ304OR	TJ364OR
Black	17038	TJ305BL	TJ365BL
Green	14110	TJ306GN	TJ366GN
Blue	15123	TJ307MB	TJ367MB
White	17875	TJ308W	TJ368W
Gray	16187	TJ309GY	TJ369GY
Violet	27144	TJ310V	TJ370V

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RAYTHEON TEST JACKS

See other
Raytheon Products
in EEM

Opto-electronics—Section 3700
Switches—Section 5100
Knobs—Section 2400
Hardware—Section 2800

RIGHT ANGLE PC MOUNT TEST JACKS

Raytheon right angle test jacks fulfill a need for a high quality, single .080 contact connector for use with closely spaced printed circuit boards. Straight-forward design and use of highest quality materials combine to provide a miniature connector with an unusual degree of reliability at modest cost.

Their entry contact design prevents damage to contact through careless probe insertion.

These jacks are listed in U.S. Navy Handbook of Miniature Parts for Electronic Equipment (NAVSHIPS-93440(B)) because of their high reliability.

They are also color coded in ten Federal Standard 595 colors.

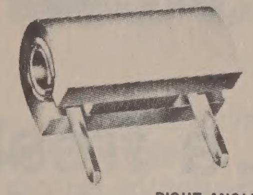
As illustrated in the figures, two terminal spacings are available, either on .300″ or .400″ centers.

MATERIAL DATA

Insulator—Polyamide per MIL-M-20693. Colors—Per MS16108C and MIL-STD-174A (Both based on Fed. Std. 595).

Contact—Beryllium per QQ-C-533, Condition A. Finish—Gold plated per MIL-G-45204 Type II Class I (50 millionths).

Contact Sleeve—Brass, half hard per QQ-B-613, Composition 2. Finish—Under plate of .0002 min. silver per QQ-S-365 Type I or III with .00003 gold overplate.



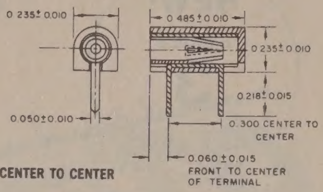
RIGHT ANGLE

ENVIRONMENTAL AND MECHANICAL DATA

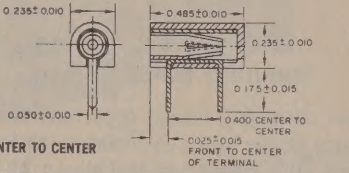
Thermal Shock—MIL-STD-202B, Method 107A Condition B (−65°C — +125°C)
Salt Spray—MIL-E-5272C, Procedure 1 (240 hours)
Humidity—MIL-STD-202B, Method 103A, Condition B (96 hours)
Fungus—MIL-E-5272C, Procedure 1
Solderability—Per MIL-S-6872
Withdrawal Force—8 oz. minimum (.080 ± .001 probe)
Mounting—.300 or .400 centers
Also applicable paragraphs of MIL-J-6751

ELECTRICAL CHARACTERISTICS

Rated Current—5 amperes max.
Operating Voltage—2000 volts RMS (sea level), 350 volts RMS (80,000 ft.)
Contact Resistance—Less than 2 milliohms
Capacitance—Less than 10 $\mu\mu$f at 1500 kc



.3″ CENTER TO CENTER



.4″ CENTER TO CENTER

ORDERING DATA

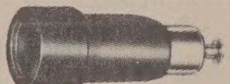
Commercial Version also available

Contact and terminal has 400 millionth tin-plate. To order add C in order number prefix. That is, TJC, etc.

	Fed Std 595 Color	Catalog Numbers	
Color	Designation	.3″ Spacing	.4″ Spacing
Yellow	13655	TJ-201Y	TJ-251Y
Brown	10075	TJ-202BR	TJ-252BR
Red	11105	TJ-203R	TJ-253R
Orange	12246	TJ-204OR	TJ-254OR
Black	17038	TJ-205BL	TJ-255BL
Green	14110	TJ-206GN	TJ-256GN
Marine Blue	15123	TJ-207MB	TJ-257MB
White	17875	TJ-208W	TJ-258W
Gray	16187	TJ-209GY	TJ-259GY
Violet (purple)	27144	TJ-210V	TJ-260V

SNAP-IN MOUNTED/SUBMINIATURE

These subminiature jacks are suitable for use on standard, miniature, or subminiature electronic equipment. Designed for minimum size, they are ruggedly constructed and accept a standard .080 diameter test prod. They nylon insulator is available in any of nine brilliant colors to permit convenient visual coding of circuit check points. An outstanding feature of this jack is the ease and speed with which it may be mounted on a panel or chassis. This is done merely by inserting the insulator in a hole of suitable diameter and pressing the contact assembly into the insulator until it is firmly seated. (See dimension data for recommended insertion tool). The portion of the insulator extending behind the panel expands slightly, locking the unit firmly in place. The entire mounting operation is performed from the front of the panel.

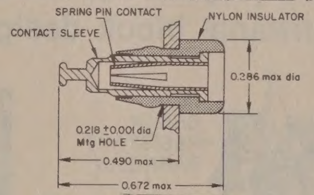


ELECTRICAL SPECIFICATIONS

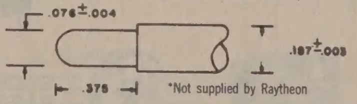
1. Contact Resistance (at room temperature, with standard .080 diameter test prod): Less than .0015 ohm.
2. Capacitance to ground (jack mounted on .052″ thick metal panel): 3mmfd.
3. Voltage breakdown: Arcing at 10 KVDC (front of jack to panel, mounted on .052″ thick panel.

PHYSICAL SPECIFICATIONS

1. Overall length: .655 max. ,
2. Insulator diameter: .286 max.
3. Insulator material: per MIL-M-20693.
4. Contact material: Beryllium-copper, per QQ-C-533, Cond. A., gold-plated.
5. Contact sleeve material: Brass per QQ-B-626, gold-plated.
6. Mounting hole diameter: .218 ± .001
7. Range of acceptable panel thickness: .031-.093
8. Weight: .002 lb. each



Insertion Tool* (for inserting contact assembly)



*Not supplied by Raytheon

ORDERING DATA

Commercial Version also available

Contact and terminal has 400 millionth tin-plate. To order add C in order number prefix. That is, TJC, etc.

Catalog No.	Color	Catalog No.	Color
TJ-400N	Natural	TJ-405BL	Black
TJ-401Y	Yellow	TJ-406GN	Green
TJ-402B	Brown	TJ-407MB	Blue
TJ-403R	Red	TJ-408W	White
TJ-404OR	Orange		

CIRCUIT BOARD MOUNTING BRACKETS

The Raytheon Circuit Board Mounting Bracket is a heavy duty component designed to mount terminals, printed circuits and resistor boards rigidly. Stacked assemblies need Fig. 1 style.

Each bracket will support a load of one-half pound when subjected to vibrational frequencies through 55 CPS with table excursions up to .060 inches or impact loads through 2000 foot-pounds.

- Four sizes for panels from 1-3/8″ to 3-7/16″ wide
- Provides Rigid Support under Shock or Vibration
- Mounts Single or Double Panels
- Meets Military Specifications MIL-E-16400A (Ships), MIL-E-5400, and MIL-P-11268B (Sig C.)
- Formed from .090″ Cold-Rolled Carbon Steel, Cadmium Plated

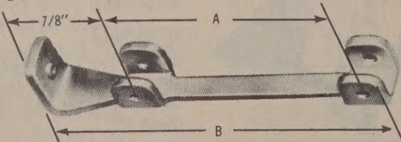


FIG. 2

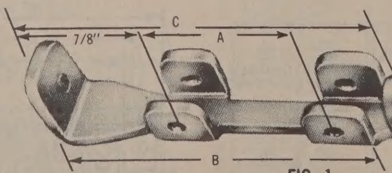


FIG. 1

PANEL WIDTH RANGE	CATALOG NUMBER		A	B	C
	STEEL	FIG.			
1-3/8—1-15/16	MB125	2	1	2-1/16	—
2—2-7/16	MB126	2	1-1/2	2-9/16	—
2-1/2—2-15/16	MB127	2	2	3-1/16	—
3—3-7/16	MB128	2	2-1/2	3-9/16	—
1-3/8—1-15/16	MB133	1	1	2-1/16	2-5/16
2—2-7/16	MB134	1	1-1/2	2-9/16	2-13/16
2-1/2—2-15/16	MB135	1	2	3-1/16	3-5/16
3—3-7/16	MB136	1	2-1/2	3-9/16	3-13/16

Tolerances: ±1/64 unless otherwise specified

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RDI barrier

NEW!
SERIES
3
QUARTER INCH

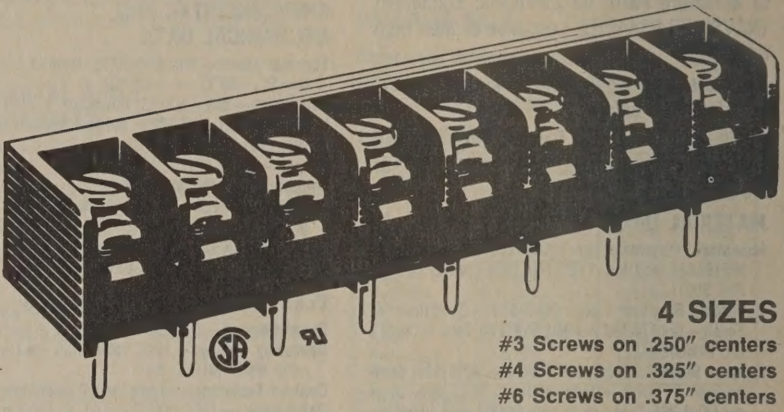
...a fresh approach to field wiring

.250″ ctr - ctr spacing featuring #3-56 screws.

New packaging design opportunities are yours as the new sub-miniature series 3 joins RDI's unique terminal blocks. All the popular terminal shapes & styles are available as featured in larger blocks.

RDI pioneered molding in resilient plastic, wire-ready (raised) screws, flat p.c. pins, back-barrier, integral stand-offs.

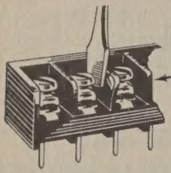
All RDI terminal blocks are available from local authorized distributors.



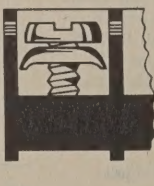
4 SIZES

#3 Screws on .250″ centers
#4 Screws on .325″ centers
#6 Screws on .375″ centers
#8 Screws on .4375″ centers

here's why RDI is the leader in terminal block design...

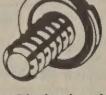


BREAK RESISTANT BARRIERS

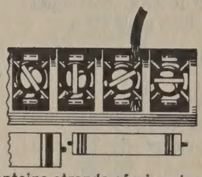


RAISED SCREWS... READY FOR WIRING

featuring wire-clamping screws... secures 2 different wires, eliminates need to lug wires.



Binder head screws also available

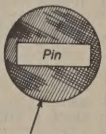


BACK BARRIER safeguards components from field wiring...

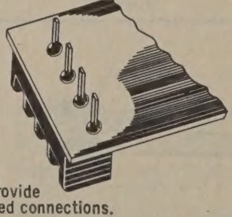
contains strands of wire-stops shorting with adjacent wire.

Stand-offs allow cleaning flux form the top side of pcb.

Integral Stand-offs



solder



Flat p.c. pins provide stronger soldered connections.

SPECIFICATIONS

BARRIER MATERIALS

Standard: Polypropylene, U.L. grade 94V-0, 105°C operating, black.
Premium: Polyester, U.L. grade 94V-0, 130°C operating, black.

TERMINALS

Standard: Steel, bright-acid-tin plated.
Premium: Brass, bright-acid-tin plated

SCREWS

Standard: Nickel plated steel binder head or with captive wire-clamping plate.
Premium: Nickel plated brass. Special order.
Sizes: #3-56, 4-40, 6-32, 8-32.

RATING

#3 Series: 5 Amperes, 300 Volts, 2500V. Dielectric
#4 Series: 10 Amperes, 300 Volts, 2500V. Dielectric
#6 Series: 15 Amperes, 600 Volts, 2500V. Dielectric
#8 Series: 20 Amperes, 600 Volts, 2500V. Dielectric

WIRE RANGE

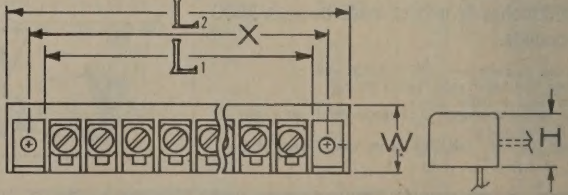
#3 Series: 18 to 22 AWG, each side of screw
#4 Series: 14 to 20 AWG, each side of screw
#6 Series: 12 to 18 AWG each side of screw
#8 Series: 10 to 16 AWG each side of screw

APPROVALS

Underwriters Laboratories Inc. recognized under Component-Wire Connectors, File E54800, Guide ZMVV2.
Canadian Standards Association certified File #LR30811, Guide 184-N-90, Class 3211.

DIMENSIONS

Terminal Block Series	L_1 Screws All Positions	L_2 Screws and End Mounting Holes	X Mounting Hole Centers	W (Inches)	H (Inches)
#3	.25(N)+.07″	.25(N)+.56″	L_2-.31″	.55	.5
#4	.325(N)+.07″	.325(N)+.71″	L_2-.385″	.6	.5
#6	.375(N)+.07″	.375(N)+.81″	L_2-.435″	.7	.6
#8	.4375(N)+.08″	.4375(N)+.945″	L_2-.5075″	.8	.7



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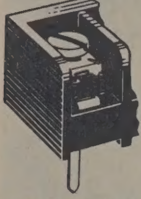
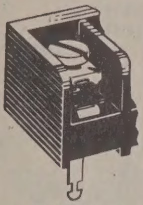
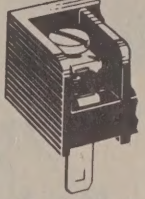
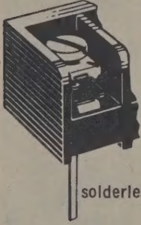
terminal blocks

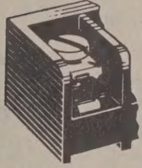
all the popular terminal styles


printed circuit pins

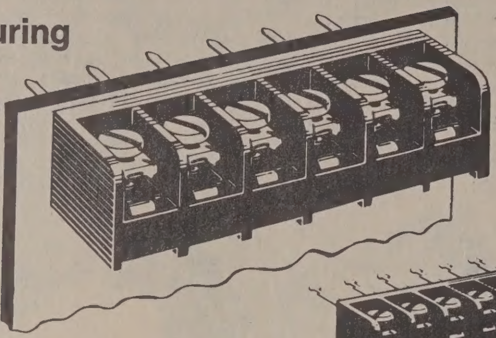

solder turret

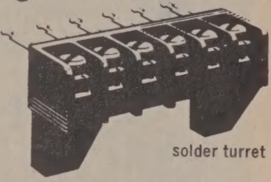

quick connect tabs

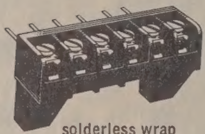

solderless wrap

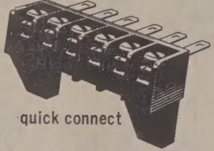

surface mount

. . . plus featuring right angle mount styles

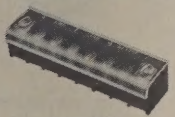

printed circuit pin

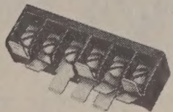

solder turret

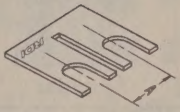

solderless wrap


quick connect

ACCESSORIES


cover kits


Q. C. terminal


jumpers . . . write for details

CATALOG NUMBER CODE

To specify standard and readily available premium materials and construction, use the codes listed below to develop the catalog number. For other variations, contact the factory.

6 PC V - 06 - 001

1. Size
2. Terminal Style
3. Terminal Orientation
4. Number of screw terminals
5. Modifier

1. Screw Size/Spacing

3 = #3-56 on .250″ centers.
4 = #4-40 on .325″ centers.
6 = #6-32 on .375″ centers.
8 = #8-32 on .4375″ centers.

2. Terminal Style

PC = Printed-circuit pin
QC = Quick-Connect tab[3]
ST = Solder turret
TB = Surface Mount (no feed-thru)
WW = Solderless-wrap pin[4]

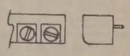
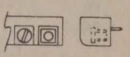
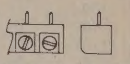
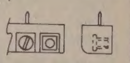
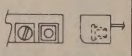
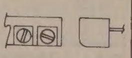
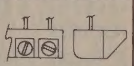
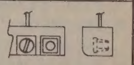
3. Terminal Orientation

V = Vertical (regular)
R = Right angle

4. Number of Screw Terminals

(Do not include barrier positions)
For example:
02 = 2 Screw terminals
10 = 10 Screw terminals
#3 Series = 32 max.
#4 Series = 30 max.
#6 Series = 28 max.
#8 Series = 25 max.

5. Modifier

Model & Modifier[1]	Screw Style	Terminal Material	Barrier[2] Material	Construction
XPCV-XX-**000** XPCV-XX-**001** XPCV-XX-002 XPCV-XX-003	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XPCV-XX-**004** XPCV-XX-**005** XPCV-XX-006 XPCV-XX-007	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XPCR-XX-**000** XPCR-XX-**001** XPCR-XX-002 XPCR-XX-003	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XPCR-XX-**004** XPCR-XX-**005** XPCR-XX-006 XPCR-XX-007	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XQCV-XX XSTV-XX XTBV-XX XWWV-XX -**000** -**001** -002 -003	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XWWV-XX-**004** XWWV-XX-**005** XWWV-XX-006 XWWV-XX-007	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XQCR-XX XSTR-XX XWWR-XX -**000** -**001** -002 -003	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	
XQCR-XX XSTR-XX XWWR-XX -**004** -**005** -006 -007	Wire-Clamp Binder Head Wire-Clamp Binder Head	Steel Steel Brass Brass	Polypropylene Polypropylene Polyester Polyester	

Notes:

[1] If modifier is -000 (standard construction), it may be omitted; i.e. 6PCV-06-000 should be noted as 6PCV-06. Modifiers in bold print are standard; others are premium.

[2] Barrier materials are U.L. approved flame-retardant grades of thermoplastic, slightly flexible to prevent breakage.

[3] Available #8 Series only.

[4] Vertical (regular) terminal available all series. Right angle available #6 and #8 series only.

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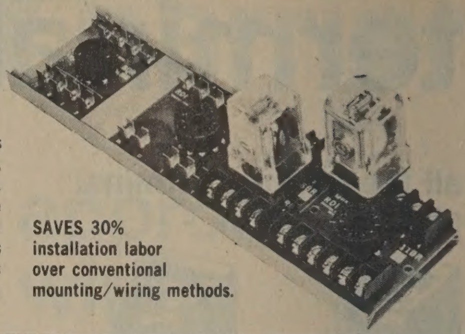
RDI/Reed Devices Inc.

SNAPTRACK™ MOUNTING SYSTEM

The SNAPTRACK™ mounting system provides a low cost convenient method for installing plug-in relays, timers and tubes in control equipment. Socket assemblies snap into position along continuous sections of SNAPTRACK, an extruded PVC, non-conductive mounting track, 3-5/32" (TK Series) wide and new 2-7/8" (2TK Series) wide. The track may be installed with rivets or screws. Socket assemblies consist of a socket mounted to an epoxy/glass P.C. board with choice of specially designed U.L. grade polypropylene barrier type screw terminal blocks or 1/4" quick-connect tabs. The assembly is then wave soldered for circuit reliability. Terminal points are clearly numbered with epoxy ink. Screws are in the raised position and feature captive wire clamps which eliminate need for bending of, or attaching hook or ring terminals to wires. Wired-in 120V, 240V neon lamp to indicate power at coil terminals available as option. Add "1" or "2" to Catalog Number.



SAVES 30% installation labor over conventional mounting/wiring methods.

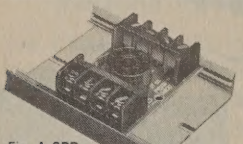


Fig. A **8BR**

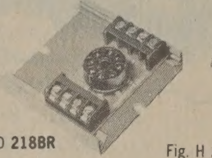


Fig. D **218BR**

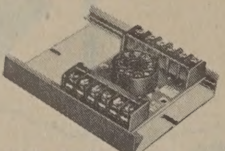


Fig. H **211BR, 311BR**

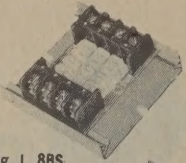


Fig. L **8BS**

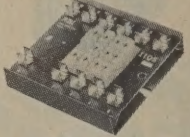


Fig. O **11QS**

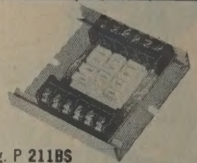


Fig. P **211BS**

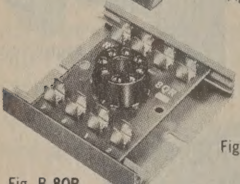


Fig. B **8QR**

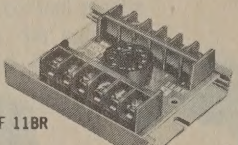


Fig. F **11BR**

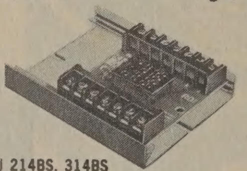


Fig. J **214BS, 314BS**

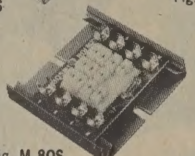


Fig. M **8QS**

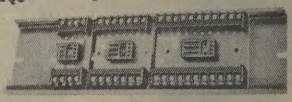


Fig. Q

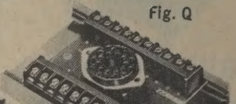


Fig. R

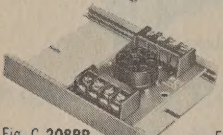


Fig. C **208BR**

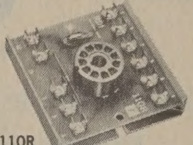


Fig. G **11QR**

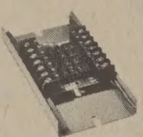


Fig. T **684BS**

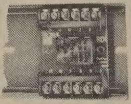


Fig. K **312BS**

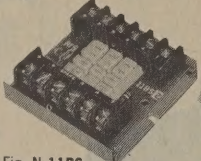


Fig. N **11BS**

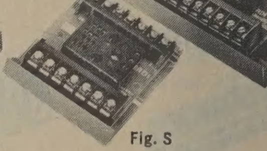


Fig. S

RDI Cat. No.	Fig.	Description	Length (Inches)	Fits Track Series
Octal (8-Pin) Socket Assemblies				
8BR	A	#8-32 screws, 10A, 250 VAC	2	TK
8BR-1	A	Same, 120 VAC Neon Lamp	2	TK
8BR-2	A	Same, 240 VAC Neon Lamp	2	TK
8QR	B	1/4" Double Quick Connect Tabs	2	TK
8QR-1	B	Same except 120 VAC Neon Lamp	2	TK
8QR-2	B	Same except 240 VAC Neon Lamp	2	TK
208BR	C	#4-40 screws, holes for bails	2	TK
208BR-1	C	Same, 120 VAC Neon Lamp	2	TK
218BR	D	Space Saver — #4-40 screws	1.5	TK
218BR-1	D	Same, 120 VAC Neon Lamp	1.5	TK
318BR	D	Space Saver — narrow track	1.5	2TK
318BR-1	D	Same except 120 VAC Neon Lamp	1.5	2TK
708BR	C	#6-32 screws, narrow track	2	2TK
708BRA	C	#6-32 B.H. screws, narrow track	2	2TK
11-Pin Round Socket Assemblies				
11BR	F	#8-32 screws, 10A, 240 VAC	3	TK
11BR-1	F	Same, 120 VAC Lamp	3	TK
11BR-2	F	Same, 240 VAC Lamp	3	TK
11QR	G	1/4" Double Quick Connect Tabs	3	TK
11QR-1	G	Same, 120 VAC Lamp	3	TK
11QR-2	G	Same, 240 VAC Lamp	3	TK
211BR	H	Space Saver — #4-40 screws	2-1/8	TK
211BR-1	H	Same, 120 VAC Lamp	2-1/8	TK
311BR	H	Space Saver — narrow track	2-1/8	2TK
311BR-1	H	Same, 120 VAC Lamp	2-1/8	2TK
711BR	F	#6-32 screws, narrow track	2.9	2TK
711BRA	F	#6-32 B.H. screws, narrow track	2.9	2TK
Miniature Relay Socket Assemblies 5A, 150 VAC				
214BS	J	4PDT	2.5	TK
214BS-1	J	Same, 120 VAC Lamp	2.5	TK
312BS	K	Two N.O., two SPDT contact forms	2-1/8	2TK
312BS-1	K	Same, 120 VAC Lamp	2-1/8	2TK
314BS	J	4 PDT	2.5	2TK
314BS-1	J	Same, 120 VAC Lamp	2.5	2TK

RDI Cat. No.	Fig.	Description	Length (Inches)	Fits Track Series
Square Base Socket Assemblies				
8BS	L	2PDT #8-32 screws, 10A, 250 VAC	2	TK
8QS	M	1/4" Double Quick Connect tabs	2	TK
8QS-1	M	Same, 120 VAC Lamp	2	TK
8QS-2	M	Same, 240 VAC Lamp	2	TK
11BS	N	3PDT, #8-32 screws, 10A, 250 VAC	3	TK
11BS-1	N	Same, 120 VAC Lamp	3	TK
11BS-2	N	Same, 240 VAC Lamp	3	TK
11QS	O	1/4" Double Quick Connect tabs	3	TK
11QS-1	O	Same, 120 VAC Lamp	3	TK
11QS-2	O	Same, 240 VAC Lamp	3	TK
211BS	P	Space Saver #4-40 screws	2-1/8	TK
211BS-1	P	Same, 120 VAC Lamp	2-1/8	TK
Sub-Miniature Relay Socket Assemblies 5A, 150 VAC				
202BS	Q	2PDT	1.5	TK
202BS-1	Q	Same, 120 VAC Lamp	1.5	TK
204BS	Q	4PDT	2.5	TK
204BS-1	Q	Same, 120 VAC Lamp	2.5	TK
206BS	Q	6PDT	3-3/4	TK
206BS-1	Q	Same, 120 VAC Lamp	3-3/4	TK
Specialty Assemblies				
220BR	R	20-Pin Round	3.5	TK
220BR-1	R	Same, 120 VAC Lamp	3.5	TK
414BS	S	Telephone Type 4PDT	2.5	TK
414BS-1	S	Same, 120 VAC Lamp	2.5	TK
416BS	S	Telephone Type 6PDT	2-13/16	TK
416BS-1	S	Same, 120 VAC Lamp	2-13/16	TK
684BS	T	4 Pole, S-D 284XDX	2.75	TK
684BS-1	T	Same, 120 VAC Lamp	2.75	TK

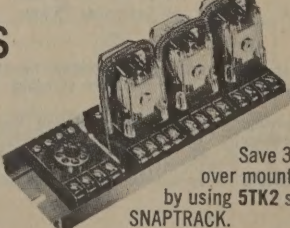
SNAPTRACK™ MOLDED SOCKET ASSEMBLIES

FEATURES

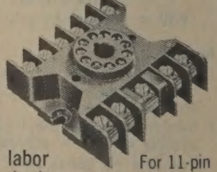
- **Rugged.** Molded of break and chip resistant U.L. recognized Lexan.
- **Positive Contact.** Phosphor bronze socket contacts.
- **Fast Wiring.** Screws feature captive wire-clamp plates, eliminate need for crimp-on terminals.
- **Versatile Mounting.** Mount singly or gang via optional 5TK2 series SNAPTRACK.

Rated 10 Amp., 300 Volts. Wire Range: 12 through 20 AWG.

For octal relays and timers. **SM8-C** (Screws w/wire-clamps) **SM8-A** w/binder head screws.



Save 30% labor over mounting singly by using **5TK2** series SNAPTRACK.



For 11-pin relays and timers. **SM11-C.** Screws have wire clamps.

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'78
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THE ONLY NATIONAL CATALOG OF ELECTRONIC PARTS, INSTRUMENTS AND EQUIPMENT DESIGNED EXCLUSIVELY FOR DISTRIBUTORS AND THEIR CUSTOMERS.

YESTERDAY'S RADIO MASTER IS TODAY'S

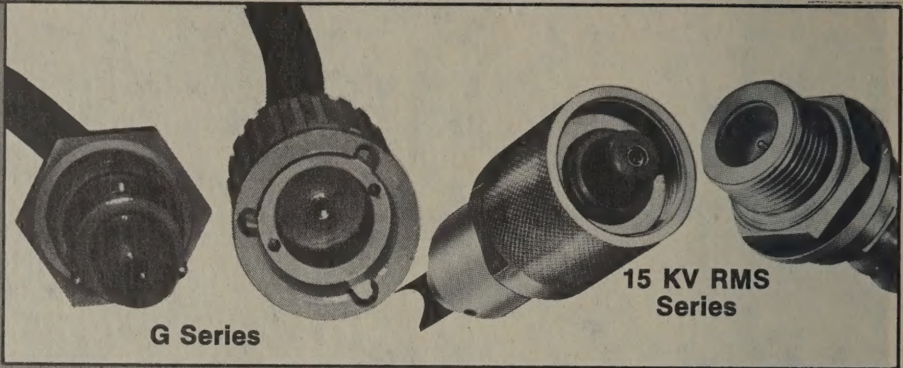
ELECTRONIC DISTRIBUTORS MASTER CATALOG

Known as O-T-S, OFF-THE-SHELF CATALOG until this edition, the MASTER CATALOG encompasses the following product areas: audio and communications equipment; electromechanical components; electronic circuit components and subassemblies; panel components and hardware; production equipment and tools; test instrumentation; power sources; wire and cable; and related materials and chemicals.

The MASTER CATALOG is broken down into four basic sections. **A GENERAL INDEX** which lists manufacturers and products alphabetically. **A MANUFACTURERS' CATALOG SECTION** which displays their respective product pages and lists their addresses and phone numbers. **A MANUFACTURERS' DIRECTORY,** where participating manufacturers, again listed alphabetically with addresses and phone numbers, highlight their distributors. And a **GEOGRAPHIC DISTRIBUTORS' DIRECTORY** which includes the names, addresses and phone numbers of the local distributors nationwide which stock the products of manufacturers whose data appears in the "Manufacturers' Catalog Section."

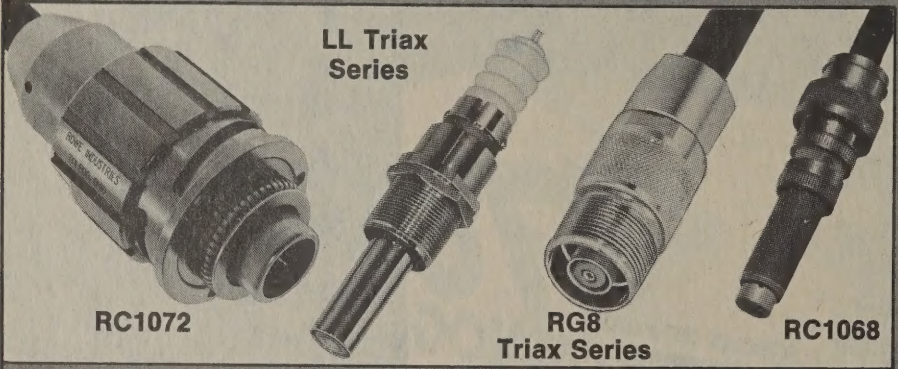
Rowe Coaxial Connectors and Cable Assemblies

Employ high-voltage, corona-free design techniques. They are ideal for use in pulse as well as DC voltage applications, through 150 KV. A wide variety of molded-on or field assembly types are offered. Available in quick disconnect or screw couplings.


G Series
15 KV RMS Series

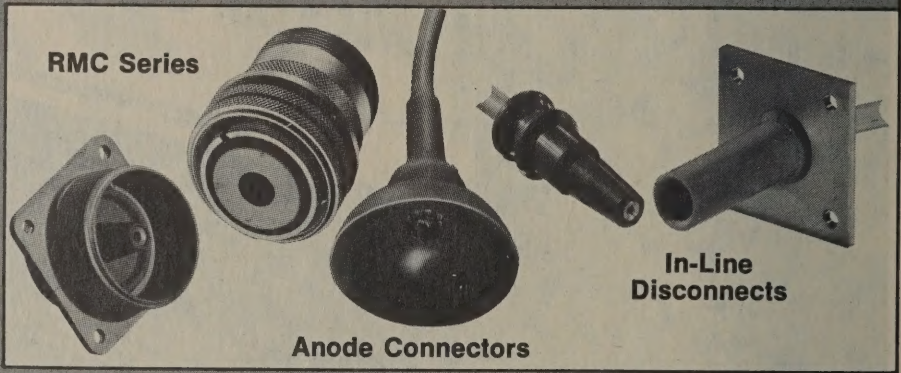
Rowe Triaxial Connectors and Cable Assemblies

A full spectrum of both molded-on and field assembly types are available for a wide variety of cable types such as the triaxial version of RG-8, up through and including specialized construction for operation in excess of 100 KV.


LL Triax Series
RC1072
RG8 Triax Series
RC1068

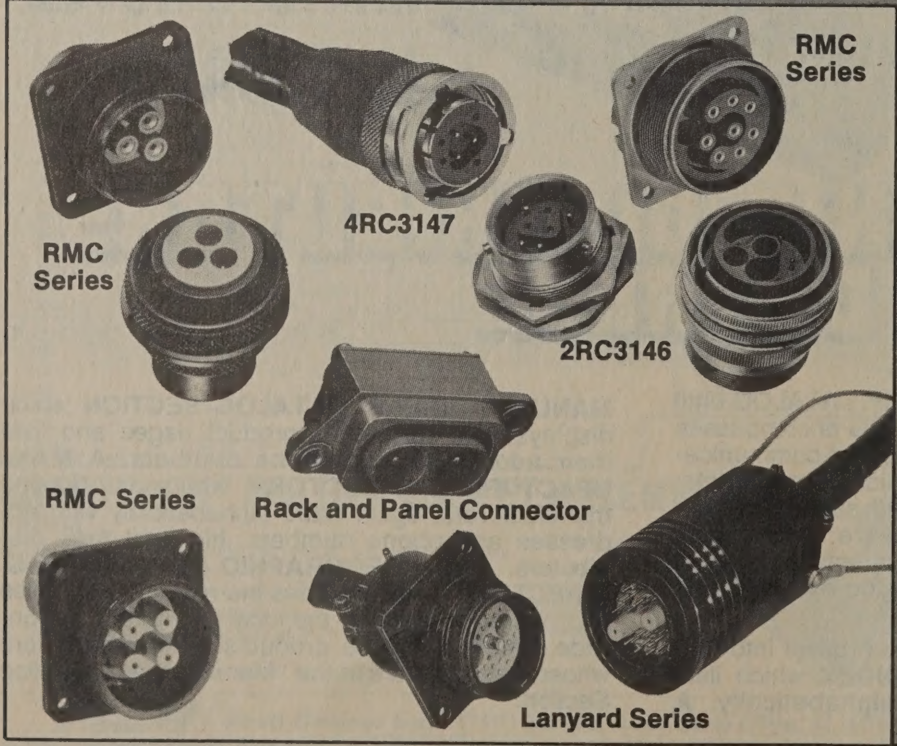
Rowe Single Contact Connectors and Cable Assemblies

Offered is an extensive listing of single contact high-voltage assemblies, which include anode connectors, in-line disconnects and others which are used unshielded to solve your simple high-voltage interconnection problems.


RMC Series
In-Line Disconnects
Anode Connectors

Rowe Multiple Contact Connectors and Cable Assemblies

Offer contact arrangements from one to thirty contacts, panel receptacles, cable plugs, rack and panel combinations, in-line types and many others. Both field assemblies and molded-on types are standard in this line.


RMC Series
4RC3147
RMC Series
2RC3146
RMC Series
Rack and Panel Connector
Lanyard Series

Rowe Industries has designed and developed over 700 specialized interconnections for which tooling is available.

World's Leader in High-Voltage

(through 200 KV)

Corona-Free CONNECTORS and CABLE ASSEMBLIES

ROWE INDUSTRIES

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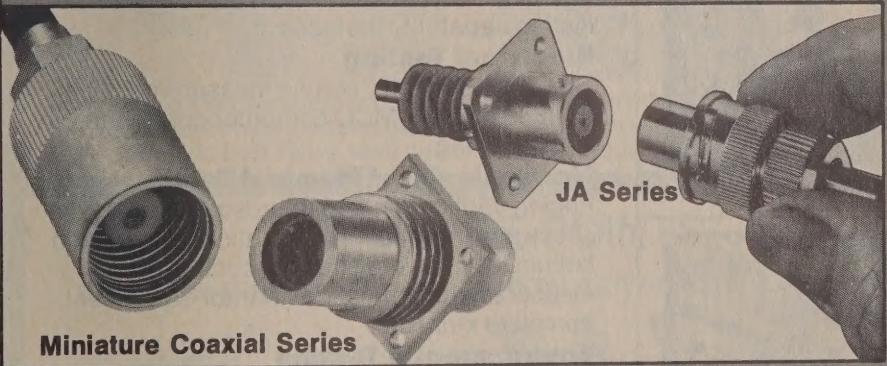
WEST COAST OFFICE: (415) 969-4831 OR (213) 235-2070
EAST COAST OFFICE: (617) 879-3250

DESIGN — DEVELOPMENT — MANUFACTURING

For reliable high voltage and all temperature wire and cable, see Rowe's ad in the Wire/Cable/Harnesses Section.

FOR YOUR COMMERCIAL, INDUSTRIAL OR MILITARY DESIGN NEEDS



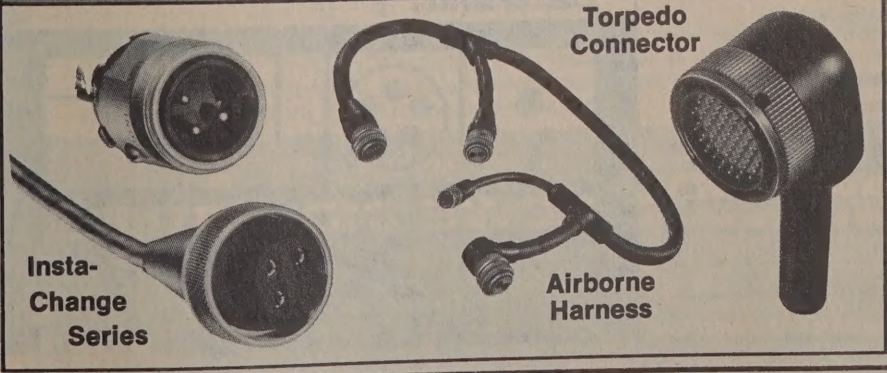
Rowe
Miniature Coaxial
Connectors and Cable Assemblies

Employ the same high-voltage design techniques as the coaxial series, but are much smaller in size for use in restricted spaces. Available in quick disconnect and screw couplings (the JA Series can be adapted to such standard type cables as RG 58 and RG 59).

Rowe
Subminiature Coaxial
Connectors and Cable Assemblies

Are ideally suited for use where space is at a premium. Employing the traditional Rowe high capability features, the subminiature sizes offer unusually high voltage operating capabilities, through 20 KV.

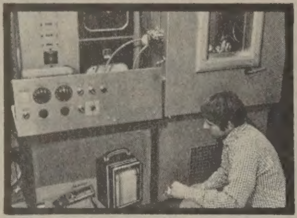
Subminiature Coaxial Series
Pancake Series

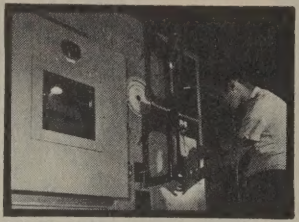


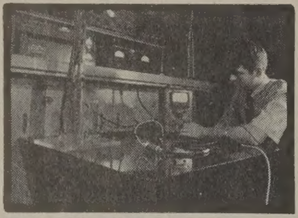
Rowe
Low-Voltage, Molded-On
Connectors and Cable Assemblies

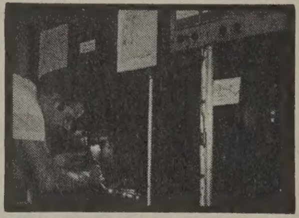
For use in severe environments. We can mold your STD connectors to cable for an environmental seal and provide a molded strain relief. Our exclusive Insta-Change series was designed for factory, mining, nuclear and oil well use.

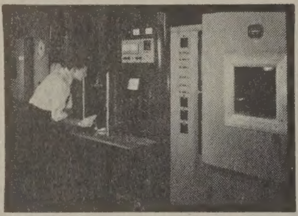
ROWE knows Specialized Interconnections

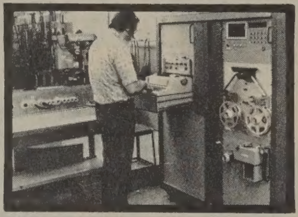

Life testing facilities.

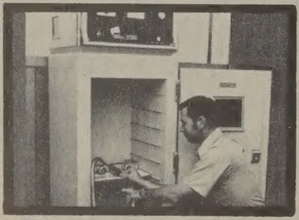

High altitude pressure chamber.

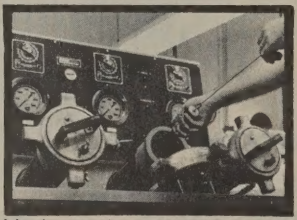

RFI-EMI-EMP test chamber.


High voltage, corona and dielectric test chamber.


Humidity chamber.


DIT-MCO computerized random access testing.


X-Ray equipment.


Hydrostatic pressure testing.

Rowe Industries, 6100 Benore Road, Toledo, Ohio 43612

Gentlemen: Please send technical literature I've checked. Thank you.

- ☐ Corona: simple techniques to eliminate it
- ☐ H.V. In-Line Disconnects and Anode Connectors thru 60 KV
- ☐ Rowe multi-contact H.V. connectors
- ☐ Sub-Miniature H.V. coax connectors thru 15 KV
- ☐ RG cable H.V. connectors (JA Series)
- ☐ Miniature Coax Connectors thru 30 KV
- ☐ Corona-free coax connectors thru 20 KV
- ☐ Corona-free high pulse coax connectors thru 40 KV
- ☐ 75 KV coax connectors (R75 Series)
- ☐ Lanyard/Umbilical Connectors
- ☐ Triaxial Connectors thru 30 KV
- ☐ Triaxial Connectors thru 55 KV
- ☐ Molded-On Interconnections
- ☐ Low-Voltage Multi-Pin Connectors (Insta-Change Series)
- ☐ High-Voltage Cable & Wire
- ☐ "All-Temp" High Temperature Wire and Cable
- ☐ SRML, SF-2, SFF-2, Aircraft & Locomotive

Print Name ______________________

Company ______________________

Address ______________________

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We're specialists in complete interconnection systems and, in particular, connectors and cable assemblies for extreme environments and unique applications. In fact, we've designed and manufactured hundreds of different connectors and cable assemblies for nuclear instrumentation and control, high voltage, corona-free thru 200 KV+, underwater instrumentation, geophysical, high and low temperatures, corrosive environments, high altitude and deep space, high and low pressures and other sophisticated military and industrial systems.

Rowe engineers design and specify custom products to meet exacting requirements and Rowe craftsmen produce them to the highest quality standards. In addition, we operate one of the most complete testing facilities in the industry. Our destructive and non-destructive testing capability includes:

Electrical Testing
Dielectric strength, corona measurement, RFI/EMI and DIT-MCO computer controlled circuit testing.

Mechanical and Physical Testing
Plating verification thru microscopic analysis, shock and vibration, hydrostatic pressure and helium leak, tensile strength, contact force measurement, optical comparitor equipment, complete x-ray lab.

Environmental Testing
Altitude thru 150,000 feet, temperature, humidity, corrosive atmospheres, accelerated life combining various conditions simultaneously.

Quality Control
Rowe's quality control and inspection systems meet or exceed MIL-Q-9858, ISR-1, NRC's 10CFR50 appendix B and standards of all aerospace and industrial firms.

With so many interconnections to choose from, chances are that we've already developed the one that meets your needs. If not, we'll custom design one for you.

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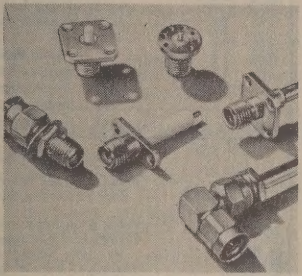
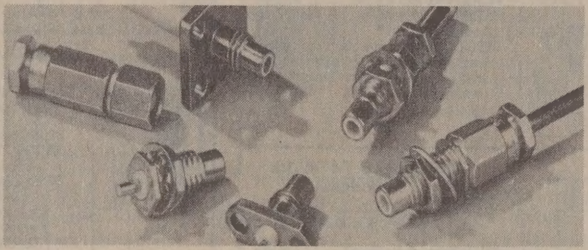
CONNECTIONS

COAXIAL RF CONNECTORS

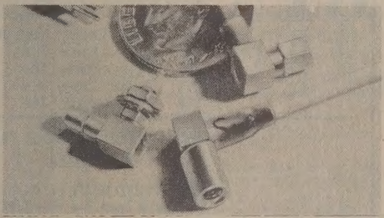
SMA
DC-26 GHz



SMB—Snap-On
DC-12.4 GHz
SMC—Screw-On
DC-12.4 GHz

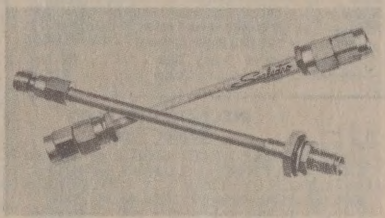


NanoheX—DC-12.4 GHz



ADAPTORS—Between Series

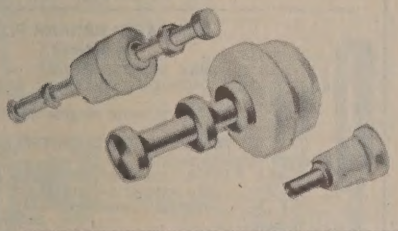
CABLE ASSEMBLIES—



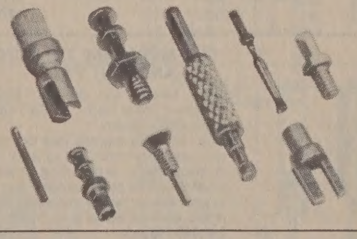
The world's largest supplier of RF subminiature connectors offers the world's largest selection of configurations. Every Sealectro connector is designed for maximum performance including lowest VSWR, greatest mechanical integrity, and best value. Most complete QPL listings in SMA, SMB & SMC types. Send for complete catalog.

SIGNAL TIE-POINTS, JACKS, PLUGS

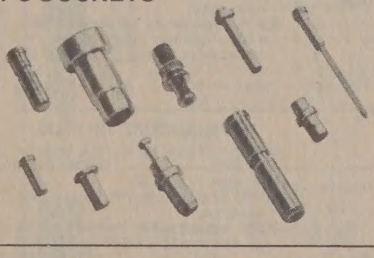
INSULATED TERMINALS



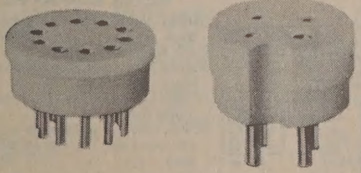
METAL TERMINALS



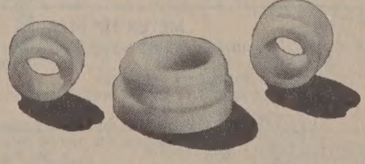
PC SOCKETS



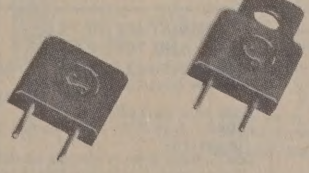
TRANSISTOR IC SOCKETS



TEFLON BUSHINGS



JUMPER PLUGS



Greatest choice of all types of electrical interconnections for metal chassis, PC boards, and flex circuits. Famous Teflon-insulated "Press-Fit" terminals offer thousands of choices for the designer. Metal sockets provide the means to mass produce PC chassis at lowest cost. Jumper plugs provide low cost programming with either male or female connectors. Send for complete catalog.

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SPECIFY SMITH ELECTRONIC COMPONENTS

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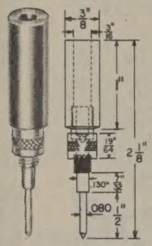
COLOR CODE SUFFIX

See Colors Available for Each Item

—101 WHITE	—104 GREEN	—107 YELLOW	—112 PURPLE
—102 RED	—105 BLUE	—108 BROWN	—113 GREY
—103 BLACK	—106 ORANGE		



INSULATED TIP PLUG
Solderless

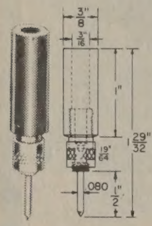
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Solderless: wire fits through body of tip then wrapped around screw portion and tightened with knurled collar. Threaded type. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	Type	NET Per C
200	Senior	$25.00



INSULATED TIP PLUG
Solderless

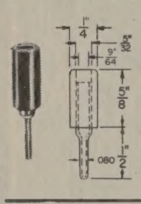
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Solderless: wire fits through body of tip then wrapped around screw portion and tightened with knurled collar. Threaded type. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	Type	NET Per C
201	Junior	$25.00



INSULATED TIP PLUG
Solder Type

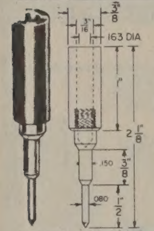
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated our No. 158.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Drawn hollow tip for easy soldering. Fits standard phone tip jack. **Std. Pkg. 100**

No.	NET Per C
237	$10.00



INSULATED TIP PLUG
Heavy Duty Type

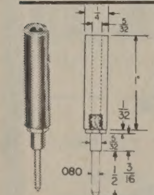
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Large diameter well enables soldering of heavy duty wire directly into plug. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
229	$26.00



SUB-MINIATURE TIP PLUG

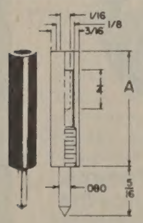
HANDLE: FIBRE, per MIL-F-1148A, Grade CH. Red, Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Ideally suited for checking sub-miniature equipment. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
270	$30.00



MINIATURE TIP PLUG AND TEST PROD

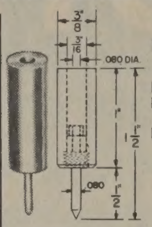
HANDLE: MACHINED BUTYRATE, per Mil-P-10408A, Type I, Class II. Red or Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 2 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Ideally suited for checking sub-miniature equipment. Fits standard phone tip jacks.

No.	Length (A)	Std. Pkg.	NET Per C
244	3/4"	100	$20.00
666	3"	25	33.00



INSULATED SHORT TIP PLUG

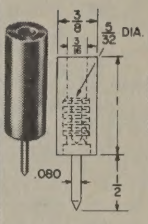
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Inserts flush to insulated handle, no metal exposed; eliminates possibility of shock or grounding. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
203	$22.00



INSULATED SHORT TIP PLUG
Solderless

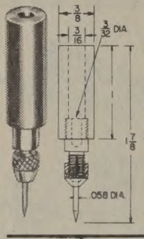
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Solderless: wire fits through handle and body of tip then wrapped around screw portion. Inserts flush to insulated handle, no metal exposed, eliminates possibility of shock or grounding. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
283	$22.00



INSULATED TIP PLUG
Phono Needle

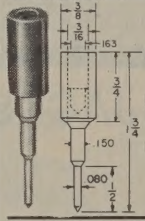
HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Removable chuck for easy replacement of broken needle. Needle pierces corrosion or plating for positive reading. **Std. Pkg. 100**

No.	NET Per C
216	$34.00



ADAPTER
Banana Plug to Tip Plug

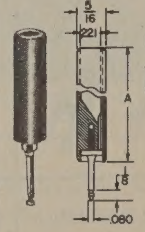
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Accepts standard banana plugs, adapts to standard tip plug. **Std. Pkg. 100**

No.	NET Per C
215	$26.00



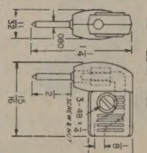
SUB-MINIATURE TIP PLUG AND TEST PROD

HANDLE: Molded Nylon, per MIL-P-20693A. Available in Red or Black. **SPECIFY COLOR**

TIP: Brass, Silver plated.

DESCR.: Solderless assembly. Ideal for use with sub-miniature printed-circuit tip jacks. Sharp tip breaks flux or oxide coating on printed-circuit pattern for positive contact when used as prod. Grooved head of prod makes positive contact when laid across wires. Fits all standard .080" tip jacks.

No.	Handle (A)	Overall (B)	Std. Pkg.	NET Per C
348	1 inch	1 5/16"	100	$40.00
349	4 inch	4 5/16"	25	50.00



METER TIP PLUG

HANDLE: MOLDED PHENOLIC plastic, Red and Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Molded in two halves for easy assembly with screw and nut. Fits standard phone tip jacks. **Std. Pkg. 50**

No.	NET Per C
235	$35.00

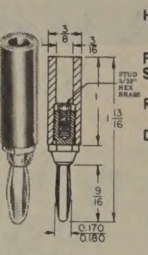
NEW! JUST ADDED!

NORELCO MINIATURE LAMPS

SEE eem PAGE 41

"HOOKON JR" PROBE WITH TEST TERMINATIONS

SEE eem PAGE 42



INSULATED BANANA PLUG

HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

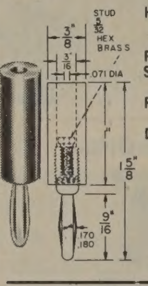
PLUG: Hex brass, nickel or silver plated.

SPRING: Four-leaved phosphor bronze or beryllium copper, nickel or silver plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
212	Phosphor Bronze	Nickel	$35.00
232	Phosphor Bronze	Silver	39.00
242	Beryllium Copper	Nickel	41.00
262	Beryllium Copper	Silver	44.00



INSULATED BANANA PLUG

HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

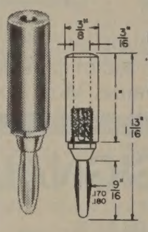
PLUG: Brass, nickel or silver plated.

SPRING: Four-leaved phosphor bronze or beryllium copper, nickel or silver plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
211	Phosphor Bronze	Nickel	$30.00
261	Phosphor Bronze	Silver	33.00
271	Beryllium Copper	Nickel	35.00
281	Beryllium Copper	Silver	39.00



INSULATED BANANA PLUG
Solderless

HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

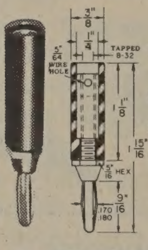
PLUG: Hex brass, nickel or silver plated.

SPRING: Four-leaved phosphor bronze or beryllium copper, nickel or silver plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Solderless: Wire fits through handle and body of tip then wrapped around screw portion. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
295	Phosphor Bronze	Nickel	$42.00
296	Phosphor Bronze	Silver	46.00
297	Beryllium Copper	Nickel	48.00
298	Beryllium Copper	Silver	51.00



INSULATED BANANA PLUG
Solderless

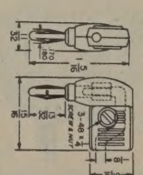
HANDLE: MACHINED BUTYRATE, per Mil-P-10408A, Type I, Class II. Red or Black. **SPECIFY COLOR**

SPRING: Four-leaved phosphor bronze, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Cross drilled hole in spacer enables quick solderless connection of wire to plug. Fits standard banana jacks. **Std. Pkg. 100**

No.	NET Per C
236	$62.00



METER BANANA PLUG

HANDLE: MOLDED PHENOLIC plastic, Red and Black. **SPECIFY COLOR**

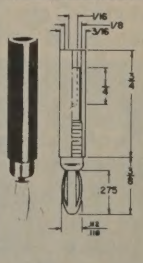
PLUG: Brass, nickel plated.

SPRING: Four-leaved phosphor bronze, nickel plated.

RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Molded in two halves for easy assembly with screw and nut. Fits standard banana jacks. **Std. Pkg. 50**

No.	NET Per C
255	$48.00



MINIATURE INSULATED BANANA PLUG
Midget Type

HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II. Red or Black. **SPECIFY COLOR**

PLUG: Brass, nickel plated.

SPRING: Beryllium Copper, nickel plated.

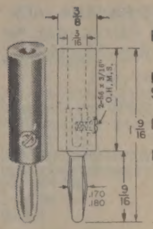
RATING: 2 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Wire soldered directly into stud. Fits miniature banana jacks. **Std. Pkg. 100**

No.	NET Per C
268	$50.00

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

INSULATED BANANA PLUG
With Side Screw

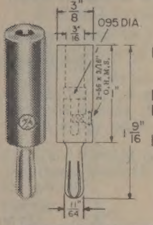


HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze or beryllium copper, nickel plated
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Set screw secures wire without soldering. Fits standard banana jacks.
Std. Pkg. 100

No.	Spring	NET Per C
204	Phosphor Bronze	$30.00
254	Beryllium Copper	35.00

INSULATED BANANA PLUG
Split Type With Side Screw

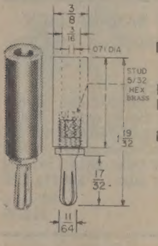


HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Cross-slotted for spring tension. Set screw secures wire, without soldering. Fits standard banana jacks. **Std. Pkg. 100**

No.	NET Per C
213	$28.00

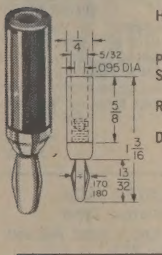
INSULATED BANANA PLUG
Split Type With Internal Stud



HANDLE: MOLDED NYLON, per MIL-P-20693. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**
PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Cross-slotted for spring tension. Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. Fits standard banana jacks. **Std. Pkg. 100**

No.	NET Per C
253	$32.00

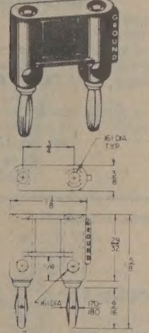
INSULATED BANANA PLUG
Midget Type



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II. Red, Black. **SPECIFY COLOR**
PLUG: Brass, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Wire soldered directly into stud. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
291	Phosphor Bronze	Nickel	$30.00
292	Phosphor Bronze	Silver	33.00
293	Beryllium Copper	Nickel	35.00
294	Beryllium Copper	Silver	39.00

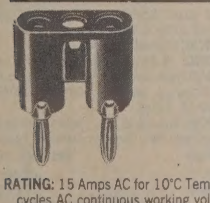
DUAL SHORTING PLUG



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS, Red, Black, Yellow, Green, Blue, White Assemblies. **SPECIFY COLOR**
PLUG: Brass, Nickel plated
SPRING: Four-leaved beryllium copper, nickel plated.
RATING: 15 Amps, AC for 10°C Temp. rise continuous working voltage.
DESCR.: Internally shorted plug mates with standard dual binding posts on ¾" centers. Used for grounding or shorting input and output connections. Can be stacked for additional current rating. Rear banana jack holes allow connection to shorted posts.
Std. Pkg. 10

No.	NET Per C
1516	$120.00

DUAL BANANA PLUG



SPECIFY COLOR
BODY: MOLDED POLYSTYRENE, Red or Black.
PLUG: Brass, Nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
SCREW: Steel, cadmium plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 5K volts 60 cycles AC continuous working voltage. CAP. 1.0 pf. between conductors.
DESCR.: Mates with standard dual binding post ¾" centers. Polarity indicated on top and side. Wire held with internal set screw. Can be stacked for multiple connections.
Std. Pkg. 25

No.	NET Per C
210	$120.00

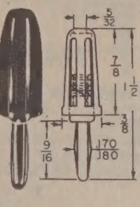
NYLON HANDLE TIP & BANANA PLUGS

COLOR CODE SUFFIX Add to Catalog Number as required

—101 WHITE	—104 GREEN	—106 ORANGE	—112 PURPLE
—102 RED	—105 BLUE	—107 YELLOW	—113 GREY
—103 BLACK		—108 BROWN	

BANANA PLUG TYPE

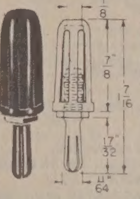
NYLON BANANA PLUG



HANDLE: MOLDED NYLON, per MIL-P 20693A.
COLORS Available in 10 std. colors as coded above. **SPECIFY COLOR**
PLUG: Brass, nickel plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
476	Phosphor Bronze	Nickel	$31.00
477	Phosphor Bronze	Silver	34.00
478	Beryllium Copper	Nickel	37.00
479	Beryllium Copper	Silver	40.00

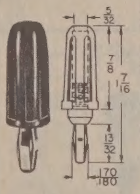
NYLON BANANA PLUG
Split Type



HANDLE: MOLDED NYLON, per MIL-P 20693A.
COLORS Available in 10 std. colors as coded above. **SPECIFY COLOR**
PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Cross-slotted for spring tension. Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. Fits standard banana jacks. **Std. Pkg. 100**

No.	NET Per C
494	$28.00

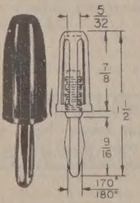
NYLON BANANA PLUG
Short Spring



HANDLE: MOLDED NYLON, per MIL-P 20693A.
COLORS Available in 10 std. colors as coded above.
PLUG: Brass, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Wire soldered directly into stud. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
426	Phosphor Bronze	Nickel	$28.00
427	Phosphor Bronze	Silver	31.00
428	Beryllium Copper	Nickel	33.00
429	Beryllium Copper	Silver	37.00

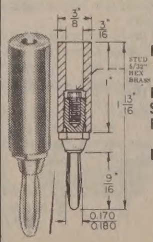
NYLON BANANA PLUG
Solderless



HANDLE: MOLDED NYLON, per MIL-P 20693A.
COLORS Available in 10 std. colors as coded above. **SPECIFY COLOR**
PLUG: Brass, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of tip than wrapped around screw portion. Inserts flush to handle, no metal exposed, eliminates possibility of shock or grounding. Fits standard banana jacks. **Std. Pkg. 100**

No.	Spring Material	Plating	NET Per C
455	Phosphor Bronze	Nickel	$31.00
456	Phosphor Bronze	Nickel	34.00
457	Beryllium Copper	Silver	37.00
458	Beryllium Copper	Nickel	40.00

HIGH TEMPERATURE BANANA PLUG



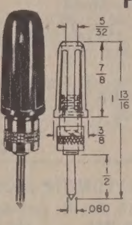
HANDLE: MOLDED NYLON, per MIL-P-20693 Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**
PLUG: Hex brass, nickel plated.
SPRING: Four-leaved, INCONEL.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Withstands temperature to 1200 degrees F. Full resiliency—non-oxidizing. Excellent for thermo-couple connection on plastic extruding die heads. **Std. Pkg. 10**

No.	NET Per C
388	$120.00

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

PIN TIP TYPE

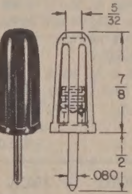
NYLON TIP PLUG
Solderless



HANDLE: MOLDED NYLON, per MIL-P 20693A. Specify color as coded above.
PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through body of tip then wrapped around screw portions and tightened with knurled collar. Threaded type. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
490	$25.00

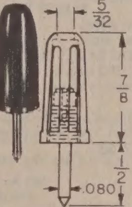
NYLON SHORT TIP PLUG
Solderless



HANDLE: MOLDED NYLON, per MIL-P 20693A. Specify color as coded above.
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of tip then wrapped around screw portion. Inserts flush to handle, no metal exposed, eliminates possibility of shock or grounding. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
492	$23.00

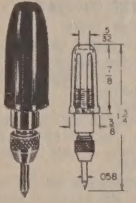
NYLON SHORT TIP PLUG



HANDLE: MOLDED NYLON, per MIL-P 20693A. Specify color as coded above.
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Inserts flush to insulated handle, no metal exposed; eliminates possibility of shock or grounding. Fits standard phone tip jacks. **Std. Pkg. 100**

No.	NET Per C
491	$23.00

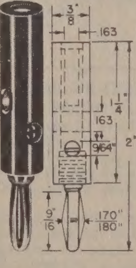
NYLON TIP PLUG
Phone Needle



HANDLE: MOLDED NYLON, per MIL-P 20693A. Specify color as coded above.
PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Removable chuck for easy replacement of broken needles. Needle pierces corrosion or plating for positive reading. **Std. Pkg. 100**

No.	NET Per C
493	$35.00

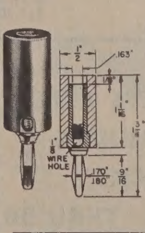
STACK BANANA PLUG
Solderless



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II. Red, Black, Yellow or Green. **SPECIFY COLOR**
BODY: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze or beryllium copper, nickel plated
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless connection. Accepts standard banana plugs in top and side. Interconnects unlimited amount of multiple circuits. **Std. Pkg. 50**

No.	Spring Material	NET Per C
1511	Phosphor Bronze	$65.00
1512	Beryllium Copper	73.00

STACK BANANA PLUG



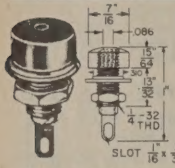
BODY: MOLDED POLYSTYRENE, Red or Black. **SPECIFY COLOR**
PLUG: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
SCREW: Steel, cadmium plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Internal set screw for wire or phone tip connection. Can be stacked for multiple connections. **Std. Pkg. 50**

No.	NET Per C
324	$58.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements!

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE



INSULATED PHONE TIP JACK

HEAD: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

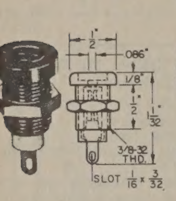
BODY: Brass, nickel plated.

CONTACT: Phosphor bronze.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Positive contact with standard phone tip plugs. Supplied complete with hex nut and fibre washer. Mounts in 15/16" hole in panels up to 3/8" thick. Accepts standard phone tip plugs. **Std. Pkg. 100**

No.	NET Per C
202	$24.00



MOLDED NYLON TIP JACK

BODY: MOLDED NYLON, per MIL-P-20693A, Red, Black. **SPECIFY COLOR**

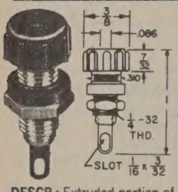
CONTACT: Phosphor bronze.

CAP: Brass, nickel plated.

RATING: 10 Amps AC for 10°C Temp. rise, continuous duty. 5K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.

DESCR.: Mounts in 3/8" holes in panels up to 5/16" thick. Accepts standard phone tip plugs. **Std. Pkg. 100**

No.	NET Per C
240	$25.00



NYLON PHONE TIP JACK

HEAD: MOLDED NYLON, per MIL-P-20693A. With molded nylon washer. Red, Black, Yellow, Green, Blue. **SPECIFY COLOR**

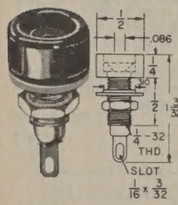
BODY: Brass, nickel plated.

CONTACT: Phosphor bronze.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Extruded portion of head and washer provides excellent insulation from panel. Supplied with hex nut. Mounts in 5/16" hole in panels up to 1/4" thick. Accepts standard phone tip plugs. **Std. Pkg. 100**

No.	NET Per C
241	$38.00



INSULATED TIP JACK
Meter Type

HEAD: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

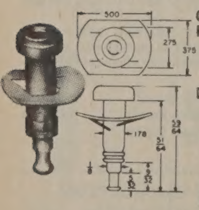
BODY: Brass, nickel plated.

CONTACT: Phosphor bronze.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Supplied complete with hex nut and fibre washer. Mounts in 5/16" hole in panels up to 3/8" thick. Recessed jack body prevents possibility of shock or grounding. Accepts standard phone tip plugs. **Std. Pkg. 100**

No.	NET Per C
282	$35.00



NYLON TEST TIP JACK

BODY: Nylon, Grade FM 10001. Specify color as coded above. 10 colors.

CONTACT: Phosphor bronze, gold plated.

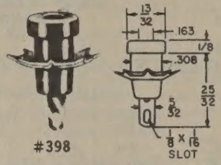
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 3 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Mounts in 3/16" hole, with Tinnerman speed nut for fast permanent assembly. Teeth embed into jack body, preventing pulling out and turning. Accepts standard phone tip plugs. **Std. Pkg. 25**

No.	NET Per C
1598	$17.00

SEE OUR COMPLETE LINE OF TEFLON TERMINALS AND TEST JACKS ON eem PAGES 48 THRU 56

"SPEEDI-MOUNT" BANANA JACK



#398

BODY: MOLDED PHENOLIC plastic. Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

CONTACT: Brass, cadmium plated.

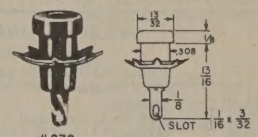
WASHER: Steel cadmium plated, internal and external tooth.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty. 3 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Unusual dished lockwasher permits fast assembly. Teeth embed into jack and panels, prevents pulling out and turning. Mounts in 5/16" hole in panels up to 3/16" thick. Accepts standard banana plugs. **Std. Pkg. 100**

No.	NET Per C
398	$10.00

"SPEEDI-MOUNT" TIP JACK



#279

BODY: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

CONTACT: Phosphor bronze.

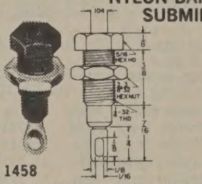
WASHER: Steel cadmium plated, internal and external tooth.

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty. 3 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.

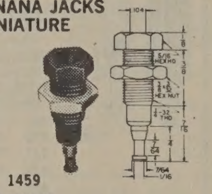
DESCR.: Unusual dished lockwasher permits fast assembly. Teeth embed into jack and panels, prevents pulling out and turning. Mounts in 5/16" hole in panels up to 3/16" thick. Accepts standard phone tip plugs. **Std. Pkg. 100**

No.	NET Per C
279	$10.00

NYLON BANANA JACKS SUBMINIATURE



1458



1459

BODY: MOLDED NYLON, per MIL-P-20693A.

COLORS: Available in 10 std. colors as coded above. Specify color by adding color code suffix to basic catalog number.

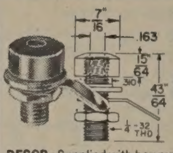
CONTACT: Brass, gold washed.

RATING: 10 Amps AC for 10°C Temp. rise, continuous duty. 2 KV 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.

DESCR.: Mounts in 1/4" hole in panels up to 1/4" thick. Accepts subminiature banana plugs. One-piece turret contact allows sealed panel entry hole. Hex head for ease in mounting. Recessed contact provides for full seating of plug with no exposed metal. **Std. Pkg. 100**

No.	Terminal	NET Per C
1458	Pierced	$33.00
1459	Turret	23.00

WE INVITE YOU to use our manufacturing and engineering facilities and our know-how to meet YOUR PARTICULAR REQUIREMENTS.



INSULATED BANANA JACK

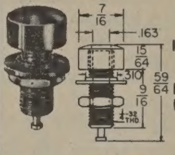
HEAD: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Supplied with hex nut, fibre washer, and brass tinned lug. Mounts in 5/16" hole in panels up to 3/8" thick. Accepts standard banana plugs. **Std. Pkg. 100**

No.	NET Per C
205	$20.00



INSULATED BANANA JACK
With Turret Terminal

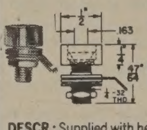
HEAD: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Supplied with hex nut & fibre washer. Mounts in 5/16" hole in panels up to 5/8" thick. Solder direct to turret terminal. Accepts standard banana plugs. **Std. Pkg. 100**

No.	NET Per C
256	$27.00



INSULATED BANANA JACK

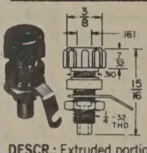
HEAD: MOLDED PHENOLIC plastic, Red, Black, **SPECIFY COLOR**

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Supplied with hex nut, fibre washer, lockwasher and brass tinned lug. Mounts in 5/16" hole in panels up to 3/8" thick. Jack body recessed for snug contact. Accepts standard banana plugs. **Std. Pkg. 100**

No.	NET Per C
219	$28.00



NYLON BANANA JACK

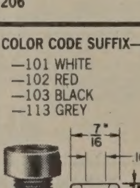
HEAD: MOLDED NYLON, per MIL-P-20693A. With molded nylon washer. Red, Black, Yellow, Green, Blue. **SPECIFY COLOR**

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Extruded portion of head and washer provides excellent insulation from panel. Supplied with hex nut, brass tinned lug. Mounts in 5/16" hole in panets up to 1/4" thick. **Std. Pkg. 100**

No.	NET Per C
221	$38.00



INSULATED JACK
Combination Type

HEAD: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. **SPECIFY COLOR**

BODY: Brass, nickel plated.

SPRING: Phosphor bronze.

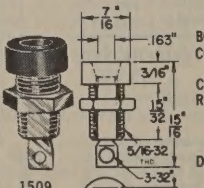
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty. 750 Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 mmfd.

DESCR.: Supplied with hex nut & fibre washer. Accepts standard phone tip plugs or standard banana plugs. Mounts in 5/16" hole in panels up to 1/2" thick. **Std. Pkg. 100**

No.	NET Per C
206	$32.00

LEXAN BANANA JACKS

"DOUBLE-D" BODY



1509

BODY: MOLDED LEXAN

COLORS: Available in 10 std. colors as coded above.

CONTACT: Brass, electro-tin plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.5 pf.

DESCR.: Mounts in 5/16" round, single or double "D" holes in panels up to 5/16" thick. Accepts standard banana plugs.

Std. Pkg. 100

No.	NET Per C
1509	$15.00

1499

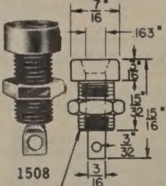
As above but completely enclosed jack with solder turret terminals. **Std. Pkg. 50**

No.	NET Per C
1499	$18.00

COLOR CODE SUFFIX—Add to Catalog Number as required

—101 WHITE
—102 RED
—103 BLACK
—113 GREY
—104 GREEN
—105 BLUE
—106 ORANGE
—107 YELLOW
—108 BROWN
—112 PURPLE

FULL-ROUND BODY



1508

BODY: MOLDED LEXAN

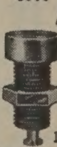
COLORS: Available in 10 std. colors as coded above. Specify color by adding color code suffix to basic catalog number.

CONTACT: Brass, electro-tin plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.0 pf.

DESCR.: Mounts in 5/16" hole in panels up to 5/16" thick. Accepts standard banana plugs. **Std. Pkg. 100**

No.	NET Per C
1508	$15.00



1498

As above but completely enclosed jack with solder turret terminals. **Std. Pkg. 50**

No.	NET Per C
1498	$18.00

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

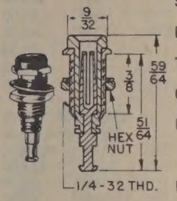
Add Dept. EM to address to tell them you saw it in eem

NYLON TIP JACK

With Metal Shell
Made to meet MIL-C-39024/10

COLOR CODE SUFFIX
(Add to Catalog Number as Required)

—101 WHITE	—105 BLUE	—108 BROWN
—102 RED	—106 ORANGE	—112 PURPLE
—103 BLACK	—107 YELLOW	—113 GREY
—104 GREEN		



BODY: MOLDED NYLON, per MIL-M-20693. Available in 10 colors as coded above. **SPECIFY COLOR**

SHELL & NUT: Brass, per QQ-B-626, nickel plated per QQ-N-290.

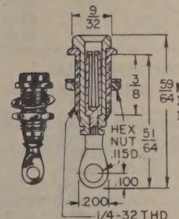
LOCKWASHER: Phospher bronze, per QQ-B-750, nickel plated per QQ-N-290.

TERMINAL: Brass, per QQ-B-626, gold plated per MIL-G-45204

CONTACT: Beryllium copper, per QQ-C-533, gold plated per MIL-G-45204.

RATINGS: *Operating voltage*: 2 KV, 60 Hz, at sea level. *Current*: 5 amps, AC, for 10°C temp. rise, continuous duty. *Contact resistance*: 2 milliohms max at rated current.

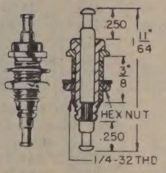
DESCR: Nylon tip jack accepts standard .080" tip plugs. Caged, closed entry contact assures maximum retention with minimum contact resistance. Metal shell eliminates possibility of stripping threads during assembly. Mounts in 1/4" hole in panels up to 1/4" thick.



No.	TYPE	DASH NO.	STD PKG.	Net per C
1501	Eyelet	-11 thru -20	100	$60.00
1502			50	$70.00

COMMERCIAL NYLON TIP JACK

With Metal Shell



BODY: MOLDED NYLON, per MIL-P-20693. Available in 10 colors as coded above **SPECIFY COLOR.**

SHELL & NUT: Brass, nickel plated.

LOCKWASHER: Phospher bronze, nickel plated.

CONTACT: Phospher bronze, bright tin plate.

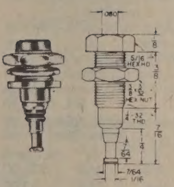
FEED THRU: Brass, bright tin plate.

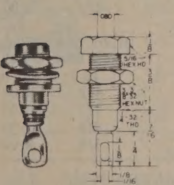
RATINGS: 2 KV, 60 Hz AC continuous working voltage. 10 amps AC for 10°C temp. rise, continuous duty. Capacitance 10 pf.

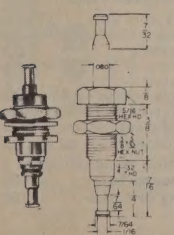
DESCR: Nylon tip jack accepts standard .080" tip plugs. Split contact provides low contact resistance. Metal shell eliminates possibility of stripping threads during assembly. Mounts in 1/4" hole in panels up to 1/4" thick.

No.	TYPE	STD. PKG.	Net per C
3501	Turret	100	$ .30
3502	Eyelet	50	$ .45
1503	Feed-Thru	50	$ .35

ALL NYLON TIP JACK







Completely Molded Nylon Jack.

Fits, all standard phone tip plugs. Contact recessed in head for safe contact. Hexagon head for grip in tightening. Mounts in 1/4" hole in panels up to 1/4" thick. Meets following requirements:

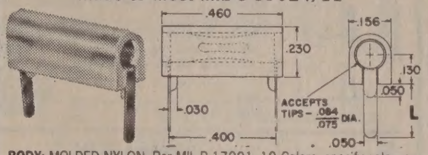
1. Salt Spray Test—Withstands 100 hours.
2. Rating—15 Amps AC for 10°C Temp rise, continuous duty. 5 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.
3. Insulation Resistance—5,000 megohms.
4. Operating Temperature— —55 to +85°C.
5. Material Specifications—
   - A. Body: Molded Nylon, per MIL-P-20693A. Specify Color as coded above.
   - B. Center contact: Heat treated Phosphor Bronze, Silver plated per QQ-S-365, Gold plated overall No. 1507 Brass, per QQ-B-626, Comp. 22. plated as above.
   - C. Hex Nut: Brass Nickel Plated.

COLORS: Available in White, Red, Black, Green, Blue, Orange, Yellow, Brown, Purple and Grey. Specify color as coded above.

No.	Type	Std. Pkg.	NET Per C
1505	Wrap Around	100	$27.00
1506	Spade Terminal	50	36.00
1507	Feed Through	50	34.00

RIGHT ANGLE PRINTED CIRCUIT TEST JACK

MILITARY TYPE
Made to Meet MIL-C-39024/11



BODY: MOLDED NYLON, Per MIL-P-17091. 10 Colors, specify color, as coded.

SPRING: Beryllium Copper, Per QQ-C-533.

FINISH: Gold Plate, per MIL-G-45204, CLASS I. Type 2. Nickel underplate, per QQ-N-290, Class I Type 7, .0002" thick.

MOUNTING: Mounts in .052" dia. holes on .400" centers. Board thickness as specified below. Can be spaced side-by-side .160" on centers minimum.

MECHANICAL DATA: Thermal shock, vibration, humidity, insulation resistance, salt spray per MIL-STD-202B. All mechanical Tests per applicable section of MIL-C-39024. Insertion force 30 oz. max., withdrawal force 3 oz. min., with .080" (.001") probe.

RATINGS: Operating voltage 1500 volts, 60 cps RMS, sea level. 350 volts, 60 cps RMS at 50,000 feet. 5 amps. AC max. current rating. Contact resistance 20 millivolt drop max. At specified current, at 25° C.

DESCR.: Double entry design, probe inserts from either end of jack. Closed entry construction will not accept probes larger than .084", will contact probes down to .074". Closed bottom design keeps jack from fouling with solder of flux. Locking ears keep jack firmly in board until soldered. Precise dimensions allow for automated assembly on boards.

Std. Pkg. 100

"L" DIMENSION 0.130

For boards up to 1/16" thick, MIL-C-39024/11-01 thru -10.

No.	NER Per C
325	$15.00

"L" DIMENSION 0.219

For boards up to 1/8" thick, MIL-C-39024/11-21 thru -30.

No.	NER Per C
321	$15.00

ECONOMY TYPE

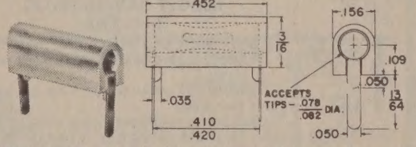
"L" DIMENSION 0.130

No.	Spring Plating	NET Per C
306	Gold flash over .0002 Silver	$13.00
359	.0002 Silver	12.00

"L" DIMENSION 0.219

328	Gold flash over .0002 Silver	$13.00
402	.0002 Silver	12.00

COMMERCIAL TYPE



BODY: MOLDED NYLON, Per MIL-P-20693A. 10 Colors, specify color, as coded.

SPRING: Beryllium Copper, Per QQ-C-533.

FINISH: Silver underplate, .0002" min., per QQ-S-365, Type I, with .00003" Gold overplate; per MIL-F-14072, M-310.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1.5 KV. 60 cycle AC continuous working voltage. Contact resistance 5 milliohms max. at rated current. Capacitance less than 5 MHz at 1 pf.

MOUNTING: Mounts in .052" dia. holes on .400" centers, in boards up to 3/16" thick. Can be spaced side-by-side .160" on centers min.

MECHANICAL DATA: Thermal shock, vibration, humidity, insulation resistance, and salt spray tests per MIL-STD-202B. Solderability per MIL-S-6872. Insertion and withdrawal force: 8 oz. min., 5 lbs. max. with .080" (±.001") dia. probe.

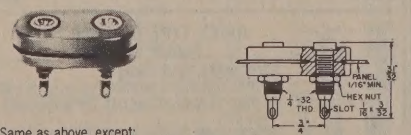
DESCR.: Double-entry design, probe inserts from either end of jack. Closed entry construction will not accept probes larger than .084", will contact probes down to .074". Closed bottom construction keeps jack from fouling with solder or flux. Locking ears hold jack firmly in board until soldered. Precise dimensions allow for automated assembly on boards. **Std. Pkg. 100**

No.	NET Per C
430	$15.00

ECONOMY TYPE

499	Spring—Gold flash over .0002 Silver	$13.00
498	Spring—.0002 Silver	12.00

STANDARD DUAL TIP JACK



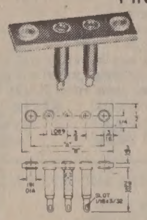
Same as above, except:

BODY: Recessed, brass, nickel plated.

DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates standard phone tip plugs. Supplied with two hex nuts. **Std. Pkg. 10**

No.	NET Per C
488	$65.00

PIN JACK STRIPS



STRIP: LAMINATED PHENOLIC, XP, Black.

BODY: Brass, nickel plated.

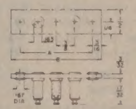
SPRING: Phosphor bronze.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1 KV, 60 cycle AC continuous working voltage.

DESCR.: From 2 to 10 pin jacks assembled on 3/8" centers on a heavy-duty board. Provides positive contact with standard phone tip plugs. Mounting holes accept screws up to #8.

No.	Jacks	Mtg. Ctrs. ("A")	Length ("B")	NET Per C
1982	2	1⅛"	1½"	$56.00
1983	3	1½"	1⅞"	72.00
1984	4	1⅞"	2¼"	88.00
1985	5	2¼"	2⅝"	110.00
1986	6	2⅝"	3"	120.00
1987	7	3"	3⅜"	136.00
1988	8	3⅜"	3¾"	152.00
1989	9	3¾"	4⅛"	168.00
1990	10	4⅛"	4½"	184.00

BANANA JACK STRIPS

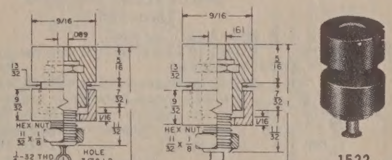


DESCR.: From 2 to 10 Banana jacks assembled on 3/8" centers on a heavy-duty board. Provides positive contact with standard banana plugs. Mounting holes accept screws up to #8.

Std. Pkg. 25

No.	Jacks	Mtg. Ctrs. ("A")	Length ("B")	NET Per C
1972	2	1⅛"	1½"	$39.00
1973	3	1½"	1⅞"	48.00
1974	4	1⅞"	2¼"	57.00
1975	5	2¼"	2⅝"	67.00
1976	6	2⅝"	3"	75.00
1977	7	3"	3⅜"	84.00
1978	8	3⅜"	3¾"	94.00
1979	9	3¾"	4⅛"	103.00
1980	10	4⅛"	4½"	112.00

HIGH VOLTAGE NYLON JACKS



1522

HIGH VOLTAGE NYLON JACKS
Made to meet MS-16107 Spec.

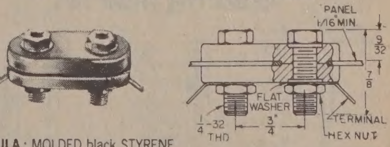
Heavy molded nylon body and cup washer prevent high-voltage flashover to panel. Meets following requirements:

1. Salt Spray Test—Withstands 100 hours.
2. Electrical Rating—15 Amps AC for 10°C Temp. rise, continuous duty. 5 KV 60 cycle AC continuous working voltage. Millivolt drop per MIL-J-6751. CAPACITANCE 2.0 pf.
3. Material Specifications.
   - A. Insulator and Washer:—Molded Nylon, per MIL-P-20693A. Colors to Fed. Std. 595. Specify color as coded above.
   - B. Insert Shell and Nut: Brass, Nickel plated per QQ-N-290, type V (FC).
   - C. Contact: Phosphor bronze, Silver plated .0002" per QQ-S-365, Gold plated overall.

Specify color as coded above, 10 colors. **Std. Pkg. 25**

No.		NET Per C
1521	Phone Tip	$60.00
1522	Banana	60.00

STANDARD DUAL BANANA JACK



INSULA.: MOLDED black STYRENE.

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 4.0 pf. to panel.

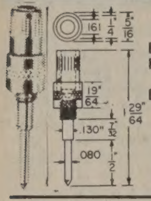
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates standard and dual banana plugs. Supplied with two hex nuts, 4 flat washers and brass tinned lugs.

Std. Pkg. 10

No.	NET Per C
489	$65.00

SPECIFY SMITH ELECTRONIC COMPONENTS

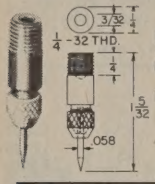
STOCKED BY LEADING DISTRIBUTORS NATIONWIDE



SOLDERLESS TIP PLUG

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: wire fits through body of tip then wraps around screw portion and tightened with knurled collar. Force fit type. Fits standard phone tip jacks. **Std. Pkg. 100**

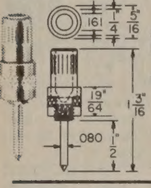
No.	Type	NET Per C
105	Senior	$21.00



NEEDLE TIP AND CHUCK

BODY: Brass, nickel plated.
NEEDLE: Steel, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Removable chuck for easy replacement. Needle pierces plating or corrosion for positive reading. **Std. Pkg. 100**

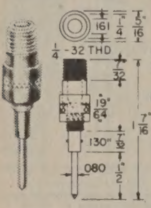
No.	Type	NET Per C
128		$30.00



SOLDERLESS TIP PLUG

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: wire fits through body of tip then wraps around screw portion and tightened with knurled collar. Force fit type. Fits standard phone tip jacks. **Std. Pkg. 100**

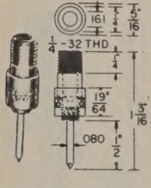
No.	Type	NET Per C
106	Junior	$21.00



SOLDERLESS TIP PLUG
Threaded Sr.

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: wire fits through body of tip then wraps around screw portion and tightened with knurled collar. Threaded for easy assembly in plastic handle. Fits standard phone tip jacks. **Std. Pkg. 100**

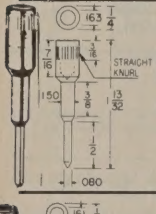
No.	Type	NET Per C
124	Senior	$21.00



SOLDERLESS TIP PLUG
Threaded Jr.

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: wire fits through body of tip then wraps around screw portion and tightened with assembly in plastic handle. Fits knurled collar. Threaded for easy standard phone tip jacks. **Std. Pkg. 100**

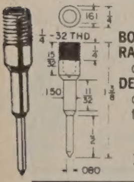
No.	Type	NET Per C
127	Junior	$21.00



HEAVY DUTY TIP PLUG
Force-Fit

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Extra large well for soldering. Rear of plug accepts standard banana plugs. Fits all standard phone tip jacks. **Std. Pkg. 100**

No.	Type	NET Per C
156	Force Fit	$21.00

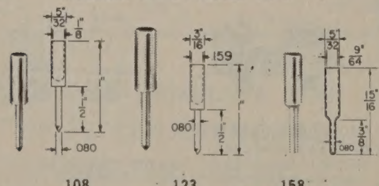


HEAVY DUTY TIP PLUG

BODY: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Extra large well for soldering. Rear of plug accepts standard banana plugs. Fits all standard phone tip jacks. Threaded for easy assembly in plastic handle. **Std. Pkg. 100**

No.	Type	NET Per C
125	Threaded	$21.00

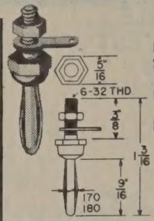
SOLDER TYPE PHONE TIPS



108 123 158

RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
MATERIAL: Brass, nickel plated. **Std. Pkg. 100**

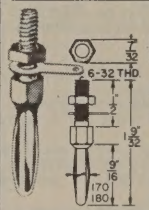
No.	Type	NET Per C
108	Standard	$5.50
123	Large I.D.	9.00
158	Drawn	2.50



BANANA PLUG

BODY: HEX BRASS, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and phosphor bronze tinned lug. Threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

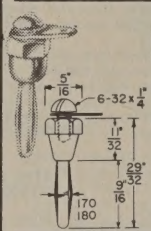
No.	NET Per C
102	$34.00



BANANA PLUG

BODY: HEX BRASS, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and phosphor bronze tinned lug. Threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

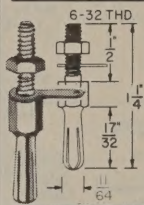
No.	NET Per C
103	$29.00



BANANA PLUG

BODY: HEX BRASS, nickel plated.
SPRING: Four-leaved phosphor bronze or beryllium copper, nickel plated
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with screw and phosphor bronze tinned lug. Internal female permits use on all size panels. Fits standard banana jacks. **Std. Pkg. 100**

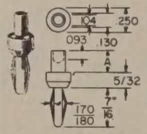
No.	Spring Material	NET Per C
100	Phosphor Bronze	$33.00
190	Beryllium Copper	40.00



BANANA PLUG
Split Type

BODY: HEX BRASS, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Fits all standard banana jacks. Supplied with hex nut and phosphor bronze lug, threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

No.	NET Per C
104	$22.00



MIDGET BANANA PLUG
Rivet Type

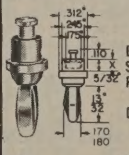
BODY: BRASS, silver plated.
SPRING: Four-leaved phosphor bronze, silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Fits all standard banana jacks. Can be furnished in varying types to meet Jan spec. **Std. Pkg. 100**

No.	Rivet Length "A"	NET Per C
121	7/32"	$22.00
143	3/16"	22.00
139	1/8"	22.00
3875	Staking Tool	Net Ea $1.50

MIL-SPEC. TYPE

Same as above, made to meet Signal Corps drawings. **Std. Pkg. 100**

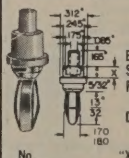
No.	Rivet Length "A"	NET Per C
122	0.261	$25.00
3875	Staking Tool	Net Ea $1.50



RIVET TYPE BANANA PLUG
Wrap Around Type

BODY: BRASS, nickel plated.
SPRING: Four leaved, beryllium copper, nickel plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Rivets to panel or bakelite board. Wire wraps around stud and is then soldered. **Std. Pkg. 100**

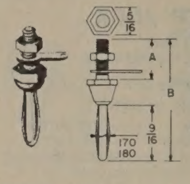
No.	"X" Dim.	Panel	NET Per C
2082	.105	1/16"	$33.00
2083	.135	3/32"	33.00
2084	.165	1/8"	33.00



RIVET TYPE BANANA PLUG
Solder Well Type

BODY: BRASS, nickel plated.
SPRING: Four leaved, beryllium copper, nickel plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Rivets to panel or bakelite board. Wire solders to well in rear of plug. **Std. Pkg. 100**

No.	"X" Dim.	Panel	NET Per C
2067	.105	1/16"	$33.00
2068	.135	3/32"	33.00
2069	.165	1/16"	33.00

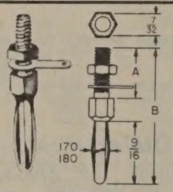


BANANA PLUG

BODY: HEX BRASS, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and tinned phosphor bronze lug threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

PHOS. BR. SPRING Nickel Plated Overall				BERYL. COP. SPRING Nickel Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
431	$34.00	6-32x3/8"	1 7/32"	443	$39.00
432	37.00	6-32x1/2"	1 7/32"	444	42.00
433	40.00	6-32x3/4"	1 19/32"	445	45.00
434	34.00	8-32x3/8"	1 7/32"	446	39.00
435	37.00	8-32x1/2"	1 11/32"	447	42.00
436	40.00	8-32x3/4"	1 19/32"	448	45.00

PHOS. BR. SPRING Silver Plated Overall				BERYL. COP. SPRING Silver Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
437	$37.00	6-32x3/8"	1 7/32"	449	$42.00
438	40.00	6-32x1/2"	1 11/32"	450	45.00
439	43.00	6-32x3/4"	1 19/32"	451	48.00
440	37.00	8-32x3/8"	1 7/32"	452	42.00
441	40.00	8-32x1/2"	1 11/32"	453	45.00
442	43.00	8-32x3/4"	1 19/32"	454	48.00

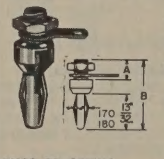


BANANA PLUG

BODY: HEX BRASS, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and tinned phosphor bronze lug threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

PHOS. BR. SPRING Nickel Plated Overall				BERYL. COP. SPRING Nickel Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
401	$28.00	6-32x3/8"	1 7/32"	414	$31.00
403	29.00	6-32x1/2"	1 11/32"	415	34.00
404	33.00	6-32x3/4"	1 19/32"	416	39.00
405	28.00	8-32x3/8"	1 7/32"	417	31.00
406	29.00	8-32x1/2"	1 11/32"	418	34.00
407	33.00	8-32x3/4"	1 19/32"	419	39.00

PHOS. BR. SPRING Silver Plated Overall				BERYL. COP. SPRING Silver Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
408	$31.00	6-32x3/8"	1 7/32"	420	$34.00
409	32.00	6-32x1/2"	1 11/32"	421	37.00
410	36.00	6-32x3/4"	1 19/32"	422	42.00
411	31.00	8-32x3/8"	1 7/32"	423	34.00
412	32.00	8-32x1/2"	1 11/32"	424	37.00
413	36.00	8-32x3/4"	1 19/32"	425	42.00

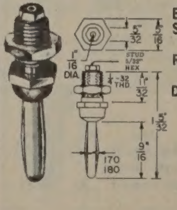


MIDGET BANANA PLUG

BODY: BRASS, nickel or silver plated.
SPRING: Phosphor bronze or beryllium copper, nickel or silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and tinned phosphor bronze lug threaded stud for panel mounting. Fits standard banana jacks. **Std. Pkg. 100**

PHOS. BR. SPRING Nickel Plated Overall				BERYL. COP. SPRING Nickel Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
460	$29.00	4-40x3/8"	15/16"	468	$33.00
461	29.00	4-40x1/2"	1 1/16"	469	33.00
462	29.00	6-32x3/8"	15/16"	470	33.00
463	29.00	6-32x1/2"	1 1/16"	471	33.00

PHOS. BR. SPRING Silver Plated Overall				BERYL. COP. SPRING Silver Plated Overall	
No.	NET Per C	A	B	No.	NET Per C
464	$32.00	4-40x3/8"	15/16"	472	$36.00
465	32.00	4-40x1/2"	1 1/16"	473	36.00
466	32.00	6-32x3/8"	15/16"	474	36.00
467	32.00	6-32x1/2"	1 1/16"	475	36.00

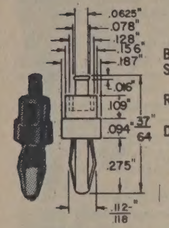


BANANA PLUG

BODY: BRASS, nickel plated
SPRING: Phosphor bronze or beryllium copper, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut. Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to plug for solderless connection. **Std. Pkg. 50**

No.	Spring Material	NET Per C
145	Phosphor Bronze	$34.00
135	Beryllium Copper	40.00

SUBMINIATURE PLUGS & JACKS

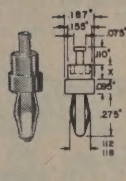


MINIATURE BANANA PLUG
Rivet Type

BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: One piece beryllium copper spring insures positive and lasting contact.

Std. Pkg. 100

No.		NET Per C
191		$21.00
No. 3876	Staking Tool Kit	Net Ea $3.00

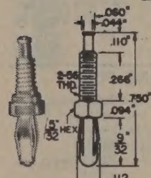


MINIATURE BANANA PLUG
Rivet Type

BODY: Brass, silver plated.
SPRING: Four-leaved beryllium copper, silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: One piece beryllium copper spring insures positive and lasting contact.

Std. Pkg. 100

No.	"X" Dim.	Panel	NET Per C
2073	.105	1/16"	$21.00
2074	.135	3/32"	21.00
2075	.165	1/8"	21.00
No. 3876	Staking Tool Kit		Net Ea. $3.00

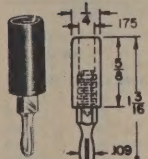


MINIATURE BANANA PLUG

BODY: Brass, silver plated.
SPRING: Four-leaved beryllium copper, silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: One piece beryllium copper spring insures positive and lasting contact.

Std. Pkg. 100

No.	NET Per C
192	$30.00

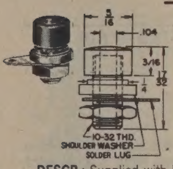


INSULATED BANANA PLUG
Sub Miniature

HANDLE: MACHINED BUTYRATE, per Fed. Spec. L-P344, Type I, Class MH, Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Cross-slotted for spring tension. Wire solders directly into plug. Fits standard midget banana jacks.

Std. Pkg. 100

No.	NET Per C
197	$32.00



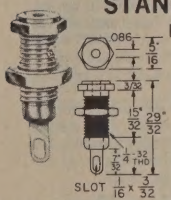
INSULATED BANANA JACK
Sub Miniature

HEAD: MACHINED BUTYRATE, per Fed. Spec. L-P344, Type i, Class MH, Red or Black. SPECIFY COLOR
BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 750 volts 60 cycle AC continuous working voltage. CAPACITANCE 6.0 pf.
DESCR.: Supplied with hex nut, fibre washer and tinned lug. Mounts in 1/4" hole in panels up to 1/8" thick. Accepts standard midget banana plugs.

Std. Pkg. 100

No.	NET Per C
196	$45.00

STANDARD TIP JACKS

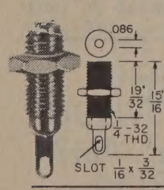


PHONE TIP JACK

BODY: Brass, nickel plated.
SPRING: Phosphor bronze.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Positive contact with standard phone tip plugs. Supplied hex nut. Mounts in 1/4" hole in panels up to 3/8" thick.

Std. Pkg. 100

No.	NET Per C
107	$28.00



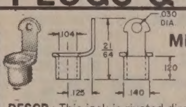
HEADLESS PHONE TIP JACK

BODY: Brass, nickel plated.
SPRING: Phosphor bronze.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut. Used with plastic molded instrument cases, where jack body is screwed into case. Accepts standard phone tip plugs.

Std. Pkg. 100

No.	NET Per C
147	$17.00

ORIGINAL EQUIPMENT MANUFACTURER: Contact the Smith factory for your production requirements of Smith standard products.

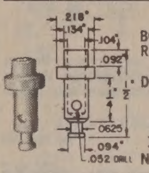


MINIATURE BANANA JACK

BODY: Brass, silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: This jack is riveted directly to chassis or to printed circuit board for easy assembly.

Std. Pkg. 1000

No.		NET Per C
194		$27.00
No. 3875	Staking Tool	NET Ea $1.50

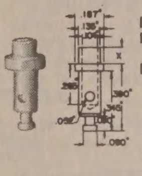


MINIATURE BANANA JACK

BODY: Brass, silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: This jack is riveted directly to chassis or to printed circuit board for easy assembly.

Std. Pkg. 100

No.		NET Per C
193		$15.00
No. 3860	Staking Tool Kit	Net Ea. $3.00

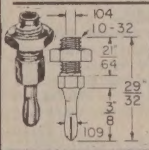


MINIATURE BANANA JACK
Panel Mount

BODY: Brass, silver plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: This jack is riveted directly to chassis or to printed circuit board for easy assembly.

Std. Pkg. 100

No.	"X" Dim.	Panel	NET Per C
2076	.105	1/16"	$15.00
2077	.135	3/32"	15.00
2078	.165	1/8"	15.00
No. 3860	Staking Tool Kit		Net Ea $3.00

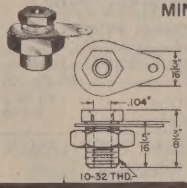


MINIATURE BANANA PLUG

BODY: Brass, nickel plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Cross-slotted, supplied with hex nut. Fits midget banana jacks.

Std. Pkg. 100

No.	NET Per C
111	$17.00



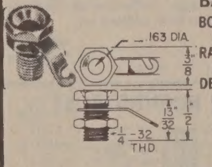
MINIATURE BANANA JACK

BODY: Hex brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and tinned lug. Mounts in .196 (#10) hole in panels up to 1/8" thick. Accepts standard midget banana plugs.

Std. Pkg. 100

No.	NET Per C
195	$20.00

STANDARD BANANA JACKS

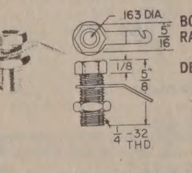


BANANA JACK

BODY: Hex brass, nickel plated. with recessed head.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and brass tinned lug. Mounts in 1/4" hole; fits panels up to 5/16" thick. Accepts standard banana plugs.

Std. Pkg. 100

No.	NET Per C
101	$19.00

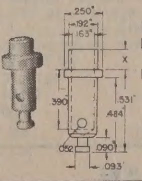


BANANA JACK

BODY: Hex brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and brass tinned lug. Mounts in 1/4" hole in panels up to 3/8" thick. Accepts standard banana plugs.

Std. Pkg. 100

No.	NET Per C
109	$19.00



PANEL MOUNT BANANA JACK

BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Accepts all standard banana plugs. These jacks are riveted directly to chassis or bakelite board.

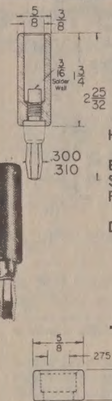
Std. Pkg. 100

No.	"X" Dim.	Panel	NET Per C
2079	.105	1/16"	$18.00
2080	.135	3/32"	18.00
2081	.165	1/8"	18.00

"OFF-THE-SHELF"

SMITH Standard Products are stocked nationally on the shelves of every major Parts Distributor. "It's Sound Planning to SPECIFY SMITH!"

GIANT BANANA PLUGS & JACKS

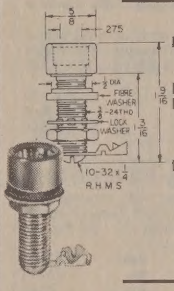


INS. GIANT BANANA PLUG

HANDLE: MACHINED PHENOLIC plastic. Red or Black. SPECIFY COLOR
BODY: Hex brass, nickel plated.
SPRING: Six-leaved phosphor bronze, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Large deep internal well for soldering heavy duty wire. Recessed so that no metal portions are exposed when plugged into mating jack in order to present shocks or grounding.

Std. Pkg. 50

No.	NET Per C
285	$130.00

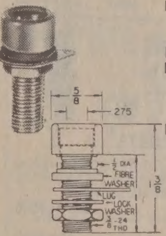


INS. GIANT BANANA JACK

HEAD: MACHINED BUTYRATE, per Fed. Spec. L-P344, Type I, class MH, Red or Black. SPECIFY COLOR
BODY: Hex brass, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 7.0 pf.
DESCR.: Supplied with hex nut, fibre washer, lock-washer, screw and tinned copper lug. Jack body recessed for snug contact. Mounts in 1/2" hole in panel up to 3/4" thick.

Std. Pkg. 50

No.	NET Per C
286	$95.00

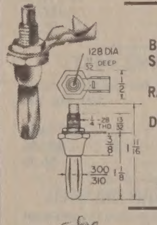


INS. GIANT BANANA JACK

HEAD: MACHINED BUTYRATE, per Fed. Spec. L-P344, Type I, class MH, Red or Black. SPECIFY COLOR
BODY: Hex brass, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 7.0 pf.
DESCR.: Supplied with hex nut, fibre washer, lock-washer, and brass tinned lug. Jack body recessed for snug contact. Mounts in 1/2" hole in panel up to 3/4" thick.

Std. Pkg. 50

No.	NET Per C
287	$95.00

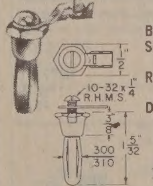


GIANT BANANA PLUG

BODY: Hex brass, nickel plated.
SPRING: Six-leaved phosphor bronze, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and brass tinned lug. Large deep internal well for soldering heavy duty wire.

Std. Pkg. 50

No.	NET Per C
185	$90.00

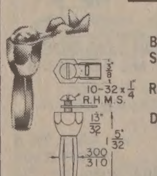


GIANT BANANA PLUG

BODY: Hex brass, nickel plated.
SPRING: Six-leaved phosphor bronze, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with screw and brass tinned lug. Internal female permits use on all size panels.

Std. Pkg. 50

No.	NET Per C
186	$80.00

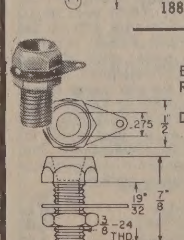


GIANT BANANA PLUG

BODY: Hex brass, nickel plated.
SPRING: Six-leaved phosphor bronze, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with screw and brass tinned lug. Internal female thread permits use on all size panels.

Std. Pkg. 50

No.	NET Per C
188	$65.00



GIANT BANANA PLUG

BODY: Hex brass, nickel plated.
RATING: 25 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied with hex nut and brass tinned lug.

Std. Pkg. 50

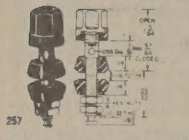
No.	Hex Head	Mfg. Hole	Panel	NET Per C
187	1/2"	3/8"	1/2"	$60.00
				Std. Pkg. 25
157	5/8"	1/2"	5/8"	70.00

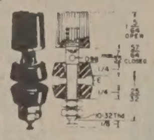
INSULATED BINDING POSTS

MOLDED LEXAN (POLYCARBONATE) MEETS FED. SPEC. L-P-393A

LEXAN 5-WAY BINDING POSTS

HEX AND FLUTED HEADS


257


459

HEAD: CAPTIVE MOLDED LEXAN, WITH BRASS, GOLD PLATED INSERT.
BODY: Brass, Gold Plated
WASHERS: Molded Lexan, with Gold Plated Brass insert.
RATINGS: 30 Amps AC for 10°C Temp. rise, continuous duty. 2 KV AC, 60 Hertz, continuous working voltage. 5.0 pf. capacitance to 1/8" thick aluminum panel.
ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip, stranded or solid wire up to 14 awg.
DESCR: Captivated Lexan head to prevent loss. Keyed, Lexan base washers completely insulate post from panel and prevent turning. Mounts in ½" round or single "D" hole as indicated. Wires directly to wrap-around solder turret, or to solder lug (not supplied) between nuts.
COLORS: Red, black, yellow, green, blue, white. **Std. Pkg. 100**

No.	Type	NET Per C
257	Hex Head	$65.00
459	Fluted Head	65.00

MIL-SPEC BINDING POSTS per MIL-P-55149/1

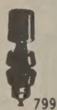
Same as Types 257 and 459 above, except meets requirements of MIL-P-55149/1, Dtd. 1 Nov. 1961. Brass per QQ-B-626, Comp. 22. Includes gold-plated flat washer and internal tooth lockwasher. **Std. Pkg. 100**

No.	Type	Head	NET Per C
267-102 (Red)	PB01FA03	Hex	$70.00
267-103 (Black)	PB01FA04	Hex	70.00
495-102 (Red)	PB01FA03	Fluted	70.00
495-103 (Black)	PB01FA04	Fluted	70.00

1257
898

899

259
897


799

ECONOMY TYPE BINDING POSTS

Same as Types 257 and 459, except utilizes solid molded lexan keyed back-up washer, instead of brass-insert washer. Provides same usage and features with added economy. Colors: Red, black, yellow, green, blue and white.
Std. Pkg. 100

No.	Type	NET Per C
1257	Hex Head	$55.00
1259	Fluted Head	55.00

COMMERCIAL TYPE BINDING POSTS

Same as Types 257 and 459, except all metal parts are nickel plated, instead of gold. Supplied in red and black only. **Std. Pkg. 100**

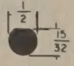
No.	Type	NET Per C
899	Hex Head	$50.00
799	Fluted Head	50.00

COMMERCIAL TYPE with LEXAN WASHER

Same as Types 257 and 459, except all metal parts are nickel plated instead of gold, and utilizes solid molded lexan keyed back-up washer, instead of brass-insert washer. Provides same usages and features with maximum economy. Supplied in red and black only. **Std. Pkg. 100**

No.	Type	NET Per C
898	Hex Head	$48.00
897	Fluted Head	48.00

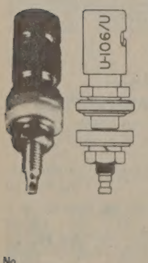
"D" PUNCH



Designed to punch a "D" HOLE ½" x 15/32" for use with all binding posts on top half of page.

No. 3837 $8.35 Ea.

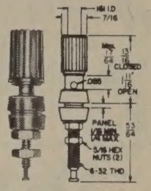
MIL-SPEC BINDING POST
Made to meet MIL-P-55149/8



HEAD & BODY: Brass, Silver-Plated,
SPRING & CONTACT PLATE: Steel.
WASHERS: Molded Nylon.
O-RINGS AND CAP: Silicon Rubber, Red or Black Cap. SPECIFY COLOR.
DESCR.: Style U-106/U binding post (Sig. Corp. Dwng. SC-C-16495). Meets requirements of Mil-P-55149/8, DTD 30 Sep 1963. Mounts in 5/16" hole, in panels from 1/16" to ⅛" thick. "O" ring seals provide waterproof seal in panel. Push on cap opens slot in which wire is inserted. Releasing cap grips wire with heavy spring pressure on serrated steel plates for minimum contact resistance. Provided with either red or black silicon rubber insulating cap boot.
Std. Pkg. 5

No.	Type	NET Ea.
1837-102 (Red)	PB08NA02	$5.00
1837-103 (Black)	PB08NA01	5.00

LEXAN BINDING POST



HEAD: CAPTIVE, MOLDED LEXAN, with brass Gold-Plated insert.
BODY: Brass, Gold Plated.
WASHERS: MOLDED LEXAN, with brass Gold-plated inserts.
ACCEPTS: Phone tip plug, spade plug, banana plug, alligator clip, or wire strand.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1 KV Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.
DESCR.: Molded washers completely insulate post from panel. Miniature washers and narrow fluted head require minimum panel space. Mounts in 3/8" round of "D" hole in panel as indicated. Wrap-around solder terminal on stud for direct connection.
COLORS: Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR.
Std. Pkg. 100

No.	NET Per C
1517	$65.00

MIL-SPEC BINDING POSTS per MIL-P-55149/1

Same as Type 1517 above, except meets requirements of MIL-P-55149/1, Dtd. 1 Nov. 1961. Brass per QQ-B-626, Comp. 22. Includes gold-plated flat washer and internal tooth lockwasher. Behind-panel length is .690" instead of 53/64". **Std. Pkg. 100**

No.	Type No.	NET Per C
1514-102 (Red)	PB01FA01	$70.00
1514-103 (Black)	PB01FA02	70.00

1276
1277

ECONOMY TYPE BINDING POSTS

Same as Type 1517, except utilizes solid molded lexan keyed back-up washer, instead of brass-insert washer. Provides same usage and features with added economy. Red, black, yellow, green, blue, and white. Specify color, as coded above. **Std. Pkg. 100**

No.	NET Per C
1277	$55.00

COMMERCIAL TYPE BINDING POSTS

Same as Type 1517, except all metal parts are nickel plated, instead of gold. Supplied in red and black only.
Std. Pkg. 100

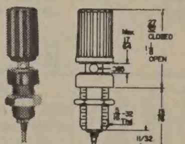
No.	NET Per C
1275	$50.00

COMMERCIAL TYPE LEXAN WASHER

Same as Type 1517, except all metal parts are nickel plated, instead of gold, and utilizes solid molded lexan keyed backup washer, instead of brass-insert washer. Provides same usages and features with maximum economy. Supplied in red and black only.

No.	NET Per C
1276	$48.00

ALL-INSULATED BINDING POST

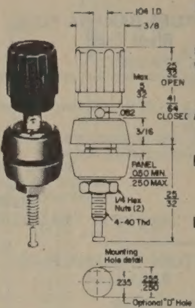


HEAD: Captive molded Lexan, per MIL-P-20693A
BODY: Brass, silver plated
NUT: Brass, nickel plated; 5/16-32, 3/32 thick, 7/16 A.F.
ACCEPTS: Phone tip plug, banana plug, alligator clip, spade lug, or wire strand.
RATING: 15 amps AC for 10°C temp. rise, continuous duty. 5 KV, 60 Hz. Continuous working voltage. Capacitance 3.3 Pf.
DESCR: Single threaded body mounts in 5/16 round, or double D hole without loose washers or nuts. Bushing dimensions similar to our No. 1509. Wrap-around solder terminal on stud for direct connection.
COLORS: Red, Black, Yellow, Green, Blue, White. Specify color as coded above.
Std. Pkg. 100

No.	Type	NET Per C
1463	Round	$50.00
1464	Double "D"	50.00

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

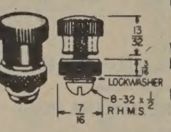
MINIATURE BINDING POST



HEAD: Captive MOLDED NYLON, per MIL-P-20693A, with Brass, gold plated insert.
BODY: Brass, gold plated.
WASHERS: Molded Nylon, per MIL-P-20693A, with Brass Gold Plated inserts.
ACCEPTS: Standard .080" phone tip, #6 spade lug, miniature banana plug, alligator clip or wire.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.5 PF.
DESCR.: Compact Binding post designed for use with miniaturized equipment. Molded washers completely insulate post from panel. Mounts in ¹/₄ round or "D" hole in panel as indicated. Wrap-around solder turret for direct wire connection.
COLORS: Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR by adding Color Code suffix to basic Catolog No. **Std. Pkg. 100**

No.	NET Per C
3015	$60.00

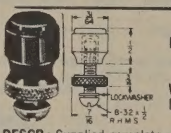
BINDING POST



HEAD: MOLDED PHENOLIC plastic, with molded-in brass threaded insert. Red or Black. SPECIFY COLOR
WASHER: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied complete with screw and lockwasher. **Std. Pkg. 100**

No.	NET Per C
265	$30.00

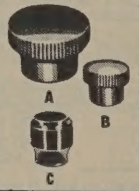
BINDING POST



HEAD: MOLDED PHENOLIC plastic, with molded-in brass threaded insert. Red or Black. SPECIFY COLOR
WASHER: brass nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied complete with screw and lockwasher. **Std. Pkg. 100**

No.	NET Per C
266	$30.00

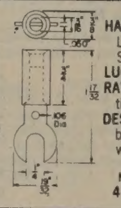
BINDING POST KNOBS



Threaded 8-32 brass inserts.
Std. Pkg. 50

No.	Style	O.D.	Height	Color	NET Per C
2271	A	¾"	½"	Black	$16.00
2272	A	¾"	½"	Red	17.00
2285	B	½"	⁷⁄₁₆"	Red	13.00
2286	B	½"	⁷⁄₁₆"	Black	13.00
2287	C	½"	½"	Red	13.00
2288	C	½"	½"	Black	13.00

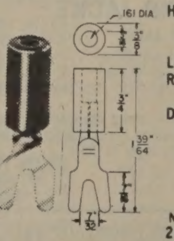
INSULATED SPADE LUG



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black SPECIFY COLOR
LUG: Brass, .050 thick, nickel plated.
RATING: 30 Amps AC for 10°C Temp.rise, continuous duty.
DESCR.: ¹/₄" I.D. fits all standard Multi-purpose binding posts. Accepts up to #10 insulated wire, which solders in front hole.
Std. Pkg. 100

No.	NET Per C
400	$15.00

INSULATED SPADE LUG

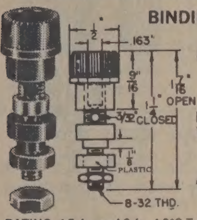


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black. SPECIFY COLOR
LUG: Steel electro tinned, .020 thick.
RATING: 15 Amp AC for 10°C Temp. rise, continuous duty.
DESCR.: Tapered slot fits studs from ¼" dia. down to #6 dia. Fits all standard binding posts. Accepts standard banana plugs in rear. Solder bridge for wire connection up to No. 18 AWG.

No.	Description	Std. Pkg.	NET Per C
218	Insulated Spade Lug	100	$10.00
129	Lug Olny	1000	2.80

JUST ADDED NORELCO MINIATURE LAMPS

See page 41 of this listing.



BINDING POST Insulated

HEAD: CAPTIVE MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or black. SPECIFY COLOR

BODY: Brass, nickel plated.

WASHERS: MOLDED BUTYRATE, per Fed Spec. L-P349A, Type 3, Class MS.

ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.

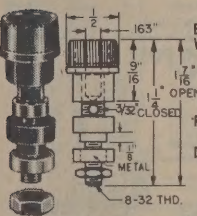
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.0 pf.

DESCR.: Mounts in 1/4" hole in panel. Supplied with one hex nut.

Std. Pkg. 100

No.	NET Per C
386	$36.00

BINDING POST Grounded



HEAD: CAPTIVE MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or black. SPECIFY COLOR

BODY: Brass, nickel plated.

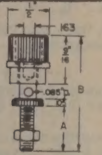
WASHERS: MOLDED BUTYRATE, per Fed Spec. L-P349A, Type 3, Class MS. Mounting Washer—Molded plastic. Back-up Washer—Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Mounts in 1/4" hole in panel. Grounded to panel by back-up washer. Supplied with one hex nut.

Std. Pkg. 100

No.	NET Per C
387	$33.00



BINDING POST Grounded

HEAD: CAPTIVE MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or black. SPECIFY COLOR

BODY: Brass, nickel plated.

ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.

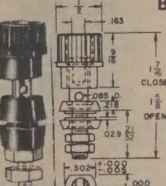
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.0 pf.

DESCR.: Can be completely insulated from panel by using our 2155 and 2163 fibre washers.

Std. Pkg. 100

No.	Description	NET Per C
220	8-32 x ½ Stud	$34.00
230	6-32 x ⅜ Stud	34.00
3875	Staking Tool	Net Ea 1:50

BINDING POST Insulated



HEAD: CAPTIVE MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or black. SPECIFY COLOR

BODY: Brass, nickel plated.

WASHERS: MOLDED BUTYRATE, per MIL-L-P349A, Type 3, Class MS. With brass inserts.

ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.

DESCR.: Mounts in 5/16" hole in panel with milled slot for locking, supplied with two hex nuts.

Std. Pkg. 100

No.	Description	NET Per C
260	8-32 Stud	$55.00
259	6-32 Stud	55.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK FOR OFF-THE-SHELF DELIVERIES OF YOUR SMALLER HARDWARE REQUIREMENTS!

BINDING POST

HEAD: CAPTIVE: MOLDED LEXAN. Red or Black. SPECIFY COLOR.

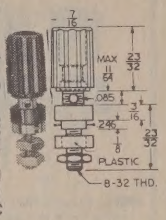
BODY: Brass, nickel plated.

WASHERS: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.

ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.0 mmfd.

DESCR.: Mounts in ¼" hole in panel. Supplied with one hex nut. **Std. Pkg. 100**



No.	NET Per C
1480	$36.00

BINDING POST

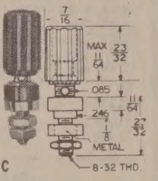
HEAD: CAPTIVE: MOLDED LEXAN. Red or Black. SPECIFY COLOR.

BODY: Brass, nickel plated.

WASHERS: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Mounting Washer —Molded plastic. Back-up Washer—Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.

DESCR.: Mounts in ¼" hole in panel. Grounded to panel by back-up washer. Supplied with one hex nut. **Std. Pkg. 100**



No.	NET Per C
1481	$33.00

BINDING POST

HEAD: GROUNDED MOLDED LEXAN. CAPTIVE: MOLDED.

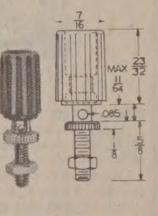
COLORS: Available in Red, Black, Yellow, Green, Blue and White. SPECIFY COLOR

BODY: Brass, nickel plated.

ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.

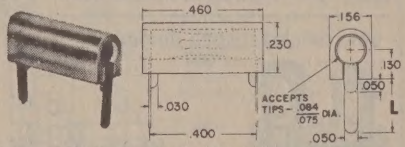
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1 K Volts 60 cycle AC continuous working voltage, when insulated from panel as recommended. CAPACITANCE 5.0 mmfd.

DESCR.: Can be completely insulated from panel by using our 2155 and 2163 fibre washers, supplied with 2 hex nuts. **Std. Pkg. 100**



No.	Stud	A	B open	B closed	NET Per C
1482	8-32 x 1/2"	1/2"	1-5/16"	1-1/8"	$34.00
1483	6-32 x 3/8"	3/8"	1-3/16"	1"	34.00

MILITARY TYPE
Made to Meet MIL-C-39024/11



BODY: MOLDED NYLON, Per MIL-P-17091. 10 Colors, specify.

SPRING: Beryllium Copper, Per QQ-C-533.

FINISH: Gold Plate, per MIL-G-45204, CLASS I. Type 2. Nickel underplate, per QQ-N-290, Class I Type 7, .0002" thick.

MOUNTING: Mounts in .052" dia. holes on .400" centers. Board thickness as specified below. Spaced side-by-side. 160" on centers minimum.

MECHANICAL DATA: Thermal shock, vibration, humidity, insulation resistance, salt spray per MIL-STD-202B. All mechanical Tests per applicable section of MIL-C-39024. Insertion force 30 oz. max., withdrawal force 3 oz. min., with .080" (.001") probe.

RATINGS: Operating voltage 1500 volts, 60 cps RMS, sea level. 350 volts, 60 cps RMS at 50,000 feet. 5 amps. AC max. current rating. Contact resistance 20 mV drop max. At specified current, at 25° C.

DESCR.: Double entry design, probe inserts from either end of jack. Closed entry construction will not accept probes larger than .084", will contact probes down to .074". Closed bottom design keeps jack from fouling with solder of flux. Locking ears keep jack firmly in board until soldered. Precise dimensions allow for automated assembly on boards.

Std. Pkg. 100

"L" DIMENSION 0.130

For boards up to 1/16" thick, MIL-C-39024/11-01 thru -10.

No.	NER Per C
325	$15.00

"L" DIMENSION 0.219

For boards up to 1/8" thick, MIL-C-39024/11-21 thru -30.

No.	NER Per C
321	$15.00

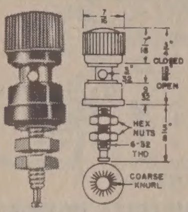
ECONOMY TYPE

"L" DIMENSION 0.130

No.	Spring Plating	NET Per C
306	Gold flash over .0002 Silver	$13.00
359	.0002 Silver	12.00

"L" DIMENSION 0.219

No.	Spring Plating	NET Per C
328	Gold flash over .0002 Silver	$13.00
402	.0002 Silver	12.00



NYLON BINDING POST
Grounded

HEAD: CAPTIVE MOLDED NYLON, per MIL-P-20693A. Red or Black with brass nickel plated insert. SPECIFY COLOR

WASHER: Molded nylon with brass nickel plated insert.

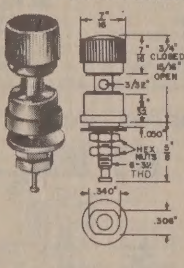
BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 6.0 pf.

DESCR.: Supplied with 2 hex nuts. Grounds to panel but supplied with nylon washer for uniformity of height with No. 378 when used on same panel. Can be installed from panel by using our No. 2150 shoulder washer. **Std. Pkg. 100**

No. 377 — **NET Per C $60.00**

NYLON BINDING POST: Insulated



HEAD: CAPTIVE: MOLDED NYLON, per MIL-P-20693A. Red or Black with brass nickel plated insert. SPECIFY COLOR

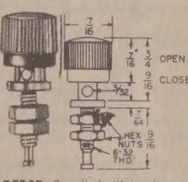
WASHER: Molded nylon with brass nickel plated insert.

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 4.0 pf.

DESCR.: Supplied with two hex nuts. Boss washer insulated post from chassis when used with bakelite washer supplied. **Std. Pkg. 100**

No.	Min. Panel Thickness	NET Per C
378	1/16"	$60.00



NYLON BINDING POST
Grounded

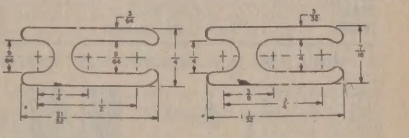
HEAD: CAPTIVE MOLDED NYLON, per MIL-P-20693A. Red or Black with brass nickel plated insert. SPECIFY COLOR

BODY: Brass, nickel plated.

RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 7.0 pf.

DESCR.: Supplied with two hex nuts. Can be insulated from panel by using our No. 2150 shoulder washer and 2162 flat washer. **Std. Pkg. 100**

No. 379 — **NET Per C $55.00**



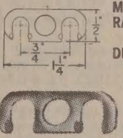
MATERIAL: Spring brass, nickel plated. .031 thick.

RATING: 50 Amps AC continuous duty. for 10°C Temp. Rise (#1828) 25 Amps A.C. continuous duty. for 10°C Temp. rise (#1829)

DESCR.: Snaps over contact barrels of standard (¾" centers) or miniature (½" centers) dual binding posts for positive shorting. Retaining feature allows link to slide on one post for temporary un-shorting without falling while loose. **Std. Pkg. 100**

No.	Description	NET Per C
1828	Standard for ¾" Posts	$7.00
1829	Miniature for ½" Posts	7.00

SHORTING LINK



MATERIAL: Spring brass, nick. pl. .033" thick.

RATING: 50Amps AC continuous duty for 10° Temp Rise.

DESCR.: Snaps over contact barrels of dual binding posts with standard 3/4" mounting centers for positive shorting. Snap-in feature allows use in any position without falling off. Rotates on either post for open circuit use, retaining snap-in feature. Center hole allows easy insertion or removal.

Std. Pkg. 100

No. 327 — **Net Per C $7.00**

SPECIAL REQUIREMENTS?

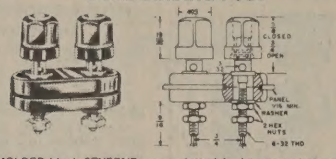
Use our Engineering and Production Facilities to design and develop new products or modify existing components to meet your specific needs.

"Specials are Standard with SMITH!"

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

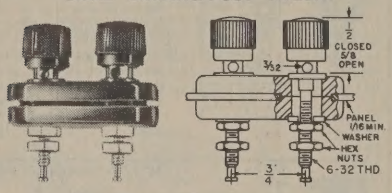
DUAL BINDING POST



INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: Captive, MOLDED LEXAN, per MIL-P-20693A, with molded in brass insert.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf, between conductors, 3.0 pf to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 25**

No.	Description	NET Per C
269BB	Two Black Heads	$125.00
269RR	Two Red Heads	125.00
269RB	One Red, One Black Head	125.00

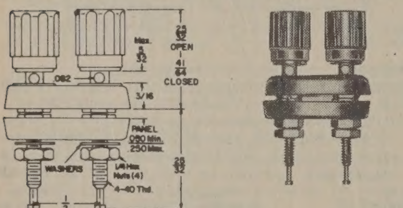
DUAL BINDING POST NYLON

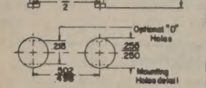


INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: Captive: MOLDED NYLON, per MIL-P-20693A, with molded in brass insert.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 3.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 25**

Net	Description	NET Per C
284BB	Two Black Heads	$95.00
284RR	Two Red Heads	95.00
284RB	One Red, One Black Head	95.00

MINIATURE DUAL BINDING POST ASSEMBLY

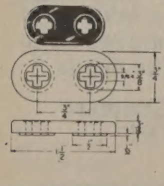




INSUL.: MOLDED Black STYRENE, octagonal keyed to align cross-holes at alternate 90° positions.
BODY: Brass, gold plated.
HEAD: Captive MOLDED NYLON, per MIL-P-20693A, with Brass plated inserts.
HARDWARE: Brass, Gold plated.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.5 pf between conductors, 3.0 pf to panel.
DESCR.: Compact Dual Binding Post designed for use with miniaturized equipment. Mounts in two 1/4" round, single or double "D" holes on 1/2" centers, in panels up to 1/4" thick. 1/2" center spacing designed for use with miniature dual connectors. Also accepts single miniature banana plugs, .080" phone tips, #6 spade lugs, alligator clips or wire. Wraparound solder turret for direct wire connections. Supplied with two hex nuts and flat washers. **Std. Pkg. 25**

Net	Description	NET Per C
3016BB	Two Black Heads	$115.00
3016RR	Two Red Heads	115.00
3016RB	One Red, One Black Head	115.00

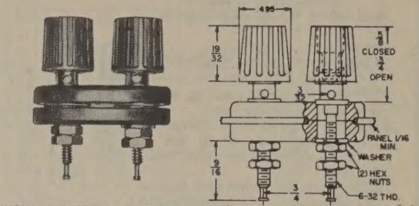
BLACK STYRENE INSULATOR



INSUL.: STYRENE, black, Spec. L-P416, Type I.
RATING: 2K Volts 60 cycle AC continuous working voltage.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. **Std. Pkg. 100**

No.	NET Per C
207	$7.00

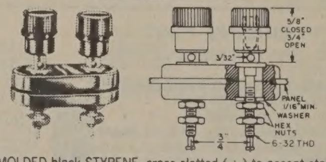
DUAL BINDING POST



INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: Captive MOLDED LEXAN. per MIL-P-20693A, with molded in brass insert.
RATING: 15 Amps AC for 10°C Temp. rise, continous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 3.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 10**

Net	Description	NET Per C
1813BB	Two Black Heads	$115.00
1813RR	Two Red Heads	115.00
1813RB	One Red, One Black Head	115.00

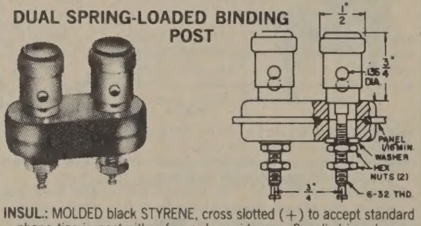
DUAL BINDING POST



INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: CAPTIVE MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or black. SPECIFY COLOR
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 3.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 25**

Net	Description	NET Per C
224BB	Two Black Heads	$95.00
224RR	Two Red Heads	95.00
224RB	One Red, One Black Head	95.00

DUAL SPRING-LOADED BINDING POST



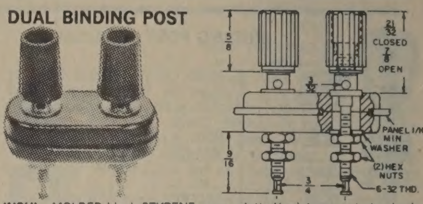
INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways. Supplied in colors on special order.
HEAD: Captive brass, nickel plated.
CAP: Molded black styrene.
BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accepts standard phone tips or wires in side holes, and locks them in place when pressure on cap is released. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 10**

No.	NET Per C
2713	$175.00

JUST ADDED NORELCO MINIATURE LAMPS

See page 41 of this listing.

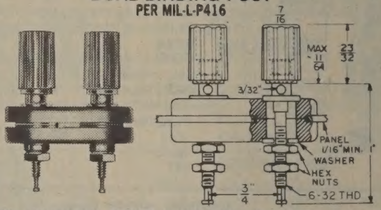
DUAL BINDING POST



INSUL.: MOLDED black STYRENE, cross slotted(+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: Captive: MOLDED LEXAN. per MIL-P-20693A, with molded in brass insert
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 3.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 10**

Net	Description	NET Per C
1814BB	Two Black Heads	$115.00
1814RR	Two Red Heads	115.00
1814RB	One Red, One Black Head	115.00

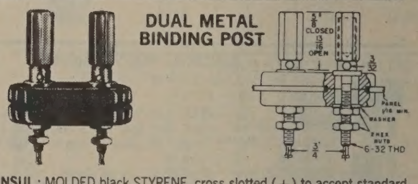
DUAL BINDING POST
PER MIL-L-P416



INSUL.: MOLDED black STYRENE, per MIL-L-P416, Type 1, cross slotted (+) to accept standard phone tips in post either forward or sideways.
BODY: Brass, nickel plated.
HEAD: Captive: MOLDED LEXAN Red or Black. SPECIFY COLOR
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 mmfd. between conductors, 3.0 mmfd. to panel.
DESCR.: Mounts in two ½" holes on ¾" mounting centers in panels up to ¼" thick. Accommodates single or dual banana plugs. Supplied with 4 hex nuts, 2 flat washers.

No.	Description	NET Per C
1477BB	Two Black Heads	$ 95.00
1477RR	Two Red Heads	95.00
1477RB	One Red, One Black Head	95.00

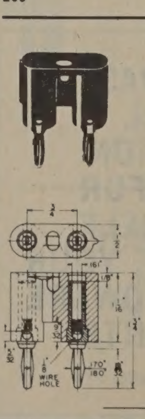
DUAL METAL BINDING POST



INSUL.: MOLDED black STYRENE, cross slotted (+) to accept standard phone tips in post either forward, or sideways.
BODY: Brass, nickel plated.
HEAD: Captive: Hex brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 3.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates single or dual banana plugs, Supplied with 4 hex nuts, 2 flat washers. **Std. Pkg. 25**

No.	NET Per C
209	$135.00

DUAL BANANA PLUG

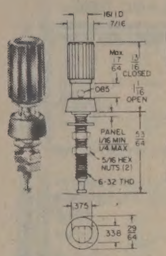


BODY: MOLDED POLYSTYRENE, Red or Black
SPECIFY COLOR
PLUG: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated
SCREW: Steel, cadmium plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 5K Volts 60 cycle AC continuous working voltage. CAPACITANCE 1.0 mmfd. between conductors.
DESCR: Mates with standard dual binding post ¾" centers. Polarity indicated on top and side. Wire held with internal set screw. Can be stacked for multiple connections.
Std. Pkg. 25

No.	Net Per C
210	$88.00

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

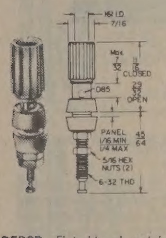
Add Dept. EM to address to tell them you saw it in eem


.161 I.D.
7/16
Max $\frac{17}{64}$
$\frac{13}{16}$ CLOSED
.085
$1\frac{1}{16}$ OPEN
PANEL 1/16 MIN 1/4 MAX
$\frac{53}{64}$
5/16 HEX NUTS (2)
6-32 THD
.375
.338
$\frac{29}{64}$

METAL BINDING POST
Grounded

HEAD: CAPTIVE, Fluted Brass, Gold-plated.
BODY: Brass, gold plated.
WASHER: MOLDED BLACK NYLON, per MIL-P-20693A, with brass Gold-plated insert.
ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Fluted-head metal post to match our No. 1517, For use where direct ground connection is made to panel or chassis. Supplied with brass, gold-plated flat metal washer for grounding.
Std. Pkg. 100

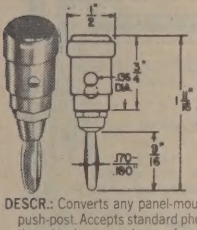
No.	NET Per C
1518	$90.00


.161 I.D.
7/16
Max $\frac{7}{32}$
$\frac{11}{16}$ CLOSED
.085
$\frac{29}{32}$ OPEN
PANEL 1/16 MIN 1/4 MAX
$\frac{45}{64}$
5/16 HEX NUTS (2)
6-32 THD

METAL BINDING POST
INSULATED

HEAD: CAPTIVE, Fluted Brass, Gold-plated.
BODY: Brass, gold plated.
WASHER: MOLDED BLACK NYLON, per MIL-P-20603A, with brass Gold-plated insert.
ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip, or wire strand.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage. CAPACITANCE 3.0 pf.
DESCR.: Fluted-head metal post to match our No. 1517. Mounts in 3/8" round or "D" hole in panel. Molded washers insulate post from panel for use where internal ground circuit is isolated from chassis or panel.
Std. Pkg. 100

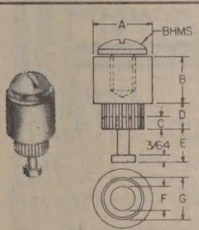
No.	NET Per C
1519	$95.00


$\frac{1}{2}$"
.136 DIA.
$\frac{3}{4}$"
$1\frac{11}{16}$"
$\frac{9}{16}$"
.170-.180"

COMBINATION POST-PLUG

HEAD: Captive brass, nickel plated.
CAP: Molded Styrene, Red or Black. SPECIFY COLOR
BODY: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Converts any panel-mounted banana jack into a spring loaded push-post. Accepts standard phone tip, solid or stranded wire, and locks them in place on release of pressure on cap.
Std. Pkg. 25

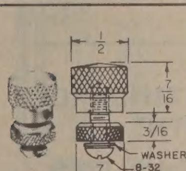
No.	NET Per C
2714	$83.00


A
BHMS
B
D
C
3/64
E
F
G

COMBINATION TERMINALS

MATERIAL: BRASS, alloy plate.
DESCR.: Combination Screw and Turret Terminal. Knurled shank prevents turning. Supplied complete with BHMS and Internal Tooth Lockwasher, unassembled.
Std. Pkg. 25

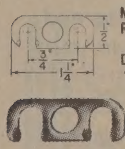
No.	A	B	C	D	E	F	G	BH MS	Panel Thk	NET Per C
2045	5/16	1/4	1/16	9/64	11/64	1/8	220	6-32	3/32	$20.00
2046	11/32	5/16	5/64	11/64	13/64	9/64	.250	8-32	1/8	20.00
2047	3/8	3/8	5/32	15/64	13/64	5/32	257	10-32	3/16	20.00


$\frac{1}{2}$
$\frac{7}{16}$
3/16
WASHER
8-32 SCREW
$\frac{7}{16}$

METAL BINDING POST

HEAD: BRASS, nickel plated.
WASHER: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Supplied complete with screw and lockwasher.
Std. Pkg. 100

No.	NET Per C
110	$35.00

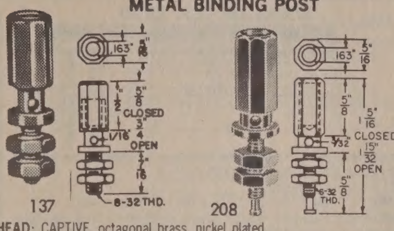

$\frac{1}{2}$"
$\frac{3}{4}$"
$1\frac{1}{4}$"

SHORTING LINK

MATERIAL: Spring brass, nick. pl. .033" thick.
RATING: 50Amps AC continuous duty for 10° Temp Rise.
DESCR.: Snaps over contact barrels of dual binding posts with standard 3/4" mounting centers for positive shorting. Snap-in feature allows use in any position without falling off. Rotates on either post for open circuit use, retaining snap-in feature. Center hole allows easy insertion or removal.
Std. Pkg. 100

No. 327 Net Per C $7.00

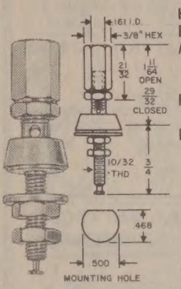
METAL BINDING POST


.163"
$\frac{5}{16}$"
$\frac{1}{2}$"
$\frac{5}{8}$"
CLOSED
1/16
$\frac{3}{4}$" OPEN
$\frac{7}{16}$"
8-32 THD.
.163"
$\frac{5}{16}$"
$\frac{5}{8}$"
$1\frac{5}{16}$" CLOSED
1/32"
$1\frac{15}{32}$" OPEN
$\frac{5}{8}$"
6-32 THD.

137 208

HEAD: CAPTIVE, octagonal brass, nickel plated.
BODY: Brass, nickel plated.
ACCEPTS: Phone tip, spade lug, banana plug, alligator clip or wire strand.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 5.0 mmfd.
DESCR.: Can be completely insulated from panel by using fibre washers. Supplied with two hex nuts.
Std. Pkg. 100

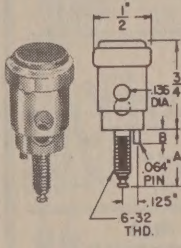
No.	Description	NET Per C
137	Standard	$50.00
208	Wrap-around	65.00


.161 I.D.
3/8" HEX
$\frac{21}{32}$
$1\frac{11}{64}$ OPEN
$\frac{29}{32}$ CLOSED
10/32 THD
$\frac{3}{4}$
.468
.500
MOUNTING HOLE

METAL BINDING POST

HEAD: Captive, Hex Brass, Nickel plated.
BODY: Brass, Nickel plated.
ACCEPTS: Phone tip plug, spade lug, banana plug, alligator clip or wire strand.
RATING: 30 Amps AC for a 10°C temp. rise, continuous duty.
DESC.: Mounts in a ½" round or "D" hole. For use where direct ground connection is made to panel or chassis 1/32 to 3/8 max. thickness. Supplied with Nickel plated flat metal washer for grounding and 2-10/32 Nickel plated nuts.
Std. Pkg. 100

No.	NET Per C
1835	$65.00


$\frac{1}{2}$"
$\frac{3}{4}$"
.136 DIA.
B
A
.064" PIN
.125"
6-32 THD.

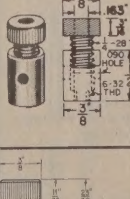
BINDING POST
Spring Loaded

HEAD: Captive brass, nickel plated.
CAP: STYRENE, Red or Black. SPECIFY COLOR
BODY: Brass, nickel plated.
PIN: Nickel Silver.
ACCEPTS: Standard phone tip or wire in side hole and locks them in place on release of pressure on cap.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Side dowel pin locates and prevents post from turning when mounted in panel.
Std. Pkg. 100

		With Dowel Pin		Less Dowel Pin	
A	B	No.	NET Per C	No.	NET Per C
5/16"	1/8"	2701	$65.00	2801	$60.00
3/8"	1/8"	2702	67.00	2802	62.00
1/2"	1/4"	2703	69.00	2803	64.00
3/4"	1/4"	2704	71.00	2804	68.00
1"	3/8"	2705	75.00	2805	70.00

Same as above less threaded stud. Supplied with 6-32 internal mounting thread.
Std. Pkg. 50

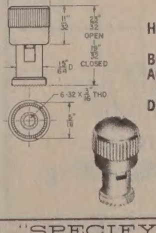
No.	Description	NET Per C
2709	With 1/8" lg. Dowel Pin	$50.00
2809	Without Dowel Pin	50.00


$\frac{3}{8}$"
.163"
$\frac{3}{16}$"
$\frac{1}{4}$-28 THD
.090 HOLE
$\frac{1}{2}$"
6-32 THD
$\frac{3}{8}$"

METAL BINDING POST

HEAD: BRASS, nickel plated.
BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Accepts standard phone tips or banana plugs.
Std. Pkg. 100

No.	NET Per C
136	$35.00

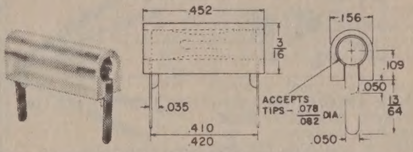

$\frac{3}{8}$"
$\frac{11}{32}$"
$\frac{23}{32}$" OPEN
$\frac{19}{32}$" CLOSED
$\frac{15}{64}$" D
6-32 X $\frac{3}{16}$" THD
$\frac{5}{16}$"

BINDING POST
Compression Type

HEAD: Captive, brass nickel plated. Straight knurled for finger grip.
BODY: Brass, nickel plated.
ACCEPTS: Phone tips or wire (up to #10 gauge.)
DESCR.: Head screws down to compress wire between body and sliding contact. Internally threaded for 6-32 mounting screw. Base knurled for positive grip to panel.
Std. Pkg. 100

No.	NET Per C
159	$30.00

RIGHT ANGLE PRINTED CIRCUIT TEST JACK
COMMERCIAL TYPE


.452
$\frac{3}{16}$
.035
.410
.420
.156
.109
.050
$\frac{13}{64}$
ACCEPTS TIPS - .078/.082 DIA.
.050

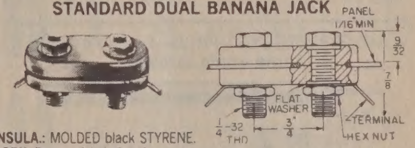
BODY: MOLDED NYLON, Per MIL-P-20693A. 10 Colors, specify color, as coded.
SPRING: Beryllium Copper, Per QQ-C-533.
FINISH: Silver underplate, .0002" min., per QQ-S-365, Type I, with .00003" Gold overplate; per MIL-F-14072, M-310.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 1.5 KV. 60 cycle AC continuous working voltage. Contact resistance 5 milliohms max. at rated current. Capacitance less than 5 MHz at 1 pf.
MOUNTING: Mounts in .052" dia. holes on .400" centers, in boards up to 3/16" thick. Can be spaced side-by-side .160" on centers min.
MECHANICAL DATA: Thermal shock, vibration, humidity, insulation resistance, and salt spray tests per MIL-STD-202B. Solderability per MIL-S-6872. Insertion and withdrawal force: 8 oz. min., 5 lbs. max. with .080" (±.001") dia. probe.
DESCR.: Double-entry design, probe inserts from either, end of jack. Closed entry construction will not accept probes larger than .084", will contact probes down to .074". Closed bottom construction keeps jack from fouling with solder or flux. Locking ears hold jack firmly in board until soldered. Precise dimensions allow for automated assembly on boards.
Std. Pkg. 100

No.	NET Per C
430	$15.00

ECONOMY TYPE

499	Spring—Gold flash over .0002 Silver	$13.00
498	Spring—.0002 Silver	12.00

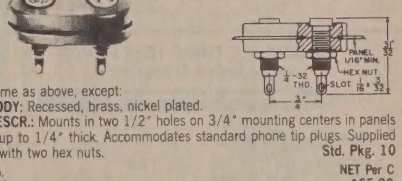
STANDARD DUAL BANANA JACK


PANEL 1/16" MIN
$\frac{9}{32}$
$\frac{7}{8}$
FLAT WASHER
TERMINAL
HEX NUT
$\frac{1}{4}$-32 THD
$\frac{3}{4}$"

INSULA.: MOLDED black STYRENE.
BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 2 K Volts 60 cycle AC continuous working voltage. CAPACITANCE 2.0 pf. between conductors, 4.0 pf. to panel.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates standard and dual banana plugs. Supplied with two hex nuts, 4 flat washers and brass tinned lugs.
Std. Pkg. 10

No.	NET Per C
489	$65.00

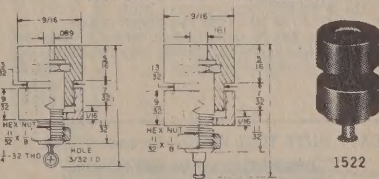
STANDARD DUAL TIP JACK


$\frac{31}{32}$
PANEL 1/16" MIN.
HEX NUT
$\frac{1}{4}$-32 THD
SLOT $\frac{1}{16}$ x $\frac{3}{32}$
$\frac{3}{4}$"

Same as above, except:
BODY: Recessed, brass, nickel plated.
DESCR.: Mounts in two 1/2" holes on 3/4" mounting centers in panels up to 1/4" thick. Accommodates standard phone tip plugs. Supplied with two hex nuts.
Std. Pkg. 10

No.	NET Per C
488	$65.00

HIGH VOLTAGE NYLON JACKS


9/16
.089
$\frac{13}{32}$
$\frac{5}{16}$
$\frac{7}{32}$
$\frac{9}{32}$
1/16
$\frac{11}{32}$
HEX NUT $\frac{11}{32}$ x $\frac{1}{8}$
$\frac{1}{4}$-32 THD
HOLE 3/32 I.D.
9/16
.161

1522

MADE TO MEET MS-16107 SPEC.

Heavy molded nylon body and cup washer prevent high-voltage flashover to panel. Meets following requirements:

1. Salt Spray Test—Withstands 100 hours.
2. Electrical Rating—15 Amps AC for 10°C Temp. rise, continuous duty. 5 KV 60 cycle AC continuous working voltage. Millivolt drop per MIL-J-6751. CAPACITANCE 2.0 pf.
3. Material Specifications.
    - A. Insulator and Washer:—Molded Nylon, per MIL-P-20693A. Colors to Fed. Std. 595. Specify color as coded above.
    - B. Insert Shell and Nut: Brass, Nickel plated per QQ-N-290, type V (FC).
    - C. Contact: Phosphor bronze, Silver plated .0002" per QQ-S-365, Gold plated overall.

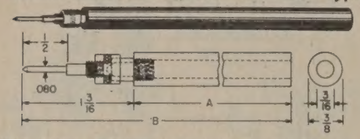
Specify color as coded above, 10 colors.
Std. Pkg. 25

No.		NET Per C
1521	Phone Tip	$60.00
1522	Banana	60.00

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

SOLDERLESS TEST PROD—Threaded Type

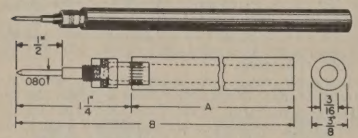


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of plug then wrapped around screw portion and tightened with knurled collar.

Std. Pkg. 25

No.	Handle (A)	Overall (B)	NET Per C
302	4"	5¼"	$33.00
303	5½"	6¾	36.00

SOLDERLESS TEST PROD—Force Fit Type

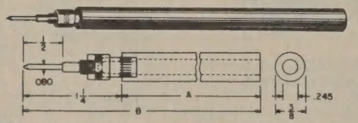


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of plug then wrapped around screw portion and tightened with knurled collar.

Std. Pkg. 25

No.	Handle (A)	Overall (B)	NET Per C
382	4"	5¼"	$33.00
383	5½"	6¾"	36.00

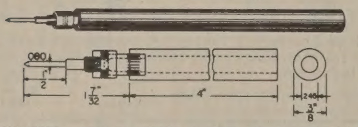
SOLDERLESS TEST PROD—Force Fit Type
Large Inside Diameter



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of plug then wrapped around screw portion and tightened with knurled collar. Extra large I.D. for heavy duty wire. **Std. Pkg. 25**

No.	Handle (A)	Overall (B)	NET Per C
352	4"	5¼"	$33.00
353	5½"	6¾"	36.00

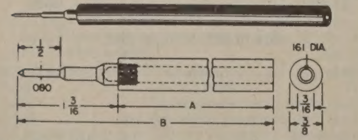
SOLDERLESS FIBRE TEST PROD
Large Inside Diameter



HANDLE: FIBRE, per MIL-F-1148A Grade CH. Red, Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Wire fits through handle and body of plug then wrapped around screw portion and tightened with knurled collar. Large I.D. permits use of heavy duty wire. **Std. Pkg. 25**

No.	NET Per C
323	$39.00

HEAVY DUTY TEST PROD—Threaded Type

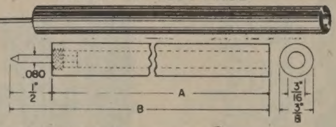


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Large diameter well enables soldering of heavy duty wire directly into plug. Fits standard phone tip jacks. **Std. Pkg. 25**

No.	Handle (A)	Overall (B)	NET Per C
319	4"	5 3/16"	$33.00
329	5½"	6 11/16"	36.00

WE INVITE YOU to use our manufacturing and engineering facilities and our know-how to meet YOUR PARTICULAR REQUIREMENTS.

SHORT TIP TEST PROD

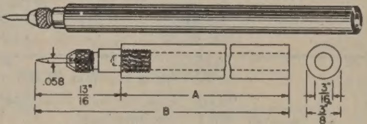


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Inserts flush with insulated handle, no metal exposed; eliminates possibility of shock or grounding . Fits standard phone tip jacks.

Std. Pkg. 25

No.	Handle (A)	Overall (B)	NET Per C
363	4"	4½"	$28.00
364	5½"	6"	31.00

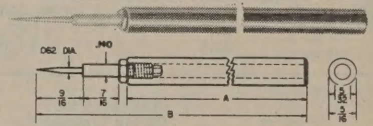
PHONO NEEDLE TEST PROD



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black.
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Removable chuck for easy replacement or broken needles. Needle pierces corrosion or plating for positive reading. **Std. Pkg. 25**

No.	Handle (A)	Overall (B)	NET Per C
317	4"	4 13/16"	$36.00
318	5½"	6 5/16"	42.00

SOLDERLESS PHONO NEEDLE TEST PROD

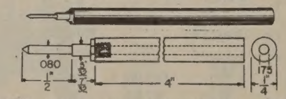


HANDLE: XXXP Phenolic lacquered, per MIL-P-79, Form TR, Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
NEEDLE: Phono needle steel.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Wire can be soldered to brass stud or directly into plug itself. Stud also locks wire to pellet for solderless connections.

Std. Pkg. 25

No.	Handle (A)	Overall (B)	NET Per C
314	4"	5 3/32"	$83.00
313	6"	7 3/32"	90.00

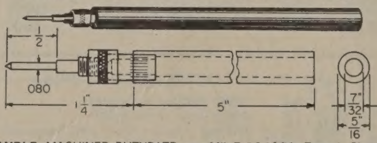
MINIATURE TEST PROD



HANDLE: FIBRE, per MIL-F-1148A Grade CH. Red, Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Threaded for easy assembly. Ideally suited for checking all types sub-miniature equipment. **Std. Pkg. 25**

No.	NET Per C
322	$39.00

PENCIL TYPE SOLDERLESS TEST PROD



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class 2, Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continous duty.
DESCR.: Solderless: Wire fits through handle and body of plug, then wraps around screw portion and is tightened with knurled collar.

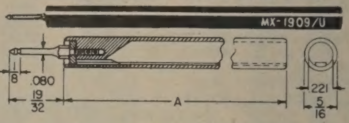
Std. Pkg. 25

No.		NET Per C
384	Force Fit Type	$33.00

JUST ADDED

New "HOOKON" Probe for high density circuits.
See **eem** page 14 of this listing.

NYLON HANDLE PRODS AND TIPS

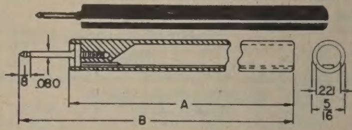


HANDLE: MOLDED NYLON, per MIL-P 20693A. SPECIFY COLOR
TIP: Brass, silver plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Solderless: Made to meet Signal Corps Drawing SC-C-82761.

Std. Pkg. 25

No.	Sig. Corps. Drawing and Part No.	Size ("A")	Color	NET Per C
176	MX-1906/U	1"	Red	$40.00
177	MX-1907/U	1"	Black	40.00
178	MX-1909/U	4"	Red	50.00
179	MX-1910/U	4"	Black	50.00

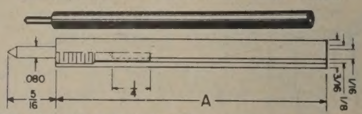
MINIATURE TIP PLUG AND TEST PROD



HANDLE: MOLDED NYLON, per MIL-P 20693A. Available in Red or Black. SPECIFY COLOR
TIP: Brass, Silver plated.
DESCR.: Solderless assembly. Ideal for use with sub-miniature printed-circuit tip jacks. Sharp tip breaks flux or oxide coating on printed-circuit pattern for positive contact when used as prod. Grooved head of prod makes positive contact when laid across wires. Fits all standard .080" tip jacks.

No.	Handle (A)	Overall (B)	Std. Pkg.	NET Per C
348	1"	1 5/16"	100	$40.00
349	4"	4 5/16"	25	50.00

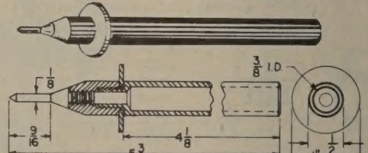
MINIATURE TIP PLUG AND TEST PROD



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II, Red or Black. SPECIFY COLOR
PLUG: Brass, nickel plated.
RATING: 2 Amps AC for 10° C Temp. rise, continuous duty.
DESCR.: Ideally suited for checking sub-miniature equipment. Fits standard phone tip jacks.

No.	Std. Pkg.	Handle (A)	NET Per C
244	100	¾"	$20.00
666	25	3"	33.00

TEST PROBE HIGH VOLTAGE TYPE



HANDLE: FIBRE, per MIL-F-1148A Grade CH. Red, Black. SPECIFY COLOR
PROBE: Brass, nickel plated.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Heavy insulated fibre probe with flash-over shield for high-voltage applications. Large internal I.D. accommodates shielded cable or R.F. networks. Heavy duty removal tip. **Std. Pkg. 10**

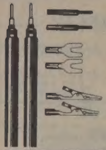
No.	NET Per C
630	$300.00

"SPECIALS ARE STANDARD WITH SMITH"

We manufacture Patch Cords, Jumpers, and Test Leads in every conceivable combination of terminal ends—plugs, jacks, clips and connectors—to be found in our entire line.

What are YOUR special requirements? We welcome your inquiry!

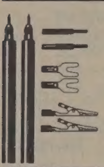
IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING



SOLDERLESS TIP TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
TIP: Solderless: brass, nickel plated. **Std. Pkg. 6**

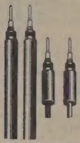
No.	Meter End	NET Each
600	Phone Tips	$1.90
601	Spade Lugs	1.85
602	Alligator Clips	1.95



PHONO NEEDLE TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
BODY: Brass, nickel plated.
NEEDLE: Steel, nickel plated. **Std. Pkg. 6**

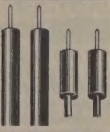
No.	Meter End	NET Each
613	Phone Tips	$1.95
614	Spade Lugs	1.90
615	Alligator Clips	2.00



ALL SOLDERLESS TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
PLUG: MOLDED THERMOSETTING plastic. Red and Black per MIL-M-14-CFG.
TIP: Solderless: Brass, nickel plated. **Std. Pkg. 6**

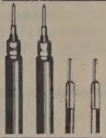
No.	NET Each
603	$2.20



SHORT TIP TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
PLUG: MOLDED PHENOLIC plastic, Red and Black.
TIP: Brass, nickel plated. **Std. Pkg. 6**

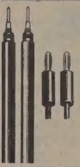
No.	NET Each
624	$2.00



SLIM HANDLE TEST LEAD

HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II, Red and Black. 5/16" O.D.
TIPS: Prod: Brass, nickel plated. Meter End: Drawn brass nickel plated. **Std. Pkg. 6**

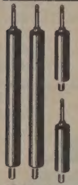
No.	NET Each
670	$2.00



BANANA PLUG TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
PLUG: MOLDED PHENOLIC plastic, Red and Black.
TIP PLUG: Solderless: Brass, nickel plated.
BODY: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
Std. Pkg. 6

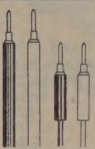
No.	NET Each
623	$2.25



SOLDERLESS PHONE TIP TEST LEAD SLIM HANDLES

HANDLE: MOLDED NYLON, per MIL-P-20693A ¼" O.D. RED and BLACK.
TIP: Brass, Silver Plated with front retention groove.
WIRE: #18 AWG, 65/36 to an O.D. of .140, rubber covered. 10,000 volts.
DESCR: Wire slips thru molded hole in handles and is held securely by washer under tip. **Std. Pkg. 6**

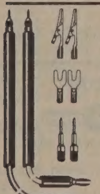
No.	NET Each
684	$2.65



SLIM HANDLE TEST LEAD

HANDLE: FIBRE, per MIL-F-1148A Grade CH. Red, Black. 1/4" O.D.
PLUG: FIBRE, per MIL-F-1148A, Grade CH. Red, Black. 1/4" O.D.
TIP: Brass, nickel plated. **Std. Pkg. 6**

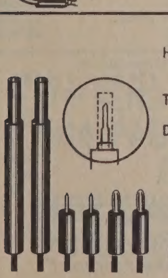
No.	NET Each
678	$2.70



TEST LEAD KIT

HANDLE: FIBRE, per MIL-F-1148A Grade CM. Red, Black. ¼"O.D.
DESCR.: Each kit is supplied with one pair of test leads. One end test prods, other end ins. banana plugs.
FITTINGS: Two each: Phone tips, alligator clips, spade lugs. **Std. Pkg. 6**

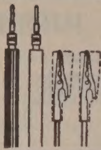
No.	Type	NET Each
610	Solderless Prods	$2.75
611	Needle Tip Prods	2.85



SHIELDED TEST LEADS

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
TIP: Prod tip brass, nickel plated. Meter end, see type.
DESCR.: Plugs insert flush to insulated handle. Prods have retractable cover leaving no metal exposed. Eliminates possibility of shock or grounding. Supplied with either phone tip or banana plug meter ends. Other variations on special order.
Std. Pkg. 6

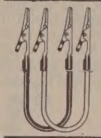
No.	Type	NET Each
616	Phone Tip End	$3.05
617	Banana Plug End	3.30



ALLIGATOR CLIP TEST LEAD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
TIPS: Solderless: Brass, nickel plated.
CLIPS: Steel, cadmium plated.
BOOT: Vinyl plastic. Red and Black. **Std. Pkg. 6**

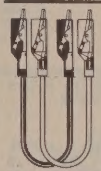
No.	NET Each
672	$1.60



ALLIGATOR CLIP TEST LEAD

CLIPS: STEEL, cadmium plated. **Std. Pkg. 6**

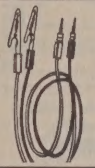
No.	Wire	NET Each
604	12 inches	$1.00
605	24 inches	1.10
606	36 inches	1.20
607	48 inches	1.30



ALLIGATOR CLIP TEST LEAD
With Boots

CLIPS: Steel, cadmium plated
BOOTS: Vinyl plastic Red and Black. **Std. Pkg. 6**

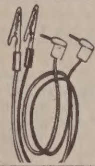
No.	Wire	NET Each
629	12 inches	$1.05
657	24 inches	1.15
658	36 inches	1.25
659	48 inches	1.35



ALLIGATOR CLIP TEST LEAD

CLIP HANDLES: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS, Red and Black.
PLUG HANDLES: MOLDED PHENOLIC plastic, Red and Black.
CLIPS: Steel, cadmium plated.
TIPS: Solderless: Brass, nickel plated. **Std. Pkg. 6**

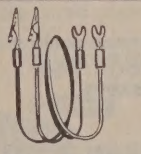
No.	NET Each
627	$1.65



ALLIGATOR CLIP TEST LEAD

CLIP HANDLES: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS, Red and Black.
CLIPS: Steel, cadmium plated.
ELBOWS: MOLDED PHENOLIC plastic, Red and Black.
TIP: Brass, nickel plated. **Std. Pkg. 6**

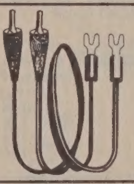
No.		NET Each
628	Phone Tip Meter Tip	$1.95
647	Banana Meter Tip	2.00



ALLIGATOR CLIP TEST LEAD

CLIP HANDLES: MOLDED BUTYRATE, per Fed. Spec. L-349A, Type 3, Class MS, Red and Black.
CLIPS: Steel, cadmium plated.
LUGS: Brass, nickel plated.
Std. Pkg. 6

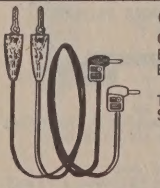
No.	NET Each
649	$1.55



CROCODILE CLIP TEST LEAD

CLIPS: Steel, cadmium plated.
BOOT: Vinyl plastic, Red and Black.
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
LUG: Brass, nickel plated.
Std. Pkg. 6

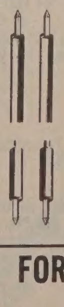
No.	NET Each
671	$2.10



CROCODILE CLIP TEST LEAD

CLIPS: Steel, cadmium plated.
BOOTS: Vinyl plastic, Red and Black.
ELBOWS: MOLDED PHENOLIC plastic, Red and Black.
TIP: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated. **Std. Pkg. 12**

No.		NET Each
648	Banana Plug End	$2.30
675	Phone Tip End	2.20

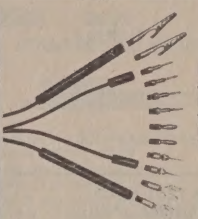


MINIATURE TEST LEAD

HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II, Red or Black.
PLUG: MACHINED BUTYRATE, 3/16" O.D., 3/4" long, per MIL-P-10408A, Type I, Class II.
TIP: Brass, nickel plated. **Std. Pkg. 6**

No.	NET Each
660	$1.60

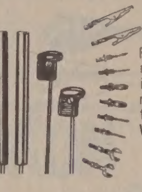
FOR PATCH CORDS AND CABLES
see eem page 14 in this listing.



"UNIVERSAL TEST LEAD"
Completely Interchangeable

Fifty Leads In One! One lead can make any required test lead combination. All parts adapt into prod handle or tip handle. Complete as shown. With plastic kit.
WIRE: 5 KV rubber covered, 26 strands #34 copper, #20 AWG insulated to an O.D. of 125". **Std. Pkg. 6**

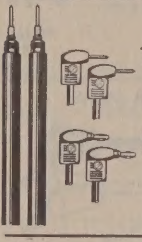
No.		NET Each
699	Standard	$5.50



"UNIVERSAL TEST LEAD"
Completely Interchangeable

Fifty Leads in One. One lead can make any required test lead combination. All parts adapt into prod handle or meter tip. Supplied with miniature tips, clips banana plugs and spade tips. Complete as shown. With plastic kit.
WIRE: 5 KV rubber covered, 26 strands #34 copper, #20 AWG insulated to an O.D. of .125" **Std. Pkg. 6**

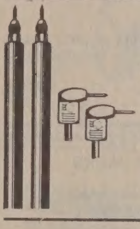
No.	Description	NET Each
679	Miniature	$5.50



METER TEST LEADS
Solderless Prod

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
TIP: Solderless: Brass, nickel plated.
ELBOW: MOLDED THERMOSETTING plastic, per MIL-M-14 CFG, Red and Black.
BODY: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated. **Std. Pkg. 12**

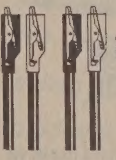
No.	Type	NET Each
625	Phone Tip Meter Tip	$2.25
685	Banana Meter Tip	2.25



NEEDLE PROD

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
NEEDLE: Steel, nickel plated.
ELBOW: MOLDED PHENOLIC PLASTIC, Red and Black. Red and Black.
BODY: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated. **Std. Pkg. 6**

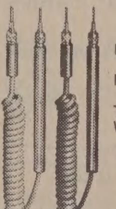
No.	Type	NET Each
626	Phone Tip Meter Tip	$2.30
686	Banana Meter Tip	2.30



MIDGET ALLIGATOR CLIP TEST LEAD

CLIPS: Steel, cadmium plated.
BOOTS: Vinyl plastic, Red and Black.
Std. Pkg. 6

No.	Wire	NET Each
716	12 inches	$1.05
717	18 inches	1.15
718	24 inches	1.25
719	36 inches	1.35



RETRACTILE ALL SOLDERLESS TEST LEAD

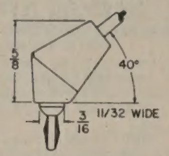
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
PLUG: MOLDED PHENOLIC plastic, Red and Black. MIL-M-14 CFG.
TIP: Solderless brass, nickel plated.
WIRE: #20 gauge, 41/36 strand, 4000 volt. nom. O.D. .165. Retracts to 12". Extends to 6 ft.
Std. Pkg. 6

No.	NET Each
618	$6.00

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

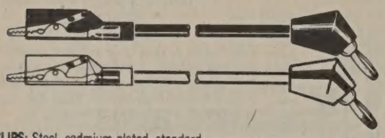
TEST LEAD WIRE SPECIFICATIONS

All test leads on this page are supplied with extra-flexible rubber-covered kinkless wire, 50-in. long, unless specified otherwise. #20 wire, 26/34 strands, 5000 Volts, .125" O.D.



PLUG HANDLE

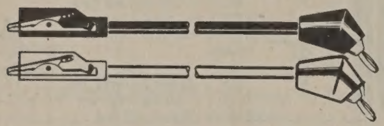
ALLIGATOR CLIP TEST LEAD FOR STANDARD BANANA JACKS



CLIPS: Steel, cadmium plated, standard.
BOOTS: Vinyl plastic, Red and Black.
BODIES: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands #36 COPPER, #18AWG, insulated to an O.D. of .140. **Std. Pkg. 12**

No.	NET Each
1332	2.30

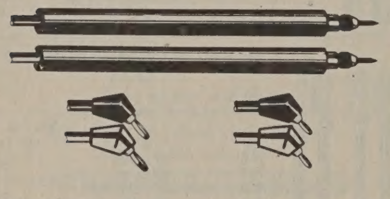
FOR MINIATURE BANANA JACKS



Same as above, except:
WIRE: 5 KV PVC flexible wire, 19 strands #36 COPPER, #24AWG, insulated to an O.D. of .090 **Std. Pkg. 12**

No.	NET Each
1342	1.80

PHONO NEEDLE TEST LEAD FOR STANDARD BANANA JACKS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black.
BODIES: Brass, nickel plated and aluminum.
NEEDLE: Steel, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated
WIRE: 10 KV PVC flexible wire, 65 strands #36 COPPER, #18AWG, insulated to an O.D. of .140 **Std. Pkg. 12**

No.	NET Each
1331	2.60

FOR MINIATURE BANANA JACKS

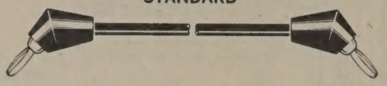
Same as above, except:
WIRE: 5 KV PVC flexible wire, 19 strands #36 COPPER, #24AWG, insulated to an O.D. of .090 **Std. Pkg. 12**

No.	NET Each
1341	2.20

MORE THAN 20 THOUSAND ELECTRONIC COMPONENT PARTS MANUFACTURED UNDER ONE ROOF

JUMPERS

BANANA PLUG STANDARD



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands # 36 COPPER, # 18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

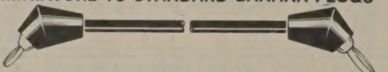
No.	Length ("A")	NET Each
1334-8	8 inches	$.85
1334-12	12 inches	.85
1334-24	24 inches	.95
1334-36	36 inches	1.05

MINIATURE

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 5 KV PVC flexible wire, 19 strands # 36 COPPER, # 24 AWG, insulated to an O.D. of .090. **Std. Pkg. 10**

No.	Length ("A")	NET Each
1344-8	8 inches	$.85
1344-12	12 inches	.85
1344-24	24 inches	.95
1344-36	36 inches	1.05

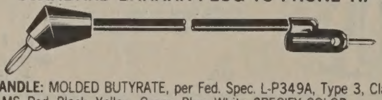
MINIATURE TO STANDARD BANANA PLUGS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 5 KV PVC flexible wire, 19 strands # 36 COPPER, # 24 AWG, insulated to an O.D. of .090. **Std. Pkg. 10**

No.	Length ("A")	NET Each
1349-8	8 inches	$.85
1349-12	12 inches	.85
1349-24	24 inches	.95
1349-36	36 inches	1.05

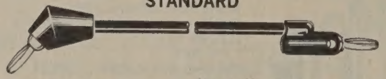
STANDARD BANANA PLUG TO PHONE TIP



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length ("A")	NET Each
1336-8	8 inches	$1.00
1336-12	12 inches	1.00
1336-24	24 inches	1.10
1336-36	36 inches	1.20

CROSS PATCH TO BANANA PLUGS STANDARD



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands # 36 COPPER, # 18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length ("A")	NET Each
1335-8	8 inches	$1.00
1335-12	12 inches	1.00
1335-24	24 inches	1.10
1335-36	36 inches	1.20

MINIATURE

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated and aluminum.
SPRING: Four-leaved beryllium copper, silver plated.
WIRE: 5 KV PVC flexible wire, 19 strands # 36 COPPER, # 24 AWG, insulated to an O.D. of .090. **Std. Pkg. 10**

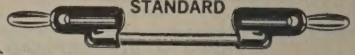
No.	Length ("A")	NET Each
1345-8	8 inches	$.90
1345-12	12 inches	.90
1345-24	24 inches	1.00
1345-36	36 inches	1.10

COLOR CODE SUFFIX

Add to Catalog Number as required

—101 WHITE	—102 RED	—103 BLACK
—104 GREEN	—105 BLUE	—107 YELLOW

"CROSS PATCH" BANANA PLUG STANDARD



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands # 36 COPPER, # 18 AWG, insulated to an O.D. of .140.
DESCR: Interconnects unlimited number of multiple circuits. Positive lasting contact for all banana plugs on top and side. **Std. Pkg. 10**

WITH PLUG SPRING 9/16" LONG

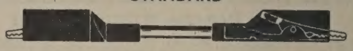
No.	Length	NET Each
1510-8	8 inches	$1.40
1510-12	12 inches	1.40
1510-24	24 inches	1.50
1510-36	36 inches	1.60

"CROSS PATCH" BANANA PLUG MINIATURE

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
COLORS: Available in 10 std. colors as coded above. SPECIFY COLOR
BODY: Brass, silver plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: General purpose, PVC insulated, 1/64" wall. # 18 AWG 41/34 stranded conductor. Voltage rating up to 1 KW R.M.S.
DESCR: Interconnects unlimited number of multiple circuits. Positive, lasting contact for banana plugs on top and side. Special lengths on request. **Std. Pkg. 10**

No.	Length	NET Each
1590-6	6 inches	$1.05
1590-12	12 inches	1.05
1590-18	18 inches	1.10
1590-24	24 inches	1.15

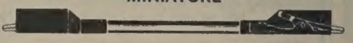
ALLIGATOR CLIP STANDARD



CLIPS: Steel, cadmium plated (No. 300).
BOOTS: Vinyl plastic. Boot colors match wire.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. Available in Red, Black, Yellow, Green, Blue and White. SPECIFY COLOR **Std. Pkg. 10**

No.	Length	NET Ea.
1596-12	12 inches	$.70
1596-24	24 inches	.80
1596-36	36 inches	.90
1596-48	48 inches	1.00
1596-60	60 inches	1.10

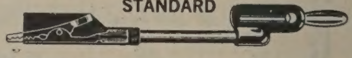
ALLIGATOR CLIP MINIATURE



CLIPS: Steel, cadmium plated (No. 338).
BOOTS: Vnyl plastic. Boot colors match wire.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
WIRE: General purpose, PCV insulated 1/64" wall, #18 AWG, 16/30 STRANDED CONDUCTOR. Available in Red, Black, Yellow, Green, Blue, and White. SPECIFY COLOR **Std. Pkg. 10**

No.	Length	NET Ea.
1597-12	12 inches	$.70
1597-18	18 inches	.75
1597-24	24 inches	.80
1597-36	36 inches	.90
1597-48	48 inches	1.00
1597-60	60 inches	1.10

ALLIGATOR CLIP TO BANANA PLUG STANDARD



HANDLE: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
PLUG: Hex brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated.
CLIPS: Steel, cadmium plated.
BOOTS: Vinyl plastic. Boot colors match wire.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length	NET Ea.
1866-12	12 inches	$1.00
1866-24	24 inches	1.10
1866-36	36 inches	1.20
1866-48	48 inches	1.30
1866-60	60 inches	1.40

PERPETUAL INVENTORY! Every major electronic parts distributor in America stocks these standard SMITH products — and depends on our tremendous factory inventory for speedy and continuing replenishment

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

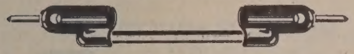
PATCH CORDS

COLOR CODE SUFFIX

Add to Catalog Number as required

—101 WHITE
—102 RED
—103 BLACK
—104 GREEN
—105 BLUE
—107 YELLOW

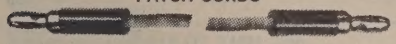
"CROSS PATCH" PIN TIP CORD



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
BODY: Brass, nickel plated.
CONTACT: Beryllium copper.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140.
DESCR.: Interconnects an unlimited number of multiple circuits .080" tip plug and female jack in rear of body fits all standard phone tips and jacks. Side holes accept standard banana plugs. **Std. Pkg. 10**

No.	Length	NET Ea.
1595-8	8 inches	$1.45
1595-12	12 inches	1.45
1595-24	24 inches	1.55
1595-36	36 inches	1.60

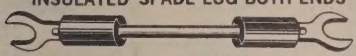
MINIATURE MOLDED PATCH CORDS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red, Yellow, Black, Green, assemblies. SPECIFY COLOR
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140.
DESCR.: Interconnects banana jacks on closely spaced centers where space is at a premium. Fits standard banana jacks. **Std. Pkg. 10**

No.	WIRE	NET Ea.
1860-8	8 inches	$ .95
1860-12	12 inches	.95
1860-24	24 inches	1.05
1860-36	36 inches	1.15

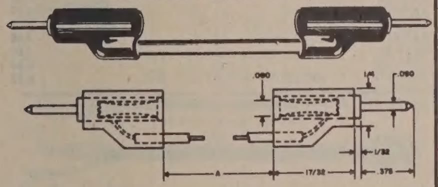
INSULATED SPADE LUG BOTH ENDS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black. SPECIFY COLOR
LUG: Brass, .050 thick, nickel plated.
RATING: 25 Amps AC for 0°C Temp. rise, continuous duty.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length	NET Ea.
1864-12	12 inches	$ .80
1864-24	24 inches	.90
1864-36	36 inches	1.00
1864-48	48 inches	1.10
1864-60	60 inches	1.20

PHONE TIP PATCH CORD



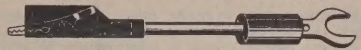
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P39A, Type 3, Class MS. Available in 10 colors as coded above. SPECIFY COLOR
BODY: BRASS, NICKEL PLATED.
CONTACT: BERYLLIUM COPPER, GOLD FLASHED
WIRE: 5 KV PVC FLEXIBLE WIRE, 19 strands #36 copper, #24 awg, insulated to an O.D. of .090".
DESCR: Short phone tip plug for fully insulated insertion in miniature jacks. Captive cage jack in rear for unlimited stack-up. Special lengths on request. **Std. Pkg. 10**

No.	Length. ("A")	NET Ea.
1591-6	6 inches	$1.25
1591-12	12 inches	1.25
1591-18	18 inches	1.30
1591-24	24 inches	1.35

SEND FOR NEW 104 PAGE REFERENCE GUIDE FOR ENGINEERS AND PURCHASING AGENTS.

JUMPERS

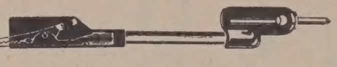
STANDARD ALLIGATOR CLIP TO SPADE LUG



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red and Black. SPECIFY COLOR
LUG: Brass, .050 thick, nickel plated.
CLIPS: Steel, cadmium plated.
BOOTS: Vinyl plastic. Boot colors match wire.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length	NET Ea.
1867-12	12 inches	$ .80
1867-24	24 inches	.90
1867-36	36 inches	1.00
1867-48	48 inches	1.10
1867-60	60 inches	1.20

STANDARD ALLIGATOR CLIP TO PIN PLUG



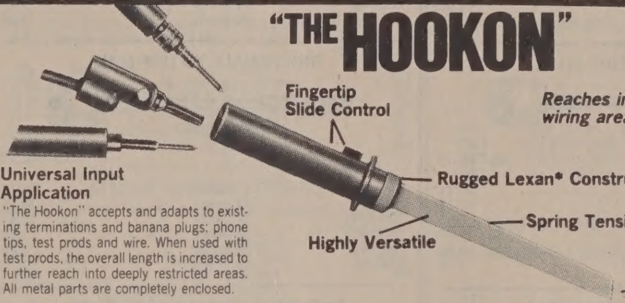
HANDLE: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green, Blue, White. SPECIFY COLOR
PLUG: Brass, nickel plated.
CLIPS: Steel, cadmium plated.
BOOTS: Vinyl plastic. Boot colors match wire.
RATING: 12 Amps AC for 10°C Temp. rise, continuous duty.
WIRE: 10 KV PVC flexible wire, 65 strands #36 copper, #18 AWG, insulated to an O.D. of .140. **Std. Pkg. 10**

No.	Length	NET Ea.
1865-12	12 inches	$1.00
1865-24	24 inches	1.10
1865-36	36 inches	1.20
1865-48	48 inches	1.30
1865-60	60 inches	1.40

"THE HOOKON"

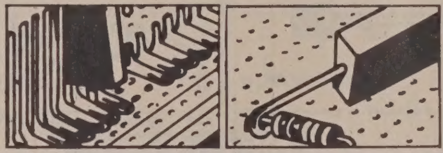
Easy to use...
Versatile...

Reaches into the densest wiring areas, quickly


Fingertip Slide Control
Rugged Lexan* Construction
Spring Tension Sensitivity
Highly Versatile
Self-Locking "Open" Position

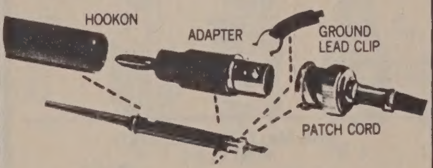
Universal Input Application
"The Hookon" accepts and adapts to existing terminations and banana plugs: phone tips, test prods and wire. When used with test prods, the overall length is increased to further reach into deeply restricted areas. All metal parts are completely enclosed.

Test Point Capability...
connects to bare wires — 26-14 gauge; .025" square; and .025" x 050" wire wrap terminations. It simplifies "touch" contact to P.C. pads, terminals, solder junctions, etc., with contact wire extended and locked. Fits between I.C. terminals on .100" centers; front slot accepts tails without extending contact.



Use Vertically or Laterally...
"The Hookon" reaches through the densest wire jungles and hooks onto leads, pins, square wire wraps for safe, sure connections. The fingertip slide control includes a self-locking open postion and a "no hands spring grip" upon trigger release.

NEW HOOKON *ACCESSORIES*



COAX CABLE ADAPTER FOR HOOKON BNC Plug to BNC Female

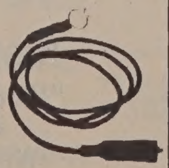
Adapts Hookon for use with scopes, generators and other equip't requiring shielded or coaxial inputs. **Std. pkg. 6**

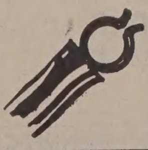
No.	
3071	Net. ea. $2.00

GROUND LEAD CLIP EXTENSION

Clips between shell and BNC to extend ground lead — 18"L. with insulated "mini" alligator clip. **Std. pkg. 6**

No.	
3072	Net ea. .60





RF PATCH CORD

Ideal for connecting Hookon with #3071 adapter to equip't using BNC or UHF inputs.

See eem page 15 for RF Patch Cord listing.

ORIGINAL EQUIPMENT MANUFACTURERS:

For your PRODUCTION requirements of SMITH standard products, we suggest you contact the factory. Use our facilities for variations to meet YOUR SPECIFICATIONS

PERPETUAL INVENTORY!

Every major electronic parts distributor in America stocks these standard SMITH products — and depends on our tremendous factory inventory for speedy and continuing replenishment

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

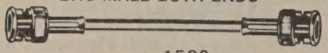
STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

ELECTRONIC COMPONENTS SPECIFY SMITH

RF PATCH CORDS

SUPPLIED WITH MIL. SPEC. RG COAXIAL CABLES WITH 95.4% BRAID SHIELDING which eliminates spurious radiation and guarantees VSWR — keeps loss at a minimum. Crimped for greater reliability. **PATENTED WATERPROOF SEAL** provides greater flexibility and strain relief.

BNC MALE BOTH ENDS

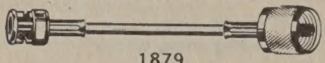


1589

Std. Pkg. 10

No.	Length	NET Ea.
1589-12	12"	$5.35
1589-24	24"	5.45
1589-36	36"	5.55
1589-48	48"	5.65
1589-60	60"	5.75

BNC MALE TO UHF MALE

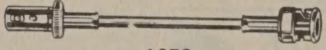


1879

Std. Pkg. 10

No.	Length	NET Ea.
1879-12	12 inches	$5.35
1879-24	24 inches	5.45
1879-36	36 inches	5.55
1879-48	48 inches	5.65
1879-60	60 inches	5.75

BNC FEMALE TO BNC MALE

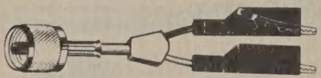


1878

Std. Pkg. 10

No.	Length	NET Ea.
1878-12	12 inches	$5.60
1878-24	24 inches	5.70
1878-36	36 inches	5.80
1878-48	48 inches	5.90
1878-60	60 inches	6.00

UHF MALE TO ALLIGATOR CLIPS



1586

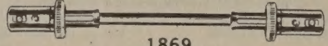
CLIPS: Steel, cadmium plated (#300).
INSUL.: Molded vinyl (#300).
DESCR.: For testing wave patterns, etc. One end terminates with UHF male, other end with insulated alligator clips, one red, one black.
WIRE: As specified above.

Std. Pkg. 10

No.	Lgth.	NET Ea.
1586-12	12"	$5.35
1586-24	24"	5.45
1586-36	36"	5.55
1586-48	48"	5.65
1586-60	60"	5.75

MORE THAN 20 THOUSAND ELECTRONIC COMPONENT PARTS MANUFACTURED UNDER ONE ROOF

BNC FEMALE BOTH ENDS

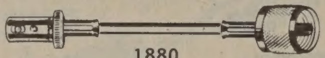


1869

Std. Pkg. 10

No.	Length	NET Ea.
1869-12	12 inches	$6.90
1869-24	24 inches	7.00
1869-36	36 inches	7.10
1869-48	48 inches	7.20
1869-60	60 inches	7.30

BNC FEMALE TO UHF MALE

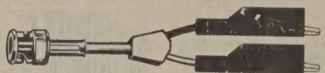


1880

Std. Pkg. 10

No.	Length	NET Ea.
1880-12	12 inches	$5.35
1880-24	24 inches	5.45
1880-36	36 inches	5.55
1880-48	48 inches	5.65
1880-60	60 inches	5.75

BNC MALE TO ALLIGATOR CLIPS



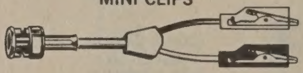
1587

CLIPS: Steel, cadmium plated (#300).
INSUL.: Molded vinyl (#300).
WIRE: As specified above.
DESCR.: For testing wave patterns, etc. One end with terminates withBNC male plug, other end with insulated alligator clips, one red, one black.

Std. Pkg. 10

No.	Length	NET Ea.
1587-12	12"	$5.35
1587-24	24"	5.45
1587-36	36"	5.55
1587-48	48"	5.65
1587-60	60"	5.75

BNC MALE TO INSULATED MINI CLIPS



CLIPS: Steel, cadmium plated, No. 338.
INSULATOR: Molded vinyl plastic, No. 389.
WIRE: RG-174/U Coaxial Cable.
DESCR.: For testing wave patterns, etc. One end terminals with BNC male, other end with insulated mini clips, one red, one black.

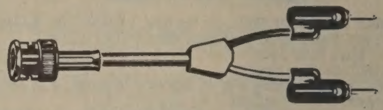
Std. Pkg. 10

No.	Length	Net Ea.
1791-12	12 inches	$5.35
1791-24	24 inches	5.45
1791-36	36 inches	5.55
1791-48	48 inches	5.65
1791-60	60 inches	5.75

JUST ADDED "HOOKON JR." PROBE WITH TEST TERMINATIONS

SEE **eem** PAGE 42

BNC MALE TO STACK TIP PLUGS

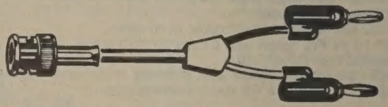


WIRE: RG-58/U 48" long.
PLUGS: No. 1595, one Red, one Black.
DESCR.: For testing wave patterns, etc. One end terminates with BNC male, other end with cross patch tip plugs, one red, one black.

Std. Pkg. 10

No.	Length	Net Ea.
1792-12	12 inches	$5.50
1792-24	24 inches	5.75
1792-36	36 inches	6.00
1792-48	48 inches	6.25
1792-60	60 inches	6.50

BNC MALE TO STACK BANANA PLUGS



WIRE: RG-58/U 48" long.
PLUGS: No. 1510, one red, one black.
DESCR.: For testing wave patterns, etc. One end terminates with BNCmale, other end with cross patch standard banana plugs, one red, one black.

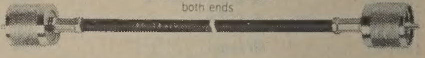
Std. Pkg. 10

No.	Length	Net Ea.
1793-12	12 inches	$5.50
1793-24	24 inches	5.75
1793-36	36 inches	6.00
1793-48	48 inches	6.25
1793-60	60 inches	6.50

CB COAXIAL CABLES

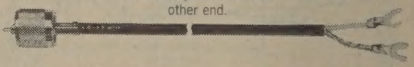
Feature pre-assembled, flexible, weather resistant RG-58U & RG-8U cables. The coaxial connectors are crimped to wire with a patented waterproof seal to afford greater flexibility and strain relief. Ideal for all types of marine, mobile and base station installations.

RG-58U cable w. PL-259 both ends



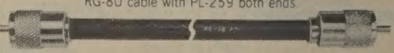
	Length	Net ea.
	12	$4.00
1871-18	18	4.10
1871-24	24	4.20
1871-36	36	4.30
1871-48	48	4.40
1871-60	60	4.60
1871-144	144"	5.60
1871-240	240"	6.80

RG-58U cable with PL-259 one end; Spade Terminals other end.



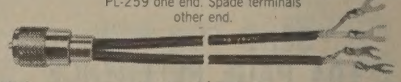
1804	36"	$2.57
1805	144"	3.87
1806	240"	5.04

RG-8U cable with PL-259 both ends.



1807	3 Feet	$4.71
1808	50 "	22.50
1809	100 "	41.80

Matched length for twin antennas. PL-259 one end. Spade terminals other end.



1810	16 Feet	6.50

***ORIGINAL EQUIPMENT MANUFACTURERS:** For your PRODUCTION requirements of SMITH standard products, we suggest you contact the factory. Use our facilities for variations to meet YOUR SPECIFICATIONS*

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

Add Dept. EM to address to tell them you saw it in eem

RF PROBES

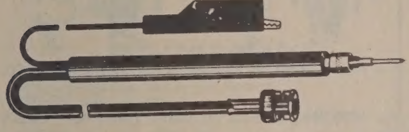
BNC FEMALE TO TEST PROBE

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black.
TIP: .080 Brass Nickel Plated.
CONNECTOR: BNC Female.
DESCR.: Permits the use of coaxial cables terminated with a BNC male for all circuit testing. Probe shielded within 1" from tip.

Std. Pkg. 1

No.	NET Each
1797	$4.85

BNC MALE TO TEST PROBE



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red.
TIP: .080 Brass Nickel Plated.
CONNECTOR: BNC male.
WIRE: RG-58/U 48" long.
CLIP: Miniature steel alligator clip, cadmium plated with black insulator.
DESCR.: Permits the use of probe testing with any equipment utilizing a BNC female termination. Probe shielded within 1" from tip.

Std. Pkg. 1

No.	NET Each
1798	$5.85

COAXIAL CONNECTORS

Std. Pkg. 5

R.F. Connectors for use with RG-6, 8, 11, 58 and 59/U coaxial cables.

STRAIGHT COAXIAL CONNECTOR

Std. Pkg 10

No.	Type	Net Ea.
1713	PL-259	$80.00C

CHASSIS TYPE COAXIAL RECEPTICAL

Std. Pkg. 10

		Net Ea.
1715	SO-239	$80.00C

COAXIAL JUNCTION

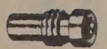
For joining separate cable lengths.

Std. Pkg. 10

		NET Ea.
1716	PL-258	$122.00C

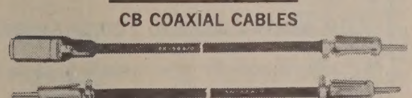
COAXIAL CABLE REDUCING ADAPTER

Std. Pkg. 10



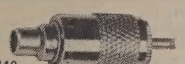
No.	Type	Wire	NET Per C
1719	UG-175 U	58/U	$27.00
1711	UG-176 U	59/U	27.00

CB COAXIAL CABLES



No.	Length	Description	Net ea.
1811	24"	Motorola plug one end. Female other.	$1.90
1812		24" Motorola plug both ends.	1.95

CB ADAPTERS



1840

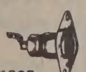
1841

Std. Pkg. 12

No.	Description	Net ea.
1840	PL-259 to RCA jack.	$1.41
1841	Motorola plug to RCA jack.	.51

MOTOROLA PLUGS & JACKS

1200



1207

1235

Std. Pkg. 100

No.	Description	Net per C
1200	Motorola Type Plug.	$15.00
1207	Motorola Jack.	20.00
1235	Motorola Jack without flange.	10.00

CATV SOLDERLESS COAXIAL CONNECTORS & ACCESSORIES

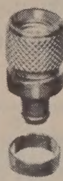


FIG 1

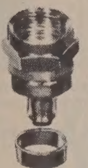


FIG 2

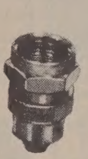


FIG 3

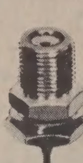


FIG 4

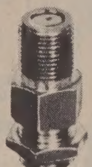


FIG 5

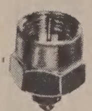


FIG 6

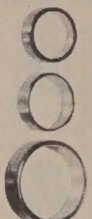


FIG 7

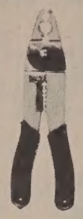


FIG 8

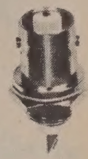


FIG 9

MALE CABLE CONNECTORS
Crimp Type

Designed to crimp onto cable, and use the center conductor of the cable for the male pin. For use with RG-59/U, RG-11/U and RG-6/U cable.

Std. Pkg. 25

No.	Style	Fig.	Descr.	NET Each.
1652	C-52	1	RG-59/U Separate Ring	$ .48
1816	F-59	2	RG-59/U Separate Ring	.30
1817	F-59A	3	RG-59/U Integral Ring	.35
1818	F-56	2	RG-6/U Separate Ring	.35
1819	F-11	2	RG-11/U Separate Ring	.70

FEMALE CHASSIS FITTINGS

Designed to accept above "C" and "F" series connectors. Supplied with nut and washer.

Std. Pkg. 25

No.	Style	Fig.	Descr.	NET Each
1660	C-61	4	Mounts in 5/16" hole	$ .90
1820	F-61	4	Mounts in 3/8" hole	.50

CABLE COUPLINGS

Female splice fittings for joining two cables with above series "C" and "F" connectors. Can also be used as bulkhead thru fittings. Supplied with nut for bulkhead mount.

Std. Pkg. 25

No.	Style	Fig.	Descr.	NET Each
1680	C-81	5	Mounts in 1/4" hole	$ .90
1821	F-81	5	Mounts in 3/8" hole	.70

ACCESSORIES

"F" Series 75-ohm termination 1/4 Watt 5%.

Std. Pkg. 25

No.	Fig.	NET Each
1822	6	$ .75

No.	Crimp Ring for:	Fig.	Std. Pkg.	Net Per C
1823	RG-59/U Cable	7	100	$2.50
1824	RG-11/U Cable	7	100	4.50
1825	RG-6/U Cable	7	100	3.50

CRIMPING & STRIPPING TOOL

Combination crimp and stripping tool for above connectors.

Std. Pkg. 1

No.	Fig.	NET Each
1826	8	$3.60

BNC FEMALE JACK

Std. Pg. 5

No.	Type	Fig.	Descr.	NET Ea.
1768	UG-1094/U	9	Single Hole Jack	$1.00

RF ADAPTERS

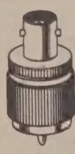


FIG 1

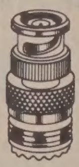


FIG 2

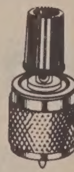


FIG 3

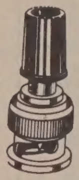


FIG 4

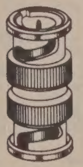


FIG 5

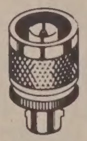


FIG 6

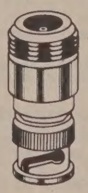


FIG 7

BNC FEMALE TO UHF MALE

FRONT: UHF plug.
REAR: BNC jack.
DESCR.: Permits the use of a BNC plug on equipment using a UHF jack.

Std. Pkg. 1

No.	Fig.	NET Each
1703	1	$ 2.50

UHF FEMALE TO BNC MALE

FRONT: BNC plug.
REAR: UHF jack.
DESCR.: Permits the use of a UHF plug to equipment using a BNC jack.

Std. Pkg. 1

No.	Fig.	NET Each
1700	2	$4.00

BINDING POST TO UHF MALE

FRONT: UHF male.
REAR: Insulated 5-way binding post.
DESCR.: Permits the adaptation of a 5-way insulated binding post to equipment using a UHF jack. Available in Red or Black.

Std. Pkg. 1

No.	Fig.	NET Each
1706	3	$3.50

BINDING POST TO BNC MALE

FRONT: BNC male.
REAR: Insulated 5-way binding post.
DESCR.: Permits adaptation of a 5-way insulated binding post to equipment using a BNC JACK. Available in Red or Black.

Std. Pkg. 1

No.	Fig.	NET Each
1705	4	$3.50

BNC MALE TO BNC MALE

FRONT: BNC plug.
REAR: BNC plug.
DESCR.: Permits interconnection between cable terminations with BNC jacks.

Std. Pkg. 1

No.	Fig.	NET Each
1704	5	$4.40

BNC FEMALE TO TYPE "N" MALE

FRONT: Type "N" plug.
REAR: BNC jack.
DESCR.: Permits the use of a BNC plug on equipment using a type "N" jack.

Std. Pkg. 1

No.	Fig.	NET Each
1701	6	$3.00

TYPE "N" FEMALE TO BNC MALE

FRONT: BNC plug.
REAR: Type "N" jack.
DESCR.: Permits the use of a type "N" plug on equipment using a BNC jack.

Std. Pkg. 1

No	Fig.	NET Each
1702	7	$5.00

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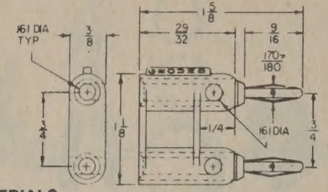
SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

STANDARD (3/4" CENTERS) DUAL TEST ADAPTERS



MATERIALS

BODY: Molded BUTYRATE, PER Fed Spec. L-P439A, Type 3, Class MS. Color BLACK unless otherwise specified.
CONDUCTOR: Brass, per QQ-B-626, Comp. 22, 1/2 hard.
SPRING: Four-leaved beryllium copper, heat treated.
HEAD: Molded nylon, per MIL-P-20693A.
SHIELD: Drawn aluminum.
SCREWS: Steel, cadmium plated.

COLOR CODE SUFFIX

Add to Catalog Number as required

—102 RED —103 BLACK

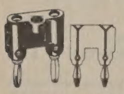
FINISHES

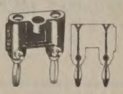
CONDUCTOR: Nickel plate, per QQ-N-290, Class I, Type VII.
SPRING: Nickel plate, as above.
TERMINAL: Gold washed.
CONNECTOR: Non-tarnish.
SHIELD: Black anodized.

RATINGS

CURRENT: 15 Amps AC for 10° Temp. Rise, continuous duty, except where limited by co-axial connectors.
VOLTAGE: 5 KV, 60 cycle AC continuous working voltage, except where limited by co-axial connectors.
CAPACITY: 1.0 mmfd nominal between 3/4" spaced conductors.
RESISTANCE: 1 milliohm or less per conductor.

CABLE MOUNTED DUAL BANANA PLUGS


1675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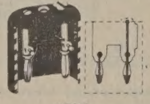

1787

SET-SCREW TYPE

REAR: 7/32 Dia. cable guide. Dual banana jacks on 3/4" centers.
FRONT: Dual banana plugs on 3/4" centers. Set-screws secure leads to conductors.
COLORS: Available in Red and Black. SPECIFY COLOR

No.	Std. Pkg. 10	NET Ea.
1675		$110.00C

TURRET-TERMINAL TYPE

REAR: 7/32 Dia. cable guide. Dual banana jacks on 3/4" centers.
FRONT: Dual banana plugs on 3/4" centers. Turret terminals for permanent solder connection of leads.
COLORS: Available in Red and Black. (Specify color)

No.	Std. Pkg. 10	NET Ea.
1676		$120.00C

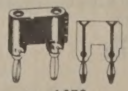
SHIELDED TYPE

REAR: Mounting screw and locating boss. Inline cable entry with flush cable guide.
FRONT: Dual banana plugs 3/4" centers. Turret terminals for permanent solder connection of leads.
SHIELD: Aluminum shield electrically connected to GND conductor fully enclosed plug and mating binding posts to reduce noise pickup.

No.	Std. Pkg. 1	NET Ea.
1787		$2.25

COMPONENT MOUNTING DUAL PLUGS

1677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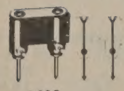
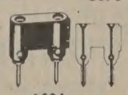

1693


1694

TURRET - BANANA

REAR: Dual banana jacks on 3/4" centers for stacking.
FRONT: Dual banana plugs on 3/4" centers. Turret terminals for permanent solder connection of component leads.
COLORS: Available in Red or Black as coded above. (Specify color)

No.	Std. Pkg. 10	NET Ea.
1678		$120.00C

TURRET - PHONE TIP

REAR: Dual phone tip jacks on 3/4" centers for stacking.
FRONT: Dual .080" phone tips on 3/4" centers. Turret terminals for permanent solder connections of component leads.
COLORS: Available in Red or Black only. (Specify color)

No.	Std. Pkg. 10	NET Ea.
1693		$ .85

SET SCREW - BANANA PLUG

REAR: Dual banana jacks on 3/4" centers for stacking.
FRONT: Dual banana jacks on 3/4" centers. Set-screws secure component leads to conductors.
COLORS: Available in Red and Black. SPECIFY COLOR

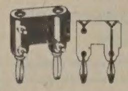
No.	Std. Pkg. 10	NET Ea.
1677		$110.00C

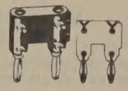
SET SCREW - PHONE TIP

REAR: Dual banana jacks on 3/4" centers for stacking.
FRONT: Dual .080" phone tips on 3/4" centers. Set screws secure component leads to conductors.
COLORS: Available in Red or Black only. (Specify color)

No.	Std. Pkg. 10	NET Ea.
1694		$ .75

COMPONENT MOUNTING DUAL PLUGS


1770


1696

ISOLATION TYPE

THREE TERMINAL

REAR: Dual banana jacks on 3/4" centers for stacking.
CENTER: Turret-terminal connections to isolated front and rear conductors in HOT circuit, and straight-thru connection of GND circuit, with terminal, allow insertion of "T" and "P" networks in input-output circuits in instruments.
FRONT: Dual banana plugs on 3/4" centers.
COLORS: Available in Red and Black. (Specify color)

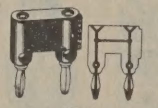
No.	Std. Pkg. 1	NET Ea.
1770		$2.50

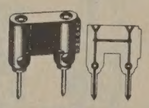
FOUR TERMINAL

REAR: Dual banana jacks on 3/4" centers for stacking.
CENTER: Turret-terminal connections to isolated front and rear conductors in both GND and HOT circuits allow insertion of matching pad or other 4-terminal networks in input circuits of instruments.
FRONT: Dual banana plugs on 3/4" centers.
COLORS: Available in Red or Black as coded above. (Specify color)

No.	Std. Pkg. 1	NET Ea.
1696		$3.25

SHORTING TYPE


1516


1692

1683

BANANA PLUG

REAR: Dual banana jacks on 3/4" centers for stacking.
INTERNAL: Busbar shorted across line.
FRONT: Dual banana plugs on 3/4" centers. Banana jack holes for side stacking.
COLORS: Available in Red, Black. SPECIFY COLOR

No.	Std. Pkg. 10	NET Ea.
1516		$120.00C

PHONE TIP

REAR: Dual banana jacks on 3/4" centers for stacking.
INTERNAL: Busbar shorted across line.
FRONT: Dual .080" phone tips on 3/4" centers. Banana jack holes for side stacking.
COLORS: Available in Red or Black as coded above. SPECIFY COLOR

No.	Std. Pkg. 25	NET Ea.
1692		$1.00

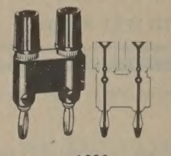
METAL SHORTING BAR TYPE

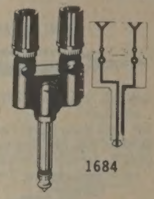
REAR: 3/32" thick brass busbar. 15 amps. continuous duty.
FRONT: Dual plugs on 3/4" ctrs. Unit sits flush to panel.

No.	Std. Pkg. 10	NET Ea.
1683	Dual Banana Plug	$ .75
1796	Dual tip plugs	.66

UTILIZE OUR IN-HOUSE INJECTION MOLDING FACILITIES for small or large quantities of insert molding on cables or components to your special requirements.

DUAL BINDING POST ADAPTERS


1682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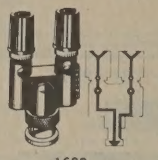
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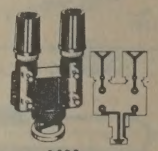

1698

BINDING POSTS TO DUAL BANANA PLUGS

REAR: Insulated dual 5-way binding posts, Red and Black heads on 3/4" centers. Banana jack holes for side stacking. Black body.
FRONT: Dual banana plugs on 3/4" centers.

No.	Std Pkg. 1	Net ea.
1682	Black Body	$2.25

BINDING POSTS TO 2-CIRCUIT PHONE PLUG

REAR: Insulated dual 5-way binding posts, Red and Black heads on 3/4" centers. Banana jack holes for side stacking. Black body.
FRONT: Standard 1/4" 2-circuit phone plug.

No.	Std. Pkg. 1	NET Ea.
1684	Black Body	$4.60

BINDING POSTS TO BNC MALE

REAR: Insulated dual 5-way binding posts, Red and Black heads on 3/4" centers. Banana jack holes for side stacking. Black body.
FRONT: BNC series co-axial plug.

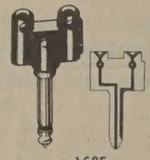
No.	Std. Pkg. 1	NET Ea.
1688	Black Body	$4.60

BINDING POSTS TO ISOLATED BNC MALE

REAR: Insulated dual 5-way binding posts, Red and Black heads on 3/4" centers. Black body.
CENTER: Turret-terminal connections to isolated front and rear conductors in both GND and HOT circuits allow insertion of matching pad or other 4-terminal networks in input circuits.
FRONT: BNC series co-axial plug.

No.	Std. Pkg. 1	NET Ea.
1698	Black Body	$10.00

ADAPTERS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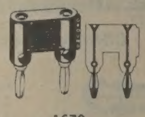

1679

DUAL BANANA JACKS TO 2-CIRCUIT PHONE PLUG

REAR: Dual banana jacks on 3/4" centers, rear and side for stacking. Black only.
FRONT: Standard 1/4" 2-circuit phone plug.

No.	Std. Pkg. 1	NET Ea.
1685	Black Body	$2.60

DUAL PHONE-TIP TO DUAL BANANA PLUGS

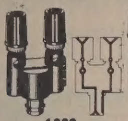
REAR: Dual .080" phone tip jacks on 3/4" centers.
FRONT: Dual banana plugs on 3/4" centers. Banana jack holes for side stacking. Black only.

No.	Std. Pkg. 10	NET Ea.
1679	Black Body	$ .85

MORE THAN 20 THOUSAND ELECTRONIC COMPONENT PARTS MANUFACTURED UNDER ONE ROOF

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

DUAL BINDING POST ADAPTERS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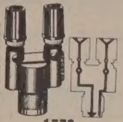
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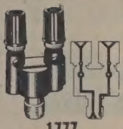
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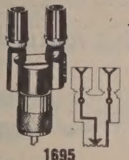
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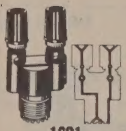

1691

BINDING POSTS TO BNC FEMALE

REAR: Insulated dual 5 way binding posts. Red and black heads on $^3/_4$" centers. Banana jack holes for side stacking.
FRONT: BNC series co-axial jack.

No.	Std. Pkg. 1	NET Ea.
1689	Black body.	$4.60

BINDING POSTS TO TNC MALE

REAR: Insulated dual 5 way binding posts. Red and black heads on $^3/_4$" centers. Banana jack holes for side stacking.
FRONT: TNC series co-axial plug.

No.	Std. Pkg.1	NET Ea.
1776	Black body.	$7.00

BINDING POSTS TO TNC FEMALE

REAR: Insulated dual 5 way binding posts. Red and black heads on $^3/_4$" centers. Banana jack holes for side stacking.
FRONT: TNC series co-axial jack.

No.	Std. Pkg. 1	NET Ea.
1777	Black body.	$6.00

BINDING POSTS TO UHF MALE

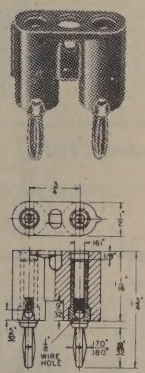
REAR: Insulated dual 5 way binding posts. Red and black heads on $^3/_4$" centers. Banana jack holes for side stacking.
FRONT: UHF series co-axial plug.

No.	Std. Pkg. 1	NET Ea.
1695	Black body.	$5.00

BINDING POSTS TO UHF FEMALE

REAR: Insulated dual 5 way binding posts. Red and black heads on $^3/_4$" centers. Banana jack holes for side stacking.
FRONT: UHF series co-axial jack.

No.	Std. Pkg. 1	NET Ea.
1691	Black body.	$5.25



DUAL BANANA PLUG

BODY: MOLDED POLYSTYRENE, Red or Black

SPECIFY COLOR

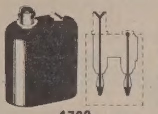
PLUG: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated
SCREW: Steel, cadmium plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 5K Volts 60 cycle AC continuous working voltage. CAPACITANCE 1.0 mmfd. between conductors.
DESCR: Mates with standard dual binding post ¾" centers. Polarity indicated on top and side. Wire held with internal set screw. Can be stacked for multiple connections.

No.	Std. Pkg. 25 Net Per C
210	$120.00

SPECIALS ARE STANDARD WITH SMITH

SEND FOR NEW 104 PAGE REFERENCE GUIDE FOR ENGINEERS AND PURCHASING AGENTS

SHIELDED CO-AXIAL CONNECTOR ADAPTERS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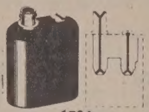
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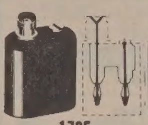
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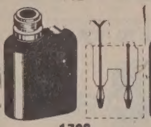
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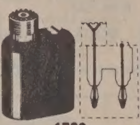

1788

BNC FEMALE TO DUAL BANANA PLUGS

REAR: BNC series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers.
SHIELD: Aluminum shield electrically connected to GND conductor fully enclosed plug and mating binding posts to reduce noise pickup.

No.	Std. Pkg. 1	NET Ea.
1783	Black body.	$3.25

BNC FEMALE TO DUAL BANANA JACKS

REAR: BNC series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers.
SHIELD: Aluminum shield electrically connected to GND conductor fully encloses jacks and mating plug to reduce noise pickup.

No.	Std. Pkg. 1	NET Ea.
1784	Black body.	$3.25

TNC FEMALE TO DUAL BANANA PLUGS

REAR: TNC series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers.
SHIELD: Aluminum shield electrically connected to GND conductor fully encloses plug and binding posts to reduce noise pickup.

No.	Std. Pkg. 1	NET Ea.
1785	Black body.	

TYPE N FEMALE TO DUAL BANANA PLUGS

REAR: Type N co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers.
SHIELD: Aluminum shield electrically connected to GND conductor fully enclosed plug and binding posts to reduce noise pickup.

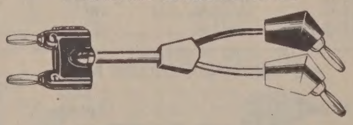
No.	Std. Pkg. 1	NET Ea.
1786	Black body.	$5.25

UHF FEMALE TO DUAL BANANA PLUGS

REAR: UHF series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers.
SHIELD: Aluminum shield electrically connected to GND conductor fully enclosed plug and mating binding posts to reduce noise pickup.

No.	Std. Pkg. 1	NET Ea.
1788	Black body.	$4.50

STANDARD DUAL BANANA PLUG TO STANDARD BANANA PLUGS



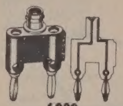
HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black.
BODIES: Brass Nickel Plated, and Aluminum.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG58/U Coaxial Cable. Std. Pkg. 10

No.	Length	NET each
1337-12	12 inches	$5.00
1337-24	24 inches	5.10
1337-36	36 inches	5.20
1337-48	48 inches	5.30
1337-60	60 inches	5.40

JUST ADDED "HOOKON JR." PROBE WITH TEST TERMINATIONS

SEE eem PAGE 42

COAXIAL CONNECTOR ADAPTERS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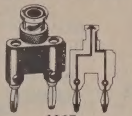
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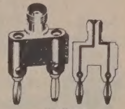
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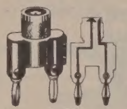
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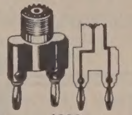
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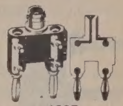

1697

BNC FEMALE TO BANANA PLUGS

REAR: BNC series co-axial jack. Banana jack holes for side stacking.
FRONT: Dual banana plugs on $^3/_4$" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1686	Black body.	$2.60

BNC MALE TO BANANA PLUGS

REAR: BNC series co-axial plug.
FRONT: Dual banana plugs on $^3/_4$" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1687	Black body.	$3.60

TNC FEMALE TO BANANA PLUGS

REAR: TNC series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1774	Black body.	

TNC MALE TO BANANA PLUGS

REAR: TNC series co-axial plug.
FRONT: Dual banana plugs on $^3/_4$" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1775	Black body.	$6.00

UHF FEMALE TO BANANA PLUGS

REAR: UHF series co-axial jack.
FRONT: Dual banana plugs on $^3/_4$" centers. Banana jack holes for side stacking.

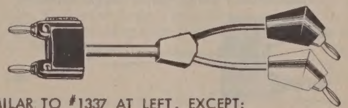
No.	Std. Pkg. 1	NET Ea.
1690	Black body.	$4.60

BNC FEMALE TO ISOLATED DUAL BANANA PLUGS

REAR: BNC series co-axial jack.
CENTER: Turret-terminal connections to isolated front and rear conductors in both GND and HOT circuits allow insertion of matching pad or other 4-terminal networks in input circuits.
FRONT: Dual banana plugs on $^3/_4$" centers.

No.	Std. Pkg. 1	NET Ea.
1697	Black body.	$9.00

MINIATURE DUAL BANANA PLUG (1/2" CENTERS) TO MINIATURE BANANA PLUGS



SIMILAR TO #1337 AT LEFT, EXCEPT:

WIRE: RB174/U Coaxial Cable. Std. Pkg. 10

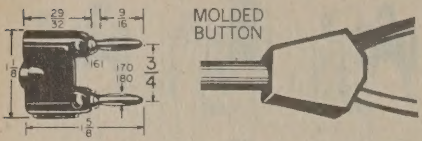
No.	Length	NET each
1347-12	12 inches	$5.00
1347-24	24 inches	5.10
1347-36	36 inches	5.20
1347-48	48 inches	5.30
1347-60	60 inches	5.40

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

SPECIFY **SMITH** ELECTRONIC COMPONENTS

STOCKED BY
LEADING
DISTRIBUTORS
NATIONWIDE

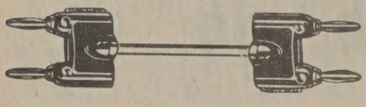
STANDARD DUAL BANANA PLUG (3/4" CENTERS) PATCH CORDS



CABLE TYPES AVAILABLE

	WIRE "A"	WIRE "B"
DESCRIPTION	2.-COND. TW. 18 GA. 65/36 STR.	RG58/U Coaxial cable.
INSULATION	Vinyl	Polyethylene
JACKET	Vinyl	Vinyl
NOM. CAP.	30 pf/ft.	50 Ohm Impedance

DOUBLE PLUG BOTH ENDS

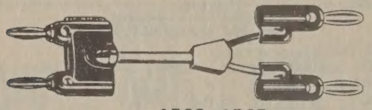


1530, 1580

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black or Grey to match wire.
PLUG: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
DESCR.: Males with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits top and side. Each end terminates with molded double banana plug. **Std. Pkg. 10**

No. Wire "A"	No. Wire "B"	Lgth.	NET Ea.
1530-12	1580-12	12"	$4.35
1530-24	1580-24	24"	4.45
1530-36	1580-36	36"	4.55
1530-48	1580-48	48"	4.65
1530-60	1580-60	60"	4.75

DOUBLE PLUG TO "CROSS-PATCH" PLUGS

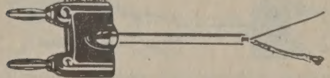


1523, 1525

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black or Grey to match wire.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
PLUG: Our No. 1510. Red and Black.
DESCR.: Mates with standard dual binding post having 3/4" centers. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits on top and side. One end terminates with double banana plug, other end with "Cross-Patch" banana plug, color coded Red and Black. **Std. Pkg. 10**

No. Wire "A"	Lgth.	NET Ea.
1523-12	12"	$5.35
1523-24	24"	5.45
1523-36	36"	5.55
1523-48	48"	5.65
1523-60	60"	5.75

DOUBLE PLUG TO TINNED LEADS

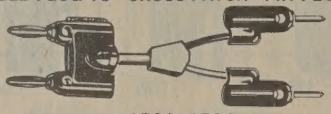


1532, 1582

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
PLUG: Brass, nickel or silver plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on the side. One end terminates with double banana plug, other end stripped and tinned. **Std. Pkg. 10**

No. Wire "A"	No. Wire "B"	Lgth.	NET Ea.
1532-12	1582-12	12"	$3.35
1532-24	1582-24	24"	3.45
1532-36	1582-36	36"	3.55
1532-48	1582-48	48"	3.65
1532-60	1582-60	60"	3.75

DOUBLE PLUG TO "CROSS-PATCH" PIN PLUGS

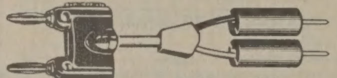


1592, 1594

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
WIRE: As specified above.
PLUG: Our No. 1595. Red and Black.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits on top and side. One end terminates with double banana plug, other end with "Cross-Patch" Pin plugs with standard .080" tip and jack in rear, banana jack in side, color coded Red and Black. **Std. Pkg. 10**

No. Wire "A"	"B" "C"	Lgth.	NET Ea.
1592-12	1594-12	12"	$5.35
1592-24	1594-24	24"	5.45
1592-36	1594-36	36"	5.55
1592-48	1594-48	48"	5.65
1592-60	1594-60	48"	5.75

DOUBLE PLUG TO PHONE TIP

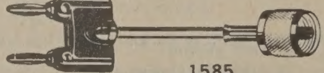


1533, 1583

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
PLUG: Our No. 203 Red and black.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. One end terminates with double banana plug, other end with insulated tip plug, one Red and one Black. **Std. Pkg. 10**

No. Wire "A"	No. Wire "B"	Lgth.	NET Ea.
1533-12	1583-12	12"	$4.70
1533-24	1583-24	24"	4.80
1533-36	1583-36	36"	4.90
1533-48	1583-48	48"	5.00
1533-60	1583-60	60"	5.10

DOUBLE PLUG TO UHF MALE

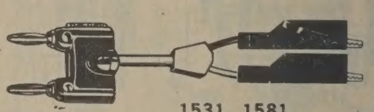


1585

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black or Grey to match wire.
PLUG: Brass, nickel or silver plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. One end terminates with double banana plug, other end with UHF male plug. **Std. Pkg. 10**

No. Wire "B"	Length	NET Ea.
1585-12	12"	$5.35
1585-24	24"	5.45
1585-36	36"	5.55
1585-48	48"	5.65
1585-60	60"	5.75

DOUBLE PLUG TO ALLIGATOR CLIPS

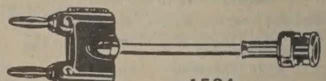


1531, 1581

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black or Gray to match wire.
PLUG: Brass, nickel or silver plated.
SPRING: Four-leaved beryllium copper, nickel plated.
CLIP: Steel, cadmium plated (No. 300).
INSUL.: Molded vinyl plastic (No. 331).
WIRE: As specified above.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. One end terminates with double banana plug, other end with insulated alligator clips, one Red, one Black. **Std. Pkg. 10**

No. Wire "A"	No. Wire "B"	Lgth.	NET Ea.
1531-12	1581-12	12"	$5.35
1531-24	1581-24	24"	5.45
1531-36	1581-36	36"	5.55
1531-48	1581-48	48"	5.65
1531-60	1581-60	60"	5.75

DOUBLE PLUG TO BNC MALE

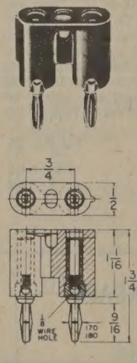


1584

HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Black or Gray to match wire.
PLUG: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: As specified above.
DESCR.: Mates with standard dual binding post having 3/4" center. Polarity indicated by the word GROUND molded on side. One end terminates with double banana plug, other end with BNC male plug. **Std. Pkg. 10**

No. Wire "B"	Length	NET Ea.
1584-12	12"	$5.35
1584-24	24"	5.45
1584-36	36"	5.55
1584-48	48"	5.65
1584-60	60"	5.75

DUAL BANANA PLUG

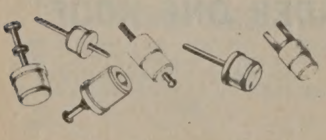


BODY: MOLDED POLYSTYRENE, Red or Black
SPECIFY COLOR
PLUG: Brass, nickel plated.
SPRING: Four-leaved phosphor bronze, nickel plated
SCREW: Steel, cadmium plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty. 5K Volts 60 cycle AC continuous working voltage. CAPACITANCE 1.0 mmfd. between conductors.
DESCR: Mates with standard dual binding post ¾" centers. Polarity indicated on top and side. Wire held with internal set screw. Can be stacked for multiple connections.
Std. Pkg. 25

No.	Net Per C
210	$120.00

SMITH TEFLON TERMINALS

SEE LAST 9 SMITH PAGES IN THIS DIRECTORY FOR CONDENSED LISTING OF SMITH TEFLON TERMINALS



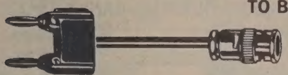
- Standoff—Feed-thru
- Probes—Test Jacks
- Connectors—Sockets
- Custom Fabrication
- Miniature
- Subminiature
- Microminiature

Send for the new 104 page Smith catalog for complete Teflon Terminal details.

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

MINIATURE DUAL (½") BANANA PLUG PATCH CORDS
CENTERS

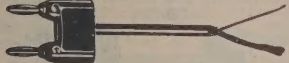
MINIATURE DUAL BANANA PLUG TO BNC MALE



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
PLUG: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
CONN.: BNC male.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" center. Polarity indicated by the word GROUND molded on side. One end terminates with the double banana plug, other end with BNC male conn. **Std. Pkg. 10**

No.	Length	NET Ea.
1748-12	12"	$5.35
1748-24	24"	5.45
1748-36	36"	5.55
1748-48	48"	5.65
1748-60	60"	5.75

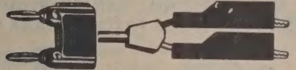
MINIATURE DUAL BANANA PLUGS TO TINNED LEADS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" centers. Polarity indicated by the word GROUND molded on side. One end terminated with double banana plug, other end stripped and tinned. **Std. Pkg. 10**

No.	Length	NET Ea.
1534-12	12"	$3.35
1534-24	24"	3.45
1534-36	36"	3.55
1534-48	48"	3.65
1534-60	60"	3.75

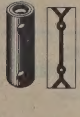
MINIATURE DUAL BANANA PLUG TO INSULATED MINI-CLIPS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
CLIP: Steel cadmium plated (No. 338).
INSULATOR: Molded vinyl plastic (No. 389).
WIRE: RG-174/U Coaxial Cable.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" centers. Polarity indicated by the word GROUND molded on side. One end terminated with double banana plug, other end with insulated miniature clips. **Std. Pkg. 10**

No.	Length	NET Ea.
1739-12	12"	$5.35
1739-24	24"	5.45
1739-36	36"	5.55
1739-48	48"	5.65
1739-60	60"	5.75

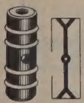
BANANA PLUG SPLICE



REAR: Standard or Miniature Banana Jack.
FRONT: Standard or miniature banana jack. Banana jack hole for side stacking. **Std. Pkg. 50**

No.	Description	NET Per C
245	Standard banana jack both ends	$28.00
5043	Miniature ban. jack both ends	28.00
5034	Stand. ban. jack to min. ban. jack	28.00

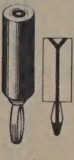
PHONE TIP PLUG SPLICE



REAR: Standard .080 phone jack.
FRONT: Standard .080 phone jack. Banana jack hole for side stacking. **Std. Pkg. 50**

No.	Description	NET Per C
246	Standard Adapter	$33.00

BANANA JACK TO BANANA PLUG ADAPTER



REAR: banana jack.
FRONT: banana plug.
COLORS: Available in Red or Black. **Std. Pkg. 10**

No.	REAR	FRONT	NET Ea.
5075	Standard jack	Standard plug	$ .50
5076	Miniature jack	Niniature plug	.50

MINIATURE SINGLE TEST ADAPTERS

Materials:
BODIES MACHINED: Butyrate, per MIL-P-10408A, Type 1, Class 2. Color Black or Red, Specify color by adding color code suffix to basic part No. as coded below.
CONDUCTORS: Brass, per QQ-B-626, Comp. 22, half hard.
SPRINGS: Four-leaved beryllium copper, heat-treated.
HEADS: Molded Nylon, Per MIL-P-20693A.
SCREWS: Steel, cadmium plated.

Finishes:
CONDUCTORS: Nickel Plate, per QQ-N-290, Class I, Type VII.
SPRING: Nickel Plate, as above.
TERMINAL: Gold washed.

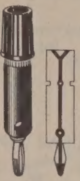
Mechanical	Standard Adapters	Miniature Adapters
PHONE TIP:	.080 DIA. X 1/2" Long	.080 Dia. x 3/8" long
BANANA PLUG:	.180/.170	.118/.112
PHONE JACKS:	.080 Dia.	.080 Dia.
BANANA JACKS:	.161 Dia.	.104 Dia.
BODIES:	3/8" Dia.	1/4" Dia.

Ratings:
CURRENT: 15 Amps (Standard), 5 Amps (Miniature) AC for 10°C Temp. Rise, Continuous Duty, except where limited by a co-axial connector.
VOLTAGE: 5 KV (Standard), 2 KV (Miniature) 60 cycle AC Continuous Working Voltage, except where limited by co-axial connector.
RESISTANCE: 1 Milliohm or less when seated in proper mating connectors.

All adapters are available in red and black.

COLOR CODE SUFFIX Add to Catalog Number as Required —103 BLACK —102 RED

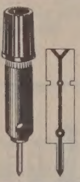
BINDING POST TO BANANA PLUG



REAR: Insulated 5-way binding post.
FRONT: Standard or Miniature Banana plug. Banana jack hole or side stacking. **Std. Pkg. 10**

No.	Description	NET Ea.
5025	Standard Adapter	$1.10
5035	Miniature Adapter	1.10

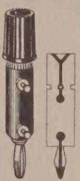
BINDING POST TO PHONE TIP



REAR: Insulated 5-way binding post.
FRONT: Standard .080 phone tip. Banana jack hole for side **Std. Pkg. 10**

No.	Description	NET Ea.
5026	Standard Adapter	$1.00
5036	Miniature Adapter	1.00

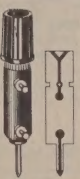
BINDING POST TO ISOLATED BANANA PLUG



REAR: Insulated 5-way binding post.
CENTER: Turret-terminal connections to isolated front and rear conductors allow insertion of component in series input circuit.
FRONT: Standard or miniature banana plug. **Std. Pkg. 10**

No.	Description	NET Ea.
5027	Standard Adapter	$1.10
5037	Miniature Adapter	1.10

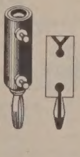
BINDING POST TO ISOLATED PHONE TIP



REAR: Insulated 5-way binding post.
CENTER: Turret-terminal connections to isolated front and rear conductors allow insertion of component in series input circuit.
FRONT: Standard .080 phone tip. **Std. Pkg. 10**

No.	Description	NET Ea.
5028	Standard Adapter	$1.00
5038	Miniature Adapter	1.00

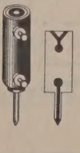
BANANA JACK TO ISOLATED BANANA PLUG



REAR: Standard or Miniature Banana Jack.
CENTER: Turret-terminal connections to isolated front and rear conductors allow insertion of component in series input circuit.
FRONT: Standard or miniature banana plug. **Std. Pkg. 10**

No.	Description	NET Ea.
5029	Standard Adapter	$1.00
5039	Miniature Adapter	1.00

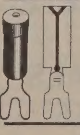
TIP JACK TO ISOLATED PHONE TIP



REAR: Standard .080 tip jack.
CENTER: Turret-terminal connections to isolated front and rear conductors allow insertion of component in series input circuit.
FRONT: Standard .080 phone tip. **Std. Pkg. 10**

No.	Description	NET Ea.
5030	Standard Adapter	$ .95
5040	Miniature Adapter	.95

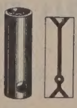
TIP JACK TO SPADE LUG



REAR: Standard .080 tip jack.
FRONT: Tapered spade lug fits studs from 1/4" down to #6. **Std. Pkg. 50**

No.	Description	NET Per C
249	Standard Adapter	$44.00

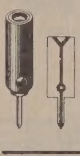
BANANA JACK TO TIP JACK SPLICE



REAR: Standard or Miniature Banana Jack.
FRONT: Standard .080 phone tip jack. Banana jack hole for side stacking. **Std. Pkg. 50**

No.	Description	NET Per C
496	Standard banana to tip jack	$33.00
5044	Miniature banana to tip jack	33.00

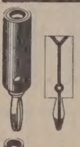
STACKING SOLDERLESS PHONE TIP



REAR: Standard or Miniature Banana Jack for stacking.
SIDE: Wire lead hole secures test lead with internal set-screw.
FRONT: Standard .080 phone tip. **Std. Pkg. 10**

No.	Description	NET Ea.
5031	Standard Adapter	$ .70
5041	Miniature Adapter	.70

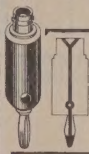
STACKING SOLDERLESS BANANA PLUG



REAR: Miniature Banana jack for stacking.
SIDE: Wire lead hole secures test lead with internal set-screw.
FRONT: Miniature banana plug. **Std. Pkg. 10**

No.	Description	NET Ea.
5042	Miniature Adapter	$ .65

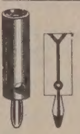
BNC SERIES JACK TO BANANA PLUG



REAR: BNC Series co-axial jack.
SIDE: Banana jack hole for side stacking.
FRONT: Standard banana plug. **Std. Pkg. 10**

No.	Description	NET Ea.
5032	Standard Adapter	$2.00

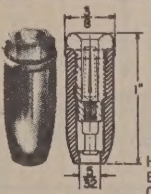
TIP JACK TO BANANA PLUG



REAR: Standard .080 phone tip jack.
FRONT: Standard or miniature banana plug. Banana jack hole for side stacking. **Std. Pkg. 50**

No.	Description	NET PER C
214	Standard Adapter	$55.00
5033	Miniature Adapter	50.00

NYLON IN-LINE TIP JACK



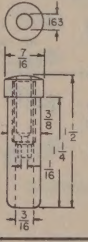
Color Code Suffix
Add to Catalog Number as Required

— 101 WHITE	— 106 ORANGE
— 102 RED	— 107 YELLOW
— 103 BLACK	— 108 BROWN
— 104 GREEN	— 112 PURPLE
— BLUE	— 113 GREY

HANDLE: MOLDED NYLON, per MIL-P 20693A.
BODY: Molded Nylon, per MIL-P-20693A.
CONTACT: Phosphor Bronze, gold plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Fits all standard phone-tip plugs, with recessed contact for safe connection. Ideally suited for use in patch and extension cords. Can also be used for panel mounting where wrap-around terminal connection must be insulated at rear. **Std. Pkg. 50**

No.	NET Per C
1513	$33.00

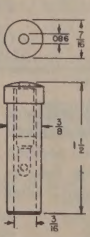
IN-LINE BANANA JACK



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II. Red, Black, Yellow, Green. **SPECIFY COLOR**
CAP: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green.
BODY: Brass, nickel plated.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Suitable for test lead extension where long leads are required. Accepts standard banana plugs. **Std. Pkg. 50**

No.	NET Per C
251	$23.00

IN-LINE PHONE TIP JACK



HANDLE: MACHINED BUTYRATE, per MIL-P-10408A, Type I, Class II. Red, Black, Yellow, Green. **SPECIFY COLOR**
CAP: MOLDED PHENOLIC plastic, Red, Black, Yellow, Green.
BODY: Brass, nickel plated.
SPRING: Phosphor bronze.
RATING: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Suitable for test lead extension where long leads are required. Accepts standard phone tip plug. **Std. Pkg. 50**

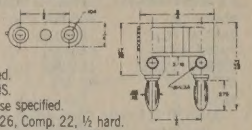
No.	NET Per C
248	$23.00

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

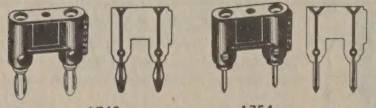
MINIATURE DUAL (½") TEST ADAPTERS

CENTERS



MATERIALS:
BODY: Molded Butyrate, per Fed. Spec. L-P349A, Type 3, Class MS. Color BLACK unless otherwise specified.
CONDUCTOR: Brass, per QQ-B-626, Comp. 22, ½ hard.
SPRING: Four-leaved beryllium copper, heat treated.
HEAD: Molded Nylon, per MIL-P-20693A.
SCREWS: Steel, cadmium plated.
FINISHES:
CONDUCTOR: Nickel plate, per QQ-N-290, Class 1, Type VII.
SPRING: Nickel plated.
TERMINAL: Gold washed.
CONNECTOR: Non-tarnish Plate.
RATINGS:
CURRENT: 5 Amps AC for 10°C Temp. Rise, continuous duty, except where limited by co-axial connectors.
VOLTAGE: 2 KV, 60 cycle AC continuous working voltage, except where limited by co-axial connectors.
CAPACITY: 3.0 pf. nominal between ½" spaced conductors.
RESISTANCE: 1 milliohm or less per conductor.

SET SCREW CONNECTION



1749 1754

BANANA PLUGS

REAR: Dual banana jacks on 1/2" centers for stacking.
FRONT: Dual .080" phone tips on 1/2" centers. Set-screws secure leads to conductors.
COLORS: Available in Red or Black. **SPECIFY COLOR** **Std. Pkg. 10**

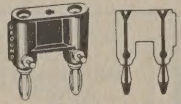
No.	NET Each
1749	$ .75

.080 PHONE TIP

REAR: Dual banana jacks on 1/2" centers for stacking.
FRONT: Dual .080" phone tips on 1/2" centers. Set-screws secure component leads to conductors.
COLORS: Available in Red or Black. **SPECIFY COLOR** **Std. Pkg. 10**

No.	NET Each
1754	$ .75

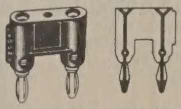
TURRET TERMINAL CONNECTION



REAR: Dual banana jacks on 1/2" centers for stacking.
FRONT: Dual banana plugs on 1/2" centers. Turret terminals for permanent solder connection of component leads.
COLORS: Available in Red or Black. **SPECIFY COLOR** **Std. Pkg. 10**

No.	NET Each
1750	$ .85

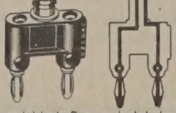
PHONE TIP ADAPTER



REAR: Dual .080" phone tip jacks on 1/2" centers for stacking.
FRONT: Dual banana plugs on 1/2" centers.
COLORS: Available in Red or Black. **SPECIFY COLOR** **Std. Pkg. 10**

No.	NET Each
1751	$ .85

BNC FEMALE TO BANANA PLUGS

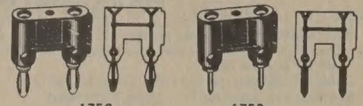


REAR: BNC series co-axial jack. Banana jack holes for stacking.
FRONT: Dual banana plugs on 1/2" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1758	Black body	$3.00

THE SMITH ORGANIZATION
has been a major supplier of electronic components to the industry for 25 years. Today, with its modern plant facilities and capabilities we are in a position to convert your ideas and needs, whether they be one or a million, and deliver what you want, when you want it!

MOLDED-IN SHORTING TYPE



1752 1753

BANANA PLUGS

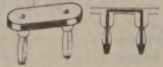
REAR: Dual banana jacks on 1/2" centers for stacking.
INTERNAL: Busbar shorted across line.
FRONT: Dual banana plugs on 1/2" centers. Banana jack holes for side stacking.
COLORS: Available in Red or Black. **SPECIFY COLOR** **Std. Pkg. 10**

No.	NET Each
1752	$ .75

.080 PHONE TIP

Same as above except:
FRONT: Dual .080 phone tips on 1/2" centers. Banana jack holes for side stacking. **Std. Pkg. 10**

No.	NET Each
1753	$ .75

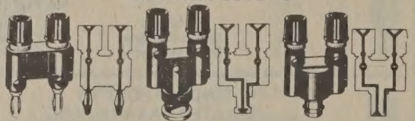


METAL SHORTING BAR TYPE

REAR: 3/32" thick brass busbar, 15 Amps. continuous duty.
FRONT: Dual miniature banana plugs on 1/2" centers. Unit sits flush to panel. **Std. Pkg. 10**

No.	NET Per C
1795	$66.00

BINDING POSTS TO



1755 1756 1757

DUAL BANANA PLUGS

REAR: Insulated dual 5-way binding posts. Red and Black heads on 1/2" centers. Banana jack holes for side stacking.
FRONT: Dual banana plugs on 1/2" centers. **Std. Pkg. 1**

No.		NET Each
1755	Black body	$2.25

BNC MALE

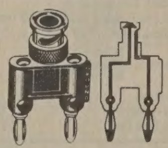
REAR: Insulated dual 5-way binding posts. Red and Black heads on 1/2" centers. Banana jack holes for side stacking.
FRONT: BNC series co-axial plug. **Std. Pkg. 1**

No.		NET Each
1756	Black body	$4.60

BNC FEMALE

REAR: Insulated dual 5-way binding posts. Red and Black heads on 1/2" centers. Banana jack holes for side stacking.
FRONT: BNC series co-axial plug. **Std. Pkg. 1**

No.		NET Each
1757	Black body	$4.60



BNC MALE TO BANANA PLUGS

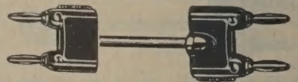
REAR: BNC series co-axial plug.
FRONT: Dual banana plugs on 1/2" centers. Banana jack holes for side stacking.

No.	Std. Pkg. 1	NET Ea.
1759	Black body	$3.95

SEE OUR COMPLETE LINE OF TEFLON TERMINALS AND TEST JACKS eem PAGES 48 THRU 56

MINIATURE DUAL BANANA PLUG PATCH CORDS

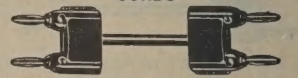
MINIATURE DUAL BANANA PLUG TO STANDARD DUAL BANANA PLUG



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
PLUG: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
DESCR.: Mates with standard or miniature banana jacks or binding posts having 1/2" center or 3/4" center. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits top and side. One end terminates in a miniature dual banana plug, 1/2" center, other end in a standard dual banana plug 3/4" center. **Std. Pkg. 10**

No.	Length	NET Ea.
1729-12	12"	$4.35
1729-24	24"	4.45
1729-36	36"	4.55
1729-48	48"	4.65
1729-60	60"	4.75

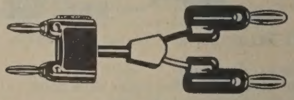
MINIATURE DUAL BANANA PLUG PATCH CORDS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
PLUG: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" centers. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits top and side. Each end terminated with molded double banana plug. **Std. Pkg. 10**

No.	Length	NET Ea.
1599-12	12"	$4.35
1599-24	24"	4.45
1599-36	36"	4.55
1599-48	48"	4.65
1599-60	60"	4.75

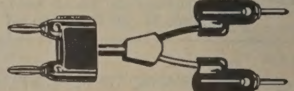
MINIATURE DUAL BANANA PLUG TO MINIATURE CROSS PATCH BANANA PLUGS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
PLUGS: Our No. 1590, Red and Black.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" centers. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits on top and side. One end terminates with double banana plug, other end with Cross-Patch banana plugs, color coded Red and Black. **Std. Pkg. 10**

No.	Length	NET Ea.
1738-12	12"	$5.35
1738-24	24"	5.45
1738-36	36"	5.55
1738-48	48"	5.65
1738-60	60"	5.75

MINIATURE DUAL BANANA PLUG TO STANDARD CROSS PATCH PIN PLUGS

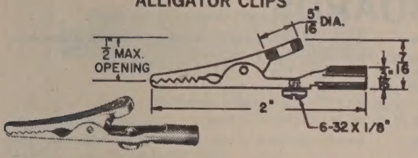


HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS.
BODY: Brass, nickel plated.
SPRING: Four-leaved beryllium copper, nickel plated.
WIRE: RG-174/U Coaxial Cable.
PLUGS: Our No. 1595, Red and Black.
DESCR.: Mates with miniature dual binding posts or banana jacks having 1/2" centers. Polarity indicated by the word GROUND molded on side. Interconnects unlimited number of multiple circuits top and side. One end terminates with cross-patch pin plugs with standard .080" tip and jack in rear, banana jack in side, color coded Red and Black. **Std. Pkg. 10**

No.	Length	NET Ea.
1535-12	12"	$5.35
1535-24	24"	5.45
1535-36	36"	5.55
1535-48	48"	5.65
1535-60	60"	5.75

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

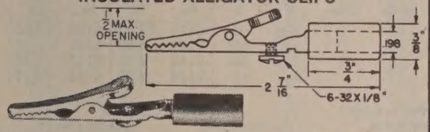
ALLIGATOR CLIPS



RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: ½" jaw opening. Jaws match accurately and grip securely, accepts standard banana plugs in rear. **Std. Pkg. 100**

Solder Connection			Screw Connection	
No.	NET Per C	Type	No.	NET Per C
300	$7.50	Steel, Cad. Pl.	350	$10.50
380	12.50	Solid Copper	360	15.50
332	14.50	Brass N.P.	339	17.50

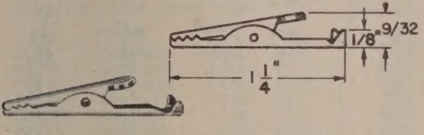
INSULATED ALLIGATOR CLIPS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. **SPECIFY COLOR**
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: ½" jaw opening. Jaws match accurately and grip securely, accepts standard banana plugs in rear. **Std. Pkg. 100**

Solder Connection			Screw Connection	
No.	NET Per C	Type	No.	NET Per C
301	$12.50	Steel, Cad. Pl.	351	$15.50
381	17.50	Solid Copper	361	20.50
354	19.50	Brass N.P.	362	22.50

MINIATURE ALLIGATOR CLIP



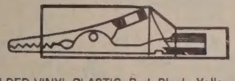
DESCR.: 3/16" jaw opening. Jaws match accurately and grip securely. Unique SMITH spring construction. Solder connection and ears for crimping. **Std. Pkg. 100**

No.	Type	NET Per C
338	Steel, Cad. Pl.	$6.00
367	Copper	8.00

MINIATURE INSULATION PIERCING ALLIGATOR CLIP

No.	NET Per C
326	$12.00

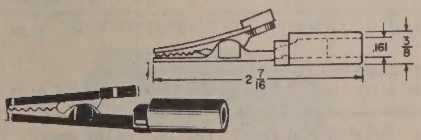
ALLIGATOR CLIP BOOTS



MATERIAL: MOLDED VINYL PLASTIC, Red, Black, Yellow, Green, Blue or White. **SPECIFY COLOR**
RATING: 1K Volts 60 cycle AC continuous working voltage.
DESCR.: Fully insulated clip while allowing maximum jaw opening. No. 331 for use on standard size alligator clips such as our No. 300. No. 389 for use on miniature alligator clips, such as our No. 338. **Std. Pkg. 100**

No.	Description	NET Per C
331	Standard	$3.50
389	Miniature	4.50

ALL INSULATED CLIP



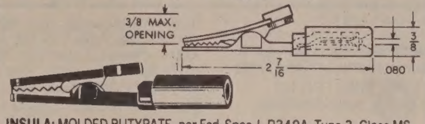
INSULA.: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS, Red or Black. **SPECIFY COLOR**
CLIP: Steel cadmium plated.
RATING: 10 Amps AC for 10°C Temp. rise, continuous duty. 1K Volts 60 cycle AC continuous working voltage.
DESCR.: All metal parts fully insulated with molded plastic. Insures against shock or grounding. Solder type construction. **Std. Pkg. 50**

No.	NET Per C
337	$30.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements!

ALL INSULATED ADAPTERS

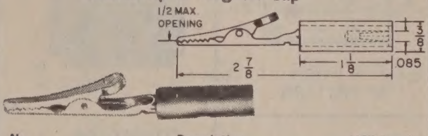
Phone Tip to Alligator Clip



INSULA: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS, Red or Black. **SPECIFY COLOR**
CLIP: Steel, cadmium plated. **BODY:** Brass.
CONTACT: Phosphor bronze.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: All metal parts fully insulated with molded plastic. Insures against shock or grounding. Jack in rear permits adapting standard phone tip plugs to alligator clips. **Std. Pkg. 50**

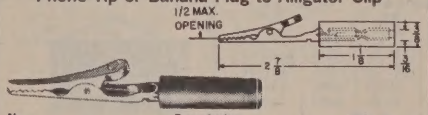
No.	NET Per C
336	$45.00

Phone Tip to Alligator Clip



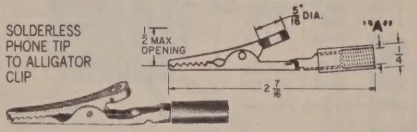
No.	Description	NET Per C
304	Steel Clip	$42.00
334	Copper Clip	47.00

Phone Tip or Banana Plug to Alligator Clip



No.	Description	NET Per C
305	Steel Clip	$50.00
335	Copper Clip	55.00

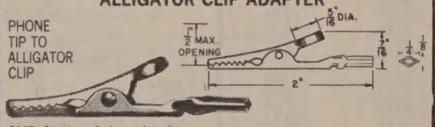
ALLIGATOR CLIP ADAPTER



BUSHING: Brass, nickel plated.
CLIP: Steel cadmium plated.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: Adapts standard solderless tips to alligator clip. This novel quick-adapter is a must for all types of benchwork. **Std. Pkg. 50**

No.	Thd. "A"	NET Per C
310	10-32	$20.00
720	8-32	20.00

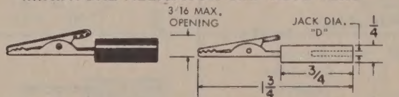
ALLIGATOR CLIP ADAPTER



CLIP: Steel, cadmium plated.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: ½" jaw opening. Jaws match accurately and grip securely. Accepts standard phone tip in rear. Crimped for spring tension. **Std. Pkg. 100**

No.	NET Per C
333	$11.00

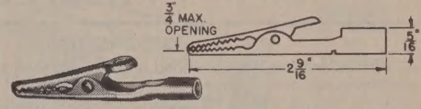
MINIATURE ALLIGATOR CLIP ADAPTERS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. **SPECIFY COLOR**
CLIP: Steel, Cadmium plated, or Copper.
BODY: Brass, Cadmium plated.
CONTACT: Beryllium Copper (Tip Jack only).
RATING: 1 Amp for 10°C Temp. rise, continuous duty.
DESCR.: Jack in rear adapts miniature alligator clip to phone tip plug, miniature banana plug or standard banana plug. **Std. Pkg. 50**

No.	Type	Jack Dia. "D"	NET Per C
STEEL, CADMIUM PLATED			
1320	Tip Plug	.080"	$39.00
1321	Min Banana Jack	.104"	39.00
1322	Std. Banana Jack	.161"	39.00
COPPER			
1323	Tip Plug	.080"	44.00
1324	Min Banana Jack	.104"	44.00
1325	Std. Banana Jack	.161"	44.00

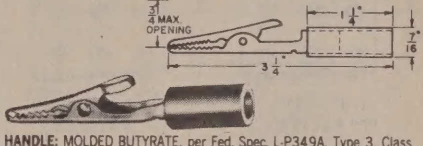
JUMBO ALLIGATOR CLIP



RATING: STEEL: 10 Amps AC for 10°C Temp. rise, continuous duty.
COPPER: 15 Amps AC for 10° C Temp. rise, continuous duty.
DESCR.: ¾" jaw opening. Jaws match accurately. For heavy terminal use. **Std. Pkg. 100**

Solder Connection			Screw Connection	
No.	NET Per C	Type	No.	NET Per C
392	$19.00	Steel, Cad. Pl.	368	$20.00
396	22.70	Solid Copper	356	27.00

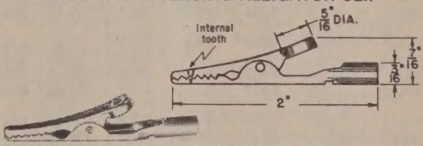
INSULATED JUMBO ALLIGATOR CLIPS



HANDLE: MOLDED BUTYRATE, per Fed. Spec. L-P349A, Type 3, Class MS. Red or Black. **SPECIFY COLOR**
RATING: STEEL: 10 Amps AC for 10°C Temp. rise, continuous duty.
COPPER: 15 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: ¾" jaw opening. Jaws match accurately. For heavy terminal use. **Std. Pkg. 100**

Solder Connection			Screw Connection	
No.	NET Per C	Type	No.	NET Per C
393	$26.50	Steel, Cad. Pl.	369	$25.00
397	31.60	Solid Copper	357	32.00

INSULATION PIERCING ALLIGATOR CLIP



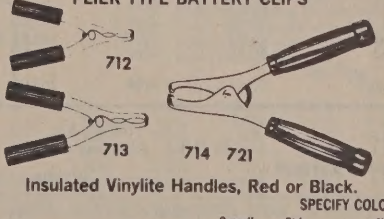
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.
DESCR.: ½" jaw opening. Jaws match accurately and grip securely. Internal tooth for piercing wire insulation. Accepts standard banana plug in rear. **Std. Pkg. 100**

No.	NET Per C
347	$15.00

BATTERY CLIPS

No.	Current Capacity	Jaw Spread	Length	Spring	Std. Pkg.	NET Per C
STEEL ELECTROPLATED						
365	5 Amp.	⅜"	1⅝"	7 lbs.	100	$11.00
366	10 Amp.	9/16"	2"	10 lb.	100	11.00
701	25 Amp.	1"	2½"	17 lbs.	10	20.00
702	50 Amp.	1½"	3⅞"	33 lbs.	5	30.00
704	100 Amp.	1⅜"	5"	40 lbs.	5	90.00
SOLID COPPER						
703	50 Amp.	1"	2½"	17 lbs.	5	30.00
705	100 Amp.	1¼"	4¾"	33 lbs.	5	110.00
706	200 Amp.	1⅜"	5¾"	40 lbs.	5	170.00

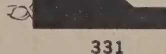
PLIER TYPE BATTERY CLIPS

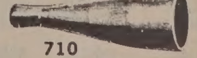


Insulated Vinylite Handles, Red or Black.
SPECIFY COLOR

No.	Amps.	Material	Overall Size	Std. Pkg.	NET Per C
712	35	Steel, Cop. Pl.	3¼"	10	$25.00
713	75	Steel, Cop. Pl.	4½"	5	35.00
714	100	Steel, Cop. Pl.	7½"	10	60.00
721	300	Solid Copper	7½"	5	180.00

BATTERY CLIP INSULATORS


331


710

Red or Black. **SPECIFY COLOR**

No.	Made to fit Smith Clip #	Material	Std. Pkg.	NET Per C
331	365	Vinyl	100	$3.50
710	704, 706	H.D. Rubber	10	75.00

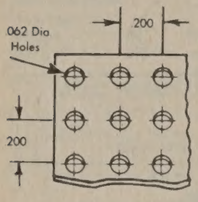
PRINTED CIRCUIT PREPUNCH BOARDS

SPECIFICATIONS

All boards are precision-punched and pre-cut to size with various spacings to accommodate and provide economical mounting of components in Electronic circuitry. They are ideal for production and prototype uses. They can be etched as required, drilled, punched or sawed. The following specifications apply:

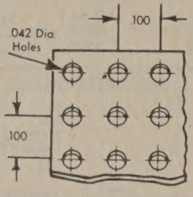
XXXP—Phenolic unclad, Type PBE-P per MIL-P-3115, 250° F Max.
EXXXP—Epoxy Paper, Type PEE per MIL-P-22324, 250° F Max.
XXXPC—Phenolic, Copper Clad, Type PP per MIL-P-13949, 250° F Max.
G-10—Epoxy Glass, unclad, Type GEE per MIL-P-18177, 300° F Max.
G-10—Epoxy Glass, Copper Clad, Type GE per MIL-P-13949B, 300° Max.

Many Others Available—Specials—Inquire



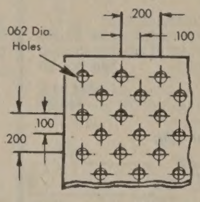
1/16" Thickness

"F" PATTERN



3/64" Thickness

"P" PATTERN



1/16" Thickness

"G" PATTERN

"F" PATTERN

.062 Holes .200 Centers 1/16" Thickness

Std. Pkg. 5

MATERIALS AVAILABLE

		XXXP		G-10		XXXP 1 Side Copper Clad		G-10 1 Side Copper Clad	
Size	No. of Holes	No.	NET Per C	No.	NET Per C	No.	NET Per C	No.	NET Per C
3x4	15x20	6001	$28.00	6014	$ 72.00	6027	$39.00	6040	$100.00
3x4.5	15x22	6002	35.00	6015	81.00	6028	45.00	6041	110.00
3x6	15x30	6003	45.00	6016	105.00	6029	60.00	6042	150.00
3x6.5	15x32	6004	48.00	6017	115.00	6030	62.00	6043	160.00
3.5x4	17x20	6005	33.00	6018	82.00	6031	45.00	6044	114.00
3.5x4.5	17x22	6006	36.50	6019	91.00	6032	50.00	6045	127.00
3.5x6	17x30	6007	50.50	6020	120.00	6033	67.00	6046	155.00
3.5x6.5	17x32	6008	55.50	6021	131.00	6034	73.00	6047	183.00
4x4.5	20x22	6009	45.00	6022	108.00	6035	60.00	6048	150.00
4x6	20x30	6010	56.00	6023	138.00	6036	75.00	6049	192.00
4x6.5	20x32	6011	60.00	6024	147.00	6037	81.00	6050	207.00
4.5x6	22x30	6012	61.50	6025	152.00	6038	83.00	6051	207.00
4.5x6.5	22x32	6013	66.00	6026	162.00	6039	88.00	6052	230.00

"P" PATTERN

.042 Holes .100 Centers 3/64" Thickness

Std. Pkg. 5

MATERIALS AVAILABLE

		G-10		G-10 1 Side Copper Clad	
Size	No. of Holes	No.	NET Per C	No.	NET Per C
2.5x4	25x40	6092	$ 66.00	6109	$ 90.00
2.5x4.5	25x45	6093	74.00	6110	100.00
2.5x6	25x60	6094	99.00	6111	134.00
2.5x6.5	25x65	6095	105.00	6112	142.00
3x4.5	30x45	6096	77.00	6113	105.00
3x4	30x40	6097	85.00	6114	115.00
3x6	30x60	6098	110.00	6115	155.00
3x6.5	30x65	6099	122.00	6116	165.00
3.5x4	35x40	6100	88.00	6117	119.00
3.5x4.5	35x45	6101	96.00	6118	132.00
3.5x6	35x60	6102	127.00	6119	177.00
3.5x6.5	35x65	6103	135.00	6120	184.00
4x4.5	40x45	6104	114.00	6121	155.00
4x6	40x60	6105	144.00	6122	197.00
4.5x6	45x60	6106	152.00	6123	212.00
4x6.5	40x65	6107	157.00	6124	220.00
4.5x6.5	45x65	6108	168.00	6125	235.00

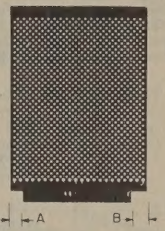
"G" PATTERN

.062 Holes .100 x .200 Alternate Centers 1/16" Thickness

Std. Pkg. 5

MATERIALS AVAILABLE

		XXXP		G-10		G-10 1 Side Copper Clad	
Size	No. of Holes	No.	NET Per C	No.	NET Per C	No.	NET Per C
3x4	(15x20)2	6053	$30.00	6066	$ 72.00	6079	$100.00
3x4.5	(15x22)2	6054	32.50	6067	81.00	6080	110.00
3x6	(15x30)2	6055	45.00	6068	105.00	6081	150.00
3x6.5	(15x32)2	6056	48.00	6069	115.00	6082	160.00
3.5x4	(17x20)2	6057	37.00	6070	80.00	6083	114.00
3.5x4.5	(17x22)2	6058	36.50	6071	91.00	6084	127.00
3.5x6	(17x30)2	6059	50.50	6072	120.00	6085	155.00
3.5x6.5	(17x32)2	6060	55.50	6073	131.00	6086	183.00
4x4.5	(20x22)2	6061	45.00	6074	108.00	6087	150.00
4x6	(20x30)2	6062	56.00	6075	138.00	6088	192.00
4x6.5	(20x32)2	6063	60.00	6076	147.00	6089	207.00
4.5x6	(22x30)2	6064	61.50	6077	152.00	6090	207.00
4.5x6.5	(22x32)2	6065	66.00	6078	162.00	6091	230.00



4.5" x 6.5" PLUG-IN CARDS WITH ETCHED FINGERS

.062 Holes. .100 x .200 Alternate Centers.
.156 Spacing. 1/16" Thickness.

Std. Pkg. 5

				G-10		XXXP	
Total Contacts	1 or 2 Sides	Fig. A	Fig. B	No.	NET Ea.	No.	NET Ea.
43	2	.408	.508	6126	$6.40	6130	$4.90
43	2	.458	.458	6127	5.80	6131	4.90
22	1	.408	.508	6128	4.90	6132	3.30
22	1	.458	.458	6129	4.90	6133	3.30

CONNECTOR INFORMATION:

With Plug-In Cards SMITH Nos.	Use SMITH Connector Commercial No.	Military No.
6126 and 6130	6227	6212
6127 and 6131	6227	6212
6128 and 6132	6220	6204
6129 and 6133	6220	6204

PLUG-IN CARDS WITH ELCO "VARICON" CONTACTS

.062 Holes. .100 x .200 Alternate Centers.
1/16" Thickness.

Std. Pkg. 1

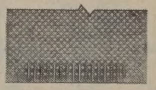


Fig. 1

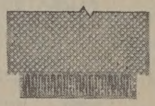
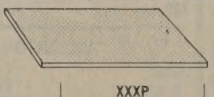


Fig. 2

No.	Fig.	No. of Contacts	Size	Material	NET Ea.
6134	1	16	4.5x6.5	Paper Epoxy	$5.20
6135	1	16	4.5x6.5	Glass Epoxy	5.50
6136	1	12	3x4.5	Paper Epoxy	3.90
6137	1	12	3x4.5	Glass Epoxy	4.20
6138	1	14	3x4.5	Paper Epoxy	3.90
6139	1	14	3x4.5	Glass Epoxy	4.50
6140	2	35	4.5x6.5	Glass Epoxy	9.80
6141	2	35	4.5x6.5	Paper Epoxy	8.50

CONNECTOR INFORMATION

Plug-In Cards, SMITH Nos.	Use Elco Connector No.
6134 and 6135	5009-016-156-001
6136 and 6137	5009-012-156-001
6138 and 6139	5004-014-103-002
6140	7008-035-146-001
6141	7001-035-146-001

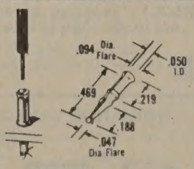


BLANK PANELS

1 and 2 Sides Copper.
1/16" Thickness.

Std. Pkg. 5

	XXXP Copper 1 Side		XXXP Copper 2 Sides		G-10 Copper 1 Side		Copper 2 Sides G-10	
Size	No.	NET Per C	No.	NET Per C	No.	NET Per C	No.	NET Per C
3x4.5	6142	$38.00	6144	$51.00	6146	$ 88.00	6148	$ 98.00
4.5x6.5	6143	70.00	6145	98.00	6147	170.00	6149	193.00



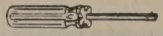
MINIATURE TUBULAR TERMINALS For .062-.067 Diam. Hole

For printed circuits. Suitable for mounting transistors, resistors, neons, etc. Tapered section retains wire leads: Positive locking in hole, no staking required. Firmly holds wires of .010 to .050 diam.

MATERIAL: .006 thick brass, precision-formed and pretinned.

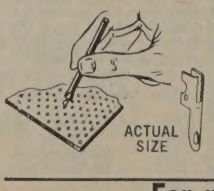
Std. Pkg. 100

No.	NET Per C
6160	$2.00



INSERTION TOOL, for hand insertion.
No. 6161 Std. Pkg. 6 NET Each $1.25

PUSH-IN TERMINALS For .062 DIAM. Holes



Miniature type, excellent for point-to-point or feed-thru wiring. Serated slot grips transistor or heavier leads. Multiple connections quickly and easily made.

MATERIAL: .008 thick Beryllium Copper.

FINISH: Fused tin plate.

Std. Pkg. 100

No.	NET Per C
6162	$1.70

INSERTION TOOL, for hand insertion.
No. 6163 Std. Pkg. 6 NET Each $1.35

For printed circuit jacks see eem page 4.

PRINTED CIRCUIT CONNECTORS

COMMERCIAL

INSULATOR: Glass filled blue Alkyd.
CONTACTS: Beryl Copper .00001 gold flash; pierced terminal.
ACCEPTS: 1/16" Printed Circuit Cards.
MTG. HOLE: .125 Clearance.
DESCR.: Bifurcated bellows action assures positive electrical contact.

.156 SPACING

.125 Mtg. Hole Clearance Pierced Terminal **Std. Pkg. 5**

Smith No.	No. of Contacts	Single or Double	Mtg. Centers	NET Ea.
6216	6	S	1.531	$2.10
6217	10	S	2.156	2.90
6218	15	S	2.937	3.60
6219	18	S	3.406	4.10
6220	22	S	4.031	4.40
6221	28	S	5.046	4.90
6222	36	S	6.219	6.10
6223	12	D	1.531	2.10
6224	20	D	2.156	2.90
6225	30	D	2.937	3.90
6226	36	D	3.406	4.10
6227	44	D	4.031	4.90
6228	56	D	5.046	5.60
6229	72	D	6.219	6.60
6230	86	D	7.302	7.60

MILITARY
MIL-C-21097

INSULATOR: Diallyl Phthalate, Green Type GDI-30 per MIL-P-19833.
CONTACTS: Beryl. Copper .000031 gold per MIL-G-45204, Type II over .0005 silver per QQ-5-365, pierced terminal.
ACCEPTS: 1/16" Printed Circuit Cards.
MTG. HOLE: .125 Clearance.
DESCR.: Bifurcated bellows action assures positive electrical contact.

.156 SPACING

.125 Mtg. Hole Clearance. Pierced Terminal **Std. Pkg. 5**

Smith No.	No. of Contacts	Single or Double	Mtg. Centers	NET Ea.
6200	6	S	1.531	$1.74
6201	10	S	2.156	2.34
6202	15	S	2.937	2.94
6203	18	S	3.406	3.12
6204	22	S	4.031	3.30
6205	28	S	5.046	4.20
6206	36	S	6.219	5.22
6207	43	S	7.302	6.30
6208	12	D	1.531	1.98
6209	20	D	2.156	2.76
6210	30	D	2.937	3.60
6211	36	D	3.406	3.90
6212	44	D	4.031	4.20
6213	56	D	5.046	4.86
6214	72	D	6.219	5.88
6215	86	D	7.302	6.30

.100 SPACING

.125 Mtg. Hole Clearance. Pierced Terminal **Std. Pkg. 1**

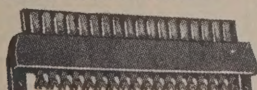
Smith No.	No. of Contacts	Single or Double	Mtg. Centers	NET Ea.
6231	40	D	2.625	$ 6.60
6232	60	D	—	8.60
6233	70	D	4.125	9.50
6234	80	D	4.625	10.40
6235	100	D	—	12.10
6236	120	D	6.625	14.00

.050 SPACING

.125 Mtg. Hole Clearance. Dip Solder Terminal **Std. Pkg. 1**

Smith No.	No. of Contacts	Single or Double	Mtg. Centers	NET Ea.
6237	40	D	1.500	$12.70
6238	60	D	2.000	14.40
6239	80	D	2.500	15.20
6240	100	D	3.000	16.90
6241	110	D	3.250	17.40
6242	128	D	3.500	18.50

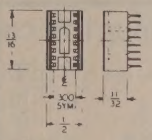
PRINTED CIRCUIT EDGE STRIPS



Convert any P.C. Board for plug-in application. Can also be used where high reliability is required. Molded diallyl phthalate body with gold plated contacts .125 Micro-inch. Available in single or double sided.

For 1/16" boards. **Std. Pkg. 1**

No.	Contacts	Single or Double	NET Each
6254	6	S	$ 4.40
6255	10	S	5.10
6256	15	S	6.10
6257	18	S	6.60
6258	22	S	7.15
6259	12	D	5.55
6260	20	D	6.80
6261	30	D	8.30
6262	36	D	9.35
6263	44	D	10.75

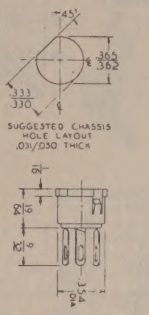


DUAL IN-LINE I.C. SOCKETS

P.C.

For 14 and 16 pin in-line Hybrid packages having 100" x 300" grid spacing. Accepts round or flat pins. Body of general purpose phenolic. Brass electro plated contacts. **Std. Pkg. 25**

No.	Pins	NET Per C
6252	14	$66.00
6253	16	66.00

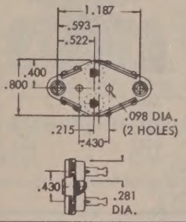


TRANSISTOR SOCKETS
For TO-5 and TO-18 Case Styles

Snap-in type transistor sockets for TO-5 and TO-18 3 and 4 lead, plus 3 lead in-line transistors. Phosphor bronze, cadmium plated contacts with a polysulfone body. Fits in "D" shape hole. **Std. Pkg. 100**

No.	Case	NET Per C
6265	TO-5	$20.00

ALL MOLDED POWER TRANSISTOR SOCKET

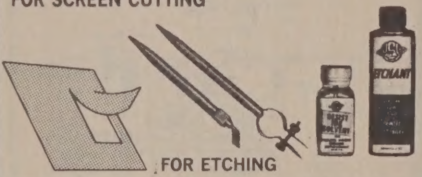


For TO-3 Case Style

For use with transistors having a TO-3 case. Body of general purpose phenolic with contacts of phosphor bronze, gold over silver plated. Mounting plate with 6-32 tapped holes. **Std. Pkg. 100**

No.	NET Per C
6266	$40.00

P.C. PROTOTYPE ETCHING EQUIPMENT FOR SCREEN CUTTING



FOR ETCHING

A low cost kit to enable the engineer to quickly etch copper-clad boards in minutes. The kit contains a unique felt-tip Resist Ink pen to apply the Resist-Ink as easily as writing. Also included is a 2-oz. bottle of Resist-Ink solvent and a 6-oz. bottle of ferric-chloride etchant solution. **Std. Pkg. 1**

No.	NET Each
6272	$7.00

Photo layout film for hand-cutting machanical negatives. A red film is laminated to a transparent backing sheet. When knife-cut, the red film laminate is peeled back to permit light to penetrate only through the cutaway area; the remainder is light-safe. Supplied in 8" x 10" sheets. **Std. Pkg. 6**

No.	NET Each
6268	$1.00

SWIVEL CUTTING KNIFE for cutting circles and curves. Also locks tight for cutting straight lines. **Std. Pkg. 6**

No.	NET Each
6269	$3.00

EXTRA BLADES for above **Std. Pkg. 12**

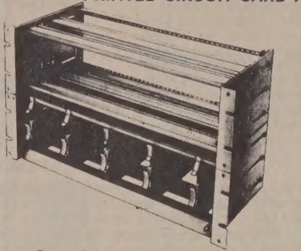
No.	NET Each
6270	$ .80

PARALLEL LINE-CUTTING KNIFE, for cutting parallel lines up to 1/2" in width. **Std. Pkg. 1**

No.	NET Each
6271	$5.00

JUST ADDED NEW "HOOKON JR." PROBE WITH TEST TERMINATIONS. SEE eem PAGE 42 OF THIS LISTING.

A UNIVERSALLY ADJUSTABLE PRINTED CIRCUIT CARD RACK



CARD RACK CAT. NO 3050 NET $30.00Each

Complete and Economical Support System for Printed Circuit Cards

ADJUSTABLE UP-AND-DOWN
For Card Widths 2⅜" to 4¾"

ADJUSTABLE FRONT-TO-BACK
For Card Lengths 3½" to 7¼"

ADJUSTABLE
For P.C. Connector Sizes

ADJUSTABLE LOCKING BAR
Holds Cards Securely against Rear Connectors

ADJUSTABLE CARD SPACING
Variable in .400" Increments

ADJUSTABLE CALIBRATED SIDE PANELS
For Fast, Precise Adjustment to Any Card Size

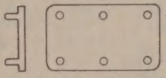
The above illustration demonstrates the simple, easy method of stacking the 3050 Card Rack with the use of catalog 3057 Stacking Plates listed below. Removal of the Guide Rails (3050-1) provides a Card Rack to accommodate larger sized P.C. Boards. (See illustration below.)

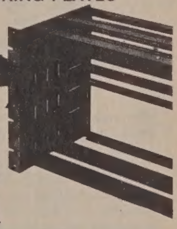
FEATURES

- CARD CAPACITY UP TO 39 CARDS,1/16" THICK
- CARD SIZES WITH LOCKING BAR, 2⅜" to 4¾" MAXIMUM WIDTH, 4⅜" TO 6½" MAXIMUM LENGTH. WITHOUT LOCKING BAR, 3½" TO 7½" MAXIMUM LENGTH.
- CARD SPACING .400" MINIMUM CENTERS, ADJUSTABLE IN .400" INCREMENTS.
- ACCOMMODATES CARD EDGE CONNECTORS WITH MOUNTING CENTERS FROM 0.936" MINIMUM TO 4.437" MAXIMUM.

Made of heavy gauge Anodized aluminum, guide and alignment members are extrusions. Supplied knock-down, all hardware, plastic card guides, step and assembly instructions. Complete with plastic board guides for 1/16" thick cards.

P.C. CARD RACK STACKING PLATES

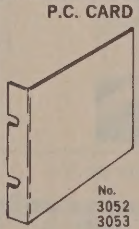




Designed to stack one or more No. 3050 card racks. Can also be used to create a double size card rack to accommodate larger size cards. Made of anodized aluminum, supplied with mounting hardware, available in pairs. **Std. Pkge. 1 Pair**

No.	Net Pair
3057	$3.50

P.C. CARD RACK BLANK END PLATES



Anodized aluminum blank-end plates for P.C. card racks. Designed for use with the standard No. 3050 hardware, to design custom rack sizes. Flanged and notched for RETMA mounting. Drill templates furnished with each pair of end plates to facilitate drilling within the P.C. card size limitations. Available in pairs. **Std. Pkge. 1 Pair**

No.	Length	Height	Centers	Net Per Pair
3052	7.812	5.219	1.125	$4.80
3053	9.000	6.970	2.000	5.80
3054	11,000	8.718	2.875	7.00
3055	12.000	5.219	1.125	5.80
3056	12.000	10.470	3.750	9.00

REPLACEMENT PARTS FOR #3050

Part No.	Description	NET Each
3050-1	Guide Rail	$2.50
3050-2	Guide Rail Bracket	.50
3050-3	Connector Rail Bracket	1.25
3050-4	Connector Rail	1.00
3050-5	Side Plate	2.50
3050-6	Locking Bar Bracket	.50
3050-7	Locking Bar	1.50
3050-8	Screw, 4-40 X 1/4, Type F Phillips	.01
3050-9	Screw, 4-40 X 3/8, Type F Phillips	.01
3050-10	Screw, 6-32 x 5/16, Type F Phillips	.01
3050-11	Hex Nut, 4-40 x 1/4	.01
3050-12	Lockwasher, Int. Tooth, #4	.01
3050-13	Nylon Guide Bushing	.02
3050-14	Captive Screw	.15
3050-16	Nylon Washer	.02
3050-17	Plastic Card Guide	.05
3050-18	Instructions	.50

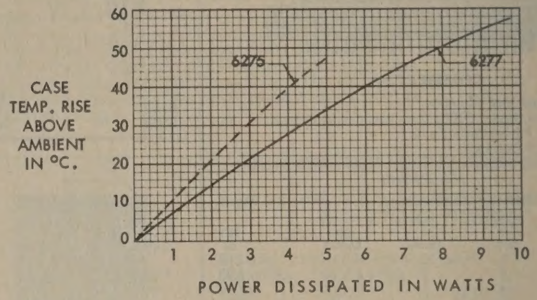
HEAT SINKS FOR SEMI-CONDUCTOR CIRCUITRY

LIGHTWEIGHT — ECONOMICAL — VERSATILE

SMITH HEAT SINKS can be depended upon for economical and efficient cooling of semi-conductor devices under individual environmental operating conditions. Designed with pre-punched transistor hole patterns of pre-painted aluminum with louver design for more efficient heat transfer, and of silver-bearing copper, also louvered, for constant retention under severe shock and vibration environments. Ideal for printed circuit boards and metal surfaces where minimum space and weight are important considerations.

THERMAL RESISTANCE

Thermal Resistance θca is the measure of the effectiveness of a heat dissipator in keeping down the temperature of a semi-conductor while heat is being developed. The thermal resistance is multiplied by the number of watts dissipated; the result is a rise in temperature above ambient air. The lower the θca figure, the cooler the semi-conductor. The θca figures represent natural convection situations in a sea level atmosphere. Actual performance in individual situations depends upon air flow, proximity of interfering objects, thermal conductive effects of the chassis, and heat radiated or convected from other components.



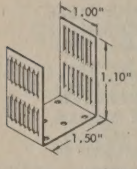


FIG. 1

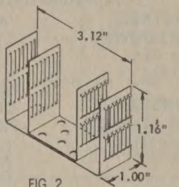


FIG. 2

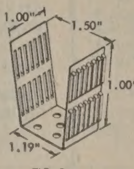


FIG. 3

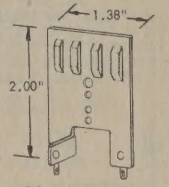


FIG. 4

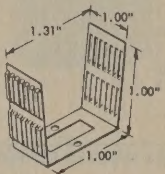


FIG. 5

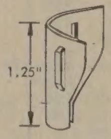


FIG. 6

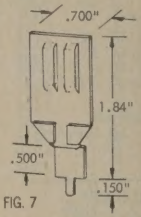


FIG. 7

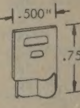


FIG. 8

THERMOVANES

Manufactured of pre-painted aluminum .060" thick. Designed for thru-board mounting, except Fig. 4 provided with mounting lugs.

ALL HEAT SINKS ARE FURNISHED WITH PRE-PUNCHED TRANSISTOR HOLE PATTERNS

Smith No.	Fig. No.	Case Style	Thermal* Res. °C/W	Wt. in Grams	Std. Pkg.	Resale Per C
6275	1	TO-3	9.5	9.8	100	$30.00
6276		TO-66, MD-17	9.5	9.8	100	30.00
6277	2	TO-3	5.6	28.4	50	65.00
6278	5	I.C., -V21-675, Case 675	9.5	9.8	100	30.00
6279		TO-66, MD-17	5.6	23.4	50	65.00
6280	3	TO-36, Stud Mtd Types ¼" max	10.0	10.8	100	30.00
6281	4	Flat Packs, Plastic or Tab	15.1	7.0	50	45.00

*Thermal Resistance measured in free air; lower when chassis-mounted.

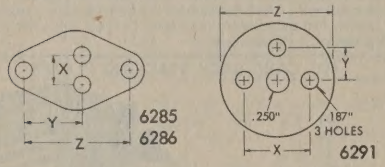
THERMOFLAGS

Manufactured of silver-bearing copper, except Fig. 6 pre-painted aluminum .018" thick. Designed for self support, except Fig. 7 provided with mounting lug.

Smith No.	Fig. No.	Case Style	Thermal* Res. °C/W	Wt. in Grams	Std. Pkg.	Resale Per C
6282	6	TO-5, 0.325" Case Dia	46	1.0	100	$15.00
6283	7	152, Tab Mtd Flat Packs	40-43	1.6	100	24.00
6284	8	TO-92, TO-98, All "D" Shape Styles	72	1.0	100	14.00

*Thermal Resistance measured in free air.

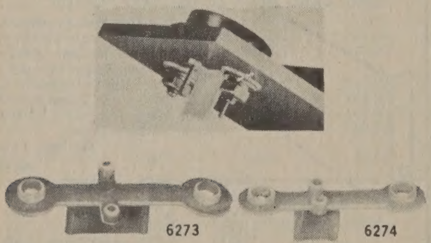
MICA INSULATING WAFERS
For TO-3, TO-66 and TO-36 Case Styles



When installed between semi-conductor and chassis or heat dissipator, it yields a lower thermal resistance. **Std. Pkg. 100**

No.	Case Style	X	Y	Z	NET Per C
6285	TO-3	.430"	.665"	1.187"	$5.00
6286	TO-66	.200"	.580"	.960"	5.00
6291	TO-36	.690"	.345"	1.187"	5.00

NYLON POWER TRANSISTOR MOUNTS



One-piece Nylon transistor mount replaces six pieces of conventional insulation when mounting power transistors. Built-in barrier separates and insulates base and emitter pins from each other. Screw insulators require $^3/_{16}$" clearance holes, pin insulators .113 dia. clearance. Mounting centers are standard for types TO-3 and TO-66 power transistors. **Std. Pkg. 100**

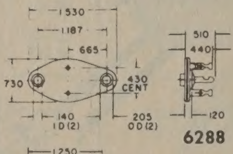
No.	Transistor Type	NET Per C
6273	TO-3	$4.00
6274	TO-66	4.00

HIGH TEMPERATURE TRANSISTOR MOUNTS

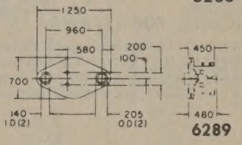
Heavy Duty, Made of Celanese 917 J101 Polyester. Designed for excessive temperature and electrieal requirements. Rated SE-O UL, 400° F Cont. **Std. Pkg. 100**

No.		NET Per C
6292	TO-3	8.00
6293	TO-66	8.00

TRANSISTOR WAFER SOCKETS FOR TO-3 AND TO-66 CASE STYLES



6288

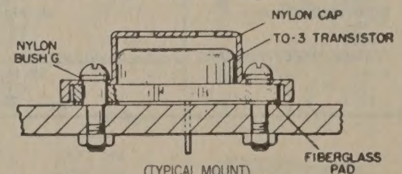


6289

Molded nylon top with molded boss washer construction and self-threading mounting bracket for # 6 screw. Contacts and mounting plate are of cadmium plated brass. **Std. Pkg. 100**

NO.	FOR CASE	NET Per C
6288	TO-3	$20.00
6289	TO-66	20.00

NYLON PROTECTIVE COVER
For TO-3 Case Style



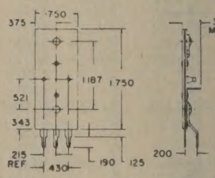
(TYPICAL MOUNT)

Insulates case from electrical shock and thermal contact. Webbed construction for free air flow. **Std. Pkg. 100**

No.	For Case Style	NET Per C
6287	TO-3	$30.00
6294	TO-66	33.00
6295	TO-5	5.50
6296	TO-18	4.50

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

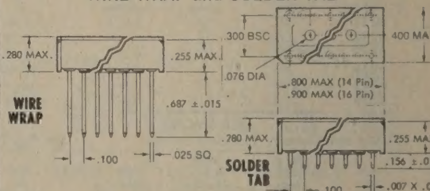
P.C. VERTICAL MOUNT SOCKET FOR TO-3 CASE STYLE



All connections are made through P.C. mounting tabs. Contacts and mounting plate of cadmium plated brass. **Std. Pkg. 100**

No. 6290 **NET Per C $50.00**

LOW PROFILE I.C. SOCKETS WIRE WRAP and SOLDER TAB



Provided with removable cover for closed entry and contact replacement, polarity guide for assembly alignment. Made of glass filled Black Nylon, phosphor bronze (QQ 13-750 Comp A) contacts, 10-20 microinches gold over 30-100 microinches silver. Available in 14 and 16 pin, wire wrap and solder tab terminals. **Std. Pkg. 50**

No.	Pins	Contacts Lgth.	Thick.	Body	NET Per C
6245	14	.687"	.025" Sq.	Wire Wrp	$85.00
6246	16	.687"	.025" Sq.	Wire Wrp	95.00
6247	14	.156"	.025x.007"	Sldr Tab	75.00
6248	16	.156"	.025x.007"	Sldr Tab	80.00

10 PIN IC SOCKET

Contacts are Brass, Cadmium Plated. Sockets are Molded of General Purpose, or Mica Filled Phenolic. Other Materials Upon Application. Socket to Accept .017 Dia. Pins. Contacts may be Omitted to Accept Various Types of Integrated Circuit Patterns. **Std. Pkg. 50**

No. 6267 **NET per C $80.00**

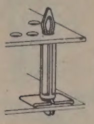
UNIVERSAL TRANSISTOR SOCKET

Contacts are Phosphor Bronze, Cadmium Plated. Sockets are Molded of General Purpose Phenolic, or Mica Filled Phenolic. Other materials available upon request.

Std. Pkg. 100

No. 6299 **Net per C $50.00**

PRINTED CIRCUIT BOARD SUPPORTS



Made of Nylon and snaps into circuit board and chassis. Chassis hole .187 diameter, thickness from .034 to .080. P. C. board hole .156 1/16 thick. **Std. Pkg. 100**

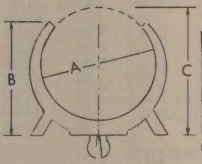
No.	Length	NET Per C
4093	3/16"	$3.00
4094	1/4"	3.10
4095	3/8"	3.30
4096	1/2"	3.50
4097	5/8"	3.75
4098	3/4"	4.00
4099	7/8"	4.50

SELF-EXTINGUISHING NYLON

Std. Pkg. 100

No.	Length	NET Per C
4293	3/16"	$4.20
4294	1/4"	4.50
4295	3/8"	4.85
4296	1/2"	5.20
4297	5/8"	5.50
4298	3/4"	6.00
4299	7/8"	6.75

COMPONENT CLIPS

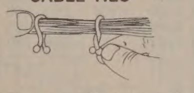


Clip Width 1/4" except #4081 3/16".

Made of black self-extinguishing Nylon. Mounts into chassis or P. C. board. For panel thickness 1/16", panel hole size 5/32"; except #4081; panel hole size 1/8". **Std. Pkg. 100**

No.	A	B	C	NET Per C
4081	7/32"	.265	.343	$ 5.70
4082	1/4"	.343	.375	6.40
4084	3/8"	.437	.500	7.40
4086	1/2"	.546	.625	9.00
4090	3/4"	.800	.875	12.00
4091	.800	.781	.925	13.00
4092	1.000	1.000	1.125	16.00

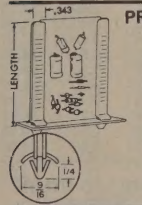
TWIST LOCK CABLE TIES



Time and cost saving white Nylon re-usuable cable ties. Twists to lock wire into place, twists to unlock. **Std. Pkg. 1**

No.	For Wire Dia.	NET Per C	NET per M
8982	.200-.300	$2.10	$18.00
8983	.400-.500	2.40	20.00
8984	.700-.800	2.90	24.00

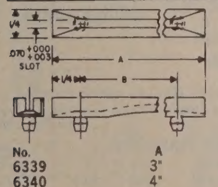
PRINTED CIRCUIT BOARD GUIDES



Position P.C. Boards of any width. Made of Natural Nylon, snaps into place. Double channeled for stacking and available in three sizes. Accepts board thicknesses from .030" to .075"; fits into panel hole .175" x .310" **Std. Pkg. 100**

No.	Length	NET Per C
6249	1"	$17.00
6250	2"	18.50
6251	3"	20.00

RACK CARD GUIDES

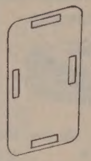


Guides may be used horizontally or vertically for mounting circuit boards in rack chassis. Guides snap into .125" dia. hole at both ends. Four lengths in natural nylon. **Std. Pkg. 50**

No.	A	B	NET Per C
6339	3"	2½"	$34.00
6340	4"	3½"	39.00
6341	6"	5½"	42.00
6342	8½"	8"	45.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements.

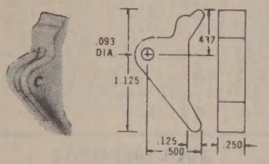
NYLON WIRE MARKER PLATES



Made of Nylon, attaches to wire harness with any type of wire tie or lacing cord. Write in identification. Available in three sizes. Reusable. **Std. Pkg. 100**

No.	Size	NET Per C
8979	3/4" x 1 1/2"	$ 9.00
8980	3/4" x 1 3/4"	9.50
8981	3/4" x 2"	10.00

NYLON CIRCUIT CARD EJECTOR



Designed for easy and quick removal of circuit boards. Lever action prevents damage to card and components. For use with cards up to 1/16" thick, supplied with mounting pins. **Std. Pkg. 100**

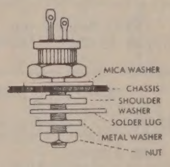
No.	NET Per C
6297	$35.00

NYLON CIRCUIT CARD HANDLE

Designed for use as a permanent handle or puller for quick and easy card insertion and removal. **Std. Pkg. 100**

No.	NET Per C
6298	$40.00

STUD TRANSISTOR MOUNTING HARDWARE



A complete listing of required mounting hardware for stud type transistors from #10 to #1/4 stud.

No.	Description	Std. Pkg.	NET Per C
1153	#10 Mica Washer	100	$3.40
1154	#1/4 Mica Washer	100	3.40
2666	#10 Nylon Shoulder Washer	100	2.20
2664	#1/4 Nylon Shoulder Washer	100	3.30
1410-10	#10 Solder Lug	1000	1.50
1468	#1/4 Solder Lug	1000	1.50
1152	#10 Metal Washer	1	.71
1147	#1/4 Metal Washer	1	.71
1367	#10-32 Nut	1	1.82
1368	#1/4-20 Nut	1	2.86
1399	#1/4-28 Nut	100	2.60

ENGINEERING TRANSISTOR MOUNT HARDWARE KIT

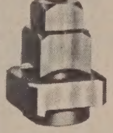
Contains all hardware necessary to mount and insulate stud mount transistors and TO-3, TO-66 types. Includes: 25 each of Smith Nos. 6285, 6286, 6291, 2666, 2664, 1410-10, 1468, 1152, 1147, 1367, 1368; 5 each of Smith Nos. 6287, 6294; 25 each of #10 mica washers, #1/4 mica washers and 1/4-28 nuts. Packaged in a clear plastic hinged box. **Std. Pkg. 1**

No.	NET Ea.
1319	$12.00

RADIO CHASSIS PUNCHES

A complete line of chassis hole punches for swiftly cutting clean, accurately located holes in chassis and panels. An assortment of round, square, "D," and Keyed holes can be punched by inserting in drilled pilot hole, and turning with wrench. Finished hole is smooth, accurately sized without burrs. Round punches are provided with center-line markings for enlarging holes larger than pilot hole. Individually packed. **Std. Pkg. 1**

ROUND



SQUARE

"KEY"

ROUND HOLE PUNCHES

No.	Hole Size	NET Ea.	No.	Hole Size	NET Ea.
3801	1/2"	$3.85	3814	1 1/4"	$ 4.60
3802	9/16"	3.85	3815	1 5/16"	5.70
3803	5/8"	3.85	3816	1 3/8"	5.70
3804	11/16"	3.90	3817	1 1/2"	6.25
3805	3/4"	3.90	3818	1 5/8"	7.60
3806	13/16"	3.90	3819	1 3/4"	8.60
3807	7/8"	3.90	3820	1 7/8"	10.65
3808	15/16"	4.40	3821	2"	11.25
3809	1"	4.40	3822	2 1/8"	12.15
3810	1 1/16"	4.60	3823	2 1/4"	12.60
3811	1 1/8"	4.60	3824	2 1/2"	20.40
3812	1 5/32"	4.60	3825	2 3/4"	28.45
3813	1 3/16"	4.60	3826	3"	39.20

SQUARE PUNCHES

3827	1/2"	$10.25	3830	7/8"	$13.00
3828	5/8"	10.25	3831	1"	13.45
3829	3/4"	11.10			

"KEY" PUNCHES

3832	15/32"	$11.65	3834	1 11/64"	$13.80
3833	15/16"	12.55	3835	1 17/64"	16.20

ROUND METER HOLE PUNCH

3836	2 25/32"	$20.35

"D" PUNCHES

3837	1/2x15/32"	$10.10	3838	5/8x19/32"	10.70

STANDARD DRIVE SCREWS

No.	Use with Nos.	NET Ea.
3847	3804 to 3807	$ .50
3848	3808 to 3817	.55
3849	3818 to 3819	.90
3850	3820 to 3824	1.10

BALL BEARING DRIVE SCREWS

Reduces friction and effort when punching round holes 11/16" and larger. For use only with Round punches listed above.

No.	Use with Nos.	NET Ea.
3839	3805 to 3808	$2.10
3840	3809 to 3817	2.30
3841	3818 to 3819	5.20
3842	3820 to 3824 and 3836	5.50

RELAY SOCKET PUNCH

P&B KHP Relay Socket Punch

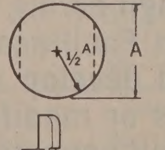
No.	Hole Size	NET Ea.
3845	1.018 x .861	$25.30
3846	1.250 x 1.375	38.50
3851	.990 x 1.140	28.00

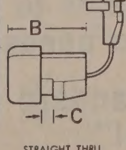
ROUND CHASSIS PUNCH SETS WITH RACK

Rack is 11" long x 3¾" wide, and holds all size round punches from ½" to 1 3/8" inclusive. Full set contains all punches and rack. Intermediate set contains punches from ½" to 1¼" by 1/8ths (7 punches). Easily mounts on wall or any vertical surface with #8 screws (not supplied). **Std. Pkg. 1**

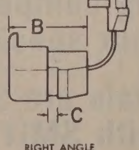
No.	Description	Net Ea.
3066	Full set (16 punches) and rack	$96.00
3844	Inter. Set (7 punches) and Rack	$45.00
3065	Rack only	$3.50

NYLON STRAIN RELIEFS





STRAIGHT THRU



RIGHT ANGLE

One-piece construction, absorbs pull and twist. Wire full anchored and insulated at chassis entrance. Available straight thru and right angle. **Std. Pkg. 100**

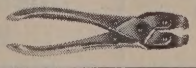
A = Chassis Hole. B = Length. C = Max. Chassis Thickness

STRAIGHT THRU

No.	Wire Type	Approx. Wire Size	A	B	C	NET Per C
937	AWM	1/8 - 3/16	.375"	.410"	.060"	$ 4.00
938	SP-1, SPT-1	.12 x .22	.437"	.410"	.062"	4.00
939	SV, SVT, HPD	.250-.290	.500"	.438"	.100"	4.50
822	SPT-1, SPT-2, SP-2, HPN	.12 to .30	.500"	.406"	.062"	6.00
823	SJ, SJT, SJO	.365-.360	.625"	.580"	.062"	9.50

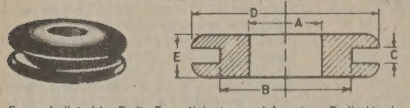
RIGHT ANGLE

No.	Wire Type	Approx. Wire Size	A	B	C	NET Per C
824	SPT-1, SPT-2, SP-2, HPN	.12 to .30	.500"	.687"	.100"	8.50
825	SV, SVT, HPD	.250-.290	.500"	.687"	.100"	8.50
826	S, ST	.360-.430	.750"	1.085"	.125"	19.00



No. 940 Setting Pliers $35.00 **NET Each**

RUBBER GROMMETS

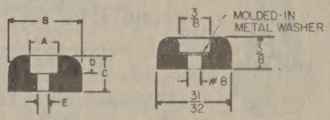


Formerly listed by Radio Essentials, Inc. and American Radio Hardware Inc., (Their catalog numbers as below, minus first digit).

Std. Pkg. 100

Cat. No.	I.D. A	P.H. B	P.T. C	O.D. D	W E	NET Per C
91114	1/8	1/4	/16	11/32	3/16	$ 2.50
91118	3/16	5/16	1/16	7/16	7/32	2.50
91103	3/16	15/32	1/8	9/16	3/8	3.30
91122	1/4	11/32	1/32	1/2	5/32	3.10
91119	1/4	13/32	1/16	9/16	1/4	2.70
91102	9/32	13/32	5/32	5/8	3/8	3.50
91123	9/32	1/2	1/4	11/16	7/16	5.50
91117	5/16	7/16	1/8	19/32	3/8	3.50
91116	5/16	1/2	1/8	3/4	3/8	5.00
91106	5/16	1/2	3/16	5/8	1/2	7.20
91120	19/64	7/16	1/16	5/8	1/4	3.10
91107	3/8	7/16	3/32	5/8	5/16	5.00
91121	3/8	1/2	1/16	21/32	1/4	3.00
91100	3/8	1/2	9/64	13/16	13/32	9.10
91111	3/8	11/16	9/64	7/8-1"	13/32	9.00
91109	3/8	7/8	1/4	1-1/16	3/8	15.00
91124	7/16	9/16	1/16	3/4	1/4	3.50
91112	49/64	1-3/32	1/16	1-5/8	5/16	15.00

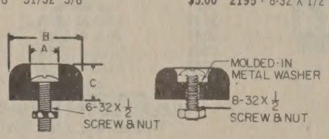
RECESS RUBBER BUMPERS



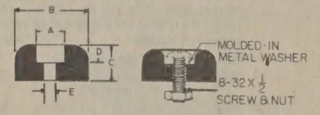
NO.	A	B	C	D	E	NET PER C	NO.	SCREW SIZE	NET PER C
2192	1/4	1/2	1/4	5/32	1/8	$1.80	2196	6-32X 1/2	$7.00
2193	1/4	5/8	5/16	5/32	1/8	$3.00	2197	6-32X 1/2	$8.00
2194	9/32	3/4	3/8	3/32	9/64	$3.50	2198	6-32X 1/2	$9.00
2184	9/32	5/8	9/32	1/8	1/8	$3.50	2199	6-32X 1/2	$9.00

(With Molded-in Metal Washer)

2135	3/8	31/32	3/8			$5.00	2195	8-32 X 1/2	$10.00

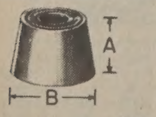


NO.	A	B	C	D	E	Net Per C	NO.	Screw Size	NET PER C
2455	1/4"	17/32"	1/4"	5/32"	1/8"	$ 3.90	2465	4-40 x 3/8"	8.90
2456	5/16"	5/8 "	5/8"	5/16"	11/64"	5.30	2467	8-32 x 1/2"	10.30
2457	1/4"	11/16"	13/32"	7/32"	1/8"	7.50	2468	4-40 x 3/8"	12.50
2458	7/32"	23/32"	17/32"	1/4"	3/32"	9.40	2469	2-56 x 1/2"	14.40
2459	1/4"	3/4"	17/64"	1/8"	1/8"	5.90	2470	4-40 x 3/8"	10.90
2460	3/8"	25/32"	9/16"	5/16"	3/16"	7.10	2471	8-32 x 1/2"	12.10
2461	1/4"	1"	1"	5/8"	1/8"	16.00	2472	4-40 x 1"	21.00



(With molded-in metal washer) With Screw and Nut

2462	1/4"	17/32"	1/4"	5/32"	1/8"	6.60	2473	4-40 x 3/8"	11.60
2463	1/4"	11/16"	13/32"	7/32"	1/8"	11.00	2474	4-40 x 3/8"	16.00
2464	1/4"	3/4"	17/64"	1/8"	1/8"	8.40	2475	4-40 x 3/8"	13.40
2465	3/8"	25/32"	9/16"	5/16"	3/16"	12.00	2476	8-32 x 1/2"	17.00



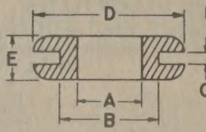
VINYL CABINET BUMPERS

All molded cabinet bumpers with brass insert to absorb screw load. Molded of ethylene vinyl, color black.

Std. Pkg. 100

No.	Size Screw	A	B	NET Per C
2181	4	3/8"	9/16"	$5.50
2182	6	7/16"	3/4"	7.00
2183	8	5/8"	15/16"	9.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements.



RUBBER GROMMETS

Std. Pkg. 100

Cat. No.	I.D. A	P.H. B	P.T. C	O.D. D	W E	NET Per C
2185	1/8	3/16	1/16	5/16	3/16	$2.40
2172	3/16	5/16	1/16	7/16	3/16	2.20
2170	1/4	3/8	1/16	5/8	1/4	2.50
2174	5/16	7/16	1/16	5/8	1/4	2.40
2175	3/8	1/2	1/16	21/32	1/4	2.50
2177	7/16	9/16	1/16	3/4	1/4	2.50
2186	1/2	3/4	1/16	1-1/16	5/16	5.30
2188	9/16	13/16	1/16	1-1/16	5/16	5.30
2187	5/8	7/8	1/16	1-1/8	5/16	5.40
2189	3/4	7/8	1/32	1"	5/32	5.20

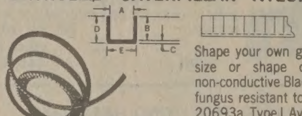
VINYL GROMMETS

DESCR.: Exceptional aging qualities. High di-electric properties. Oil resistant. Durameter hardness 45 to 85.

Std. Pkg. 100

Cat. No.	I.D. A	P.H. B	P.T. C	O.D. D	W E	NET Per C
2145	1/8	1/4	1/16	11/32	3/16	$1.20
2146	3/16	5/16	1/16	7/16	7/32	1.80
2147	1/4	3/8	1/16	9/16	1/4	2.00
2148	3/8	1/2	1/16	5/8	1/4	2.20
2149	1/2	5/8	1/16	13/16	9/32	3.50

EXTRUDED "CATERPILLAR" NYLON GROMMET

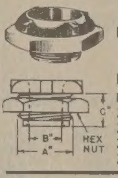


Shape your own grommets to fit any size or shape opening. Made of non-conductive Black Nylon. Type 6/6, fungus resistant to conform to MIL M 20693a, Type I. Available in 25 ft. rolls for panel thickness .052 to .125

Std. Pkg. 1

No.	A	B	C	D	E	NET Ea.
2692	.052	.150	.040	.190	.125	$10.00
2693	.085	.155	.045	.200	.162	11.50
2694	.125	.175	.045	.220	.206	12.00

BAKELITE BUSHINGS



BODY: MOLDED Phenolic, black. U. L. approved, recommended for temperatures up to 300 degrees Fahrenheit.

NUT: Steel, cadmium plated. **Std. Pkg. 50**

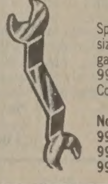
No.	A	B	C	NET Per C
2136	13/32"	17/64"	1/4"	$ 4.70
2137	17/32"	5/16"	5/16"	6.50
2138	21/32"	29/64"	5/16"	8.00
2139	27/32"	9/16"	11/32"	25.00

FIBRE WASHER KIT

Each kit contains about 1,000 Flat and Shoulder Washers, packed in an 18-compartment plastic box, in the following approximate quantities of SMITH standard washers:

100 each #2151, 2161, 2153, 2160; 75 each #2150, 2162; 60 each #2155, 2163; 50 each #2156, 2164, 2154, 2165; 35 each #2159, 2167; 25 each #2158, 2168; 10 each #2157, 2169.

No.	Std. Pkg. 1	NET Each
2173	Kit of 1,000 Washers	$20.00



SHAFT WRENCHES

Specially designed offset, double-end wrenches for most hex sizes encountered in electronic construction. Made of heavy gauge, cadmium plated steel, clearly marked with size. No. 999 is especially useful for Toggle Switch and Volume Control mounting nuts.

Std. Pkg. 25

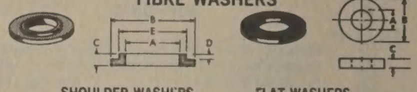
No.	For Nut Sizes	NET per C
998	5/16" - 3/8"	$30.00
999	½ - 9/16"	30.00
997	Set of 2 above	60.00

SPECIAL REQUIREMENTS?

Use our Engineering and Production Facilities to design and develop new products or modify existing components to meet your specific needs.

"Specials are Standard with SMITH!"

FIBRE WASHERS



SHOULDER WASHERS FLAT WASHERS

MATERIAL: Commercial vulcanized fibre, black, per MIL-F-1148A, grade CH.

TOLERANCES: "A" dim. (I.D.) — +.010 —.000
All other dimensions show, ±1/64".
"E" dim. (shoulder dia.) — +.000 —.010

Std. Pkg. 1

SHOULDER WASHERS

Cat. No.	Screw Clear.	A (I.D.)	B (O.D.)	C (Thk)	D (Shldr Hgt.)	E (Shldr Dia.)	NET Per C	NET Per M
2171	No. 2	.093	.250	.055	.025	.154	$1.90	$15.00
2151	No. 4	.115	.250	.062	.031	.187	1.40	11.00
2152	No. 6	.141	.250	.093	.031	.187	1.40	11.00
2153	No. 6	.141	.312	.093	.031	.187	1.50	12.00
2150	No. 6	.141	.375	.093	.031	.240	1.50	12.00
2155	No. 8	.167	.375	.093	.031	.246	1.50	12.00
2156	No. 10	.194	.375	.093	.031	.308	1.60	13.00
2154	1/4"	.253	.500	.093	.031	.308	1.60	13.00
2159	17/64"	.265	.500	.093	.031	.365	2.10	17.00
2158	3/8"	.385	.625	.093	.031	.498	2.30	19.00
2157	3/8"	.378	.750	.093	.031	.498	2.70	22.00

FLAT WASHERS

Cat. No.	Screw Clear	A (I.D.)	B (O.D.)	C (Thk)	NET Per C	NET Per M
2191	No. 2	.093	.250	1/32"	$ .80	$ 6.00
2161	No. 4	.115	.250	1/16"	.90	7.00
2160	No. 6	.141	.250	1/16"	.90	7.00
2162	No. 6	.141	.375	1/16"	.90	7.00
2163	No. 8	.169	.375	1/16"	1.00	8.00
2164	No. 10	.196	.375	1/16"	1.00	8.00
2165	1/4"	.253	.500	1/16"	1.00	8.00
2166	1/4"	.253	.500	3/32"	1.80	14.00
2167	5/16"	.315	.500	1/16"	1.30	10.00
2168	3/8"	.385	.625	1/16"	1.30	10.00
2169	3/8"	.378	.750	1/16"	1.90	15.00

NYLON WASHERS

MATERIAL: Nylon (Zytel 101), natural, per MIL-P-20693A.

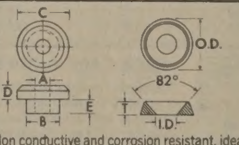
TOLERANCES: "A" dim. (I.D.) —+.010 —.000
All other dimensions shown, ±1/64".
"E" dim. (shoulder dia.) — +.000 —.010

SHOULDER WASHERS

Cat. No.	Screw Clear.	A (I.D.)	B (O.D.)	C (Thk)	D (Shldr Hgt.)	E (Shldr Dia.)	NET Per C	NET Per M
2651	No. 2	.093	.250	.055	.025	.154	$2.20	$17.00
2661	No. 4	.115	.250	.062	.031	.187	2.00	15.00
2662	No. 6	.141	.250	.093	.031	.187	2.00	15.00
2663	No. 6	.141	.312	.093	.031	.187	2.10	16.00
2660	No. 6	.141	.375	.093	.031	.240	2.20	17.00
2665	No. 8	.167	.375	.093	.031	.246	2.20	17.00
2666	No. 10	.194	.375	.093	.031	.308	2.20	17.00
2664	1/4"	.253	.500	.093	.031	.308	3.30	25.00
2669	17/64"	.265	.500	.093	.031	.365	3.30	25.00
2668	3/8"	.385	.625	.093	.031	.498	3.30	25.00
2667	3/8"	.378	.750	.093	.031	.498	4.80	37.00

FLAT WASHERS

Cat. No.	Screw Clear	A (I.D.)	B (O.D.)	C (Thk)	NET Per C	NET Per M
2652	No. 2	.093	.250	1/32"	$1.00	$ 8.00
2671	No. 4	.115	.250	1/16"	1.20	9.00
2514	No. 4	.115	.281	3/64"	1.20	9.00
2670	No. 6	.141	.250	1/16"	1.20	9.00
2515	No. 6	.141	.312	3/64"	1.20	9.00
2672	No. 6	.141	.375	1/16"	1.40	11.00
2673	No. 8	.170	.375	1/16"	1.40	11.00
2516	No. 8	.170	.375	1/16"	1.40	11.00
2674	No. 10	.196	.375	1/16"	1.40	11.00
2517	No. 10	.196	.437	1/16"	1.80	14.00
2675	1/4"	.253	.500	1/16"	2.10	16.00
2676	1/4"	.253	.500	3/32"	3.30	25.00
2518	1/4"	.253	.562	1/16"	2.20	17.00
2677	5/16"	.315	.500	1/16"	2.10	16.00
2678	3/8"	.385	.625	1/16"	2.50	19.00
2679	3/8"	.378	.750	1/16"	3.90	30.00



MOLDED NYLON WASHERS

SHOULDER-FINISHING

Non conductive and corrosion resistant, ideal for insulation, cushioning or spacing protection. Meets Military Specification MIL-P-20693, Type 1, Available in Natural.

Std. Pkg. 100

SHOULDER WASHERS

No.	A	B	C	D	E	NET Per C
2681	.122	.187	.281	.040	.040	$2.25
2682	.146	.218	.328	.040	.040	2.40
2683	.174	.250	.375	.060	.050	2.50
2684	.201	.281	.437	.050	.050	2.75
2685	.260	.375	.562	.060	.060	3.00
2686	.385	.500	.750	.060	.060	4.75

FINISHING WASHERS

No.	O.D.	I.D.	Thickness	NET Per C
2687	.437	.143	.100	$5.00
2688	.515	.171	.115	5.25
2689	.580	.191	.152	5.50
2690	.609	.225	.160	6.00
2691	.683	.251	.183	6.50

MACHINE SCREWS

ROUND HEAD
STEEL, CADMIUM PLATED

Size	No.	NET per C	No.	NET per M
2-56 x ¼"	1173C	$1.29	1173M	$11.90
2-56 x ½"	1174C	1.39	1174M	12.90
2-56 x ¾"	1175C	1.47	1175M	13.70
3-48 x ¾"	1176C	1.54	1176M	14.40
4-36 x ¼"	1177C	1.39	1177M	12.90
4-36 x 3/8"	1178C	1.43	1178M	13.30
4-36 x ½"	1183C	1.48	1183M	13.80
4-36 x 5/8"	1184C	1.56	1184M	14.60
4-36 x ¾"	1185C	1.59	1185M	14.90
4-40 x ¼"	1350C	1.39	1350M	12.90
4-40 x 3/8"	1351C	1.43	1351M	13.30
4-40 x ½"	1352C	1.48	1352M	13.80
4-40 x 5/8"	1353C	1.56	1353M	14.60
4-40 x ¾"	1354C	1.59	1354M	14.90
6-32 x ¼"	1000C	1.23	1000M	11.30
6-32 x 3/8"	1001C	1.27	1001M	11.70
6-32 x ½"	1002C	1.32	1002M	12.20
6-32 x 5/8"	1355C	1.40	1355M	13.00
6-32 x ¾"	1356C	1.48	1356M	13.80
6-32 x 1"	1357C	1.64	1357M	15.40
6-32 x 2"	1358C	3.42	1358M	33.20
8-32 x ¼"	1006C	1.55	1006M	14.50
8-32 x 3/8"	1007C	1.45	1007M	13.50
8-32 x ½"	1008C	1.55	1008M	14.50
8-32 x 5/8"	1010C	1.67	1010M	15.70
8-32 x ¾"	1359C	1.80	1359M	17.00
10-32 x ¼"	1271C	3.04	1271M	29.40
10-32 x ½"	1360C	1.84	1360M	17.40
10-32 x ¾"	1361C	2.14	1361M	20.40
10-32 x 1"	1362C	2.47	1362M	23.70

BRASS, NICKEL PLATED

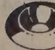
Size	No.	NET per C	No.	NET per M
4-36 x ¼"	1044C	$2.17	1044M	$26.20
4-36 x 3/8"	1045C	2.79	1045M	26.90
4-36 x ½"	1046C	3.38	1046M	32.80
4-40 x ¼"	1047C	2.72	1047M	26.20
4-40 x 3/8"	1048C	2.79	1048M	26.90
4-40 x ½"	1049C	3.38	1049M	32.80
6-32 x ¼"	1050C	3.38	1050M	32.80
6-32 x 3/8"	1051C	3.61	1051M	35.10
6-32 x ½"	1052C	4.05	1052M	39.50
8-32 x ¼"	1056C	4.99	1056M	48.80
8-32 x 3/8"	1057C	5.27	1057M	51.70
8-32 x ½"	1058C	5.96	1058M	58.60

BINDING HEAD
STEEL, CADMIUM PLATED

Size	No.	NET per C	No.	NET per M
2-56 x ¼"	1369C	$1.29	1369M	$11.90
2-56 x ½"	1370C	1.39	1370M	12.90
2-56 x 5/8"	1371C	1.43	1371M	13.30
3-48 x ¼"	1272C	1.21	1272M	11.10
4-40 x ¼"	1372C	1.39	1372M	12.90
4-40 x ½"	1373C	1.48	1373M	13.80
4-40 x ¾"	1374C	1.60	1374M	15.00
6-32 x 1/8"	1273C	1.09	1273M	9.90
6-32 x 3/16"	1375C	1.40	1375M	13.00
6-32 x ¼"	1425C	1.23	1425M	11.30
6-32 x 3/8"	1426C	1.27	1426M	11.70
6-32 x ½"	1427C	1.32	1427M	12.20
6-32 x 5/8"	1376C	1.40	1376M	13.00
6-32 x ¾"	1377C	1.48	1377M	13.80
8-32 x ¼"	1428C	1.55	1428M	14.50
8-32 x 5/16"	1378C	1.50	1378M	14.00
8-32 x 3/8"	1429C	1.45	1429M	13.50
8-32 x ½"	1430C	1.55	1430M	14.50
8-32 x ¾"	1379C	1.80	1379M	17.00
10-32 x ½"	1380C	1.84	1380M	17.40
10-32 x ¾"	1381C	2.14	1381M	20.40

OVAL HEAD RACK SCREWS
STEEL, NICKEL PLATED

Size	No.	NET per C	No.	NET per M
6-32 x ¾"	1382C	$1.55	1382M	$14.50
8-32 x ¾"	1383C	1.96	1383M	18.60
10-32 x ½"	1111C	2.53	1111M	24.30
10-32 x ¾"	1112C	2.44	1112M	23.40



COUNTER SUNK WASHERS
BRASS, NICKEL PLATED

Size	No.	NET per C	No.	NET per M
#6	1115C	$1.90	1115M	$18.00
#8	1116C	1.95	1116M	18.50
#10	1117C	2.00	1117M	19.00

HEXAGON NUTS
BRASS NICKEL PLATED

Thread Size	WD A.F.	Thick-ness	No.	NET per C	No.	NET per M
2-56	3/16	1/16	1326C	$1.04	1326M	$ 9.40
3-48	3/16	1/16	1327C	1.04	1327M	9.40
4-36	1/4	3/32	1188C	1.33	1188M	12.30
4-40	1/4	3/32	1168C	1.33	1168M	12.30
6-32	1/4	3/32	1189C	1.33	1189M	12.30
6-32	5/16	7/64	1190C	1.87	1190M	17.70
8-32	1/4	3/32	1328C	1.33	1328M	12.30
8-32	5/16	7/64	1192C	1.79	1192M	16.90
10-32	5/16	7/64	1193C	1.85	1193M	17.30

VOLUME CONTROL —SWITCH AND POTENTIOMETER NUTS
HEX BRASS NICKEL PLATED

Thrd Size	WD. A.F.	Thk-ness	No.	Net Per C	No.	Net Per M
¼-20	7/16	3/16	1329C	$4.58	1329M	$44.80
¼-28	⅜	3/32	1243C	2.36	1243M	22.60
¼-28	⅜	⅛	1244C	2.41	1244M	23.10
¼-32	5/16	5/64	1245C	1.87	1245M	17.70
¼-32	⅜	3/32	1187C	2.60	1187M	25.00
5/16-32	7/16	.101	1255C	3.71	1255M	36.10
⅜-32	½	3/32	1195C	2.33	1195M	22.30
*⅜-32	½	3/32	*1199C	2.50	1199M	22.00
⅜-32	9/16	3/32	1258C	3.05	1258M	29.50
15/32-32	9/16	5/64	1196C	2.42	1196M	23.20
15/32-32	9/16	3/32	1260C	2.65	1260M	25.50

**STEEL, CADMIUM PLATED

RING NUTS, BRASS NICKEL PLATED

Thrd Size	Dia.	Thk-ness	No.	Net Per C	No.	Net Per M
⅜-32	½	3/32	1120C	$ 5.10	1120M	$ 50.00
15/32-32	⅝	1/16	1197C	3.10	1197M	30.00

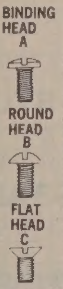
DRESS NUT BRASS NICKEL PLATED

15/32-32	⅝	3/32	1198C	22.00	1198M	200.00

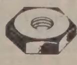
HEXAGON NUTS
STEEL, CADMIUM PLATED

2-56	3/16	1/16	1363C	$1.47	1363M	$13.70
3-48	3/16	1/16	1364C	1.47	1364M	13.70
4-36	¼	3/32	1398C	1.42	1398M	13.20
4-40	¼	3/32	1365C	1.42	1365M	13.20
6-32	¼	3/32	1179C	1.42	1179M	13.20
6-32	5/16	7/64	1180C	1.42	1180M	13.20
8-32	¼	3/32	1366C	1.42	1366M	13.20
8-32	5/16	7/64	1181C	1.70	1181M	16.00
10-32	⅜	⅛	1367C	1.82	1367M	17.20
¼-20	7/16	3/16	1368C	2.86	1368M	27.60
½-32	⅜	⅛	1186C	2.90	1186M	28.00

NYLON SCREWS
Natural Color, MIL-P-20693A Std. Pkg. 100

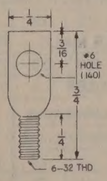


Size	A No.	B No.	C No.	
4-40 x ¼	2500	2520	2580	$4.50
4-40 x ⅜	2501	2521	2581	4.50
4-40 x ½	2502	2522	2582	4.50
6-32 x ¼	2503	2523	2583	4.50
6-32 x ⅜	2504	2524	2584	4.50
6-32 x ½	2505	2525	2585	4.50
6-32 x ⅝	2506	2526	2586	4.50
6-32 x ¾	2507	2527	2587	4.50
8-32 x ¼	2509	2529	2589	4.50
8-32 x ⅜	2510	2530	2590	4.50
8-32 x ½	2511	2531	2591	4.50
8-32 x ⅝	2512	2532	2592	4.50



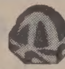
NYLON HEX NUTS
Natural Color, MIL-P-20693A. Std. Pkg. 100

No.	Size	NET per C
2554	4-40 x ¼"	$8.00
2555	6-32 x 5/16"	8.00
2556	8-32 x 11/32"	8.00
2557	10-32 x ⅜"	8.00



SPADE BOLTS
STEEL, CADMIUM PLATED

No.	NET Per C	No.	NET Per M
1500C	$9.10	1500M	90.00



CAP NUTS
BRASS NICKEL PLATED

Thrd Size	Hex	Ht.	No.	Net Per C	No.	Net Per M
6-32	5/16	9/32	1300C	$3.30	1300M	$32.00
8-32	5/16	9/32	1301C	$3.30	1301M	32.00
10-32	⅜	11/32	1302C	4.00	1302M	39.00
¼-20	7/16	⅜	1303C	5.00	1303M	49.00
¼-20	½	11/32	1304C	6.10	1304M	60.00
¼-28	7/16	⅜	1305C	5.00	1305M	49.00
5/16-18	9/16	7/16	1306C	8.30	1306M	82.00
⅜-16	⅝	½	1307C	12.00	1307M	110.00
⅜-24	⅝	½	1308C	12.00	1308M	110.00

OPEN END CAP NUTS

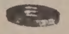
8-32	5/16	¼	1309C	2.60	1309M	25.00
¼-20	7/16	21/64	1310C	5.10	1310M	50.00
¼-20	½	⅜	1311C	6.10	1311M	60.00
5/16-18	9/16	⅜	1312C	7.40	1312M	73.00

KNURLED THUMB NUTS
BRASS NICKEL PLATED

Thrd Size	Dia.	Ht.	No.	Net Per C	No.	Net Per M
6-32	⅜	¼	1313C	$3.20	1313M	$31.00
8-32	7/16	5/16	1314C	4.50	1314M	44.00
10-24	½	21/64	1315C	5.30	1315M	52.00
10-32	½	21/64	1316C	5.30	1316M	52.00
¼-20	⅝	⅜	1317C	7.80	1317M	77.00

BATTERY NUTS
BRASS NICKEL PLATED

Thrd Size	Dia.	Ht.	No.	Net Per C	No.	Net Per M
6-32	11/32	13/64	1248C	$3.00	1248M	$29.00
8-32	11/32	13/64	1249C	3.00	1249M	29.00



ROUND LOCK NUTS
BRASS NICKEL PLATED

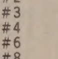
Thrd Size	Dia.	Thk-ness	No.	Net Per C	No.	Net Per M
⅛P	9/16	3/32	1240C	$2.80	1240M	$27.00
⅛P	¾	3/32	1241C	5.60	1241M	55.00

HEX LOCK NUT

1/8P	½	⅛	1242C	2.80	1242M	27.00

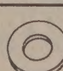
INTERNAL TOOTH LOCKWASHERS
STEEL – CADMIUM PLATED

I.D. (Clear)	O.D.	Thk-ness	No.	Net Per C	No.	Net Per M
#2	3/16	1/32	1118C	$ .91	1118M	$ 8.10
#3	7/32	1/32	1119C	.71	1119M	7.00
#4	¼	1/32	1127C	.85	1127M	7.50
#6	9/32	1/32	1128C	.83	1128M	7.30
#8	11/32	3/64	1129C	.83	1129M	7.30
#10	⅜	3/64	1130C	.85	1130M	7.50
¼"	15/32	1/16	1132C	1.38	1132M	12.80
⅜"	11/16	1/16	1131C	1.85	1131M	17.50
⅜"	½	3/64	1145C	1.98	1145M	18.80
15/32	19/32	1/32	1146C	2.10	1146M	20.00



EXTERNAL TOOTH LOCKWASHERS
STEEL – CADMIUM PLATED

#4	¼	1/32	1139C	$ .85	1139M	$ 7.50
#6	5/16	1/32	1140C	.83	1140M	7.30
#8	⅜	1/32	1141C	.83	1141M	7.30
#10	13/32	3/64	1142C	.85	1142M	7.50
¼"	½	1/16	1144C	1.38	1144M	12.80
⅜"	11/16	5/64	1143C	1.85	1143M	17.50



FLAT WASHERS
STEEL, NICKEL PLATED

I.D. (Clear)	O.D.	Thk-ness	No.	Net Per C	No.	Net Per M
#2	¼	1/32	1138C	$.71	1138M	$7.00
#4	5/16	1/32	1149C	.71	1149M	7.00
#6	⅜	1/32	1150C	.71	1150M	7.00
#8	⅜	1/32	1151C	.71	1151M	7.00
#10	⅜	1/32	1152C	.71	1152M	7.00
¼"	9/16	3/64	1147C	.71	1147M	7.00
⅜"	⅝	1/32	1148C	.71	1148M	7.00

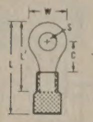
3M COMPANY

SOLDERLESS TERMINALS

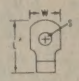
MANUFACTURED BY
3M COMPANY AND
DISTRIBUTED BY
HERMAN H. SMITH

SOLDERLESS TERMINALS

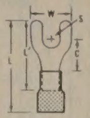
COLOR CODE: CLEAR-YELLOW: 26-24 AWG; RED: 22-18 AWG; BLUE: 16-14 AWG; YELLOW: 12-10 AWG;



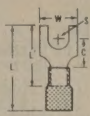
RING



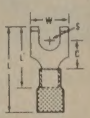
FLAG



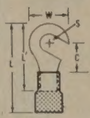
SPADE



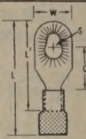
BLOCK SPADE



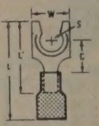
BLOCK SPADE FLANGED



HOOK



MULTI STUD



SNAP SPADE

26-24 WIRE RANGE

MILITARY—26-24 BARREL I.D. .035
COMMERICAL—26-24 THICKNESS .020

RING

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
STUD	WIDTH	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
1-2	.14	.11	.32	5100	2.30			.46			5101	9.40
3-4	.20	.21	.46	4968	2.30			.60			4972	9.40
5-6	.20	.21	.46	4969	2.30			.60			4973	9.40
8	.25	.27	.54	4970	2.30			.68			4974	9.40
10	.25	.27	.54	4971	2.30			.68			4975	9.40

SPADE

3-4	.20	.21	.46	4976	2.30			.60			4978	9.40
5-6	.25	.27	.54	4977	2.30			.68			4979	9.40

22-18 WIRE RANGE

MILITARY 22-18 BARREL I.D. .075
COMMERCIAL 22-16 THICKNESS .030

RING

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
STUD	WIDTH	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
1-2	.25	.23	.60	5102	2.30	5107	4.00	.80	5112	4.90	5117	8.10
3-4	.25	.23	.60	5103	2.30	5108	4.00	.80	5113	4.90	5118	8.10
5-6	.25	.23	.60	4801	2.30	4804	4.00	.80	4809	4.90	4812	8.10
8	.33	.29	.70	4802	2.30	4805	4.00	.90	4810	4.90	4813	8.10
10	.33	.29	.70	4803	2.30	4806	4.00	.90	4811	4.90	4814	8.10
1/4	.47	.40	.89	5104	3.10	5109	4.80	1.09	5114	5.80	5119	10.00
5/16	.47	.40	.89	5105	3.40	5110	5.10	1.09	5115	7.00	5120	10.70
3/8	.57	.40	.94	5106	3.40	5111	5.10	1.14	5116	7.00	5121	10.70

FLAG

4-6	.38	.34	.66	5122	3.50							
8	.38	.34	.66	5123	3.50							
10	.38	.34	.66	4815	3.50							

SPADE

4-6	.34	.29	.70	4816	2.30	4819	4.00	.90	4822	4.90	4825	8.10
8	.34	.29	.70	4817	2.30	4820	4.00	.90	4823	4.90	4826	8.10
10	.34	.29	.70	4818	2.30	4821	4.00	.90	4824	4.90	4827	8.10

BLOCK SPADE

4-6	.30	.25	.65	4829	2.30	4832	4.00	.85	4835	4.90	4838	8.10
8	.30	.25	.65	4830	2.30	4833	4.00	.85	4836	4.90	4839	8.10
10	.30	.25	.65	4831	2.30	4834	4.00	.85	4837	4.90	4840	8.10

BLOCK SPADE FLANGED

4-6	.30	.25	.56	4841	2.30	4844	4.00	.78	4847	4.90	4850	8.10
8	.30	.25	.56	4842	2.30	4845	4.00	.78	4848	4.90	4851	8.10
10	.30	.25	.56	4843	2.30	4846	4.00	.78	4849	4.90	4852	8.10

HOOK

4-6	.33	.29	.70	4853	2.30	4856	4.00	.90	4859	4.90	4862	8.10
8	.33	.29	.70	4854	2.30	4857	4.00	.90	4860	4.90	4863	8.10
10	.33	.29	.70	4855	2.30	4858	4.00	.90	4861	4.90	4864	8.10

MULTI-STUD RING

2-4-6	.28	.29	.74	5200	2.50			.94	5202	5.40		
6-8-10	.35	.30	.82	5201	3.40			1.02	5203	6.30		

SNAP SPADE

4	.25	.25	.68	5204	2.50			.88	5208	5.40		
6	.25	.25	.68	5205	2.50			.88	5209	5.40		
8	.30	.25	.68	5206	2.50			.88	5210	5.40		
10	.32	.25	.68	5207	2.50			.88	5211	5.40		

16-14 WIRE RANGE

BUR. OF SHIPS 2½-4 BARREL I.D. .095
THICKNESS. .030

RING

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
STUD	WIDTH	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
1-2	.25	.23	.60	5125	2.30	5129	4.00	.80	5133	5.00	5137	7.00
3-4	.25	.23	.60	5126	2.30	5130	4.00	.80	5134	5.00	5138	7.00
5-6	.25	.23	.60	4865	2.30	4869	4.00	.80	4873	5.00	4877	7.00
8	.33	.29	.60	4866	2.30	4870	4.00	.90	4874	5.00	4878	7.00
10	.33	.29	.70	4867	2.30	4871	4.00	.90	4875	5.00	4879	7.00
1/4	.47	.40	.89	4868	3.10	4872	4.80	1.09	4876	5.80	4880	10.00
5/16	.47	.40	.89	5127	3.40	5131	5.10	1.09	5135	7.00	5139	10.70
3/8	.57	.40	.94	5128	3.40	5132	5.10	1.14	5136	7.00	5140	10.70

FLAG

4-6	.38	.34	.68	5141	3.50							
8	.38	.34	.68	5142	3.50							
10	.38	.34	.68	4881	3.50							

SPADE

4-6	.34	.29	.70	4882	2.30	4885	4.00	.90	4888	4.90	4891	8.10
8	.34	.29	.70	4883	2.30	4886	4.00	.90	4889	4.90	4892	8.10
10	.34	.29	.70	4884	2.30	4887	4.00	.90	4890	4.90	4893	8.10

BLOCK SPADE

4-6	.30	.25	.65	4894	2.30	4897	4.00	.85	4901	4.90	4904	8.10
8	.30	.25	.65	4895	2.30	4898	4.00	.85	4902	4.90	4905	8.10
10	.30	.25	.65	4896	2.30	4899	4.00	.85	4903	4.90	4906	8.10

BLOCK SPADE FLANGED

4-6	.30	.25	.65	4907	2.30	4910	4.00	.85	4913	4.90	4916	8.10
8	.30	.25	.65	4908	2.30	4911	4.00	.85	4914	4.90	4917	8.10
10	.30	.25	.65	4909	2.30	4912	4.00	.85	4915	4.90	4918	8.10

HOOK

4-6	.33	.29	.70	4919	2.30	4922	4.00	.90	4925	4.90	4928	8.10
8	.33	.29	.70	4920	2.30	4923	4.00	.90	4926	4.90	4929	8.10
10	.33	.29	.70	4921	2.30	4924	4.00	.90	4927	4.90	4930	8.10

MULTI-STUD RING

2-4-6	.25	.29	.74	5212	2.50			.94	5214	5.40		
6-8-10	.35	.30	.82	5213	3.50			1.02	5215	6.30		

SNAP SPADE

4	.25	.25	.68	5216	2.50			.88	5220	5.40		
6	.25	.25	.68	5217	2.50			.88	5221	5.40		
8	.30	.25	.68	5218	2.50			.88	5222	5.40		
10	.32	.25	.68	5219	2.50			.88	5223	5.40		

QUICK SLIDE ACCESSORIES

MULTI-STACK DISCONNECTS

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
WIRE SIZE	TAB WIDTH	TAB THICK		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
22-18	.250	.030	65	5077	6.50			.85	5079	8.70		
16-14	.250	.030	65	5078	6.50			.85	5080	8.70		

MULTI-STACK DISCONNECTS — OPEN BARREL

20-14	.250	.030	79	5082	6.50							

DOUBLE MALE — FEMALE ADAPTORS

	.250	.030	75	5081	6.90							

MALE TABS

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
STUD	WIDTH	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
6	.250	.26	85	5083	2.80							
8	.250	.26	85	5084	2.80							

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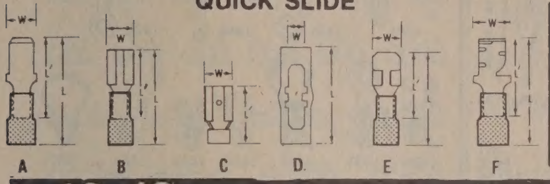
SOLDERLESS TERMINALS

3M COMPANY

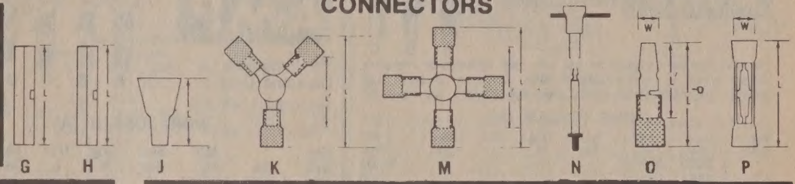
SOLDERLESS TERMINALS

COLOR CODE CLEAR-YELLOW: 26-24 AWG; RED: 22-18 AWG; BLUE: 16-14 AWG; YELLOW: 12-10 AWG

QUICK SLIDE



CONNECTORS



12-10 WIRE RANGE

BUR. OF SHIPS 6-9

BARREL I.D. .138
THICKNESS .040

RING

(SEE ILLUSTRATION ON PREVIOUS PAGE)

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
STUD	WIDTH	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
3-4	.28	.29	.69	5144	3.20	5150	6.30	.99	5156	6.00	5162	10.00
5-6	.28	.29	.59	5145	3.20	5151	6.30	.99	5157	6.00	5163	10.00
8	.38	.29	.73	5146	3.20	5152	6.30	1.03	5158	6.00	5164	10.00
10	.38	.29	.73	4931	3.20	4934	6.30	1.03	4937	6.00	4940	10.00
1/4	.61	.44	.99	4932	3.80	4935	7.00	1.29	4938	7.10	4941	11.00
5/16	.61	.44	.99	4933	3.80	4936	7.00	1.29	4939	7.10	4942	11.00
3/8	.61	.44	.99	5148	3.80	5154	7.00	1.29	5160	7.10	5166	11.00
1/2	.75	.59	1.22	5149	8.50	5155	11.60	1.52	5161	10.40	5167	13.80

FLAG

(SEE ILLUSTRATION ON PREVIOUS PAGE)

4-6	.38	.28	.68	5168	4.00							
8	.38	.28	.68	5169	4.00							
10	.38	.28	.68	4943	4.00							

SPADE

(SEE ILLUSTRATION ON PREVIOUS PAGE)

4-6	.38	.29	.73	5171	3.20	5172	6.30	1.03	5173	6.00	5174	10.00
8	.38	.29	.73	4944	3.20	4946	6.30	1.03	4948	6.00	4950	10.00
10	.38	.29	.73	4945	3.20	4947	6.30	1.03	4949	6.00	4951	10.00

BLOCK SPADE

(SEE ILLUSTRATION ON PREVIOUS PAGE)

4-6	.32	.29	.73	5175	3.20	5176	6.30	1.03	5177	6.00	5178	10.00
8	.32	.29	.73	4952	3.20	4954	6.30	1.03	4956	6.00	4958	10.00
10	.32	.29	.73	4953	3.20	4955	6.30	1.03	4957	6.00	4959	10.00

HOOK

(SEE ILLUSTRATION ON PREVIOUS PAGE)

4-6	.38	.29	.73	5179	3.20	5180	6.30	1.03	5181	6.00	5182	10.00
8	.38	.29	.73	4960	3.20	4962	6.30	1.03	4964	6.00	4966	10.00
10	.38	.29	.73	4961	3.20	4963	6.30	1.03	4965	6.00	4967	10.00

MULTI-STUD RING

(SEE ILLUSTRATION ON PREVIOUS PAGE)

6-8-10	.39	.34	.91	5224	4.50			1.21	5225	7.70		

SNAP SPADE

(SEE ILLUSTRATION ON PREVIOUS PAGE)

4-6	.28	.28	.73	5226	3.50			1.03	5230	7.70		
8	.32	.28	.73	5227	3.50			1.03	5231	7.70		
10	.32	.28	.73	5228	3.50			1.03	5232	7.70		
1/4	.32	.44	.94	5229	6.10			1.24	5233	8.90		

CONNECTORS

BUTT

(FIGURE G)

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
WIRE SIZE	MAT THK.	CLEAR		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
26-24	.020		.38	4986	2.40			.88			4990	12.90
22-18	.030		.56	4987	2.40			1.00	4991	5.20		
16-14	.030		.56	4988	2.40			1.00	4992	5.20		
12-10	.040		.56	4989	3.80			1.04	4993	6.50		

PARALLEL

(FIGURE H)

22-18	.030		.32	4994	2.00			.67	4997	4.40		
16-14	.030		.32	4995	2.00			.67	4998	4.40		
12-10	.040		.32	4996	2.80			.67	4999	5.40		

BUTT-CLOSED END

(FIGURE J)

WIRE												
22-14								.61			5005	4.30
16-10								.74			5006	5.40

3 WAY CONNECTOR

(FIGURE K)

22-18			.89	5188	7.80			1.07	5191	15.90		
16-14			.89	5189	7.80			1.07	5192	15.90		
12-10			.89	5190	10.70			1.07	5193	17.60		

4 WAY CONNECTOR

(FIGURE M)

22-18			1.08	5194	10.20			1.32	5197	21.20		
16-14			1.08	5195	10.20			1.32	5198	21.20		
12-10			1.08	5196	14.70			1.32	5199	25.60		

"T" TAP WITH MATING PLUG

(FIGURE N)

									5183	16.40		

SNAP PLUGS

(FIGURE O)

WIRE SIZE	SNAP AREA	BARREL LENGTH										
16-14	.157	.18	.59	5020	2.30			.85	5022	5.00		
16-14	.176	.18	.59	5021	2.30			.85	5023	5.00		

SNAP PLUG RECEPTACLE

(FIGURE P)

	.157							1.34	5024	8.00		

QUICK SLIDES

MALE

(FIGURE A)

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
WIRE SIZE	TAB WIDTH	TAB THICK.		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
18-14	.187	.016	.50	5011	2.40			.79	5013	5.10		
18-14	.250	.030	.73	5012	2.40			.93	5014	5.10		

FEMALE

(FIGURE B)

18-14	.187	.016	.47	5007	2.60			.77	5009	5.20		
18-14	.250	.030	.64	5008	2.60			.86	5010	5.20		

FLAG FEMALE

(FIGURE C)

22-18	.187	.030	46	5184	3.10							
22-18	.250	.030	.50	5185	3.10							
18-14	.187	.030	.49	5186	3.10							
18-14	.250	.030	.51	5187	3.10							

RECEPTACLE

(FIGURE D)

BASIC DIMENSIONS			L'	BUTTED		BRAZED		L	VINYL INSUL.		NYLON INSUL.	
WIRE SIZE	TAB WIDTH	TAB THICK.		NO.	NET/C	NO.	NET/C		NO.	NET/C	NO.	NET/C
	.250	.030						2.12	5019	10.60		

SELF MATING

(FIGURE E)

18-14	.187		.47	5015	2.60			.77	5017	5.20		
18-14	.250		.64	5016	2.60			.86	5018	5.20		

CROSS LOCK

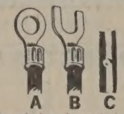
(FIGURE F)

22-18	.25	.030	75	5001	4.40			.95	5003	6.70		
16-14	.25	.030	75	5002	4.40			.95	5004	6.70		

SUGG. RESALE DISCOUNT SCHEDULE

1,000—4,999	Net
5,000—14,999	Net Less 10%
15,000—24,999	Net Less 15%
25,000—and up	Net Less 20%

AMP "SOLISTRAND" Non-Insulated



The only terminal designed for use with solid, stranded or irregularly shaped wires, or combinations of wires. Corrosion resistant, high strength, electro-tinned; versatile—widely adjustable. **Std. Pkg. 100**

RING TONGUE (A)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22 to 16	2850	32989	4	7/32	17/32	5/32	$6.00
	2851	34194	6	7/32	17/32	5/32	6.00
	2852	32990	8	9/32	11/16	15/64	7.00
	2853	33214	10	5/16	11/16	9/32	7.00
	2854	33215	1/4	15/32	15/16	27/64	10.00
	2855	33452	5/16	15/32	15/16	27/64	10.00
	2856	33453	3/8	17/32	1 1/16	17/32	10.00
16 to 14	2857	32991	4	1/4	9/16	11/64	$7.00
	2858	34197	6	1/4	9/16	11/64	7.00
	2859	32992	8	5/16	11/32	1/4	7.00
	2860	320093	10	5/16	11/32	1/4	7.00
	2861	33218	1/4	15/32	15/16	7/16	10.00
	2862	33454	5/16	15/32	15/16	7/16	10.00
	2863	33455	3/8	17/32	1 1/8	17/32	10.00

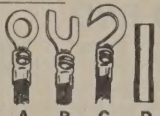
SPADE TONGUE (B)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22 to 16	2864	32897	6	11/32	5/8	13/64	$6.00
	2865	32898	8	11/32	5/8	13/64	6.00
	2866	32899	10	11/32	5/8	13/64	6.00
16 to 14	2867	32903	6	11/32	5/8	13/64	$6.00
	2868	32904	8	11/32	5/8	13/64	6.00
	2869	32905	10	11/32	5/8	13/64	6.00

BUTT CONNECTOR (C)

No.	AMP No.	Wire Size	I.D.		NET Per C
2870	31818	22-16	.140 I.D.	37/64	$8.00
2871	31819	16-14	.170 I.D.	37/64	8.00

AMP "PLASTI-GRIP" (P.G.)



Insulated strong, special plastic has high dielectric strength. Applied with single operation of press dies or hand tools. High tensile strength. High conductivity copper, electro-tinned. Color coded for wire size. **Std. Pkg. 100**

RING TONGUE (A)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22 to 16	2750	34141	4	7/32	21/32	5/32	$10.50
	2751	34142	6	7/32	21/32	5/32	10.50
	2752	34145	8	9/32	25/32	1/4	10.50
	2753	34146	10	9/32	25/32	1/4	10.50
	2754	34150	1/4	15/32	1 1/16	27/64	12.00
	2755	34151	5/16	15/32	1 1/16	27/64	12.00
	2756	34152	3/8	17/32	1 13/64	33/64	12.00
16 to 14	2757	34157	4	1/4	11/16	5/32	10.50
	2758	34158	6	1/4	11/16	5/32	10.50
	2759	34160	8	11/32	27/32	17/64	10.50
	2760	34161	10	11/32	27/32	17/64	10.50
	2761	34162	1/4	15/32	1 1/16	27/64	12.00
	2762	34163	5/16	15/32	1 1/16	27/64	12.00
	2763	34164	3/8	17/32	1 13/64	33/64	12.00

SPADE TONGUE (B)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22 to 16	2764	34153	6	11/32	49/64	13/64	$10.50
	2765	34155	8	3/8	57/64	19/64	10.50
	2766	34156	10	3/8	57/64	19/64	10.50
16 to 14	2767	34165	6	3/8	57/64	19/64	$10.50
	2768	34166	8	3/8	57/64	19/64	10.50
	2769	34167	14	3/8	57/64	19/64	10.50

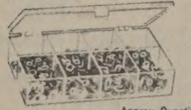
HOOK TONGUE (C)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
20-16	2770	34501	6	9/32	47/64	3/16	$10.50
	2771	321699	8	11/32	55/64	9/32	10.50
16-14	2772	320263	8	11/32	55/64	17/64	14.00

BUTT CONNECTOR (D)

No.	AMP No.	Wire Size				NET Per C
2773	34070	22-16	.140	I.D.	1	$12.00
2774	34071	16-14	.70	I.D.	1 1/64	12.00

SOLDERLESS TERMINAL ASSORTMENTS*



A basic assortment of the most commonly used Ring Tongue and Spade Terminals for wire sizes 22 thru 14. Packed in a re-usable clear plastic compartmented box. **Std. Pkg. 1**

No.	Approx. Quantity of Terminals	Style	NET Ea.
1526	200	"PLASTI-GRIP"	$25.00
1527	300	"PLASTI-GRIP"	35.00
1528	200	"SOLISTRAND"	16.00
1529	300	"SOLISTRAND"	22.00
1577	200	"P.I.D.G."	30.00
1578	300	"P.I.D.G."	45.00

*Refers to AMP Solderles Terminals this page.

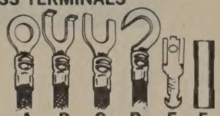
TERMINAL KITS**

Uninsulated		Vinyl Insulated		Nylon Insulated	
Contains 200 popular ass't'd types. 18 styles.	NET	Contains 180 popular types. 18 styles	NET	Contains 165 assorted types. 18 styles	NET
No. 4981 With Tool	$12.60	No. 4982 With Tool	$17.10	No. 4983 With Tool	$21.49
No. 4984 Less Tool	7.10	No. 4985 Less Tool	11.60	No. 5000 Less Tool	15.49

** Refers to Solderless Terminals on

SOLDERLESS TERMINALS

AMP Pre-insulated Diamond Grip



Color-coded for wire size. **Std. Pkg. 100**

RING TONGUE (A)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22 to 16	1550	320882	4	3/16	21/32	5/32	$13.00
	1551	31881	6	7/32	21/32	5/32	13.00
	1552	31886	8	9/32	25/32	1/4	13.00
	1553	31887	10	9/32	25/32	1/4	13.00
	1554	31894	1/4	15/32	1 1/16	27/64	15.00
14 to 16	1555	32441	4	1/4	11/16	11/64	13.00
	1556	32442	6	1/4	11/16	11/64	13.00
	1557	31902	8	11/32	27/32	9/32	13.00
	1558	322238	10	5/16		1/4	13.00
	1559	31906	1/4	15/32	1/16	7/16	15.00

FLANGED SPADE (B)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22-16	1560	32562	6	19/64	23/32	13/64	$13.00
	1561	32498	8	27/64	13/16	1/4	13.00
14-16	1562	320881	6	19/64	23/32	13/64	13.00
	1563	320862	8	19/64	23/32	13/64	16.00
	1564	320863	10	19/64	23/32	13/64	16.00

SPADE TONGUE (C)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22-16	1565	34541	6	1/4	51/64	19/64	$13.00
	1566	32053	8	3/8	57/64	19/64	15.00
	1567	32054	10	3/8	57/64	19/64	13.00
14-16	1568	35559	6	19/64	47/64	13/64	13.00
	1569	321233	8	19/64	47/64	13/64	13.00
	1570	32060	10	3/8	57/64	5/16	15.C0

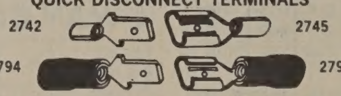
HOOK TONGUE (D)

Wire Size	No.	AMP No.	Stud Size	Tong. W.	O'all L.	Stud Clear.	NET Per C
22-16	1571	34313	6	9/32	47/64	13/64	$13.00
	1572	32456	8	11/32	55/64	9/32	13.00
14-16	1573	320381	6	11/32	27/32	9/32	13.00
	1574	320306	8	11/32	27/32	9/32	15.00
	1575	35481	10	11/32	27/32	9/32	13.00
18-14	1576	Terminal Strip Connectors (E)					$ 3.00

BUTT CONNECTOR (F)

Wire Size	No.	AMP No.	I.D.			NET Per C
22-16	1548	320559	.125 I.D.	—	—	$ 50.00
16-14	1549	320562	.150 I.D.	—	—	50.00

QUICK DISCONNECT TERMINALS



Terminals of pure electrolytic copper. Resists corrosion and insures shelf life. Beveled entry for easy wire threading and improved V-ridges for wire protection. Male tongue width .248/.251, female entry .225 Min. **Std. Pkg. 100**

Non-Insulated

Male	Female	Wire-Size	NET Per C
2742	2745	22-16	$2.10
2743	2746	16-14	2.10
2744	2747	12-10	2.10

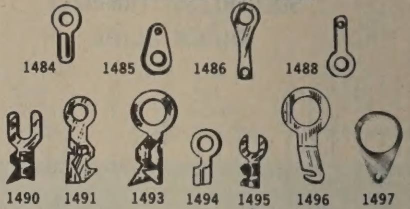
Insulated

Male	Female	Wire-Size	NET Per C
2794	2797	22-16	4.50
2795	2798	16-14	4.50
2796	2799	12-10	4.50

No. 2748 Kit, 50 each, 12 types in plastic box **Std. Pkg. 1** NET Ea. $19.80

JUST ADDED NEW "HOOKON JR." PROBE WITH TEST TERMINATIONS. SEE eem PAGE 42 OF THIS LISTING.

SOLDER LUGS—Hot Tinned



Std. Pkg. 1000

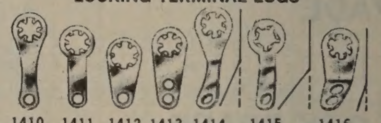
No.	Material	Length	Thick.	Hole	NET Per M
1484	Ph. Br.	5/8"	.020"	No. 6	$ 12.00
1485-4	Ph. Br.	17/32"	.012"	No. 4	12.00
1485-6	Ph. Br.	17/32"	.012"	No. 6	12.00
1485-8	Ph. Br.	17/32"	.012"	No. 8	12.00
1485-10	Ph. Br.	17/32"	.012"	No. 10	12.00
1486-4	Ph. Br.	13/16"	.012"	No. 4	12.00
1486-6	Ph. Br.	13/16"	.012"	No. 6	12.00
1486-8	Ph. Br.	13/16"	.012"	No. 8	12.00
1486-10	Ph. Br.	13/16"	.012"	No. 10	12.00
1488-4	Ph. Br.	9/16"	.012"	No. 4	12.00
1488-6	Ph. Br.	9/16"	.012"	No. 6	12.00
1488-8	Ph. Br.	9/16"	.012"	No. 8	12.00
1490	Brass	3/4"	.020"	No. 10	15.00
1491	Copper	15/16"	.020"	No. 10	25.00
1493	Brass	1-1/8"	.027"	1/4"	30.00
1494-6	Brass	5/8"	.020"	No. 6	13.00
1494-8	Brass	5/8"	.020"	No. 8	13.00
1495	Brass	5/8"	.020"	No. 8	15.00
1496	Brass	3/4"	.020"	1/4"	15.00
1497	Brass	7/8"	.017"	3/8"	18.00

SOLDER LUG ASSORTMENT

A complete assortment of the most widely used Solder Lug styles, with hole sizes from #4 thru #10. Packed in a re-usuable clear plastic compartmented box. **Std. Pkg. 1**

No.	Approx Quantity of Terminals	NET Each
1546	1400	$ 20.00

LOCKING TERMINAL LUGS

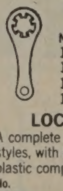


BRASS HOT TINNED

Std. Pkg. 1000

No.	Length	Thick	Hole	NET Per M
1410-4	7/8"	.018"	No. 4	$15.00
1410-6	7/8"	.018"	No. 6	15.00
1410-8	7/8"	.018"	No. 8	15.00
1410-10	57/64"	.018"	No. 10	15.00
1410-14	13/16"	.018"	1/4"	15.00
1411-4	47/64"	.020"	No. 4	15.00
1411-6	47/64"	.020"	No. 6	15.00
1411-8	47/64"	.020"	No. 8	15.00
1412-4	5/8"	.018"	No. 4	15.00
1412-6	5/8"	.018"	No. 6	15.00
1412-8	5/8"	.018"	No. 8	15.00
1413-4	23/32"	.018"	No. 4	15.00
1413-6	23/32"	.018"	No. 6	15.00
1413-8	23/32"	.018"	No. 8	15.00
1414-4	13/16"	.018"	No. 4	15.00
1414-6	13/16"	.018"	No. 6	15.00
1414-8	13/16"	.018"	No. 8	15.00
1414-10	53/64"	.018"	No. 10	15.00
1415-4	41/64"	.018"	No. 4	15.00
1415-6	41/64"	.018"	No. 6	15.00
1415-8	41/64"	.018"	No. 8	15.00
1416-4	11/16"	.020"	No. 4	15.00
1416-6	11/16"	.020"	No. 6	15.00
1416-8	11/16"	.020"	No. 8	15.00

LOCKING TYPE TERMINAL LUGS



BRASS HOT TINNED

Std. Pkg. 1000

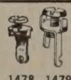
No.	Length	Thick	Hole	NET Per M
1465	47/64"	.020	#4	$15.00
1466	47/64"	.020	#6	15.00
1467	7/8"	.020	#8	15.00
1468	13/16"	.020	1/4"	15.00

LOCKING TERMINAL LUG ASSORTMENT

A complete assortment of the most widely used Locking Terminal Lug styles, with hole sizes from #4 thru #10. Packed in a re-usuable clear plastic compartmented box. **Std. Pkg. 1**

No.	Approx. Quantity of Terminals	Net Ea.
1547	900	$20.00

TERMINAL LUGS & SCREWS



Recommended for heavy duty terminal strips. Lugs are tapped with screw inserted. Brass hot tinned.

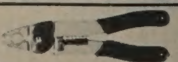
Std. Pkg. 100

No.	Screw	NET Per C
1478	6-32	$6.00
1479	8-32	10.00

TOOLS

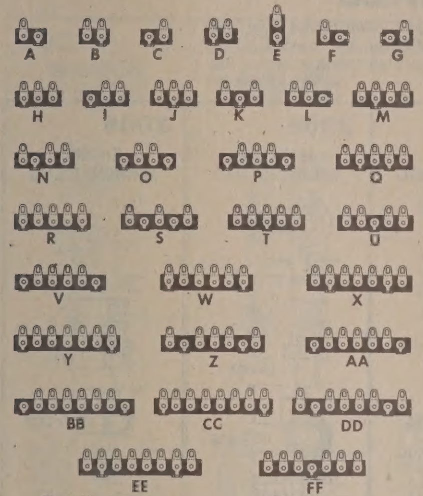
Std. Pkg. 1

Made of heavy gauge heat treated tool steel with insulated handles. Adjustable tension screw, cuts and crimps wire and all types of terminals 10-22 AWG, also 7 MM.



No.		NET Ea.
4980	Less Bolt Cutter	$5.50
5050	With Bolt Cutter	7.00

TIE DOWN TERMINAL STRIPS



Standard Type

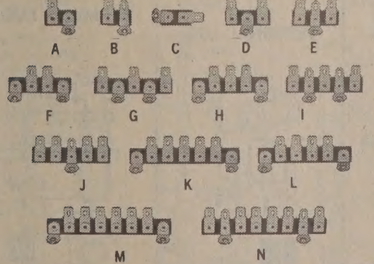
LUG: STEEL cadmium plated, spaced 3/8"
STRIP: XP Phenolic 3/8" wide x .062 thick.
MOUNT.: .140 I.D. for No. 6 screw.
Std. Pkg. 100

Miniature Type

LUG: STEEL cadmium plated, spaced 1/4" centers.
STRIP: XP Phenolic 5/16" wide x .062 thick.
MOUNT.: .096 I.D. for No. 3 screw or 3/32 rivet. **Std. Pkg. 100**

STANDARD TYPE			MINIATURE TYPE	
No.	NET Per C	Illustration	No.	NET Per C
861	$4.10	A	1061	$6.10
862	4.10	B	1062	6.10
813	4.10	C	1003	6.10
820	4.10	D	1004	6.10
849	4.10	E	1039	6.10
828	4.10	F	1005	6.10
821	4.10	G	1009	6.10
830	5.20	H	1055	8.10
829	5.20	I	1043	8.10
864	5.20	J	1064	8.10
863	5.20	K	1063	8.10
846	5.20	L	1059	8.10
850	5.80	M	1074	8.60
857	5.80	N	1072	9.20
867	7.00	O	1067	9.80
853	8.60	P	1073	10.40
868	8.60	Q	1068	10.90
847	8.60	R	1071	10.90
865	8.60	S	1065	10.40
866	7.00	T	1066	10.90
855	6.90	U	1084	10.40
869	9.70	V	1069	12.70
854	9.70	W	1076	12.70
879	10.50	X	1158	14.40
859	10.50	Y	1156	14.40
871	10.50	Z	1157	14.40
860	10.50	AA	1060	14.40
848	11.00	BB	1078	16.10
900	11.00	CC	1075	16.10
858	11.00	DD	1096	16.10
870	11.00	EE	1070	16.10
901	11.00	FF		

TERMINAL STRIPS Universal Lugs

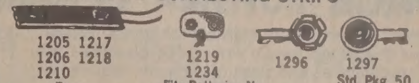


LUG: STEEL cadmium plated, spaced 3/8"
STRIP: XP Phenolic 3/8" wide x .062 thick.
MOUNT.: .140 I.D. for No. 6 screw.
DESCR.: QUICK CONNECT-DISCONNECT; TIE POINT SOLDER: WRAP and SOLDER.
Std. Pkg. 100

No.	Illust.	NET Per C	No.	Illust.	NET Per C
1085	A	$5.60	1092	H	$13.10
1086	B	6.30	1093	I	14.40
1087	C	5.60	1094	J	13.20
1088	D	8.10	1095	K	18.80
1089	E	8.80	1097	L	16.30
1090	F	10.60	1098	M	21.30
1091	G	13.10	1099	N	21.90

1576	Terminal Strip Connectors	3.00

BATTERY CONNECTING STRIPS



Std. Pkg. 50

No.	Term. Spacing	Fits Batteries No. Eveready	Burgess	RCA	Net per C
1205	1½"	455, 467, 475, 468	XX30, XX45, K45, V451	VS055, VS016, VS082, VS125	$35.00
1206	2½"	490	N60	VS090	
1210	15/16"	437, 495, 477, 2356, 479	XX50, N60X, P45, C6X, P60	VS217, VS316 VS218, VS219	35.00 35.00
1217	1¼"	707	D5	VS315	$35.00
1218	1⅜"	274, 276	4D4, D6	VS306	35.00
1219	13/16"	243	2Z3	VS324	35.00
1234	½"	E126, 415, 216, 416, 246	H126, U30, 2U6, UX45, 2N6	VS328, VS086, VS323, VS318, VS305	27.00

CONNECTOR SNAPS

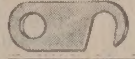
Std. Pkg. 100

1296	Female	226, 228	P6, PM8	VS300A, VS329	15.00
1297	Male	2709		VS326	15.00

SCREW TYPE TERMINAL BOARD

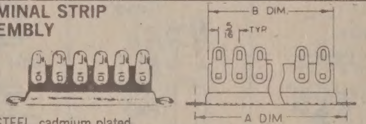
LUGS: BRASS, hot tinned, spaced 7/16" centers.
SCREW: Steel cadmium plated 6/32 x 3/8.
STRIP: XP Phenolic 5/8" wide x .062 thick.

No.	Terminal	Mounting Center	Std. Pkg.	NET Per C
914	1	7/8"	50	$12.00
872	2	1 7/16"	50	13.00
873	3	1 3/4"	50	19.00
874	4	2 3/16"	50	23.00
875	5	2 5/8"	25	28.00
876	6	3 1/16"	25	31.00
877	7	3 1/2"	25	38.00
928	8	3 15/16"	25	42.00
929	9	4 3/8"	25	46.00
930	10	4 13/16"	25	52.00



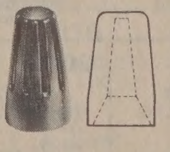
878	Shorting Link	2.50

TERMINAL STRIP ASSEMBLY



LUG: STEEL, cadmium plated.
BASE: STEEL, cadmium plated. Mounting holes for No. 6 screw.
STRIP: XP Phenolic **Std. Pkg. 100**

No.	Terminals	Dimensions "A"	"B"	NET Per C
3002	2	1.000	5/8"	$10.50
3003	3	1.312	15/16"	13.00
3004	4	1.625	1 1/4"	15.50
3005	5	1.937	9/16"	17.00
3006	6	2.250	1 7/8"	18.50
3007	7	2.562	2 3/16"	19.50
3008	8	2.875	2 1/2"	22.00
3009	9	3.187	2 13/16"	24.00
3010	10	3.500	3 1/8"	26.50
3011	11	3.812	3 7/16"	27.50
3012	12	4.125	3 3/4"	30.00
3013	13	4.937	4 3/32"	32.00



SOLDERLESS WIRE CONNECTORS

Precision engineered for tight locking action. Molded from Phenolic or Urea. Connectors far exceed UL dielectric and temperature requirements. Supplied with hardened steel spring OR molded in threads.

Std. Pkg. 100

		WIRE COMBINATIONS		SUGGESTED RESALE	
PART NO.	VOLTAGE RATING	MIN.	MAX.	100-999 PER C	1000 & UP PER M
		Black Phenolic (With Spring Grip)			
1841	300V	2 #20	2 #18	2.50	$22.50
1842	600V	2 #18	2 #18 + 1 #12	3.10	28.90
1843	600V	2 #18	2 #18 + 1 #16	2.90	26.10
1844	600V	2 #14	3 #18 + 1 #14	3.50	31.50
1845	600V	2 #14	2 #16 + 2 #14	3.50	31.50
1846	600V	2 #14	2 #14 + 1 #10	4.60	41.40
1847	600V	2 #12	3 #16 + 3 #12	5.80	52.20
1848	600V	2 #18	3 #18 + 3 #12	4.60	41.40
		White Urea (Without Spring Grip)			
1850	300V	2 #22	2 #18	1.40	12.60
1851	300V	2 #20	2 #18 + 1 #16	1.40	12.60
1852	300V	2 #18	1 #18 + 2 #16	1.60	14.40
1853	600V	2 #18	2 #16 + 1 #18	2.10	18.90
1854	600V	3 #18	2 #18 + 2 #14	3.20	28.80

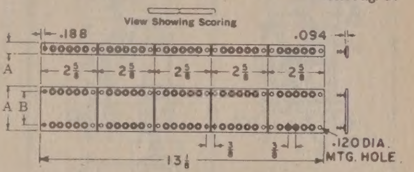
USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements!

SCORED TERMINAL BOARDS

featuring
SNAP-APART SEPARATION

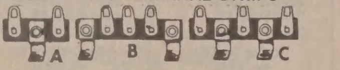
SMITH Scored Boards are fabricated in PBE material per MIL-P-3115C, Temp. 250°F. Max., Type XXXP. Terminals are securely staked and are made of Brass per QQ-626 comp. 22, half-hard with hot-tinned dip solder finish, per MIL-F-14072, Type 221. Smith type 2008.

Std. Pkg. 10



No.	A	B	Terminals	NET Price Each
2810	1/2"	Single Row	25	$2.25
2811	1 1/2"	1"	50	4.70
2812	2"	1 1/2	50	4.90
2813	2 1/2"	2"	50	5.10
2814	3"	2 1/2	50	5.25

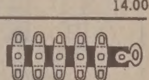
BRACKET TYPE TERMINAL STRIPS



LUGS: STEEL cadmium plated, spaced 3/8" centers.
STRIP: XP Phenolic 3/8" wide x .062 thick.
MOUNT.: .140 I.D. for No. 6 screw. **Std. Pkg. 100**

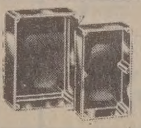
No.	Fig.	Lugs	NET Per C
1077	A	2	$5.60
1079	C	3	8.80
1080	B	3	9.40
1081	B	4	10.00
1082	B	5	12.00
1083	B	6	14.00

"T" TYPE TERMINAL STRIPS



LUGS: STEEL cadmium plated, spaced 3/8" centers.
BRACKETS: Brass, cadmium plated.
STRIP: X Phenolic 3/8" wide x .062 thick.
MOUNT.: .140 I.D. for No. 6 screw. **Std. Pkg. 100**

No.	Lugs	NET Per C
815	1	$6.20
816	2	8.60
817	3	10.40
818	4	11.50
819	5	15.00



INSTRUMENT CASES AND COVERS

Ideal for small instruments and test equipment. The right size and the right mounting for your requirements. Molded of high quality, glass finish, thermosetting plastic. Threaded brass insert for cover mounting. BLACK ONLY.

Std. Pkg. 5

No.	H	W	D	Insert	NET Per C
2377	4"	2 7/8"	1 9/16"	4-40	$75.00
2291	5"	4 1/4"	1 3/4"	6-32	150.00
2255	6 1/4"	3 3/4	2"	6-32	140.00
2257	6 13/16"	5 9/32"	2 5/16	4-40	240.00
2289	8 1/2"	7 7/16"	3"	6-32	280.00

PHENOLIC COVERS

2378	For No. 2377	$25.00
2292	For No. 2291	40.00
2256	For No. 2255	90.00
2260	For No. 2257	160.00
2390	For No. 2289	250.00

PANEL PLATE

Brushed and lacquered Aluminum

2379	For No. 2255	$1.10

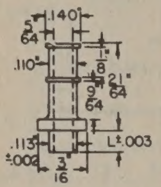
See eem page 40 for Complete Selection of Knobs.

SWAGE TURRET TERMINALS

Terminals shown below are "stock" items, available for speedy delivery. All brass, silver-plated, precision made. See next page for Suggested Resale Prices. For quantities over 15,000 request special prices. Inquiries are invited, for special types and sizes to particular requirements. L indicates shank length of lug. T indicates thickness of mounting boards.

Standard Package 100

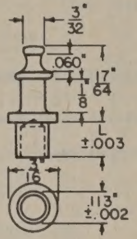
2000
HOLLOW LUG


.140"
5/64
1/8
.110"
21/64
9/64
.113
±.002
L±.003
3/16

No.	L	T
2000A	.075	1/32
2000B	.105	1/16
2000C	.135	3/32
2000D	.165	1/8
2000E	.195	5/32
2000F	.230	3/16

Staking Tool Kit
No. 3860

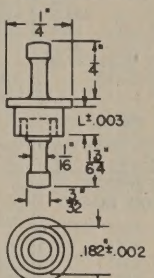
2001
SHORT TERMINAL LUG


3/32
.060"
17/64
1/8
L
±.003
3/16
.113"
±.002

No.	L	T
2001A	.075	1/32
2001B	.105	1/16
2001C	.135	3/32
2001D	.165	1/8

Staking Tool Kit
No. 3860

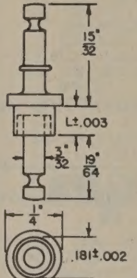
2002
DOUBLE END TERMINAL LUG


1/4
1/4
L±.003
1/16
13/64
3/32
.182"±.002

No.	L	T
2002A	.105	1/16
2002B	.135	3/32
2002C	.165	1/8
2002D	.195	5/32
2002E	.230	1/16

Staking Tool Kit
No. 3861

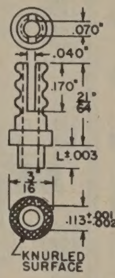
2003
DOUBLE END LUG, LONG


15/32
L±.003
3/32
19/64
1/4
.181±.002

No.	L	T
2003A	.105	1/16
2003B	.135	3/32
2003C	.165	1/8
2003D	.195	5/32
2003E	.230	3/16

Staking Tool Kit
No. 3862

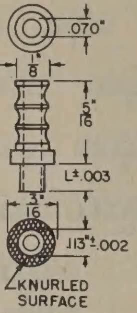
2004
SLOTTED TERMINAL LUG SHORT


.070"
.040"
.170"
21/64
L±.003
3/16
.113±.001 -.002
KNURLED SURFACE

No.	L	T
2004A	.075	1/32
2004B	.105	1/16
2004C	.135	3/32
2004D	.165	1/8

Staking Tool Kit
No. 3863

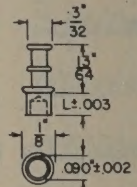
2005
HOLLOW KNURLED LUG


.070"
1/8
5/16
L±.003
3/16
.113"±.002
KNURLED SURFACE

No.	L	T
2005A	.105	1/16
2005B	.135	3/32
2005C	.165	1/8

Staking Tool Kit
No. 3860

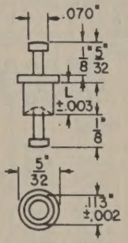
2006
SHORT TERMINAL LUG


3/32
13/64
L±.003
1/8
.090"±.002

No.	L	T
2006A	.075	1/32
2006B	.105	1/16
2006C	.135	3/32
2006D	.165	1/8

Staking Tool Kit
No. 3864

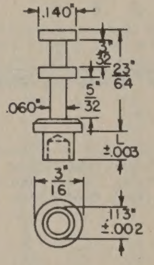
2007
SHORT DOUBLE END LUG


.070"
1/8
5/32
L
±.003
1/8
5/32
.113"
±.002

No.	L	T
2007A	.075	1/32
2007B	.105	1/16
2007C	.135	3/32
2007D	.165	1/8

Staking Tool Kit
No. 3865

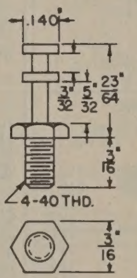
2008
TERMINAL LUG


.140"
3/32
23/64
.060"
5/32
L
±.003
3/16
.113"
±.002

No.	L	T
2008A	.075	1/32
2008B	.105	1/16
2008C	.135	3/32
2008D	.165	1/8
2008E	.195	5/32
2008F	.230	3/16
2008G	.293	1/4

Staking Tool Kit
No. 3860

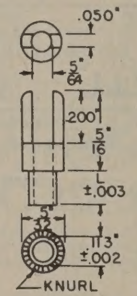
2009
TERMINAL LUG


.140
3/32
5/32
23/64
3/16
4-40 THD.
3/16

No. 2009

Staking Tool Kit
Not Required

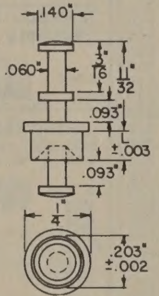
2010
SPLIT TERMINAL LUG


.050"
5/64
.200
5/16
L
±.003
5/32
.113"
±.002
KNURL

No.	L	T
2010A	.075	1/32
2010B	.105	1/16
2010C	.135	3/32
2010D	.165	1/8

Staking Tool Kit
No. 3866

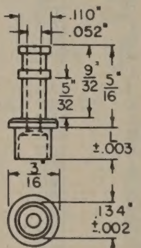
2011
DOUBLE END TERMINAL LUG


.140
.060"
3/16
11/32
.093
L
±.003
.093"
1/4
.203"
±.002

No.	L	T
2011A	.105	1/16
2011B	.135	3/32
2011C	.165	1/8
2011D	.195	5/32
2011E	.230	3/16

Staking Tool Kit
Not Available

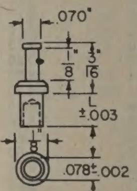
2012
TERMINAL LUG


.110"
.052"
9/32
5/32
5/16
L
±.003
3/16
.134"
±.002

No.	L	T
2012A	.105	1/16
2012B	.135	3/32
2012C	.165	1/8

Staking Tool Kit
No. 3860

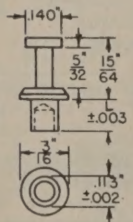
2013
TERMINAL LUG


.070"
1/8
3/16
L
±.003
1/8
.078±.002

No.	L	T
2013A	.075	1/32
2013B	.105	1/16
2013C	.135	3/32
2013D	.165	1/8

Staking Tool Kit
No. 3864

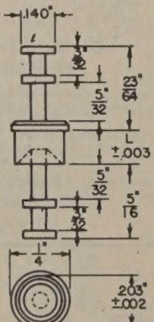
2014
TERMINAL LUG


.140"
5/32
15/64
±.003
3/16
.113"
±.002

No.	L	T
2014A	.105	1/16
2014B	.135	3/32
2014C	.165	1/8
2014D	.195	5/32
2014E	.230	3/16

Staking Tool Kit
No. 3860

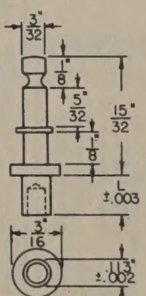
2015
TERMINAL LUG


.140"
3/32
5/32
23/64
L
±.003
5/32
5/16
3/32
1/4
.203"
±.002

No.	L	T
2015A	.135	3/32
2015B	.165	1/8
2015C	.195	5/32
2015D	.230	3/16

Staking Tool Kit
Not Available

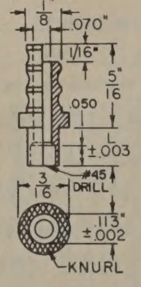
2016
TERMINAL LUG


3/32
1/8
5/32
15/32
1/8
L
±.003
3/16
.113"
±.002

No.	L	T
2016A	.105	1/16
2016B	.135	3/32
2016C	.165	1/8

Staking Tool Kit
No. 3860

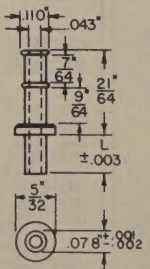
2017
HOLLOW KNURLED LUG


1/8
.070"
1/16"
5/16
.050
L
±.003
#45 DRILL
3/16
.113"
±.002
KNURL

No.	L	T
2017A	.105	1/16
2017B	.135	3/32
2017C	.165	1/8
2017D	.195	5/32

Staking Tool Kit
No. 3860

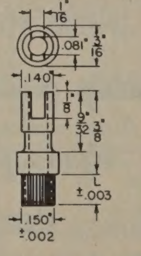
2018
HOLLOW TERMINAL LUG


.110"
.043"
7/64
21/64
9/64
L
±.003
5/32
.078"+.001 -.002

No.	L	T
2018A	.075	1/32
2018B	.105	1/16
2018C	.135	3/32
2018D	.165	1/8
2018E	.195	5/32
2018F	.230	3/16

Staking Tool Kit
No. 3863

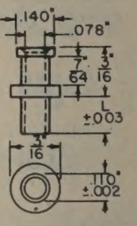
2019
SPLIT TERMINAL LUG


1/16
.081"
3/16
.140"
1/8
9/32
3/8
L
±.003
.150"
±.002

No.	L	T
2019A	.075	1/32
2019B	.105	1/16
2019C	.135	3/32
2019D	.165	1/8
2019E	.195	5/32
2019F	.230	3/16

Staking Tool Kit
No. 3860

2020
TERMINAL LUG

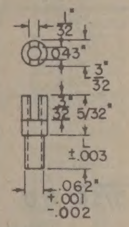

.140"
.078"
7/64
3/16
L
±.003
3/16
.110"
±.002

No.	L	T
2020A	.075	1/32
2020B	.105	1/16
2020C	.135	3/32
2020D	.165	1/8

Staking Tool Kit
No. 3860

SWAGE TURRET TERMINALS

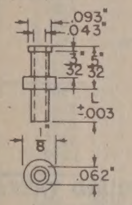
2021
MINIATURE SPADE LUG


1/32
.043"
3/32
5/32"
L
±.003
.062"
+.001
-.002

No.	L	T
2021A	.037	1/64
2021B	.053	1/32
2021C	.084	1/16
2021D	.115	3/32
2021E	.147	1/8

Staking Tool Kit
No. 3867

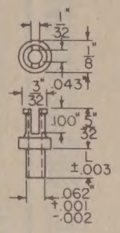
2022
MINIATURE HOLLOW LUG


.093"
.043"
3/32
L
±.003
1/8
.062"

No.	L	T
2022A	.037	1/64
2022B	.053	1/32
2022C	.084	1/16
2022D	.115	1/32
2022E	.147	1/8

Staking Tool Kit
No. 3864

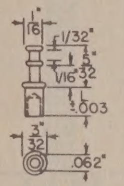
2023
MINIATURE HOLLOW SPLIT LUG


1/32
1/8
3/32
.043"
.100"
5/32
L
±.003
.062"
+.001
-.002

No.	L	T
2023A	.037	1/64
2023B	.053	1/32
2023C	.084	1/16
2023D	.115	3/32
2023E	.147	1/8

Staking Tool Kit
No. 3864

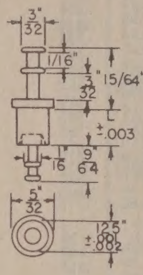
2024
MINIATURE DOUBLE TIE LUG


1/16
1/32"
5/32
1/16
L
±.003
3/32
.062"

No.	L	T
2024A	.037	1/64
2024B	.053	1/32
2024C	.084	1/16
2024D	.115	3/32
2024E	.147	1/8

Staking Tool Kit
No. 3868

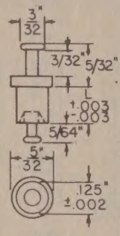
2025
MINIATURE THROUGH LUG


3/32
1/16"
3/32
15/64"
L
±.003
1/16
9/64
5/32
.125"
±.001
-.002

No.	L	T
2025A	.075	1/32
2025B	.105	1/16
2025C	.135	1/32
2025D	.165	1/8

Staking Tool Kit
No. 3869

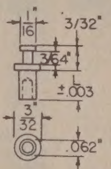
2026
MINIATURE THROUGH LUG


3/32
3/32
5/32"
L
+.003
-.003
5/64"
5/32
.125"
±.002

No.	L	T
2026A	.075	1/32
2026B	.105	1/16
2026C	.135	3/32
2026D	.165	1/8

Staking Tool Kit
No. 3869

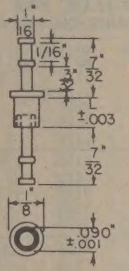
2027
MINIATURE LUG


1/16
3/32"
3/64"
L
±.003
3/32
.062"

No.	L	T
2027A	.037	1/64
2027B	.054	1/32
2027C	.084	1/16
2027D	.115	3/32
2027E	.147	1/8

Staking Tool Kit
No. 3868

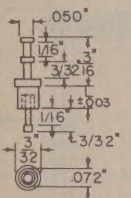
2028
FEED-THRU TERMINAL LUG


1/16
1/16"
7/32
3/32
L
±.003
7/32
1/8
.090"
±.001

No.	L	T
2028A	.054	1/32
2028B	.084	1/16
2028C	.115	3/32
2028D	.147	1/8

Staking Tool Kit
No. 3870

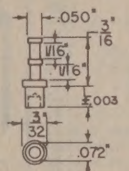
2029
TERMINAL LUG


.050"
1/16
3/16
3/32
L
±.003
1/16
3/32
3/32"
.072"

No.	L	T
2029A	.054	1/32
2029B	.084	1/16
2029C	.115	3/32
2029D	.147	1/8

Staking Tool Kit
No. 3871

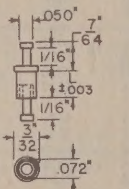
2030
TERMINAL LUG


.050"
3/16
1/16
1/16
L
±.003
3/32
.072"

No.	L	T
2030A	.054	1/32
2030B	.084	1/16
2030C	.115	3/32
2030D	.147	1/8

Staking Tool Kit
No. 3868

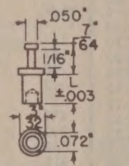
2031
FEED TERMINAL LUG


.050"
7/64
1/16"
L
±.003
1/16"
3/32
.072"

No.	L	T
2031A	.054	1/32
2031B	.084	1/16
2031C	.115	3/32
2031D	.147	1/8

Staking Tool Kit
No. 3871

2032
TERMINAL LUG


.050"
7/64
1/16"
L
±.003
3/32
.072"

No.	L	T
2032A	.054	1/32
2032B	.084	1/16
2032C	.115	1/32
2032D	.147	1/8

Staking Tool Kit
No. 3868

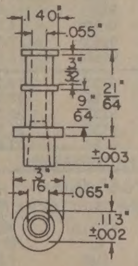
SUGGESTED RESALE PRICES & QUANTITY DISCOUNT SCHEDULE

Cat. No.	NET Per C	Cat. No.	NET Per C
2000	$ 6.10	2021	$ 4.60
2001	6.00	2022	3.50
2002	14.60	2023	5.00
2003	14.90	2024	3.50
2004	8.70	2025	7.50
2005	6.80	2026	5.30
2006	3.60	2027	3.50
2007	5.00	2028	4.60
2008	6.00	2029	4.50
2009	9.10	2030	3.20
2010	9.20	2031	3.60
2011	10.00	2032	3.50
2012	6.60	2033	10.80
2013	3.20	2034	11.50
2014	4.50	2035	10.30
2015	13.50	2036	11.10
2016	6.60	2037	15.00
2017	8.00	2038	15.00
2018	6.70		
2019	9.00		
2020	4.80		

QUANTITY DISCOUNT OFF NET

100	- 999	Net
1,000	- 4,999	15%
5,000	- 9,999	25%
10,000	- 24,999	35%
25,000	- 49,999	40%
50,000	- 99,999	50%
100,000		On Request

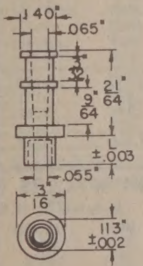
2033
RECEPTACLE LUG


.140
.055"
3/32
21/64"
9/64
L
±.003
1/16
.065"
.113"
±.002

No.	L	T
2033A	.075	1/32
2033B	.105	1/16
2033C	.135	3/32
2033D	.165	1/8
2033E	.195	5/32
2033F	.230	3/16

Staking Tool Kit
No. 3860

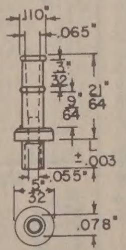
2034
RECEPTACLE LUG


.140
.065"
3/32
21/64"
9/64
L
±.003
.055"
3/16
.113"
±.002

No.	L	T
2034A	.075	1/32
2034B	.105	1/16
2034C	.135	3/32
2034D	.165	1/8
2034E	.195	5/32
2034F	.230	3/16

Staking Tool Kit
No. 3860

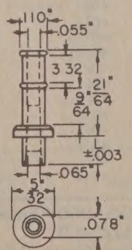
2035
RECEPTACLE LUG


.110
.065"
3/32
21/64"
9/64
L
±.003
.055"
5/32
.078"

No.	L	T
2035A	.075	1/32
2035B	.105	1/16
2035C	.135	3/32
2035D	.165	1/8
2035E	.195	5/32
2035F	.230	3/16

Staking Tool Kit
No. 3863

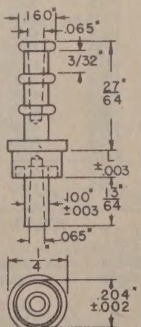
2036
RECEPTACLE LUG


.110
.055"
3/32
21/64"
9/64
L
±.003
.065"
5/32
.078"

No.	L	T
2036A	.075	1/32
2036B	.105	1/16
2036C	.135	3/32
2036D	.165	1/8
2036E	.195	5/32
2036F	.230	5/16

Staking Tool Kit
No. 3863

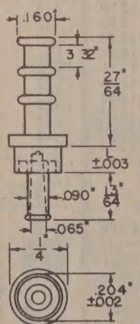
2037
TAPERED TERMINAL


.160
.065"
3/32"
27/64
L
±.003
.100"
±.003
13/64
.065"
1/4"
.204"
±.002

No.	L	T
2037A	.105	1/16
2037B	.135	3/32
2037C	.165	1/8

Staking Tool Kit
Not Available

2038
TAPERED TERMINAL

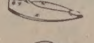

.160
3/32"
27/64
L
±.003
.090"
13/64
.065"
1/4
.204"
±.002

No.	L	T
2038A	.105	1/16
2038B	.135	3/32
2038C	.165	1/8

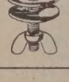
Staking Tool Kit
Not Available

ALL STAKING TOOL KITS
Each. $3.00

ACCESSORY TOOL HOLDERS



Anvil Bench Tool Holder, 1/4" anvils. Maileable iron base with bottom felt pad for bench use.
No. 3877 **Net. Ea. $4.20**



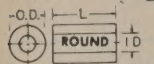
Anvil tool holder for use with drill press, arbor, kick press, punch press or vise.
No. 3878 **Net. Ea. $1.50**

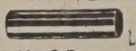
We invite your inquiries on other types of turret terminals not shown here.

SPECIFY SMITH OVER 1000 TYPES & SIZES SPACERS

CONTACT YOUR LOCAL DISTRIBUTOR, OR FACTORY DIRECT, FOR PRODUCTION QUANTITIES

BRASS ROUND SPACERS ZINC PLATED





1/4" O.D.

Std. Pkg. 100

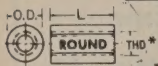
CLEARANCE HOLE

Length "L"	#4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C
.125	8700	8701	8702	$ 5.70
.187	8703	8704	8705	6.20
.250	2340	2100	2105	7.00
.312	8706	8707	8708	7.90
.375	2341	2101	2106	8.40
.437	8709	8710	8711	9.20
.500	2342	2102	2107	9.40
.562	8712	8713	8714	10.70
.652	8715	8716	8717	11.20
.687	8718	8719	8720	14.00
.750	2343	2103	2108	14.50
.812	8721	8722	8723	15.00
.875	8724	8725	8726	16.30
.937	8727	8728	8726	16.80
1.000	2344	2104	2109	18.60

3/8" O.D.

Length "L"	#4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C
.125	8730	8731	8732	$10.20
.187	8733	8734	8735	11.90
.250	2345	2110	2115	12.50
.312	8736	8737	8738	13.40
.375	2346	2111	2116	15.90
.437	8739	8740	8741	16.90
.500	2347	2112	2117	17.30
.562	8742	8743	8744	21.80
.625	8745	8746	8747	20.70
.687	8748	8749	8750	23.30
.750	2348	2113	2118	20.60
.812	8751	8752	8753	24.10
.875	8754	8755	8756	27.40
.937	8757	8758	8759	28.20
1.000	2349	2114	2119	29.30

BRASS THREADED ROUND SPACERS Zinc Plated

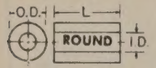


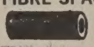
1/4" O.D.

Length "L"	THD 4-40 No.	THD 6-32 No.	THD 8-32 No.	NET Per C
.125	8760	8761	8762	$ 7.40
.187	8763	8764	8765	7.70
.250	2370	2120	2125	8.00
.312	8766	8767	8768	8.50
.375	2371	2121	2126	9.50
.437	8769	8770	8771	10.10
.500	2372	2122	2127	12.40
.562	8772	8773	8774	13.20
.625	8775	8776	8777	13.70
.687	8778	8779	8780	17.80
.750	2373	2123	2128	18.00
.812	8781	8782	8783	18.10
.875	8784	8785	8786	19.10
.937	8787	8788	8789	19.50
1.000	2374	2124	2129	21.00

*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through.

FIBRE SPACERS





MATERIAL: FIBRE, per MIL-F-1148A, Grade CH.

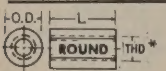
Std. Pkg. 100

1/4" O.D.

Clearance Hole

Length "L"	#4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C
.125	8880	8881	8882	$ 5.20
.187	8883	8884	8885	5.80
.250	2335	2130	2140	6.30
.312	8886	8887	8888	7.10
.375	2336	2131	2141	7.80
.437	8889	8890	8891	8.50
.500	2337	2132	2142	9.20
.562	8892	8893	8894	10.20
.625	8895	8896	8897	10.60
.687	8898	8899	8900	11.70
.750	2338	2133	2143	12.60
.812	8901	8902	8903	13.80
.875	8904	8905	8906	14.50
.937	8907	8908	8909	15.20
1.000	2339	2134	2144	15.50

PHENOLIC THREADED SPACERS 1/4" O.D.



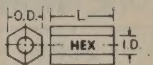
MATERIAL: PBE Grade MIL-P-79A. Natural color.

Std. Pkg. 100

Length "L"	THD. 4-40 No.	THD. 6-32 No.	THD. 8-32 No.	NET Per C
.250	8660	8661	8662	$ 9.40
.312	8663	8664	8665	10.40
.375	8666	8667	8668	12.00
.437	8669	8670	8671	12.40
.500	8672	8673	8674	13.40
.562	8675	8676	8677	14.00
.625	8678	8679	8680	15.00
.687	8681	8682	8683	16.70
.750	8684	8685	8686	17.70
.812	8687	8688	8689	18.40
.875	8690	8691	8692	19.40
.937	8693	8694	8695	20.00
1.000	8696	8697	8698	21.00

*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through.

BRASS HEX SPACERS Zinc Plated



1/4" HEX

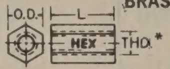
Clearance Hole

Length "L"	#4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C
.125	8790	8791	8792	$ 6.40
.187	8793	8794	8795	6.80
.250	2380	2300	2305	7.50
.312	8796	8797	8798	8.90
.375	2381	2301	2306	9.20
.437	8799	8800	8801	9.50
.500	2382	2302	2307	9.80
.562	8802	8803	8804	10.80
.625	8805	8806	8807	11.40
.687	8808	8809	8810	14.20
.750	2383	2303	2308	14.50
.812	8811	8812	8813	15.70
.875	8814	8815	8816	17.50
.937	8817	8818	8819	19.00
1.000	2384	2304	2309	20.00

3/8" HEX

Length "L"	#4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C
.125	8850	8851	8852	$10.60
.187	8853	8854	8855	11.90
.250	2385	2310	2315	12.80
.312	8856	8857	8858	14.80
.375	2386	2311	2316	16.20
.437	8859	8860	8861	19.80
.500	2387	2312	2317	20.50
.562	8862	8863	8864	21.50
.625	8865	8866	8867	23.70
.687	8868	8869	8870	24.10
.750	2388	2313	2318	25.10
.812	8871	8872	8873	26.40
.875	8874	8875	8876	29.50
.937	8877	8878	8879	29.90
1.000	2389	2314	2319	32.60

BRASS THREADED HEX SPACERS Zinc Plated



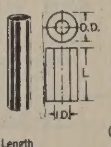
1/4" HEX

Std. Pkg. 100

Length "L"	THD 4-40 No.	THD 6-32 No.	THD 8-32 No.	NET Per C
.125	8820	8821	8822	$ 7.50
.187	8823	8824	8825	8.00
.250	2330	2320	2325	8.70
.312	8826	8827	8828	9.40
.375	2331	2321	2326	10.60
.437	8829	8830	8831	11.40
.500	2332	2322	2327	12.40
.562	8832	8833	8834	14.50
.625	8835	8836	8837	17.30
.687	8838	8839	8840	18.30
.750	2333	2323	2328	19.30
.812	8841	8842	8843	20.00
.875	8844	8845	8846	20.30
.937	8847	8848	8849	21.30
1.000	2334	2324	2329	22.80

*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through.

NYLON SPACERS 1/4" O.D.

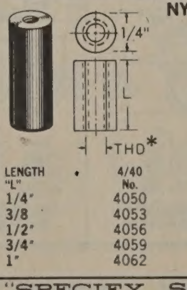


Non-conductive and molded of corrosive resistant Nylon. Useful for a wide variety of applications as well as for bushings, bearings, rollers and glides. Available in Natural finish. 1/4" O.D. in various clearance hole diameters.

Std. Pkg. 100

Length	#4 (.115") No.	#6 (.140") No.	#8 (.171") No.	NET Per C
.125	4000	4001	4002	$ 3.30
.187	4003	4004	4005	3.80
.250	4006	4007	4008	4.30
.312	4009	4010	4011	4.90
.375	4012	4013	4014	5.50
.437	4015	4016	4017	6.00
.500	4018	4019	4020	6.50
.562	4021	4022	4023	7.00
.625	4024	4025	4026	7.50
.687	4027	4028	4029	8.00
.750	4030	4031	4032	8.50
.812	4033	4034	4035	8.80
.875	4036	4037	4038	9.30
.937	4039	4040	4041	9.70
1.000	4042	4043	4044	10.00

NYLON THREADED SPACERS 1/4" O.D.



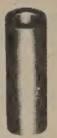
Molded Nylon, Type 66, Mil Spec. 20693A, 1/4" O.D. machine tapped.

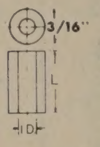
*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through.

Std. Pkg. 100

LENGTH "L"	4/40 No.	6/32 No.	8/32 No.	NET Per C
1/4"	4050	4051	4052	$ 8.00
3/8	4053	4054	4055	9.50
1/2"	4056	4057	4058	11.00
3/4"	4059	4060	4061	15.00
1"	4062	4063	4064	18.00

BRASS ROUND SPACERS, ZINC PLATE 3/16" O.D.





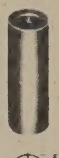
Std. Pkg. 100

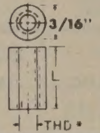
DIM. "L"	CLEARANCE HOLE #2(.093) No.	#4(.115) No.	NET Per C
.125	9000	9015	$ 5.70
.187	9001	9016	6.20
.250	9002	9017	7.00
.312	9003	9018	7.90
.375	9004	9019	8.40
.437	9005	9020	$ 9.00
.500	9006	9021	9.40
.562	9007	9022	10.70
.625	9008	9023	11.20
.687	9009	9024	14.00
.750	9010	9025	$14.50
.812	9011	9026	15.00
.875	9012	9027	16.30
.937	9013	9028	16.80
1.000	9014	9029	18.00

ROUND THREADED 3/16" O.D.

*On Threaded Spacers over ½", tap is ⅜" from each end and not continuous through.

Std. Pkg. 100



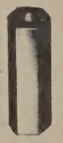


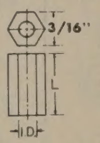
DIM. "L"	THREADED 2-56 No.	4-40 No.	NET Per C
.125	9030	9045	$ 7.40
.187	9031	9046	7.70
.250	9032	9047	8.00
.312	9033	9048	8.50
.375	9034	9049	9.50
.437	9035	9050	$10.10
.500	9036	9051	12.40
.562	9037	9052	13.20
.625	9038	9053	13.70
.687	9039	9054	17.80
.750	9040	9055	$18.00
.812	9041	9056	18.10
.875	9042	9057	19.10
.937	9043	9058	19.50
1.000	9044	9059	21.00

BRASS HEX SPACERS 3/16" HEX

CLEARANCE HOLE

Std. Pkg. 100



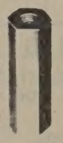


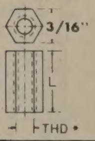
DIM. "L"	#2(.093) No.	#4(.115) No.	NET Per C
.125	9100	9115	$ 6.40
.187	9101	9116	6.80
.250	9102	9117	7.50
.312	9103	9118	8.90
.375	9104	9119	9.20
.437	9105	9120	$ 9.50
.500	9106	9121	9.80
.562	9107	9122	10.80
.625	9108	9123	11.40
.6875	9109	9124	14.20
.750	9110	9125	$14.50
.812	9111	9126	15.70
.875	9112	9127	17.50
.937	9113	9128	19.00
1.000	9114	9129	20.00

3/16" HEX THREADED SPACERS

*On Threaded Spacers over ½", tap is ⅜" from each end and not continuous through.

Std. Pkg. 100

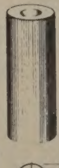


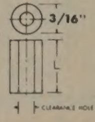


DIM. "L"	THREADED 2-56 No.	4-40 No.	NET Per C
.125	9130	9145	$ 7.50
.187	9131	9146	8.00
.250	9132	9147	8.70
.312	9133	9148	9.40
.375	9134	9149	10.60
.437	9135	9150	$11.40
.500	9136	9151	12.40
.562	9137	9152	14.50
.625	9138	9153	17.30
.687	9139	9154	18.30
.750	9140	9155	$19.30
.812	9141	9156	20.00
.875	9142	9157	20.30
.937	9143	9158	21.30
1.000	9144	9159	22.80

NYLON SPACERS 3/16" O.D.

Molded Nylon Type 66, Mil Spec. 20693A Std. Pkg. 100



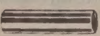


DIM "L"	#2 (091) No.	#4 (115) No.	NET PER C
.125	9160	9180	3.30
.187	9161	9181	3.80
.250	9162	9182	4.30
.312	9163	9183	4.90
.375	9164	9184	5.50
.437	9165	9185	6.00
.500	9166	9186	6.50
.562	9167	9187	7.00
.625	9168	9188	7.50
.687	9169	9189	8.00
.750	9170	9190	8.50
.812	9171	9191	8.80
.975	9172	9192	9.30
.937	9173	9193	9.70
1000	9174	9194	10.00

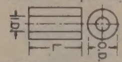
IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

Add Dept. EM to address to tell them you saw it in eem

ALUMINUM SPACERS



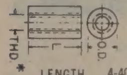
Irridite 14-2 per MIL-C-5541



ROUND

Std. Pkg. 100

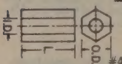
LENGTH "L"	¼ " O.D. Clearance Hole #4(.115) No.	#6(.140) No.	#8(.171) No.	NET Per C	5/16" O.D. Clearance Hole #10(.200) No.	Per C
.125	8480	8500	8520	$5.00	8540	$ 7.00
.187	9200	9207	9214	5.50	9221	7.50
.250	8481	8501	8521	6.00	8541	8.00
.312	9201	9208	9215	6.50	9222	8.50
.375	8482	8502	8522	7.00	8542	9.00
.437	9202	9209	9216	7.50	9223	9.50
.500	8483	8503	8523	8.00	8543	10.00
.562	9203	9210	9217	8.50	9224	10.50
.625	8484	8504	8524	9.00	8544	11.00
.687	9204	9211	9218	9.50	9225	11.50
.750	8485	8505	8525	10.00	8545	12.00
.812	9205	9212	9219	10.50	9226	12.50
.875	8486	8506	8526	11.00	8546	13.00
.937	9206	9213	9220	11.50	9227	13.50
1.000	8487	8507	8527	12.00	8547	14.00
1.250	8488	8508	8528	15.00	8548	15.00
1.500	8489	8509	8529	16.00	8549	16.00
1.750	8490	8510	8530	17.00	8550	17.00
2.000	8491	8511	8531	18.00	8551	18.00



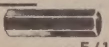
ROUND THREADED

* LENGTH "L"	¼" O.D. 4-40 No.	6-32 No.	8-32 No.	NET Per C	5/16" O.D. 10-32 No.	NET Per C
.125	8320	8340	8360	$6.00	8380	$8.00
.187	9228	9235	9242	6.50	9249	8.50
.250	8321	8341	8361	7.00	8381	9.00
.312	9229	9236	9243	7.50	9250	9.50
.375	8322	8342	8362	8.00	8382	10.00
.437	9230	9237	9244	8.50	9251	10.50
.500	8323	8343	8363	9.00	8383	11.00
.562	9231	9238	9245	9.50	9252	11.50
.625	8324	8344	8364	10.00	8384	12.00
.687	9232	9239	9246	10.50	9253	12.50
.750	8325	8345	8365	11.00	8385	13.00
.812	9233	9240	9247	11.50	9254	13.50
.875	8326	8346	8366	12.00	8386	14.00
.937	9234	9241	9248	12.50	9255	14.50
1.000	8327	8347	8367	14.00	8387	15.00
1.250	8328	8348	8368	16.00	8388	16.00
1.500	8329	8349	8369	17.00	8389	17.00
1.750	8330	8350	8370	18.00	8390	18.00
2.000	8331	8351	8371	19.00	8391	19.00

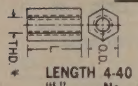
*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through



HEX



LENGTH "L"	¼" O.D. CLEARANCE HOLE #4 (.115) No.	#6 (.140) No.	#8 (.171) No.	NET Per C	CLEAR 5/16"O.D. #10 (.200) No.	NET Per C
.125	8560	8580	8600	$6.00	8620	$9.00
.187	9256	9263	9270	6.50	9277	9.50
.250	8561	8581	8601	7.00	8621	10.00
.312	9257	9264	9271	7.50	9278	10.50
.375	8562	8582	8602	8.00	8622	11.00
.437	9258	9265	9272	8.50	9279	11.50
.500	8563	8583	8603	9.00	8623	12.00
.562	9259	9266	9273	9.50	9280	12.50
.625	8564	8584	8604	10.00	8624	13.00
.687	9260	9267	9274	10.50	9281	13.50
.750	8565	8585	8605	11.00	8625	14.00
.812	9261	9268	9275	11.50	9282	14.50
.875	8566	8586	8606	12.00	8626	15.00
.937	9262	9269	9276	12.50	9283	15.50
1.000	8567	8587	8607	13.00	8627	16.00



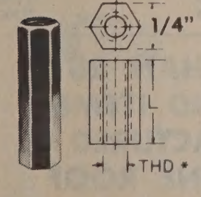
HEX THREADED

LENGTH "L"	¼" O.D. 4-40 No.	6-32 No.	8-32 No.	NET Per C	5/16" O.D. 10-32 No.	NET Per C
.125	8400	8420	8440	$ 7.00	8460	$ 10.00
.187	9284	9291	9298	7.50	9305	10.50
.250	8401	8421	8441	8.00	8461	11.00
.312	9285	9292	9299	8.50	9306	11.50
.375	8402	8422	8442	9.00	8462	12.00
.437	9286	9293	9300	9.50	9307	12.50
.500	8403	8423	8443	10.00	8463	13.00
.562	9287	9294	9301	10.50	9308	13.50
.625	8404	8424	8444	11.00	8464	14.00
.687	9288	9295	9302	11.50	9309	14.50
.750	8405	8425	8445	12.00	8465	15.00
.812	9289	9296	9303	12.50	9310	15.50
.875	8406	8426	8446	13.00	8466	16.00
.937	9290	9297	9304	13.50	9311	16.50
1.000	8407	8427	8447	14.00	8467	17.00

*On threaded spacers 3/4" and longer, tap is 3/8" from each end, and not continuous through.

THREADED HEX STAINLESS STEEL SPACERS

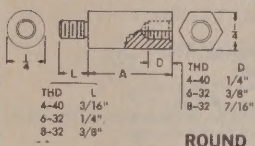
* On Threaded Spacers over ½" tap is ⅜" from each end and not continuous through.



MINIMUM Std. Pkg. 100

DIM. "L"	4-40	6-32	NET Per C
.125	9060	9080	$29.00
.187	9061	9081	30.00
.250	9062	9082	31.00
.312	9063	9083	32.00
.375	9064	9084	33.00
.437	9065	9085	38.00
.500	9066	9086	43.00
.562	9067	9087	46.00
.625	9068	9088	49.00
.687	9069	9089	52.00
.750	9070	9090	54.00
.812	9071	9091	55.00
.875	9072	9092	56.00
.937	9073	9093	57.00
1.000	9074	9094	58.00

MALE-FEMALE THREADED SPACERS



THD	L
4-40	3/16"
6-32	1/4"
8-32	3/8"

THD	D
4-40	1/4"
6-32	3/8"
8-32	7/16"

BRASS, cadmium plated.

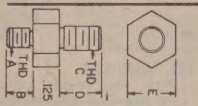
Std. Pkg. 100

ROUND

4-40 Thd. No.	6-32 Thd. No.	8-32 Thd. No.	Length "A"	NET Per C
8200	8232	8264	.250	$22.80
8201	8233	8265	.375	23.20
8202	8234	8266	.500	23.70
8203	8235	8267	.625	24.20
8204	8236	8268	.750	24.70
8205	8237	8269	.875	25.20
8206	8238	8270	1.000	25.90
8207	8239	8271	1.125	26.40
8208	8240	8272	1.250	27.60
8209	8241	8273	1.375	29.30
8210	8242	8274	1.500	30.30
8211	8243	8275	1.625	31.00
8212	8244	8276	1.750	31.60
8213	8245	8277	2.000	32.40
8214	8246	8278	2.500	33.90
8215	8247	8279	3.000	36.80

HEX

4-40 Thd. No.	6-32 Thd. No.	8-32 Thd. No.	Length "A"	NET Per C
8216	8248	8280	.250	$22.80
8217	8249	8281	.375	23.20
8218	8250	8282	.500	23.70
8219	8251	8283	.625	24.20
8220	8252	8284	.750	24.70
8221	8253	8285	.875	25.20
8222	8254	8286	1.000	25.90
8223	8255	8287	1.125	26.40
8224	8256	8288	1.250	27.60
8225	8257	8289	1.375	29.30
8226	8258	8290	1.500	30.30
8227	8259	8291	1.625	31.00
8228	8260	8292	1.750	31.60
8229	8261	8293	2.000	32.40
8230	8262	8294	2.500	33.90
8231	8263	8295	3.000	36.80

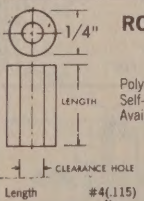


MALE SPACER ADAPTERS

Dual-stud spacer adapters convert female threaded spacers to male-female or splice spacers together for added length. Brass, cadmium plated hex body for wrench tightening. Adds $^{1}/_{8}$" to length of spacer.

Std. Pkg. 25

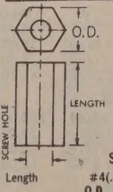
No.	Thd. A	Lgth. B	Thd. C	Lgth. D	Hex E	NET Per C
8300	4-40	3/16"	4-40	3/16"	1/4"	$21.30
8301	4-40	3/16"	6-32	1/4"	1/4"	23.60
8302	6-32	1/4"	6-32	1/4"	1/4"	24.50
8303	6-32	1/4"	8-32	3/8"	1/4"	25.00
8304	8-32	3/8"	8-32	3/8"	1/4"	26.00
8305	8-32	3/8"	10-32	3/8"	1/4"	27.00
8306	8-32	3/8"	10-32	3/8"	5/16"	29.10
8307	10-32	3/8"	10-32	3/8"	5/16"	30.60



ROUND PLASTIC SPACERS

Polyvinyl Dichloride (PVDC) $^{1}/_{4}$" O.D. plastic spacers. Self-extinguishing and high temperature resistant. Available in gray. **Std. Pkg. 100**

Length	CLEARANCE HOLE #4(.115) No.	#6(.140) No.	#8(.171) No.	NET Per C
$^{1}/_{4}$"	4154	4155	4156	$3.20
$^{3}/_{8}$"	4157	4158	4159	3.35
$^{1}/_{2}$"	4160	4161	4162	3.50
$^{5}/_{8}$"	4163	4164	4165	3.75
$^{3}/_{4}$"	4166	4167	4168	4.20
1"	4169	4170	4177	4.35



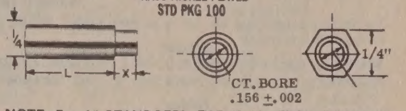
HEX PLASTIC SPACERS

Polyvinyl Dichloride (PVDC) $^{1}/_{4}$" Hex Spacers. Self-extinguishing and high temperature resistant. Designed for use with self-tapping screws. Available in gray. **Std. Pkg. 100**

Length	SELF-TAPPING SCREW HOLE SIZE #4(.092) O.D. 3/16" No.	#6(.110) O.D. 1/4" No.	#8(.141) O.D. 3/8" No.	NET Per C
$^{3}/_{8}$"	4178	—	—	$3.50
$^{1}/_{2}$"	4179	4180	—	4.00
$^{5}/_{8}$"	4181	4182	4183	4.20
$^{3}/_{4}$"	4184	4185	4186	4.35
$^{7}/_{8}$"	4187	4188	4189	5.00
1"	4190	4191	4192	5.50

THREADED SWAGE STANDOFFS

BRASS NICKEL PLATED
STD PKG 100



NOTE: For 1" STANDOFFS. TAP IS ½" FROM EACH END, AND NOT CONTINUOUS THRU. 8-32 TAPS ARE FULL LENGTH, BUT DO NOT CLEAR COUNTERBORE.
C = Counter Bore S = Shoulder

				ROUND No.	Net Per C	HEX No.	Net Per C
2.56 THREAD	PANEL	"X"	"L"	"S"-dia. .125		"C" I.D. .098	
RD & HEX O.D. .156	3/64	.094	.125	4369	10.00	4269	10.40
			.187	4370	10.40	4270	10.70
			.250	4371	10.70	4271	11.00
4.40 THREAD	PANEL	"X"	"L"	"S" dia.-.138		"C" I.D. .113	
	3/64	.094	.125	4354	10.00	4254	10.40
			.187	4358	10.40	4258	10.70
STK.TOOL 3879 $3.00			.250	4362	10.40	4262	11.00
	1/16	.105	.125	4355	10.00	4255	10.40
			.107	4359	10.40	4259	10.70
	3/32	.135	.125	4356	10.00	4258	10.40
			.187	4360	10.40	4250	10.70
	1/8	.165	.125	4357	10.00	4257	10.40
			.187	4361	10.40	4261	10.70
4.40 THREAD	PANEL	"X"	"L"	"S" dia.-.187		"C" I.D-.156	
	1/16	.105	.250	4100	10.40	4200	11.00
			.375	4103	12.00	4203	12.70
			.500	4106	14.70	4206	15.40
			.625	4109	15.40	4209	16.08
			.750	4112	17.00	4212	17.70
			1.000	4115	22.00	4215	22.70
STK.TOOL 3372 $3.00	3/32	.135	.250	4101	10.40	4201	11.00
			.375	4104	12.00	4204	12.70
			.500	4107	14.70	4207	15.40
			.625	4110	15.40	4210	16.00
			.750	4113	17.00	4213	17.70
			1.000	4116	22.00	4216	22.70
	1/8	.165	.250	4102	10.40	4202	11.00
			.375	4105	12.00	4205	12.70
			.500	4108	14.70	4208	15.40
			.625	4111	15.40	4211	16.00
			.750	4114	17.00	4214	17.70
			1.000	4117	22.00	4217	22.70
6-32 THREAD	PANEL	"X"	"L"	"5" dia.-.138		"C" I.D. - .113	
	1/16	.105	.125	4363	10.00	4263	10.40
			.187	4366	10.40	4266	10.70
STK.TOOL 3880 $3.00	3/32	.135	.125	4364	10.00	4264	10.40
			.137	4367	10.40	4267	10.70
	1/8	.165	.125	4365	10.00	4265	10.40
			.137	4368	10.40	4268	10.70
6-32 THREAD	PANEL	"X"	"L"	"5" dia. - .187		"C" I.D.-.156	
	1/15	.125	.250	4118	10.40	4218	11.00
			.375	4121	12.00	4221	12.70
			.500	4124	14.70	4224	15.40
			.625	4127	15.40	4227	16.00
			.750	4130	15.40	4230	17.70
			1.000	4133	22.00	4233	22.70
STK.TOOL 3873 $3.00	3/32	.125	.250	4119	10.40	4219	11.00
			.375	4122	12.00	4222	12.70
			.500	4125	14.70	4225	15.40
			.625	4128	15.40	4228	16.00
			.750	4131	17.00	4231	17.70
			1.000	4134	22.00	4234	22.70
	1/8	.135	.250	4120	10.40	4220	11.00
			.375	4123	12.00	4223	12.70
			.500	4126	14.70	4226	15.40
			.625	4129	15.40	4229	16.00
			.750	4132	17.00	4232	17.70
			1.000	4135	22.00	4235	22.70
8-32 THREAD	PANEL	"X"	"L"	"5" dia. - .187		"C" I.D. - .156	
	1/16	.105	.250	4136	10.40	4236	11.00
			.375	4139	12.00	4239	12.70
			.500	4142	14.70	4242	15.40
			.625	4145	15.40	4245	16.00
			.750	4148	17.00	4248	17.70
			1.000	4151	22.00	4251	22.70
STK.TOOL $3.00	3/32	.135	.230	4137	10.40	4237	11.00
			.375	4140	12.00	4240	12.70
			.500	4143	14.70	4243	15.40
			.625	4146	15.40	4246	16.00
			.750	4149	17.00	4249	17.70
			1.000	4152	22.00	4252	22.70
	1/8	.165	.250	4138	10.40	4238	11.00
			.375	4141	12.00	4241	12.70
			.500	4144	14.70	4244	15.40
			.625	4147	15.40	4247	16.00
			.750	4150	17.00	4250	17.70
			1.000	4153	22.00	4253	22.70

EQUIPMENT HANDLES

MATERIAL AND FINISH SPECIFICATIONS

The following specifications are met by all panel handles, ferrules, and hardware where applicable:

Materials:

BRASS: In accordance with Federal spec. QQ-B-626, Composition 22, ½ Hard.

ALUMINUM: In accordance with Federal Spec. QQ-A-365, Composition A, Type '3.

Finishes:

NICKEL PLATE: Polished Nickel Plate. In accordance with Federal Spec. QQ-N-290, Class I, Type VI.

BLACK OXIDE: In accordance with MIL-F-495A.

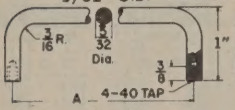
SATIN ETCH: Commercial finish.

BLACK ANODIZE: In accordance with MIL-A-5625A.

Note:

Aluminum Handles, either round or oval, and matching ferrules, can be supplied anodized in colors per MIL-A-8625A on special order.

5/32" O.D. PANEL HANDLES

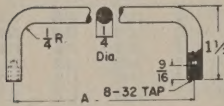


5/32" Diameter panel handles. Brass and Aluminum finished as shown, with internal 4-40 thread. Individually packaged.

Std. Pkg. 10

No.	(A)	Finish	NET Ea.
		BRASS	
1632	1¼"	Nickel Plate	$1.25
1633	1¼"	Black Oxide	1.25
1636	2"	Nickel Plate	1.40
1637	2"	Black Oxide	1.40
1640	3"	Nickel Plate	1.45
1641	3"	Black Oxide	1.45
		ALUMINUM	
1634	1¼"	Satin	$1.00
1635	1¼"	Blk. Anodize	1.15
1638	2"	Satin	1.20
1639	2"	Blk. Anodize	1.35
1642	3"	Satin	1.25
1643	3"	Blk. Anodize	1.40

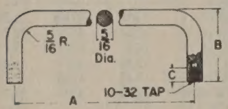
1/4" O.D. PANEL HANDLES



No.	(A)	Finish	NET Ea.
		BRASS	
1616	2"	Nickel Plate	$1.50
1617	2"	Black Oxide	1.50
1620	3"	Nickel Plate	1.55
1621	3"	Black Oxide	1.55
1624	4"	Nickel Plate	1.60
1625	4"	Black Oxide	1.60
1628	6"	Nickel Plate	1.80
1629	6"	Black Oxide	1.80
		ALUMINUM	
1618	2"	Satin	$ .80
1619	2"	Blk. Anodize	.85
1622	3"	Satin	.85
1623	3"	Blk. Anodize	.95
1626	4"	Satin	.90
1627	4"	Blk. Anodize	1.00
1630	6"	Satin	1.05
1631	6"	Blk. Anodize	1.20

PANEL HANDLES

5/16" O.D.

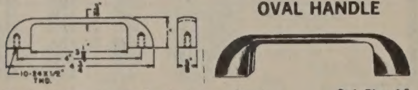


Brass Panel Handles, finished as shown, with internal thread. Individually packaged.

Std. Pkg. 10

No.	(A)	(B)	(C)	NET Ea.
		BRASS NICKEL PLATE		
2050	3"	1-5/16"	7/16"	$1.60
2057	3"	1-1/2"	9/16"	1.75
2056	4-1/4"	1-1/2"	9/16"	1.85
2051	4-9/16"	1-1/2"	9/16"	2.00
2052	6-7/16"	1-3/4"	9/16"	2.50
		BRASS BLACK OXIDE		
1601	3"	1-5/16"	7/16"	$1.60
1602	3"	1-1/2"	9/16"	1.75
1604	4-1/4"	1-1/2"	9/16"	1.85
1605	4-9/16"	1-1/2"	9/16"	2.00
1606	6-7/16"	1-3/4"	9/16"	2.50

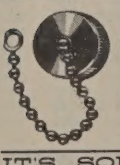
OVAL HANDLE



Die Cast Zamac Handle. Brush chrome plated. Std. Pkg. 10

No.	Net Per C
2065	$ 120.00
2070	120.00

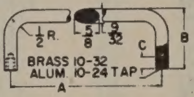
CAP AND CHAIN



DESCR.: Brass, nickel plated. Seals chassis connectors against dust. Eliminates noisy connections. Used with any threaded one or two conductor chassis unit. Std. Pkg. 25

No.		NET Per C
118	5/8-27 Thread	$110.00

OVAL PANEL HANDLES

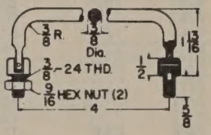


Flat, oval panel handles in Brass, and Aluminum, finished as shown. Brass handles have internal 10-32 thread. Aluminum handles have internal 10-24 thread. Individually packaged.

Std. Pkg. 10

No.	Mtg. Ctrs. (A)	Height (B)	Tap Depth (C)	Fnish	NET Ea.
			BRASS		
1644	3"	1-9/32"	9/32"	Nickel Plate	$3.00
1645	3"	1-9/32"	9/32"	Black Oxide	3.00
1647	4-9/16"	1-1/2"	1/2"	Nickel Plate	3.50
1648	4-9/16"	1-1/2"	1/2"	Black Oxide	3.50
1651	6-7/16"	1-3/4"	1/2"	Nickel Plate	3.65
1653	6-7/16"	1-3/4"	1/2"	Black Oxide	3.65
1655	9"	1-3/4"	1/2"	Nickel Plate	4.15
1657	9"	1-3/4"	1/2"	Black Oxide	4.15
			ALUMINUM		
1646	3"	1-9/32"	9/32"	Black Anodize	3.00
1649	4-9/16"	1-1/2"	9/32"	Black Anodize	3.50
1654	6-7/16"	1-3/4"	9/32"	Black Anodize	3.65
1658	9"	1-3/4"	9/32"	Black Anodize	4.15

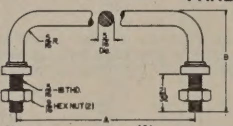
FOLDING HANDLES



Folding Brass panel handles with spring-loaded detents which snap into upright or left-or-right folded position. Finished as shown. Supplied with brass, nickel plated hex nuts. Mounts in 3/8" panel holes. Individually packaged. Std. Pkg. 10

No.	Finish	NET per C
1662	Nickel Plate	$800.00
1663	Black Oxide	800.00

5/16" O.D. PANEL HANDLES



Brass Panel Handles, finished as shown with male threaded stud. Supplied complete with matching ferrules, and brass nickel plated hex nuts. Individually packaged.

Std. Pkg. 10

No.	(A)	(B)	NET Ea.
	BRASS NICKEL PLATE		
1607	2"	2⅛"	$2.20
1609	3"	2⅛"	2.25
1611	4"	2⅛"	2.50
2053	4¼"	2⅛"	2.55
1614	6"	2 11/16"	2.95
	BRASS BLACK OXIDE		
1608	2"	2⅛"	$2.20
1610	3"	2⅛"	2.25
1612	4"	2⅛"	2.50
1613	4¼"	2⅛"	2.55
1615	6"	2 11/16"	2.95

FERRULES

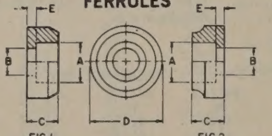


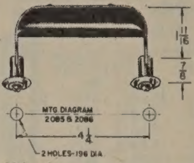
FIG.1 FIG.2

Brass and Aluminum ferrules, finished as shown, to match handles listed above.

Std. Pkg. 50

No.	Fig.	(A)	(B)	(C)	(D)	(E)	Per C
			BRASS NICKEL PLATED				
1664	1	5/32"	.109	1/8"	1/4"	3/64"	$23.00
1668	1	1/4"	.203	3/16"	3/8"	1/16"	29.00
2055	1	5/16"	.219	1/4"	9/16"	1/16"	32.00
2054	2	5/16"	.196	5/16"	3/4"	3/32"	42.00
			BRASS, BLACK OXIDE				
1665	1	5/32"	.109	1/8"	1/4"	3/64"	$23.00
1669	1	1/4"	.203	3/16"	3/8"	1/16"	29.00
1673	1	5/16"	.219	1/4"	9/16"	1/16"	32.00
1672	2	5/16"	.196	5/16"	3/4"	3/32"	42.00
			ALUMINUM SATIN ETCH				
1666	1	5/32"	.109	1/8"	1/4"	3/64"	23.00
1670	1	1/4"	.263	3/16"	3/8"	1/16"	25.00
			ALUMINUM, BLACK ANODIZED				
1667	1	5/32"	.109	1/8"	1/4"	3/64"	23.00
1671	1	1/4"	.203	3/16"	3/8"	1/16"	25.00

MOLDED GRIP HANDLES



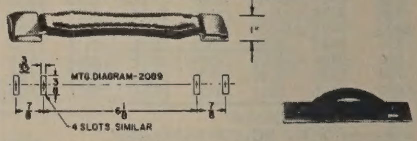
HANDLE: Molded high impact Styrene, fungus resistant.
HARDWARE: Steel, nickel plated.
RATING: 75 lbs. maximum load.
DESCR: Rounded palm fitting design.

Std. Pkg. 10

Attaches with 10-32 machine screws supplied. Maximum panel thickness 1/4".

No.	Color	NET per C
2085	Black	$230.00
2086	Grey	230.00

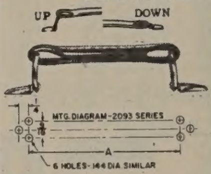
SPRING-GLIDE HANDLES



HANDLE: Black genuine leather, contoured stitched.
HARDWARE: Steel, chrome plate.
DESCR.: Strong spring-glide retract mechanism prevents handle rattle at vibration extremes, automatically lies flat against case when not in use. Attaches with fold tabes on cap against rear bearing washer plate. Spring and washer plate can be secured with optional screws. Maximum panel thickness 1/4". Std. Pkg. 10

No.	Color	NET Per C
2089	Black	$440.00

RETRACTO-LINK HANDLES

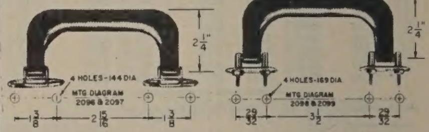


HANDLE: Black genuine leather, matching stitching.
HARDWARE: Steel, nickel plated.
RATING: 60 lbs. maximum load.
DESCR: Sliding link retracts inside handle to lie flat to panel when not in use. Shipped with all hardware assembled except decorative cover cap.
Attaches with fold tabs against bearing washer plate which can be secured with optional # 6 screws (not supplied). Maximum panel thickness ½".

Attaches with # 6 screws or rivets (not supplied). Maximum panel thickness unlimited.

			NET Per C
2093	4½"	5¾"	$380.00
2094	5½"	6⅝"	380.00
2095	6¾"	7⅞"	380.00

MOLDED GRIP HANDLES



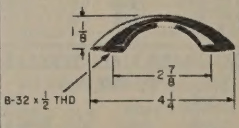
HANDLE: Molded high impact Styrene.
HARDWARE: Steel, nickel plated.
RATING: 60 lbs maximum load.
DESCR.: Designed for economy and rugged use. Folds flat to case. Attaches with rivets or # 6 screws (not supplied). Maximum panel thickness unlimited. Std. Pkg. 10

No.	Color	NET Per C
2096	Black	$80.00
2097	Grey	80.00

Attaches with integral 8-32 studs and nuts supplied. Maximum panel thickness 3/8".

2098	Black	$170.00

BAKELITE HANDLE

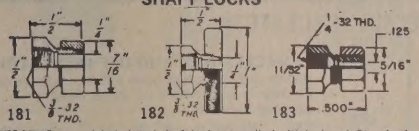


MATERIAL: Molded Phenolic, Red or Black.
RATING: 40 lbs. maximum load.
DESCR.: Molded cabinet handle attaches with two 8-32 screws (not supplied) on 2 7/8 mounting centers. Std. Pkg. 10

No.	Color	NET Per C
2281	Black	$27.00C
2282	Red	27.00C

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

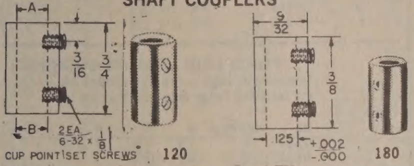
SHAFT LOCKS


1/2"
1/4"
1/2"
7/16"
3/8-32 THD.
181
1/2"
1"
3/8-32 THD
182
1/4-32 THD.
.125
11/32"
5/16"
.500"
183

DESCR.: Brass, nickel plated shaft locks, supplied with lock nut. Standard (No. 181, 182) for 1/4" shafts; miniature (No. 183) for 1/8" shafts.

No.	(A)	(B)	(C)	(D)	(E)	Std. Pkg.	Per C
181	.253	1/2"	1/2"	7/16"	3/8"-32	100	$50.00
182	.253	1/2"	1/2"	1"	3/8"-32	25	95.00
183	.128	1/2"	11/32"	5/16"	1/4"-32	25	34.00

SHAFT COUPLERS

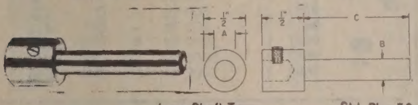

A
3/16
3/4
B
2 EA 6-32 x 1/8
CUP POINT SET SCREWS
120
9/32
3/8
.125
+.002
-.000
180

DESCR.: Brass and insulated shaft couplers. Supplied with two 6-32 x 1/8" slotted cup-point set screws, except as indicated. Std. Pkg. 50

Brass, Nickel Plated Couplers

No.	(A)	(B)	(C)	(D)	(E)	NET Per C
120	1/4"	1/4"	7/16"	3/4"	3/16"	$40.00
131	1/4"	3/8"	1/2"	3/4"	3/16"	48.00
133	3/8"	3/8"	1/2"	3/4"	3/16"	48.00
With Four Set Screws, Spaced 90°						
138	1/4"	1/8"	7/16"	3/4"	3/16"	65.00
Miniature Coupler, With 4-40 x 1/8" Allen Head Cup-Point Set Screws						Std. Pkg. 25
180	1/8"	1/8"	9/32"	3/8"	5/64"	40.00
Insulated Black Fibre Per Mil-F-1148A, Grade Ch.						Std. Pkg. 50
140	1/4"	1/4"	7/16"	3/4"	3/16"	40.00

EXTENDERS Brass and Insulated



Long Shaft Type Std. Pkg. 50

No.	A	B	C	Material	NET Per C
150	1/4"	-1/4"	1 1/4"	Brass N.P.	$65.00
130	1/4"	-1/4"	1 1/4"	Fibre	65.00
132	3/8"	-1/4"	1 1/4"	Brass N.P.	75.00

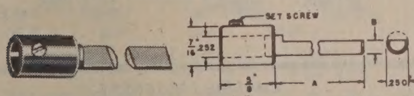
Short Shaft Type

No.	A	B	C	Material	NET Per C
160	1/4"	-1/4"	5/8"	Brass N.P.	$50.00
161	1/4"	-1/4"	5/8"	Fibre	50.00

MINIATURE EXTENDER With Allen Head Set Screws

189	1/8"	-1/8"	3/8"	Brass N.P.	$50.00

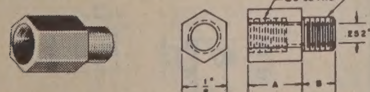
SHAFT EXTENDERS For Volume Controls


SET SCREW
7/16"
.252
3/8"
A
B
.250

Brass, Nickel Plated. Std. Pkg. 25

No.	A	B	NET Per C
FULL ROUND			
2356	2"	.250"	$63.00
2357	3"	.250"	64.00
2358	4"	.250"	68.00
WITH FLAT			
2359	2"	.219"	69.00
2360	3"	.219"	75.00
2361	4"	.219"	93.00
2362	2"	.156"	69.00
2363	3"	.156"	75.00
2364	4"	.156"	93.00

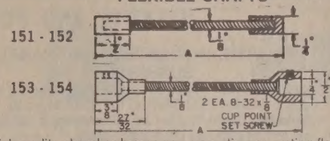
BUSHING EXTENDERS For Volume Controls


3/8-32 THD.
.252"
1/2"
A
B

Brass, Nickel Plated. Std. Pkg. 25

No.	A	B	NET Per C
2350	5/8"	3/16"	$55.00
2351	5/8"	1/4"	60.00
2352	5/8"	3/8"	65.00
2353	11/16"	3/8"	75.00
2354	11/16"	1/2"	77.00
2355	3/4"	1/4"	80.00

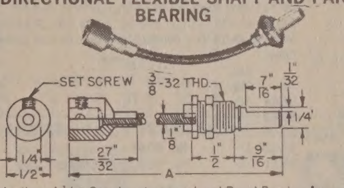
FLEXIBLE SHAFTS


151 - 152
1/2"
1/8"
A
1/4"
153 - 154
3/8
27/32"
1/8"
2 EA 8-32 x 1/8
CUP POINT
SET SCREW
A
1/4"
1/2"

High quality phosphor bronze non-magnetic, non-rusting flexible shafts. Remote control when necessary to mount condensers and potentiometers away from panel at unusual angles. Turns at any angle up to 90°; free from back lash. Std. Pkg. 25

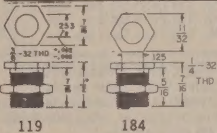
No.	Size "A"	Description	NET Per C
151	3"	With 1/4" hub	$ 85.00
152	6"	With 1/4" hub	120.00
153	3 5/8"	With 1/4" coupler	200.00
154	6 5/8"	With 1/4" coupler	215.00

BI-DIRECTIONAL FLEXIBLE SHAFT AND PANEL BEARING


SET SCREW
3/8-32 THD.
7"/16
1"/32
1/4'
1/4
1/2"
27"/32
1"/8
1"/2
9"/16
A

Combination of 1/4" Coupler at one end and Panel Bearing Assembly at other. High quality phosphor bronze non-magnetic, non-rusting flexible shaft, turns at angle up to 90°. Free from backlash. Std. Pkg. 25

No.	Length "A"	NET Ea.
165	4 1/16"	$2.30
166	7 1/16"	2.40


.253
3/8-32 THD
11/32
.125
1/4-32 THD
5/16
7/16

119 184

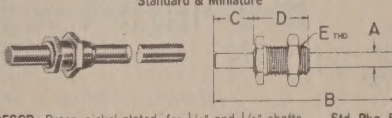
PANEL BEARINGS

DESCR.: Brass, nickel plated panel bearings, supplied with hex nut. Standard (No. 119) for 1/4" shafts; miniature (No. 184) for 1/8" shafts. Std. Pkg. 100

No.	(A)	(B)	(C)	(D)	(E)	Per C
119	.253	7/16"	1/2"	7/16"	3/8"-32	$22.00
184	.128	11/32"	7/16"	5/16"	1/4"-32	22.00

PANEL BEARING ASSEMBLIES

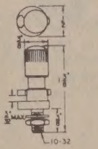
Standard & Miniature



DESCR.: Brass, nickel plated for 1/4" and 1/8" shafts. Std. Pkg. 50

No.	A	B	C	D	E	NET Per C
148	.250	3"	1/2	1/2	3/8-32	$75.00
149	.250	6"	1/2	1/2	3/8-32	80.00
1448	.125	2"	11/32	7/16	1/4-32	75.00
1449	.125	4"	11/32	7/16	1/4-32	80.00

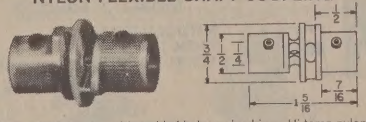
DIAL LOCK



HEAD: Captive: Brass, nickel plated.
BODY: Brass, nickel plated.
DESCR.: Prevents detuning of the dial when locked by means of the captive knurled nut. Supplied with hex nut & lockwasher. Std. Pkg. 25

No.	NET Per C
199	$130.00

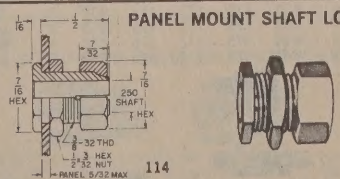
NYLON FLEXIBLE SHAFT COUPLING


1/2
3/4
1/2
1/4
1 5/16
7/16

DESCR.: Molded nylon with molded-in brass bushings. Hi-temp nylon not influenced by moisture. Designed for long reach shaft coupling. Supplied with 2 Allen head set screws. Std. Pkg. 25

No.	NET Per C
164	$165.00

PANEL MOUNT SHAFT LOCKS

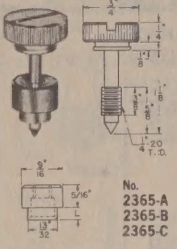

1/16
1/2
7/32
7/16 HEX
7/16
250 SHAFT
HEX
3/8-32 THD
1/2 3/32 HEX NUT
PANEL 5/32 MAX
114

DESCR.: Brass, nickel plated combination panel bearings and shaft locks. Type 155 mounts on front of panel with 4-40 hardware thru flange plate. Type 14 mounts thru panel in 3/8" hole. For 1/4" shafts. Std. Pkg. 50

No.	TPE	NET Per C
114	Single-hole mount	$55.00

CAPTIVE SCREW & BUSHING

Large Head

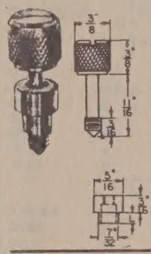

3/4"
1/4"
1/8"
1 1/8"
3/8"
5/8"
1/4-20 T.D.
9/16
5/16"
L
13/32

BODY: Brass, nickel plated.
DESCR.: Supplied with panel bushing as shown. Used extensively for quick removal of panels from chassis. Non-removable from panel. Std. Pkg. 25

No.	Panel Bushing Length (L)	Panel Thick.	NET Per C
2365-A	5/32"	1/8"	$125.00
2365-B	7/32"	3/16"	125.00
2365-C	9/32"	1/4"	125.00

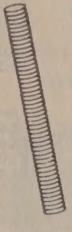
CAPTIVE SCREW & BUSHING

Small Head


3/8"
3/8"
11/16"
3/16
5/16"
3/16"
L
7/32"

BODY: Brass, nickel plated.
DESCR.: Supplied with panel bushing as shown. Used extensively for quick removal of panels from chassis. Non-removable from panel. Std. Pkg. 25

No.	Panel Bushing Length (L)	Panel Thick.	NET Per C
2375-A	5/32"	1/8"	$55.00
2375-B	7/32"	3/16"	55.00
2375-C	9/32"	1/4"	55.00



BRASS THREADED RODS

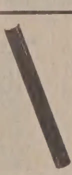
1-Ft. Length Std. Pkg. 10 2-Ft. Length

No.	NET Ea.	Threaded	No.	NET Ea.
1400-1	$. 90	6-32	1400-2	$1.80
1401-1	.90	8-32	1401-2	1.80
1402-1	.90	10-32	1402-2	1.80
1403-1	1.10	¼-20	1403-2	2.20

NYLON THREADED RODS

1-Ft. Length Std. Pkg. 10 2-Ft. Length

No.	NET Ea.	Threaded	No.	NET Ea.
1420-1	$1.20	6-32	1420-2	2.40
1421-1	1.30	8-32	1421-2	2.60
1422-1	1.50	10-32	1422-2	3.00
1423-1	1.80	¼-20	1423-2	3.60



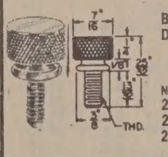
PLAIN RODS

Brass, Acetate & Nylon

¼" DIA Std. Pkg. 10 1/8" DIA

No.	Net Ea.	Type	Length	No.	NET Ea.
1404	$ .70	Brass N.P.	6"	1431	$ .60
1405	1.40	Brass N.P.	12"	1432	1.20
1406	.15	Acetate	6"	1433	.15
1407	.30	Acetate	12"	1434	.30
1408	.35	Nylon	6"	1440	.35
1409	.70	Nylon	12"	1441	.70

THUMB SCREW

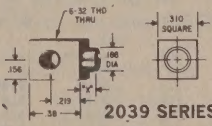

7"/16
1/4
1/8
25/32
3/8
THD.

BODY: Brass, nickel plated.
DESCR.: Used extensively for quick removal of panels from chassis. Std. Pkg. 25

No.	Thread	* NET Per C
2366	6-32	$30.00
2367	8-32	30.00
2368	10-32	30.00

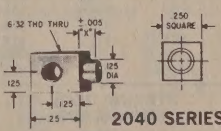
CHASSIS FASTENERS

Designed to be swaged onto metal chassis for use as mounting surfaces for terminal boards, tie strips, etc. Brass, Cadmium Plated. Std. Pkg. 100


6-32 THD THRU
.310 SQUARE
.156
.188 DIA
"X"
.219
.38

2039 SERIES

No.	"X"	Board Thickness	NET Per C
2039B	.105	.062	$30.00
2039C	.135	.094	30.00
2039D	.165	.125	30.00


6-32 THD THRU
±.005
"X"
.250 SQUARE
.125
.125 DIA
.125
.25

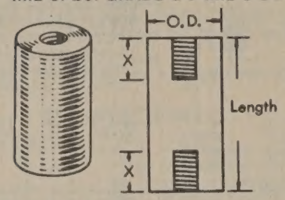
2040 SERIES

No.	"X"	Board Thickness	NET Per C
2040A	.075	.031	$30.00
2040B	.105	.062	30.00
2040C	.135	.094	30.00
2040D	.165	.125	30.00

SPECIFY SMITH ELECTRONIC COMPONENTS

STOCKED BY LEADING DISTRIBUTORS NATIONWIDE

CERAMIC STANDOFFS
MIL SPEC. GRADE L-5 MIL 1-10



ROUND

Std. Pkg. 100

3/8" Dia. 6/32 Thread

No.	MIL Type	Length	X	NET Per C
2600	NL523W01-004	.500	5/32	28.00
2601	NL523W01-005	.625	3/16	29.00
2602	NL523W01-006	.750	1/4	30.00
2603	NL523W01-008	1.000	3/8	32.00
2604	NL523W01-010	1.250	3/8	33.00
2605	NL523W01-012	1.500	3/8	37.00
2606	NL523W01-016	2.000	3/8	40.00

1/2" Dia. 8/32 Thread

No.	MIL Type	Length	X	NET Per C
2607	NL523W02-005	.625	3/16	30.00
2608	NL523W02-006	.750	1/4	31.00
2609	NL523W02-008	1.000	1/4	33.00
2610	NL523W02-010	1.250	3/8	37.00
2611	NL523W02-012	1.500	3/8	39.00
2612	NL523W02-016	2.000	3/8	44.00
2613	NL523W02-020	2.500	3/8	48.00
2614	NL523W02-024	3.000	3/8	53.00

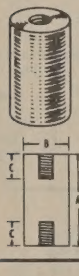
3/4" Dia. 10/32 Thread

No.	MIL Type	Length	X	NET Per C
2615	NL523W03-008	1.000	3/8	63.00
2616	NL523W03-010	1.250	3/8	68.00
2617	NL523W03-012	1.500	3/8	77.00
2618	NL523W03-016	2.000	3/8	81.00
2619	NL523W03-020	2.500	3/8	90.00
2620	NL523W03-024	3.000	3/8	100.00
2621	NL523W03-032	4.000	3/8	109.00

1" Dia. 1/4 x 20 Thread

No.	MIL Type	Length	X	NET Per C
2622	NL523W04-010	1.250	7/16	90.00
2623	NL523W04-012	1.500	1/2	97.00
2624	NL523W04-016	2.000	5/8	113.00
2625	NL523W04-020	2.500	5/8	125.00
2626	NL523W04-024	3.000	5/8	136.00
2627	NL523W04-032	4.000	5/8	148.00
2628	NL523W04-040	5.000	5/8	161.00
2629	NL523W04-048	6.000	5/8	174.00

CERAMIC STANDOFFS, COMMERCIAL



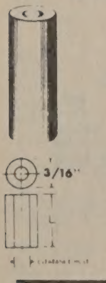
Grade L5 Ceramic with outside glazed. Std. Pkg. 100

No.	A	B	C	Thd.	NET Per C
2640	¼"	¼"	THRU	6-32	24.00
2641	½"	¼"	5/32"	6-32	25.00
2642	⅜"	⅜"	5/32"	6-32	26.00
2643	½"	⅜"	3/16"	6-32	28.00
2644	½"	½"	9/64"	6-32	29.00
2645	¾"	½"	¼"	6-32	30.00
2646	1"	½"	⅜"	6-32	32.00
2647	1½"	½"	9/16"	6-32	37.00
2648	2½"	½"	½"	6-32	63.00
2649	2½"	¾"	¾"	¼-20	127.00
2650	4"	¾"	¾"	¼-20	147.00

NYLON SPACERS

3/16" O.D. Molded Nylon, Type 66, Mil Spec. 20693A

Std. Pkg. 100



DIM "L"	#2 (.091) No.	#4 (.115) No.	NET PER C
.125	9160	9180	3.30
.187	9161	9181	3.80
.250	9162	9182	4.30
.312	9163	9183	4.90
.375	9164	9184	5.50
.437	9165	9185	6.00
.500	9166	9186	6.50
.562	9167	9187	7.00
.625	9168	9188	7.50
.687	9169	9189	8.00
.750	9170	9190	8.50
.812	9171	9191	8.80
.875	9172	9192	9.30
.937	9173	9193	9.70
1.000	9174	9194	10.00

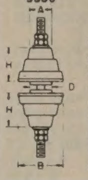
STAKING TOOL KITS
FOR SWAGE STANDOFFS

No.	Thread	Price
3872	4-40	$3.00 ea.
3873	6-32	3.00 ea.

NEED SPECIAL SCREW MACHINE WORK?
CALL OUR SUBSIDIARY
NELSON SCREW MACHINE PRODUCTS, INC.
OR CONTACT US DIRECTLY.

STEATITE AND PORCELAIN INSULATORS

9550

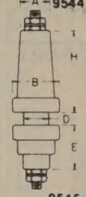


STEATITE INSULATED THRU-PANEL BUSHINGS

Consists of a pair of identical steatite insulators along with cushion washers and hardware. The 9555 assembly has interlocking insulators which are self-centering in mounting hole and may be used on very thin panels.

No.	Std. Pkg.	H	B	D	A	Hdwre	Net Ea.
9555	50	¼"	¾"	15/32"	½"	6-32	.48
9550	25	½"	¾"	15/32"	⅜"	6-32	.66
9551	10	13/16"	1¼"	27/32"	⅝"	10-32	1.05
9552	10	1⅛"	1¾"	1 7/32	⅞"	¼"-20	1.50

9544



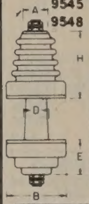
THRU-PANEL INSULATORS

Compression mounted by means of a stud throughout the entire length of the unit. Extrusion of insulator base extends thru mounting hole, increasing the breakdown rating. Units have flat mounting surfaces and are furnished with cushion washer. Types with jacks have terminal permitting connection above, as well as below, panel.

STEATITE

No.	Std. Pkg.	H	B	D	E	A	Hdwre	Net Ea.
9544	50	⅝"	⅝"	5/16"	5/16"	⅜"	6-32	.75
9542	25	⅞"	¾"	13/32"	⅜"	½"	10-32	.84
9540	25	1¼"	5/16"	7/16"	½"	19/32"	10-32	1.00
9543	10	No. 9542 with Std. Ban. Jack						1.03
9541	10	No. 9540 with Std. Ban. Jack						1.19

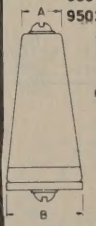
9545
9548



PORCELAIN

No.	Std. Pkg.	H	B	D	E	A	Hdwre	Ea.
9545	25	1⅜"	1¼"	½"	11/15"	⅝"	10-32	1.10
9548	10	2"	1⅝"	11/16"	⅞"	¾"	10-32	1.68
9546	10	2¾"	1⅝"	11/16"	1"	15/15"	¼"-20	2.15
9547	10	4½"	2⅛"	31/32"	1½"	1 1/16"	¼"-20	3.60
9557	10	No. 9545 with Std. Ban. Jack						1.30
9558	10	No. 9548 with Std. Ban. Jack						1.88
9556	10	No. 9546 with Giant Ban. Jk.						2.75

9500
9501
9502



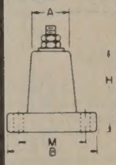
STEATITE CONE INSULATORS

Constructed of grade L-423 or better steatite, with threaded holes. Insulators are furnished complete with two nickel-plated machine screws, nickel-plated brass washers, and a cork cushion washer.

No.	Std. Pkg.	H	B	A	Hdwre	NET PER C
9500	50	21/32"	⅝"	7/16"	6-32	$90.00
9501	25	1 1/32"	¾"	½"	8-32	125.00
9502	25	1 7/16"	1"	½"	8-32	130.00
9503	10	2 1/16"	1⅛"	⅝"	10-32	300.00
9504	10	3 1/16"	1½"	¾"	10-32	700.00

STEATITE STAND-OFF INSULATORS

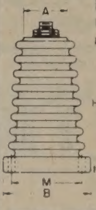
9521



Two hole mounting permits substantial lateral loads. Hardware includes screw, flat washer, and two nuts.

No.	Std. Pkg.	H	B	M	A	Hdwre	Net Ea.
9524	50	⅝"	1"	11/16"	1⅜"	6-32	$.35
9522	50	1"	1 5/32"	13/16"	15/32"	8-32	.50
9520	25	1 9/16"	1¾"	1 5/16"	¾"	10-32	.70
9523	10	No. 9522 with Std. Ban. Jack					.62
9521	10	No. 9520 with Std. Ban. Jack					.80

PORCELAIN STAND-OFF INSULATORS



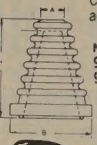
Feature square mounting bases with four mounting holes. Porcelain is dense molded and glazed, except on mounting surfaces.

No.	Std. Pkg.	H	B	M	A	Hdwre	Net Ea.
9562	10	2¾"	1⅞"	1⅜"	⅞"	¼"-20	$1.75
9560	10	4½"	2½"	1⅞"	1 3/16"	¼"-20	2.10

This group is supplied with drawn and etched aluminum bases.

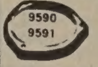
No.	Std. Pkg.	H	B	M	A	Hdwre	Net ea.
9565	10	1⅜"	1⅞"	1½"	⅝"	10-32	2.30
9568	10	2"	1¾"	1⅜"	23/32"	10-32	2.40
9566	10	2¾"	1¾"	1⅜"	1"	¼"-20	2.50
9567	10	4½"	2¼"	1¾"	1 1/16"	¼"-20	2.75

PORCELAIN LEAD-IN BUSHINGS



Consisting of single porcelain insulators less all hardware and mounting flange except cushion washer.

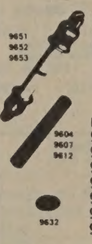
No.	Std. Pkg.	H	B	A	Net Ea.
9553	10	1¾"	2½"	1 1/16"	1.70
9554	10	4"	3½"	1"	2.15



Stamped aluminum mounting flanges, for three mounting holes spaced 120 degrees apart.

No.	Std. Pkg.	For Bushing No.	Net Ea.
9590	10	9553	$2.75
9591	10	9554	2.75

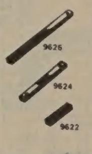
PORCELAIN ANTENNA STRAIN INSULATORS



The 9651, 9652, and 9653 have heavy 1½ diameter wet porcelain insulator with specially sealed end bells of non-corrosive aluminum alloy Porcelain is glazed to prevent moisture absorption. 1 diameter 5/8 square. The 9632 is a compression type strain insulator for aircraft or guy wire applications—made of dry process glazed porcelain.

No.	Std. Pkg.	Breaking Strength	Length Net	Length Overall	Net Ea.
9632	50	EGG	—	1½"	$.30
9604	25	400 lbs.	—	4"	.50
9607	25	800 lbs.	—	7"	8.50
9612	25	800 lbs.	—	12"	9.50
9651	1	5000 lbs.	8"	15½"	42.00
9652	1	5000 lbs.	12"	19½"	45.00
9653	1	5000 lbs.	20"	25½"	66.00

PORCELAIN FEEDER INSULATORS

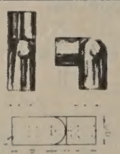


Conventional feeder spreaders for constructing high efficiency, open-wire antenna feeders and transmission lines. Insulators are made of high grade, low absorption porcelain silicone impregnated for moisture resistance. Insulators have ⅜" x ½" cross section. The 9622 has extra notches for 1½" line spacing.

No.	Std. Pkg.	Length	Net Ea.
9622	25	2"	.24
9624	25	4"	.48
9626	25	6"	.60

No.	Std. Pkg.	Length	Net Ea.
9632	50	1½"	$.30

SWIVEL STANDOFFS

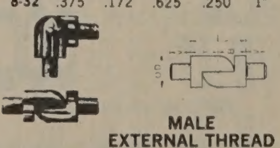


MATERIALS: BRASS
FINISH: TIN PLATED
DESCR.: FOR PRINTED CIRCUIT BOARDS

STD. PKG. 25

FEMALE INTERNAL THREAD

NO.	O.D.	THD.	TOP (T)	DEP. (U)	BOT (B)	DEP. (V)	LGTH (L)	NET PER C
3021	3/16	4-40	.375	.172	.375	.172	¾"	$55.00
3022	3/16	4-40	.375	.172	.625	.250	1"	60.00
3023	¼	6-32	.375	.172	.375	.172	¾"	60.00
3024	¼	6-32	.375	.172	.625	.250	1"	65.00
3025	¼	8-32	.375	.172	.375	.172	¾"	60.00
3026	¼	8-32	.375	.172	.625	.250	1"	65.00



MALE EXTERNAL THREAD

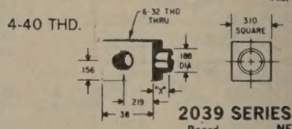
NO.	O.D.	THD.	TOP (T)	DEP. (U)	BOT (B)	DEP. (V)	LGTH (L)	NET PER C
3027	3/16	4-40	.250	.250	.250	.250	½"	$55.00
3028	¼	6-32	.250	.312	.250	.312	½"	60.00
3029	¼	8-32	.250	.312	.250	.312	½"	60.00

NOTE; SPECIAL SIZES ON REQUEST.

CHASSIS FASTENERS

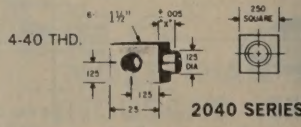
Designed to be swaged onto metal chassis for use as mounting surfaces for terminal boards, tie strips, etc. Brass, Cadmium Plated.

Std. Pkg. 100



2039 SERIES

No.	"X"	Board Thickness	NET Per C
2039B	.105	.062	$30.00
2039C	.135	.094	30.00
2039D	.165	.125	30.00



2040 SERIES

No.	"X"	Board Thickness	NET Per C
2040A	.075	.031	$30.00
2040B	.105	.062	30.00
2040C	.135	.094	30.00
2040D	.165	.125	30.00

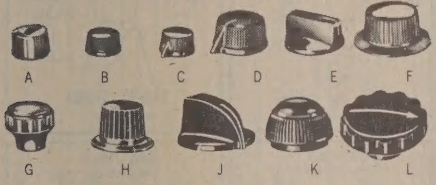
INSTRUMENT KNOBS

A
B
C
Plain
With Pointer
With Skirt

Molded black bakelite instrument knobs with molded in brass insert for $\frac{1}{4}$" shafts. Style B pointer knobs have white vinyl pointer. Style C skirt type have white indicator line. Style D same as style A except with protruding brass insert for mounting special dials and pointers.
Std. Pkg. 10

No.	Style	O.D.	Pointer Size	Height	NET Per C
2200	A	$1\frac{1}{8}$"		$\frac{5}{8}$"	$57.00
2201	A	$1\frac{3}{8}$"		$\frac{11}{16}$"	59.00
2202	A	$1\frac{5}{8}$"		$\frac{3}{4}$"	65.00
2203	A	$2\frac{3}{8}$"		$\frac{7}{8}$"	90.00
2204	B	$1\frac{1}{8}$"	$\frac{3}{4}$" pointer	$\frac{11}{16}$"	85.00
2205	B	$1\frac{3}{8}$"	$1\frac{1}{16}$" pointer	$\frac{11}{16}$"	87.00
2206	B	$1\frac{5}{8}$"	$1\frac{3}{16}$" pointer	$\frac{13}{16}$"	93.00
2207	B	$2\frac{3}{8}$"	$1\frac{9}{16}$" pointer	$\frac{15}{16}$"	121.00
2208	C	$1\frac{1}{8}$"	$1\frac{1}{2}$" Skirt	$\frac{13}{16}$"	118.00
2209	C	$1\frac{3}{8}$"	$1\frac{3}{4}$" Skirt	$\frac{7}{8}$"	125.00
2210	C	$1\frac{5}{8}$"	$2\frac{1}{16}$" Skirt	$\frac{29}{32}$"	136.00
2211	C	$2\frac{3}{8}$"	3" Skirt	$1\frac{1}{32}$"	170.00

CONTROL KNOBS

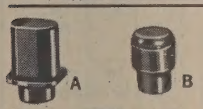


Molded bakelite control knobs. Supplied with $\frac{1}{4}$" molded hole; complete with set screw. *Recessed for locknut.
Std. Pkg. 50

No.	Style	O.D.	Height	Color	NET Per C
2240	A	$\frac{3}{4}$"	$\frac{19}{32}$"	Black	$28.00
2242	B	$\frac{11}{16}$"	$\frac{13}{32}$"	Black	13.00
2244*	B	1"	$\frac{1}{2}$"	Black	22.00
2275†	B	$\frac{11}{16}$"	$\frac{13}{32}$"	Black	22.00
2246	C	$\frac{11}{16}$"	$\frac{13}{32}$"	Black	14.00
2273†	C	$\frac{11}{16}$"	$\frac{13}{32}$"	Black	23.00
2248*	D	1"	$\frac{1}{2}$"	Black	29.00
2250*	E	$1\frac{1}{8}$"	$\frac{9}{16}$"	Black	25.00
2252*	F	$1\frac{1}{2}$"	$\frac{11}{16}$"	Black	32.00
2258	G	$\frac{7}{8}$"	$\frac{3}{4}$"	Black	28.00
2265	H	$\frac{29}{32}$"	$\frac{19}{32}$"	Black	29.00
2267	J	$1\frac{3}{16}$"	$\frac{5}{8}$"	Black	23.00
2283	L	$\frac{7}{8}$"	$\frac{1}{2}$"	Black	41.00

† Supplied with brass insert.

PUSH BUTTON KNOBS



Std. Pkg. 50

No.	Style	O.D.	Height	Color	Per C
2277	A	$\frac{1}{2}$"	$\frac{51}{64}$"	Black	$12.00
2279	B	$\frac{31}{64}$"	$\frac{9}{16}$"	Black	8.50

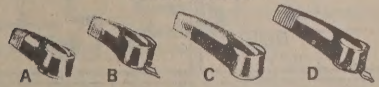
POINTER KNOBS

A
Length $1\frac{1}{4}$"
Hgt. $\frac{5}{8}$"
B
Length 2"
Hgt. $\frac{5}{8}$"
C
Length $1\frac{1}{4}$"
Hgt. $\frac{9}{16}$"

Molded bakelite pointer knobs, supplied with $\frac{1}{4}$" plain hole or brass insert. Complete with set screw.
Std. Pkg. 50

No.	Style	Type Hole	Color	NET Per C
2220	A	$\frac{1}{4}$" Plain	Black	$27.00
2223	A	$\frac{1}{4}$" Brass Insert	Black	33.00
2226	B	$\frac{1}{4}$" Plain	Black	31.00
2228	B	$\frac{1}{4}$" Brass Insert	Black	45.00
2230	C	$\frac{1}{4}$" Plain	Black	24.00

LEVER KNOBS



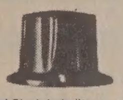
Molded bakelite lever knobs with $\frac{1}{4}$" brass insert, complete with set screw.
Std. Pkg. 50

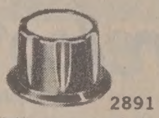
No.	Style	Length	Height	Color	NET Per C
2232	A	$1\frac{5}{8}$"	$\frac{19}{32}$"	Black	$46.00
2234	B	$1\frac{15}{16}$"	$\frac{19}{32}$"	Black	81.00
2236	C	$2\frac{1}{2}$"	$\frac{5}{8}$"	Black	45.00
2238	D	$2\frac{13}{16}$"	$\frac{5}{8}$"	Black	81.00

UTILIZE OUR FACILITIES

- ENGINEERING & DESIGN
- PRECISION TURNING
- STAMPING
- MOLDING
- ASSEMBLY

FLUTED INSTRUMENT KNOBS


2391


2891

Molded Black bakelite, supplied with white filled line on crown and skirt. Supplied with $\frac{1}{4}$" plain hole with set screw.
Std. Pkg. 10

No.	Skirt	Height	Net Per C
2391	$\frac{3}{4}$"	$\frac{1}{2}$"	$42.00
2392	$1\frac{1}{8}$"	$\frac{5}{8}$"	47.00
2393	$1\frac{1}{4}$"	$\frac{3}{4}$"	54.00
2394	$1\frac{1}{2}$"	$\frac{7}{8}$"	58.00
2395	2.000"	$\frac{15}{16}$"	75.00
With $\frac{1}{8}$" plain hole and set screw			
2396	$\frac{3}{4}$"	$\frac{1}{2}$"	44.00
Same as above, except for spun Silver insert and lined skirt.			
2891	$\frac{3}{4}$"	$\frac{1}{2}$"	64.00
2892	$1\frac{1}{8}$"	$\frac{5}{8}$"	80.00
2893	$1\frac{1}{4}$"	$\frac{3}{4}$"	67.00
2894	$1\frac{1}{2}$"	$\frac{7}{8}$"	87.00
2895	2.000"	$\frac{15}{16}$"	100.00
With $\frac{1}{8}$" plain hole and set screw			
2896	$\frac{3}{4}$"	$\frac{1}{2}$"	66.00

DESIGNER SERIES INSTRUMENT KNOBS

2885

2890

Molded Black bakelite with lined spun Silver insert. Supplied with plain $\frac{1}{4}$" hole and set screw.
Std. Pkg. 10

No.	Height	Diameter	Net Per C
2885	$\frac{5}{8}$"	$\frac{3}{4}$"	$69.00
2886	$\frac{11}{16}$"	1.000"	67.00
2887	$\frac{3}{4}$"	$1\frac{3}{8}$"	80.00
2888	$\frac{13}{16}$"	$1\frac{3}{4}$"	88.00
Pointer type, white line on pointer.			
2890	$\frac{5}{8}$"	$1\frac{1}{4}$"	88.00
With $\frac{1}{8}$" plain hole and set screw			
2889	$\frac{5}{8}$"	$\frac{1}{2}$"	68.00

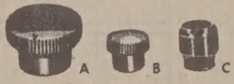
2879

2884

Same as above, lined crown, less the spun Silver insert.

No.	Height	Diameter	Net Per C
2879	$\frac{5}{8}$"	$\frac{3}{4}$"	$40.00
2880	$\frac{11}{16}$"	1.000"	42.00
2881	$\frac{3}{4}$"	$1\frac{3}{8}$"	48.00
2882	$\frac{13}{16}$"	$1\frac{3}{4}$"	56.00
With $\frac{1}{8}$" plain hole and set screw			
2883	$\frac{5}{8}$"	$\frac{1}{2}$"	39.00
Pointer type, white line on pointer.			
2884	$\frac{5}{8}$"	$1\frac{1}{4}$"	46.00

BINDING POST KNOBS



Std. Pkg. 50

threaded 8-32 brass inserts

No.	Style	O.D.	Height	Color	NET Per C
2271	A	$\frac{3}{4}$"	$\frac{1}{2}$"	Black	$16.00
2272	A	$\frac{3}{4}$"	$\frac{1}{2}$"	Red	17.00
2285	B	$\frac{1}{2}$"	$\frac{7}{16}$"	Red	13.00
2286	B	$\frac{1}{2}$"	$\frac{7}{16}$"	Black	13.00
2287	C	$\frac{1}{2}$"	$\frac{1}{2}$"	Red	13.00
2288	C	$\frac{1}{2}$"	$\frac{1}{2}$"	Black	13.00

CONCENTRIC FLUTED INSTRUMENT KNOB

2397

2897

Molded Black and Red bakelite dual concentric knob. Black outside knob with White filled line on skirt. Red inner knob with White filled line on skirt and crown. Supplied with set screws.
Std. Pkg. 10

No.	NET Per C
2397	$90.00
Same as above except with lined spun Silver insert on Red inner knob.	
2897	110.00

CONCENTRIC DESIGNER SERIES KNOBS

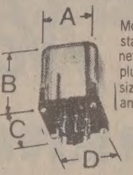
Molded Black outside knob with filled line $\frac{1}{4}$ hole, inner molded Black knob with lined spun Silver lined insert, $\frac{1}{8}$ hole.
Std. Pkg. 10

No.	NET Per C
2898	$120.00

Same as above except less the spun Silver insert, outside knob with lined side, top inner knob with lined crown.

No.	NET Per C
2899	89.00

PLUG-IN MODULE HOUSINGS



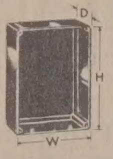
Molded plastic housings and pin headers fit standard tube sockets. For use in packaging relays, networks, miniature interchangeable circuits in plug-in, replaceable modules. Available in three sizes and materials for a wide range of temperature and environmental applications.

Std. Pkg. 25

HEADERS	A	B	C	D
MIN.	1 3/16	1 9/16	1⅜	1⅜
STD.	1 3/16	1 15/16	1⅜	1⅜
LGE.	1¾	2 15/16	1 31/32	1 31/32

HEADER BLACK	STYRENE BLACK		BUTYRATE BLACK		NYLON NATURAL	
	Cat. No.	Net. Ea.	Cat. No.	Net Ea.	Cat. No.	Net Ea.
			MINIATURE			
8 Pin	2437-08	$ .75	2421-08	$ .90	2424-08	$ .80
9 Pin	2437-09	.90	2421-09	1.00	2424-09	1.00
11 Pin	2437-11	.90	2421-11	1.00	2424-11	1.00
20 Pin	2437-20	1.00	2421-20	1.15	2424-20	1.15
			STANDARD			
8 Pin	2438-08	$ .75	2422-08	$ .75	2432-08	$ .90
9 Pin	2438-09	.80	2422-09	.90	2432-09	1.00
11 Pin	2438-11	.80	2422-11	.90	2432-11	1.00
20 Pin	2438-20	1.00	2422-20	1.00	2432-20	1.15
			LARGE			
8 Pin	2439-08	$ .95	2423-08	$1.40	—	—
11 Pin	2439-11	1.00	2423-11	1.45	—	—
20 Pin	2439-20	1.35	2423-20	1.70	—	—

INSTRUMENT CASES AND COVERS

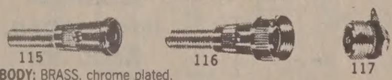


Ideal for small instruments and test equipment. The right size and the right mounting for your requirements. Molded of high quality, glass finish, thermosetting plastic. Threaded brass insert for cover mounting. BLACK ONLY
Std. Pkg. 5.

No.	H	W	D	Insert	NET Ea.
2377	4"	2⅞"	1 9/16"	4-40*	$ .75
2291	5"	4¼"	1¾"	6-32	1.50
2255	6¼"	3¾"	2"	6-32	1.40
2257	6 13/16"	5 9/32"	2 5/16"	4-40	2.40
2289	8½"	7 7/16"	3"	6-32	2.80
		PHENOLIC COVERS			
2378		For No. 2377			$25.00
2292		For No. 2291			40.00
2256		For No. 2255			90.00
2260		For No. 2257			160.00
2390		For No. 2289			250.00
		PANEL PLATE Brushed and lacquered Aluminum			
2379		For No. 2255			1.10

*SELF TAPPING

MICROPHONE CONNECTORS



BODY: BRASS, chrome plated.
SPRING: Steel, cadmium plated.
INSUL.: XXXP PHENOLIC.
DESCR.: Designed for use with single conductor cable. Microphone connectors provided with flexible protector spring. Cable clamped firmly to connector by hollow point set screw.
Std. Pkg. 50

MICROPHONE CONNECTORS

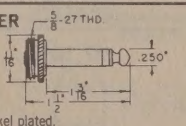
No.	Type	NET Per C
115	Single Contact Male	$39.00
116	Single Contact Female	65.00

CHASSIS CONNECTORS

Mount to .385 hole grounded; .500 hole insulated with shoulder washer.

No.	Type	Std. Pkg.	NET Per C
117	Single Contact Male	25	$60.00

PHONE PLUG ADAPTER



BODY: Body, tip, sleeve—Brass, nickel plated.
INSUL.: XXXP PHENOLIC.
RATING: 5 Amps AC for 10°C Temp. rise, continuous duty.750 Volts 60 cycle AC continuous working voltage.
DESCR.: Assembled to insure positive contact with input wire of mating microphone connector. Molded styrene separator insures maximum insulation between conductors. Mates with No. 116 microphone connector. Fits standard phone jacks.
Std. Pkg. 25

No.	Net Per C
113	$47.00

Norelco® MINIATURE LAMPS

Exclusively Distributed by

HERMAN H. SMITH, INC.

A NORTH AMERICAN PHILIPS COMPANY

Through Electronic Distributors

A wide variety of miniature, subminiature incandescent lamps, neon glow and telephone types.

Many types to choose for applications in Aircraft, Telephone equipment, Annunciators, Appliances, Flashlights, Automotive, Marine, Game equipment, Medical, Radio, TV, Toys etc.

The lamps offer a long life reliability and high output when used under manufacturers ratings.

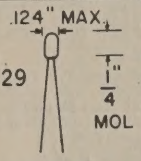
Fig. 29

.124" MAX.
1/4" MOL
T-1 Bulb
Wire Term Base

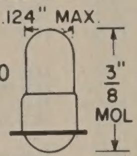
Fig. 30

.124" MAX.
3/8" MOL
T-1 Bulb
S.C. Mid. Flg. Base

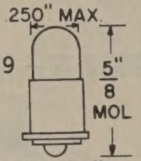
Fig. 19

.250" MAX.
5/8" MOL
T-1¾ Bulb
S.C. Mid. Flg. Base

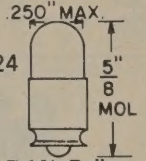
Fig. 24

.250" MAX.
5/8" MOL
T-1¾ Bulb
Mid. Grooved Base

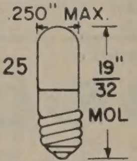
Fig. 25

.250" MAX.
19/32" MOL
T-1¾ Bulb
Mid. Screw Base

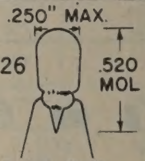
Fig. 26

.250" MAX.
.520 MOL
T-1¾ Bulb
Wire Term Base

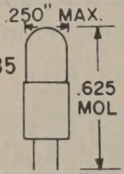
Fig. 35

.250" MAX.
.625 MOL
T-1¾ Bulb
Bi-Pin Base

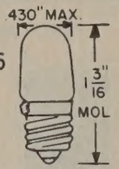
Fig. 6

.430" MAX.
1 3/16" MOL
T-3¼ Bulb
Min. Screw Base

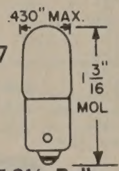
Fig. 7

.430" MAX.
1 3/16" MOL
T-3¼ Bulb
Min. Bay. Base

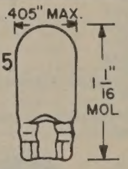
Fig. 15

.405" MAX.
1 1/16" MOL
T-3¼ Bulb
Wedge Base

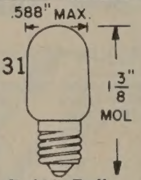
Fig. 31

.588" MAX.
1 3/8" MOL
T-4½ Bulb
Min. Screw Base

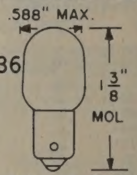
Fig. 36

.588" MAX.
1 3/8" MOL
T-4½ Bulb
Min. Bay. Base

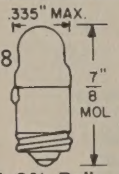
Fig. 28

.335" MAX.
7/8" MOL
TL-2¾ Bulb
Special Base

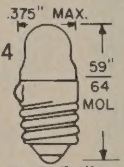
Fig. 14

.375" MAX.
59/64" MOL
TL-3 Bulb
Min. Screw Base

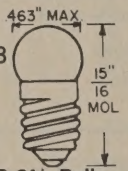
Fig. 3

.463" MAX.
15/16" MOL
G-3½ Bulb
Min. Screw Base

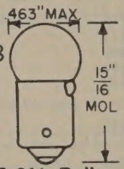
Fig. 8

.463" MAX.
15/16" MOL
G-3½ Bulb
Min. Bay. Base

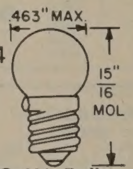
Fig. 4

.463" MAX.
15/16" MOL
G-4½ Bulb
Min. Screw Base

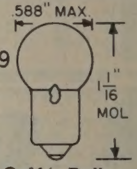
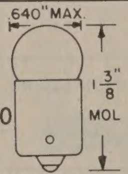
Fig. 9

.588" MAX.
1 1/16" MOL
G-4½ Bulb
Min. Bay. Base

Fig. 20

.640" MAX.
1 3/8" MOL
G-5 Bulb
S.C. Bay. Base

For further details and technical information, Send for Catalog.

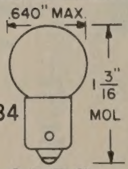
Fig. 34

.640" MAX.
1 3/16" MOL
G-5 Bulb
Min. Bay. Base

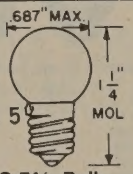
Fig. 5

.687" MAX.
1 1/4" MOL
G-5½ Bulb
Min. Screw Base

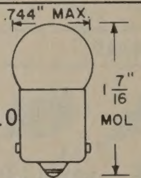
Fig. 10

.744" MAX.
1 7/16" MOL
G-6 Bulb
S.C. Bay. Base

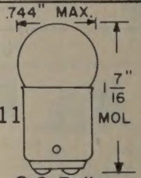
Fig. 11

.744" MAX.
1 7/16" MOL
G-6 Bulb
D.C. Bay. Base

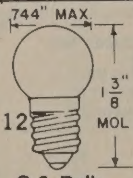
Fig. 12

.744" MAX.
1 3/8" MOL
G-6 Bulb
Cand. Screw Base

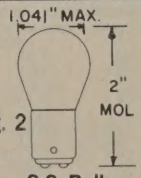
Fig. 2

1.041" MAX.
2" MOL
S-8 Bulb
D.C. Bay. Base

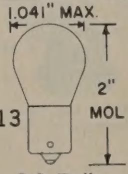
Fig. 13

1.041" MAX.
2" MOL
S-8 Bulb
S.C. Bay. Base

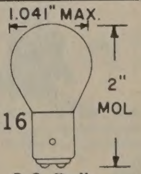
Fig. 16

1.041" MAX.
2" MOL
S-8 Bulb
D.C. Index Base

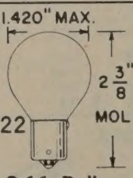
Fig. 22

1.420" MAX.
2 3/8" MOL
S-11 Bulb
S.C. Bay. Base

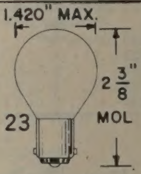
Fig. 23

1.420" MAX.
2 3/8" MOL
S-11 Bulb
D.C. Bay. Base

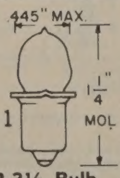
Fig. 1

.445" MAX.
1 1/4" MOL
B-3½ Bulb
S.C. Min. Flg. Base

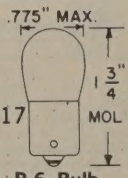
Fig. 17

.775" MAX.
1 3/4" MOL
B-6 Bulb
S.C. Bay. Base

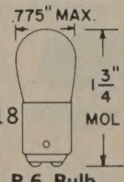
Fig. 18

.775" MAX.
1 3/4" MOL
B-6 Bulb
D.C. Bay. Base

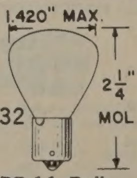
Fig. 32

1.420" MAX.
2 1/4" MOL
RP-11 Bulb
S.C. Bay. Base

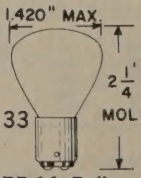
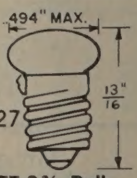
Fig. 33

1.420" MAX.
2 1/4" MOL
RP-11 Bulb
D.C. Bay. Base

Fig. 27

.494" MAX.
13/16"
FE-3¾ Bulb
Min. Screw Base

STOCKED BY
LEADING
DISTRIBUTORS
NATIONWIDE

ELECTRONIC COMPONENTS SPECIFY SMITH

Norelco® MINIATURE LAMPS Standard Package of 10

LAMP #	HHS #	FIG. #	Prices each QTY OF 10	QTY OF 100	QTY OF 500
PR2	43000	1	.235E	.198E	.160E
PR3	43020	1	.243E	.204E	.165E
PR4	43035	1	.243E	.204E	.165E
PR5	43050	1	.456E	.383E	.310E
PR6	43060	1	.243E	.204E	.165E
PR7	43075	1	.282E	.237E	.192E
PR12	43085	1	.243E	.204E	.165E
PR13	43100	1	.243E	.204E	.165E
PR15	43115	1	.321E	.270E	.218E
PR18	43135	1	.306E	.257E	.208E
PR20	43150	1	.368E	.309E	.250E
10	43185	8	.421E	.354E	.286E
12	43195	8	.343E	.288E	.233E
13	43205	3	.194E	.163E	.132E
14	43215	3	.194E	.163E	.132E
15	43230	9	.715E	.601E	.486E
19	43240	8	.480E	.403E	.326E
27	43250	4	.332E	.279E	.226E
31	43265	4	.547E	.460E	.372E
35	43275	5	.971E	.816E	.660E
40	43285	6	.204E	.172E	.139E
41	43295	6	.307E	.258E	.209E
42	43305	6	.786E	.660E	.534E
43	43320	7	.307E	.258E	.209E
44	43330	7	.197E	.166E	.134E
45	43340	7	.522E	.439E	.355E
46	43345	6	.191E	.161E	.130E
47	43355	7	.184E	.155E	.125E
48	43365	6	.391E	.329E	.266E
49	43370	7	.356E	.299E	.242E
50	43375	3	.232E	.195E	.158E
51	40005	8	.171E	.144E	.116E
52	43380	3	.621E	.522E	.422E
53	40020	8	.185E	.156E	.126E
53X	40025	8	.241E	.203E	.164E
55	40035	9	.244E	.205E	.166E
57	40050	9	.227E	.191E	.154E
57X	40055	9	.222E	.187E	.151E
63	40060	10	.252E	.212E	.171E
64	40065	11	.355E	.298E	.241E
67	40075	10	.240E	.202E	.163E
68	40095	11	.341E	.287E	.232E
81	40105	10	.323E	.263E	.213E
82	40120	11	.274E	.230E	.186E
87	40140	13	.684E	.575D	.465E
89	40155	10	.252E	.212E	.171E
93	40180	13	.359E	.302E	.244E
94	40195	2	.402E	.338E	.273E
97	40210	10	.281E	.236E	.191E
97A	40213	10	.443E	.372E	.301E
112	43465	14	.510E	.429E	.347E
123	43485	3	.241E	.203E	.164E
130	43500	8	.259E	.218E	.176E
131	43515	3	.250E	.210E	.170E
137	43535	8	.349E	.293E	.237E
158	40215	15	.228E	.192E	.155E
159	43545	15	.303E	.255E	.206E
161	40225	15	.232E	.195E	.158E
194	40235	15	.228E	.192E	.155E
198	40245	16	.559E	.470E	.380E
199	40250	13	.538E	.452E	.366E
209	40255	17	.702E	.590E	.477E
210	40265	18	.457E	.384E	.311E
211	40275	41	.393E	.330E	.267E
212	40295	41	.450E	.378E	.306E
219	43555	8	.671E	.564E	.456E
222	43565	14	.330E	.277E	.224E
223	43575	27	.440E	.370E	.299E
224	43585	28	.653E	.549E	.444E
233	43600	3	.499E	.419E	.339E
239	43610	7	.777E	.653E	.528E
240	43620	7	.830E	.697E	.564E
243	43640	14	.635E	.534E	.432E
245	43655	3	.331E	.278E	.225E
257	43680	9	.463E	.389E	.315E
268	46040	19	1.980E	1.663E	1.346E
293	40305	9	.232E	.195E	.158E
301	43715	20	.836E	.702E	.568E
303	43735	10	.741E	.623E	.504E
304	43745	11	.859E	.722E	.584E
305	43750	13	.756E	.635E	.514E
306	43755	2	1.578E	1.326E	1.073E
307	43765	13	.766E	.644E	.521E
3071F	43775	13	1.212E	1.018E	.824E
308	43785	2	1.055E	.886E	.717E
3081F	43795	2	1.089E	.915E	.740E
309	43805	22	1.206E	1.013E	.820E
3091F	43815	22	1.934E	1.625E	1.315E
311	43835	22	1.233E	1.036E	.838E
312	43845	23	2.468E	2.073E	1.678E
313	43855	7	.424E	.356E	.288E
313R	43865	7	.899E	.755E	.611E
315	43875	13	1.696E	1.425E	1.153E
327	46075	19	.618E	.519E	.420E
327AS15	46085	19	2.224E	1.868E	1.512E

LAMP #	HHS #	FIG. #	Prices each QTY OF 10	QTY OF 100	QTY OF 500
327R	46090	19	.969E	.814E	.659E
328	46100	19	.478E	.402E	.325E
328AS10	46115	19	1.892E	1.589E	1.286E
328R	46120	19	.969E	.814E	.659E
330	46130	19	.827E	.695E	.562E
330R	46140	19	1.809E	1.520E	1.230E
331	46150	19	1.011E	.849E	.687E
334	46165	24	.925E	.777E	.629E
335	46180	25	1.578E	1.326E	1.073E
336	46195	24	1.497E	1.258E	1.018E
337	46210	24	1.780E	1.495E	1.210E
338	46225	19	.899E	.755E	.611E
342	46235	25	1.815E	1.525E	1.234E
344	46250	19	1.415E	1.189E	.962E
345	46260	19	1.564E	1.314E	1.063E
346	46275	24	1.302E	1.094E	.885E
349	46290	19	1.114E	.936E	.757E
356	43885	8	.784E	.659E	.533E
367X	46300	19	1.764E	1.482E	1.199E
368	46320	19	.802E	.674E	.542E
370	46330	19	1.564E	1.314E	1.063E
373	46345	25	1.796E	1.509E	1.221E
375	46360	19	2.171E	1.824E	1.476E
377	46370	19	1.121E	.942E	.762E
378	46385	25	1.846E	1.551E	1.255E
379	46395	24	1.225E	1.029E	.833E
380	46405	19	2.181E	1.832E	1.483E
381	46420	19	1.162E	.976E	.790E
382	46430	19	1.228E	1.032E	.835E
385	46445	19	2.051E	1.723E	1.394E
386	46455	24	1.586E	1.332E	1.078E
387	46465	19	.624E	.524E	.424E
388	46475	24	1.578E	1.326E	1.073E
394	46490	19	1.364E	1.146E	.927E
397	46500	24	1.085E	.912E	.738E
398	46510	24	1.108E	.931E	.753E
401	43925	4	.796E	.669E	.541E
405	43940	4	.716E	.601E	.486E
406	43945	4	.596E	.501E	.405E
407	43950	4	.402E	.338E	.273E
425	43975	4	.328E	.276E	.223E
427	43990	9	.880E	.740E	.599E
432	44010	4	.622E	.523E	.423E
455	44020	4	.590E	.496E	.401E
458	44030	3	.828E	.696E	.563E
502	44035	4	.204E	.172E	.139E
503	44045	9	.355E	.298E	.241E
509K	44055	12	.496E	.417E	.337E
605	44065	4	.569E	.478E	.387E
631	40310	10	.530E	.445E	.360E
680AS15	46560	29	2.311E	1.941E	1.571E
682	46565	30	2.408E	2.023E	1.637E
682AS15	46575	30	2.696E	2.265E	1.833E
683AS15	46590	29	2.311E	1.941E	1.571E
683R	46595	29	1.948E	1.636E	1.324E
685	46605	30	2.408E	2.023E	1.637E
685AS15	46615	30	3.075E	2.583E	2.091E
713AS15	46625	29	2.828E	2.376E	1.923E
714	46630	30	2.408E	2.023E	1.637E
714AS15	46640	30	2.696E	2.265E	1.833E
715AS15	46655	29	2.311E	1.941E	1.571E
718	46670	30	2.408E	2.023E	1.637E
718AS15	46675	30	2.696E	2.265E	1.833E
755	44075	7	.382E	.321E	.260E
756	44090	7	.630E	.529E	.428E
757	44105	7	.563E	.473E	.383E
965	44130	31	1.317E	1.106E	.895E
1003	40320	17	.353E	.297E	.240E
1004	40325	18	.353E	.297E	.240E
1016	40335	16	1.069E	.898E	.727E
1034	40345	16	.394E	.331E	.268E
1034A	40365	16	.725E	.609E	.493E
1034NA	40375	16	1.073E	.902E	.730E
1073	40385	13	.460E	.387E	.313E
1129	40395	13	.393E	.330E	.267E
1130	40400	2	.574E	.482E	.390E
1133	40410	32	.786E	.660E	.534E
1134	40420	33	1.193E	1.002E	.811E
1141	40430	13	.353E	.297E	.240E
1142	40440	2	.402E	.338E	.273E
1143	40445	32	1.156e	.971E	.786E
1144	40455	33	1.136E	.954E	.772E
1154	40470	16	.494E	.415E	.336E
1155	40480	10	.413E	.347E	.281E
1156	40490	13	.460E	.387E	.313E
1157	40505	16	.343E	.288E	.233E
1157A	40530	16	.684E	.575E	.465E
1157NA	40540	16	.890E	.748E	.605E
1158	40545	2	.677E	.569E	.460E
1176	40570	2	.524E	.440E	.356E
1183	40575	32	1.586E	1.332E	1.078E
1184	40585	33	1.553E	1.305E	1.056E
1195	40600	32	1.721E	1.446E	1.170E
1196	40610	33	1.809E	1.520E	1.230E
1203	40620	13	1.446E	1.215E	.983E

LAMP #	HHS #	FIG. #	Prices each QTY OF 10	QTY OF 100	QTY OF 500
1204	40630	2	2.146E	1.803E	1.459E
1224	44170	11	.925E	.777E	629E
1251	40640	10	.685E	.576E	.466E
1302	44180	7	.572E	.481E	.389E
1309	44190	17	2.732E	2.295E	1.857E
1408	44225	7	.362E	.304E	.246E
1445	40660	8	.228E	.192E	.155E
1446	44255	3	.602E	.506E	.409E
1447	44265	3	.262E	.220E	.178E
1449	44285	3	.199E	.167E	.135E
1450	44295	8	1.262E	1.060E	.858E
1458	44305	34	1.000E	.840E	.680E
1483	44335	4	.494E	.415E	.336E
1487	44345	6	.307E	.258E	.209E
1488	44355	7	.652E	.548E	.443E
1489	44370		4.737E	3.979E	3.220E
1490	44380	7	.615E	.517E	.418E
1493	44410	2	1.558E	1.309E	1.059E
1495	44425	36	.705E	.592E	.479E
1630	44455		2.040E	1.714E	1.387E
1651	44465	13	1.650E	1.386E	1.122E
1665	44475	13	1.534E	1.289E	1.043E
16651F	44485	13	1.490E	1.119E	.748E
1680	44495	13	1.122E	.943E	.763E
1683	44525	13	1.402E	1.178E	.953E
1691	40665	13	1.939E	1.629E	1.318E
1692	44540	2	2.287E	1.921E	1.555E
1705D	47000	26	.687E	.577E	.467E
1728D	47015	26	.500E	.420E	.340E
1730D	47030	26	1.143E	.960E	.777E
1738D	47040	26	.507E	.426E	.345E
1739D	47050	26	.645E	.542E	.439E
1762D	47060	26	.502E	.422E	.341E
1764D	47070	26	.562E	.472E	.382E
1767	47080	25	.809E	.680E	.550E
1768	47090	25	.955E	.802E	.649E
1769	47100	25	1.134E	.953E	.771E
1775	47110	25	1.073E	.902E	.730E
1783D	47120	26	.500E	.420E	.340E
1784D	47130	26	.771E	.648E	.524E
1810	44575	7	1.250E	1.050E	.850E
1813	44580	7	.328E	.276E	.223E
1815	44585	7	.387E	.325E	.263E
1816	44590	7	.274E	.230E	.186E
1818	44600	7	.968E	.813E	.658E
1819	44610	7	.463E	.389E	.315E
1820	44620	7	.449E	.377E	.305E
1821	44635	6	9.870E	8.290E	6.710E
1822	44645	7	.765E	.643E	.520E
1823	44655	6	1.272E	1.069E	.865E
1826	44665	7	.868E	.729E	.590E
1828	44675	7	.818E	.687E	.556E
1829	44685	7	.459E	.386E	.312E
1832	44705	6	2.014E	1.692E	1.369E
1835	44715	7	.925E	.777E	.629E
1847	44735	7	.219E	.184E	.149E
1850	44745	7	.463E	.389E	.315E
1855	44755	36	.703E	.591E	.478E
1864	44770	7	.566E	.476E	.385E
1866	44780	7	.274E	.230E	.186E
1867	44790	7	1.250E	1.050E	.850E
1869D	47140	26	1.217E	1.022E	.827E
1888	40685	7	.669E	.562E	.455E
1889	40695	7	.241E	.203E	.164E
1891	44800	7	.216E	.182E	.147E
1892	44805	7	.312E	.262E	.212E
1893	44810	7	.224E	.188E	.152E
1895	40705	9	.227E	.191E	.154E
1906	44815	7	1.743E	1.464E	1.185E
2102D	47155	26	.900E	.756E	.612E
2107D	47165	26	1.377E	1.157E	.936E
2112D	47175	26	.821E	.690E	.558E
2114D	47185	49	.800E	.672E	.544E
2158D	47195	26	1.431E	1.202E	.973E
2162D	47210	26	.702	.590E	.477E
2169D	47220	26	1.370E	1.151E	.931E
2174D	47240	26	.694E	.583E	.472E
2180D	47265	26	1.158	.973E	.787E
2181D	47280	26	.628E	.528E	.427E
2182D	47290	26	.677E	.569E	.460E
2187D	47310	26	.978E	.822E	.665E
7335	47480	19	1.080E	.907E	.734E
7327	47470	35	.978E	.822E	.665E
7344	47490	35	1.140E	.958E	.775E
7349	47500	35	1.228E	1.032E	.835E
7367	47510	35	1.254E	1.054E	.853E
7370	47520	35	1.564E	1.314E	1.063E
7375	47530	35	2.655E	2.230E	1.805E
7377	47540	35	1.105E	.928E	.751E
7380	47550	35	1.877E	1.577E	1.276E
7381	47560	35	1.325E	1.113E	.901E
7382	47570	35	1.325E	1.113E	.901E
7387	47580	35	1.300E	1.092E	.884E
4ES	48000	42	.754E	.632E	.509E
4ESB	48010	43	1.013E	.849E	.684E

LAMP #	HHS #	FIG. #	Prices each QTY OF 10	QTY OF 100	QTY OF 500
5ES	48020	42	.760E	.637E	.513E
5ESB	48030	43	1.001E	.839E	.676E
6A	48335	44	.809E	.680E	.550E
6C	48345	44	.809E	.680E	.550E
6ES	48040	42	.754E	.632E	.509E
6ESB	48050	43	1.013E	.849E	.684E
6PS	48060	45	.820E	.687E	.554E
6PSB	48070	46	1.055E	.884E	.713E
10A	48355	44	1.369E	1.147E	.925E
10ES	48080	42	.754E	.632E	.509E
10ESB	48090	43	1.013E	.849E	.684E
12A	48365	44	.809E	.680E	.550E
12B	48375	44	.809E	.680E	.550E
12C	48380	44	.809E	.680E	.550E
12ES	48100	42	.754E	.632E	.509E
12ESB	48110	43	1.013E	.849E	.684E
12PS	48120	45	.820E	.687E	.554E
12PSB	48130	46	1.055E	.884E	.713E
16ES	48140	42	.754E	.632E	.509E
16ESB	48150	43	1.013E	.849E	.684E
18A	48395	44	1.369E	1.147E	.925E
18B	48390	44	1.369E	1.147E	.925E
24A	48400	44	.809E	.680E	.550E
24B	48405	44	.809E	.680E	.550E
24C	48410	44	.809E	.680E	.550E
24D	48415	44	.809E	.680E	.550E
24E	48420	44	.809E	.680E	.550E
24ES	48160	42	.754E	.632E	.509E
24ESB	48170	43	1.031E	.864E	.697E
24PS	48180	45	.820E	.687E	.554E
24PSB	48190	46	1.055E	.884E	.713E
24X	48435	48	.983E	.823E	.668E
28ES	48200	42	.754E	.632E	.509E
24ESB	48210	43	1.055E	.884E	.713E
28PS	48220	45	.754E	.632E	.509E
28PSB	48230	46	1.055E	.884E	.713E
30A	48440	44	1.055E	.884E	.713E
35A	48445	44	.983E	.823E	.668E
48A	48450	44	.983E	.823E	.668E
48B	48460	44	.983E	.823E	.668E
48C	48470	44	.983E	.823E	.668E
48D	48480	44	.983E	.823E	.668E
48ES	48240	42	1.055E	.884E	.713E
48ESB	48250	43	1.284E	1.076E	.868E
48PS	48260	45	.820E	.687E	.554E
48PSB	48270	46	1.055E	.884E	.713E
55B	48495	44	.983E	.823E	.668E
55C	48500	44	.983E	.823E	.668E
60A	48510	44	.983E	.823E	.668E
60PS	48280	45	.941E	.789E	.636E
60PSB	48290	46	1.182E	.991E	.799E
120MB	48300	47	1.152E	.965R	.778E
120PS	48310	45	.862E	.723E	.583E
120PSB	48325	46	1.152E	.965E	.778E
A1B	49020		.239E	.201E	.163E
A1C	49035		.239E	.201E	.163E
AR3	49240		2.622E	2.204E	1.785E
NE2	49000		.201E	.169E	.137E
NE-2A	49070		.209E	.176E	.142E
NE-2B	49088		.201E	.169E	.137E
NE-2D	49200		2.092E	1.758E	1.424E
NE-2E	49090		.209E	.176E	.142E
NE-2H	49190		.209E	.176E	.142E
NE-2J	49210		1.939E	1.630E	1.320E
NE-2U	49086		.247E	.208E	.168E
NE-2V	49080		.247E	.208E	.168E
NE-3	49410		1.981E	1.665E	1.349E
NE-4	49415		1.370E	1.152E	.933E
NE-5	49420		1.981E	1.665E	1.349E
NE-7	49136		1.952E	1.641E	1.329E
NE-16	49400		2.926E	2.459E	1.992E
NE-17	49140		2.713E	2.280E	1.847E
NE-21	49150		2.835E	2.383E	1.930E
NE-23	49345		.549E	.462E	.374E
NE-30	49250		5.333E	4.482	3.631E
NE-32	49295		3.202E	2.691E	2.180E
NE-45	49160		2.682E	2.254E	1.826E
NE-47	49170		2.622E	2.204E	1.785E
NE-48	49180		2.440E	2.051E	1.661E
NE-51	49115		.701E	.589E	.477E
NE-51H	49130		.701E	.589E	.477E
NE-56	49260		3.839E	3.227E	2.614E
NE-57	49220		2.958E	2.486E	2.014E
NE-58	49230		2.682E	2.254E	1.826E
NE-67	49395		1.370E	1.152E	.933E
NE-68	49355		.670E	.563E	.456E
NE-76	49365		1.312E	1.103E	.893E
NE-81	49360		1.037E	.872E	.706E
NE-83	49375		.883E	.742E	.601E
NE-84	49270		1.666E	1.400E	1.134E
NE-86	49385		.701E	.589E	.477E
NE-96	49331		1.099E	.924E	.748E
NE-97	49333		.823E	.692E	.560E

NEW! JUST ARRIVED! HOOKON JUNIOR PROBE/PATCH CORDS

HOOKON JUNIOR PROBE/PATCH CORDS

Hooks on to bare wire, component leads, wire-wrap terminals, etc. Slides directly onto 1025 square Wire-Wraps down to .100" centers. Locking feature allows hook to be used as a probe on P.C. pads, terminals, solder junctions. Easily repaired in the field. Made of super tough nylon. On patch cord and/or attachments, all plugs and buttons are of molded Butyrate, per Fed. Spec. LP-349A, Type 3, Class MS with nickel plated brass bodues. Springs are nickel plated Beryllium copper with lead wire. Wire is 24AWG, extra-flexible test lead wire, 5KV, PVC, .090 O.D. Cable is RG-58/U Co-axial, Black. Nominal 50 Ohms impedance. Brass connectors have anti-tarnish plating. In red or black.

SPECIFY COLOR STD. PKG. 10

HOOKON JUNIOR PROBE SERIES #3067

HOOKON JUNIOR JUMPER CORD SERIES #3068

HOOKON JUNIOR TO TINNED LEAD SERIES #3069

HOOKON JUNIOR TO STANDARD ANGLE BANANA PLUG SERIES #3073

HOOKON JUNIOR TO MINIATURE ANGLE BANANA PLUG SERIES #3074

HOOKON JUNIOR TO STANDARD STACK BANANA PLUG SERIES #3075

HOOKON JUNIOR TO MINIATURE STACK BANANA PLUG SERIES #3076

HOOKON JUNIOR TO PHONE TIP SERIES #3077

HOOKON JUNIOR TO ALLIGATOR CLIP SERIES #3078

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HOOKON JUNIOR TO BNC MALE CONNECTOR SERIES #3081

HOOKON JUNIOR TO THREADED FEMALE JACK SERIES #3082

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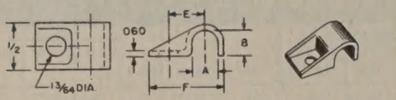
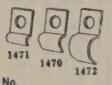
NYLON "HALF" CABLE CLAMPS



Made of solvent resistant Nylon, unaffected by most solvents, alkalies, dilute mineral acids and most organic acids. Available in Black and conforms to the following Military Specifications:
MIL-P17091A and Amendment 2, MIL-P-17091B/MIL-M-20693A. Type 1, MIL-STD-242A (Ships)/MIL-STD-242B (Ships), MS-39014 (ORD).
Std. Pkg. 100

No.	Wire Size	A	B	E	F	NET Per C
8964	1/8	.115	.115	.307	.675	5.50
8965	3/16	.172	.172	.336	.732	5.90
8966	1/4	.234	.234	.366	.732	6.50
8967	5/16	.297	.297	.400	.859	6.70
8968	3/8	.359	.359	.430	.920	7.00
8969	7/16	.422	.422	.460	.980	7.25
8970	1/2	.484	.484	.492	1.044	8.00

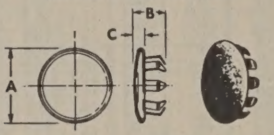
METAL CABLE CLAMPS



Steel Cadmium Plated with No. 8 Mtg. Hole **Std. Pkg. 100**

No.	Length	Width	Cable	NET Per C
1471	5/8"	3/8"	1/6"	$ .90
1470	3/4"	3/8"	1/4"	.95
1472	1"	3/8"	1/2"	1.00

METAL HOLE PLUGS

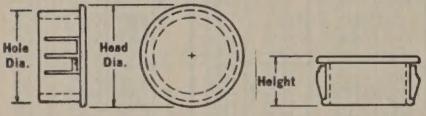


Metal plugs for covering punched or drilled holes. Firm grip spring action prongs in steel, nickel plated. **Std. Pkg. 100**

No.	Hole Dia.	A	B	C	Prongs	NET per C
650	1/4"	13/32"	15/64"	1/16"	6	$3.00
651	5/16"	7/16"	1/4"	1/16"	6	3.00
652	3/8"	1/2"	15/64"	1/16"	6	3.00
653	1/2"	21/32"	9/32"	5/64"	8	4.00
654	5/8"	13/16"	19/64"	5/64"	8	5.00
655	3/4"	59/64"	19/64"	5/64"	12	5.00
608	7/8"	1 1/16"	19/64"	1/16"	12	6.00
612	1"	1 9/64"	21/64"	3/32"	12	8.00
656*	1"	1 5/32"	19/64"	5/64"	6	30.00
3084	1 1/8"	1 5/16"	11/32"	5/64"	12	10.00
3085	1 1/4"	1 7/16"	11/32"	3/32"	12	10.25
3086	1 3/8"	1 9/16"	13/32"	5/64"	12	10.50
3087	1 1/2"	1 41/64"	13/32"	3/32"	12	12.00

*Vent

NYLON HOLE PLUGS

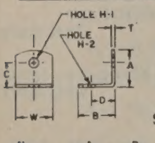


Nylon hole plug. Type 66, Mil Spec. 20693A. Maximum panel thickness .062", 1/4 and 5/16); all others .125". All flat heads, except 1 1/4" dia. domed, head thickness 1/16". **Std. Pkg. 100**

No.	Hole Dia.	Head Dia.	Height	NET per C
3089	1/4"	5/16"	5/16"	$4.00
3090	5/16"	3/8"	5/16"	4.25
3091	3/8"	15/32"	13/32"	4.50
3092	1/2"	37/64"	13/32"	4.75
3093	5/8"	23/32"	13/32"	5.75
3094	3/4"	27/32"	13/32"	7.50
3095	1.000	1 1/8"	29/64"	10.00
3096	1 1/8"	1 7/32"	20/64"	10.75
3097	1 1/4"	1 3/8"	20/64"	13.00
3098	1 3/8"	1 15/32"	20/64"	15.00
3099	1 1/2"	1 39/64"	29/64"	16.50
3083*	1"	1 13/64"	20/64"	12.00

*Vent

ANGLES



A — Length of leg
B — Length of leg
T — Thickness
W — Width
C — Hole Location
D — Hole Location
H1 — Hole Diameter
H2 — Hole Diameter

STEEL, Cadmium Plated **Std. Pkg. 100**

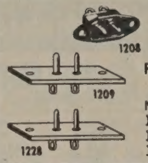
No.	A	B	C	D	W	T	H1	H2	Net Per C
1444	7/16	7/16	17/64	1/4	3/8	.032	3/16	#4	$.90
1445	1/2	1/2	11/32	23/64	1/2	.050	#6	#4	1.50
1446	49/64	27/64	39/64	15/64	5/16	.032	#6	#6	1.70
1447	19/64	1/2	61/64	23/64	5/16	.050	#8	#8	2.00
1476	11/16	11/16	1/2	1/2	3/8	.032	#6	#6	2.50

Note: No. 1476 has Hot Tin Dipped finish

BRASS, Nickel Plated

No.	A	B	C	D	W	T	H1	H2	Net Per C
1474	15/32	15/32	19/64	19/64	5/16	.025	#8	#8	$4.50
1475	21/32	21/32	3/8	3/8	3/8	.050	#8	#8	7.50

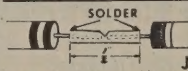
INTERLOCK PLUGS



RATING: 125 VAC — 15 AMP
Std. Pkg. 100

No.	Type	NET Per C
1208	Recessed-Metal Shell	$19.00
1209	Polarized	20.00
1228	Flush	11.00

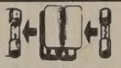
"CLEAPS" (Connectors for Joining Severed Wires)



MATERIAL: Brass, cadmium plated.
WIRE SIZE: For wires, .010" to .050" (B&S Gauge 16 to 30)
DESCR.: Used to splice cut leads of condensers, resistors, etc., in process of trouble-shooting. Insert wire in each tapered end and solder thru center opening. **Std. Pkg. 1000**

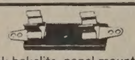
No. 1270 **NET Per M $10.00**

TV SNAP-ON FUSE HOLDER



Snap fuse clip over burned out fuse. Insert new fuse without soldering.
No. 529 **Std. Pkg. 50** **Net per C $50.00**

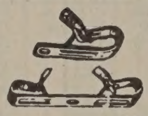
FUSE MOUNTING BASES



Black bakelite, panel mount type. Will accommodate the 3 A G Auto type cartridge fuse. **Std. Pkg. 50**

No.	Type	NET per C
530	Single	$22.00
531	Double	40.00

FAHNESTOCK SPRING BATTERY CLIPS



Clips are made of brass, nickel plated and are available in the single and double clip types. **Std. Pkg. 100**

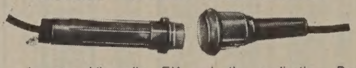
SINGLE CLIPS

No.	Width	Length	Mtg. Hole	NET Per C
539	7/32"	11/16"	#4	$2.80
533	5/16"	25/32"	#6	2.80
534	3/8"	1"	#6	4.00

DOUBLE CLIPS

No.	Width	Length	Mtg. Hole	NET Per C
535	5/16"	1 15/32"	#6	16.00
536	3/8"	2 1/8"	#8	20.00

MOLDED "IN-LINE" FUSE HOLDER



For use in automobile radios, T.V., and other applications. Provides positive insulated connection. For use with 3AG fuse, supplied with 18" wire loop; less fuse. **Std. Pkg. 50**

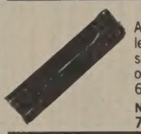
No.	NET Per C
1295	$40.00

SHRINK TUBING ASSORTMENT

Laboratory or Work Shop assortment of Heat Shrink Polyolefin tubing, meets Mil Spec 123053/5. Contains 6 different colors of all sizes from 1/16" thru ⅜" in 12" lengths, total of 36 feet. **Std. Pkge 5**

No.	Suggested Resale/Ea.
7705	$10.80

P.V.C. TUBING ASSORTMENT



A 36 piece assortment of tubing consisting of 12" lengths, sizes #24 thru #2; 3 lengths of each size, a total of 12 sizes in assorted colors. Made of Military Grade 105°PVC, conforms to Mil-I-631D. **Std. Pkg. 6**

No.	Net Ea.
7706	$3.00

HEX AND SPLINE KEYS

Made of special alloy steel, tempered to avoid brittleness and impose maximum resistance to torsional strain. Ends ground for easy insertion. **Std. Pkg. 100**

HEX KEYS				SPLINE KEYS			
No.	Screw	O.D.	NET Per C	No.	Screw	O.D.	NET Per C
340	No. 2	.034	$8.60	370	No. 4	.058	$8.60
341	No. 3, 4	.050	8.60	371	No. 5	.068	8.60
342	No. 5, 6	.062	8.60	372	No. 6	.075	8.60
343	No. 8	.078	8.60	373	No. 8	.093	8.60
344	No. 10	.093	9.90	374	No. 10	.109	9.90
345	1/4"	.125	9.90	375	1/4"	.143	9.90
346	5/16"	.156	9.90	376	5/16"	.182	9.90

HEX AND SPLINE KEY KITS

Attractive tearproof vinyl plastic kit with individual pockets for each of six keys in kit. **Std. Pkg. 10**

No.		NET per C
355	Kit of 6 hex keys for screws from No. 3 to 5/16".	$66.00
385	Kit of 6 spline keys for screws from No. 5 to 5/16".	$66.00
390	Combination Kit of 3 hex and 3 spline keys for No. 6-8-10 screws.	$66.00
395	Kit of 7 hex keys for screws from No. 2 to 5/16" and 4 spline keys Nos. 4, 6, 8, and 10.	$130.00

STANDARD WALL

TEFLON* SPAGHETTI TUBING COLOR CODE CHART

— 101 WHITE
— 102 RED
—103 BLACK
— 104 GREEN
— 105 BLUE
— 106 ORANGE
— 107 YELLOW
— 108 BROWN
— 112 PURPLE
— 113 GREY
— 115 NATURAL

(If no color is specified, Natural Teflon (—115) will be supplied.)

Meets and exceeds MIL-I-22129B. Ideal for slip-on insulation, and provides greater reliability and resistance to high temperatures. Shrink-back is virtually eliminated. Individually packed in dust-proof bags.
SPECIFY COLOR

STANDARD WALL

CAT. No.	AWG WIRE SIZE	NOM I.D.	NOM. WALL THK.	STD. PKG. FT.	NET EA.
7701-24	24	.022	.012	100	$8.66
7701-22	22	.027	.012	100	9.57
7701-20	20	.034	.016	100	12.91
7701-19	19	.038	.016	100	14.04
7701-18	18	.042	.016	100	15.12
7701-17	17	.047	.016	100	16.46
7701-16	16	.053	.016	100	17.46
7701-15	15	.059	.016	100	18.36
7701-14	14	.066	.016	100	19.65
7701-13	13	.076	.016	100	21.81
7701-12	12	.085	.016	100	23.32
7701-11	11	.095	.016	100	25.92
7701-10	10	.106	.016	100	30.91
7701-09	9	.118	.020	100	46.32
7701-81	⅛"	.125	.020	100	52.80
7701-08	8	.133	.020	50	27.55
7701-07	7	.148	.020	50	28.20
7701-06	6	.166	.020	50	30.38
7701-05	5	.186	.020	50	33.24
7701-04	4	.208	.020	50	38.40
7701-03	3	.234	.020	50	41.16
7701-41	¼"	.250	.020	50	44.40
7701-02	2	.263	.020	50	45.19
7701-01	1	.294	.020	50	50.40
7701-51	5/16"	.312	.020	50	57.60
7701-00	0	.330	.020	50	55.80

LIGHTWEIGHT

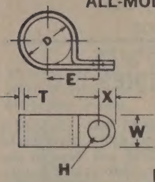
CAT NO.	AWG WIRE SIZE	NOM I.D.	NOM. WALL THK.	STD. PKG. FT.	NET EA.
7703-28	28	.015	.006	100	$7.54
7703-26	26	.018	.006	100	6.00
7703-24	24	.022	.006	100	6.48
7703-22	22	.027	.006	100	7.44
7703-20	20	.034	.006	100	9.24
7703-19	19	.038	.006	100	9.72
7703-18	18	.042	.006	100	10.10
7703-17	17	.047	.006	100	11.52
7703-16	16	.053	.006	100	12.60
7703-15	15	.059	.006	100	12.96
7703-14	14	.066	.008	100	13.80
7703-13	13	.076	.008	100	15.60
7703-12	12	.085	.008	100	16.92
7703-11	11	.095	.008	100	18.36
7703-10	10	.106	.008	100	20.16
7703-09	9	.118	.008	50	14.83
7703-81	⅛"	.125	.008	50	15.60
7703-08	8	.133	.008	50	16.32
7703-07	7	.148	.008	50	20.64
7703-06	6	.166	.010	50	23.88
7703-05	5	.186	.010	50	26.04
7703-04	4	.208	.010	50	29.28
7703-03	3	.234	.010	50	31.68
7703-41	¼	.250	.010	50	33.60
7703-02	" 2	.263	.010	50	35.76
7703-01	1	.294	.010	50	40.08
7703-51	5/16"	.312	.012	50	43.20
7703-00	0	.330	.012	50	45.48

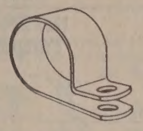
THINWALL

CAT. NO.	AWG WIRE SIZE	NOM. I.D.	NOM. WALL THK.	STD. PKG. FT.	NET EA.
7702-30	30	.012	.009	100	$7.80
7702-28	28	.015	.009	100	6.84
7702-26	26	.018	.009	100	6.24
7702-24	24	.022	.010	100	6.84
7702-22	22	.027	.010	100	7.56
7702-20	20	.034	.012	100	9.36
7702-19	19	.038	.012	100	10.08
7702-18	18	.042	.012	100	10.92
7702-17	17	.047	.012	100	11.88
7702-16	16	.053	.012	100	12.96
7702-15	15	.059	.012	100	13.20
7702-14	14	.066	.012	100	14.16
7702-13	13	.076	.012	100	15.96
7702-12	12	.085	.012	100	17.04
7702-11	11	.095	.012	100	18.96
7702-10	10	.106	.012	100	20.40
7702-09	9	.118	.015	100	28.68
7702-81	⅛"	.125	.015	100	29.28
7702-08	8	.133	.015	50	16.66
7702-07	7	.148	.015	50	20.40
7702-06	6	.166	.015	50	26.04
7702-05	5	.186	.015	50	29.16
7702-04	4	.208	.015	50	31.68
7702-03	3	.234	.015	50	34.20
7702-41	¼"	.250	.015	50	36.00
7702-02	2	.263	.015	50	38.88
7702-01	1	.294	.015	50	39.60
7702-51	5/16"	.312	.015	50	46.80
7702-00	0	.330	.015	50	48.00

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

ALL-MOLDED CABLE CLAMPS





POLYPROPYLENE

Marked for easy identification. Polypropylene cable clamps feature excellent support at low cost. Manufactured entirely from propylene, they exhibit no environmental stress cracking and have excellent heat resistance at prolonged periods of time. Propylene clamps are impervious to most acids, alkalines, organic solvents and detergents. Conforms to applicable Mil. Specs. **Std. Pkg. 100**

T = .060 X = 7/32" W = 1/2" H = 13/64"

No.	Hole (D)	E	NET Per C
8910	1/8"	.360	$1.60
8911	3/16"	.423	1.80
8912	1/4"	.457	1.90
8913	5/16"	.498	2.00
8914	3/8"	.529	2.10
8915	7/16"	.560	2.20
8916	1/2"	.592	2.30
8917	9/16"	.623	2.40
8918	5/8"	.654	2.50
8919	11/16"	.752	2.60
8920	3/4"	.783	2.70
8921	7/8"	.845	2.90
8922	1"	.908	3.00

CELLULOSE

Marked for easy identification. Cellulose Cable Clamps feature excellent support at low cost. Made entirely from cellulose, they are ultra-violet stabilized for extreme weather resistance. Tough and lightweight, they provide exceptional service in both outdoor and indoor applications. Conforms to applicable Mil. Specs. **Std. Pkg. 100**

T = .060 X = 7/32" W = 1/2" H = 13/64"

No.	Hole (D)	E	NET Per C
8925	1/8"	.360	$2.10
8926	3/16"	.423	2.20
8927	1/4"	.457	2.30
8928	5/16"	.498	2.40
8929	3/8"	.529	2.50
8930	7/16"	.560	2.60
8931	1/2"	.592	2.70
8932	9/16"	.623	2.90
8933	5/8"	.654	3.00
8934	11/16"	.752	3.30
8935	3/4"	.783	3.50
8936	7/8"	.845	3.70
8937	1"	.908	3.90

NYLON

Marked for easy identification. Black Nylon Cable Clamps feature excellent support. Manufactured from the best material available they exhibit a tough rigidity at elevated temperatures. Nylon is insoluble in common solvents, alkalies, dilute mineral acids and most organic acids. Made to meet these Military Specifications: Mil-Std-24E; MS-30914 (ord.) Mil-C-21565(NAS); Mil-P-17091-B; Mil-P-20693. **Std. Pkg. 100**

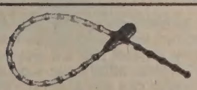
T = .060 X = 7/32" W = 1/2" H = 13/64"

No.	Hole (D)	E	NET Per C
8940	1/8"	.360	$2.30
8941	3/16"	.423	2.40
8942	1/4"	.457	2.50
8943	5/16"	.495	2.60
8944	3/8"	.529	2.70
8945	7/16"	.560	2.80
8946	1/2"	.592	2.90
8947	9/16"	.623	3.00
8948	5/8"	.654	3.20
8949	11/16"	.752	3.30
8950	3/4"	.783	3.50
8951	7/8"	.845	3.70
8952	1"	.908	3.90

T = .050 W = 3/8" X = 7/32" H = 13/64"

No.	Hole (D)	E	NET Per C
8955	1/8"	.325	1.90
8956	3/16"	.378	2.00
8957	1/4"	.409	2.10
8958	5/16"	.441	2.20
8959	3/8"	.471	2.30
8960	7/16"	.519	2.40
8961	1/2"	.550	2.50

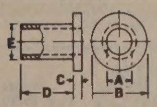
BEADED WIRE TIES
White Nylon



Std. Pkg. 100

No. 8962 5" Long **NET Per C $2.30**

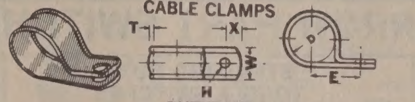
NYLON SPACER BUSHINGS



Natural Color, MIL-P-20693A. **Std. Pkg. 100**

No.	I.D.(A)	B	C	D	E	NET Per C
2534	#4 (.115)	.235	3/64	1/4	.147	$2.30
2535	#6 (.143)	.290	3/64	1/4	.170	2.40
2536	#8 (.170)	.344	1/16	3/8	.205	2.50
2537	#10 (.200)	.399	1/16	3/8	.260	2.70
2538	1/4"(.260)	.513	1/16	3/8	.312	3.00

CABLE CLAMPS



BUTYRATE

Made to meet MIL Std 243B (Ships), MS 3914 (Ord.) Withstands temperatures from −60 to +175 degrees F.

T = .060 W = 1/2" X = 7/32" H = .204 **Std. Pkg. 100**

No.	Hole (D)	E	NET Per C
831	1/8	.360	$ 2.34
832	3/16	.423	2.40
833	1/4	.457	2.58
834	5/16	.498	2.85
835	5/8	.529	3.00
836	7/16	.560	3.30
837	1/3	.592	3.60
838	9/16	.623	4.20
839	5/8	.654	4.50
840	11/16	.752	4.80
841	3/4	.783	5.10
842	7/8	.845	5.40
843	1	.908	5.70
844	1 1/8	.970	6.00
845	1 1/4	1.062	6.30

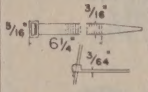
NYLON

MIL P17091A, Amend 2. Withstands temperature from −60 to +250 degrees F. **Std. Pkg. 100**

1/8" to 1/2"(D)-T=.040; W=5/8"; X=5/32"; H=.167
9/16" to 1¼"(D)-T=.060; W=½"; X=3/64; H=.204

No.	Hole (D)	E	Per C
771	1/8	.310	$ 3.60
772	3/16	.373	3.90
773	1/4	.407	4.20
774	5/16	.448	4.65
775	3/8	.479	4.80
776	7/16	.510	5.10
777	1/2	.542	5.40
778	5/16	.623	6.60
779	5/8	.654	7.20
780	11/16	.752	7.50
781	3/4	.783	8.10
782	1/8	.845	8.70
783	1	.908	10.20
784	1 1/8	1.002	12.00
785	1 1/4	1.062	13.80

NYLON LOCKING CLAMP



Wedge and ratchet design makes for positive holding and locking. Accommodates cables from 1/8" to 1 3/4". No knot tying, just slip clamp around cable, insert tongue and pull tight. **Std. Pkg. 100**

No.		NET Per C
800	100	$9.00

NYLON MOUNTING TABS

For use with No. 800 locking clamp when premounted assembly points are desired. Furnished with 203 mounting hole. **Std. Pkg. 100**

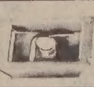
No.	NET Per C
801	$3.00

NYLON PERFORATING STRAPPING

For bundling of wire, cable and tubing. Time saver for harnessing. Use No. 803 ratchet buckle for fast assembly. Supplied on 50' rolls. **Std. Pkg. 1**

No. Roll	NET Per roll
802	$28.00 Ea.

NYLON RATCHET BUCKLE



For No. 802 strapping. Quick and easier assembly with this ingenious item. **Std. Pkg. 100**

No.		Net Per C
803	For 1/2" Strapping	$12.00

TIGHTENING TOOL

Used with strapping for fast assembly. **Std. Pkg. 1**

No.	NET Each
804	$22.00

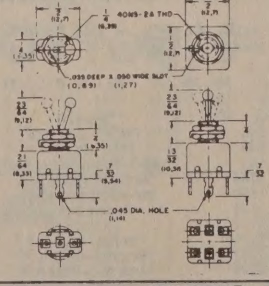
NYLON ADJUSTABLE CABLE TIE

Efficiently and economically replaces lacing cord, tape and other fasteners in wrap-around applications. Adjustable from 1/8" to 1 3/8" diameter. Once applied it cannot slip. Made of Nylon.

No. 8963C	NET Per C 1.50
No. 8963M	NET Per M 13.00

ARROW, H.

MIDGET TOGGLE SWITCHES



NYLON LACING CORD

MIL-T-713-D, Type P, classes 3, 2 and 1. Supplied in 1-lb. tubes. **Std. Pkg. 1**

Natural

No.	Class	Test	Yardage	NET Ea.
734	1	70 lb.	600	$13.00
735	2	48 lb.	800	13.00
736	3	32 lb.	1140	13.00

Black

No.	Class	Test	Yardage	NET Ea.
791	1	70 lb.	600	$17.00
792	2	48 lb.	800	17.00
793	3	32 lb.	1140	17.00

NYLON LACING TAPE Braided—MGD Finish

#18 size meets MIL-T-43435, size 3, finish B. Furnished in 500 yards spools.

Natural Color

No	Size	Width	Thick	Test	NET Each
766	18	.090	.0125	50 lbs.	$15.00
767	21	.0625	.009	25 lbs.	17.00

Black Color

No	Size	Width	Thick	Test	NET Each
769	18	.090	.0125	50 lbs.	$16.00
770	21	.0625	.009	25 lbs.	18.00

Commercial Type

Has all application of above but at a much lower cost. Supplied in 1-lb tubes in natural color.

No.	Width	Yardage	NET Ea.
743	1/8"	620	$12.00

LINEN LACING CORD

Mildew proofed. Spec. MIL-T-713-A, Type N. Supplied in 1 lb. tubes. **Std. Pkg. 1**

Natural

No.	Ply	Class	Ydg.	NET Ea.
727	4	—	850	$15.00
730	6	3	600	15.00
739	8	2	470	15.00
733	9	—	400	15.00
742	12	1	300	15.00

Black

No.	Ply	Class	Ydg.	NET Ea.
794	4	—	850	$15.00
795	6	3	600	15.00
796	8	2	470	15.00
797	9	—	400	15.00
798	12	1	300	15.00

BLIND HOLE MOUNTING ACCESSORIES

Molded of polyethylene and requires no mounting hardware or special tools, just snaps into hole. Color Grey, temperature rating 100-205°F. **Std. Pkg. 100**

ARROW HART

SUB-MINIATURE TOGGLE SWITCHES

Offers the greatest switching flexibility and is available in both positive and momentary action. Gold plated silver stationary contacts to insure continuity on low energy circuits and Rhodium plated silver movable contacts to withstand mechanical wear. Molded daillyl phthalate and aluminum housing. Available in Commercial and Military types Rating. Resistive and *Inductive.

5A 125V. AC
5A 29V. DC
Max. Inrush: 25A
Mimimum rating: 40 milliamps at 1.5 volts
*AC: 75% Power Factor
IDC: An Inductors
Mechanical Life: 100,000 cycles **Std. Pkg. 5**

COMMERCIAL

Housing and mounting hardware gold anodized. Available only in stainless steel ball lever.

Smith No.	A H & H No.	Circuit*	Net Each
4740	TC-3	SPDT A-B-A	$6.10
4741	TE-3	SPDT C-B-A	6.40
4742	TG-3	SPDT C-B-C	6.40
4743	TM-3	SPDT C-D-A	6.40
4744	TS-1	SPST B-D-A	5.50
4745	TS-2	DPST B-D-A	6.80
4746	TS-3	SPDT A-D-A	6.10
4747	TC-6	DPDT A-B-A	8.00
4748	TE-6	DPDT C-B-C	9.90
4749	TG-6	DPDT C-B-C	9.90
4750	TM-6	DPDT C-D-A	9.90
4751	TS-6	DPDT A-D-A	8.00

MILITARY

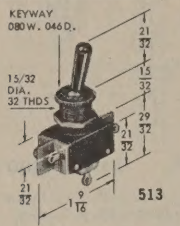
Meets Mil S-3950B, MS75028 and MS75029. Housing and hardware, clear anodized. Available only with aluminum bat lever.

Smith No.	A H & H No.	MS No.	Circuit*	NET Each
4760	TC-3-M	MS75028-21	SPDT A-B-A	$6.40
4761	TE-3-M	MS75028-31	SPDT C-B-A	6.80
4762	TG-3-M	MS75028-27	SPDT C-B-C	6.80
4763	TM-3-M	MS75028-26	SPDT C-D-A	6.80
4764	TS-1-M	MS75028-22	SPST B-D-A	6.80
4765	TS-2-M	MS75029-22	DPST B-D-A	7.30
4766	TS-3-M	MS75028-23	SPDT A-D-A	6.40
4767	TC-6-M	MS75029-21	DPDT A-B-A	8.30
4768	TE-6-M	MS75029-31	DPDT C-B-A	10.50
4769	TG-6-M	MS75029-27	DPDT C-B-C	10.50
4770	TM-6-M	MS75029-26	DPDT C-D-A	10.50
4771	TS-6-M	MS75029-23	DPDT A-D-A	8.30

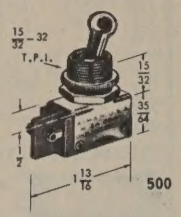
*A-ON, B-OFF, C-Momentary ON, D-None

ARROW HART SWITCHES

SMALL CANOPY TYPE SWITCHES



513



500

Laminated type 15/32-32 slotted sleeve, nickel finish. Supplied with hex nut and knurled nut. Solder terminals, SPST rated at 3 amps-250 volts AC-DC; all other rated at 1 amp-250 volts, 3 amps-125 volts AC-DC.
Std. Pkg. 10

BAT LEVER POSITIVE ACTION

15/32" long shaft

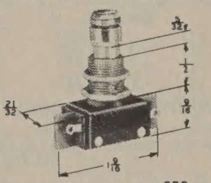
No.	NET Each	CIRCUIT
510	$1.70	SPST
511	2.15	SPDT
512	3.10	DPST
513	3.55	DPDT

BALL LEVER POSITIVE ACTION

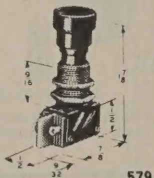
15/32" long shaft

No.	CIRCUIT	NET Each
500	SPST	$1.70
502	SPDT	2.15
504	DPST	3.10
506	DPDT	3.55

MOMENTARY PUSH SWITCHES



558



579

Laminated type 15/32-32 x 9/16" slotted sleeve, nickel finish. Supplied with hex nut and knurled nut. All switches accept snap on button. SPST rated at 3 amps-250 volts AC-DC. All others rated at 1 amp-250 volts, 3 amps-125 volts AC-DC.
Std. Pkg. 10

SUPPLIED LESS BUTTON: ORDER BUTTON SEPARATELY.

QUICK MAKE AND BREAK

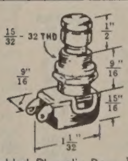
Normally Closed (ON)			Normally Open (OFF)	
No.	NET Each	CIRCUIT	No.	NET Each
552	$3.40	SPST	555	$3.40
556	3.85	SPDT	—	—
557	3.95	2 Circ.	—	—
564	4.60	DPST	558	4.60
559	4.75	DPDT	—	—

SLOW MAKE AND BREAK

Rated at 1 amp.-125 volts AC

Normally Closed (ON)			Normally Open (OFF)	
	NET Each	CIRCUIT		NET Each
582	$1.90	SPST	579	$1.90 ea.
580	2.40	2 Circ.	—	2.40 ea.

MIDGET MOMENTARY SWITCH



SLOW MAKE AND BREAK

Molded Phenolic Base 15/32-32 x 9/16" slotted sleeve. Nickel Finish. Supplied with hex nut and knurled nut. Side connected silver plated solder contacts. Rated at 3 amps-120 volts A. C. Supplied less button; order button separately.
Std. Pkg. 10

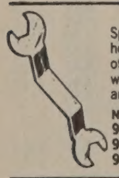
Normally Closed (ON)

No.	Circuit	NET Each
925	SPST	$1.40
926	2 Circ.	1.50

Normally Open (OFF)

No.	Circuit	NET Each
927	SPST	$1.40

SHAFT WRENCHES

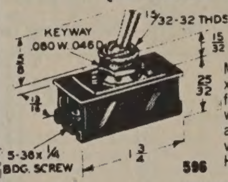


Specially designed offset, double-end wrenches for most hex sizes encountered in electronic construction. Made of heavy gauge, cadmium plated steel, clearly marked with size. No. 999 is especially useful for Toggle Switch and Volume Control mounting nuts.
Std. Pkg. 25

No.	For Nut Sizes	NET per C
998	5/16" - 3/8"	$30.00
999	½" - 9/16"	30.00
997	Set of 2 above	60.00

STANDARD DUTY TOGGLE SWITCHES

QUICK MAKE AND BREAK



596

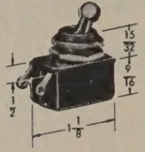
Molded phenolic base, 15/32-32 x 7/16" long slotted sleeve, nickel finish. Screw terminals. Supplied with hex nuts. All rated at 6 amps-250 volts, 12 amps-125 volts AC-DC. DPST also rated at 1 HP at 250 volts AC-DC.
Std. Pkg. 10

BAT LEVER

No.	CIRCUIT	NET Each
597	SPST	$2.60
598	SPDT	2.60
596	DPST	2.60

MIDGET SIZE TOGGLE SWITCHES

590

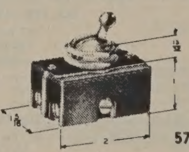


Molded phenolic base, 15/32-32 x 15/32" long slotted sleeve, nickel finish. Side connected silver plated solder contacts. Supplied with hex nut and knurled nut. SPST rated at 2 amps 250 volts; 6 amps.-125 volts; all others rated at 1 amp-250 volts, 6 amps.-125 volts.
Std. Pkg.10

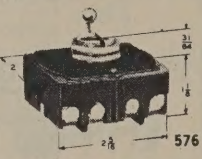
BALL LEVER			BAT LEVER	
No.	NET Each	CIRCUIT	No.	NET Each
590	$1.50	SPST	591	$1.50
589	1.85	SPDT	592	1.85

EXTRA HEAVY DUTY POWER SWITCHES

3 POSITION—POSITIVE CENTER OFF



574



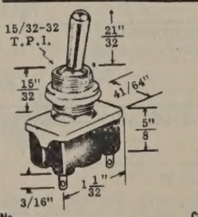
576

Slotted sleeve 3/4-32, nickel finish. Screw terminals. Supplied with 2 hex nuts. Rated at 5 amps-250 volts, 10 amps-125 volts plus HP rating shown below.
Std. Pkg. 5

Description
3/4 HP 250 volts AC-DC
1/2 HP 115/230 volts AC, 3 phase
1/2 HP 115/230 volts AC, 2 phase

No.	CIRCUIT	NET Each
574	DPDT	$ 7.80
575	TPDT	12.00
576	4PDT	16.00

MIDGET TOGGLE SWITCH



Bat lever. Molded phenolic base. 15/32-32 x 15/32" long. Slotted sleeve, nickel finish. Supplied with hex nut and knurled nut. Back connected silver plated solder contacts. Rated 1 amp.-250 volts; 3 amps.-125 volts.
Std. Pkg. 10

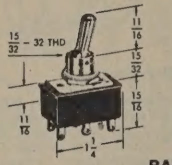
No.	Circuit	NET Each
920	SPST	$1.70
921	SPDT	2.05
923	DPST	2.55
924	DPDT	2.90

SWITCH ACCESSORIES

508 509 581 1146 1170 1171 1172 1196 1197 1198

No.	Description	Std. Pkg.	NET Per C
508	ON-OFF name plate	100	$ 7.00
509	HI-LO name plate	100	7.00
581	Snap-On Button (Red or Black)	50	35.00
1146	Narrow Rim Lockwasher	100	2.10
1170	Key—Remove off position	50	33.00
1171	Key—Remove both positions	50	33.00
1172	Locking Ring	100	3.20
1196	Hex Nut—Brass N. P.	100	2.42
1197	Ring Nut—Brass N. P.	100	3.10
1198	Dress Nut—Brass N. P.	100	22.00

INTERMEDIATE SIZE TOGGLE SWITCHES

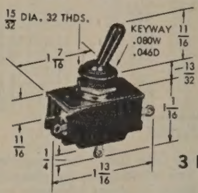


Molded phenolic base. 15/32-32 x 15/32" long slotted sleeve, nickel finish. Supplied with hex nut and knurled nut. Back connected silver plated solder contacts. SPDT rated at 1 amp-250 volts, 6 amps-125 volts AC-DC; all others rated at 3 amps-250 volts, 6 amps-125 volts AC-DC.
Std. Pkg. 10

BAT LEVER

POSITIVE ACTION			MOMENTARY ACTION		
No.	NET Each	CIRCUIT	No.		NET Each
520	$1.70	SPST	524	OFF	$2.70
521	2.05	SPDT	—		
522	2.55	DPST	537	OFF	3.20
523	2.90	DPDT	525		4.25

ST TYPE TOGGLE SWITCHES



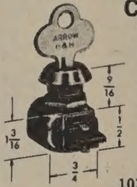
MEETS MIL-S-3950B

3 POSITION – CENTER OFF

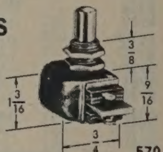
Rated at 3 amps-250 volts, 6 amps-125 volts AC-DC.
Std. Pkg. 10

No.	CIRCUIT	NET Each
566	SPDT	$3.30
567	DPDT	4.05

CANOPY TYPE ROTARY SWITCHES



1034

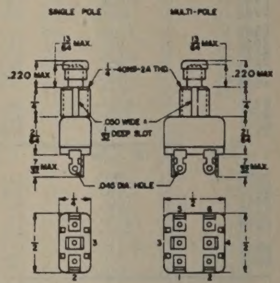


570

Laminated type, 11/32-32 x 15/32" sleeve, nickel finish. Solder lugs. Supplied with hex nut and dress nut, SPST rated at 3 amps-250 volts AC-DC, all others rated at 1 amp-250 volts, 3 amps-125 volts, AC-DC. Key removable in OFF position only on SPST and DPST—key removable in both positions on all others. 1 1/8" shaft.
Std. Pkg. 10

KEY TYPE		CIRCUIT	ROTARY TYPE	
	NET Each			NET Each
1034	$4.45	SPST	570	$2.30
1035	4.55	SPDT	—	—
1037	5.60	DPST	—	—
1038	5.65	DPDT	573	4.85

ARROW H SUB-MINIATURE MOMENTARY PUSH BUTTON SWITCHES



Smallest momentary switch available, combining maximum performance, dependability and durability with minimum weight and envelope. Gold plated leaf contacts, with molded diallyl phthalate body and anodized aluminum housing. Mounts with 1/4" diameter slotted sleeve, supplied with mounting hardware. Nylon push button caps are optional and are available in seven colors.

Rating: 2A. 29V.DV Resistive
1A. 115V.AC
Minimum Rating: 10 Micro-amps at 50 MV.
Weight: 2.5 Grams Single Pole
4.0 Grams Double Pole
Mechanical Life: Min. 1,000,000 Cycles.

Smith No.	Circuit	Std. Pkg.	Net Each
4755	SPDT NO/MC	5	$5.50
4756	DPDT NO/MC	5	6.80
4757	3PST/3P/NO	5	8.10
4758	3PST/3./NC	5	9.30
4754	Button Only, Available in Red, Black, Green, Yellow Blue, Brown, Natural	25	.21

CUTLER-HAMMER

TOGGLE SWITCHES

STANDARD DUTY

15 Amps. 125 Volts — 10 Amps, 250 Volts AC, UL Approved 15/32" shank; slow-make and break; bakelite case. AC rated only for longer life and greater capacity. **Std. Pkg. 10**

BACK CONNECTED LUG TERMINALS

No	C-H No.	Type	NET Each
966	7501K13	SPST	$1.45
967	7505K4	SPDT	1.60
968	7561K4	DPST	2.20
969	7565K5	DPDT	2.60
970	7611K2	TPST	2.60
971	7615K2	TPDT	4.10

BACK CONNECTED SCREW TERMINALS

No	C-H No.	Type	NET Each
972	7500K14	SPST	$1.60
973	7504K4	SPDT	1.90
974	7560K5	DPST	2.60
975	7564K6	DPDT	3.20
976	7610K2	TPST	4.75
977	7614K2	TPDT	6.70

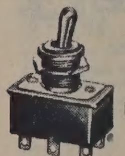
CENTER OFF STANDARD DUTY TOGGLE SWITCHES

BACK CONNECTED LUG TERMINALS

No	C-H No.	Type	NET Each
978	7503K13	SPDT	$ 1.60
979	7563K4	DPDT	2.60
980	7613K2	TPDT	5.00

BACK CONNECTED SCREW TERMINALS

No	C-H No.	Type	NET Each
981	7502K13	SPDT	$ 1.90
982	7562K4	DPDT	3.20
983	7612K2	TPDT	6.00



TOGGLE SWITCHES

LIGHT DUTY

AC-DC, UL Approved; 15/32" shank; quick make — quick break; bakelite case. Unusually small size for electrical capacity. **Std. Pkg. 10**

BACK CONNECTED LUG TERMINALS

SMALL BAT HANDLE 15/32" LONG

No.	C-H No.	Type	Current Rating 125 V.	Current Rating 250 V	NET Each
950	8280K16	SPST		3 Amps.	$1.45
951	8381K8	SPST	6 Amps.	3 Amps.	1.50
952	8282K14	SPDT	3 Amps.	1 Amp.	1.80
955	8370K7	DPST	6 Amps.	3 Amsp.	2.60
957	8373K7	DPDT	6 Amps.	3 Amps.	3.00

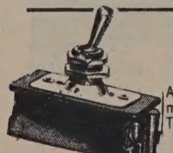
SIDE CONNECTED SCREW TERMINALS

Small Bat Handle $^{15}/_{32}$" Long

No.	C-H No.	Type	Current Rating 125 V.	Current Rating 250 V	NET Each
958	8285K8	SPST		3 Amps.	$1.70
959	8396K8	SPST	6 Amps.	3 Amps.	1.75
961	8372K7	DPST	6 Amps.	3 Amps.	3.15
963	8375K7	DPDT	6 Amps.	3 Amps.	4.00

WIRE LEADS — SIX INCHES LONG

No.	C-H No.	Type	Current Rating 125 V.	Current Rating 250 V	NET Each
964	8290K16	SPST		3 Amps.	$1.70
965	8391K8	SPST	6 Amps.	3 Amps.	1.75



TOGGLE SWITCHES

HEAVY DUTY

AC-DC, UL Approved: 15/32" shank; quick make-quick break; bakelite case. Screw Terminals. **Std. Pkg. 10**

No.	C-H No.	Type	Current Rating 125 V	Current Rating 250-V	NET Each
984*	7321K3	SPST	12 A	6 A	$2.90
985*	7320K3	DPST	12 A	6 A	2.70
986+	7361K5	SPST	15 A	10 A	4.85
987+	7360K8	DPST	15 A	10 A	4.60
988±	7402K4	DPST		20 A	6.20

*1 Hp — 125/250V. +1½ Hp — 125/250V.
±1½ Hp — 125V. 2 Hp — 250 V.

MORE THAN 20 THOUSAND ITEMS MANUFACTURED UNDER ONE ROOF

CUTLER-HAMMER SWITCHES

PUSH BUTTON SWITCHES

Push to make—Push to break

AC-DC, UL Approved; $^{11}/_{16}$" shank; bakelite case. Pushing the button once closes the contacts. Pushing it again opens the contacts. Rated at 6 Amps. 125 Volts; 3 Amps. 250 Volts. **Std. Pkg. 10**

No.	C-H No.	Type	Term.	NET Each
989	7206K4	SPST	Lug	$1.75
990	7208K4	SPST	Screw	2.00
991	7207K4	SPST	Wire	2.00

PUSH BUTTON MOMENTARY SWITCHES

Std. Pkg. 10

AC-DC, UL Approved, $^{15}/_{32}$" shank; rated at $^{3}/_{4}$ Amp. 125 volts — $^{1}/_{4}$ Amp. 250 volts.

No.	C-H No.	Type	Term.	NET Each
992	8411K11	SP Norm. Op	Lug	$ .80
993	8411K12	SP Norm. Op	Screw	.95
994	8411K8	SP Norm. Cl	Lug	.60
995	8411K7	SP Norm. Cl	Screw	.75

CONTINENTAL-WIRT SLIDE SWITCHES

FIG. 1

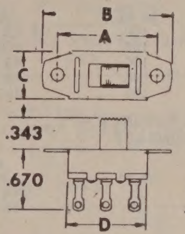
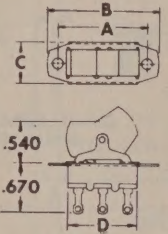
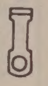


FIG. 2



LUG A



LUG B

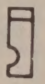


FIG. 3

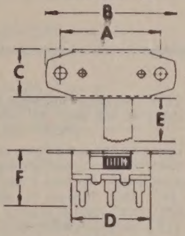
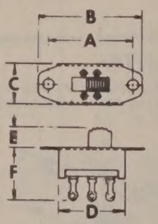
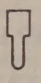


FIG. 4



LUG C



LUG D

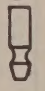
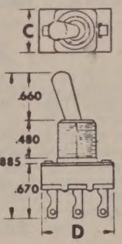


FIG. 5



RATINGS: Based on 125 Volts

Rating A — 3.0 amps AC, 0.5 amps DC
Rating B — 6.0 amps AC, 0.5 amps DC
Rating C — 0.5 amp AC-DC

SLIDE SWITCHES—STANDARD

DETENT.

FIG. 1 — LUG A

TYPE	DIMENSIONS A	B	C	D	RATING "A" No.	RATING "A" NET Per C	RATING "D" No.	RATING "D" NET Per C
SPST	1.12	1.40	0.54	0.88	515	$17.00	1105	$24.00
SPDT	1.12	1.40	0.54	0.88	516	18.00	1106	25.00
DPST	1.12	1.40	0.54	0.88	517	24.00	1107	32.00
DPDT	1.12	1.40	0.54	0.88	1054	35.00	1108	33.00
DP3Pos	1.40	1.65	0.54	1.18	1054	35.00	8637	37.00
3PDT	1.12	1.40	0.71	0.88	1109	55.00	8638	65.00
3P3Pos	1.40	1.65	0.78	1.18	8635	65.00	8639	75.00
4PDT	1.12	1.40	1.00	0.88	1104	75.00	8640	80.00
4P3Pos	1.40	1.65	1.00	1.18	8636	90.00	8641	100.00
SPRING RETURN								
SPST	1.12	1.40	0.54	0.88	568	36.00	8643	33.00
SPDT	1.12	1.40	0.54	0.88	569	40.00	8644	35.00
DPDT	1.12	1.40	0.71	0.88	8642	45.00	8645	50.00

ROCKER

FIG. 2 — LUG A - RATING "A"

TYPE	DIMENSIONS A	B	C	D	DETENT No.	DETENT NET Per C	SPRING RETURN No.	SPRING RETURN NET Per C
SPST	1.12	1.40	0.54	0.88	8646	50.00	8651	60.00
SPDT	1.12	1.40	0.54	0.88	8647	55.00	8652	65.00
DPST	1.12	1.40	0.54	0.88	8648	60.00	—	—
DPDT	1.12	1.40	0.54	0.88	8649	62.00	—	—
SPDT	1.12	1.40	0.71	0.88	8650	90.00	—	—

SIDE ACTION

FIG. 3 — LUG A - RATING "A"

TYPE	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
SPDT	1.12	1.40	0.54	0.88	0.51	.610	8668	30.00
DPDT	1.12	1.40	0.54	0.88	0.51	.610	8664	33.00

PRINTED CIRCUIT

FIG. 1 — LUG C - RATING "A"

TYPE	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
SPDT	1.12	1.40	0.54	0.88	—	—	8613	20.00
DPDT	1.12	1.40	0.54	0.88	—	—	8614	30.00

PRINTED CIRCUIT — SIDE ACTION

FIG. 3 — LUG C - RATING "C"

TYPE	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
DPDT	1.125	1.406	0.54	0.88	0.515	.610	8615	30.00

SUBMINIATURE SLIDE SWITCHES

DETENT

FIG. 4 — LUG A or B - RATING "C"

TYPE	LUG	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
SPDT	B	0.56	0.76	0.31	0.33	0.19	0.261	8655	$45.00
SPDT	A	0.81	1.00	0.40	0.63	0.20	0.550	1226	27.00
DPDT	A	0.81	1.00	0.40	0.63	0.20	0.550	1227	35.00
SP3Pos	A	1.00	1.19	0.40	0.80	0.20	0.550	1238	40.00
DP3Pos	A	1.00	1.19	0.40	0.80	0.20	0.550	1239	45.00
SPRING RETURN									
SPDT	A	0.81	1.00	0.40	0.63	0.20	0.550	1236	40.00

PRINTED CIRCUIT

LUG C or D - RATING "C"

TYPE	LUG	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
SPST	C	0.812	1.00	0.400	0.628	0.208	0.550	8632	30.00
DPDT	C	0.812	1.00	0.400	0.628	0.208	0.550	8633	36.00
DPDT	D	0.562	0.762	0.312	0.380	0.187	0.371	8634	65.00

PRINTED CIRCUIT — SIDE ACTION

FIG.3 — LUG C - RATING "C"

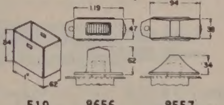
TYPE	DIMENSIONS A	B	C	D	E	F	No.	NET Per C
SPDT	0.812	1.00	0.400	0.628	0.456	0.504	8616	45.00
DPDT	0.812	1.00	0.400	0.628	0.456	0.504	8617	50.00
DP3Pos	1.000	1.19	0.400	0.800	0.456	0.504	8618	65.00

SIDE TOGGLE SWITCHES

FIG. 5 — LUG A - RATING "B"

No.	TYPE	DIMENSIONS C	D	NET Per C
1100	SPDT	0.544	0.88	$93.00
1101	DPDT	0.544	0.88	100.00
1102	3PDT	0.714	0.88	130.00
1103	4PDT	1.000	0.88	150.00

SLIDE SWITCH ACCESSORIES



519 8656 8557

Description
Nylon Shield
Black Slide Topper for Standard Switch
Black Slide Topper For Miniature Switch

No.	NET Per C
519	$15.00
8656	12.00
8657	12.00

USE OUR VAST NATIONAL DISTRIBUTION NETWORK for Off-The-Shelf Deliveries of your smaller hardware requirements.

PILOT LIGHT SOCKETS

Sockets are available for Mini Screw, Mini Bayonet, Candelabra Screw. Candelalbra Bayonet (Single and Double Contact). Sub-Mini Groove, Wedge and Printed Circuit in Mini Bayonet and Sub-Mini groove. Brackets are made of .025-032 corrosion resistant plated steel, shells of nickel plated brass and tinned brass solder lugs.

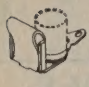


FIG. 1

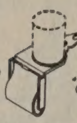


FIG. 2

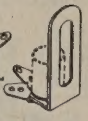


FIG. 3

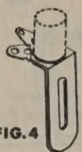


FIG. 4

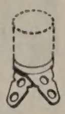


FIG. 5

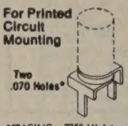


FIG. 6

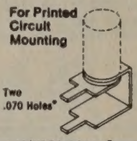


FIG. 7

*SPACING: .375" Miniature Bayonet; 19/64" Subminiature Groove.

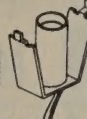


FIG. 8

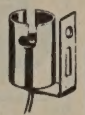


FIG. 9

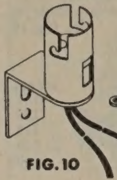


FIG. 10

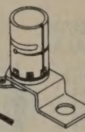


FIG. 11

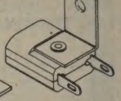


FIG. 12

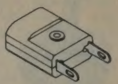


FIG. 13

MINIATURE SCREW

No.	Fig. No.	Std. Pkg.	NET Per C
1922	1	100	$36.00
1923	2	100	36.00
1928	3	100	36.00
1929	4	100	36.00
1934	5	100	33.00

MINIATURE BAYONET

No.	Fig. No.	Std. Pkg.	NET Per C
1924	1	100	$33.00
1925	2	100	33.00
1930	3	100	33.00
1931	4	100	33.00
1935	5	100	33.00
1938	8	100	45.00
1900	6	25	65.00
1901	7	25	110.00

CANDELABRA SCREW

No.	Fig. No.	Std. Pkg.	NET Per C
1926	1	100	$ 43.00
1927	2	100	43.00
1932	3	100	43.00
1933	4	100	43.00
1936	5	100	33.00

CANDELABRA BAYONET — SINGLE CONTACT

No.	Fig. No.	Std. Pkg.	NET Per C
1902	9	25	$60.00
1903	10	25	60.00

CANDELABRA BAYONET — DOUBLE CONTACT

No.	Fig. No.	Std. Pkg.	NET Per C
1904	9	25	$75.00
1905	10	25	75.00

SUB-MINIATURE GROOVE

No.	Fig. No.	Std. Pkg.	NET Per C
1906	6	25	$120.00
1907	7	25	120.00
1908	11	25	75.00

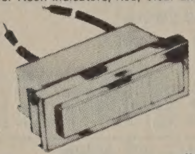
WEDGE

No.	Fig. No.	Std. Pkg.	NET Per C
1909	13	25	$50.00
1910	12	25	50.00

INDICATOR LIGHTS

Housings of White Nylon, lens of high impact plastic. Built-in resistors provide voltage ratings from 6-3V to 115V. Low voltage indicators use incandescent lamps, the 115V indicators use high brilliance Neon lamps. Lens colors available for incandescent indicators, Red, Green and Amber, for Neon Indicators, Red, Clear and Amber.

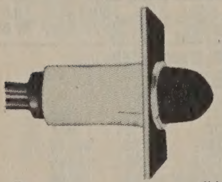
SPECIFY COLOR



Self-mounting, snaps into a rectangular opening 1.28 x .391", panel thickness up to .090". Terminates with two 6" wire leads, 18 gauge, UL and CSA approved.

Std. Pkg. 10

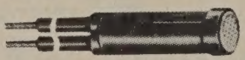
No.	Voltage	NET Per C
1911	6.3 V	$190.00
1912	28 V	190.00
1913	115 V	160.00



Self-mounting, snaps into a ½" round hole and requires no mounting hardware. Terminates with two 6" wire leads, 18 gauge, stripped ½" UL and CSA approved.

Std. Pkg. 10

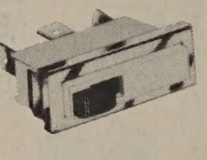
No.	Voltage	NET Per C
1914	6.3 V	$190.00
1915	28 V	190.00
1916	115 V	160.00



Designed to mount in a 5/16" round hole, retained by Speednut which is supplied. Terminates with two 6" wire leads, 18 gauge, stripped 1/2". UL and CSA approved.

Std. Pkg. 10

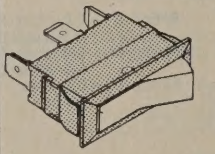
No.	Voltage	NET Per C
1917	6.3 V	$190.00
1918	28 V	190.00
1919	115 V	160.00



Low cost switch and indicator combination. Self-mounting, snaps into a rectangular opening 1.281" x .395", panel thickness to .080". SPST switch rated at 6 Amps AC 125 V. Terminates with three quick disconnect .250" tabs. Available only for 115 V operation. UL and CSA approved.

Std. Pkg. 10

No.	Voltage	NET Per C
1920	115 V	$270.00

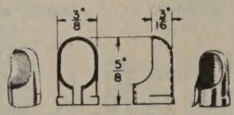


Self-mounting, snaps into a rectangular opening 1.281" x .395" panel thickness .032"—.125". SPST switch rated 10 Amps AC 125 V. Illuminated rocker, lights in the "on" position. Terminates with two quick-disconnect .250" male tabs. Available for 115 V only. UL and CSA approved.

Std. Pkg. 10

No.	Voltage	Per C NET
1921	115 V	$270.00

PILOT LIGHT SHIELD



1963 1969

Prevents glare when used in radio receiver meters, etc. Ribbed bottom holds shield securely in place on bulb.

Std. Pkg. 100

No.	Type	Per C
1963	Brass Cad Plate	$5.50
1968	Plain Brass	5.00
1969	Flared Brass Cad. Plate	6.00

"UNIVERSAL" FOREIGN ADAPTER PLUGS

1991

1992

1993

1994

852

856

Permits operation of American, British or Continental electric shavers, radios, record players and other small appliances from any electrical outlet anywhere in the world, supplying the required voltage. All plugs are rated at 15 amps/117 V; 7½ Amps/220 V.

Std. Pkg. 25

No.	Male Plug	NET Per C
1991	Continental	$ 70.00
1992	American	75.00
1993	Bayonet	$ 140.00
1994	Screw	3.60 Ea
1995	Kit of 4 Adapters, 1 each of above Std. Pkg. 1	3.00 each

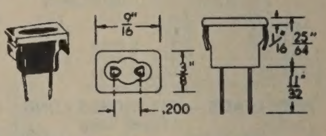
Streamlined bakelite plug adapters. Adapts from American to Foreign type.

RATING: 125 VAC — 15 AMP
220 VAC — 7.5 AMP

Std. Pkg. 25

No.	Female End	Male End	NET per C
852	American	Continental	$ 60.00
856	American	British	80.00

SNAP-IN BULB CONNECTOR



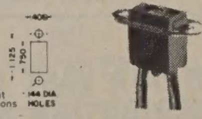
Designed for use with the new Twin Pin Baseless Miniature Lamps (G.E. #10-25 volts, #12-6.3 volts, or #15-7.0 volts). Easily assembled to any unit for indicating purposes. Withstands excessive temperatures. Snaps into a .500 x.296 rectangular hole in panels .032 to .062 thick. Bezel — brass, cad. plated: contacts — brass, silver plated.

Std. Pkg. 25

No. 1504 **NET Per C $25.00**

CONVENIENCE OUTLETS

BRACKET TYPE
Top or Bottom Mount



Flat steel bracket mounts with two #6 screws or equivalent size eyelets. Black only.

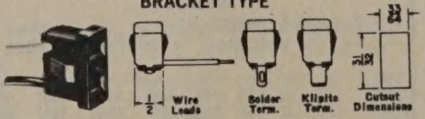
RATING: 15 Amps, 125 Volts AC or DC.

LEADS: No. 1279 has two leads, plastic wire #16 gauge, 8" long. UL approved.

Std. Pkg. 50

No.	Type	Terminals	NET Per C
1299	Top or Bottom Mount	Solder	18.00

PUSH-IN SNAP-LOCK BRACKET TYPE



Carbon Steel spring clips lock unit securely in place when pushed into opening. UL approved.

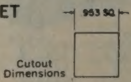
RATING: 15 Amps, 125 Volts AC or DC.

LEADS: Plastic wire #14 gauge, 6" long.

Std. Pkg. 50

No.	Terminals	Color	Per C
1283-103	Wire Leads	Black	$30.00
1284-103	Solder	Black	38.00
1285-103	Kilpite	Black	38.00

THREE WIRE OUTLET



(With grounding lead) Carbon steel spring clips lock unit securely in place when pushed into opening. UL approved.

RATING: 15 Amps, 125 Volts, AC or DC.

LEADS: Two #14 gauge 6" long plastic wire and one #16 gauge green ground lead 6" long.

Std. Pkg. 50

No.	Color	NET Per C
1280-103	Black	$ 45.00
1280-101	White	45.00

SPECIALS ARE STANDARD WITH SMITH.

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

SPECIFY SMITH TEFLON* TERMINALS

*Du Pont's registered trademark

PLATING INFORMATION
FOR ALL SMITH TEFLON TERMINALS LISTED IN THIS DIRECTORY

-P1 and -P12 are STANDARD PLATING.
Add $10.00 per M for any plating other than P-1 & P-12 WHERE STANDARD.

For Platings listed below, other than Standard, consult Factory.
Minimum Quantity 1000 Pieces.

TEST JACKS & PROBES:	Plating -P1 (see below)
STANDOFFS & FEED-THRUS:	Plating -P12 (see below)
PROBES & PLUGS	Plating - P17 (see below)

PLATING DASH NO.	TYPE OF PLATING	THICKNESS OF PLATE	APPLICABLE SPECIFICATIONS if any
—P1 (STANDARD)	Copper strike Gold flash	0.0005 0.000020	QQ-S-365, Type III MIL-G-45204, Type II
—P2	Copper strike Silver plate	0.0003/0.0005	QQ-S-365, Type III
—P3	Copper strike Solder plate	0.0005 Min.	(M-259) MIL-F-14072 (M222, Type I)
—P4	Copper strike Gold flash	0.000010/0.000020	MIL-G-45204, Type II
—P5	Copper strike Silver plate Gold plate	0.0003 0.000050	QQ-S-365, Type III MIL-G-45204, Type II
—P6	Copper strike Gold plate	0.000050/0.000070	MIL-G-45204, C1.1, Type II
—P7	Copper strike Gold plate	0.000200/0.000250	MIL-G-45204, C1.3, Type II
—P8	Copper strike Gold plate	0.000100/0.000150	MIL-G-45204, C1.2, Type II
—P9	Copper strike Nickel plate Gold plate	0.000050/0.000070 0.000030/0.000050	QQ-N-290, Class I MIL-G-45204, Type II
—P10	Copper strike Gold plate	0.00030 Min.	MIL-G-45204, Type II
—P11	Copper Tin plate	0.0002 0.0002/0.0004	MIL-T-10727, Type I
—P12 (STANDARD)	Copper Bright acid tin "Tintilate"	0.000050 0.0003	MIL-T-10727, Type I
—P13	Hot tin dip	Approx. 0.0002	MIL-T-10727, Type II
—P17	Copper strike Nickel plate	0.0003/0.0005	QQ-N-290, C1.1, Type VI (KC)
—P18	Silver Gold	0.0005 0.000030	QQ-S-365, Type III
—P45	Copper strike Solder plate	DISCONTINUED PROCESS IS AN ENVIRONMENTAL POLLUTANT	MIL-T-10727, Reflowed

Add $5.00 per M to List Prices For Colors

QUANTITY DISCOUNTS
FOR ALL SMITH TEFLON TERMINALS LISTED IN THIS DIRECTORY

100 — 999	30% Off
1,000 — 4,999	45% Off
5,000 —14,999	55% Off
15,000 — & up	On request

COLOR CODE SUFFIX - Add to Catalog Number as Required

— 101 WHITE*	— 104 GREEN	— 107 YELLOW	— 112 PURPLE
— 102 RED	— 105 BLUE	— 108 BROWN	— 113 GREY
— 103 BLACK	— 106 ORANGE		

*White is natural "Teflon" per MIL-P-19468 and will be supplied if no color is specified.

PROBES & PLUGS

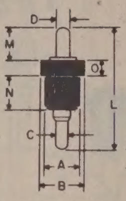


FIG. 80

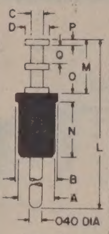


FIG. 81

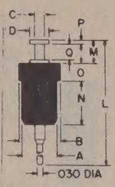


FIG. 82

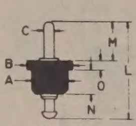


FIG. 83

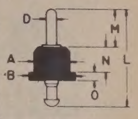


FIG. 88

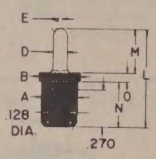


FIG. 84

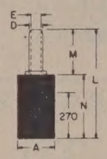


FIG. 85

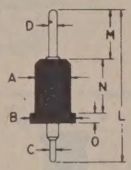


FIG.86

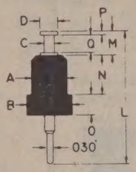


FIG. 89

FOR RAPID SELECTION: terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

C & D = PROBE DIAS.
M = LGTH. OF PIN
A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
L = OVERALL LGTH.

FIG. No.	SMITH No.	DIMENSIONS A	B	C	D	E	L	M	N	O	P	Q	RESALE Per M
80	**73-1028**	.185	.218	.030	.040	—	1.870	.120	.250	.046	—	—	$240.00
80	**73-1018**	.148	.172	.030	.050	—	1.937	.250	.165	.046	—	—	240.00
80	**73-1003**	.185	.218	.030	.050	—	1.937	.250	.140	.046	—	—	240.00
80	**73-1001**	.185	.218	.030	.050	—	.906	.250	.287	.046	—	—	240.00
80	**73-1000**	.185	.218	.030	.050	—	1.531	.250	.287	.046	—	—	240.00
80	**73-1002**	.185	.218	.030	.050	—	2.083	.250	.287	.046	—	—	240.00
80	**73-3006**	.218	.250	.040	.050	—	1.531	.312	.375	.157	—	—	240.00
80	**73-1006**	.185	.218	.050	.081	—	.739	.281	.287	.046	—	—	$190.00
81	**73-1010**	.185	.218	.060	.125	—	1.052	.281	.287	.046	.031	.093	230.00
82	**73-1009**	.185	.218	.050	.093	—	2.000	.125	.150	.230	.020	.085	$220.00
82	**73-1008**	.185	.218	.050	.093	—	1.000	.125	.287	.093	.020	.085	200.00
82	**73-1007**	.185	.218	.050	.093	—	2.005	.125	.287	.093	.020	.085	200.00
83	**73-1182**	.148	.172	.040	—	—	.415	.125	.100	.040	—	—	$180.00
83	**73-1156**	.148	.172	.040	—	—	.478	.188	.100	.040	—	—	180.00
83	**73-1022**	.171	.187	.040	—	—	.687	.272	.212	.040	—	—	$190.00
83	**73-1011**	.185	.218	.050	—	—	.562	.250	.135	.052	—	—	$190.00
83	**73-1016**	.185	.218	.050	—	—	.562	.250	.141	.046	—	—	190.00
83	**73-1023**	.185	.218	.050	—	—	.906	.250	.287	.046	—	—	220.00
83	**73-1027**	.185	.218	.062	—	—	.612	.250	.141	.046	—	—	$190.00
83	**73-1017**	.185	.218	.081	—	—	.562	.250	.141	.046	—	—	$190.00
83	**73-1015**	.185	.218	.081	—	—	.739	.281	.287	.046	—	—	190.00
83	**73-1026**	.185	.218	.090	—	—	.648	.190	.287	.046	—	—	$190.00

PLATING: Standard (-P17) unless otherwise specified.

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	RESALE Per M
84	**73-3010**	.218	.250	—	.080	.062	.695	.270	.325	.050	—	—	$210.00
85	**73-3001**	.218	—	—	.080	.062	.645	.270	.375	—	—	—	$210.00
85	**73-3016**	.218	—	—	.080	.062	.875	.500	.375	—	—	—	220.00
85	**73-3012**	.218	—	—	.090	.062	.645	.270	.375	—	—	—	$210.00
86	**37-1028**	.185	.218	.030	.040	—	1.870	.120	.250	.046	—	—	$200.00
86	**37-1018**	.148	.172	.030	.050	—	1.937	.250	.165	.046	—	—	200.00
86	**37-1003**	.185	.218	.030	.050	—	1.937	.250	.141	.046	—	—	200.00
86	**37-1001**	.185	.218	.030	.050	—	.906	.250	.287	.046	—	—	220.00
86	**37-1000**	.185	.218	.030	.050	—	1.531	.250	.287	.046	—	—	230.00
86	**37-1002**	.185	.218	.030	.050	—	2.083	.250	.287	.046	—	—	240.00
86	**37-1006**	.185	.218	.050	.081	—	.739	.281	.287	.046	—	—	200.00
88	**37-1182**	.148	.172	.040	—	—	.415	.125	.100	.040	—	—	$200.00
88	**37-1156**	.148	.172	.040	—	—	.478	.188	.100	.040	—	—	200.00
88	**37-1022**	.171	.187	.040	—	—	.687	.272	.212	.040	—	—	230.00
88	**37-1011**	.185	.218	.050	—	—	.562	.250	.135	.052	—	—	$180.00
88	**37-1016**	.185	.218	.050	—	—	.562	.250	.141	.046	—	—	180.00
88	**37-1023**	.185	.218	.050	—	—	.906	.250	.287	.046	—	—	200.00
88	**37-1027**	.185	.218	.062	—	—	.612	.250	.141	.046	—	—	$200.00
88	**37-1017**	.185	.218	.081	—	—	.562	.250	.141	.046	—	—	$210.00
88	**37-1015**	.185	.218	.081	—	—	.739	.281	.287	.046	—	—	200.00
88	**37-1026**	.185	.218	.090	—	—	.648	.190	.287	.046	—	—	$200.00
89	**37-1009**	.185	.218	.050	.093	—	2.000	.125	.150	.230	.020	.085	$220.00
89	**37-1008**	.185	.218	.050	.093	—	1.000	.125	.287	.093	.020	.085	220.00
89	**37-1007**	.185	.218	.050	.093	—	2.005	.125	.287	.093	.020	.085	220.00

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available.
See at right For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNTS

SPECIFY SMITH TEFLON* TERMINALS

*Du Pont's registered trademark

TEST JACKS

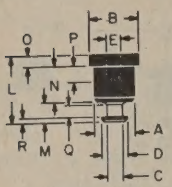


FIG. 68

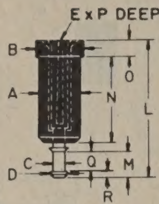


FIG. 69

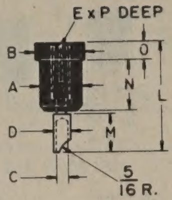


FIG. 70

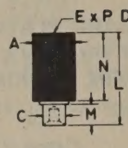


FIG. 71

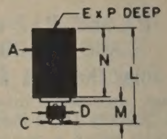


FIG. 72

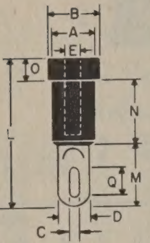


FIG. 76

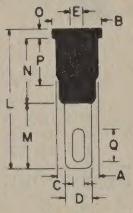


FIG. 77

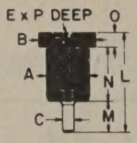


FIG. 97

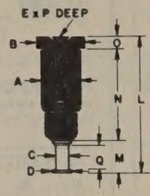


FIG. 98

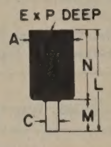


FIG. 96

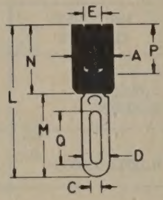


FIG. 78

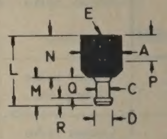


FIG. 79

FOR RAPID SELECTION:

terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

E = PROBE
P = PROBE DEPTH
A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

PANEL BOARD MOUNT

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
68	63-1033	.120	.150	.046	.080	.040	.203	.060	.113	.030	.078	.040	.010	$340.00
68	63-1032	.148	.172	.046	.080	.040	.203	.060	.097	.046	.078	.040	.010	340.00
68	63-1029	.140	.172	.046	.080	.040	.253	.060	.143	.050	.125	.040	.010	320.00
68	63-1077	.140	.172	.046	.060	.040	.345	.120	.179	.046	.140	.077	.023	320.00
68	63-1010	.148	.172	.040	.060	.040	.345	.120	.179	.046	.140	.077	.023	320.00
68	•63-1061	.148	.172	.040	.060	.040	.345	.120	.179	.046	.140	.077	.023	550.00
68	63-1072	.120	.142	.040	.060	.040	.410	.120	.244	.046	.205	.060	.030	320.00
68	63-1012	.120	.142	.040	.060	.040	.449	.120	.283	.046	.245	.060	.030	320.00
68	63-1079	.185	.218	.054	.074	.050	.437	.120	.271	.046	.195	.053	.037	$340.00
68	63-1004	.185	.218	.054	.074	.080	.437	.120	.271	.046	.195	.053	.037	$340.00
68	•63-1060	.185	.218	.054	.074	.080	.437	.120	.271	.046	.195	.053	.037	550.00
68	63-1075	.185	.218	.054	.074	.080	.504	.187	.271	.046	.195	.104	.037	340.00
68	63-1006	.204	.250	.054	.074	.080	.437	.120	.271	.046	.195	.053	.037	360.00
68	63-1057	.185	.218	.054	.074	.080	.367	.120	.301	.046	.225	.047	.035	360.00
68	63-1005	.185	.218	.054	.074	.080	.640	.187	.400	.050	.287	.104	.037	360.00
68	63-1080	.185	.218	.080	.125	.080	.455	.105	.300	.050	.315	.065	.020	360.00
68	63-1054	.185	.218	.054	.074	.090	.340	.120	.174	.046	.140	.077	.023	$320.00
68	63-1003	.185	.218	.054	.074	.090	.437	.120	.271	.046	.195	.053	.037	340.00
68	63-1007	.170	.218	.046	.078	.090	.375	.066	.269	.046	.250	.040	.010	360.00
68	63-1028	.200	.218	.054	.074	.093	.699	.187	.386	.125	.390	.116	.035	$360.00
68	63-1013	.200	.218	.054	.074	.093	.761	.187	.386	.187	.455	.116	.035	400.00
68	63-1081	.200	.375	.054	.074	.093	.834	.187	.417	.230	.518	.116	.035	500.00
68	63-1011	.218	.250	.066	.098	.104	.400	.060	.294	.046	.250	.037	.010	$350.00
69	63-1500	.148	.171	.040	.060	.040	.470	.100	.285	.065	.225	.070	.020	$350.00
69	63-1504	.148	.171	.040	.060	.062	.470	.100	.285	.065	.225	.070	.020	350.00
70	63-1083	.148	.171	.046	.061	.040	.359	.140	.154	.065	.125	—	—	$360.00
70	63-1093	.148	.188	.046	.061	.040	.359	.140	.154	.065	.125	—	—	360.00
70	63-1506	.148	.172	.046	.060	.040	.531	.147	.334	.050	.250	—	—	360.00
70	63-1505	.203	.245	.046	.060	.040	.531	.147	.334	.050	.250	—	—	360.00
70	63-1510	.185	.250	.080	.100	.080	.437	.156	.216	.065	.187	—	—	$510.00
76	63-1001	.185	.218	.050	.115	.040	.687	.354	.287	.046	.250	.156	—	$260.00
76	63-1016	.185	.218	.050	.115	.050	.624	.354	.224	.046	.200	.156	—	260.00
76	63-1037	.185	.218	.050	.115	.050	.687	.330	.146	.187	.200	.156	—	260.00
76	63-1014	.185	.218	.050	.115	.050	.687	.354	.281	.052	.250	.156	—	260.00
76	63-1000	.185	.218	.050	.115	.050	.687	.354	.287	.046	.250	.156	—	260.00
76	63-1017	.185	.218	.050	.115	.060	.718	.316	.356	.046	.315	.156	—	$260.00
76	63-1015	.185	.218	.050	.115	.080	.687	.330	.146	.187	.187	.156	—	260.00
76	63-1002	.185	.218	.050	.115	.080	.687	.354	.287	.046	.250	.156	—	260.00
76	63-1085	.185	.218	—	.110	.080	.710	.354	.287	.070	.275	.156	.050	260.00
77	63-1052	.185	.218	.050	.115	.050	.620	.287	.287	.046	.250	.156	—	$260.00
77	63-1063	.185	.218	.050	.115	.080	.704	.354	.304	.046	.280	.156	—	260.00
97	63-1095	.148	.18	.040	—	.040	.359	.140	.154	.065	.135	—	—	$360.00
98	63-1151	.185	.218	.055	.070	.050	.890	.150	.275	.046	.350	.090	—	$560.00

•Closed Entry Type

VERTICAL - FLOATING

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
71	63-3018	.187	—	.066	—	.080	.376	.085	.281	—	.200	—	—	$500.00
71	63-3019	.187	—	.066	—	.080	.376	.085	.281	—	.200	—	—	500.00
71	63-3020	.187	—	.062	—	.080	.381	.090	.281	—	.250	—	—	500.00
71	63-3008	.218	—	.112	—	.080	.381	.080	.281	—	.250	—	—	500.00
71	63-3007	.218	—	.112	—	.080	.441	.078	.343	—	.250	—	—	500.00
72	63-3017	.187	—	.048	.056	.080	.391	.100	.281	250	.250	—	—	$500.00
96	63-1073	.218	—	.050	—	.080	.585	.140	.430	—	.278	—	—	$350.00
78	63-1086	.185	—	—	.105	.050	.641	.354	.287	—	.204	—	—	$260.00
79	63-1034	.140	—	.046	.080	.025	.203	.060	.143	—	.075	.040	.010	$370.00
79	63-1009	.120	—	.046	.080	.040	.203	.060	.140	—	.075	.040	.010	370.00
79	63-1008	.140	—	.046	.080	.040	.203	.060	.140	—	.075	.040	.010	370.00
79	63-1039	.187	—	.046	.078	.090	1.000	.060	.940	—	.825	.040	.010	540.00
79	63-1038	.218	—	.046	.078	.090	1.000	.060	.940	—	.825	.040	.010	540.00

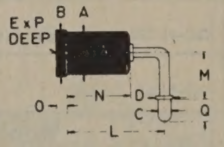


FIG. 73

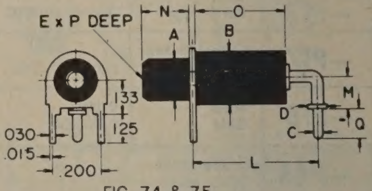


FIG. 74 & 75

RIGHT ANGLE - PRINTED CIRCUIT MOUNT

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
73	63-1098	.218	250	.040	—	.040	.300	.437	.154	046	.190	—	—	$530.00
73	63-1099	.218	250	.040	—	.040	.500	.437	.154	046	.190	—	—	530.00
73	63-3000	.218	250	.050	.080	.080	.400	.250	.316	.046	.250	.125	—	620.00
74	63-3003	.187	218	.050	.080	.080	.400	.140	.046	.300	.125	.250	—	$620.00
74	63-3002	.187	218	.050	.080	.080	.500	.140	.046	.420	.125	.250	—	620.00
74	63-3004	.187	218	.040	.080	.080	.520	.140	.046	.340	.130	.250	—	620.00
74	63-3005	.187	.218	.035	.080	.080	.400	.140	.046	.300	.187	.250	—	620.00
75	63-3009	.187	218	.050	.080	.080	.500	.140	.230	.425	.125	.500	—	$620.00

COLORS: Supplied in White (-101) unless otherwise specified.
Ten colors available.
PLATING: Standard (P-1) unless otherwise specified.

For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

SPECIFY SMITH TEFLON* TERMINALS

* Du Pont's registered trademark

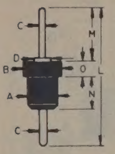


FIG 28

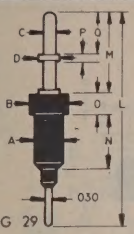


FIG 29

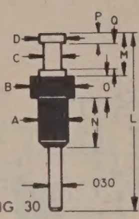


FIG 30

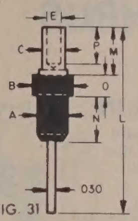


FIG. 31

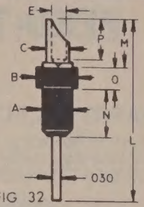


FIG 32

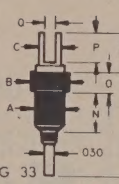


FIG 33

Miniature
Micro-Miniature

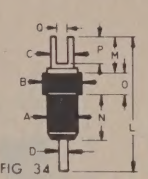


FIG 34

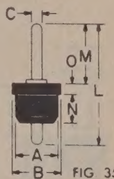


FIG 35

FOR RAPID SELECTION: terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

FEED-THRU MICRO-MINIATURE

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
28	81-1019	.058	.093	.018	.062	—	.450	.200	.060	.020	—	—	—	$290.00
28	81-1016	.075	.093	.030	.060	—	.550	.275	.100	.040	—	—	—	$290.00
29	81-1515	.075	.093	.032	.060	—	1.500	.210	.100	.040	.020	.100	—	$300.00
29	81-1514	.075	.093	.030	.060	—	1.500	.210	.125	.040	.020	.100	—	300.00
29	81-1513	.075	.093	.032	.060	—	1.500	.210	.125	.040	.020	.100	—	300.00
29	81-1516	.075	.093	.032	.060	—	1.700	.210	.125	.090	.020	.100	—	330.00
30	81-1506	.075	.093	.040	.060	—	.250	.090	.060	.030	.020	.050	—	$290.00
30	81-1505	.075	.093	.040	.060	—	.510	.100	.100	.040	.020	.060	—	290.00
31	81-1007	.075	.093	.060	—	.040	.588	.125	.100	.040	.080	—	—	360.00
32	81-1009	.075	.093	.060	—	.040	.588	.120	.100	.040	.080	—	—	$390.00
33	81-2002	.075	.093	.060	—	—	.471	.100	.090	.040	.080	.024	—	$290.00
33	81-2000	.075	.093	.060	—	—	.510	.100	.090	.040	.080	.024	—	290.00
33	81-2001	.075	.093	.060	—	—	.635	.225	.090	.040	.075	.024	—	290.00
34	81-2005	.075	.093	.060	—	—	.320	.100	.100	.040	.080	.024	—	$290.00
34	81-2003	.075	.093	.060	—	—	.510	.100	.100	.040	.080	.024	—	290.00
34	81-2004	.075	.093	.060	—	—	.525	.100	.100	.040	.080	.024	—	260.00
34	81-2016	.075	.093	.060	—	—	.320	.100	.125	.040	.080	.024	—	220.00
34	81-2017	.075	.093	.066	—	—	.320	.100	.125	.040	.080	.024	—	220.00

FEED-THRU SUB-MINIATURE STRAIGHT PIN

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
35	82-1023	.093	.125	.040	—	—	.375	.147	.075	.040	—	—	—	$120.00
35	82-1025	.093	.125	.040	—	—	.337	.125	.100	.040	—	—	—	120.00
35	82-1076	.093	.125	.040	—	—	.453	.156	.100	.040	—	—	—	140.00
35	82-1022	.093	.125	.040	—	—	.515	.210	.100	.040	—	—	—	140.00
35	82-1077	.093	.125	.040	—	—	.987	.687	.100	.040	—	—	—	150.00
35	82-1031	.125	.150	.040	—	—	.335	.125	.060	.040	—	—	—	$120.00
35	82-1032	.125	.150	.040	—	—	.350	.187	.060	.040	—	—	—	120.00
35	82-1018	.125	.150	.040	—	—	.515	.210	.060	.040	—	—	—	140.00
35	82-1002	.148	.172	.040	—	—	.515	.210	.050	.050	—	—	—	$140.00
35	82-1075	.148	.172	.040	—	—	.325	.075	.100	.040	—	—	—	130.00
35	82-1080	.148	.172	.040	—	—	.443	.093	.100	.040	—	—	—	130.00
35	82-1021	.148	.172	.040	—	—	.375	.125	.100	.040	—	—	—	130.00
35	82-1000	.148	.172	.040	—	—	.443	.210	.100	.040	—	—	—	120.00
35	82-1003	.148	.172	.040	—	—	.515	.210	.100	.040	—	—	—	140.00
35	82-1068	.148	.172	.040	—	—	.562	.210	.100	.040	—	—	—	140.00
35	82-1010	.148	.172	.040	—	—	.725	.210	.100	.040	—	—	—	150.00
35	82-1011	.148	.172	.040	—	—	1.000	.210	.100	.040	—	—	—	150.00
35	82-1084	.148	.172	.045	—	—	.585	.320	.100	.040	—	—	—	140.00
35	82-1033	.148	.172	.040	—	—	.890	.625	.100	.040	—	—	—	150.00
35	82-1069	.148	.172	.040	—	—	.431	.106	.110	.050	—	—	—	130.00
35	82-1001	.148	.172	.040	—	—	.410	.147	.110	.050	—	—	—	120.00
35	82-1004	.148	.172	.040	—	—	.535	.210	.110	.050	—	—	—	120.00
35	82-1007	.148	.172	.040	—	—	.535	.210	.120	.040	—	—	—	120.00
35	82-1028	.148	.172	.040	—	—	.407	.125	.132	.040	—	—	—	120.00
35	82-1027	.148	.172	.040	—	—	.515	.210	.132	.040	—	—	—	120.00
35	82-1008	.148	.172	.040	—	—	.535	.210	.132	.040	—	—	—	130.00
35	82-1086	.148	.172	.040	—	—	2.500	.750	.132	.040	—	—	—	220.00
35	82-1009	.148	.172	.040	—	—	.535	.210	.160	.040	—	—	—	130.00
35	82-1081	.148	.172	.040	—	—	.535	.210	.160	.040	—	—	—	130.00
35	82-1030	.148	.172	.040	—	—	.571	.210	.160	.040	—	—	—	130.00
35	82-1063	.148	.172	.040	—	—	.630	.210	.170	.040	—	—	—	150.00
35	82-1064	.148	.172	.040	—	—	.630	.210	.170	.040	—	—	—	150.00
35	82-1065	.148	.172	.040	—	—	.630	.210	.217	.040	—	—	—	150.00
35	82-1067	.148	.172	.040	—	—	.725	.210	.250	.040	—	—	—	150.00
35	82-1026	.157	.172	.040	—	—	.515	.210	.100	.040	—	—	—	$120.00
35	82-1072	.169	.218	.049	—	—	.937	.125	.100	.040	—	—	—	$210.00
35	82-1071	.169	.218	.049	—	—	1.187	.125	.100	.040	—	—	—	210.00
35	82-1073	.169	.218	.049	—	—	1.250	.125	.100	.040	—	—	—	210.00
35	82-1013	.169	.219	.040	—	—	1.500	.460	.100	.040	—	—	—	230.00
35	82-1014	.169	.219	.049	—	—	1.500	.460	.100	.040	—	—	—	230.00
35	82-1082	.171	.218	.040	—	—	1.090	.680	.110	.050	—	—	—	$170.00
35	82-1012	.171	.218	.040	—	—	1.000	.680	.110	.050	—	—	—	230.00
35	82-1015	.172	.195	.040	—	—	.515	.210	.100	.040	—	—	—	$130.00
35	82-1070	.172	.195	.040	—	—	.560	.210	.100	.040	—	—	—	140.00
35	82-1005	.179	.200	.040	—	—	.515	.210	.100	.040	—	—	—	$120.00
35	82-1006	.218	.250	.040	—	—	.515	.210	.100	.040	—	—	—	130.00

METAL HEX STAND-OFFS

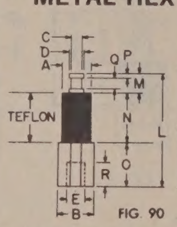


FIG. 90

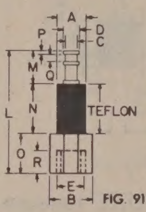


FIG. 91

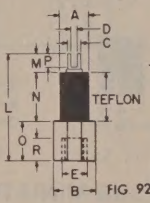


FIG. 92

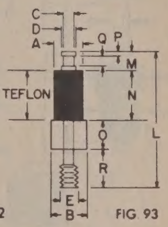


FIG. 93

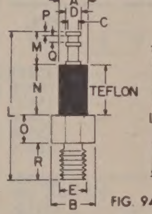


FIG. 94

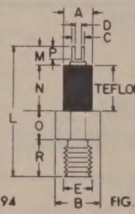


FIG. 95

R = LGTH. OF THD.
B = DIA. OF HEX
L = OVERALL LGTH.
O = LGTH. OF HEX
N = LGTH. OF TEFLON
A = DIA. OF TEFLON

SUB-MINIATURE TURRET - BIFURCATED

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
90	52-1504	.125	.156	.045	.066	4-40	.484	.079	.218	.181	.018	.049	.100	$470.00
90	52-1503	.245	.250	.039	.140	4-40	.594	.180	.156	.258	.031	.120	.156	530.00
90	52-1510	.245	.250	.039	.140	4-40	1.172	.180	.750	.258	.031	.120	.156	620.00
90	52-1501	.245	.250	.069	.140	6-32	.594	.180	.156	.258	.031	.120	.156	$530.00
90	52-1511	.245	.250	.039	.140	6-32	1.172	.180	.750	.258	.031	.120	.156	620.00
• 91	52-1500	.125	.156	.045	.066	4-40	.547	.148	.218	.181	.018	.031	.100	$470.00
91	52-1512	.125	.156	.045	.066	4-40	.547	.148	.218	.181	.018	.031	.100	$510.00
91	52-1505	.245	.250	.069	.140	4-40	.719	.310	.156	.258	.025	.100	.156	530.00
91	52-1507	.245	.250	.069	.140	4-40	1.297	.310	.750	.258	.025	.100	.156	620.00
• 91	52-1502	.245	.250	.069	.140	6-32	.719	.310	.156	.258	.025	.100	.156	$470.00
91	52-1513	.245	.250	.069	.140	6-32	.719	.310	.156	.258	.025	.100	.156	$550.00
91	52-1508	.245	.250	.069	.140	6-32	1.297	.310	.750	.258	.025	.100	.156	620.00
92	52-2002	.125	.156	.066	.036	4-40	.484	.087	.218	.181	.067	—	.100	$470.00
92	52-2001	.245	.250	.140	.060	4-40	.594	.174	.156	.258	.101	—	.156	470.00
92	52-2003	.245	.250	.140	.060	4-40	1.172	.174	.750	.258	.101	—	.156	620.00
92	52-2000	.245	.250	.140	.060	6-32	.594	.174	.156	258	.101	—	.156	$470.00
92	52-2004	.245	.250	.140	.060	6-32	1.172	.174	.750	258	.101	—	.156	620.00
93	53-1504	.125	.156	.045	.066	4-40	.672	.079	.218	.128	.018	.049	.250	$500.00
93	53-1503	.245	.250	.069	.140	4-40	.766	.180	.156	.180	.031	.120	.250	530.00
93	53-1510	.245	.250	.069	.140	4-40	1.344	.180	.750	.180	.031	.120	.250	630.00
93	53-1509	.125	.156	.045	.066	6-32	.672	.079	.218	.128	.018	.049	.250	$500.00
93	53-1501	.245	.250	.069	.140	6-32	.766	.180	.156	.180	.031	.120	.250	,530.00
93	53-1511	.245	.250	.069	.140	6-32	1.344	.180	.750	.180	.031	.120	.250	630.00
• 94	53-1500	.125	.156	.045	.066	4-40	.750	.148	.218	.128	.018	.031	.250	$500.00
94	53-1512	.125	.156	.045	.066	4-40	.750	.148	.218	.128	.018	.031	.250	$560.00
94	53-1505	.245	.250	.069	.140	4-40	.890	.310	.156	.180	.025	.100	.250	530.00
94	53-1507	.245	.250	.069	.140	4-40	1.469	.310	.750	.180	.025	.100	.250	630.00
94	53-1506	.125	.156	.045	.066	6-32	.750	.148	.218	.128	.018	.031	.250	$500.00
94	53-1513	.245	.250	.069	.100	6-32	.890	.310	.156	.180	.025	.100	.250	$600.00
• 94	53-1502	.245	.250	.069	.140	6-32	.890	.310	.156	.180	.025	.100	.250	530.00
94	53-1508	.245	.250	.069	.140	6-32	1.469	.310	.750	.180	.025	.100	.250	630.00
95	53-2002	.125	.156	.066	.036	4-40	.672	.087	.218	.128	.067	—	.250	$500.00
95	53-2001	.245	.250	.140	.060	4-40	.766	.174	.156	.180	.101	—	.250	530.00
95	53-2003	.245	.250	.140	.060	4-40	1.344	.174	.750	.180	.101	—	.250	630.00
95	53-2005	.125	.156	.066	.036	6-32	.672	.087	.218	.128	.067	—	.250	$500.00
95	53-2000	.245	.250	.140	.060	6-32	.766	.174	.156	.180	.101	—	.250	530.00
95	53-2004	.245	.250	.140	.060	6-32	1.344	.174	.750	.180	.101	—	.250	630.00

(HEX BASE: Cad. Plate, Chromate Conversion)

- Same dimensions as above when made to meet Mil-T-55155

Smith No.	Mil No.
52-1512	SE-10-9-D-02
52-1513	SE-10-9-D-01
53-1512	SE-09-9-E-02
53-1513	SE-09-9-E-01

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified.
For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

TEFLON* TERMINALS SPECIFY SMITH

*Du Pont's registered trademark

FEED-THRUS

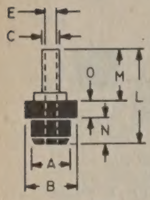


FIG. 48

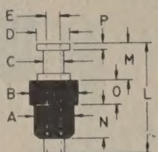


FIG. 49

FOR RAPID SELECTION:

terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
N = LGTH. OF MIN. DIA.
M = LGTH. OF PIN
L = OVERALL LGTH.

B = MAJ. DIA.
O = LGTH. OF MAJ. DIA.
C = DIA. OF PIN

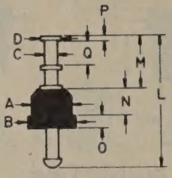


FIG. 42

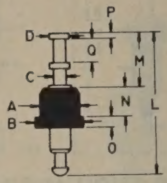


FIG. 43

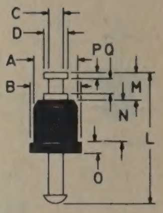


FIG. 44

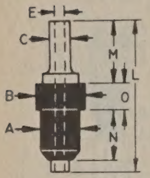


FIG. 50

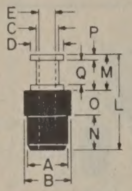


FIG. 52

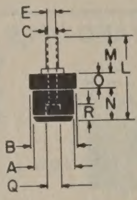


FIG. 54

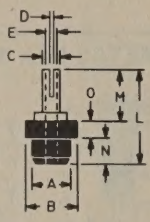


FIG. 51

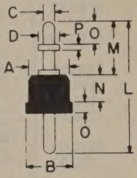


FIG. 46

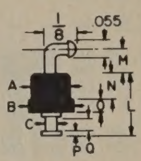


FIG. 47

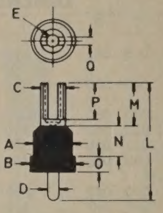


FIG. 64

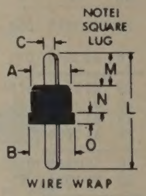


FIG. 101

SUB-MINIATURE TUBULAR

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
48	82-1134	.093	.125	.040	—	.030	.215	.125	.050	.040	—	—	—	$150.00
• 48	82-1040	.093	.125	.040	—	.030	.225	.125	.060	.040	—	—	—	150.00
48	82-1135	.093	.125	.040	—	.030	.312	.207	.060	.040	—	—	—	150.00
48	82-1115	.093	.125	.040	—	.030	.317	.187	.090	.040	—	—	—	170.00
48	82-1116	.093	.125	.040	—	.030	.405	.275	.090	.040	—	—	—	150.00
48	82-1161	.093	.125	.043	—	.030	.252	.100	.110	.040	—	—	—	150.00
• 48	82-1037	.120	.130	.040	—	.030	.310	.207	.053	.050	—	—	—	$150.00
48	82-1036	.125	.150	.040	—	.030	.225	.125	.060	.040	—	—	—	$140.00
48	82-1151	.125	.150	.040	—	.030	.225	.126	.075	.025	—	—	—	140.00
48	82-1126	.125	.150	.040	—	.030	.247	.147	.075	.025	—	—	—	140.00
48	82-1124	.125	.150	.040	—	.030	.325	.125	.075	.125	—	—	—	140.00
48	82-1123	.148	.172	.040	—	.030	.245	.147	.053	.045	—	—	—	$150.00
48	82-1035	.148	.172	.040	—	.030	.250	.147	.053	.050	—	—	—	150.00
48	82-1034	.148	.172	.040	—	.030	.310	.207	.053	.050	—	—	—	150.00
48	82-1127	.148	.172	.080	—	.052	.193	.105	.063	.025	—	—	—	150.00
48	82-1090	.148	.172	.085	—	.063	.332	.207	.075	.050	—	—	—	150.00
48	82-1038	.148	.172	.040	—	.030	.296	.136	.100	.060	—	—	—	150.00
• 48	82-1017	.148	.172	.085	—	.063	.367	.207	.110	.050	—	—	—	150.00
48	82-1091	.148	.172	.085	—	.070	.367	.207	.110	.050	—	—	—	150.00
48	82-1089	.148	.172	.085	—	.063	.413	.207	.156	.050	—	—	—	150.00
48	82-1039	.171	.218	.040	—	.030	.367	.207	.110	.050	—	—	—	$160.00
48	82-1041	.171	.218	.085	—	.063	.367	.207	.110	.050	—	—	—	160.00
48	82-1024	.200	.240	.085	—	.063	.367	.207	.110	.050	—	—	—	$180.00
49	82-1055	.148	.172	.040	—	.030	.296	.136	.100	.060	—	—	—	$150.00
50	82-1146	.082	.093	.040	—	.030	.375	.172	.148	.040	—	—	—	$160.00
52	82-1119	.093	.125	.040	.080	.030	.215	.125	.050	.040	.020	.093	—	$150.00
52	82-1120	.125	.150	.060	.090	.030	.293	.133	.060	.040	.020	.093	—	$140.00
52	82-1122	.125	.150	.060	.090	.030	.200	.090	.060	.050	.020	.093	—	140.00
52	82-1049	.125	.150	.060	.090	.030	.273	.133	.080	.060	.020	.093	—	140.00
52	82-1103	.125	.150	.060	.090	.030	.273	.133	.100	.040	.020	.093	—	140.00
52	82-1118	.125	.150	.060	.090	.030	.293	.133	.110	.050	.020	.093	—	140.00
52	82-1093	.148	.172	.060	.093	.040	.238	.133	.065	.040	.020	.093	—	$160.00
52	82-1054	.148	.172	.060	.090	.030	.273	.133	.100	.040	.020	.093	—	160.00
52	82-1050	.148	.172	.060	.090	.030	.303	.133	.100	.040	.020	.093	—	160.00
52	82-1051	.148	.172	.060	.090	.030	.333	.133	.110	.050	.020	.093	—	160.00
52	82-1096	.148	.172	.060	.093	.030	.293	.133	.110	.050	.020	.093	—	160.00
52	82-1016	.148	.172	.082	.125	.063	.351	.133	.125	.093	.020	.093	—	160.00
52	82-1092	.148	.172	.060	.090	.030	.303	.133	.130	.040	.020	.093	—	160.00
52	82-1060	.148	.172	.060	.093	.042	.392	.162	.130	.100	.020	.130	—	160.00
52	82-1052	.171	.188	.082	.125	.062	.381	.133	.125	.093	.020	.093	—	$160.00
54	82-1046	.148	.172	.040	—	.030	.282	.147	.075	.060	—	.070	.042	$150.00
54	82-1085	.148	.172	.040	—	.030	.387	.207	.110	.050	—	.050	.050	150.00
54	82-1150	.148	.172	.072	—	.052	.606	.025	.220	.025	—	.062	.011	150.00
54	82-1088	.171	.218	.085	—	.063	.710	.500	.160	.040	—	.085	.050	$160.00
54	82-1047	.171	.218	.085	—	.063	.417	.207	.160	.050	—	.085	.050	160.00
54	82-1044	.200	.240	.040	—	.030	.367	.207	.110	.050	—	.050	.057	$160.00
54	82-1045	.218	.250	.060	—	.030	.287	.147	.100	.040	—	.050	.030	160.00
51	82-2015	.125	.150	.050	.030	.030	.160	.062	.073	.025	—	—	—	$230.00

• Same dimensions as above when made to meet Mil-T-55155	*Smith No.*	*Mil No.*
	82-1040	FT-05-9-B-01
	82-1037	FT-05-9-B-02

REVERSED SUB-MINIATURE TURRET

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
42	28-1516	.093	.125	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$120.00
42	28-1551	.116	.172	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$130.00
42	28-1521	.125	.150	.040	.080	—	.500	.210	.060	.040	.020	.100	—	$120.00
42	28-1518	.148	.172	.040	.080	—	.500	.210	.060	.040	.020	.100	—	$120.00
42	28-1536	.148	.172	.040	.080	—	.685	.395	.065	.040	.020	.070	—	120.00
42	28-1539	.148	.172	.040	.080	—	.438	.210	.083	.040	.020	.100	—	120.00
42	28-1509	.148	.172	.040	.080	—	.438	.210	.100	.040	.020	.100	—	120.00
42	28-1500	.148	.172	.040	.080	—	.500	.210	.100	.040	.020	.100	—	120.00
42	28-1537	.148	.172	.040	.080	—	.550	.245	.125	.040	.020	.100	—	160.00
42	28-1512	.148	.172	.040	.080	—	.609	.210	.125	.093	.020	.100	—	130.00
42	28-1527	.148	.172	.040	.080	—	.609	.210	.158	.060	.020	.100	—	130.00
42	28-1501	.148	.172	.040	.080	—	.500	.210	.165	.040	.020	.100	—	120.00
42	28-1550	.148	.172	.040	.080	—	.531	.210	.165	.040	.020	.100	—	120.00
42	28-1532	.148	.172	.040	.080	—	.609	.210	.165	.040	.020	.100	—	130.00
42	28-1538	.148	.172	.040	.080	—	.812	.210	.165	.040	.020	.100	—	150.00
42	28-1546	.152	.172	.047	.093	—	.437	.156	.088	.040	.020	.047	—	$140.00
42	28-1547	.152	.172	.047	.093	—	.437	.156	.100	.040	.020	.047	—	140.00
42	28-1514	.152	.172	.047	.093	—	.500	.156	.150	.040	.020	.047	—	130.00
42	28-1502	.179	.200	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$130.00
42	28-1515	.185	.218	.040	.080	—	.438	.210	.100	.040	.020	.100	—	$140.00
42	28-1534	.185	.218	.040	.080	—	.609	.210	.125	.093	.020	.100	—	140.00
43	28-1504	.148	.172	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$150.00
43	28-1523	.148	.172	.040	.080	—	.531	.210	.100	.040	.020	.100	—	150.00
43	28-1505	.148	.172	.040	.080	—	.531	.210	.125	.040	.020	.100	—	150.00
43	28-1520	.175	.218	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$170.00
43	28-1506	.185	.218	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$170.00
43	28-1507	.185	.218	.040	.080	—	.531	.210	.125	.040	.020	.100	—	170.00
44	28-1540	.093	.125	.040	.080	—	.350	.125	.100	.040	.020	.085	—	$120.00
44	28-1524	.125	.150	.040	.080	—	.350	.125	.060	.040	.020	.095	—	$120.00
44	28-1558	.148	.172	.040	.080	—	.380	.090	.100	.040	.020	.060	—	$130.00
44	28-1510	.148	.172	.040	.080	—	.443	.093	.100	.040	.020	.062	—	130.00
44	28-1513	.148	.172	.040	.080	—	.350	.125	.100	.040	.020	.094	—	120.00
44	28-1137	.148	.172	.040	.080	—	.450	.190	.100	.040	.020	.160	—	130.00
44	28-1581	.148	.172	.040	.080	—	.520	.190	.100	.040	.020	.160	—	140.00
44	28-1557	.148	.172	.040	.080	—	.640	.250	.125	.040	.020	.210	—	150.00
44	28-1549	.148	.172	.040	.093	—	.781	.078	.125	.040	.015	.062	—	120.00
44	28-1542	.148	.172	.040	.080	—	.493	.093	.170	.020	.020	.063	—	130.00
44	28-1511	.148	.172	.040	.080	—	.493	.093	.180	.040	.020	.062	—	130.00
44	28-1525	.172	.200	.048	.090	—	.500	.120	.125	.075	.020	.080	—	$150.00
44	28-1541	.172	.200	.080	.125	—	.500	.120	.125	.075	.020	.080	—	140.00
44	28-1143	.263	.312	.050	.093	—	.781	.078	.100	.040	.015	—	—	$180.00
46	28-1545	.148	.172	.040	.080	—	.500	.210	.100	.040	.020	.120	—	$160.00
47	28-1598	.148	.172	.040	.080	—	.240	.109	.100	.040	.020	.062	—	$180.00
64	28-2050	.148	.172	.125	.040	.062	.495	.190	.125	.060	.140	.042	—	$180.00
101	28-1140	.172	.187	.050	—	—	1.060	.500	.187	.100	—	—	—	160.00

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified.
For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

TEFLON* TERMINALS SPECIFY SMITH

*Du Pont's registered trademark

FEED-THRUS

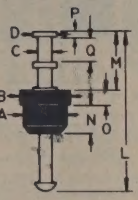


FIG. 37

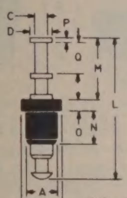


FIG. 38

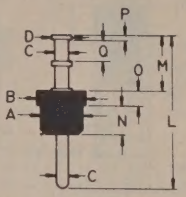


FIG. 39

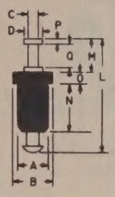


FIG. 40

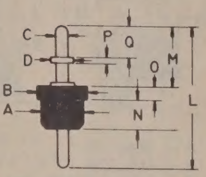


FIG. 41

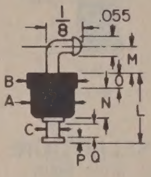


FIG. 45

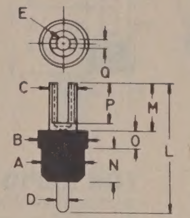


FIG. 87

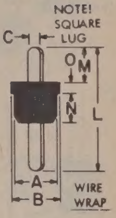


FIG. 100

FOR RAPID SELECTION: terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

SUB-MINIATURE TURRET

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
• 37	82-1516	.093	.125	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$120.00
37	82-1551	.116	.172	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$130.00
37	82-1521	.125	.150	.040	.080	—	.500	.210	.060	.040	.020	.100	—	$120.00
37	82-1518	.148	.172	.040	.080	—	.500	.210	.060	.040	.020	.100	—	$120.00
37	82-1536	.148	.172	.040	.080	—	.685	.395	.065	.040	.020	.070	—	120.00
37	82-1539	.148	.172	.040	.080	—	.438	.210	.083	.040	.020	.100	—	120.00
37	82-1509	.148	.172	.040	.080	—	.438	.210	.100	.040	.020	.100	—	120.00
37	82-1500	.148	.172	.040	.080	—	.500	.210	.100	.040	.020	.100	—	120.00
37	82-1537	.148	.172	.040	.080	—	.550	.245	.125	.040	.020	.100	—	120.00
37	82-1512	.148	.172	.040	.080	—	.609	.210	.125	.093	.020	.100	—	130.00
37	82-1527	.148	.172	.040	.080	—	.609	.210	.158	.060	.020	.100	—	130.00
37	82-1501	.148	.172	.040	.080	—	.500	.210	.165	.040	.020	.100	—	120.00
37	82-1550	.148	.172	.040	.080	—	.531	.210	.165	.040	.020	.100	—	120.00
37	82-1532	.148	.172	.040	.080	—	.609	.210	.165	.040	.020	.100	—	130.00
37	82-1538	.148	.172	.040	.080	—	.812	.210	.165	.040	.020	.100	—	140.00
• 37	82-1597	.148	.172	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$160.00
37	82-1546	.152	.172	.047	.093	—	.437	.156	.088	.040	.020	.047	—	$140.00
37	82-1547	.152	.172	.047	.093	—	.437	.156	.100	.040	.020	.047	—	140.00
37	82-1514	.152	.172	.047	.093	—	.500	.156	.150	.040	.020	.047	—	140.00
37	82-1502	.179	.200	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$130.00
37	82-1515	.185	.218	.040	.080	—	.438	.210	.100	.040	.020	.100	—	$130.00
37	82-1534	.185	.218	.040	.080	—	.609	.210	.125	.093	.020	.100	—	140.00
38	82-1504	.148	.172	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$150.00
38	82-1505	.148	.172	.040	.080	—	.531	.210	.125	.040	.020	.100	—	150.00
38	82-1520	.175	.218	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$160.00
38	82-1506	.185	.218	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$160.00
38	82-1507	.185	.218	.040	.080	—	.531	.210	.125	.040	.020	.100	—	160.00
39	82-1523	.148	.172	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$120.00
40	82-1540	.093	.125	.040	.080	—	.350	.125	.100	.040	.020	.085	—	$120.00
40	82-1524	.125	.150	.040	.080	—	.350	.125	.060	.040	.020	.095	—	$120.00
40	82-1558	.148	.172	.040	.080	—	.380	.090	.100	.040	.020	.060	—	$120.00
40	82-1510	.148	.172	.040	.080	—	.443	.093	.100	.040	.020	.062	—	120.00
40	82-1513	.148	.172	.040	.080	—	.350	.125	.100	.040	.020	.094	—	120.00
40	82-1570	.148	.172	.040	.093	—	.385	.160	.100	.040	.020	.130	—	130.00
40	82-1137	.148	.172	.040	.080	—	.450	.190	.100	.040	.020	.160	—	120.00
40	82-1581	.148	.172	.040	.080	—	.520	.190	.100	.040	.020	.160	—	120.00
40	82-1557	.148	.172	.040	.080	—	.640	.250	.125	.040	.020	.210	—	130.00
40	82-1549	.148	.172	.040	.080	—	.500	.120	.130	.040	.020	.080	—	120.00
40	82-1542	.148	.172	.040	.080	—	.493	.093	.170	.020	.020	.063	—	130.00
40	82-1511	.148	.172	.040	.080	—	.493	.093	.180	.040	.020	.062	—	130.00
40	82-1525	.172	.200	.048	.090	—	.500	.120	.125	.075	.020	.080	—	$150.00
40	82-1541	.172	.200	.080	.125	—	.500	.120	.125	.075	.020	.080	—	140.00
40	82-1143	.263	.312	.050	.093	—	.781	.078	.100	.040	.015	—	—	$170.00
41	82-1545	.148	.172	.040	.080	—	.500	.210	.100	.040	.020	.120	—	$150.00
45	82-1598	.148	.172	.040	.080	—	.350	.097	.100	.040	.020	.062	—	$180.00
87	82-2050	.148	.172	.125	.040	.062	.495	.190	.125	.060	.140	.042	—	210.00
100	82-1140	.172	.187	.050	—	—	1.060	.500	.187	.100	—	—	—	160.00

• Made to Meet Mil-T-55155

Smith No.	*Mil No.*
82-1516	FT-04-9-B-03
82-1597	FT-04-9-B-01

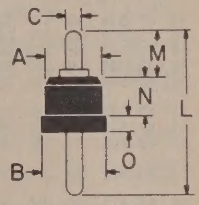


FIG 36

REVERSED SUB-MINIATURE STRAIGHT PIN

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
36	28-1023	.093	.125	.040	—	—	.375	.147	.075	.040	—	—	—	$120.00
36	28-1025	.093	.125	.040	—	—	.335	.125	.100	.040	—	—	—	120.00
36	28-1076	.093	.125	.040	—	—	.453	.156	.100	.040	—	—	—	140.00
36	28-1022	.093	.125	.040	—	—	.515	.210	.100	.040	—	—	—	140.00
36	28-1077	.093	.125	.040	—	—	.987	.687	.100	.040	—	—	—	150.00
36	28-1031	.125	.150	.040	—	—	.335	.125	.060	.040	—	—	—	120.00
36	28-1032	.125	.150	.040	—	—	.350	.187	.060	.040	—	—	—	120.00
36	28-1018	.125	.150	.040	—	—	.515	.210	.060	.040	—	—	—	$140.00
36	28-1002	.148	.172	.040	—	—	.515	.210	.050	.050	—	—	—	$140.00
36	28-1075	.148	.172	.040	—	—	.325	.075	.100	.040	—	—	—	130.00
36	28-1080	.148	.172	.040	—	—	.443	.093	.100	.040	—	—	—	130.00
36	28-1021	.148	.172	.040	—	—	.375	.125	.100	.040	—	—	—	130.00
36	28-1000	.148	.172	.040	—	—	.443	.210	.100	.040	—	—	—	120.00
36	28-1003	.148	.172	.040	—	—	.515	.210	.100	.040	—	—	—	140.00
36	28-1068	.148	.172	.040	—	—	.562	.210	.100	.040	—	—	—	140.00
36	28-1010	.148	.172	.040	—	—	.725	.210	.100	.040	—	—	—	150.00
36	28-1011	.148	.172	.040	—	—	1.000	.210	.100	.040	—	—	—	150.00
36	28-1084	.148	.172	.045	—	—	.585	.320	.100	.040	—	—	—	140.00
36	28-1033	.148	.172	.040	—	—	.890	.625	.100	.040	—	—	—	150.00
36	28-1069	.148	.172	.040	—	—	.431	.106	.110	.050	—	—	—	120.00
36	28-1001	.148	.172	.040	—	—	.410	.147	.110	.050	—	—	—	120.00
36	28-1004	.148	.172	.040	—	—	.535	.210	.110	.050	—	—	—	120.00
36	28-1007	.148	.172	.040	—	—	.535	.210	.120	.040	—	—	—	120.00
36	28-1028	.148	.172	.040	—	—	.407	.125	.132	.040	—	—	—	120.00
36	28-1086	.148	.172	.040	—	—	2.500	.175	.132	.040	—	—	—	130.00
36	28-1027	.148	.172	.040	—	—	.515	.210	.132	.040	—	—	—	120.00
36	28-1008	.148	.172	.040	—	—	.535	.210	.132	.040	—	—	—	130.00
36	28-1009	.148	.172	.040	—	—	.535	.210	.160	.040	—	—	—	130.00
36	28-1081	.148	.172	.040	—	—	.535	.210	.160	.040	—	—	—	131.00
36	28-1030	.148	.172	.040	—	—	.571	.210	.160	.040	—	—	—	130.00
36	28-1063	.148	.172	.040	—	—	.630	.210	.170	.040	—	—	—	150.00
36	28-1064	.148	.172	.040	—	—	.630	.210	.170	.040	—	—	—	150.00
36	28-1065	.148	.172	.040	—	—	.630	.210	.217	.040	—	—	—	150.00
36	28-1067	.148	.172	.040	—	—	.725	.210	.250	.040	—	—	—	150.00
36	28-1026	.157	.172	.040	—	—	.515	.210	.100	.040	—	—	—	$120.00
36	28-1073	.169	.218	.049	—	—	.250	.125	.100	.040	—	—	—	$210.00
36	28-1072	.169	.218	.049	—	—	.937	.125	.100	.040	—	—	—	210.00
36	28-1071	.169	.218	.049	—	—	1.875	.125	.100	.040	—	—	—	210.00
36	28-1013	.169	.219	.040	—	—	2.500	.460	.100	.040	—	—	—	230.00
36	28-1014	.169	.219	.040	—	—	2.500	.460	.100	.040	—	—	—	230.00
36	28-1082	.171	.218	.040	—	—	1.090	.680	.110	.050	—	—	—	$170.00
36	28-1012	.171	.218	.040	—	—	2.000	.680	.110	.050	—	—	—	230.00
36	28-1015	.172	.195	.040	—	—	.515	.210	.100	.040	—	—	—	$130.00
36	28-1070	.172	.195	.040	—	—	.560	.210	.100	.040	—	—	—	140.00
36	28-1005	.179	.200	.040	—	—	.515	.210	.100	.040	—	—	—	$120.00
36	28-1006	.218	.250	.040	—	—	.515	.210	.100	.040	—	—	—	$130.00

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified.

For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

TEFLON* TERMINALS SPECIFY SMITH

*Du Pont's registered trademark

FEED-THRUS

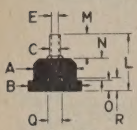


FIG. 55

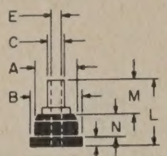


FIG. 56 O

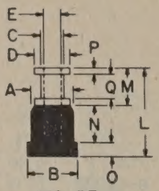


FIG. 57

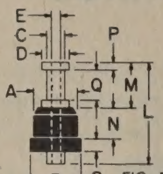


FIG. 58

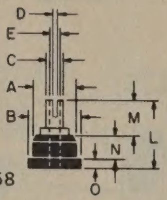


FIG. 53

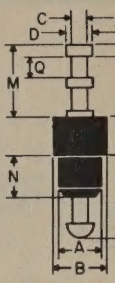


FIG. 59

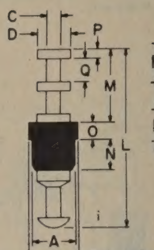


FIG. 60

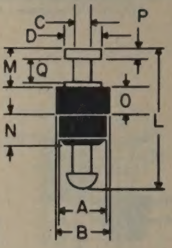


FIG. 61

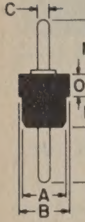


FIG. 62

FOR RAPID SELECTION:

terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

MINIATURE

FIG. No.	SMITH No.	DIMENSIONS												RESALE Per M
		A	B	C	D	E	L	M	N	O	P	Q	R	
59	83-1509	.148	.172	.040	.093	—	.836	.250	.165	.187	.020	.095	—	$160.00
59	83-1510	.148	.172	.040	.093	—	.836	.250	.230	.125	.020	.095	—	160.00
59	83-1530	.148	.172	.040	.080	—	.812	.210	.287	.046	.020	.100	—	160.00
59	•83-1597	.148	.172	.040	.093	—	.836	.250	.230	.125	.020	.093		$200.00
59	83-1544	.161	.187	.050	.093	—	.836	.250	.212	.187	.020	.093	—	$180.00
59	83-1524	.171	.187	.050	.093	—	.836	.250	.150	.250	.020	.093	—	$180.00
59	83-1511	.171	.187	.050	.093	—	.836	.250	.212	.187	.020	.095	—	180.00
59	83-1553	.171	.187	.050	.093	—	1.337	.281	.400	.375	.031	.093	—	240.00
59	83-1512	.204	.250	.040	.093	—	.836	.250	.212	.187	.020	.093	—	$200.00
59	83-1513	.230	.250	.040	.093	—	.836	.250	.212	.187	.020	.093	—	$200.00
59	83-1501	.234	.250	.040	.080	—	.500	.210	.100	.040	.020	.100	—	$150.00
59	83-1500	.264	.312	.040	.080	—	.531	.210	.100	.040	.020	.100	—	$150.00
60	83-1516	.171	.187	.062	.125	—	.828	.281	.200	.125	.031	.093	—	$150.00
60	83-1515	.185	.218	.062	.125	—	.828	.281	.210	.094	.031	.093	—	$180.00
60	83-1542	.185	.218	.062	.125	—	.828	.281	.212	.187	.031	.093	—	180.00
60	83-1570	.218	.250	.062	.125	—	.828	.281	.212	.050	.031	.093	—	$190.00
60	83-1571	.218	.250	.062	.125	—	.828	.281	.310	.050	.031	.093	—	190.00
61	83-1540	.171	.187	.050	.093	—	.740	.125	.125	.187	.020	.093	—	$160.00
61	83-1505	.171	.187	.050	.093	—	.740	.125	.150	.250	.031	.062	—	160.00
61	83-1502	.171	.187	.046	.093	—	.540	.133	.171	.063	.020	.093	—	120.00
61	83-1504	.171	.187	.050	.093	—	.740	.125	.212	.187	.031	.062	—	160.00
61	83-1521	.171	.187	.050	.125	—	1.115	.125	.212	.562	.031	.062	—	240.00
61	83-1506	.171	.187	.050	.093	—	.865	.125	.275	.250	.031	.062	—	180.00
61	83-1551	.171	.187	.050	.093	—	1.115	.125	.318	.365	.031	.062	—	240.00
61	83-1552	.171	.187	.050	.093	—	1.115	.125	.340	.375	.031	.062	—	240.00
61	83-1507	.171	.187	.050	.125	—	1.115	.125	.400	.375	.031	.062	—	230.00
61	83-1520	.171	.250	.050	.093	—	.740	.125	.212	.187	.031	.062	—	190.00
61	83-1522	.171	.250	.050	.125	—	1.365	.125	.525	.500	.031	.062	—	250.00
61	83-1523	.171	.250	.050	.125	—	1.965	.125	.825	.800	.031	.062	—	390.00
61	83-1503	.185	.215	.046	.093	—	.640	.133	.210	.093	.020	.093	—	$150.00
61	83-1519	.185	.215	.046	.093	—	.718	.133	.288	.093	.020	.093	—	160.00
61	83-1508	.217	.250	.050	.125	—	1.365	.125	.525	.500	.031	.062	—	$310.00
61	83-1514	.217	.250	.050	.125	—	1.965	.125	.825	.800	.031	.062	—	350.00
62	83-1002	.148	.172	.040	—	—	.619	.187	.105	.140	—	—	—	$160.00
62	•83-1000	.165	.187	.040	—	—	.675	.200	.150	.125	—	—	—	$160.00
62	83-1001	.165	.187	.040	—	—	.710	.210	.150	.125	—	—	—	160.00
62	83-1003	.171	.187	.046	—	—	.540	.133	.171	.063	—	—	—	$160.00
62	83-1004	.171	.187	.063	—	—	.740	.125	.212	.187	—	—	—	160.00
62	83-1005	.171	.187	.050	—	—	.865	.125	.275	.250	—	—	—	160.00
63	83-1531	.171	.312	.125	.188	—	.506	.099	.171	.063	.020	.048	—	180.00
63	83-1532	.171	.312	.046	.093	—	.540	.133	.171	.063	.020	.093	—	180.00
65	83-1525	.218	.250	.062	.125	—	1.187	.281	.375	.250	.031	.093	—	$310.00
65	83-1526	.218	.250	.062	.125	—	1.687	.281	.625	.500	.031	.093	—	380.00
65	83-1527	.218	.250	.062	.125	—	2.287	.281	.925	.800	.031	.093	—	540.00
66	83-2050	.148	.172	.062	.125	—	.495	.190	.125	.060	.140	.042	—	$200.00
66	83-2031	.171	.187	.078	.148	—	.593	.203	.150	.100	.156	.046	—	$220.00
66	83-2001	.171	.187	.046	.148	—	.821	.203	.212	.187	.156	.030	—	220.00
66	83-2000	.171	.187	.078	.148	—	.821	.203	.212	.187	.156	.046	—	220.00
66	83-2003	.171	.187	.046	.148	—	.947	.203	.275	.250	.156	.030	—	240.00
66	83-2002	.171	.187	.078	.148	—	.947	.203	.275	.250	.156	.046	—	240.00
66	83-2005	.171	.187	.046	.148	—	1.197	.203	.400	.375	.156	.030	—	260.00
66	83-2004	.171	.187	.078	.148	—	1.197	.203	.400	.375	.156	.046	—	260.00
66	83-2007	.171	.187	.078	.148	—	1.197	.203	.525	.250	.156	.046	—	260.00
66	83-2006	.171	.187	.078	.148	—	1.197	.203	.550	.225	.156	.046	—	260.00
66	83-2034	.218	.250	.086	.156	—	.828	.281	.310	.050	.200	—	—	$240.00
67	83-2500	.171	.187	.050	—	4-36	.899	.281	.212	.187	—	—	—	$230.00
67	83-2502	.171	.187	.050	—	4-36	1.024	.281	.275	.250	—	—	—	240.00
67	83-2504	.171	.187	.050	—	4-36	1.274	.281	.400	.375	—	—	—	240.00
67	83-2501	.171	.187	.050	—	4-40	.899	.281	.212	.187	—	—	—	230.00
67	83-2503	.171	.187	.050	—	4-40	1.024	.281	.275	.250	—	—	—	240.00
67	83-2505	.171	.187	.050	—	4-40	1.274	.281	.400	.375	—	—	—	250.00

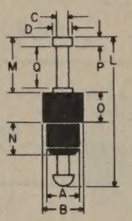


FIG. 63

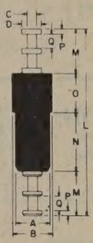


FIG. 65

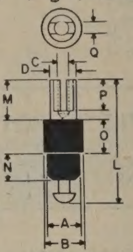


FIG. 66

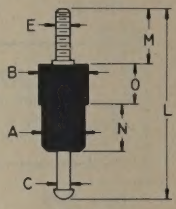


FIG.67

REVERSED SUB-MINIATURE TUBULAR

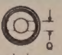
FIG. No.	SMITH No.	DIMENSIONS												RESALE Per M
		A	B	C	D	E	L	M	N	O	P	Q	R	
55	28-1046	.148	.172	.040	—	.030	.282	.147	.075	.060	—	.070	.042	$150.00
55	28-1085	.148	.172	.040	—	.030	.387	.207	.110	.050	—	.050	.050	150.00
55	28-1150	.148	.172	.072	—	.052	.606	.025	.220	.025	—	.062	.011	150.00
55	28-1088	.171	.218	.085	—	.063	.710	.500	.160	.040	—	.085	.050	$160.00
55	28-1047	.171	.218	.085	—	.063	.417	.207	.160	.050	—	.085	.050	160.00
55	28-1044	.200	.240	.040	—	.030	.367	.207	.110	.050	—	.050	.057	$160.00
55	28-1045	.218	.250	.060	—	.030	.287	.147	.100	.040	—	.050	.030	$160.00
56	28-1134	.093	.125	.040	—	.030	.215	.125	.050	.040	—	—	—	$150.00
56	28-1040	.093	.125	.040	—	.030	.225	..125	.060	.040	—	—	—	150.00
56	28-1135	.093	.125	.040	—	.030	.312	.207	.060	.040	—	—	—	150.00
56	28-1115	.093	.125	.040	—	.030	.317	.187	.090	.040	—	—	—	150.00
56	28-1116	.093	.125	.040	—	.030	.405	.275	.090	.040	—	—	—	150.00
56	28-1161	.093	.125	.043	—	.030	.252	.100	.110	.040	—	—	—	150.00
56	28-1037	.120	.130	.040	—	.030	.310	.207	.053	.050	—	—	—	$150.00
56	28-1036	.125	.150	.040	—	.030	.225	.125	.060	.040	—	—	—	$140.00
56	28-1151	.125	.150	.040	—	.030	.225	.126	.075	.025	—	—	—	140.00
56	28-1126	.125	.150	.040	—	.030	.247	.147	.075	.025	—	—	—	140.00
56	28-1124	.125	.150	.040	—	.030	.325	.125	.075	.125	—	—	—	140.00
56	•28-1042	.125	.150	.050	—	.030	.193	.105	.063	.025	—		—	$190.00
56	28-1123	.148	.172	.040	—	.030	.245	.147	.053	.045	—	—	—	$150.00
56	28-1035	.148	.172	.040	—	.030	.250	.147	.053	.050	—	—	—	150.00
56	28-1034	.148	.172	.040	—	.030	.310	.207	.053	.050	—	—	—	150.00
56	28-1127	.148	.172	.080	—	.052	.193	.105	.063	.025	—	—	—	150.00
56	28-1090	.148	.172	.085	—	.063	.332	.207	.075	.050	—	—	—	150.00
56	28-1038	.148	.172	.040	—	.030	.296	.136	.100	.060	—	—	—	150.00
56	•28-1017	.148	.172	.085	—	.063	.367	.207	.110	.050	—	—	—	150.00
56	28-1091	.148	.172	.085	—	.070	.367	.207	.110	.050	—	—	—	150.00
56	28-1089	.148	.172	.085	—	.063	.413	.207	.156	.050	—	—	—	150.00
56	28-1039	.171	.218	.040	—	.030	.367	.207	.110	.050	—	—	—	$160.00
56	28-1041	.171	.218	.085	—	.063	.367	.207	.110	.050	—	—	—	160.00
56	28-1024	.200	.240	.085	—	.063	.367	.207	.110	.050	—	—	—	$180.00
57	28-1119	.093	.125	.040	.080	.030	.215	.125	.050	.040	.020	.093	—	$150.00
57	28-1120	.125	.150	.060	.090	.030	.293	.133	.060	.040	.020	.093	—	$140.00
57	28-1122	.125	.150	.060	.090	.030	.200	.090	.060	.050	.020	.093	—	140.00
57	28-1049	.125	.150	.060	.090	.030	.273	.133	.080	.060	.020	.093	—	140.00
57	28-1103	.125	.150	.060	.090	.030	.273	.133	.100	.040	.020	.093	—	140.00
57	28-1118	.125	.150	.060	.090	.030	.293	.133	.110	.050	.020	.093	—	140.00
57	28-1093	.148	.172	.060	.093	.040	.238	.133	.065	.040	.020	.093	—	$160.00
57	28-1054	.148	.172	.060	.090	.030	.273	.133	.100	.040	.020	.093	—	160.00
57	28-1096	.148	.172	.060	.093	.030	.293	.133	.110	.050	.020	.093	—	160.00
57	28-1016	.148	.172	.082	.125	.063	.351	.133	.125	.093	.020	.093	—	160.00
57	28-1092	.148	.172	.060	.090	.030	.303	.133	.130	.040	.020	.093	—	160.00
57	28-1060	.148	.172	.060	.093	.042	.392	.162	.130	.100	.020	.130	—	160.00
57	28-1052	.171	.188	.082	.125	.062	.381	.133	.125	.093	.020	.093	—	$160.00
57	28-1048	.263	.297	.060	.090	.030	.333	.133	.160	.040	.020	.093	—	$200.00
58	28-1050	.148	.172	.060	.090	.030	.303	.133	.100	.040	.020	.093	—	$170.00
58	28-1051	.148	.172	.060	.090	.030	.333	.133	.110	.050	.020	.093	—	170.00
53	28-2015	.125	.150	.050	.030	.030	.160	.062	.073	.025	—	—	—	$230.00

- Same dimensions as above when made to meet Mil-T-55155

Smith No.	MIL No.
83-1597	FT-04-9-B-02
83-1000	FT-03-9-B-03
28-1042	FT-06-9-B-01
28-1017	FT-06-9-B-02

COLORS: Supplied in White(-101)unless otherwise specified. Ten colors available.
PLATING: Standard (P-12) unless otherwise specified.
For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

SPECIFY SMITH TEFLON* TERMINALS



STAND-OFFS

*Du Pont's registered trademark

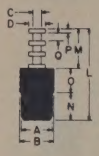


FIG. 17

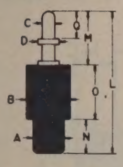


FIG. 18

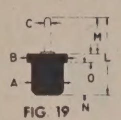


FIG. 19

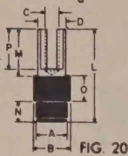


FIG. 20

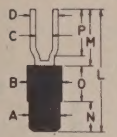


FIG. 21

FOR RAPID SELECTION: terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

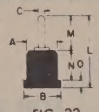


FIG. 22

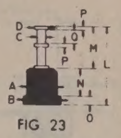


FIG. 23

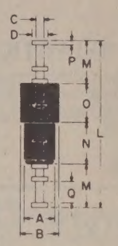


FIG. 24

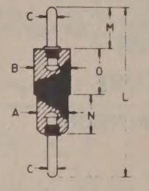


FIG. 25

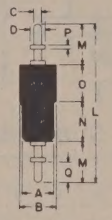


FIG. 26

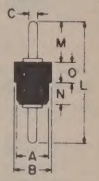


FIG. 27

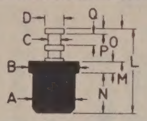


FIG. 15

MINIATURE TURRET

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
15	93-1515	.104	.125	.046	.090	—	.346	.156	.087	.103	.020	.046	—	$140.00
15	93-1542	.104	.125	.046	.093	—	.346	.156	.087	.103	.020	.046	—	140.00
15	93-1549	.104	.125	.046	.093	—	.359	.156	.100	.103	.020	.046	—	140.00
15	93-1526	.127	.156	.046	.090	—	.531	.156	.156	.219	.020	.046	—	$170.00
15	93-1527	.135	.187	.040	.093	—	.647	.250	.150	.250	.020	.093	—	$140.00
15	93-1518	.148	.172	.040	.093	—	.482	.250	.110	.125	.020	.093	—	$140.00
15	93-1525	.148	.172	.040	.093	—	.598	.250	.165	.187	.020	.093	—	140.00
15	93-1535	.165	.187	.046	.093	—	.656	.156	.100	.400	.020	.046	—	$170.00
15	93-1563	.165	.187	.040	.093	—	.797	.250	.100	.400	.020	.093	—	170.00
15	93-1524	.165	.187	.046	.093	—	.468	.156	.125	.187	.020	.046	—	140.00
15 •	93-1500	.165	.187	.046	.093	—	.431	.156	.150	.125	.020	.046	—	140.00
15	93-1551	.165	.187	.040	.080	—	.485	.210	.150	.125	.020	.100	—	140.00
15	93-1502	.165	.187	.040	.093	—	.522	.250	.150	.125	.020	.093	—	140.00
15	93-1503	.165	.187	.046	.125	—	.556	.281	.150	.125	.031	.093	—	140.00
15	93-1519	.165	.187	.046	.125	—	.556	.281	.150	.125	.031	.093	—	140.00
15	93-1501	.165	.187	.046	.093	—	.493	.156	.150	.187	.020	.046	—	140.00
15	93-1504	.165	.187	.040	.093	—	.584	.250	.150	.187	.020	.093	—	140.00
15	93-1506	.165	.187	.046	.125	—	.616	.281	.150	.187	.031	.093	—	160.00
15	93-1505	.165	.187	.046	.093	—	.556	.156	.150	.250	.020	.046	—	140.00
15	93-1529	.165	.187	.040	.093	—	.647	.250	.150	.250	.020	.093	—	160.00
15	93-1530	.165	.187	.046	.125	—	.681	.281	.150	.250	.031	.093	—	160.00
15	93-1534	.165	.187	.046	.093	—	.706	.156	.150	.400	.020	.046	—	180.00
15	93-1533	.165	.187	.040	.093	—	.797	.250	.150	.400	.020	.093	—	180.00
15	93-1507	.165	.187	.046	.125	—	.831	.281	.150	.400	.031	.093	—	180.00
15	93-1528	.165	.187	.046	.125	—	.681	.281	.200	.200	.031	.093	—	160.00
15	93-1560	.165	.187	.046	.125	—	.831	.281	.200	.350	.031	.093	—	160.00
15	93-1561	.165	.187	.047	.125	—	.893	.343	.200	.350	.031	.125	—	180.00
15	93-1532	.165	.187	.046	.093	—	.706	.156	.300	.250	.020	.046	—	180.00
15	93-1579	.171	.187	.040	.093	—	.390	.250	.100	.040	.020	.093	—	$140.00
15	93-1574	.171	.187	.040	.093	—	.525	.250	.125	.150	.020	.093	—	140.00
15	93-1510	.171	.187	.046	.093	—	.431	.156	.150	.125	.020	.046	—	140.00
15	93-1552	.171	.187	.046	.080	—	.485	.210	.150	.125	.020	.100	—	140.00
15	93-1580	.171	.187	.040	.093	—	.525	.250	.150	.125	.020	.093	—	140.00
15	93-1520	.171	.187	.046	.125	—	.556	.281	.150	.125	.031	.093	—	140.00
15	93-1521	.171	.187	.062	.125	—	.556	.281	.150	.125	.031	.093	—	140.00
15	93-1511	.171	.187	.046	.093	—	.493	.156	.150	.187	.020	.046	—	140.00
15	93-1516	.171	.187	.040	.093	—	.584	.250	.150	.187	.020	.093	—	140.00
15	93-1583	.171	.187	.046	.125	—	.619	.281	.150	.187	.031	.093	—	150.00
15	93-1512	.171	.187	.046	.093	—	.556	.156	.150	.250	.020	.046	—	150.00
15	93-1547	.171	.187	.040	.080	—	.610	.210	.150	.250	.020	.100	—	150.00
15	93-1581	.171	.187	.040	.093	—	.650	.250	.150	.250	.020	.093	—	150.00
15	93-1531	.171	.187	.046	.125	—	.681	.281	.150	.250	.031	.093	—	160.00
15	93-1513	.171	.187	.046	.125	—	.831	.281	.150	.400	.031	.093	—	160.00
15	93-1582	.171	.187	.040	.093	—	.800	.250	.150	.400	.020	.093	—	160.00
15	93-1557	.171	.187	.046	.093	—	.593	.156	.187	.250	.020	.046	—	160.00
15	93-1543	.171	.187	.062	.125	—	.621	.281	.215	.125	.031	.093	—	160.00
15	93-1559	.171	.187	.046	.093	—	.706	.156	.300	.250	.020	.046	—	160.00
15	93-1562	.171	.187	.046	.125	—	.831	.281	.300	.250	.031	.093	—	170.00
15	93-1578	.171	.218	.040	.080	—	.350	.210	.100	.040	.020	.100	—	140.00
15	93-1522	.171	.218	.040	.080	—	.485	.210	.150	.125	.020	.100	—	140.00
15	93-1536	.171	.250	.046	.125	—	.968	.281	.187	.500	.031	.093	—	240.00
15	93-1514	.171	.250	.046	.125	—	1.268	.281	.187	.800	.031	.093	—	280.00
15	93-1553	.185	.218	.046	.125	—	.546	.281	.140	.125	.031	.093	—	$150.00
15	93-1000	.185	.218	.046	.093	—	.487	.154	.287	.046	.020	.046	—	150.00
15	93-1005	.185	.218	.046	.093	—	.583	.250	.287	.046	.020	.093	—	150.00
15	93-1558	.215	.250	.046	.125	—	.718	.281	.187	.250	.031	.093	—	$200.00
15	93-1538	.215	.250	.046	.093	—	.843	.156	.187	.500	.020	.046	—	220.00
15	93-1537	.215	.250	.040	.093	—	.934	.250	.187	.500	.020	.093	—	220.00
15	93-1508	.215	.250	.046	.125	—	.968	.281	.187	.500	.031	.093	—	220.00
15	93-1540	.215	.250	.046	.093	—	1.143	.156	.187	.800	.020	.046	—	240.00
15	93-1539	.215	.250	.040	.093	—	1.234	.250	.187	.800	.020	.093	—	240.00
15	93-1509	.215	.250	.046	.125	—	1.268	.281	.187	.800	.031	.093	—	240.00
15	93-1576	.215	.250	.046	.125	—	.641	.281	.310	.050	.031	.093	—	170.00
15	93-1564	.215	.250	.046	.125	—	.968	.281	.317	.370	.031	.093	—	180.00
15	93-1571	.312	.375	.125	.187	—	.812	.500	.250	.062	.032	.200	—	$300.00

• Made to Meet MIL-T-55155

Smith No.	MIL No.
93-1500	SE-07-9-B-02

MINIATURE SUB-MINIATURE

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
17	93-1554	.171	.187	.046	.093	—	.555	.218	.150	.187	.020	.046	—	$200.00
18	93-1575	.171	.250	.046	.125	—	.993	.281	.187	.500	.031	.140	—	$250.00
19	93-1003	.165	.187	.040	—	—	.485	.210	.150	.125	—	—	—	$140.00
19	93-1004	.165	.187	.040	—	—	.547	.210	.150	.187	—	—	—	140.00
19	93-1006	.165	.187	.040	—	—	.718	.312	.218	.187	—	—	—	160.00
19	93-1007	.180	.200	.062	—	—	.600	.300	.175	.125	—	—	—	$160.00
19	93-1001	.185	.218	.040	—	—	.543	.210	.287	.046	—	—	—	$150.00
19	93-1002	.185	.218	.040	.—	—	1.133	.800	.333	.046	.—	.—	—	170.00
20	93-2010	.165	.187	.078	.148	—	.603	.203	.150	.250	.156	.046	—	$230.00
20	93-2012	.171	.187	.078	.148	—	.703	.203	.100	.406	.156	.046	—	$240.00
20	93-2006	.171	.187	.046	.148	—	.478	.203	.150	.125	.156	.030	—	200.00
20	93-2007	.171	.187	.046	.148	—	.478	.203	.150	.125	.161	.030	—	200.00
20	93-2000	.171	.187	.078	.148	—	.478	.203	.150	.125	.156	.046	—	200.00
20	93-2008	.171	.187	.046	.148	—	.540	.203	.150	.187	.161	.030	—	200.00
20	93-2001	.171	.187	.078	.148	—	.540	.203	.150	.187	.156	.046	—	220.00
20	93-2009	.171	.187	.046	.148	—	.603	.203	.150	.250	.156	.030	—	220.00
20	93-2002	.171	.187	.078	.148	—	.603	.203	.150	.250	.156	.046	—	220.00
20	93-2011	.171	.187	.046	.148	—	.753	.203	.150	.400	.161	.030	—	230.00
20	93-2003	.171	.187	.078	.148	—	.753	.203	.150	.400	.156	.046	—	230.00
20	93-2017	.171	.187	.046	.148	—	.555	.203	.165	.187	.161	.030	—	230.00
20	93-2014	.171	.187	.078	.148	—	.890	.203	.187	.500	.156	.046	—	270.00
20	93-2018	.171	.187	.078	.148	—	.602	.203	.212	.187	.156	.046	—	230.00
20	93-2020	.171	.187	.078	.148	—	.620	.203	.230	.187	.156	.046	—	230.00
20	93-2016	.171	.250	.078	.148	—	1.190	.203	.187	.800	.156	.046	—	340.00
20	93-2013	.217	.250	.046	.148	—	.890	.203	.187	.500	.161	.030	—	$300.00
20	93-2004	.217	.250	.078	.148	—	.890	.203	.187	.500	.156	.046	—	300.00
20	93-2015	.217	.250	.046	.148	—	1.190	.203	.187	.800	.161	.030	—	340.00
20	93-2005	.217	.250	.078	.148	—	1.190	.203	.187	.800	.156	.046	—	340.00
20	93-2021	.218	.250	.086	.156	—	.641	.281	.310	.050	.200	.055	—	$220.00
21	93-2019	.171	.187	.090	.150	—	.633	.296	.150	.187	.234	—	—	$220.00
22	93-1003	.165	.187	.040	—	—	.485	.210	.150	.125	—	—	—	$140.00
22	93-1004	.165	.187	.040	—	—	.547	.210	.150	.187	—	—	—	140.00
22	93-1006	.165	.187	.040	—	—	.718	.312	.218	.187	—	—	—	160.00
22	93-1007	.180	.200	.062	—	—	.600	.300	.175	.125	—	—	—	$160.00
22	93-1001	.185	.218	.040	—	—	.543	.210	.287	.046	—	—	—	150.00
22	93-1002	.185	.218	.040	.—	—	1.133	.800	.333	.046	.—	.—	—	170.00
23	93-1000	.185	.218	.046	.093	—	.487	.154	.287	.046	.020	.046	—	$150.00
23	93-1005	.185	.218	.046	.093	—	.583	.250	.287	.046	.020	.093	—	150.00
24	93-3500	.169	.205	.040	.080	—	.640	.210	.170	.050	.020	.100	—	$210.00
24	93-3509	.148	.187	.040	.080	—	.819	.210	.212	.187	.020	.100	—	$230.00
24	93-3500	.171	.187	.040	.080	—	.819	.210	.212	.187	.020	.100	—	$210.00
24	93-3505	.187	.218	.040	.080	—	.819	.210	.212	.187	.020	.100	—	$230.00
24	93-3501	.218	.250	.046	.125	—	1.187	.281	.375	.250	.031	.093	—	$320.00
24	93-3502	.218	.250	.046	.125	—	1.687	.281	.625	.500	.031	.093	—	390.00
24	93-3503	.218	.250	.046	.125	—	1.287	.281	.925	.800	.031	.093	—	460.00
25	93-3512	.148	.172	.040	.—	—	.819	.210	.187	.212	—	—	—	$230.00
25	93-3511	.148	.187	.040	.—	—	.819	.210	.187	.212	—	—	—	230.00
25	93-3507	.171	.187	.040	.—	—	.572	.110	.140	.212	—	—	—	$230.00
25	93-3508	.171	.187	.040	.—	—	.696	.172	.140	.212	—	—	—	230.00
25	93-3513	.171	.187	.040	.—	—	.587	.125	.187	.150	—	—	—	230.00
25	93-3504	.171	.187	.040	.—	—	.819	.210	.187	.212	—	—	—	230.00
26	93-3510	.171	.187	.040	.080	—	.819	.210	.212	.187	.020	.120	—	$230.00
27	92-3003	.148	.172	.040	—	—	.515	.155	.160	.040	—	—	—	$220.00
27	92-3001	.148	.172	.040	—	—	.560	.180	.160	.040	—	—	—	220.00
27	92-3002	.148	.172	.040	—	—	.606	.155	.210	.080	—	—	—	260.00
27	92-3000	.169	.205	.040	—	—	.640	.210	.170	.020	—	—	—	220.00

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified.
For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

SPECIFY SMITH TEFLON* TERMINALS

STAND-OFFS

* Du Pont's registered trademark

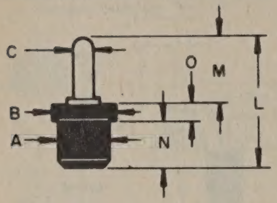


FIG. 1

FOR RAPID SELECTION:

terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

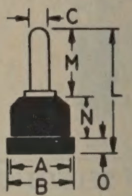


FIG. 2

SUB-MINIATURE STRAIGHT PIN

FIG. No.	SMITH No.	DIMENSIONS A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
1	92-1025	.093	.125	.040	—	—	.262	.147	.075	.050	—	—	—	$130.00
1	92-1055	.093	.125	.040	—	—	.299	.174	.085	.040	—	—	—	130.00
1	92-1053	.093	.125	.040	—	—	.213	.093	.089	.031	—	—	—	130.00
1	92-1066	.093	.125	.040	—	—	.250	.130	.089	.031	—	—	—	130.00
1	•92-1034	.093	.125	.040	—	—	.350	.210	.100	.040	—	—	—	130.00
1	92-1089	.093	.125	.040	—	—	.572	.432	.100	.040	—	—	—	130.00
1	92-1095	.093	.125	.040	—	—	.587	.447	.100	.040	—	—	—	130.00
1	92-1089	.093	.125	.040	—	—	.672	.532	.100	.040	—	—	—	130.00
1	92-1090	.093	.125	.040	—	—	.737	.597	.100	.040	—	—	—	160.00
1	92-1094	.093	.125	.040	—	--	.755	.615	.100	.040	—	—	—	160.00
1	92-1091	.093	.125	.040	—	—	.770	.630	.100	.040	—	—	—	160.00
1	92-1098	.093	.125	.040	—	—	.797	.657	.100	.040	—	—	—	160.00
1	92-1086	.093	.125	.040	—	—	1.025	.885	.100	.040	—	—	—	200.00
1	92-1087	.093	.125	.040	—	—	1.125	.985	.100	.040	—	—	—	200.00
1	92-1003	.104	.125	.040	—	—	.250	.130	.098	.031	—	—	—	$130.00
1	92-1035	.104	.125	.040	—	—	.250	.130	.089	.031	—	—	—	130.00
1	92-1067	.106	.125	.040	—	—	.250	.130	.089	.031	—	—	—	$130.00
1	92-1070	.112	.172	.040	—	—	.350	.210	.120	.020	—	—	—	$120.00
1	92-1061	.112	.172	.040	—	—	.350	.210	.120	.020	—	—	—	120.00
1	92-1971	.125	.150	.040	—	—	.310	.210	.060	.040	—	—	—	$130.00
1	• 92-1097	.148	.172	.040	—	—	.350	.210	.100	.040		—		$190.00
1	92-1022	.148	.172	.040	—	—	.247	.147	.050	.050	—	—	—	$130.00
1	92-1020	.148	.172	.040	—	—	.310	.210	.050	.050	—	—	—	130.00
1	92-1052	.148	.172	.040	—	—	.210	.120	.060	.030	—	—	—	130.00
1	92-1054	.148	.172	.040	—	—	.350	.210	.062	.076	—	—	—	130.00
1	92-1008	.148	.172	.040	—	—	.350	.210	.062	.078	—	—	—	130.00
1	92-1015	.148	.172	.040	—	—	.250	.150	.070	.030	—	—	—	130.00
1	92-1037	.148	.172	.040	—	—	.260	.145	.075	.040	—	—	—	130.00
1	92-1038	.148	.172	.040	—	—	.230	.105	.075	.050	—	—	—	130.00
1	92-1012	.148	.172	.040	—	—	.335	.210	.075	.050	—	—	—	130.00
1	92-1006	.148	.172	.040	—	—	.345	.210	.075	.060	—	—	—	130.00
1	92-1062	.148	.172	.040	—	—	.330	.210	.100	.020	—	—	—	130.00
1	92-1017	.148	.172	.040	—	—	.250	.110	.100	.040	—	—	—	130.00
1	92-1016	.148	.172	.040	—	—	.265	.125	.100	.040	—	—	—	130.00
1	92-1018	.148	.172	.040	—	—	.285	.145	.100	.040	—	—	—	130.00
1	92-1000	.148	.172	.040	—	—	.350	.210	.100	.040	—	—	—	130.00
1	92-1050	.148	.172	.040	—	—	.460	.320	.100	.040	—	—	—	130.00
1	92-1011	.148	.172	.040	—	—	.594	.450	.100	.040	—	—	—	130.00
1	92-1019	.148	.172	.040	—	—	.750	.610	.100	.040	—	—	—	130.00
1	92-1085	.148	.172	.040	—	—	.797	.657	.100	.040	—	—	—	130.00
1	92-1021	.148	.172	.040	—	—	.305	.145	.110	.050	—	—	—	130.00
1	92-1001	.148	.172	.040	—	—	.370	.210	.110	.050	—	—	—	130.00
1	92-1069	.148	.172	.040	—	—	.350	.210	.120	.020	—	—	—	130.00
1	92-1007	.148	.172	.040	—	—	.370	.210	.120	.040	—	—	—	130.00
1	92-1060	.148	.172	.040	—	—	.350	.210	.125	.015	—	—	—	130.00
1	92-1051	.148	.172	.040	—	—	.280	.125	.125	.040	—	—	—	130.00
1	92-1036	.148	.172	.040	—	—	.365	.193	.132	.040	—	—	—	130.00
1	92-1068	.148	.172	.040	—	—	.382	.210	.132	.040	—	—	—	130.00
1	92-1072	.148	.172	.040	—	—	.390	.218	.132	.040	—	—	—	130.00
1	92-1073	.148	.172	.040	—	—	.750	.578	.132	.040	—	—	—	130.00
1	92-1009	.148	.172	.040	—	—	.406	.210	.156	.040	—	—	—	130.00
1	92-1010	.148	.172	.040	—	—	.500	.210	.250	.040	—	—	—	130.00
1	92-1063	.148	.172	.040	—	—	.500	.210	.250	.040	—	—	—	130.00
1	92-1003	.171	.195	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00
1	92-1004	.179	.200	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00
1	92-1005	.218	.250	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00

• Made to Meet MIL-T-55155

Smith No.	MIL No.
92-1097	SE-08-9-B-01
92-1034	SE-08-01-B-02

REVERSED SUB-MINIATURE STRAIGHT PIN

FIG. No.	SMITH No.	DIMENSIONS A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
2	29-1025	.093	.125	.040	—	—	.262	.147	.075	.050	—	—	—	$130.00
2	29-1055	.093	.125	.040	—	—	.299	.174	.085	.040	—	—	—	130.00
2	29-1053	.093	.125	.040	—	—	.213	.093	.089	.031	—	—	—	130.00
2	29-1066	.093	.125	.040	—	—	.250	.130	.089	.031	—	—	—	130.00
2	29-1034	.093	.125	.040	—	—	.350	.210	.100	.040	—	—	—	130.00
2	29-1089	.093	.125	.040	—	—	.572	.432	.100	.040	—	—	—	130.00
2	29-1095	.093	.125	.040	—	—	.587	.447	.100	.040	—	—	—	130.00
2	29-1088	.093	.125	.040	—	—	.672	.532	.100	.040	—	—	—	140.00
2	29-1090	.093	.125	.040	—	—	.737	.597	.100	.040	—	—	—	160.00
2	29-1094	.093	.125	.040	—	—	.755	.615	.100	.040	—	—	—	160.00
2	29-1091	.148	.172	.040	—	—	.795	.630	.100	.065	—	—	—	160.00
2	29-1098	.093	.125	.040	—	—	.797	.657	.100	.040	—	—	—	160.00
2	29-1086	.093	.125	.040	—	—	1.025	.885	.100	.040	—	—	—	200.00
2	29-1087	.093	.125	.040	—	—	1.125	.985	.100	.040	—	—	—	200.00
2	29-1003	.104	.125	.040	—	—	.250	.130	.089	.031	—	—	—	130.00
2	29-1035	.104	.125	.040	—	—	.250	.130	.089	.031	—	—	—	$130.00
2	29-1067	.106	.125	.040	—	—	.250	.130	.089	.031	—	—	—	120.00
2	29-1070	.112	.172	.040	—	—	.350	.210	.120	.020	—	—	—	$120.00
2	29-1061	.112	.172	.040	—	—	.350	.210	.125	.015	—	—	—	$120.00
2	29-1071	.125	.150	.040	—	—	.310	.210	.060	.040	—	—	—	130.00
2	29-1022	.148	.172	.040	—	—	.247	.147	.050	.050	—	—	—	130.00
2	29-1020	.148	.172	.040	—	—	.310	.210	.050	.050	—	—	—	130.00
2	29-1052	.148	.172	.040	—	—	.210	.120	.060	.030	—	—	—	130.00
2	29-1008	.148	.172	.040	—	—	.350	.210	.062	.078	—	—	—	130.00
2	29-1054	.148	.172	.040	—	—	.350	.210	.062	.078	—	—	—	130.00
2	29-1015	.148	.172	.040	—	—	.250	.150	.070	.030	—	—	—	130.00
2	29-1037	.148	.172	.040	—	—	.260	.145	.075	.040	—	—	—	130.00
2	29-1038	.148	.172	.040	—	—	.230	.105	.075	.050	—	—	—	130.00
2	29-1012	.148	.172	.040	—	—	.335	.210	.075	.050	—	—	—	130.00
2	29-1006	.148	.172	.040	—	—	.345	.210	.075	.060	—	—	—	130.00
2	29-1062	.148	.172	.040	—	—	.330	.210	.100	.020	—	—	—	130.00
2	29-1017	.148	.172	.040	—	—	.250	.110	.100	.040	—	—	—	130.00
2	29-1016	.148	.172	.040	—	—	.265	.125	.100	.040	—	—	—	130.00
2	29-1018	.148	.172	.040	—	—	.285	.145	.100	.040	—	—	—	130.00
2	29-1000	.148	.172	.040	—	—	.350	.210	.100	.040	—	—	—	130.00
2	29-1050	.148	.172	.040	—	—	.460	.320	.100	.040	—	—	—	130.00
2	29-1011	.148	.172	.040	—	—	.594	.450	.100	.040	—	—	—	130.00
2	29-1019	.148	.172	.040	—	—	.750	.610	.100	.040	—	—	—	140.00
2	29-1085	.148	.172	.040	—	—	.797	.657	.100	.040	—	—	—	130.00
2	29-1021	.148	.172	.040	—	—	.305	.145	.110	.050	—	—	—	130.00
2	29-1001	.148	.172	.040	—	—	.370	.210	.110	.050	—	—	—	130.00
2	29-1069	.148	.172	.040	—	—	.350	.210	.120	.020	—	—	—	130.00
2	29-1007	.148	.172	.040	—	—	.370	.210	.120	.040	—	—	—	130.00
2	29-1060	.148	.172	.040	—	—	.350	.210	.125	.015	—	—	—	130.00
2	29-1051	.148	.172	.040	—	—	.280	.125	.125	.040	—	—	—	130.00
2	29-1036	.148	.172	.040	—	—	.365	.193	.132	.040	—	—	—	130.00
2	29-1068	.148	.172	.040	—	—	.382	.210	.132	.040	—	—	—	130.00
2	29-1072	.148	.172	.040	—	—	.390	.218	.132	.040	—	—	—	130.00
2	29-1073	.148	.172	.040	—	—	.750	.578	.132	.040	—	—	—	140.00
2	29-1009	.148	.172	.040	—	—	.406	.210	.156	.040	—	—	—	130.00
2	29-1010	.148	.172	.040	—	—	.500	.210	.250	.040	—	—	—	130.00
2	29-1063	.148	.172	.040	—	—	.330	.210	.074	.046	—	—	—	130.00
2	29-1003	.171	.195	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00
2	29-1004	.179	.200	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00
2	29-1005	.218	.250	.040	—	—	.350	.210	.100	.040	—	—	—	$130.00

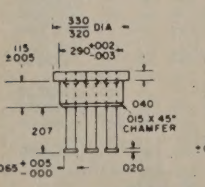
COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified.
For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory

TEFLON* TRANSISTOR HOLDERS

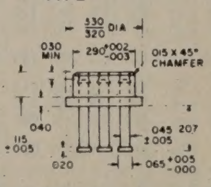
These holders provide insulated top and botton chassis mounting support of transistors. They have thru-holes and turreted solder terminals for wiring transistor leads and passive components, eliminating the need of a pad and providing total insulation and strain relief.

Holders shown represent the basic configurations available for JEDEC Packages TO-5 (.200" Dia. Pitch Circle) and TO-18 (.100" Dia. Pitch Circle.) Other styles and variations are constantly being added. Consult our ENGINEERING Dept for special requirements.

TYPE

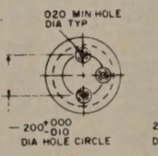


STANDARD

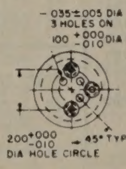


REVERSED

3-PIN

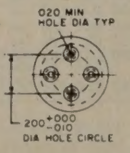


A
3 PINS

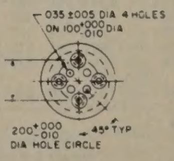

035±005 DIA 3 HOLES ON 100 +000 -010 DIA
200 +000 -010 DIA HOLE CIRCLE
45° TYP

B
3 PINS
3 HOLES

4-PIN



C
4 PINS


035 ±005 DIA 4 HOLES ON 100 +000 -010 DIA
200 +000 -010 DIA HOLE CIRCLE
45° TYP

D
4 PINS
4 HOLES

3-PIN

No.	Type	Fig.	NET Each
34-1000	Std.	A	$.18
43-1000	Rev.	A	.18
34-1003	Std.	B	.18
43-1003	Rev.	B	.18

4-PIN

No.	Type	Fig.	NET Each
34-1100	Std.	C	$.20
43-1100	Rev.	C	.20
34-1104	Std.	D	.20
43-1104	Rev.	D	.20

DISCOUNT SCHEDULE

1 - 99	NET
100 - 249	10% Off
250 - 499	15% Off
500 - 999	25% Off
1000 and up	On Request

SPECIFY SMITH TEFLON* TERMINALS

STAND-OFFS

*Du Pont's registered trademark

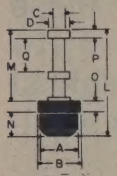


FIG. 3

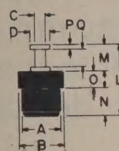


FIG. 4

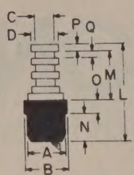


FIG. 5

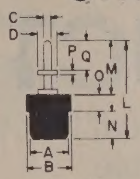


FIG. 6

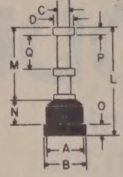


FIG. 9

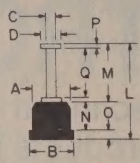


FIG. 10

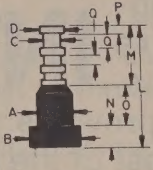


FIG. 11

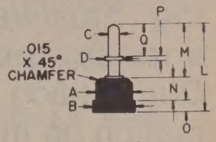


FIG. 12

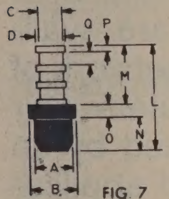


FIG. 7

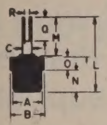


FIG. 8

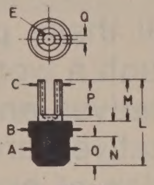


FIG. 16

FOR RAPID SELECTION:

terminals are listed (within figure groups) in ascending order of the MOST PERTINENT DIMENSION:

A = MIN. DIA.
B = MAJ. DIA.
N = LGTH. OF MIN. DIA.
O = LGTH. OF MAJ. DIA.
M = LGTH. OF PIN
C = DIA. OF PIN
L = OVERALL LGTH.

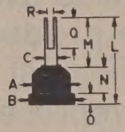


FIG. 13

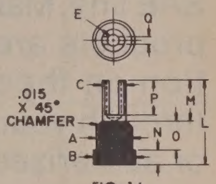


FIG. 14

SUB-MINIATURE

TURRET - SINGLE - MULTIPLE BIFURCATED

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
3	92-1577	.093	.125	.040	.080	—	.280	.140	.100	.040	.030	.040	—	$130.00
3	92-1500	.093	.125	.030	.060	—	.310	.170	.100	.040	.020	.060	—	120.00
3	• 92-1528	.093	.125	.040	.080	—	.350	.210	.100	.040	.020	.100	—	130.00
3	92-1587	.093	.125	.040	.080	—	.390	.210	.140	.040	.020	.100	—	130.00
3	92-1540	.130	.172	.040	.093	—	.480	.250	.190	.040	.020	.093	—	$130.00
3	92-1519	.148	.172	.046	.090	—	.254	.154	.060	.040	.020	.046	—	$120.00
3	92-1511	.148	.172	.046	.093	—	.296	.156	.100	.040	.020	.046	—	120.00
3	92-1500	.148	.172	.040	.080	—	.350	.210	.100	.040	.020	.100	—	120.00
3	92-1578	.148	.172	.040	.080	—	.390	.250	.100	.040	.020	.093	—	120.00
3	92-1573	.148	.172	.040	.080	—	.400	.210	.100	.090	.020	.093	—	120.00
3	92-1586	.148	.172	.045	.093	—	.443	.250	.100	.093	.020	.085	—	120.00
3	• 92-1542	.148	.172	.040	.080	—	.359	.210	.109	.040	.020	.100	—	120.00
3	92-1570	.148	.172	.046	.093	—	.319	.154	.125	.040	.020	.046	—	120.00
3	92-1501	.148	.172	.040	.080	—	.375	.210	.125	.040	.020	.100	—	120.00
3	92-1505	.148	.172	.040	.080	—	.428	.210	.125	.093	.020	.100	—	120.00
3	92-1504	.148	.172	.046	.093	—	.334	.154	.140	.040	.020	.046	—	120.00
3	92-1566	.148	.172	.040	.080	—	.406	.210	.156	.040	.020	.100	—	120.00
3	92-1524	.148	.172	.040	.080	—	.461	.210	.158	.093	.020	.100	—	120.00
3	92-1506	.148	.172	.040	.093	—	.455	.250	.160	.040	.020	.093	—	120.00
3	92-1567	.148	.172	.040	.093	—	.470	.250	.180	.040	.020	.093	—	120.00
3	92-1507	.148	.172	.040	.093	—	.500	.210	.250	.040	.020	.100	—	120.00
3	92-1512	.148	.172	.040	.080	—	.540	.250	.250	.040	.020	.093	—	120.00
3	92-1534	.152	.172	.047	.093	—	.335	.207	.088	.040	.020	.093	—	$120.00
3	92-1532	.152	.172	.047	.093	—	.296	.156	.100	.040	.020	.047	—	120.00
3	92-1535	.152	.172	.047	.093	—	.347	.207	.100	.040	.020	.093	—	120.00
3	92-1531	.152	.172	.047	.093	—	.346	.156	.150	.040	.020	.047	—	120.00
3	92-1533	.152	.172	.047	.093	—	.361	.156	.165	.040	.020	.047	—	120.00
3	92-1513	.171	.187	.040	.080	—	.405	.210	.155	.040	.020	.100	—	$130.00
3	92-1502	.179	.200	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$130.00
3	92-1508	.185	.218	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$130.00
3	92-1523	.185	.218	.040	.080	—	.460	.300	.120	.040	.020	.140	—	130.00
3	92-1503	.185	.218	.040	.080	—	.375	.210	.125	.040	.020	.100	—	130.00
3	92-1526	.204	.250	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$140.00
4	92-1579	.093	.125	.040	.080	—	.230	.090	.100	.040	.020	.060	—	$130.00
4	92-1527	.148	.172	.040	.080	—	.262	.125	.087	.050	.020	.085	—	$130.00
4	92-1525	.148	.172	.040	.080	—	.250	.110	.100	.040	.020	.080	—	130.00
4	92-1563	.148	.172	.046	.093	—	.296	.156	.100	.040	.020	.116	—	130.00
4	92-1562	.148	.172	.040	.080	—	.382	.227	.130	.025	.020	.187	—	130.00
4	92-1571	.148	.172	.045	.093	—	.468	.250	.168	.050	.020	.180	—	150.00
4	92-1521	.148	.172	.040	.080	—	.455	.227	.187	.040	.020	.187	—	130.00
4	92-1581	.150	.175	.045	.093	—	.468	.250	.168	.050	.020	.190	—	130.00
4	92-1520	.171	.200	.048	.090	—	.320	.120	.125	.075	.020	.080	—	$150.00
5	92-1517	.148	.172	.070	.109	—	.362	.232	.080	.050	.029	.031	—	$180.00
5	92-1514	.148	.172	.070	.109	—	.392	.232	.110	.050	.029	.031	—	180.00
6	92-1509	.148	.172	.040	.080	—	.328	.210	.075	.040	.020	.120	—	$130.00
6	92-1545	.148	.172	.040	.080	—	.350	.210	.100	.040	.020	.120	—	130.00
6	92-1546	.148	.172	.040	.080	—	.415	.210	.165	.040	.020	.120	—	130.00
7	92-1516	.093	.125	.068	.078	—	.255	.150	.075	.030	.015	.031	—	$160.00
7	92-1515	.093	.125	.068	.078	—	.344	.153	.140	.041	.015	.031	—	160.00
8	92-2008	.104	.125	.080	—	—	.350	.210	.100	.040	—	.180	.036	$180.00
8	92-2000	.148	.172	.040	—	—	.265	.125	.100	.040	—	.010	.010	$180.00
16	92-2010	.148	.172	.125	—	.062	.375	.190	.125	.060	.140	.030	—	$180.00

• Made to Meet MIL-T-55155

Smith No.	MIL No.
92-1528	SE-07-9-B-02
92-1542	SE-07-9-B-01

REVERSED SUB-MINIATURE

TURRET - SINGLE - MULTIPLE BIFURCATED

FIG. No.	SMITH No.	A	B	C	D	E	L	M	N	O	P	Q	R	RESALE Per M
9	29-1577	.093	.125	.040	.080	—	.280	.140	.100	.040	.020	.040	—	$130.00
9	29-1500	.093	.125	.030	.060	—	.310	.170	.100	.040	.020	.060	—	120.00
9	29-1528	.093	.125	.040	.080	—	.350	.210	.100	.040	.020	.100	—	130.00
9	29-1587	.093	.125	.040	.080	—	.390	.210	.140	.040	.020	.100	—	130.00
9	29-1540	.130	.172	.040	.093	—	.480	.250	.190	.040	.020	.093	—	$130.00
9	29-1519	.148	.172	.046	.093	—	.254	.154	.060	.040	.020	.046	—	$120.00
9	29-1511	.148	.172	.046	.093	—	.296	.156	.100	.040	.020	.046	—	120.00
9	29-1500	.148	.172	.040	.080	—	.350	.210	.100	.040	.020	.100	—	120.00
9	29-1578	.148	.172	.040	.080	—	.390	.250	.100	.040	.020	.093	—	120.00
9	29-1573	.148	.172	.040	.080	—	.400	.210	.100	.090	.020	.093	—	120.00
9	29-1586	.148	.172	.045	.093	—	.443	.250	.100	.093	.020	.085	—	120.00
9	29-1542	.148	.172	.040	.080	—	.359	.210	.109	.040	.020	.100	—	120.00
9	29-1570	.148	.172	.046	.093	—	.319	.154	.125	.040	.020	.046	—	120.00
9	29-1501	.148	.172	.040	.080	—	.375	.210	.125	.040	.020	.100	—	120.00
9	29-1505	.148	.172	.040	.080	—	.428	.210	.125	.093	.020	.100	—	120.00
9	29-1504	.148	.172	.046	.093	—	.334	.154	.140	.040	.020	.046	—	120.00
9	29-1566	.148	.172	.040	.080	—	.406	.210	.156	.040	.020	.100	—	120.00
9	29-1524	.148	.172	.040	.080	—	.461	.210	.158	.093	.020	.100	—	120.00
9	29-1506	.148	.172	.040	.093	—	.455	.250	.160	.040	.020	.093	—	120.00
9	29-1567	.148	.172	.040	.093	—	.470	.250	.180	.040	.020	.093	—	120.00
9	29-1507	.148	.172	.040	.093	—	.500	.210	.250	.040	.020	.100	—	120.00
9	29-1512	.148	.172	.040	.080	—	.540	.250	.250	.040	.020	.093	—	120.00
9	29-1534	.152	.172	.047	.093	—	.335	.207	.088	.040	.020	.093	—	$120.00
9	29-1532	.152	.172	.047	.093	—	.296	.156	.100	.040	.020	.047	—	120.00
9	29-1535	.152	.172	.047	.093	—	.347	.207	.100	.040	.020	.093	—	120.00
9	29-1531	.152	.172	.047	.093	—	.346	.156	.150	.040	.020	.047	—	120.00
9	29-1533	.152	.172	.047	.093	—	.361	.156	.165	.040	.020	.047	—	120.00
9	29-1513	.171	.187	.040	.080	—	.405	.210	.155	.040	.020	.100	—	$130.00
9	29-1502	.179	.200	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$130.00
9	29-1508	.185	.218	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$130.00
9	29-1523	.185	.218	.040	.080	—	.460	.300	.120	.040	.020	.140	—	130.00
9	29-1503	.185	.218	.040	.080	—	.375	.210	.125	.040	.020	.100	—	130.00
9	29-1526	.204	.250	.040	.080	—	.350	.210	.100	.040	.020	.100	—	$140.00
10	29-1579	.093	.125	.040	.080	—	.230	.090	.100	.040	.020	.060	—	$130.00
10	29-1527	.148	.172	.040	.080	—	.262	.125	.087	.050	.020	.085	—	$130.00
10	29-1525	.148	.172	.040	.080	—	.250	.110	.100	.040	.020	.080	—	130.00
10	29-1563	.148	.172	.046	.093	—	.296	.156	.100	.040	.020	.116	—	130.00
10	29-1562	.148	.172	.040	.080	—	.382	.227	.130	.025	.020	.187	—	130.00
10	29-1571	.148	.172	.045	.093	—	.468	.250	.168	.050	.020	.180	—	130.00
10	29-1521	.148	.172	.040	.080	—	.455	.227	.187	.040	.020	.187	—	130.00
10	29-1581	.150	.175	.045	.093	—	.468	.250	.168	.050	.020	.190	—	$130.00
10	29-1520	.171	.200	.048	.090	—	.320	.120	.125	.075	.020	.080	—	$150.00
11	29-1515	.093	.125	.068	.078	—	.344	.153	.140	.041	.015	.031	—	$160.00
11	29-1516	.093	.125	.068	.078	—	.255	.150	.075	.030	.015	.031	—	160.00
11	29-1514	.148	.172	.070	.109	—	.392	.232	.110	.050	.029	.031	—	$180.00
12	29-1509	.148	.172	.040	.080	—	.328	.210	.075	.040	.020	.120	—	130.00
12	29-1545	.148	.172	.040	.080	—	.350	.210	.100	.040	.020	.120	—	130.00
12	29-1546	.148	.172	.040	.080	—	.415	.210	.165	.040	.020	.120	—	$130.00
13	29-2008	.104	.125	.080	—	—	.350	.210	.100	.040	—	.180	.036	$200.00
13	29-2000	.148	.172	.040	—	—	.265	.125	.100	.040	—	.010	.010	200.00
13	29-2009	.148	.172	.040	—	—	.275	.125	.110	.040	—	.050	.010	$200.00
14	29-2010	.148	.172	.125	—	.062	.375	.190	.125	.060	.140	9030	—	$200.00

COLORS: Supplied in White (-101) unless otherwise specified. Ten colors available. **PLATING:** Standard (P-12) unless otherwise specified. **For COLOR CODE, PLATING SUFFIXES and QUANTITY DISCOUNT SCHEDULE see LAST SMITH PAGE in this Directory**

IT'S SOUND PLANNING TO "SPECIFY SMITH" WHEN DESIGNING OR PURCHASING

INTRODUCTION

Stanford Applied Engineering is a broad-based manufacturer of electronic packaging hardware and systems. Our catalog provides technical information on most of the products in the SAE line. Many other custom designed products are also available. Information on these products is available through your nearest SAE sales office or authorized representative.

SAE is one of the fastest growing electronic packaging companies in the world. This growth is the result of our ability to design and produce a wide spectrum of high quality products in almost any area of electronic packaging. We have four manufacturing plants, strategically located throughout the country. We do our own high speed contact stamping and high capacity injection molding, make our own PC boards and automatically assemble these components into the highest quality interconnection devices available.

Almost all these products are available through a world-wide network of representatives and distributors. Our representatives are supported by an organization of experienced application engineers who can help solve the most difficult electronic packaging problems.

Whenever you need interconnection components, whether it's connectors, IC sockets or a complete integrated packaging system, look to SAE. You'll see why we're called the OEM connection.

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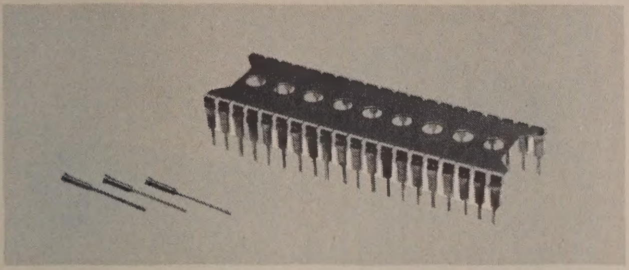
Stanford Applied Engineering

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

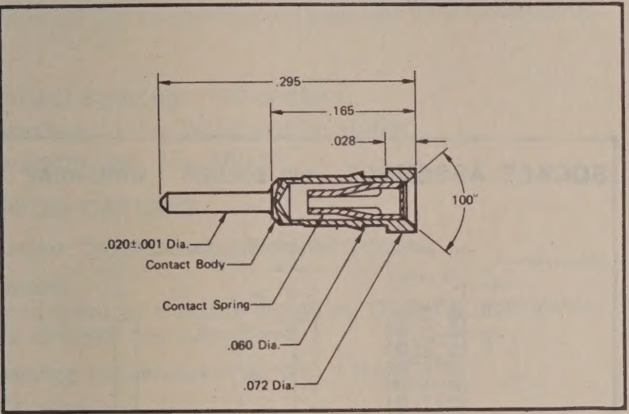
IC Sockets

CONTACTS AND CARRIERS
SERIES 4000

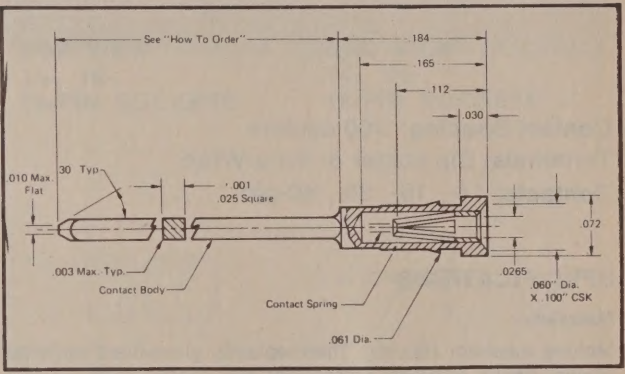


- Low profile
- High temperature resistance — ideal for burn-in
- Extra large lead-in of .060″ dia.
- Available in carrier assemblies for ease of assembly
- Shorter clip to accommodate short IC leads
- Terminals
- Wire-Wrap™ or Dip solder

DIP-SOLDER CONTACT


.295
.165
.028
100″
.020±.001 Dia.
Contact Body
Contact Spring
.060 Dia.
.072 Dia.

WIRE-WRAP CONTACT


See "How To Order"
.184
.165
.112
.030
.010 Max. Flat
30 Typ.
±.001
.025 Square
.072
.0265
.060″ Dia. X .100″ CSK
.003 Max. Typ.
Contact Body
Contact Spring
.061 Dia.

SPECIFICATIONS

Operating Temperature:
Dip Solder or Wire-Wrap Contact: −65°C to +175°C

Contact Body: Brass, ½ hard, per QQ-B-626

Contact Spring:
Beryllium copper with choice of several thicknesses of gold over .000050 nickel.

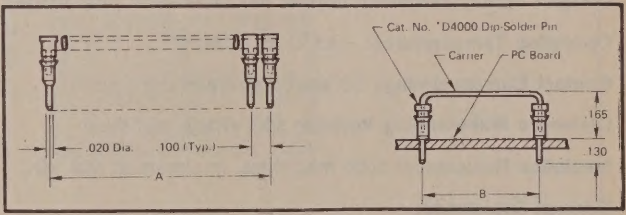
Accepts TO-116 standard lead configuration.

Contact accepts .016″ to .020″ dia. pin with a minimum withdrawal force of one ounce.

Mounts in PC boards of .062″ minimum thickness.

Mounting Hole Diameter: .005″ ±.002″

CARRIER ASSEMBLY


Cat. No. *D4000 Dip-Solder Pin
Carrier
PC Board
.165
.130
.020 Dia.
.100 (Typ.)
A
B

Part No.	A	B	Part No.	A	B
*C4000-8	.300	.300	*C4000-28	1.300	.600
*C4000-14	.600	.300	*C4000-40	1.900	.600
*C4000-16	.700	.300	*C4000-48	2.300	.600
			*C4000-64	3.100	.600

*Omit "C" for standard spring force of 1.0 oz.

HOW TO ORDER (Select One from Each Category)

Contact Plating				Basic Model Number			Terminals				Retention Force
Contact Body: .000010 Gold Contact Spring: .000010 Gold	Contact Body: .000010 Gold Contact Spring: .000030 Gold	Contact Body: .000030 Gold Contact Spring: .000030 Gold	Contact Body: .0002/.0003 Bright Tin Contact Spring: .000010 Gold	Wire-Wrap contact	Dip Solder Contact	Dash	.000″ (Socket only. Without post, for soldering applications)	.200″ (single level Wire-Wrap post)	.375″ (Two level Wire-Wrap post)	.500″ (Three level Wire-Wrap post)	0.5 oz. light spring force
C	R	M	T	W4000		–	L	1L	2L	3L	C*
C	R				D4000	–					C*

← Category

Order Code
Enter Codes to
Make Part No.

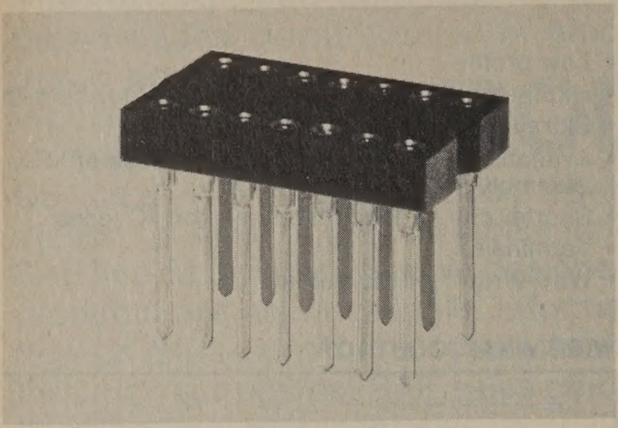
Contact Plating				Basic Model Number			Number of Contacts							Retention Force
Contact Body: .000010 Gold Contact Spring: .000010 Gold	Contact Body: .000010 Gold Contact Spring: .000030 Gold	Contact Body: .000030 Gold Contact Spring: .000030 Gold	Contact Body: .00002/.00003 Bright Tin Contact Spring: .000010 Gold		Carrier Assembly	Dash	4 Double Row	7 Double row	8 Double row	14 Double row	20 Double row	24 Double row	32 Double row	0.5 oz. light spring force
C	R	M	T		C4000	–	8	14	16	28	40	48	64	C*
						–								

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Stanford Applied Engineering

IC Sockets

DISCRETE ASSEMBLIES
SERIES 4000



Contact Spacing: .100 centers
Terminals: Dip solder or Wire-Wrap
Contacts: 14-, 16-, 28-, 40-pin

SPECIFICATIONS

Materials:

Molded Insulator Header: Thermoplastic glass-filled polyester (color, black), or nylon, glass-filled type (color, blue).

Contact Body: Brass per QQ-B-626. Composition 22.

Contact Spring: Beryllium copper per QQ-C-533, heat-treated.

Operating Temperatures: −55°C to +150°C.

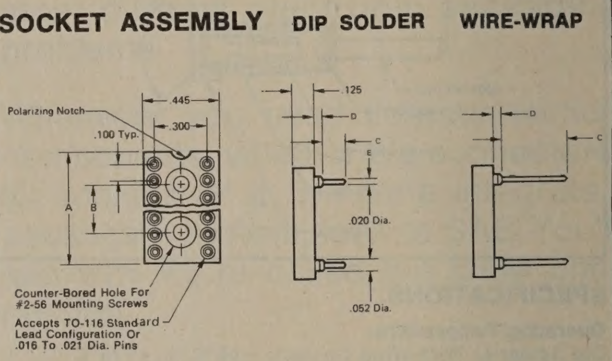
Contact Current Rating: 3.0 amp. maximum.

Dielectric Withstanding Voltage: 500 VRMS, minimum.

Insulation Resistance: 5000 megohms, minimum at 500 VDC

Contact Resistance:
7.0 milliohms, maximum. Gold plating per MIL-G-45204, Type II over .000050 thick minimum nickel per QQ-N-290.

SOCKET ASSEMBLY


DIP SOLDER
WIRE-WRAP

Polarizing Notch
.445
.300
.100 Typ.
A
B
Counter-Bored Hole For #2-56 Mounting Screws
Accepts TO-116 Standard Lead Configuration Or .016 To .021 Dia. Pins
.125
D
C
E
.020 Dia.
.052 Dia.

Part No.	A	B	C	D	E ±.001
DH4000-14***	.745	.400	.130	.040	.020 Dia. Pin
DH4000-16***	.845	.500	.130	.040	.020 Dia. Pin
DH4000-28***	1.444	.800	.130	.040	.020 Dia. Pin
DH4000-40***	2.044	.800	.130	.040	.020 Dia. Pin
WH4000-14-1L***	.745	.400	.200	.070	.025 Square Post
WH4000-16-1L***	.845	.500	.200	.070	.025 Square Post
WH4000-14-2L***	.745	.400	.375	.070	.025 Square Post
WH4000-16-2L***	.845	.500	.375	.070	.025 Square Post
WH4000-14-3L***	.745	.400	.510	.070	.025 Square Post
WH4000-16-3L***	.845	.500	.510	.070	.025 Square Post
WH4000-28-1L***	1.444	.800	.200	.070	.025 Square Post
WH4000-28-2L***	1.444	.800	.375	.070	.025 Square Post
WH4000-28-3L***	1.444	.800	.510	.070	.025 Square Post
WH4000-40-1L***	2.044	.800	.200	.070	.025 Square Post
WH4000-40-2L***	2.044	.800	.375	.070	.025 Square Post
WH4000-40-3L***	2.044	.800	.510	.070	.025 Square Post

SPECIFY: "C" for Light Force Contact (Omit for Standard Contact)

HOW TO ORDER (Select One from Each Category)

Category →	Contact Plating				Basic Model Number			Number of Contacts				Insulator Material		Retension Force
	Contact Body: .000010 Gold Contact Spring: .000010 Gold	Contact Body: .000010 Gold Contact Spring: .000030 Gold	Contact Body: .000030 Gold Contact Spring: .000030 Gold	Contact Body: .00002/.00003 Bright Ti. Contact Spring: .000010 Gold	Socket Assembly: Dip Solder	Socket Assembly: Wire-Wrap	Dash	7 Double Row	8 Double Row	14 Double Row	20 Double Row	Black Valox	Blue Nylon	0.5 oz. Light Spring Force
	C	R	M	T	DH4000	WH4000	–	14	16	28	40	B	BU	C*
Order Code Enter Codes to Make Part No.							–							

*Omit "C" for standard spring force of 1.0 oz.

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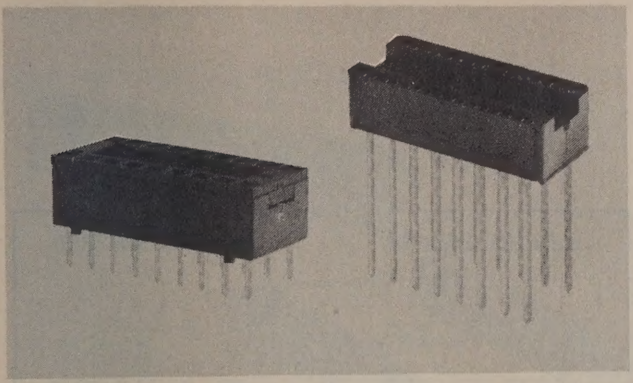
IC Sockets

STANDARD PROFILE
SERIES 2200/2203 and 2900



Contact Spacing: .100 centers
Terminals: Wire-Wrap or Dip solder
Contacts: 14-, 16-, 18-pin

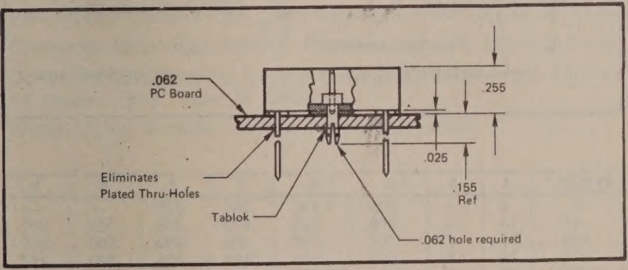
SPECIFICATIONS

Insulator: Thermoplastic glass-filled polyester

Contacts:
Spring tempered phosphor bronze per QQ-B-750, gold plated. (See Ordering Information.)

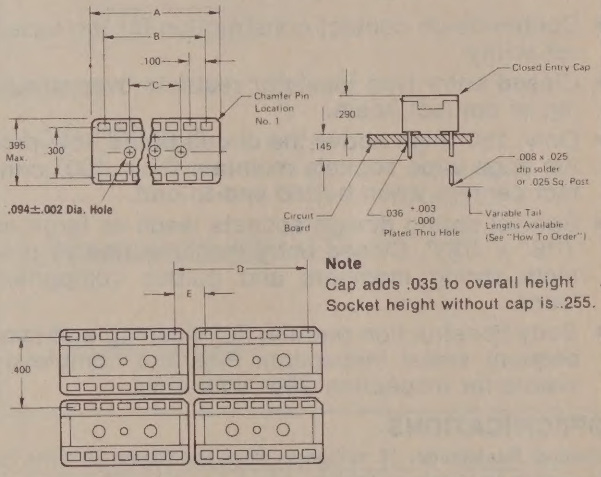
Operating Temperature: −55°C to +150°C.

NEW TABLOK™ SOCKET DESIGNED FOR NON-SOLDER APPLICATIONS — SERIES 2203


.062
PC Board
.255
.025
.155
Ref
Eliminates
Plated Thru-Holes
Tablok
.062 hole required

TOP VIEW 14-, 16-, 18-PIN SOCKETS

END VIEW 14-, 16-, 18-PIN SOCKETS


A
B
.100
C
Chamfer Pin
Location
No. 1
.395
Max.
.300
.094±.002 Dia. Hole
Closed Entry Cap
.290
.145
.008 x .025
dip solder
or .025 Sq. Post
Circuit
Board
.036 +.003 -.000
Plated Thru Hole
Variable Tail
Lengths Available
(See "How To Order")
D
E
.400

Note
Cap adds .035 to overall height
Socket height without cap is .255.

Contacts	A	B	C	D	E
14 Contact	.760	.600	.300	.800	.200
16 Contact	.860	.700	.400	.900	.200
18 Contact	.896	.800	.500	.900	.100

HOW TO ORDER (Select One from Each Category)

Category →	Contact Plating			Basic Model Number				Number of Contacts			Color		Closed Entry Cap	Length of Wire Wrap Post (Applicable to SA 2200 & 2203)			
	.000010 Gold per MIL-G-45204 Type II	.000050 Gold per MIL-G-45204 Type II, Class 1	.00020 Bright Tin per MIL-T-10727, Type I	Wire-Wrap	Tablok	Dip Solder	Dash	14 Pin	16 Pin	18 Pin	Black	White	Cap is standard on 18-pin socket. If cap is required on 14- or 16-pin socket, add "C" to Part No.	.645 long (3-level wrap)	.425 long (2-level wrap)	.320 long (1-level wrap)	.145 long (Special length)
	C	M	T	SA2200	SA2203	SA2900	–	14	16	18	B	W	C	*	ST	SL	LT
Order Code enter codes to make part no.							–										

*Omit "C" for standard spring force of 1.04oz.

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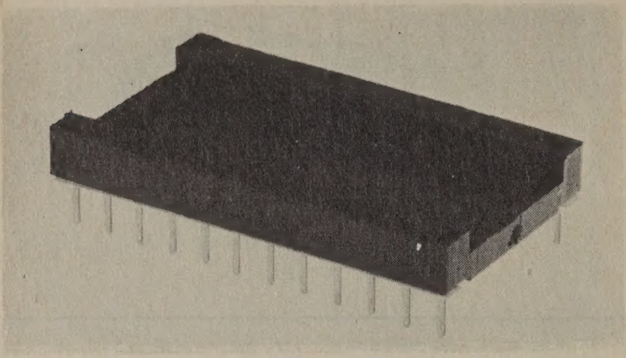
IC Sockets

LOW-PROFILE, EDGE WIPE, SIDE WIPE
SERIES EW3700 and SW3800

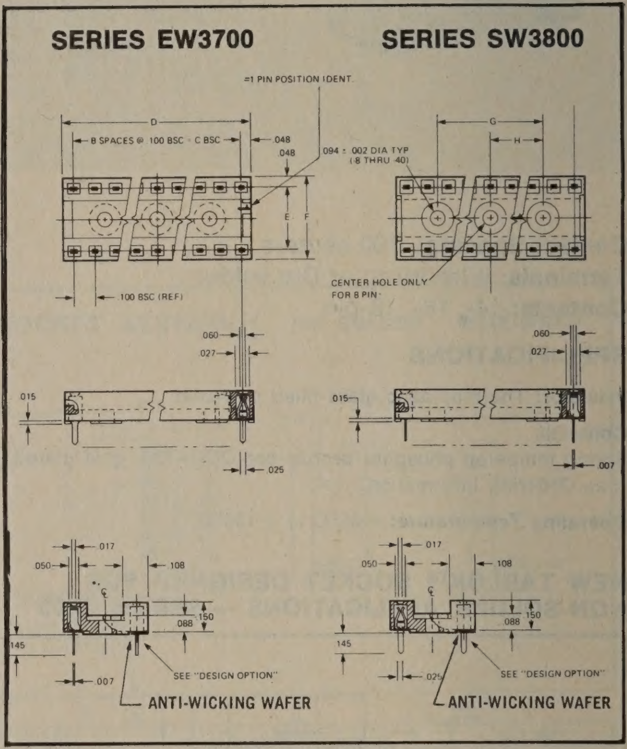


Contact Spacing: .100 centers
Terminals: Dip solder
Contacts: 8 through 40 pins

- Double-beam contact construction for increased reliability.
- Closed entry type insulator restricts over-stressing of contact beam.
- Only .150″ high above the circuit board, low-profile edge wipe sockets maintain their .100″ contact centers when butted end-to-end.
- Special spring design accepts leads as large as .016″ x .023″. Closed entry insulator design protects spring members and guides component leads.
- Body construction permits flux-flushing and subsequent visual inspection. Pins are completely visible for inspection after soldering.

SPECIFICATIONS

Contact Resistance: 15 milliohms (max.) at 1 amp.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.
Operating Temperature: −55°C to +140°C.
Materials:
Insulator: Thermoplastic glass-filled polyester. Color, black.
Contacts: Meets UL 94V-2 or better. Nickel silver alloy standard. Optional material beryllium copper, heat treated. Call out base Part No. 3750.
Design Option: Self-retaining terminal design eliminates contact clinching for wave-soldering. Plated thru hole dia. .035/.040 (see "How to Order").



Part No.*	A	B	C	D	E	F	G	H
-8	8	3	.300	.396	.300	.395	—	—
-14	14	6	.600	.696	.300	.395	.500	.250
-16	16	7	.700	.796	.300	.395	.500	.250
-18	18	8	.800	.896	.300	.395	.500	.250
-22	22	10	1.000	1.096	.400	.495	.800	.400
-24	24	11	1.100	1.196	.600	.695	.800	.400
-28	28	13	1.300	1.396	.600	.695	.800	.400
-40	40	19	1.900	1.996	.600	.695	.800	.400

*Suffix applies to both 3700 and 3800 Series

HOW TO ORDER (Select One from Each Category)

Category	Contact Plating				Basic Part Number	Number of Contacts										
	Nickel Silver Alloy: .000020 Thick. 18 Karat Gold Inlay Over Nickel	Nickel Silver Alloy: .0002 to .0003 Thick Tin Plate	Nickel Silver Alloy: .000030 Thick Gold Over Nickel	Nickel Silver Alloy: .000050 Thick Gold Over Nickel		8 Contacts	14 Contacts	16 Contacts	18 Contacts	22 Contacts	24 Contacts	28 Contacts	40 Contacts	Black Insulator Body	Anti-Wicking Wafer	Self Retaining Terminal
	I	T	R	M	EW3700 (Edge Wipe)	8	14	16	18	22	24	28	40	B	W	R
					SW3800 (Side Wipe)											
Order Code Enter Codes to Make Part No.																

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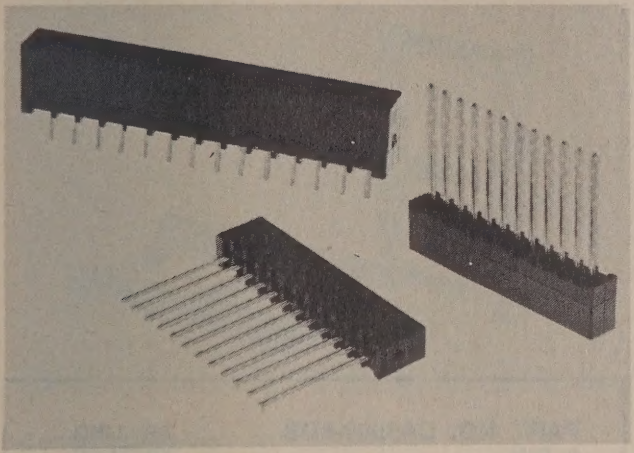
IC Sockets

STANDARD PROFILE STRIPS
SERIES SA2300, 2301, 3000, 3001
LOW PROFILE STRIPS SERIES SA3200



Contact Spacing: .100 or .200 centers
Terminals: Wire-Wrap or Dip solder
Contacts: 11-, 12-, 14-, 20-pin strips

SPECIFICATIONS

Contact Resistance: 15 milliohms (max.) at 1 amp.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.
Operating Temperature: −55°C to +150°C.

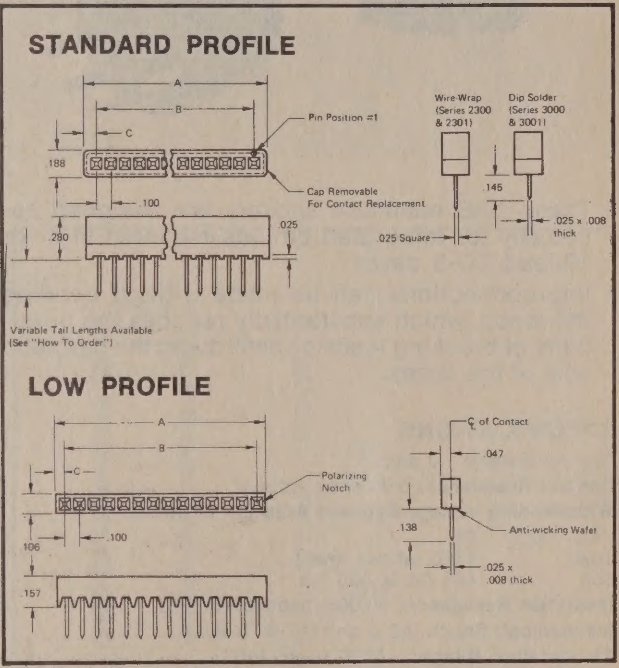
Materials:

Insulator: Thermoplastic glass-filled polyester (all IC sockets).

Contacts: (Standard Profile) Phosphor bronze per QQ-B-750.

Contacts: (Low Profile) Beryllium copper, heat-treated. Gold or tin plated. (see "How to Order").

Wafer: (Low Profile) Non-flammable polyester.


STANDARD PROFILE
A
B
C
Pin Position #1
.188
.100
Cap Removable
For Contact Replacement
.280
.025
Variable Tail Lengths Available
(See "How To Order")
Wire-Wrap
(Series 2300
& 2301)
Dip Solder
(Series 3000
& 3001)
.145
.025 Square
.025 x .008
thick
LOW PROFILE
A
B
C
Polarizing
Notch
.100
.106
.157
℄ of Contact
.047
.138
Anti-wicking Wafer
.025 x
.008 thick

STANDARD PROFILE

Contacts	A	B	C	Contacts	A	B	C
11	1.096	1.000	.048	14	1.490	1.300	.095
12	1.290	1.100	.095	20	2.090	1.900	.095

LOW PROFILE

Contacts	A	B	C	Contacts	A	B	C
14-Pin	1.396	1.300	.048	20-Pin	1.996	1.900	.048

NOTE: 11-Pin (Standard Profile) 14- and 20-Pin (Low Profile) maintain .100 spacing when butted end to end.

HOW TO ORDER (Select One from Each Category)

Category	Contact Plating			Basic Model Number	Terminals		Insulator Style		Basic Model Number		Number of Contacts				Color		Length of Wire-Wrap Post (Applicable to SA2300 Series)				
	.000010 Gold per MIL-G-45204, Type II	.000050 Gold per MIL-G-45204, Type II, Class 1	.00020 Bright Tin per MIL-T-10727, Type I	Standard Profile	Wire-Wrap Terminals	Dip Solder Terminals	12-, 14-, or 20-pin strips	11-pin strips	Low Profile	Dash	11 contacts per strip	12 contacts per strip	14 contacts per strip	20-contacts per strip	Black	White	.645'' long, 3-level wrap	.425'' long, 2-level wrap	.320'' long, 1-level wrap	.145'' long, Special length	
	C	M	T	SA	230	300	0	1	SA3200	—	11	12	14	20	B	W	*	ST	SL	LT	
Order Code enter codes to make part no.										—											

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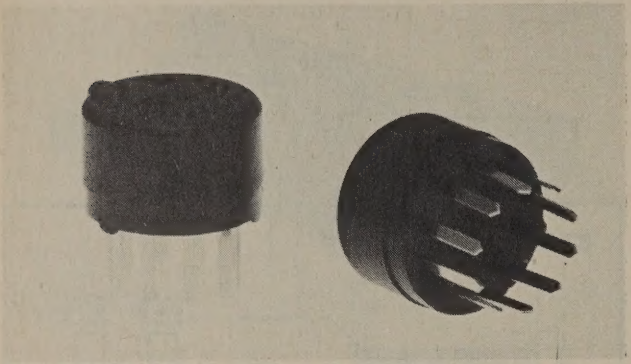
IC Sockets

LOW PROFILE
SERIES CA3500



- These SAE miniature sockets are designed especially for integrated circuits mounted in 8- or 10-lead TO-5 cases.
- Interconnections can be made without bending the leads, which substantially reduces the possibility of breaking leads or destroying the hermetic seal of the cases.

SPECIFICATIONS

Current Rating: 1.0 amp.

Contact Resistance: 0.05 ohms (max.).

Withstanding Voltage Between Adjacent Contacts:

VAC RMS	DC
1020	1560 (at sea level)
350	465 (at 50,000 ft.)

Insulation Resistance: 50,000 megohms (min.)

Mechanical: Shock: 50 g per MIL-STD-202.

Temperature Range: −55°C to +140°C.

Recommended Mounting Method: Solder in PC Board.

Recommended TO-5 Lead Dia.: .012 to .019.

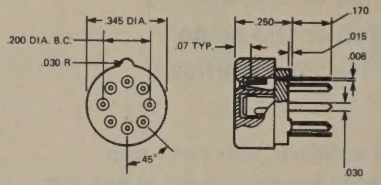
Materials:

Insulator: Thermoplastic Polyester, 30% glass filled, UL rating 94V-2 or better.

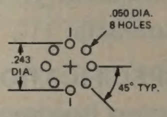
Contacts: Phosphor bronze, per QQ-B-750.

Contact Plating: Gold plate per MIL-G-45204 Type II, .000010 min. over .000050 min. nickel plate per QQ-N-29.

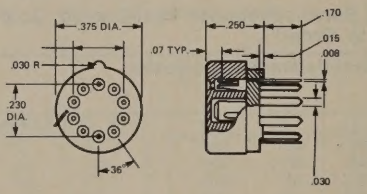
PART NO. CA3500-8DS
8 PIN


.345 DIA.
.200 DIA. B.C.
.030 R
45°
.250
.170
.07 TYP.
.015
.008
.030

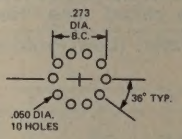
DRILLING PATTERN


.050 DIA.
8 HOLES
.243
DIA.
45° TYP.

PART NO. CA3500-10DS
10 PIN


.375 DIA.
.030 R
.230
DIA.
36°
.250
.170
.07 TYP.
.015
.008
.030

DRILLING PATTERN


.273
DIA.
B.C.
36° TYP.
.050 DIA.
10 HOLES

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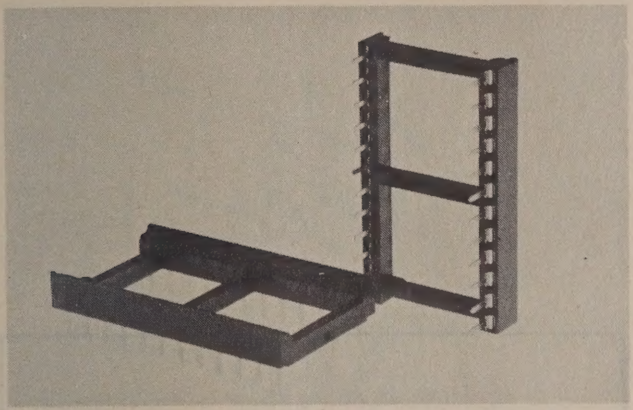
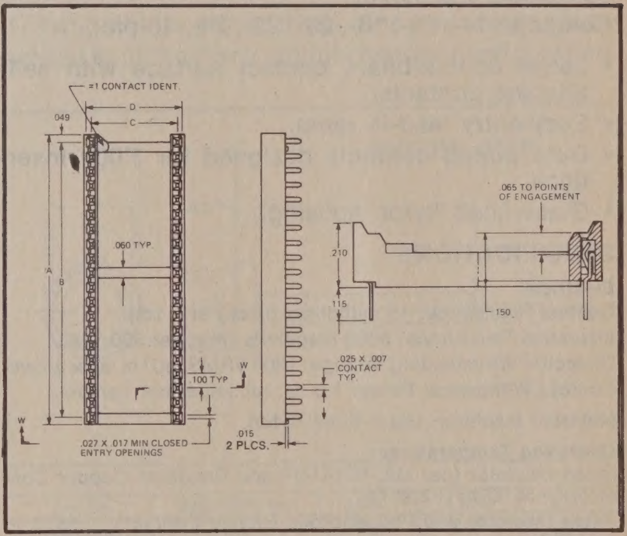
IC Sockets

LOW PROFILE
SERIES 3600



Contact Spacing: .100 Centers
Terminals: Dip solder
Contacts: 14-, 16-, 22-, 24-, 40-pin

- Large contact surface area.
- Easy entry lead-in ramp.
- Only .150″ high above the circuit board, these low-profile sockets maintain their 0.100″ contact centers when butted end-to-end. This provides continuous rows of contacts for universal applications and high-density packaging.
- Special spring design accepts leads as large as 0.027″ x 0.017″. Closed entry insulator design protects spring members and guides component leads.
- Solder-wicking eliminated by unique anti-wicking contact design. Body construction permits flux-flushing and subsequent visual inspection.



Part No.	Number of Contacts	A (max.)	B	C	D (max.)
3600-14	14	.698	.600	.300	.398
3600-16	16	.798	.700	.300	.398
3600-22	22	1.098	1.000	.400	.498
3600-24	24	1.198	1.100	.600	.698
3600-40	40	1.998	1.900	.600	.698

SPECIFICATIONS

Electrical:
Contact Resistance: 15 milliohms (max.) at 1 amp.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Material:
Insulator: Thermoplastic polyester 30% glass-filled. UL rating 94V-2 or better.

Operating Temperature: −55°C to +150°C.

Contact Material/Plating: Nickel/Silver Alloy No. 770 Selective plated at point of contact. (see "How to Order.")

HOW TO ORDER (Select One from Each Category)

Category →	Contact Plating		Basic Part No.					No. Pins					Insulator Color	
	.000020 Min. Gold Inlay Over Nickel	.0002 Min. Tin Lead Over Copper					Dash						Black Body	White Body
	IC	TC	3	6	0	0	—	14	16	22	24	40	B	W
Order Code Enter Codes to Make Part No.														

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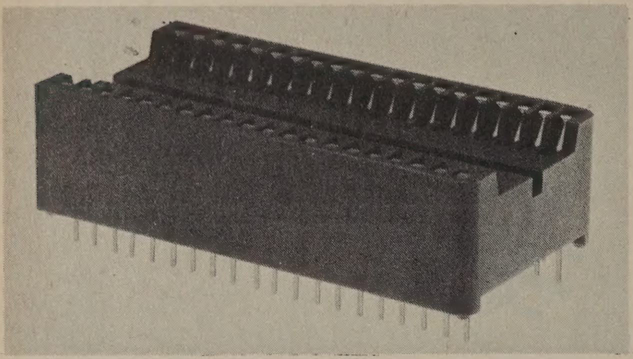
IC Sockets

HIGH TEMPERATURE
SERIES IS3900



Contact Spacing: .100 centers
Terminals: Dip solder
Contacts: 14-, 16-, 18-, 20-, 22-, 24-, 40-pin

- Large double-beam contact surface with self-aligning contacts.
- Easy-entry lead-in ramp.
- Gold plated contacts designed for 5,000 insertions.
- Glass-filled Ryton housing.

SPECIFICATIONS

Electrical

Contact Resistance: 15 milliohms (max.) at 1 amp.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.
Dielectric Withstanding Voltage: 1200 VRMS, 60 Hz, at sea level.
Contact Withdrawal Force: 1.0 oz. minimum per contact.

Material: Insulator: Glass-filled Ryton.

Operating Temperatures:

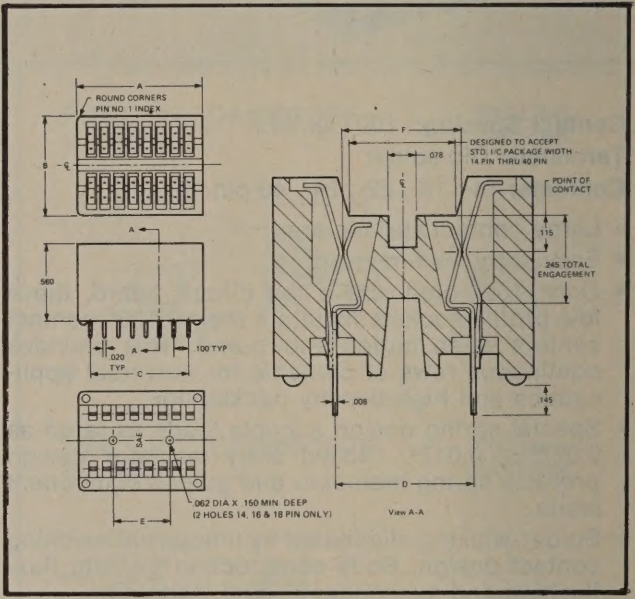
Ryton Insulator (per MIL-M-1414F) and Beryllium Copper Contacts: −55°C to +200°C.

Ryton Insulator and Phosphorous Bronze Contacts: −55°C to +150°C.

Contact Plating:

Phosphor Bronze: .000010. Gold plating per MIL-G-45204, Type II, over 0.000050 thick minimum nickel per QQ-N-290.

Beryllium Copper: Selective gold plating .000050 at contact point plus .000010 gold all over on 0.000050 minimum nickel per QQ-N-29.


A
ROUND CORNERS
PIN NO 1 INDEX
B
℄
A
.560
A
.020
TYP
C
.100 TYP
SAE
.062 DIA X .150 MIN DEEP
(2 HOLES 14, 16 & 18 PIN ONLY)
E
F
DESIGNED TO ACCEPT
STD. I/C PACKAGE WIDTH
14 PIN THRU 40 PIN
.078
℄
POINT OF
CONTACT
.115
.245 TOTAL
ENGAGEMENT
.008
.145
D
View A-A

Part Number	No. of Contacts	A	B	C	D	E	F
**IS3900-14E	14	.795	.720	.600	.40	.300	.330
**IS3900-16E	16	.895	.720	.700	.40	.400	.330
**IS3900-18E	18	.995	.720	.800	.40	.500	.330
**IS3900-20E	20	1.095	.720	.900	.40	—	.330
**IS3900-22E	22	1.195	.820	1.000	.50	—	.430
**IS3900-24E	24	1.295	1.020	1.100	.70	—	.630
**IS3900-40E	40	2.095	1.020	1.900	.70	—	.630

HOW TO ORDER (Select One from Each Category)

Category	Contact Plating		Basic Part Number						Number of Contacts							Insulator Body
	Phosphor Bronze: 0.000010 Min. Thickness: Gold Over 0.000050 Min. Nickel	Beryllium Copper: 0.000050 Gold at Contact Point Plus 0.000010 Gold All Over On 0.000050 Thick (Min.) Nickel							14-Pin	16-Pin	18-Pin	20-Pin	22-Pin	24-Pin	40-Pin	Glass Filled Ryton Insulator Body
	CP	MB	I	S	3	9	0	0	14	16	18	20	22	24	40	E
Order Code Enter Codes to Make Part No.																

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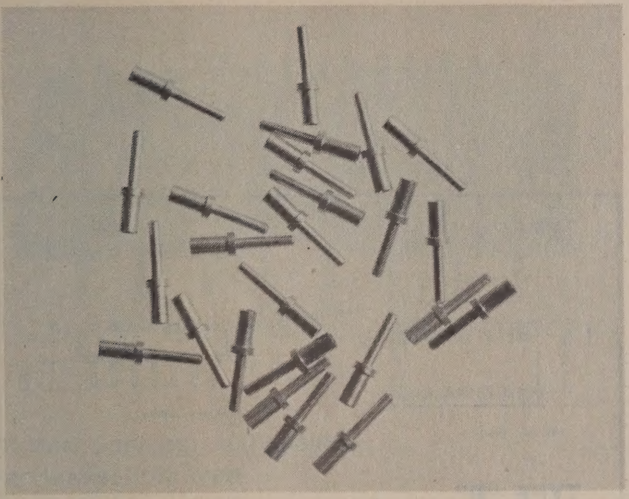
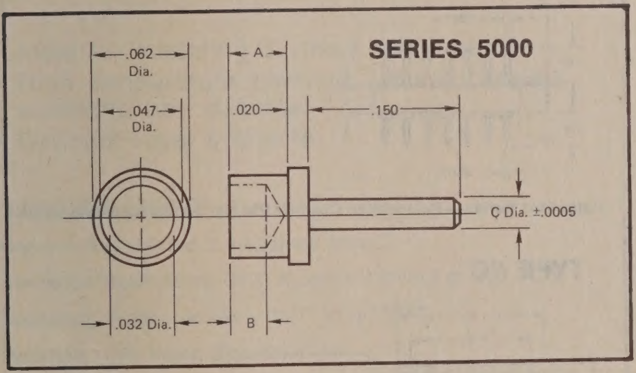
Add Dept. EM to address to tell them you saw it in eem

Cirkut Sockets

MODULE PIN
SERIES 5000/5225

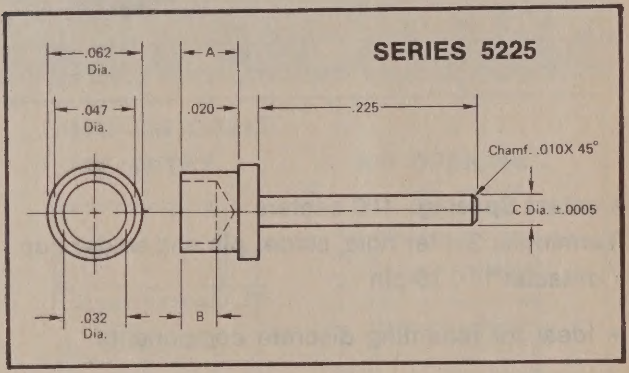


Series 5000/5225 Module Pins are a complete family of close tolerance pins specifically engineered to provide optimum mating with Cirkut Sockets. Readily swaged into place, these pins can easily be arranged to fit most any module header configuration.



Part No.	Board Thickness	A Dim.	B Dim.	C Dia.
5000-015-1	.032	.062	.047	.015
5000-015-2	.062	.094	.079	.015
5000-015-3	.094	.125	.110	.015
5000-015-4	.125	.156	.140	.015
5000-020-1	.032	.062	.047	.020
5000-020-2	.062	.094	.079	.020
5000-020-3	.094	.125	.110	.020
5000-020-4	.125	.156	.140	.020
5000-025-1	.032	.062	.047	.025
5000-025-2	.062	.094	.079	.025
5000-025-3	.094	.125	.110	.025
5000-025-4	.125	.156	.140	.025
5000-030-1	.032	.062	.047	.030
5000-030-2	.062	.094	.079	.030
5000-030-3	.094	.125	.110	.030
5000-030-4	.125	.156	.140	.030
5000-040-1	.032	.062	.047	.040
5000-040-2	.062	.094	.079	.040
5000-040-3	.094	.125	.110	.040
5000-040-4	.125	.156	.140	.040

NOTE: Use Swaging Tool Set — 1500MRR



Part No.	Board Thickness	A Dim.	B Dim.	C Dia.
5225-025-1	.032	.062	.047	.025
5225-025-2	.062	.094	.079	.025
5225-025-3	.094	.125	.110	.025
5225-025-4	.125	.156	.140	.025
5225-030-1	.032	.062	.047	.030
5225-030-2	.062	.094	.079	.030
5225-030-3	.094	.125	.110	.030
5225-030-4	.125	.156	.140	.030

NOTES:
1. Tolerance .xxxx ±.005 Before Plating
2. Material: Brass ½ Hard, Comp 22
3. Finish: Gold Plate Per MIL-G-45204, Type II, Class 1
4. Use Swaging Tool No. 1500MRR

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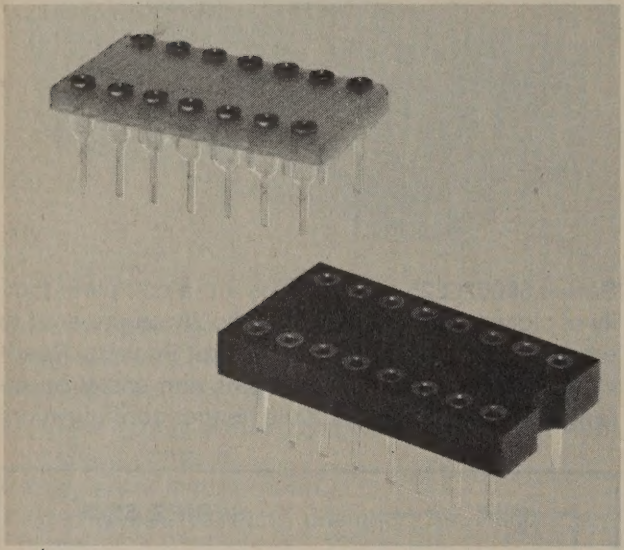
Component Mounting Boards

DUAL-IN-LINE SERIES 6100



Contact Spacing: .100 centers
Terminals: Solder hole, solder pin and solder cup
Contacts: 14-, 16-pin

- Ideal for mounting discrete components

SPECIFICATIONS

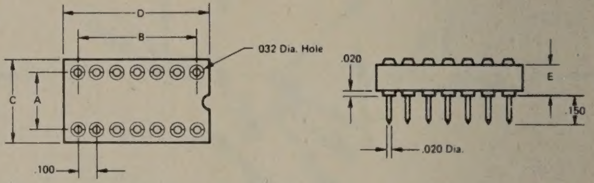
Materials:

Contact: Copper alloy, gold plated per MIL-G-45204, Type II, Class I.

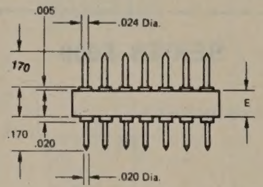
Insulator: See tabulation.

Note: Custom configurations available on request. Printed circuit artwork on board can tie pins together and reduce wiring interconnections. Please consult factory.

TYPE "A"

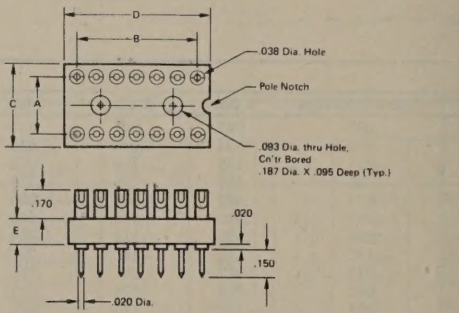

D
B
032 Dia. Hole
C
A
.100
.020
E
.150
.020 Dia.

TYPE "B"


.005
.024 Dia.
170
E
.170
.020
.020 Dia.

Note: 6141 Series—Polarization Chamfer Pin No. 1—No Mounting Holes.

TYPE "C"


D
B
.038 Dia. Hole
Pole Notch
C
A
.093 Dia. thru Hole,
Cn'tr Bored
.187 Dia. X .095 Deep (Typ.)
.170
E
.020
.150
.020 Dia.

Note:
Alternate dimensions above are for 14-pin or 16-pin boards

Part No.	Contacts	Type Contact	A	B	C	D	E	Insulator Material
6129	14	A	.300	.600	.428	.750	.125	Nylon, Type 6/6, Color blue
6136	16	A	.300	.700	.428	.850	.125	Nylon, Type 6/6, Color blue
6141-14	14	A	.300	.600	.395	.750	.062	Epoxy glass laminate, Color green
6141-16	16	A	.300	.700	.395	.850	.062	Epoxy glass laminate, Color green
6144-14	14	B	.300	.600	.445	.750	.125	Nylon, Type 6/6, Color blue
6144-16	16	B	.300	.700	.445	.850	.125	Nylon, Type 6/6, Color blue
6169-14	14	C	.300	.600	.428	.750	.125	Nylon, Type 6/6, Color blue
6169-16	16	C	.300	.700	.428	.850	.125	Nylon, Type 6/6, Color blue

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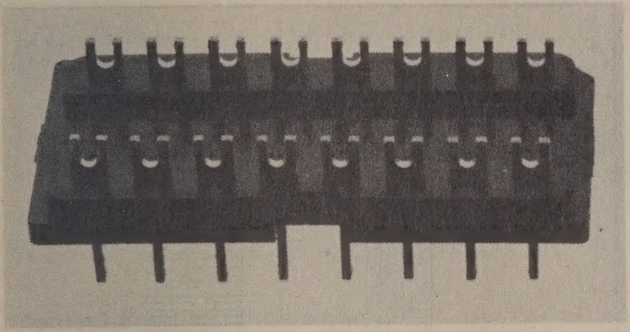
Component Mounting Boards

DUAL-IN-LINE SERIES H6170/C6170



Contact Spacing: .100 centers
Terminals: Fork type
Contacts: 14-, 16-pin

- Ideal for mounting discrete components
- High temperature phenolic insulator resists soldering iron damage.
- Optional cover available.

SPECIFICATIONS

Contact Resistance: 5 milliohms (max.).

Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Operating Temperature: −55°C to +150°C.

Materials: (Mounting Boards)

Insulator: Glass phenolic per MIL-M-14, MHF. Color, black.

Contacts: Phosphor bronze per QQ-B-750.

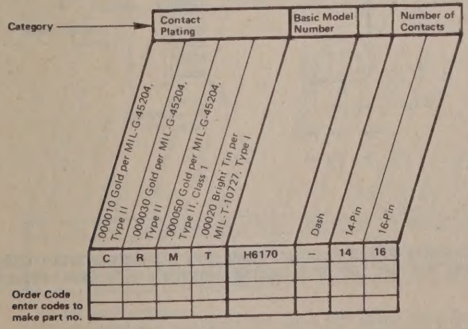
Plating:

Gold plated per MIL-G-45204, Type II. Tin plated per MIL-T-10727, Type I. (See "How to Order.")

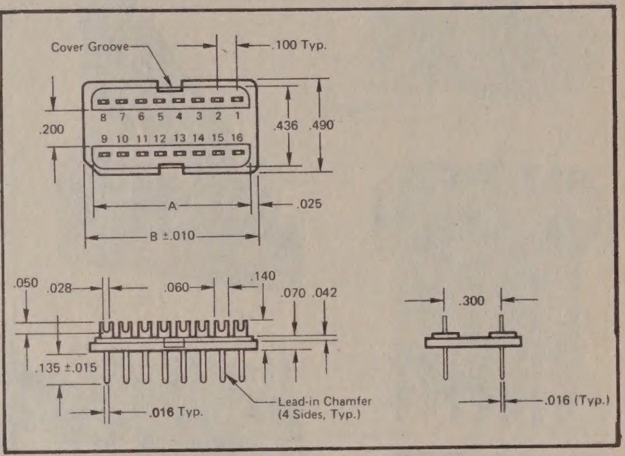
Material: (Cover)

Thermoplastic glass-filled polyester. Color, black.

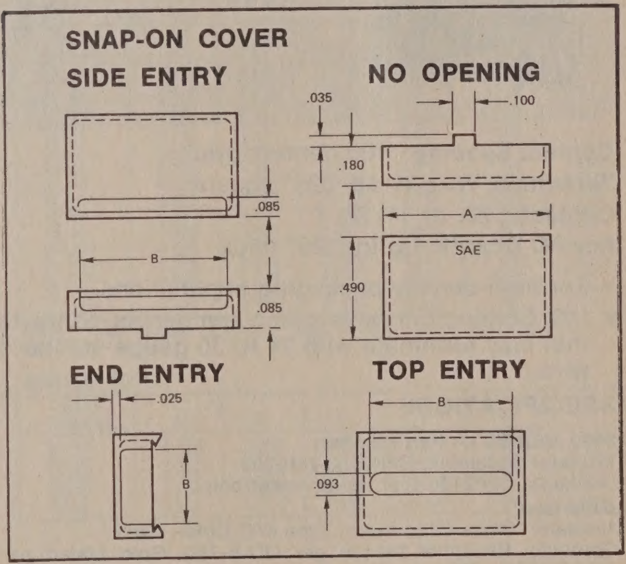
HOW TO ORDER (Select One from Each Category)


Category
Contact Plating
Basic Model Number
Number of Contacts
000010 Gold per MIL-G-45204, Type II
000030 Gold per MIL-G-45204, Type II
000050 Gold per MIL-G-45204, Type II, Class 1
00020 Bright Tin per MIL-T-10727, Type I
Dash
14-Pin
16-Pin
C
R
M
T
H6170
–
14
16
Order Code enter codes to make part no.

COMPONENT MOUNTING BOARD


Cover Groove
.100 Typ.
8 7 6 5 4 3 2 1
9 10 11 12 13 14 15 16
.200
.436
.490
A
.025
B ±.010
.050
.028
.060
.140
.070
.042
.135 ±.015
.016 Typ.
Lead-in Chamfer (4 Sides, Typ.)
.300
.016 (Typ.)

	A	B		A	B
14-Pin	.731	.785	16-Pin	.831	.885


SNAP-ON COVER
SIDE ENTRY
NO OPENING
.035
.100
.180
.085
A
B
SAE
.490
.085
END ENTRY
TOP ENTRY
.025
B
B
.093

14-PIN

Part No.	Cable Entry Location	A	B
14C6170-180E	End	.785	.350
14C6170-180S	Side	.785	.692
14C6170-180T	Top	.785	.692
14C6170-180	None	.785	N/A

16-PIN

Part No.	Cable Entry Location	A	B
16C6170-180E	End	.885	.350
16C6170-180S	Side	.885	.792
16C6170-180T	Top	.885	.792
16C6170-180	None	.885	N/A

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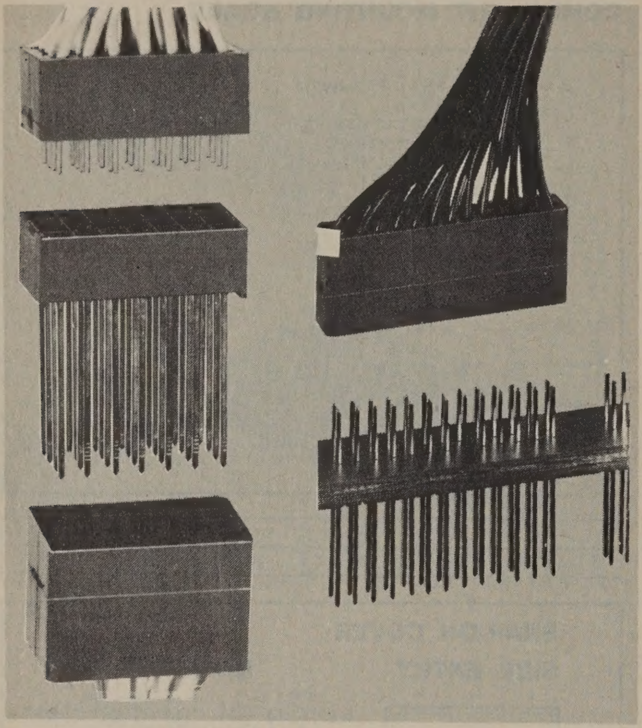
Engineering

I/O Connectors

.100 GRID CENTERS
SERIES 2100, 2500 and 2700



Contact Spacing: .100 centers grid
Terminals: Wire-Wrap .025″ square
Contacts: 28, or 14, 26, 7
For PC Boards: Up to .125″ thick

- For high-density packaging applications.
- I/O Connectors have crimp removable contacts that may terminate with 24 to 30 gauge standard wire.

SPECIFICATIONS

2100 SERIES — Part Number:
Insulator Assembly: CFP2100-28B-390
Contacts: CFP2100 (For replacement only).

Materials:
Insulator: Glass-filled nylon, Type 6/6. Color, black.
Contacts: Phosphor bronze per QQ-B-750. Gold plated per MIL-G-45204. Type II, Class 1.

2500 SERIES — 28 OR 14 CONTACTS — Part Number:
Insulator: IJ2500-28
Contact: MP2500 (Accepts 24 to 30 gauge wire).
Crimp Tool: MC2500 Extraction Tool: ME2500

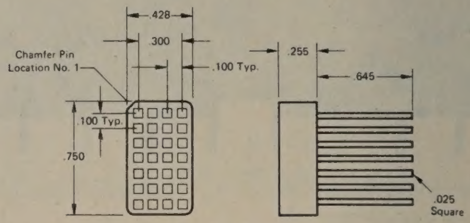
Materials:
Insulator: Glass-filled nylon, Type 6. Color, black.
Contacts: Phosphor bronze per QQ-B-750. Gold plated per MIL-G-45204. Type II, Class 1.

2500 SERIES — 7 OR 26 CONTACTS — Part Number:
Insulator: IJ2500-7S

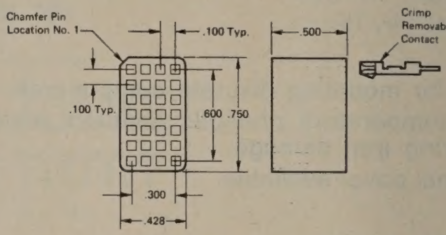
2700 SERIES — Part Number:
Insulator: MP2700-28 or -14.
Contact: PMP2700 (Accepts 24 to 30 gauge wire).
Crimp Tool: MS3198-1 Extraction Tool: 2700

Materials:
Insulator: Glass-filled nylon, Type 6. Color, black.
Contacts: Leaded copper. Gold plated per MIL-G-45204. Type II, Class 1.

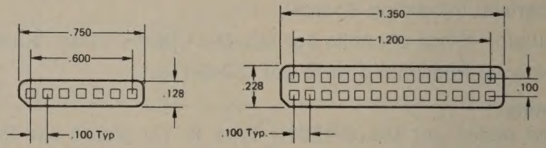
2100 SERIES — 28 OR 14 CONTACTS
(Available with mounting ear option)


.428
.300
Chamfer Pin Location No. 1
.100 Typ.
.100 Typ.
.750
.255
.645
.025 Square

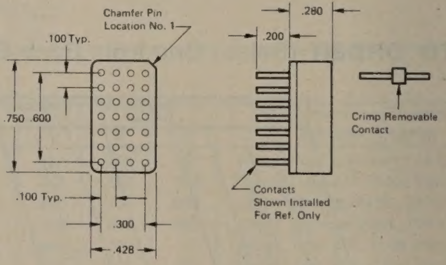
2500 SERIES — 28 OR 14 CONTACTS


Chamfer Pin Location No. 1
.100 Typ.
.500
Crimp Removable Contact
.100 Typ.
.600
.750
.300
.428

2500 SERIES — 7 OR 26 CONTACTS*


.750
.600
.128
.100 Typ
1.350
1.200
.228
.100
.100 Typ.

2700 SERIES — 28 OR 14 CONTACTS


Chamfer Pin Location No. 1
.100 Typ.
.280
.200
.750
.600
Crimp Removable Contact
.100 Typ.
Contacts Shown Installed For Ref. Only
.300
.428

*The 2500 Series -27 and -7 contact connectors will mate with any .025 sq. pin. (.200″ long min.) on .100″ grid spacing compatible with these configurations.

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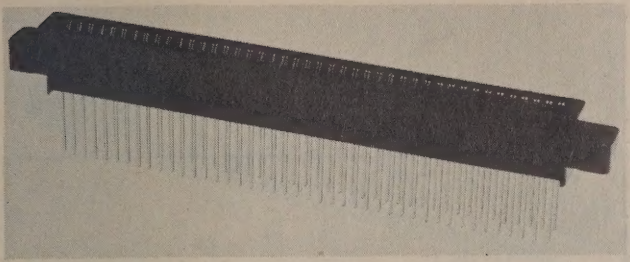
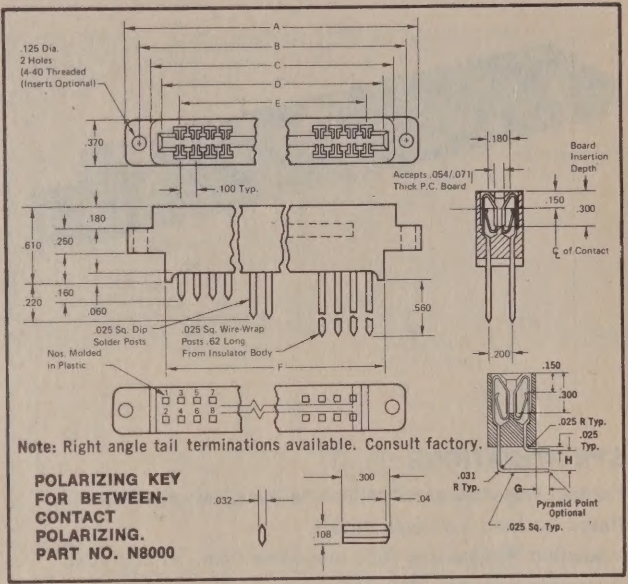
Add Dept. EM to address to tell them you saw it in eem

PC Connectors

.100 CONTACT CENTERS
SERIES 7000/7001





Note: Right angle tail terminations available. Consult factory.

POLARIZING KEY FOR BETWEEN-CONTACT POLARIZING. PART NO. N8000

Contact Spacing: .100 centers
Terminals:
Wire-Wrap: .025″ sq. x .62″
Dip Solder: .025″ sq. x .220″ or .018″ sq. x .160″
Pairs/Contacts: 10/20 thru 70/140
For PC Boards: .062 thick

- Bifurcated bellows contacts.
- Extra-large chamfer board entry.
- Replaceable contacts.
- In-between contact polarizing.
- Insulator stand-off for solder flux flushing.
- Increased contact wiping length on PC board.

SPECIFICATIONS

Contact Resistance: 30 mV (max.) at rated current.
Rated Current: 3 amps.
Insulation Resistance: 5000 megohms, minimum.
Operating Voltage: 600 VDC at sea level.
Operating Temperature: −55°C to +150°C.
Materials:
Insulator: Phenolic. Color, black.
Alternate Material: Diallyl phthalate. Color, green.
Contacts: Phosphor bronze per QQ-B-750. Gold plated per MIL-G-45204 Type II.
Polarizing Key: Glass-filled nylon, type 6/6.
Threaded Insert (optional): Stainless steel, passivated.

Note: Two dimensional configurations of this connector series are available for design flexibility. Comparison between tables for 7000 and 7001 Series Connectors reflects the difference between the two basic units. Dimensions affected are: A — overall length, B — center-to-center mounting, C — shoulder dimension, and F — base dimension, terminal side. Two charts are shown for easier reference.

SERIES 7000

Pairs/ Contacts	A	B	C	D	E	F
10/20	1.835	1.575	1.260	1.100	0.900	1.150
15/30	2.335	2.075	1.760	1.600	1.400	4.650
20/40	2.835	2.575	2.260	2.100	1.900	2.150
22/44	3.035	2.775	2.460	2.300	2.100	2.350
25/50	3.335	3.075	2.760	2.600	2.400	2.650
28/56	3.635	3.375	3.060	2.900	2.700	2.950
30/60	3.835	3.575	3.260	3.100	2.900	3.150
35/70	4.335	4.075	3.760	3.600	3.400	3.650
36/72	4.435	4.175	3.860	3.700	3.500	3.750
40/80	4.835	4.575	4.260	4.100	3.900	4.150
43/86	5.135	4.875	4.560	4.400	4.200	4.450
50/100	5.835	5.575	5.260	5.100	4.900	5.150
55/110	6.350	6.075	5.760	5.600	5.400	5.650
60/120	6.835	6.575	6.260	6.100	5.900	6.150
65/130††	7.335	7.075	6.760	6.650	6.400	6.570
70/140	7.835	7.575	7.260	7.100	6.900	7.150

††Basic model number should be 7008 for this configuration. Consult factory for other layouts.

SERIES 7001

Pairs/ Contacts	A	B	C	D	E	F
22/44	3.110	2.850	2.550	2.300	2.100	2.530
25/50	3.410	3.150	2.850	2.600	2.400	2.830
30/60	3.910	3.650	3.350	3.100	2.900	3.330
36/72	4.510	4.250	3.950	3.700	3.500	3.930
43/86	5.210	4.950	4.650	4.400	4.200	4.630

HOW TO ORDER (Select One from Each Category)

Category		Order Code
Contact Plating	Commercial .00001 Gold	C
	Military .00003 Gold	M
Insulator Material	Phenolic	PH
	Diallyl Phthalate	DP
Basic Model Number	See note below	7000
	See note below	7001
	**	7002
	Dash	—
Number of Contacts	10 Double row	20†
	20 Double row	40†
	22 Double row	44
	25 Double row	50
	28 Double row	56†
	30 Double row	60
	35 Double row	70
	36 Double row	72
	40 Double row	80
	43 Double row	86
	50 Double row	100
	60 Double row	120
	65 Double row	130†
	70 Double row	140†
Mounting	Standard .125 Hole in Ears	*
	4-40 Threaded insert	T
	No Mounting Ears	NE
Terminals	.025″ sq. X .62″ long Wire-Wrap tails	*
	.025″ sq. X .220″ long Dip Solder Tails	ST
	.018″ sq. X .160″ long Dip Solder Tails	CST

Order Code
Enter Codes to
Make Part No.

Right Angle

**	G	H
R23	.100	.150
R24	.100	.200
R33	.150	.150
R34	.150	.200

†7000 Series only.
*If you want this configuration, leave this space blank in Part Number.
**Flush mounting ears, consult factory for available layouts.

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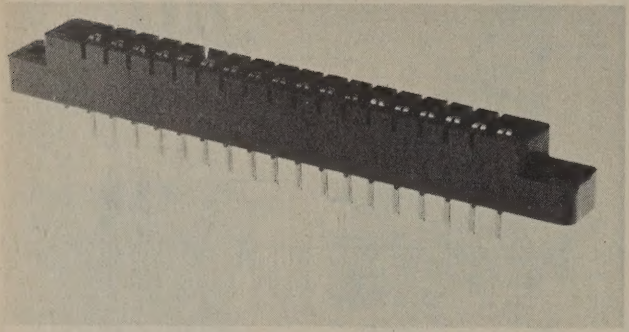
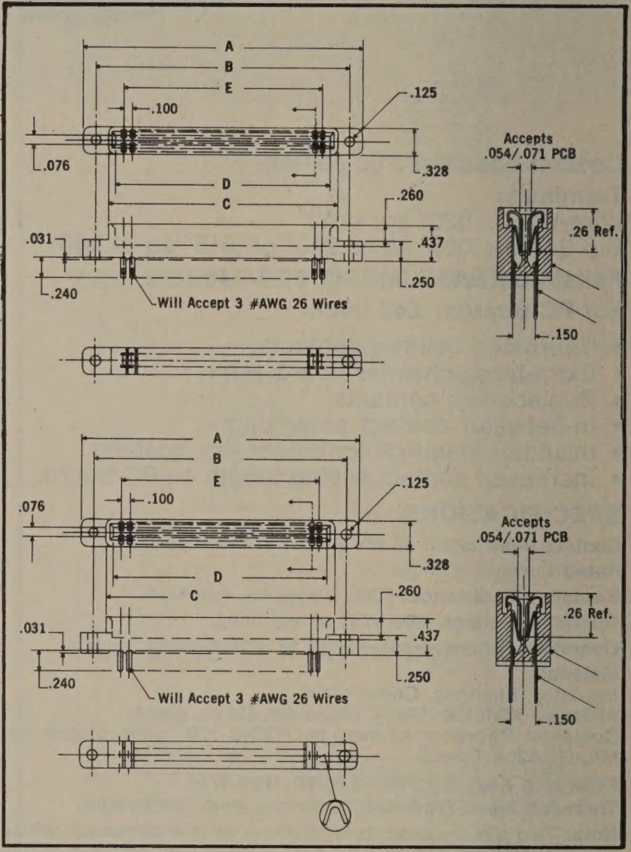
PC Connectors

.100 CONTACT CENTERS
SERIES SEC/SEM





Part No.	A	B	C	D	E
SE* 22D/**	3.075	2.275	2.475	2.307	2.100
SE* 25D/**	3.375	3.075	2.767	2.600	2.400

SPECIFICATIONS

Contact Resistance: 6.0 milliohms (max.) at rated current.

Rated Current: 5.0 amps (max.).

Insulation Resistance; 5000 megohms (min.) at 500 VDC.

Operating Voltage: 1800 VAC at sea level.

Operating Temperature: −55°C to +150°C.

Materials:

Insulator: Diallyl phthalate per MIL-M-14, Type SDG. Color, Green.

Contact: Phosphor bronze per QQ-B-750.

Contact Plating: Gold plate per MIL-G-45204, Type II over 0.000050 min. nickel.

Polarizing Key: Glass filled nylon polyamide, natural.

Thread Insert (Optional): Stainless steel.

How To Order (Select One From Each Category)

Category →	Basic Part Number	Gold Plating Option		Contact Configuration		Terminal		Mounting Styles	
		.000010 Gold per MIL-G-45204, Type II	.000030 Gold per MIL-G-45204, Type II	22 Dual Contacts	25 Dual Contacts	Pierced Eyelet	Dip Solder	.125 Diameter Clearance Hole	#4-40 Threaded Inserts
	SE†	C	M	22D	25D	/1	/2	-2	-3
Order Code Enter Code to Make Part No.									

†These configurations are presently tooled. More configurations may be available, consult factory.

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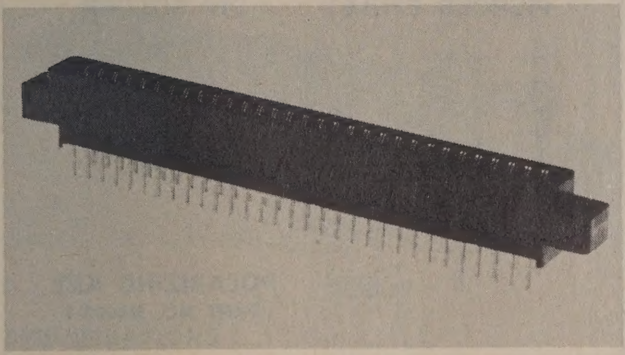
PC Connectors

.125 CONTACT CENTERS
SERIES 8100



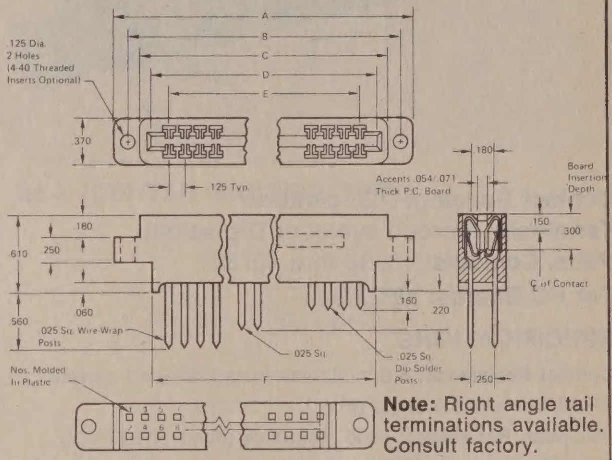
Contact Spacing: .125 centers
Terminals:
Wire-Wrap: .025″ sq. x .62″
Dip Solder: .025″ sq. x .160″ or .220″
Pairs/Contacts: 15/30 thru 50/100
For PC Boards: .062 thick

- Bifurcated bellows contacts.
- Extra-large chamfer board entry.
- Stand-off for solder flux flushing.
- Increased contact wiping length on PC board.
- Replaceable contact.

SPECIFICATIONS

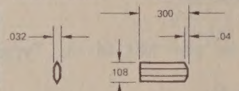
Contact Resistance: 30 MV (max.) at rated current.
Rated Current: 3 amps.
Insulation Resistance: 5000 megohms, minimum.
Operating Voltage: 600 VDC at sea level.
Operating Temperature: −55°C to +150°C.

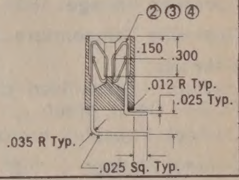
Materials:
Insulator: Phenolic. Color, black.
Alternate Material: Diallyl phthalate. Color, green.
Contacts: Phosphor bronze per QQ-B-750. Gold plated per MIL-G-45204, Type II.
Polarizing Key: Glass-filled nylon Type 6/6.


A
B
C
D
E
.125 Dia.
2 Holes
(4-40 Threaded
Inserts Optional)
.370
.125 Typ.
.180
Accepts .054/.071
Thick P.C. Board
Board
Insertion
Depth
.180
.250
.610
.150
.300
℄ of Contact
.060
.560
.025 Sq. Wire-Wrap
Posts
.025 Sq.
.160
.220
.025 Sq.
Dip Solder
Posts
F
.250
Nos. Molded
In Plastic
1 3 5 7
2 4 6 8

Note: Right angle tail terminations available. Consult factory.

POLARIZING KEY FOR BETWEEN CONTACT POLARIZING


.300
.032
.04
.108


②③④
.150
.300
.012 R Typ.
.025 Typ.
.035 R Typ.
.025 Sq. Typ.

PART NO. N8000

Pairs/ Contacts	A	B	C	D	E	F
15/30	2.680	2.420	2.160	2.000	1.750	2.000
22/44	3.555	3.295	3.035	2.875	2.625	2.875
28/56	4.305	4.045	3.785	3.625	3.375	3.625
30/60	4.555	4.295	4.035	3.875	3.625	3.875
31/62	4.680	4.420	4.160	4.000	3.750	4.000
35/70	5.180	4.920	4.660	4.500	4.250	4.500
36/72	5.305	5.045	4.785	4.625	4.375	4.625
40/80	5.805	5.545	5.285	5.125	4.875	5.125
43/86	6.180	5.920	5.660	5.500	5.250	5.500
50/100	7.055	6.795	6.536	6.375	6.125	6.375

How To Order (Select One From Each Category)

Category	Contact Plating		Insulator Material		Basic Model Number		Number of Contacts										Mounting			Terminals		
	Commercial .00001 Gold	Military .00003 Gold	Phenolic	Diallyl Phthalate		Dash	15 Double row	22 Double row	28 Double row	30 Double row	31 Double row	35 Double row	36 Dobule row	40 Double row	43 Double row	50 Double row	Standard 125'' Mounting Holes	4-40 Threaded Insert	No Mounting Ears	.025'' sq. X 62'' long Wire-Wrap Tails	.025'' sq. X .220'' long Wire-Wrap	.025'' sq. X .160'' long Dip Solder Tails
	C	M	PH	DP	8100	–	30	44	56	60	62	70	72	80	86	100	*	T	NE	*	ST	SST
					8100	–											•			•		
Order Code enter codes to make part no.					***8102																	

*If you want this configuration, leave this space blank in Part Number.
***For flush mounting bar consult factory for available layouts.

Right Angle Option

**	G	H
R23	.100	.150
R24	.100	.200
R33	.150	.150
R34	.150	.200

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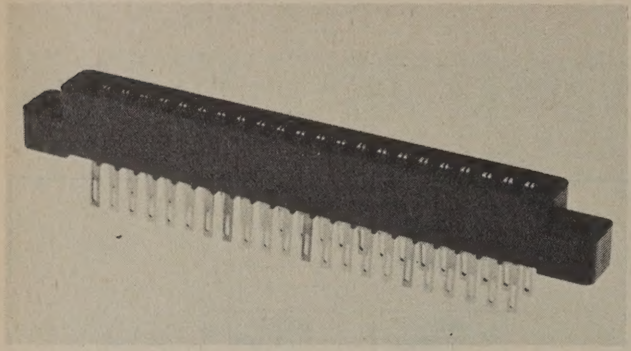
Stanford Applied Engineering

PC Connectors

.125 CONTACT CENTERS
SERIES SBC/SBM



Contact Spacing: .125 centers
Terminals: Pierced eyelet or Dip solder
Pairs/Contacts: 18/36 thru 40/80
For PC Boards: .062 thick

SPECIFICATIONS

Contact Resistance: 6.0 milliohms (max.) at rated current.

Rated Current: 5.0 amps (max.).

Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Operating Voltage: 1800 VAC at sea level.

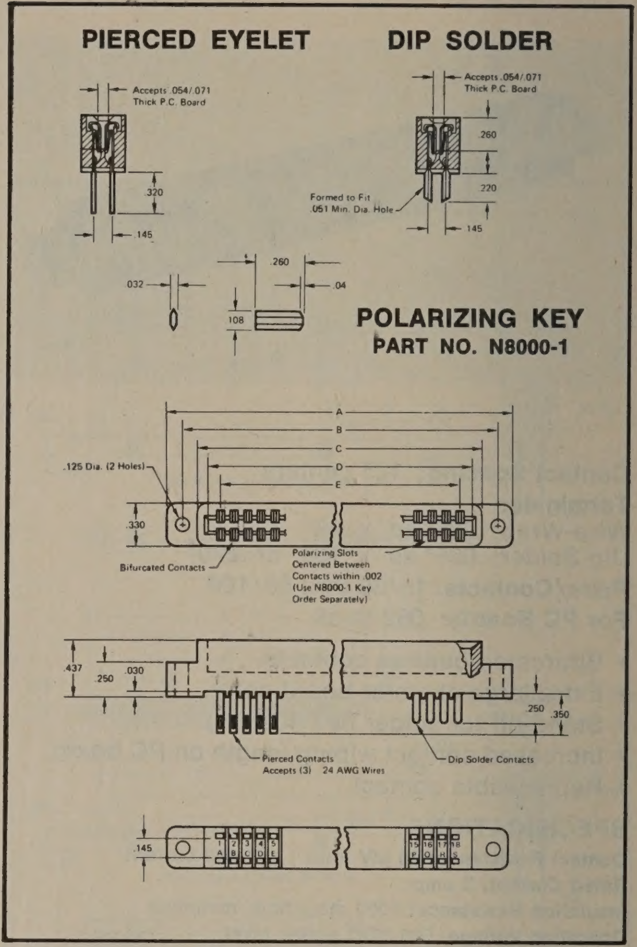
Operating Temperature: −55°C to +150°C.

Materials:
Insulator: Glass-filled diallyl phthalate per MIL-M-14, Type SDG-F. Color, green.
Contact: Phosphor bronze per QQ-B-750.

Contact Plating:
Gold plate per MIL-G-45204, Type II over .000050 nickel min.

Polarizing Key: Glass-filled nylon polyamide, natural.

Threaded Insert (optional): Stainless steel.


PIERCED EYELET
DIP SOLDER
Accepts .054/.071 Thick P.C. Board
.320
.145
Accepts .054/.071 Thick P.C. Board
.260
.220
Formed to Fit .051 Min. Dia. Hole
145
.260
032
.04
108
POLARIZING KEY
PART NO. N8000-1
A
B
C
D
E
.125 Dia. (2 Holes)
.330
Bifurcated Contacts
Polarizing Slots Centered Between Contacts within .002 (Use N8000-1 Key Order Separately)
.437
.250
.030
.250
.350
Pierced Contacts Accepts (3) 24 AWG Wires
Dip Solder Contacts
.145
1 2 3 4 5
A B C D E
15 16 17 18
P O H S

Part No.	Number of Contact Positions	A	B	C	D	E
SB* 18D/**	18/36	3.055	2.795	2.535	2.375	2.125
SB* 22D/**	22/24	3.555	3.295	3.035	2.875	2.625
SB* 28D/**	28/56	4.305	4.045	3.785	3.625	3.375
SB* 36D/**	36/72	5.305	5.054	4.785	4.625	4.375
SB* 40D/**	40/80	5.805	5.545	5.285	5.125	4.875
SB* 50D/**	50/100	7.005	6.795	6.535	6.375	6.125

HOW TO ORDER (Select One from Each Category)

Category →	Basic Part Number	Contact Plating		Number of Contacts						Terminals		Mounting Style	
		.000010 Gold per MIL-G-45204, Type II	.000030 Gold per MIL-G-45204, Type II	18 Double rows	22 Double rows	28 Double rows	36 Double rows	40 Double rows	50 Double rows	Pierced eyelet	Dip solder	.125" dia. Clearance Holes	#4-40 Threaded Inserts
	SB	C	M	18D	22D	28D	36D	40D	50D	/1	/2	-2	-3
Order Code enter codes to make part no.	SB												

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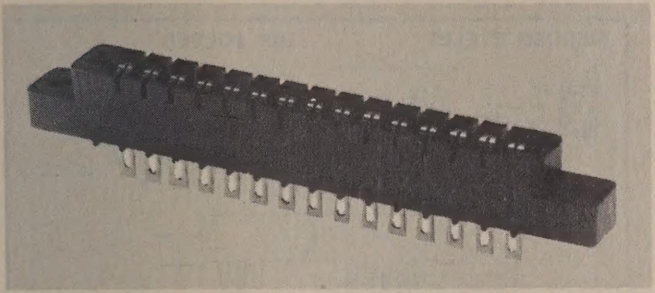
.156 CONTACT CENTERS
SERIES SAC/SAM and BSA



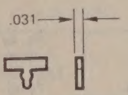
SPECIFICATIONS

Contact Resistance: 30 MV (max.) at rated current.
Rated Current: 5 amps.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.
Operating Voltage: 1800 VAC at sea level.
Operating Temperature: −55°C to +150°C.

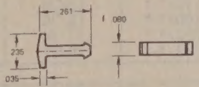
Materials:

Insulator:
6 thru 22 Positions: Green diallyl phthalate per MIL-M-14, Type SDG.
28 thru 43 Positions: Black, general purpose phenolic.
Contacts: Phosphor bronze per QQ-B-750. Gold plated over .000050 nickel (see "How to Order").
Polarizing Keys: Glass-filled nylon, Type 6/6.
Threaded Insert (optional): Stainless steel, passivated.

POLARIZING KEYS



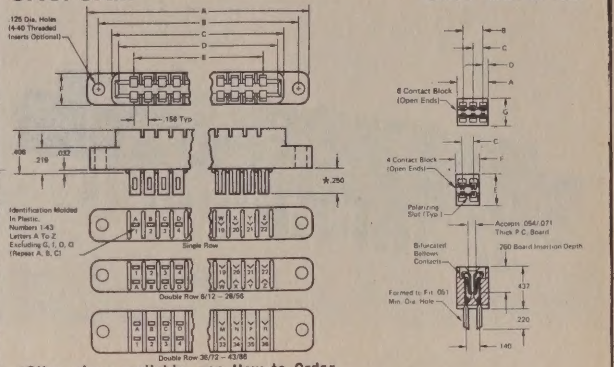
Between-Contact
PART NO. 007900
Requires .040 ±.003 wide PC board slot.
Material: Nylon Type 6/6, Fed. Std 5.95. Color 23690 (Typ).


.261
.080
.235
.035

In-Contact
PART NO. 057-001-0002
Requires .090 ±.003 wide PC board slot.
Material: Nylon Type 6/6, Fed. Std 5.95. Color 23690 (Typ).

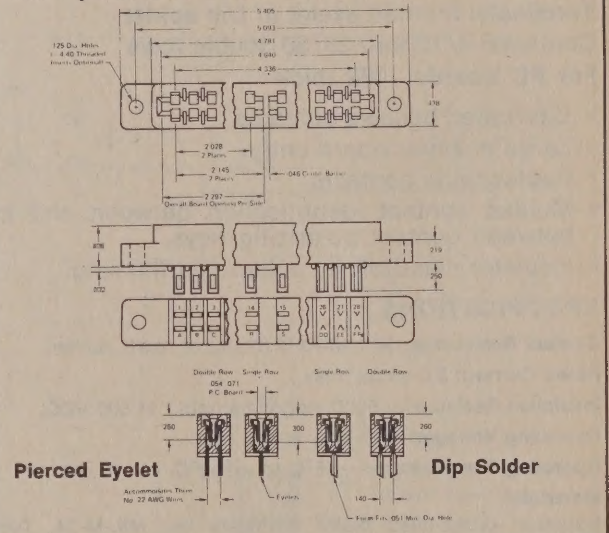
SAC/SAM

SAC 2D & 3D


.125 Dia. Holes (4-40 Threaded Inserts Optional)
A
B
C
D
E
F
.156 Typ
.406
.032
.219
.250
Identification Molded In Plastic. Numbers 1-43 Letters A To Z Excluding G, I, O, Q (Repeat A, B, C)
Single Row
Double Row 6/12 – 28/56
Double Row 36/72 – 43/86
6 Contact Block (Open Ends)
4 Contact Block (Open Ends)
G
Polarizing Slot (Typ.)
Accepts .054/.071 Thick P.C. Board
.260 Board Insertion Depth
Bifurcated Bellows Contacts
Formed to Fit .051 Min. Dia. Hole
.437
.220
.140

*Other sizes available, see How to Order.

BSA (CENTER BARRIER TYPE)


5.405
5.093
4.781
4.640
4.336
.125 Dia. Holes (4-40 Threaded Inserts Optional)
.478
2.028 2 Places
2.145 2 Places
.046 Center Barrier
2.297 Overall Board Opening Per Side
.406
.219
.250
.032
Double Row
Single Row
Single Row
Double Row
.054/.071 P.C. Board
.260
.300
.260
Accommodates Three No. 22 AWG Wires
Eyelets
.140
Form Fits .051 Min. Dia. Hole

Pierced Eyelet

Dip Solder

Number of Contacts Single	Number of Contacts Double	A	B	C	D	E	F	G
6	6/12	1.781	1.531	1.218	1.078	.780	.328	
10	10/20	2.406	2.156	1.843	1.703	1.404	.328	
15	15/30	3.187	2.937	2.624	2.484	2.184	.328	
18	18/36	3.656	3.406	3.093	2.953	2.652	.328	
22	22/44	4.281	4.031	3.717	3.578	3.276	.328	
	28/56	5.214	4.964	4.652	4.532	4.212	.438	
	36/72	6.469	6.219	5.906	5.778	5.460	.438	
	43/86	7.552	7.302	7.000	6.802	6.552	.438	
SAC 2D or 3D		.462	.312	.156	.075	.328	.306	.328

HOW TO ORDER (Select One from Each Category)

Category		Code
Basic Model Number		SA
		BSA**
Contact Plating	.00001 Gold Over Nickel	C
	.00003 Gold Over Nickel	M
Number of Contacts Per Row	Contacts Per Row (Open Slot)*	2
	Contacts Per Row (Open Slot)*	3
	Contacts Per Row	6
	Contacts Per Row	10
	Contacts Per Row	15
	Contacts Per Row	18
	Contacts Per Row	22
	Contacts Per Row*	28
	Contacts Per Row*	36
	Contacts Per Row*	43
Number Rows	Single (6-22 Only)	S
	Double	D
		/
Terminals	Pierced Eyelet	1
	Dip Solder .250" long x .051" dia.	2
	Dip Solder .250" long x .040" dia.	3
	Dip Solder .437" long x .051" dia.	4
	Dip Solder .437" long x .040" dia.	5
	Dip Solder .218" long x .051" dia.	6
	Dip Solder .218" long x .040" dia.	7
	Dip Solder .156" long x .051" dia.	8
	Dash	—
Mounting Style	.125" dia. Mounting Hole	2
	#4-40 Threaded Insert	3
	No Mounting Ears	NE
	Open Slot (SAC2 or 3D Only)	OS

Order Code enter codes to make part no.

*Available only in Double Row.
*Available 28 Double only.

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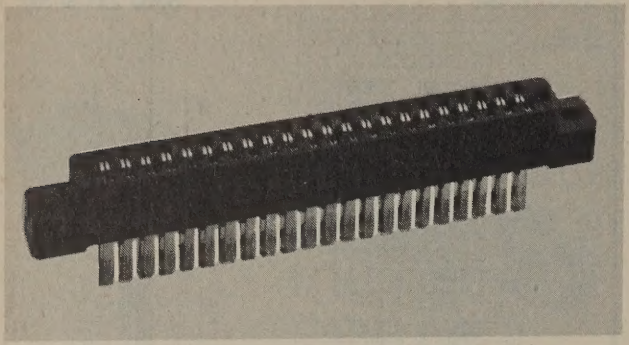
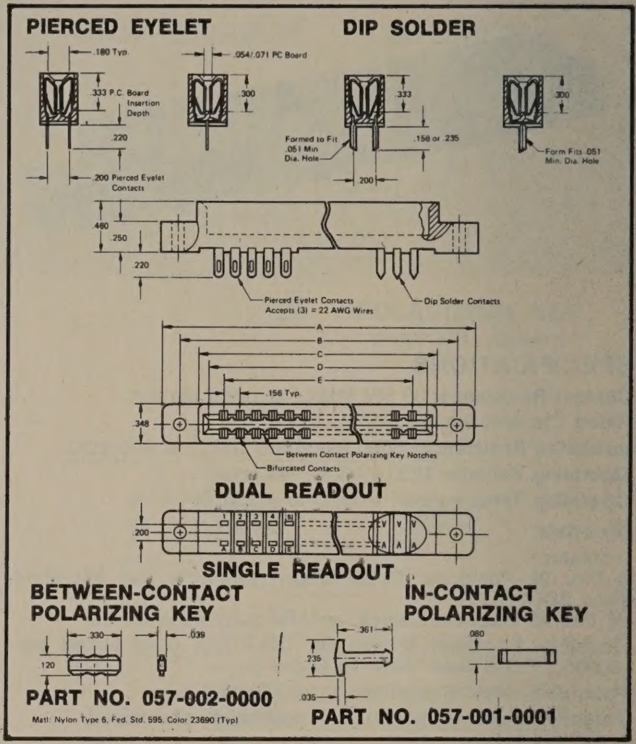
PC Connectors

.156 CONTACT CENTERS
DIMENSIONS TO MIL-C-21097C
SERIES SCC/SCM




PIERCED EYELET
DIP SOLDER
.180 Typ.
.054/.071 PC Board
.333 P.C. Board Insertion Depth
.300
.220
.200 Pierced Eyelet Contacts
.333
Formed to Fit .051 Min Dia. Hole
.156 or .235
.200
.300
Form Fits .051 Min. Dia. Hole
.460
.250
.220
Pierced Eyelet Contacts Accepts (3) = 22 AWG Wires
Dip Solder Contacts
A
B
C
D
E
.156 Typ.
.348
Between Contact Polarizing Key Notches
Bifurcated Contacts
DUAL READOUT
1
2
3
4
5
A
B
C
D
E
V
A
.200
SINGLE READOUT
BETWEEN-CONTACT POLARIZING KEY
.330
.039
.120
PART NO. 057-002-0000
Matl: Nylon Type 6, Fed. Std. 595. Color 23690 (Typ)
IN-CONTACT POLARIZING KEY
.361
.235
.035
.080
PART NO. 057-001-0001

Contact Spacing: .156 centers
Terminals: Pierced eyelet or Dip solder
Contacts: 6/12 thru 25/50 double rows
For PC Boards: .062 thick

- Bifurcated bellows contacts.
- Large chamfer board entry.
- Replaceable contacts.
- Molded contact identification between and in-between contact polarizing keys.
- Insulator stand-off for solder flux flushing.

SPECIFICATIONS

Contact Resistance: 30 millivolts (max.) at rated current.

Rated Current: 5.0 amps (max.).

Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Operating Voltage: 1800 VAC at sea level.

Operating Temperature: −55°C to +150°C.

Materials:

Insulator: Glass-filled diallyl phthalate per MIL-M-14, Type SDG-F. Color, green.

Contact: Phosphor bronze per QQ-B-750. Beryllium-copper available. Consult factory.

Contact Plating:

Gold plate per MIL-G-45204, Type II over .000050 nickel min. (see "How to Order").

Polarizing Key: Glass-filled nylon polyamide, natural.

Threaded Insert (optional): Stainless steel.

Part No.	No. of Contacts Each Row/ Total	A	B	C	D	E
SC* 6D/*-*	6/12	1.785	1.531	1.239	1.100	.780
SC* 10D/*-*	10/20	2.410	2.156	1.864	1.724	1.404
SC* 12D/*-*	12/24	2.723	2.468	2.176	2.036	1.716
SC* 15D/*-*	15/30	3.191	2.938	2.645	2.504	2.184
SC* 18D/*-*	18/36	3.660	3.406	3.114	2.972	2.652
SC* 22D/*-*	22/44	4.285	4.032	3.739	3.596	3.276
SC* 25D/*-*	25/50	4.754	4.500	4.208	4.064	3.744

Part No.	No. of Contacts Single Row	A	B	C	D	E
SC* 6S/*-*	6	1.781	1.531	1.218	1.100	.780
SC* 10S/*-*	10	2.406	2.156	1.843	1.724	1.404
SC* 15S/*-*	15	3.187	2.937	2.624	2.504	2.184
SC* 18S/*-*	18	3.656	3.406	3.093	2.972	2.652
SC* 22S/*-*	22	4.281	4.031	3.717	3.598	3.276
SC* 25S/*-*	25	4.754	4.500	4.688	4.064	3.744

HOW TO ORDER (Select One from Each Category)

Category →		
Basic Part No.		SC
Contact Plating	.00001 Gold Over Nickel	C
	.00003 Gold Over Nickel	M
No. of Contacts	Contacts Per Row	6
	Contacts Per Row	10
	Contacts Per Row — Double Row Only	12
	Contacts Per Row	15
	Contacts Per Row	18
	Contacts Per Row	22
	Contacts Per Row	25
	Single	S
	Double	D
	Slant	/
Terminals	Pierced Eyelet	1
	.156" Long Dip Solder	2
	.235" Long Dip Solder	3
	Extender Type	4
	.156" Long Dip Solder Flat With .140" Row to Row	5
	.156" Long Dip Solder Flat Without Retaining Barb	6
	.156" Long Dip Solder Flat With Retaining Barb	7
	Dash	—
Mounting Style	No Mounting Ears	1
	.128" Dia. Holes in Ears	2
	#4-40 Threaded Insert	3
	.142" Dia. Holes in Ears	4

Order Code enter codes to make part no.

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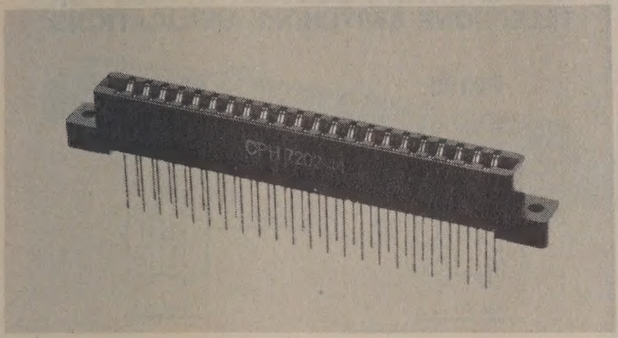
PC Connectors

.156 CONTACT CENTERS
SERIES 7202



SPECIFICATIONS

Contact Resistance: 30 millivolts (max.) at rated current.

Rated Current: 3 amps.

Insulation Resistance: 5000 megohms, min.

Operating Voltage: 600 VDC at sea level.

Operating Temperature: −55°C to +150°C.

Materials:

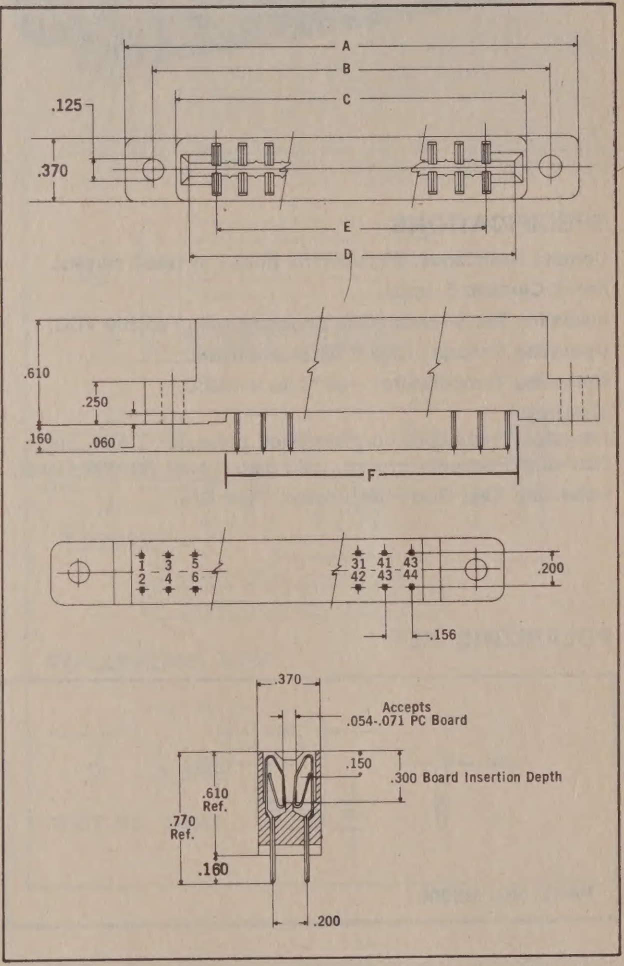
Insulator: Phenolic. Color, black.

Alternate Material: Diallyl phthalate. Color, green.

Contacts: Phosphor bronze per QQ-B-750. Gold plated per MIL-G-45204, Type II.

Polarizing Key: Glass-filled nylon, Type 6/6.

Threaded Insert (optional): Stainless steel, passivated.



Part No.	Contact ID	A	B	C	D	E	F
CPH7202-44	1-44	4.348	4.030	3.748	3.596	3.276	3.465
CPH7202-72	1-72	6.532	6.214	5.932	5.780	5.460	5.650

HOW TO ORDER (Select One from Each Category)

Category →	Contact Plating		Insulator Material		Basic Part No.				No. of Contacts		Mounting Style			Terminals	
	.000010 Gold	.000030 Gold	Phenolic Insulator Body	Diallyl Phthalate					22 Double	36 Double	Standard .125 Through Hole	Threaded Insert	No Mounting Ears	.025 x .062 Wire Wrap	DIP Solder Tail
	C	M	PH	DP	7	2	0	2	44	72	†	T	NE		ST
Order Code Enter Codes to Make Part No.															

†Other configurations may be tooled. Consult factory.

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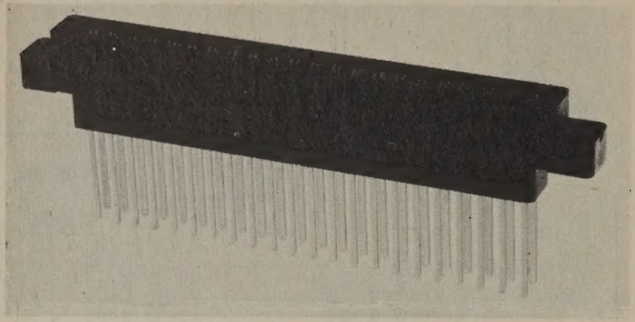
PC Connectors

.156 CONTACT CENTERS
SERIES P9000 (.031″ x .062″ TAIL SIZE)



SPECIFICATIONS

Contact Resistance: 30 millivolts (max.) at rated current.

Rated Current: 5 amps.

Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Operating Voltage: 1800 VAC at sea level.

Operating Temperature: −55°C to +150°C.

Materials:

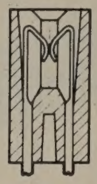
Insulator: Thermoplastic glass-filled polyester. Color, black.

Contacts: Phosphor bronze, gold plated over .000050 nickel.

Polarizing Key: Glass-filled nylon, Type 6/6.

NEW SHORTING CONTACT STYLES FOR TELEPHONE SWITCHING APPLICATIONS

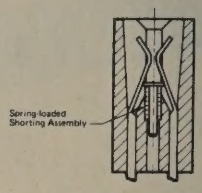
P9100



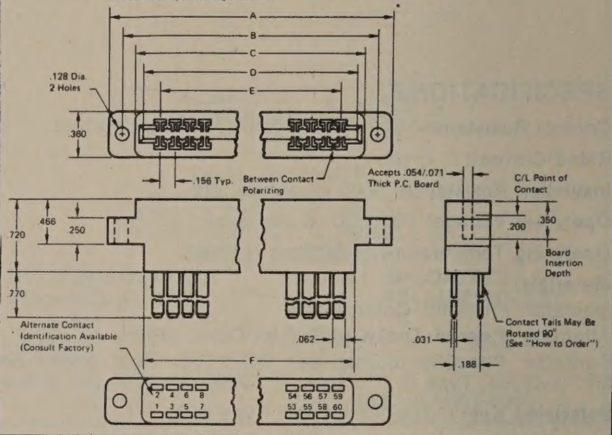
Shorts out after board disengagement

(*) Consult Factory for ordering information.

P9200

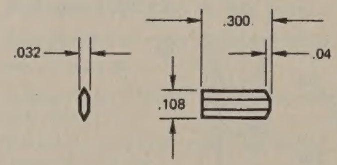

Spring-loaded Shorting Assembly

Shorts out prior to board disengagement


A
B
C
D
E
.128 Dia. 2 Holes
.360
.156 Typ.
Between Contact Polarizing
Accepts .054/.071 Thick P.C. Board
C/L Point of Contact
.350
.200
Board Insertion Depth
.466
.250
.720
.770
Alternate Contact Identification Available (Consult Factory)
.062
.031
Contact Tails May Be Rotated 90° (See "How to Order")
.188
F
2 4 6 8
1 3 5 7
54 56 57 59
53 55 58 60

No. of Contacts	A	B	C	D	E	F
10/20	2.406	2.158	1.876	1.724	1.404	1.614
12/24	2.720	2.468	2.176	2.035	1.716	1.916
15/30	3.187	2.938	2.656	2.504	2.184	2.384
18/36	3.654	3.406	3.124	2.972	2.652	2.852
22/44	4.278	4.030	3.748	3.596	3.276	3.476
30/60	5.526	5.278	4.996	4.844	4.524	4.724

POLARIZING KEY


.032
.300
.04
.108

PART NO. N8000

HOW TO ORDER (Select One from Each Category)

Category →	Contact Plating			Basic Model Number	Terminals			Number of Contacts					
	.000010 Gold per MIL-G-45204, Type II	.000030 Gold per MIL-G-45204, Type II	.000050 Gold per MIL-G-45204, Type II, Class 1		Contact tails located as shown in drawing	Contact tails rotated 90° from position in drawing	Dash	10 Double row	12 Double row	15 Double row	18 Double row	22 Double row	30 Double row
	C	R	M	P900	0	2	—	20	24	30	36	44	60
Order Code enter codes to make part no.													

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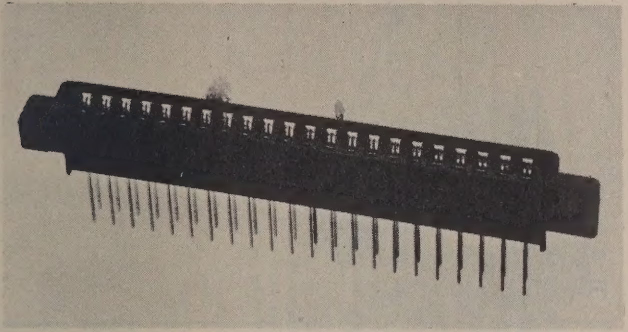
PC Connectors

.156 CONTACT CENTERS
SERIES SAW



Contact Spacing: .156 centers
Terminals: Wire-Wrap
Pairs/Contacts: 22/44
For PC Boards: .062 thick

SPECIFICATIONS

Contact Resistance: 30 millivolts (max.) at rated current.

Rated Current: 5 amps.

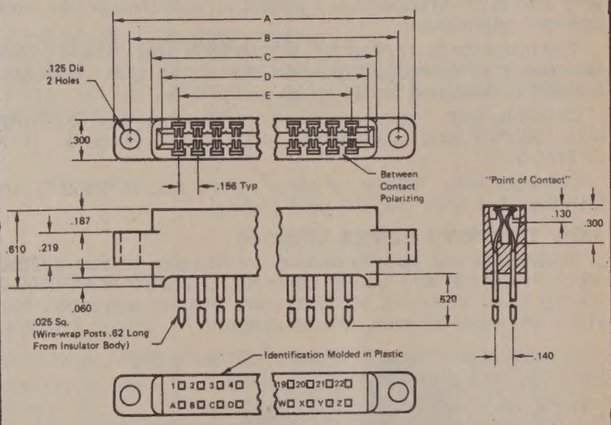
Insulation Resistance: 5000 megohms (min.) at 500 VDC.

Operating Voltage: 1800 VAC at sea level.

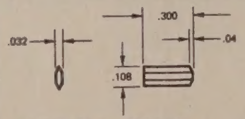
Operating Temperature: −55°C to +150°C.

Materials:
Insulator: Thermoplastic glass-filled polyester. Color, black.
Contacts: Phosphor bronze. .000010 gold plating per MIL-G-45204, Type II over nickel.

Polarizing Key: Glass-filled nylon, Type 6/6.


A
B
C
D
E
.125 Dia
2 Holes
.300
.156 Typ
Between
Contact
Polarizing
"Point of Contact"
.130
.300
.187
.610
.219
.060
.620
.025 Sq.
(Wire-wrap Posts .62 Long
From Insulator Body)
.140
Identification Molded in Plastic
1 2 3 4
A B C D
19 20 21 22
W X Y Z

POLARIZING KEY


.300
.032
.04
.108

PART NO. N8000

Pairs Contact	A	B	C	D	E
22/44	4.281	4.031	3.717	3.578	3.276

HOW TO ORDER (Select One from Each Category)

Category →	Basic Part No.	Number of Contacts		Terminals		Mounting Style
		22 Double row		.025'' sq X .62'' Wire-Wrap posts	Dash	.125'' dia. Hole in Mounting ears
	SAW	22	/D	3	–	2
Order Code enter codes to make part no.						

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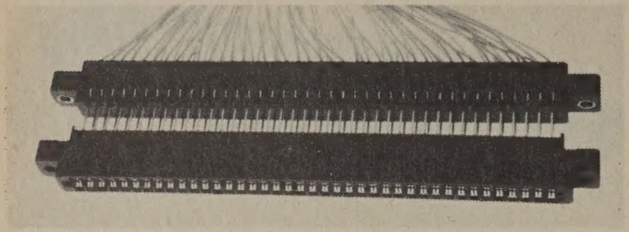
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Stanford Applied Engineering

PC Connectors

TRANSITION CONNECTOR SERIES IJ2250-80
BACK PLANE TRANSITION CONNECTOR SERIES 2501



SERIES IJ2250-80

Contact Spacing: .125 centers
Terminals: Crimp-Type
Pairs/Contacts: 40/80
For PC Boards: N/A

The IJ2250 engages the 3rd level of the .025" square Wire-Wrap posts on the P8100-80 Connector. It permits bringing stranded wire into Wire-Wrapped back panels for input/output or interconnect applications.

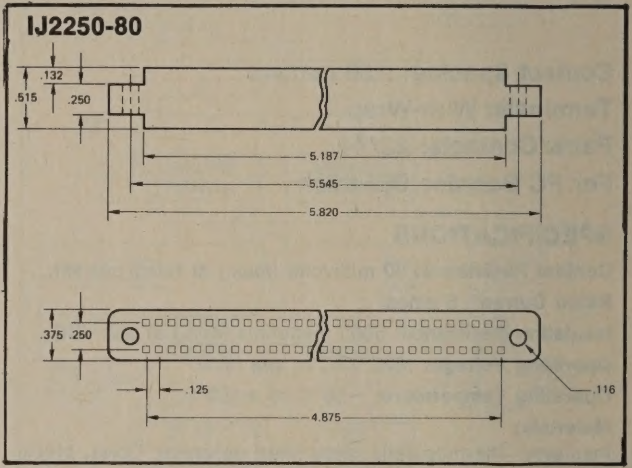
The insulator body (Part No. IJ2250-80 is green diallyl phthalate per MIL-M-19833, Type GDI-30). Crimp type removable contact is designed for 24 to 30 gauge wire.

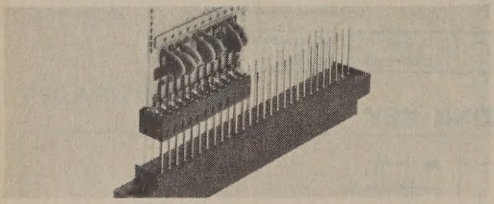
Contacts with "commercial plating" bronze per QQ-B-750 with .000010 gold plating per MIL-G-45204, Type II. (P/N CP2500-2.)

Contacts with "Military Plating" (Part No. MP2500-2) are identical, but with .000050 gold plating.

HOW TO ORDER SERIES IJ2250-80

When ordering, specify number of insulator bodies (IJ2250-80) and number and type of contacts (CP2500-2 or MP2500-2). Crimp tools (Part No. MC2500) and contact extraction tools (Part No. ME2500) may also be ordered.





SERIES 2501

Contact Spacing: .125 centers
Terminals: Solder tab
Pairs/Contacts: 12/24
For PC Boards: .032 and .062 thick

The 2501-24 is a 24-pin device designed to interface with Wire-Wrap back planes. Pin-to-pin compatible with standard IBM equipment, it will plug directly onto any .025" x .250" pin spacing.

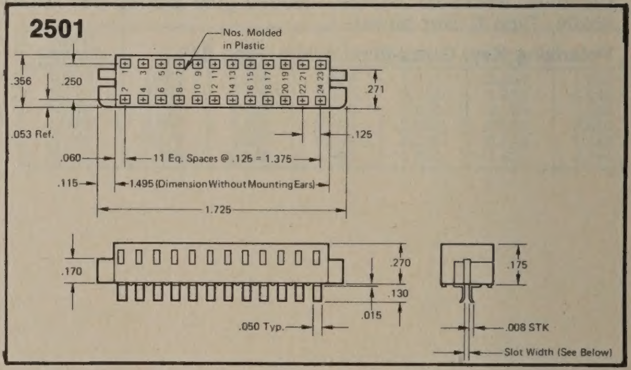
With solder tabs it will accept any .031" or .062" thick board with .125" contact centers. Tabs may be welded or gang soldered to PC boards or to flat wire cables using standard equipment.

Available without polarizing "ears" for end-to-end mounting on .125" centers.

SPECIFICATIONS

Contact Resistance: 30 millivolts (max.) at rated current.
Rated Current: 3 amps.
Insulation Resistance: 5000 megohms (min.) at 500 VDC.
Operating Voltage: 800 VDC at sea level.
Operating Temperature: −55°C to +150°C.

Materials:
Insulator: Green diallyl phthalate per MIL-M-14, Type SDG-F.
Contacts: (Solder Tabs) Phosphor bronze, per QQ-B-750. .000010 gold plating over .000050 nickel per MIL-G-45204, Type II, Class 2. Conforms to MIL-E-5400K for metal-to-metal contact in airborne/avionic equipment.



HOW TO ORDER (Select One from Each Category) SERIES 2501

Category	Basic Part No.		Contact	Polarizing		Slot Width	
		Dash	24 Contact Pairs	Without Ears	With Ears	.040" (for .031" boards)	.067" (for .062" boards)
	PC 2501	–	24	•	E	•	A
	PC 2501		24	•		•	
Order Code enter codes to make part no.							

• If you want this configuration, leave this space blank in part number.

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Stanford
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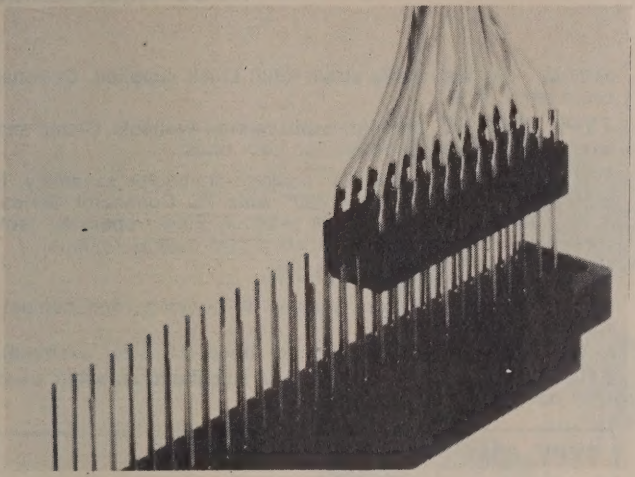
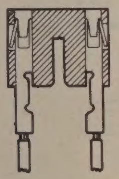
Engineering

Add Dept. EM to address to tell them you saw it in eem

PC Connectors

CABLE CONNECTOR SERIES 2501
WIRE-WRAP POSTS SERIES B250





Typical cross section showing contacts installed. Dimensions and specifications for insulator with crimp contacts are the same as for solder tab Model PC2501-24.

SERIES 2501

The 2501 Series is also available with crimp contacts (shown at left) for use as a cable connector or input/output connector. It permits bringing stranded wire into Wire-Wrapped back panels by engaging with the .025″ square posts of any .125″ x .250″ grid connector. (See 8100 Series Connector.)

The crimp type contacts accept 24 to 30 gauge stranded wire. The insulator comes without polarizing ears for end-to-end mounting on .125″ centers.

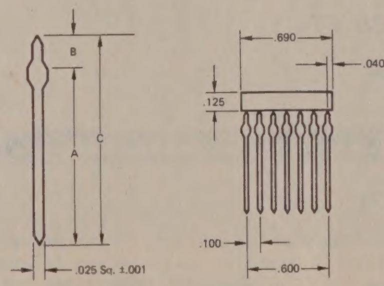
ORDERING INFORMATION

For 2501-24 with crimp removable contacts specify number of insulator bodies (IJ2501-24), and number contacts (MP2500). For hand crimp tool, order MC2500.

SERIES B250

INDIVIDUAL PINS FOR AUTOMATIC LOAD INSERTION

Supplied as individual contacts or in 7-pin strip form on .100″ centers for speedy installation. Carrier strips may be broken off after installation of pins or left intact to provide Vcc or ground bussing.



Terminals	A	B	C	Terminals	A	B	C
L	.125	.318	.443	3L	.698	.318	1.016
1L	.316	.318	.634	3LM	.698	.040	.743
2L	.507	.318	.825				

SPECIFICATIONS

Materials:
Phosphor bronze per QQ-B-750 (see How to Order for Plating).

Installation Tools:
For Individual Contacts: P/N T250
For 7-Pin Strips: P/N T250-LS

Recommended Mounting Hole:
Unplated: .034″ to .036″ dia.
Plated Thru: .032″ to .035″ dia. (posts must be soldered in plated-thru hole for maximum retention).

How To Order (Select One From Each Category)

Category	Contact Plating		Basic Model Number	Terminals					Individual Post or Strip Configuration	
	.000010 Gold per MIL-G-45204, Type II	.000050 Gold per MIL-G-45204, Type II, Class 1		A — .125″ (for Wave Solder) B — .318″ (1 Level Wire-Wrap)	A — .316″ (1 Level Wire-Wrap) B — .318″ (1 Level Wire-Wrap)	A — .507″ (2 Level Wire-Wrap) B — .318″ (1 Level Wire-Wrap)	A — .698″ (3 Level Wire-Wrap) B — .040″ (Solder Stub)		Individual Posts	7-Pin Strips (Not Available as 3LM)
	C	M	B250	L	1L	2L	3L	3LM	*	S
			B250						*	
Order Code enter codes to make part no.										

* If you want this configuration, leave this space blank in part number.

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Stanford Applied Engineering

PC Connectors

PC CONNECTOR HOOD ASSEMBLIES

COMPACT SMART STYLING, CLEAN DESIGN

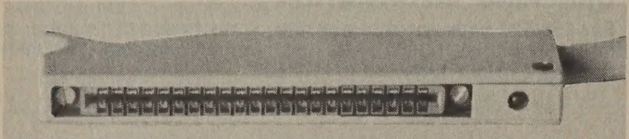
Hoods, clamp and strain-relief blocks are molded, high-impact, self-extinguishing, light-blue ABS plastic.

Simplified assembly/disassembly. All hardware furnished.

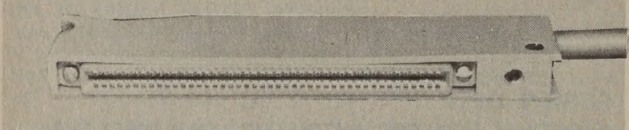
TYPE 8018 Accommodates standard 0.380″ width PC Connector Series from 6 pin to a maximum connector length of 4.36″. Modified to connector designated. Cable entry nominally ⅜″, two adjustable strain-relief blocks supplied. Optional cable entry to ½″.

8018-15; -18; 22 — Stock parts made to fit SAE's SAC 15D, 18D or 22D (respectively) connector or those with like overall and center to center dimensions.

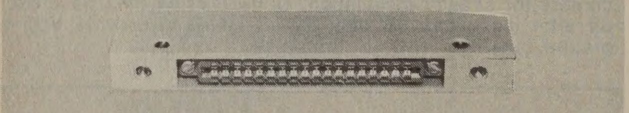
TYPE 8030 Accommodates standard 0.470″ width PC Connector Series from 6 pin to a maximum connector length of 6.220″. Modified to connector designated. Cable entry nominally 7/16″, one adjustable strain-relief block supplied. Optional cable entry of ½″.



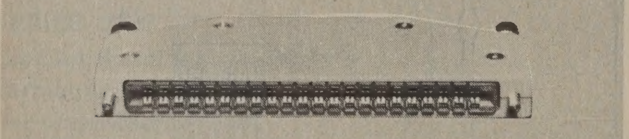
TYPE 8018



TYPE 8030



TYPE 8030 FT



TYPE 8031

TYPE 8030 FT Through-cable version available. Clamp and strain-relief blocks supplied for both ends.

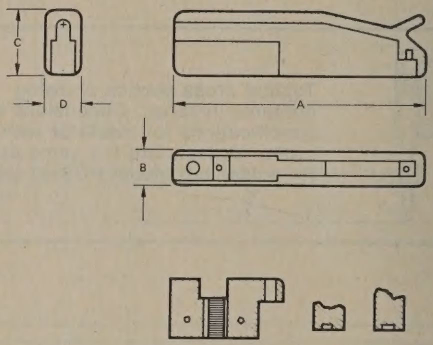
TYPE 8031 Perpendicular cable-to-connector assembly. It is designed for 22-pin, in 0.350″ wide PC Connector Series. Accommodates dual or single readout. Finger-operated jack screws on 4.031 centers included. Cable clamps optional.

ORDERING INFORMATION

Order desired connectors, number of contacts, and contact-spacing as follows:

a. Give basic 4 figure number for hood (8018 for example).
b. List connector part number and manufacturer being used in hood.

TYPE 8031



Type	No. of In-Line Contacts	Hood Dimensions			
		A	B	C	D
8018	6-22	†	0.380	1.250	0.600
8030	6-30	†	0.470	1.300	0.640
8030FT	6-30	†	0.470	1.300	0.640
8031	22	4.385	0.350	1.500	0.460

†Tailored to connector length.

All hood assemblies available with or without corresponding PC Connectors. When ordering from above table, specify overall length and mounting hole dimensions.

Cylindrical Connectors

FRONT AND REAR RELEASE CONNECTORS MIL-C-5015G

The MS Connector Series manufactured by Stanford Applied Engineering to MIL-C-5015G is a cylindrical, threaded-coupling connector available in the MS3450 removable, **rear-release,** crimp contact series. It features high-strength plastic retention fingers for lightweight and increased dielectric strength. The connector is also available in the MS3400 removable, **front release,** crimp contact series with rugged metal clips for positive contact retention. Both series are intermatable with existing MIL-C-5015G and threaded MIL-C-83723 (USAF) connectors.

These MS Connectors are designed in shell sizes 10 thru 48 and are available in all classes for use in aerospace as well as industrial applications. The series includes the Class D Connector which meets the very rigorous shock and vibration requirements defined in MIL-C-5015G — perhaps the most demanding of the military specifications. Also available in the Class DS Stainless Steel Connector, the only stainless steel Connector specified by a military specification.

All tvpes of rear hardware is available for both the MS3400 and MS3450 Connector Series. Some hardware is available as complete connector-accessory assemblies.

The plastic contact retention fingers offered in the MS3450 Series (rear release contacts) allows the unique advantage of accepting a wide range of wire sizes unacceptable in the front release type connectors. Special metal tools have been designed by Stanford Applied Engineering to accommodate oversize wire, eliminating plastic tools that can break off tips and leave chips in the contact retention area.

Complete details are outlined in a new 80-page catalog available upon request.

SAE

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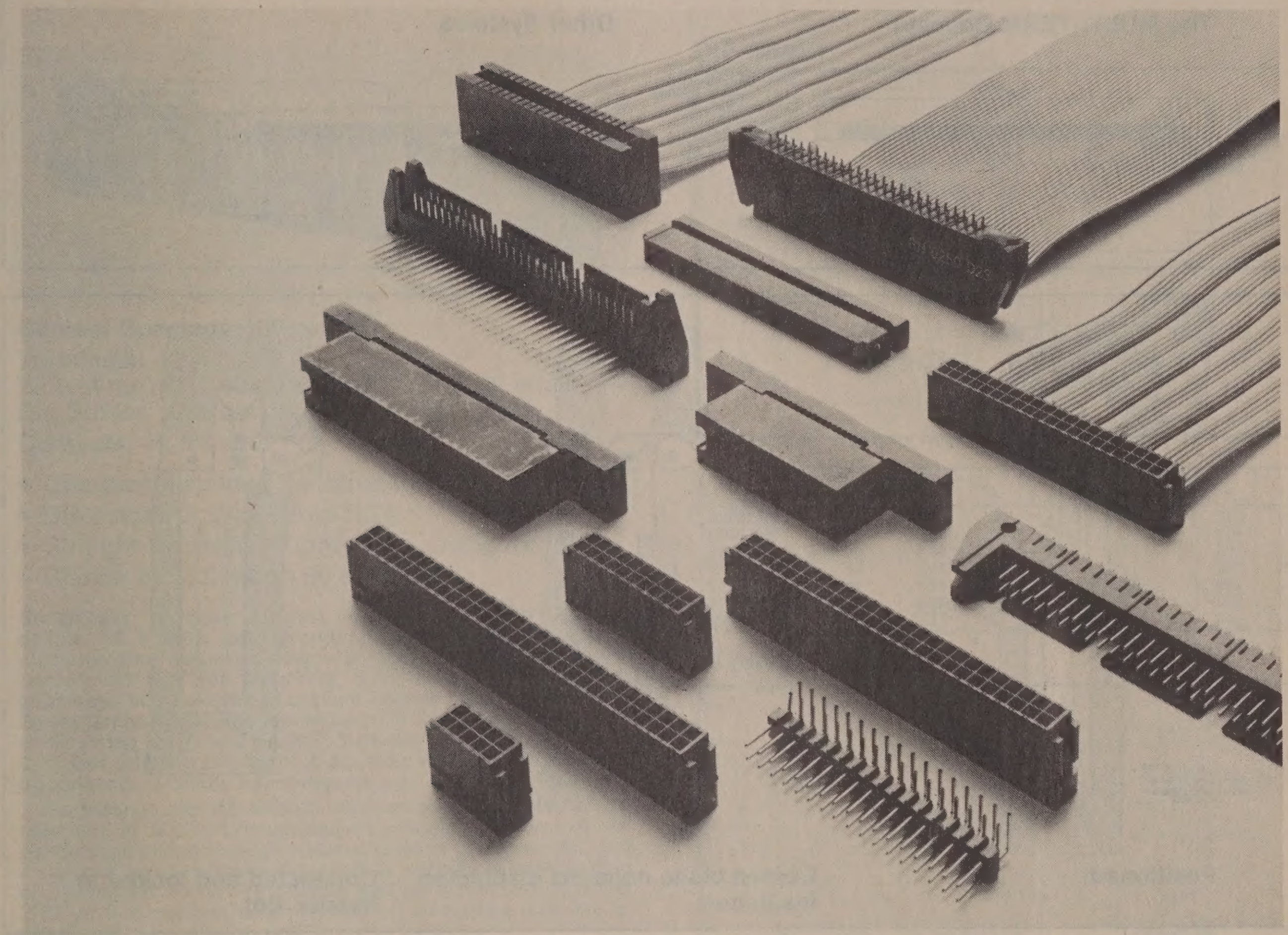
Multi-Term™

FLAT CABLE INTERCONNECTION SYSTEM



TM-Stanford Applied Engineering, Inc.

FOR SPEED, ECONOMY AND RELIABILITY

The benefits of flat cable over conventional wiring have been widely recognized throughout the industry. They include: reduced weight; increased volumetric efficiency; simplified assembly; preplanned, reproducible and uniformly wired assemblies; elimination of wiring errors; test, trouble-shooting and rework time reduced; improved reliability; consistent electrical characteristics; and lower installation costs.

The advantages of SAE's MULTI-TERM line of interconnection components is equally numerous and significant. Our unique contact, for example, features a smooth, coined edge that penetrates the cable jacket through insulation displacement and compresses the conductors, resulting in a strong, gas-tight connection. This coined edge, rather than a sheared or sheared offset edge, eliminates any possibility of conductor scoring or nicking.

Additionally, our exclusive, locking barb on every **individual** contact engages the mating header slot to assure positive retention across the **entire** width of the cable. By eliminating any possibility of header warpage, a highly reliable connection is achieved, even under conditions of shock, vibration or cable strain. On the other end, connectors will mate with several male terminations, e.g., .025″ square or round tails, as well as MIL-approved blade types, utilizing a tuning fork-style female contact for greater reliability.

You can choose between PC Connectors, Header Connectors, I/O Headers, and Socket Connectors with or without strain relief clamps — all on .100″ contact centers with your choice of 10 through 60 pins; and 14- or 16-pin Dip Connectors on .100″ x .300″ grid spacings. Contact configurations offer your choice of 1, 2 or 3 level wrap tails in a straight-through or right angle terminations, as well as Dip solder styles.

Another feature of the MULTI-TERM line is an improved, pre-assembled PC, socket and Dip Connector that allows the termination of up to 60 conductors in one quick and error-free operation. Accepting either 26, 28 or 30 AWG flat ribbon cable or discrete wire, connector housings are molded of black thermoplastic polyester. Cables are offered in either all gray with one red edge or in ten color-coded ribbons, encapsulated in a self-extinguishing PVC film.

These new components have been specifically designed to be completely compatible with all present industry standards, to provide a competitive and readily available second source.

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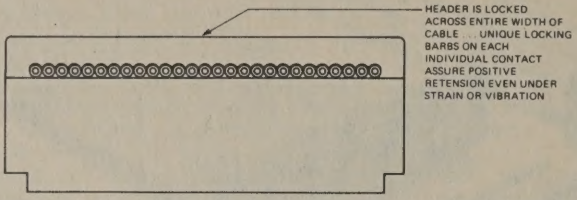
Stanford Applied Engineering

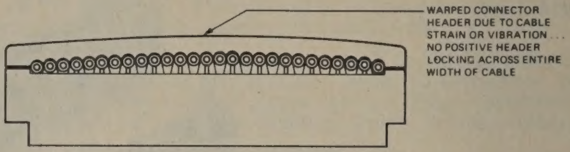
Multi-Term™

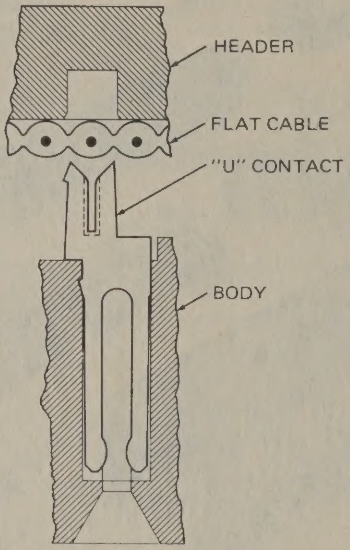
FLAT CABLE INTERCONNECTION SYSTEM

The MULTI-TERM Concept

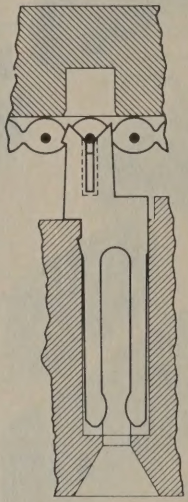

HEADER IS LOCKED ACROSS ENTIRE WIDTH OF CABLE . . . UNIQUE LOCKING BARBS ON EACH INDIVIDUAL CONTACT ASSURE POSITIVE RETENSION EVEN UNDER STRAIN OR VIBRATION

Other Systems

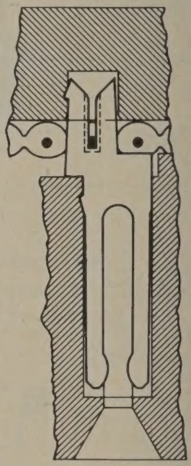

WARPED CONNECTOR HEADER DUE TO CABLE STRAIN OR VIBRATION . . . NO POSITIVE HEADER LOCKING ACROSS ENTIRE WIDTH OF CABLE


HEADER
FLAT CABLE
"U" CONTACT
BODY

Positioned.

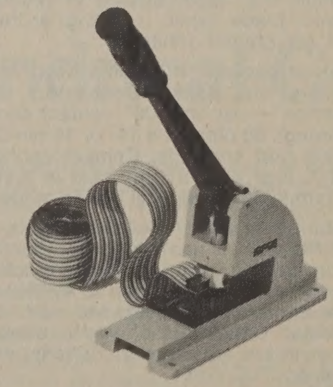


Coined blade contacts displacing insulation.



Connected and locked in header slot.

INSTALLATION TOOLING



Fast, efficient installation tooling is an integral part of the Multi-Term system. Consult factory for details.

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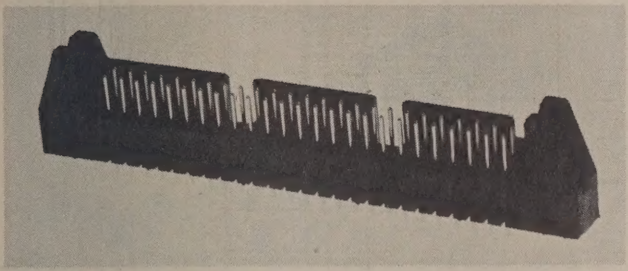
Multi-Term™ INTERCONNECT SYSTEM

HEADER CONNECTORS
.100 CONTACT CENTERS
SERIES 6200



Contact Spacing: .100 centers

Terminals:

Wire-Wrap: .025 square, straight or right angle

Dip Solder: .025 dia. straight or right angle

Contacts: 10 thru 60

- One-piece, molded construction.
- Dip solder or Wire-Wrap tails.
- Straight-through or right angle configurations.
- Choice of 10 through 60 contacts.

Specifically designed for fast, simple installation on logic panels, PC boards, back planes, etc. A high-precision, one-piece molded header includes a shroud that provides pin protection; nut and bolt mounting; positive cable to connector alignment; and is keyed to prevent reversed mating. The 6200 Series Connectors come with either .025″ square posts for automatic wiring equipment or .025″ diameter Dip solder pins, each in proper grid and alignment to accept a wide variety of female disconnects, whether board-mounted or cable-type terminals.

Pin features include smooth, flat contact surfaces with corners held to .003″ maximum radius; a tapered lead-in that will not damage plated through-holes; a uniform cross-section, and a conical tip specifically designed to simplify Wire-Wrapping or disconnect. Posts are straight and perpendicular to within .010″ of true position, and they will accommodate one, two or three wraps, depending upon pin selected.

Dip solder pins are designed to accommodate PC boards up to .125″ thick, and both style of terminations are available in either straight or right-angle configurations.

SPECIFICATIONS

Electrical:

Current Rating: 1 amp.

Dielectric Withstanding Voltage: 500 volts at sea level (min.).

Insulation Resistance: 5 x 10^6 ohms (min.).

Materials:

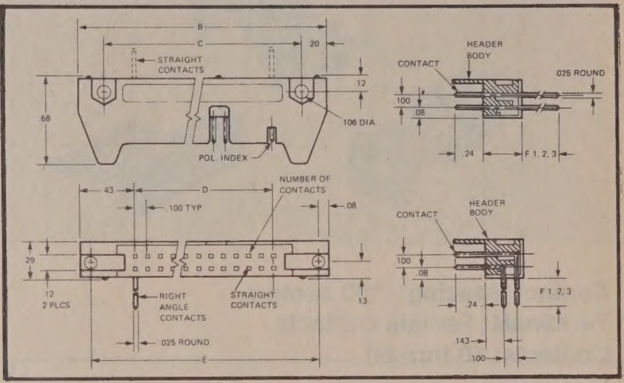
Housing: Thermoplastic glass-filled polyester. Color, black.

Contacts: Phosphor bronze per QQ-B-750.

Operating Temperatures: −55°C to +140°C.

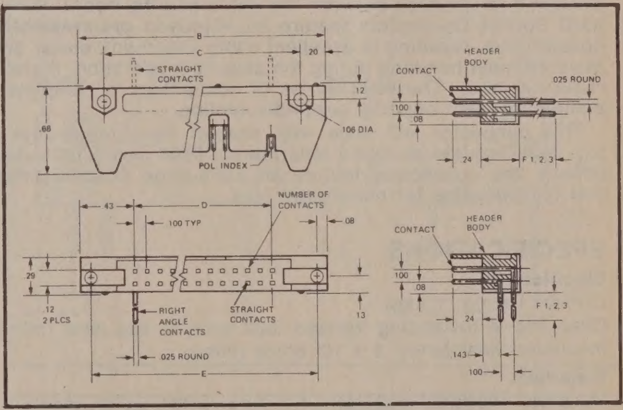
Contact Plating: See "How to Order."

DIP Solder


B
C
20
STRAIGHT CONTACTS
12
.68
106 DIA
POL. INDEX
HEADER BODY
CONTACT
.025 ROUND
100
08
24
F 1, 2, 3
43
D
100 TYP
NUMBER OF CONTACTS
08
29
12
2 PLCS
RIGHT ANGLE CONTACTS
STRAIGHT CONTACTS
13
025 ROUND
E
143
100

Assembly No.	No. of Contacts	B	C	D	E	F_1	F_2	F_3
RH6210D**	10	1.26	.86	.400	1.10		.092	.155
RH6220D**	20	1.76	1.36	.900	1.60		.092	.155
RH6226D**	26	2.06	1.66	1.200	1.90		.092	.155
RH6234D**	34	2.46	2.06	1.600	2.30		.092	.155
RH6240D**	40	2.76	2.36	1.900	2.60		.092	.155
RH6250D**	50	3.26	2.86	2.400	3.10		.092	.155
RH6260D**	60	3.76	3.36	2.900	3.60		.092	.155

Wire-Wrap


B
C
20
STRAIGHT CONTACTS
12
.68
106 DIA
POL. INDEX
HEADER BODY
CONTACT
.025 ROUND
100
08
24
F 1, 2, 3
43
D
100 TYP
NUMBER OF CONTACTS
08
29
12
2 PLCS
RIGHT ANGLE CONTACTS
STRAIGHT CONTACTS
13
025 ROUND
E
143
100

Assembly No.	No. of Contacts	B	C	D	E	F_1	F_2	F_3
RH6210W**	10	1.26	.86	.400	1.10		.47	.61
RH6220W**	20	1.76	1.36	.900	1.60		.47	.61
RH6226W**	26	2.06	1.66	1.200	1.90		.47	.61
RH6234W**	34	2.46	2.06	1.600	2.30		.47	.61
RH6240W**	40	2.76	2.36	1.900	2.60		.47	.61
RH6250W**	50	3.26	2.86	2.400	3.10		.47	.61
RH6260W**	60	3.76	3.36	2.900	3.60		.47	.61

**See Ordering Information

HOW TO ORDER

ASSEMBLY NUMBER CODE

R H 62 ** * * *

PLATING CODE FOR CONTACTS
R — .000020 Gold Over .000050 Nickel

CONNECTOR CONFIGURATION
H — Header Connector

CONNECTOR SIZES
10 thru 60 Contacts

CONTACT CONFIGURATION
D — Dip Solder .025 Dia.
W — Wire-Wrap .025 Sq.

CONTACT TAIL CONFIGURATION
R — Right Angle
S — Straight

BOARD THICKNESS IF DIP SOLDER
1 — Not Tooled
2 — .062 Thick
3 — .094-.125 Thick
OR LEVELS OF WIRE-WRAP
1 — Not Tooled
2 — 2 Levels
3 — 3 Levels

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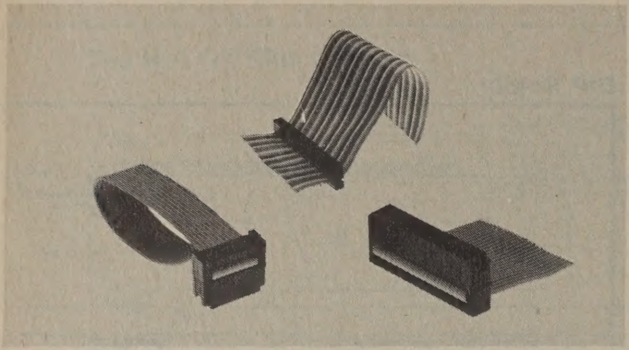
Stanford Applied Engineering

Multi-Term™ INTERCONNECT SYSTEM

SOCKET CONNECTORS
.100 CONTACT CENTERS
FEMALE, SERIES 6300

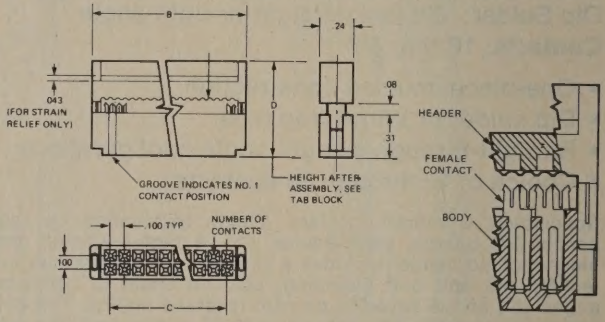


Contact Spacing: .100 centers
Terminals: Female contacts
Contacts: 10 thru 60

- Unique coined edge contacts.
- Multi-locked headers.
- Pre-assembled unit.
- Accepts 26, 28 or 30 AWG flat ribbon cable or discrete wire.
- Available with or without strain relief clamps.
- Choice of 10 through 60 contacts

Designed to interface between the cable and the board, Series 6300 Socket Connectors feature an improved **pre-assembled** construction, resulting in excellent cable alignment; easier and more efficient handling during the assembly operation, thereby reducing labor. The 6300 Series of connectors is completely compatible with existing assembly tooling.

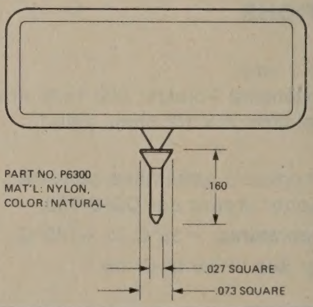
This connector will mate with several male terminations, e.g., .025″ square or round tails, Series 6600 and 6200. Additionally, the connectors feature an extra-large chamfer entry that compensates for misaligned pins.


B
.24
043
(FOR STRAIN RELIEF ONLY)
D
.08
.31
HEADER
FEMALE CONTACT
BODY
GROOVE INDICATES NO. 1 CONTACT POSITION
HEIGHT AFTER ASSEMBLY, SEE TAB BLOCK
.100 TYP
NUMBER OF CONTACTS
100
C

Assembly No.	No. of Contacts	B	C	D With Strain Relief	D Without Strain Relief
RD6310***	10	.68	.40	.610	.460
RD6320***	20	1.18	.90	.610	.460
RD6326***	26	1.48	1.20	.610	.460
RD6334***	34	1.88	1.60	.610	.460
RD6340***	40	2.18	1.90	.610	.460
RD6350***	50	2.68	2.40	.610	.460
RD6360***	60	3.18	2.90	.610	.460

***See Ordering Information

POLARIZING KEY


PART NO. P6300
MAT'L: NYLON,
COLOR: NATURAL
.160
.027 SQUARE
.073 SQUARE

SPECIFICATIONS

Electrical:
Current Rating: 1 amp.
Dielectric Withstanding Voltage: 500 volts at sea level (min.).
Insulation Resistance: 5 x 10^6 ohms (min.).

Materials:
Housing: Thermoplastic glass-filled polyester. Color, black.
Contacts: Beryllium copper, heat treated.

Operating Temperatures: −55°C to +140°C.

Contact Plating: See "How to Order."

HOW TO ORDER

R D63 ** * * S *

ASSEMBLY NUMBER CODE

PLATING CODE FOR CONTACTS
R — .000020 Gold Over .000050 Nickel

CONNECTOR SIZES
10 thru 60 Contacts

C — Standard Cap with Cable Stop
W — Without Cap

S — Strain Relief (Optional)

CABLE TYPE
R — Ribbon

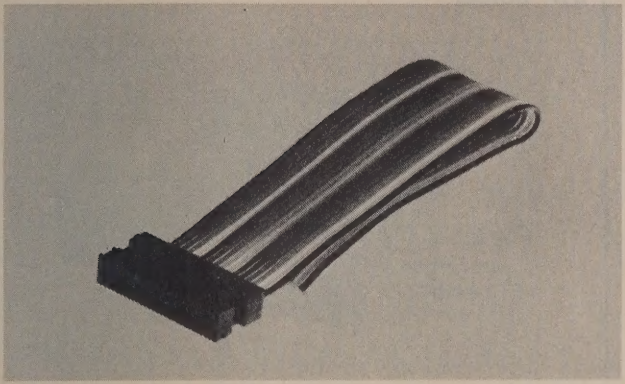
WIRE SIZES
A — AWG 30
B — AWG 28
C — AWG 26

Stanford Applied Engineering

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Multi-Term™ INTERCONNECT SYSTEM

DIP CONNECTORS
.100 CONTACT CENTERS
MALE, SERIES 6400



Contact Spacing: .100 centers
Terminals: Dip solder
Contacts: 14 or 16

- Unique coined edge contacts.
- Multi-locked headers.
- Pre-assembled unit.
- Accepts 26, 28 or 30 AWG flat ribbon cable or discrete wire.
- Snap-locking retainer.
- Choice of 14 or 16 contacts.

Designed to interface between the cable and the board, Series 6400 Dip Connectors feature an improved pre-assembled construction that allows excellent cable alignment as well as easier and more efficient handling during assembly, thereby resulting in reduced labor. The 6400 Series of connectors is completely compatible with all existing assembly tooling. Additionally, our patented snap-locking device secures the connector to the board-mounted socket.

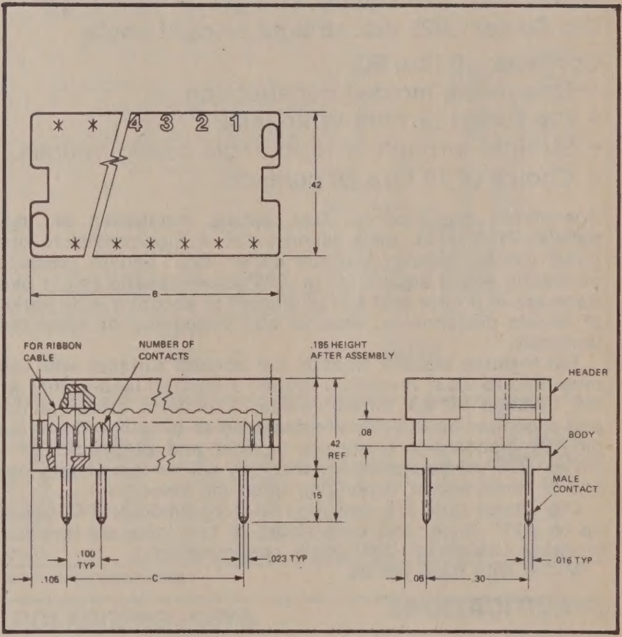
SPECIFICATIONS

Electrical:
Current Rating: 1 amp.
Dielectric Withstanding Voltage: 500 volts at sea level (min.).
Insulation Resistance: 5 x 10^6 ohms (min.).

Materials:
Housing: Thermoplastic glass-filled polyester. Color, black.
Contacts: Beryllium copper, heat treated.

Operating Temperature: −55°C to +140°C.

Contact Plating: See "How to Order."



Assembly No.	No. of Contacts	B	C	Assembly No.	No. of Contacts	B	C
RD6414**	14	.81	.60	RD6416**	16	.91	.70

**See Ordering Information

HOW TO ORDER

R D64 ** * *

ASSEMBLY CODE NUMBER

PLATING CODE FOR CONTACTS
R — .000020 Min. Gold Over .000050 Nickel

CONNECTOR SIZES
14-14 Contacts
16-16 Contacts

CABLE TYPE
R — Ribbon

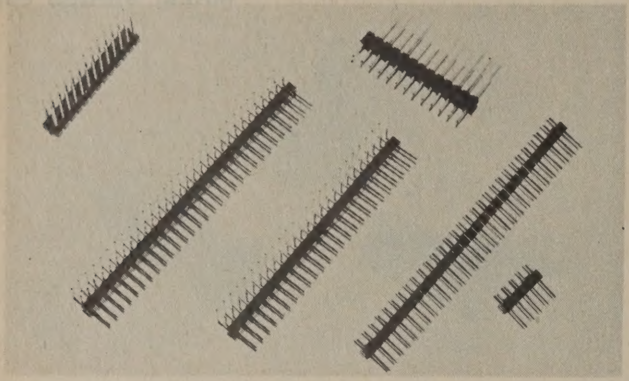
WIRE SIZES
A — AWG 30
B — AWG 28
C — AWG 26

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Stanford Applied Engineering

Multi-Term™ INTERCONNECT SYSTEM

I/O HEADERS
.100 CONTACT CENTERS
SERIES 6600



Contact Spacing: .100 centers

Terminals:
Wire-Wrap: .025 square, straight or right angle
Dip Solder: .025 dia. straight or right angle.

Contacts: 10 thru 60

- One-piece, molded construction.
- Dip solder or Wire-Wrap tails.
- Straight-through or right angle configurations.
- Choice of 10 thru 60 contacts.

Specifically designed for fast, simple installation on logic panels, PC boards, back planes, etc. A high-precision, one-piece molded header features either .025″ square posts for automatic wiring equipment or .025″ diameter Dip solder pins. Each are in proper grid and alignment to accept a wide variety of female disconnects, whether board-mounted or cable-type terminals.

Pin features include smooth, flat contact surfaces with corners held to .003″ maximum radius; a tapered lead-in that will not damage plated through-holes; a uniform cross section, and a conical tip specifically designed to simplify Wire-Wrapping or disconnect. Posts are straight and perpendicular to within .010″ of true position, and they will accommodate one, two or three wraps, depending upon pin selected.

Dip solder pins are designed to accommodate PC boards up to .125″ thick, and both styles of terminals are available in either straight or right-angle configurations.

Mates with 6300 Series.

SPECIFICATIONS

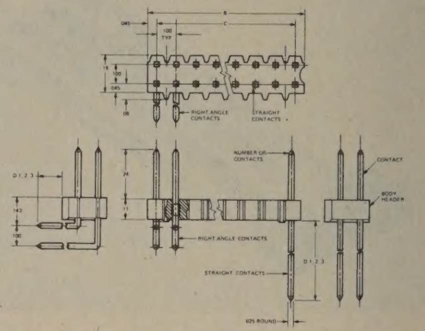
Electrical:
Current Rating: 1 amp.
Dielectric Withstanding Voltage: 500 volts at sea level (min.).
Insulation Resistance: 5 x 10^6 ohms (min.).

Materials:
Housing: Thermoplastic glass-filled polyester. Color, black.
Contacts: Phosphor bronze per QQ-B-750.

Operating Temperature: −55°C to +140°C.

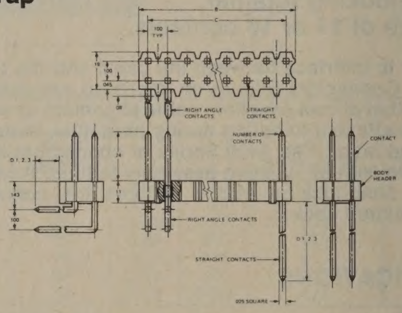
Contact Plating: See "How to Order." Mates with 6300 Series.

DIP Solder


B
C
.045
.100 TYP
.19
.100
.045
.08
RIGHT ANGLE CONTACTS
STRAIGHT CONTACTS
D 1,2,3
.143
.100
.24
.11
NUMBER OF CONTACTS
CONTACT
BODY HEADER
RIGHT ANGLE CONTACTS
D 1,2,3
STRAIGHT CONTACTS
.025 ROUND

Assembly No.	No. of Contacts	B	C	D_1	D_2	D_3
RB6610D*	10	.49	.40	Not Tooled	.092	.155
RB6620D*	20	.99	.90		.092	.155
RB6626D*	26	1.29	1.20		.092	.155
RB6634D*	34	1.69	1.60		.092	.155
RB6640D*	40	1.99	1.90		.092	.155
RB6650D*	50	2.49	2.40		.092	.155
RB6660D*	60	2.99	2.90		.092	.155

Wire-Wrap


B
C
.100 TYP
.100
.045
RIGHT ANGLE CONTACTS
STRAIGHT CONTACTS
NUMBER OF CONTACTS
CONTACT
BODY HEADER
D 1,2,3
.143
RIGHT ANGLE CONTACTS
D 1,2,3
STRAIGHT CONTACTS
.025 SQUARE

Assembly No.	No. of Contacts	B	C	D_1	D_2	D_3
RB6610W*	10	.49	.40	Not Tooled	.47	.61
RB6620W*	20	.99	.90		.47	.61
RB6626W*	26	1.29	1.20		.47	.61
RB6634W*	34	1.69	1.60		.47	.61
RB6640W*	40	1.99	1.90		.47	.61
RB6650W*	50	2.49	2.40		.47	.61
RB6660W*	60	2.99	2.90		.47	.61

*See Ordering Information

HOW TO ORDER

ASSEMBLY NUMBER CODE R B 66 ** * * *

PLATING CODE FOR CONTACTS
R — .000020 Gold Over .000050 Nickel

CONNECTOR CONFIGURATION
B — Board Connector

CONNECTOR SIZES
10 thru 60 Contacts

CONTACT CONFIGURATION
D — Dip Solder .025 Round
W — Wire-Wrap .025 Square

CONTACT TAIL CONFIGURATION
R — Right Angle
S — Straight

BOARD THICKNESS IF DIP SOLDER
1 — Not Tooled
2 — .062 Thick
3 — .094-.125 Thick

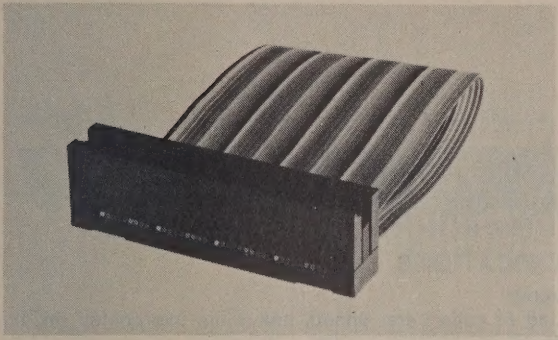
OR LEVELS OF WIRE-WRAP
1 — Not Tooled
2 — 2 Levels
3 — 3 Levels

Stanford Applied Engineering

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Multi-Term™ INTERCONNECT SYSTEM

PC CONNECTORS
.100 CONTACT CENTERS, DUAL READOUT
SERIES 6700



Contact Spacing: .100 centers
Terminals: Bifurcated contacts
Contacts: 10/20 thru 25/50
For PC Boards: .054 to .071 thick

- Pre-loaded, bifurcated contacts.
- Unique coined edge U-form contacts.
- Multi-locked headers.
- One piece, pre-assembled plastic insulator.
- Available with or without mounting ears.
- Optional polarizing keys.
- Accepts 26, 28 or 30 AWG flat ribbon cable.
- Choice of 20 thru 50 contacts.

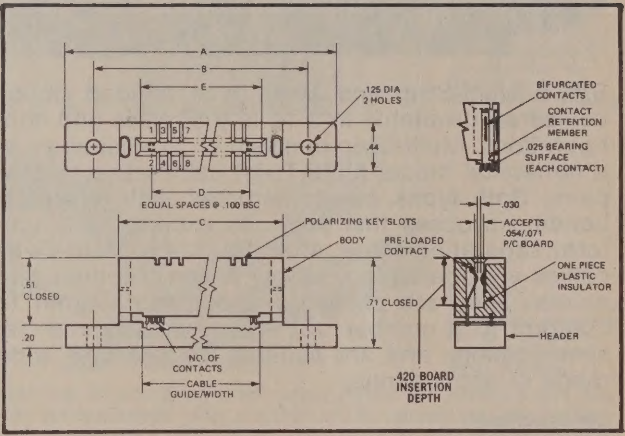
Designed to interface between the cable and the board, Series 6700 PC Connectors feature an improved one-piece pre-assembled construction, resulting in excellent cable alignment; easier and more efficient handling during the assembly operation, thereby reducing labor. The 6700 Series of connectors is completely compatible with all existing assembly tooling.

SPECIFICATIONS

Electrical:
Current Rating: 1 amp.
Dielectric Withstanding Voltage: 500 volts at sea level (min.).
Insulation Resistance: 5 x 10^6 ohms (min.).

Materials:
Housing: Thermoplastic glass-filled polyester. Color, black.
Contacts: Beryllium copper, heat treated.

Operating Temperature: −55°C to +140°C.
Contact Plating: See "How to Order."

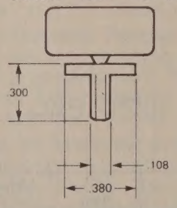

A
B
E
.125 DIA
2 HOLES
1 3 5 7
2 4 6 8
.44
D
EQUAL SPACES @ .100 BSC
BIFURCATED CONTACTS
CONTACT RETENTION MEMBER
.025 BEARING SURFACE (EACH CONTACT)
C
POLARIZING KEY SLOTS
BODY
PRE-LOADED CONTACT
.030
ACCEPTS .054/.071 P/C BOARD
.51 CLOSED
.20
.71 CLOSED
ONE PIECE PLASTIC INSULATOR
HEADER
NO. OF CONTACTS
CABLE GUIDE/WIDTH
.420 BOARD INSERTION DEPTH

Assembly No.	No. of Contacts	A	B	C	D	E	(F) Without Mounting Ears
RD6720***	20	2.30	1.80	1.44	9	1.10	1.44
RD6726***	26	2.60	2.10	1.74	12	1.40	1.74
RD6734***	34	3.00	2.50	2.14	16	1.80	2.14
RD6740***	40	3.30	2.80	2.44	19	2.10	2.44
RD6750***	50	3.90	3.40	2.96	24	2.60	2.96

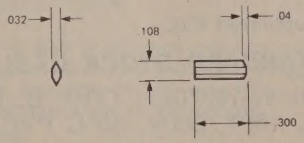
*See Ordering Information

POLARIZING KEYS

PART NO. P6700



PART NO. N8000


032
.04
.108
.300

HOW TO ORDER

ASSEMBLY NUMBER CODE R D67 ** * * *

PLATING CODE FOR CONTACTS
R — .000020 Gold Over .000050 Nickel

CONNECTOR SIZES
20 thru 50 Contacts

WIRE SIZES
A — AWG 30
B — AWG 28
C — AWG 26

MOUNTING TYPES
N — No Mtg. Ears
H — Half Mtg. Ears

CABLE TYPE
R — Ribbon

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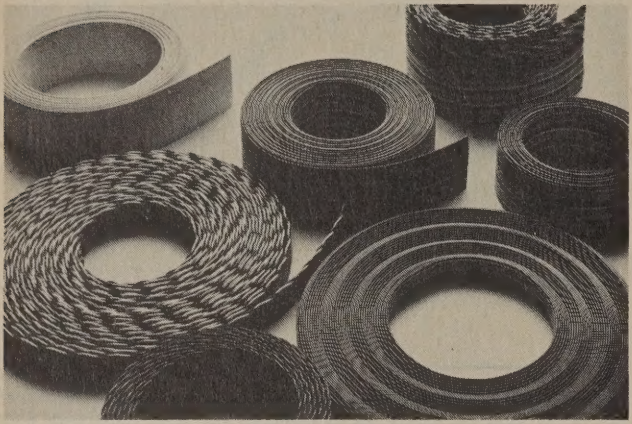
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Stanford
Applied
Engineering

Multi-Strip™/Multi-Twist™

BONDED RIBBON CABLE



SAE's Multi-Strip and Multi-Twist bonded ribbon cables are available in a variety of sizes and configurations. Multi-Strip consists of parallel wires in a horizontal plane. Multi-Twist cables use twisted pairs. Both types are constructed with a special bonding process that provides exceptionally uniform separation force. Multi-Strip and Multi-Twist cables are offered in a variety of constructions and colors. They are designed and manufactured to conform to a number of military and commercial specifications and are suitable for use in a wide range of applications.

Constructions:
Flat bonded cable.
Bonded twisted pairs.
Bonded triads with jacket.
Mixed bonded wires and twisted pairs.

Colors:
All standard colors and stripes.
Special colors available.

Gauge Sizes:
30 thru 10 AWG.

Insulations:
PVC.
Crosslinked PVC.

STANDARD STOCK CABLES

MIL-W-16878/1, TYPE B, 600V, 105°C PVC
UL 1061, 300V, 80°C PVC

Part No.	AWG	No. Cond.	Strand	Nom. Width	Approx. Wt./Roll (Lbs.)
10-MS-30-7B	30	10	7/38	.32	.74
15-MS-30-7B	30	15	7/38	.48	1.11
20-MS-30-7B	30	20	7/38	.64	1.48
30-MS-30-7B	30	30	7/38	.96	2.22
10-MS-28-7B	28	10	7/36	.35	1.00
15-MS-28-7B	28	15	7/36	.53	1.50
20-MS-28-7B	28	20	7/36	.70	2.00
30-MS-28-7B	28	30	7/36	1.05	3.00
10-MS-26-7B	26	10	7/34	.39	1.42
14-MS-26-7B	26	14	7/34	.55	1.99
15-MS-26-7B	26	15	7/34	.59	2.13
16-MS-26-7B	26	16	7/34	.63	3.18
20-MS-26-7B	26	20	7/34	.78	3.84
30-MS-26-7B	26	30	7/34	1.17	4.26

SPECIFICATIONS

Conductor:
Stranded or solid bare, tinned, heavy tin, overcoated tin, tin, top-coated or prebond copper conductors.

Insulations:
MIL-W-16878, Type B — UL 1061, UL 1007
MIL-W-16878, Type C — UL 1015, UL 1095
MIL-W-16878, Type D — UL 1472, UL 1429
UL 1430, UL 1431

Temperature Ratings: 80°C, 90°C, 105°C, depending on type.

Voltage Ratings: 300, 600 and 1000 volts, depending on type.

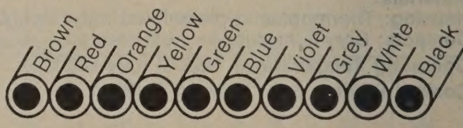
HOW TO ORDER

Multi-Strip 10 MS 26 7 B
Number of conductors
Multi-Strip
Wire gauge
Number of strands
Insulation type

Multi-Twist 10 MT 26 7 B
Number of twisted pairs
Multi-Twist
Wire gauge
Number of strands
Insulation type

Note: Adding an X to Part Number denotes colors other than Standard Color Code. Please specify any special color sequence when placing your order.

Standard color code (repetitive)



Part No.	AWG	No. Cond.	Strand	Nom. Width	Approx. Wt./Roll (Lbs.)
10-MS-24-7B	24	10	7/32	.44	2.05
10-MS-24-19B	24	10	19/36	.45	2.22
15-MS-24-7B	24	15	7/32	.66	3.08
15-MS-24-19B	24	15	19/36	.68	3.33
20-MS-24-7B	24	20	7/32	.88	4.10
20-MS-24-19B	24	20	9/36	.90	4.44
30-MS-24-7B	24	30	7/32	1.32	6.15
30-MS-24-19B	24	30	19/36	1.35	6.66
10-MS-22-7B	22	10	7/30	.51	2.97
10-MS-22-19B	22	10	19/34	.51	3.22
15-MS-22-7B	22	15	7/30	.77	4.46
15-MS-22-19B	22	15	19/34	.77	4.83
20-MS-22-7B	22	20	7/30	1.01	5.94
20-MS-22-19B	22	20	19/34	1.02	6.44
30-MS-22-7B	22	30	7/30	1.53	8.91
30-MS-22-19B	22	30	19/34	1.53	9.66

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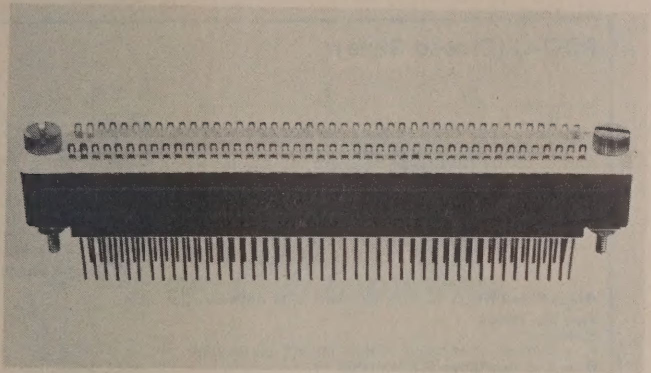
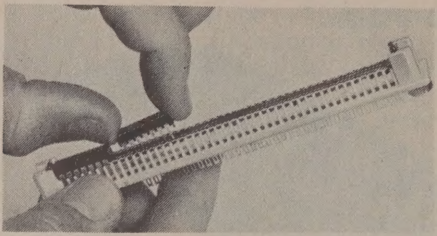
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

DipStik™

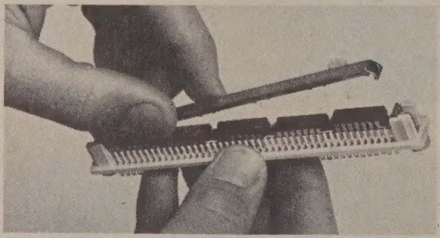
HIGH DENSITY ELECTRONIC PACKAGING SYSTEM



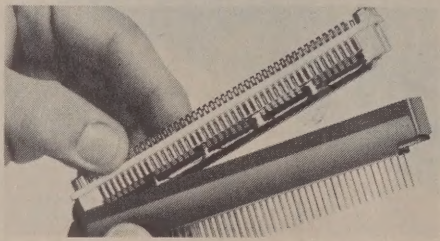
DipStik is a unique new method for mounting dual-in-lines. The DipStik System has been specifically designed to eliminate many of the problems and costs associated with printed circuit boards and sockets. It brings electronic packaging up to the level of integrated circuits by providing high capacitance, low impedance ground and power planes not found in current mounting systems.



Drop In: Up to 5 dual-in-line assemblies (up to 88 pins total) in the cartridge.



Snap In: The loaded DipStik cartridge into the DipStik receptacle and give the coupling screws a twist.



Clamp In: The dual-in-lines with the special clamp and spring assembly which holds them firmly in place.

THIS IS THE DipStik SYSTEM

The DipStik System consists of four basic parts.

1. **Cartridge Assembly:** This unit, fabricated of Diallyl Phthalate, holds the dual-in-lines in place.
2. **Receptacle Assembly:** When mated with the cartridge assembly, circuitry terminating is completed with Wire-Wrapable .025 square pins.
3. **Bus System:** This system, fabricated of copper alloys, provides power and ground to the dual-in-lines . . . without the use of solder.
4. **Mounting Hardware:** Mounting hardware and a variety of chassis designed specifically for use with the DipStik System.

HERE'S HOW DipStik SAVES YOU TIME AND MONEY OVER THE USE OF PRINTED CIRCUIT BOARDS AND SOCKETS

Printed Circuit Boards for Mounting Dual-in-lines Eliminated:
DipStik eliminates the need for PC boards, connectors, associated hardware, extractors and extenders.

100% Test Point Capability:
The DipStik System provides a test point for each dual-in-line lead through the use of terminals with eyelets in the DipStik cartridge.

System Maintenance Enhanced:
Defective dual-in-lines are easily replaced in the system simply by removing the cartridge assembly from the receptacle assembly, an operation which takes only a few seconds and may be accomplished with a minimum of equipment disassembly and downtime.

System Updating and Modification Facilitated:
Obsolete dual-in-lines are replaced in the same manner as defective ones. Re-Wire-Wrapping to meet new design requirements is also relatively simple since the Wire-Wrap terminals are easily accessible.

Increased Protection for Dual-in-lines:
The dual-in-lines are protected from external objects by the DipStik which completely surrounds them. Damage from shock and vibration is also minimized.

Versatility:
14- and 16-pin dual-in-lines, as well as non-discrete dual-in-lines, may be mixed in the same DipStik.

Low Insertion Forces:
Special straightening of dual-in-line lead leads prior to insertion is unnecessary. The fragile dual-in-line leads and internal bonds are protected during assembly since leads are not shoved into a socket or clearance holes in PC boards.

Ease of Assembly and Testing:
No special tools are required for the assembly of dual-in-lines into the DipStik. Terminals with eyelets for each dual-in-line lead are provided in the cartridge which may be used both as test points and for the mounting of non dual-in-line discrete components.

Packaging Density Increased:
The DipStik System increases packaging density of dual-in-lines as much as 100% over printed circuit mounting methods.

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SANTA CLARA, CALIFORNIA 95050
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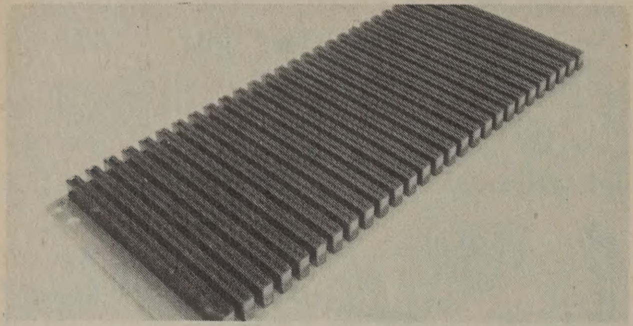
Stanford Applied Engineering

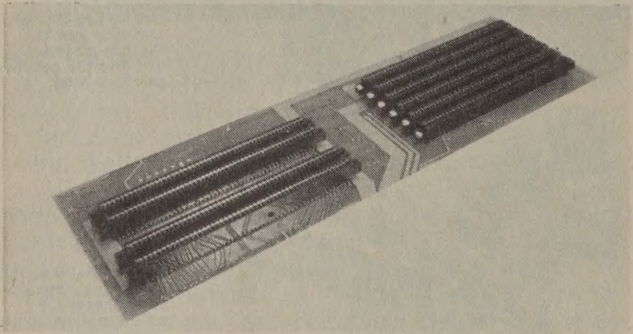
Back Panels

PDQ™ BACK PANEL CONNECTOR ASSEMBLIES

PIN-IN-BOARD (PDQ)



DISCRETE



SAE supports its back plane product line with:

- Full engineering staff — ability to take customer schematic to finished product.
- PCB manufacturing capability — double sided and multilayer.
- Complete Wire-Wrap services.
- Complete test capabilities.

SPECIFICATIONS

Materials:

Contacts: Phosphor bronze per QQ-B-750, Composition A.

Contact Plating: 10, 30 or 50 microinches of gold per MIL-G-45204, Type II over 50 microinches of nickel.

Insulator: Thermoplastic glass-filled polyester.

Mechanical:

Contact and Row Spacing: (See tables on this page.)

Contact Engagement Force: 4 to 9 oz. average per contact pair.

Contact Separation Force: 2 oz. minimum per contact pair.

Electrical:

Contact Current Rating — Continuous at 30°C Temperature Rise: 3.0 amps.

Contact Current Rating — Surge at 40°C Temperature Rise: 4.0 amps.

Contact Current Rating — Pulse at 40°C Temperature Rise: 9.0 amps.

Contact Resistance — Contact to PC Board: 7.0 milliohms max.

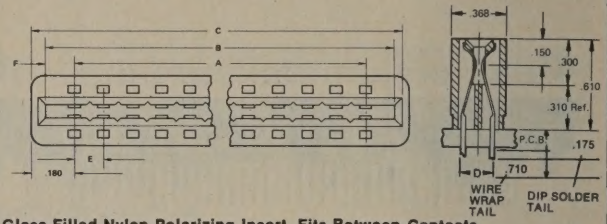
Contact Resistance — PC Board to Mother Board: 7.0 milliohms max.

Contact Resistance — Contact to Plated Thru-Hole: 1.0 milliohm max.

Low-Level Circuit Resistance at 1 Milliamp: 5.5 milliohms.

Insulation Resistance: 5000 megohms min.

PDQ-C (Closed Style)



Glass Filled Nylon Polarizing Insert. Fits Between Contacts.

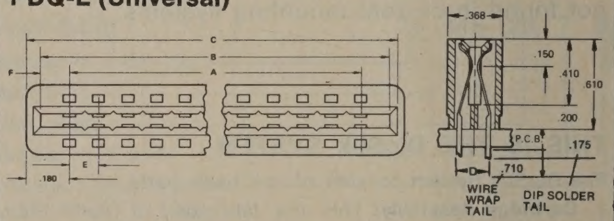
Part No. N8000

Notes:

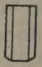
A — Number of contacts minus one x E dimension
B — A + two times F dimension
C — A + .360 (except .156 grid) C — A + .460 for .156

Dimensions	.100 x .100	.125 x .125	.100 x .200	.125 x .250	.156 x .200
D	.100	.125	.200	.250	.200
E	.100	.125	.100	.125	.156
F	.100	.125	.100	.125	.160

PDQ-L (Universal)



Glass Filled Nylon Polarizing Insert. Fits Between Contacts.



Part No. N8000

Notes:

A — Number of contacts minus one x E dimension
B — A + two times F dimension
C — A + .360 (except .156 grid) C — A + .460 for .156

Dimensions	.100 x .100	.125 x .125	.100 x .200	.125 x .250	.156 x .200
D	.100	.125	.200	.250	.200
E	.100	.125	.100	.125	.156
F	.100	.125	.100	.125	.160

SAE Connector back planes are available in two forms — Discrete and Pin in board (PDQ™).

DISCRETE

I. **Application:** Primarily used where all communicating is being done through the printed circuit board.

II. **Process:** Being vertically integrated the manufacture of a discrete back plane would consist of the marriage by wave solder of an SAE printed circuit board and a Dip solder edge board connector (i.e. SACXXD/2-2, SCCXXD/2-2, SBCXXD/2-2, SECXXD/2-2, CPH7000-XXST or CST, CPH7207-XXST and CPH8100-XXST or SST).

PDQ™ (PRESS FIT OR PIN IN BOARD)

I. **Application:** Most advantageous where communicating is being done through the printed circuit board and through the use of Wire-Wrap.

II. **Process:** PDQ™ is manufactured by pressing contact pins through the use of automatic insertion equipment into a plated through hole to form a gastight joint. After the pins are inserted the connector housing is placed over pins to form a connector.

Stanford Applied Engineering

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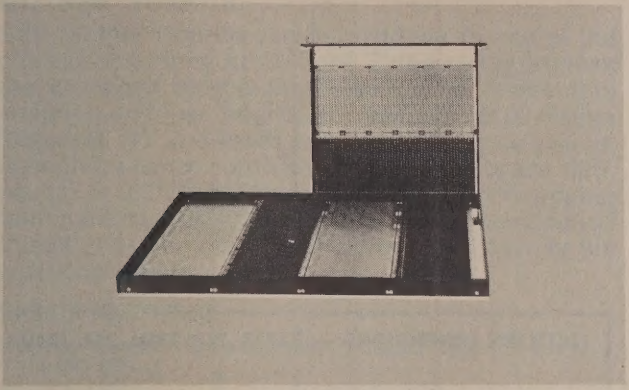
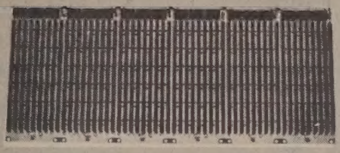
Logic Panels

SERIES EX700

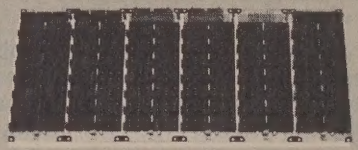


- Modular — 14, 16 universal patterns.
- Total ground plane — provides a lower ground characteristic impedance resulting in excellent noise immunity; and the structure of the lattice ground pattern results in a shorter electrical path to enhance high frequency performance.
- I/O options to fit designers needs.
- Power distribution by bus-bar interconnection and/or through direct power and ground input terminals.
- Decoupling Capacitors — one RF decoupling capacitor for every three devices in the system. In addition a full size panel contains twelve tantalum bypass capacitors to limit power supply ground line noise.

EX700



EX714



HOW TO ORDER

Model	Type	Sockets	Power & Ground Posts	Decoupling Capacitors*	Filter Capacitors†	I/O	Panel Size
EX700-9	Universal pattern. 9 rows per section spaced .300". Each row has 55 holes .100" center-to-center.	Socket strips installed in every row for universal use.	48	Provision for up to 48 decoupling capacitors per section.	2	See table below	2.675 x 6.950
EX700-18			96		4		5.375 x 6.950
EX700-27			144		6		8.075 x 6.950
EX700-36			192		8		10.775 x 6.950
EX700-45			240		10		13.475 x 6.950
EX700-54			288		12		16.175 x 6.950
EX714-42	Committed Ground & Power Pins 7 & 14	42 x 14-pin	Optional	14	2	See table below	2.675 x 6.950
EX714-84		84 x 14-pin	Optional	28	4		5.375 x 6.950
EX714-126		126 x 14-pin	Optional	42	6		8.075 x 6.950
EX714-168		168 x 14-pin	Optional	56	8		10.775 x 6.950
EX714-210		210 x 14-pin	Optional	70	10		13.475 x 6.950
EX714-252		252 x 14-pin	Optional	84	12		16.175 x 6.950
EX714-42U	Uncommitted Ground & Power	42 x 14-pin	84	14	2	See table below	2.675 x 6.950
EX714-84U		84 x 14-pin	168	28	4		5.375 x 6.950
EX714-126U		126 x 14-pin	252	42	6		8.075 x 6.950
EX714-168U		168 x 14-pin	336	56	8		10.775 x 6.950
EX714-210U		210 x 14-pin	420	70	10		13.475 x 6.950
EX714-252U		252 x 14-pin	504	84	12		16.175 x 6.950
EX716-36	Committed Ground & Power Pins 8 & 16	36 x 16-pin	Optional	12	2	See table below	2.675 x 6.950
EX716-72		72 x 16-pin	Optional	24	4		5.375 x 6.950
EX716-108		108 x 16-pin	Optional	36	6		8.075 x 6.950
EX716-144		144 x 16-pin	Optional	48	8		10.775 x 6.950
EX716-180		180 x 16-pin	Optional	60	10		13.475 x 6.950
EX716-216		216 x 16-pin	Optional	72	12		16.175 x 6.950
EX716-36U	Uncommitted Ground & Power	36 x 16-pin	72	12	2	See table below	2.675 x 6.950
EX716-72U		72 x 16-pin	144	24	4		5.375 x 6.950
EX716-108U		108 x 16-pin	216	36	6		8.075 x 6.950
EX716-144U		144 x 16-pin	288	48	8		10.775 x 6.950
EX716-180U		180 x 16-pin	360	60	10		13.475 x 6.950
EX716-216U		216 x 16-pin	432	72	12		16.175 x 6.950

*.01 μF †10 μF

SPECIFICATIONS

Material: Copper-clad, glass-base laminate, Type GF per MIL-P-13949D (FR-4).

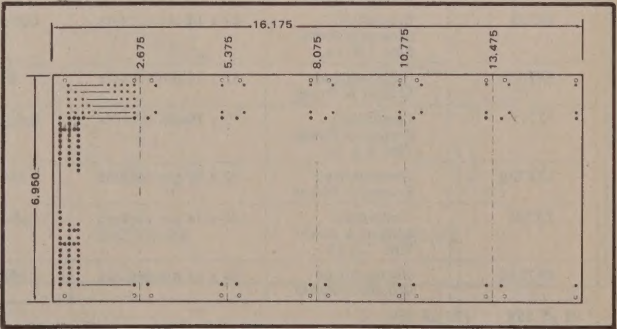
Board Thickness: 0.125", 2 ounces copper on both sides.

Color: Blue.

OPTIONS

Option	Description
1	3 x 14 pin sockets, P/N CSA-2200-14B. Total I/O lines per section: 42
2	3 x 28 pin sockets, P/N CFP-2100-28B. Total I/O lines per section: 84
3	2 Multi-Term Connectors with 26 wrap posts, P/N RH6226W3S. Total I/O lines per section: 52
4	2 Multi-Term Connectors with 20 wrap posts, P/N RH6220W3S. Total I/O lines per section: 40
5	52 wrap posts, P/N CB-250-3L. Total I/O lines per section: 52
6	2 x 23 pin socket strips. Total I/O lines per section: 46

OUTLINE DIMENSIONS



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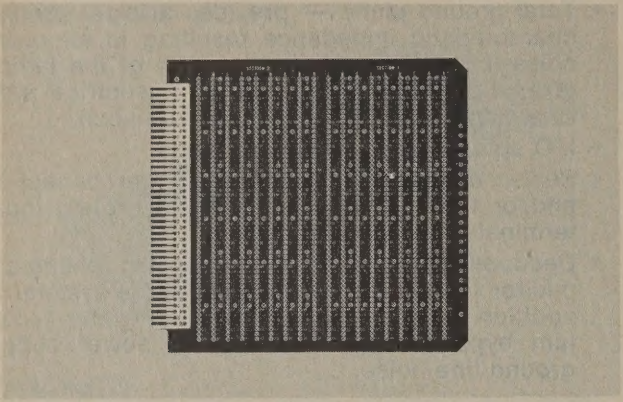
Stanford Applied Engineering

Logic Panels

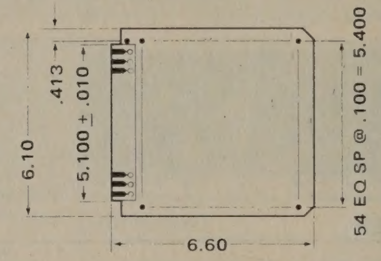
PLUG-IN MODULES



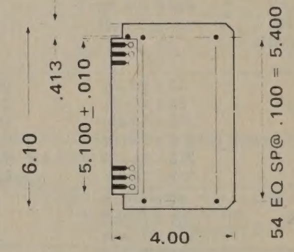
A variety of plug-in modules is available, and feature the same patterns as for the standard panels. For convenience, 18 numbered wrap posts are provided which can be used as test points.

Two standard sizes are available as described in the table below. Both have 80 contact fingers which can mate to a discrete connector or onto an EX500 Series Mother Board. Off-the-shelf mounting hardware to accommodate either configuration is described on page 38.

OUTLINE DIMENSIONS — EX718, 772, 772U, 784, 784U



OUTLINE DIMENSIONS — EX709, 736, 736U, 742, 742U



SPECIFICATIONS

Material: Copper-clad, glass-base laminate, Type GF per MIL-P-13949D (FR-4).

Board Thickness: .062″, 2 ounces copper on both sides.

Color: Blue.

Contacts:
Gold-plated in accordance with MIL-G-45204, 0.000050″ thick. Gold over low-stress nickel in accordance with QQ-N-290, 0.0003″ minimum.

HOW TO ORDER

Model	Type	Sockets	Power & Ground Posts	Decoupling Capacitors*	Filter Capacitors†	Test Points (Wrap Posts)	Board Size
EX709	Universal Pattern	Socket strips installed in every row for universal use.	48	Up to 48	2	18	4.00 x 6.10
EX718	Universal Pattern	Socket strips installed in every row for universal use.	96	Up to 96	2	18	6.60 x 6.10
EX736	Committed Ground & Power Pins 8 & 16	36 x 16-pin sockets	Optional	12	2	18	4.00 x 6.10
EX736U	Uncommitted Ground & Power	36 x 16-pin sockets	72	12	2	18	4.00 x 6.10
EX742	Committed Ground & Power Pins 7 & 14	42 x 14-pin sockets	Optional	14	2	18	4.00 x 6.10
EX742U	Uncommitted Ground & Power	42 x 14-pin sockets	84	14	2	18	4.00 x 6.10
EX772	Committed Ground & Power Pins 8 & 16	72 x 16-pin sockets	Optional	24	2	18	6.60 x 6.10
EX772U	Uncommitted Ground & Power	72 x 16-pin sockets	144	24	2	18	6.60 x 6.10
EX784	Committed Ground & Power Pins 7 & 14	84 x 14-pin sockets	Optional	28	2	18	6.60 x 6.10
EX784U	Uncommitted Ground & Power	84 x 14-pin sockets	168	28	2	18	6.60 x 6.10

*.01 µF 25V †22 µF 25V

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Logic Panels

MOTHER BOARDS
CHASSIS AND CARD FILES

MOTHER BOARDS

SAE Mother Boards can be installed in any of the chassis described to the right. Three configurations are standard off-the-shelf items. The connectors supplied on these boards are SAE CPH8100 Series featuring 80 pre-loaded bifurcated, gold-plated, phosphor bronze contacts. These contacts are .025″ square x .62″ long for solderless Wire-Wrapping terminations. Custom requirements can be supplied to suit your particular application. Just specify the positions desired.

SPECIFICATIONS

Material: Copper-clad glass-base laminate, Type GF per MIL-P-13949D (FR-4).

Board Thickness: 0.125″, 2 ounces copper on both sides.

Color: Blue.

Connector:

Body: Green, glass-filled diallyl phthalate per MIL-M-14, Type SDG-F.

Contacts: Phosphor bronze per QQ-B-750. Gold-plated per MIL-G-45204, Type II.

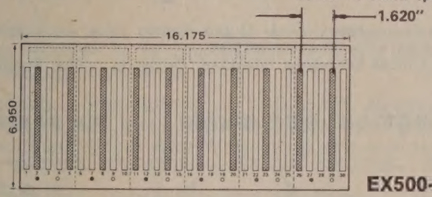
Contact Current Rating: 3 amps.

Insulation Resistance: 5000 megohms.

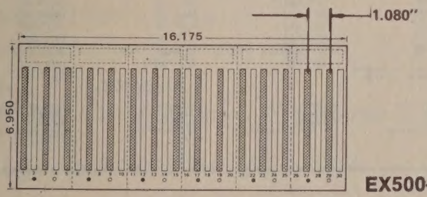
Operating Temperature: −65°C to +150°C.

CONNECTOR CONFIGURATION

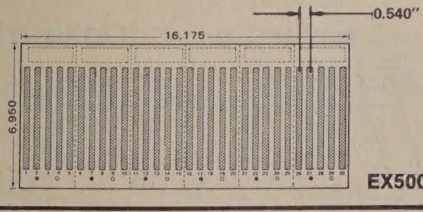
Typical
Center-To-Center Spacing



EX500-10



EX500-15



EX500-30

HOW TO ORDER

Model	Type	Connector	Filter Capacitors*	I/O	Board Size
EX500-10	Mother Board	10 Ea. CPH8100-80 SAE Connectors	12	See options Page 36	6.950 x 16.175
EX500-15	Mother Board	15 Ea. P8000-80 SAE Connectors	12	See options Page 36	6.950 x 16.175
EX500-30	Mother Board	30 Ea. CPH8100-80 SAE Connectors	12	See options Page 36	6.950 x 16.175

*10 μF

CHASSIS AND CARD FILES

Mounting hardware for all logic panels and plug-in modules is manufactured by Stanford Applied Engineering, Inc., and dimensionally conforms to industry established standards.

EX520-1: Horizontal drawer. Mounts in a standard 19″ rack and holds 2 each EX700 Series panels or EX500 Mother Boards. Supplied with 1¾″ front and rear panels and straight slides. For tilt slides order EX520-1T.

EX520-3: Same as EX520-1 except supplied with 3½″ front and rear panels. For tilt slides order EX520-3T.

EX520-5: Same as EX520-1 except supplied with 5¼″ front and rear panels. For tilt slides order EX520-5T.

EX530-7: One-section vertical frame. Mounts in a standard 19″ rack and holds one EX700 Series panel. Comes with or without 2 left or 2 right hinges. When ordering specify:

EX530-7 — without hinges.
EX530-7L — with left hinges.
EX530-7R — with right hinges.

EX530-14: Two-section vertical frame, as above.

EX530-21: Three-section vertical frame, as above.

EX530-28: Four-section vertical frame, as above.

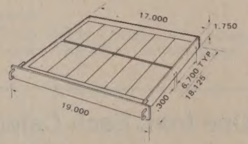
EX540-1: Card file for small plug-in modules. Supplied with rear panel and is fully assembled to hold 30 discrete CPH8100-80 SAE Connectors.

EX540-2: Same as EX540-1 but assembled to hold one EX500 Mother Board.

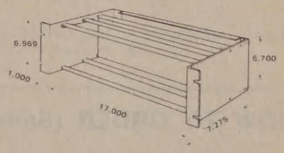
EX550-1: Card file for large plug-in modules. Supplied with rear panel and is fully assembled to hold 30 discrete CPH8100-80 SAE Connectors.

EX550-2: Same as EX550-1 but assembled to hold one EX500 Mother Board.

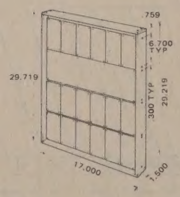
CHASSIS AND CARD FILE CONFIGURATIONS



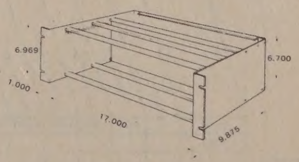
EX520-1



EX540-1



EX530-28



EX550-1

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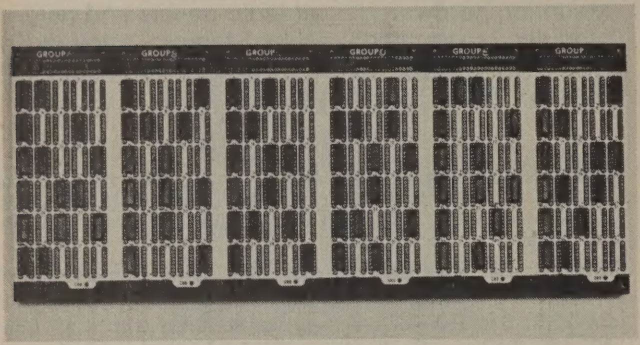
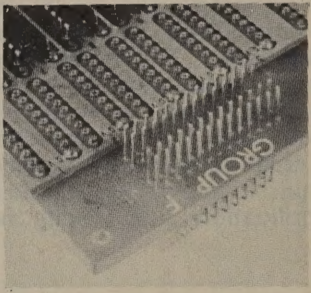
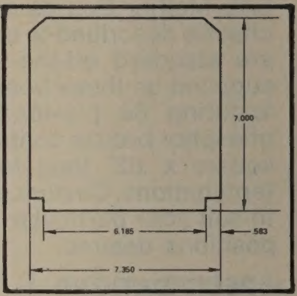
Engineering

Logic Panels

SERIES 8186-PG
14- AND 16-LEAD DUAL-IN-LINE IC's






7.000
6.185
.583
7.350

8186 LOGIC PANEL

Modular construction. Available in any multiple of 30 IC device patterns, up to 180 patterns. Each 30 pattern section accepts up to 3 interfacing plugs for input-output connections.

Machined beryllium copper socket terminals with closed entry contacts assure positive retention of IC leads.

Double sided 0.125″ thick board with power and ground planes connected to 2 contacts in each pattern.

Pin spacing on 0.100″ centers.

For Wire-Wrap Service — see page 42.

8186 PLUG-IN BOARD

The 8186 PG-60 is a 0.062″ thick double-sided PC packaging panel designed to hold 60 x 14- or 16-pin IC devices. Each pin is numbered for easy reference. Additionally, each pattern has 2 extra Wire-Wrap dummy pins connected to Ground and Power, respectively. Standard board has 3-level Wire-Wrap pins.

As a special feature, the panel has mounting provisions for 20 decoupling capacitors; 1 for every 3 devices, and 2 filter capacitors. Ten test points, marked TP1 through TP10, add to the versatility of this packaging panel.

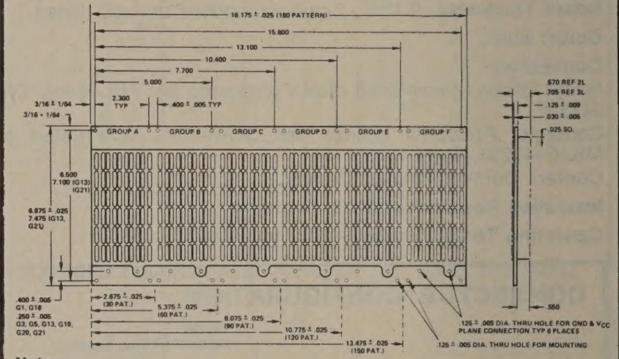
The I/O Connector Section contains 122 contacts and is compatible with other industry supplied plug-in logic modules.

Materials:

PC Board: .125″ thick glass epoxy, 2 oz. copper circuitry, both sides, tin plated.

Contacts: Gold over nickel per MIL-G-45204.

DETAIL "A" ALTERNATE I/O PIN LAYOUT

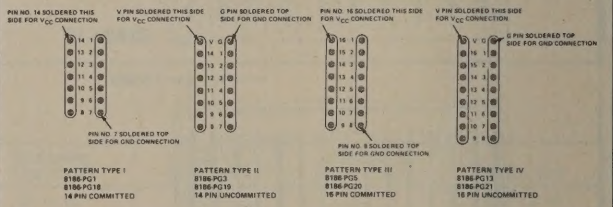

16.175 ± .025 (180 PATTERN)
15.800
13.100
10.400
7.700
5.000
2.300 TYP
.400 ± .005 TYP
3/16 ± 1/64
3/16 + 1/64
GROUP A
GROUP B
GROUP C
GROUP D
GROUP E
GROUP F
6.500
7.100 (G13) (G21)
6.875 ± .025
7.475 (G13, G21)
.400 ± .005 G1, G18
.260 ± .005 G3, G5, G13, G19, G20, G21
2.675 ± .025 (30 PAT.)
5.375 ± .025 (60 PAT.)
8.075 ± .025 (90 PAT.)
10.775 ± .025 (120 PAT.)
13.475 ± .025 (150 PAT.)
.570 REF 2L
.705 REF 3L
.125 ± .009
.030 ± .005
.025 SQ.
.550
.125 ± .005 DIA. THRU HOLE FOR GND & VCC PLANE CONNECTION TYP 6 PLACES
.125 ± .005 DIA. THRU HOLE FOR MOUNTING

Notes:

The dimensions shown above to the dashed lines are finished panel widths, for panels with the specified number of patterns.

Tolerance Unless Otherwise Specified: Decimals ±.005, Fractions ±1/64.

Vcc (BOTTOM) SIDE SHOWN PIN PATTERNS


PIN NO. 14 SOLDERED THIS SIDE FOR VCC CONNECTION
PIN NO. 7 SOLDERED TOP SIDE FOR GND CONNECTION
V PIN SOLDERED THIS SIDE FOR VCC CONNECTION
G PIN SOLDERED TOP SIDE FOR GND CONNECTION
PIN NO. 16 SOLDERED THIS SIDE FOR VCC CONNECTION
PIN NO. 8 SOLDERED TOP SIDE FOR GND CONNECTION
V PIN SOLDERED THIS SIDE FOR VCC CONNECTION
G PIN SOLDERED TOP SIDE FOR GND CONNECTION
V
G

PATTERN TYPE I
8186-PG1
8186-PG18
14 PIN COMMITTED

PATTERN TYPE II
8186-PG3
8186-PG19
14 PIN UNCOMMITTED

PATTERN TYPE III
8186-PG5
8186-PG20
16 PIN COMMITTED

PATTERN TYPE IV
8186-PG13
8186-PG21
16 PIN UNCOMMITTED

HOW TO ORDER (Select One from Each Category)

Category →	Basic Model No.		Socket Pattern and I/O Type									No. of Socket Patterns							Terminal Length	
			Female Contact I/O				W/W Feed Thru Contact I/O*													
		Dash	Pattern Type I	Pattern Type II	Pattern Type III	Pattern Type IV	Pattern Type I	Pattern Type II	Pattern Type III	Pattern Type IV	Dash								.375 (Two Level Wire Wrap Post)	.500 (Three Level Wire Wrap Post)
	8186	–	PG1	PG3	PG5	PG13	PG18	PG19	PG20	PG21	–	30	60	90	120	150	180	–	2L	**
	8186	–									–							–		
Enter Codes To Make Part No.																				

*I/O Terminations Per Detail "A". Mates With SAE PN.IJ-2500-26 Pin Plug. See P. 13

**Leave Blank If Three Level (3L) Pins Are Desired.

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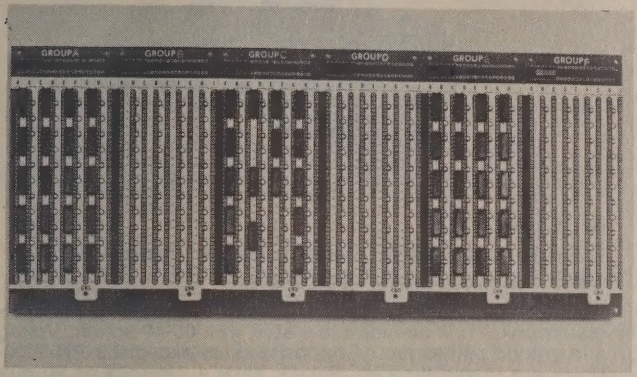
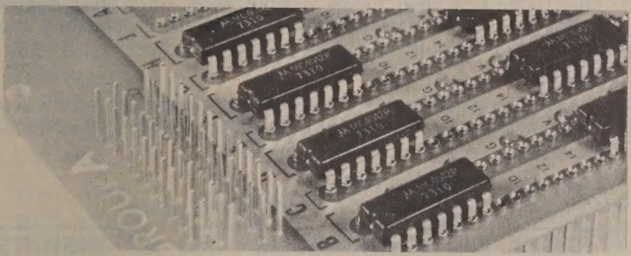
Logic Panels

SERIES 8186-UG
UNIVERSAL APPLICATIONS


GROUP A
GROUP B
GROUP C
GROUP D
GROUP E
GROUP F



DETAIL "A" ALTERNATE I/O PIN LAYOUT

Modular construction. Available in any multiple of 9 rows up to 54 rows. Each 9 row section accepts up to 3 interfacing plugs for input-output connection.

Panel accepts combinations of 14-through 40-lead Dip ICs. Double-sided 0.125″ thick board with power and ground planes connected to additional Wire-Wrap terminations outside of contact row.

Easy IC insertion, large contoured entry holes.

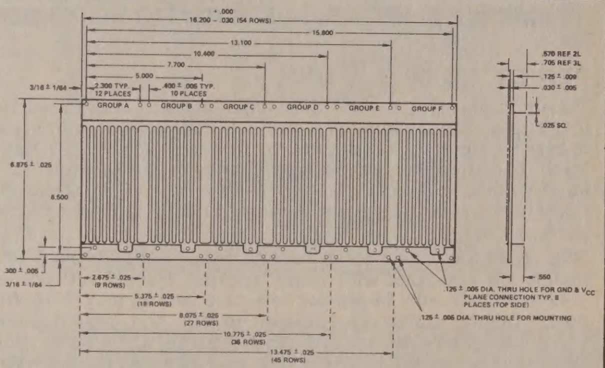
Pin spacing on 0.100″ centers.

For Wire-Wrapping service — see page 42.

Materials:

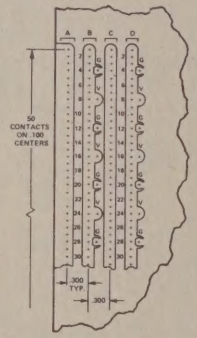
PC Board: .125″ thick glass epoxy, 2 oz. copper circuitry, both sides, tin plated.

Contacts: Gold over nickel per MIL-G-45204.


+.000
16.200 −.030 (54 ROWS)
15.800
13.100
10.400
7.700
5.000
3/16 ± 1/64
2.300 TYP. 12 PLACES
.400 ± .006 TYP. 10 PLACES
GROUP A
GROUP B
GROUP C
GROUP D
GROUP E
GROUP F
6.875 ± .025
6.500
.300 ± .005
3/16 ± 1/64
2.875 ± .025 (9 ROWS)
5.375 ± .025 (18 ROWS)
8.075 ± .025 (27 ROWS)
10.775 ± .025 (36 ROWS)
13.475 ± .025 (45 ROWS)
.570 REF 2L
.705 REF 3L
.125 ± .009
.030 ± .005
.025 SQ.
.550
.125 ± .005 DIA. THRU HOLE FOR GND & VCC PLANE CONNECTION TYP. 8 PLACES (TOP SIDE)
.125 ± .005 DIA. THRU HOLE FOR MOUNTING

Notes:

The dimensions shown above to the dashed lines are finished panel widths, for panels with the specified number of rows.
Tolerance Unless Otherwise Specified: Decimals ±.005, Fractions ±1/64.


A
B
C
D
50 CONTACTS ON .100 CENTERS
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
G
V
.300 TYP.
.300

Note:

Double-sided board with power and ground planes connected to additional Wire-Wrap terminations outside of contact row.

HOW TO ORDER (Select One from Each Category)

Category → Basic Part No.		I/O Description			No. Of Rows Of 50 Contacts							Terminal Length	
	Dash	Female Contact	W/W Feed Thru Contact*	Dash							Dash	.375 (Two Level Wire Wrap Post)	.500 (Three Level Wire Wrap Post)
8186	–	UG1	UG6	–	9	18	27	36	45	54	–	2L	**
8186	–			–							–		

Enter Codes To Make Part No.

*I/O Terminations Per Detail "A". Mates With SAE PN.IJ-2500-26 Pin Plug. See P. 13
**Leave Blank If Three Level (3L) Pins Are Desired.

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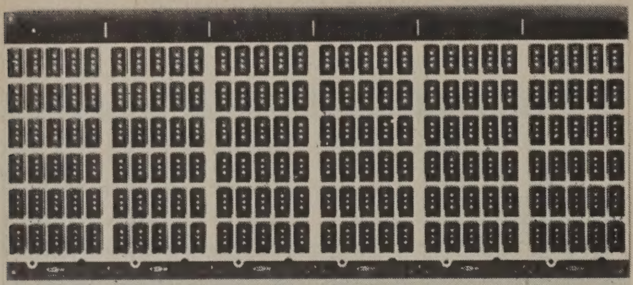
Logic Panels

HIGH DENSITY, MODULAR LOGIC PANELS **SERIES 10,000**
LOGIC PLUG-IN BOARD **SERIES 10,020**



SERIES 10,000

This modular off-the-shelf SAE logic panel is fabricated from 0.125" glass epoxy laminate. Modular construction permits use in any multiple of 30 patterns up to 180 in the 10,000 Series. Each 30-pattern section offers a unique SAE feature of 84 input/output connections. Also available in a universal configuration as PN 10015 with 9 rows of 53 contacts per section. Up to 54 rows.

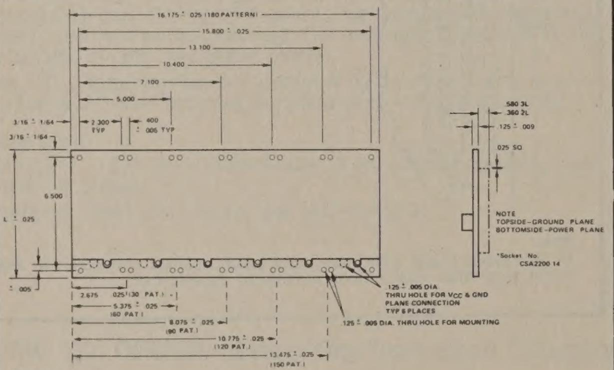
SAE offers four optional pin patterns for all logic panels. The -14 panels are equipped with 14-pin sockets. Panels suffixed with -142 are fitted with 14-pin sockets plus two dummy Wire-Wrap posts. Dummy posts are soldered to Vcc and ground planes. The third option -16, accepts 16-pin sockets. The last option, -162, is fitted with 16-pin sockets plus two dummy Wire-Wrap posts. Patterns are illustrated as seen from the bottom (Vcc) side.

Example of Ordering Number:

10010-14-180: Panel with 180 patterns of 14-pins per pattern.

10010-162-150: Panel with 150 patterns of 16-pins and 2 dummies per pattern.

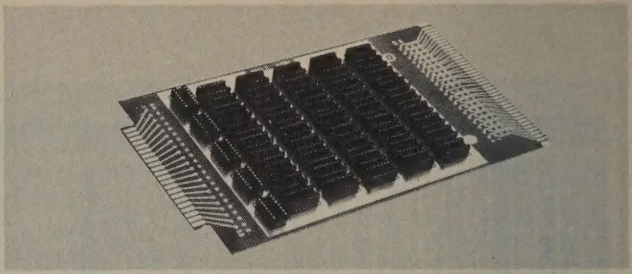
10015-18: Panel with 18 rows of 53 contacts per row. Rows are on 0.300" centers.


16.175 ± .025 (180 PATTERN)
15.800 ± .025
13.100
10.400
7.100
5.000
3/16 ± 1/64
2.300 TYP
.400 ± .005 TYP
3/16 ± 1/64
6.500
L ± .025
± .005
2.675 .025 (30 PAT.)
5.375 ± .025 (60 PAT.)
8.075 ± .025 (90 PAT.)
10.775 ± .025 (120 PAT.)
13.475 ± .025 (150 PAT.)
.125 ± .005 DIA THRU HOLE FOR VCC & GND PLANE CONNECTION TYP 6 PLACES
.125 ± .005 DIA. THRU HOLE FOR MOUNTING
.580 3L
.360 2L
.125 ± .009
.025 SQ
NOTE
TOPSIDE–GROUND PLANE
BOTTOMSIDE–POWER PLANE
*Socket No. CSA2200 14

Notes:
The dimensions shown above to the dashed lines are finished panel widths, for panels with the specified number of patterns.
Tolerance Unless Otherwise Specified: Decimals ±.005, Fractions ±1/64.

HOW TO ORDER

Part No.	Length L	Pin Pattern
10010-14	6.875	14-pin
10010-142	6.875	14-pin plus 2 dummies
10010-16	6.875	16-pin
10010-162	7.457	16-pin plus 2 dummies
10015	6.875	53 holes/row, 9 rows/section



SERIES 10,020

UL-Approved High Density Logic Panels with Optional Connector Take-offs

SAE standard logic panels are fabricated from 0.062" FR-4 glass epoxy laminate and are plated with 60-40 solder. Voltage and ground planes are on opposite sides except for PN 10024. Holes are plated through. Panels have a capacity of 50 dual-in-line IC packages.

The 10024 universal board has 18 rows on 0.300" centers. There are 64 contacts per row. Power and ground are interleaved on both sides of the board.

Extender Cards:

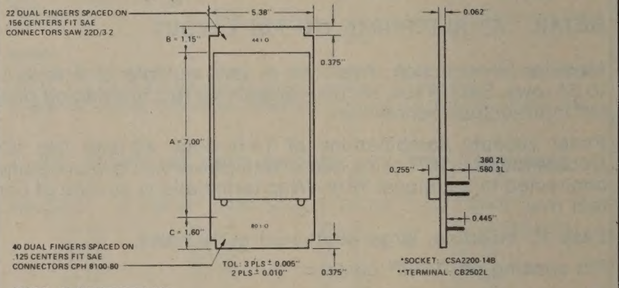
Order Extender Card PN 10810-4 for use with 44-Pin Connector and Extender Card PN 10190-1 for use with 80-Pin Connector.

Card files are available on request.

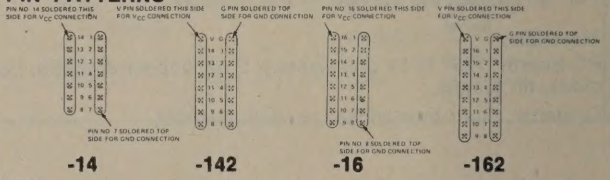
Example of Ordering Number:

10020-14: Configuration "A" with 14-pin option.

PANEL CONFIGURATIONS AND DIMENSIONS


22 DUAL FINGERS SPACED ON .156 CENTERS FIT SAE CONNECTORS SAW 22D/3 2
5.38"
B = 1.15"
44 I O
0.375"
A = 7.00"
C = 1.60"
80 I O
40 DUAL FINGERS SPACED ON .125 CENTERS FIT SAE CONNECTORS CPH 8100-80
TOL: 3 PLS ± 0.005"
2 PLS ± 0.010"
0.375"
0.062"
0.255"
.360 2L
.580 3L
0.445"
*SOCKET: CSA2200-14B
**TERMINAL: CB2502L

PIN PATTERNS


PIN NO. 14 SOLDERED THIS SIDE FOR VCC CONNECTION
PIN NO. 7 SOLDERED TOP SIDE FOR GND CONNECTION
V PIN SOLDERED THIS SIDE FOR VCC CONNECTION
G PIN SOLDERED TOP SIDE FOR GND CONNECTION
PIN NO. 16 SOLDERED THIS SIDE FOR VCC CONNECTION
PIN NO. 8 SOLDERED TOP SIDE FOR GND CONNECTION
V PIN SOLDERED THIS SIDE FOR VCC CONNECTION
G PIN SOLDERED TOP SIDE FOR GND CONNECTION
-14
-142
-16
-162

Note:
All 10,000 and 10,020 boards are offered with 3 level wrap sockets. These boards can also be supplied with 2 level wrap sockets. Add ST when ordering, e.g., a. 10,010-142-90-ST, b. 10,023-142-ST.

HOW TO ORDER

Part No.	Configuration & Dimension	Input/ Output Connections	Pin Pattern Options			
			14-Pin	14-Pin Plus Vcc & GND Dummies	16-Pin	16-Pin Plus Vcc & GND Dummies
10020	A 7.00 x 5.38	—	−14	−142	−16	−162
10021	A & B 8.15 x 5.38	44	−14	−142	−16	−162
10022	A & C 8.60 x 5.38	80	−14	−142	−16	−162
10023	A & B & C 9.75 x 5.38	124	−14	−142	−16	−162
10024	A & B & C 9.75 x 5.38	124		UNIVERSAL		

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Add Dept. EM to address to tell them you saw it in eem

Computer-Aided Wiring Services

Give SAE a system design, pin list, logic diagram, or wire list and we'll deliver the finished hardware; or if you prefer, have us just do the wiring on your own assemblies. Either way, you get the economy and reliability that computer-directed wrapping offers over soldering, with no set-up or tooling charges for standard panels and cages.

We have the equipment, plant facilities, and trained people to provide you with all your wiring needs, as our computer-directed Wire-Wrapping services is available for either standard or custom designed panels.

We can start with your logic diagram and end up with wired hardware and documentation. Give us your wire lists or signal string lists in SAE's format or your own. Our wiring services will process your inputs and based upon these our program will perform an error analysis designed to flag or eliminate wiring or assembly problems.

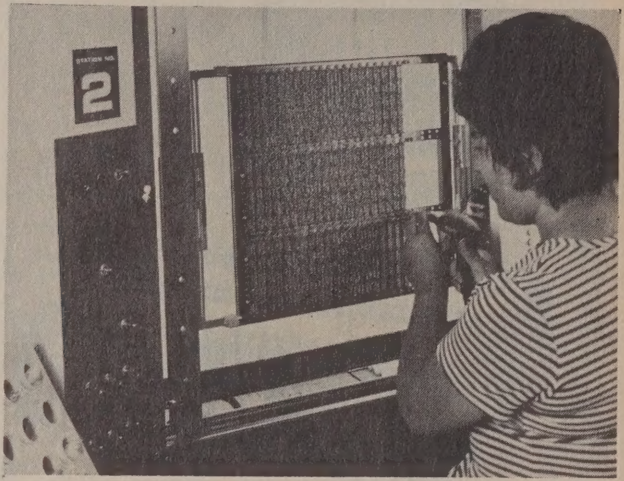
Some of the checks performed include:

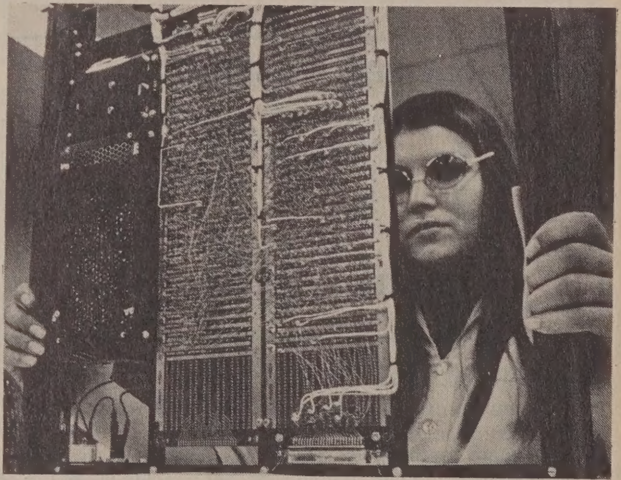
1. Geometry errors — improper use of pin callout for the hardware to be wired.
2. Overloads.
3. Multiple sources in a string.
4. Signal strings with a source, but no loads or vise-versa.
5. Duplicate pin callout within a string.
6. Single-pin errors.
7. Z-level errors.

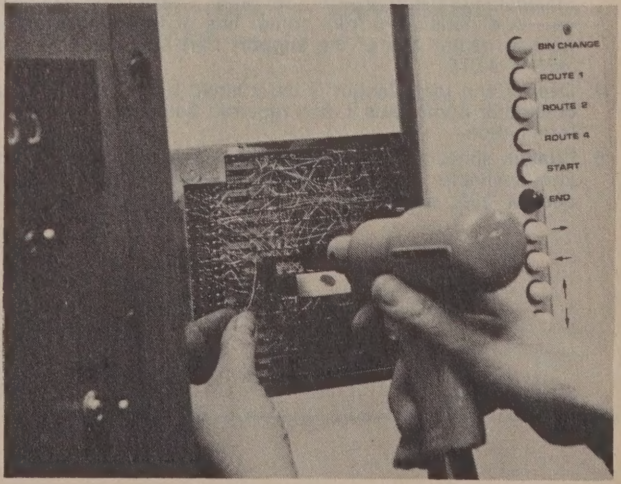
Prior to final assembly, the documentation is submitted to customer for approval and update.

A typical panel will be point-to-point randomly dressed, however both right angle and critical path routing can be provided. In addition, we can terminate twisted pairs, and twisted trios as well as single conductor wires.

Wire-routing optimization is a feature of SAE's program and is accomplished whether the requested wiring format is point-to-point or restricted.







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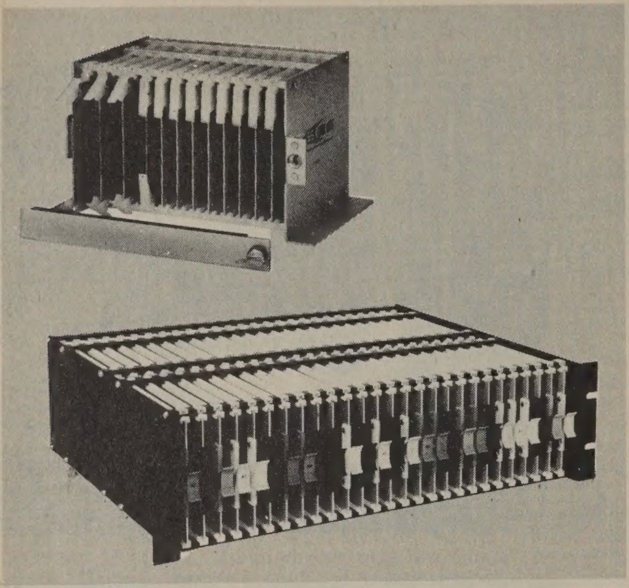
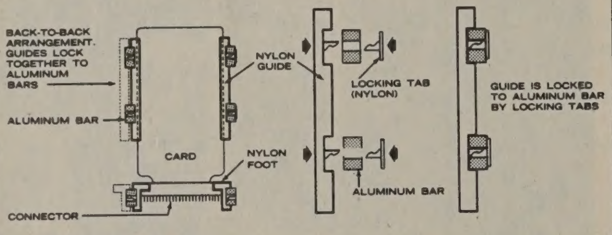
Card Files



“SNAP-TOGETHER” CONSTRUCTION


BACK-TO-BACK ARRANGEMENT. GUIDES LOCK TOGETHER TO ALUMINUM BARS
ALUMINUM BAR
CARD
CONNECTOR
NYLON GUIDE
NYLON FOOT
LOCKING TAB (NYLON)
ALUMINUM BAR
GUIDE IS LOCKED TO ALUMINUM BAR BY LOCKING TABS

TO MAKE A DRAWING

1. Accumulate ordering information at bottom of page.
2. Card guide support bar spacing is the sum of nominal circuit board height plus .375″.
3. Connector mounting foot support bar spacing is determined by adding the connector mounting holes center to center dimension to the connector foot offset x dimension (see page 44 —x dimension is from center line of the foot mounting hole to center line of the support bar) e.g., 4.031 + 2 x .422 = 4.875.
4. Overall end plate length is determined by card length and connector depth plus space required behind connector for termination.
5. Custom sheet metal end plates: Any flange or slot dimension available. Standard RETMA flanges are 1″ with .563″ deep x .250″ wide slots.

SUBASSEMBLIES

Because SAE's packaging system is modular — a building block of standard parts — any combination is possible which best fits the need. These basic parts are complimented by a complete line of accessories including identification tabs, card pullers, circuit card ejectors, circuit card ejector/retainers, and cable connector hoods.

SAE's modular construction is expandable in three dimensions. Any depth — width — length, single or multi-bay, combination is available . . . any card size can be accommodated.

The structure consists of aluminum end plates and support bars. Card guides and connector mounting feet are snapped on to the bars on centers to meet the customer's packaging density requirements. The Snap-Together feature allows removal of an individual guide or mounting foot without removing adjacent parts.

5 BASIC PARTS

Even though the package configuration may involve custom sheet metal end plates flanged for horizontal or vertical mounting, the card file will consist of 5 basic parts.

1. Support bar (aluminum)
2. End plate (aluminum)
3. Locking tab (nylon)
4. Connector mounting foot (nylon)
5. Card guide (nylon)

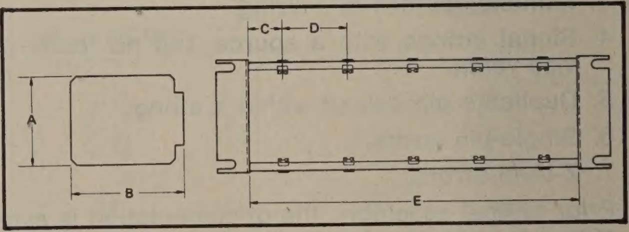
HOW TO ORDER

A part number example is indicated below. If you wish to design a custom file using standard parts please see below for assistance in preparing your drawing. SAE's sheet metal capability can accommodate any end plate or enclosure configuration you may wish to incorporate.

If you intend to use number 6100 or 6101 card ejectors, please specify when ordering. End plates: Unless otherwise specified, end plate height will be the closest RETMA standard dimension greater than the circuit card height.

Plate length will be sufficient to accommodate connector depth plus space behind connector for termination.

If you wish SAE connectors installed in your card file, please specify when ordering.



Two Bays 5.45 7.36 21 .50 .75 17.00 SAC22S/1-2 Front Mount

No. of Bays
Board Height, Dimen. A
Board Length, Dimen. B
No. of Board Positions
Dimension C
Desired Spacing*, Dimension D
Length of Card File Area, Dimension E
Connector Part No.
Mounting Flange Orientation (Front Mount, Rear Mount, etc.)

***Note:** Note any irregular spacing for power supplies or other tall components.

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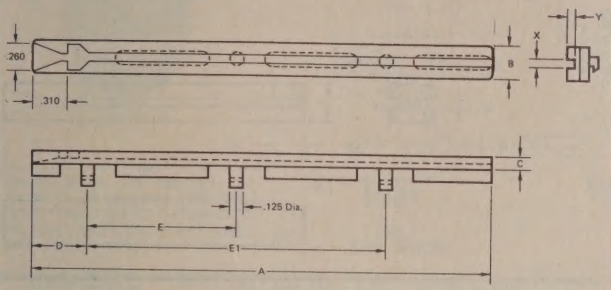
Card Files

ACCESSORIES

LOCKING TAB CARD GUIDE — 1000 SERIES

MATERIAL: Nylon


.260
.310
Y
X
B
C
.125 Dia.
E
D
E1
A

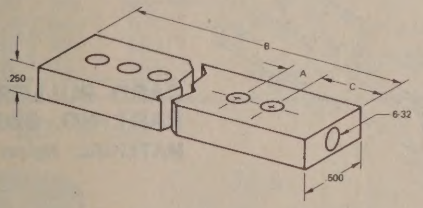
Model No.	A	B	C	D	E	E1	X	Y
1250	2.50	.312	.125	.50	1.500	—	.070	.075
1250M	2.38	.187	.125	.38	1.810	—	.045	.060
1450	4.50	.312	.125	.50	3.000	—	.070	.075
1650	6.50	.312	.125	.50	5.000	—	.070	.075
1651	6.50	.365	.125	.50	5.000	—	.100	.072
1900	9.06	.312	.144	.50	3.765	7.530	.080	.104
1125	12.53	.343	.144	.50	5.796	11.592	.083	.104

Notes:

1. For proper installation, a hole dia. of 0.1285″ 0.25 x 0.50 bar stock is recommended.
2. Install with lock tab Part No. 3000 (100201 on 1250M Guide).
3. Material: Type 6 nylon per MIL Spec M20693A, Types IV and IVa. UL 94V-2 or better.

SUPPORT BAR — 4000 SERIES

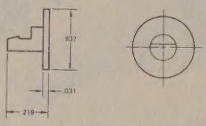
MATERIAL: 6061T Aluminum


.250
B
A
C
6-32
.500

Part No.	A	B	C	Part No.	A	B	C
4020	.200	17.0	.50	4060	.625	17.0	.375
4025	.250	17.0	.50	4100	1.000	17.0	1.000
4050	.500	17.0	.50				

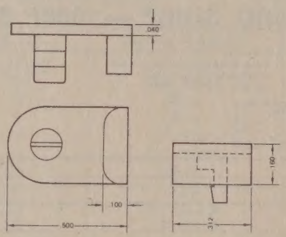
LOCKING TAB — PART NO. 3000

MATERIAL: Nylon



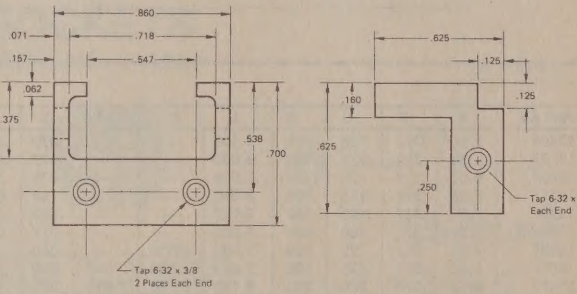
IDENTIFICATION LOCKING TAB — PART NO. 3100

MATERIAL: Nylon


.040
.100
.500
.160
.312

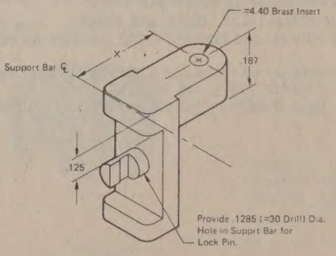
HIGH STRENGTH EXTRUSIONS

MATERIAL: Aluminum Alloy 6063


.860
.071
.718
.157
.547
.062
.375
.538
.700
.625
.125
.160
.125
.625
.250
Tap 6-32 x 3/8 Each End
Tap 6-32 x 3/8 2 Places Each End

CONNECTOR FOOT — 2000 SERIES

MATERIAL: Nylon


=4.40 Brass Insert
X
Support Bar ℄
.187
.125
Provide .1285 (=30 Drill) Dia. Hole in Supprt Bar for Lock Pin.

Note:
Use .500″ x .250″ Support Bar.

Part No.	X
2359	.359
2422	.422

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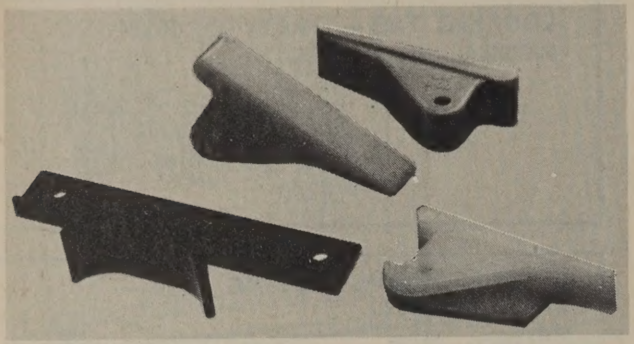
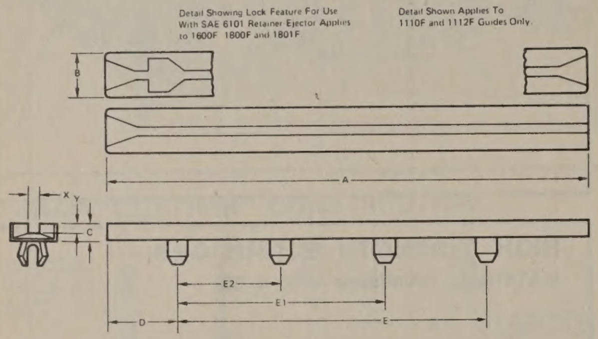
Card Files



SNAP-IN CARD GUIDE — 1000F SERIES


Detail Showing Lock Feature For Use With SAE 6101 Retainer-Ejector Applies to 1600F 1800F and 1801F
Detail Shown Applies To 1110F and 1112F Guides Only.
B
A
X
Y
C
E2
E1
D
E

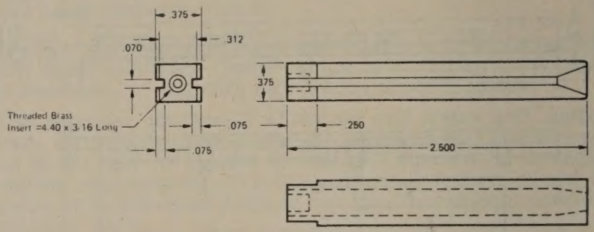
Part No.	A	B	C	D	E	E1	E2	X	Y
1250F	2.50	.312	.125	.500	1.500	—	—	.070	.075
1450F	4.50	.312	.125	.500	3.000	—	—	.070	.075
1600F	6.00	.312	.125	.500	5.000	—	—	.070	.075
1451F	4.50	.318	.125	.500	3.000	—	—	.140	.075
1650F	6.50	.312	.125	.500	5.020	—	—	.070	.075
1650FDT	6.50	.312	.200	.500	5.000	—	—	.077	.150
1800F	8.00	.312	.125	.500	7.000	3.500	—	.070	.075
1801F	8.00	.312	.175	.500	7.000	3.500	—	.070	.125
1962F	9.62	.270	.200	.500	8.150	5.130	3.010	.077	.150
1110F	11.00	.312	.200	.500	10.000	5.000	—	.077	.150
1112F	11.06	.312	.150	.500	10.070	5.038	—	.100	.100
1160F	16.00	.312	.200	.500	15.000	10.000	5.000	.077	.150

Notes:

1. Use sheet metal thickness of from 0.060 to 0.090 for proper installation.
2. Provide 0.172/0.177 dia. hole for mounting 1250F and 1450F.
3. Provide 0.182 dia. hole for mounting 1451F, 1600F and 1650F.
4. Provide 0.187 x 0.250 O round hole for end tabs and 0.182 dia. hole for center tabs on 1800F and 1801F.
5. Provide 0.187 x 0.250 O round holes for end tabs and 0.203 dia. hole for center tabs on 1962F, 1110F, 1112F, 1110FS, 1160F and 1650FDT.
6. Material Type 6 Nylon per MIL Spec M20693A, Types 4 and 4A. Meets UL 94V-2 or better.

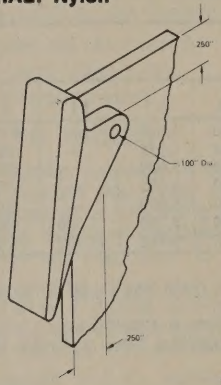
VERTICAL CARD GUIDE — PART NO. 1250V

MATERIAL: Nylon


.375
.312
.070
Threaded Brass Insert =4.40 x 3/16 Long
.075
.075
375
.250
2.500

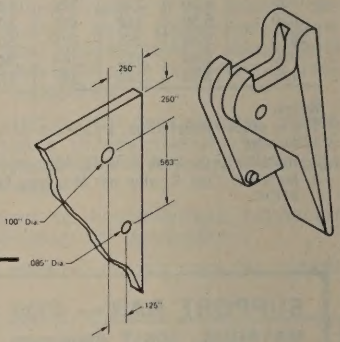
CARD EJECTOR — PART NO. 6100

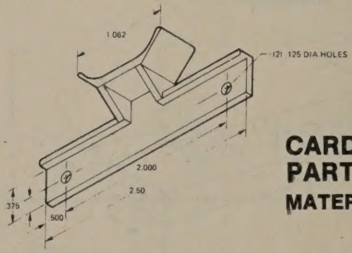
MATERIAL: Nylon


.250"
.100" Dia
.250"

RETAINER EJECTOR — PART NO. 6101

MATERIAL: Nylon


.250"
.250"
.563"
.100" Dia.
.085" Dia.
.125"


1.062
(2) .125 DIA HOLES
2.000
2.50
.375
.500

CARD PULLER — PART NO. 6200

MATERIAL: Nylon

STAMPED METAL CAPABILITIES

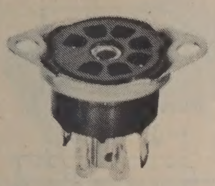
1. Metal guide stamped out of 16 gauge material.
2. Guide spacing to .600 (min.) centers.
3. Guide length — 2.62 long — can be used in tandem to accommodate large daughter boards.
4. Assemblies spot welded or knocked down for assembly at customer's facility.

Stanford Applied Engineering

STANFORD APPLIED ENGINEERING, INC.
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

SAE /ALCON DIVISION
1750 N. KIMBALL AVENUE / CHICAGO, ILLINOIS 60647
TELEPHONE (312) 235-5030

7-PIN MINIATURE TUBE SOCKETS



Shown below are examples of Alcon's wide range of 7-Pin Miniature Tube Sockets. Information on other types and styles available upon request.

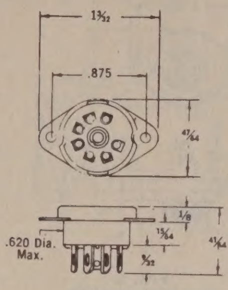

1³⁄₃₂
.875
⁴⁷⁄₆₄
⅛
¹⁵⁄₆₄
⁴¹⁄₆₄
.620 Dia. Max.
⁵⁄₃₂

FIG. 1
TOP MOUNT

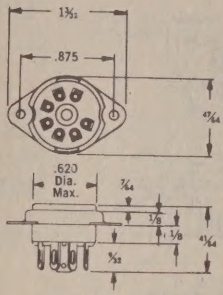

1³⁄₃₂
.875
⁴⁷⁄₆₄
.620 Dia. Max.
⁷⁄₆₄
⅛
⅛
⁴¹⁄₆₄
⁵⁄₃₂

FIG. 2
TOP MOUNT

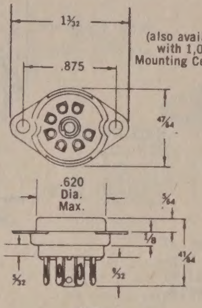

1³⁄₃₂
(also available with 1,000 Mounting Centers)
.875
⁴⁷⁄₆₄
.620 Dia. Max.
⁵⁄₆₄
⅛
⁴¹⁄₆₄
⁵⁄₃₂
⁵⁄₃₂

FIG. 3
BOTTOM MOUNT

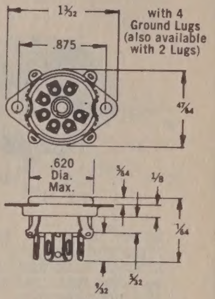
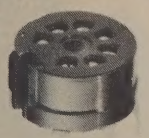

1³⁄₃₂
with 4 Ground Lugs (also available with 2 Lugs)
.875
⁴⁷⁄₆₄
.620 Dia. Max.
⁵⁄₆₄
⅛
⅛
¹⁄₆₄
⁵⁄₃₂
⁵⁄₃₂

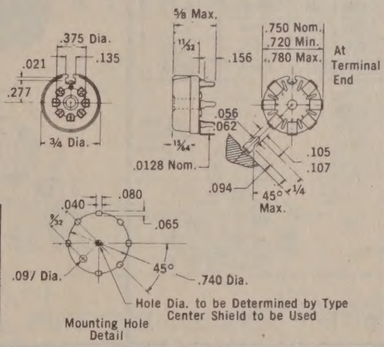
FIG. 4
BOTTOM MOUNT

ALCON Part No.	Mtg. Hole Dia.	ALCON Part No.	Mtg. Hole Dia.	Fig. Ref.	Casting Material*	Center Shield Dia.
5-7515-1M	.095	5-7515-3M	.128	1	G.P. Black	³⁄₁₆
5-7515-2M	.095	5-7515-4M	.128	1	G.P. Black	None
5-7515-1L	.095	5-7515-3L	.128	1	Mica	³⁄₁₆
5-7515-2L	.095	5-7515-4L	.128	1	Mica	None
5-7526-0M	.095	5-7526-6M	.128	2	G.P. Black	³⁄₁₆
5-7526-3M	.095	5-7526-8M	.128	2	G.P. Black	None
5-7526-0L	.095	5-7526-6L	.128	2	Mica	³⁄₁₆
5-7526-3L	.095	5-7526-9L	.128	2	Mica	None
5-7525-0M	.095	5-7525-6M	.128	3	G.P. Black	³⁄₁₆
5-7525-3M	.095	5-7525-93M	.128	3	G.P. Black	None
5-7525-0L	.095	5-7525-6L	.128	3	Mica	³⁄₁₆
5-7525-3L	.095	5-7525-93L	.128	3	Mica	None
5-7525-33M	.095	5-7525-73M	.128	4	G.P. Black	³⁄₁₆
5-7525-34M	.095	5-7525-88M	.128	4	G.P. Black	None
5-7525-35L	.095	5-7525-66L	.128	4	Mica	³⁄₁₆
5-7525-52L	.095	5-7525-70L	.128	4	Mica	None

7-PIN PRINTED CIRCUIT TUBE SOCKETS

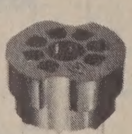
PART NO. 5-7561

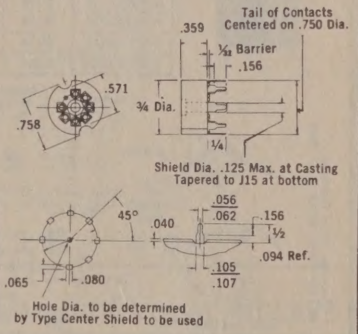



.375 Dia.
.021
.135
.277
¾ Dia.
⅝ Max.
¹¹⁄₃₂
.156
.750 Nom.
.720 Min.
.780 Max.
At Terminal End
.056
.062
¹³⁄₆₄
.0128 Nom.
.105
.107
.094
45°
¼
Max.
.040
.080
³⁄₃₂
.065
.09/ Dia.
45°
.740 Dia.
Hole Dia. to be Determined by Type Center Shield to be Used
Mounting Hole Detail

ALCON Part No.	Center Shield	Casting Material*
5-7561-1M	With	G.P.
5-7561-2M	None	G.P.
5-7561-1L	With	Mica
5-7561-2L	None	Mica

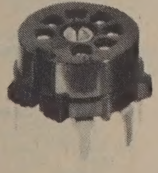
PART NO. 5-7562

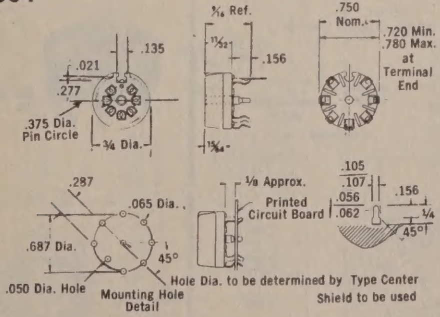



Tail of Contacts Centered on .750 Dia.
.359
¹⁄₃₂ Barrier
.156
.571
¾ Dia.
.758
¼
Shield Dia. .125 Max. at Casting Tapered to J15 at bottom
45°
.040
.056
.062
.156
½
.094 Ref.
.105
.107
.065
.080
Hole Dia. to be determined by Type Center Shield to be used

ALCON Part No.	Center Shield	Casting Material*
5-7562-1M	With	G.P.
5-7562-2M	None	G.P.
5-7562-1L	With	Mica
5-7562-2L	None	Mica

PART NO. 5-7564

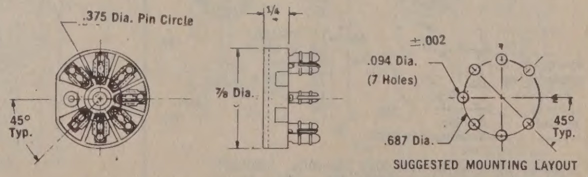



.135
.021
.277
.375 Dia. Pin Circle
¾ Dia.
⁵⁄₁₆ Ref.
¹¹⁄₃₂
.156
¹³⁄₆₄
.750 Nom.
.720 Min.
.780 Max.
at Terminal End
.287
.065 Dia.
.687 Dia.
45°
.050 Dia. Hole
Mounting Hole Detail
⅛ Approx.
Printed Circuit Board
.105
.107
.056
.062
.156
¼
45°
Hole Dia. to be determined by Type Center Shield to be used

General purpose or low loss phenolic. Available with or without center shield. No. 1-0061 ground strap available separately.

PART NO. 5-7571

Material:
General purpose phenolic. Other casting materials available.


.375 Dia. Pin Circle
45° Typ.
¼
⅞ Dia.
±.002
.094 Dia.
(7 Holes)
.687 Dia.
45° Typ.
SUGGESTED MOUNTING LAYOUT

*Other casting materials available, including SE-O rated.

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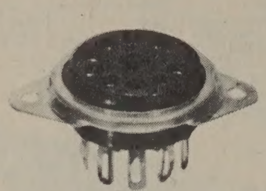
1750 N. KIMBALL AVENUE / CHICAGO, ILLINOIS 60647
TELEPHONE (312) 235-5030

9-PIN MINIATURE TUBE SOCKETS



Shown below are examples of Alcon's wide range of 9-Pin Miniature Tube Sockets. Information on other types and styles available upon request.

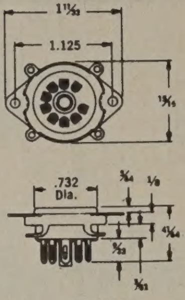

1$^{11}/_{32}$
1.125
$^{13}/_{16}$
.732 Dia.
$^{3}/_{64}$
1/8
$^{41}/_{64}$
$^{3}/_{32}$
$^{5}/_{32}$

FIG. 1
TOP MOUNT

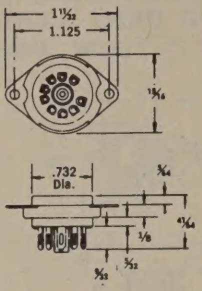

1$^{11}/_{32}$
1.125
$^{13}/_{16}$
.732 Dia.
$^{3}/_{64}$
$^{41}/_{64}$
1/8
$^{5}/_{32}$
$^{3}/_{32}$

FIG. 2
BOTTOM MOUNT

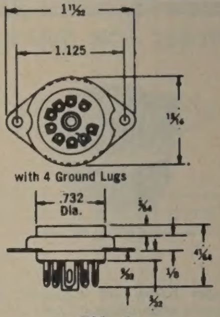

1$^{11}/_{32}$
1.125
$^{13}/_{16}$
with 4 Ground Lugs
.732 Dia.
$^{3}/_{64}$
$^{41}/_{64}$
$^{3}/_{32}$
1/8
$^{5}/_{32}$

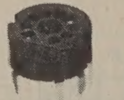
FIG. 3
BOTTOM MOUNT

ALCON Part No.	Mtg. Hole Dia.	ALCON Part No.	Mtg. Hole Dia.	Fig. Ref.	Casting Material*	Center Shield Dia.
5-9926-0M	.095	5-9926-6M	.128	1	G.P. Black	3/16
5-9926-3M	.095	5-9926-8M	.128	1	G.P. Black	None
5-9926-0L	.095	5-9926-6L	.128	1	Mica	3/16
5-9926-3L	.095	5-9926-8L	.128	1	Mica	None
5-9925-0M	.095	5-9925-6M	.128	2	G.P. Black	3/16
5-9925-3M	.095	5-9925-8M	.128	2	G.P. Black	None
5-9925-0L	.095	5-9925-6L	.128	2	Mica	3/16
5-9925-3L	.095	5-9925-8L	.128	2	Mica	None
5-9925-1M	.095	5-9925-7M	.128	3	G.P. Black	3/16
5-9925-2M	.095	5-9925-8M	.128	3	G.P. Black	None
5-9925-1L	.095	5-9925-7L	.128	3	Mica	3/16
5-9925-2L	.095	5-9925-8L	.128	3	Mica	None

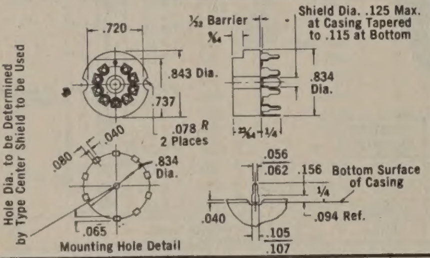
*Other materials available, including SE-0 rated.

9-PIN PRINTED CIRCUIT TUBE SOCKETS

PART NO. 5-9960

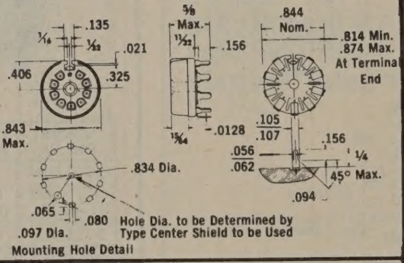


ALCON Part No.	Center Shield	Casting Material
5-9960-1M	With	G.P.
5-9960-2M	None	G.P.
5-9960-1L	With	Mica
5-9960-2L	None	Mica

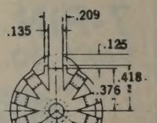

.720
$^{1}/_{32}$ Barrier
$^{3}/_{64}$
Shield Dia. .125 Max. at Casing Tapered to .115 at Bottom
.843 Dia.
.834 Dia.
.737
.078 R 2 Places
$^{13}/_{64}$
1/4
.040
.080
.834 Dia.
.056
.062
.156
Bottom Surface of Casing
1/4
.094 Ref.
.040
.065
.105
.107
Mounting Hole Detail
Hole Dia. to be Determined by Type Center Shield to be Used

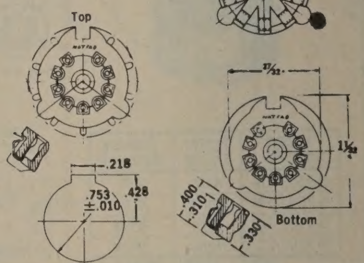
PART NO. 5-9961

ALCON Part No.	Center Shield	Casting Material
5-9961-1M	With	G.P.
5-9961-2M	None	G.P.
5-9961-1L	With	Mica
5-9961-2L	None	Mica

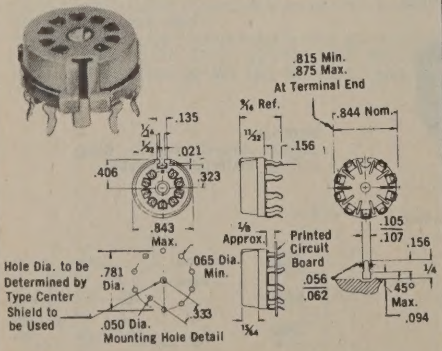

.135
$^{1}/_{16}$
$^{1}/_{32}$
.021
.406
.325
.843 Max.
5/8 Max.
$^{11}/_{32}$
.156
.844 Nom.
.814 Min. .874 Max. At Terminal End
.0128
$^{13}/_{64}$
.105
.107
.056
.062
.156
1/4
45° Max.
.094
.834 Dia.
.065
.080
.097 Dia.
Hole Dia. to be Determined by Type Center Shield to be Used
Mounting Hole Detail

PART NO. 5-9963


.209
.135
.125
.418
.376

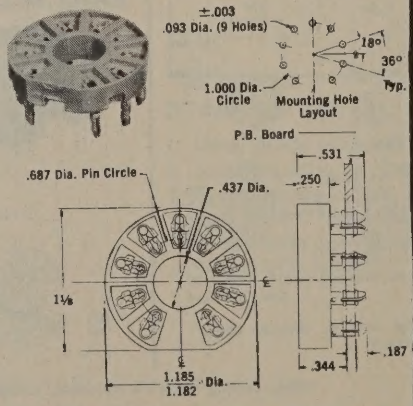

Top
$^{27}/_{32}$
1$^{1}/_{32}$
.218
.753 ±.010
.428
.400
.310
.330
Bottom

PART NO. 5-9964

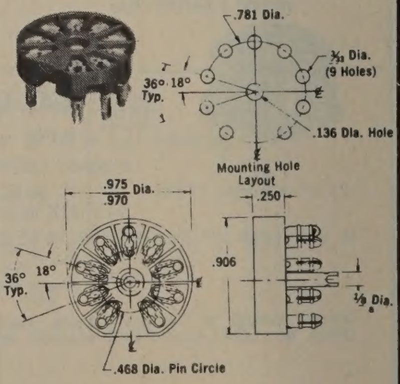

.815 Min.
.875 Max.
At Terminal End
$^{3}/_{16}$ Ref.
.844 Nom.
.135
$^{1}/_{64}$
$^{1}/_{32}$
.021
$^{11}/_{32}$
.156
.406
.323
.843 Max.
1/8 Approx.
Printed Circuit Board
.105
.107
.156
1/4
45° Max.
.094
.056
.062
.065 Dia. Min.
.781 Dia.
.333
.050 Dia.
$^{13}/_{64}$
Hole Dia. to be Determined by Type Center Shield to be Used
Mounting Hole Detail

General purpose or low loss phenolic. Available with or without center shield. No. 1-0061 ground strap available separately.

PART NO. 5-9388


±.003
.093 Dia. (9 Holes)
18°
36° Typ.
1.000 Dia. Circle
Mounting Hole Layout
P.B. Board
.531
.250
.687 Dia. Pin Circle
.437 Dia.
1 1/8
.187
.344
1.185
1.182
Dia.

PART NO. 5-9004


.781 Dia.
$^{3}/_{32}$ Dia. (9 Holes)
36° 18° Typ.
.136 Dia. Hole
Mounting Hole Layout
.975
.970
Dia.
.250
.906
36° Typ.
18°
1/8 Dia.
.468 Dia. Pin Circle

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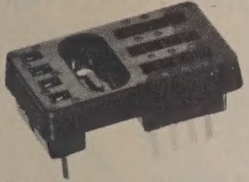
/ALCON DIVISION
1750 N. KIMBALL AVENUE / CHICAGO, ILLINOIS 60647
TELEPHONE (312) 235-5030

RELAY SOCKETS

GENERAL PURPOSE — 2, 4, 6 POLE



All Contacts are Beryllium Copper, Gold Plated.

Sockets are Molded of General Purpose, or Mica Filled Phenolic.

Other Materials Upon Application.

OPTIONAL RETAINER WIRE

.024 Dia. Tinned Spring Tempered Wire. Supplied as Separate Part.

To be Inserted into Recess on Narrow Sides of Socket.

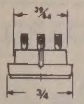
Part No.	Poles
21-1730	2
21-1730-1	4
21-1730-2	6

OPTIONAL GROUND WIRE 21-1729

.022 Dia. Nickel Silver Wire 18°, Spring Tempered.

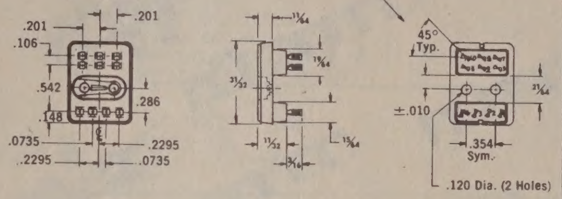
To be Inserted into Socket Recess Under Mounting Screw Head.

Supplied as Separate Part.

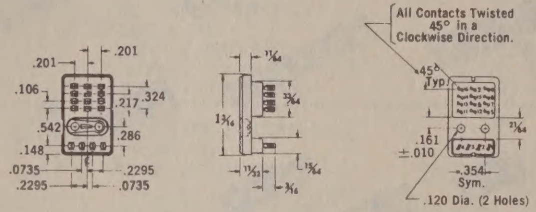


Note: Solder hole applicable to hand wired type only.

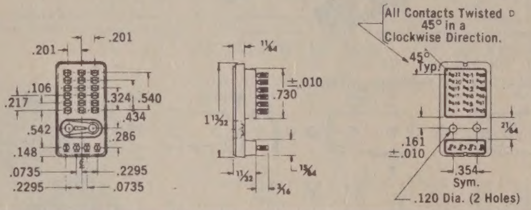
2 POLE — PART NO. 51-1002 (SOLDER) 51-10002-2 (PC)


All Contacts Twisted 45° in a Clockwise Direction.
.201
.201
.106
.542
.148
.286
.0735
.2295
.2295
.0735
11/64
19/64
31/32
11/32
13/64
3/16
45° Typ.
±.010
21/64
.354 Sym.
.120 Dia. (2 Holes)

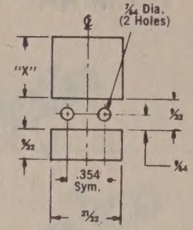
4 POLE — PART NO. 51-16006 (SOLDER) 51-16005-1 (PC)


All Contacts Twisted 45° in a Clockwise Direction.
.201
.201
.106
.217
.324
.542
.286
.148
.0735
.2295
.2295
.0735
11/64
13/16
39/64
11/32
13/64
3/16
45° Typ.
.161
±.010
21/64
.354 Sym.
.120 Dia. (2 Holes)

6 POLE — PART NO. 51-22002 (SOLDER) 51-22001-1 (PC)

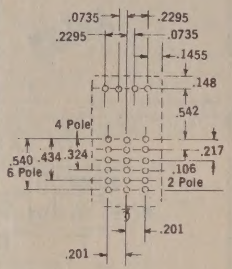

All Contacts Twisted 45° in a Clockwise Direction.
.201
.201
.106
.217
.324
.540
.434
.542
.286
.148
.0735
.2295
.2295
.0735
11/64
±.010
.730
113/32
11/32
13/64
3/16
45° Typ.
.161
±.010
21/64
.354 Sym.
.120 Dia. (2 Holes)

RECOMMENDED MOUNTING LAYOUT

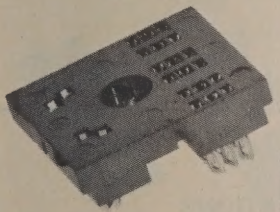

7/64 Dia. (2 Holes)
℄
"X"
3/32
3/32
3/64
.354 Sym.
21/32

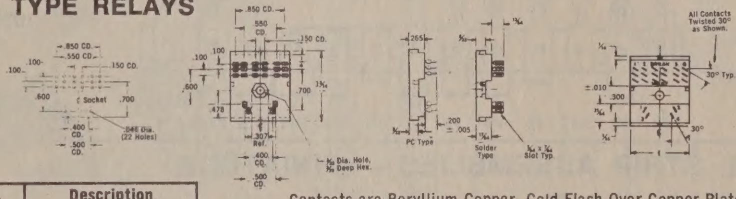
Part No.	"X"
51-10001	13/32
51-16003	9/16
51-22001	25/32

RECOMMENDED BOARD LAYOUT


.0735
.2295
.2295
.0735
.1455
.148
.542
4 Pole
.540
.434
.324
.217
.106
6 Pole
2 Pole
.201
.201

SOCKETS FOR HQA & LB TYPE RELAYS

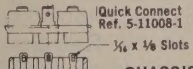



.850 CD.
.550 CD.
.150 CD.
.100
.100
.600
℄ Socket
.700
.400 CD.
.500 CD.
.046 Dia. (22 Holes)
.478
.307 Ref.
1/16 Dia. Hole, 3/32 Deep Hex.
.265
.200 ± .005
PC Type
Solder Type
3/64 x 1/16 Slot Typ.
All Contacts Twisted 30° as Shown.
±.010
.300
30° Typ.
30°

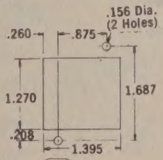
Part No.	Description
51-20000-1	Printed Circuit Type
51-22000	Hand Wired Type

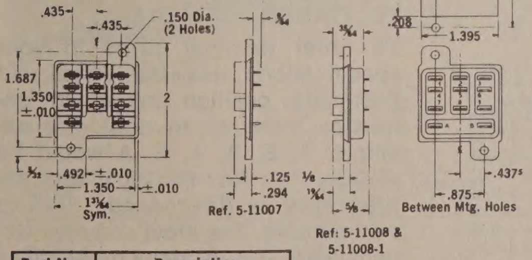
Contacts are Beryllium Copper, Gold Flash Over Copper Plate.
Sockets are Molded of General Purpose or Mica Filled Phenolic.
Other Materials Upon Application.
Optional Retainer Wire to be Ordered Separately. Order Part No. 21-1730-1.

SOCKETS FOR STANDARD GENERAL PURPOSE RELAYS


Quick Connect Ref. 5-11008-1
1/16 x 1/8 Slots

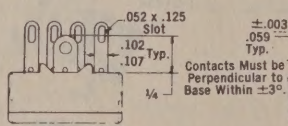
CHASSIS LAYOUT


.156 Dia. (2 Holes)
.260
.875
1.270
1.687
.208
1.395

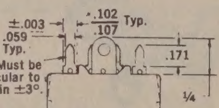

.435
.435
.150 Dia. (2 Holes)
1.687
1.350
±.010
2
3/32
.492
±.010
1.350
±.010
113/64 Sym.
3/64
35/64
.125
.294
Ref. 5-11007
1/8
13/64
5/8
Ref: 5-11008 & 5-11008-1
.4375
.875
Between Mtg. Holes

Part No.	Description
5-11007	Printed Circuit Type
5-11008	Hand Wired Type
5-11008-1	Quick Disconnect Term.

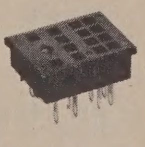
SOCKETS FOR MINIATURE INDUSTRIAL RELAYS

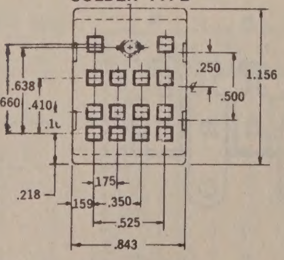

.052 x .125 Slot
.102
.107
Typ.
1/4
Contacts Must be Perpendicular to Base Within ±3°.

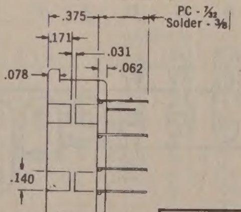
SOLDER TYPE

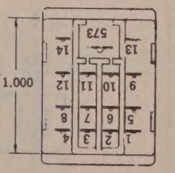

±.003
.059 Typ.
.102
.107
Typ.
.171
1/4

PC TYPE




.250
.500
1.156
.638
.660
.410
.218
.159
.175
.350
.525
.843


.375
PC - 7/32
Solder - 3/8
.171
.031
.062
.078
.140


1.000
13
14
9
10
11
12
5
6
7
8
1
2
3
4

Part No.	Description
5-15000-3	Printed Circuit Type
5-15000-0	Hand Wired Type

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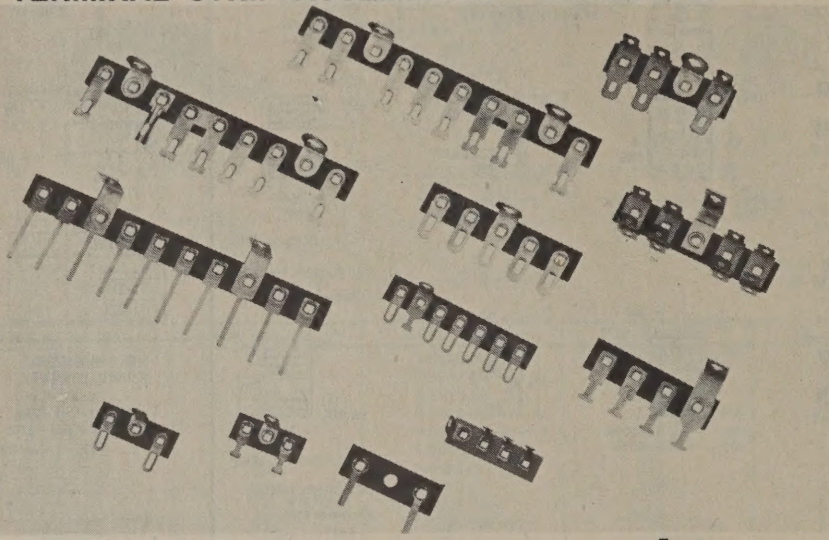
340 MARTIN AVENUE
SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

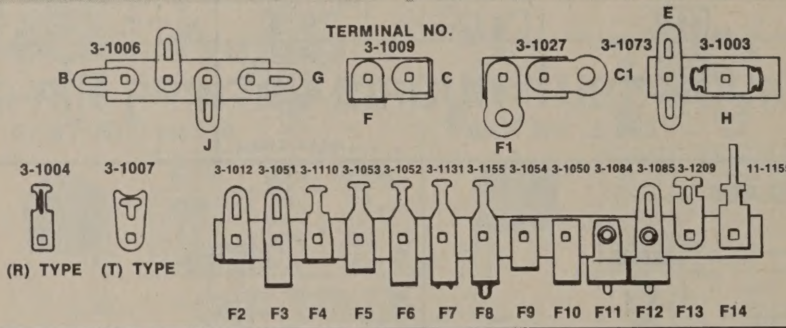
Stanford
Applied
Engineering

SAE /ALCON DIVISION
1750 N. KIMBALL AVENUE / CHICAGO, ILLINOIS 60647
TELEPHONE (312) 235-5030

ASSEMBLIES

TERMINAL STRIP ASSEMBLIES — STANDARD




TERMINAL NO.
3-1006
B
G
J
3-1009
C
F
3-1027
C1
F1
3-1073
E
3-1003
H
3-1004
3-1007
(R) TYPE
(T) TYPE
3-1012 3-1051 3-1110 3-1053 3-1052 3-1131 3-1155 3-1054 3-1050 3-1084 3-1085 3-1209
11-1155
F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14

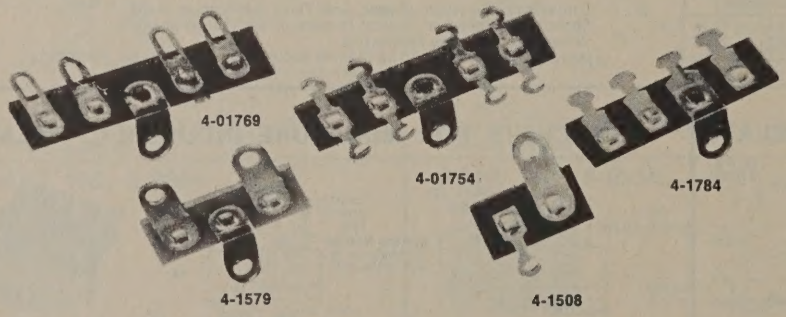
SPECIFICATIONS

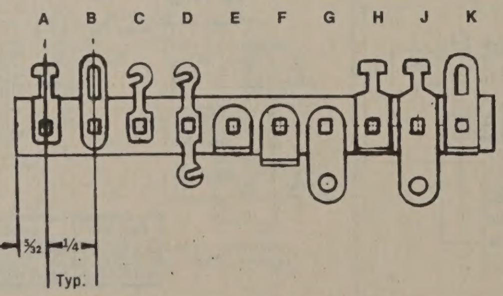
ALCON Terminal Strips are made of 1/16" thick by 3/8" wide NEMA grade XP laminated phenolic with lugs assembled in position on either 3/8" or 1/2" centers. Other insulating materials can be specified with waxing or varnish impregnation.

TO ORDER

To order terminal strips to your specifications use the chart and designate position letters in sequence from left to right. For example: F2, A, A, F, A, A would be ALCON Part No. 4-1243. If "R" or "T" type lugs are desired add "R" or "T" to part number when ordering. Add "W" to part number if wax impregnation is desired. The most common terminals are shown. Many other styles are available.

TERMINAL STRIP ASSEMBLIES — MINIATURE


4-01769
4-01754
4-1784
4-1579
4-1508


A B C D E F G H J K
5/32
1/4
Typ.

Part No.
ALCON
A — 3-1020
B — 3-1150
C — 3-1038
D — 3-1022
E — 3-1040
F — 3-1069
G — 3-1039
H — 3-1089
J — 3-1115
K — 3-1227

SPECIFICATIONS

ALCON Miniature Terminal Strips are made of 3/64" thick by 5/16" wide NEMA grade XP laminated phenolic with lugs assembled in position on 1/4" centers. Other insulating materials can be specified with waxing or varnish impregnation.

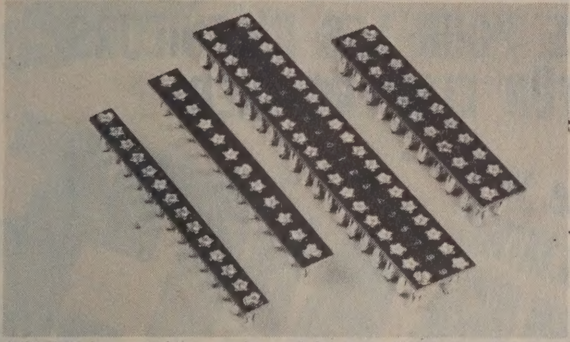
TO ORDER

To order terminal strips to your specifications use the chart and designate position letters in sequence from left to right. For example: A, E, A, A, E, A would be ALCON Part No. 4-1529. If wax impregnation is desired add "W" to part number. The most common terminals are shown. Many other styles are available.

/ALCON DIVISION
1750 N. KIMBALL AVENUE / CHICAGO, ILLINOIS 60647
TELEPHONE (312) 235-5030

ASSEMBLIES

GRIP TYPE CONICAL LUG ASSEMBLIES



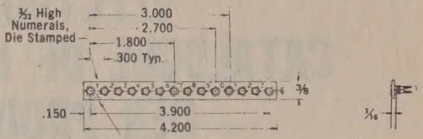
GRIP-TYPE lug assemblies can be used for conventional wire chassis or dip soldering process. One or more wires can be inserted into each lug and soldered individually or with multiple dip soldering process. Inserting leads into the GRIP-TYPE lugs eliminate the necessity of Wire-Wrapping.

Laminated material is XP phenolic and lugs are brass cadmium plated. Other types of laminated material available on request.

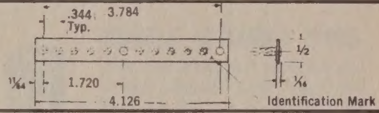
Note: Orientation of Conical Lugs is Optional.

3⁄8″ WIDE STRIP — LUGS ON .300″ CENTERS

IDENTIFICATION MARK ON OPPOSITE SIDE OF PLATE, DIE STAMPED.

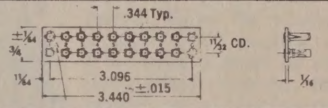

3⁄32 High Numerals, Die Stamped
3.000
2.700
1.800
.300 Typ.
3⁄8
.150
3.900
4.200
1⁄16

1⁄2″ WIDE STRIP — LUGS ON .344″ CENTERS


.344 Typ.
3.784
1⁄2
11⁄64
1.720
1⁄16
4.126
Identification Mark

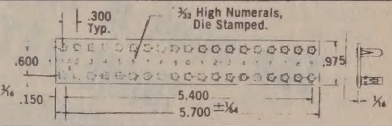
3⁄4″ WIDE STRIP — LUGS ON .344″ CENTERS

IDENTIFICATON MARK ON OPPOSITE SIDE OF PLATE.

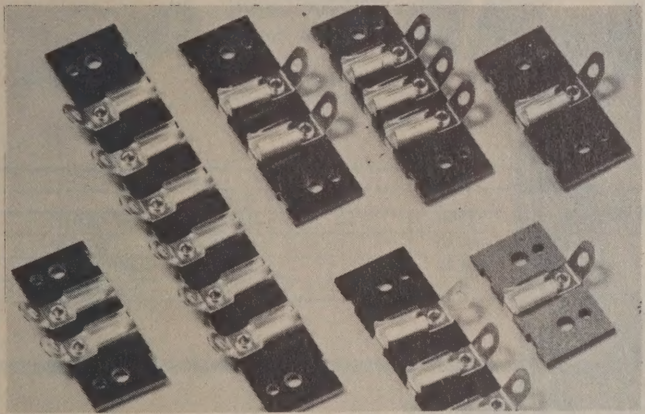

.344 Typ.
±1⁄64
3⁄4
11⁄32 CD.
11⁄64
3.096
±.015
3.440
1⁄16

.975″ WIDE STRIP — LUGS ON .300″ CENTERS

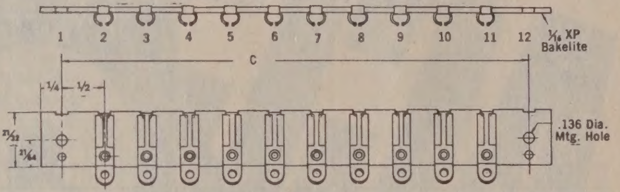
IDENTIFICATION MARK ON OPPOSITE SDE OF STRIP, DIE STAMPED.


.300 Typ.
3⁄32 High Numerals, Die Stamped.
.600
.975
3⁄16
.150
5.400
5.700 ±1⁄64
1⁄16

CONTACT STRIP ASSEMBLIES

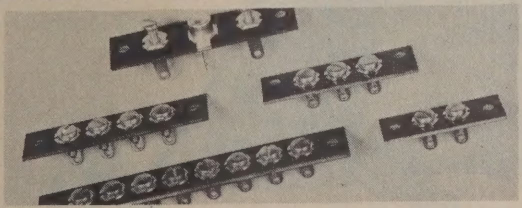


"0" DENOTES MTG. HOLE • "A" DENOTES CONTACT FOR .125 DIA. PIN
"B" DENOTES CONTACT FOR .156 DIA. PIN

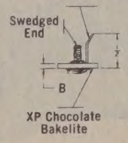

1
2
3
4
5
6
7
8
9
10
11
12
1⁄16 XP Bakelite
C
1⁄4
1⁄2
21⁄32
21⁄64
.136 Dia. Mtg. Hole

ALCON Part No.	Dim. "C"	No. of Contacts	Positions of Contacts											
			1	2	3	4	5	6	7	8	9	10	11	12
4-1801	1.000	1	0	A	0									
4-1802	1.500	2	0	A	A	0								
4-1803	2.000	3	0	A	B	A	0							
4-1804	2.500	4	0	B	A	A	B	0						
4-1805	3.000	5	0	A	B	A	B	A	0					
4-1806	3.500	6	0	A	A	A	A	A	A	0				
4-1807	4.000	7	0	A	A	A	A	A	A	A	0			
4-1808	4.500	8	0	A	A	A	A	A	A	A	A	0		
4-1809	5.000	9	0	A	A	A	A	A	A	A	A	A	0	
4-1810	5.500	10	0	A	A	A	A	A	A	A	A	A	A	0

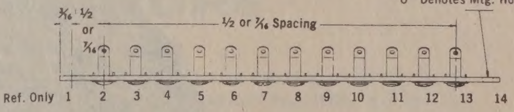
BINDING POST ASSEMBLIES

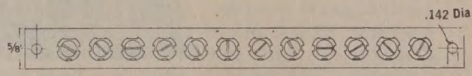


"A" DENOTES OUR 3-1030 LUG & SCREW ASSEMBLY

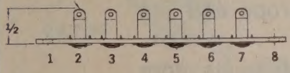

Swedged End
B
XP Chocolate Bakelite

"0" Denotes Mtg. Hole

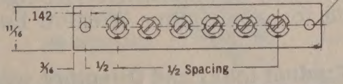

3⁄16
1⁄2
or
7⁄16
1⁄2 or 7⁄16 Spacing
Ref. Only
1
2
3
4
5
6
7
8
9
10
11
12
13
14



"A" DENOTES OUR 3-1030 LUG & SCREW ASSEMBLY


1⁄2
1
2
3
4
5
6
7
8

"0" DENOTES MTG. HOLE


.142
11⁄16
3⁄16
1⁄2
1⁄2 Spacing

ALCON Part No.	No. of Lugs	Position of Terminals							
		1	2	3	4	5	6	7	8
4-3061	1	0	A	0					
4-3062	2	0	A	A	0				
4-3063	3	0	A	A	A	0			
4-3064	4	0	A	A	A	A	0		
4-3065	5	0	A	A	A	A	A	0	
4-3066	6	0	A	A	A	A	A	A	0

ALCON Part No.	Dim. "B"	No. of Lugs	Position or Terminals													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
4-3001	1⁄16	1	0	A	0											
4-3002	1⁄16	2	0	A	A	0										
4-3003	1⁄16	3	0	A	A	A	0									
4-3004	1⁄16	4	0	A	A	A	A	0								
4-3005	1⁄16	5	0	A	A	A	A	A	0							
4-3006	1⁄16	6	0	A	A	A	A	A	A	0						
4-3007	5⁄64	7	0	A	A	A	A	A	A	A	0					
4-3008	5⁄64	8	0	A	A	A	A	A	A	A	A	0				
4-3009	5⁄64	9	0	A	A	A	A	A	A	A	A	A	0			
4-3010	5⁄64	10	0	A	A	A	A	A	A	A	A	A	A	0		
4-3017	5⁄64	11	0	A	A	A	A	A	A	A	A	A	A	A	0	
4-3020	5⁄64	12	0	A	A	A	A	A	A	A	A	A	A	A	A	0

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SANTA CLARA, CALIFORNIA 95050
(408) 243-9200 / TWX 910-338-0132

Stanford Applied Engineering

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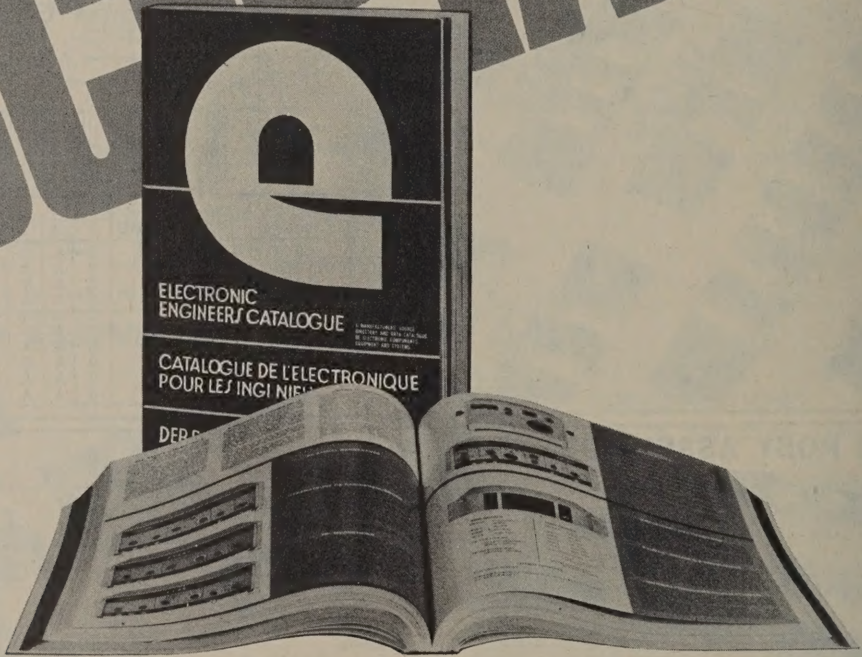
DER PRODUKTKATALOG FÜR ELEKTRONIKER

The book is out...and the response is in...

IMMEDIATE AND OVERWHELMING

ACCEPTANCE



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It is divided into three distinct sections: 1. **The Product Index and Directory,** which lists more than 3,000 products alphabetically in English with their French and German equivalents. 2. **The Manufacturers' Catalogue Section,** which is a compilation of Manufacturers' Catalogues in alphabetical order. 3. **The Manufacturers' Sales Offices and Trade Marks Directory,** which alphabetically includes country, address, telex or TWX numbers of the Manufacturers' main and local sales offices and/or agents.

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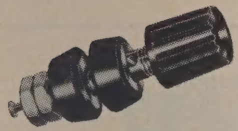
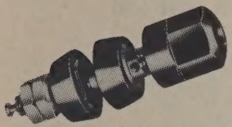
5-way® BINDING POSTS

5 WAYS TO CONNECT ● GOLD-PLATED BRASS PARTS ● RANGE OF COLORS



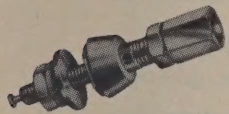
FLUTED NUT TYPES

Plastic parts of standard (not miniature) size types molded of Lexan polycarbonate resin; brass parts are gold-plated. Rated for 30 amperes, 1000 volts working. Nickel-plated brass types available on special order.



HEX NUT TYPES

Rated for 30 amperes, 1000 volts working. Brass parts are gold-plated; plastic parts are of nylon compounded to meet military specifications MIL-P-20693A, Type IV. Nickel-plated brass types available on order.

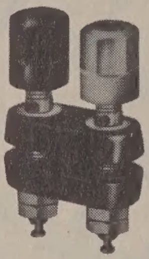


GROUNDING TYPE

For making rapid connections to ground. Made of finely machined brass nickel-plated and polished. Panel grounding collar frozen to shaft has "D" type shoulder for locking in keyed panel hole.

MINIATURE TYPES

Fluted nut design only. Rated for 15 amperes, 1000 volts working. Gold-plated brass parts; nylon plastic parts compounded to meet military specification MIL-P-20693A, Type IV. Types with nickel-plated brass available also.



DOUBLE ASSEMBLY TYPES

For instrument and equipment panels requiring binding posts mounted on ¾" centers. Rated for a current capacity of 30 amperes and a working voltage of 1000 volts. Brass parts are gold-plated; panel insulators in black only. Rugged, self-contained assembly makes mounting more accurate, faster and easier than two individual binding posts and gives maximum strength where connections are frequently made.

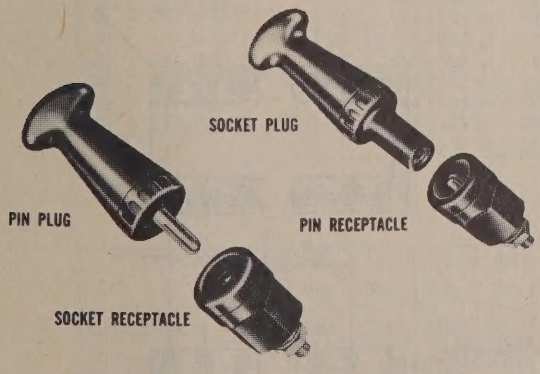
STYLE	TYPE
BINDING POSTS	
FLUTED NUT — STANDARD	DF31*
HEX NUT — STANDARD	DF30*
GROUNDING — ALL METAL	GP30NC
FLUTED NUT — MINIATURE	DF21*

STYLE	TYPE
DOUBLE ASSEMBLY TYPES	
BLACK & RED HEX NUTS	DF30-2-BRC

*Add desired color suffix to series designation number:
BC (black), BLC (blue), RC (red), WTC (white),
YC (yellow), GNC (green). For example: DF21BLC.

SUPERCON®

ELECTRICAL CONNECTORS



Nylon plastic parts; gold-plated brass current-carrying parts. Wiring connections to the same plug can be either soldered or solderless. Plug cable-fastening screws permit a wide range of cable sizes. Plug grips are of a simple, two-piece threaded construction for quick assembly. All receptacle plastic parts are molded of the same color to permit more rapid and accurate circuit identification front and back of panel when installed. The 25, 50 and 100 ampere types are listed by Underwriters' Laboratories, Inc.

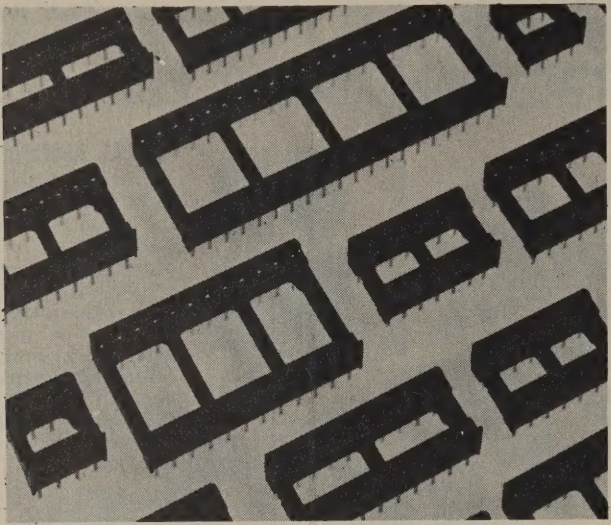
AMPERES	PIN PLUGS TYPE†	SOCKET RECEPTACLES TYPE†	SOCKET PLUGS TYPE†	PIN RECEPTACLES TYPE†
25	PP25G	RS25G	PS25G	RP25G
50	PP50G	RS50G	PS50G	RP50G
100	PP100G	RS100G	PS100G	RP100G
250	PP250G	RS250G	PS250G	RP250G

†Add desired color suffix to series designation number: B (black), BL (blue), R (red), WT (white), Y (yellow), GN (green). For example: PS25GWT.

THE SUPERIOR ELECTRIC COMPANY
1000 MIDDLE STREET • BRISTOL, CONN. 06010 • PHONE: (203) 582-9561

TEXAS INSTRUMENTS
CONNECTOR SYSTEMS MARKETING
34E Forest St. MS2-16, Attleboro, MA 02703
Telephone: (617) 222-2800, Ext. 268/269
TWX: 710-346-0566 TLX: 927708

Low Profile DIP Sockets Face Grip



		DIMENSION				
GOLD PART NO.	PINS	"X" ± 0.005	"Y" MAX.	"Z" MAX.	PINS	TIN PART NO.
C95-08-00	8	0.300	0.400	0.400	8	C85-08-00
C95-14-00	14	0.300	0.700	0.400	14	C85-14-00
C95-16-00	16	0.300	0.800	0.400	16	C85-16-00
C95-18-00	18	0.300	0.900	0.400	18	C85-18-00
C95-20-00	20	0.300	1.000	0.400	20	C85-20-00
C95-22-00	22	0.400	1.100	0.500	22	C85-22-00
C95-24-00	24	0.600	1.200	0.700	24	C85-24-00
C95-28-00	28	0.600	1.400	0.700	28	C85-28-00
C95-40-00	40	0.600	2.000	0.700	40	C85-40-00

- Low Insertion, high retention forces
- Anti-wicking design
- Inlay in contact area cuts cost and improves performance

SPECIFICATIONS

Material:

A. Body — glass reinforced polyester UL rated 94V-O

B. Contact — copper nickel alloy

C. Finish — 75 micro-inch min. gold inlay (C95 only)
200 micro-inch min. tin inlay (C85 only)

Notes:

A. Operating Temperature
-65°C to +125°C (C95 only)
-10°C to +100°C (C85 only)

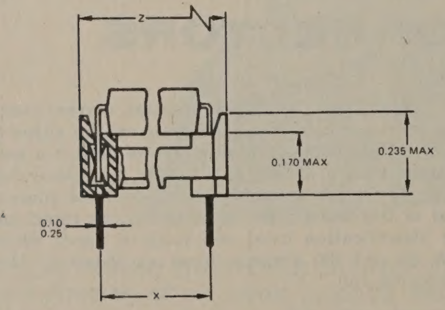
B. Accommodates standard IC leads up to 0.014 in. thick and 0.025 in. wide

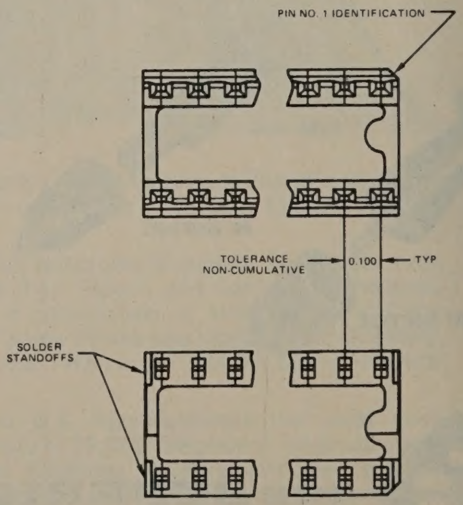
C. Sockets may be mounted end to end on 0.100" centers continuous line

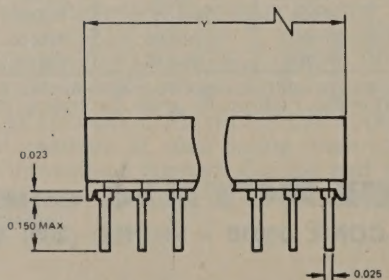
D. Closed entry and ramp features provided to facilitate automatic IC insertion

E. Large opening and high standoff features provide improved heat dissipation and cleaning

F. Contacts have redundant spring elements







TEXAS INSTRUMENTS
CONNECTOR SYSTEMS MARKETING
34E Forest St. MS2-16, Attleboro, MA 02703
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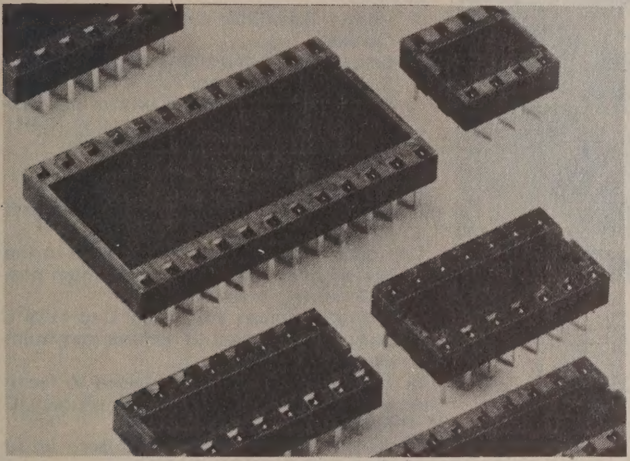
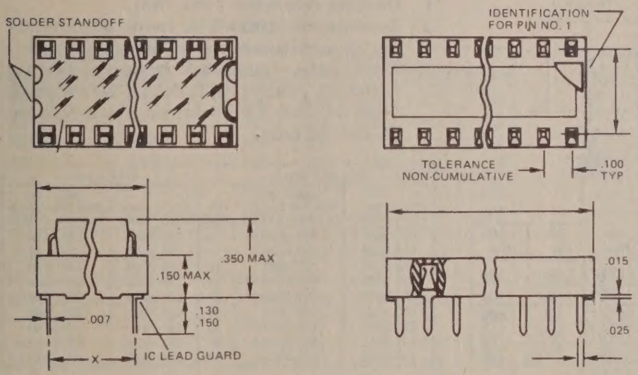
TWX: 710-346-0566 TLX: 927708

Low Profile DIP Sockets Edge Grip



- **Universal mounting and packaging**
- **Anti-wicking**
- **Solder standoffs for easy cleaning**
- **Redundant contact points for low contact resistance, higher reliability and repetitive insertion**

Here's the line of low profile solder tail sockets that makes wrought gold contact surfaces available at a price competitive with tin. And finally makes low price *and* high performance available by using a new, durable tin inlay. Only you know your performance requirements. But now, using gold or tin inlay, you can pick your own kind of savings — with TI sockets.



GOLD INLAY

Pins	Part Number
8	C93-08-02
14	C93-14-02
16	C93-16-02
18	C93-18-02
20	C93-20-02
22	C93-22-02
24	C93-24-02
28	C93-28-02
40	C93-40-02

TIN INLAY

PINS	PART NUMBER WITH WAFER		PART NUMBER WAFERLESS
8	C84-08-02	or	C84-08-00
14	C84-14-02	or	C84-14-00
16	C84-16-02	or	C84-16-00
18	C84-18-02	or	C84-18-00
20	C84-20-02	or	C84-20-00
22	C84-22-02	or	C84-22-00
24	C84-24-02	or	C84-24-00
28	C84-28-02	or	C84-28-00
40	C84-40-02	or	C84-40-00

	8 Pin	14 Pin	16 Pin	18 Pin
Dimension X ±.005	.300	.300	.300	.300
Dimension V ±.015	.400	.700	.800	.900
Dimension W (max.)	.400	.400	.400	.400

	20 Pin	22 Pin	24 Pin	28 Pin	40 Pin
Dimension X ±.005	.300	.400	.600	.600	.600
Dimension V ±.015	1.000	1.100	1.200	1.400	2.000
Dimension W (max.)	.400	.500	.700	.700	.700

SPECIFICATIONS

Material:

A. Body — Thermo plastic material meeting UL specification 94V-O

B. Contact — copper nickel alloy

C. Finish: — see part number schedule
C84 Series — 200 Micro-inch tin inlay
C93 Series — 75 Micro-inch gold inlay

Notes:

A. Sockets meet requirements of Texas Instruments test specifications TS-0005 and test report TR-0003

B. Operating temperature -65°C to +125°C

C. Contacts have redundant spring elements

D. Accommodates standard IC leads up to .011 ± .003 x .018 ± .003

E. Contact is designed and oriented in the plastic body to generate maximum possible contact pressure

F. Socket is designed to achieve maximum density on boards

G. Sockets may be mounted end to end on .100" centers continuous line

H. Socket is designed to prevent IC leads from contacting P/C board

I. Closed entry feature provided to facilitate automatic IC insertion and protects the IC leads against damage.

J. Waferless design will become standard during the second half of 1977.

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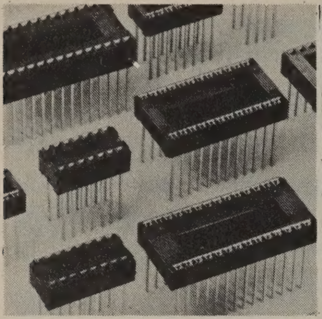
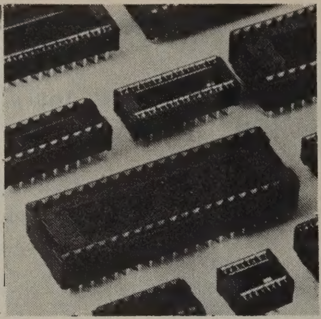
TWX: 710-346-0566 TLX: 927708

Standard Profile DIP Sockets Edgeboard Connectors





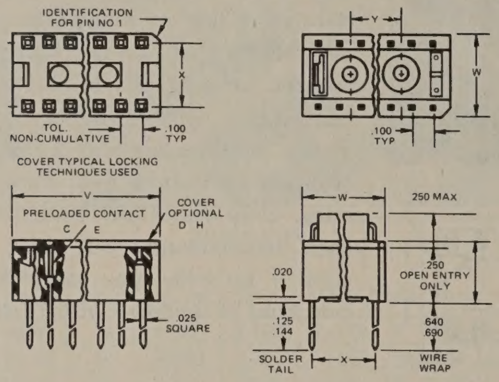
SPECIFICATIONS FOR DIP SOCKETS

Material:

A. Body — glass filled nylon (GFN)
B. Contact:
Solder tail — phosphor bronze per QQ-B-750 (C-82), copper nickel alloy (C-92)
Wire Wrap — phosphor bronze per QQ-B-750 (C-81), copper nickel alloy (C-91)
C. Finish — see part number schedule

Notes:

A. Contacts are replaceable
B. Contacts have redundant spring elements
C. Cover is removable
D. Contact is designed and oriented in the plastic body to generate maximum possible contact pressure
E. Operating temperature −65° C to +125° C
F. Socket is designed to achieve maximum density on boards
G. Closed entry cover is provided to facilitate automatic insertion and protect IC leads against damage
H. Accommodates standard IC leads up to .011 ± .003 x .018 ± .003
I. Contact retention 7 lbs. min.
J. Sockets are capable of being automatically or semiautomatically wire wrapped
K. Open entry, coverless version available. Order by specifying C9X-XX-50 for gold inlay or C8X-XX-54 for tin plate. N/A in 36 and 40 pins.



	8 Pin	14 Pin	16 Pin	18 Pin	20 Pin	24 Pin	28 Pin	36 Pin	40 Pin
Dimen. V ±.010	.465	.765	.865	.965	1.065	1.280	1.480	1.880	2.080
Dimen. W (max.)	.400	.400	.400	.400	.400	.700	.700	.700	.700
Dimen. X ±.005	.300	.300	.300	.300	.300	.600	.600	.600	.600
Dimen. Y ±.010	NA	.300	.400	.400	.400	.500	.500	.800	.800
Dimen. Z ±.005	.280	.280	.280	.280	.280	.280	.280	.280	.280

SOLDER TAIL			WIRE WRAP	
75μ IN. MIN GOLD INLAY	200μ IN. MIN TIN PLATE PER MIL-T-10727	NO. PINS	50μ IN. MIN GOLD INLAY	200μ IN. MIN TIN PLATE PER MIL-T-10727
C92-08-00	C82-08-04	8	C91-08-00	C81-08-04
C92-14-00	C82-14-04	14	C91-14-00	C81-14-04
C92-16-00	C82-16-04	16	C91-16-00	C81-16-04
C92-18-00	C82-18-04	18	C91-18-00	C81-18-04
C92-20-00	C82-20-04	20	C91-20-00	C81-20-04
C92-24-00	C82-24-04	24	C91-24-00	C81-24-04
C92-28-00	C82-28-04	28	C91-28-00	C81-28-04
C92-36-00	C82-36-04	36	C91-36-00	C81-36-04
C92-40-00	C82-40-04	40	C91-40-00	C81-40-04

EDGEBOARD CONNECTOR SPECIFICATIONS

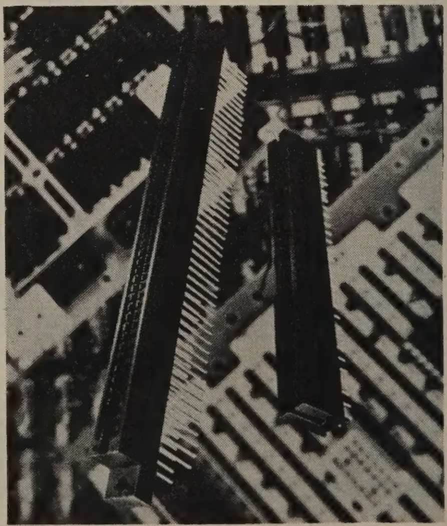
Material:

A. Body — glass filled nylon
B. Contact — copper nickel alloy
C. Finish:
Solder Tail — 75 micro-inch gold inlay
Wire Wrap — 50 micro-inch gold inlay

Notes:

A. Gang mating force — number of positions x 0.65 lbs.
B. Separation force (individual) — 0.5 oz. min.
C. Contact Resistance — 15 milliohms max.
D. Constriction resistance — 5 milliohms max.
E. Insulation resistance — 10,000 megohms min.
F. Dielectric withstanding voltage — 650 vacrms
G. Contact retention:
Wire Wrap — 7 lbs. min.
Solder Tail — 2 lbs. min.
H. Normal (contact) force — 50 grams min.
I. Contacts are replaceable
J. Contacts are bifurcated
K. Operating temperature: −65° C to +125° C
L. Wire wrap connectors are capable of semi or automatically wire wrapped
M. For further test information, refer to TI test report TR-0009

- **Wrought gold inlay 50-75 micro-inch thick**
- **Wire wrap or solder tail, 6 to 50 positions**
- **Choice of .100 or .125 centers**



TEXAS INSTRUMENTS

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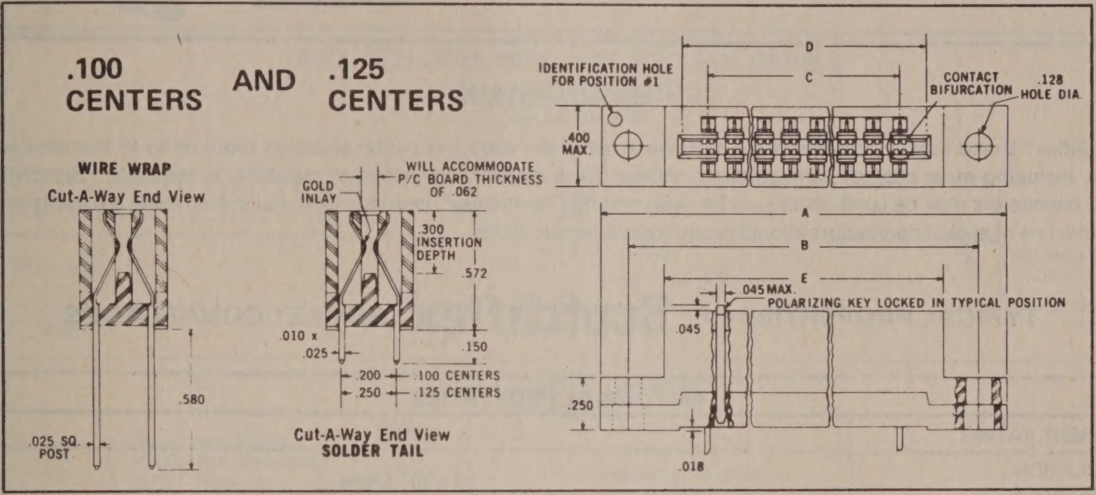
Edgeboard Connectors



.100 CENTERS

Part Number		No. of Pos.	Dimensions				
Wire Wrap	Solder Tail		A±.015	B±.010	C	D±.010	E±.010
H311106	H312106	06	1.460	1.200	.500	.700	.860
H311107	H312107	07	1.560	1.300	.600	.800	.960
H311108	H312108	08	1.660	1.400	.700	.900	1.060
H311109	H312109	09	1.760	1.500	.800	1.000	1.160
H311110	H312110	10	1.860	1.600	.900	1.100	1.260
H311111	H312111	11	1.960	1.700	1.000	1.200	1.360
H311112	H312112	12	2.060	1.800	1.100	1.300	1.460
H311113	H312113	13	2.160	1.900	1.200	1.400	1.560
H311114	H312114	14	2.260	2.000	1.300	1.500	1.660
H311115	H312115	15	2.360	2.100	1.400	1.600	1.760
H311116	H312116	16	2.460	2.200	1.500	1.700	1.860
H311117	H312117	17	2.560	2.300	1.600	1.800	1.960
H311118	H312118	18	2.660	2.400	1.700	1.900	2.060
H311119	H312119	19	2.760	2.500	1.800	2.000	2.160
H311120	H312120	20	2.860	2.600	1.900	2.100	2.260
H311121	H312121	21	2.960	2.700	2.000	2.200	2.360
H311122*	H312122*	22	3.060	2.800	2.100	2.300	2.460
H311123	H312123	23	3.160	2.900	2.200	2.400	2.560
H311124	H312124	24	3.260	3.000	2.300	2.500	2.660
H311125*	H312125*	25	3.360	3.100	2.400	2.600	2.760
H311126	H312126	26	3.460	3.200	2.500	2.700	2.860
H311127	H312127	27	3.560	3.300	2.600	2.800	2.960
H311128	H312128	28	3.660	3.400	2.700	2.900	3.060
H311129	H312129	29	3.760	3.500	2.800	3.000	3.160
H311130*	H312130*	30	3.860	3.600	2.900	3.100	3.260
H311131	H312131	31	3.960	3.700	3.000	3.200	3.360
H311132	H312132	32	4.060	3.800	3.100	3.300	3.460
H311133	H312133	33	4.160	3.900	3.200	3.400	3.560
H311134	H312134	34	4.260	4.000	3.300	3.500	3.660
H311135	H312135	35	4.360	4.100	3.400	3.600	3.760
H311136*	H312136*	36	4.460	4.200	3.500	3.700	3.860
H311137	H312137	37	4.560	4.300	3.600	3.800	3.960
H311138	H312138	38	4.660	4.400	3.700	3.900	4.060
H311139	H312139	39	4.760	4.500	3.800	4.000	4.160
H311140*	H312140*	40	4.860	4.600	3.900	4.100	4.260
H311141	H312141	41	4.960	4.700	4.000	4.200	4.360
H311142	H312142	42	5.060	4.800	4.100	4.300	4.460
H311143*	H312143*	43	5.160	4.900	4.200	4.400	4.560
H311144	H312144	44	5.260	5.000	4.300	4.500	4.660
H311145	H312145	45	5.360	5.100	4.400	4.600	4.760
H311146	H312146	46	5.460	5.200	4.500	4.700	4.860
H311147	H312147	47	5.560	5:300	4.600	4.800	4.960
H311148	H312148	48	5.660	5.400	4.700	4.900	5.060
H311149	H312149	49	5.760	5.500	4.800	5.000	5.160
H311150*	H312150*	50	5.860	5.600	4.900	5.100	5.260

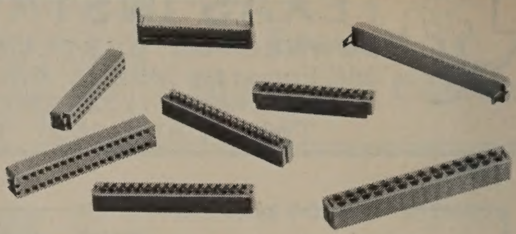
.125 CENTERS

Part Number		No. of Pos.	Dimensions				
Wire Wrap	Solder Tail		A±.015	B±.010	C	D±.010	E±.010
H321106	H322106	06	1.635	1.375	.625	.875	1.035
H321107	H322107	07	1.760	1.500	.750	1.000	1.160
H321108	H322108	08	1.885	1.625	.875	1.125	1.285
H321109	H322109	09	2.010	1.750	1.000	1.250	1.410
H321110	H322110	10	2.135	1.875	1.125	1.375	1.535
H321111	H322111	11	2.260	2.000	1.250	1.500	1.660
H321112	H322112	12	2.385	2.125	1.375	1.625	1.785
H321113	H322113	13	2.510	2.250	1.500	1.750	1.910
H321114	H322114	14	2.635	2.375	1.625	1.875	2.035
H321115	H322115	15	2.760	2.500	1.750	2.000	2.160
H321116	H322116	16	2.885	2.625	1.875	2.125	2.285
H321117	H322117	17	3.010	2.750	2.000	2.250	2.410
H321118	H322118	18	3.135	2.875	2.125	2.375	2.535
H321119	H322119	19	3.260	3.000	2.250	2.500	2.660
H321120	H322120	20	3.385	3.125	2.375	2.625	2.785
H321121	H322121	21	3.510	3.250	2.500	2.750	2.910
H321122*	H322122*	22	3.635	3.375	2.625	2.875	3.035
H321123	H322123	23	3.760	3.500	2.750	3.000	3.160
H321124	H322124	24	3.885	3.625	2.875	3.125	3.285
H321125	H322125	25	4.010	3.750	3.000	3.250	3.410
H321126	H322126	26	4.135	3.875	3.125	3.375	3.535
H321127	H321127	27	4.260	4.000	3.250	3.500	3.660
H321128*	H322128*	28	4.385	4.125	3.375	3.625	3.785
H321129	H322129	29	4.510	4.250	3.500	3.750	3.910
H321130	H322130	30	4.635	4.375	3.625	3.875	4.035
H321131	H322131	31	4.760	4.500	3.750	4.000	4.160
H321132	H322132	32	4.885	4.625	3.875	4.125	4.285
H321133	H322133	33	5.010	4.750	4.000	4.250	4.410
H321134	H322134	34	5.135	4.875	4.125	4.375	4.535
H321135	H322135	35	5.260	5.000	4.250	4.500	4.660
H321136*	H322136*	36	5.385	5.125	4.375	4.625	4.785
H321137	H322137	37	5.510	5.250	4.500	4.750	4.910
H321138	H322138	38	5.635	5.375	4.625	4.875	5.035
H321139	H322139	39	5.760	5.500	4.750	5.000	5.160
H321140*	H322140*	40	5.885	5.625	4.875	5.125	5.285
H321141	H322141	41	6.010	5.570	5.000	5.250	5.410
H321142	H322142	42	6.135	5.875	5.125	5.375	5.535
H321143*	H322143*	43	6.260	6.000	5.250	5.500	5.660
H321144	H322144	44	6.385	6.125	5.375	5.625	5.785
H321145	H322145	45	6.510	6.250	5.500	5.750	5.910
H321146	H322146	46	6.635	6.375	5.625	5.875	6.035
H321147	H322147	47	6.760	6.500	5.750	6.000	6.160
H321148	H322148	48	6.885	6.625	5.875	6.125	6.285
H321149	H322149	49	7.010	6.750	6.000	6.250	6.410
H321150*	H322150*	50	7.135	6.875	6.125	6.375	6.535

TI Part No. for Polarizing Key is R1079-01.
A key will be included with each connector.

*Parts indicated are in distributor stock. All other sizes contact factory.

Scotchflex® BRAND SOCKET CONNECTORS



INTRODUCTION

"Scotchflex" Brand socket connectors are available in all of the sizes and center spacings required to fit standard wrap panels, including most custom configurations. Where quick disconnect/reconnect capability is required, "Scotchflex" socket connectors may be used in conjunction with mating "Scotchflex" headers. Optional strain reliefs are available for the entire line of socket connectors should design needs require them.

TYPICAL PROPERTIES OF Scotchflex® BRAND SOCKET CONNECTORS

ELECTRICAL PROPERTIES	
CURRENT RATING	1 AMP
INSULATION RESISTANCE	$>1 \times 10^{9}$ Ohms
DIELECTRIC WITHSTANDING VOLTAGE	>1,000 Volts at Sea Level
ENVIRONMENTAL PROPERTIES	
TEMPERATURE RATING	-67°F to +221°F (-55°C to +105°C)
PHYSICAL PROPERTIES	
INSULATION MATERIAL	Glass Reinforced Polyester; U.L. Flammability Rating 94V-0
COLOR	All except 3327 Series: Gray 3327 Series: Red
CONTACT MATERIAL	Beryllium Copper
CONTACT PLATING	0.000030" (.762 μm) Min. Gold* Per Mil-G-45204 Type II over 0.000050" (1.27 μm) Min. Nickel
MARKING	Raised Figures; 3M Logo, Part Identification Numbers, Contact Position Numbers, Orientation Triangle
WIRE ACCOMMODATION	All except 3450 and 3441 Series: 26 AWG Solid; 28 AWG Solid or Stranded; 30 AWG Solid 3450 Series: 26 AWG Solid; 24 AWG Stranded 3441 Series: 24 AWG Stranded
CONTACT INSERTION FORCE	All except 3450, 3441 and 3307 Series: .50 lb. (2.2N) per Contact 3450 Series: .20 lb. (.89N) per Contact 3441 Series: .16 lb. (.71N) per Contact 3307 Series: .30 lb. (1.33N) per Contact
CONTACT WITHDRAWAL FORCE	All except 3450, 3441 and 3307 Series: .50 lb. (2.2N) per Contact 3450 Series: .10 lb. (.44N) per Contact 3441 Series: .11 lb. (.49N) per Contact 3307 Series: .26 lb. (1.16N) per Contact

*0.000050" (1.27 μm) Min. Gold on 3450 Series

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3471-0000).

TOLERANCE UNLESS NOTED

	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

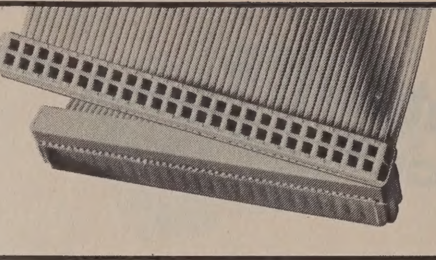
Note that throughout this book all U.S. dimensions are followed with their corresponding metric dimensions in parenthesis.

Electronic Products Division 3M COMPANY

3M CENTER • SAINT PAUL, MINNESOTA 55101

Scotchflex® BRAND SOCKET CONNECTORS

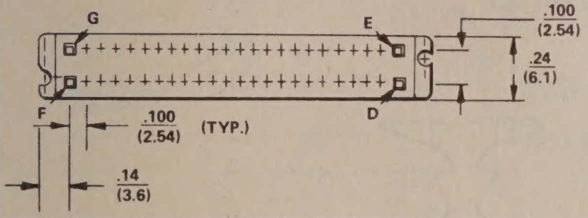
.100"(2.54mm) X .100"(2.54mm) GRID SPACING

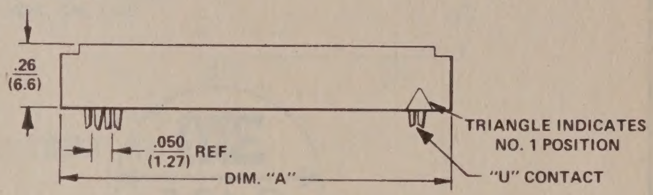


3473, 3421, 3399, 3414, 3417 AND 3425 SERIES

CONNECTOR BODY

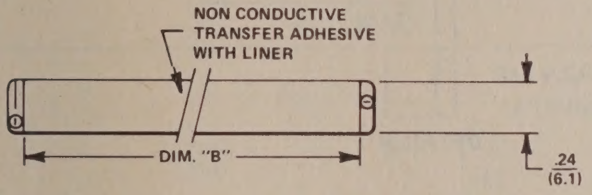
(ALL VERSIONS)

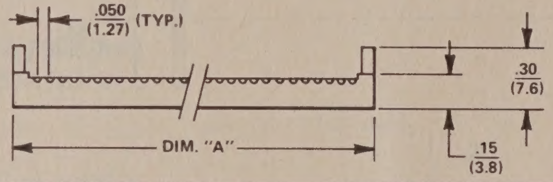

G
E
D
F
.100
(2.54)
.24
(6.1)
.100
(2.54)
(TYP.)
.14
(3.6)


.26
(6.6)
.050
(1.27)
REF.
DIM. "A"
TRIANGLE INDICATES
NO. 1 POSITION
"U" CONTACT

FLAT CABLE COVER

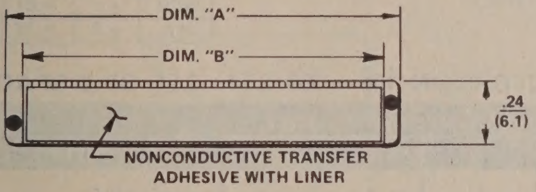
(0000 SUFFIX)

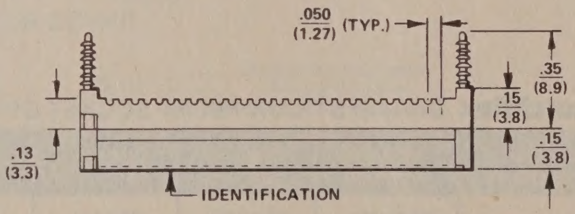

NON CONDUCTIVE
TRANSFER ADHESIVE
WITH LINER
DIM. "B"
.24
(6.1)


.050
(1.27)
(TYP.)
.30
(7.6)
DIM. "A"
.15
(3.8)

OPEN END STRAIN RELIEF COVER

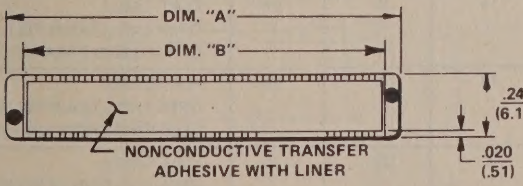
(3000 SUFFIX)

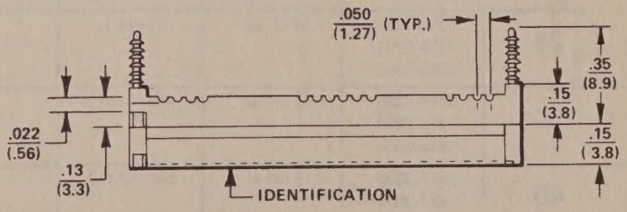

DIM. "A"
DIM. "B"
.24
(6.1)
NONCONDUCTIVE TRANSFER
ADHESIVE WITH LINER


.050
(1.27)
(TYP.)
.35
(8.9)
.15
(3.8)
.15
(3.8)
.13
(3.3)
IDENTIFICATION

CLOSED END STRAIN RELIEF COVER

(5000 SUFFIX)


DIM. "A"
DIM. "B"
.24
(6.1)
.020
(.51)
NONCONDUCTIVE TRANSFER
ADHESIVE WITH LINER


.050
(1.27)
(TYP.)
.35
(8.9)
.15
(3.8)
.15
(3.8)
.022
(.56)
.13
(3.3)
IDENTIFICATION

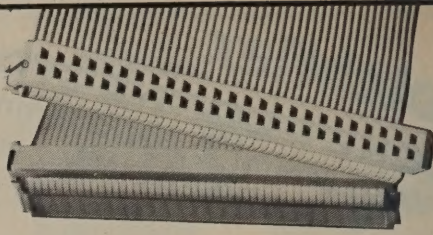
TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3473-0000).

Electronic Products Division 3M COMPANY

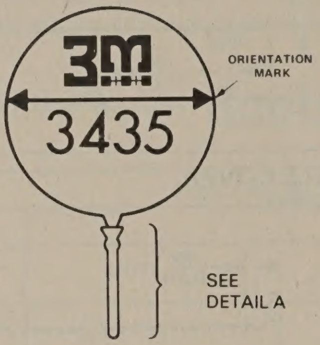
3M CENTER • SAINT PAUL, MINNESOTA 55101

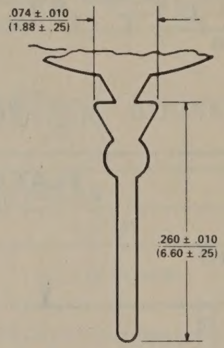
Scotchflex® BRAND SOCKET CONNECTORS



POLARIZING KEY
3M PART NO. 3435-0000

USED WITH 3M PART NOS: 3399, 3407, 3414, 3417, 3421, 3424, 3425, 3471, 3327





DETAIL A

MATERIAL: POLYESTER .032 (.81) THICK.
COLOR: GRAY. MARKING: RAISED FIGURES.

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Scotchflex BRAND STRAIN RELIEF SOCKET CONNECTORS ON .100 x .100 (2.54 x 2.54) GRID SPACING

CONTACT QUANTITY	3M PART NUMBER	DIM. "A"	DIM. "B" REF.	CONTACT NUMBERING SEQUENCE D:	E:	F:	G:	TYPE OF COVER
10	3473-0000	.68 (17.3)	.55 (12.8)	1	2	9	10	FLAT CABLE
	3473-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3473-5000	"	"	"	"	"	"	CLOSED END STRAIN RELIEF
20	3421-0000	1.18 (30.0)	1.05 (26.7)	"	"	19	20	FLAT CABLE
	3421-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3421-5000	"	"	"	"	"	"	CLOSED END STRAIN RELIEF
26	3399-0000	1.48 (37.6)	1.35 (34.3)	"	14	13	26	FLAT CABLE
	3399-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3399-5000	"	"	"	"	"	"	CLOSED END STRAIN RELIEF
34	3414-0000	1.88 (47.8)	1.75 (44.5)	"	18	17	34	FLAT CABLE
	3414-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3414-5000	"	"	"	"	"	"	CLOSED END STRAIN RELIEF
40	3417-0000	2.18 (55.4)	2.05 (52.1)	"	2	39	40	FLAT CABLE
	3417-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3417-5000	"	"	"	"	"	"	CLOSED END STRAIN-RELIEF
50	3425-0000	2.68 (68.1)	2.55 (64.8)	"	"	49	50	FLAT CABLE
	3425-3000	"	"	"	"	"	"	OPEN END STRAIN RELIEF
	3425-5000	"	"	"	"	"	"	CLOSED END STRAIN RELIEF

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3473-0000).

Electronic Products Division 3M COMPANY
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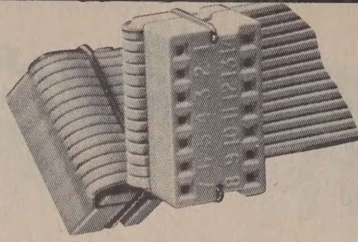
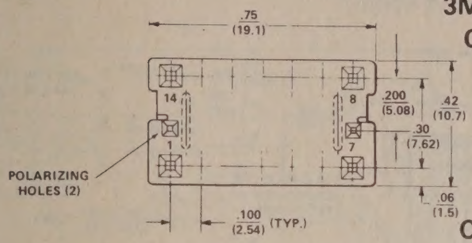
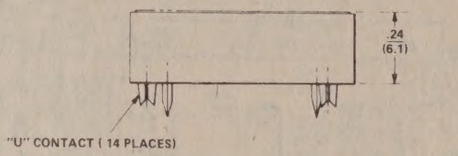
Scotchflex® BRAND SOCKET CONNECTORS
.100"(2.54mm) X .300"(7.62mm) GRID SPACING

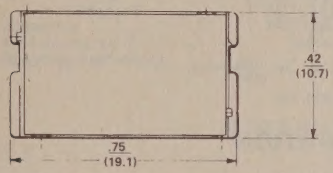


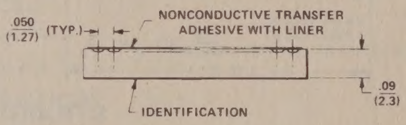
3M PART NO. 3407-0000
CONNECTOR BODY


.75
(19.1)
14
8
1
7
.200
(5.08)
.42
(10.7)
.30
(7.62)
POLARIZING
HOLES (2)
.06
(1.5)
.100
(2.54) (TYP.)

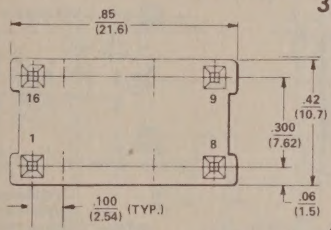

.24
(6.1)
"U" CONTACT (14 PLACES)

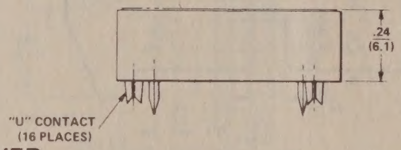
CONNECTOR COVER


.42
(10.7)
.75
(19.1)

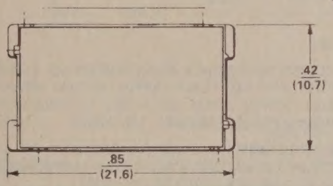

.050
(1.27) (TYP.)
NONCONDUCTIVE TRANSFER
ADHESIVE WITH LINER
.09
(2.3)
IDENTIFICATION

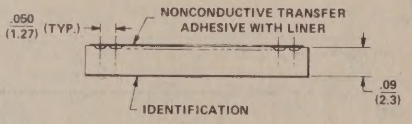
3M PART NO. 3327-0000
CONNECTOR BODY


.85
(21.6)
16
9
1
8
.42
(10.7)
.300
(7.62)
.06
(1.5)
.100
(2.54) (TYP.)

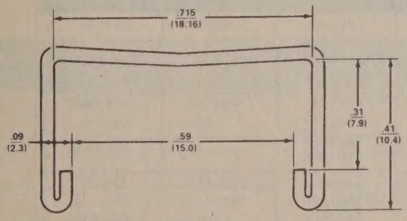

.24
(6.1)
"U" CONTACT
(16 PLACES)

CONNECTOR COVER


.42
(10.7)
.85
(21.6)


.050
(1.27) (TYP.)
NONCONDUCTIVE TRANSFER
ADHESIVE WITH LINER
.09
(2.3)
IDENTIFICATION

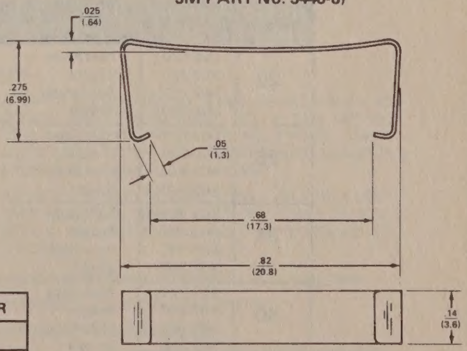
STRAIN RELIEF FOR 3407-0000
(3M PART NO. 3448-3)


.715
(18.16)
.31
(7.9)
.41
(10.4)
.09
(2.3)
.59
(15.0)

MATERIAL: NICKEL PLATED STEEL MUSIC WIRE, 13 GA. [.031 (.79) DIA.].

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	.

STRAIN RELIEF FOR 3327-0000
3M PART No. 3448-8)


.025
(.64)
.275
(6.99)
.05
(1.3)
.68
(17.3)
.82
(20.8)
.14
(3.6)

MATERIAL: STEEL 30 GA. [.010 (.25) THK.].
FINISH: RED EPOXY COATING, .01 (.3) NOMINAL.

CONTACT QUANTITY	3M PART NUMBER
14	3407-0000
16	3327-0000

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering be sure to include the complete series/suffix number (i.e., 3407-0000).

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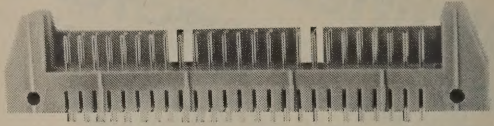
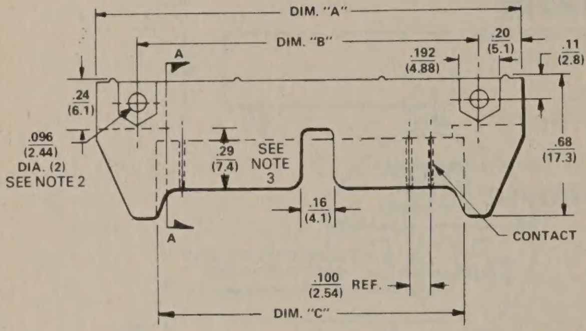
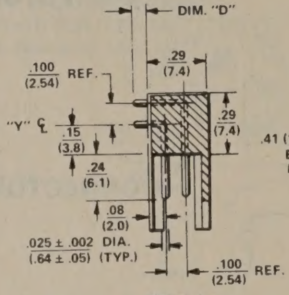
Scotchflex® BRAND SOLDER TAIL HEADERS .100" (2.54mm) x .100"(2.54mm)

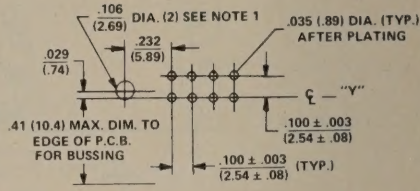


RIGHT ANGLE PIN CONFIGURATION


DIM. "A"
DIM. "B"
.192 (4.88)
.20 (5.1)
.11 (2.8)
A
.24 (6.1)
.096 (2.44) DIA. (2) SEE NOTE 2
.29 (7.4)
SEE NOTE 3
.68 (17.3)
.16 (4.1)
CONTACT
.100 (2.54) REF.
DIM. "C"

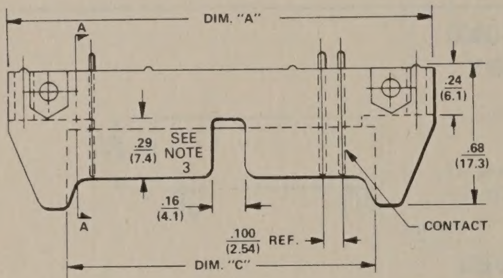

DIM. "D"
.100 (2.54) REF.
.29 (7.4)
"Y" ℄
.15 (3.8)
.29 (7.4)
.24 (6.1)
.08 (2.0)
.025 ± .002 DIA. (.64 ± .05) (TYP.)
.100 (2.54) REF.

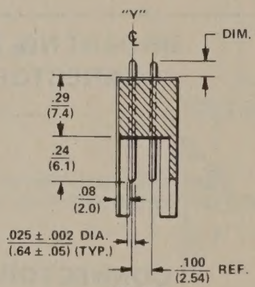
SEC. A-A


.106 (2.69) DIA. (2) SEE NOTE 1
.035 (.89) DIA. (TYP.) AFTER PLATING
.232 (5.89)
.029 (.74)
℄ — "Y"
.41 (10.4) MAX. DIM. TO EDGE OF P.C.B. FOR BUSSING
.100 ± .003 (2.54 ± .08)
.100 ± .003 (2.54 ± .08) (TYP.)

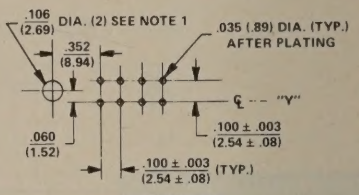
RECOMMENDED
P.C. BOARD HOLE PATTERN
(SHOWN FOR MOUNTING SIDE OF BOARD)

STRAIGHT PIN CONFIGURATION

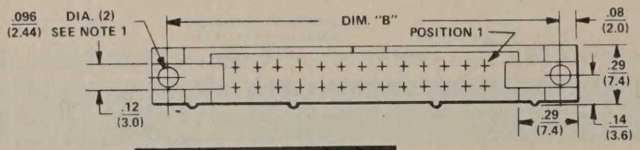

DIM. "A"
A
.24 (6.1)
.29 (7.4)
SEE NOTE 3
.68 (17.3)
.16 (4.1)
A
CONTACT
.100 (2.54) REF.
DIM. "C"


"Y"
℄
DIM. "D"
.29 (7.4)
.24 (6.1)
.08 (2.0)
.025 ± .002 DIA. (.64 ± .05) (TYP.)
.100 (2.54) REF.

SEC. A-A


.106 (2.69) DIA. (2) SEE NOTE 1
.035 (.89) DIA. (TYP.) AFTER PLATING
.352 (8.94)
℄ -- "Y"
.060 (1.52)
.100 ± .003 (2.54 ± .08)
.100 ± .003 (2.54 ± .08) (TYP.)

RECOMMENDED
P.C. BOARD HOLE PATTERN
(SHOWN FOR MOUNTING SIDE OF BOARD)


.096 (2.44) DIA. (2) SEE NOTE 1
DIM. "B"
POSITION 1
.08 (2.0)
.29 (7.4)
.12 (3.0)
.29 (7.4)
.14 (3.6)

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

NOTES:

1. ACCEPTS NO. 2-56 HEX HD SCREW OR NO. 1-72 RD HD SCREW (FRONT MOUNTING), NO. 4 SELF-TAPPING SCREW (REAR MOUNTING), OR NO. 2 RIVET. [WHEN USING NO. 4 SELF-TAPPING SCREW, HOLE DIAMETER SHOULD BE INCREASED TO .116 (2.95).]
2. ACCEPTS ANY NO. 2 SCREW OR RIVET, OR A NO. 4 SELF-TAPPING SCREW. [WHEN USING NO. 4 SELF-TAPPING SCREW, HOLE DIAMETER SHOULD BE INCREASED TO .116 (2.95).]
3. DOUBLE SLOT ON 3433 SERIES.

CONTACT QUANTITY	3M PART NUMBER	PIN CONFIGURATION	BOARD THICKNESS	DIM "A"	DIM "B"	DIM "C"	DIM "D" ± .010 (±.025)
20	3428-1002	Right Angle	.062 (1.57)	1.76 (44.7)	1.36 (34.5)	1.18 (30.0)	.92 (2.34)
	3428-2002	Straight	"	"	1.60 (40.6)	"	"
	3428-1003	Right Angle	.094-.125 (2.39-3.18)	"	1.36 (34.5)	"	.155 (3.94)
	3428-2003	Straight	"	"	1.60 (40.6)	"	"
26	3429-1002	Right Angle	.062 (1.57)	2.06 (52.3)	1.66 (42.2)	1.48 (37.6)	.92 (2.34)
	3429-2002	Straight	"	"	1.90 (48.3)	"	"
	3429-1003	Right Angle	.094-.125 (2.39-3.18)	"	1.66 (42.2)	"	.155 (3.94)
	3429-2003	Straight	"	"	1.90 (48.3)	"	"
34	3431-1002	Right Angle	.062 (1.57)	2.46 (62.5)	2.06 (52.3)	1.88 (47.8)	.92 (2.34)
	3431-2002	Straight	"	"	2.30 (58.4)	"	"
	3431-1003	Right Angle	.094-.125 (2.39-3.18)	"	2.06 (52.3)	"	.155 (3.94)
	3431-2003	Straight	"	"	2.30 (58.4)	"	"
40	3432-1002	Right Angle	.062 (1.57)	2.76 (70.1)	2.36 (59.9)	2.18 (55.4)	.92 (2.34)
	3432-2002	Straight	"	"	2.60 (66.0)	"	"
	3432-1003	Right Angle	.094-.125 (2.39-3.18)	"	2.36 (59.9)	"	.155 (3.94)
	3432-2003	Straight	"	"	2.60 (66.0)	"	"
50	3433-1002	Right Angle	.062 (1.57)	3.26 (82.8)	2.86 (72.6)	2.68 (68.1)	.92 (2.34)
	3433-2002	Straight	"	"	3.10 (78.7)	"	"
	3433-1003	Right Angle	.094-.125 (2.39-3.18)	"	2.86 (72.6)	"	.155 (3.94)
	3433-2003	Straight	"	"	3.10 (78.7)	"	"

Electronic Products Division 3M COMPANY

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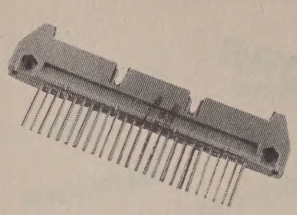
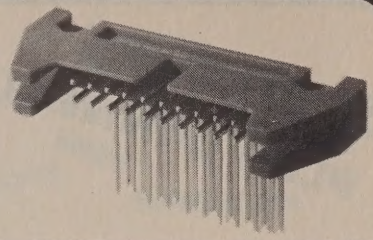
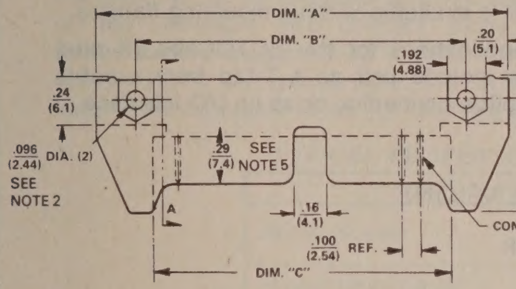
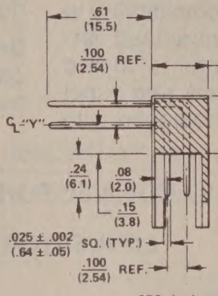
Scotchflex® BRAND
WRAP TAIL HEADERS
.100"(2.54mm) x .100"(2.54mm)



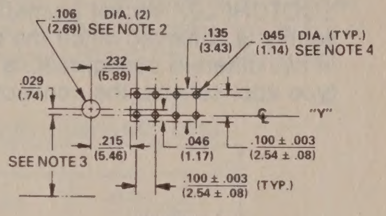


RIGHT ANGLE PIN CONFIGURATION


DIM. "A"
DIM. "B"
.20 (5.1)
.192 (4.88)
.11 (2.8)
.24 (6.1)
.096 (2.44) DIA. (2)
SEE NOTE 2
.29 (7.4) SEE NOTE 5
.68 (17.3)
A
.16 (4.1)
CONTACT
.100 (2.54) REF.
DIM. "C"

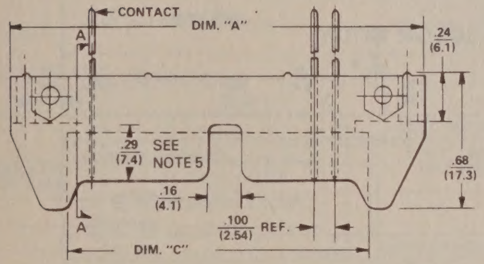

.61 (15.5)
.100 (2.54) REF.
.29 (7.4)
℄ "Y"
.29 (7.4)
.24 (6.1)
.08 (2.0)
.15 (3.8)
.025 ± .002 (.64 ± .05) SQ. (TYP.)
.100 (2.54) REF.

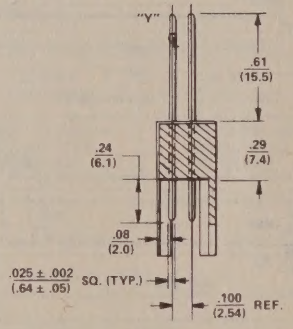
SEC. A - A


.106 (2.69) DIA. (2) SEE NOTE 2
.135 (3.43)
.045 (1.14) DIA. (TYP.) SEE NOTE 4
.232 (5.89)
.029 (.74)
℄ "Y"
.215 (5.46)
.046 (1.17)
.100 ± .003 (2.54 ± .08)
SEE NOTE 3
.100 ± .003 (2.54 ± .08) (TYP.)

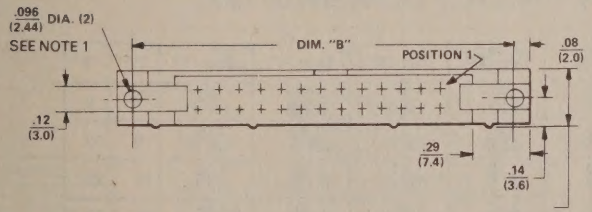
RECOMMENDED HOLE PATTERN (SHOWN FOR MOUNTING SIDE OF BOARD)

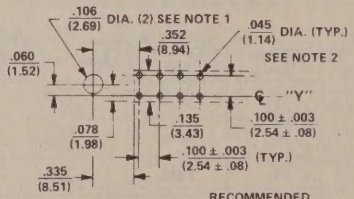
STRAIGHT PIN CONFIGURATION


CONTACT
DIM. "A"
A
.24 (6.1)
.29 (7.4) SEE NOTE 5
.68 (17.3)
.16 (4.1)
A
.100 (2.54) REF.
DIM. "C"


"Y"
.61 (15.5)
.24 (6.1)
.29 (7.4)
.08 (2.0)
.025 ± .002 (.64 ± .05) SQ. (TYP.)
.100 (2.54) REF.

SEC. A - A


.096 (2.44) DIA. (2)
SEE NOTE 1
DIM. "B"
POSITION 1
.08 (2.0)
.12 (3.0)
.29 (7.4)
.14 (3.6)


.106 (2.69) DIA. (2) SEE NOTE 1
.352 (8.94)
.045 (1.14) DIA. (TYP.)
SEE NOTE 2
.060 (1.52)
℄ "Y"
.135 (3.43)
.100 ± .003 (2.54 ± .08)
.078 (1.98)
.100 ± .003 (2.54 ± .08) (TYP.)
.335 (8.51)

RECOMMENDED HOLE PATTERN (SHOWN FOR MOUNTING SIDE OF BOARD)

CONTACT QUANTITY	3M PART NUMBER	PIN CONFIGURATION	DIM. "A"	DIM. "B"	DIM. "C"
20	3428-3005 3428-4005	Right Angle Straight	1.76 (44.7) "	1.36 (34.5) 1.60 (40.6)	1.18 (30.0) "
26	3429-3005 3429-4005	Right Angle Straight	2.06 (52.3) "	1.66 (42.2) 1.90 (48.3)	1.48 (37.6) "
34	3431-3005 3431-4005	Right Angle Straight	2.46 (62.5) "	2.06 (52.3) 2.30 (58.4)	1.88 (47.8) "
40	3432-3005 3432-4005	Right Angle Straight	2.76 (70.1) "	2.36 (59.9) 2.60 (66.0)	2.18 (55.4) "
50	3433-3005 3433-4005	Right Angle Straight	3.26 (82.8) "	2.86 (72.6) 3.10 (78.7)	2.68 (68.1) "

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3428-3005).

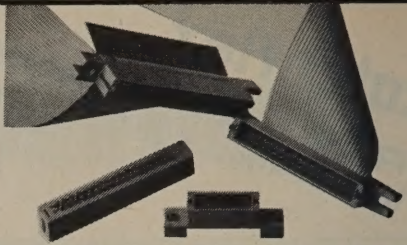
NOTES:

1. ACCEPTS NO. 2-56 HEX HD SCREW OR NO. 1-72 RD HD SCREW (FRONT MOUNTING), NO. 4 SELF-TAPPING SCREW (REAR MOUNTING), OR NO. 2 RIVET. [WHEN USING NO. 4 SELF-TAPPING SCREW, HOLE DIAMETER SHOULD BE INCREASED TO .116 (2.95).]
2. ACCEPTS ANY NO. 2 SCREW OR RIVET, OR A NO. 4 SELF-TAPPING SCREW. [WHEN USING NO. 4 SELF-TAPPING SCREW, HOLE DIAMETER SHOULD BE INCREASED TO .116 (2.95).]
3. .41 (10.4) MAX. DIM. TO EDGE OF P.C.B. FOR BUSSING.
4. ALTERNATE — SLOT (DOTTED LINES).
5. DOUBLE SLOT ON 3433 SERIES.

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Electronic Products Division 3M COMPANY
3M CENTER • SAINT PAUL, MINNESOTA 55101

Scotchflex® BRAND PLUG CONNECTORS

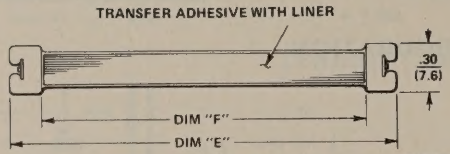


Featuring .025" (0.64 mm) square pins, this new family of connectors provides plug compatibility to SCOTCHFLEX socket connectors. Increased versatility is achieved since the connector is offered in two different configurations. For rack and panel type applications, the connector is designed with mounting flanges. When mid-spanning the plug connector is available without mounting flanges.

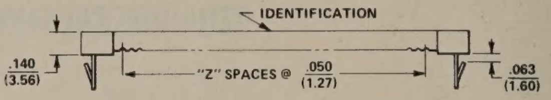
Design applications for the SCTOCHFLEX plug connector include use as a T-tap from a cable buss; a splice connector, or as an I/O interface.

PLUG CONNECTOR DIMENSIONS

CONNECTOR COVER

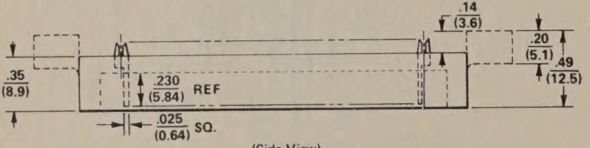

TRANSFER ADHESIVE WITH LINER
.30 (7.6)
DIM "F"
DIM "E"

(Bottom View)

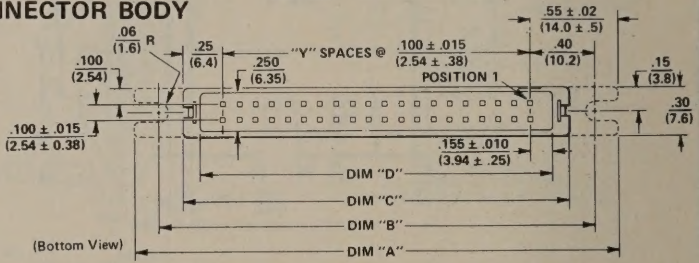

IDENTIFICATION
.140 (3.56)
"Z" SPACES @ .050 (1.27)
.063 (1.60)

(Side View)

CONNECTOR BODY


.14 (3.6)
.20 (5.1)
.49 (12.5)
.35 (8.9)
.230 (5.84) REF
.025 (0.64) SQ.

(Side View)


.06 (1.6) R
.100 (2.54)
.25 (6.4)
.250 (6.35)
"Y" SPACES @ .100 ± .015 (2.54 ± .38)
.55 ± .02 (14.0 ± .5)
.40 (10.2)
.15 (3.8)
POSITION 1
.30 (7.6)
.100 ± .015 (2.54 ± 0.38)
.155 ± .010 (3.94 ± .25)
DIM "D"
DIM "C"
DIM "B"
DIM "A"

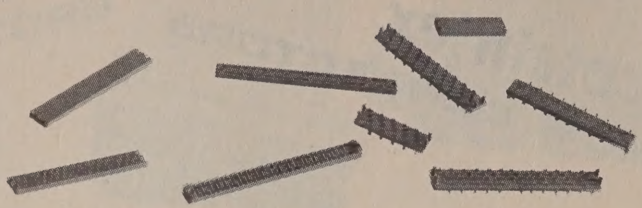
(Bottom View)

3M Part Number	Mounting Style
-0000	With Mounting Flanges
-0001	Without Mounting Flanges

Contact Qty.	3M Part No.	Dim "A" ± .02/.5	Dim "B"	Dim "C"	Dim "D"	Dim "E"	Dim "F"	"Y"	"Z"
10	3325	1.50 (38.1)	1.20 (30.5)	.90 (22.7)	.71 (18.0)	.90 (22.9)	.51 (12.4)	4	9
20	3326	2.00 (50.8)	1.70 (43.2)	1.40 (35.6)	1.21 (30.7)	1.40 (35.6)	1.05 (26.7)	9	19
26	3328	2.30 (56.6)	2.00 (50.8)	1.70 (43.2)	1.51 (38.4)	1.70 (43.2)	1.35 (52.1)	12	25
34	3329	2.70 (68.6)	2.40 (61.0)	2.10 (53.3)	1.91 (48.5)	2.10 (53.3)	1.75 (44.5)	16	33
40	3324	3.00 (76.2)	2.70 (68.6)	2.40 (61.0)	2.21 (56.1)	2.40 (61.0)	2.05 (52.1)	19	39
50	3331	3.50 (88.9)	3.20 (81.3)	2.90 (73.7)	2.71 (68.8)	2.90 (73.7)	2.55 (64.8)	24	49

TYPICAL PROPERTIES CHART	
PHYSICAL	
INSULATOR MATERIAL	Glass reinforced polyester; U.L. flammability rating 94V-0.
COLOR	Gray
CONTACT MATERIAL	Beryllium Copper
CONTACT PLATING	0.000030" (.762 μm) min. gold per MIL-G-45204 Type II over 0.000050" (1.27 μm) min nickel
MARKING	Raised Figures; 3M logo, part identification number, and orientation triangle.
WIRE ACCOMMODATION	26 AWG solid, 28 AWG solid and stranded, 30 AWG solid
ELECTRICAL	
CURRENT RATING	1A
INSULATION RESISTANCE	> 5M Ω
DIELECTRIC WITHSTANDING VOLTAGE	> 500 V rms
ENVIRONMENTAL	
TEMPERATURE RATING	− 67°F to +221°F (−55°C to +105°C)

Scotchflex® BRAND P.C.B. CONNECTORS



INTRODUCTION

Flat cable may be terminated at the circuit card by hand or flow solderable SCOTCHFLEX connectors. The contacts which are positioned in the connector body are soldered to the board as a unit. The flat cable terminates in the connector to the "U" form end of the contacts. As with other SCOTCHFLEX connectors, no stripping or soldering of conductors is required. SCOTCHFLEX P.C.B. Connectors come in a variety of configurations to mate with SCOTCHFLEX flat cable.

TYPICAL PROPERTIES OF Scotchflex® BRAND P.C.B. CONNECTORS

PHYSICAL PROPERTIES			
3M PART NUMBER	3474-____T 3402-____T 3422-____T 3418-____T 3434-____T 3426-____T	3470-0000T	3378-____T 3468-0000T
INSULATION MATERIAL	GLASS FILLED POLYESTER; U.L. FLAME RETARDANT RATING 94V-O		
COLOR	GRAY		
CONTACT MATERIAL	BERYLLIUM COPPER		
CONTACT PLATING	TIN ALLOY		
MARKING	RAISED FIGURES, 3M PART & IDENTIFICATION NUMBER		
WIRE ACCOMMODATION	26 AWG SOLID, 28 AWG SOLID & STRANDED 30 AWG SOLID	24 AWG STRANDED	24 AWG STRANDED
CABLE ACCEPTANCE	.050" (1.27 mm) CONDUCTOR CENTERS	.0625" (1.59 mm) CONDUCTOR CENTERS	.075" (1.90 mm) CONDUCTOR CENTERS
ELECTRICAL PROPERTIES			
CURRENT RATING	1 AMP		
INSULATION RESISTANCE	>5 X 10^6 OHMS		
DIELECTRIC WITHSTANDING VOLTAGE	>500 VOLTS AT SEA LEVEL		
ENVIRONMENTAL PROPERTIES			
TEMPERATURE RATING	-67°F TO +221°F (-55°C TO +105°C)		

REFERENCE CHART FOR P.C.B. CONNECTORS

DIMENSIONS	
U.S.	Inches
Metric	(mm)

NO. OF CONTACTS	3M PART NUMBER	FOR PC BOARD THICKNESS	FOR ASSEMBLY BEFORE SOLDERING USE LOCATOR PLATE PART NUMBER	FOR ASSEMBLY AFTER SOLDERING USE LOCATOR PLATE PART NUMBER	MATES WITH 3M FLAT CABLE
10	3474-0000T	.062 (1.57)	3443-15	3443-8	3350/10, 3365/10, 3306/10
	3474-0001T	.094-.125 (2.39-3.18)			
20	3422-0000T	.062 (1.57)	3443-16	3443-8	3350/20, 3365/20, 3306/20, 3369/20, 3476/20
	3422-0001T	.094-.125 (2.39-3.18)			
24	3470-0000T	.062 (1.57)	3443-34	3443-8	3451/24
	3470-0001T	.094-.125 (2.39-3.18)			
26	3434-0000T	.062 (1.57)	3443-15	3443-8	3350/26, 3365/26, 3306/26, 3469/26, 3476/26
	3434-0001T	.094-.125 (2.39-3.18)			
28	3468-0000T	.062 (1.57)	3443-33	3443-8	3405/28
	3468-0001T	.094-.125 (2.39-3.18)			
34	3402-0000T	.062 (1.57)	3443-15	3443-8	3350/34, 3365/34, 3306/34, 3469/34, 3476/34
	3402-0001T	.094-.125 (2.39-3.18)			
36	3378-0000T	.062 (1.57)	3443-19	3443-8	3405/36
	**3378-1000T	.062 (1.57)			Individ. Insulated Wire
40	3418-0000T	.062 (1.57)	3443-16	3443-8	3350/40, 3365/40, 3306/40, 3380/40, 3469/40, 3476/40
	3418-0001T	.094-.125 (2.39-3.18)			
50	3426-0000T	.062 (1.57)	3443-15	3443-8	3350/50, 3365/50, 3306/50, 3380/50, 3469/50, 3476/50
	3426-0001T	.094-.125 (2.39-3.18)			

**3378-1000 denotes individual wire cover.

NOTE: All connectors listed use the 3442-1 standard platen, except the 3378-____T connector, which utilizes the 3442-2 platen. While the above data was correct at the time of publication, it is recommended that for specification purposes a current Spec Data Sheet on the particular connector be requested. These sheets contain full dimensional details and are available from the Scotchflex sales representative in your area.

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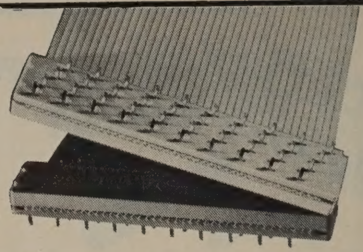
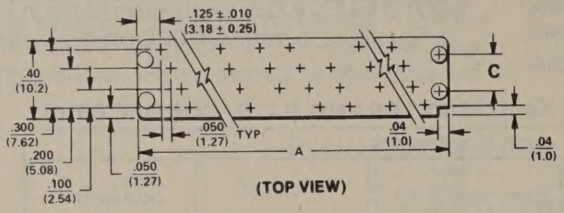
Scotchflex® BRAND P.C.B. CONNECTORS

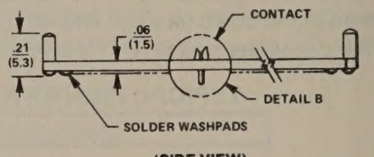


3M PART NOS. 3474-_____T, 3434-_____T, 3402-_____T, & 3426-_____T

CONNECTOR BODY

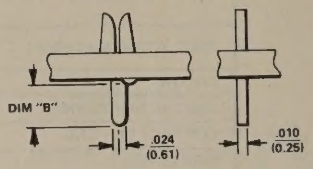

.125 ± .010
(3.18 ± 0.25)
.40
(10.2)
C
.300
(7.62)
.200
(5.08)
.100
(2.54)
.050
(1.27)
.050
(1.27)
TYP
.04
(1.0)
A
.04
(1.0)

(TOP VIEW)


.21
(5.3)
.06
(1.5)
CONTACT
DETAIL B
SOLDER WASHPADS

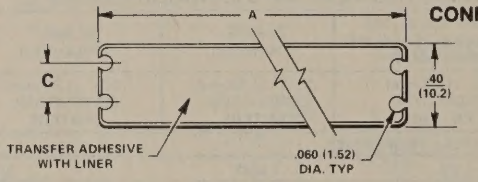
(SIDE VIEW)

DIMENSIONS	
U.S.	Inches
Metric	(mm)

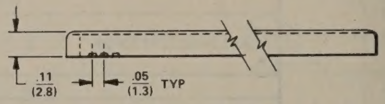

DIM "B"
.024
(0.61)
.010
(0.25)

DETAIL B

CONNECTOR COVER


A
C
.40
(10.2)
TRANSFER ADHESIVE
WITH LINER
.060 (1.52)
DIA. TYP

(TOP VIEW)

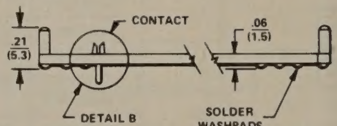

.11
(2.8)
.05
(1.3)
TYP

(SIDE VIEW)

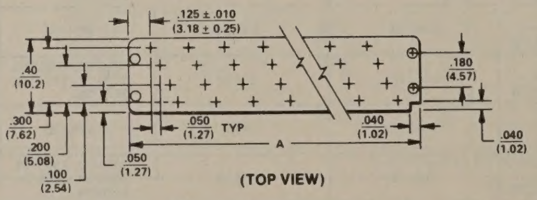
Scotchflex BRAND P.C.B. CONNECTORS				
CONTACT QUANTITY	CONNECTOR PART NUMBER	DIMENSIONS		
		A	B	C
10	3474-0000T	.70 (17.8)	.100 ± .010 (2.54 ± .025)	.200 (5.08)
	3474-0001T		.156 ± .010 (3.96 ± .025)	
20	3422-0000T	1.20 (30.5)	.100 ± .010 (2.54 ± .025)	
	3422-0001T		.156 ± .010 (3.96 ± .025)	
26	3434-0000T	1.50 (38.1)	.100 ± .010 (2.54 ± .025)	.181 (4.60)
	3434-0001T		.156 ± .010 (3.96 ± .025)	
34	3402-0000T	1.90 (48.3)	.100 ± .010 (2.54 ± .025)	.181 (4.60)
	3402-0001T		.156 ± .010 (3.96 ± .025)	
40	3418-0000T	2.20 (55.9)	.100 ± .010 (2.54 ± .025)	
	3418-0001T		.156 ± .010 (3.96 ± .025)	
50	3426-0000T	2.70 (68.6)	.100 ± .010 (2.54 ± .025)	.181 (4.60)
	3426-0001T		.156 ± .010 (3.96 ± .025)	

3M PART NOS. 3422-_____T & 3418-____T

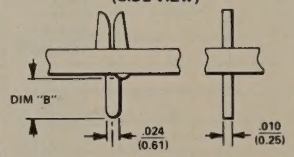
CONNECTOR BODY


.21
(5.3)
CONTACT
.06
(1.5)
DETAIL B
SOLDER
WASHPADS

(SIDE VIEW)

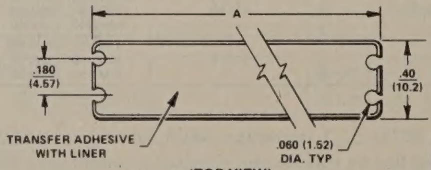

.125 ± .010
(3.18 ± 0.25)
.40
(10.2)
.180
(4.57)
.300
(7.62)
.200
(5.08)
.100
(2.54)
.050
(1.27)
.050
(1.27)
TYP
.040
(1.02)
A
.040
(1.02)

(TOP VIEW)

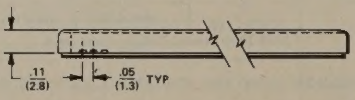

DIM "B"
.024
(0.61)
.010
(0.25)

DETAIL B

CONNECTOR COVER


A
.180
(4.57)
.40
(10.2)
TRANSFER ADHESIVE
WITH LINER
.060 (1.52)
DIA. TYP

(TOP VIEW)


.11
(2.8)
.05
(1.3)
TYP

(SIDE VIEW)

DIMENSIONS	
U.S.	Inches
Metric	(mm)

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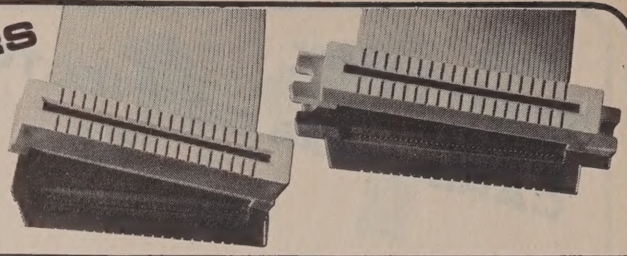
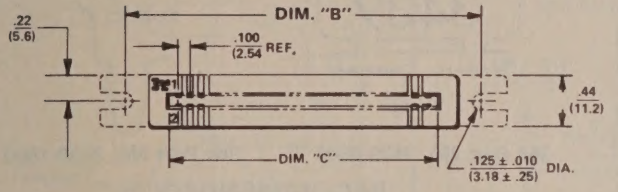
Scotchflex® BRAND CARD-EDGE CONNECTORS

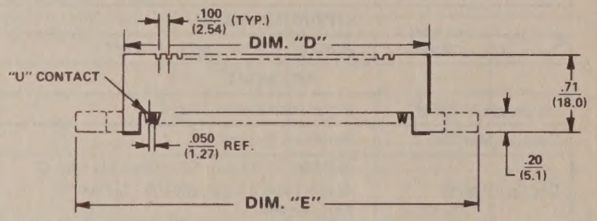


Dual-readout "Scotchflex" Card-Edge Connectors let you make up to 50 terminations in a single step. All styles are offered with or without mounting ears; both versions have bifurcated, gold-plated beryllium copper contacts insuring dependable electrical interface through repeated insertions and withdrawals. Insulation-piercing "U" contacts are on .050" (1.27mm) centers, staggered to accept .100" (2.54mm) spacing on card-edge.

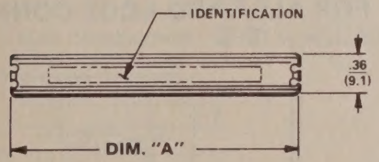
3461, 3462, 3463 & 3464 SERIES

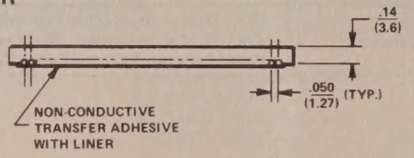
CONNECTOR BODY


DIM. "B"
.22
(5.6)
.100
(2.54 REF.
.44
(11.2)
DIM. "C"
.125 ± .010
(3.18 ± .25)
DIA.


.100
(2.54)
(TYP.)
DIM. "D"
"U" CONTACT
.71
(18.0)
.050
(1.27)
REF.
.20
(5.1)
DIM. "E"

CONNECTOR COVER

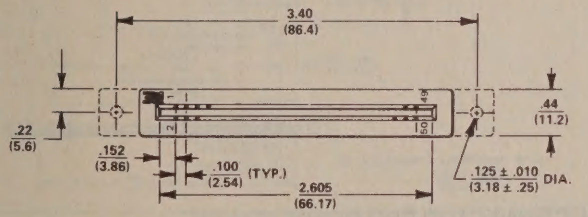

IDENTIFICATION
.36
(9.1)
DIM. "A"

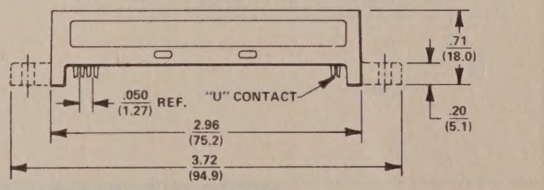

.14
(3.6)
NON-CONDUCTIVE
TRANSFER ADHESIVE
WITH LINER
.050
(1.27)
(TYP.)

Refer to page for recommended P.C. Board configuration.

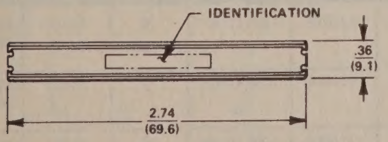
3415 SERIES

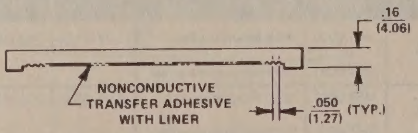
CONNECTOR BODY


3.40
(86.4)
.22
(5.6)
.44
(11.2)
.152
(3.86)
.100
(2.54)
(TYP.)
2.605
(66.17)
.125 ± .010
(3.18 ± .25)
DIA.


.71
(18.0)
.050
(1.27)
REF.
"U" CONTACT
.20
(5.1)
2.96
(75.2)
3.72
(94.9)

CONNECTOR COVER


IDENTIFICATION
.36
(9.1)
2.74
(69.6)


.16
(4.06)
NONCONDUCTIVE
TRANSFER ADHESIVE
WITH LINER
.050
(1.27)
(TYP.)

Refer to page for recommended P.C. Board configuration.

TOLERANCE UNLESS NOTED

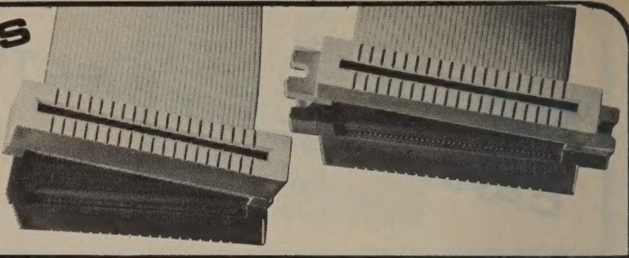
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3461-0000).

Electronic Products Division 3M COMPANY

3M CENTER • SAINT PAUL, MINNESOTA 55101

Scotchflex® BRAND CARD-EDGE CONNECTORS

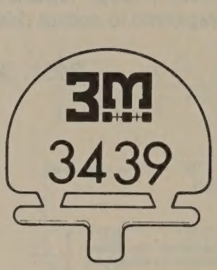


TYPICAL PROPERTIES FOR ALL CARD-EDGE CONNECTORS

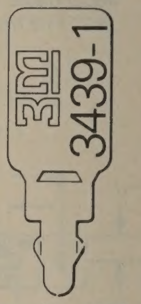
ELECTRICAL	
Current Rating	1 AMP
Dielectric Withstanding Voltage	>1,000 Volts at Sea Level
Insulation Resistance	>1 x 10^9 Ohms
ENVIRONMENTAL	
Temperature Rating	-67°F to +221°F (-55°C to 105°C)
PHYSICAL	
Insulation Material	Glass-filled thermoplastic
Contact Material	Beryllium Copper
Contact Plating	.000050″ (1.27 μm) Min. Gold per MIL-G-45204 Type II over .000100″ (2.54 μm) Min. Nickel
Color	Gray
Contact Spacing	.100″ (2.54 mm); accepts Scotchflex Cables on .050″ (1.27 mm) Centers. Mates with P.C. Board Pads on .100″ (2.54 mm) Centers.

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

POLARIZING KEYS FOR ALL CARD-EDGE CONNECTORS

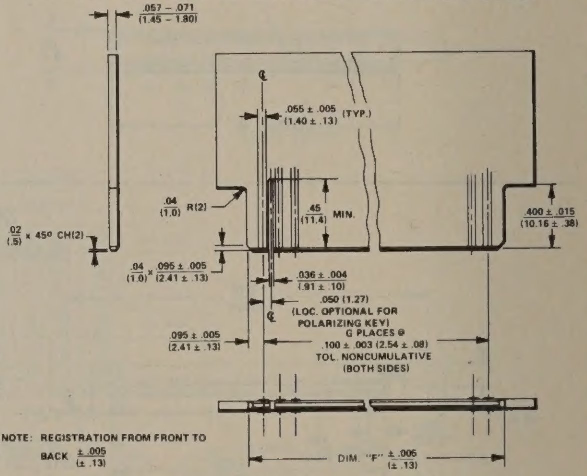


3M Part No. 3439-0000



3M Part No. 3439-1000

RECOMMENDED P.C. BOARD CONFIGURATION FOR ALL CARD-EDGE CONNECTORS


.057 – .071 (1.45 – 1.80)
℄
.055 ± .005 (1.40 ± .13) (TYP.)
.04 (1.0) R(2)
.45 (11.4) MIN.
.400 ± .015 (10.16 ± .38)
.02 (.5) x 45° CH(2)
.04 (1.0) x .095 ± .005 (2.41 ± .13)
.036 ± .004 (.91 ± .10)
.050 (1.27) (LOC. OPTIONAL FOR POLARIZING KEY)
℄
.095 ± .005 (2.41 ± .13)
G PLACES @ .100 ± .003 (2.54 ± .08) TOL. NONCUMULATIVE (BOTH SIDES)
NOTE: REGISTRATION FROM FRONT TO BACK ± .005 (± .13)
DIM. "F" ± .005 (± .13)

SCOTCHFLEX BRAND CARD-EDGE CONNECTOR REFERENCE CHART

CONTACT QUANTITY	3M PART NUMBER	MOUNTING STYLE	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	DIM. "E"	DIM. "F"	"G" PLACES	PLATEN NUMBER	MATING SCOTCHFLEX CABLE
20	3461-0000	With Mounting Ears	1.24 (31.5)	1.80 (45.7)	1.104 (28.04)	1.50 (38.1)	2.00 (50.8)	1.095 (27.81)	9	3442-4	3350/20, 3365/20, 3306/20, 3469/20, 3476/20, 3302/20
	3461-0001	Without Mounting Ears	″	″	″	″	″	″	″	″	″
26	3462-0000	With Mounting Ears	1.54 (39.1)	2.10 (53.3)	1.404 (35.66)	1.80 (45.7)	2.30 (58.4)	1.395 (35.43)	12	3442-7	3350/26, 3365/26, 3306/26, 3469/26, 3476/26, 3302/26
	3462-0001	Without Mounting Ears	″	″	″	″	″	″	″	″	″
34	3463-0000	With Mounting Ears	1.94 (49.3)	2.50 (63.5)	1.804 (45.82)	2.20 (55.9)	2.70 (68.6)	1.795 (45.59)	16	3442-3	3350/34, 3365/34, 3306/34, 3469/34, 3476/34, 3302/34
	3463-0001	Without Mounting Ears	″	″	″	″	″	″	″	″	″
40	3464-0000	With Mounting Ears	2.24 (56.9)	2.80 (71.1)	2.104 (53.42)	2.50 (63.5)	3.00 (76.2)	2.095 (53.21)	19	3442-8	3350/40, 3365/40, 3306/40, 3380/40, 3469/40, 3476/40, 3302/40
	3464-0001	Without Mounting Ears	″	″	″	″	″	″	″	″	″
50	3415-0000	With Mounting Ears	2.85 (69.6)	3.40 (86.4)	2.605 (66.17)	2.96 (75.2)	3.72 (94.9)	2.595 (65.91)	24	3442-1	3350/50, 3365/50, 3306/50, 3380/50, 3469/50, 3476/50, 3302/50
	3415-0001	Without Mounting Ears	″	″	″	″	″	″	″	″	″

NOTE: All Scotchflex Card-Edge Connectors use Locator Plate 3443-11.

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3461-0000).

Electronic Products Division 3M COMPANY

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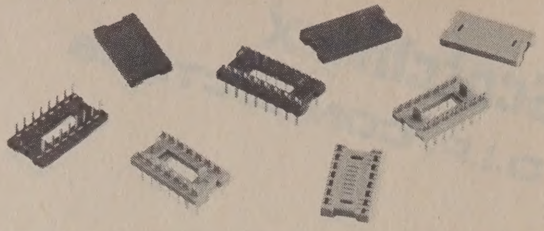
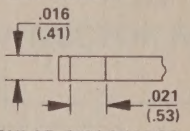
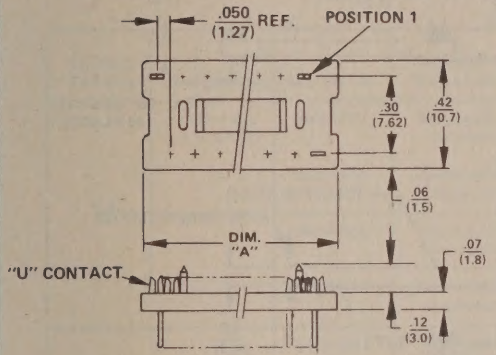
Scotchflex® BRAND D.I.P. CONNECTORS

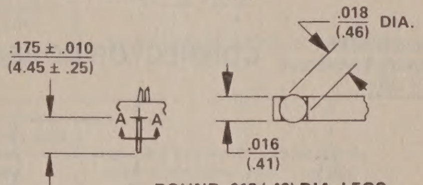


3406 & 3416 SERIES CONNECTOR BODY


.016
(.41)
.021
(.53)

RECTANGULAR .016 (.41) LEGS
(Used on 3M Part Nos. 3406-0000, 3406-1000, 3416-0000 and 3416-1000)


.050 (1.27) REF.
POSITION 1
.30 (7.62)
.42 (10.7)
.06 (1.5)
DIM. "A"
.07 (1.8)
"U" CONTACT
.12 (3.0)

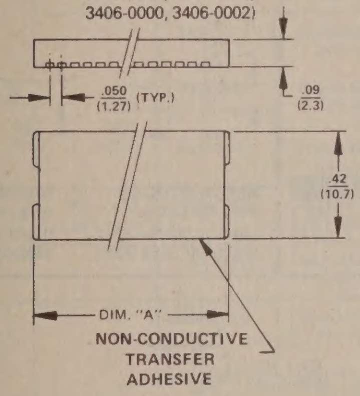

.018 (.46) DIA.
.175 ± .010
(4.45 ± .25)
A
A
.016
(.41)

ROUND .018 (.46) DIA. LEGS
(Used on 3M Part Nos. 3406-0002, 3406-1002, 3416-0002 and 3416-1002)

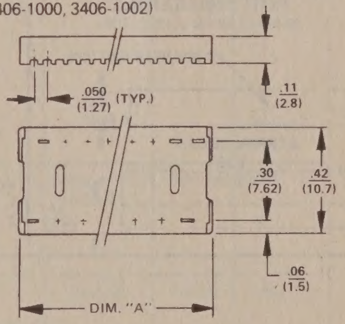
Contact Quantity	3M Part Number	DIM. "A"
14	3406-0000	.75 (19.1)
	3406-0002	"
	3406-1000	"
	3406-1002	"
16	3416-0000	.85 (21.6)
	3416-0002	"
	3416-1000	"
	3416-1002	"

CONNECTOR COVERS

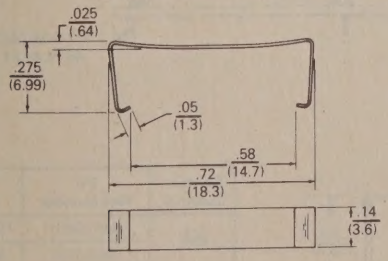
FLAT CABLE COVER
(Used on 3M Part Nos. 3416-0000, 3416-0002, 3406-0000, 3406-0002)


.050 (1.27) (TYP.)
.09 (2.3)
.42 (10.7)
DIM. "A"
NON-CONDUCTIVE TRANSFER ADHESIVE

INDIVIDUAL WIRE COVER
(Used on 3M Part Nos. 3416-1000, 3416-1002, 3406-1000, 3406-1002)

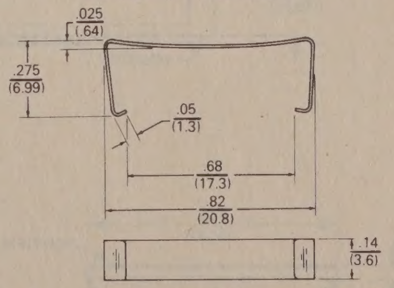

.050 (1.27) (TYP.)
.11 (2.8)
.30 (7.62)
.42 (10.7)
.06 (1.5)
DIM. "A"

STRAIN RELIEF
(3M Part No. 3448-7)
FOR USE WITH 3406 SERIES


.025 (.64)
.275 (6.99)
.05 (1.3)
.58 (14.7)
.72 (18.3)
.14 (3.6)

MATERIAL: GRAY EPOXY-COATED STEEL [.010 (.25) THICK].

STRAIN RELIEF
(3M Part No. 3448-8)
FOR USE WITH 3416 SERIES


.025 (.64)
.275 (6.99)
.05 (1.3)
.68 (17.3)
.82 (20.8)
.14 (3.6)

MATERIAL: RED EPOXY-COATED STEEL [.010 (.25) THICK].

TOLERANCE UNLESS NOTED

	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3416-0000).

Electronic Products Division 3M COMPANY
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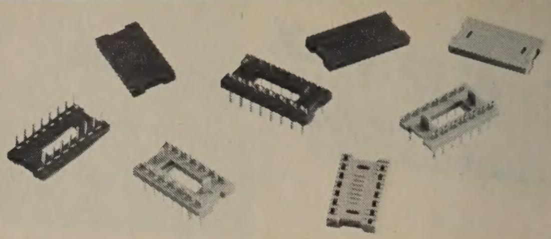
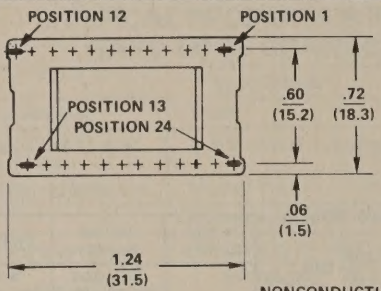
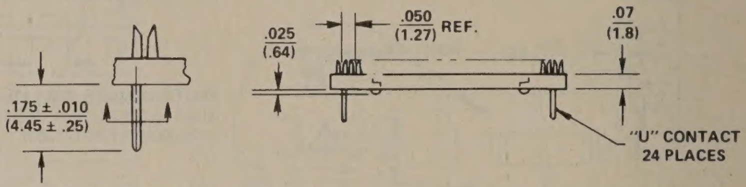
Scotchflex® BRAND D.I.P. CONNECTORS

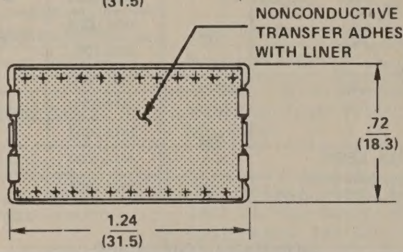


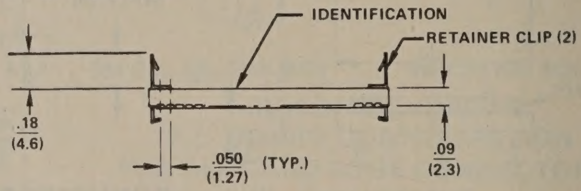

POSITION 12
POSITION 1
POSITION 13
POSITION 24
.60 (15.2)
.72 (18.3)
.06 (1.5)
1.24 (31.5)

3460 SERIES CONNECTOR BODY


.175 ± .010 (4.45 ± .25)
.025 (.64)
.050 (1.27) REF.
.07 (1.8)
"U" CONTACT 24 PLACES

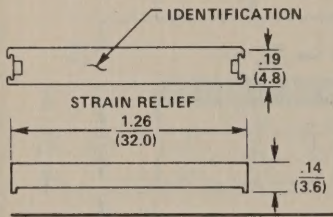
CONNECTOR COVER


NONCONDUCTIVE TRANSFER ADHESIVE WITH LINER
.72 (18.3)
1.24 (31.5)


IDENTIFICATION
RETAINER CLIP (2)
.18 (4.6)
.050 (1.27) (TYP.)
.09 (2.3)

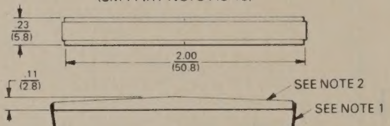
STRAIN RELIEF FOR 3460 SERIES

(SHIPPED WITH CONNECTOR)


IDENTIFICATION
.19 (4.8)
STRAIN RELIEF
1.26 (32.0)
.14 (3.6)

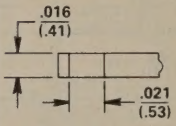
STRAIN RELIEF FOR 3508 CONNECTOR

(3M PART NO. 3448-18)

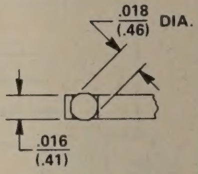

.23 (5.8)
2.00 (50.8)
.11 (2.8)
SEE NOTE 2
SEE NOTE 1

NOTES:
1. STAINLESS STEEL .010 (.25) THK.
2. MATERIAL: GRAY GLASS FILLED POLYESTER

TOLERANCE UNLESS NOTED	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

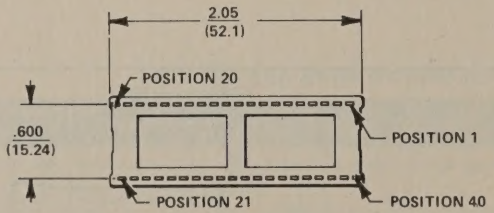

.016 (.41)
.021 (.53)

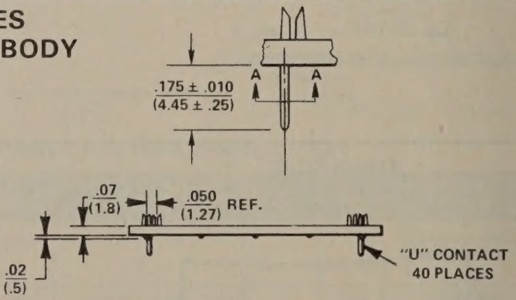
RECTANGULAR
.016 (.41) LEGS
(Used on 3M Parts No. 3460-0000, 3508-0000)


.018 (.46) DIA.
.016 (.41)

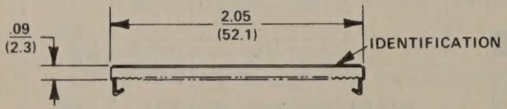
ROUND
.018 (.46) DIA. LEGS
(Used on 3M Parts No. 3460-0002, 3508-0002)

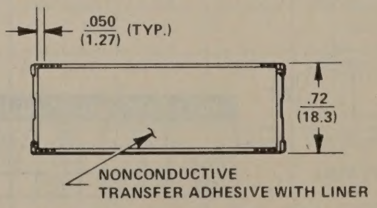
3508 SERIES CONNECTOR BODY


2.05 (52.1)
POSITION 20
.600 (15.24)
POSITION 1
POSITION 21
POSITION 40


.175 ± .010 (4.45 ± .25)
A
A
.07 (1.8)
.050 (1.27) REF.
"U" CONTACT 40 PLACES
.02 (.5)

CONNECTOR COVER


.09 (2.3)
2.05 (52.1)
IDENTIFICATION


.050 (1.27) (TYP.)
.72 (18.3)
NONCONDUCTIVE TRANSFER ADHESIVE WITH LINER

Contact Quantity	3M Part Number	Leg Type
24	3460-0000	Rectangular
	3460-0002	Round
40	3508-0000	Rectangular
	3508-0002	Round

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3460-0000).

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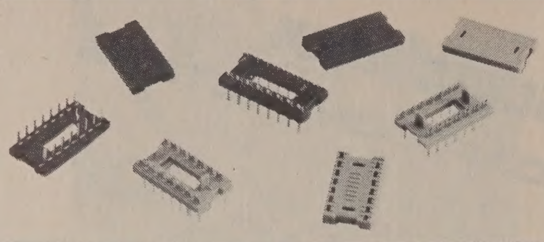
Scotchflex® BRAND D.I.P. CONNECTORS



Scotchflex® BRAND D.I.P. CONNECTOR REFERENCE CHART

Contact Quantity	Grid Spacing	3M Part No.	Connector Description	Mates With:	Strain Relief Part No.	Platen Part No.	Locator Plate Part No.
14	.100 x .300 (2.54 x 7.62)	3406-0000	Rectangular leg with flat cable cover	3M Flat Cable 3350, 3365, 3302, 3306, 3469	3448-7	3442-1	3443-12
	"	3406-0002	Round leg with flat cable cover		"	"	"
	"	3406-1000	Rectangular leg with individual wire cover	28 AWG & 26 AWG Stranded & Solid Individual Insulated Wire	"	"	"
	"	3406-1002	Round leg with individual wire cover		"	"	"
16	"	3416-0000	Rectangular leg with flat cable cover	3M Flat Cable 3350, 3365, 3302, 3306, 3469	3448-8	3442-1	3443-13
	"	3416-0002	Round leg with flat cable cover		"	"	"
	"	3416-1000	Rectangular leg with individual wire cover	28 AWG & 26 AWG Stranded & Solid Individual Insulated Wire	"	"	"
	"	3416-1002	Round leg with flat cable cover		"	"	"
	"	3498-0000	Pluggable leg with flat cable cover	3M Flat Cable 3350, 3365, 3302, 3306, 3469	"	"	3443-43
24	.100 x .600 (2.54 x 15.24)	3460-0000	Rectangular leg with flat cable cover	3M Flat Cable 3350, 3365, 3302, 3306	(Shipped with Connector)	3442-6	3443-10
	"	3460-0002	Round leg with flat cable cover		"	"	"
40	"	3508-0000	Rectangular leg with flat cable cover	3M Flat Cable 3350, 3365, 3302, 3306, 3469, 3476	3448-18	3442-8	3443-47
	"	3508-0002	Round leg with flat cable cover		"	"	"

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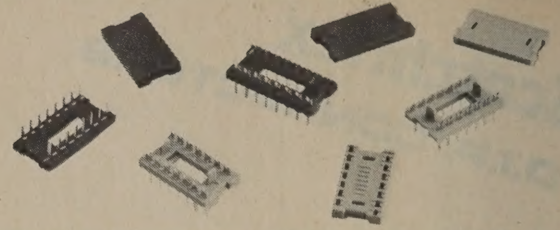
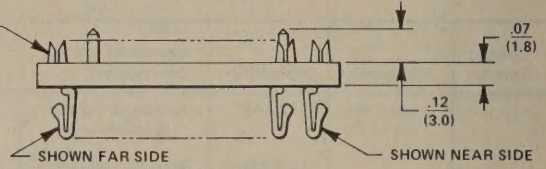
Scotchflex® BRAND D.I.P. CONNECTORS

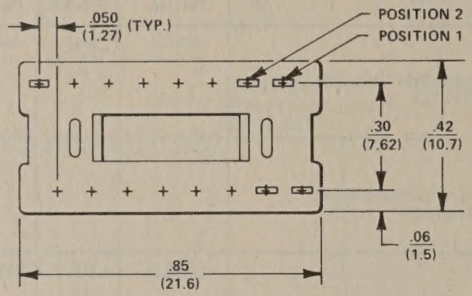


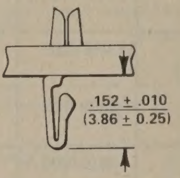
3M PART NO. 3498-0000

This is a solderless low-profile, pluggable connector that can be inserted or removed directly from a P.C.B. board having the proper hole pattern. It can be soldered if desired, and does not require an I.C. socket.

CONNECTOR BODY

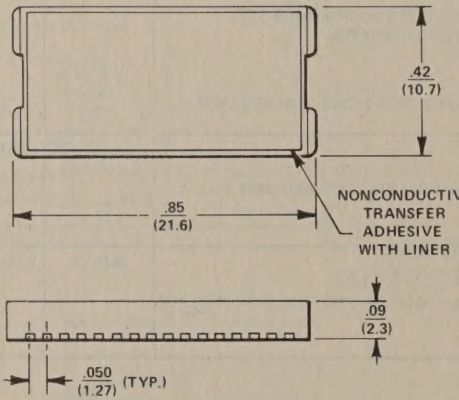

"U" CONTACT 16 PLACES
.07 (1.8)
.12 (3.0)
SHOWN FAR SIDE
SHOWN NEAR SIDE

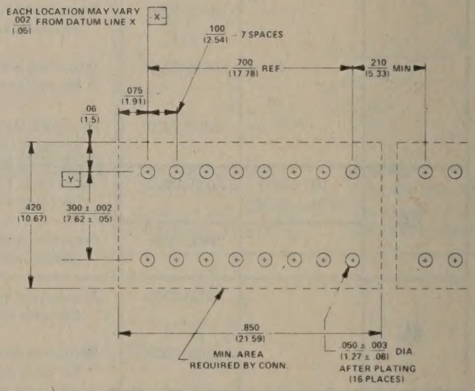

.050 (1.27) (TYP.)
POSITION 2
POSITION 1
.30 (7.62)
.42 (10.7)
.06 (1.5)
.85 (21.6)


.152 ± .010 (3.86 ± 0.25)

CONTACT DETAIL

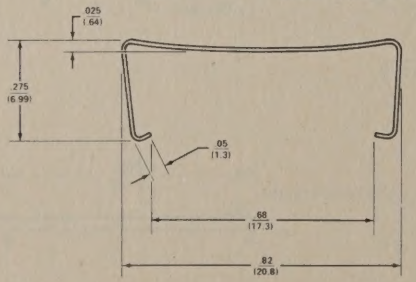
CONNECTOR COVER


.42 (10.7)
.85 (21.6)
NONCONDUCTIVE TRANSFER ADHESIVE WITH LINER
.09 (2.3)
.050 (1.27) (TYP.)

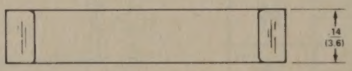

EACH LOCATION MAY VARY .002 (.05) FROM DATUM LINE X
X
100 (2.54) - 7 SPACES
700 (17.78) REF
210 (5.33) MIN
075 (1.91)
06 (1.5)
Y
420 (10.67)
300 ± .002 (7.62 ± .05)
.850 (21.59)
MIN. AREA REQUIRED BY CONN.
.050 ± .003 (1.27 ± .08) DIA AFTER PLATING (16 PLACES)

RECOMMENDED P.C. BOARD PATTERN
(Shown for mounting side of board)

3448-8 STRAIN RELIEF FOR USE WITH 3498-0000


.025 (.64)
.275 (6.99)
.05 (1.3)
.68 (17.3)
.82 (20.8)

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	



MATERIAL: RED EPOXY-COATED STEEL [.010 (.25) THK].

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3498-0000).

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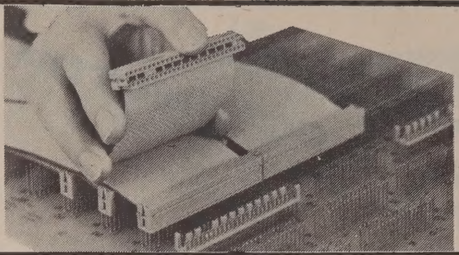
Scotchflex® BRAND SOCKET CONNECTOR AND KEYING HEADER SYSTEM



Unique polarizing, keying and backplane interconnection capabilities have been added to the Scotchflex Cable/Connector line with the introduction of a new mass terminating Socket Connector and Keying Header.

The 50 position Socket Connector will directly interface with .025" square backplane wrap pins. This Connector mates with 50 conductor Scotchflex Brand Flat Cables in 26 AWG or 30 AWG solid conductor and 28 AWG solid or stranded conductor versions.

Polarizing is accomplished with the Keying Header which is placed directly over 54, .025" square pins.

Its design includes posts on opposite corners for alignment of the header over the wrap pins. These posts also serve as a depth guide for .237" engagement, eliminating the need to cut pins, and allowing for two layers of wrap below the header.

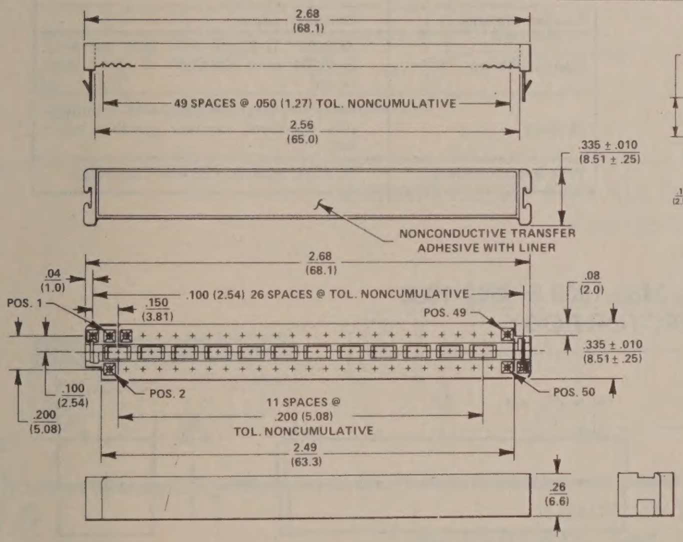
Rectangular keying posts in the center of the header break away to allow positive keying of the Socket Connector. A polarizing key is inserted into the keying holes on the Connector for mistakeproof polarization.

A wire form strain relief handle is available which minimizes stress to the contact/conductor interconnection and provides an area for identification.

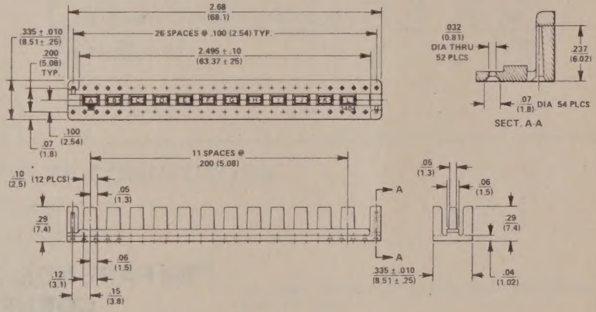
All Connector housings and polarizing keys are constructed of glass-reinforced thermoplastic with a flammability rating of 94 V-0.

SOCKET CONNECTOR DIMENSIONS
3M PART NO. 3307

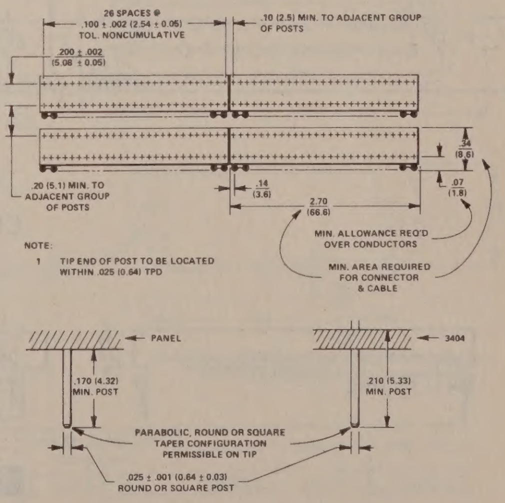
DIMENSIONS	
English	Inches
Metric	(mm)


2.68 (68.1)
49 SPACES @ .050 (1.27) TOL. NONCUMULATIVE
2.56 (65.0)
.335 ± .010 (8.51 ± .25)
NONCONDUCTIVE TRANSFER ADHESIVE WITH LINER
2.68 (68.1)
.04 (1.0)
.08 (2.0)
POS. 1
.150 (3.81)
.100 (2.54) 26 SPACES @ TOL. NONCUMULATIVE
POS. 49
.335 ± .010 (8.51 ± .25)
.100 (2.54)
.200 (5.08)
POS. 2
11 SPACES @ .200 (5.08) TOL. NONCUMULATIVE
POS. 50
2.49 (63.3)
.26 (6.6)

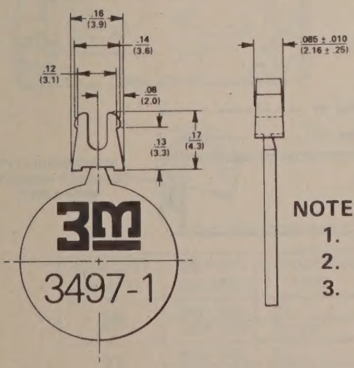
KEYING HEADER DIMENSIONS
3M PART NO. 3404


2.68 (68.1)
.335 ± .010 (8.51 ± .25)
26 SPACES @ .100 (2.54) TYP.
.200 (5.08) TYP.
2.495 ± .10 (63.37 ± .25)
.100 (2.54)
.07 (1.8)
.032 (0.81) DIA THRU 52 PLCS
.237 (6.02)
.07 (1.8) DIA 54 PLCS
SECT. A-A
11 SPACES @ .200 (5.08)
.10 (2.5) (12 PLCS)
.05 (1.3)
.29 (7.4)
.12 (3.1)
.06 (1.5)
.15 (3.8)
A
.335 ± .010 (8.51 ± .25)
.05 (1.3)
.06 (1.5)
.29 (7.4)
.04 (1.02)

WRAP POST SPECIFICATION


26 SPACES @ .100 ± .002 (2.54 ± 0.05) TOL. NONCUMULATIVE
.10 (2.5) MIN. TO ADJACENT GROUP OF POSTS
.200 ± .002 (5.08 ± 0.05)
.34 (8.6)
.07 (1.8)
.20 (5.1) MIN. TO ADJACENT GROUP OF POSTS
.14 (3.6)
2.70 (66.6)
MIN. ALLOWANCE REQ'D OVER CONDUCTORS
MIN. AREA REQUIRED FOR CONNECTOR & CABLE
NOTE:
1 TIP END OF POST TO BE LOCATED WITHIN .025 (0.64) TPD
PANEL
3404
.170 (4.32) MIN. POST
.210 (5.33) MIN. POST
PARABOLIC, ROUND OR SQUARE TAPER CONFIGURATION PERMISSIBLE ON TIP
.025 ± .001 (0.64 ± 0.03) ROUND OR SQUARE POST

POLARIZING KEY
3M PART NO. 3497-1


.16 (3.9)
.14 (3.6)
.12 (3.1)
.08 (2.0)
.17 (4.3)
.13 (3.3)
.085 ± .010 (2.16 ± .25)
3M
3497-1

NOTES:
1. MATERIAL – POLYESTER
2. COLOR – GREY
3. MARKING – RAISED FIGURES

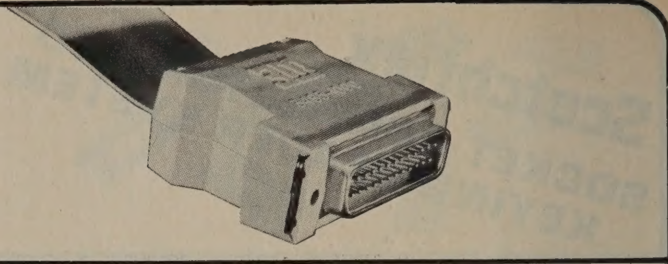
DIMENSIONS	
English	Inches
Metric	(mm)

SOCKET CONNECTOR/KEYING HEADER REFERENCE CHART

Socket CONNECTOR NO.	CONTACT QTY.	GRID SPACING	LOCATOR PLATE NO.	PLATEN NO.	STRAIN RELIEF NO.
3307	50	.100 x .200 (2.54) x (5.08)	3443-42	3442-9	3448-17

POLARIZING KEY NO.	KEYING HEADER NO.	SCOTCHFLEX CABLE NOS. USED WITH SYSTEM
3497-1	3404	3306/50 3469/50 3365/50 3476/50 3350/50 3380/50 3302/50

Scotchflex® BRAND DELTA CONNECTOR SYSTEM

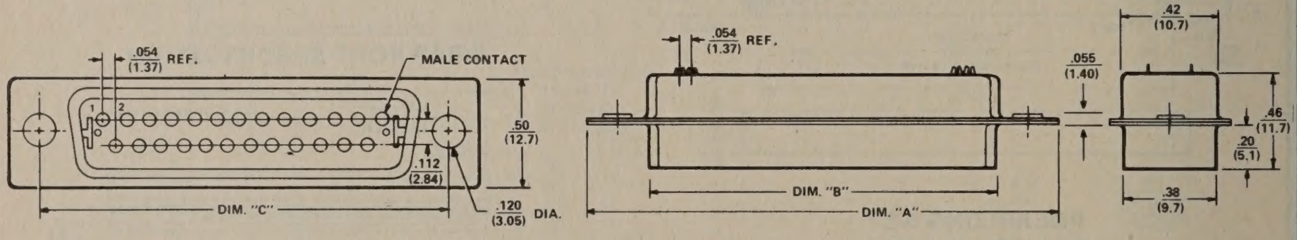


Here is the first system in the industry to permit mass connection of "D" subminiature connectors without the time-consuming stripping, soldering, crimping and individual positioning of discrete wires required by other systems. The "Scotchflex" Delta Connector System offers simultaneous stripping and terminating using the proven "U" contact principle pioneered by 3M. To provide instant interfacing of equipment having two different center spacings, the "Scotchflex" Delta System offers cables with unique variable patterns of center spacing (see page 00). The "Scotchflex" Delta System provides unequaled versatility, since its connectors are cable-compatible with all other "Scotchflex" connectors (Socket, P.C.B., D.I.P., Plug and Card-Edge) and also mate with all other "D" subminiature connectors in the industry. A complete line of accessory components is available.

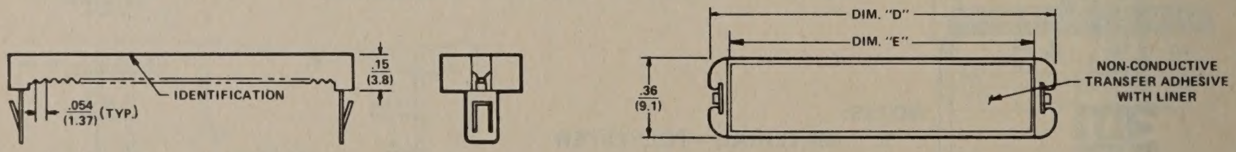
TYPICAL PROPERTIES OF THE SCOTCHFLEX DELTA CONNECTOR

ELECTRICAL	
Current Rating	1 Amp
Insulation Resistance	>1 x 10⁹ ohms
Dielectric Strength	>1,000 volts at sea level
ENVIRONMENTAL	
Temperature Rating	-67°F to +221°F (-55°C to +105°C)
PHYSICAL	
Contact Housing	Gray glass-reinforced polyester (U.L. Flammability Rating 94V-O) encased in steel shell plated with yellow chromate over clear cadmium
Contact Material	Beryllium copper
Contact Plating	.000050" (1.27μm) min. gold per MIL-G-45204 over .000050" (1.27μm) min. nickel
Marking	Raised figures: 3M logo, part identification numbers, contact position numbers
Wire Accommodation	26 AWG Solid and 28 AWG Stranded

3M PART NOS. 3482-1000 & 3502-1000 CONNECTOR BODY



CONNECTOR COVER



TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3482-1000).

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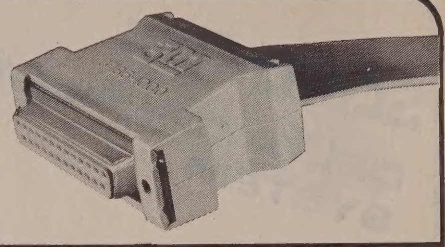
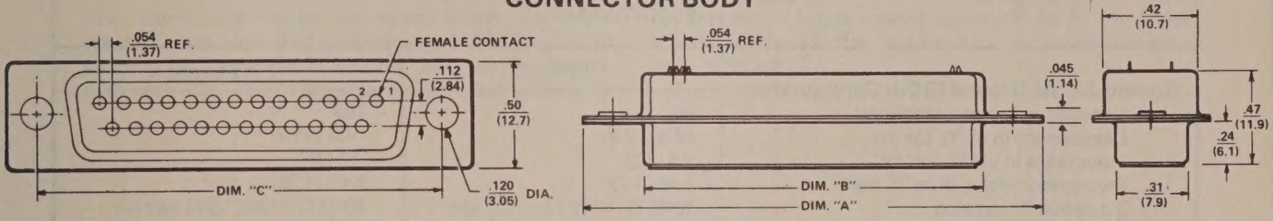
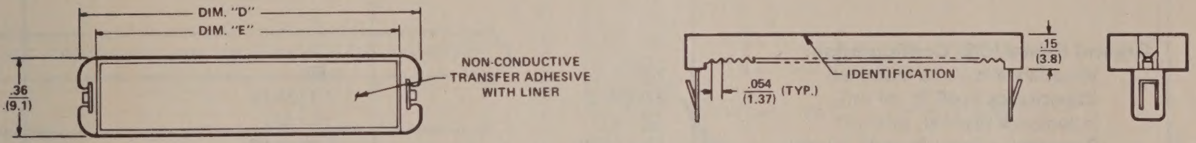
Scotchflex® BRAND DELTA CONNECTOR SYSTEM



3M PART NOS. 3483-1000 & 3503-1000 CONNECTOR BODY

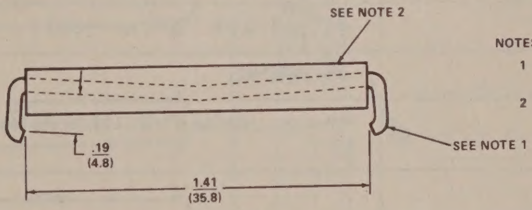

.054 (1.37) REF.
FEMALE CONTACT
2
1
.112 (2.84)
.50 (12.7)
DIM. "C"
.120 (3.05) DIA.
.054 (1.37) REF.
.045 (1.14)
DIM. "B"
DIM. "A"
.42 (10.7)
.47 (11.9)
.24 (6.1)
.31 (7.9)

CONNECTOR COVER


DIM. "D"
DIM. "E"
.36 (9.1)
NON-CONDUCTIVE TRANSFER ADHESIVE WITH LINER
.15 (3.8)
IDENTIFICATION
.054 (1.37) (TYP.)

STRAIN RELIEF FOR ALL DELTA CONNECTORS

(3M PART NO. 3448-6)


SEE NOTE 2
SEE NOTE 1
.19 (4.8)
1.41 (35.8)

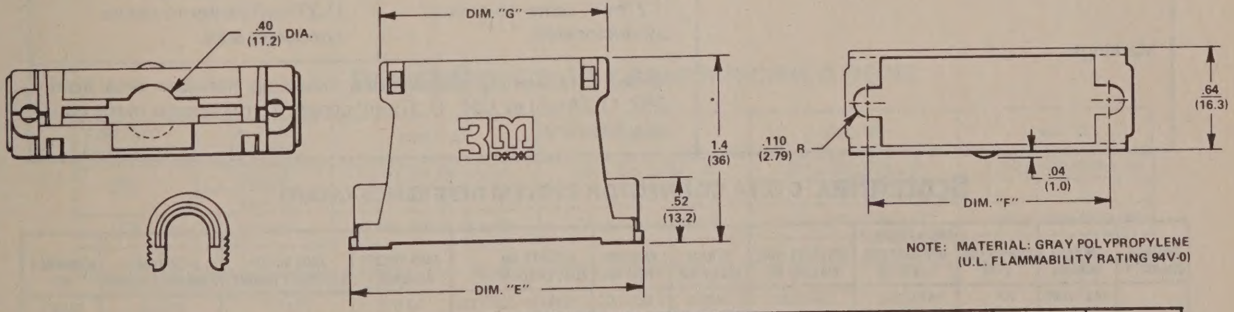
NOTES:

1 MATERIAL: NICKEL-PLATED STEEL MUSIC WIRE, 19 GA. [.043 (1.09) DIA.].

2 MATERIAL: GRAY EXTRUDED POLYVINYL CHLORIDE.

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

JUNCTION SHELL (3M PART NOS. 3485-1000 & 3485-4000)


.40 (11.2) DIA.
DIM. "G"
1.4 (36)
.52 (13.2)
DIM. "E"
.110 (2.79) R
.64 (16.3)
.04 (1.0)
DIM. "F"

NOTE: MATERIAL: GRAY POLYPROPYLENE (U.L. FLAMMABILITY RATING 94V-0)

CONTACT QUANTITY	3M PART NUMBER	CONNECTOR TYPE	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	TAKES JUNCTION SHELL NO.	DIM. "E"	DIM. "F"	DIM. "G"
25	3482-1000	Pin	2.09 (53.1)	1.58 (40.1)	1.85 (47.0)	1.53 (38.9)	3485-1000	2.20 (55.9)	1.85 (47.0)	1.72 (43.7)
	3483-1000	Socket	"	1.51 (38.4)	"	"	"	"	"	"
37	3502-1000	Pin	2.74 (69.6)	2.23 (56.7)	2.50 (63.5)	2.18 (55.4)	3485-4000	2.84 (72.1)	2.50 (63.5)	2.40 (61.0)
	3503-1000	Socket	"	2.16 (54.8)	"	"	"	"	"	"

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3482-1000).

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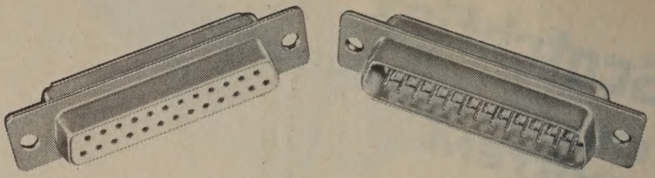
Scotchflex® BRAND DELTA CONNECTOR SYSTEM



TYPICAL PROPERTIES OF SCOTCHFLEX DELTA CABLES

ELECTRICAL		
	3349/25	3507 Series
Ground-Signal-Ground (GSG) Configuration:		
Impedance in ohms (nominal)	94	103
Capacitance in pF/ft. (pF/m)	14.6 (47.9)	14.0 (45.9)
Inductance in μH/ft. (μH/m)	.16 (.52)	.17 (.56)
Propagation delay in ns/ft. (ns/m)	1.46 (4.79)	1.43 (4.69)
Insulation Resistance	10^4M Ω/10-ft. (3m) sample	10^4M Ω /10-ft. (3m) sample
Voltage Rating	300 VRMS	300 VRMS
Ground-Signal (GS) Configuration:		
Impedance in ohms (nominal)	137	150
Capacitance in pF/ft. (pF/m)	8.0 (26.3)	7.3 (24.0)
Inductance in μH/ft. (μH/m)	.25 (.82)	.26 (.85)
Propagation Delay in ns/ft. (ns/m)	1.42 (4.66)	1.39 (4.56)
Insulation Resistance	10^4M Ω/10-ft. (3m) sample	10^4M Ω /10-ft. (3m) sample
Voltage Rating	300 VRMS	300 VRMS
ENVIRONMENTAL		
Temperature Rating	-4°F. to +221°F. (-20°C to +105°C)	
PHYSICAL		
Insulator Material	Polyvinyl chloride (PVC), U.L. style No. 2651, flammability rating of FR-1.	
Color	Gray	
Conductors	26 AWG (.404) Solid Copper	28 AWG 7.36 (7x.127) Nylon-coated Stranded Copper
Markings	Red line indicating .050" (1.27mm) center-to-center conductor area.	Black line indicating .050" (1.27mm) center-to-center conductor area.
	Raised lines running across cable indicating transition area from .050" (1.27mm) to .054" (1.37mm) center. Termination is made outside these lines.	

Scotchflex BRAND DELTA CONNECTOR SYSTEM REFERENCE CHART

CONTACT QUANTITY	3M PART NUMBER	CONNECTOR TYPE	FOR ASSEMBLY USE LOCATOR PLATE NO.	DISCRETE WIRE FIXTURE NO.	STRAIN RELIEF NO.	JUNCTION SHELL NO.	ACCEPTS 3M FLAT CABLE NO.	JACK SOCKET ASSEMBLY	JACK SCREW ASSEMBLY (SHORT)	JACK SCREW ASSEMBLY (LONG)	ASSEMBLY KIT
25	3482-1000	Pin	3443-39 or 3443-44	3480/26	3448-6	3485-1000	3349/25 3507/25	3341-1	3342-1	3342-2	3343-1
	3483-1000	Socket	3443-30 or 3443-45	3480/25	"	"	" "	"	"	"	"
37	3502-1000	Pin	3443-44	--	3448-19	3485-2000	3507/37	"	"	"	"
	3503-1000	Socket	3443-45	--	"	"	"	"	"	"	"

For proper assembly of connector, ask your 3M sales representative for free instruction booklet "Instructions and Installation Procedures for Operation of the SCOTCHFLEX Delta Connector System."

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3482-1000).

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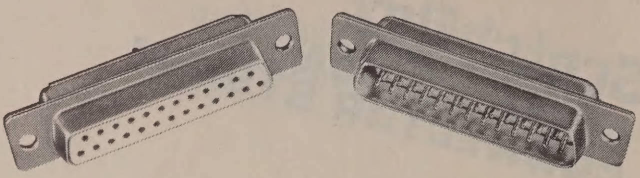
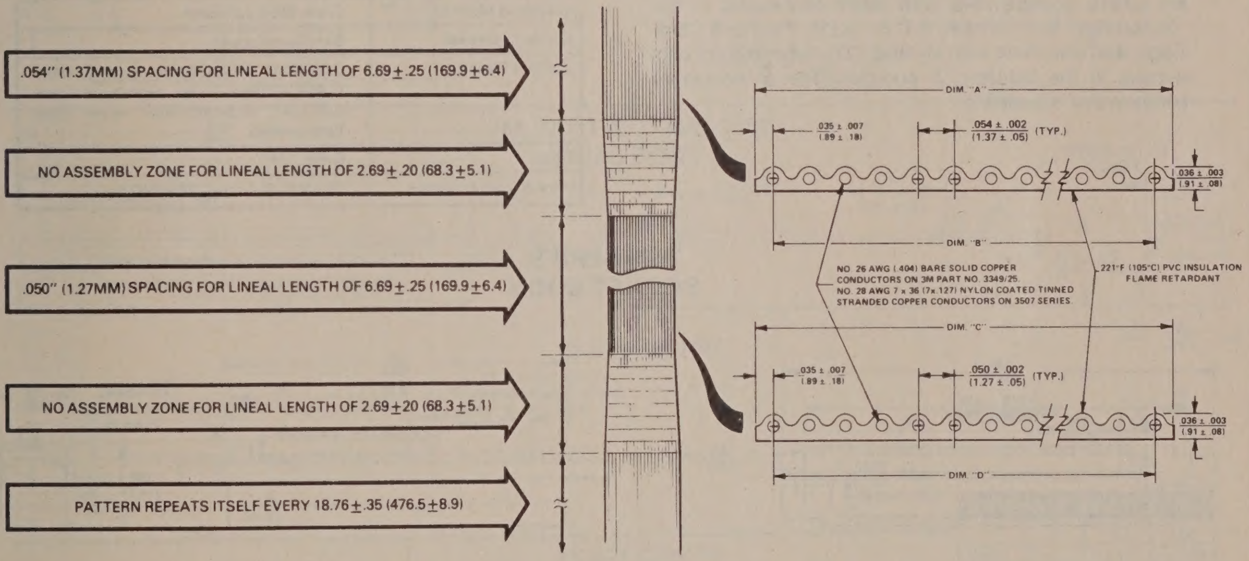
Scotchflex® BRAND DELTA CONNECTOR SYSTEM



Instant interfacing of equipment having two different center spacings is made possible with these "Scotchflex" vari-spaced cables. As shown below, conductor spacing areas with .054" (1.37mm) and .050" (1.27mm) spacing are alternated in roughly 18" overall patterns, with each .050" (1.27mm) segment identified by a red or black stripe on the cable. Transition or "no assembly" zones separating the active conductor areas are identified by a series of ridges running perpendicular to the cable conductors; this buffer area is not to be used for termination purposes.


.054" (1.37MM) SPACING FOR LINEAL LENGTH OF 6.69±.25 (169.9±6.4)
NO ASSEMBLY ZONE FOR LINEAL LENGTH OF 2.69±.20 (68.3±5.1)
.050" (1.27MM) SPACING FOR LINEAL LENGTH OF 6.69±.25 (169.9±6.4)
NO ASSEMBLY ZONE FOR LINEAL LENGTH OF 2.69±20 (68.3±5.1)
PATTERN REPEATS ITSELF EVERY 18.76±.35 (476.5±8.9)
DIM. "A"
.035 ± .007 (.89 ± .18)
.054 ± .002 (1.37 ± .05) (TYP.)
.036 ± .003 (.91 ± .08)
DIM. "B"
NO. 26 AWG (.404) BARE SOLID COPPER CONDUCTORS ON 3M PART NO. 3349/25.
NO. 28 AWG 7 x 36 (7x.127) NYLON COATED TINNED STRANDED COPPER CONDUCTORS ON 3507 SERIES.
221°F (105°C) PVC INSULATION FLAME RETARDANT
DIM. "C"
.035 ± .007 (.89 ± .18)
.050 ± .002 (1.27 ± .05) (TYP.)
.036 ± .003 (.91 ± .08)
DIM. "D"

Scotchflex BRAND DELTA CABLE SPECIFICATIONS

CONTACT QUANTITY	3M PART NUMBER	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"
25	3349/25	1.366±.020 (34.70±.51)	1.296±.010 (32.92±.25)	1.270±.020 (32.26±.51)	1.200±.010 (30.48±.25)
	3507/25	"	"	"	"
37	3507/37	2.014±.025 (51.16±.63)	1.944±.015 (49.37±.38)	1.870±.025 (47.50±.63)	1.800±.015 (45.72±.38)

Most "Scotchflex" Brand products are identified by a multi-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3349/25). For complete ordering information, see chart on p.

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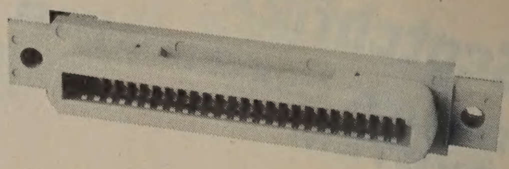
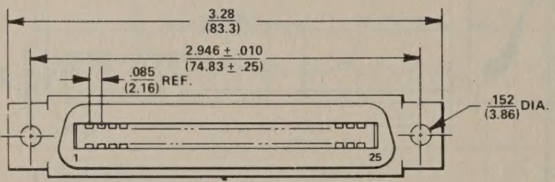
Scotchflex® BRAND DELTA RIBBON CONNECTOR SYSTEM

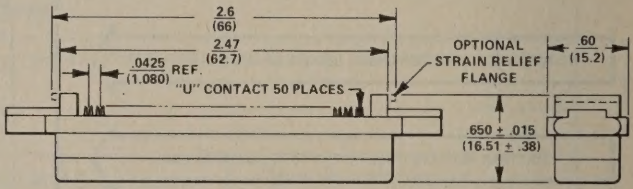


Now you can mass-terminate ribbon connectors without the expensive wire preparation and assembly costs required by other systems. The "Scotchflex" Delta Ribbon Connector System eliminates all stripping, soldering, crimping and individual positioning of discrete wires; using 3M's proven "U" contact principle you strip and terminate 50 conductors (25 pairs) simultaneously. To provide instant interfacing of equipment having two different center spacings, the "Scotchflex" Delta Ribbon System offers cables with unique variable patterns of center spacing (see page 00). Unequaled versatility is provided by the system, since all Delta Ribbon connectors are cable-compatible with other connectors in the "Scotchflex" line (Socket, P.C.B., D.I.P., Plug and Card-Edge, and also mate with all other "D" subminiature connectors in the industry. A complete line of accessory components is available.

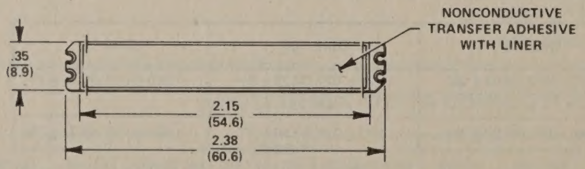
TYPICAL PROPERTIES FOR ALL DELTA RIBBON CONNECTORS	
ELECTRICAL	
Current Rating	1 AMP
Dielectric Withstanding Voltage	>1,000 Volts at Sea Level
Insulation Resistance	>1x10⁹ Ohms
ENVIRONMENTAL	
Temperature Range	-67°F to +221°F (-55°C to +105°C)
PHYSICAL	
Insulation Material	Glass-filled polyester
Contact Material	Beryllium copper
Contact Plating	0.000030" (.762μm) min. gold per MIL-G-45204 Type II on wiping tab over 0.000100" (2.54μm) min. nickel. Gold flash overall.
Color	Gray
Wire Accommodation	28 AWG Stranded, 26 AWG Solid

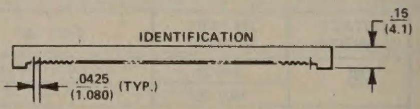
3489 SERIES SOCKET BODY


3.28
(83.3)
2.946 ± .010
(74.83 ± .25)
.085
(2.16)
REF.
.152
(3.86)
DIA.
1
25


2.6
(66)
2.47
(62.7)
.0425
(1.080)
REF.
"U" CONTACT 50 PLACES
OPTIONAL STRAIN RELIEF FLANGE
.60
(15.2)
.650 ± .015
(16.51 ± .38)

SOCKET COVER


.35
(8.9)
NONCONDUCTIVE TRANSFER ADHESIVE WITH LINER
2.15
(54.6)
2.38
(60.6)


IDENTIFICATION
.15
(4.1)
.0425
(1.080)
(TYP.)

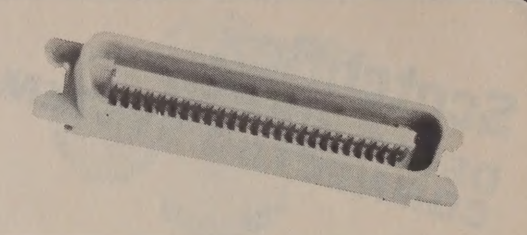
CONTACT QUANTITY	3M PART NUMBER	STRAIN RELIEF PROVISION
50	3489-1000	Without Strain Relief Flanges
	3489-1001	With Strain Relief Flanges

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3489-1000).

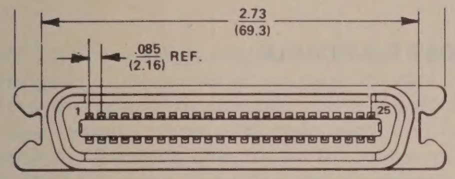
Electronic Products Division 3M COMPANY
3M CENTER • SAINT PAUL, MINNESOTA 55101

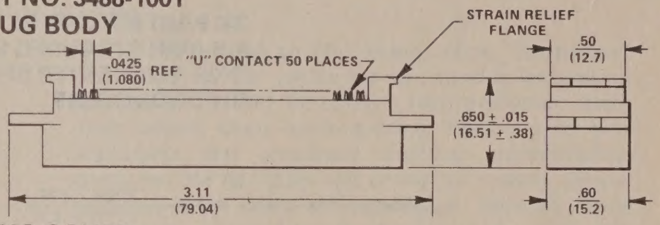
Scotchflex® BRAND DELTA RIBBON CONNECTOR SYSTEM



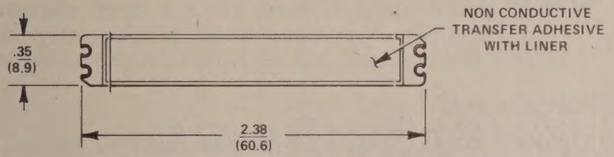
3M PART NO. 3488-1001

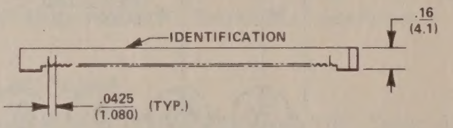
PLUG BODY


2.73
(69.3)
.085
(2.16) REF.
1
25


.0425
(1.080) REF.
"U" CONTACT 50 PLACES
STRAIN RELIEF
FLANGE
.50
(12.7)
.650 ± .015
(16.51 ± .38)
3.11
(79.04)
.60
(15.2)

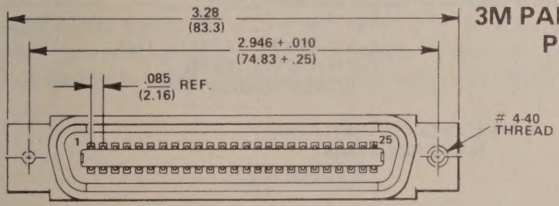
PLUG COVER

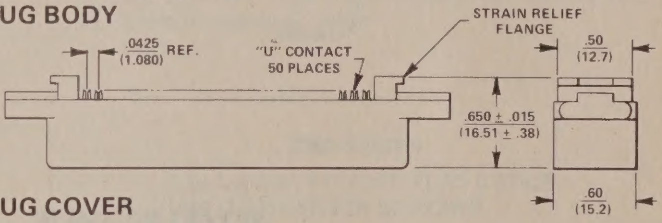

NON CONDUCTIVE
TRANSFER ADHESIVE
WITH LINER
.35
(8.9)
2.38
(60.6)


IDENTIFICATION
.16
(4.1)
.0425
(1.080) (TYP.)

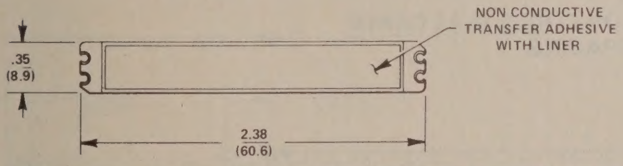
3M PART NO. 3488-1002

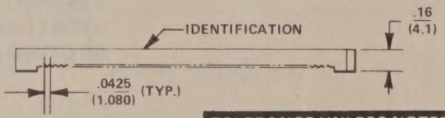
PLUG BODY


3.28
(83.3)
2.946 + .010
(74.83 + .25)
.085
(2.16) REF.
# 4-40
THREAD
1
25


.0425
(1.080) REF.
"U" CONTACT
50 PLACES
STRAIN RELIEF
FLANGE
.50
(12.7)
.650 ± .015
(16.51 ± .38)
.60
(15.2)

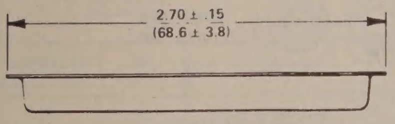
PLUG COVER


NON CONDUCTIVE
TRANSFER ADHESIVE
WITH LINER
.35
(8.9)
2.38
(60.6)

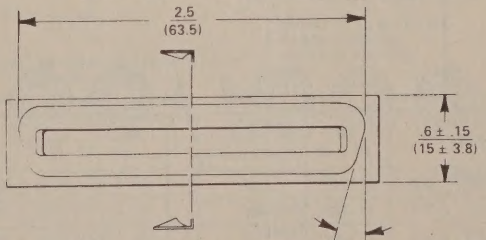

IDENTIFICATION
.16
(4.1)
.0425
(1.080) (TYP.)

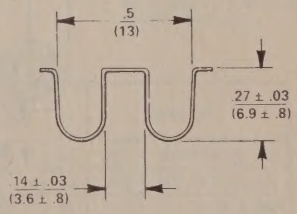
TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

DUST COVER
(3M PART NO. 3412)


2.70 ± .15
(68.6 ± 3.8)

MATERIAL: CLEAR VINYL


2.5
(63.5)
.6 ± .15
(15 ± 3.8)


.5
(13)
.27 ± .03
(6.9 ± .8)
.14 ± .03
(3.6 ± .8)

Scotchflex DELTA RIBBON CONNECTOR SYSTEM REFERENCE CHART

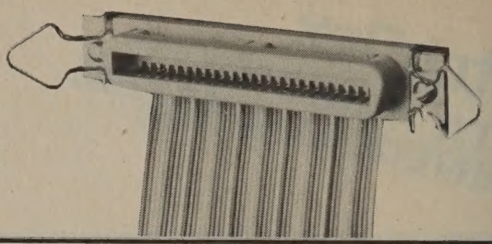
CONTACT QUANTITY	3M PART NUMBER	FOR ASSEMBLY USE LOCATOR PLATE NO.	STRAIN RELIEF NO.	STRAIN RELIEF HOOD NO.	ACCEPTS 3M FLAT CABLE NO.	BAIL MOUNT KIT	SCREW MOUNT KIT	JACK SOCKET KIT	DUST COVER
50	3489-1000	3443-41	—	—	3389/50, 3384/50	3475-1	3342-3	3441-2	3412
	3489-1001	"	3448-15	3485-2	"	"	"	"	"
	3488-1001	3443-48	"	"	"	"	—	—	"
	3448-1002	"	"	"	"	—	3342-3	3341-2	"

For proper assembly of connector, ask your 3M sales representative for free instruction booklet "Instructions and Installation Procedures for Operation of the SCOTCHFLEX Delta Ribbon Connector System."

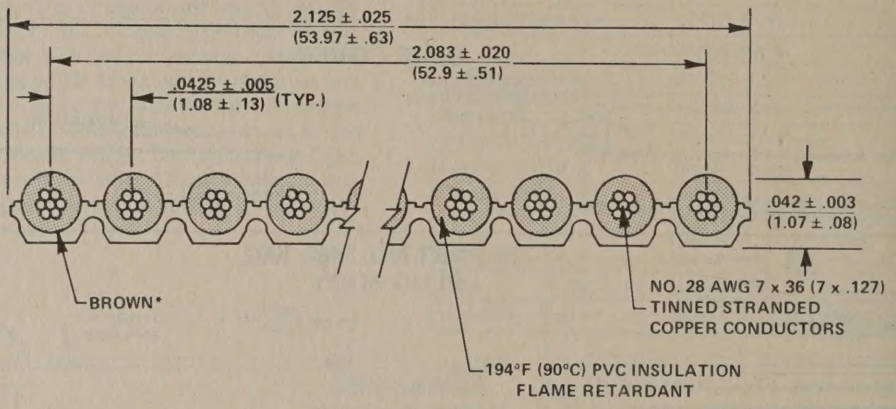
Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3489-1000).

Electronic Products Division 3M COMPANY
3M CENTER • SAINT PAUL, MINNESOTA 55101

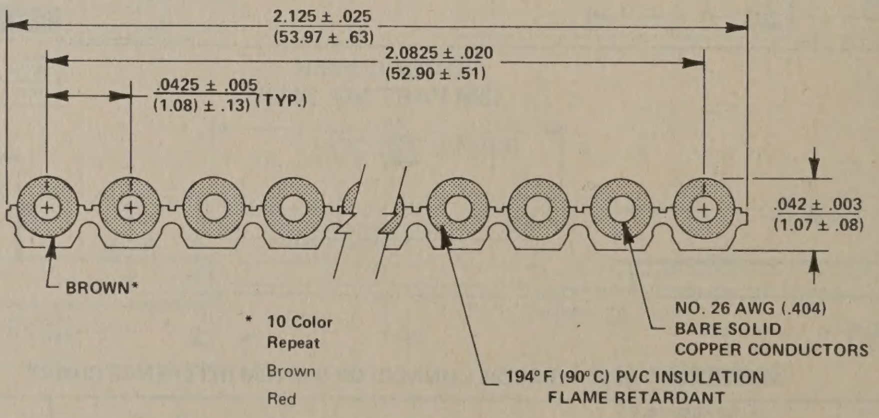
Scotchflex® BRAND DELTA RIBBON CONNECTOR SYSTEM



3M PART NO. 3389/50
#28 AWG STRANDED COLOR-CODED FLAT CABLE
.0425 (1.08) CENTER SPACING
50 CONDUCTORS


2.125 ± .025
(53.97 ± .63)
2.083 ± .020
(52.9 ± .51)
.0425 ± .005
(1.08 ± .13) (TYP.)
.042 ± .003
(1.07 ± .08)
BROWN*
NO. 28 AWG 7 x 36 (7 x .127)
TINNED STRANDED
COPPER CONDUCTORS
194°F (90°C) PVC INSULATION
FLAME RETARDANT

3M PART NO. 3384/50
#26 AWG SOLID COLOR-CODED FLAT CABLE
.0425 (1.08) CENTER SPACING
50 CONDUCTORS

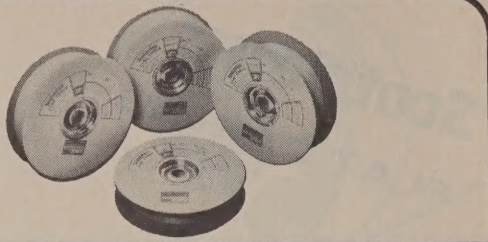

2.125 ± .025
(53.97 ± .63)
2.0825 ± .020
(52.90 ± .51)
.0425 ± .005
(1.08) ± .13) (TYP.)
.042 ± .003
(1.07 ± .08)
BROWN*
NO. 26 AWG (.404)
BARE SOLID
COPPER CONDUCTORS
194° F (90° C) PVC INSULATION
FLAME RETARDANT

* **10 Color Repeat**
- Brown
- Red
- Orange
- Yellow
- Green
- Blue
- Violet
- Gray
- White
- Black

Electronic Products Division 3M COMPANY

3M CENTER • SAINT PAUL, MINNESOTA 55101

Scotchflex® BRAND FLAT CABLES



INTRODUCTION

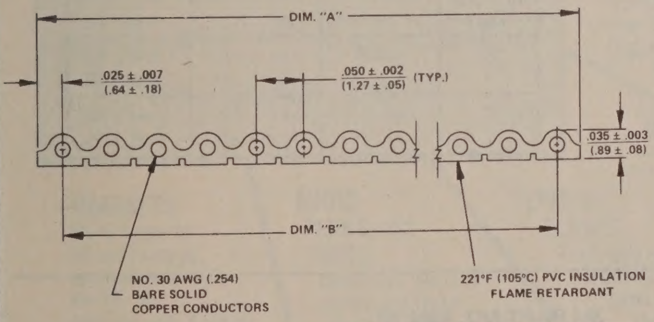
3M Company's lightweight, low-profile flat cables are designed to mate with all standard industry connectors. They are offered in standard round conductor, ground plane, ground plane with drain wire, and color-coded versions. Being flexible, these flat cables can be bent or folded without damaging either conductors or insulation. Conductors are joined in one-piece construction with a ribbed top side for positioning in mating connectors; there is a red, black or green coding stripe along one edge of the cable to simplify orientation. Insulation is polyvinyl chloride, U.L. listed at 300 VRMS, 221°F (105°C), with an FR-1 rating. Using "Scotchflex" connectors, 3M flat cables are also suitable for bussing operations. The 3M Company's high production standards assure close center-spacing tolerances to give predictable and consistent electrical characteristics. Using the 3M flat cable and connector system, jumper assembly labor costs are appreciably reduced, since hand wiring and soldering are eliminated. For assistance with special design problems, contact your local 3M sales representative or "Scotchflex" distributor.

ROUND CONDUCTOR FLAT CABLE

The 3M Company supplies 7 standard round conductor flat cables. They come in wire sizes #30 AWG Solid, #28 AWG Stranded, #26 AWG Solid, and #24 AWG Stranded with up to 64 conductor widths. Depending on the particular cable, there are three center spacings to choose from — .050", .0625" and .075". Being zippable, breakouts can be made when more than one connector is required on an end. With this wide selection, 3M has the right cable to meet your needs.

3350 SERIES

#30 AWG SOLID FLAT CABLE .050 (1.27) CENTER SPACING


DIM. "A"
.025 ± .007 (.64 ± .18)
.050 ± .002 (1.27 ± .05) (TYP.)
.035 ± .003 (.89 ± .08)
DIM. "B"
NO. 30 AWG (.254) BARE SOLID COPPER CONDUCTORS
221°F (105°C) PVC INSULATION FLAME RETARDANT

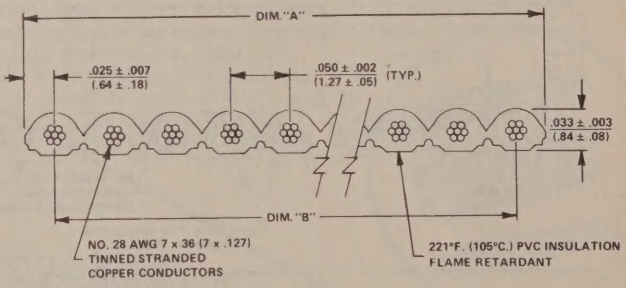
Number of Conductors	3M Part No.	DIM. "A"	DIM. "B"
10	3350/10	.500 ± .010 (12.70 ± .25)	.450 ± .007 (11.43 ± .18)
14	3350/14	.700 ± .010 (17.78 ± .25)	.650 ± .007 (16.51 ± .18)
16	3350/16	.800 ± .015 (20.32 ± .38)	.750 ± .011 (19.05 ± .28)
20	3350/20	1.000 ± .015 (25.40 ± .38)	.950 ± .011 (24.13 ± .28)
24	3350/24	1.200 ± .015 (30.48 ± .38)	1.150 ± .011 (29.21 ± .28)
26	3350/26	1.300 ± .015 (33.02 ± .38)	1.250 ± .011 (31.75 ± .28)
34	3350/34	1.700 ± .020 (43.18 ± .51)	1.650 ± .015 (41.91 ± .38)
40	3350/40	2.000 ± .020 (50.80 ± .51)	1.950 ± .015 (49.53 ± .38)
50	3350/50	2.500 ± .020 (63.50 ± .51)	2.450 ± .015 (62.23 ± .38)

U.L. STYLE NO. 2651

NOTE: RED MARKING ON ONE EDGE OF CABLE.

3365 SERIES

#28 AWG STRANDED FLAT CABLE .050 (1.27) CENTER SPACING


DIM. "A"
.025 ± .007 (.64 ± .18)
.050 ± .002 (1.27 ± .05) (TYP.)
.033 ± .003 (.84 ± .08)
DIM. "B"
NO. 28 AWG 7 x 36 (7 x .127) TINNED STRANDED COPPER CONDUCTORS
221°F. (105°C.) PVC INSULATION FLAME RETARDANT

Number of Conductors	3M Part No.	DIM. "A"	DIM. "B"
10	3365/10	.500 ± .010 (12.70 ± .25)	.450 ± .007 (11.43 ± .18)
14	3365/14	.700 ± .010 (17.78 ± .25)	.650 ± .007 (16.51 ± .18)
16	3365/16	.800 ± .015 (20.32 ± .38)	.750 ± .011 (19.05 ± .28)
20	3365/20	1.000 ± .015 (25.40 ± .38)	.950 ± .011 (24.13 ± .28)
24	3365/24	1.200 ± .015 (30.48 ± .38)	1.150 ± .011 (29.21 ± .28)
26	3365/26	1.300 ± .015 (33.02 ± .38)	1.250 ± .011 (31.75 ± .28)
34	3365/34	1.700 ± .020 (43.18 ± .51)	1.650 ± .015 (41.91 ± .38)
40	3365/40	2.000 ± .020 (50.80 ± .51)	1.950 ± .015 (49.53 ± .38)
50	3365/50	2.500 ± .020 (63.50 ± .51)	2.450 ± .015 (62.23 ± .38)
60	3365/60	3.000 ± .020 (76.20 ± .51)	2.950 ± .015 (74.93 ± .38)
64	3365/64	3.200 ± .020 (81.28 ± .51)	3.100 ± .015 (78.74 ± .38)

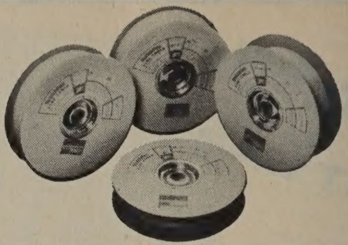
NOTE: RED MARKING ON ONE EDGE OF CABLE

U.L. STYLE NO. 2651

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by a multiple-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3350/10).

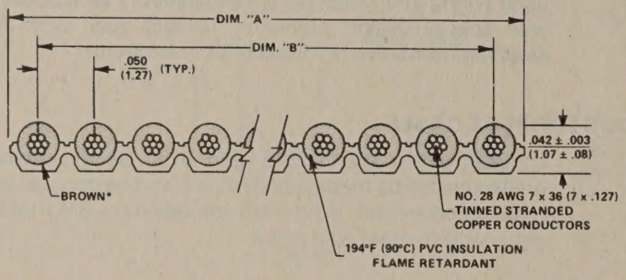
Scotchflex® BRAND FLAT CABLES



Color-coding adds the convenience of individual wire identification to the proven advantages of the "Scotchflex" mass termination system. Similar to our familiar gray cable, these new additions to the "Scotchflex" line are fully zippable, permitting conductors to be either mass terminated or separated for multiple discrete connections. Depending on the particular cable, they are available with 28 AWG stranded and 26 AWG solid conductors on .0425", .050" or .054" centers, in cable sizes up to 64 conductors.

3302 SERIES

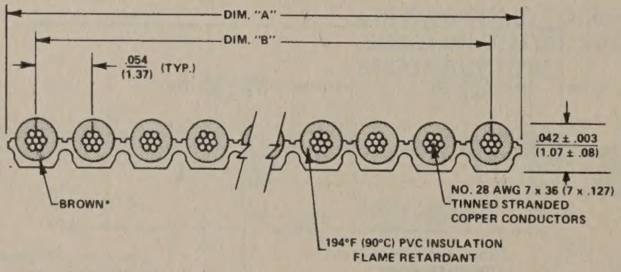
#28 AWG STRANDED COLOR-CODED FLAT CABLE
.050 (1.27) CENTER SPACING


DIM. "A"
DIM. "B"
.050 (1.27) (TYP.)
.042 ± .003 (1.07 ± .08)
BROWN*
NO. 28 AWG 7 x 36 (7 x .127) TINNED STRANDED COPPER CONDUCTORS
194°F (90°C) PVC INSULATION FLAME RETARDANT

3M Part Number	DIM. "A"	DIM. "B"
3302/10	.500 ± .015 (12.70 ± .38)	.450 ± .010 (11.43 ± .25)
3302/14	.700 ± .015 (17.78 ± .38)	.650 ± .010 (16.51 ± .25)
3302/16	.800 ± .020 (20.32 ± .51)	.750 ± .015 (19.05 ± .38)
3302/20	1.000 ± .020 (25.40 ± .51)	.950 ± .015 (24.13 ± .38)
3302/24	1.200 ± .020 (30.48 ± .51)	1.150 ± .015 (29.21 ± .38)
3302/26	1.300 ± .020 (33.02 ± .51)	1.250 ± .015 (31.75 ± .38)
3302/34	1.700 ± .025 (43.18 ± .63)	1.650 ± .020 (41.91 ± .51)
3302/40	2.000 ± .025 (50.80 ± .63)	1.950 ± .020 (49.53 ± .51)
3302/50	2.500 ± .025 (63.50 ± .63)	2.450 ± .020 (62.23 ± .51)
3302/64	3.200 ± .025 (81.28 ± .63)	3.100 ± .020 (78.74 ± .51)

3301 SERIES

#28 AWG STRANDED COLOR-CODED FLAT CABLE
.054 (1.37) CENTER SPACING
25 CONDUCTORS


DIM. "A"
DIM. "B"
.054 (1.37) (TYP.)
.042 ± .003 (1.07 ± .08)
BROWN*
NO. 28 AWG 7 x 36 (7 x .127) TINNED STRANDED COPPER CONDUCTORS
194°F (90°C) PVC INSULATION FLAME RETARDANT

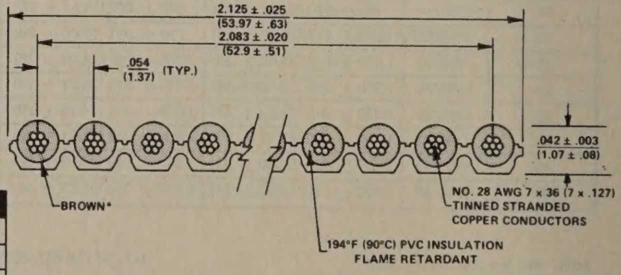
Number of Conductors	3M Part No.	Dim. "A"	Dim. "B"
25	3301/25	1.350 ± .020 (34.29 ± .51)	1.296 ± .015 (32.92 ± .38)
37	3301/37	1.998 ± .025 (50.75 ± .63)	1.944 ± .020 49.37 ± .51)

3M PART NO. 3384/50

#26 AWG SOLID COLOR-CODED FLAT CABLE
.0425 (1.08) CENTER SPACING
50 CONDUCTORS

3M PART NO. 3389/50

#28 AWG STRANDED COLOR-CODED FLAT CABLE
.0425 (1.08) CENTER SPACING
50 CONDUCTORS


2.125 ± .025 (53.97 ± .63)
2.083 ± .020 (52.9 ± .51)
.054 (1.37) (TYP.)
.042 ± .003 (1.07 ± .08)
BROWN*
NO. 28 AWG 7 x 36 (7 x .127) TINNED STRANDED COPPER CONDUCTORS
194°F (90°C) PVC INSULATION FLAME RETARDANT

TOLERANCE UNLESS NOTED			
	.0	.00	.000
INCH	±.1	±.01	±.005
mm	±.3	±.13	

Most "Scotchflex" Brand products are identified by an eight-digit 3M Part Number. When ordering, be sure to include the complete series/suffix number (i.e., 3302/10).

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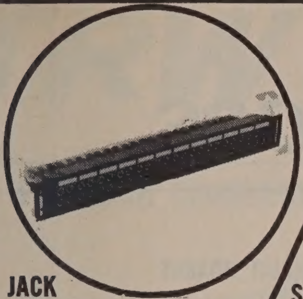
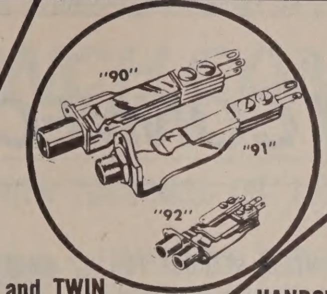


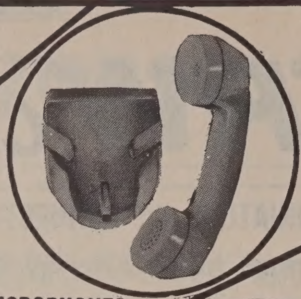
JACK MOUNTING PANELS

Used for mounting standard and miniature telephone and coaxial jacks, keys, lamp sockets, etc. Equivalents of W.E. and many others available. Request bulletins on Product Family 70.



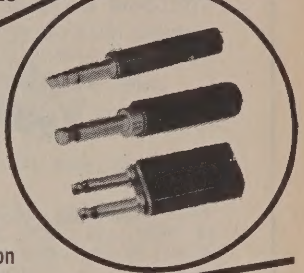
SINGLE and TWIN TELEPHONE JACKS

Standard and miniature size jacks. All circuit configurations. Panels for these provided by Product Family 70. Request bulletin on Product Family 51 53, and 55 on jacks.



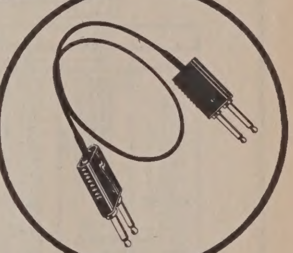
HANDSETS—HEADSET-MICROPHONES and ACCESSORIES

Types for all telecommunication, telephone operators, broadcast station, intercomm, etc. applications. Includes sound powered and carbon microphones, a variety of push-to-talk switches, cords, and accessories, such as cradles for hanging handsets. Request bulletins on Product Family 20.



TELEPHONE PLUGS

Nearly all types, W.E. Kellogg, A.E., etc. both single and twin in two and three circuit forms. All have molded in place nylon insulation. Request bulletins on Product Family 80.



AUDIO PATCH, SWITCHBOARD, and TEST CORDS

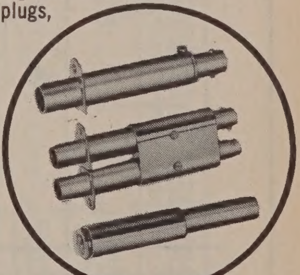
With standard and miniature size single and twin telephone plugs. Nylon braided tinsel conductor cords. Request bulletin on Product Family 30.

TRIMM'S Full Line

Available from our industrial distributor in your area

COAX JACKS — PLUGS — PATCH CORDS — and RELATED COMPONENTS

Standard sized single and twin jacks including normal through and terminating types, W.E. and RCA compatible, fitting wide assortment of coax cables and other connectors. Twin looping plugs, single plugs, plug adapters, patch cords, etc. Also specialized triax and twinax concentric series jacks and plugs as well as miniaturized type. Request bulletin on Product Family 60.



HEADSETS

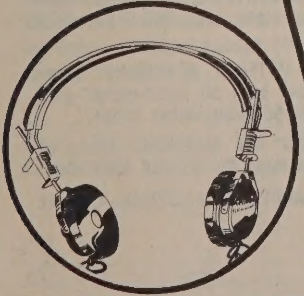
Many types in all cost ranges, applicable to wide variety of applications. Request bulletin on Product Family 01 through 19.

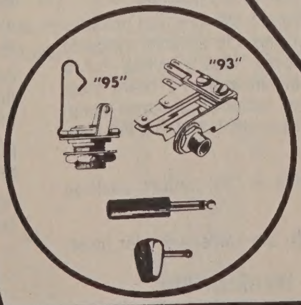
AUDIO PLUGS and JACKS

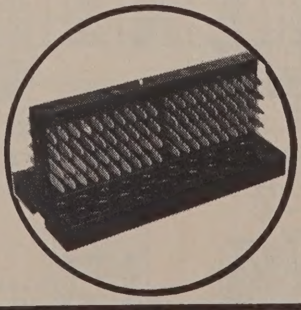
Numerous low cost plugs and jacks for hi-fi, tape recorders, sound equipment, etc. Request bulletin on Product Family 40.

TERMINAL BLOCKS

Originally used by the telephone industry (often called Christmas Tree type) now also widely used in other system work. Up to 14 rows per block; 10, 20, and 26 terminals per row. Lug types — solder, wire-wrap, and hybrid solder, wire-wrap. Request bulletin on Product Family 35.







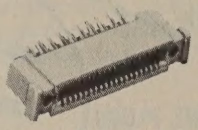
Dept. EM, 400 W. Lake St., P.O. Box 489, Libertyville, IL 60048
Phone (312) 362-3700

TRIMM INC.

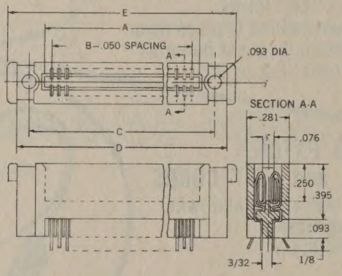
TRW CINCH CONNECTORS

MINIATURE PC CONNECTORS

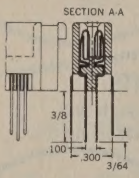
"TYKON" EDGE CONNECTORS/.050" SPACING - DOUBLE READOUT FOR 1/16" PRINTED CIRCUIT BOARDS



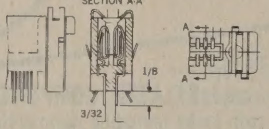
CONVENTIONAL TYPE WITHOUT MOUNTING CLIPS



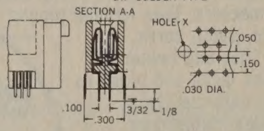
WRAP POST TAIL



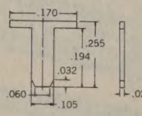
CONVENTIONAL TYPE WITH MOUNTING CLIPS



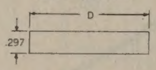
DIP SOLDER TYPE



POLARIZING KEY



RECOMMENDED CHASSIS OPENING .040 TO .062 THICK



FEATURES AND SPECIFICATIONS

SPECIAL FEATURES: High density (.050" centers) miniature edge connector with special ribbon-type contacts.

Potential applications include standard and thin film memory planes, diodes on insulating substrates and virtually any type of modular plug-in unit.

Available in wide range of sizes with variety of terminations and mounting styles.

SIZES: Available in 6, 10, 15, 20 and 25 contact position sizes with intermediate sizes available on special order.

TERMINATIONS: Available with conventional ribbon-type wiring tails; dip solder or wire wrap versions also available.

MOUNTING STYLES: Conventional wiring tail types available with special mounting clips for snap-in removable semi-flush panel mounting or without clips and using plain .093" dia. holes for standard mounting.

INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONTACT MATERIAL & PLATING: Beryllium copper with 30 micro-inches gold finish over 50 micro-inches copper.

MOUNTING CLIP MATERIAL & PLATING: Carbon steel with cadmium plate plus yellow chromate finish.

POLARIZING KEY MATERIALS: Made of cellulose acetate and must be ordered separately.

PERFORMANCE SPECIFICATIONS: Contact factory.

ORDERING INFORMATION

DESCRIPTION	PART NUMBERS* CONVENTIONAL TYPE WO/CLIPS**	CONVENTIONAL TYPE W/CLIPS	NO. OF POSI-TIONS	NO. OF CON-TACTS
6-Position Connector	255-06-30-190	255-06-30-200	6	12
10-Position Connector	255-10-30-190	255-10-30-200	10	20
15-Position Connector	255-15-30-190	255-15-30-200	15	30
20-Position Connector	255-20-30-190	255-20-30-200	20	40
25-Position Connector	255-25-30-190	255-25-30-200	25	50
Polarizing Key	Part No. 456-99-99-190			

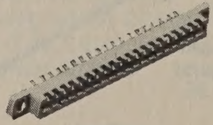
* To order DIP SOLDER or WIRE WRAP TYPES: Substitute "210" as final three figures of part number for dip solder types and "220" for wire wrap types (e.g. 255-06-30-210 or 255-06-30-220); both types available in all sizes shown above.

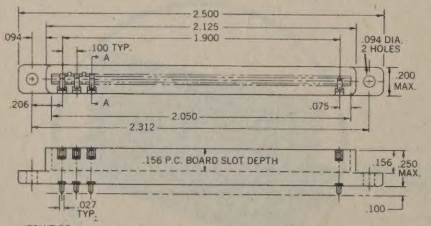
** These items available through Cinch Distributors.

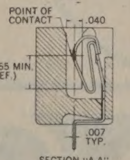
DIMENSIONAL DATA

SIZE (No. of Contact Positions)	DIMENSIONS "A"	"B"	"C"	"D"	"E"
6	.350	.250	.550	.725	.850
10	.550	.450	.750	.925	1.050
15	.800	.700	1.000	1.175	1.300
20	1.050	.950	1.250	1.425	1.550
25	1.300	1.200	1.500	1.675	1.800

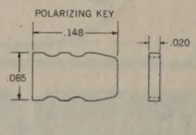
"MINI-TYKE" EDGE CONNECTOR/.100" SPACING - SINGLE READOUT FOR 1/32" PRINTED CIRCUIT BOARDS







SECTION "A-A"



FEATURES AND SPECIFICATIONS

SPECIAL FEATURES: Extremely low profile connector for compact packaging — overall ¼" height of connector less than half that of standard PC connectors.

Preloaded contact construction provides uniformity of gap and assures adequate contact pressure. Ideally suited for a wide range of miniature PC board plug-in applications including airborne equipment, test equipment and digital components.

SIZE: Available in 20 contact position size only.

TERMINATION: Dip solder tails for insertion and wave soldering in PC mother board.

MOUNTING STYLE: Plain .094" Dia. holes for standard mounting.

INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONTACT MATERIAL & PLATING: Beryllium copper with 50 micro-inches gold finish over 50 micro-inches copper.

POLARIZING KEY MATERIAL: Made of nylon and must be ordered separately.

PERFORMANCE SPECIFICATIONS: Contact factory.

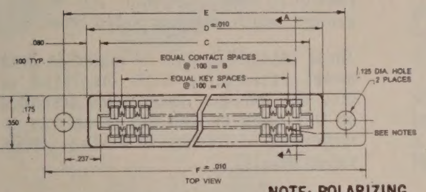
ORDERING INFORMATION

DESCRIPTION	PART NUMBER	NO. OF POSITIONS	NO. OF CONTACTS
Connector	259-20-30-233	20	20
Polarizing Key	457-01-25-008	—	—

TRW CINCH CONNECTORS

PC BOARD CONNECTORS WITH TERMINALS ON .100 CENTERS

251 36 30 410


E
D ± .010
A
.080
C
.100 TYP.
EQUAL CONTACT SPACES @ .100 = B
EQUAL KEY SPACES @ .100 = A
.125 DIA. HOLE 2 PLACES
.175
.350
SEE NOTES
.237
F ± .010
TOP VIEW

FEATURES AND SPECIFICATIONS

CURRENT RATING: 3 amperes.

RATED VOLTAGE (Sea Level): 600 VDC.

INSULATION RESISTANCE: 5000 megohms min.

CONTACT RESISTANCE: 16 milliohms max.

TERMINAL STYLES: Dip Solder, Wire Wrap or Solder Tab.

TOTAL INSERTION FORCE: A maximum of one lb. times the number of contact pairs when measured with a .070 in. thick steel blade in accordance with MIL-C-21097.

INDIVIDUAL SEPARATION FORCE: A minimum of one oz. per pair of contacts when measured with a .054 in. thick blade in accordance with MIL-C-21097.

INSULATOR MATERIAL: Diallyl phthalate, type SDG-F per MIL-M-14 Color Green.

POLARIZING KEY MATERIAL: Nylon.

CARD GUIDE MATERIAL: Polypropylene, Color Green.

CONTACT MATERIAL: Alloy 688 high tensile brass.

CONTACT PLATING MATERIAL: .00003 min. gold over .00005 min. nickel on contacting area .00001 gold on remainder of contact.

"Recognized under the Component Program of Underwriters' Laboratories, Inc."

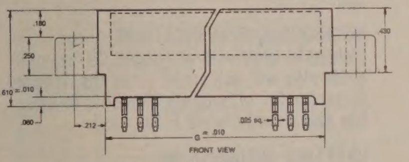
DIMENSIONAL DATA

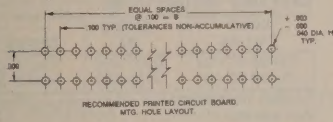
	PART NUMBER	NO. OF CONTACTS	DIMENSIONS A	B	C	D	E	F	G
SOLDER TAB	*251-10-30-410	10/20	.800	.900	1.100	1.260	1.575	1.835	1.150
	†251-15-30-410	15/30	1.300	1.400	1.600	1.760	2.075	2.335	1.650
	*251-18-30-410	18/36	1.600	1.700	1.900	2.060	2.375	2.635	1.950
	*251-20-30-410	20/40	1.800	1.900	2.100	2.260	2.575	2.835	2.150
	†251-22-30-410	22/44	2.000	2.100	2.300	2.460	2.775	3.035	2.350
	*251-25-30-410	25/50	2.300	2.400	2.600	2.760	3.075	3.335	2.650
	*251-28-30-410	28/56	2.600	2.700	2.900	3.060	3.375	3.635	2.950
	*251-30-30-410	30/60	2.800	2.900	3.100	3.260	3.575	3.835	3.150
	*251-31-30-410	31/62	2.900	3.000	3.200	3.360	3.675	3.935	3.250
	*251-35-30-410	35/70	3.300	3.400	3.600	3.760	4.075	4.335	3.650
	†251-36-30-410	36/72	3.400	3.500	3.700	3.860	4.175	4.435	3.750
	†251-40-30-410	40/80	3.800	3.900	4.100	4.260	4.575	4.835	4.150
	†251-43-30-410	43/86	4.100	4.200	4.400	4.560	4.875	5.135	4.450
	*251-44-30-410	44/88	4.200	4.300	4.500	4.660	4.975	5.235	4.550
	*251-49-30-410	49/98	4.700	4.800	5.000	5.160	5.475	5.735	5.050
	†251-50-30-410	50/100	4.800	4.900	5.100	5.260	5.575	5.835	5.150
DIP SOLDER	*252-10-30-360	10/20	.800	.900	1.100	1.260	—	—	1.150
	†252-15-30-360	15/30	1.300	1.400	1.600	1.760	—	—	1.650
	*252-18-30-360	18/36	1.600	1.700	1.900	2.060	—	—	1.950
	*252-20-30-360	20/40	1.800	1.900	2.100	2.260	—	—	2.150
	†252-22-30-360	22/44	2.000	2.100	2.300	2.460	—	—	2.350
	*252-25-30-360	25/50	2.300	2.400	2.600	2.760	—	—	2.650
	*252-28-30-360	28/56	2.600	2.700	2.900	3.060	—	—	2.950
	*252-30-30-360	30/60	2.800	2.900	3.100	3.260	—	—	3.150
	*252-31-30-360	31/62	2.900	3.000	3.200	3.360	—	—	3.250
	*252-35-30-360	35/70	3.300	3.400	3.600	3.760	—	—	3.650
	†252-36-30-360	36/72	3.400	3.500	3.700	3.860	—	—	3.750
	†252-40-30-360	40/80	3.800	3.900	4.100	4.260	—	—	4.150
	†252-43-30-360	43/86	4.100	4.200	4.400	4.560	—	—	4.450
	*252-44-30-360	44/88	4.200	4.300	4.500	4.660	—	—	4.550
	*252-49-30-360	49/98	4.700	4.800	5.000	5.160	—	—	5.050
	†252-50-30-360	50/100	4.800	4.900	5.100	5.260	—	—	5.150
WIRE WRAP	*253-10-30-260	10/20	.800	.900	1.100	1.260	1.575	1.835	1.150
	†253-15-30-260	15/30	1.300	1.400	1.600	1.760	2.075	2.335	1.650
	*253-18-30-260	18/36	1.600	1.700	1.900	2.060	2.375	2.635	1.950
	*253-20-30-260	20/40	1.800	1.900	2.100	2.260	2.575	2.835	2.150
	†253-22-30-260	22/44	2.000	2.100	2.300	2.460	2.775	3.035	2.350
	*253-25-30-260	25/50	2.300	2.400	2.600	2.760	3.075	3.335	2.650
	*253-28-30-260	28/56	2.600	2.700	2.900	3.060	3.375	3.635	2.950
	*253-30-30-260	30/60	2.800	2.900	3.100	3.260	3.575	3.835	3.150
	*253-31-30-260	31/62	2.900	3.000	3.200	3.360	3.675	3.935	3.250
	*253-35-30-260	35/70	3.300	3.400	3.600	3.760	4.075	4.335	3.650
	†253-36-30-260	36/72	3.400	3.500	3.700	3.860	4.175	4.435	3.750
	†253-40-30-260	40/80	3.800	3.900	4.100	4.260	4.575	4.835	4.150
	†253-43-30-260	43/86	4.100	4.200	4.400	4.560	4.875	5.135	4.450
	*253-44-30-260	44/88	4.200	4.300	4.500	4.660	4.975	5.235	4.550
	*253-49-30-260	49/98	4.700	4.800	5.000	5.160	5.475	5.735	5.050
	†253-50-30-260	50/100	4.800	4.900	5.100	5.260	5.575	5.835	5.150

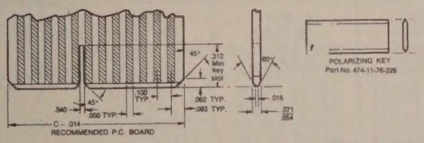
* To be made available at a later date. Contact factory.

† Indicates items available through Cinch Distributors.

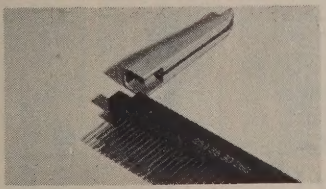
NOTE: POLARIZING KEY SLOTS LOCATED SYMMETRICALLY BETWEEN CONTACT POSITIONS.


.180
.250
.430
.610 ± .010
.080
.212
.025 sq.
G ± .010
FRONT VIEW

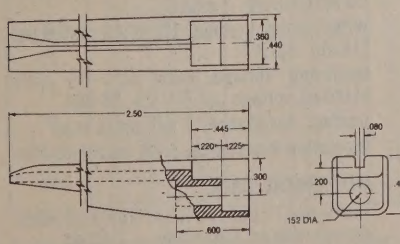

EQUAL SPACES @ .100 = B
.100 TYP. (TOLERANCES NON-ACCUMULATIVE)
+.003 -.000 .040 DIA. HOLE TYP.
.300
RECOMMENDED PRINTED CIRCUIT BOARD MTG. HOLE LAYOUT

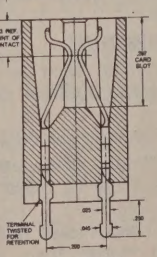

45°
.312 Min key slot
60°
45°
.100 TYP.
.062 TYP.
.083 TYP.
.015
.071
.054
.040
.050 TYP.
C - .014
RECOMMENDED P.C. BOARD
POLARIZING KEY Part No. 474-11-76-229

CARD GUIDE POST NO. 474-11-90-259

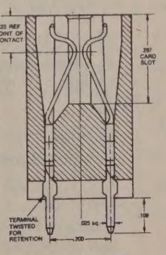


Card Guides No. 474-11-90-259 can be ordered separately and can be assembled with any 251- or 253- connector with clearance mounting holes. Available through Cinch distributors; specify No. 50-GP-1.

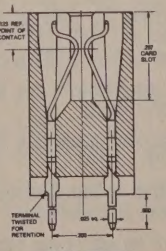

.360
.440
2.50
.445
.220
.225
.300
.600
.080
.200
.480
.152 DIA


.123 REF POINT OF CONTACT
.297 CARD SLOT
.025
.045
.250
TERMINAL TWISTED FOR RETENTION
.300

SOLDER TAB


.123 REF POINT OF CONTACT
.297 CARD SLOT
.025 sq.
.109
TERMINAL TWISTED FOR RETENTION
.200

DIP SOLDER

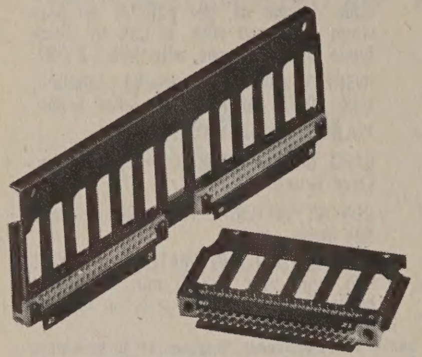

.125 REF POINT OF CONTACT
.297 CARD SLOT
.025 sq.
TERMINAL TWISTED FOR RETENTION
.200

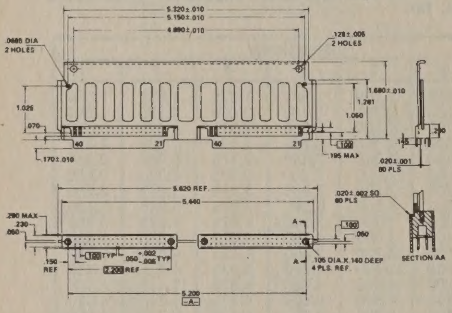
WIRE WRAP

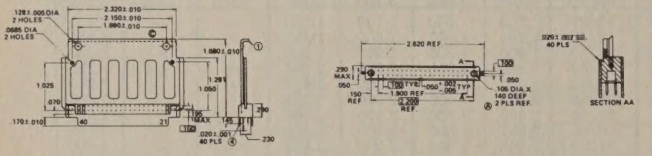
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

NAFI 40 & 80 CONTACT PC CONNECTOR & MODULES







This miniature connector assembly can be quickly and easily disassembled and reassembled for wave solder installation of PC boards as well as for field servicing and retrofit.

These 40 and 80 pin connectors are designed to meet, or exceed, the requirements of NavOrd specification number WS-6116, and associated profile drawing number 2672600. Specifically, they comply with the design configurations delineated by NavOrd drawings 0102-655 and 0102-660, respectively.

These assemblies function as headers for the support of a printed circuit board measuring approximately $2\frac{5}{16}$", or $5\frac{5}{16}$" x $1\frac{3}{32}$". They provide for the assembly of dual-in-line packages, the leads of which will extend through the cutouts in the metal frame portion, into the printed circuit board allowing for their interconnection by wave soldering. The metal frame acts as a heat sink to carry away the heat generated by the dual-in-line devices.

The connector contains 40 contacts, 2 rows of 20 each arranged in .100" x .100" centers, which are gold plated brass.

These assemblies may be mated to back panel assemblies with insulated or grounded mini-mod receptacles described on this page, or with any receptacle arrangement conforming to NavOrd specification WS6157.

ELECTRICAL SPECIFICATIONS

Current Rating: 3.0 amps.
Contact Resistance: 6.0 milliohms max.
Dielectric Strength: 1000V RMS, 1200V DC.
Insulation Resistance: 100,000 megohms min.

MATERIALS AND FINISHES

Contact Strip: Glass filled diallyl phthalate per MIL-M-14F, Type SDG.

Contact Pins: Brass alloy per QQ-B-613, 50 microinches gold minimum over nickel.
Frame: Black anodized aluminum per QQ-A-250.

MECHANICAL SPECIFICATIONS

Molded-in pins will withstand 20 oz. pull.
Guide ribs will withstand 10 in.-lbs. torque.
Extractor fin withstands 6 in.-lbs. torque.
Pin shield withstands 6 lbs. pull.

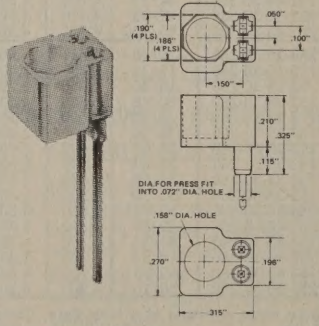
ORDERING INFORMATION

Cinch Part No.	NavOrd No.	Description
299 99 00 004	0102-655	Single Span
299 99 00 005	0102-660	Double Span

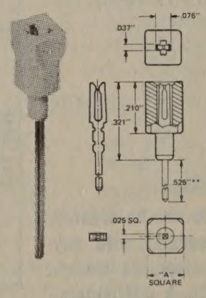
Consult the factory for other frame cutout configurations.

RECEPTACLE HARDWARE

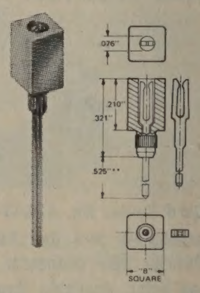
POLARIZING MODULE



SIGNAL MODULE



GROUND MODULE



Grid	Dim. "A"	Dim. "B"
.100" x .100"	.095"	.095"
.125" x .125"	.120"	.120"
.150" x .150"	.145"	.145"

**Other tail lengths available upon request.

MINI-MOD MODULES

FEATURES

- Modular construction for wide latitude of configurations on .100" x .100", 125" x .125" and .150" x .150" grid.
- Meet stringent requirements for military airborne applications.
- Meet NAFI's standard packaging concept per WS-6157A.
- Nylon modules serve as both contact retention devices and as a dielectric.
- Available in colors for easy color coding and identification.
- Automatic assembly operations offer low overall costs.

PHYSICAL CHARACTERISTICS

Insulator Material: White nylon per MIL-M-20693A. Other colors available on request.

Ground Material: Aluminum per QQ-A-225.

Contact Material: Phosphor bronze per QQ-B-750. Comp. A or Beryllium copper per QQ-C-533.

Contact Plating: 30 microinches gold per MIL-G-45204B over copper flash. Other finishes available on request.

ELECTRICAL CHARACTERISTICS

Current Rating: 3 amps.

Withstanding Voltage: 1800V AC tested per EIA std. RS-364.

Operating Voltage: 600V AC — ⅓ withstanding voltage per EIA std. RS-364.

Contact Resistance: 8 milliohms max.

Insulation Resistance: 5000 megohms min.

MECHANICAL DATA

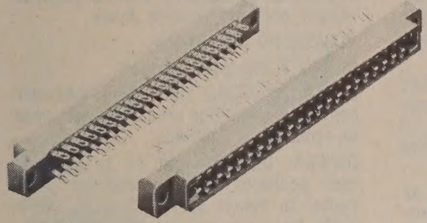
Individual contact insertion and withdrawal with an .020 blade — 2-10 oz.
Individual contact retention — 8 lbs. min.

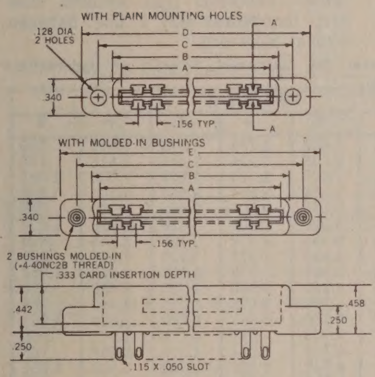
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

STANDARD PC CONNECTORS

STANDARD EDGE CONNECTORS WITH SOLDER TAB CONTACTS/ .156″ SPACING - SINGLE OR DOUBLE READOUT FOR 1/16″ PRINTED CIRCUIT BOARDS





FEATURES AND SPECIFICATIONS

SPECIAL FEATURES: Patented bifurcated bellows contacts Pat. No. 3274532 provide added contact reliability especially in applications where vibration and board irregularities are involved.

SIZES: Both single and double readout versions are available in 6, 10, 12, 15, 18, 20, 22 and 25-contact position sizes.

TERMINATION: Bifurcated contacts with conventional .115″ x .050″ slot solder tabs.

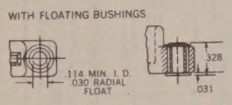
MOUNTING STYLES: Available with either .128″ diameter holes for standard mounting molded-in bushings or floating bushings. .142″ diameter plain holes also available on special order.

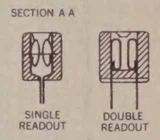
INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

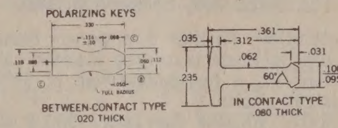
CONTACT MATERIALS & PLATING: Contacts are available in either phosphor bronze or beryllium copper. Standard finish is 30 micro-inches gold in the contacting area and 10 micro-inches gold on the remainder of the contact. Beryllium copper contacts can also be supplied with special finish of 50 micro-inches gold over 100 micro-inches copper to meet MIL-C-21079 C.

POLARIZING KEY MATERIALS: Two types of polarizing keys are available, and must be ordered separately as follows: Part No. 456-07-35-003 (for between-contact polarization) is made of glass epoxy; Part No. 474-11-54-200 (for in-contact polarization) is made of diallyl phthalate.

PERFORMANCE SPECIFICATIONS: Contact factory.







456-07-35-003

474-11-54-200

SINGLE READOUT

"Recognized under the Component Program of Underwriters' Laboratories, Inc."

NO. OF CONTACT POSI-TIONS	TYPE I PART NO. (Plain Mtg. Holes .128″ Dia.)	TYPE 1A PART NO. (Plain Mtg. Holes .142″ Dia.)	TYPE 2 PART NO. (Molded-In Bushings)	TYPE 3 PART NO. (Floating/ Bushings)	CONTACT MATERIAL	DIMENSIONS A	B	C	D	E	NO. OF CONTACT POSI-TIONS
6	250-06-30-170*	250-06-30-211	250-06-30-190	250-06-30-200	Phosphor Bronze	1.100	1.239	1.531	1.785	1.937	6
	250-06-30-171†	250-06-30-210	250-06-30-191†	250-06-30-201†	Beryllium Copper						
10	250-10-30-170*	250-10-30-211	250-10-30-190	250-10-30-200	Phosphor Bronze	1.724	1.864	2.156	2.410	2.562	10
	250-10-30-171†	250-10-30-210	250-10-30-191†	250-10-30-201†	Beryllium Copper						
12	250-12-30-170*	250-12-30-211	250-12-30-190	250-12-30-200	Phosphor Bronze	2.036	2.177	2.469	2.723	2.875	12
	250-12-30-171	250-12-30-210	250-12-30-191	250-12-30-201	Beryllium Copper						
15	250-15-30-170*	250-15-30-211	250-15-30-190	250-15-30-200	Phosphor Bronze	2.504	2.645	2.937	3.191	3.343	15
	250-15-30-171†	250-15-30-210	250-15-30-191†	250-15-30-201†	Beryllium Copper						
18	250-18-30-170*	250-18-30-211	250-18-30-190	250-18-30-200	Phosphor Bronze	2.972	3.114	3.406	3.660	3.812	18
	250-18-30-171†	250-18-30-210	250-18-30-191†	250-18-30-201†	Beryllium Copper						
20	250-20-30-170	250-20-30-211	250-20-30-190	250-20-30-200	Phosphor Bronze	3.286	3.427	3.719	3.973	4.125	20
	250-20-30-171	250-20-30-210	250-20-30-191	250-20-30-201	Beryllium Copper						
22	250-22-30-170*	250-22-30-211	250-22-30-190	250-22-30-200	Phosphor Bronze	3.596	3.739	4.031	4.285	4.437	22
	250-22-30-171†	250-22-30-210	250-22-30-191†	250-22-30-201†	Beryllium Copper						
25	250-25-30-170*	250-25-30-211	250-25-30-190	250-25-30-200	Phosphor Bronze	4.067	4.208	4.500	4.754	4.906	25
	250-25-30-171	250-25-30-210	250-25-30-191	250-25-30-201	Beryllium Copper						

DOUBLE READOUT

"Recognized under the Component Program of Underwriters' Laboratories, Inc."

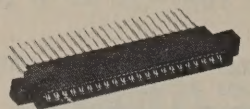
NO. OF CONTACT POSI-TIONS	TYPE I PART NO. (Plain Mtg. Holes .128″ Dia.)	TYPE 1A PART NO. (Plain Mtg. Holes .142″ Dia.)	TYPE 2 PART NO. (Molded-In Bushings)	TYPE 3 PART NO. (Floating/ Bushings)	CONTACT MATERIAL	DIMENSIONS A	B	C	D	E	NO. OF CONTACT POSI-TIONS
6	251-06-30-160*	251-06-30-260	251-06-30-210	251-06-30-220	Phosphor Bronze	1.100	1.239	1.531	1.785	1.937	6
	251-06-30-161†	251-06-30-261	251-06-30-211†	251-06-30-221†	Beryllium Copper						
10	251-10-30-160*	251-10-30-260	251-10-30-210	251-10-30-220	Phosphor Bronze	1.724	1.864	2.156	2.410	2.562	10
	251-10-30-161†	251-10-30-261	251-10-30-211†	251-10-30-221†	Beryllium Copper						
12	251-12-30-160*	251-12-30-260	251-12-30-210	251-12-30-220	Phosphor Bronze	2.036	2.177	2.469	2.723	2.875	12
	251-12-30-161	251-12-30-261	251-12-30-211	251-12-30-221	Beryllium Copper						
15	251-15-30-160*	251-15-30-260	251-15-30-210	251-15-30-220	Phosphor Bronze	2.504	2.645	2.937	3.191	3.343	15
	251-15-30-161†	251-15-30-261	251-15-30-211†	251-15-30-221†	Beryllium Copper						
18	251-18-30-160*	251-18-30-260	251-18-30-210	251-18-30-220	Phosphor Bronze	2.972	3.114	3.406	3.660	3.812	18
	251-18-30-161†	251-18-30-261	251-18-30-211†	251-18-30-221†	Beryllium Copper						
20	251-20-30-160	251-20-30-260	251-20-30-210	251-20-30-220	Phosphor Bronze	3.286	3.427	3.719	3.973	4.125	20
	251-20-30-161	251-20-30-261	251-20-30-211	251-20-30-221	Beryllium Copper						
22	251-22-30-160*	251-22-30-260	251-22-30-210	251-22-30-220	Phosphor Bronze	3.596	3.739	4.031	4.285	4.437	22
	251-22-30-161†	251-22-30-261	251-22-30-211†	251-22-30-221†	Beryllium Copper						
25	251-25-30-160*	251-25-30-260	251-25-30-210	251-25-30-220	Phosphor Bronze	4.067	4.208	4.500	4.754	4.906	25
	251-25-30-161	251-25-30-261	251-25-30-211	251-25-30-221	Beryllium Copper						

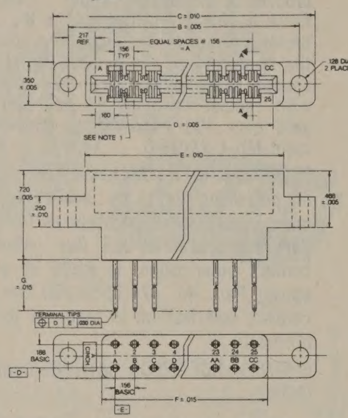
* These items available through Cinch distributors.
† Can be supplied to meet MIL-C-21097C.

TRW CINCH CONNECTORS

PC BOARD CONNECTORS WITH TERMINALS ON .156 CENTERS

PRINTED CIRCUIT BOARD CONNECTORS/WITH WIRE WRAP .031 x .062 TERMINALS ON .156 CENTERS





FEATURES AND SPECIFICATIONS

CURRENT RATING: 3 amperes. Based upon all contacts carrying specified current and a temperature rise of 30°C above ambient.

RATED VOLTAGE (Sea Level): 900 V AC RMS 1200 V DC. (Based on ⅓ voltage breakdown)

TEST VOLTAGE (Sea Level): 2000 V AC RMS 2700 V DC. (Based on 75% voltage breakdown)

CONTACT RESISTANCE (Millivolt Drop @ 3 Amp): 16 millivolt max.

TOTAL INSERTION FORCE: 20 lbs. max. Performed in accordance with Paragraph 4.6.6.2 of MIL-C-21097 using .070 inch thick blade.

INDIVIDUAL CONTACT ENGAGING AND SEPARATION FORCE: 2-16 oz. Performed in accordance with Paragraph 4.6.6.1.1 of MIL-C-21097B using .062 inch thick blade.

INDIVIDUAL SEPARATION FORCE: 1 oz. min. Performed in accordance with Paragraph 4.6.6.1.2 of MIL-C-21097 using .054 inch thick blade.

DURABILITY: 100 cycles with steel blade .070 inch thick. Contact resistance and individual contact separation force requirements met after test.

INSULATOR MATERIALS: General purpose impact phenolic — color black.

POLARIZING KEY: Nylon

CONTACT: Phosphor bronze

CONTACT PLATING: .00006 min. gold over copper in contacting area .0001 min. gold on remainder of contact.

GENERAL DESCRIPTION: 10 to 30 contact positions double read-out .156 center to center spacing. For 1/16 (.054-.070) thick printed circuit card. Bifurcated — cantilever type contacts. Wire wrap termination .031 x .062. Between contact polarizing.

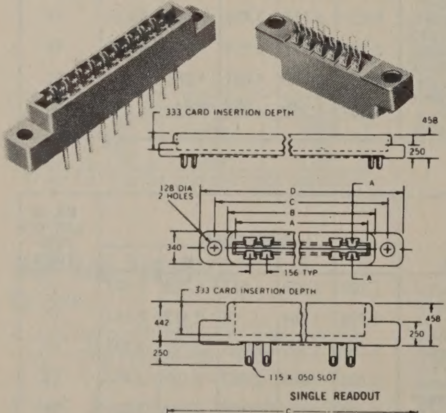
ORDERING INFORMATION "Recognized under the Component Program of Underwriters' Laboratories, Inc."

PART NUMBER	NO. OF CONTACTS	DIMENSIONS						
		A	B	C	D	E	F	G
253-10-00-253†	10/20	1.404	2.158	2.408	1.724	1.878	1.616	.550
253-10-00-254†	10/20	1.404	2.158	2.408	1.724	1.878	1.616	.755
253-10-00-255†	10/20	1.404	2.158	2.408	1.724	1.878	1.616	1.051
253-15-00-253†	15/30	2.184	2.938	3.188	2.504	2.658	2.396	.550
253-15-00-254†	15/30	2.184	2.938	3.188	2.504	2.658	2.396	.755
253-15-00-255†	15/30	2.184	2.938	3.188	2.504	2.658	2.396	1.051
253-18-00-253†	18/36	2.652	3.406	3.656	2.972	3.126	2.864	.550
253-18-00-254†	18/36	2.652	3.406	3.656	2.972	3.126	2.864	.755
253-18-00-255†	18/36	2.652	3.406	3.656	2.972	3.126	2.864	1.051
253-22-00-253†	22/44	3.276	4.030	4.280	3.596	3.750	3.488	.550
253-22-00-254†	22/44	3.276	4.030	4.280	3.596	3.750	3.488	.755
253-22-00-255†	22/44	3.276	4.030	4.280	3.596	3.750	3.488	1.051
253-25-00-253†	25/50	3.744	4.498	4.748	4.064	4.218	3.956	.550
253-25-00-254†	25/50	3.744	4.498	4.748	4.064	4.218	3.956	.755
253-25-00-255†	25/50	3.744	4.498	4.748	4.064	4.218	3.956	1.051
253-30-00-253†	30/60	4.524	5.278	5.528	4.844	4.988	4.736	.550
253-30-00-254†	30/60	4.524	5.278	5.528	4.844	4.998	4.736	.755
253-30-00-255†	30/60	4.524	5.278	5.528	4.844	4.998	4.736	1.051
474-11-76-229†				Polarizing Key				

† Indicates items available through Cinch Distributors.

SPECIAL PURPOSE .156 CENTER PC BOARD EDGE CONNECTORS

PC BOARD EDGE CONNECTORS FOR INTERCONNECTING TWO OR MORE STANDARD 1/16" PRINTED CIRCUIT BOARDS



RATED VOLTAGE: AC RMS, adj. terminals 830 V (Sea Level) 300 V (3.4 Hg. 50,000 feet); 200 V (1.3 Hg. 70,000 feet).

CURRENT: 5.0 Amps.

PLATING: All contacts selective plated — 30 micro-inches gold in contacting area and 10 micro-inches gold on remainder of contact.

CONTACT RESISTANCE: .005 Ohms at Rated Current.

INSULATION RESISTANCE: 5000 Megohms.

ENVIRONMENTAL: Per MIL-C-21097 and MIL-STD-202, latest versions.

SHOCK: 3 blows of 50G, Method 202B.

TEMPERATURE CYCLING: 5 continuous cycles per Method 107B, Test Condition B: Beryllium copper −65°C to 125°C; Phosphor bronze −65°C to 105°C.

SALT SPRAY: 48 hrs. per Method 101B, Condition B.

VIBRATION: Per Method 204A, Condition B.

HUMIDITY: Per Method 103B, Condition B.

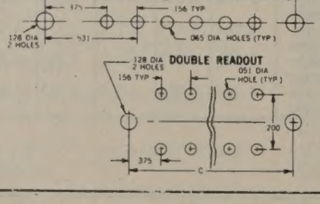
ORDERING INFORMATION

NO. OF CONTACT POSITIONS	CARD EXTENDER	EXTENDED DIP SOLDER TERMINATIONS	
	DOUBLE READOUT PART NUMBER	SINGLE READOUT PART NUMBER	DOUBLE READOUT PART NUMBER
6	251-06-30-390	252-06-30-230	252-06-30-260
10	251-10-30-390	252-10-30-230	252-10-30-260
12	251-12-30-390	252-12-30-230	252-12-30-260
15	251-15-30-390	252-15-30-230	252-15-30-260
18	251-18-30-390	252-18-30-230	252-18-30-260
22	251-22-30-390	252-22-30-230	252-22-30-260
25	251-25-30-390	252-25-30-230	252-25-30-260

All connectors listed are available "off-the-shelf" from Cinch Distributors.

DIMENSIONAL DATA

NO. OF CONTACT POSITIONS	A	B	C	D
6	1.100	1.239	1.531	1.785
10	1.724	1.864	2.156	2.410
12	2.036	2.177	2.469	2.723
15	2.504	2.645	2.937	3.191
18	2.972	3.114	3.406	3.660
22	3.596	3.739	4.031	4.285
25	4.067	4.208	4.500	4.754



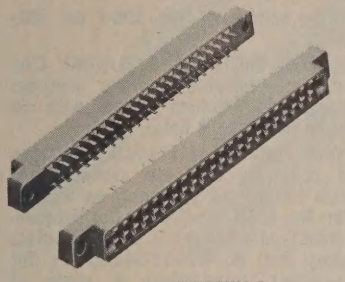
PC BOARD MOUNTING HOLE LAYOUT

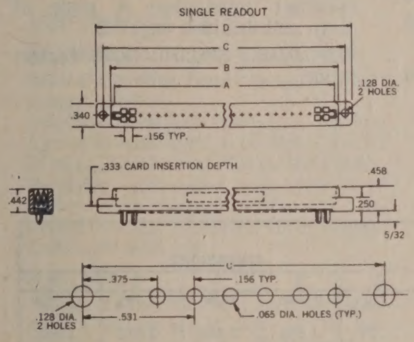
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

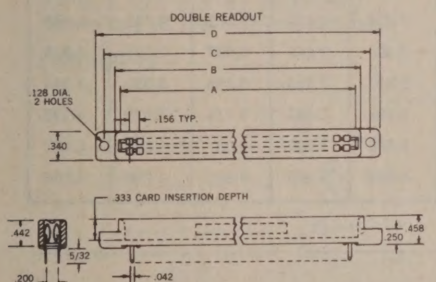
TRW CINCH CONNECTORS

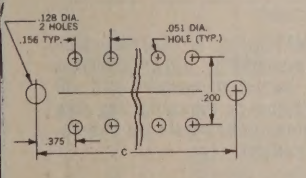
STANDARD DIP SOLDER PC CONNECTORS .156 CENTER SPACING

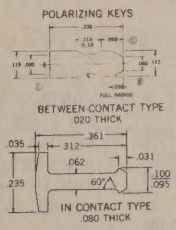
STANDARD EDGE CONNECTORS WITH DIP SOLDER CONTACTS/ .156″ SPACING - SINGLE OR DOUBLE READOUT FOR 1/16″ PRINTED CIRCUIT BOARDS











DIMENSIONAL DATA

SIZE (No. of Contact Positions)	DIMENSIONS "A"	"B"	"C"	"D"
6	1.100	1.239	1.531	1.785
10	1.724	1.864	2.156	2.410
12	2.036	2.177	2.469	2.723
15	2.504	2.645	2.937	3.191
18	2.972	3.114	3.406	3.660
20	3.286	3.427	3.719	3.973
22	3.596	3.739	4.031	4.285
25	4.067	4.208	4.500	4.754

FEATURES AND SPECIFICATIONS

SPECIAL FEATURES. Patented bifurcated bellows contacts Pat. No. 374532 provide added contact reliability especially in applications where vibration and board irregularities are involved.

SIZES: Both single and double readout versions are available in 6, 10, 12, 15, 18, 20, 22 and 25-contact position sizes.

TERMINATIONS: Bifurcated contacts with tails designed for dip soldering 5/32″ long. Other lengths available on special order.

MOUNTING STYLE: Plain .128″ diameter holes for standard mounting.

INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONTACT MATERIALS & PLATING: Contacts are available in either phosphor bronze or beryllium copper. Standard finish is 30 micro-inches gold in contacting area and 10 micro-inches on remainder of contact. Connectors can also be supplied with a contact finish of 50 micro-inches gold over 100 micro-inches copper to meet MIL-C-21097C.

POLARIZING KEY MATERIALS: Two types of polarizing keys are available, and must be ordered separately as follows: Part No. 456-07-35-003 (for between-contact polarization) is made of glass epoxy; Part No. 474-11-54-200 (for in-contact polarization) is made of diallyl phthalate.

PERFORMANCE SPECIFICATIONS: Contact factory.

SINGLE READOUT

"Recognized under the Component Program of Underwriters' Laboratories, Inc."

NO. OF CONTACT POSI-TIONS	PART NO. (Plain Mounting Holes)	CONTACT MATERIAL	DIMENSIONS A	B	C	D	NO. OF CONTACT POSI-TIONS
6	252-06-30-240 * 252-06-30-241	Phosphor Bronze Beryllium Copper	1.100	1.239	1.531	1.785	6
10	252-10-30-240 * 252-10-30-241	Phosphor Bronze Beryllium Copper	1.724	1.864	2.156	2.410	10
12	252-12-30-240 252-12-30-241	Phosphor Bronze Beryllium Copper	2.036	2.177	2.469	2.723	12
15	252-15-30-240 * 252-15-30-241	Phosphor Bronze Beryllium Copper	2.504	2.645	2.937	3.191	15
18	252-18-30-240 * 252-18-30-241	Phosphor Bronze Beryllium Copper	2.972	3.114	3.406	3.660	18
20	252-20-30-240 252-20-30-241	Phosphor Bronze Beryllium Copper	3.286	3.427	3.719	3.973	20
22	252-22-30-240 * 252-22-30-241	Phosphor Bronze Beryllium Copper	3.596	3.739	4.031	4.285	22
25	252-25-30-240 * 252-25-30-241	Phosphor Bronze Beryllium Copper	4.067	4.208	4.500	4.754	25

DOUBLE READOUT

NO. OF CONTACT POSI-TIONS	PART NO. (Plain Mounting Holes)	CONTACT MATERIAL	DIMENSIONS A	B	C	D	NO. OF CONTACT POSI-TIONS
6	252-06-30-160* 252-06-30-161†	Phosphor Bronze Beryllium Copper	1.100	1.239	1.531	1.785	6
10	252-10-30-160 * 252-10-30-161†	Phosphor Bronze Beryllium Copper	1.724	1.864	2.156	2.410	10
12	252-12-30-160* 252-12-30-161	Phosphor Bronze Beryllium Copper	2.036	2.177	2.469	2.723	12
15	252-15-30-160* 252-15-30-161†	Phosphor Bronze Beryllium Copper	2.504	2.645	2.937	3.191	15
18	252-18-30-160* 252-18-30-161†	Phosphor Bronze Beryllium Copper	2.972	3.114	3.406	3.660	18
20	252-20-30-160 252-20-30-161	Phosphor Bronze Beryllium Copper	3.286	3.427	3.719	3.973	20
22	252-22-30-160* 252-22-30-161†	Phosphor Bronze Beryllium Copper	3.596	3.739	4.031	4.285	22
25	252-25-30-160* 252-25-30-161	Phosphor Bronze Beryllium Copper	4.067	4.208	4.500	4.754	25

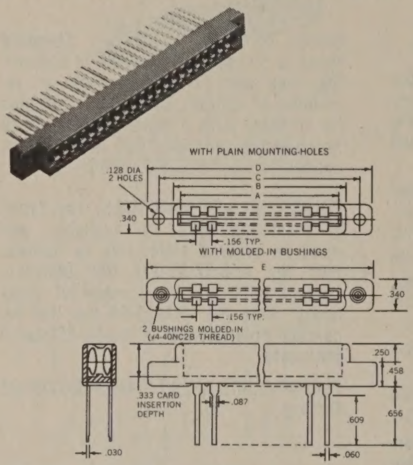
* These items available through Cinch distributors.
† Can be supplied to meet MIL-C-21097C.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

STANDARD PC CONNECTORS .156 CENTER SPACING

STANDARD EDGE CONNECTORS WITH WIRE WRAP POST CONTACTS/ .156″ SPACING - DOUBLE READOUT FOR 1/16″ PRINTED CIRCUIT BOARDS


WITH PLAIN MOUNTING-HOLES
.128 DIA. 2 HOLES
D
C
B
A
.340
.156 TYP.
WITH MOLDED-IN BUSHINGS
E
.340
.156 TYP.
2 BUSHINGS MOLDED-IN (#4-40NC2B THREAD)
.250
.458
.333 CARD INSERTION DEPTH
.087
.609
.656
.030
.060

FEATURES AND SPECIFICATIONS

SPECIAL FEATURES: Available in wide range of sizes and mounting styles.

SIZES: Available in 6, 10, 12, 15, 18, 20 and 25 contact position sizes.

TERMINATION: Special wrap post contacts with .060″ x .030″ tails designed for wire wrapping.

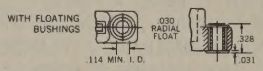
MOUNTING STYLES: Available with plain .128″ diameter holes for standard mounting, molded-in bushings or floating bushings.

INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONTACT MATERIALS & PLATING: Contacts are available in either phosphor bronze or beryllium copper with 30 micro-inches gold finish.

POLARIZING KEY MATERIALS: Two types of polarizing keys are available and must be ordered separately as follows: Part No. 456-07-35-003 key (for between-contact polarization) is made of glass epoxy. Part No. 474-11-54-200 key (for in-contact polarization) is made of diallyl phthalate (see page 13).

PERFORMANCE SPECIFICATIONS: Contact factory.


WITH FLOATING BUSHINGS
.030 RADIAL FLOAT
.328
.114 MIN. I. D.
.031

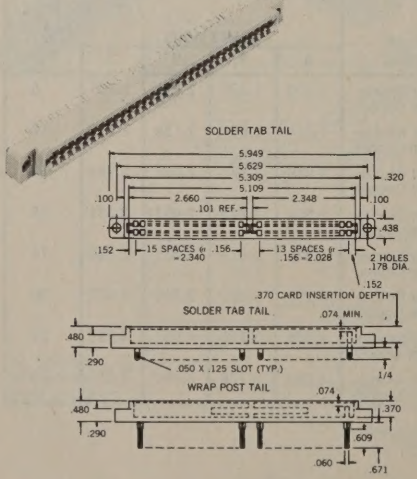
SPECIFICATIONS

NO. OF CONTACT POSITIONS	TYPE 1 PART NO. (Plain Mounting Holes)	TYPE 2 PART NO. (Molded-In Bushings)	TYPE 3 PART NO. (Floating Bushings)	CONTACT MATERIAL	DIMENSIONS A	B	C	D	E
6	253-06-30-140* 253-06-30-141	253-06-30-180 253-06-30-181	253-06-30-170 253-06-30-171	Phosphor Bronze Beryllium Copper	1.100	1.239	1.531	1.785	1.937
10	253-10-30-140* 253-10-30-141	253-10-30-180 253-10-30-181	253-10-30-170 253-10-30-171	Phosphor Bronze Beryllium Copper	1.724	1.864	2.156	2.410	2.562
12	253-12-30-140* 253-12-30-141	253-12-30-180 253-12-30-181	253-12-30-170 253-12-30-171	Phosphor Bronze Beryllium Copper	2.036	2.177	2.469	2.723	2.875
15	253-15-30-140* 253-15-30-141	253-15-30-180 253-15-30-181	253-15-30-170 253-15-30-171	Phosphor Bronze Beryllium Copper	2.504	2.645	2.937	3.191	3.343
18	253-18-30-140* 253-18-30-141	253-18-30-180 253-18-30-181	253-18-30-170 253-18-30-171	Phosphor Bronze Beryllium Copper	2.972	3.114	3.406	3.660	3.812
20	253-20-30-140 253-20-30-141	253-20-30-180 253-20-30-181	253-20-30-170 253-20-30-171	Phosphor Bronze Beryllium Copper	3.286	3.427	3.719	3.973	4.125
22	253-22-30-140* 253-22-30-141	253-22-30-180 253-22-30-181	253-22-30-170 253-22-30-171	Phosphor Bronze Beryllium Copper	3.596	3.739	4.031	4.285	4.437
25	253-25-30-140 253-25-30-141	253-25-30-180 253-25-30-181	253-25-30-170 253-25-30-171	Phosphor Bronze Beryllium Copper	4.067	4.208	4.500	4.754	4.906

* These items available through Cinch distributors.

SPECIAL DESIGN PC CONNECTORS .156 CENTER SPACING

SPECIAL EDGE CONNECTORS WITH CENTER BRIDGE DESIGN/ .156″ SPACING - DOUBLE READOUT FOR 1/16″ PRINTED CIRCUIT BOARDS


SOLDER TAB TAIL
5.949
5.629
5.309
5.109
.320
.100
2.660
2.348
.100
.101 REF.
.438
.152
15 SPACES @ .156 = 2.340
13 SPACES @ .156 = 2.028
2 HOLES .178 DIA.
.152
.370 CARD INSERTION DEPTH
SOLDER TAB TAIL
.074 MIN.
.480
.290
.050 X .125 SLOT (TYP.)
1/4
WRAP POST TAIL
.074
.480
.370
.290
.609
.060
.671

FEATURES AND SPECIFICATIONS

SPECIAL FEATURES: Center bridge construction utilized in insulator to minimize warpage. Available with both solder tab and wrap post termination.

SIZE: Available in 30-position size only.

TERMINATIONS: Available with conventional solder tab tails or .060″ x .030″ wrap post contacts.

MOUNTING STYLE: Plain .178″ diameter holes for standard mounting.

INSULATOR MATERIAL: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

CONTACT MATERIALS & PLATING: Contacts are available in either phosphor bronze or beryllium copper with 30 micro-inches gold on the contacting area and 10 micro-inches gold on the remainder of contact.

POLARIZING KEY MATERIALS: Available with "in-contact" polarization only; polarizing key is made of diallyl phthalate and must be ordered separately. (Part No. 474-11-54-200).

PERFORMANCE SPECIFICATIONS: Contact factory.

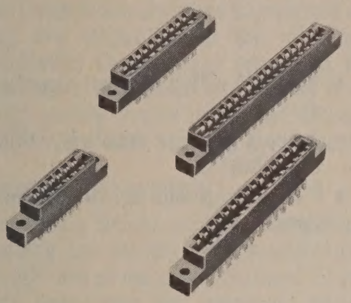
ORDERING INFORMATION

DESCRIPTION	PART NO.	CONTACT MATERIAL	NO. OF POSI-TIONS	NO. OF CON-TACTS
Connector w/Solder Tab Tails	251-30-30-232 251-30-30-231	Phosphor Bronze Beryllium Copper	30	60
Connector w/Wrap Post Tails	253-30-30-212* 253-30-30-213*	Phosphor Bronze Beryllium Copper	30	60

* Plated 30 micro-inches gold. Not selective.

TRW CINCH CONNECTORS

SERIES 90 ECONO-LINE LOW-COST P.C. EDGE CONNECTORS ON .156″ CENTERS FOR 1/16″ BOARDS —.333 DEEP CARD SLOT



Most of the performance features of TRW/Cinch Connectors standard printed circuit edge connectors are found in this low-cost version for commercial applications. Except for the reduced amount of gold-plating, the Series 90 Econo-Line connectors meet all the latest requirements of MIL-C-21097, Std. 202.

The Series 90 incorporates a newly developed high tensile brass, Alcoloy* 688, in its bifurcated bellow contacts. Tne contact area is selectively plated with 20 microinches of gold over 30 microinches of nickel that provides a non-migrating base. A green, glass-filled thermoplastic polyester replaces the more expensive diallyl phthalate used in the standard connector insulator.

Econo-Line connectors are supplied in 6, 10, 12, 15, 18, 22 and 25 positions, with either single or double readout in either conventional solder eyelet or dip solder tails.

*T.M. Olin Corporation.

PERFORMANCE DATA

MECHANICAL

Contact Insertion Force: 16 oz. max. per contact position.

Individual Separation Force: 1 oz. min. Performed in accordance with Para. 4.6.6.1.2 of MIL-C-21097 using .054-in. thick blade.

Durability: 100 cycles with steel blade .070-in. thick. Contact resistance and individual contact separation force requirements met after test.

ELECTRICAL

Voltage Rating (AC RMS, adjacent terminals): 830V (sea level); 300V (3.4″ Hg, 50,000 feet); 450V (1.3″ Hg, 70,000 feet).

Test Voltage (AC RMS, adjacent terminals): 1870V (sea level); 675V (3.4″ Hg, 50,000 feet); 450V (1.3″ Hg, 70,000 feet).

Current Rating: 5 amperes.

(Based upon all contacts carrying specified current and a temperature rise of 30°C. above ambient.)

Contact Resistance (at rated current): .005 ohms.

Insulation Resistance: 5000 Megohms.

ENVIRONMENTAL SPECIFICATIONS

(Per MIL-C-21097 and MIL-STD-202, latest versions)

Shock: 3 blows at 50G, Method 202B.

Temperature Cycling: 5 continuous cycles per Method 107B.

Test Condition B: −65°C to +125°C.

Salt Spray: 48 hours per Method 101B, Condition B.

Vibration: Per Method 204A, Condition B for bifurcated contacts.

Humidity: Per Method 103B, Condition B.

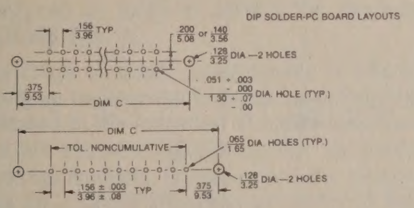
MATERIALS & FINISHES

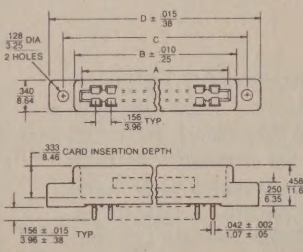
Contacts: Alcoloy 688 high tensile brass.

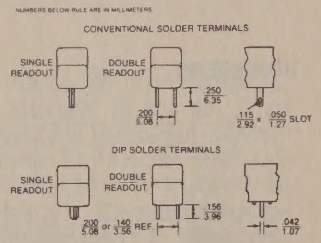
Plating: Contact surface selectively plated with 20 microinches gold over 30 microinches nickel overall; solder-coated terminals.

Insulator: 30% glass-filled green polyester, SEO-rated.

DIMENSIONS


DIP SOLDER-PC BOARD LAYOUTS
.156 / 3.96 TYP
.200 / 5.08 or .140 / 3.56
.128 / 3.25 DIA —2 HOLES
.051 + .003 − .000 / 1.30 + .07 − .00 DIA. HOLE (TYP.)
.375 / 9.53
DIM. C
TOL. NONCUMULATIVE
.065 / 1.65 DIA. HOLES (TYP.)
.156 ± .003 / 3.96 ± .08 TYP
.375 / 9.53
.128 / 3.25 DIA.—2 HOLES


D ± .015 / .38
C
B ± .010 / .25
A
.128 / 3.25 DIA. 2 HOLES
.340 / 8.64
.156 / 3.96 TYP
.333 / 8.46 CARD INSERTION DEPTH
.458 / 11.63
.250 / 6.35
.156 ± .015 / 3.96 ± .38 TYP
.042 ± .002 / 1.07 ± .05


NUMBERS BELOW RULE ARE IN MILLIMETERS
CONVENTIONAL SOLDER TERMINALS
SINGLE READOUT
DOUBLE READOUT
.250 / 6.35
.200 / 5.08
.115 / 2.92 × .050 / 1.27 SLOT
DIP SOLDER TERMINALS
SINGLE READOUT
DOUBLE READOUT
.156 / 3.96
.200 / 5.08 or .140 / 3.56 REF.
.042 / 1.07

DIP SOLDER TERMINALS, .200 SPACING BETWEEN ROWS

Contact Positions	SINGLE READOUT		DOUBLE READOUT	
	Part No.	Distributor Part No.	Part No.	Distributor Part No.
6	252-06-90-240	50-6EE-10	252-06-90-160	50-12EE-40
10	252-10-90-240	50-10EE-10	252-10-90-160	50-20EE-40
12	252-12-90-240	50-12EE-10	252-12-90-160	50-24EE-40
15	252-15-90-240	50-15EE-10	252-15-90-160	50-30EE-40
18	252-18-90-240	50-18EE-10	252-18-90-160	50-36EE-40
22	252-22-90-240	50-22EE-10	252-22-90-160	50-44EE-40
25	252-25-90-240	50-25EE-10	252-25-90-160	50-50EE-40

No. of Contact Pos.	DIMENSIONS			
	A	B	C	D
6	1.100	1.239	1.531	1.785
10	1.724	1.864	2.156	2.410
12	2.036	2.177	2.469	2.723
15	2.504	2.645	2.937	3.191
18	2.972	3.114	3.406	3.660
22	3.596	3.739	4.031	4.285
25	4.067	4.208	4.500	4.754

CONVENTIONAL SOLDER TERMINALS

Contact Positions	SINGLE READOUT		DOUBLE READOUT	
	Part No.	Distributor Part No.	Part No.	Distributor Part No.
6	250-06-90-170	50-6EE-20	251-06-90-160	50-12EE-30
10	250-10-90-170	50-10EE-20	251-10-90-160	50-20EE-30
12	250-12-90-170	50-12EE-20	251-12-90-160	50-24EE-30
15	250-15-90-170	50-15EE-20	251-15-90-160	50-30EE-30
18	250-18-90-170	50-18EE-20	251-18-90-160	50-36EE-30
22	250-22-90-170	50-22EE-20	251-22-90-160	50-44EE-30
25	250-25-90-170	50-25EE-20	251-25-90-160	50-50EE-30

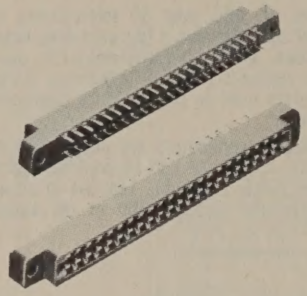
DIP SOLDER TAILS, DOUBLE READOUT, .140 SPACING BETWEEN ROWS

Contact Positions	Distributor Part No.	Factory No.
6	50-12EE-140	252-06-90-210
10	50-20EE-140	252-10-90-210
12	50-24EE-140	252-12-90-210
15	50-30EE-140	252-15-90-210
18	50-36EE-140	252-18-90-210
22	50-44EE-140	252-22-90-210
25	50-50EE-140	252-25-90-210

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

DIP SOLDER TERMINAL PC CONNECTORS
0.140″ SPACING BETWEEN ROWS 0.156″ CONTACT CENTERS



- Patented bifurcated bellows contacts for added contact reliability.
- Ideal for applications involving vibration or board irregularities.
- 6, 10, 12, 15, 18, 22 and 25-contact sizes, double readout.
- Available with or without mounting ears.
- Accepts single or double 1/16″ thick sided boards.
- 0.125″ long dip solder terminations.

MATERIALS

Insulator Material: Green glass-filled diallyl phthalate, type SDG-F per MIL-M-14.

Contact Material: Contacts are available in phosphor bronze. Standard finish is 30 micro-inches gold in contacting area and 10 micro-inches gold on remainder of contact.

Polarizing Key Materials: Two types of polarizing keys are available, and must be ordered separately as follows: Part No. 456-07-35-003 (for between contact polarization) is made of glass epoxy; Part No. 474-11-54-200 (for in-contact polarization) is made of diallyl phthalate.

ENVIRONMENTAL SPECIFICATIONS

Shock: 3 blows of 50G per MIL-STD-202C, Method 202B.

Temperature Cycling: 5 continuous cycles (−65°C to +105°C) per MIL-STD-202C, Method 107B, Test Condition B.

Salt Spray: 48 hours per MIL-STD-202C, Method 101B, Condition B.

Vibration: Per MIL-STD-202C, Method 204A, Test Condition B.

Humidity: Per MIL-STD-202C, Method 103B, Condition B.

ELECTRICAL SPECIFICATIONS

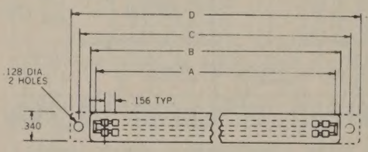
Test Voltage (AC RMS, adjacent terminals): 830V (sea level); 300V (3.4″ Hg, 50,000 feet); 200V (1.3″ Hg, 70,000 feet).

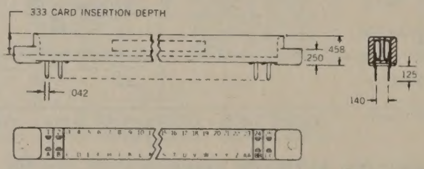
Current Rating: 5.0 amperes.

Contact Resistance at Rated Current: .005 ohms.

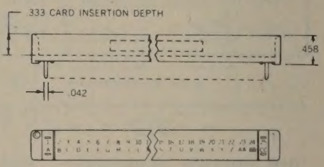
Insulation Resistance: 5000 megohms.

DIMENSIONS



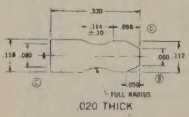


210 SERIES

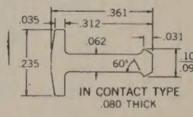


211 SERIES

POLARIZING KEYS

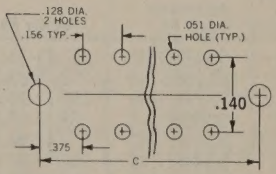


456-07-35-003



474-11-54-200

MOUNTING HOLE LAYOUT



WITH MOUNTING HOLES

Contact Positions	Contacts	Factory Part No.	Dimensions			
			A	B	C	D
6	12	252-06-30-210*	1.100	1.239	1.531	1.785
10	20	252-10-30-210*	1.724	1.864	2.156	2.410
12	24	252-12-30-210*	2.036	2.177	2.469	2.723
15	30	252-15-30-210*	2.504	2.645	2.937	3.191
18	36	252-18-30-210*	2.972	3.114	3.406	3.660
22	44	252-22-30-210*	3.596	3.739	4.031	4.285
25	50	252-25-30-210*	4.067	4.208	4.500	4.754

WITHOUT MOUNTING HOLES

6	12	252-06-30-211*	1.100	1.239		
10	20	252-10-30-211*	1.724	1.864		
12	24	252-12-30-211*	2.036	2.177		
15	30	252-15-30-211*	2.504	2.645		
18	36	252-18-30-211*	2.972	3.114		
22	44	252-22-30-211*	3.596	3.739		
25	50	252-25-30-211*	4.067	4.208		

*These items available through Cinch distributors.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

CINCH D-SUBMINIATURE CONNECTORS†

All Cinch D-Subminiature Connectors undergo final assembly and inspection in the ultra-modern, temperature controlled Cinch "clean room." In this room, contacts, insulators and shells are stored and assembled under tight quality control inspection. Ultrasonic cleaning capabilities are also available on request.

GENERAL DESCRIPTION

The Cinch D-Subminiature Connectors described in this catalog are designed for applications where space and weight are prime considerations. These high contact density connectors are especially well-suited for aircraft, missile and ground support installations. Although designed essentially for rack-and-panel installations, D series connectors may be adapted for cable attachment by means of accessory junction shells with integral clamps.

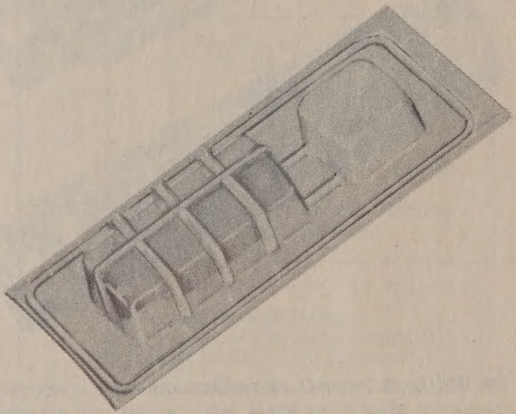
In addition to the original D series with solder pot contacts in a two piece insulator, Cinch now offers Golden D, Mark I Connectors with solder pot contacts in a monobloc insulator for improved moisture resistance; Royal D, Mark III connectors with crimp snap-in contacts in the Little Caesar assembly for high performance, high reliability applications, and the Burgun-D with insertable and removable stamped or machine contacts for commercial applications.

All D-Subminiature Connectors will inter-mate if insert arrangements correspond. Mark I and Mark III connectors are designed to meet or exceed the requirements of MIL-C-24308 Rev. A.

A wide range of insert arrangements is offered accommodating up to 50 contacts accepting standard AWG wire as indicated in the individual specifications. Combination layouts are available, with provisions for coaxial and/or high voltage contacts. Printed circuit and wire wrap terminations are also available. The versatility of the D series is further enhanced by the variety of insulating materials and finishes, as well as a complete line of accessories.

The D-Subminiature series is handled by leading electronic distributors throughout the country. Questions regarding modifications of these designs or any connector requirement should be addressed to your local Cinch representative and will receive his immediate attention.

CONNECTORS INDIVIDUALLY PACKED IN HEAT-SEALED CONTAINERS TO ASSURE EXTENDED SHELF-LIFE



To protect D-Subminiature Connectors from contamination and other corrosive elements in the air, Cinch individually packs each connector in heat-sealed polyvinylchloride containers (as shown). This assures every customer of an extended shelf life. A separate compartment is also provided in each container for the loose crimp-type contacts supplied with the Royal D Mark III Connectors. Connectors can also be packed in individual polyethylene bags if desired.

INDEX CONNECTORS

Type	Description	Common Name	Insulator Type	Contact Termination	Page
D*C	D connectors with crimp snap-in contacts in two-piece insulators, with integral retension system	Burgun D	Two-piece, Nylon	Crimp Snap-in Screw machine and stamped contacts	4-8
D*MA	D connectors with crimp snap-in contacts in monoblock insulators utilizing Little Caesar rear release contact assembly	Royal D, Mark III	Monobloc, diallyl phthalate	Crimp Snap-in	20-21
D*M	D connectors with monoblock insulators for more critical application requirements	Golden D, Mark I	Monobloc, diallyl phthalate	Solder Pot	15-19
		Golden D, Mark I Combination	Monobloc, diallyl phthalate	Solder Pot with coaxial and/or HV and/or power	
D*	Original D connector with two-piece insulators	Original D	Two-piece, Nylon	Solder Pot	13-14

ACCESSORIES	24-25
GENERAL RATINGS AND SPECIFICATIONS	12
HOW TO ORDER AND STANDARD DIMENSIONS	11
DURA-CON MICRO MINIATURE STRIP AND RECTANGULAR CONNECTORS ON .050 CENTERS	26-27

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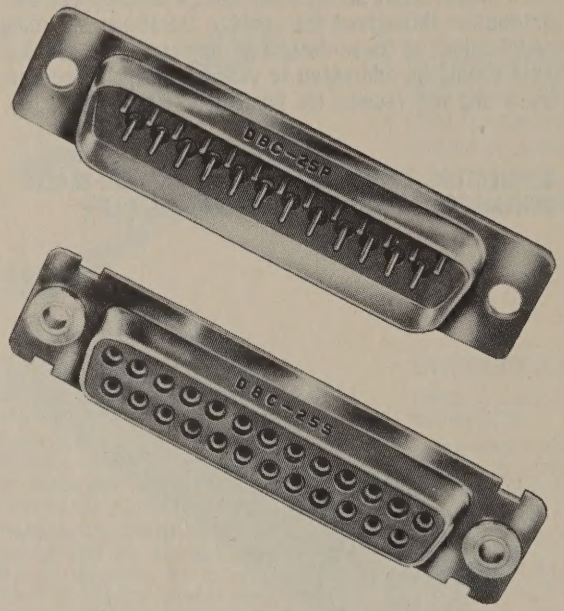
†Manufactured under license agreement with ITT Cannon Electric Inc.

TRW CINCH CONNECTORS

BURGUN-D MARK IV CONNECTORS



The TRW/Cinch Burgun-D subminiature connector is designed for commercial applications where space, weight, and economy are important considerations.

It is especially suited to plug-in module, cable to panel and cable to cable installations, in computers and peripherals, test equipment, communications equipment and a wide range of other applications.

The Burgun-D (Mark IV) Series utilizes rear-release crimp snap-in contacts, that are readily inserted and removed by means of a simple, expendable insertion/extraction tool.

It offers these important features:

- Mates with existing original D and Mark I, Mark II and Mark III connectors.
- Operates at temperatures to 250°F (120°C).
- Size 20 contacts accommodate wire size #18 through #30 AWG stranded wire. (Screw machine only.)
- Closed-entry sockets automatically corrects misaligned pins.
- Rated at 5 amperes for #20 wire.
- Available in 9, 15, 25, 37, and 50 contact arrangements.
- Variety of contacts for hand and machine assembly and PC board insertion.

A COMPLETE LINE OF HARDWARE and accessories including junction shells, hoods, dust caps and lock assemblies is available and listed in TRW/Cinch Catalogs CD-12, and C-46.

FOR IMMEDIATE DELIVERY from stock, contact your TRW/Cinch D-subminiature industrial distributor.

CONDENSED DATA

STANDARD MATERIALS & FINISHES

Shell: Steel, yellow chromate over cadmium plate.

Insulator: Glass-filled burgundy nylon (per Fed. Spec. L-P-395B).

Contacts:

Machined — Copper alloy.

Stamped — Cadmium copper.

Contact Plating:

Selective Stamped — 30 microinches of gold (min.) over 50 microinches of nickel (min.) at contacting area, with gold flash overall.

Overall Stamped — 20 microinches of gold (min.) over 60 microinches of nickel (min.).

Machined — 20 microinches of gold over 60 microinches nickel (min.).

Rivets and Washers: Stainless steel (float mounting).

MECHANICAL FEATURES

Coupling: Friction and lock accessories.

Polarization: Keystone-shaped shells.

Contact Type: Crimp snap-in.

ELECTRICAL DATA

Contact Termination: Crimp.

Wire Size:

Size 20 Contacts — #20, #22, and #24 AWG stranded wire.

Size 20-18 Contacts — One #18 or two #22 AWG stranded wires.

Current Rating: Size 20 Contacts — 5 amps.

VOLTAGE RATING

	Sea Level	20,000 ft.	70,000 ft.	120,000 ft.
Average Flashover:	1500V AC	1000V AC	500V AC	255V AC
Test:	1000V AC	650V AC	325V AC	175V AC

Voltage Drop: Size 20 Contacts — 2.67 millivolts max. per amp when tested in accordance with MIL-STD-202, Method 307.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

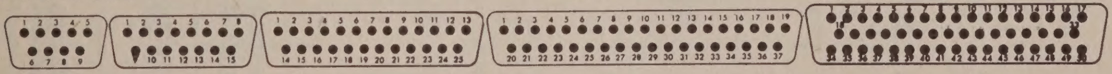
TRW CINCH CONNECTORS

HOW TO ORDER BURGUN-D CONNECTORS

D B C F 15 P A * FO

- D — Series Prefix
- B — Shell Sizes: A, B, C, D, E
- C — C — BURGUN-D Series with core retention, rear release removable contacts
- F — No Designation: Standard .120 dia. hole
  - R: Reverse float mount for front panel mounting
  - F: Float mounts for rear panel mounting
- 15 — Contact Arrangement
- P — P — Pin
S — Socket
- A — Printed Circuit Terminal Modifier:
  - A: Right angle printed circuit connector
  - B: Straight printed circuit connector
- * — Modification:
  - D: .026/.022 dia. right angle machined contacts with bracket
  - F: .026/.022 dia. straight machined contacts
  - K: .026/.022 dia. right angle less bracket
  - Note: For additional modifiers contact factory.
- FO — Connector less contacts (FO not stamped on connector)

BASIC CONTACT ARRANGEMENTS
#20 CONTACTS ONLY



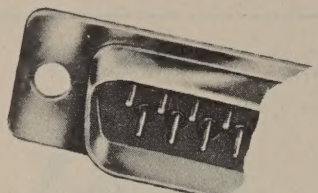
Shell Size	E	A	B	C	D
No. of Contacts	9	15	25	37	50
Contact Size	#20	#20	#20	#20	#20

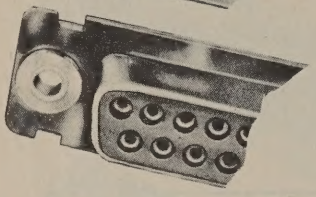
PART NUMBERS

CONNECTORS WITH STD. .120 MOUNTING HOLE				CONNECTORS WITH FLOAT MOUNTS			
With Loose Machine Contacts		Less Contacts		With Loose Machine Contacts		Less Contacts	
Description Part No.	Factory Part No.	Description Part No.	Factory Part No.	Description Part No.	Factory Part No.	Description Part No.	Factory Part No.
DEC-9P	234-09-11-102	DEC-9PFO	234-09-11-100	DECF-9P	234-09-11-107	DECF-9PFO	234-09-11-106
DEC-9S	233-09-11-102	DEC-9SFO	233-09-11-100	DECF-9S	233-09-11-107	DECF-9SFO	233-09-11-106
DAC-15P	234-15-11-102	DAC-15PFO	234-15-11-100	DACF-15P	234-15-11-107	DACF-15PFO	234-15-11-106
DAC-15S	233-15-11-102	DAC-15SFO	233-15-11-100	DACF-15S	233-15-11-107	DACF-15SFO	233-15-11-106
DBC-25P	234-25-11-102	DBC-25PFO	234-25-11-100	DBCF-25P	234-25-11-107	DBCF-25PFO	234-25-11-106
DBC-25S	233-25-11-102	DBC-25SFO	233-25-11-100	DBCF-25S	233-25-11-107	DBCF-25SFO	233-25-11-106
DCC-37P	234-37-11-102	DCC-37PFO	234-37-11-100	DCCF-37P	234-37-11-107	DCCF-37PFO	234-37-11-106
DCC-37S	233-37-11-102	DCC-37SFO	233-37-11-100	DCCF-37S	233-37-11-107	DCCF-37SFO	233-37-11-106
DDC-50P	234-50-11-102	DDC-50PFO	234-50-11-100	DDCF-50P	234-50-11-107	DDCF-50PFO	234-50-11-106
DDC-50S	233-50-11-102	DDC-50SFO	233-50-11-100	DDCF-50S	233-50-11-107	DDCF-50SFO	233-50-11-106

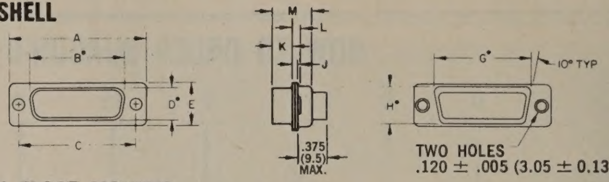
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS



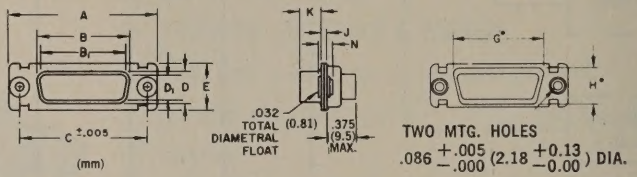


STANDARD SHELL



TWO HOLES
.120 ± .005 (3.05 ± 0.13) DIA.

SHELL WITH FLOAT MOUNTS



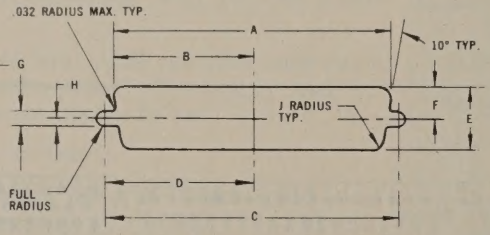
TWO MTG. HOLES
.086 $^{+.005}_{-.000}$ (2.18 $^{+0.13}_{-0.00}$) DIA.

It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount.

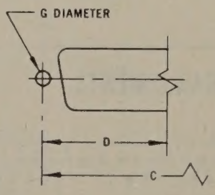
Description Part No.	A ±.015(0.38)	B* ±.010(0.25)	B₁ ±.005(0.13)	C ±.005(0.13)	D* ±.010(0.25)	D₁ ±.010(0.25)	E ±.015(0.38)	G* ±.010(0.25)
DEC-9P	1.213(30.81)		.666 (16.9)	.984(24.99)		.329 (8.4)	.494(12.55)	.759(19.28)
DEC-9S	1.213(30.81)	.640(16.26)		.984(24.99)	.308(7.82)		.494(12.55)	.759(19.28)
DAC-15P	1.541(39.14)		.994 (25.3)	1.312(33.32)		.329 (8.4)	.494(12.55)	1.083(27.51)
DAC-15S	1.541(39.14)	.968(24.59)		1.312(33.32)	.308(7.82)		.494(12.55)	1.083(27.51)
DBC-25P	2.088(53.04)		1.534 (39.0)	1.852(47.04)		.329 (8.4)	.494(12.55)	1.625(41.27)
DBC-25S	2.088(53.04)	1.508(38.30)		1.852(47.04)	.308(7.82)		.494(12.55)	1.625(41.27)
DCC-37P	2.729(63.32)		2.182 (55.4)	2.500(63.50)		.329 (8.4)	.494(12.55)	2.272(57.71)
DCC-37S	2.729(63.32)	2.156(54.76)		2.500(63.50)	.308(7.82)		.494(12.55)	2.272(57.71)
DDC-50P	2.635(66.93)		2.079 (52.8)	2.406(61.11)		.436 (11.1)	.605(15.37)	2.178(55.32)
DDC-50S	2.635(66.93)	2.062(52.34)		2.406(61.11)	.420(10.67)		.605(15.37)	2.178(55.32)

Description Number	H* ±.010(0.25)	J ±.010(0.25)	K ±.010(0.25)	L ±.010(0.25)	M ±.010(0.25)	N ±.010(0.25)
DEC-9P	.422(10.72)	.030(0.76)	.236(5.99)	.045(1.14)	.422(10.72)	.120(3.05)
DEC-9S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
DAC-15P	.422(10.72)	.030(0.76)	.236(5.99)	.045(1.14)	.422(10.72)	.120(3.05)
DAC-15S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
DBC-25P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
DBC-25S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
DCC-37P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
DCC-37S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
DDC-50P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
DDC-50S	.534(13.56)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)

B and D are the outside dimensions (for socket side). B₁ and D₁ are the inside dimensions (for pin side). For shell with float mounts, add F after C, e.g., DECF-9P. (Bracketed figures mm)



Standard Cutout



Optional Cutout
(For rear mounting)

Plug	Mounting Method	A ±.005(0.13)	B ±.005(0.13)	C ±.005(0.13)	D ±.005(0.13)	E ±.005(0.13)	F ±.005(0.13)	G ±.002(0.05)	H ±.002(0.05)	J ±.005(0.13)
DA,	Front Mtg.	1.202(30.53)	.601(15.26)	1.312(33.32)	.656(16.66)	.513(13.03)	.257(6.53)	.120(3.05)	.060(1.52)	.083(2.11)
DAC	Rear Mtg.	1.134(28.80)	.567(14.40)	1.312(33.32)	.656(16.66)	.449(11.40)	.225(5.72)	.120(3.05)	.060(1.52)	.132(3.35)
DAF,	Front Mtg.	1.234(31.34)	.617(15.67)	1.312(33.32)	.656(16.66)	.545(13.84)	.273(6.93)	.088(2.24)	.044(1.12)	.083(2.11)
DACF	Rear Mtg.	1.166(29.62)	.583(14.81)	1.312(33.32)	.656(16.66)	.481(12.22)	.241(6.12)	.088(2.24)	.044(1.12)	.132(3.35)
DB,	Front Mtg.	1.743(44.27)	.872(22.15)	1.852(38.61)	.926(23.52)	.513(13.03)	.257(6.53)	.120(3.05)	.060(1.52)	.083(2.11)
DBC	Rear Mtg.	1.674(42.52)	.837(21.26)	1.852(38.61)	.926(23.52)	.449(11.40)	.225(5.72)	.120(3.05)	.060(1.52)	.132(3.35)
DBF,	Front Mtg.	1.775(45.08)	.888(22.26)	1.852(38.61)	.926(23.52)	.545(13.84)	.273(6.93)	.088(2.24)	.044(1.12)	.083(2.11)
DBCF	Rear Mtg.	1.706(43.33)	.853(21.67)	1.852(38.61)	.926(23.52)	.481(12.22)	.241(6.12)	.088(2.24)	.044(1.12)	.132(3.35)
DC,	Front Mtg.	2.391(60.73)	1.196(30.38)	2.500(63.50)	1.250(38.10)	.513(13.03)	.257(6.53)	.120(3.05)	.060(1.52)	.083(2.11)
DCC	Rear Mtg.	2.326(59.08)	1.163(29.54)	2.500(63.50)	1.250(38.10)	.449(11.40)	.225(5.72)	.120(3.05)	.060(1.52)	.132(3.35)
DCF,	Front Mtg.	2.423(61.54)	1.212(30.78)	2.500(63.50)	1.250(38.10)	.545(13.84)	.273(6.93)	.088(2.24)	.044(1.12)	.083(2.11)
DCCF	Rear Mtg.	2.354(59.79)	1.177(29.90)	2.500(63.50)	1.250(38.10)	.481(12.22)	.241(6.12)	.088(2.24)	.044(1.12)	.132(3.35)
DD,	Front Mtg.	2.297(58.34)	1.149(29.18)	2.406(61.11)	1.203(30.56)	.623(15.82)	.312(7.92)	.120(3.05)	.060(1.52)	.083(2.11)
DDC	Rear Mtg.	2.218(56.34)	1.109(28.17)	2.406(61.11)	1.203(30.56)	.555(14.10)	.278(7.06)	.120(3.05)	.060(1.52)	.132(3.35)
DDF,	Front Mtg.	2.329(59.16)	1.165(29.59)	2.406(61.11)	1.203(30.56)	.655(16.64)	.328(8.33)	.088(2.24)	.044(1.12)	.083(2.11)
DDCF	Rear Mtg.	2.250(57.15)	1.125(28.57)	2.406(61.11)	1.203(30.56)	.587(14.91)	.294(7.47)	.088(2.24)	.044(1.12)	.132(3.35)
DE,	Front Mtg.	.874(22.20)	.437(11.10)	.984(24.99)	.492(12.50)	.513(13.03)	.257(6.53)	.120(3.05)	.060(1.52)	.083(2.11)
DEC	Rear Mtg.	.806(20.47)	.403(10.24)	.984(24.99)	.492(12.50)	.449(11.40)	.225(5.72)	.120(3.05)	.060(1.52)	.132(3.35)
DEF,	Front Mtg.	.906(23.01)	.453(11.51)	.984(24.99)	.492(12.50)	.545(13.84)	.273(6.93)	.088(2.24)	.044(1.12)	.083(2.11)
DECF	Rear Mtg.	.838(21.29)	419(10.41)	.984(24.99)	.492(12.50)	.481(12.22)	.241(6.12)	.088(2.24)	.044(1.12)	.132(3.35)

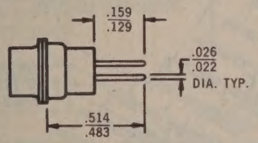
(Bracketed figures mm)

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

PRINTED CIRCUIT CONNECTORS

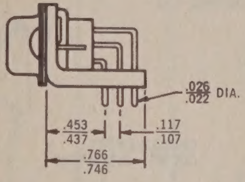
STRAIGHT PRINTED CIRCUIT CONTACT CONNECTORS

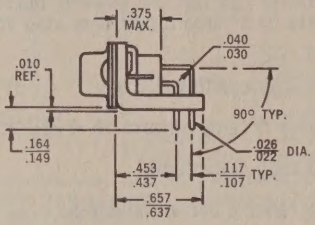

.159
.129
.026
.022
DIA. TYP.
.514
.483

Supplied as complete assemblies with gold plated machined contacts.

Description Part No.	Part No.
DEC-9PBF	234-9-11-104
DEC-9SBF	233-9-11-104
DAC-15PBF	234-15-11-104
DAC-15SBF	233-15-11-104
DBC-25PBF	234-25-11-104
DBC-25SBF	233-25-11-104
DCC-37PBF	234-37-11-104
DCC-37SBF	233-37-11-104
DDC-50PBF	234-50-11-104
DDC-50SBF	233-50-11-104

RIGHT ANGLE CONNECTORS


.026
.022 DIA.
.453
.437
.117
.107
.766
.746


.375
MAX.
.040
.030
.010
REF.
90° TYP.
.164
.149
.026
.022 DIA.
.453
.437
.117
.107 TYP.
.657
.637

With Assembled Contacts

With Molded Bracket		Less Bracket	
Description Part No.	Factory Part No.	Description Part No.	Factory Part No.
DEC-9SAD	233-09-11-101	DEC-9SAK	233-09-11-105
DEC-9PAD	234-09-11-101	DEC-9PAK	234-09-11-105
DAC-15SAD	233-15-11-101	DAC-15SAK	233-15-11-105
DAC-15PAD	234-15-11-101	DAC-15PAK	234-15-11-105
DBC-25SAD	233-25-11-101	DBC-25SAK	233-25-11-105
DBC-25PAD	234-25-11-101	DBC-25PAK	234-25-11-105
DCC-37SAD	233-37-11-101	DCC-37SAK	233-37-11-105
DCC-37PAD	234-37-11-101	DCC-37PAK	234-37-11-105
DDC-50SAD	233-50-11-101	DDC-50SAK	233-50-11-105
DDC-50PAD	234-50-11-101	DDC-50PAK	234-50-11-105

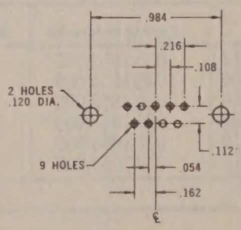
METRIC EQUIVALENTS FOR PC BOARD CONNECTOR LAYOUTS

Inches	mm's	Inches	mm's
.039	0.99	.435	11.09
.054	1.37	.489	12.42
.055	1.40	.544	13.82
.108	2.74	.598	15.19
.109	2.77	.652	16.56
.112	2.84	.707	17.96
.120	3.05	.761	19.33
.162	4.11	.815	20.70
.163	4.14	.870	22.10
.216	5.49	.924	23.47
.218	5.54	.978	24.84
.224	5.69	.984	24.99
.272	6.91	1.312	33.32
.324	8.23	1.852	47.04
.326	8.28	2.406	61.11
.381	9.68	2.500	63.50

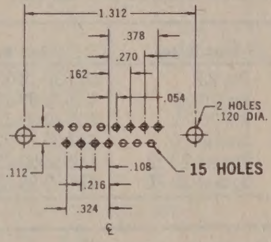
LEAD HOLE SIZE

Terminal Dia.	Hole Dia.
.040	.055
.030	.045
.024	.039

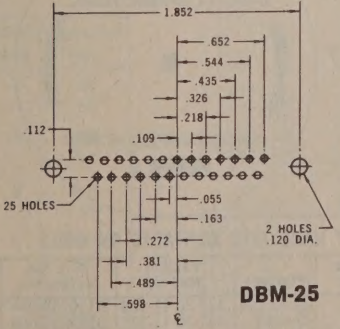
BOARD LAYOUTS


.984
.216
.108
2 HOLES
.120 DIA.
.112
9 HOLES
.054
.162
℄

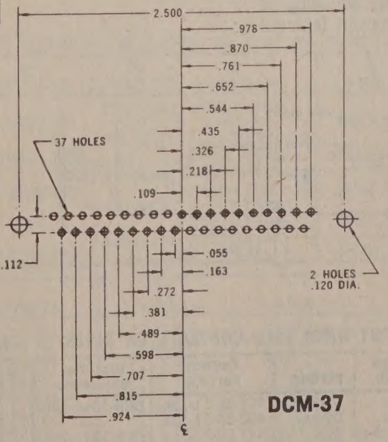
DEM-9


1.312
.378
.270
.162
.054
2 HOLES
.120 DIA.
.112
.108
15 HOLES
.216
.324
℄

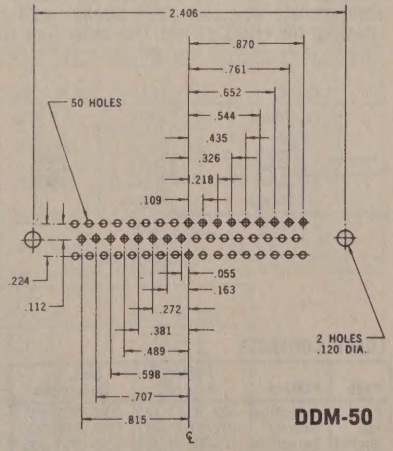
DAM-15


1.852
.652
.544
.435
.326
.218
.112
.109
25 HOLES
.055
.163
.272
.381
.489
.598
2 HOLES
.120 DIA.
℄

DBM-25


2.500
.978
.870
.761
.652
.544
.435
.326
.218
.109
37 HOLES
.112
.055
.163
.272
.381
.489
.598
.707
.815
.924
2 HOLES
.120 DIA.
℄

DCM-37


2.406
.870
.761
.652
.544
.435
.326
.218
.109
50 HOLES
.224
.112
.055
.163
.272
.381
.489
.598
.707
.815
2 HOLES
.120 DIA.
℄

DDM-50

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

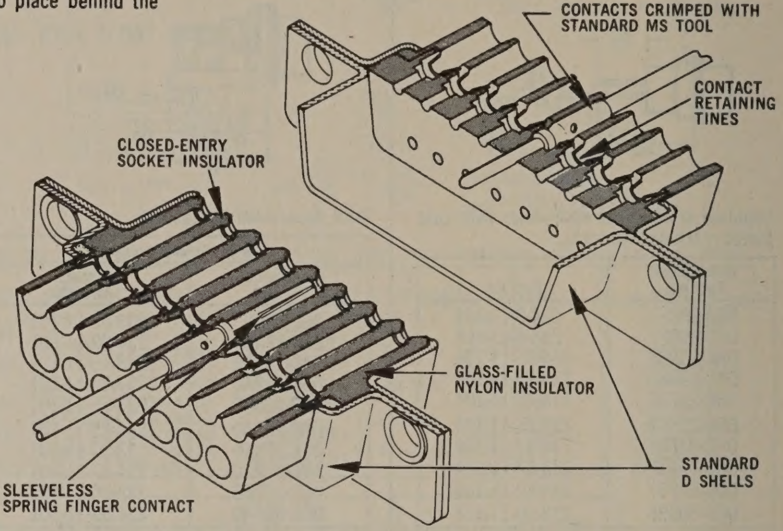
TRW CINCH CONNECTORS

REAR RELEASE CONTACT RETENTION SYSTEM

The BURGUN-D connector features a rear insulator with integral, molded contact retaining tines. These plastic tines permit the insertion and extraction of contacts from the rear of the connector with a simple, expendable plastic insertion/extraction tool. During contact insertion, the retaining tines expand as the contact passes thru. These rugged tines snap into place behind the contact shoulder when the contact is fully inserted. The tool is inserted to expand the tines, allowing easy extraction of the wired contact.

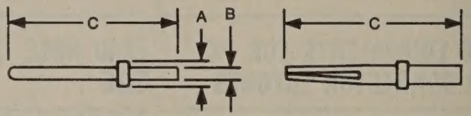
The retention system and the integral contact retaining tines guarantee functional reliability in many environments.

- Mates with existing D types.
- Operates in temperatures to +250°F.
- Crimp snap-in contacts.
- Highly reliable socket contacts.
- Insertion/extraction with expendable tool.
- Corrects misaligned contacts.


CONTACTS CRIMPED WITH STANDARD MS TOOL
CONTACT RETAINING TINES
CLOSED-ENTRY SOCKET INSULATOR
GLASS-FILLED NYLON INSULATOR
STANDARD D SHELLS
SLEEVELESS SPRING FINGER CONTACT

MACHINED CONTACTS

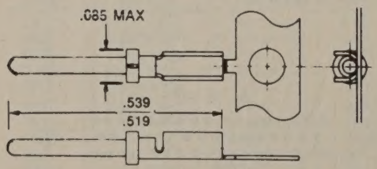
Machined contacts are supplied loose for use with hand crimp tools or in vibration hopper feeder crimp machines. A vibrator-feed, semi-automatic tool, 599-11-11-225 is available. These contacts are supplied in three wire cup sizes.

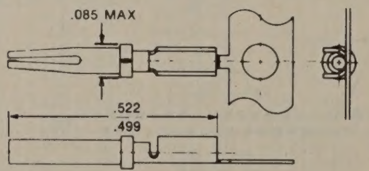


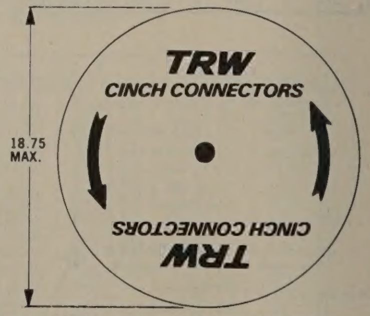
Description	Part No.	Cannon Reference	Wire Accommodation	A ±.002(.051)	B ±.002(.051)	C Max.
Pin 20	403-30-15-130-410	030-1952-000*	#20, 22, 24	.067(1.70)	.042(1.07)	.537(13.64)
Pin 20-18	403-30-99-129-410	030-1954-000	#18 or 2-#22	.086(2.18)	.066(1.68)	.874(22.20)
Pin 20-26	403-30-99-126-410	030-1952-002	#26, 28, 30	.067(1.70)	.025(0.64)	.537(13.64)
Socket 20	414-30-14-227-410	030-1953-000*	#20, 22, 24	.067(1.70)	.042(1.07)	.523(13.28)
Socket 20-18	414-30-99-236-410	030-1955-000	#18 or 2-#22	.086(2.18)	.062(1.68)	.852(21.64)
Socket 20-26	414-30-99-233-410	030-1953-002	#26, 28, 30	.067(1.70)	.025(0.64)	.523(13.28)

STAMPED CONTACTS

Stamped contacts are supplied loose for use with hand crimp tools, or on reels for use with the semiautomatic machines, selectively gold plated or with gold plate overall. These contacts will accommodate wire sizes #20 through #28 AWG by adjusting or changing the crimp die set. (For other wire sizes consult factory.)







LOOSE CONTACTS

Type	Plating	Factory Part No.	Dist. No. Reference
Pin	Selective	402-30-11-135	030-1960-005*
Pin	Overall	402-30-11-137	030-1960-001
Socket	Selective	412-30-14-355	030-1957-005*
Socket	Overall	412-30-14-361	030-1957-001

*These items available through Cinch distributors.

RIGHT HAND FEED CONTACTS ON REELS

Type (RH)	Plating	Factory Part No.	Dist. No. Reference
Pin	Selective	402-30-11-134	BCR-1960-20P*
Pin	Overall	402-30-11-136	—
Socket	Selective	412-30-14-354	BCR-1957-20S*
Socket	Overall	412-30-14-360	—

LEFT HAND FEED CONTACTS ON REELS

Type (LH)	Plating	Factory Part No.	Dist. No. Reference
Pin	Selective	402-30-11-138	D110238-034*
Pin	Overall	402-30-11-139	D110238-004
Socket	Selective	412-30-14-362	D110238-035*
Socket	Overall	412-30-14-363	D110238-005

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

HOW TO ORDER — TYPES D*MA, D*M & D CONNECTORS

D B MA M R 15 P A * FO

D — Series Prefix

B — Shell Sizes A, B, C, D, E

MA —
No designator — 2 pc. nylon Insulator — solder type Contacts — original "D" series
M: Monobloc insert — solder type contacts Mark I series
MA: Monobloc insert — crimp type contacts Mark III series

M — M: For connectors having .00005 gold plate over .0001 min. copper plate on contacts — omit for standard Mark I and Mark III only.

R —
No designator — standard .120 diameter hole
E — 4-40 clinch nut for rear panel mounting
F — float mounts for rear panel mounting
R — reverse float mount for front panel mounting

15 — Contact Arrangement, See page 12.

P —
P — Pin
S — Socket

A —
Printed circuit terminal modifier — applicable to the Mark I Series (monobloc, solder type).

A — Right-angle printed circuit connector with .040 diameter terminals; with bracket assembly and accommodates printed circuit boards up to 1/16 maximum thickness. (Plug only.)

B — Straight printed circuit connector with .040 diameter terminals; accommodates printed circuit boards up to 3/32 maximum thickness.

H — Straight printed circuit connector with .040 diameter terminals; accommodates printed circuit boards up to 1/8 maximum thickness.

L — Right-angle printed circuit connector with .030 diameter terminals with bracket assembly and accommodates printed circuit boards up to 3/32 maximum thickness. (Plug only.)

Printed Circuit Terminal Modifier — Applicable to the original "D" series.

V — Straight printed circuit connector with .040 diameter terminals; accommodates printed circuit boards up to 1/16 maximum thickness.

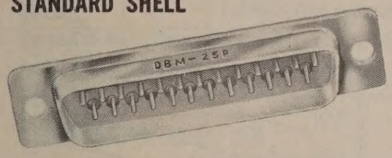
***** — Modification — consult factory

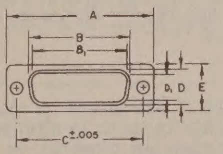
FO — Connector less contacts (FO not stamped on connector)

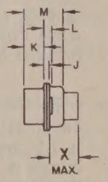
STANDARD DIMENSIONS

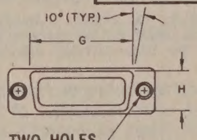
	Dim. X	mm
Original "D"	.312	7.92
Mark I	.390	9.91
Mark III	.375	9.50

STANDARD SHELL



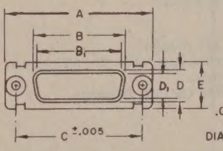


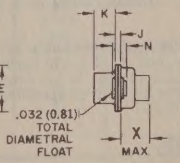


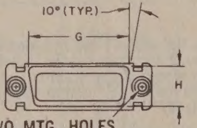


TWO HOLES .120 ± .005 (3.05 ± 0.13) DIA.

SHELL WITH FLOAT MOUNTS







TWO MTG. HOLES .086 $^{+.005}_{-.000}$ (2.18 $^{+0.13}_{-0.00}$) DIA.

It is recommended that only one assembly, either pin or socket, be float mounted. For front panel mounting use reverse float mount.

Shell Size	Connector Type	A ±.015(0.38)	B* ±.010(0.25)	B1 ±.005(0.13)	C ±.005(0.13)	D* ±.010(0.25)	D1 ±.010(0.25)	E ±.015(0.38)	G* ±.010(0.25)
E	9P	1.213(30.81)	.640(16.26)	.666 (16.9)	.984(24.99)	.308(7.82)	.329 (8.4)	.494(12.55)	.759(19.28)
	9S	1.213(30.81)			.984(24.99)			.494(12.55)	.759(19.28)
A	15P	1.541(39.14)	.968(24.59)	.994 (25.3)	1.312(33.32)	.308(7.82)	.329 (8.4)	.494(12.55)	1.083(27.51)
	15S	1.541(39.14)			1.312(33.32)			.494(12.55)	1.083(27.51)
B	25P	2.088(53.04)	1.508(38.30)	1.534 (39.0)	1.852(47.04)	.308(7.82)	.329 (8.4)	.494(12.55)	1.625(41.27)
	25S	2.088(53.04)			1.852(47.04)			.494(12.55)	1.625(41.27)
C	37P	2.729(63.32)	2.156(54.76)	2.182 (55.4)	2.500(63.50)	.308(7.82)	.329 (8.4)	.494(12.55)	2.272(57.71)
	37S	2.729(63.32)			2.500(63.50)			.494(12.55)	2.272(57.71)
D	50P	2.635(66.93)	2.062(52.34)	2.079 (52.8)	2.406(61.11)	.420(10.67)	.436 (11.1)	.605(15.37)	2.178(55.32)
	50S	2.635(66.93)			2.406(61.11)			.605(15.37)	2.178(55.32)

Shell Size	Connector Type	H* ±.010(0.25)	J ±.010(0.25)	K ±.010(0.25)	L ±.010(0.25)	M ±.010(0.25)	N ±.010(0.25)
E	9P	.422(10.72)	.030(0.76)	.236(5.99)	.045(1.14)	.422(10.72)	.120(3.05)
	9S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
A	15P	.422(10.72)	.030(0.76)	.236(5.99)	.045(1.14)	.422(10.72)	.120(3.05)
	15S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
B	25P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
	25S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
C	37P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
	37S	.422(10.72)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)
D	50P	.422(10.72)	.039(0.99)	.231(5.87)	.060(1.52)	.426(10.82)	.129(3.28)
	50S	.534(13.56)	.030(0.76)	.243(6.17)	.045(1.14)	.429(10.92)	.120(3.05)

B and D are the outside dimensions (for socket side). B_1 and D_1 are the inside dimensions (for pin side). For shell with float mounts, add F after C, e.g., DECF-9P. (Bracketed figures mm)

TRW CINCH CONNECTORS

GENERAL RATINGS AND SPECIFICATIONS

VOLTAGE RATINGS

All voltage figures are AC (rms), 60 cps. measured at approximately 77°F., 50% RH.

Connectors with Basic Arrangements
AWG #20 wire contacts only

All voltages are measured from contact to contact, and contact to shell, in unmated condition.

Connector Type		Altitude (feet) Sea Level	20,000	50,000	70,000
D*MA	Average Flashover	1500	1000	500	500
	Test	1000	650	325	325
D*M D*	Average Flashover	1700	1000	650	500
	Test	1250	750	475	375

Connectors with Combination Arrangements
AWG #20 wire contacts with coaxial, high power, and/or high voltage contacts
All voltages are for plugs and receptacles in both mated and unmated conditions.

Altitude (feet)		Sea Level		20,000		Sea Level		20,000	
Type of Contact		90°	Straight	90°	Straight	90°	Straight	90°	Straight
Center Conductor to Coaxial Shell	Average Flashover	1200	1500	900	1000	600	700	400	500
	Test	800	1000	600	650	400	475	275	325
High Power Contact and/or Coaxial Shell to Plug Shell	Average Flashover	1500	1500	1000	1000	500	500	500	500
	Test	1000	1000	650	650	325	325	325	325
Coaxial Shell to Nearest Standard Solder Pot Contact	Average Flashover	•	1500	•	1500	•	900	•	650
	Test	•	1000	•	1000	•	600	•	425
HV Contact to Nearest #20 Contact or to Shell	Average Flashover	3800	3800	2300	2300	500	900	650	650
	Test	2800	2800	1700	1700	675	675	475	475

• Not applicable due to variable rotation.

CURRENT RATINGS

Cinch vs. Military.

The Cinch rating for #20 contacts is 5 amps, which means 5 amps for all contacts simultaneously. MIL-W-5088 rates #20 contacts at 7.5 amps maximum. The explanation is as follows:

MIL-W-5088B, Paragraph 3-9-2-1-2 specifies:

"Table I current ratings for cables in bundles are based upon 15 or more cables carrying no more than 20% of the total carrying capacity of the bundle."

Table I specifies a current rating of 7.5 amps maximum for single wires in bundles of 15 or more wires. NOTE: Wires and contacts are both considered to be in the category of conductors.

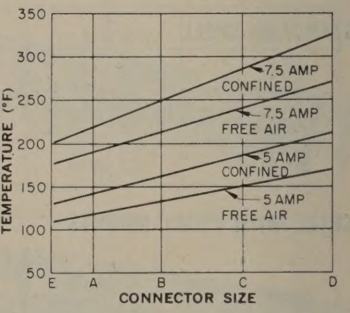
Explanation

If 15 wires (normally rated at 7.5 amps per wire maximum, or at a total bundle current of 112.5 amps) are not to carry more than 20% of the total 112.5 amps, the average current rating per wire is 20% of 112.5 amps (total bundle capacity) divided by 15 (number of wires).

Conclusion

The Military rating of #20 contacts or wires is 1.5 amps average (based on 15 wires per bundle or 15 contacts per connector) vs. a Cinch rating of 5 amps.

Average Maximum Temperature vs. Connector Size for various current ratings of mated pairs of D Subminiature Connectors.



Notes:

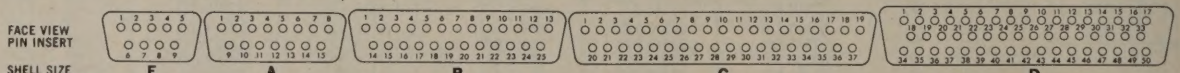
1. Free air condition. Connectors not shielded from ambient condition in any manner.
2. Confined condition. Connectors placed in insulated box (1 x 2 x 3.5) during test, with no moving air.
3. Average maximum temperature stabilization: 1 hour or less in all cases.
4. All contacts in each mated pair tested were wired in series with specified current flowing.
5. Ambient conditions 77°F. 50% rh.

MATERIAL AND PLATING SPECIFICATIONS

Material	Application	Per Specification
Berryllium Copper	Coax. Recept. Outer Body	QQ-C-530
Brass	Contact	QQ-B-626a, Composition 22, HH
Brass	Shell	QQ-B-613a, Composition 2, soft temper
Diallyl phthalate, glass fibre filled, (short)	Insulator	MIL-M-14F. Type SDGF
Diallyl phthalate, glass fibre filled, (long)	Insulator	MIL-P-19833. Type GDI-30F
Leaded copper	Contact	Anaconda Alloy 1870 or equivalent
Nylon	Insulator	MIL-P-17091B
Phosphor bronze	Contact	ASTM B139. Alloy BE per QQ-B-750
Stainless steel	Float rivet	per QQ-S-764B
Stainless steel	Float washer	No. 304, per QQ-S-766c
Steel	Shell	QQ-S-636
Teflon	Coaxial Insulator	—

Plating	Application	Per Specification
Cadmium plate	Shell	QQ-P-416a. Type II, Class 2
Copper	Contact	MIL-C-14550, Class I
Gold plate	Contact	MIL-G-45204, Type II, Class I
Silver plate	Contact	QQ-S-365a
Tin plate	Shell and contact	MIL-T-10727A

BASIC CONTACT ARRANGEMENTS (Applicable to all Series)



SHELL SIZE	E	A	B	C	D
NO. OF CONTACTS	9	15	25	37	50
CONTACT SIZE	#20	#20	#20	#20	#20

TRW CINCH CONNECTORS

ORIGINAL D CONNECTORS

GENERAL INFORMATION

The Cinch Original D Plug utilizes a two-piece nylon insulator housed in a variety of five basic shell sizes: E, A, B, C, and D. These shell sizes contain 9, 15, 25, 37, and 50 #20 solder pot contacts respectively. Standard contact terminations accommodate up to #20 AWG stranded wire. Current rating is 5 amperes.*

The keystone shape of the shell assures proper polarization. Coupling is by means of friction; locking accessories are available. Also available are shells with float mounts. Connectors with #4-40 or #2-56 clinch nut mounts may be provided.

With standard nylon insulators, operating temperatures range from −65°F to +250°F (the limiting factor being the insulator material). When diallyl phthalate insulator is substituted, the operating temperature range is from −65°F to +275°F.

*Military rating of #20 contacts or wires is 1.5 amps average, and 7.5 amps maximum. See explanation on page 12.

MATERIALS AND FINISHES

Shells:	Steel, cadmium plated with yellow chromate supplementary coating.
Pin Contacts:	Brass, gold plated (.00002 min.) over nickel plate (.000060 min.).
Socket Contacts:	Phosphor bronze, gold plated (.00002 min.) over nickel plate (.000060 min.).
Insulators:	Nylon, two-piece.
Float Mounting Rivets and Washers:	Stainless steel.

For listing of applicable specifications see page 12.

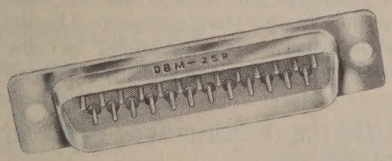
PERFORMANCE DATA

Voltage Rating:	See tabulation on page 12.
Insulation Resistance:	Greater than 5,000 megohms, determined in accordance with MIL-STD-202D, Method 302, Condition B.
Contact Resistance:	2.7 milliohms maximum @ 7.5 amps.
Individual Contact Separation Force:	1 to 8 ounces.
Moisture Resistance:	Exceeds test requirements of MIL-STD-202D, Method 106.†
Vibration:	Exceeds test requirements of MIL-STD-202D, Method 204, Condition B.†
Shock:	Exceeds test requirements of MIL-STD-202D, Method 213, Condition G.†
Corrosion Resistance:	Exceeds requirements of 48 hr. exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.†

†As referenced in MIL-C-24308.

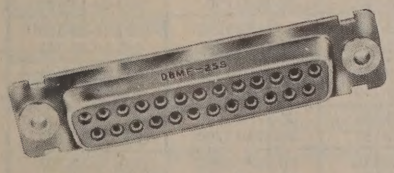
ORDERING INFORMATION

STANDARD MOUNT



Shell Size	Layout	Order No.*	Factory No.
E	9 Contact Plug	DE-9P *	231-09-11-101
	Socket	DE-9S *	230-09-11-101
A	15 Contact Plug	DA-15P *	231-15-11-101
	Socket	DA-15S *	230-15-11-101
B	25 Contact Plug	DB-25P *	231-25-11-101
	Socket	DB-25S *	230-25-11-112
C	37 Contact Plug	DC-37P *	231-37-11-101
	Socket	DC-37S *	230-37-11-101
D	50 Contact Plug	DD-50P *	231-50-11-101
	Socket	DD-50S *	230-50-11-101

FLOAT MOUNT



Shell Size	Layout	Order No.*	Factory No.
E	9 Contact Plug	DEF-9P *	231-09-11-306
	Socket	DEF-9S *	230-09-11-301
A	15 Contact Plug	DAF-15P *	231-15-11-301
	Socket	DAF-15S *	230-15-11-301
B	25 Contact Plug	DBF-25P *	231-25-11-301
	Socket	DBF-25S *	230-25-11-301
C	37 Contact Plug	DCF-37P *	231-37-11-301
	Socket	DCF-37S *	230-37-11-301
D	50 Contact Plug	DDF-50P *	231-50-11-304
	Socket	DDF-50S *	230-50-11-301

* These items available through Cinch distributors.

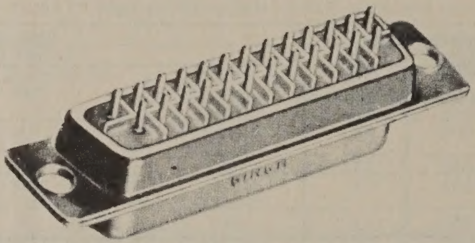
FOR DIMENSIONS SEE C-46 PAGE 11

TRW CINCH CONNECTORS

ORIGINAL D CONNECTORS (Cont'd)

PRINTED CIRCUIT TERMINALS

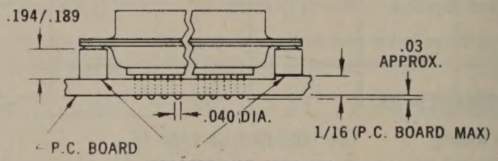
Straight terminals for printed circuit boards up to and including 1/16″ maximum thickness. Terminals extend 3/32″ beyond the rear of the insert. For greater board thicknesses consult factory.



ORDERING INFORMATION

Shell Size	Layout	Order No.*	Factory No.
E	9 Contact Plug Socket	DE-9PV * DE-9SV *	231-09-12-112 230-09-12-115
A	15 Contact Plug Socket	DA-15PV * DA-15SV *	231-15-12-121 230-15-12-131
B	25 Contact Plug Socket	DB-25PV * DB-25SV *	231-25-12-116 230-25-12-105
C	37 Contact Plug Socket	DC-37PV * DC-37SV *	231-37-12-115 230-37-12-114
D	50 Contact Plug Socket	DD-50PV * DD-50SV *	231-50-12-114 230-50-12-113

* These items available through Cinch distributors.



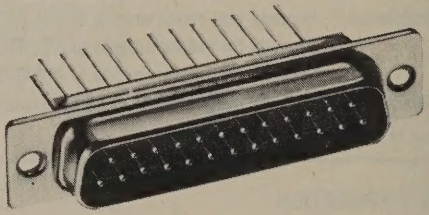
SPACERS NOT SUPPLIED
For additional dimensions see table on page 11.

WIRE WRAP TERMINALS

RACK AND PANEL CONNECTORS WITH 0.025″ SQUARE WIRE WRAP* TAILS

Cinch D-Subminiature Connectors are designed for applications where space and weight considerations are prime considerations. These high contact density connectors are especially well-suited for aircraft, missile and ground support installations. They are designed to meet or exceed most of the requirements of MIL-C-24308.

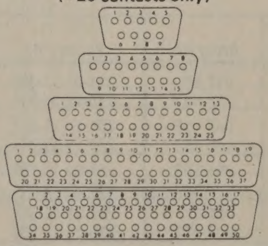
These wire-wrap versions are available in 9, 15, 25, 37 and 50 contact sizes in both plug and socket types. Two tail lengths are available: 3/8″ long to accommodate two wires, and 37/64″ long to accommodate three wires. Socket contacts and plug pins are copper alloy gold plated over silver. Insulators are two-piece nylon, and the outer shells are yellow chromate finished, cadmium-plated steel.



These D-Subminiature Connectors will intermate with any other D-Subminiature Connector of the same insert configuration. Mating connectors with standard termination may be adapted for cable attachment by means of accessory junction shells with integral clamps.

IMMEDIATE DELIVERY FROM CINCH DISTRIBUTORS can be provided on the 3/8″ long termination types.

ORDERING INFORMATION

(#20 contacts only)	Layout	Shell Size	3/8″ TAIL LENGTH**		37/64″ TAIL LENGTH	
			Order No.	Factory No.	Order No.	Factory No.
	9 Contact Plug Socket	E	DE-9P-F179 DE-9S-F179	231-09-13-133 230-09-13-132	DE-9P-F179C DE-9S-F179C	231-09-13-134 230-09-13-133
	15 Contact Plug Socket	A	DA-15P-F179 DA-15S-F179	231-15-13-152 230-15-13-142	DA-15P-F179C DA-15S-F179C	231-15-13-153 230-15-13-143
	25 Contact Plug Socket	B	DB-25P-F179 DB-25S-F179	231-25-13-157 230-25-13-149	DB-25P-F179C DB-25S-F179C	231-25-13-161 230-25-13-150
	37 Contact Plug Socket	C	DC-37P-F179 DC-37S-F179	231-37-13-141 230-37-13-131	DC-37P-F179C DC-37S-F179C	231-37-13-142 230-37-13-132
	50 Contact Plug Socket	D	DD-50P-F179 DD-50S-F179	231-50-13-136 230-50-13-124	DD-50P-F179C DD-50S-F179C	231-50-13-137 230-50-13-125

*Trademark Gardner-Denver Corp.

**All 3/8″ Tail length D-Subminiature Connectors are available for immediate delivery from local Authorized Cinch Distributors.

FOR DIMENSIONS SEE C-46 PAGE 11

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

GOLDEN D MARK I CONNECTORS

GENERAL INFORMATION

Cinch D*M Connectors feature solder pot contacts in a monobloc insulator for improved temperature characteristics and increased moisture resistance. Two insulator types are available: (a) combination layouts with coaxial and/or high voltage contacts plus standard AWG wire contacts, and (b) layouts with standard AWG wire contacts only. The five amp* solder pot contacts accommodate wire sizes up to #20 AWG stranded wire. Socket contacts are of the closed entry type. Operating temperatures range from −65°F to +300°F.

Combination layouts are supplied with unfilled coaxial and/or HV contact cavities. Coaxial and HV contacts must be ordered separately, and may be used interchangeably in any of the layouts listed. HV contacts accommodate wire sizes up to #20. In both, coaxial and HV contacts, the center contacts have solder type termination. Braid, on coaxial contacts, may be soldered or crimped to the outer conductor. Both of the above contacts are snap-in, removable type.

Standard coaxial and HV plugs contain female center contacts; receptacles contain male center contacts. Special reversed versions are available. Pin connector assemblies accommodate coaxial and HV plugs only; socket assemblies accommodate receptacles. Connector assemblies and contact inserts are matched and color coded to ease assembly. Pins and plugs are coded red, sockets and receptacles are coded blue. No insertion tool is required. Coaxial and HV inserts may be removed with Cinch Tool CET-C6B.

Five basic shell sizes are available. Polarization is by means of the keystone cornered shell. Coupling is by friction; locking accessories are available. Shells with float mounts are also available.

Printed circuit plugs are listed on page 9 with other popular modifications. For additional modifications and special plugs, consult factory. Accessories such as junction shells are shown on pages 24 and 25.

*Military rating of #20 contacts or wires is 1.5 amps average, and 7.5 amps maximum. See explanation on page 12.

MATERIALS AND FINISHES

Shells: Steel, cadmium plated with yellow chromate supplementary coating.

Insulators: Diallyl phthalate, glass fibre filled, med. green color, monobloc construction.

#20 Contacts (Standard): Pins and sockets: brass, gold plated (.00002 min.) over nickel (.00006 min.).

Coaxial Contacts (Standard):

- **Outer Contact —** Plug: Brass, gold plated (.00003) over silver plate (.0001). Receptacle: Beryllium copper, gold plated (.00003) over silver plate (.0001).
- **Center Female Contact —** Phosphor bronze, gold plated (.00003) over silver plate (.0001).
- **Center Male Contact —** Brass, gold plated (.00003) over silver plate (.0001).
- **Insulator —** Teflon.

High Voltage Contacts (Standard):

- **Socket Contact —** Phosphor bronze, gold plated (.00003) over silver plate (.0002).
- **Pin Contact —** Brass, gold plated (.00003) over silver plate (.0002).
- **Insulator —** Nylon (temperature range: −65°F to +250°F).

For listing of applicable specifications see page 12.

PERFORMANCE DATA

VOLTAGE RATING:

Insulation Resistance Ref. MIL-C-24308 — Greater than 5000 megohms in accordance with MIL-STD-202D, Method 302, Condition B

Contact Resistance Ref. MIL-C-24308 — (#20 contacts) 2.67 milliohms max. exceeds requirements of Para 3.53

Contact Engagement Force Ref. MIL-C-24308 — .7 to 12 oz. when tested with MS3197 test pin

Contact Separation Force Ref. MIL-C-24308 — .7 to 8 oz. when tested with MS3197 test pin

Moisture Resistance Ref. MIL-C-24308 — Exceeds test requirements of MIL-STD-202D, Method 106

Vibration Ref. MIL-C-24308 — Exceeds test requirements of MIL-STD-202D, Method 204, Condition B

Shock Ref. MIL-C-24308 — Exceeds test requirements of MIL-STD-202D, Method 213, Condition G

Corrosion Resistance Ref. MIL-C-24308 — Exceeds requirements of 48-hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B

High Potential Test Voltage Ref. MIL-C-24308 — MIL-STD-202D, Method 301

Temperature Cycling Ref. MIL-C-24308 — MIL-STD-202D, Method 102A, Condition D

See tabulation on page 12.

CROSS REFERENCE MIL-C-24308 MILITARY PART NO. VERSUS CINCH PART NO.

	Mark I Solder Contact Connectors	
	Military Part No.	Cinch Part No.
Sockets	M24308/1-1	230-09-09-129
	M24308/1-2	230-15-09-129
	M24308/1-3	230-25-09-129
	M24308/1-4	230-37-09-129
	M24308/1-5	230-50-09-129
Plugs	M24308/3-1	231-09-09-129
	M24308/3-2	231-15-09-129
	M24308/3-3	231-25-09-129
	M24308/3-4	231-37-09-129
	M24308/3-5	231-50-09-129

	Mark I Solder Contact Connectors With Float Mount	
	Military Part No.	Cinch Part No.
Sockets	M24308/1-12	230-09-09-322
	M24308/1-13	230-15-09-322
	M24308/1-14	230-25-09-322
	M24308/1-15	230-37-09-322
	M24308/1-16	230-50-09-322
Plugs	M24308/3-12	231-09-09-322
	M24308/3-13	231-15-09-322
	M24308/3-14	231-25-09-322
	M24308/3-15	231-37-09-322
	M24308/3-16	231-50-09-322

	Solder Contact Connectors (Non-Magnetic)	
	Military Part No.	Cinch Part No.
Sockets	M24308/5-1	230-09-09-513
	M24308/5-2	230-15-09-513
	M24308/5-3	230-25-09-513
	M24308/5-4	230-37-09-513
	M24308/5-5	230-50-09-513
Plugs	M24308/7-1	231-09-09-513
	M24308/7-2	231-15-09-513
	M24308/7-3	231-25-09-513
	M24308/7-4	231-37-09-513
	M24308/7-5	231-50-09-513

	Solder Contact Connectors (Non-Magnetic) With Float Mount	
	Military Part No.	Cinch Part No.
Sockets	M24308/5-12	230-09-09-210
	M24308/5-13	230-15-09-210
	M24308/5-14	230-25-09-210
	M24308/5-15	230-37-09-210
	M24308/5-16	230-50-09-210
Plugs	M24308/7-12	231-09-09-210
	M24308/7-13	231-15-09-210
	M24308/7-14	231-25-09-210
	M24308/7-15	231-37-09-210
	M24308/7-16	231-50-09-210

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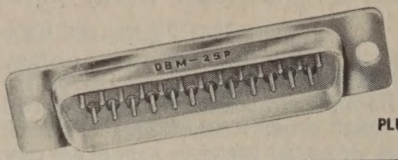
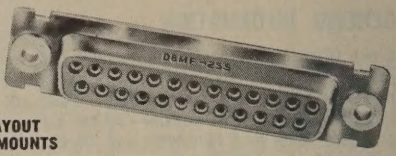
TRW CINCH CONNECTORS

GOLDEN D MARK I CONNECTORS (Cont'd)



STANDARD MOUNT **FLOAT MOUNT**



PLUG WITH BASIC LAYOUT IN STANDARD SHELL

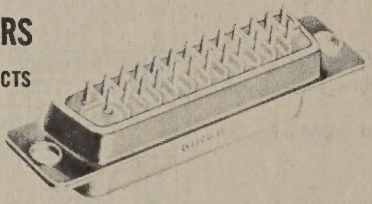
Shell Size	Layout	Standard Connectors Order No.*	Standard Connectors Factory No.	Commercial Equivalents of MIL-C-24308 Connectors Order No.	Commercial Equivalents of MIL-C-24308 Connectors Factory No.
E	9 Contact Plug Socket	DEM-9P* DEM-9S*	231-09-09-105 230-09-09-107	DEMM-9P DEMM-9S	231-09-09-120 230-09-09-120
A	15 Contact Plug Socket	DAM-15P* DAM-15S*	231-15-09-108 230-15-09-110	DAMM-15P DAMM-15S	231-15-09-127 230-15-09-123
B	25 Contact Plug Socket	DBM-25P* DBM-25S*	231-25-09-109 230-25-09-111	DBMM-25P DBMM-25S	231-25-09-124 230-25-09-1[illegible]
C	37 Contact Plug Socket	DCM-37P* DCM-37S*	231-37-09-109 230-37-09-109	DCMM-37P DCMM-37S	231-37-09-131 230-37-09-119
D	50 Contact Plug Socket	DDM-50P* DDM-50S*	231-50-09-109 230-50-09-111	DDMM-50P DDMM-50S	231-50-09-132 230-50-09-131

SOCKET WITH BASIC LAYOUT IN SHELL WITH FLOAT MOUNTS

Shell Size	Layout	Standard Connectors Order No.*	Standard Connectors Factory No.	Commercial Equivalents of MIL-C-24308 Connectors Order No.	Commercial Equivalents of MIL-C-24308 Connectors Factory No.
E	9 Contact Plug Socket	DEMF-9P* DEMF-9S*	231-09-09-301 230-09-09-301	DEMMF-9P DEMMF-9S	231-09-09-305 230-09-09-314
A	15 Contact Plug Socket	DAMF-15P* DAMF-15S*	231-15-09-301 230-15-09-302	DAMMF-15P DAMMF-15S	231-15-09-304 230-15-09-312
B	25 Contact Plug Socket	DBMF-25P* DBMF-25S*	231-25-09-301 230-25-09-301	DBMMF-25P DBMMF-25S	231-25-09-308 230-25-09-312
C	37 Contact Plug Socket	DCMF-37P* DCMF-37S*	231-37-09-301 230-37-09-302	DCMMF-37P DCMMF-37S	231-37-09-307 230-37-09-314
D	50 Contact Plug Socket	DDMF-50P* DDMF-50S*	231-50-09-301 230-50-09-301	DDMMF-50P DDMMF-50S	231-50-09-308 230-50-09-313

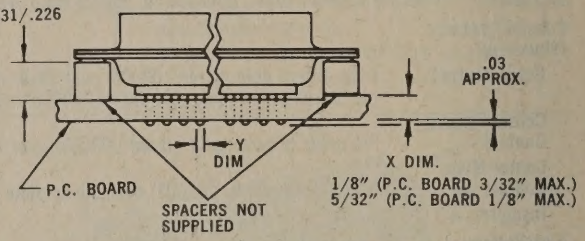
PC CONNECTORS

STRAIGHT PC CONTACTS



These compact, high contact density connectors are designed for direct, above board mounting to printed circuit boards up to ⅛″ thick. They provide a highly reliable means for direct inline interconnection of printed circuitry with mother-board mounted sockets.

Shell Size	Layout	.040 Dia. 3/32″ Board Order No.	.040 Dia. 3/32″ Board Factory No.	.040 Dia. ⅛″ Board Order No.	.040 Dia. ⅛″ Board Factory No.
E	9 Contact Plug Socket	DEM-9PB DEM-9SB	231-09-09-117 230-09-09-127	DEM-9PH DEM-9SH	231-09-09-130 230-09-09-128
A	15 Contact Plug Socket	DAM-15PB DAM-15SB	231-15-09-124 230-15-09-118	DAM-15PH DAM-15SH	231-15-09-139 230-15-09-127
B	25 Contact Plug Socket	DBM-25PB DBM-25SB	231-25-09-127 230-25-09-122	DBM-25PH DBM-25SH	231-25-09-125 230-25-09-121
C	37 Contact Plug Socket	DCM-37PB DCM-37SB	231-37-09-118 230-37-09-114	DCM-37PH DCM-37SH	231-37-09-121 230-37-09-120
D	50 Contact Plug Socket	DDM-50PB DDM-50SB	231-50-09-133 230-50-09-119	DDM-50PH DDM-50SH	231-50-09-136 230-50-09-135



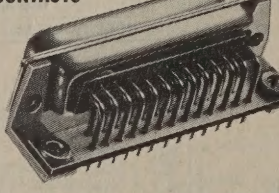
1/8″ (P.C. BOARD 3/32″ MAX.)
5/32″ (P.C. BOARD 1/8″ MAX.)

Dimensions subject to change

Part No. Printed Circuit Terminal Modifier	X	Y ±.003
B	3/32	.040
H	⅛	.040

For additional dimensions see table on page 11.

RIGHT ANGLE PC CONTACTS



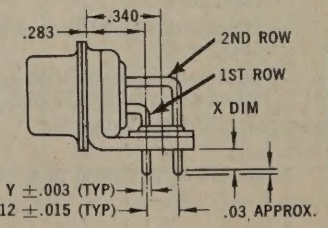
These right-angle plugs are available in 9, 15, 25, and 37 contact configurations. The standard units listed herein are supplied with 0.040″ or 0.030″ nominal diameter pins that extend 0.093″ below the 90° bracket for 1/16″ boards and .135 for 3/32″ boards, other pin diameters and lengths may be obtained on special order.

Design and construction of these connectors meets or exceeds many of the requirements of MIL-C-24308.

These right-angle D-Subminiature connectors will mate with any other D-Subminiature connector of the same insert configuration. Mating connectors may be adapted for cable attachment by means of accessory junction shells.

Shell Size	Layout Plug Contact	.040 Dia. 1/16″ Board Order No.	.040 Dia. 1/16″ Board 1 Piece Molded Nylon	.040 Dia. 1/16″ Board 3 Piece Bracket	.030 Dia. 3/32″ Board Order No.	.030 Dia. 3/32″ Board 3 Piece Bracket
E	9	DEM-9PA	231-09-09-126	231-09-09-124	DEM-9PL	231-09-09-118
A	15	DAM-15PA	231-15-09-133	231-15-09-115	DAM-15PL	231-15-09-125
B	25	DBM-25PA	231-25-09-137	231-25-09-116	DBM-25PL	231-25-09-121
C	37	DCM-37PA	231-37-09-137	231-37-09-130	DCM-37PL	231-37-09-127

For additional dimensions see table on page 11.



Part No. Printed Circuit Terminal Modifier	X	Y ±.003 Typ.
A	.093	.040
L	.135	.030

FOR DIMENSIONS SEE C-46 PAGE 11 * These items available through Cinch distributors.

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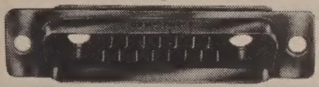
TRW CINCH CONNECTORS

GOLDEN D MARK I CONNECTORS (Cont'd)



PLUG WITH
COMBINATION
LAYOUT IN
STANDARD SHELL

MARK 1 — COMBINATION PLUG & SOCKET LAYOUTS
STANDARD SHELL — STANDARD FINISH ON CONTACTS

Shell Size	Order No.*	Factory No.
E	*DEM-5W1P	236-05-00-101
	*DEM-5W1S	235-05-00-101
A	*DAM-3W3P	236-03-00-101
	*DAM-3W3S	235-03-00-101
	*DAM-7W2P	236-07-00-101
	*DAM-7W2S	235-07-00-101
	*DAM-11WIP	236-11-00-102
	*DAM-11W1S	235-11-00-101
B	*DBM-9W4P	236-09-00-101
	*DBM-9W4S	235-09-00-101
	*DBM-13W3P	236-13-001-01
	*DBM-13W3S	235-13-00-101
	*DBM-17W2P	236-17-00-101
	*DBM-17W2S	235-17-00-101
	*DBM-21W1P	236-21-00-101
	*DBM-21W1S	235-21-00-101
C	DCM-8W8P	236-08-00-101
	DCM-8W8S	235-08-00-101
	*DCM-13W6P	236-13-00-102
	*DCM-13W6S	235-13-00-102
	DCM-17W5P	236-17-00-102
	DCM-17W5S	235-17-00-102
	DCM-21W4P	236-21-00-107
	DCM-21W4S	235-21-00-105
	DCM-25W3P	236-25-00-101
	DCM-25W3S	235-25-00-101
	DCM-27W2P	236-27-00-101
	DCM-27W2S	235-27-00-101
D	DDM-24W7P	236-24-00-101
	DDM-24W7S	235-24-00-101
	DDM-36W4P	236-36-00-101
	DDM-36W4S	235-36-00-101

MARK 1 — COMBINATION PLUG & SOCKET LAYOUTS
STANDARD SHELL — MILITARY FINISH ON CONTACTS

Shell Size	Order No.	Factory No.
E	DEMM-5W1P	236-05-00-102
	DEMM-5W1S	235-05-00-105
A	DAMM-3W3P	236-03-00-102
	DAMM-3W3S	235-03-00-102
	DAMM-7W2P	236-07-00-104
	DAMM-7W2S	235-07-00-102
	DAMM-11W1P	236-11-00-106
	DAMM-11W1S	235-11-00-103
B	DBMM-9W4P	236-09-00-104
	DBMM-9W4S	235-09-00-106
	DBMM-13W3P	236-13-00-105
	DBMM-13W3S	235-13-00-103
	DBMM-17W2P	236-17-00-110
	DBMM-17W2S	235-17-00-107
	DBMM-21W1P	236-21-00-103
	DBMM-21W1S	235-21-00-103
C	DCMM-8W8P	236-08-00-103
	DCMM-8W8S	235-08-00-103
	DCMM-13W6P	236-13-00-108
	DCMM-13W6S	235-13-00-109
	DCMM-17W5P	236-17-00-116
	DCMM-17W5S	235-17-00-112
	DCMM-21W4P	236-21-00-102
	DCMM-21W4S	235-21-00-102
	DCMM-25W3P	236-25-00-106
	DCMM-25W3S	235-25-00-105
	DCMM-27W2P	236-27-00-102
	DCMM-27W2S	235-27-00-102
D	DDMM-24W7P	236-24-00-106
	DDMM-24W7S	235-24-00-107
	DDMM-36W4P	236-36-00-103
	DDMM-36W4S	235-36-00-102

SOCKET WITH
COMBINATION
LAYOUT IN
SHELL WITH FLOAT MOUNTS

MARK 1 — COMBINATION PLUG & SOCKET LAYOUTS
SHELL WITH FLOAT MOUNTS — STANDARD FINISH ON CONTACTS

Shell Size	Order No.*	Factory No.
E	DEMF-5W1P	236-05-00-301
	DEMF-5W1S	235-05-00-301
A	DAMF-3W3P	236-03-00-301
	*DAMF-3W3S	235-03-00-301
	DAMF-7W2P	236-07-00-301
	DAMF-7W2S	235-07-00-301
	*DAMF-11W1P	236-11-00-301
	*DAMF-11W1S	235-11-00-301
B	*DBMF-9W4P	236-09-00-301
	*DBMF-9W4S	235-09-00-301
	DBMF-13W3P	236-13-00-301
	DBMF-13W3S	235-13-00-301
	*DBMF-17W2P	236-17-00-301
	*DBMF-17W2S	235-17-00-302
	DBMF-21W1P	236-21-00-301
	DBMF-21W1S	235-21-00-301
C	DCMF-8W8P	236-08-00-301
	DCMF-8W8S	235-08-00-301
	DCMP•13W6P	236-13-00-302
	DCMF-13W6S	235-13-00-302
	DCMF-17W5P	236-17-00-302
	DCMF-17W5S	235-17-00-307
	DCMF-21W4P	236-21-00-303
	DCMF-21W4S	235-21-00-305
	DCMF-25W3P	236-25-00-301
	DCMF-25W3S	235-25-00-301
	DCMF-27W2P	236-27-00-301
	DCMF-27W2S	235-27-00-301
D	DDMF-24W7P	236-24-00-301
	DDMF-24W7S	235-24-00-302
	DDMF-36W4P	236-36-00-301
	DDMF-36W4S	235-36-00-302

MARK 1 — COMBINATION PLUG & SOCKET LAYOUTS
SHELL WITH FLOAT MOUNTS — MILITARY FINISH ON CONTACTS

Shell Size	Order No.	Factory No.
E	DEMMF-5W1P	236-05-00-302
	DEMMF-5W1S	235-05-00-304
A	DAMMF-3W3P	236-03-00-302
	DAMMF-3W3S	235-03-00-305
	DAMMF-7W2P	236-07-00-302
	DAMMF-7W2S	235-07-00-305
	DAMMF-11W1P	236-11-00-302
	DAMMF-11W1S	235-11-00-307
B	DBMMF-9W4P	236-09-00-302
	DBMMF-9W4S	235-09-00-306
	DBMMF-13W3P	236-13-00-303
	DBMMF-13W3S	235-13-00-307
	DBMMF-17W2P	236-17-00-303
	DBMMF-17W2S	235-17-00-314
	DBMMF-21W1P	236-21-00-302
	DBMMF-21W1S	235-21-00-304
C	DCMMF-8W8P	236-08-00-302
	DCMMF-8W8S	235-08-00-302
	DCMMF-13W6P	236-13-00-304
	DCMMF-13W6S	235-13-00-309
	DCMMF-17W5P	236-17-00-304
	DCMMF-17W5S	235-17-00-317
	DCMMF-21W4P	236-21-00-302
	DCMMF-21W4S	235-21-00-306
	DCMMF-25W3P	236-25-00-302
	DCMMF-25W3S	235-25-00-305
	DCMMF-27W2P	236-27-00-304
	DCMMF-27W2S	235-27-00-302
D	DDMMF-24W7P	236-24-00-302
	DDMMF-24W7S	235-24-00-304
	DDMMF-36W4P	236-36-00-302
	DDMMF-36W4S	235-36-00-304

FOR DIMENSIONS SEE C-46 PAGE 11

* These items available through Cinch distributors.

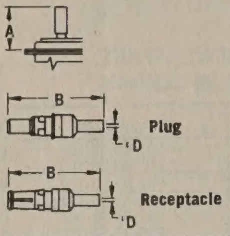
TRW CINCH CONNECTORS

GOLDEN D MARK I CONNECTORS (Cont'd)

REMOVABLE COAXIAL, HIGH VOLTAGE, AND HIGH POWER CONTACTS

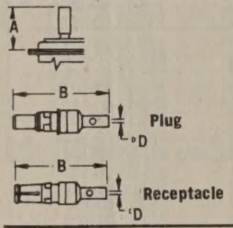
All coaxial and high voltage contacts have solder center contact. For coax, high voltage, and power contact material, see page 15.

COAXIAL CONTACT TERMINATIONS For D*M coaxial crimp tools, consult factory.



STRAIGHT CRIMP BRAID CONTACTS

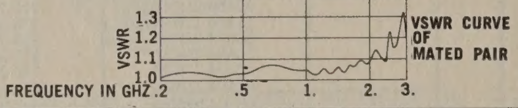
	Part Number				Dimensions			RG Cable No.	
	Standard Finish		Military Finish **		A	B	D		
	Order No.	Factory No.	Order No.	Factory No.	Max.	Ref.	±.005	Old	New
Plug	DM53740	167-0133-000	DM53740-17	167-0251-000	.739	.929	.040	196/U	178B/U
Plug	DM53740-1	167-0126-000	DM53740-15	167-0007-000	.739	.929	.067	187/U 188/U	179B/U 316B/U
Plug	DM53740-3	167-0130-000	DM53740-16	167-0057-000	.847	1.037	.110	195/U	180B/U
Plug	DM53740-5	167-0088-000	DM53740-18	167-0252-000	.847	1.037	.125	58/U	58B/U
Receptacle	DM53742	167-0124-000	DM53742-18	167-0253-000	.739	.929	.040	196/U	178B/U
Receptacle	DM53742-1	167-0118-000	DM53742-16	167-0006-000	.739	.929	.067	187/U 188/U	179B/U 316B/U
Receptacle	DM53742-3	167-0122-000	DM53742-17	167-0041-000	.847	1.037	.110	195/U	180B/U
Receptacle	DM53742-5	167-0086-000	DM53742-19	167-0254-000	.847	1.037	.125	58/U	58B/U



STRAIGHT SOLDER BRAID CONTACTS

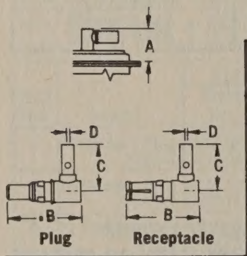
Plug	DM53740-5008*	167-0189-000	DM53740-5015	167-0113-000	.739	.929	.040	196/U	178B/U
Plug	DM53740-5001*	167-0153-000	DM53740-5099	167-0010-000	.739	.929	.067	187/U 188/U	179B/U 316B/U
Plug	DM53740-5002*	167-0132-000	DM53740-5104	167-0237-000	.847	1.037	.110	195/U	180B/U
Plug	DM53740-5005	167-0150-000	DM53740-5101	167-0207-000	.847	1.037	.125	58/U	58B/U
Receptacle	DM53742-5006	167-0190-000	DM53742-5092	167-0138-000	.739	.929	.040	196/U	178B/U
Receptacle	DM53742-5001*	167-0169-000	DM53742-5089	167-0012-000	.739	.929	.067	187/U 188/U	179B/U 316B/U
Receptacle	DM53742-5002*	167-0168-000	DM53742-5091	167-0139-000	.847	1.037	.110	195/U	180B/U
Receptacle	DM53742-5004*	167-0172-000	DM53742-5086	167-0137-000	.847	1.037	.125	58/U	58B/U
Plug (Short)	DM53740-5000*	167-0129-000	DM53740-5100	167-0011-000	.670	.860	.040	196/U	178B/U
Receptacle (Short)	DM53742-5000*	167-0121-000	DM53742-5085	167-0023-000	.670	.860	.040	196/U	178B/U

50 OHM MATCHED IMPEDANCE COAX CONTACTS



Description	Part No.
Straight Plug 50 Ohm	167-02-46-000
Straight Receptacle 50 Ohm	167-02-45-000

To be used with UT-85 coax cable

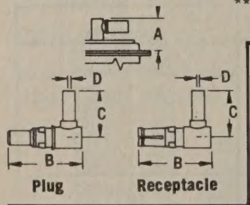


RIGHT ANGLE SOLDER BRAID CONTACTS

Cinch can also supply 50 ohm matched impedance coax contacts to be used with UT-85 coax cable.

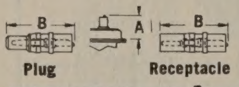
	Part Number				Dimensions				RG Cable No.	
	Standard Finish		Military Finish **		A	B		D		
	Order No.	Factory No.	Order No.	Factory No.	Max.	Ref.	C	±.005	Old	New
Plug	DM53741-5000*	167-0187-000	DM53741-5059	167-0020-000	.530	.734	.492	.040	196/U	178B/U
Plug	DM53741-5001*	167-0128-000	DM53741-5062	167-0074-000	.530	.734	.492	.067	187/U 188/U	179B/U 316B/U
Plug	DM53741-5003	167-0151-000	DM53741-5063	167-0159-000	.530	.734	.601	.110	195/U	130B/U
Plug	DM53741-5004	167-0173-000	DM53741-5060	167-0255-000	.530	.734	.601	.125	58/U	58B/U
Receptacle	DM53743-5000*	167-0119-000	DM53743-5073	167-0013-000	.530	.734	.492	.040	196/U	178B/U
Receptacle	DM53743-5001*	167-0120-000	DM53743-5076	167-0101-000	.530	.734	.492	.067	187/U 188/U	179B/U 316B/U
Receptacle	DM53743-5003	167-0171-000	DM53743-5077	167-0158-000	.530	.734	.601	.110	195/U	180B/U
Receptacle	DM53743-5004	167-0170-000	DM53743-5074	167-0106-000	.530	.734	.601	.125	58/U	58B/U

** MIL-C-24308 Finish: .00005 minimum gold plate over .0001 minimum copper plate.



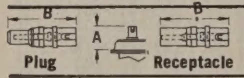
RIGHT ANGLE CRIMP BRAID CONTACTS

Plug	DM53741	167-0176-000	DM53741-12	167-0256-000	.530	.734	.492	.040	196/U	178B/U
Plug	DM53741-1	167-0152-000	DM53741-11	167-0162-000	.530	.734	.492	.067	187/U 188/U	179B/U 316B/U
Plug	DM53741-3	167-0160-000	DM53741-10	167-0072-000	.530	.734	.601	.110	195/U	180B/U
Plug	DM53741-4	167-0149-000	DM53741-13	167-0257-000	.530	.734	.601	.125	58/U	58B/U
Receptacle	DM53743-2	167-0174-000	DM53743-18	167-0258-000	.530	.734	.492	.040	196/U	178B/U
Receptacle	DM53743-3	167-0166-000	DM53743-16	167-0161-000	.530	.734	.492	.067	187/U 188/U	179B/U 316B/U
Receptacle	DM53743-5	167-0165-000	DM53743-17	167-0055-000	.530	.734	.601	.110	195/U	180B/U
Receptacle	DM53743-6	167-0164-000	DM53743-19	167-0259-000	.530	.734	.601	.125	58/U	58B/U



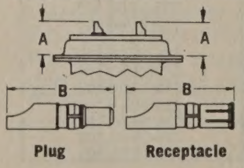
STRAIGHT HIGH VOLTAGE CONTACTS

	Part Number				Dimensions		
	Standard Finish		Military Finish **		A	B	
	Order No.	Factory No.	Order No.	Factory No.	Max.	Ref.	Wire Size
Plug	DM51157	167-0002-000	DM51157-8	167-0263-000	.539	.734	#20
Receptacle	DM51155	167-0111-000	DM51155-7	167-0221-000	.539	.734	#20



RIGHT ANGLE HIGH VOLTAGE CONTACTS

Plug	DM51157-5000	167-0260-000	DM51157-5005	167-0261-000	.491	.697	#20
Receptacle	DM51155-5000	167-0089-000	DM51155-5004	167-0262-000	.491	.697	#20



HIGH POWER SOLDER TYPE CONTACTS

	Part Number				Dimensions			
	Standard Finish		Military Finish **		A	B	Cur. Rating	Wire Size
	Order No.	Factory No.	Order No.	Factory No.	Max.	Ref.	(amps)	Wire Size
Plug	DM53745-1	167-0144-000	DM53745-28	167-0219-000	.666	.866	40	#8
Plug	DM53745-7	167-0042-000	DM53745-27	167-0167-000	.666	.866	20	#21
Plug	DM53745-8	167-0115-000	DM53745-25	167-0187-000	.666	.866	10	#16
Receptacle	DM53744-1	167-0145-000	DM53744-21	167-0220-000	.666	.856	40	#8
Receptacle	DM53744-6	167-0043-000	DM53744-25	167-0215-000	.666	.856	20	#21
Receptacle	DM53744-7	167-0087-000	DM53744-24	167-0188-000	.666	.856	10	#16

** MIL-C-24308 Finish: .00005 minimum gold plate over .0001 minimum copper plate.
* These items available through Cinch distributors.

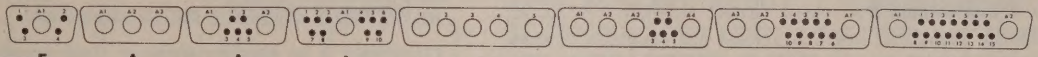
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

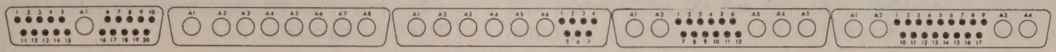
GOLDEN D MARK I CONNECTORS (Cont'd)

COMBINATION ARRANGEMENTS #20 CONTACTS WITH COAX, POWER AND/OR HIGH VOLTAGE CONTACTS

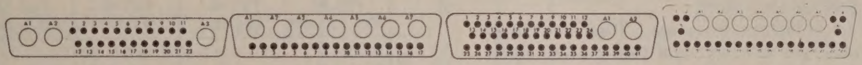
Coax and/or high voltage contacts must be ordered separately. See page 11 for ordering numbers.



Shell Size	E	A	A	A	B*	B	B	B
Arrangement	5W1	3W3	7W2	11W1	5W5	9W4	13W3	17W2
No. of Contacts	4	0	5	10	0	5	10	15
Contact Size	#20	—	#20	#20	—	#20	#20	#20
Coax or HV Cavities	1	3	2	1	5	4	3	2



Shell Size	B	C	C	C	C*
Arrangement	21W1	8W8	13W6	17W5	21WA4
No. of Contacts	20	0	7	12	17
Contact Size	#20	—	#20	#20	#20
Coax or HV Cavities	1	8	6	5	4



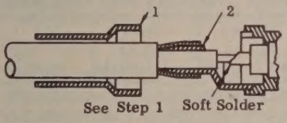
Shell Size	C	D	D	D*
Arrangement	25W3	24W7	43W2	30WS7
No. of Contacts	22	17	41	23
Contact Size	#20	#20	#20	#20
Coax or HV Cavities	3	7	2	7 shielded contacts

Consult factory for D*MA Series combination arrangements.

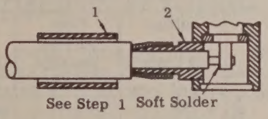
* These items not tooled.

COAXIAL CABLE INSTALLATION INSTRUCTIONS

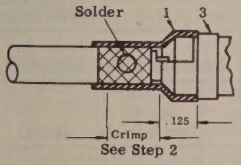
STRAIGHT COAXIAL

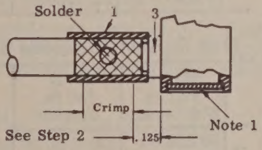


90° COAXIAL

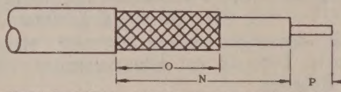


STEP 1. Slide outer ring (1) over cable jacket. Trim cable. Insert cable dielectric and center conductor into inside diameter of inner sleeve (2) solder center conductor to coaxial center contact.





STEP 2. Slide outer ring (1) forward until flush with coaxial shell, (3) confining braid between outer ring and inner sleeve. For solder type coaxials, soft solder outer ring to assembly through cross-drilled solder hole. For crimp type coaxials, crimp with tool indicated being sure to crimp in area defined.



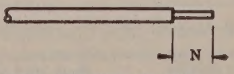
TRIM COAXIAL CABLE TO THESE DIMENSIONS FOR INSTALLATION TO D*M COAXIAL CONTACTS

RECOMMENDED COAXIAL CABLE DIMENSIONS

Nomenclature	N	O	P	Tool No. Note 2
DM-53740	5/16	1/4	5/64	A
-1	5/16	1/4	5/64	B
-3	3/8	5/16	5/64	C
-5	3/8	5/16	5/64	C
DM-53741	3/8	15/64	1/16	A
-1	3/8	15/64	1/16	B
-3	27/64	5/16	3/32	C
-4	27/64	5/16	3/32	C
DM-53742	5/16	1/4	5/64	A
-1	5/16	1/4	5/64	B
-3	3/8	5/16	5/64	C
-5	3/8	5/16	5/64	C
DM-53743-2	3/8	15/64	1/16	A
-3	3/8	15/64	1/16	B
-5	27/64	5/16	3/32	C
-6	27/64	5/16	3/32	C
DM-53740-5000	5/16	1/4	5/64	None
-5001	5/16	1/4	5/64	None
-5002	3/8	5/16	5/64	None
-5005	3/8	5/16	5/64	None
-5008	5/16	1/4	5/64	None
DM-53741-5000	3/8	15/64	1/16	None
-5001	3/8	15/64	1/16	None
-5003	27/64	5/16	3/32	None
-5004	27/64	5/16	3/32	None
DM-53742-5000	5/16	1/4	5/64	None
-5001	5/16	1/4	5/64	None
-5002	3/8	5/16	5/64	None
-5004	3/8	5/16	5/64	None
-5006	5/16	1/4	5/64	None
DM-53743-5000	3/8	15/64	1/16	None
-5001	3/8	15/64	1/16	None
-5003	27/64	5/16	3/32	None
-5004	27/64	5/16	3/32	None

All tolerances ±.010 inch.

RECOMMENDED AWG WIRE DIMENSIONS



TRIM AWG WIRE TO THIS DIMENSION FOR INSTALLATION TO #20 CONTACTS

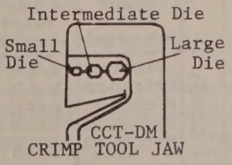
All tolerances ±.010 inch.

Nomenclature	N	Tool No. Note 2
DM-53744	.119	None
-5000	.119	None
DM-53745	.119	None
-5000	.119	None
Solder Type #20 Contact	.119	None

NOTES

1. Soft solder or stake access cap into shell after cable assembly on 90° type coaxials.

2. Crimp tool description — Cannon CCT-DM (to crimp outer sleeve only).
   A. Use small die.
   B. Use intermediate die.
   C. Use large die.



3. Pin assemblies will accommodate high voltage and coaxial plugs only. Socket assemblies will accommodate high voltage and coaxial receptacles only.

TRW CINCH CONNECTORS

ROYAL D MARK III CONNECTORS

GENERAL INFORMATION

The D*MA connector is a D-Subminiature Connector that utilizes the "Little Caesar" rear release contact assembly. This contact assembly allows rear insertion, release and extraction of crimp snap-in contacts. The simplified contact design with no undercuts offers greater bend resistance and a hard, closed entry socket insulator insures positive contact alignment. Crimp terminations accommodate #20, #22 and #24 AWG stranded wire and are rated for 5 amps.* ROYAL D-connectors are intermateable and interchangeable with all other D-Subminiature Connectors having compatible contact arrangement.

Polarization is by keystone shape of shell; coupling is by friction. Accessories are shown on pages 24 and 25. An extraction tool is supplied with ROYAL D-connectors. Extra contacts may be ordered for replacement purposes. See page 21 for ordering information.

MATERIALS, FINISHES AND TYPES

Shell:	Steel, cadmium plated with yellow chromate supplementary coating.
Insulator:	Diallyl phthalate, glass fibre filled, per MIL-P-19833, Type GDI-30F, royal purple color, monobloc construction.
Contacts:	Pin—leaded copper, gold plate over nickel plate. Socket—copper alloy, gold plate over nickel plate with stainless steel sleeves.
Current Rating:	(#20 Contacts) 5 amps.*
Contact Termination:	Crimp, accommodating #20, #22 or #24 AWG stranded wire. The 20-18 contacts accommodate one #18 or two #22 AWG stranded wires.
Contact Type:	Snap-in, removable, crimp, with rear release assembly. Contacts not interchangeable with other D Series.
Socket Type:	Closed entry.
Float Mounting	
Rivets & Washers:	Stainless steel.

For listing of applicable specifications, see page 12.

*Military rating of #20 contacts or wires is 1.5 amps average, and 7.5 amps maximum. See explanation on page 12.

PERFORMANCE DATA

VOLTAGE RATING:

Insulation Resistance Ref. MIL-C-24308	— Greater than 5000 megohms in accordance with MIL-STD-202D, Method 302, Condition B
Contact Resistance Exceeds Req'ts of MIL-C-24308	— (#20 contacts) 20 milliohms max. in accordance with Para 3.5.8
Contact Engagement Force Ref. MIL-C-24308	— .7 to 12 oz. when tested with MS3197 test pin
Contact Separation Force Ref. MIL-C-24308	— .7 to 8 oz. when tested with MS3197 test pin
Moisture Resistance Ref. MIL-C-24308	— Exceeds test requirements of MIL-STD-202D, Method 106
Vibration Ref. MIL-C-24308	— Meets test requirements of MIL-STD-202D, Method 204, Condition B
Shock Ref. MIL-C-24308	— Meets test requirements of MIL-STD-202D, Method 213, Condition G
Corrosion Resistance Ref. MIL-C-24308	— Exceeds requirements of 48-hour exposure to salt spray in accordance with MIL-STD-202D, Method 101A, Condition B
High Potential Test Voltage Ref. MIL-C-24308	— MIL-STD-202D, Method 301
Temperature Cycling Ref. MIL-C-24308	— MIL-STD-202D, Method 102A, Condition B

See tabulation on page 12.

Military Part No.	Cinch Part No.
*M24308/10-1 Socket	415-30-99-130
*M24308/11-1 Pin	403-30-99-106

Mark III Crimp Removable Contact Connectors

	Military Part No. With Contacts	Cinch Part No. Complete	Military Part No. Less Contacts	Cinch Part No. Less Contacts	Marked
Sockets	M24308/2-1 *	230-01-09-102	M24308/2-281	230-01-09-109	M24308/2-1
	M24308/2-2 *	230-01-15-102	M24308/2-282	230-01-15-109	M24308/2-2
	M24308/2-3 *	230-01-25-102	M24308/2-283	230-01-25-109	M24308/2-3
	M24308/2-4 *	230-01-37-102	M24308/2-284	230-01-37-109	M24308/2-4
	M24308/2-5 *	230-01-50-102	M24308/2-285	230-01-50-109	M24308/2-5
Plugs	M24308/4-1 *	231-01-09-102	M24308/4-259	231-01-09-109	M24308/4-1
	M24308/4-2 *	231-01-15-102	M24308/4-260	231-01-15-109	M24308/4-2
	M24308/4-3 *	231-01-25-102	M24308/4-261	231-01-25-109	M24308/4-3
	M24308/4-4 *	231-01-37-102	M24308/4-262	231-01-37-109	M24308/4-4
	M24308/4-5 *	231-01-50-102	M24308/4-263	231-01-50-109	M24308/4-5

Mark III Crimp Removable Contact Connectors With Float Mount

	Military Part No. With Contacts	Cinch Part No. Complete	Military Part No. Less Contacts	Cinch Part No. Less Contacts	Marked
Sockets	M24308/2-23	230-01-09-307	M24308/2-292	230-01-09-308	M24308/2-23
	M24308/2-24	230-01-15-307	M24308/2-293	230-01-15-308	M24308/2-24
	M24308/2-25	230-01-25-307	M24308/2-294	230-01-25-308	M24308/2-25
	M24308/2-26	230-01-37-307	M24308/2-295	230-01-37-308	M24308/2-26
	M24308/2-27	230-01-50-307	M24308/2-296	230-01-50-308	M24308/2-27
Plugs	M24308/4-302	231-01-09-307	M24308/4-324	231-01-09-308	M24308/4-302
	M24308/4-303	231-01-15-307	M24308/4-325	231-01-15-308	M24308/4-303
	M24308/4-304	231-01-25-307	M24308/4-326	231-01-25-308	M24308/4-304
	M24308/4-305	231-01-37-307	M24308/4-327	231-01-37-308	M24308/4-305
	M24308/4-306	231-01-50-307	M24308/4-328	231-01-50-308	M24308/4-306

Mark III Crimp Removable Contact Connectors (Non-Magnetic)

	Military Part No. With Contacts	Cinch Part No. Complete	Military Part No. Less Contacts	Cinch Part No. Less Contacts	Marked
Sockets	M24308/6-1	230-01-09-500	M24308/6-281	230-01-09-504	M24308/6-1
	M24308/6-2	230-01-15-500	M24308/6-282	230-01-15-504	M24308/6-2
	M24308/6-3	230-01-25-500	M24308/6-283	230-01-25-504	M24308/6-3
	M24308/6-4	230-01-37-500	M24308/6-284	230-01-37-504	M24308/6-4
	M24308/6-5	230-01-50-500	M24308/6-285	230-01-50-504	M24308/6-5
Plugs	M24308/8-1	231-01-09-500	M24308/8-259	231-01-09-504	M24308/8-1
	M24308/8-2	231-01-15-500	M24308/8-260	231-01-15-504	M24308/8-2
	M24308/8-3	231-01-25-500	M24308/8-261	231-01-25-504	M24308/8-3
	M24308/8-4	231-01-37-500	M24308/8-262	231-01-37-504	M24308/8-4
	M24308/8-5	231-01-50-500	M24308/8-263	231-01-50-504	M24308/8-5

Mark III Crimp Removable Contact Connectors (Non-Magnetic) With Float Mount

	Military Part No. With Contacts	Cinch Part No. Complete	Military Part No. Less Contacts	Cinch Part No. Less Contacts	Marked
Sockets	M24308/6-259	230-01-09-200	M24308/6-324	230-01-09-201	M24308/6-259
	M24308/6-260	230-01-15-200	M24308/6-325	230-01-15-201	M24308/6-260
	M24308/6-261	230-01-25-200	M24308/6-326	230-01-25-201	M24308/6-261
	M24308/6-262	230-01-37-200	M24308/6-327	230-01-37-201	M24308/6-262
	M24308/6-263	230-01-50-200	M24308/6-328	230-01-50-201	M24308/6-263
Plugs	M24308/8-302	231-01-09-200	M24308/8-324	231-01-09-201	M24308/8-302
	M24308/8-303	231-01-15-200	M24308/8-325	231-01-15-201	M24308/8-303
	M24308/8-304	231-01-25-200	M24308/8-326	231-01-25-201	M24308/8-304
	M24308/8-305	231-01-37-200	M24308/8-327	231-01-37-201	M24308/8-305
	M24308/8-306	231-01-50-200	M24308/8-328	231-01-50-201	M24308/8-306

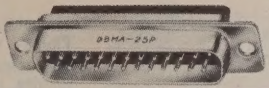
* These items available through Cinch distributors.

TRW CINCH CONNECTORS

ROYAL D MARK III CONNECTORS (CONT'D)

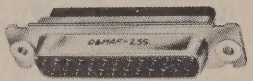
ORDERING INFORMATION

STANDARD SHELL



Shell Size	Layout	Order No.*	Factory No.	Order No.	Factory No.
E	9 Contact				
	Plug	DEMA-9P*	231-01-09-100	DEMAM-9P	231-01-09-108
	Socket	DEMA-9S*	230-01-09-100	DEMAM-9S	230-01-09-108
A	15 Contact				
	Plug	DAMA-15P*	231-01-15-100	DAMAM-15P	231-01-15-107
	Socket	DAMA-15S*	230-01-15-100	DAMAM-15S	230-01-15-107
B	25 Contact				
	Plug	DBMA-25P*	231-01-25-100	DBMAM-25P	231-01-25-108
	Socket	DBMA-25S*	230-01-25-100	DBMAM-25S	230-01-25-107
C	37 Contact				
	Plug	DCMA-37P*	231-01-37-100	DCMAM-37P	231-01-37-108
	Socket	DCMA-37S*	230-01-37-100	DCMAM-37S	230-01-37-108
D	50 Contact				
	Plug	DDMA-50P*	231-01-50-100	DDMAM-50P	231-01-50-107
	Socket	DDMA-50S*	230-01-50-100	DDMAM-50S	230-01-50-105

SHELL WITH FLOAT MOUNTS



Shell Size	Layout	Order No.*	Factory No.	Order No.	Factory No.
E	9 Contact				
	Plug	DEMAF-9P*	231-01-09-300	DEMAMF-9P	231-01-09-305
	Socket	DEMAF-9S*	230-01-09-300	DEMAMF-9S	230-01-09-305
A	15 Contact				
	Plug	DAMAF-15P*	231-01-15-300	DAMAMF-15P	231-01-15-305
	Socket	DAMAF-15S*	230-01-15-300	DAMAMF-15S	230-01-15-305
B	25 Contact				
	Plug	DBMAF-25P*	231-01-25-300	DBMAMF-25P	231-01-25-304
	Socket	DBMAF-25S*	230-01-25-300	DBMAMF-25S	230-01-25-304
C	37 Contact				
	Plug	DCMAF-37P*	231-01-37-300	DCMAMF-37P	231-01-37-302
	Socket	DCMAF-37S*	230-01-37-300	DCMAMF-37S	230-01-37-305
D	50 Contact				
	Plug	DDMAF-50P*	231-01-50-300	DDMAMF-50P	231-01-50-302
	Socket	DDMAF-50S*	230-01-50-300	DDMAMF-50S	230-01-50-304

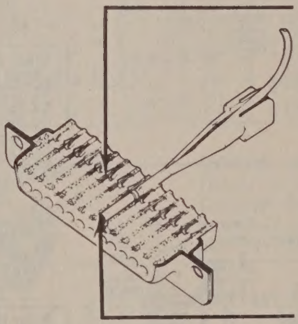
FOR DIMENSIONS SEE PAGE 11

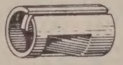
"LITTLE CAESAR" REAR RELEASE CONTACT ASSEMBLY

The "Little Caesar" rear release contact assembly permits contacts to be inserted by hand and to be released and extracted from the rear of the connector with a simple, expendable plastic tool.

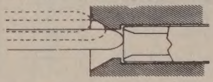
The contact is inserted from the rear of the connector thru a cylindrical clip in the insulator until the indented tines of the clip snap securely behind the contact shoulder. The contact is released as the plastic tool is inserted into the rear of the connector, expanding the tines beyond the contact shoulder and permitting contact extraction. The simplified contact design improves bend resistance through a single holding shoulder with no undercuts.

The "Little Caesar" contact assembly was selected by the National Aerospace Standards Committee for use in a major industry connector specification for vital programs demanding great operational reliability.

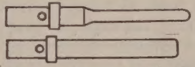




Contact retaining clip.

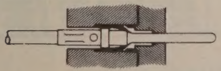


Hard dielectric, closed-entry socket inserts realigns bent or misaligned pin contacts.

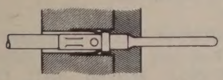


Simple stronger contact without undercuts for greater bend resistance.

CONTACT INSERTION

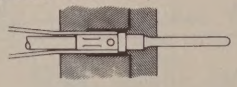


Contact partially inserted.



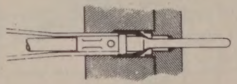
Tines snap behind contact shoulder when contact is fully inserted.

CONTACT EXTRACTION



Insert extraction tool to fully bottomed condition.

Tines expanded beyond contact shoulder.



Remove contact by pulling on wire.

Contact partially removed.

ORDERING INFORMATION FOR ADDITIONAL CONTACTS

All D*MA connectors are supplied with the proper number of crimp type contacts. Additional contacts may be ordered for replacement purposes as indicated.

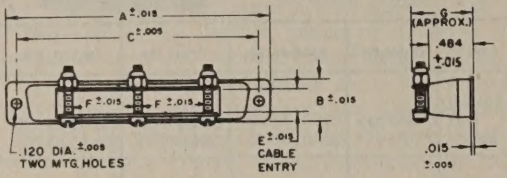
	Contact Part Numbers			
	Pin		Socket	
Contact Size	Order No.	Factory No.	Order No.	Factory No.
20 Standard Finish	330-5291-000*	403-30-99-214	031-1007-000*	415-30-99-119
20-18 Standard Finish	330-5291-001	403-30-99-215	031-1007-001	415-30-99-118
20 Military Finish	M24308/11-1*	403-30-99-106	M24308/10-1*	415-30-99-130

* These items available through Cinch distributors.

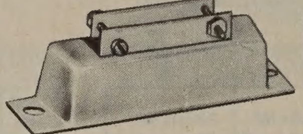
TRW CINCH CONNECTORS

ACCESSORIES JUNCTION SHELLS

19678 STRAIGHT CLAMP


A ±.015
C ±.005
F ±.015
F ±.015
B ±.015
E ±.015
CABLE ENTRY
.120 DIA. ±.005
TWO MTG. HOLES
G (APPROX.)
.484 ±.015
.015 ±.005

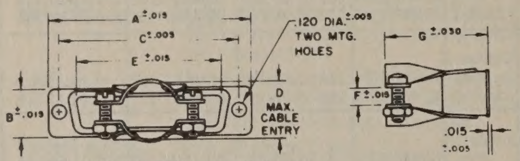
For use with D*, D*M and D*MA only



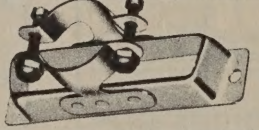
Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.
All tolerances are ±.010 unless noted otherwise.

Order No.* by Shell Size	Factory No.	No. of Cable Locking Screws Required	A	B	C	E	F	G
DA-19678-1*	239-13-22-004	2	1.531	.500	1.312	.296	.312	.640
DB-19678-2*	239-13-22-003	2	2.078	.500	1.852	.296	.796	.640
DC-19678-3*	239-13-22-002	3	2.718	.500	2.500	.296	.687	.640
DD-19678-4*	239-13-22-001	3	2.625	.609	2.406	.390	.687	.703

ROUND CLAMP


A ±.015
C ±.005
E ±.015
.120 DIA. ±.005
TWO MTG. HOLES
B ±.015
D MAX. CABLE ENTRY
G ±.030
F ±.015
.015 ±.005

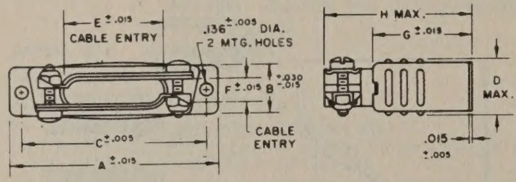
For use with D*, D*M and D*MA only

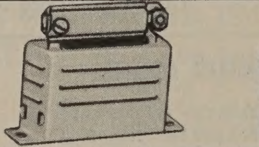


Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

Order No. by Shell Size	Factory No.	A	B	C	D	E	F	G
DA-20961	239-14-22-017	1.531	.500	1.312	.406	.984	.125	1.031
DB-20962	239-14-22-018	2.078	.500	1.852	.593	1.515	.187	1.062
DC-20963	239-14-22-019	2.718	.500	2.500	.718	2.171	.250	1.062
DD-20964	239-14-22-020	2.625	.609	2.406	.812	2.093	.312	1.062

DEEP, STRAIGHT CLAMP

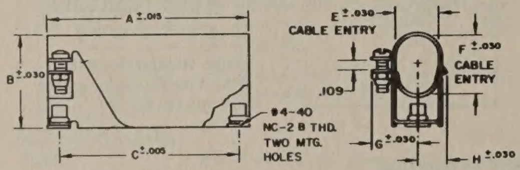

E ±.015
CABLE ENTRY
.136 ±.005 DIA.
2 MTG. HOLES
F ±.015
B +.030 -.015
CABLE ENTRY
C ±.005
A ±.015
H MAX.
G ±.015
D MAX.
.015 ±.005



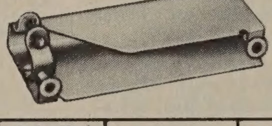
Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

Order No.* by Shell Size	Factory No.	A	B	C	D	E	F	G	H
DE-24657*	239-14-23-030	1.203	.484	.984	.578	.375	.375	.750	1.219
DA-24658*	239-14-22-068	1.531	.484	1.312	.578	.713	.312	.750	1.250
DB-24659*	239-14-22-066	2.078	.484	1.852	.578	1.000	.312	1.000	1.531
DC-24660*	239-14-22-067	2.718	.484	2.500	.578	1.375	.312	1.000	1.531
DD-24661*	239-14-22-049	2.625	.593	2.406	.687	1.406	.406	1.125	1.656

19977 RIGHT ANGLE CLAMP


A ±.015
B ±.030
#4-40 NC-2 B THD. TWO MTG. HOLES
C ±.005
E ±.030
CABLE ENTRY
F ±.030
CABLE ENTRY
.109
G ±.030
H ±.030

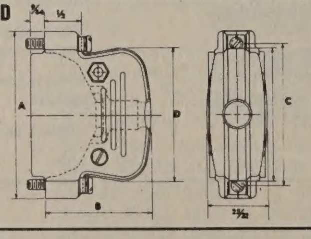
For use with D*, D*M and D*MA only

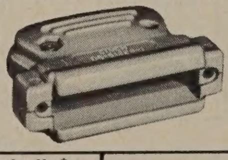


Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

Order No.* by Shell Size	Factory No.	A	B	C	E	F	G	H
DE-19977-5*	239-14-22-021	1.203	.718	.984	.437	.437	.468	.281
DA-19977-1*	239-14-22-013	1.531	.718	1.312	.437	.437	.468	.281
DB-19977-2*	239-14-22-014	2.078	.968	1.852	.437	.625	.468	.281
DC-19977-3*	239-14-22-015	2.718	1.187	2.500	.437	.812	.468	.281
DD-19977-4*	239-14-22-016	2.625	1.250	2.406	.562	.906	.531	.343

ALL MOLDED HOOD

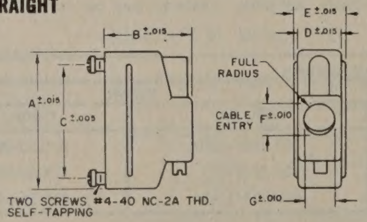

¾
¼
A
B
D
C
²⁵⁄₃₂

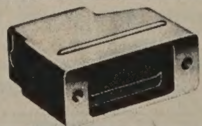


Material: Grey Melamine.
Finish: None.
Corrosion Resistance: Hardware passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

Order No.* by Shell Size	Factory No.	A	B	C	D
DA-51225-1*	239-13-99-069	$1\frac{41}{64}$	$1\frac{19}{64}$	1.312	$1\frac{7}{32}$
DB-51226-1*	239-13-99-070	$2\frac{13}{64}$	$1\frac{13}{32}$	1.852	$1\frac{51}{64}$

PLASTIC STRAIGHT


B ±.015
A ±.015
C ±.005
TWO SCREWS #4-40 NC-2A THD. SELF-TAPPING
E ±.015
D ±.015
FULL RADIUS
CABLE ENTRY
F ±.010
G ±.010



Material: Nylon.
Finish: None.
Corrosion Resistance: Hardware passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

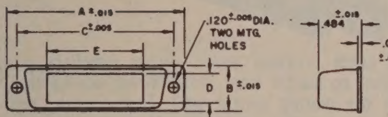
Order No.* by Shell Size	Factory No.	A	B	C	D	E	F	G
DE-51218-1*	239-13-99-101	1.218	1.000	.984	.500	.562	.281	.281
DA-51210-1*	239-13-99-124	1.546	1.000	1.312	.500	.562	.360	.360
DB-51212-1*	239-13-99-135	2.093	1.250	1.852	.500	.562	.493	.360

* These items available through Cinch distributors.

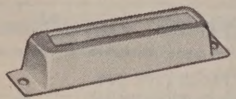
TRW CINCH CONNECTORS

ACCESSORIES (Cont'd)

POTTING SHELLS

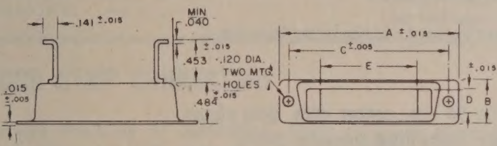

A ±.015
C ±.005
E
.120 ±.005 DIA.
TWO MTG. HOLES
D
B ±.015
.484 ±.015
.015 ±.005

For use with D*, D*M and D*MA only

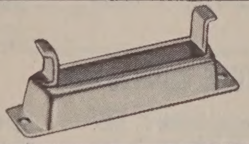


Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.
All tolerances are ±.010 unless noted otherwise.

Order No. by Shell Size	Factory No.	A	B	C	D	E
DA-19678-10	239-14-22-009	1.531	.500	1.312	.300	.588
DB-19678-11	239-14-22-010	2.078	.500	1.852	.300	1.125
DC-19678-12	239-14-22-011	2.718	.500	2.500	.300	1.750
DD-19678-13	239-14-22-012	2.625	.609	2.406	.390	1.750


.141 ±.015
MIN .040
±.015
.453
.120 DIA. TWO MTG. HOLES
.015 ±.005
.484 ±.015
A ±.015
C ±.005
E
±.015
D
B

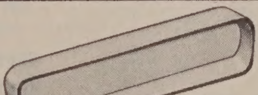
For use with D*, D*M and D*MA only

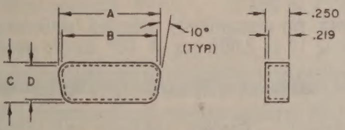


Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

DA-19678-14	239-19-22-074	1.531	.500	1.312	.300	.588
DB-19678-15	239-19-22-075	2.078	.500	1.852	.300	1.125
DC-19678-16	239-19-22-076	2.718	.500	2.500	.300	1.750
DD-19678-17	239-19-22-077	2.625	.009	2.406	.390	1.750

DUST CAPS



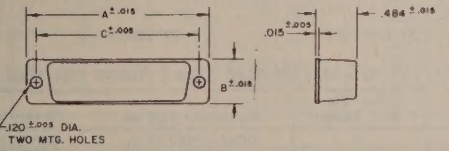

A
B
10° (TYP)
C
D
.250
.219

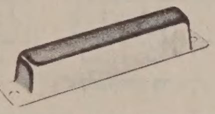
Material: Polypropylene (clear).
Finish: None.

Order No. by Shell Size*	For Use with	Factory No.	A	B	C	D
DE-59-20	DE-9S	474-11-92-303	.694	.627	.362	.295
DE-60-20	DE-9P	474-11-92-304	.749	.682	.412	.345
DA-59-20	DA-15S	474-11-92-305	1.022	.955	.362	.295
DA-60-20	DA-15P	474-11-92-306	1.077	1.010	.412	.345
DB-59-20	DB-25S	474-11-92-301	1.562	1.495	.362	.295
DB-60-20	DB-25P	474-11-92-302	1.635	1.568	.430	.363
DC-59-20	DC-37S	474-11-92-307	2.210	2.143	.362	.295
DC-60-20	DC-37P	474-11-92-308	2.283	2.216	.430	.363
DD-59-20	DD-50S	474-11-92-309	2.116	2.049	.474	.407
DD-60-20	DD-50P	474-11-92-310	2.179	2.112	.536	.469

*These items available through Cinch distributors.

SWITCHING SHELLS

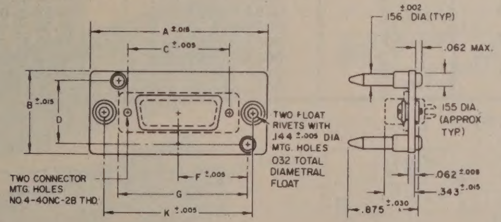

A ±.015
C ±.005
B ±.015
.120 ±.005 DIA.
TWO MTG. HOLES
.015 ±.005
.484 ±.015

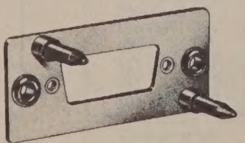


Material: Low carbon steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202D, Method 101C, Condition B.

Order No. by Shell Size	Factory No.	A	B	C
DA-19678-6	239-14-22-005	1.531	.500	1.312
DB-19678-7	239-14-22-006	2.078	.500	1.852
DC-19678-8	239-14-22-007	2.718	.500	2.500
DD-19678-9	239-14-22-008	2.625	.609	2.406

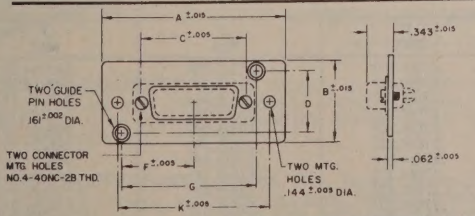
GUIDE PIN PLATES

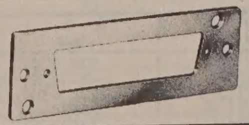

A ±.015
C ±.005
B ±.015
D
TWO FLOAT RIVETS WITH .144 ±.005 DIA MTG. HOLES .032 TOTAL DIAMETRAL FLOAT
TWO CONNECTOR MTG. HOLES NO.4-40NC-2B THD.
F ±.005
G
K ±.005
±.002 .156 DIA (TYP)
.062 MAX.
.155 DIA. (APPROX TYP)
.062 ±.005
.343 ±.015
.875 ±.030



Material: Plates and float hardware are cold rolled steel; guidepins are stainless steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

Order No. by Shell Size	Factory No.	A	B	C	D	F	G	K
DA-22213	442-36-22-703	2.281	1.000	1.312	.750	.898	1.663	1.906
DB-22255	442-36-22-701	2.820	1.000	1.852	.750	1.168	2.203	2.446
DC-22070	442-36-22-702	3.468	1.000	2.500	.750	1.492	2.851	3.094
DD-21962	442-36-22-706	3.375	1.125	2.406	.874	1.437	2.749	3.000


A ±.015
C ±.005
B ±.015
D
TWO GUIDE PIN HOLES .161 ±.002 DIA.
TWO CONNECTOR MTG. HOLES NO.4-40NC-2B THD.
F ±.005
G
K ±.005
TWO MTG. HOLES .144 ±.005 DIA.
.343 ±.015
.062 ±.005



Material: Cold rolled steel.
Finish: Cadmium plate, yellow chromate.
Corrosion Resistance: Passes 48 hour exposure to salt spray in accordance with MIL-STD-202A, Method 101A, Condition B.

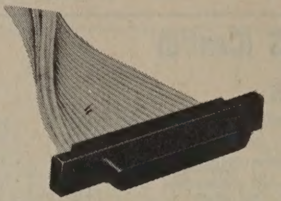
DA-22214	442-36-22-503	2.281	1.000	1.312	.750	.898	1.663	1.906
DB-22254	442-36-22-502	2.820	1.000	1.852	.750	1.168	2.203	2.446
DC-22071	442-36-22-501	3.468	1.000	2.500	.750	1.492	2.851	3.094
DD-21961	442-36-22-500	3.375	1.125	2.406	.874	1.437	2.749	3.000

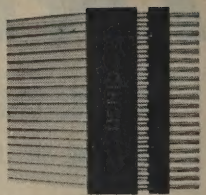
FOR ACCESSORIES OTHER THAN THOSE SHOWN, CONSULT FACTORY

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

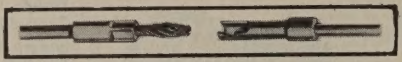
MICROMINIATURE CONNECTORS





DURA-CON*SERIES CONNECTORS ON .050" CENTERS

- High contact density with up to 266 contacts per square inch
- Lightweight
- Rugged, reliable contacts
- Shock and vibration resistant



The Cinch Dura-Con Series of Microminiature Strip and Rectangular connectors are ideally suited for space and weight reduction in miniaturized airborne electronics and for shorter signal paths in electronic data processing equipment. Both Cinch Dura-Con Series have rugged, high-performance contacts capable of providing shock and vibration proof continuity from dry circuit to three amperes current.

This is accomplished by making the pin the spring member. The Cinch Dura-Con is made from a precision miniature spring cable with a welded tip. The expanded cable provides seven spring members peripherally around the pin so that no matter what radial forces are applied, contact is maintained with the mating socket wall. Furthermore, this flexible spring pin can be bent many times without evidencing any metal fatigue. By protecting this pin in a recessed tolerance cavity, reliable mating is assured. Hence, despite its small size, the Cinch Dura-Con provides superior performance.

* Trade name TRW Inc.
Licensed by New Twist Connector Corporation.

DURA-CON D RECTANGULAR MICROMINIATURE CONNECTORS

This series of microminiature rectangular connectors is available in contact layouts with 9, 15, 21, 25, 37, and 51 positions. In addition to the ½" long #24 AWG solid copper leads and 18" long #26 AWG stranded Type E insulated wire terminations, this connector series can be supplied with custom terminations.

Contacts: 24 size; copper alloy, gold plated.
Insulator: Glass-filled polyester 94V-0.

PERFORMANCE DATA

ELECTRICAL

Current Rating: 3 amperes.
Contact Resistance: Nominal 4 milliohms, maximum 8 milliohms.
Dielectric Withstanding Voltage:
Sea Level: 900V RMS 60 Hz. **70,000 Ft.:** 300V RMS 60 Hz.
Insulation Resistance: 5,000 megohms minimum.

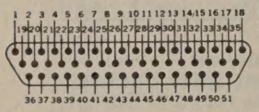
MECHANICAL

Contact Engaging Force: 6 oz. per contact maximum.
Contact Separation Force: ½ oz. per contact minimum.

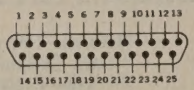
ENVIRONMENTAL

Temperature: −65°F to 300°F.
Vibration and Shock: No discontinuity detected (equipment sensitivity 6 nanoseconds) during 10 to 2,000 cps at .06" double amplitude or 50 g. 20 shocks 500 g.
Durability: Contact resistance still within specification after 500 cycles mating and unmating.
Salt Spray: No damage — Contact resistance still within specification after mated sample exposed 48 hours per MIL-STD-202B, Method 101A, Condition B.

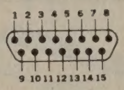
CONTACT ARRANGEMENTS (FACE VIEW OF PIN INSERT)



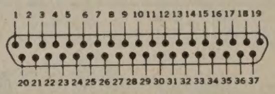
51 CONTACTS



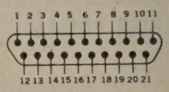
25 CONTACTS



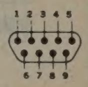
15 CONTACTS



37 CONTACTS



21 CONTACTS



9 CONTACTS

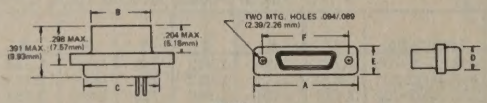
Termination: #24 AWG Solid Copper Leads, ½" long.

No. of Contacts	P — Pin S — Socket	Distributor Part No.	Factory Part No.
9	P	DCDA-9P4C4-00.5	280-51-09-001
	S	DCDA-9S4C4-00.5	280-52-09-001
15	P	DCDA-15P4C4-00.5	280-51-15-001
	S	DCDA-15S4C4-00.5	280-52-15-001
21	P	DCDA-21P4C4-00.5	280-51-21-001
	S	DCDA-21S4C4-00.5	280-52-21-001
25	P	DCDA-25P4C4-00.5	280-51-25-001
	S	DCDA-25S4C4-00.5	280-52-25-001
37	P	DCDA-37P4C4-00.5	280-51-37-001
	S	DCDA-37S4C4-00.5	280-52-37-001
51	P	DCDA-51P4C4-00.5	280-51-51-001
	S	DCDA-51S4C4-00.5	280-52-51-001

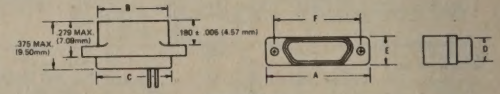
Termination: 18" #26 AWG Stranded, Type E, Yellow Insulation.

No. of Contacts	P — Pin S — Socket	Distributor Part No.	Factory Part No.
9	P	DCDA-9P6E2-18.0	280-53-09-001
	S	DCDA-9S6E2-18.0	280-54-09-001
15	P	DCDA-15P6E2-18.0	280-53-15-001
	S	DCDA-15S6E2-18.0	280-54-15-001
21	P	DCDA-21P6E2-18.0	280-53-21-001
	S	DCDA-21S6E2-18.0	280-54-21-001
25	P	DCDA-25P6E2-18.0	280-53-25-001
	S	DCDA-25S6E2-18.0	280-54-25-001
37	P	DCDA-37P6E2-18.0	280-53-37-001
	S	DCDA-37S6E2-18.0	280-54-37-001
51	P	DCDA-51P6E2-18.0	280-53-51-001
	S	DCDA-51S6E2-18.0	280-54-51-001

DIMENSIONS



PLUG



RECEPTACLE

Part No.	A Max.	B Max.	C Max.	D Max.	E Max.	F Max.
DCDA-9P	.785(19.93)	.2905(7.38)	.403(10.23)	.170(4.32)	.215(5.46)	.565(14.35)
DCDA-9S	.785(19.93)	.3760(9.55)	.403(10.23)	.170(4.32)	.215(5.46)	.565(14.35)
DCDA-15P	.935(23.74)	.4405(11.21)	.553(14.04)	.170(4.32)	.215(5.46)	.715(18.16)
DCDA-15S	.935(23.74)	.5260(13.36)	.553(14.04)	.170(4.32)	.215(5.46)	.715(18.16)
DCDA-21P	1.085(27.38)	.5905(14.91)	.703(17.73)	.170(4.32)	.205(5.26)	.865(21.97)
DCDA-21S	1.085(27.38)	.5905(15.14)	.703(17.73)	.170(4.32)	.205(5.26)	.865(21.97)
DCDA-25P	1.185(30.09)	.6905(17.54)	.803(20.39)	.170(4.32)	.215(5.46)	.965(24.51)
DCDA-25S	1.185(30.09)	.7760(19.71)	.803(20.39)	.170(4.32)	.215(5.46)	.965(24.51)
DCDA-37P	1.485(37.71)	.9905(25.16)	1.103(28.01)	.170(4.32)	.215(5.46)	1.270(32.25)
DCDA-37S	1.485(37.71)	1.0760(27.33)	1.103(28.01)	.170(4.32)	.215(5.46)	1.270(32.25)
DCDA-51P	1.435(36.44)	.9405(23.89)	1.053(26.74)	.213(5.41)	.258(6.55)	1.215(30.86)
DCDA-51S	1.435(36.44)	1.0260(26.06)	1.053(26.74)	.213(5.41)	.258(6.55)	1.215(30.86)

Note: P — Pin (Plug), S — Socket (Receptacle) (Bracketed figures millimeters)

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TRW CINCH CONNECTORS

DURA-CON D MICROMINIATURE CONNECTORS (Cont'd)

PANEL CUTOUT DIMENSIONS

FIGURE 1 — FRONT MOUNTING

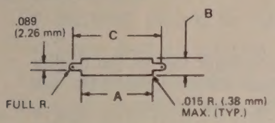
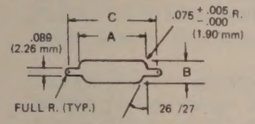

.089
(2.26 mm)
C
B
A
FULL R.
.015 R. (.38 mm)
MAX. (TYP.)

FIGURE 2 — REAR MOUNTING


C
A
.075 +.005 −.000 R.
(1.90 mm)
.089
(2.26 mm)
B
FULL R. (TYP.)
26 /27

Size	Figure	A +.004(.102) −.000(.000)	B +.004(.102) −.000(.000)	C +.005(.127) −.000(.000)
DCDA-9	1	.408(10.36)	.172(4.37)	.570(14.49)
	2	.381(9.68)	.216(5.49)	.570(14.49)
DCDA-15	1	.558(14.17)	.172(4.37)	.720(18.29)
	2	.531(13.49)	.216(5.49)	.720(18.29)
DCDA-21	1	.706(17.93)	.172(4.37)	.870(22.10)
	2	.673(17.09)	.216(5.49)	.870(22.10)
DCDA-25	1	.808(20.52)	.172(4.37)	.970(24.64)
	2	.731(18.56)	.216(5.49)	.970(24.64)
DCDA-37	1	1.108(28.14)	.172(4.37)	1.270(32.26)
	2	1.081(27.46)	.216(5.49)	1.270(32.26)
DCDA-51	1	1.058(26.87)	.215(5.46)	1.220(30.99)
	2	1.031(26.19)	.259(6.58)	1.220(30.99)

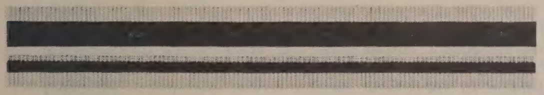
(Bracketed figures millimeters)

DURA-CON STRIP CONNECTORS

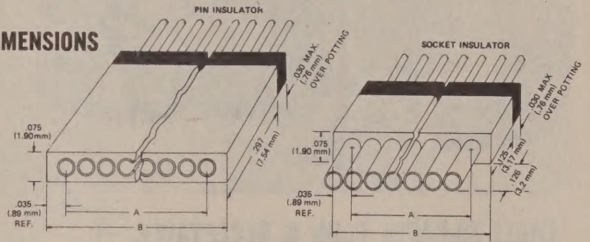
For maximum flexibility of application, Cinch Dura-Con contacts are available in strips on .050″ centers. By cutting, adding, or stacking, a variety of contact arrangements can be achieved. These versatile connector strips are available with up to 120 contact positions on special order. Moreover, guide pins that engage prior to the contact in the mating cycle, can be provided to assist in mating and polarization.

Contacts: 24 gage copper alloy, gold plated.

Insulator: Glass-filled polyester 94V-O.



DIMENSIONS


PIN INSULATOR
.030 MAX (.76 mm) OVER POTTING
.075 (1.90mm)
.297 (7.54 mm)
.035 (.89 mm) REF.
A
B
SOCKET INSULATOR
.030 MAX (.76 mm) OVER POTTING
.075 (1.90 mm)
.125 (3.17 mm)
.126 (3.2 mm)
.035 (.89 mm) REF.
A
B

Part No.	A	B Max.
CSA1-5P/5S	.200(5.080)	.270(6.858)
CSA1-10P/10S	.450(11.420)	.520(13.198)
CSA1-15P/15S	.700(17.780)	.770(19.558)
CSA1-20P/20S	.950(24.130)	1.020(25.908)

(Bracketed figures millimeters)

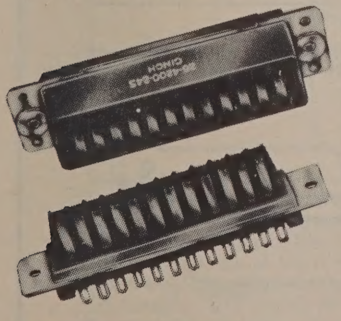
Termination: #24 AWG Solid Copper Leads, ½″ Long.

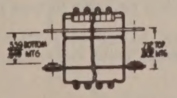
No. of Contacts	P — Pin S — Socket	Distributor Part No.	Factory Part No.
5	P	CSA1-5P4C4-00.5	280-10-05-001
	S	CSA1-5S4C4-00.5	280-20-05-001
10	P	CSA1-10P4C4-00.5	280-10-10-001
	S	CSA1-10S4C4-00.5	280-20-10-001
15	P	CSA1-15P4C4-00.5	280-10-15-001
	S	CSA1-15S4C4-00.5	280-20-15-001
20	P	CSA1-20P4C4-00.5	280-10-20-001
	S	CSA1-20S4C4-00.5	280-20-20-001

Termination: 18″ #26 AWG Stranded, Type E, Yellow Insulation.

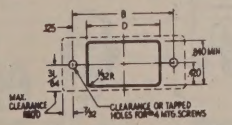
No. of Contacts	P — Pin S — Socket	Distributor Part No.	Factory Part No.
5	P	CSA1-5P6E2-18.0	280-30-05-001
	S	CSA1-5S6E2-18.0	280-40-05-001
10	P	CSA1-10P6E2-18.0	280-30-10-001
	S	CSA1-10S6E2-18.0	280-40-10-001
15	P	CSA1-15P6E2-18.0	280-30-15-001
	S	CSA1-15S6E2-18.0	280-40-15-001
20	P	CSA1-20P6E2-18.0	280-30-20-001
	S	CSA1-20S6E2-18.0	280-40-20-001

BLUE RIBBON‡ RECTANGULAR CONNECTORS

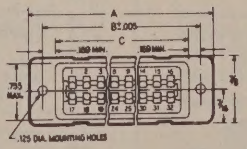


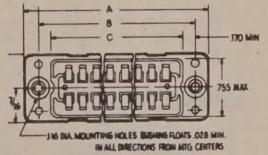


MATING PLUG & RECEPTACLE


B
D
.325
.840 MIN
3/32 R
.420
MAX. CLEARANCE .600
CLEARANCE OR TAPPED HOLES FOR #4 MTG SCREWS

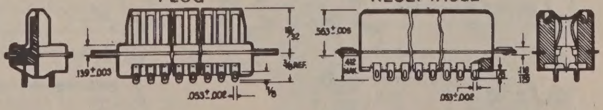
MOUNTING LAYOUT


A
B±.005
C
.159 MIN.
.159 MIN.
.735 MAX.
.125 DIA. MOUNTING HOLES


A
B
C
.170 MIN
.755 MAX
.116 DIA. MOUNTING HOLES BUSHING FLOATS .028 MIN. IN ALL DIRECTIONS FROM MTG CENTERS

PLUG

RECEPTACLE


.139±.003
.053±.002
1/8
3/8 REF.
.563±.006
.42 MAX
.053±.002
.116 .125

ELECTRICAL SPECIFICATIONS VOLTAGE RATINGS: (a) At Sea Level 800 VDC, (b) At 70,000 Feet 300 VDC; CONTACT CURRENT RATING: 5 Amperes; CONTACT RESISTANCE: .003 Ohms Maximum; INSULATION RESISTANCE (As Received): 100,000 Megohms Minimum.

MECHANICAL SPECIFICATIONS CONTACTS: Plug, Copper, ASTM-B-152, Type ETP, Socket, Phosphor bronze, ASTM-B-103, MIL-B-892, Grade A; FINISH: .00002 Gold per MIL-G-45204, Type II over copper flash; MOUNTING PLATE: Passivated stainless steel. TEMPERATURE RANGE: −67°C to 130°C.

No. of Contacts	Part Numbers		Dimensions			
	Plug	Socket	A	B	C	D (Min.)
8	26-4100-8P	26-4200-8S	$1\frac{23}{32}$	1.375	$1\frac{1}{32}$	1.120
16	26-4100-16P	26-4200-16S	$2\frac{15}{32}$	2.125	$1\frac{25}{32}$	1.868
24	26-4100-24P	26-4200-24S	$3\frac{7}{32}$	2.875	$2\frac{17}{32}$	2.620
32	26-4100-32P	26-4200-32S	$3\frac{31}{32}$	3.625	$3\frac{9}{32}$	3.370

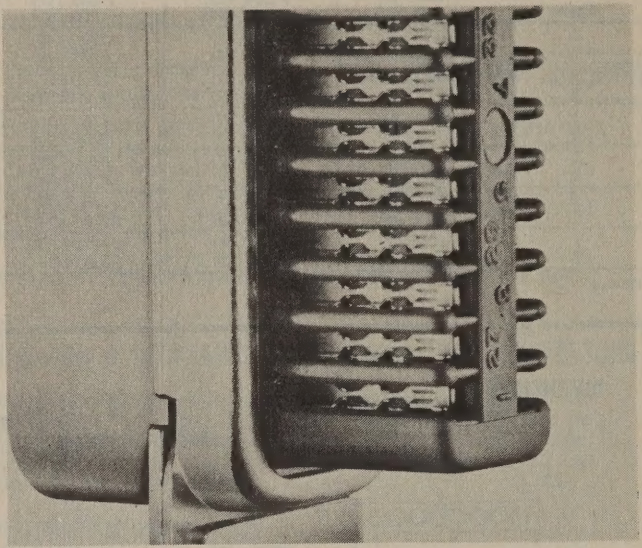
*Tolerances: Fractions ± $\frac{1}{64}$ Decimals ± .005

‡ Trade Mark Bunker Ramo Corp.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

CINCH SOLDERLESS RIBBON CONNECTORS

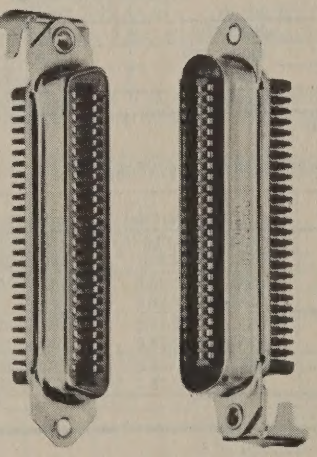


The Solderless Cinch Ribbon Connector has all the quality features of the solder type Cinch Ribbon Connectors, are intermateable and utilize all the same hardware.

The solderless Cinch Ribbon Series can be terminated with automatic, semi-automatic or field hand tools. Each contact provides four gas-tight connections for both 24 and 26 gauge solid wire*. Termination speeds far exceed soldering techniques.

This newly designed connector incorporates a built-in strain relief in each contact to prevent any inadvertant removal of the wires; however, contacts can be reused without physical damage or electrical degradation.

CABLE-TO-CABLE PLUG & RECEPTACLE



Miniaturized rack and panel connectors utilizing "ribbon" contact feature. Smooth, easy insertion/extraction action plus the double-sided self-cleaning flexing action of both mated contact members provide added reliability. Shell polarization and float-mounted receptacle assure proper alignment. Insulator material is 30% glass-filled polyester. Plug and receptacle contacts are of cadium bronze, ASTM-B-105, with a finish of .00002 gold per MIL-G-45204 Type II over copper flash. Shells are steel with a finish of .0002 to .0004 zinc. No stripping of wires required for perfect connections when terminated with Cinch Auto-Clinch, Certi-Clinch, or Mini-Clinch tools.

CONNECTORS WITH DEEP HOOD

No. of Contacts*	PLUGS TRW/Cinch Part No. C_D	RECEPTACLE TRW/Cinch Part No. C_D
50	223-15-50-001	223-16-50-001

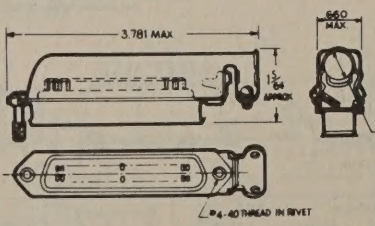
CONNECTORS WITH SHALLOW HOODS

No. of Contacts*	PLUGS TRW/Cinch Part No. C_D	RECEPTACLE TRW/Cinch Part No. C_D
50	223-15-50-002	223-16-50-002

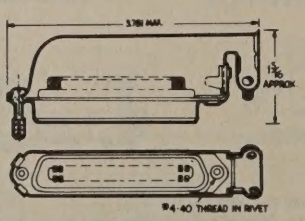
C_D Indicates items normally available through Cinch distributors.

* Also available in 14, 24, 36 and 64 contact sizes. All sizes can be terminated with solid wire 24 and 26 gauge (with .040" mas. insulation dia.). For stranded wire, consult factory.

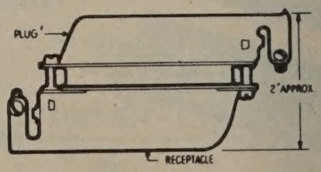
DIMENSIONAL DATA



PLUG



RECEPTACLE



MATING PLUG & RECEPTACLE

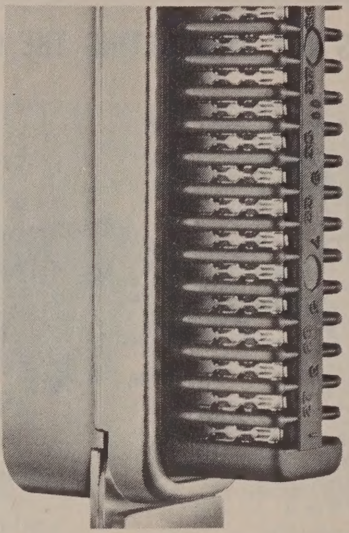
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

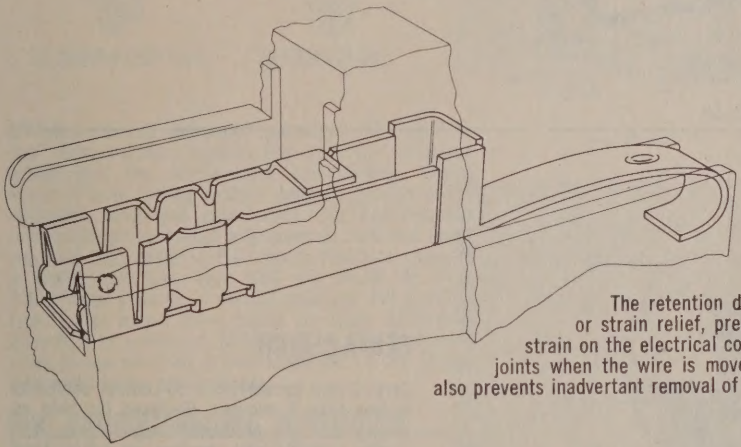
TRW CINCH CONNECTORS

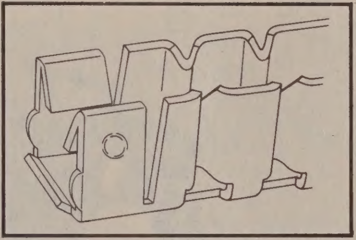
CINCH SOLDERLESS RIBBON CONNECTORS

FEATURES

- Identical mating to standard solder type connector.
- Same contact material.
- Same mating and mounting dimensions.
- Will handle 22, 24 and 26 gauge solid wire* (with .040 max. insulation dia.)
- Built-in wire restraint.
- 4 points of contact provide redundancy.
- Exactly same mounting and auxiliary hardware.
- Rapid field wiring.
- Totally interchangeable with existing Cinch Ribbon Connectors and hardware.

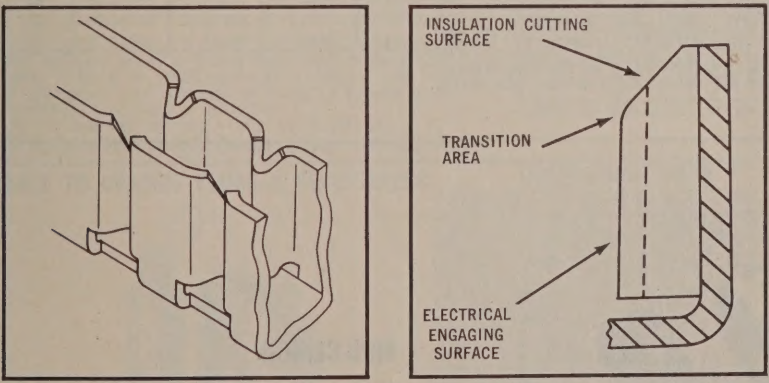




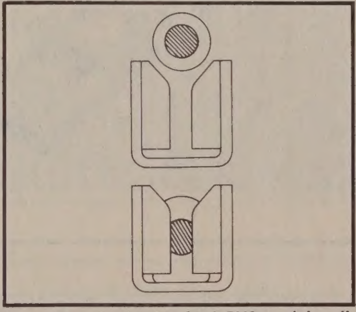


The retention device or strain relief, prevents strain on the electrical contact joints when the wire is moved. It also prevents inadvertant removal of wire.

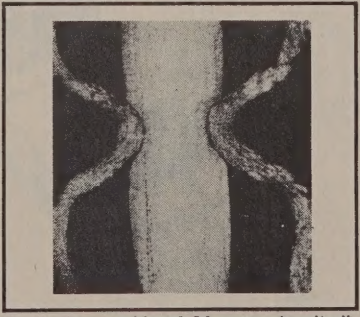
* For stranded wire applications consult factory.



The shape of the wire terminating end of the contact is arranged with four indents. These indents are so constructed and shaped as to peel the insulation off the wire at these points. The step-by-step progression is as follows. As the wire enters, the insulation is peeled off by the ramp shape of the contact indents. This leads into a coined, relatively sharp area. As the wire, after the insulation is removed, progresses into the remaining contact pocket, the transition area permits the conductor to be deformed and held between each set of the two opposing indented sections. The result is four gas tight connections on each conductor.



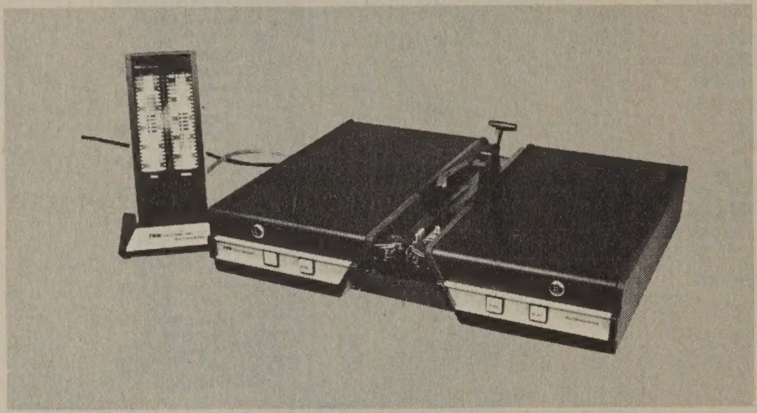
Insulation, both standard PVC and irradiated PVC is pierced sufficiently to facilitate electrical connection.



Photomicrographic of 24 gauge longitudinal cross section of prime electrical contact area.

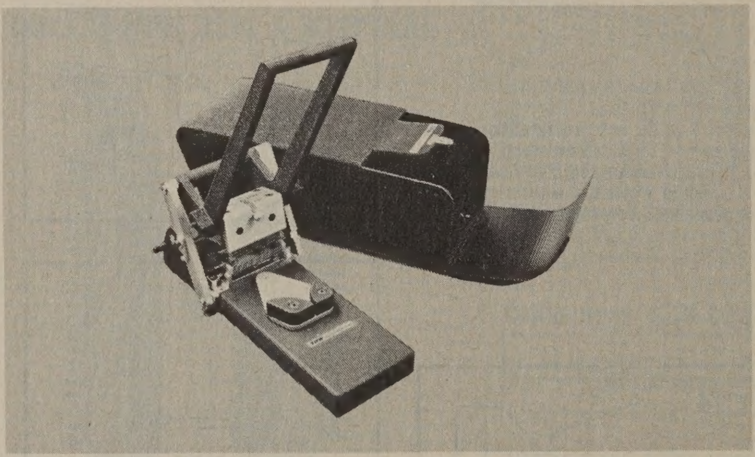
TRW CINCH CONNECTORS

SYSTEMS FOR TERMINATING THE CINCH SOLDERLESS RIBBON CONNECTOR



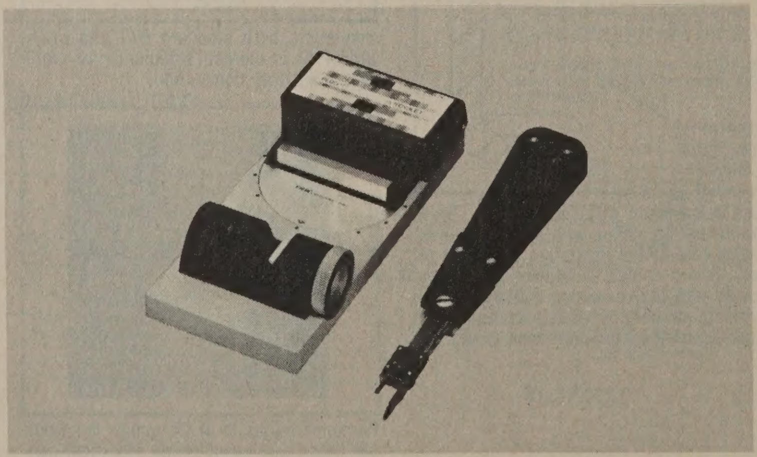
AUTO-CLINCH

Auto-Clinch for rapid factory wiring. Completely terminates a 50-contact connector in less than 2 minutes. Has provision for omission of wires, inspection check during wiring and correction of errors. Options include Color Code display and selective programmer.



CERTA-CLINCH

Certa-Clinch terminates a 50-contact connector in less than 4 minutes. Designed for field assembly and low production applications, it is readily portable and requires no set-up time.



MINI-CLINCH (CD)

Mini-Clinch is a lightweight belt-mounted unit that enables a serviceman in the field to terminate a 50-contact connector in less than 5 minutes. It can be used with 90° or 180° connectors. Wires are automatically cut as they are inserted into the terminals.

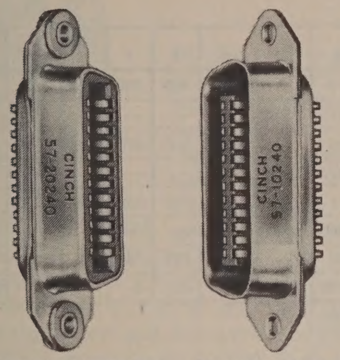
(CD) Indicates items normally available through Cinch distributors.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

CINCH RIBBON CONNECTORS

RACK AND PANEL PLUGS & RECEPTACLES


CINCH
57-20240
CINCH
57-10240

57-20240 RECEPTACLE **57-10240 PLUG**

Miniaturized rack and panel connectors utilizing "ribbon" contact feature. Smooth, easy insertion/extraction action plus the double-sided, self-cleaning, flexing action of both mating contact members provide added reliability. Shell-type polarization and float-mounted receptacle assure proper alignment on rack and panel only, not applicable to P.C. types. Insulator material is diallyl phthalate, type MDG per MIL-M-14F. Plug B-105, with a finish of .00002 gold per MIL-G-45204 type II over copper flash. Shells are brass, ASTM-B-36 Alloy 6, with a finish of .0002 to .0004 zinc. Pretinning wires before soldering is recommended. 14, 24, 36 and 50-contact sizes are available.

PART NUMBER ORDERING INFORMATION

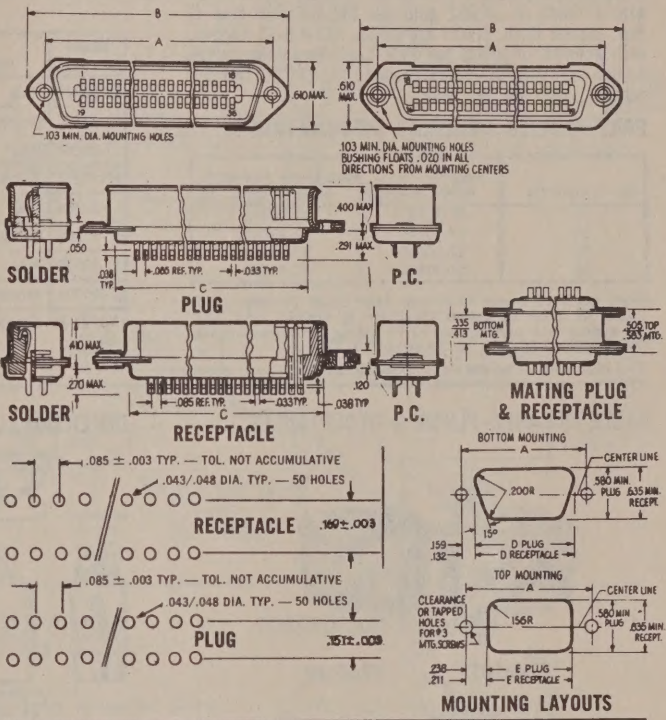
No. of Contacts	SOLDER Ⓒ Plug Part No.*	SOLDER Ⓒ Receptacle Part No.*	P.C. Ⓒ Plug Part No.	P.C. Ⓒ Receptacle Part No.
14	57-10140	57-20140	57-10140-4	57-20140-8†
24	57-10240	57-20240	57-10240-3	57-20240-8†
36	57-10360	57-20360	57-10360-13	57-20360-9†
50	57-10500	57-20500	57-10500-27	57-20500-31

*Part numbers shown in Listing have finish of **clear** chromate. If finish of **yellow** chromate is desired, add "-1" to appropriate part number(s) in listing to indicate same. (Examples: 57-10140-1 or 57-20140-1.)

† No float bushings supplied — mtg. hole is .185 dia.

Ⓒ Indicates items normally available through Cinch distributors.

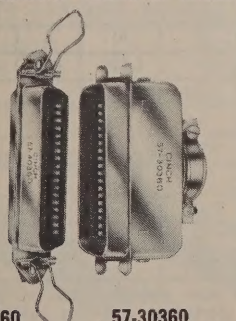
DIMENSIONAL DATA


B
A
.610 MAX.
.103 MIN. DIA. MOUNTING HOLES
.103 MIN. DIA. MOUNTING HOLES BUSHING FLOATS .020 IN ALL DIRECTIONS FROM MOUNTING CENTERS
.400 MAX
.291 MAX
.050
.038 TYP.
.085 REF. TYP.
.033 TYP.
C
SOLDER
P.C.
PLUG
.410 MAX
.270 MAX
.120
.038 TYP
RECEPTACLE
.335 .413 BOTTOM MTG.
.605 TOP .583 MTG.
MATING PLUG & RECEPTACLE
.085 ± .003 TYP. — TOL. NOT ACCUMULATIVE
.043/.048 DIA. TYP. — 50 HOLES
RECEPTACLE
.160±.003
PLUG
.151±.003
BOTTOM MOUNTING
CENTER LINE
.200R
.580 MIN PLUG
.635 MIN. RECEPT.
15°
.159
.132
D PLUG
D RECEPTACLE
TOP MOUNTING
CLEARANCE OR TAPPED HOLES FOR #3 MTG. SCREWS
.156R
.238
.211
E PLUG
E RECEPTACLE
MOUNTING LAYOUTS

P.C.	SOLDER	DIMENSIONS‡ TYPE	A	B	C	D Min.	E Min.
57-10140-4	57-10140	Plug	1.417	1.750	.910	1.098	.940
57-20140-8	57-20140	Receptacle	1.417	1.750	.910	1.153	.995
57-10240-3	57-10240	Plug	1.842	2.175	1.335	1.523	1.365
57-20240-8	57-20240	Receptacle	1.842	2.175	1.335	1.578	1.420
57-10360-13	57-10360	Plug	2.352	2.685	1.845	2.033	1.875
57-20360-9	57-20360	Receptacle	2.352	2.685	1.845	2.088	1.930
57-10500-27	57-10500	Plug	2.947	3.270	2.440	2.628	2.472
57-20500-31	57-20500	Receptacle	2.947	3.270	2.440	2.683	2.525

‡NOTE: All dimensions are reference.

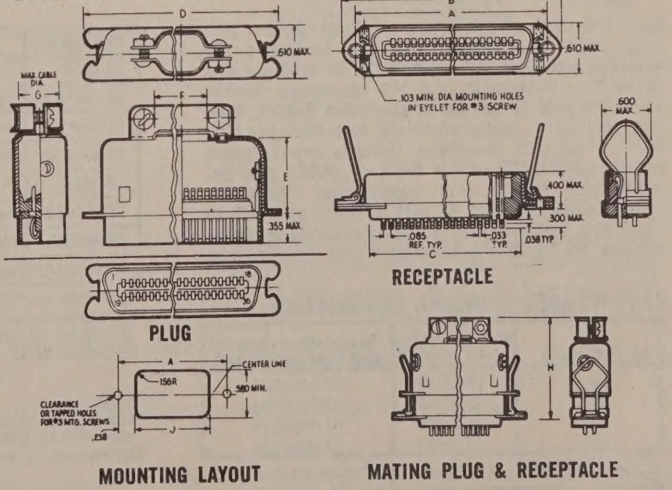
CABLE TO CHASSIS PLUGS & RECEPTACLES


CINCH
57-30360
57-40360

57-40360 **57-30360**

Miniaturized connectors with same basic features as those shown on above except plug is equipped with hood and cable clamp while receptacle has sturdy spring-type latches which are guided and held by cutouts in plug hood flanges. Insulator body is molded of diallyl phthalate, type MDG per MIL-M-14F. Plug and

DIMENSIONAL DATA


D
.610 MAX.
MAX. CABLE DIA.
G
F
E
.355 MAX.
PLUG
B
A
.610 MAX.
.103 MIN. DIA. MOUNTING HOLES IN EYELET FOR #3 SCREW
.600 MAX.
.400 MAX.
.300 MAX.
.085 REF. TYP.
.033 TYP.
.038 TYP.
C
RECEPTACLE
A
CENTER LINE
.156R
.580 MIN.
CLEARANCE OR TAPPED HOLES FOR #3 MTG. SCREWS
.238
J
MOUNTING LAYOUT
H
MATING PLUG & RECEPTACLE

TRW CINCH CONNECTORS

CINCH RIBBON CONNECTORS (Cont'd)

CABLE TO CHASSIS PLUGS & RECEPTACLES (Cont'd)

receptacle contacts are cadmium bronze, ASTM-B-105 with a finish of .00002 gold per MIL-G-45204 type II over copper flash. Shells are brass, ASTM-B-36 Alloy 6, with a finish of .0002 to .0004 zinc. Pretinning wires before soldering is recommended. 14, 24, 36 and 50-contact sizes are available.

PART NUMBER ORDERING INFORMATION

No. of Contacts	Plug Part No.* (with hood) Ⓒ	Receptacle Part No.* (with latches) Ⓒ
14	57-30140	57-40140
24	57-30240	57-40240
36	57-30360	57-40360
50	57-30500	57-40500

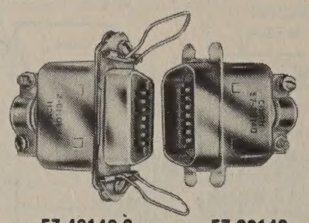
*Part numbers shown in listing have finish of **clear** chromate. If finish of **yellow** chromate is desired, add "-1" to appropriate part number(s) in listing to indicate same. (Example: 57-30140-1 or 57-40140-1.)

Ⓒ Indicates items normally available through Cinch distributors.

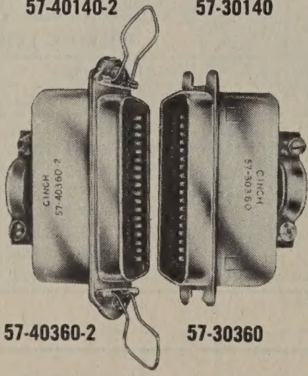
Dimensions‡	Type	A	B	C	D	E	F	G	H	J min.
57-30140	Plug	—	—	—	1.495	.843	.306	.422	1.668	—
57-40140	Receptacle	1.417	1.750	.910	—	—	—	—	—	.940
57-30240	Plug	—	—	—	1.920	.825	.473	.473	1.668	—
57-40240	Receptacle	1.842	2.175	1.335	—	—	—	—	—	1.365
57-30360	Plug	—	—	—	2.431	.905	.640	.473	1.730	—
57-40360	Receptacle	2.352	2.685	1.845	—	—	—	—	—	1.875
57-30500	Plug	—	—	—	3.025	.995	.766	.473	1.825	—
57-40500	Receptacle	2.947	3.270	2.440	—	—	—	—	—	2.472

‡NOTE: All dimensions are reference.

CABLE-TO-CABLE PLUGS & RECEPTACLES



57-40140-2 57-30140



57-40360-2 57-30360

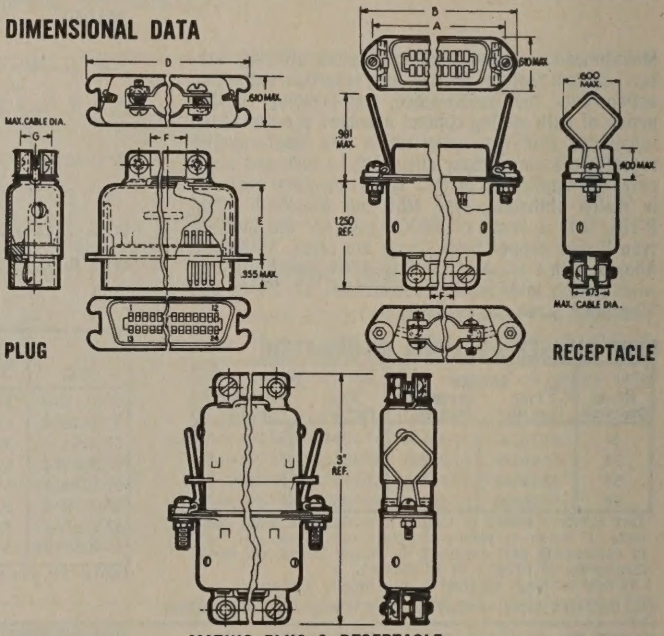
Same miniaturized connectors as shown on two previous pages except both plug and receptacle are equipped with hood and cable clamp for cable-to-cable application. Receptacle also has spring-type latches which are held by cutouts in plug hood flanges. Insulator material is diallyl phthalate, type MDG per MIL-M-14F. Plug and receptacle contacts are cadmium bronze, ASTM-B-105 with a finish of .00002 gold per MIL-G-45204 type II over copper flash. Shells are brass, ASTM-B-36 Alloy 6, with a finish of .0002 to .0004 zinc. Pretinning wires before soldering is recommended. 14, 24, 36 and 50-contact sizes are available.

PART NUMBER ORDERING INFORMATION

No. of Contacts	Plug Part No.* (with hood) Ⓒ	Receptacle Part No.* (with hood and latches)
14	57-30140	57-40140-2†
24	57-30240	57-40240-3†
36	57-30360	57-40360-2†
50	57-30500	57-40500-2†

Ⓒ Indicates items normally available through Cinch distributors.

DIMENSIONAL DATA



MATING PLUG & RECEPTACLE

Dimensions‡	Type	A	B	D	E	F	G
57-30140	Plug	—	—	1.495	.843	.306	.422
57-40140-2	Receptacle	1.417	1.750	—	—	.306	.422
57-30240	Plug	—	—	1.920	.825	.473	.473
57-40240-3	Receptacle	1.842	2.175	—	—	.473	.473
57-30360	Plug	—	—	2.431	.905	.640	.473
57-40360-2	Receptacle	2.352	2.685	—	—	.640	.473
57-30500	Plug	—	—	3.025	.995	.766	.473
57-40500-2	Receptacle	2.947	3.270	—	—	.766	.473

*Part numbers shown in listing have **clear** chromate finish. If finish of **yellow** chromate is desired, add "-1" to appropriate plug part number(s) in listing. (Example: 57-30240-1) and "-6" to appropriate receptacle part number(s). (Example: 57-40240-6.)

NOTES:

†These cable-to-cable receptacles are available for large volume requirements only; consult factory for details.

‡All dimensions are reference.

TRW CINCH CONNECTORS

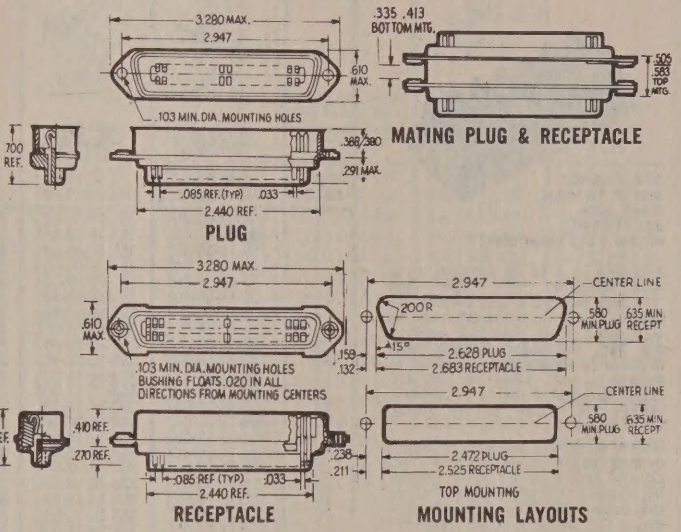
CINCH RIBBON CONNECTORS (Cont'd)

SPECIAL "HIGH-BARRIER" RACK AND PANEL PLUG & RECEPTACLE

57-10500-6 57-20500-6

Available in 50-contact size only. Same as 50-contact rack and panel connector shown on page 5, except for a special "high barrier" (additional insulator material) interposed between opposite rows of contacts. Insulator body is molded of diallyl phthalate, type MDG per MIL-M-14F. Plug and receptacle contacts are of cadmium bronze, ASTM-B-105, with a finish of .00003 gold per MIL-G-45204 type II over gold flash per MIL-G-45204 type I over .00005 copper per MIL-C-14550. Shells are brass, ASTM-B-36 Alloy 6, with a finish of .0002 to .0004 zinc. Polyethylene dust covers also available as shown below.

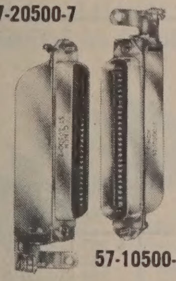
DIMENSIONAL DATA


3.280 MAX.
2.947
.610 MAX.
.103 MIN. DIA. MOUNTING HOLES
700 REF.
.388/.380
.291 MAX.
.085 REF. (TYP)
.033
2.440 REF.
PLUG
.335 .413 BOTTOM MTG.
.505 .583 TOP MTG.
MATING PLUG & RECEPTACLE
3.280 MAX.
2.947
.610 MAX.
.103 MIN. DIA. MOUNTING HOLES BUSHING FLOATS .020 IN ALL DIRECTIONS FROM MOUNTING CENTERS
.159
.132
.700 REF.
.410 REF.
.270 REF.
.238
.211
.085 REF (TYP)
.033
2.440 REF.
RECEPTACLE
2.947
CENTER LINE
.200 R
15°
.580 MIN. PLUG
.635 MIN. RECEPT
2.628 PLUG
2.683 RECEPTACLE
2.947
CENTER LINE
.580 MIN. PLUG
.635 MIN. RECEPT
2.472 PLUG
2.525 RECEPTACLE
TOP MOUNTING
MOUNTING LAYOUTS

PART NUMBER ORDERING INFORMATION

No. of Contacts	Plug Part No. Ⓒ	Receptacle Part No. Ⓒ
50	57-10500-6	57-20500-6

SPECIAL "HIGH-BARRIER" CABLE-TO-CABLE PLUG & RECEPTACLE

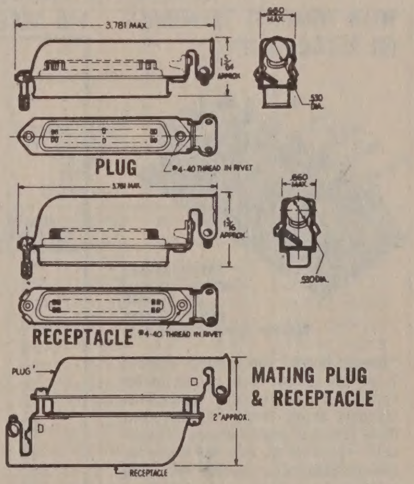


57-20500-7

57-10500-7

Same as 50-contact rack and panel connector shown above except for special hood and hardware for cable-to-cable applications. Plug and receptacle have same special "high barrier" of insulator material interposed between opposite rows of contacts. Insulator body is molded of diallyl phthalate, type MDG per MIL-M-14F. Plug and receptacle contacts are of cadmium bronze, ASTM-B-105 with a finish of .00003 gold per MIL-G-45204 type II over gold flash per MIL-G-45204 type I over .00005 copper per MIL-C-14550. Shells are brass, ASTM-B-36 Alloy 6, with a finish of .0002 to .0004 zinc. Polyethylene dust covers are supplied.

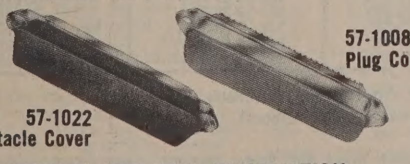
DIMENSIONAL DATA


3.781 MAX.
1 5/64 APPROX.
.660 MAX.
.530 DIA.
PLUG
#4-40 THREAD IN RIVET
3.781 MAX.
1 5/16 APPROX.
.660 MAX.
.530 DIA.
RECEPTACLE
#4-40 THREAD IN RIVET
PLUG
2" APPROX.
RECEPTACLE
MATING PLUG & RECEPTACLE

PART NUMBER ORDERING INFORMATION

No. of Contacts	Plug Part No. Ⓒ	Receptacle Part No. Ⓒ
50	57-10500-7	57-20500-7

POLYETHYLENE DUST COVERS



57-1008 Plug Cover

57-1022 Receptacle Cover

The 50-contact Cinch Ribbon connectors can be supplied with optional polyethylene dust covers. Two types of covers are available: one for the plugs and one for the receptacles. The plug cover is blue and fits inside the shell. The receptacle cover is red and fits outside the shell. The covers can be used only with these 50-contact size connectors.

PART NUMBER ORDERING INFORMATION

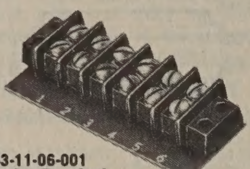
Plug Cover Part No.	Color and Type	Receptacle Cover Part No.	Color and Type
57-1008	Blue — Fits Inside Shell	57-1022	Red — Fits Outside Shell

Ⓒ Indicates items normally available through Cinch distributors.

TRW CINCH CONNECTORS

140 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS AND MARKER STRIPS

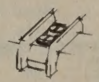
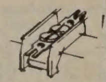
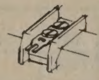
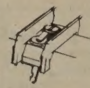


353-11-06-001 Barrier Terminal Block with 363-11-06-011 Marker Strip (Imprinted)

Available in 1 to 25 terminal sizes with standard, "W," "¾W" and "Y" type terminals. Has 5-40 binder head screws. Accommodates up to #14 solid wire. Terminal centers are ⅜". Creepage distance from terminal to terminal and terminal to ground is ¼". Materials and finishes designated below. Electrical ratings are shown on the inside front cover.

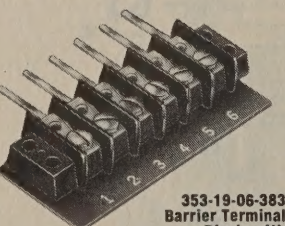
Marker strips are available to mount beneath barrier block and afford additional insulation for metal mounting surface. "Single" marker strips that extend out on only one side are shown in listing below; "double" marker strips extending out on both sides are also available. Marker strips can be imprinted with terminal designations as described on page 12.

140 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	 STANDARD TERMINAL Ⓒ 5-40 x 3⁄16 B.H. Screws	 "W" TYPE TERMINAL 5-40 x ¼ B.H. Screws	 "¾W" TYPE TERMINAL Ⓒ 5-40 x ¼ B.H. Screws	MARKER STRIPS* FOR STANDARD, "W" and "¾W" TYPE Ⓒ TERMINALS	 "Y" TYPE TERMINAL Ⓒ 5-40 x ¼ B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	353-11-01-001	353-16-01-001	353-17-01-001	363-11-01-010	353-18-01-001	363-12-01-010
2	†353-11-02-001	353-16-02-001	353-17-02-001	363-11-02-010	353-18-02-001	363-12-02-010
3	†353-11-03-001	353-16-03-001	353-17-03-001	363-11-03-010	353-18-03-001	363-12-03-010
4	†353-11-04-001	353-16-04-001	353-17-04-001	363-11-04-010	353-18-04-001	363-12-04-010
5	†353-11-05-001	353-16-05-001	353-17-05-001	363-11-05-010	353-18-05-001	363-12-05-010
6	†353-11-06-001	353-16-06-001	353-17-06-001	363-11-06-010	353-18-06-001	363-12-06-010
7	†353-11-07-001	353-16-07-001	353-17-07-001	363-11-07-010	353-18-07-001	363-12-07-010
8	†353-11-08-001	353-16-08-001	353-17-08-001	363-11-08-010	353-18-08-001	363-12-08-010
9	†353-11-09-001	353-16-09-001	353-17-09-001	363-11-09-010	353-18-09-001	363-12-09-010
10	†353-11-10-001	353-16-10-001	353-17-10-001	363-11-10-010	353-18-10-001	363-12-10-010
11	†353-11-11-001	353-16-11-001	353-17-11-001	363-11-11-010	353-18-11-001	363-12-11-010
12	†353-11-12-001	353-16-12-001	353-17-12-001	363-11-12-010	353-18-12-001	363-12-12-010
13	†353-11-13-001	353-16-13-001	353-17-13-001	363-11-13-010	353-18-13-001	363-12-13-010
14	†353-11-14-001	353-16-14-001	353-17-14-001	363-11-14-010	353-18-14-001	363-12-14-010
15	†353-11-15-001	353-16-15-001	353-17-15-001	363-11-15-010	353-18-15-001	363-12-15-010
16	†353-11-16-001	353-16-16-001	353-17-16-001	363-11-16-010	353-18-16-001	363-12-16-010
17	†353-11-17-001	353-16-17-001	353-17-17-001	363-11-17-010	353-18-17-001	363-12-17-010
18	†353-11-18-001	353-16-18-001	353-17-18-001	363-11-18-010	353-18-18-001	363-12-18-010
19	†353-11-19-001	353-16-19-001	353-17-19-001	363-11-19-010	353-18-19-001	363-12-19-010
20	†353-11-20-001	353-16-20-001	353-17-20-001	363-11-20-010	353-18-20-001	363-12-20-010
21	†353-11-21-001	353-16-21-001	353-17-21-001	363-11-21-010	353-18-21-001	363-12-21-010
22	†353-11-22-001	353-16-22-001	353-17-22-001	363-11-22-010	353-18-22-001	363-12-22-010
23	†353-11-23-001	353-16-23-001	353-17-23-001	363-11-23-010	353-18-23-001	363-12-23-010
24	†353-11-24-001	353-16-24-001	353-17-24-001	363-11-24-010	353-18-24-001	363-12-24-010
25	†353-11-25-001	353-16-25-001	353-17-25-001	363-11-25-010	353-18-25-001	363-12-25-010

†Available with SEMS Screws through Cinch Distributors. See Page 12.

WITH WRAPOST TERMINALS (UL RECOGNIZED)



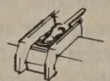
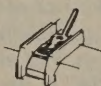
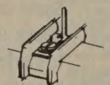
353-19-06-383 Barrier Terminal Block with 363-11-06-011 Marker Strip (Imprinted)

"Jones" Barrier Blocks with wrapost terminals on one side permit faster connections — four times faster than standard screw terminals. There are three terminal angles presently available — parallel to, at a 45° angle to, and perpendicular to the mounting surface. Choose the angle that best suits your application.

Available in 1 to 25-terminal sizes with each of the terminal angles. Has 5-40 binder head screw opposite terminal. Terminal centers are ⅜". Creepage distance is ¼". Materials and finishes designated below. Electrical ratings are shown on the inside front cover.

Standard 140 Series marker strips are available to mount beneath the barrier block and insulate against the metal mounting surface. "Single" or "double" marker strips are available. Marker strips can be imprinted with terminal designations as shown on page 12.

140 SERIES (WRAPOST) PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	 PARALLEL (180°) STYLE 5-40 x 3⁄16 B.H. Screws	 45° STYLE 5-40 x 3⁄16 B.H. Screws	 PERPENDICULAR (90°) STYLE 5-40 x 3⁄16 B.H. Screws	MARKER STRIPS* FOR ALL STYLES Ⓒ
1	353-19-01-383	353-19-01-385	353-19-01-386	363-11-01-010
2	353-19-02-383	353-19-02-385	353-19-02-386	363-11-02-010
3	353-19-03-383	353-19-03-385	353-19-03-386	363-11-03-010
4	353-19-04-383	353-19-04-385	353-19-04-386	363-11-04-010
5	353-19-05-383	353-19-05-385	353-19-05-386	363-11-05-010
6	353-19-06-383	353-19-06-385	353-19-06-386	363-11-06-010
7	353-19-07-383	353-19-07-385	353-19-07-386	363-11-07-010
8	353-19-08-383	353-19-08-385	353-19-08-386	363-11-08-010
9	353-19-09-383	353-19-09-385	353-19-09-386	363-11-09-010
10	353-19-10-383	353-19-10-385	353-19-10-386	363-11-10-010
11	353-19-11-383	353-19-11-385	353-19-11-386	363-11-11-010
12	353-19-12-383	353-19-12-385	353-19-12-386	363-11-12-010
13	353-19-13-383	353-19-13-385	353-19-13-386	363-11-13-010
14	353-19-14-383	353-19-14-385	353-19-14-386	363-11-14-010
15	353-19-15-383	353-19-15-385	353-19-15-386	363-11-15-010
16	353-19-16-383	353-19-16-385	353-19-16-386	363-11-16-010
17	353-19-17-383	353-19-17-385	353-19-17-386	363-11-17-010
18	353-19-18-383	353-19-18-385	353-19-18-386	363-11-18-010
19	353-19-19-383	353-19-19-385	353-19-19-386	363-11-19-010
20	353-19-20-383	353-19-20-385	353-19-20-386	363-11-20-010
21	353-19-21-383	353-19-21-385	353-19-21-386	363-11-21-010
22	353-19-22-383	353-19-22-385	353-19-22-386	363-11-22-010
23	353-19-23-383	353-19-23-385	353-19-23-386	363-11-23-010
24	353-19-24-383	353-19-24-385	353-19-24-386	363-11-24-010
25	353-19-25-383	353-19-25-385	353-19-25-386	363-11-25-010

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.

EYELET MATERIAL and FINISH: Brass, Nickel-Plated. No Eyelet on Wrapost.

SCREW MATERIAL and FINISH: Steel, Nickel-Plated.

"W", "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped. Wrapost Terminal Electro Tin Plate.

MARKER STRIP MATERIAL: 1⁄32" NEMA Grade XPC, UL Rated 94V-0.

* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14. To order imprinted marker strips change fourth field from 010 to 011.

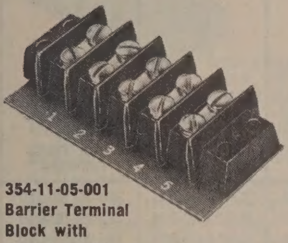
Ⓒ Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

141 SERIES (UL RECOGNIZED)

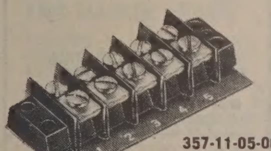
BARRIER TERMINAL BLOCKS AND MARKER STRIPS



354-11-05-001 Barrier Terminal Block with 364-11-05-011 Marker Strip (Imprinted)

Available in 1 to 20-terminal sizes with standard, "W," "¾W" and "Y" type terminals. Has 6-32 binder head screws. Accommodates up to #12 solid wire. Terminal centers are 7/16". Creepage distance from terminal to terminal is 3/8" and terminal to ground is 5/16". Materials and finishes described below. Electrical ratings shown on inside front cover. Marker strips are available to mount beneath barrier block and provide insulation for metal mounting surface. "Single" or "double" marker strips are available. Marker strips can be imprinted with terminal designations as described on page 12.

WITH QUICK-CLAMP* TERMINALS (UL RECOGNIZED)



357-11-05-001 Barrier Terminal Block with 364-11-05-011 Marker Strip (Imprinted)

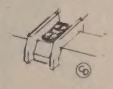
141 Series Barrier Blocks with Quick-Clamp Terminals permit efficient rapid assembly without costly wire terminals and without bending conductors around screws. Just insert the conductors and tighten screws to make positive contact.

Available in 1 to 20-terminal sizes for one side only, both sides, with "¾W" connection on one side and with "Y" connection through the panel. Uses 6-32 binder head screws. Terminal centers are 7/16". See page 12 for more complete description on the terminal itself and wire gauges accommodated. Materials and finishes described below. Electrical ratings are shown on the inside front cover.

141 Series marker strips are available to mount beneath the barrier block and provide insulation from the metal mounting surface. "Single" or "double" marker strips are available. Terminal designations can be imprinted on marker strips as shown on page 12.

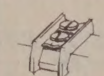
* Patent Pending

141 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	 Ⓒ STANDARD TERMINAL 6-32 x 1/4 B.H. Screws	"W" TYPE TERMINAL 6-32 x 5/16 B.H. Screws	Ⓒ "¾W" TYPE TERMINAL 6-32 x 5/16 B.H. Screws	Ⓒ MARKER STRIPS* FOR STANDARD, "W" and "¾W" TERMINALS	Ⓒ "Y" TYPE TERMINAL 6-32 x 5/16 B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	354-11-01-001	354-16-01-001	354-17-01-001	364-11-01-010	354-18-01-001	364-12-01-010
2	†354-11-02-001	354-16-02-001	354-17-02-001	364-11-02-010	354-18-02-001	364-12-02-010
3	†354-11-03-001	354-16-03-001	354-17-03-001	364-11-03-010	354-18-03-001	364-12-03-010
4	†354-11-04-001	354-16-04-001	354-17-04-001	364-11-04-010	354-18-04-001	364-12-04-010
5	†354-11-05-001	354-16-05-001	354-17-05-001	364-11-05-010	354-18-05-001	364-12-05-010
6	†354-11-06-001	354-16-06-001	354-17-06-001	364-11-06-010	354-18-06-001	364-12-06-010
7	†354-11-07-001	354-16-07-001	354-17-07-001	364-11-07-010	354-18-07-001	364-12-07-010
8	†354-11-08-001	354-16-08-001	354-17-08-001	364-11-08-010	354-18-08-001	364-12-08-010
9	†354-11-09-001	354-16-09-001	354-17-09-001	364-11-09-010	354-18-09-001	364-12-09-010
10	†354-11-10-001	354-16-10-001	354-17-10-001	364-11-10-010	354-18-10-001	364-12-10-010
11	†354-11-11-001	354-16-11-001	354-17-11-001	364-11-11-010	354-18-11-001	364-12-11-010
12	†354-11-12-001	354-16-12-001	354-17-12-001	364-11-12-010	354-18-12-001	364-12-12-010
13	†354-11-13-001	354-16-13-001	354-17-13-001	364-11-13-010	354-18-13-001	364-12-13-010
14	†354-11-14-001	354-16-14-001	354-17-14-001	364-11-14-010	354-18-14-001	364-12-14-010
15	†354-11-15-001	354-16-15-001	354-17-15-001	364-11-15-010	354-18-15-001	364-12-15-010
16	†354-11-16-001	354-16-16-001	354-17-16-001	364-11-16-010	354-18-16-001	364-12-16-010
17	†354-11-17-001	354-16-17-001	354-17-17-001	364-11-17-010	354-18-17-001	364-12-17-010
18	†354-11-18-001	354-16-18-001	354-17-18-001	364-11-18-010	354-18-18-001	364-12-18-010
19	†354-11-19-001	354-16-19-001	354-17-19-001	364-11-19-010	354-18-19-001	364-12-19-010
20	†354-11-20-001	354-16-20-001	354-17-20-001	364-11-20-010	354-18-20-001	364-12-20-010

†Available with SEMS Screws through Cinch Distributors. See Page 12.

141 SERIES (QUICK-CLAMP) PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	STANDARD TERMINAL (One Side Only) 6-32 x 5/16 B.H. Screws	 STANDARD TERMINAL (Both Sides) 6-32 x 5/16 B.H. Screws	"¾W" TYPE TERMINAL 6-32 x 3/8 B.H. Screws	Ⓒ MARKER STRIPS* FOR STANDARD "¾W" TYPE TERMINAL	"Y" TYPE TERMINAL 6-32 x 3/8 B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	357-11-01-001	357-12-01-001	357-13-01-001	364-11-01-010	357-14-01-001	364-12-01-010
2	357-11-02-001	357-12-02-001	357-13-02-001	364-11-02-010	357-14-02-001	364-12-02-010
3	357-11-03-001	357-12-03-001	357-13-03-001	364-11-03-010	357-14-03-001	364-12-03-010
4	357-11-04-001	357-12-04-001	357-13-04-001	364-11-04-010	357-14-04-001	364-12-04-010
5	357-11-05-001	357-12-05-001	357-13-05-001	364-11-05-010	357-14-05-001	364-12-05-010
6	357-11-06-001	357-12-06-001	357-13-06-001	364-11-06-010	357-14-06-001	364-12-06-010
7	357-11-07-001	357-12-07-001	357-13-07-001	364-11-07-010	357-14-07-001	364-12-07-010
8	357-11-08-001	357-12-08-001	357-13-08-001	364-11-08-010	357-14-08-001	364-12-08-010
9	357-11-09-001	357-12-09-001	357-13-09-001	364-11-09-010	357-14-09-001	364-12-09-010
10	357-11-10-001	357-12-10-001	357-13-10-001	364-11-10-010	357-14-10-001	364-12-10-010
11	357-11-11-001	357-12-11-001	357-13-11-001	364-11-11-010	357-14-11-001	364-12-11-010
12	357-11-12-001	357-12-12-001	357-13-12-001	364-11-12-010	357-14-12-001	364-12-12-010
13	357-11-13-001	357-12-13-001	357-13-13-001	364-11-13-010	357-14-13-001	364-12-13-010
14	357-11-14-001	357-12-14-001	357-13-14-001	364-11-14-010	357-14-14-001	364-12-14-010
15	357-11-15-001	357-12-15-001	357-13-15-001	364-11-15-010	357-14-15-001	364-12-15-010
16	357-11-16-001	357-12-16-001	357-13-16-001	364-11-16-010	357-14-16-001	364-12-16-010
17	357-11-17-001	357-12-17-001	357-13-17-001	364-11-17-010	357-14-17-001	364-12-17-010
18	357-11-18-001	357-12-18-001	357-13-18-001	364-11-18-010	357-14-18-001	364-12-18-010
19	357-11-19-001	357-12-19-001	357-13-19-001	364-11-19-010	357-14-19-001	364-12-19-010
20	357-11-20-001	357-12-20-001	357-13-20-001	364-11-20-010	357-14-20-001	364-12-20-010

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.
TERMINAL MATERIAL and FINISH: Brass, Nickel-Plated.
SCREW MATERIAL and FINISH: Steel, Nickel-Plated.
"W", "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.
MARKER STRIP MATERIAL: 1/32" NEMA Grade XPC, UL Rated 94V-O.

* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14. To order imprinted marker strips change fourth field from 010 to 011.

Ⓒ Indicates items normally available through Cinch Distributors.

TRW/CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

142 SERIES (UL RECOGNIZED)

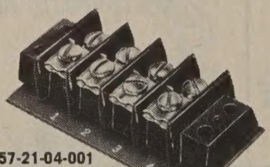
BARRIER TERMINAL BLOCKS AND MARKER STRIPS

355-11-04-001 Barrier Terminal Block with 365-11-04-011 Marker Strip (Imprinted)

Available in 1 to 17-terminal sizes with standard, "W," "¾W" and "Y" type terminals. Has 8-32 binder head screws. Accommodates up to #10 solid wire. Terminal centers are 9/16". Creepage distance from terminal to terminal is 5/16" and terminal to ground is ⅜". Materials and finishes described below. Electrical ratings shown on inside front cover.

Marker strips are available to mount beneath barrier block and provide insulation for metal mounting surface. "Single" or "double" marker strips are available. Terminal designations can be imprinted on marker strips as described on page 12.

WITH QUICK-CLAMP* TERMINALS (UL RECOGNIZED)



357-21-04-001 Barrier Terminal Block with 365-11-04-011 Marker Strip (Imprinted)

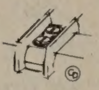
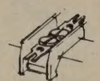
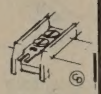
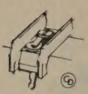
142 Series Barrier Blocks with Quick-Clamp Terminals permit fast, efficient assembly without costly wire terminals and without bending conductors around screws. Insert the conductors, tighten the screws and positive contact is made.

Available in 1 to 17-terminal sizes for one side only, both sides, with "¾W" connection on one side and with "Y" connection through the panel. 8-32 binder head screws are used. 9/16" terminal centers. Refer to page 12 for more complete description on the terminal itself and wire gauges accommodated. Materials and finishes described below. Electrical ratings are shown on the inside front cover.

142 Series marker strips are available to mount beneath the barrier block and afford insulation from the metal mounting surface. "Single" or "double" marker strips are available. Marker strips can be imprinted with terminal designations as shown on page 12.

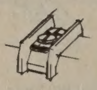
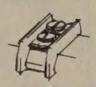
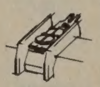
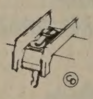
*Patent Pending

142 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	 Ⓖ STANDARD TERMINAL 8-32 x 5/16 B.H. Screws	 "W" TYPE TERMINAL 8-32 x 5/16 B.H. Screws	 Ⓖ "¾W" TYPE TERMINAL 8-32 x 5/16 B.H. Screws	Ⓖ MARKER STRIPS* FOR STANDARD, "W" and "¾W" TYPE TERMINALS	 Ⓖ "Y" TYPE TERMINAL 8-32 x 5/16 B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	355-11-01-001	355-16-01-001	355-17-01-001	365-11-01-010	355-18-01-001	365-12-01-010
2	†355-11-02-001	355-16-02-001	355-17-02-001	365-11-02-010	355-18-02-001	365-12-02-010
3	†355-11-03-001	355-16-03-001	355-17-03-001	365-11-03-010	355-18-03-001	365-12-03-010
4	†355-11-04-001	355-16-04-001	355-17-04-001	365-11-04-010	355-18-04-001	365-12-04-010
5	†355-11-05-001	355-16-05-001	355-17-05-001	365-11-05-010	355-18-05-001	365-12-05-010
6	†355-11-06-001	355-16-06-001	355-17-06-001	365-11-06-010	355-18-06-001	365-12-06-010
7	†355-11-07-001	355-16-07-001	355-17-07-001	365-11-07-010	355-18-07-001	365-12-07-010
8	†355-11-08-001	355-16-08-001	355-17-08-001	365-11-08-010	355-18-08-001	365-12-08-010
9	†355-11-09-001	355-16-09-001	355-17-09-001	365-11-09-010	355-18-09-001	365-12-09-010
10	†355-11-10-001	355-16-10-001	355-17-10-001	365-11-10-010	355-18-10-001	365-12-10-010
11	†355-11-11-001	355-16-11-001	355-17-11-001	365-11-11-010	355-18-11-001	365-12-11-010
12	†355-11-12-001	355-16-12-001	355-17-12-001	365-11-12-010	355-18-12-001	365-12-12-010
13	†355-11-13-001	355-16-13-001	355-17-13-001	365-11-13-010	355-18-13-001	365-12-13-010
14	†355-11-14-001	355-16-14-001	355-17-14-001	365-11-14-010	355-18-14-001	365-12-14-010
15	†355-11-15-001	355-16-15-001	355-17-15-001	365-11-15-010	355-18-15-001	365-12-15-010
16	†355-11-16-001	355-16-16-001	355-17-16-001	365-11-16-010	355-18-16-001	365-12-16-010
17	†355-11-17-001	355-16-17-001	355-17-17-001	365-11-17-010	355-18-17-001	365-12-17-010

†Available with SEMS Screws through Cinch Distributors. See Page 12.

142 SERIES (QUICK-CLAMP) PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	 STANDARD TERMINAL (One Side Only) 8-32 x ⅜ B.H. Screws	 STANDARD TERMINAL (Both Sides) 8-32 x ⅜ B.H. Screws	 "¾W" TYPE TERMINAL 8-32 x ⅜ B.H. Screws	Ⓖ MARKER STRIPS* FOR STANDARD, "W" and "¾W" TYPE TERMINALS	 Ⓖ "Y" TYPE TERMINAL 8-32 x ⅜ B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	357-21-01-001	357-22-01-001	357-23-01-001	365-11-01-010	357-24-01-001	365-12-01-010
2	357-21-02-001	357-22-02-001	357-23-02-001	365-11-02-010	357-24-02-001	365-12-02-010
3	357-21-03-001	357-22-03-001	357-23-03-001	365-11-03-010	357-24-03-001	365-12-03-010
4	357-21-04-001	357-22-04-001	357-23-04-001	365-11-04-010	357-24-04-001	365-12-04-010
5	357-21-05-001	357-22-05-001	357-23-05-001	365-11-05-010	357-24-05-001	365-12-05-010
6	357-21-06-001	357-22-06-001	357-23-06-001	365-11-06-010	357-24-06-001	365-12-06-010
7	357-21-07-001	357-22-07-001	357-23-07-001	365-11-07-010	357-24-07-001	365-12-07-010
8	357-21-08-001	357-22-08-001	357-23-08-001	365-11-08-010	357-24-08-001	365-12-08-010
9	357-21-09-001	357-22-09-001	357-23-09-001	365-11-09-010	357-24-09-001	365-12-09-010
10	357-21-10-001	357-22-10-001	357-23-10-001	365-11-10-010	357-24-10-001	365-12-10-010
11	357-21-11-001	357-22-11-001	357-23-11-001	365-11-11-010	357-24-11-001	365-12-11-010
12	357-21-12-001	357-22-12-001	357-23-12-001	365-11-12-010	357-24-12-001	365-12-12-010
13	357-21-13-001	357-22-13-001	357-23-13-001	365-11-13-010	357-24-13-001	365-12-13-010
14	357-21-14-001	357-22-14-001	357-23-14-001	365-11-14-010	357-24-14-001	365-12-14-010
15	357-21-15-001	357-22-15-001	357-23-15-001	365-11-15-010	357-24-15-001	365-12-15-010
16	357-21-16-001	357-22-16-001	357-23-16-001	365-11-16-010	357-24-16-001	365-12-16-010
17	357-21-17-001	357-22-17-001	357-23-17-001	365-11-17-010	357-24-17-001	365-12-17-010

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.

TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.

MARKER STRIP MATERIAL: 1/32" NEMA Grade XPC, UL Rated 94V-O.

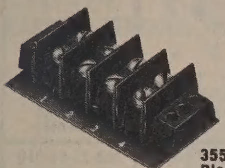
* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14. To order imprinted marker strips change fourth field from 010 to 011.

Ⓖ Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

142/150/151/152 SERIES


355-11-04-222 Barrier Terminal
Block with 365-11-04-011
Marker Strip (Imprinted)

356-11-03-001 Barrier Terminal
Block with 366-11-03-011
Marker Strip (Imprinted)

356-21-03-001 Barrier Terminal
Block with 366-21-03-011
Marker Strip (Imprinted)

356-31-02-001 Barrier
Terminal Block with 366-31-02-011
Marker Strip (Imprinted)

142 SERIES
SPECIAL HIGH BARRIER TERMINAL BLOCKS AND MARKER STRIPS

The 142 Series is also available, in 1 to 4-terminal sizes only, with special ¾″ high barriers to meet requirements for certain 220 volt specifications. Terminal centers still ⁹⁄₁₆″. Creepage distance becomes ¾″. "Single" or "double" marker strips available for use with each size barrier block and can be imprinted with terminal designations as shown on page 12.

SPECIAL 142 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	STD. TERM. ONLY (As Shown) 8-32 x ⁵⁄₁₆ B.H. Screws	MARKER (CD) STRIPS*
1	355-11-01-223	365-11-01-010
2	355-11-02-224	365-11-02-010
3	355-11-03-225	365-11-03-010
4	355-11-04-222	365-11-04-010

150 SERIES (UL RECOGNIZED) BARRIER TERMINAL BLOCKS AND MARKER STRIPS

Available in 1 to 10-terminal sizes with standard, "W," "¾W" and "Y" type terminals. Uses 10-32 binder screws. Accommodates up to #10 wire or 50 amp solder lug for #6 stranded wire. Terminal centers are ¹¹⁄₁₆″. Creepage distance from terminal to terminal is ⅝″; from terminal to ground is ⁷⁄₁₆″. Materials and finishes described below. Electrical ratings are shown on the inside front cover.
Marker strips are available to mount beneath barrier block and provide insulation for metal mounting surface. "Single" or "double" marker strips are available. Terminal designations can be imprinted on marker strips as shown on page 12.

150 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	STANDARD TERMINAL (CD) 10-32 x ⁵⁄₁₆ B.H. Screws	"W" TYPE TERMINAL 10-32 x ⁵⁄₁₆ B.H. Screws	"¾W" TYPE TERMINAL 10-32 x ⁵⁄₁₆ B.H. Screws	MARKER STRIPS* FOR STANDARD "W" and "¾W" TYPE TERMINALS	"Y" TYPE TERMINAL (CD) 10-32 x ⁵⁄₁₆ B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	356-11-01-001	356-16-01-001	356-17-01-001	366-11-01-010	356-18-01-001	366-12-01-010
2	356-11-02-001	356-16-02-001	356-17-02-001	366-11-02-010	356-18-02-001	366-12-02-010
3	356-11-03-001	356-16-03-001	356-17-03-001	366-11-03-010	356-18-03-001	366-12-03-010
4	356-11-04-001	356-16-04-001	356-17-04-001	366-11-04-010	356-18-04-001	366-12-04-010
5	356-11-05-001	356-16-05-001	356-17-05-001	366-11-05-010	356-18-05-001	366-12-05-010
6	356-11-06-001	356-16-06-001	356-17-06-001	366-11-06-010	356-18-06-001	366-12-06-010
7	356-11-07-001	356-16-07-001	356-17-07-001	366-11-07-010	356-18-07-001	366-12-07-010
8	356-11-08-001	356-16-08-001	356-17-08-001	366-11-08-010	356-18-08-001	366-12-08-010
9	356-11-09-001	356-16-09-001	356-17-09-001	366-11-09-010	356-18-09-001	366-12-09-010
10	356-11-10-001	356-16-10-001	356-17-10-001	366-11-10-010	356-18-10-001	366-12-10-010

151 SERIES (UL RECOGNIZED) BARRIER TERMINAL BLOCKS AND MARKER STRIPS

Available in 1 to 8-terminal sizes with standard, "W" and "¾W" type terminals. Has 12-32 binder head screws. Accommodates up to #8 wire or 70 amp solder lug for #4 stranded wire. Creepage distance is ¾″ from terminal to terminal and ½″ from terminal to ground. ⅞″ terminal centers. Materials and finishes described below. Electrical ratings are shown on the inside front cover.
Marker strips to mount beneath barrier block and provide insulation for metal mounting surface are available. "Single" or "double" marker strips are available. Marker strips can be imprinted with terminal designations as described on page 12.

151 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	STANDARD TERMINAL (CD) 12-32 x ⅜ B.H. Screws	"W" TYPE TERMINAL 12-32 x ⅜ B.H. Screws	"¾W" TYPE TERMINAL 12-32 x ⅜ B.H. Screws	MARKER STRIPS* FOR ALL 151 SERIES TERMINALS
1	356-21-01-001	356-26-01-001	356-27-01-001	366-21-01-010
2	356-21-02-001	356-26-02-001	356-27-02-001	366-21-02-010
3	356-21-03-001	356-26-03-001	356-27-03-001	366-21-03-010
4	356-21-04-001	356-26-04-001	356-27-04-001	366-21-04-010
5	356-21-05-001	356-26-05-001	356-27-05-001	366-21-05-010
6	356-21-06-001	356-26-06-001	356-27-06-001	366-21-06-010
7	356-21-07-001	356-26-07-001	356-27-07-001	366-21-07-010
8	356-21-08-001	356-26-08-001	356-27-08-001	366-21-08-010

152 SERIES (UL RECOGNIZED) BARRIER TERMINAL BLOCKS AND MARKER STRIPS

Available in 1 to 6-terminal sizes with standard, "W" and "¾W" type terminals. Uses ¼″-28 binder head screws. Accommodates up to #6 wire or 90 amp solder lug for #2 stranded wire. Creepage distance from terminal to terminal is 1″, from terminal to ground ⅝″. Terminal centers are 1⅛″. Materials and finishes described below. Electrical ratings are shown on the inside front cover.
Marker strips are available to mount beneath barrier block and afford insulation for metal mounting surface. "Single" or "double" marker strips are also available. Terminal designations can be imprinted on marker strips as described on page 12.

152 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	STANDARD TERMINAL (CD) ¼″-28 x ½ B.H. Screws	"W" TYPE TERMINAL ¼″-28 x ½ B.H. Screws	"¾W" TYPE TERMINAL ¼″-28 x ½ B.H. Screws	MARKER STRIPS* FOR ALL 152 SERIES TERMINALS
1	356-31-01-001	356-36-01-001	356-37-01-001	366-31-01-010
2	356-31-02-001	356-36-02-001	356-37-02-001	366-31-Q2-010
3	356-31-03-001	356-36-03-001	356-37-03-001	366-31-03-010
4	356-31-04-001	356-36-04-001	356-37-04-001	366-31-04-010
5	356-31-05-001	356-36-05-001	356-37-05-001	366-31-05-010
6	356-31-06-001	356-36-06-001	356-37-06-001	366-31-06-010

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.
TERMINAL MATERIAL and FINISH: Brass, Nickel-Plated.
SCREW MATERIAL and FINISH: Steel, Nickel-Plated.
"W", "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.
MARKER STRIP MATERIAL: ¹⁄₃₂″ NEMA Grade XPC, UL Rated 94V-O.

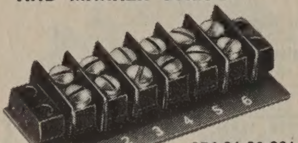
* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14.
To order imprinted marker strips change fourth field from 010 to 011.

(CD) Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

164 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS AND MARKER STRIPS

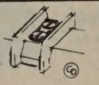
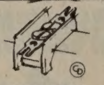
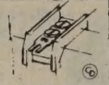
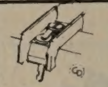


354-21-06-001 Barrier Terminal Block with 363-11-06-011 Marker Strip (Imprinted)

Similar to the 140 Series except equipped with 6-32 screws. Available in 1 to 21-terminal sizes with standard, "W," "¾W" and "Y" type terminals. Accommodates up to #14 solid wire. Terminal centers are ⅜". Creepage distance from terminal to terminal and terminal to ground is ¼". Materials and finishes described below. Electrical ratings shown on inside front cover.

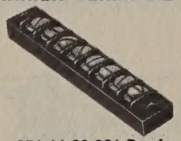
Marker strips are available to mount beneath barrier block and provide insulation for metal mounting surface. "Single" or "double" marker strips are available. Terminal designations can be imprinted on marker strips as described on page 12.

164 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	 (CD) STANDARD TERMINAL 6-32 x ¼ B.H. Screws	 (CD) "W" TYPE TERMINAL 6-32 x ¼ B.H. Screws	 (CD) "¾W" TYPE TERMINAL 6-32 x ¼ B.H. Screws	(CD) MARKER STRIPS* FOR STANDARD, "W" and "¾W" TYPE TERMINALS	 (CD) "Y" TYPE TERMINAL 6-32 x ¼ B.H. Screws	MARKER STRIPS* FOR "Y" TYPE TERMINAL
1	354-21-01-001	354-26-01-001	354-27-01-001	363-11-01-010	354-28-01-001	363-12-01-010
2	354-21-02-001	354-26-02-001	354-27-02-001	363-11-02-010	354-28-02-001	363-12-02-010
3	354-21-03-001	354-26-03-001	354-27-03-001	363-11-03-010	354-28-03-001	363-12-03-010
4	354-21-04-001	354-26-04-001	354-27-04-001	363-11-04-010	354-28-04-001	363-12-04-010
5	354-21-05-001	354-26-05-001	354-27-05-001	363-11-05-010	354-28-05-001	363-12-05-010
6	354-21-06-001	354-26-06-001	354-27-06-001	363-11-06-010	354-28-06-001	363-12-06-010
7	354-21-07-001	354-26-07-001	354-27-07-001	363-11-07-010	354-28-07-001	363-12-07-010
8	354-21-08-001	354-26-08-001	354-27-08-001	363-11-08-010	354-28-08-001	363-12-08-010
9	354-21-09-001	354-26-09-001	354-27-09-001	363-11-09-010	354-28-09-001	363-12-09-010
10	354-21-10-001	354-26-10-001	354-27-10-001	363-11-10-010	354-28-10-001	363-12-10-010
11	354-21-11-001	354-26-11-001	354-27-11-001	363-11-11-010	354-28-11-001	363-12-11-010
12	354-21-12-001	354-26-12-001	354-27-12-001	363-11-12-010	354-28-12-001	363-12-12-010
13	354-21-13-001	354-26-13-001	354-27-13-001	363-11-13-010	354-28-13-001	363-12-13-010
14	354-21-14-001	354-26-14-001	354-27-14-001	363-11-14-010	354-28-14-001	363-12-14-010
15	354-21-15-001	354-26-15-001	354-27-15-001	363-11-15-010	354-28-15-001	363-12-15-010
16	354-21-16-001	354-26-16-001	354-27-16-001	363-11-16-010	354-28-16-001	363-12-16-010
17	354-21-17-001	354-26-17-001	354-27-17-001	363-11-17-010	354-28-17-001	363-12-17-010
18	354-21-18-001	354-26-18-001	354-27-18-001	363-11-18-010	354-28-18-001	363-12-18-010
19	354-21-19-001	354-26-19-001	354-27-19-001	363-11-19-010	354-28-19-001	363-12-19-010
20	354-21-20-001	354-26-20-001	354-27-20-001	363-11-20-010	354-28-20-001	363-12-20-010
21	354-21-21-001	354-26-21-001	354-27-21-001	363-11-21-010	354-28-21-001	363-12-21-010

171 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS



351-11-08-001 Barrier Terminal Block

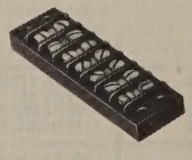
A miniature barrier terminal block with single screw terminals. Available in 1 to 8 terminal sizes with standard type terminal only. Has 2-56 x 3/16" binder head screws. Terminal centers are ¼". Insulator material is general purpose black phenolic. Eyelets are brass with nickel-plated finish. Marker strips are not available for use with the 171 Series. Screws are steel, nickel-plated.

171 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	PART NUMBER (CD)	NO. OF TERMINALS	PART NUMBER (CD)
1	351-11-01-001	5	351-11-05-001
2	351-11-02-001	6	351-11-06-001
3	351-11-03-001	7	351-11-07-001
4	351-11-04-001	8	351-11-08-001

172 SERIES (UL RECOGNIZED)

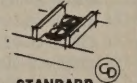
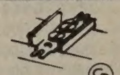
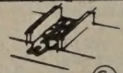
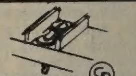
BARRIER TERMINAL BLOCKS



351-21-08-001 Barrier Terminal Block

Miniature barrier terminal block with double screw terminals. Available in 1 to 14-terminal sizes with standard, "W," "¾W" and "Y" type terminals. 2-56 binder head screws. ¼" terminal centers. Insulator molded of general purpose black phenolic. Eyelets and screws are nickel-plated brass. "W," "¾W" and "Y" terminals are made of brass, hot solder dipped. Marker strips are available; write for details.

172 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	 (CD) STANDARD TERMINAL 2-56 x 3/16 B.H. Screws	 (CD) "W" TYPE TERMINAL 2-56 x ¼ B.H. Screws	 (CD) "¾W" TYPE TERMINAL 2-56 x ¼ B.H. Screws	 (CD) "Y" TYPE TERMINAL 2-56 x 3/16 B.H. Screws
1	351-21-01-001	351-26-01-001	351-27-01-001	351-28-01-001
2	351-21-02-001	351-26-02-001	351-27-02-001	351-28-02-001
3	351-21-03-001	351-26-03-001	351-27-03-001	351-28-03-001
4	351-21-04-001	351-26-04-001	351-27-04-001	351-28-04-001
5	351-21-05-001	351-26-05-001	351-27-05-001	351-28-05-001
6	351-21-06-001	351-26-06-001	351-27-06-001	351-28-06-001
7	351-21-07-001	351-26-07-001	351-27-07-001	351-28-07-001
8	351-21-08-001	351-26-08-001	351-27-08-001	351-28-08-001
9	351-21-09-001	351-26-09-001	351-27-09-001	351-28-09-001
10	351-21-10-001	351-26-10-001	351-27-10-001	351-28-10-001
11	351-21-11-001	351-26-11-001	351-27-11-001	351-28-11-001
12	351-21-12-001	351-26-12-001	351-27-12-001	351-28-12-001
13	351-21-13-001	351-26-13-001	351-27-13-001	351-28-13-001
14	351-21-14-001	351-26-14-001	351-27-14-001	351-28-14-001

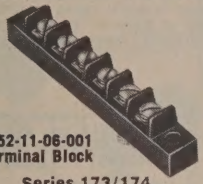
INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.
EYELET MATERIAL and FINISH: Brass, Nickel-Plated.
SCREW MATERIAL and FINISH: Steel, Nickel-Plated.
"W", "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.
MARKER STRIP MATERIAL: 1/32" NEMA Grade XPC, UL Rated 94V-O.

* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14. To order imprinted marker strips change fourth field from 010 to 011.

(CD) Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

173/174/176 SERIES
BARRIER TERMINAL BLOCKS



352-11-06-001
Barrier Terminal Block
Series 173/174

353-51-07-001

Series 176

173/174 SERIES BARRIER TERMINAL BLOCKS

Single screw terminal barrier blocks. Terminals centers are 3/8". 173 Series has 4-4 x 5/16" Sems type binder head screws. 174 Series has 4-40 x 1/4" plain binder head screws. Both types have general purpose black phenolic insulators. Nickel-plated brass eyelets and steel screws, both nickel-plated.

176 SERIES FEED-THRU TERMINALS

Same dimensions and materials as 173/174 except 5-40 x 3/16" binder head screws. Feed-thru terminals are molded-in electro-tin plated brass. Available with or without mounting tabs, with 1/8" leads for 1/16" boards or 3/16" leads for 1/8" boards. Terminals are 0.093" diameter, for insertion in 9/64" hole.

PART NUMBER ORDERING INFORMATION

No. OF TERMI-NALS	173 SERIES 4-40 x 5/16 Sems Type B.H. Screws	174 SERIES 4-40 x 1/4 Plain Type B.H. Screws	176 SERIES for 1/16" boards with mounting tabs	176 SERIES for 1/16" boards without mounting tabs	176 SERIES for 1/8" boards with mounting tabs	176 SERIES for 1/8" boards without mounting tabs
1	352-15-01-001	352-11-01-001				
2	352-15-02-001	352-11-02-001	353-51-02-001	353-51-02-002	353-51-02-100	353-51-02-101
3	352-15-03-001	352-11-03-001	353-51-03-001	353-51-03-002	353-51-03-100	353-51-03-101
4	352-15-04-001	352-11-04-001	353-51-04-001	353-51-04-002	353-51-04-100	353-51-04-101
5	352-15-05-001	352-11-05-001	353-51-05-001	353-51-05-002	353-51-05-100	353-51-05-101
6	352-15-06-001	352-11-06-001	353-51-06-001	353-51-06-002	353-51-06-100	353-51-06-101
7	352-15-07-001	352-11-07-001	353-51-07-001	353-51-07-002	353-51-07-100	353-51-07-101
8	352-15-08-001	352-11-08-001	353-51-08-001	353-51-08-002	353-51-08-100	353-51-08-101
9	352-15-09-001	352-11-09-001	353-51-09-001	353-51-09-002	353-51-09-100	353-51-09-101
10	352-15-10-001	352-11-10-001	353-51-10-001	353-51-10-002	353-51-10-100	353-51-10-101

240/241/242 SERIES
BARRIER TERMINAL BLOCKS AND MARKER STRIPS

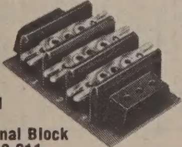
359-14-06-001
240 Series
Barrier Terminal Block with
363-11-06-011 Marker Strip
(Imprinted)

Similar to the 140, 141 and 142 Series except that solder terminals are used instead of screw terminals. These solder terminals are designed to accommodate one or more wires, which can be brought through slot into hole, simplifying soldering. Terminal sizes available are: 1-25 for the 240 Series, 1-20 for the 241 and 1-17 for the 242. Terminal centers are shown in the dimensional drawings. Materials and finishes are described below. Electrical ratings are shown on the inside front cover. Marker strips that mount beneath barrier block and afford insulation from metal mounting surfaces are available in either "single" or "double" type. See page 12 for information on imprinting terminal designations in these marker strips.

PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	240 SERIES BARRIER BLOCKS With Solder Terminals	240 SERIES MARKER STRIPS*	241 SERIES BARRIER BLOCKS With Solder Terminals	241 SERIES MARKER STRIPS*	242 SERIES BARRIER BLOCKS With Solder Terminals	242 SERIES MARKER STRIPS*
1	359-14-01-001	363-11-01-010	359-24-01-001	364-11-01-010	359-34-01-001	365-11-01-010
2	359-14-02-001	363-11-02-010	359-24-02-001	364-11-02-010	359-34-02-001	365-11-02-010
3	359-14-03-001	363-11-03-010	359-24-03-001	364-11-03-010	359-34-03-001	365-11-03-010
4	359-14-04-001	363-11-04-010	359-24-04-001	364-11-04-010	359-34-04-001	365-11-04-010
5	359-14-05-001	363-11-05-010	359-24-05-001	364-11-05-010	359-34-05-001	365-11-05-010
6	359-14-06-001	363-11-06-010	359-24-06-001	364-11-06-010	359-34-06-001	365-11-06-010
7	359-14-07-001	363-11-07-010	359-24-07-001	364-11-07-010	359-34-07-001	365-11-07-010
8	359-14-08-001	363-11-08-010	359-24-08-001	364-11-08-010	359-34-08-001	365-11-08-010
9	359-14-09-001	363-11-09-010	359-24-09-001	364-11-09-010	359-34-09-001	365-11-09-010
10	359-14-10-001	363-11-10-010	359-24-10-001	364-11-10-010	359-34-10-001	365-11-10-010
11	359-14-11-001	363-11-11-010	359-24-11-001	364-11-11-010	359-34-11-001	365-11-11-010
12	359-14-12-001	363-11-12-010	359-24-12-001	364-11-12-010	359-34-12-001	365-11-12-010
13	359-14-13-001	363-11-13-010	359-24-13-001	364-11-13-010	359-34-13-001	365-11-13-010
14	359-14-14-001	363-11-14-010	359-24-14-001	364-11-14-010	359-34-14-001	365-11-14-010
15	359-14-15-001	363-11-15-010	359-24-15-001	364-11-15-010	359-34-15-001	365-11-15-010
16	359-14-16-001	363-11-16-010	359-24-16-001	364-11-16-010	359-34-16-001	365-11-16-010
17	359-14-17-001	363-11-17-010	359-24-17-001	364-11-17-010	359-34-17-001	365-11-17-010
18	359-14-18-001	363-11-18-010	359-24-18-001	364-11-18-010		
19	359-14-19-001	363-11-19-010	359-24-19-001	364-11-19-010		
20	359-14-20-001	363-11-20-010	359-24-20-001	364-11-20-010		
21	359-14-21-001	363-11-21-010				
22	359-14-22-001	363-11-22-010				
23	359-14-23-001	363-11-23-010				
24	359-14-24-001	363-11-24-010				
25	359-14-25-001	363-11-25-010				

250/251/252 SERIES
BARRIER TERMINAL BLOCKS AND MARKER STRIPS



359-44-03-001
250 Series
Barrier Terminal Block
with 366-11-03-011
Marker Strip (Imprinted)

Similar to the 150, 151 and 152 Series except for use of solder terminals instead of screw terminals. Solder terminals accommodate one or more wires that can be brought through slot into hole, simplifying solder operation. Terminal sizes available include: 1-10 for the 250 Series, 1-8 for the 251 and 1-6 for the 252. Refer to dimensional drawings for terminal centers. Materials and finishes are described below. Electrical ratings are shown on inside front cover. "Single" or "double" marker strips are available to mount beneath barrier block and provide insulation from metal mounting surface. Terminal designations can be imprinted on marker strips as described on page 12.

PART NUMBER ORDERING INFORMATION

NO. OF TERMI-NALS	250 SERIES BARRIER BLOCKS With Solder Terminals	250 SERIES MARKER STRIPS*	251 SERIES BARRIER BLOCKS With Solder Terminals	251 SERIES MARKER STRIPS*	252 SERIES BARRIER BLOCKS With Solder Terminals	252 SERIES MARKER STRIPS*
1	359-44-01-001	366-11-01-010	359-54-01-001	366-21-01-001	359-64-01-001	366-31-01-010
2	359-44-02-001	366-11-02-010	359-54-02-001	366-21-02-010	359-64-02-001	366-31-02-010
3	359-44-03-001	366-11-03-010	359-54-03-001	366-21-03-010	359-64-03-001	366-31-03-010
4	359-44-04-001	366-11-04-010	359-54-04-001	366-21-04-010	359-64-04-001	366-31-04-010
5	359-44-05-001	366-11-05-010	359-54-05-001	366-21-05-010	359-64-05-001	366-31-05-010
6	359-44-06-001	366-11-06-010	359-54-06-001	366-21-06-010	359-64-06-001	366-31-06-010
7	359-44-07-001	366-11-07-010	359-54-07-001	366-21-07-010		
8	359-44-08-001	366-11-08-010	359-54-08-001	366-21-08-010		
9	359-44-09-001	366-11-09-010				
10	359-44-10-001	366-11-10-010				

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.

TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.

MARKER STRIP MATERIAL: 1/32" NEMA Grade XPC, UL Rated 94V-0.

* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14.

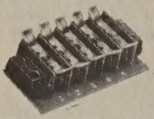
To order imprinted marker strips change fourth field from 010 to 011.

Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

341/342 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS AND MARKER STRIPS



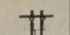
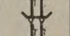
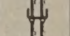
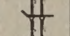
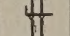
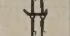
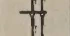
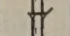
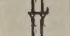
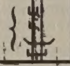
354-32-05-001 341 Series Barrier Terminal Block with 364-11-05-011 Marker Strip (Imprinted)

Similar to 141 and 142 Series except equipped with solderless-type terminals to accommodate either AMP tab receptacles or Ark-Les quick connects. (Contact manufacturer for exact part number.) Terminal sizes available are 1-20 for the 341 Series and 1-17 for the 342. A variety of terminal types are available for each series as shown. Refer to dimensional drawings for terminal centers. Materials and finishes are described below. Electrical ratings are shown on inside front cover.

"Single" or "double" type marker strips can be supplied to mount beneath barrier block and afford insulation from metal mounting surfaces. Terminal designations can be imprinted on marker strips as described on page 12.

9 different types of terminals can be supplied with any of the 341 or 342 Series barrier blocks. Identify these types by changing the **second field** of the part number to match the 341 or 342 series number opposite the desired terminal drawing below. For example, to order a 5-terminal 341 Series with both terminals at right angles (Type C), signify part no. 354-33-05-001. In addition, there are 4 more terminal types as shown which can be ordered in combination with the 9 regular terminal types. To order any of these 4 "combination" types, write direct to the factory for more further information, enclosing detailed drawings where possible.

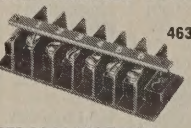
PART NUMBER ORDERING INFORMATION

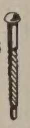
Insert in 2nd Field 341 Series	Insert in 2nd Field 342 Series	Terminal Drawing	Terminal Type
31	21		A
32	22		B
33	23		C
34	24		D
35	25		E
36	26		F
37	27		G
38	28		H
39	29		J
Combination Types			

NO. OF TERMINALS	341 SERIES BARRIER BLOCKS† With Solderless Terminals	341 SERIES MARKER STRIPS* (CD)	342 SERIES BARRIER BLOCKS† With Solderless Terminals	342 SERIES MARKER STRIPS* (CD)
1	354-31-01-001	364-11-01-010	355-21-01-001	365-11-01-010
2	354-31-02-001	364-11-02-010	355-21-02-001	365-11-02-010
3	354-31-03-001	364-11-03-010	355-21-03-001	365-11-03-010
4	354-31-04-001	364-11-04-010	355-21-04-001	365-11-04-010
5	354-31-05-001	364-11-05-010	355-21-05-001	365-11-05-010
6	354-31-06-001	364-11-06-010	355-21-06-001	365-11-06-010
7	354-31-07-001	364-11-07-010	355-21-07-001	365-11-07-010
8	354-31-08-001	364-11-08-010	355-21-08-001	365-11-08-010
9	354-31-09-001	364-11-09-010	355-21-09-001	365-11-09-010
10	354-31-10-001	364-11-10-010	355-21-10-001	365-11-10-010
11	354-31-11-001	364-11-11-010	355-21-11-001	365-11-11-010
12	354-31-12-001	364-11-12-010	355-21-12-001	365-11-12-010
13	354-31-13-001	364-11-13-010	355-21-13-001	365-11-13-010
14	354-31-14-001	364-11-14-010	355-21-14-001	365-11-14-010
15	354-31-15-001	364-11-15-010	355-21-15-001	365-11-15-010
16	354-31-16-001	364-11-16-010	355-21-16-001	365-11-16-010
17	354-31-17-001	364-11-17-010	355-21-17-001	365-11-17-010
18	354-31-18-001	364-11-18-010		
19	354-31-19-001	364-11-19-010		
20	354-31-20-001	364-11-20-010		

540 SERIES (UL RECOGNIZED)

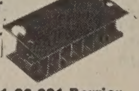
BARRIER TERMINAL BLOCKS AND MARKER STRIPS





Drive Pin 463-10-22-015

353-21-06-001 Barrier Terminal Block with 363-21-06-071 Marker Strip (Imprinted)



353-21-06-001 Barrier Terminal Block with 363-31-06-020 "Cover"

Available in 1 to 31 terminal sizes with standard, "W," "¾W" and "Y" type terminals. Particularly recommended when electrical and mechanical performance requirements are especially critical. Same terminal centers (⅜″) as 140 Series. Also uses same 5-40 binder head screws. Otherwise, has higher and wider barriers. Extra material between barriers at the base strengthens construction and maintains same ½″ creepage distance between terminal to terminal and terminal to ground. Terminal designations can be imprinted on this base. Materials and finishes are described below. Electrical ratings are shown on inside front cover.

Bottoms are closed so that insulating strips are not required. However, knockouts are molded into the base so that "Y" terminals can be accommodated if desired. A top-mounted marker strip, ¼″ wide is available and can be imprinted with ⅛″ numbers or a "double" marker strip can be used as a "cover" with one end position slotted to facilitate swinging the cover clear for quick inspection. Character designations can be imprinted on one or both sides of the cover if desired as described on page 12.

540 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	STANDARD TERMINAL (CD) 5-40 x ¼ B.H. Screws	"W" TYPE TERMINAL 5-40 x ¼ B.H. Screws	"¾W" TYPE TERMINAL 5-40 x ¼ B.H. Screws	"Y" TYPE TERMINAL 5-40 x ¼ B.H. Screws	540 SERIES TOP-MOUNTED MARKER STRIPS§ (CD)	540 SERIES COVERS‡¶ (DOUBLE MARKER STRIPS)
1	353-21-01-001	353-26-01-001	353-27-01-001	353-28-01-001	363-21-01-070	363-31-01-020
2	353-21-02-001	353-26-02-001	353-27-02-001	353-28-02-001	363-21-02-070	363-31-02-020
3	353-21-03-001	353-26-03-001	353-27-03-001	353-28-03-001	363-21-03-070	363-31-03-020
4	353-21-04-001	353-26-04-001	353-27-04-001	353-28-04-001	363-21-05-070	363-31-04-020
5	353-21-05-001	353-26-05-001	353-27-05-001	353-28-05-001	363-21-05-070	363-31-05-020
6	353-21-06-001	353-26-06-001	353-27-06-001	353-28-06-001	363-21-06-070	363-31-06-020
7	353-21-07-001	353-26-07-001	353-27-07-001	353-28-07-001	363-21-07-070	363-21-07-020
8	353-21-08-001	353-26-08-001	353-27-08-001	353-28-08-001	363-21-08-070	363-31-08-020
9	353-21-09-001	353-26-09-001	353-27-09-001	353-28-09-001	363-21-09-070	363-31-09-020
10	353-21-10-001	353-26-10-001	353-27-10-001	353-28-10-001	363-21-10-070	363-31-10-020
11	353-21-11-001	353-26-11-001	353-27-11-001	353-28-11-001	363-21-11-070	363-31-11-020
12	353-21-12-001	353-26-12-001	353-27-12-001	353-28-12-001	363-21-12-070	363-31-12-020
13	353-21-13-001	353-26-13-001	353-27-13-001	353-28-13-001	363-21-13-070	363-31-13-020
14	353-21-14-001	353-26-14-001	353-27-14-001	353-28-14-001	363-21-14-070	363-31-14-020
15	353-21-15-001	353-26-15-001	353-27-15-001	353-28-15-001	363-21-15-070	363-31-15-020
16	353-21-16-001	353-26-16-001	353-27-16-001	353-28-16-001	363-21-16-070	363-31-16-020
17	353-21-17-001	353-26-17-001	353-27-17-001	353-28-17-001	363-21-17-070	363-31-17-020
18	353-21-18-001	353-26-18-001	353-27-18-001	353-28-18-001	363-21-18-070	363-31-18-020
19	353-21-19-001	353-26-19-001	353-27-19-001	353-28-19-001	363-21-19-070	363-31-19-020
20	353-21-20-001	353-26-20-001	353-27-20-001	353-28-20-001	363-21-20-070	363-31-20-020
21	353-21-21-001	353-26-21-001	353-27-21-001	353-28-21-001	363-21-21-070	363-31-21-020
22	353-21-22-001	353-26-22-001	353-27-22-001	353-28-22-001	363-21-22-070	363-31-22-020
23	353-21-23-001	353-26-23-001	353-27-23-001	353-28-23-001	363-21-23-070	363-31-23-020
24	353-21-24-001	353-26-24-001	353-27-24-001	353-28-24-001	363-21-24-070	363-31-24-020
25	353-21-25-001	353-26-25-001	353-27-25-001	353-28-25-001	363-21-25-070	363-31-25-020
26	353-21-26-001	353-26-26-001	353-27-26-001	353-28-26-001	363-21-26-070	363-31-26-020
27	353-21-27-001	353-26-27-001	353-27-27-001	353-28-27-001	363-21-27-070	363-31-27-020
28	353-21-28-001	353-26-28-001	353-27-28-001	353-28-28-001	363-21-28-070	363-31-28-020
29	353-21-29-001	353-26-29-001	353-27-29-001	353-28-29-001	363-21-29-070	363-31-29-020
30	353-21-30-001	353-26-30-001	353-27-30-001	353-28-30-001	363-21-30-070	363-31-30-020
31	353-21-31-001	353-26-31-001	353-27-31-001	353-28-31-001	363-21-31-070	363-31-31-020

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.

TERMINAL MATERIAL and FINISH: Brass, Nickel-Plated.

"W," "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.

* Marker strip part numbers shown are "single sided" not imprinted type that extend out on only one side; equivalent "double" type strips extending out on both sides also available. To order change second field to 14. To order imprinted marker strips change fourth field from 010 to 011.

† See information on "341 and 342 Series Terminals" on how to signify desired terminal type by changing second field part numbers above. "31" and "21" are given as examples.

341 and 342 SERIES TERMINAL MATERIAL and FINISH: Brass, Cadmium-Plated.

341 and 342 SERIES MARKER STRIP MATERIAL: 1/32″ NEMA Grade XPC, UL Rated 94V-0.

‡ 17/64″ spacers should be used with 540 Series cover available on special request.

§ TOP-MOUNTED MARKER STRIP MATERIAL: 1/16″ NEMA Grade XPC, UL Rated 94V-0.

¶ COVER (DOUBLE MARKER STRIP) MATERIAL: 1/32″ NEMA Grade XPC, UL Rated 94V-0.

SCREW MATERIAL and FINISH: Steel, Nickel-Plated.

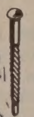
(CD) Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

541 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS AND ACCESSORIES


Drive Pin 463-10-22-014

354-61-05-001 Barrier Terminal Block with 364-61-05-071 Marker Strip (Imprinted)

354-61-05-001 Barrier Terminal Block with 364-71-05-020 "Cover"

Available in 1 to 30 terminal sizes with standard, "W," "¾W" and "Y" type terminals. Ideal for higher voltage requirements. Same terminal centers (⁷⁄₁₆″) as 141 Series. 6-32 binder head screws. Has higher and wider barriers with extra material between barriers at the base. Creepage distance is ⅝″ between terminal to terminal and terminal to ground. Terminal designations can be imprinted on base. Materials and finishes are described below. Electrical ratings are shown on inside front cover.

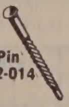
Insulating strips are not required because of closed bottoms on barrier block. However, "Y" terminals can still be accommodated if desired through use of knockouts molded into base. Top-mounted ¼″ wide marker strip is available and can be imprinted with ⅛″ numbers or a "double" marker strip can be used as a "cover" with one end position slotted to facilitate swinging clear. Cover can be imprinted with character designations on one or both sides as described on page 12.

541 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	STANDARD TERMINAL CO 6-32 x ¼ B.H. Screws	"W" TYPE TERMINAL 6-32 x ⁵⁄₁₆ B.H. Screws	"¾W" TYPE TERMINAL 6-32 x ⁵⁄₁₆ B.H. Screws	"Y" TYPE TERMINAL 6-32 x ⁵⁄₁₆ B.H. Screws	541 SERIES TOP-MOUNTED MARKER STRIPS CO	541 SERIES COVERS† (DOUBLE MARKER STRIPS)
1	354-61-01-001	354-66-01-001	354-67-01-001	354-68-01-001	364-61-01-070	364-71-01-020
2	354-61-02-001	354-66-02-001	354-67-02-001	354-68-02-001	364-61-02-070	364-71-02-020
3	354-61-03-001	354-66-03-001	354-67-03-001	354-68-03-001	364-61-03-070	364-71-03-020
4	354-61-04-001	354-66-04-001	354-67-04-001	354-68-04-001	364-61-04-070	364-71-04-020
5	354-61-05-001	354-66-05-001	354-67-05-001	354-68-05-001	364-61-05-070	364-71-05-020
6	354-61-06-001	354-66-06-001	354-67-06-001	354-68-06-001	364-61-06-070	364-71-06-020
7	354-61-07-001	354-66-07-001	354-67-07-001	354-68-07-001	364-61-07-070	364-71-07-020
8	354-61-08-001	354-66-08-001	354-67-08-001	354-68-08-001	364-61-08-070	364-71-08-020
9	354-61-09-001	354-66-09-001	354-67-09-001	354-68-09-001	364-61-09-070	364-71-09-020
10	354-61-10-001	354-66-10-001	354-67-10-001	354-68-10-001	364-61-10-070	364-71-10-020
11	354-61-11-001	354-66-11-001	354-67-11-001	354-68-11-001	364-61-11-070	364-71-11-020
12	354-61-12-001	354-66-12-001	354-67-12-001	354-68-12-001	364-61-12-070	364-71-12-020
13	354-61-13-001	354-66-13-001	354-67-13-001	354-68-13-001	364-61-13-070	364-71-13-020
14	354-61-14-001	354-66-14-001	354-67-14-001	354-68-14-001	364-61-14-070	364-71-14-020
15	354-61-15-001	354-66-15-001	354-67-15-001	354-68-15-001	364-61-15-070	364-71-15-020
16	354-61-16-001	354-66-16-001	354-67-16-001	354-68-16-001	364-61-16-070	364-71-16-020
17	354-61-17-001	354-66-17-001	354-67-17-001	354-68-17-001	364-61-17-070	364-71-17-020
18	354-61-18-001	354-66-18-001	354-67-18-001	354-68-18-001	364-61-18-070	364-71-18-020
19	354-61-19-001	354-66-19-001	354-67-19-001	354-68-19-001	364-61-19-070	364-71-19-020
20	354-61-20-001	354-66-20-001	354-67-20-001	354-68-20-001	364-61-20-070	364-71-20-020
21	354-61-21-001	354-66-21-001	354-67-21-001	354-68-21-001	364-61-21-070	364-71-21-020
22	354-61-22-001	354-66-22-001	354-67-22-001	354-68-22-001	364-61-22-070	364-71-22-020
23	354-61-23-001	354-66-23-001	354-67-23-001	354-68-23-001	364-61-23-070	364-71-23-020
24	354-61-24-001	354-66-24-001	354-67-24-001	354-68-24-001	364-61-24-070	364-71-24-020
25	354-61-25-001	354-66-25-001	354-67-25-001	354-68-25-001	364-61-25-070	364-71-25-020
26	354-61-26-001	354-66-26-001	354-67-26-001	354-68-26-001	364-61-26-070	364-71-26-020
27	354-61-27-001	354-66-27-001	354-67-27-001	354-68-27-001	364-61-27-070	364-71-27-020
28	354-61-28-001	354-66-28-001	354-67-28-001	354-68-28-001	364-61-28-070	364-71-28-020
29	354-61-29-001	354-66-29-001	354-67-29-001	354-68-29-001	364-61-29-070	364-71-29-020
30	354-61-30-001	354-66-30-001	354-67-30-001	354-68-30-001	364-61-30-070	364-71-30-020

542 SERIES (UL RECOGNIZED)

BARRIER TERMINAL BLOCKS AND ACCESSORIES


Drive Pin 463-10-22-014

355-31-04-001 Barrier Terminal Block with 365-31-04-071 Marker Strip (Imprinted)

355-31-04-001 Barrier Terminal Block with 365-41-04-020 "Cover"

Available in 1-26 terminal sizes with standard, "W," "¾W" and "Y" type terminals. Higher and wider barriers increase voltage ratings. Same ⁵⁄₁₆″ terminal centers as 142 Series. Also uses 8-32 x ⁵⁄₁₆″ binder head screws. Extra material between barriers at base adds strength and maintains same ¾″ creepage distance between terminal to terminal and terminal to ground. Terminal designations can be imprinted on base. Materials and finishes described below. Electrical ratings shown on inside front cover.

Bottoms are closed, eliminating need for insulating strips. Knockouts are molded into base to accommodate "Y" terminals if desired. Top mounted ¼″ wide marker strip is available and can be imprinted with ⅛″ numbers or a "double" marker strip can be used as a "cover" with one end position slotted to facilitate swinging clear for fast inspection. Character designations can be imprinted on one or both side of the cover if desired.

542 SERIES PART NUMBER ORDERING INFORMATION

NO. OF TERMINALS	STANDARD TERMINAL CO 8-32 x ⁵⁄₁₆ B.H. Screws	"W" TYPE TERMINAL 8-32 x ⁵⁄₁₆ B.H. Screws	"¾W" TYPE TERMINAL 8-32 x ⁵⁄₁₆ B.H. Screws	"Y" TYPE TERMINAL 8-32 x ⁵⁄₁₆ B.H. Screws	542 SERIES CO TOP-MOUNTED MARKER STRIPS	542 SERIES COVERS‡ (DOUBLE MARKER STRIPS)
1	355-31-01-001	355-36-01-001	355-37-01-001	355-38-01-001	365-31-01-070	365-41-01-020
2	355-31-02-001	355-36-02-001	355-37-02-001	355-38-02-001	365-31-02-070	365-41-02-020
3	355-31-03-001	355-36-03-001	355-37-03-001	355-38-03-001	365-31-03-070	365-41-03-020
4	355-31-04-001	355-36-04-001	355-37-04-001	355-38-04-001	365-31-04-070	365-41-04-020
5	355-31-05-001	355-36-05-001	355-37-05-001	355-38-05-001	365-31-05-070	365-41-05-020
6	355-31-06-001	355-36-06-001	355-37-06-001	355-38-06-001	365-31-06-070	365-41-06-020
7	355-31-07-001	355-36-07-001	355-37-07-001	355-38-07-001	365-31-07-070	365-41-07-020
8	355-31-08-001	355-36-08-001	355-37-08-001	355-38-08-001	365-31-08-070	365-41-08-020
9	355-31-09-001	355-36-09-001	355-37-09-001	355-38-09-001	365-31-09-070	365-41-09-020
10	355-31-10-001	355-36-10-001	355-37-10-001	355-38-10-001	365-31-10-070	365-41-10-020
11	355-31-11-001	355-36-11-001	355-37-11-001	355-38-11-001	365-31-11-070	365-41-11-020
12	355-31-12-001	355-36-12-001	355-37-12-001	355-38-12-001	365-31-12-070	365-41-12-020
13	355-31-13-001	355-36-13-001	355-37-13-001	355-38-13-001	365-31-13-070	365-41-13-020
14	355-31-14-001	355-36-14-001	355-37-14-001	355-38-14-001	365-31-14-070	365-41-14-020
15	355-31-15-001	355-36-15-001	355-37-15-001	355-38-15-001	365-31-15-070	365-41-15-020
16	355-31-16-001	355-36-16-001	355-37-16-001	355-38-16-001	365-31-16-070	365-41-16-020
17	355-31-17-001	355-36-17-001	355-37-17-001	355-38-17-001	365-31-17-070	365-41-17-020
18	355-31-18-001	355-36-18-001	355-37-18-001	355-38-18-001	365-31-18-070	365-41-18-020
19	355-31-19-001	355-36-19-001	355-37-19-001	355-38-19-001	365-31-19-070	365-41-19-020
20	355-31-20-001	355-36-20-001	355-37-20-001	355-38-20-001	365-31-20-070	365-41-20-020
21	355-31-21-001	355-36-21-001	355-37-21-001	355-38-21-001	365-31-21-070	365-41-21-020
22	355-31-22-001	355-36-22-001	355-37-22-001	355-38-22-001	365-31-22-070	365-41-22-020
23	355-31-23-001	355-36-23-001	355-37-23-001	355-38-23-001	365-31-23-070	365-41-23-020
24	355-31-24-001	355-36-24-001	355-37-24-001	355-38-24-001	365-31-24-070	365-41-24-020
25	355-31-25-001	355-36-25-001	355-37-25-001	355-38-25-001	365-31-25-070	365-41-25-020
26	355-31-26-001	355-36-26-001	355-37-26-001	355-38-26-001	365-31-26-070	365-41-26-020

INSULATOR MATERIAL: General Purpose Black Phenolic; Other Materials Available.
TERMINAL MATERIAL and FINISH: Brass, Nickel-Plated.
SCREW MATERIAL and FINISH: Steel, Nickel-Plated.
"W", "¾W" and "Y" TERMINAL MATERIAL and FINISH: Brass, Hot Solder Dipped.
TOP-MOUNTED MARKER STRIP MATERIAL: ¹⁄₁₆″ NEMA Grade XPC, UL Rated 94V-0.
COVER (DOUBLE MARKER STRIP) MATERIAL: ¹⁄₃₂″ NEMA Grade XPC, UL Rated 94V-0.
CO Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

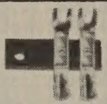
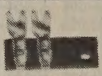
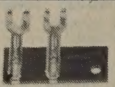
FANNING STRIPS

FOR CONNECTING TO BARRIER TERMINAL BLOCKS

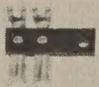
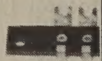
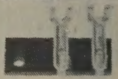
161 Series Fanning Strip with Cable Clamp and 141 Series Barrier Terminal Block

Fanning strips serve as a convenient means for rapidly making and removing connections from barrier terminal blocks. They facilitate cable or harness wiring and minimize the possibility of subsequent wiring errors. Both straight and angle type fanning strips are available. Terminals are made of .032″ brass, cadmium-plated. The 3/32″ thick, 1/2″ wide XP black phenolic mounts are furnished with a hole, in either the right or left side, for securing the cable with lacing twine. For larger sizes, use of a cable clamp as shown on page 12 is recommended.

STRAIGHT TYPE FANNING STRIP PART NUMBER ORDERING INFORMATION

	160 SERIES  Ⓒ 327-11-02-001 Fits 140 Series Barrier Blocks 3/8″ Terminal Centers		**160B SERIES**  327-22-02-001 Fits 140 Series Barrier Blocks 3/8″ Terminal Centers		**161 SERIES** Ⓒ 327-31-02-001 Fits 141 Series Barrier Blocks 7/16″ Terminal Centers		**162 SERIES**  Ⓒ 327-42-02-001 Fits 142 Series Barrier Blocks 9/16″ Terminal Centers	
NO. OF TERMI-NALS	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**
2	327-11-02-001	327-12-02-001	327-21-02-001	327-22-02-001	327-31-02-001	327-32-02-001	327-41-02-001	327-42-02-001
3	327-11-03-001	327-12-03-001	327-21-03-001	327-22-03-001	327-31-03-001	327-32-03-001	327-41-03-001	327-42-03-001
4	327-11-04-001	327-12-04-001	327-21-04-001	327-22-04-001	327-31-04-001	327-32-04-001	327-41-04-001	327-42-04-001
5	327-11-05-001	327-12-05-001	327-21-05-001	327-22-05-001	327-31-05-001	327-32-05-001	327-41-05-001	327-42-05-001
6	327-11-06-001	327-12-06-001	327-21-06-001	327-22-06-001	327-31-06-001	327-32-06-001	327-41-06-001	327-42-06-001
7	327-11-07-001	327-12-07-001	327-21-07-001	327-22-07-001	327-31-07-001	327-32-07-001	327-41-07-001	327-42-07-001
8	327-11-08-001	327-12-08-001	327-21-08-001	327-22-08-001	327-31-08-001	327-32-08-001	327-41-08-001	327-42-08-001
9	327-11-09-001	327-12-09-001	327-21-09-001	327-22-09-001	327-31-09-001	327-32-09-001	327-41-09-001	327-32-09-001
10	327-11-10-001	327-12-10-001	327-21-10-001	327-22-10-001	327-31-10-001	327-32-10-001	327-41-10-001	327-42-10-001
11	327-11-11-001	327-12-11-001	327-21-11-001	327-22-11-001	327-31-11-001	327-32-11-001	327-41-11-001	327-42-11-001
12	327-11-12-001	327-12-12-001	327-21-12-001	327-22-12-001	327-31-12-001	327-32-12-001	327-41-12-001	327-42-12-001
13	327-11-13-001	327-12-13-001	327-21-13-001	327-22-13-001	327-31-13-001	327-32-13-001	327-41-13-001	327-42-13-001
14	327-11-14-001	327-12-14-001	327-21-14-001	327-22-14-001	327-31-14-001	327-32-14-001	327-41-14-001	327-42-14-001
15	327-11-15-001	327-12-15-001	327-21-15-001	327-22-15-001	327-31-15-001	327-32-15-001	327-41-15-001	327-42-15-001
16	327-11-16-001	327-12-16-001	327-21-16-001	327-22-16-001	327-31-16-001	327-32-16-001	327-41-16-001	327-42-16-001
17	327-11-17-001	327-12-17-001	327-21-17-001	327-22-17-001	327-31-17-001	327-32-17-001	327-41-17-001	327-42-17-001
18	327-11-18-001	327-12-18-001	327-21-18-001	327-22-18-001	327-31-18-001	327-32-18-001		
19	327-11-19-001	327-12-19-001	327-21-19-001	327-22-19-001	327-31-19-001	327-32-19-001		
20	327-11-20-001	327-12-20-001	327-21-20-001	327-22-20-001	327-31-20-001	327-32-20-001		
21	327-11-21-001	327-12-21-001	327-21-21-001	327-22-21-001				

ANGLE TYPE FANNING STRIP PART NUMBER ORDERING INFORMATION

	160A SERIES  327-14-02-001 Fits 140 Series Barrier Blocks 3/8″ Terminal Centers		**160BA SERIES**  327-23-02-001 Fits 140 Series Barrier Blocks 3/8″ Terminal Centers		**161A SERIES** 327-34-02-001 Fits 141 Series Barrier Blocks 7/16″ Terminal Centers		**162A SERIES**  327-43-02-001 Fits 142 Series Barrier Blocks 9/16″ Terminal Centers	
NO. OF TERMI-NALS	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**	**C.C. Hole on Left**	**C.C. Hole on Right**
2	327-13-02-001	327-14-02-001	327-23-02-001	327-24-02-001	327-33-02-001	327-34-02-001	327-43-02-001	327-44-02-001
3	327-13-03-001	327-14-03-001	327-23-03-001	327-24-03-001	327-33-03-001	327-34-03-001	327-43-03-001	327-44-03-001
4	327-13-04-001	327-14-04-001	327-23-04-001	327-24-04-001	327-33-04-001	327-34-04-001	327-43-04-001	327-44-04-001
5	327-13-05-001	327-14-05-001	327-23-05-001	327-24-05-001	327-33-05-001	327-34-05-001	327-43-05-001	327-44-05-001
6	327-13-06-001	327-14-06-001	327-23-06-001	327-24-06-001	327-33-06-001	327-34-06-001	327-43-06-001	327-44-06-001
7	327-13-07-001	327-14-07-001	327-23-07-001	327-24-07-001	327-33-07-001	327-34-07-001	327-43-07-001	327-44-07-001
8	327-13-08-001	327-14-08-001	327-23-08-001	327-24-08-001	327-33-08-001	327-34-08-001	327-43-08-001	327-44-08-001
9	327-13-09-001	327-14-09-001	327-23-09-001	327-24-09-001	327-33-09-001	327-34-09-001	327-43-09-001	327-44-09-001
10	327-13-10-001	327-14-10-001	327-23-10-001	327-24-10-001	327-33-10-001	327-34-10-001	327-43-10-001	327-44-10-001
11	327-13-11-001	327-14-11-001	327-23-11-001	327-24-11-001	327-33-11-001	327-34-11-001	327-43-11-001	327-44-11-001
12	327-13-12-001	327-14-12-001	327-23-12-001	327-24-12-001	327-33-12-001	327-34-12-001	327-43-12-001	327-44-12-001
13	327-13-13-001	327-14-13-001	327-23-13-001	327-24-13-001	327-33-13-001	327-34-13-001	327-43-13-001	327-44-13-001
14	327-13-14-001	327-14-14-001	327-23-14-001	327-24-14-001	327-33-14-001	327-34-14-001	327-43-14-001	327-44-14-001
15	327-13-15-001	327-14-15-001	327-23-15-001	327-24-15-001	327-33-15-001	327-34-15-001	327-43-15-001	327-44-15-001
16	327-13-16-001	327-14-16-001	327-23-16-001	327-24-16-001	327-33-16-001	327-34-16-001	327-43-16-001	327-44-16-001
17	327-13-17-001	327-14-17-001	327-23-17-001	327-24-17-001	327-33-17-001	327-34-17-001	327-43-17-001	327-44-17-001
18	327-13-18-001	327-14-18-001	327-23-18-001	327-24-18-001	327-33-18-001	327-34-18-001		
19	327-13-19-001	327-14-19-001	327-23-19-001	327-24-19-001	327-33-19-001	327-34-19-001		
20	327-13-20-001	327-14-20-001	327-23-20-001	327-24-20-001	327-33-20-001	327-34-20-001		
21	327-13-21-001	327-14-21-001	327-23-21-001	327-24-21-001				

Ⓒ Indicates items normally available through Cinch Distributors.

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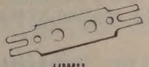
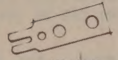
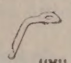
TRW CINCH CONNECTORS

OPTIONAL TERMINALS, JUMPERS AND CABLE CLAMPS

SOLDER TERMINALS


"W"


"¾W"

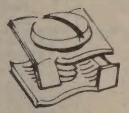

"Y"

"W," "¾W" and "Y" terminals are available optionally as separate terminals for use with 140, 141 and 142 Series barrier blocks as indicated below. Also specify hot solder dipped finish when ordering. Material is brass.

SOLDER TERMINALS PART NUMBER ORDERING INFORMATION

FOR:	"W" TYPE	"¾W" TYPE	"Y" TYPE
140 Series	495-11-11-017	495-11-11-019	495-12-11-016
141 Series	495-11-11-020	495-11-11-022	495-12-11-012
142 Series	495-11-11-023	495-11-11-025	495-12-11-011

QUICK-CLAMP* TERMINALS



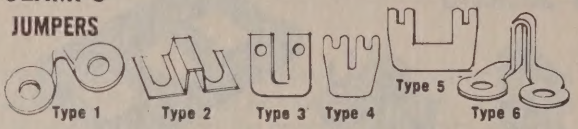
Simplifies engaging of wires to barrier blocks. Wire is inserted into flared opening and screw is tightened. Screws are nickel-plated brass, binder head type. Terminals are electro-tinned brass. Set includes two mating clamps and one screw. For use with 141 and 142 Series barrier blocks as shown below.

* Patent Pending

QUICK-CLAMP* TERMINALS PART NUMBER ORDERING INFORMATION

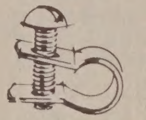
FOR:	PART NO.	WIRE GAUGES	SCREW SIZE
141 Series	422-14-11-143	14 thru 22	6-32 x ⁵⁄₁₆"
142 Series	422-14-11-144	8 thru 16	8-32 x ⅜"

JUMPERS



Used for making permanent connections between adjacent barrier block terminals, except for type 5, which connects two alternate terminals bridging the intermediate terminal. Six types for use with 140, 141, 142, 540, 541 and 542 Series barrier blocks as shown. All jumpers are brass with nickel-plated satin finish.

CABLE CLAMPS



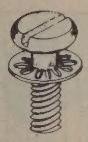
For use with "Jones" Fanning Strips shown on page 20. Recommended for securing the cable where at least several conductors are to be terminated with fanning strips. As indicated, six different inner diameter sizes are available. Clamps and 6-32 x ½" round head screws are stainless steel, passivated. For convenience cable clamps are supplied unassembled.

PART NUMBER ORDERING INFORMATION

JUMPERS | CABLE CLAMPS

FOR:	PART NO.	TYPE	INNER DIA.	PART NO.
141 Series	422-13-11-026	1	¼"	422-04-11-109
142 Series	422-13-11-025	1	⅜"	422-04-11-110
140 Series	422-13-11-013	2	½"	422-04-11-111
141 Series	422-13-11-012	3	⅝"	422-04-11-112
142, 542 Series	422-13-11-028	4	¾"	422-04-11-113
142, 542 Series	422-13-11-027	5	⅞"	422-04-11-114
540 Series	422-13-11-029	6		
541 Series	422-13-11-030	6		
542 Series	422-13-11-031	6		

SEMS SCREW TERMINALS



The Sems screw termination, with integral lockwasher, permits rapid, permanent attachment of solid or stranded wire leads or spade lug terminations to the barrier terminal block. The lockwasher teeth cut into the termination material, assuring excellent electrical contact and the ability to withstand substantial strain and vibration.

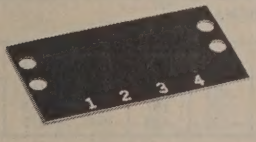
The Sems screws are nickel plated steel and the lockwasher is nickel plated phosphor bronze.

When ordering by ten digit manufacturing part number, change second digit from 11 to 12. (Example: 355-12-02-001)

When ordering by distributor part number, add letter (E). (Example: 2-140-E)

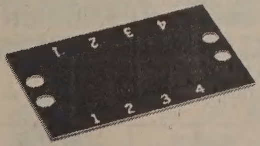
IMPRINTING INFORMATION ON MARKER STRIPS (UL RECOGNIZED)

"SINGLE" MARKER STRIPS



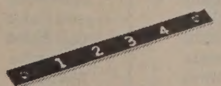
All "single" marker strips, extending out on only one side, as shown in this catalog, can be supplied at extra cost with terminal designations as desired, imprinted directly on the strips. Either ³⁄₃₂" or ⅛" high letters, number, words or symbols can be imprinted in white. If no preference is given, the size best suited for the particular order will be used. Each imprinting order necessitates a set-up charge in addition to regular imprinting charges based on the number of characters and panels. Please make sure all imprinting instructions are clear and concise.

"DOUBLE" MARKER STRIPS



"Double" marker strips, extending out on both sides, can also have terminal designations imprinted at extra cost on one or two sides, if desired ⅛" high letters, numbers, words or symbols can be imprinted in white and if no preference is given, the best suited size for the particular order will be used. When used as a "cover" for the 540, 541 or 542 Series, "double" marker strips can also be imprinted on either side, as specified. Regular imprinting and set-up charges apply. Please indicate whether the marker strip is being used as "double" or "cover."

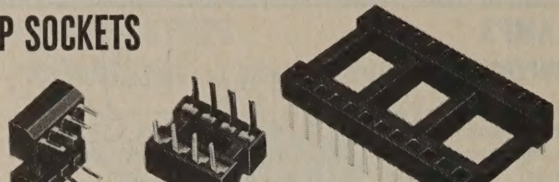
SPECIAL TOP-MOUNTED MARKER STRIPS



Special marker strips used on top of 540, 541 and 542 Series barrier blocks can be imprinted with terminal designations at extra cost. ⅛" letters, numbers, words or symbols can be imprinted in white. Each imprinting order requires both set-up and regular imprinting charges. Please make sure all necessary instructions are included.

TRW CINCH CONNECTORS

DIP SOCKETS



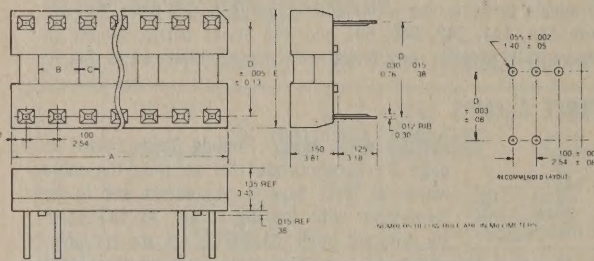
These low profile DIP sockets are extremely economical. The unique design permits substantial reduction in assembly costs and, at the same time, incorporates many features that were previously available only in more expensive sockets. TRW/Cinch DIP sockets are produced in 8, 14, 16 and 24 contact sizes as standard items. Other sizes can be developed by the addition of insulator tooling.

LOW PROFILE SOCKETS with P. C. BOARD TERMINALS

MATERIALS INSULATOR: Glass fiber polyester 94V-O (U.L. rated); CONTACTS: Brass Alloy (Olin 688); PLATING: 0.001 electroplated solder (60/40) over 0.0005 electroplated copper or .00003 gold inlay on phosphor bronze.

ELECTRICAL/ENVIRONMENTAL SPECIFICATIONS CURRENT RATING: 1 Amp; INSULATION RESISTANCE: 20 x 10^6 megohms (EIARS-364-TP21); WITHSTANDING VOLTAGE: 1000 Volts AC RMS (EIARS-364-TP20); CONTACT RESISTANCE: 12 milliohms @ 1 Amp, 10 milliohms @ 1 milliampere and 20 millivolts; INTERLEAD CAPACITANCE: 0.35 pf at 1 MHz (MIL-STD-202, Method 305); VIBRATION: No interruption of current when tested per EIARS-364-TP28; SHOCK: No mechanical failure or disengagement when tested per EIA-TP27, RS-364; HUMIDITY: Insulation resistance exceeded 20 x 10^6 megohms after 96 hours @ 40°C and 95% R.H. per EIA-TP21, Method II, Condition A, RS-364.

MECHANICAL SPECIFICATIONS CONTACT INSERTION FORCE: 3.0 oz. minimum, 4.0 oz. maximum; CONTACT WITHDRAWAL FORCE: 3.5 oz. minimum, 4.5 oz. maximum; CONTACT RETENTION: 12 oz. minimum, 15 oz. average.

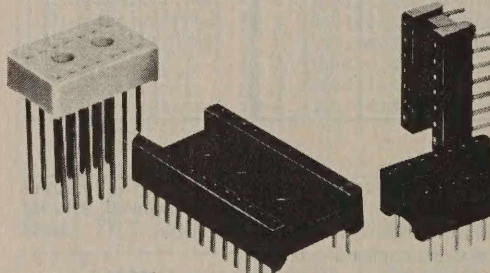

B
C
A
D
.050
1.27
.100
2.54
±.005
±.13
.030
.76
.015
.38
.017 RIB
.30
±.003
±.08
.150
3.81
.125
3.18
.055 ± .002
1.40 ± .05
.100 ± .003
2.54 ± .08
RECOMMENDED LAYOUT
.135 REF
3.43
.015 REF
.38

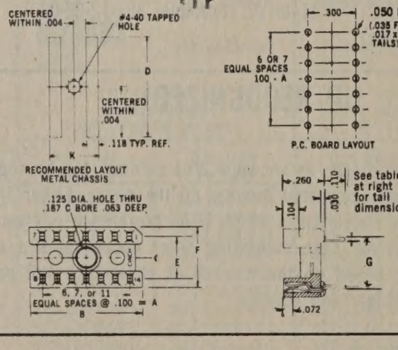
No. of Contacts	Inches				
	A	B	C	D	E
8	.400	.220	0	.300	.376
14	.700	.130	.065	.300	.376
16	.800	.160	.070	.300	.376
18	.900	.190	.075	.300	.376
22	1.100	.260	.070	.400	.476
24	1.200	.290	.075	.600	.676
40	2.000	.540	.100	.600	.676

ORDERING INFORMATION

No. of Contacts	Electroplated Solder Contacts		Gold Inlay Contacts	
	Distributor Part No.	Factory Part No.	Distributor Part No.	Factory Part No.
8	8E-DIP	133-58-90-091	8E-DIP-4	133-58-90-094
14	14E-DIP	133-59-90-090	14E-DIP-4	133-59-90-095
16	16E-DIP	133-59-90-092	16E-DIP-4	133-59-90-096
18	18E-DIP	133-59-90-098	18E-DIP-4	133-59-90-101
22	22E-DIP	133-59-90-099	22E-DIP-4	133-59-90-102
24	24E-DIP	133-59-90-093	24E-DIP-4	133-59-90-097
40	40E-DIP	133-59-90-100	40E-DIP-4	133-59-90-103

PRECISION SOCKETS — DIP SOLDER TAILS




CENTERED WITHIN .004
#4-40 TAPPED HOLE
D
CENTERED WITHIN .004
K
.118 TYP. REF.
RECOMMENDED LAYOUT METAL CHASSIS
.300
.050 DIA. MAX.
(.035 FOR .017 x .017 SQ. TAILS)
6 OR 7 EQUAL SPACES .100 - A
P.C. BOARD LAYOUT
.125 DIA. HOLE THRU
.187 C BORE .063 DEEP
E
F
6, 7, or 11 EQUAL SPACES @ .100 = A
B
.260
.104
See table at right for tail dimensions.
G
.072

MATERIALS INSULATORS: GP Black Phenolic per MIL-M-14, Diallyl Phthalate per MIL-M-14, Type SDG, Contacts: Beryllium copper with gold or electro-tin plating. RECOMMENDED MOUNTING METHODS: CHASSIS: 4-40 x ¼″ Fillister head screw; P.C. BOARD: Solder in.

ELECTRICAL SPECIFICATIONS CURRENT RATING: 1.0 amp; CONTACT RESISTANCE: 6 milliohms (at 1 amp); CAPACITANCE PER MIL-STD-202; Method 305 at 100 KHz between adj. contacts: 0.33 pfd avg. WITHSTANDING VOLTAGE BETWEEN ADJACENT CONTACTS: 1800 VRMS; INSULATION RESISTANCE: 1.0 x 10^6 megohms minimum.

MECHANICAL SPECIFICATIONS VIBRATION: Per MIL-STD-202C, Condition D, Method 204A. No continuity interruptions of 1 microsecond or longer. No damage to contact or insulator. No disengagement of DIP module from the socket; SHOCK: Per MIL-STD-202C, Method 202B. Shock level of 150 G's. No continuity interruptions of 1 microsecond or longer. No damage to contact or insulator. No disengagement of DIP module from the socket; TEMPERATURE RANGE: Phenolic: −65°C to 150°C.

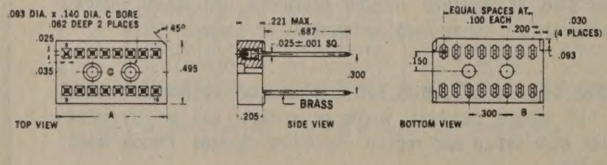
Contacts	Insulator	Contact Plating	.017x.033 Tails .170 long	.017x.033 Tails .120 long	.017x.033 Sq. Tails .110 long
14	Diallyl Phthalate	Gold Plated	133-51-92-072	‡133-59-92-060	‡133-51-02-005
14	Diallyl Phthalate	Electro-Tin	133-51-92-071	133-59-92-066	133-51-92-001
14	GP Black Phenolic	Electro-Tin	133-51-02-073	‡133-59-02-059	‡133-51-02-003
14	GP Black Phenolic	Gold Plated	133-51-02-074	133-59-02-065	133-51-02-004
16	Diallyl Phthalate	Gold Plated	133-51-92-077	‡133-59-92-061	‡133-51-92-008
16	Diallyl Phthalate	Electro-Tin	133-51-92-076	133-59-92-067	133-51-92-002
16	GP Black Phenolic	Gold Plated	133-51-02-078	133-59-02-068	133-51-02-007
16	GP Black Phenolic	Electro-Tin	133-51-02-075	‡133-59-02-062	‡133-51-02-006
24	Diallyl Phthalate	Electro-Tin	133-59-92-079	133-59-92-070	133-59-92-009
24	Diallyl Phthalate	Gold Plated	133-59-92-080	133-59-92-064	‡133-59-92-010
24	GP Black Phenolic	Electro-Tin	133-59-02-081	‡133-59-02-063	‡133-59-02-011
24	GP Black Phenolic	Gold Plated	133-59-02-082	133-59-02-069	133-59-02-012

‡These items available through Cinch distributors.

No. of Contacts	A	B	C	D	E	F	G ±.015	H	J
14	.600	.770	.796	.300	.424	.187	.300	.093	.446
16	.700	.870	.896	.300	.424	.187	.300	.093	.446
24	1.100	1.270	1.296	.600	.724	.488	.600	.125	.746

PRECISION SOCKETS — WIRE WRAP TAILS

.025 x .025 W.W. TAILS .687 LONG


.093 DIA. x .140 DIA. C BORE .062 DEEP 2 PLACES
45°
.025
.035
.495
A
TOP VIEW
.221 MAX.
.687
.025±.001 SQ.
.300
BRASS
.205
SIDE VIEW
EQUAL SPACES AT .100 EACH
.200
.030 (4 PLACES)
.150
.093
.300
B
BOTTOM VIEW

DIM.	14 Pin	16 Pin
A	.770	.870
B	.235	.285

MATERIALS INSULATORS: Glass Nylon −65°C to 125°C; CONTACTS: Solid .025 brass wire wrap post with sharp (.003 max. radius) corners. (Gold or electro-tin plated).

ELECTRICAL SPECIFICATIONS CURRENT RATING: 1 ampere; CONTACT RESISTANCE: 6 milliohms; INSULATION RESISTANCE: 1 x 10^6 Megohms; WITHSTANDING VOLTAGE: 1000 Volts AC RMS; INTERLEAD CAPACITANCE: 0.40 pf at 1 MHz.

MECHANICAL SPECIFICATIONS CONTACT SEPARATION FORCE: Min. 4 oz., Max. 1 oz.; MIN. CONTACT SEPARATION FORCE AFTER 100 CYCLES: 1 oz.

Part No.	Contacts	Insulator	Contacts
‡133-59-91-055	14	Black	Electro-Tin
‡133-59-91-056	14	White	Electro-Tin
‡133-59-91-051	14	Black	Gold Plated
‡133-59-91-052	14	White	Gold Plated
‡133-59-91-058	16	Black	Electro-Tin
‡133-59-91-057	16	White	Electro-Tin
‡133-59-91-054	16	Black	Gold Plated
‡133-59-91-053	16	White	Gold Plated

‡These items available through Cinch distributors.

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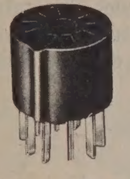
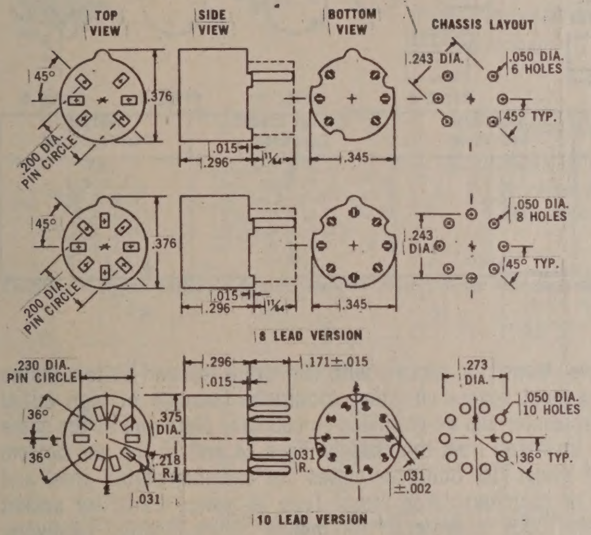
TRW CINCH CONNECTORS

IC SOCKETS

TO-5 CASE SOCKETS



These Cinch miniature sockets are designed especially for integrated circuits mounted in 6, 8 or 10-lead TO-5 cases. They provide a convenient, dependable means of installing or removing IC's from the printed circuit board. Interconnections can be made without bending the leads, which substantially reduces the possibility of breaking leads or destroying the hermetic seal of the cases. Insulation material is diallyl phthalate Type SDG, contacts are beryllium copper with 30 micro-inches of gold over a copper flash.


TOP VIEW
SIDE VIEW
BOTTOM VIEW
CHASSIS LAYOUT
45°
.376
.200 DIA. PIN CIRCLE
.015
.296
1⁄64
.345
.243 DIA.
.050 DIA. 6 HOLES
45° TYP.
.050 DIA. 8 HOLES
8 LEAD VERSION
.230 DIA. PIN CIRCLE
36°
.375 DIA.
.218 R.
.031
.171±.015
.031 R.
.031 ±.002
.273 DIA.
.050 DIA. 10 HOLES
36° TYP.
10 LEAD VERSION

SPECIFICATIONS

ELECTRICAL

Current Rating: 1.0 ampere
Contact Resistance: 0.050 ohms, maximum
Withstanding Voltage Between Adjacent Contacts:

AC RMS	DC
1020	1560 (at sea level)
350	465 (at 50,000 ft.)

Insulation Resistance: 50,000 megohm, minimum

MECHANICAL

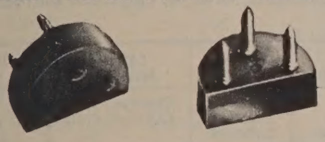
Shock: 50 g per MIL-STD-202
Temperature Range: −65°C to +125°C
Insertion Force: 16 lb. maximum
Withdrawal Force: 3 lb. minimum
Recommended Mtg. Method: Solder in PC Board

MATERIALS

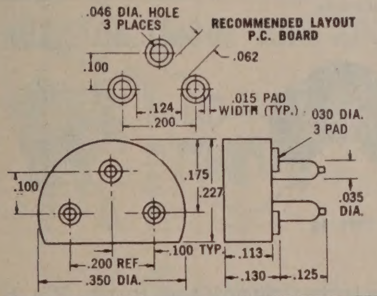
Insulator: Diallyl phthalate Type SDG per MIL-M-14
Contacts: Beryllium copper
Finish: Copper flash plus .00003 gold plate

Part No.	No. of Leads
‡133-96-92-060	6
‡133-98-92-061	8
‡133-99-92-054	10

LOW PROFILE 3-PIN P.C. SOCKETS FOR TO-5 CASES



These high quality Cinch-designed 3-pin sockets for TO-5 series transistors incorporate many unique features necessary for high circuit reliability . . . features not found in similar competitive units.


.046 DIA. HOLE 3 PLACES
RECOMMENDED LAYOUT P.C. BOARD
.062
.100
.124
.200
.015 PAD WIDTH (TYP.)
.030 DIA. 3 PAD
.100
.175
.227
.035 DIA.
.200 REF.
.100 TYP.
.350 DIA.
.113
.130
.125

SPECIFICATIONS

ELECTRICAL

Voltage Ratings: AC RMS	DC
1500	2000 (at sea level)
500	700 (at 50,000 ft.)

Current Rating: 2.5 amperes
Contact Resistance: 0.005 ohms
Insulation Resistance: 100,000 megohms

MECHANICAL

Maximum Pin Diameter: .019 inch
Maximum Pin Depth: 0.200 ±0.010 inch
Maximum Insertion Force: 5 ounces measured with an 0.017" diameter pin
Minimum Withdrawal Force: 1⁄4 ounce measured with an 0.014" diameter pin, after 3 sizing cycles with an 0.017" diameter pin
Durability: 1⁄4 ounce minimum withdrawal force after 100 cycles with an 0.017" diameter pin

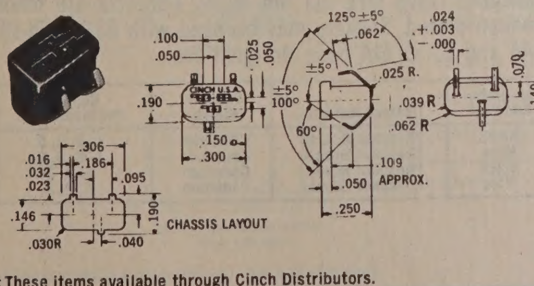
MATERIALS

Insulator: 20% glass filled natural nylon.
Contacts: Beryllium Copper, Tin Plate over Copper Base.
Insulator Colors:

Part No.	Color
‡133-23-92-041	Black
‡133-23-92-039	Natural
‡133-23-92-040	Green

TRANSISTOR SOCKETS

PRESS-IN AND SNAP-IN TRANSISTOR SOCKETS TYPE T-1


125°±5°
.024 +.003 −.000
.062
.100
.050
.025
.050
±5°
.025 R.
.070
.140
.190
±5° 100°
.039 R
.062 R
.150
.300
60°
.109 APPROX.
.050
.250
.306
.186
.016
.032
.023
.095
.146
.190
.030R
.040
CHASSIS LAYOUT

A commercial transistor socket with contact arrangement for exact mating with TO-18 transistors. Presses into polarized chassis cutout in 1⁄16" thick boards having bottom circuitry only. Insulator body is approved general purpose black phenolic (Type CFG per MIL-M-14) and contacts are beryllium copper with 30 micro-inches gold finish.

Part No.	No. of Contacts	Insulator Material	Contact Material
131-73-02-062	3	Black	Beryllium Copper

‡These items available through Cinch Distributors.

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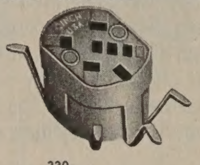
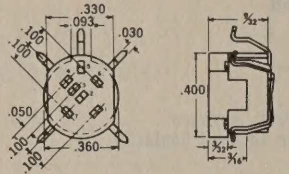
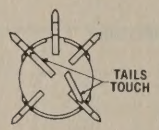
TRW CINCH CONNECTORS

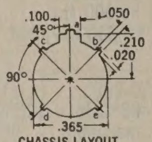
TRANSISTOR SOCKETS (CONT.)

UNIVERSAL TRANSISTOR SOCKETS TYPE T-7



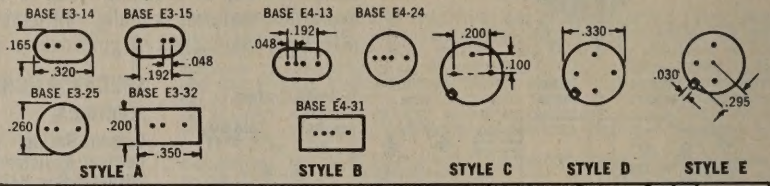

.330
.093
.030
.100
.050
.100
.360
.400
3/32
3/32
3/16


TAILS TOUCH


.100
45°
.050
a
b
c
.210
.020
90°
d
e
.365

CHASSIS LAYOUT

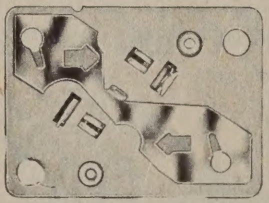
For use with ten transistor bases and five base styles illustrated. Insulator bodies are all mica-filled low loss phenolic (MFE). Contacts are beryllium copper, gold-plated. For use with 1/16″ thick printed circuit board. Table lists the chassis cutout tabs required for the various base types.


BASE E3-14
BASE E3-15
BASE E4-13
BASE E4-24
.165
.320
.048
.192
.192
.048
.200
.100
.330
.030
.295
BASE E3-25
BASE E3-32
BASE E4-31
.260
.200
.350
STYLE A
STYLE B
STYLE C
STYLE D
STYLE E

Part No.	Transistor Base Styles	Chassis Cutout Tabs Used	Contact Positions Used
‡133-27-12-011	All	a, b, c, d, e	All
‡133-24-12-012*	A & C	c, d, e	1, 3, 4, 7
133-25-12-013*	B & C	b, c, d, e	1, 2, 3, 4, 7
‡133-23-12-014*	C	c, d, e	1, 4, 7
‡133-25-12-015	D	a, b, c, d, e	1, 4, 5, 6, 7
‡133-23-12-016*	E	b, d, e	1, 6, 7
‡133-24-12-017	A & C	c, d, e	1, 3, 4, 7

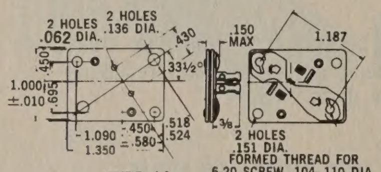
*In positions where contacts are not required, cavity for contacts is also omitted except in position 5.

POWER TRANSISTOR SOCKETS



TYPE 14

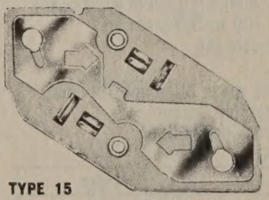
Type 14 and 15 power transistor sockets with laminated top and bottom plates are used under the most severe vibration conditions because of high initial withdrawal force. Transistor can be grounded to collector plate and at the same time be completely insulated from the chassis. Type 14 and 15 top and bottom plates are made of Valox 310. Collector plates are cadmium-plated steel and contacts are made of cadmium-plated brass. Type 16 power transistor socket with molded insulator body is designed for mobile communication receivers. Type 16 socket has an insulating body of general purpose black phenolic (also available in mica and diallyl) and contacts are phosphor bronze, cadmium plated.


2 HOLES .062 DIA.
2 HOLES .136 DIA.
.430
.150 MAX
1.187
.450
33½°
1.000 ±.010
.695
.450
.580
.518
.524
1.090
1.350
3/8
2 HOLES .151 DIA.
FORMED THREAD FOR 6-20 SCREW .104-.110 DIA. HOLE IN C.R. STEEL PLATE

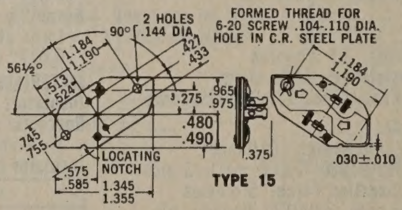
TYPE 14

Part No.	Type	Insulator Material	Contact Material	Contact Finish	Collector Plate Material & Finish
‡133-32-10-013	14	XP Natural*	Brass	Cadmium	Cadmium-Plated Steel
133-32-10-021	15	XP Natural*	Brass	Cadmium	Cadmium-Plated Steel
‡133-12-02-016	16	Black†	Phosphor Bronze	Cadmium	—

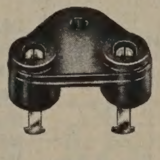
*Wax impregnated. †Also available in mica and diallyl.



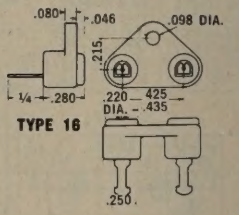
TYPE 15


2 HOLES .144 DIA.
90°
FORMED THREAD FOR 6-20 SCREW .104-.110 DIA. HOLE IN C.R. STEEL PLATE
1.184
1.190
.421
.433
56½°
.513
.524
.275
.965
.975
.480
.490
.745
.755
LOCATING NOTCH
.575
.585
1.345
1.355
.375
1.184
1.190
.030±.010

TYPE 15



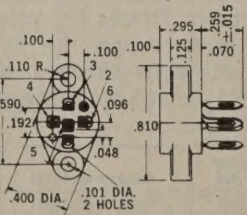
TYPE 16

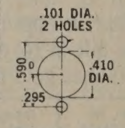

.080
.046
.098 DIA.
.215
1/4
.280
.220 DIA.
.425
.435
.250

TYPE 16

GENERAL PURPOSE TRANSISTOR SOCKETS TYPE 13

Multi-purpose all-molded sockets designed to the triangular base layout (.2″ x .1″ JETEC-30 contact centers) as well as the 3-contact in-line layout (.048″ x .192″ contact centers). Insulator material is either general purpose black phenolic or mica-filled low loss phenolic (Type MFE per MIL-M-14). Contacts are made of phosphor bronze, cadmium plated. Sockets may be used with E3-14, E3-15, E3-25, E3-32, E3-43, E3-44 and E3-51 EIA base designations.


.100
.100
.110 R.
3
2
4
6
.590
.096
.192
5
.048
.400 DIA.
.101 DIA. 2 HOLES
.100
.295
.125
.259 ±.015
.070
.810


.101 DIA. 2 HOLES
.590
.410 DIA.
.295

CHASSIS LAYOUT

Part No.	Type	Insulator Material	Contact Material	Contact Finish	Contact Positions Used
‡133-14-01-011	13	Black	Phosphor Bronze	Cadmium	1, 2, 3, 5
133-14-11-014	13	Mica	Phosphor Bronze	Cadmium	1, 2, 3, 5
133-13-01-012	13	Black	Phosphor Bronze	Cadmium	1, 2, 3
133-13-11-025	13	Mica	Phosphor Bronze	Cadmium	1, 2, 3

‡These items available through Cinch Distributors.

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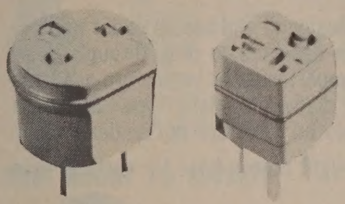
TRW CINCH CONNECTORS

MINIATURE SEMICONDUCTOR SOCKETS

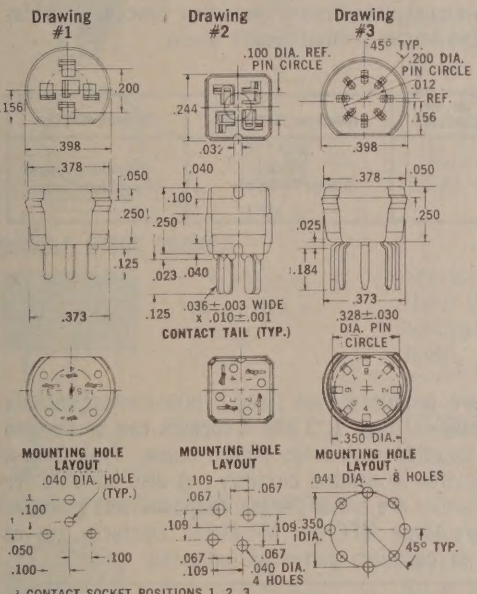
TO-5 AND TO-18 CASE DEVICES



This group of semiconductor sockets, for printed circuit board insertion, covers the standard configurations in most common use today.

Their low profile (.250″) makes them especially applicable in high density applications. All units are made of MFE, mica-filled phenolic, and the six position TO-5 socket, is also available in FEP fluoro-carbon resin.

These Cinch sockets have low contact resistance, low capacitance and insulation resistance of over 1000 megohms. They are rated at 1.0 amperes and 750 volts A.C.


Drawing #1
Drawing #2
Drawing #3
.100 DIA. REF. PIN CIRCLE
45° TYP.
.200 DIA. PIN CIRCLE
.012 REF.
.200
.156
.244
.398
.032
.378
.050
.040
.100
.250
.025
.125
.184
.023
.040
.373
.036±.003 WIDE x .010±.001
CONTACT TAIL (TYP.)
.328±.030 DIA. PIN CIRCLE
.350 DIA.
MOUNTING HOLE LAYOUT
.040 DIA. HOLE (TYP.)
.109
.067
.041 DIA. — 8 HOLES
.350 DIA.
.040 DIA. 4 HOLES
.100
.050

3 CONTACT SOCKET POSITIONS 1, 2, 3
4 CONTACT SOCKET POSITIONS 1, 2, 3, 5

SPECIFICATIONS

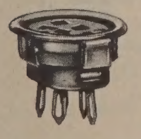
Maximum Voltage: 750 VAC
Maximum Current: 1.0 amperes
Max. Capacitance: 1.3 pf (1.0 pf for FEP)
Insulation Test: 1685 VAC
Insulation Resistance: 1000 megohm, minimum
Contact Resistance: 0.05 ohms

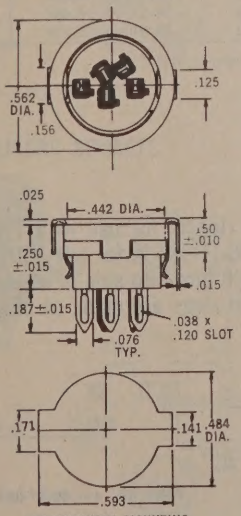
Socket Size	No. of Contacts	Terminal Mounting	Contact Material	Insulator Material**	Part No.	Contact Plating*	Dim. Drawing
TO-5	3	PC Board	Phos. Bronze	MFE	‡133-23-11-024	(1)	#1
TO-5	4	PC Board	Phos. Bronze	MFE	‡133-24-11-026	(1)	#1
TO-5	6	PC Board or Chassis	Ber. Copper	MFE	‡133-96-12-062	(2)	#3
TO-5	6	PC Board or Chassis	Ber. Copper	FEP	‡133-96-92-067	(2)	#3
TO-5	8	PC Board or Chassis	Ber. Copper	MFE	‡133-98-12-062	(2)	#3
TO-18	3	PC Board	Phos. Bronze	MFE	‡133-23-11-034	(2)	#2
TO-18	4	PC Board	Phos. Bronze	MFE	‡133-24-11-035	(2)	#2

*CONTACT PLATING: (1) Chromate over .0003″ cadmium
(2) .0003″ tin over .0001″ copper

**INSULATOR MATERIAL: MFE — Mica filled phenolic
FEP — Fluorocarbon resin

NUVISTOR TRIODE TUBE SOCKETS




.562 DIA.
.156
.125
.025
.442 DIA.
.150 ±.010
.250 ±.015
.015
.187±.015
.038 x .120 SLOT
.076 TYP.
.171
.141
.484 DIA.
.593

RECOMMENDED MOUNTING HOLE CUT-OUT

MECHANICAL CRIMP MOUNTING TYPE

This type socket is fastened to the chassis by two tabs, which are an integral part of the metal saddle retaining the insulator body. These tabs are rolled against the underneath side of the chassis. Insulator material is mica-filled low loss phenolic (Type MFE), glass-filled diallyl phthalate (Type SDG-F per MIL-M-14). Contacts are made of brass, phosphor bronze or beryllium copper with finishes as shown below. Saddles are made of cold rolled steel or brass, with finishes as shown below.

Part No.	Insulator Material*	Contact Material	Contact Finish	Saddle Material	Saddle Finish
‡133-65-10-001	Mica	Brass	.0001 Cadmium	C.R. Steel	Copper Flash plus .0001 Cadmium
133-65-11-011	Mica	Phosphor Bronze	.0001 Silver†	C.R. Steel	Copper Flash plus .0001 Cadmium
133-65-12-012	Mica	Beryllium Copper	.0001 Silver†	C.R. Steel	Copper Flash plus .0001 Cadmium
133-65-92-025	Diallyl	Beryllium Copper	.0005 Gold	C.R. Steel	Copper Flash plus .0001 Cadmium

*Also available in general purpose black phenolic.

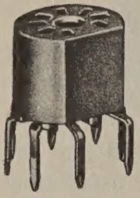
†Contact tails hot solder coated.

‡These items available through Cinch Distributors.

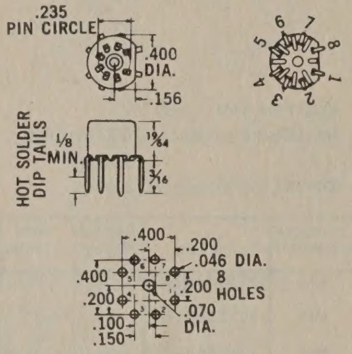
TRW CINCH CONNECTORS

SUBMINIATURE TUBE SOCKETS

SUBMINIATURE MILITARY STAND-OFF SOCKETS TYPE S-1, S-3



TYPE S-1


.235
PIN CIRCLE
.400
DIA.
.156
6
7
5
8
4
1
3
2
HOT SOLDER
DIP TAILS
1/8
MIN.
19/64
3/16
.400
.200
.046 DIA.
.400
.200
8
HOLES
.200
.070
DIA.
.100
.150

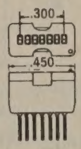
Two types of subminiature stand-off sockets designed and tooled under military contract to meet MIL specifications. They are designed to drop through clearance holes arranged on a .050″x.050″ grid layout. Insulator bodies are available in either mica-filled low loss phenolic (MFE) or diallyl phthalate (Type SDG). Both types have beryllium copper contacts, silver-plated, with tips hot solder dipped.

The Type S-1 subminiature socket has an eight button base for vertical tube position and has no center shield.

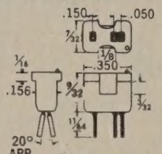
The Type S-3 socket is a seven-contact in-line subminiature right angle socket for horizontal tube position. A nickel-plated brass mounting bracket provides additional support when mounted to the printed circuit board.

Part No.	Type	No. of Contacts	Insulator Materials	Contact Material
131-78-12-024	S-1	8	Mica	Beryllium Copper
131-78-92-025	S-1	8	Diallyl Phthalate	Beryllium Copper

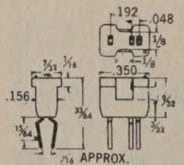
THREE, FIVE AND SEVEN CONTACT IN-LINE SOCKETS



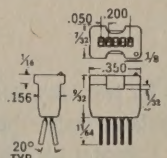
TYPE 4


.150
.050
7/32
1/8
.350
1/16
.156
9/32
3/32
11/64
20°
APP.

TYPE 1


.192
.048
1/8
3/32
1/16
.350
1/8
.156
23/64
3/32
3/32
15/64
7/16 APPROX.

TYPE 2


.050
.200
7/32
1/8
1/16
.350
.156
9/32
3/32
11/64
20°
TYP.

TYPE 3

The first subminiature sockets ever produced. Type 1 and 2 three-contact sockets can be used with 3-prong transistors. Type 1, 3 and 4 sockets can be swaged or cemented into chassis or mounted with rings shown below. Type 2 is a stand-off style socket used primarily in printed circuitry but also suitable for conventional wiring. Insulating bodies are either general purpose black phenolic or mica-filled low loss phenolic (Type MFE per MIL-M-14). Contacts are of beryllium copper, either silver or cadmium plated as indicated.

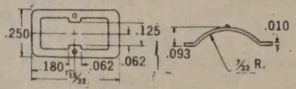
Part No.	Type	No. of Contacts	Insulator Material	Contact Material	Contact Finish
131-13-02-061	1	3	Black	Beryllium Copper	Silver
131-13-02-054	2	3	Black	Beryllium Copper	Cadmium
131-15-12-011	3	5	Mica†	Beryllium Copper	Silver
131-15-12-013	3	5	Mica	Beryllium Copper	Silver*
131-17-12-038	4	7	Mica†	Beryllium Copper	Silver
131-17-12-039	4	7	Mica	Beryllium Copper	Silver*

†Also available in black. *Contact tails hot solder coated.

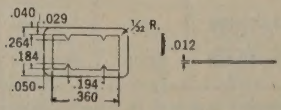
MOUNTING SPRING AND MOUNTING RINGS

No. 441-00-23-094 spring is designed for use with Type 1 and 2 three-contact sockets having a .093″ deep slot in the side of the insulator. Tempered spring steel material ensures positive retention of socket in chassis.

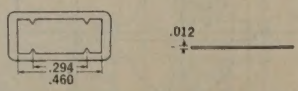
No. 441-00-11-082 ring is for use with Type 1, 2 and 3 sockets. No. 441-00-11-084 is for use with Type 4 and 5 sockets. Sharp teeth bite into side of insulator when ring is pressed on. Both rings are made of brass.


.250
.125
.010
.093
.062
.180
.062
11/32
3/32 R.

PART NO. 441-00-23-094


.040
.029
1/32 R.
.264
.184
.012
.050
.194
.360

PART NO. 441-00-11-082



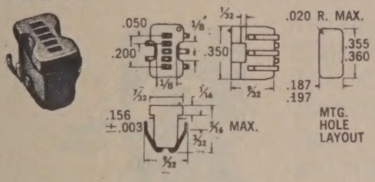
PART NO. 441-00-11-084

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

SUBMINIATURE TUBE SOCKETS (CONT'D)

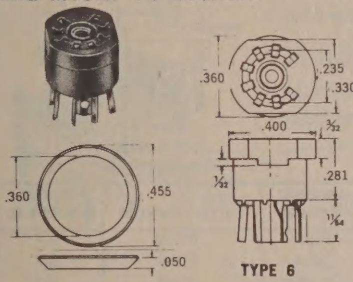
TYPE S-5



Type S-5 is a commercial 5-contact socket that presses into a non-polarized chassis cutout. For use on 1/16" thick boards. Insulator body is mica-filled low loss phenolic (MFE). Contacts are beryllium copper, silver-plated.

Part No.	No. of Contacts	Insulator Material	Contact Material
131-75-12-045	5	Mica	Beryllium Copper

RING MOUNT T-3 SOCKETS

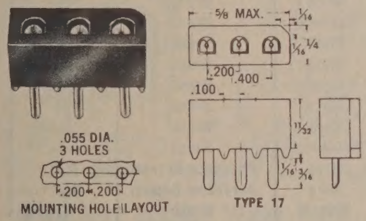


These 8-contact sockets can be swaged or cemented into chassis or mounted with mounting ring No. 441-00-11-099. Insulator material is mica-filled low loss phenolic (Type MFE per MIL-M-14). Contacts have twisted tails and are made of beryllium copper with silver plated finish. Center shield is brass, cadmium plated. Mounting ring is .010 brass.

Part No.	Type	Insulator Material	Contact Finish	Contact Finish	Center Shield Material	Center Shield Finish
132-18-12-011	6	Mica	Beryllium Copper	Silver	Brass	Cadmium
132-18-12-017	6	Mica	Beryllium Copper	Silver*	Brass	Cadmium

*Contact tails and center shield hot solder coated.

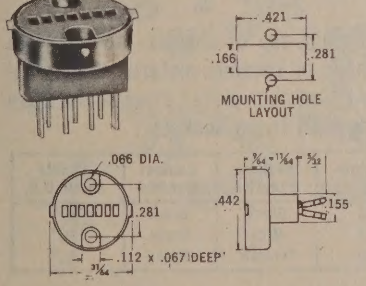
DOUBLE DIODE SOCKET



Special 3-contact socket used for mounting a diode in printed circuit applications. Used in horizontal phase detector. Insulator material is general purpose black phenolic. Contacts are made of brass with electro-tinned over copper flash finish.

Part No.	Type	Insulator Material	Contact Material	Contact Finish
203-91-03-029	17	Black	Brass	Electro-Tinned over Copper Flash

IN-LINE TYPE MILITARY SOCKETS

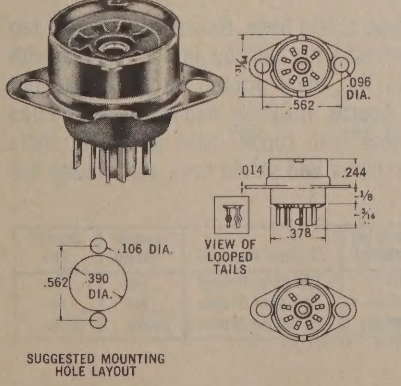


These in-line sockets are designed and tooled under military contact to meet MIL specifications. Available with or without nickel-plated brass mounting base. Either type can be mounted with No. 422-11-11-098 nickel-plated brass nut and No. 460-14-19-106 0-80 NF-2 stainless steel filister head type screws, which must be ordered separately. Insulator material is diallyl phthalate (Type SDG per MIL-M-14). Silver-plated beryllium copper contacts available with twisted tails as shown.

Part No.	Insulator Material	Contact Material	Contact Finish	Tail Type	Military Standard
131-27-92-011	Diallyl	Beryllium Copper	Silver*	Twisted	MS-35408-1
131-17-92-032	Diallyl	Beryllium Copper	Silver*	Twisted	—
131-17-92-034	Diallyl	Beryllium Copper	Silver	Looped	—

*Contact tails hot solder coated.

T-3 TYPE MILITARY SOCKETS



These sockets, utilizing the T-3 pin layout, are designed for military use in equipment subject to humidity or vibration conditions. Available with or without nickel-plated shield base type mounting saddle as shown. Insulator material is either diallyl phthalate (Type SDG per MIL-M-14) or mica-filled low loss phenolic (Type MFE per MIL-M-14). Contacts are beryllium copper, silver-plated. Sockets available with twisted or looped contact tails as indicated. Sockets also available with keyway rotated 90°. Center shields, when supplied, are brass, hot solder coated.

Part No.	Insulator Material	Contact Material	Contact Finish	Tail Type	Center Shield	Military Standard
132-28-92-022	Diallyl	Beryllium Copper	Silver*	Twisted	Yes	MS-35407-1
*132-28-12-023	Mica	Beryllium Copper	Silver*	Twisted	Yes	MS-35407-2
132-28-92-019	Diallyl	Beryllium Copper	Silver	Looped	No	—
132-28-92-023	Diallyl	Beryllium Copper	Silver	Looped	No	—
132-28-92-025	Diallyl	Beryllium Copper	Silver*	Twisted	Yes	—
132-28-12-026	Mica	Beryllium Copper	Silver*	Twisted	Yes	—

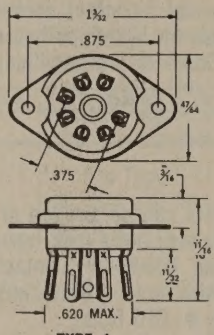
*Contact tails hot solder coated.

TRW CINCH CONNECTORS

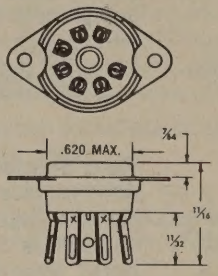
7-PIN MINIATURE TUBE SOCKETS

MOLDED MINIATURE SOCKETS WITH MOUNTING SADDLES

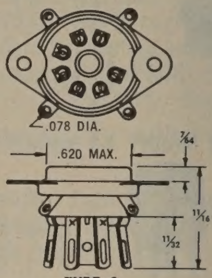
Securely holds all standard 7-pin miniature tubes. Available in top-mount, bottom-mount with ground lugs or bottom-mount with integral eyelets. Molded of high dielectric black phenolic, mica-filled low loss phenolic or ceramic material. Copper flash and electrolytic tin steel saddle with ⅞″ mounting centers and .098 or .125 diameter mounting holes. Designed for mounting through chassis in ⅝″ diameter hole. Center ground shield is brass. Positive grip contacts of spring temper brass alloy are cadmium-plated. Phosphor bronze and beryllium copper contacts are silver-plated. Standard contact length is 11/32″, as shown in drawings; 3/16″ and ¼″ contact lengths are also available on special order.



TYPE 1
Top Mount



TYPE 2
Bottom Mount

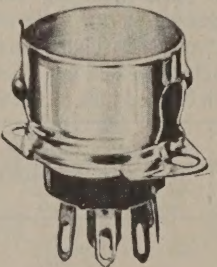


TYPE 3
Bottom Mount
With Ground Lugs

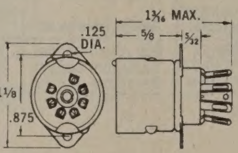
Part No.	Mtg. Hole Dia.	Part No.	Mtg. Hole Dia.	Type	Insulator Material	Contact Material	Center Shield O.D.
‡111-12-00-026	.098	111-12-00-037	.125	1	Black	Brass	3/16″
‡111-12-10-027	.098	111-12-10-038	.125	1	Mica	Brass	3/16″
111-12-20-035	.098	111-12-20-039	.125	1	Ceramic	Brass	3/16″
111-12-00-028	.098	111-12-00-034	.125	1	Black	Brass	—
111-12-10-029	.098	111-12-10-032	.125	1	Mica	Brass	—
111-12-20-036	.098	111-12-20-040	.125	1	Ceramic	Brass	—
‡111-11-00-011	.098	111-11-00-016	.125	2	Black	Brass	3/16″
‡111-11-10-012	.098	111-11-10-017	.125	2	Mica	Brass	3/16″
‡111-11-20-020	.098	111-11-20-024	.125	2	Ceramic	Brass	3/16″
111-11-00-013	.098	111-11-00-022	.125	2	Black	Brass	—
111-11-10-019	.098	111-11-10-023	.125	2	Mica	Brass	—
111-11-20-021	.098	111-11-20-025	.125	2	Ceramic	Brass	—
111-11-11-048	.098	111-11-11-041	.125	2	Mica	Phosphor Bronze	3/16″
—	—	111-11-12-014	.125	2	Mica	Beryllium Copper	3/16″
111-25-00-012	.098	—	—	3	Black*	Brass	3/16″

*Also available in Mica and Ceramic insulator materials.

MINIATURE SHIELD BASE SOCKETS



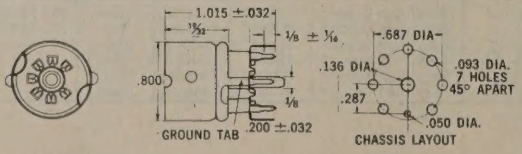
Shield base is attached to socket body for mounting through top of chassis. Molded from high dielectric black phenolic, mica-filled low loss phenolic or ceramic material. Cadmium-plated brass contacts and hot-solder-coated center shield. Cadmium-plated steel shield base with ⅞″ mounting centers. Use J-slot type tube shields with these sockets.



Part No.	Mtg. Hole Dia.	Insulator Material	Contact Material	Center Shield O.D.
‡111-31-00-012	.125	Black	Brass	3/16″
‡111-31-10-011	.125	Mica	Brass	3/16″
‡111-31-20-102	.125	Ceramic	Brass	3/16″

MINIATURE SHIELD BASE STAND-OFF SOCKETS TYPE MSB-1

These miniature sockets have an attached bayonet type shield base. Bases have ground tab where specified in listings below. May also be obtained with heli-coil insert for use with No. 4-40 NC-2 screw. Sockets listed are for use in 1/16″ thick printed circuit board, but others may also be obtained for use in 3/32″ and ⅛″ boards. Insulator bodies are mica-filled low loss phenolic (MFE). Contacts are phosphor bronze with copper flash and electrolytic tin. Center shield is copper flash and electrolytic tin brass and shield base and ground tab are nickel-plated brass.



Part No.	Insulator Material	Contact Material	Center Shield	Ground Tab
‡111-51-11-084	Mica	Phosphor Bronze	Yes	Yes
111-51-11-085	Mica	Phosphor Bronze	No	No
111-51-11-086	Mica	Phosphor Bronze	No	Yes

‡These items available through Cinch Distributors.

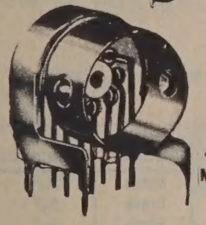
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

7-PIN MINIATURE TUBE SOCKETS (CONT'D)

MILITARY CONTRACT PC SOCKETS

TYPE MSB-2

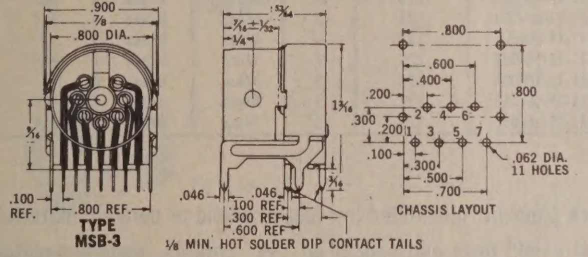

TYPE MSB-3

Two types of miniature shield base sockets designed for military use to meet rigid MIL specifications. Both types drop through clearance holes arranged on a .1″ x .1″ grid layout. The Type MSB-2 socket has a mica-filled low loss phenolic (MFE) insulator body. Contacts are phosphor bronze, silver-plated with hot solder dipped tails. Center shield is brass, hot solder dipped, and shield base is brass, nickel-plated. Hot solder dipped ground tab is an integral part of the base. The Type MSB-3 socket, for right angle tube position, also has a mica-filled low loss phenolic (MFE) insulator body. Contacts are made of beryllium copper, silver-plated with hot solder dipped tails. Shield base is brass, copper flash and electrolytic tin.

IMPORTANT

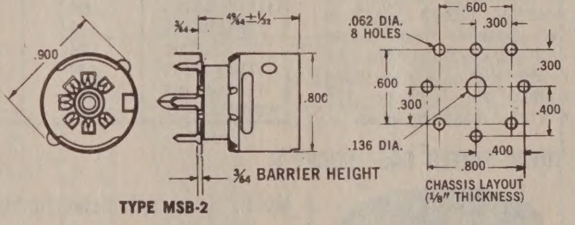
All of the sockets shown on this panel can **only** be purchased with a Government contract number. No exceptions can be made.

Part No.	Type	Insulator Material	Contact Material	Center Shield
111-54-11-101	MSB-2	Mica	Phosphor Bronze	Yes
111-54-12-149	MSB-3	Mica	Beryllium Copper	No


.900
7/8
.800 DIA.
9/16
.100 REF.
.800 REF.
53/64
7/16±1/32
1/4
1 3/16
3/16
.046
.046
.100 REF
.300 REF
.600 REF
.800
.600
.400
.200
.800
.300
.200
1 2 3 4 5 6 7
.100
.300
.500
.700
.062 DIA. 11 HOLES
TYPE MSB-3

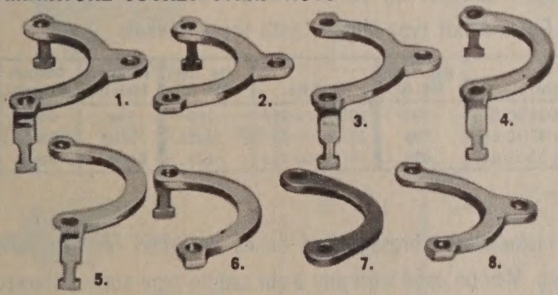
1/8 MIN. HOT SOLDER DIP CONTACT TAILS

CHASSIS LAYOUT

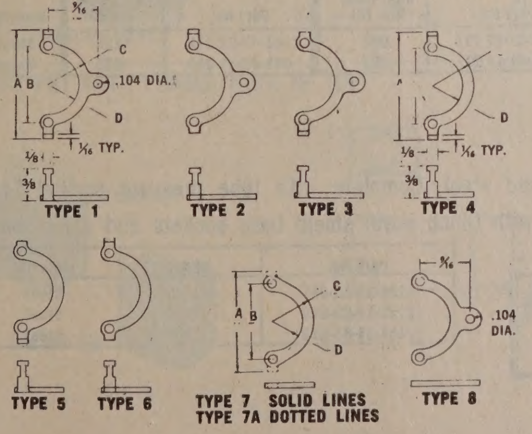

.900
3/64
49/64±1/32
.800
3/64 BARRIER HEIGHT
.062 DIA. 8 HOLES
.600
.300
.300
.600
.300
.400
.136 DIA.
.400
.800
TYPE MSB-2

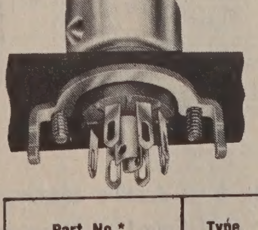
CHASSIS LAYOUT (1/8″ THICKNESS)

MINIATURE SOCKET STRAP NUTS



A Cinch development for ease and simplicity in mounting miniature sockets. One strap nut takes the place of two conventional type nuts. Generally used in assembling shield base sockets. 8 types are available, with hot tin dipped ground lugs attached for convenience in wiring. All are made of 1/16″ brass. Three finishes are available with each type: .0005 cadmium-plated, .0005 cadmium-plated plus yellow chromate or .0003 electro-tin. Desired finish must be specified. Strap nuts with .104 diameter rivet hole can be used for mounting or for grounding to aluminum chassis. All mounting holes are tapped to accept No. 4-40 screws.


9/16
C
A B
.104 DIA.
D
1/16 TYP.
1/8
3/8
D
1/8
1/16 TYP.
3/8
C
A B
D
9/16
.104 DIA.
TYPE 1
TYPE 2
TYPE 3
TYPE 4
TYPE 5
TYPE 6
TYPE 7 SOLID LINES
TYPE 7A DOTTED LINES
TYPE 8


TYPICAL STRAP NUT ASSEMBLY WITH SHIELD BASE SOCKET

Part. No.*	Type	Dim. A	Dim. B	Dim. C	Dim. D
422-05-11-113	1	1¼	.875	15/32	11/32
422-05-11-133	2	1 3/16	.875	15/32	11/32
422-05-11-143	3	1 3/16	.875	15/32	11/32
‡422-05-11-103	4	1¼	.875	15/32	11/32
422-05-11-083	5	1 3/16	.875	15/32	11/32
422-05-11-093	6	1 3/16	.875	15/32	11/32
422-05-11-153	7	—	.875	7/16	21/64
422-05-11-148	8	—	.875	15/32	11/32

*Specify finish.

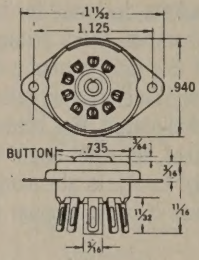
‡These items available through Cinch Distributors.

TRW CINCH CONNECTORS

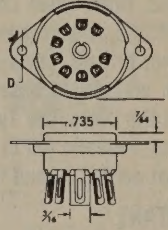
9-PIN NOVAL TUBE SOCKETS

MOLDED NOVAL SOCKETS WITH MOUNTING SADDLES

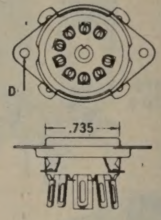
For all standard 9-pin noval tubes. Available in top-mount with or without button guide, bottom mount, bottom mount with ground lugs or bottom mount with integral eyelets. Molded of high dielectric black phenolic, mica-filled low loss phenolic or ceramic material (top mount only) with cadmium-plated brass contacts and hot-solder-coated center shield. Designed for mounting through chassis in ¾″ diameter hole, copper flash and electrolytic tin steel saddle with 1⅛″ mounting centers and .098 or .125 diameter mounting holes.



TYPE 1
Top Mount Without Button
TYPE 1A
Top Mount With Button



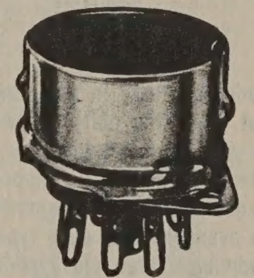
TYPE 2
Bottom Mount



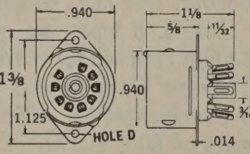
TYPE 3
Bottom Mount With Ground Lugs

Part No.	Mtg. Hole Dia. (D)	Part No.	Mtg. Hole Dia.	Type	Insulator Material	Contact Material	Center Shield O.D.
‡121-12-00-017	.098	121-12-00-023	.125	1	Black	Brass	3⁄16″
‡121-12-10-018	.098	121-12-10-022	.125	1	Mica	Brass	3⁄16″
121-14-20-094	.098	121-14-20-095	.125	1A	Ceramic	Brass	3⁄16″
‡121-11-00-016	.098	121-11-00-021	.125	2	Black	Brass	3⁄16″
121-11-00-029	.098	121-11-00-027	.125	2	Black	Brass	—
‡121-11-10-015	.098	121-11-10-020	.125	2	Mica	Brass	3⁄16″
121-11-10-019	.098	121-11-10-026	.125	2	Mica	Brass	—
121-25-00-013	.098	121-25-00-015	.125	3	Black	Brass	3⁄16″
121-25-10-014	.098	121-25-10-016	.125	3	Mica	Brass	3⁄16″

NOVAL SHIELD BASE SOCKETS

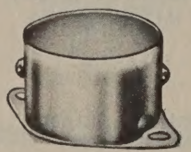


Molded from high dielectric black phenolic, mica-filled low loss phenolic or ceramic material. One piece cadmium-plated steel shield base and saddle on 1⅛″ centers. Cadmium-plated brass contacts and copper flash and elctrolytic tin center shield. Mounts through top of chassis in ¾″ diameter hole. Use Cinch J-Slot type shields with these sockets.

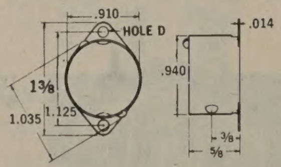


Part No.	Mtg. Hole Dia. (D)	Part No.	Mtg. Hole Dia. (D)	Insulator Material	Contact Material
‡121-31-00-015	.098	121-31-00-014	.125	Black	Brass
‡121-31-10-012	.098	121-31-10-011	.125	Mica	Brass
‡121-31-20-018	.098	121-31-20-019	.125	Ceramic	Brass

J-SLOT SHIELD BASES



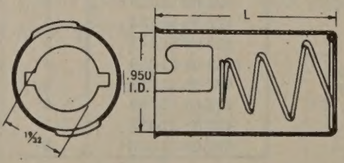
Durable cadmium-plated steel or nickel-plated brass shield bases designed for use with J-slot shields. 1⅛″ mounting centers. May be used with any 9-pin saddle type socket shown.



Part No.	Mtg. Hole Dia. (D)	Part No.	Mtg. Hole Dia. (D)	Material
441-41-22-213	.098	‡441-43-22-212	.125	Steel
441-41-11-216	.098	441-43-11-215	.125	Brass

J-SLOT TUBE SHIELDS

Made from durable cadmium-plated steel. Complete with tube pressure spring. J-slot feature designed to fit securely with Cinch noval shield base sockets and shield base.



Part No.	Dim. L	Material
‡151-11-13-011	1½″	Steel
‡151-11-23-012	1 15/16″	Steel
‡151-11-33-013	2⅜″	Steel

‡These items available through Cinch Distributors.

TRW CINCH CONNECTORS

300 SERIES WITH STANDARD TERMINATION

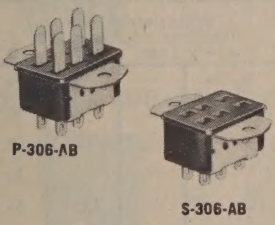
The "Jones" 300 Series plugs and sockets, designed for light and medium duty applications, are small in size with good separation between contacts. This series is available in sizes from 2 to 33 contacts, arranged for either cap or panel mounting. All plugs and sockets are polarized so that plugs of one size cannot fit with sockets of another size. 24 to 33-contact plugs with standard termination also have a special polarizing pin to facilitate faster positioning of the mating plug and socket.

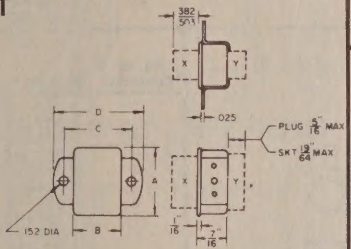
The insulating material is general purpose black phenolic. Phosphor bronze "knife-switch" type socket contacts engage both sides of flat brass plug contacts, providing double contact area. All contacts are cadmium-plated. Plug prongs are 5/32" wide and 5/64" thick. All solder lugs provided with size .093" x .062" wiring hole. Formed metal caps have black wrinkle finish with insulating liners. Other finishes and material available. Consult factory.

The 300 Series plugs and sockets feature MONOBLOCK (one-piece) construction. MONOBLOCK eliminates internal moisture traps. 300, 400 and 2400 Series UL recognized.

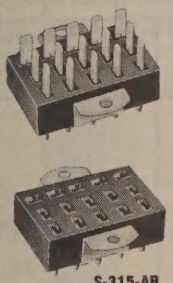
Note: All 2-contact plugs and sockets are round; all other sizes are rectangular. *U.S. Pat. Nos. 2688123 & 2980881

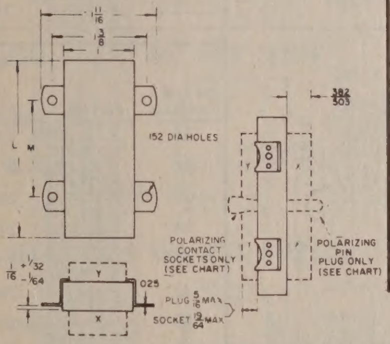
TYPE AB WITH ANGLE BRACKET


P-306-AB
S-306-AB


.382
.503
X
Y
.025
D
C
A
B
.152 DIA
PLUG 5/16 MAX
SKT 19/64 MAX
1/16
7/16

No. of Contacts	(CD) Part No.*	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	D
2	P-302-AB S-302-AB	21/32 Dia.	—	31/32	1 7/32
3	P-303-AB S-303-AB	1	7/16	3/4	1 1/16
4	P-304-AB S-304-AB	3/4	11/16	1	1 5/16
6	P-306-AB S-306-AB	1	11/16	1	1 5/16
8	P-308-AB S-308-AB	1 1/4	11/16	1	1 5/16
10	P-310-AB S-310-AB	1 9/16	11/16	1	1 5/16
12	P-312-AB S-312-AB	1 1/4	15/16	1 1/4	1 9/16

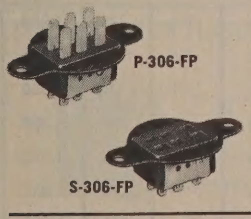

P-315-AB
S-315-AB

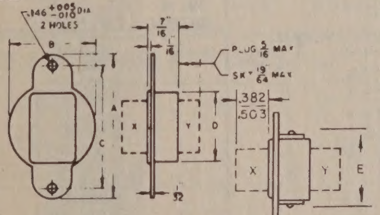

11/16
3/8
L
M
.152 DIA HOLES
.382
.503
Y
POLARIZING CONTACT SOCKETS ONLY (SEE CHART)
POLARIZING PIN PLUG ONLY (SEE CHART)
1/16 +1/32 -1/64
.025
PLUG 5/16 MAX
SOCKET 19/64 MAX
X

No. of Contacts	(CD) Part No.*	Dimensions Tol.: ±1/64" or ±.005" L	M	Polarizing Contact Pin	Polarizing In Cont. or Pin Position
15	P-315-AB S-315-AB	1 5/8	See Note	No	—
18	P-318-AB S-318-AB	1 15/16	1 1/4	No	—
21	P-321-AB S-321-AB	2 1/4	15/16	No	—
24	P-324-AB S-324-AB	2 9/16	1 1/4	Yes	14
27	P-327-AB S-327-AB	2 7/8	1 9/16	Yes	14
30	P-330-AB S-330-AB	3 3/16	1 7/8	Yes	14
33	P-333-AB S-333-AB	3 1/2	2 3/16	Yes	17

Note: P-315-AB and S-315-AB require only two mounting brackets, mounted at center on longer sides.
18-33 contact sizes require four mounting brackets.

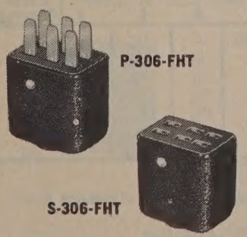
TYPE FP WITH FLUSH PLATE

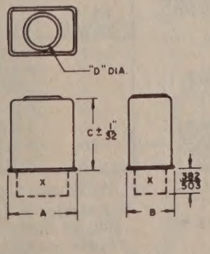

P-306-FP
S-306-FP


.146 +.005 -.010 DIA 2 HOLES
B
A
C
X
Y
D
7/16
1/16
PLUG 5/16 MAX
SKT 19/64 MAX
.382
.503
1/32
E

No. of Contacts	(CD) Part No.	Tolerance: ±1/64" or ±.005" A	B	C	D	E (Max.)
2	P-302-FP S-302-FP	2 1/16	1 1/4	1 3/4	—	23/32
3	P-303-FP S-303-FP	2 1/16	1 1/4	1 3/4	15/16	1/2
4	P-304-FP S-304-FP	2 1/16	1 1/4	1 3/4	11/16	3/4
6	P-306-FP S-306-FP	2 1/16	1 1/4	1 3/4	15/16	3/4
8	P-308-FP S-308-FP	2 9/16	1 3/4	2 1/4	1 3/16	3/4
10	P-310-FP S-310-FP	2 9/16	1 3/4	2 1/4	1 1/2	3/4
12	P-312-FP S-312-FP	2 9/16	1 3/4	2 1/4	1 3/16	1

TYPE FHT WITH FLARED HOLE IN TOP


P-306-FHT
S-306-FHT


"D" DIA
C ± 1/32
X
A
B
.382
.503

No. of Contacts	Part No.*	Tolerance: ±1/64" or ±.005" A	B	C	D
2	P-302-FHT S-302-FHT	21/32 Dia.	—	61/64	3/8
3	P-303-FHT S-303-FHT	1	7/16	61/64	5/16
4	P-304-FHT S-304-FHT	3/4	11/16	61/64	3/8
6	P-306-FHT S-306-FHT	1	11/16	1 5/64	7/16
8	P-308-FHT S-308-FHT	1 1/4	11/16	1 5/64	1/2
10	P-310-FHT S-310-FHT	1 9/16	11/16	1 13/64	1/2
12	P-312-FHT S-312-FHT	1 1/4	15/16	1 13/64	9/16

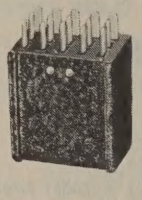
*P-Indicates Plug S-Indicates Socket.
X dimension is applicable to plugs only, with allowance made for pin float.
Y is the dimension for contact tail extension.
(CD) Indicates items normally available through Cinch Distributors.

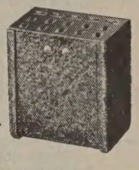
TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

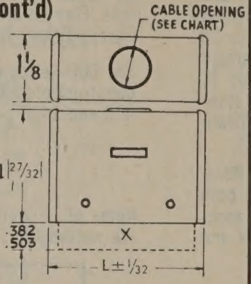
TRW CINCH CONNECTORS

300 SERIES WITH STANDARD TERMINATION (cont'd)

TYPE FHT WITH FLARED HOLE IN TOP (Cont'd)


P-315-FHT


S-315-FHT

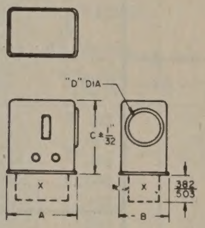


No. of Contacts	Part No.*	Dimensions In Inches L ±1/32	Dimensions In Inches Cable Opening	Polarizing Contact Pin	Polarizing In Cont. or Pin Position
15	P-315-FHT S-315-FHT	1 11/16	9/16	No	—
18	P-318-FHT S-318-FHT	2	9/16	No	—
21	P-321-FHT S-321-FHT	2 5/16	5/8	No	—
24	P-324-FHT S-324-FHT	2 5/8	5/8	Yes	14
27	P-327-FHT S-327-FHT	2 15/16	5/8	Yes	14
30	P-330-FHT S-330-FHT	3 1/4	3/4	Yes	14
33	P-333-FHT S-333-FHT	3 9/16	3/4	Yes	17

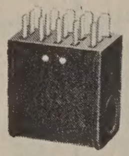
TYPE FHE WITH FLARED HOLE IN END

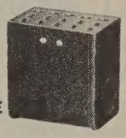
P-306-FHE

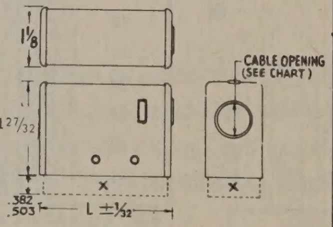
S-306-FHE



No. of Contacts	Part No.*	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	D
2	P-302-FHE S-302-FHE	21/32 Dia.	—	61/64	5/16
3	P-303-FHE S-303-FHE	1	7/16	61/64	1/4
4	P-304-FHE S-304-FHE	3/4	11/16	61/64	3/8
6	P-306-FHE S-306-FHE	1	11/16	1 5/64	7/16
8	P-308-FHE S-308-FHE	1 1/4	11/16	1 5/64	1/2
10	P-310-FHE S-310-FHE	1 9/16	11/16	1 13/64	1/2
12	P-312-FHE S-312-FHE	1 1/4	15/16	1 13/64	9/16


P-315-FHE


S-315-FHE

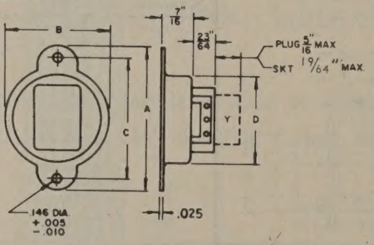


No. of Contacts	Part No.*	Dimensions In Inches L ±1/32	Dimensions In Inches Cable Opening	Polarizing Contact Pin	Polarizing In Cont. or Pin Position
15	P-315-FHE S-315-FHE	1 11/16	9/16	No	—
18	P-318-FHE S-318-FHE	2	9/16	No	—
21	P-321-FHE S-321-FHE	2 5/16	5/8	No	—
24	P-324-FHE S-324-FHE	2 5/8	5/8	Yes	14
27	P-327-FHE S-327-FHE	2 15/16	5/8	Yes	14
30	P-330-FHE S-330-FHE	3 1/4	3/4	Yes	14
33	P-333-FHE S-333-FHE	3 9/16	3/4	Yes	17

TYPE RP WITH RECESSED PLATE

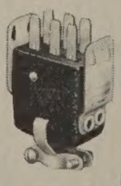
P-306-RP

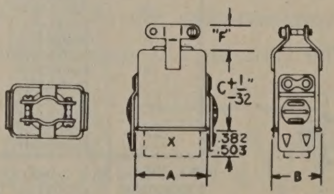
S-306-RP



No. of Contacts	Part No.* Ⓒ	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	D (Max.)
2	P-302-RP S-302-RP	2 1/16	1 1/2	1 3/4	1.350
3	P-303-RP S-303-RP	2 1/16	1 1/2	1 3/4	1.350
4	P-304-RP S-304-RP	2 1/16	1 1/2	1 3/4	1.350
6	P-306-RP S-306-RP	2 1/16	1 1/2	1 3/4	1.350
8	P-308-RP S-308-RP	2 9/16	2	2 1/4	1.850
10	P-310-RP S-310-RP	2 9/16	2	2 1/4	1.850
12	P-312-RP S-312-RP	2 9/16	2	2 1/4	1.850

TYPE CCT-L WITH CABLE CLAMP IN TOP OF CAP AND WITH LOCKS


P-306-CCT-L



No. of Contacts	Part No.* Ⓒ	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	F	Cable Opening
2	P-302-CCT-L	21/32 Dia.	—	61/64	25/64	3/8
3	P-303-CCT-L	1	7/16	61/64	25/64	5/16
4	P-304-CCT-L	3/4	11/16	61/64	27/64	3/8
6	P-306-CCT-L	1	11/16	1 5/64	27/64	7/16
8	P-308-CCT-L	1 1/4	11/16	1 5/64	27/64	1/2
10	P-310-CCT-L	1 9/16	11/16	1 13/64	27/64	1/2
12	P-312-CCT-L	1 1/4	15/16	1 13/64	27/64	9/16

*P-Indicates Plug S-Indicates Socket

X dimension is applicable to plugs only, with allowance made for pin float.

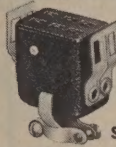
Y is the dimension for contact tail extension.

Ⓒ Indicates items normally available through Cinch Distributors.

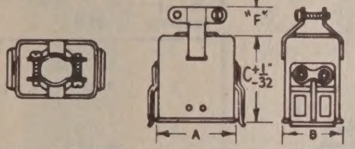
TRW CINCH CONNECTORS

300 SERIES WITH STANDARD TERMINATION (cont'd)

TYPE CCT-K WITH CABLE CLAMP IN TOP OF CAP & WITH KEEPERS

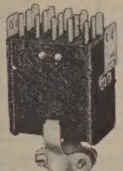


S-306-CCT-K

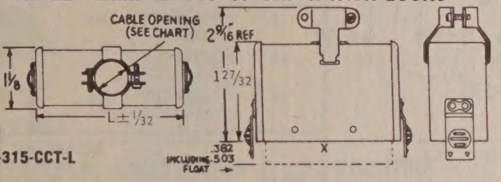


No. of Contacts	Part No.* Ⓒ_D	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	F	Cable Opening
2	S-302-CCT-K	21/32 Dia.	—	61/64	25/64	3/8
3	S-303-CCT-K	1	7/16	61/64	25/64	5/16
4	S-304-CCT-K	3/4	11/16	61/64	27/64	3/8
6	S-306-CCT-K	1	11/16	1 5/64	27/64	7/16
8	S-308-CCT-K	1 1/4	11/16	1 5/64	27/64	1/2
10	S-310-CCT-K	1 9/16	11/16	1 13/64	27/64	1/2
12	S-312-CCT-K	1 1/4	15/16	1 13/64	27/64	9/16

TYPE CCT-L WITH CABLE CLAMP IN TOP OF CAP & WITH LOCKS



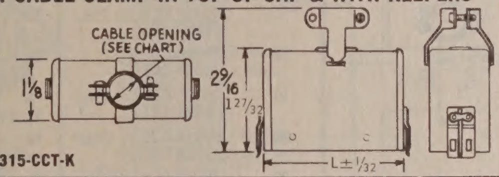
P-315-CCT-L



No. of Contacts	Part No.* Ⓒ_D	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	P-315-CCT-L	1 11/16	9/16	No	—
18	P-318-CCT-L	2	9/16	No	—
21	P-321-CCT-L	2 5/16	5/8	No	—
24	P-324-CCT-L	2 5/8	5/8	Yes	14
27	P-327-CCT-L‡	2 15/16	5/8	Yes	14
30	P-330-CCT-L‡	3 1/4	3/4	Yes	14
33	P-333-CCT-L‡	3 9/16	3/4	Yes	17

TYPE CCT-K WITH CABLE CLAMP IN TOP OF CAP & WITH KEEPERS

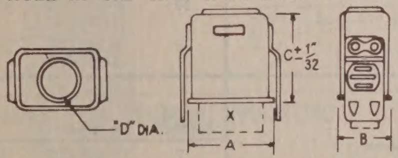
S-315-CCT-K



No. of Contacts	Part No.* Ⓒ_D	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	S-315-CCT-K	1 11/16	9/16	No	—
18	S-318-CCT-K	2	9/16	No	—
21	S-321-CCT-K	2 5/16	5/8	No	—
24	S-324-CCT-K	2 5/8	5/8	Yes	14
27	S-327-CCT-K‡	2 15/16	5/8	Yes	14
30	S-330-CCT-K‡	3 1/4	3/4	Yes	14
33	S-333-CCT-K‡	3 9/16	3/4	Yes	17

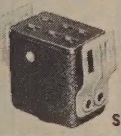
TYPE FHT-L WITH FLARED HOLE IN CAP AND WITH LOCKS

P-306-FHT-L

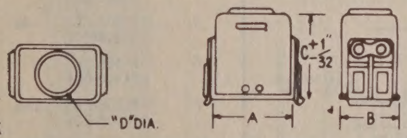


No. of Contacts	Part No.*	Dimensions In Inches Tolerance: ±1/64" or .005" A	B	C	D
2	P-302-FHT-L	21/32 Dia.	—	61/64	3/8
3	P-303-FHT-L	1	7/16	61/64	5/16
4	P-304-FHT-L	3/4	11/16	61/64	3/8
6	P-306-FHT-L	1	11/16	1 5/64	7/16
8	P-308-FHT-L	1 1/4	11/16	1 5/64	1/2
10	P-310-FHT-L	1 9/16	11/16	1 13/64	1/2
12	P-312-FHT-L	1 1/4	15/16	1 13/64	9/16

TYPE FHT-K WITH FLARED HOLE IN CAP AND WITH KEEPERS

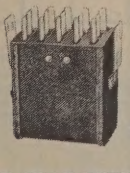


S-306-FHT-K

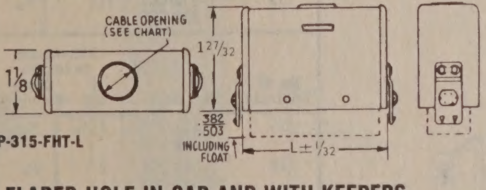


No. of Contacts	Part No.*	Dimensions In Inches Tolerance: ±1/64" or .005" A	B	C	D
2	S-302-FHT-K	21/32 Dia.	—	61/64	3/8
3	S-303-FHT-K	1	7/16	61/64	5/16
4	S-304-FHT-K	3/4	11/16	61/64	3/8
6	S-306-FHT-K	1	11/16	1 5/64	7/16
8	S-308-FHT-K	1 1/4	11/16	1 5/64	1/2
10	S-310-FHT-K	1 9/16	11/16	1 13/64	1/2
12	S-312-FHT-K	1 1/4	15/16	1 13/64	9/16

TYPE FHT-L WITH FLARED HOLE IN CAP AND WITH LOCKS

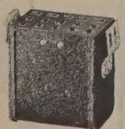


P-315-FHT-L

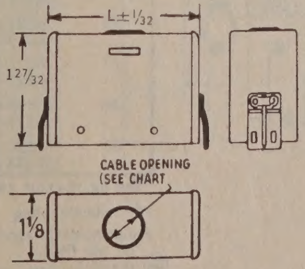


No. of Contacts	Part No.*	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	P-315-FHT-L	1 11/16	9/16	No	—
18	P-318-FHT-L	2	9/16	No	—
21	P-321-FHT-L	2 5/16	5/8	No	—
24	P-324-FHT-L	2 5/8	5/8	Yes	14
27	P-327-FHT-L‡	2 15/16	5/8	Yes	14.
30	P-330-FHT-L‡	3 1/4	3/4	Yes	14
33	P-333-FHT-L‡	3 9/16	3/4	Yes	17

TYPE FHT-K WITH FLARED HOLE IN CAP AND WITH KEEPERS



S-315-FHT-K



No. of Contacts	Part No.*	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	S-315-FHT-K	1 11/16	9/16	No	—
18	S-318-FHT-K	2	9/16	No	—
21	S-321-FHT-K	2 5/16	5/8	No	—
24	S-324-FHT-K	2 5/8	5/8	Yes	14
27	S-327-FHT-K‡	2 15/16	5/8	Yes	14
30	S-330-FHT-K‡	3 1/4	3/4	Yes	14
33	S-333-FHT-K‡	3 9/16	3/4	Yes	17

*P-Indicates Plug S-Indicates Socket

‡Keepers and locks are centered on each side, not on each end as shown.

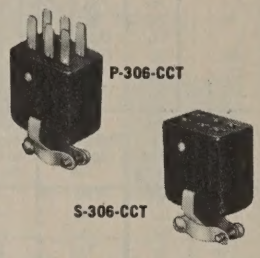
X dimension is applicable to plugs only, with allowance made for pin float.

Ⓒ_D Indicates items normally available through Cinch Distributors.

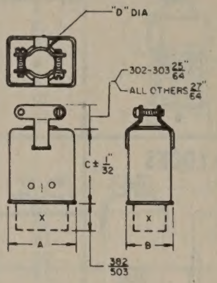
TRW CINCH CONNECTORS

300 SERIES WITH STANDARD TERMINATION (cont'd)

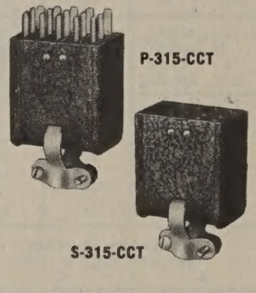
TYPE CCT WITH CABLE CLAMP IN TOP


P-306-CCT

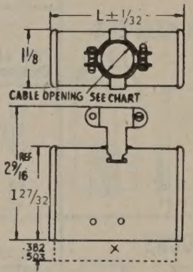
S-306-CCT



No. of Contacts	(CD) Part No.*	Dimensions In Inches Tolerance: ±1/64" or ±.005" A	B	C	D
2	P-302-CCT S-302-CCT	21/32 Dia.	—	61/64	3/8
3	P-303-CCT S-303-CCT	1	7/16	61/64	5/16
4	P-304-CCT S-304-CCT	3/4	11/16	61/64	3/8
6	P-306-CCT S-306-CCT	1	11/16	1 5/64	7/16
8	P-308-CCT S-308-CCT	1 1/4	11/16	1 5/64	1/2
10	P-310-CCT S-310-CCT	1 9/16	11/16	1 13/64	1/2
12	P-312-CCT S-312-CCT	1 1/4	15/16	1 13/64	9/16

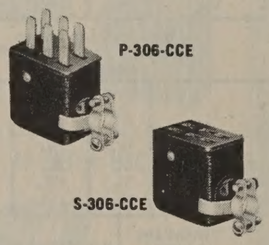

P-315-CCT

S-315-CCT

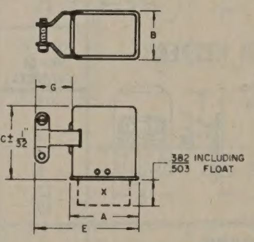


No. of Contacts	(CD) Part No.*	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	P-315-CCT S-315-CCT	1 11/16	9/16	No	—
18	P-318-CCT S-318-CCT	2	9/16	No	—
21	P-321-CCT S-321-CCT	2 5/16	5/8	No	—
24	P-324-CCT S-324-CCT	2 5/8	5/8	Yes	14
27	P-327-CCT S-327-CCT	2 15/16	5/8	Yes	14
30	P-330-CCT S-330-CCT	3 1/4	3/4	Yes	14
33	P-333-CCT S-333-CCT	3 9/16	3/4	Yes	17

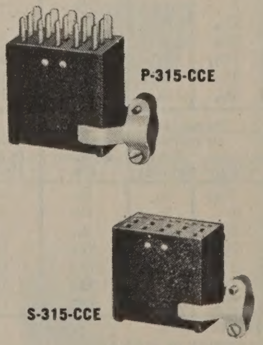
TYPE CCE WITH CABLE CLAMP IN END


P-306-CCE

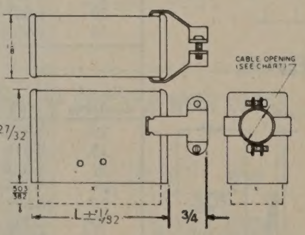
S-306-CCE



No. of Contacts	(CD) Part No.*	Dimensions In Inches ±1/64" or ±.005" A	B	C	G	Cable Opening
2	P-302-CCE S-302-CCE	21/32 Dia.	—	61/64	5/16	5/16
3	P-303-CCE S-303-CCE	1	7/16	61/64	25/64	1/4
4	P-304-CCE S-304-CCE	3/4	11/16	61/64	27/64	3/8
6	P-306-CCE S-306-CCE	1	11/16	1 5/64	27/64	7/16
8	P-308-CCE S-308-CCE	1 1/4	11/16	1 5/64	27/64	1/2
10	P-310-CCE S-310-CCE	1 9/16	11/16	1 13/64	27/64	1/2
12	P-312-CCE S-312-CCE	1 1/4	15/16	1 13/64	27/64	9/16


P-315-CCE

S-315-CCE



No. of Contacts	(CD) Part No.*	Dimensions In Inches L ±1/32	Cable Opening	Polarizing Contact Pin	Polarizing In Cont. Pin Pos.
15	P-315-CCE S-315-CCE	1 11/16	9/16	No	—
18	P-318-CCE S-318-CCE	2	9/16	No	—
21	P-321-CCE S-321-CCE	2 5/16	5/8	No	—
24	P-324-CCE S-324-CCE	2 5/8	5/8	Yes	14
27	P-327-CCE S-327-CCE	2 15/16	5/8	Yes	14
30	P-330-CCE S-330-CCE	3 1/4	3/4	Yes	14
33	P-333-CCE S-333-CCE	3 9/16	3/4	Yes	17

"See pg. 10 cable clamp for CCE caps."

*P-Indicates Plug S-Indicates Socket

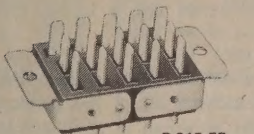
X dimension is applicable to plugs only, with allowance made for pin float.

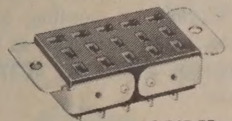
(CD) Indicates items normally available through Cinch Distributors.

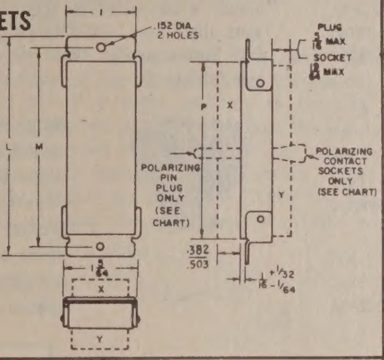
TRW CINCH CONNECTORS

300 SERIES WITH STANDARD TERMINATION (cont'd)

TYPE EB WITH END BRACKETS


P-315-EB

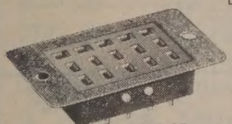

S-315-EB

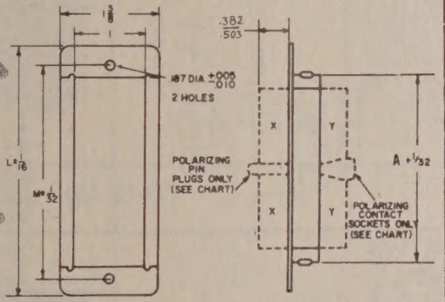

1
.152 DIA. 2 HOLES
PLUG 3/16 MAX
SOCKET 13/64 MAX
L
M
P
X
Y
POLARIZING PIN PLUG ONLY (SEE CHART)
POLARIZING CONTACT SOCKETS ONLY (SEE CHART)
.382 / .503
1 5/64
1/16 +1/32 -1/64

No. of Contacts	ⒸD Part No.*	Dimensions In Inches L ±1/32	M ±1/32	P ±1/64	Polar. Contact Pins	Polar. In Cont. Pin Pos.
15	P-315-EB S-315-EB	2 5/16	2	1 5/8	No	—
18	P-318-EB S-318-EB	2 5/8	2 5/16	1 15/16	No	—
21	P-321-EB S-321-EB	2 15/16	2 5/8	2 1/4	No	—
24	P-324-EB S-324-EB	3 1/4	2 15/16	2 9/16	Yes	14
27	P-327-EB S-327-EB	3 9/16	3 1/4	2 7/8	Yes	14
30	P-330-EB S-330-EB	3 7/8	3 9/16	3 3/16	Yes	14
33	P-333-EB S-333-EB	4 3/16	3 7/8	3 1/2	Yes	17

TYPE SB WITH SHALLOW BRACKET FOR FLUSH MOUNTING

P-315-SB


S-315-SB


1 3/8
1
.382 / .503
.187 DIA +.005 -.010 2 HOLES
X
Y
L ±1/16
M ±1/32
A ±1/32
POLARIZING PIN PLUGS ONLY (SEE CHART)
POLARIZING CONTACT SOCKETS ONLY (SEE CHART)

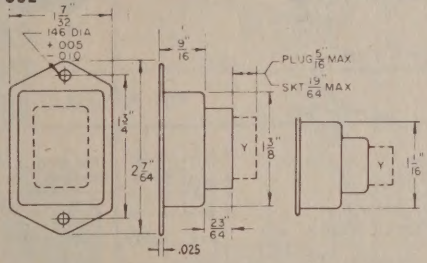
No. of Contacts	ⒸD Part No.*	Dimensions In Inches A ±1/32	M ±1/32	L ±1/16	Polar. Contact Pins	Polar. In Cont. Pin Pos.
15	P-315-SB S-315-SB	1 11/16	2 1/8	2 35/64	No	—
18	P-318-SB S-318-SB	2	2 7/16	2 55/64	No	—
21	P-321-SB S-321-SB	2 5/16	2 3/4	3 11/64	No	—
24	P-324-SB S-324-SB	2 5/8	3 1/16	3 31/64	Yes	14
27	P-327-SB S-327-SB	2 15/16	3 3/8	3 51/64	Yes	14
30	P-330-SB S-330-SB	3 1/4	3 11/16	4 7/64	Yes	14
33	P-333-SB S-333-SB	3 9/16	4	4 27/64	Yes	17

TYPE DB WITH DEEP BRACKET FOR RECESSED MOUNTING

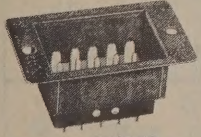
CANNOT BE USED WITH CCE

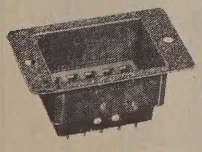
P-306-DB

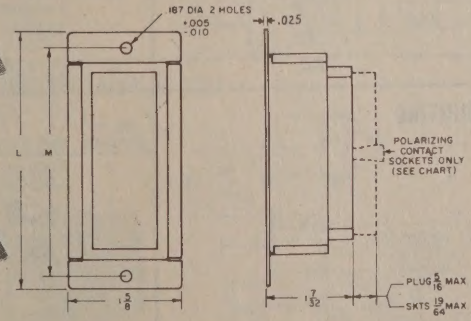
S-306-DB


1 7/32"
.146 DIA + .005 - .010
9/16"
PLUG 5/16 MAX
SKT 19/64 MAX
1 3/4"
2 7/64"
Y
1 3/8"
1 1/16"
23/64"
.025

No. of Contacts	ⒸD Part No.*	
2	P-302-DB S-302-DB	See Dimensions On Diagram
3	P-303-DB S-303-DB	
4	P-304-DB S-304-DB	
6	P-306-DB S-306-DB	
8	P-308-DB S-308-DB	
12	P-312-DB S-312-DB	


P-315-DB


S-315-DB


.187 DIA 2 HOLES +.005 -.010
.025
L
M
POLARIZING CONTACT SOCKETS ONLY (SEE CHART)
PLUG 5/16 MAX
SKTS 19/64 MAX
1 5/8
7/32

No. of Contacts	ⒸD Part No.*	Dimensions In Inches L ±1/16	M ±1/32	Polarizing Contact Pins	Polarizing In Cont. Pin Pos.
15	P-315-DB S-315-DB	2 13/16	2 3/8	No	—
18	P-318-DB S-318-DB	3 1/8	2 11/16	No	—
21	P-321-DB S-321-DB	3 7/16	3	No	—
24	P-324-DB S-324-DB	3 3/4	3 5/16	Yes	14
27	P-327-DB S-327-DB	4 1/16	3 5/8	Yes	14
30	P-330-DB S-330-DB	4 3/8	3 15/16	Yes	14
33	P-333-DB S-333-DB	4 11/16	4 1/4	Yes	17

*P-Indicates Plug S-Indicates Socket

X dimension is applicable to plugs only, with allowance made for pin float.

Y is the dimension for contact tail extension.

ⒸD Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

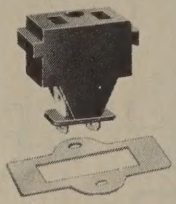
400 SERIES WITH STANDARD TERMINATION

The "400" Series plugs and sockets from the famous "Jones" line of quality components are rated for duty beyond the range of the 300 Series. Maximum rating is 1200 volts r.m.s. at 15 amperes.

400 Series plugs and sockets are available in sizes of 2, 4, 6, 8, 10 and 12 contacts, each size being polarized and suitable for either cap or panel mounting. "Knife-switch" type socket contacts are made of cadmium-plated phosphor bronze. These contacts engage both sides of the flat plug contacts, providing double the contact area.

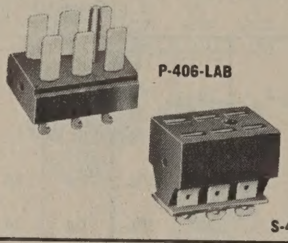
Plug prongs are made of cadmium-plated brass ¼" wide by 1/16" thick. Caps are finished in black wrinkle and equipped with insulating lining. Other finishes and material available. Consult factory.

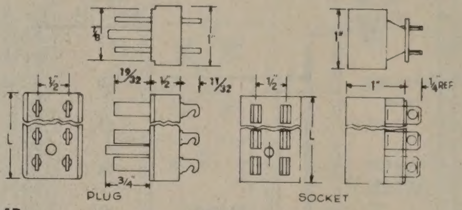
Should a connector be required which is rated for higher voltages, the "Jones" 2400 Series plugs and sockets are similar to the 400 Series except that the 2400 Series has a higher voltage rating.



Note: The 2-contact angle bracket (AB) type socket will not accept the standard angle bracket as shown in the S-406-AB illustration below. Instead, a special bracket is supplied for mounting to a panel or chassis. The illustration at the left shows the S-402-AB socket with the special bracket.

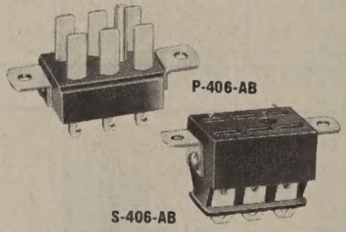
TYPE LAB LESS ANGLE BRACKETS

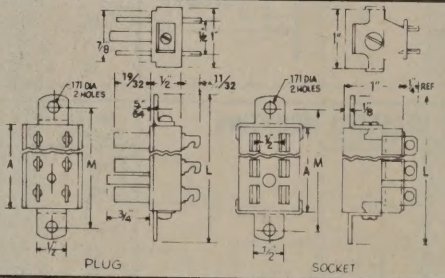




No. of Contacts	(CD) Part No.*	Dimensions In Inches ±1/64" L
2	P-402-LAB S-402-LAB	9/16
4	P-404-LAB S-404-LAB	1
6	P-406-LAB S-406-LAB	1 7/16
8	P-408-LAB S-408-LAB	1 7/8
10	P-410-LAB S-410-LAB	2 5/16
12	P-412-LAB S-412-LAB	2 3/4

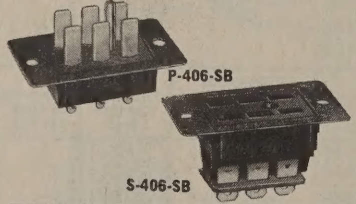
TYPE AB WITH ANGLE BRACKETS

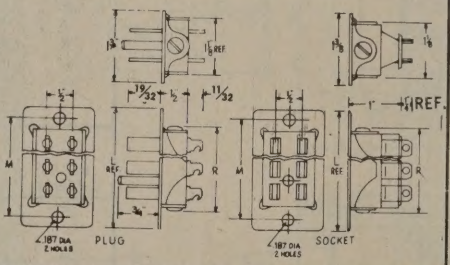




No. of Contacts	(CD) Part No.*	Dimensions In Inches ±1/64" A	M	L
2	P-402-AB S-402-AB	9/16	1 3/16	1 19/32
4	P-404-AB S-404-AB	1	1 5/8	2 1/32
6	P-406-AB S-406-AB	1 7/16	2 1/16	2 15/32
8	P-408-AB S-408-AB	1 7/8	2 1/2	2 29/32
10	P-410-AB S-410-AB	2 5/16	2 15/16	3 11/32
12	P-412-AB S-412-AB	2 3/4	3 3/8	3 25/32

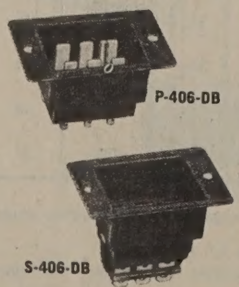
TYPE SB WITH SHALLOW BRACKET FOR FLUSH MOUNTING

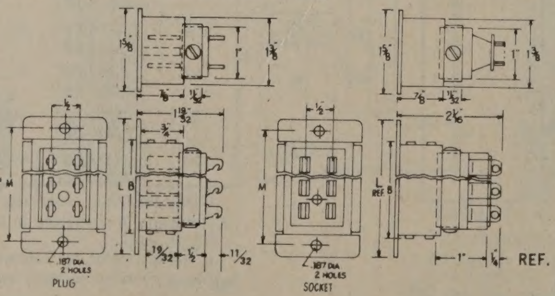




No. of Contacts	(CD) Part No.*	Dimensions In Inches ±1/64" L	M	R(Max.)
2	P-402-SB S-402-SB	1 1/2	1 1/16	49/64
4	P-404-SB S-404-SB	1 15/16	1 1/2	1 15/64
6	P-406-SB S-406-SB	2 3/8	1 15/16	1 43/64
8	P-408-SB S-408-SB	2 13/16	2 3/8	2 7/64
10	P-410-SB S-410-SB	3 1/4	2 13/16	2 35/64
12	P-412-SB S-412-SB	3 11/16	3 1/4	2 63/64

TYPE DB WITH DEEP BRACKET FOR RECESSED MOUNTING





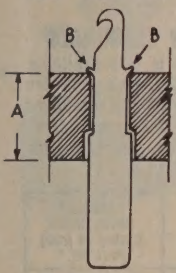
No. of Contacts	(CD) Part No.*	Dimensions In Inches ±1/64" B	L	M
2	P-402-DB S-402-DB	59/64	1 3/4	1 5/16
4	P-404-DB S-404-DB	1 23/64	2 3/16	1 3/4
6	P-406-DB S-406-DB	1 51/64	2 5/8	2 3/16
8	P-408-DB S-408-DB	2 15/64	3 1/16	2 5/8
10	P-410-DB S-410-DB	2 43/64	3 1/2	3 1/16
12	P-412-DB S-412-DB	3 7/64	3 15/16	3 1/2

*P-Indicates Plug S-Indicates Socket

(CD) Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

400 SERIES WITH STANDARD TERMINATION (cont'd)

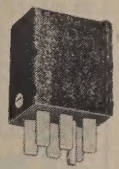


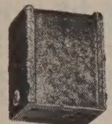
NOTE REGARDING LOOSE CONTACTS ON 400 SERIES PLUGS

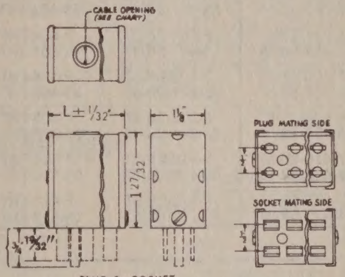
This illustration shows the method of staking 400 Series plug contacts in the phenolic body. Manufacturing tolerances permit a slight variation in the "A" dimension during the molding process. Thus, in some instances the fit between the contact and the body at points "B" may not be perfectly snug. When this condition occurs, the contact appears to be "loose" in the connector body. However, the security of the contact is in no way jeopardized and the performance of the connector is not impaired.

It is recommended that personnel responsible for inspection and installation of the connectors be informed of this condition to avoid unnecessary delays and correspondence arising from a mistaken conclusion that the connectors are faulty. In case of doubt, however, it is advisable to check with the local Cinch representative or contact the factory before any action is taken.

TYPE FHT WITH FLARED HOLE IN TOP

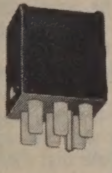

P-406-FHT

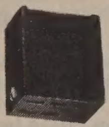

S-406-FHT

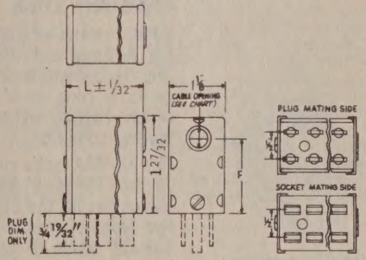

CABLE OPENING (SEE CHART)
L±1/32
1 1/8
1 27/32
3/4
19/32"
PLUG MATING SIDE
SOCKET MATING SIDE
PLUG & SOCKET

No. of Contacts	Part No.*	Dimensions In Inches L ±1/32"	Cable Opening ±1/64"
2	P-402-FHT S-402-FHT	5/8	5/16
4	P-404-FHT S-404-FHT	1 1/16	7/16
6	P-406-FHT S-406-FHT	1 1/2	7/16
8	P-408-FHT S-408-FHT	1 15/16	9/16
10	P-410-FHT S-410-FHT	2 3/8	9/16
12	P-412-FHT S-412-FHT	2 13/16	5/8

TYPE FHE WITH FLARED HOLE IN END


P-406-FHE


S-406-FHE

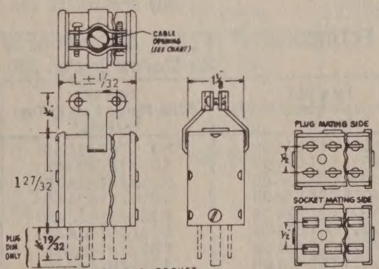

L±1/32
1 1/8
CABLE OPENING (SEE CHART)
1 27/32
F
PLUG DIM ONLY
3/4
19/32"
PLUG MATING SIDE
SOCKET MATING SIDE
PLUG & SOCKET

No. of Contacts	Part No.*	Dimensions In Inches F	L ±1/32"	Cable Opening ±1/64"
2	P-402-FHE S-402-FHE	1 3/8	5/8	3/8
4	P-404-FHE S-404-FHE	1 3/8	1 1/16	7/16
6	P-406-FHE S-406-FHE	1 3/8	1 1/2	7/16
8	P-408-FHE S-408-FHE	1 11/32	1 15/16	9/16
10	P-410-FHE S-410-FHE	1 11/32	2 3/8	9/16
12	P-412-FHE S-412-FHE	1 5/16	2 13/16	5/8

TYPE CCT WITH CABLE CLAMP IN TOP

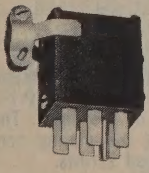
P-406-CCT

S-406-CCT


CABLE OPENING (SEE CHART)
L±1/32
1 1/8
3/4
1 27/32
PLUG DIM ONLY
3/4
19/32
PLUG MATING SIDE
SOCKET MATING SIDE
1/2
1/2
PLUG & SOCKET

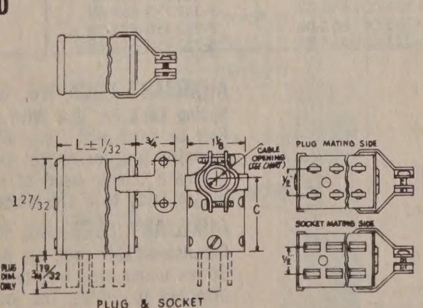
No. of Contacts	Part No.* Ⓒ	Dimensions In Inches L ±1/32"	Cable Opening ±1/64"
2	P-402-CCT S-402-CCT	5/8	5/16
4	P-404-CCT S-404-CCT	1 1/16	7/16
6	P-406-CCT S-406-CCT	1 1/2	7/16
8	P-408-CCT S-408-CCT	1 15/16	9/16
10	P-410-CCT S-410-CCT	2 3/8	9/16
12	P-412-CCT S-412-CCT	2 13/16	5/8

TYPE CCE WITH CABLE CLAMP IN END


P-406-CCE

S-406-CCE

"See p. 9 cable clamp for CCE Caps"


L±1/32
3/4
1 1/8
CABLE OPENING (SEE CHART)
1 27/32
C
PLUG DIM ONLY
3/4
19/32
PLUG MATING SIDE
SOCKET MATING SIDE
1/2
1/2
PLUG & SOCKET

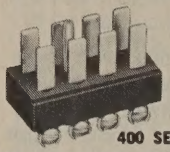
No. of Contacts	Part No.* Ⓒ	Dimensions In Inches L ±1/32"	C	Cable Opening ±1/64"
2	P-402-CCE S-402-CCE	5/8	1 3/8	3/8
4	P-404-CCE S-404-CCE	1 1/16	1 3/8	7/16
6	P-406-CCE S-406-CCE	1 1/2	1 3/8	7/16
8	P-408-CCE S-408-CCE	1 15/16	1 11/32	9/16
10	P-410-CCE S-410-CCE	2 3/8	1 11/32	9/16
12	P-412-CCE S-412-CCE	2 13/16	1 5/16	5/8

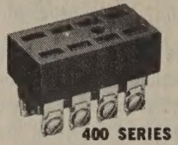
*P-Indicates Plug S-Indicates Socket

Ⓒ Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

400 SERIES—WITH SCREW TERMINALS


400 SERIES PLUG


400 SERIES SOCKET

400 SERIES PLUGS AND SOCKETS WITH SCREW TERMINALS

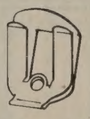
In addition to the solder-type terminals, the 400 Series is also available with screw terminals as listed below. The plug and socket bodies are of slightly different construction from those used with the standard solder-type. This is necessary in order to accommodate the screw terminals. However, the overall dimensions for installation purposes are compatible with the standard type. (To order see top pg. 11.)

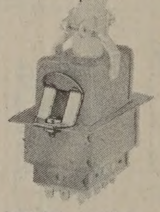
No. of Contacts	Type LAB (Less Angle Brackets) Part No.*	Type AB (With Angle Brackets) Part No.*	Type SB (With Shallow Bracket) Part No.*	Type DB (With Deep Bracket) Part No.*	Type FHT (With Flared Hole in Top) Part No.*	Type FHE (With Flared Hole in End) Part No.*	Type CCT (With Cable Clamp in Top) Part No.*	Type CCE (With Cable Clamp in End) Part No.*
2	P-402-LAB-ST SS-402-LAB-ST	P-402-AB-ST SS-402-AB-ST	P-402-SB-ST SS-402-SB-ST	P-402-DB-ST SS-402-DB-ST	P-402-FHT-ST SS-402-FHT-ST	P-402-FHE-ST SS-402-FHE-ST	P-402-CCT-ST SS-402-CCT-ST	P-402-CCE-ST SS-402-CCE-ST
4	P-404-LAB-ST SS-404-LAB-ST	P-404-AB-ST SS-404-AB-ST	P-404-SB-ST SS-404-SB-ST	P-404-DB-ST SS-404-DB-ST	P-404-FHT-ST SS-404-FHT-ST	P-404-FHE-ST SS-404-FHE-ST	P-404-CCT-ST SS-404-CCT-ST	P-404-CCE-ST SS-404-CCE-ST
6	P-406-LAB-ST SS-406-LAB-ST	P-406-AB-ST SS-406-AB-ST	P-406-SB-ST SS-406-SB-ST	P-406-DB-ST SS-406-DB-ST	P-406-FHT-ST SS-406-FHT-ST	P-406-FHE-ST SS-406-FHE-ST	P-406-CCT-ST SS-406-CCT-ST	P-406-CCE-ST SS-406-CCE-ST
8	P-408-LAB-ST SS-408-LAB-ST	P-408-AB-ST SS-408-AB-ST	P-408-SB-ST SS-408-SB-ST	P-408-DB-ST SS-408-DB-ST	P-408-FHT-ST SS-408-FHT-ST	P-408-FHE-ST SS-408-FHE-ST	P-408-CCT-ST SS-408-CCT-ST	P-408-CCE-ST SS-408-CCE-ST
10	P-410-LAB-ST SS-410-LAB-ST	P-410-AB-ST SS-410-AB-ST	P-410-SB-ST SS-410-SB-ST	P-410-DB-ST SS-410-DB-ST	P-410-FHT-ST SS-410-FHT-ST	P-410-FHE-ST SS-410-FHE-ST	P-410-CCT-ST SS-410-CCT-ST	P-410-CCE-ST SS-410-CCE-ST
12	P-412-LAB-ST SS-412-LAB-ST	P-412-AB-ST SS-412-AB-ST	P-412-SB-ST SS-412-SB-ST	P-412-DB-ST SS-412-DB-ST	P-412-FHT-ST SS-412-FHT-ST	P-412-FHE-ST SS-412-FHE-ST	P-412-CCT-ST SS-412-CCT-ST	P-412-CCE-ST SS-412-CCE-ST

*P-Indicates Plug SS-Indicates Sockets

AUXILIARY LOCKING ARRANGEMENTS

Capped Connector Member Showing Extrusion for Engaged Auxiliary Lock


Auxiliary Lock 63A Factory No. 422-12-14-012


Complete Auxiliary Locking Assembly

AUXILIARY LOCK 63A—FACTORY NO. 422-1214012

Where connectors are subject to shock or vibration, the Auxiliary Locking Arrangement (No. 63A) is recommended. It can be used with the 300 Series end bracket (EB), shallow bracket (SB) or deep bracket (DB) types. It consists of a set of spring locks secured by the mounted bolts which engage extrusions on the cap creating a secure, shakeproof mating condition.

The No. 63A locks must be ordered separately, one pair for each plug and socket. The part numbers for the plugs and sockets with the special extrusions on the caps are found in the table below. Note that there are two types of caps, one with extrusions placed for end bracket or shallow bracket mates (S-type) and the other for deep bracket mates (D-type). **IMPORTANT:** As indicated below, the caps with the S-type mates are the only ones which can be used with FHE and CCE plugs and sockets.

PLUGS AND SOCKETS WITH D-TYPE EXTRUSIONS

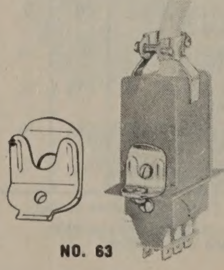
For Deep Bracket (DB) Mates

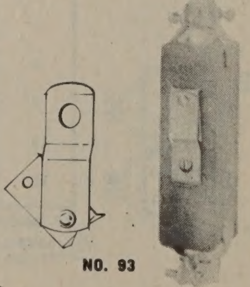
PLUGS AND SOCKETS WITH S-TYPE EXTRUSIONS

For Shallow Bracket (SB) and End Bracket (EB) Mates

No. of Contacts	Type FHT (With Flared Hole in Top) Part No.*	Type CCT (With Cable Clamp in Top) Part No.*	Type FHT (With Flared Hole in Top) Part No.*	Type CCT (With Cable Clamp in Top) Part No.*	Type CCE (With Cable Clamp in End) Part No.*
15	P-315-FHT-63A-DB S-315-FHT-63A-DB	P-315-CCT-63A-DB S-315-CCT-63A-DB	P-315-FHT-63A-SB S-315-FHT-63A-SB	P-315-CCT-63A-SB S-315-CCT-63A-SB	P-315-CCE-63A-SB S-315-CCE-63A-SB
18	P-318-FHT-63A-DB S-318-FHT-63A-DB	P-318-CCT-63A-DB S-318-CCT-63A-DB	P-318-FHT-63A-SB S-318-FHT-63A-SB	P-318-CCT-63A-SB S-318-CCT-63A-SB	P-318-CCE-63A-SB S-318-CCE-63A-SB
21	P-321-FHT-63A-DB S-321-FHT-63A-DB	P-321-CCT-63A-DB S-321-CCT-63A-DB	P-321-FHT-63A-SB S-321-FHT-63A-SB	P-321-CCT-63A-SB S-321-CCT-63A-SB	P-321-CCE-63A-SB S-321-CCE-63A-SB
24	P-324-FHT-63A-DB S-324-FHT-63A-DB	P-324-CCT-63A-DB S-324-CCT-63A-DB	P-324-FHT-63A-SB S-324-FHT-63A-SB	P-324-CCT-63A-SB S-324-CCT-63A-SB	P-324-CCE-63A-SB S-324-CCE-63A-SB
27	P-327-FHT-63A-DB S-327-FHT-63A-DB	P-327-CCT-63A-DB S-327-CCT-63A-DB	P-327-FHT-63A-SB S-327-FHT-63A-SB	P-327-CCT-63A-SB S-327-CCT-63A-SB	P-327-CCE-63A-SB S-327-CCE-63A-SB
30	P-330-FHT-63A-DB S-330-FHT-63A-DB	P-330-CCT-63A-DB S-330-CCT-63A-DB	P-330-FHT-63A-SB S-330-FHT-63A-SB	P-330-CCT-63A-SB S-330-CCT-63A-SB	P-330-CCE-63A-SB S-330-CCE-63A-SB
33	P-333-FHT-63A-DB S-333-FHT-63A-DB	P-333-CCT-63A-DB S-333-CCT-63A-DB	P-333-FHT-63A-SB S-333-FHT-63A-SB	P-333-CCT-63A-SB S-333-CCT-63A-SB	P-333-CCE-63A-SB S-333-CCE-63A-SB

*P-Indicates Plug S-Indicates Socket


NO. 63


NO. 93

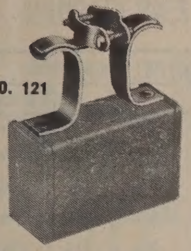
AUXILIARY LOCK NO. 63—FACTORY NO. 422-12-14-011

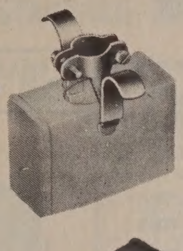
Spring Lock For Use With 400 Series Panel-Mounted Plugs and Sockets: Can be used with Type AB or SB. Proper operation requires that the mounted plug or socket body be flush with the top of the panel. The standard binder head screws furnished for fastening the mating connector body to a cap must be replaced by filister head screws.

AUXILIARY LOCK NO. 93—FACTORY NO. 319-01-99-003

Extension-Cable Lock For Use With 400 Series: Can be used with any 400 Series unmounted (cap-type) plug or socket when both mating units are attached to cables. The lock is attached to the plug cap with the screw which holds the cap to the connector body. The binder head screws in the socket cap must be replaced with filister head screws and the opening in the lock snaps over the filister head screws, completing the lock.

TRW CINCH CONNECTORS


NO. 121

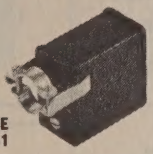

NO. 120

COMBINATION CABLE CLAMPS AND HANDLES

These units provide relief from strain on connector wiring and also facilitate connector separation in close quarters. Can be used for both plugs and sockets. Cap is not included.

No. 120 fits all Type CCT plugs and sockets of the 400 and 2400 Series and 15-33 contact plugs and sockets of the 300 Series.

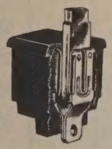
No. 121 fits the following Type FHT plugs and sockets of the 300, 400 and 2400 Series: 300 Series — 24, 27, 30 and 33 contact; 400 Series — 10 and 12 contact; 2400 Series — 10 and 12 contact.


No. S-2408-CCE with #21851

CABLE CLAMP FOR CCE CAPS — When Used with Deep Bracket

When ordering CCE caps for 315-333, 402-412, 2402-2412 Series plugs or sockets that are to be mated with DB plugs or sockets specify cable clamp No. 21851. (For example, P-2408-CCE with No. 2185.) There is no difference in price. Standard cable clamps normally furnished with all CCE will mate with SB plugs and sockets only.

2400 SERIES WITH STANDARD TERMINATION


Cross-section of 2400 Series socket showing four-surfaced contact with plug prong.

IMPORTANT NOTICE

All 2400 Series plugs and sockets are available with "early mate" grounding connections that engage before contacts mate. To order, simply add letter "G" to part number desired.

Example:

Plug without grounding pin P-2402-LAB
Plug with grounding pin PG-2402-LAB
Socket without grounding terminal S-2402-LAB
Socket with grounding terminal SG-2402-LAB

The "Jones" 2400 Series plugs and sockets are designed for excellent electrical and mechanical performance. Ratings for the 2400 Series **voltage** (for which the 2400 Series carries a 50% higher rating). Note the electrical rating chart on the inside front cover.

A unique socket contact designed is utilized in the 2400 Series as shown in the above illustration. Four individual flexing surfaces make contact make contact over practically their entire length. Note in the illustration how they exert maximum pressure at every point. Also note the unique method of anchoring terminals in the block — they cannot be moved up or down.

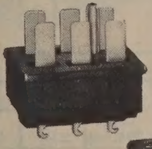
The contact-to-contact and contact-to-ground distance has been considerably increased by mounting the contacts into recessed pockets with a phenolic barrier surrounding and extending above. This method is used on both the top and bottom side of both plugs and sockets, greatly increasing the leakage path.

All units of the 2400 Series are interchangeable with corresponding units of the 400 Series. The same 2, 4, 6, 8, 10 and 12-contact plug and socket sizes are available, each size being polarized and suitable for either cap or panel mounting.

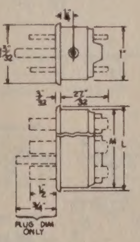
Plug and socket bodies are molded of general purpose black phenolic. Socket prongs are of heavy brass 1/4" x 1/16", cadmium-plated. The formed metal caps have a black wrinkle finish with insulating liners.

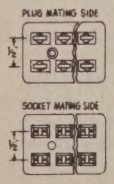
A shoulder extends around the mating side of the 2400 Series plug and socket presenting a finished appearance when mounted in bracket or cap. Because of this shoulder, when angle brackets are used, they must first be removed from the plug or socket. The unit is then inserted into the chassis with the brackets replaced underneath the panel.

TYPE LAB (LESS ANGLE BRACKETS)


P-2406-LAB

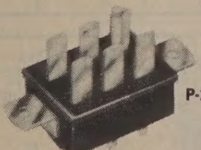
S-2406-LAB

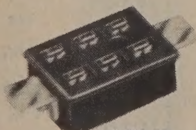


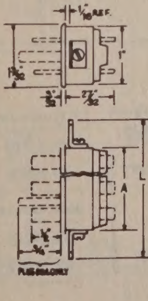


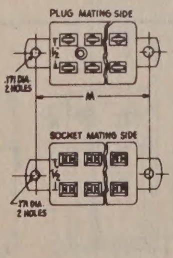
No. of Contacts	Ⓒᴅ Part No.*	Dim. In Inches ±1/64" L	M
2	P-2402-LAB S-2402-LAB	21/32	9/16
4	P-2404-LAB S-2404-LAB	1 3/32	1
6	P-2406-LAB S-2406-LAB	1 17/32	1 7/16
8	P-2408-LAB S-2408-LAB	1 31/32	1 7/8
10	P-2410-LAB S-2410-LAB	2 13/32	2 5/16
12	P-2412-LAB S-2412-LAB	2 27/32	2 3/4

TYPE AB (WITH ANGLE BRACKETS)


P-2406-AB


S-2406-AB





No. of Contacts	Part No.*	Dim. In Inches ±1/64" L	M	A
2	P-2402-AB S-2402-AB	1 19/32	1 3/16	9/16
4	P-2404-AB S-2404-AB	2 1/32	1 5/8	1
6	P-2406-AB S-2406-AB	2 15/32	2 1/16	1 7/16
8	P-2408-AB S-2408-AB	2 29/32	2 1/2	1 7/8
10	P-2410-AB S-2410-AB	3 11/32	2 15/16	2 5/16
12	P-2412-AB S-2412-AB	3 25/32	3 3/8	2 3/4

*P-Indicates Plug S-Indicates Socket
Ⓒᴅ Indicates items normally available through Cinch Distributors.

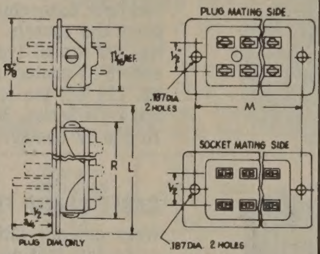
TRW CINCH CONNECTORS

2400 SERIES WITH STANDARD TERMINATION (cont'd)

TYPE SB (WITH SHALLOW BRACKET FOR FLUSH MOUNTING)

P-2406-SB

S-2406-SB

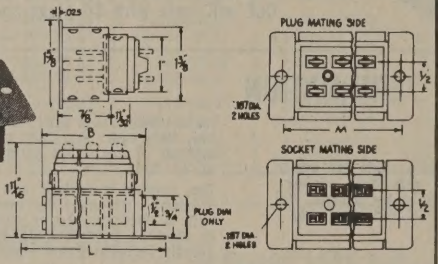

PLUG MATING SIDE
SOCKET MATING SIDE
.187 DIA. 2 HOLES
.187 DIA. 2 HOLES
M
R
L
PLUG DIM. ONLY

No. of Contacts	Part No.* Ⓒ	Dim. In Inches R ±1/16"	L ±1/64	M ±1/64
2	P-2402-SB S-2402-SB	13/16	1½	1 1/16
4	P-2404-SB S-2404-SB	1¼	1 15/16	1½
6	P-2406-SB S-2406-SB	1 11/16	2⅜	1 15/16
8	P-2408-SB S-2408-SB	2⅛	2 13/16	2⅜
10	P-2410-SB S-2410-SB	2 9/16	3¼	2 13/16
12	P-2412-SB S-2412-SB	3	3 11/16	3¼

TYPE DB (WITH DEEP BRACKET FOR RECESSED MOUNTING)

P-2406-DB

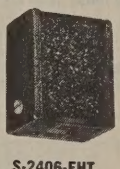
S-2406-DB

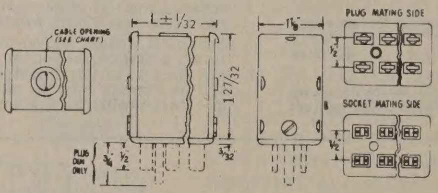

.025
PLUG MATING SIDE
SOCKET MATING SIDE
.187 DIA. 2 HOLES
.187 DIA. 2 HOLES
B
M
L
PLUG DIM ONLY

No. of Contacts	Part. No.* Ⓒ	Dim. In Inches B ±1/64"	L ±1/16"	M ±1/32"
2	P-2402-DB S-2402-DB	15/16	1¾	1 5/16
4	P-2404-DB S-2404-DB	1⅜	2 3/16	1¾
6	P-2406-DB S-2406-DB	1 13/16	2⅝	2 3/16
8	P-2408-DB S-2408-DB	2¼	3 1/16	2⅝
10	P-2410-DB S-2410-DB	2 11/16	3½	3 1/16
12	P-2412-DB S-2412-DB	3⅛	3 15/16	3½

TYPE FHT (WITH FLARED HOLE IN TOP)

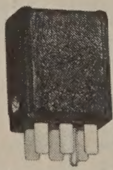
P-2406-FHT


S-2406-FHT

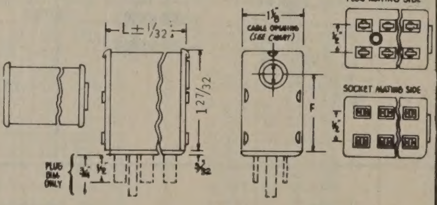

CABLE OPENING (SEE CHART)
L ± 1/32
1 27/32
PLUG DIM ONLY
PLUG MATING SIDE
SOCKET MATING SIDE
B

No. of Contacts	Part. No.*	Dim. In Inches Cable Opening	L ±1/32"
2	P-2402-FHT S-2402-FHT	5/16	⅝
4	P-2404-FHT S-2404-FHT	7/16	1 1/16
6	P-2406-FHT S-2406-FHT	7/16	1½
8	P-2408-FHT S-2408-FHT	9/16	1 15/16
10	P-2410-FHT S-2410-FHT	9/16	2⅜
12	P-2412-FHT S-2412-FHT	⅝	2 13/16

TYPE FHE (WITH FLARED HOLE IN END)


P-2406-FHE

S-2406-FHE

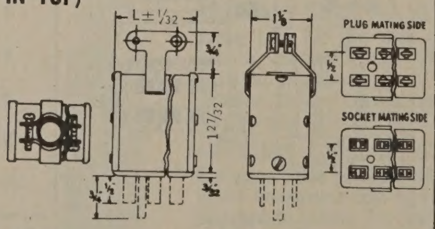

L ± 1/32
CABLE OPENING (SEE CHART)
1 27/32
F
PLUG DIM ONLY
PLUG MATING SIDE
SOCKET MATING SIDE

No. of Contacts		Dim. In Inches Cable Opening	L ±1/32"	F ±1/32"
2	P-2402-FHE S-2402-FHE	⅜	⅝	1⅜
4	P-2404-FHE S-2404-FHE	7/16	1 1/16	1⅜
6	P-2406-FHE S-2406-FHE	7/16	1½	1⅜
8	P-2408-FHE S-2408-FHE	9/16	1 15/16	1 11/32
10	P-2410-FHE S-2410-FHE	9/16	2⅜	1 11/32
12	P-2412-FHE S-2412-FHE	⅝	2 13/16	1 5/16

TYPE CCT (WITH CABLE CLAMP IN TOP)

P-2406-CCT

S-2406-CCT

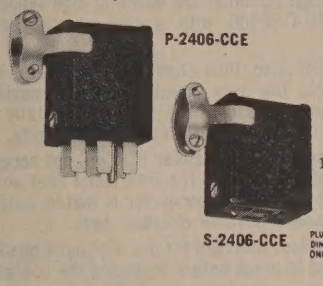

L ± 1/32
1 27/32
PLUG MATING SIDE
SOCKET MATING SIDE

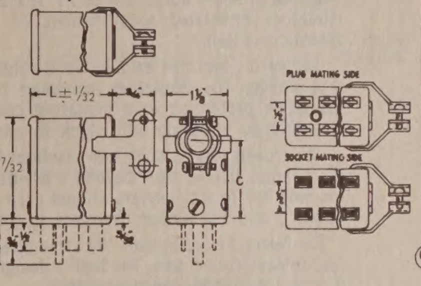
No. of Contacts	Part. No.* Ⓒ	Dim. In Inches L ±1/32"	Cable Opening
2	P-2402-CCT S-2402-CCT	⅝	5/16
4	P-2404-CCT S-2404-CCT	1 1/16	7/16
6	P-2406-CCT S-2406-CCT	1½	7/16
8	P-2408-CCT S-2408-CCT	1 15/16	9/16
10	P-2410-CCT S-2410-CCT	2⅜	9/16
12	P-2412-CCT S-2412-CCT	2 13/16	⅝

Ⓒ Indicates items normally available through Cinch Distributors.
*P-Indicates Plug S-Indicates Socket

2400 SERIES WITH STANDARD TERMINATION (cont'd)

TYPE CCE (WITH CABLE CLAMP IN END)

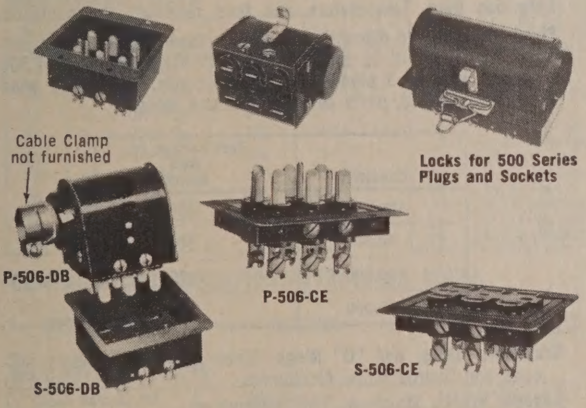




No. of Contacts	Ⓒ Part. No.*	Dim. In Inches L ±1/32"	C ±1/32"	Cable Opening
2	P-2402-CCE S-2402-CCE	5/8	1 3/8	3/8
4	P-2404-CCE S-2404-CCE	1 1/16	1 3/8	7/16
6	P-2406-CCE S-2406-CCE	1 1/2	1 3/8	7/16
8	P-2408-CCE S-2408-CCE	1 15/16	1 11/32	9/16
10	P-2410-CCE S-2410-CCE	2 3/8	1 11/32	9/16
12	P-2412-CCE S-2412-CCE	2 13/16	1 5/16	5/8

Ⓒ Indicates items normally available througn Cinch Distributors.
*P-Indicates Plug S-Indicates Socket

500 SERIES — WITH STANDARD SCREW TERMINALS / MOUNTING DATA



Locks for 500 Series Plugs and Sockets

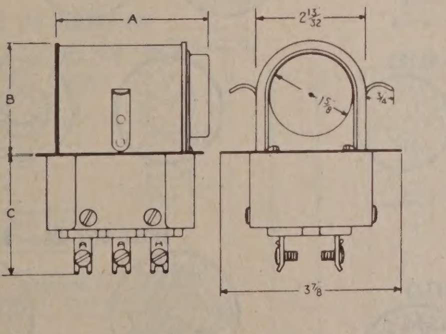
No. 500-L Lock fits any deep bracket and cap combination. It holds securely, but can be released instantly. The lock is fastened by the same screw or rivet that holds the deep bracket to the panel. Two locks are required. Cannot be used on shallow brackets.

The "Jones" 500 Series plugs and sockets are designed for use in extremely heavy-duty applications. Ratings are somewhat dependent on the parameters of the associated circuitry, but maximum voltage is nominally 3000 volts and maximum current is nominally 25 amperes per contact. Wattage per contact should not exceed 5000 watts.

500 Series plugs and sockets are available in sizes of 2, 4, 6, 8, 10 and 12 contacts, each size being polarized so as to prevent accidental mismating with any other size. The units have been designed to allow maximum accessibility under plug caps for making terminal connections and also subsequent inspection. Plug and socket blocks will accept all appropriately-sized caps and brackets interchangeably.

Male contacts are brass and female contacts are phosphor bronze, cadmium-plated. Metal parts of caps and brackets are steel and made rustproof by parkerizing. All caps are insulated with canvas bakelite. Plug prong cross section is 5/16" by 3/32".

IMPORTANT: When used with high voltages present, it is recommended that a deep bracket type (DB) be used as one plug or socket and that its mate has a cap. Shallow brackets (Type SB) are for use only in connecting to mates of the same type.



For Type DB connectors, dimension B is 2 1/4" and Dimension C is 2 5/8" reference on the socket and 2 7/16" reference on the plug. For Type SB connectors, dimension C is 1 9/16", cap height is 2 57/64".

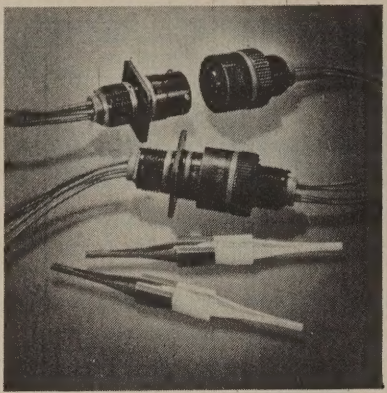
No. of Contacts	Ⓒ Type DB (With Deep Bracket for Recess Mounting) Type DB Part No.*	Ⓒ Type CE (With Cap) Type CE Part No.*	Type SB (With Ⓒ Shallow Bracket for Flush Mounting) Type SB Part No.*	Dimen. "A"
2	P-502-DB S-502-DB	P-502-CE S-502-CE	P-502-SB S-502-SB	1 11/16"
4	P-504-DB S-504-DB	P-504-CE S-504-CE	P-504-SB S-504-SB	2 1/2"
6	P-506-DB S-506-DB	P-506-CE S-506-CE	P-506-SB S-506-SB	3 5/16"
8	P-508-DB S-508-DB	P-508-CE S-508-CE	P-508-SB S-508-SB	4 1/8"
10	P-510-DB S-510-DB	P-510-CE S-510-CE	P-510-SB S-510-SB	4 15/16"
12	P-512-DB S-512-DB	P-512-CE S-512-CE	P-512-SB S-512-SB	5 3/4"

*P-Indicates Plug S-Indicates Socket

Ⓒ Indicates items normally available through Cinch Distributors.

TRW CINCH CONNECTORS

NUCON MIL-C-83723 SERIES III CYLINDRICAL CONNECTORS



The TRW Cinch Nucon Series of cylindrical connectors are built to exceed the specifications of MIL-C-83723 Series III. The design combines the exacting high reliability miniature connector specifications of MIL-C-26500 with a rear-release contact retention system.

The series features an all-plastic retention disc, thus eliminating the metal clips that shorten the insulation resistance path. The user therefore obtains maximum insulation protection in a miniature connector design. The shells are totally machined from aluminum bar stock to ensure close tolerances and uniformity.

The closed entry-socket side insulator has a lead-in chamfer that will not accept a pin contact that is bent beyond a pre-established limit. The interfacial seal on the pin side has raised barriers around each pin. When the connector is mated, barriers displace into the socket chamfers to provide a positive moisture seal.

The Nucon Series utilizes the same plastic tool specified for use with most qualified rear-release connectors. The tool is designed to break before damaging the connector if it is misused by the assembler.

The Nucon Series is made in a full range of shell sizes from 8 through 24 and both square flange and single hole mounting are available.

PERFORMANCE CHARACTERISTICS

Durability: No detrimental damage after 500 mating-unmating cycles.

Corrosion: Salt spray test per method 1001, condition B, MIL-STD-1344: no exposure of basis metal affecting performance.

Moisture Resistance: 100 megohms or greater at 25°C when tested per MIL-STD-1344, Method 1002.

Dielectric Withstanding Voltage: Sea level test per Method 3001 of MIL-STD-1344.

Altitude Immersion: 1000 megohms or greater when tested per MIL-STD-1344, Method 1004. Temperature Cycling: Tested per Condition C, Method 102, MIL-STD-202.

Vibration: No discontinuity longer than 1 microsecond per Method 214, MIL-STD-202.

MATERIALS AND FINISHES

Pin and Socket Contacts: Copper base alloy gold plated per MIL-G-45204 over suitable underplate.

Shells: Aluminum Alloy.

Finish: Conductive (Electroless Nickel); Non-conductive (Anodized).

Retention Disc: Temperature and fluid resistant thermoplastic.

Physical Shock: No discontinuity greater than 1 microsecond during application of ½ sinewave transient shock impulses of 300 gravity units to 3 planes for 3 milliseconds. Connectors shall not be damaged, parts shall not become loose.

Condition	Test Voltage AC, RMS Mated
Sea Level	1500
50,000	500
70,000	375
110,000	200

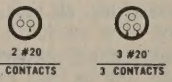
Grommets, Seals, and "O" Rings: Cinch Nuline Proprietary silicone and fluorosilicone elastomers.

Bayonet Rivets: Stainless Steel, passivated.

Inserts: Temperature and fluid resistant thermoplastic.

INSERTS AVAILABLE (showing front face of socket insert)

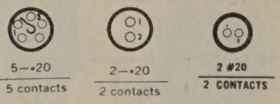
SHELL SIZE 8 — 83723



2 #20
2 CONTACTS

3 #20
3 CONTACTS

SHELL SIZE 10 — 83723

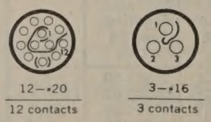


5—#20
5 contacts

2—#20
2 contacts

2 #20
2 CONTACTS

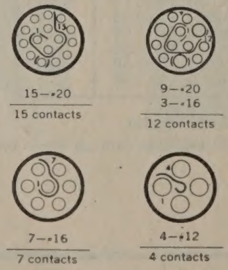
SHELL SIZE 12 — 83723



12—#20
12 contacts

3—#16
3 contacts

SHELL SIZE 14 — 83723



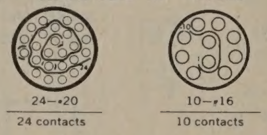
15—#20
15 contacts

9—#20
3—#16
12 contacts

7—#16
7 contacts

4—#12
4 contacts

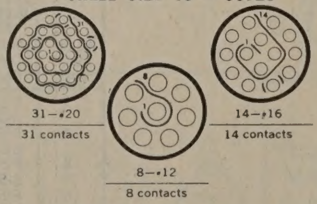
SHELL SIZE 16 — 83723



24—#20
24 contacts

10—#16
10 contacts

SHELL SIZE 18 — 83723

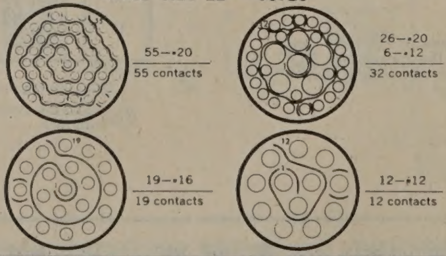


31—#20
31 contacts

8—#12
8 contacts

14—#16
14 contacts

SHELL SIZE 22 — 83723



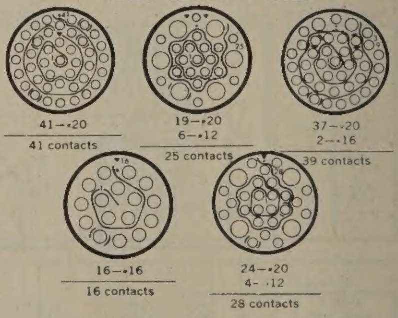
55—#20
55 contacts

26—#20
6—#12
32 contacts

19—#16
19 contacts

12—#12
12 contacts

SHELL SIZE 20 — 83723



41—#20
41 contacts

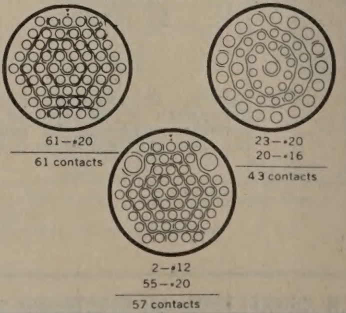
19—#20
6—#12
25 contacts

37—#20
2—#16
39 contacts

16—#16
16 contacts

24—#20
4—#12
28 contacts

SHELL SIZE 24 — 83723



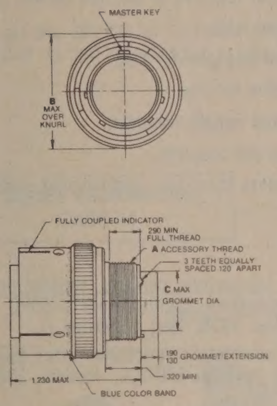
61—#20
61 contacts

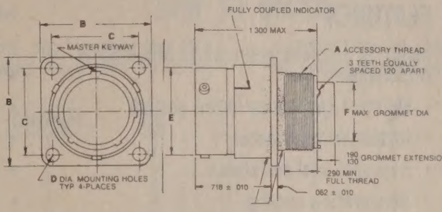
23—#20
20—#16
43 contacts

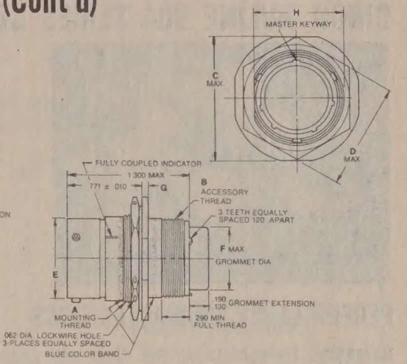
2—#12
55—#20
57 contacts

TRW CINCH CONNECTORS

NUCON MIL-C-83723 SERIES III CYLINDRICAL CONNECTORS (Cont'd)


MASTER KEY
B MAX OVER KNURL
FULLY COUPLED INDICATOR
290 MIN FULL THREAD
A ACCESSORY THREAD
3 TEETH EQUALLY SPACED 120 APART
C MAX GROMMET DIA
190/130 GROMMET EXTENSION
320 MIN
1.230 MAX
BLUE COLOR BAND


B
C
MASTER KEYWAY
B
C
D DIA. MOUNTING HOLES TYP 4-PLACES
E
FULLY COUPLED INDICATOR
1.300 MAX
A ACCESSORY THREAD
3 TEETH EQUALLY SPACED 120 APART
F MAX GROMMET DIA
190/130 GROMMET EXTENSION
290 MIN FULL THREAD
718 ± 010
062 ± 010


H
MASTER KEYWAY
C MAX
D MAX
FULLY COUPLED INDICATOR
1.300 MAX
771 ± 010
G
B ACCESSORY THREAD
3 TEETH EQUALLY SPACED 120 APART
F MAX GROMMET DIA
E
190/130 GROMMET EXTENSION
290 MIN FULL THREAD
A MOUNTING THREAD
062 DIA. LOCKWIRE HOLE 3-PLACES EQUALLY SPACED
BLUE COLOR BAND

DIMENSIONAL DATA

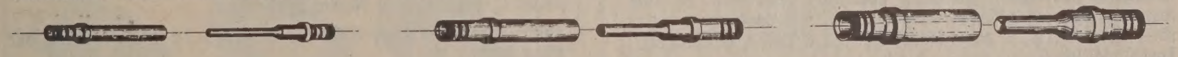
Shell Size	A Accessory Thd.	B	C
8	½-20 UNF-2A	.766	.305
10	⅝-20 UNEF-2A	.906	.405
12	¾-20 UNEF-2A	1.078	.531
14	⅞-20 UNEF-2A	1.141	.665
16	1-20 UNEF-2A	1.266	.790
18	1 1/16-18 UNEF-2A	1.375	.869
20	1 3/16-18 UNEF-2A	1.510	.994
22	1 5/16-18 UNEF-2A	1.625	1.119
24	1 7/16-18 UNEF-2A	1.760	1.244

MOUNTING DIMENSIONS

Shell Size	A Accessory Thd.	B ±.005	C ±.005	D ±.005	E	F
8	½-20 UNF-2A	.812	.594	.120	.536/ .531	.305
10	⅝-24 UNEF-2A	.937	.719	.120	.659/ .654	.405
12	¾-20 UNEF-2A	1.031	.812	.120	.829/ .824	.531
14	⅞-20 UNEF-2A	1.125	.906	.120	.898/ .893	.665
16	1-20 UNEF-2A	1.250	.969	.120	1.025/1.020	.790
18	1 1/16-18 UNEF-2A	1.343	1.062	.120	1.313/1.126	.869
20	1 3/16-18 UNEF-2A	1.437	1.156	.120	1.256/1.251	.994
22	1 5/16-18 UNEF-2A	1.562	1.250	.120	1.381/1.376	1.119
24	1 7/16-18 UNEF-2A	1.703	1.375	.149	1.506/1.501	1.244

Shell Size	A Mounting Thd.	B Accessory Thd.	C	D	E	F	G	H ±.005
8	⅝-20 UN-2A	½-20 UNF-2A	.979	.828	.536/ .531	.305	.137/.097	.592
10	¾-20 UNEF-2A	⅝-24 UNEF-2A	1.104	.953	.659/ .654	.405	.137/.097	.717
12	15/16-20 UNEF-2A	¾-20 UNEF-2A	1.291	1.140	.829/ .824	.531	.113/.097	.904
14	1-20 UNEF-2A	⅞-20 UNEF-2A	1.391	1.250	.898/ .893	.665	.137/.097	.967
16	1⅛-20 UN-20	1-20 UNEF-2A	1.516	1.329	1.025/1.020	.790	.137/.097	1.092
18	1¼-20 UN-2A	1 1/16-18 UNEF-2A	1.641	1.455	1.131/1.126	.869	.137/.097	1.216
20	1⅜-18 UNEF-2A	1 3/16-18 UNEF-2A	1.766	1.642	1.256/1.251	.994	.137/.097	1.341
22	1½-20 UN-2A	1 5/16-18 UNEF-2A	1.954	1.705	1.381/1.376	1.119	.168/.128	1.466
24	1⅝-18 UNEF-2A	1 7/16-18 UNEF-2A	2.079	1.892	1.506/1.501	1.244	.168/.128	1.591

CONTACTS AND INSERTION/EXTRACTION TOOLS



MIL-C-83723 CONTACTS

Cinch Catalog No.	Military No.	Type & Size
CN0930-2001P CN0930-2001S	M39029/4-20-20 M39029/5-20-20	Pin 20-20 Socket 20-20
CN0930-1601P CN0930-1601S	M39029/4-16-16 M39029/5-16-16	Pin 16-16 Socket 16-16
CN0930-1201P CN0930-1201S	M39029/4-12-12 M39029/5-12-12	Pin 12-12 Socket 12-12

INSERTION/EXTRACTION TOOLS

Cinch Catalog No.	Military No.	Size
CN0930-0020	M83723/31-20	20
CN0930-0016	M83723/31-16	16
CN0930-0012	M83723/31-12	12

SEALING PLUGS

Size	Color	Cinch Catalog No.	Military No.
20	Red	CN0930-3020	M83723/28-20
16	Blue	CN0930-3016	M83723/28-16
12	Yellow	CN0930-3012	M83723/28-12

ORDERING INFORMATION

MIL-C-83723 CONNECTORS ONLY

CN0930 S 1 0 A 10—02 N 115

Series Designation

Contact Style ("P" Pin, "S" Socket)

Coupling Type ("0" Threaded "1" Bayonet)

Shell Style ("6" Straight Plug, "0" sq. fl. recept., "3" Single Hole Mount)

Class ("A" non-conductive finish, "R" conductive finish)

Shell Size (08, 10, 12, 14, 16, 18, 20, 22, and 24)

Insert Arrangement

Polarity (N, 6, 7, 8, 9 or 10)

Connector Deviations
115—Standard Connector Only
116—Standard Connector Less Contacts and Seal Plugs
117—Standard Connector with Contacts and Seal Plugs Less Insertion and Extraction Tools

MIL-C-83723 BACKSHELLS ONLY

CN0930-A 1 A-22

Series Designation

Type "A" M83723/15 Backshell

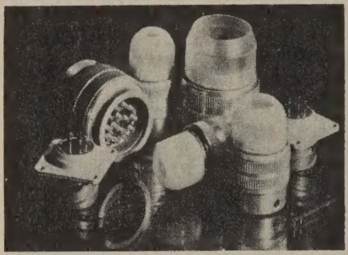
Finish Designation
"1" Conductive Finish
"2" Non-conductive Finish

Style
"A" Backshell with 90° Clamp
"N" Backshell with No Clamp
"S" Backshell with Straight Clamp

Shell Size

TRW CINCH CONNECTORS

CINCH NULINE 904 SERIES COMMERCIAL INPUT/OUTPUT CONNECTORS



FEATURES

Meets or exceeds appropriate MIL-C-5015 requirements for:

- Moisture resistance (when potted).
- Insulation resistance.
- Environmental resistance.
- Temperature cycling.

Additional features of the 904 Series:

- Lightweight.
- Visual engagement ring.
- Positive locking.
- Hooded female contacts.
- Three pin coupling.
- Stainless steel pins and bayonet slots.

PERFORMANCE CHARACTERISTICS

Durability: Connectors do not show any damage detrimental to the operation of the connector after 100 mating-unmating cycles at a rate of 300 cycles per hour.

Corrosion Resistance: After salt-spray testing per MIL-STD-202, Method 101C, Test Condition B connectors show no exposure of base metal which will affect performance.

Dielectric Withstanding Voltage: Connectors show no evidence of breakdown or flash over between adjacent contacts and from contacts to outer shell when subjected to the conditions specified in table below. (Tests performed per Method 3001 of MIL-STD-1344.)

	Condition*	Test V RMS	Recommended Working Voltage DC	Recommended Working Voltage AC
Sea Level	Unsealed	1500	700	500
	Sealed	2000	700	500
70,000 Ft.	Unsealed	375	175	125
	Sealed	1500	700	500

*(Unsealed) Refers to connectors with no provisions made for sealing front or rear areas.
(Sealed) Refers to connectors that are potted or pressurized in mounting, having front and rear areas sealed.

Insulation Resistance: Minimum insulation resistance of 5000 megohms between adjacent contacts and from contacts to outer shell when tested in accordance with MIL-STD-202, Method 302, Test Condition B.

Vibration: There are no circuit descontinuities longer than one microsecond when subjected to vibration testing in accordance with MIL-STD-1344, Method 2005, Test Condition III.

Physical Shock: Connectors are not damaged when subjected to 1500 G's for 0.5 milliseconds in each of three mutually perpendicular planes per MIL-STD-202, Method 213A, Test Condition F.

Temperature Cycling: Mated connectors perform satisfactorily after being subjected to temperature cycling from −55°C to +85°C per MIL-STD-202, Method 102A, Test Condition D.

Humidity: Connectors remain completely functional after being subjected to humidity testing per MIL-STD-202, Method 103B, Test Condition A.

Contact Resistance: Contact resistance through each mated contact pair doesn't exceed the requirements specified in the following table when tested in accordance with MIL-STD-1344, Method 3004.

Contact Mating End Size	Wire Size	Test Current (Amp)	Millivolt Drop (Max.) Initial	Millivolt Drop (Max.) After Corrosion
#20	20	7.5	55	65
	22	5.0	45	55
	24	3.0	45	55
#16	16	13.0	50	60
	18	10.0	45	55
	20	7.5	45	55

MATERIALS & FINISHES

Contacts: Copper Base Alloy Gold Plated per MIL-G-45204, Type II, Grade C, Class 0 over Nickel Underplate.

Shells: Aluminum Alloy 6262 per QQ-A-225/10 Gray Anodized per MIL-A-8625.

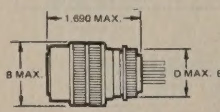
Inserts: Diallyl Phthalate per MIL-M-14F, Type MDG.

Face Seals: Neoprene Rubber per MIL-R-3065.

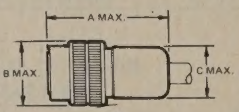
Bayonet Pins: Stainless Steel Type 303 Passivated.

Component Parts: Anodized Aluminum conforming to QQ-A-225 or Passivated Stainless Steel in accordance with QQ-S-764.

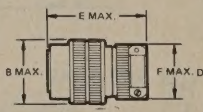
DIMENSIONS



06E



06P



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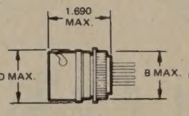
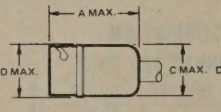
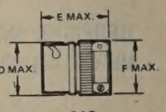


01E



01P

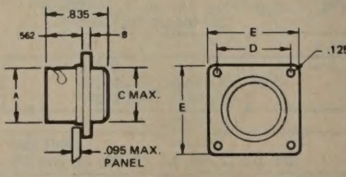


01C

Connector Size	A Inches	A Centimeters	B Inches	B Centimeters	C Inches	C Centimeters	D Inches	D Centimeters	E Inches	E Centimeters	F Inches	F Centimeters
12	1.687	4.284	.957	2.430	.795	2.019	.895	2.273	1.870	4.749	.817	2.075
14	1.687	4.284	1.082	2.748	.920	2.336	1.000	2.540	1.870	4.749	.967	2.456
18	1.687	4.284	1.375	3.492	1.170	2.971	1.250	3.175	1.870	4.749	1.185	3.009
20	1.734	4.404	1.500	3.810	1.223	3.106	1.375	3.492	1.970	5.003	1.312	3.332
22	1.734	4.404	1.625	4.127	1.352	3.434	1.468	3.728	1.970	5.003	1.440	3.657

MOUNTING DIMENSIONS (For Square Flange Connectors)

Connector Size	A Inches	A Centimeters	B Inches	B Centimeters	C Inches	C Centimeters	D Inches	D Centimeters	E Inches	E Centimeters
12	.662	1.681	.062	0.157	.690	1.752	.812	2.062	1.031	2.618
14	.781	1.983	.062	0.157	.812	2.062	.906	2.301	1.125	2.857
18	1.032	2.621	.093	0.236	1.062	2.697	1.062	2.697	1.312	3.332
20	1.156	2.936	.093	0.236	1.187	3.014	1.156	2.936	1.437	3.649
22	1.281	3.253	.093	0.236	1.281	3.253	1.250	3.175	1.562	3.967



TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1015 SOUTH SIXTH ST. / MINNEAPOLIS, MINN. 55415

TRW CINCH CONNECTORS

904 SERIES (Cont'd)

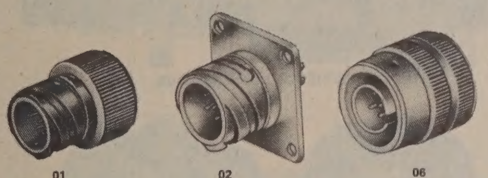
HOW TO ORDER

To get the 904 Series Connector you want, put together the part number as per the example in the following chart. The available combinations of shell styles and construction classes are shown below along with available inserts.

CN0904 06 E 12-7 P W

SERIES DESIGNATION
CN0904

SHELL STYLE

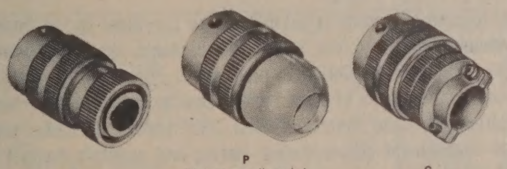


01
Cable Mounting
Receptacle

02
4-Hole Mount
Panel Receptacle

06
Cable Plug-
Straight

CONSTRUCTION

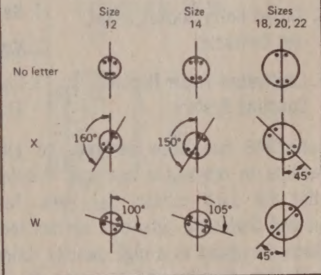


E
Environmentally sealed
(Unitized grommet)

P
Environmentally sealed
(Disposable Polyethylene
Potting Form Furnished)

C
Mechanical Clamp
(Sealed only when potted)

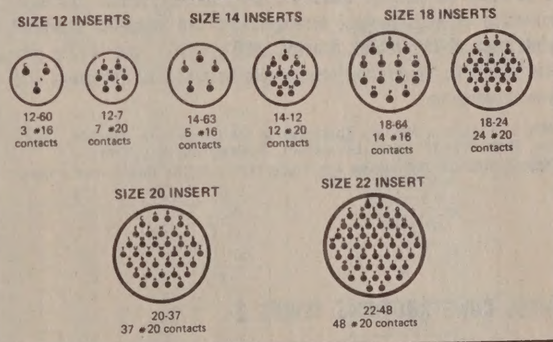
ALTERNATE INSERT POSITIONS



TYPE OF CONTACT

P-Pin
S-Socket

INSERTS AVAILABLE (Front face of pin insert shown)



SIZE 12 INSERTS

12-60
3 #16
contacts

12-7
7 #20
contacts

SIZE 14 INSERTS

14-63
5 #16
contacts

14-12
12 #20
contacts

SIZE 18 INSERTS

18-64
14 #16
contacts

18-24
24 #20
contacts

SIZE 20 INSERT

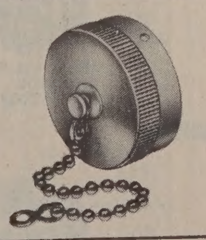
20-37
37 #20 contacts

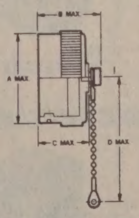
SIZE 22 INSERT

22-48
48 #20 contacts

CAP & CHAIN ASSEMBLIES

Cap and chain assemblies for 904 Series Receptacles are waterproof and include a sealing gasket. They provide protection against live circuits and contamination when receptacles are unmated.

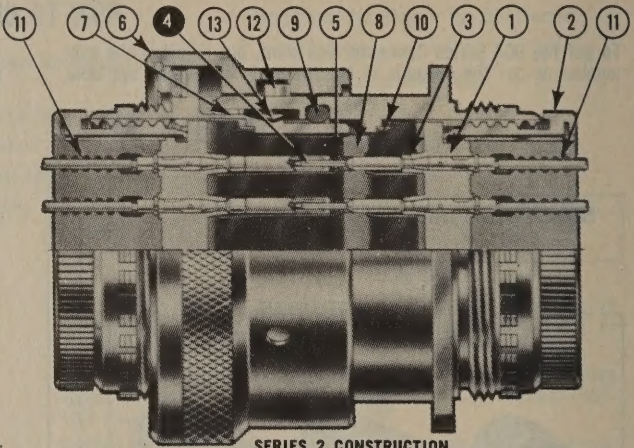




Connector Size	Part No.	A		B		C		D	
		Inches	Centimeters	Inches	Centimeters	Inches	Centimeters	Inches	Centimeters
12	CN0904-1200	.804	2.042	.774	1.965	.603	1.531	3.5	8.890
14	CN0904-1400	.938	2.382	.750	1.905	.594	1.508	3.5	8.890
18	CN0904-1800	1.172	2.976	.774	1.965	.603	1.531	3.5	8.890
20	CN0904-2000	1.296	3.291	.774	1.965	.603	1.531	4.0	10.160
22	CN0904-2200	1.421	3.609	.774	1.965	.603	1.531	4.0	10.160

TRW CINCH CONNECTORS

CINCH-NULINE ASTRO/348® MIL-C-81511 HIGH DENSITY CONNECTORS



SERIES 2 CONSTRUCTION

DESIGN FEATURES

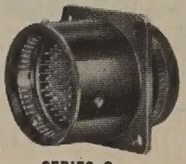
1. Molded One-Piece Contact Retention Disc.
2. Captivated Rear-Locking Nut (Metal to Metal Bottoming).
3. Individual Contact Risers.
4. Anti-Scoop Recessed Pin Contacts (in receptacle).
5. Closed Entry Socket Insert and Contacts.
6. Captivated Triple Bayonet Coupling System.
7. 5 Key Shell Polarization. (Series 2, Size 8 has 2 keys.)
8. Interfacial Mating Seal.
9. Dynamic "O" Ring Peripheral Shell Ring.
10. Monoblock Construction — Inserts Bonded to Shells.
11. Self-Sealing Rear Grommets.
12. Visual Mating Indicator.
13. Shell to Shell Grounding Fingers.

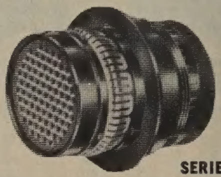
Astro/348 has been designed to eliminate the costly space-wasters in removable contacts. Problem-causing metal retention clips for each contact are gone. Instead, a single one-piece molded dielectric retention system locks Poke-Home contacts in place. Designed as a high density subminiature, Astro/348 is the best high density miniature and standard connector ever made. It packs more contacts of every size into standard shells than any other design. MIL-C-81511* has established the standard connector family for the next decade.

The single-piece retention disc gives other excellent advantages in addition to density. Dielectric wall thicknesses in the subminiature #23-22 contact arrangements **are equal to standard miniatures.** With greater density, #20's, #16's and #12's provide dielectric separation comparable to standard miniature and power connectors.

*MIL-C-81511 is a Military Specification for Connectors, Electric, Circular, High Density, Quick Disconnect, Environment Resistant.

**Astro/348 and Poke-Home are Trade Marks of the Bunker-Ramo Corp.


SERIES 2


SERIES 1

GROUNDING FINGERS

Shell-to-shell grounding is established by beryllium spring fingers permanently fixed to the Series 2 receptacle shell and permanently fixed to the Series 1 plug shell. These spring fingers, spaced at a minimum of 6 per inch (except at key-ways in Series 2 construction), make contact at least .090″ before pin-socket electrical engagement occurs during mating and maintain contact at least .090″ after pin-socket disengagement during unmating.

SHELL CONSTRUCTIONS SERIES 2

Plug
348-46EXX-XX

Single Hole Mtg.
Receptacle
348-43EXX-XX

Square Flange
Receptacle
348-40EXX-XX

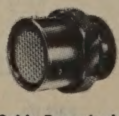
Cable Receptacle
348-41EXX-XX

SHELL CONSTRUCTIONS SERIES 1

Plug 348-36EXX-XX

Square Flange Receptacle
348-30EXX-XX

Single Hole Mtg. Receptacle
348-33EXX-XX

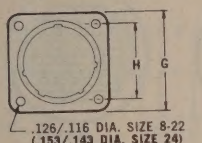

Cable Receptacle
348-31EXX-XX

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1015 SOUTH SIXTH ST. / MINNEAPOLIS, MINN. 55415

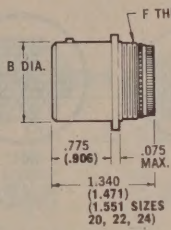
TRW CINCH CONNECTORS

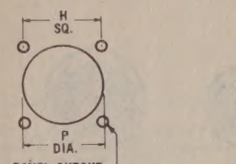
CINCH-NULINE ASTRO/348 HIGH DENSITY CONNECTORS (Cont'd)

SHELL DIMENSIONS (inches) All Dimensions Are Shown As MAX.

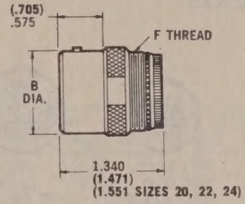

H
G
.126/.116 DIA. SIZE 8-22
(.153/.143 DIA. SIZE 24)

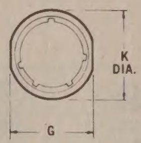
SQUARE FLANGE RECEPTACLE


F THREAD
B DIA.
.775
(.906)
.075
MAX.
1.340
(1.471)
(1.551 SIZES
20, 22, 24)

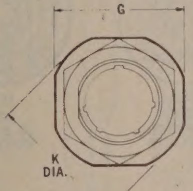

H
SQ.
P
DIA.
.132/.122 DIA.
SIZE 8-22
(.159/.149 DIA.
SIZE 24)

PANEL CUTOUT
.125 MAX. PANEL
THICKNESS
FRONT OR REAR
PANEL MOUNT

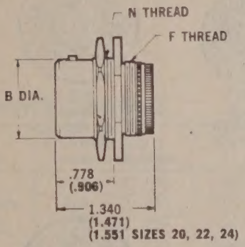

(.705)
.575
F THREAD
B
DIA.
1.340
(1.471)
(1.551 SIZES 20, 22, 24)

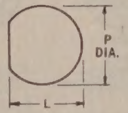


CABLE RECEPTACLE

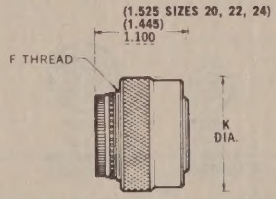


SINGLE HOLE MOUNTING RECEPTACLE


N THREAD
F THREAD
B DIA.
.778
(.906)
1.340
(1.471)
(1.551 SIZES 20, 22, 24)



PANEL CUTOUT
.125 MAX. PANEL
THICKNESS


(1.525 SIZES 20, 22, 24)
(1.445)
1.100
F THREAD
K
DIA.

PLUG

Bold face in parentheses indicates Series 1-Long 100% No-Scoop Design.

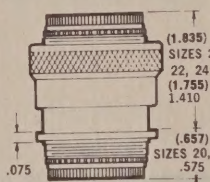
DIMENSIONS

	SHELL SIZE						
	8-Standard Series 2	8-Long Series 1	10-Standard Series 2	10-Long Series 1	14-Standard Series 2	14-Long Series 1	16-Standard Series 2
B Dia. Max.	.553	.553	.678	.678	.928	.928	1.054
F Thread	½-28	½-28	⅝-28	⅝-28	⅞-28	⅞-28	1-28
G Max. Sq. Flange Recept.	.820	.820	.945	.945	1.133	1.133	1.258
G. Max. Cabie Recept. Flats	.565	.565	.690	.690	.940	.940	1.066
G Max. Single Hole Mtg. Recept. & Her. Seal "D" Hole Recept.	.989	.989	1.114	1.114	1.401	1.401	1.526
H ±.005	.594	.594	.719	.719	.906	.906	.969
K Dia. Max. Cable Recept.	.780	.780	.900	.900	1.150	1.150	1.280
K Dia. Max. Single Hole Mtg. Recept. & Herm. Seal Single Hole	1.072	1.072	1.197	1.197	1.510	1.510	1.635
K Dia. Max. Plug	.850	.850	.975	.975	1.225	1.225	1.350
K Dia. Max. Herm. Seal Solder Flange Recept.	.945	.945	1.070	1.070	1.320	1.320	1.446
L ±.005	.605	.605	.730	.730	.980	.980	1.105
N Thread	⅝-20	⅝-20	¾-20	¾-20	1-20	1-20	1⅛-20
P Dia. ±.005	.635	.635	.760	.760	1.010	1.010	1.135
Q Max.	.710	.843	.710	.843	.710	.843	.710
R Dia. ±.005	.661	.661	.786	.786	1.036	1.036	1.162

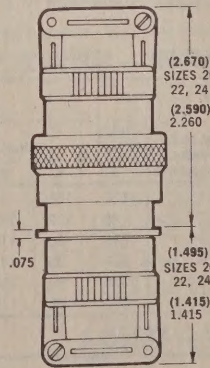
	SHELL SIZE					
	16-Long Series 1	18-Standard Series 2	18-Long Series 1	20-Long Series 1	22-Long Series 1	24-Long Series 1
B Dia. Max.	1.054	1.178	1.178	1.303	1.428	1.553
F Thread	1-28	1⅛-28	1⅛-28	1¼-28	1⅜-28	1½-28
G Max. Sq. Flange Recept.	1.258	1.351	1.351	1.475	1.570	1.711
G. Max. Cable Recept. Flats	1.066	1.190	1.190	1.315	1.440	1.565
G Max. Single Hole Mtg. Recept. & Her. Seal "D" Hole Recept.	1.526	1.651	1.651	1.776	1.901	2.026
H ±.005	.969	1.062	1.062	1.156	1.250	1.375
K Dia. Max. Cable Recept.	1.280	1.400	1.400	1.525	1.650	1.775
K Dia. Max. Single Hole Mtg. Recept. & Herm. Seal Single Hole	1.635	1.745	1.745	1.870	1.995	2.120
K Dia. Max. Plug	1.350	1.475	1.475	1.624	1.749	1.874
K Dia. Max. Herm. Seal Solder Flange Recept.	1.446	1.570	1.570	1.816	1.941	2.066
L ±.005	1.105	1.230	1.230	1.355	1.480	1.605
N Thread	1⅛-20	1¼-20	1¼-20	1⅜-20	1½-20	1⅝-20
P Dia. ±.005	1.135	1.260	1.260	1.385	1.510	1.635
Q Max.	.843	.740	.873	.903	.903	.903
R Dia. ±.005	1.162	1.286	1.286	1.411	1.536	1.661

N.A. — Hermetics available only in Standard Sizes 8 through 18, Long Size 24.
Screened area indicates Series 1-Long 100% No-Scoop Design.

MATED CONNECTORS DIMENSIONS (inches)


(1.835)
SIZES 20,
22, 24
(1.755)
1.410
(.657)
SIZES 20, 22,24
.575
.075

MATED PLUG & SQUARE FLANGE RECEPTACLE


(2.670)
SIZES 20,
22, 24
(2.590)
2.260
.075
(1.495)
SIZES 20,
22, 24
(1.415)
1.415

MATED PLUG & SQUARE FLANGE RECEPTACLE WITH CABLE SUPPORT

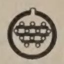
Bold face in parentheses indicates Series 1-Long 100% No-Scoop Design.

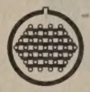
TRW CINCH CONNECTORS

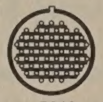
CINCH-NULINE ASTRO/348 HIGH DENSITY CONNECTORS (Cont'd)

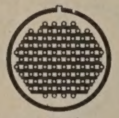
INSERT ARRANGEMENTS

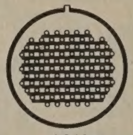
A01*
8-04
4 #23-22
CONTACTS

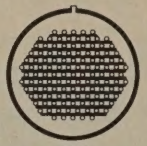

B01*
10-12
12 #23-22
CONTACTS

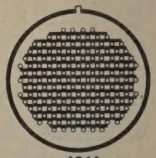

D01*
14-37
37 #23-22
CONTACTS

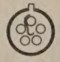

E01*
16-55
55 #23-22
CONTACTS

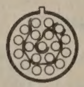

F01*
18-85
85 #23-22
CONTACTS

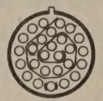

G01*
20-92
92 #23-22
CONTACTS

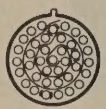

H01*
22-121
121 #23-22
CONTACTS

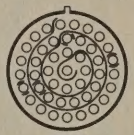

J01*
24-155
155 #23-22
CONTACTS

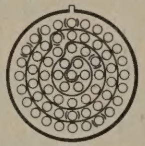

B02*
10-05
5 #20-20
CONTACTS

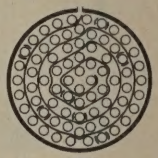

D02*
14-19
19 #20-20
CONTACTS

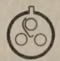

E02*
16-27
27 #20-20
CONTACTS

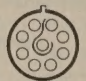

F02*
18-38
38 #20-20
CONTACTS

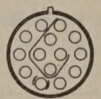

G02*
20-45
45 #20-20
CONTACTS

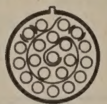

H02*
22-61
61 #20-20
CONTACTS

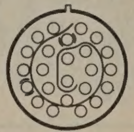

J02*
24-74
74 #20-20
CONTACTS

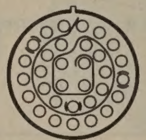

B03*
10-03
3 #16-16
CONTACTS

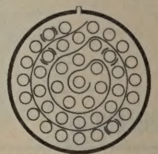

D03*
14-09
9 #16-16
CONTACTS

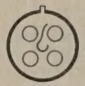

E03*
16-14
14 #16-16
CONTACTS

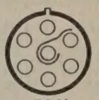

F03*
18-21
21 #16-16
CONTACTS

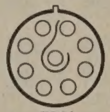

G03*
20-24
24 #16-16
CONTACTS

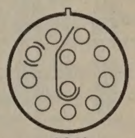

H03*
22-32
32 #16-16
CONTACTS

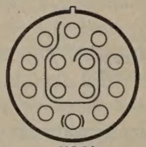

J03*
24-41
41 #16-16
CONTACTS

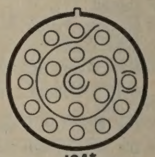

D04*
14-04
4 #12-12
CONTACTS


E04*
16-07
7 #12-12
CONTACTS


F04*
18-09
9 #12-12
CONTACTS


G04*
20-11
11 #12-12
CONTACTS


H04*
22-14
14 #12-12
CONTACTS


J04*
24-19
19 #12-12
CONTACTS

Note: Front face of pin inserts shown.

* Military Designation for Shell and Insert Arrangement

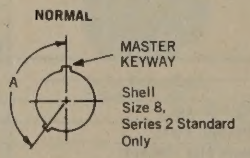
STANDARD — SERIES 2

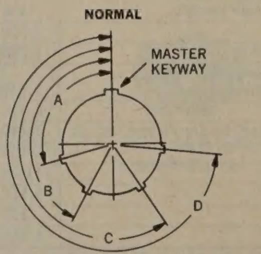
Key and Keyway Arrangement	Angular Location (All Dimensions In Degrees)								
	Shell Size 8	Shell Sizes 10, 14				Shell Sizes 16, 18			
	A	A	B	C	D	A	B	C	D
1	128	105	140	215	265	105	140	215	265
2	190	102	132	248	320	18	149	192	259
3	205	80	118	230	312	92	152	222	342
4	220	35	140	205	275	84	152	204	334
5	235	64	155	235	304	24	135	199	240
6	250	35	115	220	270	98	152	268	338

LONG — SERIES 1

Key and Keyway Arrangement	Angular Location (All Dimensions In Degrees)											
	Shell Size 8				Shell Sizes 10, 14				Shell Sizes 16, 18, 20, 22, 24			
	A	B	C	D	A	B	C	D	A	B	C	D
1	105	140	215	265	95	141	208	236	80	142	196	293
2	102	132	248	320	113	156	182	292	135	170	200	310
3	80	118	230	312	90	145	195	252	49	169	200	244
4	35	140	205	275	53	156	220	255	66	140	200	257
5	64	155	234	304	119	146	176	298	62	145	180	280
6	91	131	197	240	51	141	184	242	79	153	197	272

ALTERNATE SHELL POSITIONS





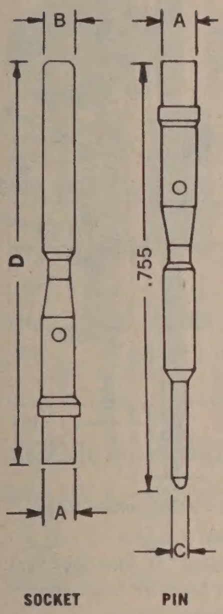
Both Series 2 Standard and Series 1 Long

Front Face of Receptacle Shown

TRW CINCH CONNECTORS

CINCH-NULINE ASTRO/348 HIGH DENSITY CONNECTORS (Cont'd)

CONTACTS



DIMENSIONS

Size	A. Max.		B Max.		C Max.		D Ref.		Current Rating
	Series 2	Series 1	Series 2	Series 1	Series 2	Series 1	Series 2	Series 1	
23-22	.050	.050	.051	.051	.028	.028	.718	1.048	5.0 Amps
23-28	.050	.050	.051	.051	.028	.028	.718	1.048	1.5 Amps
20-20	.078	.078	.078	.078	.041	.041	.718	1.048	7.5 Amps
16-16	.103	.103	.113	.113	.063	.063	.718	1.048	13.0 Amps
12-12	.158	.158	.161	.161	.095	.095	.718	1.048	23.0 Amps

Screened area indicates Series 1 (100% No-Scoop) Design.

TABLE OF POWER CONTACTS

Contact Size		Wire Size Accommodations	Cinch-Nuline Part No.		MS Part No.	
			Socket	Pin	Socket	Pin
23-22	Series 2	#22, #24, #26	348-100-2201S-02	348-100-2202P-02	MS90460A23-22	MS90461A23-22
23-28		#28, #30, #32	348-100-5047S-02	348-100-5047P-02	MS90460A23-28	MS90461A23-28
20-20		#20, #22, #24	348-100-2000S-02	348-100-2000P-02	MS90460A20-20	MS90461A20-20
16-16		#16, #18, #20	348-100-1600S-02	348-100-1600P-02	MS90460A16-16	MS90461A16-16
12-12		#12, #14	348-100-1200S-02	348-100-1200P-02	MS90460A12-12	MS90461A12-12
23-22	Series 1	#22, #24, #26	348-100-2203S-02	348-100-2202P-02	MS3343A23-22	MS90461A23-22
23-28		#28, #30, #32	348-100-5048S-02	348-100-5047P-02	MS3343A23-28	MS90461A23-28
20-20		#20, #22, #24	348-100-2003S-02	348-100-2000P-02	MS3343A20-20	MS90461A20-20
16-16		#16, #18, #20	348-100-1603S-02	348-100-1600P-02	MS3343A16-16	MS90461A16-16
12-12		#12, #14	348-100-1203S-02	348-100-1200P-02	MS3343A12-12	MS90461A12-12

FOR CONTACT FINISHES:
"A" 150°C. MS rating, use Cinch-Nuline P/N with .02 (see table).
"B" 200°C. MS rating, use Cinch-Nuline P/N with -03.
EXAMPLE: MS90460B23-22 is equivalent to 348-100-2201S-03.

Screened area indicates Series 1 (100% No-Scoop) Design.

HOW TO ORDER

To get the specific Astro/348 Connector you want, put together the part number as per the following example:

348 - 3 0 E 18 - 85 P 1 (200)

Series Designation

Connector Type
150°C Oper. Temp.
3-Series 1 Connector
4-Series 2 Connector
200°C Oper. Temp.
5-Series 1 Connector
6-Series 2 Connector
High Fluid Resistance
7-Series 1 Connector
8-Series 2 Connector
175°C Oper. Temp.

0-Sq. Flange Recept.
1-Cable Receptacle
3-Single Hole Mtg. Recept.
5-Solder Flange Recept.
(Hermetic only)
6—Straight Plug

Class
E-Environmental
H-Hermetic
(Solder cap contacts)
P-Potting seal

Shell Size
08 10 14 16 18 20* 22* 24*
*Available only in Series 1-Long

Omit if no cable clamp is desired.
(200)—Connector with cable clamp.
(201)—Connector less contacts.
(207)—Connector with Fluorosilicone rubber seals and insert, Connector Types 3 & 4 only.

Alternate Shell Positions
1 Normal,
2, 3, 4, 5, 6
As per table on Page 2•1023

Contact Style
P-Pin
S-Socket

Insert Arrangement
03 04 05 07 09 11
12 14 19 21 24 27
32 37 38 41 45 55
61 74 85 92
121 (01)* 155 (01)*

MIL-STD PART NO. FORMAT FOR REV. "C" CONNECTORS

Note: Under Rev. "C" of MIL-C-81511, the part numbering system has been revised to a 15 digit system to be in conformance with Defense Standardization Manual 4120-3-M.
The connector part number is put together as per the following example:

M81511 / 01 E F 01 P 1

Specification No.

Shell Style
Series 2 Connectors
/01 Sq. Flange Recept.
/02 Solder Flange Recept., Hermetic
/03 Single Hole Mtg. Recept.
/04 Single Hole Mtg. Recept., Hermetic
/05 Cable Receptacle
/06 Straight Plug
/28 Single Hole Mtg. Recept., Bulkhead Feed thru Contacts, Hermetic
/31 Square Flange Recept., Potting Seal
/32 Single Hole Mtg. Recept., Potting Seal
/33 Cable Recept., Potting Seal
/34 Straight Plug, Potting Seal

Series 1 Connectors
/21 Square Flange Recept.
/22 Solder Flange Recept., Hermetic
/23 Single Hole Mtg. Recept.
/24 Single Hole Mtg. Recept., Hermetic
/25 Cable Receptacle
/26 Straight Plug
/27 Single Hole Mtg. Recept., Bulkhead Feed thru Contacts, Hermetic
/35 Square Flange Recept., Potting Seal
/36 Single Hole Mtg. Recept., Potting Seal
/37 Cable Recept., Potting Seal
/38 Straight Plug, Potting Seal

Alternate Shell Positions
1, 2, 3, 4, 5, 6
As per table on Page 2•1023

Contact
P-Pin, S-Socket,
C-Feed thru Cont.

Insert Arrangement
Code numbers coordinated with insert arrangements Page 2•1023.
Example:
F01 is 18-85 insert.

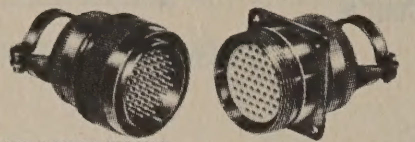
Shell Size

8	10	14	16	18	20	22	24
A	B	D	E	F	G	H	J

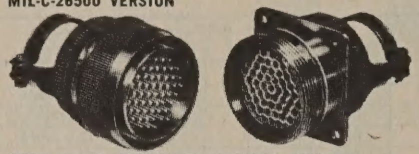
Class
E-Grommet Seal Connectors (150°C Oper. Temp.)
F-Grommet Seal Connectors (175°C Oper. Temp.)
A-Grommet Seal Connectors (200°C Oper. Temp.)
H-Hermetic Seal Connectors (150°C Oper. Temp.)
G-Hermetic Seal Connectors (175°C Oper. Temp.)
B-Hermetic Seal Connectors (200°C Oper. Temp.)
P-Potting Seal Connectors (150°C Oper. Temp.)
T-Potting Seal Connectors (175°C Oper. Temp.)
C-Potting Seal Connectors (200°C Oper. Temp.)

TRW CINCH CONNECTORS

CINCH-NULINE "OMEGA" SERIES — HIGH EFFICIENCY CIRCULAR CONNECTORS



MIL-C-26500 VERSION



MIL-C-38300 VERSION OR "GOLDEN OMEGA"

MORE CONTACTS IN LESS SPACE

When it becomes necessary to provide connections for a large number of circuits in a limited amount of space, a CINCH-NULINE "Omega" Series High Environmental Circular Connector is your best choice. CINCH-NULINE offers a wide selection of these miniature connectors that meet and exceed the requirements of MIL-C-26500 and MIL-C-38300. They are available in a variety of constructions, including those which can be potted. Most connectors feature MIL-C-26636 Crim-Lok contacts. Many others are available also with coaxial or shielded or thermocouple contacts.

SIGNIFICANT ADVANCE IN STATE-OF-THE-ART

On the ground or in space, wherever there is a requirement for superior environmental protection, high reliability and minimum weight and bulk, CINCH-NULINE "Omega" Series Connectors are the answer. To produce this series requires the satisfaction of many exacting requirements on reliability, logistics and present and anticipated environmental conditions. To meet these requirements, it was necessary to develop advanced design concepts, formulate materials for specific connector usage and work out new production techniques. The resulting connectors exceed the stringent requirements of MIL-C-26500 (USAF) and MIL-C-38300 (USAF) for performance and reliability.

THE "GOLDEN OMEGA" — CLOSED ENTRY & FRONT SERVICING

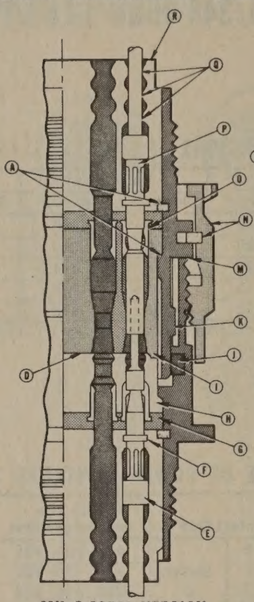
"Golden Omega" Connectors are identical to the other connectors in the "Omega" Series, except the socket inserts have a hard face of glass-filled epoxy. They are the first connectors to combine the positive reliability of closed entry with the speed and convenience of front servicing. In addition, the MIL-C-26636 contacts are tamper proof. Wrong-size contacts or oversize test prods cannot be inserted in the hard dielectric contact entry-ways on the socket inserts.

COMPLETE ENVIRONMENTAL SEALING

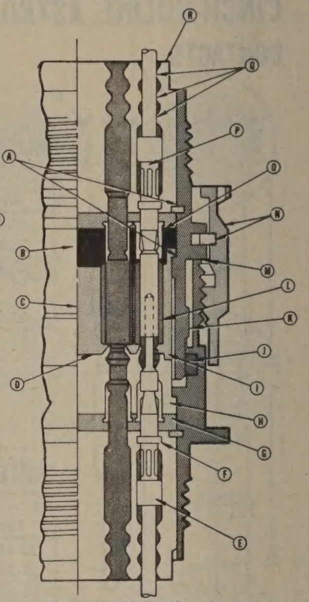
CINCH-NULINE "Omega" Series Connectors are fully sealed against extreme environmental conditions. Silicone rubber dielectric provides resilience and unsurpassed resistance to tear, compression set, fluids and high temperatures.

When the connectors are mated, insert faces compress to form a resilient dielectric seal around each individual contact. A continuous barrier on the periphery of the socket insert mates with a recess around the pin insert to form an additional compression seal. A dynamic "O" ring seal between mated shells constitutes still another barrier to dirt and moisture, and protects the integrity of the face seals. Together with monoblock construction, this puts void-free, continuous dielectric around each contact through the entire connector length.

Monoblock construction, with bonded interfaces between the dielectric components (insert, anti-deflection disc, and grommet) eliminates air voids and protects connectors from degrading moisture and altitude conditions. A pressurizing seal around each contact at the major O.D. prevents the passage of air or moisture through the contact hole, and triple sealing riser design at each wire hole in the grommet seals each individual wire.



MIL-C-26500 VERSION



MIL-C-38300/Golden Omega

A. Positive Location Captivated Insert (Mechanical Interlock)
B. Resilient Rear Insert (Only on MIL-C-38300 Version)
C. Closed Entry Hard Dielectric Front Insert (Only on MIL-C-38300 Version)
D. Insert Static Face Seal
E. Pin Contact, MIL-C-26636
F. Contact Pressurizing Seal
G. Anti-Deflection Disc
H. Resilient Pin Insert
I. Insert Rim Seal
J. Dynamic "O" Ring Shell Seal
K. Five Key Shell Polarization
L. Releasing Sleeve
M. Metal to Metal Shoulder
N. Bayonet or Threaded Coupling, Permanent Captivation
O. Contact Retention Clip
P. Socket Contact, MIL-C-26636
Q. Wire Sealing Risers
R. Grommet

WIDE VARIETY OF CONFIGURATIONS

Detailed information on configurations available, shell sizes, dimensions and data on how to order are given on the following pages.

GO/NO-GO RELIABILITY

When a "Golden Omega" connector is mated, you can be sure there is proper contact. The socket contacts are closely surrounded by hard dielectric with a chamfered entry to guide in the pins accurately. However, if the pins are bent, the hard dielectric presents a closed entry and prevents mating.

LIGHTWEIGHT & HIGH CONTACT DENSITY

Connector shells are impact-extruded aluminum forgings with a high strength-to-weight ratio. The insert arrangement is designed for the maximum number of contacts within the area available.

CRIM-LOK CONTACTS

Crim-Lok contacts (front release, rear insertable) provide for easy servicing of connector circuits without disassembling the connector from its mounting, or disturbing adjacent contacts. MIL-C-26636 contacts are crimped quickly, consistently, and reliably with either hand or power tools. They have high electrical conductivity, present a smooth configuration, and completely protect electrical contact pressure-members from environmental and handling damage. The contacts come in sizes 20, 16, 12, and shielded coaxial, with rhodium-over-silver plating. (Other platings such as gold are available; write factory for details.)

TRW CINCH CONNECTORS

CINCH-NULINE "OMEGA" SERIES — HIGH EFFICIENCY CIRCULAR CONNECTORS (Cont'd)

ALTERNATE SHELL POSITIONS

THREADED PLUG

THREADED SQUARE FLANGE RECEPTACLE

THREADED SINGLE HOLE MOUNTING RECEPTACLE

BAYONET PLUG

BAYONET SQUARE FLANGE RECEPTACLE

BAYONET SINGLE HOLE MOUNTING RECEPTACLE

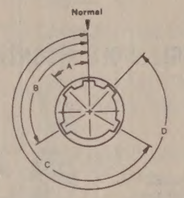
FOR CONNECTORS SIZE 8 & 10

(All Dimensions In Degrees)				
Position	A	B	C	D
Normal	105	140	215	265
6	102	132	248	320
7	80	118	230	312
8	35	140	205	275
9	64	155	234	304
10*	25	115	220	270

* Size 10 only

FOR CONNECTORS SIZE 12, 14, 16, 18, 20, 22, 24

(All Dimensions In Degrees)				
Position	A	B	C	D
Normal	105	140	215	265
6	18	149	192	259
7	92	152	222	342
8	84	152	204	334
9	24	135	199	240
10	98	152	268	338

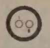


FRONT FACE OF RECEPTACLE SHOWN

Note: Alternate positions 6 thru 10 incorporate special shell polarizing key and keyways. All inserts remain in normal position.

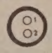
INSERTS AVAILABLE — (Showing front face of socket insert)

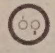
SHELL SIZE 8 — MS27561

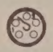

2 #20 CONTACTS
INSERT 8-2

3 #20 CONTACTS
INSERT 8-3

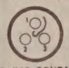
SHELL SIZE 10 — MS24260

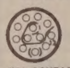

2 #20 CONTACTS
INSERT 10-2


2 #16 CONTACTS
INSERT 10-20

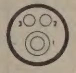

5 #20 CONTACTS *
INSERT 10-5

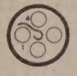
SHELL SIZE 12 — MS24260

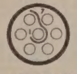

3 #16 CONTACTS*
INSERT 12-3

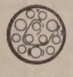

12 #20 CONTACTS *
INSERT 12-12

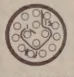
SHELL SIZE 14 — MS24260


2 #16 CONTACTS
1 #2 SHIELDED CONTACT
INSERT 14-3

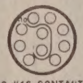

4 #12 CONTACTS *
INSERT 14-4

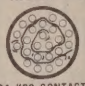

7 #16 CONTACTS *
INSERT 14-7


9 #20 CONTACTS
3 #16 CONTACTS
INSERT 14-12

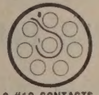

15 #20 CONTACTS *
INSERT 14-15

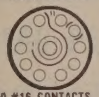
SHELL SIZE 16 — MS24261

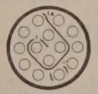

10 #16 CONTACTS
INSERT 16-10

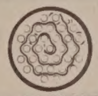

24 #20 CONTACTS *
INSERT 16-24

SHELL SIZE 18 — MS24262

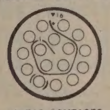

8 #12 CONTACTS
INSERT 18-8

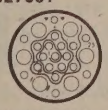

10 #16 CONTACTS
1 #2 SHIELDED CONTACT
INSERT 18-11

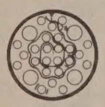

14 #16 CONTACTS *
INSERT 18-14

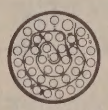

31 #20 CONTACTS*
INSERT 18-31

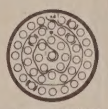
SHELL SIZE 20 — MS27561


16 #16 CONTACTS
INSERT 20-16

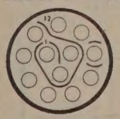

19 #20 CONTACTS
6 #12 CONTACTS
INSERT 20-25

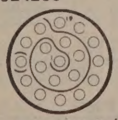

24 #20 CONTACTS
4 #12 CONTACTS
INSERT 20-28

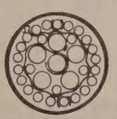

37 #20 CONTACTS
2 #16 CONTACTS
INSERT 20-39

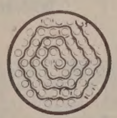

41 #20 CONTACTS *
INSERT 20-41

SHELL SIZE 22 — MS24263

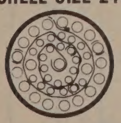

12 #12 CONTACTS
INSERT 22-12

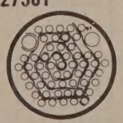

19 #16 CONTACTS *
INSERT 22-19

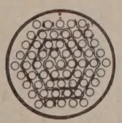

26 #20 CONTACTS
6 #12 CONTACTS
INSERT 22-32


55 #20 CONTACTS *
INSERT 22-55

SHELL SIZE 24 — MS27561


23 #20 CONTACTS
20 #16 CONTACTS
INSERT 24-43


2 #12 CONTACTS
55 #20 CONTACTS
INSERT 24-57


61 #20 CONTACTS *
INSERT 24-61

SPECIFICATIONS

Contact Size	Rated Amps	for AWG Wire Size	Insulation Max.	O.D. Min.
20	7.5	24-22-20	.090	.040
16	20.	18-16	.130	.064
12	35.	14-12	.170	.106
#2 Shielded	7.5	Shielded Cable Size 20 per MIL-C-7078. Type II		

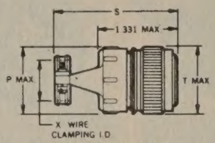
*Available with hard-dielectric face socket inserts for "Golden Omega" (MIL-C-38300) connectors.
Pin inserts for MIL-C-38300 connectors have a resilient face and, except for marking, are identical to MIL-C-26500 pin inserts.

TRW CINCH CONNECTORS

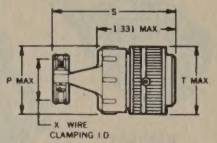
CINCH-NULINE "OMEGA" SERIES — HIGH EFFICIENCY CIRCULAR CONNECTORS (Cont'd)

DIMENSIONS

PLUGS


S
1.331 MAX
P MAX
T MAX
X WIRE CLAMPING I.D

THREADED PLUG
C48-06RXX-XXX
MS24266RXXT-XXX

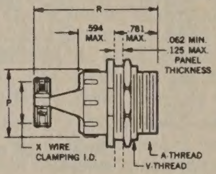

S
1.331 MAX
P MAX
T MAX
X WIRE CLAMPING I.D

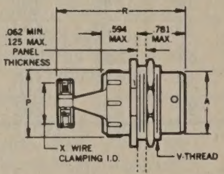
BAYONET PLUG
C48-16RXX-XXX
MS24266RXXB-XXX

Shell Size	P Max.	T Max. Th'd	Bay.	X ±.015	S Max.
8	.582	.708	.766	.180	1.832
10	.731	.836	.906	.270	1.832
12	.919	1.025	1.078	.400	1.832
14	.981	1.125	1.141	.460	2.067
16	1.106	1.250	1.266	.610	2.067
18	1.231	1.375	1.375	.690	2.067
20	1.356	1.510	1.510	.830	2.067
22	1.481	1.625	1.625	.940	2.067
24	1.606	1.760	1.760	1.040	2.067

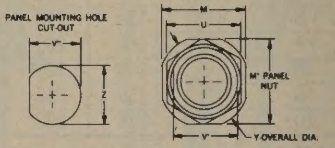
SINGLE HOLE MOUNTING RECEPTACLES

THREADED RECEPTACLE
C48-03RXX-XXX
MS24265RXXT-XXX


R
.594 MAX.
.781 MAX.
.062 MIN.
.125 MAX.
PANEL THICKNESS
P
X WIRE CLAMPING I.D.
A THREAD
V THREAD


R
.062 MIN.
.125 MAX.
PANEL THICKNESS
.594 MAX
.781 MAX
P
A
X WIRE CLAMPING I.D.
V THREAD

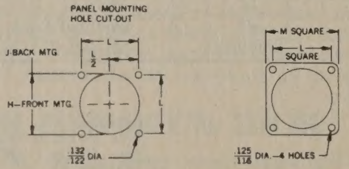
BAYONET RECEPTACLE
C48-13RXX-XXX
MS24265RXXB-XXX


PANEL MOUNTING HOLE CUT-OUT
V"
Z
M
U
M' PANEL NUT
V'
Y OVERALL DIA.

PANEL CUTOUT **FLANGE AND NUT**
BOTH THREADED & BAYONET RECEPTACLES

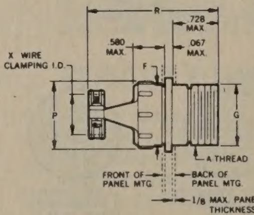
Shell Size	DIMENSIONS (Inches) A Th'd	A + .000 − .005	M Max.	M' Max.	P Max.	U Max.	V Th'd	V' ±.003	V" ±.005	X ±.015	Y Max.	Z ±.005	R Max.
8	9/16-24	.536	.984	.938	.582	.828	⅝-20	.593	.605	.180	1.068	.635	1.890
10	11/16-24	.659	1.109	1.082	.731	.953	¾-20	.718	.730	.270	1.192	.760	1.890
12	⅞-20	.829	1.296	1.299	.919	1.140	15/16-20	.905	.917	.400	1.380	.947	1.890
14	15/16-20	.898	1.396	1.371	.981	1.250	1-20	.968	.980	.460	1.505	1.010	2.125
16	1 1/16-18	1.025	1.521	1.515	1.106	1.329	1⅛-20	1.093	1.105	.610	1.630	1.135	2.125
18	1 3/16-18	1.131	1.646	1.660	1.231	1.455	1¼-20	1.217	1.225	.690	1.740	1.260	2.125
20	1 5/16-18	1.266	1.771	1.770	1.356	1.642	1⅛-18	1.342	1.350	.830	1.860	1.385	2.125
22	1 7/16-18	1.381	1.959	1.948	1.481	1.705	1½-20	1.467	1.475	.940	2.040	1.510	2.125
24	1 9/16-18	1.506	2.084	2.084	1.606	1.892	1⅝-18	1.592	1.600	1.040	2.160	1.635	2.125

SQUARE FLANGE RECEPTACLES

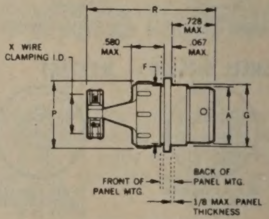

PANEL MOUNTING HOLE CUT-OUT
L
L/2
J-BACK MTG
H—FRONT MTG
L
.132/.122 DIA
M SQUARE
L SQUARE
.125/.116 DIA.—4 HOLES

PANEL CUTOUT **FLANGE**

BOTH THREADED & BAYONET RECEPTACLES


R
.728 MAX
.580 MAX
.067 MAX
X WIRE CLAMPING I.D.
F
P
G
A THREAD
FRONT OF PANEL MTG
BACK OF PANEL MTG
1/8 MAX. PANEL THICKNESS

THREADED RECEPTACLE
C48-00RXX-XXX
MS24264RXXT-XXX


R
.728 MAX
.580 MAX
.067 MAX
X WIRE CLAMPING I.D
F
P
A
G
FRONT OF PANEL MTG
BACK OF PANEL MTG
1/8 MAX. PANEL THICKNESS

BAYONET RECEPTACLE
C48-10RXX-XXX
MS24264RXXB-XXX

Shell Size	DIMENSIONS (Inches) A Th'd	A + .000 − .005	F Max.	G Max.	H Min.	J Min.	L ±.005	M ±.005	P Max.	X ±.015	R Max.
8	9/16-24	.536	.437	.561	.447	.620	.594	.812	.582	.180	1.890
10	11/16-24	.659	.562	.696	.572	.748	.719	.937	.731	.270	1.890
12	⅞-20	.829	.750	.875	.760	.913	.812	1.031	.919	.400	1.890
14	15/16-20	.898	.812	.935	.822	.980	.906	1.125	.981	.460	2.125
16	1 1/16-18	1.025	.938	1.062	.948	1.107	.969	1.250	1.106	.610	2.125
18	1 3/16-18	1.131	1.062	1.187	1.072	1.209	1.062	1.343	1.231	.690	2.125
20	1 5/16-18	1.256	1.182	1.312	1.192	1.337	1.156	1.437	1.356	.830	2.125
22	1 7/16-18	1.381	1.312	1.437	1.322	1.452	1.250	1.562	1.481	.940	2.125
24	1 9/16-18	1.506	1.432	1.562	1.442	1.577	1.375	1.703	1.606	1.040	2.125

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC./ 1501 MORSE AVE./ELK GROVE VILLAGE, ILL. 60007

TRW CINCH CONNECTORS

HOW TO ORDER

To get the specific "Omega" Series Connector you want, put together the part number as per the following typical example. (Remember, of course, that only the inserts shown on Page 2361 are available.)

C48 - 0 6 R 22 - 55 P 6 - (102)

Series Designation C48—

Coupling Type 0-Threaded
1-Bayonet

Shell Style 0-Square Flange Receptacle
3-Single Hole Mounting Receptacle
6-Straight Plug

Environmental Class R-Meets MIL-C-26500(USAF)
C-Meets MIL-C-38300(USAF)*

Shell Size 8,10, 12, 14, 16, 18, 20, 22, 24

See Table of available inserts on Page 2361

Number of Contacts 2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16, 19, 24, 25, 29, 31, 32, 39, 41, 43, 55, 61

Contact Style P-Pin, S-Socket

Alternate Shell Positions as per Table on Page 2361 (Omit for normal position)

Deviations
(100)—
Connector for Potting
(102)—
Connector Less Cable Support
(105)—
Connector Less Contacts
(106)—
Connector Less Contacts & Less Cable Support
(145)—
MIL-C-38300 Contact Style "P" Only

* MIL-C-38300 Connectors are furnished without cable clamp. If a cable support is desired, it must be ordered separately.

MIL STANDARD PART NUMBERS

You can use MS as well as CINCH-NULINE part numbers in ordering "Omega" Series Connectors. The MS part numbers for MIL-C-26500 Connectors are worked out on the basis shown in the table below. Whether you order by the MS or the "Omega" Series Number, all qualified connectors are shipped with the MS marking.

The part numbers for MIL-C-38300 Connectors start off with the identification M38300/ and take the form M38300/XXXX-XX. To determine the specific M numbers, refer to military specifications MIL-C-38300.

MS24266 R 22 T 55 P 6 X

MS Shell Drawing
MS24264—
Sq. Flange Recept.
MS24265—
Single Hole Mtg. Receptacle
MS24266—
Straight Plug

Environmental Class
R-Meets MIL-C-26500(USAF)

Shell Size 8, 10, 12, 14, 16, 18, 20, 22, 24

Coupling Type T-Threaded, B-Bayonet

Number of Contacts
3, 4, 5, 7, 8, 11, 12, 14, 15, 19, 24, 31, 55

Contact Style
P-Pin
S-Socket

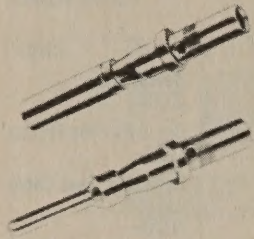
Cable Support X-Less Cable Support (Omit if cable support is desired)

Alternate Shell Positions as per Table on page 2361 (Omit for normal position)

TRW CINCH CONNECTORS

CINCH-NULINE "OMEGA" SERIES

CRIM-LOK CONTACTS & SEALING PLUGS



MIL-C-26636 CONTACTS

When you order "Omega" Series Connectors with contacts, the contact package contains 20% spares. The package also includes seal plugs for at least 15% of the contact holes (or at least 3 sealing plugs).

To order contacts and sealing plugs separately use the part numbers in the table at right. (The contacts, of course, are MIL-C-26636 contacts.) Contacts may also be ordered in reels for use with automatic crimping tools.

CONTACT DATA

Contact Size	Max. Current Rating	Wire Size	CINCH-NULINE Part No.		MS Part No.	
			Pin	Socket	Pin	Socket
No. 20	7.5 Amps	24-22-20 AWG	C48-1595-02	C48-100-2000S-02	MS24254-20P	MS24255-20S
No. 16	22 Amps	18-16 AWG	C48-1825-02	C48-100-1600S-02	MS24254-16P	MS24255-16S
No. 12	41 Amps	14-12 AWG	C48-1827-02	C48-1215-02	MS24254-12P	MS24255-12S
No. 1* (Shielded)	3 Amps	RG179/U, 179A/U, 187/U, 188/U, 161/U	C48-1226-50	C48-1227-50	—	—
No. 2** (Shielded)	7.5 Amps	RG195/U	C48-2187-50	C48-2188-50	—	—
No. 2** (Shielded)	7.5 Amps	—	C48-2187-02	C48-2188-02	MS27184	MS21785

*Cables RG178/U, RG178A/U, and RG196/U can be accommodated with modification to shielded contacts.

**AWG 18, 20, and 22 shielded wire per MIL-C-7078 Type II or MIL-C-27500 (USAF) can be accommodated with modification to shielded contacts.

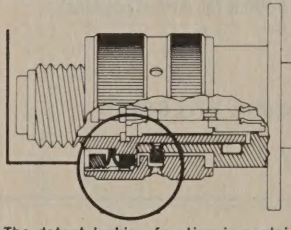
***MS numbers represent similar type contacts, pending qualification of CINCH-NULINE part numbers.

GROMMET SEALING PLUGS

Color Code	Size	CINCH-NULINE Part No.	MS Part No.
Yellow	12	C48-2221-12	MS27187-2
Blue	16	C48-2221-16	MS27187-1

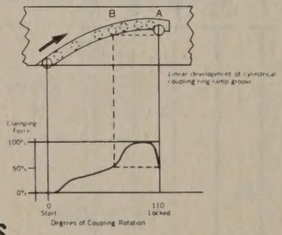
Color Code	Size	CINCH-NULINE Part No.	MS Part No.
Red	20	CC48-2221-20	MS27186-1
White	#2 Shielded	C48-1458	MS25251-8

CINCH-NULINE MMB SERIES



The detent locking function is contained in this area and isolated from the mechanism which locks the connectors together.

Patent Numbers: 3,805,379, 3,750,087



CONTACTS

When you order connectors with contacts, the contact package contains enough contacts to complete the insert arrangement and have 2 spares left. The package also includes enough sealing plugs for at least 15% of the contacts in the insert, in any case a minimum of 3 sealing plugs. To provide proper sealing, insert unwired contacts and sealing plugs in all unused holes. (Use a #12 contact for a #1 shielded hole.) To order contacts and sealing plugs separately use the part numbers in the table at right. Contacts may also be ordered in reels for use with automatic crimping tools.

GROMMET SEALING PLUGS

Color Code	Size	TRW/Cinch Part No.	MS Part No.
Yellow	12 & #1 Shielded	C48-2221-12	MS27187-2
Blue	16	C48-2221-16	MS27187-1
Red	20	C48-2221-20	MS27186-1
White	#2 Shielded	C48-1458-01	—

• The convenience of bayonet coupling. • The rigidity of screw type coupling

Severe vibration, such as that which occasionally occurs in airborne equipment, can cause a high rate of early failure in connectors. This is especially true of the bayonet type of coupling connectors. To overcome this problem, aircraft manufacturers put out a call for connector manufacturers to design a more vibration-proof model, within definite limits.

Realizing that a new type of connector could cost more per unit than the failure-prone type, the aircraft companies stipulated that the increased costs should be justified by reduced maintenance cost and lower air traffic revenue losses caused by excessive downtime. Also, to prevent a complete re-engineering of the present connection systems used in airplanes, the new design would have to:

1. Mate with the standard MIL-C-26500 and MIL-C-83723 bayonet receptacle presently used on the aircraft.
2. Use standard contacts.
3. Use standard crimping, insertion and removal tools.
4. Withstand vibration and shock equivalent to the capability of thread-coupled connectors locked up metal-to-metal.

To meet the challenging conditions imposed by the aircraft manufacturers, TRW/Cinch NuLine engineers decided to approach the development of a new design based on an analysis of the failure-modes of the present connector system.

Critical analysis of the connector needing improvement revealed that a vibration envelope induced forces on the connector that resulted in a wear producing relative motion between the plug and its mating receptacle.

Further analysis of the connector design disclosed that the "relative motion" was due to the unloading effect on the clamping force when the bayonet dropped into its detent in the coupling ring ramp.

Contact Size	Wire Size AWG	Max. Current Rating Amps	TRW/Cinch Part No.		MS Part No.		Crimping Tool	Bushing (Positioner)	Crimp Jaw Setting Dia. (Insp.)	Insertion Tool	Removal Tool
			Pin	Socket	Pin	Socket					Standard Connector
No. 20	24 22 20	3.0 5.0 7.5			MS24254-20P	MS24255-20S	294-126 294-186 294-243 294-293 294-358 294-506	Included 294-1266 Turret Hd. Turret Hd. 294-444 Automatic	 .031-.041 .031-.041 .031-.041	294-88 (MS24256A20) 94 294-213	294-89 (MS524256R20)
No. 16	18 16	16 22			MS24254-16P	MS24255-16S	294-126 294-243 294-293 294-358 294-506	Included Turret Hd. Turret Hd. 294-901 Automatic	 .041-.053 .041-.053	294-96 (MS24256A16)	294-97 (MS24256R16)
No. 12	14 12	32 41			MS24254-12P	MS24255-12S	294-86 294-126 294-243 294-293 294-358 294-506	294-903 Included Turret Hd. Turret Hd. 294-903 Automatic	.0625 .062-.072 .062-.072	294-72 (MS2425BA12)	294-73 (MS24256R12)
No. 1* (Shielded)	** **** *****	3 1 1	C48-1226-02 C48-1226-54 C48-1226-55	C48-1227-02 C48-1227-54 C48-1227-55			294-289	294-1631		294-72† (MS24256A12)	294-73† (S24256R12)
No. 2 (Shielded)	***	7.5	C48-2187-02	C48-2188-02			294-358	294-1015		294-128†	294-127†

*Replaces No. 12 power contact.

**Accommodates Cables RG174/U, RG179/U, RG179A/U, RG187/Y, RG188/U, and RG161/U as well as shielded wire. Can also accommodate Cable MIL-C-27500-22 K1N6 (Extruded) or 22 AWG per MIL-C-7078 Type II.

***Accommodates Cable MIL-C-27500-22 K1N6; 20 K1N6; 18 K1N6 (Extruded) or 22, 20, 18 AWG, per MIL-C-7078 Type II.

****For use with RG195/U, RG180/U, RG180A/U, and RG180B/U.

*****Accommodates Cables RG178/U, RG178A/U, RG178B/U, and RG196/U.

†These tools are applicable to all #1 or #2 shielded contacts, respectively, not just contacts listed here.

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC./1501 MORSE AVE./ELK GROVE VILLAGE, ILL. 60007

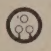
TRW CINCH CONNECTORS

CINCH-NULINE MMB SERIES (Cont'd)

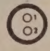
INSERTS

SHELL SIZE 8 — MS27561

2 #20 CONTACTS
INSERT 8-2


3 #20 CONTACTS
INSERT 8-3

SHELL SIZE 10 — MS24260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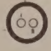
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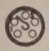
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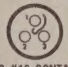
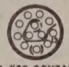
SHELL SIZE 12 — MS24260


3 #16 CONTACTS
INSERT 12-3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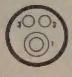
SHELL SIZE 14 — MS24260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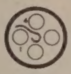
1 #2 SHIELDED CONTACT
INSERT 14-3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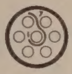
INSERT 14-4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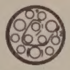
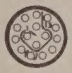
INSERT 14-7


9 #20 CONTACTS
3 #16 CONTACTS
INSERT 14-12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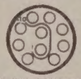
INSERT 14-15

SHELL SIZE 16 — MS24261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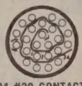
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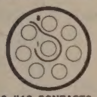
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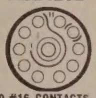
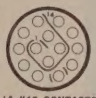

10 #16 CONTACTS
1 #2 SHIELDED CONTACT
INSERT 18-11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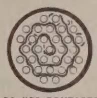
INSERT 18-14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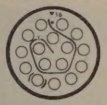
INSERT 18-31

SHELL SIZE 20 — MS27561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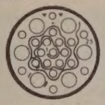
INSERT 20-16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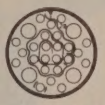
6 #12 CONTACTS
INSERT 20-25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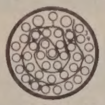
4 #12 CONTACTS
INSERT 20-28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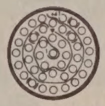
2 #16 CONTACTS
INSERT 20-39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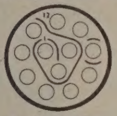
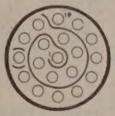
INSERT 20-41

SHELL SIZE 22 — MS24263


12 #12 CONTACTS
INSERT 22-12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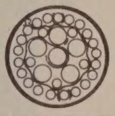
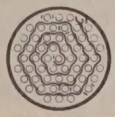
INSERT 22-19


26 #20 CONTACTS
6 #12 CONTACTS
INSERT 22-32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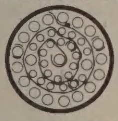
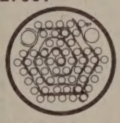
INSERT 22-55

SHELL SIZE 24 — MS27561


23 #20 CONTACTS
20 #16 CONTACTS
INSERT 24-43


2 #12 CONTACTS
55 #20 CONTACTS
INSERT 24-57

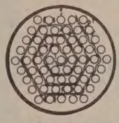

61 #20 CONTACTS
INSERT 24-61

TABLE I

Shell and Insert	Shell Size	Contacts	Drawing
08-02	8	2 #20	MS27561
08-03	8	3 #20	MS27561
10-02	10	2 #20	MS24260
10-05	10	5 #20	MS24260
10-20	10	2 #16	MS24260
12-03	12	3 #16	MS24260
12-12	12	12 #20	MS24260
14-03	14	2 #16	MS24260
		1 #2 Coax	
14-04	14	4 #12	MS24260
14-07	14	7 #16	MS24260
14-12	14	9 #20	MS24260
		3 #16	
14-15	14	15 #20	MS24260
16-10	16	10 #16	MS24261
16-24	16	24 #20	MS24261
18-08	18	8 #12	MS24262
18-11	18	10 #16	MS24262
		1 #2 Coax	
18-14	18	14 #16	MS24262
18-31	18	31 #20	MS24262
20-16	20	16 #16	MS27561
20-25	20	19 #20	MS27561
		6 #12	
20-28	20	24 #20	MS27561
		4 #12	
20-39	20	37 #20	MS27561
		2 #16	
20-41	20	41 #20	MS27561
22-12	22	12 #12	MS24263
22-19	22	19 #16	MS24263
22-32	22	26 #20	MS24263
		6 #12	
22-55	22	55 #20	MS24263
24-43	24	23 #20	MS27561
		20 #16	
24-57	24	55 #20	MS27561
		2 #12	
24-61	24	61 #20	MS27561

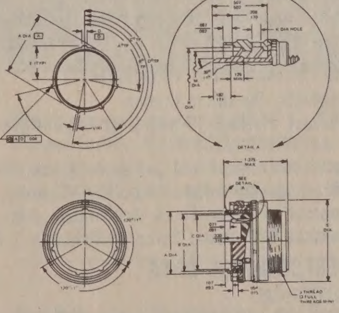


TABLE II

Shell Size	A +.000 −.005	B Min.	C Max.	D +.003	E +.000 −.003	J (3 Full Threads Min.)	K Min.	M +.005 −.000	R Min.	S Max.	V +.003
8	.424	.352	.312	.084	.234	7/16-28 UNEF-2A	.079	.539	.632	.766	.042
10	.526	.428	.388	.084	.285	9/16-24 UNEF-2A	.094	.662	.760	.906	.052
12	.696	.598	.558	.084	.370	3/4-20 UNEF-2A	.094	.832	.930	1.078	.052
14	.765	.667	.627	.084	.405	13/16-20 UNEF-2A	.094	.901	.999	1.141	.052
16	.892	.794	.754	.115	.468	15/16-20 UNEF-2A	.094	1.028	1.126	1.266	.052
18	.998	.900	.860	.115	.521	1 1/16-18 UNEF-2A	.094	1.134	1.232	1.375	.052
20	1.123	1.025	.985	.115	.583	1 3/16-18 UNEF-2A	.094	1.261	1.357	1.510	.052
22	1.248	1.150	1.110	.115	.646	1 5/16-18 UNEF-2A	.094	1.384	1.482	1.625	.052
24	1.373	1.275	1.235	.115	.708	1 7/16-18 UNEF-2A	.094	1.511	1.607	1.760	.052

TABLE III — ALTERNATE SHELL KEY POSITIONS

Shell	Position	A°	B°	C°	D°
8 and 10	Normal	105	140	215	265
	6	102	132	248	320
	7	80	118	230	312
	8	35	140	205	275
	9	64	155	234	304
10	10	25	115	220	270
12 14 16 18 20 22 24	Normal	105	140	215	265
	6	18	149	192	259
	7	92	152	222	342
	8	84	152	204	334
	9	24	135	199	240
	10	98	152	268	338

TABLE IV
TRW/CINCH NULINE PART NO. CODE (EXAMPLE)

C0909A 10 — 05 P 8 — XXX

Basic Part No.

Shell Size (See Table I)

Insert Arrangement (See Table I)

P-Pin Insert, S-Socket Insert

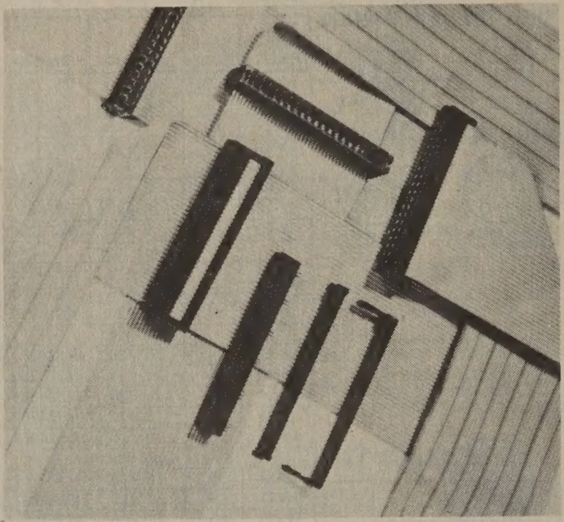
Alternate Shell Key Position (See Table III)

Deviation
- -102 Less Cable Support
- -105 Less Contacts
- -106 Less Contacts and Less Cable Support
- -998 Nickel Plate per MIL-C-26074 Class 3 Grade A. .001 Min.

NOTES:
1. The C0909A-XX-XXXX-XXX complies with the requirements of TRW/Cinch Nuline PS-C0909 product specification.
2. The last three digits of the part number in Table IV are optional and denote deviations to the Standard Connector.

TRW CINCH CONNECTORS

SERIES 299 FLAT CABLE CONNECTORS



- Available in six sizes
- Optional strain relief
- Cable accurately positioned automatically by cover
- Integral molded locking tabs for added retention
- Two wire contact points for extra reliability
- Ultra-compact design saves board space

TRW Cinch flat cable connectors, either with strain relief or without, are available in six sizes — 10, 20, 26, 34, 40 and 50 positions. All accept flat cable with .05 inch (1,27mm) spacing in wire gauges #24 through #30. Gold plated bifurcated contacts provide two wire contact points for added reliability. Strain relief is provided through the use of a three-piece assembly.

With TRW Cinch flat cable connectors, the cable is automatically positioned for termination by means of grooves on the cover rather than by the terminating tool. TRW Cinch terminating tool fixtures are interchangeable with a customer's existing tools.

Flat ribbon cable manufactured by TRW Holyoke Wire & Cable is available through TRW Cinch Connectors distributors.

MATERIALS AND FINISHES

Contacts: Beryllium Copper

Contact Plating: 30 microinches gold over 50 microinches nickel per MIL-G-45204

Insulator: Glass-filled polyester (black), 94 V-0 rating

Wire Accommodation: 24 to 30 AWG, solid; 26 to 30 AWG, stranded

Contact Insertion Force (Individual): 6 oz. max.

Contact Withdrawal Force (Individual): 1 oz. min.

PERFORMANCE DATA

ELECTRICAL

Voltage Rating (AC RMS, Adjacent Terminals): 300 volts (sea level)

Test Voltage (AC RMS, Adjacent Terminals): 1500 volts (sea level)

Rated Current: 1 ampere

Insulation Resistance: 5000 Megohms Min.

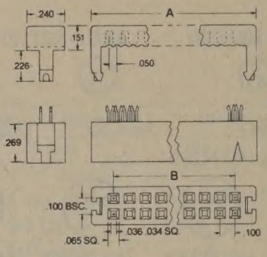
ENVIRONMENTAL

Temperature Rating: 105°C

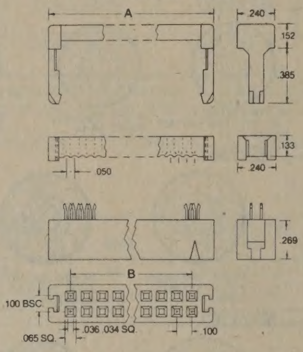
ORDERING INFORMATION

No. of Contacts	Factory Part Numbers		Distributor Part Numbers	
	Without Strain Relief	With Strain Relief	Without Strain Relief	With Strain Relief
10	299-14-00-001	299-14-00-002	FC-10	FC-10SR
20	299-14-00-003	299-14-00-004	FC-20	FC-20SR
26	299-14-00-005	299-14-00-006	FC-26	FC-26SR
34	299-14-00-007	299-14-00-008	FC-34	FC-34SR
40	299-14-00-009	299-14-00-010	FC-40	FC-40SR
50	299-14-00-011	299-14-00-012	FC-50	FC-50SR

WITHOUT STRAIN RELIEF

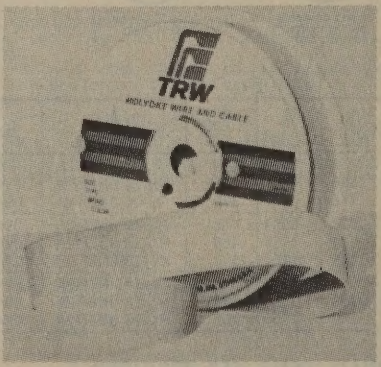


WITH STRAIN RELIEF



No. of Contacts	A	B
10	.685	.400
20	1.185	.900
26	1.485	1.200
34	1.885	1.600
40	2.185	1.900
50	2.685	2.400

8000 SERIES FLAT LAMINATED CABLE



ORDERING INFORMATION

No. of Conductors	Part No.
10	8000-10
14	8000-14
16	8000-16
20	8000-20
26	8000-26
34	8000-34
40	8000-40
50	8000-50

SPECIFICATIONS

Configuration: Conductors on .050 spacing

Conductor: #28 AWG stranded (7/36) soft annealed copper

Insulation: Flame Retardant PVC

Temperature: 105°C UL Style 2678

Voltage Rating: 150 VAC

Insulation Resistance: 10^{10} ohms min. per 10 feet

Impedance: 105 ohms balanced; 73 ohms unbalanced

Capacitance: 9.6 pf per foot — pair 17.0 pf per foot — triplet

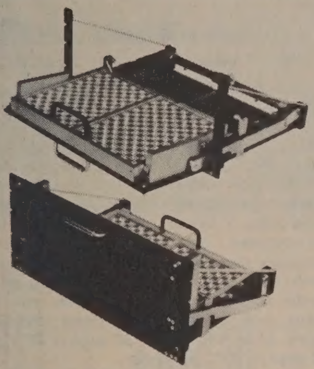
Wall Thickness: .009″ average; .006″ minimum

Polarization: Color Band for #1 position

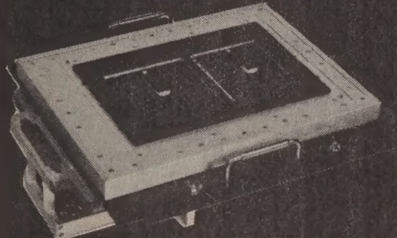
Standard Put-up: 100 foot spools

TRW CINCH CONNECTORS, AN ELECTRONIC COMPONENTS DIV. OF TRW INC. / 1501 MORSE AVE. / ELK GROVE VILLAGE, ILL. 60007

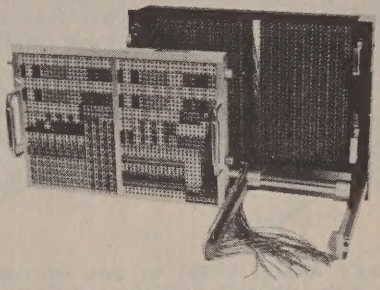
Patchboard Programming Systems and Accessories



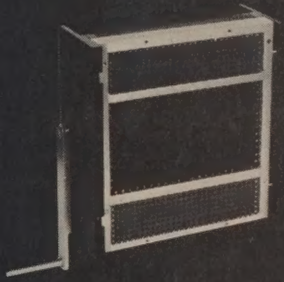
Drawer Type Systems—a roll cam designed for horizontal mounting to save up to 50% in panel areas. Also provides R.F. shielding. Five standard sizes range from 480 to 1870 contacts. All fit 19" wide racks.



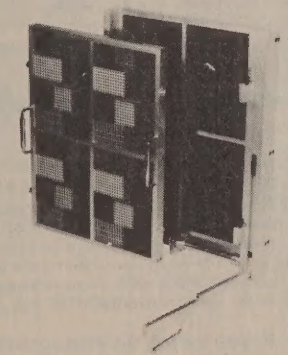
TEST FIXTURE — VPC has available two sizes of fixtures: Large fixture will accept P.C. boards up to 10" x 14" Small fixture accepts PBC up to 7" x 10.500. Fixtures for larger boards are available upon request; contact factory. Fixtures are available in Kit form or Wired to customer specifications.



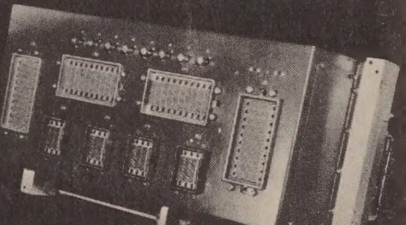
Roll Cam Modular Systems. This system is the same as Virginia Panel Corporation standard Roll Cam system except being Modular. Printed circuit boards can be attached to rear of Module or can be wired with Virginia Panel Corporation .093 Locktite Terminals, 1632 contacts.



True Thru-Shielded Systems—offer individual shielding, matched impedance, VSWR of 1.01 from 100 MHz to 500 MHz. These advanced programming systems can be manufactured to virtually any specifications.

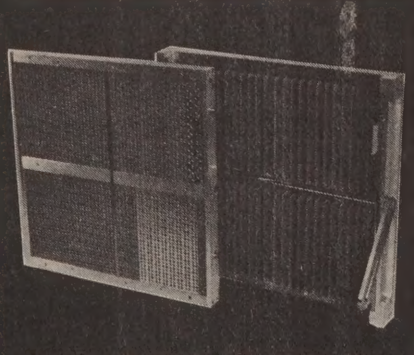


Roll Cam Systems—offer greatest capability and reliability, large number of contacts (24 sizes from 48 to 5120 contacts). Camming action engages full patchboard gently and accurately.



Pre-Wired Systems—can be standard panel boards wired to special quick connectors to eliminate hours of wiring and permit instantaneous re-circuiting. The 2560-contact roll cam system shown terminates in only 13 connectors.

Plating—Nickel or Gold
Board Material—Phenolic or Diallyl Phthalate
Contact Diameters—.093 and .053
Connections—Solder, wire wrap or Locktite
Finish—clear polish or black anodized
Silk Screen—Alpha/ numeric grid or special designs
Patchcords—Manual or fixed; single tip to nine-prong tip; squids; splits; shunts.
All unconditionally guaranteed.
Tools—a variety of 27 tools for crimping, extraction, insertion, and paddle contact.
Send for complete 40-page catalog today.



Modular Systems offer true thru shielded matched impedance. Regular shielded and digital modules. Printed circuit boards can be flow soldered to rear of module or wired with Virginia Panel Corporation .093 Locktite Terminals, 2400 front removable contacts.

We have salesmen in 42 U.S. Cities. Please refer to the proper section in this catalog for the one nearest you, or contact our factory in Waynesboro, Va.

Besides our 75 standard models of programming systems, some of which are described on this page, VPC also produces a wide variety of custom products.

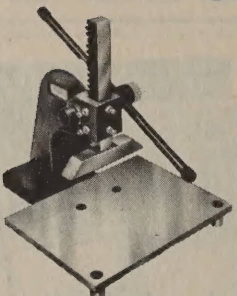
We invite your inquiries and will appreciate your business.

VIRGINIA PANEL CORPORATION
DEPT. EM
1400 NEW HOPE ROAD

VPC

WAYNESBORO, VIRGINIA 22980
(703) 942-8376

VECTOR TOOLS FOR WIRING AND RIBBON CABLE TERMINATING

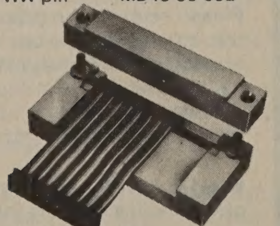


P186-1 ARBOR PRESS for gang inserting terminals. Use with P187 Universal Ribbon Cable Plug Terminating Fixture. Can also be used generally for assembling, bending, blanking, forming, marking, piercing, punching, riveting, and trimming.

The press is die cast high strength Zamak zinc with a ground steel mechanism. A large work area 6" x 8 3/8" (152.4mm x 212.7mm) and a 12" (304.8mm) lever arm coupled with a 2.3" (58.4mm) and 3.6" (91.44mm) vertical capacity make this an ideal addition to any laboratory. Press includes removable pressure bar 4.4" x .75" (111.76mm x 19.05mm) installed on ram for use with terminal installation tools and ribbon cable terminating fixture.

GANG TERMINAL INSTALLING TOOLS
for use with P186-1 Press

For Terminal	Tool	Accessories Suggested
K24, K26, K30, K31, K41	P188	alignment block MB45-65-062
P189-16	R30, R31 socket pin	alignment block MB45-65-062 and pickup tray P164
P190-16	R32 socket pin	alignment block MB45-65-062 and pickup tray P164
P192	T28 push-in	alignment block MB45-65-062
P193	T42-1 push-in	alignment block MB45-65-062
P194	T44, T46 WW pin	alignment block MB45-65-062
P196	T46-5 hdr, WW pin	alignment block MB45-65-062
P198	T49 WW pin	alignment block MB45-65-062



P187 UNIVERSAL RIBBON CABLE IDC (Insulation Displacement Connector Terminating Device)

This low cost fixture terminates female IDC plugs made by Vector, Alpha, Amp, Ansley, Berg, CW, JAE, 3M, SAE in seconds. (Excluding Alpha and CW strain relief cover type plugs); Berg Female Quickie Connector Type 65484 with strain relief requires P187-1 pressure bar which must be ordered separately. For best results, use in listed P186-1 press. Alternately, may be used with ordinary arbor press, vise, or "C" clamp.

ACCESSORIES

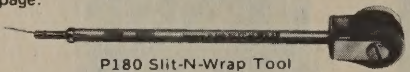
Female I.D.C. Plugs—Use on ribbon cable and terminate, using P187 fixture above to make pluggable interconnections between p.c. cards, remote equipment, etc. Vector IDC plugs are compatible with others made by Alpha, Amp Ansley, Berg, CW, JAE, 3M, SAE, and Spectra Strip, and will mate with "headers" created with Vector T46-5 0.025" (.64mm) square pins. Contacts are phosphor bronze gold over nickel plating, located on .1" x .1" (2.54 mm x 2.54 mm) grid, housed in glass filled U.L. listed polyester and have 1 Amp current rating, temperature rating of -55°C to 105°C.

RIBBON CABLE FOR IDC CONNECTORS

Vector ribbon cable is color coded U.L. Style 1061, 28 gage stranded tinned copper, encapsulated in self-extinguishing PVC film. Conductors are precisely spaced 0.050 inches (1.27 mm) apart to provide proper control of electrical characteristics. User may make IDC interconnect cables any required length from the 10 foot (3.05 meters) rolls.

Cat. no.	No. of conductors	Length feet	meters	Use with Vector IDC plug no.*
KW2-20-10	20	10	3.05	KS2-20
KW2-40-10	40	10	3.05	KS2-40

*May also be used with other manufacturers' IDC plugs as listed in IDC plug listing on this page.



P180 Slit-N-Wrap Tool

SLIT-N-WRAP WIRE WRAPPING TOOLS AND WIRE FOR .025(.64mm) SQUARE TERMINALS

Slit-N-Wrap wiring is 3 times faster than conventional manual wrapping because it eliminates measuring, cutting and separate wire stripping. Slit-N-Wrap wired joints are gas tight, low resistance—under .005 ohms resistance, and exceed W.W. specification pull-off test requirements.

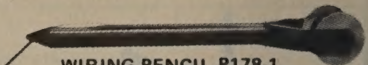
Slit-N-Wrap wiring tools are patented and have a special tip which makes a slit in the thin but tough polyurethane nylon insulation coating of the 28 gage wire furnished and used with the tool. The slitting occurs as posts are wrapped and **not** between wrap posts when directions are followed. The technique is suitable for production as well as laboratory use, and is readily mastered by anyone.

Two one hundred foot (30.5 meters) spools of Slit-N-Wrap wire are included with each Slit-N-Wrap tool, as well as a P183 wire cutoff chisel and wire forming tool.

Replacement wire is available with insulation colors of red, green, blue, and clear.

All tools listed will also make wrapped connections using prestripped 28 gage wires placed in the tip end.

P160-4T1	110V 60hz Slit-N-Wrap tool with transformer for production use.
P160-4T	Battery powered Slit-N-Wrap tool with batteries, recharger.
P160-8	110 V 60 hz heavy duty charger, bench type. Use on "quick charge" for fast recharge; use on "regular" for overnight or intermittant recharging, of battery powered P180 or P160 series tools.
P180	Manual Slit-N-Wrap tool.
P180A	Replacement bit for all Slit-N-Wrap tools listed.
P181	Quick Clipper for wire.
28 ga replacement wire	Slit-N-Wrap wire supplied in packages of 3.
W28-2A	Pkg 3, green; W28-2B pkg 3, red; W28-2C pkg 3 clear; W28-2D pkg 3, blue.



WIRING PENCIL P178-1

Pencil wiring makes for fast wiring of circuits because spool-fed 36 or 32 gage wire with "solder thru" insulation can quickly be guided and twisted around component leads, I.C. socket tails, etc. and followed by soldering with a 750°F iron (398°C). The insulation "melts" when touched with the iron and solder, quickly producing a solder joint. Minimum technique is involved, and breadboard or production circuitry can be built fast. Tools are furnished with two spools (400' per spool) of 36 gage solder thru wire (one green, one red). Replacement wire is available in color choices of red, green, blue, and clear. 36 gage is 400' per spool; 32 gage is 200' per spool.

Ordering Information

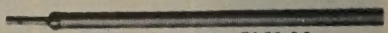
P178-1 wiring pencil with one spool of wire

Replacement wire—36 gage

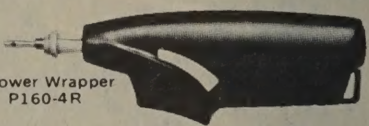
W36-4A pkg 2 green; W36-4B pkg 2 red; W36-4C pkg 2 clear; W36-4D pkg 2 blue. For 32 gage, order W32-4A, B, C, or D, pkg 2.

WIRING SPACERS

Accessory item keeps wire runs neat and out of way. .080 inch (2.03 mm) high by 3.6 inches long with wire slots and "feet" to fit 0.042 holes at 0.1 inch multiples. Supplied in packages of 20—pin P179WS-3.6, pkg. 20.



Manual Wrapper P160-2A



Power Wrapper P160-4R

WRAP-N-STRAP WIRE WRAPPING TOOLS

Vector tools for wrapping 0.025 square, .045 square, or .031 by .062 posts provide high quality at minimum price, with the added value of single bit/sleeve construction. Manual models and battery powered drivers for wrapping and unwrapping are listed below.

P160-2A	Manual wrapping tool for 0.025 (.64 mm) square posts, No. 26-30 gage wire.
P160-1A	Manual unwrapping tool for 0.025 (.64 mm) square posts, No. 26-30 gage wire.
P160-9	Combination wrapping/unwrapping tool for 0.025 (.64 mm) square posts and 26-30 gage wire. Use manually or in P160-4R battery powered wrapper.
P160-4R (AC version is P160-4R1)	Battery powered driver for P160-2A wrapper and P160-9 wrapper/unwrapper, above (110 V. 60 hz recharger included).
P160-6	Manual wrapping tool for .045 (1.14 mm) square posts, for No. 22-26 gage wire.
P160-7	Manual unwrapping tool for wrapping .045 inch (1.14 mm) square posts.
P160-2A-1	Bus strapping tool for 0.025 inch (.64 mm) square posts. Wraps solid 26-30 gage bus wire.
P160-6-1	Bus strapping tool for .045 inch (1.14 mm) square posts. Wraps solid 22-26 gage bus wire.

In the interest of improved design and performance, Vector reserves the right to make changes in its specifications without prior notice.

VECTOR ELECTRONIC COMPANY, INC., 12460 Gladstone Avenue, Sylmar CA 91342 Phone (213) 365-9661 TWX 910-496-1539

VECTOR DIP SOCKETS, SOCKET PINS & RECEPTACLES

SOCKETS FOR DUAL-IN-LINE DEVICES

DIP sockets available from Vector, accommodate most of the currently used DIP I.C. packages. The best features are incorporated into these sockets:

- Tapered entry helps guide DIP leads into the socket receptacles.
- Gold inlay contact springs firmly hold the DIP leads and accommodate rectangular DIP leads 0.010 inch (0.254 mm) x 0.020 inch (5.08 mm), and up to 0.024 inch (0.609 mm) diameter round pins.
- Individual contacts are accurately spaced 0.1 inch (2.54 mm) side to side for insertion into perforated circuit boards such as Vector "P" pattern.
- Polarizing notch or chamfer on body.

P157-1 DIP INSERTION TOOL

This is a "must" if one wishes to avoid bent leads in the insertion process, since it holds and aligns DIP leads for faster and more accurate assembly into sockets. P157-1 accommodates 14- and 16-pin DIPS.

P150 DIP EXTRACTION TOOL

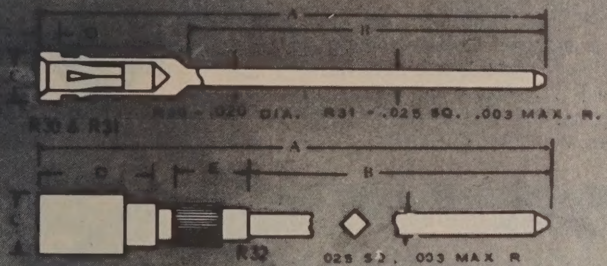
Removal tool for DIPs assures easy pull-out of DIPs without bending leads. P150 extracts 8-, 14-, 16-, and 24-lead DIPs.

DUAL IN-LINE SOCKETS FOR ICS — ORDERING INFORMATION

	CASTING DIMENSIONS				CONTACTS	
Catalog No.	Height	Length	Width	Spacing between rows	Max. term. length below casting	Type*
R708-2	0.150 (3.81)	0.400 (10.16)	0.400 (10.16)	0.300 (7.62)	0.150 (3.81)	ST
R714	0.280 (7.11)	0.765 (19.43)	0.400 (10.16)	0.300 (7.62)	0.690 (17.52)	WP
R714-1	0.280 (7.11)	0.765 (19.43)	0.400 (10.16)	0.300 (7.62)	0.144 (3.65)	ST
R714-2	0.150 (3.81)	0.700 (17.78)	0.400 (10.16)	0.300 (7.62)	0.150 (3.81)	ST
R716	0.280 (7.11)	0.865 (21.97)	0.400 (10.16)	0.300 (7.62)	0.690 (17.52)	WP
R716-1	0.280 (7.11)	0.865 (21.97)	0.400 (10.16)	0.300 (7.62)	0.144 (3.65)	ST
R716-2	0.150 (3.81)	0.800 (20.32)	0.400 (10.16)	0.300 (7.62)	0.150 (3.81)	ST
R724	0.280 (7.11)	1.280 (32.51)	0.700 (17.78)	0.600 (15.24)	0.690 (17.52)	WP
R724-2	0.150 (3.81)	1.200 (30.48)	0.700 (17.78)	0.600 (15.24)	0.150 (3.81)	ST
R740	0.280 (7.11)	2.080 (52.83)	0.700 (17.78)	0.600 (15.24)	0.690 (17.52)	WP
R740-2	0.280 (7.11)	2.080 (52.83)	0.700 (17.78)	0.600 (15.24)	0.144 (3.65)	ST

*ST = Solder Tail; WP = Wrap Post .025 inch (.64 mm sq.)

P150 is DIP Hand Extraction Tool; P157-1 is DIP Hand Insertion Tool—installs all 14- & 16-pin DIPs



SOCKET PINS

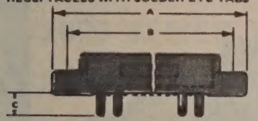
High quality copper alloy gold plated four-fingered contacts are housed inside gold plated brass screw machine terminals with solderable or 0.025" sq. wire wrappable tails for installing wherever required in 1/16" thick circuit boards. Models R30 and R31 have lower profile than low-profile DIP sockets, and press fit into 0.055" dia. holes. Model R32 fits 0.042" dia. holes in "P" Pattern Micro-Vectorbord® or DIP Plugbords.

		Dimensions					
Part No.	Tail Type	A	B	C	D	E	Supplied in Pkg.:
R30	Solder	.29	.11	.072	.030	--	25, 100, or 1000
R31	WW	.703	.500	.072	.030	--	25, 100, or 1000
R32	WW	.745	.500	.072	.155	.075	25, 100, or 1000

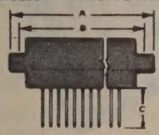
P158 Impact Insert. Tool w/D10 Die Point inserts R30, R31; w/D9 Die Point inserts R32. P158-1 Holder adapts Tool to drill or arbor press.

VECTOR RECEPTACLES FOR 0.062 THICK CIRCUIT CARDS

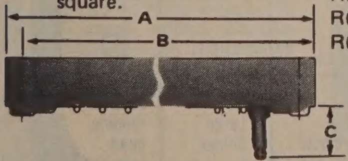
RECEPTACLES WITH SOLDER EYE TABS



RECEPTACLES WITH 0.025 SQ. WRAP POST TAILS



Vector receptacles are designed to accept printed circuit cards made by Vector or other manufacturers. Quality material and construction are used throughout to insure reliable performance. All wire wrappable contact tails (wrap post type) are 0.025 inch (0.64 mm) square.



Model No.	No. of Contacts	Spacing	Contact Tail Style	A	B	C	Accepts Vector Plugbord
R630	15/30	0.156	Solder Eyelet	3.27	2.94	.28	3796, 3797
R630-1	15/30	0.156	Wrap Post	3.27	2.94	.62	3796, 3797
R636-1	36/72	0.100	Wrap Post	4.44	4.175	.60	All 3719 Models All 4066 Series 4312 Series
R636-2	36/72	0.100	Solder Eyelet	4.48	4.175	.25	All 3719 Models All 4066 Series 4312 Series
R644	22/44	0.156	Solder Eyelet	4.36	4.03	.28	All 3677, 3682 All 4112, All 838 Models 3662, 3474, 4050-1
R644-3	22/44	0.156	Wrap Post	4.36	4.03	.60	All 3677, 3682 All 4112, All 838 Models 3662, 3474, 4050-1
R612-1*	12	0.2	Solder	3.15	2.88	.27	837 Series
R616-1*	16	0.2	Solder	3.95	3.68	.27	812 Series
R635*	35	0.1x0.2	Solder	4.21	3.93	.27	848 Series
R680	40/80	0.125	Wrap Post	5.81	5.545	.62	4350
R680-1	40/80	0.125	Wrap Post	5.81	5.545	.62	4350
R680-2	40/80	0.125	Solder Eyelet	5.81	5.545	.25	4350
R681***	50/100	0.125	Dip Solder	7.06	6.795	.25	8800V Series
R681-1	50/100	0.125	Wrap Post	7.06	6.795	.62	8800V Series
R681-2**	50/100	0.125	Wrap Post	7.06	6.795	.22	8800V Series

*Elco Varicon contacts

**Single level wrap tail with 0.250 spaced rows for wrapping, soldering, or IMSAI mother boards

***Dip solder tails with 0.140 (3.56 mm) spaced rows for Altair mother boards. Fits 0.042 inch diameter (1.07 mm) holes.

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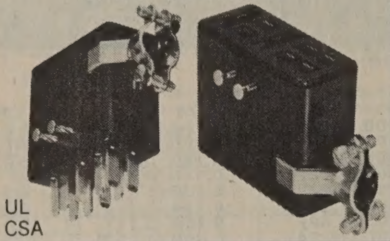
VECTOR ELECTRONIC COMPANY, INC. 12460 Gladstone Avenue, Sylmar CA 91342 Phone (213) 365-9661 TWX 910-496-1539

BEAU®

Plug & Socket Connectors

3300 SERIES

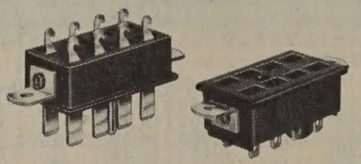
10 amps, 250 volts
2-33 contacts



UL
CSA

5400 SERIES

15 amps, 250 volts
4-16 contacts

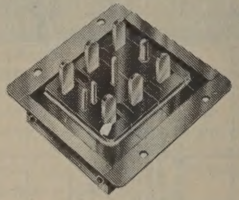


UL
CSA

Also, 4400 Series—for mounting from back of panel.

5500 SERIES

50 amps, 250 volts
2-16 contacts



Shallow-bracket mounting

SEVEN EXCLUSIVE INNOVATIONS

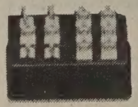
1. PRE-GROUNDING—see next page.

2. THERMOPLASTIC BACKSHELLS.

(Metal also.) Resilient thermoplastic backshells provide greater dielectric strength and greater safety. They're also non-rusting and acid resistant. UL; CSA.

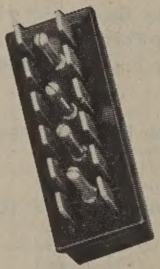
3. WAVE SOLDERABLE CONTACT TAILS.

Special tail design (S_6 and P_7) allows for mounting directly to PC boards and flexible circuits — and gives you the economy of automatic wave soldering. 3300 Series. UL; CSA.



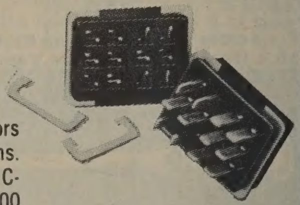
4. 16 CONTACTS IN THE SPACE OF 12.

Our 15 amp connectors can have up to 16 contacts—4 more than other 15 amp makes. That's 33% more contacts in the same amount of space. UL; CSA.



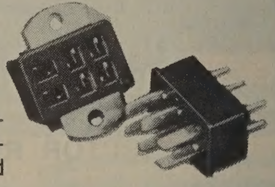
5. PANEL MOUNTED IN ONE-FOURTH THE TIME.

C-clip mounting of Beau connectors cuts panel mounting time by 3/4ths. No drilling. No screws. Just slide on C-clips and it's secure. 3300, 5400 Series. UL; CSA.



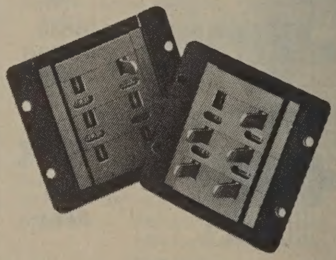
6. SELF-POLARIZING 6-CONTACT CONNECTOR.

With contacts set in opposing directions, even a heavy hand can't mismate our 6-contact 10 amp plugs and sockets. UL; CSA.



7. HERMAPHRODITIC SELF-POLARIZING.

With male and female contacts in both halves, or with conventional polarization. Can gang in building block fashion. 50 amp.



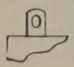
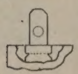
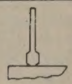
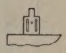
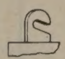
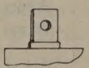
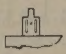
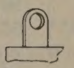
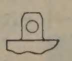
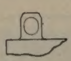
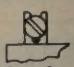
PANEL MOUNTING HARDWARE

AB = Angle Bracket
ABR = Angle Bracket Reversed
LAB = Less Angle Bracket
ABT = Angle Bracket Tapped
DB = Deep Bracket
EB = End Bracket
EBR = End Bracket Reversed
EBT = End Bracket Tapped
FP = Flat Plate
SB = Shallow Bracket
SCC = Snap "C" Clip
RP = Recessed Plate

CABLE MOUNTING HARDWARE

BBS = Blank Back Shell
CCE = Cable Clamp End
CCE-L = Cable Clamp End, Latch
CCE-K = Cable Clamp End, Keeper
CCT = Cable Clamp Top
CCT-L = Cable Clamp Top, Latch
CCT-K = Cable Clamp Top, Keeper
FHE = Flared Hole End
FHE-L = Flared Hole End, Latch
FHE-K = Flared Hole End, Keeper
FHT = Flared Hole Top
FHT-L = Flared Hole Top, Latch
FHT-K = Flared Hole Top, Keeper

CONTACT TAILS

3300 SERIES				5400 SERIES						5500
 **P or S** Solder eye	 **P_1 or S_1** Quick Connect .110 tab	 **P_4 (long) P_7 (short)** Wire-Wrap	 **P_7 or S_6** Printed Circuit	 **P** Solder hook	 **P_1** .205 tab **P_2** .187 tab	 **S_6** Printed Circuit	 **P_3** Large Solder eye	 **S_1** Quick Connect/ Sold. eye	 **S_3** Large Solder Eye	 **P or S** Binding head screw

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BEAU®

Pre-Grounding Connectors

3300 SERIES: 10 amps per contact
5400 SERIES: 15 amps per contact

PRE-GROUNDING FOR GREATER SAFETY

Beau gives you the greater safety of U.L. recognized pre-grounding plug and socket connectors. The extra long grounding contact engages before any other active contacts are mated. Available for chassis and cable mounting.

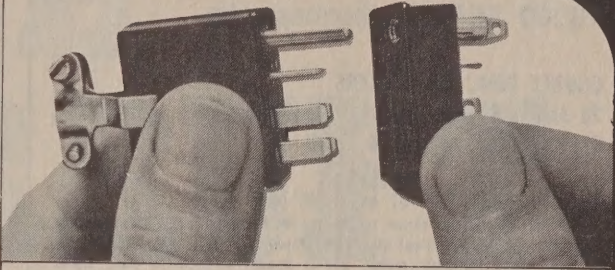
LOWEST INSTALLED COST

Only Beau offers the longer pre-grounding contact. Thus, you will never have to cut any contacts to a shorter length to achieve a safer connection. No more costly, time-consuming hand cutting operations.

CONTACT POSITION

In the 3300 Series, the grounding contact takes the place of a regular contact. Connector sizes 3324 through 3333 are already of the pre-grounding type, and there is no need to specify the grounding contact.

In the 5400 Series, the grounding contact is an additional contact position rather than taking the place of a standard contact.



SPECIFICATIONS

For other specifications and data, see previous page.

Rating: 3300 Series, 10 amps per contact at 250 v,
5400 Series, 15 amps per contact at 250 v

Grounding contact rating: 30 amps at rated voltages.

No. of contacts: 3300 Series, 3 to 33 (incl. grounding contact),
5400 Series, 5 to 13 (incl. grounding contact)

Grounding contact: Extra long, heavy-duty plated brass.

Grounding contact tail: 5400 Series, mounted on an elevated creep path barrier that puts required distance between ground and active contacts.

U.L. RECOGNIZED. CSA CERTIFIED.

Single-Row High-Barrier Resilient Terminal Strips

72000 SERIES: thermoplastic

SINGLE ROW; 3/8" CENTERS
20 AMPS, 600 VOLTS
FEED THRU AND CLOSED BACK

BEND BARRIERS WITHOUT BREAKING

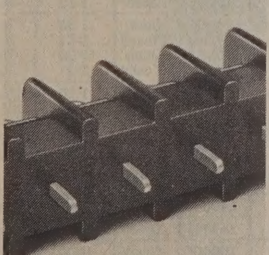
Beau's flexible barrier strips reduce breakage dramatically because they are made of highly resilient glass-filled thermoplastic materials. Impact strength is many times greater than phenolics. Production line and infield damage (and time-consuming re-wiring) are virtually eliminated.

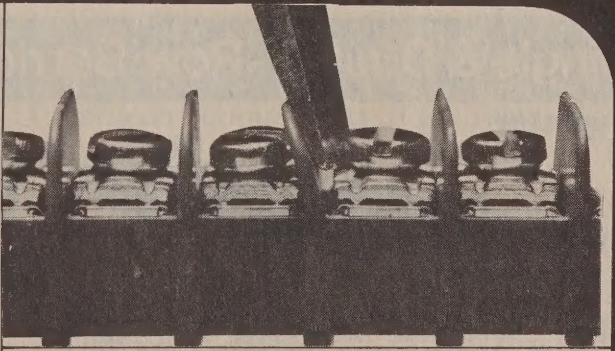
PROTECTS SOLDER JOINTS FROM DAMAGE

Exclusive from Beau — terminals are ultrasonically imbedded in the base. This eliminates solder joint damage from torqueing screws, or from strain in dressing down wire bundles. Also, pull-out strength is double the other makes.

TERMINAL TAILS ENCLOSED

Cavities are eliminated around dip solder terminal tails. This allows mounting directly on PC board without affecting circuit isolation. It eliminates entrapment of foreign matter, reduces solder wicking.





SPECIFICATIONS

Size: 5/8" w x 21/32" h

No. of terminals: 1 to 26

Terminal styles (bottom):

- Printed circuit, straight or right angle
- Wire wrap with long extended tail
- Quick connect tab (insulated feed thru)
- Solder turret (insulated feed thru)
- Closed back

Terminal styles (screw side):

- #6-32 x 1/4" binding head screw
- Wire clamp plate, self rising
- Quick connect tab (1 to 6 terminations per circuit)
- Solder terminal, single or double ended

Colors: Black (standard), others available.

U.L. RECOGNIZED. CSA CERTIFIED.

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BEAU®

Double-Row High-Barrier Resilient Terminal Strips

76000 SERIES: thermoplastic

DOUBLE ROW; 3/8" CENTERS
20 AMPS, 600 VOLTS
CLOSED BACK AND FEED THRU

BEND BARRIERS WITHOUT BREAKING

Beau's flexible barrier strips reduce breakage dramatically because they are made of highly resilient glass-filled thermoplastic materials with highest U.L. flame retardant rating, 94V-0. Impact strength is many times greater than phenolics. Production line and in-field damage and time-consuming re-wiring are virtually eliminated.

GET 20 AMPS IN THE SAME SPACE AS 15

These 20-ampere strips are designed to take the same panel space as any double-row 15-ampere barrier terminal strip. They are 7/8-inches wide and have screw terminals 3/8-inches on centers.

SCREW TERMINALS WON'T PULL OUT

The 76000 Series eliminates the problem of insecure terminal retention commonly found in closed back double-row barrier terminal strips. Eyelets and nails have been eliminated. Instead, screw terminals are ultrasonically welded (imbedded) into the barrier strip. It's more rugged, and has a greater creep path. With a closed back, you get the electrical rating you want — without insulating strips.

FEED THRU STYLES HAVE ENCLOSED CONTACT TAILS

Unlike the typical thru-hole in feed thru styles, ours is virtually the same size as the contact tail. This maximizes circuit isolation, eliminates entrapment of foreign matter, reduces solder wicking.

SPECIFICATIONS

Size: 7/8" W x 5/8" H

No. of terminals: 1 to 30 (molded to length; no rough cut ends)

Base style: Closed back or feed thru

Mounting: With or without mounting ends

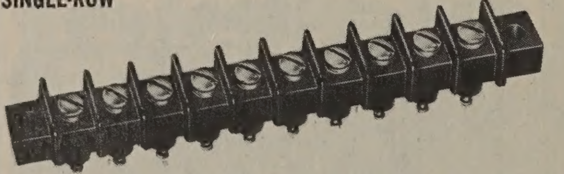
Terminal styles:
- #6-32 x 1/4" binding head screw (standard)
- Wire clamp plate, self rising
- Quick connect tab (1 to 6 terminations per circuit)
- Solder terminal, single or double
- Feed-thru solder, long and short
- Feed-thru PC, long and short
- Feed-thru wire wrap
- Z terminal, over-the-side PC

Colors: Black (standard) others available

U.L. RECOGNIZED. CSA CERTIFIED.

Single & Double-Row Barrier Terminal Strips

SINGLE-ROW



Available in 15 and 20 amp models, both have high-impact glass-filled phenolic bases with excellent breakage resistance. They are furnished in green, with or without mounting ends. Nickel-plated brass screws. Cadmium or tin plated terminals. Imprinting on barrier strip body available.

U.L. RECOGNIZED. CSA CERTIFIED.

Rating, Amps	Series No.	Back Types	No. Circuits	Width	Height	Terminal Screws	Term. Ctrs.
15	12000	Feed thru & Closed	1-31	35/64"	7/16"	5-40x3/16"	3/8"
20	13000	Feed thru & Closed	1-26	47/64"	35/64"	6-32x1/4"	7/16"

TERMINALS

12000 SERIES	13000 SERIES	
Closed back	Screw	Insulated taper pin
PC	Closed back	PC
Turret	Turret, insul.	Turret
Quick connect	PC, insul.	Quick connect

DOUBLE-ROW

Available in general-purpose phenolic or glass-filled phenolic materials (black). Also, -T series in highly resilient glass-filled thermoplastic, with highest U.L. flame retardant rating, 94V-0. Wide choice of terminal styles, marker/insulation strips and other hardware. Black, standard.

U.L. RECOGNIZED. CSA CERTIFIED.

Rating, Amps	Series No.	Back Types	No. Circuits	Width	Height	Terminal Screws	Term. Ctrs.
PHENOLIC CONSTRUCTION							
10	10000	Open	1-20	5/8"	5/16"	2-56x3/16"	1/4"
15	14000	Open	1-30	7/8"	13/32"	5-40x1/4"	3/8"
	15000	Closed	1-31	7/8"	27/64"	5-40x1/4"	3/8"
	16000	Open	1-30	7/8"	13/32"	6-32x1/4"	3/8"
	17000	Closed	1-31	7/8"	27/64"	6-32x1/4"	3/8"
20	18000	Open	1-30	1 1/8"	1/2"	6-32x1/4"	7/16"
	19000	Closed	1-30	1 1/8"	35/64"	6-32x1/4"	7/16"
30	21000	Open	1-25	1 5/16"	5/8"	8-32x5/16"	9/16"
	22000	Closed	1-26	1 5/16"	21/32"	8-32x5/16"	9/16"
THERMOPLASTIC CONSTRUCTION							
15	14000T	Open	1-30	7/8"	13/32"	5-40x1/4"	3/8"
15	16000T	Open	1-30	7/8"	13/32"	6-32x1/4"	3/8"
20	18000T	Open	1-30	1 1/8"	1/2"	6-32x1/4"	7/16"

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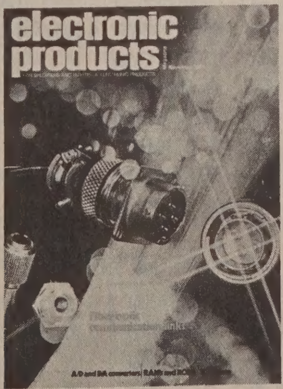

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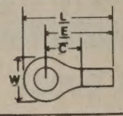
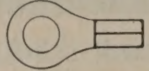
waldom

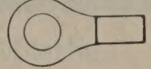
MAT'L THICK .020

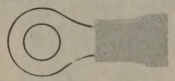
RING TONGUE TERMINALS
26-22 WIRE RANGE
STANDARD BARREL LENGTH

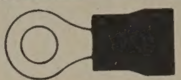
MANUFACTURED BY
HOLLINGSWORTH®
(INSULATION COLOR — YELLOW)











			BUTTED SEAM		NON-INSULATED	BRAZED SEAM				VINYL		INSULATED	NYLON				
STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS. NIT-B P/N	WALDOM EQUIV. P/N	E	L	MFGRS. FIT P/N INS. DIA. .096	WALDOM EQUIV. P/N	E	L	MFGRS. FIIG P/N INS. DIA. .092	WALDOM EQUIV. P/N	E	L	PRICE CODE
0	.14	.17	R26201	(S-1925)			.34	.41	R70500FN		.51	.59	R70736N	(N-5925)	.59	.68	A
2	.14	.17	R26202	(S-1926)			.34	.41	R70501FN		.51	.59	R70737N	(N-5926)	.59	.68	A
4	.20	.22	R26203	(S-1929)			.39	.50	R70502FN		.56	.68	R70738N	(N-5929)	.65	.76	A
6	.20	.22	R26204	(S-1930)			.39	.50	R70503FN		.63	.68	R70739N	(N-5930)	.65	.76	A
6	.25	.29	R26205				.46	.59	R70504FN		.63	.77	R70740N		.72	.86	A
8	.25	.29	R26206	(S-1932)			.46	.59	R70505FN		.63	.77	R70741N	(N-5932)	.72	.86	A
8	.32	.29	R26208				.46	.62	R70506FN		.63	.80	R70742N		.72	.88	A
10	.25	.29	R26207	(S-1933)			.46	.59	R70507FN		.63	.77	R70743N	(N-5933)	.72	.86	A
10	.32	.29	R26209				.46	.62	R70508FN		.63	.80	R70744N		.72	.88	A

22-16 WIRE RANGE
STANDARD BARREL LENGTH

MAT'L THICK .032

(INSULATION COLOR — RED)

									INS. DIA. .160				INS. DIA. .146				
2	.22	.16	R4103	(S-1099)	R4103B	(B-3099)	.43	.55	R70476F	(T-2099)	.65	.78	R70750N	(N-5099)	.69	.82	A
4	.22	.16	R4104	(S-1047)	R4104B	(B-3047)	.43	.55	R70477F	(T-2047)	.65	.78	R70751N	(N-5047)	.69	.82	A
4	.28	.32	R4261	(S-1096)	R4261B	(B-3096)	.59	.73	R70478F	(T-2096)	.81	.96	R70752N	(N-5096)	.85	1.00	A
6	.28	.16	R4105	(S-1001)	R4105B	(B-3001)	.43	.55	R70479F	(T-2001)	.65	.78	R70753N	(N-5001)	.69	.82	A
6	.25	.32	R4110	(S-1700)	R4110B	(B-3700)	.59	.72	R70480F	(T-2700)	.81	.95	R70754N	(N-5700)	.85	.99	A
6	.28	.32	R4262	(S-1002)	R4262B	(B-3002)	.59	.73	R70481F	(T-2002)	.81	.96	R70755N	(N-5002)	.85	1.00	A
8	.22	.16	R4193	(S-1097)	R4193B	(B-3097)	.43	.54	R70474F	(T-2097)	.65	.78	R70756N	(N-5097)	.69	.82	A
8	.28	.32	R4263	(S-1021)	R4263B	(B-3021)	.59	.73	R70475F	(T-2021)	.81	.96	R70757N	(N-5021)	.85	1.00	A
8	31	.32	R4111	(S-1701)	R4111B	(B-3701)	.59	.75	R70482F	(T-2701)	.81	.98	R70758N	(N-5701)	.85	1.02	A
10	.28	.32	R4264	(S-1098)	R4264B	(B-3098)	.59	.73	R70487F	(T-2098)	.81	.96	R70759N	(N-5098)	.85	1.00	A
10	.31	.32	R4112	(S-1003)	R4112B	(B-3003)	.59	.75	R70483F	(T-2003)	.81	.98	R70760N	(N-5003)	.85	1.02	A
¼	.47	.44	R4113	(S-1004)	R4113B	(B-3004)	.71	.94	R70484F	(T-2004)	.93	1.17	R70761N	(N-5004)	.97	1.21	B

16-14 WIRE RANGE
STANDARD BARREL LENGTH

(INSULATION COLOR — BLUE)

									INS. DIA. .195				INS. DIA. .172				
2	.25	.16	R-3301	(S-1102)	R3301-B	(B-3102)	.42	.55	R70488F	(T-2102)	.64	.78	R70768N	(N-5102)	.68	.82	A
4	.25	.16	R4119	(S-1048)	R4119B	(B-3048)	.42	.55	R70489F	(T-2048)	.64	.78	R70769N	(N-5048)	.68	.82	A
6	.25	.16	R4120	(S-1006)	R4120B	(B-3006)	.42	.55	R70490F	(T-2006)	.64	.78	R70770N	(N-5006)	.68	.82	A
6	.25	.37	R61002G	(S-1007)	R61002GB	(B-3007)	.64	.78	R70469GF	(T-2007)	.86	1.02	R70771GN	(N-5007)	.90	1.05	A
6	.31	.28	R4121	(S-1092)	R4121B	(B-3092)	.55	.71	R70491F	(T-2092)	.77	.94	R70772N	(N-5092)	.81	.98	A
6	.31	.37	R4121G		R4121GB		.64	.80	R70470GF		.86	1.03	R70773GN		.90	1.07	A
8	.31	.28	R4122	(S-1024)	R4122B	(B-3024)	.55	.71	R70492F	(T-2024)	.77	.94	R70774N	(N-5024	.81	.98	A
8	.31	.37	R4122G	(S-1093)	R4122GB	(B-3093)	.64	.80	R70471GF	(T-2093)	.86	1.03	R70775GN	(N-5093)	.90	1.07	A
10	.31	.28	R4123	(S-1008)	R4123B	(B-3008)	.55	.71	R70493F	(T-2008)	.77	.94	R70776N	(N-5008)	.81	.98	A
10	.31	.37	R4123G	(S-1094)	R4123GB	(B-3094)	.64	.80	R70473GF	(T-2094)	.86	1.04	R70777GN	(N-5094)	.90	1.07	A
¼	.46	.44	R4124	(S-1009)	R4124B	(B-3009)	.71	.94	R70494F	(T-2009)	.93	1.17	R70778N	(N-5009)	.97	1.21	B

12-10 WIRE RANGE
STANDARD BARREL LENGTH

(INSULATION COLOR — YELLOW)

									INS. DIA. .265				INS. DIA. .239				
4	.28	.27	R3454	(S-1148)	R3454B	(B-3148)	.54	.68	R74296F	(T-2148)	.83	.98	R70785N	(N-5148)	.85	1.00	D
6	.28	.27	R3455	(S-1149)	R3455B	(B-3145)	.54	.68	R74297F	(T-2149)	.83	.98	R70786N	(N-5149)	.85	1.00	D
6	.31	.27	R3453		R3453B		.55	.70	R74298F		.83	.98	R70787N		.85	1.02	D
6	.37	.28	R3456	(S-1049)	R3456B	(B-3049)	.56	.74	R74299F	(T-2049)	.85	1.04	R70788N	(N-5049)	.87	1.06	D
8	.28	.27	R3452	(S-1150)	R3452B	(B-3150)	.54	.68	R74300F	(T-2150)	.83	.98	R70789N	(N-5150)	.85	1.00	D
8	.37	.28	R2994	(S-1050)	R2994B	(B-3050)	.56	.74	R74301F	(T-2050)	.85	1.04	R70790N	(N-5050)	.87	1.06	D
10	.37	.28	R3457	(S-1011)	R3457B	(B-3011)	.56	.74	R74302F	(T-2011)	.85	1.04	R70791N	(N-5011)	.87	1.06	D
¼	.52	.47	R3458	(S-1100)	R3458B	(B-3100)	.74	1.00	R74303F	(T-2100)	1.03	1.30	R70792N	(N-5100)	1.05	1.32	E

"REFER TO PAGE 2375 FOR PRICES" SAMPLES, OR PRICES FOR LARGER QUANTITIES AVAILABLE UPON REQUEST

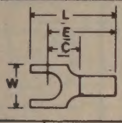
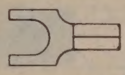
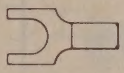
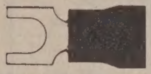
waldom

BLOCK SPADE TERMINALS 22-16 WIRE RANGE STANDARD BARREL LENGTH

MANUFACTURED BY
HOLLINGSWORTH®

MAT'L THICK .032

(COLOR INSULATION — RED)

			BUTTED SEAM	NON-INSULATED	BRAZED SEAM				VINYL		INSULATED		NYLON				
																	
STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS. NIT-B P/N	WALDOM EQUIV. P/N	E	L	MFGRS. FIT P/N INS. DIA. .160	WALDOM EQUIV. P/N	E	L	MFGRS. FIIG P/N INS. DIA. .146	WALDOM EQUIV. P/N	E	L	PRICE CODE
6	.30	.19	BS41162	(S-1014)	BS41162B	(B-3014)	.46	.58	BS70684F	(T-2014)	.68	.81	BS70683N	(N-5014)	.72	.85	A
6	.24	.32	BS41163	(S-1118)	BS41163B	(B-3118)	.59	.72	BS70685F	(T-2118)	.81	.95	BS70588N	(N-5118)	.85	.99	A
8	.30	.19	BS41172	(S-1030)	BS41172B	(B-3030)	.46	.58	BS70676F	(T-2030)	.68	.81	BS70682N	(N-5030)	.72	.85	A
8	.24	.32	BS41173	(S-1031)	BS41173B	(B-3031)	.59	.72	BS70677F	(T-2031)	.81	.95	BS70692N	(N-5031)	.85	.99	A
10	.30	.19	BS41182	(S-1032)	BS41182B	(B-3032)	.46	.58	BS70678F	(T-2032)	.68	.81	BS70674N	(N-5032)	.72	.85	A
10	.30	.32	BS41183	(S-1505)	BS41183B	(B-3505)	.59	.72	BS70679F	(T-2505)	.81	.95	BS70675N	(N-5505)	.85	.99	A

22-18 WIRE RANGE SHORT BARREL LENGTH

MAT'L THICK .032

(INSULATION COLOR — RED)

									INS. DIA. .160				INS. DIA. .146				
6	.30	.19	BS41162S	(SS-1014)	BS41162SB	(SB-3014)	.36	.49	BS70684SF	(ST-2014)	.63	.77	BS70683SN	(SN-5014)	.62	.75	A
6	.24	.32	BS41163S	(SS-1118)	BS41163SB	(SB-3118)	.49	.63	BS70685SF	(ST-2118)	.76	.91	BS70588SN	(SN-5118)	.75	.89	A
8	.30	.19	BS41172S	(SS-1030)	BS41172SB	(SB-3030)	.36	.49	BS70676SF	(ST-2030)	.63	.77	BS70682SN	(SN-5030)	.62	.75	A
8	.24	.32	BS41173S	(SS-1031)	BS41173SB	(SB-3031)	.49	.63	BS70677SF	(ST-2031)	.76	.91	BS70692SN	(SN-5031)	.75	.89	A
10	.30	.19	BS41182S	(SS-1032)	BS41182SB	(SB-3032)	.36	.49	BS70678SF	(ST-2032)	.63	.77	BS70674SN	(SN-5032)	.62	.75	A
10	.30	.32	BS41183S	(SS-1505)	BS41183SB	(SB-3505)	.49	.63	BS70679SF	(ST-2505)	.76	.91	BS70675SN	(SN-5505)	.75	.89	A

16-14 WIRE RANGE STANDARD BARREL LENGTH

MAT'L THICK .032

(INSULATION COLOR — BLUE)

									INS. DIA. .195				INS. DIA. .172				
4	.22	.38	BS41270	(S-1121)	BS41270B	(B-3121)	.64	.76	BS75000F	(T-2121)	.86	.99	BS75001N	(N-5121)	.90	1.03	A
6	.30	.19	BS41272	(S-1015)	BS41272B	(B-3015)	.49	.58	BS70594F	(T-2015)	.68	.81	BS70596N	(N-5015)	.72	.85	A
6	.25	.38	BS41273	(S-1123)	BS41273B	(B-3123)	.64	.83	BS74167F	(T-2123)	.86	1.06	BS74175N	(N-5123)	.90	1.10	A
8	.30	.19	BS41282	(S-1033)	BS41282B	(B-3033)	.46	.58	BS75002F	(T-2033)	.68	.81	BS75003N	(N-5033)	.72	.85	A
8	.25	.38	BS41283		BS41283B		.64	.83	BS74169F		.86	1.06	BS75004N		.90	1.10	A
10	.31	.38	BS41278	(S-1016)	BS41278B	(B-3016)	.65	.90	BS74170F	(T-2016)	.86	1.13	BS74178N	(N-5016)	.90	1.17	A
10	.30	.19	BS41292	(S-1702)	BS41292B	(B-3702)	.46	.58	BS75005F	(T-2702)	.68	.81	BS75006N	(N-5702)	.72	.85	A

16-14 WIRE RANGE SHORT BARREL LENGTHS

MAT'L THICK .032

(INSULATION COLOR — BLUE)

									INS. DIA. .195				INS. DIA. .172				
4	.22	.38	BS41270S	(SS-1121)	BS41270SB	(SB-3121)	.55	.67	BS75000SF	(ST-2121)	.82	.95	BS75001SN	(SN-5121)	.80	.93	A
6	.30	.19	BS41272S	(SS-1015)	BS41272SB	(SB-3015)	.36	.49	BS70594SF	(ST-2015)	.63	.77	BS70596SN	(SN-5015)	.62	.75	A
6	.25	.38	BS41273S	(SS-1123)	BS41273SB	(SB-3123)	.55	.73	BS74167SF	(ST-2123)	.82	1.01	BS74175SN	(SN-5123)	.80	1.00	A
8	.30	.19	BS41282S	(SS-1033)	BS41282SB	(SB-3033)	.36	.49	BS75002SF	(ST-2033)	.63	.77	BS75003SN	(SN-5033)	.62	.75	A
8	.25	.38	BS41283S		BS41283SB		.55	.73	BS74169SF		.82	1.01	BS75004SN		.80	1.00	A
10	.31	.38	BS41278S	(SS-1016)	BS41278SB	(SB-3016)	.55	.80	BS74170SF	(ST-2016)	.82	1.08	BS74178SN	(SN-5016)	.80	1.07	A
10	.30	.19	BS41292S	(SS-1702)	BS41292SB	(SB-3702)	.36	.49	BS75005SF	(ST-2702)	.63	.77	BS75006SN	(SN-5702)	.62	.75	A

12-10 WIRE RANGE STANDARD BARREL LENGTH

MAT'L THICK .040

(INSULATION COLOR — YELLOW)

									INS. DIA. .265				INS. DIA. .239				
6	.31	.27	BS29952		BS29952B		.54	.67	BS74318F		.83	.98	BS75056N		.85	1.00	D
6	.31	.27	BS29953	(S-1706)	BS29953B	(B-3706)	.54	.76	BS74319F	(T-2706)	.83	1.06	BS74091N	(N-5706)	.85	1.08	D
8	.31	.27	BS34782		BS34782B		.54	.67	BS74320F		.83	.98	BS75057N		.85	1.00	D
8	.31	.27	BS34783	(S-1707)	BS34783B	(B-3707)	.54	.76	BS74321F	(T-2707)	.83	1.06	BS74092N	(N-5707)	.85	1.08	D
10	.31	.27	BS34792		BS34792B		.54	.67	BS74322F		.83	.98	BS75058N		.85	1.00	D
10	.31	.27	BS34793	(S-1708)	BS34793B	(B-3708)	.54	.76	BS74323F	(T-2708)	.83	1.06	BS74099N	(N-5708)	.85	1.08	D

"REFER TO PAGE 2375 FOR PRICES"   SAMPLES, OR PRICES FOR LARGER QUANTITIES AVAILABLE UPON REQUEST

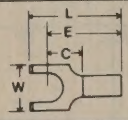
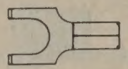
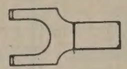
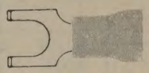
waldom

FLANGED BLOCK SPADE TERMINALS 22-16 WIRE RANGE STANDARD BARREL LENGTH

MANUFACTURED BY
HOLLINGSWORTH®

MAT'L THICK .032

(INSULATION COLOR — RED)

 L E C T W			BUTTED SEAM		NON-INSULATED		BRAZED SEAM		VINYL		INSULATED		NYLON				
																	
STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS. NIT-B P/N	WALDOM EQUIV. P/N	E	L	MFGRS. FIT P/N INS. DIA. .160	WALDOM EQUIV. P/N	E	L	MFGRS. FIIG P/N INS. DIA. .146	WALDOM EQUIV. P/N	E	L	PRICE CODE
2	.18	.19	SF20746		SF20746B		.46	.60	SF74001F		.68	.83	SF75007N		.72	.87	A
2	.29	.19	SF20747		SF20747B		.46	.60	SF74002F		.68	.83	SF75008N		.72	.87	A
4	.29	.19	SF20748	(S-1125)	SF20748B	(B-3125)	.46	.60	SF74003F	(T-2125)	.68	.83	SF75009N	(N-5125)	.72	.87	A
6	.29	.19	SF20749	(S-1080)	SF20749B	(B-3080)	.46	.60	SF74004F	(T-2080)	.68	.83	SF74008N	(N-5080)	.72	.87	A
8	.29	.19	SF20750	(S-1081)	SF20750B	(B-3081)	.46	.60	SF74005F	(T-2081)	.68	.83	SF74009N	(N-5081)	.72	.87	A
10	.29	.19	SF20751	(S-1082)	SF20751B	(B-3082)	.46	.63	SF74006F	(T-2082)	.68	.83	SF74010N	(N-5082)	.72	.87	A

22-18 WIRE RANGE SHORT BARREL LENGTH

(INSULATION COLOR — RED)

MAT'L THICK .032

									INS. DIA. .160				INS. DIA. .172				
2	.18	.19	SF20746S		SF20746SB		.36	.51	SF74001SF		.63	.79	SF75007SN		.62	.77	A
2	.29	.19	SF20747S		SF20747SB		.36	.51	SF74002SF		.63	.79	SF75008SN		.62	.77	A
4	.29	.19	SF20748S	(SS-1125)	SF20748SB	(SB-3125)	.36	.51	SF74003SF	(ST-2125)	.63	.79	SF75009SN	(SN-5125)	.62	.77	A
6	.29	.19	SF20749S	(SS-1080)	SF20749SB	(SB-3080)	.36	.51	SF74004SF	(ST-2080)	.63	.79	SF74008SN	(SN-5080)	.62	.77	A
8	.29	.19	SF20750S	(SS-1081)	SF20750SB	(SB-3031)	.36	.51	SF74005SF	(ST-2081)	.63	.79	SF74009SN	(SN-5081)	.62	.77	A
10	.29	.19	SF20751S	(SS-1082)	SF20751SB	(SB-3082)	.36	.54	SF74006SF	(ST-2082)	.63	.79	SF74010SN	(SN-5082)	.62	.77	A

16-14 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — BLUE)

MAT'L THICK .032

									INS. DIA. .195				INS. DIA. .172				
6	.29	.19	SF20855	(S-1083)	SF20855B	(B-3083)	.46	.60	SF74013F	(T-2083)	.68	.83	SF74011N	(N-5083)	.72	.87	A
8	.29	.19	SF20856	(S-1084)	SF20856B	(B-3084)	.46	.60	SF74014F	(T-2084)	.68	.83	SF74016N	(N-5084)	.72	.87	A
10	.29	.19	SF20857	(S-1085)	SF20857B	(B-3085)	.46	.60	SF74015F	(T-2085)	.68	.83	SF74019N	(N-5085)	.72	.87	A

16-14 WIRE RANGE SHORT BARREL LENGTH

(INSULATION COLOR — BLUE)

MAT'L THICK .032

									INS. DIA. .195				INS. DIA. .175				
6	.29	.19	SF20855S	(SS-1083)	SF20855SB	(SB-3083)	.36	.51	SF74013SF	(ST-2083)	.63	.79	SF74011SN	(SN-5083)	.62	.77	A
8	.29	.19	SF20856S	(SS-1084)	SF20856SB	(SB-3084)	.36	.51	SF74014SF	(ST-2084)	.63	.79	SF74016SN	(SN-5084)	.62	.77	A
10	.29	.19	SF20857S	(SS-1085)	SF20857SB	(SB-3085)	.36	.51	SF74015SF	(ST-2085)	.63	.79	SF74019SN	(SN-5085)	.62	.77	A

12-10 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — YELLOW)

MAT'L THICK .040

									INS. DIA. .265				INS. DIA. .239				
6	.38	.25	SF22451	(S-1722)	SF22451B	(B-3722)	.52	.74	SF74324F	(T-2722)	.81	1.04	SF74017N	(N-5722)	.83	1.06	D
8	.38	.25	SF22453	(S-1723)	SF22453B	(B-3723)	.52	.74	SF74325F	(T-2723)	.81	1.04	SF74026N	(N-5723)	.83	1.06	D
10	.38	.25	SF22456	(S-1724)	SF22456B	(B-3724)	.52	.74	SF74326F	(T-2724)	.81	1.04	SF74018N	(N-5724)	.83	1.06	D

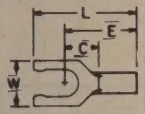
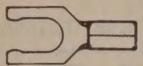
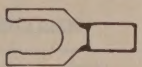
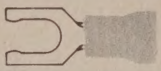
"REFER TO PAGE 2375 FOR PRICES" SAMPLES, OR PRICES FOR LARGER QUANTITIES AVAILABLE UPON REQUEST

waldom

MAT'L THICK .032

STANDARD SPRING SPADE TERMINALS 22-18 WIRE RANGE STANDARD BARREL LENGTH

MANUFACTURED BY
HOLLINGSWORTH®
(INSULATION COLOR — RED)

 L E C W			BUTTED SEAM	NON-INSULATED	BRAZED SEAM				VINYL	INSULATED			NYLON				
																	
STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	MFGRS. FIT P/N INS. DIA. .160	WALDOM EQUIV. P/N	E	L	MFGRS. FIIG P/N INS. DIA. .146	WALDOM EQUIV. P/N	E	L	PRICE CODE
6	.25	.26	SS20900		SS20900B		.44	.67	SS75047F		.71	.95	SS75048N		.69	.93	A
6	.28	.26	SS20901		SS20901B		.44	.67	SS74051F		.71	.95	SS75049N		.69	.93	A
8	.28	.26	SS20902		SS20902B		.44	.67	SS74052F		.71	.95	SS75050N		.69	.93	A
10	.33	.26	SS20903		SS20903B		.44	.67	SS74053F		.71	.95	SS75051N		.69	.93	A

16-14 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — BLUE)

MAT'L THICK .032

STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	INS. DIA. .195		E	L	INS. DIA. .172		E	L	PRICE CODE
6	.28	.26	SS20816		SS20816B		.44	.67	SS74037F		.71	.95	SS75052N		.69	.93	A
8	.28	.26	SS20817		SS20817B		.44	.67	SS75053F		.71	.95	SS75054N		.69	.93	A
10	.33	.26	SS20818		SS20818B		.44	.67	SS74043F		.71	.95	SS75055N		.69	.93	A

12-10 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — YELLOW)

MAT'L THICK .040

STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	INS. DIA. .265		E	L	INS. DIA. .239		E	L	PRICE CODE
6	.31	.26	SS20828		SS20828B		.53	.78	SS74311F		.83	1.08	SS74202N		.85	1.11	D
8	.31	.26	SS20829		SS20829B		.53	.78	SS74312F		.83	1.08	SS74203N		.85	1.11	D
10	.33	.26	SS20830		SS20830B		.53	.78	SS74313F		.83	1.08	SS74204N		.85	1.11	D

MINI-SPRING SPADE TERMINALS 22-18 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — RED)

MAT'L THICK .032

STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	INS. DIA. .160		E	L	INS. DIA. .146		E	L	PRICE CODE
2	.18	.26	SS22482		SS22482B		.44	.56	SS75037F		.71	.84	SS75038N		.69	.83	A
4	.25	.26	SS22465		SS22465B		.44	.56	SS75039F		.71	.84	SS74045N		.69	.83	A
5	.25	.26	SS22466		SS22466B		.44	.56	SS75040F		.71	.84	SS75041N		.69	.83	A
6	.25	.26	SS22467		SS22467B		.44	.56	SS74056F		.71	.84	SS74047N		.69	.83	A
8	.28	.26	SS22468		SS22468B		.44	.56	SS74057F		.71	.84	SS74048N		.69	.83	A
10	.33	.26	SS22469		SS22469B		.44	.60	SS74058F		.71	.88	SS74049N		.69	.87	A

16-14 WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — BLUE)

MAT'L THICK .032

STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	INS. DIA. .195		E	L	INS. DIA. .172		E	L	PRICE CODE
5	.25	.26	SS22470		SS22470B		.44	.56	SS74042F		.71	.84	SS75043N		.69	.83	A
6	.25	.26	SS22471		SS22471B		.44	.56	SS74040F		.71	.84	SS75044N		.69	.83	A
8	.28	.26	SS22472		SS22472B		.44	.56	SS74038F		.71	.84	SS75045N		.69	.83	A
10	.33	.26	SS22473		SS22473B		.44	.60	SS74039F		.71	.88	SS75046N		.69	.87	A

12-10 AWG WIRE RANGE STANDARD BARREL LENGTH

(INSULATION COLOR — YELLOW)

MAT'L THICK .040

STUD SIZE	W	C	MFGRS. NIT P/N	WALDOM EQUIV. P/N	MFGRS NIT-B P/N	WALDOM EQUIV. P/N	E	L	INS. DIA. .265		E	L	INS. DIA. .239		E	L	PRICE CODE
5	.25	.26	SS22474		SS22474B		.53	.65	SS74314F		.83	.95	SS74071N		.85	.97	D
6	.25	.26	SS22475		SS22475B		.53	.65	SS74315F		.83	.95	SS75063N		.85	.97	D
8	.28	.26	SS22476		SS22476B		.53	.65	SS74316F		.83	.95	SS75064N		.85	.97	D
10	.33	.26	SS22477		SS22477B		.53	.70	SS74317F		.83	1.00	SS75065N		.85	1.03	D

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MANUFACTURED BY
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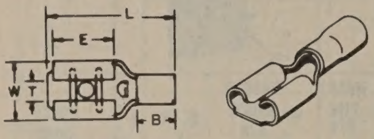
STANDARD FEMALE SLIP-ONS (QUICK DISCONNECTS)

26-24 WIRE RANGE



(INSULATION COLOR—YELLOW)

					NON-INSULATED			VINYL INSULATED NYLON						
					MFGRS. NIT P/N	WALDOM EQUIV. P/N		MFGRS. FIT P/N	WALDOM EQUIV. P/N		MFGRS. FIIG P/N	WALDOM EQUIV. P/N		PRICE CODE
TAB SIZE	W	T	E	B			L	INS. DIA.	.095	L	INS. DIA	.092	L	
.125 X .016	.159	.039	.250	.17	S074715S	(S-1725)	.50	S074855SFN		.68	S074939SN	(N-5725)	.76	AS
.125 X .032	.159	.039	.250	.17	S074718S	(S-1726)	.50	S074858SFN		.68	S074942SN	(N-5726)	.76	AS
.187 X .020	.233	.026	.250	.17	S09202S		.59	S073030FN		.77	S073040SN		.86	AS
.187 X .032	.233	.026	.250	.17	S09197S		.59	S073031FN		.77	S073041SN		.86	AS
.205 X .020	.250	.026	.250	.17	S09192S		.59	S073032FN		.77	S073042SN		.86	AS
.205 X .032	.250	.026	.250	.17	S09186S		.59	S073033FN		.77	S073043SN		.86	AS
.250 X .032	.300	.065	.300	.17	S09181S		.64	S073034FN		.82	S073044SN		.91	AS

22-18 WIRE RANGE

(INSULATION COLOR—RED)

								INS. DIA.	.125		INS. DIA.	.118		
.110 X .020	.144	.035	.250	.17	S01120S		.50	S070887SF		.78	S070850SN		.76	AS
.110 X .032	.144	.035	.250	.17	S01130S		.50	S070889SF		.78	S070851SN		.76	AS
.125 X .020	.159	.040	.250	.17	S09466S		.50	S075012SF		.78	S075013SN		.76	AS
.125 X .032	.159	.040	.250	.17	S09470S		.50	S075014SF		.78	S075015SN		.76	AS
.187 X .020	.233	.026	.250	.17	S09604S		.59	S073060SF		.87	S073070SN		.86	AS
.187 X .032	.233	.026	.250	.17	S09602S		.59	S073061SF		.87	S073071SN		.86	AS
.205 X .020	.250	.026	.250	.17	S09603S		.59	S073062SF		.87	S073072SN		.86	AS
.205 X .032	.250	.026	.250	.17	S09601S		.59	S073063SF		.87	S073073SN		.86	AS
.250 X .032	.300	.065	.300	.17	S09600S	(S-1727)	.64	S073064SF	(T-2727)	.92	S073074SN	(N-5727)	.91	AS

16-14 WIRE RANGE

(INSULATION COLOR—BLUE)

								INS. DIA.	.160		INS. DIA.	.146		
.110 X .020	.144	.035	.250	.17	S01137S		.50	S070897SF		.78	S070873N		.76	AS
.110 X .032	.144	.035	.250	.17	S01144S		.50	S070899SF		.78	S070874N		.76	AS
.125 X .020	.159	.040	.250	.17	S09741S	(SS-1186)	.50	S075016SF	(ST-2186)	.78	S075017N	(SN-5186)	.76	AS
.125 X .032	.159	.040	.250	.17	S09745S	(SS-1728)	.50	S075018SF	(ST-2728)	.78	S075019N	(SN-5728)	.76	AS
.187 X .020	.233	.026	.250	.17	S09704S	(SS-1187)	.59	S073090SF	(ST-2187)	.87	S073100N	(SN-5187)	.86	AS
.187 X .032	.233	.026	.250	.17	S09702S		.59	S073091SF		.87	S073101N		.86	AS
.205 X .020	.250	.026	.250	.17	S09703S		.59	S073092SF		.87	S073102N		.86	AS
.205 X .032	.250	.026	.250	.17	S09701S		.59	S073093SF		.87	S073103N		.86	AS
.250 X .032	.300	.065	.300	.17	S09700S	(SS-1090)	.64	S073094SF	(ST-2090)	.92	S073104N	(SN-5090)	.91	AS

16-12 WIRE RANGE

(INSULATION COLOR—BLUE)

.250 X .032	.300	.175	.300	.17		(SS-1188)*	.85		(ST-2188)*			(SN-5188)*	.85	AT

12-10 WIRE RANGE

(INSULATION COLOR—YELLOW)

.250 X .032	.300	.065	.300	.25	S09176		.74	S075020F		1.04	S073106N		1.06	AT

*Not Manufactured by Hollingsworth

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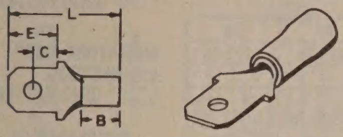
MANUFACTURED BY
HOLLINGSWORTH®

STANDARD MALE SLIP-ONS (QUICK DISCONNECTS)
22-18 WIRE RANGE



(INSULATION COLOR—RED)

TAB SIZE	C	E	B	NON-INSULATED MFGRS. NIT P/N	NON-INSULATED WALDOM EQUIV. P/N	L	VINYL INSULATED MFGRS. FIT P/N	VINYL INSULATED WALDOM EQUIV. P/N		NYLON MFGRS. FIIG P/N	NYLON WALDOM EQUIV. P/N		PRICE CODE
							INS. DIA.		L	INS. DIA.		L	
.110 X .020	.130	.280	.17	S09418S		.58	S074246SF	.124	.81	S074251SN	.118	.85	AU
.187 X .020	.125	.250	.17	S09416S		.55	S073120SF	.124	.78	S073121SN	.118	.82	AU
.187 X .032	.125	.250	.17	S09104S		.62	S073117SF	.160	.84	S073118SN	.146	.88	AU
.187 X .032	.125	.250	.26	S09104		.71	S073142F	.160	.94	S073144N	.146	.98	AU
.205 X .020	.125	.250	.17	S09417S		.55	S073122SF	.124	.78	S073123SN	.118	.80	AU
.205 X .032	.125	.250	.17	S09105S		.62	S073114SF	.160	.78	S073115SN	.146	.80	AU
.205 X .032	.125	.250	.26	S09105		.71	S075059F	.160	.94	S075060N	.146	.98	AU
.250 X .032	.134	.312	.17	S09106S		.67	S073111SF	.160	.90	S073112SN	.146	.93	AU
.250 X .032	.134	.312	.76	S09106		.76	S073143F	.160	1.00	S073145N	.146	1.03	AU

16-14 WIRE RANGE

(INSULATION COLOR—BLUE)

							INS. DIA.		L	INS. DIA.			
.110 X .020	.130	.280	.17	S09352S		.58	S074256SF	.160	.86	S074261SN	.146	.85	AU
.187 X .020	.125	.250	.17	S09350S	(S-1190)	.55	S073135SF	(T-2190)*	.83	S073136SN	(N-5190)*	.82	AU
.187 X .032	.125	.250	.17	S09118S		.62	S073132SF	.195	.90	S073133SN	.172	.88	AU
.187 X .032	.125	.250	.26	S09118		.71	S073146F	.195	.94	S073148N	.172	.98	AU
.205 X .020	.125	.250	.17	S09351S		.55	S073137SF	.160	.83	S073138SN	.146	.80	AU
.205 X .032	.125	.250	.17	S09119S		.62	S073129SF	.195	.90	S073130SN	.172	.80	AU
.205 X .032	.125	.250	.26	S09119		.71	S075061F	.195	.94	S075062N	.172	.98	AU
.250 X .032	.150	.312	.17	S09004S	(S-1089)	.67	S073126SF	(T-2089)†	.95	S073127SN	(N-5089)†	.93	AU
.250 X .032	.150	.312	.26	S09003		.76	S073147F	.195	.99	S073149N	.172	1.03	AU
								*.160 †.195			*.146 †.172		

Hollingsworth NIT Series
(Non-Insulated, Butted Seam)
Waldom S-1000 Series

PRICE SCHEDULE

	100-999 per C	1,000-4,999 per M	5,000-& up per M
A	3.30	21.50	16.10
B	5.20	34.60	26.00
D	4.90	32.20	24.20
E	5.90	38.80	29.10
AS	4.30	28.20	21.20
AT	4.40	29.00	21.80
AU	4.00	26.30	19.70

Hollingsworth NIT-B Series
(Non-Insulated, Brazed Seam)
Waldom B-3000 Series

PRICE SCHEDULE

	100-999 per C	1,000-4,999 per M	5,000-& up per M
A	4.80	31.90	23.90
B	6.95	48.75	36.70
D	7.00	46.60	35.00
E	8.70	61.00	45.90

Hollingsworth FIT Series
(Fixed Insulated Terminal)
Waldom T-2000 Series

PRICE SCHEDULE

	100-999 per C	1,000-4,999 per M	5,000-& up per M
A	7.70	50.90	38.20
B	9.90	65.60	49.20
D	9.80	64.80	48.60
E	10.90	72.40	54.30
AS	8.90	59.10	44.30
AT	14.60	97.20	72.90
AU	8.30	55.20	41.40

Hollingsworth FIIG Series
(Fixed Insulated Insulation Grip)
Waldom N-5000 Series

PRICE SCHEDULE

	100-999 per C	1,000-4,999 per M	5,000-& up per M
A	11.80	78.10	58.60
B	13.90	92.50	69.40
D	14.80	98.10	73.60
E	15.10	100.70	75.50
AS	13.70	91.40	68.60
AT	25.95	182.60	137.45
AU	12.80	85.30	64.00

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NYLON CONNECTORS (MFG. BY MOLEX INC.)

MINIATURE .062″ CONNECTORS DATA

No. of Cir.	1		3		4		5		6		8		9		12		15		24		38	
	1625-1		1625-3		1625-4		1625-5		1625-6		1649-8		1625-9		1625-12		1625-15		1625-24		1772-36	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
A	N/A	N/A	.265	.318	N/A	N/A	.265	N/A	.552	N/A	.330	N/A	.552	.615	.563	.614	.563	.614	.715	.765	.707	.825
B	N/A	N/A	.650	.754	N/A	N/A	.940	N/A	.505	N/A	1.715	N/A	.650	.752	.795	.903	.934	1.042	1.079	1.182	1.677	1.795
C	.203 Dia.		.203		.203		.203		.484		.310		.531		.531		.531		.640		.859	
D	.781		.781		.781		.781		.781		.781		.781		.781		.781		.750		.781	
E	N/A		.203		.203		.203		.484		.220		.484		.484		.484		.500		.687	
F	N/A		.484		.625		.781		.343		1.500		.484		.625		.765		.920		1.515	
G	N/A		.390		.390		.390		.390		.390		.390		.390		.390		.375		.390	
H	N/A		.187		N/A		.187		.375		.312		.375		.375		.375		.500		.562	
I	.203 Dia.		.203		.203		.203		.484		.225		.531		.531		.531		.640		1.015	
J	.750		.750		.750		.750		.750		.750		.750		.750		.750		.750		.750	
K	.296 Dia.		.281		.296		.296		.578		.312		.578		.578		.593		.750		.812	
L	N/A		.484		.625		.781		.343		1.500		.484		.625		.781		.930		1.640	
M	N/A		.578		.734		.875		.453		1.593		.578		.718		.859		1.031		1.640	
N	N/A		.375		.375		N/A		.375		N/A		.375		.375		.375		.375		.375	
O	N/A		.187		N/A		N/A		N/A		N/A		.375		.375		.350		.500		.625	

STANDARD .093″ CONNECTORS DATA

No. of Cir.	1		2		3		4		5		6		9		12		15	
	1619		1545		1396		1490		1653		1261		1292		1360		1375	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P	R	P
A	N/A	N/A	.705	.800	.840	.933	1.038	1.131	N/A	N/A	.718	.750	.828	.937	1.050	1.155	1.240	1.343
B	N/A	N/A	.312	.375	.312	.375	.312	.375	N/A	N/A	.600	.695	.725	.725	.655	.760	.655	.760
C	.234 Dia.		.250		.234		.236		.234		.632		.625		.640		.632	
D	1.000		1.000		1.031		1.000		1.000		1.031		1.031		1.031		1.031	
E	N/A		.250		.234		.236		.234		.632		.625		.640		.632	
F	N/A		.531		.671		.875		1.062		.437		.671		.870		1.067	
G	N/A		.437		.437		.437		.437		.437		.437		.437		.437	
H	N/A		.250		.234		.236		N/A		.562		.562		.562		.562	
I	.241 D.		.250		.234		.250		.250		.734		.634		.634		.632	
J	.968		.968		.968		.968		.968		.968		.968		.968		.968	
K	.358 D.		.352		.338		.338		.343		.640		.734		.734		.734	
L	N/A		.531		.671		.859		1.062		.531		.765		.975		1.169	
M	N/A		.640		.773		.968		1.171		.531		.765		.975		1.169	
N	N/A		.421		.421		.421		.421		.421		N/A		.421		.421	
O	N/A		.250		.234		.250		N/A		.562		.562		.562		.562	

Dimensions subject to nominal variation. N/A — Not Applicable.

ORDER DATA

WALDOM MINIATURE NYLON CONNECTOR HOUSINGS .062″ PIN DIA. — 250 VOLTS PER CIRCUIT

PLUG OR RECEPTACLE				PLUG CONFIGURATION ONLY			RECEPTACLE CONFIGURATION ONLY			
No. of Cirs.	Amps Per Cir.	Std. Pack-age	Eng. P/N New No. Shown ( )	With Mounting Ears	Without Mounting Ears	Per Pkg.	Eng. P/N New No. Shown ( )	With Holding Tabs	With Mtg. Ears and Holding Tabs	Per Pkg.
1	5	10	1625-1	—	P (03-06-2011)	1.00	1625-1	R (03-06-1011)	—	.85
3	5	10	1625-3	P (03-06-2031)	P1 (03-06-2032)	1.70	1625-3	R1 (03-06-1032)	R (03-06-1031)	1.95
4	5	10	1625-4	P (03-06-2041)	P1 (03-06-2042)	3.85	1625-4	R1 (03-06-1042)	R (03-06-1041)	3.80
5	5	5	1625-5	P (03-06-2054)	P1 (03-06-2055)	1.25	1625-5	—	R (03-06-1055)	1.65
6	5	5	1625-6	P (03-06-2062)	P1 (03-06-2061)	1.20	1625-6	—	R (03-06-1061)	1.40
8	5	5	1649-8	—	P (03-06-2081)	1.00	1649-8	—	R (03-06-1081)	1.25
9	5	5	1625-9	P (03-06-2091)	P1 (03-06-2092)	1.30	1625-9	R1 (03-06-1092)	R (03-06-1091)	1.50
12	5	5	1625-12	P (03-06-2121)	P1 (03-06-2122)	1.35	1625-12	R1 (03-06-1122)	R (03-06-1121)	1.55
15	5	5	1625-15	P (03-06-2151)	P1 (03-06-2152)	2.20	1625-15	R1 (03-06-1152)	R (03-06-1151)	2.55
24	4	5	1625-24	P (03-06-2241)	P1 (03-06-2242)	3.30	1625-24	R1 (03-06-1242)	R (03-06-1241)	3.45
36	4	5	1772-36	P (03-06-2361)	P1 (03-06-2362)	3.75	1772-36	—	R (03-06-1361) R1 (03-06-1362)†	3.90

WALDOM STANDARD NYLON CONNECTOR HOUSINGS .093″ PIN DIA. — 250 VOLTS PER CIRCUIT

1	12	10	1619P	—	P (03-09-2011)	1.00	1619R	R (03-09-1011)	—	.85
2	12	10	1545P	P (03-09-2021)	P1 (03-09-2022)	1.95	1545R	R1 (03-09-1022)	R (03-09-1021)	2.00
3	12	10	1396P	P (03-09-2031)	P1 (03-09-2032)	1.70	1396R	R1 (03-09-1032)	R (03-09-1031)	1.70
4	9	10	1490P	P (03-09-2041)	P1 (03-09-2042)	2.40	1490R	R1 (03-09-1042)	R (03-09-1041)	2.45
5	9	5	1653P	—	P (03-09-2052)	1.40	1653R	R (03-09-1052)	—	1.75
6	9	5	1261P	P (03-09-2061)	P1 (03-09-2062)	1.55	1261R	R2 (03-09-1063)	R (03-09-1061)	1.60
9	9	5	1292P	P (03-09-2091)	P1 (03-09-2092)	1.65	1292R	R3 (03-09-1094)	R (03-09-1091) R2 (03-09-1093)†	1.70
12	7.5	5	1360P	P1 (03-09-2122)	P (03-09-2121)	1.65	1360R	—	R (03-09-1121) R1 (03-09-1122)†	1.85
15	7.5	5	1375P	P2 (03-09-2152)	P (03-09-2151)*	2.60	1375R	—	R (03-09-1151)	2.95

* With Pull Tabs only. † Without Mounting Ears and Holding Tabs.

STRAIN RELIEF (2 PCS. REQUIRED PER PLUG OR RECEPTACLE)

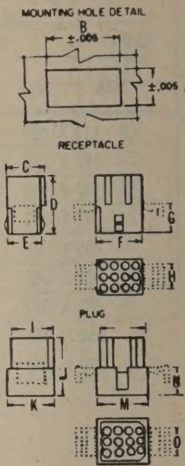
Eng. P/N	New P/N	Used With	"A" I.D.	Std. Pkg.	Per Pkg.
SD-1815	15-04-0201	15 Cir. .062″	.230″	10	3.50
SD-1864-415	15-04-0202	36 Cir. .062″	.500″	10	3.75

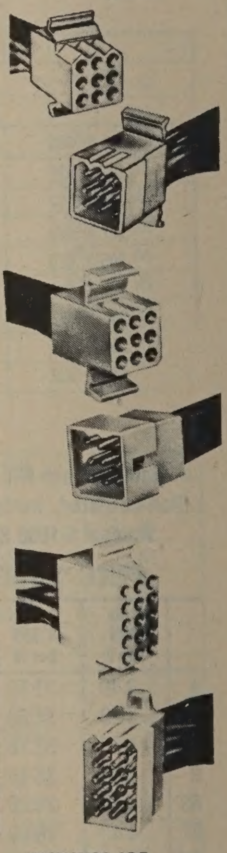
Maximum Panel Thickness For Mounting Ears:
.062″ Series........ .060″ (1.5mm)
.093″ Series........ .093″ (2.4mm)

Engineering Part Nos. are to be used as a Reference No. only. Order by proper 8 digit Part No. shown.

STANDARD .093″ CONNECTORS
(.198″ GRID PATTERN)

MINIATURE .062″ CONNECTORS
(.145″ GRID PATTERN)





HOUSINGS ARE SUPPLIED LESS TERMINALS

These items are manufactured by Molex Incorporated

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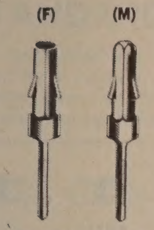
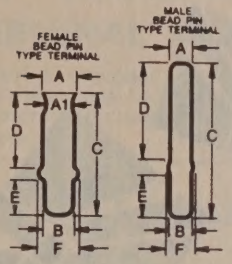
waldom

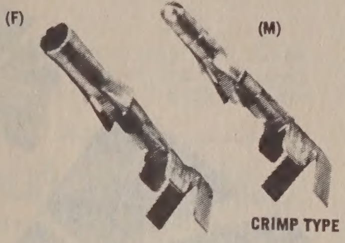
CRIMP & P.C. TERMINALS (MFG. BY MOLEX INC.)



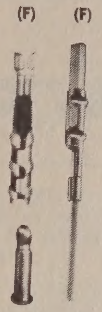
PRINTED CIRCUIT TAIL



STANDARD PACKAGE OF 100 PIECES



CRIMP TYPE



CLASPCON

Part	Body Dia. A Outside	Body Dia. A-1 Inside	Staking Dia. B	Overall Length C	Contact Length D	Staking Length E	Bead Dia. F	Bead Terminal Part No.
Female Bead-type terminal (mates with 1560 and 1854 Miniature .062 Male Terminal).	.093	.060	.083	.365	.210	.125	.110	M93-102
Male Bead-type terminal (mates with 1561 and 1855 Miniature .062 Female Terminal).	3 varieties	.062	.062	.435	.280	.125	.090	R62-3
		.062	.062	.555	.400	.125	.090	R62-4
		.062	.062	.455	.280	.145	.100	R62-5
Female Bead-type terminal (mates with 1190, 1380 & 1434 Standard .093 Male Terminal).	.118	.089	.093	.420	.234	.140	.150	M118-95A
Male Bead Pin-type terminal (mates with 1189, 1381 & 1433 Standard .093 Female Terminal).	2 varieties	.093	.093	.592	.437	.109	.125	R93-12
		.093	.093	.592	.437	.169	.125	R93-31

PROTOTYPE HAND TOOL

HT-1919 — $8.95 each
HT-1921 — $8.95 each

Eng. No.	New P/N	Type	Mating Dia.	Style	Wire Range	Per Pkg.	Prototype Hand Tool	Manual Prod. Tool
1189	02-09-1103	F	.093	Crimp	18-14	4.30	HT-1919	HTR-1031-C
1190	02-09-2103	M	.093	Crimp	18-14	4.30	HT-1919	HTR-1031-C
1381	02-09-1118	F	.093	Crimp	24-18	4.30	HT-1919	HTR-1031-C
1380	02-09-2118	M	.093	Crimp	24-18	4.30	HT-1919	HTR-1031-C
1433	02-09-1143	F	.093	Crimp	30-22	4.30	HT-1921	HTR-2262
1434	02-09-2143	M	.093	Crimp	30-22	4.30	HT-1921	HTR-2262
1377	02-09-1133	F	.093	P.C. Tail	—	3.25	—	—
1376	02-09-2133	M	.093	P.C. Tail	—	3.25	—	—
1881-2	02-08-1102	F	.093	Crimp	28-16	4.60	HT-1919	HTR-1031-C
1561	02-06-1103	F	.062	Crimp	22-18	4.65	HT-1921	HTR-2262
1560	02-06-2103	M	.062	Crimp	22-18	4.65	HT-1921	HTR-2262
1855	02-06-1132	F	.062	Crimp	30-22	4.65	HT-1921	HTR-2262
1854	02-06-2132	M	.062	Crimp	30-22	4.65	HT-1921	HTR-2262
1929	02-05-1105	F	.062	Crimp	22-18	4.00	HT-1921	HTR-2262
M-93-102	M-93-102	F	.093	Bead Chain	—	1.80	—	—
R-93-12	R-93-12	M	.093	Bead Chain	—	1.80	—	—
R-93-31	R-93-31	M	.093	Bead Chain	—	1.80	—	—
M-118-95A	M-118-95A	F	.093	Bead Chain	—	1.85	—	—
R-62-3	R-62-3	M	.062	Bead Chain	—	1.80	—	—
R-62-4	R-62-4	M	.062	Bead Chain	—	1.85	—	—
R-62-5	R-62-5	M	.062	Bead Chain	—	1.80	—	—

F — Female. M — Male.

Engineering Part Nos. are to be used as a Reference No. only. Order by proper 8 digit Part No. shown.

PRODUCTION TOOL

HTR-1031-C — $75.00 each
HTR-2262 — $75.00 each

DESIGNER KITS

The MINIATURE SERIES No. WM-72 (using .062″ pin terminals) Designer Kit contains parts to assemble male and female connector housing from SINGLE-CIRCUIT to 36-CIRCUIT COMPLETE CONNECTORS. (Total of 56 Connectors.) Includes crimping tool and pin terminal ejector tool. WM-72 Kit Each $34.95.

A must for every creative designer, repairman and experimenter . . . as modern as today's circuitry. Eliminates need of searching for proper connectors or tools — everything is under one lid. This polarized Nylon Connector Designers Kit comes with all circuit capacities, complete with Male and Female housings, terminals and crimp tool. Separated in individual compartments, each connector element is numbered and described, enabling you to re-order when running low.

This light-weight, unbreakable kit closes with a snap-lock to avoid spills and mix-ups. Each kit contains a prototype hand crimping tool, specially balanced and weighted for ease of operation. Machined from hardened-steel, this tool provides excellent, uniform crimps every time. It also cuts and strips wire. Each kit also contains a special terminal ejector tool, and detailed crimping instructions permanently affixed and mar-proof.

WALDOM also produces a Designer Kit in the STANDARD SERIES No. WM-50 (using .093″ pin terminals). Similarly, it has all the elements and tools necessary to make up standard connectors in all sizes. (Single circuit to 15 circuits in the standard series.) Total of 45 complete connectors.

WM-50 KIT EACH $29.95

These items are manufactured by Molex Incorporated

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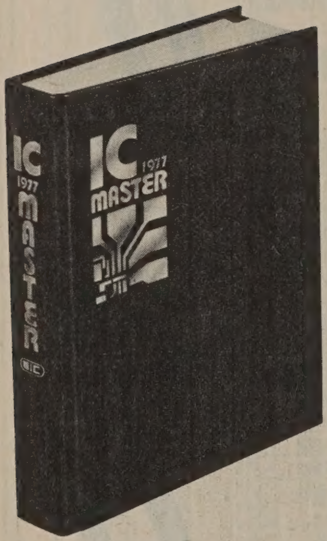
THE NEW 1977 IC MASTER PAYS OFF!



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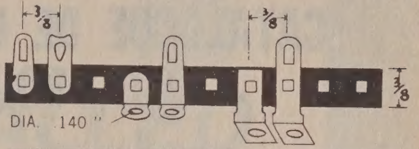
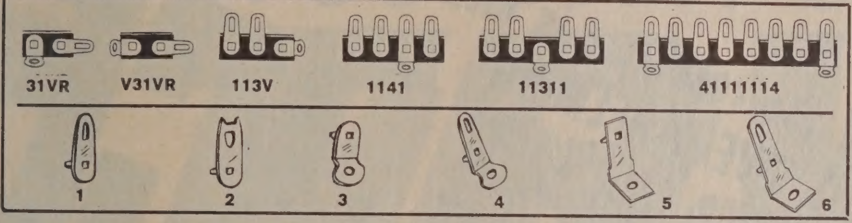
STANDARD TERMINAL STRIPS

Our new automatic machinery is equipped to meet every terminal strip need. Some of the most popular numbers are shown below. Other combinations are available upon request. Brass or steel cadmium plated lugs are firmly locked into a 1/16″ thick bakelite. Spacing between lug centers is 3/8″.





Where layouts or blue prints are not readily available, orders can be filled by simple use of our Part Numbers.

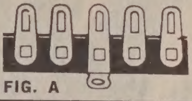
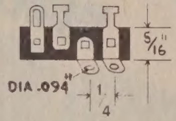


FIG. A

Example — Fig. A contains Lug No. 1 and Bracket No. 4. Specify Item No. 11411.

MINIATURE INSULATED TERMINAL STRIPS

Miniature terminal strips are recommended for all applications where space is a factor. These strips are made of the same materials as the standard terminal strips described above except smaller. Strips are 1/16″ by 5/16″ wide grade XP laminated phenolic with brass lugs securely eyeletted in position. Lugs are supplied in any of the finishes used on the standard series with the insulation likewise available in a choice of materials and finishes.



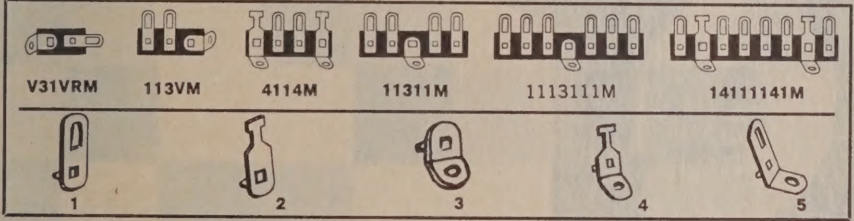
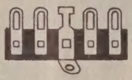
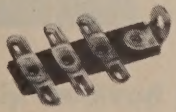


FIG. B



Example — Fig. B contains Lug No. 1 and Bracket No. 4 Specify Item No. 11411M.

"T" TYPE TERMINAL STRIPS



Lugs: Steel cadmium plated spaced 3/8″ centers.

Strips: XP Bakelite — 3/8″ wide x .062″ thick.

Mount: 140 I.D. for No. 6 screw.

Can be supplied in any length or to any specification.

ALSO AVAILABLE IN MINIATURE

Lugs: Brass cadmium plated 1/4″ centers.

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76-35
(2 1/16″ center)

76-35CC
(2″ center)

PHONO JACKS

Available with insulating washers.

375
(also available:
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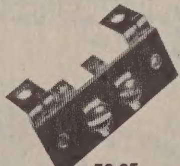
350

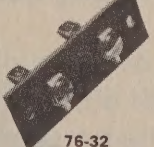
360

BINDING POST BOARDS — STANDARD & HEAVY DUTY

76-4



76-25



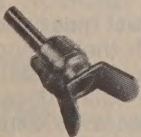
76-32

88-3

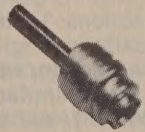
Binding post boards are manufactured to standard and custom specifications. Standard range from 1 to 10 lug positions in 7/16″ spacing. Screws are 6/32″ x 3/8″ binding head cadmium or nickel plated. Heavy duty range from 1 to 12 lug positions in 1/2″ spacing. Screws are 8/32″ x 5/16″ binding head nickel plated.

PHONO PLUGS AND JACKS

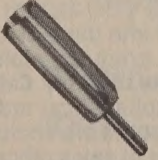
Largest selection of types manufactured.



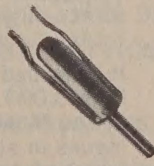
332G Short Pin
333G Long Pin



332 Short Pin
333 Long Pin



400 (Motorola type)



400-1 (Motorola type)

400-3 (Motorola type)

500 (Motorola type)

500-1 (Motorola type)

500-2 (Motorola type)

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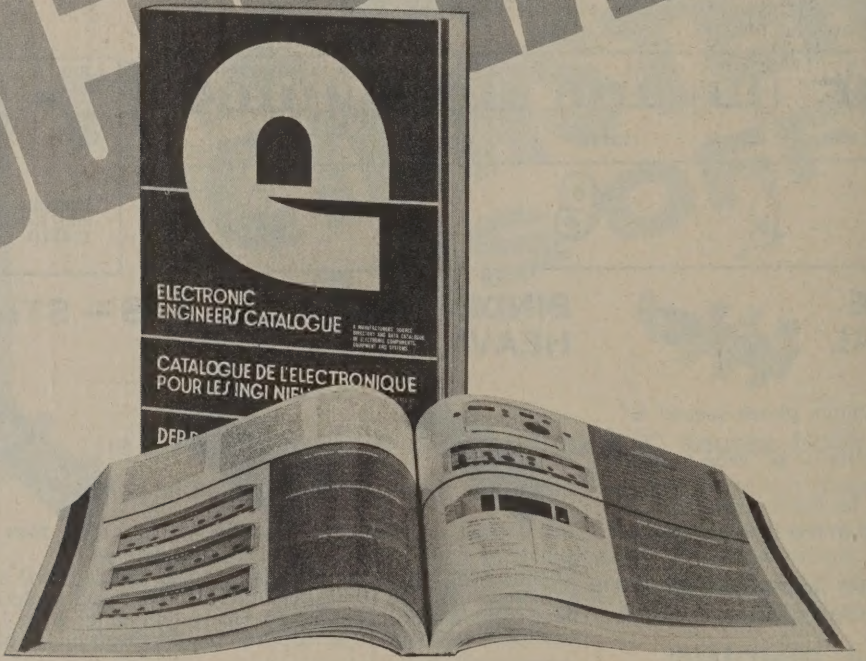
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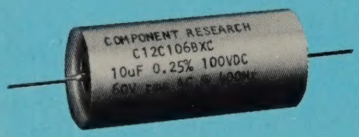
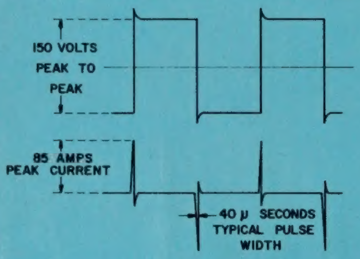


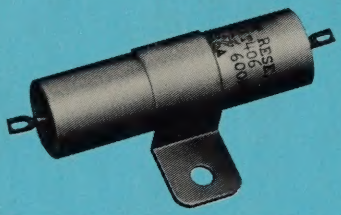
MIL-C-83421/1 QUALIFIED (SUPERMETALLIZED)

40 KHz AC rated, metallized polycarbonate capacitors qualified to MIL-C-83421/1 and MIL-C-39022/9C are available from stock. Because of superior performance they are titled "SUPERMETALLIZED." They are 100% reliability screened. For the Trident program, 30 VDC rated capacitors receive 168 hours of AC burn-in at 22 Vrms, 40 KHz, and 100°C.

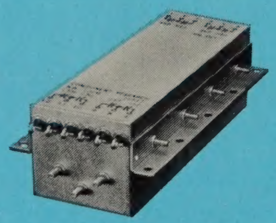


Component Research Company developed this AC dielectric withstanding test for use in MIL-C-39022/9 which was then superseded by MIL-C-83421/1. This test assists in early detection of abnormally high dissipation factor and high ESR. The voltage square wave when applied to each capacitor proves the ability of the terminations to withstand relatively high peak and RMS current.

Typical voltage and peak current waveforms shown at left for A12B106, 10 μF, 50 V, metallized polycarbonate capacitor during the one minute AC square wave screening at 100 Hz.

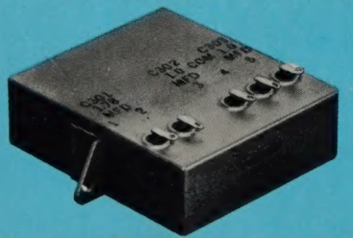


The .033 μF polystyrene capacitor shown can handle 300 Vrms at 25 KHz and fits in a 0.562" x 1.875" metal case. The capacitor features: high Q, tight capacitance tolerance and drift, and low controlled temperature coefficient. Additional configurations are available which are smaller in size and have higher AC current ratings.



This polystyrene capacitor network contains 8 precisely matched 1.2 μF sections. Each capacitor section is capable of operating with 170 Vrms applied at 25 KHz, with low heat rise. This network is one of many critical components supplied by Component Research Company for major weapons systems.

Component Research Company foil-polypropylene capacitors are used for various AC applications. This capacitor network is used in a weapons system where utmost reliability is required. Lower cost types can also be supplied for industrial applications with complete AC rating information.



In 1965 Component Research Company developed this precision metallized capacitor network for very accurate guidance and control of a sophisticated missile system. These networks are still being purchased annually due to their superb proven performance in field use. Their unique characteristics are: high insulation resistance, low dielectric absorption, low temperature coefficient, and low noise during environmental exposure.

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